

## DR22 SERIES | DC OUTPUT

DIN RAIL MOUNT SOLID STATE RELAYS



### Features

- Output ratings up to 30 Amps at 200 VDC
- Integral heat sink eliminates the need for complex thermal calculations
- DBC substrate for superior thermal performance
- LED input status indicator
- IP20 touch-safe housing
- 1kHz Maximum PWM Frequency
- 3750 VAC optical isolation
- C-UL-US approved



### PRODUCT SELECTION

| Control Voltage | 20 A       | 30 A       |
|-----------------|------------|------------|
| 4-32 VDC        | DR2220D20U | DR2220D30U |



### SPECIFICATIONS

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

| Description                                                            | 20 A       | 30 A       |
|------------------------------------------------------------------------|------------|------------|
| Absolute Maximum Rating [VDC]                                          | 200        | 200        |
| Recommended Operating Voltage [VDC]                                    | 1-150      | 1-150      |
| Maximum Off-State Leakage Current @ Rated Voltage [mA <sub>rms</sub> ] | 0.1        | 0.2        |
| Load Current, DC General Use UL508 @ 40°C [ADC]                        | 20         | 30         |
| Load Current, DC Motor Starting UL508 FLA @ 40°C [ADC]                 | 4.1        | 5.4        |
| Minimum Load Current [mA] <sup>2</sup>                                 | 5          | 5          |
| Maximum Surge Current [ADC] (10ms)                                     | 58         | 86         |
| Maximum On-State Voltage Drop @ Rated Current [VDC]                    | 0.680      | 0.535      |
| Maximum On-State Resistance [RDS-ON][Ohms]                             | 0.034      | 0.016      |
| Maximum Pulse Width Modulation Frequency [Hz] <sup>3</sup>             | 1000       | 900        |
| Motor Rating UL 508 [HP (kW)]: 120 VDC                                 | 1/3 (0.25) | 1/2 (0.37) |

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

| Description                          | DC Control        |
|--------------------------------------|-------------------|
| Control Voltage Range                | 4-32 VDC          |
| Maximum Reverse Voltage              | -32 VDC           |
| Minimum Turn-On Voltage <sup>4</sup> | 4 VDC             |
| Must Turn-Off Voltage                | 1 VDC             |
| Minimum Input Current (for on-state) | 11 mA             |
| Maximum Input Current                | 15 mA             |
| Nominal Input Impedance              | Current Regulated |
| Maximum Turn-On Time [μsec]          | 75                |
| Maximum Turn-Off Time [μsec]         | 100               |

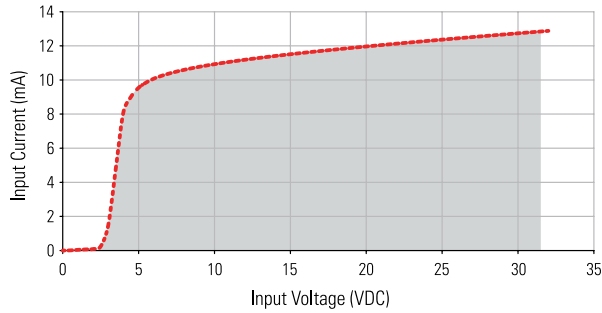
## General <sup>(1)</sup>

| Description                                         | Parameters           |
|-----------------------------------------------------|----------------------|
| Dielectric Strength, Input to Output (50/60Hz)      | 3750 Vrms            |
| Dielectric Strength, Input/Output to Case (50/60Hz) | 2500 Vrms            |
| Minimum Insulation Resistance (@ 500 VDC)           | 10 <sup>9</sup> Ohms |
| Maximum Capacitance, Input/Output                   | 8 pF                 |
| Ambient Operating Temperature Range                 | -40 to 80 °C         |
| Ambient Storage Temperature Range                   | -40 to 100 °C        |
| Weight (typical)                                    | 10.5 oz (298 g)      |
| Housing Material                                    | UL94 V-0             |
| Heat Sink Material                                  | Aluminum             |
| Din Rail Clip Material                              | Zinc Plated Steel    |
| Hardware Finish                                     | Nickel Plating       |
| Input Terminal Screw Torque Range (lb-in/Nm)        | 13-15/1.5-1.7        |
| Load Terminal Screw Torque Range (lb-in/Nm)         | 13-15/1.5-1.7        |
| Humidity                                            | 95% non-condensing   |
| LED Input Status Indicator                          | Green                |



