



D Series

Single-Phase Central Lighting Inverters

Catalog Number	
Comments	Type

FEATURES

Application

Designed for indoor installation in commercial or industrial applications.

Operation

When normal utility-supplied power is present, the LSN model central lighting inverter provides load-side line conditioning with "brownout" protection, and charges the system batteries when required. When utility-supplied power is interrupted, or the voltage varies from predetermined limits, the system will automatically and instantaneously transfer to emergency mode without interruption to connected loads. DC battery-derived emergency power is inverted to AC power and supplied in a pure sine wave output form for 90 minutes (standard run time). A low voltage battery disconnect circuit prevents "deep discharge" damage to the batteries during prolonged power outages. When normal power is restored the system will automatically restart, providing power to connected loads and recharging the batteries. The charging circuit will bring the batteries to full recharge within UL time standards.

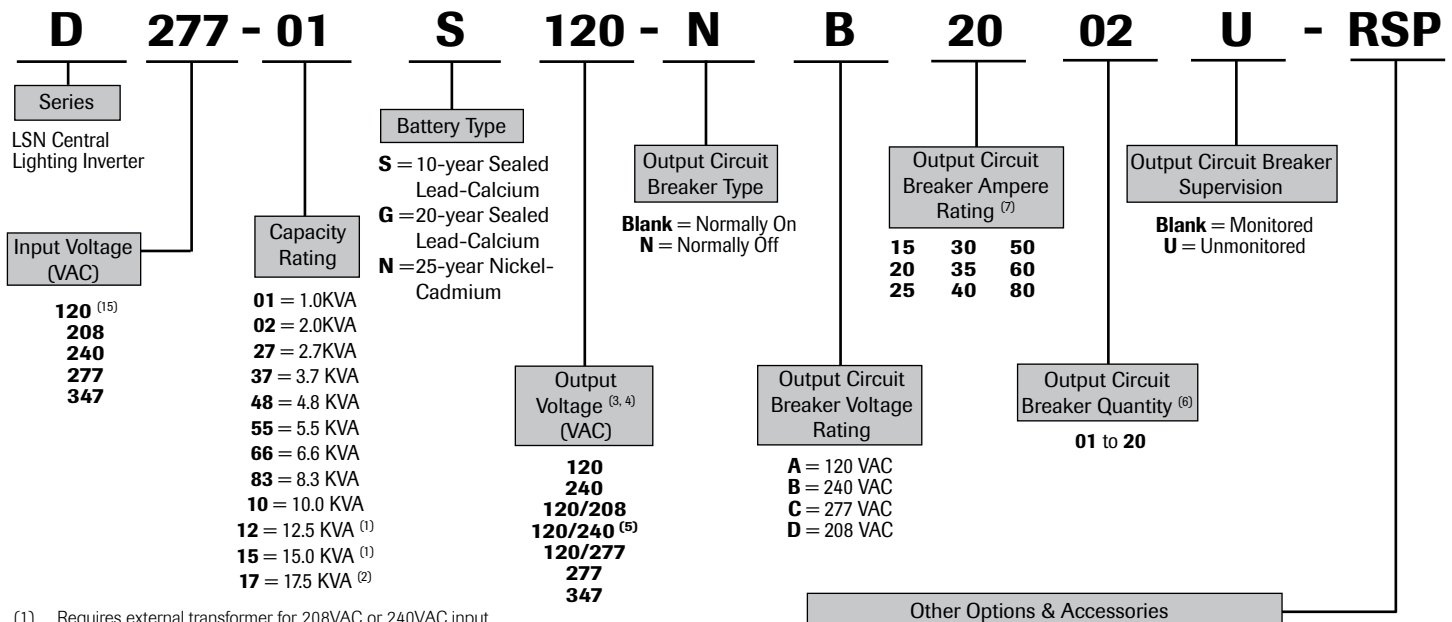
Construction

The LSN cabinet is constructed of steel, finished with a light gray paint and features locking cabinetry and password-protected user interface for security. Louvers at front and top of cabinet allow venting.

