

cynergy³ componentsTM



High Voltage & RF Reed Relays





Radio frequency, high voltage and custom reed relays

Cynergy³ Components Limited has been involved in the manufacture of Reed Switches, Reed Relays, Liquid Level and Flow Switches, for over 40 years.

Design, development and manufacturing of reed relays are all contained within one site in Wimborne, Dorset. This enables Cynergy³ to maintain complete control over production, quality and delivery, as well as providing our customers with fast and accurate responses.



The Wimborne site incorporates a new clean room, installed in 2006, where our specialist Radio Frequency, High Voltage and High Power Reed Switches are built. Our production areas include a comprehensive range of coil winding equipment, Float Switch, Flow Switch and Reed Relay production lines. Specialised automated and semi-automated test equipment is used for each of the product ranges, to ensure the standard of quality.

The company aims to provide high quality products, based on innovative engineering skills and reliable production processes. We develop close partnerships with our customers by working with them, from early feasibility studies through to delivering production quantities.

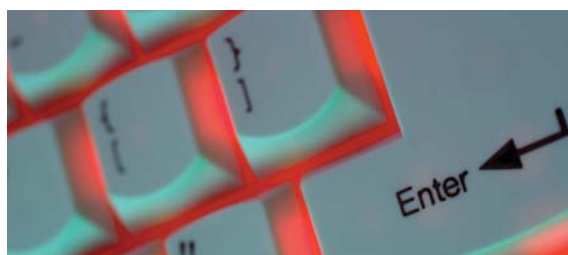
Radio Frequency Reed Relays (DC to 30MHz)

The RF reed relay range has been developed from our expertise in high vacuum RF reed switches and is the result of many years research and development, working with the world's top HF radio system manufacturers. Solutions are available to suit all HF applications requiring voltage isolation up to 9kV and carry currents up to 20 Amps (RMS at 30MHz).

High Voltage Reed Relays (to 15kV isolation)

The HV reed relay range includes relays capable of withstanding up to 15kV DC, in the D series, which are widely used in high reliability applications such as cardiac defibrillators, cable, transformer and semiconductor test equipment, as well as high voltage power supplies. A number of different mounting and connection options are offered alongside the popular PCB 'through-hole' version.

The miniature S series is available in a 30mm package, for use in applications where PCB space is at a premium. These are capable of isolating up to 5kV DC and were developed specifically for the high voltage ATE market, where size, performance and reliability are paramount.



Custom Reed Relays

Cynergy³ have supplied many hundreds of custom designed relays to suit particular customer application requirements, over the last 30 years. We are geared towards providing custom RF, HV and general purpose relays, drawing on standard components, thus minimising development costs.

**ISO 9001
registered
production
facility, high
voltage & radio
frequency reed
relays for over
thirty years**



Certificate No. FM 2050

High Voltage Reed Relays

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Radio Frequency Reed Relays

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Visit our website for application notes:

www.cynergy3.com

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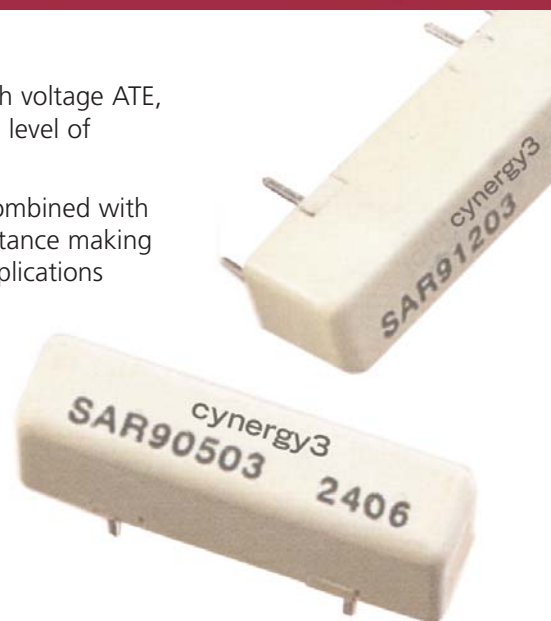
High Voltage Reed Relays

- **Compact Footprint**
- **Designed Specifically for High Voltage**
- **3 or 5kV Isolation between Contacts**
- **Rhodium Contacts for Low Resistance**

Miniature 3 & 5kV, 10W S Series

This series was developed for use in high voltage ATE, where space is at a premium but a high level of performance and reliability is essential.

The small package size, 28 x 8mm, is combined with 3 or 5kV isolation and low contact resistance making the S series suitable for high voltage applications at DC and low frequency.



Available as Form A (SPNO) only.

Contact	Units	Conditions	3kV Form A			5kV Form A		
Contact Material			Rhodium			Rhodium		
Isolation across contacts	kV	DC or AC peak	3			5*		
Max. Switching Power	W		10			10		
Max. Switching Voltage	V	DC or AC peak	20			20		
Max. Switching Current	A	DC or AC peak	0.5			0.5		
Max. Carry Current	A	DC or AC rms (60Hz)	2			2		
Capacitance across contacts	pF	coil/screen grounded	<0.1			<0.1		
Lifetime	operations	dry switching	10 ⁹			10 ⁹		
Lifetime	operations	10W switching	10 ⁸			10 ⁸		
Contact Resistance	mOhms	maximum (typical)	80 (30)			80 (30)		
Insulation Resistance	Ohms	minimum (typical)	10 ¹⁰ (10 ¹³)			10 ¹⁰ (10 ¹³)		
Coil			5V	12V	24V	5V	12V	24V
Must Operate	V	DC, 20°C	3.7	9	20	3.7	9	20
Must Release	V	DC, 20°C	0.5	1.25	3	0.5	1.25	3
Operate Time	ms	diode fitted	1.0	1.0	1.0	1.0	1.0	1.0
Release Time	ms	diode fitted	0.5	0.5	0.5	0.5	0.5	0.5
Resistance	Ohms	20°C	140	600	1000	140	600	1000
Relay								
Isolation contact to coil	kV	DC or AC peak	3			5		
to all other terminals	Ohms	minimum (typical)	10 ¹⁰ (10 ¹³)			10 ¹⁰ (10 ¹³)		
Environmental								
Operating temperature range	°C		-20 to +70			-20 to +70		
Weight	gm	Typical	3.1			3.1		

* DC only, Pin 3 at high Voltage

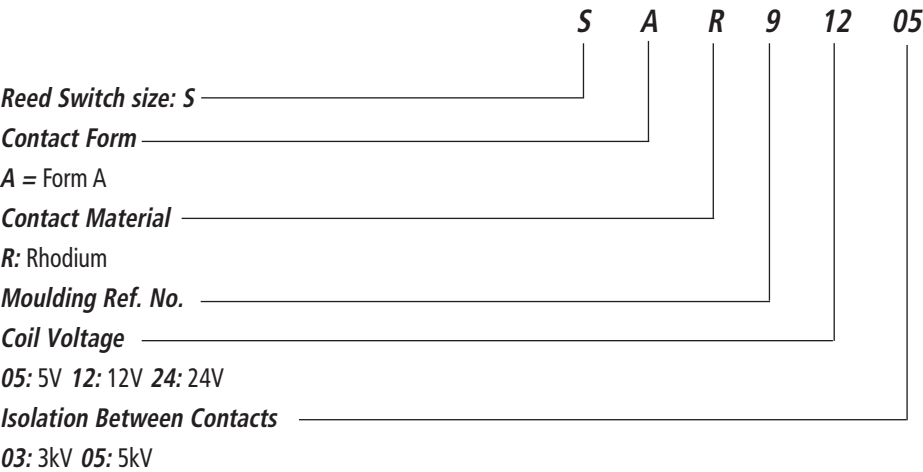
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Miniature 3 & 5kV, 10W
S Series

