

HBC-1Z Series Single-Phase DIN Mount Solid-State Contactors



- 17.5mm to 70mm DIN mount single-phase solid-state contactors
- Zero-crossing output ratings up to 85 amps @ 42-600Vac in a 40°C ambient environment
- 4-32Vdc or 20-275Vac / 24-190Vdc control voltage with LED status indicator
- Integrated fan with over temperature protection (85A models)
- I²T ratings up to 18,000 A²S
- Integrated output over voltage transient protection
- IP20 touch-safe housing
- Design according to EN/IEC60947-4-2, EN/IEC60947-4-3, EN/IEC62314, UL508, CSA 22-2 No. 14-13
- 100 kA short circuit current rating according to UL508
- cULus Listed, CE Compliant

Selection Guide

Load Current (Product Width)	Input Voltage	Output Terminal Configuration*	Part Number	Ext. Power Supply	Fan	Over Temp. Protection
20A @ 42-600Vac (17.5mm, Low Profile)	4-32Vdc	'E' – Contactor	HBC-1Z60D20E	-	-	-
	20-275Vac / 24-190Vdc	'E' – Contactor	HBC-1Z60A20E	-	-	-
25A @ 42-600Vac (17.5mm, Low Profile)	4-32Vdc	'E' – Contactor	HBC-1Z60D25E	-	-	-
		'U' – SSR	HBC-1Z60D25U	-	-	-
	20-275Vac / 24-190Vdc	'E' – Contactor	HBC-1Z60A25E	-	-	-
		'U' – SSR	HBC-1Z60A25U	-	-	-
65A @ 42-600Vac (70mm)	4-32Vdc	'E' – Contactor	HBC-1Z60D65E	-	-	-
		'U' – SSR	HBC-1Z60D65U	-	-	-
	20-275Vac / 24-190Vdc	'E' – Contactor	HBC-1Z60A65E	-	-	-
		'U' – SSR	HBC-1Z60A65U	-	-	-
85A @ 42-600Vac (70mm)	5-32Vdc	'E' – Contactor	HBC-1Z60D85EF	24Vdc	Yes	Yes
	20-275Vac / 24-190Vdc	'E' – Contactor	HBC-1Z60A85EF			
		'U' – SSR	HBC-1Z60A85UF			

*Output terminal configuration options are exhibited on pages 6, 10-12

Output Specifications

	HBC..1Z..20..	HBC..1Z..25..	HBC..1Z..65..	HBC..1Z..85..
Operational Voltage (Vrms +10% max, 45-65Hz)	42-600	42-600	42-600	42-600
Blocking Voltage (Vpk)	1,200			
Transient Blocking Voltage (Vrms)	625			
Load Current Range (AC-51 rating, Arms @ 40°C)	0.15 - 20	0.25 - 25	0.5 - 65	0.5 - 85
Load Current Range (AC-53a rating, Arms @ 40°C)	0.15 - 5	0.25 - 5	0.5 - 20	0.5 - 20
Max. Motor Starts per Hour (50% duty-cycle @ 40°C)	30			
Maximum Surge Current (Apk, t=10ms)	325	600	1,900	1,900
I ² T for Fusing (A ² S, t=10ms)	525	1,800	18,000	18,000
Critical dv/dt (V/μs, Tj @ 40°C)	1,000			
Max. Off-State Leakage Current (Arms @ 600Vac)	.003			

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Input Specifications

		HBC-1Z..D..	HBC-1Z..A..
Control Voltage Range	HBC-1Z..60..	4-32Vdc	20-275Vac / 21.6-190Vdc
	HBC-1Z..60..F	5-32Vdc	20-275Vac / 21.6-190Vdc
Maximum Reverse Voltage		32Vdc	-
Turn-On Response Time		0.5 cycle + 500µs @ 24VDC	2 cycles @ 230VAC/110VDC
Turn-Off Response Time		0.5 cycle + 500µs @ 24VDC	0.5 cycle + 40ms @ 230VAC/110VDC
Input Current Range (mA)	HBC-1Z..60..	5-10mA	5-36mA
	HBC-1Z..60..F	20-25mA	5-36mA

Over Temperature Alarm Specifications for HBC-1Z..F

		HBC-1Z..D..F	HBC-1Z..A..F
Output Type		PNP open collector	Potential Free
Normal State		Closed	Closed
Maximum Current Rating		50mAdc	50mAdc
Rated Voltage	Us (A1+)	24Vdc (+/- 10%)	-
	Ua (11+)	-	24Vdc (+20% / -15%)
Fan Rating		Uf (IN2 & IN3)	24Vdc (+/- 10%)
Alarm Voltage Drop	Typical	2.8Vdc	1.8Vdc
	Maximum	4.0Vdc	3.5Vdc
Reverse Polarity Protection		24Vdc	24Vdc
Visual Indication		Continuous Red LED when fault (OTP) is present	

General Specifications

Dielectric Strength Input to Output	HBC..1Z..	4,000Vrms
	HBC-1Z..D..F	2,500Vrms
	HBC-1Z..A..F	4,000Vrms
Dielectric Strength - Input / Output to Heat Sink		4,000Vrms
Dielectric Strength - Input to Fan / Alarm Output (HBC..1Z..A..F)		2,500Vrms
Ambient Operating Temperature Range		-40 +80°C (-30 +70°C for HBC-1Z..85..F)
Weight	HBC..1Z..20	Approximately 0.57 lbs (260 g)
	HBC..1Z..25	Approximately 0.57 lbs (260 g)
	HBC..1Z..65	Approximately 2.14 lbs (972 g)
	HBC..1Z..85	Approximately 2.43 lbs (1,100 g)
UL Flammability Rating (Housing)		UL94 V-0 (conforms to EN 60355-1 requirements)
Impact Resistance (EN 50155 / EN 61373)		15/11 g/ms
Vibration Resistance (2-100Hz, IEC 60068-2-6, EN 50155, EN 61373)		2g / axis
Relative Humidity		95% non-condensing @ 40°C
EU RoHS Compliant		Yes
China RoHS Compliant		Power assembly contains lead (Pb) above the limit requirement of GB/T 26572 in one of the homogeneous materials used for this part.

