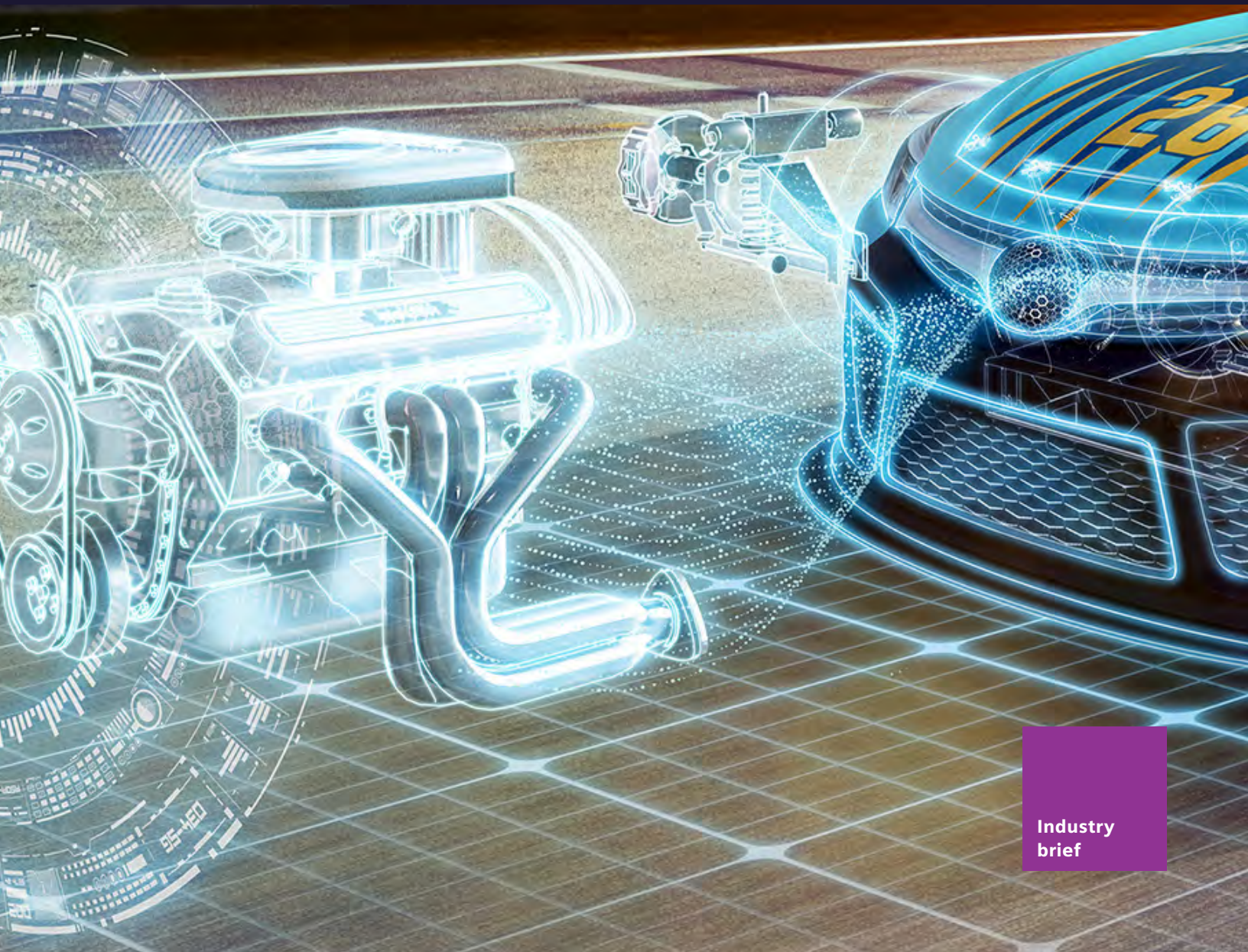


# **Test Stand industry solutions**

Complete hardware, software  
and service offerings



# Complete industry solutions for test stands from Siemens

**Whether the results are to verify specifications**, to confirm manufacturing integrity (end-of-line), durability, reliability, noise, vibration, harshness (NVH), or any other kind of assessment, Siemens has the right hardware, software, services and expertise for any industrial test stand application.

**Starting with hardware automation**, it's extremely important to make sure the components selected are designed for the application and testing specifications, and that replacement components are readily available.

**Software tools are the next important consideration**, which allows for the seamless exchange of data that can provide business-level information, efficient simulation and optimal test results.

**Finally, this leads to services**. Manufacturers need the ability to have skilled personnel available to either maintain the equipment directly or train local personnel. By utilizing various Xcare bundles, it is possible to scale a service program to suit your individual needs.

## Strengthen the drive train to see real benefits

Historically speaking, innovation was driven from trying new ideas of which only a small fraction could be commercialized. Having an effective digital drive train provides an environment where more ideas can be considered, developed and tested without the heavy investment in time to develop a design or the expense of hardware prototypes. Siemens became the first to receive a UL certification utilizing digital modeling and simulation for a product being tested in early 2024.

[For details, click here.](#)

In simple terms, the digital drive train touches every aspect of plant optimization by reducing the complexity of systems, interoperability issues, as well as machine and personnel safety. This benefits the customer by using virtual prototyping, verifying plant or machine performance, interoperability testing, predictive maintenance, as well as increased training and skill development of employees on new equipment. In other words, learn about the equipment before it is installed on your plant-floor, and maximize the benefit of the new equipment on the first day. All of these benefits work to reduce the real cost to the plant and shorten the time to bring a new innovative product to market.



## Siemens can help solve the key issues for various test stand applications

- ✓ Energy exchange in common DC bus
- ✓ High dynamics, Integrated safety functions
- ✓ Adaptable control system for the highest torque quality
- ✓ Integrated battery simulation
- ✓ Speed and torque consistence
- ✓ Integration of modern simulation tools
- ✓ Energy recovery for braking applications
- ✓ ...and more



### Machine builders



### Availability



Increase the availability of your machines

### Speed



Shorten your time-to-market

### Business models



Develop new service and business models

### Machine operators



### Productivity



Increase the productivity of your production

### Flexibility



Increase the flexibility of your production

### Efficiency



Identify possibilities for optimization

# Test Stand industry solutions

As a complete supplier of electronic components and application-specific concepts, Siemens has the answer to every one of these challenges. We are more than willing to help you implement your innovative test stand concepts that are fit for the future.

