



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

product brand name	SIRIUS
product category	Motor starter
product designation	Failsafe reversing starters
design of the product	With electronic overload protection and safety-related disconnection
product type designation	3RM1
<b>General technical data</b>	
equipment variant according to IEC 60947-4-2	3
product function	fail-safe reversing starter
• intrinsic device protection	Yes
• for power supply reverse polarity 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	0.1 W
• without load current share typical	3.22 W
insulation voltage rated value	500 V
overvoltage category	III
surge voltage resistance rated value	6 kV
maximum permissible voltage for protective separation	
• between main and auxiliary circuit	500 V
• between control and auxiliary circuit	250 V
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 (operating cycles) typical	15 000 000
reference code according to IEC 81346-2	Q
Substance Prohibitance (Date)	03/01/2017
SVHC substance name	Blei - 7439-92-1 Bleimonoxid (Bleioxid) - 1317-36-8 2,2',6,6'-Tetrabrom-4,4'-isopropylidendi - 79-94-7
product function	
• direct start	No
• reverse starting	Yes
product function short circuit protection	No
<b>Electromagnetic compatibility</b>	
EMC emitted interference according to IEC 60947-1	class A
EMC immunity according to IEC 60947-1	Class A
conducted interference	
• 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

<ul style="list-style-type: none"> <li>• due to high-frequency radiation according to IEC 61000-4-6</li> </ul>	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

#### Safety related data

<b>safety device type according to IEC 61508-2</b>	Type B
<b>safe state</b>	Load circuit open
<b>B10d value</b>	1 300 000
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>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 a
PFHD with high demand rate according to EN 62061	2E-8 1/h
<b>failure rate [FIT]</b>	
<ul style="list-style-type: none"> <li>• at rate of recognizable hazardous failures (<math>\lambda_{dd}</math>)</li> </ul>	1 400 FIT
<ul style="list-style-type: none"> <li>• at rate of non-recognizable hazardous failures (<math>\lambda_{du}</math>)</li> </ul>	16 FIT
<b>Safe failure fraction (SFF)</b>	99.4 %
<b>PFDavg with low demand rate according to IEC 61508</b>	1.75E-5
<b>MTTFd</b>	75 a
<b>hardware fault tolerance according to IEC 61508</b>	1
<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>	5E-8 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 a

#### Main circuit

<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>	
<ul style="list-style-type: none"> <li>• at AC at 400 V rated value</li> </ul>	2 A
<ul style="list-style-type: none"> <li>• at AC-3 at 400 V rated value</li> </ul>	2 A
<ul style="list-style-type: none"> <li>• at AC-53a at 400 V at ambient temperature 40 °C rated value</li> </ul>	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

#### Inputs/ Outputs

<b>input voltage at digital input</b>	
<ul style="list-style-type: none"> <li>• at DC rated value</li> </ul>	110 V
<ul style="list-style-type: none"> <li>• with signal &lt;0&gt; at DC</li> </ul>	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>	
• 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>	
• 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>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>	
• at 50 Hz rated value	110 ... 230 V
• at 60 Hz rated value	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>	
• 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>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>	
• 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	0.85
• full-scale value	1.1
<b>control current at AC</b>	
• at 110 V in standby mode of operation	8 mA
• at 230 V in standby mode of operation	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 of operation	4 mA
• during operation	30 mA
<b>inrush current peak</b>	
• at AC at 110 V	1 200 mA
• at AC at 230 V	2 900 mA

<ul style="list-style-type: none"> <li>• at AC at 110 V at switching on of motor</li> <li>• at AC at 230 V at switching on of motor</li> </ul>	1 200 mA 2 900 mA
<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> <li>• at AC at 110 V at switching on of motor</li> <li>• at AC at 230 V at switching on of motor</li> </ul>	1 ms 1 ms 1 ms 1 ms
<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>	1.4 W 3.22 W
<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>	2 A 2 A 2 A 2 A
<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 DIN 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>	0 mm 0 mm 50 mm 50 mm 0 mm 0 mm 0 mm 50 mm 3.5 mm 50 mm
<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>	-25 ... +60 °C -40 ... +70 °C -40 ... +70 °C
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>	No No
<b>product function bus communication</b>	No
protocol is supported AS-Interface protocol	No
<b>Connections/ Terminals</b>	
<b>type of electrical connection</b> <ul style="list-style-type: none"> <li>• for main current circuit</li> <li>• for auxiliary and control circuit</li> </ul>	screw-type terminals for main circuit, screw-type terminals for control circuit screw-type terminals screw-type terminals
<b>wire length for motor unshielded maximum</b>	100 m

