

Solid-State Relays

Zero-point switching, without heatsink

Main Characteristics:

Space-saving, width of only 22.5 mm
 LED display
 Various connection technologies
 Plug-in control terminal
 Degree of protection IP 20
 Zero switching



Standards / Approvals:

DIN EN 60947-4-3
 UL 508 / CSA
 CE
 C-Tick

Ordering Key:

3RF21	20	- 1	A	A	0	2
Solid state relay without heat sink	Max. load current 20 = 20 A 30 = 30 A 50 = 50 A 70 = 70 A 90 = 88 A	Connection technology 1 = Screw connection 2 = Spring-loaded 3 = Ring cable connection M5	Switching function A = Zero-point switching	Controlled phases A = Single-phase	Control voltage 0 = 24 V DC 2 = 110 - 230 V AC 4 = 4 - 30 V DC *	Operating voltage 2 = 24 - 230 V 4 = 48 - 460 V 5 = 48 - 600 V 6 = 48 - 600 V

Not all possible versions are available ex stock.

Main Circuit¹:

Type	I _{max}		I _e IEC 947-4-3		I _e UL/CSA		Power loss With I _{max} W	Min. load current A	Max. leakage current mA
	A	With R _{thha} / 40 °C	A	With R _{thha} / 40 °C	A	With R _{thha} / 50 °C			
3RF2120-.	20	2.0 K/W	20	1.7 K/W	20	1.3 K/W	28.5	0.1	10
3RF2130-1.	30	1.1 K/W	30	0.79 K/W	30	0.56 K/W	44	0.5	10
3RF2150-1.	50	0.68 K/W	50	0.48 K/W	50	0.33 K/W	66	0.5	10
3RF2150-2.			20	2.60 K/W	20	2.90 K/W			
3RF2150-3.			50	0.48 K/W	50	0.33 K/W			
3RF2170-1.	70	0.40 K/W	50	0.77 K/W	50	0.60 K/W	94	0.5	10
3RF2190-1.	88	0.33 K/W	50	0.94 K/W	50	0.85 K/W	118	0.5	10
3RF2190-2.			20	2.80 K/W	20	3.50 K/W			
3RF2190-3.			88	0.22 K/W	83	0.19 K/W			

Type		3RF21...AA.2	3RF21...AA.4	3RF21...AA.5	3RF21...AA.6
Rated operating voltage U _e	V	24 ... 230	48 ... 460	48 ... 600	48 ... 600
	• Voltage range	V	20 ... 253	40 ... 506	40 ... 660
	• Rated frequency	Hz	50/60 ± 10 %		
Rated insulation voltage U _i	V	600			
Rated impulse withstand voltage U _{imp}	kV	6			
Blocking voltage	V	800	1200	1200	1600
Slew rate	V/µs	1000			

¹ The current I_{max} provides information about the performance of the solid-state relays. The actual permitted rated operating current I_e can be smaller depending on the connection method and cooling conditions. The spring-loaded terminals version can be used for a rated current of up to approx. 20 A with one conductor and up to approx. 40 A with two conductor on each terminal.

Type	Rated impulse withstand strength I_{tsm}	I^2t value A^2s
3RF2120-	200	200
3RF2130-.AA.2	300	450
3RF2130-.AA.4	300	450
3RF2130-.AA.6	400	800
3RF2150-	600	1800
3RF2170-.AA.2	1200	7200
3RF2170-.AA.4	1200	7200
3RF2170-.AA.6	1150	6600
3RF2190-	1150	6600

Control Circuit A1-A2:				
Type		3RF21...AA0.	3RF21...AA2.	3RF21...AA4.
Control voltage U_s	V	24 DC (EN 61131-2)	110 ... 230 AC	4 ... 30 DC
Max. control voltage U_s	V	30	253	30
Typical operating current	mA	20	15	20
Response voltage	V	15	90	4
Drop-out voltage	V	5	40	1
Rated frequency of the control supply voltage	Hz	--	50/60 \pm 10 %	--
Switching times ON delay	ms	1 + max. one half-wave	40 + max. one half-wave	1 + max. one half-wave
OFF delay	ms	1 + max. one half-wave	40 + max. one half-wave	1 + max. one half-wave

