

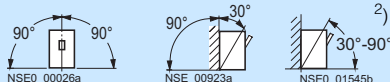
Technical specifications

Type		VL160X 3VL1	VL160 3VL2	VL250 3VL3	VL400 3VL4	VL630 3VL5	VL800 3VL6	VL1250 3VL7	VL1600 3VL8
Max. rated current I_n		A 160	160	250	400	630	800	1250	1600
N pole		A 160	160	250	400	630	800	1250	1600
Rated insulation voltage U_i acc. to IEC 60947-2									
Main current paths	AC V	800	800	800	800	800	800	800	800
Auxiliary circuits	AC V	690	690	690	690	690	690	690	690
Rated impulse withstand voltage U_{imp}									
Main current paths	kV	8	8	8	8	8	8	8	8
Auxiliary circuits	kV	4	4	4	4	4	4	4	4
Rated operational voltage U_e									
IEC 50/60 Hz	AC V	690	690	690	690	690	690	690	690
	DC ²⁾ V	500	600	600	600	600	600	600	600
NEMA 60 Hz	AC V	600	600	600	600	600	600	600	600
Utilization categories (IEC 60947-2)		A	A	A	A	A B ³⁾	A B ³⁾	A B ³⁾	A B ³⁾
Permissible ambient temperature									
Operation	°C	-25 ... +70	-25 ... +70	-25 ... +70	-25 ... +70	-25 ... +70	-25 ... +70	-25 ... +70	-25 ... +70
Storage	°C	-40 ... +80	-40 ... +80	-40 ... +80	-40 ... +80	-40 ... +80	-40 ... +80	-40 ... +80	-40 ... +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 50 °C	% 100/--	100/100	100/100	100/100	100/100	--/100	--/100	--/100
	TM/ETU At 60 °C	% 93/--	93/95	93/95	93/95	93/95	--/95	--/95	--/95
	TM/ETU At 70 °C	% 86/--	86/80	86/80	86/80	86/80	--/80	--/80	--/80
• Circuit breakers for motor protection	Up to 50 °C	% --	100	100	100	100	--	--	--
	At 60 °C	% --	95	95	95	95	--	--	--
	At 70 °C	% --	80	80	80	80	--	--	--
• Circuit breakers for starter combinations and non-automatic circuit breakers	Up to 50 °C	% 100	100	100	100	100	100	100	100
	At 60 °C	% 93	93	93	93	93	93	93	93
	At 70 °C	% 86	86	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	2.0	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
Weights of 4-pole circuit breakers									
Basic unit without electronic trip unit	kg	--	2.0	2.2	5.5	9.7	18.2	27.5	34.8
Thermal-magnetic overcurrent trip unit	kg	--	1.0	1.0	1.9	1.5	--	--	--
Solid-state overcurrent trip unit	kg	--	1.1	1.1	2.1	2.0	2.3	6.0	6.0
Basic unit									
• With thermal-magnetic overcurrent trip unit	kg	2.5	3.0	3.2	7.4	11.2	--	--	--
• With solid-state overcurrent trip unit	kg	--	3.1	3.3	7.6	11.7	20.5	33.5	40.8
Rated short-circuit breaking capacity acc. to IEC 60947-2		For rated short-circuit breaking capacity see table under "Overview".							

¹⁾ Circuit breaker cannot be used for direct current.

²⁾ Rated DC data apply only for thermal-magnetic overcurrent trip units.

³⁾ On request.

