SIEMENS

## Data sheet 3RT2016-1AF02


power contactor, AC-3e/AC-3, 9 A, 4 kW / 400 V, 3-pole, 110 V AC, 50/60 Hz, auxiliary contacts: 1 NC, screw terminal

| | |
|---|---|
| **product brand name** | SIRIUS |
| **product designation** | Power contactor |
| **product type designation** | 3RT2 |
| **General technical data** | |
| **size of contactor** | S00 |
| **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 | 0.9 W |
| ● at AC in hot operating state per pole | 0.3 W |
| ● without load current share typical | 4.2 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 safe isolation 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)** | |
| ● of contactor typical | 30 000 000 |
| ● 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** | |


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| | |
|---|---|
| **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 | 22 A |
| ● at AC-1 | |
| — 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 |
| ● at AC-4 at 400 V rated value | 8.5 A |
| ● at AC-5a up to 690 V rated value | 19.4 A |
| ● at AC-5b up to 400 V rated value | 7.4 A |
| ● at AC-6a | |
| — up to 230 V for current peak value n=20 rated value | 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 mm² |
| **operational current for approx. 200000 operating cycles at AC-4** | |
| ● at 400 V rated value | 4.1 A |
| ● at 690 V rated value | 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 |
| ● **with 2 current paths in series at DC-1** | |
| — 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 3 current paths in series at DC-1** | |
| — at 24 V rated value | 20 A |
| — at 60 V rated value | 20 A |


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| | |
|---|---|
| — at 110 V rated value | 20 A |
| — 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** | |
| — at 24 V rated value | 20 A |
| — at 60 V rated value | 0.5 A |
| — at 110 V rated value | 0.15 A |
| **● with 2 current paths in series at DC-3 at DC-5** | |
| — at 24 V rated value | 20 A |
| — at 60 V rated value | 5 A |
| — at 110 V rated value | 0.35 A |
| **● with 3 current paths in series at DC-3 at DC-5** | |
| — at 24 V rated value | 20 A |
| — at 60 V rated value | 20 A |
| — at 110 V rated value | 20 A |
| — at 220 V rated value | 1.5 A |
| — at 440 V rated value | 0.2 A |
| — at 600 V rated value | 0.2 A |
| **operating power** | |
| ● at AC-3 | |
| — at 230 V rated value | 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 | |
| — at 230 V rated value | 2.2 kW |
| — at 400 V rated value | 4 kW |
| — at 500 V rated value | 4 kW |
| — at 690 V rated value | 5 kW |
| **operating power for approx. 200000 operating cycles at AC-4** | |
| ● at 400 V rated value | 2 kW |
| ● at 690 V rated value | 2.5 kW |
| **operating apparent power at AC-6a** | |
| ● up to 230 V for current peak value n=20 rated value | 2 kVA |
| ● up to 400 V for current peak value n=20 rated value | 3.6 kVA |
| ● up to 500 V for current peak value n=20 rated value | 4.6 kVA |
| ● up to 690 V for current peak value n=20 rated value | 5.9 kVA |
| **operating apparent power at AC-6a** | |
| ● up to 230 V for current peak value n=30 rated value | 1.3 kVA |
| ● up to 400 V for current peak value n=30 rated value | 2.4 kVA |
| ● up to 500 V for current peak value n=30 rated value | 3.1 kVA |
| ● up to 690 V for current peak value n=30 rated value | 4 kVA |
| **short-time withstand current in cold operating state up to 40 °C** | |
| ● limited to 1 s switching at zero current maximum | 155 A; Use minimum cross-section acc. to AC-1 rated value |
| ● limited to 5 s switching at zero current maximum | 111 A; Use minimum cross-section acc. to AC-1 rated value |
| ● limited to 10 s switching at zero current maximum | 86 A; Use minimum cross-section acc. to AC-1 rated value |
| ● limited to 30 s switching at zero current maximum | 66 A; Use minimum cross-section acc. to AC-1 rated value |
| ● limited to 60 s switching at zero current maximum | 55 A; Use minimum cross-section acc. to AC-1 rated value |
| **no-load switching frequency** | |
| ● at AC | 10 000 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 | 110 V |
| ● at 60 Hz rated value | 110 V |


