

### Motor protection circuit breaker

- For thermal and magnetic protection of AC and DC motors
- Conformity to standards IEC 947-2, IEC 947-4-1 and VDE 0660
- Manual push-button operation
- Setting ranges from 0.1 to 25A at 690V AC and 220V DC
- Short-circuit capacity of 65kA up to setting range of 1.6-2.5A/400V

#### Standards

IEC 947-2  
IEC 947-4-1  
VDE 0660

#### Approvals



- Trip class 10
- Instant magnetic tripping (12 times the maximum operating current Ie)
- Single phase protection
- Ambient temperature compensation between - 5° C and + 40° C
- Internal and external accessories easy to mount
- Quick fixing on DIN rail EN 50022-35 and, with two screws, on plate or wall
- Terminals protected against accidental contacts (IP20)
- Suitable for isolation ( ) and positive padlocking in open position (IEC 947-1 § 7-1-6)

### Motor protection circuit breakers





3-phase motor AC3 380/415V kW	Magnetical tripping current A	Thermal tripping current (setting range)		Cat. no.	Ref. no.	Pack
		Min. A	Max. A			
0.02	1.9	0.1	0.16	SFK0A	120001	1/5
0.06	3.0	0.16	0.25	SFK0B	120002	1/5
0.06 / 0.09	4.8	0.25	0.4	SFK0C	120003	1/5
0.12 / 0.18	7.5	0.4	0.63	SFK0D	120004	1/5
0.25	12	0.63	1	SFK0E	120005	1/5
0.37 / 0.55	19	1	1.6	SFK0F	120006	1/5
0.75	30	1.6	2.5	SFK0G	120007	1/5
1.1 / 1.5	48	2.5	4	SFK0H	120008	5
2.2	75	4	6.3	SFK0I	120009	5
3.7 / 4.0	120	6.3	10	SFK0J	120010	5
5.5 / 7.5	190	10	16	SFK0K	120011	5
9.0	240	16	20	SFK0L	120012	1/5
11 / 12.5	300	20	25	SFK0M	120013	1/5




Circuit breaker to protect transformers on request




**Auxiliary contact blocks**

				Cat. no.	Ref. no.	Pack	
 <p><b>Side mounting</b></p>		1NO	1NC	SFAL11N	120020	5	
		2NO		SFAL20N	120021	5	
		1NO	1NC	SFAL11D	120022	5	
		(advanced on closing)					
		2NO		SFAL20D	120023	5	
		(advanced on closing)					
	For lower energy levels ( $\geq 4V, \geq 4mA$ )	1change-over PE + N conductor		SFAL11S SFALPEN	120027 264826	1 1	
 <p><b>Internal mounting</b></p>		1NO	1NC	SFAI11	120024	5	
	Switch trip indicator-alarm	1NO		SFAK10	120025	5	
		1NC		SFAK01	120026	5	

**Coils for internal mounting**

				Cat. no.	Ref. no.	Pack
 <p><b>Minimum power</b></p>	Functioning range: $0.35U_e < U < 0.7U_e$ Manual reset Dissipated power 2.2VA / 1W	110V / 50Hz	120V / 60Hz	SFB0RJ	120034	5
		220V / 50Hz	240V / 60Hz	SFB0RN	120035	5
		380V / 50Hz	440V / 60Hz	SFB0RU	120036	5
<p><b>Undervoltage release special for machinery</b></p> 	According to IEC204-1, DIN VDE 0113, INRS Art. L233-5 A combination of a special undervoltage release and auxiliary contact block SFAL20D	110V / 50Hz	120V / 60Hz	SFB0RJM	107256	1
		220V / 50Hz	240V / 60Hz	SFB0RNM	120114	1
		380V / 50Hz	440V / 60Hz	SFB0RUM	120115	1
<p><b>Shunt trip</b></p> 	Functioning range: $0.7U_e < U < 1.2U_e$ Manual reset	110V / 50Hz	120V / 60Hz	SFB0AJ	120030	5
		220V / 50Hz	240V / 60Hz	SFB0AN	120031	5
		380V / 50Hz	440V / 60Hz	SFB0AU	120032	5

**Current limiter**

				Cat. no.	Ref. no.	Pack
 <p><b>Current limiter</b></p>	Combined with SFK. Upgrades breaking capacity to 50kA/3~400V Not available UL, CSA.			SFVH03	120050	1
		$I_n = 32A$				

