



POWER PROTECTION

Series 600 UPS

**Single Module Three Phase
338 kVA to 1000 kVA; 60 Hz**

**Installation
Manual**

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IMPORTANT SAFETY INSTRUCTIONS

Save These Instructions.

This manual contains important instructions that should be followed during installation of your Series 600 UPS and batteries.



WARNING

EXERCISE EXTREME CARE WHEN HANDLING UPS CABINETS TO AVOID EQUIPMENT DAMAGE OR INJURY TO PERSONNEL. THE UPS MODULE WEIGHT RANGES FROM 8400 POUNDS (3810 KG) TO 17650 POUNDS (7460 KG).

LOCATE CENTER OF GRAVITY SYMBOLS BEFORE HANDLING EACH CABINET. TEST LIFT AND BALANCE THE CABINETS BEFORE TRANSPORTING. MAINTAIN MINIMUM TILT FROM VERTICAL AT ALL TIMES.

MODULES HAVE HOLES INTENDED FOR RIGGING BARS OR CHAINS. PREVENT CHAINS OR CABLES FROM CONTACTING CABINET BY USING SPREADER BAR AND ADEQUATE PADDING.

UNITS ARE SUPPLIED WITH BOLT-ON BRACKETS FOR USE WITH FORKLIFT. RECTANGULAR HOLES ARE PROVIDED FOR USE WITH ROL-A-LIFTS.

FOLLOW ALL BATTERY SAFETY PRECAUTIONS WHEN INSTALLING, CHARGING, OR SERVICING BATTERIES. IN ADDITION TO THE HAZARD OF ELECTRIC SHOCK, GAS PRODUCED BY BATTERIES CAN BE EXPLOSIVE AND SULFURIC ACID CAN CAUSE SEVERE BURNS.

IN CASE OF FIRE INVOLVING ELECTRICAL EQUIPMENT, ONLY CARBON DIOXIDE FIRE EXTINGUISHERS, OR THOSE APPROVED FOR USE IN ELECTRICAL FIRE FIGHTING, SHOULD BE USED.

EXTREME CAUTION IS REQUIRED WHEN PERFORMING MAINTENANCE.

BE CONSTANTLY AWARE THAT THE UPS SYSTEM CONTAINS HIGH DC AS WELL AS AC VOLTAGES.

CHECK FOR VOLTAGE WITH BOTH AC AND DC VOLTMETERS PRIOR TO MAKING CONTACT.



WARNING

**LOCATE CENTER OF GRAVITY SYMBOLS
AND DETERMINE UNIT WEIGHT
BEFORE HANDLING CABINET.**



If you require assistance for any reason, call the toll-free Liebert Customer Service & Support number; 1-800-543-2378. For CS&S to assist you expediently, please have the following information available:

Part Number: _____

Serial Number: _____

kVA Rating: _____

Date Purchased: _____

Date Installed: _____

Location: _____

Input Voltage: _____

Output Voltage: _____

Battery Reserve Time: _____

1.0 SAFETY PRECAUTIONS

Read this manual thoroughly, paying special attention to the sections that apply to you, before working with the UPS. Retain this section for use by installing personnel.

Under typical operation and with all UPS doors closed, only normal safety precautions are necessary. The area around the UPS system should be kept free from puddles of water, excess moisture, or debris.

Special safety precautions are required for procedures involving handling, installation, and maintenance of the UPS system or the battery. Observe all safety precautions in this manual before handling or installing the UPS system. Observe all safety precautions in the **Operation and Maintenance Manual**, before as well as during performance of all maintenance procedures. Observe all battery safety precautions before working on or near the battery.

This equipment contains several circuits that are energized with high voltage. Only test equipment designated for troubleshooting should be used. This is particularly true for oscilloscopes. Always check with an AC and DC voltmeter to ensure safety before making contact or using tools. Even when the power is turned Off, dangerously high potentials may exist at the capacitor banks and at the batteries.

ONLY qualified service personnel should perform maintenance on the UPS system. When performing maintenance with any part of the equipment under power, service personnel and test equipment should be standing on rubber mats. The service personnel should wear insulating shoes for isolation from direct contact with the floor (earth ground).

Unless all power is removed from the equipment, one person should never work alone. A second person should be standing by to assist and summon help in case an accident should occur.

Three types of messages are used throughout the manual to stress important text. Carefully read the text below each Warning, Caution, and Note and use professional skills and prudent care when performing the actions described by that text.

A **Warning** signals the presence of a possible serious, life-threatening condition. For example:



WARNING

LETHAL VOLTAGES MAY BE PRESENT WITHIN THIS UNIT EVEN WHEN IT IS APPARENTLY NOT OPERATING. OBSERVE ALL CAUTIONS AND WARNINGS IN THIS MANUAL. FAILURE TO DO SO COULD RESULT IN SERIOUS INJURY OR DEATH. DO NOT WORK ON OR OPERATE THIS EQUIPMENT UNLESS YOU ARE FULLY QUALIFIED TO DO SO!! NEVER WORK ALONE.

A **Caution** indicates a condition that could seriously damage equipment and possibly injure personnel. For example:



CAUTION

Extreme care is necessary when removing shoring braces. Do not strike the cabinet with hammers or other tools.

A **Note** emphasizes important text. If the note is not followed, equipment could be damaged or may not operate properly. For example:



NOTE

If the UPS system has a blown fuse, the cause should be determined before you replace the fuse. Contact Liebert Customer Service and Support.




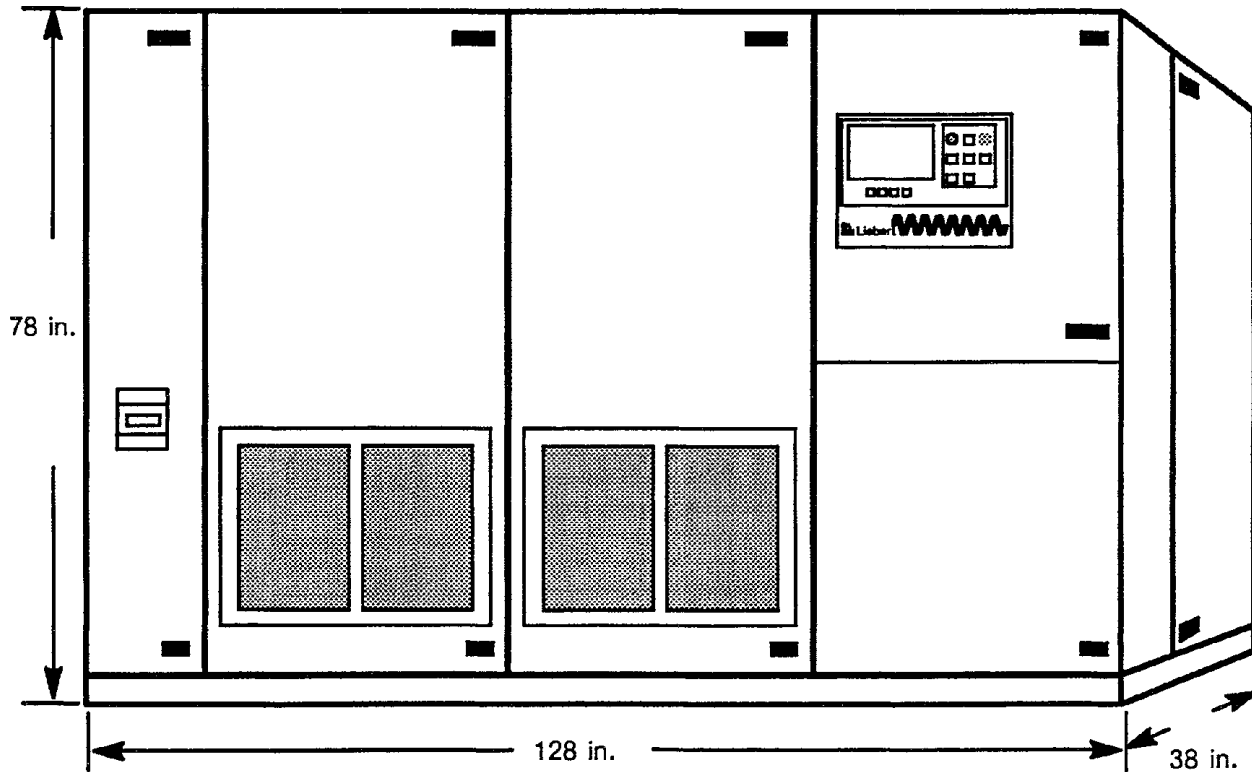
WARNING
LOCATE CENTER OF GRAVITY SYMBOLS 
AND DETERMINE UNIT WEIGHT
BEFORE HANDLING CABINET.

Figure 1 Single Module 338 kVA UPS



Each UPS module is shipped as two or three separate cabinets for easier handling. Refer to the Shipping Split Detail drawing for dimensions and weights of your units.

2.0 INSTALLATION CONSIDERATIONS

Install your Series 600 UPS in accordance with the submittal drawing package and the following procedures.

A Liebert authorized representative must perform the initial system check-out and start-up to ensure proper system operation. Equipment warranties will be voided unless system start-up is performed by a Liebert authorized representative. Contact your local Liebert sales representative or Liebert Customer Service and Support at **1-800-543-2378** to arrange for system start-up.



CAUTION

Read this manual thoroughly before attempting to wire or operate the unit. Improper installation is the most significant cause of UPS start-up problems.

Do not install this equipment near gas or electric heaters. It is preferable to install the UPS in a restricted location to prevent access by unauthorized personnel.

1. Proper planning will speed unloading, location, and connection of the UPS. **Refer to Figure 3 through Figure 48 and Appendix A - Series 600 UPS Site Planning Data.**
2. Use the shortest output distribution cable runs possible, consistent with logical equipment arrangements and with allowances for future additions if planned.
3. Recommended ambient operating temperature is 25°C (77°F). Relative humidity must be less than 95%, non-condensing. Note that room ventilation is necessary, but air conditioning may not be required. Maximum ambient operating temperature is 40°C (104°F). The batteries should not exceed 25°C (77°F). At elevations above 4,000 feet (1219 meters) derating may be required (consult your Liebert sales representative).
4. Even though your Liebert UPS unit is at least 91% efficient, the heat output is substantial. For more specific information, see **Appendix A - Series 600 UPS Site Planning Data**. Be sure environmental conditioning systems can accommodate this BTU load, even during utility outages.
5. The routing (inside the facility) to the installation site, as well as the floor at the final equipment location, must be capable of supporting the cabinet weight and the weight of any moving equipment. The modules weigh between 8400 and 17550 pounds. Refer to **Appendix A - Series 600 UPS Site Planning Data**.
6. Plan the routing to ensure that the unit can move through all aisleways, doorways, and around corners without risking damage.



CAUTION

Observe all battery safety precautions when working on or near the battery.

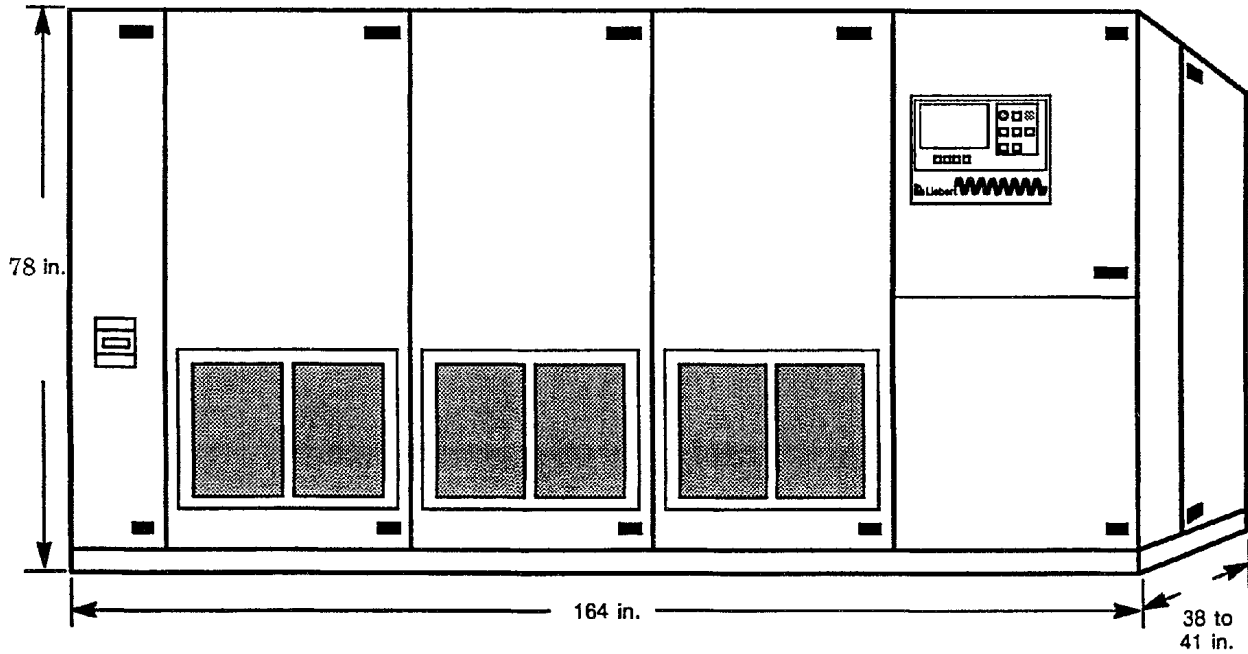


WARNING

**LOCATE CENTER OF GRAVITY SYMBOLS
AND DETERMINE UNIT WEIGHT
BEFORE HANDLING CABINET.**



Figure 2 Single Module 400 to 1000 kVA UPS



Cabinet depth of 400 and 500 kVA modules is 38 inches.
Cabinet depth of 625 and 750 (HL) kVA modules is 41 inches.

Refer to drawings for 208 VAC dimensions (338 to 500 kVA)
and for 750 (LL) and 1000 kVA modules (not shown).

Each UPS module is shipped as two or three separate cabinets for easier handling.
Refer to the Shipping Split Detail drawing for dimensions and weights of your units.

3.0 UNLOADING AND HANDLING

The UPS module is shipped as separate cabinets to allow easy handling at the site. Because the weight distribution in the cabinets is uneven, use extreme care during handling and transport.



WARNING

ONLY QUALIFIED PERSONNEL SHOULD HANDLE THIS EQUIPMENT. EXERCISE EXTREME CARE WHEN HANDLING UPS CABINETS TO AVOID EQUIPMENT DAMAGE OR INJURY TO PERSONNEL. THE UPS MODULE WEIGHT RANGES FROM 8400 POUNDS TO 17650 POUNDS.

LOCATE CENTER OF GRAVITY SYMBOLS BEFORE HANDLING CABINET. TEST LIFT AND BALANCE THE CABINET BEFORE TRANSPORTING. MAINTAIN MINIMUM TILT FROM VERTICAL AT ALL TIMES.

HOLES IN THE BOTTOM OF THE UNIT ARE INTENDED FOR USE WITH RIGGING BARS OR CHAINS. PREVENT CHAINS OR CABLES FROM CONTACTING CABINET BY USING SPREADER BAR AND ADEQUATE PADDING. UNITS ARE SUPPLIED WITH BOLT-ON BRACKETS FOR USE WITH FORKLIFT. RECTANGULAR HOLES ARE PROVIDED FOR USE WITH ROL-A-LIFTS.

To reduce the possibility of shipping damage, cabinets are shored with 2x4 bracing, secured with screw-type nails. This shoring must be carefully removed prior to unloading.



CAUTION

Extreme care is necessary when removing shoring braces. Do not strike cabinet with hammers or other tools.

4.0 INSPECTIONS

4.1 External Inspections

1. While the UPS system is still on the truck, inspect the equipment and shipping container(s) for any signs of damage or mishandling. Do not attempt to install the system if damage is apparent. If any damage is noted, file a damage claim with the shipping agency within 24 hours and contact Liebert Customer Service and Support at 1-800-543-2378 to inform them of the damage claim and the condition of the equipment.
2. Locate the bag containing the keys for the front access door. The bag is attached to the cabinet.
3. Compare the contents of the shipment with the bill of lading. Report any missing items to the carrier and to Liebert Customer Service and Support immediately.
4. Check the nameplate on the cabinet to verify that the model number corresponds with the one specified. Record the model number and serial number in the front of this installation manual. A record of this information is necessary should servicing become required.

4.2 Internal Inspections

1. Verify that all items have been received.
2. If spare parts were ordered, verify arrival.
3. Open doors and remove cabinet panels to check for shipping damage to internal components.
4. Check for loose connections or unsecured components in the cabinet(s).
5. Check for installation of circuit breaker line safety shields. There should be no exposed circuit breaker terminals when the cabinet doors are opened.
6. Check for any unsafe condition that may be a potential safety hazard.
7. UPS modules are shipped with internally mounted shipping brackets. The shipping brackets (painted orange) must be removed.

5.0 EQUIPMENT LOCATION

1. Handle cabinets in accordance with **WARNINGS** in **3.0 - Unloading and Handling**. Use a suitable material handling device to move each cabinet to its final location. **Exercise extreme care because of the uneven weight distribution.**
2. Carefully lower the cabinets to the floor and position them for cabinet interconnection.
3. Verify that the UPS system is installed in a clean, cool and dry location.
4. Installation and serviceability will be easier if adequate access is provided on all sides of the equipment, but only access to the front and right side is required.
 - a. Verify that there is adequate clearance to open cabinet doors. See drawings and local codes (4 feet is recommended).
 - b. Verify that there is adequate area in front of circuit breakers to perform maintenance. Check installation drawings for location of breakers. Check with local codes.
 - c. Verify that there is adequate clearance above all cabinets to allow exhaust air to flow without restriction (2 feet minimum, unobstructed).
5. Connect the cabinets, internal cables, and bus bars. Refer to the Shipping Split Details (**Figure 19** to **Figure 26**) and other drawings.

6.0 BATTERIES

6.1 Battery Safety Precautions

Installation and servicing of batteries should be performed or supervised by personnel knowledgeable of batteries and the required precautions. Keep unauthorized personnel away from batteries.

When replacing batteries, use the same number and type of batteries.



CAUTION

Lead-acid batteries contain hazardous materials. Batteries must be handled, transported, and recycled or discarded in accordance with federal, state, and local regulations. Because lead is a toxic substance, lead-acid batteries should be recycled rather than discarded.

Do not open or mutilate the battery or batteries. Released electrolyte is harmful to the skin and eyes. It may be toxic. Do not dispose of battery or batteries in a fire. The battery may explode.

A battery can present a risk of electrical shock and high short circuit current. The following precautions should be observed when working on batteries

- 1. Remove watches, rings, or other metal objects.**
- 2. Use tools with insulated handles.**
- 3. Wear rubber gloves and boots.**
- 4. Do not lay tools or metal parts on top of batteries.**
- 5. Disconnect charging source prior to connecting or disconnecting battery terminals.**
- 6. Determine if battery is inadvertently grounded. If inadvertently grounded, remove source of ground. Contact with any part of a grounded battery can result in electrical shock. The likelihood of such shock will be reduced if such grounds are removed during installation and maintenance.**

Lead-acid batteries can present a risk of fire because they generate hydrogen gas. The following procedures should be followed:

- 1. DO NOT SMOKE when near batteries.**
- 2. DO NOT cause flame or spark in battery area.**
- 3. Discharge static electricity from body before touching batteries by first touching a grounded metal surface.**

Battery Safety Precautions in French Per CSA Requirements

Instructions Importantes Concernant La Sécurité

Conserver Ces Instructions



ADVERTISSEMENT

DES PIÈCES SOUS ALIMENTATION SERONT LAISSÉES SANS PROTECTION DURANT CES PROCÉDURES D'ENTRETIEN. UN PERSONNEL QUALIFIÉ EST REQUIS POUR EFFECTUER CES TRAVAUX.

LES FUSIBLES A C.C. DE LA BATTERIE D'ACCUMULATEURS OPÈRENT EN TOUT TEMPS A LA TENSION NOMINALE. LA PRÉSENCE D'UN FUSIBLE A C.C. BRÛLE INDIQUE UN PROBLÈME SÉRIEUX. LE REMPLACEMENT DE CE FUSIBLE, SANS AVOIR DÉTERMINÉ LES RAISONS DE LA DÉFECTUOSITÉ, PEUT ENTRAÎNER DES BLESSURES OU DES DOMMAGES SÉRIEUX À L'ÉQUIPEMENT. POUR ASSISTANCE, APPELER LE DÉPARTEMENT DE SERVICE À LA CLIENTÈLE DE LIEBERT.



DANGER

Les accumulateurs plomb-acide contiennent de la matière comportant un certain risque. Les accumulateurs doivent être manipulés, transportés et recyclés ou éliminés en accord avec les lois fédérales, provinciales et locales. Parce que le plomb est une substance toxique, les accumulateurs plomb-acide devraient être recyclés plutôt qu'éliminés.

Il ne faut pas brûler le ou les accumulateurs. L'accumulateur pourrait alors exploser.

Il ne faut pas ouvrir ou endommager le ou les accumulateurs. L'électrolyte qui pourrait s'en échapper est dommageable pour la peau et les yeux.

Un accumulateur représente un risque de choc électrique et de haut courant de court-circuit. Lorsque des accumulateurs sont manipulés, les mesures préventives suivantes devraient être observées:

1. Retirer toutes montres, bagues ou autres objets métalliques.
2. Utiliser des outils avec manchon isolé.
3. Porter des gants et des bottes de caoutchouc.
4. Ne pas déposer les outils ou les pièces métalliques sur le dessus des accumulateurs.
5. Interrompre la source de charge avant de raccorder ou de débrancher les bornes de la batterie d'accumulateurs.
6. Déterminer si l'accumulateur est mis à la terre par erreur. Si oui, défaire cette mise à la terre. Tout contact avec un accumulateur mis à la terre peut se traduire en un choc électrique. La possibilité de tels chocs sera réduite si de telles mises à la terre sont débranchées pour la durée de l'installation ou de l'entretien.

Les accumulateurs plomb-acide présentent un risque d'incendie parce qu'ils génèrent des gaz à l'hydrogène. Les procédures suivantes devront être respectées.

1. **NE PAS FUMER** lorsque près des accumulateurs.
2. **NE PAS** produire de flammes ou d'étincelles près des accumulateurs.
3. Décharger toute électricité statique présente sur votre corps avant de toucher un accumulateur en touchant d'abord une surface métallique mise à la terre.



DANGER

L'électrolyte est un acide sulfurique dilué qui est dangereux au contact de la peau et des yeux. Ce produit est corrosif et aussi conducteur électrique. Les procédures suivantes devront être observées:

1. Porter toujours des vêtements protecteurs ainsi que des lunettes de protection pour les yeux.
2. Si l'électrolyte entre en contact avec la peau, nettoyer immédiatement en rinçant avec de l'eau.
3. Si l'électrolyte entre en contact avec les yeux, arroser immédiatement et généreusement avec de l'eau. Demander pour de l'aide médicale.
4. Lorsque l'électrolyte est renversée, la surface affectée devrait être nettoyée en utilisant un agent neutralisant adéquat. Une pratique courante est d'utiliser un mélange d'approximativement une livre (500 grammes) de bicarbonate de soude dans approximativement un gallon (4 litres) d'eau. Le mélange de bicarbonate de soude devra être ajouté jusqu'à ce qu'il n'y ait plus apparence de réaction (mousse). Le liquide résiduel devra être nettoyé à l'eau et la surface concernée devra être asséchée.

6.2 Battery Installation

A remote battery disconnect switch with overcurrent protection is required per the National Electrical Code. A disconnecting means (per UL1778) such as a module battery disconnect or battery isolation switch should be provided for each parallel string of batteries. Refer to **Figure 46** and **Figure 47**. Contact your Liebert sales representative regarding this option.

1. Install battery racks and batteries per manufacturer's installation and maintenance instructions.
2. Verify battery area has adequate ventilation and battery operating temperature complies with manufacturer's specification.

If you have any questions concerning batteries, battery racks, or accessories, contact Liebert Customer Service and Support at **1-800-543-2378**.

7.0 WIRING CONSIDERATIONS



WARNING

ALL POWER CONNECTIONS MUST BE COMPLETED BY A LICENSED ELECTRICIAN THAT IS EXPERIENCED IN WIRING THIS TYPE OF EQUIPMENT. WIRING MUST BE INSTALLED IN ACCORDANCE WITH ALL APPLICABLE NATIONAL AND LOCAL ELECTRICAL CODES. IMPROPER WIRING MAY CAUSE DAMAGE TO THE EQUIPMENT OR INJURY TO PERSONNEL.

VERIFY THAT ALL INCOMING HIGH AND LOW VOLTAGE POWER CIRCUITS ARE DE-ENERGIZED AND LOCKED OUT BEFORE INSTALLING CABLES OR MAKING ANY ELECTRICAL CONNECTIONS.

Refer to **Appendix A - Series 600 UPS Site Planning Data** and installation drawings in **Figure 3** through **Figure 48**. Determine AC currents for your system (kVA, voltage, and optional input filter). Also refer to equipment nameplate for the model number, rating, and voltage. Refer to **Table 1** and **Table 2** for wire termination data.



NOTE

*Use 75°C copper wire. Select wire size based on the ampacities in **Table 3** of this manual, a reprint of Table 310-16 and associated notes of the National Electrical Code (NFPA 70).*



CAUTION

The weight of power cables must be adequately supported to avoid stress on bus bars and lugs. In addition to weight support, the following restraining method is recommended to control cable movement during external fault conditions: Wrap line cables together at 6 inches and 12 inches from the terminals with 5 wraps of 3/8 inch nylon rope or equivalent (tensile strength of 2000 pounds). Support remainder of cable with 5 wraps every 6 inches or 1 wrap every 1 inch

7.1 Power and Control Wiring

1. Power wiring must be run in individual, separate conduit or cable tray. Control wiring must be stranded and run in individual separate steel conduit.



CAUTION

Power and control wiring must be separated!

2. Observe local, state and national electrical codes. Verify utility power and its overcurrent protection rating will accommodate the UPS input rating, including battery recharging.
3. A safety ground wire must be run from building ground to ground point in the UPS Module Cabinet. The grounding conductor shall comply with the following conditions installation:
 - a. An insulated grounding conductor that is green, with or without one or more yellow stripes, is to be installed as part of the branch circuit that supplies the unit or system.
 - b. The grounding conductor described above is to be grounded to earth at the service equipment or, if supplied by a separately derived system, at the supply transformer or motor-generator set.
 - c. The attachment-plug receptacles in the vicinity of the unit or system are all to be of a grounding type, and the grounding conductors serving these receptacles are to be connected to earth ground at the service equipment.
4. Observe clockwise phase rotation of all power wiring. Phase A leads Phase B leads Phase C. A qualified electrician should check the phase rotation.
5. NEC Class 1 wiring methods are required for control and communication Class 2 circuits.

7.2 Battery Wiring

Power wiring to the batteries connects positive, negative, and ground power cables to the UPS. Connection of the UPS to the batteries serves to both charge and discharge the batteries (when needed). The battery disconnect (circuit breaker) requires a control cable. Refer to **Figure 46** and **Figure 47**.



CAUTION

Be sure polarity is correct when wiring the batteries to the connected equipment (positive to positive; negative to negative). If polarity is not correct, fuse failures or equipment damage can result.

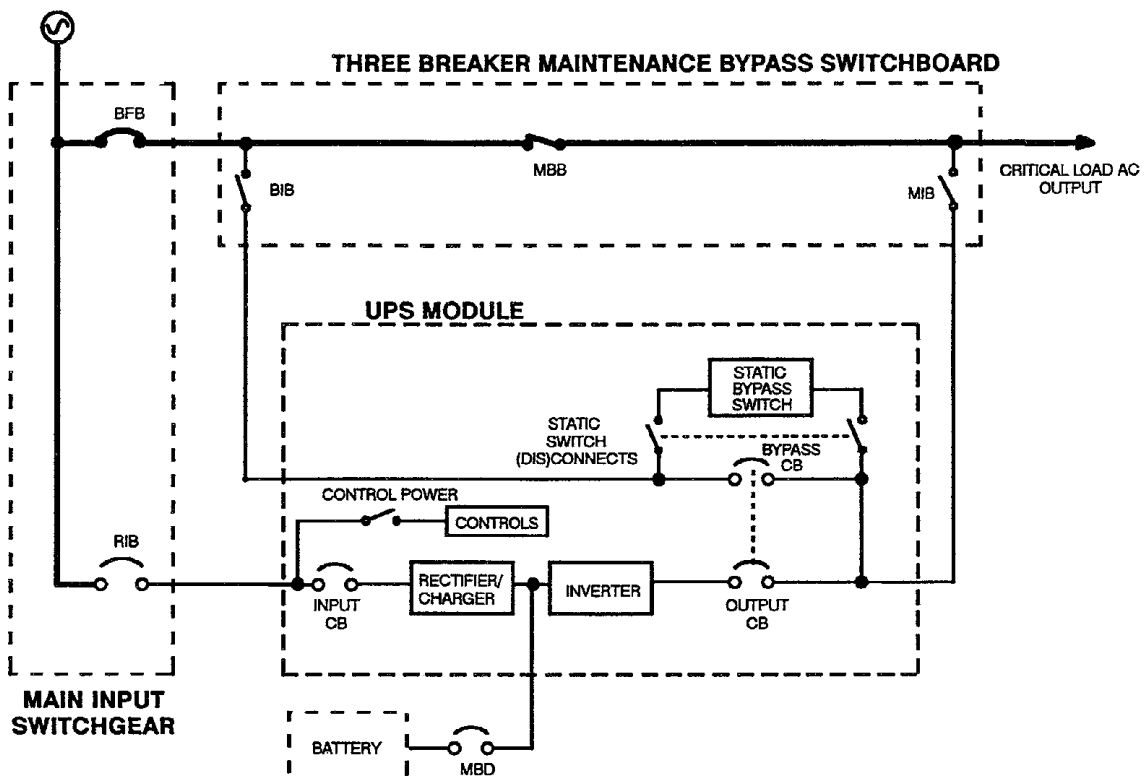
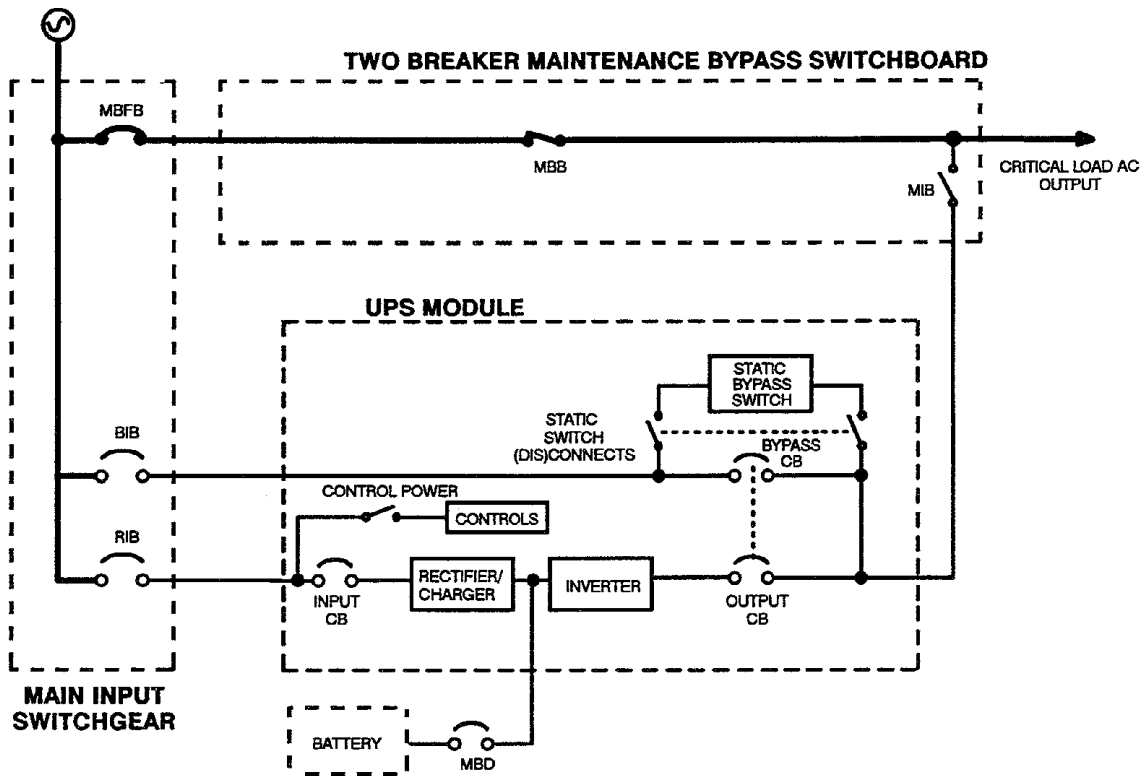
Call Liebert Customer Service and Support to schedule installation check-out and start-up.



NOTE

Inspection of the battery installation is a service that can be provided by Liebert. A Battery Specialist can perform a detailed inspection of the entire battery system to ensure it meets current IEEE standards. This inspection service is recommended because batteries are a very critical part of the UPS system.

Figure 3 Typical Power Wiring Connections with Maintenance Bypass



8.0 WIRING CONNECTIONS



WARNING

VERIFY THAT ALL INCOMING HIGH AND LOW VOLTAGE POWER CIRCUITS ARE DE-ENERGIZED AND LOCKED OUT BEFORE INSTALLING CABLES OR MAKING ELECTRICAL CONNECTIONS.

ALL POWER CONNECTIONS MUST BE COMPLETED BY A LICENSED ELECTRICIAN EXPERIENCED IN WIRING UPS EQUIPMENT, AND IN ACCORDANCE WITH ALL APPLICABLE NATIONAL AND LOCAL ELECTRICAL CODES.

IMPROPER WIRING MAY CAUSE DAMAGE TO THE UPS OR INJURY TO PERSONNEL.



CAUTION

All shielded cables, non-shielded cables, non-shielded control wires, non-shielded battery breaker control wires, and non-shielded remote control wires must be housed in individual, separate, steel conduits. Placing multiple cables in the same conduit with other control or power wiring may cause system failure.

Refer to the drawings in this manual and any other drawings provided by Liebert for this installation. Make all of the following connections:

1. AC power cables from input power source circuit breaker (RIB) to UPS Module Input. Observe phase rotation.
2. AC power cables from bypass power source circuit breaker (BIB) to UPS Module Bypass input. Observe phase rotation.
3. AC power cables from UPS Module Output to critical load. Observe phase rotation.

| Abbreviations for Circuit Breakers | |
|------------------------------------|-----------------------------------|
| BFB | Bypass Feeder Breaker |
| BIB | Bypass Input Breaker |
| MBB | Maintenance Bypass Breaker |
| MBD | Module Battery Disconnect |
| MBFB | Maintenance Bypass Feeder Breaker |
| MIB | Maintenance Isolation Breaker |
| RIB | Rectifier Input Breaker |

4. The UPS Module Output Neutral is connected to one common point and solidly grounded per requirements of the National Electrical Code. The ground connection inside the UPS cabinet may be required the power wiring configuration at your site.



