## GE Energy

# GPS 2436 Infinity Power System

## +24V DC Medium Power Plant

- Medium power applications utilizing single-phase or 3-phase 240Vac input
- Full featured control and monitoring capability
- 3600 Amp system capacity
- Efficiency approaching 97%

## Benefits

### Reliability

- Distributed fault tolerance
- Proven field performance
- Controller continuity

### Intelligence

- Industry leading controller features
- Ethernet interface for remote access
- Centralized network management

### Investment Protection

- Module compatibility
- Power shelf growth
- Flexible upgrade options

### On Time Delivery

- 4 – 6 week availability
- 24/7 technical support
- Standard building blocks

### Overview

The GPS2436 capitalizes on the product strengths found in the GPS4848 and Infinity product families by integrating the high efficiency Infinity TE rectifier platform and the time-tested distribution found in the GPS4848. Utilizing the 1U 100A 24Vdc rectifiers, a fully equipped bay only requires 15.75 inches allowing for as much as 60 inches of distribution panels. With this increased density, a single bay GPS2436 system provides ampacity and distribution for most medium and small applications while retaining all the features found with the larger GSP4848.

### Bay Options

The GPS2436 system can be deployed with capacity of up to 2400 amps in a single cabinet or expanded over multiple cabinets to 3600 amps. Designed for either internal input AC breakers or terminal strip terminations, rectifier shelves can be spread across two bays or concentrated to a single bay. In applications needing additional distribution, two more bays can be added and dedicated exclusively for distribution.

### Infinity Rectifiers

The Infinity TE rectifier series offers modules for use in +24Vdc applications.

Rectifier:

- NE100AC24ATEZ Rectifier, 100A/24V Output

### Galaxy Millennium® II & Pulsar Plus Controllers

The Galaxy Millennium II controller combines sophisticated power monitoring and remote management. This flagship controller simplifies operations and maintenance while lowering administrative costs. Remote peripheral modules support over 500 monitoring points for GE Energy or third party devices. Ethernet, SNMP, and TL1 provide integration with power engineering and NOC workflow.

As an economical alternative, the GPS2436 can be equipped with the Pulsar Controller. Designed to monitor and control system components including rectifier's converters and distribution modules via a multi-drop RS485 digital communications bus. System status, parameters settings and alarm thresholds can be viewed and configured from the controller's front panel or PC interface.

### Total Efficiency

The GE Energy Total Efficiency™ (TE) architecture reduces energy loss and lowers cooling costs by 50-70%. TE products will prioritize sustainable energy sources like solar, wind, water and fuel cells over traditional utility grid or diesel generator sources – and they will intelligently respond to smart grid information to reduce consumption during peak demand periods. Active Rectifier Management™ (ARM) and Battery Charging Optimization™ (BCO) features increase efficiency on current and legacy power infrastructures. The Total Efficiency architecture addresses issues end-to-end based on our proven experience and expertise in batteries, power distribution, DC energy systems, AC-DC power supplies, and DC-DC board mounted power to deliver a solution that is more safe, reliable and energy efficient than competitive alternatives.

imagination at work

# Infinity TE Rectifiers

- **Compact** - 1RU form factor providing high power density (24 W/in$^3$)
- **Plug and Play** – installation of the rectifier in a shelf connected to a compatible system controller initializes all set up parameters automatically.  No adjustments are needed.
- **Extended service life** – parallel operation with automatic load sharing ensures that parallel units are not unduly stressed even when a unit fails or is removed.
- **Monitoring / control** – the built in microprocessor controls and monitors all critical rectifier functions and communicates with the system controller using the built in Galaxy Protocol serial interface.
- **Fail safe performance** – hot insertion capabilities allow for rectifier replacement without system shutdown; soft start and inrush current protection prevent nuisance tripping of upstream breakers.

## Applications

- Telecommunications networks
- Digital subscriber line (DSL)
- Indoor/outdoor wireless
- Routers/switches
- Fiber in the loop
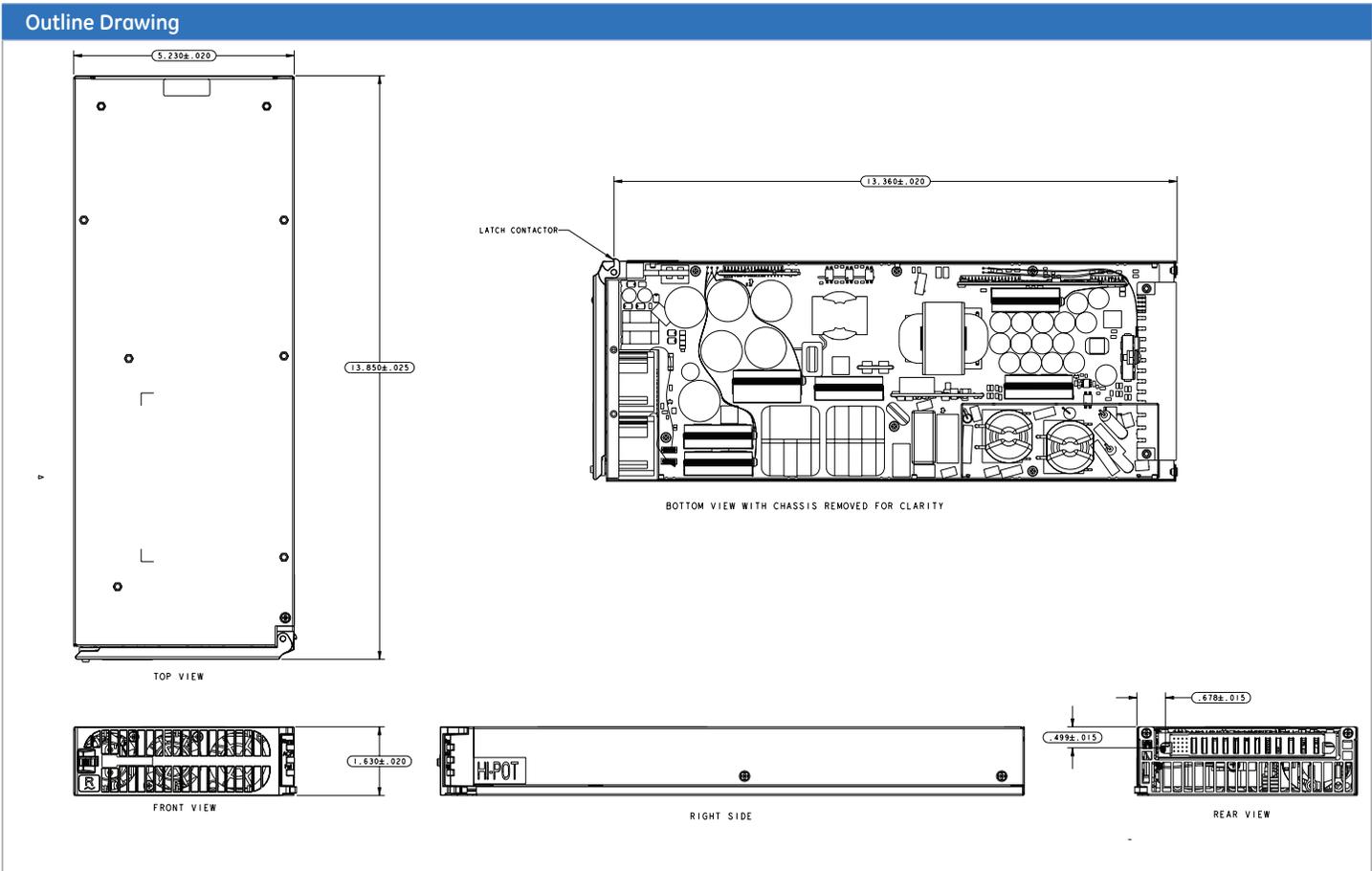- Transmission
- Data networks
- PBX

