Sensata Technologies

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.

Malfunctions 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 (1)

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

INPUT SPECIFICATIONS (1)

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 (1)

Description	DRML1
External Teach Voltage Range	4-32 VDC
Minimum Input Current	100 µA
Maximum Input Current	1.5 mA

CURRENT SENSING SPECIFICATIONS (1)

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

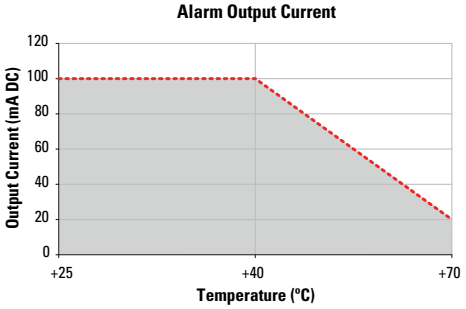
ALARM SPECIFICATIONS (1)

Description		DRML1
Output Voltage Range		6-29.8 VDC
Output Voltage @ Max. Current (24 VDC supply)		22 VDC
Maximum Output Current (2)		100 mA
Minimum Output Current		1mA
Maximum Off-State Leakage Current @ Rated Voltage		1 µA
Maximum Number of Outputs Connected in Parallel (3)		128
Alarm Delay Time	0.1 sec	0.1 ± 0.035 sec
	1 sec	1 ± 0.1 sec
	5 sec	5 ± 0.1 sec
No Mains Voltage/ Open Load Detection Current Min/Max	20 Amp Range	50 mA_{RMS} / 500 mA_{RMS}
	50 Amp Range	100 mA_{RMS} / 1.0 A_{RMS}

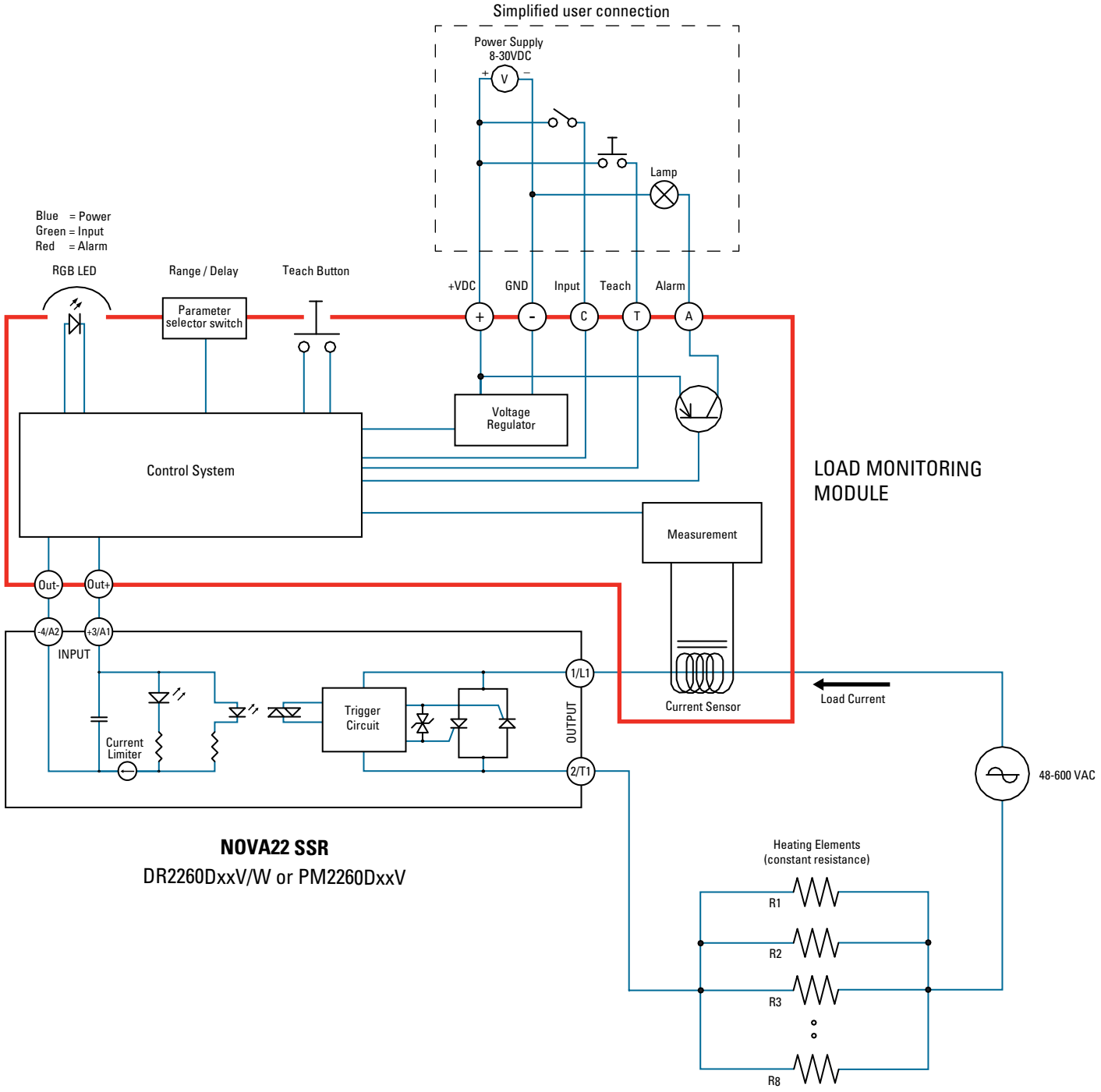
GENERAL SPECIFICATIONS (1)

