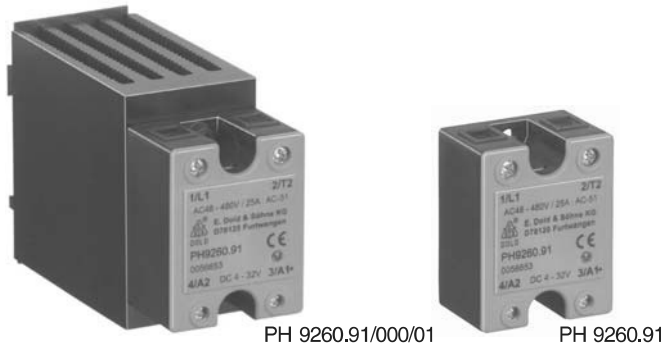
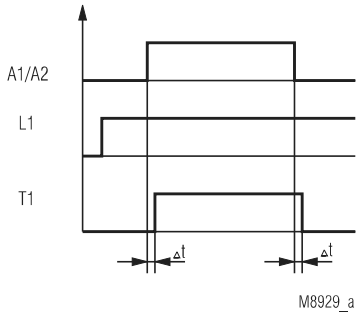
Semiconductor Relay PH 9260 powerswitch

A 027349



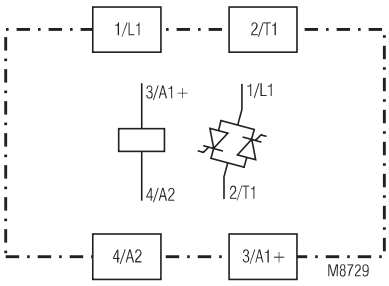
- AC semiconductor relay
- According to IEC/EN 60947-4-3
- Load current up to 100 A, AC 51 with I^2t up to 6600 A^2s
- Switching at cero crossing
- 2 anti-parallel thyristors
- DCB technology (direct bonding method) for excellent heat transmission properties
- Touch protection IP20
- Box terminals
- LED status indicator
- Peak reverse voltage 1200 V or 1600 V
- Insulation voltage 4000 V
- As option with overtemperature protection
- As option with heat sink, for DIN rail mounting

Function Diagram



Δt = max. 20ms; zero crossing control

Circuit diagram



PH 9260.91

Approvals and Marking

CE cULus Canada / USA pending

Applications

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 whith 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 courrent.

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.

Notes

Overtemperature protection
Optionally, the semiconductor relay has an overtemperature protection to monitor the temperature of the heat sink. To this end, a thermal release switch (NC contact) can be inserted into the respective pocket at the bottom of the semiconductor relay. As soon as the temperature of the heat sink exceeds for example 100°C, the thermal release switch. For thermal protection of the semiconductor relay, a thermal release switch of UCHIYA type UP62 – 100 can be installed.

Technical data

Output

Load current [A], (AC 51):	25	50	100	125
Load limit integral I^2t [A^2s]:	800	1800 6600*)	6600	18000
max. overload current [A] t = 10 ms:	400	600 1150*)	1150	1900
periodic overload current t = 1 s [A]:	40	120 150*)	150	200
On-state voltage at nominal current [V]:	1.2	1.4	1.4	1.3
Rate of rise of off-state voltage [V/µs]:	500	500	1000	1000
Rate of rise of current [A/µs]:	100	100	100	150

Temperature data

Thermal resistance junction - housing [kW]:	0.6	0.5	0.3	0.3
Thermal resistance housing [kW]:	12	12	12	12
Junction temperature [°C]:		125		
Temperature range [°C]:		- 20 ... 80		

*) Variant PH 9260.91/100

Drive Circuit

	DC	AC/DC	AC/DC
Control voltage range [V]:	4 ... 32	18 ... 27	85 ... 265
Making voltage [V]:	≥ 3.0	10	35
Turn-off voltage [V]:	≤ 1.0	6.0	5
Max. nominal input current [mA]:	12	25 (AC) 12 (DC)	5.0 at 240 V AC (regulated)

