

SIPS™ 2000 Installation Requirements Summary September 2010

Table of Contents:

1. General
 2. Battery Cabinet, Specifications and Requirements
 - 2.1 *General Requirements*
 - 2.2 *Physical Characteristics*
 - 2.3 *Environmental*
 - 2.4 *Electrical*
 3. Power Conversion and Control Cabinet, Specifications and Requirements
 - 3.1 *General Requirements*
 - 3.2 *Physical Characteristics*
 - 3.3 *Environmental*
 - 3.4 *Electrical*
 4. Charger Cabinet, Specifications and Requirements
 - 4.1 *General Requirements*
 - 4.2 *Physical Characteristics*
 - 4.3 *Environmental*
 - 4.4 *Electrical*
- Figure 1
- Figure 2
- Figure 3
- Appendix A – SIPS 2000 Cabinet and Installation Drawings

1. General

SIPS (for Scalable Intelligent Power Supplies) 2000 is a lithium-ion battery based portable power system designed to supply power for various communications and electronic equipment both indoor / outdoor deployments.

The SIPS system includes three (3) equipment cabinet types:

- 1) Battery Cabinet
- 2) Power Conversion and Control Cabinet
- 3) Charger Cabinet

Generally, Battery Cabinets are populated with one or more high-energy cartridge-style lithium-ion battery packs. One or more Battery Cabinets are then connected as the power source to a Power Conversion and Control Cabinet. The connection between each Battery Cabinet and a Power Conversion and Control Cabinet is made via a supplied 10-conductor cable assembly with circular connectors. The Power Conversion and Control Cabinet converts DC battery power into appropriate power outputs which are connected to one or more user load devices such as wireless network equipment and video cameras. Connections between power outputs and user load devices are made via supplied 4-conductor cable assemblies with circular connectors. Figures 1 and 2 depict example configurations.

Up to 20 lithium ion battery packs within a Battery Cabinet are recharged concurrently by connecting the Battery Cabinet to a Charger Cabinet. Connection between a Battery Cabinet and a Charger Cabinet are made via three (3) supplied 10-conductor cable assemblies with circular connectors. Three (3) cables are used to conduct the relatively high currents required for fast recharge cycles. The Charger Cabinet input power is supplied by a suitable mains supply. Connection between the Charger Cabinet and the mains supply is made with a supplied 3-conductor cable assembly having a twist-lock NEMA style connector for the Charger Cabinet inlet and bare wire ready for the user-selected termination method for the mains connection. One Charger Cabinet recharges one fully depleted Battery Cabinet in approximately two hours. Figure 3 shows an example configuration.

All three cabinet types share similar characteristics. They are all made of weather and impact resistant compression molded polyester fiberglass material with hinged, screw-closure front doors. Each cabinet is enveloped in a tubular steel roll cage serving additional impact protection, hand holds for ease of handling, feet for standing the cabinet on any of six (6) sides, and ease of attachment to structures by lashing or clamping. The space requirement for each cabinet including enveloping roll cage is 22.3 x 20.2 x 13.6 inches. All cabinets have electrical interconnects implemented on the "right" 22.3 x 13.6 inch surface. The same surface carries a conspicuous Unit Identification Number. Weathertight LED annunciators as well as a weathertight momentary pushbutton switch are located on each cabinet type on the "top" 20.2 x 13.6 inch surface. Details are depicted in Appendix A "SIPS 2000 Cabinet and Interconnect Drawings".

2. Battery Cabinet, Specifications and Requirements

2.1 General Requirements

Battery Cabinets are low power dissipation, utilize no active cooling, and may be placed close to one another without concern for self-heating. On the other hand, lithium ion batteries should be kept in as cool an environment as possible, away from other heat generating equipment, whenever possible as their service life is inversely proportional to operating and storage temperature. Cooler is better.

Battery Cabinets should be placed within five (5) to six (6) feet of Power Conversion or Charger Cabinets to enable interconnection with standard supplied six (6) foot cables.

In general, cabinets may be oriented with any of six (6) sides down. Access to electrical interconnections (“right” side) and annunciators and pushbutton (“top” side) should be considered. In outdoor deployments, cabinets are best oriented with their “top” side up for maximum resistance to ground water when present.

2.2 Physical Characteristics

General Type: DataCom Fiberglass Hinged Cover Type 4X WiFi Cabinet

Height: 22.3” (including roll cage)

Width: 20.2”

Depth: 13.6”

Weight:

Battery Cabinet (without batteries): 35 lbs.

Populated with 20 battery packs: 70 lbs.

Material: Enclosure and door made of molded fiberglass polyester that resists chemicals and temperature change.

Type 304 stainless steel piano hinge

Fiberglass material is RAL 7035 light gray inside and out

Industry Standards: UL 508A, 508 File No. E54315
Type 4, Type 4X, Type 12, and Type 13
NEMA/EEMAC Type 3, 3R, 4, 4X, 12, and 13
Enclosure flammability rating per UL 508
CSA File No. LR-36508: Type 4X
IEC 60529, IP66

Door closure: Two (2) SS screws

2.3 Environmental

Temperatures:

Operating: -30 to 40 °C
Storage: -30 to 40 °C
(storage below 25C recommended for best life)
(battery packs may be removed for storage if desired)

Humidity: 20 to 90% RH non-condensing

Altitude 3000 m (10,000 ft.) max

2.4 Electrical

Output Power:

Voltage: 22 VDC
Discharge Current: 20A max

Charge Power (use only supplied charger):

Voltage 24 VDC nominal
Current 60A nominal

Connectorization:

- 1) Main Battery Power Connector, 10-pole female socket circular connector
- 2) Auxiliary Charge Connector 1, 10-pole male pin circular connector
- 3) Auxiliary Charge Connector 2, 10-pole male pin circular connector

3. Power Conversion and Control Cabinet, Specifications and Requirements

3.1 General Requirements

Power Conversion and Control Cabinets are medium power dissipation, utilize no active cooling, and should be positioned with a 1-foot minimum clearance to surrounding equipment and structure when operating, when possible.

