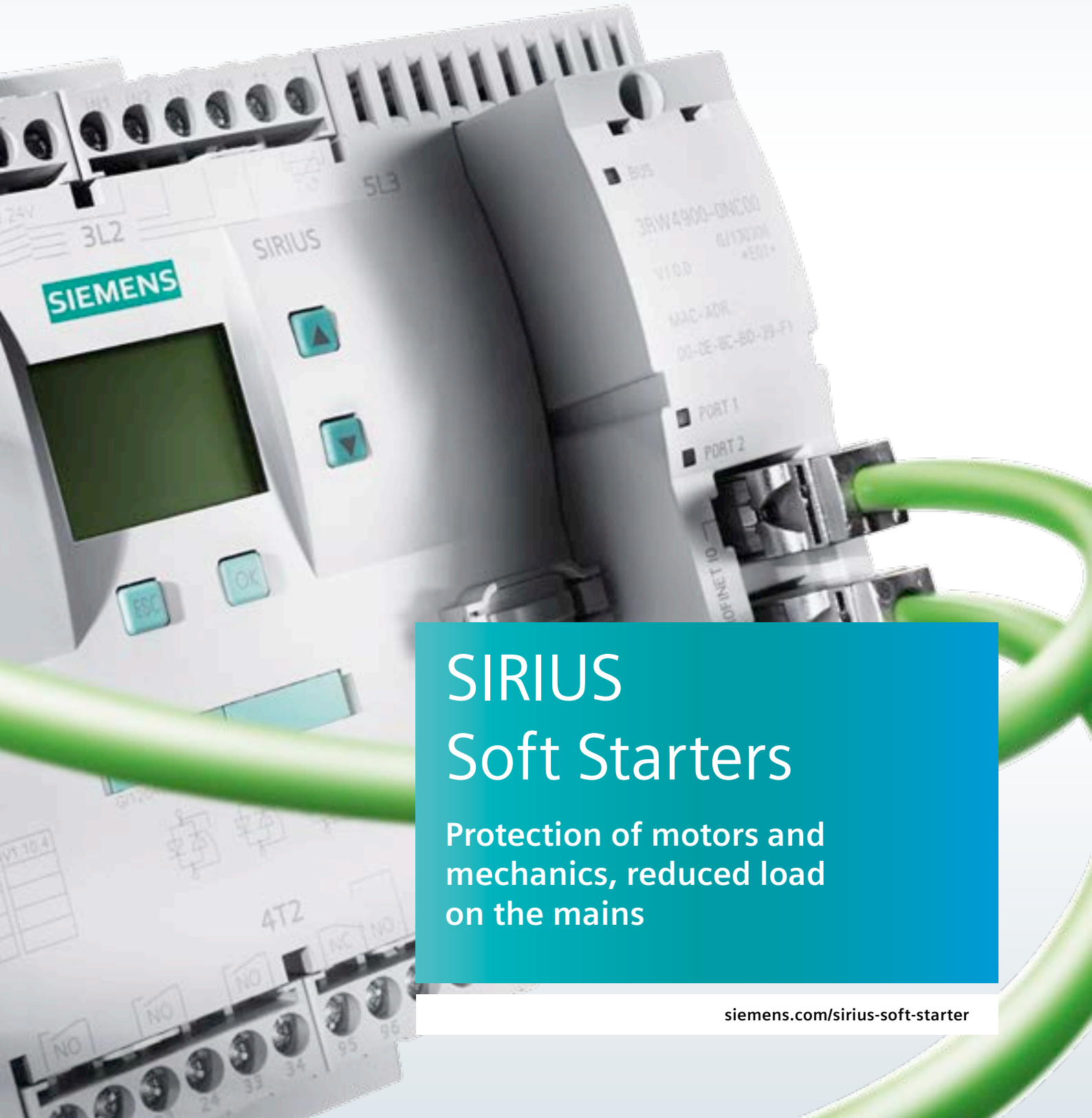
SIEMENS

Ingenuity for life



SIRIUS Soft Starters

Protection of motors and mechanics, reduced load on the mains

siemens.com/sirius-soft-starter

With SIRIUS soft starters, e.g. the acceleration of cooling water pumps in power plants can be optimized and water hammers avoided through special pump stop functions.

Contents

The Ideal SIRIUS Soft Starter for All Applications

Today, three-phase motors serve as the ultimate drive concept. Yet, for many cases, direct starting or wye-delta starting may not always be the best solution. Annoying side effects such as mechanical impact in the machine or voltage drops in the line supply frequently occur. With SIRIUS soft starters, these problems are a thing of the past. This seamless range offers a suitable soft alternative for almost any application – whether for standard or high-feature starting. Optimum and future-proof machine concepts can be very easily and efficiently realized through the smooth starting of three-phase motors.

SIRIUS Devices for the Control Cabinet

SIRIUS soft starters are perfectly matched with the SIRIUS devices for the control cabinet. The modular standard components, which can be flexibly combined, offer everything for the switching, protecting and starting of various consumers. The range features state-of-the-art technology and offers continuous innovations such as compact soft starter solutions, solid-state switching devices and many further products.

With only seven sizes, the range covers the entire power spectrum up to 250 kW. To assemble a load feeder in next to no time, a soft starter, circuit breaker, contactor or overload relay is simply docked on and screw-fastened. By the way, also maintenance is just as easy and fast as the SIRIUS components' configuration, installation and wiring.

SIRIUS devices for the control cabinet not only feature innovative technology, but are also accommodated in a perfect design, which received the renowned iF Product Design Award. Space-saving assembly, outstanding ergonomics as well as excellent design and workmanship ensure a particularly tidy arrangement in the control cabinet.

SIRIUS also scores a top ranking in worldwide comparison: Whether in São Paolo, Berlin or Shanghai – SIRIUS devices for the control cabinet are available with international approvals all around the world. Our comprehensive service network provides prompt support throughout the entire life cycle in more than 190 countries.

The SIRIUS range	
Load feeders	Up to 250 kW easily realizable with standard devices
Modularity	Everything is matched and can be combined as required
Versions and sizes	Efficient and flexible, thanks to 7 compact sizes
Assembly	Fast commissioning, short set-up times, easy wiring
Communication	Open for SIRIUS NET; connection to AS-Interface, PROFINET and PROFIBUS DP possible
Maintenance	Extremely durable; low maintenance and reliable
Construction	Space-saving, thanks to small device width and side-by-side assembly up to 60 °C
Approvals	Worldwide approvals and certification UL, CSA, shipbuilding
Design	Clear, ergonomic and award-winning
Mounting	Reliable screw-type or snap-on mounting over entire service life
Service	Short delivery periods also for spare parts through global logistics network
Environment	Environmentally friendly production and materials; recyclability; low power loss
Accessories	Low variance with integrated accessories
Spring-loaded technology	Fast and safe connection; vibration-proof and maintenance-free

Soft Starting of Three-Phase Motors

What is the operating principle of soft starters?

