SIEMENS

Data sheet 3RW5516-1HF04

SIRIUS soft starter 200-480 V 32 A, 24 V AC/DC Screw terminals Fail-safe

Siemens EcoTech

product brand name	SIRIUS
product category	Hybrid switching devices
product designation	Failsafe soft starters
product type designation	3RW55
manufacturer's article number	
● of high feature HMI module usable	3RW5980-0HF00
● of communication module PROFINET standard usable	3RW5980-0CS00
● of communication module PROFINET high-feature usable	3RW5950-0CH00
● of communication module PROFIBUS usable	3RW5980-0CP00
● of communication module Modbus TCP usable	3RW5980-0CT00
● of communication module Modbus RTU usable	3RW5980-0CR00
● of communication module Ethernet/IP	3RW5980-0CE00
● of circuit breaker usable at 400 V	3RV2032-4VA10; Type of coordination 1, Iq = 65 kA, CLASS 10
● of circuit breaker usable at 500 V	3RV2032-4VA10; Type of coordination 1, Iq = 10 kA, CLASS 10
● of circuit breaker usable at 400 V at inside-delta circuit	3RV2032-4JA10; Type of coordination 1, Iq = 65 kA, CLASS 10
● of circuit breaker usable at 500 V at inside-delta circuit	3RV2032-4JA10; Type of coordination 1, Iq = 10 kA, CLASS 10
● of the gG fuse usable up to 690 V	3NA3824-6; Type of coordination 1, Iq = 65 kA
● of the gG fuse usable at inside-delta circuit up to 500 V	3NA3824-6; Type of coordination 1, Iq = 65 kA
● of full range R fuse link for semiconductor protection usable up to 690 V	3NE1818-0; Type of coordination 2, Iq = 65 kA
● of back-up R fuse link for semiconductor protection usable up to 690 V	3NE8022-1; Type of coordination 2, Iq = 65 kA
● of the redundant contactor for applications > SIL 1 according to EN 62061	3RT2036
● of the redundant contactor for applications > SIL 1 at inside-delta circuit according to EN 62061	3RT2036
● of the redundant contactor for applications > SIL 1 according to EN ISO 13849-1	3RT2037
● of the redundant contactor for applications > SIL 1 at inside-delta circuit according to EN ISO 13849-1	3RT2037
General technical data	
starting voltage [%]	20 ... 100 %
stopping voltage [%]	50 %; non-adjustable
start-up ramp time of soft starter	0 ... 360 s
ramp-down time of soft starter	0 ... 360 s
start torque [%]	10 ... 100 %
stopping torque [%]	10 ... 100 %
torque limitation [%]	20 ... 200 %
current limiting value [%] adjustable	125 ... 800 %

breakaway voltage [%] adjustable	40 ... 100 %
breakaway time adjustable	0 ... 2 s
number of parameter sets	3
accuracy class	5 (based on IEC 61557-12)
certificate of suitability	
● CE marking	Yes
● UL approval	Yes
● CSA approval	Yes
product component	
● HMI-High Feature	Yes
● is supported HMI-High Feature	Yes
product feature integrated bypass contact system	Yes
number of controlled phases	3
current unbalance limiting value [%]	10 ... 60 %
ground-fault monitoring limiting value [%]	10 ... 95 %
buffering time in the event of power failure	
● for main current circuit	100 ms
● for control circuit	100 ms
idle time adjustable	0 ... 255 s
insulation voltage rated value	480 V
degree of pollution	3, acc. to IEC 60947-4-2
impulse voltage rated value	6 kV
blocking voltage of the thyristor maximum	1 600 V
service factor	1.15
surge voltage resistance rated value	6 kV
maximum permissible voltage for protective separation	
● between main and auxiliary circuit	480 V; does not apply for thermistor connection
shock resistance	15 g / 11 ms, from 6 g / 11 ms with potential contact lifting
vibration resistance	15 mm up to 6 Hz; 2 g up to 500 Hz
recovery time after overload trip adjustable	60 ... 1 800 s
utilization category according to IEC 60947-4-2	AC 53a
reference code according to IEC 81346-2	Q
Substance Prohibitance (Date)	11/22/2019
SVHC substance name	Lead - 7439-92-1 Lead monoxide (lead oxide) - 1317-36-8 2-methyl-1-(4-methylthiophenyl)-2-morpholinopropan-1-one - 71868-10-5 Dibutylbis(pentane-2,4-dionato-O,O')tin - 22673-19-4 Diboron trioxide - 1303-86-2 Lead titanium trioxide - 12060-00-3
Weight	3.2 kg
product function	
● ramp-up (soft starting)	Yes
● ramp-down (soft stop)	Yes
● breakaway pulse	Yes
● adjustable current limitation	Yes
● creep speed in both directions of rotation	Yes
● pump ramp down	Yes
● DC braking	Yes
● motor heating	Yes
● min/max pointer	Yes
● trace function	Yes
● intrinsic device protection	Yes
● motor overload protection	Yes; Full motor protection (thermistor motor protection and electronic motor overload protection) / When using the motor overload protection according to ATEX, an upstream contactor is required in inside-delta circuit.
● evaluation of thermistor motor protection	Yes; Type A PTC or Klixon / Thermoclick
● inside-delta circuit	Yes
● auto-RESET	Yes
● manual RESET	Yes
● remote reset	Yes
● communication function	Yes
● operating measured value display	Yes
● event list	Yes

