อิเล็กทรอนิกส์ซอฟท์สตาร์ทเตอร์
Solid-State Soft Starters

5.1 รุ่นซีเรียส (SIRIUS Version)

3RW30/31

5.2 รุ่นมัลติฟังก์ชั่น (SIKOSTART Version)

3RW34

3RW22

Introduction

SIRIUS 3RW30, 3RW31 Solid-state motor controllers for soft starting

- เหมาะสำหรับการสตาร์ทมอเตอร์แบบ Soft Start และ Soft Stopping ของมอเตอร์แบบ Asynchronous
- ใช้งานได้กับ Switching Devices ทุกรุ่นของ SIRIUS 3R
- สามารถติดตั้งกับ Megnetic Contactor และ Circuit Breaker

มีทั้งหมด 4 ขนาดดังนี้			
ขนาด S00	สำหรับ	1.1 - 4 kW	Output ที่ 415 V AC
ขนาด S0	สำหรับ	5.5-11 kW	Output ที่ 415 V AC
ขนาด S2	สำหรับ	15 -22 kW	Output ที่ 415 V AC
ขนาด S3	สำหรับ	30 -55 kW	Output ที่ 415 V AC

- SIRIUS 3RW30 รุ่นมาตรฐานสำหรับมอเตอร์ที่ fixed number of poles (speed)
- SIRIUS 3RW31 รุ่นพิเศษสำหรับมอเตอร์ที่สามารถเปลี่ยนจำนวน Pole ได้ (มีเฉพาะรุ่น S00)

คุณสมบัติ

- Soft starting ควบคุมมอเตอร์ด้วยแรงดันไฟฟ้า (Voltage Ramp) โดยสามารถปรับแรงดันเริ่มต้น (U_S) ได้ตั้งแต่ 40 ถึง 100% และ Ramp time สามารถตั้งได้ตั้งแต่ 0 ถึง 20 วินาที
- Soft stopping สามารถปรับตั้งได้ตั้งแต่ 0 ถึง 20 วินาที
- ใช้ได้กับแรงดันตั้งแต่ 200 V AC ถึง 575 V AC
- ใช้แรงดันควบคุม 24V AC/DC หรือ 110 ถึง 230 V AC/DC

หมายเหตุ

- SIRIUS 3RW3 ถูกออกแบบมาให้ใช้งานสำหรับการสตาร์ทมอเตอร์แบบปกติ ถ้าเป็นการสตาร์ทแบบอื่น หรือในกรณี High switching frequency ควรเลือกใช้รุ่นที่ใหญ่ขึ้น
- ในกรณีที่มอเตอร์ใช้เวลาในการสตาร์ทนาน หรือหยุดนาน ควรใช้ร่วมกับ Overload Relay และ PTC Thermistor
- ไม่ควรมี Capacitive component เช่น ตัวปรับแก้ค่าเพาเวอร์แฟ็คเตอร์ ระหว่างตัวมอเตอร์ และ SIRIUS 3RW3
- อุปกรณ์ป้องกันระบบอย่างอื่น เช่นฟิวส์ โอเวอร์โหลดรีเลย์ จะถูกกำหนดโดย Direct on-line starting และ Local short-circuit ซึ่งจะต้องสั่งซื้อแยกต่างหาก

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Features

- Soft starting with voltage ramp; the setting range of the starting voltage Us is sufficient between 40% to 100% and ramp time tR can be set from 0 s to 20 s
- Controlled shutdown with voltage ramps; the shut-down ramp time off can be varied between 0 s to 20 s
- Setting with 3 potentiometers, simple installation and startup
- System voltages from 200 to 460 V, 50/60 Hz
- Two control voltage designs for 24 V AC/DC and 110 to 230 V AC/DC
- Wide temperature range: -25 to 60 °C

Selection and ordering Data

3RW30/31

mm

Type	W	H	D
3RW301	45	97.5	100.5
3RW302	45	125	124
3RW303	55	160	148
3RW304	70	170	183

