

Fail-safe direct starter, 3RM1, 500 V, 0.09 - 0.75 kW, 0.4 - 2 A, 110-230 V AC, screw/spring-type 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	0.1 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 ² , 500 Hz
Operating frequency maximum	1 1/s
Mechanical service life (switching cycles) <ul style="list-style-type: none"> • typical 	30 000 000
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"> • direct start • reverse starting 	Yes No
Product function Short circuit protection	No

Electromagnetic compatibility

Conducted interference <ul style="list-style-type: none"> • due to burst acc. to IEC 61000-4-4 • due to conductor-earth surge acc. to IEC 61000-4-5 • due to conductor-conductor surge acc. to IEC 61000-4-5 • due to high-frequency radiation acc. to IEC 61000-4-6 	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"> • at rate of recognizable hazardous failures (λ_{dd}) • at rate of non-recognizable hazardous failures (λ_{du}) 	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	0.4 ... 2 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	2 A
• at AC-53a at 400 V at ambient temperature 40 °C rated value	2 A
Ampacity when starting maximum	16 A
Operating power for three-phase motors at 400 V at 50 Hz	0.09 ... 0.75 kW

Inputs/ Outputs

Input voltage at digital input	
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<ul style="list-style-type: none"> • at DC rated value • with signal <0> at DC • for signal <1> at DC 	110 V 0 ... 40 V 79 ... 121
Input voltage at digital input <ul style="list-style-type: none"> • at AC rated value • with signal <0> at AC • for signal <1> at AC 	110 V 0 ... 40 V 93 ... 253 V
Input current at digital input <ul style="list-style-type: none"> • with signal <0> typical • for signal <1> typical 	0.0004 A 0.002 A
Input current at digital input <ul style="list-style-type: none"> • for signal <1> at DC • with signal <0> at DC 	1.5 mA 0.25 mA
Input current at digital input with signal <0> at AC <ul style="list-style-type: none"> • at 110 V • at 230 V 	0.2 mA 0.4 mA
Input current at digital input for signal <1> at AC <ul style="list-style-type: none"> • at 110 V • at 230 V 	1.1 mA 2.3 mA
Number of CO contacts for auxiliary contacts	1
Operating current of auxiliary contacts at AC-15 at 230 V maximum	3 A
Operating current of auxiliary contacts at DC-13 at 24 V maximum	1 A

Control circuit/ Control

Type of voltage of the control supply voltage	AC/DC
Control supply voltage 1 at AC <ul style="list-style-type: none"> • at 50 Hz • at 60 Hz 	110 ... 230 V 110 ... 230 V
Control supply voltage frequency <ul style="list-style-type: none"> • 1 rated value • 2 rated value 	50 Hz 60 Hz
Control supply voltage 1 <ul style="list-style-type: none"> • at DC rated value 	110 V
Operating range factor control supply voltage rated value at DC <ul style="list-style-type: none"> • initial value • Full-scale value 	0.85 1.1
Operating range factor control supply voltage rated value at AC at 50 Hz <ul style="list-style-type: none"> • initial value • Full-scale value 	0.85 1.1

Operating range factor control supply voltage rated value at AC at 60 Hz	
• initial value	1.1
• Full-scale value	0.85
Control current at AC	
• 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
Control current at DC	
• in standby mode	4 mA
• when switching on	13 mA
• during operation	30 mA

Response times	
Switch-on delay time	90 ... 120 ms
Off-delay time	60 ... 90 ms

Installation/ mounting/ dimensions	
Mounting position	vertical, horizontal, standing (observe derating)
Mounting type	screw and snap-on mounting onto 35 mm standard mounting rail
Height	100 mm
Width	22.5 mm
Depth	141.6 mm
Required spacing	
• 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

Ambient conditions	
Installation altitude at height above sea level	
• maximum	2 000 m
Ambient temperature	

