



Fail-safe direct starter, 3RM1, 500 V, 0.09 - 0.75 kW, 0.4 - 2 A, 110-230 V AC, screw/spring-type terminals

|   |  |
|---|--|
| <b>product brand name</b>                                     | SIRIUS   |
| <b>product category</b>                                       | Motor starter  |
| <b>product designation</b>                                    | Fail-safe direct starter   |
| <b>design of the product</b>                                  | With electronic overload protection and safety-related disconnection |
| <b>product type designation</b>                               | 3RM1   |
| <b>General technical data</b>                                 |  |
| <b>trip class</b>   | CLASS 10A  |
| <b>equipment variant according to IEC 60947-4-2</b>           | 3  |
| <b>product function</b>                                       | fail-safe direct starter   |
| • intrinsic device protection                                 | Yes  |
| • for power supply reverse polarity protection                | Yes  |
| <b>suitability for operation device connector 3ZY12</b>       | No   |
| <b>insulation voltage rated value</b>                         | 500 V  |
| <b>overvoltage category</b>                                   | III  |
| <b>surge voltage resistance rated value</b>                   | 6 kV   |
| <b>maximum permissible voltage for safe isolation</b>         |  |
| • between main and auxiliary circuit                          | 500 V  |
| • between control and auxiliary circuit                       | 250 V  |
| <b>shock resistance</b>                                       | 6g / 11 ms   |
| <b>vibration resistance</b>                                   | 1 ... 6 Hz, 15 mm; 20 m/s <sup>2</sup> , 500 Hz                      |
| <b>operating frequency maximum</b>                            | 1 1/s  |
| <b>mechanical service life (switching cycles) typical</b>     | 15 000 000   |
| <b>reference code according to IEC 81346-2</b>                | Q  |
| <b>Substance Prohibitance (Date)</b>                          | 03/01/2017   |
| <b>product function</b>                                       |  |
| • direct start  | Yes  |
| • reverse starting  | No   |
| <b>product function short circuit protection</b>              | No   |
| <b>Electromagnetic compatibility</b>                          |  |
| EMC emitted interference according to IEC 60947-1             | class A  |
| EMC immunity according to IEC 60947-1                         | Class A  |
| <b>conducted interference</b>                                 |  |
| • due to burst according to IEC 61000-4-4                     | 3 kV / 5 kHz   |
| • due to conductor-earth surge according to IEC 61000-4-5     | 4 kV signal lines 2 kV   |
| • due to conductor-conductor surge according to IEC 61000-4-5 | 2 kV   |
| • due to high-frequency radiation according to IEC 61000-4-6  | 10 V   |
| <b>field-based interference according to IEC 61000-4-3</b>    | 10 V/m   |

