SIEMENS

## Data sheet 3RT2038-3AL20

Power contactor, AC-3 80 A, 37 kW / 400 V 1 NO + 1 NC, 230 V AC 50/60 Hz, 3-pole Size S2, Spring-type terminals

| | |
|---|---|
| **product brand name** | SIRIUS |
| **product designation** | Power contactor |
| **product type designation** | 3RT2 |
| **General technical data** | |
| **size of contactor** | S2 |
| **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 | 17.1 W |
| ● at AC in hot operating state per pole | 5.7 W |
| ● without load current share typical | 17.2 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 protective separation between coil and main contacts according to EN 60947-1 | 400 V |
| **shock resistance at rectangular impulse** | |
| ● at AC | 11.8g / 5 ms, 7.4g / 10 ms |
| **shock resistance with sine pulse** | |
| ● at AC | 18.5g / 5 ms, 11.6g / 10 ms |
| **mechanical service life (switching 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)** | 10/01/2014 |
| **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 | 90 A |
| ● at AC-1 | |
| — up to 690 V at ambient temperature 40 °C rated value | 90 A |
| — up to 690 V at ambient temperature 60 °C rated value | 80 A |
| ● at AC-3 | |
| — at 400 V rated value | 80 A |
| — at 500 V rated value | 80 A |
| — at 690 V rated value | 58 A |
| ● at AC-3e | |
| — at 400 V rated value | 80 A |
| — at 500 V rated value | 80 A |
| — at 690 V rated value | 58 A |
| ● at AC-4 at 400 V rated value | 55 A |
| ● at AC-5a up to 690 V rated value | 79.2 A |
| ● at AC-5b up to 400 V rated value | 66.4 A |
| ● at AC-6a | |
| — up to 230 V for current peak value n=20 rated value | 70 A |
| — up to 400 V for current peak value n=20 rated value | 70 A |
| — up to 500 V for current peak value n=20 rated value | 70 A |
| — up to 690 V for current peak value n=20 rated value | 58 A |
| ● at AC-6a | |
| — up to 230 V for current peak value n=30 rated value | 46.7 A |
| — up to 400 V for current peak value n=30 rated value | 46.7 A |
| — up to 500 V for current peak value n=30 rated value | 46.7 A |
| — up to 690 V for current peak value n=30 rated value | 46.7 A |
| minimum cross-section in main circuit at maximum AC-1 rated value | 35 mm² |
| **operational current for approx. 200000 operating cycles at AC-4** | |
| ● at 400 V rated value | 30 A |
| ● at 690 V rated value | 24 A |
| **operational current** | |
| ● **at 1 current path at DC-1** | |
| — at 24 V rated value | 55 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 | 55 A |
| — at 110 V rated value | 45 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 | 55 A |
| — at 110 V rated value | 55 A |
| — at 220 V rated value | 45 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 | 35 A |
| — at 220 V rated value | 1 A |
| — at 440 V rated value | 0.1 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 | 55 A |
| — at 110 V rated value | 25 A |
| — at 220 V rated value | 5 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 | 55 A |
| — at 110 V rated value | 55 A |
| — at 220 V rated value | 25 A |
| — at 440 V rated value | 0.6 A |
| — at 600 V rated value | 0.35 A |
| **operating power** | |
| ● at AC-2 at 400 V rated value | 37 kW |
| ● at AC-3 | |
| — at 230 V rated value | 22 kW |
| — at 400 V rated value | 37 kW |
| — at 500 V rated value | 37 kW |
| — at 690 V rated value | 45 kW |
| ● at AC-3e | |
| — at 230 V rated value | 22 kW |
| — at 400 V rated value | 37 kW |
| — at 500 V rated value | 37 kW |
| — at 690 V rated value | 45 kW |
| **operating power for approx. 200000 operating cycles at AC-4** | |
| ● at 400 V rated value | 15.8 kW |
| ● at 690 V rated value | 21.8 kW |
| **operating apparent power at AC-6a** | |
| ● up to 230 V for current peak value n=20 rated value | 27.8 kVA |
| ● up to 400 V for current peak value n=20 rated value | 48.4 kVA |
| ● up to 500 V for current peak value n=20 rated value | 60.6 kVA |
| ● up to 690 V for current peak value n=20 rated value | 69.3 kVA |
| **operating apparent power at AC-6a** | |
| ● up to 230 V for current peak value n=30 rated value | 18.6 kVA |
| ● up to 400 V for current peak value n=30 rated value | 32.3 kVA |
| ● up to 500 V for current peak value n=30 rated value | 40.4 kVA |
| ● up to 690 V for current peak value n=30 rated value | 55.8 kVA |
| **short-time withstand current in cold operating state up to 40 °C** | |
| ● limited to 1 s switching at zero current maximum | 1 298 A; Use minimum cross-section acc. to AC-1 rated value |
| ● limited to 5 s switching at zero current maximum | 898 A; Use minimum cross-section acc. to AC-1 rated value |
| ● limited to 10 s switching at zero current maximum | 640 A; Use minimum cross-section acc. to AC-1 rated value |
| ● limited to 30 s switching at zero current maximum | 414 A; Use minimum cross-section acc. to AC-1 rated value |
| ● limited to 60 s switching at zero current maximum | 333 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 | 700 1/h |
| ● at AC-2 maximum | 350 1/h |
| ● at AC-3 maximum | 500 1/h |

