AIA SPECIFICATIONS & TECHNICAL DESCRIPTION

For 4.0, 5.0, 6.5, 8.0kVA / kW

Cooper Lighting Solutions / Sure-Lites INVW-T NEMA 3R– Three Phase Uninterruptible Power System

This description contains all the necessary functional and technical information for the **Sure-Lites INVW-T, NEMA 3R wet location** series of uninterruptible power supplies.

This specification also provides electrical and mechanical characteristics and an overall description of the typical operation of a **Sure-Lites INVW-T** system.

For any further information, please contact our Authorized Sales Representative or **Cooper Lighting Solutions** directly.

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SECTION 1.0 GENERAL

1.1 SPECIFICATION

This specification defines the electrical and mechanical characteristics and requirements for a stand-by, single-phase or three-phase, solid-state uninterruptible power supply, and hereafter referred to as the DR system. The DR shall provide high quality, computer grade AC power for today's electronic lighting loads (power factor corrected and self-ballast fluorescent, incandescent, quartz re-strike, halogen and/or HID) during emergency backup.

The DR shall incorporate a high frequency pulse width modulated (PWM) inverter utilizing IGBT technology, a microprocessor controlled inverter and a temperature compensating battery charger, a user-friendly control panel with audible and visual alarms.

1.2 DESIGN STANDARDS

The DR shall be designed in accordance with the applicable sections of the current revision of the following documents. Where a conflict arises between these documents and statements made herein, the statements in this specification shall supersede.

- UL 924 Standard Emergency Lighting and Power Equipment
- National Electrical Code
- NFPA- 101
- OSHA and Life Safety Code
- Seismic Zone 4

1.3 SYSTEM DESCRIPTION

1.3.1 Design Requirements - Electronics Module

A. Nominal input/output Voltage
The Input and Output voltage of the DR shall be pre-configured to match the user specified input and load requirements. Available three-phase input / output voltages are 120/208 or 277/480VAC.

Input: _____ VAC, ___-phase, ___ -wire-plus-ground
Output: _____ VAC, ___-phase, ___ -wire-plus-ground

B. Output Load Capacity
The output load capacity of the DR shall be rated in kVA at unity power factor. The DR shall be able to supply the rated kW from .5 lagging to .5 leading.

Rating: _____ kVA / kW

1.3.2 Design Requirement - Battery System

A. Battery Cells
The DR shall be provided with sealed, valve regulated lead acid batteries.

B. Reserve Time
The battery system shall be sized to provide the necessary reserve time to feed the inverter in case of a mains failure.

Battery Reserve time: ___ minutes

C. Recharge Time
The battery charger shall recharge the fully discharge batteries within a 24 hour period. The charger shall be an integrated 3-step, microprocessor controlled and temperature compensating.

1.3.3 Modes of Operation

The DR shall be designed to operate with less than a 2-millisecond transfer time:

A. Normal
The DR Inverter is a standby system and the commercial AC power continuously supplies the critical load. The input converter (bi-directional transformer) derives power from the commercial AC power source and supplies to the inverter while simultaneously providing floating charge to the batteries.

B. Emergency
Upon failure of the commercial AC power the inverter instantaneously with a maximum of a 2-millisecond break, switches its power supply from the input converter to the battery system. There shall be no loss of power to the critical load upon the failure or restoration of the utility source.

C. Recharge
Upon restoration of commercial AC power after a power outage, the input converter shall automatically restart and start charging the batteries. The critical loads are powered by the commercial AC power again.

