Drives for process industry
Narendra Patil, Siemens Ltd. India
SINAMICS - Follow the largest family to find the optimum solution

Siemens is the TOP SUPPLIER for drive technology

For variable speed drives we recommend for the future one brand: SINAMICS
The drives family SINAMICS
Totally integrated in control and supervisory level
The drives family SINAMICS – Perfect interaction with automation and motors

Integrated for SINAMICS:

- Engineering with SIZER
- Parameterizing with STARTER
- Operator control
- Diagnostics
- Communication

Tools:
- SIMATIC STEP 7
- SIMOTION SCOUT
- SINUMERIK SinuCom NC
- SIZER
- STARTER

SINAMICS is part of Totally Integrated Automation

SINAMICS PLC
SINUMERIK Numerical Control
SIMOTION Motion Control

Induction motors
Geared motors
Synchronous motors

Restricted © Siemens Ltd. 2014 All rights reserved.
SINAMICS, the optimum drive for every purpose

Efficient pumping, blowing, and compressing, or precise motion, machining, and processing, the number of applications for converters is almost boundless: It is just as well there is a single drive family for all applications, which is able to meet any requirement perfectly: SINAMICS. Our portfolio stands for integrated engineering, highest energy efficiency, and easy operation.
## SINAMICS Overview of the Portfolio

<table>
<thead>
<tr>
<th>V series</th>
<th>G series</th>
<th>S series</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="V series" /></td>
<td><img src="image" alt="G series" /></td>
<td><img src="image" alt="S series" /></td>
</tr>
<tr>
<td><strong>Basic</strong></td>
<td><strong>Efficient</strong></td>
<td><strong>Flexible</strong></td>
</tr>
</tbody>
</table>

### Application examples

- **Basic Performance**
- **Plug 'n' play Ruggedness**
- **General Performance Application-opt. variants**
- **High usability**
- **High Performance Highest functionality Innovation driver**

### Requirements

<table>
<thead>
<tr>
<th>Feature</th>
<th>V series</th>
<th>G series</th>
<th>S series</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closed-loop control performance</td>
<td><img src="image" alt="V series" /></td>
<td><img src="image" alt="G series" /></td>
<td><img src="image" alt="S series" /></td>
</tr>
<tr>
<td>(TIA) Totally Integrated Automation Integration</td>
<td>-</td>
<td><img src="image" alt="G series" /></td>
<td><img src="image" alt="S series" /></td>
</tr>
<tr>
<td>Energy recovery topology</td>
<td>-</td>
<td><img src="image" alt="G series" /></td>
<td><img src="image" alt="S series" /></td>
</tr>
<tr>
<td>Integrated safety functions</td>
<td><img src="image" alt="V series" /></td>
<td><img src="image" alt="G series" /></td>
<td><img src="image" alt="S series" /></td>
</tr>
</tbody>
</table>

### Standards

- **Standard**
- **Mid-range**
- **High-end**
## SINAMICS
### Targeted Applications / Types of Use

<table>
<thead>
<tr>
<th>Type of use</th>
<th>Low BASIC</th>
<th>SINAMICS Performance EFFICIENT</th>
<th>High FLEXIBLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pumping</td>
<td>V SERIES</td>
<td>G SERIES</td>
<td>S SERIES</td>
</tr>
<tr>
<td>Blowing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compressing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moving</td>
<td>V SERIES</td>
<td>G SERIES</td>
<td>S SERIES</td>
</tr>
<tr>
<td>Processing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Machining</td>
<td></td>
<td>G SERIES</td>
<td>S SERIES</td>
</tr>
</tbody>
</table>
The drives family SINAMICS
Suitable for pumping, ventilating, compressing

Typical applications:
Centrifugal pumps, eccentric spiral/worm/screw pumps, hydraulic pumps, dosing pumps, descaling pumps, fans, compressors