Size	Rated Current (A)	Motor Output at 230V (kW)	Motor Output at 400V (kW)	Part No.	Price Baht
Electronic Softstarters for 3-Phase Motor					
S00	6	0.55-1.1	1.1-2.2	**3RW30 14-1CB•4**	12,700
	9	1.5-2.2	3-4	**3RW30 16-1CB•4**	15,300
S0	12.5	3	5.5	**3RW30 24-1AB•4**	16,800
	16	4	7.5	**3RW30 25-1AB•4**	19,300
	25	5.5	11	**3RW30 26-1AB•4**	21,800
S2	32	7.5	15	**3RW30 34-1AB•4**	25,600
	38	11	18.5	**3RW30 35-1AB•4**	32,700
	45	15	22	**3RW30 36-1AB•4**	43,000
S3	63	18.5	30	**3RW30 44-1AB•4**	46,400
	75	22	37	**3RW30 45-1AB•4**	58,400
	100	30	45-55	**3RW30 46-1AB•4**	70,000

Rated Control Voltage	AC/DC 24 V	AC/DC 110-230 V
Order No. Suffix (•)	0	1

Selection and Ordering Data

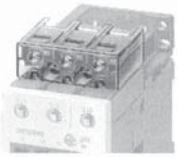
Size	Rated Current (A)	Motor Output at 115VAC (kW)	Motor Output at 230VAC (kW)	Part No.	Price Baht
Softstarters for single-phase motors					
S0	25	2.2	4	**3RW30 26-1AA12**	16,900
S2	38	3	5.5	**3RW30 35-1AA12**	27,000
S3	75	3.5	11	**3RW30 45-1AA12**	46,400

Size	Rated Current (A)	Motor Output at 230VAC (kW)	Motor Output at 400VAC (kW)	Part No.	Price Baht
Softstarters with two-ramp control for 3-phase motors with two speeds (double pole-reversing)					
S0	12.5	3	5.5	**3RW31 24-1CB14**	24,200
	16	4	7.5	**3RW31 25-1CB14**	26,300
	25	5.5	11	**3RW31 26-1CB14**	28,400

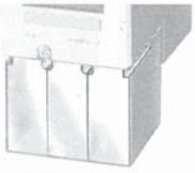
Accessories for Solid-State Soft Starters

3RW39 26-8A

3RW39 36-8A



3RT19 36-4EA2



3RT19 46-4EA1

For Devices Type	Design	Part No.	Price Baht
Fans			
3RW3. 2.	To increase switching frequency and for unit mounting in positions different from the normal position. The fan is snapped into the housing from below.	**3RW39 26-8A**	5,200
3RW30 3.,4.		**3RW39 36-8A**	6,400
Covers			
Terminal cover for box terminals			
3RW30 3.	Additional touch guard to be fitted at the box terminals (2 units required per device, 1 Pack=10 Units).	**3RT19 36-4EA2**	170
3RW30 4.		**3RT19 46-4EA2**	210
Terminal cover for cable lug and busbar connection			
3RW 30 4.	For meeting the clearance and as protection against accidental fingertouch with distant box terminals. (2 units required per device, 1 Pack=1 Unit)	**3RT19 46-4EA1**	330

Note : The covers and connection modules listed here are also used for load feeders (circuit-breaker 3RV + contactor 3RT)

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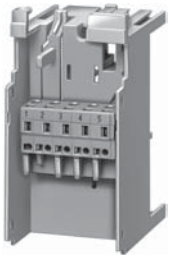
	For Devices Type	Description	Part No.	Price Baht
 3RK1 400		**AS-Interface load feeder modules for size S00-S0**		
		AS-Interface load feeder module • For snapping onto standard mounting all • For mounting onto 40 mm or 60 mm busbar systems And SIRIUS busbar adapters the fitting support is Required. The AS-Interface connector for data and Auxiliary supply cables (yellow and black) Must be ordered separately. 2 inputs / 1 output / DC 24 V	**3RK1 400-1KG01-0AA1**	8,600
 3RK1 901-3GA00		4 inputs / 2 output / DC 24V	**3RK1 400-1MG01-0AA1**	9,900
		2 inputs / 1 relay output /AC 120/230	**3RK1 402-3KG02-0AA1**	10,800
		3 inputs / 1 relay output/AC 120/230 V	**3RK1 402-3LG02-0AA1**	11,300
 3RK1 901-OEA00		**Support for AS-Interface Load feeder module** 45 mm For mounting onto 3RA 19 22-1A SIRIUS standard mounting rail adapter	**3RK1 901-3GA00**	1,020
 3RK1 901-ONA00 3RK1 901-OPA00		**Power connector set** 5-pole, 2.5 mm² (1 pack. = 5 plugs and 5 couplings)	**3RK1 901-0EA00**	11,400
		AS-Interface connector for data and Auxiliary supply cables yellow With overlapping terminals for 2 x (0.5 to 0.75 mm²) flexible lead (1 Pack. = 5 Units) black	**3RK1 901-0NA00** **3RK1 901-0PA00**	2,000 2,000
 3RA19 22		**Adapters for rail mounting**		
	3RW 30.1	For mechanical fixing of circuit-breaker and soft starter; suitable for snap-on fitting on standard mounting rail or for screw fitting (1 Pack. = 5 Units)	**3RA19 22-1A**	3,600
 3TX7 462-3.		**Surge suppressor of RC network for PLC control**		
	3RW 30.	**RC element** AC127 V for snapping onto 35 mm standard to 240 V mounting rail	**3TX7 462-3T**	740