Application assistance is available for several standard test stand applications. The SINAMICS variable frequency drives library is available for download at the Siemens Industry Online Support (SIOS) website. [Click here to learn more.](#)

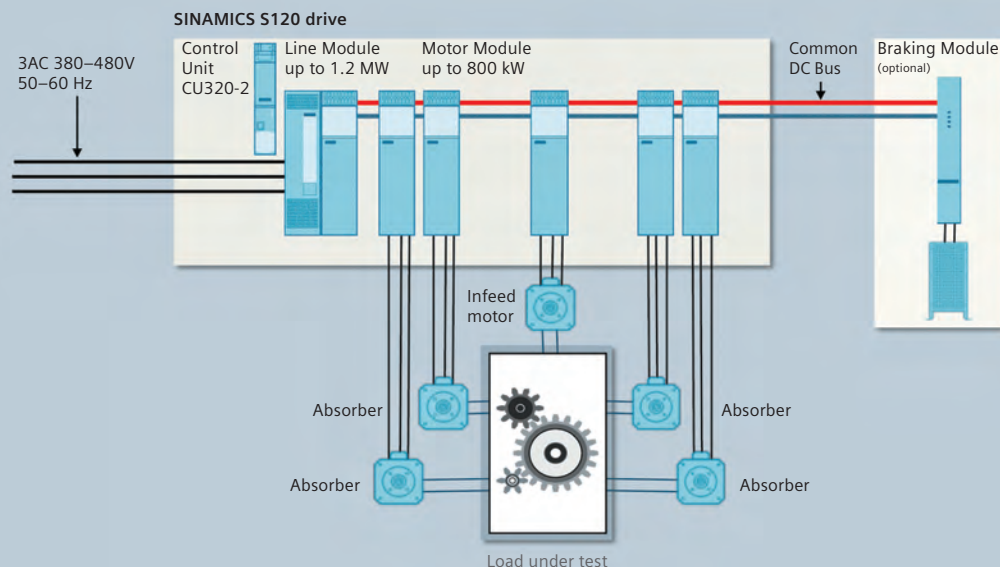
Some of the supported applications include:

<b>Transmission</b>	Cold Test Stand, Hot Test Stand
<b>Engine</b>	Manual, Automatic, Differential, Transfer Case
<b>Electric vehicle</b>	Hybrid Transmission, Electric Transmission, Battery/Fuel Cell, Motor
<b>Roller rigs</b>	Noise, Vibration, Harshness (NVH), Performance
<b>Special test stands</b>	Brake, Drive Shaft, Balancing Machines, Tire Testing Machines, Steering Machines, Component, Fatigue

## Manual and automatic transmission

Siemens products used:

- ✓ SINAMICS S120 drives
- ✓ SIMATIC S7-1500 PLC
- ✓ SIMOTICS M main motors
- ✓ SIMATIC HMI



## Hot and cold engine test solution

### Hot

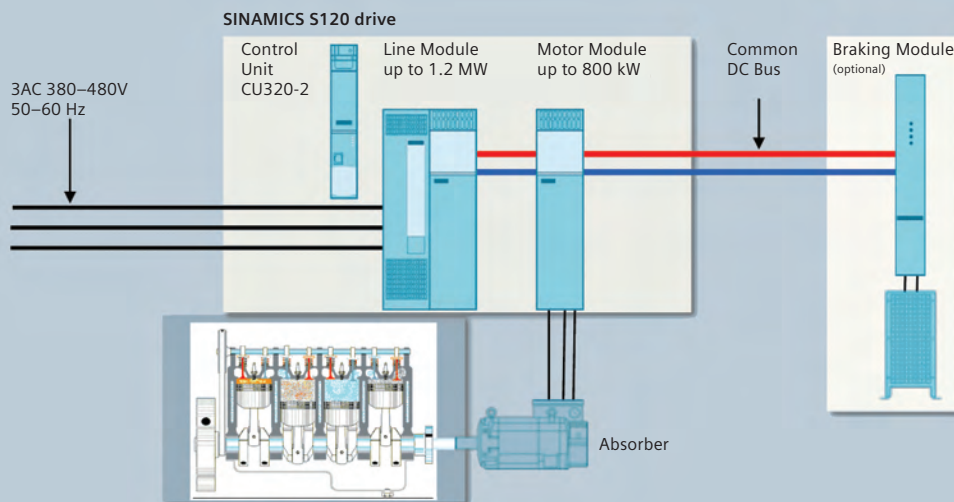
- Test for function and proper seal before the engine is mounted in a vehicle
- Motor is run on its own power until specific oil temperature is reached
- Without, or with incrementally increased motor loads
- Key data for a production check are measured, monitored and documented
  - Speed and torque
  - Oil pressure and temperature
  - Cooling water temperature and flow
  - True running, ignition, injection time, oil turbidity, emission values, etc.
- A short performance test is carried out at the end of the warm-up phase
- Operator checks motor for abnormal noise and leaks

### Cold

- Tests internal combustion engines directly on the assembly line
- Motor is powered electrically rather than with fuel—much greener
- After leak testing, the motor is filled with oil and fuel, where required
- Test results demonstrated compliance with quality requirements

### Siemens products used:

- |                                 |                       |
|---------------------------------|-----------------------|
| ✓ SINAMICS S120 drives          | ✓ SIMATIC S7-1500 PLC |
| ✓ SIMOTICS M main motors        | ✓ SIMATIC HMI         |
| ✓ SINAMICS DCP DC-DC converters |                       |



## Powertrain for electric vehicles

### Battery simulation with SINAMICS drives components

#### The challenge

- Battery or fuel cell test
- Trend towards higher voltage and voltage constancy without ripple

