Integrated Drive Systems
for Sugar Industry
Answers for the Sugar Industry
Table of Contents

Integrated Drive Systems (IDS) 04
Perfect Drive Concepts 08
FLENDER Gear Units 16
Siemens Geared Motors 22
FLENDER Couplings 24
Large Drives 26
Totally Integrated Automation (TIA) 28
Manufacturing Facilities 30
Customer Service Support 31
Integrated Drive Systems

Siemens Integrated Drive Systems (IDS) are the world’s first true one-stop solution for entire drive trains integrating with any automation environment, with different focuses for almost all industries, and even in the entire lifecycle.

The unique concept of threefold horizontal, vertical and lifecycle integration can deliver incredible benefits and quantifiable value, providing customers with a high level of productivity, efficiency, and reliability.

Through Siemens IDS, companies are able to boost the availability of their application or plant to up to 99 percent (for example, with conveyor applications), cut engineering time by up to 30 percent with the integration of the Totally Integrated Automation (TIA) Portal, and reduce maintenance costs by up to 15 percent.

“With the Integrated Drive System, we are writing a new chapter in the success story of drive systems from Siemens.

We are providing our customers with a comprehensive range of possibilities for optimum use of the most all-embracing product portfolio for electric drives, which we have been innovating continuously for more than 160 years.”
Perfectly matching components

Seamless integration into automation

Covering every step of the lifecycle
An eye for the big picture helps make the most of every component

**Horizontal integration** on the drive train level provides the tangible benefits of one-stop sourcing for motor, gear unit, coupling, frequency converter, and controls.

For the customer, this also translates into single-vendor responsibility, which facilitates purchasing and helps reduce the warranty costs that are often not considered.

Even more important, it provides a single point of contact for the entire drive train, eliminating the finger-pointing often prevalent in multivendor solutions. This ensures a rapid resolution of problems in the field, and it also provides a higher degree of reliability: Only a single vendor can consistently reduce interface losses, resonances, and wear by means of design, engineering, and optimally matched components. This translates into reduced operational and maintenance costs during operation, less downtime, and outstanding availability of up to 99 percent.

A consistent view on drives unlocks untapped potential

**Vertical integration**, integration of the drive train into the system architectures of the industrial production processes, is an essential precondition for production with maximum value added. That’s why all components of Integrated Drive Systems are integrated into the TIA architecture of Siemens Industry.

All TIA components, from the sensor level to the manufacturing execution system, are attuned to one another and enable maximum communication and control – and with Integrated Drive Systems, drive technology becomes part of this universe. This ensures a high level of monitoring, precise control, and the efficient use of energy, resources, and raw materials.

The integration of Integrated Drive Systems into the TIA Portal drastically simplifies engineering, commissioning, and diagnostics work. Configuration during the planning phase, the associated simulation, and drive train dimensioning enter a whole new dimension in efficiency, which results in the substantial reduction of engineering time by up to 30 percent.

Consideration of the entire lifecycle creates value in daily operation

**Lifecycle integration** means taking into account every aspect of an application in a holistic manner – from the earliest design steps all the way to maintenance and upgrades. Siemens provides a seamlessly integrated range of software that enables optimized planning and engineering, comprehensive and reliable simulations, and even data-based services for all Integrated Drive Systems. Moreover, qualified Siemens drive experts are available wherever and whenever needed to provide hands-on support and specialist knowledge when it comes to fully exploiting the potential that Integrated Drive Systems offer.

In practice, preventive maintenance measures, which become possible through consistent use of available data, can significantly simplify maintenance efforts and spare parts management. This helps reduce costs by up to 15 percent. At the same time, software and services help increase productivity, reduce energy consumption by up to 40 percent, and ensure the highest possible degrees of availability in daily operation.
You can boost the availability of your application or plant to up to 99%. For example, with conveyor applications.

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

With Integrated Drive Systems, you can reduce your maintenance costs by up to 15%.
Perfect Drive Concepts
for More Productivity & Efficiency in the Sugar Industry

The production of sugar entails great complexity and expenses. In addition to high power consumption during seasonal production, it requires above all high operational reliability and smooth production processes.

