sinumerik
& simodrive

SIEMENS

SINUMERIK 802 &
SIMODRIVE base line

Related catalogs

SINUMERIK & SIMODRIVE NC 60
Automation Systems for
Machine Tools
Order No.:
E86060-K4460-A101-B1-7600

The offline Mall of CA 01
Automation and Drives

Order No.:
E86060-D4001-A110-C2-7600

A&D Mall

Internet:
www.siemens.com/automation/mall

CD-ROM for Catalog 802

In the CD-ROM that accompanies
Catalog 802, you will find:
• Information about planning/con-
  figuring based on the technical
  documentation; additional technical
  documentation can be found
  under:
  *www.siemens.com/automation/
  doconweb*
• Dimension drawings of our motors
  (PDF/DXF format)
• Glossary for the explanation of terms
  and functions
• NCSD configurator for determining
  Order Nos. for SINUMERIK and
  SIMODRIVE components
• Catalog 802 in electronic form
  (PDF format)
• Catalog NC 60 in electronic
  form (PDF format)

**Hardware and software
requirements**
• Intel Pentium 333 MHz or higher
• Minimum 128 MB of RAM
• Screen resolution 1024 x 768 pixels
• 4 x CD-ROM drive
• Windows 9x/NT 4.x/2000/XP
• Acrobat Reader
• MS Internet Explorer 5.5 and newer

Start
Insert the CD-ROM into the CD-ROM
drive. The program starts automati-
cally. If the AutoRun function is not
activated in your system, start file
"start.hta" from the CD-ROM using
the Windows Explorer.

Note
Installation is not necessary to view
the information on this CD-ROM. This
does not apply, however, when using
the NCSD configurator or dimension
drawings in DXF format.

Hotline
Please send any questions or sugges-
tions to:
motioncontrol.docu@erlf.siemens.de

Trademarks

SINUMERIK & SIMODRIVE

SINUMERIK 802S/C/D base line
SINUMERIK 802D
SIMODRIVE base line

Catalog 802 · 2004

Supersedes:
Catalogs · September 2001

The products in this catalog
are also included in the
electronic catalog CA 01

Contact your local Siemens representative
for further information

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SIEMENS

Introduction

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Function Overview   SINUMERIK 802S base line
SINUMERIK 802C base line
SINUMERIK 802D base line
SINUMERIK 802D

2

Basic components   SINUMERIK 802S base line
SINUMERIK 802C base line
SINUMERIK 802S/C manual machine
SINUMERIK 802D base line
SINUMERIK 802D
MCP machine control panel

Accessories
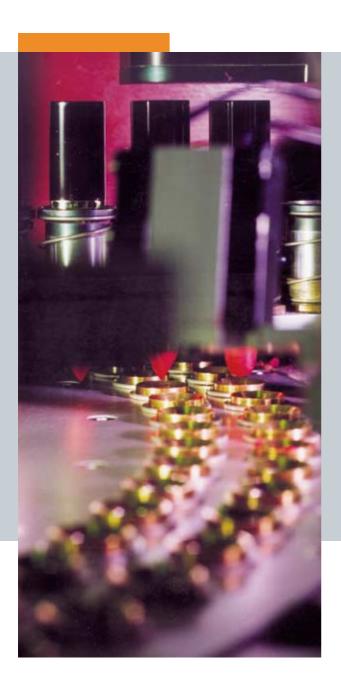– ADI 4 (analog drive interface for 4 axes)
– PP 72/48/ I/O module

3

Converter systems   SIMODRIVE 611
SIMODRIVE base line
FM STEPDRIVE

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Appendix   Repair Service Contract
Retrofit
Documentation
Indexes

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Welcome to
Automation and Drives

We would like to welcome you to Automation and Drives and our comprehensive range of products, systems, solutions and services for production and process automation and building technology worldwide.

With Totally Integrated Automation and Totally Integrated Power, we deliver solution platforms based on standards that offer you a considerable savings potential.

Discover the world of our technology now. If you need more detailed information, please contact one of your regional Siemens partners.
They will be glad to assist you.

Function Overview

2

Function Overview
SINUMERIK 802S base line/802C base line

2

Control assembly/application
- CNC user memory (non-volatile) for programs, 256 KB
- Part program memory, up to 100 programs
- Max. 3 axes + 1 spindle
- Spindle positioning
- Incremental encoder RS 422
- Additional spindle encoder RS 422
- Resolution 1 µm/0.0001 inches

CNC functionality
- Look ahead, 1 block

CNC programming
- Programming language, DIN 66025 and SINUMERIK high-level language parts
- Inch/metric dimensions
- Contour programming
- Absolute/incremental programming
- X axis diameter/radius programming
- Arithmetic and trigonometric function
- Menu programming
- Subroutine call
- Skip function
- Chamfer/radius transition
- Plane selection
- Workpiece coordinate system

Interpolation types
- Linear interpolation
- Circular interpolation
- Helical interpolation

Data transmission
- RS 232C serial interface
- Start-up data transmission from ECU to ECU

Operation
- Slimline operator panel, monochrome, 8″
- Full CNC keyboard
- □ 2 electronic handwheels can be connected
- Graphical cycle support
- Selection of a large number of HMI languages, thereof 2 languages available in the system/switchable
- 6 access protection levels
- Onboard pocket calculator
- Program execution from external

Operating modes
- Automatic
- DNC mode
- MDA mode
- JOG mode
- □ Teach in
- Reference point approach manual/via CNC program
- Follow-up mode
- Increment weighting with handwheel
- Manual mode interrupt
- JOG and handwheel simultaneous mode
- Incremental axis approach
- Dry run
- Single block

Editing
- Block number search
- Program number search
- Background editing

Displays
- Graphical display
- Status display
- Current position display
- Program display
- Program error display
- Parameter display
- Operator error display
- Alarm display
- Servo setting display
- Spindle display
- Self-diagnostics function
- Status signal output (NC ready, servo ready, automatic operation, etc.)

Tool offsets
- Length/radius compensation
- 15 tools
- 30 tool offsets
- Tool radius offset in the plane
- Collision monitoring, machining area
- Tool tip radius compensation
- Tool position compensation
- Geometry/wear compensation
- Tool length measurement

- Standard features at no additional costs
- □ Option or accessory

Zero offsets translational/rotary
- Zero offsets, adjustable, max. 4
- Zero offsets, programmable

Axis monitoring
- Limit switch monitoring
- 2 software limit switches
- Contour monitoring
- Position monitoring
- Clamping monitoring

Compensation
- Stored leadscrew error compensation
- Backlash compensation
- Measuring system error compensation
- Drift compensation for analog set points

Axis functions
- Velocity (max. default 100,000 mm/min / 40,000 inch/min)
- Feedrate override, 0% to 120%
- Feedrate per min
- Feedrate per revolution
- JOG override

Auxiliary functions
- Miscellaneous function M (2 digit)
- Max. 3 auxiliary functions per block

Spindle functions
- Spindle speed, programmable (max. 999,999.9 rpm)
- Spindle override 0% to 120%
- 5 gear stages
- Automatic gear stage selection
- Oriented spindle stop
- Constant cutting speed
- Thread cutting
- Tapping/rigid tapping

Cycles
- Cycles for turning
- Cycles for drilling/milling

PLC area
- SIMATIC S7-200 software CPU
- User memory, 4,000 instructions
- Ladder programming
- Windows programming tools
- Digital inputs/outputs, 48/16
- ☐ Digital inputs/outputs, 64/32 in one 16/16 step (in preparation)
- 1024 flags
- 16 timers
- 32 counters
- Typical processing time for bit commands 1.8 μs

Diagnostics functions
- Diagnostics basic functions
- PLC status

Alarms and messages
- Alarms selectable in the part program
- Alarms and messages from PLC

Start-up
- Start-up tools, running on external PC
- Series start-up via serial interface

Manual machine additional functionality
The manual machine version contains in addition the following functions:
- Constant oriented spindle stop for material change
- Threading with constant cut profile at working spindle
- Cutting of multiple threads
- Cutting of conic threads
- Cutting of transversal tread
- Center thread cutting
- Repair thread cutting
- Center boaring
- Grooving (single and multiple)
- Stock removal (3 different shapes)
- Limit stop turning in X and Z axis
- Conic turning over the complete working area

- Standard features at no additional costs
- ☐ Option or accessory

Control assembly/application

- CNC user memory (non-volatile) for programs, 256 KB
- Part program memory, up to 100 programs
- Max. 4 axes + 1 spindle (SINUMERIK 802D)
- Max. 2 axes + 1 spindle (SINUMERIK 802D base line)
- Spindle positioning
- Incremental encoder sin/cos
- Absolute encoder EnDat
- Linear scale sin/cos or EnDat
- Additional spindle encoder RS 422 (TTL)
- Resolution 0.1 μm/0.00001 inches

CNC functionality

- Look ahead, 35 (SINUMERIK 802D)/10 (SINUMERIK 802D base line) blocks
- FRAME concept (mirror image, scaling, rotation)
- 1 measuring probe, with/without delete distance-to-go
- □ Transmit/Tracyl (SINUMERIK 802D)

