

1-DC SERIES | 7 TO 40 AMPS

PANEL MOUNT SOLID STATE RELAYS



Features

- Ratings from 7 A to 40 A @ 200 VDC and from 7 A to 10 A @ 500VDC
- Mosfet Output
- UL Approved, CE Compliant to EN60950-1
- Improved SEMS screw and washer
- Redesigned housing with anti-rotation barriers
- DC control
- EMC Compliant to Level 3
- Epoxy Free Design

PRODUCT SELECTION

Load Voltage	7 A	10 A	12 A	20 A	40 A
100 VDC	D1D07		D1D12	D1D20	D1D40
200 VDC	D2D07		D2D12		D2D40
400 VDC	D4D07		D4D12		
500 VDC	D5D07	D5D10			

SPECIFICATIONS

Output ⁽²⁾

Description	7 A	12 A	20 A	40A	7A	12A	40A	7A	12A	7A	10A
Recommended Operating Voltage [Vdc]	1-72	1-72	1-72	1-72	1-150	1-150	1-150	1-300	1-300	1-385	1-385
Absolute Maximum Rating [Vdc]	100	100	100	100	200	200	200	400	400	500	500
Maximum Off-State Leakage Current @ Rated Voltage [mA]	0.1	0.2	0.3	0.3	0.1	0.3	0.3	0.3	0.3	0.2	0.3
Maximum Load Current [Adc] ⁽³⁾	7	12	20	40	7	12	40	7	12	7	10
Minimum Load Current [mA] ⁽⁴⁾	1	1	1	1	1	1	1	1	1	1	1
Maximum Surge Current (10msec) [Adc]	23	28	42	106	22	31	106	18	36	19	29
Maximum On-State Voltage Drop @ Rated Current [Vdc]	0.5	0.9	0.8	1	1.5	0.7	0.8	2.3	2.6	3.5	3.3
Maximum On-State Resistance [RDS-ON] [Ohms]	0.07	0.072	0.039	0.025	0.21	0.062	0.021	0.33	0.22	0.5	0.33
Thermal Resistance Junction to Case (Rjc) [°C/W]	2	2	1.71	0.68	1.24	0.71	0.22	0.56	0.39	0.6	0.43
Minimum Heat Sink for Rated Current @ 40°C [°C/W]	5	3	2	1	3	3	0.7	2	1	1	0.7
Maximum Pulse Width Modulation Frequency [Hz] ⁽⁵⁾	5000	4000	3500	2500	3500	2000	950	1200	900	1100	900

Input ⁽¹⁾

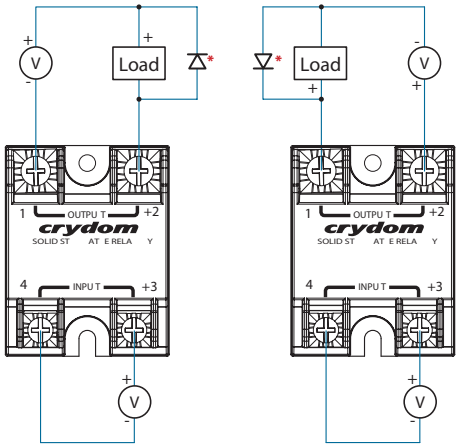
Description	DC Control
Control Voltage Range	3.5-32 VDC
Maximum Reverse Voltage	-32 VDC
Minimum Turn-On Voltage ⁽⁶⁾	3.5 VDC
Must Turn-Off Voltage	1 VDC
Minimum Input Current (for on-state)	10 mA
Maximum Input Current	15 mA
Nominal Input Impedance	Current Regulated
Maximum Turn-On Time [µsec]	100
Maximum Turn-Off Time [µsec]	100

General ⁽¹⁾

Description	Parameters
Dielectric Strength, Input/Output/Base (50/60Hz)	3750 Vrms
Minimum Insulation Resistance (@ 500 VDC)	10 ⁹ Ohms
Maximum Capacitance, Input/Output	8 pF
Ambient Operating Temperature Range ⁽⁷⁾	-40 to 100 °C
Ambient Storage Temperature Range	-40 to 125 °C
Weight (typical)	2.66 oz (75.5 g)
Housing Material	UL94 V-0
Baseplate Material	Aluminum
Input Terminal Screw Torque Range (lb-in/Nm)	13-15 / 1.5-1.7
Load Terminal Screw Torque Range (lb-in/Nm)	18-20 / 2-2.2
SSR Mounting Screw Torque Range (lb-in/Nm)	18-20 / 2-2.2
Input/Load Terminal Screw Torque Range (lb-in/Nm) (1)	w/"K" option 8-10 / 0.9-1.13
Input/Output Terminal Screw Thread Size	#6-32 UNC / #8-32 UNC
Humidity per IEC60068-2-78	93% non-condensing
MTBF (Mean Time Between Failures) at 40°C ambient temperature ⁽⁸⁾	21,395,130 hours (2,441 years)
MTBF (Mean Time Between Failures) at 60°C ambient temperature ⁽⁸⁾	11,545,504 hours (1,317 years)