Typische Applikationen:
Kreiselpumpen, Exzentrerschneckenpumpen, Hydraulikpumpen, Dosierpumpen, Entzunderungspumpen, Lüfter, Kompressoren
The drives family SINAMICS
Suitable for moving

Typical applications:
Conveyors, elevators/escalators,
hoisting devices, ship's drives,
cable railways, test stands,
rack feeders, roll changers,
pick & place, indexing tables,
cross cutters, roller feeds

Typische Applikationen:
Förderer, Aufzüge, Roll-/Fahrtreppen,
Hebezeuge, Schiffsantriebe,
Seilbahnen, Prüfstände,
Regalbediengeräte, Rollenwechsler,
Pick & Place, Rundtaktische,
Querschneider, Walzenvorschub
The drives family SINAMICS
Suitable for processing

<table>
<thead>
<tr>
<th>SINAMICS products</th>
<th>SINAMICS Produkte</th>
</tr>
</thead>
<tbody>
<tr>
<td>SM/SL150</td>
<td>SM/SL150</td>
</tr>
<tr>
<td>S150</td>
<td>S150</td>
</tr>
<tr>
<td>S120</td>
<td>S120</td>
</tr>
<tr>
<td>S110</td>
<td>S110</td>
</tr>
<tr>
<td>DCM</td>
<td>DCM</td>
</tr>
<tr>
<td>GL/GM150</td>
<td>GL/GM150</td>
</tr>
<tr>
<td>G180</td>
<td>G180</td>
</tr>
<tr>
<td>G130/G150</td>
<td>G130/G150</td>
</tr>
<tr>
<td>G120</td>
<td>G120</td>
</tr>
<tr>
<td>G120C</td>
<td>G120C</td>
</tr>
<tr>
<td>G110</td>
<td>G110</td>
</tr>
<tr>
<td>V20</td>
<td>V20</td>
</tr>
</tbody>
</table>

Typical applications: Mixer, crushers, centrifuges, extruders, winders/unwinders, leading/following drives, rolling mills, mechanical presses, servo presses, printing machines, tubular bagging machines, single/coordinated axis motion control

Typische Applikationen: Mischer, Brecher, Zentrifugen, Extruder, Auf-/Abwickler, Leit-/Folgeantriebe, Walzwerke, Pressenhauptantriebe, Servopressen, Druckmaschinen, Schlauchbeutelmaschinen, Einzel-/Mehrracks-Motion Control
The drives family SINAMICS
Suitable for machining

Typical applications:
- Main and axis drives for Turning, milling, drilling, sawing, gear cutting, grinding, laser machining, nibbling and punching

Typische Applikationen:
- Haupt- und Achsantriebe für drehen, fräsen, bohren, sägen, verzahnen, schleifen, lasern, nibbeln und stanzen
Applications & benefits:
SINAMICS offers ...

Innovative and future orientated drives technology on a basis of hard- and software platforms

- A scalable and modular drive solution for each and every drive task and application
- Broad range of functions, power ratings and voltages
- Can be flexibly integrated into the automation environment, part of IDS and TIA
- Integrated safety functions
- High degree of flexibility and combinability
- Simplified and standard engineering and commissioning
- Continuous usability, common selection and engineering tools

SINAMICS can offer the right drive for EVERY task
Applications & benefits:
SINAMICS Safety Integrated reacts surely faster

There is an increased risk of injury wherever rotating units such as saws, rollers and spindles are used, but also where handling axes and machine slides are often moved with a high linear velocity.

Safety Integrated - for SINAMICS reliably masters specific hazardous situations. It has a significantly faster response time and a higher degree of functionality with generally unchanged and occasionally even increased productivity. Lower costs, increased safety.