CNC programming

- Programming language, DIN 66025 and SINUMERIK high-level language, online interpreter for other G codes
- Inch/metric dimensions
- Contour programming
- Absolute/incremental programming
- X axis diameter/radius programming
- Direct drawing dimension programming
- Arithmetic and trigonometric function
- Menu programming
- Subroutine call
- Skip function
- Chamfer/radius transition
- Plane selection
- Workpiece coordinate system

Interpolation types

- Linear interpolation
- Circular interpolation
- Helical interpolation
- Polar coordinate interpolation

Data transmission

- RS 232C serial interface
- Data backup and start-up with PC card
- PROFIBUS

Operation

- Slimline operator panel, monochrome, 10.4″
- □ Slimline operator panel, color, 10.4″ (SINUMERIK 802D)
- □ Slimline operator panel, color, 10.4″ and DIN sinulation/real time monitoring (SINUMERIK 802D base line)
- DIN simulation/real time monitoring (SINUMERIK 802D)
- Full CNC keyboard
- □ 3 electronic handwheels can be connected
- Graphical cycle support
- Selection of a large number of HMI languages, thereof 2 languages available in the system/switchable
- 6 access protection levels
- Workpiece counter
- Onboard pocket calculator
- Program execution via external DNC

Operating modes

- Automatic
- DNC mode
- MDA mode
- JOG mode
- Reference point approach manual/via CNC program
- Follow-up mode
- Increment weighting with handwheel
- Manual mode interrupt
- JOG and handwheel simultaneous mode
- Incremental axis approach
- Dry run
- Single block

Editing

- Block number search
- Program number search
- Background editing

Displays

- Graphical display
- Status display
- Current position display
- Program display
- Program error display
- Parameter display
- Operator error display
- Alarm display
- Servo setting display
- Spindle display
- Self-diagnostics function
- Status signal output (NC ready, servo ready, automatic operation, etc.)

- Standard features at no additional costs
- □ Option or accessory

Tool offsets
- Length/radius compensation
- □ Tool life monitoring (SINUMERIK 802D)
- 18 tools/36 tools offsets (SINUMERIK 802D base line)
- 48 tools for milling, 32 tools for turning (SINUMERIK 802D)
- 96 tool offsets for milling/64 tool offsets for turning (SINUMERIK 802D)
- Tool radius offset in the plane
- Collision monitoring, machining area
- Tool tip radius compensation
- Tool position compensation
- Geometry/wear compensation
- Automatic tool length measurement (SINUMERIK 802D)

Zero offsets translational/rotary
- Zero offsets, settable, max. 6
- Zero offsets, programmable

Axis monitoring
- Limit switch monitoring
- 2 software limit switches
- Contour monitoring
- Position monitoring
- Zero speed control
- Clamping monitoring

Compensation
- Stored leadscrew error compensation
- Backlash compensation
- Measuring system error compensation

Axis functions
- Rotary axis turning
- Velocity (max. default 100,000 mm/min / 40,000 inch/min)
- Feedrate override, 0% to 200%
- Feedrate per min
- Feedrate per revolution
- Jerk limitation (SINUMERIK 802D)
- JOG override
- □ Travel to fixed stop (SINUMERIK 802D)

Auxiliary functions
- Miscellaneous function M (2 digit)
- 2nd auxiliary function H (6 digits)
- Max. 3 auxiliary functions per block

Spindle functions
- Spindle speed, programmable (max. 999,999.9 rpm)
- Spindle override 0% to 200%
- 5 gear stages
- Automatic gear stage selection
- Oriented spindle stop
- Constant cutting speed
- Thread cutting
- Tapping/rigid tapping

Cycles
- Cycles for turning
- Cycles for drilling/milling

PLC area
- SIMATIC S7-200 software CPU
- User memory, 6,000 instructions
- Ladder programming language
- Windows programming tool
- □ Max. 144/96 digital inputs/outputs
- 3072 flags
- 40 timers
- 32 counters
- Typical processing time for bit commands 0.4 μs

Diagnostics functions
- Diagnostics basic functions
- PLC status
- Onboard ladder display
- □ PLC teleservice (SINUMERIK 802D)

Alarms and messages
- Alarms and messages selectable in the part program
- Alarms and messages from PLC

Safety functions
- Axis limitation from PLC
- Working area limitation

Start-up
- Start-up tools, running on external PC
- Series start-up via serial interface
- Series start-up via PC card

- Standard features at no additional costs
- □ Option or accessory

Function Overview

Notes

Basic components

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Basic components
CNC controls

CNC control		*Converter system*

SINUMERIK 802S base line
1 MG/1 channel
4 axes
(3 axes analog/
1 spindle analog)

FM STEPDRIVE

SINUMERIK 802C base line
1 MG/1 channel
4 axes
(3 axes analog/
1 spindle analog)

SIMODRIVE 611 universal HR
SIMODRIVE base line

SINUMERIK 802D base line
1 MG/1 channel
3 axes
(2 axes digital/
1 spindle digital/analog)

SIMODRIVE 611 universal E HR

SINUMERIK 802D
1 MG/1 channel
5 axes
(4 axes digital/
1 spindle digital/analog)

SIMODRIVE 611 universal E HR

SINUMERIK I/O

ADI 4
(Analog Drive Interface
for 4 Axes)

PP 72/48 I/O module

P_NC01_EN_00645_a

Overview

The SINUMERIK 802S base line is a CNC control that was developed for operation with up to 3 stepper drives and one analog spindle.

The target market is that of turning and milling machines in the low-end performance range that place correspondingly low demands on the drive technology. This allows stepper motor technology to be used with all the advantages of its simple design and equally good accuracy and ruggedness.
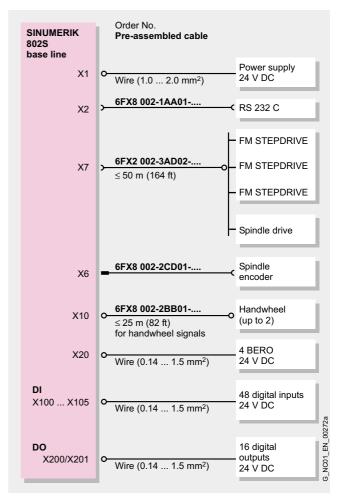
Benefits

- Very compact mounting dimensions
- Easy operation thanks to DIN programming
- High reliability thanks to operator panel mounting,
- Compact control comprising CNC, PLC, MCP and I/O section
- Complete delivery with CNC, Toolbox and logbook
- All tools are included in the scope of supply
- Very cost-effective drive technology using stepper motors
- Maintenance-free: Without battery and fan

Function

- Up to 3 axes for stepper drive and one analog spindle (without C-axis)
- Analog spindle through ±10 V interface
- Turning or milling are freely selectable
- Pre-assigned machine data
- RS 232 C interface
- 48 digital inputs and 16 digital outputs (0.5 A)
  - expandable by a module with 16 digital inputs and 16 digital outputs
- Sample program and PLC templates

Integration

Connection overview for SINUMERIK 802S base line

Please note the maximum permissible cable lengths (e.g. ≤ 25 m (82 ft)). Function faults can occur if longer lengths are used.

3

Basic components
CNC controls

| SINUMERIK 802S base line | SINUMERIK 802C base line |

■ Technical specifications

SINUMERIK 802S base line

Input voltage	24 V DC +20%/-15%
Power consumption	26 W
Current consumption	1 A/2.6 A on starting
Degree of protection to IEC 60529	
• Front	IP65
• Rear	IP20
Permissible air humidity to IEC 61131-2	5 ... 95% without condensation. Intake air free of aggressive gases.
Permissible ambient temperature	
• Storage and transport	-40 ... +70 °C (-40 ... +158 °F)
• Operation (horizontal installation)	0 ... +55 °C (32 ... +131 °F)
Weight, approx.	4 kg (8.82 lb)
Dimensions (W x H x D)	420 mm x 300 mm x 83 mm (16.54 in x 11.81 in x 3.27 in)

■ Selection and Ordering Data

Designation	Order No.
SINUMERIK 802S base line complete package comprising:	**6FC5 500-0AA00-1AA0**
• Operator panel control incl. machine control panel and I/O (48 digital inputs and 16 digital outputs)	
• Toolbox	
• Logbook	
Emergency stop button on the operator panel	
• Actuating element	**3SB3 000-1HA20**
• Contact block	**3SB3 400-0A**
PLC module D I/O	**6FC5 511-0CA00-0AA0**
• 16 digital inputs	
• 16 digital outputs	

■ Overview

The SINUMERIK 802C base line is a CNC control that was developed for operation with up to 3 analog drives and one analog spindle. The target market is that of turning and milling machines in the low-end performance range and the retrofit market.

It is possible in this case to implement simple drives with TTL encoders or resolvers. A typical example is the SIMODRIVE base line drive.

