

N-Series Switches

The N-Series Addressable Switch combines the look and feel of a traditional electro-mechanical control coupled with a built in PCB and provides a flexible, cost effective alternative to a CAN/LIN based switch. The N-Series produces up to 144 individual switch IDs by using a resistive ladder circuit. Different switch IDs are achieved by changing the resistor values tied to individual loads, which can then be assigned to the specific functions that the switch is controlling. Each switch is connected to an ECU and the application software is written to recognize the switch IDs to determine which load is being controlled as well as the selected actuator position. As a result, the wiring harnesses are more simplified and specific loads can now be rearranged without the need for a costly and time consuming harness redesign, giving designers the ultimate in design flexibility.

Applications:

- ♦ On-Highway Transportation Equipment
- ♦ Agricultural Equipment
- ♦ Construction Equipment
- ♦ Marine



Features:

- ♦ Cost effective alternative to CAN/LIN based switch
- ♦ Up to 144 individual switch IDs
- ♦ Simplified Wiring harnesses
- ♦ Readdressable loads without harness redesign
- ♦ Available with paddle or rocker actuator



Carling Technologies®

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Electrical

Current Ratings	.4VA @ 28VDC (MAX)
Dielectric Strength	1250 Volts RMS between pole to pole 3750 Volts RMS between live parts and accessible surfaces
Insulation Resistance	50 Megaohms
Contact Bounce	20 milliseconds max.
Contacts	gold plated
Terminals	Brass or copper/silver plate 3/16" (4.76mm) Quick Connect terminations standard.

Mechanical

Endurance	250,000 cycles minimum
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Physical

Lighted	Incandescent - rated 10,000 hours LED - rated 100,000 hours 1/2 life (LED is internally ballasted for voltages to 24VDC)
Seals	Rocker, base & bracket are sealed.
Base	Nylon 66 GF rated to 85°C with a flammability rating of 94V0.
Rocker and Paddle	Nylon 66 Reinforced, rated to 105°C
Laser Etched Rocker	Polycarbonate rated at 100°C.
Lens	Polycarbonate rated at 100°C. Front snap-in.
Connector	Nylon 66 rated at 85°C. Polarized.
Bracket	Nylon Zytel

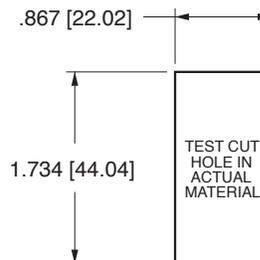
Actuator Travel (Angular Displacement)

2 position	26°
3 position	13° from center

Environmental

Environmental	IP67 for above the panel components of the actual switch, representing an index of protection as applied to electrical equipment in accordance with IEC 529, BS 5490, DIN 400 50 & NFC 20 010.
Operating Temperature	-40°C to +85°C
Vibration	Per SAE J1399 "electronic Tachometer Specification" for Class II truck and bus applications. Test Criteria: No change in resistance and no evidence of physical damage.
Salt Spray	Exposure to 95% water, 5% NCI fog solution at 95 degrees F according to ASTM B 117-90 "Standard Test Method of Salt Spray (fog) Testing". Test Criteria: No visual evidence of corrosion or external physical damage.
Humidity	Samples were exposed to selected temperature profile, while maintaining 90% +/- 5% relative humidity for 30 cycles. Test Criteria: No evidence of external physical deterioration.

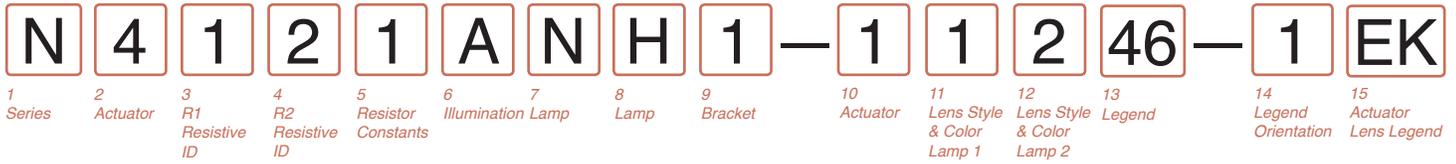
Mounting Specifications



MOUNTING HOLE

Panel Thickness Range

Acceptable Panel Thickness
.030 to .156 (.76mm to 3.96mm)
Recommended:
.030, .062, .093, .125 and .156