● error logbook	Yes
● via software parameterizable	Yes
● via software configurable	Yes
● screw terminal	Yes
● spring-loaded terminal	No
● **PROFIenergy**	Yes; in connection with the PROFINET Standard and PROFINET High-Feature communication modules
● **firmware update**	Yes
● **removable terminal for control circuit**	Yes
● voltage ramp	Yes
● torque control	Yes
● combined braking	Yes
● analog output	Yes; 4 ... 20 mA (default) / 0 ... 10 V
● programmable control inputs/outputs	Yes
● condition monitoring	Yes
● automatic parameterisation	Yes
● application wizards	Yes
● alternative run-down	Yes
● emergency operation mode	Yes
● reversing operation	Yes
● soft starting at heavy starting conditions	Yes
Power Electronics	
operational current	
● at 40 °C rated value	32 A
● at 40 °C rated value minimum	6.5 A
● at 50 °C rated value	28.4 A
● at 60 °C rated value	26 A
operational current at inside-delta circuit	
● at 40 °C rated value	55.4 A
● at 50 °C rated value	49 A
● at 60 °C rated value	45 A
operating voltage	
● rated value	200 ... 480 V
● at inside-delta circuit rated value	200 ... 480 V
relative negative tolerance of the operating voltage	-15 %
relative positive tolerance of the operating voltage	10 %
relative negative tolerance of the operating voltage at inside-delta circuit	-15 %
relative positive tolerance of the operating voltage at inside-delta circuit	10 %
operating power for 3-phase motors	
● at 230 V at 40 °C rated value	7.5 kW
● at 230 V at inside-delta circuit at 40 °C rated value	15 kW
● at 400 V at 40 °C rated value	15 kW
● at 400 V at inside-delta circuit at 40 °C rated value	22 kW
Operating frequency 1 rated value	50 Hz
Operating frequency 2 rated value	60 Hz
relative negative tolerance of the operating frequency	-10 %
relative positive tolerance of the operating frequency	10 %
minimum load [%]	10 %; Relative to set Ie
power loss [W] for rated value of the current at AC	
● at 40 °C after startup	10 W
● at 50 °C after startup	9 W
● at 60 °C after startup	8 W
power loss [W] at AC at current limitation 350 %	
● at 40 °C during startup	519 W
● at 50 °C during startup	437 W
● at 60 °C during startup	386 W
type of the motor protection	Electronic, tripping in the event of thermal overload of the motor
Control circuit/ Control	
type of voltage of the control supply voltage	AC/DC

control supply voltage at AC	
● at 50 Hz rated value	24 V
● at 60 Hz rated value	24 V
relative negative tolerance of the control supply voltage at AC at 50 Hz	-20 %
relative positive tolerance of the control supply voltage at AC at 50 Hz	20 %
relative negative tolerance of the control supply voltage at AC at 60 Hz	-20 %
relative positive tolerance of the control supply voltage at AC at 60 Hz	20 %
control supply voltage frequency	50 ... 60 Hz
relative negative tolerance of the control supply voltage frequency	-10 %
relative positive tolerance of the control supply voltage frequency	10 %
control supply voltage at DC rated value	24 V
relative negative tolerance of the control supply voltage at DC	-20 %
relative positive tolerance of the control supply voltage at DC	20 %
control supply current in standby mode rated value	420 mA
holding current in bypass operation rated value	820 mA
inrush current by closing the bypass contacts maximum	0.91 A
inrush current peak at application of control supply voltage maximum	7.5 A
duration of inrush current peak at application of control supply voltage	20 ms
design of the overvoltage protection	Varistor
design of short-circuit protection for control circuit	4 A gG fuse (Icu=1 kA), 6 A quick-acting fuse (Icu=1 kA), C1 miniature circuit breaker (Icu= 600 A), C6 miniature circuit breaker (Icu= 300 A); Is not part of scope of supply
Inputs/ Outputs	
number of digital inputs	4
● with fail-safe	1
● parameterizable	4
● **number of digital outputs**	3
● Number of digital outputs with fail-safe	1
● number of digital outputs parameterizable	2
● number of digital outputs not parameterizable	1
digital output version	2 normally-open contacts (NO) / 1 normally-closed contact (NC) / 1 changeover contact (CO)
number of analog outputs	1
switching capacity current of the relay outputs	
● at AC-15 at 250 V rated value	3 A
● at DC-13 at 24 V rated value	1 A
Response times	
OFF-delay time with safety-related request when switched off via control inputs maximum	100 ms
Installation/ mounting/ dimensions	
mounting position	Vertical (can be rotated +/- 90° and tilted forward or backward +/- 22.5°)
fastening method	screw fixing
height	275 mm
width	170 mm
depth	152 mm
required spacing with side-by-side mounting	
● forwards	10 mm
● backwards	0 mm
● upwards	100 mm
● downwards	75 mm
● at the side	5 mm
weight without packaging	2.6 kg
Connections/ Terminals	
type of electrical connection	