## Key Features

- Extended temperature range
- Redundant fan cooling
- Front panel LED indicators
- 1U height, hi power density
- +24 or -48V input
- Digital load sharing
- Hot pluggable
- RoHS compliant

## Specifications

| Input | NE100AC24ATEZ |
|---|---|
| Voltage Range | 95-275Vac |
| Input Current | 15-12A @100-120Vac<br>15A @200-240Vac |
| Input Frequency | 45 – 66Hz |
| Power Factor | 0.98 @ >50% load |
| Efficiency | > 96% (Peak 96.9%) |
| Total Harmonic Distortion | < 5% @loads over 50% |
| **Output** | |
| Voltage Adjust Range | 21-29Vdc |
| Voltage Nominal | 27.25V |
| Regulation(with controller) | ±0.5% |
| Ripple | 100mVrms |
| Output Current<br>- High-Line<br>- Low-Line | 100A @27.25V<br>44A @27.25V |
| Heat Dissipation @ max out | 174W / 594 BTU/hr |

| Environmental | |
| --- | --- |
| Operating Temperature | -40°C to +75°C (-40°F to 167°F) |
| Storage Temperature | -40°C to +85°C (-40°F to 185°F) |
| Humidity | < 95% non-condensing |
| Altitude | 2000M max |

| Mechanical | |
| --- | --- |
| Length (inch/mm) | 13.85 / 352 |
| Width (inch/mm) | 5.23 / 133 |
| Height (inch/mm) | 1.63 / 42 |
| Weight (lb/Kg) | 5.05 / 2.2 |

| Safety and Standards Compliance | |
| --- | --- |
| NEBs Level 3 | Evaluated by independent NRTL test lab to Telcordia GR63, Issue 3 & GR 1089, Issue 5 |
| Safety | UL 60950-1, 2nd Ed. Recognized<br>CSA C22.2 No. 60950-1-03 Certified |
| RoHS | Compliant to RoHS EU Directive 2002/95/EC; RoHS 6/6 |
| EMC | European Directive 2004/108/EC; EN55022, Class A; EN55024; FCC, Class A; GR1089-CORE, Issue 5 |

## Outline Drawing



TOP VIEW

LATCH CONTACTOR

BOTTOM VIEW WITH CHASSIS REMOVED FOR CLARITY

FRONT VIEW

RIGHT SIDE

REAR VIEW

# Galaxy Millennium™ II Controller



**Galaxy Millennium II** is our flagship controller designed to meet the needs of the most advanced power systems. Building on the Galaxy Millennium platform, the Galaxy Millennium II delivers state-of-the art performance by combining sophisticated control, monitoring, and remote network access previously on three separate circuit packs into a single integrated unit. The controller has been designed to simplify plant administrative and surveillance routines as well as reduce operating, provisioning, and personnel expenses.

Configuration of the **Galaxy Millennium II** can be performed via menu based front panel display, a local terminal or remote modem using EasyView2, or through a local or remote network connection utilizing standard web browsers or network protocols. In addition to its standard integrated monitoring capabilities, this controller offers extensive external monitoring using bay interface cards (BICs), distribution control cards, and remote peripheral monitoring modules (RPMs) designed for various inputs and transducers. Additional external relay contacts are also available.

The Galaxy Millennium II, with integrated network access, allows for advanced network supervision using standard network management protocols and available network management software. The GE Energy Galaxy Manager network management software can be used to meet power system engineering, operations and maintenance needs. Via the World Wide Web, users gain access to live data and information logged into Galaxy Manager's centralized server from each monitored system controller across the power network.

## Applications

- Infinity NE-M
- CPS6000-M2
- GPS 4848/100

- Galaxy Vector controller upgrades
- GPS 4812/24
- GPS 2424

- Stand-alone monitoring applications
- Galaxy Millenium upgrades & replacements

## Key Features

**Remote Access and Features**

- Integrated 10/100Base-T Ethernet Network capability
  - TCP/IP
  - SNMP Version 2c for remote management
  - SMTP for email
  - Telnet for remote command line interface
  - TL-1
  - DHCP for network plug-n-play
  - FTP for rapid backup and upgrades
  - HTTP for standard and custom web pages for standard browsers
  - Compatible with Galaxy Manager and other standard network management packages
  - Standard shielded RJ-45 interface referenced to chassis ground
- Optional Dataswitch
  - Connections to 3 standard RS-232 devices for pass-through and alarm management
  - BSN extension to provide 3 additional RS-232 serial connections
- Configurable RS-232/485 port for remote via TL1/X.25
- EasyView2, Windows-based software, for configuration and reporting through local terminal or Modem connections
- Multiple password-protected security levels: User, Super-User, Administrator for all access

**Standard System Features**

- Monitoring and control of up to 85 RS485 serial connected devices
  - Maximum of 85 serial switchmode rectifiers
  - Maximum of 32 bay interface cards (BICs)
  - Maximum of 16 serial converters
- Standard and custom User Defined system alarms
  - Alarm cut-off
  - Alarm test
  - Multiple-level alarm severity: Critical, Major, Minor, Warning, and record-only
- Standard rectifier management features
  - Automatic rectifier restart
  - Reserve engine transfer
  - Adaptive Rectifier Management (ARM)/Energy Efficiency
  - Remote rectifier (on/off) control
  - Automatic rectifier sequence control
  - N + X redundancy check
- Low Voltage Load and Low Voltage Battery Disconnect Options (3)
- Various levels of configuration, statistics, and history
  - All stored in non-volatile memory
  - Remote and local backup and restore of configuration data
- Remote and local software upgrade
- Basic, busy hour, and trend statistics kept
- Detailed history kept
- Maintenance reminders
- Inventory management
- User defined events and derived channels
- Hardware DIP switch access control

**Standard Battery Management Features**

- Float/boost mode control
  - Manual front panel boost
  - Manual timed boost locally, T1.317, and remotely initiated
  - External timed boost
  - Battery thermal protect module (BTP)
  - Auto boost terminated by time or current
- Battery discharge testing
  - Manual
  - Periodic
  - Plant Battery Test (PBT) input driven
- Slope thermal compensation
  - High temperature compensation
  - Low temperature compensation
  - Step temperature
  - STC Enable/Disable, low temperature Enable/Disable
  - mV/°C adjustments
- High temperature disconnect/step setting
- Sophisticated reserve-time prediction
  - User configurable system reserve low alarm during normal operation
  - User configurable reserve time low alarm
- Recharge current limit
- Integrated "At Rate Calculator" for estimation purposes
- Battery discharge trace data
- Emergency Power-Off Input
- Lithium battery fail input

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## Features

### Integrated Outputs

- Traditional office alarm interface with 19 Form-C alarm outputs (60VDC @.3A)
  - Standard default assignments: Power Critical-Audio, Power Critical-Visual, Power Critical-External, Power Major-Audio, Power Major-Visual, Power Major-External, Power Minor-Audio, Power Minor-Visual, Power Minor-External, Major Fuse (MJF), Minor Fuse (MNF), Battery On Discharge (BD), AC Fail (ACF), Rectifier Fail, High Voltage (HV), Very Low Voltage (VLV), Controller Fail, User Relay 1, User Relay 2
  - 16 Form-Cs are user assignable
- 1 1/3A Auxiliary Battery Supply (ABS) Output

### Remote Peripheral Monitoring & Control

- Modular monitor and control growth options for up to 95 monitoring modules optimized for DC voltage and shunt monitoring, binary input detection, temperature monitoring, external transducer monitoring
- Additional Form-C relay output control available
- Devices managed and powered by the controller via one twisted-pair cable over distances of 300m or more
- Daisy-chain connections from module to module reduce installation costs and cable congestion
- Modules can be located near monitored source
- Various panels for rack-mounting available