■ Benefits

■ Very compact mounting dimensions

■ Easy operation thanks to DIN programming

■ High reliability thanks to operator panel mounting

■ Compact control comprising CNC, PLC, MCP and I/O section

■ Complete delivery with CNC, Toolbox and logbook

■ All tools are included in the scope of supply
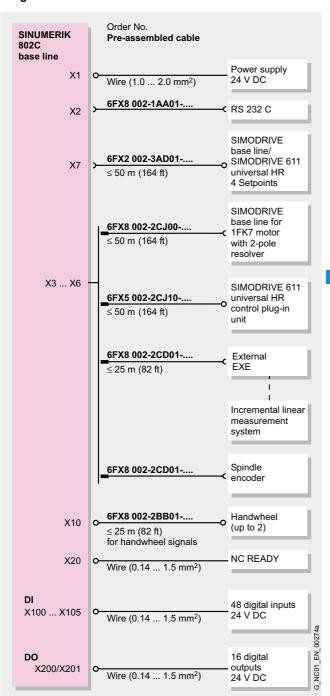
■ Maintenance-free: Without battery and fan

■ Function

• Up to 3 analog axes and one analog spindle (without C-axis)

• Analog spindle through ±10 V interface

• Turning or milling are freely selectable

• Pre-assigned machine data

• RS 232 C interface

• 48 digital inputs and 16 digital outputs (0.5 A)
  - expandable by a module with 16 digital inputs and 16 digital outputs

• Sample program and PLC templates

■ Integration

SINUMERIK 802C base line	Order No. **Pre-assembled cable**	
X1	Wire (1.0 ... 2.0 mm^2)	Power supply 24 V DC
X2	6FX8 002-1AA01-....	RS 232 C
X7	6FX2 002-3AD01-.... ≤ 50 m (164 ft)	SIMODRIVE base line/ SIMODRIVE 611 universal HR 4 Setpoints
	6FX8 002-2CJ00-.... ≤ 50 m (164 ft)	SIMODRIVE base line for 1FK7 motor with 2-pole resolver
X3 ... X6	6FX5 002-2CJ10-.... ≤ 50 m (164 ft)	SIMODRIVE 611 universal HR control plug-in unit
	6FX8 002-2CD01-.... ≤ 25 m (82 ft)	External EXE
		Incremental linear measurement system
	6FX8 002-2CD01-....	Spindle encoder
X10	6FX8 002-2BB01-.... ≤ 25 m (82 ft) for handwheel signals	Handwheel (up to 2)
X20	Wire (0.14 ... 1.5 mm^2)	NC READY
DI X100 ... X105	Wire (0.14 ... 1.5 mm^2)	48 digital inputs 24 V DC
DO X200/X201	Wire (0.14 ... 1.5 mm^2)	16 digital outputs 24 V DC

G_NC01_EN_00274a

Connection overview for SINUMERIK 802C base line

Please note the maximum permissible cable lengths (e.g. ≤ 25 m/82 ft). Function faults can occur if longer lengths are used.

■ Technical specifications

SINUMERIK 802C base line

Input voltage	24 V DC +20%/-15%
Power consumption	26 W
Current consumption	1 A/2.6 A on starting
Degree of protection to IEC 60529	
• Front	IP65
• Rear	IP20
Permissible air humidity to IEC 61131-2	5 ... 95% without condensation. Intake air free of aggressive gases.
Permissible ambient temperature	
• Storage and transport	-40 ... +70 °C (-40 ... +158 °F)
• Operation (horizontal installation)	0 ... +55 °C (32 ... +131 °F)
Weight, approx.	4 kg (8.82 lb)
Dimensions (W x H x D)	420 mm x 300 mm x 83 mm (16.54 in x 11.81 in x 3.27 in)

■ Selection and Ordering Data
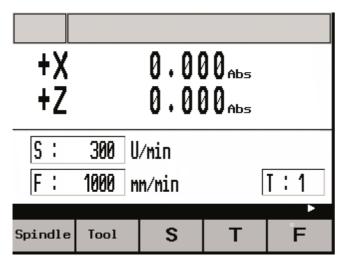
Designation	Order No.
SINUMERIK 802C base line complete package comprising:	6FC5 500-0AA11-1AA0
• Operator panel control incl. machine control panel and I/O (48 digital inputs and 16 digital outputs)	
• Toolbox	
• Logbook	
Emergency stop button on the operator panel	
• Actuating element	3SB3 000-1HA20
• Contact block	3SB3 400-0A
PLC module D I/O	6FC5 511-0CA00-0AA0
• 16 digital inputs	
• 16 digital outputs	

3

Basic components
CNC controls

■ **Overview**

SINUMERIK 802S/C manual machine base screen

The SINUMERIK 802S/C manual machine operating software allows a conventional turning machine to be operated using handwheels and the available graphical cycles. In particular the stored cycles enable complex contours to be machined repeatedly in the easiest possible manner. The familiar easy operation of a conventional turning machine is completely retained. Productivity, accuracy and ease of use can, however, be improved even more.

A special feature of this software is the ability to switch over from the normal CNC control mode (SINUMERIK 802S/C base line) to "manual machine" mode which allows operation of the machine either as a CNC machine or as a conventional machine.

The hardware is based on the SINUMERIK 802S base line or SINUMERIK 802C base line.
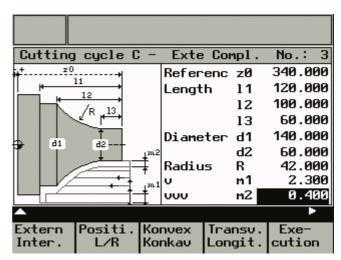
The "manual machine" operating software is a component part of the Toolbox (available soon). The Toolbox is already included in the standard SINUMERIK 802S/C base line package.

■ **Benefits**
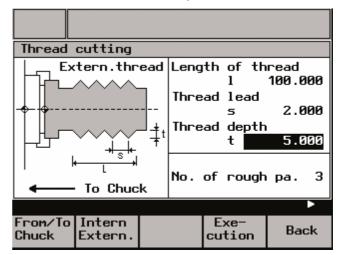
■ Conventional operation
■ No programming knowledge necessary
■ Expanded machining possibilities
■ Better machining results
■ Simplified mechanical design of the conventional machine

■ **Function**

• 2 axes (stepper or analog interface) and one analog spindle
• Machining support through cycles
• Easy thread repair

SINUMERIK 802S/C manual machine cycle-stock removal

SINUMERIK 802S/C manual machine cycle-thread cutting

■ Overview

The SINUMERIK 802D base line is a CNC control that was developed for operation with 2 digital drives and one digital/analog spindle (without C-axis).

The target market is that of compact turning machines with corresponding requirements on accuracy, simplicity and ruggedness, which are necessary today for this machine class.
A PROFIBUS-enabled two-axis control unit SIMODRIVE 611 universal E HR is already included in the basic package.

The retrofit area is also opened up to this control by the ADI 4 module (Analog Drive Interface for 4 axes) and by interfacing to PROFIBUS.

■ Benefits

- Very compact mounting dimensions
- Easy to operate thanks to DIN programming
- High availability
- Compact control comprising CNC, PLC, MCP and I/O section
- Complete delivery in basic package
- Comprehensive programming aids with cycles and contour definitions
- Digital drives technology over PROFIBUS DP
- Maintenance-free: Without battery and fan
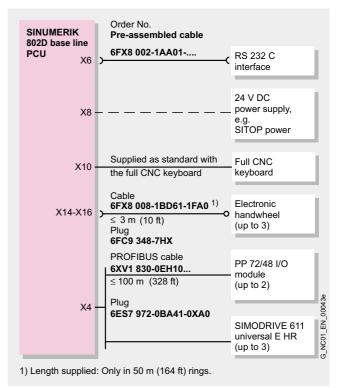
■ Function

- 2 digital feed drives and one digital/analog spindle (without C axis)
- A bipolar or unipolar analog spindle can be implemented
- Turning or milling are freely selectable
- RS 232 C interface
- Pre-assigned machine data
- Sample program and PLC templates/library in the scope of supply
- Easy PLC (S7-200) "Ladder" programming
- Digital or analog spindle (±10 V) can be selected
- CNC keyboards (horizontal or vertical design)
- 144 digital inputs and 96 digital outputs (0.25 A)
- Converter system SIMODRIVE 611 universal E HR via PROFIBUS DP

■ Integration

The following components can be connected to the SINUMERIK 802D base line:

- Up to 3 electronic handwheels
- Mini handheld unit
- Machine control panel through PP 72/48 I/O module

1) Length supplied: Only in 50 m (164 ft) rings.

Connection overview for SINUMERIK 802D base line

Please note the maximum permissible cable lengths (e.g. ≤ 25 m (82 ft)). Function faults can occur if longer lengths are used.

