Integrated Drive Systems
Discover Siemens
Integrated Drive Systems

Integrated Drive systems are Siemens’ trendsetting answer to the high degree of complexity that characterizes drive and automation technology today. The world’s only true one-stop solution for entire drive systems is particularly characterized by threefold integration:

Horizontal, vertical, and lifecycle integration ensure that every drive system component fits seamlessly into the whole system, into any automation environment, and even into the entire lifecycle of a plant.

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> Ralf-Michael Franke
  CEO Drive Technologies Division, Siemens

> Sal Spada
  Market Analyst, ARC Advisory Group

> Rolf Themann
  Technical Director, Sklostroj
Integration creates value added

Siemens Integrated Drive Systems deliver a unique answer to today's complex challenges in the field of automation and drive technology: Perfectly interacting components throughout an integrated drive portfolio, integrated into automation, and with software and services for all stages of the lifecycle. That means value added through shorter time to market and shorter time to profit.
Integrated Drive Systems

Siemens Integrated Drive Systems are the only true one-stop solution for entire drive systems worldwide. This consistent approach for the complete drive train is particularly characterized by the concept of threefold integration: horizontal, vertical, and comprehensive lifecycle integration. For better reliability, productivity, and efficiency.

Horizontal integration

Integrated drive portfolio: all frequency converters, motors, couplings, and gear units available from a single source.

Perfectly integrated, perfectly interacting. For all power and performance classes. As standard solutions or combined to an individual solution.

You can boost the availability of your application or plant to up to 99%*.

Learn more about horizontal integration

Vertical integration

Integrated into automation: from the field level via controller level up to MES thanks to Totally Integrated Automation (TIA).

Whatever the application.

With TIA Portal you can cut your engineering time by up to 30%.

Learn more about vertical integration

Lifecycle integration

Integrated software and services throughout the entire lifecycle.

For better performance and maximum investment protection.

With Integrated Drive Systems you can reduce your maintenance costs by up to 15%.

Learn more about lifecycle integration
**Integrated drive portfolio**

All frequency converters, motors, couplings, and gear units available from a single source. Perfectly integrated, perfectly interacting. For all power and performance classes. As standard solutions or combined to an individual solution.

**Your Benefits:**
- Unrivaled portfolio from a single source
- Ensured drive train compatibility
- Reliable system performance
- Optimized components and ideally tuned drive train for productivity and efficiency gains
Solution: MultipleDrive

Improved productivity and reliability in cement production and in the milling of limestone, clinker, slag, lime, plaster, and ore

Technology:
- Modular system for high-power vertical mills
- Two to six variable-speed drives in various arrangements
- Optimally matched components
- Pre-aligned, interchangeable standardized components
- Ability of the grinding dish bearing to absorb static radial loads
- Direct transfer of grinding forces into the foundation

Benefits:
- High quality standard of standardized components
- Best possible energy efficiency and optimal grinding results thanks to variable speed control
- Maximum availability of the drive system thanks to modularity
- Suits mill power ranges of up to 16.5 MW
- Reduced building height
- Less civil works thanks to economies of scale
- Greatest possible design flexibility according to customer requirements
- Easy servicing and maintenance of drives
- Tuned one-stop system from a single source

16.5 MW Suits mills of up to 16.5 MW

Discover more on the Internet
Solution: conveyor drives

Increased productivity and reliability in minerals and mining as well as in cement production

**Technology:**
- Gear units optimized for conveyor belt drive applications
- Housing shape for optimum thermal capacity
- Self-aligning systems available
- Optimized for remote and/or central solutions

**Benefits:**
- Highly standardized components ensure cost-efficiency
- Active redundancy with multiple drives for overland conveyors
- Maximum availability thanks to proven components
- No cooling system required
- Low capital cost with gear units
- Low noise-emissions

4,500 kW

Power ratings up to 4,500 kW!
Product: SIMOGEAR

Productivity gains in conveyor technology for industrial applications, with cranes and hoists, and in environment, water, and sewage technologies

**Technology:**
- New modular geared motor series with all market-relevant gear types (helical, parallel shaft, bevel, and worm gear units)
- New series fulfills customer-relevant mounting dimensions generally used in the market
- New series designed to mount induction motors and synchronous motors with high efficiencies according to IE2, IE3, and IE4 in an integrated design

**Benefits**
- High energy efficiency for fast return on investment thanks to
  - Two-stage bevel and helical gear units
  - High-efficiency motors
  - Helical/parallel shaft gear units in two-stage range with an efficiency ≥ 96% instead of three-stage gear units with an efficiency of approx. 94%
- Very compact and low-weight for easy handling in the smallest space

96% Improvement in gear unit efficiency to up to 96%

Discover more on the Internet
Application: mining trucks

Productivity and reliability gains with mining truck drives

**Technology:**
- Integrated variable-speed drive system
- Adaptive torque and speed control
- Optimally matched components

