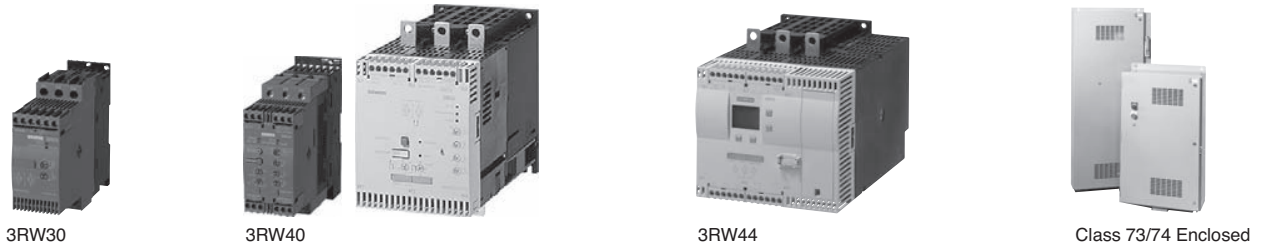


Motor Starters, Soft Starters and Load Feeders

Introduction

Overview



3RW30

3RW40

3RW44

Class 73/74 Enclosed

Order No. **Page**

For operation in the control cabinet

3RW soft starters for standard applications

- Application areas
 - Fans
 - Building/construction machines
 - Escalators
 - Air conditioning systems
 - Assembly lines
 - Operating mechanisms
- Pumps
- Presses
- Transport systems
- Fans
- Compressors and coolers

| | | | |
|----------------------------|--|--------------|-----|
| 3RW30 soft starters | <ul style="list-style-type: none"> • SIRIUS 3RW30 soft starters for soft starting and smooth ramp-down of three-phase asynchronous motors • Performance range of up to 75 Hp (at 460 V) | 3RW30 | 7/4 |
| 3RW40 soft starters | <ul style="list-style-type: none"> • SIRIUS 3RW40 soft starters with the integral functions <ul style="list-style-type: none"> - Solid-state motor overload and intrinsic device protection and - Adjustable current limiting for the soft starting and stopping of three-phase asynchronous motors • Performance range of up to 300 Hp (at 460 V) | 3RW40 | 7/8 |

3RW soft starters for high-feature applications

- Application areas
 - Pumps
 - Compressors
 - Industrial refrigerating systems
 - Conveying systems
 - Machine tools
- Fans
- Cooling systems
- Water transport
- Hydraulics
- Mills

| | | | |
|----------------------------|--|--------------|------|
| 3RW44 soft starters | <ul style="list-style-type: none"> • In addition to soft starting and soft ramp-down, the solid-state SIRIUS 3RW44 soft starters provide numerous functions for higher-level requirements • Performance range <ul style="list-style-type: none"> - Up to 900 Hp (at 460 V) in inline circuit and - Up to 1600 Hp (at 460 V) in inside-delta circuit | 3RW44 | 7/16 |
|----------------------------|--|--------------|------|

For enclosed applications

| | | | |
|---|--|--------------------|------|
| Enclosures in NEMA 1, 3, 4, & 12 types UL/CSA listed | <ul style="list-style-type: none"> • Complete starter includes 3RW40 or 3RW44 and CPT • Performance Range of up to 600 Hp (at 460 V) • Combination options include circuit breaker or fusible disconnect | Class 73/74 | 7/83 |
| | <ul style="list-style-type: none"> • Application areas: <ul style="list-style-type: none"> - Compressors - Pumps - Stamping presses - Cooling towers - Molding and extruding - Chippers and debarkers - Lumber processing - Pulp & paper processing - Conveyors - Textiles - HVAC | | |

For Operation in the Control Cabinet

3RW Soft Starters

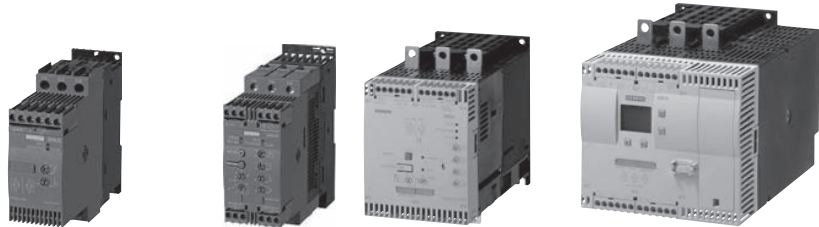
General Data

Overview

The advantages of the SIRIUS soft starters at a glance:

