

# Model: SHDLxM

**600 kA Per Phase\***  
ANSI/UL 1449

**A = Type 2 SPD, I<sub>n</sub> = 10 kA**

**B = Type 2 SPD, I<sub>n</sub> = 20 kA**

**C = Type 1 SPD, I<sub>n</sub> = 10 kA**

**D = Type 1 SPD, I<sub>n</sub> = 20 kA**



\* Based on 3 Phase Wye, 4 Wire and Ground  
I<sub>n</sub> = Nominal Discharge Current per ANSI/UL 1449-2006

## Key Features

- **Discrete “All Mode” Circuitry: Directly Connected Protection Elements in “All Modes” (10 modes for 3 phase Wye circuits) as recommended by ANSI/IEEE Std. 1100-2005**
- **Industry Leading Measured Limiting Voltage (let-through) Performance**
- **UL 1283 EMI/RFI Parallel Configured Voltage Responsive Circuitry Type 2 SPDs only**
- **Local & Remote Diagnostics**
- **Independent Verification of Performance and Safety**
- **No moving parts or springs - No mechanical or electro-mechanical thermal/over-current protection**
- **Component-Level, Thermal Fusing**
- **Patented Internal, Circuit Board Mounted, Over-Current Fusing**
- **25 Year Unlimited Free Replacement Warranty**



**Application:** The SHDLx series was developed for use at high ampacity service entrances, distribution panels, and disconnects. This versatile unit is robust enough to handle the punishment of the largest industrial service entrance applications while still providing protection from transients that are generated inside the facility. This device is especially well suited for lightning prone locations as well as locations within or adjacent to transient generating industrial facilities.

**ANSI/IEEE C62.41.1 & C62.41.2-2002 environments:** Suitable for Categories: A, B & C (Most Severe Electrical Environments)

**IEC Environments:** Suitable for use in IEC 61643-11 environments

**Circuit Topology:** Parallel configured **Voltage Responsive Circuitry** circuit design incorporating component-level, thermal fusing and circuit board mounted, **Patented** internal over-current fusing methodology with discrete **“All Mode”** protection (10 modes for 3 phase Wye units). All protection circuits are encapsulated in our high-dielectric compound to promote long component life and protection from the weather and vibration.

**Protection Modes:** Industry-best practice of dedicated protection components for all operational modes of the electrical system. **Discrete L-N, L-L (Normal Mode) and L-G, N-G (Common Mode)** Example: Directly Connected Protection Elements in All 10 modes for a 3 phase, 4 wire, Wye system, (i.e. 3 L-N modes, 3 L-L modes, 3 L-G modes and 1 N-G mode).

**Input Power:** 50-400 Hz (60 Hz nominal)

**Temperature Rating:** Up to 80°C

**Insertion Loss Data: (L-N)**

Frequency:	122 kHz	1 MHz	Max Attenuation & Freq.
Attenuation:	3 dB	28 dB	47 dB @ 1.2 MHz

**Standard Enclosure:** NEMA 12 Rated, painted steel enclosure  
(Other enclosure options available see pg. 2)

**Nominal Discharge Current (I<sub>n</sub>) Rating:** 10 kA (SHDLC, SHDLA), 20 kA (SHDLB, SHDLD\*\*) (\*\*Complies with the requirements of UL 96A Master Label for Installation Requirements for Lightning Protection Systems)

**Diagnostics:** Green LED's, one per phase, normally on. A wide range of optional diagnostics is available (see page two for details).

**Circuit Interrupt:** Internal component-level, thermal fusing and patented circuit board mounted, over-current fusing. No external over-current protection required. (Note: National and local codes may require the use of a circuit interrupt device(s) if conduit is added to make the wired connection to the panel or gear.

**Short Circuit Current Rating:** 200 kAIC

**Product Qualifications:**

Listed to ANSI/UL 1449 by UL (E340498), CSA (MC#241804); UL 1283\*

(\*Type 2 SPDs only)

ISO 9001 Certified Manufacturing Facility by NQA

Voltage Code	ANSI/UL 1449 Voltage Protection Rating (VPR)						
	L-N	HL-N	L-G	HL-G	N-G	L-L	HL-L
1S1	600	-	600	-	600	1000	-
3Y1	600	-	600	-	600	1000	-
3D1	600	900	600	1000	600	1000	1000
3Y2	900	-	1000	-	900	1800	-
3N2	-	-	1000	-	-	1000	-
3N4	-	-	1800	-	-	1800	-