|   |   |
|---|---|
| <b>electrostatic discharge according to IEC 61000-4-2</b>                                       | 6 kV contact discharge / 8 kV air discharge   |
| <b>conducted HF interference emissions according to CISPR11</b>                                 | Class B for domestic, business and commercial environments; Class A for industrial environments at 110 V DC |
| <b>field-bound HF interference emission according to CISPR11</b>                                | Class B for domestic, business and commercial environments; Class A for industrial environments at 110 V DC |
| <b>Safety related data</b>  |   |
| <b>safety device type according to IEC 61508-2</b>  | Type B  |
| Safety Integrity Level (SIL) according to IEC 61508   | 3   |
| <b>SIL Claim Limit (subsystem) according to EN 62061</b>  | SILCL 3   |
| performance level (PL) according to EN ISO 13849-1  | e   |
| category according to EN ISO 13849-1  | 4   |
| <b>stop category according to EN 60204-1</b>  | 0   |
| <b>Safe failure fraction (SFF)</b>  | 99.4 %  |
| <b>average diagnostic coverage level (DCavg)</b>  | 99 %  |
| <b>diagnostics test interval by internal test function maximum</b>                              | 600 s   |
| <b>function test interval maximum</b>   | 1 y   |
| <b>failure rate [FIT]</b>   |   |
| • at rate of recognizable hazardous failures ( $\lambda_{dd}$ )                                 | 1 400 FIT   |
| • at rate of non-recognizable hazardous failures ( $\lambda_{du}$ )                             | 16 FIT  |
| PFHD with high demand rate according to EN 62061  | 0.00000002 1/h  |
| <b>PFDAvg with low demand rate according to IEC 61508</b>                                       | 0.000018  |
| <b>MTTFd</b>  | 75 y  |
| <b>hardware fault tolerance according to IEC 61508</b>  | 1   |
| <b>safe state</b>   | Load circuit open   |
| <b>protection class IP on the front according to IEC 60529</b>                                  | IP20  |
| <b>touch protection on the front according to IEC 60529</b>                                     | finger-safe   |
| <b>hardware fault tolerance according to IEC 61508 relating to ATEX</b>                         | 0   |
| <b>PFDAvg with low demand rate according to IEC 61508 relating to ATEX</b>                      | 0.0005  |
| <b>PFHD with high demand rate according to EN 62061 relating to ATEX</b>                        | 0.00000005 1/h  |
| <b>Safety Integrity Level (SIL) according to IEC 61508 relating to ATEX</b>                     | SIL2  |
| <b>T1 value for proof test interval or service life according to IEC 61508 relating to ATEX</b> | 3 y   |
| <b>Main circuit</b>   |   |
| <b>number of poles for main current circuit</b>   | 3   |
| <b>design of the switching contact</b>  | Hybrid  |
| <b>adjustable current response value current of the current-dependent overload release</b>      | 0.4 ... 2 A   |
| <b>minimum load [%]</b>   | 20 %; from set rated current  |
| <b>type of the motor protection</b>   | solid-state   |
| operating voltage rated value   | 48 ... 500 V  |
| <b>relative symmetrical tolerance of the operating voltage</b>                                  | 10 %  |
| <b>operating frequency 1 rated value</b>  | 50 Hz   |
| <b>operating frequency 2 rated value</b>  | 60 Hz   |
| <b>relative symmetrical tolerance of the operating frequency</b>                                | 10 %  |
| <b>operational current</b>  |   |
| • at AC at 400 V rated value  | 2 A   |
| • at AC-3 at 400 V rated value  | 2 A   |
| • at AC-53a at 400 V at ambient temperature 40 °C rated value                                   | 2 A   |
| <b>ampacity when starting maximum</b>   | 16 A  |
| operating power for 3-phase motors at 400 V at 50 Hz  | 0.09 ... 0.75 kW  |
| <b>Inputs/ Outputs</b>  |   |
| <b>input voltage at digital input</b>   |   |
| • at DC rated value   | 110 V   |
| • with signal <0> at DC   | 0 ... 40 V  |