1.3.4 Performance Requirements

1.3.4.1 AC Input to DR

A. Voltage Configuration for Standard Units: 3-phase, 4-wire-plus-ground.

B. Voltage Range: (+10%, -15%)

C. Frequency: 60 Hz. (+/- 3%)

D. Power Factor: . 5 lagging / leading

E. Inrush Current: 1.25 times nominal input current, 10 times 1 line cycle for incandescent loads

F. Current Limit: 125% of nominal input current

G. Voltage Distortion: 10% THD maximum from 50% to full load

H. Surge Protection: Sustains input surges without damage per standards set in UL924

1.3.4.2 AC Output, DR Inverter

A. Voltage Configuration for Standard Units: 3-phase, 4-wire-plus-ground.

B. Static Voltage Stability: Load current changes +/- 2%, battery discharge +/- 12.5%

C. Dynamic Voltage Stability: +/- 2% (25% step load), +/- 3% (50% step load)

D. Dynamic Recovery Time to within 1% of nominal: 3 cycles (0-100% load step)

E. Output Harmonic Distortion: < 3% (with linear load)

F. Frequency: 60 Hz (+/- .05Hz during emergency mode)

G. Load Power Factor Range: 0.5 lagging to 0.5 leading

H. Output Power Rating: kVA = kW

I. Overload Capability: to 115% continuous rating
to 150% for 2.5 seconds
to 250% for 3 line cycles

J. Crest Factor: <= 2.8

1.4 ENVIRONMENTAL CONDITIONS

The DR shall be capable to operate within the specified design and performance criteria provided that the following environmental conditions are met:

A. Storage/Transport Temperature:
-4 to 158 deg. F (-20 to 70 deg. C) without batteries
0 to 104 deg. F (-18 to 40 deg. C) with batteries*

* Maximum recommended storage temperature for batteries is 25 deg. C for up to six months. Storage at up to 40 deg. C is acceptable for a maximum of three months.

B. Operating Temperature: Standard system: 50 to 104 deg. F (10 to 40 deg. C);
Optional heater extends cold temperature battery performance

C. Relative Humidity: 0 to 95% non-condensing

D. Altitude: Operating: to 10,000 ft. (3,000 m) above sea level
De-rated 5% per Km above 3 Km
Storage/Transport: to 40,000 ft. (12.2 Km) above sea level

E. Audible Noise: 45 dBA @ 1 meter from surface of the DR

1.5 SUBMITTALS

1.5.1 Proposal Submittals

Submittals with the proposal shall include the following:

A. System configuration with single-line diagrams

B. Functional relationship of equipment including weights dimensions and heat Dissipation

C. Descriptions of equipment to be furnished, including deviations from these specifications

D. Size and weight of units to be handled by installing contractor

E. Detailed layouts of customer power and control connections

F. Detailed installation drawings including all terminal locations

1.5.2 DR Delivery Submittals

Submittals upon DR delivery shall include:

A. A complete set of submittal drawings

B. One set of instruction manuals. Manuals shall include a functional description of the equipment, installation, safety precautions, instructions, step-by-step operating procedures and routine maintenance guidelines, including illustrations.

1.6 WARRANTY

1.6.1 DR Module

The DR manufacturer shall warrant the DR module against defects in materials and workmanship for 12 months after initial start-up or 18 months after ship date, whichever occurs first.

1.6.2 Battery

Sealed Lead Calcium VRLA, 5-year life expectancy – one-year full replacement warranty plus an additional four years pro-rata.

1.7 QUALITY ASSURANCE

1.7.1 Manufacturer Qualifications
A minimum of 35 years experience in the design, manufacture, and testing of emergency power systems is required.

1.7.2 Factory Testing
Before shipment, the manufacturer shall fully and completely test the system to assure compliance with the specification.

SECTION 2.0 PRODUCT

2.1 FABRICATION

All materials of the DR shall be new, of current manufacture, high grade, free from all defects and shall not have been in prior service except as required during factory testing.

The DR module and a 90-minute battery bank shall be housed in a single freestanding NEMA type 3R enclosure. The cabinet shall incorporate 2 doors to minimize frontal clearance requirements, lockable via a 3-point latch system, keyed with Corbin 60 locks. Battery cabinets shall not be required, thus minimizing the overall system's footprint. Front access only shall be required for installation, adjustments and expedient servicing (MTTR: < 15 minutes). All components shall have a modular design and quick disconnect means to facilitate field service.