### Enhanced Battery Management Features

- Battery discharge test options including periodic and manual tests (local/ remote) with configurable thresholds or 20% discharge algorithm
- State of charge indication
- Rectifiers on-line during test (minimize risk to service)
- Discharge data stored in non-volatile memory. Graphical data available

- Accurate battery reserve time calculations that factor in battery specific parameters, plant voltage, load, temperature, number of battery strings and number of cells per string
- Thermal compensation (STC) and recharge current limit to maximize battery life

### Extensive Plant and Monitoring Statistics

- Real-time data and historical statistics help analyze critical performance parameters
- Statistics for planning preventive or corrective maintenance before serious problems occur

### Derived Channels

- 32 derived channels enable arithmetic and Boolean operations to be performed on measured values to allow customer specific parameters such as output power to be calculated and managed

### Rectifier Management

- Energy Efficiency, provides ability to automatically shutdown selected rectifiers during low plant loads maintaining maximum battery plant efficiency without sacrificing reliability
- Provides Reserve Operation feature for maintaining designated number of rectifiers on during Engine runs as well as proper sequencing for generators
- Provides ability to transfer rectifiers (TR1-TR4) on in certain sequences for return of AC

## Galaxy Manager Compatible

- Centralized web server and database with multiple user access to live or managed data with drill down to problem details
- Monitor and control of more than 40 connected devices
- Management information from polling or alarms received from alarm traps from multiple sites are available on one screen via the inter/ intranet
- Trend user selected data over time
- Automatic or manual report generation
- Standard engineering tools like reserve time calculators and cable voltage drop analyzer

## Specification

| General | |
|---|---|
| Operating Voltage | ± 24Vdc, ± 48Vdc (Range: ± 18 to ± 60Vdc) |
| Input Power | 36W (depending on options) |
| Operating Temperature Range | -40°C to +75°C (-40 to 167°F) |
| Storage Temperature Range | -40°C to +85°C (-40 to 185°F) |
| Operating Relative Humidity | 0 - 95% (non-condensing) |
| Physical Specifications | 9.24" H x 20.76" W x 2.14" D |
| Display | 8-line by 40-character backlit LCD |

| Agency Certifications | |
|---|---|
| NEBs | Evaluated by independent NRTL test lab to Telcordia GR63, Issue 3 and GR1089-CORE, Issue 5 (including level 3 testing) |
| EMC (Emissions) | FCC and EN 55022, Class B; FCC, Class B; GR1089-CORE, Issue 5 |
| Safety | UL Listed Component as Part of GPS Power System |

# Pulsar Plus Controller



The Pulsar Plus family of controllers provides system monitoring and control features for Infinity, CP, and other power systems. These controllers monitor and control system components including rectifiers, converters, and distribution modules via a multi-drop RS485 digital communications bus. System status, parameters, settings, and alarm thresholds can be viewed and configured from the controller's front panel display. Assignment and configuration of alarm inputs and output relays can be performed from a laptop computer connected to a local RS-232 or Ethernet port, or by remote access is through a network connection to the World Wide Web (internet) or your enterprise network (intranet). An optional modem is also available.

This controller utilizes standard network management protocols allowing for advanced network supervision. GE Energy Galaxy Manager™ software is the centralized visibility and control component of a comprehensive power management system designed to meet engineering, operations and maintenance needs. The Galaxy Manager client-server architecture enables remote access to system controllers across the power network.

## Applications

- Telecommunications networks
- Digital subscriber line (DSL)
- Indoor/outdoor wireless
- Routers/switches
- Fiber in the loop
- Transmission
- Data networks
- PBX

## Key Features

### Remote Access and Features

- Integrated 10/100Base-T Ethernet Network
  - TCP/IP
  - SNMP V2c for management
  - SMTP for email
  - Telnet for command line interface
  - DHCP for plug-n-play
  - FTP for rapid backup and upgrades
  - HTTP for standard web pages and browsers
  - Compatible with Galaxy Manager and other management packages
  - Shielded RJ-45 interface referenced to chassis ground
- Password protected security levels: User, Super-User, Administrator for all access
- Ground-referenced RS232 system port
- ANSI T1.317 command-line interface
- Modem access support
  - Remote via external modem
  - Callback security
- EasyView2, Windows-based GUI software for local terminal or Modem access

### Standard System Features

- Monitor and control of more than 60 connected devices
  - Robust RS485 system bus
- Standard and user defined alarms
  - Alarm test
  - Assignable alarm severity: Critical, Major, Minor, Warning, and record-only
  - 10 alarm relays (7 user assigned)
- Rectifier management features
  - Automatic rectifier restart
  - Active Rectifier Management ARM (energy efficiency)
  - Remote rectifier (on/off)
  - Reserve Operation
  - Automatic rectifier sequence control
  - N + X redundancy check
- Multiple Low Voltage Load and Low Voltage Battery Disconnect thresholds
- Configuration, statistics, and history
  - All stored in non-volatile memory
  - Remote/local backup and restore of configuration data
- Industry standard defaults
  - Customer specific configurations available
- Remote/ local software upgrade
- Basic, busy hour, and trend statistics
- Detailed event history
- User defined events and derived channels

### Standard Battery Management Features

- Float/boost mode control
  - Manual boost
  - Manual timed boost locally, T1.317, and remotely initiated
  - Auto boost terminated by time or current
- Battery discharge testing
  - Manual (local/remote)
  - Periodic
  - Plant Battery Test (PBT) input driven
  - Configurable threshold or 20% algorithm
  - Graphical discharge data
  - Rectifiers on-line during test
- Slope thermal compensation
  - High temperature
  - Low temperature
  - Step temperature
  - STC Enable/Disable, low temperature Enable/Disable
  - Configurable mV/°C slopes
- State of charge indication
- High temperature disconnect setting
- Reserve-time prediction
- Recharge current limit
- Emergency Power-Off input

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## Integrated Monitoring Inputs/Outputs

- System plant voltage (accuracy ±0.04V, resolution 0.01V)
- One system shunt (accuracy ±0.5% full scale, resolution 1A)
  - Battery or load
  - Mounted in the return side of DC bus
- Up to 15 binary inputs
  - Six inputs close/open to battery
  - 9 input close/open to return
  - User assignable
- Up to 7 Form-C output alarms (60VDC @ .5A)
  - User assignable
- 1-Wire™ bus devices
  - Up to 16 temperature probes (QS873)
  - Up to 6 mid-string monitors (ES771)

| General | |
|---|---|
| Operating Voltage | ±24 Vdc, ±48 Vdc (Range: ±18 to ±60 Vdc) |
| Input Power | Less than 7W |
| Operating Temperature Range | -40°C to +75°C (-40 to 167 °F) |
| Operating Relative Humidity | 0 - 95% (non-condensing) |
| Storage Temperature Range | -40°C to +85°C (-40 to 185 °F) |
| Physical Specifications | Sizes vary by packaging option |
| Display | 8-line by 40-character with alarm context sensitive backlit LCD |

