

MD SERIES

OWNERS MANUAL



3.1KVA - 7.5KVA UNINTERRUPTIBLE POWER SUPPLY

IMPORTANT - SAVE THESE INSTRUCTIONS - PLEASE READ THIS MANUAL
BEFORE USING EQUIPMENT



Caution

The following symbol indicates that caution should be taken when performing the process required in this manual. Damage to the unit or personal harm could happen if proper precautions are not taken.



Shock Hazard

The following symbol indicates that there is a risk of electrical shock if proper precautions are not followed. Only qualified personnel should perform the actions required in this manual.



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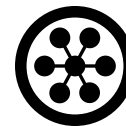
NOT INTENDED FOR LIFE SUPPORT APPLICATIONS

ABOUT THIS MANUAL

When viewing electronically, click on the subject to jump to that page.
Clicking the header on the front page will launch the Controlled Power web site.
Clicking anywhere else on the front page will also jump to the Table of Contents.
Clicking any blue text will take you to that section of our website.

Click on the  at the top of each page to return to the Table of Contents.

INTRODUCTION



MD Series UPS

The overall function of the MD Series UPS's is to take polluted, fluctuating, and erratic electrical power that exists in all areas today and purify or replace it (in the case of complete power outages) with well-regulated, computer grade power.

The MD Series UPS's maintain electrical power to the critical load for approximately 10 minutes to several hours. The backup time is a function of the amount of battery reserve that is purchased with the system.

Features & Benefits

The MD Series products are designed to maximize backup time, protect your computer or critical load, and monitor all the key parameters of electrical power including a log of events.

Features include:

- Steady, Regulated Voltage to $\pm 3\%$, Providing Proven Performance and Extending the Life of Your Equipment.
- Highest Level Performance Sine Wave Output Matches Your System's Requirements.
- 100% Power Conditioning.
- No-break, Continuous Power Provides Seamless Switching to Battery Backup.
- Patented "Fuzzy Ranging"™ Control Extends Battery Life and Backup Time.
- Optional Extended Backup Time.
- Optional NetMinder UPS Communications Software and Hardware for UPS Monitoring and Network Management.

MD Series Display Monitor & Diagnostics Provide System Status:

Bright, 3-Digit Alpha Numeric Display

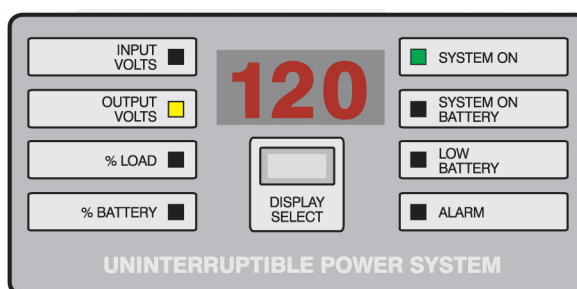
- Input Voltage
- Output Voltage
- Percent of Battery Capacity
- Percent of Load
- Percent of Battery Charged

LED Indicators Provide System Status

- System On (Green)
- System On Battery (Yellow)
- Low Battery Warning (Red)
- Alarm

Selectable

- Low Battery Warning Setting
- Auto / Manual Restart
- Start on Battery Power
- Alarm Silence





Total Power Security

Built-In Isolation

It is a common fact that isolation transformers provide electrical security for the load, eliminate electrical noise, and produce a new clean ground for digital and communication signals. All MD Series UPS's include a power purifying isolation transformer (uncommonly found in 3.1kVA to 7.5kVA UPS's), which protects your equipment from the most damaging power disturbances. This standard isolation transformer offers the user a choice of input and output voltage selections between 120 to 240 volts.

Input Power Factor Correction With Less Than 10% Total Harmonic Distortion (THD)

The MD Series goes beyond the traditional UPS. Double magnetic conversion prevents damaging load-generated harmonics from backing-up into the utility lines.

User-Friendly Full Monitoring Features

The MD Series has a full complement of diagnostic indicators. Metering includes: Battery Voltage, Input Voltage, Output Voltage, and % Load. Status LEDs include: System On, On Battery, Low Battery, and Alarm.

Fuzzy Ranging™

Fuzzy Ranging™, a patented technology solution, uses fuzzy logic to automatically broaden the input operating range to -40% as a function of load. This feature provides added security during deep brownout conditions without battery consumption. Fuzzy Ranging assures the batteries will be at full capacity for a real emergency...a power outage.

Communications

The NetMinder UPS Management Suite and NetMinder CS141 Series of Ethernet Adapters inform of the status and condition of the UPS and the incoming electrical power, as well as protect the LAN / WAN from unwanted downtime and unnecessary maintenance costs.

NetMinder UPS Management Suite Programs (CD)

NetMinder UPSMAN - Performs all UPS monitoring and data logging. Executes all alarm notifications, network configurations, and server shutdown requests.

NetMinder UPSMON - Works in conjunction with UPSMAN to give a visual display of UPS status, electrical parameters, alarm conditions, and system logs.

NetMinder RCCMD - Client-side application that performs an orderly, unattended shutdown of servers. RCCMD can receive its shutdown instructions from either a UPSMAN server, a UNMSII server, or a CS141 web server.

NetMinder UNMSII (basic version) - Server-side application that centralizes monitoring and e-mail alarm reporting of up to (9) Controlled Power Company UPS's, from a single terminal. Note that the full version of UNMSII includes SNMP notification, as well as the ability to monitor up to an unlimited number of UPS's. Contact Controlled Power Company for additional details.

NetMinder CS141 Series of Ethernet Adapters

The NetMinder CS141 series of adapters provide complete integration of the UPS into an Ethernet or RS485 network, and thereby provide 24 / 7 monitoring of UPS status, electrical parameters, and notification of alarm conditions. With the ability to communicate in Ethernet TCP/IP, MODBUS TCP, and MODBUS RS485 network environments, the CS141 adapters keep system personnel informed and alerted to any critical condition. When used with NetMinder RCCMD, all CS141 adapters provide added network protection from downtime, and prevent unnecessary maintenance costs that result from data corruption and server crashes.

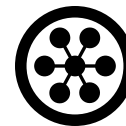
The NetMinder CS141 Ethernet Adapter is available in (3) unique versions:

CS141B: Ethernet / SNMP / TCP/IP Adapter

CS141L: Advanced Ethernet / SNMP / TCP/IP / MODBUS TCP Adapter with facilities monitoring I/O and auxiliary contact closure inputs.

CS141L-485: Advanced Ethernet / SNMP / TCP/IP / MODBUS TCP / MODBUS RS485 Adapter with auxiliary contact closure inputs.

INTRODUCTION CONTINUED



Product Specifications:

Input

120, 208, or 240 VAC at 60 Hz; 220 VAC at 50 Hz

Operating Range: +10%, -40% typical

Frequency Range: ± 2.5 Hz

Power Factor: Self-correcting to >0.95 (approaching unity)

Input Harmonics: $<10\%$ THD (Total Harmonic Distortion)

Spike Attenuation: 3000:1

Performance

Overload Capability: 125% for ten minutes

Surge Capability: 150% of rated output without need of static bypass

Frequency Stability: ± 0.2 Hz

Inner Winding Capacitance: 0.01 picofarads (primary to second coupling)

Common Mode: 120 dB

Transverse Mode: 70 dB (-3 dB at 1 kHz; -20 dB per decade)

Reactive Power Correction: Load at .6 pF corrected to $>.95$ at input (automatically self-correcting)

Fuzzy Ranging Plus™: Human-like decision making to optimize usable input line voltage without use of batteries. Range extends without battery consumption to 60% of nominal input voltage.

Output

Sine Wave Voltage: Typical 3% harmonic distortion, any single harmonic

At 60 Hz: 120 VAC; 120/208 VAC; 120/240 VAC

At 50 Hz: 220 VAC; 110/220 VAC

Crest Factor: 3.5:1

K Factor: 30 or better

Power Factor: 0.7 switch mode rated

Harmonic Attenuation: Load generated harmonics are attenuated 120% at the input

Line Regulation: Typical $\pm 3\%$

Load Regulation: Typically better than $\pm 3\%$

Isolation: Galvanic isolation

Environmental

Isolation: NEC article 250-5d; complies with this standard that specifies a separately derived power source

Operating Temperature: 0°C to 40°C without derating in any mode

Storage Temperature: -20°C to 50°C

Relative Humidity: 95% non-condensing

Elevation: 5,000 feet, 1500 meters

Agencies

- IEEE 587 Category B Guide for surge suppression
- IEC 555
- ANSI / IEEE C62.41 and .45 Category A and B
- FAA - G - 2100F power factor specifications
- CBEMA and ANSI C84.1, exceeds specifications and recommendations

MTBF

Total System: 100,000 hours

Transformer: 200,000 hours

Mean Time to Repair: Less than one hour

Safety

- U/L Listed 1778 Standard for UPS Equipment
- U/L Listed 544 Standard for Medical and Dental Equipment CSA Certified
- FCC Article 15, Section J, Class A, will not cause harmful interference with any other electronic devices.



SAFETY PRECAUTIONS

**IMPORTANT SAFEGUARDS, READ AND FOLLOW ALL SAFETY INSTRUCTIONS.
SAVE THESE INSTRUCTIONS.**



******* CAUTION *******



**A BATTERY CAN PRESENT A RISK OF ELECTRICAL SHOCK AND HIGH SHORT CIRCUIT CURRENT.
THE FOLLOWING PRECAUTIONS SHOULD BE OBSERVED WHEN WORKING ON BATTERIES:**

- REMOVE WATCHES, RINGS, OR OTHER METAL OBJECTS.
 - USE TOOLS WITH INSULATED HANDLES.
 - WEAR RUBBER GLOVES AND BOOTS.
- DO NOT LAY TOOLS OR METAL PARTS ON TOP OF BATTERIES.
- DISCONNECT CHARGING SOURCE PRIOR TO CONNECTING OR DISCONNECTING BATTERY TERMINALS.



******* CAUTION *******



**USE CAUTION WHEN HANDLING OR SERVICING BATTERIES. BATTERY ACID CAN CAUSE BURNS TO SKIN
AND EYES. IF ACID IS SPILLED ON SKIN OR IN THE EYES, FLUSH WITH FRESH WATER AND CONTACT A
PHYSICIAN IMMEDIATELY.**

**BATTERIES ARE VERY HEAVY. USE CAUTION WHEN LIFTING AND MOVING THEM. INSTALLATION SHOULD
ONLY BE PERFORMED BY AUTHORIZED PERSONNEL.**

**DIAGRAMS FOR WIRING BATTERIES ARE SHOWN ON THE FOLLOWING PAGES. BE SURE TO WIRE
BATTERIES PROPERLY. IMPROPER WIRING CAN CAUSE DAMAGE TO THE BATTERIES. WIRING SHOULD
ONLY BE PERFORMED BY AUTHORIZED PERSONNEL.**

- FOLLOW ALL STANDARD AND LOCAL ELECTRICAL CODES.
- BE SURE INPUT POWER TO UPS IS PROPERLY GROUNDED.
- DO NOT ALLOW WATER OR FOREIGN OBJECTS TO GET INSIDE UPS.
- DO NOT PLACE OBJECTS OR LIQUIDS ON TOP OF THE UPS.
- DO NOT LOCATE UPS NEAR RUNNING WATER OR WHERE THERE IS EXCESSIVE HUMIDITY.
- DO NOT USE OUTDOORS.
- DO NOT MOUNT NEAR GAS OR ELECTRIC HEATERS.
- EQUIPMENT SHOULD BE MOUNTED IN LOCATIONS AND AT HEIGHTS WHERE IT WILL NOT READILY
BE SUBJECTED TO TAMPERING BY UNAUTHORIZED PERSONNEL.
- THE USE OF ACCESSORY EQUIPMENT NOT RECOMMENDED BY THE MANUFACTURER MAY CAUSE
AN UNSAFE CONDITION.
- DO NOT USE THIS EQUIPMENT FOR OTHER THAN INTENDED USE.
- SERVICING OF BATTERIES SHOULD BE PERFORMED OR SUPERVISED BY PERSONNEL
KNOWLEDGEABLE OF BATTERIES AND THE REQUIRED PRECAUTIONS.
- KEEP UNAUTHORIZED PERSONNEL AWAY FROM BATTERIES.
- DO NOT SHORT BATTERY TERMINALS.
- DO NOT DISPOSE OF BATTERY OR BATTERIES IN A FIRE. THE BATTERY MAY EXPLODE.
- ONLY REPLACE BATTERIES WITH IDENTICAL SPECIFICATION OF ORIGINAL BATTERIES SUPPLIED
WITH THE SYSTEM.
- DO NOT OPEN OR MUTILATE THE BATTERY OR BATTERIES. RELEASED ELECTROLYTE IS HARMFUL
TO THE SKIN AND EYES. IT MAY BE TOXIC.
- READ AND FOLLOW ALL SAFETY INSTRUCTIONS. SAVE THESE INSTRUCTIONS.

RECEIVING THE UNIT



**** WARNING ****



**INSPECTION, PLACEMENT, INSTALLATION, SET-UP
AND START-UP SHOULD BE PERFORMED
BY QUALIFIED PERSONNEL**



**** WARNING ****



**HIGH VOLTAGE EXISTS, CAUTION MUST BE TAKEN WHEN WORKING NEAR THE
BATTERY TERMINALS. POWER IS SUPPLIED BY MORE THAN ONE SOURCE. MAKE
SURE BOTH AC AND DC CIRCUIT BREAKERS ARE OFF BEFORE
INSTALLING OR SERVICING THE UPS**



INSPECTION

Upon receipt of your UPS, visually inspect the unit for shipping damage. If shipping damage has occurred, the purchaser should promptly notify the carrier and file a claim with the carrier. The factory should be notified if the damages may impair the operation of the unit. Reference front cover or accompanying paper work for factory contact information.

Note: Remove the top panel of the UPS and inspect inside the unit for shipping damage.

IMPORTANT NOTICE

This shipment has been carefully inspected, checked and properly packaged at our company.

When it was delivered to the carrier it was in good condition and technically it became your property at that time. Thus, any damage, whether obvious or hidden, must be reported to the transportation company within FIVE days of receipt of the shipment at your premises to avoid forfeiting claims for damages.

FOR ALL SHIPMENTS DAMAGED IN TRANSIT

Leave the items, packing material and carton "AS IS". Notify your carrier's local office and ask for immediate inspection of the carton and contents.

After inspection has been made by the carrier, and you have received acknowledgment in writing as to the damage, notify our Customer Service Department to make any required repair arrangements.

It is your responsibility to follow the above instructions or the carrier will not honor any claims for damage. Also, if there are any shortages or questions regarding this shipment, please notify us within FIVE days.

Please note that we cannot be responsible for any service work or back-charges unless authorized by us in writing, before the work is performed.



RECEIVING THE UNIT CONTINUED

STORAGE



WHILE IN STORAGE BATTERIES MUST BE CHARGED FOR 24 HOURS EVERY 6 MONTHS. WHILE IN STORAGE DISCONNECT THE BATTERY CONNECTOR FROM THE INVERTER.



If it is necessary to store the unit, be sure to place it in a clean dry area. **For extended storage, the batteries must be charged for 24 hours every 6 months. Failure to do so will result in weak or bad batteries which WILL NOT be covered under the warranty.** Charging is accomplished by installing the batteries, turning the UPS on and allowing it to run. See “*Installation - Battery Installation*” and “*Installation - Battery Wiring*” for details on installing batteries and the “*Setup Procedure*” and “*Start-up Procedure*” for turning the UPS on. **While storing, disconnect the battery connector from the UPS.** Make sure proper ventilation is available any time the UPS is on.



CAUTION
CABINETS AND BATTERIES ARE EXTREMELY HEAVY
USE PROPER EQUIPMENT WHEN REMOVING
THE UNITS FROM THE CONTAINER

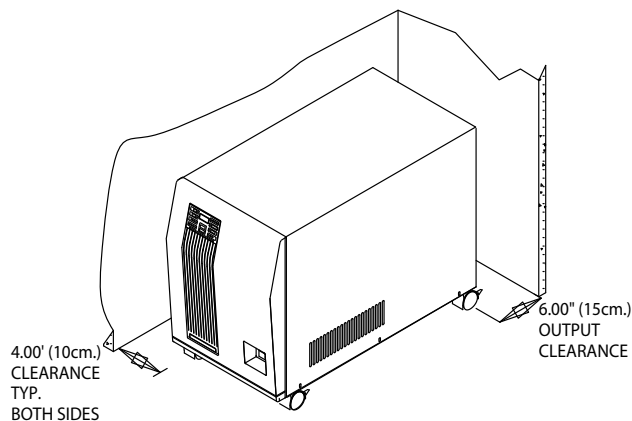


LOCATION / PLACEMENT

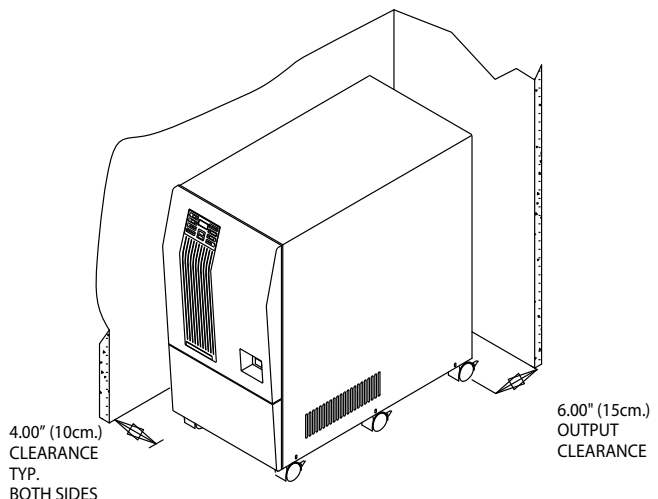
The UPS is designed for office environments. To extend battery life it is recommended to locate the UPS and the external batteries (when applicable) in a controlled environment. To minimize risk of over heating avoid placing the UPS in direct sunlight, near heat registers, or any other type of heat generating source.

Allow a minimum of 4” clearance on the sides and a minimum of 6” clearance at the back of the UPS.

MD3.1-5KVA



MD6.0-7.5KVA





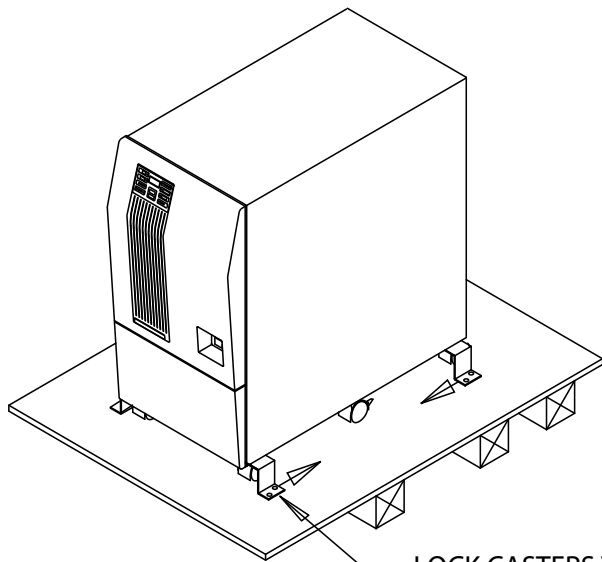
REMOVING THE UPS FROM THE PALLET

TOOLS REQUIRED.

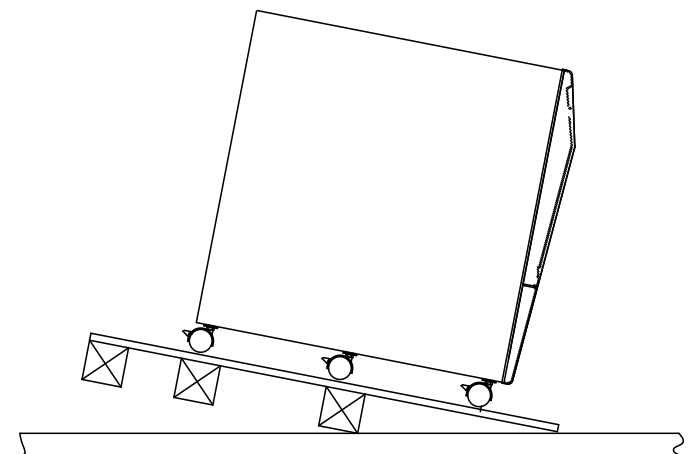
1/2" and 9/16" Socket Wrench, Hammer

STEPS TO REMOVE THE CABINET

1. Check to make sure the casters are locked.
2. Remove the lag bolts holding the brackets to the skid with a 1/2" Wrench.
3. Remove the brackets with a hammer. Larger units may have a different style shipping bracket. If this is the case, remove the shipping brackets from the unit with a 9/16" socket wrench.
4. Unlock the casters and carefully roll the unit down the ramp or use a forklift to carefully lift the unit from the skid.