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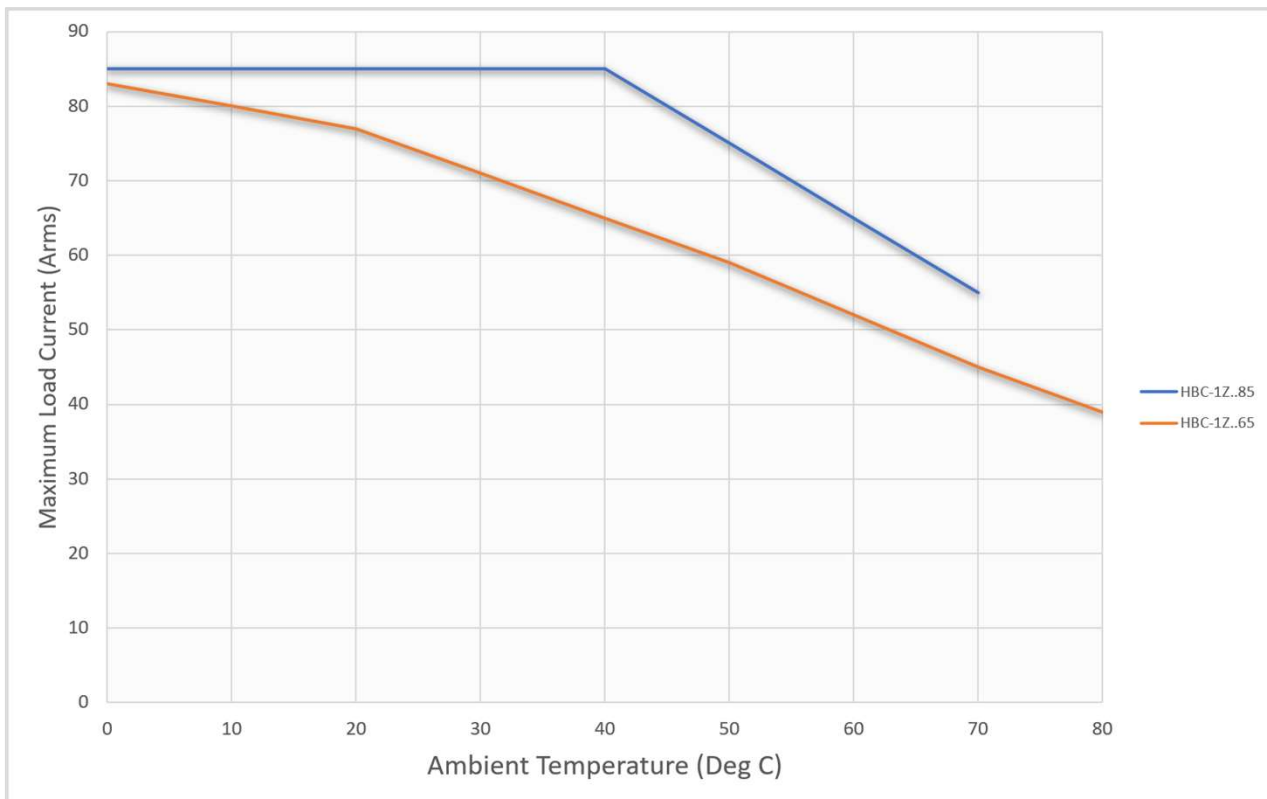
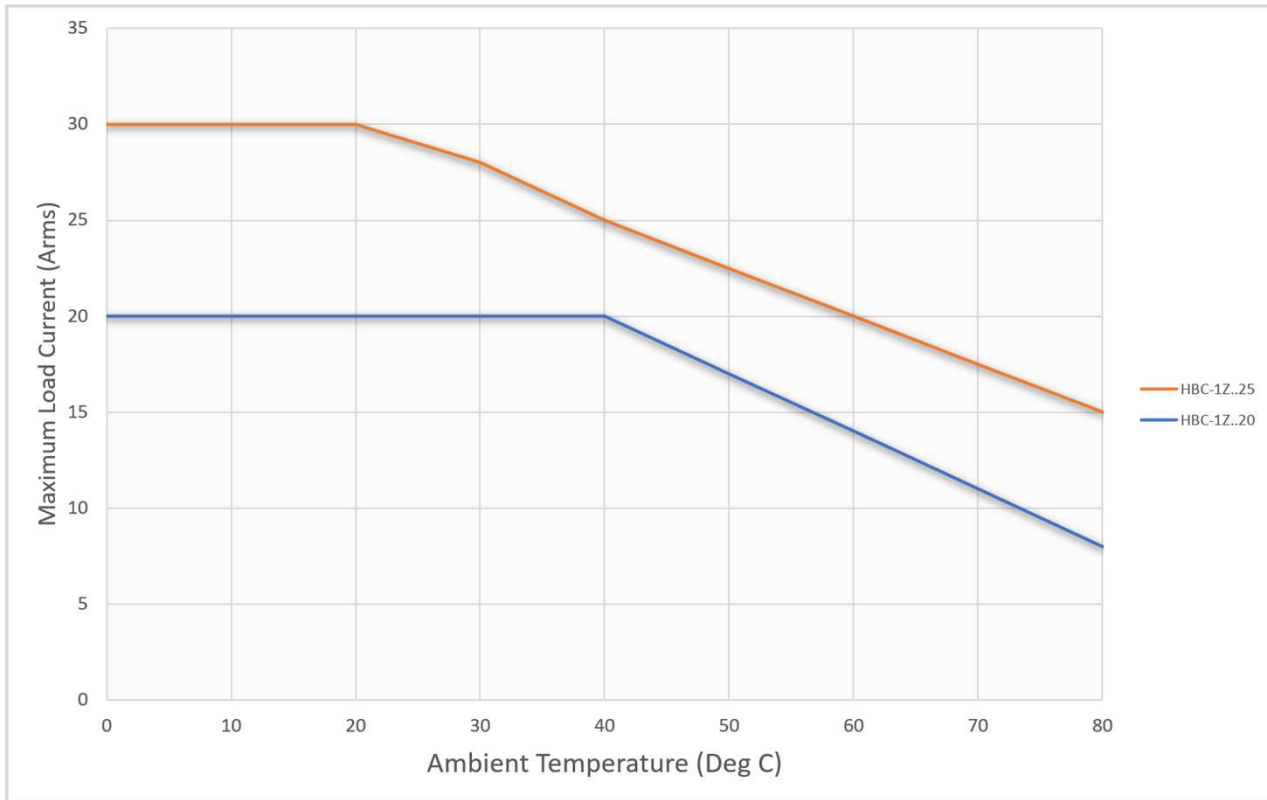
Agency Approvals and Electromagnetic Compatibility