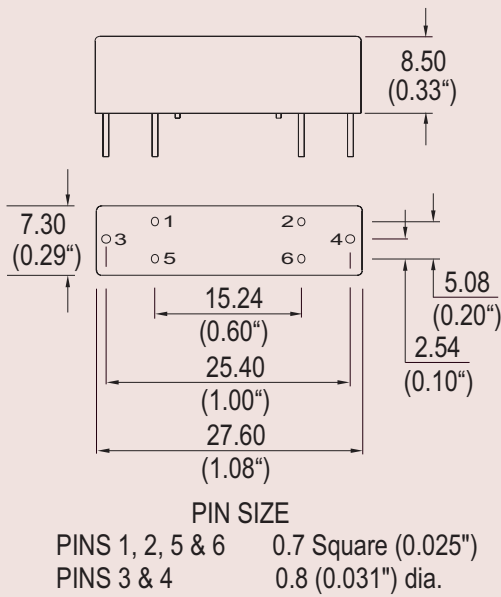
Part Numbering system



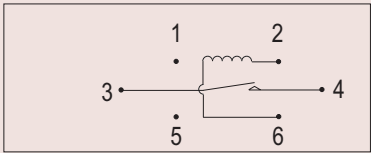
See website for application notes and latest data



Mechanical Diagram



CIRCUIT DIAGRAM.



High Voltage Reed Relays

- 15kV Isolation
- Low Contact Resistance
- High Power Switching
- PCB or Panel Mount
- Flying Lead, Solder and Spade connection options

Standard 10 & 15kV, 50W D Series

Very high isolation voltages, up to 15kV, are achieved through the use of high vacuum reed switches with either Rhodium or Tungsten contacts and make these relays suitable for high reliability applications such as cardiac defibrillators, test equipment and high voltage power supplies. The Rhodium contacts have low contact resistance while the Tungsten contacts can switch higher voltages.

Printed Circuit Board (PCB) or Panel mount, via nylon studs, versions are available.

Connection options include PCB, solder turret tag, flying lead and Spade Terminals.



Available as Form A (SPNO) or Form B (SPNC) contact configurations

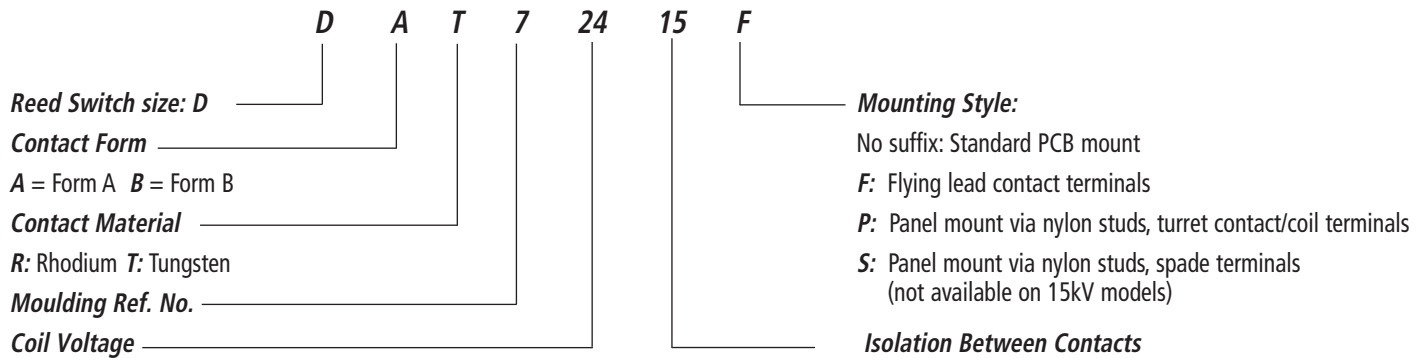
Contact	Units	Conditions	10kV Form A			10kV Form B			15kV Form A		
Contact Material			Rhodium	Tungsten		Rhodium	Tungsten		Tungsten		
Isolation across contacts	kV	DC or AC peak	10	10		10	10		15		
Max. Switching Power	W		50	50		50	50		50		
Max. Switching Voltage	V	DC or AC peak	1000	7000		1000	7000		10000		
Max. Switching Current	A	DC or AC peak	3	2		3	2		2		
Max. Current Carry	A	DC or AC peak	4	3		4	3		2		
Capacitance across contacts	pF	coil/screen grounded	<0.2	<0.2		<0.2	<0.2		<0.2		
Lifetime	operations	dry switching	10 ⁹	10 ⁹		10 ⁹	10 ⁹		10 ⁹		
Lifetime	operations	50W switching	10 ⁶	10 ⁶		10 ⁶	10 ⁶		10 ⁶		
Contact resistance	mOhms	maximum (typical)	50 (15)	250 (100)		50 (15)	250 (100)		250 (100)		
Insulation Resistance	Ohms	minimum (typical)	10 ¹⁰ (10 ¹³)	10 ¹⁰ (10 ¹³)		10 ¹⁰ (10 ¹³)	10 ¹⁰ (10 ¹³)		10 ¹⁰ (10 ¹³)		
Coil at 20°C			5V	12V	24V	5V	12V	24V	5V	12V	24V
Must Operate	V	DC	3.7	9	20	3.7	9	20	3.7	9	20
Must Release	V	DC	0.5	1.25	4	0.5	1.25	4	0.5	1.25	4
Operate Time	ms	diode fitted	3.0	3.0	3.0	2.0	2.0	2.0	3.0	3.0	3.0
Release Time	ms	diode fitted	2.0	2.0	2.0	3.0	3.0	3.0	2.0	2.0	2.0
Resistance	Ohms		28	150	780	38	240	925	16	95	350
Relay											
Isolation contact to coil	kV	DC or AC peak		17			17			17	
Insulation resistance contact to all other	Ohms	Minimum (typical)		10 ¹⁰ (10 ¹³)			10 ¹⁰ (10 ¹³)			10 ¹⁰ (10 ¹³)	
Environmental											
Operating temperature range	°C			-20 to +70			-20 to +70			-20 to +70	
Weight	Version		Standard			Panel			Spade		
	Form A	gm	23			28			29		
	Form B	gm	31			36			37		
									Flying Lead		
									38		
									46		

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Standard 10 & 15kV, 50W D Series

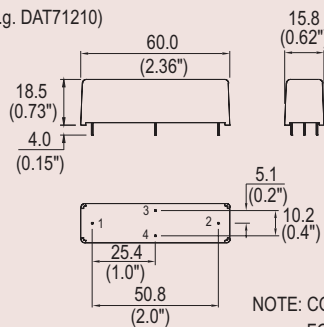


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Mechanical Diagram

STANDARD

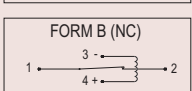
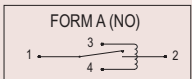
(e.g. DAT71210)



CIRCUIT DIAGRAMS

(ALL VARIANTS)

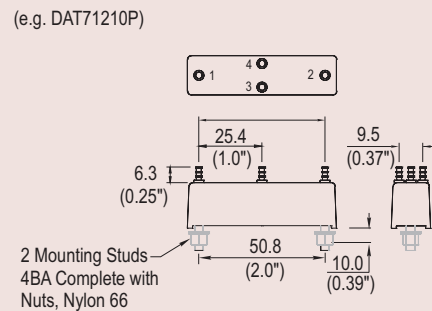
Viewed from underside



NOTE: COIL POLARITY IS IMPORTANT FOR FORM B VARIANT ONLY.