|   |  |
|---|--|
| <ul style="list-style-type: none"> <li>• for signal &lt;1&gt; at DC</li> </ul>  | 79 ... 121                                       |
| <b>input voltage at digital input</b> <ul style="list-style-type: none"> <li>• at AC rated value</li> <li>• with signal &lt;0&gt; at AC</li> <li>• for signal &lt;1&gt; at AC</li> </ul>  | 110 V<br>0 ... 40 V<br>93 ... 253 V              |
| <b>input current at digital input</b> <ul style="list-style-type: none"> <li>• for signal &lt;1&gt; at DC</li> <li>• with signal &lt;0&gt; at DC</li> </ul>   | 1.5 mA<br>0.25 mA                                |
| <b>input current at digital input with signal &lt;0&gt; at AC</b> <ul style="list-style-type: none"> <li>• at 110 V</li> <li>• at 230 V</li> </ul>  | 0.2 mA<br>0.4 mA                                 |
| <b>input current at digital input for signal &lt;1&gt; at AC</b> <ul style="list-style-type: none"> <li>• at 110 V</li> <li>• at 230 V</li> </ul>   | 1.1 mA<br>2.3 mA                                 |
| number of CO contacts for auxiliary contacts  | 1  |
| <b>operational current of auxiliary contacts at AC-15 at 230 V maximum</b>  | 3 A  |
| <b>operational current of auxiliary contacts at DC-13 at 24 V maximum</b>   | 1 A  |
| <b>Control circuit/ Control</b>   |  |
| <b>type of voltage of the control supply voltage</b>  | AC/DC  |
| <b>control supply voltage at AC</b> <ul style="list-style-type: none"> <li>• at 50 Hz rated value</li> <li>• at 60 Hz rated value</li> </ul>  | 110 ... 230 V<br>110 ... 230 V                   |
| <b>relative negative tolerance of the control supply voltage at AC at 60 Hz</b>   | 15 %   |
| <b>relative positive tolerance of the control supply voltage at AC at 60 Hz</b>   | 10 %   |
| <b>control supply voltage 1 at AC</b> <ul style="list-style-type: none"> <li>• at 50 Hz</li> <li>• at 60 Hz</li> </ul>  | 110 ... 230 V<br>110 ... 230 V                   |
| <b>control supply voltage frequency</b> <ul style="list-style-type: none"> <li>• 1 rated value</li> <li>• 2 rated value</li> </ul>  | 50 Hz<br>60 Hz                                   |
| <b>relative negative tolerance of the control supply voltage at DC</b>  | 15 %   |
| <b>relative positive tolerance of the control supply voltage at DC</b>  | 10 %   |
| control supply voltage 1 at DC rated value  | 110 V  |
| <b>operating range factor control supply voltage rated value at DC</b> <ul style="list-style-type: none"> <li>• initial value</li> <li>• full-scale value</li> </ul>  | 0.85<br>1.1                                      |
| <b>operating range factor control supply voltage rated value at AC at 50 Hz</b> <ul style="list-style-type: none"> <li>• initial value</li> <li>• full-scale value</li> </ul>   | 0.85<br>1.1                                      |
| <b>operating range factor control supply voltage rated value at AC at 60 Hz</b> <ul style="list-style-type: none"> <li>• initial value</li> <li>• full-scale value</li> </ul>   | 0.85<br>1.1                                      |
| <b>control current at AC</b> <ul style="list-style-type: none"> <li>• at 110 V in standby mode of operation</li> <li>• at 230 V in standby mode of operation</li> <li>• at 110 V when switching on</li> <li>• at 230 V when switching on</li> <li>• at 110 V during operation</li> <li>• at 230 V during operation</li> </ul> | 8 mA<br>6 mA<br>40 mA<br>25 mA<br>25 mA<br>14 mA |
| <b>control current at DC</b> <ul style="list-style-type: none"> <li>• in standby mode of operation</li> <li>• when switching on</li> <li>• during operation</li> </ul>  | 4 mA<br>13 mA<br>30 mA                           |