| | |
|---|---|
| ● at AC-3e maximum | 500 1/h |
| ● at AC-4 maximum | 150 1/h |
| **Control circuit/ Control** | |
| **type of voltage of the control supply voltage** | AC |
| **control supply voltage at AC** | |
| ● at 50 Hz rated value | 230 V |
| ● at 60 Hz rated value | 230 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 | 210 VA |
| ● at 60 Hz | 188 VA |
| **inductive power factor with closing power of the coil** | |
| ● at 50 Hz | 0.69 |
| ● at 60 Hz | 0.65 |
| **apparent holding power of magnet coil at AC** | |
| ● at 50 Hz | 17.2 VA |
| ● at 60 Hz | 16.5 VA |
| **inductive power factor with the holding power of the coil** | |
| ● at 50 Hz | 0.36 |
| ● at 60 Hz | 0.39 |
| **closing delay** | |
| ● at AC | 10 ... 80 ms |
| **opening delay** | |
| ● at AC | 10 ... 18 ms |
| **arcing time** | 10 ... 20 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 | 65 A |

| | |
|---|---|
| ● at 600 V rated value | 62 A |
| **yielded mechanical performance [hp]** | |
| ● for single-phase AC motor | |
| — at 110/120 V rated value | 5 hp |
| — at 230 V rated value | 15 hp |
| ● for 3-phase AC motor | |
| — at 200/208 V rated value | 20 hp |
| — at 220/230 V rated value | 25 hp |
| — at 460/480 V rated value | 50 hp |
| — at 575/600 V rated value | 60 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: 250 A (690 V, 100 kA), aM: 160 A (690 V, 100 kA), BS88: 200 A (415 V, 80 kA) |
| — with type of assignment 2 required | gG: 160A (690V,100kA), aM: 80A (690V,100kA), BS88: 125A (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 standard mounting rail according to DIN EN 60715 |
| ● side-by-side mounting | Yes |
| **height** | 114 mm |
| **width** | 55 mm |
| **depth** | 130 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 | spring-loaded terminals |
| ● at contactor for auxiliary contacts | Spring-type terminals |
| ● of magnet coil | Spring-type terminals |
| **type of connectable conductor cross-sections** | |
| ● for main contacts | |
| — solid or stranded | 2x (1 ... 35 mm²), 1x (1 ... 50 mm²) |
| — finely stranded with core end processing | 2x (1 ... 25 mm²), 1x (1 ... 35 mm²) |
| ● at AWG cables for main contacts | 2x (18 ... 2), 1x (18 ... 1) |
| **connectable conductor cross-section for main contacts** | |
| ● finely stranded with core end processing | 1 ... 35 mm² |
| **connectable conductor cross-section for auxiliary contacts** | |