The DR shall be powered painted with the manufacturer's standard color. Standard cabinet shall be CRS, painted with weather resistant powder coat paint; stainless steel cabinet shall be available optionally. All circuit boards shall be conformal coated and all internal metal parts shall be either painted with weather resistant paint or plated. The DR shall be constructed of replaceable subassemblies. Like assemblies and like components shall be interchangeable.

Cooling of the DR shall be forced-air in emergency mode, powered by the DR. In normal mode, the system shall be continually cooled as required via temperature-controlled fans. All fans shall be mounted internal to the enclosure minimize audible noise.

2.2 COMPONENTS
The DR shall be comprised of the following components:

A. **DR Module** - The DR module shall contain an inverter, an AC distribution with an input circuit breaker, back-feed relay, control, and monitoring subsystems.

B. **Battery Module -** The battery module shall contain the battery plant required to produce the reserve energy to supply the inverter during abnormal AC mains conditions. The battery module is contained within the system cabinet on all system VA's.

2.2.1 Battery Charger

A. General
In the standard configuration the charger converts ac voltage to dc voltage. With commercial power present, the inverter power transformer is powered and the IGBT modules are microprocessor controlled to recharge the batteries. The temperature compensated battery charger circuit supplies constant voltage and constant current to the batteries. Once the batteries have received a full recharge, a constant trickle charge maintains batteries at maximum level. Recharge time is 24 hours maximum at nominal ac input voltage. The ac ripple current of the dc output meets the battery manufacturer specification, thus ensuring the maximum battery lifetime.

B. AC Input Current
The charger unit is provided with an ac input current limiting circuit whereby the maximum input current shall not exceed 125% of the output full current rating.

C. Automatic Restart
Upon restoration of utility AC power, after a utility AC power outage and after a full DR automatic end-of-discharge shutdown, the DR will automatically restart, performing the normal DR startup.

D. DC Filter
The charger shall have and output filter to minimize AC ripple voltage into the battery.
Under no conditions shall ripple voltage into the battery exceed 2% RMS.

E. Battery Recharge
The charger is capable of producing battery-charging current sufficient enough to recharge the fully discharged battery bank within a 24-hour period. After the battery is recharged, the charger shall maintain full battery charge until the next emergency operation.

F. Over-voltage Protection
The charger is equipped with a DC over-voltage protection circuit so that if the DC voltage rises above the pre-set limit, the charger is to shut down automatically and initiate an alarm condition.

2.2.2 Inverter

A. General
The inverter converts dc voltage supplied by the battery to ac voltage of a precisely stabilized amplitude and frequency that is suitable for powering most sophisticated electrical equipment. The inverter output voltage is generated by sinusoidal pulse width modulation (PWM). The use of a high carrier frequency for PWM and a dedicated ac filter circuit consisting of a transformer and capacitors, ensure a very low distortion of the output voltage (THD<3% on linear loads).

B. Overload Capability
The inverter during emergency modes shall be capable of supplying current and voltage for overloads exceeding 100% and up to 150% of full load current for 12 line cycles, 125% for 5 minutes and 110% for 10 minutes.

C. Output Power Transformer
A dry type power transformer provides the inverter AC output. The transformer is built with copper wiring exclusively. The hottest winding temperature of the transformer shall not exceed the temperature limit of the transformer insulation class of material at ambient temperature.

2.2.3 Display and Controls

A. Monitoring and Control
The DR system provides operation monitoring and control, audible alarms, LED indicators, and diagnostics. The internally mounted control panel includes a 2-line 20-character LCD display, a keypad to control and monitor the internal operation of the system. This allows the operator to easily "watch" system functions as they occur and check on virtually any aspect of the system's operation. Monitoring and control are microprocessor-based for accuracy and reliability. To ensure only authorized personnel can operate the unit, the system is multi-level password protected for all control functions and parameter changes.

- **Maintenance Bypass Switch:**
  This device is internally mounted in the system and permits maintenance personnel to easily bypass the protected equipment directly to the AC utility power. The make before break switch isolates the system to perform routine maintenance or servicing.