type of connectable conductor cross-sections for main contacts	
• solid	1x (0,5 ... 4 mm <sup>2</sup> ), 2x (0,5 ... 2,5 mm <sup>2</sup> )
• finely stranded with core end processing	1x (0,5 ... 4 mm <sup>2</sup> ), 2x (0,5 ... 1,5 mm <sup>2</sup> )
<b>connectable conductor cross-section for main contacts</b>	
• solid or stranded	0.5 ... 4 mm <sup>2</sup>
• finely stranded with core end processing	0.5 ... 4 mm <sup>2</sup>
<b>connectable conductor cross-section for auxiliary contacts</b>	
• solid or stranded	0.5 ... 2.5 mm <sup>2</sup>
• finely stranded with core end processing	0.5 ... 2.5 mm <sup>2</sup>
<b>type of connectable conductor cross-sections</b>	
• for auxiliary contacts	
— solid	1x (0,5 ... 2,5 mm <sup>2</sup> ), 2x (1,0 ... 1,5 mm <sup>2</sup> )
— finely stranded with core end processing	1x (0.5 ... 2.5 mm <sup>2</sup> ), 2x (0.5 ... 1 mm <sup>2</sup> )
• for AWG cables for auxiliary contacts	1x (20 ... 14), 2x (18 ... 16)
<b>AWG number as coded connectable conductor cross section</b>	
• for main contacts	20 ... 12
• for auxiliary contacts	20 ... 14

#### UL/CSA ratings

<b>yielded mechanical performance [hp]</b>	
• for single-phase AC motor	
— at 230 V rated value	0.125 hp
• for 3-phase AC motor	
— at 200/208 V rated value	0.333 hp
— at 220/230 V rated value	0.333 hp
— at 460/480 V rated value	0.75 hp
operating voltage at AC rated value	480 V
operational current at AC at 480 V according to UL 508	2 A

#### Certificates/ approvals

General Product Approval	EMC
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[Confirmation](#)



For use in hazard- ous locations	Functional Safety/Safety of Ma- chinery	Declaration of Conformity	Test Certificates	other
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tificate](#)



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ates/Test Report](#)

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#### Railway

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#### 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=3RM1302-1AA14>