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Introduction

SIKOSTART 3RW34 Solid-state motor controllers for soft starting

- เหมาะสำหรับการสตาร์ทมอเตอร์แบบ Soft Starting และ Soft Stopping ของ AC Induction Motor แบบ 3 เฟส

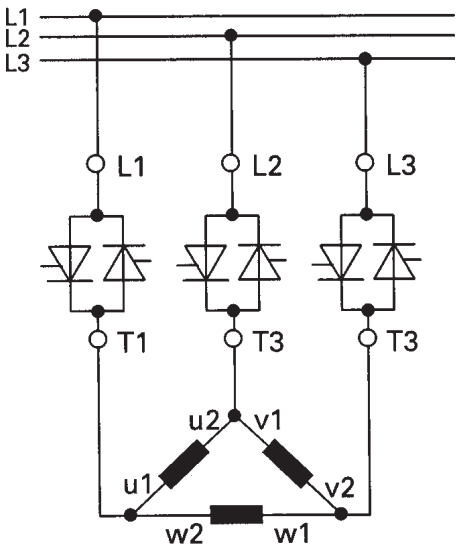
คุณสมบัติ

- Soft starting ควบคุมมอเตอร์ด้วยแรงดันไฟฟ้า (Voltage Ramp) โดยสามารถปรับแรงดันเริ่มต้น (U_s) ได้ตั้งแต่ 30 ถึง 80% และ Ramp time สามารถตั้งได้ตั้งแต่ 0.5 ถึง 60 วินาที
- Soft stopping สามารถปรับตั้งได้ตั้งแต่ 0.5 ถึง 60 วินาที
- ใช้ได้กับแรงดันตั้งแต่ 200 V AC ถึง 575 V AC
- ใช้แรงดันควบคุม 24V AC/DC หรือ 110 ถึง 230 V AC/DC

หมายเหตุ

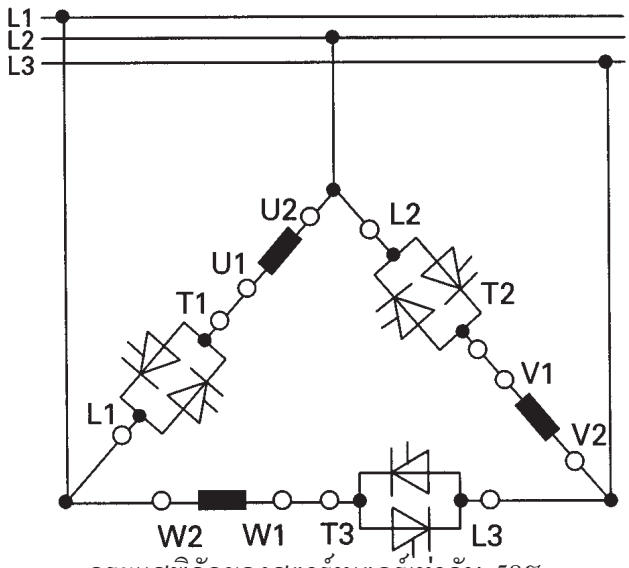
- SIKOSTART 3RW34 ถูกออกแบบมาให้ใช้งานสำหรับการสตาร์ทมอเตอร์แบบปกติ ถ้าเป็นการสตาร์ทแบบอื่นหรือในกรณี High switching frequency ควรเลือกใช้รุ่นที่ใหญ่ขึ้น
- ในกรณีที่มอเตอร์ใช้เวลาในการสตาร์ท หรือ หยุดนาน ควรใช้ร่วมกับโอเวอร์โหลดรีเลย์ และ PTC Thermistor
- ไม่ควรมี Capacitive component เช่น ตัวปรับแก้ค่าเพาเวอร์แฟ็คเตอร์ ระหว่างตัวมอเตอร์ และ SIKOSTART 3RW34
- อุปกรณ์ป้องกันระบบอย่างอื่น เช่นฟิวส์ โอเวอร์โหลดรีเลย์ จะถูกกำหนดโดย Direct on-line starting และ Local short-circuit ซึ่งจะต้องสั่งซื้อแยกต่างหาก

