

Operator's Guide 03/2002 Edition

sinumerik

SINUMERIK 840D/840Di/810D  
CAD-Reader

**SIEMENS**



# SIEMENS

## SINUMERIK 840D/840Di/810D CAD Reader

### Operator's Guide

#### Valid for

<i>Control System</i>	<i>Software Version</i>
SINUMERIK 840D	6
SINUMERIK 840DE (export version)	6
SINUMERIK 840D (powerline)	6
SINUMERIK 840DE (powerline export version)	6
SINUMERIK 840Di	2
SINUMERIK 840DiE (export version)	2
SINUMERIK 810D	3
SINUMERIK 810DE (export version)	3
SINUMERIK 810D (powerline)	6
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03.02 Edition

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# SINUMERIK® Documentation

## Printing history

Brief details of this edition and previous editions are listed below.

The status of each edition is shown by the code in the "Remarks" column.

*Status code in the "Remarks" column:*

**A ....** New documentation.

**B ....** Unrevised edition with new Order No.

**C ....** Revised edition with new status.

If factual changes have been made on the page since the last edition, this is indicated by a new edition coding in the header on that page.

<b>Edition</b>	<b>Order No.</b>	<b>Comment</b>
03.02	Included only in the online help	A

This manual is included in the documentation available on CD ROM (**DOCONCD**)

<b>Edition</b>	<b>Order No.</b>	<b>Comment</b>
09.02	6FC5 298-6CA00-0BG3	C

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Other functions not described in this documentation might be executable in the control. This does not, however, represent an obligation to supply such functions with a new control or when servicing.

We have checked that the contents of this document correspond to the hardware and software described. Nonetheless, differences might exist and we cannot therefore guarantee that they are completely identical. The information given in this publication is reviewed at regular intervals and any corrections that might be necessary are made in subsequent editions. We welcome suggestions for improvement.

Subject to change without prior notice.

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## Notes

## Preface

### Organization of documentation

SINUMERIK documentation is organized on 2 separate levels:

- General Documentation
- User documentation

### Target group

This Manual is intended for machine-tool users. This publication provides detailed information that the user needs to operate this application for the SINUMERIK 840D/840Di/810D controls.

### Hotline

If you have any queries, please contact the Hotline given below:

A&D Technical Support Tel.: ++49-180-5050-222

Fax: ++49-180-5050-223

If you have any questions about the documentation (suggestions, corrections), please send a fax to the following fax address or email:

A&D Technical Support Tel.: ++49-9131-98-2176

Email: [motioncontrol.docu@erlf.siemens.de](mailto:motioncontrol.docu@erlf.siemens.de)

Fax form: See Suggestions/Corrections Sheet at the back of the document.

### Internet address

<http://www.ad.siemens.de/sinumerik>

### Objectives

This Operator's Guide describes the CAD Reader PC application and how to use it. The CAD Reader enables you to convert drawings constructed with a CAD system for further processing on a SINUMERIK control. The format of the imported file is DXF (**D**rawing **eX**change **F**ormat) from which contours or drill points are filtered out.

### Note

The CAD Reader can be used for systems with the following software versions:

Controls	SINUMERIK 840D/840Di/810D	All versions
Target systems	HMI Advanced or HMI Embedded	SW 5.1 and higher
	ShopMill and ManualTurn	SW 5.3 and higher
	ShopTurn	SW 6.2 and higher

Please note the supplementary conditions regarding the number of cycles.

**Search tools**

A table of contents and keyword index are provided to help you access information quickly.

**SINUMERIK 840D  
powerline**

Improved performance versions

- SINUMERIK 840D powerline and
  - SINUMERIK 840DE powerline
- are available from 09.2001 onwards.

For a list of available **powerline** modules, please refer to the Hardware Description:

**References:** /PHD/ Configuring Manual SINUMERIK 840D

**SINUMERIK 810D  
powerline**

Improved performance versions

- SINUMERIK 810D powerline and
  - SINUMERIK 810DE powerline
- are available from 03.2002 onwards.

For a list of available **powerline** modules, please refer to the Hardware Description:

**References:** /PHC/ Configuring Manual SINUMERIK 810D

**Standard scope**

This Operator's Guide describes the functionality afforded by standard functions. Differences and additions implemented by the machine-tool manufacturer are documented by the machine-tool manufacturer.

Please consult your local Siemens office for more detailed information about other SINUMERIK 840D, 840Di and 810D as well as the publications that apply to all SINUMERIK controls (e.g. Universal Interface, Measuring Cycles ...).

Other functions not described in this documentation might be executable in the control. This does not, however, represent an obligation to supply such functions with a new control or when servicing.

**Applicability**

Catalog NC 60 is the definitive document as regards the validity of functions

/BU/ Ordering Information, Catalog NC 60.



## Structure of descriptions

All functions and operating options have been described according to the same internal structure as far as this is meaningful and practicable. The various levels of information have been structured so that you can find the information you are looking for quickly.



### 1. Function

This theoretical section is primarily intended as learning material for the NC beginner. It provides important information that will help you to understand the principle of operating functions.

You should work through the manual at least once to get an idea of the scope of the functions and capability of your SINUMERIK control.



### 2. Operating sequence

This section provides a clear diagrammatic description of the sequence of key inputs required. If inputs have to be made at individual stages of the sequence or if you require additional information, you will find this next to the key illustrations.



### 3. Further notes

For safety reasons, some of the functions are protected from access by unauthorized persons. The machine-tool manufacturer can influence or modify the described functions. Please follow the instructions of the machine-tool manufacturer.

A vertical bar on the left side of the page contains a series of icons. From top to bottom, the icons are: a grey bar, a 3D cube, a sequence of arrows, a hand pointing, a hand pointing, a warning triangle, a lowercase 'i', an L-shaped corner, an equals sign followed by a question mark, a speech bubble, and a document with a star.

## Explanation of symbols

## Function

## Operating sequence

## Further notes

Cross-references to other documentation or sections

Danger notes

Additional notes or background information

Ordering data option

Explanation

Description of syntax

Programming examples



**Notes**

The following special notes have been used in this documentation:

This symbol appears in this documentation whenever it is necessary to draw your attention to an important item of information.



In this documentation, you will find this symbol with a reference to an ordering option. The function described is executable only if the control contains the designated option.



**Warnings**

The following warning notes with varying degrees of severity are used in the documentation:



**Danger**

Indicates an imminently hazardous situation which, if not avoided, **will** result in death or serious injury or in substantial property damage.



**Warning**

Indicates a potentially hazardous situation which, if not avoided, **could** result in death or serious injury or in substantial property damage.



**Caution**

Used with the safety alert symbol indicates a potentially hazardous situation which, if not avoided, **may** result in minor or moderate injury or in property damage.

**Caution**

Used without safety alert symbol indicates a potentially hazardous situation which, if not avoided, **may** result in property damage.

**Notice**

Used without the safety alert symbol indicates a potential situation which, if not avoided, **may** result in an undesirable result or state.



**References**

This symbol appears whenever specific information can be found in other literature.

A complete list of available literature is included in the Appendix of this Operator's Guide.

**Principle**

Your SIEMENS 840D/840Di/810D has been designed and constructed according to state-of-the-art technology and approved safety regulations and standards.