Power Conversion and Control Cabinets need to be placed within five (5) to six (6) feet of Battery Cabinets to enable interconnection with standard supplied six (6) foot cables. Load devices may be located as dictated by interconnect cable length and other requirements, generally within 25 feet of the Power Conversion and Control Cabinet.

In general, cabinets may be oriented with any of six (6) sides down. Access to electrical interconnections (“right” side) and annunciators and pushbutton (“top” side) should be considered. In outdoor deployments, cabinets are best oriented with their “top” side up for maximum resistance to ground water when present.

3.2 Physical Characteristics

General Type: DataCom Fiberglass Hinged Cover Type 4X WiFi Cabinet

Height: 22.3” (including roll cage)

Width: 20.2”

Depth: 13.6”

Weight: 40 lbs.

Material: Enclosure and door made of molded fiberglass polyester that resists chemicals and temperature change.

Type 304 stainless steel piano hinge

Fiberglass material is RAL 7035 light gray inside and out

Industry Standards: UL 508A, 508 File No. E54315
Type 4, Type 4X, Type 12, and Type 13
NEMA/EEMAC Type 3, 3R, 4, 4X, 12, and 13
Enclosure flammability rating per UL 508
CSA File No. LR-36508: Type 4X
IEC 60529, IP66

Door closure: Two (2) SS screws



3.3 Environmental

Temperatures:

Operating: -30 to 40 °C
Storage: -30 to 40 °C

Humidity: 20 to 90% RH non-condensing

Altitude 3000 m (10,000 ft.) max

3.4 Electrical

Input Power (use only supplied Battery Cabinets):

Voltage: 22 VDC
Power: 170W max

Output Power 1:

Voltage: 120 VAC, 60 Hz
Power: 30W typical, 135W max

Output Power 2:

Voltage: 120 VAC, 60 Hz
Power: 0W typical, 135W max

Output Power 3:

Voltage: 24 VAC, 60 Hz
Power: 65W typical, 80W max

Maximum combined output power: 135W

Connectorization:

- 1) Main Battery Power Connector #1, 10-pole male pin circular connector
- 2) Main Battery Power Connector #2, 10-pole male pin circular connector
- 3) Main Battery Power Connector #3 10-pole male pin circular connector
- 4) Main Battery Power Connector #4, 10-pole male pin circular connector
- 5) 120VAC Output Power Connector #1, 4-pole female socket circular connector
- 6) 120VAC Output Power Connector #2, 4-pole female socket circular connector
- 7) 24VAC Output Power Connector, 4-pole female socket circular connector
- 8) Ethernet Network Management Connector, RJ-45

4. Charger Cabinet, Specifications and Requirements

4.1 General Requirements

Charger Cabinets are high power dissipation, utilize forced air-cooling, and should be oriented and positioned to facilitate free airflow. Airflow is shown in Appendix A and requires cool inlet air at the “rear” fan shroud and unobstructed outlet air flow at the “front” fan shroud. Although a 1-foot minimum clearance to surrounding equipment and structure is adequate, additional space should be provided, especially in warmer ambient conditions, when possible.

Charger Cabinets need to be placed within five (5) to six (6) feet of Battery Cabinets to enable interconnection with standard supplied six (6) foot cables. Location with respect to the mains power panel is arbitrary but standard 12 AWG conductor cabling suggests locations within 25 feet of the mains supply considering the 10A input current requirement.

Generally, charger cabinets are best oriented with “top” wherein forced air-cooling is optimized. However, even the charger cabinets may be oriented with any of six (6) sides down if airflow is unrestricted otherwise. As with all cabinet types, access to electrical interconnections (“right” side) and annunciators and pushbutton (“top” side) should be considered. In outdoor deployments, all cabinet types are best oriented with their “top” side up for maximum resistance to ground water when present.

4.2 Physical Characteristics

General Type: DataCom Fiberglass Hinged Cover Type 4X WiFi Cabinet

Height: 22.3” (including roll cage)

Width: 20.2”

Depth: 13.6”

Weight: 65 lbs.

Material: Enclosure and door made of molded fiberglass polyester that resists chemicals and temperature change.

Type 304 stainless steel piano hinge

Fiberglass material is RAL 7035 light gray inside and out

Industry Standards: UL 508A, 508 File No. E54315
Type 4, Type 4X, Type 12, and Type 13
NEMA/EEMAC Type 3, 3R, 4, 4X, 12, and 13
Enclosure flammability rating per UL 508
CSA File No. LR-36508: Type 4X
IEC 60529, IP66

Door closure: Two (2) SS screws

4.3 Environmental

Temperatures:

Operating: -30 to 40 °C

Storage: -30 to 40 °C

Humidity: 20 to 90% RH non-condensing

Altitude 3000 m (10,000 ft.) max

4.4 Electrical

Input Power (use only supplied Battery Cabinets):

Voltage: 230 VAC, 60 Hz, 1Φ

Current: 10A max

Output Power:

Voltage: 24 VDC nominal

Current: 60A nominal



PO Box 1112 Willoughby, OH 44096-1112 (440) 942-2133

**SIPS™ 2000 Installation
Requirements Summary
September 2010**

Connectorization:

- 1) Main Battery Power Connector #1, 10-pole male pin circular connector
- 2) Auxiliary Charge Connector #1, 10-pole female socket circular connector
- 3) Auxiliary Charge Connector #2, 10-pole female socket circular connector
- 4) Mains Power Connector, 2-pole 3-wire grounding male NEMA L6-20R twist-lock