Siemens introduces the Perfect Drive Concepts that suit every sugar application requirements.
Perfect Drive Concepts for Various Sugar Applications:

- Carrier and Elevator Drives
- Sugar Mill Drives
- Pressure Feeder Drives
Higher Productivity and Efficiency

As a leading provider of drive technology for primary production and material extraction and as the world only complete-system provider, we are very familiar with all the requirements of sugar mill and sugar refinery operation. Whether it is in confined space conditions or in hot and humid areas, extreme conditions are the right work environment for our drives, because our solutions are 100 per cent designed to cope with anything they are put through.

In FLENDER gear units, Siemens offers you the widest range of highly-developed conveying drives by far. With a variety of standard construction forms we have precisely the right solution for every requirement.

FLENDER conveyor drives have the correct solution for:

- Cane Carriers
- Cane Levelers
- Kickers
- Bagasse Elevators
Perfect Drive Concepts

- Sugar Mill Drives

**Always the Right Mill Drive Solution**

No matter green field or brown field, large or small, Siemens will have the perfect solution for your mill drives.

Start from retaining the open gear systems and replacing steam turbines or DC motors with our FLENDER Standard Gear Units, SIMOTICS motors and SINAMICS drives. An increased efficiency of 40% can be achieved.

If you desire a more modern approach, having no open gears, DUORED Load Sharing Gear Units or PLANUREX2 Planetray Gear Units combined with SIMOTICS motors and SINAMICS drives will be the choice from 6,000 TCD and above.
Complete Solution up to 10,000 TCD

Complete Solution above 8,000 TCD
Always the Right Pressure Feeder Solution

Adding or having a Heavy Duty Pressure Feeder increases your milling extraction. Using PLANUREX2 Planetary Gear Units, either centrally or individually driven, provides a compact solution for Pressure Feeder drives.
FLENDER Gear Units

FLENDER FZG and SIG Standard Industrial Gear Units

<table>
<thead>
<tr>
<th>Application Description</th>
<th>For Cane Transport Systems and Mill Drives: Start from our Standard GG25 Cast Iron Monoblock or Splitted Housing with available GGG40 material or Steel Welded as options. Anti-friction bearings for efficiency and extended service lifetime. Dust resistant TACONITE Seals are standard equipment for the sugar industry.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design</td>
<td>Helical and Bevel-Helical Gear Units</td>
</tr>
<tr>
<td>Size</td>
<td>28</td>
</tr>
<tr>
<td>Gear Stages</td>
<td>1 to 4-Stage</td>
</tr>
<tr>
<td>Power Ratings</td>
<td>Up to 10,500 kW</td>
</tr>
<tr>
<td>Transmission Ratios</td>
<td>$i = 1$ to 450</td>
</tr>
<tr>
<td>Nominal Torques</td>
<td>Up to 1,400,000 Nm</td>
</tr>
<tr>
<td>Mounting Positions</td>
<td>Horizontal and Vertical</td>
</tr>
</tbody>
</table>
FLENDER Gear Units

- FLENDER DUORED Load Sharing Gear Units

**FLENDER DUORED Load Sharing Gear Units**

Flender gear units are used in the manufacturing process of sugar from sugar beet and sugar cane and contribute to saving energy through their optimized design. Carefully planned drive systems are designed to save space.

The DUORED relies on the Load Sharing principles in which the total torque load is shared among two Output Pinions to drive a final helical gear. This gives the DUORED its compact size while delivering high torque figures and also high ratios. Perfect drive train for Side Cane Carriers and Mill Drives.

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**For Side Cane Carriers:**

- Standard Cast Iron GG25 Housing and Steel Welded Housing for larger sizes
- Standard Cylindrical Output Shaft
- Supplied with our standard Oil Supply and Cooler System
- Dust protection on the shafts will be provided by the standard TACONITE Seals.
FLENDER DUORED Load Sharing Gear Units

Technical data
Type: DUORED
Sizes: from 550 to 1200
Power rating: up to 9,740 kW
Ratios: $i = \text{from 18 to 900}$
Nominal torque: from 550 to $4,800 \text{ kNm}$

Advantages
- Design optimized for energy savings
- Noise-optimized
- Space-saving design
- Highest efficiency with favorable temperature behavior