**Additional equipment**

The applications of SIEMENS controls can be expanded by adding special additional devices, equipment and expansions supplied by SIEMENS.

**Personnel**

Only **appropriately trained, authorized and reliable personnel** may be allowed to operate this equipment. No-one without the necessary training must be allowed to operate the control, even temporarily.

The corresponding **responsibilities** of personnel who set up, operate and maintain the equipment must be clearly **defined** and adherence to these responsibilities **monitored**.

**Procedure**

**Before** the control is started up, the personnel who will work on the control system must become thoroughly acquainted with the Operator's Guide. It is also the **duty** of the equipment operator **to constantly monitor** the overall technical condition of the control (outwardly apparent defects or damage as well as changes in operating performance).

## Service



Repairs must be carried out by personnel who are **specially trained and qualified** in the relevant technical subject according to the information supplied in the service and maintenance guide. All relevant safety regulations must be followed.

The following is deemed to be **improper usage** and **exempts the manufacturer from any liability**:

**Any** application which does not comply with the rules for proper usage described above.

If the control is **not in technically perfect condition**, or is operated without due regard for safety regulations and accident prevention instructions given in the Instruction Manual.

If faults that might affect the safety of the equipment are not rectified **before** the control is started up.

Any **modification, bypassing or disabling** of items of equipment on the control that are required to ensure fault-free operation, unlimited use and active and passive safety.

Improper usage gives rise to **unforeseen dangers** to:

- Life and limb of personnel,
- The control, machine or other assets of the owner and the user



## Notes

## Introduction

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## 1.1 The CAD Reader product

### Description

The CAD Reader program converts files of CAD drawings into contours or drill patterns for SINUMERIK 840D/840Di/810D.

### Functions

The following functions can be converted by the CAD Reader:

- Import DXF files
- Hide graphics layers
- Automatic contour trace
- Optional workpiece zero per contour/drill point
- Several contours/drill points can be selected simultaneously
- Create and convert contours or drill patterns for ShopMill, ShopTurn, ManualTurn, HMI Advanced or HMI Embedded
- Display existing contours/drill points in geometry processor/cycles support.

## 1.2 General function



### General function

The CAD Reader enables you to convert drawings constructed with a CAD system for further processing on a SINUMERIK control. The format of the imported file is DXF (**D**rawing **eX**change **F**ormat) from which contours or drill points are filtered out. Any information that is not needed for further processing (such as dimensions, hatching, labels, borders) can be removed.

Existing contours or drill patterns are converted such that they can be interpreted by the geometry processor or the cycles support.



### 1.2.1 Scope of application



#### Scope of application

The CAD Reader is suitable for the following HMI target systems:

- HMI Advanced or HMI Embedded (Standard) SW 5.1 and higher
- ShopMill SW 5.3 and higher
- ShopTurn SW 6.2 and higher
- ManualTurn SW 5.3 and higher

DXF files converted by the CAD Reader program can be processed by NC controls with G code programming such as SINUMERIK 840D/840Di/810D.

#### Notes

- The HMI Advanced or HMI Embedded (standard) target system, ShopMill, ShopTurn or ManualTurn must be defined before the contour is traced.
- When ShopMill or ShopTurn is defined as the target system, you are prompted to enter a contour name before the contour is traced.
- Please observe the boundary conditions applicable to the relevant target system. This applies in particular to the number of contour elements as regards the geometry processor or cycles.

Further information about suitable HMI target systems:

/BAD/, HMI Advanced Operator's Guide

/BEM/, HMI Embedded Operator's Guide

/BAS/, ShopMill Operator's Guide

/BAT/, ShopTurn Operator's Guide

/BAM/, ManualTurn Operator's Guide

### 1.2.2 Software



#### Software

The software is compatible with operating systems Microsoft Windows 95, Windows 98, Windows Me, Windows NT 4.0 and Microsoft Windows 2000.

### 1.2.3 Formats

#### Input format

Basic input format: **DXF** (**D**rawing **eX**change **F**ormat)

DXF input formats as defined by AUTOCAD® are supported.

#### Output formats

After conversion, NC programs can be saved as file types

- MPF
- SPF
- ARC.

When a file is saved, the CAD Reader creates G code (NC blocks) from the selected contour. This code can be processed directly with the SINUMERIK.

Comment blocks which can be processed by the geometry processor or the cycles support are saved at the same time.

Imported contours can be recompiled or modified by means of the geometry processor.

Drill holes are generally generated in cycles format and can thus be recompiled on the control.

### 1.2.4 Plane generation

#### Generation of relevant data

When the relevant data are saved as part program blocks, they are converted to MPF format by the geometry processor and the appropriate planes G17, G18, G19 are generated.

#### Notes

- Technology data are not specified in the CAD Reader, but must generally be programmed in the editor or the geometry processor.
- NC milling programs are created only in the 2D machining plane. The infeed axis must be programmed later.



## How to Use the CAD Reader

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## 2.2 Define the zero point



Element Center  
Element Start  
Element End  
Free Input  
Mouse Position

### Set the zero point

To output the contour as an NC program, you must specify a zero point in the drawing since, in most cases, this will deviate from the zero point of the DXF file.

You have the following options for defining the zero point:

- Automatically at element center
- Automatically at element start
- Automatically at element end
- Direct input of coordinates
- Any position selected



e.g. X100, Y100  
with the mouse

## 2.3 Contour trace



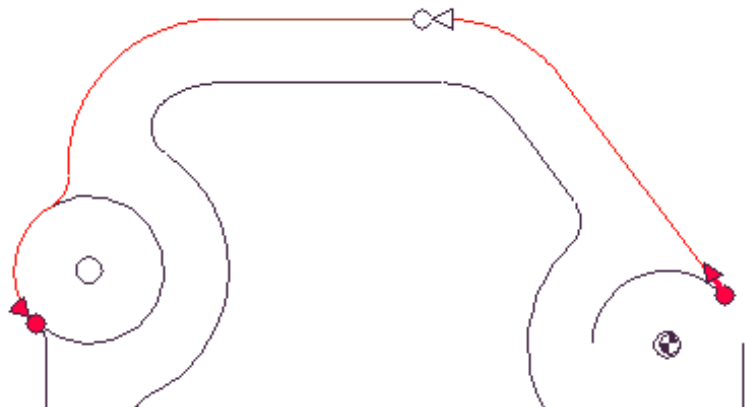
**Set the contour start point**  
Element Center  
Element Start/End Point  
Mouse Position

### Contour trace with start and end points

The start and end points of the contour to be created are selected as a function of the initial position of the applied technology:

- Automatically at element center
- Automatically at element start/end point
- Directly selected with the mouse

### Example





#### Set the contour end point

Element Center  
Element End Point  
Mouse Position  
Current Position

1. The contour direction is determined by the defined start point ●→ and the remaining contour selection. When the contour is traced, an attempt is made to automatically select as much of the contour as possible.
2. Selection in the event of conflict  
If the automatic contour trace function cannot determine a following element clearly, interactive mode is activated. You will be prompted to identify the next element in the contour.
3. Full circle as contour  
The contour trace can integrate a full circle in both directions.
4. Set the end point  
You can set and save the end point at any contour trace element of your choice.

