

Fail-safe direct starter, 3RM1, 500 V, 0.55 - 3 kW, 1.6 - 7 A, 110-230 V AC, screw terminals



Product brand name	SIRIUS
Product category	Motor starter
Product designation	Fail-safe direct starter
Design of the product	With electronic overload protection and safety-related disconnection
Product type designation	3RM1

General technical data	
Trip class	CLASS 10A
Product function	
• Intrinsic device protection	Yes
Suitability for operation Device connector 3ZY12	No
Power loss [W] for rated value of the current at AC in hot operating state per pole	1.13 W
Insulation voltage	
• rated value	500 V
Surge voltage resistance rated value	6 kV
maximum permissible voltage for safe isolation	
• between main and auxiliary circuit	500 V
• between control and auxiliary circuit	250 V

Protection class IP	IP20
Shock resistance	6g / 11 ms
Vibration resistance	1 ... 6 Hz, 15 mm; 20 m/s <sup>2</sup> , 500 Hz
Operating frequency maximum	1 1/s
Mechanical service life (switching cycles) <ul style="list-style-type: none"> <li>• typical</li> </ul>	15 000 000
Reference code acc. to DIN 40719 extended according to IEC 204-2 acc. to IEC 750	Q
Reference code acc. to DIN EN 81346-2	Q
Reference code acc. to DIN EN 61346-2	Q
Product function <ul style="list-style-type: none"> <li>• direct start</li> <li>• reverse starting</li> </ul>	Yes No
Product function Short circuit protection	No

### Electromagnetic compatibility

Conducted interference <ul style="list-style-type: none"> <li>• due to burst acc. to IEC 61000-4-4</li> <li>• due to conductor-earth surge acc. to IEC 61000-4-5</li> <li>• due to conductor-conductor surge acc. to IEC 61000-4-5</li> <li>• due to high-frequency radiation acc. to IEC 61000-4-6</li> </ul>	3 kV / 5 kHz 4 kV signal lines 2 kV 2 kV 10 V
Electrostatic discharge acc. to IEC 61000-4-2	6 kV contact discharge / 8 kV air discharge
Conducted HF-interference emissions acc. to CISPR11	Class B for domestic, business and commercial environments; Class A for industrial environments at 110 V DC
Field-bound HF-interference emission acc. to CISPR11	Class B for domestic, business and commercial environments; Class A for industrial environments at 110 V DC

### Safety related data

Safety device type acc. to IEC 61508-2	Type B
Safety Integrity Level (SIL) acc. to IEC 61508	3
Performance level (PL) acc. to EN ISO 13849-1	e
Category acc. to EN ISO 13849-1	4
Stop category acc. to DIN EN 60204-1	0
Safe failure fraction (SFF)	99.4 %
Average diagnostic coverage level (DCavg)	99 %
Diagnostics test interval by internal test function maximum	600 s
Function test interval maximum	1 y
Failure rate [FIT] <ul style="list-style-type: none"> <li>• at rate of recognizable hazardous failures (<math>\lambda_{dd}</math>)</li> <li>• at rate of non-recognizable hazardous failures (<math>\lambda_{du}</math>)</li> </ul>	1 400 FIT 16 FIT

PFHD with high demand rate acc. to EN 62061	0.00000002 1/h
PFDavg with low demand rate acc. to IEC 61508	0.000018
MTTFd	75 y
Hardware fault tolerance acc. to IEC 61508	1
T1 value for proof test interval or service life acc. to IEC 61508	20 y
Safe state	Load circuit open
Protection against electrical shock	finger-safe
Off-delay time with safety-related request	
• when switched off via control inputs maximum	90 ms
• when switched off via supply voltage maximum	120 ms
Hardware fault tolerance acc. to IEC 61508 relating to ATEX	0
PFDavg with low demand rate acc. to IEC 61508 relating to ATEX	0.0005
PFHD with high demand rate acc. to EN 62061 relating to ATEX	0.00000005 1/h
Safety Integrity Level (SIL) acc. to IEC 61508 relating to ATEX	SIL2
T1 value for proof test interval or service life acc. to IEC 61508 relating to ATEX	3 y

