## SIEMENS

## Data sheet

## 3RT2016-1AK21



power contactor, AC-3e/AC-3, 9 A, 4 kW / 400 V, 3-pole, 120 V AC, 50/60 Hz, auxiliary contacts: 1 NO, screw terminal, size: S00

product brand name	SIRIUS
product designation	Power contactor
product type designation	3RT2
General technical data	
size of contactor	S00
product extension	
<ul> <li>function module for communication</li> </ul>	No
auxiliary switch	Yes
power loss [W] for rated value of the current	
<ul> <li>at AC in hot operating state</li> </ul>	0.9 W
<ul> <li>at AC in hot operating state per pole</li> </ul>	0.3 W
<ul> <li>without load current share typical</li> </ul>	1.1 W
type of calculation of power loss depending on pole	quadratic
insulation voltage	
<ul> <li>of main circuit with degree of pollution 3 rated value</li> </ul>	690 V
<ul> <li>of auxiliary circuit with degree of pollution 3 rated value</li> </ul>	690 V
surge voltage resistance	
<ul> <li>of main circuit rated value</li> </ul>	6 kV
<ul> <li>of auxiliary circuit rated value</li> </ul>	6 kV
maximum permissible voltage for protective separation between coil and main contacts according to EN 60947-1	400 V
shock resistance at rectangular impulse	
• at AC	6,7g / 5 ms, 4,2g / 10 ms
shock resistance with sine pulse	
• at AC	10,5g / 5 ms, 6,6g / 10 ms
mechanical service life (operating cycles)	
<ul> <li>of contactor typical</li> </ul>	30 000 000
<ul> <li>of the contactor with added electronically optimized auxiliary switch block typical</li> </ul>	5 000 000
<ul> <li>of the contactor with added auxiliary switch block typical</li> </ul>	10 000 000
reference code according to IEC 81346-2	Q
Substance Prohibitance (Date)	10/01/2009
Weight	0.233 kg
Ambient conditions	
installation altitude at height above sea level maximum	2 000 m
ambient temperature	
during operation	-25 +60 °C
during storage	-55 +80 °C
relative humidity minimum	10 %
relative humidity at 55 °C according to IEC 60068-2-30 maximum	95 %

Environmental footprint	
Environmental Product Declaration(EPD)	Yes
global warming potential [CO2 eq] total	39.6 kg
global warming potential [CO2 eq] during manufacturing	1.18 kg
global warming potential [CO2 eq] during operation	38.5 kg
global warming potential [CO2 eq] after end of life	-0.155 kg
Main circuit	
number of poles for main current circuit	3
number of NO contacts for main contacts	3
operating voltage	
<ul> <li>at AC-3 rated value maximum</li> </ul>	690 V
<ul> <li>at AC-3e rated value maximum</li> </ul>	690 V
operational current	
<ul> <li>at AC-1 at 400 V at ambient temperature 40 °C rated value</li> <li>at AC-1</li> </ul>	22 A
up to 690 V at ambient temperature 40 °C rated value	22 A
— up to 690 V at ambient temperature 60 °C rated value	20 A
• at AC-3	
— at 400 V rated value	9 A
— at 500 V rated value	7.7 A
— at 690 V rated value	6.7 A
• at AC-3e	
— at 400 V rated value	9 A
— at 500 V rated value	7.7 A
- at 690 V rated value	6.7 A
<ul> <li>at AC-4 at 400 V rated value</li> <li>at AC 5a up to 690 V rated value</li> </ul>	8.5 A 19.4 A
<ul> <li>at AC-5a up to 690 V rated value</li> <li>at AC-5b up to 400 V rated value</li> </ul>	19.4 A 7.4 A
<ul> <li>at AC-6a</li> </ul>	
<ul> <li>up to 230 V for current peak value n=20 rated value</li> </ul>	5.3 A
— up to 400 V for current peak value n=20 rated value	5.3 A
— up to 500 V for current peak value n=20 rated value	5.3 A
— up to 690 V for current peak value n=20 rated value	5 A
● at AC-6a	
— up to 230 V for current peak value n=30 rated value	3.5 A
— up to 400 V for current peak value n=30 rated value	3.5 A
— up to 500 V for current peak value n=30 rated value	3.6 A
— up to 690 V for current peak value n=30 rated value	3.3 A
minimum cross-section in main circuit at maximum AC-1 rated value	4 mm <sup>2</sup>
operational current for approx. 200000 operating cycles at AC-4	4.1.0
<ul> <li>at 400 V rated value</li> <li>at 690 V rated value</li> </ul>	4.1 A 3.3 A
operational current	
• at 1 current path at DC-1	
- at 24 V rated value	20 A
— at 60 V rated value	20 A
— at 110 V rated value	2.1 A
— at 220 V rated value	0.8 A
— at 440 V rated value	0.6 A
— at 600 V rated value	0.6 A
<ul> <li>with 2 current paths in series at DC-1</li> </ul>	
— at 24 V rated value	20 A
— at 60 V rated value	20 A
— at 110 V rated value	12 A
— at 220 V rated value	1.6 A
— at 440 V rated value	0.8 A
— at 600 V rated value	0.7 A