CAUTION

UPS bypass and output neutral must be connected to only one common point in the UPS. This neutral line must be grounded at the source.

5. DC power cables (and ground) from battery to Module Battery Disconnect (MBD) circuit breaker, and then to UPS Module DC bus. Observe polarity. DC power cables should be installed in conduit with conductors in matched pairs (positive and negative).
6. Module Battery Disconnect control wiring to UPS Module. Module Battery Disconnect control wiring must be housed in individual separate steel conduit. Do not run in power circuit conduit.

-
7. Power and control connections required for the Maintenance Bypass Switchboard.
 8. Control wiring to Remote Monitor Panel, if used. Selected alarm messages are also available for customer use through a set of contacts on a separate terminal board. Wiring must be run in individual separate steel conduit.
 9. Emergency Power Off control wiring must be run in separate steel conduit.
 10. Communications wiring for terminals, site monitoring, or modem must be run in separate steel conduit.
 11. Any additional special wiring required at your site.

9.0 WIRING INSPECTION

1. Verify all power connections are tight.
2. Verify all control wire terminations are tight.
3. Verify all power wires and connections have proper spacing between exposed surfaces, phase-to-phase and phase-to-ground.
4. Verify that all control wires are run in individual, separate, steel conduit.

Table 1 Power Wiring Terminals - Factory Supplied

| Connection Type | | | | | |
|---|--|-----------|---|---------|--------|
| UPS Module Rating kVA | AC Input | AC Output | Battery | Neutral | Ground |
| 338 - 1000 | Lugs on circuit breakers, or bus bars (for field supplied lugs). Refer to installation drawings. | | Bus bars for connecting hardware (1/2" on 1-3/4" centers) are provided. A field supplied lug is required. | | |
| Use 75°C copper wire. Select wire size based on the ampacities in Table 310-16 (see Table 3 of this manual) and associated notes of the National Electrical Code (NFPA 70). | | | | | |
| Use commercially available solderless lugs for the wire size required for your application. Connect wire to the lug using tool and procedure specified by the lug manufacturer. | | | | | |

Table 2 Torque Specifications

| Nut and Bolt Combinations | | | | |
|---------------------------|------------------|-----|--|-----|
| Bolt Shaft Size | Grade 2 Standard | | Electrical Connections with Belleville Washers | |
| | Lb-in | N-m | Lb-in | N-m |
| 1/4 | 53 | 6.0 | 46 | 5.2 |
| 5/16 | 107 | 12 | 60 | 6.8 |
| 3/8 | 192 | 22 | 95 | 11 |
| 1/2 | 428 | 48 | 256 | 29 |

| Circuit Breakers With Compression Lugs (For Power Wiring) | | |
|---|-------|-----|
| Current Rating | Lb-in | N-m |
| 400 - 1200 Amps | 300 | 34 |

| Terminal Block Compression Lugs (For Control Wiring) | | |
|--|------------|------------|
| AWG Wire Size or Range | Lb-in | N-m |
| #22 - #14 | 3.5 to 5.3 | 0.4 to 0.6 |

Use the values in this table unless the equipment is labeled with a different torque value.

Table 3 Table 310-16

Allowable Ampacities of Insulated Conductors Rated 0-2000 Volts, 60° to 90°C (140° to 194°F)¹

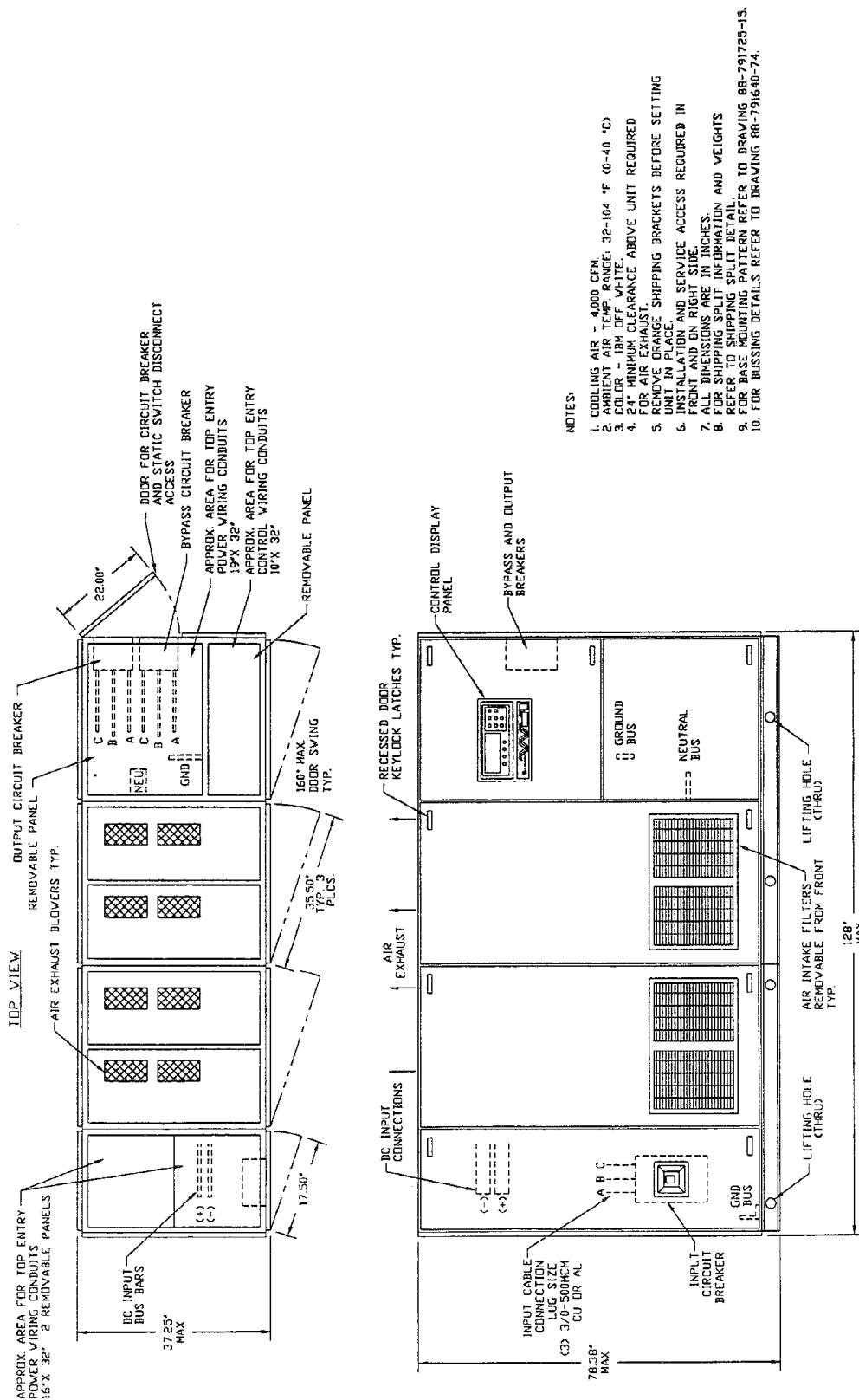
Not More than Three Conductors in Raceway or Cable or Earth (Directly Buried), based on Ambient Temperature of 30° (86°F)

| Size | Temperature Rating of Conductor. See Table 310-13. | | | | | | Size |
|--------------------|---|---|--|---------------------|--|---|-----------------|
| | 60°C (140°F) | 75°C (167°F) | 90°C (194°F) | 60°C (140°F) | 75°C (167°F) | 90°C (194°F) | |
| | Types TW† UF† | Types FEPW†, RH,RHW†, THHW†, THW†, THWN†, XHHW†, USE†, ZW† | Types TBS, SA, SIS,FEP†, FEPB†,MI, RHH†, RHW-2 THHN†,THHW†, THW-2,THWN-2, USE-2, XHH, XHHW† XHHW-2,ZW-2 | Types TW† UF† | Types RH†, RHW†, THHW†, THW†, THWN†, XHHW†, USE† | Types TBS, SA,SIS, THHN†, THHW†, THW-2, THWN-2, RHH†, RHW-2, USE-2, XHH, XHHW†, XHHW-2, ZW-2 | |
| Copper | | | Aluminum or Copper-Clad Aluminum | | | | |
| 18 | ..... | ..... | 14 | ..... | ..... | ..... | ..... |
| 16 | ..... | ..... | 18 | ..... | ..... | ..... | ..... |
| 14 | 20† | 20† | 25† | ..... | ..... | ..... | ..... |
| 12 | 25† | 25† | 30† | 20† | 20† | 25† | 12 |
| 10 | 30 | 35† | 40† | 25 | 30† | 35† | 10 |
| 8 | 40 | 50 | 55 | 30 | 40 | 45 | 8 |
| 6 | 55 | 65 | 75 | 40 | 50 | 60 | 6 |
| 4 | 70 | 85 | 95 | 55 | 65 | 75 | 4 |
| 3 | 85 | 100 | 110 | 65 | 75 | 85 | 3 |
| 2 | 95 | 115 | 130 | 75 | 90 | 100 | 2 |
| 1 | 110 | 130 | 150 | 85 | 100 | 115 | 1 |
| 1/0 | 125 | 150 | 170 | 100 | 120 | 135 | 1/0 |
| 2/0 | 145 | 175 | 195 | 115 | 135 | 150 | 2/0 |
| 3/0 | 165 | 200 | 225 | 130 | 155 | 175 | 3/0 |
| 4/0 | 195 | 230 | 260 | 150 | 180 | 205 | 4/0 |
| 250 | 215 | 255 | 290 | 170 | 205 | 230 | 250 |
| 300 | 240 | 285 | 320 | 190 | 230 | 255 | 300 |
| 350 | 260 | 310 | 350 | 210 | 250 | 280 | 350 |
| 400 | 280 | 335 | 380 | 225 | 270 | 305 | 400 |
| 500 | 320 | 380 | 430 | 260 | 310 | 350 | 500 |
| 600 | 355 | 420 | 475 | 285 | 340 | 385 | 600 |
| 700 | 385 | 460 | 520 | 310 | 375 | 420 | 700 |
| 750 | 400 | 475 | 535 | 320 | 385 | 435 | 750 |
| 800 | 410 | 490 | 555 | 330 | 395 | 450 | 800 |
| 900 | 435 | 520 | 585 | 355 | 425 | 480 | 900 |
| 1000 | 455 | 545 | 615 | 375 | 445 | 500 | 1000 |
| 1250 | 495 | 590 | 665 | 405 | 485 | 545 | 1250 |
| 1500 | 520 | 625 | 705 | 435 | 520 | 585 | 1500 |
| 1750 | 545 | 650 | 735 | 455 | 545 | 615 | 1750 |
| 2000 | 560 | 665 | 750 | 470 | 560 | 630 | 2000 |
| Correction Factors | | | | | | | |
| Ambient Temp °C | For ambient temperatures other than 30°C (86°F), multiply the allowable ampacities shown above by the appropriate factor shown below. | | | | | | Ambient Temp °F |
| 21-25 | 1.08 | 1.05 | 1.04 | 1.08 | 1.05 | 1.04 | 70-77 |
| 26-30 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 78-86 |
| 31-35 | .91 | .94 | .96 | .91 | .94 | .96 | 87-95 |
| 36-40 | .82 | .88 | .91 | .82 | .88 | .91 | 96-104 |
| 41-45 | .71 | .82 | .87 | .71 | .82 | .87 | 105-113 |
| 46-50 | .58 | .75 | .82 | .58 | .75 | .82 | 114-122 |
| 51-55 | .41 | .67 | .76 | .41 | .67 | .76 | 123-131 |
| 56-60 | ..... | .58 | .71 | ..... | .58 | .71 | 132-140 |
| 61-70 | ..... | .33 | .58 | ..... | .33 | .58 | 141-158 |
| 71-80 | ..... | ..... | .41 | ..... | ..... | .41 | 159-176 |

† Unless otherwise specifically permitted elsewhere in this Code, the overcurrent protection for conductor types marked with an obelisk (†) shall not exceed 15 amperes for No. 14, 20 amperes for No. 12, and 30 amperes for No. 10 copper; or 15 amperes for No. 12 and 25 amperes for No. 10 aluminum and copper-clad aluminum after any correction factors for ambient temperature and number of conductors have been applied.

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Figure 4 Outline Drawing, 338 kVA



NOTES

1. COOLING AIR - 4000 CFM
2. AMBIENT AIR TEMP. RANGE: 32-104 °F (0-40 °C)
3. COLOR - IBM OFF WHITE.
4. 24" MINIMUM CLEARANCE ABOVE UNIT REQUIRED FOR AIR EXHAUST.
5. REMOVE ORANGE SHIPPING BRACKETS BEFORE SETTING UNIT IN PLACE AND SERVICE ACCESS REQUIRED IN FRONT OF UNIT ON RIGHT SIDE.
6. ALL DIMENSIONS ARE IN INCHES.
7. FOR SHIPPING SPLIT INFORMATION AND WEIGHTS REFER TO SHIPPING SPLIT DETAIL.
8. FOR BASE MOUNTING PATTERN REFER TO DRAWING 88-791725-1S.
9. FOR BUSSING DETAILS REFER TO DRAWING 88-791640-74.
10. FOR BUSSING DETAILS REFER TO DRAWING 88-791640-74.

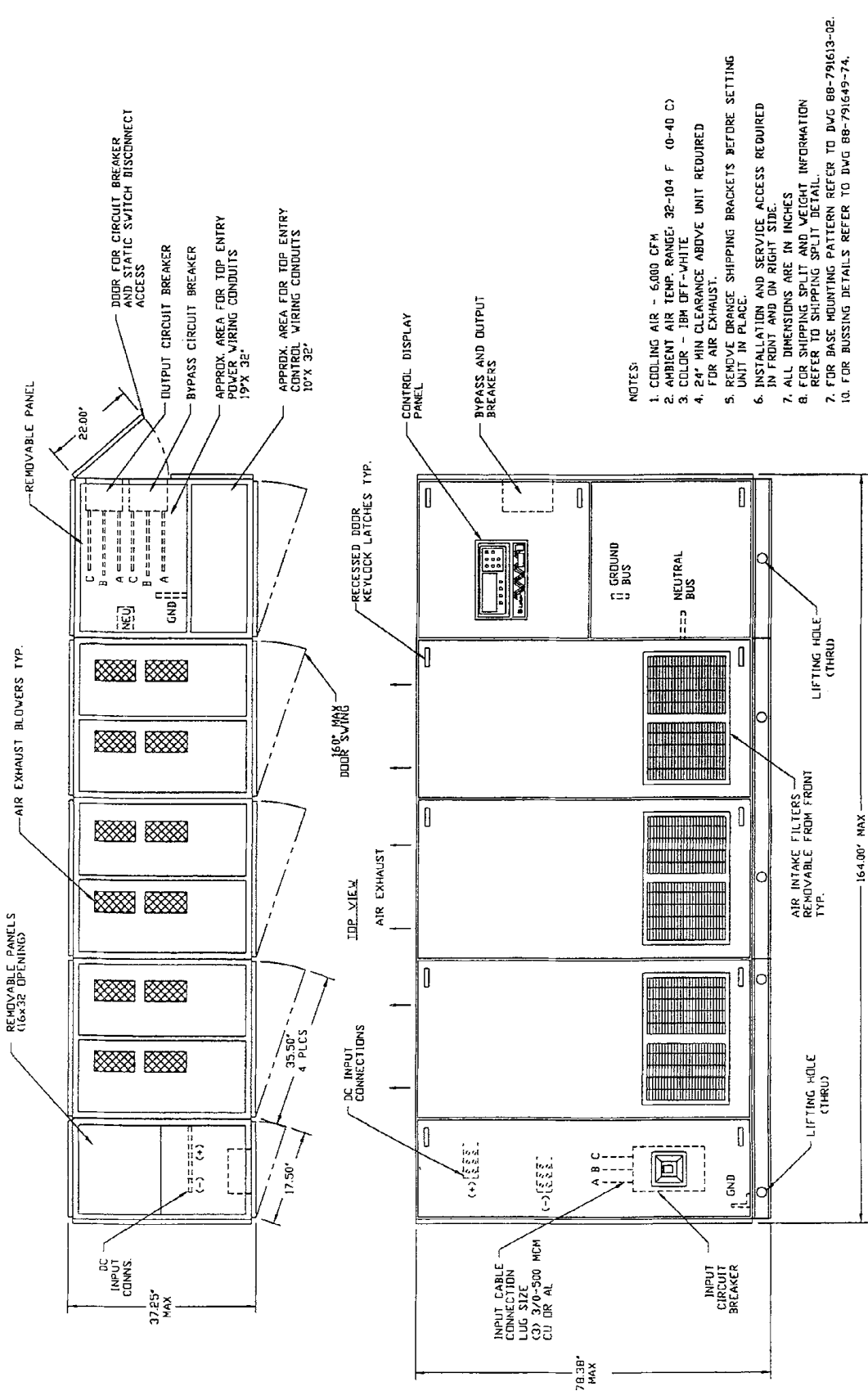
| | | | | | |
|----------------------|--|--------------------------|--|---|--|
| DRAWN BY D MCKAY | | SHEET NO 1 OF 1 | | TITLE OUTLINE DRAWING 338 KVA SINGLE MODULE UPS 480 V AND 600 V SERIES 600 | |
| CHK BY J CAMPBELL | | ECN NO | | REV. NO. | |
| DES APVL | | REF. DWG. NO. ING4064 | | DWG. NO. 88-791640-64 | |
| | | | | DATE 02/07/95 | |
| | | | | ORDER NO. | |
| | | | | 1 | |

ING40641306



9650 JERONIMO RD.
IRVINE, CALIFORNIA 92718

Figure 5 Outline Drawing, 400 kVA



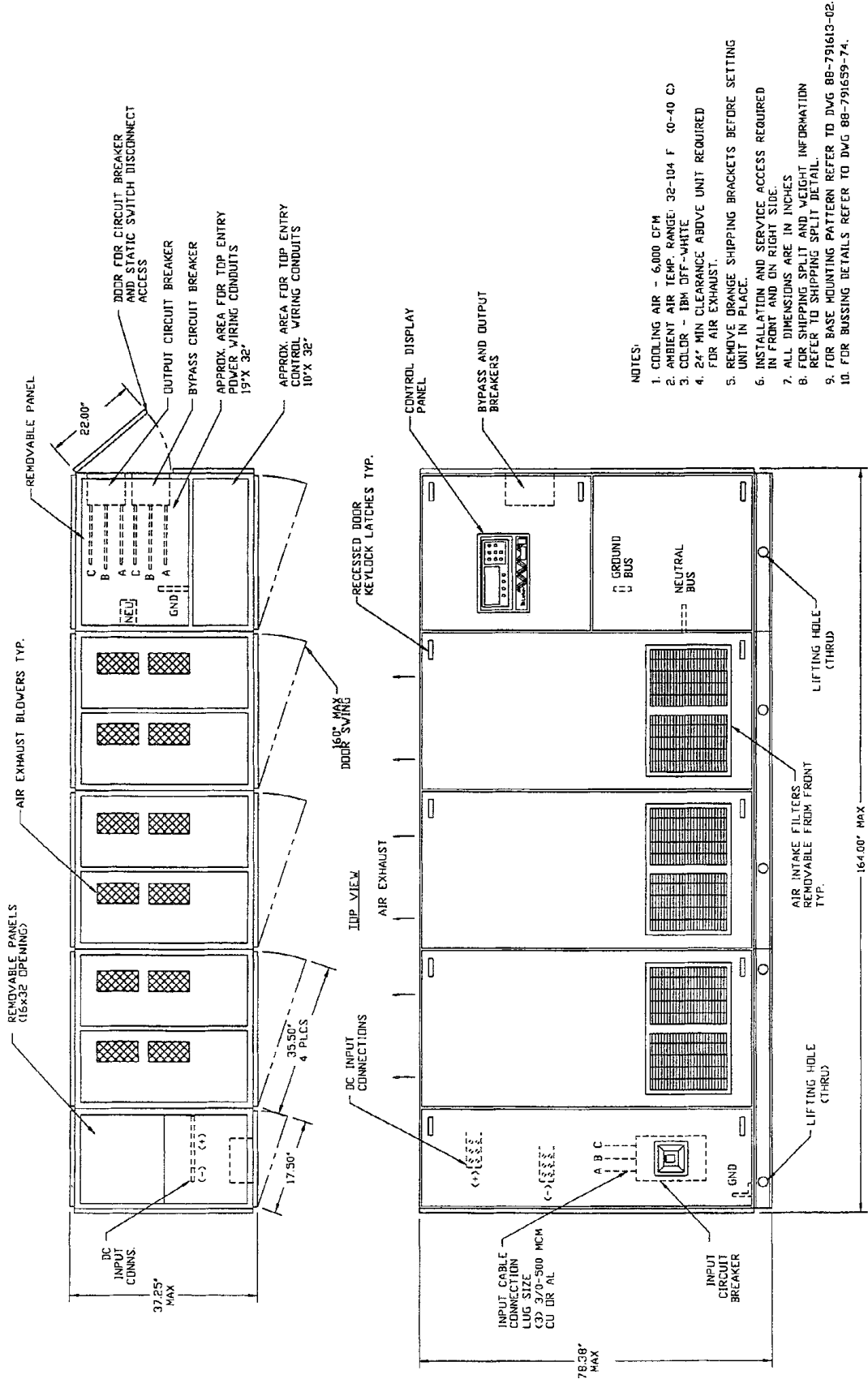
- NOTES:
1. COOLING AIR - 6,000 CFM
 2. AMBIENT AIR TEMP. RANGE: 32-104 F (0-40 C)
 3. COLOR - IBM OFF-WHITE
 4. 24" MIN CLEARANCE ABOVE UNIT REQUIRED FOR AIR EXHAUST.
 5. REMOVE ORANGE SHIPPING BRACKETS BEFORE SETTING UNIT IN PLACE.
 6. INSTALLATION AND SERVICE ACCESS REQUIRED IN FRONT AND ON RIGHT SIDE.
 7. ALL DIMENSIONS ARE IN INCHES
 8. FOR SHIPPING SPLIT AND WEIGHT INFORMATION REFER TO SHIPPING SPLIT DETAIL.
 9. FOR BASE MOUNTING PATTERN REFER TO DWG BB-791613-02.
 10. FOR BUSSING DETAILS REFER TO DWG BB-791649-74.

| | | | | | |
|----------------------|--|----------------------|--|---|--|
| DRAWN BY B FISH | | SHEET NO 1 OF 1 | | TITLE OUTLINE DRAWING 400 KVA SINGLE MODULE UPS 480 V AND 600 V SERIES 600 | |
| CHK BY J CAMPBELL | | ECN NO | | DWG. NO. BB-791649-64 | |
| DES APVL IN64964 | | REF. DWG. IN64964 | | DATE 05/19/95 | |
| | | | | ORDER NO. | |



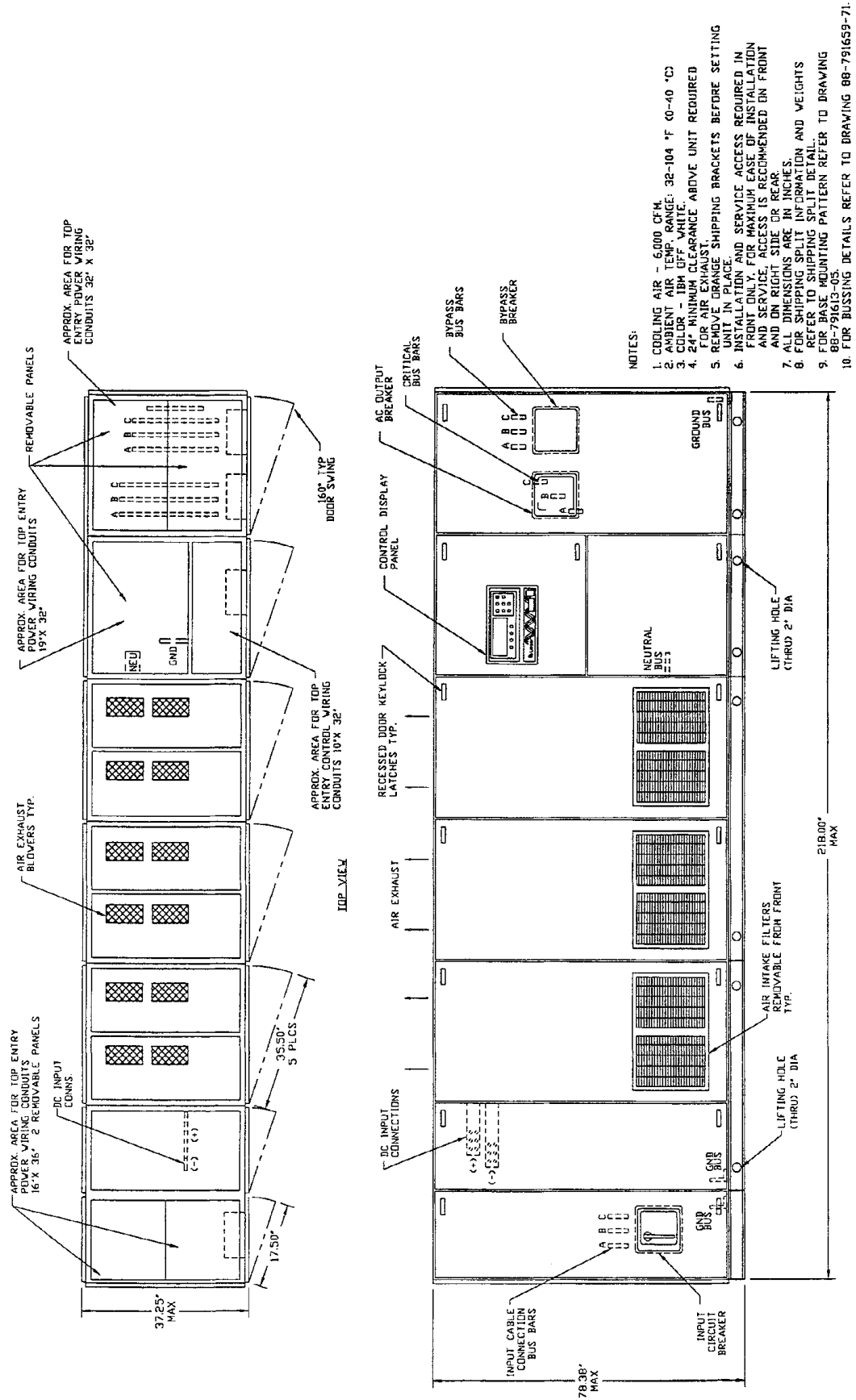
FILE NAME: IN64964.DWG

Figure 6 Outline Drawing, 500 kVA



| | | | | | |
|---|--|----------------------|--|---|--|
| DRAWN BY B FISH | | SHEET NO 1 OF 1 | | TITLE OUTLINE DRAWING 500 KVA SINGLE MODULE UPS 480 V AND 600 V SERIES 600 | |
| CHK BY J CAMPBELL | | ECN NO | | REV. NO. 1 | |
| DES APVL | | REF. DWG. 1N65964 | | DWG. NO. 88-791659-64 | |
| | | DATE 05/30/95 | | ORDER NO. | |
| 9650 JERONIMO RD. IRVINE, CALIFORNIA 92718 | | | | | |

Figure 7 Outline Drawing, 500 kVA, 208 VAC

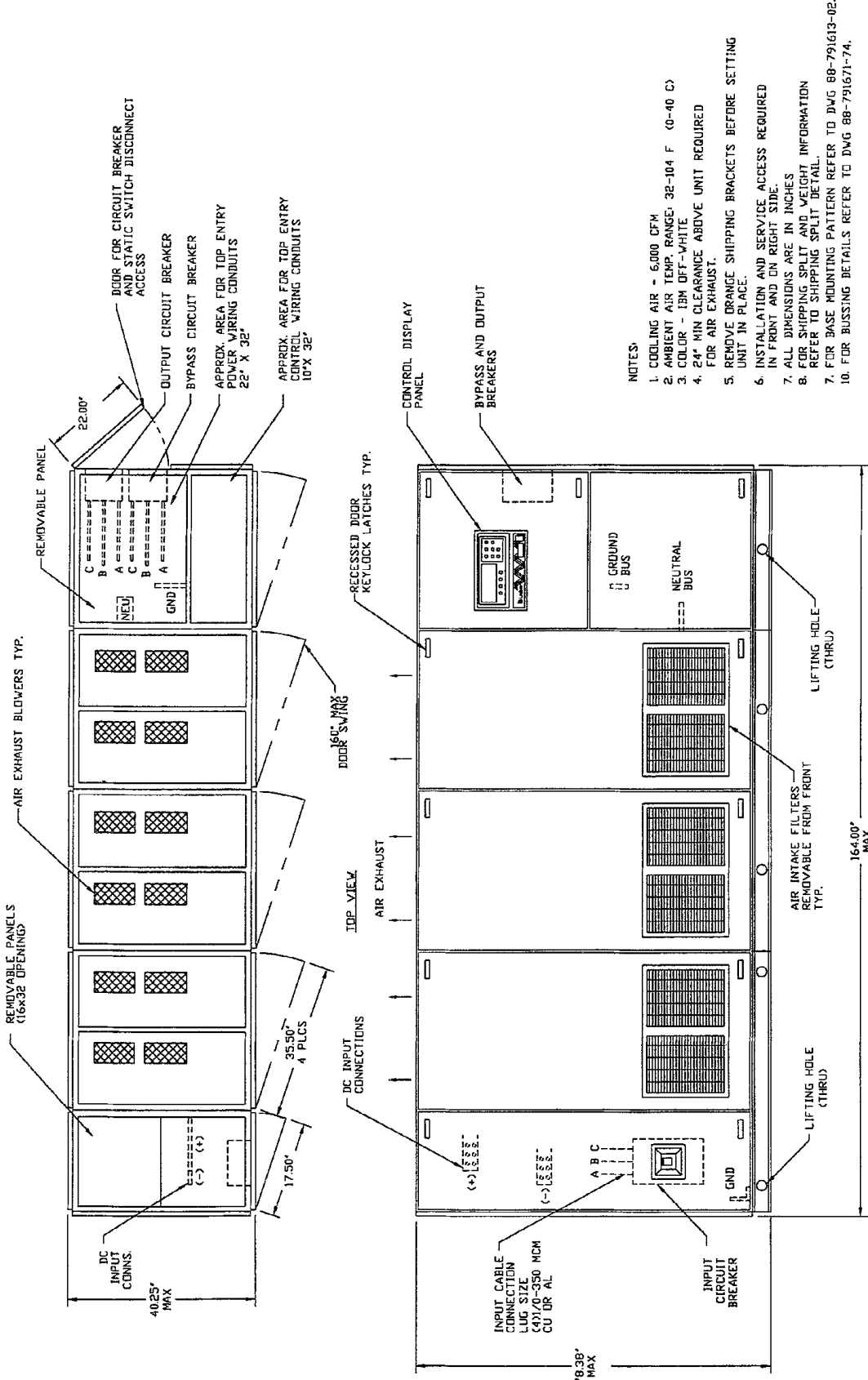


- NOTES:
1. COOLING AIR - 6,000 CFM.
 2. AMBIENT AIR TEMP. RANGE: 32-104 °F (0-40 °C)
 3. COLD R - IBM GFF WHITE.
 4. 24" MINIMUM CLEARANCE ABOVE UNIT REQUIRED FOR AIR EXHAUST.
 5. REMOVE ORANGE SHIPPING BRACKETS BEFORE SETTING UNIT IN PLACE.
 6. INSTALLATION AND SERVICE ACCESS REQUIRED IN FRONT ONLY FOR MAXIMUM EASE OF INSTALLATION AND SERVICE ACCESS IS RECOMMENDED ON FRONT AND ON RIGHT SIDE OR REAR.
 7. ALL DIMENSIONS ARE IN INCHES.
 8. FOR SHIPPING SPLIT INFORMATION AND WEIGHTS REFER TO SHIPPING SPLIT DETAIL.
 9. FOR BASE MOUNTING PATTERN REFER TO DRAWING 88-791613-05.
 10. FOR BUSSING DETAILS REFER TO DRAWING 88-791659-71.

| | | | | | | | |
|------------------------|--|----------------------|--|--|--|------------------|--|
| DRAWN BY B FISH | | SHEET NO 1 OF 1 | | DWG. NO. 88-791659-61 | | DATE 05/30/95 | |
| CHK BY J CAMPBELL | | ECN NO | | REV. NO. 1 | | ORDER NO. | |
| DES APVL ING5961 | | REF. DWG. ING5961 | | TITLE OUTLINE DRAWING 500 KVA SINGLE MODULE UPS 208 V INPUT - 208 / 120 V OUTPUT SERIES 600 | | | |
| FILE NAME: ING5961.DWG | | | | | | | |



Figure 8 Outline Drawing, 625 kVA

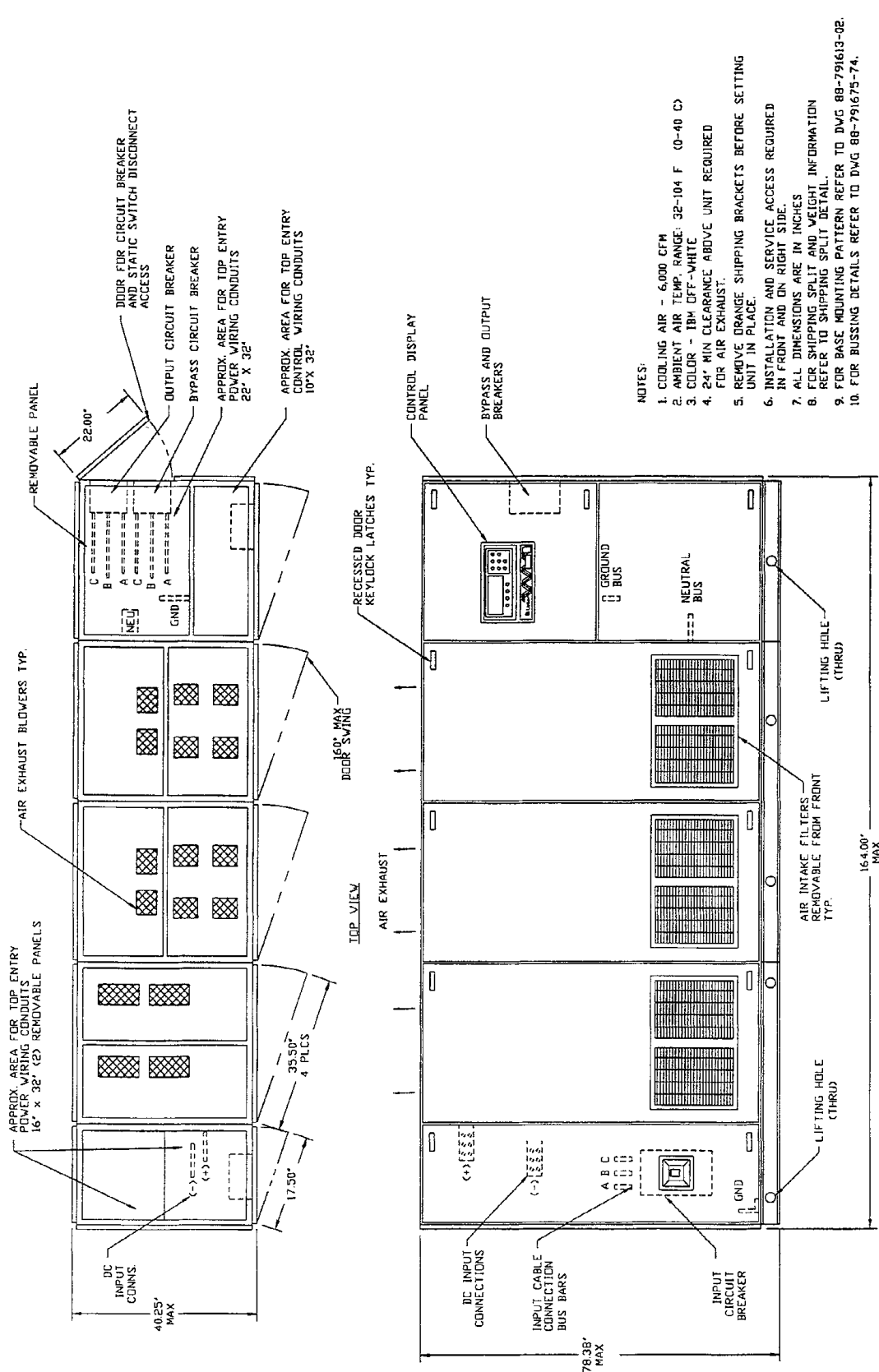


- NOTES:
1. COOLING AIR - 6,000 CFM
 2. AMBIENT AIR TEMP. RANGE: 32-104 F (0-40 C)
 3. COLOR - 13M OFF-WHITE
 4. 24" MIN CLEARANCE ABOVE UNIT REQUIRED FOR AIR EXHAUST.
 5. REMOVE ORANGE SHIPPING BRACKETS BEFORE SETTING UNIT IN PLACE.
 6. INSTALLATION AND SERVICE ACCESS REQUIRED IN FRONT AND ON RIGHT SIDE.
 7. ALL DIMENSIONS ARE IN INCHES
 8. FOR SHIPPING SPLIT AND WEIGHT INFORMATION REFER TO SHIPPING SPLIT DETAIL.
 9. FOR BASE MOUNTING PATTERN REFER TO DWG 88-791613-02.
 10. FOR BUSSEING DETAILS REFER TO DWG 88-791671-74.