#### The solution

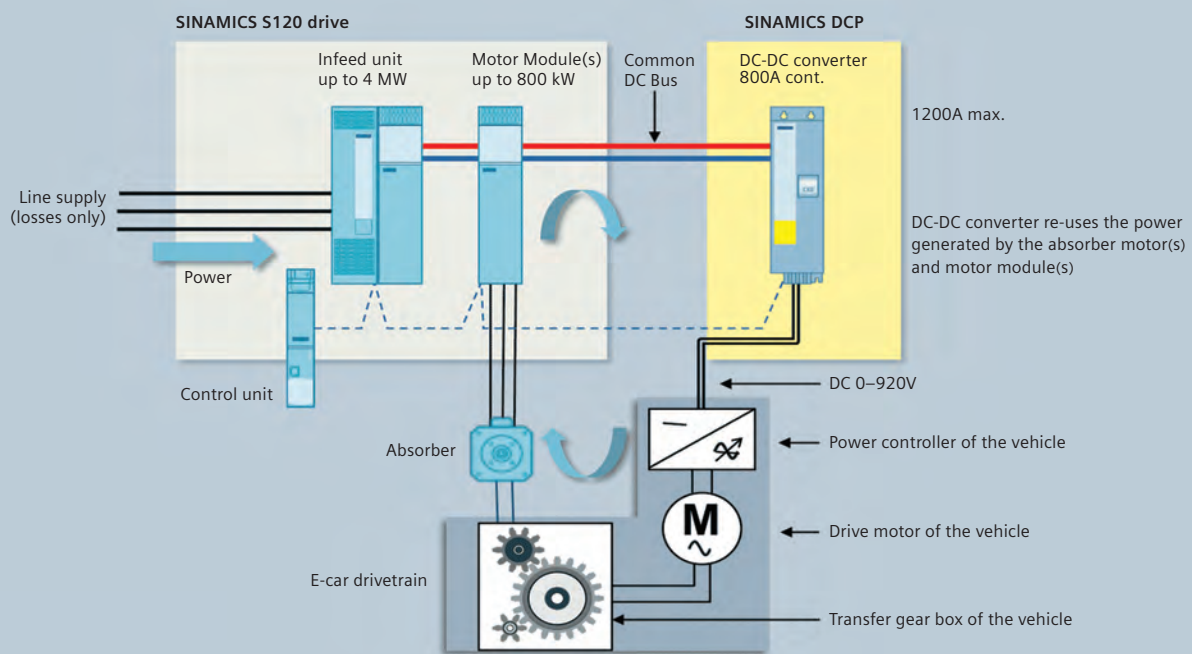
- Integration of functionality of a variable DC source into the SINAMICS S120 drive system
- 1000V DC with 690V AC

#### Your benefits

- Energy regeneration to grid during discharge
- High dynamic DC converter
- Common hardware platforms

#### Siemens products used:

- ✓ SINAMICS S120 drives
- ✓ SIMOTICS M main motors
- ✓ SINAMICS DCP DC-DC converters
- ✓ SIMATIC S7-1500 PLC
- ✓ SIMATIC HMI



## Roller rig

NVH or performance test stand

### The challenge

- High precision roller rigs with constant torque (no ripple)
- Improve stiffness of the system to eliminate inaccuracies

### The solution

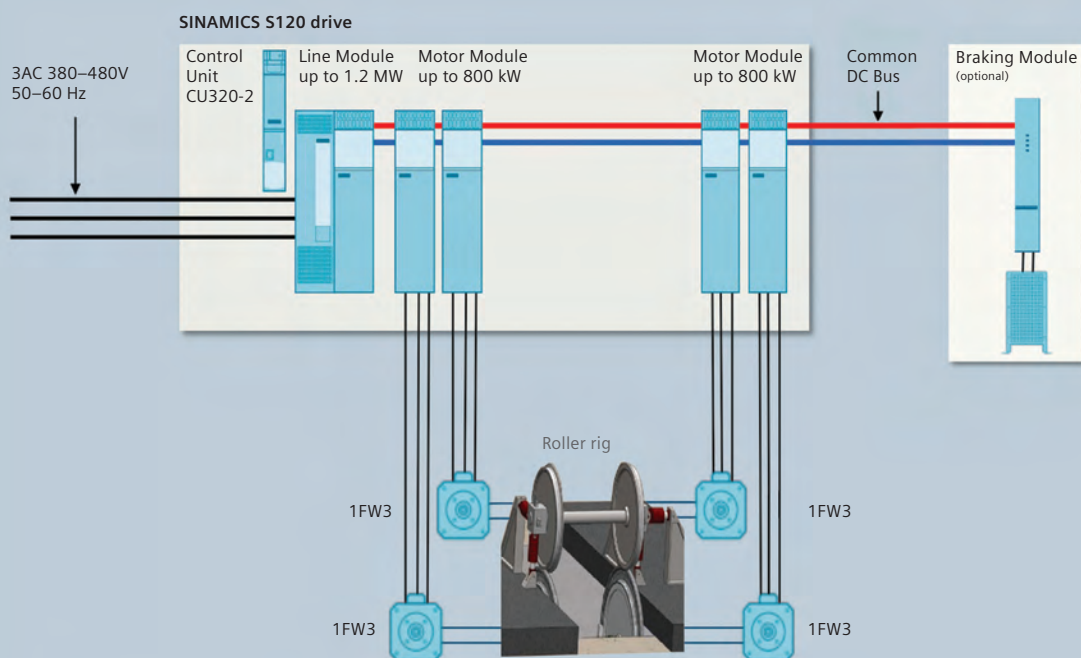
- Compact style using SIMOTICS T-1FW3 direct drive torque motors
- Energy exchange with common DC bus

### Your benefits

- Noise minimization by water cooling and variable switching frequency
- Drive integrated gearing

### Siemens products used:

- ✓ SINAMICS S120 drives
- ✓ SIMOTICS M main motors or SIMOTICS T torque motors
- ✓ SIMATIC S7-1500 PLC
- ✓ SIMATIC HMI







## Software solutions

### A closer look at software and digitalization solutions

#### DriveSim family

This provides a full-featured simulation experience of SINAMICS drives, creating a digital twin of the real SINAMICS firmware, and ensuring that all parameters and configurations are identical to those of the real drive train. SINAMICS DriveSim models reproduce the logical and functional aspects of the drive system, which are identical to their real-world drive counterparts, simulating the electrical, magnetic and mechanical aspects. Learn about the performance before it is built.