- Soft starting and smooth ramp-down¹⁾
- Stepless starting
- Reduction of current peaks
- Avoidance of mains voltage fluctuations during starting
- Reduced load on the power supply network

- Reduction of the mechanical load in the operating mechanism
- Considerable space savings and reduced wiring compared with conventional starters
- Maintenance-free switching
- Very easy handling
- Fits perfectly in the SIRIUS modular system



| | | SIRIUS 3RW30 Standard applications | SIRIUS 3RW40 Standard applications | SIRIUS 3RW44 High-Feature applications |
|---|----|---------------------------------------|---------------------------------------|---|
| Rated current up to 50 °C | A | 3 ... 98 | 11 ... 385 | 26 ... 1076 |
| Rated operational voltage | V | 200 ... 480 | 200 ... 600 | 200 ... 690 |
| Motor rating at 460 V | | | | |
| • Inline circuit | Hp | 1.5 ... 75 | 7.5 ... 300 | 15 ... 900 |
| • Inside-delta circuit | Hp | -- | -- | 22 ... 1600 |
| Ambient temperature | °C | -25 ... +60 | -25 ... +60 | 0 ... +60 |
| Soft starting/ramp-down | | ✓ ¹⁾ | ✓ | ✓ |
| Voltage ramp | | ✓ | ✓ | ✓ |
| Starting/stopping voltage | % | 40 ... 100 | 40 ... 100 | 20 ... 100 |
| Starting and ramp-down time ⁷⁾ | s | 0 ... 20 | 0 ... 20 | 1 ... 360 |
| Torque control | | -- | -- | ✓ |
| Starting/stopping torque | % | -- | -- | 20 ... 100 |
| Torque limit | % | -- | -- | 20 ... 200 |
| Ramp time | s | -- | -- | 1 ... 360 |
| Integral bypass contact system | | ✓ | ✓ | ✓ |
| Intrinsic device protection | | -- | ✓ | ✓ |
| Motor overload protection | | -- | ✓ | ✓ |
| Thermistor motor protection | | -- | ✓ ²⁾ | ✓ |
| Integrated remote RESET | | -- | ✓ ³⁾ | ✓ |
| Adjustable current limiting | | -- | ✓ | ✓ |
| Inside-delta circuit | | -- | -- | ✓ |
| Breakaway pulse | | -- | -- | ✓ |
| Creep speed in both directions of rotation | | -- | -- | ✓ |
| Pump ramp-down | | -- | -- | ✓ ⁴⁾ |
| DC braking | | -- | -- | ✓ ⁴⁾ 5) |
| Combined braking | | -- | -- | ✓ ⁴⁾ 5) |
| Motor heating | | -- | -- | ✓ |
| Communication | | -- | -- | With PROFIBUS DP (optional) |
| External display and operator module | | -- | -- | (optional) |
| Operating measured value display | | -- | -- | ✓ |
| Error logbook | | -- | -- | ✓ |
| Event list | | -- | -- | ✓ |
| Slave pointer function | | -- | -- | ✓ |
| Trace function | | -- | -- | ✓ ⁶⁾ |
| Programmable control inputs and outputs | | -- | -- | ✓ |
| Number of parameter sets | | 1 | 1 | 3 |
| Parameterization software (Soft Starter ES) | | -- | -- | ✓ |
| Power semiconductors (thyristors) | | 2 controlled phases | 2 controlled phases | 3 controlled phases |
| Screw terminals | | ✓ | ✓ | ✓ |
| Spring-type terminals | | ✓ | ✓ | ✓ |
| UL/CSA | | ✓ | ✓ | ✓ |
| CE marking | | ✓ | ✓ | ✓ |
| Soft starting under heavy starting conditions | | -- | -- | ✓ ⁴⁾ |

Configuring support

Win-Soft Starter, Electronic Application Selector, Technical Assistance Tel.: 1-800-333-7421

✓ Function is available; -- Function is not available.

¹⁾ Only soft starting available for 3RW30.

²⁾ Optional up to size S3 (device variant).

³⁾ Available for 3RW40 2. to 3RW40 4., optional for 3RW40 5. and 3RW40 7..

⁴⁾ Calculate soft starter and motor with size allowance where required.

⁵⁾ Not possible in inside-delta circuit.

⁶⁾ Trace function with Soft Starter ES software.

⁷⁾ Actual motor start times are load dependent.