| | | | | | |
|------------------------|--|----------------------|--|---|--|
| DRAWN BY B FISH | | SHEET NO 1 OF 1 | | TITLE OUTLINE DRAWING 625 KVA SINGLE MODULE UPS 480 V AND 600 V SERIES 600 | |
| CHK BY J CAMPBELL | | EGN NO | | DWG. NO. 88-791671-64 | |
| DES APVL | | REF. DWG. IN67164 | | DATE 05/31/95 | |
| | | | | ORDER NO. | |
| | | | | REV. NO. 1 | |
| FILE NAME: IN67164.DWG | | | | | |



Figure 9 Outline Drawing, 750 kVA (High Link - 240 Cells)



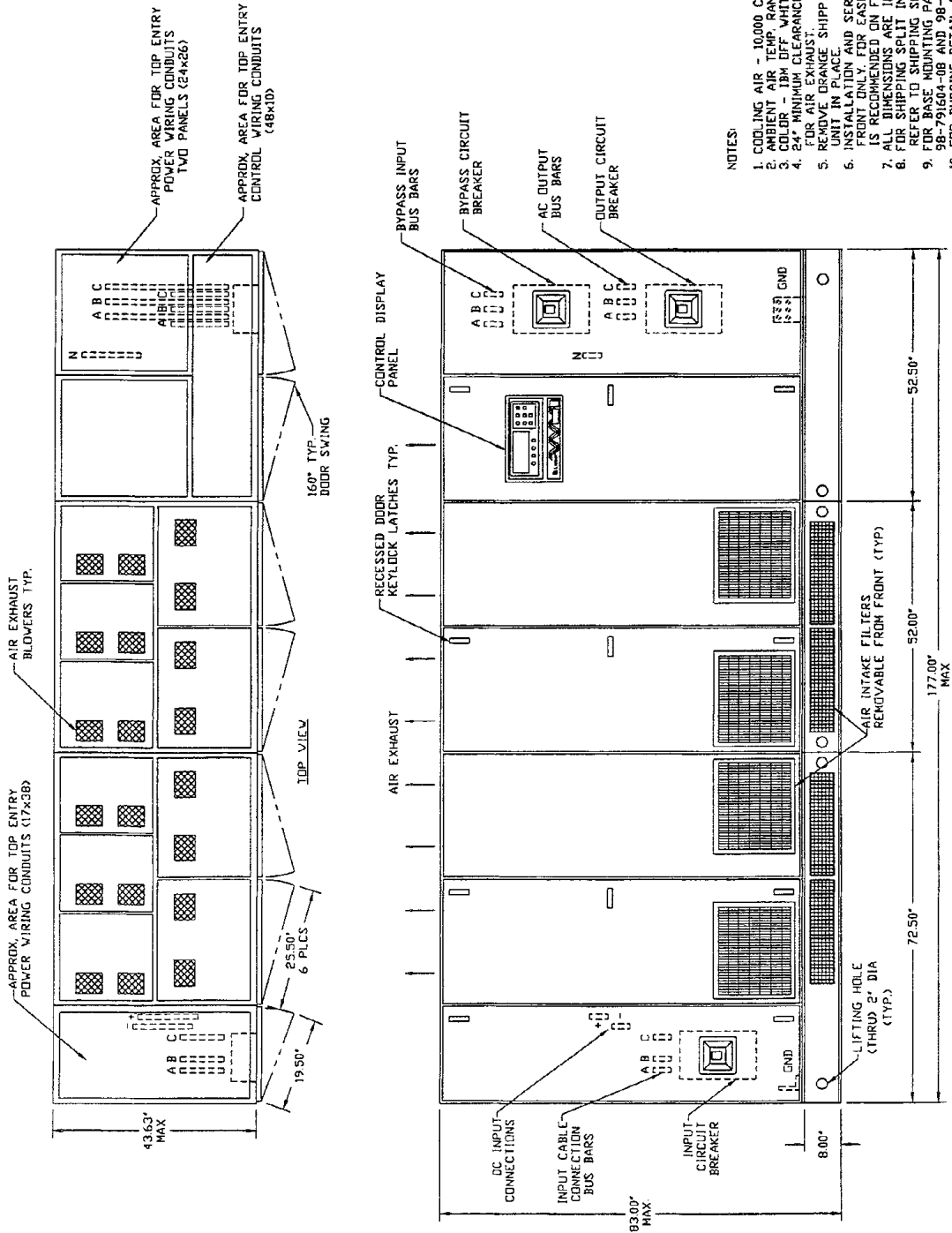
- NOTES:
1. COOLING AIR - 6,000 CFM
 2. AMBIENT AIR TEMP. RANGE: 32-104 F (0-40 C)
 3. COLOR - IBM OFF-WHITE
 4. 24" MIN CLEARANCE ABOVE UNIT REQUIRED FOR AIR EXHAUST.
 5. REMOVE ORANGE SHIPPING BRACKETS BEFORE SETTING UNIT IN PLACE.
 6. INSTALLATION AND SERVICE ACCESS REQUIRED IN FRONT AND ON RIGHT SIDE.
 7. ALL DIMENSIONS ARE IN INCHES
 8. FOR SHIPPING SPLIT AND WEIGHT INFORMATION REFER TO SHIPPING SPLIT DETAIL.
 9. FOR BASE MOUNTING PATTERN REFER TO DWG 88-791613-02.
 10. FOR BUSSING DETAILS REFER TO DWG 88-791675-74.

| | | | | | |
|----------------------|--|--------------------|--|--|--|
| DRAWN BY B FISH | | SHEET NO 1 OF 1 | | TITLE OUTLINE DRAWING 750 KVA - 240 CELL SINGLE MODULE UPS 480 V AND 600 V SERIES 600 | |
| CHK BY J CAMPBELL | | ECN NO | | DWG. NO. 88-791675-64 | |
| DES APVL IN67564 | | REF. DWG. | | DATE 06/01/95 | |
| | | REV. NO. 1 | | ORDER NO. | |



FILE NAME: IN67564.DWG

Figure 10 Outline Drawing, 750 kVA (Low Link - 180 Cells)



NOTES:

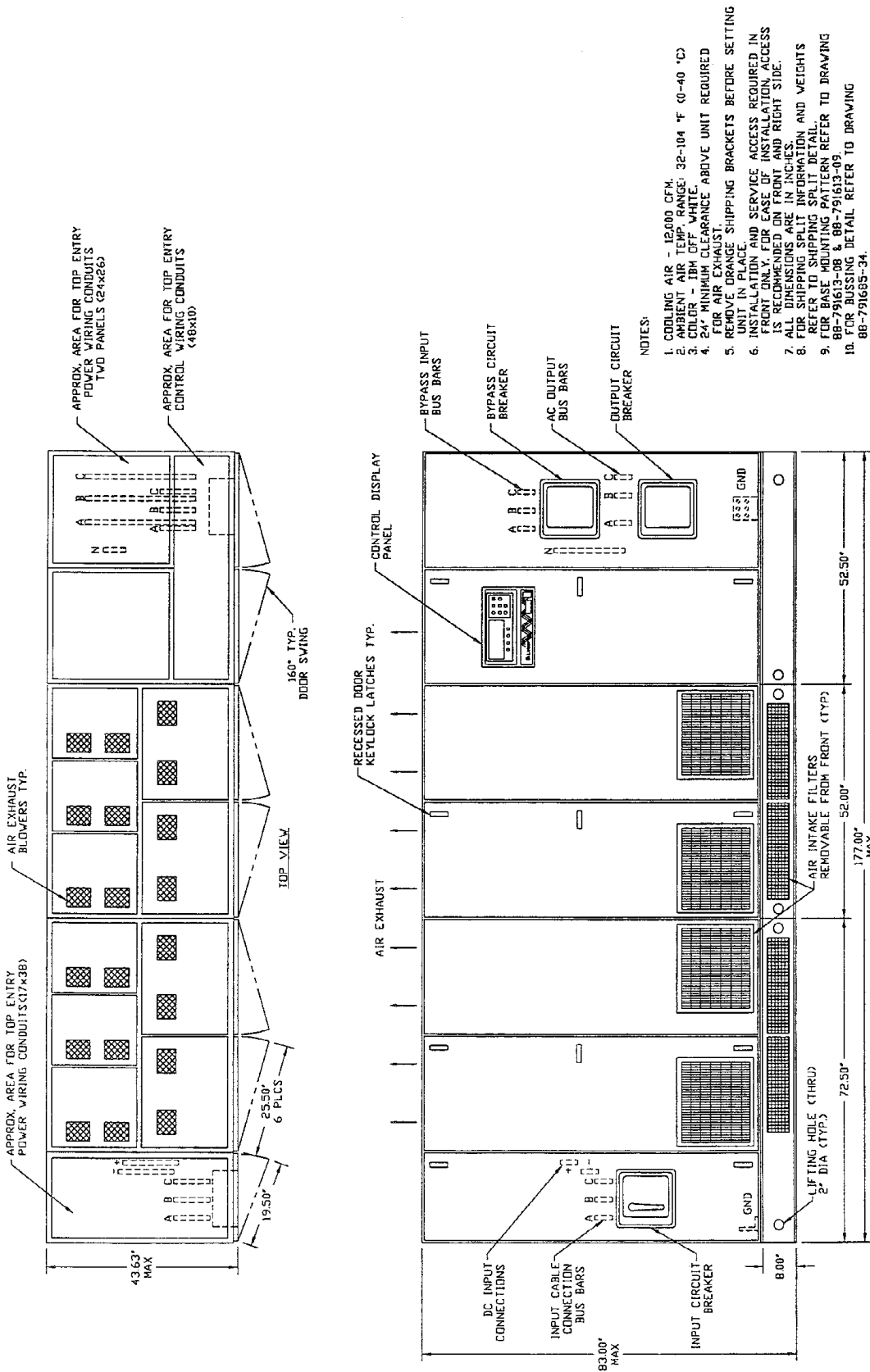
1. COOLING AIR - 10,000 CFM
2. AMBIENT AIR TEMP. RANGE: 32-104 °F (0-40 °C)
3. COLOR - 18M OFF WHITE.
4. 24" MINIMUM CLEARANCE ABOVE UNIT REQUIRED FOR AIR EXHAUST.
5. REMOVE ORANGE SHIPPING BRACKETS BEFORE SETTING UNIT IN PLACE.
6. INSTALLATION AND SERVICE ACCESS REQUIRED IN FRONT ONLY. FOR EASE OF INSTALLATION, ACCESS IS REQUESTED ON THE RIGHT SIDE.
7. AIR EXHAUST AREA INCLUDES 20" CLEARANCE.
8. FOR SHIPPING SPLIT INFORMATION AND WEIGHTS REFER TO SHIPPING PATTERN DETAIL.
9. FOR BASE MOUNTING PATTERN REFER TO DRAWING 98-791604-08 AND 98-791604-09.
10. FOR BUSSING DETAIL REFER TO DRAWING 88-791676-34.

| | | | | | |
|-----------------------|--|--------------------|--|---|--|
| DRAWN BY B FISH | | SHEET NO 1 OF 1 | | TITLE OUTLINE DRAWING 750 KVA - 180 CELL FRONT ACCESS SINGLE MODULE UPS 480 V AND 600 V SERIES 600 | |
| CHK BY J CAMPBELL | | ECN NO | | DWG. NO. 88-791676-14 | |
| DES APVL JING67614 | | REF. DWG. | | DATE 06/01/95 | |
| | | | | ORDER NO. | |
| | | | | REV. NO. 1 | |



FILE NAME: 7657614.DWG

Figure 11 Outline Drawing, 1000 kVA



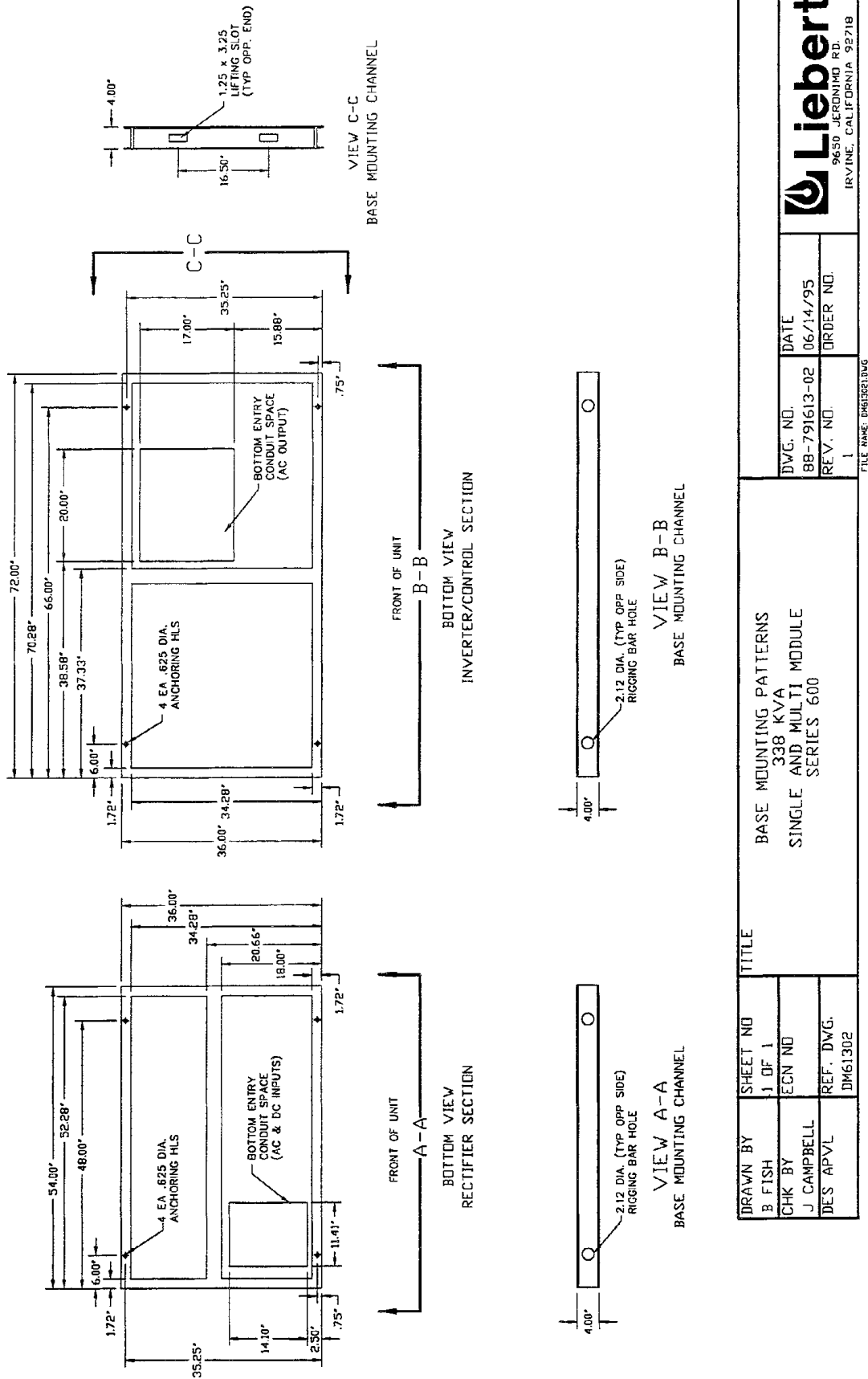
- NOTES:
1. COOLING AIR - 12,000 CFM.
 2. AMBIENT AIR TEMP. RANGE: 32-104 °F 10-40 °C
 3. COLOR - IBM OFF WHITE.
 4. 24" MINIMUM CLEARANCE ABOVE UNIT REQUIRED FOR AIR EXHAUST.
 5. REMOVE DRANGE SHIPPING BRACKETS BEFORE SETTING UNIT IN PLACE.
 6. INSTALLATION AND SERVICE ACCESS REQUIRED IN FRONT FOR CASE OF REWIRING AND RECALCULATION. ACCESS REQUIRED FOR CASE OF REWIRING AND RECALCULATION. ACCESS REQUIRED FOR CASE OF REWIRING AND RECALCULATION. ACCESS REQUIRED FOR CASE OF REWIRING AND RECALCULATION.
 7. ALL DIMENSIONS ARE IN INCHES.
 8. FOR SHIPPING SPLIT INFORMATION AND WEIGHTS REFER TO SHIPPING SPLIT DETAIL.
 9. FOR BASE MOUNTING PATTERN REFER TO DRAWING 88-791613-08 & 88-791613-09.
 10. FOR BUSSING DETAIL REFER TO DRAWING 88-791685-34.

| | | | | | |
|----------------------|--|----------------------|--|---|--|
| DRAWN BY B FISH | | SHEET NO 1 OF 1 | | TITLE OUTLINE DRAWING 1000 KVA FRONT ACCESS SINGLE MODULE UPS 480 V AND 600 V SERIES 600 | |
| CHK BY J CAMPBELL | | ECN NO | | DWG. NO. 88-791685-14 | |
| DES APVL IN68514 | | REF. DWG. IN68514 | | DATE 06/07/95 | |
| | | | | ORDER NO. | |



FILE NAME: IN68514.DWG

Figure 12 Base Mounting Details, 338 kVA




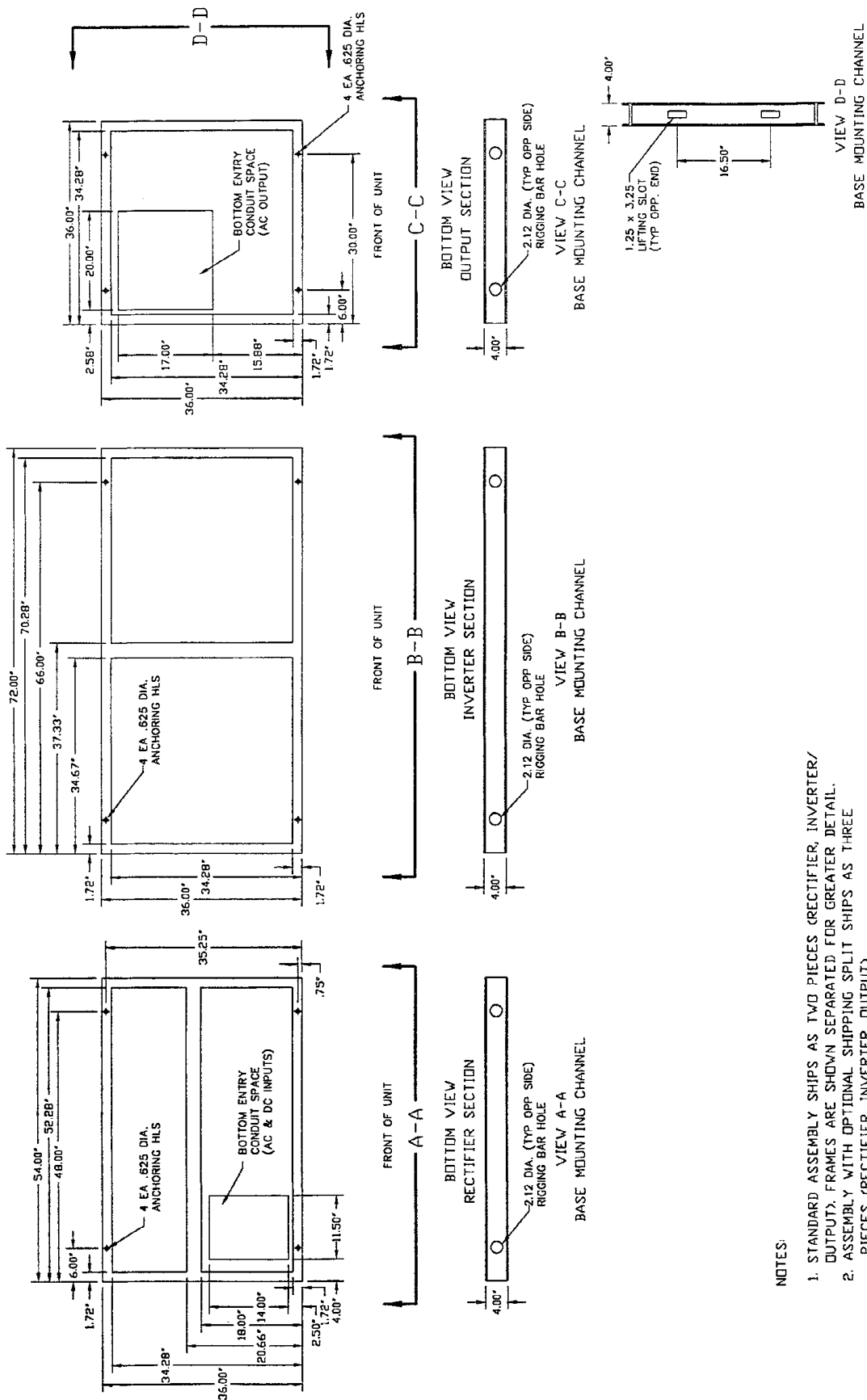
| | | | | | |
|----------------------|--|----------------------|--|--|--|
| DRAWN BY B FISH | | SHEET NO 1 OF 1 | | TITLE BASE MOUNTING PATTERNS 338 KVA SINGLE AND MULTI MODULE SERIES 600 | |
| CHK BY J CAMPBELL | | ECN NO | | DWG. NO. 88-791613-02 | |
| DES' APVL | | REF. DWG. DM61302 | | DATE 06/14/95 | |
| | | | | ORDER NO. | |
| | | | | REV. NO. 1 | |
| | | | | FILE NAME: DM61302.DWG | |
| | | | |  9650 JERONIMO RD. IRVINE, CALIFORNIA 92718 | |

Figure 13 Base Mounting Details, 400 and 500 kVA

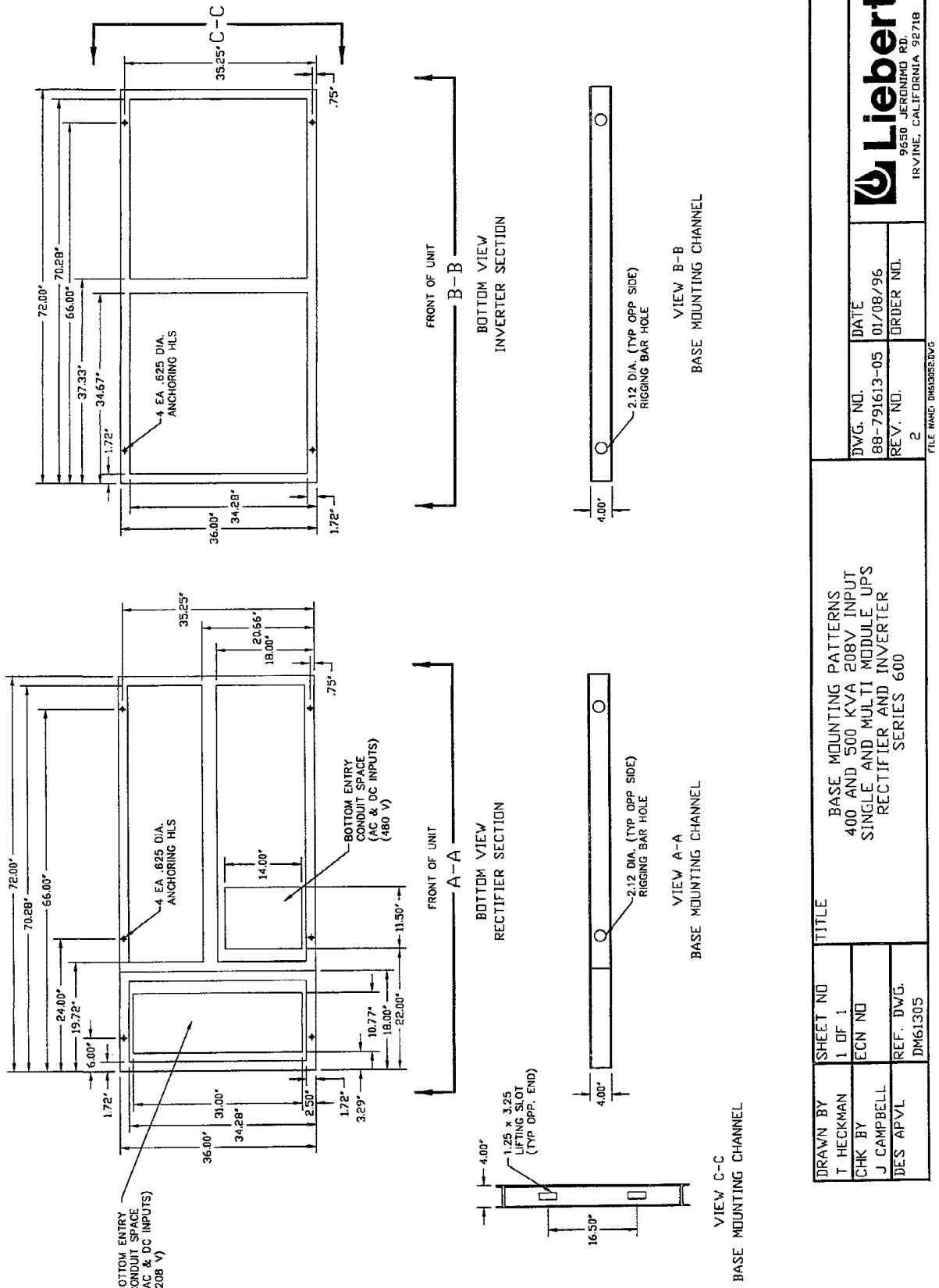


NOTES:
 1. STANDARD ASSEMBLY SHIPS AS TWO PIECES (RECTIFIER, INVERTER/ OUTPUT). FRAMES ARE SHOWN SEPARATED FOR GREATER DETAIL.
 2. ASSEMBLY WITH OPTIONAL SHIPPING SPLIT SHIPS AS THREE PIECES (RECTIFIER, INVERTER, OUTPUT).

| | | | | | |
|----------------------|--|----------------------|--|--|--|
| DRAWN BY B FISH | | SHEET NO 1 OF 1 | | TITLE BASE MOUNTING PATTERNS 400 AND 500 KVA, 480 AND 600 V SINGLE AND MULTI MODULE SERIES 600 | |
| CHK BY J CAMPBELL | | ECN NO | | DWG. NO. 88-791613-03 | |
| DES APVL | | REF. DWG. DM61303 | | DATE 06/14/95 | |
| | | | | ORDER NO. | |
| | | | | IRVINE, CALIFORNIA 92718 | |

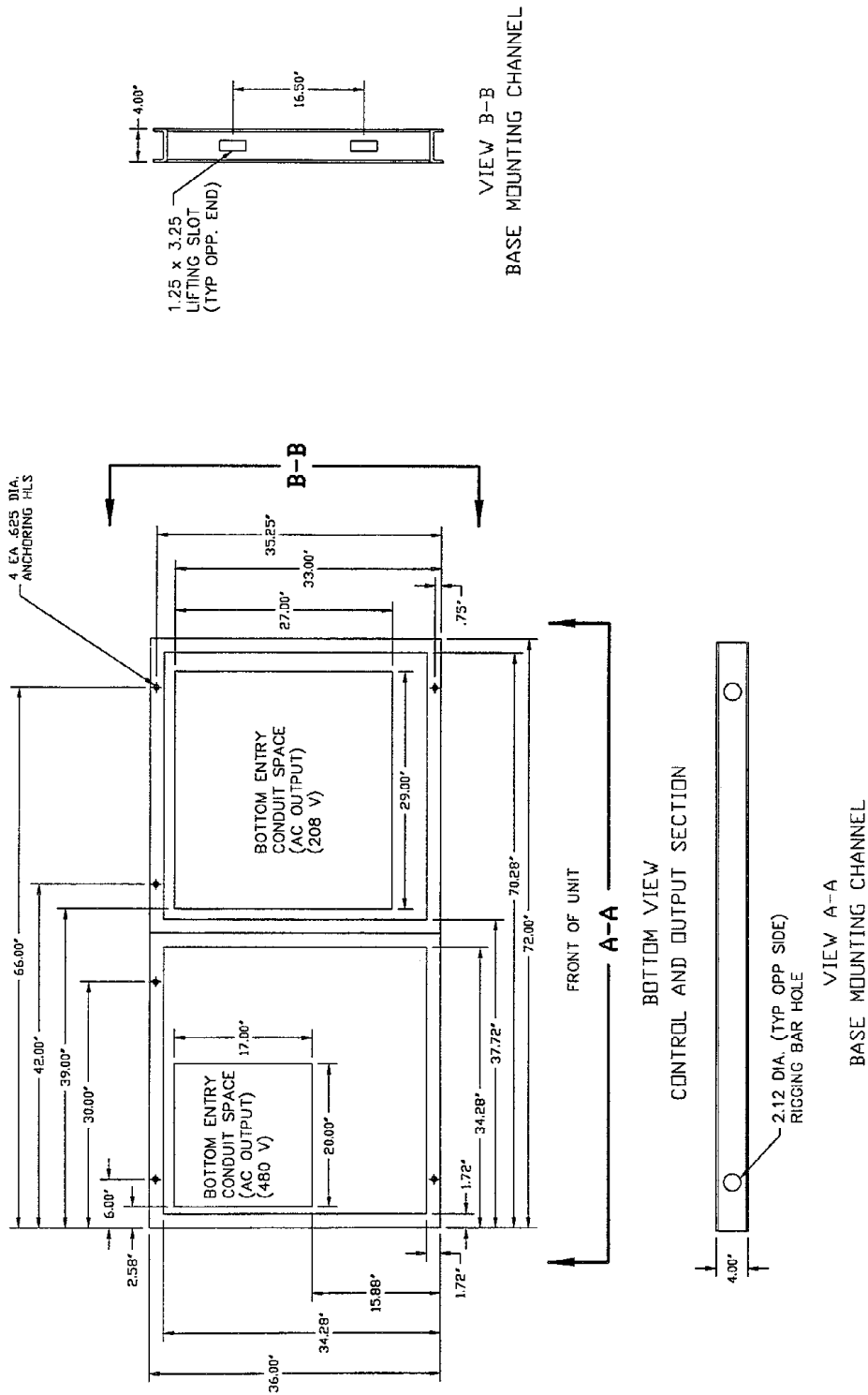


Figure 14 Base Mounting Details, 400 and 500 kVA, 208 VAC, Rectifier and Inverter Sections



| | | | | |
|-----------------------|----------------------|--|---|------------------|
| DRAWN BY T HECKMAN | SHEET NO 1 OF 1 | TITLE BASE MOUNTING PATTERNS 400 AND 500 KVA 208V INPUT SINGLE AND MULTI MODULE UPS RECTIFIER AND INVERTER SERIES 600 | DWG. NO. 88-791613-05 | DATE 01/08/96 |
| CHK BY J CAMPBELL | ECN NO | | REV. NO. 2 | ORDER NO. |
| DES APVL | REF. DWG. DM61305 | | 9650 JERONIMO RD. IRVINE, CALIFORNIA 92718 | |

