

Installation recommendations

Installation in equipment

B-Frame safety clearance, UL standard

B

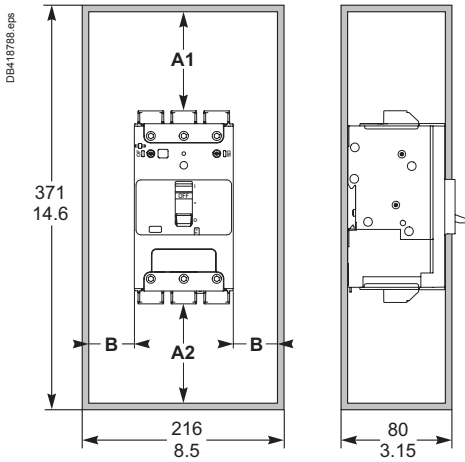
Minimum clearance between backplate and uninsulated power connections

For all types of PowerPact B-frame circuit breakers that use uninsulated power connections (for example, busbars, spreaders, or uninsulated crimped lugs), the minimum clearance distance with the enclosure backplate is shown below. When using uninsulated connectors be sure to maintain the proper clearance between live parts and grounded metallic back pan or use the insulation screen.



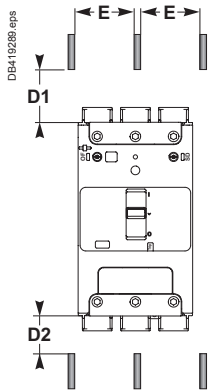
UL standard

Minimum enclosure dimensions



Operating voltage $U \leq 690$ V								
For devices equipped with:	Clearance (mm)							
	Between devices	Between device and sheet metal						
		Painted sheet metal			Bare sheet metal			
	A1	A2	B	A1	A2	B		
■ no accessories	0	30 mm 1.18 in.	5 mm 0.19 in.	0	40 mm 1.57 in.	5 mm 0.19 in.	5 mm 0.19 in.	
■ interphase barriers	0	0	0	0	0	0	5 mm 0.19 in.	
■ long terminal shields	0	0	0	0	0	0	5 mm 0.19 in.	

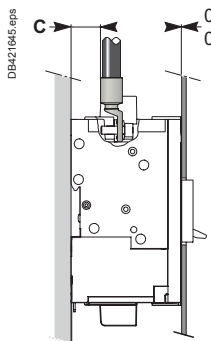
Minimum safety clearances to bare busbars



Operating voltage $U \leq 690$ V			
Clearances to live bare busbars ^[1]			
Spacing $E \leq 60$ mm (2.36 in.)		Spacing $E > 60$ mm (2.36 in.)	
D1	D2	D1	D2
200 mm 7.87 in.	100 mm 3.94 in.	120 mm 4.72 in.	60 mm 2.36 in.

[1] These clearances can be reduced for special installations as long as the configuration is checked by tests.

Compression lug safety clearance



An insulating screen or long terminal shield is required if:

- for 2, 3, 4 poles $C < 9.5$ mm (< 0.37 in.),
- for 1 pole $C < 12.7$ mm (< 0.5 in.).