Agency Approvals	UL508 Listed (E224932) cULus Listed (E224932)
Conformance	IEC/EN 60947-4-2 IEC/EN 60947-4-3
Short Circuit Current Rating	100kA (UL508)
EMC Immunity	EN 60947-4-3
Electrostatic Discharge (ESD) Immunity	IEC/EN 61000-4-2
- Air discharge, 8kV	Performance Criteria 1
- Contact, 4kV	Performance Criteria 1
Electrical Fast Transient (Burst) Immunity	IEC/EN 61000-4-4
- Output: 2kV, 5kHz	Performance Criteria 1
- Input: 1kV, 5kHz	Performance Criteria 1
Electrical Surge Immunity (HBC-1Z..)	IEC/EN 61000-4-5
- Output, line to line, 1kV	Performance Criteria 1
- Output, line to earth, 2kV	Performance Criteria 1
- Input, line to line, 1kV	Performance Criteria 2
- Input, line to earth, 2kV	Performance Criteria 2
Electrical Surge Immunity (HBC-1Z..F)	IEC/EN 61000-4-5
- Output, line to line, 1kV	Performance Criteria 1
- Output, line to earth, 2kV	Performance Criteria 1
- DC lines, line to line, 500V	Performance Criteria 2
- DC lines, line to earth, 500V	Performance Criteria 2
- Signal lines, line to earth, 1kV	Performance Criteria 2
EMC Emissions	EN 60947-4-3
Radio Interference Voltage Emission (Conducted) 0.15 - 30MHz	IEC/EN 55011 Class A (industrial) with filters
Radiated Radio Frequency Immunity	IEC/EN 61000-4-3
- 10V/m, 80 - 1000 MHz	Performance Criteria 1
- 10V/m, 1.4 - 2 GHz	Performance Criteria 1
- 3V/m, 2 - 2.7 GHz	Performance Criteria 1
Conducted Radio Frequency Immunity	IEC/EN 61000-4-6
- 10V/m, 0.15 - 80 MHz	Performance Criteria 1
Voltage Dips Immunity	IEC/EN 61000-4-11
- 0% for 0.5, 1 cycle	Performance Criteria 2
- 40% for 10 cycles	Performance Criteria 2
- 70% for 25 cycles	Performance Criteria 2
- 80% for 250 cycles	Performance Criteria 2
Voltage Interruptions Immunity	IEC/EN 61000-4-11
- 0% for 5000ms	Performance Criteria 2
Radio Interference Field Emission (Radiated) 30 - 1000MHz	IEC/EN 55011 Class A (industrial)

