SIEMENS

Data sheet 3RT2028-1AP60

power contactor, AC-3e/AC-3, 38 A, 18.5 kW / 400 V, 1 NO + 1 NC, 220 V AC, 50 Hz / 240 V, 60 Hz, 3-pole, screw terminal

product brand name	SIRIUS
product designation	Power contactor
product type designation	3RT2
General technical data	
size of contactor	S0
product extension	
● function module for communication	No
● auxiliary switch	Yes
power loss [W] for rated value of the current	
● at AC in hot operating state	9.6 W
● at AC in hot operating state per pole	3.2 W
● without load current share typical	10.5 W
insulation voltage	
● of main circuit with degree of pollution 3 rated value	690 V
● of auxiliary circuit with degree of pollution 3 rated value	690 V
surge voltage resistance	
● of main circuit rated value	6 kV
● of auxiliary circuit rated value	6 kV
maximum permissible voltage for safe isolation between coil and main contacts according to EN 60947-1	400 V
shock resistance at rectangular impulse	
● at AC	8,3g / 5 ms, 5,3g / 10 ms
shock resistance with sine pulse	
● at AC	13,5g / 5 ms, 8,3g / 10 ms
mechanical service life (operating cycles)	
● of contactor typical	10 000 000
● of the contactor with added electronically optimized auxiliary switch block typical	5 000 000
● of the contactor with added auxiliary switch block typical	10 000 000
reference code according to IEC 81346-2	Q
Substance Prohibitance (Date)	10/01/2009
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 %
Main circuit	

number of poles for main current circuit	3
number of NO contacts for main contacts	3
operating voltage	
● at AC-3 rated value maximum	690 V
● at AC-3e rated value maximum	690 V
operational current	
● at AC-1 at 400 V at ambient temperature 40 °C rated value	50 A
● at AC-1	
— up to 690 V at ambient temperature 40 °C rated value	50 A
— up to 690 V at ambient temperature 60 °C rated value	42 A
● at AC-3	
— at 400 V rated value	38 A
— at 500 V rated value	32 A
— at 690 V rated value	21 A
● at AC-3e	
— at 400 V rated value	38 A
— at 500 V rated value	32 A
— at 690 V rated value	21 A
● at AC-4 at 400 V rated value	22 A
● at AC-5a up to 690 V rated value	44 A
● at AC-5b up to 400 V rated value	31.5 A
● at AC-6a	
— up to 230 V for current peak value n=20 rated value	30.8 A
— up to 400 V for current peak value n=20 rated value	30.8 A
— up to 500 V for current peak value n=20 rated value	30.8 A
— up to 690 V for current peak value n=20 rated value	21 A
● at AC-6a	
— up to 230 V for current peak value n=30 rated value	20.5 A
— up to 400 V for current peak value n=30 rated value	20.5 A
— up to 500 V for current peak value n=30 rated value	21.4 A
— up to 690 V for current peak value n=30 rated value	21 A
minimum cross-section in main circuit at maximum AC-1 rated value	10 mm²
operational current for approx. 200000 operating cycles at AC-4	
● at 400 V rated value	12 A
● at 690 V rated value	12 A
operational current	
● **at 1 current path at DC-1**	
— at 24 V rated value	35 A
— at 110 V rated value	4.5 A
— at 220 V rated value	1 A
— at 440 V rated value	0.4 A
— at 600 V rated value	0.25 A
● **with 2 current paths in series at DC-1**	
— at 24 V rated value	35 A
— at 110 V rated value	35 A
— at 220 V rated value	5 A
— at 440 V rated value	1 A
— at 600 V rated value	0.8 A
● **with 3 current paths in series at DC-1**	
— at 24 V rated value	35 A
— at 110 V rated value	35 A
— at 220 V rated value	35 A
— at 440 V rated value	2.9 A

