

# LOAD MONITORING MODULE | DRML1

## SSR ACCESSORIES

### Description

The DRML1 Load Monitoring Module is designed to be plugged on top of any Nova22 Solid State Relay with Contactor configuration (PM22 and DR22 Series with options V or W) to monitor up to 8 heating elements with similar current value, with a total current ranging from 1.2 Amps up to 50 Amps.

The DRML1 module permanently measures the load current and compares it against a pre-set nominal value (TEACH value) which is stored during the installation of the module either by pressing the "Teach-In" pushbutton, placed on the front, or with the external "Teach-In" input.

The alarm output is activated when the module detects an undercurrent of 12.5% below the nominal value, which corresponds to the failure of a single load. The module can also detect other fault conditions, such as: overcurrent (current

exceeding 12.5% of the nominal current), blown fuses (open load), damaged (short circuited) or interrupted SSR, and it can also detect half-wave operation.

The maximum current value (20 Amps or 50 Amps) and an adjustable alarm response delay (0.1 sec, 1 sec or 5 secs) are selectable on the front via the parameter selector switch. The alarm delay avoids fault messages generated by voltage drops.

Malfuncions are indicated by a multicolor LED, which indicates when power is ON and also when the Teach-In function is activated (Blue), when the input signal is ON (Green) and when an alarm condition is activated (Red).

The DRML1 module is ideal for monitoring the correct operation of a wide range of equipment, such as injection molding, plastic extrusion and thermoforming machines.



### Features

- Sensing current range from 1.2 to 50 Amps at 600 VAC
- Up to 8 resistive loads can be monitored
- Under & Overcurrent detection
- No Mains Voltage/ Open Load and SSR Short Circuit detection
- Compatible with DIN Rail and Panel Mount SSRs (DR2260DxxV/W & PM2260DxxV)
- Easy installation and removal
- LED status indicator
- IP20 touch-safe housing
- Up to 128 outputs can be connected in parallel

**NOVA22**

### PRODUCT SELECTION

Module Type	
Load Monitoring	DRML1

### POWER SUPPLY SPECIFICATIONS <sup>(1)</sup>

Description	DRML1
Supply Voltage Range	8-30 VDC
Minimum Supply Current	10 mA
Maximum Supply Current	30 mA

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

Description	DRML1
Input Voltage Range	4-32 VDC
Minimum Input Current	100 µA
Maximum Input Current	1.5 mA
Maximum Turn-On Time (Ton)	15 msec
Maximum Turn-Off Time (Toff)	15 msec

## EXTERNAL TEACH SPECIFICATIONS <sup>(1)</sup>

Description	DRML1
External Teach Voltage Range	4-32 VDC
Minimum Input Current	100 $\mu$ A
Maximum Input Current	1.5 mA

## CURRENT SENSING SPECIFICATIONS <sup>(1)</sup>

Description	DRML1	
Maximum Teach Current	50 A <sub>RMS</sub>	
Minimum Teach Current	1.2 A <sub>RMS</sub>	
Teach Current	20 Amp Range	1.2-20 A <sub>RMS</sub>
	50 Amp Range	3.2-50 A <sub>RMS</sub>
Minimum Single Load Current	20 Amp Range	0.15 A <sub>RMS</sub>
	50 Amp Range	0.40 A <sub>RMS</sub>
Undercurrent Detection	Teach Current * 0.875 A <sub>RMS</sub>	
Overcurrent Detection	Teach Current * 1.125 A <sub>RMS</sub>	
Load Voltage Frequency Range	47-400 Hz	
Load Voltage Range	48-600 VAC	
Number of Loads	1 to 8	