Applications
- Processing of sugar beet and cane

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<table>
<thead>
<tr>
<th>Product</th>
<th>DUORED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>14</td>
</tr>
<tr>
<td>Gear Stages</td>
<td>3 to 5-Stage</td>
</tr>
<tr>
<td>Power Ratings</td>
<td>Up to 10,000 kW</td>
</tr>
<tr>
<td>Transmission Ratios</td>
<td>$i = \text{18 to 900}$</td>
</tr>
<tr>
<td>Nominal Torques</td>
<td>Up to 4,000,000 Nm</td>
</tr>
</tbody>
</table>

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For Mill Drives:
Standard DUORED unit with additional standard equipment for Mill Drives, such as:
- Square Output Shaft
- Axial Thrust Bearing on Output Square Shaft
- TACONITE Seals

Maintenance drive also available as an integrated optional equipment.
With the FLENDER planetary gear unit series, Siemens provides also standardized gear unit solutions for higher power rating ranges in the proven FLENDER quality. With 42 sizes and seven basic types the PLANUREX series ensures torque ranges of up to 7,000,000 Nm and transmission ratios of 4,000:1.

Application specific gear units for Mills, Heavy Duty Pressure Feeders and Diffusers are made standard with PLANUREX2. With high technology, simplicity and efficiency in mind, PLANUREX2 is more compact, lighter yet stronger than its competitors.

PLANUREX2: Purpose built made standard.

### FLENDER PLANUREX2

**Individual Mill Drives**

For Heavy Duty Pressure Feeders as well as Independently Driven Mill Drives.

With cast iron housing and double walled planet carriers, we can deliver more torque in a more compact overall package.

All of our PLANUREX2 drives comes with our standard Oil Supply and Cooler System.

Standard TACONITE Seals provide the protection against dust on both input and output shafts.

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<table>
<thead>
<tr>
<th>Design</th>
<th>Planetary Gear Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>30</td>
</tr>
<tr>
<td>Gear Stages</td>
<td>2 to 3-Stage and Gear Unit Combinations</td>
</tr>
<tr>
<td>Power Ratings</td>
<td>Up to 14,500 kW</td>
</tr>
<tr>
<td>Transmission Ratios</td>
<td>Up to i = 4,000</td>
</tr>
<tr>
<td>Nominal Torques</td>
<td>Up to 4,700,000 Nm</td>
</tr>
</tbody>
</table>
FLENDER PLANUREX2
Mill Central Drives
For Centrally Driven Heavy Duty Pressure Feeders and Mills.
PLANUREX2 gear unit with added standard equipment, such as:
- Square Output Shaft with Axial Thrust Bearings
- Special Foot Mount Unit perpendicular to the axis of rotation
- TACONITE Seals

FLENDER PLANUREX2
Diffuser Drive
For Diffuser Chain Drives.
PLANUREX2 Bevel Planetary Gear Unit with ratio 4,000, integrated with SIMOTICS motor provides a highly compact solution for your diffuser.
Unit can be shaft mounted with Shrink Disc Connection or foot mounted with Cylindrical Output Shaft.

<table>
<thead>
<tr>
<th>Product</th>
<th>P.NZ.., P.SZ.., P.KZ..</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>10</td>
</tr>
<tr>
<td>Gear Stages</td>
<td>2 to 3-Stage</td>
</tr>
<tr>
<td>Transmission Ratios</td>
<td>$i = 25$ to 4,000</td>
</tr>
<tr>
<td>Nominal Torques</td>
<td>Up to 7,000,000 Nm</td>
</tr>
<tr>
<td>Mounting Positions</td>
<td>Horizontal</td>
</tr>
</tbody>
</table>
Siemens Geared Motors

**SIMOGEAR**

**Correct Drives for Processing Side**

Siemens offers a complete range of geared motors to drive anything in the processing section of a typical sugar factory. From winches, pumps, clarifying mixers, dryers, conveyors - you name it, we have the right drive for you.