<ul style="list-style-type: none"> during operation during storage during transport 	-25 ... +60 °C
Relative humidity during operation	-40 ... +70 °C
Air pressure	-40 ... +70 °C
<ul style="list-style-type: none"> acc. to SN 31205 	10 ... 95 %
	900 ... 1 060 hPa

Communication/ Protocol

Product function Bus communication	No
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Connections/ Terminals

Type of electrical connection <ul style="list-style-type: none"> for main current circuit for auxiliary and control current circuit 	screw-type terminals for main circuit, spring-loaded terminals (push-in) for control circuit screw-type terminals spring-loaded terminals (push-in)
Type of connectable conductor cross-sections <ul style="list-style-type: none"> for main contacts <ul style="list-style-type: none"> — solid — finely stranded with core end processing at AWG conductors for main contacts 	1x (0,5 ... 4 mm ²), 2x (0,5 ... 2,5 mm ²) 1x (0,5 ... 4 mm ²), 2x (0,5 ... 1,5 mm ²) 1x (20 ... 12), 2x (20 ... 14)
Connectable conductor cross-section for main contacts <ul style="list-style-type: none"> single or multi-stranded finely stranded with core end processing 	0.5 ... 4 mm ² 0.5 ... 4 mm ²
Connectable conductor cross-section for auxiliary contacts <ul style="list-style-type: none"> single or multi-stranded finely stranded with core end processing finely stranded without core end processing 	0.5 ... 1.5 mm ² 0.5 ... 1 mm ² 0.5 ... 1.5 mm ²
Type of connectable conductor cross-sections <ul style="list-style-type: none"> for auxiliary contacts <ul style="list-style-type: none"> — solid — finely stranded with core end processing — finely stranded without core end processing at AWG conductors for auxiliary contacts 	1x (0.5 ... 1.5 mm ²), 2x (0.5 ... 1.5 mm ²) 1x (0,5 ... 1,0 mm ²), 2x (0,5 ... 1,0 mm ²) 1x (0.5 ... 1.5 mm ²), 2x (0.5 ... 1.5 mm ²) 1x (20 ... 16), 2x (20 ... 16)
AWG number as coded connectable conductor cross section <ul style="list-style-type: none"> for main contacts for auxiliary contacts 	20 ... 12 20 ... 16

UL/CSA ratings


Yielded mechanical performance [hp] <ul style="list-style-type: none"> for single-phase AC motor 	
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- at 230 V rated value
- for three-phase AC motor
 - at 200/208 V rated value
 - at 220/230 V rated value
 - at 460/480 V rated value

0.125 hp
0.333 hp
0.333 hp
0.75 hp

Certificates/ approvals

General Product Approval	EMC	For use in hazardous locations
 CCC	 CSA	 UL
  		

Functional Safety/Safety of Machinery	Declaration of Conformity	other
Type Examination Certificate	 EG-Konf.	Miscellaneous Confirmation