#### Main circuit

Number of poles for main current circuit	3
adjustable pick-up value current of the current-dependent overload release	1.6 ... 7 A
Minimum load [%]	20 %
Type of the motor protection	solid-state
Operating voltage	
• rated value	48 ... 500 V
Relative symmetrical tolerance of the operating voltage	10 %
Operating frequency 1 rated value	50 Hz
Operating frequency 2 rated value	60 Hz
Relative symmetrical tolerance of the operating frequency	10 %
Operating current	
• at AC at 400 V rated value	7 A
• at AC-53a at 400 V at ambient temperature 40 °C rated value	7 A
Ampacity when starting maximum	56 A
Operating power for three-phase motors at 400 V at 50 Hz	0.55 ... 3 kW
Derating temperature	40 °C

#### Inputs/ Outputs

<b>Input voltage at digital input</b>	
• at DC rated value	110 V
• with signal <0> at DC	0 ... 40 V
• for signal <1> at DC	79 ... 121
<b>Input voltage at digital input</b>	
• at AC rated value	110 V
• with signal <0> at AC	0 ... 40 V
• for signal <1> at AC	93 ... 253 V
<b>Input current at digital input</b>	
• with signal <0> typical	0.0004 A
• for signal <1> typical	0.002 A
<b>Input current at digital input</b>	
• for signal <1> at DC	1.5 mA
• with signal <0> at DC	0.25 mA
<b>Input current at digital input with signal &lt;0&gt; at AC</b>	
• at 110 V	0.2 mA
• at 230 V	0.4 mA
<b>Input current at digital input for signal &lt;1&gt; at AC</b>	
• at 110 V	1.1 mA
• at 230 V	2.3 mA
Number of CO contacts for auxiliary contacts	1
<b>Operating current of auxiliary contacts at AC-15 at 230 V maximum</b>	3 A
<b>Operating current of auxiliary contacts at DC-13 at 24 V maximum</b>	1 A

#### Control circuit/ Control

<b>Type of voltage of the control supply voltage</b>	AC/DC
<b>Control supply voltage 1 at AC</b>	
• at 50 Hz	110 ... 230 V
• at 60 Hz	110 ... 230 V
<b>Control supply voltage frequency</b>	
• 1 rated value	50 Hz
• 2 rated value	60 Hz
<b>Control supply voltage 1</b>	
• at DC rated value	110 V
<b>Operating range factor control supply voltage rated value at DC</b>	
• initial value	0.85
• Full-scale value	1.1
<b>Operating range factor control supply voltage rated value at AC at 50 Hz</b>	
• initial value	0.85

• Full-scale value	1.1
<b>Operating range factor control supply voltage rated value at AC at 60 Hz</b>	
• initial value	1.1
• Full-scale value	0.85
<b>Control current at AC</b>	
• at 110 V in standby mode	8 mA
• at 230 V in standby mode	6 mA
• at 110 V when switching on	40 mA
• at 230 V when switching on	25 mA
• at 110 V during operation	25 mA
• at 230 V during operation	14 mA
<b>Control current at DC</b>	
• in standby mode	4 mA
• when switching on	13 mA
• during operation	30 mA

<b>Response times</b>	
<b>Switch-on delay time</b>	90 ... 120 ms
<b>Off-delay time</b>	60 ... 90 ms

<b>Installation/ mounting/ dimensions</b>	
<b>Mounting position</b>	vertical, horizontal, standing (observe derating)
<b>Mounting type</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>	
• with side-by-side mounting	
— forwards	0 mm
— Backwards	0 mm
— upwards	50 mm
— downwards	50 mm
— at the side	0 mm
• for grounded parts	
— forwards	0 mm
— Backwards	0 mm
— upwards	50 mm
— at the side	3.5 mm
— downwards	50 mm

<b>Ambient conditions</b>	
<b>Installation altitude at height above sea level</b>	
• maximum	2 000 m

<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>
Relative humidity during operation	10 ... 95 %
<b>Air pressure</b>	
<ul style="list-style-type: none"> <li>acc. to SN 31205</li> </ul>	900 ... 1 060 hPa