Description	Parameters
Dielectric Strength, Input to Output (50/60Hz)	4000 V_{RMS}
Minimum Insulation Resistance (@ 500 VDC)	10^9 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



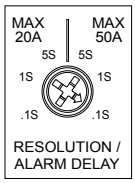
EQUIVALENT CIRCUIT BLOCK DIAGRAMS/WIRING DIAGRAM



NOVA22 SSR

DR2260DxxV/W or PM2260DxxV

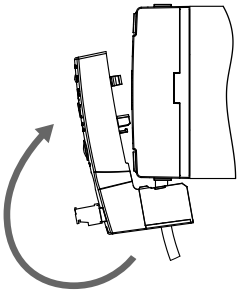
- Remove the ID marker and input connector from the NOVA22 relay.
- Wire input and output as shown in the Wiring Diagram. Before wiring terminal 2/T1 pass the wire through the module hole. For recommended wire sizes and terminal torques see TABLE 1.
- Mount the module onto the relay as shown in steps 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.



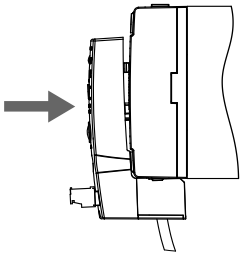
Parameter selector switch

Module Mounting

STEP 1:
Align the module to the bottom of SSR

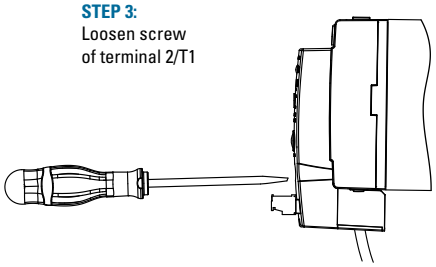


STEP 2:
Push to put into place as shown



Module Removal

STEP 3:
Loosen screw of terminal 2/T1



STEP 4:
Hold module and pull to remove

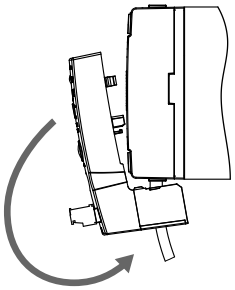


TABLE 1. Recommended Torque and Wire Sizes

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 mm²) [minimum]	25 [111]
		10 AWG (6 mm²)	70 [310]
		8 AWG (10 mm²) [maximum]	70 [310]
Input	1.6 (0.19)	28 AWG (0.09 mm²) [minimum]	2.2 [9.8]
		14 AWG (2.5 mm²) [maximum]	22 [98]