with 2 surrant action in carias at DC 4	
with 3 current paths in series at DC-1     — at 24 V rated value	20 A
— at 60 V rated value	20 A 20 A
	20 A 20 A
— at 110 V rated value	
— at 220 V rated value	20 A
— at 440 V rated value	1.3 A
— at 600 V rated value	1 A
at 1 current path at DC-3 at DC-5	20 A
— at 24 V rated value	20 A
— at 60 V rated value — at 110 V rated value	0.5 A
	0.15 A
with 2 current paths in series at DC-3 at DC-5     at 24 V reted value	20 A
— at 24 V rated value	5 A
— at 60 V rated value	
— at 110 V rated value	0.35 A
with 3 current paths in series at DC-3 at DC-5     at 24 V reted value	20 A
— at 24 V rated value	20 A 20 A
— at 60 V rated value	
— at 110 V rated value	20 A 1.5 A
— at 220 V rated value	1.5 A 0.2 A
— at 440 V rated value	
- at 600 V rated value	0.2 A
• at AC-2 at 400 V rated value	4 kW
• at AC-3	4 KVV
<ul> <li>at AC-3</li> <li>— at 230 V rated value</li> </ul>	2.2 kW
— at 400 V rated value	4 kW
— at 500 V rated value	4 KW
— at 690 V rated value	5.5 kW
• at AC-3e	5.5 KVV
- at 230 V rated value	2.2 kW
— at 400 V rated value	4 kW
— at 500 V rated value	4 kW
— at 600 V rated value	5.5 kW
operating power for approx. 200000 operating cycles at AC-	0.0 KW
4	
• at 400 V rated value	2 kW
• at 690 V rated value	2.5 kW
operating apparent power at AC-6a	
<ul> <li>up to 230 V for current peak value n=20 rated value</li> </ul>	2 kVA
<ul> <li>up to 400 V for current peak value n=20 rated value</li> </ul>	3.6 kVA
<ul> <li>up to 500 V for current peak value n=20 rated value</li> </ul>	4.6 kVA
<ul> <li>up to 690 V for current peak value n=20 rated value</li> </ul>	5.9 kVA
operating apparent power at AC-6a	
<ul> <li>up to 230 V for current peak value n=30 rated value</li> </ul>	1.3 kVA
<ul> <li>up to 400 V for current peak value n=30 rated value</li> </ul>	2.4 kVA
<ul> <li>up to 500 V for current peak value n=30 rated value</li> </ul>	3.1 kVA
<ul> <li>up to 690 V for current peak value n=30 rated value</li> </ul>	4 kVA
short-time withstand current in cold operating state up to 40 °C	
Imited to 1 s switching at zero current maximum	155 A; Use minimum cross-section acc. to AC-1 rated value
Imited to 5 s switching at zero current maximum	111 A; Use minimum cross-section acc. to AC-1 rated value
Imited to 10 s switching at zero current maximum	86 A; Use minimum cross-section acc. to AC-1 rated value
Imited to 30 s switching at zero current maximum	66 A; Use minimum cross-section acc. to AC-1 rated value
Imited to 60 s switching at zero current maximum	55 A; Use minimum cross-section acc. to AC-1 rated value
no-load switching frequency	40.000 4/5
• at AC	10 000 1/h
operating frequency	1,000,1/b
• at AC-1 maximum	1 000 1/h
• at AC-2 maximum	750 1/h 750 1/h
• at AC-3 maximum	750 1/h