Type			VL160X 3VL1	VL160 3VL2	VL250 3VL3	VL400 3VL4	VL630 3VL5	VL800 3VL6	VL1250 3VL7	VL1600 3VL8
Endurance	Operating cycles		20000	20000	20000	20000	10000	10000	3000	3000
Electrical endurance	Operating cycles		10000	10000	10000	10000	5000	3000	1500	1500
Max. switching frequency	1/h		120	120	120	120	60	60	30	30
Connection types			See "Main Connections, Basic Equipment and Options"							
Conductor cross-sections										
Box terminals ⁴⁾										
• Solid or stranded cable	Copper only	mm ²	2.5 ... 70	2.5 ... 70	25 ... 185	50 ... 300	--	--	--	--
		mm ²	2.5 ... 50	2.5 ... 50	25 ... 120	50 ... 240	--	--	--	--
		mm	12 × 10	12 × 10	17 × 10	25 × 10	--	--	--	--
Connecting terminal plate for flexible busbar ³⁾			mm	--	--	--	2 units 10 × 32	--	--	--
Circular conductor terminal for cable ⁴⁾										
• Solid or stranded cable	Cu or Al	mm ²	16-70	16-70	25-185	50-300	--	--	--	--
		mm ²	10-50	10-50	25-120	50-240	--	--	--	--
Multiple feed-in terminal ⁴⁾										
• Solid or stranded cable	Cu or Al	mm ²	--	--	--	2 units 50 ... 120	2 units 50 ... 240	3 units 50 ... 240	4 units 50 ... 240	--
		mm ²	--	--	--	2 units 50 ... 95	2 units 50 ... 185	3 units 50 ... 185	4 units 50 ... 185	--
• Direct connection of busbars	Cu or Al	mm	17 × 7	22 × 7	24 × 7	32 × 10	40 × 10	2 × 40 × 10	2 × 50 × 10	3 × 60 × 10
			M5 ⁵⁾	M5 ⁵⁾	M8	M8	M6	M8	M8	--
Screw for connection with screw terminal										
Conductor cross-sections for control circuits with terminal connection										
Screw terminals										
• Solid		mm ²	0.75 ... 1.5	0.75 ... 1.5	0.75 ... 1.5	0.75 ... 1.5	0.75 ... 1.5	0.75 ... 1.5	0.75 ... 1.5	0.75 ... 1.5
		mm ²	0.75 ... 1.0	0.75 ... 1.0	0.75 ... 1.0	0.75 ... 1.0	0.75 ... 1.0	0.75 ... 1.0	0.75 ... 1.0	0.75 ... 1.0
For details see Mounting Instruction										
Power loss per circuit breaker at max. rated current										
System protection	TM 0.8-1.0	W	12 ... 70	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 air circuit breaker			W	40	40	60	90	160	250	210
For motor protection			W	--	40	60	90	160	--	--
Permissible mounting position ¹⁾										
Auxiliary and alarm switches										
Conventional free-air thermal current I _{th}			A 10	10	10	10	10	10	10	10
Rated making capacity			A 10	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	10		
	AC-15	A 6	6	6	6	6	3	1		
DC										
Rated operational voltage			V 24	48	110	230				
Rated operational current	DC-12	A 10	10	5	2.5	1				
	DC-13	A 3	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	10 TDz/ 10
Leading auxiliary switch with rotary operating mechanism										
Rated thermal current I _{th}			A 2	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)	2 (ind. 0.5)
Rated operational voltage			V AC 230	230	230	230	230	230	230	230
Rated operational current			A 2	2	2	2	2	2	2	2
Rated breaking capacity, inductive, p.f. = 0.7			A 0.5	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	2
Back-up fuse, quick			A 2	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 breaking capacity, inductive, p.f. = 0.7			A 4	4						
Rated switching capacity			A 16	10						
Back-up fuse, quick			A 16	10						

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

⁵⁾ M6 on request.

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

³⁾ Not for 690 V AC/600 V DC.

⁴⁾ Cross-sections according to IEC 60999.