Order codes

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## Enclosures

				Cat. no.	Ref. no.	Pack
	Surface mounting		IP41-PG16	SFS04	120040	1
			Conversion kit IP55	SFS0K2	120046	1
			IP55-PG16	SFS05	120041	1
			IP41-M25	SFS04M	212558	1
			IP65-M25	SFS05M	212559	1
	Flush mounting		IP41	SFE04	120042	1
			Conversion kit IP55	SFE0K2	120047	1
			IP55	SFE05	120043	1

## Accessories for enclosures

				Cat. no.	Ref. no.	Pack
	Neutral connection	For use with surface and flush mounting enclosures		SFVN0	101369	1
	Padlocking device	Up to 3 padlocks 6 - 8 mm		SFVCD	120054	1
	Emergency mushroom push-buttons IP55	Impulse function		SFPS0	120051	1
		Latched, pull to release		SFPRO	120052	1
		Key locked, turn to release		SFPE0	120053	5
		Conversion kit IP55 for SFS04		SFS04K1	245217	1
		Conversion kit IP55 for SFE04		SFE04K1	216604	1
	Indicator lamps for AC and DC	Green 110/120V		GPELGAJ	101375	1
		Green 220/240V		GPELGAN	101376	1
		Green 380/440V		GPELGAU	101377	1
		Green 480/500V		GPELGAX	101378	1
		Green 600V		GPELGAY	101379	1
		Red 110/120V		GPELRAJ	101380	1
		Red 220/240V		GPELRAU	101381	1
		Red 380/440V		GPELRAU	101382	1
		Red 480/500V		GPELRAX	101383	1
		Red 600V		GPELRAY	101384	1
		Transparent 110/120V		GPELCAJ	101385	1
		Transparent 220/240V		GPELCAU	101386	1
		Transparent 380/440V		GPELCAU	101387	1
Transparent 480/500V		GPELCAU	101388	1		
Transparent 600V		GPELCAY	101389	1		

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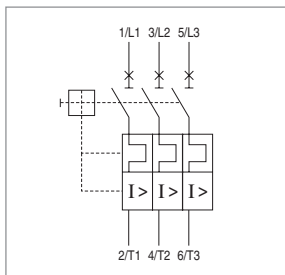
Accessories for enclosures (continued)

				Cat. no.	Ref. no.	Pack
Three phase busbar block	4 units	Ui 690V / Ie 63A	L = 207mm	<b>GPB104A</b>	101392	2
	5 units	Ui 690V / Ie 63A	L = 261mm	<b>GPB105A</b>	101393	2
	Plastic cover for 3 unused terminals			<b>GPB1GA</b>	101408	2
Supply block	Ie = 63A Fully insulated			<b>SFVB8</b>	254537	5

Terminal numbering

Motor protection circuit breaker

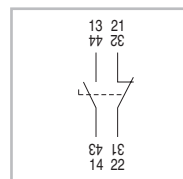
SFK...



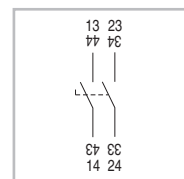
Auxiliary contact blocks

Side mounting

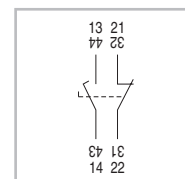
SFAL11N



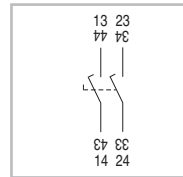
SFAL20N



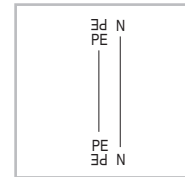
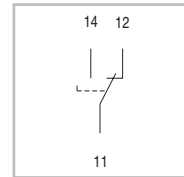
SFAL11D



SFAL20D

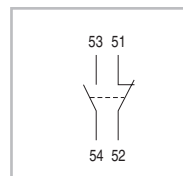


SFAL11S

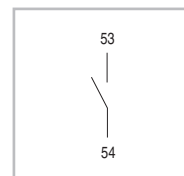


Internal mounting

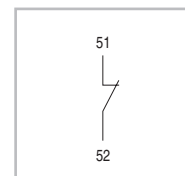
SFAI11



SFAK10



SFAK01



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## Technical data

### General

Rated thermal current (Ith) at 40°C	25A
Rated insulation voltage (Ui)	690V
Rated operational voltage (Ue)	AC 690V, 40/60Hz
(see application diagram)	DC 220V, with or without earth

