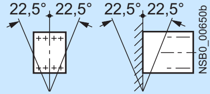
Technical specifications

Contactor	Type Size		3RT12 64 S10	3RT12 65 S10	3RT12 66 S10
General data					
Permissible mounting position The contactors are designed for operation on a vertical mounting surface.					
Mechanical endurance		Operating cycles	10 million		
Electrical endurance			[1]		
Rated insulation voltage U_i (degree of pollution 3)		V	1000		
Rated impulse withstand voltage U_{imp}		kV	8		
Safe isolation between the coil and the main contacts according to EN 60947-1, Appendix N		V	690		
Mirror contacts A mirror contact is an auxiliary NC contact that cannot be closed simultaneously with a NO main contact.			Yes, according to EN 60947-4-1, Appendix F		
Permissible ambient temperature	During operation During storage	°C °C	-25 ... +60/+55 with AS-Interface -55 ... +80		
Degree of protection according to EN 60947-1, Appendix C **Touch protection** according to EN 50274			IP00/open, coil assembly IP20 Finger-safe with cover		
Shock resistance	Rectangular pulse Sine pulse	*g*/ms *g*/ms	8.5/5 and 4.2/10 13.4/5 and 6.5/10		
Conductor cross-sections			[2]		
Electromagnetic compatibility (EMC)			[3]		
Short-circuit protection					
Main circuit Fuse links, gL/gG LV HRC 3NA, DIAZED 5SB, NEOZED 5SE					
- According to IEC 60 947-4-1/ EN 60947-4-1	• Type 1 coordination • Type 2 coordination • Weld-free[4]	A A A	500 500 400		
Auxiliary circuit					
• Fuse links gL/gG DIAZED 5SB, NEOZED 5SE (weld-free protection for $I_k \geq$ 1 kA) Or miniature circuit breakers with C characteristic (short-circuit current I_k 400 A)		A	10		

[1] See endurance of the main contacts on page 3/19.

[2] See conductor cross-sections on page 3/59.

[3] See Electromagnetic Compatibility (EMC) on page 3/12.

[4] Test conditions according to IEC 60947-4-1.

3RT12 vacuum contactors, 3-pole, 110 ... 250 kW

Contactor	Type Size		3RT12 64 S10	3RT12 65 S10	3RT12 66 S10
Control					
Operating range of the solenoid AC/DC (UC)			$0.8 \times U_{s\ min}$ ... $1.1 \times U_{s\ max}$		
Power consumption of the solenoid (when coil is cool and rated range $U_{s\ min}$ ... $U_{s\ max}$)					
• Conventional operating mechanism					
- AC operation	Closing at $U_{s\ min}$	VA/p.f.	530/0.9		
	Closing at $U_{s\ max}$	VA/p.f.	630/0.9		
	Closed at $U_{s\ min}$	VA/p.f.	6.1/0.9		
	Closed at $U_{s\ max}$	VA/p.f.	7.4/0.9		
- DC operation	Closing at $U_{s\ min}$	W	580		
	Closing at $U_{s\ max}$	W	700		
	Closed at $U_{s\ min}$	W	6.8		
	Closed at $U_{s\ max}$	W	8.2		
• Solid-state operating mechanism					
- AC operation	Closing at $U_{s\ min}$	VA/p.f.	420/0.8		
	Closing at $U_{s\ max}$	VA/p.f.	570/0.8		
	Closed at $U_{s\ min}$	VA/p.f.	4.3/0.8		
	Closed at $U_{s\ max}$	VA/p.f.	5.6/0.8		
- DC operation	Closing at $U_{s\ min}$	W	460		
	Closing at $U_{s\ max}$	W	630		
	Closed at $U_{s\ min}$	W	3.4		
	Closed at $U_{s\ max}$	W	4.2		
PLC control input (EN 61131-2/type 2)			24 V DC/≤ 30 mA power consumption, (operating range 17 ... 30 V DC)		
Operating times (Total break time = Opening delay + Arcing time)					
• Conventional operating mechanism					
- With $0.8 \times U_{s\ min}$ ... $1.1 \times U_{s\ max}$	Closing delay	ms	30 ... 95		
	Opening delay	ms	40 ... 80		
- For $U_{s\ min}$ ... $U_{s\ max}$	Closing delay	ms	35 ... 50		
	Opening delay	ms	50 ... 80		
• Solid-state operating mechanism, actuated via A1/A2					
- With $0.8 \times U_{s\ min}$ ... $1.1 \times U_{s\ max}$	Closing delay	ms	105 ... 145		
	Opening delay	ms	80 ... 100		
- For $U_{s\ min}$ ... $U_{s\ max}$	Closing delay	ms	110 ... 130		
	Opening delay	ms	80 ... 100		
• Solid-state operating mechanism, actuated via PLC input					
- With $0.8 \times U_{s\ min}$ ... $1.1 \times U_{s\ max}$	Closing delay	ms	45 ... 80		
	Opening delay	ms	80 ... 100		
- For $U_{s\ min}$ ... $U_{s\ max}$	Closing delay	ms	50 ... 65		
	Opening delay	ms	80 ... 100		
• Arcing time		ms	10 ... 15		