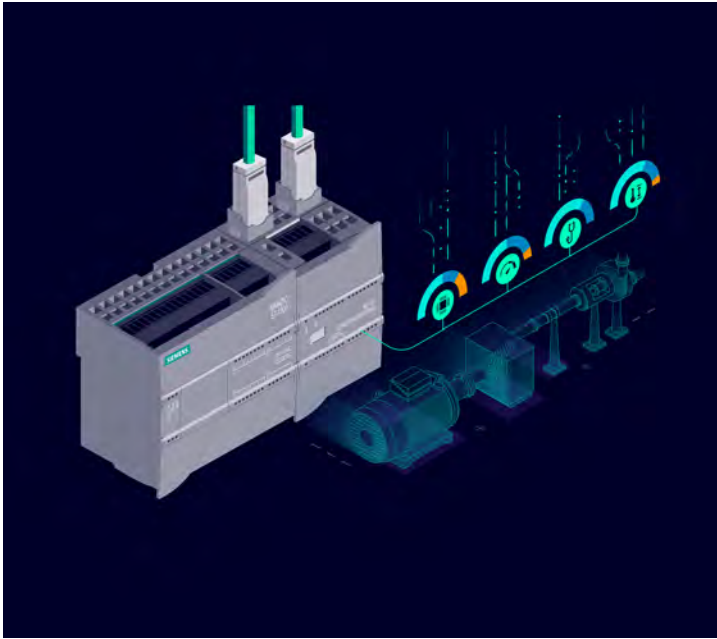
Virtual engineering and commissioning is a revolutionary approach to designing and commissioning the electrical drive train. Simulate and test your systems in a virtual environment, eliminating the need for costly on-site visits, as well as reducing personnel and machinery risks. With the SINAMICS DriveSim family, you can be confident that your simulations will accurately reflect the performance of your drive train.

#### Analyze MyDrives

Monitor and analyze low-voltage drive systems via Cloud or Industrial Edge applications. The Insights Hub application, Analyze MyDrives, lets you centrally monitor drive systems in the manufacturing and process industries. Data is evaluated to identify optimization opportunities or pending maintenance requirements through an email-based notification service triggered by configurable limits.

Analyze MyDrives for Industrial Edge unlocks the full potential of SINAMICS drives in motion use cases. The Edge app monitors drive data at speeds of up to 8 kHz and detects hidden patterns using machine learning and artificial intelligence (AI) algorithms. Relying on data analytics, you can identify mechanical anomalies in the drive train without the need of additional scheduled preventative maintenance routines.





## Condition Monitoring Systems

### SIPLUS CMS1200 vs SIMOTICS Connect 400

Siemens provides two approaches to retrieve environment-rich data directly from the machine. The availability of machines and plants is paramount, and minimizing unscheduled down-times is key to a successful bottom line. It is necessary to detect machine anomalies at an early stage, then to prepare the replacement parts, schedule the maintenance resources and minimize impacts to the overall production.

#### **SIMOTICS Connect 400**

This device is a wireless vibration sensor mounted directly to the field devices (e.g., motors, gearboxes, etc.), and requires a wireless access point to the cloud (Insights Hub) with a subscription to the cloud analytic tools (SIDRIVE IQ FLEET). All engineering and analysis is performed in the cloud app.

#### **SIPLUS CMS1200**

This approach requires a SIMATIC S7-1200 PLC to connect up to seven SM12821 modules. Each module can accept up to four vibration sensors. All engineering and analysis is performed in the SM12821 (no external devices required). This option can be paired with the Edge app, Analyze MyDrives, for either Cloud or Industrial Edge applications.

## Software extensions

### SINAMICS S120 drive system for test stands

Siemens offers advanced software extensions for the SINAMICS S120 drive system, enhancing performance and flexibility for test stand applications.

These SINAMICS S120 advanced features for test stands include cogging torque compensation for constant torque and speed, and coupling of multiple drive motor modules using SERVCOUPL technology. It also integrates MATLAB SIMULINK models for efficient simulation engineering and provides engine combustion simulation with Torque Pulse Simulation (TPS). Additionally, the system includes learning error compensation (LECo) for automatic disturbance compensation and setpoint generation with adjustable signal parameters.

For more information and to see the full range of benefits, please visit our website: [usa.siemens.com/test-stands](https://usa.siemens.com/test-stands).



# Service solutions

## Financial Services to support your business needs

### Extended payment terms (EPT)

The cost of money has increased and it will remain a significant cost that must be addressed by your business. Your customers are taking longer to pay their bills and this puts your business at risk of carrying the cost of goods longer. Siemens can offer bridge financing at attractive rates to extend your standard payment terms. This effectively changes your terms from NET30 to something more in-line with your business requirements. Using the Siemens EPT program, your terms with us can be extended up to 180 days.

Our simple and flexible payment option is designed to help you acquire the necessary Siemens software, hardware and technology needed in the timeframe your customers desire. This unsecured credit option enables you to strategically manage your cash reserves and projects while awaiting payment from your customers.

[Learn more by clicking here.](#)

#### EPT offers flexible financing with longer payment terms



Up to 180 days  
to pay



Can be used flexibly  
as needed



Additional credit lines independent  
of existing bank relationships



Easy to setup and  
simple-to-use

### Machinery and technology financing

The cost of new machinery and updated technology can be challenging to commit to the initial purchase. Siemens can be your partner to develop a payment plan without impacting your existing capital or credit lines. This allows you to act quickly, to expand and meet constantly changing business needs, while maintaining useful capital for other projects.

With affordable financing payments made over time, machinery and technology financing makes budgeting easier. You get all the benefits of use from the needed machinery and technology, while the assets effectively pay for themselves over time.

[Discover how by clicking here.](#)

#### Machinery and technology financing is an affordable way to benefit from the use of the latest technology



Pay as you use new machinery  
and technology



Existing credit lines  
remain untouched



Simple and  
easy-to-use

## Training services to support your business needs

Siemens can offer a variety of different training programs for the software and hardware on your plant-floor.

### Virtual and classroom training

More traditional learning options are available with either in-person training at one of our training centers or special offerings around the country. Similar content is available via a virtual classroom allowing for a training experience without the need to travel.

### On-line self-paced learning

This self-paced learning path offers students the flexibility to set their own schedule and study pace for completion.

### quickSTEP (complimentary)

A wide range of web-based courses is available for individuals new to the technology field. Enhance your understanding of the basic concepts at your pace.

