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*Ingenuity for life*



## Clever motor starting

Soft motor starting with  
SINAMICS and SIRIUS

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# Starting motors the clever way

## The right drive solution for your application

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Companies in all industrial sectors are faced with the challenge of ensuring the efficient operation of electric motors in a host of applications. Factors such as mechanical load, cost efficiency, compliance with standards, reliability and improvement in energy efficiency need to be taken into account. In view of these challenges, it is often not easy to decide between a frequency converter and a soft starter.

Both ensure smooth, torque-controlled motor starting and prevent excessive torques that can result in premature damage to the components in the drive train and even in failure. Typical areas of use are pumps, fans, compressors, conveyor belts, belt drives or escalators.

### Frequency converters as the solution

- Ideal for flexible speed control to meet variable process parameters
- Dedicated product functions and options for optimum adaptation to a particular application
- User friendliness and flexibility

### Soft starters as the solution

- Compact and cost-efficient drive solution for fixed speed operation
- Low maintenance requirement, additional accessories often not necessary
- Integrated bypass function to reduce energy losses during operation, no additional heat generation

Whatever constraints you face, Siemens will offer you the best drive solution for your motor. Whether for efficient pumping, ventilating, and compressing, or precision moving, processing or machining, the number of applications where converters and soft starters can be used is almost endless. With our **SINAMICS** and **SIRIUS** portfolio, we can offer you the perfect solutions for your complex requirements. Our portfolio stands for integrated engineering, maximum energy efficiency and user-friendly operation. See for yourself!

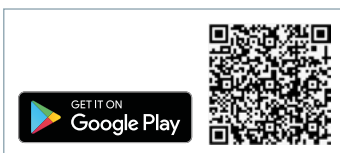
## Contents:

<b>SINAMICS V20</b> Simple. Rugged. Efficient. Frequency converters	<b>4 – 5</b>
<b>SINAMICS G120X</b> Versatile. Rugged. Application-specific. Frequency converters	<b>6 – 7</b>
<b>SINAMICS G120C</b> Versatile. User-friendly. Compact. Frequency converters	<b>8 – 9</b>
<b>SINAMICS G120</b> Multifunctional. Combinable. Safety Integrated. Frequency converters	<b>10 – 11</b>
<b>SINAMICS V90</b> Simple. Precise. System-based. Servo converters	<b>12 – 13</b>
<b>SINAMICS S210</b> Versatile. Precise. Safety Integrated. Servo converters	<b>14 – 15</b>
<b>SIRIUS 3RW30, 3RW40, 3RW50</b> Compact. Easy. Motor-friendly. Soft starters – Basic Performance	<b>16 – 17</b>
<b>SIRIUS 3RW52, 3RW55, 3RW55 Failsafe</b> Intelligent. Efficient. Safe. Soft starters – General Performance / High Performance	<b>18 – 19</b>

### Simulation Tool for Soft Starters



### SINAMICS SELECTOR App



The **Simulation Tool for Soft Starters (STS)** provides a convenient means of designing soft starters using a simple, quick and easy-to-use interface. Entering the motor and load data will simulate the application and prompt suggestions for suitable soft starters. Please go to the App Store or to Google Play.

[www.siemens.com/sts](http://www.siemens.com/sts)

Configure intuitively and quickly your preferred converter in the output range 0,12 kW to 630 kW. With just a few clicks you get to the correct article numbers – from anywhere. Our app contains the products SINAMICS V20, G120, G120C, G120X and G120P. Download the **SINAMICS SELECTOR App** this very day from the App Store or Google Play.