LSN LIFE SAFETY NETWORK



ORDERING GUIDE



- (1) Requires external transformer for 208VAC or 240VAC input.
- (2) 277 and 347VAC input only.
- (3) Other voltages available. Consult factory.
- (4) External transformer may be required.
- (5) Loading may not exceed 50% of the system's total rating on any 120VAC leg.
- (6) Normally On circuit breakers: a maximum of 14 monitored, single pole positions or 20 unmonitored, single pole positions may be specified. Normally Off circuit breakers: a maximum of 8 single pole positions (monitored or unmonitored) may be specified.
- (7) Normally Off circuit breakers: a maximum rating of 20 amps.
- (8) The EPO option requires the SMT option.
- (9) Specify runtime in minutes when ordering. Example: AR120.
- (10) Available with 1.0, 2.0, 2.7, 3.7, 5.5, and 6.6KVA Series with S batteries only.
- (11) Available on 1.0 KVA - 4.8KVA Series.
- (12) Available on 5.5 KVA - 17.5KVA Series. Not available with 120V input on 6.6KVA and above. Not available with 208V input on 12.5 KVA and above. Not available with 240V input on 15.0 KVA and above.
- (13) Supplied in a wall mounted, NEMA 1 type enclosure. Cannot be used in systems with more than one single-pole output circuit breaker, on systems with different input and output voltages.
- (14) See System Configuration for 90-Minute Run Time.
- (15) Not available on 8.3KVA - 17.5KVA Series.

Options

- EML** = Email Device
- RSP** = Remote Status Panel
- SMT** = System Monitoring Terminal
- EPO** = Emergency Power Off Terminal ⁽⁸⁾
- AR** = Alternate Runtime ⁽⁹⁾
- SBC** = Short Battery Cabinet ⁽¹⁰⁾
- IBS** = Internal Maintenance Bypass Switch (Make Before Break)
- C10** = 10 Amp Charger Upgrade ⁽¹¹⁾
- C20** = 20 Amp Charger Upgrade ⁽¹²⁾
- CL60** = Cabinet Locks

Accessories

- MBB** = External Maintenance Bypass Switch ⁽¹³⁾ (Make Before Break)
- BBM** = External Maintenance Bypass Switch ⁽¹³⁾ (Break Before Make)
- DSFK** = Seismic Kit ⁽¹⁴⁾



Hubbell Lighting, Inc.



D Series

Single-Phase Central Lighting Inverters

OPTIONS AND ACCESSORIES

Suffix	Options	Description
EML	Email Device	A device that automatically notifies the user of system test results and alarm conditions. The Email Device sends detailed notifications to up to six pre-programmed email addresses. Requires customer supplied CAT5 cable connected to user network.
RSP	Remote Status Panel	Provides remote annunciation for the LSN inverter to indicate inverter and alarm status. Owner-installed option. Must be installed within 1,000 ft. of the LSN inverter. Seven-conductor-minimum, 22AWG wire for connection from options board to Remote Status Panel must be supplied by installer.
SMT	System Monitoring Terminals	Provides connections points for Inverter and Alarm Relays (low power contacts change status with either inverter or alarm events), and Remote Status Panel (allows the addition of an RSP at any time).
EPO	Emergency Power Off	Provides a set of terminals to which an Emergency Power Off switch can be wired. Closing the switch will immediately shut down the system. Note: the EPO option requires the SMT option.
AR	Alternate Runtime	Runtimes other than the standard 90 minutes may be specified. When ordering alternate runtimes, specify discharge time required in minutes. Example: AR30
SBC	Short Battery Cabinet	For applications where headroom is limited. Reduces the overall height by 15 inches. Available on systems with ratings from 1.0, 2.0, 2.7, 3.7, 5.5, and 6.6KVA series with Type S batteries only. Dimensions: 31"H x 30"W x 18 ^{5/8} "D.
C10 C20	Charger Upgrades	10 Amp charger upgrade. Available on 1.0KVA - 4.8KVA Series. 20 Amp charger upgrade. Available on 5.5KVA - 17.5KVA Series.
CL60	Cabinet Locks	Universal cabinet locks for all electronic and battery cabinets.
	Monitored Circuit Breakers	Monitored output circuit breakers (normally-on or normally-off) will sound an alarm when tripped. See Ordering Guide.
	Normally-On Circuit Breakers	Specified when connected loads are to be energized at all times. See Ordering Guide.
	Normally-Off Circuit Breakers	Specified when connected loads are only energized during emergency operation. A user-programmable retransfer delay (up to 999 seconds) to normal utility power is provided. See Ordering Guide.
IBS	Internal Maintenance Bypass Switch	A three-position "make before break" service switch mounted inside the cabinet. Compatible with all input/output combinations and any combination or quantity of output circuit breakers.
Suffix	Accessories	Description
MBB BBM	External Maintenance Bypass Switch	MBB=Make-before-break. BBM=Break-before-make. Enables power to be removed from the inverter system and remain connected to the load. This allows the inverter system to be completely removed, replaced or repaired without interruption to the load. Consult factory for proper specification.
DFSK	Seismic Kit	Field-installed. Provides Category D seismic rating. See System Configuration for 90-minute run time.