Standard-circuit



กระแสพิกัดของสตาร์ทเตอร์เท่ากับกระแสพิกัดปกติของมอเตอร์ และใช้สายไฟ 3 สายเข้ามอเตอร์

Inside-delta-circuit



กระแสพิกัดของสตาร์ทเตอร์เท่ากับ 58% ของกระแสพิกัดปกติของมอเตอร์ และใช้สายไฟ 6 สายเข้ามอเตอร์ (เหมือนการสตาร์ทแบบสตาร์-เดลต้า)

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Features

- Soft starting with voltage ramp; the setting range of the starting voltage (U_s) extends from 30% to 80% and ramp time t_R can be set from 0.5 s to 60 s
- Soft deceleration with voltage ramp; the deceleration ramp time t_{off} can be set in a range from 0.5 s to 60 s. The switching voltage U_{off} depends on the selected starting voltage (U_s)
- Setting via 3 potentiometers, simple installation and startup, automatic operation possible
- System voltages from 200 to 575 V, 50/60 Hz
- Two control voltage designs for 24 V DC and 230 V AC
- Wide temperature range: -25 to 60°C
- Optional AS-interface control

Selection and Ordering Data

3RW34

Current (I_e) Amp	Motor Output at 400 V AC (kW)	Part No.	Price Baht
Standard connection, Ambient Temp. 40°C			
57	30	**3RW34 54-0DC•4**	151,000
70	37	**3RW34 55-0DC•4**	163,000
110	45-55	**3RW34 57-0DC•4**	193,000
135	75	**3RW34 58-0DC•4**	219,000
162	90	**3RW34 65-0DC•4**	260,000
195	110	**3RW34 66-0DC•4**	301,000
235	132	**3RW34 67-0DC•4**	344,000
352	160-200	**3RW34 72-0DC•4**	469,000
500	250	**3RW34 83-0DC•4**	626,000
700	315-400	**3RW34 84-0DC•4**	930,000
1,050	560-630	**3RW34 86-0DC•4**	1,204,000

mm

Type	W	H	D
3RW34 54	216	356	187
3RW34 55/57/58	216	356	187
3RW34 65/66/67	292	381	190
3RW34 72	344	417	224
3RW34 83/84	442	517	231
3RW34 86	448	794	220

Current (I_e) Amp	Motor Output at 400 V AC (kW)	Part No.	Price Baht
6 Wire Connection (Inside-Delta), Ambient Temp. 40°C			
110	45-55	**3RW34 54-0DC•4**	151,000
135	75	**3RW34 55-0DC•4**	163,000
205	110	**3RW34 57-0DC•4**	193,000
235	132	**3RW34 58-0DC•4**	219,000
285	160	**3RW34 65-0DC•4**	260,000
352	200	**3RW34 66-0DC•4**	301,000
450	250	**3RW34 67-0DC•4**	344,000
608	335	**3RW34 72-0DC•4**	469,000
865	400-500	**3RW34 83-0DC•4**	626,000
1,216	560-710	**3RW34 84-0DC•4**	930,000
1,720	850-1,000	**3RW34 86-0DC•4**	1,204,000

Rated Control Voltage	DC 24 V	AC 230 V
Order No. Suffix (•)	2	4

Softstarters for Motors

3RW22

Service Range
- Pumps, compressors
- Fans
- Conveyor belts
- Breaker, mills
- Stirring appauatus
- Grinding machines
- Wire-drawing machines, textile machines
- Presses
- machine tools