#### Further notes

- Full circles can be saved as a contour or as drill points.
- You can cancel the contour trace either via the keyboard with the "Esc" key or via the right mouse button.

#### Set the contour label

Before the contour is traced, you can set labels by entering start and end labels.

The CAD Reader switches to interactive mode if you specify a label which has already been assigned, i.e.

- when the trace is performed on contours that are already selected
- when the contour is attached to files which already contain the label.



## 2.4 Drill points



Any Position  
Row of Holes  
Hole Circle  
Hole Matrix



### Set drill points

1. Full circle as drill hole

You can select a full circle with the Drill Points function. The G code generated is output in the cycle format.

### Drill points start

2. You can select the drill pattern to parameterize drill points as

- any drill positions
- according to cycle
- according to cycle
- according to cycle.

For further information about drill cycles and drill patterns, please see: /PGZ/, Programming Guide Cycles, Chapter 2

### Drill points end

3. This button accepts drill points selected from the drill pattern.

## 2.5 Manipulate graphic display



### Select the processing area:

If the file contains a large number of supplementary drawings such as cuts, hatching, labeling, detail views, borders, etc., you can reduce the number of elements by using a "lasso" to select a processing area.



### Deselect the processing area:

You can click this button to deselect the processing area again.

**Zoom / keys "+" and "-"**

You can use the mouse button to select a zoom area within a drawing. By clicking the button and using a "lasso" or the "+" and "-" keys, you can increment or decrement the magnification of the zoomed area. You can move the zoomed area with the cursor keys.

**2.6 Process an imported file****Redraw / space bar**

Redisplays the current drawing in optimized form according to the layer selection.

**Geometry**

When you click this button, the coordinates for the selected element as defined by the current zero point are displayed. If the display box includes an Edit button, you can select it to edit the element.

**Note**

This function is useful for making minor changes to the geometry designed to remedy shortcomings (particularly missing intersections) in the CAD drawing.

Use the geometry processor to make bigger changes.

You **cannot undo** changes once they have been made.

**Layer selection:**

A selected DXF file is always displayed initially with all its layers. If the file contains several layers, these are all displayed in the basic view. It is possible, however, to hide layers which do not contain any data relevant to the contour. It is also possible to select contours that are defined over several layers in a selection box for the contour trace. Layer selections cannot be undone.





### Turn contour

This button rotates the drawing by 90 degrees each time about the defined zero point according to the default settings. Existing contours are not rotated at the same time.



### Show hatching and dimensions

This button shows or hides hatching and dimensions in CAD drawings. The function is reset again when you click the button again.



### Delete contour trace

You can select and completely delete contours that are already defined. The "Delete contour" function is activated when you select this button once and deactivated when you click it again. Delete finished contours:

- Click button: Activate "Delete contour"
- Select contour: Contour is deleted



### Delete geometry element

You can use this function to delete individual geometry elements. It is activated when you click the button once and deactivated when you click it again. Delete geometry element:

- Click button: Activate "Delete geometry element"
- Select element: Geometry element is deleted



### Delete geometry area

A whole area selected by a rectangle drawn with the mouse (defining the area to be deleted) can be deleted from the geometry when you click this button. Every time you delete an area, the function is automatically deactivated and must be re-activated explicitly via this button.

- Select button: Activate "Delete geometry area"
- Select area: Geometry area is deleted

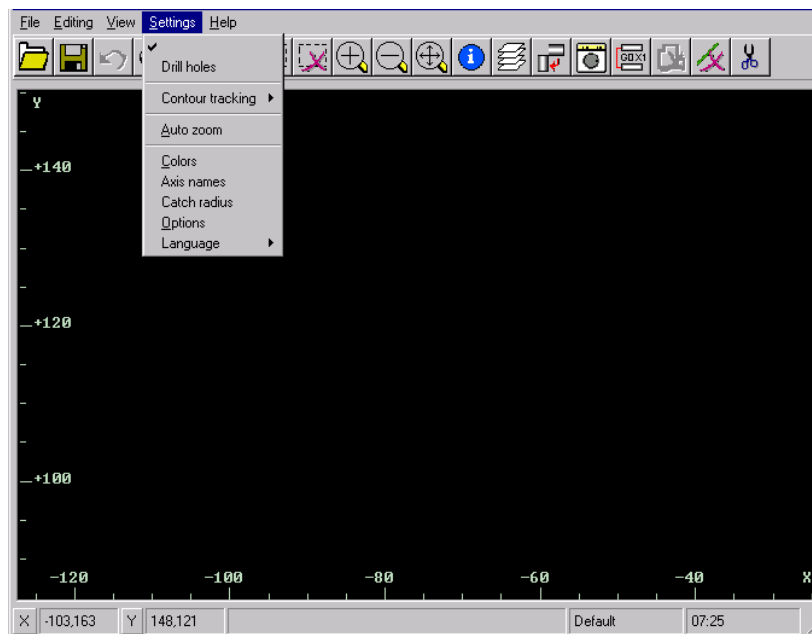
**Notes**

**Additional Settings**



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### 3.1 Additional settings and displays



#### Edit

The global "Edit" menu contains alternative commands to the toolbar such as Set Contour Points/Drill Points, Select Layers, Rotate Contour or Set Zero Point.

#### View → Status Line

You can show the status line by selecting "View → View Status Line". The coordinates of the axis names (X, Y) and the target system (standard) are displayed in the status line.

#### Settings

##### Select contour trace or drill point

Choose whether to accept contours or select drill points.

##### Contour trace → element or intersection

This function applies to the contour trace and undo.

Element: All intersections in the current element are included and displayed.

Intersection: Only the next intersection in each case is displayed.

##### Auto Zoom

When selection options are chosen for the contour trace, the elements included in the selection are automatically zoomed in each case.

### Colors

You can set the number and names of the settable colors for individual contour elements in the Colors menu.

The system defaults become effective again when you select "Default".

### Axis names

Axis names are specified with the relevant plane in the contour display, e.g.:

- Axis names: 1st axis X, 2nd axis Y, 3rd axis Z
- Interpolation parameters: 1st axis I, 2nd axis J, 3rd axis K

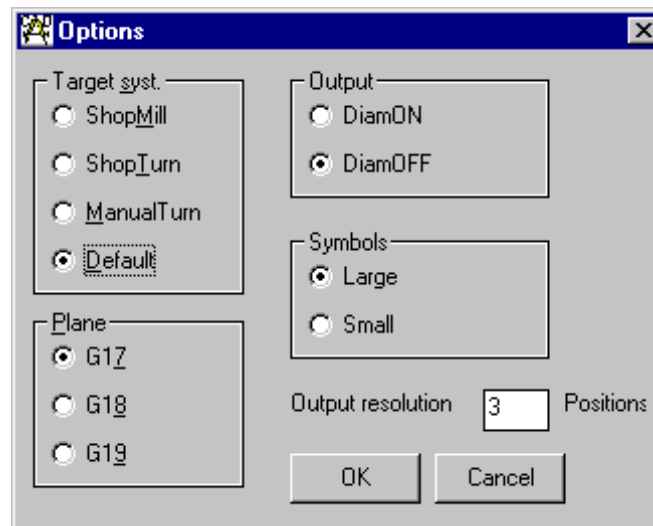
### Capture radius

Here you can set the capture radius in millimeters within which the elements are interpreted as being "associated". This enables you to acquire and process imprecisely defined drawings.