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| **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 60 Hz | 0.75 |
| **apparent holding power of magnet coil at AC** | |
| ● at 50 Hz | 4.2 VA |
| ● at 60 Hz | 3.3 VA |
| **inductive power factor with the holding power of the coil** | |
| ● at 50 Hz | 0.25 |
| ● at 60 Hz | 0.25 |
| **closing delay** | |
| ● 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 NC 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 | 7.6 A |
| ● at 600 V rated value | 9 A |
| **yielded mechanical performance [hp]** | |
| ● for single-phase AC motor | |
| — 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** | |


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| | |
|---|---|
| **design of the fuse link** | |
| ● for short-circuit protection of the main circuit | |
| — with type of coordination 1 required | gG: 35A (690V,100kA), aM: 20A (690V,100kA), BS88: 35A (415V,80kA) |
| — with type of assignment 2 required | gG: 20A (690V,100kA), aM: 16A (690V, 100kA), BS88: 20A (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** | 58 mm |
| **width** | 45 mm |
| **depth** | 73 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 (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 mm²), 2x (0.75 ... 2.5 mm²) |
| **connectable conductor cross-section for main contacts** | |
| ● solid | 0.5 ... 4 mm² |
| ● stranded | 0.5 ... 4 mm² |
| ● finely stranded with core end processing | 0.5 ... 2.5 mm² |
| **connectable conductor cross-section for auxiliary contacts** | |
| ● solid or stranded | 0.5 ... 4 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), 2x 4 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), 2x 12 |
| **AWG number as coded connectable conductor cross section** | |
| ● for main contacts | 20 ... 12 |
| ● for auxiliary contacts | 20 ... 12 |
| **Safety related data** | |
| **product function** | |
| ● mirror contact according to IEC 60947-4-1 | Yes |
| B10 value with high demand rate according to SN 31920 | 1 000 000 |


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| | |
|---|---|
| **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 a |
| **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 | CE EG-Konf. | UKCA | Type Test Certific-ates/Test Report | Special Test Certific-ate |

### Marine / Shipping

| | | | | | |
|---|---|---|---|---|---|
| ABS | BUREAU VERITAS | DNV | LRS | PRS | RINA |

| Marine / Shipping | other | | | Railway |
|---|---|---|---|---|
| RMRS | Confirmation | VDE | Confirmation | Vibration and Shock |

## Further information

**Siemens has decided to exit the Russian market (see here).**
https://press.siemens.com/global/en/pressrelease/siemens-wind-down-russian-business
**Siemens is working on the renewal of the current EAC certificates.**
Please contact your local Siemens office on the status of validity of the EAC certification if you intend to import or offer to supply these products to an EAC relevant market (other than the sanctioned EAEU member states Russia or Belarus).
**Information on the packaging**
https://support.industry.siemens.com/cs/ww/en/view/109813875
**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=3RT2016-1AF02
**Cax online generator**
http://support.automation.siemens.com/WW/CAXorder/default.aspx?lang=en&mlfb=3RT2016-1AF02
**Service&Support (Manuals, Certificates, Characteristics, FAQs,...)**
https://support.industry.siemens.com/cs/ww/en/ps/3RT2016-1AF02
**Image database (product images, 2D dimension drawings, 3D models, device circuit diagrams, EPLAN macros, ...)**
http://www.automation.siemens.com/bilddb/cax_de.aspx?mlfb=3RT2016-1AF02&lang=en
**Characteristic: Tripping characteristics, I²t, Let-through current**


