Solid State Relays
Industrial, 1-Phase ZS (IO) w. LED and Built-in Varistor
Type HPR48

- Zero switching
- Direct copper bonding (DCB) technology
- LED indication
- Line & Load accepts: 10-14 AWG
- Built-in varistor 480 V
- Clip-on IP 20 protection cover
- Self-lifting terminals
- Housing free of moulding mass
- Blocking voltage: 1200V_p
- Opto-isolation: > 4000VAC rms
- 2 input ranges: 4-32 VDC and 20-280 VAC/22-48 VDC
- Operational ratings: Up to 75 AMPS rms
- Rated voltage: 480 VAC rms

E 62767

Product Description

The industrial, 1-phase relay with anti parallel thyristor output is the most widely used industrial SSR due to its multiple application possibilities. The relay can be used for resistive, inductive and capacitive loads. The zero switching relay switches ON when the sinusoidal curve crosses zero and switches OFF when the current crosses zero.

The instant-on relay with DC control input can be used for phase control. The built in varistor secures transient protection for the heavy industrial applications, and the LED indicates the status of the control input. The clip on cover is securing touch protection to IP20. Protected output terminals can handle cables up to 16mm2 (6 AWG).

Ordering Key

HPR 48 A 25

- **Solid State Relay**
- **Rated voltage**
- **Control voltage**
- **Rated operational current**

Type Selection

Control voltage	Rated operation current
A: 20-280VAC/22-48VDC	25: 25 AMPS rms
D: 4-32VDC	50: 50 AMPS rms
	75: 75 AMPS rms
	100: 100 AMPS rms

Selection Guide

Rated operational voltage	Blocking voltage	Control voltage	Rated operational current 25A	50A	75A	100A
480 VAC rms	1200V_p	4 to 32 VDC	**HPR48D25**	**HPR48D50**	**HPR48D75**	**HPR48D100**
		20 to 280 VAC 22 to 48 VDC	**HPR48A25**	**HPR48A50**	**HPR48A75**	**HPR48A100**

General Specifications

	HPR48...
Operational voltage range	42 to 530 VAC rms
Blocking voltage	≥ 1200 V_p
Zero voltage turn-on	≤ 10V
Operational frequency range	45 to 65Hz
Power factor	> 0.5 @ 480 VAC rms
Approvals	cULus
CE-marking	Yes

Input Specifications

	HPR..D..	HPR..A..
Control voltage range		
HPR48...	4 - 32 VDC	20 - 280 VAC 22 - 48 VDC
Pick-up voltage @ Ta = 25°C		
HPR48...	3.5 VDC	18 VAC/DC
Reverse voltage	32 vdc	-
Drop out voltage	1.2 VDC	6 VAC/DC
Input current @ max input voltage		
HPR.....	≤ 12 mA	≤ 20 mA
Response time pick-up		
HPR.....	≤ 1/2 cycle	≤ 12 ms
Response time drop-out	≤ 1/2 cycle	≤ 40 ms

Output Specifications

	HPR...25	HPR...50	HPR...75	HPR...100
Rated operational current				
AC51 @ ta=25°C	25 AMPS rms	50 AMPS rms	75 AMPS rms	100 AMPS rms
AC53a @ Ta=25°C	5 AMPS rms	15 AMPS rms	20 AMPS rms	30 AMPS rms
Min. operational current	150 mA	250 mA	400 mA	500 mA
Rep. overload current t=1 s	< 55 AMPS rms	< 125 AMPS rms	<150 AMPS rms	<200 AMPS rms
Non-rep. surge current t=10 ms	$325A_p$	$600A_p$	$1150A_p$	$1900A_p$
Off-state leakage current @ rated voltage and frequency	< 3mA rms	< 3mA rms	< 3mA rms	< 3mA rms
I^2t for fusing t=10 ms	$< 525A^2s$	$< 1800A^2s$	$< 6600A^2s$	$< 18000A^2s$
On-state voltage drop @ rated current	1.6 V rms	1.6 V rms	1.6 V rms	1.6 V rms
Critical dV/dt off-state min.	1000V/µs	1000V/µs	1000V/µs	1000V/µs