1 SERIES
N

2 CIRCUIT²
Terminal Orientation

() - momentary

Position:	1	2	3
STANDARD			
2 & 4	On	Connected Terminals	1 & 2
4	On	NONE	ON
5	(On)	NONE	ON
6	On	ON	ON
7	(On)	ON	On
8	(On)	ON	(On)

3 R1 RESISTIVE IDENTIFICATION

1	1020	7	3570
2	1300	8	4320
3	1620	A	5230
4	2000	B	6340
5	2430	C	7870
6	2940	D	10000

4 R2 RESISTIVE IDENTIFICATION

1	1020	7	3570
2	1300	8	4320
3	1620	A	5230
4	2000	B	6340
5	2430	C	7870
6	2940	D	10000

5 RESISTOR CONSTANTS (INDICATES SWITCH STATE)

	R3	R4	R5
1	1300	10000	5320
2	825	6650	3830

6 ILLUMINATION
Lamp #1: above terminals 9 & 10 end of switch.; Lamp #2 above terminals 11 & 12 end of switch. Positive (+) and negative (-) symbols apply to LED lamps only.

S	Lamps	Illumination Type	Lamp wired to Terminals	
A	# 1	Standard	10+	12-
A	# 2	Standard	11+	9-
B	# 1 & 2	Special Parallel	11+	9-
C	# 1 & 2	Special Parallel	10+	9-
1	# 1	Independent	10+	9-
2	# 2	Independent	12+	11-
3	# 1	Independent	10+	9-
	# 2	Independent	12+	9-
4	# 1	Independent	10+	9-
	# 2	Independent	12+	11-

7,8 LAMP (SAME CODING FOR BOTH SELECTIONS)
Selection 7: above terminals 10 & 9; Selection 8: above terminals 12 & 11
No lamp 0

LED* 12VDC	Red C	Amber N	Green H
* Consult factory for "daylight bright", blue/green and white LED options. Typical current draw for LED is 20ma.			

9 BRACKET COLOR¹

	Black	White	Gray	Red
Standard Bracket	1	2	3	4
Rockerguard at Lamp 1	A	B	C	D
Rockerguard at Lamp 2	E	F	G	H

10 ACTUATOR STYLE AND COLOR¹

	Black A	White B	Gray C	Red D	Laser Etched 1
Rocker	A	B	C	D	1
Paddle	J	N	K	M	

11 & 12 LENS STYLE AND COLOR
Lens color for LEDs must be clear, white, or match color of LED.

0 - No Actuator	Z - No Lens					
Clear	White	Amber	Green	Red	Blue	
1	-	B	G	M	T	Large Transparent
-	7	C	H	N	U	Large Translucent
3	-	D	J	P	V	Bar Transparent
-	9	E	K	R	W	Bar Translucent
5	A	-	-	-	-	Laser Etch background color

13 LEGEND ORIENTATION
00 No legend this location / no actuator
For legend options & codes, see pages 54-65 of this catalog.

14 LEGEND ORIENTATION
0 No legend (used with codes 11-18 in selection 12)

1 Orientation 1 - vertical, lamp 1 on top

2 Orientation 2 - horizontal, lamp 1 on right

3 Orientation 3 - vertical, lamp 1 on bottom

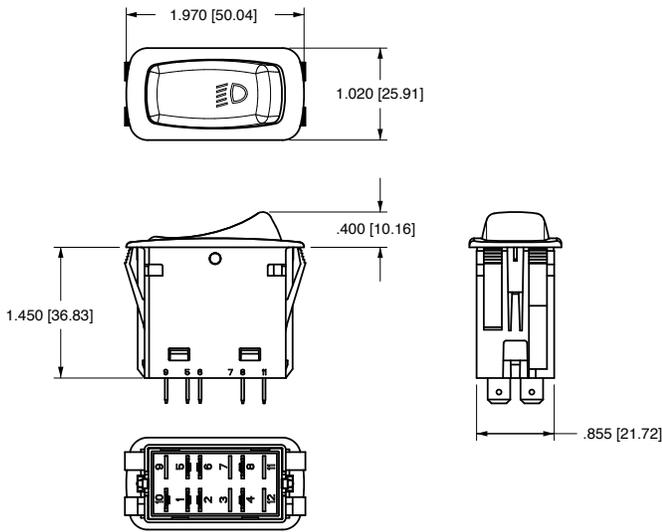
4 Orientation 4 - vertical, lamp 1 on left

15 ACTUATOR LENS LEGEND
00 No legend this location / no actuator
For legend options & codes, see pages 54-65 of this catalog.