Type		VL160X 3VL1	VL160 3VL2	VL250 3VL3	VL400 3VL4	VL630 3VL5	VL800 3VL6	VL1250 3VL7	VL1600 3VL8
Auxiliary and alarm switches									
Tripped indication switch in RCD module ¹⁾									
Rated thermal current I_{th}	A	--	2	2	2	--	--	--	--
Rated making capacity	A	--	2	2	2	--	--	--	--
Rated operational voltage	V AC	--	250	250	250	--	--	--	--
Rated operational current	A	--	2	2	2	--	--	--	--
Rated breaking capacity, inductive, p.f. = 0.7	A	--	0.5	0.5	0.5	--	--	--	--
Rated switching capacity	A	--	2	2	2	--	--	--	--
Back-up fuse, quick	A	--	2	2	2	--	--	--	--
Trip units									
		Group 1: VL160X to VL400				Group 2: VL630 to VL1600			
Undervoltage trip unit									
Response voltage:									
Release (circuit breaker is tripped)	V	0.35 ... $0.70 \times U_s$				0.35 ... $0.70 \times U_s$			
Pick-up (circuit breaker can be closed)	V	0.85 ... $1.1 \times U_s$				0.85 ... $1.1 \times U_s$			
Power consumption (continuous duty) at:									
AC 50/60 Hz 24 V	VA	1.4				1.2			
AC 50/60 Hz 110-127 V	VA	1.0				1.8			
AC 50/60 Hz 220-250 V	VA	1.0				1.8			
AC 50/60 Hz 208 V	VA	1.0				1.8			
AC 50/60 Hz 277 V	VA	1.0				1.8			
AC 50/60 Hz 380-415 V	VA	1.0				1.8			
AC 50/60 Hz 440-480 V	VA	1.0				1.8			
AC 50/60 Hz 500-525 V	VA	1.0				1.8			
AC 50/60 Hz 600 V	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:									
AC 50/60 Hz 24 V	VA	310				330			
AC 50/60 Hz 48-60 V	VA	335 ... 465				380 ... 460			
AC 50/60 Hz 110-127 V	VA	470 ... 630				330 ... 430			
AC 50/60 Hz 208-277 V	VA	585 ... 1000				520 ... 800			
AC 50/60 Hz 380-600 V	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 operational voltage	s	Interrupts automatically, less than 10 ms				Interrupts automatically, less than 10 ms			
Time-delay device for undervoltage trip unit									
Rated control supply voltage U_s	V AC/DC	220 ... 250				220 ... 250			
Control voltage for undervoltage trip unit	V DC	220 ... 250				220 ... 250			
Conductor cross-sections									
Finely stranded with end sleeve	mm ²	2 × (0.5 ... 1.5)				2 × (0.5 ... 1.5)			
Solid	mm ²	2 × (0.5 ... 1.5)				2 × (0.5 ... 1.5)			
Delay time/connection									
Undervoltage trip units	s	3/--				1.5/--			
	s	6/Bridge Y2–Y1				3/Bridge Y2–Y1			
Undervoltage trip unit and auxiliary relay (3RH11)	s	0.6/--				0.3/--			
	s	1.2/Bridge Y2–Y1				0.6/Bridge Y2–Y1			

¹⁾ Max. DC rated operational voltage 125 V, minimum load 50 mA at 5 V DC.