LOCK CASTERS THEN
REMOVE LAG BOLTS
KNOCK OUT SHIPPING
BRACKETS WITH A HAMMER



UNLOCK CASTERS THEN
TILT SKID AND USE IT
AS A RAMP TO REMOVE
UNIT FROM SKID



PRELIMINARY INSTALLATION

INSTALLATION CONSIDERATIONS

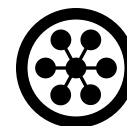
Prior to installing the MD Series UPS be sure to take into consideration the site you have selected. UPS's produce heat and therefore require ventilation as well as accessibility. Consider these factors:

- Ventilation
- Size of the UPS
- Weight Load
- Noise Requirements
- Audible
- Clearances
- Accessibility
- Excessively Long Power Runs
- Proper Ground Techniques
- Generator Applications
- Distribution of Power
- Communications (i.e...Early Power Warning Feature)
- Remote Emergency Power Off (REPO)
- Monitors
- Extended Battery Run Times
- Options
- Input Source Voltage
- Receiving Facilities
- Available Single Phase KVA
- Room Temperature
- Distance of Inverter to Critical Load

AC INPUT BREAKER, WIRING AND AMPERAGE MATRIX - CORD CONNECTED UNITS ONLY

KVA	KW	INPUT VOLTAGE	INPUT LINE PLUG	NO. OF INPUT WIRES	INPUT BREAKER INSTALLED IN THE UPS / SERVICE PANEL BREAKER ¹	OUTPUT VOLTAGE	OUTPUT CURRENT
3.1	2.2	120V	L5-30 ²	3W	40A	120V	25.8A
3.1	2.2	208V	L14-30 ³	4W	40A	208V	14.9A
3.1	2.2	240V	L14-30 ³	4W	40A	240V	12.9A
3.5	2.5	120V	5-50	3W	40A	120V	29A
3.5	2.5	208V	L14-30 ³	4W	40A	208V	16.8A
3.5	2.5	240V	L14-30 ³	4W	40A	240V	14.6A
4.5	3.2	120V	5-50	3W	50A	120V	37.5A
4.5	3.2	208V	L14-30 ³	4W	40A	208V	21.6A
4.5	3.2	240V	L14-30 ³	4W	40A	240V	18.8A
5	3.5	120V	5-50	3W	50A	120V	41.7A
5	3.5	208V	L14-30 ³	4W	40A	208V	24A
5	3.5	240V	L14-30 ³	4W	40A	240V	20.8A
6	4.2	120V	NA	3W	70A	120V	50A
6	4.2	208V	14-50 ⁴	4W	50A	208V	29A
6	4.2	240V	14-50 ⁴	4W	50A	240V	25A
7	5	120V	NA	3W	70A	120V	58A
7	5	208V	14-50 ⁴	4W	50A	208V	34A
7	5	240V	14-50 ⁴	4W	50A	240V	29A
7.5	5.3	120V	NA	3W	70A	120V	62A
7.5	5.3	208V	14-50 ⁴	4W	50A	208V	36A
7.5	5.3	240V	14-50 ⁴	4W	50A	240V	31A
¹ The UPS breaker may be larger than the service panel AC breaker to accommodate for the expanability feature of the UPS.							
² Optional 3W, 5-30P input line plug may be provided. ³ Optional 3W, 6-30P or L6-30P input line plug may be provided.							
⁴ Optional 3W, 6-50P or L6-50P input line plug may be provided.							

NOTE: Output currents at 120 volts (from 3.1K to 7.5K) are derived from the addition of two line to neutral loads.



AC INPUT BREAKER, WIRING AND AMPERAGE MATRIX - HARD WIRED UNITS ONLY

Field wiring for units with hardwired input options, use only copper conductors suitable for 75° C and in accordance with NEC and local codes.

Input field wiring terminal Torque tightening:

For units rated 3.1kVA through 5.0kVA – 17.7 in-lb

For units rated 6.0kVA through 7.5kVA – 50 in-lb

KVA	KW	INPUT VOLTAGE	SERVICE PANEL AC BREAKER (MIN)	INPUT BREAKER INSTALLED IN THE UPS / SERVICE PANEL BREAKER*	INPUT FIELD WIRING CONDUCTOR SIZE (MIN/MAX)	NO. OF INPUT WIRES	OUTPUT VOLTAGE	OUTPUT CURRENT
3.1	2.2	120V	35	40A	8/6 AWG	3W	120V	25.8A
3.1	2.2	208V	20	40A	12/6 AWG	4W	208V	14.9A
3.1	2.2	240V	20	40A	12/6 AWG	4W	240V	12.9A
3.5	2.5	120V	40	40A	8/6 AWG	3W	120V	29A
3.5	2.5	208V	25	40A	10/6 AWG	4W	208V	16.8A
3.5	2.5	240V	20	40A	12/6 AWG	4W	240V	14.6A
4.5	3.2	120V	45	50A	6/6 AWG	3W	120V	37.5A
4.5	3.2	208V	25	40A	10/4 AWG	4W	208V	21.6A
4.5	3.2	240V	25	40A	10/4 AWG	4W	240V	18.8A
5	3.5	120V	45	50A	6/4 AWG	3W	120V	41.7A
5	3.5	208V	30	40A	10/4 AWG	4W	208V	24A
5	3.5	240V	25	40A	10/4 AWG	4W	240V	20.8A
6	4.2	120V	60	70A	4/4 AWG	3W	120V	50A
6	4.2	208V	35	50A	8/4 AWG	4W	208V	29A
6	4.2	240V	30	50A	10/4 AWG	4W	240V	25A
7	5	120V	70	70A	4/4 AWG	3W	120V	58A
7	5	208V	40	50A	8/4 AWG	4W	208V	34A
7	5	240V	35	50A	8/4 AWG	4W	240V	29A
7.5	5.3	120V	70	70A	4/4 AWG	3W	120V	62A
7.5	5.3	208V	40	50A	8/4 AWG	4W	208V	36A
7.5	5.3	240V	35	50A	8/4 AWG	4W	240V	31A

*The UPS breaker may be larger than the service panel AC breaker to accommodate for the expandability feature of the UPS.

NOTE: Output currents at 120 volts (from 3.1K to 7.5K) are derived from the addition of two line to neutral loads.



PRELIMINARY INSTALLATION CONTINUED

INSTALLATION NOTES

- All sizes are available with a hardwired or an input plug option. All hardwired units must be shipped with mounting channel and units with an input plug option may have either mounting channel or caster options. However, if the 6kVA – 7.5kVA 120V INPUT models are selected...hardwired is standard (no input plug available), and the unit must be shipped with floor mounting channels.
- The AC input breaker, wiring and amperage matrix defines the plug and proper AC breaker size for the appropriate KVA. Refer only to the matrix for the service panel AC breaker size.

For Input Wiring, Refer To *“Installation - AC Input and Output Wiring”*

- All 208/240 VAC MD Series UPS systems will operate without the neutral wire at the input of the system, however, the neutral wire is required when bypassing the system without the use of the VPXT (Voltage and Phase Correction Transformer) option.
- Do not attempt to change the plug supplied with the equipment. Controlled Power Company offers receptacle/plug converters that will allow you to match most standard receptacles
- All MD Series UPS's require a ground wire. The ground wire should be the same size as the input feed wires. The ground that feeds the UPS should be of good integrity and dedicated to the UPS. The run should be as short as possible. Conduit cannot be used for the grounding of the circuit.

Reference: NEC Article 250

- Systems using the VPXT option, do not require the neutral from the AC source panel. The VPXT recreates the neutral and generates a new neutral ground bond in accordance with the National Electric Code.
- The System is designed to operate on the primary power you select. Verify that the available power source meets the voltage and current requirements. Under no circumstances should the primary not conform to the UPS operating voltage you have selected.
- If this voltage is not correct for your application refer to section *“Installation - Changing the Input Voltage”*.
- The input plug is 120 or 240 volts unless tagged for 208 volts.

PRELIMINARY INSTALLATION CONTINUED



CABINET DIMENSIONS AND CLEARANCES							
KVA	CABINET STYLE	DIMENSIONS			CLEARANCES REQUIRED		
		WIDTH	HEIGHT	DEPTH	RIGHT SIDE CLEARANCE	LEFT SIDE CLEARANCE	REAR CLEARANCE
3.1 - 5	CASTERS	15"	22.44"	29.813"	4"	NONE	6"
6 - 7.5	CASTERS	15"	30.44"	29.813"	4"	NONE	6"
3.1 - 5	CHANNEL	15"	22.5"	29.813"	4"	NONE	6"
6 - 7.5	CHANNEL	15"	30.5"	29.813"	4"	NONE	6"
3.1 - 5	STACK PACK WITH BATTERY CABINET	15"	29.813"	36.613"	4"	NONE	6"
6 - 7.5	STACK PACK WITH BATTERY CABINET	16.806"	43.545"	29.813"	4"	NONE	6"
3.1 - 5	RACK MOUNT	19"	20.7"	27"	NONE	NONE	6"
6 - 7.5	RACK MOUNT	19.103"	34.595"	27.625"	NONE	NONE	6"
EXTERNAL B2B BATTERY CABINET ONLY WITH CASTERS		15"	22.44"	32.935	NONE	NONE	6"
EXTERNAL B3B BATTERY CABINET ONLY WITH CASTERS		15"	30.44"	32.935"	NONE	NONE	6"
RACK MOUNT EXTERNAL B2B BATTERY CABINET ONLY		19"	20.595"	30.688"	NONE	NONE	6"
RACK MOUNT EXTERNAL B3B BATTERY CABINET ONLY		19"	27.775	30.331"	NONE	NONE	6"
"C" EXTERNAL BATTERY CABINET ONLY		21.5"	44.625"	33.313"	NONE"	NONE	6"
"H" EXTERNAL BATTERY CABINET ONLY		33.25"	52.730"	40"	NONE	NONE	6"

"Appendix A - Cabinet Outlines" for complete measurements



INSTALLATION

AC INPUT AND OUTPUT WIRING FOR MD3100 - MD5000 MODELS TYPICAL INPUT AND OUTPUT WIRING FOR ALL CABINET STYLES



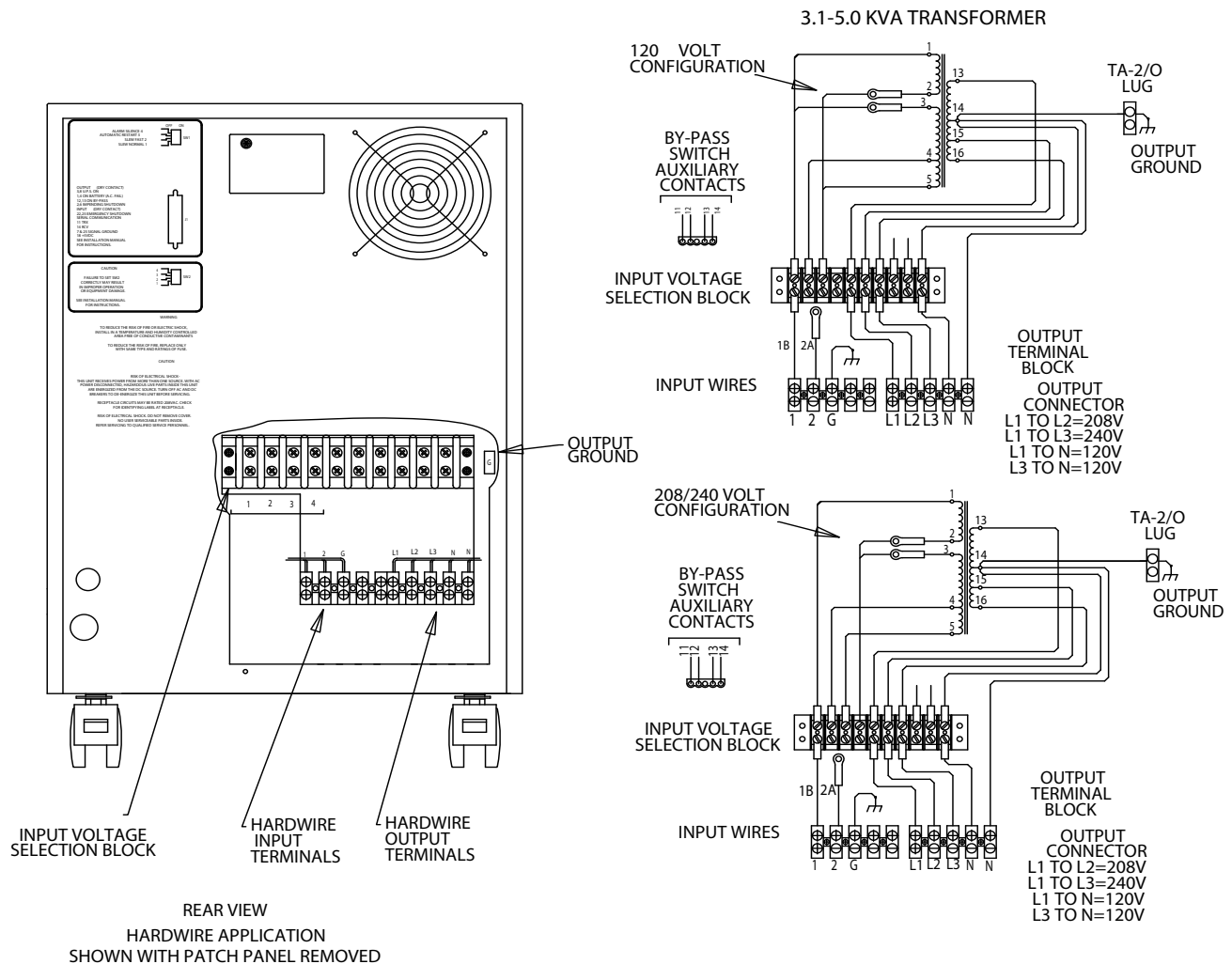
**** WARNING ****



HIGH VOLTAGE EXISTS, CAUTION MUST BE TAKEN WHEN WORKING NEAR THE BATTERY TERMINALS. POWER IS SUPPLIED BY MORE THAN ONE SOURCE. MAKE SURE BOTH AC AND DC CIRCUIT BREAKERS ARE OFF BEFORE INSTALLING OR SERVICING THE UPS.



NOTE: LOADS MUST BE SPLIT EVENLY BETWEEN OUTPUTS
L1-N AND L3-N WHENEVER POSSIBLE



120 VOLT INPUT: CONNECT 2A TO TRANS LEAD #5 & JUMPER
(3 TO 1) & (2 TO 5) ON INPUT VOLTAGE SELECT BLOCK

208 VOLT INPUT: CONNECT 2A TO TRANSFORMER LEAD #4 JUMPER (2 TO 3)

240 VOLT INPUT: CONNECT 2A TO TRANSFORMER LEAD #5 JUMPER (2 TO 3)

Input terminal torque rating - 3.1KVA through 5.0KVA - 17.7in.lb.

INSTALLATION CONTINUED



AC INPUT AND OUTPUT WIRING FOR MD6000 - MD7500 MODELS TYPICAL INPUT AND OUTPUT WIRING FOR ALL CABINET STYLES



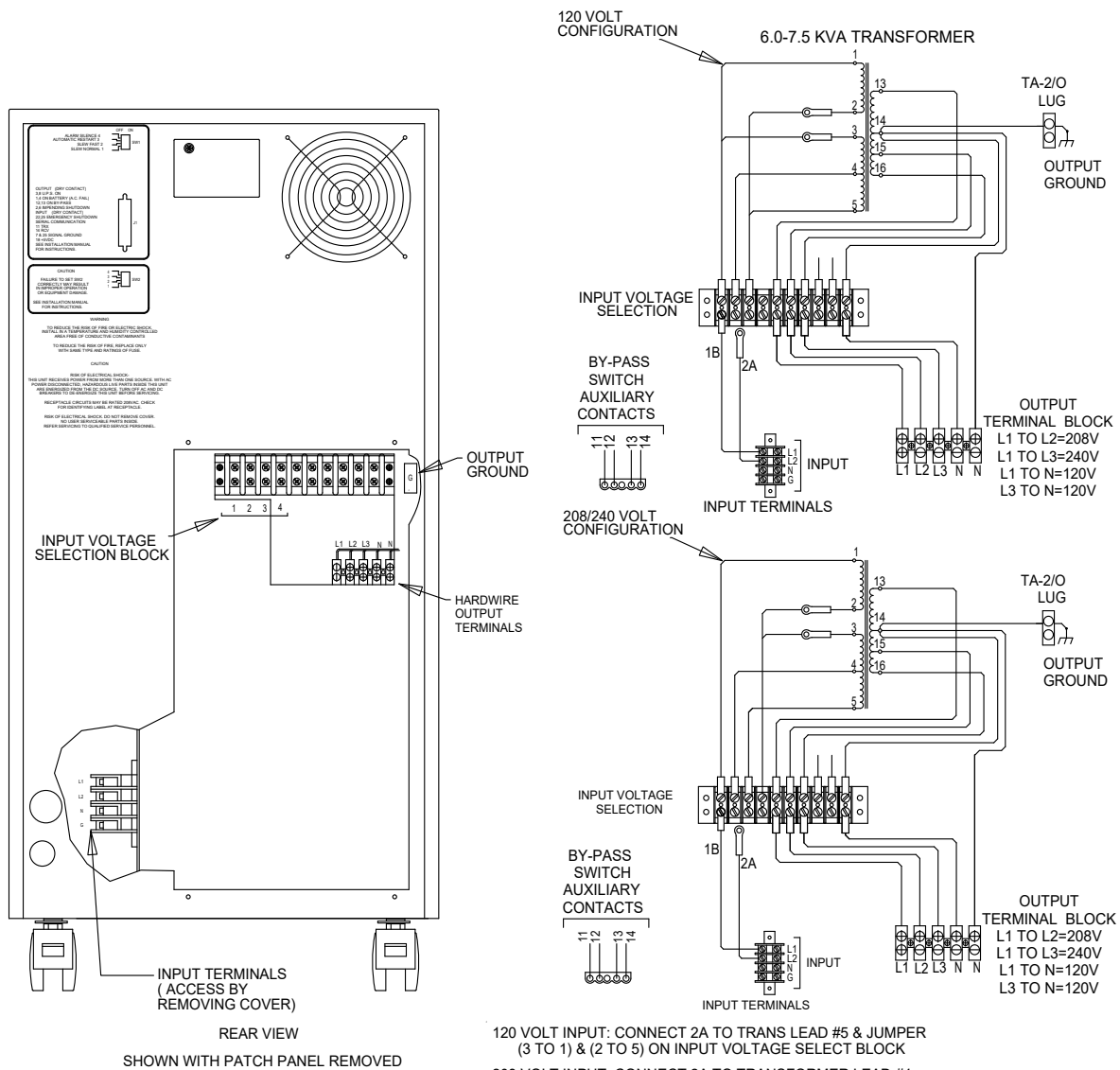
**** **WARNING** ****



HIGH VOLTAGE EXISTS, CAUTION MUST BE TAKEN WHEN WORKING NEAR THE BATTERY TERMINALS. POWER IS SUPPLIED BY MORE THAN ONE SOURCE. MAKE SURE BOTH AC AND DC CIRCUIT BREAKERS ARE OFF BEFORE INSTALLING OR SERVICING THE UPS.



**NOTE: LOADS MUST BE SPLIT EVENLY BETWEEN OUTPUTS
L1-N AND L3-N WHENEVER POSSIBLE**



Input terminal torque rating - 6.0KVA through 7.5KVA - 50in.lb.



INSTALLATION CONTINUED

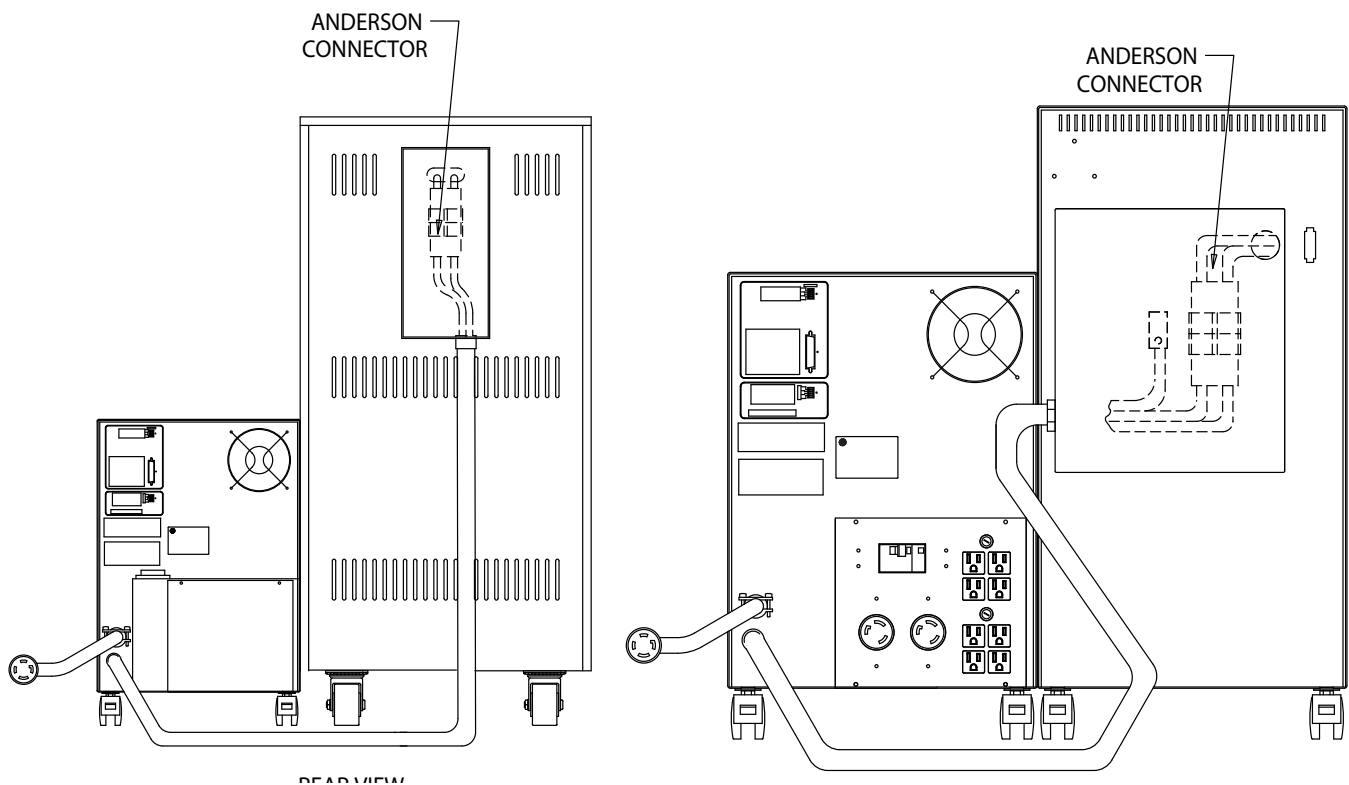
EXTERNAL BATTERY CABINET INSTALLATION



**** WARNING ****



HIGH VOLTAGE EXISTS, CAUTION MUST BE TAKEN WHEN WORKING NEAR THE BATTERY TERMINALS. POWER IS SUPPLIED BY MORE THAN ONE SOURCE. MAKE SURE BOTH AC AND DC CIRCUIT BREAKERS ARE OFF BEFORE INSTALLING OR SERVICING THE UPS



TYPICAL CONNECTION FOR ALL SIZES AND EXTERNAL BATTERY CABINET STYLES

OTHER OPTIONAL DEVICES



INSTALLING OTHER OPTIONS

Refer to “*Installation - Options Installation Diagram*”

**The power supply for these options MUST be taken from the output of the UPS.
A 120V receptacle (5-20R) on the output of the UPS is required.**

REMOTE EMERGENCY POWER OFF PUSH-BUTTON

This option allows you to completely disable the UPS, which is required by many local safety codes. The push-button may mount near an entrance or exit and comes standard with 50 feet of cable terminated with a 4 pin connector. The 4 pin connector is used in conjunction with a DB25 gender changer that plugs into the UPS.

