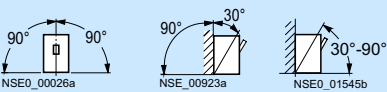


Technical specifications

Type		VL150 UL DG frame	VL250 UL FG frame	VL400 UL JG frame	VL400X UL LG frame	VL800 UL MG frame	VL1200 UL NG frame	VL1600 UL PG frame
Max. rated current I_n		A 150	250	400	600	800	1200	1600
Rated insulation voltage U_i only according to IEC 60947-2								
Main circuits	AC V	800	800	800	800	800	800	800
Auxiliary circuits	AC V	690	690	690	690	690	690	690
Rated operational voltage U_o								
NEMA 50/60 Hz	AC V	600	600	600	600	600	600	600
	DC ¹⁾ V	500	500	500	500	500	500	500
IEC 50/60 Hz	AC V	690	690	690	690	690	690	690
Utilization categories		A	A	A	A B ²⁾	A B ²⁾	A B ²⁾	A B ²⁾
Permissible ambient temperature								
Operation	°C	-25 to +70	-25 to +70	-25 to +70	-25 to +70	-25 to +70	-25 to +70	-25 to +70
Storage	°C	-40 to +80	-40 to +80	-40 to +80	-40 to +80	-40 to +80	-40 to +80	-40 to +80
Permissible load at various ambient temperatures								
Close to the circuit breaker, related to the rated current of the circuit breaker								
• Circuit breakers for system protection	TM/ETU	up to 40 °C	% 100/100	100/100	100/100	100/100	--/100	--/100
	TM/ETU	at 50 °C	% 93/95	93/95	93/95	93/95	--/95	--/95
	TM/ETU	at 60 °C	% 86/80	86/80	86/80	86/80	--/80	--/80
• Circuit breakers for starter combinations and non-automatic circuit breakers		up to 40 °C	% 100	100	100	100	100	100
		at 50 °C	% 93	93	93	93	93	93
		at 60 °C	% 86	86	86	86	86	86
Weights of 3-pole circuit breakers								
Basic unit without electronic trip unit	kg	1.5	1.6	4.2	7.8	14.2	21	27.3
Thermal-magnetic overcurrent trip unit	kg	0.7	0.7	1.5	1.2	--	--	--
Solid-state overcurrent trip unit	kg	0.9	0.9	1.7	1.5	1.8	4.0	4.0
Basic unit								
• with thermal-magnetic overcurrent trip unit	kg	2.2	2.3	5.7	9.0	--	--	--
• with solid-state overcurrent trip unit	kg	2.4	2.5	5.9	9.3	16.0	25.0	31.3
Rated short-circuit breaking capacity		For rated short-circuit breaking capacity see table under "Overview".						

¹⁾ Rated DC data apply only for thermal-magnetic overcurrent trip units.

²⁾ On request.