## Galaxy Manager Compatible

- Centralized web server and database with multiple user access to live or managed data with drill down to problem details
- Monitor and control of more than 40 connected devices
- Management information from polling or alarms received from alarm traps from multiple sites are available on one screen via the inter/intranet
- Trend user selected data over time
- Automatic or manual report generation
- Standard engineering tools like reserve time calculators and cable voltage drop analyzer

| Safety and Standards Compliance | |
|---|---|
| NEBs | Evaluated by independent NRTL test lab to Telcordia GR63, Issue 3 and GR1089-CORE, Issue 5 |
| Safety | CSA C22.2 No. 60950-1-03 Certified for Canada and U.S.; UL60950-1 1st Ed. |
| RoHS | Compliant to RoHS EU Directive 2002/95/EC RoHS 5/6 |
| EMC | European Directive 2004/108/EC; EN55022, Class A; EN55024; FCC, Class A; GR1089-CORE, Issue 5 |

| Agency Certifications | |
|---|---|
| NEB Level 3 | Evaluated by independent NRTL test lab to Telcordia GR63, Issue 3 and GR1089-CORE, Issue 5 |
| EMC | European Directive 2004/108/EC; EN55022 (CISPR22) Class A; EN55024 (CISPR24) |
| Safety | Underwriters Laboratories (UL) Listed per Subject Letter 1801: Power Distribution Center for Communications Equipment, and cUL Certified (CSA 22.2 950): Safety of Information Technology Equipment |

# GE Energy

## Cabinet Specifications

| Mechanical | |
|---|---|
| Height | 84.0 inches (2,134mm) |
| Width | 23.6 inches (600mm) |
| Depth | 23.6 inches (600mm) |

| Thermal | |
|---|---|
| 12 Rectifiers | 1,368W (4632 BTU/hr) |
| 24 Rectifiers | 2,736W (9264 BTU/hr) |

| Environmental | |
|---|---|
| Operating Temperature Range | 0°C to +45°C (32°F to 113°F) |
| Operating Relative Humidity | < 95% non-condensing |
| Storage Temperature Range | -40°C to +85°C (-40°F to 185°F) |
| EMC | FCC and CISPR22 (EN55022) Class A |
| Immunity | GR1089, EN55024 |

| Agency Certifications | |
|---|---|
| UL | Canada/US UL60950/UL1801 |
| EMI/EMC | CISPR class B conducted and radiated |

# GE Energy

## Outline Drawing

# GE Energy
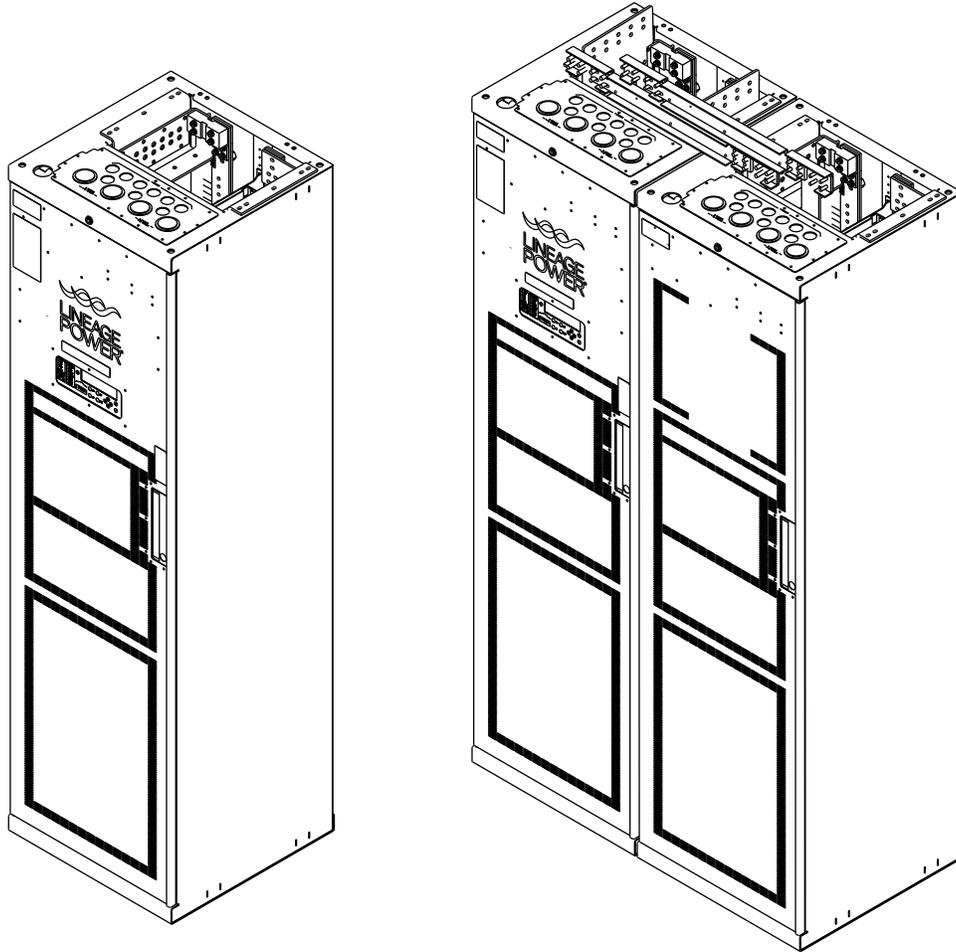
## AC INPUT SPECIFICATIONS

| FOR CODE | NAME PLATE RATING (INPUT CURRENT) | EXTERNAL BREAKER | | CONDUIT QTY & SIZE | WIRE SIZE (BASED ON WIRE RATED 75 C) | GROUND WIRE (BASED ON WIRE RATED 75 C) |
|---|---|---|---|---|---|---|
| | | SIZE | QTY | | | |
| G021 | 1 AC FEED AT 130A, 200 VAC | 150A | (1) 3 POLE | 1 (2") | (3) 1/0 AWG | (1) 6 AWG |
| G022 | 2 AC FEED AT 130A, 200 VAC | 150A | (2) 3 POLE | 2 (2") | (6) 1/0 AWG | (2) 6 AWG |
| G026 | 12 AC FEED AT 15A EACH, 200 VAC | 20A | (12) 2-POLE | 1 (2") | (24) 8 AWG | (1) 8 AWG |
| | 12 AC FEED AT 15A EACH, 200 VAC | 20A | (12) 2-POLE | 2 (1.5") | (24) 8 AWG | (2) 8 AWG |
| | 12 AC FEED AT 15A EACH, 200 VAC | 20A | (12) 2-POLE | 4 (1") | (24) 10 AWG | (4) 10 AWG |
| | 6 AC FEED AT 30A EACH, 200 VAC | 40A | (6) 2-POLE | 2 (1") | (12) 8 AWG | (2) 8 AWG |
| G027 | 24 AC FEED AT 15A EACH, 200 VAC | 20A | (24) 2-POLE | 2 (2") | (48) 8 AWG | (2) 8 AWG |
| | 24 AC FEED AT 15A EACH, 200 VAC | 20A | (24) 2-POLE | 4 (1.5") | (48) 8 AWG | (4) 8 AWG |
| | 24 AC FEED AT 15A EACH, 200 VAC | 20A | (24) 2-POLE | 8 (1") | (48) 10 AWG | (8) 10 AWG |
| | 12 AC FEED AT 30A EACH, 200 VAC | 40A | (12) 2-POLE | 4 (1") | (24) 8 AWG | (4) 8 AWG |
| | 8 AC FEED AT 45A EACH, 200 VAC | 60A | (8) 2-POLE | 2 (1.5") | (16) 4 AWG | (2) 6 AWG |
| G028 | 36 AC FEED AT 15A EACH, 200 VAC | 20A | (36) 2-POLE | 4 (1.5") | (72) 8 AWG | (4) 8 AWG |
| | 36 AC FEED AT 15A EACH, 200 VAC | 20A | (36) 2-POLE | 3 (2") | (72) 8 AWG | (3) 8 AWG |
| | 36 AC FEED AT 15A EACH, 200 VAC | 20A | (36) 2-POLE | 9 (1") | (72) 10 AWG | (9) 10 AWG |
| | 18 AC FEED AT 30A EACH, 200 VAC | 40A | (18) 2-POLE | 3 (2") | (36) 4 AWG | (3) 6 AWG |
| | 12 AC FEED AT 45A EACH, 200 VAC* | 60A | (12) 2-POLE | 4 (1.5") | (24) 4 AWG | (4) 6 AWG |

