POWERSWITCH
Solid-State Contactor
BF 9250, BH 9250

0231842



BF 9250 up to 10 A



BF 9250 up to 50 A



BF 9250 up to 25 A



BH 9250 up to 10 A

- According to IEC/EN 60947-4-2, IEC/EN 60947-4-3
- 1-, 2- and 3-pole models
- Load current up to 50 A
- For AC load up to 480 V
- Switching at zero crossing
- Protected by varistors
- As option temperature protection of the power semiconductors with monitoring output
- Mounting on DIN-rail
- As option with control input X1 with low current consumption e.g. to be controlled by a PLC
- As option up to 3 separate semiconductor contactors in one unit
- BF 9250: width 22.5 mm, 45 mm and 90 mm
  BH 9250: width 45 mm, 67.5 mm and 112.5 mm

Applications

Fast and noiseless switching of:
- Heating elements
- Motors
- Valves
- Lighting

Indicators

BF 9250/001, BH 9250/001, BH9250/006

Green LED "A1-A2":	On, when voltage on A1/A2
Yellow LED "x1":	On, when voltage on X1
Red LED "ϑ>":	On, when overtemperature

BF 9250/003

Green LED "T_a":	On, when A1 connected
Green LED "T_b":	On, when A3 connected
Green LED "T_c":	On, when A5 connected

BF 9520/004

Green LED "T_a":	On, when A1 connected
Green LED "T_b":	On, when A2 connected
Green LED "T_c":	On, when A3 connected

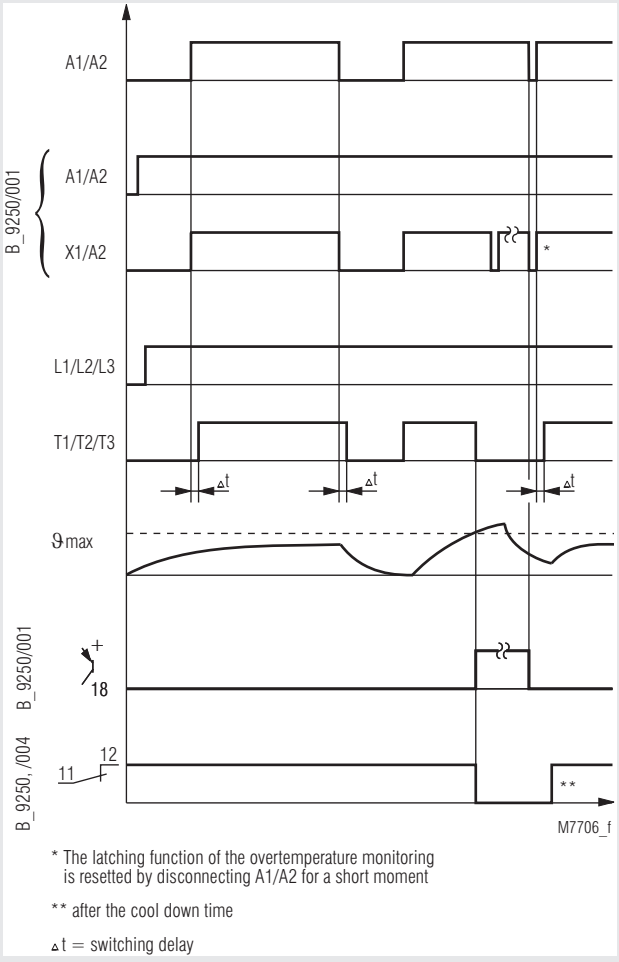
BF 9250

Green LED "A1-A2":	On, when voltage on A1

Approvals and Markings

CE c UL us LISTED
Canada / USA

Function Diagram

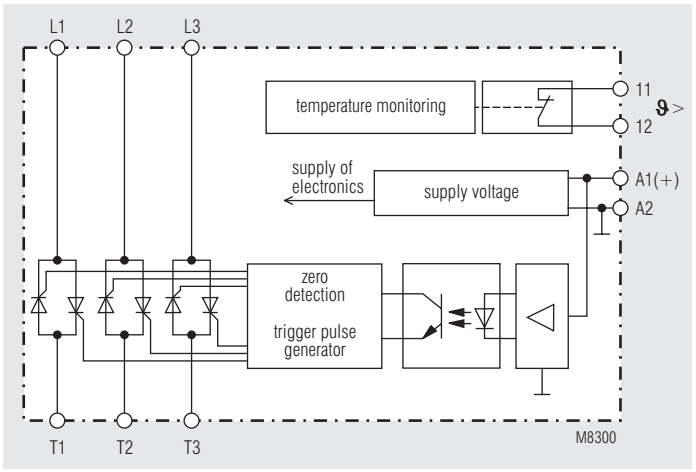


* The latching function of the overtemperature monitoring is resetted by disconnecting A1/A2 for a short moment