3

Basic components
CNC controls

Technical specifications

SINUMERIK 802D base line

Input voltage	24 V DC +20%/-15%
Power consumption	50 W
Degree of protection to EN 60529 (IEC 60529)	
• Front	IP65
• Rear	IP00
Humidity rating in accordance with EN 60721-3-3	Class 3K5 condensation and icing excluded. Low air temperature 0 °C (+32 °F).
Permissible ambient temperature	
• Storage and transport	-20 ... +60 °C (-4 ... +140 °F)
• Operation	0 ... +50 °C (32 ... +122 °F)
Weight, approx.	
• PCU	4.9 kg (10.80 lb)
• Full CNC keyboard	1.7 kg (3.75 lb)
Dimensions (W x H x D)	
• PCU	309.4 mm x 330 mm x 70 mm (12.18 in x 12.99 in x 2.76 in)
• Full CNC keyboard, vertical format	172 mm x 330 mm x 24 mm (6.77 in x 330 mm x 0.94 in)
• Full CNC keyboard, horizontal format	309,4 mm x 175 mm x 24 mm (12.18 in x 6.89 in x 0.94 in)

Selection and Ordering Data

Designation	Order No.
SINUMERIK 802D base line Basic package comprising: • 1 x PCU-802D base line • 1 x SIMODRIVE 611 universal E HR • 1 x Motion Control slide-in unit with PROFIBUS DP • 1 x PP 72/48 I/O module • 3 x PROFIBUS connector • 1 x SINUMERIK Toolbox 802D base line	**6FC5 600-0AB01-0AA0**

Selection and Ordering Data (continued)

Designation	Order No.
Hardware components	
SINUMERIK 802D base line CNC operator panel (PCU)	**6FC5 610-0BB10-0AA1**
Full CNC keyboard, vertical format for mounting on the side of the PCU incl. connecting cable Length: 1.5 m (4 ft 11 in)	**6FC5 603-0AC12-1AA0**
Full CNC keyboard, horizontal format for mounting under the PCU incl. connecting cable Length: 1.5 m (4 ft 11 in)	**6FC5 603-0AC13-1AA0**
PP 72/48 I/O module 72 inputs, 48 outputs 24 V DC, 0.25 A	**6FC5 611-0CA01-0AA0**
Terminal strip converter 50-pole	**6EP5 406-5AA00**
Cable set 6 m (20 ft) ribbon cable, 8 insulation displacement connectors, 50-pole	**6EP5 306-5BG00**
Machine Control Panel MCP vertical format for mounting on the side of the PCU	**6FC5 603-0AD00-0AA1**
PC card Type STRATA 8 MB (empty)	**6FC5 247-0AA11-0AA2**
Software	
SINUMERIK 802D base line Toolbox on CD-ROM incl. • Cycles • Languages • SinuCOM PCIN • Alarmtext Editor • SimoCom U • PLC 802 programming tool	**6FC5 650-0EB00-0AG0**
Software option	
Simulation/simultaneous recording and user interface in color	**6FC5 673-0AB01-0AF0**

Overview

The SINUMERIK 802D is an operator panel control that combines all the components of a CNC control unit (CNC, PLC, HMI) in one unit. It is possible to connect 4 digital axes and one digital/analog spindle over PROFIBUS DP. This also applies to the I/O that is operated on the same bus connection. In this manner, all the requirements for easy installation with minimal wiring overhead are fulfilled. The functional scope of the control is ideally suited for standardized turning and milling machines. The modular construction of the drive system offers maximum flexibility for every application.

The retrofit area is also opened up to this control by the ADI 4 module (Analog Drive Interface for 4 axes) and by interfacing to PROFIBUS.

Benefits

- Easy to operate thanks to DIN programming and ISO code
- High availability
- Compact control comprising CNC, PLC, HMI and I/O section
- Complete delivery in basic package
- Comprehensive programming aids with cycles and contour definitions
- Digital drives technology over PROFIBUS DP
- Maintenance-free: Without battery and fan
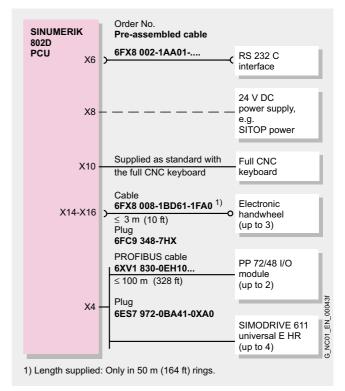
Function

- 4 digital feed drives and one digital/analog spindle, with C-axis and 3 digital axes, one spindle and an auxiliary spindle
- A bipolar or a unipolar analog spindle can be used
- Turning or milling are freely selectable
- RS 232 C interface
- Pre-assigned machine data
- Sample program and PLC templates/library included in scope of supply
- Simple PLC (S7-200) "Ladder" programming
- Full CNC keyboard (vertical or horizontal format)
- 144 digital inputs and 96 digital outputs (0.25 A)
- SIMODRIVE 611 universal E HR converter system via PROFIBUS DP

Integration

The following components can be connected to the SINUMERIK 802D:

- Up to 3 electronic handwheels
- Mini handheld unit
- Machine control panel through PP 72/48 I/O module

1) Length supplied: Only in 50 m (164 ft) rings.

Connection overview for SINUMERIK 802D

Please note the maximum permissible cable lengths (e.g. ≤ 25 m/82 ft). Function faults can occur if longer lengths are used.

3

Basic components
CNC controls

Technical specifications

SINUMERIK 802D

Input voltage	24 V DC +20%/-15%
Power consumption	50 W
Degree of protection to EN 60529 (IEC 60529)	
• Front	IP65
• Rear	IP00
Humidity rating in accordance with EN 60721-3-3	Class 3K5 condensation and icing excluded. Low air temperature 0 °C (+32 °F).
Permissible ambient temperature	
• Storage and transport	-20 ... +60 °C (-4 ... +140 °F)
• Operation	0 ... +50 °C (32 ... +122 °F)
Weight, approx.	
• PCU	4.9 kg (10.80 lb)
• Full CNC keyboard	1.7 kg (3.75 lb)
Dimensions (W x H x D)	
• PCU	309.4 mm x 330 mm x 70 mm (12.18 in x 12.99 in x 2.76 in)
• Full CNC keyboard, vertical format	172 mm x 330 mm x 24 mm (6.77 in x 12.99 in x 0.94 in)
• Full CNC keyboard, horizontal format	309.4 mm x 175 mm x 24 mm (12.18 in x 6.89 in x 0.94 in)

Selection and Ordering Data

Designation	Order No.
SINUMERIK 802D Basic Package 1 comprising: • SINUMERIK 802D (PCU) • Full CNC keyboard **vertical format** • **1** x SIMODRIVE 611 universal E HR • **1** x Motion Control slide-in unit with PROFIBUS DP • 1 x PP 72/48 I/O module • **3** x PROFIBUS connector • SINUMERIK 802D Toolbox	**6FC5 600-0AG01-0AA0**
SINUMERIK 802D Basic Package 2 comprising: • SINUMERIK 802D (PCU) • Full CNC keyboard **vertical format** • **2** x SIMODRIVE 611 universal E HR • **2** x Motion Control slide-in unit with PROFIBUS DP • 1 x PP 72/48 I/O module • **4** x PROFIBUS connector • SINUMERIK 802D Toolbox	**6FC5 600-0AG02-0AA0**
SINUMERIK 802D Basic Package 3 comprising: • SINUMERIK 802D (PCU) • Full CNC keyboard **horizontal format** • **2** x SIMODRIVE 611 universal E HR • **2** x Motion Control slide-in unit with PROFIBUS DP • 1 x PP 72/48 I/O module • **4** x PROFIBUS connector • SINUMERIK 802D Toolbox	**6FC5 600-0AF02-0AA0**

Selection and Ordering Data (continued)

Designation	Order No.
Hardware components	
SINUMERIK 802D CNC operator panel (PCU)	**6FC5 610-0BA10-0AA1**
Full CNC keyboard, vertical format for mounting on the side of the PCU incl. connecting cable Length: 1.5 m (4 ft 11 in)	**6FC5 603-0AC12-1AA0**
Full CNC keyboard, horizontal format for mounting under the PCU incl. connecting cable Length: 1.5 m (4 ft 11 in)	**6FC5 603-0AC13-1AA0**
PP 72/48 I/O module 72 inputs, 48 outputs 24 V DC, 0.25 A	**6FC5 611-0CA01-0AA0**
Terminal strip converter 50-pole	**6EP5 406-5AA00**
Cable set 6 m (20 ft) ribbon cable, 8 insulation displacement connectors, 50-pole	**6EP5 306-5BG00**
Machine Control Panel MCP vertical format for mounting on the side of the PCU	**6FC5 603-0AD00-0AA1**
PCMCIA card for series start-up	**6FC5 650-0DA00-0AH0**
Software	
SINUMERIK 802D Toolbox on CD-ROM incl. • Cycles • Languages • SinuCom PCIN • Alarm text editor • SimoCom U • PLC 802 programming tool	**6FC5 650-0EA00-0AG0**
Software options	
User interface in color	**6FC5 673-0AA01-0AF0**
Tool life and quantity monitoring	**6FC5 651-0AA01-0AA0**
Transmit and peripheral surface transformation	**6FC5 651-0AA02-0AA0**
PLC remote diagnostics	**6FC5 653-0AA01-0AA0**
Traversing to fixed stop	**6FC5 655-0AA01-0AA0**

3

■ **Overview**

The MCP machine control panel for SINUMERIK 802D and SINUMERIK 802D base line provides an easy solution for turning and milling machines. All the keys required for operation are provided and can be directly connected to the PP 72/48 I/O module over a ribbon cable. The connections are made at the 24 V DC level and are therefore easy to implement.