AUTOMATIC MESSAGE DIALER

Monitors when UPS is on battery power, when the batteries are low and the room temperature. Each of these conditions will automatically dial up to four pre-programmed phone numbers and delivers a voice synthesized warning message. The Automatic Message Dialer will continue to call until the message is acknowledged. Warning features may be added which are - moisture detection, unauthorized access and alarms pertinent to heating and cooling systems.

The “call in” feature allows you to call in from any outside telephone. You receive a report on monitored conditions and may listen for unusual sounds in the room.

It is recommended to plug the monophone into the UPS so you are assured the monophone is working during power outages. The Automatic Message Dialer has it's own battery and may be plugged into any 120 volt AC outlet, but the battery is not rechargeable and must be replaced annually. This option comes with 50 feet of cable terminated with a DB25 connector and a 10 foot telephone cord. NOTE: All auxiliary conditions are contact closure inputs.

REMOTE ANNUNCIATOR

This option provides a remote emergency power off push button and remotely monitors the UPS status with incandescent bulbs. The monitor function includes UPS On, System on Battery, Impending Shutdown, and By-Pass Active. The option comes with 50 feet of cable terminated with a DB25 connector and a 24 volt power supply that plugs into the output of the UPS. See “*Optional Remote Annunciator Installation*”.

NOTE: If a 4X port expander is used the 24 volt power supply is not required. Remote annunciator may be connected directly to 4X expander.

4X COMMUNICATIONS PORT EXPANDER

This option allows communication to the UPS by up to four separate peripherals. All ports are isolated eliminating mixed ground problems or incompatibility of signal style. The 4X Expander must be plugged into the UPS and comes with a interconnecting cable for the J1 port on the UPS.

2X COMMUNICATIONS PORT EXPANDER

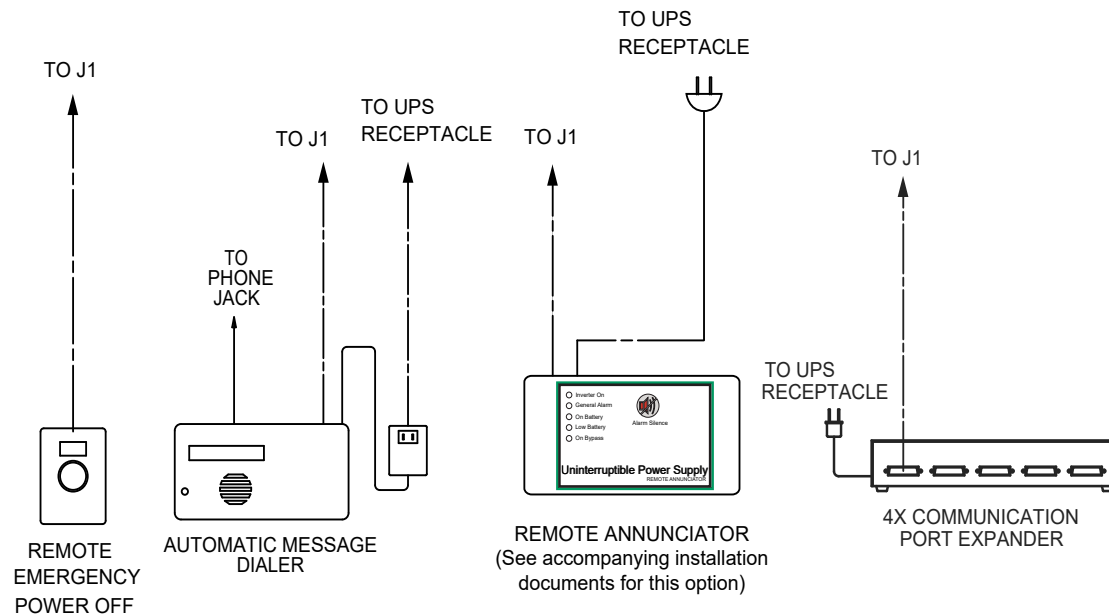
This option allows communication to the UPS by up to two separate peripherals. The option has one male DB25 connector and two female DB25 connectors one foot long. Note: There is NO isolation between the two female connectors.



OTHER OPTIONAL DEVICES CONTINUED

OPTIONS INSTALLATION DIAGRAM

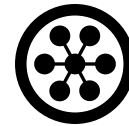
The power supply for these options MUST be taken from the output of the UPS. A 120V receptacle (5-20R) on the output of the UPS is required.



NOTE: THE POWER SUPPLY FOR DEVICES, EXCLUDING THE REMOTE EMERGENCY POWER OFF, MUST BE TAKEN FROM THE OUTPUT OF THE INVERTER. A 120V RECEPTACLE (5-20R) WHOSE SUPPLY IS TAKEN FROM THE OUTPUT OF THE INVERTER MUST BE INSTALLED NEAR THE LOCATION OF THE DEVICE.

TYPICAL FOR ALL CABINET STYLES

OPTIONAL REMOTE ANNUNCIATOR INSTALLATION



Please read this entire instruction set before installing!
Turn off all power before installing or servicing!



REMOTE ANNUNCIATOR

Controlled Power Company's Remote Annunciator is capable of displaying status conditions of an Uninterruptible Power Supply and alarming under critical conditions. The following installation instructions include operation, wiring, and mounting your Remote Annunciator.

OPERATION

During normal operation of the UPS, the Remote Annunciator will illuminate the green UPS On LED. During an alarm condition (unit over temperature, utility fail, etc.) the red General Alarm LED will illuminate along with other applicable LED's indicating the nature of the alarm and the audible alarm will sound. The audible alarm can be silenced by pressing the Alarm Silence button on the front of the unit. If another alarm condition occurs (i.e. low battery), the alarm will resound. The audible alarm can be altogether defeated by changing jumper J1 on the circuit board. See the back side of the Remote Annunciator for J1 jumper setting.

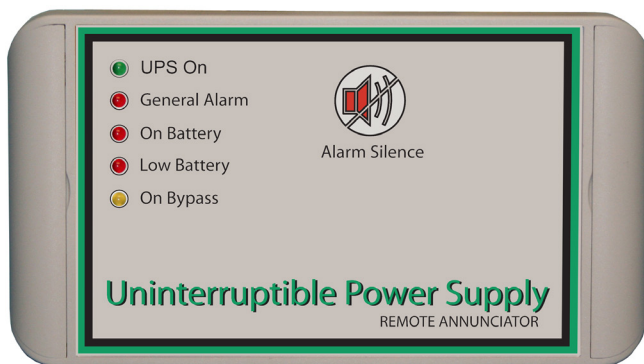


Figure 1: Remote Annunciator

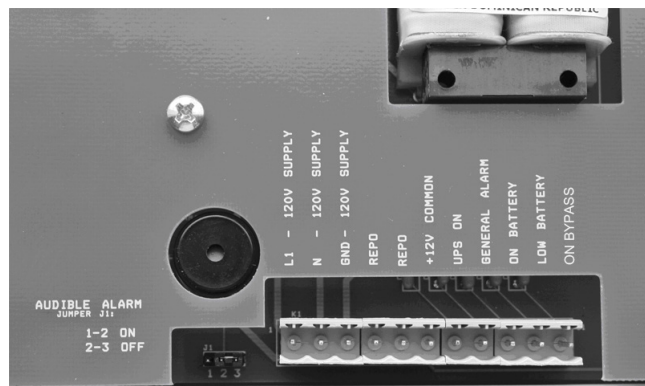


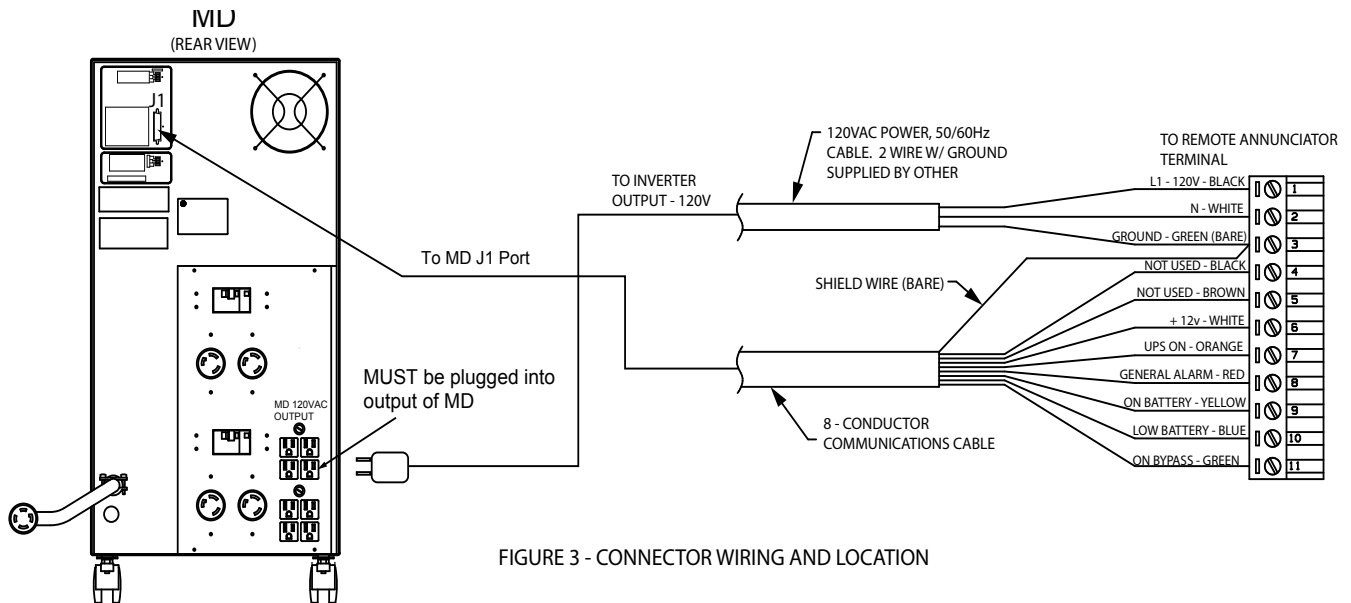
Figure 2: Rear of Remote Annunciator showing J1 and terminal header

WIRING

The wiring of the Remote Annunciator consists of two feeds. One being the communication cable supplied with the unit, and the other is 120Vac 50/60Hz from the output of the UPS it is monitoring. The power supply can be taken directly from an output breaker on the unit, a receptacle or panel that is fed by the UPS or a nearby circuit fed by the UPS. From the UPS, run the communication cable to the location of the Remote Annunciator. The cable may be run through conduit, walls or cable tray/raceway, but care must be taken not to pinch, cut or kink the cable. After the cable is run, trim excess cable or coil in a safe location. Both feeds, after entering the box, must be wired to the supplied connector as shown in Fig 3. Use standard 1/2" box connector clamps to anchor the wire to the box (not supplied).



OPTIONAL REMOTE ANNUNCIATOR INSTALLATION



NOTES:

1. All wires to connector must be stranded, maximum 12 AWG.
2. If using solid conductor for AC power, splice in length (minimum 4") of stranded wire to connector.
3. Strip outer sheathing and foil back minimum 2".
4. Strip all wires 0.25".
5. 120V supply must come from UPS output. Power must be present in event of utility failure.
6. Connector on other end of communication cable to be factory wired.

After all cable routing and connector wiring is complete, plug Remote Annunciator connector into the terminal header.

MOUNTING

The Remote Annunciator is designed to be wall mounted with wiring inputs through the rear or top/bottom (using conduit). Flipping out the side doors, remove the four screws fastening the cover to the box. The cover is attached to the box with two plastic retaining straps. Using the four holes in the back of the box and proper anchors (not supplied), mount the unit to drywall, masonry, paneling or any other type of wall. Holes are provided for rear cable entry. If top or bottom entry is desired, holes must be drilled in recommended location for (maximum 1/2") conduit (Fig. 4).

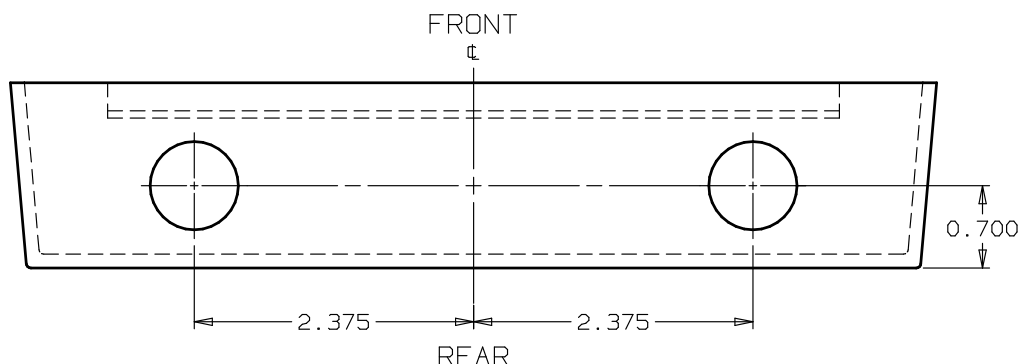
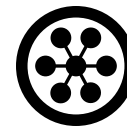


Figure 4: Drilling locations for top/bottom conduit entrance.

OPTIONAL REMOTE COMMUNICATIONS



NETMINDER REMOTE COMMUNICATIONS

The NetMinder UPS Management Suite and NetMinder CS141 Series of Ethernet Adapters inform of the status and condition of the UPS and the incoming electrical power, as well as protect the LAN / WAN from unwanted downtime and unnecessary maintenance costs. NOTE the CS121 has been discontinued and replaced by the CS141. The CS121 is still supported.

NetMinder UPS Management Suite Programs (CD)

NetMinder UPSMAN

Performs all UPS monitoring and data logging. Executes all alarm notifications, network configurations, and server shutdown requests.

NetMinder UPSMON

Works in conjunction with UPSMAN to give a visual display of UPS status, electrical parameters, alarm conditions, and system logs.

NetMinder RCCMD

Client-side application that performs an orderly, unattended shutdown of servers. RCCMD can receive its shutdown instructions from either a UPSMAN server, a UNMSII server, or a CS141 web server.

NetMinder UNMSII (basic version)

Server-side application that centralizes monitoring and e-mail alarm reporting of up to (9) Controlled Power Company UPS's, from a single terminal. Note that the full version of UNMSII includes SNMP notification, as well as the ability to monitor up to an unlimited number of UPS's. Contact Controlled Power Company for additional details.

NetMinder CS141 Series of Ethernet Adapters

The NetMinder CS141 series of adapters provide complete integration of the UPS into an Ethernet or RS485 network, and thereby provide 24 / 7 monitoring of UPS status, electrical parameters, and notification of alarm conditions. With the ability to communicate in Ethernet TCP/IP, MODBUS TCP, and MODBUS RS485 network environments, the CS141 adapters keep system personnel informed and alerted to any critical condition. When used with NetMinder RCCMD, all CS141 adapters provide added network protection from downtime, and prevent unnecessary maintenance costs that result from data corruption and server crashes.

The NetMinder CS141 Ethernet Adapter is available in (3) unique versions:

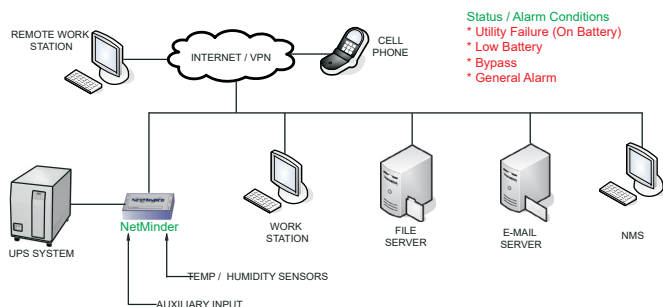
CS141B: Ethernet / SNMP / TCP/IP Adapter

CS141L: Advanced Ethernet / SNMP / TCP/IP / MODBUS TCP Adapter with facilities monitoring I/O and auxiliary contact closure inputs.

CS141L-485: Advanced Ethernet / SNMP / TCP/IP / MODBUS TCP / MODBUS RS485 Adapter with auxiliary contact closure inputs.

NetMinder CS141 Features & Benefits

- Real-time Remote UPS Monitoring
- Web Server Based
- MODBUS ASCII and RTU
- Graphic Event and Data Trending
- Exportable Data and Event Logging for Trending Analysis and Troubleshooting



See the accompanying communications manual for setup instructions.

See “Communications Description” for port locations.



OPTIONAL REMOTE COMMUNICATIONS CONTINUED

NETMINDER REMOTE COMMUNICATIONS INTERCONNECTION DIAGRAM

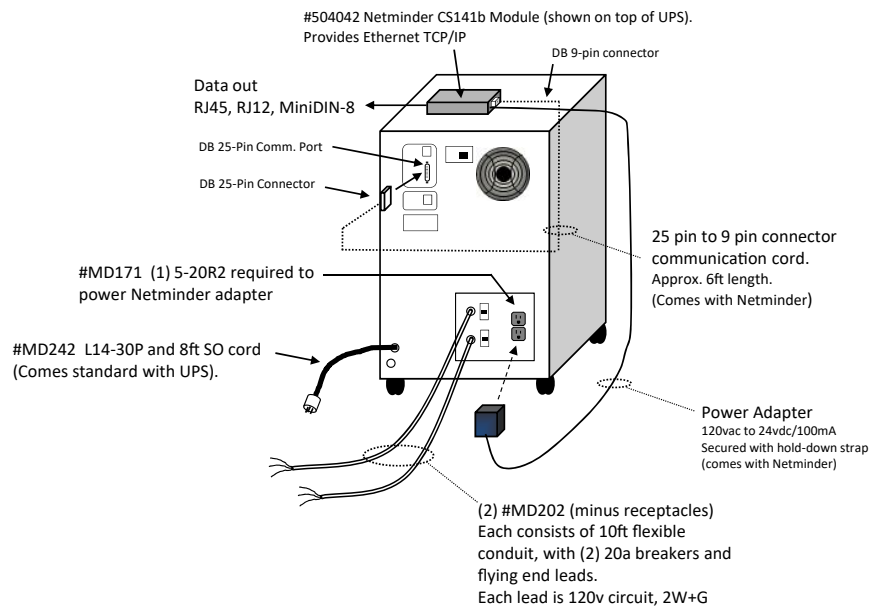


MD Model UPS

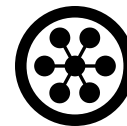
Commercial/Industrial UPS system
High MTBF, Power Conditioning/Voltage Regulation

Illustration provided to show compliance with the need for (2) 10 foot flying leads in flexible conduit. And the Ethernet communication adapter.

MD3500, #MD352 – Back side, Illustrated



SYSTEM SET UP



Prior to turning on the power and starting the UPS, it is very important to check out the mode in which you intend to operate the system.

- All operating parameters are factory set to standard operating modes.
- Selector switch SW1 and SW2 at the rear of the UPS allows you to change the mode operation that best suits your specific needs.

SELECTOR SWITCH SW1 (DIP SWITCH SELECTION)

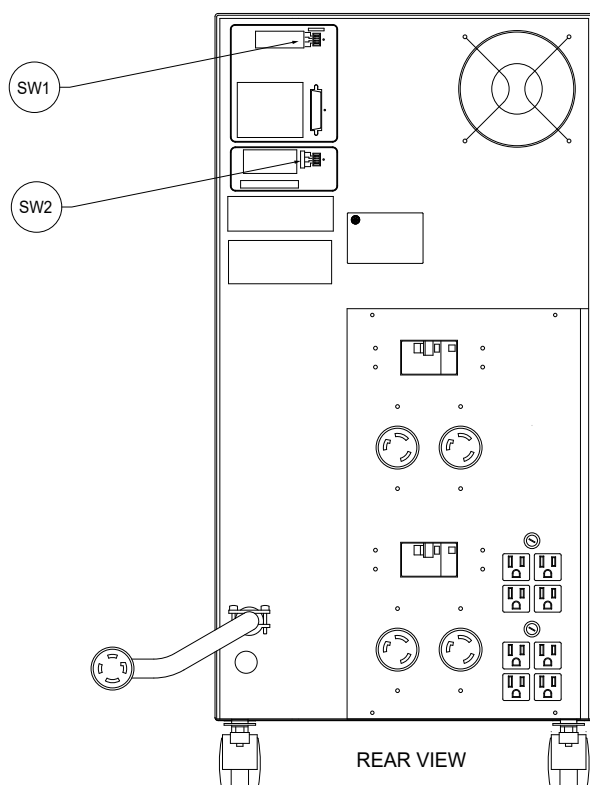
Operating Mode

Position 1 - Slew Rate Normal (factory set to normal). **Do not change switch with UPS on.**

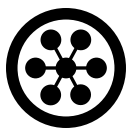
Position 2 - Slew Rate Fast - This selection is typically used when the UPS must follow a rapidly changing input frequency. I.E.....engine generators. Do not change switch with UPS on. NOTE: Only one switch must be on at a time for Positions #1 and #2..

Position 3 - Manual or Automatic Restart - (Automatic Restart - following a power down caused by depleting the battery power, the UPS will automatically start upon restoration of utility power). This selection can be changed with the UPS on. Manual restart requires push-button at front of unit to be reset. ON = Auto Restart, OFF = Manual Restart.

Position 4 - Audible Alarm - (Off to silence audible alarm). This selection can be changed with the UPS on.



DIP SWITCH (SW1) STANDARD SETTINGS		
POSITION	DESCRIPTION	STATUS
1	SLEW NORMAL	OFF
2	SLEW FAST	ON
3	AUTO RESTART	ON
4	AUDIBLE ALARM	ON



SYSTEM SET UP CONTINUED

SELECTOR SWITCH SW2 (DIP SWITCH SELECTION)

Input Voltage Selection

Do not change this setting without changing or verifying that the input wiring matches the input voltage selection. (See “Changing the Input Voltage”).

INPUT VOLTAGE	SWITCH POSITIONS			
	POSITION 1	POSITION 2	POSITION 3	POSITION 4
120 VAC	ON	OFF	OFF	OFF
208 VAC	OFF	ON	OFF	OFF
220 VAC	OFF	OFF	ON	OFF
240 VAC	OFF	OFF	OFF	ON

GENERATOR APPLICATIONS

If your MD series UPS is going to operate with a generator system, the following changes will be needed.

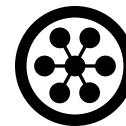
1. Slew Rate Change – You will need to change selector switch SW1 on the back of the UPS from “normal” to “fast” slew rate.
2. System Set Point Changes – Change the system set points as noted below. Refer to the “Communications” section for instructions on how to change the set points.