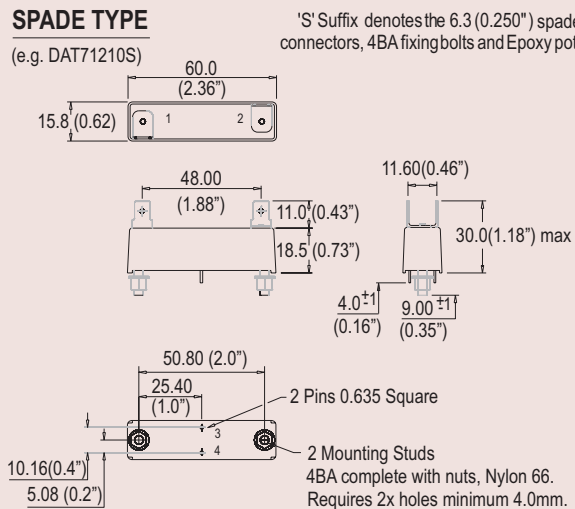
PANEL MOUNT

(e.g. DAT71210P)



SPADE TYPE

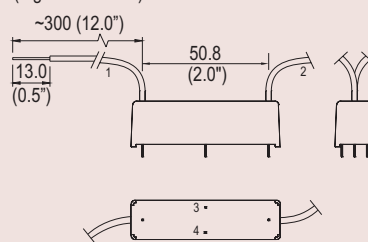
(e.g. DAT71210S)



'S' Suffix denotes the 6.3 (0.250") spade connectors, 4BA fixing bolts and Epoxy potting.

FLYING LEAD

(e.g. DAT71210F)



NOTE: PINS WHICH ARE NOT NUMBERED HAVE NO ELECTRICAL CONNECTION.



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Radio Frequency Reed Relays

- 0.5A RF at 1-30MHz
- 1.5kV Isolation
- Long Lifetime
- 1" Package
- Customising Facility

Miniature Screened 0.5A, 1.5kV 2 Series

A sub-miniature package for RF applications in the 1-30MHz band. The use of vacuum reed switches with rhodium contacts offers high isolation voltages, low contact resistance and long operating lifetime. Additional RF screening is available to further enhance RF performance for more demanding applications.

Available with switch connections via PCB only.



Available as Form A (SPNO), Form B (SPNC) or latching (bistable) contact configurations

Contact	Units	Conditions	Form A	Form B	Latching
Contact Material			*Ruthenium	*Ruthenium	*Ruthenium
Carry Current	A	DC or AC rms max	1.0	1.0	1.0
Switching Current	A	DC or AC peak max	0.5	0.5	0.5
Switching Power	W	DC max	10	10	10
Switching Voltage	V	DC or AC peak max	300	300	300
Isolation across contacts	kV	DC or AC peak	1.5	1.5	1.5
Capacitance across contacts	pF	coil/screen grounded	<0.4	<0.4	<0.4
Lifetime	operations	dry switching	10 ⁹	10 ⁹	10 ⁹
Lifetime	operations	10W switching	10 ⁸	10 ⁸	10 ⁸
Contact Resistance (Initial)	mOhms	maximum (typical)	200	200	200
Insulation Resistance	Ohms	minimum (typical)	10 ¹⁰ (10 ¹³)	10 ¹⁰ (10 ¹³)	10 ¹⁰ (10 ¹³)
Coil			12V	12V	12V
Must Operate	V	DC, 20°C	8	8	7
Must Release	V	DC, 20°C	2	2	N/A
Min Pulse Length	ms		N/A	N/A	4.0
Operate Time	ms		1.0	1.0	1.0
Release Time	ms	diode fitted	0.5	0.5	0.5
Resistance	Ohms	20°C	200	900	1530
Relay					
Isolation contact to coil	kV	DC or AC peak	1.5	1.5	1.5
Environmental					
Operating temperature range	°C		-40 to +100	-40 to +100	-40 to +100
Storage temperature range	°C		-40 to +125	-40 to +125	-40 to +125
Weight	gm	typical	20	20	22

*Ruthenium Oxide over Rhodium

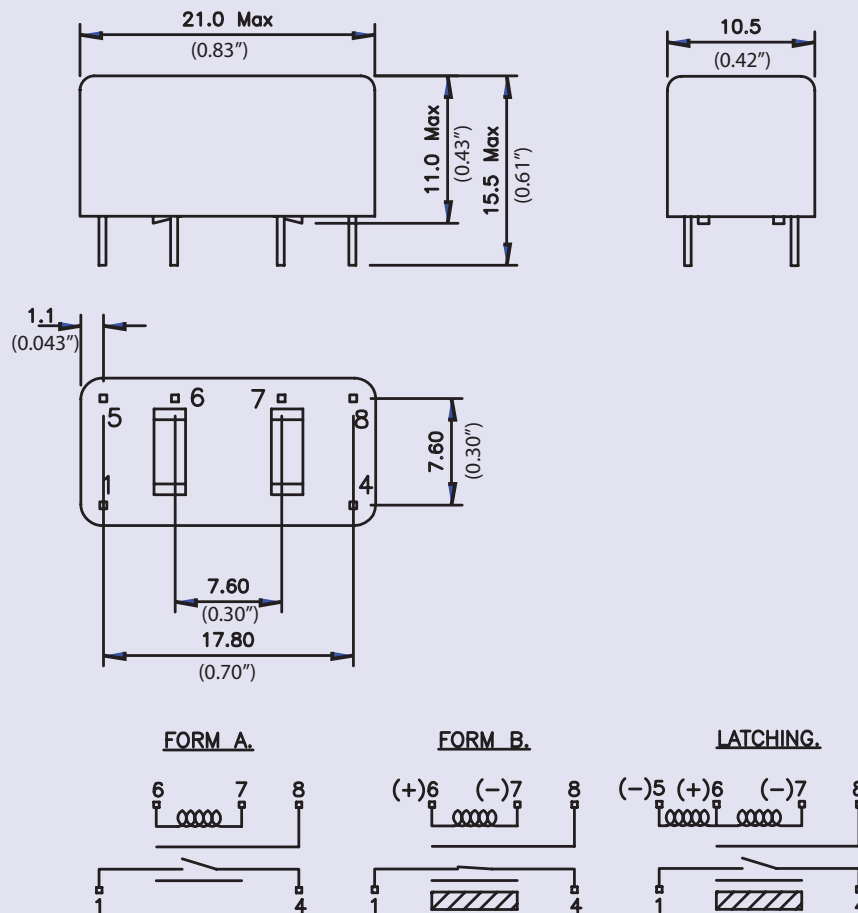
Miniature Screened 0.5A, 1.5kV 2 Series

Part Numbering system

	T	A	R	2	12	S	M
Reed Switch size: T							
Contact Form A: Form A, B: Form B, L: Latching							
Contact Material R: Ruthenium over Rhodium							
Relay Series Number							
Coil Voltage 5: 5V, 12: 12V, 24: 24V							
RF Screening S: Screened, N: Unscreened							
Magnetic Screen M: Fitted N: None							

See website for application notes and latest data

Mechanical Diagram



Circuit diagrams viewed from the underside

Radio Frequency Reed Relays

- 3.5A RF at 1-30MHz
- 3.5kV Isolation
- Long Lifetime

Miniature Screened 3.5A, 3.5kV 4 Series

A highly flexible, low cost package for RF applications in the 1-30MHz band. The use of vacuum reed switches with rhodium contacts offers high isolation voltages, low contact resistance and long operating lifetime. Additional RF screening is available to further enhance RF performance for more demanding applications.

Available as Form A (SPNO), Form B (SPNC) or latching (bistable) contact configurations with switch connections via either PCB or flying lead.



