104-0020B

ARC SUPPRESSION TECHNOLOGIES®

Every Cycle Counts!®

NOsparc®

MGXDC1F250, MGXDC1F125, MGXDC1F108, MGXDC1F096, MGXDC1F084, MGXDC1F072, MGXDC1F060, MGXDC1F048, MGXDC1F036, MGXDC1F024, and MGXDC1F012

PATENTS GRANTED AND PATENTS PENDING

PowerSide™ Contact Arc Suppressor

Contact Arc Suppression for DC Power
Relays, Contactors, and Snap-Action Switches

User Manual

IMPORTANT NOTES

This document provides information required to install a NOsparc® arc suppressor. You must read and understand this document before installing this device.

If you have any problems with your installation, please refer to Technical Support contact information below.

TRADEMARKS:
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CONTACT INFORMATION

Arc Suppression Technologies, LLC
7900 International Drive, Suite 300
Bloomington, Minnesota 55425 USA
+1 612-928-5546
info@ArcSuppressionTechnologies.com
www.ArcSuppressionTechnologies.com

APPLICABLE DOCUMENTS:

The UL Recognized Component mark shown below indicates that UL LLC has certified the compliance of the NOsparc® units included in this manual as "Component - Auxiliary Devices" for both Canada and the United States.

Underwriters Laboratories
UL 508 Industrial Control Equipment

CSA-C22.2 No. 14, Industrial Control Equipment

c UL us
File No.: E346457

LIFE SUPPORT:

Arc Suppression Technologies products are specifically NOT authorized for use as critical components in life support devices or systems without the express written approval of the Chief Executive Officer of Arc Suppression Technologies.

As used herein:

Life support devices or systems are devices or systems which support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in significant injury to the user.

A critical component is any component in a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or to affect its safety or effectiveness.

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Arc Suppression Technologies only accepts products for repair or return that are accompanied by a Return Material Authorization number from the appropriate distributor or sales representative.

Please refer to your original purchase agreement or contact your distributor or sales representative for return policy information.

SAFETY INFORMATION OVERVIEW

We use note, caution and warning symbols throughout this book to draw your attention to important operational and safety information.

"WARNING" describes an alert with information that is important for protecting personnel and equipment from damage.

"CAUTION" describes any condition that could result in damage to the equipment or result in physical harm to personnel.

The CAUTION or WARNING "SAFETY" alert symbol

(an exclamation mark in a triangle) precedes a general caution or warning statement. It describes safety requirements to meet local, national and international standards.

The Electrical Shock Hazard CAUTION OR WARNING symbol, (a lightning bolt in a triangle) precedes an electric shock hazard. It describes a potential electrical shock hazard which can result in personal injury or death.

"NOTE" describes any item of interest to the user, owner or operator.

WARNINGS:

Follow extreme caution when applying NOsparc® to trip and close contacts or in circuits containing elements that can be energized by a 1/2 power cycle pulse.

This User Manual must be thoroughly and accurately followed to avoid unintended equipment operation.

The assembly must conform to National Electric Code (NEC) safety standards, as well as locally applicable codes. Failure to do so could result in personal injury or loss of life. See the product rating curve for wire gauge selection, ambient temperature and current restrictions.

Follow extreme caution when conducting short cycle time tests, especially below the maximum rated cycle time for the associated relay; typically 3s. Even at significantly

reduced power levels the relay contacts become extremely hot due to high current densities at the point of contact constriction just before the contact breaks open. Always follow the relay manufacturers specifications and requirements. Standard relays typically have a maximum short period cycle time of 1200 cycles per hour.

Only authorized and qualified personnel should install and service the NOsparc® MGXDC1F. Failure to comply with these recommendations may result in damage to equipment and property and injury to personnel.

Always test the function and performance of NOsparc® in the intended application.

An arc suppressor DOES NOT eliminate arcing, therefore, use of the NOsparc® will not eliminate hazards associated with electrical current contact arcing.

