SIEMENS CNC Solutions for Automotive Powertrain Production
Ryan Legg
Manufacturing in America | 03/22-23/2017
For more than 50 years, SINUMERIK CNC controllers have been influencing the machine tool market. The innovative strength of an experienced development team ensures that highly productive machine concepts with SINUMERIK CNC controllers can also be implemented in the future.
Siemens Machine Tool Systems
- We are facing globalization

With a **dense network of sales, service and training locations worldwide**, together with **international manufacturing locations**, Siemens Machine Tool Systems faces the challenges posed by globalization.

- **Sales:** Worldwide in more than 40 countries
- **Service and Support:** Worldwide 25 hotline departments, 70 spare parts and repair centers and 60 service centers
- **Training:** Worldwide in 31 countries
- **Manufacturing:** Worldwide at 9 locations
Maximum competence in all technologies
- SINUMERIK is found on many machining technologies

<table>
<thead>
<tr>
<th>Turning</th>
<th>Milling</th>
<th>Gear cutting</th>
<th>Grinding</th>
<th>Composite machining</th>
<th>Robotics and handling</th>
<th>Nibbling, water jet, laser, plasma</th>
<th>Multitasking</th>
</tr>
</thead>
</table>

Maximum synergy in production
- Uniform operation and programming
- Consistent training and maintenance

Maximum progress in production
- Most modern multi-tasking concepts
- Optimal feature transfer between different technologies

Siemens Machine Tool Systems serves a very wide range of technologies in the machine tool market. This results into valuable synergies for manufacturing companies as well as maximum progress when creating new production processes.
The Siemens Machine Tool Systems Portfolio
- the perfect CNC solution for every machine concept

The **SINUMERIK product family** provides perfect solutions for all **machine concepts** – from attractively priced CNC entry-level machines to **standardized machine concepts** and up to modular **premium-machine concepts**.
SINUMERIK covers the complete range of machine tools from the entry level to the most demanding applications.
As a world leader in drive technology, Siemens Machine Tool Systems is able to offer more complete solutions for machine tool equipment.
SIMOTICS infeed and spindle motors characterize the dynamics and output of the machine. Advanced design principles yield perfect machining results and always ensure an excellent price-performance ratio.
SINUMERIK Safety Integrated allows **unlimited machine movements** in setup mode with open protective doors and thus provides significantly **increased user friendliness** to the **machine operator**.
SINUMERIK offers intelligent interfaces for the integration of robots – from simple connection through convenient integration of handling robots to high-quality motion control of machines with robot kinematics.
Handling with Robots
The road to fully automated and flexible production

Automation with robot ensures
- Consistent quality
- Uniform production
- High flexibility

Run MyRobot /Handling: Single Point of Operation

Alignement required between RC and NC
Run MyRobot /Handling
Overcome barriers to robot operation by operation via CNC

Execution directly from CNC possible
Programming
Manual traversing
Diagnostics

Changeover operations optimized
One operating unit
CNC knowledge only required
Integrated diagnostic functionality

SINUMERIK PLC
Command interface
Command interpreter
### CNC operating and programming with SINUMERIK Operate
- Welcome to the 21st century

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation like a PC</td>
<td>Online help with moving images, Context-sensitive graphics help system, Transparent data management</td>
</tr>
<tr>
<td>Consistent for all technologies</td>
<td>Consistent operating and programming concept for all machining technologies</td>
</tr>
<tr>
<td>Intuitive setup</td>
<td>Graphic interactive machine setup, Intuitive and powerful tool management</td>
</tr>
<tr>
<td>For all kinds of programming</td>
<td>ISO code, Technology cycle support programGUIDE, Workstep programming ShopMill / ShopTurn</td>
</tr>
<tr>
<td>Onboard diagnosis and optimization</td>
<td>Onboard servo and drive optimization, Onboard signal, bus and network diagnosis, Onboard maintenance and service tools</td>
</tr>
<tr>
<td>Learning and programming on the PC</td>
<td>SinuTrain for SINUMERIK Operate, Control-identical operating and programming on PC</td>
</tr>
</tbody>
</table>