### Communication/ Protocol

<b>Product function Bus communication</b>	No
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### Connections/ Terminals

<b>Type of electrical connection</b>	screw-type terminals for main circuit, screw-type terminals for control circuit
<ul style="list-style-type: none"> <li>for main current circuit</li> <li>for auxiliary and control current circuit</li> </ul>	<p>screw-type terminals</p> <p>screw-type terminals</p>
<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 conductors for main contacts</li> </ul>	<p>1x (0,5 ... 4 mm<sup>2</sup>), 2x (0,5 ... 2,5 mm<sup>2</sup>)</p> <p>1x (0,5 ... 4 mm<sup>2</sup>), 2x (0,5 ... 1,5 mm<sup>2</sup>)</p> <p>1x (20 ... 12), 2x (20 ... 14)</p>
<b>Connectable conductor cross-section for main contacts</b>	
<ul style="list-style-type: none"> <li>single or multi-stranded</li> <li>finely stranded with core end processing</li> </ul>	<p>0.5 ... 4 mm<sup>2</sup></p> <p>0.5 ... 4 mm<sup>2</sup></p>
<b>Connectable conductor cross-section for auxiliary contacts</b>	
<ul style="list-style-type: none"> <li>single or multi-stranded</li> <li>finely stranded with core end processing</li> </ul>	<p>0.5 ... 2.5 mm<sup>2</sup></p> <p>0.5 ... 2.5 mm<sup>2</sup></p>
<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> </ul> </li> <li>at AWG conductors for auxiliary contacts</li> </ul>	<p>1x (0,5 ... 2,5 mm<sup>2</sup>), 2x (1,0 ... 1,5 mm<sup>2</sup>)</p> <p>1x (0.5 ... 2.5 mm<sup>2</sup>), 2x (0.5 ... 1 mm<sup>2</sup>)</p> <p>1x (20 ... 14), 2x (18 ... 16)</p>
<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>	<p>20 ... 12</p> <p>20 ... 14</p>

### 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 110/120 V rated value</li> <li>— at 230 V rated value</li> </ul> </li> </ul>	<p>0.25 hp</p> <p>0.5 hp</p>

- for three-phase AC motor
  - at 200/208 V rated value
  - at 220/230 V rated value
  - at 460/480 V rated value

1 hp  
1.5 hp  
3 hp

## Certificates/ approvals

<b>General Product Approval</b>	<b>EMC</b>	<b>For use in hazardous locations</b>
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CCC



CSA



UL



RCM



ATEX

<b>Functional Safety/Safety of Machinery</b>	<b>Declaration of Conformity</b>	<b>Test Certificates</b>	<b>other</b>	<b>Railway</b>
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[Type Examination Certificate](#)



EG-Konf.

[Miscellaneous](#)

[Type Test Certificates/Test Report](#)

[Confirmation](#)

[Special Test Certificate](#)

## Further information

**Information- and Downloadcenter (Catalogs, Brochures,...)**

[www.siemens.com/ic10](http://www.siemens.com/ic10)

**Industry Mall (Online ordering system)**

<https://mall.industry.siemens.com/mall/en/en/Catalog/product?mlfb=3RM1107-1AA14>

