

## PRODUCT OVERVIEW

The **FORZA1** series is a compact, modular emergency lighting inverter designed to supply emergency back-up for HID fixtures, quartz restrike, fluorescent, incandescent, and low voltage Life Safety products. The **FORZA1** is suitable for outdoor emergency egress lighting, medium size offices, and warehouses. The modular design and low MTTR ensure easy maintenance and field upgradeability.

## STANDARD FEATURES

- PWM/MOSFET Inverter Technology for high efficiency and low THD
- UL924 listed and meets or exceeds the requirements of OSHA for emergency lighting and power. NFPA70, NFPA101, NFPA110, UBC, and SBCCI and New York City approved
- 97% efficient in standby mode means no fan for cooling
- Compatible with HID, fluorescent, incandescent, and electronic low voltage lighting
- Maintenance-free, sealed lead calcium valve regulated lead acid batteries
- Field upgradeable from 500VA to 2000VA by additional battery modules
- Microprocessor controlled, 2x20 character display with touch pad controls front panel interface
- Programmable set points are password controlled with user and service levels.

## MECHANICAL SPECIFICATIONS

- Small footprint. Each unit measures 26"Wx10"Hx10"D
- Floor or wall mountable
- 16AWG steel constructed with powder coat surface
- Modular design allows separation of inverter and battery modules
- Electric knockouts for easy installation
- Breaker and Fuse access panel for easy routine maintenance

## STANDARD ALARMS

- |                    |                     |
|--------------------|---------------------|
| - Output           | - Inverter          |
| - Charger          | - Low Battery       |
| - High Temp        | - Load Reduction    |
| - Overload         | - Overload Shutdown |
| - Near Low Battery | - Low Voltage       |
| - High Voltage     |                     |

## OPTIONS

- Circuit Breaker Trip Alarm
- Normal Off Output
- RS-232
- Summary Alarm Dry Contact
- Extended Runtime
- Remote Meter Panel
- Remote Summary Alarm Panel
- Multiple Voltages

\*Additional enclosures may be required when ordering certain options.

## DIAGNOSTIC FEATURES

- User programmable with password protection for alarms and diagnostics
- Self testing and diagnostic with event, test and alarm logs
- Standard Logs: Alarm log (75), Event log (75), Test log (50)

## ELECTRICAL SPECIFICATIONS

**Rating:** 500-2000VA

**Input:** 120 or 277VAC, 2 wire plus ground, +10/-15%  
60Hz, +/-3 Hz  
1 Hz per second  
Input circuit breaker

**Output:** 120 or 277VAC, 2 wire plus ground  
2.8 = peak/rms current crest factor  
<3% THD for linear load  
60Hz +/- 25% load step change voltage regulation  
Output circuit breaker

**Battery:** Sealed Lead Calcium VRLA  
Battery circuit breaker protection  
String voltage-48VDC for all models

**Environmental:** <10,000 feet without derating  
20 to 30 degrees Celsius  
-20 to 70 degrees Celsius (electronics only)  
<95% (non-condensing)

**Physical:** Electronic Enclosure Dimensions=26"Wx10"Hx10"D  
Weight=77LBS (35kg)  
Battery Enclosure Dimensions=26"Wx10"Hx10"D  
Weight=22LBS (10kg) per module w/o batteries

## PRODUCT OVERVIEW

The **FORZA2** is a central inverter system designed to supply emergency back-up for HID fixtures, with quartz restrike, fluorescent, incandescent and low voltage Life Safety Products. It will support these loads at cold starts for all normally off circuits or regular normally on circuits. With self-diagnostics and over 120 parameters stored for test, event, and data logs, you are assured all NFPA codes are met. The **FORZA2** is also designed to function with the latest T5 & T5HO electronic ballasts. The **FORZA2** eliminates unit equipment in architecturally sensitive applications and reduces maintenance costs of individual testing. All tests and diagnostics are performed and recorded automatically.

## STANDARD FEATURES

- Less than 15 minute MTTR.
- Pure PWM sine wave, less than 3% THD with 0.5 lead and 0.5 lag load capabilities. Microprocessor and crystal controlled.
- UL924 listed and meets or exceeds the requirements of OSHA for emergency lighting and power. NFPA70, NFPA101, NFPA110, UBC, and SBCCI and New York City approved.
- Compatible with HID, fluorescent, incandescent, and electronic low voltage lighting.
- Maintenance-free, sealed lead calcium valve regulated lead acid batteries.
- Selective models are upgradeable. Upgrades must be performed and programmed by authorized factory personnel.
- Self-testing per NFPA & UL standards. Memory logs of over 120 parameters contained in test, event and fault logs.
- Bonded fin heat sink for maximum thermal performance. Fan energized during inverter mode increases reliability and reduces preventative maintenance. No air filters required.