	750.4%
• at AC-3e maximum	750 1/h
• at AC-4 maximum	250 1/h
Control circuit/ Control	
type of voltage of the control supply voltage	AC
control supply voltage at AC	
• at 50 Hz rated value	120 V
• at 60 Hz rated value	120 V
operating range factor control supply voltage rated value of magnet coil at AC	
• at 50 Hz	0.8 1.1
• at 60 Hz	0.85 1.1
apparent pick-up power of magnet coil at AC	
• at 50 Hz	27 VA
• at 60 Hz	24.3 VA
inductive power factor with closing power of the coil	
at 50 Hz	0.8
• at 50 Hz	0.75
apparent holding power of magnet coil at AC	
apparent holding power of magnet con at AC     • at 50 Hz	4.2 VA
• at 50 Hz	4.2 VA 3.3 VA
	0.0 YA
inductive power factor with the holding power of the coil	0.25
• at 50 Hz	0.25
• at 60 Hz	0.25
closing delay	0.05
• at AC	9 35 ms
opening delay	
• at AC	4 15 ms
arcing time	10 15 ms
control version of the switch operating mechanism	Standard A1 - A2
Auxiliary circuit	
number of NO contacts for auxiliary contacts instantaneous contact	1
operational current at AC-12 maximum	10 A
operational current at AC-15	
	10.4
<ul> <li>at 230 V rated value</li> </ul>	10 A
<ul> <li>at 230 V rated value</li> <li>at 400 V rated value</li> </ul>	10 A 3 A
• at 400 V rated value	3 A
<ul><li>at 400 V rated value</li><li>at 500 V rated value</li></ul>	3 A 2 A
<ul> <li>at 400 V rated value</li> <li>at 500 V rated value</li> <li>at 690 V rated value</li> </ul>	3 A 2 A
<ul> <li>at 400 V rated value</li> <li>at 500 V rated value</li> <li>at 690 V rated value</li> </ul> operational current at DC-12	3 A 2 A 1 A
<ul> <li>at 400 V rated value</li> <li>at 500 V rated value</li> <li>at 690 V rated value</li> </ul> <b>operational current at DC-12</b> <ul> <li>at 24 V rated value</li> </ul>	3 A 2 A 1 A 10 A
<ul> <li>at 400 V rated value</li> <li>at 500 V rated value</li> <li>at 690 V rated value</li> </ul> <b>operational current at DC-12</b> <ul> <li>at 24 V rated value</li> <li>at 48 V rated value</li> </ul>	3 A 2 A 1 A 10 A 6 A
<ul> <li>at 400 V rated value</li> <li>at 500 V rated value</li> <li>at 690 V rated value</li> </ul> <b>operational current at DC-12</b> <ul> <li>at 24 V rated value</li> <li>at 48 V rated value</li> <li>at 60 V rated value</li> </ul>	3 A 2 A 1 A 10 A 6 A 6 A
<ul> <li>at 400 V rated value</li> <li>at 500 V rated value</li> <li>at 690 V rated value</li> </ul> <b>operational current at DC-12</b> <ul> <li>at 24 V rated value</li> <li>at 48 V rated value</li> <li>at 60 V rated value</li> <li>at 60 V rated value</li> <li>at 110 V rated value</li> </ul>	3 A 2 A 1 A 10 A 6 A 6 A 3 A
<ul> <li>at 400 V rated value</li> <li>at 500 V rated value</li> <li>at 690 V rated value</li> </ul> <b>operational current at DC-12</b> <ul> <li>at 24 V rated value</li> <li>at 48 V rated value</li> <li>at 60 V rated value</li> <li>at 110 V rated value</li> <li>at 125 V rated value</li> </ul>	3 A 2 A 1 A 10 A 6 A 6 A 3 A 2 A
<ul> <li>at 400 V rated value</li> <li>at 500 V rated value</li> <li>at 690 V rated value</li> </ul> operational current at DC-12 <ul> <li>at 24 V rated value</li> <li>at 48 V rated value</li> <li>at 60 V rated value</li> <li>at 110 V rated value</li> <li>at 125 V rated value</li> <li>at 220 V rated value</li> <li>at 600 V rated value</li> <li>at 600 V rated value</li> </ul>	3 A 2 A 1 A 10 A 6 A 6 A 3 A 2 A 1 A
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<ul> <li>at 400 V rated value</li> <li>at 500 V rated value</li> <li>at 690 V rated value</li> <li>operational current at DC-12 <ul> <li>at 24 V rated value</li> <li>at 48 V rated value</li> <li>at 60 V rated value</li> <li>at 110 V rated value</li> <li>at 125 V rated value</li> <li>at 220 V rated value</li> <li>at 600 V rated value</li> <li>at 600 V rated value</li> <li>at 24 V rated value</li> <li>at 24 V rated value</li> <li>at 600 V rated value</li> <li>at 25 V rated value</li> <li>at 20 V rated value</li> <li>at 10 V rated value</li> <li>at 125 V rated value</li> <li>at 600 V rated value</li> <li>at 125 V rated value</li> <li>at 125 V rated value</li> <li>at 125 V rated value</li> <li>at 600 V rated value</li> <li>at 600 V rated value</li> <li>at 600 V rated value</li> </ul> </li> </ul>	3 A 2 A 1 A 10 A 6 A 6 A 3 A 2 A 2 A 1 A 0.15 A 10 A 2 A 2 A 2 A 1 A 0.9 A 0.3 A 0.1 A 1 faulty switching per 100 million (17 V, 1 mA)
