

# CN SERIES

## PLUG-IN/PCB MOUNT SOLID STATE RELAYS

Sensata | Crydom CN Series AC & DC Output Plug-in Solid State Relays are thin 5 mm wide relays ideally suited for high density PCB applications. CN Series SSRs are designed to be pluggable into industry standard relay sockets or solderable into printed circuit boards, and they are available in ratings of 2 Amps at 24 to 280 VAC or 0.1 to 6 Amps at 0 to 100 VDC. They are UL recognized and CE compliant.



### Features

- 5 mm Mini SIP SSR
- Ratings 24 VDC @ 3.5 A, 48 VDC @ 100mA, 100 VDC @ 6 A and 240 VAC @ 2 A
- DC Control, 5, 24 and 60 V
- UL & cUL recognized @ 40°C, 100K-Cycle Endurance Test
- CE & RoHS Compliant

### Applications

- Automation Equipment
- Test Equipment
- Packaging equipment
- Valves & Solenoids
- Vending Equipment
- Medical Equipment

## PRODUCT SELECTION

Control Voltage	3.5 A	100mA	6 A	2 A
3-12 VDC	CN024D05	CN048D05	CN100D05	CN240A05
15-30 VDC	CN024D24	CN048D24	CN100D24	CN240A24
38-72 VDC	CN024D60	CN048D60		CN240A60

## SPECIFICATIONS

### Output<sup>(1)</sup>

Description	CN024Dxx	CN048Dxx	CN100Dxx	CN240Axx
Operating Voltage	0-24 VDC	0-48 VDC	0-100 VDC	24-280 VAC (47-63Hz)
Maximum Load Current @ 40°C <sup>(2)</sup>	3.5 A	100mA	6 A	2 A
Minimum Load Current [mA]	1	1	1	70
Maximum Blocking Voltage	30 VDC	60 VDC	100 VDC	600 VDC
Maximum Surge Current [Apk]	9 (10ms)	0.3 mA (10ms)	45 (10ms)	115/120 (50/60 Hz, 1 cycle)
Maximum I <sup>2</sup> t for fusing 50/60Hz (1/2 cycle) [A <sup>2</sup> sec]	N/A	N/A	N/A	66/60
Typical On-State Voltage Drop @ Rated Current (V)	0.4	1.0	0.1	1.1 (peak)
Maximum Off-State Leakage Current @ Rated Voltage [mA]	0.001	0.001	0.001	4.0

<b>Maximum PWM (Hz) <sup>(3)</sup></b>	500	500	40	N.A.
<b>Minimum Off-State dv/dt @ Maximum Rated Voltage [V/μsec]</b>	N/A	N/A	N/A	500
<b>Switch Configuration</b>	N.O.	N.O.	N.O.	N.O.

### Input Specifications for CN024 <sup>(1)</sup>

Description	CN024D05	CN024D24	CN024D60
<b>Control Voltage Range</b>	3-12 VDC	15-30 VDC	38-72 VDC
<b>Must Turn On Voltage</b>	3 VDC	15 VDC	38 VDC
<b>Must Turn Off Voltage</b>	1 VDC	5 VDC	5 VDC
<b>Nominal Input Impedance</b>	500 Ohm	3.5K Ohm	20K Ohm
<b>Typical Input Current</b>	10mA @ 5 VDC	7mA @ 24 VDC	3mA @ 60 VDC
<b>Typical Turn-On Time [μsec]</b>	120	350	400
<b>Typical Turn-Off Time [μsec]</b>	100	80	70