## MECHANICAL SPECIFICATIONS

- System module is housed in a freestanding NEMA 1 enclosure.
- Small footprint (electronics) - up to 4.8kVA 25”(depth) x 30” (width). Dimensions will vary depending on configurations required.
- 14AWG steel constructed with powder coat surface.
- Hinged doors with security locks for easy maintenance.
- Standard battery cabinets are designed to allow stacking to minimize the overall footprint.
- Front access only shall be required for installation, adjustments and expedient servicing
- Maintenance Bypass permits maintenance personnel to easily bypass the inverter and connect to AC power, allowing routine maintenance.

## SYSTEM DISPLAY FUNCTIONS

Meter Functions	Program Functions	Control Functions
AC Voltage Input	Set Date	Test and Event Log (75 logs)
AC Voltage Output	Set Time	Date, Time, Duration
AC current output	Set Month Test Date/Set Month Test Time	Output volt/Current
Battery voltage	Set Yearly Test Date/set Yearly Test Time	Ambient Temp
Battery current	Set Load Fault Reduction Setting	Alarm Log (50 logs)
VA output	Set Low Battery Alarm	Buzzer On/Off
Inverter Watts	Set Near Low Battery Alarm	
Ambient Temperature	Set Low AC Voltage Alarm	
System Days	Set High AC Voltage Alarm	
Inverter Minutes	Set Ambient Temperature Alarm	

## MAINTENANCE CONTRACTS:

A complete offering of preventive and full-service maintenance contracts for both the inverter 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 option will include a unit start-up and site training.

## SYSTEM OPTIONS

**Output Circuit Breaker:** Maximum output breakers available is 12 unsupervised (1-pole), 8 supervised (1-pole).

**Output Trip Alarm:** An audible and visual alarm activates when an output distribution circuit breaker is open or has tripped.

**Fast Charge:** This is a battery charger upgrade which decreases the time to recharge a fully discharged battery bank to a full charge. The recharge time is decreased from the standard 24hr period to a 12hr period.

**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 output trip alarm.

**Auto-Dialer:** Automatically dials up to 4 user-programmable phone numbers upon any alarm conditions. Capable of leaving a user-programmable digital or audible message. A dedicated phone line is required.

## BATTERY OPTIONS

**S-Battery (Sealed Lead-Calcium) (Standard):** A maintenance-free, valve regulated lead calcium battery. Constructed with a rugged polypropylene case. No special room ventilation required. 10-year designed life expectancy.

**G-Battery (Sealed Lead-Calcium):** A maintenance-free, long life, valve regulated lead calcium battery. Constructed with a polypropylene jar, which is installed in a modular steel tray to create its own enclosure. Does not require any special room ventilation. 20-year designed life expectancy.

**N-Battery (Nickel-Cadmium):** A minimum maintenance wet cell requiring addition of distilled water periodically. This battery type provides a wider operating range. Constructed with a translucent, heavy-duty polypropylene case. This case is marked with a high/low line to check electrolyte level. 25-year designed life expectancy.

## ELECTRICAL SPECIFICATIONS

**INPUT: Voltage** - 120 or 277VAC 1-phase 2-wire +10% - 15%. Contact factory for all other voltages.

**Input Power Walk-in** - Limiting inrush current to less than 125%. 10 times for 1 line cycle.

**Input Frequency** - 60Hz, +/- 3%, 50Hz available upon request.

**Synchronizing Slew Rate** - 1Hz per second nominal.

**Protection** - Input Circuit Breaker.

**Harmonic Distortion** - <10%.

**Power Factor** - 0.5 lag/lead.

**OUTPUT: Voltage** - 120 or 277VAC 1-phase 2-wire. Contact factory for all other voltages.

**Static Voltage** - Load current change +/-2%, battery discharge +/-12.5%.

**Dynamic Voltage** - +/-2% for +/-25% load step change, +/-3% for a 50% load step change, recovery within 3 cycles.

**Harmonic Distortion** - <3% THD for linear load.

**Output Frequency** - 60Hz +/- 0.05Hz during emergency mode.

**Load Power Factor** - 0.5 lag to 0.5 load.

**Inverter Overload** -125% for 5 minutes.

**Protection** - Output Circuit Breakers (optional).

**BATTERY: Type** - Valve-regulated sealed lead-calcium.

**Charger** - Microprocessor controlled for various battery types and temperature compensating (recharge per UL924 spec).