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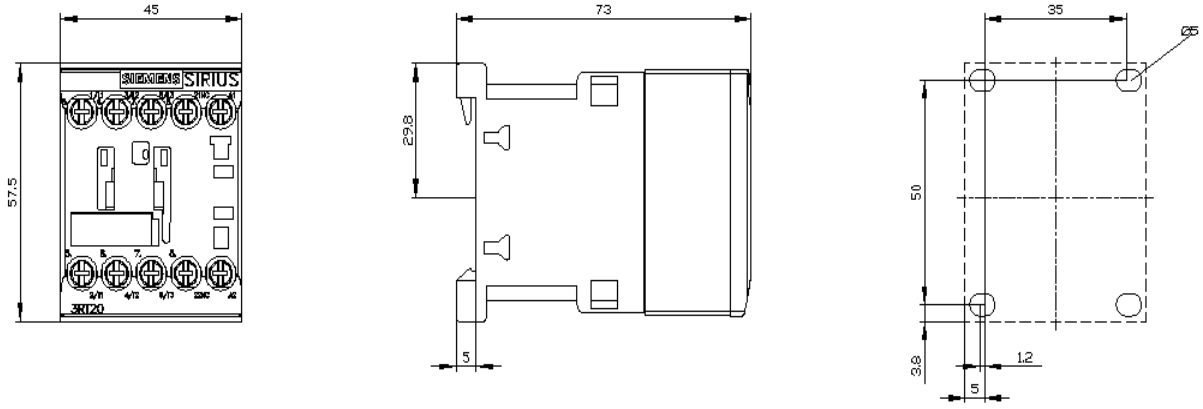
https://support.industry.siemens.com/cs/ww/en/ps/3RT2016-1AF02/char

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

http://www.automation.siemens.com/bilddb/index.aspx?view=Search&mlfb=3RT2016-1AF02&objecttype=14&gridview=view1





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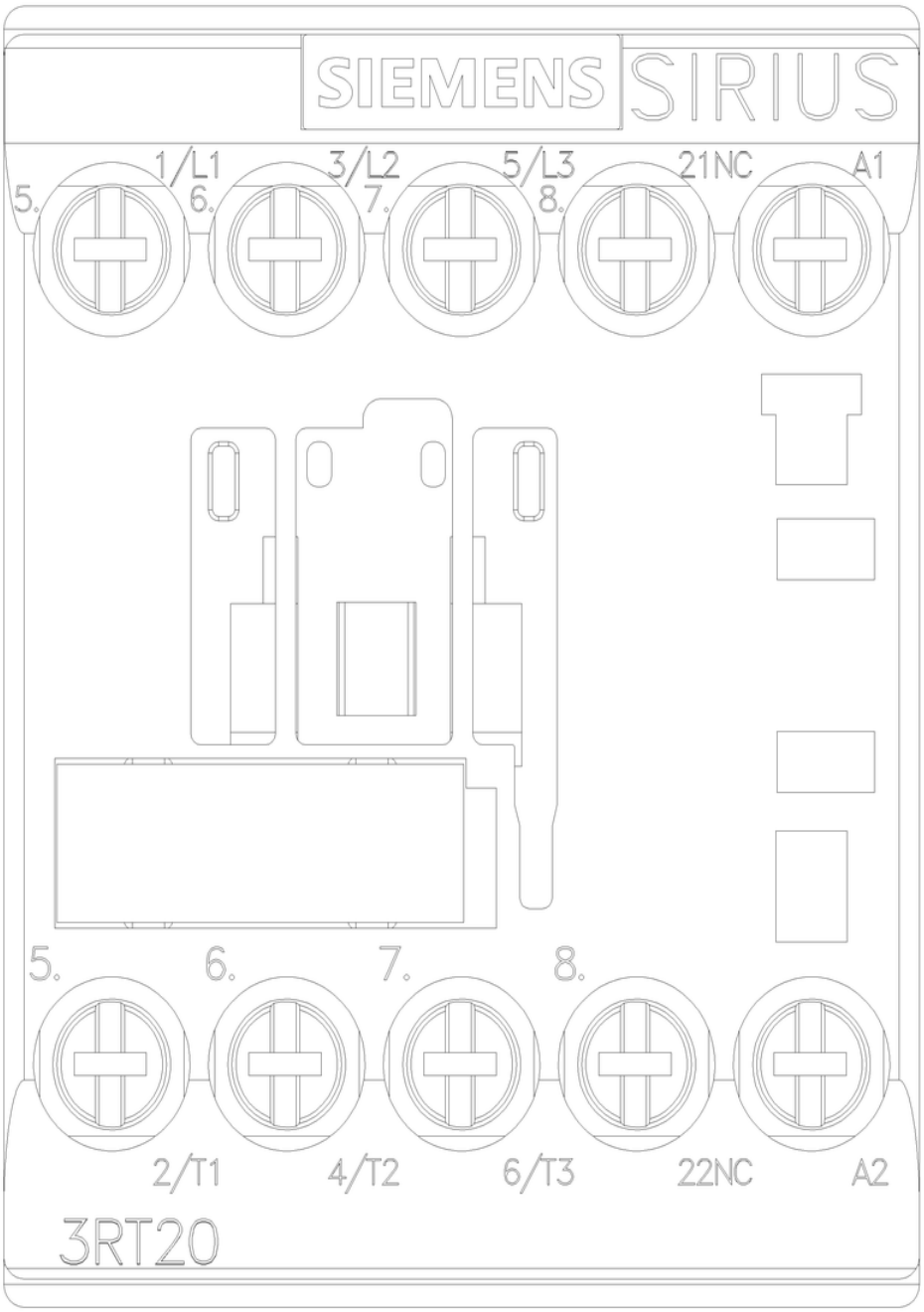



