

### Short-circuit withstand strength to IEC 60 439-1

#### Type testing to IEC 60 439-1

During the course of system type-testing, the following tests were conducted on the Rittal busbar systems and on representative Rittal RiLine top-mounting components:

#### Proof of insulating properties (to IEC/EN 60 439-1, 8.2.2)

Test piece: Representative system assembly  
Test with surge voltage 1.2/50  $\mu$ s, 9.8 kV

#### Proof of short-circuit withstand strength (to IEC/EN 60 439-1, 8.2.3)

see diagrams below

#### Proof of creepage distances and clearance (to IEC/EN 60 439-1, 8.2.5)

Test piece: Representative system assembly

### Mini-PLS busbar support up to 250 A, 3-pole

Model No. SV 9600.000

40 mm bar centre distance, for Mini-PLS special busbars

Rated operating voltage: up to 690 V AC

Level of contamination: 3

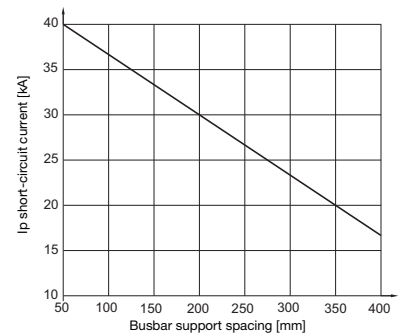
Rated frequency: 50/60 Hz

#### Basis of test:

– VDE 0660, part 500/IEC 60 439

#### Test implemented:

– Rated peak withstand current  $I_{pk}$



### Busbar support up to 800 A, 3-pole

Model No. SV 9340.000/SV 9340.010

60 mm bar centre distance, for busbars 15 x 5 – 30 x 10 mm.

Rated operating voltage: up to 690 V AC

Rated insulation voltage: 1000 V AC

Rated surge voltage: 8 kV

Overvoltage category: IV

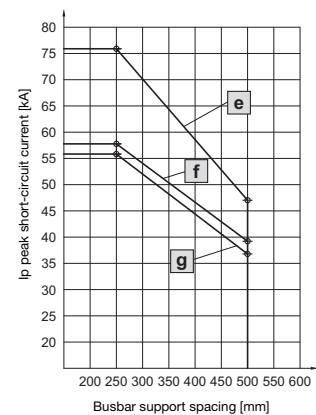
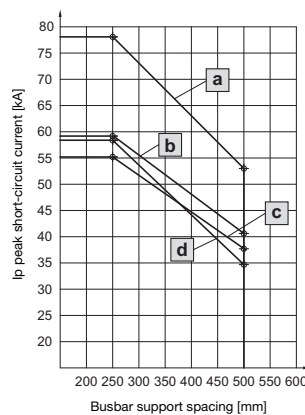
Level of contamination: 3

Rated frequency: 50/60 Hz

#### Test implemented:

– Rated peak withstand current  $I_{pk}$

– Rated short-time withstand current  $I_{cw}$



Busbar mm	l mm	$I_{cw}^{1)}$ kA
30 x 10	250	37.6
30 x 5	250	36.0
20 x 10	250	29.0

<sup>1)</sup> For 1 sec.

l = Busbar support spacing

Busbar mm	Curve
30 x 10	<b>a</b>
20 x 10	<b>b</b>
25 x 5	<b>c</b>
15 x 5	<b>d</b>

Busbar mm	Curve
30 x 5	<b>e</b>
20 x 5	<b>f</b>
15 x 10	<b>g</b>

# Power distribution

## Short-circuit withstand strength to IEC

### PLS busbar support

#### up to 800 A/1600 A, 3-pole

Model No. SV 9341.000/SV 9342.000

60 mm bar centre distance,  
for PLS special busbars

Rated operating voltage: up to 690 V AC

Rated insulation voltage: 1000 V AC

Rated impulse withstand voltage: 8 kV

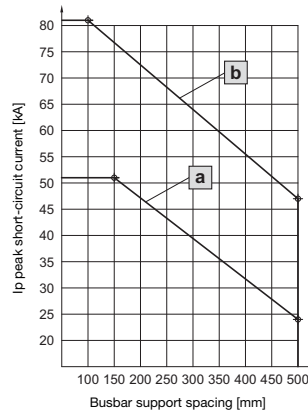
Overvoltage category: IV

Level of contamination: 3

Rated frequency: 50/60 Hz

#### Test implemented:

- Rated peak withstand current  $I_{pk}$
- Rated short-time withstand current  $I_{cw}$