You can find further information on the Internet at:

www.usa.siemens.com/softstarters

For Operation in the Control Cabinet

3RW Soft Starters

3RW40 for standard applications

Overview

SIRIUS 3RW40 soft starters have all the same advantages as the 3RW30 soft starters.

The SIRIUS 3RW40 soft starters are characterized above all by their small space requirements. Integrated bypass contacts mean that minimal power is used at the power semiconductors (thyristors) after the motor has started up. This cuts down on heat losses, enabling a more compact design and making external bypass circuits superfluous.

At the same time this soft starter comes with additional integrated functions such as adjustable current limiting, motor overload and intrinsic device protection, and optional thermistor motor protection on some models.

Internal intrinsic device protection prevents the thermal overloading of the thyristors and the power section defects this can cause. As an option the thyristors can also be protected by semiconductor fuses from short-circuiting.

Thanks to integrated status monitoring and fault monitoring, this compact soft starter offers many different diagnostics options. Up to four LEDs and relay outputs permit differentiated monitoring and diagnostics of the operating mechanism by indicating the operating state as well as for example mains or phase failure, missing load, non-permissible tripping time/class setting, thermal overloading or device faults.

Soft starters rated up to 300 Hp (at 460 V) for standard applications in three-phase systems are available. Extremely small sizes, low power losses and simple start-up are just three of the many advantages of the SIRIUS 3RW40 soft starters.

"Increased safety" type of protection EEx e according to ATEX directive 94/9/EC

The 3RW40 soft starter sizes S0 to S12 are suitable for the starting of explosion-proof motors with "increased safety" type of protection EEx e.

See "Appendix" → "Standards and approvals" → "Type overview of approved devices for potentially explosive areas (ATEX explosion protection)".

Application

The SIRIUS 3RW40 solid-state soft starters are suitable for soft starting and stopping of three-phase asynchronous motors.

Due to two-phase control, the current is kept at minimum values in all three phases throughout the entire starting time and disturbing direct current components are eliminated in addition. This not only enables the two-phase starting of motors up to 300 Hp (at 460 V) but also avoids the current and torque peaks which occur e. g. with wye-delta starters.

Application areas

- Pumps
- Heat pumps
- Hydraulic pumps
- Presses
- Conveyors
- Roller conveyor
- Screw conveyors
- Escalators
- Small fans
- Centrifugal blowers
- Bow thrusters
- Stirrers
- Extruders
- Lathes
- Milling machines