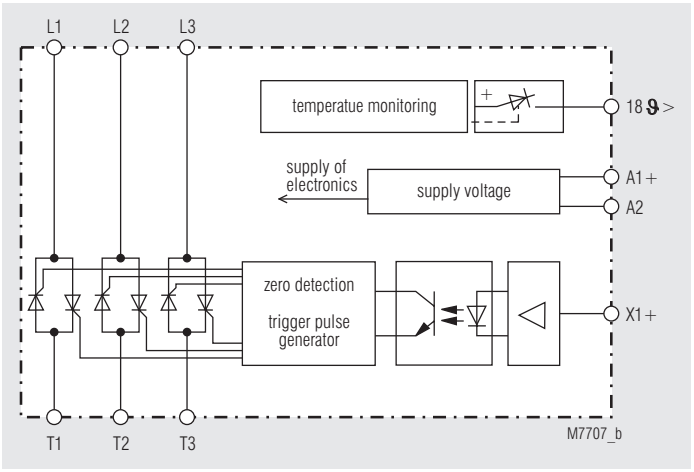
** after the cool down time

Δt = switching delay

Block Diagrams

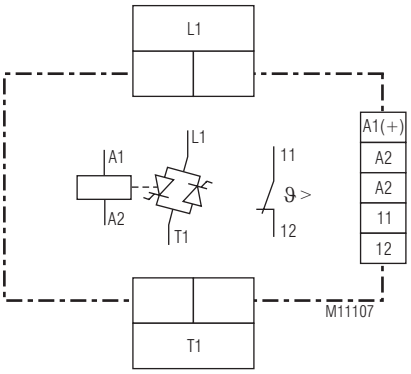


BF 9250, BF 9250/004

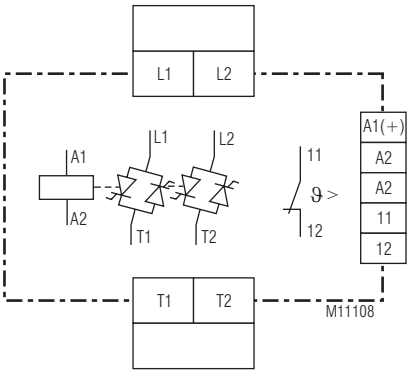


BF 9250/001, BH 9250/001

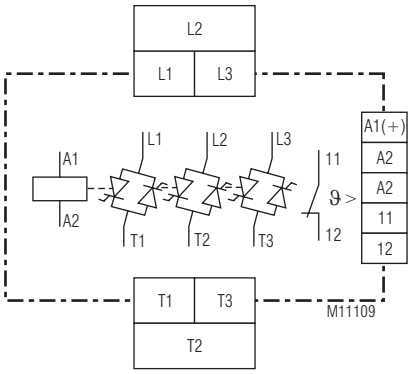
Circuit Diagrams



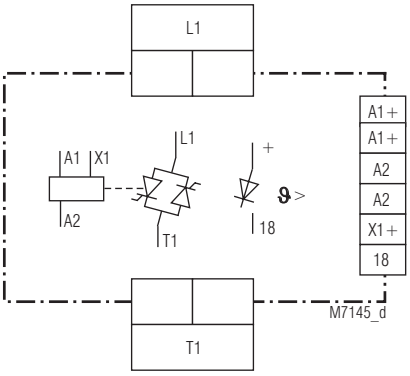
BF 9250.01



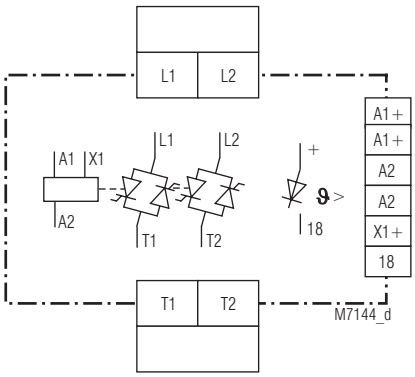
BF 9250.02



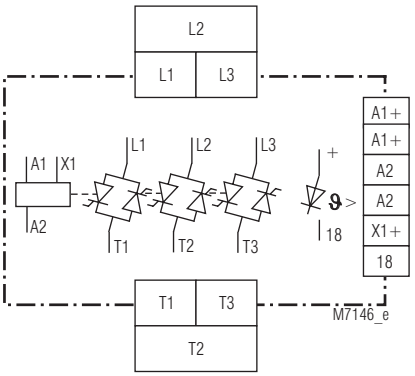
BF 9250.03



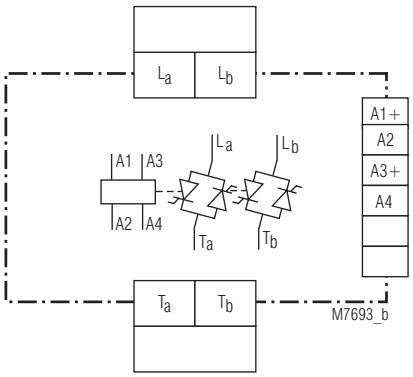
BF 9250.01/001



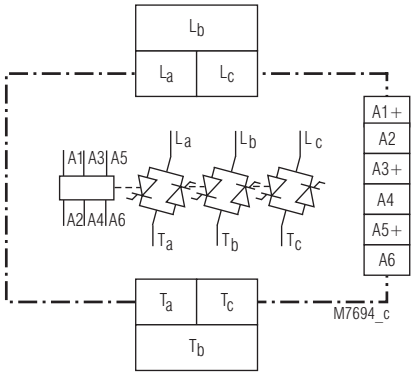
BF 9250.02/001



BF 9250.03/001



BF 9250.92/003

