



# SCUDO-EM SINGLE PHASE INVERTER

Distributed by BeLuce

cUL listed to CSA C22.2 No. 141-15

Project Name: \_\_\_\_\_

Model Number: \_\_\_\_\_

Prepared By: \_\_\_\_\_

Date: \_\_\_\_\_



## ORDERING GUIDE

SCU-EM - - - - -

SERIES	INPUT	OUTPUT <sup>1</sup>	OUTPUT (KVA/KW)	BATTERY	RUNTIME	OPTIONS (REFERENCE PAGE 5 OPTIONS MATRIX)	
SCU-EM	A = 120 H = 208 J = 240 B = 277 C = 347	A = 120 E = 120/277 K = 120/240 B = 277 L = 277/120 P = 120/208 C = 347	1 kW 1.6 kW 2.2 kW 2.8 kW	S (Standard - VRLA)	C (30 min) D (60 min) S (90 min) E (120 min)	<b>Output Breakers<sup>2</sup></b>  <b>Output:</b> B - Normally On N <sup>7</sup> - Normally Off  <b>Voltage/Poles:</b> A - 120V, 1-Pole H - 208V, 2-Poles J - 240V, 2-Poles B - 277V, 1-Pole C - 347V O - Other  <b>Amp Rating:</b> 15, 20, 25, 30, 35  <b>*Quantity<sup>2</sup>:</b> 01 - 10 (Qty Must Be Specified)  <b>Warranty &amp; On-Site Services<sup>8</sup>:</b> 2YW - Start Up & Same Day Training 2YWT - Start Up, Same Day Training and Full Run Test 5YP - 5-Year Preventative Maintenance Plan 5YW- 5-Year Extended Electronics Warranty TR - Training On Day Other Than Start Up Date	A - Remote Summary Alarm Panel BAT <sup>9</sup> - batteries and units are shipped together (uninstalled) or separately (3 months or 6 months) BL - Circuit Breaker Lock(s) BTM - Battery Temperature Monitor *C - Status Monitoring Contacts Dry Form C *DT - Drip Top (NEMA 2) EB - External Bypass, input/ output voltage must match and output breakers are limited to (1) only F - Fast Charge I - Inverter On Dry Form C Contact L - Load Control Relay M <sup>3</sup> - Internal Maintenance Bypass M(BBM) <sup>6</sup> - Internal Maintenance Bypass "Break Before Make" O - Output Transfer Delay P <sup>7</sup> - Remote Status Panel (Status Alarms, Requires C Option) S - Summary Fault Form C Contacts *T <sup>2</sup> - Output Trip Alarm (Qty Must Be Specified) V <sup>4</sup> - Time Delay 15 Minutes Y - Battery Strapping ZM - Zone Monitoring (Quantity Must Be Specified) <b>PICK 1:</b> SEA - Serial to Ethernet Adapter BAC - BACnet Communications (MSTP) BIP - BACnet IP IoT - Inverter Connection Cloud Communication (Avail. 2024) MIP - Modbus TCP/IP MOD - Modbus RTU <b>MOUNTING OPTIONS PICK 1:</b> (BLANK) - Standard Wall FM - Floor Mount Bracket (Adds 4" to total system height) W - Wall Mount Brackets Z - Seismic / Raised Floor (Adds 4" to total system height) <b>ACCESSORIES</b> EMBP <sup>5</sup> - External Maintenance Bypass Switch SPARES - Spare Parts Kit SPAREF - Spare Fuse Kit

NOTE: <sup>1</sup>These items are mandatory in order configuration. <sup>2</sup>Only single-phase voltages available. <sup>3</sup>Unless specified, a single output breaker will be supplied with each unit and the current rating will vary based on the output power and voltage rating of the unit; Maximum specified output breakers: 6 supervised; A 2-pole breaker occupies 2 positions. <sup>4</sup>Maintenance bypass switch is a "make before break". <sup>5</sup>15-minute retransfer time delay of normally off circuit after return of utility. <sup>6</sup>Enclosure height may increase. <sup>7</sup>Maintenance Bypass is "break before make". <sup>8</sup>Remote Status Panel requires "C" Option (Status Monitoring Dry Form C Contacts Alarm Panel). <sup>9</sup>Warranty is 1yr standard includes all parts for electronics; Batteries are 1yr full, 9yrs prorated. <sup>10</sup>If batteries are shipped separately additional charges will apply.