System Set Points – Generator Applications Only

Description	Value entered w/ no al input voltage = 120V	Value entered w/ nominal input voltage = 208V	Value entered w/ nominal input voltage = 240V
High Line Switch Point	% = 115	% = 115	% = 115
Low Output Frequency Alarm Set Point	57	57	57
High Output Frequency Alarm Set Point	63	63	63
Low Line Sample Accumula- tion Set Point	Available (1-2) = 2	Available (1-2) = 2	Available (1-2) = 2
Frequency Accumulation Buffer	Available (2-9) = 9	Available (2-9) = 9	Available (2-9) = 9

Note : All other parameters remain at Factory Preset Levels – refer to “Communications” section for remaining parameters.

START UP



1. Re-install all panels that may have been removed during installation.
2. Verify the input voltage matches the UPS input volts and the UPS output voltage matches your equipment's input voltage. See the specification tag on the rear of the unit.
3. Remove any loads that are connected to the output of the UPS.
4. Using the line cord and plug supplied, plug in the UPS and turn on the utility circuit breaker feeding the circuit. If the UPS has a hard wired input, verify proper connection and then turn on the utility circuit breaker feeding the circuit.



**NOTE: Batteries require charging for 6 to 8 hours.
Backup time is reduced until batteries are fully charged.**



5. Turn on the battery circuit breaker (DC Breaker) and then the input circuit breaker located on the front of the UPS. There will be a few seconds delay as the unit comes on. The digital display and "System On" LED will illuminate. Scroll to the "Output Volts" function and make sure the output voltage is reading correctly. This should match the reading in Step 6.
6. Verify, with a voltmeter, that the output voltage on the UPS matches the load requirement.



Do not plug your equipment in if output voltage is out of spec, contact factory.



7. Simulate a power loss by turning off the INPUT CIRCUIT BREAKER ONLY, located on the front of the UPS. An "Audible Alarm" will sound and the following LED's will illuminate.

- System On

- System on Battery

- Alarm

8. While on inverter, verify the output voltage on the UPS matches the load requirement while on batteries.

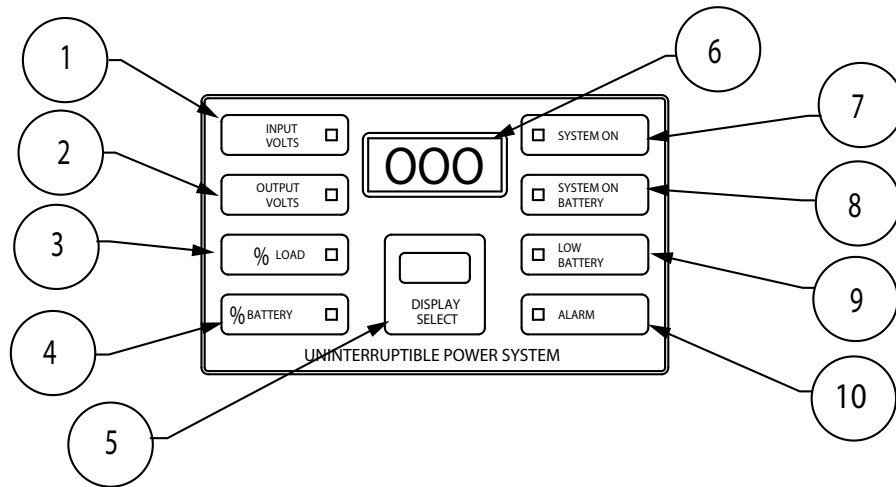


Do not plug your equipment in if output voltage is out of spec, contact factory.



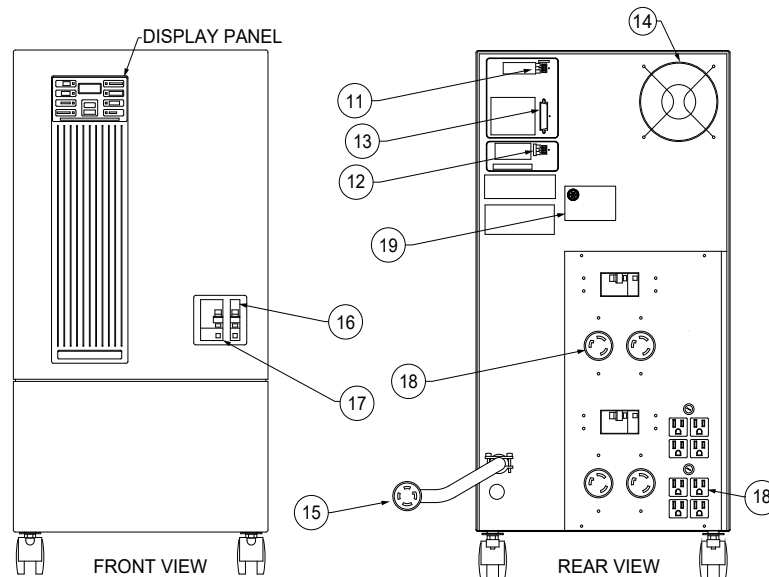
9. Turn on the input circuit breaker and the UPS will return to utility power. With the optional output breakers **OFF**, plug in the loads. Optional output breakers are located on the back of the unit. See "Appendix A - Cabinet Outlines" and "Component Location Diagram".
10. With the UPS running and the "System On" LED illuminated, turn on the output circuit breakers and loads.
11. Some loads start hard and may cause the UPS to display a temporary overload. This is normal and in no way will damage the UPS.
12. If the overload (typically too much equipment connected to the UPS) persists and is in excess of 150% the UPS will shut off within ten minutes. If the unit is overloaded, some equipment will have to be removed or the UPS must be expanded.

Call Customer Support for any questions during start up at 1-800-521-4792.



DISPLAY PANEL

1. **Input Volts** - LED ON indicates unit is monitoring the input voltage via the digital display. This function is activated by pushing the display select button.
2. **Output Volts** - LED ON indicates unit is monitoring the output voltage via the digital display. This function is activated by pushing the display select button.
3. **Percent Load** - LED ON indicates unit is monitoring the output load capacity relative to maximum watts via the digital display. This function is activated by pushing the display select button.
4. **Percent Battery** - LED ON indicates unit is monitoring the percentage of battery charge via the digital display. When operating on battery power the digital display monitors percentage of battery time remaining.
5. **Display Select** - This push-button selects 1 of 4 monitor functions mentioned above and displays the results on the digital display.
6. **Digital Display** - Three digit display monitoring the four previous functions. This display monitors one function at a time and is selected by the "Display Select" push-button.
7. **System On** - LED ON indicates the on/off switch is on and AC power is available at the input. LED will remain on when unit is on battery power.
8. **System On Battery** - LED ON indicates the UPS is on battery power accompanied by an audible alarm. The UPS may switch to battery power even when it appears there are no power outages. The reason is that the UPS detects input sags and surges and does not necessarily require a total power loss to switch to battery power. The UPS will remain on battery power for a few seconds after normal AC power is restored.
9. **Low Battery** - LED ON indicates batteries are low and a total UPS shutdown is imminent unless AC power returns. This alarm setpoint is user selectable via the communications port (see "*Communications*" to turn on at a predetermined percentage of battery time remaining. Percentage is selectable from 10% to 90% of battery remaining. Standard selection is 40%.
10. **Alarm** - LED ON is accompanied by an audible alarm for a number of alarm functions (see "*Communications*"). Alarm will clear automatically once the alarm condition is resolved.



TYPICAL FOR ALL CABINET STYLES

11. SW1 - This is a selector switch with the following functions:

Position #1 - ON = Slew rate Normal (do not change this switch with UPS on). Note: Only 1 switch may be on at a time for position 1 and 2. Turn position 1 on and 2 off if UPS switches to batteries often.

Position #2 - ON = Slew rate Fast - this selection typically used when UPS must track rapidly changing input frequency. i.e. engine generators (do not change this switch with UPS on).

Position #3 - ON = Audible alarm on, OFF = Alarm silence.

Position #4 - During extended power outages the UPS will automatically turn off to prevent total battery depletion. Upon return of utility power you have the option for the UPS to turn on automatically or manually by resetting the on/off switch. ON = Auto Restart, OFF = Manual Restart

12. SW2 - Input voltage selection dip switch - NOTE: must match the input voltage of the UPS. **DO NOT CHANGE SETTINGS**, See *“Changing the Input Voltage”*.

13. J1 Port - Used for communications between the UPS and your computer (see *“Communications”*).

14. Cooling Fans - Allow minimum of 2” clearance for airflow.

15. Line Cord - Input power is connected here.

16. AC Input Breaker - Turns the UPS On or Off, connects the AC Power feed. Note: Both the AC and DC breakers must be off to stop the unit unless the hot start feature is enabled (See *“System Set Points”* in the *“Communications”* section).

17. DC Breaker - Turns the batteries On or Off. Turn OFF when in storage. Note: Both the AC and DC breakers must be off to stop the unit unless the hot start feature is enabled (See *“System Set Points”* in the *“Communications”* section).

18. Output Receptacles - Equipment to be protected is connected here.

19. Spec Tag - Indicates units specifications.



OPERATION CONTINUED

IMBB (INTERNAL MAKE BEFORE BREAK) BYPASS SWITCH OPTION



****** WARNING ******

**DO NOT OPERATE THE BYPASS SWITCH
WHILE THE UNIT IS ON BATTERY POWER.**



IMBB - Internal make before break bypass switch.

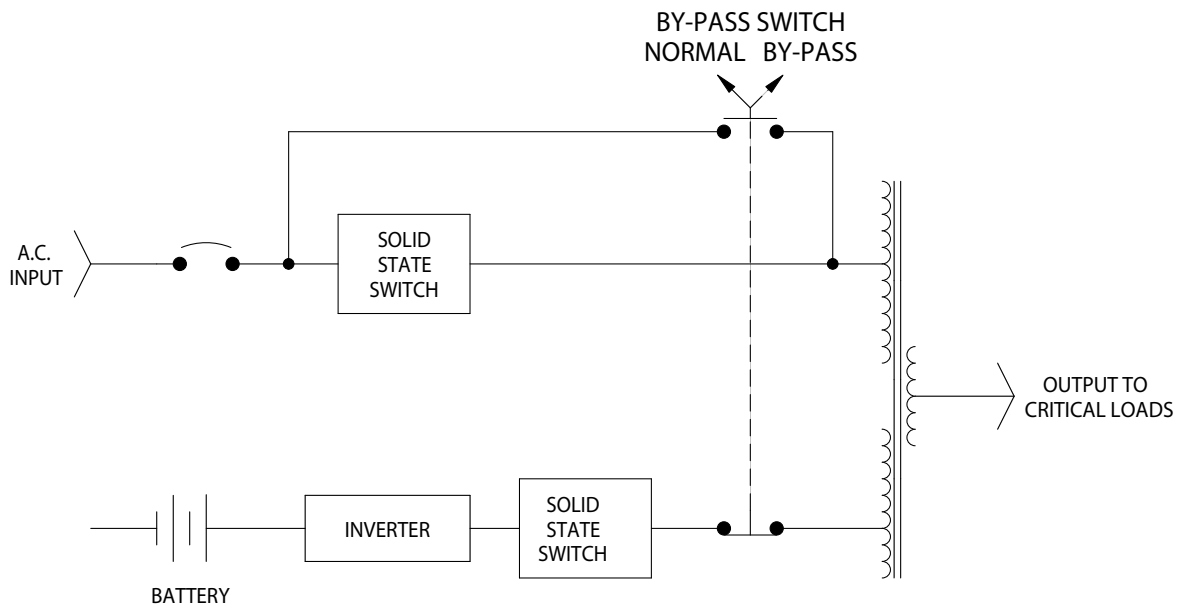
This switch bypasses the battery backup capability of the UPS, but still utilizes the power purification transformer to provide clean power to your computers in the event of a battery or inverter failure. You may operate this switch with no interruption to critical loads.



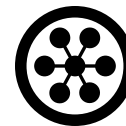
****** CAUTION ******

**THIS IS NOT A MAINTENANCE BYPASS SWITCH
THE UPS MUST BE COMPLETELY SHUTDOWN TO PERFORM SERVICE.**





After switching to bypass mode, it is recommended that the DC circuit breaker be turned to the “OFF” position. This will prevent battery discharge and possible battery damage if left in bypass mode for extended periods of time. Be sure to turn the DC circuit breaker back “ON” before returning to normal mode operation.



PMBB WRAP AROUND MAINTENANCE BYPASS SWITCH OPTION

THE FOLLOWING APPLIES FOR SYSTEMS WITH PMBB (PRE-WIRED MAKE BEFORE BREAK) WRAP AROUND MAINTENANCE BYPASS OPTION



****** WARNING ******

**DO NOT OPERATE THE BYPASS SWITCH
WHILE THE UNIT IS ON BATTERY POWER.**

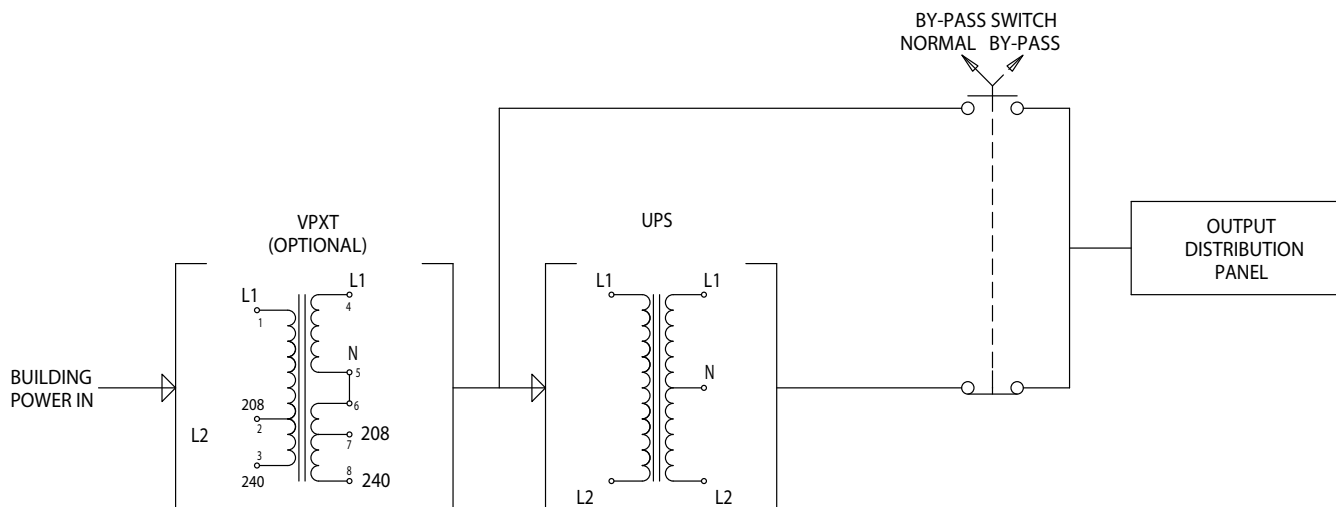


PMBB (Pre-wired make before break bypass assembly)

This switch can only be used when the AC power source is a true single phase source and the input and output voltages of the UPS are the same or when using the VPXT option. Typically a 240/120 volt source is a true single phase while 208/120 is three phase.

If the sum of the line voltages to neutral add up to the line voltages the source is single phase. A 208/120 volt true single phase source will have one power leg that measures 88 volts line to neutral.

This switch is mounted on the rear of the UPS in such a manner as to allow the receptacle panel to be added or changed.



After switching to bypass mode, it is recommended that the DC circuit breaker be turned to the “OFF” position. This will prevent battery discharge and possible battery damage if left in bypass mode for extended periods of time. Be sure to turn the DC circuit breaker back “ON” before returning to normal mode operation.



OPERATION CONTINUED

PBBM WRAP AROUND MAINTENANCE BYPASS SWITCH OPTION

THE FOLLOWING APPLIES FOR SYSTEMS WITH PBBM (PRE-WIRED BREAK BEFORE MAKE) WRAP AROUND MAINTENANCE BYPASS OPTION.



***** WARNING *****

A BREAK BEFORE MAKE BYPASS SWITCH WILL CAUSE THE CRITICAL LOAD TO SHUTDOWN DURING TRANSFER.





****** WARNING ******

DO NOT OPERATE THE BYPASS SWITCH WHILE THE UNIT IS ON BATTERY POWER.



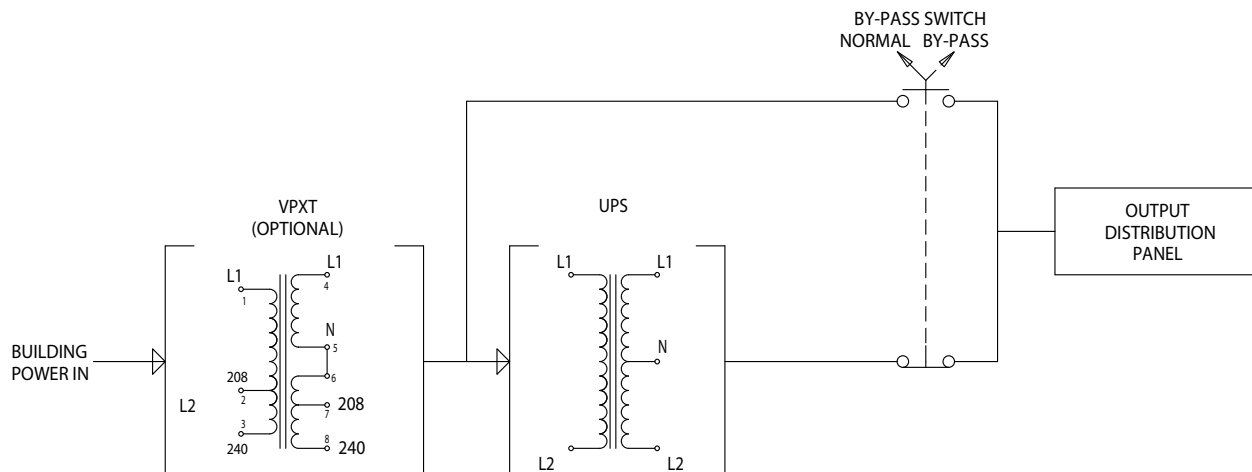
PBBM (Pre-wired Break Before Make Bypass Assembly)

This switch can only be used when the input and output voltages of the UPS are the same. If they are not the same, a VPXT unit may be added to eliminate this problem.

120/208 3 phase input will bypass a UPS wired for 208 VAC 1 phase input and 120/208 VAC 1 phase output.

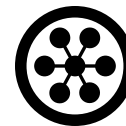
120/240 1 phase input will bypass a UPS wired for 240 VAC 1 phase input and 120/240 VAC 1 phase output.

This switch is mounted on the rear of the UPS in such a manner as to allow the receptacle panel to be added or changed.



After switching to bypass mode, it is recommended that the DC circuit breaker be turned to the “OFF” position. This will prevent battery discharge and possible battery damage if left in bypass mode for extended periods of time. Be sure to turn the DC circuit breaker back “ON” before returning to normal mode operation.

CHANGING THE INPUT VOLTAGE



*** CAUTION ***



When using bypass switches, changing the input voltage may negate the bypass function. Be sure that the input and output of the UPS are the same. Contact the Customer Support Department at 1-800-521-4792 if you have any questions.



There are three items that need to be modified when changing the input voltage.

1. Dip switch settings - Input voltage selection.
2. Rewiring the input voltage selection block.
3. Software modifications.

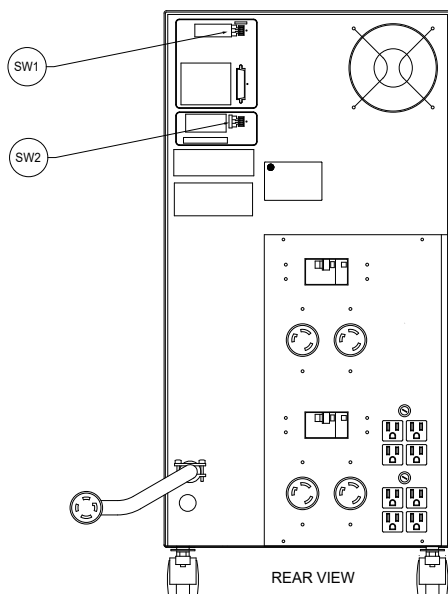
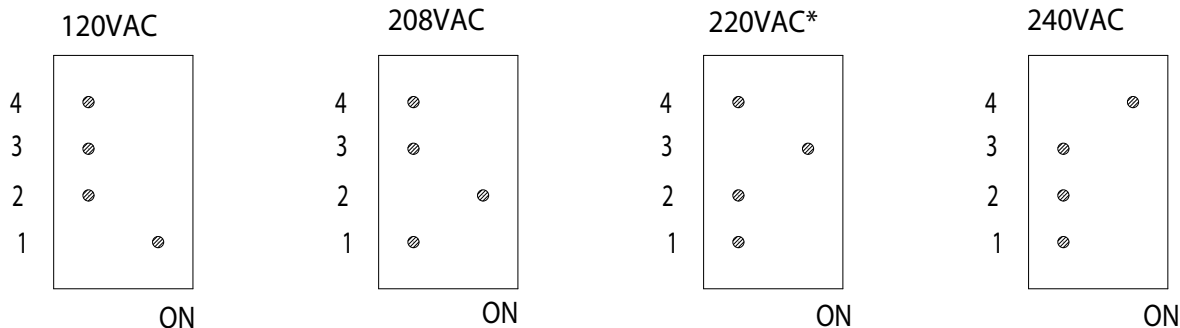


Turn off **all** power (open AC and DC breaker on the front of the unit) and unplug the UPS prior to performing the following steps.



1. DIP SWITCH SETTINGS (SW2) - INPUT VOLTAGE SELECTION

Note that Selector Switch 2 (SW2) at the rear of the UPS, must match the input voltage selection.