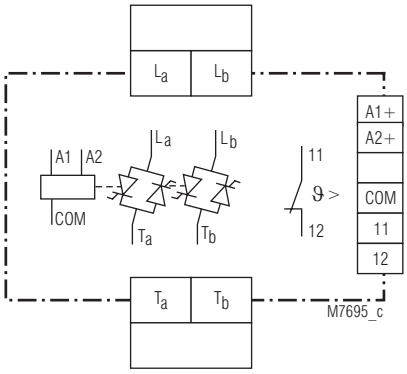


BF 9250.93/003

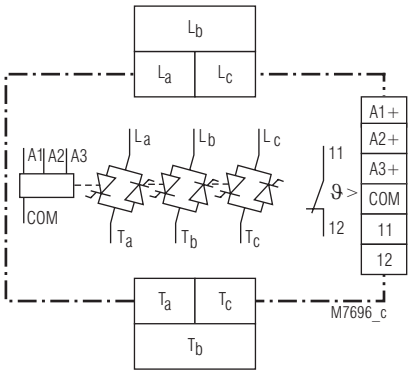
Connection Terminals

Terminal designation	Signal description
A1, A2, A3, A4, A5, A6, COM, X1	Control or operating voltage
18	Indicator output
11, 12	NC contact
L1, L2, L3	Mains connections
T1, T2, T3	Load outputs
T1b, T2b	Load outputs

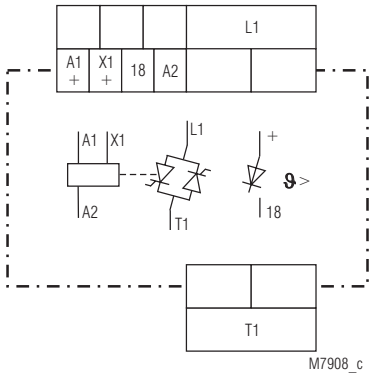
Circuit Diagrams



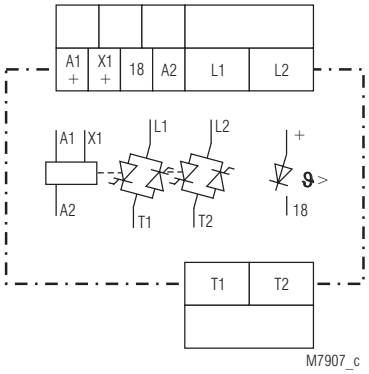
BF 9250.02/004



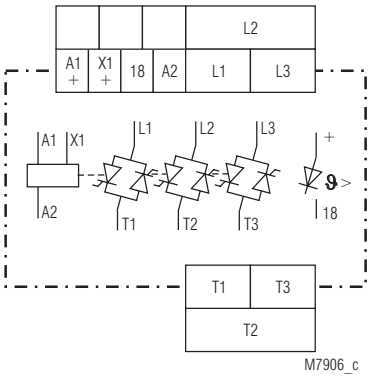
BF 9250.03/004



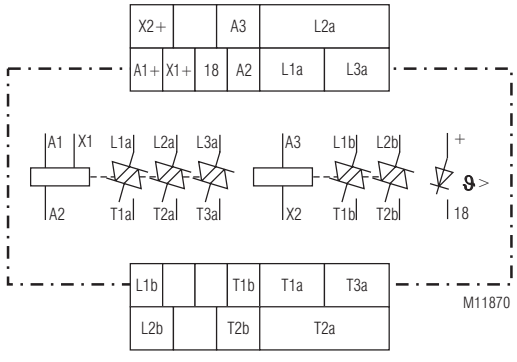
BH 9250.01/001



BH 9250.02/001



BH 9250.03/001



BH 9250.03/006

Input

BF 9250/001, BH 9250/001:

Operation voltage A1/A2:	DC 24 V
Voltage tolerance:	± 10 %
Input current:	35 mA
Control voltage X1/A2:	DC 3 … 48V
Making voltage:	DC 3 V
Switch off voltage:	DC 2 V
Start current:	0.5 mA at DC 3 … 10 V 10 mA at DC 10 … 48 V
Start up delay [ms]:	≤ 2 + 1/2 Periode
Release delay [ms]:	≤ 1 + 1/2 Periode

BF 9250/003:

Control voltage A1/A2:	DC 24 V, control of T_a
Control voltage A3/A4:	DC 24 V, control of T_b
Control voltage A5/A6:	DC 24 V, control of T_c
Start up delay [ms]:	≤ 1 + 1/2 Periode
Release delay [ms]:	≤ 1 + 1/2 Periode

BF 9250/004:

Control voltage A1/COM:	DC 24 V, control of T_a
Control voltage A2/COM:	DC 24 V, control of T_b
Control voltage A3/COM:	DC 24 V, control of T_c
Start up delay [ms]:	≤ 1 + 1/2 Periode
Release delay [ms]:	≤ 1 + 1/2 Periode

BF 9250:

Control voltage A1/A2:	AC/DC 110 … 230V, AC/DC 24 V
Start up delay [ms]:	≤ 3 + 1/2 Periode
Release delay [ms]:	≤ 35 + 1/2 Periode

BH 9250/006:

Operation voltage A1+/A2:	DC 24 V
Control voltage X1+/A2:	DC 3 ... 48 V
Control voltage X2+/A3:	DC 24 V

Output

Load output T1, T2, T3; T_a, T_b, T_c
Load currents at 100 % duty cycle ED, AC 51:

BF 9250 BH 9250	Ambient temperature	Device without heat sink	Device with small heat sink	Device with large heat sink
1-pole	25°C 40°C	13 A 10 A	30 A 25 A	55 A 50 A
2-pole	25°C 40°C	7 A 6.5 A	17.5 A 15 A	28 A 25 A
3-pole	25°C 40°C	6 A 5 A	14 A 10 A	20 A 15 A

BH 9250.03/006:
Load output T1a, T2a, T3a
AC-51 3 x 3 A
Load output T1b, T2b
AC-51 2 x 1 A
Current reduction over 40°C

BF 9250 BH 9250	Device without heat sink	Device with small heat sink	Device with large heat sink
1-pole	0.2 A / °C	0.4 A / °C	0.6 A / °C
2-pole	0.2 A / °C	0.3 A / °C	0.4 A / °C
3-pole	0.2 A / °C	0.2 A / °C	0.3 A / °C

Min. load current:	AC 40 mA
Rated load voltage range:	AC 24 ... 480 V
Frequency range:	50 / 60 Hz
Leakage current in off state at nominal voltage U_N and nominal frequency (Tj=125°C, max.):	1.0 mA
at load voltage up to:	AC 480 V
Peak inverse voltage:	± 1200 Vp

Technical Data

Short circuit current at t=10 ms BF 9250.01; .02; .92; BH 9250.01; .02:	600 A
BF 9250.03; .93; BH 9250.03:	400 A
Power dissipation:	P = 1.2 [V] x I eff. [A] / k [W] with k as formfactor and k = 1.1 for sinusoidal current

Semiconductor fuse

BF 9250 BH 9250	I_N	load limit integral of the semi-conductor	Semiconductor fuse Type	Article-No.	Brand
1-pole	10 A	1800 A^2s	fuse 10 x 38	6003434.16	SIBA
	25 A	1800 A^2s	fuse 10 x 38	6003434.30	SIBA
	50 A	1800 A^2s	NH-00	2020920.63	SIBA
2-pole	2x6,5 A	1800 A^2s	fuse 10 x 38	6003434.10	SIBA
	2x15 A	1800 A^2s	fuse 10 x 38	6003434.20	SIBA
	2x25 A	1800 A^2s	fuse 10 x 38	6003434.30	SIBA
3-pole	3x5 A	800 A^2s	fuse 10 x 38	6003434.8	SIBA
	3x10 A	800 A^2s	fuse 10 x 38	6003434.16	SIBA
	3x15 A	800 A^2s	fuse 10 x 38	6003434.20	SIBA

Varistor voltage: AC 510 V

Semiconductor Monitoring Output

Output (Terminal 18)**:**	Transistor, plus switching
Switched auxiliary voltage:	DC 24 V
Switching capacity:	100 mA, short circuit proof
Residual voltage:	Typ. 0.6 V

Output (NC contact 11, 12)