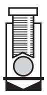
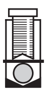
3RT12 vacuum contactors, 3-pole, 110 ... 250 kW

Contactor	Type Size			**3RT12 64** **S10**	**3RT12 65** **S10**	**3RT12 66** **S10**
Main circuit						
AC capacity						
Utilization category AC-1 **Switching resistive loads**						
Rated operational currents I_e		at 40 °C up to 1000 V	A	330		
		at 60 °C up to 1000 V	A	300		
Rated power for AC loads[1)] P.f. = 0.95 (at 60 °C)		at 230 V	kW	113		
		400 V	kW	197		
		500 V	kW	246		
		690 V	kW	340		
		1000 V	kW	492		
Minimum conductor cross-section for loads with I_e		at 40 °C	mm^2	185		
		at 60 °C	mm^2	185		
Utilization category AC-2 and AC-3						
Rated operational currents I_e		up to 1000 V	A	225	265	300
Rated power for slipring or squirrel-cage motors at 50 and 60 Hz		at 230 V	kW	73	85	97
		400 V	kW	128	151	171
		500 V	kW	160	189	215
		690 V	kW	223	265	288
		1000 V	kW	320	378	428
Thermal load capacity		10 s current[2)]	A	1800	2120	2400
Power loss per conducting path		at I_e/AC-3	W	9	12	14
Utilization category AC-4 (for $I_a = 6 \times I_e$)						
Rated operational current I_e		up to 690 V	A	195	230	280
Rated power for squirrel-cage motors with 50 Hz and 60 Hz		at 400 V	kW	110	132	160
• The following applies to a contact endurance of about 200000 operating cycles:						
Rated operational currents I_e		up to 690 V	A	97	115	140
		1000 V	A	68	81	98
Rated power for squirrel-cage motors with 50 Hz and 60 Hz		at 230 V	kW	30	37	45
		400 V	kW	55	65	79
		500 V	kW	68	81	98
		690 V	kW	94	112	138
		1000 V	kW	95	114	140
Utilization category AC-6a **Switching AC transformers**						
Rated operational current I_e						
• For inrush current n = 20		up to 690 V	A	278		
• For inrush current n = 30		up to 690 V	A	185		
Rated power P						
• For inrush current n = 20		at 230 V	kVA	111		
		400 V	kVA	193		
		500 V	kVA	241		
		690 V	kVA	332		
		1000 V	kVA	482		
• For inrush current n = 30		at 230 V	kVA	74		
		400 V	kVA	128		
		500 V	kVA	160		
		690 V	kVA	221		
		1000 V	kVA	320		
For deviating inrush current factors x, the power must be recalculated as follows: $P_x = P_{n\,30} \cdot 30/x$						
Utilization category AC-6b **Switching low-inductance (low-loss, metallized dielectric) AC capacitors** Ambient temperature 40 °C						
Rated operational currents I_e		up to 500 V	A	220		
Rated power for single capacitors or banks of capacitors (minimum inductance of 6 µH between capacitors connected in parallel) at 50 Hz, 60 Hz and		at 230 V	kvar	88		
		400 V	kvar	152		
		500 V	kvar	191		
		690 V	kvar	152		
Switching frequency						
Switching frequency *z* in operating cycles/hour						
Contactors without overload relays		No-load switching frequency	h^{-1}	2000	2000	
Dependence of the switching frequency z' on the operational current I' and operational voltage U': $z' = z \cdot (I_e/I') \cdot (400\ V/U')^{1.5} \cdot 1/h$		AC-1	h^{-1}	800	750	
		AC-2	h^{-1}	300	250	
		AC-3	h^{-1}	750	750	
		AC-4	h^{-1}	250	250	
Contactors with overload relays (mean value)			h^{-1}	60	60	

1) Industrial furnaces and electric heaters with resistance heating, etc. increased power consumption on heating up taken into account).