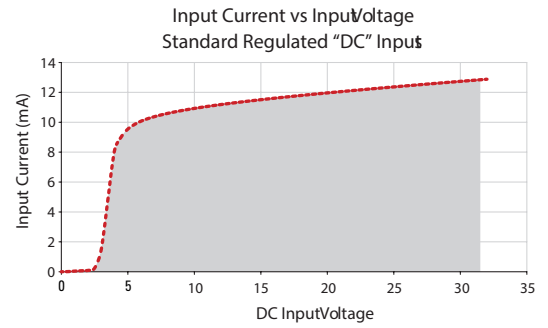
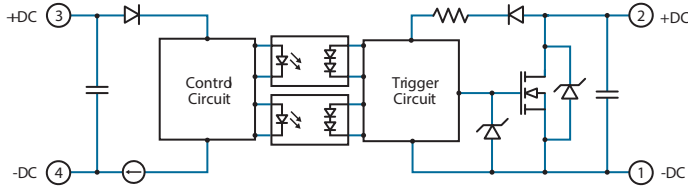
● WIRING DIAGRAM

* Inductive loads must be diode suppressed.



Recommended Wire Sizes		
Terminals	Wire Size (Solid / Stranded)	Wire Pull-Out Strength (lb)[N]
Input	24 AWG (0.2 mm2) / 0.2 [minimum]	10 [44.5]
	2 x 12 AWG (3.3 mm2) / 3.3 [maximum]	90 [400]
Output	20 AWG (0.5 mm2) / 0.518 [minimum]	30 [133]
	2 x 10 AWG (5.3 mm2) / 5.3	110 [490]
	2 x 8 AWG (8.4 mm2) / 8.4 [maximum]	90 [400]

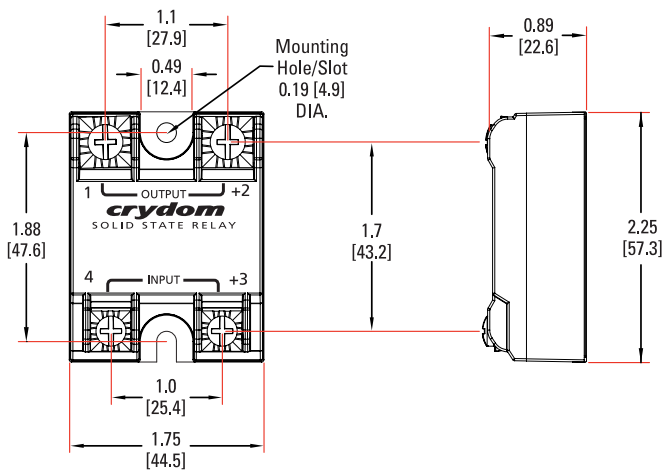
EQUIVALENT CIRCUIT BLOCK DIAGRAMS



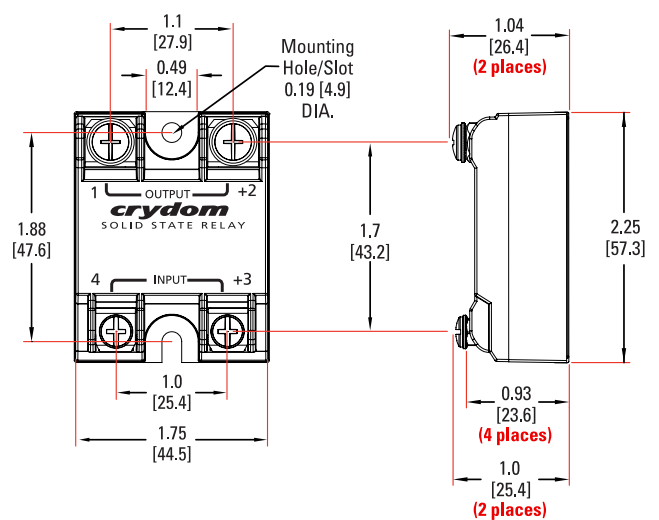
MECHANICAL SPECIFICATIONS (2)