A large capture radius increases the number of possible following elements.

### Options

Input screenform for selecting target systems or displayed plane as well as settings for display and representation.



**Language**

You can select the following standard languages for the dialogs of the complete CAD Reader application:

- German
- English
- French
- Italian
- Spanish.

To activate the new language, you must restart the CAD Reader.

**Help**

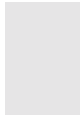
This document, including the application example, are provided as a help.

**Miscellaneous**

You can move the toolbar to any position using the mouse.



## Example of Application



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## 4.1 Example of application for a contour trace



### Start the CAD Reader

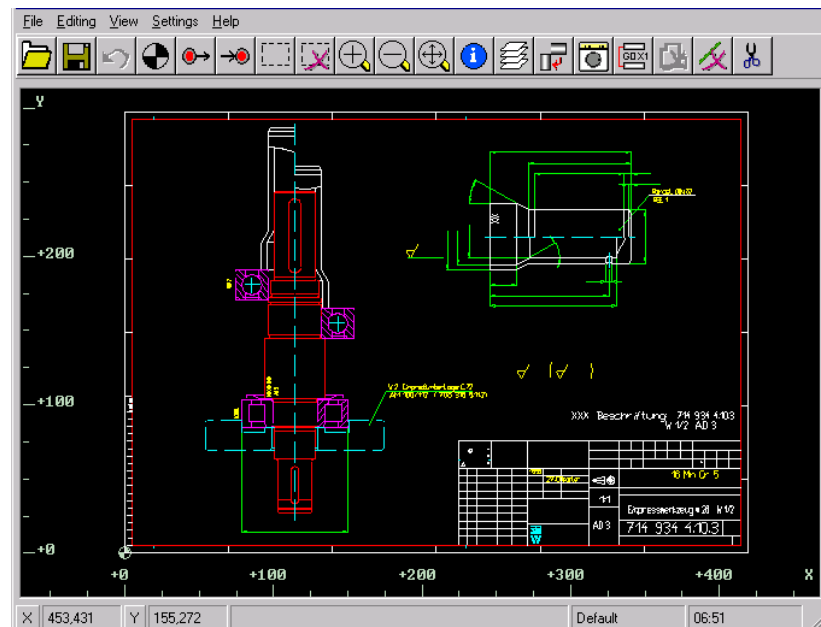
You can start the CAD Reader program by double clicking this button.



### Open the DXF file

Click the **Open** button to select a CAD drawing. The following screen appears, e.g. on the PC

DXF file



CAD drawing of a shaft



### Layer selection

The DXF file contains several layers which are all displayed via the Layer Selection screen. "Deselect All" deselects the existing

- layer "1" and
- layer "0".

Select layer "1" and confirm with "OK".



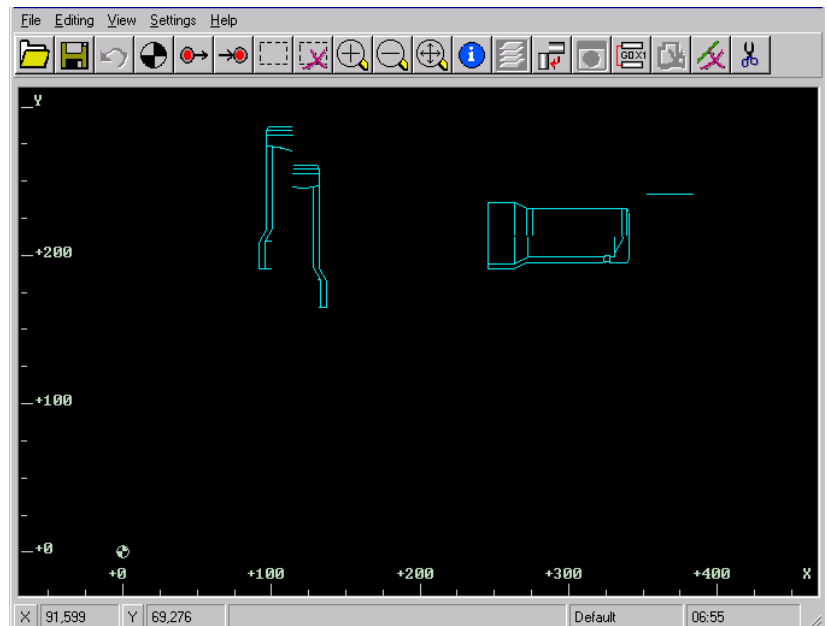
### Redraw

With **Redraw** you size the selected sub-area of the drawing to match the window and display it again in optimized form.



## 4.1 Example of application for a contour trace

Layer selection view



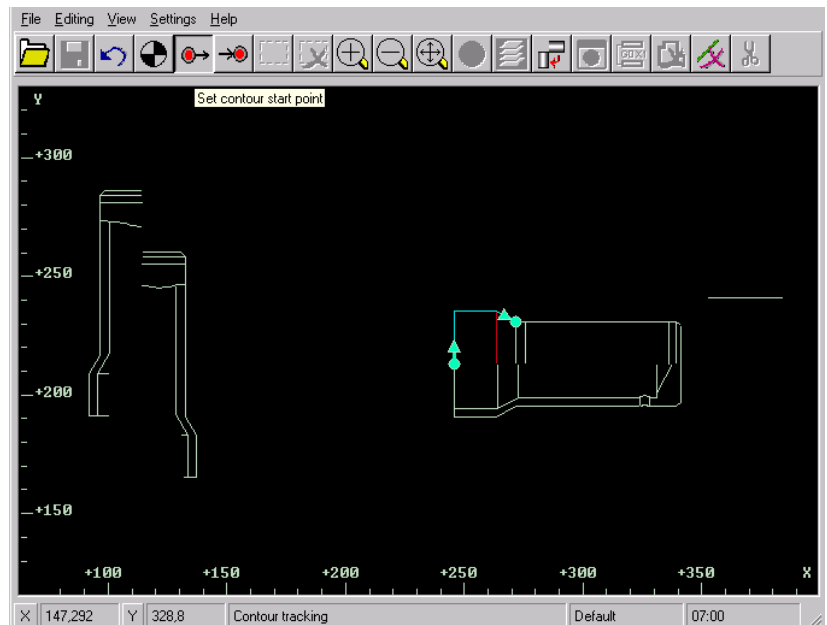
CAD Reader for layer "1" in optimized display form.

**Contour trace with start and end points**

Click this button to start the contour trace and select "Element center" in the selection menu which then appears.

Move the mouse to the desired start element and select the direction with the mouse (always click the small triangle). Move the arrow with the mouse in the right direction and select the next corner point.

Element center



Select the element center and contour trace in direction of arrow.