**Protection** - Automatic low-battery disconnect, automatic restart upon utility return.

**Disconnect** - Fuse

**Optional Runtimes** - Extended runtimes available. See product selection guide.

\*Battery module may be contained in external cabinet(s) depending on the system VA required.

**CHARGER:** The temp compensated battery charger supplies constant voltage & constant current to batteries.

- Charges batteries within 24hrs maximum with constant trickle charge to maintain batteries at maximum level.
- Provided with an AC input current limiting circuit whereby the maximum input current shall not exceed 125% of full output rating.
- Upon restoration of AC power, the system will automatically restart, performing the normal central system start up.
- Charger shall have an output filter to minimize AC ripple voltage into the battery. Ripple will not exceed 2% RMS.
- 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.

**ENVIRONMENTAL:** **Altitude** - <10,000 feet (above sea level) without de-rating.

**Operating Temperature** - System operates safely from 0° to 40°C (32° to 104°F) up to 95% humidity. UL rating, 20° to 30°C (68° to 86°F), includes battery performance which can be affected by temperature.

Contact factory for details

**Storage Temperature** - (- 20° to 70°C electronics only).

**Relative Humidity** - <95% (non-condensing).

**GENERAL:** **Design** - Stand-by no break. PWM inverter type utilizing IGBT technology with 2Ms transfer time

**Generator Input** - Compatible with generators.

**Control Panel** - Microprocessor controlled 2x20 character display with touch pad controls & functions, 5 LED indicators & alarm.

**Metering** - Input & Output Voltage, Battery & Output Current, Output VA, Temperature, Inverter Wattage.

**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, Output Fault, Optional Circuit Breaker Trip.

**Communications** - RS-232 port (DB9) Programmable monthly and yearly testing (meets NFPA 101, Life Safety Code requirements).

**Manual Maintenance Bypass** - Optional internal or optional external without internal distribution breakers.

**Alarm Contacts** - Optional Summary Form "C" contacts.

**Warranty** - 1 year standard warranty includes all parts, labor, & travel expenses within 48 contiguous states. 10 years prorated warranty on batteries. Extended warranties, preventative maintenance and customized service plans are available.

**Factory Start-Up** - Purchase factory start-up & receive 1 additional year of electronics warranty.

**5 Year Maintenance Plan** - Purchase 5 year maintenance plan & receive free factory start-up.

**5 Year Electronic Warranty** - Purchase 5 year electronic warranty & receive free factory start-up.

**PHYSICAL:** **Cabinet** - Free-standing NEMA 1.

**Cooling** - Forced air, during emergency mode. Convection cooled during normal operation. No filters required.

**Cable Entry** - Top and side.

**Access** - Front only.

## PRODCUT OVERVIEW

The **FORZA3** is a central inverter system designed to supply emergency back-up for HID fixtures, with quartz restrike, fluorescent, incandescent and low voltage Life Safety Products. It will support these loads at cold starts for all normally off circuits or regular normally on circuits. With self-diagnostics and over 120 parameters stored for test, event, and data logs, you are assured all NFPA codes are met. The **FORZA3** is also designed to function with the latest T5 & T5HO electronic ballasts. The **FORZA3** eliminates unit equipment in architecturally sensitive applications and reduces maintenance costs of individual testing. All tests and diagnostics are performed and recorded automatically.

## STANDARD FEATURES

- Less than 15 minute MTTR.
- Pure PWM sine wave, less than 3% THD with 0.5 lead and 0.5 lag load capabilities. Microprocessor and crystal controlled.
- UL924 listed and meets or exceeds the requirements of OSHA for emergency lighting and power. NFPA70, NFPA101, NFPA110, UBC, and SBCCI and New York City approved.
- Compatible with HID, fluorescent, incandescent, and electronic low voltage lighting.
- Maintenance-free, sealed lead calcium valve regulated lead acid batteries.
- Selective models are upgradeable. Upgrades must be performed and programmed by authorized factory personnel
- Self-testing per NFPA & UL standards. Memory logs of over 120 parameters contained in test, event and fault logs.
- Bonded fin heat sink for maximum thermal performance. Fan energized during inverter mode increases reliability and reduces preventative maintenance. No air filters required.