[www.siemens.com/sinamics-selector](http://www.siemens.com/sinamics-selector)

# SINAMICS V20

## Simple. Rugged. Efficient.

### Advantages and customer benefits

- The perfect solution for basic applications
- Simple installation in the control cabinet
- Simple handling
- Simply economical
- Integrated, local or mobile operator panel
- Plug-and-play (parameters preset)
- Copy your own drive parameters directly in the packaging, with optional parameter loader

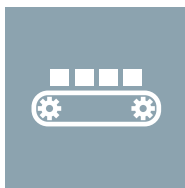
### Digitalization

- Integration in the automation process with integrated communications interface (USS/Modbus RTU)
- SINAMICS CONNECT 300 in connection with SINAMICS BOP interface module
- SINAMICS V20 Smart Access Module (SAM)

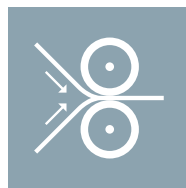
### Applications



Pumping  
Ventilating  
Compressing



Moving



Processing

# Frequency converters



## Technical data

- Protection type IP20/UL open type
- V/f control mode (linear, quadratic, FCC, ECO)
- 200 ... 240 V 1AC 0.12 ... 3 kW
- 380 ... 480 V 3AC 0.37 ... 30 kW
- No safety functions
- Commissioning tools  
SINAMICS BOP-2, SINAMICS V20 Smart Access Module
- Control via LOGO! (terminals/analog),  
SIMATIC S7-1200 or SIMATIC S7-1500 via USS/  
Modbus RTU
- Recommended motors  
SIMOTICS GP/SD (standard induction motors)

# SINAMICS G120X

## Versatile. Rugged. Application-specific.

### Advantages and customer benefits

- Simple selection and ordering using just one article number – and immediately ready to run
- Faster commissioning with improved user-friendly setup using the SINAMICS G120 Smart Access Module or SINAMICS IOP-2
- Simple installation, maintenance and service
- Integrated STO SIL3 safety function protects operators, machines and processes
- Rugged design for operation in harsh environments
- Long cable lengths without output reactors

### Digitalization

- Integration into the automation process with integrated communications interface (PROFINET, PROFIBUS, EtherNet/IP, Modbus RTU, USS, BACnet MS / TP2, Wi-Fi via SINAMICS G120 Smart Access Module)
- Suitable for digitalization through cloud based applications and direct connection to MindSphere
- Predictive maintenance and transparency over the powertrain with SINAMICS CONNECT 300

### Applications



Pumping  
Ventilating  
Compressing

# Frequency converters



## Technical data

- IP20, UL open type, IP21 (roof top kit)
- V/f control mode (linear, square-law, FCC, ECO), vector control without encoder (SLVC)
- 200 ... 240 V 3AC -20%/+10% 0.75 ... 55 kW
- 380 ... 480 V 3AC -20%/+10% 0.75 ... 560 kW
- 500 ... 690 V 3AC -20%/+10% 3 ... 630 kW
- Safety function STO
- Commissioning tools SINAMICS BOP-2, SINAMICS IOP-2 and SINAMICS G120 Smart Access Module
- Control via SIMATIC S7-1500/1200/400, Desigo PX
- Recommended motors  
SIMOTICS GP/SD (standard induction motors, synchronous reluctance motors),  
SIMOTICS FD (compact induction motors with different cooling concepts),  
SIMOTICS DP (smoke extraction motors)

# SINAMICS G120C

## Versatile. User-friendly. Compact.

### Advantages and customer benefits

- Simple installation, commissioning and operation
- Rugged, compact system for challenging environmental conditions
- Reduced costs due to savings in energy consumption and electrical operation costs
- Integrated safety
- Terminals/interfaces are configured using macros
- Plug-in terminals for motor and power supply cables
- Perfectly integrated into the automation process

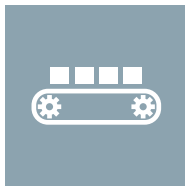
### Digitalization

- Integration into the automation process with integrated communications interface (PROFINET, PROFIBUS DP, EtherNet/IP, USS/Modbus RTU, CANopen, PROFIsafe)
- Suitable for digitalization and cloud-based analytics
- SINAMICS G120 Smart Access Module
- SINAMICS CONNECT 300