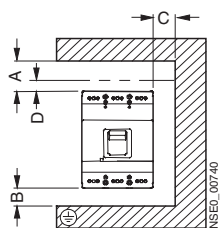
Type		VL160X 3VL1	VL160 3VL2	VL250 3VL3	VL400 3VL4	VL630 3VL5	VL800 3VL6	VL1250 3VL7	VL1600 3VL8
Motorized operating mechanisms		x	x	x	--	--	--	x	x
Motorized operating mechanism with spring energy store (synchronizable)		x	x	x	x	x	x	--	--
Motorized operating mechanisms									
Power consumption	VA/W	< 100	< 100	< 100	--	--	--	< 250	< 250
Rated control supply voltage U_s	50/60Hz V AC	42	110-127 / 220-240		--	--	--	42-48 / 60	110-127 / 220-250
	V DC	24 / 48	60 / 110-127 / 220		--	--	--	24 / 42-48 / 60	110-127 / 220-250
DIAZED fuses (gG operational class, characteristic slow)	A	4	2		--	--	--	4	2
Miniature circuit breaker (C characteristic acc. to DIN VDE 0641)	A	4	2		--	--	--	4	2
Operating range	V	0.85 ... 1.1 $\times U_s$	0.85 ... 1.1 $\times U_s$	0.85 ... 1.1 $\times U_s$	--	--	--	0.85 ... 1.1 $\times U_s$	0.85 ... 1.1 $\times U_s$
Minimum command duration at U_s	ms	50	50	50	--	--	--	50	50
Max. command duration, depends on circuit ¹⁾		Non-maintained or continuous command			--	--	--	Non-maintained or continuous command	
Total make-time	s	< 1	< 1	< 1	--	--	--	< 5	< 5
Break-time	s	< 1	< 1	< 1	--	--	--	< 5	< 5
Interval time between OFF and ON commands	s	> 2	> 2	> 2	--	--	--	> 5	> 5
Interval time between ON and OFF commands	s	> 2	> 2	> 2	--	--	--	> 5	> 5
Max. permissible switching frequency	1/h	120	120	120	--	--	--	30	30
Motorized operating mechanism with spring energy store (synchronizable)									
Power consumption	VA/W	< 100	< 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			--	--
DIAZED fuses (gG operational class, characteristic slow)	A	4			2			--	--
Miniature circuit breakers (C characteristic acc. to DIN VDE 0641)	A	4			2			--	--
Operating range	V	0.85 ... 1.1 $\times U_s$	0.85 ... 1.1 $\times U_s$	0.85 ... 1.1 $\times U_s$	0.85 ... 1.1 $\times U_s$	0.85 ... 1.1 $\times U_s$	0.85 ... 1.1 $\times U_s$	--	--
Minimum command duration at U_s	ms	50	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	< 100	--	--
Break-time	s	< 5	< 5	< 5	< 5	< 5	< 5	--	--
Interval time between OFF and ON commands	s	> 5	> 5	> 5	> 5	> 5	> 5	--	--
Interval time between ON and OFF commands	s	> 1	> 1	> 1	> 1	> 1	> 1	--	--
Max. permissible switching frequency	1/h	120	120	120	120	60	60	--	--

x Available

-- Not available

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

Space requirements above arc chutes



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 and manual refer to the Internet

Manual for the SENTRON 3VL circuit breaker

This manual contains additional technical information, covering a product description, mode of operation, electrical wiring system and retrofitting.

The manual and operating instructions are available in PDF format at:

<http://www.siemens.com/lowvoltage/manuals>

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			
VL160X	Standard High	0.011	35	70	35	25	25	35
VL160	Standard High Very high	0.011	50	100	50	25	25	35
VL250	Standard High Very high	0.015	50	100	50	25	25	35
VL400	Standard High Very high	0.036	50	100	50	25	25	35
VL630	Standard High Very high	0.18	50	100	50	25	25	35
VL800	Standard High Very high	0.22	50	100	50	25	25	35
VL1250	Standard High Very high	0.22	70	100	70	30	30	50
VL1600	Standard High Very high	0.264	100	100	100	100	30	100

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)

Correlation between short-circuit making capacity, short-circuit breaking capacity and the corresponding power factor (according to IEC 60947-2)

Short-circuit breaking capacity I_{cu}	Power factor	Minimum value for short-circuit making capacity I_{cm} (n x short-circuit breaking capacity)
A	p.f.	$n \times I_{cu}$
$4500 < I_{cu} \leq 6000$	0.7	$1.5 \times I_{cu}$
$6000 < I_{cu} \leq 10000$	0.5	$1.7 \times I_{cu}$
$10000 < I_{cu} \leq 20000$	0.3	$2.0 \times I_{cu}$
$20000 < I_{cu} \leq 50000$	0.25	$2.1 \times I_{cu}$
$50000 < I_{cu}$	0.2	$2.2 \times I_{cu}$

e.g. VL250H (H = high switching capacity): $I_{cu} = 70$ kA (415 V AC)

$I_{cm} = 2.2 \times 70000 = 154$ kA (415 V AC)