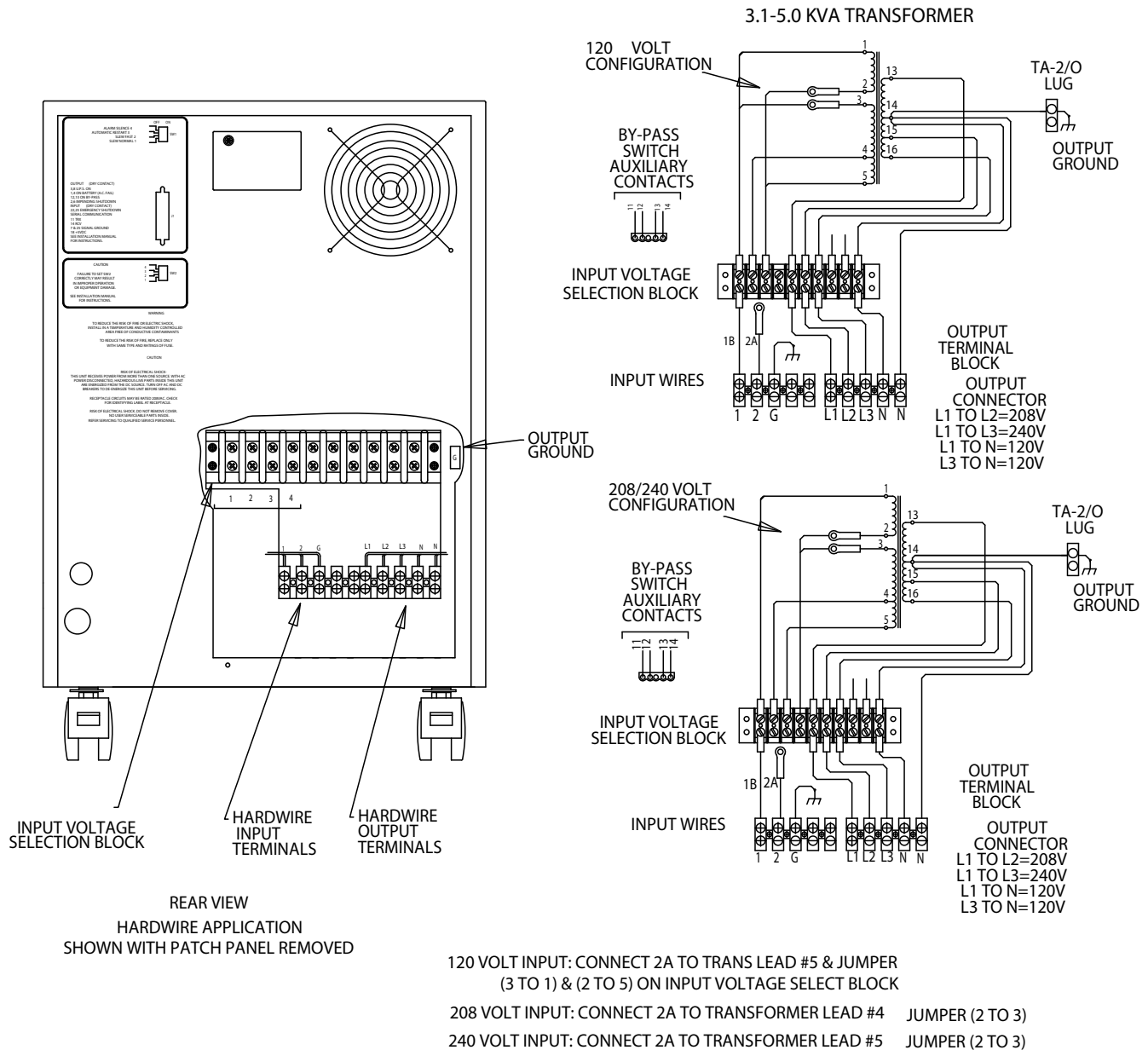
* No transformer tap is provided in standard unit. Consult factory for applications of this voltage.



CHANGING THE INPUT VOLTAGE CONTINUED

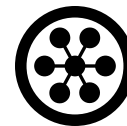
2. REWIRING THE INPUT VOLTAGE SELECTION BLOCK

Also see “Installation - AC Input and Output Wiring”



TYPICAL FOR ALL CABINET STYLES

CHANGING THE INPUT VOLTAGE CONTINUED



3. SOFTWARE MODIFICATIONS

Also see “*Communications - Communicating with the UPS*”

There are alarm and operation set points that will alter the behavior of the UPS. It is not recommended that these be modified without a complete understanding of the function. Consult Customer Support at 1-800-521-4792 prior to modifying set points.

MINIMUM SYSTEM REQUIREMENTS:

1. Computer/Laptop with Windows 3.1 or later.
2. “Hyperterminal” (Windows 3.1, Windows XP) or “PuTTY” for Windows Vista and Windows 7 or later. (download at <http://www.putty.org/>).
3. USB Port and a DB25 to USB Null Modem Conversion Cable - for use with all Windows operating systems and “Hyperterminal” or “PuTTY” emulation programs.

PROCEDURE

1. Connect the DB25 to USB Null Modem Conversion cable from J1 on the rear of the UPS to the USB port on a computer.
2. Make sure the UPS is ON and running.
3. Start Windows on the computer, access “All Programs” then “Accessories” then “Communications” then “Hyper Terminal” for Windows 3.1 or Windows XP. Or launch “PuTTY” for Windows Vista and Windows 7 or later.
4. In the Hyperterminal “Connection Description” window, enter any name then choose any icon - Click OK. For “PuTTY” users, Connection type = Serial, Serial Line = Com Port of computer being used, Speed = 1200. “PuTTY” users can name and save the session for later use. “PuTTY” users skip to step 7.
5. In the Hyperterminal “Connect To” window, choose “Connect Using” and select the comport you are using, Click OK.
6. In the Hyperterminal “COM Port Settings” window, set the following parameters: 1200 Baud, 8 data bits, 0 parity, 1 stop bit, flow control = xon/xoff, then click OK.
7. To enter into the “Memory Modification Group” type a lower case “m” and hit “ENTER”.
8. The response will be: PASSWORD=
9. Enter a lower case “sps-92”. then hit “ENTER”
10. Upon entering the correct password, one line item will be displayed at a time, i.e.,

Min AC Start = 204

Min AC Start = If the value is to remain unchanged press ENTER and the next parameter will appear or else type the new value. After entering the new value press “ENTER” to scroll to the next parameter. To end the process type a lower case “e”.

11. After making the desired changes, send a lower case “p” and the System Parameters will appear on the screen. Verify the changes that you have made. If further changes are required, go back to step 7.
12. At this point you are already out of the “Memory Modification Group” (after entering the lower case “e” in step 10).
13. Disconnect the communications cable.



COMMUNICATIONS DESCRIPTION

COMMUNICATIONS

Three methods can be used to communicate with the UPS:

- Direct connect to a terminal.
- Direct connect to a PC that is operating as a terminal emulator or a communication software that will emulate a terminal.
- Modem operation.

Once the communication link is established, system set points, system parameters, system status and memory modification is attainable.

Any system status change will automatically cause the UPS to send an alert warning signal. The signal sent is “?”. User software can be written to identify this signal and initiate automatic unattended action.

J1 PORT - DB25 PIN FUNCTION

Pin #	Name	Description
1	UPS On (Battery Operation)	Closes on battery operation
2	Receive Data	RS/232
3	Transmit Data	RS/232
6	(+) 10 VDC Supply	Limited to 1 mA
7	Signal Ground	Communication signal ground
8	UPS On (Ready)	Closes when UPS is ready
11	Low Battery Alarm (Shutdown Pending)	Closes when low battery
14	General Alarm	Closes on alarm condition
20	(+) 10 VDC Supply	RS/232
21	(-) 10 VDC Supply	Limited to 1 mA
23	Remote Emergency Power Off	Positive DC input w / reference to ground shuts unit off
25	Signal Ground	Communication signal ground

Pins 8, 1, 11 and 14 are open collector transistor, 40V Max. requiring a pull up resistor, 300mA Max. The contacts are referenced to pins 7 or 25 which is chassis ground.

Pin 23 requires a high input limited to 20 VDC with reference to pin 7 and 25 (ground) or the +10 VDC signal at pin 6 may be utilized with an external contact.

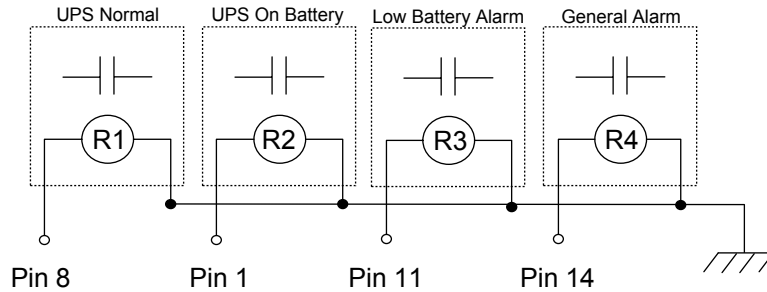
RS232 TECHNICAL SPECIFICATION SUMMARY

Connector	25 Pin, Type D, Female
Format	ASCII 8 bit, One Start Bit, One Stop Bit
Parity	None
Duplex	Full
Delimiters	Carriage Return per Block

Baud Rate – 1200 BPS. Standard SNMP operation is 9600 BPS. Default is 1200 BPS.



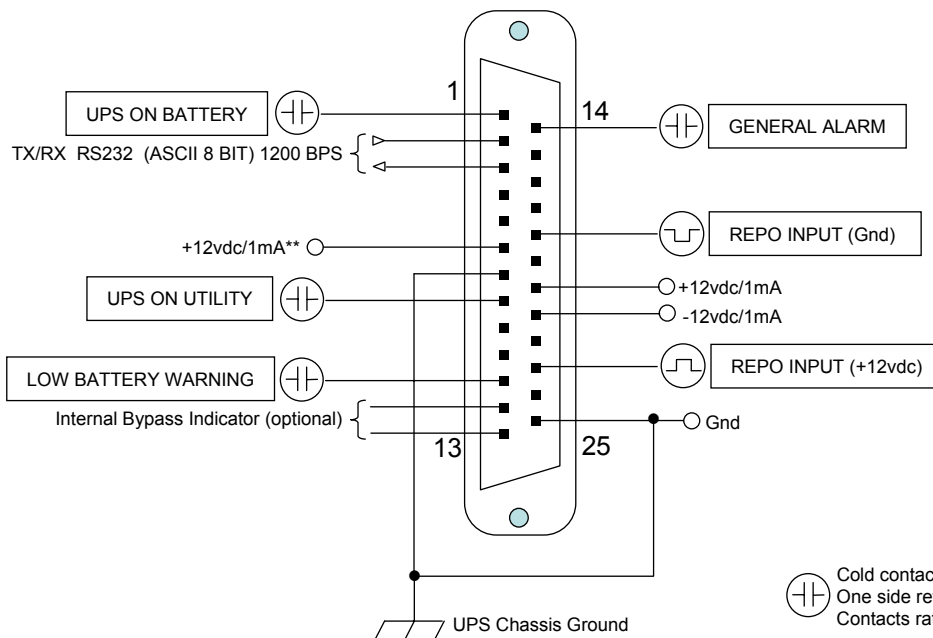
Slave Relays for alternate voltage/current and isolation requirements
(Recommended to insure proper interface without operational interference)



Customers input should be sink type, where contact closure pulls input to chassis ground common.

R1-R4 contact and coil specifications to match customer alarm interface and DC Power Source requirements.

MD UPS J1 Port / DB25



Cold contact output, closes upon Alarm.
One side reference to internal chassis ground.
Contacts rated at 24vdc/ac, 0.5 amps.

**Note: 1mA is not enough to drive most discrete relay devices
Use only for REPO control or TTL Logic control.



COMMUNICATING WITH THE UPS

There are alarm and operation set points that will alter the behavior of the UPS. It is not recommended that these be modified without a complete understanding of the function. Consult Customer Support at 1-800-521-4792 prior to modifying set points.

MINIMUM SYSTEM REQUIREMENTS:

1. Computer/Laptop with Windows 3.1 or later.
2. "Hyperterminal" (Windows 3.1, Windows XP) or "PuTTY" for Windows Vista and Windows 7 or later. (download at <http://www.putty.org/>).
3. USB Port and a DB25 to USB Null Modem Conversion Cable - for use with all Windows operating systems and "Hyperterminal" or "PuTTY" emulation programs.

PROCEDURE

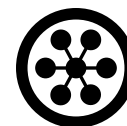
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2. Make sure the UPS is ON and running.
3. Start Windows on the computer, access "All Programs" then "Accessories" then "Communications" then "Hyper Terminal" for Windows 3.1 or Windows XP. Or launch "PuTTY" for Windows Vista and Windows 7 or later.
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11. After making the desired changes, send a lower case "p" and the System Parameters will appear on the screen. Verify the changes that you have made. If further changes are required, go back to step 7.
12. At this point you are already out of the "Memory Modification Group" (after entering the lower case "e" in step 10).
13. Disconnect the communications cable.

COMMUNICATIONS CONTINUED



COMMUNICATIONS - CONTINUED

SYSTEM PARAMETERS

The following lists parameters the UPS monitors and also system status of the UPS while operating.

To access System Parameters and Status send the lower case “s” to the UPS from the terminal.

You must hit the “s” key each time to update system status.

Description	Sample Display	Description
AC Volts In	Input Line Voltage = 240	The voltage the UPS is receiving
AC Volts Out	Output Voltage = 240	The voltage the UPS is delivering to the load
Battery Volts	Batter Voltage % = 98	Percentage of full charge of the battery
AC Amps Out	Output Current = 2.4	Amperage the load draws from the UPS
% of Full Load	Load % = 90	The percentage of total capacity that the load is using
Watts Out	KW = .54	The total real power the UPS is delivering to the load
Volt Amps Out	KVA = .77	The total apparent power the UPS is delivering to the load
Power Factor	Power Factor = 0.70	The power factor of the load (KW/KVA)
Incomming Line Frequency	Frequency = 60.0	Displays the input frequency when on line, output frequency when on inverter
Crest Factor	Crest Factor	Peak Current / RMS Current
Outages	Outage	The number of outages recorded from the last clear function
Overloads	Overload	The number of overloads from the last clear function

SYSTEM STATUS

Description	Sample Display	Description
Synchronization	Synchronization	When the UPS is in sync with the line frequency
UPS On	UPS On	When the UPS is producing an output voltage
Low Battery Warning	Low Battery Warning	When the battery level reaches the preset value of alarm condition
On Battery	On Inverter	When the UPS is supplying output power from the batteries
Overload Alarm	Overload Alarm	When the UPS is supplying more power than its rated capacity
Low Output	Low Output	When the output voltage goes lower than the preset alarm condition
High Output	High Output	When the output voltage exceeds the preset alarm condition
Check Battery	Check Battery	When the battery discharge is greater then normal
Frequency Fault	Frequency Fault	When the fault exceeds the preset range of alarm conditions
Overtemp Warning	Overtemp Warning	When the UPS temperature reaches a critical level. immediate shut-down.
Shorted SCR Shutdown	Shorted SCR Shutdown	When the power electronic switch is shorted
Low Battery Shutdown	Low Battery Shutdown	When the batteries are depleted the UPS shuts off
Output Shutdown	Output Shutdown	If selected, the UPS will shutdown when the output exceeds set points
Output Warning	Output Warning	If selected, UPS will alarm when output exceeds set points



COMMUNICATIONS CONTINUED

COMMUNICATIONS - CONTINUED

SYSTEM SET POINTS

To access System Set Points send the lower case “p” to the UPS from the terminal. Note: This allows monitoring of system set points only.

Description	Sample Display	Password	Explanation
Minimum AC Start Voltage	204	Required	Minimum AC voltage required before the UPS will start.
Maximum AC Start Voltage	Max AC Start = 264(+15% Max)	Required	If the input voltage exceeds this value, the UPS will not start
Low Output Alarm Setpoints	Low Output = 210	Required	Alarm or shutdown if the output voltage dips to this set value.
High Output Alarm Setpoints	High Output = 264	Required	Alarm or shutdown if the output voltage reaches this set value.
Low Battery Warning Set Point	Low Battery (%) - Min = 010 Max = 070	No Access	Percent of battery capacity alarm set value.
High Battery Warning Set Point	High Battery (%) = 105	No Access	Manufacturer set point for diagnostics and charger control.
Low Frequency Alarm Set Point	Low Frequency = 059 Max = 057	Required	Alarm or shutdown if the output frequency dips to this set value.
High Frequency Alarm Set Point	High Frequency = 061 Max = 063	Required	Alarm or shutdown if the output frequency reaches this set value.
Over Temperature Set Point	Over Temperature = 160	No Access	Manufacturer set point.
Nominal Input Voltage	Input Nominal = 240	Required	Nominal input voltage. Switch set points are calculated from this value.
Nominal Output Voltage	Output Nominal = 240	Required	Nominal output voltage. Value from which other calculations are derived.
Maximum KVA Rating	Output VA = 850	Required	Maximum KVA rating of the UPS.
Low Line Switch Point. NOTE: Fuzzy Logic is entered as shown	Sag Switch Point (%) = 065 Fuzzy Logic = 000 Fuzzy Plus = 001	Required	Percent below nominal AC input when the UPS will switch to battery operation.
High Line Switch Point	Surge Switch Point (%) = 110 (%) = 115 Max	Required	Percent above nominal AC input when the UPS will switch to battery operation.
Low Line Sample Accumulation Buffer	Sensativity (1-2) = 1	Required	Averaging factor for low line voltage. 1 = least averaging (greater sensitivity).
Frequency Accumulation Buffer	Frequency Delay (2-9) = 8	Required	Number of AC cycles required to be out of set frequency range prior to switching to inverter mode.
Power Grid Stability Check	Transfer Delay (Sec) = 20	No Access	Amount of time in seconds the UPS will wait before accepting the AC input
System ID Number	System ID = Units 8 Digit Serial #	Required	System identification serial number.
System Shutdown Enable	Output Shutdown Enable (1/0) = 0	Required	If enable set = 1, the UPS will shut-down when alarm set points are exceeded. 0 = audible alarm only.
Hot Start or AC Start	Hot Start = 1 AC Start = 0	Required	Hot Start - Unit turns on with no AC input power. AC Start - AC power required for unit to turn on.



SYSTEM SET POINTS - FACTORY PRESET LEVELS

Description	Value entered w/ nominal input voltage = 120V	Value entered w/ nominal input voltage = 208V	Value entered w/ nominal input voltage = 240V
Minimum AC Start Voltage	102	177	204
Maximum AC Start Voltage	132	229	264
Nominal Input Voltage	120	208	240
Nominal Output Voltage	Refer to unit Spec tag	Refer to unit Spec tag	Refer to unit Spec tag
Low Output Alarm Set points	105	182	210
High Output Alarm Set points	132	229	264
Low Line Switch Point. NOTE: Fuzzy Logic is entered as shown	Fuzzy Logic = 00.	Fuzzy Logic = 00.	Fuzzy Logic = 00.
High Line Switch Point	% = 110	% = 110	% = 110
Low Output Frequency Alarm Set Point	59	59	59
High Output Frequency Alarm Set Point	61	61	61
Low Line Sample Accumulation Set Point	Available (1-2) = 1	Available (1-2) = 1	Available (1-2) = 1
Frequency Accumulation Buffer	Available (2-9) = 8	Available (2-9) = 8	Available (2-9) = 8
System Shutdown Enable	Audible Only = 0	Audible Only = 0	Audible Only = 0
Maximum KVA Rating	Enter actual KVA Rating - See units spec tag	Enter actual KVA Rating - See units spec tag	Enter actual KVA Rating - See units spec tag
Hot Start or AC Start	AC Start = 0	AC Start = 0	AC Start = 0



PREVENTIVE MAINTENANCE



**** **WARNING** ****



HIGH VOLTAGE EXISTS, CAUTION MUST BE TAKEN WHEN WORKING NEAR THE BATTERY TERMINALS. POWER IS SUPPLIED BY MORE THAN ONE SOURCE. MAKE SURE BOTH AC AND DC CIRCUIT BREAKERS ARE OFF BEFORE INSTALLING OR SERVICING THE UPS

GENERAL MAINTENANCE

The best preventive maintenance is to operate the MD Series UPS in a clean environment with proper ventilation and no restrictions on air intakes and cooling fan outputs.

Battery connections should be tightened annually by qualified electrical personnel. Batteries should be replaced every 5 years.

The UPS should be checked monthly on battery operation. Take precautions to have computers in a mode that could tolerate a shut down. To simulate a utility power loss, simply turn off the AC circuit breaker located on the UPS. Observe the battery display. A properly functioning system will show 90 - 100% on the battery display and should decrement slowly.

COMPLETE MAINTENANCE CHECK

PREPARATION

A shutdown period must be scheduled to perform maintenance unless the system is equipped with a "Maintenance Bypass" switch. A computer load should be available to test the UPS with a loss of power simulation.

EQUIPMENT

Digital multimeter, wire brush or other cleaning device (for battery connections), insulated tools (for battery connections) and safety glasses.

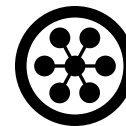
SYSTEM OPERATION

1. With the power on, check the display functions of the unit for proper operation.
2. Turn both the AC and DC breakers off.

VISUAL INSPECTION

1. Remove the top panel.
2. Remove any load from the units output.
3. Check for burnt, frayed, broken or loose connections. Look closely in the following areas: Inverter components, power semi-conductors, input, output connections, circuit breakers, transformer connections, capacitors, fans, bypass switch and electronic circuit boards.

PREVENTIVE MAINTENANCE CONTINUED



VISUAL INSPECTION CONTINUED

4. Correct for any loose connections, replace any physically burned or broken components. Use extreme care when replacing components to assure correct installation.

NOTE: Check off all items on the Performance Checklist.

BATTERY CHECKS



Servicing of batteries should be performed or supervised by personnel knowledgeable of batteries and the required precautions. Keep unauthorized personnel away from batteries. See "Safety Precautions".



1. Visually inspect all of the battery connections,. If there is any sign of corrosion - disconnect that battery and clean with a wire brush. Tighten all other battery connections. Make sure the batteries are not swollen or cracked. If they are, contact factory.
2. Turn both the AC and DC breakers on. Let the unit run for a minute.
3. Verify the battery float voltage in table A after following these steps. Place a DC voltmeter on millivolt scale and measure across resistor R5 on the switch mode board #406242/416857. This signal limits at 75 millivolts when batteries require a full charge. If this condition exists allow the batteries to charge until the signal is 15 millivolts or less.
4. Place voltmeter across K1 connector on switch mode board wires V2 (common) and V1. Adjust P2 float voltage as shown in Table A.