*Requires (8) CC408641204 AC Strapping Kits

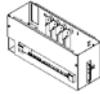# Ordering Information – GPS2436  Infinity Power System

The GPS2436 system can be deployed with capacity of up to 2400 amps in a single cabinet or expanded over multiple cabinets to 3600 amps. Designed for either internal input AC breakers or terminal strip terminations, rectifier shelves can be spread across two bays or concentrated to a single bay. In applications needing additional distribution, two more bays can be added and dedicated exclusively for distribution.
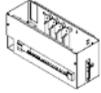
## Key Features

- Medium power applications utilizing single-phase or 3-phase 240Vac input
- Full featured control and monitoring capability
- 2400 Amp charge capacity per bay maximum
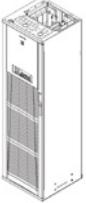- Efficiency approaching 97%

# Step 1: Select the Power Bays

**Note**: Even though all NE based rectifiers utilize single phase input, the GPS bays are designed to accept 3 phase input when the bulk feed (G021 or G022) is selected.

| Output | Ordering Code | Model | AC Input | | Picture |
|---|---|---|---|---|---|
| **+24V** | 150023168 | GPS 2436 Primary Bay, Millennium II controller, bulk feed to **Circuit Breakers 208-240V AC** input for up to 12 NE100 rectifiers, battery shunt. | **240Vac** | | |
| **1200A** | | H5692436G001, G011, G021 | PHS - PHS | (1) 3PH AC Input 12 Circuit Breakers | Vertical Distribution Available 60" |
| **+24V** | CC109167722 | GPS 2436 Primary Bay, Millennium II controller, bulk feed to **Circuit Breakers 208-240V AC** input for up to 24 NE100 rectifiers, battery shunt. | **240Vac** | | |
| **2400A** | | H5692436G001, G011, G022 | PHS - PHS | (2) 3PH AC Inputs 12 Circuit Breakers | Vertical Distribution Available 54" |
| **+24V** | 150023169 | GPS 2436 Primary Bay, Millennium II controller, **terminal strip feed 208-240V AC** input for up to 12 NE100 rectifiers, battery shunt. | **240Vac** | | |
| **1200A** | | H5692436G001, G011, G026 | PHS - PHS or PHS - N | 12 AC Feeds | Vertical Distribution Available 60" |
| **+24V** | CC109167714 | GPS 2436 Primary Bay, Millennium II controller, **terminal strip feed 208-240V AC** input for up to 24 NE100 rectifiers, battery shunt. | **240Vac** | | |
| **2400A** | | H5692436G001, G011, G027 | PHS - PHS or PHS - N | 24 AC Feeds | Vertical Distribution Available 54" |

# Step 1: Select the Power Bays (cont.)

| Output | Ordering Code | Model | | AC Input | | Picture |
|---|---|---|---|---|---|---|
| **+24V** | 150024271 | GPS 2436 Primary Bay, Pulsar controller, Bulk feed to **Circuit Breakers 208-240V AC** input for up to 12 NE100 rectifiers, battery shunt. | | **240Vac** | | |
| **1200A** | | H5692436G001, G012, G021 | | PHS - PHS | (1) 3PH AC Input 12 Circuit Breakers | Vertical Distribution Available 60" |
| **+24V** | 150024270 | GPS 2436 Primary Bay, Pulsar controller, Bulk feed to **Circuit Breakers 208-240V AC** input for up to 24 NE100 rectifiers, battery shunt. | | **240Vac** | | |
| **2400A** | | H5692436G001, G012, G022 | | PHS - PHS | (2) 3PH AC Inputs 12 Circuit Breakers | Vertical Distribution Available 54" |
| **+24V** | 150024272 | GPS 2436 Primary Bay, Pulsar controller, **terminal strip feed 208-240V AC** input for up to 12 NE100 rectifiers, battery shunt. | | **240Vac** | | |
| **1200A** | | H5692436G001, G012, G026 | | PHS - PHS or PHS - N | 12 AC Feeds | Vertical Distribution Available 60" |
| **+24V** | 150024269 | GPS 2436 Primary Bay, Pulsar controller, **terminal strip feed 208-240V AC** input for up to 24 NE100 rectifiers, battery shunt. | | **240Vac** | | |
| **2400A** | | H5692436G001, G012, G027 | | PHS - PHS or PHS - N | 24 AC Feeds | Vertical Distribution Available 54" |

## Step 1: Select the Power Bays (cont.)

| Output | Ordering Code | Model | AC Input | | Picture |
|---|---|---|---|---|---|
| **+24V** | 150023173 | GPS 2436 Secondary Bay, no controller, **terminal strip feed 208-240V AC** input for up to 24 NE100 rectifiers, battery shunt. Use this bay with comcode 150023169 only. Requires External tie bar kit, see step 8. | **240Vac** | | |
| **2400A** | | H5692436, G002, G027 | PHS - PHS or PHS - N | 24 AC Feeds | Vertical Distribution Available 54" |
| **+24V** | 150023172 | GPS 2436 Secondary Bay, no controller, **terminal strip feed 208-240V AC** input for up to 12 NE100 rectifiers, battery shunt. Requires External tie bar kit, see step 8. | **240Vac** | | |
| **1200A** | | H5692436, G002, G026 | PHS - PHS or PHS - N | 12 AC Feeds | Vertical Distribution Available 60" |
| **+24V** | 150023171 | GPS 2436 Secondary Bay, no controller, bulk feed to **Circuit Breakers 208-240V AC** input for up to 24 NE100 rectifiers, battery shunt. Use this bay with comcode 150023168 only. Requires External tie bar kit, see step 8. | **240Vac** | | |
| **2400A** | | H5692436, G002, G022 | PHS - PHS | (2) 3PH AC Inputs 24 Circuit Breakers | Vertical Distribution Available 54" |
| **+24V** | 150023170 | GPS 2436 Secondary Bay, no controller, bulk feed to **Circuit Breakers 208-240V AC** input for up to 12 NE100 rectifiers, battery shunt. Requires External tie bar kit, see step 8. | **240Vac** | | |
| **1200A** | | H5692436, G002, G021 | PHS - PHS | (1) 3PH AC Inputs 12 Circuit Breakers | Vertical Distribution Available 60" |
| | 150023174 | GPS 2436 Centralized Architecture, Secondary Bay, distribution only. Vertical Distribution Space 72.0". No Controller. Can be used with any primary bay selected. Requires External tie bar kit, see step 8. | | Distribution Only Bay | |
| | | H5694827G002 | | | Vertical Distribution Available 72" |

| Additional Kits | | | | |
|---|---|---|---|---|
| | **Ordering Code** | **Model** | | |
| | CC408641204 | Strapping kit to collect rectifier AC input on terminal block. Options allow for 2 or 3 rectifiers per block. | | |

| | **2 Term Block Kits** | **3 Term Block Kits** |
|---|---|---|
| 12 Rectifiers | 3 | 3 |
| 24 Rectifiers | 6 | 5 |

| | **Ordering Code** | **Model** | |
|---|---|---|---|
| | 850019233 | Bus Bar Extender: Used to terminate large battery terminations. Order one set per bay when required | Provides 16 return terminations |

## Step 2: Select Rectifiers

| Output | Ordering Code | Description | Photo |
|---|---|---|---|
| **R ~** | CC109160834 | 95-150Vac input, 24V, 45A output<br>175-275Vac input, 24V, 100A output | |
| **100A** | | NE100AC24ATEZ | |