## MECHANICAL SPECIFICATIONS

- System module is housed in a freestanding NEMA 1 enclosure.
- Small footprint (electronics) - 4.8kVA-16.7kVA:25" (depth) x 30" (width) 24kVA-50kVA: 31" (depth) x 44" (width).
- 14AWG steel constructed with powder coat surface.
- Hinged doors with security locks for easy maintenance.
- Battery cabinets are designed to allow stacking to minimize the overall footprint.
- Front access only shall be required for installation, adjustments and expedient servicing.
- All components shall have a modular design and quick disconnect means to facilitate field service.
- Maintenance Bypass permits maintenance personnel to easily bypass the inverter and connect to AC power, allowing routine maintenance.

## SYSTEM DISPLAY FUNCTIONS

Meter Functions	Program Functions	Control Functions
AC Voltage Input	Set Date	Test and Event Log (75 logs)
AC Voltage Output	Set Time	Date, Time, Duration
AC current output	Set Month Test Date/Set Month Test Time	Output volt/Current
Battery voltage	Set Yearly Test Date/set Yearly Test Time	Ambient Temp
Battery current	Set Load Fault Reduction Setting	Alarm Log (50 logs)
VA output	Set Low Battery Alarm	Buzzer On/Off
Inverter Watts	Set Near Low Battery Alarm	
Ambient Temperature	Set Low AC Voltage Alarm	
System Days	Set High AC Voltage Alarm	
Inverter Minutes	Set Ambient Temperature Alarm	

## SYSTEM OPTIONS

**Output Circuit Breaker:** Maximum output breakers available: 4.8k up to 16.7k systems - 12 unsupervised (1-pole), 9 supervised (1-pole). 24k up to 50k systems - 24 unsupervised (1-pole), 16 supervised (1-pole). Combinations of 1, 2 and 3 pole breakers available (consult factory).

**Output Trip Alarm:** An audible and visual alarm activates when an output distribution circuit breaker is open or has tripped.

**Fast Charge:** This is a battery charger upgrade which decreases the time to recharge a fully discharged battery bank to a full charge. The recharge time is decreased from the standard 24hr period to a 12hr period.

**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 output trip alarm.

**Auto-Dialer:** Automatically dials up to 4 user-programmable phone numbers upon any alarm conditions. Capable of leaving a user-programmable digital or audible message. A dedicated phone line is required

## BATTERY OPTIONS

**S-Battery (Sealed Lead-Calcium) (Standard):** A maintenance-free, valve regulated lead calcium battery. Constructed with a rugged polypropylene case. No special room ventilation required. 10-year designed life expectancy.

**G-Battery (Sealed Lead-Calcium):** A maintenance-free, long life, valve regulated lead calcium battery. Constructed with a polypropylene jar, which is installed in a modular steel tray to create its own enclosure. Does not require any special room ventilation. 20-year designed life expectancy.

**N-Battery (Nickel-Cadmium):** A minimum maintenance wet cell requiring addition of distilled water periodically. This battery type provides a wider operating range. Constructed with a translucent, heavy-duty polypropylene case. This case is marked with a high/low line to check electrolyte level. 25-year designed life expectancy.

## ELECTRICAL SPECIFICATIONS

**INPUT: Voltage** - 120/208 or 277/480VAC 3-phase 4-wire +10%-15% (Wye configuration).

**Input Power Walk-in** - Limiting inrush current to less than 125%. 10 times for 1 line cycle.

**Input Frequency** - 60Hz, +/- 3%.

**Synchronizing Slew Rate** - 1Hz per second nominal.

**Protection** - Input Circuit Breaker.

**Harmonic Distortion** - <10%.

**Power Factor** - 0.5 lag/lead.

**OUTPUT: Voltage** - 120/208 or 277/480VAC 3-phase 4 wire. (Wye or Delta configuration).

**Static Voltage** - Load current change +/-4%, battery discharge +/-4%.

**Dynamic Voltage** - +/-3% for +/-25% load step change, +/-6% for a 50% load step change, recovery within 3 cycles.

**Harmonic Distortion** - <3% THD for linear load.

**Output Frequency** - 60Hz +/- 0.05Hz during emergency mode.

**Load Power Factor** - 0.5 lag to 0.5 lead.

**Inverter Overload** - 115% for 5 minutes, 125% for 12 line cycles.

**Protection** - Output Circuit Breaker (optional).

**BATTERY: Type** - Valve-regulated sealed lead-calcium..

**Charger** - Microprocessor controlled for various battery types and temperature compensating (recharge per UL924 spec).