# SCUDO-EM SINGLE PHASE INVERTER

The SCUDO-EM series inverters provide direct AC power and full illumination to all lighting sources. These units are a line interactive, single-phase, solid-state interruptible\* power supply source. With industry-leading efficiencies, they run cool and reduce the overall operating costs of emergency lighting systems. The small cabinet, with wall or floor mount capabilities, allows clients to install the system virtually anywhere in the building with minimal space requirements. All SCUDO-EM lighting inverters perform and log the monthly and yearly tests as required by the building codes, and the intelligent front meter panel allows easy access to this information. In addition, this front meter panel displays system status and allows for real time diagnostics of the system's electronics.

## FEATURES

- 98% Efficient (Typical)
- 65KAIC Input Rating
- NFPA 101 Self Testing and Data Logging
- User Programmable with Password Protection
- Automatic Event, Test and Alarm Log
- Compatible with all lighting loads including HID/LED
- Input Circuit Breaker
- One Output Circuit Breaker
- Wall Hung Units (No Mounting Brackets)
- RS-232 Communication Port
- \*2 milliseconds(ms) Transfer Time

## SAFETY

- cUL listed to CSA C22.2 No. 141-15

## SPECIFICATION

- Input Voltage: 120, 208, 240, 277 or 347VAC 1 Phase 2 Wire Plus Ground
- Output Voltage: 120, 120/208, 120/240, 120/277, 277, 277/120 or 347VAC 1 Phase 2 Wire Plus Ground
- Output Load Power Factor 0.5 Lag to 0.5 Lead
- Output Distortion Less than 3% THD for Linear Loads
- Forced Air Cooling Only During Emergency Operation; No Filters Required
- Electronic and Magnetic Ballast Compatible
- Generator Compatibility
- 30, 60, 90 or 120 Minute Runtime Available

## AUDIBLE ALARM

The SCUDO-EM audible alarm will activate with any of the following conditions and automatically store the 75 most recent events:

- High battery charger voltage
- Charger Fault
- 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
- Output overload shutdown
- System test failure

## OPTIONAL FEATURES

- Enhanced Communications
  - Expanded Building Management Protocols
  - BACnet or Modbus Communications Interface
  - IoT Connect Cloud Software (Available 2024)
- Internal or External Maintenance Bypass
- Summary Form C Contacts
- Status Monitoring Contacts
- Output Circuit Breakers
- Normally Off Output with Variable Time Delay
- Output Trip Alarms
- Remote Summary Alarm Panel
- Wall Brackets, Floor, or Seismic Mounting

## APPLICATIONS

- Airports Terminals
- Apartment / Condominium Complexes
- Arenas / Stadiums
- Assisted Living Centers & Nursing Homes
- Casinos / Resorts
- Correctional Facilities
- Financial Institutions
- Government Buildings / Public Address Systems
- Hospitals / Clinics
- Hotels / Motels
- Industrial & Commercial Spaces
- Institutional
- Office Buildings
- Parking Structures / Garages
- Race Tracks
- Religious Facilities
- Restaurants
- Retail Department Stores & Malls
- Subways / Mass Transit Stations
- Theaters

## BATTERIES

Batteries do not come pre-installed. They can be shipped together with the unit(s) or shipped separately at a later date (3 or 6 months) with additional charges.