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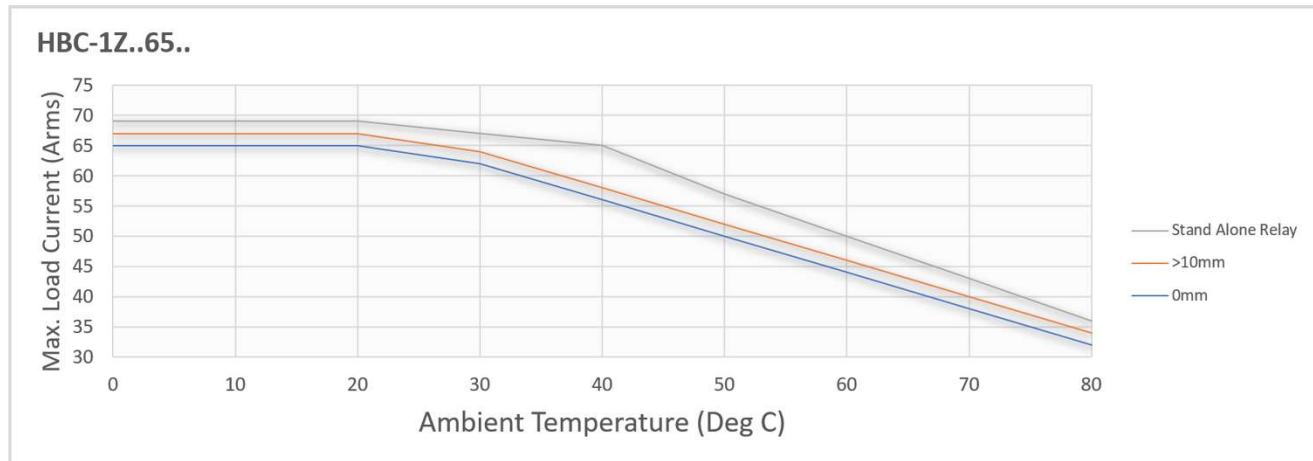
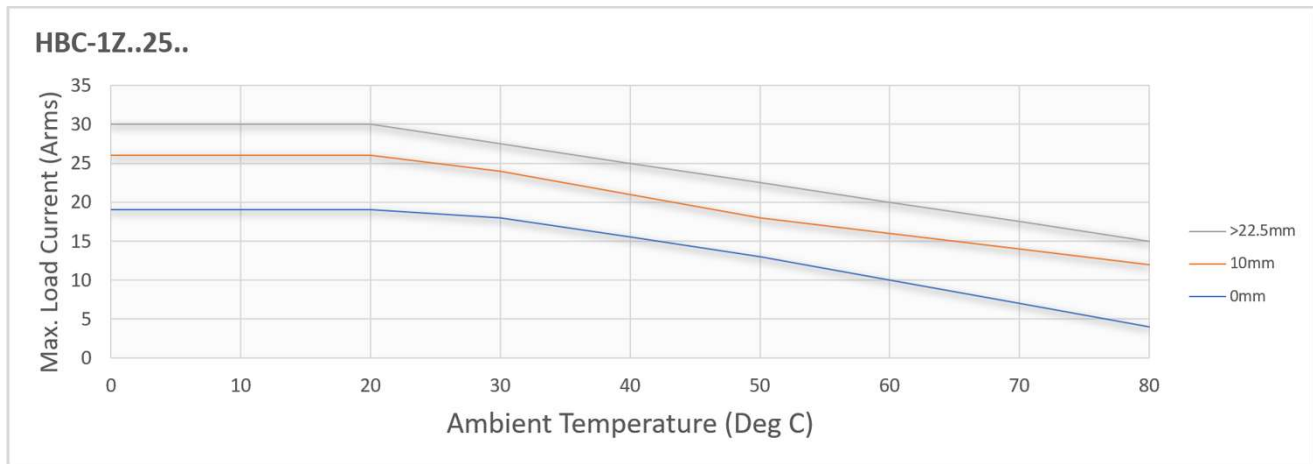
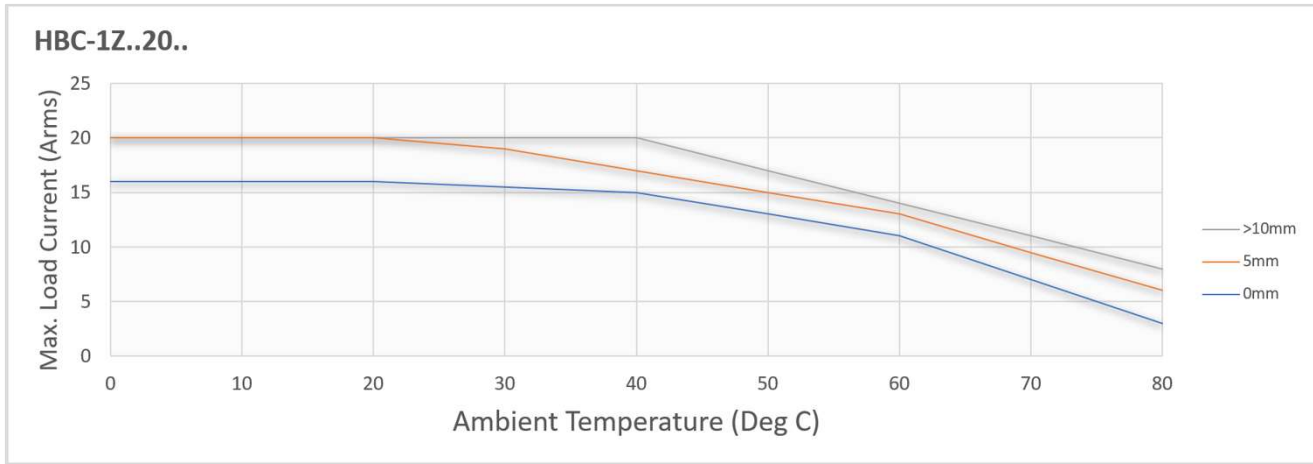
Derate Curves (UL508)



