



semiconductor relay, 1-pole 3RF3 for use with heat sinks width 22.5 mm, 20 A 48-460 V 110-230 V AC spring-loaded terminal



product brand name	SIRIUS
product designation	solid-state relay
product type designation	3RF31
manufacturer's article number	
• _1 of the accessories that can be ordered	3RF3900-0WA88
product designation	
• _1 of the accessories that can be ordered	heat conducting foil
General technical data	
product function	zero-point switching
power loss [V·A] maximum	19 VA
power loss [W] for rated value of the current	
• at AC in hot operating state	19 W
• at AC in hot operating state per pole	19 W
• without load current share typical	3.5 W
type of calculation of power loss current-dependent	linear
insulation voltage rated value	600 V
surge voltage resistance of main circuit rated value	6 kV
protection class IP	IP20
protection class IP on the front according to IEC 60529	IP20
shock resistance according to IEC 60068-2-27	15 g / 11 ms
vibration resistance according to IEC 60068-2-6	2 g
reference code according to IEC 81346-2	Q
Substance Prohibitance (day/month/year)	01/15/2024
SVHC substance name	Lead CAS-No. 7439-92-1 Lead monoxide (lead oxide) CAS-No. 1317-36-8 2-methyl-1-(4-methylthiophenyl)-2-morpholinopropan-1-one CAS-No. 71868-10-5 Melamine CAS-No. 108-78-1
Net Weight	0.08 kg
Main circuit	
number of poles for main current circuit	1
number of NO contacts for main contacts	1
number of NC contacts for main contacts	0
type of voltage of the operating voltage	AC
operating voltage	
• at AC	
— at 50 Hz rated value	48 ... 460 V

— at 60 Hz rated value	48 ... 460 V
operating frequency rated value	50 ... 60 Hz
relative symmetrical tolerance of the operating frequency	10 %
operating range relative to the operating voltage at AC	
• at 50 Hz	40 ... 506 V
• at 60 Hz	40 ... 506 V
operational current rated value maximum	20 A
operational current	
• at AC-1 at 400 V rated value	20 A
• at AC-51 rated value	20 A
• at AC-51 according to IEC 60947-4-3	20 A
• according to UL 508 rated value	20 A
ampacity maximum	90 A
operational current minimum	500 mA
rate of voltage rise at the thyristor for main contacts maximum permissible	1 000 V/μs
blocking voltage at the thyristor for main contacts maximum permissible	1 200 V
reverse current of the thyristor	10 mA
derating temperature	40 °C
surge current resistance rated value	1 300 A
I²t value maximum	8 000 A ² ·s
Control circuit/ Control	
type of voltage of the control supply voltage	AC
control supply voltage at AC	
• at 50 Hz	110 ... 230 V
• at 60 Hz	110 ... 230 V
control supply voltage 1 at AC	
• at 50 Hz	110 ... 230 V
• at 60 Hz	110 ... 230 V
control supply voltage at AC	
• at 50 Hz full-scale value for signal<0> recognition	40 V
• at 60 Hz full-scale value for signal<0> recognition	40 V
• initial value for signal <1> detection	90 V
control supply voltage frequency	
• 1 rated value	50 Hz
• 2 rated value	60 Hz
symmetrical line frequency tolerance	5 Hz
operating range factor control supply voltage rated value at AC at 50 Hz	
• initial value	0.82
operating range factor control supply voltage rated value at AC at 60 Hz	
• initial value	0.82
control current at minimum control supply voltage	
• at AC	2 mA
control current at AC rated value	15 mA
ON-delay time	40 ms; additionally max. one half-wave
OFF-delay time	40 ms; additionally max. one half-wave
Installation/ mounting/ dimensions	
fastening method side-by-side mounting	Yes
fastening method	screw fixing
design of the thread of the screw for securing the equipment	M4
tightening torque of fixing screw maximum	1.5 N·m
tightening torque [lbf·in] of fixing screw maximum	13 lbf·in
height	85 mm
width	22.5 mm
depth	48 mm
Connections/ Terminals	