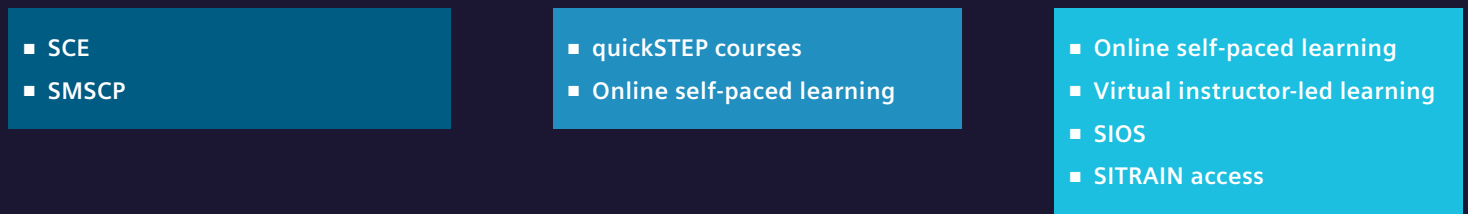


## Path to skills development

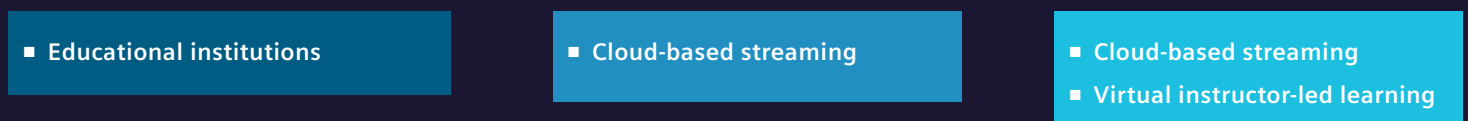
### Novice



### SITRAIN learning portfolio



### Delivery method







### Siemens Industry Online Services (SIOS)

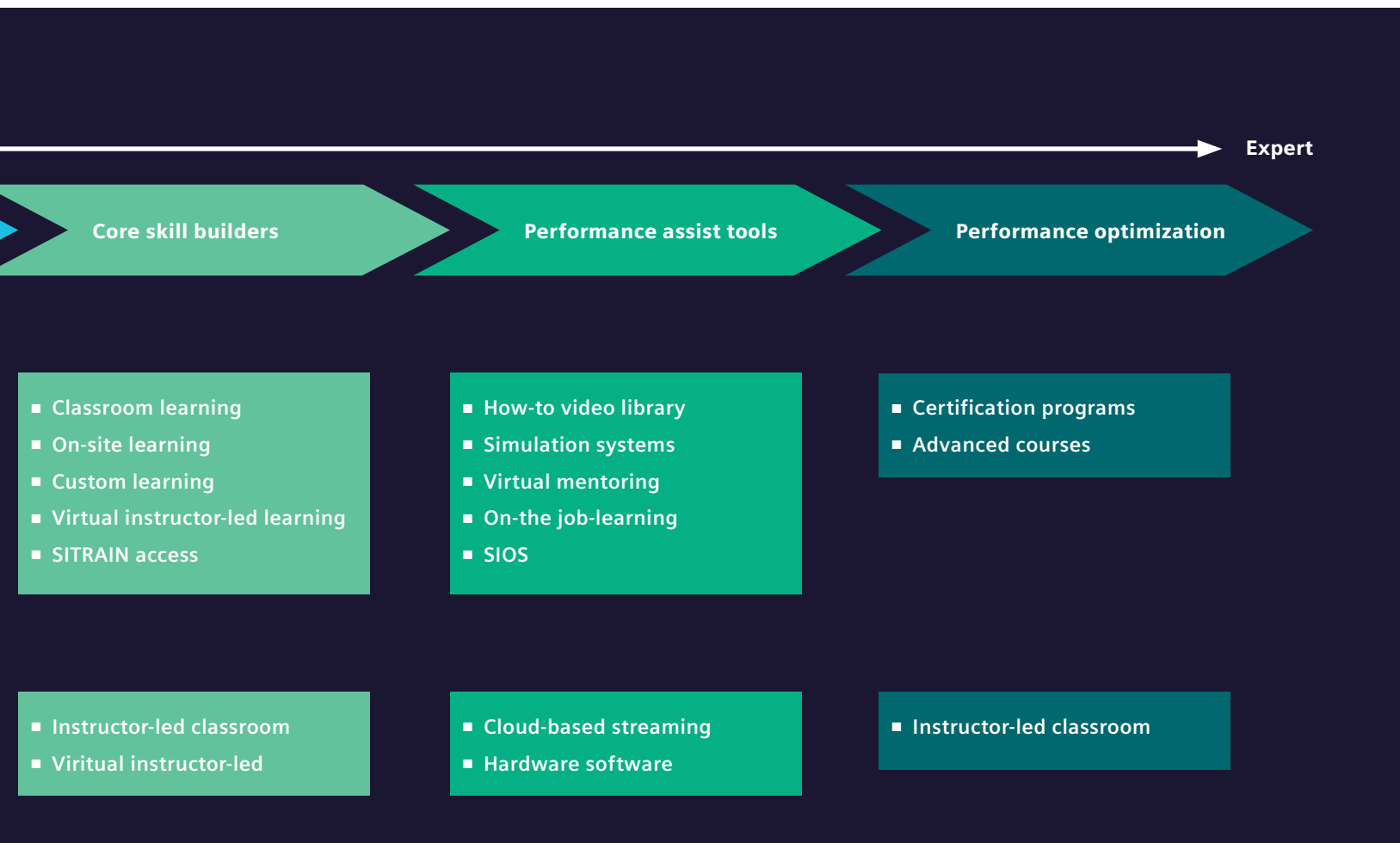
This is an online repository of FAQs, manuals, application notes, libraries, product updates and more.

### Mentoring training

Designed for the experienced user who wants to move from good to great, direct one-on-one mentoring is offered by a technical expert—digging deep and unlocking the knowledge to improve your programming and troubleshooting skills.

### How-to videos

These on-demand, high-impact videos are designed to help with the initial “getting started”. They are also an excellent way to refresh yourself about a particular topic.