### Standards

IEC 947-2	IEC 947-4-1	VDE 0660
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### Approvals

UL	CSA
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### Main circuit

Category	AC3, DC4
Operational frequency limits	40 to 60 Hz
Opening time	aprox. 7 ms
Mechanical endurance	10 <sup>5</sup> operations
Electrical endurance category AC3	10 <sup>5</sup> operations
Maximum operating rate	40 operations/hour
Total dissipated power at rated thermal current and hot state	6 W

### Tripping characteristics

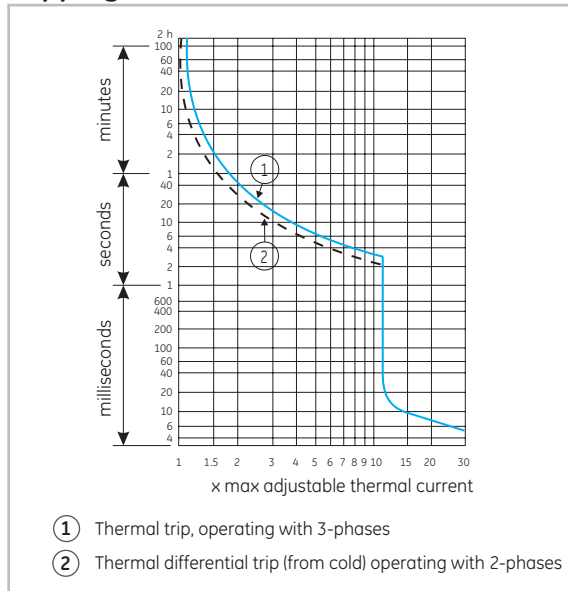
Thermal	
Symmetrical overloads	Class 10 (see curve 1, tripping curves)
Asymmetrical overloads (phase failure)	To IEC 947-4-1 (see curve 2, tripping curves)
Temperature compensation	- 5 to + 40°C

Magnetic	
	12 × Ie (Ie = max. thermal setting value)
Shunt release	
	0.7 - 1.2 Ue 100% ED
Operating voltage limits	
	2.2 VA
Consumption	
AC	1 W
DC	0.85 - 1.1 Ue 100% ED

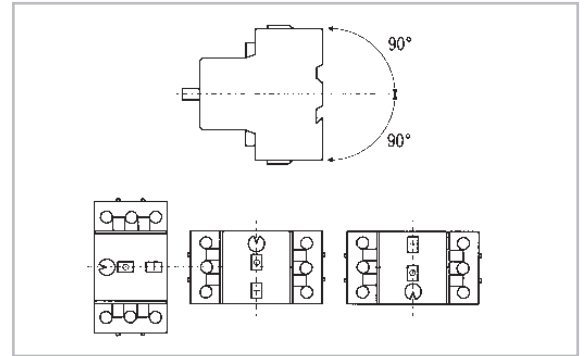
Undervoltage release	
Operating voltage limits	0.75 - 0.35 Ue
Breaking voltage limits	2.2 VA
Consumption	1 W

Wiring capacity	
Rigid wire	min. 2 wires of 0,75mm <sup>2</sup> max. 2 wires of 6mm <sup>2</sup>
Flexible wire	min. 2 wires of 0,75mm <sup>2</sup> max. 2 wires of 4mm <sup>2</sup>