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

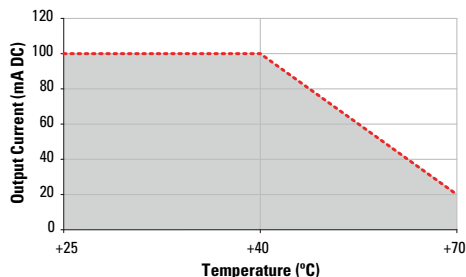
Description	DRML1	
Output Voltage Range	6-29.8 VDC	
Output Voltage @ Max. Current (24 VDC supply)	22 VDC	
Maximum Output Current <sup>(2)</sup>	100 mA	
Minimum Output Current	1 mA	
Maximum Off-State Leakage Current @ Rated Voltage	1 $\mu$ A	
Maximum Number of Outputs Connected in Parallel <sup>(3)</sup>	128	
Alarm Delay Time	0.1 sec	0.1 $\pm$ 0.035 sec
	1 sec	1 $\pm$ 0.1 sec
	5 sec	5 $\pm$ 0.1 sec
No Mains Voltage/ Open Load Detection Current Min/Max	20 Amp Range	50 mA <sub>RMS</sub> / 500 mA <sub>RMS</sub>
	50 Amp Range	100 mA <sub>RMS</sub> / 1.0 A <sub>RMS</sub>

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

Description	Parameters
Dielectric Strength, Input to Output (50/60Hz)	4000 V <sub>RMS</sub>
Minimum Insulation Resistance (@ 500 VDC)	10 <sup>9</sup> Ohms
Maximum Capacitance, Input/Output	14 pF
Ambient Operating Temperature Range	-25 to 70 °C
Ambient Storage Temperature Range	-25 to 70 °C
Weight (typical)	1.5 oz (43 g)
Housing Material	UL94 V-0
Humidity	95% non-condensing
LED Input Status Indicator	See Status Chart

