SELECTION GUIDE BACKUP FUSE FOR SPD



How to choose the correct backup fuse for SPD



FAQ: How to choose the correct backup fuse for SPD

• Why is it required to install a backup fuse?

The need to install a backup fuse upstream of SPD is linked to the end of life of the SPD itself. A SPD composed by varistor elements for phase protection can reach the end of its life in 2 ways: overload or short circuit.

- **a.** End of life due to overload: this is the most common case and does not involve any additional risk of short circuit for the system. The SPD at the end of its life behaves as an open circuit.
- **b.** End of life due to short circuit: it is a very remote case that occurs in the event of a violent electrodynamic stress inside the device that causes the active wires (phases and neutral) to be constantly in conduction with the earth connection. This causes the prospective short circuit current lk to be at the point of installation of the SPD.

The backup fuse is mandatory to protect the system in the event of the end of life of the SPD due to short circuit.

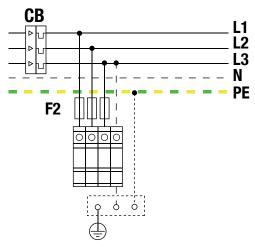
• Choice of backup fuse

If a backup fuse is required, the choice of fuse depends on:

- Prospective short circuit current lk
- Type and size of line protection used in the system.



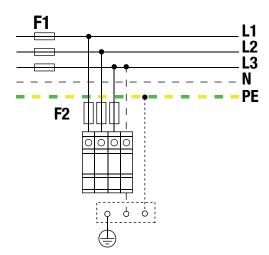
a. Line protected by circuit breaker



CB=Circuit breaker F2=Backup fuse

SPD	Series	Series Type 1 (limp=25kA)		Type 1 (limp=12,5kA)			Type 2 (In=20kA)	Type 2 (In=5kA)
		SA1B		SAOB		SAO	SG2	SG2C
	lk	lk<=50kA	50kA <ik<=100ka< td=""><td>Ik<=50kA</td><td>50kA<ik<=100ka< td=""><td>lk<=25kA</td><td>Ik<=100kA</td><td>Ik<=6kA</td></ik<=100ka<></td></ik<=100ka<>	Ik<=50kA	50kA <ik<=100ka< td=""><td>lk<=25kA</td><td>Ik<=100kA</td><td>Ik<=6kA</td></ik<=100ka<>	lk<=25kA	Ik<=100kA	Ik<=6kA
	<=32A			Backup fuse not needed		Backup fuse not needed	Backup fuse not needed	Backup fuse not needed
In CB	32A <in<=63a< td=""><td rowspan="2">63A gG without</td></in<=63a<>							63A gG without
	63A <in<=125a< td=""><td>125A gG with</td></in<=125a<>					125A gG with		
	>125A	125A gG with derating,	ting, 125A gG With derating, A 250A gG limp=10kA limp=10kA 16	125A gG with derating,	125A gG with derating, limp=10kA	derating, limp=10kA 160A gG without derating	125A gG without derating	derating
	N.a.	limp=10kA 250A gG without derating		limp=10kA 160A gG without derating				