■ **Benefits**

- Easily connected using ribbon cables and post links
- Dimensions to suit SINUMERIK 802D/SINUMERIK 802D base line
- Fully equipped with all the necessary function elements

■ **Function**

- 24 V DC supply level
- Can be adapted to turning and milling applications by means of replaceable keys
- User-assignable keys with LED indicator
- Emergency stop mushroom pushbutton with NO and NC contacts
- 2 override rotary knobs for feedrate and spindle drive

■ **Technical specifications**

MCP for SINUMERIK 802D/SINUMERIK 802D base line

Input voltage	24 V DC +20%/-15%
Power consumption	5 W
Inputs/outputs	Plug-in connector acc. to MIL-C-83-503/DIN 41-651
Degree of protection to EN 60529 (IEC 60529)	
• Front	IP54
• Rear	IP00
Condensation	not permissible
Permissible ambient temperature	
• Storage and transport	-20 ... +60 °C (-4 ... +140 °F)
• Operation	0 ... +50 °C (32 ... +122 °F)
Weight, approx.	1.5 kg (3.31 lb)
Dimensions (W x H x D)	170 mm x 330 mm x 60 mm (6.69 in x 12.99 in 2.36 in)

■ **Selection and Ordering Data**

Designation	Order No.
Machine Control Panel MCP for SINUMERIK 802D/ SINUMERIK 802D base line	**6FC5 603-0AD00-0AA1**

3

Basic components
Accessories

■ Overview

ADI 4, (Analog Drive Interface for 4 Axes) can be used to operate up to 4 drives with analog setpoint interface.

Several ADI 4 modules can be connected to the SINUMERIK 840Di, permitting analog control of all its axes. Mixed operation of SIMODRIVE 611 universal HR and SIMODRIVE POSMO SI/CD/CA digital drives with ADI 4 is possible, the axes can interpolate with one another.

Two ADI 4 modules can be connected to the SINUMERIK 802D, permitting analog control of all axes of the SINUMERIK 802D. Combined operation with SIMODRIVE universal E HR digital drives is not possible. Only one ADI 4 module can be connected to the SINUMERIK 802D base line in accordance with its number of axes.

■ Benefits

■ Connection via PROFIBUS DP to motion control functionality (isochrone mode)

■ 4 inputs for incremental encoder (TTL signals) or optionally 4 inputs [1] for absolute value encoder (SSI)

■ 4 analog outputs ±10 V for the setpoint

■ 4 relay contacts for drive enable axes 1 to 4

■ 10 digital outputs [1]
(4 general, 6 drive-specific)

■ 10 digital drive-specific inputs [2]

■ Onboard status display on 4 diagnostics LEDs

An external power supply (+24 V DC) is required for the module and the digital outputs.

■ Integration

Connecting encoders with SINUMERIK 802D/802D base line

In the case of SINUMERIK 802D/802D base line (in accordance with the number of axes), the following configurations are available as standard for each ADI 4:

• **4** x TTL signal inputs with P/R out of:
  - 3 x 2500, 1 x 1024
  - 1 x 9000, 1 x 18000, 1 x 1024, 1 x 2500
    or
  - 3 x 2048, 1 x 1024
  - 1 x 9000, 1 x 18000, 1 x 1024, 1 x 2048

As an alternative, in the case of SINUMERIK 802D/802D base line, linear scales (TTL signals) can be connected using the ADI 4 module. The following configurations are available for each ADI 4 as standard:

• **4** x TTL signal inputs with P/R out of:
  - 4 x 2500
    or
  - 4 x 5000

Other configurations can be ordered on request.

■ Technical specifications

ADI 4

|	
Input voltage	24 V DC
Power consumption, max.	30 W
Inputs/outputs	isolated
Degree of protection according to EN 60529	IP20
Condensation	not permissible
Permissible ambient temperature	
• Storage	-20 ... +55 °C (-4 ... +131 °F)
• Transport	-40 ... +70 °C (-40 ... +158 °F)
• Operation	0 ... +55 °C (32 ... +131 °F)
Weight, approx.	1.5 kg (3.31 lb)
Dimensions (W x H x D)	48.5 mm x 325 mm x 154.4 mm (1.91 in x 12.8 in x 6.08 in)

■ Selection and Ordering Data
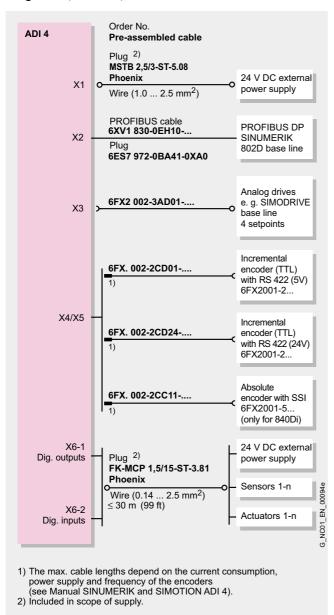
Designation	Order No.
ADI 4 Analog Drive Interface for 4 axes	**6FC5 211-0BA01-0AA1**

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1) Cannot be used with SINUMERIK 802D/802D base line.

2) Only 9 can be used with SINUMERIK 802D/802D base line.

3

Integration (continued)

ADI 4	Order No. **Pre-assembled cable**	
X1	Plug [2] **MSTB 2,5/3-ST-5.08 Phoenix** Wire (1.0 ... 2.5 mm^2)	24 V DC external power supply
X2	PROFIBUS cable **6XV1 830-0EH10-...** Plug **6ES7 972-0BA41-0XA0**	PROFIBUS DP SINUMERIK 802D base line
X3	**6FX2 002-3AD01-....**	Analog drives e. g. SIMODRIVE base line 4 setpoints
X4/X5	**6FX. 002-2CD01-....** [1]	Incremental encoder (TTL) with RS 422 (5V) 6FX2001-2...
	6FX. 002-2CD24-.... [1]	Incremental encoder (TTL) with RS 422 (24V) 6FX2001-2...
	6FX. 002-2CC11-.... [1]	Absolute encoder with SSI 6FX2001-5... (only for 840Di)
X6-1 Dig. outputs	Plug [2] **FK-MCP 1,5/15-ST-3.81 Phoenix** Wire (0.14 ... 2.5 mm^2) ≤ 30 m (99 ft)	24 V DC external power supply
		Sensors 1-n
X6-2 Dig. inputs		Actuators 1-n

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1) The max. cable lengths depend on the current consumption,
   power supply and frequency of the encoders
   (see Manual SINUMERIK and SIMOTION ADI 4).
2) Included in scope of supply.

Connection overview ADI 4

Please note the maximum permissible cable lengths (e.g. ≤ 25 m/82 ft). Function faults can occur if longer lengths are used.

3

SINUMERIK I/O
PP 72/48 I/O module

■ **Overview**

The I/O module PP 72/48 is connected to PROFIBUS DP and provides 72 digital inputs and 48 digital outputs. The 3 plug-in connectors for the inputs and outputs are 50-pole terminal posts for connecting ribbon cables. Application areas are with SINUMERIK 802D/802D base line.
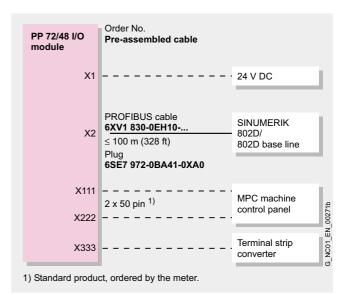
■ **Benefits**

■ Connection via PROFIBUS DP

■ 3 post links with 24 digital inputs and 16 digital outputs each with 24 V DC, 0.25 A

■ With mounting plate for easy mounting

■ Integral 24 V DC power supply with electrical isolation between inputs and outputs and PROFIBUS

■ **Integration**

The PP 72/48 I/O module can be used for the following CNC controls:

• SINUMERIK 802D base line

• SINUMERIK 802D

A power supply (+24 V DC) is required for the module and the digital outputs.

Connection overview of PP 72/48

Please note the maximum permissible cable lengths (e.g. ≤ 25 m (82 ft)). Function faults can occur if longer lengths are used.

■ **Technical specifications**

PP 72/48	
Input voltage	24 V DC +20%/-15%
Power consumption	11 W
Inputs/outputs	Plug-in connector acc. to MIL-C-83-503/DIN 41-651
Degree of protection to EN 60529 (IEC 60529)	IP00
Condensation	not permissible
Permissible ambient temperature	
• Storage and transport	-20 ... +60 °C (-4 ... +140 °F)
• Operation	0 ... +50 °C (32 ... +122 °F)
Weight, approx.	1.2 kg (2.65 lb)
Dimensions (W x H x D)	325 mm x 194 mm x 35 mm (12.8 in x 7.64 in x 1.38 in)

■ **Selection and Ordering Data**

Designation	Order No.
PP 72/48 I/O module for 72 digital inputs and 48 digital outputs	**6FC5 611-0CA01-0AA0**
Accessories	
Terminal strip converter	**6EP5 406-5AA00**
Cable set comprising: 6 m (20 ft) ribbon cable 50-pole 8 insulation displacement connectors 50-pole	**6EP5 306-5BG00**
PROFIBUS cable	**6XV1 830-0EH10-....**
PROFIBUS connectors	**6ES7 972-0BA40-0XA0**

Converter systems

4

SIMODRIVE 611 universal E HR control unit

Overview

Digital control unit and Motion Control with PROFIBUS DP V2 SIMODRIVE 611 universal E HR

SIMODRIVE 611 universal E HR is a control unit for which the option module "Motion Control with PROFIBUS DP V2" is required. The complete control unit can then be used with the SINUMERIK 802D/802D base line with motor frequencies up to 1400 Hz with speed and torque control for:

- 1FT6/1FK synchronous motors
- 1PH and 1LA asynchronous motors with/without encoder
- Non-Siemens motors suitable for converter operation

SIMODRIVE 611 universal E HR can be used in single-axis and two-axis power modules.