Thermal Specifications

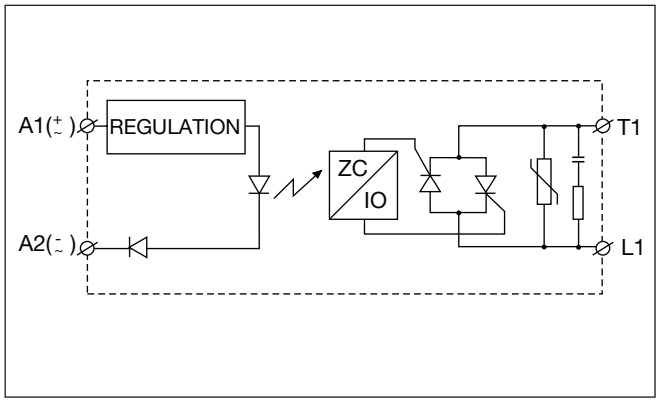
	HPR...25	HPR...50	HPR...75	HPR...100
Operating temperature range	-20° to 70°C (36° to 126°F)			
Storage temperature range	-40° to 100°C (72° to 180°F)			
Junction temperature	≤ 125°C (225°F)	≤ 125°C (225°F)	≤ 125°C (225°F)	≤ 125°C (225°F)
R_{th} junction to case	≤ 0.80°C/W	≤ 0.50°C/W	≤ 0.35°C/W	≤ 0.30°C/W
R_{th} junction to ambient	≤ 20.0°C/W	≤ 20.0°C/W	≤ 20.0°C/W	≤ 20.0°C/W

Housing Specifications

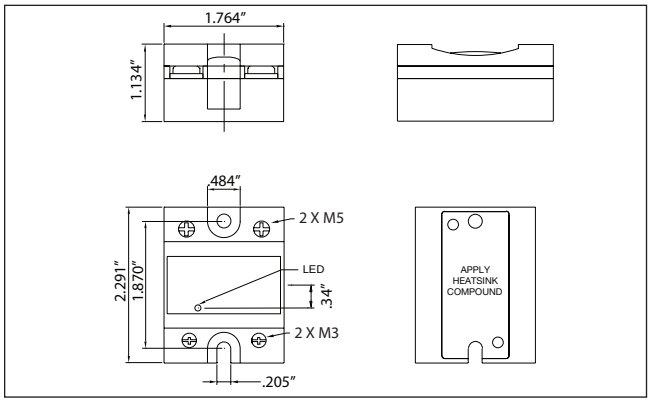
Weight	
25A, 50A	Approx. 60g (2.2 Ounces)
75A, 100A	Approx. 100g (3.6 Ounces)
Housing material	Noryl GFN 1, black
Baseplate	
25A, 50A	Aluminium
75A, 100A	Copper, nickel-plated
Potting compound	None

Relay	
Mounting screws	M5
Mounting torque	1.5-2.0 Nm (13-18 in lbs)
Control terminal	
Mounting screws	M3 x 9
Mounting torque	0.5 Nm (4.4 in lbs)
Power terminal	
Mounting screws	M5 x 9
Mounting torque	2.4 Nm (21 in lbs)

Functional Diagram



Dimensions



Heatsink Data
(load current versus ambient temperature)

HPR...25

Load current [A]	Thermal resistance [°C/W]						Power dissipation [W]
25.0	2.70	2.34	1.98	1.61	1.25	0.89	28
22.5	3.10	2.69	2.28	1.86	1.45	1.04	24
20.0	3.61	3.13	2.65	2.18	1.70	1.23	21
17.5	4.26	3.70	3.14	2.59	2.03	1.47	18
15.0	5.14	4.47	3.80	3.14	2.47	1.80	15
12.5	6.38	5.56	4.73	3.91	3.09	2.27	12
10.0	8.25	7.19	6.14	5.08	4.02	2.97	9
7.5	11.4	9.94	8.49	7.04	5.59	4.14	7
5.0	17.7	15.4	13.2	11.0	8.74	6.51	4
2.5	-	-	-	-	18.2	13.6	2
	20	30	40	50	60	70°C	
	68	86	104	122	140	158°F	

T_A Ambient temp.