SAFETY:

All creepage distances and clearances of NOsparc® have been designed to meet requirements of safety standards.

When using NOsparc® MGXDC1F, basic safety precautions should always be followed to reduce risk of fire, electric shock, and injury to persons. When installing NOsparc® into your system, make sure that the Quick Connect Terminal connector is properly crimped, terminated, insulated and that the proper wire gauge is used and that the connector is securely seated. Incorrect application or termination can result in harmful or fatal electrical shock or component damage.

CAUTIONS:

The NOsparc® will pass a leakage current (see specifications) even though the contacts across which it is connected are open (similar to leakage present with snubber use). This capacitive leakage current can be sufficient to turn-on some solid state and electromechanical relays, or to cause electric shock to personnel. Therefore:

The NOsparc® must never be connected across relay, contactor, or snap action switch contacts driving high impedance loads.

The NOsparc® must never be connected across relay, contactor, or snap action switch contacts used for galvanic/safety isolation.

Proper care must be taken when handling and installing NOsparc® MGXDC1F.

Never plug or unplug NOsparc® while powered.

Do not connect NOsparc® directly to power!

Use caution when installing or modifying power connections.

NOTES:

Connect NOsparc® across the power switching relay, contactor, or snap action switch contacts only!

NOsparc® capabilities will be fully effective even under mixed load conditions.

NOsparc® has been designed to support the following DC power loads:

General Purpose

Resistive

DO NOT use NOsparc® DC products for AC power applications.

DO NOT use NOsparc® under the following power conditions:

Non-sinusoidal power circuits

Phase controlled power circuits

DO NOT connect NOsparc® across the following components:

General Purpose

Resistive

DO NOT use NOsparc® either above or below its ratings or specifications.

DO NOT operate the contacts to which the NOsparc® is attached above or below their ratings or specifications.

DISCLAIMER

All product, product specifications and data are subject to change without notice to improve reliability, function or design or otherwise.

Arc Suppression Technologies, LLC, its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Arc Suppression Technologies"), disclaim any and all liability for any errors, inaccuracies, or incompleteness contained in this User Manual or in any other disclosure relating to any product.

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Statements regarding the suitability of products for certain types of applications are based on Arc Suppression Technologies' knowledge of typical requirements that are often placed on Arc Suppression Technologies products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in data sheets and/or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Arc Suppression Technologies' terms and conditions of purchase, including but not limited to the warranty expressed therein.

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MATERIAL CATEGORY POLICY

Arc Suppression Technologies, LLC hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.

WARRANTY

Please contact your distributor or sales representative for warranty information.

TECHNICAL SUPPORT

Please contact your distributor or sales representative with technical support and product support questions. Have the following information available when contacting your representative: Model Number and Serial Number.

In certain circumstances, direct product support from Arc Suppression Technologies may be reached via the following communication methods:

support@ArcSuppressionTechnologies.com

www.arcsuppressiontechnologies.com/contact-us/support/

+1 612-928-5546

CONDITIONS FOR SERVICE:

In the event of a product malfunction, Arc Suppression Technologies or an authorized agent should perform all repairs to a NOsparc® arc suppressor. It is the responsibility of users requiring service to report the need for service to their distributor or sales representative.

Any components, devices or other equipment used with or adjacent to a NOsparc® arc suppressor is the sole responsibility of the end user and not of Arc Suppression Technologies or any of its agents, resellers, representatives or distributors.

RETURN MATERIAL AUTHORIZATION & PROCESS:

Authorization prior to returning product is required. Please refer to your original purchase agreement or contact your distributor or sales representative for an RMA number and instructions before returning product.

NOTE: Terms and conditions vary by distributor and representative. Please refer questions to your distributor or sales representative.

PRODUCT DESCRIPTION

NOsparc® products (DC power applications) are a family of two-terminal contact arc suppressors that attach across the contact points of a power relay, contactor, or snap action switch. The products are designed to protect the contact points from premature destruction due to contact current arcing. This extends contact life 10X or more depending on application.