Contact	Units	Conditions	Form A			Form B			Latching	
Contact Material			Rhodium			Rhodium			Rhodium	
Carry Current	A	DC or AC rms max	3.5*			3.5*			1.5	
Switching Current	A	DC or AC peak max	0.5			0.5			0.5	
Switching Power	W	DC max	10			10			10	
Switching Voltage	V	DC or AC peak max	20			20			20	
Isolation across contacts	kV	DC or AC peak min	3			3			3.5	
Capacitance across contacts	pF	coil/screen grounded	<0.1			<0.1			<0.1	
Lifetime	operations	dry switching	10 ⁹			10 ⁹			10 ⁹	
Lifetime	operations	10W switching	10 ⁸			10 ⁸			10 ⁸	
Contact Resistance	mOhms	maximum (typical)	80 (30)			80 (30)			80 (30)	
Insulation Resistance	Ohms	minimum (typical)	10 ¹⁰ (10 ¹³)			10 ¹⁰ (10 ¹³)			10 ¹⁰ (10 ¹³)	
ESR at 30MHz (no screen)	mOhms	typical	95 @ 3A rms			95 @ 3A rms			200 @ 1.5A rms	
ESR at 30MHz (part screen)	mOhms	typical	80 @ 3A rms			80 @ 3A rms			180 @ 1.5A rms	
Coil			5V	12V	24V	5V	12V	24V	5V	12V
Must Operate	V	DC, 20°C	3.5	8	15	3.5	8	15	3	7
Must Release	V	DC, 20°C	1	2	4	1	2	4	N/A	N/A
Min Pulse Length	ms		N/A	N/A	N/A	N/A	N/A	N/A	2.0	2.0
Operate Time	ms		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Release Time	ms	diode fitted	0.5	0.5	0.5	0.5	0.5	0.5	1.0	1.0
Resistance	Ohms	20°C	70	380	1500	65	350	1200	188	500
Relay										
Isolation contact to coil	kV	DC or AC peak	3			3			3.5	
Capacitance contact to all other terminals	pF	Contacts open	<1.0			<1.0			<1.0	
Capacitance contact to all other terminals	pF	Contacts closed	<1.5			<1.5			<1.5	
Environmental										
Operating temperature range	°C	Limited Current	-40 to +100*			-40 to +100*			-40 to +100	
Storage temperature range	°C		-40 to +125			-40 to +125			-40 to +125	
Weight	gm	typical	3.5			4.2			3.1	

*see graphical data

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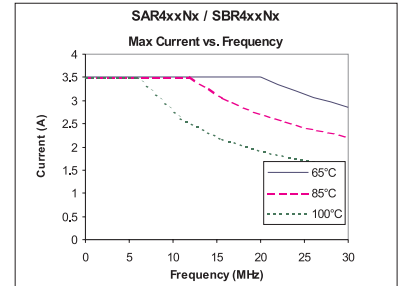
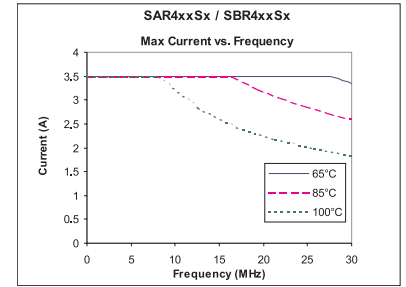


Miniature Screened 3.5A, 3.5kV 4 Series

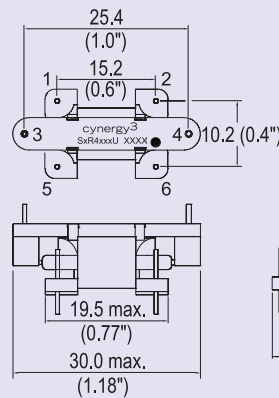
Part Numbering system

Reed Switch size: S ————— S
Contact Form A: Form A, **B:** Form B, **L:** Latching ————— A
Contact Material R: Rhodium ————— R
Relay Series Number ————— 4
Coil Voltage 5: 5V, 12: 12V, 24: 24V ————— 05
Screening S: Screened, **N:** Unscreened ————— S
Contact Pin Orientation D: PCB **U:** Flying Lead ————— U

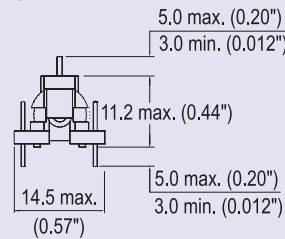
See website for application notes and latest data



Mechanical Diagram

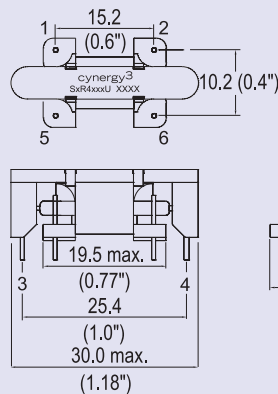


Flying Lead

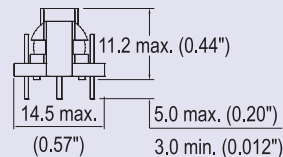


Pins 1, 2, 5, 6 require 0.9mm diameter $\pm$ 0.05mm holes

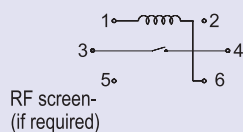
Mechanical Diagram



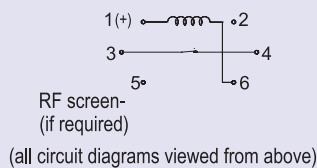
PCB Mount



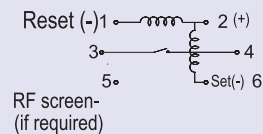
Circuit Diagram, Form A



Circuit Diagram, Form B



Circuit Diagram, Latching



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Radio Frequency Reed Relays

- Excellent RF Characteristics
- Carry Current up to 4A RF at 30MHz
- 3.5 kV Isolation
- Low RF Loss
- Long Lifetime

Miniature Fully Screened 4A, 3.5kV 6 Series

A fully screened relay offering low RF loss and high current carrying capacity, which was developed with RF design engineers in the radio communications industry. The relay coil is totally enclosed in a copper screen, resulting in lower self-heating and RF loss, and Rhodium contacts are used in the vacuum reed switches, yielding higher carry currents for a given frequency and ambient temperature.

Available as Form A (SPNO), Form B (SPNC) or latching (bistable) contact configurations with switch connections via either PCB or flying lead.



Contact	Units	Conditions	Form A			Form B			Latching	
Contact Material			Rhodium			Rhodium			Rhodium	
Carry Current	A	DC or AC rms max	4*			4*			1.5	
Switching Current	A	DC or AC peak max	0.5			0.5			0.5	
Switching Power	W	DC max	10			10			10	
Switching Voltage	V	DC or AC peak max	20			20			20	
Isolation	kV	DC min	3			3			3.5	
Capacitance across contacts	pF	coil/screen grounded	<0.1			<0.1			<0.1	
Lifetime	operations	dry switching	10 ⁹			10 ⁹			10 ⁹	
Lifetime	operations	10W switching	10 ⁸			10 ⁸			10 ⁸	
Contact Resistance	mOhms	maximum (typical)	80 (30)			80 (30)			80 (30)	
Insulation Resistance	Ohms	minimum (typical)	10 ¹⁰ (10 ¹³)			10 ¹⁰ (10 ¹³)			10 ¹⁰ (10 ¹³)	
Coil			5V	12V	24V	5V	12V	24V	5V	12V
Must Operate	V	DC, 20°C	3.5	8	15	3.5	8	15	N/A	N/A
Must Release	V	DC, 20°C	1	2	4	1	2	4	3	7
Min Pulse Length	ms		N/A	N/A	N/A	N/A	N/A	N/A	2.0	2.0
Operate Time	ms		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Release Time	ms	diode fitted	0.5	0.5	0.5	0.5	0.5	0.5	1.0	1.0
Resistance	Ohms	20°C	70	380	1500	65	350	1200	188	500
Relay										
Isolation contact to coil	kV	DC or AC peak	3			3			3.5	
Environmental										
Operating temperature range	°C	Limited Current	-40 to +100*			-40 to +100*			-40 to +100	
Storage temperature range	°C		-40 to +125			-40 to +125			-40 to +125	
Weight	gm	typical	5.3			6.1			5.0	
*see graphical data										