- **Summary Form "C" Contacts:**
  Form "C" contacts rated at 5 amps maximum at 250VAC/30VDC. Dry contacts will change state when any system alarm activates. Contacts change states with the following alarms: High/low battery charger fault, near low battery, low battery, load reduction fault, output overload, high/low AC input volts, high ambient temperature, inverter fault, and with optional circuit breaker trip alarm.

B. Metering
Scrolling through the meter functions can monitor the following measurements:
- Utility input voltage
- System output voltage
- Battery voltage
- Battery current
- System output current
- System output VA
- Inverter wattage
- System temperature
- Date & time

C. LED Indication
The internally mounted panel with integrated LEDs allows a quick check of the DR operating status.

- AC Present (Green)
- System Ready (Green)
- Battery Charging (Yellow)
- Battery Power (Yellow)
- Fault (Red)

D. Audible Alarm
Audible alarm will activate with any of the following conditions and automatically store the 50 most recent events.

- High battery charger voltage
- Low battery charger voltage
- High AC input voltage
- Low AC input voltage
- Near low battery voltage
- Low battery voltage
- Load reduction fault
- High Ambient temperature
- Inverter fault
- Output fault
- Output overload

2.2.4 Communication Interfaces

2.2.4.1 RS-232 Interface

The system shall be equipped with an RS-232 serial port (DB9) for remote communications over a serial cable. A proprietary (but publicly available) communication protocol shall be provided to access the following inverter telemetry over RS-232:

- Input Voltage(s)
- Output Voltage(s)
- Output Current(s)
- Total Output Power
- Ambient Temperature
- Battery Voltage
- Battery Current
- Total Time On Battery
- Days of Operation
- The results of the inverter's last auto-run monthly self-test
- The results of the inverter's last auto-run yearly self-test
- Alarm states (no utility, on battery, battery low, input voltage high or low, inverter failure detected, inverter overloaded and overload shutdown, 'load reduction' activated, ambient temperature high, and battery charger fault).
- Event logs, Alarm logs and Test logs

2.2.4.2 Serial to Ethernet Interface

The system shall be equipped with an RJ-45 Ethernet port for remote communications over a Local Area Network (LAN). The Serial to Ethernet Interface shall provide a Telnet, SSH and web (HTTP) interface to the inverter using a proprietary (but publicly available) communication protocol to access the following inverter telemetry over the LAN:

- Input Voltage(s)
- Output Voltage(s)
- Output Current(s)
- Total Output Power
- Ambient Temperature
- Battery Voltage
- Battery Current
- Total Time On Battery
- Days of Operation
- The results of the inverter's last auto-run monthly self-test
- The results of the inverter's last auto-run yearly self-test
- Alarm states (no utility, on battery, battery low, input voltage high or low, inverter failure detected, inverter overloaded and overload shutdown, 'load reduction' activated, ambient temperature high, and battery charger fault).
- Event logs, Alarm logs and Test logs

2.2.4.3 IoT (Internet of Things) Cloud Interface

The system shall be equipped with an RJ-45 Ethernet port, which when provided with a connection to the Internet (whether dedicated or shared), shall enable remote monitoring of inverter telemetry, and email and SMS push notifications of alarms.

2.2.4.3.1 Secure, Scalable Multi-User Web Interface Hosted on Cloud

The IoT cloud application shall provide a secure web interface (HTTPS with TLS 1.3 encryption) such that it can be securely accessed and fully utilized from any web-enabled device (whether smartphone, tablet or PC) running any web-enabled operating system (Windows, Linux, macOS, iOS, Android, etc). The application shall be hosted on a cloud service on the Internet, such that the web-enabled device can access the application from anywhere as long as it has an Internet connection (whether from the same LAN as the inverter, or outside, anywhere on the Internet). The application shall support multiple users sharing access to the same inverter(s) as desired, with no limits on number of concurrent users accessing the system, and no corresponding service delays. Users shall be able to enter user friendly names for their inverters, organize their inverters into a hierarchy of areas (folders), and if desired, share their inverters with other users of the cloud application on an inverter-by-inverter basis.