<ul> <li>at 400 V rated value</li> <li>at 500 V rated value</li> <li>at 690 V rated value</li> <li>operational current at DC-12 <ul> <li>at 24 V rated value</li> <li>at 48 V rated value</li> <li>at 60 V rated value</li> <li>at 110 V rated value</li> <li>at 125 V rated value</li> <li>at 220 V rated value</li> <li>at 600 V rated value</li> </ul> </li> <li>operational current at DC-13 <ul> <li>at 24 V rated value</li> <li>at 60 V rated value</li> <li>at 600 V rated value</li> </ul> </li> <li>operational current at DC-13 <ul> <li>at 24 V rated value</li> <li>at 60 V rated value</li> <li>at 125 V rated value</li> <li>at 220 V rated value</li> <li>at 220 V rated value</li> <li>at 480 V rated value</li> <li>at 480 V rated value</li> </ul> </li> </ul>	3 A 2 A 1 A 10 A 6 A 6 A 6 A 3 A 2 A 2 A 1 A 0.15 A 10 A 2 A 2 A 2 A 1 A 0.9 A 0.3 A 0.1 A 1 faulty switching per 100 million (17 V, 1 mA) 7.6 A
<ul> <li>at 400 V rated value</li> <li>at 500 V rated value</li> <li>at 690 V rated value</li> <li>operational current at DC-12 <ul> <li>at 24 V rated value</li> <li>at 48 V rated value</li> <li>at 60 V rated value</li> <li>at 110 V rated value</li> <li>at 125 V rated value</li> <li>at 220 V rated value</li> <li>at 600 V rated value</li> </ul> </li> <li>operational current at DC-13 <ul> <li>at 24 V rated value</li> <li>at 60 V rated value</li> <li>at 24 V rated value</li> <li>at 600 V rated value</li> </ul> </li> <li>operational current at DC-13 <ul> <li>at 24 V rated value</li> <li>at 60 V rated value</li> <li>at 110 V rated value</li> <li>at 125 V rated value</li> <li>at 125 V rated value</li> <li>at 60 V rated value</li> <li>at 125 V rated value</li> <li>at 120 V rated value</li> <li>at 125 V rated value</li> <li>at 125 V rated value</li> <li>at 120 V rated value</li> <li>at 120 V rated value</li> <li>at 480 V rated value</li> <li>at 480 V rated value</li> <li>at 480 V rated value</li> <li>at 600 V rated value</li> <li>at 600 V rated value</li> </ul> </li> </ul>	3 A 2 A 1 A 10 A 6 A 6 A 3 A 2 A 2 A 1 A 0.15 A 10 A 2 A 2 A 1 A 0.15 A 10 A 2 A 2 A 1 A 0.15 A 10 A 2 A 2 A 1 A 0.15 A
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at 110/120 V rated value	0.00 hz
— at 110/120 V rated value	0.33 hp
— at 230 V rated value	1 hp
• for 3-phase AC motor	
— at 200/208 V rated value	2 hp
— at 220/230 V rated value	3 hp
— at 460/480 V rated value	5 hp
— at 575/600 V rated value	7.5 hp
contact rating of auxiliary contacts according to UL	A600 / Q600
Short-circuit protection	
design of the miniature circuit breaker for short-circuit protection of the auxiliary circuit up to 230 V	C characteristic: 10 A; 0.4 kA
design of the fuse link	
<ul> <li>for short-circuit protection of the main circuit</li> </ul>	
<ul> <li>— with type of coordination 1 required</li> </ul>	gG: 35A (690V,100kA), aM: 20A (690V,100kA), BS88: 35A (415V,80kA)
<ul> <li>— with type of assignment 2 required</li> </ul>	gG: 20A (690V,100kA), aM: 16A (690V, 100kA), BS88: 20A (415V, 80kA)
<ul> <li>for short-circuit protection of the auxiliary switch required</li> </ul>	gG: 10 A (500 V, 1 kA)
Installation/ mounting/ dimensions	
mounting position	+/-180° rotation possible on vertical mounting surface; can be tilted forward and backward by +/- 22.5° on vertical mounting surface
fastening method side-by-side mounting	Yes
fastening method	screw and snap-on mounting onto 35 mm DIN rail according to DIN EN 60715
height	58 mm
width	45 mm
depth	73 mm
required spacing	
<ul> <li>with side-by-side mounting</li> </ul>	
— forwards	10 mm
— upwards	10 mm
— downwards	10 mm
— at the side	0 mm
<ul> <li>for grounded parts</li> </ul>	
— forwards	10 mm
— upwards	10 mm
— at the side	6 mm
— downwards	10 mm
• for live parts	
— forwards	10 mm
— upwards	10 mm
— downwards	10 mm
— at the side	6 mm
Connections/ Terminals	
type of electrical connection	
for main current circuit	screw-type terminals
<ul> <li>for auxiliary and control circuit</li> </ul>	screw-type terminals
<ul> <li>at contactor for auxiliary contacts</li> </ul>	Screw-type terminals
• of magnet coil	Screw-type terminals
type of connectable conductor cross-sections	
for main contacts	
— solid	2x (0.5 1.5 mm²), 2x (0.75 2.5 mm²), 2x 4 mm²
solid or stranded	2x (0,5 1,5 mm²), 2x (0,75 2,5 mm²), 2x 4 mm²
- finely stranded with core end processing	2x (0.5 1.5 mm <sup>2</sup> ), 2x (0.75 2.5 mm <sup>2</sup> )
<ul> <li>for AWG cables for main contacts</li> </ul>	2x (20 16), 2x (18 14), 2x 12
connectable conductor cross-section for main contacts	
• solid	0.5 4 mm²
• stranded	0.5 4 mm <sup>2</sup>
<ul> <li>finely stranded with core end processing</li> </ul>	0.5 2.5 mm <sup>2</sup>
connectable conductor cross-section for auxiliary contacts	
solid or stranded	0.5 4 mm²
finely stranded with core end processing	0.5 4 mm
type of connectable conductor cross-sections	
for auxiliary contacts	
· IOI auxiliary contacts	