Soft starters limit the starting current and starting torque. This reliably prevents both mechanical stress as well as line voltage dips. The motor voltage is reduced through phase angle control and increased from an adjustable starting voltage up to the line voltage within the ramp time. Thanks to the step-free control of the supply voltage, the motor is adjusted to the driven machine's load behavior. Mechanical operating equipment is accelerated in a particularly gentle manner, which positively influences its operating behavior and prolongs its service life.

In short: Soft starting and stopping protects the connected devices and ensures a smooth production flow.

Can load feeders be assembled with soft starters?

Of course. Fuseless load feeders of small size can be effortlessly assembled with circuit breakers, e.g. the SIRIUS 3RV. Thanks to the integrated overload functionality, also fused feeders can be realized[1)] in a rapid and space-saving manner.

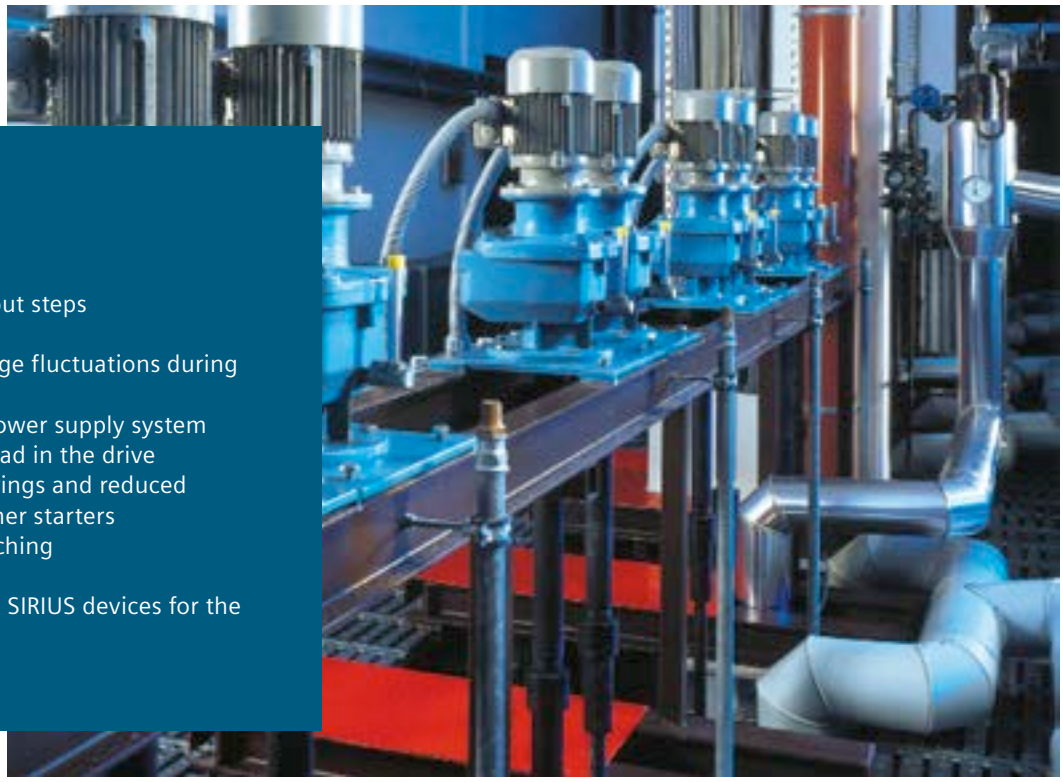
How is the connection realized?

Connection is realized in the same manner as with all other SIRIUS devices for the control cabinet: either using screw-type or spring-loaded terminals. Further connection systems can be employed subject to availability.

What about communication?

As a matter of course, our soft starters are able to communicate with the outside world. With our high-feature soft starters, this is realized with communication modules for PROFIBUS DP and PROFINET.

[1)] Not with 3RW30



SIRIUS soft starters – advantages at a glance

- Soft start and soft stop
- Smooth starting, without steps
- Reduced current peaks
- Avoidance of line voltage fluctuations during start-up
- Reduced load on the power supply system
- Reduced mechanical load in the drive
- Considerable space savings and reduced wiring compared to other starters
- Maintenance-free switching
- Ease of handling
- Perfectly matched with SIRIUS devices for the control cabinet

Technology in Detail

The Soft Principle

How are the parameters of a soft starter set?

With our standard soft starters, the ramp-up time, starting voltage and ramp-down time can be comfortably set via potentiometers. The values can be adjusted particularly finely within the usual setting ranges. For soft starters with motor overload protection, this also applies to the nominal motor current, the selection of the tripping class and the settable current limiting. The multiple functions of our high-feature soft starters are set rapidly and comfortably via the integrated keypad with menu-prompted graphical display. Also commissioning and diagnostics are realized via this keypad.

Why is torque control the better solution?

Current and voltage fluctuations upon start-up are problems frequently encountered by operators of power supply systems. Your machines are then stressed by abrupt torque fluctuations. The soft torque control of our high-feature soft starters minimizes the maintenance expenditures for your machines.

How about motor overload protection?

No problem: Our soft starters come with integrated motor overload protection for many applications. This does away with additional wiring costs and even protects the soft starter against overload. For all other cases, you can utilize the advantages of our further SIRIUS devices for the control cabinet by employing our circuit breakers or overload relays. All components are perfectly matched.

What are the advantages of the inside-delta circuit?

With inside-delta circuits, the soft starter's phases are switched in series with the individual motor windings, thanks to which the soft starter merely has to conduct the delta current, i. e. 58% of the nominal motor current (conductor current). Automatic recognition of the circuit type by our soft starters partially facilitates the application of considerably smaller devices.

Do all three phases have to be controlled?

No, this is not required for operational switching. Also for smooth motor start using our soft alternative, two controlled phases are sufficient with standard soft starters. Moreover, our solution not only saves costs, but also space in the control cabinet. However, the third controlled phase is required for inside-delta circuits.

What are the benefits of settable current limiting?