FEATURES

Installation

Input power entry point is from the cabinet top. Bottom channels for lifting straps and wall brackets for anchoring. Servicing is accessible from cabinet front.

Compliances

UL 924 Listed, Emergency Lighting and Power Equipment (standard 90 minute run time)
 UL 1778 Listed, Uninterruptible Power Supply Equipment (alternate run times; types G and N batteries)
 ANSI C62.41: ANSI C62.45 (Cat. A & B)
 FCC class A
 National Electrical Code (NFPA 70)
 Life Safety Code (NFPA 101)
 OSHA, state and local codes
 Made in U.S.A.

Warranty

Two years full on all components from date of shipment. Batteries are covered under a separate warranty:

Battery Type	Full	Pro-rata
S (sealed lead-calcium)	1 year	9 years
G (sealed lead-calcium)	1 year	14 years
N (wet nickel-cadmium)	1 year	14 years

Batteries must be connected to an energized charging circuit within 90 days from date of shipment or warranty is void.

Factory Startup

Supplied standard with all D series inverters.



D Series

Single-Phase Central Lighting Inverters

SPECIFICATIONS

KVA/KW Rating	1.0K	2.0K	2.7K	3.7K	4.8K	5.5K	6.6K	8.3K	10.0K	12.5K	15.0K	17.5K	
Power Factor Range	.8 lead to .75 lag												
Input/Output Voltage Combinations Available – Single Phase	Input VAC: 120, 208, 240, 277, 347 Output VAC: 120, 240, 277, 347, 120/240 ⁽¹⁾ , 120/277 Other voltages available; consult factory ⁽²⁾						Input VAC: 208, 240, 277, 347 ⁽³⁾ Output VAC: 120, 240, 277, 347, 120/240 ⁽¹⁾ , 120/277 Other voltages available; consult factory ⁽²⁾						
AC Input Circuit Breaker Rating – 120/277V	120/20A 208/15A 240/15A 277/15A 347/15A	120/30A 208/20A 240/15A 277/15A 347/15A	120/40A 208/25A 240/20A 277/20A 347/20A	120/50A 208/30A 240/25A 277/25A 347/20A	120/70A 208/40A 240/35A 277/30A 347/25A	120/70A 208/40A 240/35A 277/30A 347/25A	120/80A 208/50A 240/45A 277/40A 347/30A	– – – – –	– – – – –	– – – – –	– – – – –	– – – – –	– – – – –
Output Voltage and Maximum Output Current in Amperes	120/8.3 240/4.2 277/3.6 347/2.9	120/16.7 240/8.3 277/7.2 347/5.8	120/22.5 240/11.3 277/9.7 347/7.8	120/30.8 240/15.4 277/13.4 347/10.7	120/40.0 240/20.0 277/17.3 347/13.8	120/45.8 240/22.9 277/19.9 347/15.9	120/55.0 240/27.5 277/23.8 347/19.0	120/69.2 240/34.6 277/29.9 347/23.9	120/83.3 240/41.7 277/36.1 347/28.8	120/104.0 240/52.1 277/45.1 347/36.0	120/125 240/62.5 277/54.2 347/43.2	120/146 240/72.9 277/63.2 347/50.4	
Standard Charger Size	5 Amps					10 Amps			15 Amps				
System DC Voltage	96	96	96	96	96	96	96	144	144	144	144	144	
Heat Output (BTU/Hr)	175	350	473	648	840	963	1,155	1,453	1,750	2,188	2,625	3,063	

⁽¹⁾ On systems with 120/240VAC output, loading may not exceed 50% of the system's total KVA rating on any 120V leg. Loading beyond 50% on any 120V leg will cause an unsafe condition and transformer failure will occur. Call our Service Line at 800-848-6439 for alternate load connection configurations.

⁽²⁾ An external transformer will be required for 12.5K and 15.0K configurations with 208VAC and 240VAC input.