2) According to IEC 60947-4-1.
For rated values for various start-up conditions see Protection Equipment: Overload Relays.

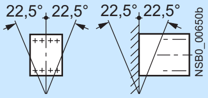
3RT12 vacuum contactors, 3-pole, 110 ... 250 kW

Contactor	Type Size		3RT12 6. S10
Main conductor cross-sections			
Screw terminals	**Main conductors:** with 3RT19 66-4G box terminal		
Front clamping point connected  NSB00479	• Finely stranded with end sleeve	mm²	70 ...240
	• Finely stranded without end sleeve	mm²	70 ...240
	• Stranded	mm²	95 ...300
	• AWG conductors, solid or stranded	AWG	3/0 ...600 kcmil
	• Ribbon cable conductors (number x width x circumference)	mm	Min. 6 x 9 x 0.8, max. 20 x 24 x 0.5
Rear clamping point connected  NSB00480	• Finely stranded with end sleeve	mm²	120 ...185
	• Finely stranded without end sleeve	mm²	120 ...185
	• Stranded	mm²	120 ...240
	• AWG conductors, solid or stranded	AWG	250 ...500 kcmil
	• Ribbon cable conductors (number x width x circumference)	mm	Min. 6 x 9 x 0.8, max. 20 x 24 x 0.5
Both clamping points connected  NSB00481	• Finely stranded with end sleeve	mm²	Min. 2 x 50, max. 2 x 185
	• Finely stranded without end sleeve	mm²	Min. 2 x 50, max. 2 x 185
	• Stranded	mm²	Min. 2 x 70, max. 2 x 240
	• AWG conductors, solid or stranded	AWG	Min. 2 x 2/0, max. 1 x 500 kcmil
	• Ribbon cable conductors (number x width x circumference)	mm	Max. 2 x (20 x 24 x 0.5)
	• Terminal screws		M12 (hexagon socket, A/F 5)
	- Tightening torque	NM	20 ... 22 (180 ... 195 lb.in)
	Main conductors: without box terminal/rail connection		
	• Finely stranded with cable lug[1]	mm²	50 ...240
	• Stranded with cable lug[1]	mm²	70 ...240
	• AWG conductors, solid or stranded	AWG	2/0 ...500 kcmil
	• Connecting bar (max. width)	mm	25
	• Terminal screws		M12 (hexagon socket, A/F 5)
	- Tightening torque	NM	14 ... 24 (124 ... 210 lb.in)
Screw terminals	**Auxiliary conductors:**		
	• Solid	mm²	2 x (0.5 ... 1.5)[2]; 2 x (0.75 ... 2.5)[2] according to IEC 60947; max. 2 x (0.75 ... 4)
	• Finely stranded with end sleeve	mm²	2 x (0.5 ... 1.5)[2]; 2 x (0.75 ... 2.5)[2]
	• AWG conductors, solid or stranded	AWG	2 x (18 ... 14)
	• Terminal screws		M3 (PZ 2)
	- Tightening torque	NM	0.8 ... 1.2 (7 ... 10.3 lb.in)

1) When connecting cable lugs according to DIN 46234 for conductor cross-sections of 185 mm² and more and according to DIN 46235 for conductor cross-sections of 240 mm² and more, the 3RT19 66-4EA1 terminal cover must be used more to keep the phase clearance.

2) If two different conductor cross-sections are connected at one clamping point, then the two cross-sections must lie within the range quoted. If identical cross-sections are used, this restriction does not apply.