Installation recommendations

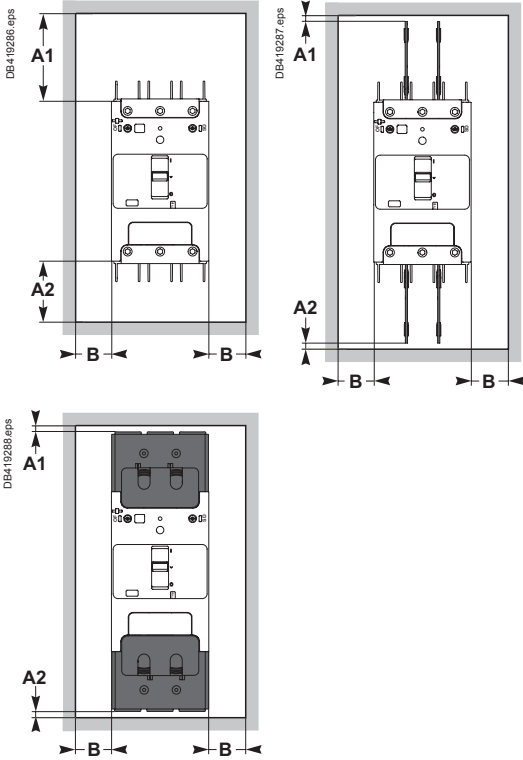
Installation in equipment

B-Frame safety clearance, IEC standard



IEC standard

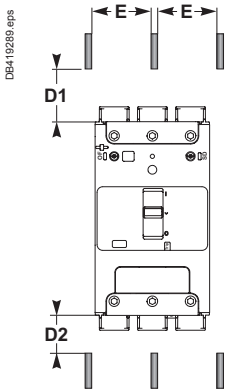
Minimum safety clearances



Operating voltage $U \leq 690\text{ V}$								
For devices equipped with:	Clearance (mm)	Between device and sheet metal						
		Between devices	Painted sheet metal			Bare sheet metal		
			A1	A2	B	A1	A2	B
■ no accessories	0	30 mm 1.18 in.	5 mm 0.19 in.	0	40 mm 1.57 in.	5 mm 0.19 in.	5 mm 0.19 in.	
■ interphase barriers	0	0	0	0	0	0	5 mm 0.19 in.	
■ long terminal shields	0	0	0	0	0	0	5 mm 0.19 in.	



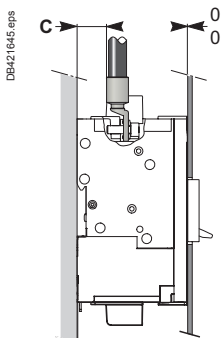
Minimum safety clearances to bare busbars



Operating voltage $U \leq 690\text{ V}$			
Clearances to live bare busbars ^[1]			
Spacing $E \leq 60\text{ mm (2.36 in.)}$		Spacing $E > 60\text{ mm (2.36 in.)}$	
D1	D2	D1	D2
200 mm 7.87 in.	100 mm 3.94 in.	120 mm 4.72 in.	60 mm 2.36 in.

[1] These clearances can be reduced for special installations as long as the configuration is checked by tests.

Compression lug safety clearance



An insulating screen or long terminal shield is required if:

- for 2, 3, 4 poles $C < 9.5\text{ mm (< 0.37 in.)}$,
- for 1 pole $C < 12.7\text{ mm (< 0.5 in.)}$.

Control wiring

B

Shunt trip (MX) and undervoltage release (MN)

Recommended maximum cable lengths

In certain circumstances, high cable capacitance due to an excessive cable length could prevent an undervoltage release MN from dropping out resulting in safety issues. In case of a shunt trip MX, an untimely trip may occur due to capacitive current leak.

To avoid these dysfunction due to cable capacitance C, the maximum cable length (L) is defined by the following table for a 1.5 mm² cable (16AWG).

Power supply voltage (Un)	Maximum cable length undervoltage trip (MN) [1]	Shunt trip (MX) [1]
24 V AC	1 243 m (4,078 ft)	3 653 m (11,985 ft)
24 V DC	unlimited	> 3653 m (11,985 ft)
48 V AC	583 m (1912 ft)	1 667 m (5,469 ft)
48 V DC	unlimited	> 1667 m (5,469 ft)
110...130 V AC	126 m (413 ft)	913 m (2,995 ft)
110...130 V DC	unlimited	> 913 m (2,995 ft)
208-240 V AC	109 m (358 ft)	160 m (525 ft)
250 V DC	unlimited	> 160 m (525 ft)
277 V AC	98 m (322 ft)	120 m (394 ft)
380-415 V AC	86 m (282 ft)	80 m (262 ft)
440-480 V AC	56 m (184 ft)	67 m (220 ft)

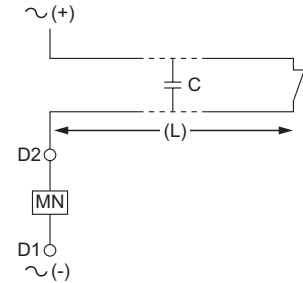
[1] Make sure auxiliaries supply voltage is within working range (0.85 Un mini...1.1 Un maxi).