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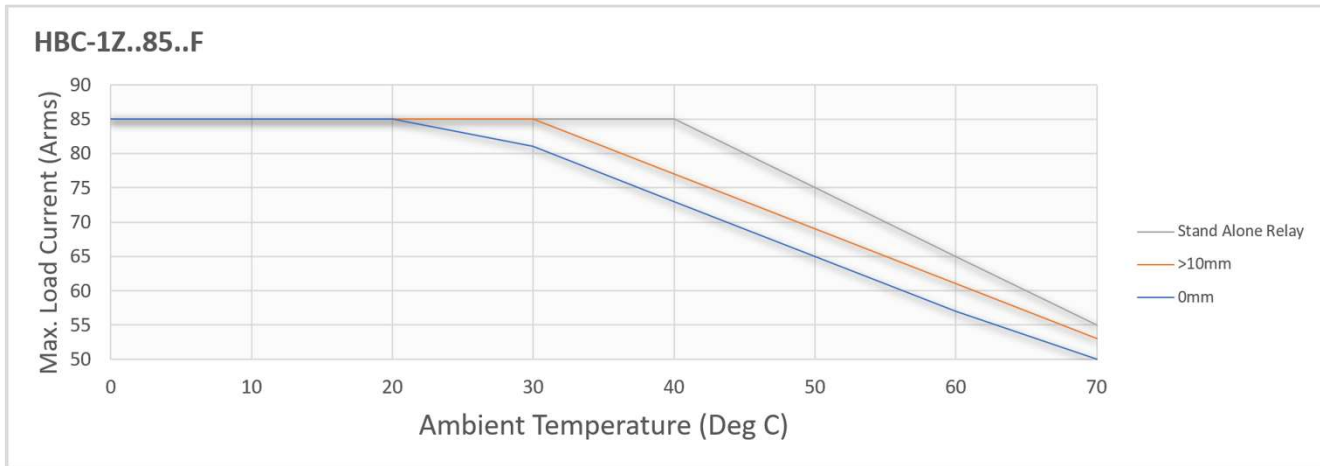
Derating vs. Spacing



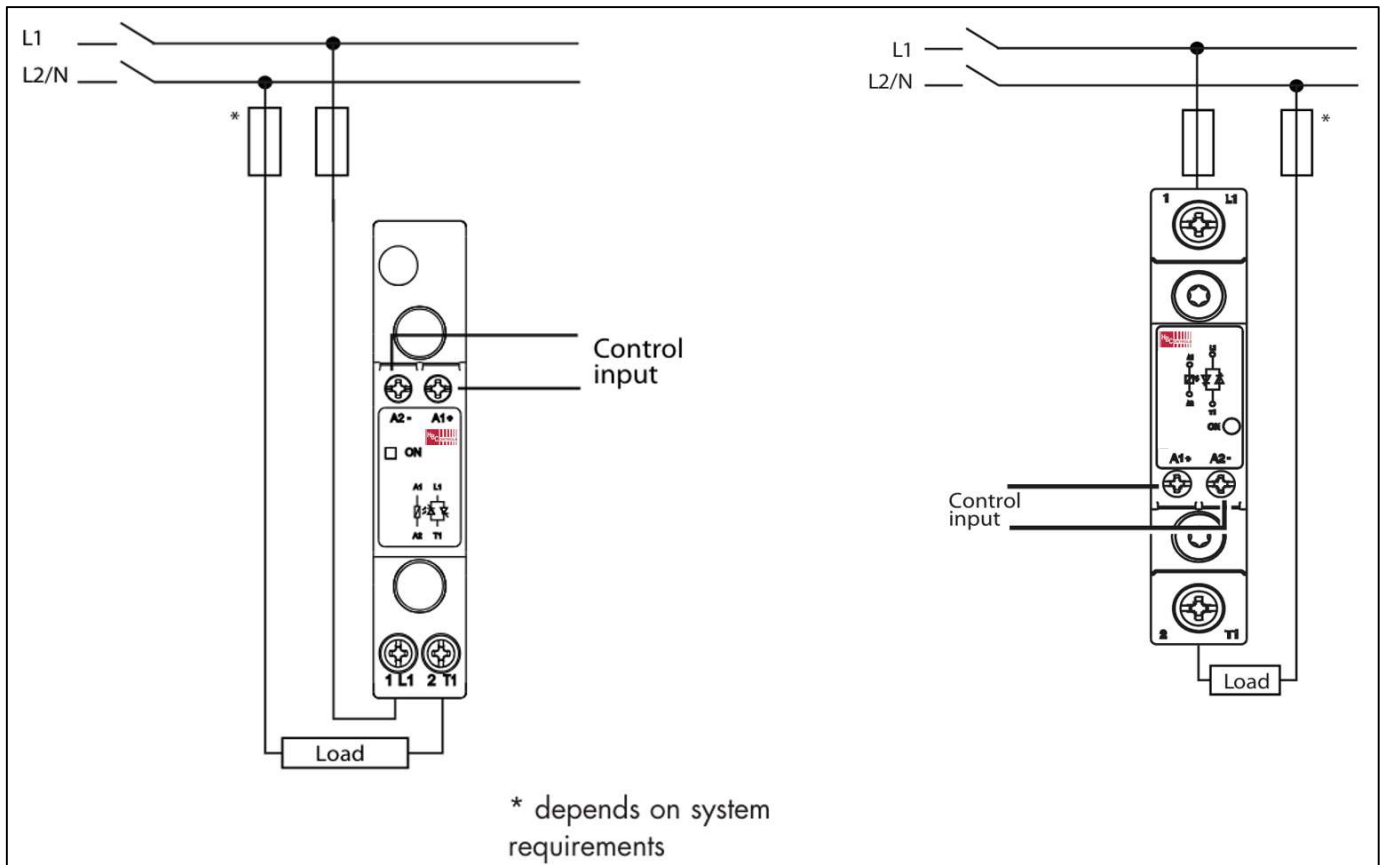
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Derating vs. Spacing