3RT12 vacuum contactors, 3-pole, 110 ... 250 kW

Contactor	Type Size		3RT12 75 S12	3RT12 76 S12
General data				
Permissible mounting position The contactors are designed for operation on a vertical mounting surface.			 	
Mechanical endurance		Operating cycles	10 million	
Electrical endurance			[1]	
Rated insulation voltage U_i (degree of pollution 3)		V	1000	
Rated impulse withstand voltage U_{imp}		kV	8	
Safe isolation between the coil and the main contacts according to EN 60947-1, Appendix N		V	690	
Mirror contacts A mirror contact is an auxiliary NC contact that cannot be closed simultaneously with a NO main contact.			Yes, according to EN 60947-4-1, Appendix F	
Permissible ambient temperature	During operation During storage	°C °C	-25 ... +60/+55 with AS-Interface -55 ... +80	
Degree of protection according to EN 60947-1, Appendix C **Touch protection** according to EN 50274			IP00/open, coil assembly IP20 Finger-safe with cover	
Shock resistance	Rectangular pulse Sine pulse	*g*/ms *g*/ms	8.5/5 and 4.2/10 13.4/5 and 6.5/10	
Conductor cross-sections			[2]	
Electromagnetic compatibility (EMC)			[3]	
Short-circuit protection				
Main circuit Fuse links, gL/gG LV HRC 3NA, DIAZED 5SB, NEOZED 5SE				
- According to IEC 60947-4-1/ EN 60947-4	• Type of coordination "1" • Type of coordination "2" • Weld-free[4]	A A A	800 800 500	
Auxiliary circuit • Fuse links gL/gG DIAZED 5SB, NEOZED 5SE (weld-free protection for $I_k \geq 1$ kA) Or miniature circuit breakers with C characteristic (short-circuit current I_k < 400 A)		A	10	

[1] See endurance of the main contacts on page 3/19.

[2] See conductor cross-sections on page 3/63.

[3] See Electromagnetic Compatibility (EMC) on page 3/12.

[4] Test conditions according to IEC 60947-4-1.

3RT12 vacuum contactors, 3-pole, 110 ... 250 kW

Contactor	Type Size			3RT12 75 S12	3RT12 76 S12
Control					
Operating range of the solenoid	AC/DC (UC)			$0.8 \times U_{s\,min} \ldots 1.1 \times U_{s\,max}$	
Power consumption of the solenoid (when coil is cool and rated range $U_{s\,min} \ldots U_{s\,max}$)					
• Conventional operating mechanism					
- AC operation	Closing at $U_{s\,min}$		VA/p.f.	700/0.9	
	Closing at $U_{s\,max}$		VA/p.f.	830/0.9	
	Closed at $U_{s\,min}$		VA/p.f.	7.6/0.9	
	Closed at $U_{s\,max}$		VA/p.f.	9.2/0.9	
- DC operation	Closing at $U_{s\,min}$		W	770	
	Closing at $U_{s\,max}$		W	920	
	Closed at $U_{s\,min}$		W	8.5	
	Closed at $U_{s\,max}$		W	10	
• Solid-state operating mechanism					
- AC operation	Closing at $U_{s\,min}$		VA/p.f.	560/0.8	
	Closing at $U_{s\,max}$		VA/p.f.	750/0.8	
	Closed at $U_{s\,min}$		VA/p.f.	5.4/0.8	
	Closed at $U_{s\,max}$		VA/p.f.	7/0.8	
- DC operation	Closing at $U_{s\,min}$		W	600	
	Closing at $U_{s\,max}$		W	800	
	Closed at $U_{s\,min}$		W	4	
	Closed at $U_{s\,max}$		W	5	
PLC control input (EN 61131-2/type 2)				24 V DC/≤ 30 mA power consumption, (operating range 17 ... 30 V DC)	
Operating times (Total break time = Opening delay + Arcing time)					
• Conventional operating mechanism					
- With $0.8 \times U_{s\,min} \ldots 1.1 \times U_{s\,max}$	Closing delay		ms	45 ... 100	
	Opening delay		ms	60 ... 100	
- For $U_{s\,min} \ldots U_{s\,max}$	Closing delay		ms	50 ... 70	
	Opening delay		ms	70 ... 100	
• Solid-state operating mechanism, actuated via A1/A2					
- With $0.8 \times U_{s\,min} \ldots 1.1 \times U_{s\,max}$	Closing delay		ms	120 ... 150	
	Opening delay		ms	80 ... 100	
- For $U_{s\,min} \ldots U_{s\,max}$	Closing delay		ms	125 ... 150	
	Opening delay		ms	80 ... 100	
• Solid-state operating mechanism, actuated via PLC input					
- With $0.8 \times U_{s\,min} \ldots 1.1 \times U_{s\,max}$	Closing delay		ms	60 ... 90	
	Opening delay		ms	80 ... 100	
- For $U_{s\,min} \ldots U_{s\,max}$	Closing delay		ms	65 ... 80	
	Opening delay		ms	80 ... 100	
• Arcing time			ms	10 ... 15	
Main circuit					
AC capacity					
Utilization category AC-1 **Switching resistive loads**					
Rated operational currents I_e		at 40 °C up to 1000 V	A	610	
		at 60 °C up to 1000 V	A	550	
Rated power for AC loads[1] P.f. = 0.95 (at 60 °C)		at 230 V	kW	208	
		400 V	kW	362	
		500 V	kW	452	
		690 V	kW	624	
		1000 V	kW	905	
Minimum conductor cross-section for loads with I_e		at 40 °C	mm^2	2 x 185	
		at 60 °C	mm^2	2 x 185	
Utilization category AC-2 and AC-3					
Rated operational currents I_e		up to 1000 V	A	400	500
Rated power for slipring or squirrel-cage motors at 50 and 60 Hz		at 230 V	kW	132	164
		400 V	kW	231	291
		500 V	kW	291	363
		690 V	kW	400	507
		1000 V	kW	578	728
Thermal load capacity		10 s current[2]	A	3200	4000
Power loss per conducting path		at I_e/AC-3	W	21	32