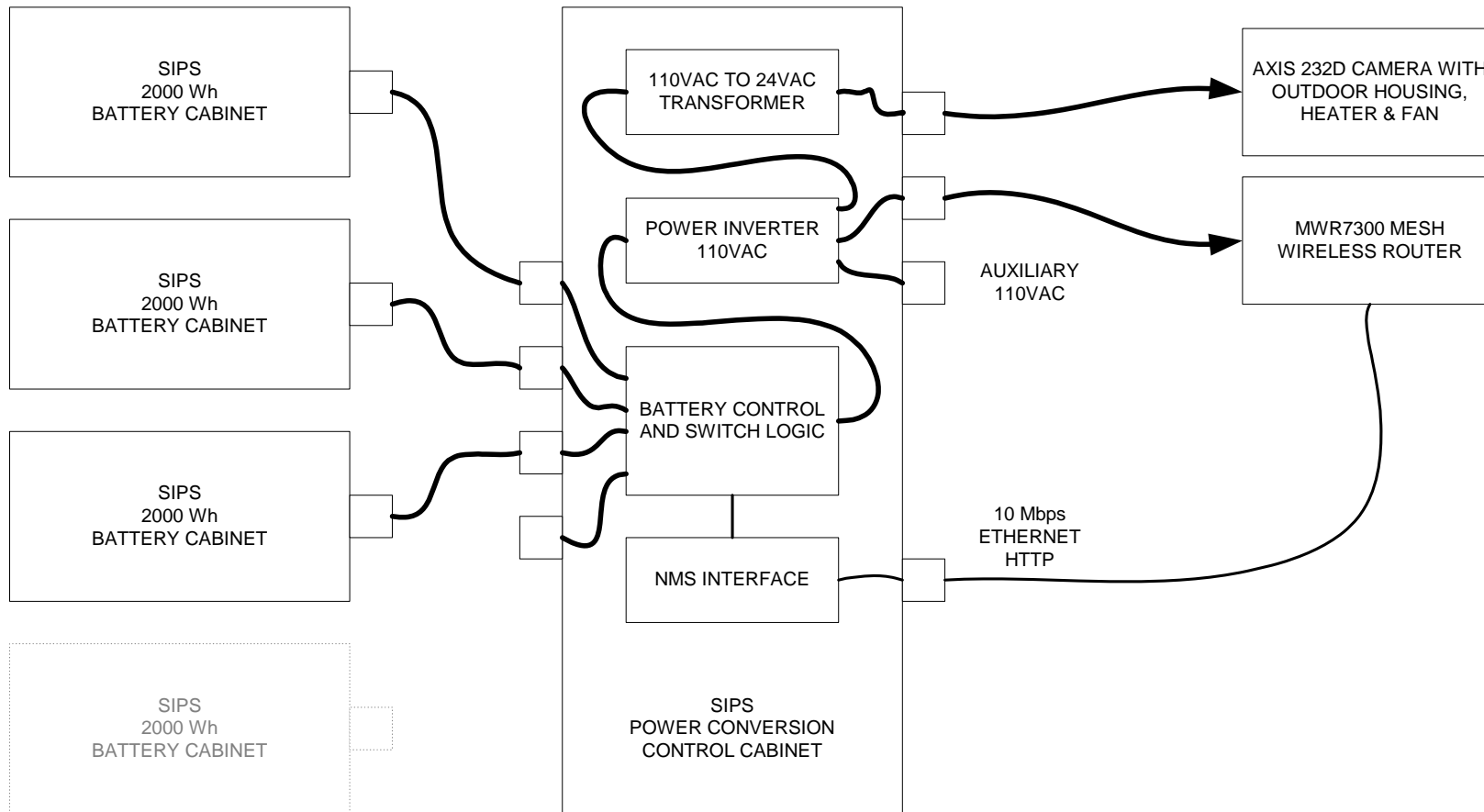


Figure 1 - MWR Type 1 node powered by SIPS™ using three (3) battery cabinets.