Features
The SIKOSTART 3RW22 compact starters have the following service propertits:
- Soft starting with breakaway impulse, voltage ramp and current limiting can be combined
- Three running-down modes selectable; free running down, soft running sown, DC braking
- Ramp detection
- Integrated thermistor provides softstarter overtemperature protection.
- Protection against temperature rise
- Interface for communication with PC
- Simple adaptation to the motor feeder
- System voltages from 200 to 500 V, 50/60 Hz
- Integrated power supply unit for three control supply voltages
- Automatic operation possible
- Display of 5 operating states and fault signals
- Applicable up to 55C
- Higher load ratings by selecting low ambient temperature
- Simple mounting and commissioning
- Value setting with potentiometer and slide switch

Mounting
The 3RW22 units are screwed to vertical surfaces. There should be at least 20 cm (40 cm for starters with rated current > 285 A) of clearance at the top and bottom to other devices in order to ensure an unobstructed flow of cooling air.

Advice
- The 3RW solid-state motor starters are designed for normal starting. In the case of heavy starting or increased starting frequency, a larger unit must be selected.
- For an exact dimensioning. The special starting conditions (e.g. direct-on-line starting time and current) must be observed.
- Special starting conditions may require, that for the start-up phase, a check of the setting range of the overload relay has to be done.
- If necessary, an overload relay for heavy starting must be selected where long starting times are involved. PTC thermistor detectors are recommended.
- No capactitive elements (e.g. correction equipment) may be contained in the motor feeder between SIKOSTART and the motor.
- Fuses, switching devices and overload relays must be ordered separately.

Selection Guide

When selecting, the total system consisting of SIKOSTART, squireel-cage motor and driven Machine must be considered.

Standard starting conditions (e.g.normal Starting, selection according to catalog) exist, When the following conditions are fulfiled:
- Motors with Class $K_L > 10$
- The moment of inertia of the whole drive system must not exceed the 10 fold value of the motor torque of inertia ($J_G > 10\ J_M$).

For the selection for abnormal starting conditions, the following is required:
- Motor ratings
- Load ratings
- Torque-speed characteristic of the driven machine and motor
- current-speed characteristic of the motor with direct-on-line starting
- Starting frequency
- Load cycle

Mode of Operation
The adjacent figure shows the basic torque characteristic of the soft starting of a motor.

Beginning with the set starting voltabge, the stator voltage is increased to 100% during the preset ramp time by a thyristor phase-angle control.

The ramp characteristic can be modified by setting diverse potentiometers.

Torque surges are thereby avoided

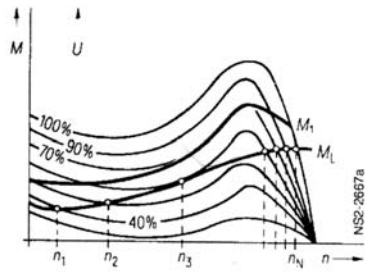
A control device (microprocessor) monitors the power factor of the motor during operation.

The motor is supplied only with as much electric power as is needed to produce the required load torque and serious drops in speed on the shaft by load surges are avoided.

Solid-state Unit Protection and RS232 Serial PC Interface and COM SIKOSTART

The unit design has, in addition to the solid-state unit protection, a PC interface for communication purposes.
This, together with the COM SIKOSTART PC program, enables simple parameterizing, controlling and monitoring SIKOSTART 3RW22 starters via a PC or a Notebook. A parameter set entered before can be stored and called again when a until having the same drive is parameterized.

It is possible, in addition, to store 2 or 3 parameter sets in the motor starter. Ths, these units are suitable for use with Dahlander connected and pole-changing motors, wind power stations as well as for serial starting motors with differing parameter sets.