General Data:		
Ambient temperature		
During operation, derating as of 40 °C	°C	-25 ... 60
During storage	°C	-55 ... 80
Mounting altitude	m	0 ... 1000; at > 1000 m, please contact our Technical Assistance
Impact resistance acc. to DIN IEC 68	g/ms	15/11
Vibration resistance	g	2
Degree of protection		IP20
Electromagnetic compatibility	(EMC)	
Interference emission		
o Conducted interference voltage IEC 60 947-4-3		Class A for industrial applications ²
o Radiated, high-frequency interference voltage IEC 60 947-4-3		Class A for industrial applications
Interference resistance		
o Electrostatic discharge acc. to IEC 61 000-4-2 (corresponds to severity 3)	kV	Contact discharge 4; air discharge 8; performance criterion 2
o Induced HF fields acc. to IEC 61 000-4-6	MHz	0.15 ... 80; 140 dB μ V; performance criterion 1
o Burst acc. to IEC 61 000-4-4	kV	2/5.0 kHz; performance criterion 1
o Surge acc. to IEC 61 000-4-5	kV	Phase-to-ground 2; phase-to-phase 1; performance criterion 2
Dielectric Strength 50/60 Hz (Input, Output / Base)	V rms	4000

² **Attention!**

This product was constructed as a EMC Class A device. The use of this product in residential applications could lead to radio interferences. In such an application, additional filtering may be required.

Type		3RF21...-1.	3RF21...-2.	3RF21...-3.
Connection, main contacts		Screw connection	Spring-loaded connection	Ring cable connection
Conductor cross-section				
○ Solid	mm ²	2 x (1.5 ... 2.5), 2 x (2.5 ... 6)	2x (0.5 ... 2.5)	
○ Finely stranded with end sleeve	mm ²	2 x (1.5 ... 2.5), 2 x (2.5 ... 6), 1 x 10	2x (0.5 ... 1.5)	
○ Finely stranded w/o end sleeve	mm ²		2x (0.5 ... 2.5)	
○ Solid or stranded	AWG	2 x (14 ... 10)	2 x (18 ... 14)	
Stripping length	mm	10	10	
Terminal screw		M 4	-	M 5
○ Tightening torque	Nm	2 ... 2.5	-	2 ... 2.5
D 5...6 mm / PZ 2	lb.in	18 ... 22	-	18 ... 22
Cable lug	DIN	-	-	DIN 46234 5-2.5 ... 5-25 ³
	JIS	-	-	JIS C 2805 R 2-5 ... 14-5

Type		3RF21...-1.	3RF21...-2.	3RF21...-3.
Connection, auxiliary/control contacts		Screw connection	Spring-loaded connection	Ring cable connection
Conductor cross-section with or without end sleeve	mm ²	1 x (0.5 ... 2.5)	0.5 ... 2.5	1 x (0.5 ... 2.5)
	mm ²	2 x (0.5 ... 1.0)		2 x (0.5 ... 1.0)
	AWG	20 ... 12	20 ... 12	20 ... 12
Stripping length	mm	7	10	7
Terminal screw		M 3	-	M 3
○ Tightening torque	Nm	0.5 ... 0.6	-	0.5 ... 0.6
D 3.5 / PZ 1	lb.in	4.5 ... 5.3	-	4.5 ... 5.3

Fused Design with Semiconductor Protection:

