

## POWERSWITCH

### Semiconductor Relay / - Contactor, 2-poles PH 9260.92



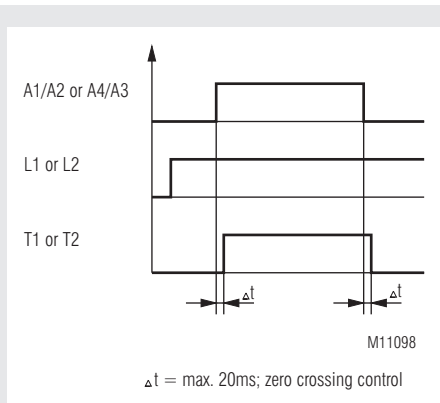
#### Your Advantages

- Free from wearing, noiseless, economic
- Excellent EMC- performance, because of switching at zero crossing
- Separate control of both poles
- Available with heatsink to be mounted on DIN rail
- Easy connection via cage clamp terminals

#### Features

- AC semiconductor relay / -contactor
- According to IEC/EN 60947-4-3
- As option load current up to 2 x 32 A or 2 x 48 A
- As option with high I<sup>2</sup>t up to 6600 A<sup>2</sup>s
- Load voltages up to AC 480 V
- 2 anti-parallel thyristors for each pole
- DCB technology (direct bonding method) for excellent heat transmission propertie
- Touch protection IP20
- Box terminals for load connections
- LED status indicator for both poles
- Peak reverse voltage up to ± 1200 V
- Insulation voltage 4000 V
- Width 45 mm

#### Function Diagram



#### Approvals and Markings



#### Applications

- Solid state relays switching at zero crossing:  
For frequent no-wear and no-noise switching of
- heating systems
  - motors
  - valves
  - lighting systems

The semiconductor relay switches at zero crossing and is suitable for many applications e.g. extrusion machines for plastic and rubber, packaging machines, solder lines, machines in food industry.

#### Function

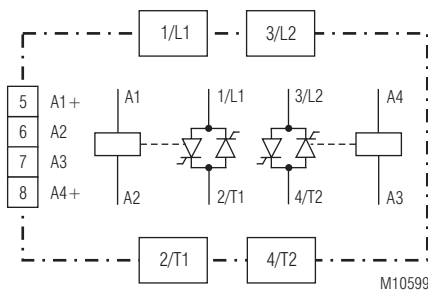
The semiconductor relay PH 9260 is designed with 2 anti-parallel connected thyristors switching at zero crossing.

When connecting the control voltage the output of the semiconductor relay is activated at the next zero crossing of the sinusoidal voltage. When disconnecting the control voltage the output is switched off at the next zero crossing of the load current.

The LED shows the state of the control input.

As option the semiconductor relay is available with heatsink to be mounted on DIN rail. This provides optimum heat transmission.

#### Circuit Diagram



PH 9260.92

## Technical Data

### Output

Load voltage AC [V]	24 ... 240, 48 ... 480	
Frequency range [Hz]:	47 ... 63	
Load current [A], AC-51:	32	48
Load limit integral I <sub>2t</sub> [A <sup>2</sup> s]:	800 6600*)	1800 6600*)
Max. Overload current [A] t = 10 ms:	400 1150*)	600 1150*)
Periodic overload current t = 1 s [A]:	40 150*)	120 150*)
Min. current [mA]:	20	
On-state voltage at nominal current [V]:	1.2	1.4
Rate of rise of off-state voltage [V/μs]:	500	500
Rate of rise of current [A/μs]:	100	100
<b>Thermische Daten</b>		
Thermal resistance junction - housing [K/W]:	0.6	0.5
Thermal resistance housing - ambient [K/W]:	12	12
Junction temperature [°C]:	≤ 125	

\*) Variant PH 9260.92/100

### Control Circuit

Control voltage range [V]:	DC 18 ... 30
max. input current [mA]:	15
Turn-on delay [ms]:	0.5 ... 10.5
Turn-off delay [ms]:	0.5 ... 10.5