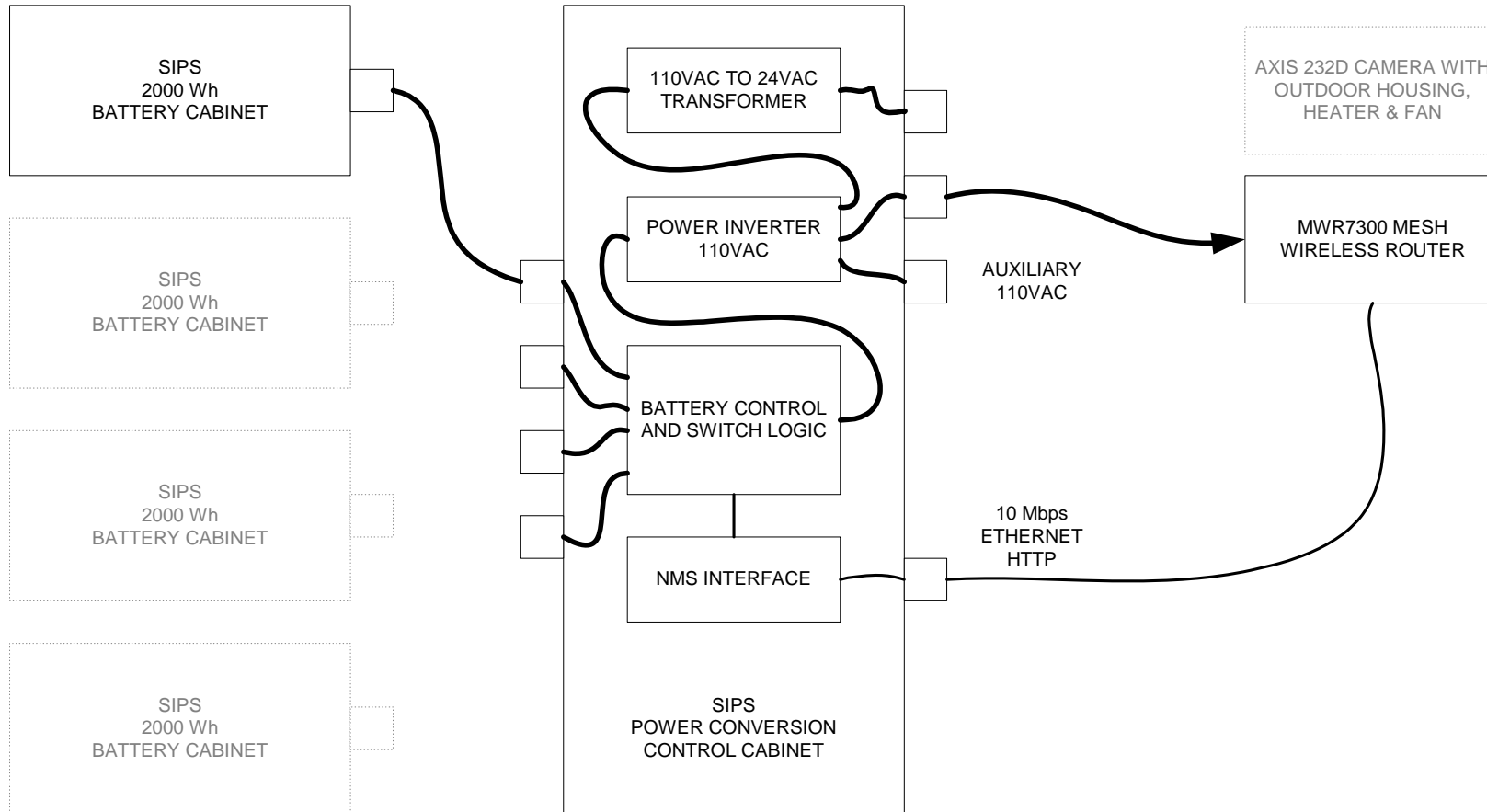


Figure 2 - MWR type 2 node power by SIPS™ using one (1) battery cabinet. Node may be field upgraded to type 1 node by simply adding battery cabinets.

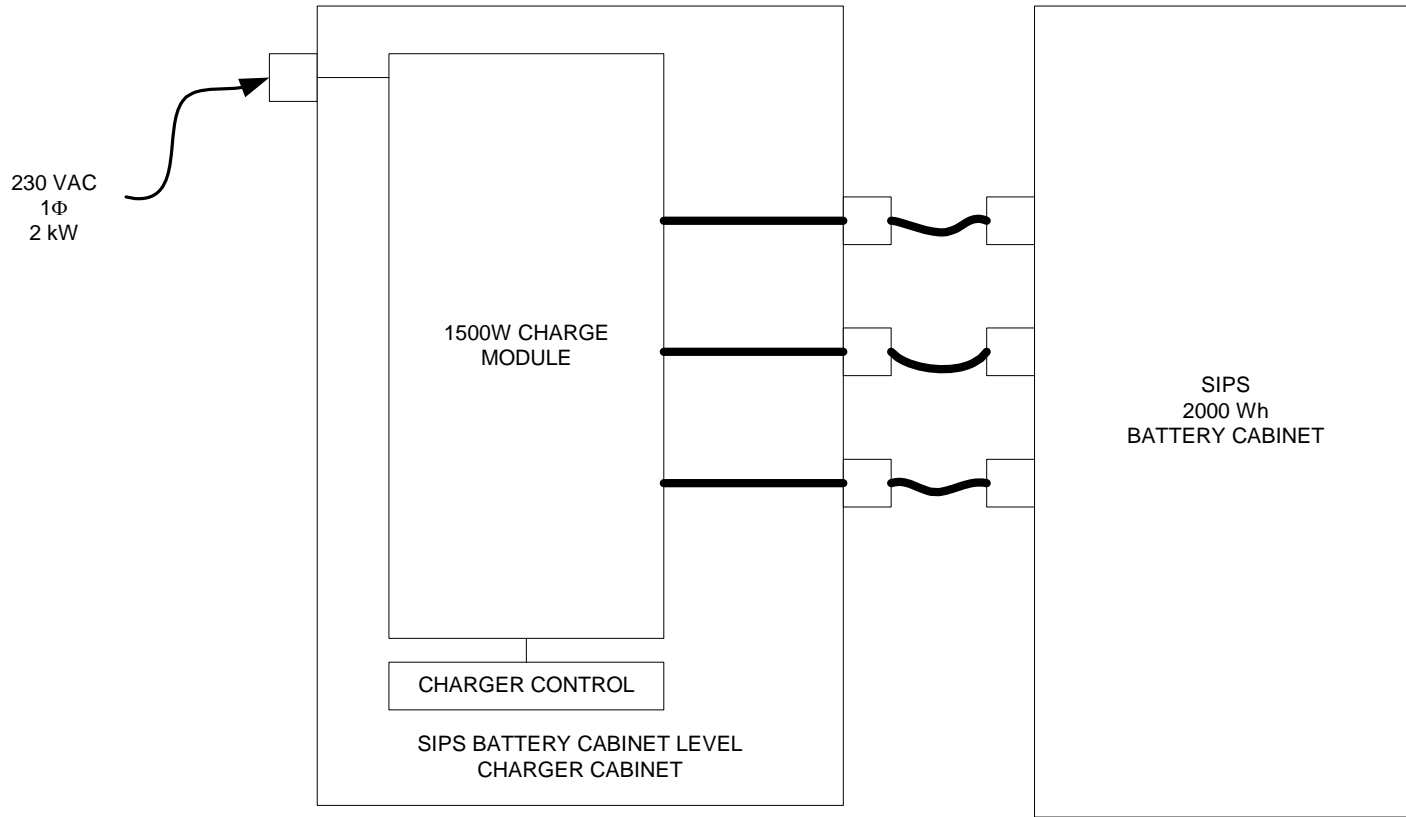


Figure 3 - SIPS™ battery cabinet level charger cabinet. One battery cabinet may be charged within 2 hours.