*see graphical data

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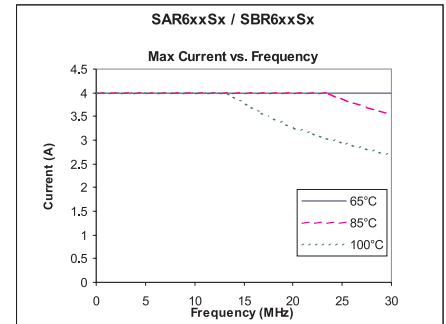
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Miniature Fully Screened 4A, 3.5kV 6 Series

Part Numbering system

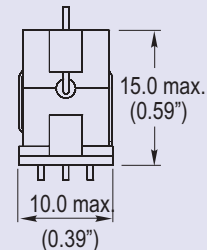
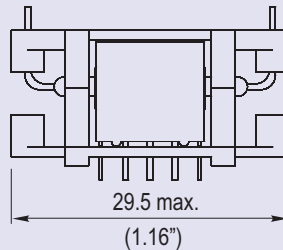
Reed Switch size: S
Contact Form A: Form A, **B:** Form B, **L:** Latching
Contact Material R: Rhodium
Relay Series Number
Coil Voltage 5: 5V, **12:** 12V, **24:** 24V
Screening S: Screened, **N:** Unscreened
Contact Pin Orientation D: PCB **U:** Flying Lead



See website for application notes and latest data

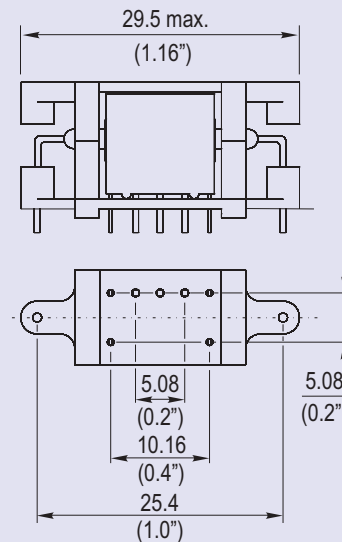
Mechanical Diagram

Flying Lead

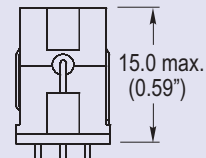


PCB Mount

Pins 3, 4 require
1mm diameter ± 0.05 holes

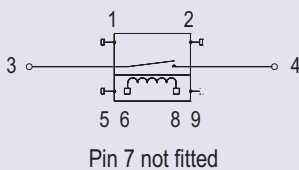


Mechanical Diagram

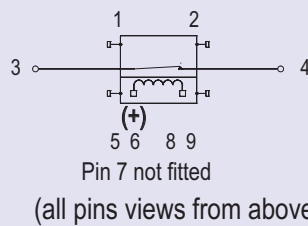


The following Pins require 0.9mm
diameter ± 0.05 mm holes, where
fitted 1, 2, 5, 6, 7, 8, 9

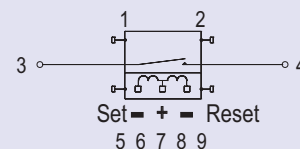
Circuit diagram, Form A



Circuit diagram, Form B



Circuit diagram, Latching



Radio Frequency Reed Relays

- Up to 3KV Isolation
- 5A Carry Current (up to 30MHz)
- Excellent RF Characteristics
- Designed for HF Applications
- Compact Package on 0.1" Pin Pitch
- Customising Facility

Miniature Screened 5A, 2kV FRS12000 Series

High current capability is achieved through the use of two reed switches in parallel. Open frame and covered construction are available, depending on voltage isolation requirements.

The series uses materials with exceptional RF and temperature performance characteristics and, in addition, the coils are partially screened offering extended RF performance over the HF band.



Contact	Units	Conditions	FRS12030	FRS12208
Action (form A, B or Latching)			A	A
Carry Current	A	RMS @ 30MHz max	5*	5*
Switching Current	A	DC max	0.5	0.5
Switching Power	W	DC max	10	10
Switching Voltage	V	DC max	20	20
Isolation	kV	DC max	0.5	2
Capacitance	pF	coil/screen gnd	0.3	0.3
Contact Connections		pin position	5 & 8	5 & 12
Lifetime	operations	dry switching	10 ⁹	10 ⁹
Contact Resistance	mOhms	maximum (typical)	80 (30)	80 (30)
Insulation Resistance	Ohms	minimum (typical)	10 ¹⁰ (10 ¹³)	10 ¹⁰ (10 ¹³)
ESR at 4.5A, 30MHz	mOhms	typical	90	90
COIL at 20°C				
Nominal Working Voltage	VDC		24	24
Working Voltage Range	VDC		19-31	19-30
Must Operate	VDC	max	15	15
Must Release	VDC	min	2	4
Nominal Resistance	ohms	+/-10%	1150	1000
RF Screening			Part	Part
RF Screening Connection		pin position	17	15
Coil Connections		pin position	3 & 11	4 & 13
RELAY				
Construction			Open Frame	Covered
Operate time (incl. bounce)	ms		2	2
Release time (incl. bounce)	ms		1	0.5
Contact to all				
other terminals	kV	DC max	0.5	2
Coil to screen	kV	DC max	0.5	0.5
Capacitance contact to				
all other terms	pF	contacts open	2.5	3.0
ENVIRONMENTAL				
Storage temperature range	°C		-55 to +125	
Operating temperature range	°C	Limited current*	-40 to +85	
Shock	g	11ms 1/2 sine pk	100	
Bump	g	6ms 1/2 sine pk	40	
Vibration	g	60-500Hz	20	
Weight	gm	typical	7	7

*see graphical data

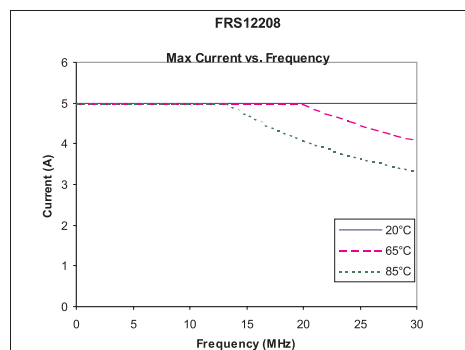
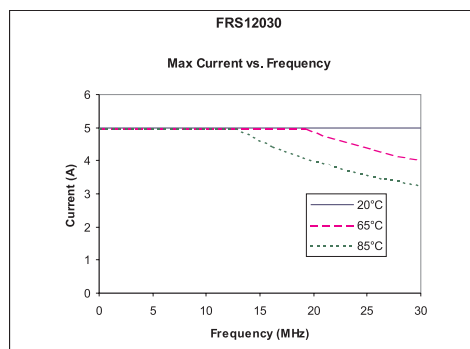
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Miniature Screened 5A, 2kV FRS12000 Series

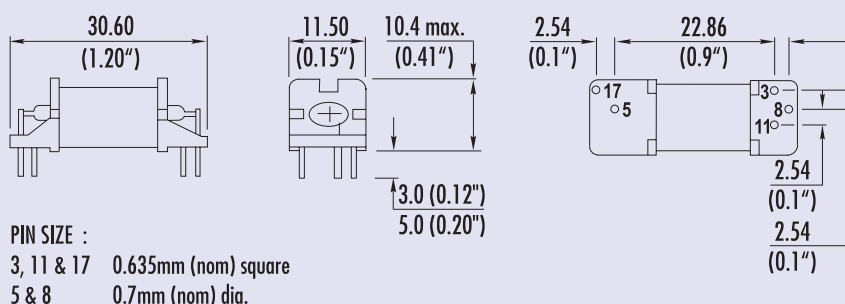
Many other variants in the FRS12000 family are available with different coil and contact configurations, as well as a number of pin footprints for drop-in replacements.