In simple terms, NOsparc® operates as follows:

NOsparc® detects the occurrence of an arc event.

NOsparc® activates to suppress the arc.

NOsparc® deactivates when the contacts are open and suppression is not required.

NOsparc® is continuously protected by over-voltage suppression.

DEFINITIONS

Arc Current ..... Plasma flow supported between open contacts

Arc Suppression Duration Time during which the electrical current contact arc is arrested

Arc Suppressor ..... Device designed to reduce contact arcing

Break ..... Action of a contact which transitions from close to open

Bounce ..... One or more brief transition(s) to the OPEN state as the contact is closing *or* to the CLOSE state as the contact is opening

Break Current ..... Contact current during Break

Cycle Time ..... Time between successive ON or OFF contact states

Inductive Load ..... Motor or transformer form the main part of the load

Inrush Current ..... Resulting turn-on current when powering an inductive, capacitive or tungsten load

Inrush Current Limiter ..... Device intended to limit the amount of turn-on current when powering an inductive, capacitive or tungsten load

Make ..... Action of a contact which transitions from open to close

Make Current ..... Contact current during Make

MOV ..... Metal Oxide Varistor

MTBF ..... Mean-Time-Between-Failures

Power-On Passthrough .... Current passing through the arc suppressor during initial power-up

RC Snubber ..... Device with resistor and capacitor in series across contact

Snubber ..... Device designed to limit voltage rise times

Suppression ..... Action of minimization of undesired event

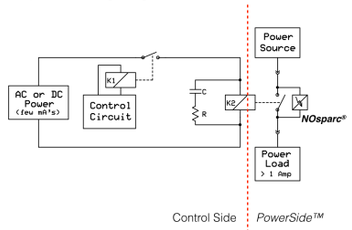
Varistor Clamping Voltage Voltage at which steady state current through the arc suppressor is ≥ 1mA

Maximum Varistor DC Voltage ..... Maximum allowed voltage across the arc suppressor (NOT operating voltage)

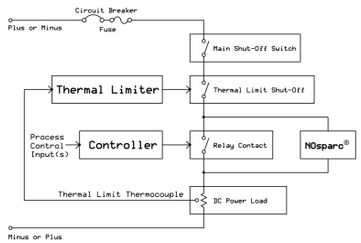
SYSTEM WIRING

NOsparc® arc suppressor has two male quick connect terminals which must mate with two properly crimped female quick connect terminals.

NOsparc® Wiring Diagrams



NOsparc® suppresses PowerSide™ contact arcing.



For simplicity, only a single (one) DC power rail shown

In order to provide effective arc suppression, the two wires between NOsparc® arc suppressor and the relay, contactor, or snap action switch contact terminals should be as short as possible.

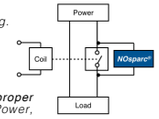
One foot or less of wire length is ideal; lengths over 3 feet are not recommended. If longer cable lengths are needed, then the wire gauge must be increased according to the following recommendation based on the length of wire between NOsparc® arc suppressor terminals and the contact terminals:

#16AWG (minimum) for less than 0" to 12" of wire
#14AWG (minimum) for less than 12" to 24" of wire
#12AWG (minimum) for less than 24" to 36" of wire

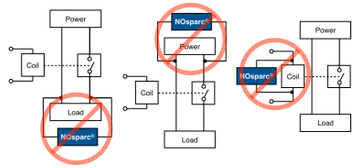
DO NOT HOOK-UP NOSPARC® ACROSS THE LOAD, POWER, OR COIL:

NOsparc® will be damaged if connected across the following locations where there is NO arcing: LOAD, POWER, and/or Coil.

At left: Proper NOsparc® wiring.