For Operation in the Control Cabinet

3RW Soft Starters

3RW40
for standard applications

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6
7

Selection and ordering data



3RW40 28-1BB14



3RW40 38-1BB14



3RW40 47-1BB14

| Ambient temperature 50 °C | | | | | Size | Order No. | List Price \$ per PU | PS* | Weight per PU approx. kg |
|---|---|-------|-------|-------|------|----------------|----------------------|--------|--------------------------|
| Rated operational current $I_e^{1)}$ | Rated power of induction motors for rated operational voltage U_e | | | | A | | | | |
| | 200 V | 230 V | 460 V | 575 V | | | | | |
| | hp | hp | hp | hp | | | | | |
| Rated operational voltage U_e 200 ... 480 V | | | | | | | | | |
| • With screw terminals | | | | | | | | | |
| 11 | 3 | 3 | 7.5 | -- | S0 | 3RW40 24-1BB□4 | | 1 unit | 0.770 |
| 23 | 5 | 5 | 15 | -- | S0 | 3RW40 26-1BB□4 | | 1 unit | 0.770 |
| 29 | 7.5 | 7.5 | 20 | -- | S0 | 3RW40 27-1BB□4 | | 1 unit | 0.770 |
| 34 | 10 | 10 | 25 | -- | S0 | 3RW40 28-1BB□4 | | 1 unit | 0.770 |
| • With spring-type terminals | | | | | | | | | |
| 11 | 3 | 3 | 7.5 | -- | S0 | 3RW40 24-2BB□4 | | 1 unit | 0.770 |
| 23 | 5 | 5 | 15 | -- | S0 | 3RW40 26-2BB□4 | | 1 unit | 0.770 |
| 29 | 7.5 | 7.5 | 20 | -- | S0 | 3RW40 27-2BB□4 | | 1 unit | 0.770 |
| 34 | 10 | 10 | 25 | -- | S0 | 3RW40 28-2BB□4 | | 1 unit | 0.770 |
| • With screw or spring-type terminals | | | | | | | | | |
| 42 | 10 | 15 | 30 | -- | S2 | 3RW40 36-□BB□4 | | 1 unit | 1.350 |
| 58 | 15 | 20 | 40 | -- | S2 | 3RW40 37-□BB□4 | | 1 unit | 1.350 |
| 62 | 20 | 20 | 40 | -- | S2 | 3RW40 38-□BB□4 | | 1 unit | 1.350 |
| • With screw or spring-type terminals | | | | | | | | | |
| 73 | 20 | 25 | 50 | -- | S3 | 3RW40 46-□BB□4 | | 1 unit | 1.900 |
| 98 | 30 | 30 | 75 | -- | S3 | 3RW40 47-□BB□4 | | 1 unit | 1.900 |
| Rated operational voltage U_e 400 ... 600 V | | | | | | | | | |
| • With screw terminals | | | | | | | | | |
| 11 | -- | -- | 7.5 | 10 | S0 | 3RW40 24-1BB□5 | | 1 unit | 0.770 |
| 23 | -- | -- | 15 | 20 | S0 | 3RW40 26-1BB□5 | | 1 unit | 0.770 |
| 29 | -- | -- | 20 | 25 | S0 | 3RW40 27-1BB□5 | | 1 unit | 0.770 |
| 34 | -- | -- | 25 | 30 | S0 | 3RW40 28-1BB□5 | | 1 unit | 0.770 |
| • With spring-type terminals | | | | | | | | | |
| 11 | -- | -- | 7.5 | 10 | S0 | 3RW40 24-2BB□5 | | 1 unit | 0.770 |
| 23 | -- | -- | 15 | 20 | S0 | 3RW40 26-2BB□5 | | 1 unit | 0.770 |
| 29 | -- | -- | 20 | 25 | S0 | 3RW40 27-2BB□5 | | 1 unit | 0.770 |
| 34 | -- | -- | 25 | 30 | S0 | 3RW40 28-2BB□5 | | 1 unit | 0.770 |
| • With screw or spring-type terminals | | | | | | | | | |
| 42 | -- | -- | 30 | 40 | S2 | 3RW40 36-□BB□5 | | 1 unit | 1.350 |
| 58 | -- | -- | 40 | 50 | S2 | 3RW40 37-□BB□5 | | 1 unit | 1.350 |
| 62 | -- | -- | 40 | 60 | S2 | 3RW40 38-□BB□5 | | 1 unit | 1.350 |
| • With screw or spring-type terminals | | | | | | | | | |
| 73 | -- | -- | 50 | 60 | S3 | 3RW40 46-□BB□5 | | 1 unit | 1.900 |
| 98 | -- | -- | 75 | 75 | S3 | 3RW40 47-□BB□5 | | 1 unit | 1.900 |

Order No. supplement for connection types

- With screw terminals
- With spring-type terminals²⁾

Order No. supplement for rated control supply voltage U_s

- 24 V AC/DC
- 110 ... 230 V AC/DC

¹⁾ Stand-alone installation without auxiliary fan.

²⁾ Power connection: screw terminals.

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Note:

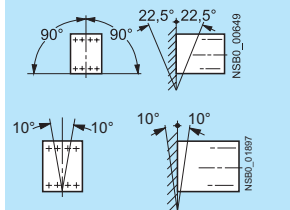
Selection of the soft starter depends on the rated motor current. The SIRIUS 3RW40 solid-state soft starters are designed for easy starting conditions. $J_{Load} < 10 \times J_{Motor}$. In the event of deviating conditions or increased switching frequency, it may be necessary to choose a larger device. Siemens recommends the use of the selection and simulation program Win-Soft Starter. For information about rated currents for ambient temperatures other than 50°C, see technical information on page 7/56