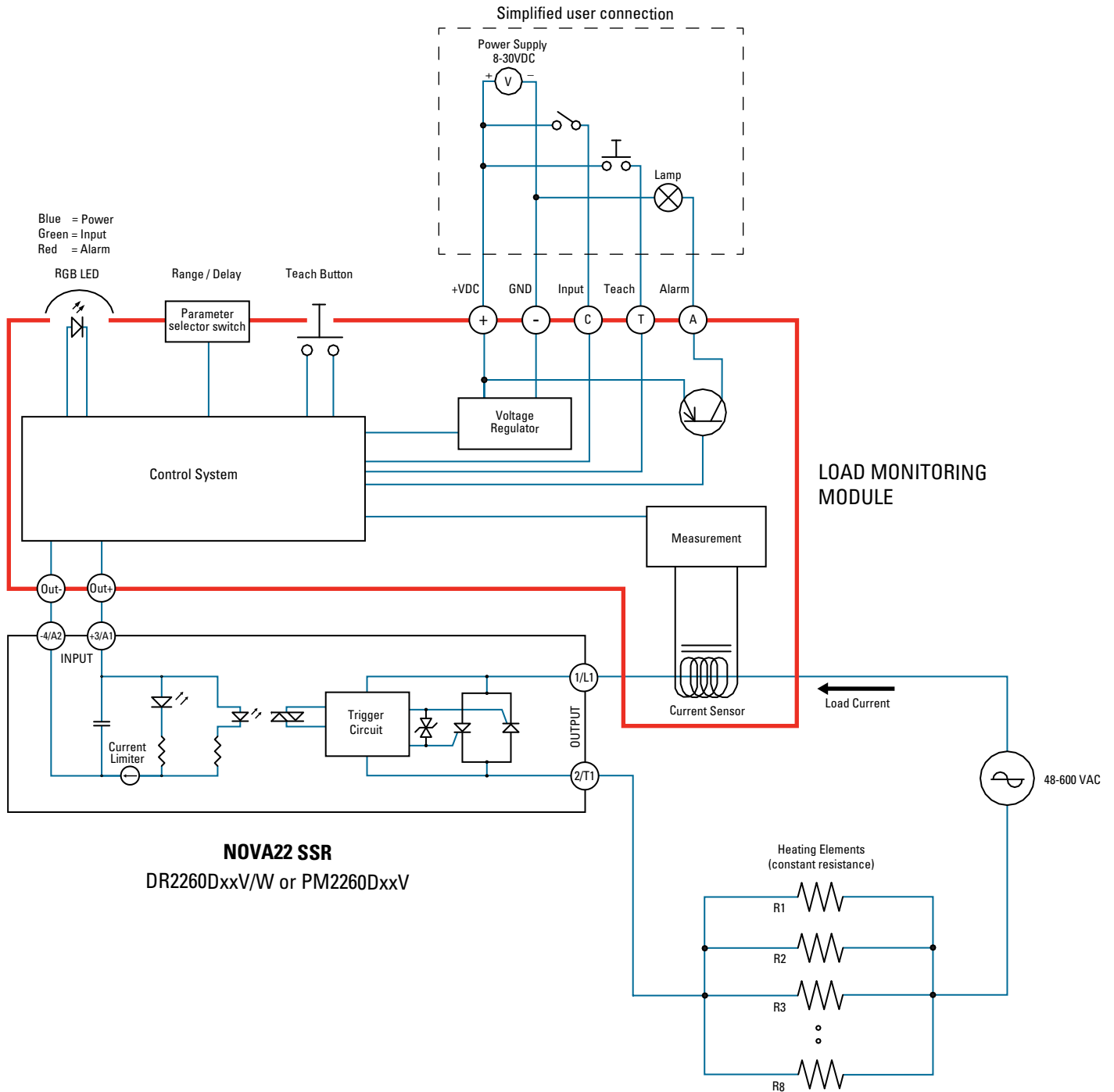
## THERMAL DERATE INFORMATION

Alarm Output Current





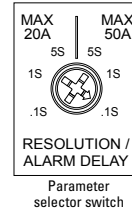
# EQUIVALENT CIRCUIT BLOCK DIAGRAMS/WIRING DIAGRAM





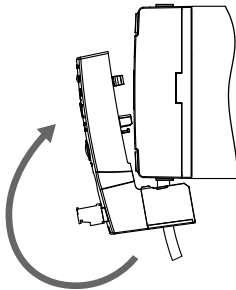
# INSTALLATION INSTRUCTIONS

- Remove the ID marker and input connector from the NOVA22 relay.
- Wire input and output as shown in the Wiring Diagram. Before wiring terminal 2/T1 pass the wire through the module hole. For recommended wire sizes and terminal torques see TABLE 1.
- Mount the module onto the relay as shown in steps 1 and 2.
- Proceed to configure the module:
  - ◆ Select the maximum load current (20 Amps or 50 Amps) and the alarm delay (0.1, 1 or 5 secs) using the parameter selector switch. NOTE: Parameter selector switch is updated at startup or if no input signal is present.
  - ◆ Turn on all power supplies.
  - ◆ Press TEACH-IN button (or apply external TEACH-IN input) for 3 seconds to store the nominal load current value. LED will blink Blue 3 times when TEACH process is complete.
  - ◆ Module will start monitoring the system once TEACH-IN button has been released. Refer to TABLE 1 and Status Charts for detailed operation and status.
- For module removal follow steps 3 and 4.