Model No. SV	Busbar mm	l mm	$I_{cw}^{1)}$ kA
<b>a)</b> 9341.000	PLS 800	150	25.9
<b>b)</b> 9342.000	PLS 1600	150	37.5

<sup>1)</sup> For 1 sec.

l = Busbar support spacing

### Busbar support

#### up to 800 A, 4-pole

Model No. SV 9340.004

60 mm bar centre distance,  
for 30 x 10 mm busbars

Rated operating voltage: up to 690 V AC

Rated insulation voltage: 1000 V AC

Rated impulse withstand voltage: 8 kV

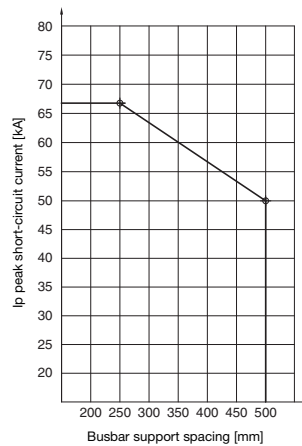
Overvoltage category: IV

Level of contamination: 3

Rated frequency: 50/60 Hz

#### Test implemented:

- Rated peak withstand current  $I_{pk}$
- Rated short-time withstand current  $I_{cw}$



Model No. SV	Busbar mm	l mm	$I_{cw}^{1)}$ kA
9340.004	30 x 10	250	29
		500	23

<sup>1)</sup> For 1 sec.

l = Busbar support spacing

### PLS busbar support

#### up to 1600 A, 4-pole

Model No. SV 9342.004

60 mm bar centre distance,  
for PLS special busbars

Rated operating voltage: up to 690 V AC

Rated insulation voltage: 1000 V AC

Rated surge voltage: 8 kV

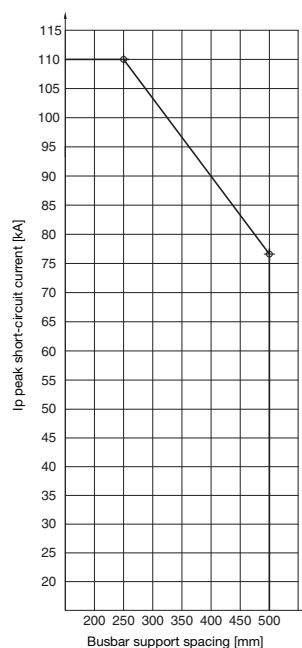
Overvoltage category: IV

Level of contamination: 3

Rated frequency: 50/60 Hz

#### Test implemented:

- Rated peak withstand current  $I_{pk}$
- Rated short-time withstand current  $I_{cw}$



Busbar mm	l mm	$I_{cw}$ kA
PLS 1600	250	50 <sup>1)</sup>
	250	53 <sup>2)</sup>
	500	38 <sup>2)</sup>

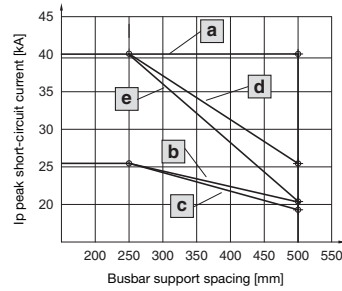
<sup>1)</sup> For 3 sec.

<sup>2)</sup> For 1 sec.

l = Busbar support spacing

### Busbar support for DC use

The figures shown in the diagram refer to a minimal bar centre distance of 60 mm. Larger centre-to-centre spacings are permissible. The rated operating voltage depends on the choice of bar centre distance and the configuration of the system with top-mounting components. The rated values can be taken from the technical specifications for the components. Compliance with the creepage distances and clearance to DIN EN 60 664-1 should be checked in the final assembly or final application.



Busbar mm	Support	Number of poles	Curve
30 x 10	SV 9340.050	3-pole	a
	SV 9340.030	1-pole	d
15 x 5 – 25 x 10	SV 9340.050	3-pole	b
	SV 9340.030	1-pole	c
PLS 800	SV 9341.050	3-pole	e
PLS 1600	SV 9342.050	3-pole	a
	SV 9342.030	1-pole	