— solid or stra	nded		2x (0.5 1.5 mm²), 2x (0.75	2.5 mm²). 2x 4 mm²		
	— finely stranded with core end processing		2x (0.5 1.5 mm <sup>2</sup> ), 2x (0.75 2.5 mm <sup>2</sup> )			
-	or auxiliary contacts	Ŭ	2x (20 16), 2x (18 14), 2x 12			
	d connectable conducto	or cross				
<ul> <li>for main contacts</li> </ul>			20 12			
<ul> <li>for auxiliary containing</li> </ul>	acts		20 12			
Safety related data						
product function						
<ul> <li>mirror contact acc</li> </ul>	cording to IEC 60947-4-1		Yes; with 3RH29			
<ul> <li>positively driven of</li> </ul>	operation according to IEC	C 60947-5-1	No			
<ul> <li>suitable for safety</li> </ul>	/ function		Yes			
suitability for use safety	-related switching OFF		Yes			
service life maximum		20 a				
test wear-related servi	ce life necessary		Yes			
proportion of dangero	us failures					
with low demand	rate according to SN 319	20	40 %			
	I rate according to SN 31		73 %			
-	emand rate according to		1 000 000			
	ow demand rate accord		100 FIT			
31920		3				
ISO 13849						
device type according	to ISO 13849-1		3			
overdimensioning acc	ording to ISO 13849-2 n	ecessary	Yes			
IEC 61508						
safety device type acc Electrical Safety	ording to IEC 61508-2		Туре А			
	the front according to I	EC 60529	IP20			
· ·	e front according to IEC		finger-safe, for vertical conta	ct from the front		
Approvals Certificates	-					
General Product Appr	oval					
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proval ERE Marine / Shipping	EMV ECM RCM	Special Test Ce	vs	Marine / Shipping	<b>BUREAU</b> VERITAS	
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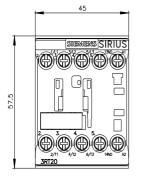
Image database (product images, 2D dimension drawings, 3D models, device circuit diagrams, EPLAN macros, ...) http://www.automation.siemens.com/bilddb/cax\_de.aspx?mlfb=3RT2016-1AK21&lang=en