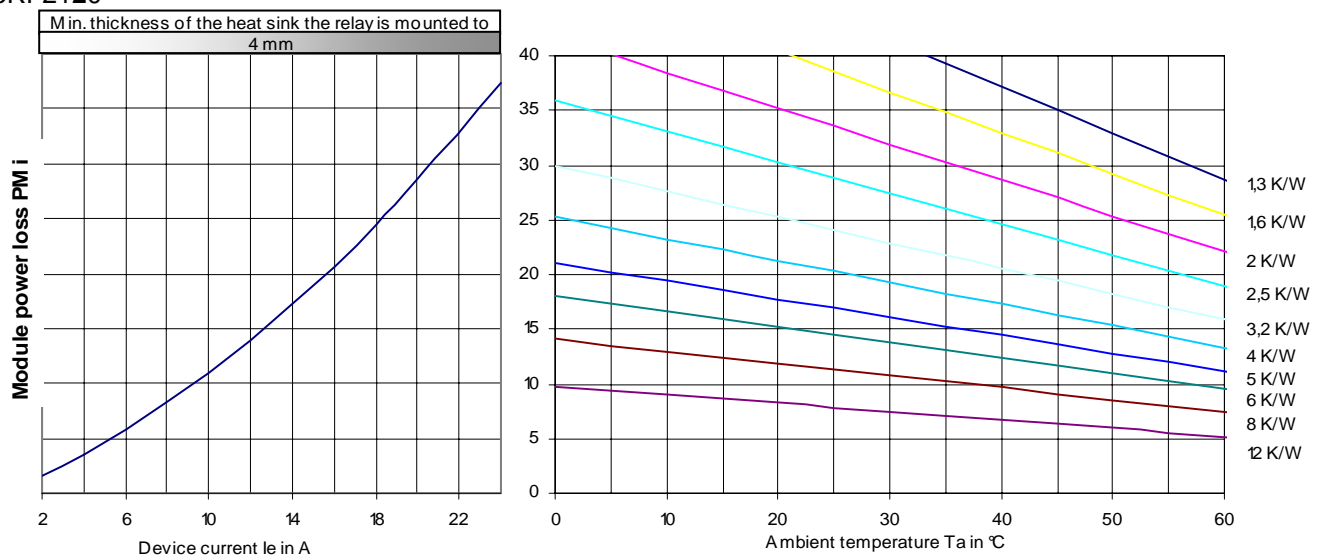
Type	Full-range fuse LV HBC design gR/SITOR	Semiconductor protection fuse, cylindrical design		
		10 x 38 mm aR / SITOR	14 x 51 mm aR / SITOR	22 x 58 mm aR / SITOR
3RF2120-...2	3NE1814-0	3NC1020	3NC1420	3NC2220
3RF2120-...4	3NE1813-0	3NC1016	3NC1420	3NC2220
3RF2130-...2	3NE1815-0	3NC1032	3NC1430	3NC2232
3RF2130-...4	3NE1815-0	3NC1025	3NC1430	3NC2232
3RF2130-...6	3NE1815-0	3NC1032	3NC1430	3NC2232
3RF2150-...2	3NE1817-0	-	3NC1450	3NC2250
3RF2150-...4	3NE1802-0	-	3NC1450	3NC2250
3RF2150-...6	3NE1803-0	-	3NC1450	3NC2250
3RF2170-...2	3NE1820-0	-	-	3NC2280
3RF2170-...4	3NE1818-0	-	-	3NC2280
3RF2170-...6	3NE1817-0	-	-	3NC2280
3RF2190-...2	3NE1820-0	-	-	3NC2200
3RF2190-...4	3NE1021-2	-	-	3NC2280
3RF2190-...6	3NE1020-2	-	-	3NC2280

³ Maximum breadth of the Cable lug 12 mm!