## 4.1 Example of application for a contour trace



### Back

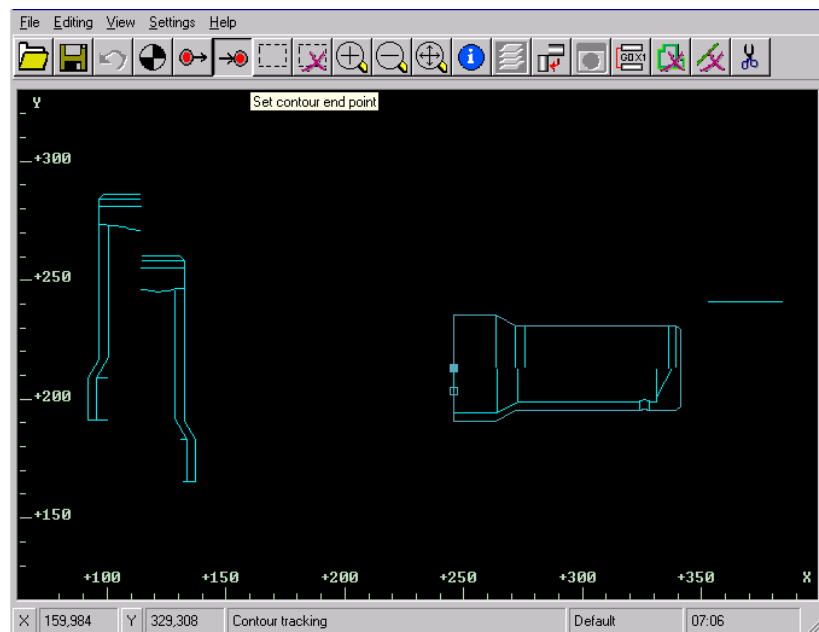
The contour is automatically undone as far as possible to the last valid position. If the wrong element has been selected in the contour trace, it is possible to undo the last action either element by element or to the last intersection depending on your selection.



### Set and select the end point

The end point is activated when you click the "Set contour end point button". You select the end point in selection menu "Element end point" and position it as required in the element using the mouse. The end point is represented by a full square as shown in the following screenshot.

Element end point



Select and position element end point.



### Save the program

Save the program as an MPF file. When a program is saved, G code is generated from the selected contour.

## Appendix

### A References

#### General Documentation

**/BU/** SINUMERIK 840D/840Di/810D/802S, C, D  
Ordering Information  
Catalog NC 60  
Order No.: E86060-K4460-A101-A8-7600

**/ST7/** **SIMATIC**  
SIMATIC S7 Programmable Logic Controllers  
Catalog ST 70  
Order No.: E86060-K4670-A111-A3-7600

**/ZI/** SINUMERIK, SIROTEC, SIMODRIVE  
Accessories and Equipment for Special-Purpose Machines  
Catalog NC Z  
Order No.: E86060-K4490-A001-A7-7600

#### Electronic Documentation

**/CD1/** The SINUMERIK System  
DOC ON CD (09.02 Edition)  
(with all SINUMERIK 840D/840Di/810D and  
SIMODRIVE publications)  
Order No.: 6FC5 298-6CA00-0BG3

**User Documentation**

<b>/AUK/</b>	SINUMERIK 840D/810D <b>Short Guide AutoTurn Operation</b> Order No.: 6FC5 298-4AA30-0BP3	(08.02 Edition)
<b>/AUP/</b>	SINUMERIK 840D/810D <b>AutoTurn Graphic Programming System</b> Operator's Guide Programming/Setup Order No.: 6FC5 298-4AA40-0BP3	(02.02 Edition)
<b>/BA/</b>	SINUMERIK 840D/810D <b>Operator's Guide MMC</b> Order No.: 6FC5 298-6AA00-0BP0	(10.00 Edition)
<b>/BAD/</b>	SINUMERIK 840D/840Di/810D <b>Operator's Guide: HMI Advanced</b> Order No.: 6FC5 298-6AF00-0BP2	(08.02 Edition)
<b>/BEM/</b>	SINUMERIK 840D/810D <b>Operator's Guide HMI Embedded</b> Order No.: 6FC5 298-6AC00-0BP2	(08.02 Edition)
<b>/BAH/</b>	SINUMERIK 840D/840Di/810D <b>Operator's Guide HT 6 (HPU new)</b> Order No.: 6FC5 298-0AD60-0BP2	(03.02 Edition)
<b>/BAK/</b>	SINUMERIK 840D/840Di/810D <b>Short Operating Guide</b> Order No.: 6FC5 298-6AA10-0BP0	(02.01 Edition)
<b>/BAM/</b>	SINUMERIK 810D/840D <b>Operator's Guide ManualTurn</b> Order No.: 6FC5 298-5AD00-0BP0	(08.00 Edition)
<b>/BAS/</b>	SINUMERIK 840D/810D <b>Operator's Guide ShopMill</b> Order No.: 6FC5 298-6AD10-0BP1	(08.02 Edition)
<b>/BAT/</b>	SINUMERIK 840D/810D <b>Operator's Guide ShopTurn</b> Order No.: 6FC5 298-6AD50-0BP2	(08.02 Edition)

<b>/BAP/</b>	SINUMERIK 840D/840Di/810D <b>Operator's Guide Handheld Programming Unit</b> Order No.: 6FC5 298-5AD20-0BP1	(04.00 Edition)
<b>/BNM/</b>	SINUMERIK 840D/840Di/810D <b>User's Guide Measuring Cycles</b> Order No.: 6FC5 298-6AA70-0BP2	(08.02 Edition)
<b>/CAD/</b>	SINUMERIK 840D/840Di/810D <b>Operator's Guide CAD Reader</b> Order No.: (included in the online help)	(03.02 Edition)
<b>/DA/</b>	SINUMERIK 840D/840Di/810D <b>Diagnostics Guide</b> Order No.: 6FC5 298-6AA20-0BP2	(02.02 Edition)
<b>/KAM/</b>	SINUMERIK 840D/810D <b>Short Guide ManualTurn</b> Order No.: 6FC5 298-5AD40-0BP0	(04.01 Edition)
<b>/KAS/</b>	SINUMERIK 840D/810D <b>Short Guide ShopMill</b> Order No.: 6FC5 298-5AD30-0BP0	(04.01 Edition)
<b>/KAT/</b>	SINUMERIK 840D/810D <b>Short Guide ShopTurn</b> Order No.: 6FC5 298-6AF20-0BP0	(07.01 Edition)
<b>/PG/</b>	SINUMERIK 840D/840Di/810D <b>Programming Guide Fundamentals</b> Order No.: 6FC5 298-6AB00-0BP2	(08.02 Edition)
<b>/PGA/</b>	SINUMERIK 840D/840Di/810D <b>Programming Guide Advanced</b> Order No.: 6FC5 298-6AB10-0BP2	(08.02 Edition)
<b>/PGK/</b>	SINUMERIK 840D/840Di/810D <b>Short Guide Programming</b> Order No.: 6FC5 298-6AB30-0BP1	(02.01 Edition)
<b>/PGM/</b>	SINUMERIK 840D/840Di/810D <b>Programming Guide ISO Milling</b> Order No.: 6FC5 298-6AC20-0BP2	(08.02 Edition)