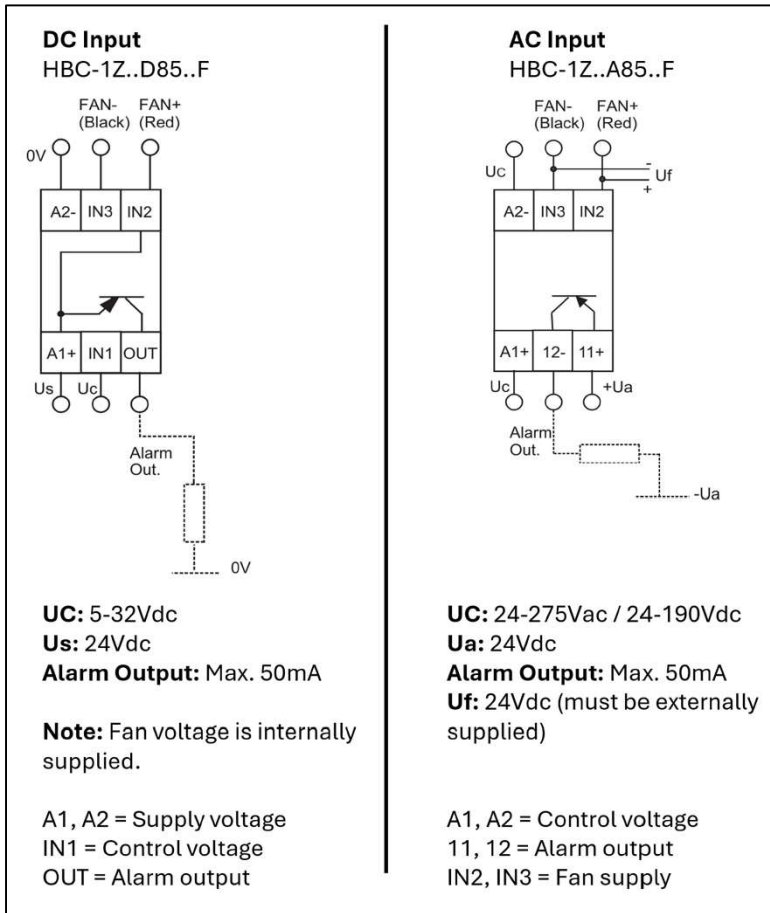
Connection Diagram (without over temperature protection)



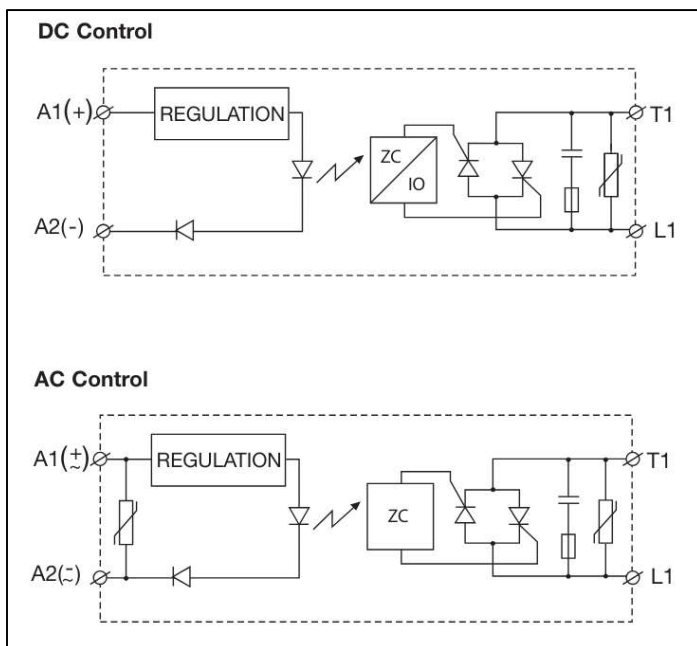
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Connection Diagram (with over temperature protection)