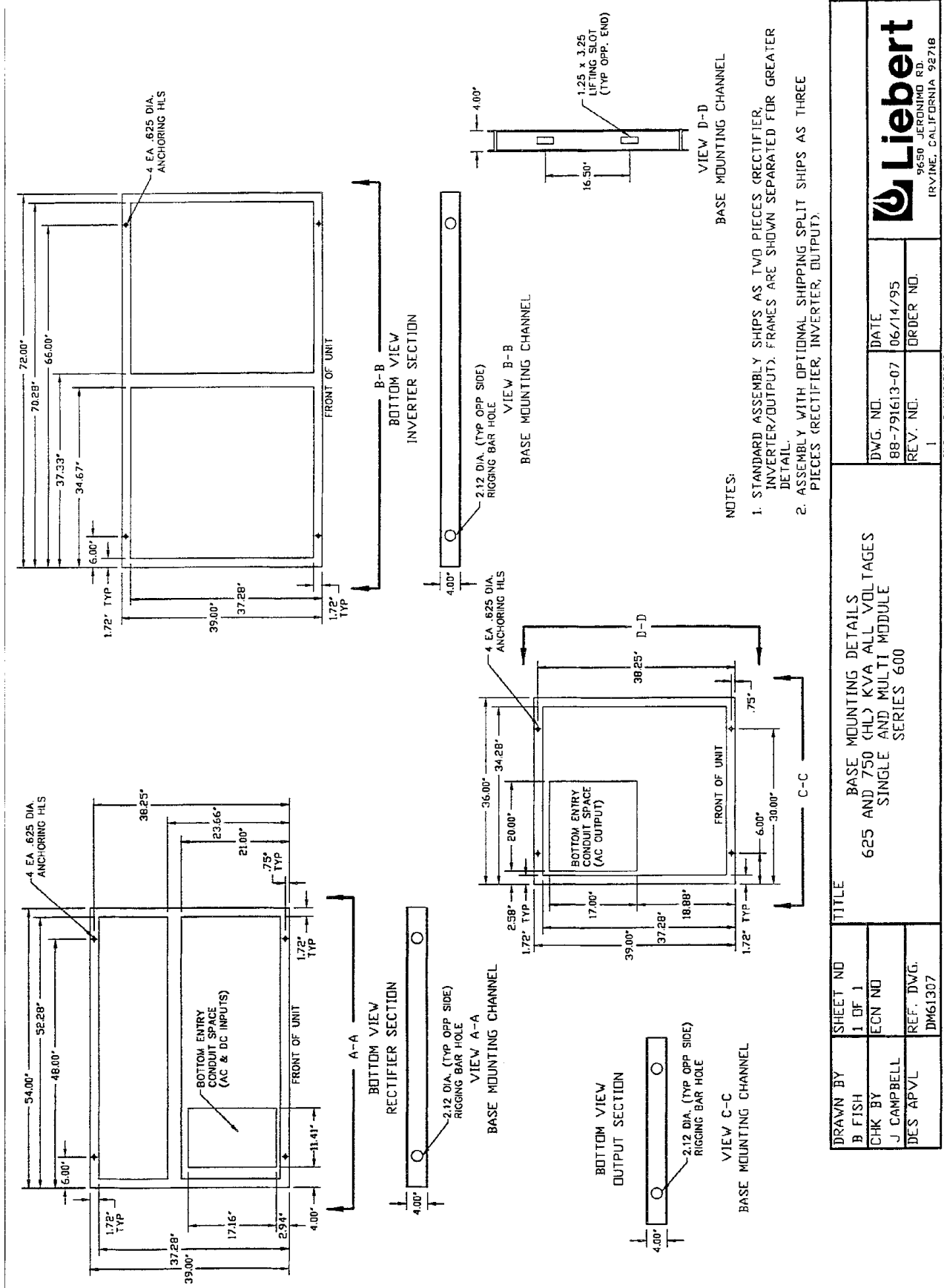
Figure 15 Base Mounting Details, 400 and 500 kVA, 208 VAC, Control and Output Sections



| | | | |
|-----------------------|----------------------|--|------------------|
| DRAWN BY T HECKMAN | SHEET NO 1 OF 1 | TITLE BASE MOUNTING DETAILS 400 AND 500 KVA 208V OUTPUT SINGLE AND MULTI MODULE UPS CONTROL AND OUTPUT SECTION SERIES 600 | |
| CHK BY J CAMPBELL | ECN NO | DWG. NO. 88-791613-06 | DATE 01/08/96 |
| DES APVL | REF. DWG. DM61306 | REV. NO. 2 | ORDER NO. |
| | | 9650 JERONIMO RD. IRVINE, CALIFORNIA 92718 | |

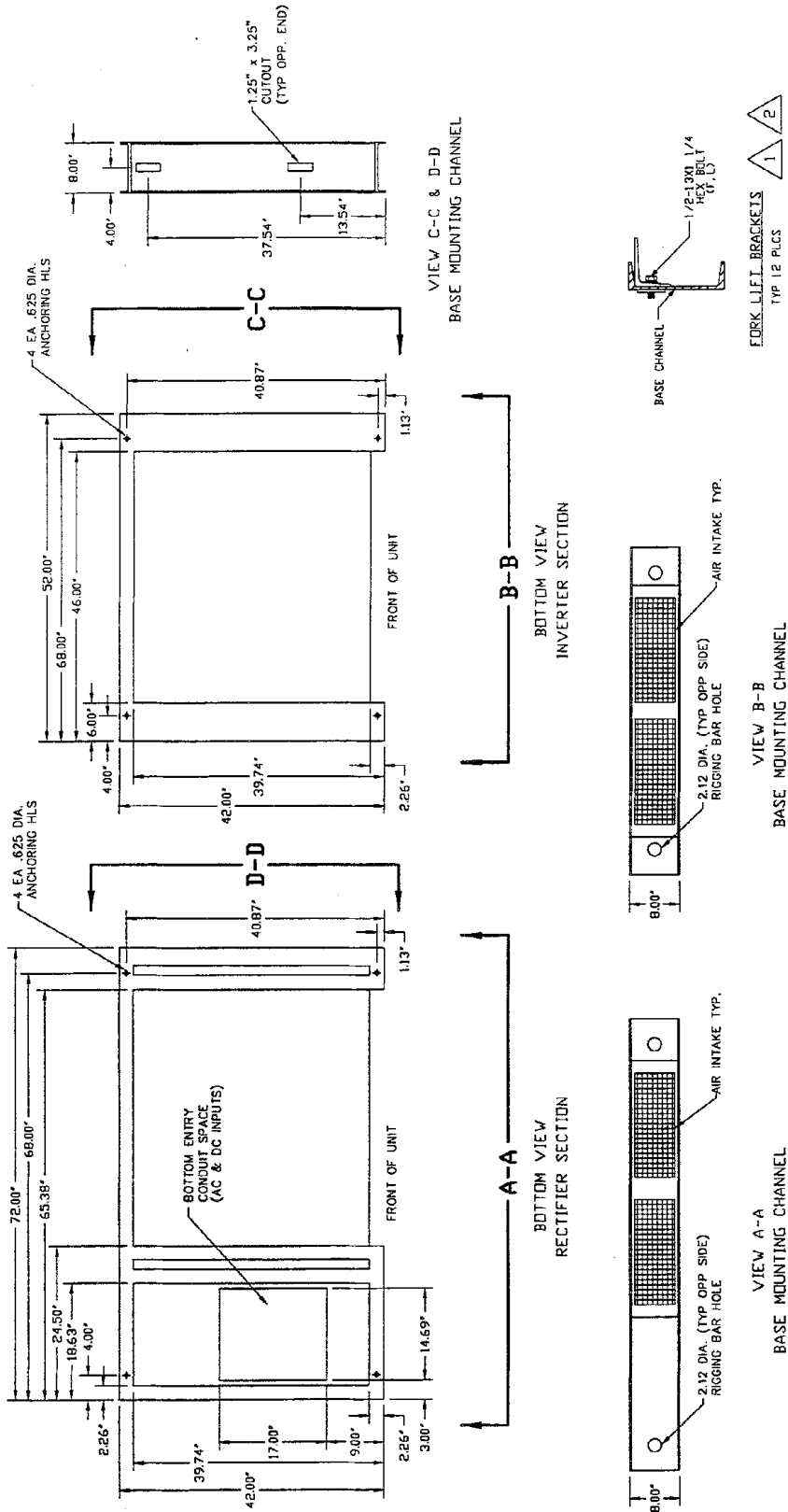
FILE NAME: DM61306.DWG

Figure 16 Base Mounting Details, 625 kVA and 750 kVA (High Link - 240 Cells)



| | | | |
|---|--|--------------------|--|
| DRAWN BY B FISH | | SHEET NO 1 OF 1 | |
| CHK BY J CAMPBELL | | ECN NO | |
| DES APVL DM61307 | | REF. DWG. | |
| TITLE BASE MOUNTING DETAILS 625 AND 750 (HL) KVA ALL VOLTAGES SINGLE AND MULTI MODULE SERIES 600 | | | |
| DWG. NO. 88-791613-07 | | DATE 06/14/95 | |
| REV. NO. 1 | | ORDER NO. | |
| 9650 JERONIMO RD. IRVINE, CALIFORNIA 92718 | | | |

Figure 17 Base Mounting Details, 750 kVA (Low Link - 180 Cells) and 1000 kVA, Rectifier and Inverter Sections



NOTES:

1. FOR LIFTING PURPOSES, USE ONLY THE ORANGE FORKLIFT BRACKETS OR RIGGING BAR HOLES. DO NOT LIFT FROM AIR INTAKE OUTLETS IN BASE.

2. ALL SHIPPING BRACKETS (PAINTED ORANGE) TO BE REMOVED AT SITE.


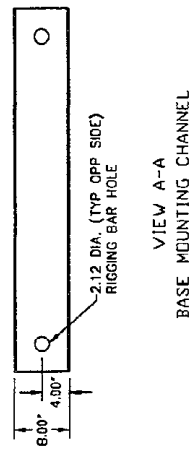
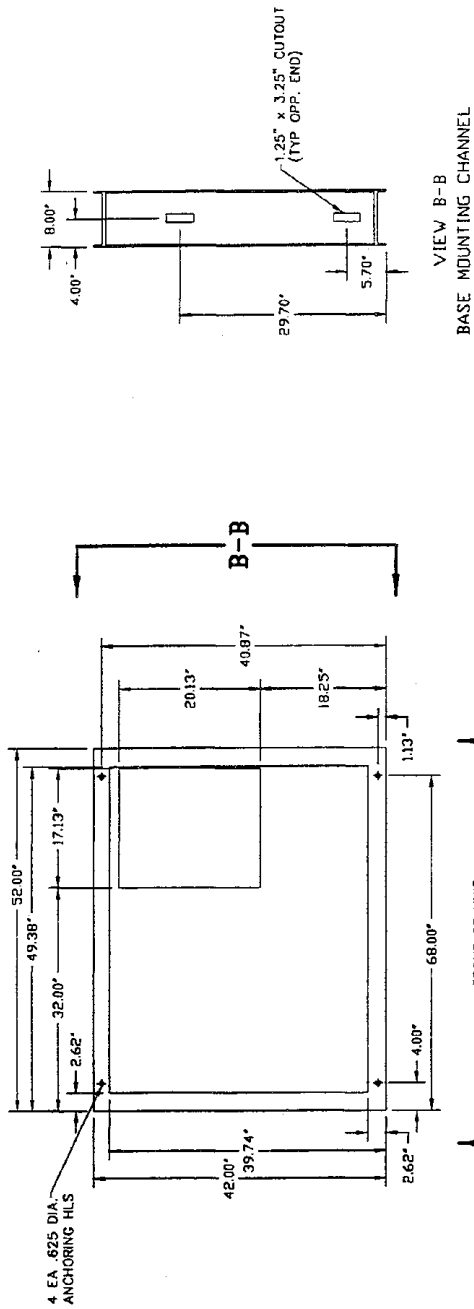

| | | | | | |
|----------------------|--|--------------------------|--|---|--|
| DRAWN BY B FISH | | SHEET NO 1 OF 1 | | TITLE BASE MOUNTING DETAILS 750 (LL) AND 1000 KVA SINGLE AND MULTI MODULE RECTIFIER AND INVERTER SECTIONS SERIES 600 | |
| CHK BY J CAMPBELL | | ECN NO | | DWG. NO. DM61308 | |
| DES APVL | | REF. DWG. | | REV. NO. 1 | |
| | | DWG. NO. 88-791613-08 | | DATE 06/14/95 | |
| | | REV. NO. 1 | | ORDER NO. | |
| | | FILE NAME: DR61308.DWG | |  IRVINE, CALIFORNIA 92718 | |

Figure 18 Base Mounting Details, 750 kVA (Low Link - 180 Cells) and 1000 kVA, Control Section



| | | | |
|----------------------|----------------------|--|------------------|
| DRAWN BY B FISH | SHEET NO 1 OF 1 | TITLE | |
| | | BASE MOUNTING DETAILS 750 (LL) AND 1000 KVA SINGLE AND MULTI MODULE CONTROL SECTION SERIES 600 | |
| CHK BY J CAMPBELL | ECN NO | DWG. NO. 88-791613-09 | DATE 06/14/95 |
| DES APVL | REF. DWG. DM61309 | REV. NO. 1 | ORDER NO. |
| | |  9650 JERONIMO RD. IRVINE, CALIFORNIA 92718 | |

FILE NAME: DM613091.DWG

Figure 19 Shipping Split Detail, 338 kVA

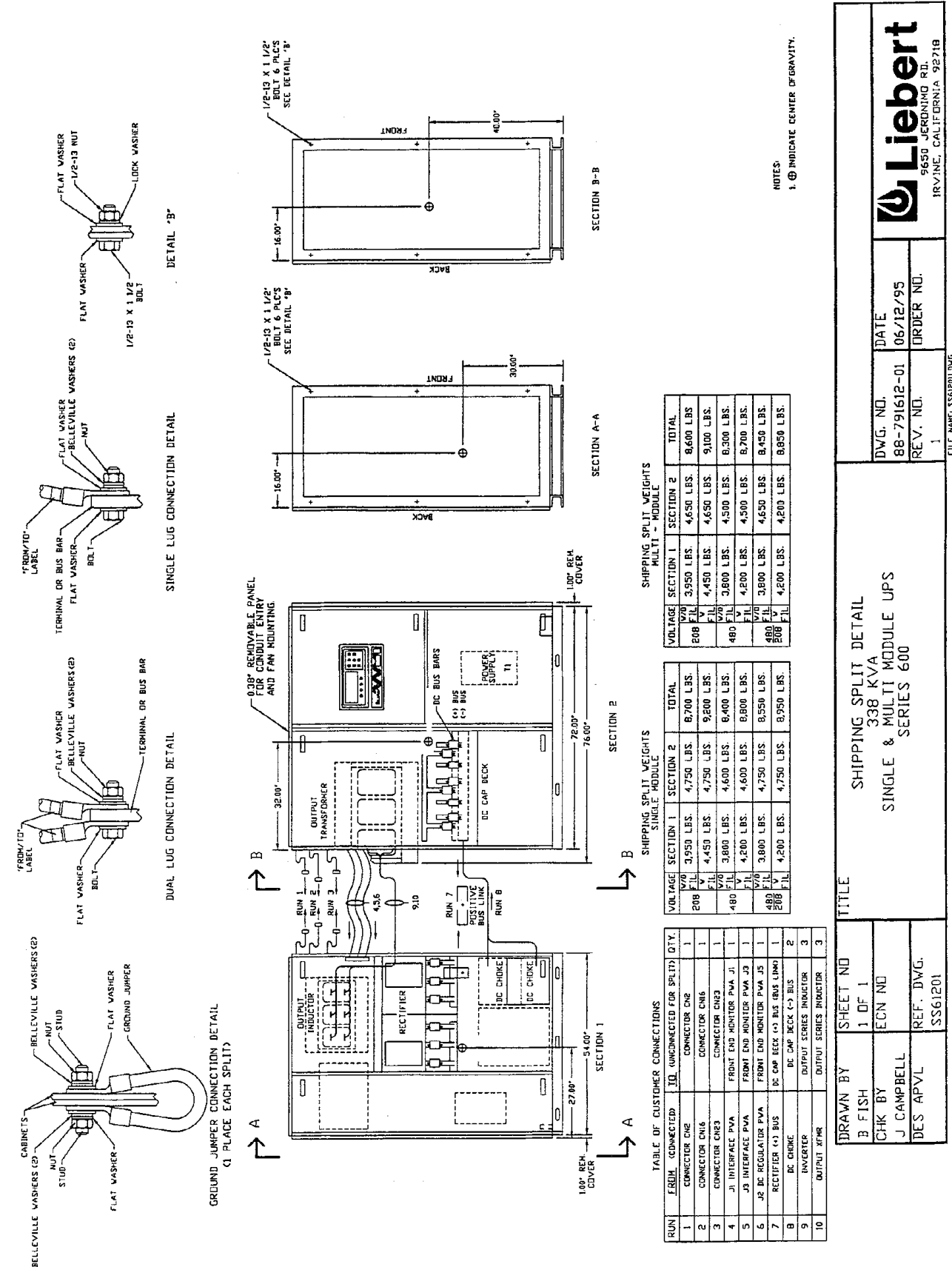


Figure 20 Shipping Split Detail, 400 and 500 kVA

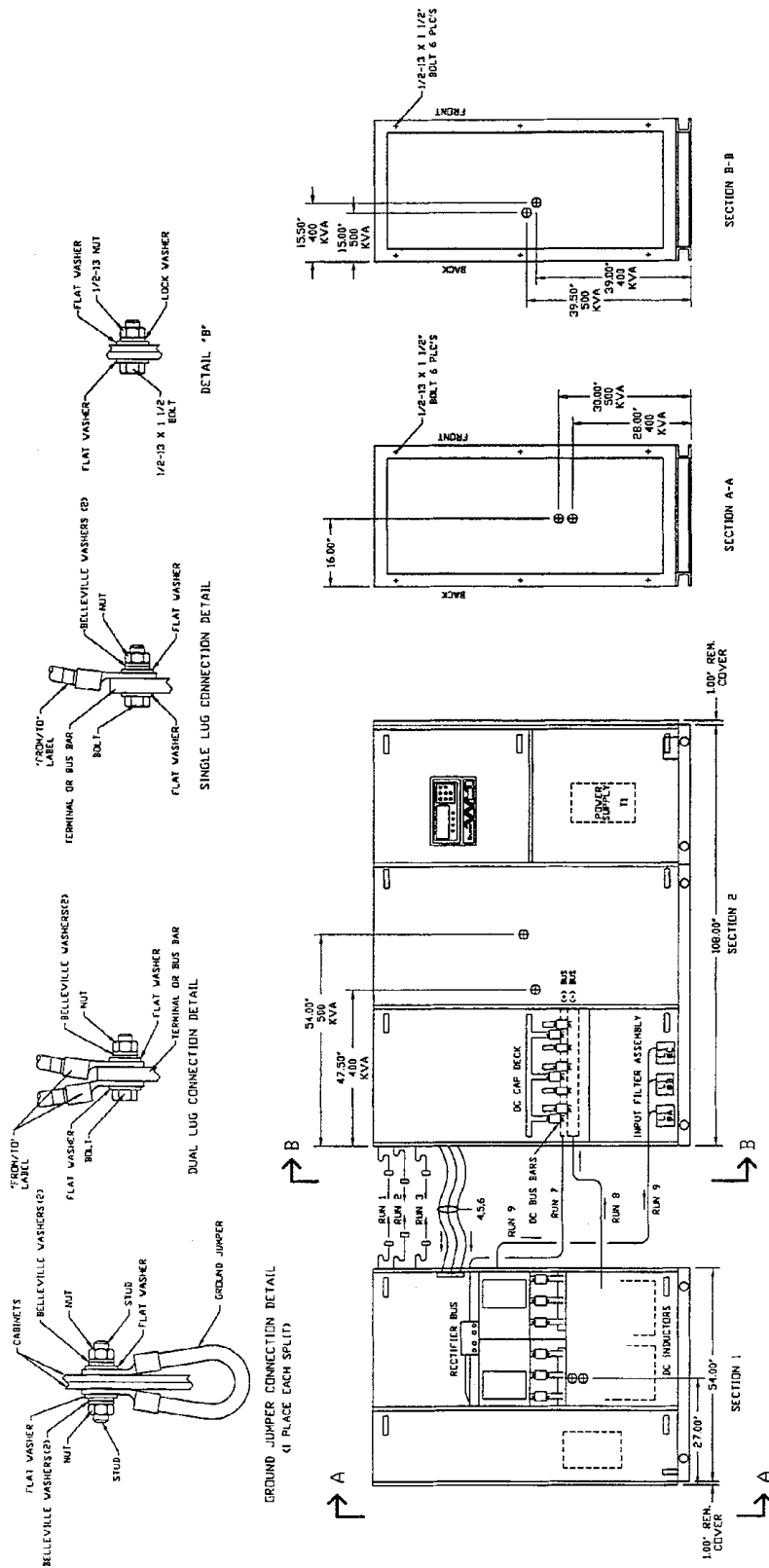


TABLE OF CUSTOMER CONNECTIONS

| RUN # | FROM | CONNECTED TO | QTY. |
|-------|--|-----------------------|------|
| 1 | CONTRACTOR ONE | CONTRACTOR ONE | 1 |
| 2 | CONTRACTOR ONE | CONTRACTOR ONE | 1 |
| 3 | CONTRACTOR ONE | CONTRACTOR ONE | 1 |
| 4 | JT INTERFACE PVA | FRONT END MONITOR PVA | 1 |
| 5 | JT INTERFACE PVA | FRONT END MONITOR PVA | 1 |
| 6 | JT DC REGULATOR PVA | FRONT END MONITOR PVA | 1 |
| 7 | RECTIFIER BUS | DC CAP DECK BUS | 4 |
| 8 | DC CHARGE | DC CAP DECK BUS | 4 |
| 9 | LINE 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20 | INPUT FILTER ASSEMBLY | 3 |

SHIPPING SPLIT WEIGHTS

| KVA | SECTION 1 | SECTION 2 | TOTAL |
|-----|------------|------------|-------------|
| 400 | 4,000 LBS. | 6,050 LBS. | 10,050 LBS. |
| 500 | 4,250 LBS. | 6,850 LBS. | 11,100 LBS. |

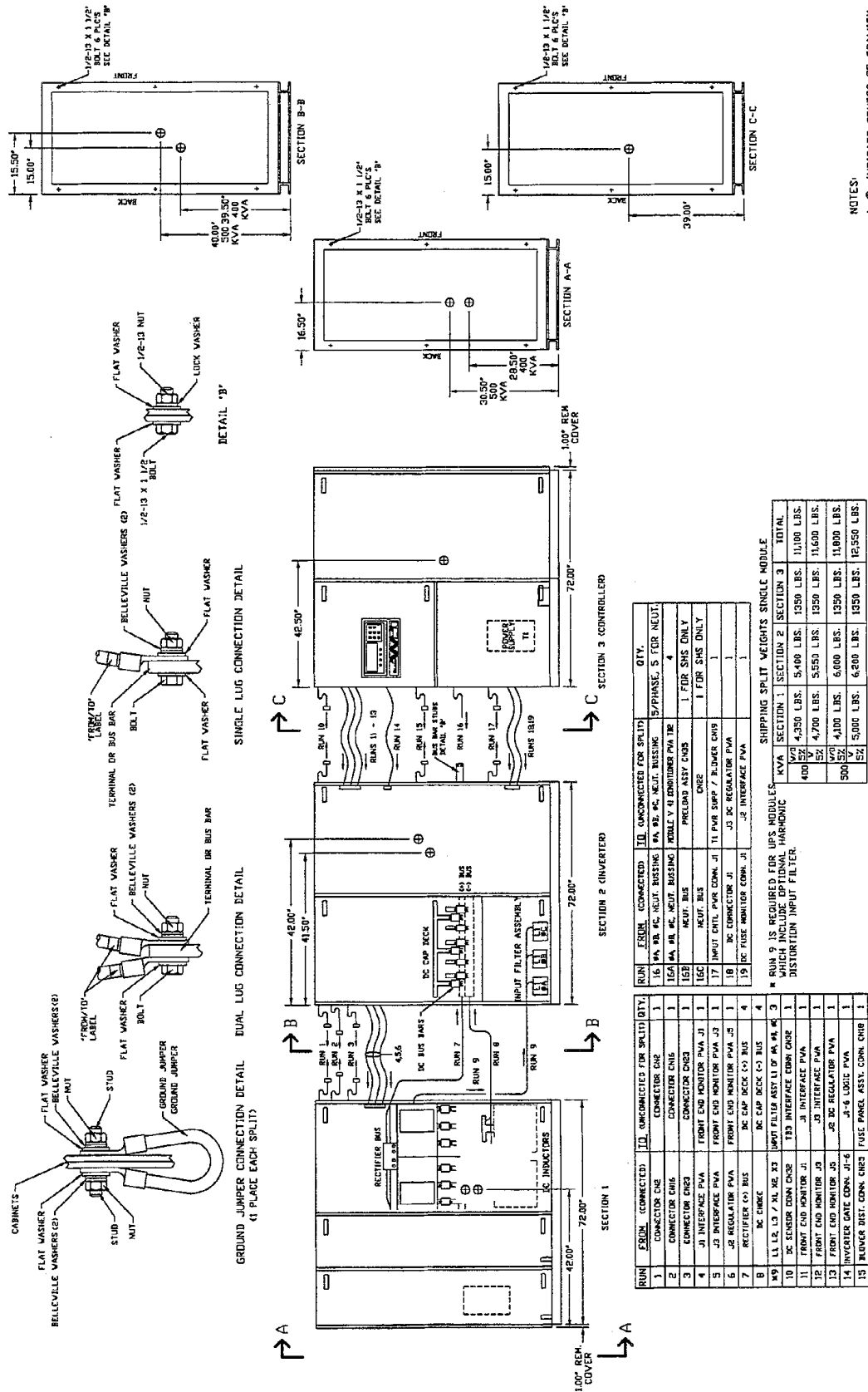
NOTES
1. ⊕ INDICATE CENTER OF GRAVITY

| | | | |
|--------------------|----------------------|---|------------------|
| DRAWN BY B FISH | SHEET NO 1 OF 1 | TITLE SHIPPING SPLIT DETAIL 400 AND 500 KVA SINGLE MODULE UPS 480 V AND 600 V SERIES 600 | |
| | | CHK BY J CAMPBELL | ECN NO |
| DES APVL | REF. DWG. SS61202 | DWG. NO. 88-791612-02 | DATE 06/12/95 |
| | | REV. NO. 1 | ORDER NO. |

FILE NAME: SSS61202.DWG

Liabert
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IRVINE, CALIFORNIA 92718

Figure 21 Shipping Split Detail, 400 and 500 kVA, 208 VAC



NOTES:
1. ⊕ INDICATE CENTER OF GRAVITY.

| RUN | FROM | TO | QUANTITY (QTY) |
|-----|--------------------------|--------------------------------|----------------|
| 1 | CONNECTOR CH2 | CONNECTOR CH2 | 1 |
| 2 | CONNECTOR CH3 | CONNECTOR CH3 | 1 |
| 3 | CONNECTOR CH3 | CONNECTOR CH3 | 1 |
| 4 | J1 INTERFACE PVA | FRONT END MONITOR PVA J1 | 1 |
| 5 | J2 INTERFACE PVA | FRONT END MONITOR PVA J2 | 1 |
| 6 | J3 INTERFACE PVA | FRONT END MONITOR PVA J3 | 1 |
| 7 | RECTIFIER C2 BUS | DC CAP SOCK C2 BUS | 4 |
| 8 | DC CHARGE | DC CAP SOCK C2 BUS | 4 |
| 9 | J1, J2, J3 / XL 28 X3 | INPUT FILTER ASST 11 OF PVA 46 | 3 |
| 10 | DC SURGE DAMP CH2 | T23 INTERFACE COMB CH2 | 1 |
| 11 | FRONT END MONITOR J3 | J3 INTERFACE PVA | 1 |
| 12 | FRONT END MONITOR J3 | J3 INTERFACE PVA | 1 |
| 13 | FRONT END MONITOR J3 | J3 DC REGULATOR PVA | 1 |
| 14 | INVERTER GATE CONN. J1-6 | J1-6 LOGIC PVA | 1 |
| 15 | INVERTER DIST. CONN. CH2 | FUSE PANEL ASST. CONN. CH2 | 1 |

| RUN | FROM | TO | QUANTITY (QTY) |
|-----|--------------------------|------------------------|---------------------|
| 16 | PVA 46 DC INPUT BUSING | PVA 46 DC INPUT BUSING | 5/PHASE, 5 FOR NEUT |
| 17 | DC INPUT BUS | PRELOAD ASST CH2S | 1 FOR SHS ONLY |
| 18 | DC INPUT BUS | DC REGULATOR PVA | 1 FOR SHS ONLY |
| 19 | DC FUSE MONITOR CONN. J1 | J1 INTERFACE PVA | 1 |

| SHIPPING SPLIT WEIGHTS SINGLE MODULE | | | | |
|--------------------------------------|------------|------------|-----------|-------------|
| KVA | SECTION 1 | SECTION 2 | SECTION 3 | TOTAL |
| 400 | 4,350 LBS. | 5,400 LBS. | 1350 LBS. | 11,100 LBS. |
| 500 | 4,700 LBS. | 5,550 LBS. | 1350 LBS. | 11,600 LBS. |
| 500 | 4,100 LBS. | 6,000 LBS. | 1350 LBS. | 11,800 LBS. |
| 500 | 5,000 LBS. | 6,200 LBS. | 1350 LBS. | 12,550 LBS. |

* RUN 9 IS REQUIRED FOR UPS MODULES WHICH INCLUDE OPTIONAL HARMONIC DISTURBANCE INPUT FILTER.

| | | | |
|--|--|--------------------|--|
| DRAWN BY B FISH | | SHEET NO 1 OF 1 | |
| CHK BY J CAMPBELL | | ECN NO | |
| DES APVL SS61205 | | REF. DWG. | |
| TITLE SHIPPING SPLIT DETAIL 400 AND 500 KVA SINGLE MODULE UPS 208 V INPUT - 208 / 120 V OUTPUT SERIES 600 | | | |
| DWG. NO. 88-791612-05 | | DATE 06/13/95 | |
| REV. NO. 1 | | ORDER NO. | |



FILE NAME: SSG6RSL.DWG

Figure 22 Shipping Split Detail, 625 kVA

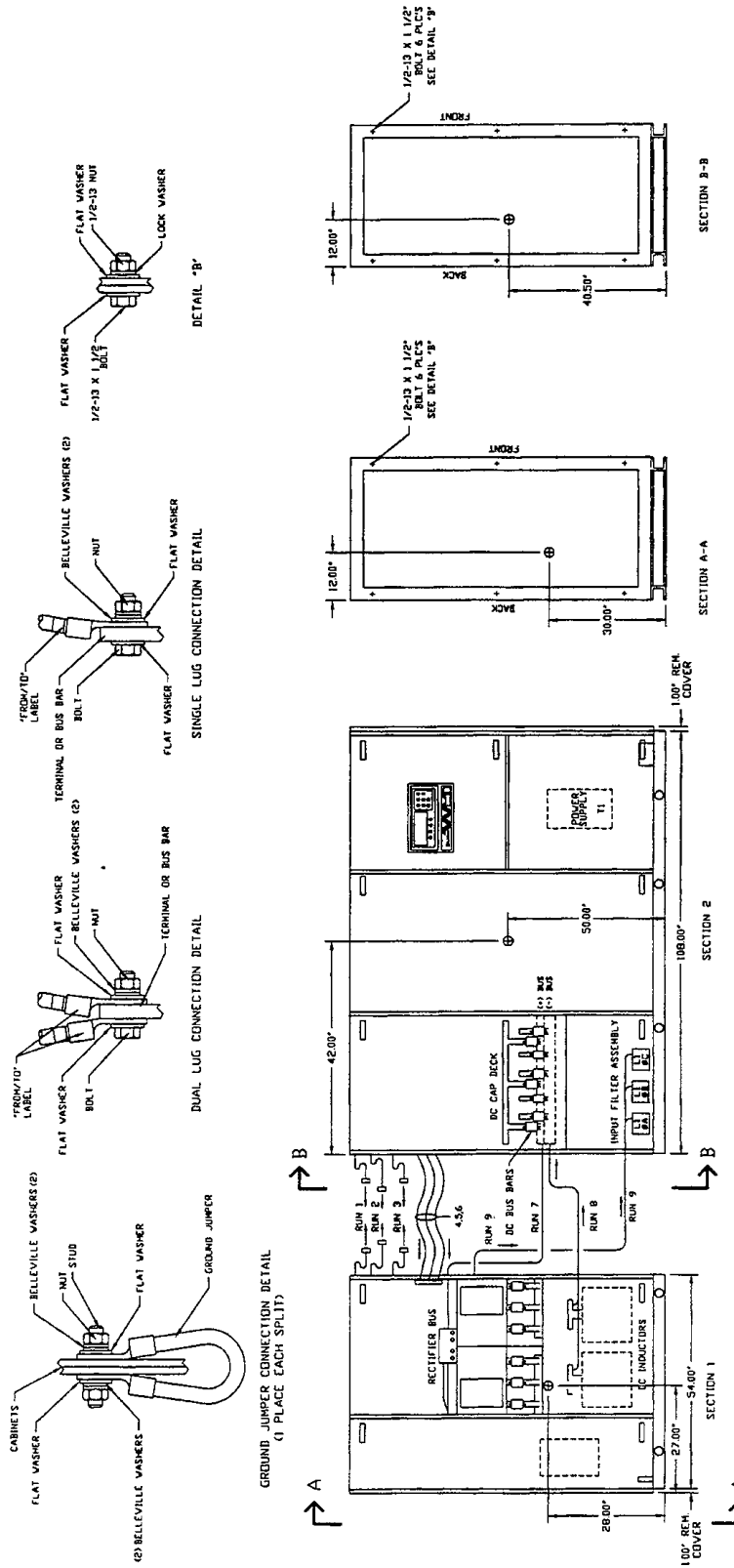


TABLE OF CUSTOMER CONNECTIONS

| FROM | CONNECTED TO | UNCONNECTED FOR SPLIT QTY. |
|------|------------------------|----------------------------|
| 1 | CONNECTOR ENG | 1 |
| 2 | CONNECTOR ENG | 1 |
| 3 | CONNECTOR ENG | 1 |
| 4 | J1 INTERFACE PVA | 1 |
| 5 | J2 INTERFACE PVA | 1 |
| 6 | J2 DC REGULATOR PVA | 1 |
| 7 | RECTIFIER (-) BUS | 4 |
| 8 | DC CHARGE | 4 |
| 9 | LINE (L1, L2, L3) (0%) | 3 |

SHIPPING SPLIT WEIGHTS SINGLE MODULE

| KVA | SECTION 1 | SECTION 2 | TOTAL |
|-----|------------|------------|-------------|
| 625 | 4,500 LBS. | 8,000 LBS. | 12,500 LBS. |
| | 4,900 LBS. | 8,250 LBS. | 13,150 LBS. |