HPR...50

Load current [A]	Thermal resistance [°C/W]						Power dissipation [W]
50.0	1.03	0.86	0.70	0.53	0.37	0.20	61
45.0	1.27	1.09	0.90	0.71	0.52	0.33	53
40.0	1.54	1.32	1.10	0.89	0.67	0.45	46
35.0	1.85	1.59	1.34	1.08	0.82	0.57	39
30.0	2.26	1.95	1.65	1.34	1.03	0.72	33
25.0	2.85	2.47	2.08	1.70	1.32	0.94	26
20.0	3.73	3.24	2.75	2.26	1.77	1.27	20
15.0	5.22	4.54	3.86	3.19	2.51	1.83	15
10.0	8.21	7.16	6.11	5.05	4.00	2.95	10
5.0	17.2	15.0	12.9	10.7	8.51	6.33	5
	20	30	40	50	60	70°C	
	68	86	104	122	140	158°F	

T_A Ambient temp.

HPR...75

Load current [A]	Thermal resistance [°C/W]						Power dissipation [W]
75.0	0.91	0.78	0.65	0.52	0.39	0.26	77
67.5	1.10	0.96	0.81	0.66	0.51	0.36	68
60.0	1.34	1.17	1.00	0.83	0.66	0.49	59
52.5	1.60	1.40	1.20	1.00	0.80	0.60	50
45.0	1.93	1.68	1.44	1.20	0.96	0.72	42
37.5	2.38	2.08	1.78	1.49	1.19	0.89	34
30.0	3.06	2.68	2.30	1.91	1.53	1.15	26
22.5	4.21	3.68	3.16	2.63	2.10	1.58	19
15.0	6.51	5.70	4.88	4.07	3.26	2.44	12
7.5	13.5	11.77	10.09	8.41	6.73	5.04	6
	20	30	40	50	60	70°C	
	68	86	104	122	140	158°F	

T_A Ambient temp.

HPR...100

Load current [A]	Thermal resistance [°C/W]						Power dissipation [W]
100.0	0.54	0.45	0.36	0.27	0.18	0.09	111
90.0	0.68	0.58	0.47	0.37	0.27	0.17	97
80.0	0.86	0.74	0.62	0.50	0.38	0.26	84
70.0	1.08	0.94	0.80	0.66	0.52	0.38	71
60.0	1.37	1.20	1.03	0.85	0.68	0.51	59
50.0	1.70	1.49	1.28	1.06	0.85	0.64	47
40.0	2.21	1.93	1.66	1.38	1.10	0.83	36
30.0	3.06	2.68	2.30	1.91	1.53	1.15	26
20.0	4.78	4.18	3.59	2.99	2.39	1.79	17
10.0	9.98	8.73	7.49	6.24	4.99	3.74	8
	20	30	40	50	60	70°C	
	68	86	104	122	140	158°F	

T_A Ambient temp.

Junction to ambient thermal resistance, $R_{th\ j\text{-}a}$	< 20.0	°C/W
Junction to case thermal resistance, $R_{th\ j\text{-}c}$	< 0.35	°C/W
Case to heatsink thermal resistance, $R_{th\ c\text{-}s}$	< 0.10	°C/W
Maximum allowable case temperature	100 (212)	°C (°F)
Maximum allowable junction temperature	125 (257)	°C (°F)

Isolation

Rated isolation voltage Input to output	≥ 4000 VAC rms
Rated isolation voltage Output to case	≥ 4000 VAC rms

Heatsink Selection

Heatsink	Thermal Resistance	Power Dissipation
HS 45C	2.00°C/W	> 60W
HS 45B	2.70°C/W	> 60W
Consult MDI	> 0.25°C/W	N/A

MDI Inc
Post Office Box 710
Edwardsburg, Michigan 49112-0710
Phone (269) 663-8574 - (800) 634-4077
Fax (269) 663-2924 - www.mdius.com