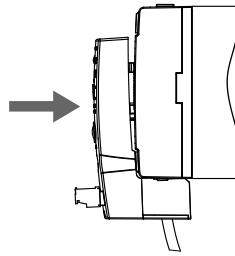


## Module Mounting

**STEP 1:**  
Align the module to the bottom of SSR

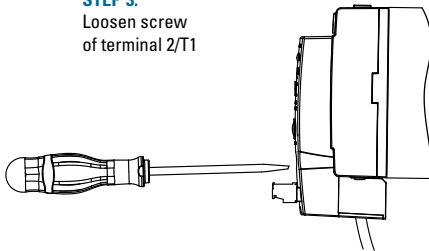


**STEP 2:**  
Push to put into place as shown

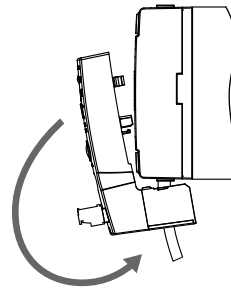


## Module Removal

**STEP 3:**  
Loosen screw of terminal 2/T1



**STEP 4:**  
Hold module and pull to remove



**TABLE 1. Recommended Torque and Wire Sizes**

Terminal	Max. Screw Torque [in-lb (Nm)]	Wire Size (Solid / Stranded)	Wire Pull-Out Strength (lb)[N]
Output	18-20 (2.0-2.2)	20 AWG (0.75 mm <sup>2</sup> ) [minimum]	25 [111]
		10 AWG (6 mm <sup>2</sup> )	70 [310]
		8 AWG (10 mm <sup>2</sup> ) [maximum]	70 [310]
Input	1.6 (0.19)	28 AWG (0.09 mm <sup>2</sup> ) [minimum]	2.2 [9.8]
		14 AWG (2.5 mm <sup>2</sup> ) [maximum]	22 [98]