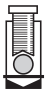
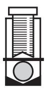
1) Industrial furnaces and electric heaters with resistance heating, etc. increased power consumption on heating up taken into account).

2) According to IEC 60947-4-1.
For rated values for various start-up conditions see Protection Equipment: Overload Relays.

3RT12 vacuum contactors, 3-pole, 110 ... 250 kW

Contactor	Type Size		3RT12 75 S12	3RT12 76 S12
Main circuit				
AC capacity				
Utilization category AC-4 (at $I_a = 6 \times I_e$)				
Rated operational current I_e	up to 690 V	A	350	430
Rated power for squirrel-cage motors with 50 Hz and 60 Hz	at 400 V	kW	200	250
• The following applies to a contact endurance of about 200000 operating cycles:				
Rated operational currents I_e	690 V 1000 V	A A	175 123	215 151
Rated power for squirrel-cage motors with 50 Hz and 60 Hz	at 230 V 400 V 500 V 690 V 1000 V	kW kW kW kW kW	56 98 124 172 183	70 122 153 212 217
Utilization category AC-6a **Switching AC transformers**				
Rated operational current I_e				
• For inrush current n = 20 • For inrush current n = 30	up to 690 V up to 690 V	A A	419 279	
Rated power P				
• For inrush current n = 20	at 230 V 400 V 500 V 690 V 1000 V	kVA kVA kVA kVA kVA	167 290 363 501 726	
• For inrush current n = 30	at 230 V 400 V 500 V 690 V 1000 V	kVA kVA kVA kVA kVA	111 193 241 332 482	
For deviating inrush current factors x, the power must be recalculated as follows: $P_x = P_{n\,30} \cdot 30/x$				
Utilization category AC-6b **Switching low-inductance (low-loss, metallized dielectric) AC capacitors** Ambient temperature 40 °C				
Rated operational currents I_e	up to 500 V	A	407	
Rated power for single capacitors or banks of capacitors (minimum inductance of 6 µH between capacitors connected in parallel) at 50 Hz, 60 Hz and	at 230 V 400 V 500 V 690 V	kvar kvar kvar kvar	162 282 352 282	
Switching frequency				
Switching frequency *z* in operating cycles/hour				
Contactors without overload relays	No-load switching frequency	h^{-1}	2000	
Dependence of the switching frequency z' on the operational current I' and operational voltage U': $z' = z \cdot (I_e/I') \cdot (400\ V/U')^{1.5} \cdot 1/h$	AC-1 AC-2 AC-3 AC-4	h^{-1} h^{-1} h^{-1} h^{-1}	700 250 750 250	
Contactors with overload relays (mean value)		h^{-1}	60	