ML = Load torque
M1 = Motor torque with SIKOSTART
Torque characteristic

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Features

- Control input 100-415 V AC
- Energy saving
- 690 V AC version available on request
- Ambient temperature selectable, 40°C or 55°C
- 5 m cable and COM software to be ordered separately

Selection and ordering data

3RW22 21

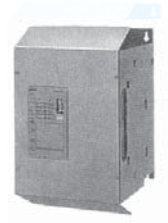
mm

Type	W	H	D
3RW22 21	120	220	145

3RW22 23 to RW22 31

mm

Type	W	H	D
3RW22 23-25	125	240	178
3RW 22 26	165	240	180
3RW22 27-28	205	280	180
3RW22 30-31	223	290	225



3RW22 34 to 3RW22 50

mm

Type	W	H	D
3RW22 34-40	270	450	265
3RW22 42-43	465	655	255
3RW22 45	560	730	340
3RW22 47-50	600	875	330

Motors switching AC2 and AC3 duty				Part No.	Price
Rated Operational Current I_e at 400 V		Rated outputs of three-phase motor at 50 Hz at: 400 V			
A (@40 °C)	A (@55 °C)	kW (@40 °C)	kW (@ 55 °C)		Baht
SIKOSTART with RS232 serial interface (200-500 V AC)					
7	5.5	3	2.2	**3RW22 21-1AB15**	76,600
10.5	9	4	4	**3RW22 23-1AB15**	87,600
22	16	11	7.5	**3RW22 25-1AB15**	96,200
28	22	15	11	**3RW22 26-1AB15**	110,800
35	32	18.5	15	**3RW22 27-1AB15**	125,700
45	37	22	18.5	**3RW22 28-1AB15**	146,400
50	45	25	22	**3RW22 30-1AB15**	166,900
70	63	37	30	**3RW22 31-1AB15**	179,200
100	85	55	45	**3RW22 34-0DB15**	255,800
135	110	75	55	**3RW22 35-0DB15**	294,100
160	140	90	75	**3RW22 36-0DB15**	411,700
235	205	132	110	**3RW22 38-0DB15**	480,100
300	250	160	132	**3RW22 40-0DB15**	596,400
450	355	250	200	**3RW22 42-0DB15**	778,300
560	450	315	250	**3RW22 43-0DB15**	991,600
700	560	400	315	**3RW22 45-0DB15**	1,241,900
865	700	500	400	**3RW22 47-0DB15**	1,600,200
1200	1000	710	560	**3RW22 50-0DB15**	2,092,600
Accessories					
Com Sikostart PC Communication program via RS232 serial interface Disk format 3.5 in.				**3RW27 01-0AA00**	2,200
Com Sikostart PC communication cable, 5 m long				**3RW29 20-1DA00**	4,300

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Softstarters for Motors

General Information 3RW22 21-3RW22 50

Model **Type no.**			**Model with device protection** **3RW22..-1AB05**	**Model with device protection and serial RS 232-interface** **3RW22..-..B1.**	
Method of setting the functions on the various models			on the starter itself via potentiometers	on the starter itself via potentiometers	via PC with COM SIKOSTATR
Start	**Impulse shart**	Value	80% Duration 50 to 1000 ms	80% 50 to 1000 ms	20 to 100% U_n 0 to 1000 ms
	Voltage ramp	Initial voltage Ramp time	20 to 100% U_n 0.3 to 180 s	20 to 100% U_n 0.3 to 180 s	20 to 100% U_n 0 to 1000 s
	Current limiting	Value Duration	from 50 to 600% $/_e$ until run-up is detected	from 50 to 600% $/_e$ until run-up is detected	value in Amps, up to max. 6x $/_e$ until run-up is detected
	Voltage limiting	Value Duration	- -	- -	20 to 100% Un 0 to 1000 s
	Run-up detection	Function	Automatic increase of the Motor terminal voltage to 100% Un when rated speed isreached	Automatic increase of the motor terminal voltage to 100% Un when rated speed is reached	Automatic increase of the motor terminal voltage to 100% Un when rated speed is reached
		De-activate	x	x	x
	Emergency start (only starting ramp active)		x	x	x
Run	**Operation with energy saving**		x	x	x
	Operation with bypass contactor		x	x	x
	Continuous operation at max. 115% I_e (FULL ON)		x	x	x
Stop	**Coast to stop**	Stop time			
	Soft stop	Initial voltage	fixed at 90% U_n of the stop ramp	fixed at 90% U_n	20 to 100% U_n
		Switch-off value Of the stop ramp	85% of the initial ramp voltae	85% of the initial ramp voltage	20 to 100% U_n
	Stop time		1 s to 20 s	1 s to 20 s	0 to 1000 s
	Pump stop	Switch-off value of The pump stop			20 to 90% U_n
		ramp Stop time	5 to 90 s	5 to 90 s	5 to 200 s
	DC braking	Braking torque	inversely proportional to the Braking duration from 20% to 85% of the max. possible braking torque	inversely proportional to the braking duration from 20% to 85% of the max. possible braking torque	20 to 100% of the max. braking torque, independent of the braking duation
		Braking duration	3 to 18 s	3 to 18 s	1 to 18 s