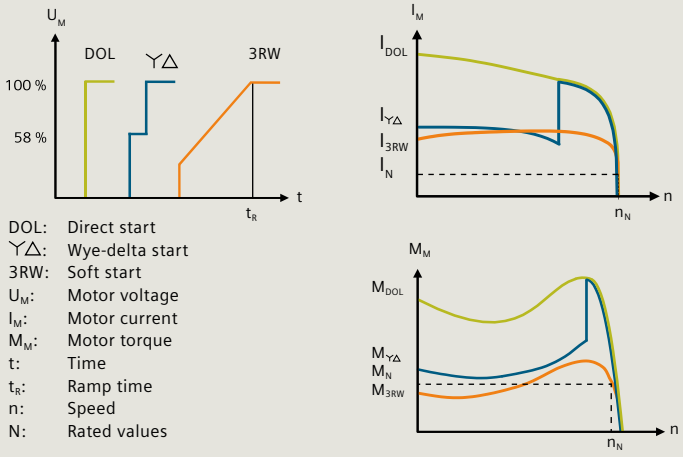
More and more power supply companies request compliance with specific current limit values during start-up to minimize the load on the power supply systems posed by high starting currents. This requirement can be perfectly met with the settable current limiting of our soft starters.

Is an external bypass contactor required?

No. Thanks to integrated bridging contact systems, bypass contactors are unnecessary while the power semiconductors' power loss is nevertheless sustainably minimized.

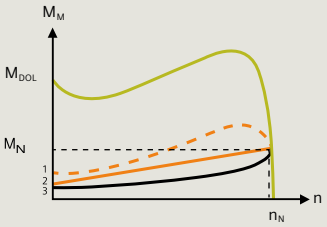
Are there further options for soft motor starting?

Soft motor starting can also be realized with a frequency converter. However, this is only reasonable if the motor's speed is to be influenced also during operation in addition to the starting phase – which increases the costs.



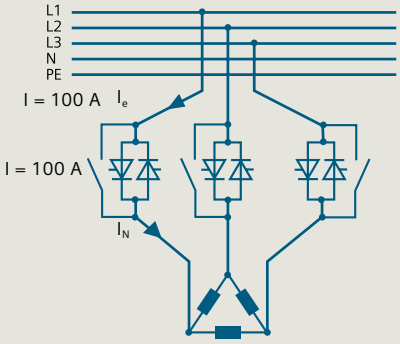
DOL: Direct start
Y△: Wye-delta start
3RW: Soft start
U_M: Motor voltage
I_M: Motor current
M_M: Motor torque
t: Time
t_R: Ramp time
n: Speed
N: Rated values

Different starter types in comparison: Direct start, wye-delta start and soft start



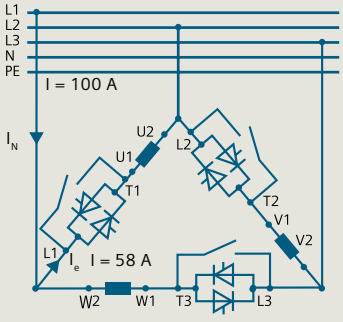
1 M_{3RW} with voltage ramp
2 M_{3RW} with torque control
3 M_L Load (e.g. pump)

Torque control prevents abrupt fluctuations



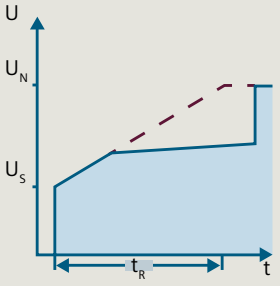
Rated current I_e of the starter corresponds to the nominal motor current I_N
3 cables to the motor

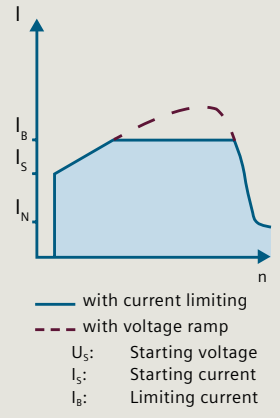
Standard circuit



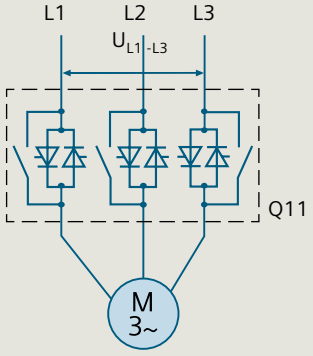
Rated current I_e of the starter corresponds to 58% of the nominal motor current I_N
6 cables (as with wye-delta starters) to the motor

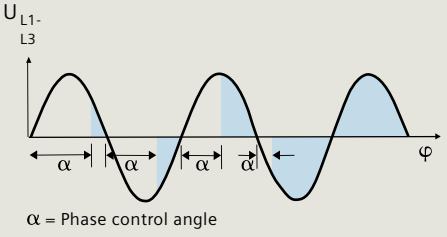
Inside-delta circuit





Soft start-up with voltage ramp and current limiting





α = Phase control angle

Phase control angle principle of the line voltage with soft starters using semiconductor elements

Soft Starters for Standard Applications

SIRIUS 3RW30 and 3RW40

Thanks to their compact design, integrated motor overload and intrinsic device protection, settable current limiting and further features, SIRIUS soft starters are the ideal starter solution for all kinds of standard applications.

In the past, typical starter solutions for standard applications were based on direct and wye-delta starting. Today, the advantages offered by soft starter solutions are increasingly utilized. SIRIUS soft starters, for example, not only improve the start-up behavior of escalators, elevators, conveyor belts and pumps, as they simply facilitate a softer start-up than electromechanical starters. Above all, they protect the drive system and the mains supply and thus contribute to reducing the system costs from many points of view.

To allow for an optimum adjustment of your drive to the application, we offer a complete portfolio of soft starters in various sizes for almost any application area. For example, the two-phase-controlled SIRIUS 3RW30 is particularly suitable for standard applications up to 55 kW. SIRIUS 3RW40, which additionally offers motor overload, intrinsic device and thermistor motor protection, also masters demanding tasks in a soft manner within the power range from 5.5 to 250 kW.

Conversion Made Easy

SIRIUS 3RW30 in Detail

Belt slippage with heater blowers or sudden water pressure build-up in washing systems are only two of many possible problems which may occur if motors output too much power directly upon start-up. With the SIRIUS 3RW30, such failures are reliably prevented up to 55 kW (with 400 V). The main advantage: As the SIRIUS 3RW30 is the world's only soft starter which offers identical sizes within one device range, it even allows for a direct conversion from direct to soft starting.

What are the advantages of soft starting?