**Benefits:**
- High power efficiency
- Traction control
- Breaking
- Positioning

360 tons

For Trucks

up to 360 tons
Integrated into automation

From the field level via controller level up to MES thanks to Totally Integrated Automation. Whatever the application

**Your Benefits:**
- Drive train as an integrated part of Totally Integrated Automation (TIA)
- Intelligent monitoring and control
- Perfectly interacting automation system components including control, sensors, HMI, and communication
In practice: Inverters within the TIA Portal

Shorter time to market and reliability gains in general machinery for continuous motion applications with horizontal and vertical movements

Technology:
- SINAMICS Startdrive as the new way of parameterizing motion within the TIA Portal V12
- Efficient engineering of the complete application thanks to TIA Portal's user-friendliness for inverters
- Perfect interaction with SIMATIC
- Automatic integration in system diagnostics
- Simple SIMOTICS integration

Benefits:
- Reduced engineering and training effort as well as reduced standstill times
- Single application database for consistent data
- Existing knowledge – from controller configuration, for instance – can easily be applied for the configuration of an inverter
- Fewer program errors with task-oriented workflow

30% Reduced engineering time by up to 30%

Discover more on the Internet
Project reference: Sklostroj, Czech Republic

New concept for the automation of a glass bottle manufacturing machine

Technology:
- Replacement of the existing pneumatic solution by a new and innovative motion control solution
- SIMOTION D445-2, motion control drive-based
- Drive system with SINAMICS S120
- SIMOTICS servomotors 1FK7 and 1FK6
- Machines with 4 or 12 stations

Benefits:
- Availability increases of up to 15 percent
- Energy cost reduction of up to 40 percent

40% Energy cost reduction of up to 40%

More details on this project reference
Industry reference: shipbuilding

Meeting the ever-increasing demand of the shipbuilding market for solutions that enable more efficient, safer, and increasingly environment-friendly ship operation.

Technology:
- SISHIP EcoMAIN provides a platform for the acquisition, aggregation, and logging of all on-board plant and system data, processes these data in a uniform manner, and makes them available on a common data platform. Energy consumption, emissions, liquid bunkering, maintenance plans, document and knowledge management, and many others can be evaluated and subsequently optimized.
- SISHIP WHRS recovers and utilizes exhaust gas heat from a ship’s diesel engine to enhance the energy efficiency of the vessel
- SISHIP eSIPOD – podded propulsion drive
- SISHIP EcoProp – innovative, energy-efficient hybrid propulsion system

Discover more on the Internet
More details on this project reference
Integrated software and services

Comprehensive software tools and expert services for the entire lifecycle, from planning, engineering, and execution all the way to services. For better performance and maximum investment protection.

Your benefits:
- Configuration software from coupling to control optimizes efficiency
- Engineering tools from design to commissioning for shorter time to market
- Productivity that has already been proven by simulation at early stages
SIZER for Siemens Drives

Ensuring the efficiency of machinery for all main drive applications in the design phase already

**Technology:**
- Engineering software for considerable simplification of the engineering of low-voltage drive train systems based on applications from gear to control
- Precise consideration of the exact mechanical design and the process load
- Optimized drive train components for seamless interaction and for the load curve of mechanical system and process
- XCat: optimized selection tool for mechanical approach to solutions

**Benefits:**
- Optimized selection of component ensures that the drive train can be operated at the most efficient load point
- Estimated overall energy savings potential of optimized configuration is 70%
Project reference: Volkswagen, Germany

Modernization of three press lines

Technology:
Complete solution of drive technology and automation components for the identical set-up of three lines comprising

- Drive system with SINAMICS S120 and SIMOTION D
- Press line simulation for process optimization
- SIPLUS CMS condition monitoring system for preventive maintenance

Benefits:
- Simplified maintenance and spares inventory through preventive maintenance
- Enhanced productivity enabling long-term reduction of lines from 17 to eight
- Energy consumption reduced by up to 40 percent
- Availability increase to at least 96 percent

More details on this project reference

Discover more on the Internet

96% Increased availability, at least 96%
Service: Condition Monitoring

Increased availability and productivity through consistent monitoring of highly stressed components

Challenge:
Drive components are typically highly stressed components that are exposed to varying levels of constant wear and tear, depending on service life and load. That’s why it is crucial to be able to correctly assess the condition of the components at all times.

Solution:
Continuous monitoring of drive components makes it possible to recognize changes in operating conditions early on and take appropriate action to prevent costly plant shutdowns and production losses.

- Higher transparency about the condition of components and machines
- Increased plant availability and, hence, productivity
- Less inspection and maintenance effort

Benefits:
- Utilization of all components right up to their wear limit
- Minimization of unscheduled plant shutdowns and a reduction in consequent damage
- Time and cost savings thanks to early planning and optimization of maintenance and service activities
- Improvement in machine and plant availability

Discover more on the Internet
Mechatronic support

Increased productivity of all machinery and shorter time to market

Approach:
• Optimization, experimental analysis, and simulation of machines
• Consideration of the entire mechatronic system including mechanics, drive train, motors, encoders, drive control, NC or motion controller

Benefits:
• Early proof of concept and assessment of machinery productivity without time-consuming and expensive prototype building
• Optimal use of Siemens drives and controllers
• Analysis of complex mechatronic problems for OEMs – customer support for critical situations, such as an end customer refusing a machine
Integrated Drive Systems in practice

Whatever the application, whatever the automation environment: Siemens Integrated Drive Systems integrate seamlessly, and they even come with a full lifecycle perspective.