PO Box 1112 Willoughby, OH 44096-1112 (440) 942-2133

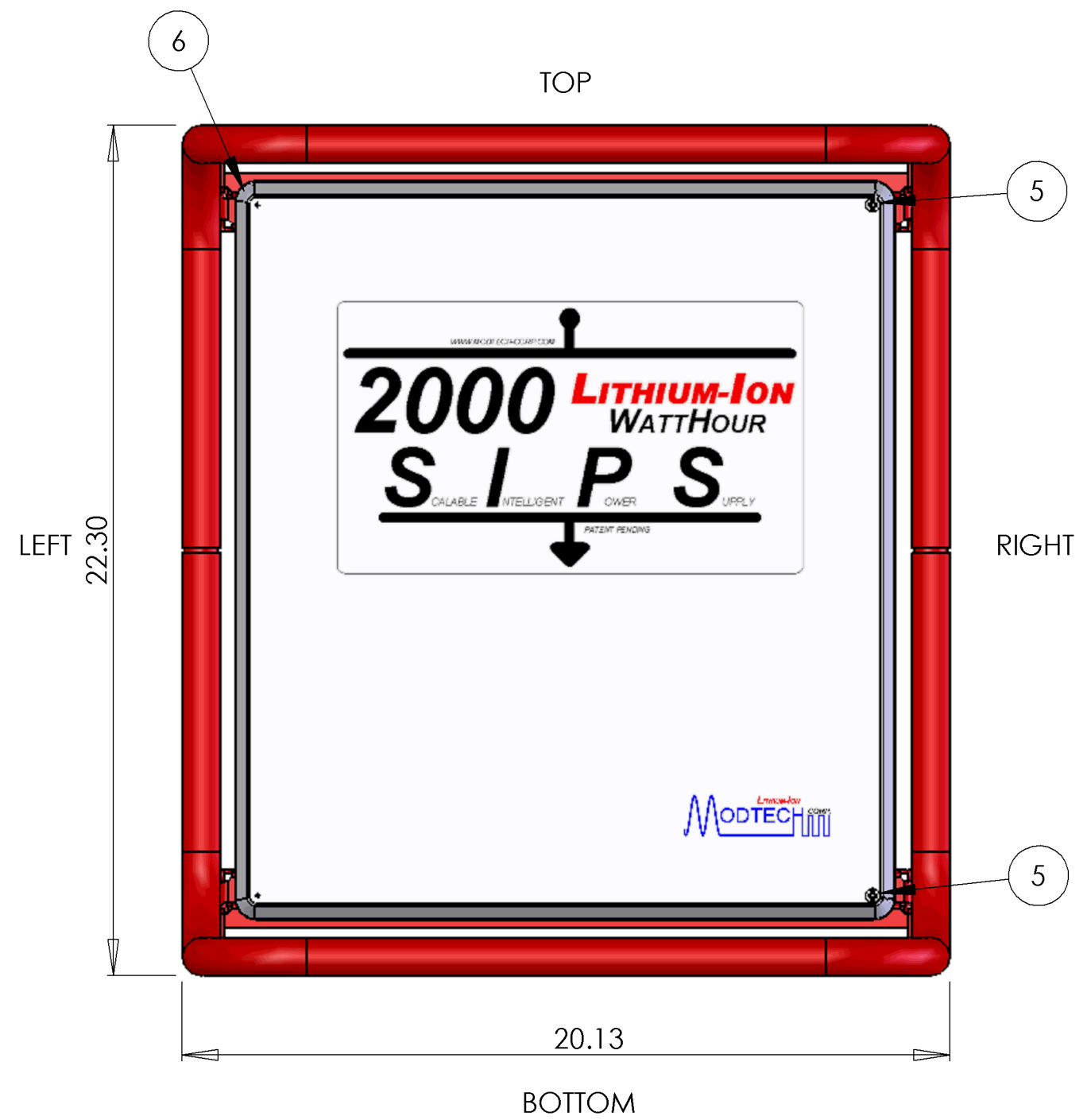
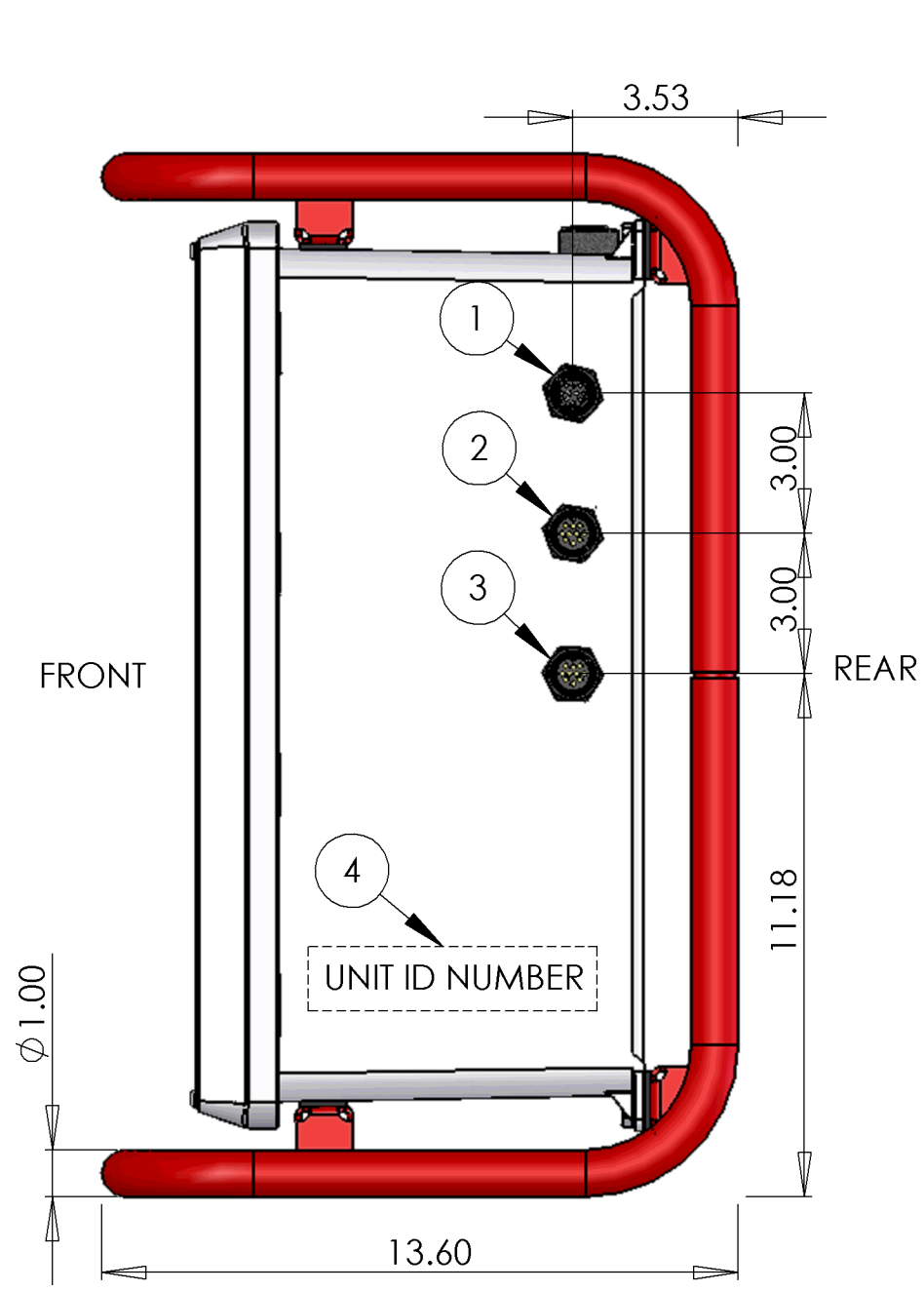
**SIPS™ 2000 Installation
Requirements Summary
September 2010**