|  |   |
|--|---|
| <b>inrush current peak</b>   |   |
| <ul style="list-style-type: none"> <li>● at AC at 110 V</li> <li>● at AC at 230 V</li> </ul>   | <p>1 200 mA</p> <p>2 900 mA</p>   |
| <b>duration of inrush current peak</b>   |   |
| <ul style="list-style-type: none"> <li>● at AC at 110 V</li> <li>● at AC at 230 V</li> </ul>   | <p>1 ms</p> <p>1 ms</p>   |
| <b>power loss [W] in auxiliary and control circuit</b>   |   |
| <ul style="list-style-type: none"> <li>● in switching state OFF <ul style="list-style-type: none"> <li>— with bypass circuit</li> </ul> </li> <li>● in switching state ON <ul style="list-style-type: none"> <li>— with bypass circuit</li> </ul> </li> </ul>  | <p>1.4 W</p> <p>3.22 W</p>  |
| <b>Response times</b>  |   |
| <b>ON-delay time</b>   | 90 ... 120 ms   |
| <b>OFF-delay time</b>  | 60 ... 90 ms  |
| <b>Power Electronics</b>   |   |
| <b>operational current</b>   |   |
| <ul style="list-style-type: none"> <li>● at 40 °C rated value</li> <li>● at 50 °C rated value</li> <li>● at 55 °C rated value</li> <li>● at 60 °C rated value</li> </ul>   | <p>2 A</p> <p>2 A</p> <p>2 A</p> <p>2 A</p>   |
| <b>Installation/ mounting/ dimensions</b>  |   |
| <b>mounting position</b>   | vertical, horizontal, standing (observe derating)   |
| <b>fastening method</b>  | screw and snap-on mounting onto 35 mm standard mounting rail  |
| <b>height</b>  | 100 mm  |
| <b>width</b>   | 22.5 mm   |
| <b>depth</b>   | 141.6 mm  |
| <b>required spacing</b>  |   |
| <ul style="list-style-type: none"> <li>● with side-by-side mounting <ul style="list-style-type: none"> <li>— forwards</li> <li>— backwards</li> <li>— upwards</li> <li>— downwards</li> <li>— at the side</li> </ul> </li> <li>● for grounded parts <ul style="list-style-type: none"> <li>— forwards</li> <li>— backwards</li> <li>— upwards</li> <li>— at the side</li> <li>— downwards</li> </ul> </li> </ul> | <p>0 mm</p> <p>0 mm</p> <p>50 mm</p> <p>50 mm</p> <p>0 mm</p> <p>0 mm</p> <p>0 mm</p> <p>50 mm</p> <p>3.5 mm</p> <p>50 mm</p> |
| <b>Ambient conditions</b>  |   |
| installation altitude at height above sea level maximum  | 4 000 m; For derating see manual  |
| <b>ambient temperature</b>   |   |
| <ul style="list-style-type: none"> <li>● during operation</li> <li>● during storage</li> <li>● during transport</li> </ul>   | <p>-25 ... +60 °C</p> <p>-40 ... +70 °C</p> <p>-40 ... +70 °C</p>   |
| environmental category during operation according to IEC 60721   | 3K6 (no ice formation, only occasional condensation), 3C3 (no salt mist), 3S2 (sand must not get into the devices), 3M6       |
| relative humidity during operation   | 10 ... 95 %   |
| air pressure according to SN 31205   | 900 ... 1 060 hPa   |
| <b>Communication/ Protocol</b>   |   |
| <b>protocol is supported</b>   |   |
| <ul style="list-style-type: none"> <li>● PROFINET IO protocol</li> <li>● PROFI-safe protocol</li> </ul>  | <p>No</p> <p>No</p>   |
| <b>product function bus communication</b>  | No  |
| protocol is supported AS-Interface protocol  | No  |
| <b>Connections/ Terminals</b>  |   |
| <b>type of electrical connection</b>   | screw-type terminals for main circuit, spring-loaded terminals (push-in) for control circuit                                  |
| <ul style="list-style-type: none"> <li>● for main current circuit</li> <li>● for auxiliary and control circuit</li> </ul>  | <p>screw-type terminals</p> <p>spring-loaded terminals (push-in)</p>  |