### Busbar support

#### up to 1250 A, 3-pole

Model No. SV 3073.000

100 mm bar centre distance, for busbars 30 x 10 – 60 x 10 mm

Rated operating voltage: up to 1000 V AC

Level of contamination: 3

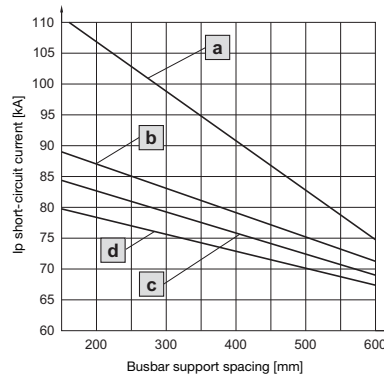
Rated frequency: 50/60 Hz

#### Basis of test:

– VDE 0660, part 500/IEC 60 439

#### Test implemented:

– Rated peak withstand current  $I_{pk}$



Busbar E-Cu mm	Rated current up to A	Curve
30 x 10	800	d
40 x 10	850	c
50 x 10	1000	b
60 x 10	1250	a

### Busbar support

#### up to 1600 A, 3-pole

Model No. SV 3052.000

185 mm bar centre distance, for busbars 50 x 10 – 80 x 10 mm

Rated operating voltage: up to 1000 V AC

Level of contamination: 3

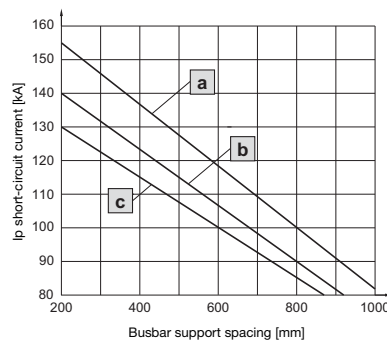
Rated frequency: 50/60 Hz

#### Basis of test:

– VDE 0660, part 500/IEC 60 439

#### Test implemented:

– Rated peak withstand current  $I_{pk}$



Busbar E-Cu mm	Rated current up to A	Curve
50 x 10	1000	c
60 x 10	1250	b
80 x 10	1600	a

# Power distribution

## Short-circuit withstand strength to IEC

### Busbar support

up to 2500 A/3000 A, 3-pole

150 mm bar centre distance

Rated operating voltage: up to 1000 V AC

Level of contamination: 3

Rated frequency: 50/60 Hz

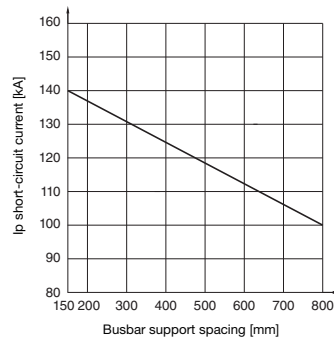
#### Basis of test:

– VDE 0660, part 500/IEC 60 439

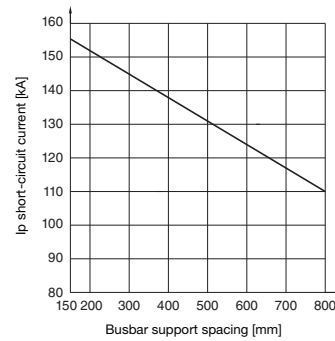
#### Test implemented:

– Rated peak withstand current  $I_{pk}$

Model No. SV 3055.000 (2500 A),  
bar accommodation  
3 x 2 x 80 x 10 mm



Model No. SV 3057.000 (3000 A),  
bar accommodation  
3 x 2 x 100 x 10 mm



### Busbar support Flat-PLS 60

#### 1 to 4-pole

Model No. SV 9676.002/SV 9676.020

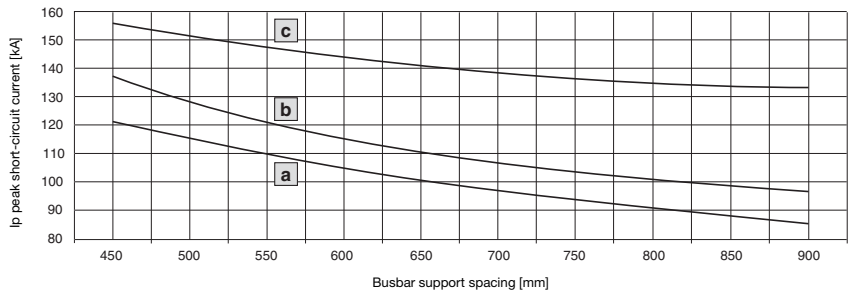
120 mm bar centre distance,  
for busbars 40 x 10 – 60 x 10 mm.  
Population: 2, 3 or 4 bars per support

Rated operating voltage: up to 690 V AC  
Rated insulation voltage: 1000 V AC  
Rated impulse withstand voltage: 8 kV

Oversoltage category: IV  
Level of contamination: 3  
Rated frequency: 50/60 Hz

#### Test implemented:

- Rated peak withstand current  $I_{pk}$
- Rated short-time withstand current  $I_{cw}$