The advantages are multiple, as the SIRIUS 3RW30 reduces the stress on the motor by reducing the start-up torque and protects the mains against hazardous current peaks through reduced current input. This reliably eliminates line voltage dips.

What are the benefits of the SIRIUS 3RW30?

The SIRIUS 3RW30 is particularly compact thanks to its consistently optimized power components in hybrid technology. It thus also facilitates side-by-side assembly up to 60 °C. It offers fast configuration and easy mounting with only 3 motor supply cables. Small fuseless load feeders can be assembled with a single module – with the SIRIUS 3RV circuit breaker. Also fused feeders can be realized in a fast and space-saving manner in combination with SIRIUS 3RB solid-state overload relays.

With the SIRIUS 3RW30 in size S0 (45 mm), up to 38 A can be switched

What about safety and reliability?

Thanks to two-phase control and the patented "polarity balancing" control principle, the SIRIUS 3RW30 is a dependable device which ensures safe and reliable operation. In addition, the integrated bypass contact system reduces the soft starter's heat loss during operation.

What are the application areas?

The SIRIUS 3RW30 can be employed in almost any standard application up to a motor rating of 55 kW with 400 V. For example for driving conveyor belts, compressors, grinding machines, saws, agitators, etc.

How is the SIRIUS 3RW30 set?

Ramp-up time and starting voltage can be comfortably and easily set via 2 potentiometers, ensuring optimum starting behavior.

How is the soft starter controlled?

Without interface relays, the SIRIUS 3RW30 can be directly controlled via the PLC – or via the control input. The respective operating state is signaled via a relay output.

What are the saving potentials?

Space savings in the control cabinet up to 70% are achievable compared to wye-delta starters (example 18.5 kW: 45 mm width instead of 158 mm). The SIRIUS 3RW30 also pays off in terms of mounting: with only 3 instead of 6 motor supply cables.

The 3RW30 is also available with removable control terminals. When replacing a 3RW30, the wiring on the terminal thus remains intact ("permanent wiring") and the terminals are simply snapped onto the new 3RW30, which saves a considerable amount of time.

Is the SIRIUS 3RW30 affordable?

Absolutely, as it not only ensures reliable operation thanks to standardized production, but is also very attractive in terms of price.

How about accessories?

In addition to easy-to-mount terminal covers for optimum touch protection, also box terminal blocks, connection modules and labeling strips from the SIRIUS range are available for the 3RW30.

High Functionality for Minimum Costs

SIRIUS 3RW40 in Detail

The SIRIUS 3RW40 is the top star among all standard soft starters! Thanks to its innovative control principle, it is not only the world's only two-phase-controlled soft starter in the power range from 5.5 kW (with 400 V) to 250 kW (with 400 V), but is also the smallest available solution thanks to its particularly compact design. It facilitates space-saving and transparent control cabinet arrangements and is thus more than a supplement of our two-phase-controlled SIRIUS 3RW30 soft starter range.

What are the benefits of the SIRIUS 3RW40?

The SIRIUS 3RW40 soft starter is seamlessly integrated in our SIRIUS portfolio for the control cabinet. As you might already know from experience with other SIRIUS devices, you will thus benefit from identical sizes and uniform connection systems. Regarding size: the particularly compact design of the SIRIUS 3RW40 is at most half as big as that of a comparable wye-delta starter, making space wastage in the control cabinet a thing of the past.
Also configuration and mounting are realized rapidly and easily thanks to 3-conductor connection.

What are the differences compared to the SIRIUS 3RW30?

In general, the SIRIUS 3RW40 offers all the advantages of the 3RW30. In addition, it offers intrinsic device protection and integrated motor protection functions. Just test it and you will be convinced.

How is the SIRIUS 3RW40 set?

Like with the SIRIUS 3RW30, the starting voltage, ramp-up and ramp-down time of the voltage ramp, as well as the current limiting, can be comfortably set via finely adjustable rotary potentiometers. The nominal motor current, trip class and reset of the motor overload function are adjusted via potentiometers and buttons, as is familiar from the SIRIUS overload relays.

What are its outstanding characteristics?

The SIRIUS 3RW40 comes with the new patented control principle "polarity balancing" for the avoidance of DC components in two-phase-controlled soft starters. With two-phase-controlled soft starters, the current resulting from the overlapping of the two controlled phases flows in the uncontrolled phase. For physical reasons, this results in an asymmetric distribution of the three phase currents during the motor's start-up process.

Even though this distribution cannot be influenced, it is uncritical in most applications. However, besides this asymmetry, the power semiconductors' control during the two controlled phases also produces the above-mentioned DC components, which may lead to a loud motor noise with starting voltages lower than 50%. "Polarity balancing" reliably eliminates these DC components during the start-up phase. It generates an even motor start-up in terms of speed, torque and current rise. The acoustic quality of the start-up process almost reaches the quality of a three-phase-controlled start-up.

Integrated state and fault monitoring via LEDs

Easy setting via invariably adjustable rotary potentiometers

This is made possible by the continuous dynamic alignment and balancing of current half-waves with different polarity during the motor start-up.

Does the SIRIUS 3RW40 feature additional protective functions?

The SIRIUS 3RW40 is equipped with optimum functionality as standard. An integrated bypass contact system reduces the soft starter's heat loss during operation. This reliably prevents heating of the switching device's environment. The integrated motor overload protection in accordance with IEC 60 947-4-2 makes an additional overload relay unnecessary; this saves space in the control cabinet and reduces the wiring costs in the feeder. The overload trip class can be variably set via a 4-level rotary potentiometer. In addition, intrinsic device protection prevents the thyristors' thermally overloading and resulting defects of the power components. Optionally, the thyristors can also be protected against short circuit with SITOR semiconductor fuses. Also inrush current peaks are reliably eliminated, thanks to settable current limiting.

Does the SIRIUS 3RW40 offer diagnostics options?

Yes, thanks to integrated status and fault monitoring. LEDs provide information on the operating state as well as possible faults, e.g. impermissible release time (CLASS setting), mains or phase failure, missing load, thermal overload or device fault. The two integrated output relays also indicate the operating state and fault signals.

Is thermistor motor protection available?

Device versions with thermistor motor protection evaluation are available up to a rating of 55 kW (with 400 V). A "Thermoclick" measuring sensor or PTC (type A) can be directly connected. In addition to thermal motor overload, wire breakage and short circuit in the sensor circuit effect a disconnection of the soft starter.

What about reset options?

After the soft starter has tripped, various reset options are available, like for intrinsic device and motor overload protection: manual or via the reset button, automatic or (up to 55 kW) remotely via short-term control voltage interruption.