Switching capacity**:**	AC 240 V*) / 2.0 A cos φ = 1 AC 240 V*) / 1.0 A cos φ = 0.6 inductive DC 24 V / 1.0 A

*) Max. AC 150 V at variant /004

General Data

Fitting position:	Cooling ribs vertically	
Operating mode:	Continuous operation	
Temperature range:		
Operation:	0 ... 40 °C max. 60 °C (with current derating factor see table)	
Storage:	- 20 ... + 80 °C	
Clearance and creepage distances		
rated impulse voltage / pollution degree	4 kV / 3	IEC 60664-1
EMC	IEC/EN 61000-6-4,	IEC/EN 61000-6-1
Electrostatic discharge:	8 kVair / 6 kV contact	IEC/EN 61000-4-2
HF-irradiation:	10 V / m	IEC/EN 61000-4-3
Fast transients:	2 kV	IEC/EN 61000-4-4
Surge voltages between		
wires for power supply:	1 kV	IEC/EN 61000-4-5
between wire and ground:	2 kV	IEC/EN 61000-4-5
HF-wire guided:	10 V	IEC/EN 61000-4-6
Interference suppression:	Limit value class A A higher suppression class can be reached by connecting capacitors of 0.47 µF / 600 V AC across the phases or across phase and neutral.	IEC/EN 60947-4-3

Technical Data

Insulation voltages

Input to Output:	2.5 kV
Input to semiconductor monitoring output (NC contact)	2.0 kV
Input to heat sink:	2.5 kV
Output to Output:	2.5 kV
Output to heat sink:	2.5 kV

Degree of protection

Housing:	IP 40	IEC/EN 60529
Terminals:	IP 20	IEC/EN 60529
Vibration resistance:	Amplitude 0,35 mm Frequency 10 ... 55 Hz,	IEC/EN 60068-2-6
Climate reseistance:	0 / 060 / 04	IEC/EN 60068-1
Terminal designation	EN 50005	
Wire connection:	DIN 46228-1/-2/-3/-4	
Load terminals:	1 x 10 mm² solid 1 x 6 mm² stranded ferruled	
Control terminals and indicator outputs		
BF 9250:	1 x 0.75 mm² stranded ferruled (isolated) DIN 46228-1/-2/-3/-4 1 x 1.5 mm² stranded ferruled DIN 46228-1/-2/-3	
BH 9250:	1 x 4 mm² solid or 1 x 2.5 mm² stranded ferruled (isolated) or 2 x 1.5 mm² stranded ferruled (isolated) DIN 46228-1/-2/-3/-4 or 2 x 2.5 mm² stranded ferrueld DIN 46228-1/-2/-3	

Wire fixing

Load terminals:	Terminal screws M 4 Box terminal with wire protection
Control terminals: BF 9250, BF 9250/001, BF 9250/003, BF 9250/004:	cage clamp terminals “Push-In”
BH 9250:	Plus-minus terminal screws M3,5 box terminals with wire protection
Mounting:	DIN rail IEC/EN 60715

Weight

BF 9250	
Width 22.5 mm:	350 g
Width 45 mm:	580 g
Width 90 mm:	1 050 g
BH 9250	
Width 45 mm:	394 g
Width 67.5 mm:	638 g
Width 112.5 mm:	1 094 g

Dimensions

Width x heigth x depth:

BF 9250**:**	22,5 x 85 x 120 mm
	45 x 85 x 120 mm
	90 x 85 x 120 mm
BH 9250:	45 x 85 x 120 mm
	67,5 x 85 x 120 mm
	112,5 x 85 x 120 mm

UL-Data according to UL508

Input

Wire connection:	60°C / 75°C copper conductors only
BF 9250:	AWG 28 - 14 Sol/Str
BH 9250:	AWG 20 - 12 Sol, 20 - 14 Str. Torque 0.8 Nm

Load circuit

Fixed screw terminal:	75°C copper conductors only AWG 18 - 8 Sol Torque 0.8 Nm or AWG 18 - 10 Str Torque 0.8 Nm (only possible at variants up to 30 A)
Temperature range:	0 ... 40 °C
Frequency range:	50 / 60 Hz
Pollution degree:	2

In the final circuit an overvoltage protector R/CSPD (VZCA2/8) with min. 480V AC, 50/60Hz, VPR=2500V, Type 3 has to be installed.

Technical data that is not stated in the UL-Data, can be found in the technical data section.