### Input Specifications for CN048 <sup>(1)</sup>

Description	CN048D05	CN048D24	CN048D60
<b>Control Voltage Range</b>	3-12 VDC	15-30 VDC	38-72 VDC
<b>Must Turn On Voltage</b>	3 VDC	15 VDC	38 VDC
<b>Must Turn Off Voltage</b>	1 VDC	5 VDC	5 VDC
<b>Nominal Input Impedance</b>	1.25K Ohm	3K Ohm	20K Ohm
<b>Typical Input Current</b>	12mA @ 5 VDC	8mA @ 24 VDC	3mA @ 60 VDC
<b>Typical Turn-On Time [μsec]</b>	20	20	20
<b>Typical Turn-Off Time [μsec]</b>	130	130	130

### Input Specifications for CN100 <sup>(1)</sup>

Description	CN100D05	CN100D24
<b>Control Voltage Range</b>	3-12 VDC	15-30 VDC
<b>Must Turn On Voltage</b>	3 VDC	15 VDC
<b>Must Turn Off Voltage</b>	1 VDC	5 VDC
<b>Nominal Input Impedance</b>	420 Ohm	3K Ohm
<b>Typical Input Current</b>	12mA @ 5 VDC	8mA @ 24 VDC
<b>Maximum Turn-On Time [μsec]</b>	400	800
<b>Maximum Turn-Off Time [μsec]</b>	180	180

### Input Specifications for CN240 <sup>(1)</sup>

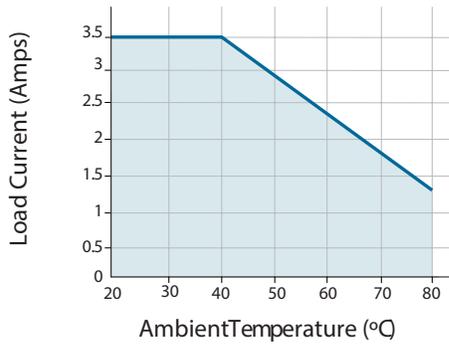
Description	CN240A05	CN240A24	CN240A60
<b>Control Voltage Range</b>	3-12 VDC	15-30 VDC	38-72 VDC
<b>Must Turn On Voltage</b>	3 VDC	15 VDC	38 VDC
<b>Must Turn Off Voltage</b>	1 VDC	5 VDC	5 VDC
<b>Nominal Input Impedance</b>	240 Ohm	3.5K Ohm	20K Ohm
<b>Typical Input Current</b>	15mA @ 5 VDC	6mA @ 24 VDC	4mA @ 60 VDC
<b>Typical Turn-On Time [μsec] <sup>(4)</sup></b>	1/2 Cycle	1/2 Cycle	1/2 Cycle
<b>Typical Turn-Off Time [μsec]</b>	1/2 Cycle	1/2 Cycle	1/2 Cycle

## GENERAL SPECIFICATIONS <sup>(1)</sup>

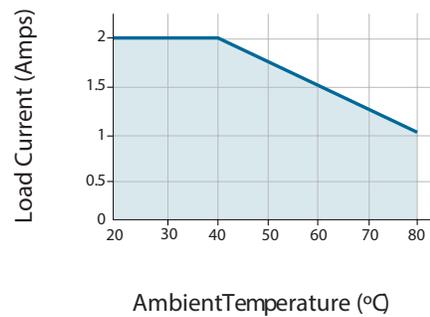
Description	Parameters
Dielectric Strength, Input/Output/Base (50/60Hz) <sup>(5)</sup>	2.5KV
Maximum Capacitance, Input/Output	1.5 pF
Ambient Operating Temperature Range	-20 to 80°C
Ambient Storage Temperature Range	-20 to 100°C
Weight (typical)	0.14 oz. (4.05g)
Housing Material	UL 94 V0
Overvoltage Category	III
Pollution Degree	2
Degree of protection (Encapsulation)	IP67