— at 600 V rated value	1.4 A
● **at 1 current path at DC-3 at DC-5**	
— at 24 V rated value	20 A
— at 220 V rated value	1 A
— at 440 V rated value	0.09 A
— at 600 V rated value	0.06 A
● **with 2 current paths in series at DC-3 at DC-5**	
— at 24 V rated value	35 A
— at 110 V rated value	15 A
— at 220 V rated value	3 A
— at 440 V rated value	0.27 A
— at 600 V rated value	0.16 A
● **with 3 current paths in series at DC-3 at DC-5**	
— at 24 V rated value	35 A
— at 110 V rated value	35 A
— at 220 V rated value	10 A
— at 440 V rated value	0.6 A
— at 600 V rated value	0.6 A
operating power	
● at AC-3	
— at 230 V rated value	11 kW
— at 400 V rated value	18.5 kW
— at 500 V rated value	18.5 kW
— at 690 V rated value	18.5 kW
● at AC-3e	
— at 230 V rated value	11 kW
— at 400 V rated value	18.5 kW
— at 500 V rated value	18.5 kW
— at 690 V rated value	18.5 kW
operating power for approx. 200000 operating cycles at AC-4	
● at 400 V rated value	6 kW
● at 690 V rated value	10.3 kW
operating apparent power at AC-6a	
● up to 230 V for current peak value n=20 rated value	12.2 kVA
● up to 400 V for current peak value n=20 rated value	21.3 kVA
● up to 500 V for current peak value n=20 rated value	26.6 kVA
● up to 690 V for current peak value n=20 rated value	25 kVA
operating apparent power at AC-6a	
● up to 230 V for current peak value n=30 rated value	8.1 kVA
● up to 400 V for current peak value n=30 rated value	14.2 kVA
● up to 500 V for current peak value n=30 rated value	18.5 kVA
● up to 690 V for current peak value n=30 rated value	25 kVA
short-time withstand current in cold operating state up to 40 °C	
● limited to 1 s switching at zero current maximum	593 A; Use minimum cross-section acc. to AC-1 rated value
● limited to 5 s switching at zero current maximum	341 A; Use minimum cross-section acc. to AC-1 rated value
● limited to 10 s switching at zero current maximum	260 A; Use minimum cross-section acc. to AC-1 rated value
● limited to 30 s switching at zero current maximum	199 A; Use minimum cross-section acc. to AC-1 rated value
● limited to 60 s switching at zero current maximum	162 A; Use minimum cross-section acc. to AC-1 rated value
no-load switching frequency	
● at AC	5 000 1/h
operating frequency	
● at AC-1 maximum	1 000 1/h
● at AC-2 maximum	750 1/h
● at AC-3 maximum	750 1/h
● 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	220 V
● at 60 Hz rated value	240 V
operating range factor control supply voltage rated	

value of magnet coil at AC	
● at 50 Hz	0.8 ... 1.1
● at 60 Hz	0.8 ... 1.1
apparent pick-up power of magnet coil at AC	
● at 50 Hz	81 VA
● at 60 Hz	79 VA
inductive power factor with closing power of the coil	
● at 50 Hz	0.72
● at 60 Hz	0.74
apparent holding power of magnet coil at AC	
● at 50 Hz	10.5 VA
● at 60 Hz	8.5 VA
inductive power factor with the holding power of the coil	
● at 50 Hz	0.25
● at 60 Hz	0.28
closing delay	
● at AC	8 ... 40 ms
opening delay	
● at AC	4 ... 16 ms
arcing time	10 ... 10 ms
control version of the switch operating mechanism	Standard A1 - A2
Auxiliary circuit	
number of NC contacts for auxiliary contacts instantaneous contact	1
number of NO contacts for auxiliary contacts instantaneous contact	1
operational current at AC-12 maximum	10 A
operational current at AC-15	
● at 230 V rated value	10 A
● at 400 V rated value	3 A
● at 500 V rated value	2 A
● at 690 V rated value	1 A
operational current at DC-12	
● at 24 V rated value	10 A
● at 48 V rated value	6 A
● at 60 V rated value	6 A
● at 110 V rated value	3 A
● at 125 V rated value	2 A
● at 220 V rated value	1 A
● at 600 V rated value	0.15 A
operational current at DC-13	
● at 24 V rated value	10 A
● at 48 V rated value	2 A
● at 60 V rated value	2 A
● at 110 V rated value	1 A
● at 125 V rated value	0.9 A
● at 220 V rated value	0.3 A
● at 600 V rated value	0.1 A
contact reliability of auxiliary contacts	1 faulty switching per 100 million (17 V, 1 mA)
UL/CSA ratings	
full-load current (FLA) for 3-phase AC motor	
● at 480 V rated value	34 A
● at 600 V rated value	27 A
yielded mechanical performance [hp]	
● for single-phase AC motor	
— at 110/120 V rated value	3 hp
— at 230 V rated value	5 hp
● for 3-phase AC motor	
— at 200/208 V rated value	10 hp
— at 220/230 V rated value	10 hp
— at 460/480 V rated value	25 hp
— at 575/600 V rated value	25 hp
contact rating of auxiliary contacts according to UL	A600 / P600