**Protection** - Automatic low-battery disconnect, automatic restart upon utility return.

**Disconnect** - Fuse (4.8 - 16.7kVA) and fuse/circuit breaker 24kVA and above.

**Optional Runtimes** - Extended runtimes available.

\*Battery module may be contained in external cabinet(s) depending on the system VA required.

**CHARGER:** The temp compensated battery charger supplies constant voltage & constant current to batteries.

- Charges batteries within 24hrs maximum with constant trickle charge to maintain batteries at maximum level.
- Provided with an AC input current limiting circuit whereby the maximum input current shall not exceed 125% of full output rating.
- Upon restoration of AC power, the system will automatically restart, performing the normal central system start up.
- Charger shall have an output filter to minimize AC ripple voltage into the battery. Ripple will not exceed 2% RMS.
- 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.

**ENVIRONMENTAL: Altitude** - <10,000 feet (above sea level) without de-rating.

**Operating Temperature** - 20° to 30°C.

**Storage Temperature** - (- 20° to 70°C electronics only).

**Relative Humidity** - <95% (non-condensing).

**GENERAL: Design** - Stand-by UPS, PWM inverter type utilizing IGBT technology with 2Ms transfer time.

**Generator Input** - Compatible with generators.

**Control Panel** - Microprocessor controlled 2x20 character display with touch pad controls & functions, 5 LED indicators & alarm.

**Metering** - Input & Output Voltage, Battery & Output Current, Output VA, Temperature, Inverter Wattage.

**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, Output Fault, Optional Circuit Breaker Trip.

**Communications** - RS-232 port (DB9) Programmable monthly and yearly testing (meets NFPA 101, Life Safety Code requirements).

**Manual Maintenance Bypass** - Standard (Internal).

**Alarm Contacts** - Optional Summary Form "C" contacts.

**Warranty** - 1 year standard warranty includes all parts, labor, & travel expenses within 48 contiguous states. 10 years pro-rated warranty on batteries. Extended warranties, preventative maintenance and customized service plans are available.

**Factory Start-Up** - Purchase factory start-up & receive 1 additional year of electronics warranty.

**5 Year Maintenance Plan** - Purchase 5 year maintenance plan & receive free factory start-up.

**5 Year Electronic Warranty** - Purchase 5 year electronic warranty & receive free factory start-up.

**PHYSICAL: Cabinet** - Free-standing NEMA 1.

**Cooling** - Forced air, during emergency mode. Convection cooled during normal operation. No filters required.

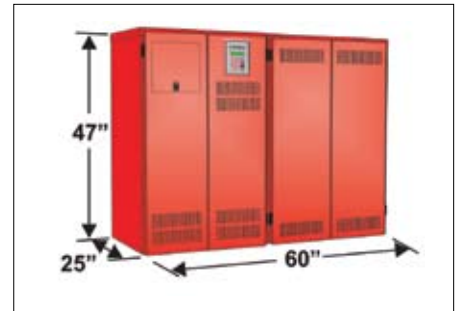
**Cable Entry** - Top and side on 4.8kVA - 16.7kVA; side only on 24kVA - 50kVA.