All dimensions are in millimeters [inches]
Tolerance: ± 0.02 in / 0.5 mm

Screw Termination

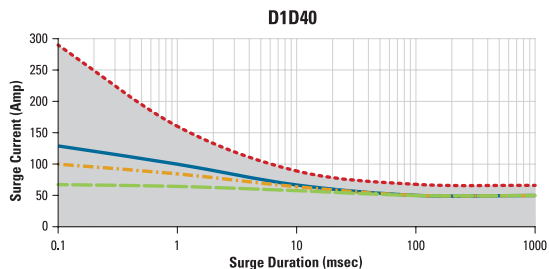
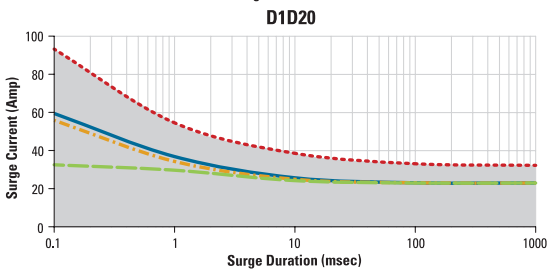
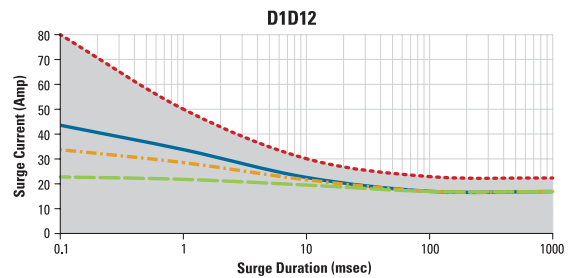
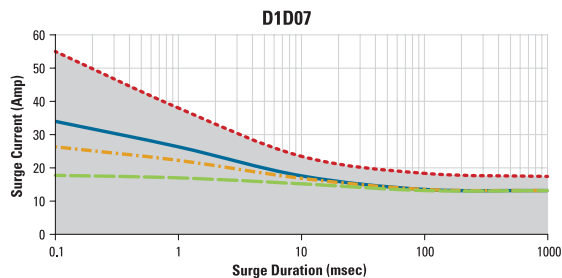


Hex Standoff Termination ("K" Option)

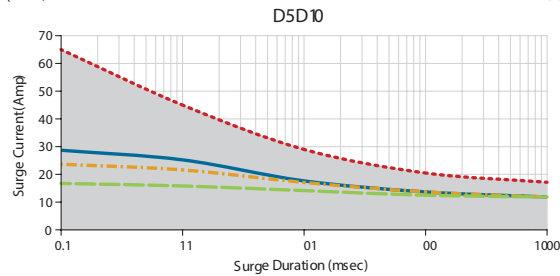
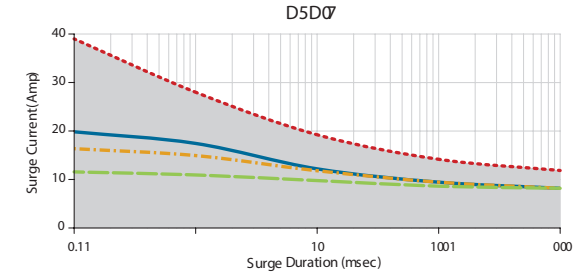
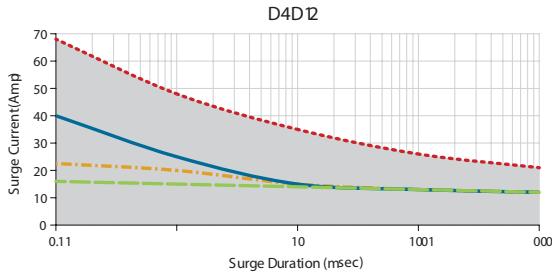
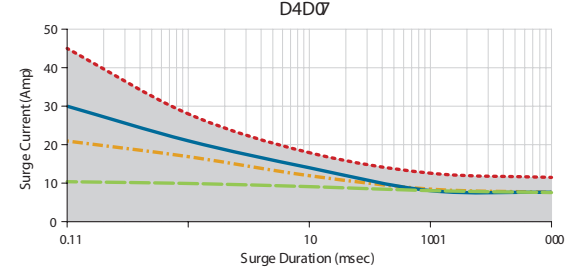
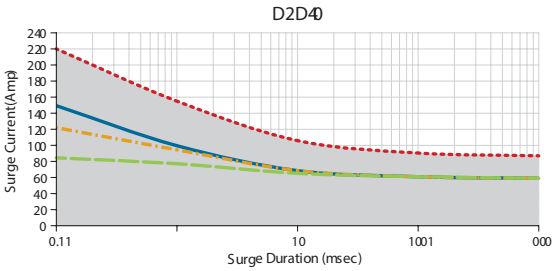
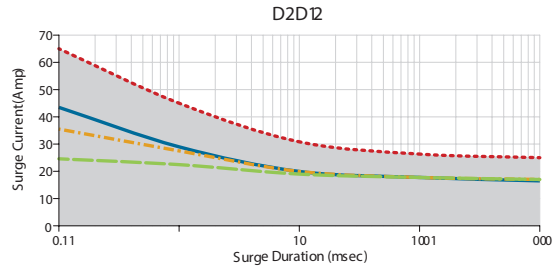
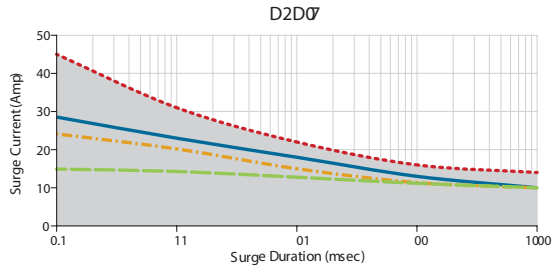