If a longer cable length is required, several solutions are possible to counteract excessive cable capacitance:

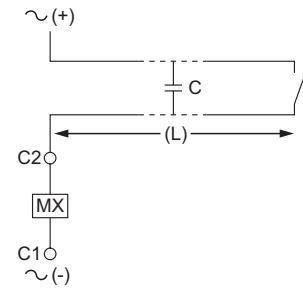
- use DC operated auxiliaries
- use lower control voltage (make sure auxiliaries supply voltage is within working range: 0.85 Un minimum...1.1 Un maximum)
- if high voltage and long control cables are required for an undervoltage release (MN), add a rectifier bridge (ref DR5TE4S – DIN rail compatible) in the control circuit. It will prevent drop out problems but increase operating time.

Electrical characteristics of MN/MX

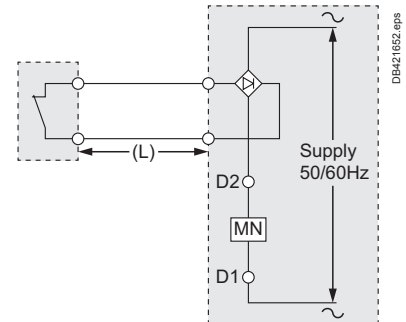
Characteristics			AC	DC
Rated voltage (V)			24, 48, 110...130, 208...240, 277, 380...415, 440... 480	24, 48, 125, 250
Power requirements	MX	Pickup (< 50 ms)	< 6 VA	< 10 W
		Seal-in	< 4 VA	< 1 W
Clearing time (ms)	MN		< 7 VA	< 2 W
			< 50	< 50
Operating range			up to 1.1 Un	



DB421650.eps



DB421651.eps



DB421652.eps

Wiring diagrams

PowerPact B-Frame AuxiliariesD-2

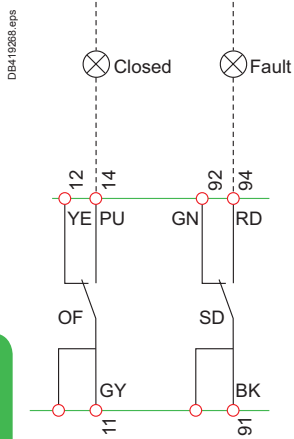


Other chapters

Functions and characteristics	A-1
Installation recommendations	B-1
Dimensions	C-1
Additional characteristics	E-1
Catalogue numbers	F-1
Glossary	G-1

PowerPact B-Frame Auxiliaries

Indication contacts OF and SD



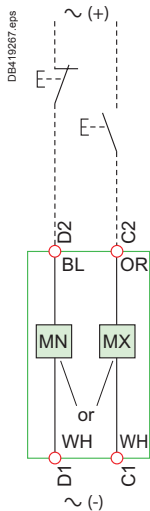
Indication contacts

OF	Device ON/OFF indication contacts
SD	Trip indication contact

Color code for auxiliary wiring

RD:	Red
YE:	Yellow
BK:	Black
GN:	Green
PU:	Purple
GY:	Grey

Remote operation (MN/MX voltage release)



Remote operation

MN	Undervoltage Release
or	
MX	Shunt trip Release

Color code for auxiliary wiring

OR:	Orange
BL:	Blue
WH:	White

The diagram is shown with circuits de-energized, relays in normal position, and all devices open, connected, and charged. Terminal connections shown as **○** must be connected by the customer.