## THERMAL DERATE INFORMATION

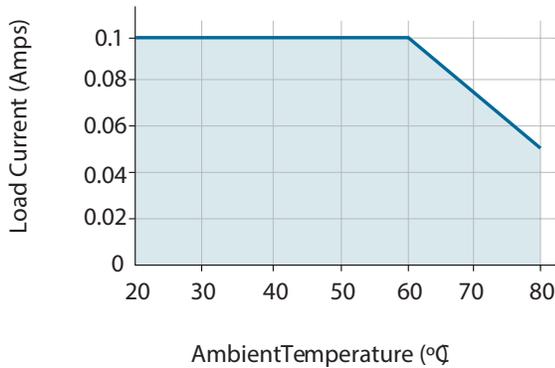
**CN024Dxx**



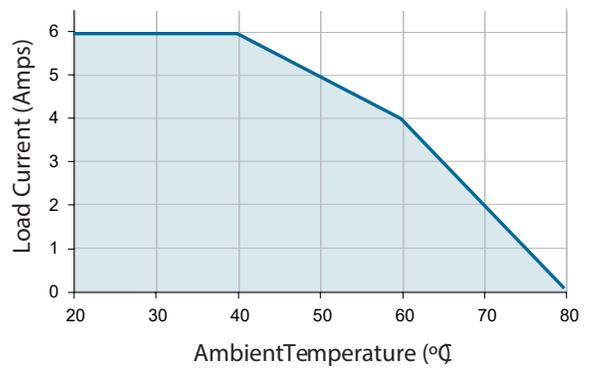
**CN240Axx**



**CN048Dxx**

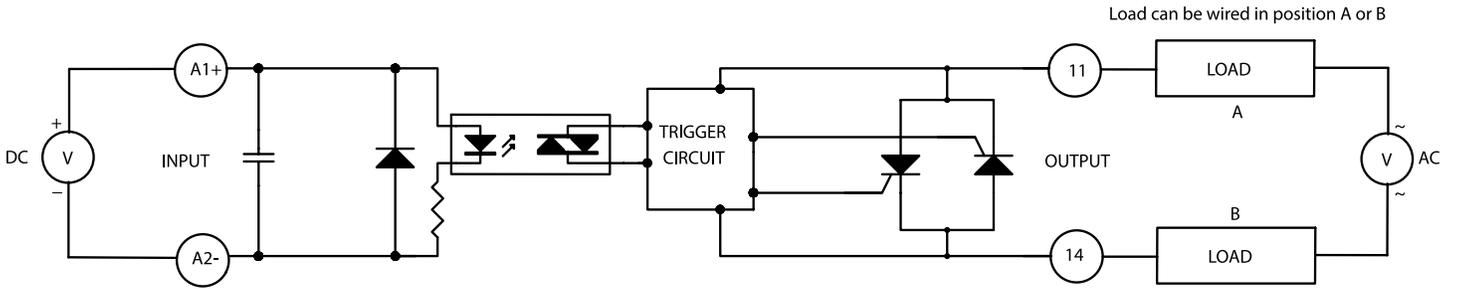