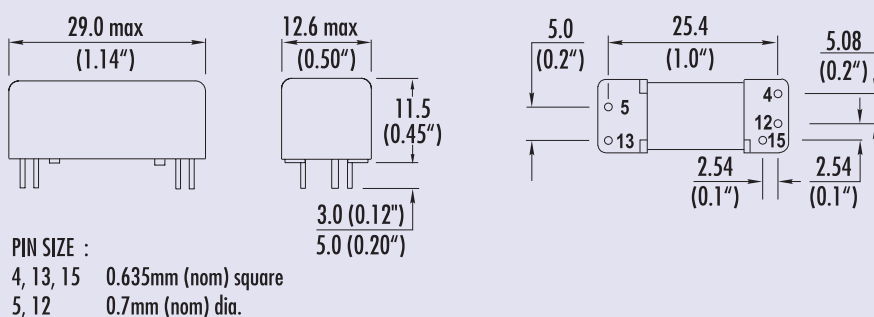
See website for application notes and latest data

Mechanical Diagram

FRS12030



FRS12208



Mechanical Diagram

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Radio Frequency Reed Relays

- Bistable Latching Relay
- 0.5 Coil Pulse length
- 3.5kV DC Isolation
- 1.5A Carry Current
- RF & Magnetic Screening
- Approved to MIL standards for Bump, Shock and Vibration

Miniature Latching 1.5A, 3.5kV

A latching RF reed relay designed for manpack, portable HF radio systems, from 1-30MHz, where power resources are limited and board space is at a premium.

These relays have separate set and reset coils to simplify board design, are capable of carrying up to 1.5A current at 30MHz and can withstand either 1.5, 3 or 3.5kV between contacts. The FRS22012 is a fast latching relay with RF and magnetic screening, that enables switching with coil pulse lengths down to 0.5ms.



Contact	Units	Conditions	FRS22012	SLR305SD01	SLR305SD02
Action (form A, B or Latching)				Latching	
Carry Current	A	RMS at 30MHz		1.5	
Switching Current	A	DC max		0.5	
Switching Power	W	DC max		10	
Switching Voltage	V	DC max		20	
Isolation	kV	DC max	3.5	1.5	3.0
Capacitance	pF	coil/screen gnd	0.2	<1	<1
Contact Connections		pin number		3 & 4	
Lifetime	operations	dry switching		10 ⁹	
Contact Resistance	mOhms	maximum (typical)		80 (30)	
Insulation Resistance	Ohms	minimum (typical)		10 ¹⁰ (10 ¹³)	
ESR at 1.5A, 30MHz	mOhms	typical		400	
COIL at 20°C					
Nom. Working Voltage	VDC		12	5	5
Min. pulse length	ms	Minimum	0.5	2	2
Operate time	ms	diode fitted	0.5	2	2
Nominal Resistance	ohms	+10%	500	300	300
RF Screening			Part	No	No
RF Screening Connection		pin number		7	
Coil Connections	Set	pin number		1 & 2(+)	
Reset				5 & 6(+)	
RELAY					
Isolation contact to coil/screen	kV	DC max		4	
Capacitance contact to all other terminals	pF	contacts open		2.5	
Capacitance contact to all other terminals	pF	contacts closed	4.0	3	3
ENVIRONMENTAL					
Operating temperature range	°C	Limited current*		-40 to +85	
Storage temperature range	°C			-40 to +125	
Weight	gm		11	7	7
*see graphical data					

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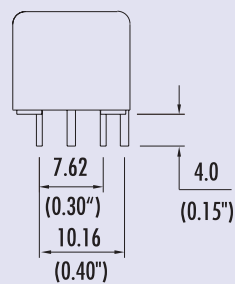
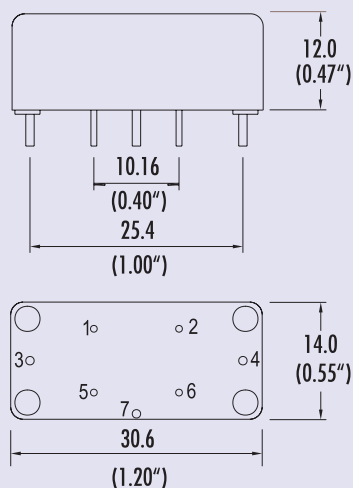


Miniature Latching 1.5A, 3.5kV

See website for application notes and latest data

Mechanical Diagram

FRS22012

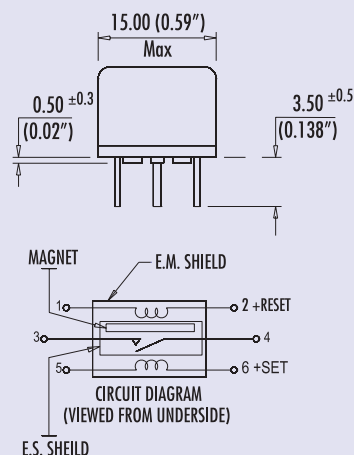
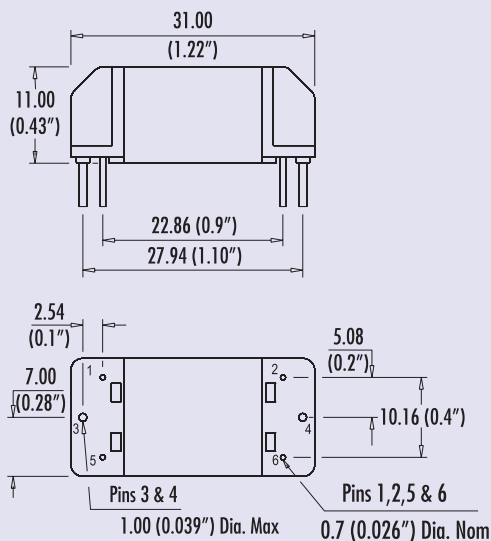


PIN SIZE

PINS 3 & 4	1.0 (0.039") dia.
PINS 1, 2, 5 & 6	0.7 (0.026") dia.
PIN 7	1.0 x 1.0 Square (0.039")

Mechanical Diagram

SLR



All dimensions in millimeters, with a tolerance of ±0.20mm unless otherwise stated.

Radio Frequency Reed Relays

- Up to 8kVDC Isolation between Contacts
- 6A Carry Current (upto 30MHz)
- Excellent RF Performance
- Ideal for Antenna Tuning Units
- Form A/B Contact Configuration
- Customising Facility

Screened 6A, 8kV FRD12000 Series

An open frame RF reed relay with 8kV isolation and 6A (at 30MHz) carry current, the FRD12000 series has been used many HF radio system specifications over the years, with applications in commercial maritime (GMDSS) equipment and military HF radio units worldwide.

The use of vacuum reed switches with rhodium contacts offers high isolation voltages, low contact resistance and long operating lifetime.