| | |
|---|---|
| • solid or stranded | 0.5 ... 2.5 mm² |
| • finely stranded with core end processing | 0.5 ... 1.5 mm² |
| • finely stranded without core end processing | 0.5 ... 2.5 mm² |
| **type of connectable conductor cross-sections** | |
| • for auxiliary contacts | |
| — solid or stranded | 2x (0.5 ... 2.5 mm²) |
| — finely stranded with core end processing | 2x (0.5 ... 1.5 mm²) |
| — finely stranded without core end processing | 2x (0.5 ... 2.5 mm²) |
| • at AWG cables for auxiliary contacts | 2x (20 ... 14) |
| **AWG number as coded connectable conductor cross section** | |
| • for main contacts | 18 ... 1 |
| • for auxiliary contacts | 20 ... 14 |
| **Safety related data** | |
| **product function** | |
| • mirror contact according to IEC 60947-4-1 | Yes |
| • positively driven operation according to IEC 60947-5-1 | No |
| B10 value with high demand rate according to SN 31920 | 1 000 000 |
| **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** | **EMC**

Confirmation | KC

**Functional Safety/Safety of Machinery** | **Declaration of Conformity** | **Test Certificates** | **Marine / Shipping**

Type Examination Certificate | Special Test Certificate | Type Test Certificates/Test Report

**Marine / Shipping**

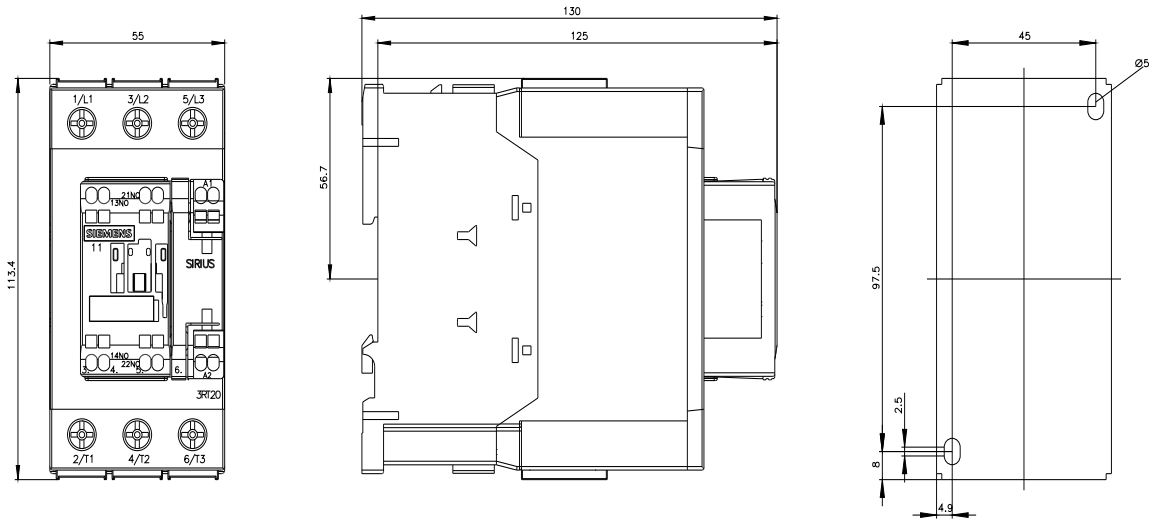
**other** | **Railway** | **Dangerous Good**