3RT12 vacuum contactors, 3-pole, 110 ... 250 kW

Contactor	Type Size		3RT12 7. S12
Conductor cross-sections			
Screw terminals	**Main conductors:** with 3RT19 66-4G box terminal		
Front clamping point connected  	• Finely stranded with end sleeve • Finely stranded without end sleeve • Stranded • AWG conductors, solid or stranded • Ribbon cable conductors (number x width x circumference)	mm^2 mm^2 mm^2 AWG mm	70 ... 240 70 ... 240 95 ... 300 3/0 ... 600 kcmil Min. 6 x 9 x 0.8, max. 20 x 24 x 0.5
Rear clamping point connected  	• Finely stranded with end sleeve • Finely stranded without end sleeve • Stranded • AWG conductors, solid or stranded • Ribbon cable conductors (number x width x circumference)	mm^2 mm^2 mm^2 AWG mm	120 ... 185 120 ... 185 120 ... 240 250 ... 500 kcmil Min. 6 x 9 x 0.8, max. 20 x 24 x 0.5
Both clamping points connected  	• Finely stranded with end sleeve • Finely stranded without end sleeve • Stranded • AWG conductors, solid or stranded • Ribbon cable conductors (number x width x circumference)	mm^2 mm^2 mm^2 AWG mm	Min. 2 x 50, max. 2 x 185 Min. 2 x 50, max. 2 x 185 Min. 2 x 70, max. 2 x 240 Min. 2 x 2/0, max. 2 x 500 kcmil Max. 2 x (20 x 24 x 0.5)
	• Terminal screws - Tightening torque	 Nm	M12 (hexagon socket, A/F 5) 20 ... 22 (180 ... 195 lb.in)
	Main conductors: without box terminal/rail connection		
	• Finely stranded with cable lug[1] • Stranded with cable lug[1] • AWG conductors, solid or stranded • Connecting bar (max. width)	mm^2 mm^2 AWG mm	50 ... 240 70 ... 240 2/0 ... 500 kcmil 25
	• Terminal screws - Tightening torque	 Nm	M10 x 30 (hexagon socket, A/F 17) 14 ... 24 (124 ... 240 lb.in)
Screw terminals	**Auxiliary conductors:**		
	• Solid	mm^2	2 x (0.5 ... 1.5)[2]; 2 x (0.75 ... 2.5)[2] according to IEC 60947; max. 2 x (0.75 ... 4)
	• Finely stranded with end sleeve • AWG conductors, solid or stranded	mm^2 AWG	2 x (0.5 ... 1.5)[2]; 2 x (0.75 ... 2.5)[2] 2 x (18 ... 14)
	• Terminal screws - Tightening torque	 Nm	M3 (PZ 2) 0.8 ... 1.2 (7 ... 10.3 lb.in)

1) When connecting cable lugs to 46234, the 3RT19 66-4EA1 terminal cover must be used for conductor cross-sections of 240 mm^2 and more as well as DIN 46235 for conductor cross-sections of 185 mm^2 and more to keep the phase clearance.

2) If two different conductor cross-sections are connected at one clamping point, then the two cross-sections must lie within the range quoted. If identical cross-sections are used, this restriction does not apply.

Contactor	Type Size			3RT12 64 S10	3RT12 65 S10	3RT12 66 S10	3RT12 75 S12	3RT12 76 S12
CSA and UL rated data								
Rated insulation voltage			V AC	600			600	
Uninterrupted current, at 40 °C	Open and enclosed		A	330			540	
Maximum horsepower ratings (CSA and UL approved values)								
Rated power for induction motors with 60 Hz		at 200 V 230 V 460 V 575 V	hp hp hp hp	60 75 150 200	75 100 200 250	100 125 250 300	125 150 300 400	150 200 400 500
Short-circuit protection	 CLASS L fuse Circuit breakers according to UL 489		kA A A	10 700 500	18 800 700	18 800 900	18 1200 1000	30 1200 1200
NEMA/EEMAC ratings	NEMA/EEMAC size		hp	--	--	5	--	6
Uninterrupted current	Open Enclosed		A A	-- --	-- --	300 270	-- --	600 540
Rated power for induction motors with 60 Hz		at 200 V 230 V 460 V 575 V	hp hp hp hp	-- -- -- --	-- -- -- --	75 100 200 200	-- -- -- --	150 200 400 400
Overload relays	Type			3RB20 66			3RB20 66	