These are certified according to IEC 61508/SIL 2, EN ISO 13849-1 Cat. 3 and PL d.
Applications & benefits: Energy efficient

SINAMICS is a decisive part of the overall energy management process of Siemens

- Identify: acquiring, visualizing and analyzing the energy flows – detecting of hidden energy-saving potential
- Evaluate: calculating the saving potentials for the complete live cycle costs
- Realize: concrete measures allow the existing cost saving potential to be fully utilized

Particularly in the phase “realize” SINAMICS plays a key role.
The reason: Electric drives use about two-thirds of all of the industrial power consumed.
Applications & benefits:
Energy efficient

Intelligent energy-saving functions
- Energy recovery when braking
- Energy equalization in the DC link
- Storing excess energy
- Automatic adaptation of the operating point
- Energy-saving when idle
- Reducing the power loss
- Cascading drives
- Energy transparency in all engineering phases
- SINAMICS in combination with SIMOTICS
- Determining the energy-saving potential with SinaSave

Especially energy saving for pump, fan and compressor applications
Energy Efficiency – Integrated Product Portfolio

The integrated product portfolio of Siemens Industry with Totally Integrated Automation
... from the field level
... to the control level
... up to management level
facilitates energy-efficient production
Family members: The drives of the SINAMICS family are available in different housings

- ready to run cabinets for high output ratings
- flexible chassis devices for high output ratings
- modular book size devices for multi axis drives w. low to medium ratings
- compact block size devices for single drives with small to medium rating
Family members: SINAMICS V – drives for basic performance applications

SINAMICS V20

- Blocksize unit
- The versatile converter for basic applications
- Industry, trade
- IP20
- 1 AC 200 – 240 V: 0.12 – 3 kW
  3 AC 380 – 480 V: 0.37 – 15 kW
- V/f control

SINAMICS offers basic drives ...
Family members: SINAMICS G – the universal drives for general performance applications

SINAMICS G120
- Blocksize unit
- Modular frequency converter for variable-speed single drives
- Industrial applications
- IP20
- 3 AC 380 – 480 V: 0.37 – 250 kW
  3 AC 660 – 690 V: 11 – 55 kW
- V/f control, vector control with/without encoder, torque control with/without encoder

SINAMICS G120C
- Blocksize unit
- The compact and versatile inverter with optimum functionality
- Machine builder and distributors, i.e. for conveyors, mixer, extruder, pumps, fans, compressors or simple handling machines
- IP20
- 3 AC 380 – 480 V: 0.55 – 18.5 kW

SINAMICS G120P / G120P Cabinet
- Blocksize unit, chassis unit, wall mounted unit and converter cabinet unit
- The specialist for pumps, fans and compressors
- Wide application range in the industry, water/wastewater and building technology, heating, ventilating, air-conditioning
- IP20, IP55
- 3AC 380 – 480 V: 0.37 ...400 kW
- V/f control, vector control without encoder, torque control without encoder

SINAMICS offers all-rounders ...

Restricted © Siemens Ltd. 2014 All rights reserved.
**Family members:** SINAMICS G – the universal drives for general performance applications

<table>
<thead>
<tr>
<th>SINAMICS G110D</th>
<th>SINAMICS G120D</th>
<th>SINAMICS G110M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blocksize unit</td>
<td>Blocksize unit</td>
<td>Motor integrated</td>
</tr>
<tr>
<td>Distributed drive for basic single-axis applications in the lower power range</td>
<td>Distributed drives for complex single-axis/multi-axis applications</td>
<td>The distributed inverter for SIMOGEAR geared motors</td>
</tr>
<tr>
<td>Simple conveyor technology applications in airports and horizontal logistics with AS-i communication and local/remote operation.</td>
<td>Conveyor technology applications, especially designed for the automobile industry, also for other high-performance conveyor applications with BUS connection.</td>
<td>Industrial applications</td>
</tr>
<tr>
<td>IP65</td>
<td>IP65</td>
<td>Up to IP66</td>
</tr>
<tr>
<td>3 AC 380 – 480 V: 0.75 – 7.5 kW+/−10%</td>
<td>3 AC 380 – 480 V: 0.75 – 7.5 kW</td>
<td>3AC 380 V - 500 V -10/+6% 0.37 kW up to 4 kW</td>
</tr>
<tr>
<td>V/f control</td>
<td>V/f control, vector control with/without encoder, torque control with/without encoder</td>
<td>U/f control, FCC (closed-loop flux-current control), sensorless vector control</td>
</tr>
</tbody>
</table>