- Notes:
- 1 Custom colors are available. Consult factory.
 - 2 Switch supplied with .187 tab terminals.

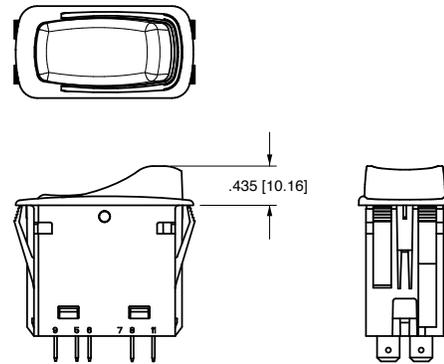
N-SERIES

SHOWN WITH LASER ETCHED ACTUATOR



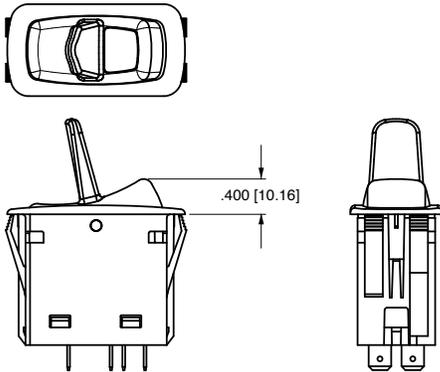
N-SERIES

SHOWN WITH ROCKER GUARD



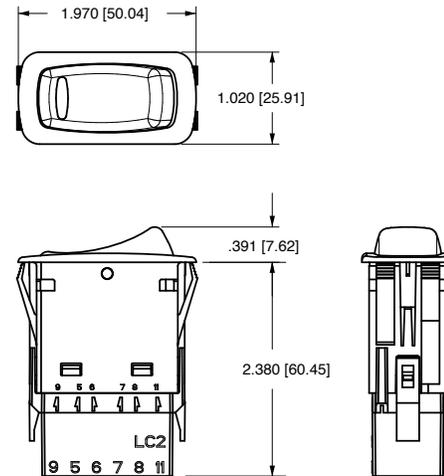
N-SERIES

SHOWN WITH LARGE LENS AND PADDLE ACTUATOR



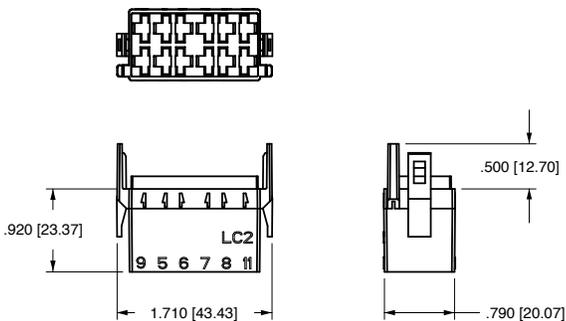
N-SERIES

SHOWN WITH BARS LENS AND CONNECTOR



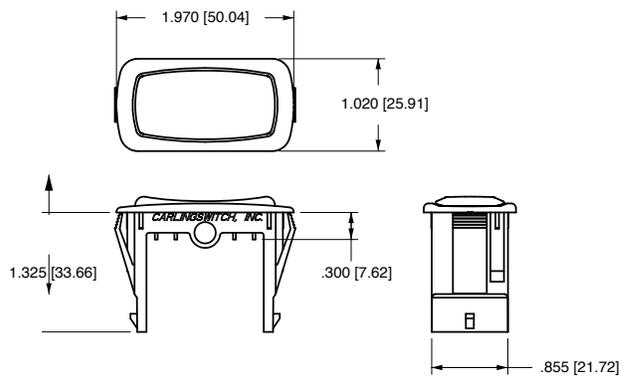
N-SERIES

LC2-01 BLACK .187 TAB CONNECTOR (PACKARD 480-SERIES)



N-SERIES

LH1 REMOVABLE HOLE PLUG WITH NON-SERRATED WINGS
LH2 HOLE PLUG WITH SERRATED WINGS



SWITCH CIRCUIT DIAGRAMS

CIRCUIT CODE	SCHEMATIC
4	
5	
6	
7	
8	

INTERNAL CIRCUIT BOARD (TYPICAL)

LAMP CIRCUIT DIAGRAMS

ILLUM. CODE	SCHEMATIC
A	
B	
C	
1	
2	
3	
4	

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