Further information

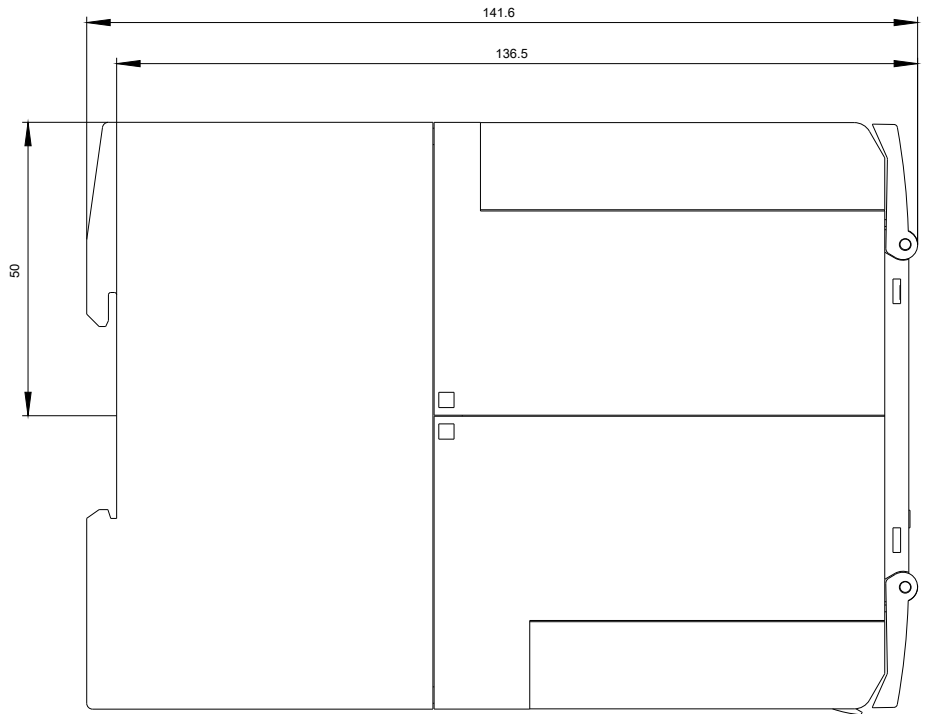
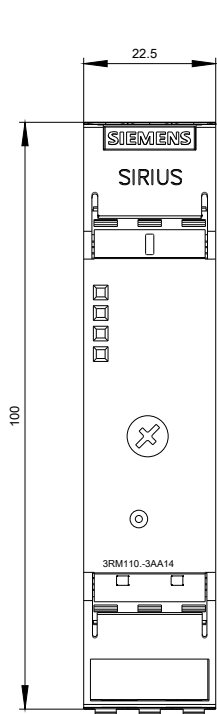
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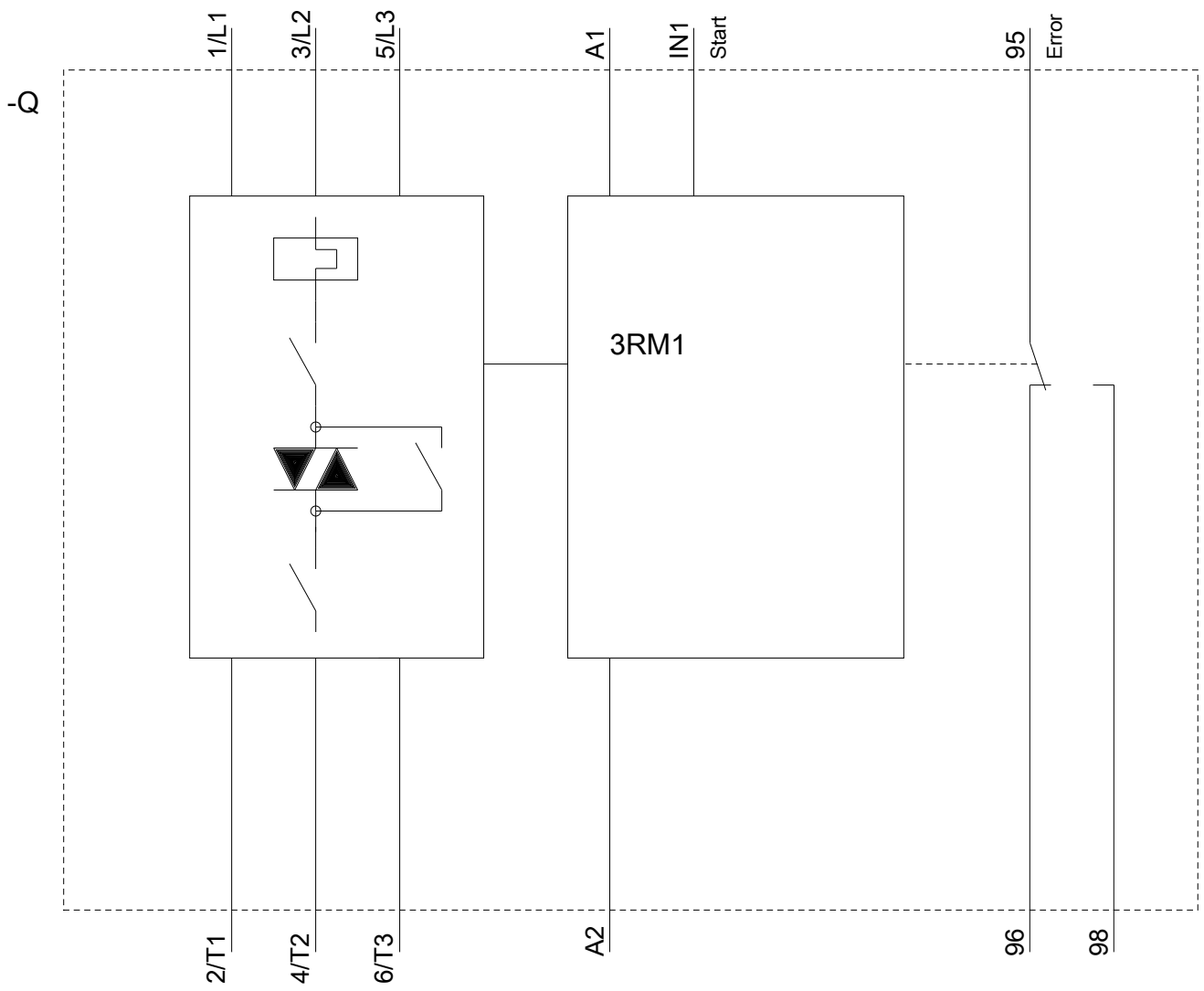
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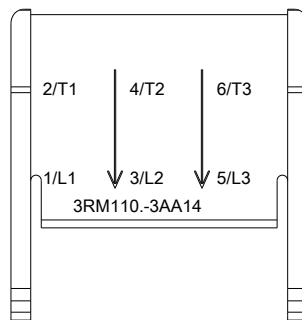
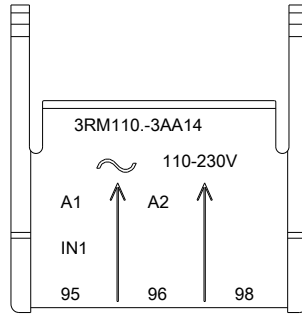