SINAMICS offers all-rounders ...
### SINAMICS G130
- **Chassis unit**
- The universal drive solution for high rating single-motor drives
- Industrial manufacturing and processing plants
- IP00 / IP20
- 3 AC 380 – 480 V: 110 – 560 kW
  - 3 AC 500 – 600 V: 110 – 560 kW
  - 3 AC 660 – 690 V: 75 – 800 kW
- V/f control, vector control with/without encoder, closed-loop speed/torque control

### SINAMICS G150
- **Converter cabinet unit**
- The universal drive solution for high rating single-motor drives
- Industrial manufacturing and processing plants
- IP20 – IP54
- 3 AC 380 – 480 V: 110 – 900 kW
  - 3 AC 500 – 600 V: 110 – 1,000 kW
  - 3 AC 660 – 690 V: 75 – 2,700 kW
- V/f control, vector control with/without encoder, closed-loop speed/torque control

### SINAMICS G180
- **Compact unit, converter cabinet unit**
- The drive solution specifically for oil & gas, chemical and process industries
- General machinery construction applications
- IP20 – IP54
- 3 AC 380 – 480 V: 2.2 – 4,100 kW
  - 3 AC 500 – 600 V: 2.2 – 5,300 kW
  - 3 AC 500 – 690 V: 2.6 – 6,600 kW
  - 3 AC 660 – 690 V: 7.5 – 6,600 kW
- V/f control, vector control with encoder, closed-loop speed/torque control

**SINAMICS offers all-rounders ...**

Restricted © Siemens Ltd. 2014 All rights reserved.
### Family members: SINAMICS S - basic servo drives and flexible, modular drive systems

<table>
<thead>
<tr>
<th>SINAMICS S110</th>
<th>SINAMICS S120 AC Drives</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Blocksize unit</strong></td>
<td><strong>Blocksize unit</strong></td>
</tr>
<tr>
<td>Single-axis positioning drive</td>
<td>Modular drive system for sophisticated single-/multi-axis applications</td>
</tr>
<tr>
<td>Machine makers and plant construction, laboratory automation systems, solar technology, medical technology</td>
<td></td>
</tr>
<tr>
<td>IP20</td>
<td>IP20</td>
</tr>
<tr>
<td><strong>1AC 200 – 240 V: 0.12 – 0.75 kW</strong>&lt;br&gt;<strong>3 AC 380 – 480 V: 0.37 – 90 kW</strong></td>
<td><strong>1 AC 200 – 240 V: 0.12 – 0.75 kW</strong>&lt;br&gt;<strong>3 AC 380 – 480 V: 0.37 – 90 kW</strong></td>
</tr>
<tr>
<td>V/f control, servo control with/without encoder, closed-loop speed/torque control</td>
<td>V/f control, vector control with/without encoder, servo control with/without encoder, closed-loop speed/torque control</td>
</tr>
</tbody>
</table>

... specialists and universalists...
**Family members:** SINAMICS S120 – for applications with high performance requirements