SURGE CURRENT INFORMATION

--- Single Pulse (i) — Duty Factor (10%) (ii) - - - Duty Factor (20%) (ii) — Duty Factor (50%) (ii)



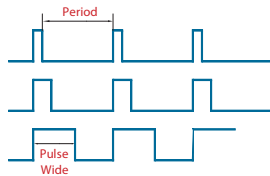
--- Single Pulse (i) — Duty Factor (10%) (ii) - - - Duty Factor (20%) (ii) — Duty Factor (50%) (ii)



Duty Factor 10%

Duty Factor 20%

Duty Factor 50%



For Pulse Width Modulation applications select the curve according duty factor and pulse duration as following.

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

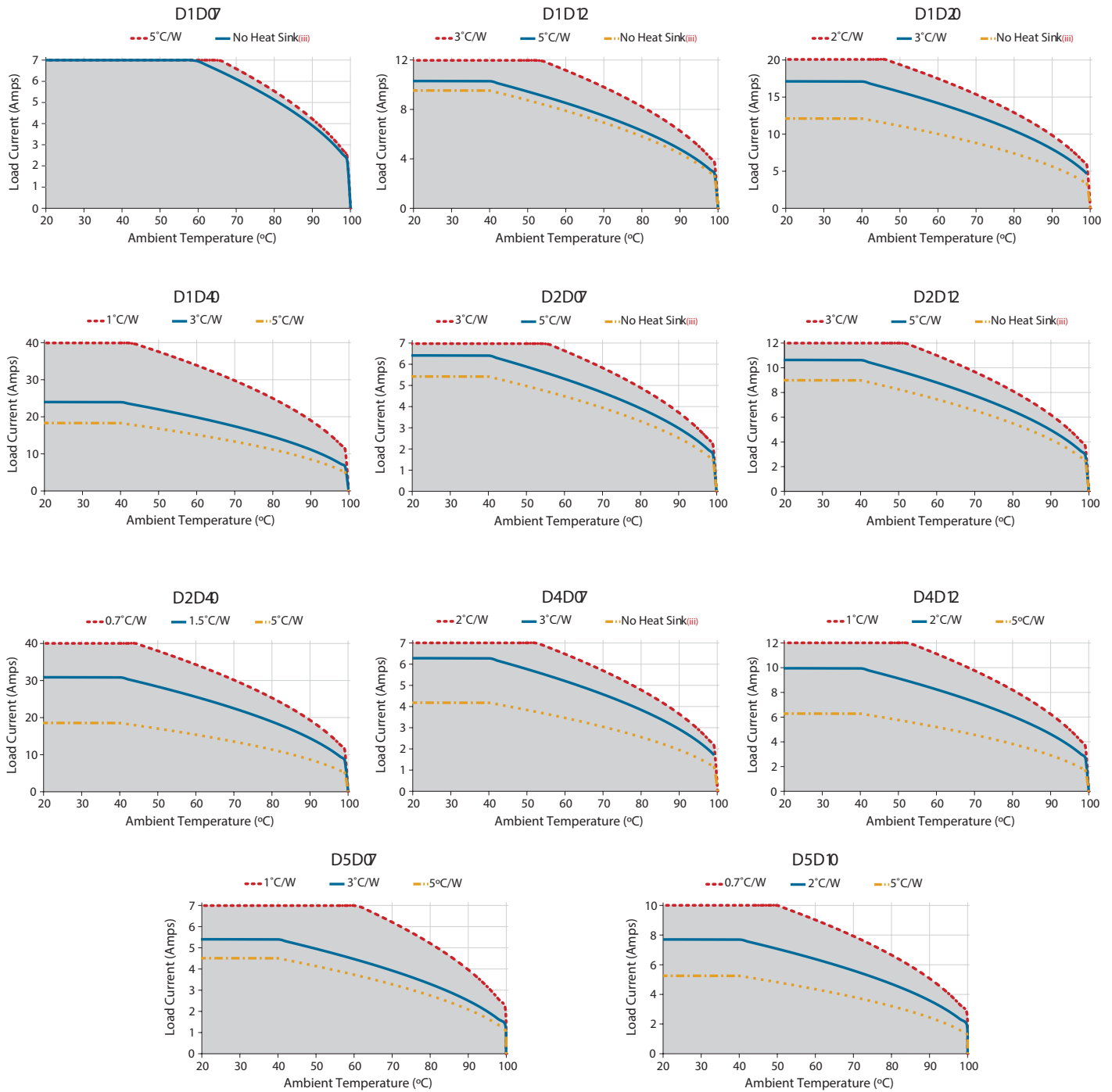
(i) for Single Surge Pulse $T_c=40^\circ\text{C}$; $T_j 175^\circ\text{C}$