2.2.4.3.2 IoT Overview Dashboard

The IoT cloud application shall provide an Overview dashboard through which the system state (healthy, warning, or alarm) of all IoT inverters associated with the logged in User's account is summarized and can be understood within a few seconds of loading the page. The Overview dashboard shall include a color-coded summary of all inverters, a map view showing the geographic locations of all inverters (each inverter being color-coded green, orange or red) overlaid on a map that allows ‘street view’ or ‘satellite view’, and a list of outstanding alarms – if any – describing which specific inverter has generated that alarm. The map view shall allow ‘zoom in’ at least up to a 1:200 scale (where one inch on the device screen corresponds to about 17’, and where building outlines are clearly visible), and ‘zoom out’ up to a continental scale, where an entire continent is visible on the device screen. When the Overview dashboard page loads, the map view shall be initialized to the correct zoom level to show all inverters associated with the logged in user account.

2.2.4.3.3 IoT Device Details Dashboard

The IoT cloud application shall provide access to the following inverter details and telemetry. Inverter telemetry shall be updated no less than once every 15 minutes.

- Serial Number
- Location
- Ratings (input voltage, output voltage, output power, battery voltage)
- A color-coded summary of the inverter’s state (green, orange or red)
- The state of the inverter’s battery and utility power
- The results of the inverter’s last auto-run self-test (monthly test or yearly test)
- An event history table for events that have occurred in the last 90 days, with the ability for Users to input textual comments on each event.
- Total Output Power (with time-series chart and tracked min/max)
- Ambient Temperature (with time-series chart and tracked min/max)
- Current Input Voltage(s)
- Current Output Voltage(s)
- Current Output Current(s)
- Current Battery Voltage
- Current Battery Current
- Total Time On Battery
- Days of Operation
- Alarm states (no utility, on battery, battery low, input voltage high or low, inverter failure detected, inverter overloaded and overload shutdown, ‘load reduction’ activated, ambient temperature high, and battery charger fault).

2.2.4.3.4 IoT ‘Push’ Notifications

The IoT cloud application shall provide the ability to push notifications by SMS (text message) or email – to User provided phone numbers or email addresses – whenever the inverter generates an alarm. The notifications shall be generated within no more than one minute of the alarm being detected by the inverter. The notifications shall contain clickable hyperlinks to access the cloud application page in question for more information.

2.2.4.3.5 IoT Network and System Security and Reliability

The IoT cloud application shall communicate securely over encrypted channels, both between inverter and the cloud, and between the cloud and the end device. The IoT interface on the inverter shall accept no inbound connections; all communication is outbound from the IoT interface to the trusted endpoint on the cloud. Inverter access shall be ‘read only’, allowing no possible physical path for ‘writing’ to the inverter in a way that would corrupt or otherwise affect its emergency backup power provision capabilities. The IoT cloud application shall be hosted on a redundant and reliable platform such as AWS (Amazon Web Services) with little to no downtimes.

2.2.4.3.6 Ease of Network Setup

The IoT interface shall support network configuration via DHCP (automatic assignment of IP address, subnet mask, default gateway, and DNS servers).If no DHCP server is available on the network, the IoT interface shall support static IP settings. The IoT interface shall only communicate to the cloud via the same network ports used for web traffic (ports 80 and 443). This way, no exceptions shall need to be made for the vast majority of corporate firewalls (which are usually set up to always allow outbound web traffic)

2.2.4.4 BACnet MS/TP Interface

The system shall be equipped with an RS-485 serial port for remote communications to a Building Management System (BMS) via BACnet MS/TP protocol. The BACnet interface shall support standard baud rates (9600, 19200, 38400, 57600, 115200) and MAC addressing (0-127), and have a programmable systemwide Device Instance number. The BACnet interface shall support standard BACnet discovery. The BACnet interface shall provide read-only access to the following inverter telemetry:

- Input Voltage(s)
- Output Voltage(s)
- Output Current(s)
- Total Output Power
- Ambient Temperature
- Battery Voltage
- Battery Current
- Total Time On Battery
- Days of Operation
- The results of the inverter’s last auto-run monthly self-test
- The results of the inverter’s last auto-run yearly self-test
- Alarm states (no utility, on battery, battery low, input voltage high or low, inverter failure detected, inverter overloaded and overload shutdown, ‘load reduction’ activated, ambient temperature high, and battery charger fault).
- Event logs, Alarm logs and Test logs, as text files downloadable via BACnet file transfer