Cax online generator

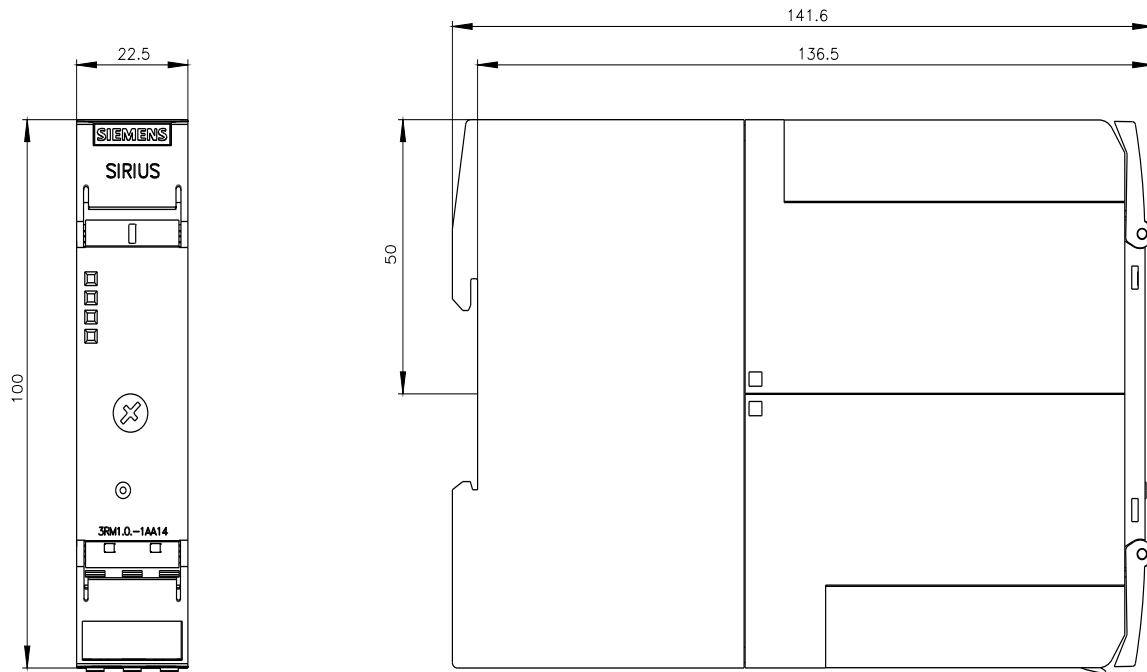
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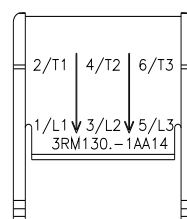
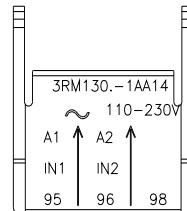
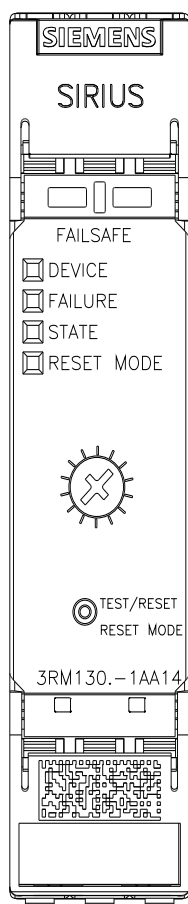
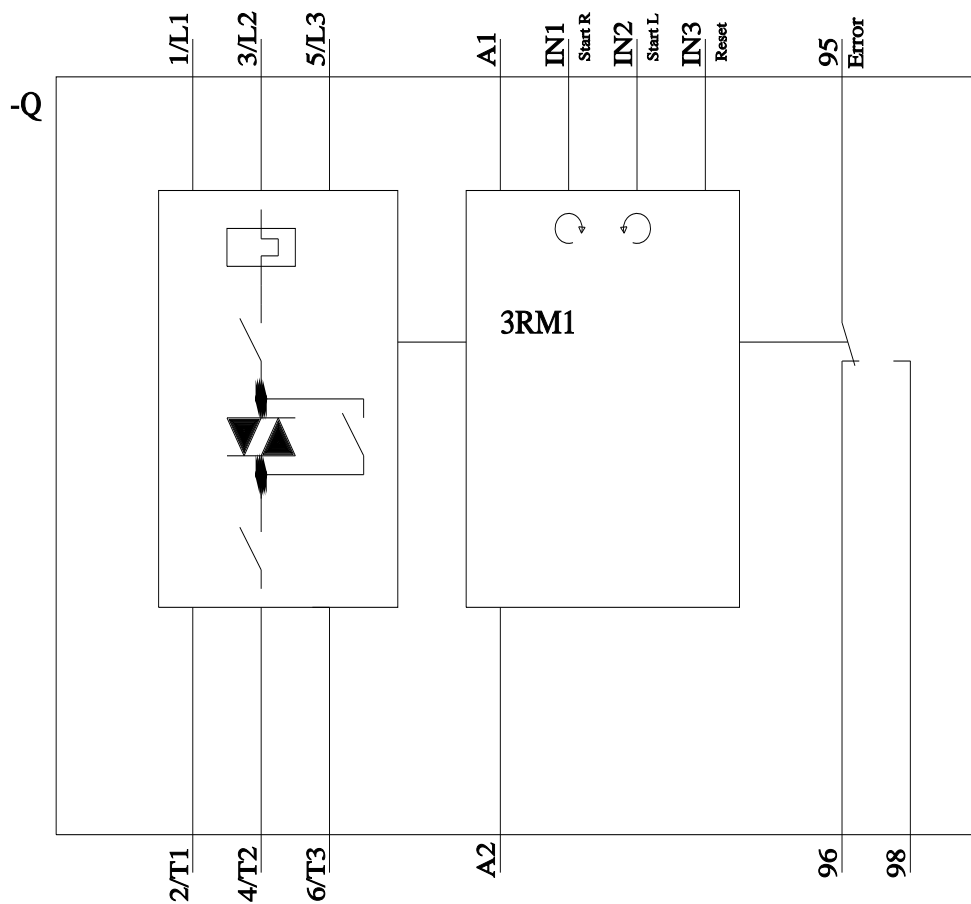
Service&Support (Manuals, Certificates, Characteristics, FAQs,...)

<https://support.industry.siemens.com/cs/ww/en/ps/3RM1302-1AA14>

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

[http://www.automation.siemens.com/bilddb/cax\\_de.aspx?mlfb=3RM1302-1AA14&lang=en](http://www.automation.siemens.com/bilddb/cax_de.aspx?mlfb=3RM1302-1AA14&lang=en)





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