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



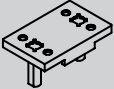
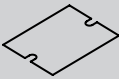
THERMAL DERATE INFORMATION

(iii) SSR metal base plate acting as heat sink, it must be exposed to free ambient air.



● ACCESSORIES

Recommended Accessories

 Cover	 Hardware Kit			 Lug Terminal	 Thermal Pad
		Heat Sink Part No.	Thermal Resistance [°C/W]		
KS101	HK1	HS501DR	5.0	TRM1	HSP-1
	HK4	HS301 / HS301DR	3.0	TRM6	HSP-2
		HS251	2.5		
		HS201 / HS201DR	2.0		
		HS202 / HS202DR	2.0		
		HS172	1.7		
		HS151 / HS151DR	1.5		
		HS122 / HS122DR	1.2		
		HS103 / HS103DR	1.0		
		HS101	1.0		
		HS073	0.7		
		HS072	0.7		
		HS053	0.5		
		HS033	0.36		
		HS023	0.25		

● AVAILABLE OPTIONS

Example : D1D07K

D

1D

07

K

Series

D: 1-DC Series

Operating Voltage

1D: 1-100 VDC
2D: 1-200 VDC
4D: 1-400 VDC
5D: 1-500 VDC

Rated Load Current

07: 7 Amps
10: 10 Amps (500 VDC only)
12: 12 Amps (not for 500 VDC)
20: 20 Amps (100 VDC only)
40: 40 Amps (100 & 200 VDC only)

Termination

Blank: Screws & clamps
K: Installed standoffs with screws for PC Board mounting ⁽¹⁾

Required for valid part number

For options only and not required for valid part number

GENERAL NOTES

- (1) Option "K" is designed and tested for use with printed circuit boards or ring/fork terminals having a thickness between 0.031 and 0.093 inches (0.79 to 2.36 mm).
- (2) All parameters at $T_c=25^{\circ}\text{C}$ unless otherwise specified.
- (3) Heat sinking required, see derating curves.
- (4) Low current loads and high ambient temperature can affect turn-on time.
- (5) 8VDC Minimum control voltage. Resistive loads only. Consider switching losses; at maximum frequency reduce to 75% output current.
- (6) Increase minimum voltage by 1V for operations from -20 to -40°C .
- (7) Decrease maximum control voltage $1.35\text{V}/^{\circ}\text{C}$ above 80°C ambient temperature.
- (8) All parameters at 50% power rating and 100% duty cycle.

For additional information or specific questions, contact Sensata Technical Support.

AGENCY APPROVALS

EN60950-1: Meets the requirements of sections 1.5: 1.7: 2.9: 2.10.5.3: 4.2: 4.5: 4.7:

IEC 61000-4-2 Electrostatic Discharge Level 3

IEC 61000-4-4 Electrically Fast Transients Level 3

IEC 61000-4-5 Electrical Surges Level 3



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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Mailing Address: Sensata Technologies, Inc., 529 Pleasant Street, Attleboro, MA 02703, USA

CONTACT US

Americas

+1 (877) 502 5500
sales.crydom@sensata.com

Europe, Middle East & Africa

+44 (1202) 416170
ssr-info.eu@sensata.com

Asia Pacific

sales.isasia@list.sensata.com
China +86 (21) 2306 1500
Japan +81 (45) 277 7117
Korea +82 (31) 601 2004
India +91 (80) 67920890
Rest of Asia +886 (2) 27602006 ext 2808