Standard Types

BF 9250.01/001 DC 24 V AC 24 ... 480 V 50/60 Hz 10 A

Article number:	0050515
• 1-pole	
• Control input X1:	DC 3 ... 48 V
• Auxiliary voltage:	DC 24 V
• Load voltage:	AC 24 ... 480 V
• Load current:	10 A
• With signal output	
• Width:	22,5 mm

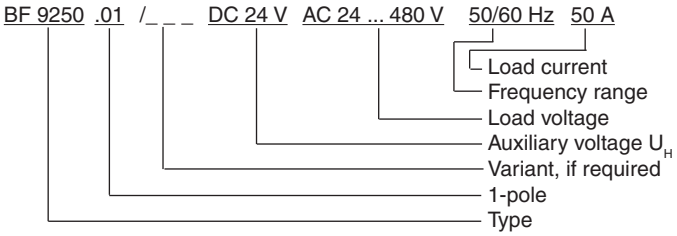
BF 9250.03/001 DC 24 V AC 24 ... 480 V 50/60 Hz 3 x 10 A

Article number:	0050520
• 3-pole	
• Control input X1:	DC 3 ... 48 V
• Auxiliary voltage:	DC 24 V
• Load voltage:	AC 24 ... 480 V
• Load current:	3 x 10 A
• With signal output	
• Width:	45 mm

Variants

BF 9250.0_:	Without low current input X1
BH 9250._ _/001:	With bigger diameter for control wires
BF 9250.92/003, BF 9250.93/003:	2 or 3 power semiconductor controlled by a separate input with galvanic isolation, without temperature monitoring of the semiconductors
BF 9250.02/004, BF 9250.03/004:	2 or 3 power semidconductor controlled by a separate input with common ground with temperature monitoring of the semiconductors signal output not latching without LED display of ϑ.

Odering example for variants



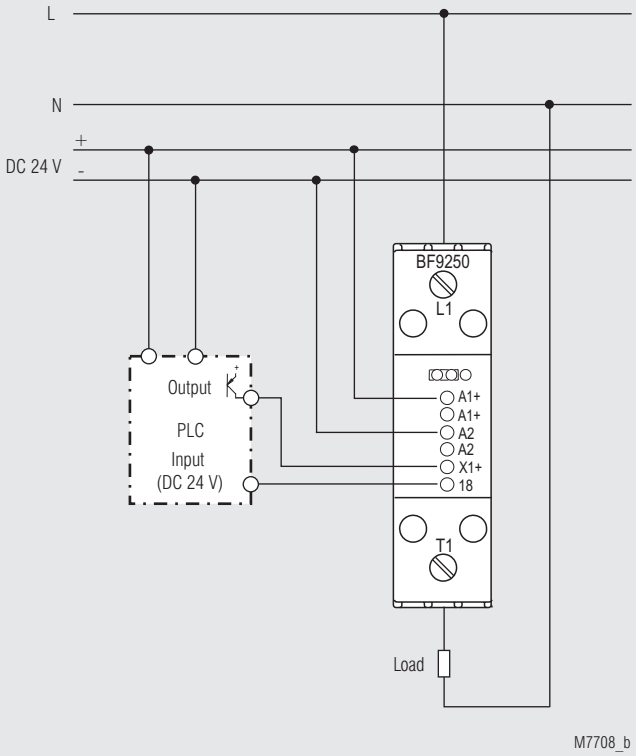
Installation

Recommended distance:
upper / lower side to cable duct: 20 mm

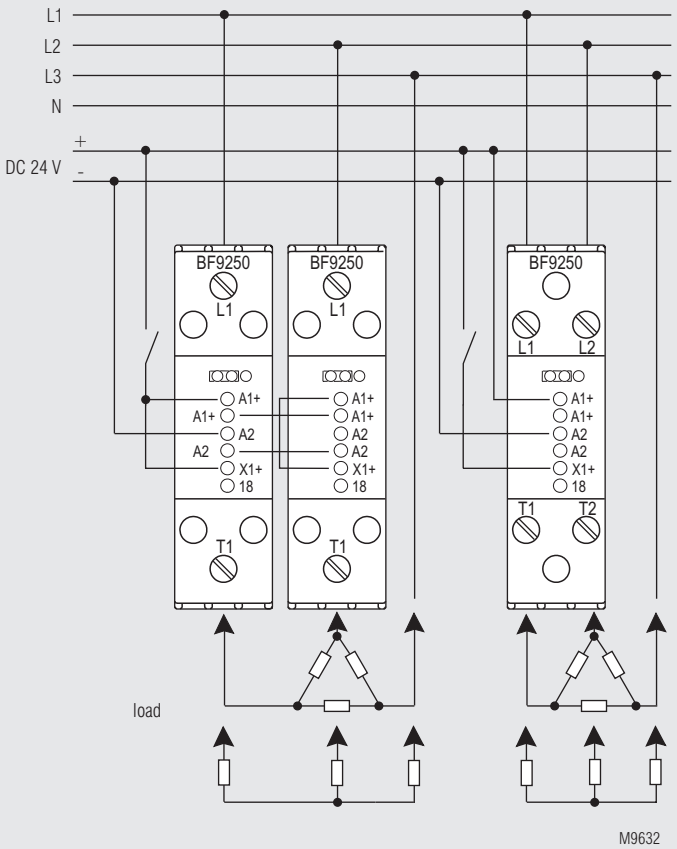
Distance on left and right: 10 mm; with max. load current and 100 % duty cycle

Application Examples

single phase system



3-phase system, 2 phases controlled



Single phase load switched by 1-pole semiconductor contactor controlled from PLC or Temperature controller output.