### Tripping curve



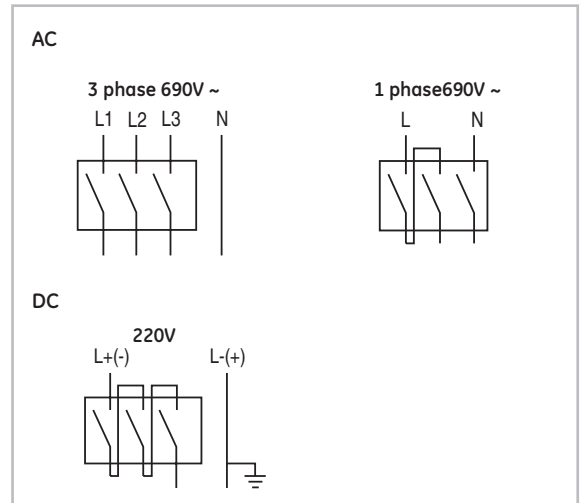
### Mounting positions



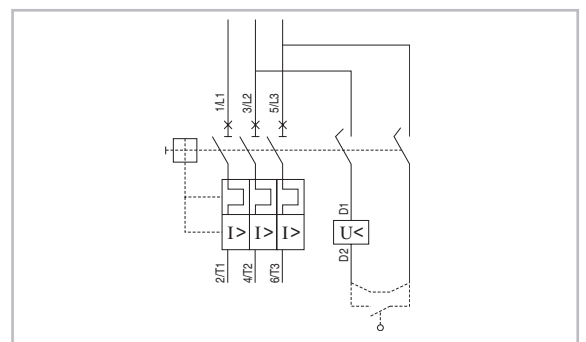
### Auxiliary contact blocks

	SFAL	SFAI - SFAK
Rated insulation voltage (Ui)	500V	500V
according VDE 0110		
Rated thermal current (Ith)	6A	6A
AC-15	Ue 230V 400V 500V Ie 3,5A 2A 1A	230V 400V 500V 2A 1A 0,5A
DC-13	Ue 60V 110V 220V Ie 1,5A 1A 0,5A	60V 110V 220V 0,7A 0,55A 0,25A
Protective fuse gl	6A	6A
Wiring capacity,		
Flexible wire	min. 2 x 0.75mm <sup>2</sup> max. 2 x 2.5mm <sup>2</sup>	2 x 0.75mm <sup>2</sup> 2 x 2.5mm <sup>2</sup>
Terminal type	M3,5, Pozidriv, safety flange screws	

### Wiring diagram



### Application diagram for tooling machines



Short-circuit breaking capacity  $I_{cu}/I_{cs}$  according to IEC 947-2

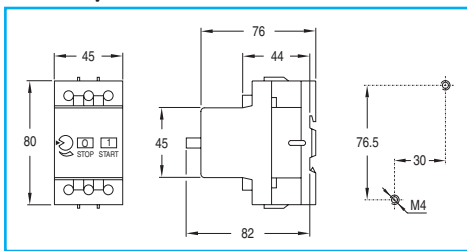
Thermal adjustment (A)	230V AC / 220V DC <sup>(1)</sup>				400V AC				415V AC				500V AC				690V AC			
	3ph motor AC3 (kW)	$I_{cu}$ (kA)	$I_{cs}$ (kA)	Fuse <sup>(2)</sup> (A)	3ph motor AC3 (kW)	$I_{cu}$ (kA)	$I_{cs}$ (kA)	Fuse <sup>(2)</sup> (A)	3ph motor AC3 (kW)	$I_{cu}$ (kA)	$I_{cs}$ (kA)	Fuse <sup>(2)</sup> (A)	3ph motor AC3 (kW)	$I_{cu}$ (kA)	$I_{cs}$ (kA)	Fuse <sup>(2)</sup> (A)	3ph motor AC3 (kW)	$I_{cu}$ (kA)	$I_{cs}$ (kA)	Fuse <sup>(2)</sup> (A)
0.1 - 0.16	-	65	65	(3)	0.02	65	65	(3)	0.02	65	65	(3)	0.04	65	65	(3)	0.06	42	42	(3)
0.16 - 0.25	-	65	65	(3)	0.06	65	65	(3)	0.06	65	65	(3)	0.06	65	65	(3)	0.12	42	42	(3)
0.25 - 0.4	0.06	65	65	(3)	0.09	65	65	(3)	0.12	65	65	(3)	0.12	65	65	(3)	0.18	42	42	(3)
0.4 - 0.63	0.09	65	65	(3)	0.12	65	65	(3)	0.18	65	65	(3)	0.25	65	65	(3)	0.37	42	42	(3)
0.63 - 1	0.12	65	65	(3)	0.25	65	65	(3)	0.25	65	65	(3)	0.37	65	65	(3)	0.75	1	1	20
1 - 1.6	0.25	65	65	(3)	0.55	65	65	(3)	0.55	65	65	(3)	0.75	65	65	(3)	1.1	1	1	20
1.6 - 2.5	0.37	65	65	(3)	0.75	65	65	(3)	0.75	10	5	25	1.1	3	1.5	25	1.5	1	0.5	20
2.5 - 4	0.75	65	65	(3)	1.5	10 (4)	5 (4)	35	1.5	10	5	35	2.2	3	1.5	35	3	1	0.5	25
4 - 6.3	1.1	65	37.5(4)	(3)	2.2	10 (4)	5 (4)	50	2.2	10	5	50	3	3	1.5	50	4	1	0.5	35
6.3 - 10	2.2	10 (4)	5 (4)	80	4	4 (4)	2 (4)	80	4	4	2	80	5.5	3	1.5	50	7.5	1	0.5	35
10 - 16	4	6 (4)	3 (4)	80	7.5	4 (4)	2 (4)	80	7.5	3.5	1.75	80	9	3	1.5	63	11	1	0.5	35
16 - 20	5	6 (4)	3 (4)	80	9	4 (4)	2 (4)	80	9	2.5	1.25	80	11	1.5	0.75	63	15	1	0.5	50
20 - 25	5.5	6 (4)	3 (4)	80	11	4 (4)	2 (4)	80	12.5	2.5	1.25	80	15	1.5	0.75	63	22	1	0.5	50