## Step 3: Select Field Installed Distribution Panels

| North American Breaker Panels | | | | | |
|---|---|---|---|---|---|
| **Ordering Code** | **Group Code** | **Panel Description** | **Vertical Space (in.)** | **Internal Return Bars (Dist Arch Only)** | **Group Code** |
| 108971474 | G43A | 6 Position 125A-800A Circuit Breaker Panel | 12 | 108908070 | G43 |
| 108971318 | G42A | 3 Position 125A-600A Circuit Breaker Panel | 6 | 108908070 | G42 |
| 108971417 | G48B | 5 Position 125A-800A Circuit Breaker Panel | 9 | 108908070 | G48 |
| 108971532 | G96A | 10 Position 3A-100A Bullet Breaker Panel | 6 | 108908104 | G96 |
| 108971680 | G97A | 14 Position 3A-200A Bullet Breaker Panel | 6 | 108908104 | G97 |
| 108987678 | G98B | 22 Position 3A-200A Bullet Breaker Panel | 9 | 108908104 | G98B |
| **North American Fuse Panels** | | | | | |
| 108970872 | G52A | 10 Position 3A-60A TPS Fuse Panel | 6 | 108908070 | G52 |
| 108986746 | G54A | 5 Position 70A-225A TPL-B Fuse Panel | 9 | 108908070 | G54 |
| CC109133113 | G53A | 2 Position 70A-600A TPL Fuse Panel | 6 | 108908104 | G53 |
| 108985235 | | 6 position 1A-15A GMT Fuse Panel | 0 | NA | NA |
| 108908070 | | Return Bus for panels in like shaded lines | | | |
| 108908104 | | Return Bus for panels in like shades lines | | | |

# Step 4: Select Distribution Components

Note:  Plug in, and bolt in distribution components are listed below.
These must be selected to match the distribution panels selected in Step 3.

| Bullet Style Load Circuit Breakers | | | | |
|---|---|---|---|---|
| Ordering # | Amperage | CB Positions (Poles) | Min Wire Gauge | Photo |
| 407998137 | 3 | 1 | 10 | |
| 407998145 | 5 | 1 | 10 | |
| 407998152 | 10 | 1 | 10 | |
| 407998160 | 15 | 1 | 10 | |
| 407998178 | 16 | 1 | 10 | |
| 407998186 | 20 | 1 | 10 | |
| 407998194 | 25 | 1 | 10 | |
| 407998202 | 30 | 1 | 10 | |
| 408213486 | 40 | 1 | 8 | |
| 407998210 | 45 | 1 | 8 | |
| 407998228 | 50 | 1 | 6 | |
| 407998236 | 60 | 1 | 6 | |
| 407998244 | 70 | 1 | 2 | |
| 407998251 | 80 | 1 | 2 | |
| 407998269 | 90 | 1 | 2 | |
| CC848808551 | 100 | 2 | 2 | |
| 408185353 | 125 | 2 | 2 | |
| 408185346 | 150 | 2 | 1/0 | |
| 408564941 | 200 | 3 | 2/0 | |
| 408535752 | 250 | 3 | 4/0 | |
| 848631479 | 2-pole adapter bus kit (includes bus for ¼" hole lug on 5/8" centers and hardware), order one per breaker | | | |
| 848745662 | 3-pole adapter bus kit (includes bus for 5/16" hole lug on 1" centers and hardware), order one per breaker | | | |

# Step 4: Select Distribution Components (cont.)

## Large Circuit Breaker Kits

| Ordering # | Amperage | CB Positions (Poles) | Min Wire Gauge | Photo |
|---|---|---|---|---|
| 108908187 | 125 | 1 | 2 | |
| 108908179 | 150 | 1 | 1/0 | |
| 108908195 | 175 | 1 | 2/0 | |
| 108908203 | 225 | 1 | 4/0 | |
| 108908211 | 300 | 2 | 2 x 4/0 | |
| 108908237 | 400 | 2 | 2 x 4/0 | |
| 108908229 | 500 | 3 | 3 x 4/0 | |
| 108908252 | 600 | 3 | 3 x 4/0 | |
| 108984782 | 800 | 4 | 4 x 4/0 | |

## Large TPL Fuses

| Ordering # | Amperage | Max # wires per position | Min Wire Gauge | Photo |
|---|---|---|---|---|
| 408472322 | 70-250A Fuse Holder Head (only required for 2 Position 70A-600A TPL Fuse Panel) | | | |
| 402328926 | 0.18A Alarm Fuse | | | |
| 406794776 | 70 | 3 | 6 | |
| 408239648 | 80 | 3 | 4 | |
| 406794784 | 100 | 3 | 2 | |
| 406925685 | 125 | 3 | 2 | |
| 406794792 | 150 | 3 | 1/0 | |
| 406794818 | 200 | 3 | 4/0 | |
| 406794982 | 225 | 3 | 4/0 | |
| 406794842 | 250 | 3 | 4/0 | |
| 406794867 | 300 | 3 | 2 x 4/0 | |
| 406794875 | 400 | 3 | 2 x 4/0 | |
| 406794883 | 500 | 3 | 2 x 4/0 | |
| 406794891 | 600 | 3 | 3 x 4/0 | |

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## Step 4: Select Distribution Components (cont.)

| Bullet Style Fuse Holder and TPS Fuses | | | | |
|---|---|---|---|---|
| Ordering # | Amperage | WP-92461 List | Min Wire Gauge | Photo |
| 406700567 | 3 | 100 | 10 | |
| 406700583 | 5 | 101 | 10 | |
| 406700591 | 6 | 102 | 10 | |
| 406700609 | 10 | 103 | 10 | |
| 406700617 | 15 | 104 | 10 | |
| 406700625 | 20 | 105 | 10 | |
| 406700633 | 25 | 106 | 10 | |
| 406700641 | 30 | 107 | 10 | |
| 406700658 | 40 | 108 | 10 | |
| 406700674 | 50 | 109 | 8 | |
| 406700682 | 60 | 110 | 6 | |
| 406700690 | 70 | 111 | 6 | |
| 402328926 | 0.18 Alarm Fuse | | | |
| 408548944 | Bullet Fuse Holder, TFD-101-011-09 (Alarms on Blown Fuse or Fuse Head Removal) | | | |
| CC408617410 | Bullet Fuse Holder, TFD-101-011-10 (Alarms on Blown Fuse Only) | | | |
| **GMT Fuses** | | | | |
| 405006222 | 0.25A | | | |
| 406976894 | 0.5A | | | |
| 405673146 | 1.33A | | | |
| 405181983 | 2A | | | |
| 406976985 | 3A | | | |
| 406159061 | 5A | | | |
| 405725433 | 7.5A | | | |
| 406159236 | 10A | | | |
| 407845197 | 12A | | | |
| 406473959 | 15A | | | |
| 408515823 | Fuse Puller | | | |