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Voltage Code*	Circuit Type	Peak Surge Current	MCOV	ANSI/IEEE C62.41.2™-2002, C62.45™-2000 and C62.62™-2010 Measured Limiting Voltages (tested with 6 inches of lead length external to the enclosure per C62.62™-2010 and ANSI/UL 1449)		
				Test Mode	Cat A 30 Ω 100 kHz Ring Wave 6 kV 200 A @ 90° Phase Angle	Category C (High) 10 kA 8/20 Current Driven Test†
1S1	120/240 V 1Ø (Split) (3 wire + ground)	200 kA L-N	150 V	L-N	261 V	729 V
		200 kA L-L	300 V	L-L	412 V	964 V
		200 kA L-G	150 V	L-G	272 V	781 V
		200 kA N-G	150 V	N-G	491 V	991 V
		1,200 kA Total	150 V			
3Y1	120/208 V 3Ø Wye (4 wire + ground)	200 kA L-N	150 V	L-N	261 V	729 V
		200 kA L-L	300 V	L-L	412 V	964 V
		200 kA L-G	150 V	L-G	272 V	781 V
		200 kA N-G	150 V	N-G	491 V	991 V
		2,000 kA Total	150 V			
3D1	120/240 V 3Ø High-Leg Delta (4 wire + ground)	200 kA L-N	150 V	L-N	261 V	729 V
		200 kA L-L	320 V	HL-N	392 V	1,374 V
		200 kA HL-N	300 V	L-L	412 V	964 V
		200 kA L-G	150 V	L-G	272 V	781 V
		200 kA HL-G	320 V	HL-G	376 V	1,414 V
		200 kA N-G	150 V	N-G	491 V	991 V
2,000 kA Total	150 V					
3Y2	277/480 V 3Ø Wye (4 wire + ground)	200 kA L-N	320 V	L-N	392 V	1,374 V
		200 kA L-L	550 V	L-L	484 V	1,758 V
		200 kA L-G	320 V	L-G	376 V	1,414 V
		200 kA N-G	320 V	N-G	817 V	1,661 V
		2,000 kA Total	320 V			
3N2	240 V 3Ø Delta (NN) (3 wire + ground)	200 kA L-L	320 V	L-L	412 V	964 V
		200 kA L-G	320 V	L-G	376 V	1,414 V
		1,200 kA Total	320 V			
3N4	480 V 3Ø Delta (NN) (3 wire + ground)	200 kA L-L	550 V	L-L	505 V	1,758 V
		200 kA L-G	550 V	L-G	505 V	2,071 V
		1,200 kA Total	550 V			

**Measured Limiting Voltage (MLV) Test Parameters:** Positive polarity, Category A: Line power applied, Category C: No line power applied, Voltages are peak (±10%). Measured Limiting Voltages are measured from the insertion point on the sine wave to the peak of the surge for powered tests. Each MLV is the average of all phases within that mode of protection. To duplicate the results, the specified mode of protection must be tested in all phases (except N-G) and averaged together. (Individual mode or shot results may vary by more than 10%). *Scope Settings: Time Base = 10 microseconds per division, Sampling Rate = 2.5 Gigasamples/sec, Bandwidth = 400 MHz (200 MHz for Cat C), Probes: Tektronix P5100/P6015A. These settings help to assure MLV results are accurate.* **All tests performed with 6" lead length (external to the enclosure), simulating actual installed performance.** The MLVs reported above are certified by Third-Party, Independent Testing. Individual test reports are available upon request.

†The MLV reported for the Category C High, 10 kA 8/20 Current Driven Test is determined by measuring the MLV of one of the fifteen 10 kA impulses impressed through the SPD during the Nominal Discharge Current (In) Test from C62.62TM-2010 and ANSI/UL 1449-2006. This is not the MLV recorded during the pre- and/or post-test 6 kV / 3 kA Combination Wave Test used to determine the VPR of the SPD. The VPRs are reported on page 1 of this specification.

\*Other voltage configurations may be available. Contact your sales representative for additional assistance.