## A closer look at service solutions

Siemens is committed to fully meeting your expectations with its comprehensive service offering. Whether you need on-site or remote service, now or in the future, we are here to provide the support you need to optimize your productivity and help you achieve your long-term goals.



Contact us

You can easily connect with our experts by accessing "mySupport" via the Industry Online Support Platform.

[Click here to connect.](#)

### Phone Support (1-800-333-7421)

Our Industry Customer Care Center (ICCC) is staffed 24 x 7 x 365 with agents available to help you get the support you need. This team is your single point-of-contact for support and service proposals. Whether you are requesting on-site support, need troubleshooting assistance, or need to start a repair order, our ICCC is here for you.

### Replacement or spare parts

Siemens offers an extensive inventory of spare parts, as well as spare parts services which include guaranteed parts availability, advanced exchange, and extended warranty to support customer operations 24 / 7.

Additionally, tools like Spares on Web (SoW) can enable customers to identify or confirm the spare parts that they need to best support their operation. The web-based tool is used for identifying Siemens spare parts and recommending spare parts kits. To search for items on the SoW site, you will need the article number or serial number of your part. Local distributors can be identified via the Siemens Distributor Locator. [Click here for details.](#)




### Field service

Siemens on-site field service includes start-up and commissioning, troubleshooting, emergency repairs and retrofits. Regular preventative maintenance services are also available. This provides an annual inspection and product maintenance to ensure reliability and performance while extending service life and identifying potential issues early.

### Siemens Xcare

Xcare is a new program designed to help you maximize the value of your automation equipment. With proactive services, actionable insight and expert support, Xcare is a partnership to optimize your equipment throughout its entire lifecycle.

#### Overview—Siemens Xcare service agreements

 <b>CORE</b> service	<b>Xcare Core customers</b> are provided with vital tools and remote services to support their existing teams in minimizing downtime and ensuring the availability and reliability of Siemens equipment.
 <b>PLUS</b> service	<b>The Xcare Plus package</b> , our most sought-after tier, enhances support by providing comprehensive assistance, including onsite repair services for components and dedicated application and system support. This ensures optimal performance for the entire lifespan of your equipment, particularly benefiting customers with limited maintenance personnel.
 <b>PREMIUM</b> service	<b>Xcare Premium offers</b> the highest level of service and support tailored for essential operations. This package includes the fastest response times, priority comprehensive support, and the most options for preventative maintenance. Additionally, it provides tools designed to enhance plant uptime, efficiency and protection.

Achieve the perfect service strategy with Xcare and focus on your core operations with confidence. [Click here for details.](#)

## Sustainability in test stands

Environmental impacts from the automation and drives selected for your company makes measuring your decarbonization efforts in your company's sustainability objectives more transparent.

SINAMICS high-performance, enclosed, regenerative drives with active front end technology, for example, allow for energy to be captured during testing which can be fed back into the grid. This can lead to significant savings in utility costs, annual energy savings, and a reduction of CO<sub>2</sub> emissions.

A great example features the 4-poster road simulator from eMpulse Test Systems. They use servo-electric actuators (SEA), as shown below, to simulate road and driving conditions to uncover "buzz, squeak and rattle" (BSR) issues as well as to assess the noise, vibration, and harshness (NVH) characteristics of vehicles.

Similar standard hydraulic systems, which require pumping fluid often from great distances away, lose vast amounts of energy. What's impressive about the eMpulse system, is that when utilizing Siemens technology, the SEA based system (which only use energy during testing) achieve an energy savings of 80% or more in comparison. Less energy not only can provide cost savings to the customer, but it contributes to the overall sustainability profile of the customer, by reducing their carbon footprint. [Click here to read the full story.](#)







# Product portfolio for test stand applications

## SINAMICS low-voltage general purpose drives

Common applications such as pumps, fans, compressors, conveyors and general machinery



### SINAMICS G120C

Enclosure type: IP20 AC drive

The compact full-function VFD solution for three-phase applications such as conveyor belts, material transport, pumps, fans and machine tools

- 380–480V 3-phase, 0.75–150 hp
- V/Hz and sensorless vector
- Safety Integrated (STO)
- Optional Wi-Fi module available
- PROFINET, EtherNet/IP, PROFIBUS DP, USS, MODBUS RTU communication



### SINAMICS G120

Enclosure type: IP20 AC drive

Modular design concept, regenerative power module option available

- 200–240V 1-phase, 0.75–5 hp
- 200–240V 3-phase, 0.75–75 hp
- 380–480V 3-phase, 0.75–400 hp
- 500–690V 3-phase, 10–250 hp
- V/Hz, vector and sensorless vector
- Closed-loop control available
- Safety Integrated basic (STO, SS1, SBC) and extended (SLS, SSM, SDI)
- Optional Wi-Fi module available
- PROFINET, EtherNet/IP, PROFIBUS DP, USS, MODBUS RTU, BACnet MS/TP communication



### SINAMICS G220

Enclosure type: IP20/IP55 AC drive

High-performance multi-purpose drive for every industry (Clean Power and Regenerative variants coming soon)

- 200–240V 3-phase, 0.75–40 hp
- 380–500V 3-phase, 1.5–75 hp
- 525–690V 3-phase, 4–75hp (*Coming soon*)
- V/Hz or V/f control (linear, linear with flux current control/FCC, parabolic and eco mode), sensorless vector control (SLVC), vector control with encoder, torque control encoderless/with encoder
- Safety Integrated basic (STO, SS1, SBC) and extended (SLS, SSM, SDI) at SIL 3, PL e, Cat. 4
- Optional Wi-Fi module available
- PROFINET, EtherNet/IP, MODBUS TCP communication (*additional option modules coming soon*)



### SINAMICS G130

Enclosure type: IP20/IP55 AC drive

High-power chassis drive

- 380–480V 3-phase, 150–800 hp
- 500–600V 3-phase, 150–800 hp
- 660–690V 3-phase, 75–800 kW
- V/Hz, vector and sensorless vector
- Safety Integrated basic (STO, SS1, SBC) and extended (SLP, SP)
- PROFINET, EtherNet/IP, MODBUS TCP, PROFIBUS DP, communication



### SIEMENS G120E-2

Enclosure type: NEMA 1/NEMA 12 AC drive

Stand-alone, wall-mount or floor-standing enclosures for SINAMICS G120 vector drives