Short-circuit protection	
design of the fuse link	
● for short-circuit protection of the main circuit	
— with type of coordination 1 required	gG: 125A (690V,100kA), aM: 50A (690V,100kA), BS88: 125A (415V,80kA)
— with type of assignment 2 required	gG: 50A (690V,100kA), aM: 25A (690V, 100kA), BS88: 50A (415V, 80kA)
● for short-circuit protection of the auxiliary switch required	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	screw and snap-on mounting onto 35 mm DIN rail according to DIN EN 60715
● side-by-side mounting	Yes
height	85 mm
width	45 mm
depth	97 mm
required spacing	
● with side-by-side mounting	
— forwards	10 mm
— upwards	10 mm
— downwards	10 mm
— at the side	0 mm
● for grounded parts	
— 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
● for auxiliary and control circuit	screw-type terminals
● at contactor for auxiliary contacts	Screw-type terminals
● of magnet coil	Screw-type terminals
type of connectable conductor cross-sections	
● for main contacts	
— solid	2x (1 ... 2.5 mm²), 2x (2.5 ... 10 mm²)
— solid or stranded	2x (1 ... 2.5 mm²), 2x (2.5 ... 10 mm²)
— finely stranded with core end processing	2x (1 ... 2.5 mm²), 2x (2.5 ... 6 mm²), 1x 10 mm²
● at AWG cables for main contacts	2x (16 ... 12), 2x (14 ... 8)
connectable conductor cross-section for main contacts	
● solid	1 ... 10 mm²
● stranded	1 ... 10 mm²
● finely stranded with core end processing	1 ... 10 mm²
connectable conductor cross-section for auxiliary contacts	
● solid or stranded	0.5 ... 2.5 mm²
● finely stranded with core end processing	0.5 ... 2.5 mm²
type of connectable conductor cross-sections	
● for auxiliary contacts	
— solid or stranded	2x (0.5 ... 1.5 mm²), 2x (0.75 ... 2.5 mm²)
— finely stranded with core end processing	2x (0.5 ... 1.5 mm²), 2x (0.75 ... 2.5 mm²)
● at AWG cables for auxiliary contacts	2x (20 ... 16), 2x (18 ... 14)
AWG number as coded connectable conductor cross section	
● for main contacts	16 ... 8
● for auxiliary contacts	20 ... 14

Safety related data

product function	
● mirror contact according to IEC 60947-4-1	Yes
B10 value with high demand rate according to SN 31920	450 000
proportion of dangerous failures	
● with low demand rate according to SN 31920	40 %
● with high demand rate according to SN 31920	73 %
failure rate [FIT] with low demand rate according to SN 31920	100 FIT
T1 value for proof test interval or service life according to IEC 61508	20 y
protection class IP on the front according to IEC 60529	IP20
touch protection on the front according to IEC 60529	finger-safe, for vertical contact from the front
suitability for use	
● safety-related switching OFF	Yes

Certificates/ approvals

General Product Approval

CSA | CCC | Confirmation | UL | KC | EAC

EMC	Functional Safety/Safety of Machinery	Declaration of Conformity		Test Certificates	
RCM	Type Examination Certificate	UKCA	CE EG-Konf.	Type Test Certific-ates/Test Report	Special Test Certific-ate