**CN100Dxx**

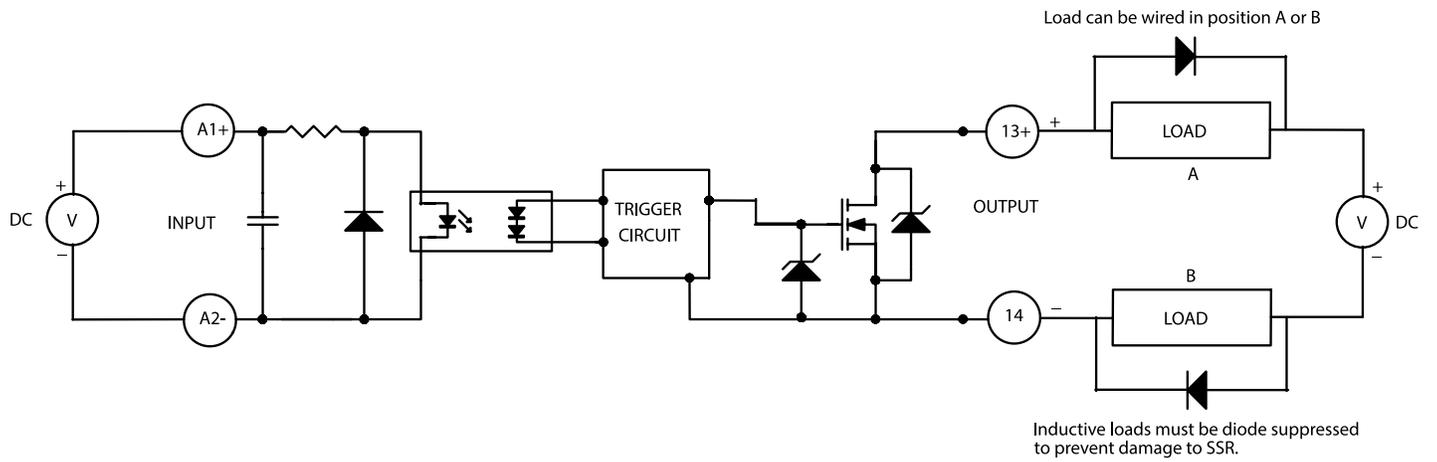


# WIRING DIAGRAM

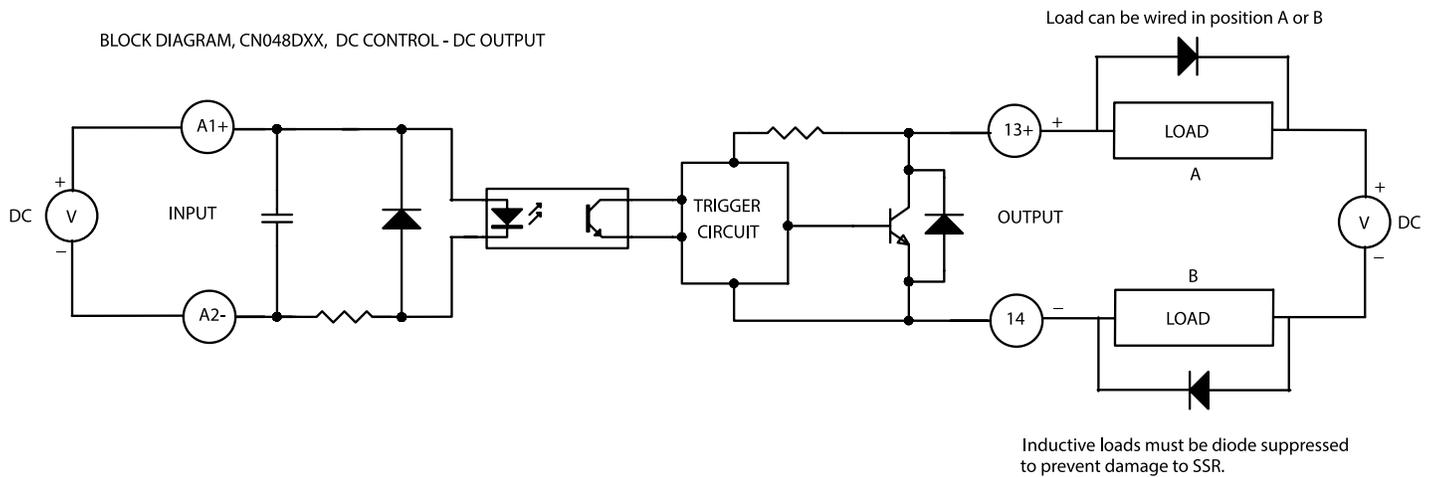
BLOCK DIAGRAM, CN240AXX, DC CONTROL - AC OUTPUT