2.2.4.5 BACnet IP Interface

The system shall be equipped with an RJ-45 Ethernet port for remote communications to a Building Management System (BMS) via BACnet IP protocol. The BACnet IP interface shall support standard IP network settings (DHCP or static IP address, subnet mask, default gateway, programmable port number) and shall have a programmable systemwide Device Instance number. The BACnet IP interface shall provide read-only access to the following inverter telemetry:

- Input Voltage(s)
- Output Voltage(s)
- Output Current(s)

- Total Output Power
- Ambient Temperature
- Battery Voltage
- Battery Current
- Total Time On Battery
- Days of Operation
- The results of the inverter's last auto-run monthly self-test
- The results of the inverter's last auto-run yearly self-test
- Alarm states (no utility, on battery, battery low, input voltage high or low, inverter failure detected, inverter overloaded and overload shutdown, 'load reduction' activated, ambient temperature high, and battery charger fault).

2.2.4.6 MODBUS Serial (RTU or ASCII) Interface

The system shall be equipped with an RS-485 serial port for remote communications to a Building Management System (BMS) via MODBUS RTU or MODBUS ASCII protocol (selectable). The MODBUS Serial interface shall support standard baud rates (9600, 19200, 38400, 115200), parity (no parity or even parity) and device addressing (1-247). The MODBUS Serial interface shall support setting a custom Device/User ID string (via Function Code 0x15) and retrieving it (via Function Code 0x11 – Report Server ID – or Function Codes 0x2B/0x0E – Encapsulated Interface Transport 'Read Device Identification'). The MODBUS Serial interface shall provide read-only access to the following inverter telemetry (via MODBUS Function Codes 0x01 through 0x04, and 0x14 for retrieving log files):

- Input Voltage(s)
- Output Voltage(s)
- Output Current(s)
- Total Output Power
- Ambient Temperature
- Battery Voltage
- Battery Current
- Total Time On Battery
- Days of Operation
- The results of the inverter's last auto-run monthly self-test
- The results of the inverter's last auto-run yearly self-test
- Alarm states (no utility, on battery, battery low, input voltage high or low, inverter failure detected, inverter overloaded and overload shutdown, 'load reduction' activated, ambient temperature high, and battery charger fault).
- Event logs, Alarm logs and Test logs, as text files downloadable via MODBUS Read File Record function code 0x14

2.2.4.7 MODBUS TCP Interface

The system shall be equipped with an RJ-45 Ethernet port for remote communications to a Building Management System (BMS) via MODBUS TCP protocol. The MODBUS TCP interface shall support standard IP network settings (DHCP or static IP address, subnet mask, default gateway, programmable port number). The MODBUS TCP interface shall provide read-only access to the following inverter telemetry:

- Input Voltage(s)
- Output Voltage(s)
- Output Current(s)
- Total Output Power
- Ambient Temperature
- Battery Voltage
- Battery Current
- Total Time On Battery
- Days of Operation
- The results of the inverter's last auto-run monthly self-test
- The results of the inverter's last auto-run yearly self-test
- Alarm states (no utility, on battery, battery low, input voltage high or low, inverter failure detected, inverter overloaded and overload shutdown, 'load reduction' activated, ambient temperature high, and battery charger fault).