The following encoder types are available:

- Incremental encoder sin/cos 1 V_{PP}
  1 to 65535 pulses, f_G max. 350 kHz,
  internal pulse multiplication 2048 x number of pulses
- Absolute encoder with EnDat and sin/cos 1 V_{PP}

The drive can be started either via a 7-segment display and keyboard on the front of the module or via the "SimoCom U" start-up tool for PCs under Windows 95/98/NT/2000/Me/XP.

Function

Functions *(per axis, selection):*

- 2 analog outputs, programmable
- 2 digital inputs/outputs, programmable
- RS 232 interface for connecting a PC/PG in order to enable use of the SimoCom U commissioning tool
- Storing of up to 4 motor data records per axis, star/delta changeover possible
- Input for TTL incremental encoder for forwarding data via the Motion Control with PROFIBUS DP (V2) to higher-level controllers SINUMERIK 802D/802D base line

Technical specifications

SIMODRIVE 611 universal E HR	
Rated power range – Infeed	
Direct system connection	yes
Unregulated infeed	5 ... 28 kW
Regulated infeed	16 ...120 kW
Rated current range – Power modules for motor inverter	
Feed application with motor encoder: Incremental encoder sin/cos 1 V_{pp} and EnDat absolute encoder	3 ... 140 A 3 ... 140 A
Main spindle application with motor encoder	3 ... 200 A
Asynchronous motor application, without motor encoder	3 ... 200 A
Rated DC link voltage	
• Unregulated	
at 3-phase 400 V -10%	490 V
at 3-phase 400 V +6%	680 V
• Regulated	
at 3-phase 400 V	600 V
at 3-phase 415 V	625 V
Type of motors	
Synchronous motor as feed drive with motor encoder Incremental encoder sin/cos 1 V_{pp} or EnDat absolute encoder	1FK/1FT6
Asynchronous/synchronous motor as main spindle drive	1PH/1PM
Asynchronous low-voltage motors	1LA

Selection and ordering data

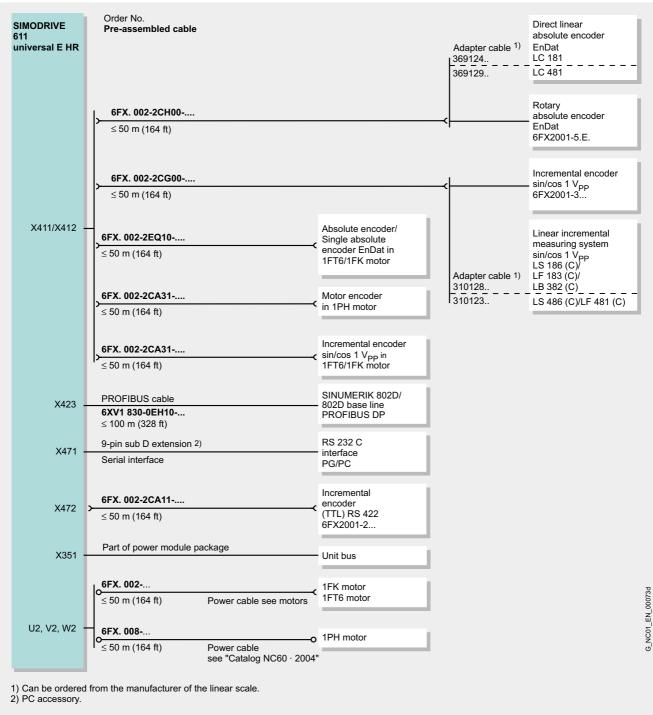| Designation	Order No.
SIMODRIVE 611 universal E HR • Two-axis version	**6SN11 18-0NH11-0AA0**
Option module (required) Motion Control with PROFIBUS DP V2 Isochrone standard slave for up to 2 axes, cyclic or acyclic data interchange up to 12 Mbit/s	**6SN11 14-0NB01-0AA0**

■ **Integration**

SIMODRIVE 611 universal E HR	Order No. **Pre-assembled cable**		
		Adapter cable [1] 369124..	Direct linear absolute encoder EnDat LC 181
		369129..	LC 481
	6FX. 002-2CH00-.... ≤ 50 m (164 ft)		Rotary absolute encoder EnDat 6FX2001-5.E.
	6FX. 002-2CG00-.... ≤ 50 m (164 ft)		Incremental encoder sin/cos 1 V_{PP} 6FX2001-3...
X411/X412	**6FX. 002-2EQ10-....** ≤ 50 m (164 ft)	Absolute encoder/ Single absolute encoder EnDat in 1FT6/1FK motor	Linear incremental measuring system sin/cos 1 V_{PP} LS 186 (C)/ LF 183 (C)/ LB 382 (C)
	6FX. 002-2CA31-.... ≤ 50 m (164 ft)	Motor encoder in 1PH motor	Adapter cable [1] 310128.. LS 486 (C)/LF 481 (C) 310123..
	6FX. 002-2CA31-.... ≤ 50 m (164 ft)	Incremental encoder sin/cos 1 V_{PP} in 1FT6/1FK motor	
X423	PROFIBUS cable **6XV1 830-0EH10-...** ≤ 100 m (328 ft)	SINUMERIK 802D/ 802D base line PROFIBUS DP	
X471	9-pin sub D extension [2] Serial interface	RS 232 C interface PG/PC	
X472	**6FX. 002-2CA11-....** ≤ 50 m (164 ft)	Incremental encoder (TTL) RS 422 6FX2001-2...	
X351	Part of power module package	Unit bus	
U2, V2, W2	**6FX. 002-...** ≤ 50 m (164 ft) Power cable see motors	1FK motor 1FT6 motor	
	6FX. 008-... ≤ 50 m (164 ft) Power cable see "Catalog NC60 · 2004"	1PH motor	

1) Can be ordered from the manufacturer of the linear scale.
2) PC accessory.

Connection overview for SIMODRIVE 611 universal E HR, absolute encoder EnDat and incremental encoder sin/cos 1 V_{PP}/TTL

4

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SIMODRIVE base line

Overview

The SIMODRIVE base line converter is designed for operation with 1FK7 motors. This can only be used with 1FK7 motors with 2-pole resolvers. The converters are preconfigured for these motors, so rapid start-up is possible.

The rugged design offers an optimum combination of functionality and the necessary technology. The main application areas for SIMODRIVE base line converters are in turning and milling machines as well as in applications that demand an economical solution.

Benefits

- Complete units
- Preconfigured devices
- Economical design
- Reduced complexity

Design

The SIMODRIVE base line converter is available as a single-axis and two-axis unit and comprises the following components:
- Unregulated infeed
- Power section with 1 x 9 A or 2 x 5 A
- Single-axis or two-axis resolver closed-loop control
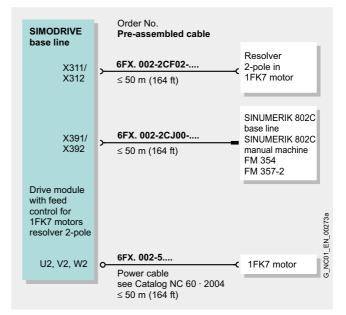
The converter is designed exclusively for use with 1FK7 motors with 2-pole resolvers.

Function

- Single-axis or two-axis devices
- For 1FK7 motors with 2-pole resolver
- Analog interface with ±10 V setpoint input

Integration

Connection overview for SIMODRIVE base line

Technical specifications

SIMODRIVE base line

Infeed type	Unregulated
Rated power	5 kW
Input voltage	3-phase AC 400 V -10% … 3-phase AC 480 V +6% [1]
Output voltage	3-phase AC 0 … 430 V
Rated current	12.5 A
Current with undervoltage	14 A
Peak current	25 A
Conductor cross-section	6 mm^2
Module width	110 mm (4.33 in)
Heat dissipation method	
• Internal heat dissipation	Natural cooling
Losses	270 W +70/90 W
Weight, approx.	
• Single-axis unit	14 kg (30.87 lb)
• Two-axis unit	17 kg (37.49 lb)
Rated current	2 x 5 A (two-axis unit), 9 A (single-axis unit)
Peak current	2 x 10 A (two-axis unit), 18 A (single-axis unit)
Motors	1FK7...-.....-.T..
Encoder	Resolver 2-pole
Encoder evaluation	Output for incremental encoder (TTL signal) 1024 S/R
Permissible ambient temperature	
• Storage and transport	-25 … +70 °C (-13 … +158 °F)
• Operation	-25 … +40 °C (-13 … +104 °F)
Dimensions (W x H x D)	110 mm x 483 mm x 271 mm (4.33 in x 19.02 in x 10.67 in)

1) Derating must be considered from 380 V.

SIMODRIVE base line	FM STEPDRIVE power section

SIMODRIVE base line

■ Selection and ordering data

Designation	Order No.
SIMODRIVE base line Converter for 1FK7 motors exclusively with 2-pole resolvers	
• Single-axis unit for 1FK7 motor with 11 Nm (97.36 lb-in)	**6FC5 548-0AC11-0AA0**
• Two-axis unit for 1FK7 motor with 8 + 6 Nm (70.81 + 53.10 lb-in)	**6FC5 548-0AC12-0AA0**
• Two-axis unit for 1FK7 motor with 6 + 3 Nm (50.10 + 26.55 lb-in)	**6FC5 548-0AC13-0AA0**
SIMODRIVE line filter	**6SN11 11-0AA01-1BA0**

FM STEPDRIVE power section

■ Overview

The FM STEPDRIVE power section controls the motion of the stepper motors in the SIMOSTEP 1FL3 series with the utmost precision. In combination with the SINUMERIK 802S base line control and the FM 353 and FM 357-2 function modules, it performs highly accurate positioning tasks in the lower output range up to 600 W.