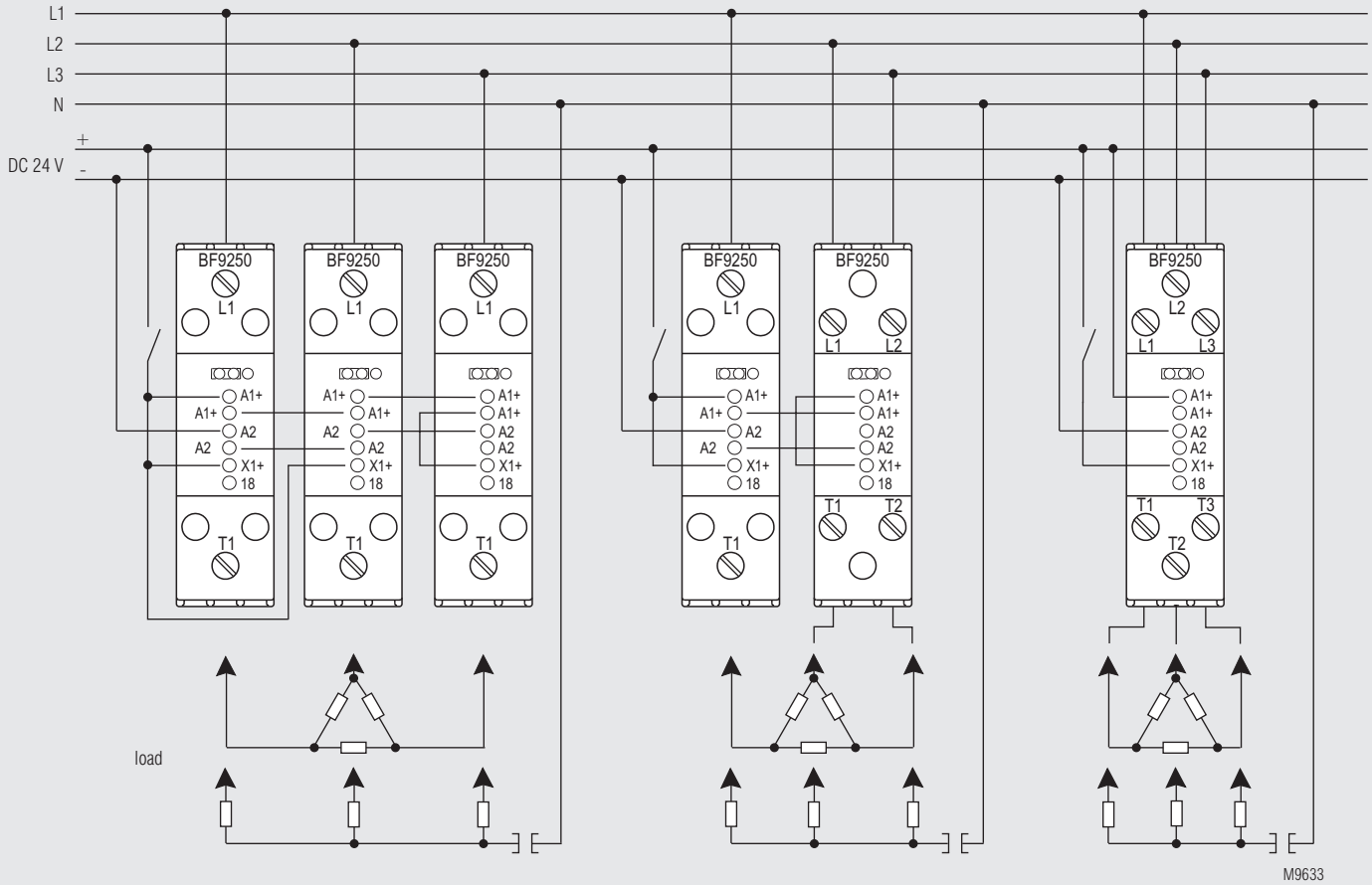
3-phase load, switched by 2 single-pole semiconductor contactors (left side) or by 1 2-pole semiconductor contactor (right side)