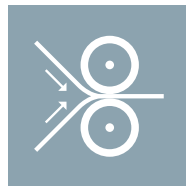
### Applications



Pumping  
Ventilating  
Compressing



Moving



Processing



# Frequency converters



## Technical data

- Protection type IP20/UL open type
- V/f control mode (linear, square-law, FCC, ECO), vector control without encoder (SLVC)
- 380 ... 480 V 3AC -20%/+10% 0.55 ... 132 kW
- Safety function STO via terminal and/or PROFIsafe
- Commissioning tools SINAMICS BOP-2, SINAMICS IOP-2 and SINAMICS G120 Smart Access Module, SINAMICS STARTER or SINAMICS Startdrive
- Control via LOGO! (terminals/analog), SIMATIC S7-1200 or SIMATIC S7-1500 via USS/Modbus RTU, PROFIBUS DP, PROFINET, EtherNet/IP, PROFIsafe
- Recommended motors SIMOTICS GP/SD (standard induction motors), SIMOGEAR (geared motors)

# SINAMICS G120

## Multifunctional. Combinable. Safety Integrated.

### Advantages and customer benefits

- Efficient project engineering and menu-driven commissioning with TIA Integration
- Time savings during series commissioning and with spare parts
- Cost efficiency thanks to application-specific configuration
- Simple, intuitive commissioning of EPos and integrated safety functions
- Fewer parts in stock plus simple and fast service due to modularity
- Energy and cost savings

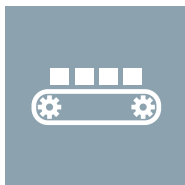
### Digitalization

- Integration into the automation process with integrated communications interface (PROFINET, PROFIBUS DP, EtherNet/IP, USS/Modbus RTU, CANopen, PROFIsafe)
- Suitable for digitalization and cloud-based analytics
- SINAMICS G120 Smart Access Module
- SINAMICS CONNECT 300

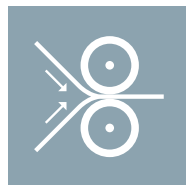
### Applications



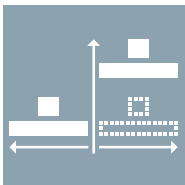
Pumping  
Ventilating  
Compressing



Moving



Processing



Positioning

# Frequency converters



## Technical data

- Protection type IP20/UL open type
- V/f control mode (linear, square-law, FCC, ECO), vector control with and without encoder (VC, SLVC)
- 200 ... 240 V 1AC/3AC -20%/+10% 0.55 ... 4 kW, PM240-2 Power Module
- 200 ... 240 V 3AC -20%/+10% 5.5 ... 55 kW, PM240-2 Power Module
- 380 ... 480 V 3AC -20%/+10% 0.55 ... 250 kW, PM240-2 Power Module
- 380 ... 480 V 3AC -20%/+10% 7.5 ... 90 kW, PM250 Power Module
- 500 ... 690 V 3AC -20%/+10% 11 ... 250 kW, PM240-2 Power Module
- Safety functions STO, SS1, SBC, SLS, SDI, SSM via terminal and/or PROFIsafe
- Commissioning tools SINAMICS BOP-2, SINAMICS IOP-2 and SINAMICS G120 Smart Access Module, SINAMICS STARTER or SINAMICS Startdrive
- Control via LOGO! (terminals/analog), SIMATIC S7-1200 or SIMATIC S7-1500 via USS/Modbus RTU, PROFIBUS DP, ROFINET, EtherNet/IP, CANopen
- Recommended motors  
SIMOTICS GP/SD (standard induction motors, synchronous reluctance motors),  
SIMOGEAR (geared motors),  
SIMOTICS M-1PH8 (compact induction motors),  
SIMOTICS XP (explosion-protected motors)

# SINAMICS V90

## Simple. Precise. System-based.

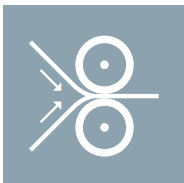
### Advantages and customer benefits

- Optimized servo performance due to one-button tuning and auto tuning
- Simple to operate all-in-one solutions for motion control applications
- Different control types, integrated braking resistor
- A strong team with SIMATIC Controller in the TIA Portal (PROFINET version)
- Cost-effective
- Supports several line voltages, reliable motor protection, and STO function
- Triple overload
- Gear unit, motor, and converter are perfectly matched