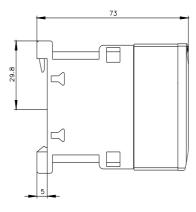
Characteristic: Tripping characteristics, I2t, Let-through current

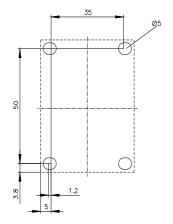
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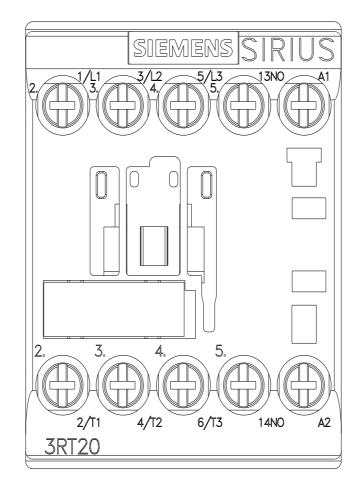
Further characteristics (e.g. electrical endurance, switching frequency)

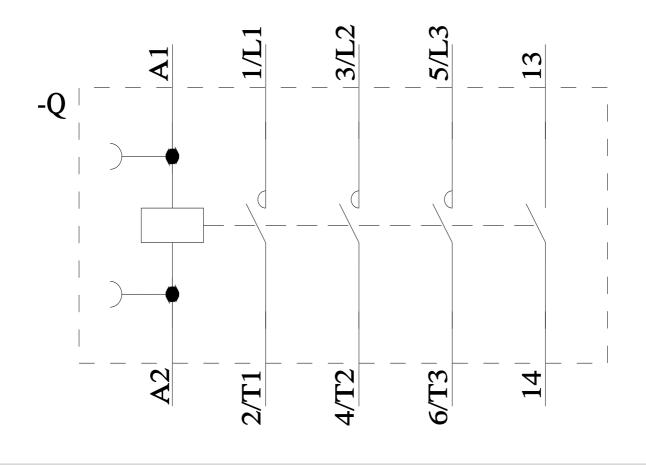
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