The FM STEPDRIVE can be used for stepper motors with torques in the 2 Nm (17.702 lb-in) to 15 Nm (132.762 lb-in) range.
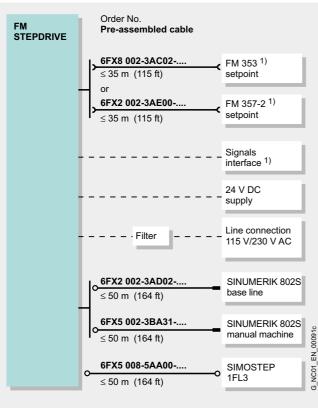
■ Design

The FM STEPDRIVE has the same design as the SIMATIC S7-300 family.

4

FM STEPDRIVE power section

Integration

FM STEPDRIVE	Order No. Pre-assembled cable	
	6FX8 002-3AC02-.... ≤ 35 m (115 ft) or	FM 353 [1] setpoint
	6FX2 002-3AE00-.... ≤ 35 m (115 ft)	FM 357-2 [1] setpoint
		Signals interface [1]
		24 V DC supply
	Filter	Line connection 115 V/230 V AC
	6FX2 002-3AD02-.... ≤ 50 m (164 ft)	SINUMERIK 802S base line
	6FX5 002-3BA31-.... ≤ 50 m (164 ft)	SINUMERIK 802S manual machine
	6FX5 008-5AA00-.... ≤ 50 m (164 ft)	SIMOSTEP 1FL3

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1) Enable signal (enabling of power unit) either 5 V via pulse interface or 24 V via signal interface.

Connection overview for FM STEPDRIVE

Technical specifications

FM STEPDRIVE

Supply voltage	115/230 V AC ±20% selectable
Input current, max.	11/5.5 A
Frequency	47 … 63 Hz
Supply voltage (signals)	24 V DC (20.4 … 28.8 V)
Input current, max.	1.5 A
DC link voltage	325 V
Pulse interface	5 V signals [1] 15-pin sub D socket, standard cable
Signal interface	24 V, I/O signals [1]
Motor connection	3 x 325 V (connected to supply system)
Phase current	1.7 …6.8 A (adjustable on unit)
Cable length, max.	50 m (164 ft) with 1.5 mm^2 30 m (98 ft 5 in) with 0.75 mm^2
Terminals for max.	2.5 mm^2
Number of steps/revolution	Adjustable to: 500, 1000, 5000, 10,000

Technical specifications (continued)

FM STEPDRIVE

Degree of protection EN 60529 (IEC 60529)	IP20, must be installed in cabinet
Condensation	not permissible
Permissible ambient temperature	
• Storage and transport	-40 … +70 °C (-40 … +158 °F)
• Operation	0 … +60 °C (32 … +140 °F) with derating and dependent on mounting position
Weight, approx.	0.85 kg (1.87 lb)
Dimensions (W x H x D)	80 mm x 125 mm x 118 mm (3.15 in x 4.92 in x 4.65 in)

Selection and ordering data

Designation	Order No.
FM STEPDRIVE Power section for SIMOSTEP stepper motors	**6SN12 27-2ED10-0HA0**
Sub D plug (3 untis) 15-pin socket (mating connector)	**6FC9348-7HX**
Filter [2]	
• 115 V single-phase with neutral conductor; type: B84142-B16-R	**213-8400**
• 230 V single-phase with neutral conductor; type: B84142-B16-R	**213-8400**
• 115 V three-phase with neutral conductor; type: B84299-K55	**213-8090**
• 230 V three-phase with neutral conductor; type: B84299-K53	**213-8084**
• 230 V three-phase without neutral conductor; type: B84143-B8-R	**213-8270**

More Information

You can order the filters required for FM-STEPDRIVE from:

RS Components GmbH

Hessenring 13b
64546 Mörfelden-Walldorf, Germany

Phone: +49 (0) 61 05 - 4 01 - 2 34

Additional information is available in the Internet under:

http://www.rscomponents.de

1) Enable signal (enabling of power section), optionally either 5 V via pulse interface or 24 V via signal interface.

2) Order from RS Components GmbH

4

Appendix

5

Repair service contract RSV

■ **Overview**

RSV description of performance

Siemens eliminates the faults on the Siemens Automation & Drives components (not applicable for complete motor spindles) specified in the contract at the machine location for the machine tool manufacturer and dealer in the context of the repair service contract (RSV).

RSV services

- Provision of servicing personnel
- Fault diagnostics on site
- Troubleshooting on site
- Proof of fault correction

Fault diagnostics refers to the components specified in the parts list of the final destination memo. Diagnostics is carried out on the basis of a technically pre-clarified fault message by the manufacturer or dealer with specification of the contract number.

Fault correction is carried out by repairing and/or replacing faulty components. In the event of a machine standstill, fault correction is carried out with the response time specified for the country group. Within the agreed contract period, faulty components which were not older than 12 months at the beginning of the RSV will be replaced free-of-charge.

Siemens provides qualified personnel for fault diagnostics and fault correction on our products. If mechanical work is also necessary, this must be provided or arranged by the manufacturer/dealer. Example: dismounting/mounting of motors or other mechanical components.

The services are provided during the usual working hours in the country of installation.

Spare parts are provided either from our central warehouses or from regional warehouses using our worldwide spare part logistics. Our central warehouses contain all important spare parts. Regional warehouses are adapted to include the components referred to in the final destination memo [1].

The following components are not defined as spare parts :

- Motors [2]
- Cables [3]
- Special or customer-specific modules and components which are not available from Siemens as spare parts.

Faulty components [4] are replaced free-of-charge within the agreed contract period.

Contract prerequisites

- Final destination memo
- Data backup at the user

The manufacturer/dealer provides the final destination memo in time and prior to commencement of the contract, and guarantees that all data of the machine are stored and available at the user. Particular data for the final destination memo are: machine number, machine type, processing technology, control system, drive system, number of measuring circuits, type of data storage, data storage medium, data on OEM application, date of commissioning at end user, country of end user, parts list of components used.

RSV certificate

The manufacturer or dealer as the RSV contract partner is provided with a certificate following handing over of the final destination memo (prerequisite for provision of services at the end customer). This certificate contains the contract number and the important contract data such as machine number, machine type, start of contract, end of contract, and address for provision of the services.

Period of validity

The RSV commences with the date registered with us for completion of the 2nd commissioning at the end customer, and ceases following expiry of the selected period for the RSV.

Contract periods

The RSV is offered for the limitation period (warranty period) of our customers (manufacturer/dealer) compared to their end customers. Various RSV periods permit you to satisfy different market requirements. In the case of RSV periods exceeding the originally selected limitation period for the Siemens A&D components, the limitation period is extended with respect to claims for subsequent fulfillment, with the exception of further rights and claims, in line with the extended RSV period. An existing RSV can be extended once by 6 months or 1 year. The extension must be ordered during the period of the basic RSV.

Contract versions

Two versions of the RSV are available:

- The master contract is for machine manufacturers who agree to order one RSV each for all machines with Siemens equipment.
- The individual contract is for machine manufacturers who order an RSV only for certain machines equipped by Siemens.

Service exclusions

The contract service is excluded in all cases of Point VIII./7 Article deficiencies of the "General conditions of supply and delivery for the electrical industry" [4]. In the case of parts subject to wear (e.g. motor bearings and fans or cables), replacement will be provided free-of-charge within 12 months following commencement of the RSV in the case of proper use, and independent of the actual RSV duration.

Export license

Fulfillment of the service call may be subject to authorization due to the purpose of use or due to the type of spare parts, equipment and documentation required. The service call is therefore subject to the granting of the necessary export licenses and absence of any other obstacles due to German or other applicable export regulations.

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1) Since the export of standard versions (components/systems) is subject to time-intensive approval procedures by authorities, and since this also applies to the delivery of components subject to approval in the context of services and spare part deliveries, it is recommendable to **primarily use the export versions**. This applies in particular in cases where the control can be exported without official approval after the machine manufacturer has installed it in a machine tool. Please also observe the paragraph "**Export information**" in Section "CNC controls".

2) For selected motors, we centrally stock components for fast delivery within Germany and the U.S.A. These motors can be manufactured and delivered within a few working days. You can obtain the current list from your Siemens partner.

3) The delivery times known to you generally apply.

4) Examples of service exclusions:
   - Non-observance of the "Siemens configuring and application guidelines"
   - Contamination critical to function (e.g. oil, conducting materials, rust)
   - Mechanical damage
   - External electrical effects
   - Intentional damage

■ Overview (continued)

Response time

The following response times apply to RSV implementation in the case of a machine standstill.

Country groups	
LG 1	Next working day
LG 2	Within two working days
LG 3	Depending on country-specific circumstances
LG 4	Depending on country-specific circumstances, only for customers with master contract for the price of the single contract

We define the response time as the time from reception of your clarified order up till our service engineer begins the journey to the site stated in the order, or until commencement of troubleshooting using Teleservice. The listed response times apply to "Technically clarified fault messages" within the usual working hours of the region (e.g. Monday to Friday 8 a.m. to 5 p.m.), excluding public holidays.