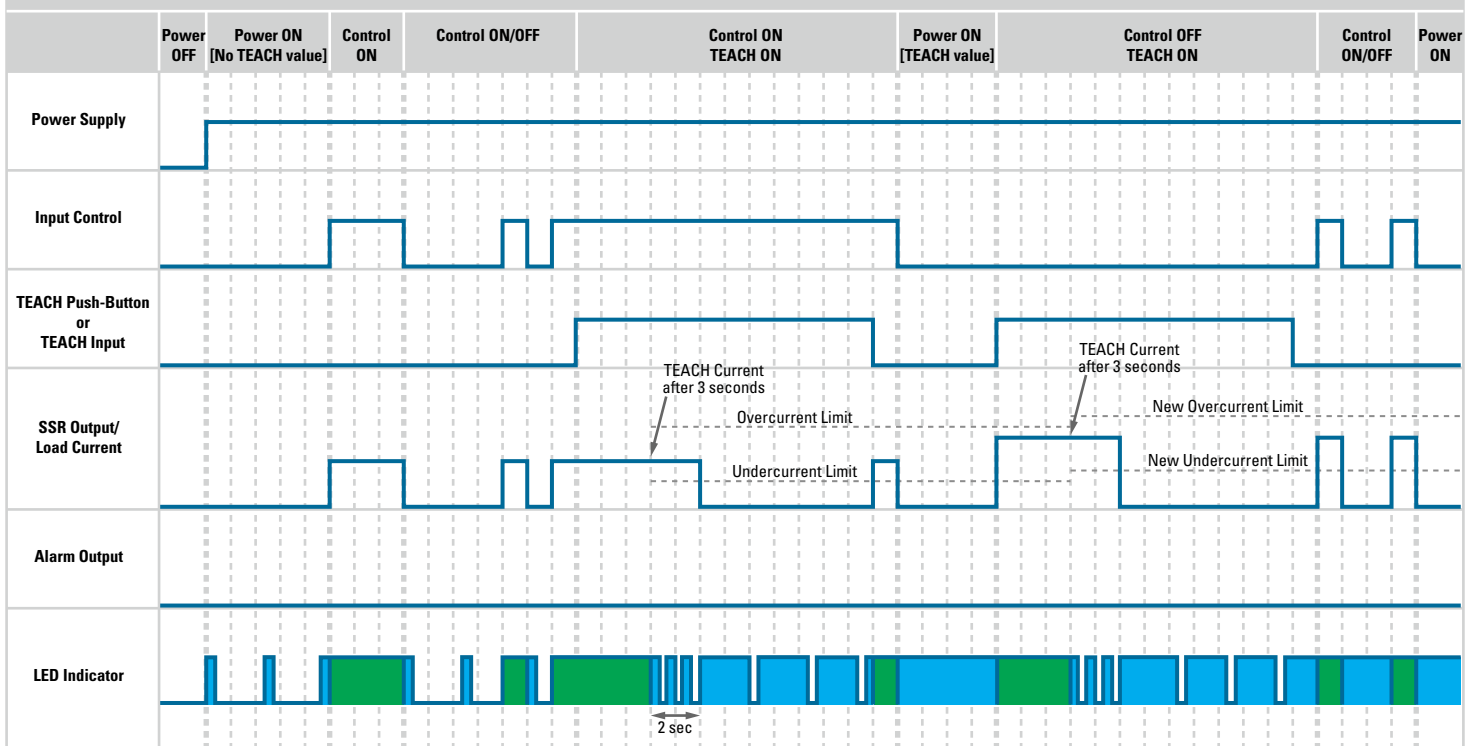
TABLE 2. LED Status

Status	LED Indicator	SSR Output	Alarm Output
No Power	Off	OFF	OFF
Power ON [brand new, no TEACH value]	Blinking Blue constantly	OFF	OFF
Power ON [TEACH value stored]	Blinking Blue 3 times	OFF	OFF
Power ON [TEACH value operative]	Blue	OFF	OFF
Input Control ON	Green	ON	OFF
ALARM - No Mains Voltage/ Open Load	Red	OFF	ON
ALARM - Undercurrent	Blinking Red 1 time	ON	ON
ALARM - Overcurrent	Blinking Red 2 times	ON	ON
ALARM - SSR Short Circuit	Blinking Red constantly	ON	ON