With **SINUMERIK Operate**, the state-of-the-art HMI in the industry sector, SINUMERIK offers a **standardized platform** for **operating and programming** machine tools.
Operator Panels for SINUMERIK
Powerful, robust and modular

- 7.5"
- 10"
- 12"
- 15"
- 19"

- OP 08T
- OP 010
- OP 010C
- OP 012
- OP 012 Redesign
- OP 015 black
- OP 015A(T)
- OP 019 black
- TP/OP 015A(T)
- OP 019
- SIMATIC ITC 1200
- SIMATIC ITC 1500
- SIMATIC ITC 1900

Connection via Ethernet

SIEMENS

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**SINUMERIK OP 015 black**
Proven user interface for smarter operation

- Easy entry to touch operation
- Capacitive touch -> robust and long-lasting:
  > 2G vibration loading
  IP66 glass front
  Contact-less sensor
- Durable LED backlight (40% average energy saving)
- LED indicator
- Caps Lock key
- Flexible USB extension
- Installation compatible with OP 012
- 15.4" wide screen 1366 x 768
- SINUMERIK / ABC (touch) keyboard
- Connection via Ethernet (integr. TCU)

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SINUMERIK OP 019 black
modern and smarter operation

- Consistent operation with touch
- Capacitive touch → robust and long-lasting: 1G vibration loading
- IP66 glass front
- Contact-less sensor

- Durable LED backlight (40% average energy saving compared with fluorescent tubes)

- Flexible USB extension
- Connection via Ethernet (integr. TCU)

- Width 483 mm
- Height 337 mm
- 18.5" wide screen 1366 x 768
- Narrow frame

OP 015A  OP 012  OP 010

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Modern operating concepts for your customer
High demands on robustness and intuitive operation

**Smartphones & Tablets:** Operating philosophies entirely without keys

**CNC user interface:** More graphical and object-oriented
**Working more effectively**
- Smoother operation, improved workflow
- Fast and simple ZOOM functions
- Intelligent scroll function
- Faster and easier access to parameters, setting and user data
- Optimized process safety, full control with gesture control for the proven SINUMERIK Operate user interface

**Robust hardware**
SINUMERIK OP 015 black / OP 019 black
SINUMERIK Operate
smarter operation - gestures

- **Tap**
  - Select window
  - Select object (e.g. NC block)

- **Tap with two fingers**
  - Call context menu (e.g. copy, paste)

- **Tap and hold**
  - Open object for changing (e.g. NC block)

- **Flick**
  - Scroll in lists (e.g. programs or tools, zero points)
  - Scroll in files (e.g. NC programs)

- **Flick with two fingers**
  - Page-scrolling in lists (e.g. NPV)
  - Page-scrolling in files (e.g. NC programs)
## SINUMERIK Operate
### smarter operation - gestures

<table>
<thead>
<tr>
<th>Gesture Description</th>
<th>Action Description</th>
</tr>
</thead>
</table>
| Flick with three fingers             | Scroll to the start or end of lists  
|                                      | Scroll to the start or end of files                                                |
| Pan                                  | Move graphic contents (e.g. simulation, mold making view)                            |
| Pan with two fingers                 | Rotate graphic contents (e.g. simulation, mold making view)                         |
| Pinch                                | Zoom-in graphic contents (e.g. simulation, mold making view)                        |
| Spread                               | Zoom-out graphic contents (e.g. simulation, mold making view)                       |
### CNC operating and programming with SINUMERIK Operate

**SinuTrain - more than just a training tool**

#### Universal:
Can be used for trainings, offline programming or professional CNC presentations

#### For all programming methods:
ISO, SINUMERIK high-level language with programGUIDE or ShopMill / ShopTurn workstep programming