Is replacement easy?

Yes, also the 3RW40 is equipped with removable control terminals. The wiring on the terminal thus remains intact ("permanent wiring") in case of replacement and the terminals are simply snapped onto the new 3RW40, which saves a considerable amount of time.

How about accessories?

We offer a comprehensive range of accessories for our soft starters, e.g. box terminal blocks, accessories for mechanical reset and a module for remote reset (for ratings > 75 kW) as well as a sealing cover and easy-to-mount terminal covers for optimum touch protection.

Furthermore, snap-on fans are available for the devices up to 55 kW which facilitate mounting of the SIRIUS 3RW40 in almost any installation position and support higher switching duties. In addition, connection modules for electrical and mechanical connections between circuit breaker and soft starter as well as labeling strips from the SIRIUS range are available.

Soft Starters for High-Feature Applications

SIRIUS 3RW44 in Detail

Equipped with maximum functionality, the all-round talent SIRIUS 3RW44 even masters difficult start-up and stopping processes in a soft manner. Thanks to innovative torque control, it can be employed for drives up to a power rating of 710 kW (with 400 V) in standard circuit or up to 1200 kW in inside-delta circuit. The functionality designed for ease of operation facilitates optimum operating comfort.

What are the benefits of the SIRIUS 3RW44?

Thanks to its particularly compact design, which is a characteristic of the entire range of SIRIUS soft starters, the SIRIUS 3RW44 is the ideal solution when space-saving and transparent control cabinet arrangements are required. For optimized motor start-up and stopping, the innovative SIRIUS 3RW44 offers an attractive and efficient alternative to frequency converters. The new torque control and a settable current limiting allow for the use of our high-feature soft starters in almost any application. The SIRIUS 3RW44 guarantees reliable prevention of torque surges and current peaks during motor starting and stopping. This reduces costs both for switchboard dimensioning as well as machinery maintenance. Whether for standard (in-line) or inside-delta circuits – the SIRIUS 3RW44 offers saving potentials, particularly in terms of size and device costs.

How is the SIRIUS 3RW44 commissioned and operated?

Commissioning of the SIRIUS 3RW44 is particularly fast and easy, thanks to a modern and ergonomic menu system. This is facilitated by a keypad with a menu-driven, multi-line graphical display with background illumination. The optimized motor start-up and stopping can be realized rapidly, easily and safely via only few settings in several preselected languages. 4-key operation and plaintext displays on every menu item ensure transparent parameterization and operation at all times. Via the display field, measuring and operating values, as well as warning and fault messages, are continuously displayed during operation and with the control voltage connected. In addition, an external display and operator module can be connected to the soft starter via a connection cable, for example to read actual values directly from the control cabinet door.

Does the SIRIUS 3RW44 feature additional protective functions?

The SIRIUS 3RW44 is equipped with optimum functionality as standard. An integrated bypass contact system reduces the soft starter's heat loss during operation. This reliably prevents heating of the switching device's environment. Moreover, it features an internal device overload protection against thermal overload of the power section's thyristors, e.g. caused by impermissibly high starting operations.

Easy user guidance via the keypad with a menu-guided, multi-line graphical display

External display and control module which can be installed in the control cabinet door as well as modules for PROFIBUS DP and PROFINET

The wiring costs for installation of an additional motor overload relay are eliminated as the SIRIUS 3RW44 also masters this function. Whether settable release times or thermistor motor protection: With SIRIUS 3RW44, you are always on the safe side! Optionally, the thyristors can also be protected against short circuit with SITOR semiconductor fuses. Also inrush current peaks are reliably eliminated thanks to settable current limiting.

Is the SIRIUS 3RW44 communication-capable?

Yes, the SIRIUS 3RW44 can be optionally retrofitted with a PROFIBUS DP module. Thanks to its communication capability, control inputs and programmable relay outputs, the SIRIUS 3RW44 can be very easily and rapidly integrated in superior controls. The utilization of a PROFINET communication module, which is also available as option, offers even more advantages:

- Line and ring bus topologies thanks to integrated switch
- Media redundancy via MRP protocol
- Break function and measured values for energy management via PROFIenergy
- NTP-synchronized time
- Module replacement without PC
- Comprehensive diagnostics and fault alarms
- OPC UA server function for open communication with visualization and control systems

Moreover, you will benefit from the break function and from precise measured values for efficient energy management via PROFIenergy. Further advantages: NTP-synchronized time, module replacement without PC, comprehensive diagnostics and fault alarms as well as the OPC UA server function for open communication with visualization and control systems. Last but not least, operating, service and diagnostics data can be called up via a standard web browser.

What are the advantages in terms of power loss?

Normally, approx. 3 W heat load are generated per every ampere flowing through an actuated thyristor. For motors with 250 kW (with 400 V), this results in a heating power of roughly 1500 W in the switching device's environment. The SIRIUS 3RW44 coolly handles these hot conditions. As a standard, all versions are equipped with mechanical bypass contacts, which bridge the thyristors after detected motor start-up. This considerably reduces the heat loss occurring during the soft starter's nominal operation. The intelligent hybrid concept, which electronically starts the motor via thyristors and operates it electromechanically via contactor contacts during rated operation, improves the feeder's overall efficiency and additionally reduces the costs for control cabinet dimensioning.

What if lower speeds are required?

For positioning and set-up tasks, a creep speed function allows for the motor's control in both directions of rotation – with reduced torque and settable low speed.

What about stopping quickly?

For the fast shutdown of driving loads, a new, combined DC brake function is offered for the SIRIUS 3RW44.

How about accessories?

We offer a comprehensive range of accessories for our soft starters, e.g. an external display and operator module for installation in the control cabinet door or the plug-on PROFIBUS DP module/PROFINET module. Circuit breaker and soft starter as well as labeling strips from the SIRIUS range are available. Furthermore, easy-to-mount box terminal blocks and sealing covers from the SIRIUS portfolio are available for optimum touch protection.

Parameterization, Configuration and Visualization

Comfortable parameterization and evaluation of SIRIUS 3RW44 with Soft Starter ES

With the Soft Starter ES V14 software, the SIRIUS 3RW44 high-feature soft starters can be rapidly and easily parameterized, monitored and diagnosed in service cases. The device parameters can be directly set at the PC and transferred to the soft starter via a serial cable or PROFIBUS/PROFINET connection.