# SCUDO-EM SINGLE PHASE INVERTER

## MONITORING AND CONTROL

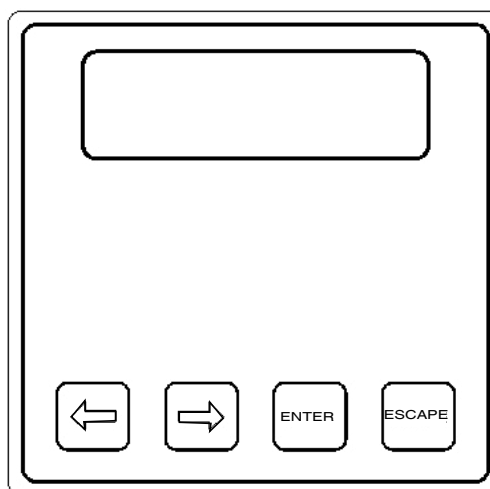
The SCUDO-EM provides operation monitoring and control, audible alarms, and diagnostics. The front-mounted control panel includes a 4-line by 20-character OLED display and a keypad for user interface. The display will be menu driven. The system will have a continuous scrolling display of the following: Date & time, System Status (AC Status, Battery Status, Charger Status), and any system faults. 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.

## METER FUNCTIONS

- AC Voltage Input
- AC Voltage Output
- AC Current Output
- Battery Voltage
- System Days
- Battery Current
- VA Output
- Inverter Watts
- Ambient Temperature
- Inverter Minutes

## CONTROL FUNCTIONS

- Test Log & Event Log
  - 75 Logs Stored
  - Date, Time, Duration
  - Output Voltage
  - Output Current
  - Ambient Temperature
  - Alarms Preset
- Alarm Log
  - 75 Logs Stored
  - Date, Time, Alarm Type
  - Test
  - Buzzer On/Off



## PROGRAM FUNCTIONS

- Date
- Time
- Month Test Date / Time
- Yearly Test Date / Time
- Load Fault Reduction Setting
- Low Battery Alarm
- Near Low Battery Alarm
- Low AC Voltage Alarm
- High AC Voltage Alarm
- Ambient Temperature Alarm

## MANUAL AND PROGRAMMABLE TESTING

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

# SCUDO-EM SINGLE PHASE INVERTER

GENERAL SPECIFICATIONS		
<b>INPUT</b>	Voltage Input Power Walk-in Input Frequency Synchronizing Slew Rate Protection Harmonic Distortion Power Factor	120, 208, 240, 277 or 347VAC 1-phase 2-wire +10%-15% Walk-in limiting inrush current to less than 125%, 10 times for 1 line cycle 60Hz, +/- 3%, 50Hz Available upon request 1Hz per second nominal Fuse & Circuit Breaker <10% 0.5 lag/lead
<b>OUTPUT</b>	Voltage Static Voltage Dynamic Voltage Harmonic Distortion Overload Output Frequency Load Power Factor Inverter Overload Protection	120, 120/208, 120/240, 120/277, 277, 277/120 or 347VAC 1-phase 2-wire Load current change +/-2%, battery discharge +/-12.5% +/- 2% for +/-25% load step change, +/-3% for a 50% load step change, recovery within 3 cycles < 3% THD for linear load Circuit Breaker protected 60Hz +/-0.05Hz during emergency mode 0.5 lag to 0.5 lead 115% for 10 minutes Optional Distribution Circuit Breakers
<b>BATTERY</b>	Type Charger Protection Disconnect	Valve-regulated lead-acid (VRLA) Microprocessor controlled for various battery types and temperature compensating (recharge per UL924 spec) Automatic low-battery disconnect; automatic restart upon utility return Circuit Breaker
<b>ENVIRONMENTAL</b>	Altitude Operating Temperature  Storage Temperature Relative Humidity	<10,000 feet (above sea level) without derating Inverter: 0°C to 40°C Battery: 20°C to 30°C -20°C to 70°C (electronics only) <95% (non-condensing)
<b>GENERAL</b>	Design Generator Input Control Panel  Metering Alarms  Communications Manual Maintenance Bypass Alarm Contacts Warranty	Line Interactive stand-by IPS, PWM inverter type utilizing IGBT technology with 2ms transfer time Compatible with generators Microprocessor controlled 4 x 20-character vacuum fluorescent display with touch pad controls/functions & scrolling system status Input & Output Voltage, Battery Voltage, Battery & Output Current, Output VA, Temperature, Inverter Wattage 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 RS-232 port (DB9). Optional E-mail/fax modem Optional Internal or optional external without internal distribution breakers Optional Summary Form "C" Contacts 1 year standard warranty and up to 9 years prorated warranty on batteries
<b>PHYSICAL</b>	Cabinet Cooling Cable Entry Access	Freestanding NEMA Type 1 Forced Air, during emergency mode Bottom, Top or Side Front