Appendix A – SIPS 2000 Cabinet and Installation Drawings

S.I.P.S. Battery Cabinet – 1 sheet

S.I.P.S. Power Conversion and Control Cabinet – 1 sheet

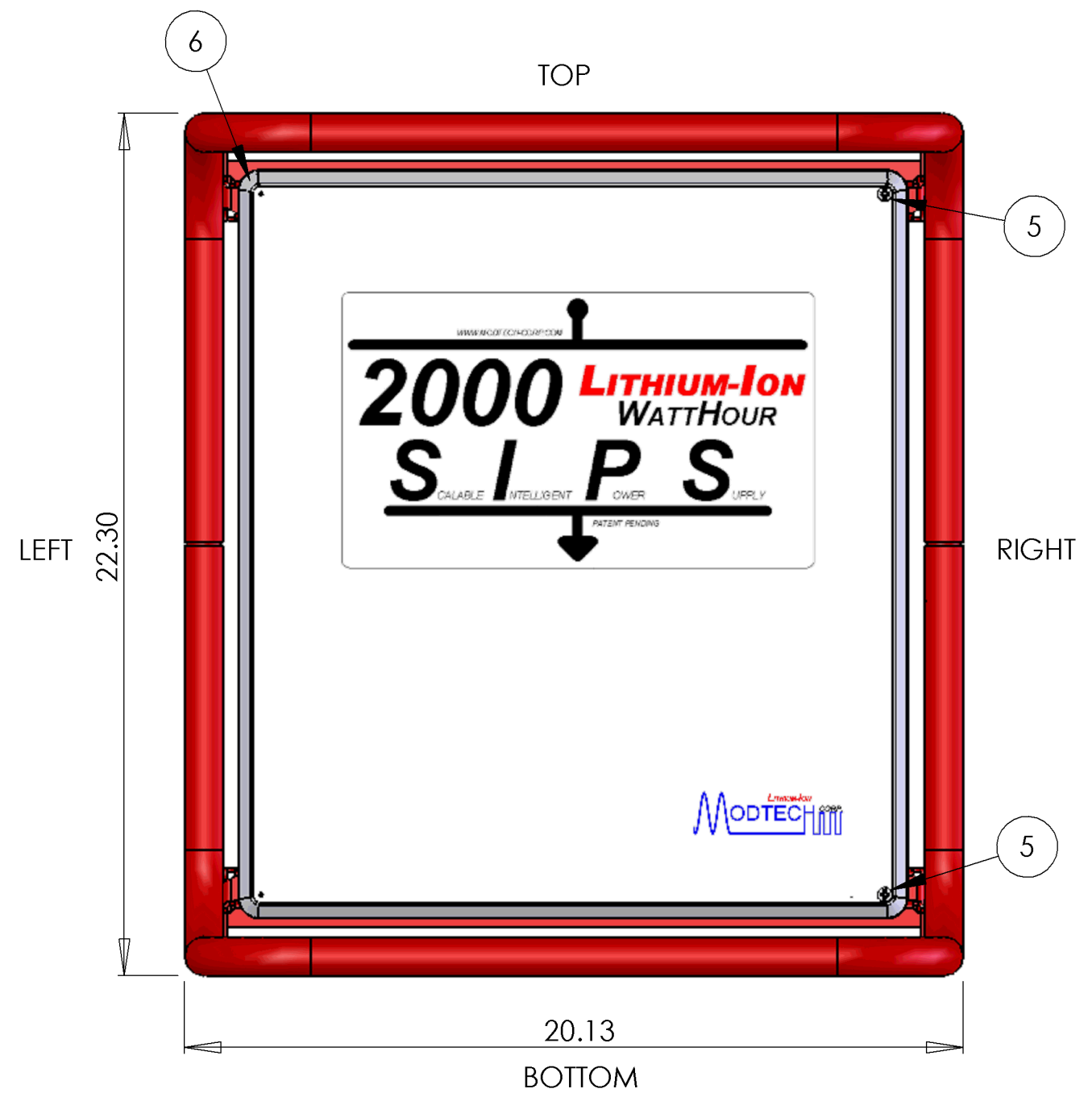
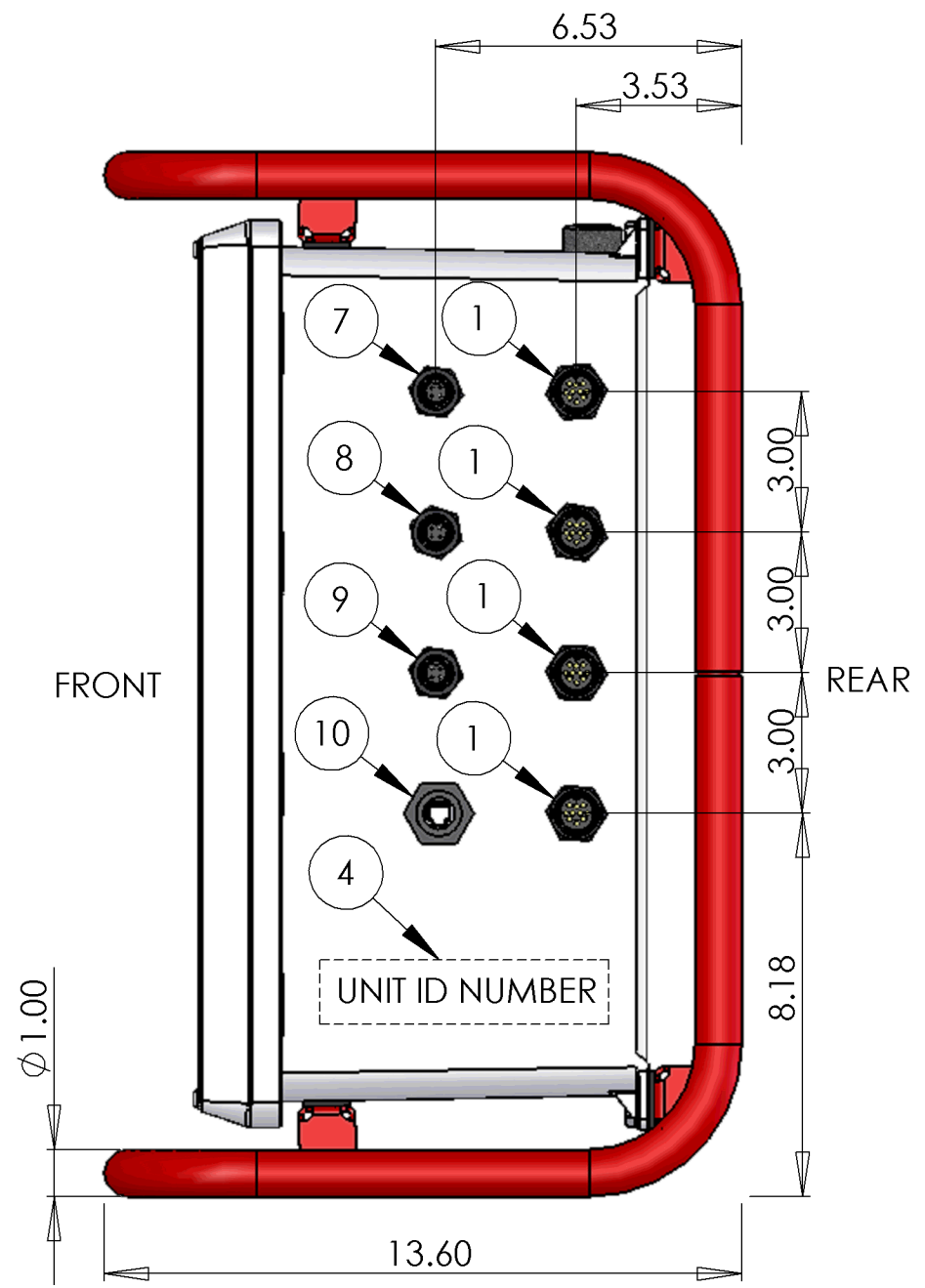
S.I.P.S. Charger Cabinet – 1 sheet