Contact	Units	Conditions	FRD12014	FRD12015	FRD12021	FRD12049
Action (form A, B or Latching)			A	A	B	B
Carry Current	A	RMS max	6	6	6	6
Switching Current	A	DC max	1	1	1	1
Switching Power	W	DC max	20	20	20	20
Switching Voltage	V	DC max	20	20	20	20
Isolation	kV	DC max	8	8	8	8
Capacitance	pF	coil/screen gnd	0.4	0.4	0.6	0.6
Lifetime	operations	dry switching	10 ⁹	10 ⁹	10 ⁹	10 ⁹
Contact Resistance	mOhms	maximum (typical)	50 (15)	50 (15)	50 (15)	50 (15)
Insulation Resistance	Ohms	minimum (typical)	10 ¹⁰ (10 ¹³)	10 ¹⁰ (10 ¹³)	10 ¹⁰ (10 ¹³)	10 ¹⁰ (10 ¹³)
ESR at 4.5A, 30MHz	mOhms	typical	150	150	150	150

Coil at 20°C						
Nominal Working Voltage	VDC		12	24	12	24
Must Operate	VDC	max	8	15	8	14
Must Release	VDC	min	2	2	2	4
Nominal Resistance	ohms	+/-10%	340	1000	380	1500
RF Screening			Part	Part	-	-
RF Screening Connection		pin position	2 & 5	2 & 5		
Coil Connections		pin position	1 & 6	1 & 6	1 & 6	1 & 6

Relay						
Operate time (including bounce)	ms		3	2	3	3
Release time	ms		1	1	2	2
Isolation contact to all other terminals	kV	DC max	10	10	10	10
Isolation coil to screen	kV	DC max	0.5	0.5	N/A	N/A
Capacitance contact to all other terms	pF	contacts open	2.0	2.0	2.5	2.5

Environmental						
Storage temperature range	°C			-55 to +125		
Operating temperature range	°C	Limited current*		-40 to +85		
Shock	g	11ms 1/2 sine pk		100		
Bump	g	6ms 1/2 sine pk		40		
Vibration	g	10- 500Hz		10		
Weight	gm		24	24	33	33

*see graphical data

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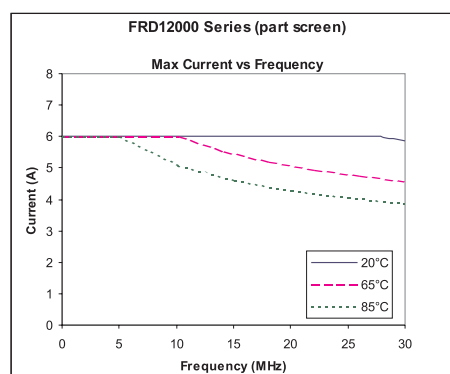
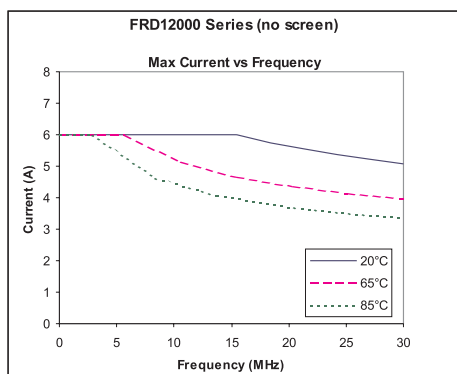


Screened 6A, 8kV FRD12000 Series

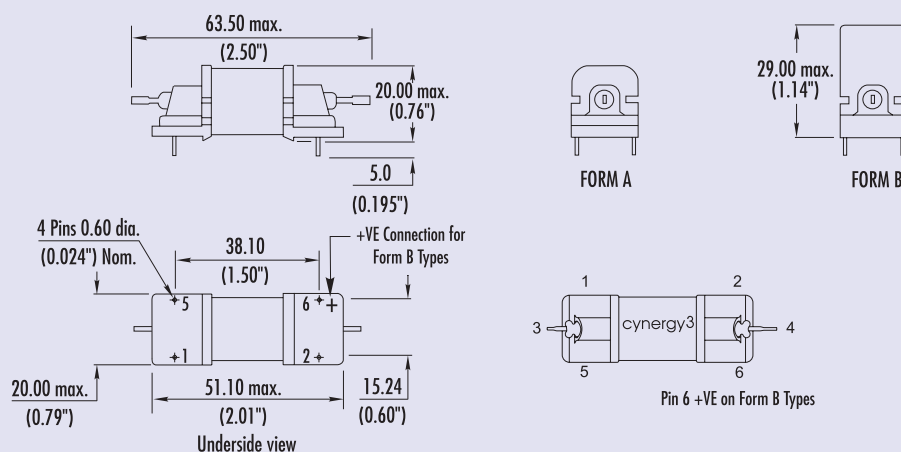
Available with either 12 or 24V coils, in both form A and B contact configurations, this proven design is fully approved to MIL standards of bump, shock and vibration and features one of Cynergy3's in-house manufactured, high vacuum reed switches for unsurpassed RF performance and reliability.

Offering a cost effective alternative to vacuum ceramic relays, the FRD12000 Series RF Reed Relay has a greater lifetime imperative for frequency hopping systems. As well as HF radios, the FRD12000 Series has also found applications in electromedical, sonar and test equipment, which require high isolation and inherent reliability.

See website for application notes and latest data



Mechanical Diagram



Radio Frequency Reed Relays

- **New Fully Screened Coil for Low RF Loss**
- **Up to 9kVDC and 6A at 30MHz**
- **Ideal for HF Antenna Tuning Applications**
- **Customising Facility**

Fully Screened 6A, 9kV FRD13000 Series

A complete RF screen around the coil assembly, for a low loss transmission path, results in better carry current at elevated temperatures for this open frame series. An anti-corona sleeve is fitted around the reed switch for improved RF voltage isolation.

This type is widely used in HF Antenna Tuning Unit (ATU) applications.



Available as Form A (SPNO) or Form B (SPNC) contact configurations

Contact	Units	Conditions	FRD13506	FRD13503	FRD13504
Action (form A, B or Latching)			A	A	B
Carry Current	A	RMS at 30MHz max	6	6	6
Switching Current	A	DC max	1	1	1
Switching Power	W	DC max	20	20	20
Switching Voltage	V	DC max	20	20	20
Isolation	kV	DC max	9	9	9
Isolation	kV	RF peak (F=2MHz)	8	8	8
Capacitance	pF	coil/screen gnd	0.5	0.5	0.5
Lifetime	operations	dry switching	10 ⁹	10 ⁹	10 ⁹
Contact Resistance	mOhms	maximum (typical)	50 (15)	50 (15)	50 (15)
Insulation Resistance	Ohms	minimum (typical)	10 ¹⁰ (10 ¹³)	10 ¹⁰ (10 ¹³)	10 ¹⁰ (10 ¹³)
ESR at 4.5A, 30MHz	mOhms	typical	30	30	30

Coil at 20°C

Nominal Working Voltage	VDC		12	24	24
Must Operate	VDC	max	9	15	16
Must Release	VDC	min	2	3	3
Nominal Resistance	Ohms	+/-10%	98	900	900
RF Screening			Full	Full	Full
RF Screening Connection		pin position	2 & 5	2 & 5	2 & 5
Coil Connections		pin position	1 & 6	1 & 6	1(+) & 6

Relay

Operate time (incl. bounce)	mS		2	2	1
Release time	mS		1	1	2
Isolation contact to all other terminals	kV	DC max	9	9	9
Isolation coil to screen	kV	DC max	0.5	0.5	0.5
Capacitance contact to all other terms	pF	contacts open	1.5	1.5	1.5

Environmental

Storage temperature range	°C			-55 to +125	
Operating temperature range	°C	Limited current*		-40 to +85	
Shock	g	11ms 1/2 sine pk		100	
Bump	g	6ms 1/2 sine pk		40	
Vibration	g	10- 500Hz		10	
Weight	gm		20	20	23