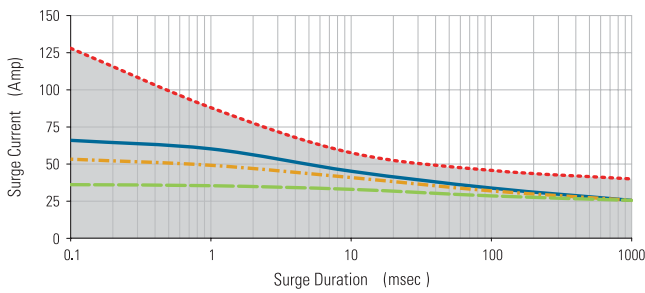
## INPUT CURRENT INFORMATION

4-32 VDC Input

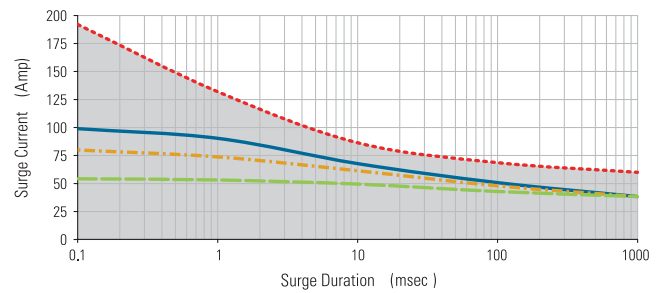


## SURGE CURRENT INFORMATION

DR2220D20U



DR2220D30U



--- Single Pulse \*    — Duty Factor (10%) \*\*    - - - Duty Factor (20%) \*\*    - - - Duty Factor (50%) \*\*

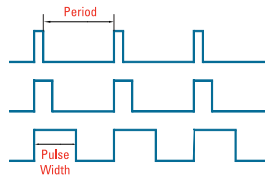
For Pulse Width Modulation applications select the curve according to the duty factor and pulse duration as follows:

$$\text{Duty Factor} = \frac{\text{Pulse Width}}{\text{Period}} \times 100 (\%)$$

Duty Factor 10%

Duty Factor 20%

Duty Factor 50%



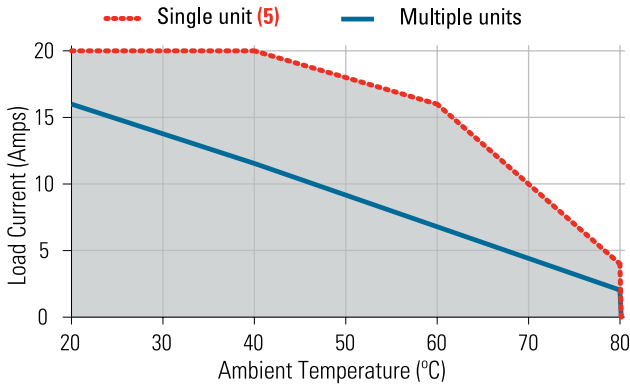
\* for Single Surge Pulse  $T_c=40^\circ\text{C}$ ;  $T_j=175^\circ\text{C}$

\*\* for Repetitive Surge Pulse  $T_c=40^\circ\text{C}$ ;  $T_j=130^\circ\text{C}$

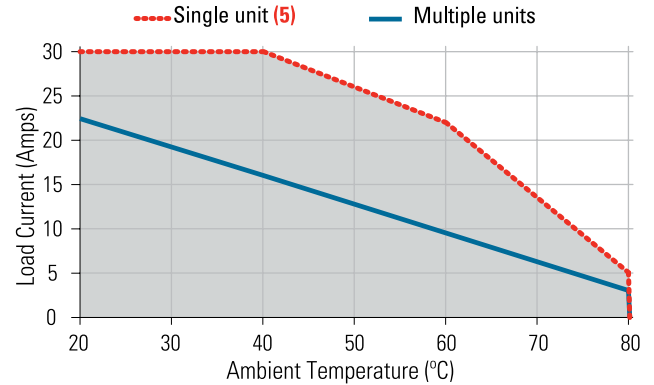


## THERMAL DERATE INFORMATION

DR2220D20U



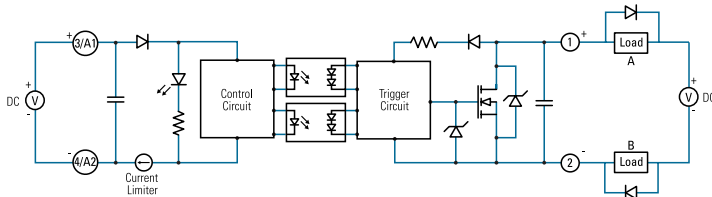
DR2220D30U





## EQUIVALENT CIRCUIT BLOCK DIAGRAMS/WIRING DIAGRAM

Load can be wired in position A or B inductive loads must be diode suppressed.