● for main current circuit	screw-type terminals
● for control circuit	screw-type terminals
wire length for thermistor connection	
● with conductor cross-section = 0.5 mm² maximum	50 m
● with conductor cross-section = 1.5 mm² maximum	150 m
● with conductor cross-section = 2.5 mm² maximum	250 m
type of connectable conductor cross-sections	
● for main contacts	
— solid	2x (1.0 ... 2.5 mm²), 2x (2.5 ... 10 mm²)
— finely stranded with core end processing	2x (1.0 ... 2.5 mm²), 2x (2.5 ... 6.0 mm²)
● for AWG cables for main current circuit solid	2x (16 ... 12), 2x (14 ... 8)
type of connectable conductor cross-sections	
● for control circuit solid	1x (0.5 ... 4.0 mm²), 2x (0.5 ... 2.5 mm²)
● for control circuit finely stranded with core end processing	1x (0.5 ... 2.5 mm²), 2x (0.5 ... 1.5 mm²)
● for AWG cables for control circuit solid	1x (20 ... 12), 2x (20 ... 14)
wire length	
● between soft starter and motor maximum	800 m
● at the digital inputs at DC maximum	1 000 m
tightening torque	
● for main contacts with screw-type terminals	2 ... 2.5 N·m
● for auxiliary and control contacts with screw-type terminals	0.8 ... 1.2 N·m
tightening torque [lbf·in]	
● for main contacts with screw-type terminals	18 ... 22 lbf·in
● for auxiliary and control contacts with screw-type terminals	7 ... 10.3 lbf·in
Ambient conditions	
installation altitude at height above sea level maximum	2 000 m; Derating as of 1000 m, see catalog
ambient temperature	
● during operation	-25 ... +60 °C; Please observe derating at temperatures of 40 °C or above
● during storage and transport	-40 ... +80 °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
● during storage according to IEC 60721	1K6 (only occasional condensation), 1C2 (no salt mist), 1S2 (sand must not get inside the devices), 1M4
● during transport according to IEC 60721	2K2, 2C1, 2S1, 2M2 (max. fall height 0.3 m)
Environmental footprint	
Global Warming Potential [CO2 eq] total	285 kg
Global Warming Potential [CO2 eq] during manufacturing	50.8 kg
global warming potential [CO2 eq] during sales	0.827 kg
Global Warming Potential [CO2 eq] during operation	240 kg
Global Warming Potential [CO2 eq] after end of life	-7.11 kg
Siemens Eco Profile (SEP)	Siemens EcoTech
Electromagnetic compatibility	
EMC emitted interference	acc. to IEC 60947-4-2: Class A
Communication/ Protocol	
communication module is supported	
● PROFINET standard	Yes
● PROFINET high-feature	Yes
● EtherNet/IP	Yes
● Modbus RTU	Yes
● Modbus TCP	Yes
● PROFIBUS	Yes
UL/CSA ratings	
manufacturer's article number	
● of circuit breaker usable for Standard Faults	
— at 460/480 V according to UL	Siemens type: 3RV2742, max. 70 A or 3VA51, max. 100 A; Iq = 5 kA
— 60/480 V according to UL	Siemens type: 3RV2742, max.40 A or 3VA51, max. 60 A; Iq max = 65 kA
— at 460/480 V at inside-delta circuit according to UL	Siemens type: 3RV2742, max. 70 A or 3VA51, max. 100 A; Iq = 5 kA
— 60/480 V at inside-delta circuit according to UL	Siemens type: 3VA51, max. 60 A; Iq max = 65 kA
— at 575/600 V according to UL	Siemens type: 3RV2742, max. 70 A or 3VA51, max. 100 A; Iq = 5 kA