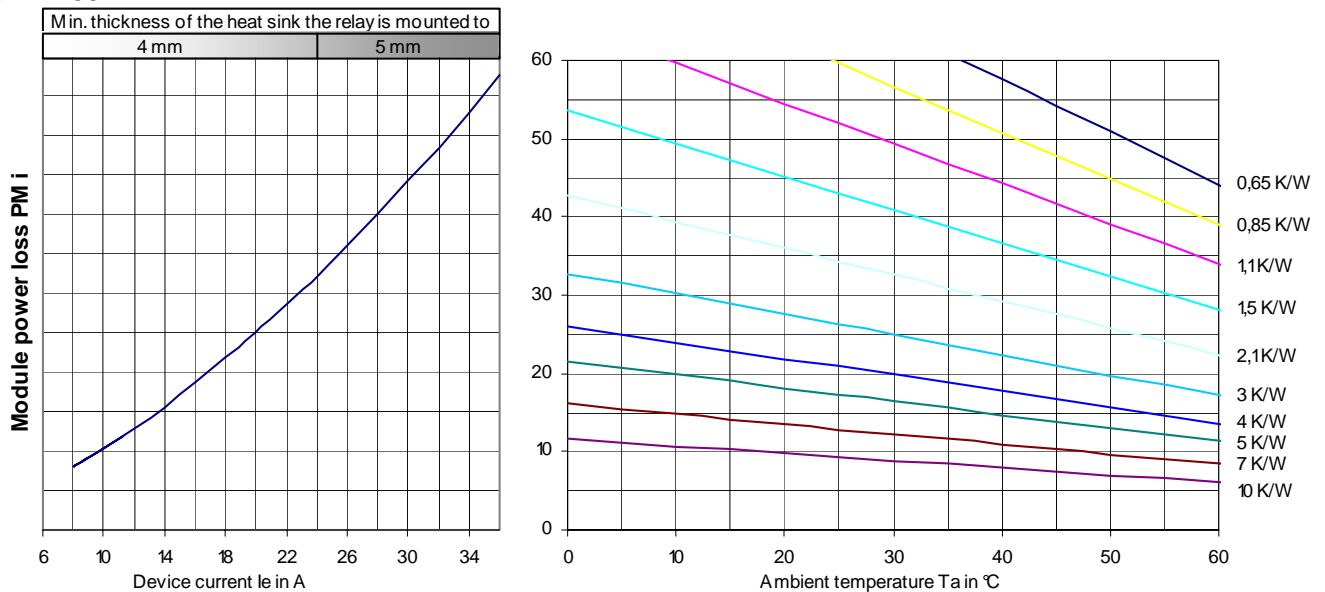
Accessories:			
Function module	Order No.	Applicable for the following types	Versions
Converter	3RF2900-0EA18	3RF21...-AA0. 3RF21...-AA4.	Us = 24 V AC/DC
Load monitoring Basic	3RF2920-0FA08	3RF21...-1AA0. 3RF21...-1AA4.	Screw connection Us = 24 V DC
Load monitoring Extended ⁴	3RF29...-0GA..	3RF21...-1.	Screw connection
Terminal cover ⁵	3RF2900-3PA88	3RF21...-3.	Ring cable connection
		3RF21...-1.	Screw connection
		3RF21...-3.	Ring cable connection

Characteristic Curves:

3RF2120-



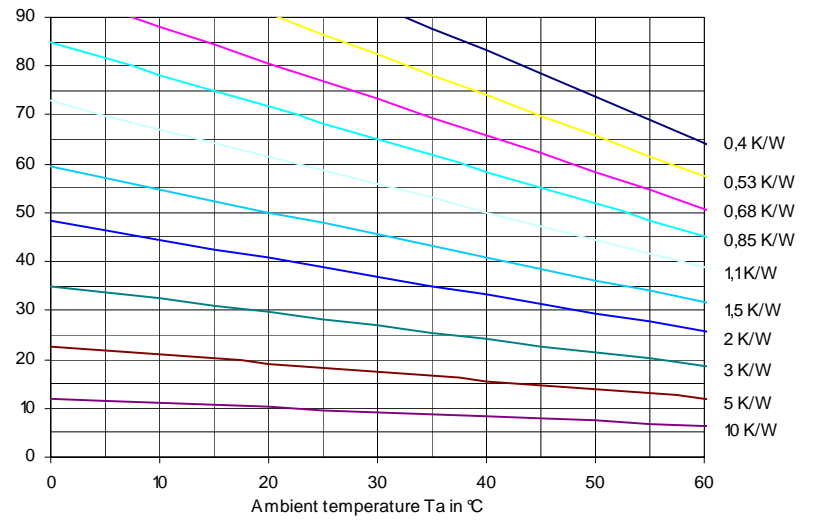
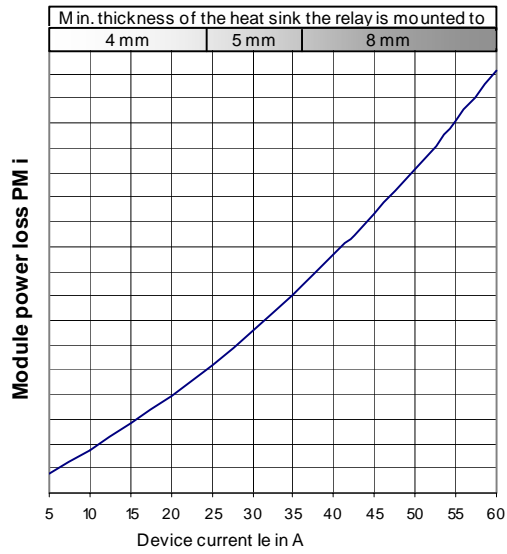
3RF2130-