TABLE A

UNIT SIZE	NUMBER OF BATTERIES	FLOAT VOLTAGE
3.1 - 5 KVA	4	54.5 VDC
6 - 7.5 KVA	8	109 VDC

5. Turn the AC input breaker off only, the unit should invert. Note the percentage of battery time remaining. The rate at which the batteries decrease is related to the actual load on the output and battery backup time. If back-up time is extremely short, contact the factory.
6. Complete a NO LOAD INVERTER test and record the readings on the Performance Checklist.
7. Turn the AC breaker on, the unit will return to line power, complete a NO LOAD ON LINE test and record the readings on the Performance Checklist.
8. Check any emergency power off devices and any options - bypass switch, REPO, remote monitor, computer interface, etc.....
9. Test the unit ON LINE with a load and record the readings on the Performance Checklist.
10. Invert the unit with a load(s) and record the readings on the Performance Checklist.

NOTE: Observe the percentage of battery time remaining. The rate at which the display decreases is related to output load and battery back-up time. If battery back-up time is very short, contact the factory.



PREVENTIVE MAINTENANCE CONTINUED

GENERATOR TEST

1. If a generator is backing the UPS, check to be sure that the UPS operates properly with the generator.
 - A. Check generator operation with no load. The unit should switch to inverter when the generator kicks on. After a minute or so the UPS should switch back to normal mode and run off the generator. Record the UPS output voltage on the Performance Checklist.
 - B. Check the generator with load(s). Follow the same steps stated above and record the readings on the Performance Checklist.

EXTERIOR CLEANING INSTRUCTIONS



Appropriate steps should be taken to avoid placement of materials on this device which may drip, fall, and the like, and increase the risk of fire or electrical shock.



The UPS should be completely shut off and disconnected from power prior to cleaning. To clean exterior, use a clean damp cloth with a mild detergent. Be careful not to drip liquids into the vents. Dry thoroughly. If liquids get into venting areas open the cabinet and carefully dry affected areas.



CAUTION - HIGH VOLTAGE EXISTS, CAUTION MUST BE TAKEN WHEN WORKING NEAR THE BATTERY TERMINALS. POWER IS SUPPLIED BY MORE THAN ONE SOURCE. MAKE SURE AC CIRCUIT BREAKER IS OFF AND THE INPUT PLUG IS DISCONNECTED FROM BUILDING POWER BEFORE OPENING THE ENCLOSURE.



PERFORMANCE CHECKLIST



CONTROLLED POWER COMPANY

UPS PERFORMANCE CHECKLIST

SRO # : Date :

Customer Name :

Model Number : Serial Number :

System Location :

	OK	NOT OK	N/A	EXPLANATION OF ITEMS CHECKED "NOT OK"
ENVIRONMENTAL CHECKS				
CLEANLINESS	☒	☐	☐	
VENTILATION	☒	☐	☐	
ROOM TEMP (Record Actual)				
*BATTERY CHECKS				
BATTERY CONNECTIONS	☒	☐	☐	
BATTERY VOLTAGE	☒	☐	☐	
ELECTRICAL CONNECTION CHECKS				
BYPASS SWITCH (SEE BELOW)	☒	☐	☐	
INPUT CONNECTIONS	☒	☐	☐	
OUTPUT CONNECTIONS	☒	☐	☐	
CIRCUIT BREAKERS	☒	☐	☐	
CIRCUIT BOARD CONNECTIONS	☒	☐	☐	
HEATSINK CONNECTIONS	☒	☐	☐	
MAIN BATTERY CONNECTOR	☒	☐	☐	
INTERNAL FAN MOTORS	☒	☐	☐	
EXTERNAL FAN MOTORS	☒	☐	☐	
FUSES	☒	☐	☐	
CAPACITORS	☒	☐	☐	
SYSTEM CHECKS				
DISPLAY FUNCTIONS	☒	☐	☐	
STATIC BYPASS	☒	☐	☐	
MANUAL BYPASS	☒	☐	☐	
FAN MOTORS	☒	☐	☐	
ON INVERTER / BATTERY	☒	☐	☐	
REPO TEST	☒	☐	☐	

SW Settings

SW1 ☐ CLOSED ☐ OPEN

SW2 ☐ CLOSED ☐ OPEN

SW4 ☐ CLOSED ☐ OPEN

IF LOADS ARE NOT AVAILABLE AT TIME OF SERVICE OR START UP, LEAVE THE UNIT IN BYPASS MODE.

Default settings should be set to Auto Restart if customer is unavailable to verify

INPUT			OUTPUT			
	NO LOAD	W/ LOAD		NO LOAD	W/ LOAD	ON BATT
L1 - N VOLTS*			L1 - N VOLTS*			
L2 - N VOLTS*			L2 - N VOLTS*			
L3 - N VOLTS*			L3 - N VOLTS*			
L1 - L2 VOLTS*			L1 - L2 VOLTS*			
L1 - L3 VOLTS*			L1 - L3 VOLTS*			
L2 - L3 VOLTS*			L2 - L3 VOLTS*			
L1 Current*			L1 Current*			
L2 Current*			L2 Current*			
L3 Current*			L3 Current*			
LN Current			LN Current			
Freq Hz			Freq Hz			
N to GND			N to GND			

* WHERE APPLICABLE

TRAINING

☐ On/Off Procedure
 ☐ Use of Bypass
 ☐ Manual Battery Test
 ☐ Battery Maintenance

☐ Use of Monitor
 ☐ Manual vs. Auto Restart
 ☐ Annual Battery Check
 ☐ Annual Maintenance

TRAINING SIGN UP:

COMMENTS:

QAF #: 19.23 SUBJECT: UPS PERFORMANCE CHECKLIST Revision #: 3

Effective Date: 04/19/21 APPROVED BY: Service Department Page #: 1 of 1



PERFORMANCE CHECKLIST CONTINUED



CONTROLLED POWER COMPANY

UPS BATTERY INSPECTION AND PERFORMANCE CHECKLIST

SRO # :

Date :

Battery Mfg. & Model# # of Batteries

(1) BATTERY INSPECTION

☐

Torque

☐

Terminal Connections

☐

Battery Connector

Any damaged batteries?: ☒ YES

☐ NO

If Yes, please explain:

(2) BATTERY VOLTAGE

Start Up

(Record actual voltage of each battery with and without load on Inverter Power)

Preventive Maintenance

(Record actual voltage of each battery with no load and after 5 minutes of rundown)

	No Load	W/ Load		No Load	W/ Load		No Load	W/ Load		No Load	W/ Load
1			2			3			4		
5			6			7			8		
9			10			11			12		
13			14			15			16		
17			18			19			20		
21			22			23			24		
25			26			27			28		
29			30			31			32		
33			34			35			36		
37			38			39			40		

FULL BATTERY RUNDOWN IS NOT REQUIRED AT START UP UNLESS OTHERWISE NOTED

(3) BATTERY RUNDOWN (ON PREVENTATIVE MAINTENANCE ONLY)

What is the UPS rated back up time?

How many minutes did the UPS run on battery before shutting off?

(4) GENERATOR TESTS

No load on GEN output

Inverter on GEN output

Does UPS return to line power when on GEN? YES

Generator Frequency

COMMENTS: **FULL BATTERY RUNDOWN IS NOT REQUIRED AT START UP UNLESS OTHERWISE NOTED**

Technician Signature :

Customer Signature :

EMAIL

DATE

QAF #: 19.24

SUBJECT: UPS BATTERY CHECKLIST

Revision #: 2

Effective Date: 04/19/21

APPROVED BY: Service Department

Page #: 1 of 1

GENERAL TROUBLESHOOTING



PROBLEM	PROBABLE CAUSE	SOLUTION
NO OUTPUT WHEN UTILITY POWER FAILS	DEFECTIVE CONTROL CIRCUITS	CONTACT FACTORY
	DEFECTIVE BATTERY OR ASSOCIATED WIRING	CHECK WIRING AND TEST BATTERIES REFER TO "PREVENTIVE MAINTENANCE"
	UNIT IN BY PASS MODE	CHECK BY PASS SWITCH
	DC BREAKER TRIPPED	RESET DC BREAKER
	BATTERIES WEAK	ALLOW BATTERIES TO CHARGE 24 HOURS AND RETEST
UPS SHUTS OFF OR OVERTEMPS	AIR INTAKE BLOCKED	CLEAN INTAKES
	EXHAUST FANS BLOCKED	CHECK FOR PROPER CLEARANCE, CLEAN EXHAUST
	DEFECTIVE FANS	REPLACE DEFECTIVE FANS
	ROOM TEMPERATURE TOO HOT	CHECK OPERATING SPECIFICATIONS
	UNIT OVERLOADED	VERIFY OUTPUT RATINGS
NO OUTPUT AT START UP	OUTPUT BREAKER OPEN OR OUTPUT FUSE OPEN	CHECK BREAKER OPERATION AND TEST OR REPLACE FUSE
	WRONG INPUT VOLTAGE	VERIFY INPUT VOLTAGE AND SELECTOR SWITCH SW2
	NO INPUT VOLTAGE	VERIFY SOURCE FEEDING THE UPS
	DEFECTIVE BATTERY	TEST BATTERIES REFER TO "PREVENTIVE MAINTENANCE"
	SHORTED OUTPUT	DISCONNECT OUTPUTS AND RESTART UNIT
	DEFECTIVE INVERTER COMPONENTS	CONTACT FACTORY
	DEFECTIVE CONTROL CIRCUITS	CONTACT FACTORY
	AC OR DC BREAKER OFF	TURN ON BOTH AC AND DC BREAKERS
UPS WILL NOT RETURN TO UTILITY POWER	INPUT VOLTAGE OR FREQUENCY OUT OF SPEC (GENERATOR APPLICATION)	VERIFY INPUT SPECS, SELECT DIFFERENT SLEW RATE REFER TO "SYSTEM SET UP"
	DEFECTIVE CONTROL CIRCUITS	CONTACT FACTORY
	INADEQUATE SOURCE	VERIFY SOURCE FEEDING UPS IS ADEQUATE
	AC BREAKER TRIPPED	RESET AC BREAKER

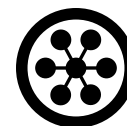


GENERAL TROUBLESHOOTING CONTINUED

PROBLEM	PROBABLE CAUSE	SOLUTION
SHORT BATTERY BACK UP TIME	BATTERY DISCONNECTED	CHECK BATTERY CONNECTIONS REFER TO “PREVENTIVE MAINTENANCE”
	BATTERY NOT CHARGING	CHECK BATTERY FLOAT VOLTAGE REFER TO “PREVENTIVE MAINTENANCE”
	OPEN CHARGER FUSE	CHECK FUSE F1 ON CHARGER BOARD
	DEFECTIVE BATTERY	TEST BATTERIES REFER TO “PREVENTIVE MAINTENANCE”
	BATTERY NOT CHARGED	ALLOW BATTERIES TO CHARGE 24 HOURS
	UNIT OVERLOADED	CHECK % LOAD DISPLAY AND REDUCE LOAD
UNIT ALARMS OCCASIONALLY	NORMAL	UPS IS PROTECTING YOUR EQUIPMENT FROM MOMENTARY SAGS AND SURGES
	INTERMITTENT ALARM	MONITOR TYPE AND FREQUENCY OF ALARM, TAKE ACTION ON PARTICULAR ALARM.
UNIT OPERATES BUT DROPS LOADS	COMMUNICATIONS ERROR	CHECK INTERFACE CABLES FOR CONTINUITY TEST COMMUNICATION SIGNALS
	OUTPUT BREAKER TRIPPED OR FUSE OPEN	RESET OUTPUT BREAKER AND TEST OUTPUT FUSE
	UNIT OVERLOADED	CHECK % LOAD DISPLAY AND REDUCE LOAD

NOTE: The MD Series has two shutdown levels, the first one releases the load, and the second shutdown will disable the internal circuitry after a period of time, before the batteries get too low. If this situation occurs, both breakers on the MD must be opened for a couple minutes and then closed, at which point the unit should power up.

WARRANTY



This Warranty applies only to the original purchaser who must properly register the product within thirty (30) days of receipt.

<https://controlledpwr.com/customer-support/warranty-registration/>

Controlled Power Company warrants that our products and their components will remain free from defects in material and workmanship for the duration of the respective warranty period* from the date of shipment and agrees to replace, F.O.B. its factory, any parts which fault through defect in material or workmanship during such period. Non payment for the product to either the reseller, rep, distributor or the factory direct will result in revocation of warranty, technical support and service contracts. **Warranty begins from date of shipment unless a factory Start-Up Plus is purchased, then the warranty begins from date of Start Up or 90 days from ship date; whichever comes first.**

If a Start-Up Plus is purchased with the unit(s) or within 30 days from original ship date, the 1st year warranty is upgraded to include onsite labor and expenses during normal business hours (Monday - Friday, 8AM - 4PM). Start-Up Plus includes all travel and living expenses. Start-Up Plus description: Testing all emergency circuitry - Calibration - Inspection - Exercising all circuit breakers - Cooling fan check - Input and output parameter check - Air intake / exhaust check - Complete battery inspection and testing (where applicable) - Re-torque all high current terminals - Battery certification report (where applicable) - Input/Output verification - Written report. User training to be done at time of start up (no return visits). Product installation is required to be complete before start up can be scheduled.

Products:

- UPS Systems (MD, MDR) / 1 Years parts only*, Batteries are warranted with a 1 year full replacement warranty and an optional 4 year (48 month) pro-rate, when enrolled in a customer support plan.

* From original shipment date / Excludes on site labor and expenses unless otherwise noted.

1. This Warranty shall be effective only if and so long as the system is installed and operated in the manner specified in the manual which accompanied the product, and is operated within the ratings on the nameplate of the system.
2. This Warranty shall be effective provided the purchaser pays the cost of transporting the faulty component(s) to and from Controlled Power Company's factory at the purchaser's own expense, unless the item covered under service contract with Controlled Power Company. There is no cost for installation of the replacement component(s) when done at the factory. Otherwise installation of the replacement component(s) are the responsibility of the purchaser, unless the item is covered under service contract with Controlled Power Company. If after inspection the faulty component has been caused by misuse or abnormal conditions in the judgment of Controlled Power Company, the purchaser will be charged for repairs based on parts and labor required. This Warranty does not cover fuses, light bulbs, and other normally expendable items. Controlled Power Company service personnel are not included in this warranty unless covered by a Controlled Power Company service contract.
3. This Warranty shall be void if any alteration is made to the system, or any of its components are altered by anyone other than an authorized Controlled Power Company service person, without the written permission of Controlled Power Company.
4. This Warranty is in lieu of all other warranties, expressed or implied. Controlled Power Company neither assumes, nor authorizes any person to assume for it, any liability other than that specifically set forth in this Warranty. Except for its obligations, Controlled Power Company assumes no liability or responsibility for personal injury, loss of life, consequential or other damages resulting from defects in, or failure of, the system or any of its components.

<https://controlledpwr.com/customer-support/warranty-registration/>



CUSTOMER SUPPORT

Contact Controlled Power Company.

CONTROLLED POWER COMPANY NATIONWIDE CUSTOMER SUPPORT

Controlled Power Company offers total customer support that assures your critical equipment is maintained properly for trouble free operation.

WHAT A CUSTOMER SUPPORT PLAN OFFERS:

HOT LINE: 24 hour toll free 1-800-521-4792.

REMEDIAL MAINTENANCE : Covers all on-site repairs, parts, freight, labor and travel expenses.

RESPONSE: Immediate 24 hour phone support. If problem is not solved Controlled Power will make every effort to have your system running within 48 hours.

BATTERIES: Battery changes, installation, freight, travel and disposal are covered under a 48 month pro-rate schedule when enrolled in a customer support plan, beginning from the original date of shipment or battery installation date. Batteries are not covered if they were not supplied by Controlled Power Company.

PREVENTIVE MAINTENANCE: Optional preventive maintenance includes the following:

- Testing all emergency circuitry
- Inspection
- Exercising all circuit breakers
- Input and output parameter check
- Complete battery inspection and testing
- Re-torque all high current terminals
- Calibration
- Clean internal and external
- Cooling fan check
- Air intake / exhaust check
- Written report

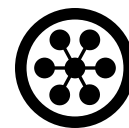
START UP: Includes installation inspection (wired properly, location, environment), Unit inspection (internal and external), Unit power up, Operation verification including options. One visit, includes all travel expenses.

PLAN	ON SITE COVERAGE	PARTS COVERED	FIELD REPAIR LABOR COVERED	FACTORY REPAIR LABOR COVERED	FREIGHT COVERED	TRAVEL EXPENSES COVERED
SILVER	NONE	YES	NO	YES	NO	NO
GOLD	M-F 8AM-4PM	YES	YES	YES	YES	YES
PLATINUM	24-7	YES	YES	YES	YES	YES

TRAINING AND PARTS

For Customers who maintain their own equipment, Controlled Power offers hands on training at our training facility and part kits. For more information, contact Controlled Power Customer Support Department at 1-800-521-4792.

Individual components are available upon request, please contact the factory for specific part numbers and prices. See "Appendix A - Component Location Diagrams" for component location and description. When contacting the Parts Department, please have the unit's full model number and serial or system number. Call 1-800-521-4792.



APPENDIX A

RELATIVE DRAWINGS

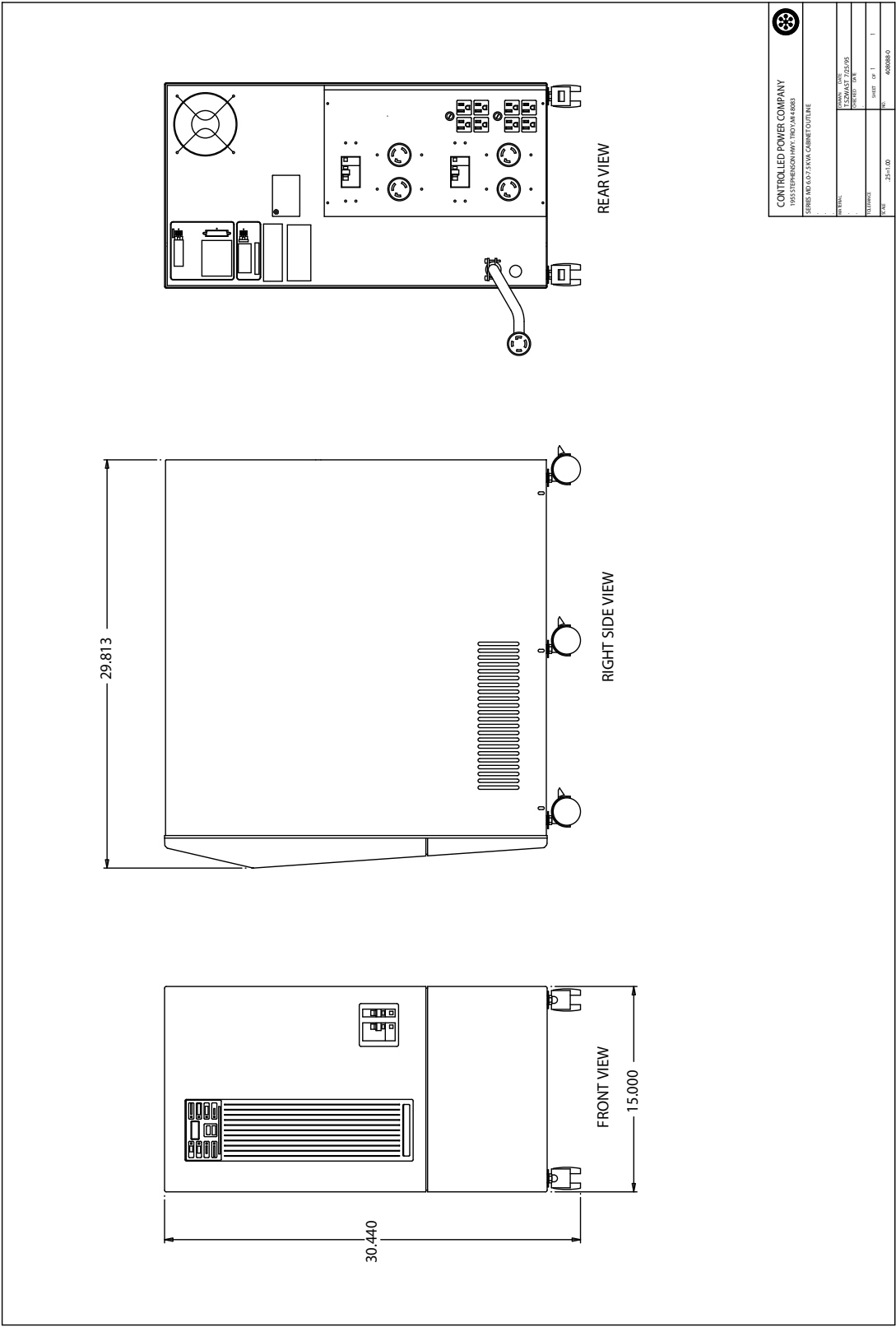
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SCHEMATICS