- 1. MAIN BATTERY POWER CONNECTOR
- 2. AUXILIARY CHARGE CONNECTOR 1
- 3. AUXILIARY CHARGE CONNECTOR 2
- 4. CONSPICUOUS UNIT IDENTIFICATION NUMBER
- 5. DOOR CLOSURE SCREWS
- 6. DOOR HINGE SIDE

PROPRIETARY AND CONFIDENTIAL
 THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF MODTECH CORP. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF MODTECH CORP. IS PROHIBITED.

| | | | | | | |
|-------------|---------|--|--|---|--------------|---|
| | | UNLESS OTHERWISE SPECIFIED: | | NAME | DATE | MODTECH CORP. TITLE: <h1>S.I.P.S.</h1> BATTERY CABINET |
| | | DIMENSIONS ARE IN INCHES TOLERANCES: ± 0.25 FRACTIONAL ± ANGULAR: MACH ± BEND ± TWO PLACE DECIMAL ± THREE PLACE DECIMAL ± | | DRAWN | KFS 10/04/07 | |
| | | INTERPRET GEOMETRIC TOLERANCING PER: | | CHECKED | JDY 10/09/07 | SIZE B DWG. NO. ESS CABINET 1 REV A SCALE: WEIGHT: SHEET 1 OF 1 |
| | | MATERIAL STEEL CAGE OVER FIBERGLASS CABINET | | ENG APPR. | | |
| | | FINISH VARIOUS | | MFG APPR. | | |
| NEXT ASSY | USED ON | | | Q.A. | | |
| APPLICATION | | DO NOT SCALE DRAWING | | COMMENTS: ALL SPECIFICATIONS SUBJECT TO CHANGE | | |