<b>/PGT/</b>	SINUMERIK 840D/840Di/810D <b>Programming Guide ISO Turning</b> Order No.: 6FC5 298-6AC10-0BP2	(08.02 Edition)
<b>/PGZ/</b>	SINUMERIK 840D/840Di/810D <b>Programming Guide Cycles</b> Order No.: 6FC5 298-6AB40-0BP2	(08.02 Edition)
<b>/PI/</b>	<b>PCIN 4.4</b> Software for Data Transfer to/from MMC Module Order No.: 6FX2 060-4AA00-4XB0 (Ger., Engl., Fr.) Order from: WK Fürth	
<b>/SYI/</b>	SINUMERIK 840Di <b>System Overview</b> Order No.: 6FC5 298-6AE40-0BP0	(02.01 Edition)

**Manufacturer/Service Documentation****a) Lists****/LIS/**

SINUMERIK 840D/840Di/810D  
SIMODRIVE 611D

**Lists**

(02.02 Edition)

Order No.: 6FC5 297-6AB70-0BP2

**b) Hardware****/BH/**

SINUMERIK 840D/840Di/810D

**Operator Components Manual (HW)**

(08.02 Edition)

Order No.: 6FC5 297-6AA50-0BP2

**/BHA/**

SIMODRIVE **Sensor**

**Absolute Encoder with Profibus DP**

User's Guide (HW)

(02.99 Edition)

Order No.: 6SN1 197-0AB10-0YP1

**/EMV/**

SINUMERIK, SIROTEC, SIMODRIVE

**EMC Installation Guideline**

(06.99 Edition)

Planning Guide (HW)

Order No.: 6FC5 297-0AD30-0BP1

**/PHC/**

SINUMERIK 810D

**Configuring Manual (HW)**

(03.02 Edition)

Order No.: 6FC5 297-6AD10-0BP0

**/PHD/**

SINUMERIK 840D

**NCU 561.2-573.4 Configuring Manual (HW)**

(08.02 Edition)

Order No.: 6FC5 297-6AC10-0BP2

**/PMH/**

SIMODRIVE **Sensor**

**Measuring System for Main Spindle Drives**

Configuring/Installation Guide, SIMAG-H (HW)

(05.99 Edition)

Order No.: 6SN1197-0AB30-0BP0

**c) Software****/FB1/**

SINUMERIK 840D/840Di/810D

**Description of Functions Basic Machine** (Part 1) (08.02 Edition)

(the various sections are listed below)

Order No.: 6FC5 297-6AC20-0BP2

- A2 Various Interface Signals
- A3 Axis Monitoring, Protection Zones
- B1 Continuous Path Mode, Exact Stop and Look Ahead
- B2 Acceleration
- D1 Diagnostic Tools
- D2 Interactive Programming
- F1 Travel to Fixed Stop
- G2 Velocities, Setpoint/Actual Value Systems, Closed-Loop Control
- H2 Output of Auxiliary Functions to PLC
- K1 Mode Group, Channels, Program Operation Mode
- K2 Axes, Coordinate Systems, Frames,  
Actual-Value System for Workpiece, External Zero Offset
- K4 Communication
- N2 EMERGENCY STOP
- P1 Transverse Axes
- P3 Basic PLC Program
- R1 Reference Point Approach
- S1 Spindles
- V1 Feeds
- W1 Tool Compensation

**/FB2/**

SINUMERIK 840D/840Di/810D(CCU2)

**Description of Functions, Extended Functions** (Part 2) (08.02 Edition)

including FM-NC: Turning, Stepping Motor

(the various sections are listed below)

Order No.: 6FC5 297-6AC30-0BP2

- A4 Digital and Analog NCK I/Os
- B3 Several Operator Panels and NCUs
- B4 Operation via PC/PG
- F3 Remote Diagnostics
- H1 Jog with/without Handwheel
- K3 Compensations
- K5 Mode Groups, Channels, Axis Replacement
- L1 FM-NC Local Bus
- M1 Kinematic Transformation
- M5 Measurements
- N3 Software Cams, Position Switching Signals
- N4 Punching and Nibbling
- P2 Positioning Axes
- P5 Oscillation
- R2 Rotary Axes



S3 Synchronous Spindles  
 S5 Synchronized Actions (up to SW 3/ thereafter /FBSY/)  
 S6 Stepper Motor Control  
 S7 Memory Configuration  
 T1 Indexing Axes  
 W3 Tool Change  
 W4 Grinding

**/FB3/**

SINUMERIK 840D/840Di/810D(CCU2)

**Description of Functions, Special Functions (Part 3)**

(08.02 Edition)

(the various sections are listed below)

Order No.: 6FC5 297-6AC80-0BP2

F2 3-Axis to 5-Axis Transformation  
 G1 Gantry Axes  
 G3 Cycle Times  
 K6 Contour Tunnel Monitoring  
 M3 Coupled Motion and Leading Value Coupling  
 S8 Constant Workpiece Speed for Centerless Grinding  
 T3 Tangential Control  
 TE1 Clearance Control  
 TE2 Analog Axis  
 TE3 Speed/Torque Coupling Master-Slave  
 TE4 Transformation Package Handling  
 TE5 Setpoint Exchange  
 TE6 MCS Coupling  
 TE7 Retrace Support  
 TE8 Clock-Independent Path-Synchronous Output of Switching Signal  
 V2 Preprocessing  
 W5 3D Tool Radius Compensation

**/FBA/**

SIMODRIVE 611D/SINUMERIK 840D/810D

**Description of Functions Drive Functions**

(08.02 Edition)

(the various sections are listed below)

Order No.: 6SN1 197-0AA80-0BP9

DB1 Operational Messages/Alarm Reactions  
 DD1 Diagnostic Functions  
 DD2 Speed Control Loop  
 DE1 Extended Drive Functions  
 DF1 Enable Commands  
 DG1 Encoder Parameterization  
 DM1 Calculation of Motor/Power Section Parameters and Controller Data  
 DS1 Current Control Loop  
 DÜ1 Monitors/Limitations

<b>/FBAN/</b>	SINUMERIK 840D/SIMODRIVE 611 DIGITAL Description of Functions <b>ANA MODULE</b> Order No.: 6SN1 197-0AB80-0BP0	(02.00 Edition)
<b>/FBD/</b>	SINUMERIK 840D Description of Functions <b>Digitizing</b> Order No.: 6FC5 297-4AC50-0BP0  DI1      Start-up DI2      Scanning with Tactile Sensors (scancad scan) DI3      Scanning with Lasers (scancad laser) DI4      Milling Program Generation (scancad mill)	(07.99 Edition)
<b>/FBDN/</b>	IT Solutions <b>NC Data Management Server</b> (DNC NT-2000) Description of Functions Order No.: 6FC5 297-5AE50-0BP2	(01.02 Edition)
<b>/FBDT/</b>	SINUMERIK 840D/840Di/810D IT Solutions <b>NC Data Transfer</b> (SinDNC) Description of Functions Order No.: 6FC5 297-1AE70-0BP1	(09.01 Edition)
<b>/FBFA/</b>	SINUMERIK 840D/840Di/810D Description of Functions <b>ISO Dialects for SINUMERIK</b> Order No.: 6FC5 297-6AE10-0BP2	(08.02 Edition)
<b>/FBFE/</b>	SINUMERIK 840D/810D Description of Functions <b>Remote Diagnosis</b> Order No.: 6FC5 297-0AF00-0BP1  FE1      Remote Diagnosis FE2      Alarm-Controlled Notification per Email: @Event	(11.01 Edition)
<b>/FBH/</b>	SINUMERIK 840D/810D <b>HMI Programming Package</b> Order No.: (supplied with software) Part 1      User's Guide Part 2      Description of Functions	(10.01 Edition)