### General Data

<b>Operating mode:</b>	Continuous operation	
<b>Temperature range:</b>		
operation:	- 20 ... 40° C	
storage:	- 20 ... 80° C	
<b>Clearance and creepage distances</b>		
rated impulse voltage / pollution degree:	6 kV / 3	IEC/EN 60 664-1
<b>EMC:</b>	IEC/EN 61 000-6-4,	IEC/EN 61 000-4-1
Electrostatic discharge (ESD):	8 kV air	IEC/EN 61 000-4-2
HF irradiation:	10 V / m	IEC/EN 61 000-4-3
Fast transients:	2 kV	IEC/EN 61 000-4-4
Surge voltages between wires for power supply:	1 kV	IEC/EN 61 000-4-5
between wire and ground:	2 kV	IEC/EN 61 000-4-5
HF-wire guided:	10 V	IEC/EN 61 000-4-6
Interference suppression:	Limit value class A	IEC/EN 60 947-4-3
<b>Degree of protection</b>		
Housing:	IP 40	IEC/EN 60 529
Terminals:	IP 20	IEC/EN 60 529
<b>Vibration resistance:</b>	Amplitude 0.35 mm frequency 10 ... 55 Hz, IEC/EN 60-068-2-6	
<b>Housing material:</b>	Fiberglass reinforced polycarbonate Flame resistant; UL 94 V0	
<b>Base plate:</b>	Aluminum, copper nickle-plated	
<b>Potting compound:</b>	Polyurethane	
<b>Mounting screws:</b>	M5 x 8 mm	
<b>Mounting torque:</b>	2,5 Nm	
<b>Connections control circuit:</b>	cage clamp terminals	
Wire cross section:	0.2 ... 1,5 mm <sup>2</sup> wire	
<b>Connections load circuit:</b>	Mounting screws M4 Pozidrive 2 PT	
Mounting torque:	1,2 Nm	
Wire cross section:	10 mm <sup>2</sup> wire	
<b>Nominal insulation voltage</b>		
Control circuit - load circuit:	4 kV <sub>eff.</sub>	
Load circuit - base plate:	4 kV <sub>eff.</sub>	
Control circuit A1/A2 - A3/A4:	250 V <sub>eff.</sub>	
Overvoltage category:	II	

## Technical Data

### Weight

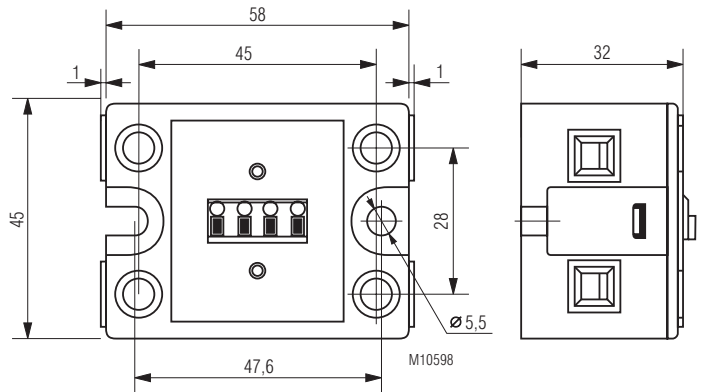
without heat sink:	approx. 107 g
PH 9260.92/_/_/_/01:	approx. 537 g
PH 9260.92/_/_/_/02:	approx. 657 g

### Dimensions

#### Width x height x depth

without heat sink::	45 x 60 x 35 mm
PH 9260.92/_/_/_/01:	45 x 80 x 127 mm
PH 9260.92/_/_/_/02:	45 x 100 x 127 mm

### Dimensions



### Accessories

PH 9260-0-12:	Graphite foil 55 x 40 x 0.25 mm to be fitted between device and heat sink, for better heat transmission Article number: 0058395
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### Standard Type

PH 9260.92 AC 48 ... 480 V	2 x 48 A	DC 18 ... 30 V
Article number:	0064252	
• Load voltage:	AC 48 ... 480 V	
• Load current:	2 x 48A	
• Control voltage:	DC 18 ... 30 V	
• Width:	45 mm	

### Varianten

PH 9260 .92 / _ 0 0 / 0 _	
0	Without heat sink
1	With heat sink 1.5 K / W
2	With heat sink 0.95 K / W
0	Standard
0	Switching at zero crossing
0	Standard
1	With heigh I <sup>2</sup> t-value

### Ordering example for variants

PH 9260.92 /100/02	AC 48 ...480 V	2 x 48 A	DC 18 ... 30 V
			Control voltage
			Load current
			Load voltage
			With heat sink 0.95 K / W
			With height I <sup>2</sup> t-value
			Type

## Notes on Sizing for Selection of a Heat Sink

The heat generated by the load current must be dissipated by a suitable heat sink. It is imperative that the junction temperature of the semiconductor is maintained for all potential environmental temperatures of under 125°C. For this reason, it is important to keep the thermal resistance between the base plate of the semiconductor relay and the heat sink to a minimum.

To protect the semiconductor relay effectively from excess heating, a thermally conducting paste should be applied before installation to the base plate of the heat sink between semiconductor relay and heat sink.