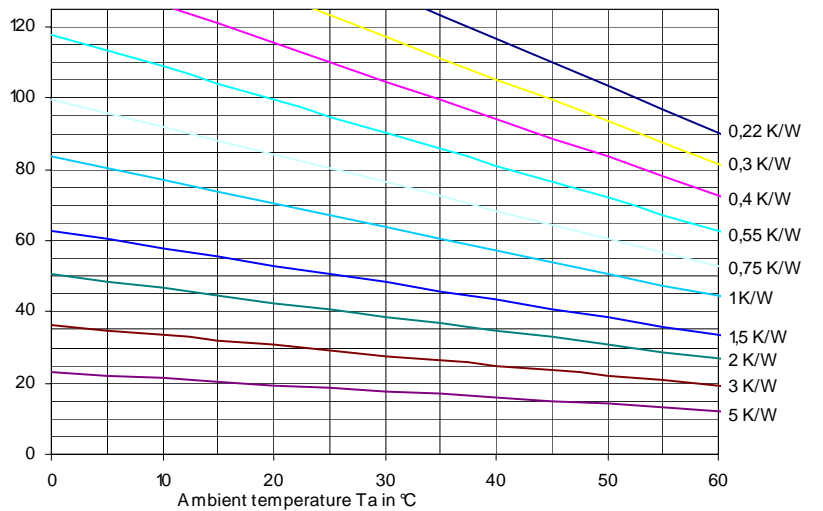
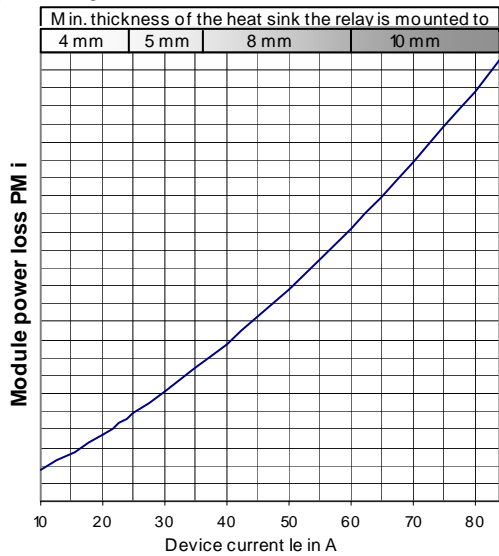
⁴ For the exact allocation of the function modules, please refer to the LV 1 Catalog.

⁵ The terminal cover can be easily adjusted for screw connection applications.

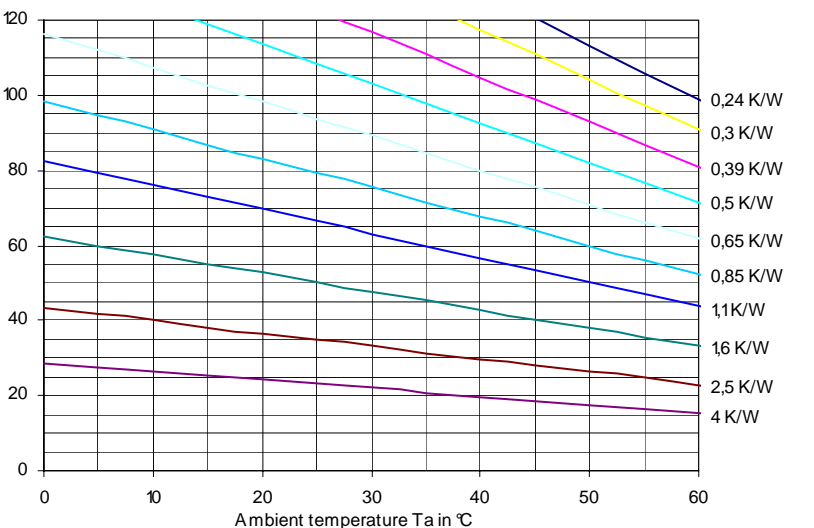
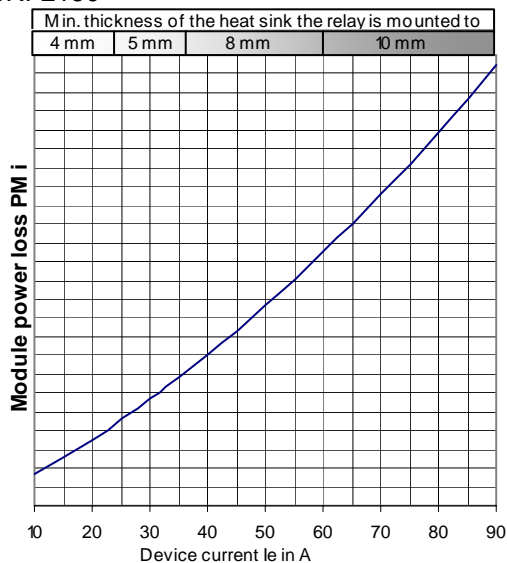
3RF2150-