<table>
<thead>
<tr>
<th>SINAMICS S120 DC Drives</th>
<th>SINAMICS S120 Cabinet Modules</th>
</tr>
</thead>
<tbody>
<tr>
<td>Booksize unit</td>
<td>Chassis unit</td>
</tr>
<tr>
<td>--</td>
<td>Cabinet Modules</td>
</tr>
<tr>
<td><strong>Modular drive system for sophisticated single-/multi-axis applications</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Machine building and plant construction</strong></td>
<td><strong>Plant construction</strong></td>
</tr>
<tr>
<td><strong>IP20</strong></td>
<td><strong>IP00, IP20, optional: IP 43</strong></td>
</tr>
<tr>
<td><strong>AC 380 – 480 V: 1.6 – 107 kW</strong></td>
<td><strong>3 AC 380 – 480 V: 110 – 3,000 kW</strong></td>
</tr>
<tr>
<td><strong>3 AC 500 – 690 V: 75 – 4,500 kW</strong></td>
<td><strong>3 AC 380 – 480 V: 1.6 – 3,000 kW</strong></td>
</tr>
<tr>
<td><strong>3 AC 500 – 690 V: 75 – 4,500 kW</strong></td>
<td></td>
</tr>
</tbody>
</table>

V/f control, vector control with/without encoder, servo control with/without encoder, closed-loop speed/torque control

**...universalists...**
**Family members:** SINAMICS S150 ready to run cabinet
SINAMICS DCM - scalable DC converters

<table>
<thead>
<tr>
<th>SINAMICS S150</th>
<th>SINAMICS DCM / Cabinet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Converter cabinet unit</td>
<td>DC converter unit, converter cabinet</td>
</tr>
<tr>
<td>Frequency converter for demanding variable speed single drives</td>
<td>Scalable DC converter for basic and demanding applications</td>
</tr>
<tr>
<td>Plant construction, operators of plants</td>
<td></td>
</tr>
<tr>
<td>IP20 (IP21, IP23, IP43, IP54)</td>
<td>IP00 – IP54</td>
</tr>
<tr>
<td>3 AC 380 – 480 V: 110 – 800 kW 3 AC 500 – 690 V: 75 – 1,200 kW</td>
<td>1AC 85 V – 3 AC 950 V: 6 – 2,508 kW (parallel connection up to 30 MW)</td>
</tr>
<tr>
<td>V/f control, vector control with/without encoder, servo control with/without encoder, closed-loop speed/torque control</td>
<td>closed-loop speed/torque control</td>
</tr>
</tbody>
</table>

... and ready-to-connect LV drive cabinets...
Family members:
SINAMICS medium voltage converters

SINAMICS PERFECT HARMONY GH180

Converter cabinet unit

The Perfect Harmony of Performance, Process and Technology

- pumps, fans, compressors, mills, kilns, crushers, conveyors, retrofits
- IP21 or higher, air cooling
  - IP52 water cooling
- Motor voltage: 2.3 to 11 kV
  - Power rating: 0.18 to 15.5 MVA
- V/f control, vector control with/without encoder,
  - closed-loop speed/torque control

... and ready-to-connect MV drive cabinets.
Family members:  
**SINAMICS medium voltage converters**

<table>
<thead>
<tr>
<th>SINAMICS GL150</th>
<th>SINAMICS GM150</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Converter cabinet unit</strong></td>
<td><strong>Converter cabinet unit</strong></td>
</tr>
<tr>
<td>Frequency converter for synchronous motors with the highest power rating</td>
<td>Frequency converter for medium-voltage variable speed drives</td>
</tr>
<tr>
<td>Machine building and plant construction</td>
<td>Machine building and plant construction</td>
</tr>
<tr>
<td>Air-cooled IP20 (opt. IP42), liquid-cooled IP41 (opt. IP54)</td>
<td>Air-cooled IP22 (opt. IP42), liquid-cooled IP43 (opt. IP54)</td>
</tr>
<tr>
<td>3 AC 2.3 bis 36 kV motor voltage 1.5 – 12 kV: 2,800 – 85,000 kW</td>
<td>3 AC 2.3 bis 36 kV motor voltage 1.5 – 12 kV: 820 – 18,000 kW (for induction motors)</td>
</tr>
<tr>
<td>Vector control with/without encoder, closed-loop speed/torque control</td>
<td>V/f control, vector control with/without encoder, closed-loop speed/torque control</td>
</tr>
</tbody>
</table>