# Step 5: Select Remote Peripheral Monitoring Options

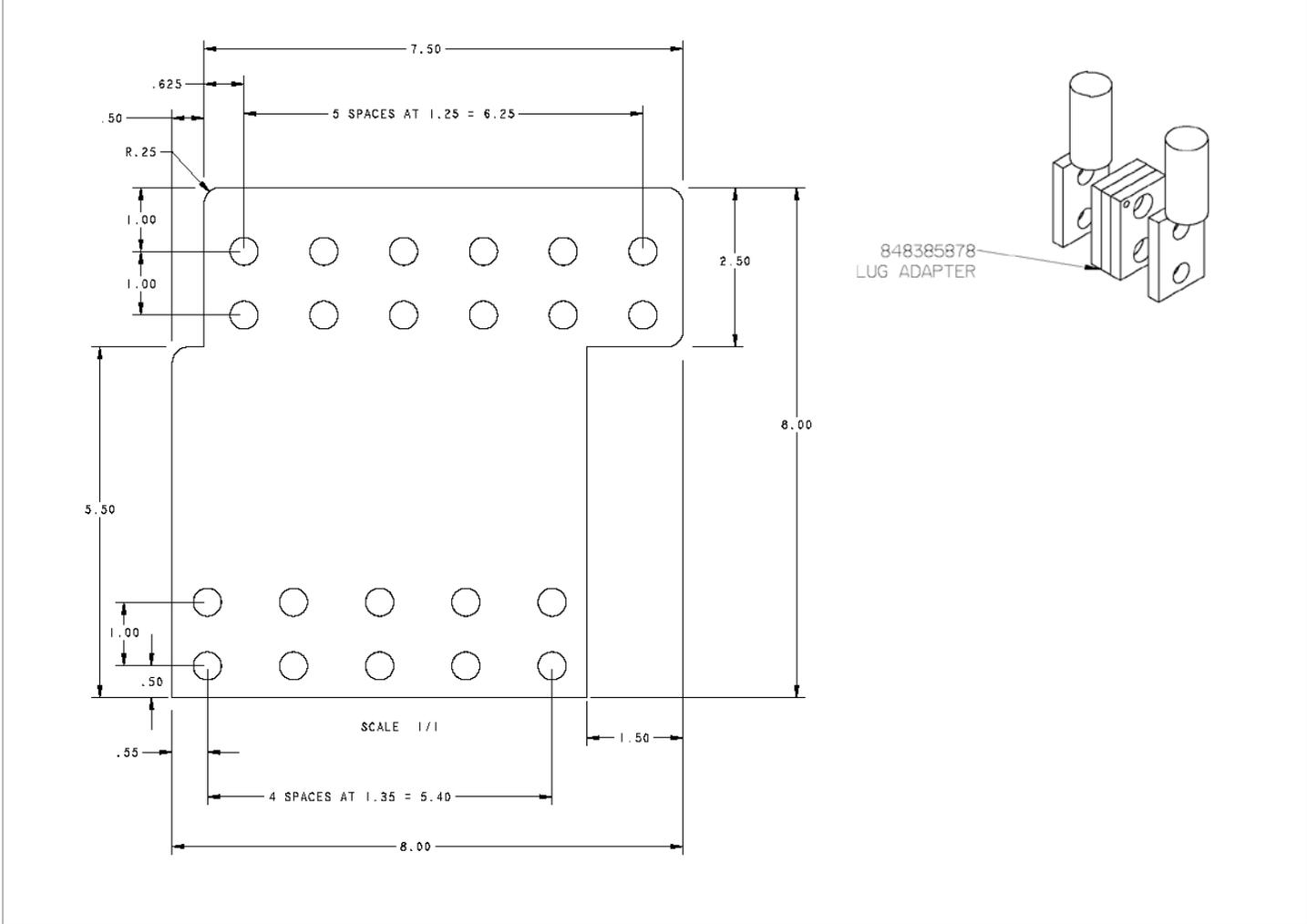| Ordering # | Description | | | Photo |
|---|---|---|---|---|
| | **Modules** | **# Inputs** | **# Temp** | |
| 108469461 | J85501G1L21 RPM Shunt Monitoring (221F) | 6 | 1 | |
| 108469479 | J85501G1L22 RPM Voltage 0-200VDC (221D) | 6 | 1 | |
| 108469495 | J85501G1L23 RPM Transducers (221J) | 6 | 1 | |
| 108298431 | J85501G1L24 RPM Voltage 0-3VDC (221A) | 6 | 1 | |
| 108298498 | J85501G1L25 RPM Voltage 0-16VDC (221B) | 6 | 1 | |
| 108469503 | J85501G1L26 RPM Voltage 0-70VDC (221C) | 6 | 1 | |
| 108298449 | J85501G1L27 RPM Binary (222A) | 6 | 1 | |
| 108483538 | J85501G1L28 RPM Temperature (223T) | 0 | 7 | |
| 108298456 | J85501G1L9  RPM Control Relay (214A) | 3 | 0 | |
| | **Supporting Material** | | | |
| 407377704 | Connecting Cable for RPMs (Order by foot) | | | |
| 848535332 | Blue panel for mounting 6 modules above a GPS cabinet | | | |
| 848412367 | White panel for mounting 6 modules in a 23-inch frame inside GPS bay | | | |
| 847307410 | 12' Cable to be used with Temperature Probes | | | |
| 847917879 | ½" Diameter Ring Terminal Temperature Probe (Cable Required) | | | |
| 848528881 | 5/16" Diameter Ring Terminal Temperature Probe (Cable Required) | | | |
| 405298308 | Termination Resistor (1 per bus) | | | |
| 406712968 | Ferrite Bead (1 per bus) | | | |
| 403607955 | Monitor Channel cable KS13385 22AWG stranded pair, R&Bk (order by the foot) | | | |
| 108984477 | 23" grey panel, 6 RPM mounting panel for Lorain plants | | | |

### Millennium Remote Monitoring
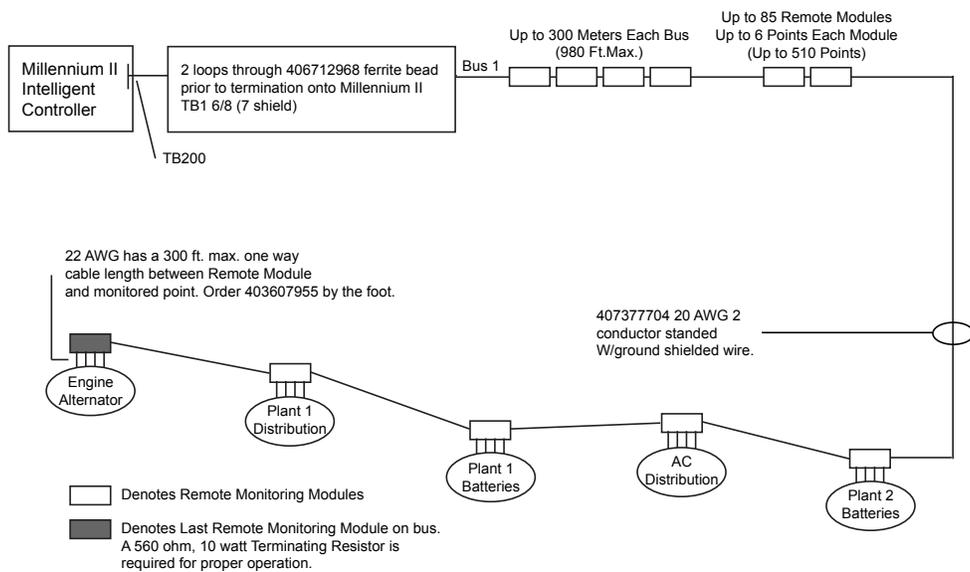
# Step 6: Select Optional AC Monitoring Equipment (Millennium 2 Controller only)