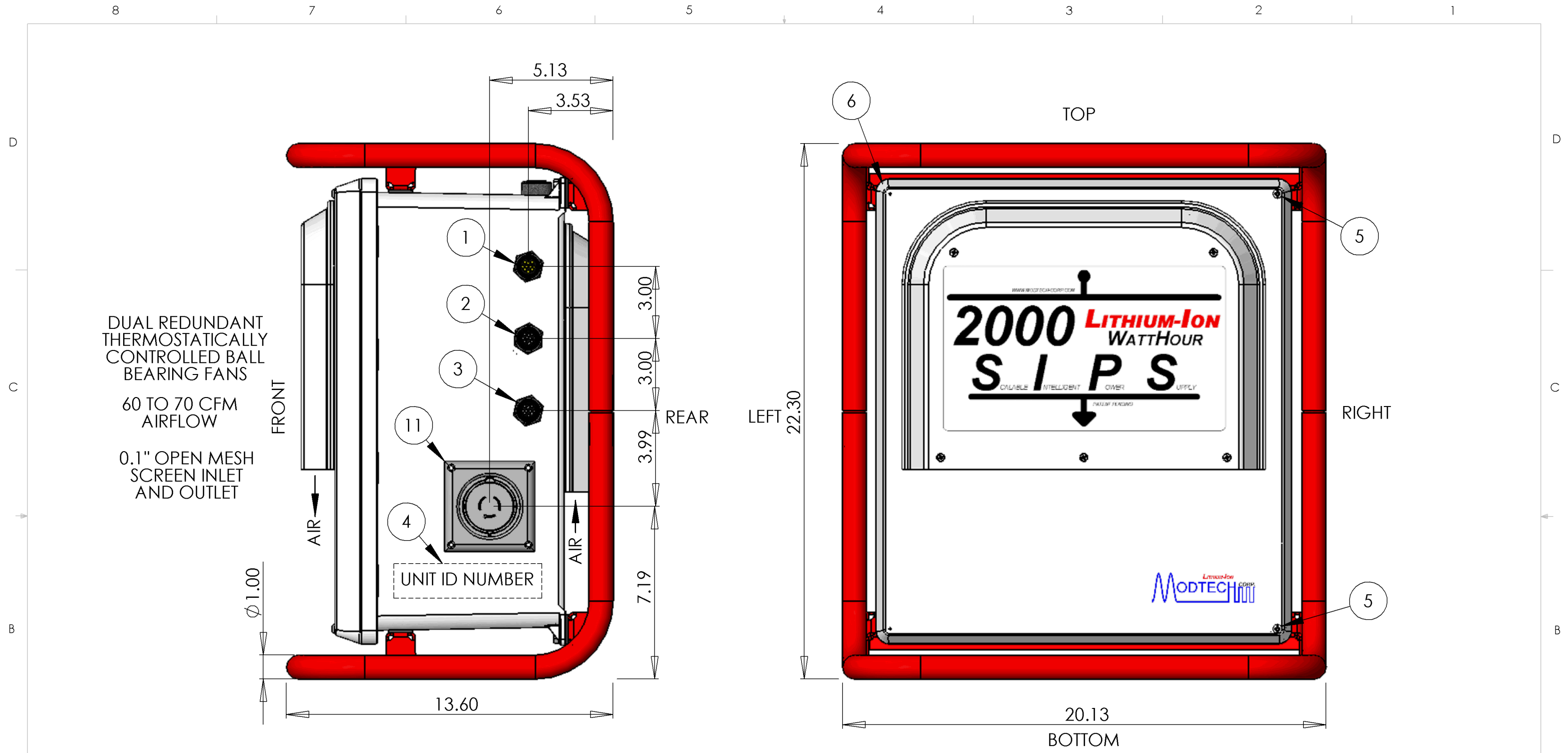


- 1. MAIN BATTERY POWER CONNECTOR 4 PLACES
- 4. CONSPICUOUS UNIT IDENTIFICATION NUMBER
- 5. DOOR CLOSURE SCREWS
- 6. DOOR HINGE SIDE
- 7. 120VAC MESH RADIO POWER CONNECTOR
- 8. AUXILIARY 120VAC POWER CONNECTOR
- 9. 24VAC AXIS CAMERA POWER CONNECTOR
- 10. RJ45 NETWORK MANAGEMENT CONNECTOR

PROPRIETARY AND CONFIDENTIAL
 THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF MODTECH CORP. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF MODTECH CORP. IS PROHIBITED.

| | | | | |
|-------------|---------|---|--------------------------------------|--------------|
| | | UNLESS OTHERWISE SPECIFIED: | NAME | DATE |
| | | DIMENSIONS ARE IN INCHES | DRAWN | KFS 10/04/07 |
| | | TOLERANCES: ± 0.25 | CHECKED | JDY 10/09/07 |
| | | FRACTIONAL ± | ENG APPR. | |
| | | ANGULAR: MACH ± BEND ± | MFG APPR. | |
| | | TWO PLACE DECIMAL ± | Q.A. | |
| | | THREE PLACE DECIMAL ± | COMMENTS: | |
| | | INTERPRET GEOMETRIC TOLERANCING PER: | ALL SPECIFICATIONS SUBJECT TO CHANGE | |
| NEXT ASSY | USED ON | MATERIAL STEEL CAGE OVER FIBERGLASS CABINET | | |
| APPLICATION | | FINISH VARIOUS | | |
| | | DO NOT SCALE DRAWING | | |

| | | |
|---|-------------------------|--------------|
| MODTECH CORP. | | |
| TITLE: S.I.P.S. | | |
| POWER CONVERSION AND CONTROL CABINET | | |
| SIZE B | DWG. NO. PCCU CABINET 1 | REV A |
| SCALE: | WEIGHT: | SHEET 1 OF 1 |



DUAL REDUNDANT THERMOSTATICALLY CONTROLLED BALL BEARING FANS
60 TO 70 CFM AIRFLOW
0.1" OPEN MESH SCREEN INLET AND OUTLET

- 1. MAIN BATTERY POWER CONNECTOR
- 2. AUXILIARY CHARGE CONNECTOR 1
- 3. AUXILIARY CHARGE CONNECTOR 2
- 4. CONSPICUOUS UNIT IDENTIFICATION NUMBER
- 5. DOOR CLOSURE SCREWS
- 6. DOOR HINGE SIDE
- 11. 230VAC 10A MAINS INPUT POWER

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF MODTECH CORP. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF MODTECH CORP. IS PROHIBITED.

| | | | | | |
|-------------|---------|---|---------|--------------------------------------|--------------|
| | | UNLESS OTHERWISE SPECIFIED: | | NAME | DATE |
| | | DIMENSIONS ARE IN INCHES | | DRAWN | KFS 10/04/07 |
| | | TOLERANCES: ± 0.25 | | CHECKED | JDY 10/09/07 |
| | | FRACTIONAL ± | | ENG APPR. | |
| | | ANGULAR: MACH ± BEND ± | | MFG APPR. | |
| | | TWO PLACE DECIMAL ± | | Q.A. | |
| | | THREE PLACE DECIMAL ± | | COMMENTS: | |
| | | INTERPRET GEOMETRIC TOLERANCING PER: | | ALL SPECIFICATIONS SUBJECT TO CHANGE | |
| | | MATERIAL STEEL CAGE OVER FIBERGLASS CABINET | | | |
| NEXT ASSY | USED ON | FINISH | VARIOUS | | |
| APPLICATION | | DO NOT SCALE DRAWING | | | |

| | | |
|--|------------------------|--------------|
| MODTECH CORP. | | |
| TITLE: S.I.P.S. CHARGER CABINET | | |
| SIZE B | DWG. NO. CHG CABINET 1 | REV A |
| SCALE: | WEIGHT: | SHEET 1 OF 1 |