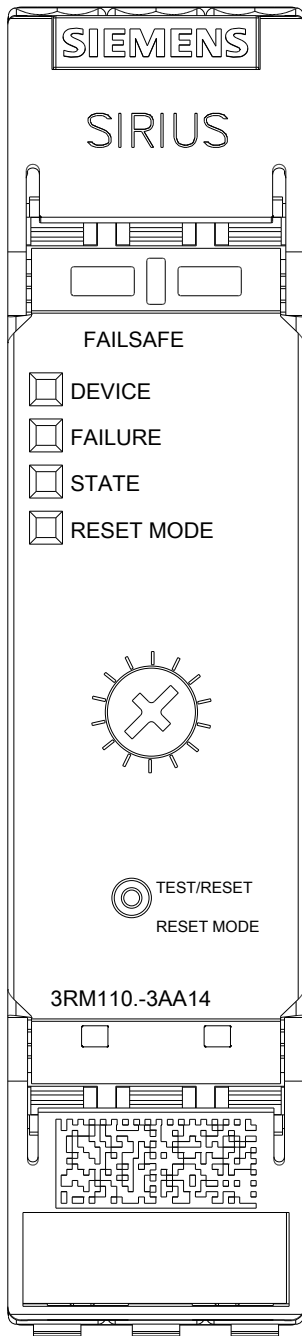
Cax online generator
<http://support.automation.siemens.com/WW/CAXorder/default.aspx?lang=en&mlfb=3RM1102-3AA14>

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?mlfb=3RM1102-3AA14&lang=en







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