**Access** - Front only.

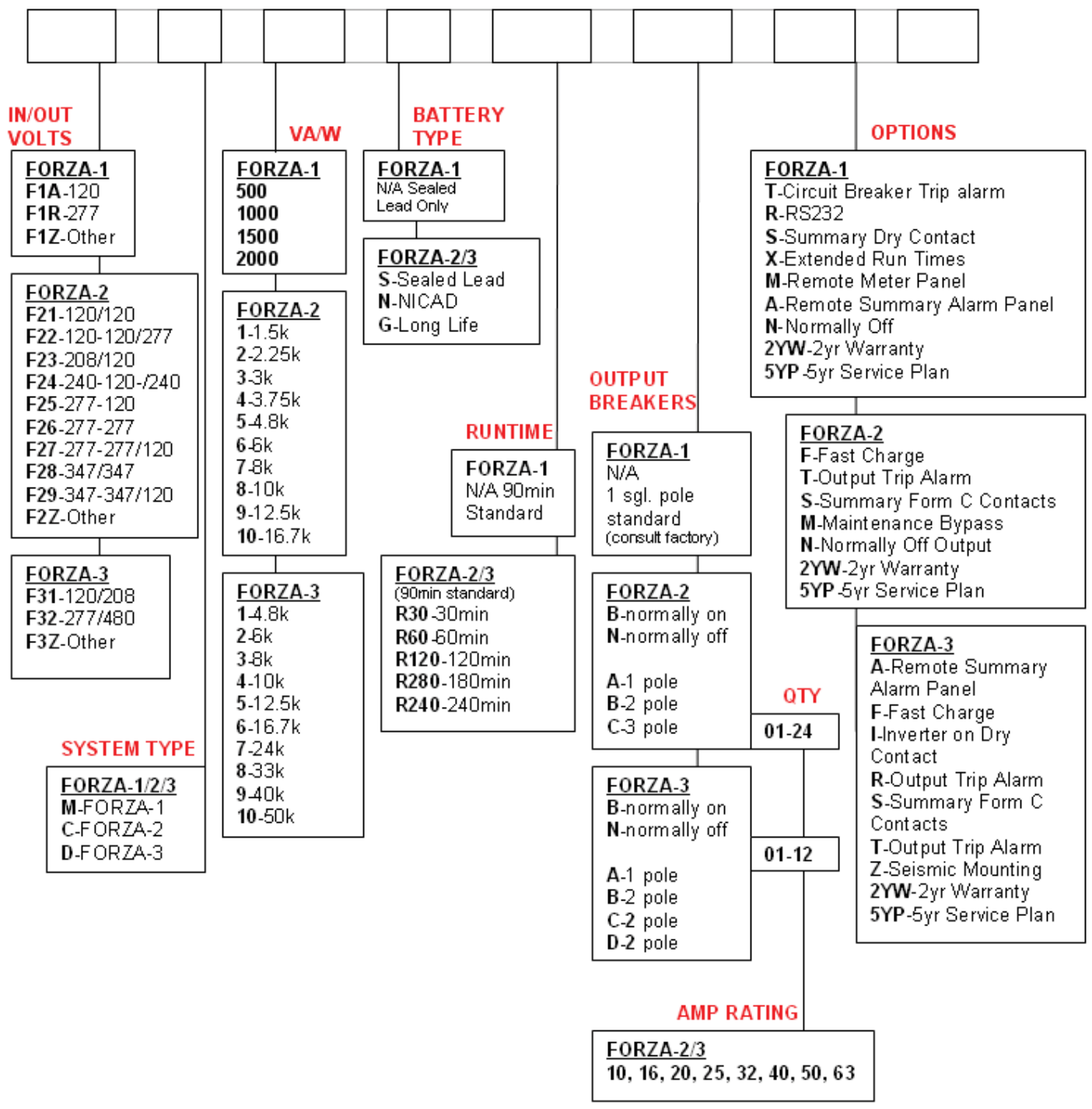
# DIMENSIONS

## STANDARD SYSTEM CONFIGURATIONS FOR 90 MINUTE BATTERIES

Series	Model Size	System Dimensions (standard)	Qty	Total System Weight (LBS)
<b>FORZA-1</b>	500W/VA	26"W x 10"H x 10"D	1	206
	1000W/VA	26"W x 10"H x 10"D	2	335
	1500W/VA	26"W x 10"H x 10"D	3	464
	2000W/VA	26"W x 10"H x 10"D	4	592
<b>FORZA-2</b>	1500W/VA	30"W x 47"H x 25"D	1	511
	2250W/VA	30"W x 47"H x 25"D	1	674
	3000W/VA	30"W x 47"H x 25"D	1	827
	3750W/VA	30"W x 47"H x 25"D	1	980
	4800W/VA	30"W x 47"H x 25"D	1	1168
	6000W/VA	60"W x 47"H x 25"D	2	1560
	8000W/VA	60"W x 47"H x 25"D	2	1965
	10000W/VA	60"W x 94"H x 25"D	3	2516
	12500W/VA	60"W x 94"H x 25"D	3	2980
	16700W/VA	60"W x 94"H x 25"D	3	3790
<b>FORZA-3</b>	4800W/VA	60"W x 47"H x 25"D	2	1633
	6000W/VA	60"W x 47"H x 25"D	2	1855
	8000W/VA	60"W x 47"H x 25"D	2	2247
	10000W/VA	60"W x 94"H x 25"D	3	2835
	12500W/VA	60"W x 94"H x 25"D	3	3279
	16700W/VA	60"W x 94"H x 25"D	3	4063
	24000W/VA	92"W x 72"H x 31"D	2	6390
	33000W/VA	140"W x 72"H x 31"D	3	8630
	40000W/VA	140"W x 72"H x 31"D	3	10,150
	50000W/VA	140"W x 72"H x 31"D	3	11,980



**EXAMPLE - F21-C-6-S-BA0720-F-M-N-2YW**



Please consult factory for more information