#### Complete user interface:
Setup (JOG), Automatic, machining parameter, data transfer

#### Intelligent software concept:
Multi-level license management without hardware dongle

#### Without additional hardware costs:
Realistic machine operation through integrated software machine control panel

#### Adaptable:
Machine data adjustment with the target machine ensures 100% CNC program compatibility

**SinuTrain for SINUMERIK Operate** is the ideal tool for professional **learning, offline programming and presentations**. Thanks to the intelligent software concept, SinuTrain for SINUMERIK Operate can be installed **conveniently offline from the machine**.
Solutions for Powertrain in the Automotive Industry

Solutions for Powertrain offers a comprehensive solution for primes and suppliers in the Powertrain area.
TRANSLINE – Based on Strong Standard Systems

Technical solution for Powertrain with standard system modules based on SIMATIC, SINUMERIK, SINAMICS, PROFINET

Standard component list with all of the products and systems which are relevant for Powertrain

All hardware and software components can be individually customized to address the needs of the end user

Reducing maintenance and training effort through TRANSLINE component standardization
TRANSLINE – Intelligent Standard Components Down the Line

SINUMERIK 840D sl
SINAMICS S120
A CNC fit for every task

SIMATIC ET 200
More intelligent local control

SINUMERIK Operator Panels and SIMATIC Panels
Everything at a glance

SIMATIC S7-300 and SIMATIC S7-1500
PLC par excellence

SINUMERIK controls and drive systems
Motors and spindles
Communication
Safety components
IT and software solutions
Operating components and user interfaces
PLC systems
I/O

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TRANSLINE – Standardized Applications

Consistent automation concepts for all Powertrain production areas
TRANSLINE – Application Example: Flexible Machining Line

SINUMERIK
840D sl
SINAMICS
S120
SINUMERIK OP
PCU
SINUMERIK HT8
SINUMERIK 840D sl SINAMICS S120
ET 200
SIMOTICS
CNC head station

SINUMERIK OP
TCU
SINUMERIK HT8
SINUMERIK 840D sl SINAMICS S120
ET 200
SIMOTICS
CNC Machine 1

SINUMERIK OP
PCU
SINUMERIK HT8
SINUMERIK 840D sl SINAMICS S120
ET 200
SIMOTICS
CNC Machine n

Ethernet
Factory network
Ethernet 1
Ethernet 2
TRANSLINE – Standardized Operation and Diagnostics

TRANSLINE offers a manufacturer-independent standard machine operation for all production areas.
### Basic services
- what you can expect from us

<table>
<thead>
<tr>
<th>Field service</th>
<th>Spare part repairs</th>
<th>Technical support (Hotline)</th>
<th>Training</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Worldwide in more than 60 regions</td>
<td>- Worldwide in more than 70 regions</td>
<td>- Worldwide in more than 25 regions</td>
<td>- Worldwide in more than 30 countries</td>
</tr>
<tr>
<td>- Professional overhaul, repair, inspection and maintenance</td>
<td>- Multi-level, adaptable spare parts and repair concept</td>
<td>- Competent SINUMERIK hotline in the local language</td>
<td>- Professional SINUMERIK training for commissioning, operating, programming and maintenance</td>
</tr>
</tbody>
</table>

To ensure maximum production uptime, **SIEMENS** provides the **necessary knowledge** and support – worldwide!
## Additional services - what you can expect from us

<table>
<thead>
<tr>
<th>Additional Services</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Siemens Financial Services</td>
<td>Need and situation-based financing solutions</td>
</tr>
<tr>
<td>Manufacturing IT</td>
<td>Implementation of SINUMERIK Integrate applications</td>
</tr>
<tr>
<td>Extended Machine Contracts</td>
<td>Tailored service contracts</td>
</tr>
<tr>
<td>Spares Plus</td>
<td>Preventive spare parts management</td>
</tr>
<tr>
<td>Productivity Improvement</td>
<td>Cycle time reduction on existing machines</td>
</tr>
<tr>
<td>Machine Retrofit</td>
<td>General overhaul of machine tools</td>
</tr>
</tbody>
</table>

With a **broad range of additional services**, SIEMENS helps **increase machine productivity** – from design to production.
Questions?

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