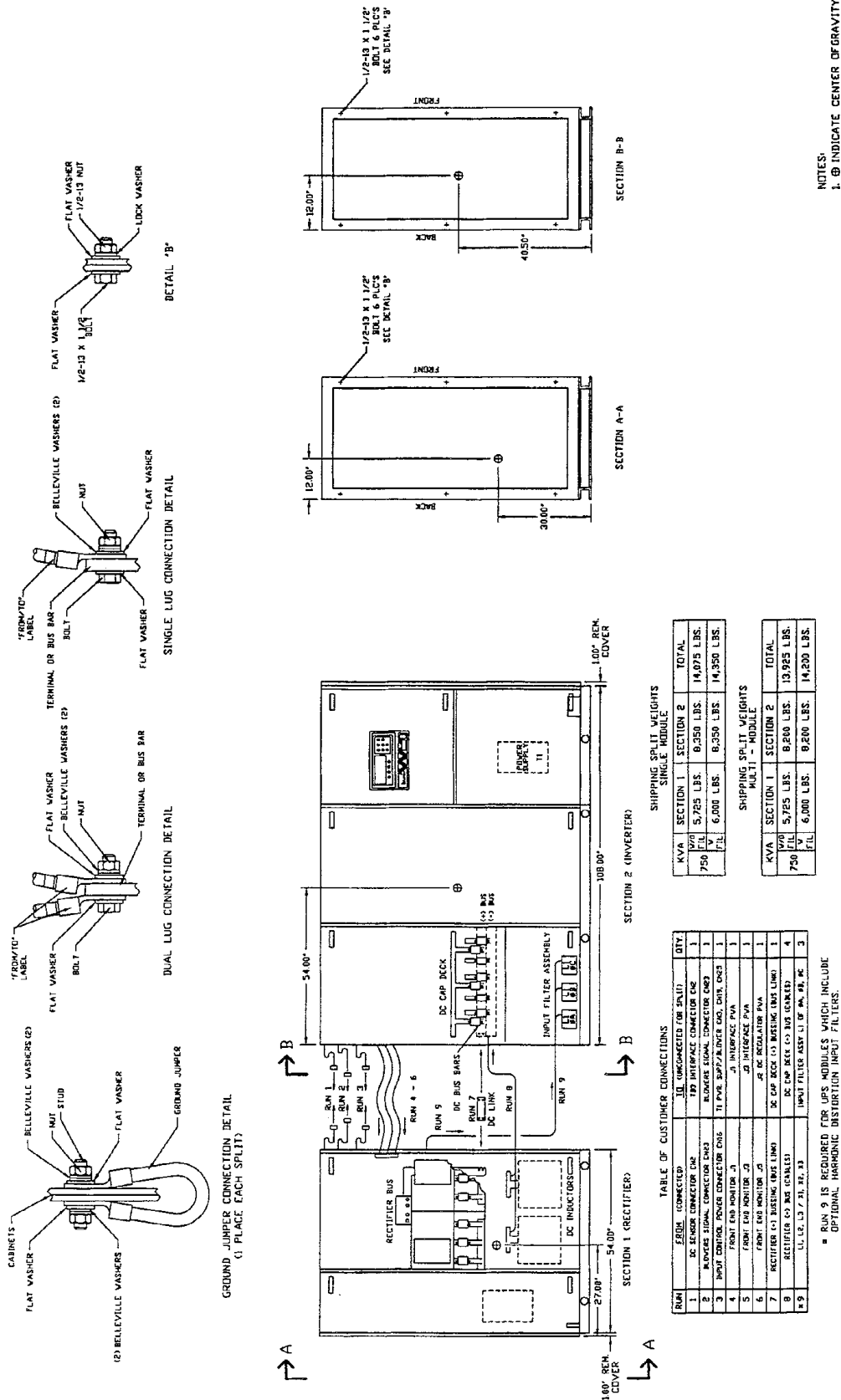
SHIPPING SPLIT WEIGHTS MULTI MODULE

| KVA | SECTION 1 | SECTION 2 | TOTAL |
|-----|------------|------------|-------------|
| 625 | 4,500 LBS. | 7,800 LBS. | 12,300 LBS. |
| | 4,900 LBS. | 8,050 LBS. | 12,950 LBS. |

NOTES:
1. ⊕ INDICATE CENTER OF GRAVITY.

| | | | | | |
|----------------------|--------------------|---|-----------|--------------------------|------------------|
| DRAWN BY B FISH | SHEET NO 1 OF 1 | SHIPPING SPLIT DETAIL 625 KVA SINGLE AND MULTI MODULE UPS SERIES 600 | | DWG. NO. 88-791612-07 | DATE 06/13/95 |
| CHK BY J CAMPBELL | ECN NO | REV. NO. 1 | ORDER NO. | IRVINE, CALIFORNIA 92718 | |
| DES APVL SS61207 | REF. DWG. | FILE NAME: SSS08071.DWG | | | |

Figure 23 Shipping Split Detail, 750 kVA (High Link - 240 Cells)



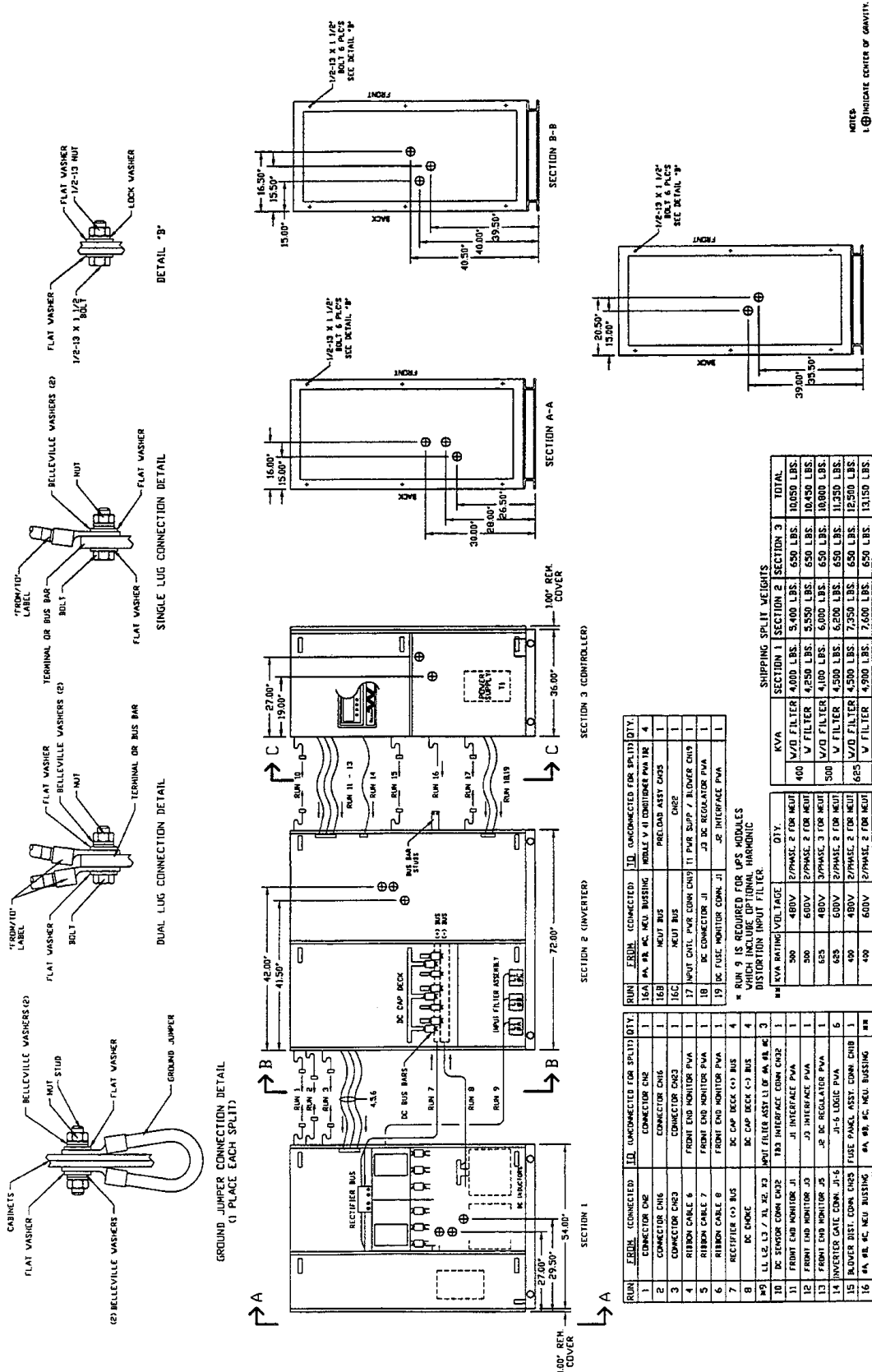
NOTES:
1. Ⓞ INDICATE CENTER OF GRAVITY.


| | | | | | |
|-----------------------|--|--------------------|--|---|--|
| DRAWN BY B. FISH | | SHEET NO 1 OF 1 | | TITLE SHIPPING SPLIT DETAIL | |
| CHK BY J. CAMPBELL | | ECN NO | | 750 KVA - 240 CELL SINGLE AND MULTI MODULE UPS SERIES 600 | |
| DES APVL SS61208 | | REF. DWG. | | DWG. NO. 88-791612-08 | |
| | | DATE 06/13/95 | | ORDER NO. | |



FILE NAME: SS61208.DWG

Figure 25 Optional Lug Shipping Split Detail, 400 to 625 kVA





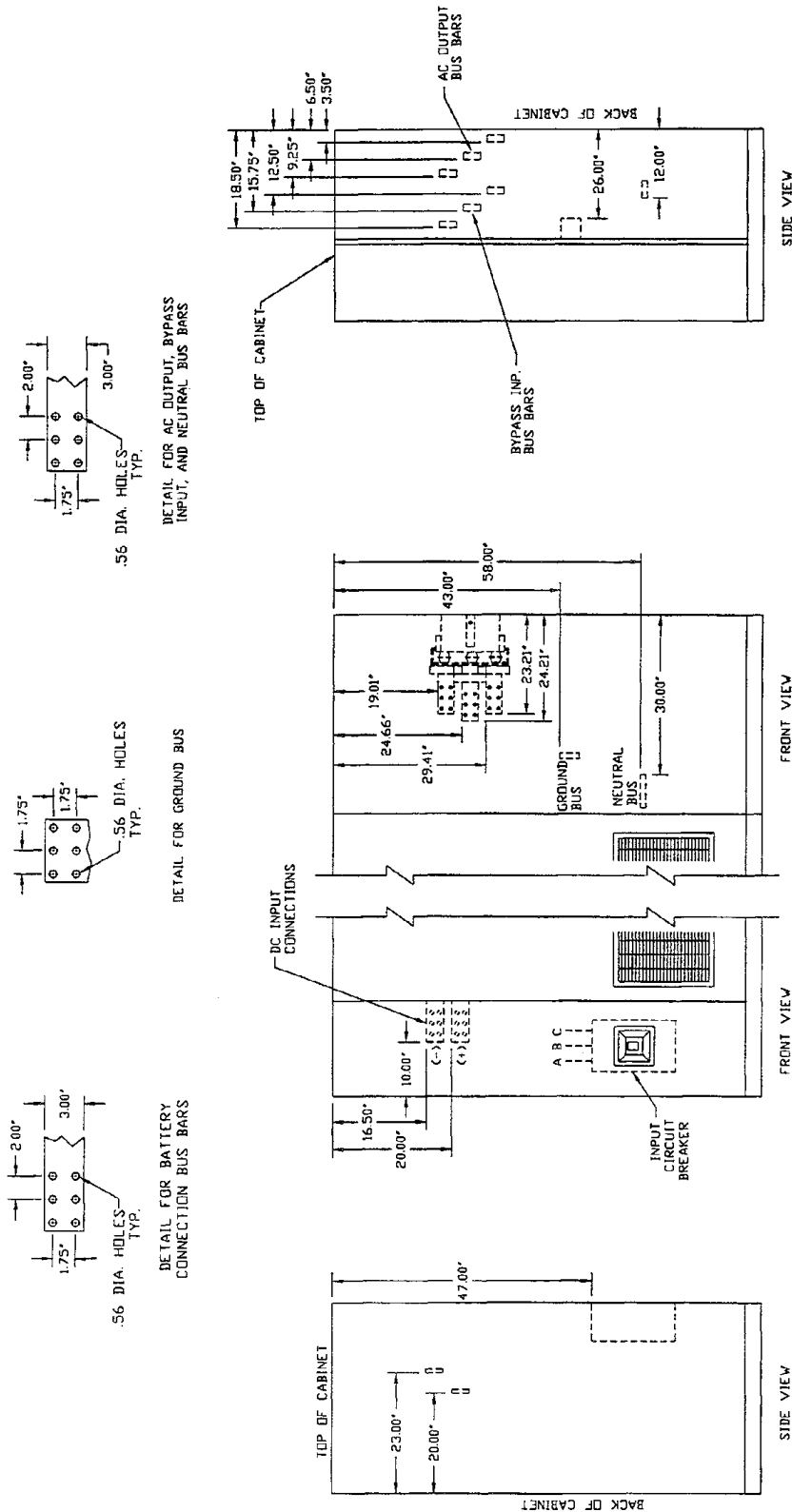
Liebert
9650 JERONIMO RD.
IRVINE, CALIFORNIA 92718

| | | |
|--------------------------|------------------------|-----------|
| DWG. NO. 88-791612-10 | DATE 06/13/95 | ORDER NO. |
| REV. NO. 1 | FILE NAME: S861210.DWG | |

SHIPPING SPLIT DETAIL
400, 500 AND 625 KVA
SINGLE MODULE UPS
WITH OPTIONAL 2ND SHIPPING SPLIT
480V AND 600V
SERIES 600

| | | |
|------------------------|----------------------|-------|
| DRAWN BY B. FISH | SHEET NO 1 OF 1 | TITLE |
| CHK BY J. CAMPBELL | ECN NO | |
| DES. APVL DES. APVL | REF. DWG. SS61210 | |

Figure 27 Bussing Details, 338 kVA



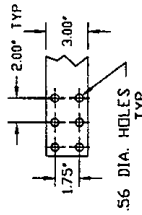
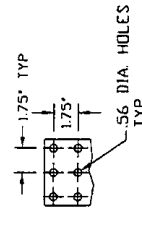
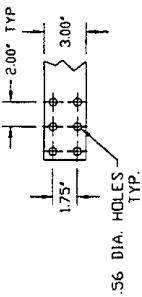
- NOTES:
1. FOR CONNECTION TO BUS BARS, LUGS TO BE PROVIDED BY OTHERS.
 2. ALL DIMENSIONS ARE IN INCHES.
 3. FOR OUTLINE DETAILS REFER TO DRAWING 88-791640-63.

| | | | |
|-----------------------|----------------------|--|------------------|
| DRAWN BY D. MCKAY | SHEET NO 1 OF 1 | TITLE BUSSEING DETAILS 338 KVA SINGLE MIDDLE UPS 480 V AND 600 V SERIES 600 | |
| CHK BY J. CAMPBELL | ECN NO | DWG. NO. 88-791640-74 | DATE 02/07/95 |
| DES APVL | REF. DWG. DB64074 | REV. NO. 1 | ORDER NO. |
| | | 9650 JERONIMO RD. IRVINE, CALIFORNIA 92718 | |

FILE NAME: DB64074.DWG

Figure 28 Bussing Details, 400 kVA

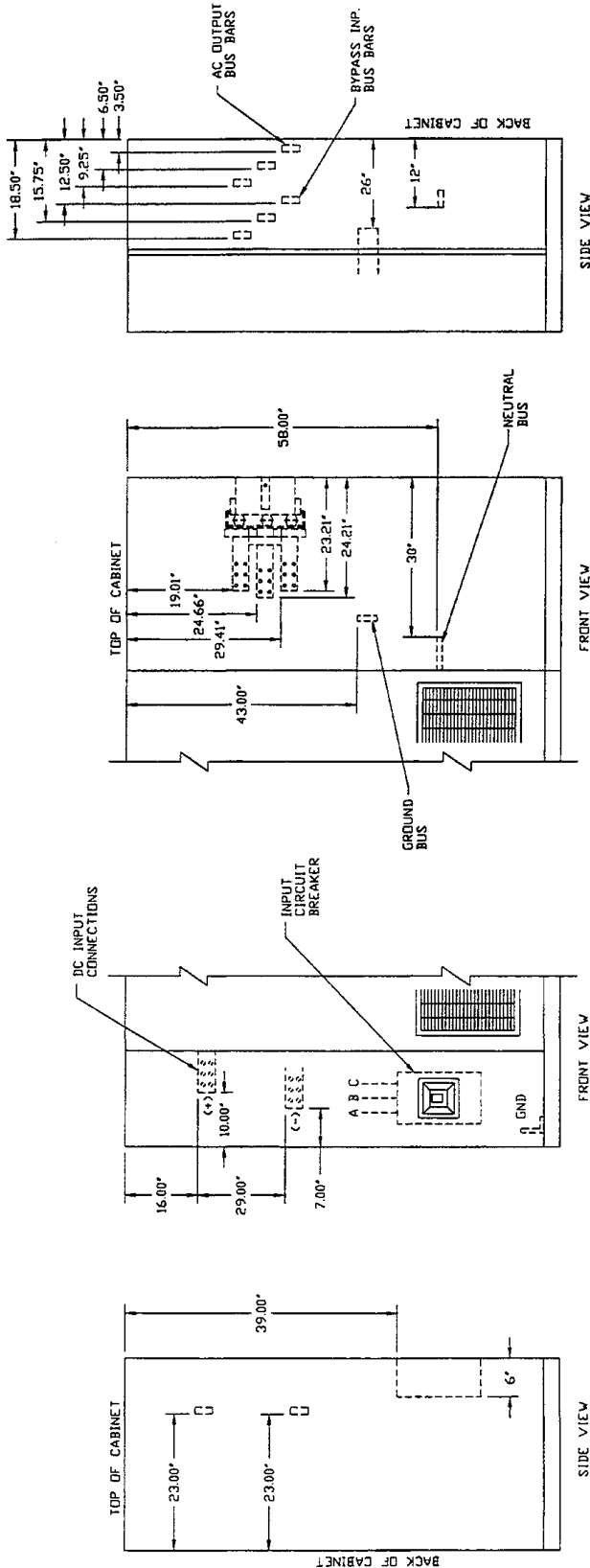
- NOTES:
 1. FOR CONNECTION TO BUS BARS, LUGS TO BE PROVIDED BY OTHERS.
 2. ALL DIMENSIONS ARE IN INCHES.
 3. FOR OUTLINE DETAILS SEE DWG 88-791649-64.



DETAIL FOR BATTERY CONNECTION BUS BARS

DETAIL FOR GROUND BUS

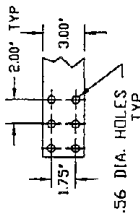
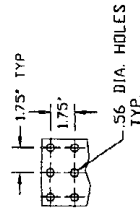
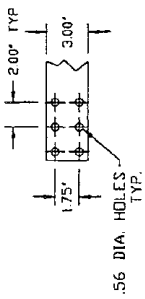
DETAIL FOR AC OUTPUT, BYPASS AND NEUTRAL BUS BARS



| | | | | | |
|--------------------------|--|-------------------------|--|--|--|
| DRAWN BY B FISH | | SHEET NO 1 OF 1 | | TITLE BUSSING DETAILS | |
| CHK BY J CAMPBELL | | ECN NO | | 400 KVA SINGLE MODULE UPS | |
| DES APVL DB64974 | | REF. DWG. DB64974 | | 480 V AND 600 V SERIES 600 | |
| DWG. NO. 88-791649-74 | | DATE 05/22/95 | | ORDER NO. | |
| REV. NO. 1 | | FILE NAME: 06649741.DWG | | 9650 JERICHO RD. IRVINE, CALIFORNIA 92718 | |

Figure 29 Bussing Details, 500 kVA

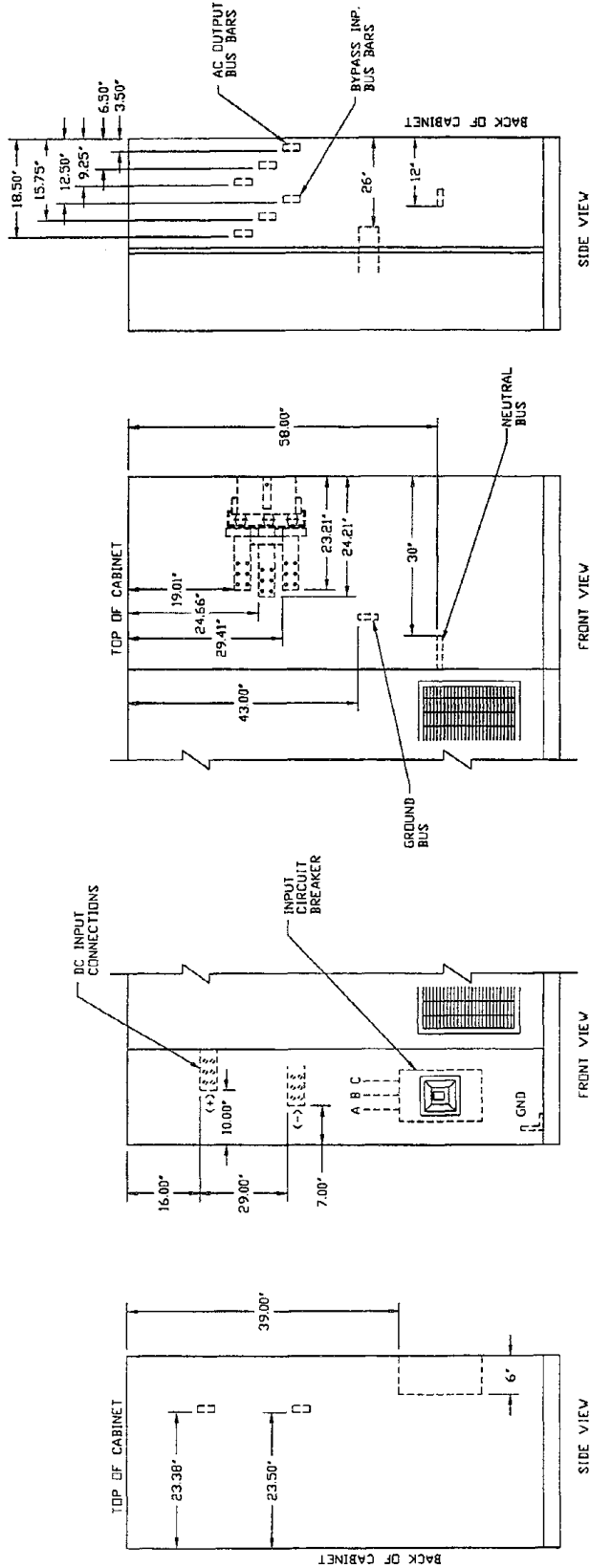
- NOTES:
1. FOR CONNECTION TO BUS BARS, LUGS TO BE PROVIDED BY OTHERS.
 2. ALL DIMENSIONS ARE IN INCHES.
 3. FOR OUTLINE DETAILS SEE DWG 88-791659-64.



DETAIL FOR BATTERY CONNECTION BUS BARS

DETAIL FOR GROUND BUS

DETAIL FOR AC OUTPUT, BYPASS AND NEUTRAL BUS BARS




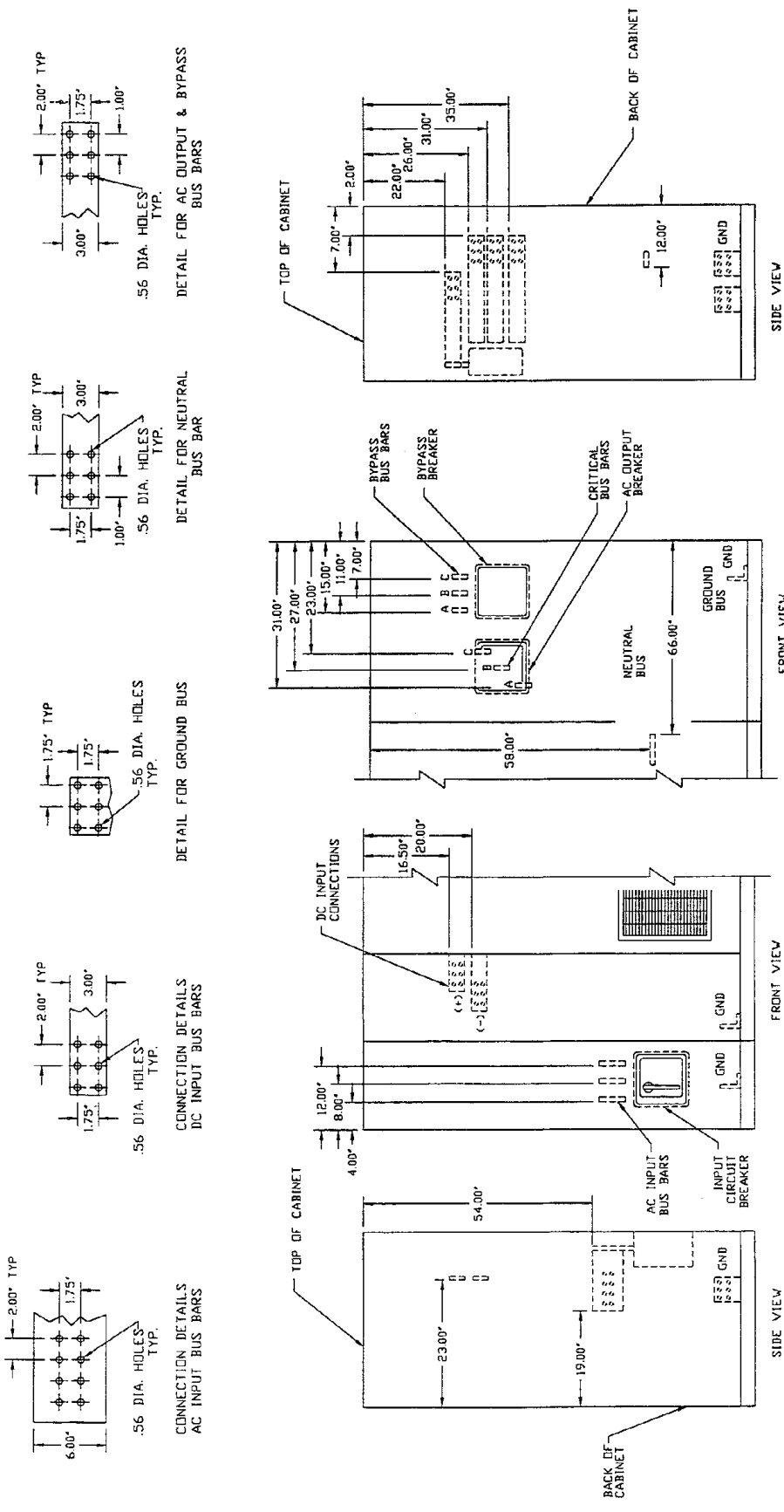
| | | | | | |
|----------------------|--|----------------------|--|--|--|
| DRAWN BY B FISH | | SHEET NO 1 OF 1 | | TITLE BUSSING DETAILS | |
| CHK BY J CAMPBELL | | ECN NO | | 500 KVA SINGLE MODULE UPS 480 V AND 600 V SERIES 600 | |
| DES APVL | | REF. DWG. DB65974 | | DWG. NO. 88-791659-74 | |
| | | | | DATE 05/30/95 | |
| | | | | ORDER NO. | |
| | | | | REV. NO. 1 | |
| | | | | FILE NAME: db65974.dwg | |
| | | | |  9650 JERONIMO RD. IRVINE, CALIFORNIA 92718 | |

Figure 30 Bussing Details, 500 kVA, 208 VAC



- NOTES:
1. FOR CONNECTION TO BUS BARS, LUGS TO BE PROVIDED BY OTHERS.
 2. ALL DIMENSIONS ARE IN INCHES.
 3. FOR OUTLINE DETAILS REFER TO DRAWING 88-791659-61.


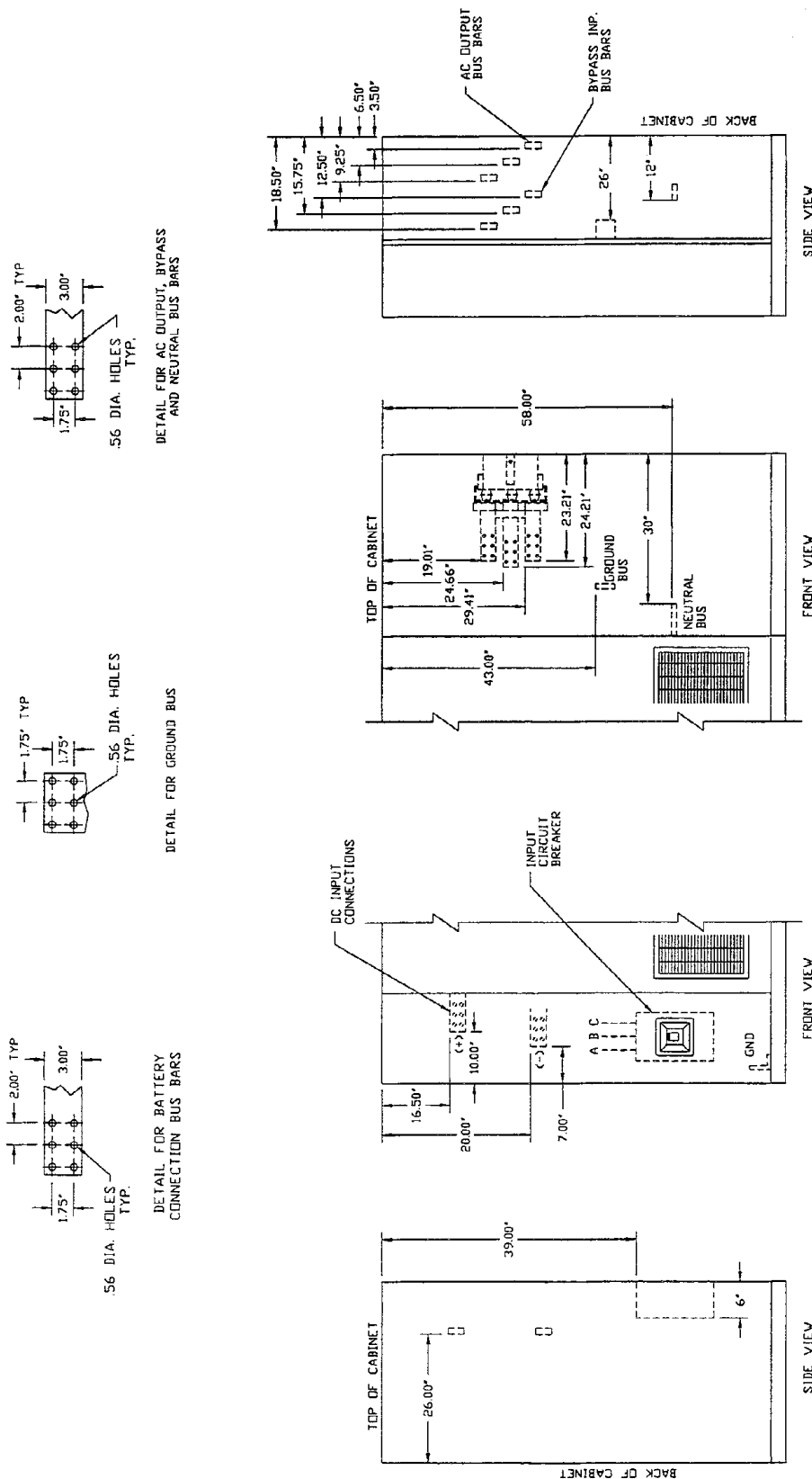
| | | | | | |
|--------------------------|--|--------------------------|--|--|--|
| DRAWN BY B FISH | | SHEET NO 1 OF 1 | | TITLE BUSSING DETAILS | |
| CHK BY J CAMPBELL | | ECN NO | | 500 KVA SINGLE MODULE UPS | |
| DES' APVL | | REF. DWG. DB65971 | | 208 V INPUT - 208 / 120 V OUTPUT SERIES 600 | |
| DWG. NO. 88-791659-71 | | DATE 05/23/95 | | ORDER NO. | |
| REV. NO. 1 | | FILE NAME DB65971.DWG | |  9650 JERONIMO RD. IRVINE, CALIFORNIA 92718 | |

Figure 31 Bussing Details, 625 kVA



- NOTES:
1. FOR CONNECTION TO BUS BARS, LUGS TO BE PROVIDED BY OTHERS.
 2. ALL DIMENSIONS ARE IN INCHES.
 3. FOR OUTLINE DETAILS SEE DWG 88-791671-64.