... and ready-to-connect MV drive cabinets...
### Family members: SINAMICS medium voltage converters

<table>
<thead>
<tr>
<th>SINAMICS SM150</th>
<th>SINAMICS SL150</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Converter cabinet unit</strong></td>
<td><strong>Converter cabinet unit</strong></td>
</tr>
<tr>
<td><strong>Frequency converter for demanding single- and multi-axis applications in the medium-voltage range</strong></td>
<td><strong>Cycloconverter for slow-speed synchronous and induction motors with a high torque</strong></td>
</tr>
<tr>
<td><strong>Industrial manufacturing and processing plants</strong></td>
<td><strong>Machine building and plant construction</strong></td>
</tr>
<tr>
<td>IP43 (opt. IP54)</td>
<td>Control section: IP20 Power unit: IP41, optional IP54</td>
</tr>
<tr>
<td>3 AC 2.3 – 36 kV motor voltage 1.5 – 12 kV: 2,800 – 31,500 kW</td>
<td>3 AC 2.3 – 36 kV motor voltage 1.5 – 12 kV: 3,000 – 40,000 kW</td>
</tr>
<tr>
<td>V/f control, vector control with/without encoder, closed-loop speed/torque control</td>
<td>Vector control with/without encoder, closed-loop speed/torque control</td>
</tr>
</tbody>
</table>

... and ready-to-connect MV drive cabinets.
SINAMICS G130/G150

The universal variable frequency drive for high-rating single-motor drives
- The quiet and compact drive for single-motor applications, which do not require energy recovery, e.g. pumps, fans, compressors, extruders, mixers and crushers.

Features
- V/f control and vector control with or without encoder
- Power range from 75 up to 2700 kW
- Simple commissioning and operator control
- Available as standard cabinet or as chassis modules
- Service-friendly thanks to easily accessible device modules
- Communication via PROFIBUS, PROFINET and other interfaces
- Energy-efficient through variable-speed operation
- Safety Integrated
- 100% line supply voltage at the motor without any secondary effects
- When required, with integrated line harmonics filter and dv/dt filter
**SINAMICS S120**

The flexible, modular drive system for sophisticated tasks

The modular drive system in different formats for high-performance and motion control applications in single- and multi-axis configurations for synchronous and induction motors.

**Features**

- Power range: 0.12–4500 kW
- Servo/vector control, V/f control
- Integrated safety and positioning functions
- Freely configurable logic and closed-loop control functions
- Additional motion control functions in conjunction with SIMOTION or SINUMERIK
- High degree of scalability, flexibility, combinability
- Energy-efficient as a result of energy recovery or DC link PROFIBUS/PROFINET/CANopen interface
- Different cooling types: air, liquid, cold plate cooling
SINAMICS S120 – scalability by modular system architecture

Example: Modular design of a multiple axis drives system consisting of SINAMICS S120 Booksize devices

CU320 Line Module

TM31 Digital-/Analogue-I/Os

Motor with DRIVE-CLiQ-Interface

SMC10/SMC20 Motor Module

Encoder with DRIVE-CLiQ-Interface

SMC30 Motor Module

Ordinary encoder (TTL/HTL)

HMI Control

DRIVE-CLiQ

(Profidrive-profile)
The scalable DC drive for basic and demanding applications
Suitable for DC applications in all sectors, for instance, rolling mills, wire-drawing machines, extruders and kneaders, cable railways and elevators as well as test stands.

Features
- Highest degree of scalability by being able to select between a Standard Control Unit and an Advanced Control Unit or a combination of both
- Power range: 6 kW–30 MW
- Maximum degree of flexibility for specific plant and system requirements
- Compatible to the predecessor product
- High plant availability through maximum reliability, service-friendly design and redundant concepts
- Simple and fast commissioning
- Communication via PROFIBUS, optionally PROFINET
- As ready-to-connect drive unit or Control Modules for retrofit projects
Rugged single-motor drive for highrating synchronous motors in the medium-voltage range

The single-motor drive that has an extremely high operational reliability is almost maintenance-free in a compact design with high power density for pumps, fans, compressors, extruders and kneaders in the double-digit Megawatt range.