$I_{cu}$  = Ultimate short-circuit breaking capacity  
 $I_{cs}$  = Service short-circuit breaking capacity

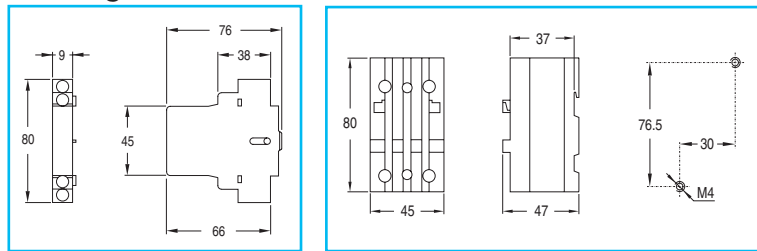
- (1) At 220V,  $t = 15$  ms
- (2) Maximum value of the fuses when the presumed short circuit current is higher than the breaking capacity of the device. Type D, slow or NH type gG/gL.
- (3) No back-up fuse required to the  $I_{cu}$  value
- (4) 50 kA in combination with current limiter

Dimensional drawings

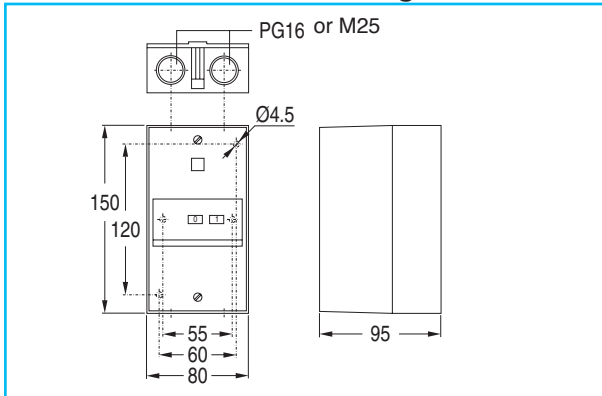
Motor protection circuit breaker



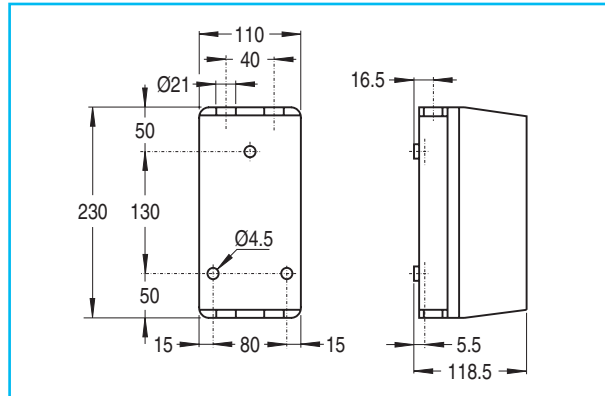
Auxiliary contact block Current limiter



Enclosures: surface mounting



Enclosure to combine with contactor



Enclosures: flush mounting