*Below, left to right: **improper** NOsparc® wiring across Power, Load, and Coil.*



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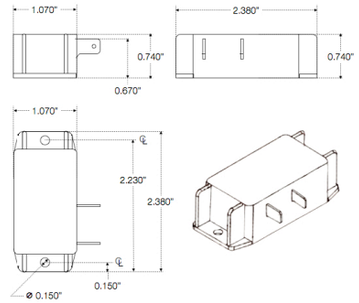
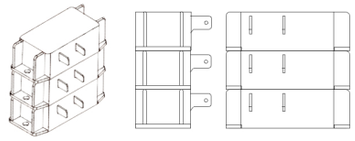
CASE SPECIFICATIONS AND MOUNTING

CASE DIMENSIONS:



PANEL MOUNTING:

For ease of installation, NOsparc® arc suppressors may be stacked up to three (3) units high by threading a #6 screw through the mounting holes in the flanges of each unit as shown below:

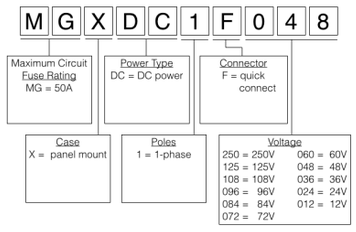


DIN RAIL MOUNTING:

DIN rail mounting of either single of stacked arc suppressors can be accomplished by adding a single DIN rail mounting adaptor (NOT PROVIDED) (accepting a #6 screw) to each side of the single arc suppressor or stacked arc suppressors.

Image above is a representation only.

PART NUMBER & PRODUCT DESCRIPTION



(Example shown: NOsparc® MGXDC1F048)

SPECIFICATIONS

NOsparc® MGXDC1F	012	024	036	048	060	072	084	096	108	125	250
ARC SUPPRESSION	Duration: 1ms (typical)										
CIRCUITS (CONTACTS)	One (1) NOsparc® per contact (multiple NOspar® units required for multi-contact relays)										
CIRCUIT BREAKER / FUSE (MAXIMUM)	50A for resistive loads (see Safe Operating Area charts below for more detail)										
CLAMPING VOLTAGE	330V (typical at 1mA)										
CONTACT CYCLING	Maximum cycle time: per relay specifications (DO NOT EXCEED relay operating specs)										
DIMENSIONS	length: 2.380in (6.045cm) width: 1.070in (2.718cm) height: 0.740in (1.880cm)										
ENVIRONMENTAL	operating temperature: -40°C to 85°C (-40°F to 185°F) storage temperature: -50°C to 125°C (-58°F to 257°F) humidity: 5% to 95% (non-condensing)										
HORSEPOWER RATING	0.08 HP	0.17 HP	0.25 HP	0.34 HP	0.42 HP	0.51 HP	0.59 HP	0.68 HP	0.76 HP	0.84 HP	1.77 HP
INTERFACE WIRES	across contacts: two (2) (W1/W2 non-polarized)										
LEAKAGE CURRENT	0.5mA (nominal)										
MOUNTING	orientation: any number of holes: two (2) hole diameter: 0.150in (#6 screw) (3.81mm)										
MTBF / RELIABILITY	2.6 million hours (MIL-HDBK-217F)										
OPERATING VOLTAGE (NOMINAL +/-15%)	12V DC	24V DC	36V DC	48V DC	60V DC	72V DC	84V DC	96V DC	108V DC	125V DC	250V DC
POWER-ON	load current passthrough: 1ms										
POWER TYPE	DC (direct current)										
TERMINATION	0.250in quick connect male terminals (non-insulated)										
TERMINATION MATE	0.250in quick connect female terminals (fully insulated)										
WEIGHT	net weight: 1oz (28g)										
WIRE GAUGE	wire length 0in to 12in: #16AWG / wire length 12in to 24in: #14AWG / wire length 24in to 36in: #12AWG (NOTE: wire length between Nosparc® and contact terminals; wire lengths over 3 feet are NOT recommended)										

CIRCUIT BREAKER / CIRCUIT FUSE DE-RATINGS:

The following charts depicts the circuit breaker / circuit fuse Safe Operating Area (SOA) for different loads.