- 460–480V 3-phase
- 380–480V 3-phase (optional)
- 6-pulse diode front end with power module PM240-2: 1–200 hp (0.75–132 kW)
- V/Hz, vector and sensorless vector, closed-loop control available
- Safety Integrated basic (STO, SS1, SBC) and extended (SLS, SSM, SDI)
- PROFINET, EtherNet/IP, PROFIBUS DP, USS, MODBUS RTU, BACnet MS/TP communication



### SINAMICS G150

Enclosure type: NEMA 1/NEMA 12 AC drive

Silent, compact, operator-friendly and ideal for pumps, fans, extruders and mixer drives based upon the SINAMICS S120 family

- 380–480V 3-phase, 150–800 hp
- 500–600V 3-phase, 150–800 hp
- Input circuit breaker standard
- Input reactor standard
- AOP30 operator interface standard
- CU320-2 with PROFINET standard
- Safety Integrated basic (STO, SS1, SBC) and extended (SLS, SSM, SDI)
- CE mark; optional UL listing
- IEC design available
- PROFINET, EtherNet/IP, MODBUS TCP, PROFIBUS DP, communication

## SINAMICS low-voltage high-performance drives

Demanding applications such as centrifuges, extruders, metal processing and forming, motion control and test stands



### SINAMICS S200 AC / AC

Enclosure type: IP20

AC drive

#### Servo system for basic applications

- 200–240V 1- or 3-phase, 0.1–1 kW
- 380–480V 3-phase, 0.2–7 kW
- Basic positioning tasks
- Servo control
- Paired with SIMOTICS 1FL2 motor
- Safety Integrated basic (STO) at SIL 3, PL e, Cat. 4
- PROFINET, Pulse Train Input (PTI) communication



### SINAMICS S210

Enclosure type: IP20

AC drive

#### Servo system for mid-range applications

- 200–240V 1-phase, 0.1–0.75 kW
- 200–480V 3-phase, 0.4–7 kW
- Motion control and positioning task
- Servo control
- Paired with SIMOTICS 1FK2, 1FT2 and 1FS2 motors
- Safety Integrated basic (STO, SS1, SBC) and extended (SLS, SSM, SDI) at SIL 3, PL e, Cat. 4
- PROFINET, EtherNet/IP communication



### SINAMICS S120 AC / AC

Enclosure type: IP20

AC drive

#### Servo system for mid-range applications

- 200–240V 1-phase, 0.5–5.0 hp
- 200–240V 3-phase, 7.5–75 hp
- 380–480V 3-phase, 0.5–400 hp
- 500–690V 3-phase, 15–150 hp
- Motion control and positioning tasks
- Vector, servo, V/Hz control
- PROFINET, EtherNet/IP, MODBUS TCP, PROFIBUS DP, communication



### SINAMICS S120

Enclosure type: IP20

AC drive

#### Multi-axis drive system for high-end applications

- Common DC bus drive system
- Air-cooled, liquid cooled
- 380–480V 3-phase, 1–1150 hp
- 500–690V 3-phase, 75–1250 hp
- Basic, regenerative and active infeeds
- Motion control and positioning tasks
- Vector, servo, V/Hz control
- Safety Integrated basic (STO, SS1, SBC) and extended (SLS, SSM, SDI)
- PROFINET, EtherNet/IP, MODBUS TCP, PROFIBUS DP, EtherCAT communication



### SINAMICS S150 AC / AC

Enclosure type: NEMA 1 / NEMA 12

AC drive

#### Single drives for test bays, cutters, centrifuges, conveyor belts and presses

- 380–480V 3-phase, 150–1150 hp
- 500–690V 3-phase, 75–1250 hp
- Active line module (standard)
- Four quadrant operation (standard)
- Safety Integrated basic (STO, SS1, SBC) and extended (SLS, SSM, SDI)
- PROFINET, EtherNet/IP, MODBUS TCP, PROFIBUS DP, EtherCAT communication



### SINAMICS S120CM

Enclosure type: NEMA 1 / NEMA 12

AC drive

#### Modular cabinet system for multi-motor drives with a common DC bus bar—typical applications include paper machines, rolling mills, test stands and hoisting gear

- 380–480V 3-phase, 150–4000 hp
- 500–690V 3-phase, 75–5000 hp
- Line-ups consist of line connection module, line modules and motor modules.
- Basic, regenerative and active infeeds
- CE mark; optional UL listing
- Safety Integrated basic (STO, SS1, SBC) and extended (SLS, SSM, SDI)
- Optional as air-cooled or liquid-cooled
- PROFINET, EtherNet/IP, MODBUS TCP, PROFIBUS DP, EtherCAT communication



## SINAMICS low-voltage high-performance drives (Continued)



### SINAMICS DCM

Enclosure type: IP20

DC drive

Scalable DC drive system for basic to demanding and sophisticated applications

- 5–40,000 hp (6.3 kW–30 MW)
- 15–3000A (single converter)
- 85–950V 3-phase
- 1- or 4-Quadrant variants available
- PROFINET, EtherNet/IP, PROFIBUS DP communication



### SINAMICS DCP

Enclosure type: IP20

DC drive

DC-DC converter for industrial and smart grid applications

- 30 kW  
DCP voltage range: 0–1000V DC  
Power: 30 kW @  $I_{max} = 50\text{ A}$ ,  $V_{in} = V_{out} = 600\text{ V DC}$
- 120 kW  
DCP voltage range: 0–1000V DC  
Power: 120 kW @  $I_{max} = 200\text{ A}$ ,  $V_{in} = V_{out} = 600\text{ V DC}$
- 250 kW  
DCP voltage range: 0–1200V DC  
Power: 250 kW @  $I_{max} = 250\text{ A}$ ,  $V_{in} = V_{out} = 600\text{ V DC}$
- PROFINET, EtherNet/IP, PROFIBUS DP communication



### SINAMICS DC Base Drive

Enclosure type: IP00

DC drive

Offers unmatched reliability and flexibility for system upgrades and backed by a 3-year extended warranty exclusive to the US market