Type		VL150 UL DG frame	VL250 UL FG frame	VL400 UL JG frame	VL400X UL LG frame	VL800 UL MG frame	VL1200 UL NG frame	VL1600 UL PG frame
Endurance	Operating cycles	20000	20000	20000	10000	10000	3000	3000
Electrical endurance	Operating cycles	10000	10000	10000	5000	3000	1500	1500
Max. switching frequency	1/h	120	120	120	60	60	30	30
Types of connection		see „Main connections, basic equipment and options“.						
Conductor cross-sections								
Box terminals (Cu)	AWG/kcmil	1 x (8-1/0)	1 x (3-250)	1 x (1/0-600)	--	--	--	--
	mm ²	1 x (10-50)	1 x (35-120)	1 x (70-300)	--	--	--	--
Round cable terminal (Cu/Al)	AWG/kcmil	1 x (6-3/0)	1 x (4-350)	1 x (250-750)	1 x (250-750)	--	--	--
	mm ²	1 x (16-70)	1 x (25-150)	1 x (150-300)	1 x (150-300)	--	--	--
Multiple feed-in terminal (Cu/Al)	AWG/kcmil	--	--	2 x (3/0-250)	2 x (2-600)	2 x (500-750)	--	--
	mm ²	--	--	2 x (95-120)	2 x (35-300)	2 x 300	--	--
	AWG/kcmil	--	--	--	--	3 x (1/0-500)	3 x (500-750)	--
	mm ²	--	--	--	--	3 x (70-240)	3 x 300	--
	AWG/kcmil	--	--	--	--	--	4 x (1/0-500)	--
	mm ²	--	--	--	--	--	4 x (70-240)	--
	AWG/kcmil	--	--	--	--	--	--	6 x (1/0-750)
	mm ²	--	--	--	--	--	--	6 x (70-300)
Direct connection of busbars (Cu/Al)	mm	22 x 7	24 x 7	32 x 10	32 x 10	2 x 40 x 10	2 x 50 x 10	2 x 60 x 10
Screw for connection with screw terminal	metric inch	M 6 10-32 UNF	M 8 5/16	M 8 --	M10 3/8	M 8 5/16	M8 5/16	M8 5/16
Power loss per circuit breaker at max. rated current								
System protection	TM 0.8-1.0	W 15-48	32-80	60-175	85-230	--	--	--
System protection	ETU or LCD ETU	W 40	60	90	160	250	210	260
for starter combinations or non-automatic circuit breakers		W 40	60	90	160	250	210	260
Permissible mounting position¹⁾								
Auxiliary and alarm switches								
Conventional free-air thermal current I_{th}	A	10	10	10	10	10	10	10
Rated making capacity	A	10	10	10	10	10	10	10
AC								
Rated operational voltage	V	24	48	110	230	400	600	
Rated operational current	AC-12	A 10	10	10	10	10	10	
	AC-15	A 6	6	6	6	3	1	
DC								
Rated operational voltage	V	24	48	110	230			
Rated operational current	DC-12	A 10	5	2.5	1			
	DC-13	A 3	1.5	0.7	0.3			
Back-up fuse/ miniature circuit breaker	A	10 TDz / 10	10 TDz / 10	10 TDz / 10	10 TDz / 10	10 TDz / 10	10 TDz / 10	10 TDz / 10
Leading auxiliary switch with rotary operating mechanism								
Rated thermal current I_{th}	A	2	2	2	2	2	2	2
Rated making capacity	A	2 (ind. 0.5)	2 (ind. 0.5)	2 (ind. 0.5)	2 (ind. 0.5)	2 (ind. 0.5)	2 (ind. 0.5)	2 (ind. 0.5)
Rated operational voltage	V AC	230	230	230	230	230	230	230
Rated operational current	A	2	2	2	2	2	2	2
Rated switching capacity, inductive, power factor = 0.7	A	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Rated switching capacity	A	2	2	2	2	2	2	2
Back-up fuse, quick	A	2	2	2	2	2	2	2
Position indicator switches								
Rated thermal current I_{th}	A	16	16					
Rated making capacity	A	16	10					
Rated operational voltage	V AC	250	400					
Rated operational current	A	16	10					
Rated switching capacity, inductive, power factor = 0.7	A	4	4					
Rated switching capacity	A	16	10					
Back-up fuse, quick	A	16	10					

¹⁾ For VL800 UL (MG frame) to VL1600 UL (PG frame) circuit breakers with guide frame in lateral mounting position. Adapter set on request.

²⁾ Permissible current load factor 0.9; only with internal accessories.