b. Line protected by fuse



F1=Line fuse	
F2=Backup fuse	

Series		Series Type 1 (limp=25kA)		Type 1 (limp=12,5kA)			Type 2 (In=5kA)
	SA1B		SAOB		SAO	SG2	SG2C
lk	lk<=50kA 50kA <lk<=100ka< td=""><td>lk<=50kA</td><td>50kA<lk<=100ka< td=""><td>lk<=25kA</td><td>lk<=100kA</td><td>lk<=6kA</td></lk<=100ka<></td></lk<=100ka<>		lk<=50kA	50kA <lk<=100ka< td=""><td>lk<=25kA</td><td>lk<=100kA</td><td>lk<=6kA</td></lk<=100ka<>	lk<=25kA	lk<=100kA	lk<=6kA
<=63A	Backup fuse not needed		Backup fuse not needed		Backup fuse not needed	Backup fuse not needed	Backup fuse not needed
63A <in<=100a< td=""><td></td></in<=100a<>							
100A <in<=125a< td=""><td rowspan="2">63A gG without derating</td></in<=125a<>							63A gG without derating
125A <in<=250a< td=""><td>125A gG with</td></in<=250a<>					125A gG with		
>250A	125A gG with derating,	125A gG with	125A gG with derating,	125A gG with	derating, limp=10kA 160A gG	125A gG without	
N.a.	limp=10kA 250A gG without derating	limp=10kA	limp=10kA 160A gG without derating	limp=10kA	without derating	derating	
	<=63A 63A <in<=100a 100A<in<=125a 125A<in<=250a >250A</in<=250a </in<=125a </in<=100a 	<=63A 33A <in<=100a 100A<in<=125a 125A<in<=250a >250A N a N a 125A gG with derating, limp=10kA 250A gG</in<=250a </in<=125a </in<=100a 	<=63A 33A <in<=100a 100A<in<=125a 125A<in<=250a >250A 125A gG with derating, limp=10kA 250A gG limp=10kA 250A gG limp=10kA</in<=250a </in<=125a </in<=100a 	<=63A 33A <in<=100a< td=""> Backup fuse not needed Backup fuse not needed 100A<in<=125a< td=""> Backup fuse not needed Backup fuse not needed 125A<in<=250a< td=""> 125A gG with derating, limp=10kA 250A gG 125A gG with derating, limp=10kA 160A gG</in<=250a<></in<=125a<></in<=100a<>	<=63A	<=63A	<=63A



• Examples

a. Line protected by circuit breaker

SG23NA300R installed in a system with a prospective short circuit current Ik=50kA and protected upstream by a 160A circuit breaker.

	Series	Type 2 (limp=20kA) SG2		
lk		Ik<=100kA		
	<=32A			
	32A <in<=63a< td=""><td>Backup fuse not needed</td></in<=63a<>	Backup fuse not needed		
In CB	63A <in<125a< td=""><td></td></in<125a<>			
	>125A	125A gG without derating		

Backup fuse needed: 125A class gG.

SA1B3NA320R installed in a system with prospective short circuit current Ik=60kA and protected upstream by a 100A circuit breaker.

Series		Type 1 (limp=25kA) SA1B (lsccr=50kA)			
lk		Ik<=50kA	50kA <lk<=100ka< td=""></lk<=100ka<>		
	<=32A	Backup fuse not needed			
	32A <in<=63a< td=""></in<=63a<>				
In CB	63A <in<=125a< td=""></in<=125a<>				
	>125A	125A gG with derating, limp=10kA 250A gG without derating	125A gG with derating, limp=10kA		

Backup fuse **NOT** needed.



b. Line protected by fuses

SG23NA300R installed in a system with a prospective short circuit current Ik=50kA and protected upstream by a 160A fuse.

	Series	Type 2 (In=20kA) SG2 (Isccr=50kA)		
lk		Ik<=100kA		
	<=63A			
	63A <in<=100a< td=""><td>Dackup fund not needed</td></in<=100a<>	Dackup fund not needed		
In F1	100A <in<=125a< td=""><td colspan="2" rowspan="2">Backup fuse not needed</td></in<=125a<>	Backup fuse not needed		
	125A <in<=250a< td=""></in<=250a<>			
	>250A	125A gG without derating		

Backup fuse **NOT** needed.

SA1B3NA320R installed in a system with a prospective short circuit current lk=25kA and protected upstream by a 315A fuse.

Series		Type 1 (limp=25kA) SA1B (lsccr=50kA)			
lk		Ik<=50kA	50kA <lk<=100ka< th=""></lk<=100ka<>		
	<=63A				
	63A <in<=100a< td=""><td colspan="4" rowspan="2">Backup fuse not needed</td></in<=100a<>	Backup fuse not needed			
In F1	100A <in<=125a< td=""></in<=125a<>				
	125A <in<=250a< td=""><td colspan="3"></td></in<=250a<>				
	>250A	125A gG with derating, limp=10kA 250A gG without derating	125A gG with derating, limp=10kA		

Backup fuse needed:

- 125A class gG with derating limp=10kA
- 250A class gG without derating





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