⁽³⁾ Input voltage on 17.5KVA model limited to 277 and 347VAC only.

Electrical

System Short Circuit Rating: 42K AIC, RMS symmetrical

Surge Voltage Test: Per UL 924

Input Power Connection: Terminal block

Input Circuit Breaker: Sized to system rating

Power Factor: Unity 1.0 (KW = KVA)

Power Consumption: Offline, 98% efficient

Inverter Design: Pulse width modulation via IGBT circuitry

IGBT Frequency Switching Rate: 16K Hz per second

Input Voltage:

1.0 - 6.6KW/KVA	8.3 - 17.5KW/KVA ⁽¹⁾
120, 208, 240, 277, 347VAC	208, 240, 277, 347

⁽¹⁾ Input voltage on 17.5KVA model limited to 277 and 347VAC only.

Input Voltage Range: Invert, +10%, - 12%; boost, -8%

Input Frequency: 60 Hz, ±3%

Synchronizing Slew Rate: 1 Hz per second, nominal

Transfer Time: "No break" switching; instantaneous

Output Wave Shape: True AC sine wave

Output Frequency: Normal: synchronized to utility;

Inverter: ±0.05, 60 Hz, +0.05 Hz

Output Voltage:

1.0 - 6.6KW/KVA	8.3 - 17.5KW/KVA
120, 240, 277, 347, 120/240 ⁽¹⁾ , 120/277	120, 240, 277, 347, 120/240 ⁽¹⁾ , 120/277

⁽¹⁾ On systems with 120/240VAC output, loading may not exceed 50% of the system's total KVA rating on any 120V leg. Loading beyond 50% on any 120V leg will cause an unsafe condition and transformer failure will occur. Call factory for alternate load configurations.

Main Output Overcurrent Protection: Circuit breaker, output fuse

Optional Output Circuit Breakers: Normally-On or Normally-Off, monitored or unmonitored, per customer requirements.

See "Ordering Guide".

Output Regulation: (static) ±5% (5% to 100% resistive load)

Output Distortion: Less than 5% THD (linear load)

Battery Circuit Breaker: Sized to system rating

Battery Cabinet Short Circuit Breaker Protection: Circuit breaker and fuses

Overload Rating: 150% momentary; 120% for five minutes, 110% for 10 minutes

Overload/Short Circuit Protection: Circuit breakers and fuses

AC Lockout: Prevents battery discharge following installation when AC power is not present

Output Voltage Regulation: Automatic boost tap circuit maintains output voltage during utility low voltage "brownout" periods without switching to battery power

Low Voltage Battery Disconnect: Protects the batteries from damaging "deep discharge" conditions during prolonged power outages

Time Delay Retransfer: Supplied with "normally off" optional output circuit breakers. Holds the unit in emergency mode after normal AC power is restored, allowing utility power to stabilize and voltage sensitive lighting to resume normal operation. Delay time is user programmable.

Test Means: Spectron[®] self-test/self-diagnostic microprocessor controlled circuitry; manual programmable testing

Indicators: Visual LED indicators, visual graphic display (2 lines, 40 characters), audible alarm system.

Security: Password protected user interface; locking cabinets

Interior Relative Humidity: 95% non-condensing

Battery/Charging System Specifications

Standard Run Time: 90 minutes per UL 924. Optional run times available via UL 1778 listing.

Charger: Three-step float, temperature compensated. 5 amp, 10 amp, or 15 amp, depending on system rating.

Bus Voltage: 96VDC or 144VDC (system rating dependent)

Battery Condition Monitoring System: Standard

Recharge Cycle: Within UL requirements

Type: Non-spillable "S" Series standard; optional type G and type N available. See "Battery" section on following page.

DC Switch: Provides isolation and back-feed protection

Operating Temperature Range: 20°C to 30°C (68°F to 86°F)



D Series

Single-Phase Central Lighting Inverters

System Configurations for 90-Minute Runtime

Type S Battery Maintenance-Free Sealed Lead-Calcium – 10-Year Design Life Expectancy at 25°C (77°F)

Standard LSN system battery; lead calcium grid alloy with electrolyte trapped in absorbent glass mat (AGM) separators. Completely sealed and requires no addition of water over its life expectancy. Polypropylene case and cover includes UL recognized low pressure safety release vents. No gassing will occur in normal use.