Type	VL150 UL DG frame	VL250 UL FG frame	VL400 UL JG frame	VL400X UL LG frame	VL800 UL MG frame	VL1200 UL NG frame	VL1600 UL PG frame
Trip units							
	Group 1: VL150 UL (DG frame) to VL400X UL (LG frame)					Group 2: VL800 UL (MG frame) to VL1600 UL (PG frame)	
Undervoltage trip unit							
Response voltage:							
Release (circuit breaker is tripped)	$V \ 0.35\text{-}0.70 \times U_s$					$0.35\text{-}0.70 \times U_s$	
Pick-up (circuit breaker can be closed)	$V \ 0.85\text{-}1.1 \times U_s$					$0.85\text{-}1.1 \times U_s$	
Power consumption (continuous duty) at:							
50/60 Hz 24 V AC ¹⁾	VA	1.4			1.2		
50/60 Hz 110-127 V AC	VA	1.0			1.8		
50/60 Hz 220-250 V AC	VA	1.0			1.8		
50/60 Hz 208 V AC	VA	1.0			1.8		
50/60 Hz 277 V AC	VA	1.0			1.8		
50/60 Hz 380-415 V AC	VA	1.0			1.8		
50/60 Hz 440-480 V AC	VA	1.0			1.8		
50/60 Hz 500-525 V AC	VA	1.0			1.8		
50/60 Hz 600 V AC ¹⁾	VA	1.0			1.8		
12 V DC	W	0.8			1.5		
24 V DC	W	0.8			1.5		
48 V DC	W	0.8			1.5		
60 V DC	W	0.8			1.5		
110 -127 V DC	W	0.8			1.5		
220-250 V DC	W	0.8			1.5		
Max. opening time	ms	50			50		
Shunt trip unit							
Response voltage:	U_s					U_s	
Pick-up (circuit breaker is tripped)	V	0.7-1.1			0.7-1.1		
Power consumption (short time) at:							
50/60 Hz 24 V AC	VA	310			330		
50/60 Hz 48-60 V AC	VA	335-465			380-460		
50/60 Hz 110-127 V AC	VA	470-630			330-430		
50/60 Hz 208-277 V AC	VA	585-1000			520-800		
50/60 Hz 380-600 V AC	VA	180-500			228-750		
24 V DC	W	360			385		
48-60 V DC	W	380-590			480-720		
110-127 V DC	W	506-680			362-424		
220-250 V DC	W	470-580			418-476		
Max. opening time	ms	50			50		
Max. duration of operating voltage	s	interrupts automatically, less than 10 ms			interrupts automatically, less than 10 ms		

1) On request.

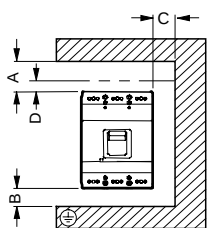
Type		VL150 UL DG frame	VL250 UL FG frame	VL400 UL JG frame	VL400X UL LG frame	VL800 UL MG frame	VL1200 UL NG frame	VL1600 UL PG frame
Motorized operating mechanism		--	--	--	--	--	x	x
Motorized operating mechanism with spring energy store (synchronizable)		x	x	x	x	x	--	--
Motorized operating mechanism								
Power consumption	VA/W	--	--	--	--	--	< 250	< 250
Rated control supply voltage U_s	50/60Hz V AC	--	--	--	--	--	42-48 / 60	110-127 / 220-250
	V DC	--	--	--	--	--	24 / 42-48 / 60	110-127 / 220-250
Melting fuse (gG operational class, characteristic slow)	A	--	--	--	--	--	4	2
Miniature circuit breakers (MCBs)	A	--	--	--	--	--	4	2
Operating range	V	--	--	--	--	--	0.85 -1.1 x U_s	0.85 -1.1 x U_s
Minimum command duration at U_s	ms	--	--	--	--	--	50	50
Max. command duration, depends on circuit ¹⁾		Non-maintained or continuous command		--	--	--	Non-maintained or continuous command	
Total make-time	s	--	--	--	--	--	< 5	< 5
Break-time	s	--	--	--	--	--	< 5	< 5
Interval time between OFF and ON commands	s	--	--	--	--	--	> 5	> 5
Interval time between ON and OFF commands	s	--	--	--	--	--	> 5	> 5
Max. permissible switching frequency	1/h	--	--	--	--	--	30	30
Motorized operating mechanism with spring energy store (synchronizable)								
Power consumption	VA/W	< 100	< 100	< 200	< 250	< 250	--	--
Rated control supply voltage U_s	50/60Hz V AC	42-48 / 60		110-127 / 220-250			--	--
	V DC	24 / 42-48 / 60		110-127 / 220-250			--	--
Melting fuse (gG operational class, characteristic slow)	A	4		2			--	--
Miniature circuit breakers (MCBs)	A	4		2			--	--
Operating range	V	0.85 -1.1 x U_s	0.85 -1.1 x U_s	0.85 -1.1 x U_s	0.85 -1.1 x U_s	0.85 -1.1 x U_s	--	--
Minimum command duration at U_s	ms	50	50	50	50	50	--	--
Max. command duration, depends on circuit ¹⁾		Non-maintained or continuous command					--	--
Total make-time	ms	< 100	< 100	< 100	< 100	< 100	--	--
Break-time	s	< 5	< 5	< 5	< 5	< 5	--	--
Interval time between OFF and ON commands	s	> 5	> 5	> 5	> 5	> 5	--	--
Interval time between ON and OFF commands	s	> 1	> 1	> 1	> 1	> 1	--	--
Max. permissible switching frequency	1/h	120	120	120	60	60	--	--