**Cax online generator**

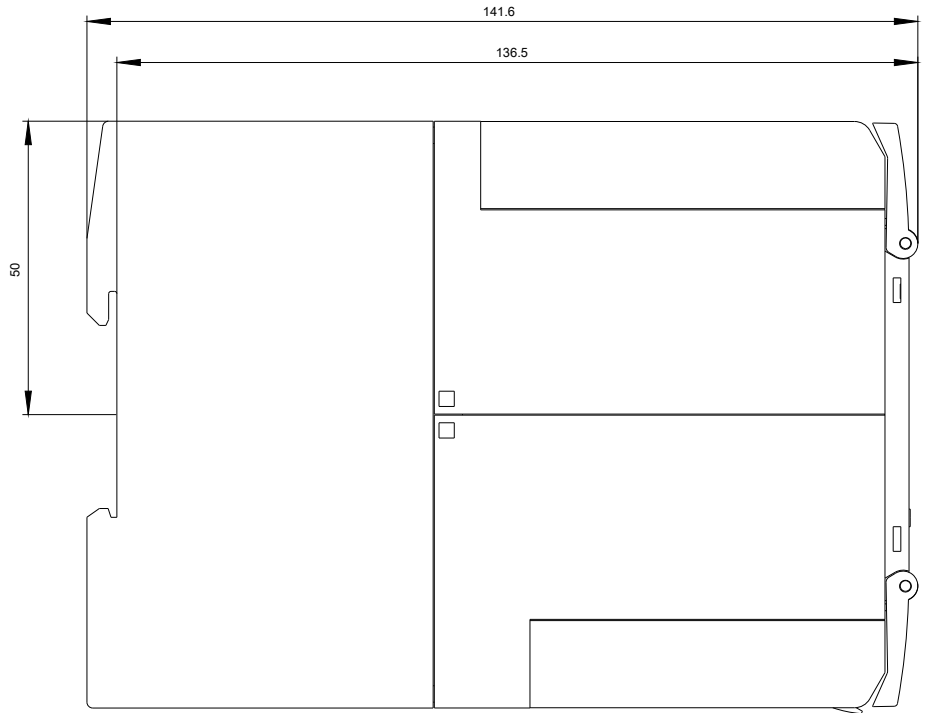
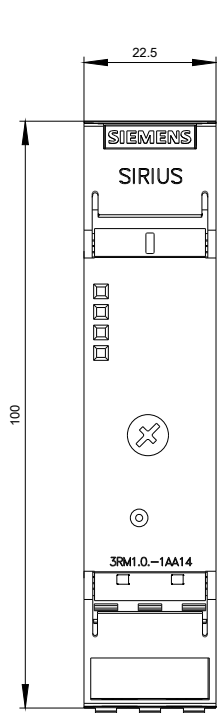
<http://support.automation.siemens.com/WW/CAXorder/default.aspx?lang=en&mlfb=3RM1107-1AA14>