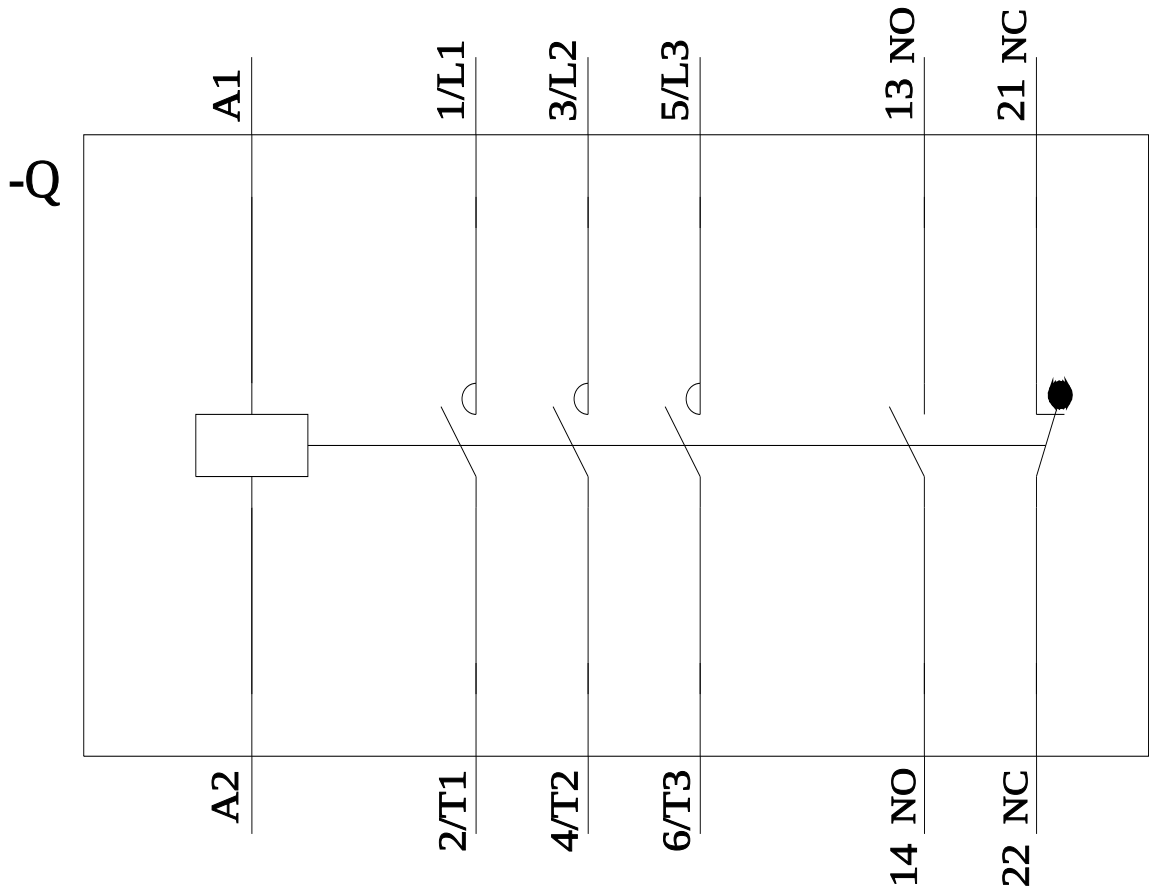
Confirmation | Confirmation | Vibration and Shock | Transport Informa-

tion

## 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=3RT2038-3AL20
**Cax online generator**
http://support.automation.siemens.com/WW/CAXorder/default.aspx?lang=en&mlfb=3RT2038-3AL20
**Service&Support (Manuals, Certificates, Characteristics, FAQs,...)**
https://support.industry.siemens.com/cs/ww/en/ps/3RT2038-3AL20
**Image database (product images, 2D dimension drawings, 3D models, device circuit diagrams, EPLAN macros, ...)**
http://www.automation.siemens.com/bilddb/cax_de.aspx?mlfb=3RT2038-3AL20&lang=en
**Characteristic: Tripping characteristics, I²t, Let-through current**
https://support.industry.siemens.com/cs/ww/en/ps/3RT2038-3AL20/char
**Further characteristics (e.g. electrical endurance, switching frequency)**
http://www.automation.siemens.com/bilddb/index.aspx?view=Search&mlfb=3RT2038-3AL20&objecttype=14&gridview=view1



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