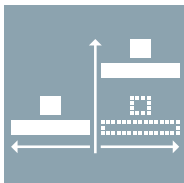
### Digitalization

- Integration in the automation process with integrated communications (Pulse/direction interface, USS/Modbus RTU, PROFINET)
- Suitable for digitalization and cloud-based analytics

### Applications



Processing



Positioning



Machining

# Servo converters



## Technical data

- Protection type for converter IP20, for motor IP65
- Servo control mode with encoder
- 200 ... 240 V 1AC/3AC -15%/+10% 0.1 ... 2 kW
- 380 ... 480 V 3AC -15%/+10% 0.4 ... 7 kW
- Safety function STO
- Commissioning via V-ASSISTANT or in TIA Portal
- Control via SIMATIC S7-1200 USS/Modbus RTU, pulse train input (PTI version), SIMATIC S7-1500 via PROFINET IRT
- Recommended motors SIMOTICS S-1FL6 servo motor

# SINAMICS S210

## Versatile. Precise. Safety Integrated.

### Advantages and customer benefits

- Simple commissioning with integrated web server and full integration in the TIA Portal
- Optimally matched to SIMATIC controllers such as S7-1500/T-CPU/ET-200 SP Open Controller
- Optimized connection technology with OCC (One Cable Connection)
- Increased performance thanks to SIMOTICS S-1FK2 servo motors
- Braking resistor already integrated
- Developed for high dynamic applications
- PROFINET IRT
- One button tuning
- DC coupling on 3AC devices

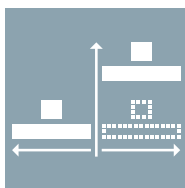
### Digitalization

- Suitable for digitalization and cloud-based analytics (PROFINET, PROFIenergy, PROFIsafe, PROFIdrive)
- Integrated web server

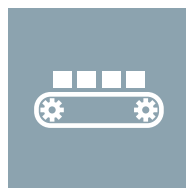
### Applications



Processing



Positioning



Moving

# Servo converters

## Technical data

- Protection type IP20, UL certification
- Servo control mode
- 200 ... 240 V 1AC/0.1 ... 0.75 kW
- 200 ... 480 V 3AC/0.4 ... 7 kW<sup>1)</sup>
- Safety functions STO, SS1, SBC, SOS, SS2, SLS, SSM, SDI, SBT, SLA via PROFIsafe
- Commissioning via integrated web server or SINAMICS Startdrive with V15.1 and higher
- Control via SIMATIC S7-1500 with PROFINET IRT
- Recommended motors with SIMOTICS S-1FK2 servo motor

1) > 1kW in preparation



# SIRIUS 3RW30, 3RW40 and 3RW50 Compact. Easy. Motor-friendly.

## Advantages and customer benefits

- Protection of the supply system, motor and load against overload
- The favorably-priced solution for simple starting and stopping conditions
- Ideal drive solution for applications with fixed speed
- Parameterization by using potentiometers
- Low maintenance efforts and costs
- No additional heat generation thanks to integrated bypass contacts
- Can be used worldwide thanks to numerous certificates and approvals
- Modern hybrid switching technology for energy-saving and long service life
- SIRIUS 3RW40: suitable for the starting of explosion-proof motors with "increased safety" type of protection EEX e according to ATEX Directive 94/9/EC
- SIRIUS 3RW50: Suitable for the starting of explosion-proof motors by certification according to ATEX/IECEX

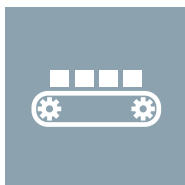
## Digitalization

- Connection to the controller possible via parallel wiring (SIRIUS 3RW30 and SIRIUS 3RW40) or integration into automation via side-mounted communication modules (3RW50)
- SIRIUS 3RW30 and SIRIUS 3RW40 for simple starting conditions:
  - Reliable function
  - Attractive price
  - Diagnostics and status LEDs
- SIRIUS 3RW50 as compact solution with high functionality:
  - HMI modules for the installation in the control cabinet door for evaluation of measured values and diagnostic data

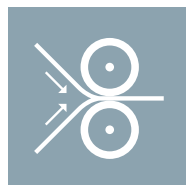
## Applications with fixed speed operation