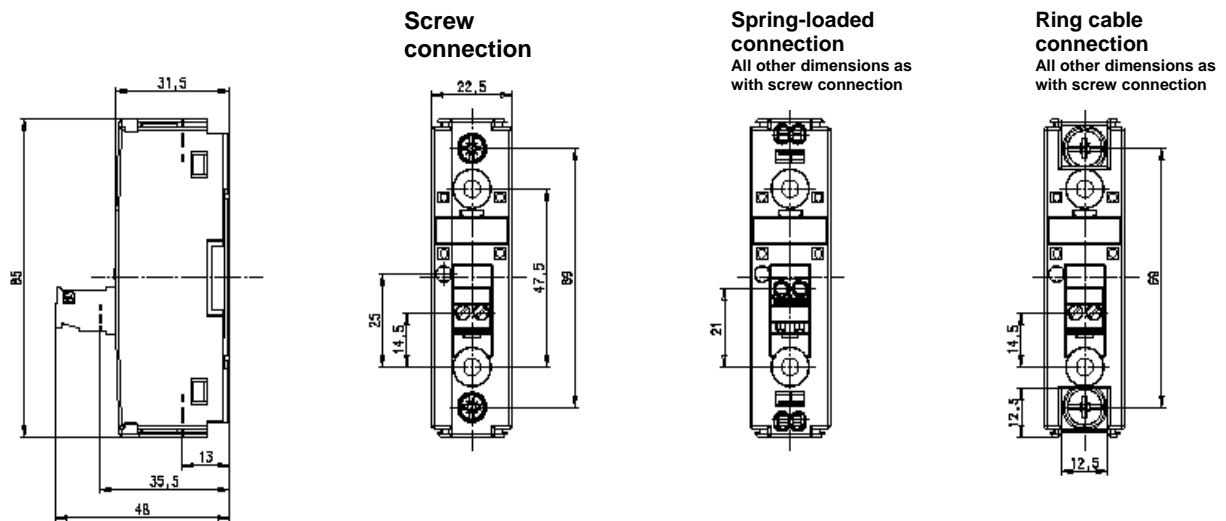
3RF2170-



3RF2190-

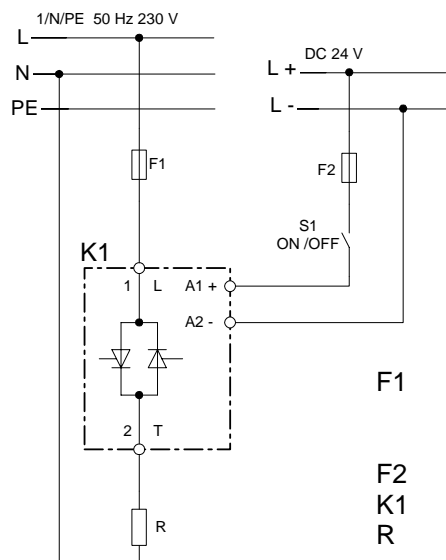


Dimension Drawings:



Device / Example Circuit Diagram:

3RF21...-AA0.
Us = 24 V DC



3RF21...-AA2.
Us = 110 ... 230 V AC