# SCUDO-EM SINGLE PHASE INVERTER

## OPTIONS MATRIX

Option Code	Option Name	Description
A	Remote Summary Alarm Panel	LED indicator and Sound alert
BAT	Battery Shipment	Batteries do not come pre-installed. They can be shipped together with the unit(s) or shipped separately at a later date (3 or 6 months) with additional charges.
BTM	Battery Temperature Monitor	1. Warning alarm: warns when the battery temperature is getting too high 2. Absolute alarm: when the temperature reaches high temp this shuts down the string of batteries where the hot battery is.
BL	Output Circuit Breaker lock(s)	Allows customer to lock OCB in on or off position
C	Status Monitoring Contacts	5 form C dry contacts: 1. System in Bypass 2. Summary Alarm: any alarm in the FMP 3. Output trip alarm 4. Utility failure 5. Inverter on
DT	Drip Top (NEMA 2)	A metal piece designed to direct falling water away from the unit
EB	External Bypass	Input/ output voltage must match and output breakers are limited to (1) only
FM	Floor Mount Bracket (add 4" to height of system)	Allows client to get the EM off the floor
F	Fast Charge	Allows the system to recharge in 12 hours from LVD
I	Inverter on Dry Form C Contact	Form C dry contact which opens when the inverter is on
L	Load Control Relay Dimmer or Bypass Switch	Equal to an LVS EPC-2-D
M	Internal Maintenance Bypass	Toggle switch designed to disconnect inverter from the electrical system for maintenance (Make before break)
M(BBM)	Internal Maintenance Bypass Break Before Make	Same as above except break before make
O	Output Transfer Delay	A device designed to delay transfer adjustable 0-7.5 seconds, factory set at 3 seconds. Used when the control system cannot detect the fast transfer
P	Remote Status Panel (Status alarms, Requires C Option)	Single gang box showing the status of alarms requires a C option
S	Summary Fault Form C contacts	Relay contact showing any alarm
SEA	Serial to Ethernet Adapter	RS232 to Ethernet adapter
T	Output Trip Alarm (Qty Must Be Specified)	Alarms when any OCB is tripped, must be specified to the output breaker qty
V	Time Delay 15 minutes	Delays transfer back to utility power for up to 15 minutes, not used much anymore mostly for HID
W	Wall Mount Bracket	Bracket for mounting system on the wall
Z	Seismic Mounting	Instructions and hardware for mounting systems in standard seismic applications
Y	Battery Strapping	Strapping of the batteries to stop movement
ZM	Zone Monitoring (Qty must be specified)	3 zones max, used to monitor other phases in 3 phase utility system or to monitor external CB panels. Not necessary with normally on OCB's.
BAC	BACnet Communications	"MSTP" allow the upload of FMP data via an RS232 intermediate device. This info can then be downloaded to the customer's device.
BIP	BACnet IP	Same as above except allows direct communication via IP
IOT	IOT inverter Connect Cloud communication	A system using the Cloud to allow monitoring of multiple systems in one location. (Available 2024)
MIP	Modbus TCP/IP	Same as BACnet IP
MOD	Modbus RTU	Same as BACnet MSTP
2YW	Startup & Same day training	Factory start-up which extends electronics warranty by an additional year
2YWT	Startup & Same day training and full run test	Same as 2YW. Includes full load test using customer load or load bank
5YP	5-Year Service Plan	Annual (once or twice) visit to perform preventative maintenance
5YW	5-Year Extended Electronics Warranty	Same as 2YW except extend the electronics warranty and additional 3 years (5 total)
TR	Training (if required on separate day)	Only used if required by the owner
EMBP	External Maintenance bypass switch	Maintenance bypass switch mounted external to the system. Can not use with OCB's
SPARES	Spare parts kit	Complete parts kits including PC boards
SPAREF	Spare fuses	Spare fuses only