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

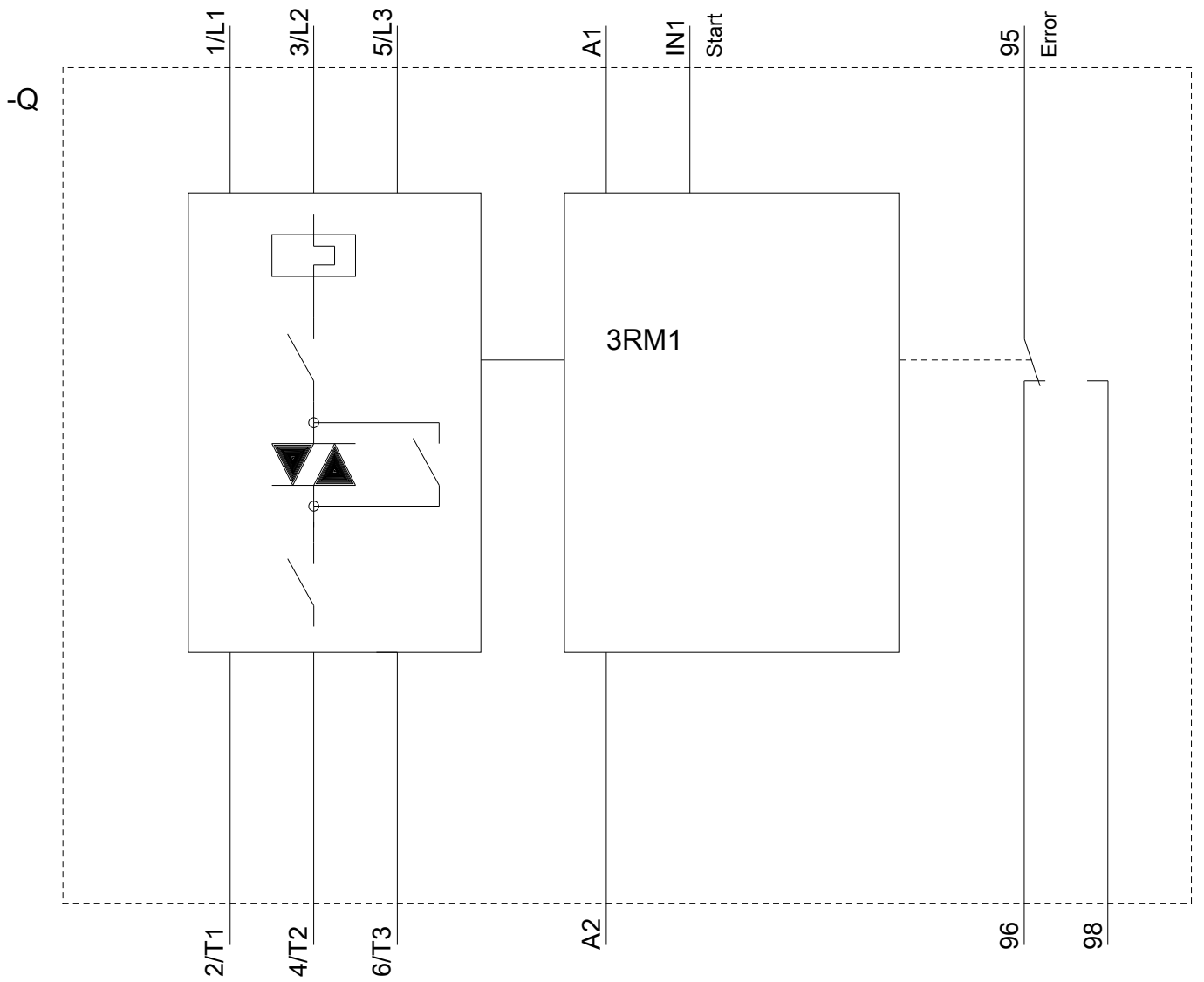
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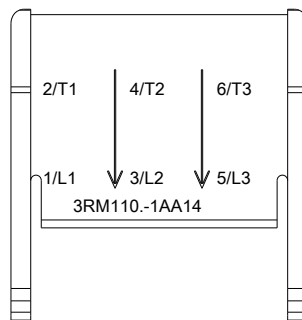
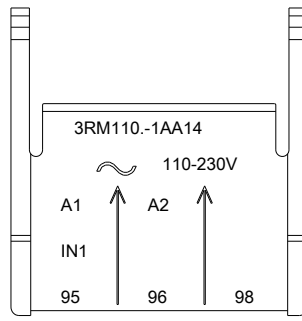
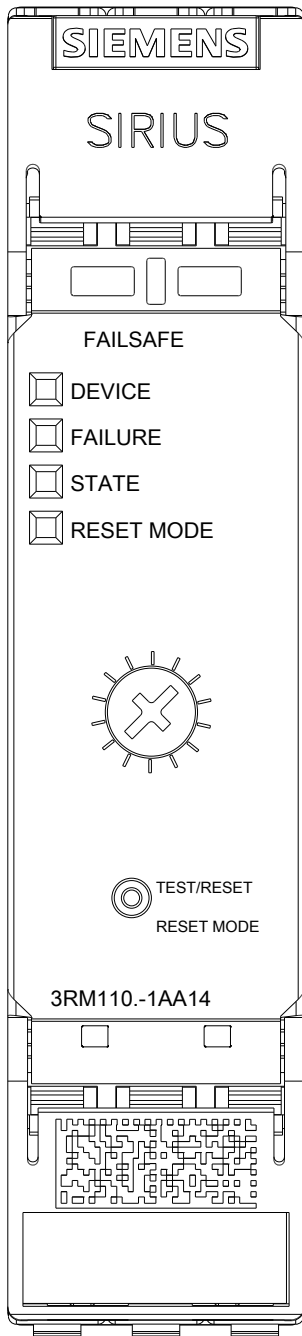
**Image database (product images, 2D dimension drawings, 3D models, device circuit diagrams, EPLAN macros, ...)**

[http://www.automation.siemens.com/bilddb/cax\\_de.aspx?mlfb=3RM1107-1AA14&lang=en](http://www.automation.siemens.com/bilddb/cax_de.aspx?mlfb=3RM1107-1AA14&lang=en)









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