The bottom line: greater reliability, higher efficiency, superior productivity, and shorter time to profit. Siemens Integrated Drive Systems boost the competitive edge of production facilities and entire companies in any branch of industry.
Czech container glass machine specialist Sklostroj commissioned Siemens with a new concept for plant automation. Part of the modernization was the replacement of the hitherto pneumatic solution with a new, innovative motion control solution with SIMOTION, the SINAMICS S120 drive system, and SIMOTICS 1FK7 and 1FK6 servomotors.

The implementation on the basis of Integrated Drive Systems achieved a 40-percent improvement of energy efficiency and a 15-percent increase of availability.

In this video Rolf Themann, technical director with Sklostroj, reports on the successful project and the improvements that Integrated Drive Systems made possible.
Siemens performed the modernization of three press lines including drive technology and automation components for the Volkswagen factory in Wolfsburg, Germany. The integrated drive system with SINAMICS S120 and SIMOTION D had been tested through virtual simulation before installation. During operation, the condition monitoring system SIPLUS CMZ ensures preventive maintenance.

The solution based on Integrated Drive Systems improved productivity, reduced maintenance effort, lowered energy consumption by 40 percent, and increased availability to at least 96 percent.

Watch this video on the Internet

This video lets you discover how the retrofit of the press lines with energy-efficient technology made the Volkswagen plant fit for the future.
AIDA Cruises

With the AIDA Sphinx class, Siemens once again combined advanced eco-friendly propulsion technology with highly reliable, fail-safe ship automation. The integrated solution SISHIP PAX translates into increased long-term efficiency for passenger transport. The modular design of the solution platform ensures maximum return on investment while enabling easy ship conversion, modernization, and expansion.
Vattenfall Europe Mining

Vattenfall Europe Mining commissioned Siemens with the construction of a 13.5-kilometer conveyor belt system for the open-cast mining site at Reichwalde, Germany. The scope of supply comprised all engineering, manufacturing, delivery, and construction of the drive system as well as the construction of the transport system. The integrated drive systems are equipped with SINAMICS S120 inverters and SIMATIC S7-400 controllers.

Thanks to the implementation on the basis of Integrated Drive Systems, Vattenfall benefits from energy and maintenance cost savings of up to 15 percent – at an availability rate of 98 percent.

Watch this video on the Internet

This video lets you experience how the innovative drive system ensures the efficient operation of the gargantuan coal conveyor system.
Lafarge

Lafarge Hungary commissioned Siemens with the construction of Europe's most modern cement plant. The innovative package solution comprised power supply and building technology as well as all drive technology based on Integrated Drive Systems: motors, inverters, and the automation system CEMAT.

The integrated drive system from Siemens is particularly characterized by low maintenance costs, outstanding efficiency, and very low energy requirements.
Experts on Integrated Drive Systems

The obvious advantages the concept of Integrated Drive Systems offers in terms of productivity, reliability, and efficiency received high specialist acclaim. Experience why technology and industry experts hold Integrated Drive Systems from Siemens in high regard.

The unanimous conclusion is that Integrated Drive Systems is a sustainable and up-to-date concept that provides solutions for today and tomorrow.
Statements

Ralf-Michael Franke
CEO Drive Technologies Division

» With Integrated Drive Systems, there is simply more to a drive component or system. Siemens Integrated Drive Systems are based on the world’s most comprehensive and consistent product range in the field of drive systems. That’s why they are the only true one-stop solution for entire drive trains on the market. «

Watch this video on the Internet

Ralf-Michael Franke explains why drive technology needs to be integrated into the whole production environment today. He also explains how Integrated Drive Systems contribute to meeting the challenges today's complex high-end world of drive and automation technology entails.
Statements

ARC Analyst Sal Spada

Sal Spada
Member of the Discrete-Automation-Team at ARC Advisory Group

» I'm confident that manufacturers will perceive drive systems as a direct source of revenue generation rather than the cost of running the business. «

Market analyst Sal Spada explains why the Integrated Drive Systems approach is a novelty, which benefits it entails, and why it has the potential to shift the perspective on drives in a lasting manner.
Statements Rolf Themann, Sklostroj

Rolf Themann
MBA, Sklostroj Executive and Technical Director

» Integrated Drive Systems – that’s why we rely on secure solutions – on drive system solutions from a single source.

We decided to go with Siemens for the integration of the drive train. Siemens is a reliable partner with extensive technical expertise in integrated drive trains as well as their integration into the TIA landscape. «
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