For Operation in the Control Cabinet

3RW Soft Starters

3RW40
for standard applications

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| Type | | 3RW40 2.-..B.4, 3RW40 3.-..B.4, 3RW40 4.-..B.4 | 3RW40 2.-..B.5, 3RW40 3.-..B.5, 3RW40 4.-..B.5 | 3RW40 5.-..BB.4, 3RW40 7.-..BB.4 | 3RW40 5.-..BB.5, 3RW40 7.-..BB.5 |
|--|------|--|--|-------------------------------------|-------------------------------------|
| Power electronics | | | | | |
| Rated operational voltage | V AC | 200 ... 480 | 400 ... 600 | 200 ... 460 | 400 ... 600 |
| Tolerance | % | -15/+10 | -15/+10 | -15/+10 | -15/+10 |
| Maximum blocking voltage (thyristor) | V AC | 1600 | | 1400 | 1800 |
| Rated frequency | Hz | 50/60 | | | |
| Tolerance | % | ±10 | | | |
| Uninterrupted duty at 40 °C (% of I_e) | % | 115 | | | |
| Minimum load (% of minimum selectable rated motor current I_M) | % | 20 (at least 2 A) | | | |
| Maximum cable length between soft starter and motor | m | 300 | | | |
| Permissible installation height | m | 5000 (derating from 1000, see characteristic curves); higher on request | | | |
| Permissible mounting position | | <ul style="list-style-type: none"> With auxiliary fan (for 3RW40 2. ... 3RW40 4.)  <ul style="list-style-type: none"> Without auxiliary fan (for 3RW40 2. ... 3RW40 4.) <p>-- (fan integrated in the soft starter)</p> | | | |
| Permissible ambient temperature | | | | | |
| Operation | °C | -25 ... +60; (derating from +40) | | | |
| Storage | °C | -40 ... +80 | | | |
| Degree of protection | | IP20 for 3RW40 2.; IP00 for 3RW40 3. and 3RW40 4. | | IP00 | |

| Type | | 3RW40 24 | 3RW40 26 | 3RW40 27 | 3RW40 28 |
|--|-----|------------|------------|------------|----------|
| Power electronics | | | | | |
| 40 °C/50 °C/60 °C | | | | | |
| Load rating with rated operational current I_e | | | | | |
| • Acc. to IEC and UL/CSA ¹⁾ , for individual mounting at 40/50/60 °C, AC-53a | A | 12.5/11/10 | 25.3/23/21 | 32.2/29/26 | 38/34/31 |
| Smallest adjustable rated motor current I_M | | | | | |
| For the motor overload protection | A | 5 | 10 | 17 | 23 |
| Power loss | | | | | |
| • In operation after completed starting with uninterrupted rated operational current (40 °C) approx. | W | 2 | 8 | 13 | 19 |
| • During starting with 300 % I_M (40°C) | W | 17 | 47 | 55 | 64 |
| Permissible rated motor current and starts per hour | | | | | |
| • Normal starting (Class 10) | | | | | |
| - Rated motor current $I_M^{(2)}$, starting time 3 s | A | 12.5/11/10 | 25.3/23/21 | 32.2/29/26 | 38/34/31 |
| - Starts per hour ³⁾ | 1/h | 50 | 23 | 23 | 19 |
| - Rated motor current $I_M^{(2)4)}$, starting time 4 s | A | 12.5/11/10 | 25.3/23/21 | 32.2/29/26 | 38/34/31 |
| - Starts per hour ³⁾ | 1/h | 36 | 15 | 16 | 12 |
| • Normal starting (Class 15) | | | | | |
| - Rated motor current $I_M^{(2)}$, starting time 4.5 s | A | 11/10/9 | 25.3/23/21 | 32.2/29/26 | 38/34/31 |
| - Starts per hour ³⁾ | 1/h | 49 | 21 | 18 | 18 |
| - Rated motor current $I_M^{(2)4)}$, starting time 6 s | A | 11/10/9 | 25.3/23/21 | 32.2/29/26 | 38/34/31 |
| - Starts per hour ³⁾ | 1/h | 36 | 14 | 13 | 13 |
| • Normal starting (Class 20) | | | | | |
| - Rated motor current $I_M^{(2)}$, starting time 6 s | A | 10/9/8 | 21/19/17 | 27/24/21 | 31/28/25 |
| - Starts per hour ³⁾ | 1/h | 47 | 21 | 20 | 18 |
| - Rated motor current $I_M^{(2)4)}$, starting time 8 s | A | 10/9/8 | 21/19/17 | 27/24/21 | 31/28/25 |
| - Starts per hour ³⁾ | 1/h | 34 | 15 | 14 | 13 |

¹⁾ Measurement at 60 °C according to UL/CSA not required.

²⁾ With 300 % I_M .

³⁾ For intermittent duty S4 with ON period = 30 %, $T_U = 40$ °C, stand-alone installation vertical. The quoted switching frequencies do not apply for automatic mode.

⁴⁾ Maximum adjustable rated motor current I_M , dependent on CLASS setting.