BLOCK DIAGRAM, CN100DXX, CN024DXX DC CONTROL - DC OUTPUT

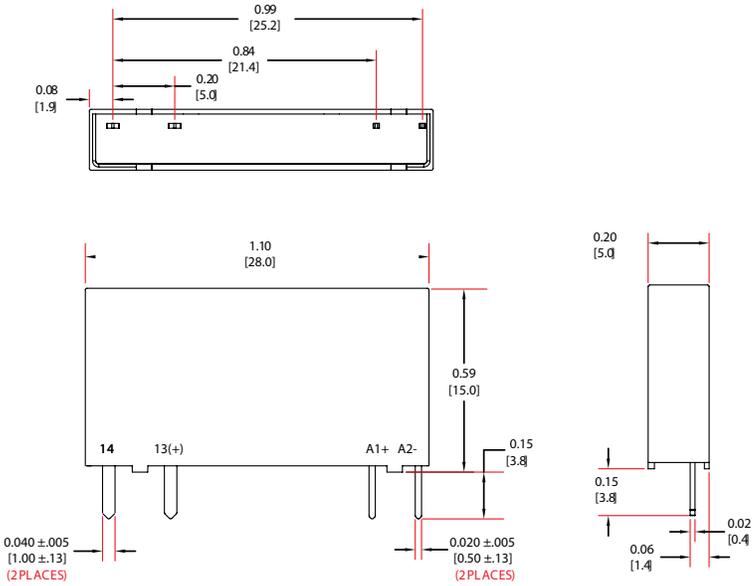


BLOCK DIAGRAM, CN048DXX, DC CONTROL - DC OUTPUT



## MECHANICAL SPECIFICATIONS

Tolerances:  $\pm 0.02$  in / 0.5 mm All dimensions are in: inches [millimeters]



## INSTALLATION INSTRUCTIONS

### Mounting on a Socket

The CN Series relays can be mounted in a DIN rail socket. The DRSCN sockets provide a convenient and easy way to install CN Series Solid State Relays on a standard 35 mm DIN rail.

Please read all installation instructions before using the sockets and relays.

- Match CN Series SSR to appropriate DRSCN socket part number to create an assembly (See Relay/Socket Compatibility)
- Insert the CN SSR on the socket
- Mount the socket on the DIN rail
- Wire the socket to the control side. AWG #24-14 solid, AWG #24-14 stranded (0.2-2.1 mm<sup>2</sup>)
- Wire the socket to the load side. AWG #24-14 solid, AWG #24-14 stranded (0.2-2.1 mm<sup>2</sup>)
- Maximum torque: 5-7 lb-in (0.56-0.8 Nm)
- If multiple units are installed be sure to follow derating curves for assemblies

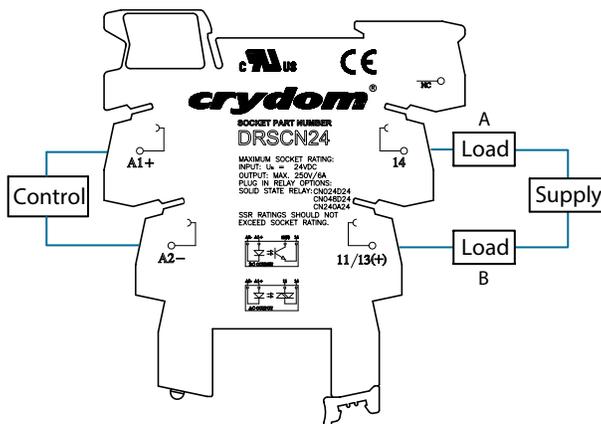
**TABLE 1. Relay/Socket Compatibility**

SSR Part. No.	DRSCN24	DRSCN05
<b>CN024D05</b>		•
<b>CN024D24</b>	•	
<b>CN048D05</b>		•
<b>CN048D24</b>	•	
<b>CN240A05</b>		•
<b>CN240A24</b>	•	
<b>CN100D05</b>		•
<b>CN100D24</b>	•	

- Installing a CN Series solid state relay in a socket that does not have matching input/output specifications may result in damage to either the relay, socket, or both, and/or in non-operation.
- Maximum output rating for DRSCN Series sockets is 250 V, 6 Amps regardless of chosen SSR.
- Proper polarity must be observed for DC input control voltage sockets being terminal A1+ positive with respect to terminal A2-.
- For AC loads, the AC line can be wired to either DRS socket terminal 11 or terminal 14. The AC load may also be wired on either the line or neutral side of the SSR. For DC loads, the proper polarity must be observed for the power supply, load and DRS socket with terminal 13 being positive with respect to terminal 14.
- DC inductive loads must be diode suppressed.
- All terminals feature screw M3 slotted drive.