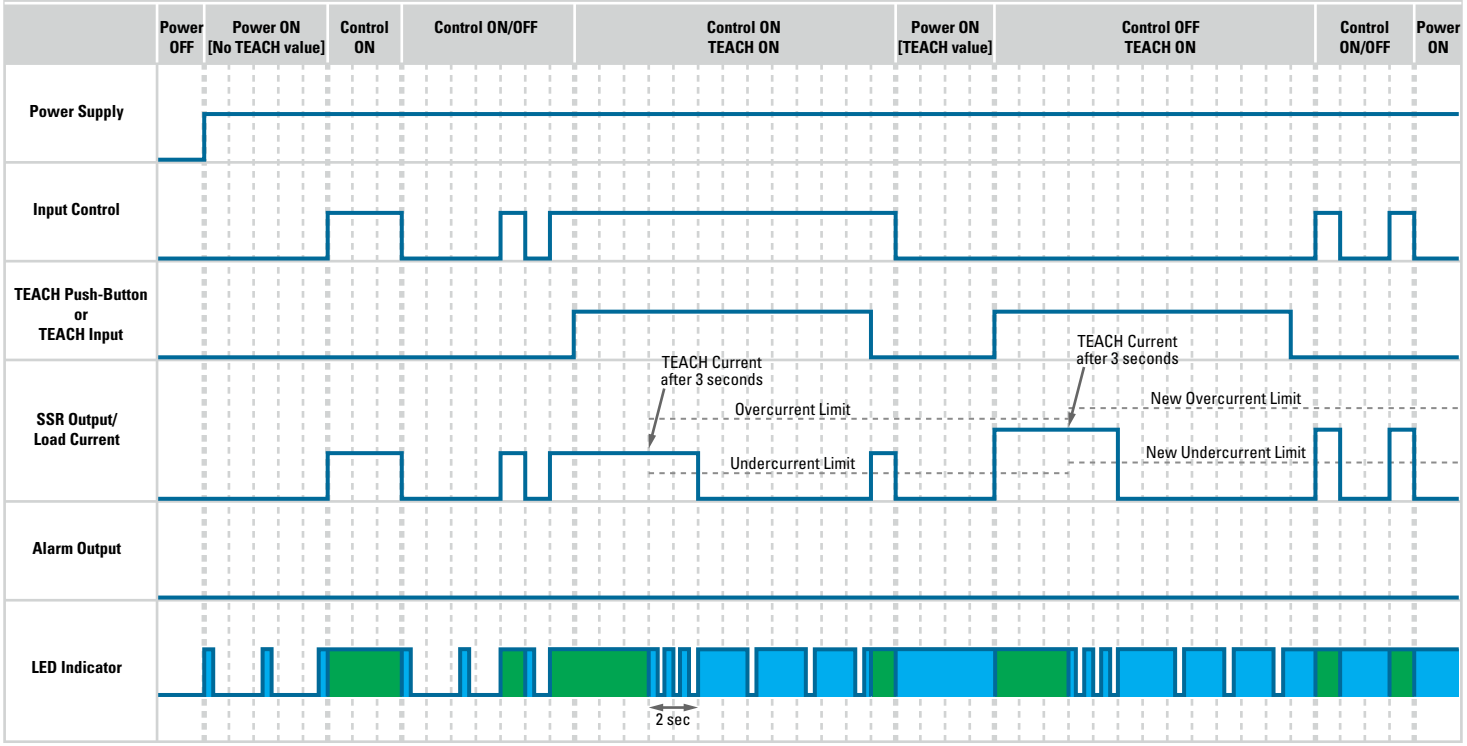
TABLE 2. LED Status

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

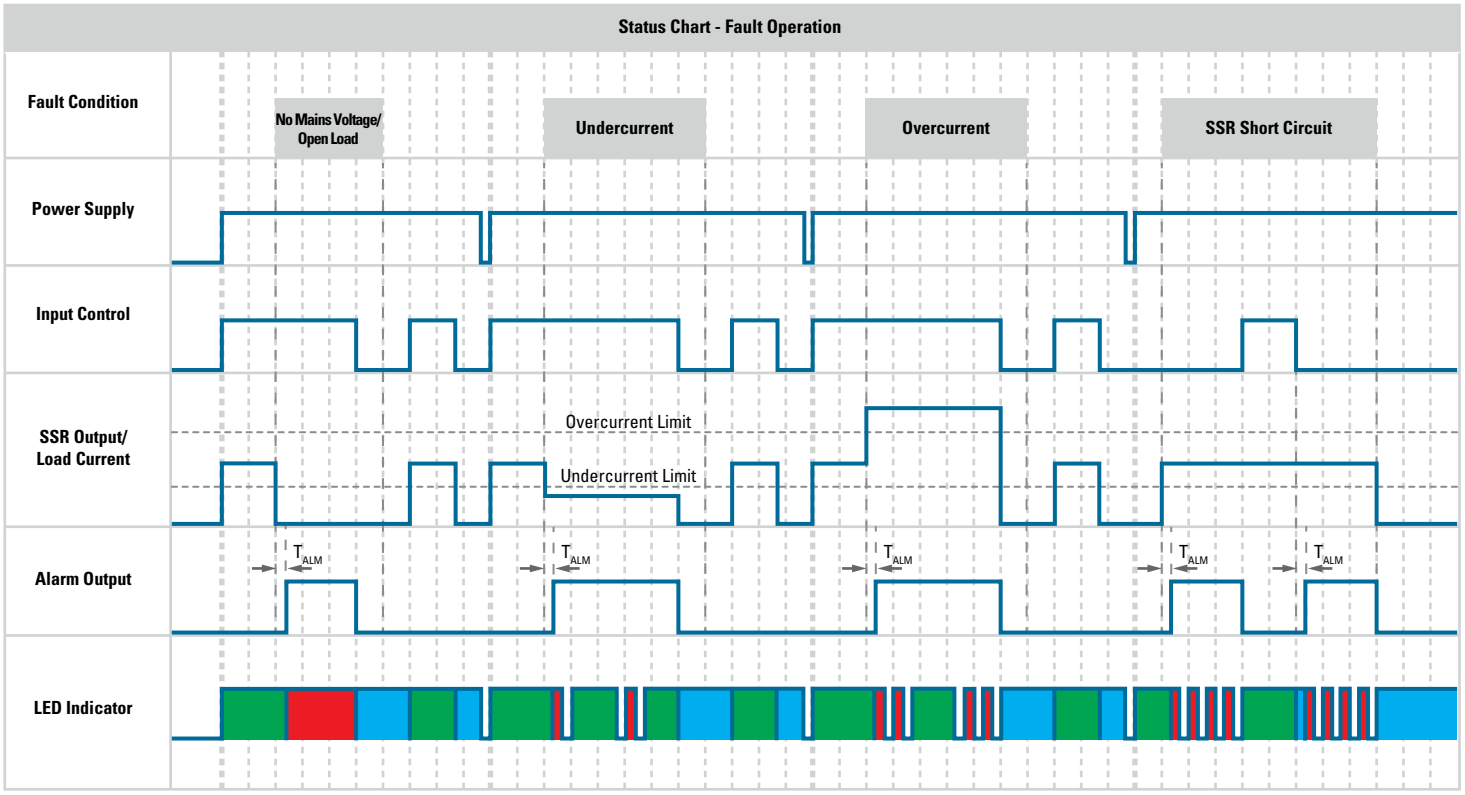
Blue Green Red

Status Chart-Normal Operation



LED Color

Blue Green Red



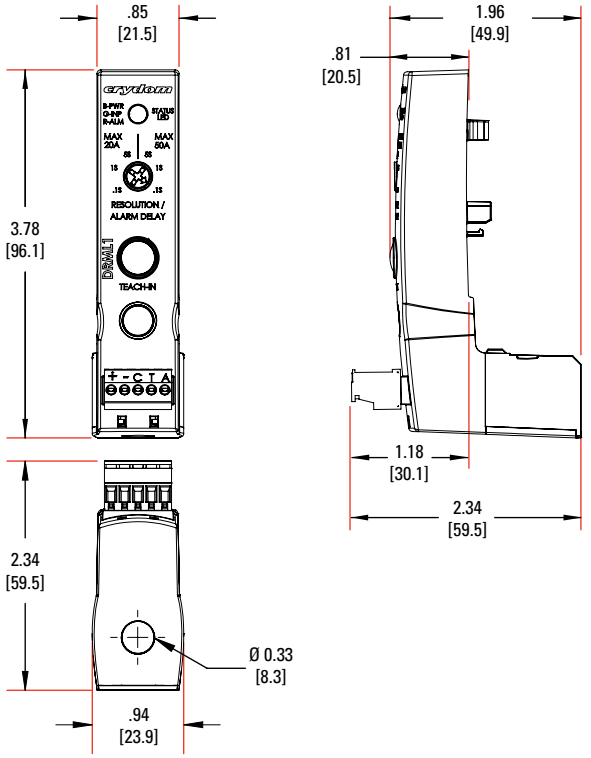
T_{ALM} = Alarm Delay Time

LED Color

Blue Green Red

MECHANICAL SPECIFICATIONS

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



AGENCY APPROVALS & CERTIFICATIONS

Approvals
c UL us E116950 IEC CE RoHS emc

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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