Country list

The repair service is offered for the following countries:

Continent	Country/region
Country group 1	
America	Brazil, Canada, Mexico, USA
Asia	China, India, Japan, Singapore, South Korea, Taiwan, Thailand
Australia	Australia
Europe	Belgium, Denmark, Germany, Finland, France, Great Britain, Italy, Liechtenstein, Luxemburg, Holland, Austria, Portugal, Sweden, Switzerland, Spain, Czech Republic, Turkey
Country group 2	
America	Argentina
Asia	Indonesia, Malaysia
Australia	New Zealand
Europe	Andorra, Estonia, Ireland, Latvia, Lithuania, Norway, Poland, Slovak Republic, Slovenia, Hungary
Country group 3	
Africa	Egypt, South Africa
Asia	Iran, Israel, Pakistan, Philippines, Saudi Arabia, Vietnam
Europe	Bulgaria, Greece, Croatia, Rumania, Russia, Ukraine, Belarus
Country group 4	
	Remaining countries

OEM service levels

To guarantee repair service for OEM applications, an assessment is necessary on the basis of the OEM service guideline. The assessment grades the OEM service application from 0 to 4. A supplement is charged for OEM service grades 1 to 4.

■ Selection and ordering data

Designation	Order No.
Repair service contract (RSV) for Siemens A&D components on machine tools for countries in groups 1 to 3	
• 1 year contract [1]	**6FC8 506-1■X0■-0AA0**
• 2 year contract [2]	**6FC8 506-2■X0■-0AA0**
• Master contract	R
• Individual contract	E
• 0 to 4 measurement circuits	1
• 5 to 6 measurement circuits	2
• 7 to 8 measurement circuits	3
• ≥ 9 measurement circuits (basic RSV for ≥ 9 measurement circuits)	8
• > 9 measurement circuits (measurement circuit supplement for RSV > 9 measurement circuits [3])	0
Repair service contract Contract extension of 6 or 12 months for Siemens A&D components on machine tools for countries in groups 1 to 3	
• Basic RSV for 1 year	**6FC8 506-0■X0■-■AA1**
• Basic RSV for 2 years	**6FC8 506-0■X0■-■AA2**
• Master contract	R
• Individual contract	E
• 0 to 4 measurement circuits	1
• 5 to 6 measurement circuits	2
• 7 to 8 measurement circuits	3
• ≥ 9 measurement circuits (basic RSV for ≥ 9 measurement circuits)	8
• > 9 measurement circuits (measurement circuit supplement for RSV > 9 measurement circuits [3])	0
Contract extension (possible once per RSV)	
• By 6 months	6
• By 1 year	1
OEM service levels Supplement for repair service contract for Siemens components on machine tools with OEM applications. Measurement circuits 1 to n for countries of groups 1 to 4	
• Supplement for OEM service level 1	**6FC8 506-3SX01-0AA0**
• Supplement for OEM service level 2	**6FC8 506-3SX02-0AA0**
• Supplement for OEM service level 3	**6FC8 506-3SX03-0AA0**
• Supplement for OEM service level 4	**6FC8 506-3SX04-0AA0**
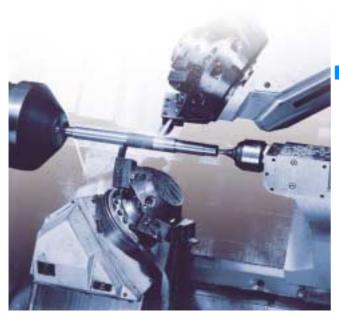
1) Max. 24 months from the transfer of risk (delivery of components).
2) Max. 36 months from the transfer of risk (delivery of components).
3) Example for 17 measurement circuits: (basic RSV for ≥ 9 measurement circuits) plus 8-times (measurement circuit supplement for RSV > 9 measurement circuits).

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Appendix

Retrofit

Overview

What do we mean by retrofit?

Retrofit is another word for machine modernization, for many users the solution when it comes to breathing new life into machinery and equipment.

The state of the mechanical components of older machines is usually good to very good, but the controllers and electrical components are worn and obsolete, so failures and spare part problems can occur more frequently.

Benefits

With modernization, the user can reap the following essential benefits, depending on the equipment and the level of retrofitting:

- Low-cost alternative to a completely new investment
- Productivity boost through increased plant availability
- Enhanced ease of use in operation and programming
- Quality improvement in machining
- Secure spare parts supply over a long period
- Secure and reliable data management

Depending on the performance range, a level of machine functionality is achieved that corresponds to the state-of-the-art, even with regard to safety and monitoring in accordance with existing guidelines and standards.

Application

The old systems are replaced by controllers and/or drives of the latest generation in accordance with the task, starting with machine tools and production machinery, and right up to presses and punching machinery. If mechanical updates are required, these are offered as part of the overall package.

More Information

The retrofit overview "Machine Modernization" provides a comprehensive description of services. It gives a clear and detailed summary of all performance features and provides help in decision-making.

The extensive reference list, arranged alphabetically according to machine manufacturer, also provides an outstanding overview of all converted machine types.

Additional information is available in the Internet under:

http://www.siemens.com/automation/partner
http://www.siemens.com/automation/service&support

In the Federal Republic of Germany, our service can be reached at all times under **0180 5050 444**.

■ **Selection and ordering data**

Designation	Order No.
User documentation	
Turning **SINUMERIK 802S/802C** **Operation/Programming**	
• German	6FC5 598-3AA00-0AP2
• English	6FC5 598-3AA00-0BP2
Turning **SINUMERIK 802D** **Short Guide**	
• German	6FC5 298-1AA30-0AP0
• English	6FC5 298-1AA30-0BP0
Turning **SINUMERIK 802D** **Operation/Programming**	
• German	6FC5 698-2AA00-0AP3
• English	6FC5 698-2AA00-0BP3
Milling **SINUMERIK 802S/802C** **Operation/Programming**	
• German	6FC5 598-3AA10-0AP2
• English	6FC5 598-3AA10-0BP2
Milling **SINUMERIK 802D** **Short Guide**	
• German	6FC5 298-1AA40-0AP0
• English	6FC5 298-1AA40-0BP0
Milling **SINUMERIK 802D** **Operation/Programming**	
• German	6FC5 698-2AA10-0AP3
• English	6FC5 698-2AA10-0BP3
Diagnostics Guide **SINUMERIK 802S/802C**	
• German	6FC5 598-3AA20-0AP2
• English	6FC5 598-3AA20-0BP2
Diagnostics Guide **SINUMERIK 802D**	
• German	6FC5 698-2AA20-0AP1
• English	6FC5 698-2AA20-0BP1
Manufacturer Documentation	
Installation & Start-Up Guide **SINUMERIK 802S**	
• German	6FC5 597-3AA00-0AP2
• English	6FC5 597-3AA00-0BP2
Installation & Start-Up Guide **SINUMERIK 802C**	
• German	6FC5 597-3AA20-0AP2
• English	6FC5 597-3AA20-0BP2
Installation & Start-Up Guide **SINUMERIK 802D**	
• German	6FC5 697-2AA00-0AP3
• English	6FC5 697-2AA00-0BP3
Description of Functions **SINUMERIK 802S/802C**	
• German	6FC5 597-3AA10-0AP2
• English	6FC5 597-3AA10-0BP2
Description of Functions **SINUMERIK 802D**	
• German	6FC5 697-2AA10-0AP2
• English	6FC5 697-2AA10-0BP2

■ **Selection and ordering data**

Designation	Order No.
User and manufacturer documentation	
Operation/Programming **Turning** **SINUMERIK 802S base line/** **802C base line**	
• German	6FC5 598-4AA01-0AP2
• English	6FC5 598-4AA01-0BP2
Installation & Start-Up Guide **SINUMERIK 802S base line**	
• German	6FC5 597-4AA01-0AP0
• English	6FC5 597-4AA01-0BP0
Operation/Programming **Milling** **SINUMERIK 802S base line/** **802C base line**	
• German	6FC5 598-4AA11-0AP0
• English	6FC5 598-4AA11-0BP0
Installation & Start-Up Guide **SINUMERIK 802C base line**	
• German	6FC5 597-4AA21-0AP0
• English	6FC5 597-4AA21-0BP0
Diagnostics Guide **SINUMERIK 802S base line/** **802C base line**	
• German	6FC5 598-4AA21-0AP0
• English	6FC5 598-4AA21-0BP0
Description of Functions **SINUMERIK 802S base line/** **802C base line**	
• German	6FC5 597-4AA11-0AP0
• English	6FC5 597-4AA11-0BP0
Short Guide **SINUMERIK 802S base line/** **802C base line**	
• German	6FC5 597-4AA31-0AP0
• English	6FC5 597-4AA31-0BP0
SIMODRIVE base line **Installation & Start-Up Guide**	
• German	6SN1 197-0AB21-0AP0
• English	6SN1 197-0AB21-0BP0

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Appendix
Indexes

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Appendix

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The information provided in this catalog contains descriptions or characteristics of performance which in case of actual use do not always apply as described or which may change as a result of further development of the products. An obligation to provide the respective characteristics shall only exist if expressly agreed in the terms of contract. Availability and technical specifications are subject to change without notice.

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