CABINET OUTLINE



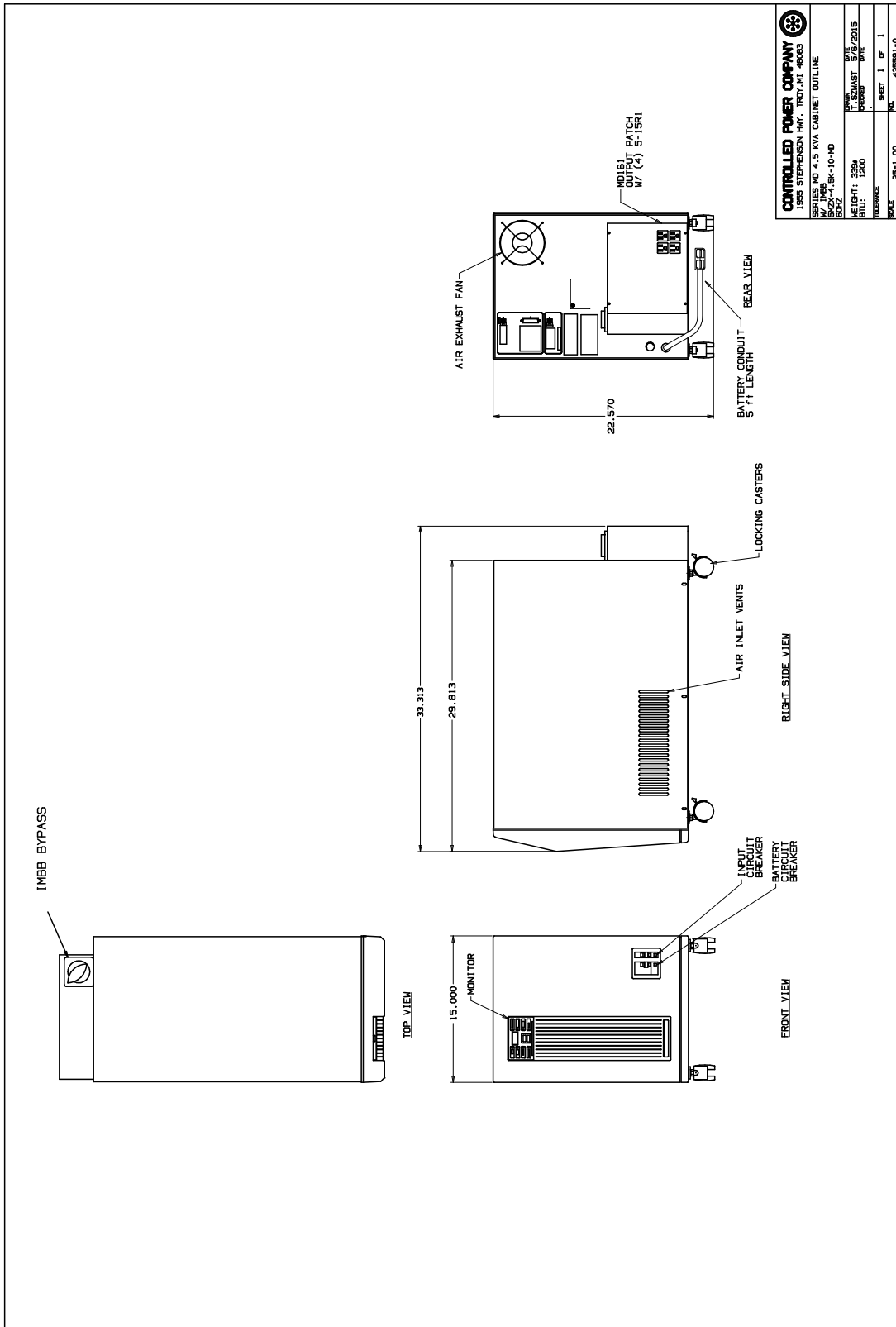
STANDARD MD6000 - MD7500 WITH CASTERS





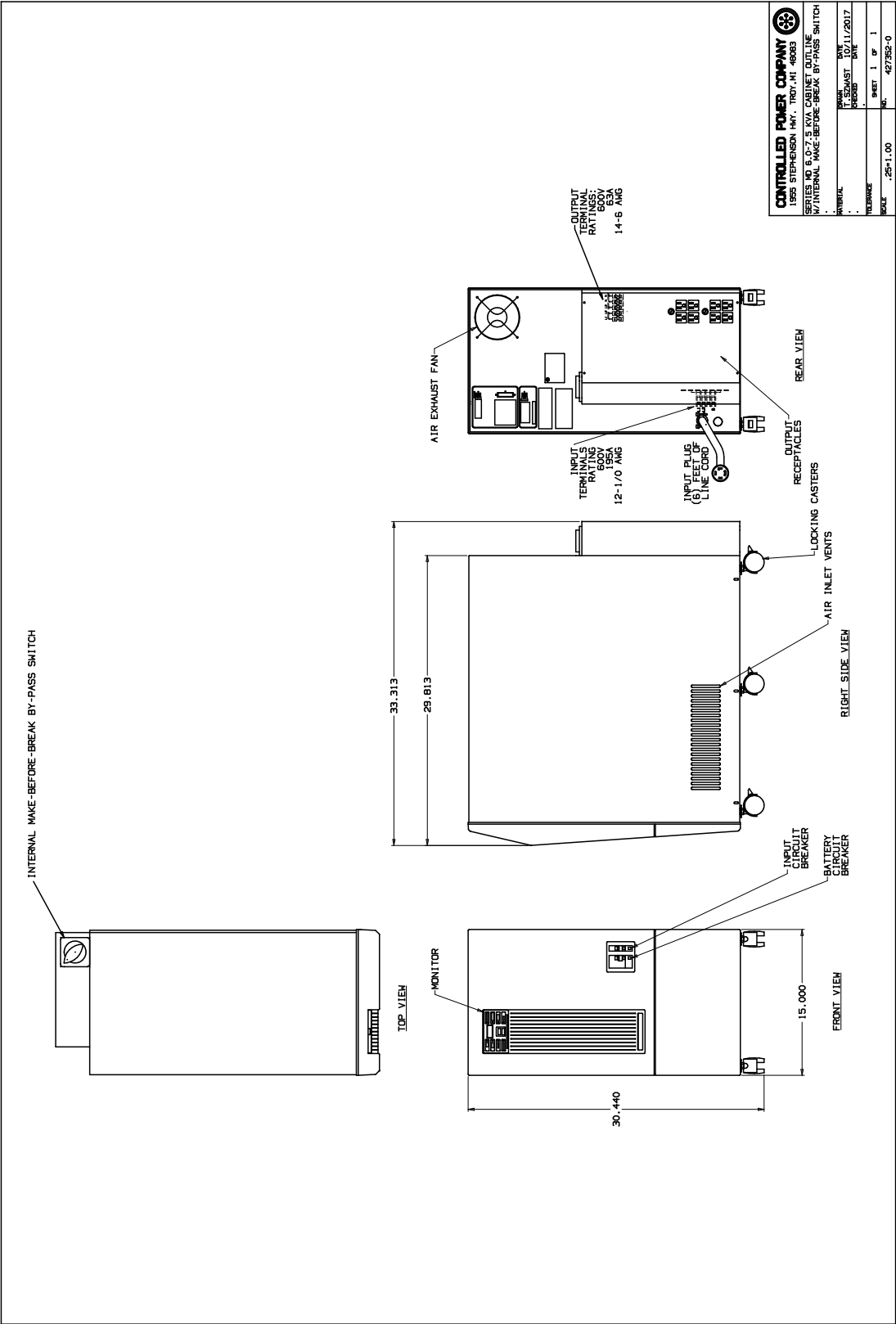
CABINET OUTLINE

STANDARD MD3100 - MD5000 WITH CASTERS AND BYPASS





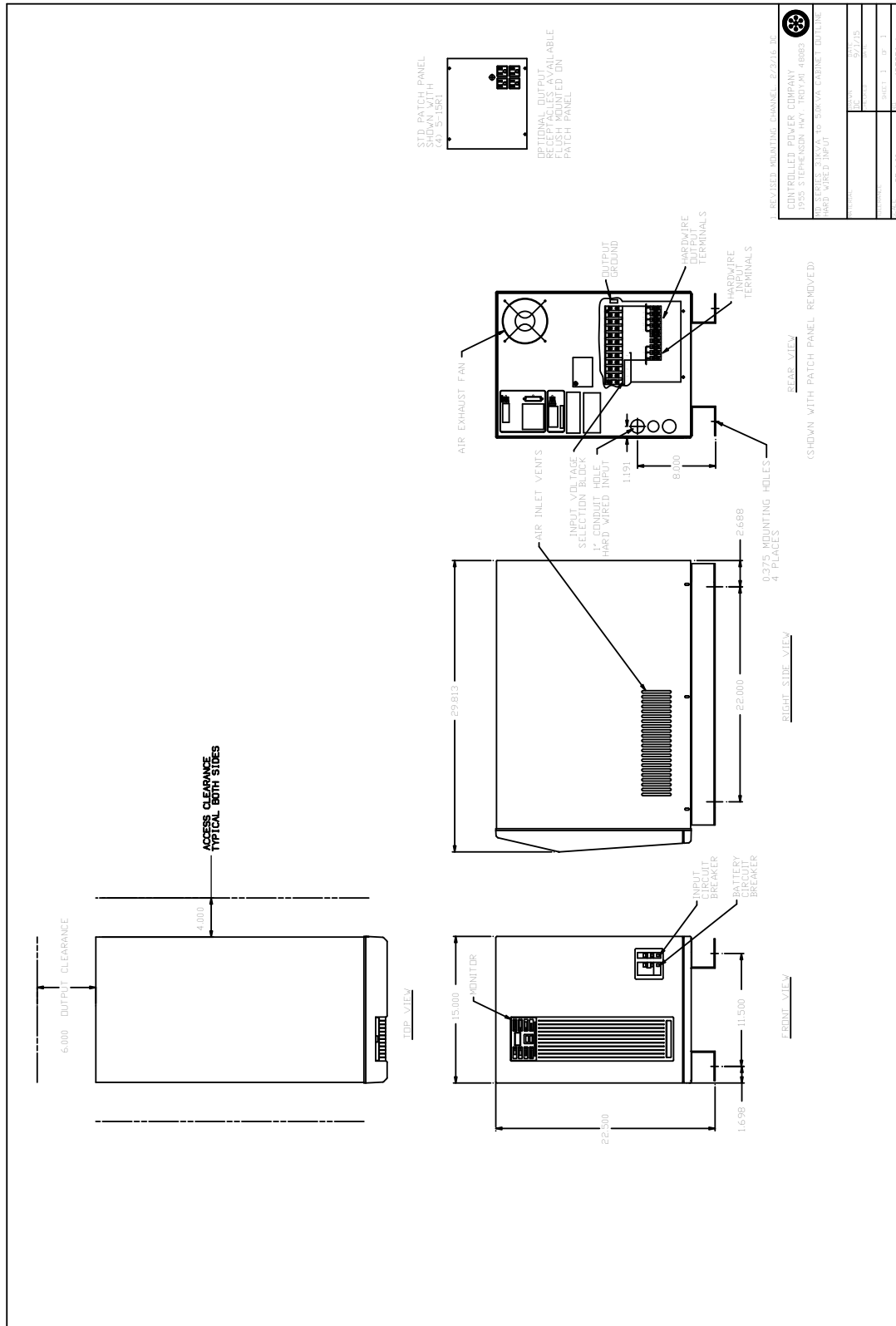
STANDARD MD6000 - MD7500 WITH CASTERS AND BYPASS





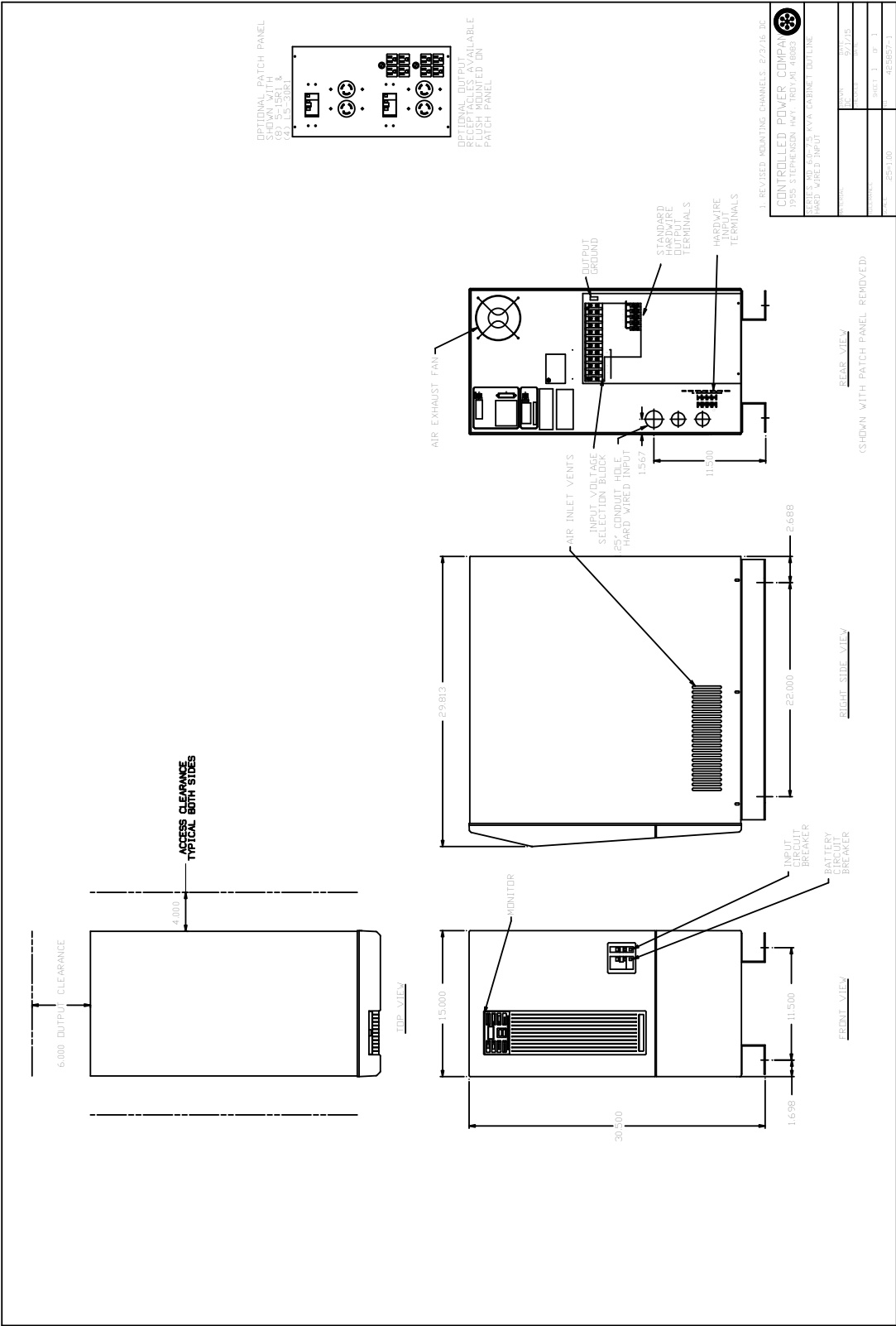
CABINET OUTLINE

STANDARD MD3100 - MD5000 WITH MOUNTING CHANNEL





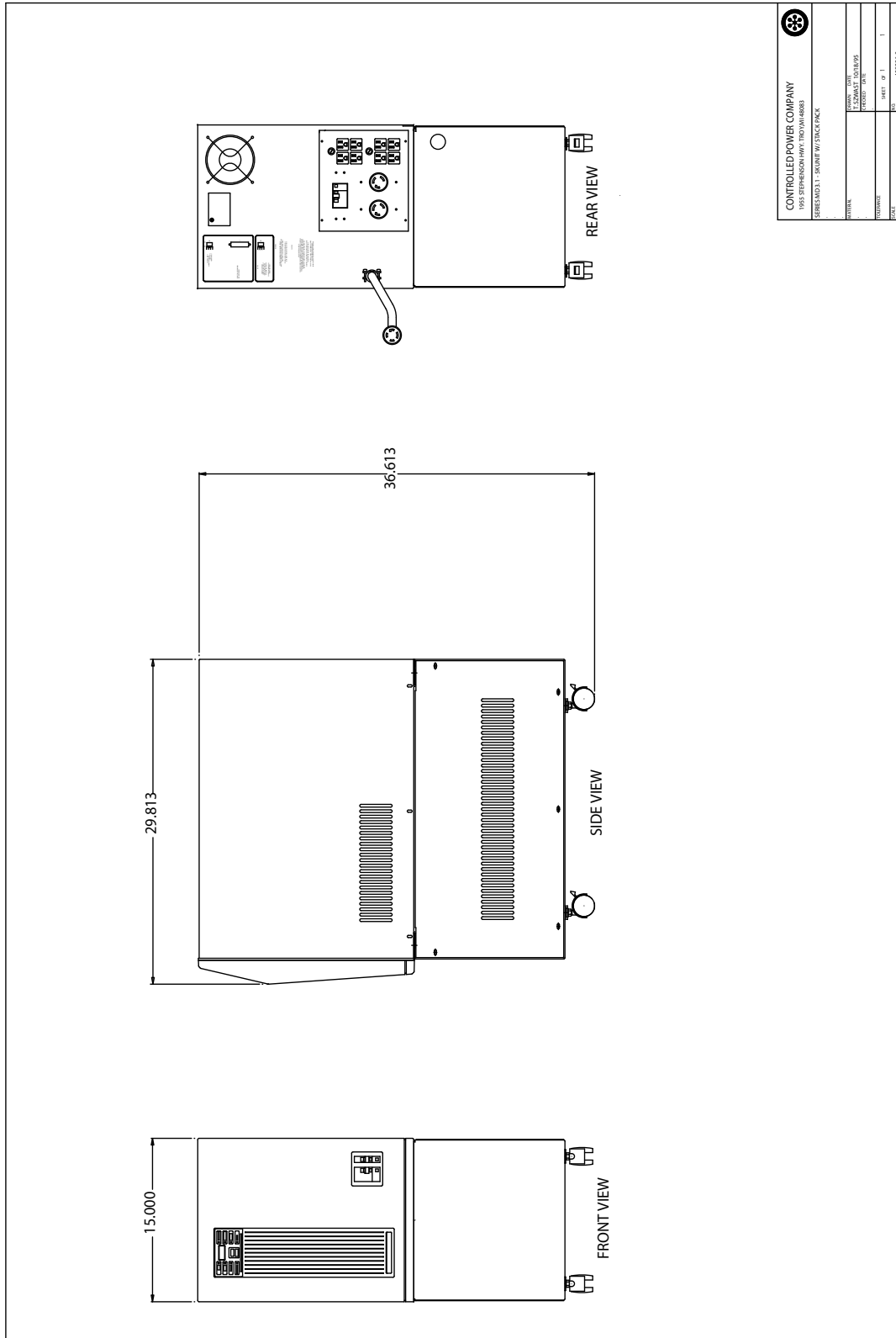
STANDARD MD6000 - MD7500 WITH MOUNTING CHANNEL





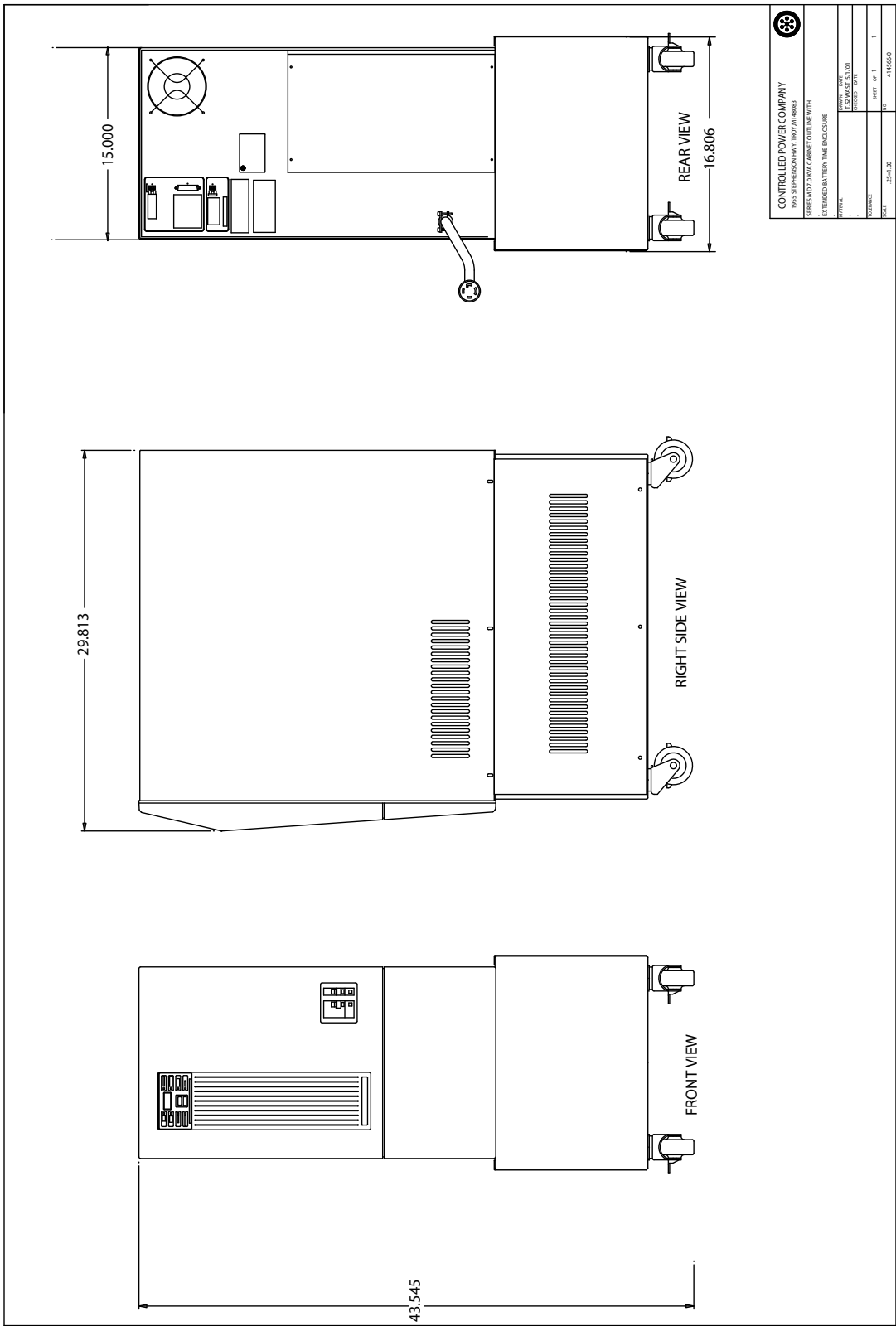
CABINET OUTLINE

MD3100 - MD5000 WITH STACK PACK



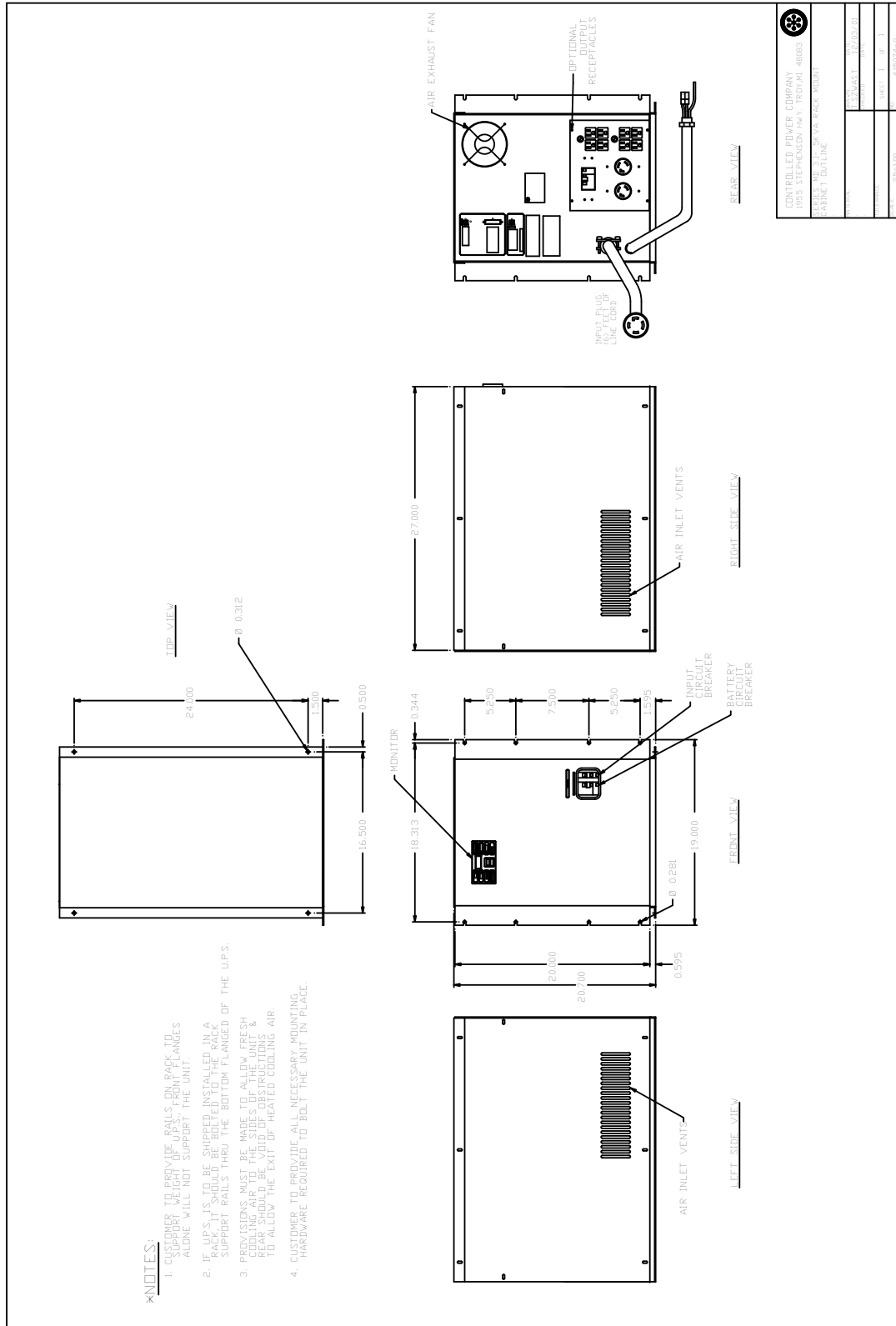


MD6000 - MD7500 WITH STACK PACK

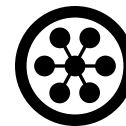




MDR3100 - MDR5000 RACK MOUNT



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[illegible]



Technical drawing of a battery extension cabinet showing three views: Front View, Top View, and Rear View.