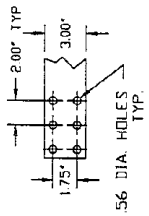
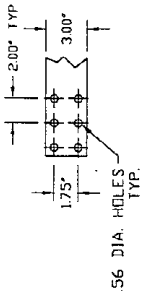
| | | | | | |
|----------------------|--|----------------------|--|--|--|
| DRAWN BY B FISH | | SHEET NO 1 OF 1 | | TITLE BUSSEING DETAILS 625 KVA SINGLE MODULE UPS 480 V AND 600 V SERIES 600 | |
| CHK BY J CAMPBELL | | ECN NO | | DWG. NO. 88-791671-74 | |
| DES APVL | | REF. DWG. DBG7174 | | DATE 05/31/95 | |
| | | | | ORDER NO. | |
| | | | | REV. NO. 1 | |
| | | | | FILE NAME: DBG7174.dwg | |
| | | | |  9650 JERONIMO RD. IRVINE, CALIFORNIA 92718 | |

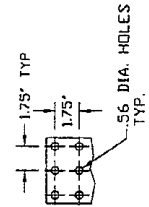
Figure 32 Bussing Details, 750 kVA (High Link - 240 Cells)



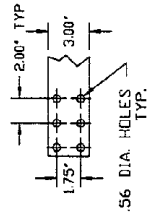
BYPASS INPUT BUS BAR DETAIL



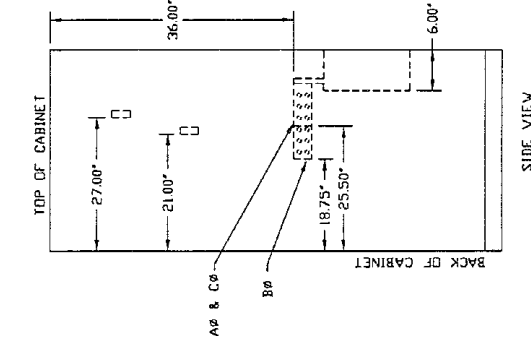
DETAIL FOR BATTERY CONNECTION BUS BARS



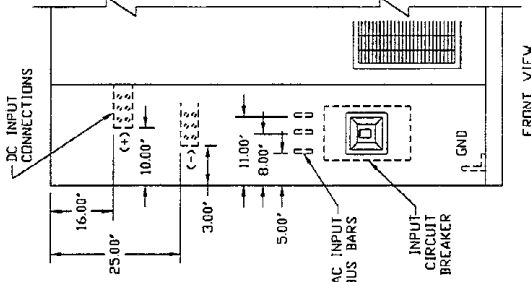
DETAIL FOR GROUND BUS



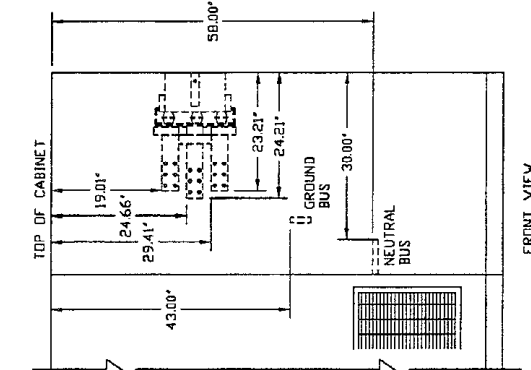
DETAIL FOR AC OUTPUT, BYPASS AND NEUTRAL BUS BARS



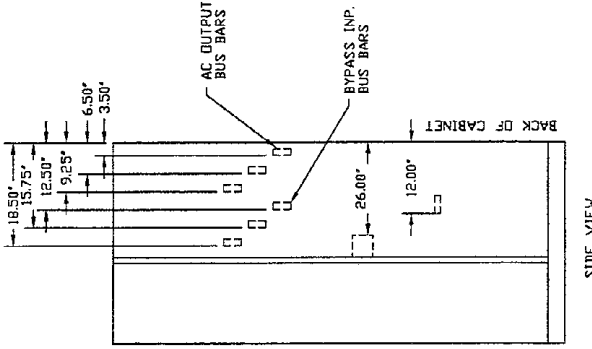
SIDE VIEW



FRONT VIEW



FRONT VIEW

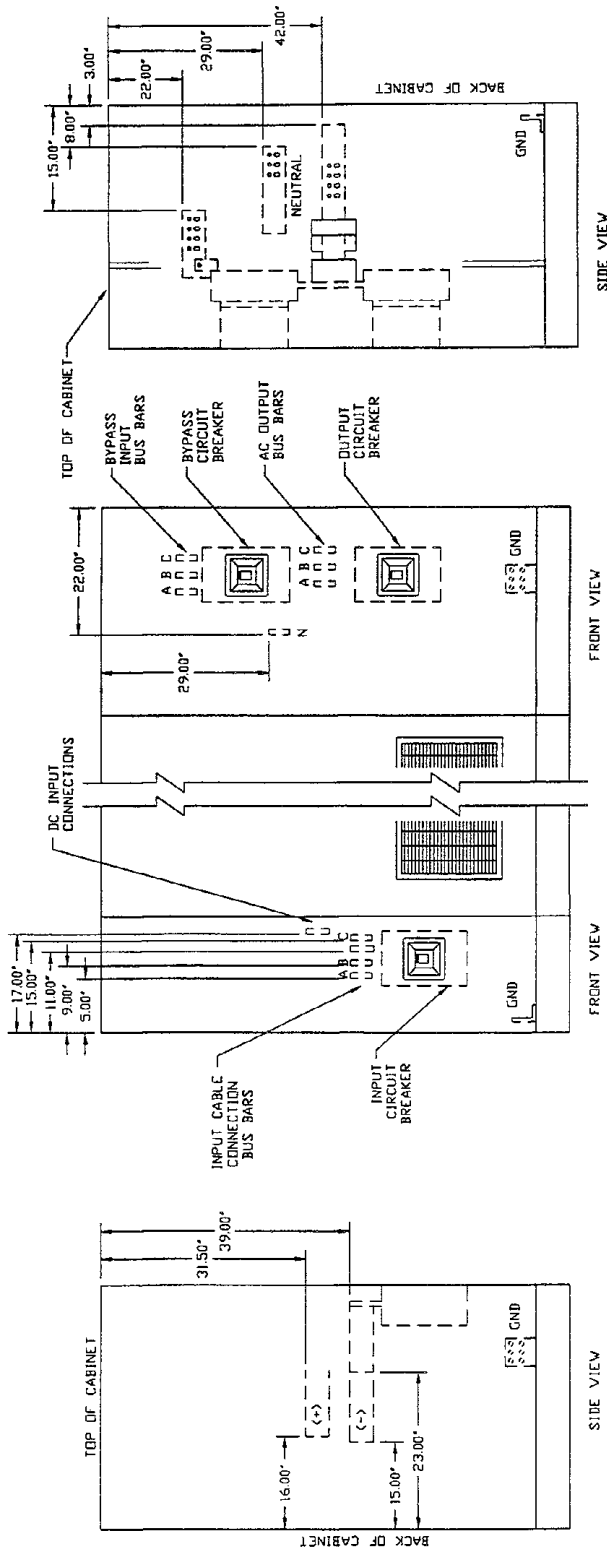
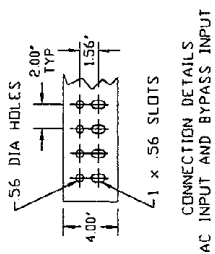
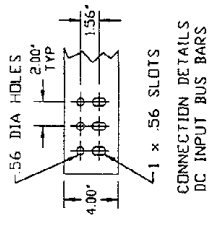
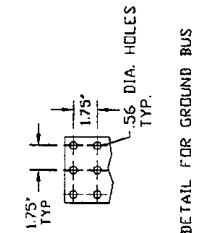
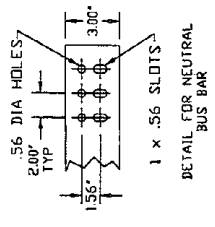
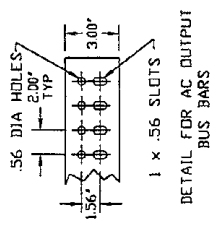


SIDE VIEW

- NOTES:
1. FOR CONNECTION TO BUS BARS, LUGS TO BE PROVIDED BY OTHERS.
 2. ALL DIMENSIONS ARE IN INCHES.
 3. FOR OUTLINE DETAILS REFER TO DRAWING 88-791675-64.

| | | | | | |
|--|--|-----------|--|---|--|
| DRAWN BY | | SHEET NO | | TITLE | |
| B FISH | | 1 OF 1 | | BUSSING DETAILS 750 KVA - 240 CELL SINGLE MODULE UPS 280 V AND 600 V SERIES 600 | |
| CHK BY | | ECN NO | | | |
| J CAMPBELL | | | | | |
| DES APVL | | REF. DWG. | | DBG7574 | |
| DWG. NO. | | DATE | | ORDER NO. | |
| 88-791675-74 | | 06/01/95 | | | |
| REV. NO. | | 1 | | | |
| Liebert 9650 JERONIMO RD. IRVINE, CALIFORNIA 92718 | | | | | |

Figure 33 Bussing Details, 750 kVA (Low Link - 180 Cells)

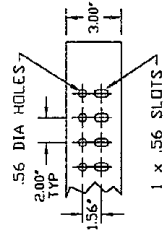


- NOTES:
1. FOR CONNECTION TO BUS BARS, LUGS TO BE PROVIDED BY OTHERS.
 2. ALL DIMENSIONS ARE IN INCHES.
 3. FOR OUTLINE DETAILS REFER TO DRAWING 88-791676-14.

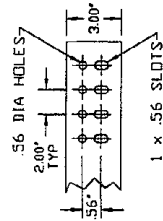
| | | | |
|---------------------|----------------------|---|--------------------------|
| DRAWN BY B FISH | SHEET NO 1 OF 1 | TITLE BUSSING DETAILS 750 KVA - 180 CELL FRONT ACCESS SINGLE MODULE UPS 480 V AND 600 V SERIES 600 | |
| | CHK BY J CAMPBELL | ECN NO | DWG. NO. 88-791676-34 |
| DES APVL DB67634 | REF. DWG. DB67634 | REV. NO. 1 | ORDER NO. |
| | | DATE 06/05/95 | IRVINE, CALIFORNIA 92718 |

FILE NAME: DB67641.DWG

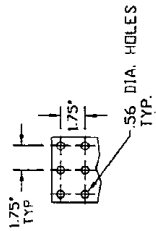
Figure 34 Bussing Details, 1000 kVA



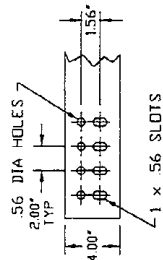
DETAIL FOR AC OUTPUT BUS BARS



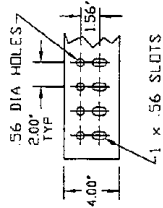
DETAIL FOR NEUTRAL BUS BAR



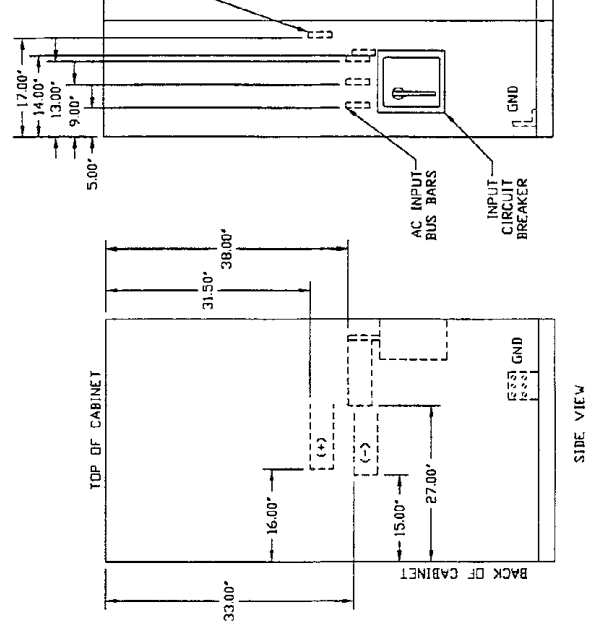
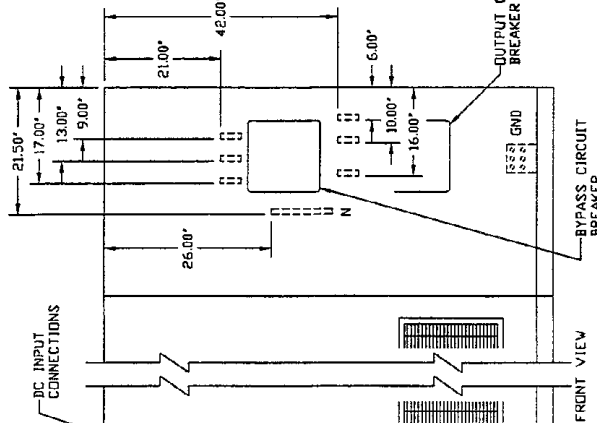
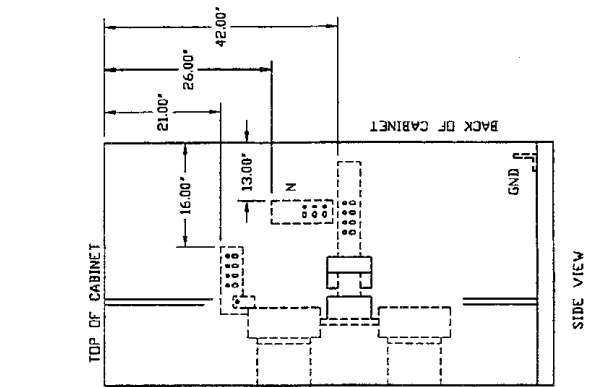
DETAIL FOR GROUND BUS



CONNECTION DETAILS DC INPUT BUS BARS



CONNECTION DETAILS AC INPUT AND BYPASS INPUT BUS BARS



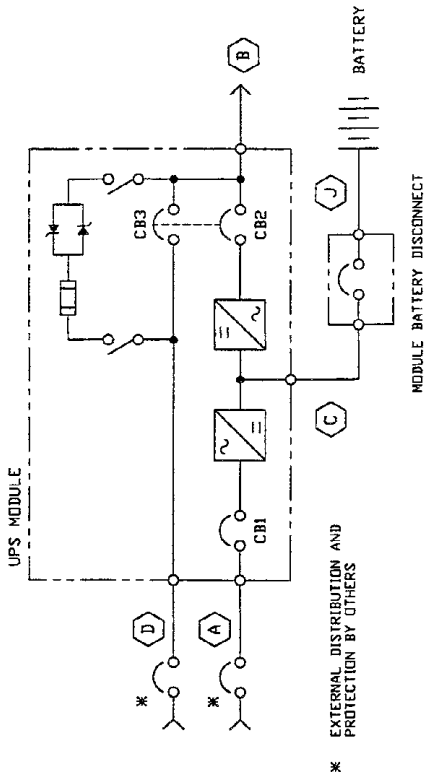
- NOTES:
1. FOR CONNECTION TO BUS BARS, LUGS TO BE PROVIDED BY OTHERS.
 2. ALL DIMENSIONS ARE IN INCHES.
 3. FOR OUTLINE DETAILS REFER TO DRAWING 88-791685-14.

| | | | | | |
|----------------------|--|----------------------|--|---|--|
| DRAWN BY B FISH | | SHEET NO 1 OF 1 | | TITLE BUSSING DETAILS 1000 KVA FRONT ACCESS SINGLE MODULE UPS 480 V AND 600 V SERIES 600 | |
| CHK BY J CAMPBELL | | ECN NO | | DWG. NO. 88-791685-34 | |
| DES APVL | | REF. DWG. DB68534 | | DATE 06/07/95 | |
| | | | | ORDER NO. | |
| | | | | IRVINE, CALIFORNIA 92718 | |

Figure 35 Module One-Line Diagram, 338 kVA

NOTES:

1. NOMINAL CURRENT IS BASED ON FULL RATED OUTPUT LOAD.
2. MAXIMUM CURRENT IS COMBINATION OF SHORT DURATION LOAD CURRENT (NONCONTINUOUS LOAD) FOR BATTERY RECHARGE PLUS NOMINAL FULL LOAD CURRENT (CONTINUOUS LOAD) PER NEC 100.
3. MAXIMUM CURRENT IS COMBINATION OF SHORT DURATION LOAD CURRENT (NONCONTINUOUS LOAD) FOR 10 MINUTE OVERLOAD RATING PLUS NOMINAL FULL LOAD CURRENT (CONTINUOUS LOAD) PER NEC 100.
4. UPS OUTPUT LOAD CABLES MUST BE RUN IN SEPARATE CONDUIT FROM INPUT CABLES.
5. POWER CABLES FROM DC LINK TO BATTERIES SHOULD BE SIZED FOR TOTAL MAXIMUM 2.0 VOLT LINE DROP AT MAXIMUM DISCHARGE CURRENT. MAXIMUM CURRENT AT END OF BATTERY DISCHARGE (300 VDC) IS DEFINED AS NONCONTINUOUS PER NEC 100.
6. GROUNDING CONDUCTORS TO BE SIZED PER NEC 250-95. NEUTRAL CONDUCTOR (IF USED) SHOULD BE SIZED FOR FULL CAPACITY.
7. ALL WIRING IS TO BE IN ACCORDANCE WITH NATIONAL AND LOCAL ELECTRICAL CODES.
8. MODULE BATTERY DISCONNECT IS PROVIDED IN A SEPARATE ENCLOSURE.
9. POWER AND CONTROL WIRING TO BE RUN IN SEPARATE CONDUITS.
10. WHEN A THREE POLE MODULE BATTERY DISCONNECT IS USED, ONE POLE MAY BE USED TO CENTER TAP THE BATTERY STRING. THIS WILL REDUCE THE MAXIMUM VOLTAGE BETWEEN ANY TWO POINTS TO ONE HALF THE STRING VOLTAGE WHEN THE MODULE BATTERY DISCONNECT IS OPEN.
11. BREAKER DESCRIPTIONS
 CBI - SQUARE D TYPE MHL36600, 1000 AF, 600 AT, 65 KAIC.
 CB2 - SQUARE D TYPE MHL36600, 1000 AF, 600 AT, 65 KAIC.
 CB3 - SQUARE D TYPE MHL36600, 1000 AF, 600 AT, 65 KAIC.
12. NOMINAL HEAT GENERATION - 80,131 BTU/HR.



* EXTERNAL DISTRIBUTION AND PROTECTION BY OTHERS

| FEEDER | NOMINAL VOLTAGE | NOMINAL CURRENT | MAXIMUM CURRENT |
|--|-----------------|-----------------|---|
| A AC INPUT TO UPS 3 PHASE, 3 WIRE & GROUND, A-B-C ROTATION (SEE NOTES 1,2,4,6,7) | 480 VAC | 420 A 380 A | 525 A (W/O FILTER) 474 A (WITH FILTER) |
| B AC OUTPUT TO LOAD, 3 PH, 4 WIRE & GROUND, A-B-C PHASE ROTATION (SEE NOTES 1,3,4,6,7), MAXIMUM 10 MIN. @ 125% OF NOMINAL CURRENT. | 480Y/277 VAC | 406 A | 507 A |
| C UPS DC LINK TO MODULE BATTERY DISCONNECT (1) POSITIVE, AND (2) NEGATIVE. (SEE NOTES 5,7,8) | 360 VDC | 800 A | 993 A AT END OF DISCHARGE |
| D AC INPUT TO UPS BYPASS, 3 PHASE, 4 WIRE & GROUND A-B-C PHASE ROTATION (SEE NOTES 1,3,4,6,7) | 480Y/277 VAC | 406 A | 507 A |
| J MODULE BATTERY DISCONNECT TO SYSTEM BATTERY. (1) POSITIVE, AND (2) NEGATIVE AND (3) NEGATIVE FOR CENTER TAP (SEE NOTES 5,7,8,10) | 360 VDC | 800 A | 993 A AT END OF DISCHARGE |

| | | | | |
|----------------------|-----------------------|--|--------------------------|------------------|
| DRAWN BY D. MCKAY | SHEET NO 1 OF 1 | ONE - LINE DIAGRAM 338 KVA / 270 KW SINGLE MODULE UPS 480 V INPUT - 480 / 277 V OUTPUT SERIES 600 | DWG. NO. 97-791640-64 | DATE 02/08/95 |
| | CHK BY J. CAMPBELL | | ECN NO | REV. NO. 1 | ORDER NO. |
| DES' APVL SL64064 | REF. DWG. SL64064 | | | |

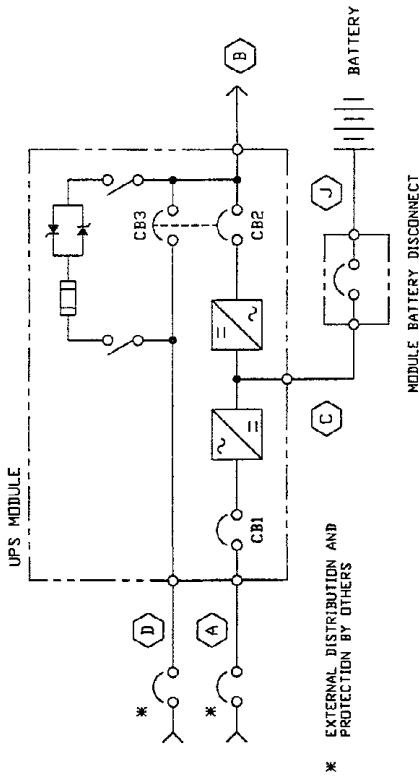


FILE NAME: SL64064.DWG

Figure 36 Module One-Line Diagram, 400 kVA

NOTES:

1. NOMINAL CURRENT IS BASED ON FULL RATED OUTPUT LOAD.
2. MAXIMUM CURRENT IS COMBINATION OF SHORT DURATION LOAD CURRENT (NONCONTINUOUS LOAD) FOR BATTERY RECHARGE PLUS NOMINAL FULL LOAD CURRENT (CONTINUOUS LOAD) PER NEC 100
3. MAXIMUM CURRENT IS COMBINATION OF SHORT DURATION LOAD CURRENT (NONCONTINUOUS LOAD) FOR 10 MINUTE OVERLOAD RATING PLUS NOMINAL FULL LOAD CURRENT (CONTINUOUS LOAD) PER NEC 100.
4. UPS OUTPUT LOAD CABLES MUST BE RUN IN SEPARATE CONDUIT FROM INPUT CABLES.
5. POWER CABLES FROM DC LINK TO BATTERIES SHOULD BE SIZED FOR TOTAL MAXIMUM 2.0 VOLT LINE DROP AT MAXIMUM DISCHARGE CURRENT. MAXIMUM CURRENT AT END OF BATTERY DISCHARGE (300 VDC) IS DEFINED AS NONCONTINUOUS PER NEC 100.
6. GROUNDING CONDUCTORS TO BE SIZED PER NEC 250-95, NEUTRAL CONDUCTOR (IF USED) SHOULD BE SIZED FOR FULL CAPACITY ELECTRICAL CODES.
7. ALL WIRING IS TO BE IN ACCORDANCE WITH NATIONAL AND LOCAL ELECTRICAL CODES.
8. MODULE BATTERY DISCONNECT IS PROVIDED IN A SEPARATE ENCLOSURE.
9. POWER AND CONTROL WIRING TO BE RUN IN SEPARATE CONDUITS.
10. WHEN A THREE POLE MODULE BATTERY DISCONNECT IS USED, ONE POLE MAY BE USED TO CENTER TAP THE BATTERY STRING. THIS WILL REDUCE THE MAXIMUM VOLTAGE BETWEEN ANY TWO POINTS TO ONE HALF THE STRING VOLTAGE WHEN THE MODULE BATTERY DISCONNECT IS OPEN.
11. BREAKER DESCRIPTIONS
 CB1 - SQUARE D TYPE MHL36700, 1000 AF, 700 AT, 65 KAIC.
 CB2 - SQUARE D TYPE MHL36600, 1000 AF, 600 AT, 65 KAIC.
 CB3 - SQUARE D TYPE MHL36600, 1000 AF, 600 AT, 65 KAIC.
12. NOMINAL HEAT GENERATION - 94,970 BTU/HR.



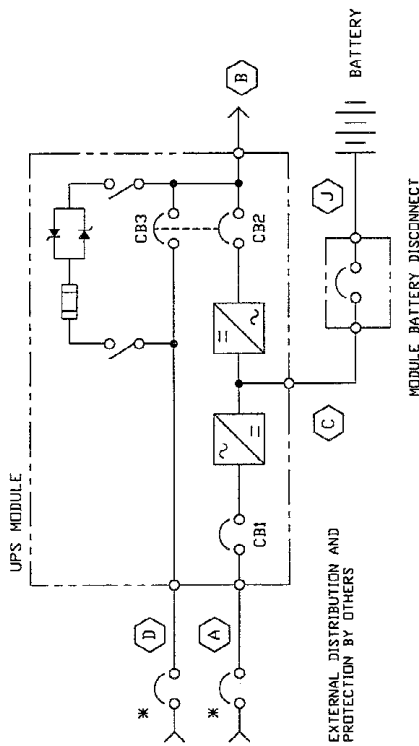
| FEEDER | NOMINAL VOLTAGE | NOMINAL CURRENT | MAXIMUM CURRENT |
|---|-----------------|-----------------|---|
| (A) AC INPUT TO UPS 3 PHASE, 3 WIRE & GROUND. A-B-C ROTATION (SEE NOTES 1,2,4,6,7) | 480 VAC | 504 A 455 A | 630 A (W/O FILTER) 568 A (WITH FILTER) |
| (B) AC OUTPUT TO LOAD, 3 PH, 4 WIRE & GROUND. A-B-C PHASE ROTATION (SEE NOTES 1,3,4,6,7) MAXIMUM 10 MIN. @ 125% OF NOMINAL CURRENT. | 480Y/277 VAC | 481 A | 601 A |
| (C) UPS DC LINK TO MODULE BATTERY DISCONNECT. (1) POSITIVE, AND (1) NEGATIVE. (SEE NOTES 5,7,8) | 360 VDC | 943 A | 1170 A AT END OF DISCHARGE |
| (D) AC INPUT TO UPS BYPASS, 3 PHASE, 4 WIRE & GROUND A-B-C PHASE ROTATION (SEE NOTES 1,3,4,6,7) | 480Y/277 VAC | 481 A | 601 A |
| (E) MODULE BATTERY DISCONNECT TO SYSTEM BATTERY. (1) POSITIVE, AND (1) NEGATIVE AND (1) POSITIVE, AND (1) NEGATIVE FOR CENTER TAP (SEE NOTES 5,7,8,10) | 360 VDC | 943 A | 1170 A AT END OF DISCHARGE |

| | | | |
|----------------------|--|------------------|--|
| DRAWN BY D MCKAY | SHEET NO 1 OF 1 | DATE 02/17/95 | LiBERT 9650 JERONIMO RD. IRVINE, CALIFORNIA 92718 |
| CHK BY J CAMPBELL | ECN NO | REV. NO. 1 | ORDER NO. |
| DES APVL SL64864 | TITLE ONE - LINE DIAGRAM 400 KVA / 320 KW SINGLE MODULE UPS 480 V INPUT - 480 / 277 V OUTPUT SERIES 600 | | |

Figure 37 Module One-Line Diagram, 500 kVA

NOTES:

1. NOMINAL CURRENT IS BASED ON FULL RATED OUTPUT LOAD.
2. MAXIMUM CURRENT IS COMBINATION OF SHORT DURATION LOAD CURRENT (NONCONTINUOUS LOAD) FOR BATTERY RECHARGE PLUS NOMINAL FULL LOAD CURRENT (CONTINUOUS LOAD) PER NEC 100.
3. MAXIMUM CURRENT IS COMBINATION OF SHORT DURATION LOAD CURRENT (NONCONTINUOUS LOAD) FOR 10 MINUTE OVERLOAD RATING PLUS NOMINAL FULL LOAD CURRENT (CONTINUOUS LOAD) PER NEC 100.
4. UPS OUTPUT CABLES MUST BE RUN IN SEPARATE CONDUIT FROM INPUT CABLES.
5. POWER CABLES FROM DC LINK TO BATTERIES SHOULD BE SIZED FOR TOTAL MAXIMUM 2.0 VOLT LINE DROP AT MAXIMUM DISCHARGE CURRENT. MAXIMUM CURRENT AT END OF BATTERY CONDUCTOR (300 VDC) IS DEFINED AS NONCONTINUOUS PER NEC 100. GROUNDING CONDUCTORS TO BE SIZED PER NEC 250-95. NEUTRAL CONDUCTOR (IF USED) SHOULD BE SIZED FOR FULL CAPACITY.
7. ALL WIRING IS TO BE IN ACCORDANCE WITH NATIONAL AND LOCAL ELECTRICAL CODES.
8. MODULE BATTERY DISCONNECT IS PROVIDED IN A SEPARATE ENCLOSURE.
9. POWER AND CONTROL WIRING TO BE RUN IN SEPARATE CONDUITS.
10. WHEN A THREE POLE MODULE BATTERY DISCONNECT IS USED, ONE POLE MAY BE USED TO CENTER TAP THE BATTERY STRING. THIS WILL REDUCE THE MAXIMUM VOLTAGE BETWEEN ANY TWO POINTS TO ONE HALF THE STRING VOLTAGE WHEN THE MODULE BATTERY DISCONNECT IS OPEN.
11. BREAKER DESCRIPTIONS
 CB1 - SQUARE D TYPE MHL36900, 1000 AF, 900 AT, 65 KAIC.
 CB2 - SQUARE D TYPE MHL36800, 1000 AF, 800 AT, 65 KAIC.
 CB3 - SQUARE D TYPE MHL36800, 1000 AF, 800 AT, 65 KAIC.
12. NOMINAL HEAT GENERATION - 118,713 BTU/HR.



* EXTERNAL DISTRIBUTION AND PROTECTION BY OTHERS

| FEEDER | NOMINAL VOLTAGE | NOMINAL CURRENT | MAXIMUM CURRENT |
|--|-----------------|-----------------|---|
| A AC INPUT TO UPS 3 PHASE, 3 WIRE & GROUND. A-B-C ROTATION (SEE NOTES 1,2,4,6,7) | 480 VAC | 630 A 562 A | 788 A (W/D FILTER) 703 A (WITH FILTER) |
| B AC OUTPUT TO LOAD, 3 PH, 4 WIRE & GROUND. A-B-C PHASE ROTATION (SEE NOTES 1,3,4,6,7) MAXIMUM 10 MIN @ 125% OF NOMINAL CURRENT. | 480Y/277 VAC | 601 A | 752 A |
| C UPS DC LINK TO MODULE BATTERY DISCONNECT. (1) POSITIVE, AND (2) NEGATIVE. (SEE NOTES 5,7,8) | 360 VDC | 1178 A | 1463 A AT END OF DISCHARGE |
| D AC INPUT TO UPS BYPASS. 3 PHASE, 4 WIRE & GROUND A-B-C PHASE ROTATION (SEE NOTES 1,3,4,6,7) | 480Y/277 VAC | 601 A | 752 A |
| J MODULE BATTERY DISCONNECT TO SYSTEM BATTERY. (1) POSITIVE, AND (2) NEGATIVE AND (3) POSITIVE, AND (4) NEGATIVE FOR CENTER TAP (SEE NOTES 5,7,8,10) | 360 VDC | 1178 A | 1463 A AT END OF DISCHARGE |

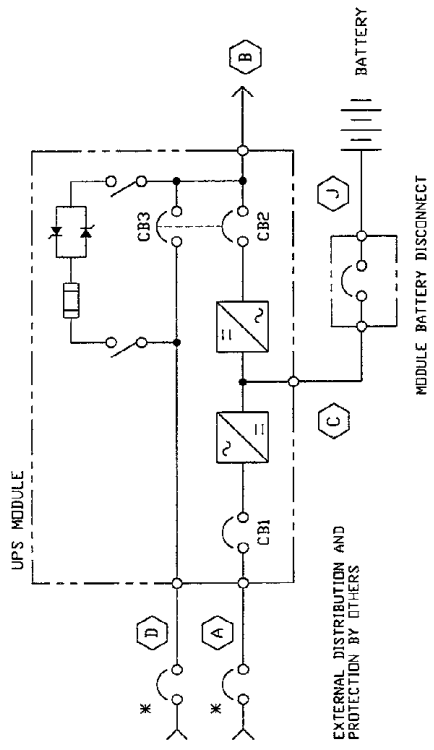
| | | | |
|----------------------|----------------------|--|------------------|
| DRAWN BY B FISH | SHEET NO 1 OF 1 | TITLE ONE - LINE DIAGRAM 500 KVA / 400 KW SINGLE MODULE UPS | |
| CHK BY J CAMPBELL | ECN NO | DWG. NO. 97-791658-64 | DATE 02/21/95 |
| DES APVL | REF. DWG. SL65864 | REV. NO. 1 | ORDER NO. |

IRVINE, CALIFORNIA 92718

FILE NAME: SL65864.DWG

Figure 38 Module One-Line Diagram, 500 kVA, 208 VAC

- NOTES:
1. NOMINAL CURRENT IS BASED ON FULL RATED OUTPUT LOAD.
 2. MAXIMUM CURRENT IS COMBINATION OF SHORT DURATION LOAD CURRENT (NONCONTINUOUS LOAD) FOR BATTERY RECHARGE PLUS NOMINAL FULL LOAD CURRENT (CONTINUOUS LOAD) PER NEC 100.
 3. MAXIMUM CURRENT IS COMBINATION OF SHORT DURATION LOAD CURRENT (NONCONTINUOUS LOAD) FOR 10 MINUTE OVERLOAD RATING PLUS NOMINAL FULL LOAD CURRENT (CONTINUOUS LOAD) PER NEC 100.
 4. UPS OUTPUT LOAD CABLES MUST BE RUN IN SEPARATE CONDUIT FROM INPUT CABLES.
 5. POWER CABLES FROM DC LINK TO BATTERIES SHOULD BE SIZED FOR TOTAL MAXIMUM 2.0 VOLT LINE DROP AT MAXIMUM DISCHARGE CURRENT. MAXIMUM CURRENT AT END OF BATTERY DISCHARGE (3000 VDC) IS DEFINED AS NONCONTINUOUS PER NEC 100.
 6. GROUNDING CONDUCTORS TO BE SIZED PER NEC 250-95. NEUTRAL CONDUCTOR (IF USED) SHOULD BE SIZED FOR FULL CAPACITY.
 7. ALL WIRING IS TO BE IN ACCORDANCE WITH NATIONAL AND LOCAL ELECTRICAL CODES.
 8. MODULE BATTERY DISCONNECT IS PROVIDED IN A SEPARATE ENCLOSURE.
 9. POWER AND CONTROL WIRING TO BE RUN IN SEPARATE CONDUITS.
 10. WHEN A THREE POLE MODULE BATTERY DISCONNECT IS USED, ONE POLE MAY BE USED TO CENTER TAP THE BATTERY STRING. THIS WILL REDUCE THE MAXIMUM VOLTAGE BETWEEN ANY TWO POINTS TO ONE HALF THE STRING VOLTAGE WHEN THE MODULE BATTERY DISCONNECT IS OPEN.
 11. BREAKER DESCRIPTIONS
 CB1 - SQUARE D TYPE PHF2036, 2000 AF, 2000 AT, 125 KAIC.
 CB2 - SQUARE D TYPE PHF2036, 2000 AF, 1800 AT, 125 KAIC.
 CB3 - SQUARE D TYPE PHF2036, 2000 AF, 1800 AT, 125 KAIC.
 12. NOMINAL HEAT GENERATION - 126,822 BTU/HR.



| FEEDER | NOMINAL VOLTAGE | NOMINAL CURRENT | MAXIMUM CURRENT |
|--|-----------------|------------------|---|
| A AC INPUT TO UPS 3 PHASE, 3 WIRE & GROUND. A-B-C ROTATION (SEE NOTES 1,2,4,6,7) | 208 VAC | 1462 A 1333 A | 1827 A (w/O FILTER) 1667 A (w/TH FILTER) |
| B AC OUTPUT TO LOAD, 3 PH, 4 WIRE & GROUND. A-B-C PHASE ROTATION (SEE NOTES 1,3,4,6,7) MAXIMUM 10 MIN. @ 125% OF NOMINAL CURRENT. | 208Y/120 VAC | 1388 A | 1735 A |
| C UPS DC LINK TO MODULE BATTERY DISCONNECT. (1) POSITIVE, AND (2) NEGATIVE. (SEE NOTES 5,7,8) | 360 VDC | 1185 A | 1470 A AT END OF DISCHARGE |
| D AC INPUT TO UPS BYPASS, 3 PHASE, 4 WIRE & GROUND A-B-C PHASE ROTATION (SEE NOTES 1,3,4,6,7) | 208Y/120 VAC | 1388 A | 1735 A |
| J MODULE BATTERY DISCONNECT TO SYSTEM BATTERY. (1) POSITIVE, AND (2) NEGATIVE FOR CENTER TAP (SEE NOTES 5,7,8) (3) POSITIVE, AND (4) NEGATIVE FOR CENTER TAP (SEE NOTES 5,7,8) | 360 VDC | 1185 A | 1470 A AT END OF DISCHARGE |

| | | | | | |
|-----------------------|--|--------------------|--|--|--|
| DRAWN BY D. MCKAY | | SHEET NO 1 OF 1 | | TITLE ONE - LINE DIAGRAM 500 KVA / 400 KW SINGLE MODULE UPS | |
| CHK BY J. CAMPBELL | | ECN NO | | 208 V INPUT - 208 / 120 V OUTPUT SERIES 600 | |
| DES. APVL | | REF. DWG. | | DWG. NO. 97-791658-61 | |
| | | | | DATE 02/21/95 | |
| | | | | ORDER NO. | |
| | | | | 1 | |

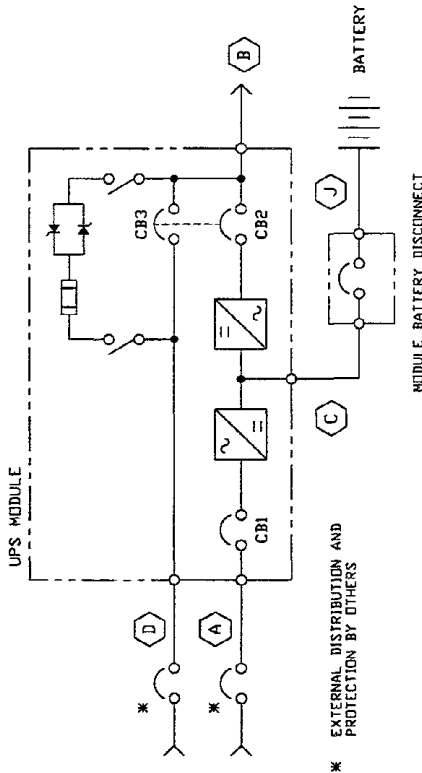
FILE NAME: SL65861.DWG

9650 JERONIMO RD.
IRVINE, CALIFORNIA 92718

Figure 39 Module One-Line Diagram, 625 kVA

NOTES:

1. NOMINAL CURRENT IS BASED ON FULL RATED OUTPUT LOAD.
2. MAXIMUM CURRENT IS COMBINATION OF SHORT DURATION LOAD CURRENT (NONCONTINUOUS LOAD) FOR BATTERY RECHARGE PLUS NOMINAL FULL LOAD CURRENT (CONTINUOUS LOAD) PER NEC 100.
3. MAXIMUM CURRENT IS COMBINATION OF SHORT DURATION LOAD CURRENT (NONCONTINUOUS LOAD) FOR 10 MINUTE OVERLOAD RATING PLUS NOMINAL FULL LOAD CURRENT (CONTINUOUS LOAD) PER NEC 100.
4. UPS OUTPUT LOAD CABLES MUST BE RUN IN SEPARATE CONDUIT FROM INPUT CABLES.
5. POWER CABLES FROM DC LINK TO BATTERIES SHOULD BE SIZED FOR TOTAL MAXIMUM 2.0 VOLT LINE DROP AT MAXIMUM DISCHARGE CURRENT. MAXIMUM CURRENT AT END OF BATTERY DISCHARGE (300 VDC) IS DEFINED AS NONCONTINUOUS PER NEC 100.
6. GROUNDING CONDUCTORS TO BE SIZED PER NEC 250-95. NEUTRAL CONDUCTOR (IF USED) SHOULD BE SIZED FOR FULL CAPACITY.
7. ALL WIRING IS TO BE IN ACCORDANCE WITH NATIONAL AND LOCAL ELECTRICAL CODES.
8. MODULE BATTERY DISCONNECT IS PROVIDED IN A SEPARATE ENCLOSURE.
9. POWER AND CONTROL WIRING TO BE RUN IN SEPARATE CONDUITS.
10. WHEN A THREE POLE MODULE BATTERY DISCONNECT IS USED, ONE POLE MAY BE USED TO CENTER TAP THE BATTERY STRING. THIS WILL REDUCE THE MAXIMUM VOLTAGE BETWEEN ANY TWO POINTS TO ONE HALF THE STRING VOLTAGE WHEN THE MODULE BATTERY DISCONNECT IS OPEN.
11. BREAKER DESCRIPTIONS
 CBI - SQUARE D TYPE MHL361000, 1000 AF, 1000 AT, 65 KAIC.
 CB2 - SQUARE D TYPE MHL361000, 1000 AF, 1000 AT, 65 KAIC.
 CB3 - SQUARE D TYPE MHL361000, 1000 AF, 1000 AT, 65 KAIC.
12. NOMINAL HEAT GENERATION - 148,391 BTU/HR.



| FEEDER | NOMINAL VOLTAGE | NOMINAL CURRENT | MAXIMUM CURRENT |
|--|-----------------|-----------------|---|
| (A) AC INPUT TO UPS 3 PHASE, 3 WIRE & GROUND. A-B-C ROTATION (SEE NOTES 1,2,4,6,7) | 480 VAC | 778 A 711 A | 973 A (W/O FILTER) 888 A (WITH FILTER) |
| (B) AC OUTPUT TO LOAD, 3 PH, 4 WIRE & GROUND. A-B-C PHASE ROTATION (SEE NOTES 1,3,4,6,7). MAXIMUM 10 MIN. @ 125% OF NOMINAL CURRENT. | 480Y/277 VAC | 752 A | 940 A |
| (C) UPS DC LINK TO MODULE BATTERY DISCONNECT. (1) POSITIVE, AND (2) NEGATIVE. (SEE NOTES 5,7,8) | 360 VDC | 1473 A | 1828 A AT END OF DISCHARGE |
| (D) AC INPUT TO UPS BYPASS, 3 PHASE, 4 WIRE & GROUND. A-B-C PHASE ROTATION (SEE NOTES 1,3,4,6,7) | 480Y/277 VAC | 752 A | 940 A |
| (J) MODULE BATTERY DISCONNECT TO SYSTEM BATTERY. (1) POSITIVE, AND (2) NEGATIVE AND (3) NEGATIVE FOR CENTER TAP (SEE NOTES 5,7,8,10) | 360 VDC | 1473 A | 1828 A AT END OF DISCHARGE |

| | | | |
|-----------------------|--------------------|--|------------------|
| DRAWN BY D. MCKAY | SHEET NO 1 OF 1 | TITLE ONE - LINE DIAGRAM 625 KVA / 500 KW SINGLE MODULE UPS | |
| CHK BY J. CAMPBELL | ECN NO | DWG. NO. 97-791670-64 | DATE 02/21/95 |
| DES. APVL SL67064 | REF. DWG. | REV. NO. 1 | ORDER NO. |

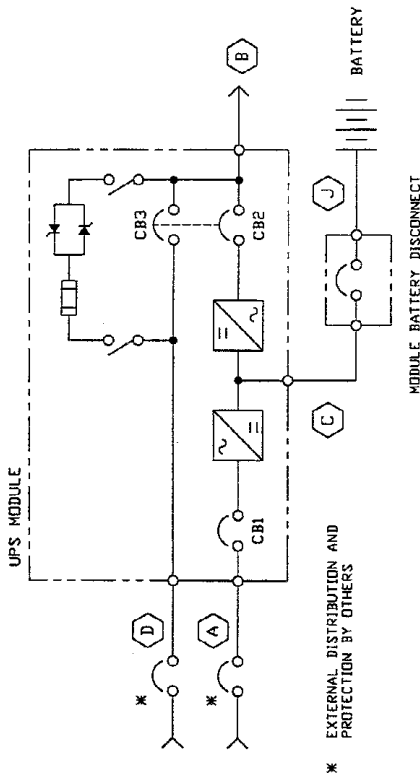
IRVINE, CALIFORNIA 92718

FILE NAME: SL67064.DWG

Figure 40 Module One-Line Diagram, 750 kVA (High Link - 240 Cells)


NOTES:

1. NOMINAL CURRENT IS BASED ON FULL RATED OUTPUT LOAD.
2. MAXIMUM CURRENT IS COMBINATION OF SHORT DURATION LOAD CURRENT (NONCONTINUOUS LOAD) FOR BATTERY RECHARGE PLUS NOMINAL FULL LOAD CURRENT (CONTINUOUS LOAD) PER NEC 100.
3. MAXIMUM CURRENT IS COMBINATION OF SHORT DURATION LOAD CURRENT (NONCONTINUOUS LOAD) FOR 10 MINUTE OVERLOAD RATING PLUS NOMINAL FULL LOAD CURRENT (CONTINUOUS LOAD) PER NEC 100.
4. UPS OUTPUT LOAD CABLES MUST BE RUN IN SEPARATE CONDUIT FROM INPUT CABLES.
5. POWER CABLES FROM DC LINK TO BATTERIES SHOULD BE SIZED FOR TOTAL MAXIMUM 2.0 VOLT LINE DROP AT MAXIMUM DISCHARGE CURRENT. MAXIMUM CURRENT AT END OF BATTERY DISCHARGE (400 VDC) IS DEFINED AS NONCONTINUOUS PER NEC 100.
6. GROUNDING CONDUCTORS TO BE SIZED PER NEC 250-95, NEUTRAL CONDUCTOR (IF USED) SHOULD BE SIZED FOR FULL CAPACITY.
7. ALL WIRING IS TO BE IN ACCORDANCE WITH NATIONAL AND LOCAL ELECTRICAL CODES.
8. MODULE BATTERY DISCONNECT IS PROVIDED IN A SEPARATE ENCLOSURE.
9. POWER AND CONTROL WIRING TO BE RUN IN SEPARATE CONDUITS.
10. WHEN A THREE POLE MODULE BATTERY DISCONNECT IS USED, ONE POLE MAY BE USED TO CENTER TAP THE BATTERY STRING. THIS WILL REDUCE THE MAXIMUM VOLTAGE BETWEEN ANY TWO POINTS TO ONE HALF THE STRING VOLTAGE WHEN THE MODULE BATTERY DISCONNECT IS OPEN.
11. BREAKER DESCRIPTIONS
 CB1 - SQUARE D TYPE MHL361200, 1200 AF, 1200 AT, 65 KAIC.
 CB2 - SQUARE D TYPE MHL361200, 1200 AF, 1200 AT, 65 KAIC.
 CB3 - SQUARE D TYPE MHL361200, 1200 AF, 1200 AT, 65 KAIC.
12. NOMINAL HEAT GENERATION - 178,070 BTU/HR.



| FEEDER | NOMINAL VOLTAGE | NOMINAL CURRENT | MAXIMUM CURRENT |
|--|-----------------|-----------------|---|
| (A) AC INPUT TO UPS 3 PHASE, 3 WIRE & GROUND. A-B-C ROTATION (SEE NOTES 1,2,4,6,7) | 480 VAC | 934 A 853 A | 1167 A (W/O FILTER) 1066 A (WITH FILTER) |
| (B) AC OUTPUT TO LOAD, 3 PH, 4 WIRE & GROUND. A-B-C PHASE ROTATION (SEE NOTES 1,3,4,6,7) MAXIMUM 10 MIN. @ 125% OF NOMINAL CURRENT. | 480Y/277 VAC | 902 A | 1128 A |
| (C) UPS DC LINK TO MODULE BATTERY DISCONNECT. (1) POSITIVE, AND (2) NEGATIVE. (SEE NOTES 5,7,B) | 480 VDC | 1326 A | 1644 A AT END OF DISCHARGE |
| (D) AC INPUT TO UPS BYPASS, 3 PHASE, 4 WIRE & GROUND A-B-C PHASE ROTATION (SEE NOTES 1,3,4,6,7) | 480Y/277 VAC | 902 A | 1128 A |
| (J) MODULE BATTERY DISCONNECT TO SYSTEM BATTERY. (1) POSITIVE, AND (2) NEGATIVE AND (3) NEGATIVE FOR CENTER TAP (SEE NOTES 5,7,8,10) | 480 VDC | 1326 A | 1644 A AT END OF DISCHARGE |

| | | | |
|----------------------|----------------------|---|------------------|
| DRAWN BY D MCKAY | SHEET NO 1 OF 1 | TITLE ONE - LINE DIAGRAM 750 KVA / 600 KW 240 CELL SINGLE MODULE UPS 480 V INPUT - 480 / 277 V OUTPUT SERIES 600 | |
| CHK BY J CAMPBELL | ECN NO | DWG. NO. 97-791675-64 | DATE 03/01/95 |
| DES APVL SL67564 | REF. DWG. SL67564 | REV. NO. 1 | ORDER NO. |

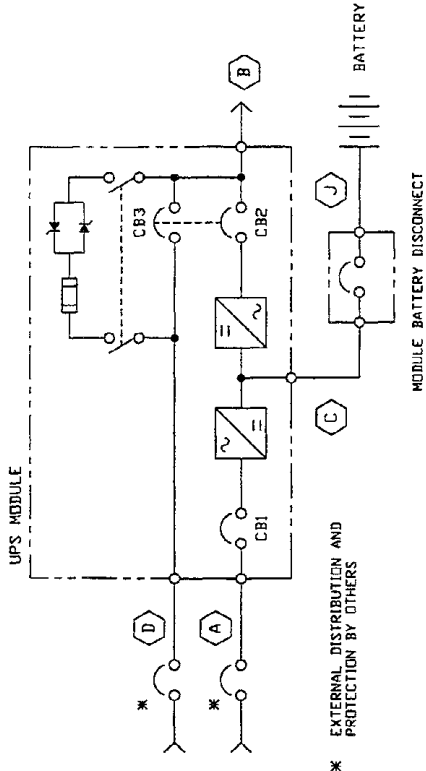


 9650 JEROME RD.
 IRVINE, CALIFORNIA 92718

FILE NAME: SL675641.DWG

Figure 41 Module One-Line Diagram, 750 kVA (Low Link - 180 Cells)

- NOTES:
1. NOMINAL CURRENT IS BASED ON FULL RATED OUTPUT LOAD.
 2. MAXIMUM CURRENT IS COMBINATION OF SHORT DURATION LOAD CURRENT (NONCONTINUOUS LOAD) FOR BATTERY RECHARGE PLUS NOMINAL FULL LOAD CURRENT (CONTINUOUS LOAD) PER NEC 100
 3. MAXIMUM CURRENT IS COMBINATION OF SHORT DURATION LOAD CURRENT (NONCONTINUOUS LOAD) FOR 10 MINUTE OVERLOAD RATING PLUS NOMINAL FULL LOAD CURRENT (CONTINUOUS LOAD) PER NEC 100.
 4. UPS OUTPUT LOAD CABLES MUST BE RUN IN SEPARATE CONDUIT FROM INPUT CABLES.
 5. NOMINAL VOLTAGE SHOWN IS MAXIMUM CONTINUOUS CHARGER OUTPUT VOLTAGE. POWER CABLES FROM DC LINK TO BATTERIES SHOULD BE SIZED FOR TOTAL MAXIMUM 2.0 VOLT LINE DROP AT MAXIMUM DISCHARGE CURRENT. MAXIMUM CURRENT AT END OF BATTERY DISCHARGE (300 VDC) IS DEFINED AS NONCONTINUOUS PER NEC 100.
 6. GROUNDING CONDUCTORS TO BE SIZED PER NEC 250-95. NEUTRAL CONDUCTOR (IF USED) SHOULD BE SIZED FOR FULL CAPACITY ELECTRICAL CODES.
 7. ALL WIRING IS TO BE IN ACCORDANCE WITH NATIONAL AND LOCAL ELECTRICAL CODES.
 8. MODULE BATTERY DISCONNECT IS PROVIDED IN A SEPARATE ENCLOSURE.
 9. POWER AND CONTROL WIRING TO BE RUN IN SEPARATE CONDUITS.
 10. WHEN A THREE POLE MODULE BATTERY DISCONNECT IS USED, ONE POLE MAY BE USED TO CENTER TAP THE BATTERY STRING. THIS WILL REDUCE THE MAXIMUM VOLTAGE BETWEEN ANY TWO POINTS TO ONE HALF THE STRING VOLTAGE WHEN THE MODULE BATTERY DISCONNECT IS OPEN.
 11. BREAKER DESCRIPTIONS
 CBI - SQUARE D TYPE MHL361200, 1200 AF, 1200 AT, 65 KAIC.
 CB2 - SQUARE D TYPE MHL361200, 1200 AF, 1200 AT, 65 KAIC.
 CB3 - SQUARE D TYPE MHL361200, 1200 AF, 1200 AT, 65 KAIC.
 12. NOMINAL HEAT GENERATION - 178,070 BTU/HR.



| FEEDER | NOMINAL VOLTAGE | NOMINAL CURRENT | MAXIMUM CURRENT |
|---|-----------------|-----------------|---|
| A AC INPUT TO UPS, 3 WIRE & GROUND, A-B-C ROTATION (SEE NOTES 1,2,4,6,7) | 480 VAC | 934 A | 1167 A (W/O FILTER) 1066 A (WITH FILTER) |
| B AC OUTPUT TO LOAD, 3 PH, 4 WIRE & GROUND, A-B-C PHASE ROTATION (SEE NOTES 1,3,4,6,7) MAXIMUM TO MIN. @ 125% OF NOMINAL CURRENT. | 480Y/277 VAC | 902 A | 1128 A |
| C UPS DC LINK TO MODULE BATTERY DISCONNECT, (1) POSITIVE, AND (1) NEGATIVE. (SEE NOTES 5,7,8) | 360 VDC | 1767 A | 2194 A AT END OF DISCHARGE |
| D AC INPUT TO UPS BYPASS, 3 PHASE, 4 WIRE & GROUND, A-B-C PHASE ROTATION (SEE NOTES 1,3,4,6,7) | 480Y/277 VAC | 902 A | 1128 A |
| J MODULE BATTERY DISCONNECT TO SYSTEM BATTERY, (1) POSITIVE, AND (1) NEGATIVE FOR CENTER TAP (SEE NOTES 5,7,8,10) | 360 VDC | 1767 A | 2194 A AT END OF DISCHARGE |

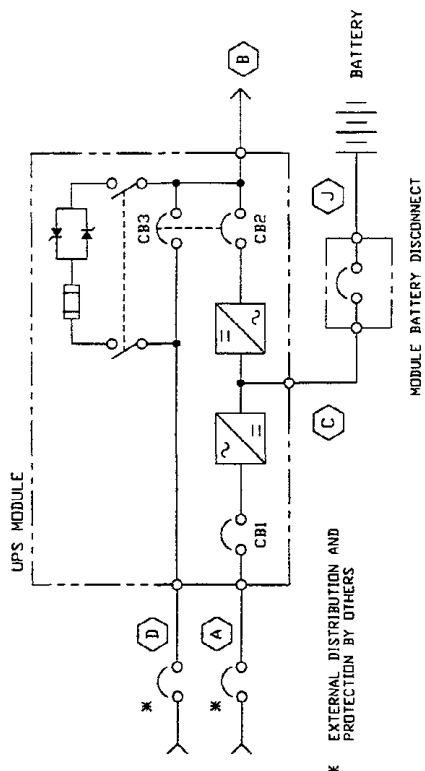
| | | | |
|----------------------|----------------------|--|-----------|
| DRAWN BY B FISH | SHEET NO 1 OF 1 | ONE LINE DIAGRAM 750 KVA \ 600 KW 180 CELL SINGLE MODULE UPS 480 V INPUT - 480 / 277 V OUTPUT SERIES 600 | |
| | ECN NO | | |
| | REF. DWG. SL67614 | | |
| CHK BY J CAMPBELL | DATE 06/06/95 | DWG. NO. 97-791676-14 | ORDER NO. |
| DES APVL | REV. NO. 1 | | |

FILE NAME 35.67614.DWG



Figure 42 Module One-Line Diagram, 1000 kVA

- NOTES:
1. NOMINAL CURRENT IS BASED ON FULL RATED OUTPUT LOAD.
 2. MAXIMUM CURRENT IS COMBINATION OF SHORT DURATION LOAD CURRENT (NONCONTINUOUS LOAD) FOR BATTERY RECHARGE PLUS NOMINAL FULL LOAD CURRENT (CONTINUOUS LOAD) PER NEC 100.
 3. MAXIMUM CURRENT IS COMBINATION OF SHORT DURATION LOAD CURRENT (NONCONTINUOUS LOAD) FOR 10 MINUTE OVERLOAD RATING PLUS NOMINAL FULL LOAD CURRENT (CONTINUOUS LOAD) PER NEC 100.
 4. UPS OUTPUT LOAD CABLES MUST BE RUN IN SEPARATE CONDUIT FROM INPUT CABLES.
 5. POWER CABLES FROM DC LINK TO BATTERIES SHOULD BE SIZED FOR TOTAL MAXIMUM 2.0 VOLT LINE DROP AT MAXIMUM DISCHARGE CURRENT. MAXIMUM CURRENT AT END OF BATTERY DISCHARGE (400 VDC) IS DEFINED AS NONCONTINUOUS PER NEC 100.
 6. GROUNDING CONDUCTORS TO BE SIZED PER NEC 250-95. NEUTRAL CONDUCTOR (IF USED) SHOULD BE SIZED FOR FULL CAPACITY.
 7. ALL WIRING IS TO BE IN ACCORDANCE WITH NATIONAL AND LOCAL ELECTRICAL CODES.
 8. MODULE BATTERY DISCONNECT IS PROVIDED IN A SEPARATE ENCLOSURE.
 9. POWER AND CONTROL WIRING TO BE RUN IN SEPARATE CONDUITS.
 10. WHEN A THREE-POLE MODULE BATTERY DISCONNECT IS USED, ONE POLE MAY BE USED TO CENTER TAP THE BATTERY STRING. THIS WILL REDUCE THE MAXIMUM VOLTAGE BETWEEN ANY TWO POINTS TO ONE HALF THE STRING VOLTAGE WHEN THE MODULE BATTERY DISCONNECT IS OPEN.
 11. BREAKER DESCRIPTIONS
 CBI - SQUARE D TYPE PHF2036, 2000 AF, 1600 AT, 100 KAIC.
 CB2 - SQUARE D TYPE PHF2036, 2000 AF, 1600 AT, 100 KAIC.
 CB3 - SQUARE D TYPE PHF2036, 2000 AF, 1600 AT, 100 KAIC.
 12. NOMINAL HEAT GENERATION - 205.514 BTU/HR.



* EXTERNAL DISTRIBUTION AND PROTECTION BY OTHERS

MODULE BATTERY DISCONNECT

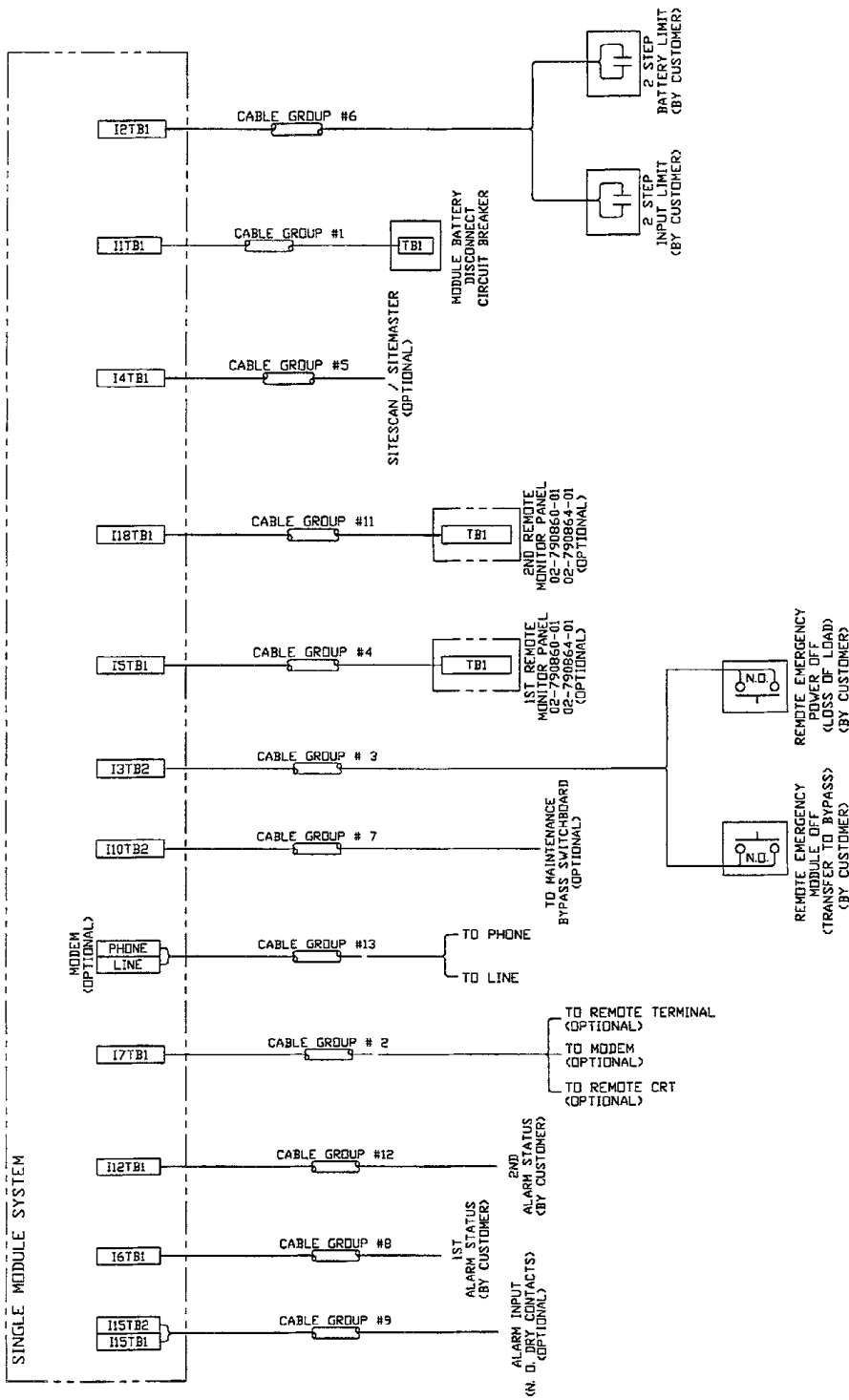
| FEEDER | NOMINAL VOLTAGE | NOMINAL CURRENT | MAXIMUM CURRENT |
|--|-----------------|------------------|---|
| (A) AC INPUT TO UPS 3 PHASE, 3 WIRE & GROUND. A-B-C ROTATION (SEE NOTES 1,2,4,6,7) | 480 VAC | 1217 A 1113 A | 1322 A (W/D FILTER) 1391 A (WITH FILTER) |
| (B) AC OUTPUT TO LOAD, 3 PH, 4 WIRE & GROUND. A-B-C PHASE ROTATION (SEE NOTES 1,3,4,6,7) MAXIMUM 10 MIN. @ 125% OF NOMINAL CURRENT. | 480Y/277 VAC | 1203 A | 1503 A |
| (C) UPS DC LINK TO MODULE BATTERY DISCONNECT. (1) POSITIVE, AND (2) NEGATIVE. (SEE NOTES 5,7,8) | 480 VDC | 1749 A | 2169 A AT END OF DISCHARGE |
| (D) AC INPUT TO UPS BYPASS, 3 PHASE, 4 WIRE & GROUND A-B-C PHASE ROTATION (SEE NOTES 1,3,4,6,7) | 480Y/277 VAC | 1203 A | 1504 A |
| (E) MODULE BATTERY DISCONNECT TO SYSTEM BATTERY. (1) POSITIVE, AND (2) NEGATIVE AND (3) POSITIVE, AND (4) NEGATIVE FOR CENTER TAP (SEE NOTES 5,7,8,10) | 480 VDC | 1749 A | 2169 A AT END OF DISCHARGE |

| | | | |
|-----------------------|----------------------|---|------------------|
| DRAWN BY B. FISH | SHEET NO 1 OF 1 | TITLE ONE LINE DIAGRAM 1000 KVA / 800 KW SINGLE MODULE UPS | |
| CHK BY J. CAMPBELL | ECN NO | DWG. NO. 97-791686-14 | DATE 06/08/95 |
| DES. APVL | REF. DWG. SL68614 | REV. NO. 1 | ORDER NO. |


FILE NAME: SL68614.DWG



Figure 43 Control Wiring Interconnect Diagram

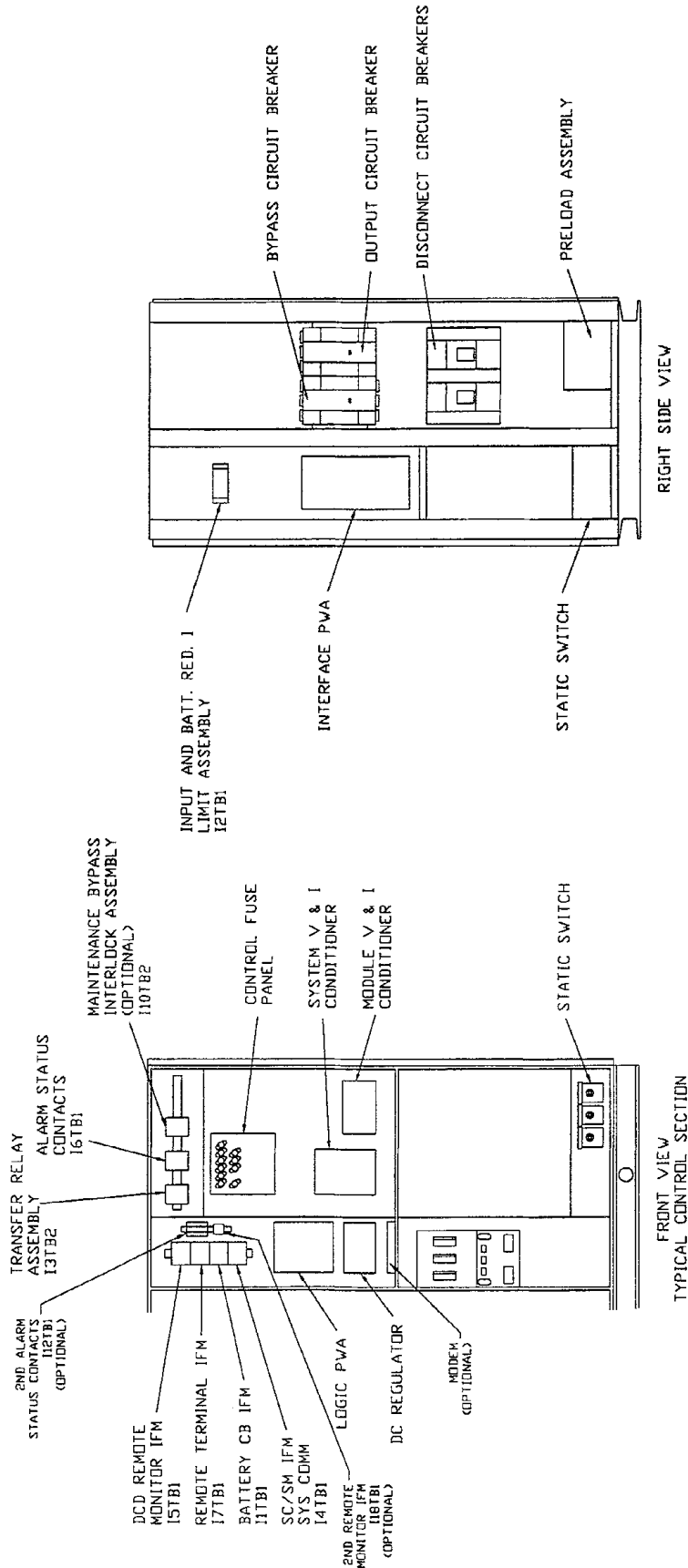


- NOTES:
1. ALL CONTROL WIRES MUST BE STRANDED AND FLEXIBLE.
 2. ALL WIRING SHOWN IS BY CUSTOMER. SEE WIRE LISTS FOR WIRE SIZES.
 3. EACH CONTROL CABLE GROUP MUST BE RUN IN A SEPARATE STEEL RACEWAY TO MINIMIZE CONTROL SIGNAL INTERFERENCE.

| | | | |
|---|--|--------------------|--|
| DRAWN BY T HECKMAN | | SHEET NO 1 OF 1 | |
| CHK BY J CAMPBELL | | ECN NO | |
| DES APVL W/D61901 | | REF. DWG. | |
| TITLE WIRING DIAGRAMS SINGLE MODULE SYSTEM INTERCONNECT DIAGRAM SERIES 600 | | | |
| DWG. NO. 96-791619-01 | | DATE 01/08/96 | |
| REV. NO. 2 | | ORDER NO. | |
|  IRVINE, CALIFORNIA 92718 | | | |

FILE NAME: V061901.DWG

Figure 44 Control Connection Location Diagram

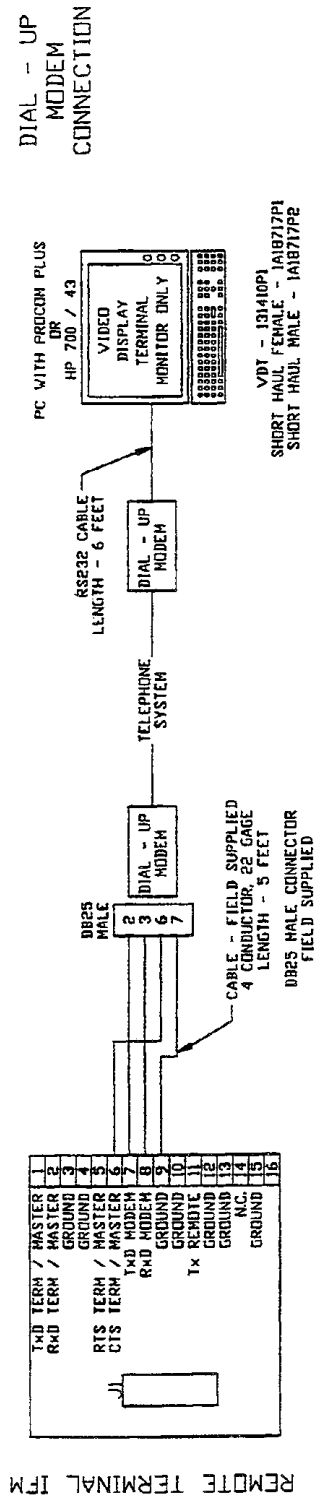
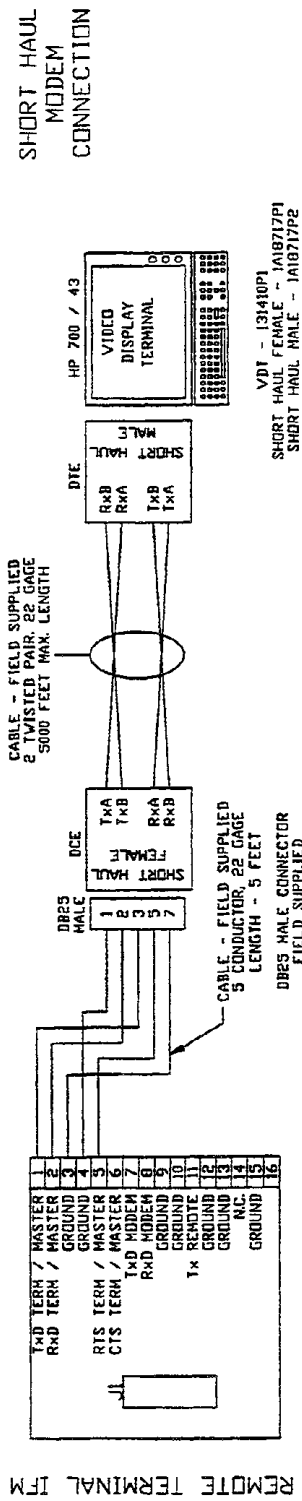
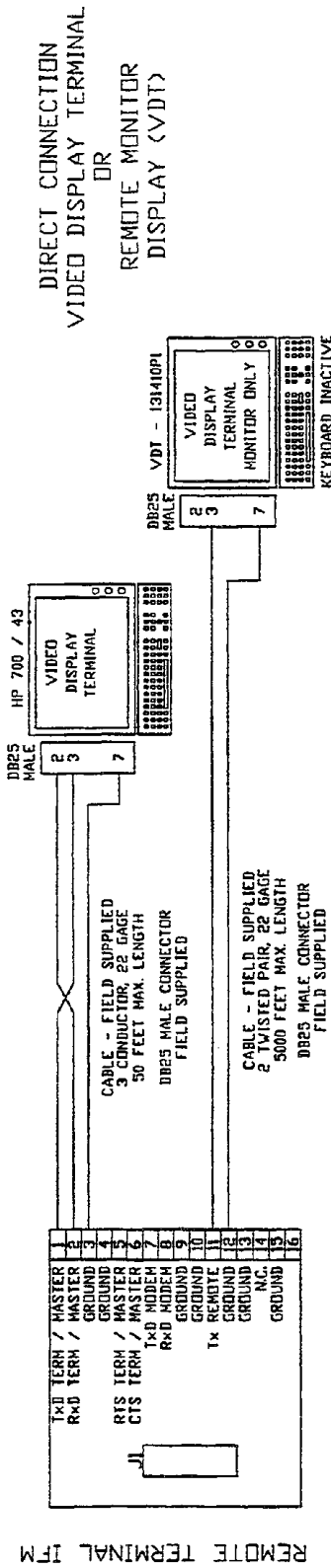


| | | | | | |
|----------------------|--|----------------------|--|--|--|
| DRAWN BY B FISH | | SHEET NO 1 OF 1 | | TITLE CONTROL CONNECTION LOCATION DIAGRAM SINGLE MODULE SYSTEM 338 KVA, 400-625 KVA (480V OUTPUT) AND 750 KVA (HIGH LINK) SERIES 600 | |
| CHK BY J CAMPBELL | | ECN NO | | DWG. NO. 96-791619-02 | |
| DES APVL | | REF. DWG. CC61902 | | DATE 08/16/95 | |
| | | | | REV. NO. 1 | |
| | | | | ORDER NO. | |