System Capacity	1.0K	2.0K	2.7K	3.7K	4.8K	5.5K	6.6K	8.3K	10.0K	12.5K	15.0K	17.5K
System Configuration	A	A	A	A	A	B	B	B	B	B	C	C
Total Weight (lbs.)*	838	1,116	1,122	1,222	1,492	1,926	2,130	2,475	2,829	2,861	4,121	4,393
Seismic Kit Configuration	DSFKA1					DSFKB1 ⁽¹⁾		DSFKB2 ⁽¹⁾	DSFKB3 ⁽¹⁾		DSFKC1 ⁽¹⁾	

Type G Battery Maintenance-Free Sealed Lead-Calcium – 20-Year Design Life Expectancy at 27°C (80°F)

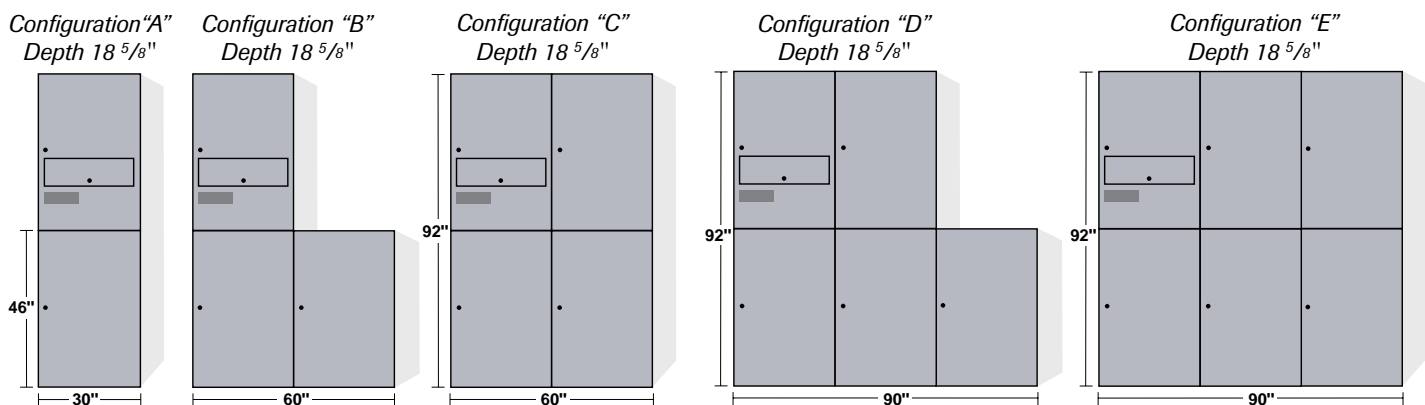
Optional LSN system battery; plates are separated by a highly porous glass mat, which functions as the electrolyte retainer. Provides the highest possible oxygen recombination. Completely sealed and requires no addition of water over its life expectancy. ABS flame retardant case and lid.

System Capacity	1.0K	2.0K	2.7K	3.7K	4.8K	5.5K	6.6K	8.3K	10.0K	12.5K	15.0K	17.5K
System Configuration	A	A	A	A	B	B	B	B	B	D	D	D
Total Weight (lbs.)*	1,365	1,384	1,390	1,472	1,684	2,062	2,630	2,679	3,589	3,657	4,885	5,491

Type N Battery Wet-Cell Nickel-Calcium – 25-Year Design Life Expectancy at 25°C (77°F)

Optional LSN system battery; pocket plate nickel-cadmium elements in an alkaline electrolyte. Polypropylene containers are standard; each cell is provided with a flip-top, flame arresting, UL recognized vent cap. Covers provide dead-top isolation. Maintainable "wet-cell" construction, requires the addition of distilled water over its life expectancy.

System Capacity	1.0K	2.0K	2.7K	3.7K	4.8K	5.5K	6.6K	8.3K	10.0K	12.5K	15.0K	17.5K
System Configuration	B	B	B	B	B	C	C	D	D	E	E	Consult Factory
Total Weight (lbs.)*	1,075	1,486	1,644	1,894	2,232	2,532	2,812	3,481	3,940	4,720	5,505	



Consult factory for alternate runtimes and battery cabinet configurations. External transformer (not illustrated) is required for 12.5K and 15.0K configurations with 208VAC and 240VAC input. Transformer cabinet dimensions are 18" W x 28" H x 15" D and weighs 250 lbs.

⁽¹⁾Add 12" of space to the width between cabinets.



Hubbell Lighting, Inc.