|  |  |
|--|--|
| <b>wire length for motor unshielded maximum</b>  | 100 m  |
| <b>type of connectable conductor cross-sections</b>  |  |
| <ul style="list-style-type: none"> <li>• for main contacts <ul style="list-style-type: none"> <li>— solid</li> <li>— finely stranded with core end processing</li> </ul> </li> <li>• at AWG cables for main contacts</li> </ul>  | 1x (0,5 ... 4 mm <sup>2</sup> ), 2x (0,5 ... 2,5 mm <sup>2</sup> )<br>1x (0,5 ... 4 mm <sup>2</sup> ), 2x (0,5 ... 1,5 mm <sup>2</sup> )<br>1x (20 ... 12), 2x (20 ... 14)   |
| <b>connectable conductor cross-section for main contacts</b>   |  |
| <ul style="list-style-type: none"> <li>• solid or stranded</li> <li>• finely stranded with core end processing</li> </ul>  | 0.5 ... 4 mm <sup>2</sup><br>0.5 ... 4 mm <sup>2</sup>   |
| <b>connectable conductor cross-section for auxiliary contacts</b>  |  |
| <ul style="list-style-type: none"> <li>• solid or stranded</li> <li>• finely stranded with core end processing</li> <li>• finely stranded without core end processing</li> </ul>   | 0.5 ... 1.5 mm <sup>2</sup><br>0.5 ... 1 mm <sup>2</sup><br>0.5 ... 1.5 mm <sup>2</sup>  |
| <b>type of connectable conductor cross-sections</b>  |  |
| <ul style="list-style-type: none"> <li>• for auxiliary contacts <ul style="list-style-type: none"> <li>— solid</li> <li>— finely stranded with core end processing</li> <li>— finely stranded without core end processing</li> </ul> </li> <li>• at AWG cables for auxiliary contacts</li> </ul> | 1x (0.5 ... 1.5 mm <sup>2</sup> ), 2x (0.5 ... 1.5 mm <sup>2</sup> )<br>1x (0,5 ... 1,0 mm <sup>2</sup> ), 2x (0,5 ... 1,0 mm <sup>2</sup> )<br>1x (0.5 ... 1.5 mm <sup>2</sup> ), 2x (0.5 ... 1.5 mm <sup>2</sup> )<br>1x (20 ... 16), 2x (20 ... 16) |
| <b>AWG number as coded connectable conductor cross section</b>   |  |
| <ul style="list-style-type: none"> <li>• for main contacts</li> <li>• for auxiliary contacts</li> </ul>  | 20 ... 12<br>20 ... 16   |

#### UL/CSA ratings

|   |   |
|---|---|
| <b>yielded mechanical performance [hp]</b>  |   |
| <ul style="list-style-type: none"> <li>• for single-phase AC motor <ul style="list-style-type: none"> <li>— at 230 V rated value</li> </ul> </li> <li>• for 3-phase AC motor <ul style="list-style-type: none"> <li>— at 200/208 V rated value</li> <li>— at 220/230 V rated value</li> <li>— at 460/480 V rated value</li> </ul> </li> </ul> | 0.125 hp<br>0.333 hp<br>0.333 hp<br>0.75 hp |
| <b>operating voltage at AC</b>  |   |
| <ul style="list-style-type: none"> <li>• according to UL rated value</li> <li>• according to CSA rated value</li> </ul>   | 480 V<br>400 V                              |

#### Certificates/ approvals

|                                 |            |
|---------------------------------|------------|
| <b>General Product Approval</b> | <b>EMC</b> |
|---------------------------------|------------|



[Confirmation](#)



|                                       |  |                                  |              |
|---------------------------------------|--|----------------------------------|--------------|
| <b>For use in hazardous locations</b> | <b>Functional Safety/Safety of Machinery</b> | <b>Declaration of Conformity</b> | <b>other</b> |
|---------------------------------------|--|----------------------------------|--------------|



[Type Examination Certificate](#)



[Confirmation](#)

#### 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?mfb=3RM1102-3AA14>

Cax online generator

<http://support.automation.siemens.com/WW/CAXorder/default.aspx?lang=en&mfb=3RM1102-3AA14>

**Service&Support (Manuals, Certificates, Characteristics, FAQs,...)**

<https://support.industry.siemens.com/cs/ww/en/ps/3RM1102-3AA14>

**Image database (product images, 2D dimension drawings, 3D models, device circuit diagrams, EPLAN macros, ...)**

[http://www.automation.siemens.com/bilddb/cax\\_de.aspx?mfb=3RM1102-3AA14&lang=en](http://www.automation.siemens.com/bilddb/cax_de.aspx?mfb=3RM1102-3AA14&lang=en)

last modified:

6/21/2022 