FILE NAME: CC61902.DWG

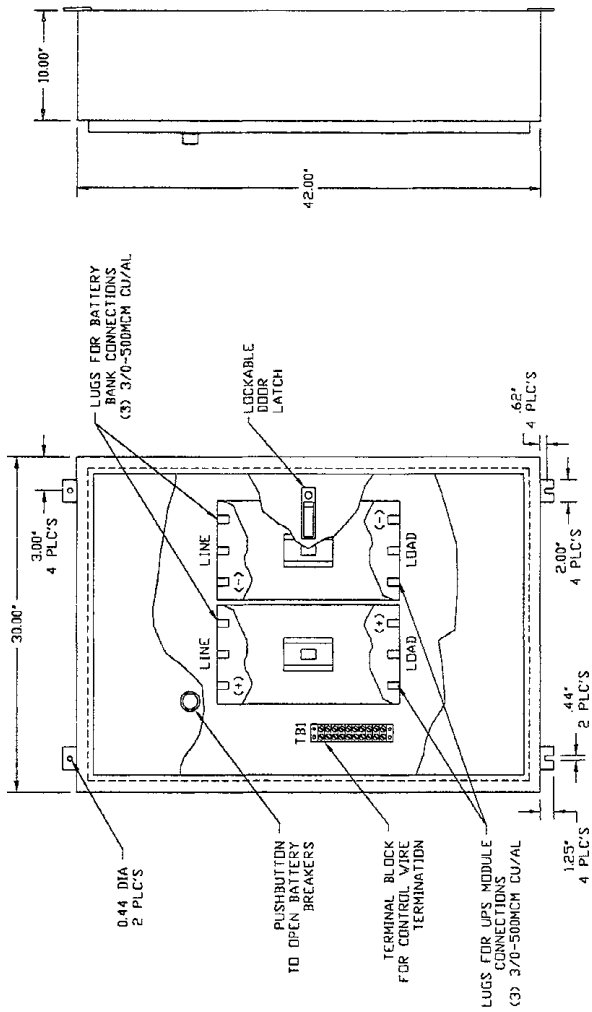
Figure 45 Video Display Terminal Wiring



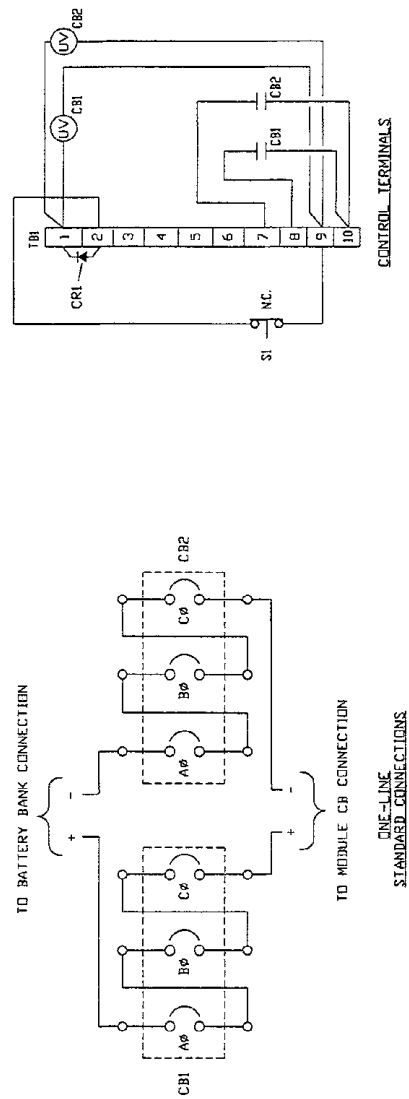
| | | | | | |
|-----------------------|--|-----------------------|--|---|--|
| DRAWN BY D. MCKAY | | SHEET NO 1 OF 1 | | TITLE SERIES 600T UPS VIDEO DISPLAY TERMINAL WIRING CONFIGURATIONS | |
| CHK BY J. CAMPBELL | | ECN NO | | DWG. NO. 96-797601-01 | |
| DES APVL DES APVL | | REF. DWG. W/D70101 | | DATE 04/03/95 | |
| | | | | REV. NO. 1 | |
| | | | | ORDER NO. | |
| | | | | FILE NAME: VDR1010.DWG | |



Figure 46 Battery Circuit Breaker



- NOTES:
1. COLOR: GREY
 2. WEIGHT: 180 LBS. APPROXIMATELY
 3. ALL DIMENSIONS ARE FOR REFERENCE ONLY
 4. ALL DIMENSIONS ARE IN INCHES
 5. BATTERY CIRCUIT BREAKER REQUIRED FOR BATTERY CABINET(S) LOCATED REMOTELY FROM THE UPS MODULE, AND ALSO FOR RACK MOUNTED BATTERIES.
 6. CIRCUIT BREAKER: MOULDED CASE 3 POLE 1000AF/300AT & 1000AF/450AT SQUARE 'D' TYPE: MHL
 7. ENCLOSURE: NEMA 12




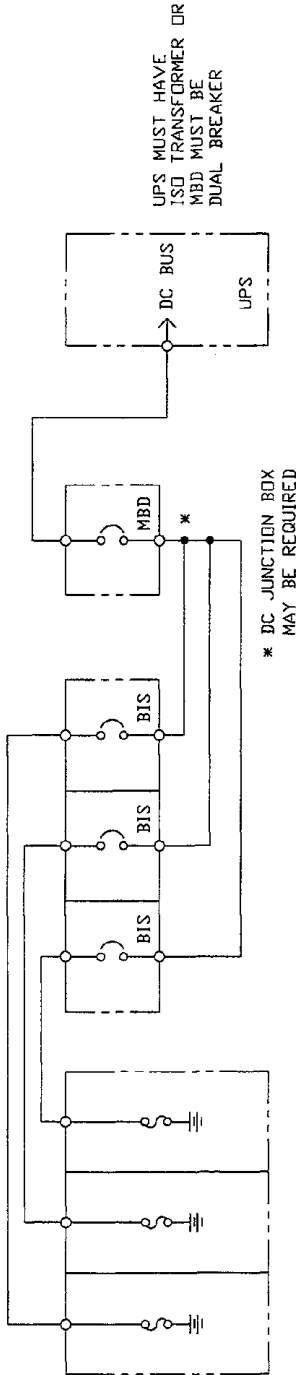
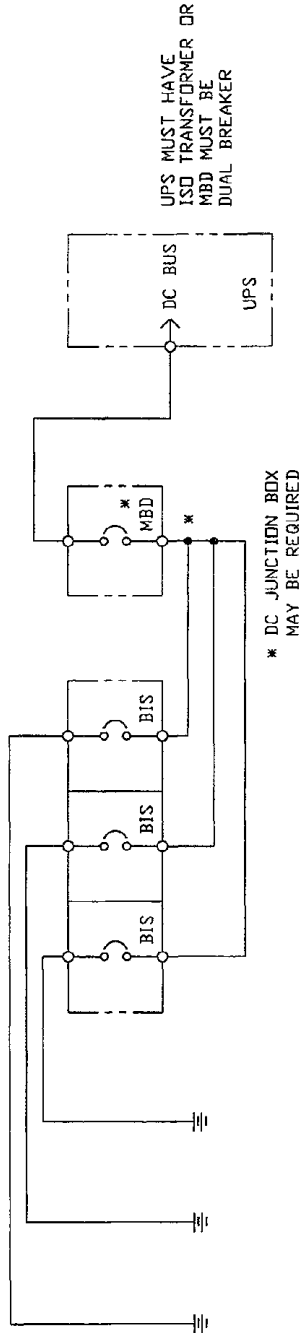
| | | | | | |
|----------------------|--|--------------------|--|--|--|
| DRAWN BY B FISH | | SHEET NO 1 OF 1 | | TITLE INSTALLATION DRAWING 1000 AF, 300 AT, AND 1000 AF, 450 AT BATTERY CIRCUIT BREAKER SERIES 600 | |
| CHK BY J CAMPBELL | | ECN NO | | DWG. NO. 88-791616-04 | |
| DES APVL ING1604 | | REF. DWG. | | DATE 06/14/95 | |
| | | | | ORDER NO. | |
| | | | | REV. NO. 1 | |
| | | | | FILE NAME: IN61604.DWG | |
| | | | |  9650 JERONIMO RD. IRVINE, CALIFORNIA 92718 | |

Figure 47 Parallel Battery Configurations



VENDER (NON-LIEBERT) BATTERY CABINETS IN TYPICAL
PARALLEL STRING CONFIGURATION




RACK MOUNTED BATTERIES IN
TYPICAL PARALLEL STRING CONFIGURATION

NOTES:

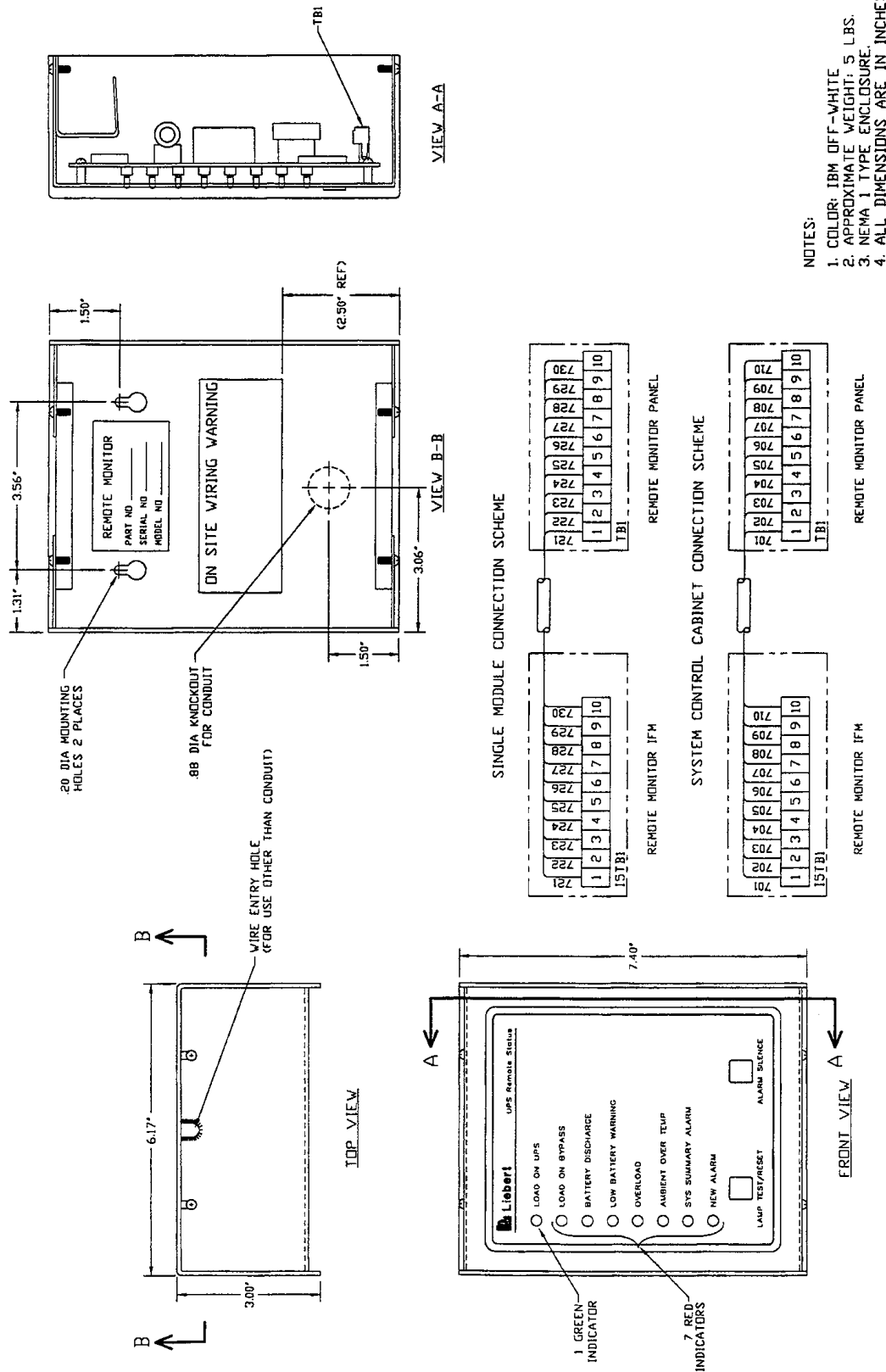
1. A DISCONNECT MEANS (per UL1778) SUCH AS A BATTERY DISCONNECT OR BATTERY ISOLATION SWITCH SHOULD BE PROVIDED FOR EACH PARALLEL STRING OF BATTERIES.

MBD = MODULE BATTERY DISCONNECT
BIS = BATTERY ISOLATION SWITCH

| | | | |
|-----------------------|----------------------|--|------------------|
| DRAWN BY T HECKMAN | SHEET NO 1 OF 1 | TITLE PARALLEL BATTERY CONFIGURATIONS | |
| CHK BY J CAMPBELL | ECN NO | DWG. NO. 88-791616-11 | DATE 01/08/96 |
| DES APVL | REF. DWG. IN61611 | REV. NO. 1 | ORDER NO. |
| | |  9650 JERONIMO RD. IRVINE, CALIFORNIA 92718 | |

FILE NAME: IN61611.DWG

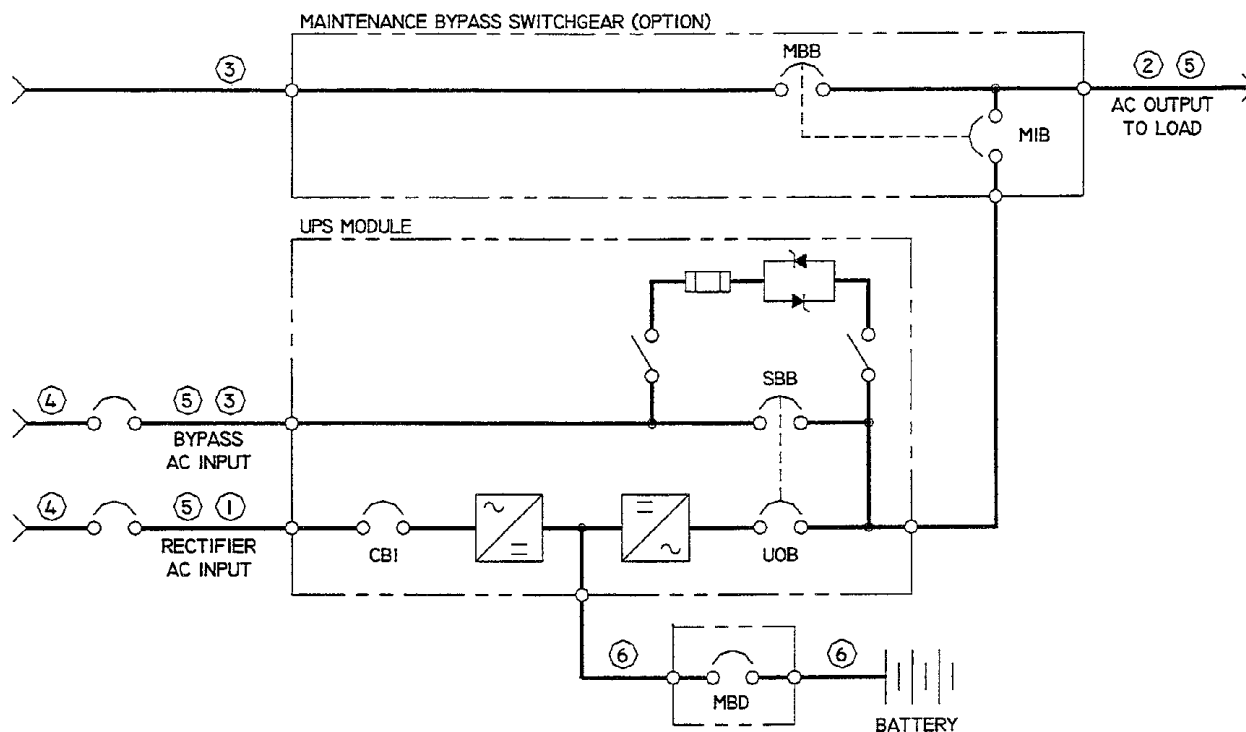
Figure 48 Remote Status Panel



| | | | |
|---|--|----------------------|--|
| DRAWN BY B FISH | | SHEET NO 1 OF 1 | |
| CHK BY J CAMPBELL | | ECN NO | |
| DES APVL | | REF. DWG. IN61701 | |
| TITLE REMOTE STATUS PANEL SURFACE MOUNT SERIES 600 | | | |
| DWG. NO. 88-791617-01 | | DATE 06/22/95 | |
| REV. NO. 1 | | ORDER NO. | |
| IRVINE, CALIFORNIA 92718 FILE NAME: IN61701.DWG | | | |

10.0 APPENDIX A - SERIES 600 UPS SITE PLANNING DATA

338-1000 kVA Single Module Systems



10.1 Notes

1. Nominal rectifier AC input current (considered continuous) is based on full rated output load. Maximum current includes nominal input current and maximum battery recharge current (considered noncontinuous). Continuous and noncontinuous current limit are defined in NEC 100. Maximum input current is controlled by current limit setting which is adjustable. Values shown are for maximum setting of 125%. Standard factory setting is 115%.
2. Nominal AC output current (considered continuous) is based on full rated output load. Maximum current includes nominal output current and overload for 10 minutes.
3. Bypass AC input current (considered continuous) is based on full rated output load.
4. Feeder protection (by others in external equipment) for rectifier AC input and bypass AC input is recommended to be provided by separate overcurrent protection devices.
5. UPS output load cables must be run in separate conduit from input cables.
6. Power cable from module DC bus to battery should be sized for a total maximum 2.0 volt line drop (measured at the module) at maximum discharge current.
7. Grounding conductors to be sized per NEC 250-95. Neutral conductors to be sized for full capacity per NEC 310-16, Note 10.
8. Rectifier AC Input: 3-phase, 3-wire, plus ground
AC Output to Load: 3-phase, 3 or 4-wire, plus ground
Bypass AC Input: 3-phase, 3 or 4-wire, plus ground
Module DC Input from Battery: 2-wire, (positive and negative)
9. All wiring is to be in accordance with National and Local Electrical Codes.
10. Minimum clearance is 2 feet above UPS.
11. Top or bottom cable entry through removable access plates. Cut plate to suit conduit size.
12. Control wiring and power cables must be run in separate conduits. Control wiring must be stranded conductors.
13. UPS module will be shipped in sections. Reconnect shipping splits according to drawings supplied with the equipment.

Table 4 338-1000 kVA Single Module System, 480 Volt - Standard Module

| UPS Rating | | Bypass AC Input Current | * Rectifier AC Input Current | | Inverter AC Output Current | | Required Battery Disconnect Rating | Maximum Battery Current at End of Discharge | % Efficiency at Full Load | Maximum Heat Dis-sipation BTU/hr. | Dimen-sions Inches | Approx. Weight Lb. | Floor Loading Lb./ Sq.Ft. |
|--------------------------|-----|-------------------------|------------------------------|------|----------------------------|------|------------------------------------|---|---------------------------|-----------------------------------|--------------------|--------------------|---------------------------|
| kVA | kW | Nom | Nom | Max | Nom | Max | Amperes | Amperes | | Full Load | (WxDxH) | (Un-packed) | (Distribu-ted Loading) |
| 338 | 270 | 406 | 420 | 525 | 406 | 507 | 1000 | 993 | 92 | 80131 | 128x38x78 | 8400 | 249 |
| 400 | 320 | 481 | 504 | 630 | 481 | 601 | 1200 | 1170 | 92 | 94970 | 164x38x78 | 10050 | 232 |
| 400 | 360 | 481 | 560 | 700 | 481 | 601 | 1200 | 1316 | 92 | 106842 | 164x38x78 | 10050 | 232 |
| 500 | 400 | 601 | 630 | 788 | 601 | 752 | 1600 | 1463 | 92 | 118713 | 164x38x78 | 10800 | 250 |
| 500 | 450 | 601 | 700 | 875 | 601 | 752 | 1600 | 1646 | 92 | 133552 | 164x38x78 | 10800 | 250 |
| 625 | 500 | 752 | 778 | 973 | 752 | 940 | 2000 | 1828 | 92 | 148391 | 164x41x78 | 12500 | 268 |
| 750 ^{HL} | 600 | 902 | 934 | 1167 | 902 | 1128 | 1600 | 1644 | 92 | 178070 | 164x41x78 | 14075 | 302 |
| 750 ^{LL} | 600 | 902 | 934 | 1167 | 902 | 1128 | 2000 | 2194 | 92 | 178070 | 177x44x82 | 14750 | 273 |
| 1000 | 800 | 1203 | 1217 | 1522 | 1203 | 1504 | 2500 | 2169 | 93 | 205514 | 177x44x82 | 16700 | 309 |
| 1000 | 900 | 1203 | 1369 | 1712 | 1203 | 1504 | 2500 | 2440 | 93 | 231203 | 177x44x82 | 16700 | 309 |
| Applicable Notes: | | 3,5,7,8,9,11,12 | 1,4,5,7,8,9,11,12 | | 2,5,7,8,9,11,12 | | 6 | 6,8,9,11,12 | — | — | 13 | 13 | — |

For explanation of notes, see referenced numbers in **10.1 - Notes**

* Nominal Input Power Factor 0.85 lagging at full load; 9% Maximum Total Input Harmonic Current Distortion (THD) at full load.

HL - 750 kVA module with 240 battery cells

LL - 750 kVA module with 180 battery cells

Table 5 338-1000 kVA Single Module System, 480 Volt - Standard Module With Optional Low Distortion Input Filter

| UPS Rating | | Bypass AC Input Current | * Rectifier AC Input Current | | Inverter AC Output Current | | Required Battery Disconnect Rating | Maximum Battery Current at End of Discharge | % Efficiency at Full Load | Maximum Heat Dis-sipation BTU/hr. | Dimen-sions Inches | Approx. Weight Lb. | Floor Loading Lb./ Sq.Ft. |
|--------------------------|-----|-------------------------|------------------------------|------|----------------------------|------|------------------------------------|---|---------------------------|-----------------------------------|--------------------|--------------------|---------------------------|
| kVA | kW | Nom | Nom | Max | Nom | Max | Amperes | Amperes | | Full Load | (WxDxH) | (Un-packed) | (Distribu-ted Loading) |
| 338 | 270 | 406 | 380 | 474 | 406 | 507 | 1000 | 993 | 92 | 80131 | 128x38x78 | 8800 | 261 |
| 400 | 320 | 481 | 455 | 568 | 481 | 601 | 1200 | 1170 | 92 | 94970 | 164x38x78 | 10450 | 242 |
| 400 | 360 | 481 | 512 | 639 | 481 | 601 | 1200 | 1316 | 92 | 106842 | 164x38x78 | 11450 | 242 |
| 500 | 400 | 601 | 562 | 703 | 601 | 752 | 1600 | 1463 | 92 | 118713 | 164x38x78 | 11350 | 262 |
| 500 | 450 | 601 | 633 | 791 | 601 | 752 | 1600 | 1646 | 92 | 133552 | 164x38x78 | 11350 | 262 |
| 625 | 500 | 752 | 711 | 888 | 752 | 940 | 2000 | 1828 | 92 | 148391 | 164x41x78 | 13150 | 282 |
| 750 ^{HL} | 600 | 902 | 853 | 1066 | 902 | 1128 | 1600 | 1644 | 92 | 178070 | 164x41x78 | 14350 | 308 |
| 750 ^{LL} | 600 | 902 | 853 | 1066 | 902 | 1128 | 2000 | 2194 | 92 | 178070 | 177x44x82 | 15600 | 289 |
| 1000 | 800 | 1203 | 1125 | 1406 | 1203 | 1504 | 2500 | 2169 | 93 | 205514 | 177x44x82 | 17550 | 325 |
| 1000 | 900 | 1203 | 1125 | 1582 | 1203 | 1504 | 2500 | 2440 | 93 | 231203 | 177x44x82 | 17550 | 325 |
| Applicable Notes: | | 3,5,7,8,9,11,12 | 1,4,5,7,8,9,11,12 | | 2,5,7,8,9,11,12 | | 6 | 6,8,9,11,12 | — | — | 13 | 13 | — |

For explanation of notes, see referenced numbers in **10.1 - Notes**

* Nominal Input Power Factor 0.92 lagging at full load; 4% Maximum Total Input Harmonic Current Distortion (THD) at full load.

HL - 750 kVA module with 240 battery cells

LL - 750 kVA module with 180 battery cells

Table 6 338-500 kVA Single Module System, 208 Volt - Standard Module

| UPS Rating | | Bypass AC Input Current | | * Rectifier AC Input Current | | Inverter AC Output Current | | Required Battery Disconnect Rating | Maximum Battery Current at End of Discharge | % Efficiency at Full Load | Maximum Heat Dissipation BTU/hr. | Dimensions Inches | Approx. Weight Lb. | Floor Loading Lb./Sq.Ft. |
|--------------------------|-----|-------------------------|-------------------|------------------------------|-----------------|----------------------------|---------|------------------------------------|---|---------------------------|----------------------------------|-------------------|--------------------|--------------------------|
| kVA | kW | Nom | Nom | Max | Nom | Max | Amperes | Amperes | | | Full Load | (WxDxH) | (Un-packed) | (Distributed Loading) |
| 338 | 270 | 937 | 980 | 1226 | 937 | 1171 | 1000 | 998 | 92 | 91138 | 128x38x78 | 8700 | 258 | |
| 400 | 320 | 1110 | 1170 | 1462 | 1110 | 1388 | 1200 | 1176 | 92 | 101457 | 218x38x78 | 11100 | 231 | |
| 400 | 360 | 1110 | 1300 | 1625 | 1110 | 1388 | 1200 | 1323 | 92 | 114140 | 218x38x78 | 11100 | 231 | |
| 500 | 400 | 1388 | 1462 | 1827 | 1388 | 1735 | 1600 | 1470 | 92 | 126822 | 218x38x78 | 11800 | 246 | |
| 500 | 450 | 1388 | 1625 | 2031 | 1388 | 1735 | 1600 | 1654 | 92 | 142675 | 218x38x78 | 11800 | 246 | |
| Applicable Notes: | | 3,5,7,8,9,11,12 | 1,4,5,7,8,9,11,12 | | 2,5,7,8,9,11,12 | | 6 | 6,8,9,11,12 | — | — | 13 | 13 | — | |

For explanation of notes, see referenced numbers in **10.1 - Notes**

* Nominal Input Power Factor 0.85 lagging at full load; 9% Maximum Total Input Harmonic Current Distortion (THD) at full load.

Table 7 338-500 kVA Single Module System, 208 Volt - Standard Module With Optional Low Distortion Input Filter

| UPS Rating | | Bypass AC Input Current | | * Rectifier AC Input Current | | Inverter AC Output Current | | Required Battery Disconnect Rating | Maximum Battery Current at End of Discharge | % Efficiency at Full Load | Maximum Heat Dissipation BTU/hr. | Dimensions Inches | Approx. Weight Lb. | Floor Loading Lb./Sq.Ft. |
|--------------------------|-----|-------------------------|-------------------|------------------------------|-----------------|----------------------------|---------|------------------------------------|---|---------------------------|----------------------------------|-------------------|--------------------|--------------------------|
| kVA | kW | Nom | Nom | Max | Nom | Max | Amperes | Amperes | | | Full Load | (WxDxH) | (Un-packed) | (Distributed Loading) |
| 338 | 270 | 937 | 895 | 1119 | 937 | 1171 | 1000 | 998 | 92 | 91138 | 128x38x78 | 9200 | 273 | |
| 400 | 320 | 1110 | 1055 | 1319 | 1110 | 1388 | 1200 | 1176 | 92 | 101457 | 218x38x78 | 11600 | 242 | |
| 400 | 360 | 1110 | 1187 | 1484 | 1110 | 1388 | 1200 | 1323 | 92 | 114140 | 218x38x78 | 11600 | 242 | |
| 500 | 400 | 1388 | 1333 | 1667 | 1388 | 1735 | 1600 | 1470 | 92 | 126822 | 218x38x78 | 12550 | 261 | |
| 500 | 450 | 1388 | 1500 | 1875 | 1388 | 1735 | 1600 | 1654 | 92 | 142675 | 218x38x78 | 12550 | 261 | |
| Applicable Notes: | | 3,5,7,8,9,11,12 | 1,4,5,7,8,9,11,12 | | 2,5,7,8,9,11,12 | | 6 | 6,8,9,11,12 | — | — | 13 | 13 | — | |

For explanation of notes, see referenced numbers in **10.1 - Notes**

* Nominal Input Power Factor 0.92 lagging at full load; 4% Maximum Total Input Harmonic Current Distortion (THD) at full load.

Table 8 338-1000 kVA Single Module System, 600 Volt - Standard Module

| UPS Rating | | Bypass AC Input Current | * Rectifier AC Input Current | | Inverter AC Output Current | | Required Battery Disconnect Rating | Maximum Battery Current at End of Discharge | % Efficiency at Full Load | Maximum Heat Dis-sipation BTU/hr. | Dimen-sions Inches | Approx. Weight Lb. | Floor Loading Lb./ Sq.Ft. |
|--------------------------|-----|-------------------------|------------------------------|------|----------------------------|------|------------------------------------|---|---------------------------|-----------------------------------|--------------------|--------------------|---------------------------|
| kVA | kW | Nom | Nom | Max | Nom | Max | Amperes | Amperes | | Full Load | (WxDxH) | (Un-packed) | (Distribu-ted Loading) |
| 338 | 270 | 325 | 336 | 420 | 325 | 406 | 1000 | 993 | 92 | 80131 | 128x38x78 | 8400 | 249 |
| 400 | 320 | 385 | 403 | 504 | 385 | 481 | 1200 | 1170 | 92 | 94970 | 164x38x78 | 10050 | 232 |
| 400 | 360 | 385 | 448 | 560 | 385 | 481 | 1200 | 1316 | 92 | 106842 | 164x38x78 | 10050 | 232 |
| 500 | 400 | 481 | 504 | 630 | 481 | 601 | 1600 | 1463 | 92 | 118713 | 164x38x78 | 10800 | 250 |
| 500 | 450 | 481 | 567 | 709 | 481 | 601 | 1600 | 1646 | 92 | 133552 | 164x38x78 | 10800 | 250 |
| 625 | 500 | 601 | 630 | 788 | 601 | 752 | 2000 | 1828 | 92 | 148391 | 164x41x78 | 12500 | 268 |
| 750 ^{HL} | 600 | 722 | 747 | 934 | 722 | 902 | 1600 | 1644 | 92 | 178070 | 164x41x78 | 14075 | 302 |
| 750 ^{LL} | 600 | 722 | 747 | 934 | 722 | 902 | 2000 | 2194 | 92 | 178070 | 177x44x82 | 14750 | 273 |
| 1000 | 800 | 962 | 974 | 1217 | 962 | 1203 | 2500 | 2169 | 93 | 205514 | 177x44x82 | 16700 | 309 |
| 1000 | 900 | 962 | 1096 | 1369 | 962 | 1203 | 2500 | 2440 | 93 | 231203 | 177x44x82 | 16700 | 309 |
| Applicable Notes: | | 3,5,7,8,9,11,12 | 1,4,5,7,8,9,11,12 | | 2,5,7,8,9,11,12 | | 6 | 6,8,9,11,12 | — | — | 13 | 13 | — |

For explanation of notes, see referenced numbers in **10.1 - Notes**

* Nominal Input Power Factor 0.85 lagging at full load; 9% Maximum Total Input Harmonic Current Distortion (THD) at full load.

HL - 750 kVA module with 240 battery cells

LL - 750 kVA module with 180 battery cells

Table 9 338-1000 kVA Single Module System, 600 Volt - Standard Module With Optional Low Distortion Input Filter

| UPS Rating | | Bypass AC Input Current | * Rectifier AC Input Current | | Inverter AC Output Current | | Required Battery Disconnect Rating | Maximum Battery Current at End of Discharge | % Efficiency at Full Load | Maximum Heat Dis-sipation BTU/hr. | Dimen-sions Inches | Approx. Weight Lb. | Floor Loading Lb./ Sq.Ft. |
|--------------------------|-----|-------------------------|------------------------------|------|----------------------------|------|------------------------------------|---|---------------------------|-----------------------------------|--------------------|--------------------|---------------------------|
| kVA | kW | Nom | Nom | Max | Nom | Max | Amperes | Amperes | | Full Load | (WxDxH) | (Un-packed) | (Distribu-ted Loading) |
| 338 | 270 | 325 | 307 | 384 | 325 | 406 | 1000 | 993 | 92 | 80131 | 128x38x78 | 8800 | 261 |
| 400 | 320 | 385 | 360 | 450 | 385 | 481 | 1200 | 1170 | 92 | 94970 | 164x38x78 | 10450 | 242 |
| 400 | 360 | 385 | 405 | 506 | 385 | 481 | 1200 | 1316 | 92 | 106842 | 164x38x78 | 11450 | 242 |
| 500 | 400 | 481 | 460 | 575 | 481 | 601 | 1600 | 1463 | 92 | 118713 | 164x38x78 | 11350 | 262 |
| 500 | 450 | 481 | 517 | 647 | 481 | 601 | 1600 | 1646 | 92 | 133552 | 164x38x78 | 11350 | 262 |
| 625 | 500 | 601 | 575 | 718 | 601 | 752 | 2000 | 1828 | 92 | 148391 | 164x41x78 | 13150 | 282 |
| 750 ^{HL} | 600 | 722 | 682 | 853 | 722 | 902 | 1600 | 1644 | 92 | 178070 | 164x41x78 | 14350 | 308 |
| 750 ^{LL} | 600 | 722 | 682 | 853 | 722 | 902 | 2000 | 2194 | 92 | 178070 | 177x44x82 | 15600 | 289 |
| 1000 | 800 | 962 | 890 | 1113 | 962 | 1203 | 2500 | 2169 | 93 | 205514 | 177x44x82 | 17550 | 325 |
| 1000 | 900 | 962 | 1012 | 1265 | 962 | 1203 | 2500 | 2440 | 93 | 231203 | 177x44x82 | 17550 | 325 |
| Applicable Notes: | | 3,5,7,8,9,11,12 | 1,4,5,7,8,9,11,12 | | 2,5,7,8,9,11,12 | | 6 | 6,8,9,11,12 | — | — | 13 | 13 | — |

For explanation of notes, see referenced numbers in **10.1 - Notes**

* Nominal Input Power Factor 0.92 lagging at full load; 4% Maximum Total Input Harmonic Current Distortion (THD) at full load.

HL - 750 kVA module with 240 battery cells

LL - 750 kVA module with 180 battery cells



Series 600 UPS

Single Module Three Phase

338 kVA to 1000 kVA; 60 Hz

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