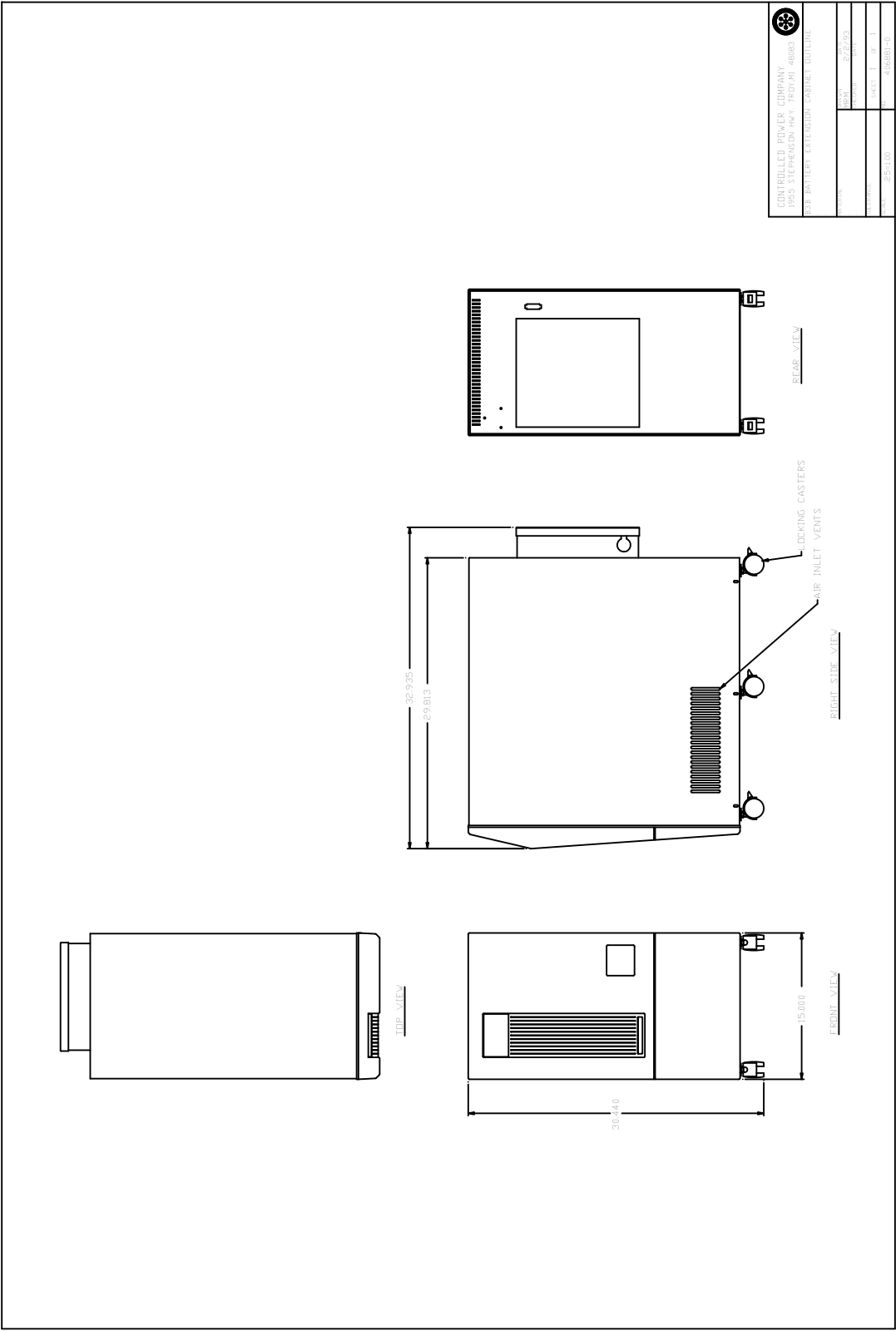
Front View: Shows the cabinet's front profile. Dimensions include a width of 22.440 and a height of 15.000. It features a large horizontal vent on the left and a smaller square vent on the right. Labels point to "LOCKING CASTERS" at the bottom corners and "AIR INLET VENTS" on the front panel.

Top View: Shows the cabinet from above. Dimensions include a width of 22.440 and a depth of 29.810. It shows the top edge and the location of the locking casters.

Rear View: Shows the cabinet's rear profile. It features a large horizontal vent on the left and a smaller square vent on the right. A label points to the "ANDERSON CONNECTOR" on the right side.



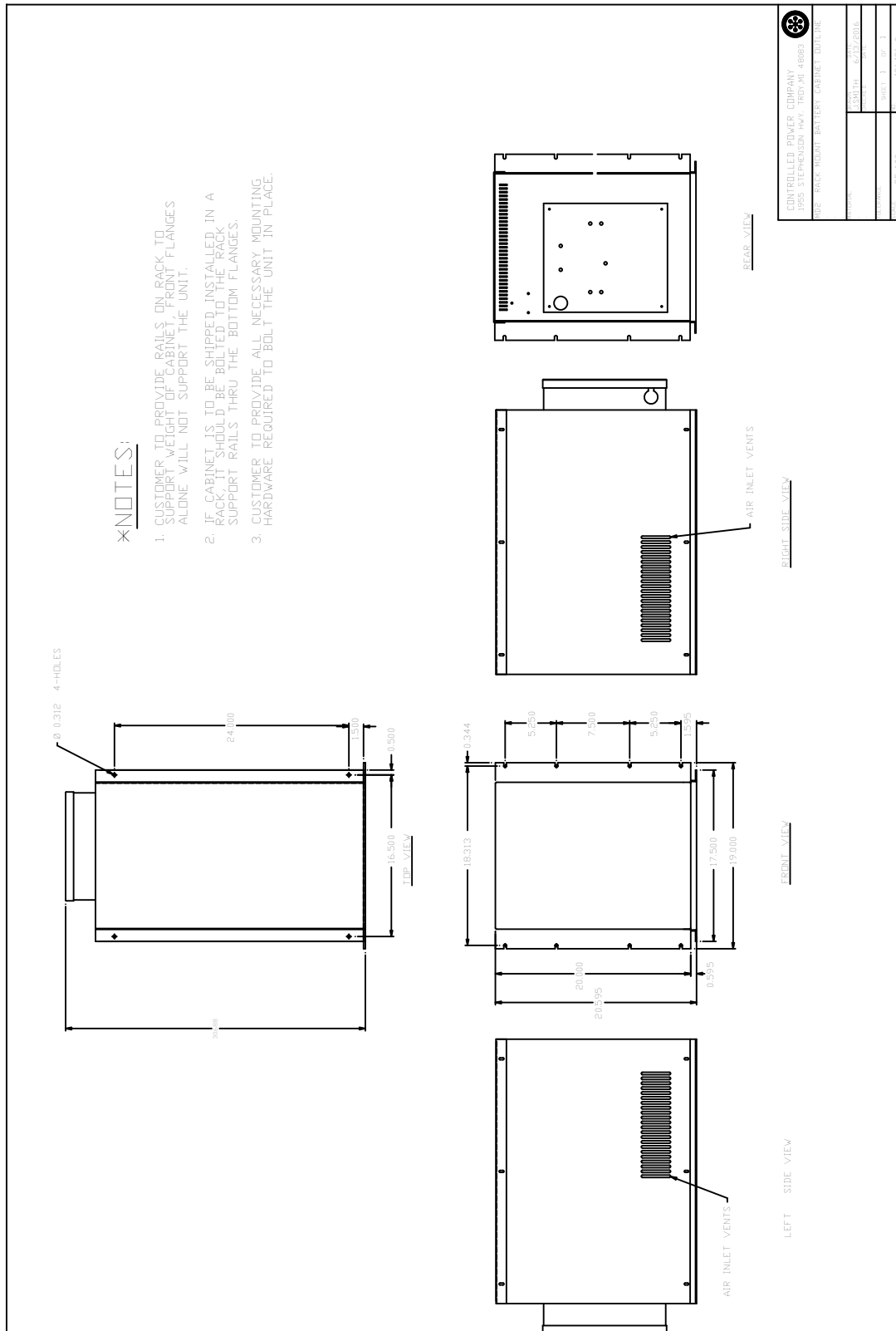
“B3B” BATTERY CABINET





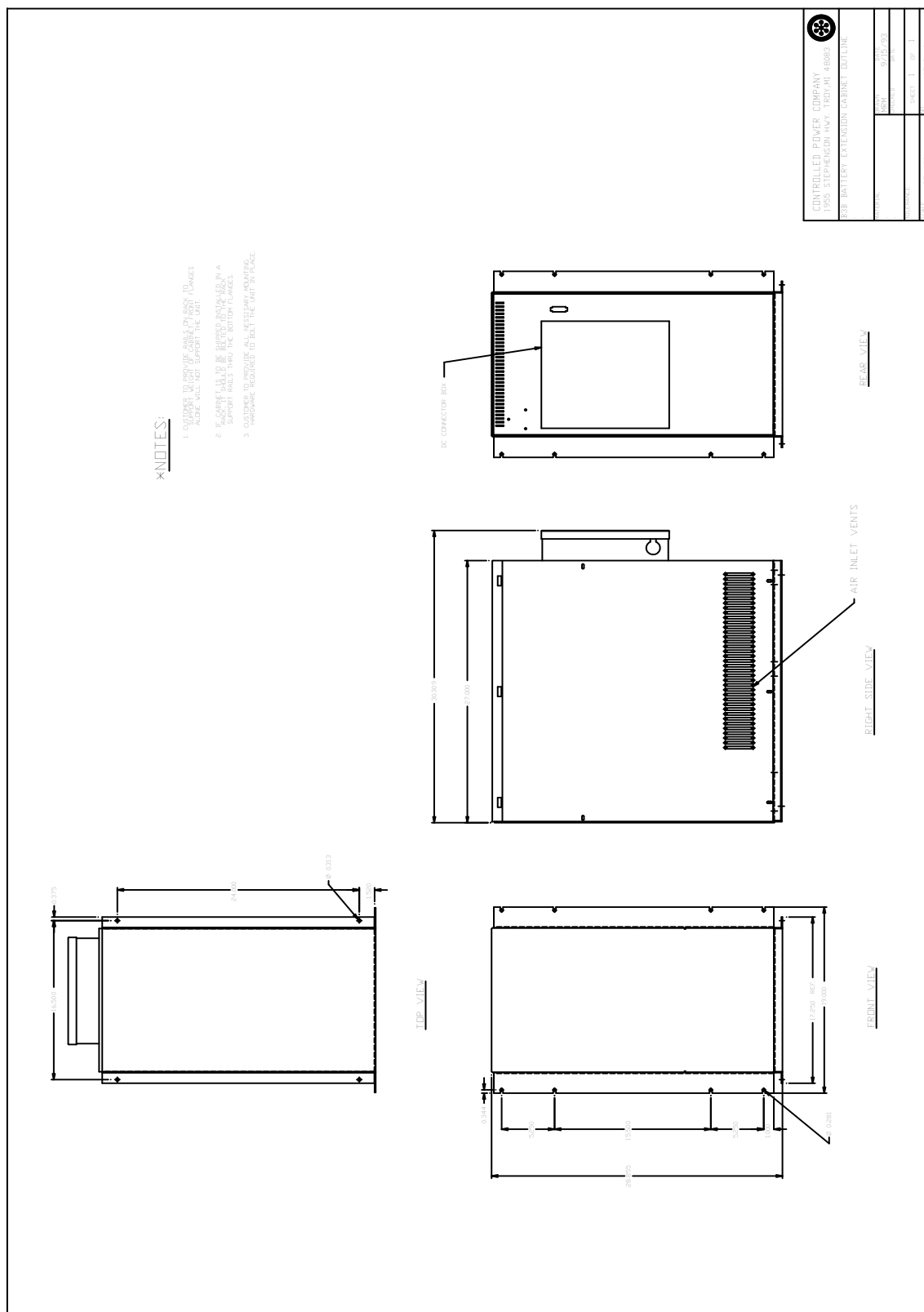
BATTERY CABINET OUTLINE

“B2B” RACK MOUNT BATTERY CABINET





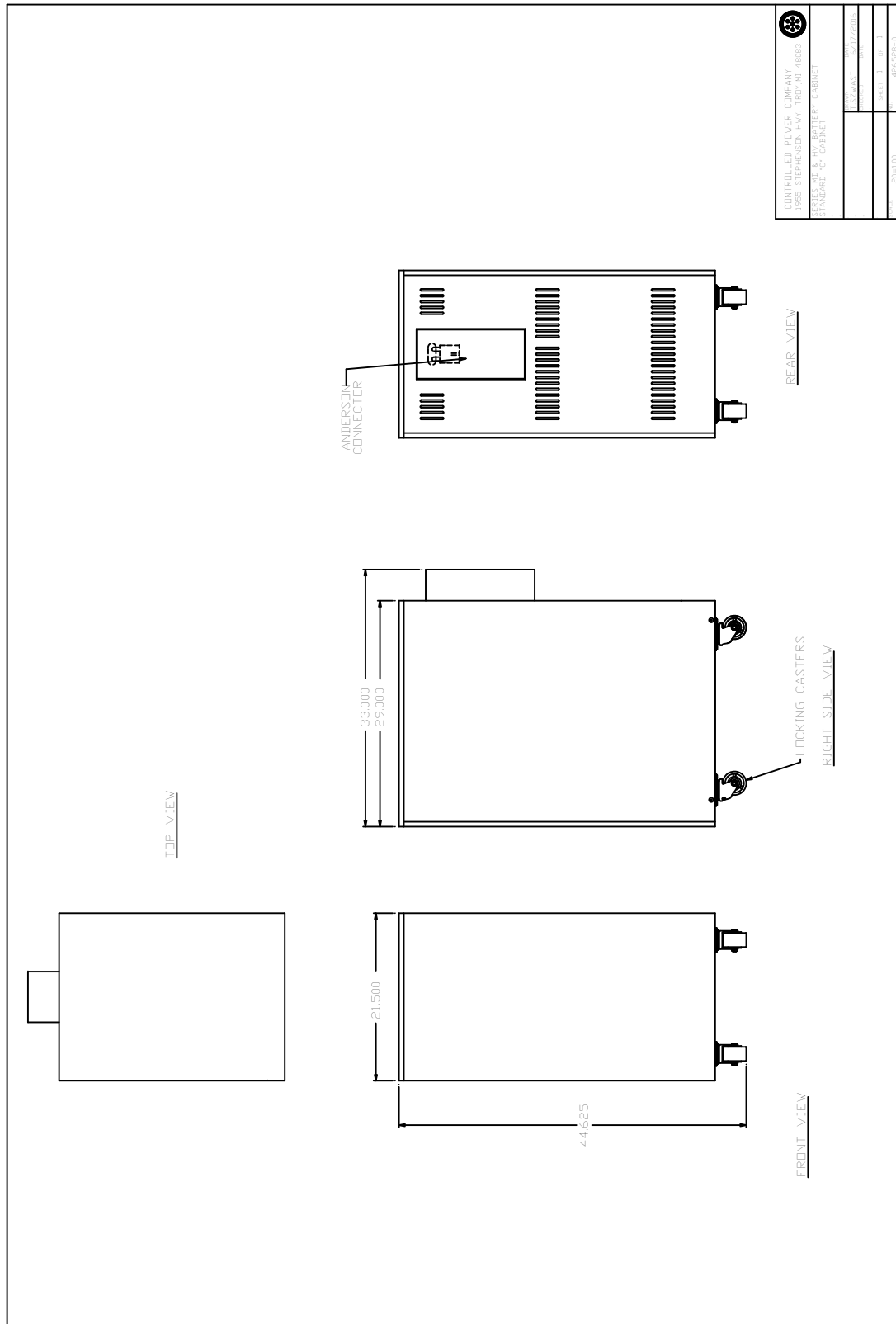
“B3B” RACK MOUNT BATTERY CABINET





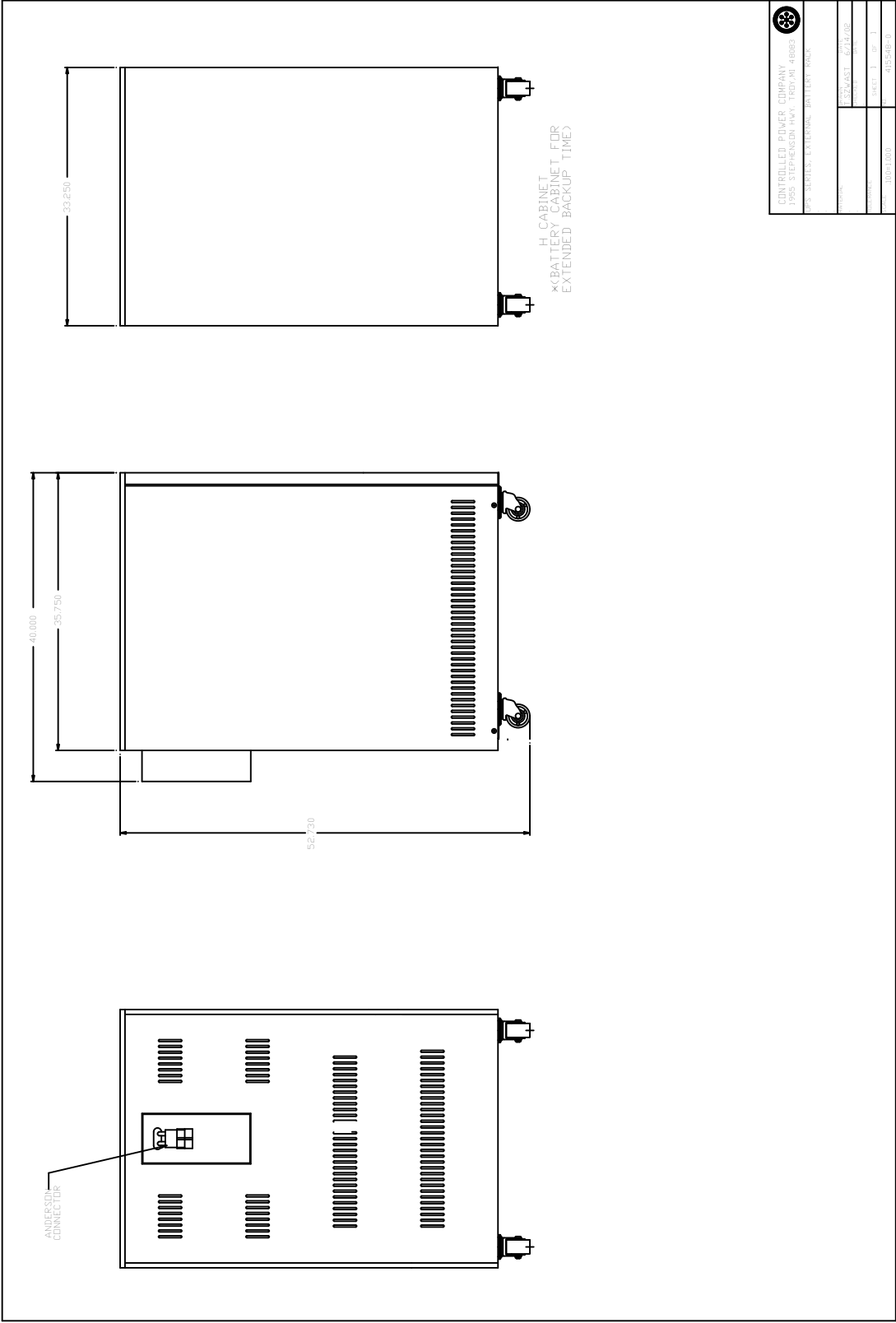
BATTERY CABINET OUTLINE

“C” BATTERY CABINET





“H” BATTERY CABINET





COMPONENT LOCATION DIAGRAM

TYPICAL - ALL SIZES AND CABINET STYLES