Turn-on delay [ms]:	5 + 1/2 cycle
Turn-off delay [ms]	
at AC/DC 18 ... 27 V:	20 + 1/2 cycle
at AC/DC 85 ... 265 V:	30 + 1/2 cycle

General data

Operating mode:	Continuous operation	
Temperature range:	- 20 ... 40° C	
Storage temperature:	- 20 ... 80° C	
Clearance and creepage distances		
overvoltage category / contamination level:	6 kV / 3	IEC/EN 60 664-1
EMC:	IEC/EN 61 000-6-4,	IEC/EN 61 000-4-1
Electrostatic discharge:	8 kV air / 6 kV contact	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 bound:	10 V	IEC/EN 61 000-4-6
Interference suppression:	Limit value class A	IEC/EN 60 947-4-3
Degree of protection		
Housing:	IP 40	IEC/EN 60 529
Terminals:	IP 20	IEC/EN 60 529
Vibration resistance:	Amplitude 0.35 mm frequency 10 ... 55 Hz,	IEC/EN 60-068-2-6

Technical data

Housing material:	Fiberglass reinforced polycarbonate Flame resistant: UL 94 V0
Floor plate:	Aluminum, copper nickle-plated
Potting compound:	Polyurethane
Mounting screws:	M 5 x 8 mm
Mounting torque:	2.5 Nm
Connections drive circuit:	Mounting screws M 3 Pozidrive 2 PT
Mounting torque:	0.5 Nm
Wire cross section:	1.5 mm^2 wire
Connections load circle:	Mounting screws M4 Pozidrive 1 PT
Mounting torque:	1.2 Nm

Nominal insulation voltage

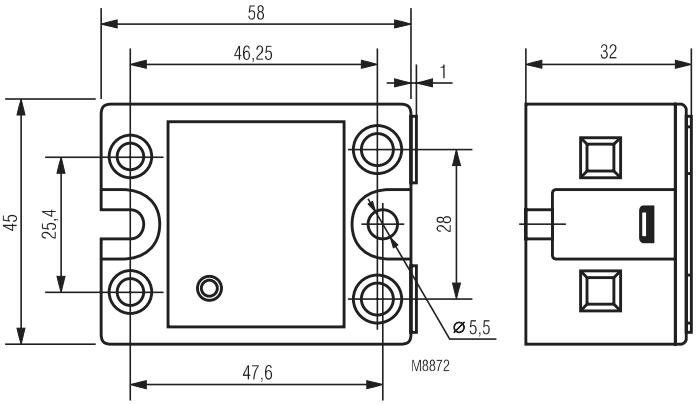
Control circuit – load circuit:	4 kV
Load circuit – floor plate:	6 kV
Overvoltage category:	II
Wire cross section:	10 mm^2 wire
Weight	
to 50 A:	90 g
to 100 A:	120 g

Dimensions

Width x height x depth

PH 9260.91/000/01:	45 x 80 x 124 mm
PH 9260.91/000/02:	45 x 100 x 124 mm

For the 100 A-variants we recommend a 25 mm^2 adapter terminal type 802/115S, Brand FTG.



Accessories

PH 9260-0-12:	Graphit gasket 55 x 40 x 0.25 mm to be fitted between device and heat sink, for better heat transmission

Technical data

Contents of article numbers

Type		PH 9260							
Variant (Designation)		Standard	PH 9260/000/01 with heat sink	Standard	PH 9260/000/02 (with heat sink)	PH 9260/100 (I^2t = 6600 A^2s)	PH 9260/100/02 (I^2t = 6600 A^2s with heat sink)	Standard	Standard
Load current		25 A	25 A	50 A	50 A	50 A	50 A	100 A	125 A
Load voltage	Control voltage								
24 - 240 V AC	4 - 32 V DC	0056651	0056953	0056652	0056954	0057699	0058195	0056821	0059736
	18 - 36 V AC/DC	*	*	*	*	*	*	*	*
	85 - 265 V AC/DC	*	0058255	*	0058256	*	*	0059631	*
48 - 480 V AC	4 - 32 V DC	0056653	0056955	0056654	0056956	0057700	0058196	0056822	0059737
	18 - 36 V AC/DC	*	*	*	*	*	*	*	*
	85 - 265 V AC/DC	*	*	*	0059074	*	*	*	*
48 - 660 V AC	4 - 32 V DC	0058676	*	*	*	0058678	*	0058677	*
	18 - 36 V AC/DC	*	*	0058958	*	0058960	*	*	*
	85 - 265 V AC/DC	*	*	0058959	*	0058961	*	*	*