| AC Monitoring Options | | |
|---|---|---|
| Ordering # | Description | Photo |
| **Configured Panels** | | |
| CC408646005 | 3P/3W 208/240V Line to Line, 10x12x14 box provides current, voltage, and power |  |
| CC408646046 | 3P/3W 480V Line to Line, 10x12x14 box provides current, voltage, and power | |
| CC408646054 | 3P/4W 208V Line to Neutral, 10x12x14 box provides current, voltage, and power | |
| **Transducers** | | |
| CC408645808 | 1-phase AC Current Transducer (Built-in CT; 150A max current; 350 kcmil max conductor size) |  |
| CC408645816 | 1-phase AC Voltage Transducer 120V |  |
| CC408645824 | 1-phase AC Voltage Transducer 208/240V | |
| CC408644537 | 3-phase AC Voltage Transducer 208/240V Line to Line |  |
| CC408645741 | 3-phase AC Voltage Transducer 208/240V Line to Neutral (120V) | |
| CC408645832 | 3-phase AC Voltage Transducer 480V Line to Line | |
| CC408645840 | 3-phase AC Current Transducer |  |
| **Current Transformers (Required for configured panels and current transducers)** | | |
| CC408645857 | Current Transformer, 200A primary, 5A secondary, 4 in inside diameter |  |
| 408524862 | Current Transformer, 400A primary, 5A secondary, 4 in inside diameter | |
| CC408645865 | Current Transformer, 600A primary, 5A secondary, 6 in inside diameter | |
| CC408645873 | Current Transformer, 800A primary, 5A secondary, 6 in inside diameter | |
| CC408645881 | Current Transformer, 1000A primary, 5A secondary, 8 in inside diameter | |
| CC408645898 | Current Transformer, 1200A primary, 5A secondary, 8 in inside diameter | |
| **Miscellaneous** | | |
| CC408645907 | Barrier terminal block to extend the CT secondary leads beyond their 12 ft factory length. Use 12 AWG THHN wire in conduit. | |
| CC408645915 | Bud Industries Wall Box (12H x 10W x 8D) w/captive screw cover & internal mounting panel. For mounting transducers | |

## Step 7: Select Battery Termination Options

| Order optional termination bar if standard 8 positions may be exceeded | |
|---|---|
| Ordering # | Description |
| 850019233 | Optional bus bar that provides 16 output terminations.  (one  required per cabinet) |
| 848385878 | Optional adapter that allows two lugs to be stacked and connected at one location. (Provides one adapter) |



848385878
LUG ADAPTER

# Step 8:  Select Optional Return Bus Bars

| Standard Architecture 600mm Bays | |
|---|---|
| **Ordering #** | **Description** |
| CC848805160 | External Return Bus Kit: Option for termination of all distribution return cables. 1 per cabinet, rated at 1800 Amps. The external return bus kit is an alternative to internal return buses when many large cables are required. |
| 150023060 | External Tie Bar Kit: Used when adding supplemental bay(s). 1 per cabinet, rated at 1800 Amps. Used with system not exceeding 12 total rectifier shelves. |
| 150022833 | External Tie Bar Kit: Used when adding supplemental bay(s). 1 per cabinet, rated at 5000 Amps. Used with systems equipped with 13-24 total rectifier shelves. |



22 SETS OF 3/8 HOLES ON I INCH CENTERS FOR 750KCMIL CABLE
7 SETS OF I/4 INCH HOLES ON 5/8 INCH CENTERS

CC848805160 EXTERNAL RETURN BUS KIT FOR MOUNTING ON DISTRIBUTED ARCHITECTURE CABINETS

THIS KIT IS AN ALTERNATIVE TO INTERNAL RETURN BUSES WHEN MANY LARGE CABLES ARE REQUIRED.

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## Notes:
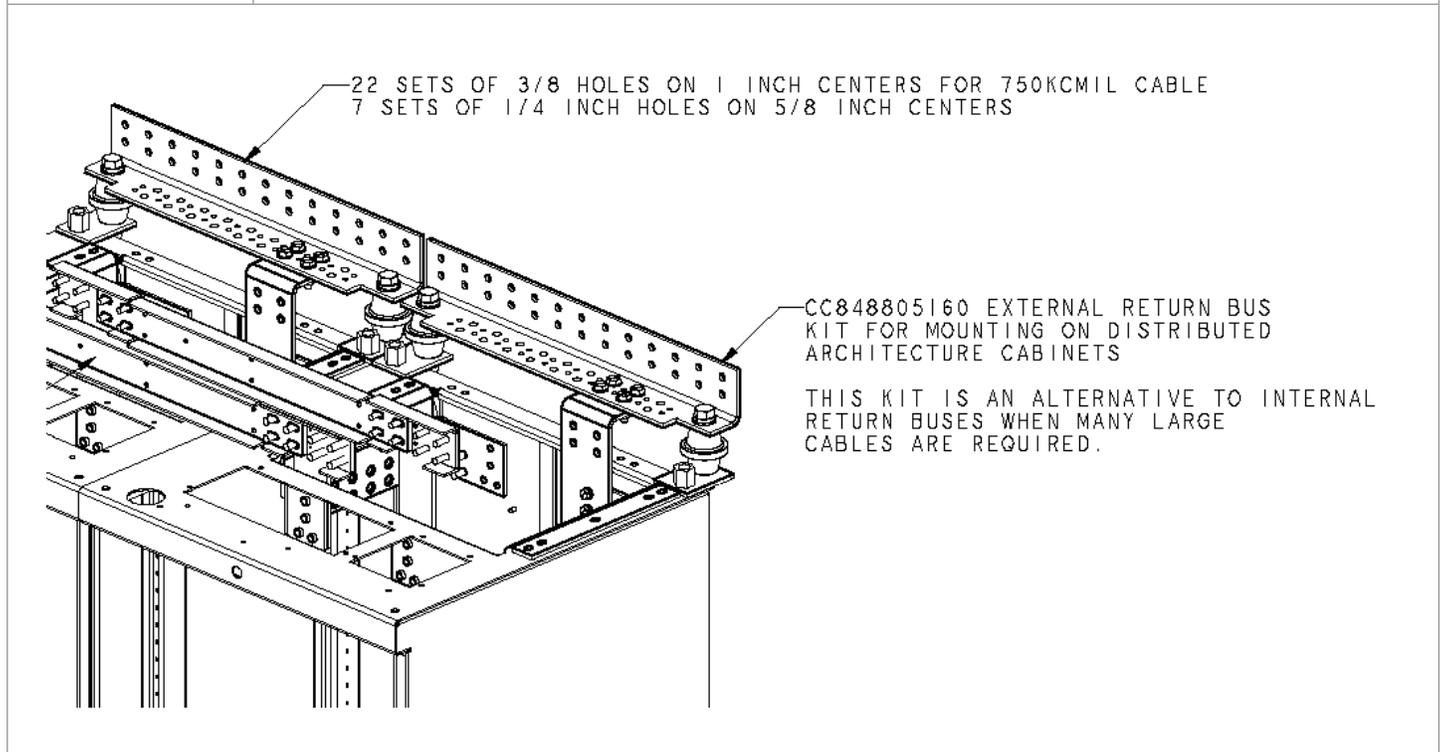
## Management Visibility

Galaxy Manager™ software is the centralized visibility and control component of a comprehensive power management system designed to meet engineering, operations and maintenance needs. The Galaxy Manager client-server architecture enables remote access to system controllers across the power network.

- Dashboard display with one-click access to management information database
- Trend analysis
- Scheduled or on demand reports
- Fault, configuration, asset, and performance management

## Training

GE Energy offers on-site and classroom training options based on certification curriculum.  Technical training can be tailored to individual customer needs.  Training enables customers and partners to more effectively manage and support the power infrastructure. We have built our training program on practical learning objectives that are relevant to specific technologies or infrastructure design objectives.

## Service & Support

GE Energy field service and support personnel are trusted advisors to our customers – always available to answer questions and help with any project, large or small. Our certified professional services team consists of experts in every aspect of power conversion with the resources and experience to handle large turnkey projects along with custom approaches to complex challenges.  Proven systems engineering and installation best practices are designed to safely deliver results that exceed our customers' expectations.

## Warranty

GE Energy is committed to providing quality products and solutions. We have developed a comprehensive warranty that protects you and provides a simple way to get your products repaired or replaced as soon as possible.

For full warranty terms and conditions please go to www.ge.com/powerelectronics.

## Contact Us

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