Model Number Example: SHDLB3Y2D5M

Base Model:	SPD Type and Nominal Discharge Current (In) Rating:	Voltage Code:	Options:
SHDL	A = Type 2 SPD, In = 10 kA B = Type 2 SPD, In = 20 kA	C = Type 1 SPD, In = 10 kA D = Type 1 SPD, In = 20 kA	See Voltage Codes 3Y2

- AC10** = Basic Internal Audible Alarm
- AC11** = Advanced Internal Audible Alarm w/ on, off, and test
- AC** = Internal Audible Alarm w/ test button, mute switch and red LED
- AC1** = AC Option w/ Dry Relay Contacts Prewired
- C** = Form C dry relay contacts
- C1** = C Option w/ Dry Relay Contacts Prewired
- D1 (CSA)** = Integral, non-fused disconnect switch (SPD unit mounts inside)
- D3 (CSA)** = Same as **D1**, except no external handle
- LP** = Remote LED indicators in individual NEMA 4X housings
- S6** = Basic Internal Surge Counter\*
- S** = Surge Counter with Reset Button\*\*

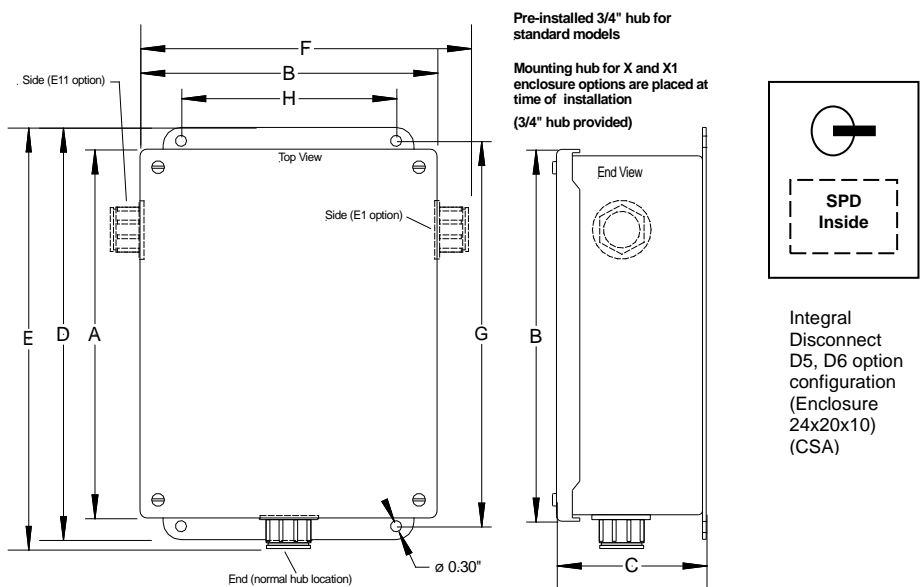
- P** = Flush Mount Plate
- R2** = Remote lights on separate circuit board in separate enclosure
- E1** = Hub on upper right side of enclosure
- M** = NEMA 12 Steel Enclosure
- W** = NEMA 4 Steel Enclosure
- X** = NEMA 4X Composite Enclosure (Box-in-box)
- X1** = NEMA 4X Composite Enclosure with Clear Lid (Box-in-box)
- X2** = NEMA 1, 2, 3, 3S, 4, 4X and 12 composite enclosure
- XS** = NEMA 4X Stainless Steel Enclosure
- X3** = NEMA 4X Composite Enclosure (10" x 8" x 4")

\*This option not available with AC Option

\*\*This option not available with AC10 or AC11 Options

**External Accessories:** **EACS** = Externally mounted diagnostic module, combines **AC**, **C**, and **S** options (Also available: **EAC**, **EC**, **ECS**, and **ES**) *Other options may be available by request.*

Enclosure Dimensions			
Inches (mm)	Standard Model	Enclosure Options	
		W	X
A	14.00 (356)	14.00 (356)	18.00 (458)
B	12.00 (305)	12.00 (305)	16.00 (407)
C	6.00 (153)	6.00 (153)	10.00 (254)
D	15.50 (394)	15.50 (394)	19.50 (496)
E	15.98 (406)	15.98 (406)	19.98 (508)
F	13.23 (309)	13.23 (309)	17.23 (411)
G	14.75 (375)	14.75 (375)	18.94 (482)
H	10.00 (254)	10.00 (254)	14.00 (356)
Type	NEMA 12 Steel	NEMA 4 Steel	NEMA 4X Composite
lbs. (kg)	30 (13.61)	30 (13.61)	55 (24.95)



**Circuit Connection:** #10 AWG wire (pre-installed)

**Mounting:** 3/4" hub (provided) and integral feet