At devices without heatsink the necessary heatsink has to be chosen according to the dimensioning notes.

* On request

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)	PH 9260 25 A Thermal resistance (K/W)					
25.0	2.8	2.5	2.1	1.8	1.5	1.1
22.5	3.2	2.8	2.5	2.1	1.7	1.3
20.0	3.7	3.3	2.8	2.4	2.0	1.6
17.5	4.3	3.8	3.4	2.8	2.4	1.9
15.0	5.1	4.6	4.0	3.5	2.9	2.4
12.5	6.3	5.6	5.0	4.3	3.6	2.8
10.0	8.0	7.2	6.4	5.6	4.7	3.9
7.5	11.0	9.9	8.7	7.6	6.5	5.4
5.0	16.8	15.0	13.5	12.0	10.0	8.5
2.5	---	---	---	---	21.0	17.6
	20	**30**	**40**	**50**	**60**	**70**
	Environmental temperature (°C)					

Load current (A)	PH 9260 50 A Thermal resistance (K/W)					
50	0.9	0.7	0.6	0.4	0.3	---
45	1.0	0.9	0.7	0.5	0.4	0.2
40	1.2	1.0	0.9	0.7	0.5	0.3
35	1.5	1.3	1.0	0.9	0.7	0.5
30	1.9	1.6	1.4	1.1	0.9	0.7
25	2.4	2.0	1.8	1.5	1.2	0.9
20	3.0	2.7	2.4	2.0	1.7	1.3
15	4.4	3.9	3.4	2.9	2.5	2.0
10	6.9	6.0	5.4	4.7	4.0	3.3
5	14.0	12.9	11.5	10.0	8.6	7.2
	20	**30**	**40**	**50**	**60**	**70**
	Environmental temperature (°C)					

Selection of a heat sink

Load current (A)	PH 9260 100 A Thermal resistance (K/W)					
100	0,43	0,35	0,25	0,2	---	---
90	0,56	0,45	0,35	0,28	0,2	---
80	0,7	0,6	0,5	0,4	0,3	0,2
70	0,9	0,8	0,65	0,55	0,4	0,3
60	1,2	1,0	0,9	0,75	0,6	0,46
50	1,6	1,4	1,2	1,0	0,85	0,6
40	2,3	2,0	1,8	1,5	1,2	1,0
30	3,4	3,0	2,5	2,2	2,0	1,5
20	5,6	5,0	4,5	3,9	3,3	2,7
10	12,0	11,0	10,0	9,0	7,6	6,0
	20	**30**	**40**	**50**	**60**	**70**
	Environmental temperature (°C)					

Load current (A)	PH 9260 125 A Thermal resistance (K/W)					
125	0.5	0.4	0.3	0.2	0.1	0.1
112.5	0.6	0,5	0.4	0.3	0.2	0.1
100	0.7	0.6	0.5	0.4	0.3	0.2
87.5	0.9	0.8	0.7	0.5	0.4	0.3
75	1.0	1.0	0.9	0.7	0.6	0.5
62.5	1.5	1.4	1.1	1.0	0.8	0.7
50.0	2.0	1.8	1.6	1.3	1.1	0.9
37.5	3.0	2.6	2.3	2.0	1.7	1.4
25	4.7	4.2	3.5	3.0	2.8	2.3
12.5	10.2	9.0	8.0	7.0	6.0	5.0
	20	**30**	**40**	**50**	**60**	**70**
	Environmental temperature (°C)					

Application example