<b>/FBHLA/</b>	SINUMERIK 840D/SIMODRIVE 611 digital Description of Functions <b>HLA Module</b> Order No.: 6SN1 197-0AB60-0BP2	(04.00 Edition)
<b>/FBMA/</b>	SINUMERIK 840D/810D Description of Functions <b>ManualTurn</b> Order No.: 6FC5 297-5AD50-0BP1	(08.00 Edition)
<b>/FBO/</b>	SINUMERIK 840D/810D Description of Functions <b>Configuring OP 030 Operator Interface</b> (the various sections are listed below) Order No.: 6FC5 297-6AC40-0BP0  BA Operator's Guide EU Development Environment (Configuring Package) PS Online only: Configuration Syntax (Configuring Package) PSE Introduction to Configuring of Operator Interface IK Screen Kit: Software Update and Configuration	(09.01 Edition)
<b>/FBP/</b>	SINUMERIK 840D Description of Functions <b>C-PLC Programming</b> Order No.: 6FC5 297-3AB60-0BP0	(03.96 Edition)
<b>/FBR/</b>	SINUMERIK 840D/810D IT Solutions Description of Functions <b>Computer Link (SinCOM)</b> Order No.: 6FC5 297-6AD60-0BP0  NFL Host Computer Interface NPL PLC/NCK Interface	(09.01 Edition)
<b>/FBSI/</b>	SINUMERIK 840D/SIMODRIVE Description of Functions <b>SINUMERIK Safety Integrated</b> Order No.: 6FC5 297-6AB80-0BP1	(03.02 Edition)
<b>/FBSP/</b>	SINUMERIK 840D/810D Description of Functions <b>ShopMill</b> Order No.: 6FC5 297-6AD80-0BP1	(08.02 Edition)
<b>/FBST/</b>	<b>SIMATIC</b> Description of Functions <b>FM STEPDRIVE/SIMOSTEP</b> Order No.: 6SN1 197-0AA70-0YP4	(01.01 Edition)

<b>/FBSY/</b>	SINUMERIK 840D/810D Description of Functions <b>Synchronized Actions</b> for Wood, Glass, Ceramics and Presses Order No.: 6FC5 297-6AD40-0BP2	(08.02 Edition)
<b>/FBT/</b>	SINUMERIK 840D/810D Description of Functions <b>ShopTurn</b> Order No.: 6FC5 297-6AD70-0BP2	(08.02 Edition)
<b>/FBTC/</b>	SINUMERIK 840D/810D IT Solutions <b>SINUMERIK Tool Data Communication SinTDC</b> Description of Functions Order No.: 6FC5297-5AF30-0BP0	(01.02 Edition)
<b>/FBTD/</b>	SINUMERIK 840D/810D IT Solutions <b>Tool Information</b> (SinTDI) with Online Help Description of Functions Order No.: 6FC5 297-6AE00-0BP0	(03.01 Edition)
<b>/FBU/</b>	<b>SIMODRIVE 611 universal/universal E</b> Description of Functions Closed-Loop Control Component for Speed Control and Positioning Order No.: 6SN1 197-0AB20-0BP5	(02.02 Edition)
<b>/FBW/</b>	SINUMERIK 840D/810D Description of Functions <b>Tool Management</b> Order No.: 6FC5 297-6AC60-0BP1	(08.02 Edition)
<b>/FBWI/</b>	SINUMERIK 840D/840Di/810D Description of Functions <b>WinTPM</b> Order No.: document is supplied with software	(02.02 Edition)
<b>/HBA/</b>	SINUMERIK 840D/840Di/810D <b>Manual @Event</b> Order No.: 6AU1900-0CL20-0AA0	(01.02 Edition)
<b>/HBI/</b>	SINUMERIK 840Di <b>Manual</b> Order No.: 6FC5 297-6AE60-0BP1	(09.02 Edition)

<b>/INC/</b>	SINUMERIK 840D/840Di/810D <b>SINUMERIK Start-Up Tool SinuCOM NC</b> (02.02 Edition) System Description Order No.: (included in online help for Start-Up Tool)
<b>/PFK/</b>	<b>SIMODRIVE</b> Planning Guide <b>1FT5/1FT6/1FK6 Motors</b> (12.01 Edition) Three-Phase AC Servo Motors for Feed and Main Spindle Drives Order No.: 6SN1197-0AB20-0BP0
<b>/PJE/</b>	SINUMERIK 840D/810D <b>Configuring Package HMI Embedded</b> (08.01 Edition) Description of Functions: Software Update, Configuration, Installation Order No.: 6FC5 297-6EA10-0BP0 (The publication "Configuring Syntax" is supplied with software and is available as PDF file)
<b>/PJFE/</b>	<b>SIMODRIVE</b> Planning Guide (09.01 Edition) <b>Synchronous Motors 1FE1</b> Three-Phase AC Motors for Main Spindle Drives Order No.: 6SN1 197-0AC00-0BP1
<b>/PJLM/</b>	SIMODRIVE Planning Guide <b>Linear Motors</b> (11.01 Edition) (on request) ALL General Information about Linear Motors 1FN1 Three-Phase AC Linear Motor 1FN1 1FN3 Three-Phase AC Linear Motor 1FN3 CON Connections Order No.: 6SN1 197-0AB70-0BP2
<b>/PJM/</b>	<b>SIMODRIVE</b> Planning Guide <b>Motors</b> (11.00 Edition) AC Motors for Feed and Main Spindle Drives Order No.: 6SN1 197-0AA20-0BP5
<b>/PJU/</b>	<b>SIMODRIVE 611</b> Planning Guide <b>Inverters</b> (05.01 Edition) Order No.: 6SN1 197-0AA00-0BP5

<b>/PMS/</b>	<b>SIMODRIVE</b> Planning Guide <b>ECO Motor Spindle</b> for Main Spindle Drives Order No: 6SN1 197-0AD04-0BP0	(04.02 Edition)
<b>/POS1/</b>	<b>SIMODRIVE POSMO A</b> User's Guide Distributed Positioning Motor on PROFIBUS DP Order No.: 6SN2 197-0AA00-0BP2	(04.01 Edition)
<b>/POS2/</b>	<b>SIMODRIVE POSMO A</b> Installation Instructions (enclosed with POSMO A)	
<b>/POS3/</b>	<b>SIMODRIVE POSMO SI/CD/CA</b> Distributed Servo Drives, User's Guide Order No.: 6SN2 197-0AA20-0BP1	(08.01 Edition)
<b>/PPH/</b>	<b>SIMODRIVE</b> Planning Guide <b>1PH2/1PH4/1PH7 Motors</b> AC Asynchronous Motors for Main Spindle Drives Order No.: 6SN1197-0AC60-0BP0	(12.01 Edition)
<b>/PPM/</b>	<b>SIMODRIVE</b> Planning Guide <b>Hollow-Shaft Motors</b> Hollow-Shaft Motors for Main Spindle Drives 1PM4 and 1PM6 Order No.: 6SN1197-0AD03-0BP0	(10.01 Edition)
<b>/S7H/</b>	<b>SIMATIC S7-300</b> Manual: Assembly, CPU Data (HW) Reference Manual: Module Data Order No.: 6ES7 398-8AA03-8AA0	(10.98 Edition)
<b>/S7HT/</b>	<b>SIMATIC S7-300</b> Manual: STEP7, Basic Information, V3.1 Order No.: 6ES7 810-4CA02-8AA0	(03.97 Edition)
<b>/S7HR/</b>	<b>SIMATIC S7-300</b> Manual STEP7, Reference Manuals, V3.1 Order No.: 6ES7 810-4CA02-8AR0	(03.97 Edition)