Busbar mm	l mm	low kA/1 sec.	Curve
4 x 60 x 10	450	55.0	a
4 x 60 x 10	900	40.0	
4 x 60 x 10	450	60.0	b
4 x 60 x 10	900	45.0	
4 x 60 x 10	450	70.0	c
4 x 60 x 10	900	60.0	

l = Busbar support spacing

Curve	Design of busbar attachment
a	Basic version <sup>1)</sup>
b	With busbar claws <sup>2)</sup>
c	With busbar stabilisers and busbar claws <sup>2)</sup>

<sup>1)</sup> Basic version consists of system attachment with fitted busbar support

<sup>2)</sup> For version see below

### Busbar support Flat-PLS 100

#### 1 to 4-pole

Model No. SV 9676.004/SV 9676.021

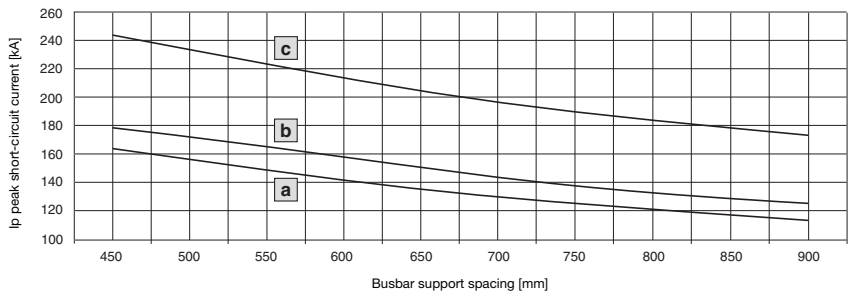
165 mm bar centre distance,  
for busbars 80 x 10 – 100 x 10 mm.  
Population: 2, 3 or 4 bars per support

Rated operating voltage: up to 690 V AC  
Rated insulation voltage: 1000 V AC  
Rated impulse withstand voltage: 8 kV

Oversoltage category: IV  
Level of contamination: 3  
Rated frequency: 50/60 Hz

#### Test implemented:

- Rated peak withstand current  $I_{pk}$
- Rated short-time withstand current  $I_{cw}$



Busbar mm	l mm	low kA/1 sec.	Curve
4 x 100 x 10	450	75.0	a
4 x 100 x 10	900	52.0	
4 x 100 x 10	450	81.6	b
4 x 100 x 10	900	55.9	
4 x 100 x 10	450	110.0	c
4 x 100 x 10	900	78.0	

l = Busbar support spacing

Curve	Design of busbar attachment
a	Basic version <sup>1)</sup>
b	With busbar claws <sup>2)</sup>
c	With busbar stabilisers and busbar claws <sup>2)</sup>

<sup>1)</sup> Basic version consists of system attachment with fitted busbar support.

<sup>2)</sup> For version see below

### Busbar claws

Model No. SV 9676.017/SV 9676.019

#### Supplementary information on Flat-PLS short-circuit protection diagrams

Mounting distance of busbar claws:

In order to achieve the cited short-circuit protection, the busbar claws must be fitted at a spacing of 300 mm. If there is a busbar support, a contact maker or a longitudinal connector located within this 300 mm, there is no need to fit a claw at this point.

Max. distance	mm
Busbar claw – Busbar claw	≤ 300
Busbar claw – Busbar support	≤ 300
Busbar claw – Contact maker	≤ 300
Busbar claw – Longitudinal connector	≤ 300

# Power distribution

## Short-circuit withstand strength to UL 508

The short-circuit withstand strength of RiLine has been extensively tested. Short-circuit withstand strength to UL criteria is assessed via the root-mean-square value of the short-circuit current ( $I_{RMS}$ ), which must be applied for at least 3 periods (60 ms).

During the course of testing, the test equipment has been adjusted to the respective root-mean-square values ( $I_{RMS}$ ). The resultant peak short-circuit currents  $I_p$  are shown in the diagrams below.

### Busbar support for feeder circuits 700 A, 3-pole

60 mm bar centre distance,  
for busbars 15 x 5 – 30 x 10 mm

**Note:**

**SV 9340.050 with E-Cu 30 x 5/10 mm**

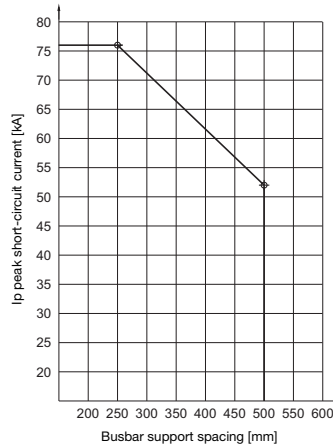
The following short-circuit value can be achieved with a pre-fuse:

- Support spacing: 350 mm
- Fuse: Class L 800 A
- $I_{RMS}$ : 50 kA

Settings  $I_{RMS}$  ( $I_{eff}$ ) of the test equipment without pre-fuse:

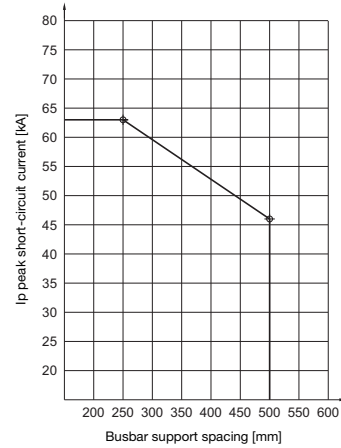
Support spacing mm	$I_{RMS}$ kA
250	35
500	25

SV 9340.050 with  
30 x 5/10 mm



Support spacing mm	$I_{RMS}$ kA
250	30
500	22

SV 9340.050  
with 25 x 5 mm  
20 x 5/10 mm  
15 x 5/10 mm



### Busbar support

#### for feeder circuits 700 A (PLS 800)/1400 A (PLS 1600), 3-pole

60 mm bar centre distance,  
for PLS special busbars

**Note:**

**SV 9342.050 (PLS 1600)**

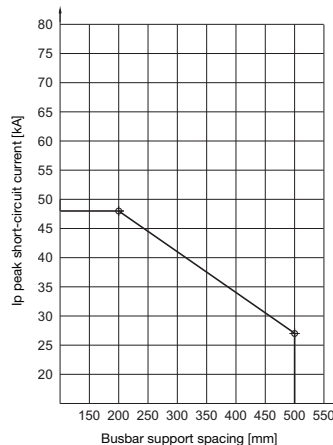
The following short-circuit value can be achieved with a pre-fuse:

- Support spacing: 250 mm
- Fuse: Class L 1400 A
- $I_{RMS}$ : 65 kA

Settings  $I_{RMS}$  ( $I_{eff}$ ) of the test equipment without pre-fuse:

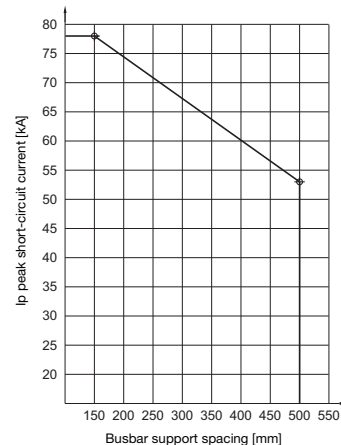
Support spacing mm	$I_{RMS}$ kA
200	22
500	14

SV 9341.050 (PLS 800)



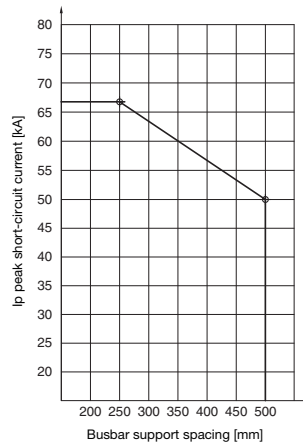
Support spacing mm	$I_{RMS}$ kA
150	35
500	25

SV 9342.050 (PLS 1600)



### Busbar support for feeder circuits up to 700 A, 4-pole

Model No. SV 9340.004  
60 mm bar centre distance

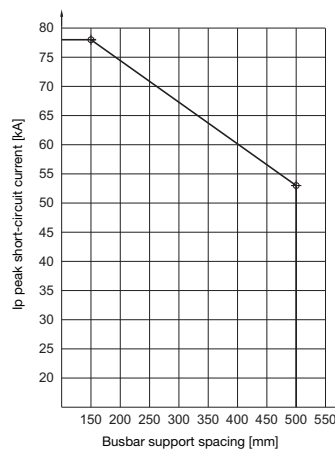


Settings  $I_{RMS}$  ( $I_{eff.}$ ) of the test equipment without pre-fuse:

Busbar mm	Support spacing mm	$I_{RMS}$
15 x 5 – 30 x 10	250	30
	500	22

### Busbar support for feeder circuits up to 1400 A, 4-pole

Model No. SV 9342.004  
60 mm bar centre distance,  
for PLS special busbars



Settings  $I_{RMS}$  ( $I_{eff.}$ ) of the test equipment without pre-fuse:

Busbar mm	Support spacing mm	RMS kA
PLS 1600	150	35
	500	25