product component removable terminal for auxiliary and control circuit	Yes
type of electrical connection • for main current circuit • for auxiliary and control circuit	spring-loaded terminals spring-loaded terminals
type of connectable conductor cross-sections • for main contacts — solid — finely stranded with core end processing — finely stranded without core end processing • for AWG cables for main contacts	2x (0.5 ... 2.5 mm ²) 2x (0.5 ... 1.5 mm ²) 2x (0.5 ... 2.5 mm ²) 2x (18 ... 14)
connectable conductor cross-section for main contacts • solid or stranded • finely stranded with core end processing • finely stranded without core end processing	0.5 ... 2.5 mm ² 0.5 ... 1.5 mm ² 0.5 ... 2.5 mm ²
type of connectable conductor cross-sections • for auxiliary and control contacts — solid — finely stranded with core end processing — finely stranded without core end processing • for AWG cables for auxiliary and control contacts	0.5 ... 1.5 mm ² 0.5 ... 2.5 mm ² 0.5 ... 2.5 mm ² 1x (20 ... 12)
AWG number as coded connectable conductor cross section for main contacts	18 ... 14
stripped length of the cable • for main contacts • for auxiliary and control contacts	10 mm 10 mm
UL/CSA ratings	
operational current according to UL 508 rated value	20 A
Electrical Safety	
touch protection on the front according to IEC 60529	finger-safe, for vertical contact from the front
Ambient conditions	
installation altitude at height above sea level maximum	1 000 m
ambient temperature • during operation • during storage	-25 ... +60 °C -55 ... +80 °C
Electromagnetic compatibility	
conducted interference • due to burst according to IEC 61000-4-4 • due to conductor-earth surge according to IEC 61000-4-5 • due to conductor-conductor surge according to IEC 61000-4-5 • due to high-frequency radiation according to IEC 61000-4-6	2 kV / 5 kHz, behavior criterion 2 2 kV, behavior criterion 2 1 kV, behavior criterion 2 140 dBuV in the frequency range 0.15 ... 80 MHz, behavior criterion 1
field-based interference according to IEC 61000-4-3	80 MHz ... 1 GHz 10 V/m, behavior criterion 1
electrostatic discharge according to IEC 61000-4-2	4 kV contact discharging / 8 kV air discharging, behavior criterion 2
conducted HF interference emissions according to CISPR11	Class A for industrial environment
field-bound HF interference emission according to CISPR11	Class B for the domestic, business and commercial environments
Short-circuit protection, design of the fuse link	
manufacturer's article number • of full range R fuse link for semiconductor protection at NH design usable • of back-up R fuse link for semiconductor protection at NH design usable • of back-up R fuse link for semiconductor protection at cylindrical design 22 x 58 mm usable	3NE1021-2 3NE8021-1 3NC2280: These fuses have a smaller rated current than the semiconductor relays
manufacturer's article number of the gG fuse • at NH design usable • at NH design usable note • at cylindrical design 22 x 58 mm usable	3NA6812: These fuses have a smaller rated current than the semiconductor relays These fuses have a smaller rated current than the semiconductor relays 3NW6212-1: These fuses have a smaller rated current than the semiconductor relays

• at cylindrical design 22 x 58 mm usable note	These fuses have a smaller rated current than the semiconductor relays
manufacturer's article number • of DIAZED fuse usable	5SB4111: These fuses have a smaller rated current than the semiconductor relays
• of DIAZED fuse usable note	These fuses have a smaller rated current than the semiconductor relays

Approvals Certificates

Environment	General Product Approval
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EMV	Test Certificates	other
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[Type Test Certificates/Test Report](#)

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[Confirmation](#)

Further information

Information on the packaging

<https://support.industry.siemens.com/cs/ww/en/view/109813875>

Information for data generation and storage

<https://support.industry.siemens.com/cs/ww/en/view/109995012>

Information- and Downloadcenter (Catalogs, Brochures,...)

<https://www.siemens.com/ic10>

Industry Mall (Online ordering system)

<https://mall.industry.siemens.com/mall/en/en/Catalog/product?mlfb=3RF3190-2AA24>

Cax online generator

<https://support.automation.siemens.com/WW/CAXorder/default.aspx?lang=en&mlfb=3RF3190-2AA24>

Service&Support (Manuals, Certificates, Characteristics, FAQs,...)

<https://support.industry.siemens.com/cs/ww/en/ps/3RF3190-2AA24>

Image database (product images, 2D dimension drawings, 3D models, device circuit diagrams, EPLAN macros, ...)

https://www.automation.siemens.com/bilddb/cax_de.aspx?mlfb=3RF3190-2AA24&lang=en