Marine / Shipping

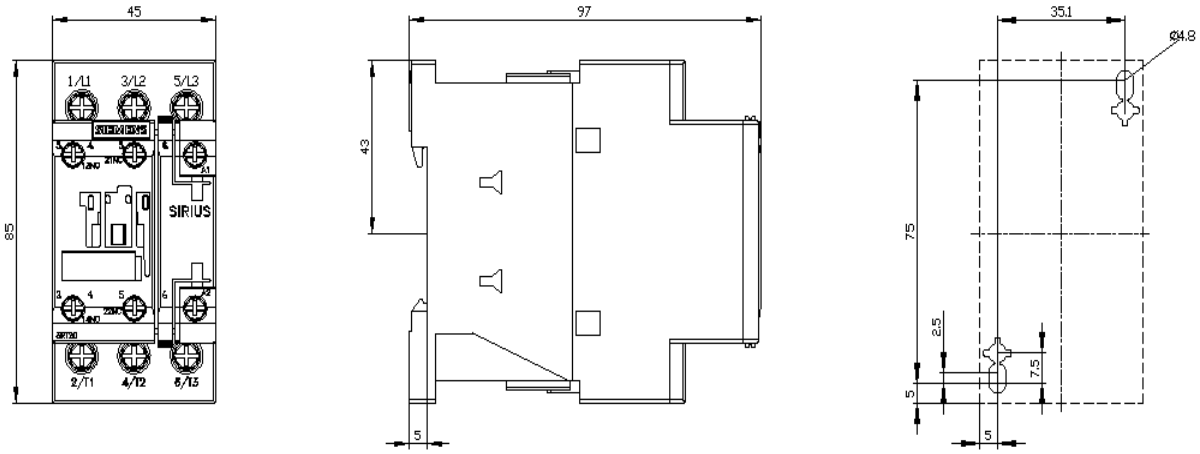
ABS | BUREAU VERITAS | DNV | LRS | RINA | RMRS

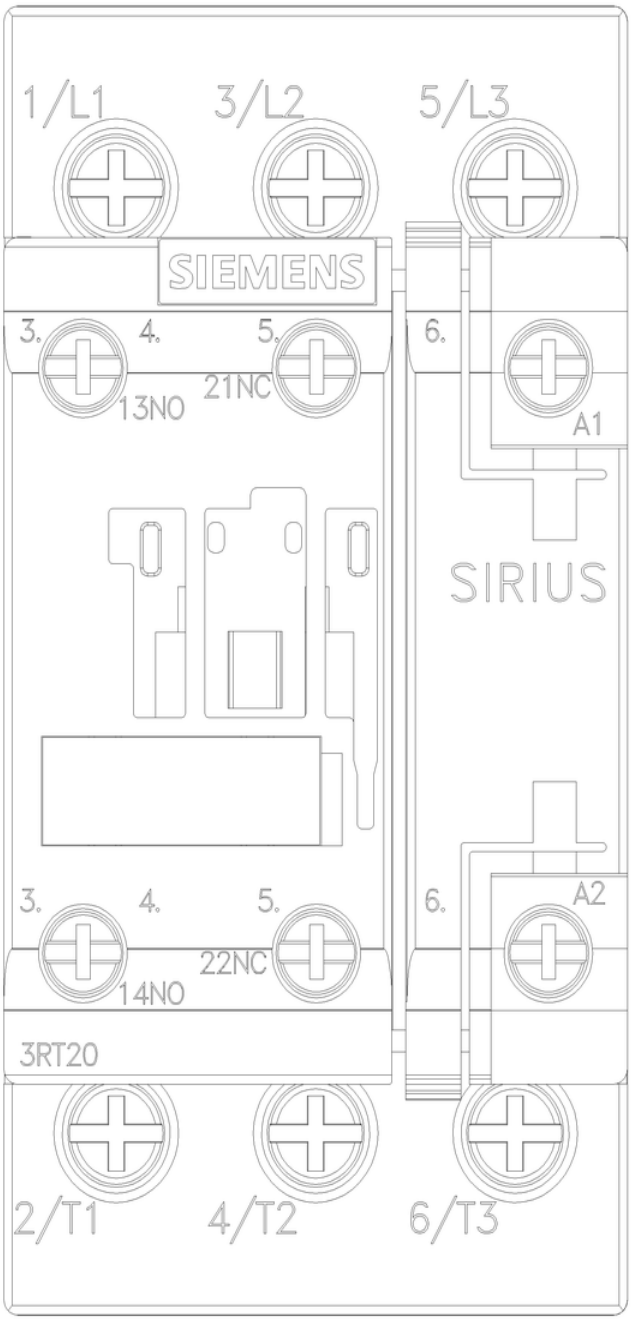
other			Railway
Confirmation	VDE	Confirmation	Vibration and Shock