x Available

-- Not available

1) Changeover contact also permissible, note Interval times between ON and OFF commands

Space requirements above arc chutes, safety distance



Arcing spaces

Minimum clearances from adjacent grounded parts and from non-insulated live parts.

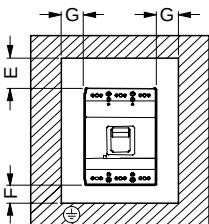
Plain conductors and busbars must be insulated with interphase barriers within the arcing space.

The specific mounting instructions for the various sizes must be observed for plain conductors and busbars outside the arcing space.

For mounting instructions refer to the Internet.

Space requirement above the arc chutes according to IEC 60947-2

Circuit breaker	Switching capacity	Minimum enclosure volume	A ≤ 415 V	> 415 ... 690 V	> 415 ... 690 V	B ≤ 690 V	C ≤ 690 V	D ≤ 690 V
Type		m ³	Without/with terminal cover	Without terminal cover	With terminal cover			
VL150 UL (DG frame)	Standard High Very high	0.011	50	100	50	25	25	35
VL250 UL (FG frame)	Standard High Very high	0.015	50	100	50	25	25	35
VL400 UL (JG frame)	Standard High Very high	0.036	50	100	50	25	25	35
VL400X UL (LG frame)	Standard High Very high	0.18	50	100	50	25	25	35
VL800 UL (MG frame)	Standard High Very high	0.22	50	100	50	25	25	35
VL1200 UL (NG frame)	Standard High Very high	0.22	70	100	70	30	30	50
VL1600 UL (PG frame)	Standard High Very high	0.264	100	100	100	100	30	100



Permitted safety distance between circuit breaker and enclosure according to UL 489

Circuit breaker	Switching capacity	Minimum enclosure volume	E	F	G
Type		m ³			
VL150 UL (DG frame)	Standard High Very high	0.011	168	229	58
VL250 UL (FG frame)	Standard High Very high	0.015	306	495	61
VL400 UL (JG frame)	Standard High Very high	0.036	366	367	127
VL400X UL (LG frame)	Standard High Very high	0.18	527	494	214
VL800 UL (MG frame)	Standard High Very high	0.22	200	25	25
VL1200 UL (NG frame)	Standard High Very high	0.22	100	30	50
VL1600 UL (PG frame)	Standard High Very high	0.264	100	100	30

Definition of the permissible safety clearances

Clearance between

A: Circuit breaker and busbars (bare metal and grounded metal); terminal cover required above 600 V AC, 500 V DC

B: Circuit breaker connection and floor

C: Side of the circuit breaker and the side panels (bare metal and grounded metal)

D: Circuit breaker and non-conducting parts with an insulation thickness of at least 3 mm (insulator, insulated busbar, painted plate)

E: Circuit breaker and upper panel of the enclosure

F: Circuit breaker and lower panel of the enclosure

G: Circuit breaker and side panel of the enclosure