2.2.4.8 SNMP Interface

The system shall be equipped with an RJ-45 Ethernet port for remote communications to a Building Management System (BMS) or Network Manager via SNMP protocol. The SNMP interface shall support standard IP network settings (DHCP or static IP address, subnet mask, default gateway).The SNMP interface shall support SNMP v1 and v2c. The SNMP interface shall support the programming of SNMP traps when user defined alarm conditions are met. The SNMP interface shall support standard 'SNMP Get', as well as standard SNMP MIB walking via 'SNMP Get Next'. The SNMP interface shall provide read only objects (OIDs) for the following inverter telemetry:

- Input Voltage(s)
- Output Voltage(s)
- Output Current(s)
- Total Output Power
- Ambient Temperature
- Battery Voltage
- Battery Current
- Total Time On Battery
- Days of Operation
- The results of the inverter's last auto-run monthly self-test
- The results of the inverter's last auto-run yearly self-test
- Alarm states (no utility, on battery, battery low, input voltage high or low, inverter failure detected, inverter overloaded and overload shutdown, 'load reduction' activated, ambient temperature high, and battery charger fault).

2.2.5 Manual and Programmable Testing

The system shall incorporate a manual test function and two automatic test modes. The system will perform a programmable, self-diagnostic monthly test for 5 minutes that is preset for the 15th of every month and the user can program the event time of day. The yearly self-diagnostic test is for 90 minutes and the user can program the time of the day the event is to take place. The microprocessor automatically records the last 75 test events in its own separate test result log.

2.2.6 Battery Assembly

The batteries are sealed, lead-acid valve regulated battery cells with a five-year prorated warranty. Precut cable wires are included to provide easy installation. A disconnect means shall be included for isolation of battery assembly from the DR module.

2.2.7 System Options

- **Output Circuit Breakers:**
  Distribution circuit breakers are for output load protection. Protection for the normally on and/or for the optional normally off loads. A maximum of 14 unsupervised 1-pole and a maximum of 8 supervised 1-pole circuit breakers are available for all systems. A maximum of 6 unsupervised 2-pole and a maximum of 4 supervised 2-pole circuit breakers are available for all systems. A maximum of 4 unsupervised 3-pole and a maximum of 2 supervised 3-pole circuit breakers are available for all systems. All circuit breakers are rated for 10,000 AIC.

- **Output Circuit Breaker Trip Alarm:**
  An audible and visual alarm activates when an output distribution circuit breaker has tripped.

- **Normally Off Output:**
  This output circuit is dedicated for the emergency equipment only. Emergency equipment only operates during power outages and when the system is on battery backup. This option leaves the load circuits off during normal utility power conditions.

- **Heater:**
  Allows the system to operate at lower temperatures and maintain full 90-minute battery capacity. Operating range with optional heater: -4 to 104 deg. F (-20 to 40 deg. C).

2.2.8 Accessories

- **Remote Meter Panel:**
  This allows greater flexibility to monitor all the system parameters from a remote location. Up to 300 feet away from the system. This allows the user to remotely monitor the status of the inverter. Also allows user to control and program the inverter from a remote location.

- **Modem:**
  Modems are devices that boost the signal level of the RS-232 diagnostic interface communications to a remote location that is more than 100 feet away from the system.

2.2.9 Ordering Number

The system shall be Myers Emergency Power Systems, LLC model:
____ - DR - _____ - _____ - _____ - _______ - __________ - __________ - _______;
NO known equal.

SECTION 3.0 EXECUTION

3.1 WIRING

All wiring shall be installed in conduit. Input and output wiring shall enter the cabinet in separate conduits.

3.2 UNIT START-UP and SITE TESTING

Site start-up and testing shall be provided by the manufacturer's field service representative during normal working hours (Mon. - Fri. 8 A.M. – 5 P.M.). Individual scheduling requirements can usually be met with 7 working days advance notice. Site testing shall consist of a complete test of the DR and accessories by the DR manufacturer in accordance with manufacturers standards. Manufacturer's approved service representative must perform commissioning for 2-year warranty to apply.

3.3 REPLACEMENT PARTS

Parts shall be available through Field Service Centers throughout the country. Recommended spare parts shall be fully stocked by local field service personnel with back up available from manufacturing location.

3.4 MAINTENANCE CONTRACTS

A complete offering of preventive and full-service maintenance contracts for both the DR system and batteries shall be available. An extended warranty and preventive maintenance package shall be available. Factory-trained service personnel shall perform warranty and preventive maintenance service. A five-year maintenance contract will include a unit start-up and site testing.