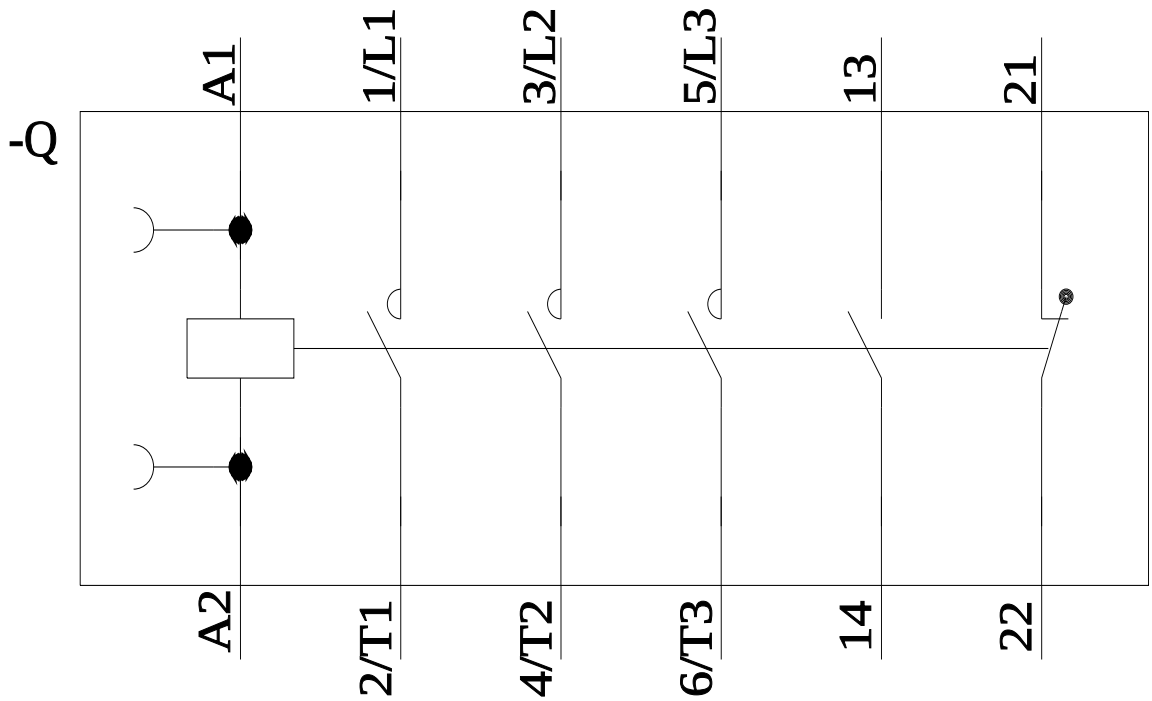
Further information

Information- and Downloadcenter (Catalogs, Brochures,…)
https://www.siemens.com/ic10
Industry Mall (Online ordering system)
https://mall.industry.siemens.com/mall/en/en/Catalog/product?mlfb=3RT2028-1AP60
Cax online generator
http://support.automation.siemens.com/WW/CAXorder/default.aspx?lang=en&mlfb=3RT2028-1AP60
Service&Support (Manuals, Certificates, Characteristics, FAQs,...)
https://support.industry.siemens.com/cs/ww/en/ps/3RT2028-1AP60
Image database (product images, 2D dimension drawings, 3D models, device circuit diagrams, EPLAN macros, ...)
http://www.automation.siemens.com/bilddb/cax_de.aspx?mlfb=3RT2028-1AP60&lang=en
Characteristic: Tripping characteristics, I²t, Let-through current
https://support.industry.siemens.com/cs/ww/en/ps/3RT2028-1AP60/char
Further characteristics (e.g. electrical endurance, switching frequency)

http://www.automation.siemens.com/bilddb/index.aspx?view=Search&mlfb=3RT2028-1AP60&objecttype=14&gridview=view1







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