Width mm	22,5	45	90		22,5	45	90		22,5	45	90
I_L / phase	10 A	25 A	50 A		10 A	25 A	50 A		10 A	25 A	50 A

BF 9250._ _/001

Application Examples

3-phase system, 3-phases controlled



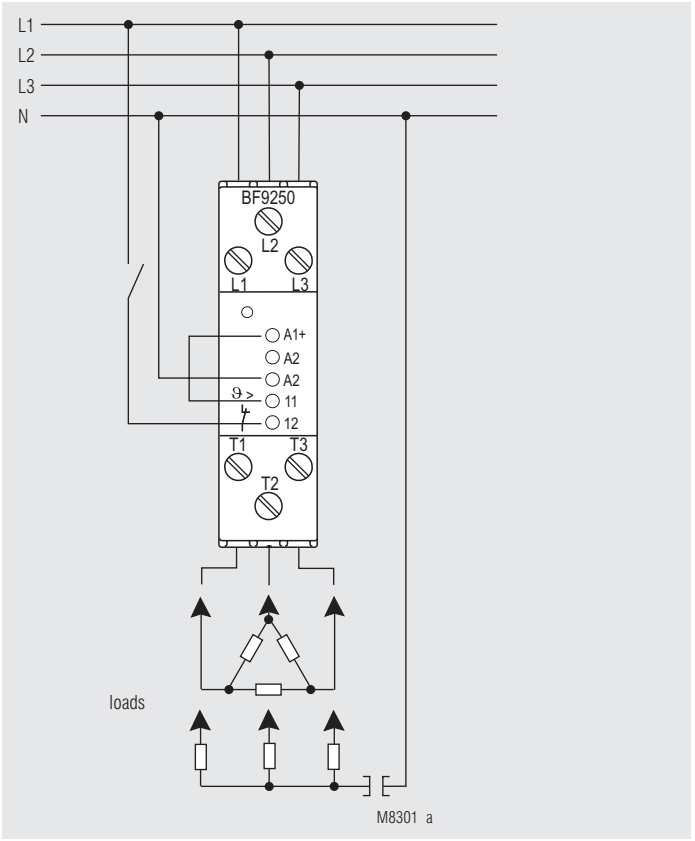
3-phase load switched by 3 single-pole semiconductor contactors

3-phase load switched by 1 3-pole semiconductor contactor

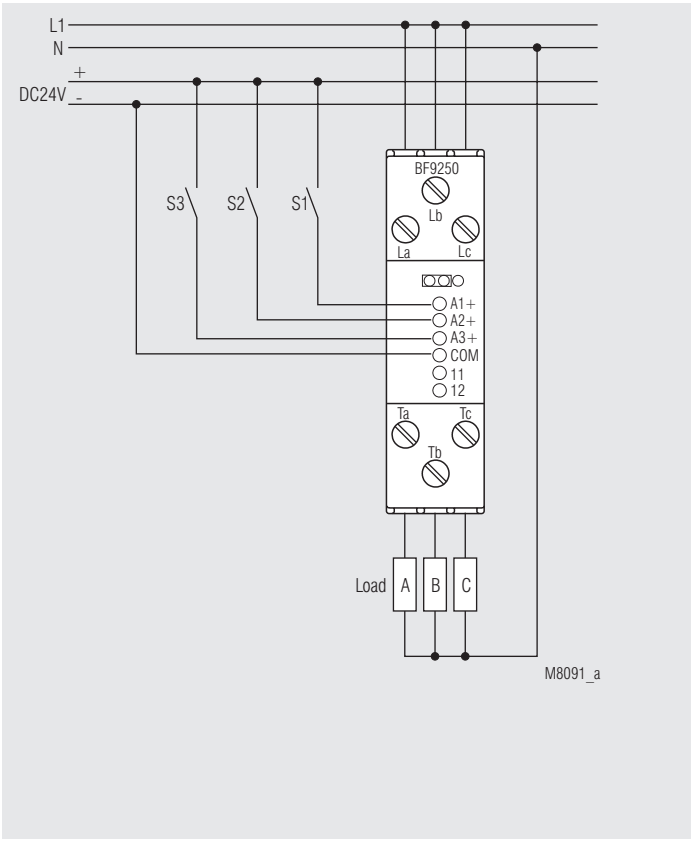
Width mm	22,5	45	90		22,5	45	90		22,5	45	90
I_L / phase	10 A	25 A	50 A		6,5 A	15 A	25 A		5 A	10 A	15 A

BF 9250._ _/001

Application Examples



BF 9250.03
3-phase load, controlled by a 3-pole semiconductor contactor with AC/DC 110-230 V control voltage.



BF 9250.03/004
3 semiconductor contactors in one housing control 3 different loads