## WIRING DIAGRAMS

DRSCN05, DRSCN24



### Mounting on a Printed Circuit Board

When different kinds of packages are mounted on PC board, temperature rise at soldering lead is dependent on package size. Therefore, set the lower temperature soldering condition than the conditions of item "Soldering profile", and confirm the temperature condition of actual usage before soldering.

When soldering condition exceeds our recommendation, the SSR characteristics may be adversely affected. It may occur package crack or power electronics failures because of thermal expansion nonconformity and resin strength reduction.

Solder creepage, wettability, or soldering strength will be affected by the soldering condition or used soldering type.

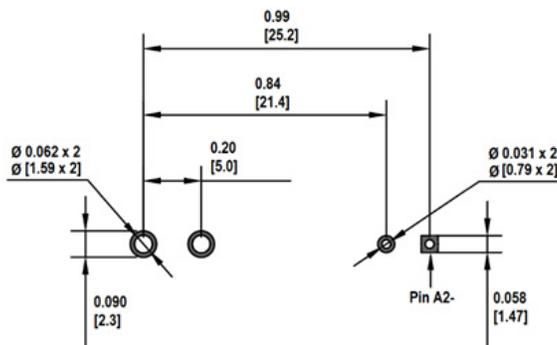
### Soldering Profile

The classification temperature ( $T_c$ ) of this product is 245°C (473°F) and the maximum dwell time ( $T_p$ ) is 30 seconds, the body temperature of this device may be ( $T_c - 5$ )°C or greater. The classification temperature sets the Maximum Body Temperature allowed for this device during lead-free reflow processes, maximum 1 cycle for reflow is allowed. For any other processes, the guidelines of J-STD-020 must be observed.

### Manual soldering method

Temperature: 350°C (662°F) to 400°C (752°F), within 3s, electrical power 30 to 60W

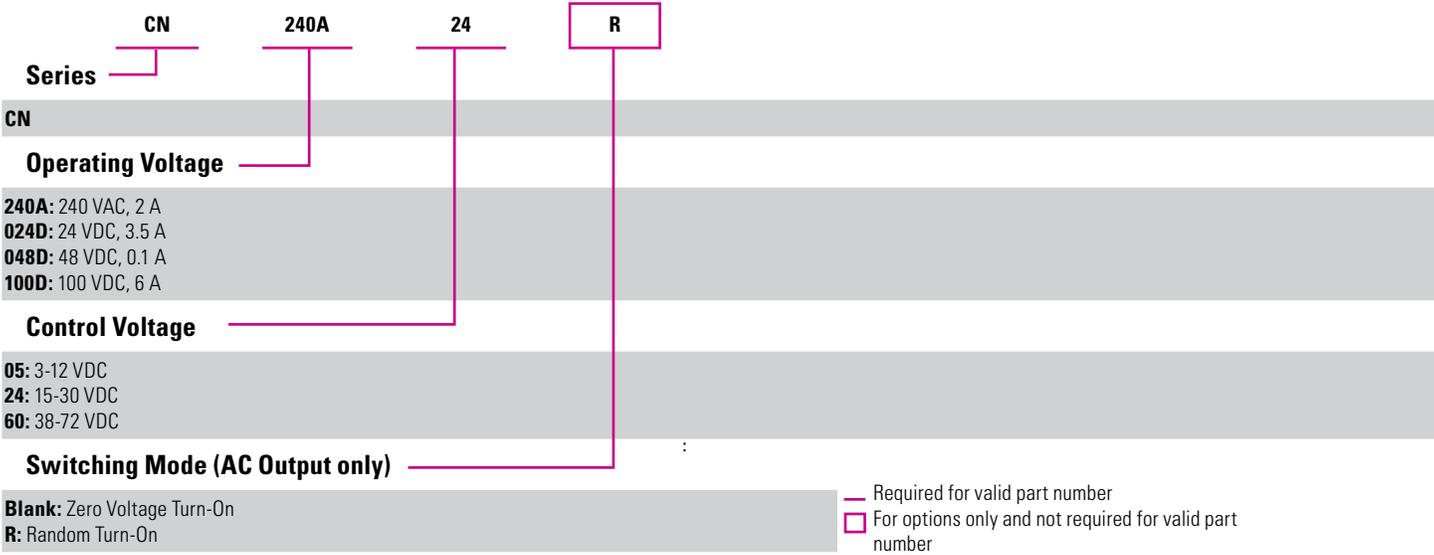
### Recommended PCB hole layout:



Tolerances:  $\pm 0.02$  in / 0.5 mm All dimensions are in: inches [millimeters]

# ORDERING OPTIONS

Example : CN240A24R



# ACCESSORIES

## DRSCN Series DIN Rail Mountable Sockets

**DRSCN05, DRSCN24**



- Sockets are fully compatible with CN series SSRs
- 6.2 mm wide
- LED status indicator
- Socket clip fits all standard 35 mm
- DIN rail profiles
- UL & cUL recognized, CE & RoHS compliant

**RELAY/SOCKET COMPATIBILITY <sup>G, H</sup>**

SSR PN	DR Socket PN	Socket Input Voltage
CN024D05 CN048D05 CN100D05 CN240A05	DRSCN05	3-12 VDC
CN024D24 CN048D24 CN100D24 CN240A24	DRSCN24	15-30 VDC

<sup>G</sup> Installing a CN Series solid state relay in a socket that does not have matching input/output specifications may result in non-operation or damage to either the relay, socket or both.  
<sup>H</sup> Maximum output rating for DRSCN Series sockets is 250 V / 6 Amps regardless of chosen SSR.

## ID Marker Strips

### CNLB, CNLN, CNL2

		
<b>Black Strips</b> Part no.: CNLB	<b>Numbered 1 to 10 Strips</b> Part no.: CNLN	<b>Numbered 11 to 20 Strips</b> Part no.: CNL2
A package of 10 plastic strips comprising 10 individual unprinted markers which can be placed on sockets' terminal block for easy identification during the use of multiple units.	A package of 10 plastic strips comprising 10 markers printed individually from 1 to 10 which can be placed on sockets' terminal block for easy identification during the use of multiple units.	A package of 10 plastic strips comprising 10 markers printed individually from 11 to 20 which can be placed on sockets' terminal block for easy identification during the use of multiple units.

## GENERAL NOTES

- (1) All parameters at 25°C unless otherwise specified.
- (2) See derating curves
- (3) Operating above the specified frequency will damage the SSR (DC output only).
- (4) Turn-on time for random turn-on version is 0.1 ms.
- (5) 3.75KV for CN048Dxx

## AGENCY APPROVALS & CERTIFICATIONS

Designed in accordance with the requirements of IEC 62314



## WARNINGS



### RISK OF MATERIAL DAMAGE AND HOT ENCLOSURE

- The product's side panels may be hot, allow the product to cool before touching
- Follow proper mounting instructions including torque values
- Do not allow liquids or foreign objects to enter this product

**Failure to follow these instructions can result in serious injury, or equipment damage.**



### HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Disconnect all power before installing or working with this equipment
- Verify all connections and replace all covers before turning on power

**Failure to follow these instructions will result in death or serious injury.**

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