— 75/600 V at inside-delta circuit according to UL	Siemens type: 3VA51, max. 60 A; Iq max = 65 kA
— at 575/600 V at inside-delta circuit according to UL	Siemens type: 3RV2742, max. 70 A or 3VA51, max. 100 A; Iq = 5 kA
● of the fuse	
— usable for Standard Faults up to 575/600 V according to UL	Type: Class RK5 / K5, max. 125 A; Iq = 5 kA
— usable for High Faults up to 575/600 V according to UL	Type: Class J / L, max. 125 A; Iq = 100 kA
— usable for Standard Faults at inside-delta circuit up to 575/600 V according to UL	Type: Class RK5 / K5, max. 125 A; Iq = 5 kA
— usable for High Faults at inside-delta circuit up to 575/600 V according to UL	Type: Class J / L, max. 125 A; Iq = 100 kA
operating power [hp] for 3-phase motors	
● at 200/208 V at 50 °C rated value	7.5 hp
● at 220/230 V at 50 °C rated value	10 hp
● at 460/480 V at 50 °C rated value	20 hp
● at 200/208 V at inside-delta circuit at 50 °C rated value	15 hp
● at 220/230 V at inside-delta circuit at 50 °C rated value	15 hp
● at 460/480 V at inside-delta circuit at 50 °C rated value	30 hp
contact rating of auxiliary contacts according to UL	R300-B300
Safety related data	
product function suitable for safety function	Yes
suitability for use	
● safety-related switching on	No
● safety-related switching OFF	Yes
safe state	Open load circuit
function test interval maximum	1 a
diagnostics test interval by internal test function maximum	1 000 s
stop category according to IEC 60204-1	0
B10d value	1 588 000
average diagnostic coverage level (DCavg)	90 %
MTTFd	39 a
IEC 62061	
Safety Integrity Level (SIL) according to IEC 62061	SIL 1
PFHD with high demand rate according to IEC 62061	1E-6 1/h
ISO 13849	
performance level (PL) according to ISO 13849-1	PL c
category according to ISO 13849-1	2
IEC 61508	
Safety Integrity Level (SIL)	
● according to IEC 61508	SIL 1
safety device type according to IEC 61508-2	Type B
PFHD with high demand rate according to IEC 61508	1E-6 1/h
PFDavg with low demand rate according to IEC 61508	0.09
Safe failure fraction (SFF)	60 %
hardware fault tolerance according to IEC 61508	0
T1 value of service life according to IEC 61508	20 a
Electrical Safety	
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
ATEX	
Safety Integrity Level (SIL) according to IEC 61508 relating to ATEX	SIL1
PFHD with high demand rate according to IEC 61508 relating to ATEX	5E-7 1/h
PFDavg with low demand rate according to IEC 61508 relating to ATEX	0.008
hardware fault tolerance according to IEC 61508 relating to ATEX	0
T1 value for proof test interval or service life according to IEC 61508 relating to ATEX	3 a
certificate of suitability	
● ATEX	Yes
● IECEx	Yes

● according to ATEX directive 2014/34/EU	BVS 18 ATEX F 003 X
type of protection according to ATEX directive 2014/34/EU	II (2)G [Ex eb Gb] [Ex db Gb] [Ex pxb Gb], II (2)D [Ex tb Db] [Ex pxb Db], I (M2) [Ex db Mb]

Approvals Certificates

General Product Approval

Confirmation

EMV

KC

For use in hazardous locations

Functional Saftey

Type Examination Certificate

Test Certificates

Type Test Certificates/Test Report

Marine / Shipping

other

Confirmation

Environment

Environment

Environmental Confirmations

Further information

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=3RW5516-1HF04
Cax online generator
http://support.automation.siemens.com/WW/CAXorder/default.aspx?lang=en&mlfb=3RW5516-1HF04
Service&Support (Manuals, Certificates, Characteristics, FAQs,...)
https://support.industry.siemens.com/cs/ww/en/ps/3RW5516-1HF04
Image database (product images, 2D dimension drawings, 3D models, device circuit diagrams, EPLAN macros, ...)
http://www.automation.siemens.com/bilddb/cax_de.aspx?mlfb=3RW5516-1HF04&lang=en
Characteristic: Tripping characteristics, I²t, Let-through current
https://support.industry.siemens.com/cs/ww/en/ps/3RW5516-1HF04/char
Characteristic: Installation altitude
http://www.automation.siemens.com/bilddb/index.aspx?view=Search&mlfb=3RW5516-1HF04&objecttype=14&gridview=view1
Simulation Tool for Soft Starters (STS)
https://support.industry.siemens.com/cs/ww/en/view/101494917