<table>
<thead>
<tr>
<th>Gearbox Designation</th>
<th>Helical Geared Motor</th>
<th>Parallel Shaft Geared Motor</th>
<th>Bevel Helical Geared Motor</th>
</tr>
</thead>
<tbody>
<tr>
<td>E39...E149 (1-stage)</td>
<td>FZ29...FZ229 (2-stage)</td>
<td>B19...B49 (2-stage)</td>
<td></td>
</tr>
<tr>
<td>Z19...Z189 (2-stage)</td>
<td>FD29...FD229 (3-stage)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D19...D189 (3-stage)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>7 (1-stage)</td>
<td>13</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>13 (2-/3-stage)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Gearbox Frame Sizes</td>
<td>50...20.000</td>
<td>100...50.000</td>
<td>50...450</td>
</tr>
<tr>
<td>Rated Gearbox Torque [Nm]</td>
<td>1.1... 10 (1-stage)</td>
<td>3.5..60 (2-stage)</td>
<td>3.5..60 (2-stage)</td>
</tr>
<tr>
<td>Gearbox Ratio</td>
<td>3.0..60 (2-stage)</td>
<td>50..330 (3-stage)</td>
<td>50..330 (3-stage)</td>
</tr>
<tr>
<td>Maximum Motor Power [kW]</td>
<td>200</td>
<td>200</td>
<td>7.5</td>
</tr>
</tbody>
</table>
Bevel Helical Geared Motor

<table>
<thead>
<tr>
<th>S19…S29 (1-stage)</th>
<th>K39…K229 (3-stage)</th>
<th>C29…C89 (2-stage)</th>
<th>S09…S29 (1-stage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 5 3</td>
<td>12 5 3</td>
<td>12 5 3</td>
<td>12 5 3</td>
</tr>
<tr>
<td>200…50.000</td>
<td>100…1600</td>
<td>200…50.000</td>
<td>200…50.000</td>
</tr>
<tr>
<td>5…330 (3-stage)</td>
<td>10…290 (2-stage)</td>
<td>5…330 (3-stage)</td>
<td>5…100 (1-stage)</td>
</tr>
<tr>
<td>250…50,000 (multi-stage)</td>
<td>250…25,000 (multi-stage)</td>
<td>250…50,000 (multi-stage)</td>
<td></td>
</tr>
<tr>
<td>200</td>
<td>15</td>
<td>200</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1.1</td>
</tr>
</tbody>
</table>

Made even more efficient with IE2 motors as standard and available IE3 as an option. Both integratable with Ethernet IP, PROFIBUS and PROFINET to ensure greater control and efficiency in your processing.
Connecting the Drive System

As the worldwide biggest manufacturer of mechanical couplings with more than 80 years of experience, Siemens takes care that the machine shafts are safely connected in almost all sectors of industry – throughout the world.

Siemens product range covers flexible and highly flexible couplings, gear couplings, all-steel couplings, fluid couplings and torque limiters. Furthermore, Siemens provides a wide range of application-related solutions, thus ensuring reliable connections in nearly all industrial sectors.

Stocks in more than 40 countries ensure the fast availability of our standard products. Gain the advantage from procuring all the products and services of the known FLENDER quality level without delay from one source. Take advantage of the possibilities offered with our wide range of couplings.

FLENDER mechanical couplings cover a torque range between 15 and 10,000,000 Nm.

<table>
<thead>
<tr>
<th>Types</th>
<th>N-EUPEX</th>
<th>BIPEX</th>
<th>RUPEX</th>
<th>ELPEX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sizes</td>
<td>8</td>
<td>3</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>Sizes</td>
<td>23</td>
<td>13</td>
<td>26</td>
<td>12</td>
</tr>
<tr>
<td>Torques</td>
<td>Up to 62,000 Nm</td>
<td>Up to 3,700 Nm</td>
<td>Up to 1,300,000 Nm</td>
<td>Up to 90,000 Nm</td>
</tr>
<tr>
<td>Coupling Type</td>
<td>Pin Coupling</td>
<td>Claw Coupling</td>
<td>Pin and Bush Coupling</td>
<td>Ring Coupling</td>
</tr>
</tbody>
</table>