Practical versions, easy licensing

Soft Starter ES V14 is available in three versions which differ in terms of operating comfort, functional scope and price. A comfortable process eases licensing. Whether Basic, Standard or Premium – the suitable license can be rapidly and comfortably downloaded online. Only the actually utilized scope is invoiced and cost-favorable upgrades are offered. With the trial license, you can test the software's functionality without risk for 14 days. The floating license enables access to any user – independent of the number of installations. Particularly the Standard and Premium license guarantee optimum engineering efficiency.

Easy creation of templates

For devices with minor differences, the central modification of few parameters in many identical devices or for the easy parameterization of identical applications, Soft Starter ES V14 offers a powerful tool for the simplified creation of parameter files. The typical file contains all possible parameters, which can all be adjusted by the user. The files can also be easily and rapidly transferred to other devices.

Comfortable parameterization with group function

For the comfortable parameterization of many devices or applications of the same type, the Soft Starter ES V14 software offers a group function which, in connection with the above-described templates, reads out the parameterization of a group of devices and automatically saves it in a separate file, or transfers the parameters from a group of files to the corresponding device groups.

Teleservice via MPI

The Soft Starter ES V14 Premium version supports use of the MPI teleservice for remote device diagnostics. This eases diagnostics and maintenance and reduces the response time in service cases.

Standard-compliant printouts

The software tool considerably simplifies machine documentation as it facilitates the parameterization's printout in accordance with DIN EN ISO 7200. The elements to be printed can be simply selected and compiled as required.

Advantages of Soft Starter ES V14

- **Transparent online and offline setting** of device functions and parameters
- **Effective diagnostics functions** on the soft starter and visualization of important measured values
- **Trace function (oscilloscope function)** for recording measured values and events
- **Consistently transparent** thanks to printout, logbook and event memory
- **High degree of user-friendliness** – convenient user interface, with English, German, French, Italian, Spanish and Chinese as possible operating languages
- **Fast, low-cost licensing** using a simple licensing procedure (available online too)
- **Time savings** through shorter start-up times

Parameterization / Commissioning

Access is either realized via the serial device interface or, with PROFIBUS DPV1/ PROFINET-capable soft starters, via any PROFIBUS/ PROFINET point. Furthermore, the Premium version supports integration in STEP 7 HW-Config. In addition, integration in TIA Portal is possible with the premium version. Testing and controlling the soft starters are also possible without DP/IO master. The software can in this case either be linked to the soft starters with a point-to-point connection (serial) or it can communicate with the individual devices via any point on PROFIBUS/PROFINET.

Diagnostics / Maintenance

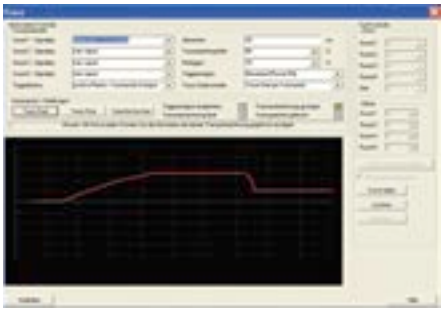
Statistical data (e.g. operating hours, switching cycles, switch-off currents, etc.) can be read out for preventive maintenance.

Program versions:

1. Basic
- Local interface
- Basic functions for device parameterization

2. Standard
- Local interface
- Extended functionality

3. Premium
- Local and PROFIBUS/PROFINET interface
- Full functionality
- Trace



Oscilloscope function with SIRIUS 3RW44 soft starters

Our delivery types:

Floating license
Full software version on CD with license

Upgrade
Combo license for parallel use of versions 2007 and V14 of SIRIUS ES

Powerpack
Special package for converting to a more powerful version with extended functionality within the same software version, e.g. Powerpack Soft Starter ES 2007 for conversion from Standard to Premium

Software update service
Our special service automatically provides you with all service packs and upgrades for up-to-dateness at all times

License download
Convenient License Key download from the Industry Mall so that you can obtain additional licenses for your software quickly and easily.

Order data SIRIUS Soft Starter ES V14

Program versions	Order number
Premium package	
Floating license	3ZS1 320-6CC10-0YA5
License download	3ZS1 320-6CE10-0YB5
Upgrade	3ZS1 320-6CC10-0YE5
Powerpack (Standard > Premium)	3ZS1 320-6CC10-0YD5
Software update service	3ZS1 320-6CC10-0YL5

Order data SIRIUS Soft Starter ES V14

Program versions	Order number
Standard package	
Floating license	3ZS1 320-5CC10-0YA5
License download	3ZS1 320-5CE10-0YB5
Upgrade	3ZS1 320-5CC10-0YE5
Powerpack (Basic > Standard)	3ZS1 320-5CC10-0YD5
Software update service	3ZS1 320-5CC10-0YL5
Basic package	
Floating license	3ZS1 320-4CC10-0YA5
License download	3ZS1 320-4CE10-0YB5

Parameterization, Configuration and Visualization

Block library SIRIUS 3RW44 soft starter for SIMATIC PCS 7

The PCS 7 block library facilitates the easy and comfortable integration of SIRIUS 3RW44 soft starters in the SIMATIC PCS 7 process control system. The PCS 7 block library SIRIUS 3RW44 soft starter contains the diagnostics and driver blocks corresponding to the diagnostics and driver concept of SIMATIC PCS 7 as well as all elements required for operation and monitoring (icons and faceplates).

Integrated functionality for optimum process guidance in all process control systems

With the integration of SIRIUS 3RW44 soft starters in the process control system, faults in the motor feeder can be easily and reliably prevented or promptly detected and rectified. This reduces downtimes to a minimum and supports their prevention from the start. Also the output and display of the most important measured values determined by the 3RW44 for example represents a helpful tool for assessment and monitoring of the system's current state.

Easy configuration

The PCS 7 block library provides all blocks required for the automation system – as well as all block icons and faceplates for the operator station required for operation and monitoring. The integration of SIRIUS 3RW44 in SIMATIC PDM facilitates system-spanning device parameterization and diagnostics of 3RW44 soft starters from a central station.

Motor block for direct drive control

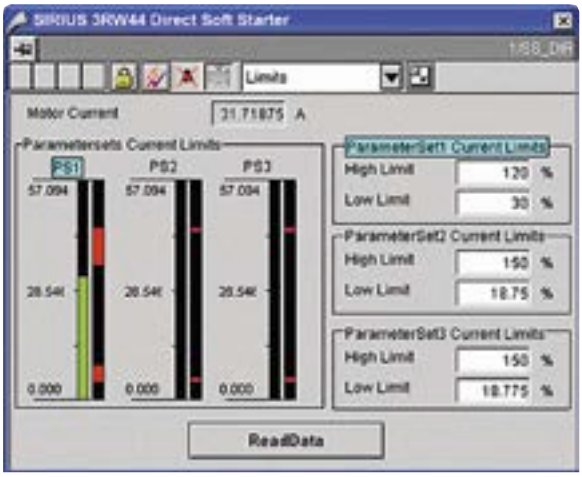
The motor blocks represent the interface between the process control system and the motors controlled by SIRIUS 3RW44. They group all functions for signal processing and provide all information required for operation and monitoring as well as detailed diagnostics.