<b>/S7S/</b>	<b>SIMATIC S7-300</b> <b>FM 353</b> Positioning Module for Stepper Drives Order in conjunction with Configuring Package	(04.97 Edition)
<b>/S7L/</b>	<b>SIMATIC S7-300</b> <b>FM 354</b> Positioning Module for Servo Drives Order in conjunction with Configuring Package	(04.97 Edition)
<b>/S7M/</b>	<b>SIMATIC S7-300</b> <b>FM 357.2</b> Multi-Axis Module for Servo and Stepper Drives Order in conjunction with Configuring Package	(01.01 Edition)
<b>/SP/</b>	<b>SIMODRIVE 611-A/611-D</b> <b>SimoPro 3.1</b> Program for Configuring Machine-Tool Drives Order No.: 6SC6 111-6PC00-0BA□, Order from: WK Fürth	

**d) Installation  
and Start-Up****/IAA/****SIMODRIVE 611A****Installation and Start-Up Guide**

(10.00 Edition)

Order No.: 6SN 1197-0AA60-0BP6

**/IAC/**

SINUMERIK 810D

**Installation and Start-Up Guide**

(03.02 Edition)

(incl. description of SIMODRIVE 611D start-up software)

Order No.: 6FC5 297-6AD20-0BP0

**/IAD/**

SINUMERIK 840D/SIMODRIVE 611D

**Installation and Start-Up Guide**

(08.02 Edition)

(incl. description of SIMODRIVE 611D start-up software)

Order No.: 6FC5 297-6AB10-0BP2

**/IAM/**

SINUMERIK 840D/840Di/810D

**HMI/MMC Installation and Start-Up Guide**

(08.02 Edition)

Order No.: 6FC5 297-6AE20-0BP2

AE1 Updates/Options  
BE1 Extend the Operator Interface  
HE1 Online Help  
IM2 HMI Embedded Start-Up (PCU 20)  
IM4 HMI Advanced Start-Up (PCU 50)  
TX1 Creating Foreign-Language Texts





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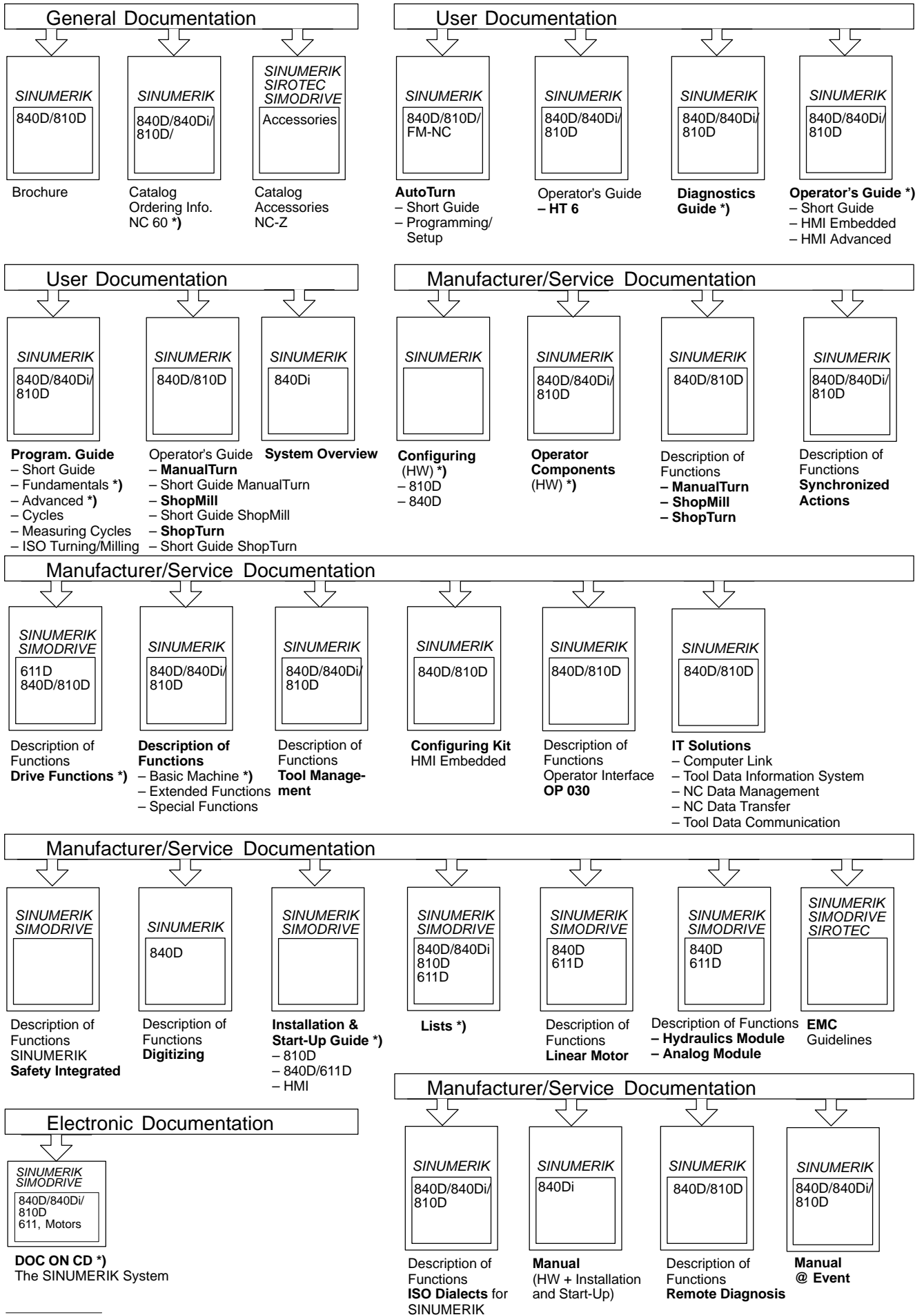
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<b>From</b>	<b>Suggestions</b>
Name	<b>Corrections</b>
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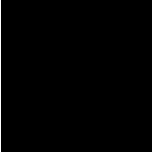
**Suggestions and/or corrections**



# Overview of SINUMERIK 840D/840Di/810D Documentation (03.2002)



\*) These documents are a minimum requirement



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