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Softstarters for Motors

Climatic conditions		Siemens Standard 29070 part 1, Climatic class J2
Mechanical Environmental conditions		
. Oscillation		Siemens Standard 29010, severity level 13
. shock		in acc. With IEC 68-2-27
Electromagnetic compatibility **EMC**		Refer to Technical Support
Electronic control section		
Rated control supply voltage	V	380to415, 200to240, 100 to 120+10 %-15%
Rated control supply current	mA	approx.40 at 380 to 415 V
	mA	approx.75 at 200 to 240 V
	mA	approx.100 at 100 to 120 V
Rated frequency	Hz	50/60,tolerance 45 to 66
Short-circuit protection of the control circuit		fuse incorporated, 250 mA slow-blow, 6.3 mmX32 mm
Control times	Switch-on delay	ms 50 f or separate control signal, i.e. when rated control power supply and main power are already present when the input signal is applied
	Switch-on delay	s 1 for contactor type operation, ON/OFF by switching the separate rated control power supply
	Switch-on delay	s 1.1 for automatic operation
	Recovery time	ms 440 after DC braking
Bridging time in the event of supply failure	Control supply voltage	ms 80
Reaction time in the event of supply failure	Load circuit	ms 100
Indication-Operation status	LED1	Ready (Standby)
(continuous LED)	LED2	Start / stopping
	LED3	Motor running
	LED4	Energy saving
	LED5	DC braking
Indiation-Fault conditions	LED1	Supply fault (phase failure, supply or land not detected, control voltage too low)
(flashing LED)	LED2	
	LED3	Thyristor fault (tripped due to overload or max. temperature exceeded)
	LED4	General fault
	LED5	Start blocked (starter too hot)

Control inputs

In the case of the models with RS 232-interface the assignment of the inputs is dependent on the number of starting parameter set chosen (max.3)

	Standard application with a single motor	Sequantial starting of several motors or windings or a pole-changing motor	
Input 1	ON	ON/OFF Parameter set 1	ON/OFF Parameter set 1
Input 2	ON	ON/OFF Parameter set 2	ON/OFF Parameter set 2
Input 3	Reset	Reset	ON/OFF Parameter set 3

	Rated operating current	approx.. 10 mA toDIN 19240
	Protection against overvoltage	Snubber circuit with varistor and capacitor
	Rated voltage	DC 24 V from internal power supply via DC+24 V terminals
Relay outputs	Output1	Group alarm (1 NO +1NC)
	Output2	Motor running (1 NO)
	Output3	DC braking, brake contactor ON (1 ON)
	Rated operational current	3A, AC-15/AC-14 at 240V
		0.1A, DC-13at240V
	Short-circuit protection	0.5ADC -13 at 24V
Max. conductor cross-sections	Solid mm2	4 A Operational Class gL/gG; 6A rapid blow (fuse not included in delivery)
	Finely stranded with end sleeve mm2	0.5to2.5
	Tightening torque Nm	0.5to1.5
		0.8to1.4

Electronic power section					
Continuous operation (% of I_e)			115%		
Starting current (% of I_e)	600%	450%	300%	250%	200%
Max. starting time cold(40C to 55C) s	2	10	60	120	200
Hot s	1	5	30	60	100

Permissible ambient	In operation C	0 to 44 or 55 (via selector switch)
Temperature	In storage C	-40 to +80 (+60 in the case of 3RW22..-..B1 .owing to disk in the package)
Degree of protection	3RW22 21 to 3RW22 31	IP20
To IEC 947-1 and DIN 40050	3RW22 34 to 3RW22 50	IP00
Overload protection		Thermistor temperature sensor on the heat sink
		Electronic protection based on mathematical thermal model
Permissible sits altitude		up to 3000 m above sea level; le needs to be derated above 1000m
Cooling fans	Rated control suppy voltage V	230±10%
(fitted to units above 37 kW)	Frequency Hz	45 to 66

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