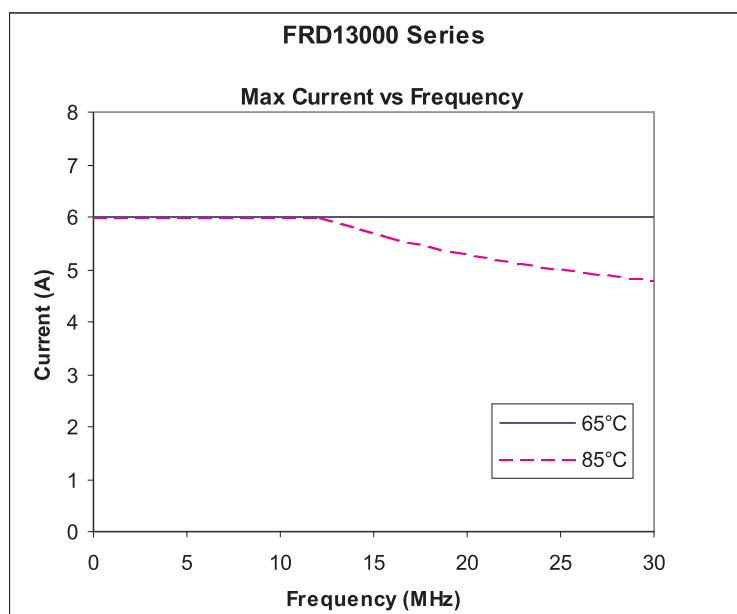
*see graphical data

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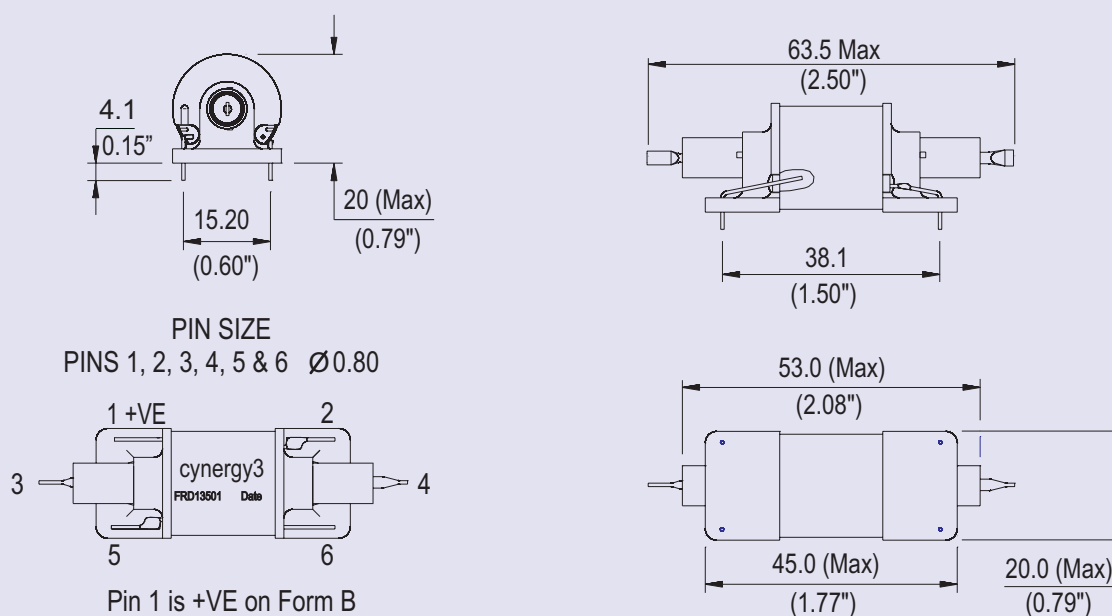


Fully Screened 6A, 9kV FRD13000 Series



See website for application notes and latest data

Mechanical Diagram



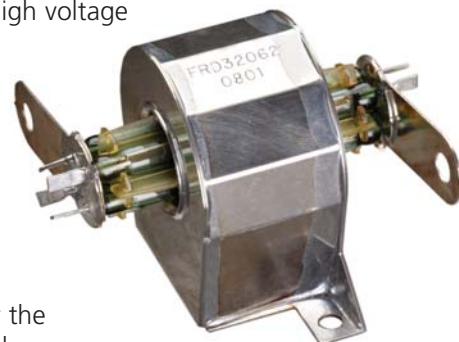
Radio Frequency Reed Relays

- Up to 20A Carry Current at 30MHz
- 6.5kV DC isolation across contacts
- Fully Screened Coil for Low RF Loss
- Cost Effective alternative to Vacuum Ceramic Devices
- Unique Design
- Suitable for 1 kW HF Transmitters

Fully Screened 20A, 6.5kV FRD30000 Series

The very high carry current capacity and high voltage isolation of this series is achieved through the use of multiple high vacuum reed switch contacts, ensuring a high level of performance and reliability.

The two standard models will carry currents of 12 and 20Amps respectively at 30MHz and feature silver plated, fully screened coil assemblies for ultra-low RF losses. Typical applications include over the horizon (OTH) HF radar systems and 1kW base station transmitters.



Available as Form A (SPNO) only.

Contact	Units	Conditions	FRD32061	FRD32062
Action (form A, B or Latching)			A	A
Carry Current	A	RMS at 30MHz max	12	20
Switching Current	A	DC max	1	1
Switching Power	W	DC max	20	20
Switching Voltage	V	DC max	20	20
Isolation	kV	DC max	6	6.5
Capacitance (max.)	pF	coil/screen gnd	2	2
Lifetime	operations	dry switching	10 ⁹	10 ⁹
		24V, 1A	10 ⁷ -10 ⁸	10 ⁷ -10 ⁸
Contact Resistance	mOhms	maximum (typical)	50 (10)	50 (10)
Insulation Resistance	Ohms	minimum (typical)	10 ¹⁰ (10 ¹³)	10 ¹⁰ (10 ¹³)

COIL at 20°C

Nominal Working Voltage	VDC		24	24
Must Operate	VDC	max	16	16
Must Release	VDC	min	4	4
Nominal Resistance	Ohms	+/-10%	430	270
RF Screening			Full	Full
RF Screening Connection			Via Mtg Screws	Via Mtg Screws

RELAY

Operate time (incl. bounce)	ms		5	5
Release time	ms		3	3
Isolation contact to all other terminals	kV	DC max	10	10
Isolation coil to screen	kV	DC max	0.5	0.5
Capacitance contact to all other terms	pF	contacts open	6.0	6.0

ENVIRONMENTAL

Storage temperature range	°C		-55 to +125	
Operating temperature range	°C		-40 to +85	
Weight	gm	typical	76	108

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Liquid Level Sensors

A wide range of Reed switch/Magnet operated Float switches, to suit most applications. There are vertical or horizontal types and internal or external mounting options, in a range of materials to operate in most liquids, from boiling water to aggressive chemicals.

Customer specific designs can be developed to meet particular applications and design parameters.

The majority of Float switches have both WRAS (Water Regulations Advisory Scheme) and UL (Underwriters Laboratories) approvals.



Industrial Level Switches

Cynergy³ Components offers a large range of stainless steel vertical and horizontal float switches for ATEX and safe area applications. The range includes vertical and horizontal types in float and displacer models with multiple switching points and lengths up to 2 metres.

Switches available for use in Hazardous Area EExd 11C T110°C, Intrinsically Safe Area EExia 11C T4 and with Lloyds Register qualification.



Liquid Flow Sensors

A range of flow switches for 15mm and 22mm pipe sizes. These flow switches are reed switch based with a magnet embedded in a piston that moves as the flow increases. The designs are suitable for use in aqueous liquids at up to 10bar pressure.

WRAS approved for use in hot and cold drinking water.



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