



semiconductor relay, 1-pole 3RF3 width 22.5 mm, 90 A 48-460 V 110-230 V AC
ring cable lug connection for mounting on available cooling surfaces

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	3RF2900-3PA88
• _2 of the accessories that can be ordered	3RF3900-0WA88
• _3 of the accessories that can be ordered	3RF3990-0GA36
product designation	
• _1 of the accessories that can be ordered	terminal cover
• _2 of the accessories that can be ordered	heat conducting foil
General technical data	
product function	zero-point switching
power loss [W] for rated value of the current	
• at AC in hot operating state	83 W
• at AC in hot operating state per pole	83 W
• without load current share typical	3.5 W
insulation voltage rated value	600 V
surge voltage resistance of main circuit rated value	6 kV
protection class IP	IP00
protection class IP on the front according to IEC 60529	IP00
shock resistance according to IEC 60068-2-27	15g / 11 ms
vibration resistance according to IEC 60068-2-6	2g
reference code according to IEC 81346-2	Q
Substance Prohibitance (Date)	01/15/2024
SVHC substance name	Lead - 7439-92-1 Lead monoxide (lead oxide) - 1317-36-8
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 • at 60 Hz	40 ... 506 V
operational current rated value maximum	80 A
operational current • at AC-1 at 400 V rated value • at AC-51 rated value • at AC-51 according to IEC 60947-4-3 • according to UL 508 rated value	80 A 80 A 80 A 80 A
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 • at 60 Hz	110 ... 230 V 110 ... 230 V
control supply voltage 1 at AC • at 50 Hz • at 60 Hz	110 ... 230 V 110 ... 230 V
control supply voltage frequency • 1 rated value • 2 rated value	50 Hz 60 Hz
control supply voltage at AC • at 50 Hz full-scale value for signal<0> recognition • at 60 Hz full-scale value for signal<0> recognition	40 V 40 V
control supply voltage • at AC initial value for signal <1> detection	90 V
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
Auxiliary circuit	
number of CO contacts for auxiliary contacts	0
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	Ring cable lug connection screw-type terminals
type of connectable conductor cross-sections • for main contacts for JIS cable lug • for AWG cables for main contacts • for DIN cable lug for main contacts	JIS C 2805 R 2-5, 5,5-5, 8-5, 14-5 1x (12 ... 4) DIN 46234 -5-2,5, -5-6, -5-10, -5-16, -5-25
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	1x (0.5 ... 2.5 mm ²), 2x (0.5 ... 1 mm ²) 1x (0.5 ... 2.5 mm ²), 2x (0.5 ... 1 mm ²) 1x (0.5 ... 2.5 mm ²), 2x (0.5 ... 1 mm ²) 1x (20 ... 12)
AWG number as coded connectable conductor cross section for main contacts	12 ... 4
tightening torque • for main contacts with screw-type terminals • for auxiliary and control contacts with screw-type terminals	2 ... 2.5 N·m 0.5 ... 0.6 N·m
tightening torque [lbf·in] • for main contacts with screw-type terminals • for auxiliary and control contacts with screw-type terminals	18 ... 22 lbf·in 4.5 ... 5.3 lbf·in
design of the thread of the connection screw • for main contacts • of the auxiliary and control contacts	M5 M3
stripped length of the cable • for main contacts • for auxiliary and control contacts	7 mm 7 mm
Electrical Safety	
protection class IP on the front according to IEC 60529	IP00; IP20 with cover
touch protection on the front according to IEC 60529	finger-safe, for vertical contact from the front with cover
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 cylindrical design 22 x 58 mm usable	3NA6812: These fuses have a smaller rated current than the semiconductor relays 3NW6212-1: 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](#)

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