Pumping  
Ventilating  
Compressing



Moving



Processing



# Soft Starters

## Basic Performance



### Technical data

- Two-phase controlled
- Control supply voltage SIRIUS 3RW30/40:  
24 V AC/DC, 110 ... 230 V AC/DC;  
Control supply voltage SIRIUS 3RW50:  
24 V AC/DC, 110 ... 250 V AC
- SIRIUS 3RW30 (from 1.5 kW) and SIRIUS 3RW40 (from 5.5 kW) for starting motors up to 55 kW at 400 V; SIRIUS 3RW50 for starting motors from 75 ... 315 kW at 400 V
- Adjustable starting voltage and ramp-up time
- Integrated bypass function for energy-efficient operation (minimum power losses)
- SIRIUS 3RW40 and SIRIUS 3RW50 only:
  - Integrated motor overload protection (CLASS 10, 15, 20), optional thermistor motor protection
  - Soft stopping function and adjustable current limiting
  - 480 or 600 V versions
- SIRIUS 3RW50 only:
  - Optional HMI modules for installation in the control cabinet door and side-mounted communication modules (PROFINET, PROFIBUS, EtherNet/IP and Modbus)
  - Analog output or thermistor motor protection

# SIRIUS 3RW52, 3RW55 and 3RW55 Failsafe Intelligent. Efficient. Safe.

## Advantages and customer benefits

- Protection of the supply system, motor and load against overload
- SIRIUS 3RW52 and SIRIUS 3RW55, the ideal solution for standard applications and also for difficult starting operations
- Suitable for inline and inside-delta circuits as replacement for contactor assembly for star-delta (wye-delta) starting
- Considerable space savings in the control panel compared to star/wye-delta combination
- Modern hybrid switching technology for energy-saving and long service life
- Can be used worldwide thanks to numerous certificates and approvals
- Pump stop, pump cleaning, torque control and automatic parameterization (SIRIUS 3RW55 and 3RW55 Failsafe)
- SIRIUS 3RW55 and 3RW55 Failsafe soft starter: suitable for the starting of explosion-proof motors by certification according to ATEX/IECEX
- SIRIUS 3RW55 Failsafe soft starter for safety-related shutdown (STO = Safe Torque Off) up to SIL 3 / PL e

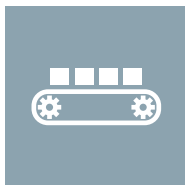
## Digitalization

- Integration into the automation system by means of plug-in communication modules (PROFINET, PROFIBUS, EtherNet/IP, Modbus)
- HMI modules for reading out measured values, diagnostics data or for setting parameters
- TIA integration for efficient configuration
- SIRIUS 3RW55 and 3RW55 Failsafe: Self-teaching automatic parameterization even under changing load conditions

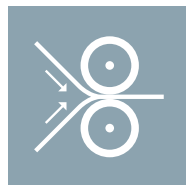
## Applications with fixed-speed operation



Pumping  
Ventilating  
Compressing



Moving



Processing

# Soft Starters

## General Performance/ High Performance



### Technical data

- Three-phase controlled
- Soft starting and stopping functions
- Control supply voltage 110 ... 250 V AC or 24 V AC/DC
- For motors from 5.5 kW ... 1200 kW at 400 V (SIRIUS 3RW52 and SIRIUS 3RW55 Failsafe for starting of motors from 5.5 kW ... 560 kW at 400 V); SIRIUS 3RW55 for starting of motors from 5.5 kW ... 1200 kW (at 400 V)
- SIRIUS 3RW52:  
Optionally analog output or thermistor motor protection
- SIRIUS 3RW55, SIRIUS 3RW55 Failsafe:  
Integrated motor control functions
- Optional plug-in communication modules (PROFINET, PROFIBUS, EtherNet/IP, Modbus)
- SIRIUS 3RW55 Failsafe: Safe Torque Off (STO) – motor torque safely shut off including restart interlock

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Article No. SICP-B10004-01-7600  
Printed in Germany  
Dispo 18101  
WÜ/1000173743 WS 11192.0  
© Siemens 2019

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