Evaluation of additional motor feeder measurands

All measured values determined via the soft starter are visualized and logged via the measured value blocks. The faceplate for measured values is called up via the motor block's faceplate. In addition to the detection of measured values, the measured value block also allows for individual settings, for example in order to respond to measured value exceedance or shortfall by means of motor disconnection or warning.

Evaluation of the motor feeder's maintenance-relevant data

The 3RW44 features powerful functions for the detection and monitoring of maintenance-relevant motor feeder data. For example, the motor's operation time and downtime, switching cycles and overload tripping events are directly detected and saved in the device and provided via the statistics block in the control system if required.



Advantages of the PCS 7 block library SIRIUS 3RW44 for SIMATIC PCS 7

- **Uniform and consistent integration** in SIMATIC PCS 7
- **Standardized blocks** for easy integration and optimum operation
- **Improved process transparency** thanks to higher information density in the control system
- **System-spanning device parameterization and diagnostics** with SIMATIC PDM

Delivery and license types
Scope of supply: AS blocks and faceplates for the integration of SIRIUS 3RW44 in the PCS 7 process control system, for PCS 7 version 6.1/V7.0 and V8.0/V8.1/V8.2

Engineering software
The PCS 7 block library SIRIUS 3RW44 soft starter supplied on CD-ROM entitles the user to execute the required engineering software on an engineering station (single license), including the runtime software for execution of the AS blocks in an automation system (single license).

Ordering data
CD, incl. electronic documentation:
For PCS 7 V6.1/V7.0: 3ZS1 633-1XX00-0YA0
For PCS 7 V8.0/V8.1/V8.2: 3ZS1 633-1XX02-0YA0

Runtime software
For application of the AS blocks in a further automation system, the respective number of runtime licenses is required, which are supplied without data carrier.

Ordering data
License without software and documentation:
For PCS 7 V6.1/7.0: 3ZS1 633-2XX00-0YB0
For PCS 7 V8.0/V8.1/V8.2: 3ZS1 633-2XX02-0YB0

Engineering software migration V7–V8 for upgrade (migration) of an existing engineering software V 6.1/V7.0/V7.1 to V8.0 of the SIRIUS 3RW44 soft starter block library for PCS 7: 3ZS1 633-1XX10-0YE0

SIRIUS Soft Starters in Practical Use

Application Examples

SIRIUS 3RW30 – for soft reversing operation of roller conveyors

Roller conveyors are, for example, employed in parcel distribution systems for transporting parcels to and from individual work stations. For this purpose, the direction of rotation of the used 11-kW motor has to be adjustable in order to realize both conveyance directions.

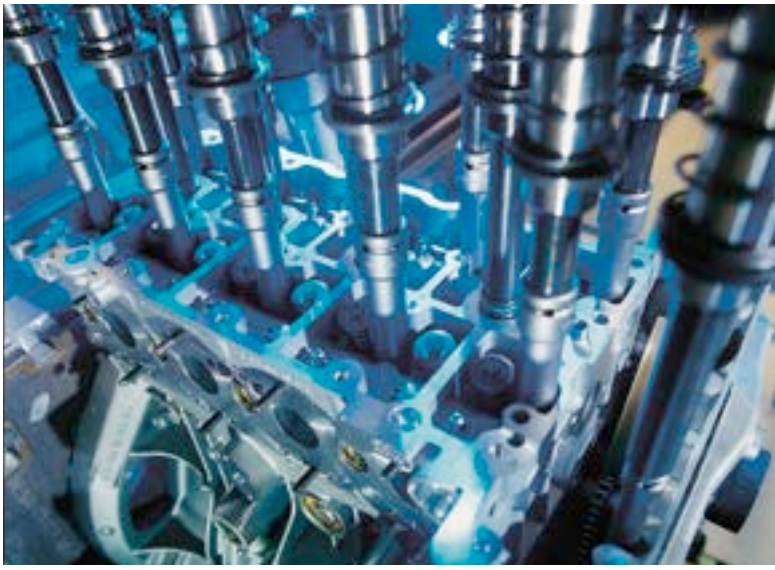
Roller conveyors pose high requirements

- The roller conveyor has to start smoothly to prevent damage to the transported goods due to slipping or tilting.
- The machine's wear and maintenance intervals should be minimized, which is why slippage of the belt drive during start-up must be prevented.
- The current load upon motor start-up is to be reduced by means of a voltage ramp.
- The feeder assembly should be as small as possible so as to not exceed the control cabinet's space capacity.

Optimum performance with SIRIUS 3RW30

- The roller conveyor is rapidly accelerated to the nominal speed without torque surges thanks to optimum setting of the voltage ramp during start-up.
- The motor's starting current is reduced.
- Reversing operation of the conveyor belt is realized through contactor interconnection with SIRIUS 3RA13 reversing contactor combinations.
- Feeder and motor protection are realized with SIRIUS 3RV circuit breakers.
- The use of SIRIUS system components guarantees maximum wiring reductions and space savings.

SIRIUS 3RW40 – for soft starting of hydraulic pumps



SIRIUS 3RW44 – for soft starting of milling machines with DC braking

In addition to many further application areas, the SIRIUS 3RW40 is optimally suited for the soft start and stop of hydraulic pumps. With a rating of 200 kW, these soft starters are for example used in the production of sheet parts, to drive the respective presses.

Hydraulic pumps require sensitive drives

- The motor's starting current has to be reduced to minimize the load of the superior mains transformer during start-up.
- Normally, integrated motor protection is called for to reduce wiring expenditures and space requirements in the control box.
- The hydraulic pump is to be started and stopped in a soft manner, to minimize the mechanical load on the drive and the pump caused by the torque surge during starting and stopping.

The SIRIUS 3RW40 offers this sensitivity as a standard

- The settable current limiting of the SIRIUS 3RW40 limits the load of the mains transformer during motor start-up.
- Motor protection is ensured by the motor overload relay with settable trip classes integrated in the soft starter.