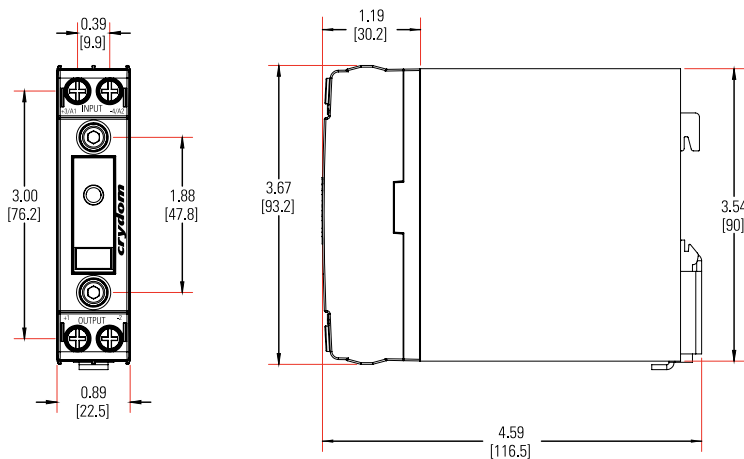
### Recommended Wire Sizes

| Terminal Configuration  | Wire Size (Solid / Stranded)             | Wire Pull-Out Strength (lb)[N] |
|-------------------------|------------------------------------------|--------------------------------|
| Output Relay "U" suffix | 2 x 18 AWG (1 mm <sup>2</sup> ) Stranded | 20 [88]                        |
| Input Relay "U" suffix  | 2 x 10 AWG (6 mm <sup>2</sup> ) Stranded | 60 [266]                       |
| Input Relay "U" suffix  | 2 x 18 AWG (1 mm <sup>2</sup> ) Stranded | 20 [88]                        |
| Input Relay "U" suffix  | 2 x 12 AWG (4 mm <sup>2</sup> ) Stranded | 40 [177]                       |

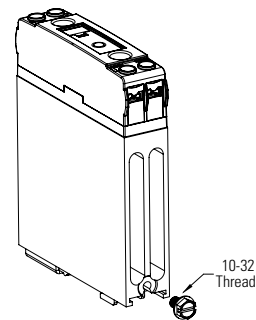


## MECHANICAL SPECIFICATIONS

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



### Protective Earth Connection



Protective Earth (PE) screw type recommended is 10-32 UNC standard not provided with SSR. Through the use of a DIN rail ground (protective conductor) terminal block, the DIN rail itself can be used as the grounding bus bar. In this case, the zinc plated steel material used for the DIN rail clip of DR22 models, permits a secure path to ground and avoid the need of a further PE connection.



## ORDERING OPTIONS

Example : DR2220D20U

|                           | DR22 | 20                         | D           | 20 | U                      |
|---------------------------|------|----------------------------|-------------|----|------------------------|
| <b>Series</b>             | DR22 |                            |             |    |                        |
| <b>Operating Voltage</b>  |      | 20: 1-200 VDC              |             |    |                        |
| <b>Control Voltage</b>    |      |                            | D: 4-32 VDC |    |                        |
| <b>Rated Load Current</b> |      | 20: 20 Amps<br>30: 30 Amps |             |    |                        |
| <b>Terminal Layout</b>    |      |                            |             |    | U: Relay Configuration |

— Required for valid part number  
☐ For options only and not required for valid part number



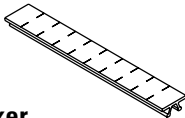
## GENERAL NOTES

- (1) All parameters at 25°C unless otherwise specified.
- (2) Low current loads and high ambient temperature can affect turn-on time.
- (3) 8 VDC Minimum control voltage. Resistive loads only. Consider switching losses; at maximum frequency reduce to 75% output current. Recommended suppressor diode connected at load side, see wiring diagram.
- (4) Increase minimum voltage by 1 V for operations from -20 to -40°C.
- (5) Minimum spacing to obtain max. current is 22.5mm between adjacent units.



## ACCESSORIES

### Recommended Accessories



#### ID Marker

CNLB  
 CNLN  
 CNL2

## AGENCY APPROVALS & CERTIFICATIONS

Certification in accordance with:

United States Standard for Industrial Control Equipment - UL 508 and

Canadian Standard Association for Industrial Control Equipment – C22.2 No. 14.



| Electromagnetic Compatibility                         |                                          |                          |                   |             |
|-------------------------------------------------------|------------------------------------------|--------------------------|-------------------|-------------|
| Generic Standard                                      | Immunity Tests                           | Test Specification Level |                   | Performance |
| IEC 61000-6-2<br>Immunity for Industrial Environments | Electrostatic Discharge<br>IEC 61000-4-2 | 4kV air discharge        |                   | Criterion A |
|                                                       |                                          | 4kV contact discharge    |                   | Criterion A |
|                                                       | Fast transients (burst)<br>IEC 61000-4-4 | Output                   | 2kV, 5kHz, 100kHz | Criterion B |
|                                                       |                                          | Input                    | 1kV, 5kHz, 100kHz | Criterion B |
|                                                       | Surge<br>IEC 61000-4-5                   | Output                   | 1kV Line to Earth | Criterion B |
|                                                       |                                          |                          | 2kV Line to Earth | Criterion B |

## 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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