Features

- Minimized number of components through the thyristor-based design
- Power range: 2.8–120 MW
- Communication via PROFIBUS, optionally PROFINET
- Simple installation, integration and operator control
- Highly reliable.
- Very compact in higher power range
The universal drive solution for medium-voltage single drives

For single-motor high-rating drives that do not require energy recovery, e.g. pumps, fans, compressors, extruders, mixers, crushers and main ship’s drives.

Features

- V/f control and vector control with or without encoder
- Power range: 820 kW–17 MW
- Simple integration and installation
- Straightforward operator control
- Communication via PROFIBUS, optionally PROFINET
- Intelligent maintenance functions
The sophisticated medium-voltage drive solution for single- and multi-motor drives

For single- and multi-motor drives with a high dynamic performance especially in rolling mills and in mining, which must be capable of energy recovery.

Features

- 4Q operation with energy recovery as standard
- Power range: 2.8–31.5 MW
- Ideal for power exchange between regenerating and motoring applications
- High drive quality and availability
- Simple integration and installation
- Straightforward operator control
- Communication via PROFIBUS, optionally PROFINET
- Intelligent maintenance functions
The Perfect Harmony of Performance, Process and Technology
- For Oil & Gas, (Petro-)Chemical, Mining, Cement,
- Power Generation, Water/Wastewater, Pulp/Paper and general industry.

Features
- Local manufacturing at Siemens Nasik.
- Very small footprint.
- Highest Efficiency & availability.
- No harmonic line filters or power factor compensation required
- Engineered to continue operating through component failures
  - Advanced cell bypass® provides greater operational availability
  - Process-tolerant protection system (ProToPS®) in combination with cell bypass
- No common mode motor insulation stress through an integral isolation transformer
- Compatible with both new and existing 1.0 service factor motors
- Up to 2kM cable length can be supported from drive to Motor as a standard.

SINAMICS PERFECT HARMONY HITS 10,000 LANDMARK

Restricted © Siemens Ltd. 2014 All rights reserved.
Pay As You Save (PAYS)
EMI scheme – Payment out of energy savings

- On receipt of Initial payment of 10% VFD is supplied
- Customer pays as energy savings starts & enjoys full ROI typically in 08 – 18 months (application/rating dependent)

Pay - As - You - Save! - with Perfect Harmony

www.siemens.com/marine
SINAMICS Cabinets

Standardized quality

- very compact style
- type-tested units, norm oriented
- ready for connection
- maintainable construction
- high quality by series-manufacturing
- Design under consideration of temperature-, thermal and short circuit simulations
- Spare part concept supports through „Spares On Web“
- standardized interfaces
- short delivery times
- custom-designed options
- Usage of only a few types and parts and thereby high flexibility

Tailored to customer needs.
Influence of long experience in the design of cabinets
There is drive for every goal

SINAMICS Drives
## Commitment to our Partners

### Online Support
- Access to expert know-how online (FAQ, software, products and many more) in several languages

### Technical Support
- Worldwide Experience at your service, On time

### Repairs
- In more than 20 workshops as well as in-house and local repairs, we offer fast and high quality repairs for our drive converters and motors worldwide

### Field Service
- Our experts from local and central service departments respond quickly and competently

### Technical Consulting
- Engineering using the appropriate tools (SIZER) – also for customers
- Experienced sales engineers are always available to support you in your projects

### Optimization and modernization
- We support our customers when it comes to optimizing and modernizing
  - e.g. for energy saving (SinaSave)
- Retrofit support
Thank you for your attention!

Presentation by

Narendra Patil.
I DT LD APM PMC MV
Siemens Ltd.
Thane Belapur Road Kalwa
Navi Mumbai
Tel – +91 22 3326 5585