- Standard range 3–800 hp (2.2–600 kW) DC I-rated
- 240V/480V 3-phase AC,  $\pm 10\%$ , 3–800 hp single-phase AC with 30% de-rate up to 125A continuous current
- 45–65 Hz
- Output voltage 0–500V DC
- Self-ventilated / forced-air ventilation
- 70–74.4 dB(A) at 60 Hz line frequency
- UL and cUL (508A), drive components are listed UL508C
- 1- or 4-Quadrant variants available
- PROFINET, EtherNet/IP, PROFIBUS DP communication



## SIMOTICS motors for motion control applications

Quality, performance and efficiency



### SIMOTICS-S 1FK

Servomotor

#### Compact synchronous motors for standard motion control applications

- Torque: 0.18–48 Nm
- Power: 0.05–8.17 kW
- Rated speeds: 2000, 3000, 4500, 6000 rpm
- Overload capability up to 400%
- Dynamic performance versions: high inertia, compact and high-dynamic
- Single-turn absolute, multi-turn absolute, or incremental encoder with DRIVE-CLiQ
- Natural cooling



### SIMOTICS-S 1FL

Servomotor

#### Compact synchronous motors for standard motion control applications

- Torque: 0.16–35 Nm
- Power: 0.1–7.0 kW
- Rated speeds: 2000 and 3000 rpm
- Dynamic performance versions: low, medium, and high inertia
- Overload capability up to 350%
- Single-turn absolute and multi-turn absolute encoder
- Natural cooling



### SIMOTICS-S 1FT

Servomotor

#### Compact synchronous motors for standard motion control applications

- Torque: 2–170 Nm
- Power: 0.88–34.2 kW
- Rated speeds: 1500, 2000, 3000, 4500, 6000 rpm
- Dynamic performance versions: compact and high-dynamic
- Overload capability up to 400%
- Either single-turn or multi-turn absolute encoder with DRIVE-CLiQ
- Natural cooling, water-cooling, forced-cooling



### SIMOTICS-M 1PH8

Main motor

#### Flexible, dynamic power for precision rotary axes applications

- Torque: 13–12,475 Nm
- Power: 2.8–1340 kW
- Rated speeds: 600, 1000, 1350, 2000, 3400, 3600 rpm
- Maximum speeds up to 20,000 rpm
- Induction and synchronous versions
- Either incremental or multi-turn absolute encoder with DRIVE-CLiQ
- Water-cooling, forced-cooling, open-circuit cooling

## Digital Drive Train (DDT)—optimization through data analytics and simulation

**Transform vibration data into digital added value for higher machine availability**  
**Predictive maintenance of mechanical components across every level**



### SIPLUS CMS (Condition Monitoring Systems)

Three different analysis methods for different application requirements:

- Parameter-based analysis (velocity, acceleration and DKW)
- Frequency-selective analysis (Fast Fourier Transform)
- Expert Analysis (free configuration and analysis of raw data)

Three different IEPE vibration sensors available for low, medium, high sensitivity

- Modular architecture: stand-alone solution (SM-VIB sensor module); or paired with the S7-1200 controller family (SM1281 sensor module)
- Analysis via integrated web-server, TIA Portal, DriveTrain Analyzer or X-Tools
- OPC UA connectivity (IIoT / Edge / Cloud)



### Connectivity Module IoT (CM IoT)

- Cost-effective, wireless, plug-and-play connectivity module
- Remote AI-based solution for low-voltage induction motors condition monitoring: IEC frame-sizes 80–450 (NEMA FS 48–580); DOL or VFD driven, any brand, any application

- Built-in sensors (measurement interval 1 to 60 minutes): temperature (-40° to +85° C); vibration Vrms in 3-axis (10 Hz–3.3 kHz); magnetic field (rotary stray field | 0.01–300 Hz)
- Battery-powered, Wi-Fi data transfer (transmission interval 1–48 h)
- Powerful analytics via DriveTrain Analyzer

## DriveSim family for simulation solutions

**Overcome the challenges in the design and engineering phases with a drive digital twin**



### DriveSim Engineer

- Innovative software-in-the-loop solution combining simulation and virtual commissioning
- Complete digital twin of the new SINAMICS drives with same firmware as the real drive to mimic all parameters and configurations
- Project testing and validation before physical installation occurs
- Product training without having a real product or demo equipment
- Available as an add-on to STARTDRIVE (from V18 SP1) via license options: 30-day free trial; annual subscription; one-time perpetual
- Efficiently design, validate, test, and virtually commission drive trains



### DriveSim Designer

- Easy-to-use model for PROFIdrive-enabled SINAMICS drives
- One Functional Mock-up Unit (FMU) model for all SINAMICS drives
- Sub-selection of the drive parameters (focus on core drive features), validated and verified against the real SINAMICS drives
- Efficiently design, validate and test SINAMICS drives with PLC integration and application kinematics
- Output simulation load characteristics can be used for drive and motor selection and dimensioning in TIA Selection Tool
- Software independent (used with any time-based simulation tools e.g., SIMIT)
- Available via license option: annual subscription

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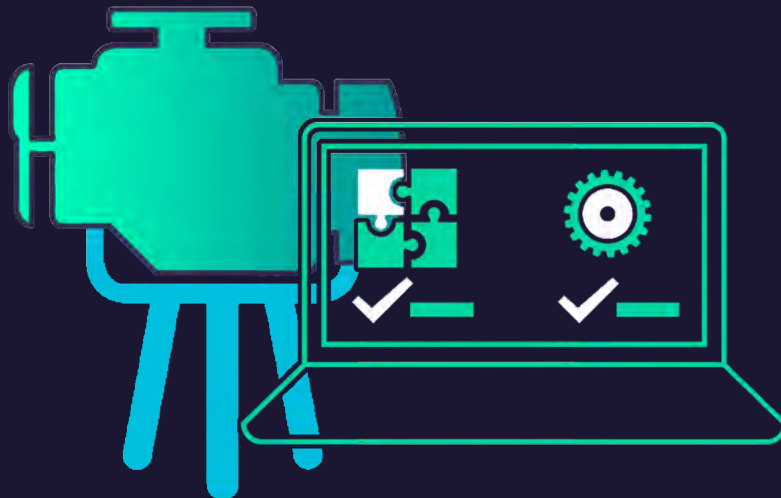
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**Published by  
Siemens Industry, Inc.**

100 Technology Drive  
Alpharetta, GA 30005

Order No. DRBR-TESTIB-0924

Printed in USA

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