# SCUDO-EM SINGLE PHASE INVERTER

## DIMENSIONS

30 MIN									
POWER RATING (KW)	VOLTAGE IN-OUT (VAC)	HEAT LOSS (BTU)	ELECTRONICS CABINET DIMENSIONS				BATTERIES		TOTAL SYSTEM WEIGHT
			WIDTH (MM)	HEIGHT (MM)	DEPTH (MM)	WEIGHT (LBS)	NO. OF BATTERIES	WEIGHT (LBS)	
1.00	120 or 277	68	615.95	698.5	266.7	121	4	93	214
1.00	347	68	615.95	1098.55	266.7	199	4	93	292
1.60	120 or 277	109	615.95	1098.55	266.7	165	6	139	304
1.60	347	109	615.95	1397	266.7	237	6	139	376
2.20	120 or 277	150	615.95	1098.55	266.7	171	8	186	357
2.20	347	150	615.95	1397	266.7	237	8	186	423
2.80	120 or 277	191	615.95	1397	266.7	203	10	232	435
2.80	347	191	615.95	1797.05	266.7	281	10	232	513

60 MIN									
POWER RATING (KW)	VOLTAGE IN-OUT (VAC)	HEAT LOSS (BTU)	ELECTRONICS CABINET DIMENSIONS				BATTERIES		TOTAL SYSTEM WEIGHT
			WIDTH (MM)	HEIGHT (MM)	DEPTH (MM)	WEIGHT (LBS)	NO. OF BATTERIES	WEIGHT (LBS)	
1.00	120 or 277	68	615.95	698.5	266.7	121	4	146	267
1.00	347	68	615.95	1098.55	266.7	199	4	146	345
1.60	120 or 277	109	615.95	1098.55	266.7	165	6	218	383
1.60	347	109	615.95	1397	266.7	237	6	218	455
2.20	120 or 277	150	615.95	1098.55	266.7	171	8	291	462
2.20	347	150	615.95	1397	266.7	237	8	291	528
2.80	120 or 277	191	615.95	1397	266.7	203	10	364	567
2.80	347	191	615.95	1797.05	266.7	281	10	364	645

90 MIN									
POWER RATING (KW)	VOLTAGE IN-OUT (VAC)	HEAT LOSS (BTU)	ELECTRONICS CABINET DIMENSIONS				BATTERIES		TOTAL SYSTEM WEIGHT
			WIDTH (MM)	HEIGHT (MM)	DEPTH (MM)	WEIGHT (LBS)	NO. OF BATTERIES	WEIGHT (LBS)	
0.90	120 or 277	61	615.95	698.5	266.7	121	4	146	267
0.90	347	61	615.95	1098.55	266.7	199	4	146	345
1.44	120 or 277	98	615.95	1098.55	266.7	165	6	218	383
1.44	347	98	615.95	1397	266.7	237	6	218	455
1.98	120 or 277	135	615.95	1098.55	266.7	171	8	291	462
1.98	347	135	615.95	1397	266.7	237	8	291	528
2.52	120 or 277	172	615.95	1397	266.7	203	10	364	567
2.52	347	172	615.95	1797.05	266.7	281	10	364	645

120 MIN									
POWER RATING (KW)	VOLTAGE IN-OUT (VAC)	HEAT LOSS (BTU)	ELECTRONICS CABINET DIMENSIONS				BATTERIES		TOTAL SYSTEM WEIGHT
			WIDTH (MM)	HEIGHT (MM)	DEPTH (MM)	WEIGHT (LBS)	NO. OF BATTERIES	WEIGHT (LBS)	
0.80	120 or 277	55	615.95	698.5	266.7	121	4	146	267
0.80	347	55	615.95	1098.55	266.7	199	4	146	345
1.28	120 or 277	87	615.95	1098.55	266.7	165	6	218	383
1.28	347	87	615.95	1397	266.7	237	6	218	455
1.76	120 or 277	120	615.95	1098.55	266.7	171	8	291	462
1.76	347	120	615.95	1397	266.7	237	8	291	528
2.24	120 or 277	153	615.95	1397	266.7	203	10	364	567
2.24	347	153	615.95	1797.05	266.7	281	10	364	645