The adjustable voltage ramp ensures the hydraulic pump's start and stop without torque surges. For the production of motor blocks, the required bores are drilled in the motor's aluminum block by means of a milling head. Due to the milling head's high inertia, shutdown of the 15-kW motor is subject to long stopping times, which cause long downtimes for tool changes and set-up operation.

The start-up behavior of milling machines requires maximum functionality

- To prevent excessive wear of the drive belts due to slippage, milling machines require an optimized and torque-controlled start-up behavior.
- The motor's starting current has to be reduced to minimize the mains load.
- The motor has to be braked with DC current to reduce the machine's long stopping times.

Competent solution with SIRIUS 3RW44

- To optimally master the difficult starting conditions, the SIRIUS 3RW44 with torque control and dynamic DC brake function is employed.
- Slippage of the belts during start-up is prevented by torque control with adjusted torque limiting function. This rapidly accelerates the milling head to the nominal speed without slippage of the belt drives.
- A higher-level current limiting function reduces the motor's starting current to a set maximum value.
- The optimum setting of the dynamic DC brake function shuts the milling head down in minimum time.
- Also motor and device overload protection is excellently mastered by the SIRIUS 3RW44 high-feature soft starter.

Overview of SIRIUS Soft Starters

Technical Data

		SIRIUS 3RW30 Standard applications	SIRIUS 3RW40 Standard applications	SIRIUS 3RW44 High-feature applications
Rated current at 40 °C	A	3 ... 106	12.5 ... 432	29 ... 1214
Rated operational voltage	V	200 ... 480	200 ... 600	200 ... 690 [1]
Motor power with 400 V				
standard circuit	kW hp	1.5 ... 55 1.5 ... 75	5.5 ... 250 7.5 ... 300	15 ... 710 15 ... 950
inside-delta circuit	kW hp	– –	– –	22 ... 1200 30 ... 1700
Ambient temperature (operation)	°C	–25 ... +60	–25 ... +60	0 ... +60
Soft start/stop		• [2]	•	•
Voltage ramp		•	•	•
Starting/stopping voltage	%	40 ... 100	40 ... 100	20 ... 100
Ramp-up and ramp-down time	s	0 ... 20 [2]	0 ... 20	0 ... 360
Torque control		–	–	•
Starting/stopping torque	%	–	–	20 ... 100
Torque limiting	%	–	–	20 ... 200
Integrated bypass contact system		•	•	•
Intrinsic device protection		–	•	•
Motor overload protection		–	• [3]	•
Thermistor motor protection		–	• [4]	•
Integrated remote reset		–	• [5]	•
Settable current limiting		–	•	•
Inside-delta circuit		–	–	•
Breakaway torque		–	–	•
Creep speed in both directions of rotation		–	–	•
Pump stop		–	–	• [6]
DC braking		–	–	• [6] [7]
Combined braking		–	–	• [6] [7]
Motor heating		–	–	•
Communication		–	–	PROFIBUS/PROFINET (option)
External display and operator module		–	–	(option)
Status measured value display		–	–	•
Error log		–	–	•
Event list		–	–	•
Non-return pointer function		–	–	•
Trace function		–	–	• [8]
Programmable control inputs and outputs		–	–	•
Number of parameter sets		1	1	•
Parameterization software (SIRIUS Soft Starter ES V14)		–	–	•
Power semiconductors (thyristors)		2 controlled phases	2 controlled phases	3 controlled phases
Screw terminals		•	•	•
Spring-type terminals		•	•	•
UL/CSA		•	•	•
CE mark		•	•	•
Soft starting and heavy-duty starting conditions		–	–	• [6]

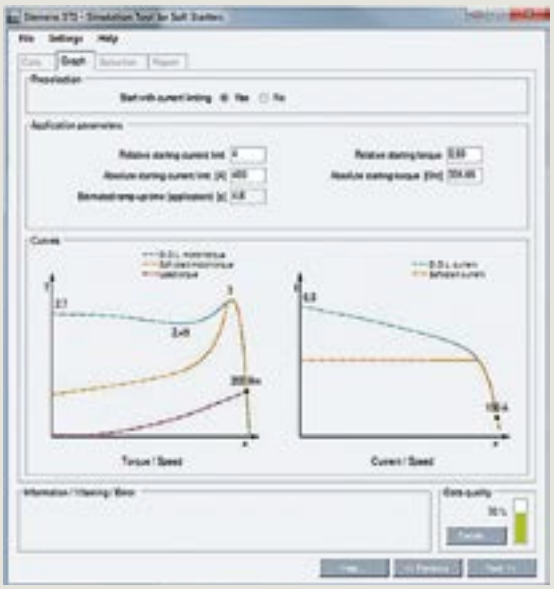
• Function available, – Function not available

1) With inside-delta circuit up to 600 V
2) 3RW30 only soft start
3) Motor overload protection (ATEX) to be used in combination
4) Optionally up to size S3 (device version)
5) With 3RW40 2. up to 3RW404.; with 3RW405. and 3RW407. optional
6) Overdimensioning of soft starter and motor if required
7) Not possible with inside-delta circuit
8) Trace function with Soft Starter ES V14 software

Configuration support
Electronic selection slide,
Simulation Tool for Soft Starters (STS):
https://support.industry.siemens.com/cs/ww/de/view/101494917
Technical Assistance: Phone: +49 (0) 911-895-5900,
E-mail: technical-assistance@siemens.com

Simulation Tool for Soft Starters (STS)

Easy input of motor and load data



Graphic display of start operations

A convenient way of designing soft starters using a simple, quick and easy-to-use interface is possible with the Simulation Tool for Soft Starters (STS). Entering the motor and load data will simulate the application and prompt suggestions for suitable soft starters. The Simulation Tool for Soft Starters (STS) is available free at: https://support.industry.siemens.com/cs/ww/en/view/101494917

Benefits

- Simple, quick and user-friendly operator interface
- Detailed and up-to-date Siemens motor database, including IE3 motors. IE4 motor data will follow as soon as it is available.
- Simulation of heavy starting up to CLASS 30
- Update-capable (e.g. motors, load types, functions)
- Fast simulations with minimum input data
- Immediate, graphical curve charts of start operations with limit values
- View in table form of suitable soft starters for the application

Technical Assistance:
Competent technical support
with all industrial control subjects:

+49 (0) 911 895 5900
technical-assistance@siemens.com
www.siemens.de/industrial-controls/technical-assistance

Scan the QR code for further information

More information

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Published by
Siemens AG 2017

Digital Factory
Control Products
P.O. Box 23 55
90713 Fuerth
Germany

Artikel No.: DFCP-B10125-00-7600
Printed in Germany
Dispo 27601
WS 03172.0