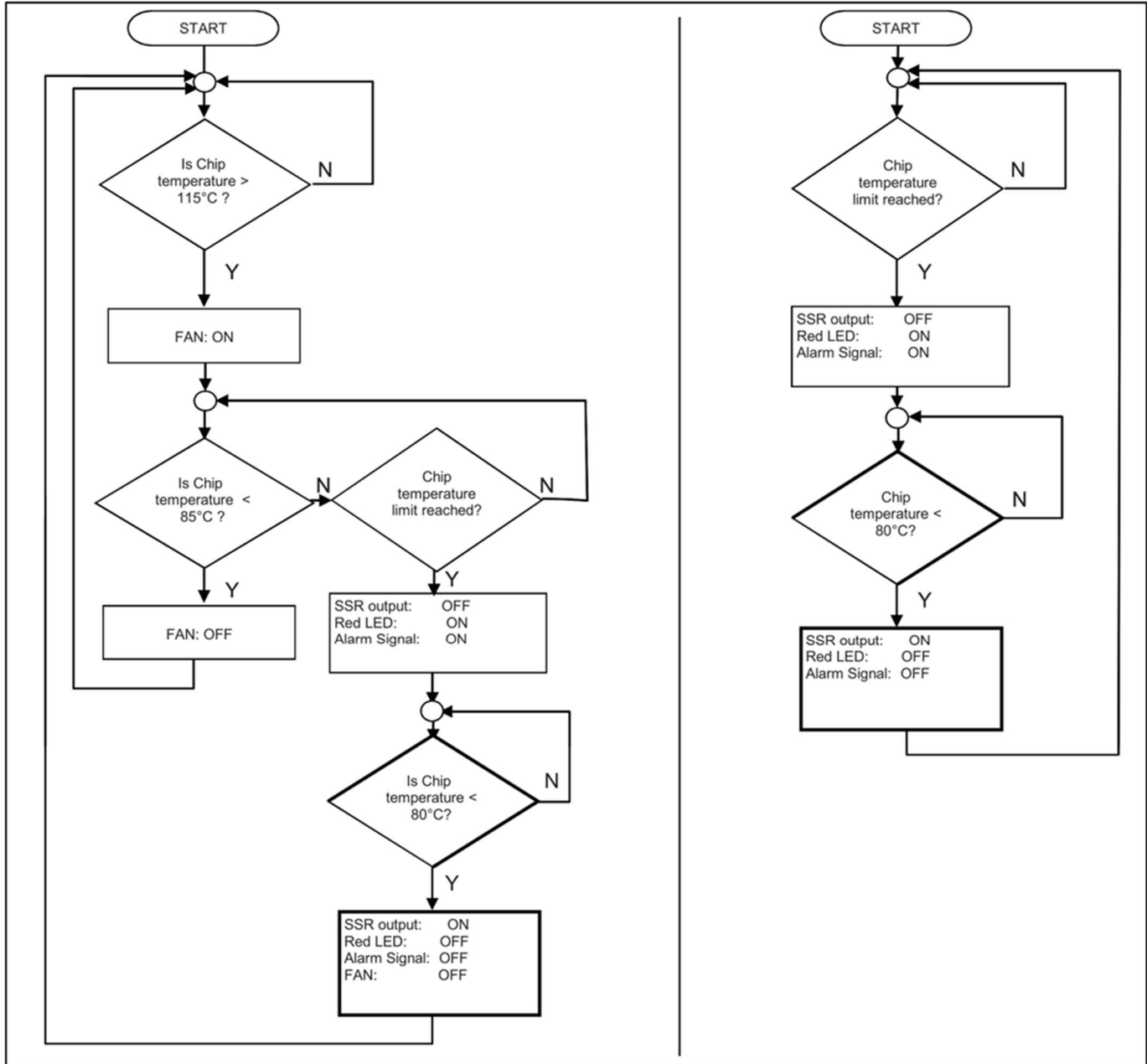
Functional Diagram (without over temperature protection)



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Over Temperature Alarm Procedure (HBC-1Z..F)



Caution:

- The alarm condition resets when the voltage signal is removed from terminal A1 (+).
- For the HBC-1Z..D85..F model, the overtemperature detection and functionality (including fan operation and alarm signaling) are lost if there is no voltage signal across terminals A1(+) and A2(-).
- For the HBC-1Z..A85..F model, IN2 and IN3 must be supplied with 24VDC for fan operation.
- The alarm procedure for the HBC-1Z..A85..F follows the 'Alarm signal only' flow because the fan operates continuously.
- The alarm condition automatically resets only when the power semiconductor temperature drops below 80°C.
- The indicated temperatures are typical values.

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Short Circuit Protection

Type 1 protection indicates that, following a short circuit, the device under test will no longer function. Conversely, Type 2 coordination ensures the device remains functional after the short circuit. In both scenarios, the short circuit must be interrupted. The fuse between the enclosure and the supply must not open. Additionally, the enclosure door or cover must not be blown open. There must be no damage to conductors or terminals, and conductors must remain connected to their terminals. The insulating bases must not break or crack to the extent that the integrity of live part mounting is compromised. There should be no discharge of parts or any risk of fire.

The product variants listed in the table below are suitable for use in circuits capable of delivering up to 100,000 Arms Symmetrical Amperes at a maximum of 600 Volts when protected by fuses. Tests at 100,000 amps were conducted with Class J fast-acting fuses. Refer to the table for the maximum allowed ampere rating of the fuse. Only use fuses. Tests with Class J fuses are representative of Class CC fuses.