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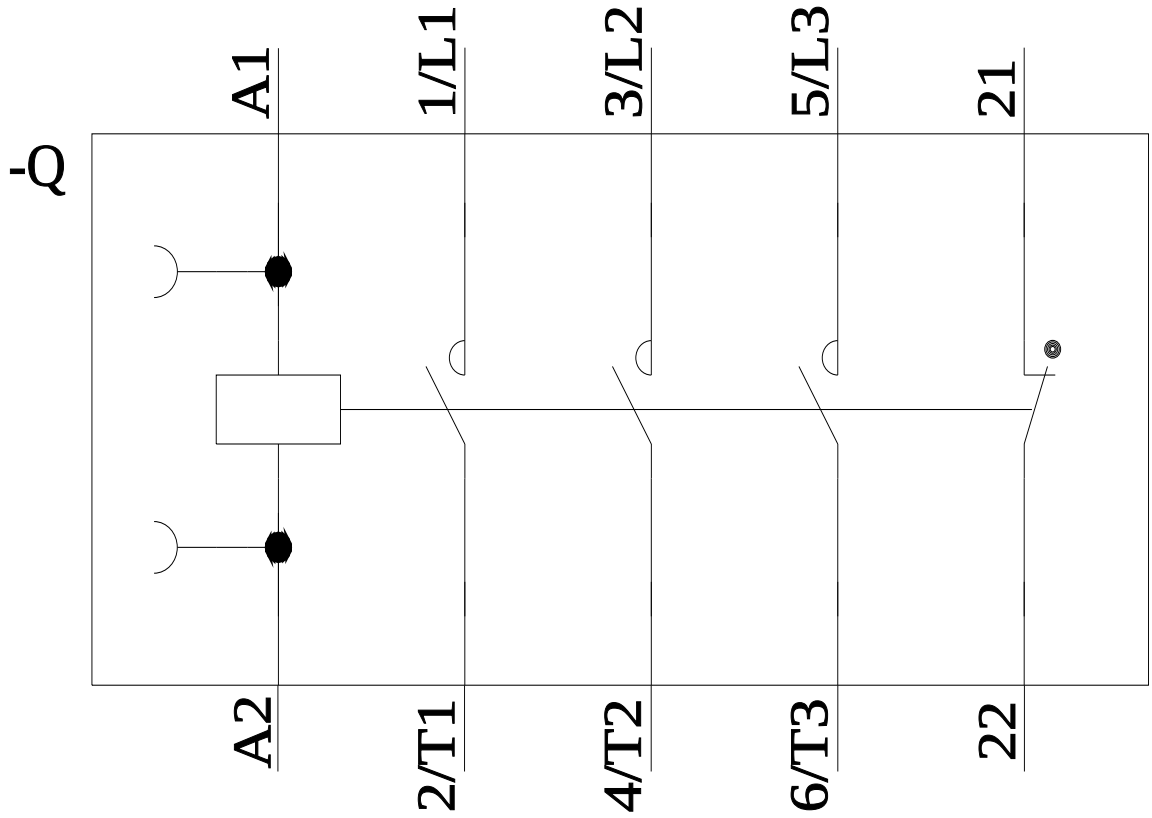


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