LED Color



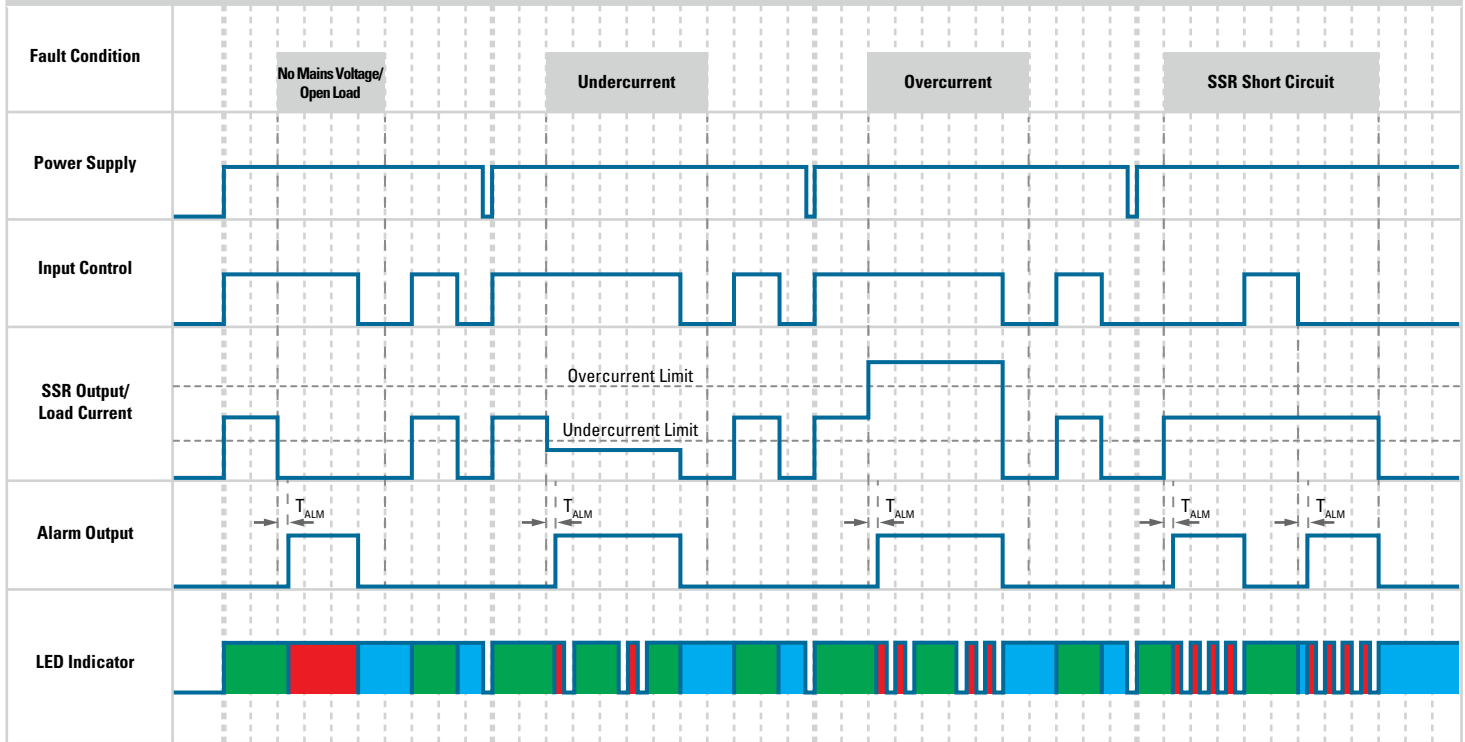
Status Chart-Normal Operation



LED Color



### Status Chart - Fault Operation



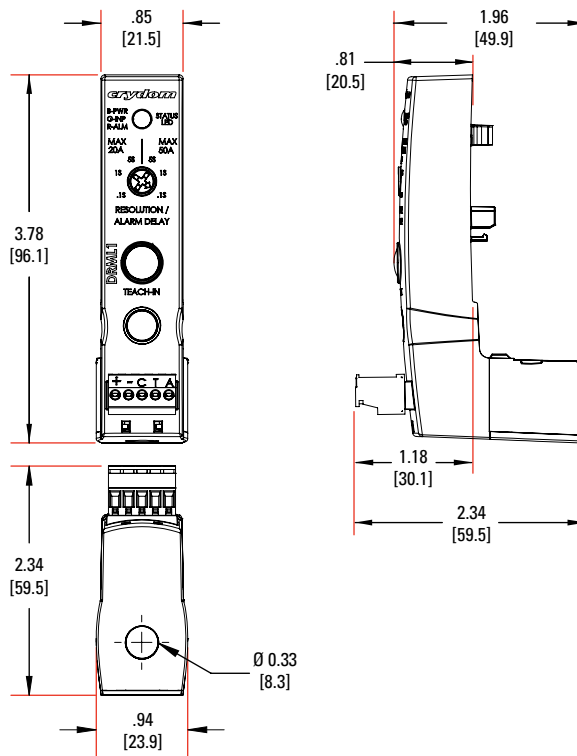
$T_{ALM}$  = Alarm Delay Time

LED Color

- Blue
- Green
- Red

## MECHANICAL SPECIFICATIONS

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



Approvals	
	   

Conformances	
United States Standard for Industrial Control Equipment - UL 508 and Canadian Standard Association for Industrial Control Equipment – C22.2 No. 14.	
Vibration Resistance	IEC 60068-2-6: Amplitude Range 10-55 Hz, Displacement 0.75 mm
Shock Resistance	IEC 60068-2-27: Peak Acceleration 15g, Duration 11ms.

Electromagnetic Compatibility				
Generic Standard	Immunity Tests	Test Specification Level	Performance	
IEC 61000-6-2 Immunity for Industrial Environments	Electrostatic Discharge IEC 61000-4-2	8kV air discharge	Criterion A	
		6kV contact discharge	Criterion A	
	Fast transients (burst) IEC 61000-4-4	Output	2kV, 5kHz, 100kHz	Criterion B
		Input	1kV, 5kHz, 100kHz	Criterion B
	Surge IEC 61000-4-5	Output	1kV Line to Line	Criterion B
			2kV Line to Earth	Criterion B
	DC Port	500 VDC Source Terminal	Criterion A	

 GENERAL NOTES

- (1) All parameters at 25°C unless otherwise specified.
- (2) For ambient temperatures above 40°C see the Alarm Output derate curve.
- (3) With a minimum alarm load current of 10mA (Impedance ≤ 2.4kΩ @ 24 VDC).

 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 – Option 2  
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