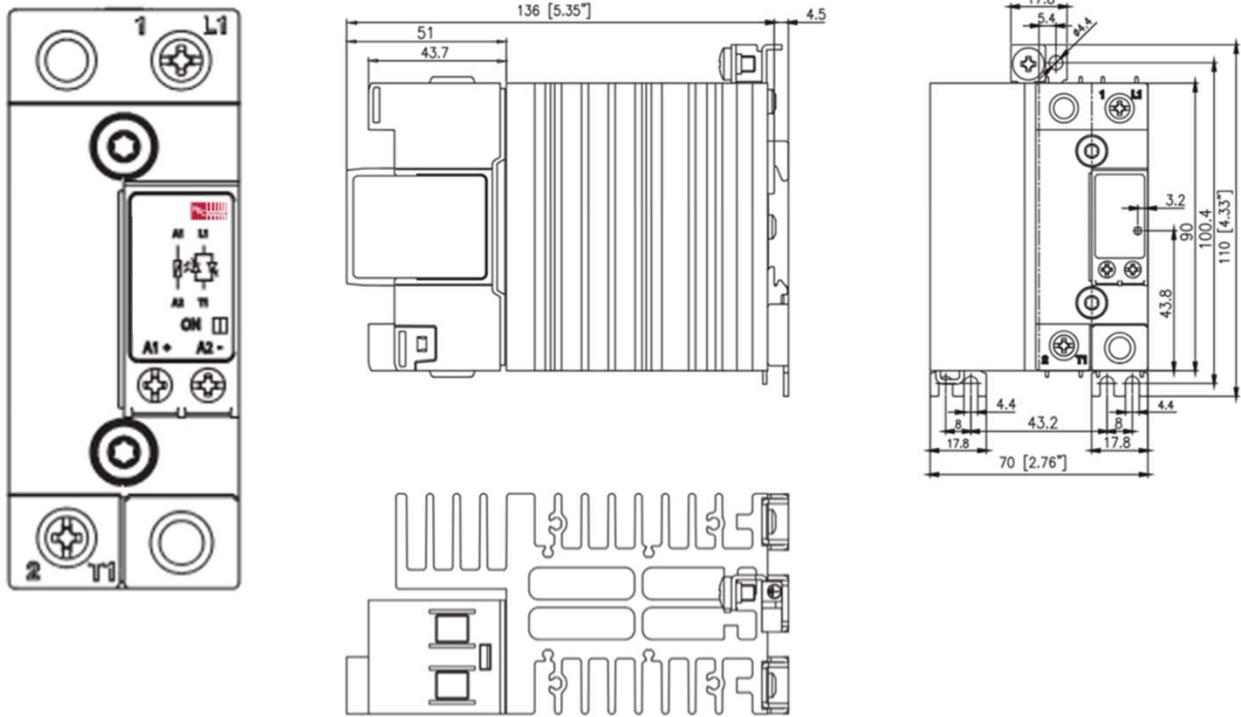
Protection Coordination Type 1 per UL508					
Part Number	Prospective Short Circuit Current	Max Fuse Size	Class	Maximum Voltage (Vac)	
HBC-1Z..20..	100kArms	10A	J	600	
HBC-1Z..25..		15A	CC		
HBC-1Z..65..		30A	J or CC		
HBC-1Z..85..		90A	J		
		40A	J		
Protection Coordination Type 2 for Heater Load Applications @ 600Vrms Max.					
Part#	Prospective Short Circuit Current	Ferraz Shawmut (Mersen)		Siba	
		Max Fuse Size	Part#	Max Fuse Size	Part#
HBC-1Z..20	10kArms 100kArms	25A	6.9xx CP GRC 14x51 /25	32A	50 142 06.32
HBC-1Z..25	10kArms 100kArms	40A	6.6xx CP URD 22x58 /40	32A	50 142 06.32
HBC-1Z..65..	10kArms	100A	6.9xx CP GRC 22x58 /100 A70QS100-4	100A	50 194 20.100
	100kArms	100A	6.621 CP URGD 27x60 /100 A70QS50-4		
HBC-1Z..85..	10kArms	100A	6.621 CP URQ 27x60 /100 A70QS100-4	100A	50 194 20.100
	100kArms	--	--	100A	50 194 20.100

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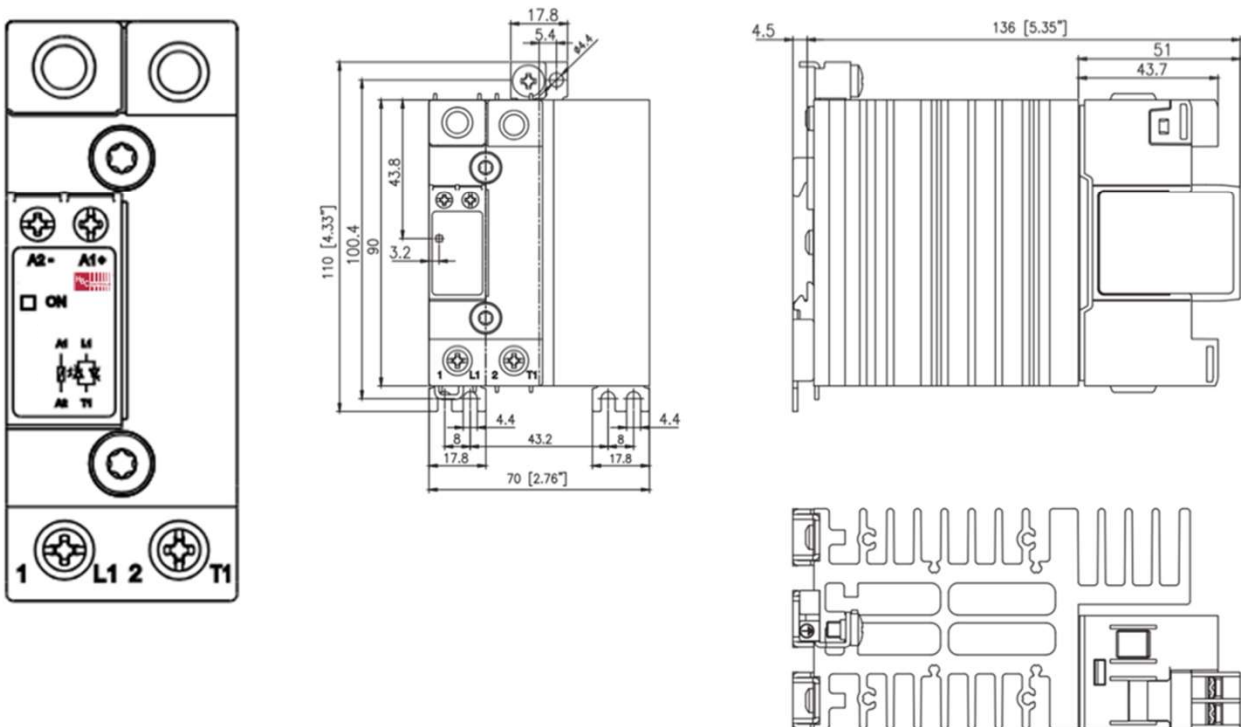


Terminal Layout and Dimensions

HBC-1Z..65E



HBC-1Z..65U



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