From the tables below, select a suitable heat sink with the next lowest thermal resistance. Thus, it is ensured that the maximum junction temperature of 125°C is not exceeded. The load current in relation to the environmental temperature can be seen from the table.

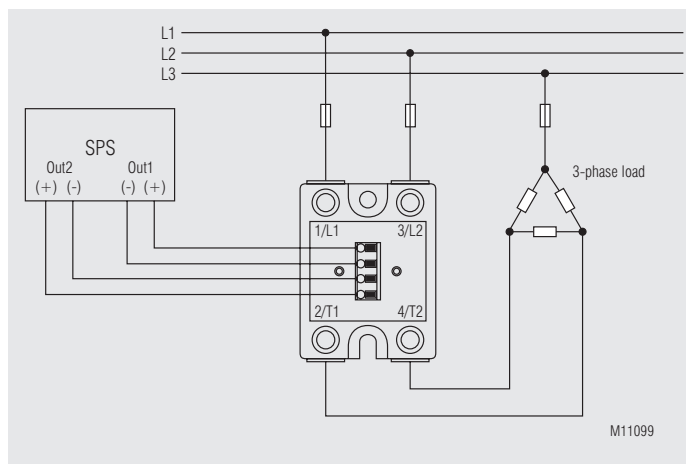
## Selection of a Heat Sink

Load current (A)	Version for 2 x 32 A Thermal resistance (K/W)					
	20	30	40	50	60	70
64	0.9	0.8	0.6	0.55	0.4	0.3
56	1.1	0.9	0.8	0.65	0.55	0.4
48	1.3	1.1	1.0	0.85	0.6	0.5
40	1.6	1.4	1.2	1.1	0.9	0.7
32	2.1	1.9	1.6	1.4	1.2	0.9
26	2.7	2.4	2.1	1.8	1.5	1.2
16	4.7	4.2	2.7	3.2	2.7	2.2
8	10.0	8.5	7.8	6.8	5.9	5.0

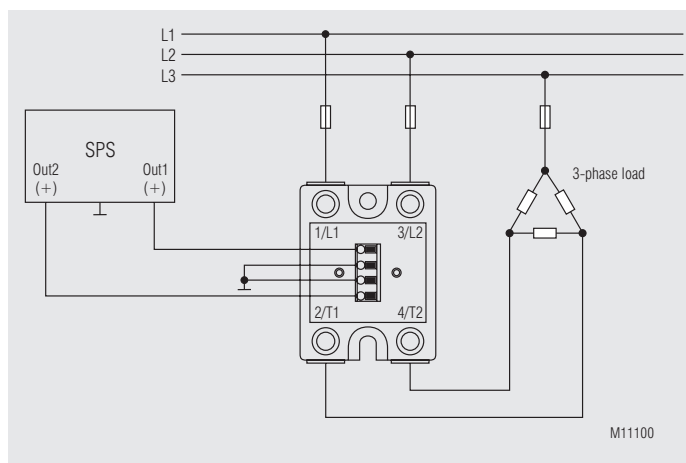
Load current (A)	Version for 2 x 48 A Thermal resistance (K/W)					
	20	30	40	50	60	70
96	0.6	0.5	0.4	0.35	0.25	0.15
84	0.7	0.6	0.55	0.45	0.35	0.25
72	0.9	0.8	0.65	0.55	0.45	0.35
60	1.1	1.0	0.85	0.75	0.6	0.45
48	1.5	1.3	1.1	1.0	0.8	0.65
36	2.1	1.9	1.6	1.44	1.2	0.9
24	3.3	3.0	2.6	2.3	1.9	1.6
12	7.0	6.0	5.5	4.9	4.0	3.5

Load current (A)	Version for 2 x 48 A at I²t = 6600 A²s Thermal resistance (K/W)					
	20	30	40	50	60	70
96	0.8	0.7	0.6	0.5	0.4	0.3
84	0.9	0.8	0.7	0.61	0.5	0.4
72	1.1	1.0	0.85	0.75	0.6	0.45
60	1.4	1.2	1.1	0.9	0.75	0.6
48	1.8	1.6	1.4	1.2	1.0	0.8
36	2.5	2.2	1.9	1.65	1.4	1.2
24	3.5	3.4	3.0	2.6	2.2	1.85
12	7.5	7.0	6.0	5.5	4.5	4.0

## Application Examples



Ansteuerung durch galvanisch getrennte Ausgänge.



Ansteuerung durch Ausgänge mit gemeinsamer Masse.