FLENDER Couplings

for Sugar Drives
<table>
<thead>
<tr>
<th>ELPEX-S</th>
<th>ELPEX-B</th>
<th>ZAPEX</th>
<th>ARPEX</th>
<th>FLUDEX</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>3</td>
<td>19</td>
<td>11</td>
<td>4</td>
</tr>
<tr>
<td>11</td>
<td>15</td>
<td>43</td>
<td>82</td>
<td>16</td>
</tr>
<tr>
<td>Up to 40,000 Nm</td>
<td>Up to 14,500 Nm</td>
<td>Up to 7,200,000 Nm</td>
<td>Up to 1,500,000 Nm</td>
<td>Up to 1,500 Nm</td>
</tr>
<tr>
<td>Rubber Disk Coupling</td>
<td>Rubber Tyre Coupling</td>
<td>Gear Coupling</td>
<td>All-Steel Coupling</td>
<td>Fluid Coupling</td>
</tr>
</tbody>
</table>
Large Drives

Innovation for Optimal Drives System

Optimal Drive System for Sugar Industry

The Large Drives range comprises heavy-duty AC machines for low and medium voltages as well as converters for these machines. Large Drives also offers DC drives, special drives, converters, automation control systems, and motors for traction drives. The range also includes converters for power distribution and after-sales service for heavy-duty drive systems.

Large Drives bases its business on system and solution expertise and platform-based manufacturing for flexible standard systems with a high level of customer benefit.
Totally Integrated Automation

Efficient Automation Starts with Efficient Engineering

Totally Integrated Automation (TIA): Efficiency Driving Productivity

Totally Integrated Automation, industrial automation from Siemens, is the name given to efficient interoperability of all automation components. The open system architecture covers the entire production process and is based on the consistent presence of shared characteristics: consistent data management, global standards, and uniform hardware and software interfaces.

These shared characteristics minimize engineering time. The result: **lower costs, reduced time to market, and greater flexibility.**

SIMATIC PCS 7: New Standards in Process Control

This system enables you to respond swiftly to constantly changing market requirements. Integrated safety concepts ensure continuous operation of your systems and protect man, machine and the environment. The offers high system availability, investment security and future-safe technology, together with a reduced total cost of ownership.
Optimizing the Complete Workflow with NAHMAT

NAHMAT Solutions

In today’s sugar industry, the automation environment must deliver accelerated engineering and commissioning processes, smooth interaction in operations, and maximum flexibility for modifications and expansions.

With Totally Integrated Automation, Siemens is the only provider that offers a comprehensive range of products and systems for automation in all sectors - including inbound to outbound logistics, and from field level to production management with integration at the plant management level. Because our ready-made custom NAHMAT solutions address all these needs, you can be assured our tailored automation solution will set new standards in efficiency and availability.

The results achieved from using our solutions will be significantly lower plant life cycle costs and faster time-to-market, which will give your company the crucial edge in this highly competitive industry.
For more than 165 years, the name Siemens has been synonymous with internationality and worldwide presence.

Siemens is a globally operating technology Company with core activities in various industries. On a continuing basis, we have around 362,000 employees as of September 30, 2013 and business activities in nearly all countries of the world and reported consolidated revenue of €75.882 billion in fiscal 2013. We operate in excess of 290 major production and manufacturing plants worldwide. In addition, we have office buildings, warehouses, research and development facilities or sales offices in almost every country in the world.
Customer Service Support
Support Over Your Entire Product Lifecycle

Product Lifecycle Services
- Online Support
- Technical Support
- Field Service
- Retrofits
- Service Contracts and Service Points
- Repair Services
- Spare Space Parts
- Commissioning (IBS)
and many more...

For Gear Units, Motors and Drives in ASEAN
- Centralized and coordinated in Singapore for the whole region
- 4 Regionalized FLENDER Service Engineers
  (1) German Service Engineer in Chonburi, Thailand
  (1) German Service Engineer in Singapore
  (2) Singaporean Service Engineer in Singapore
- 2 Large Siemens Maintenance Facilities
  Nakornphatom, Thailand
  Bukit Raja, Shah Alam, Malaysia

SIEMENS Repair Workshops
- Nakornphatom, Thailand
  Located on 4 Rai (6,400 sq.m) of land, with approx. 2500 sq.m working space
  ISO9001 Quality Management system Certified by TUV since 2000
- Bukit Raja, Shah Alam, Malaysia
  ISO9001 Quality Management system Certified by TUV since 2000
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