HEIDENHAIN

Operating Instructions for
Programming Station

iTNC 530

English (en)
2/2012

TNC Model, Software and Features

This manual describes functions and features provided by the TNC programming station as of the following NC software numbers.

TNC model	NC software number
iTNC 530 programming station	340 494-07
iTNC 530 HSCI programming station	606 424-02

The programming station software is fully compatible with the TNCs listed below.

TNC model	NC software number
iTNC 530	340 490-07
iTNC 530 (export version)	340 491-07
iTNC 530 with Windows XP	340 492-07
iTNC 530 with Windows XP (export version)	340 493-07
iTNC 530 with HSCI	606 420-02
iTNC 530 with HSCI (export version)	606 421-02

Many machine manufacturers, as well as HEIDENHAIN, offer programming courses for the TNCs. We recommend these courses as an effective way of improving your programming skill and sharing information and ideas with other TNC users.

> **User documentation:**
>
> All TNC functions are described in the User's Manuals for the iTNC 530. Please contact HEIDENHAIN if you need a copy of these User's Manuals. Have your NC software number handy. It is shown on the iTNC's MOD screen.
>
> The user documentation is also available as online help, which can be called with the HELP key of your programming station.
>
> If you have purchased the complete version of the programming station, you will find all the user documentation on the TNCguide DVD included with the programming station.

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Important Information on the Software for the Programming Station

1.1 Introduction

General information

> This manual describes the special features of the iTNC 530 programming station. All available NC functions are described in the overall User's Manual and in the User's Manual for Cycle Programming. smarT.NC functions are described in the smarT.NC pilot.

TNC controls from HEIDENHAIN have always been user friendly: Thanks to their simple programming in HEIDENHAIN conversational language, field-proven cycles, unambiguous function keys, and clear and vivid graphic functions, they now count among the most popular shop-floor programmable controls.

Now there is also software for running a programming station using Windows. The HEIDENHAIN keyboard included in delivery is simply connected to the USB port on your PC. For test purposes you can also use the iTNC 530 programming station with your standard PC keyboard (see "The Demo Version" on page 33).

As an alternative, you can also use the virtual keyboard for the programming station (see "Showing the virtual keyboard" on page 29).

Options/Feature content level (FCL)

Some powerful functions are not available as a standard feature on all TNC controls, but must be enabled via a keyword.

All functions are available without surcharge on the iTNC 530 programming station. The free demo version, however, only permits storage of programs up to a certain program length (see "The Demo Version" on page 33).

> When creating programs with the iTNC 530 programming station, please ensure that you only use functions actually available on your machine. Otherwise, the program could contain **ERROR** blocks after it has been downloaded to the control, or error messages could appear during testing or program run.

Compatibility

The programming modes provide the same features as an iTNC 530 connected to a machine tool (with NC software 340 490-07 or 606 424-02). You create programs

- in HEIDENHAIN conversational format, according to ISO, or with smarT.NC,
- with graphic support during programming and for program verification,
- and with all other proven iTNC features, such as FK free contour programming.

You work with the original iTNC software—without any compatibility problems. The programs created with the programming station run on machines equipped with an iTNC 530 and NC software 340 490-07 or 606 424-02. A requirement for this to work is that the programming station software must have been interfaced to the machine and that the software options you are using must have been enabled on your machine.

> If you also use the programming station to create programs for older software versions of the iTNC 530 or older TNC contouring controls, please note the section below on **Downward compatibility.**

Downward compatibility

The available functions of the iTNC 530 programming station exactly match those of the TNC software 340 490-07 or 606 424-02. If your TNC control is running this software, then you can download all programs created with the programming station directly to the control. If you want to use the programming station to create programs for older TNC controls, please note the following:

- Do not use any features of the iTNC 530 that are not available on older TNC controls. The next pages include an overview of which features are available with which software versions.
- In some cycles, parameters that were not available on older controls or in older software versions for the iTNC 530 have been added (see "Differences in machining cycles concerning the TNC 4xx", page 12, or see "Differences in touch probe cycles concerning the TNC 4xx", page 16). These additional parameters are identified internally as optional. Beginning with the last parameter of the respective cycle, you can use the NO ENT key to delete them from the cycle definition to make the program downward compatible.

> If there are any uncertainties, compare the program created on the iTNC 530 programming station with the block formatting of your control as it is described in its User's Manual.

Differences in machining cycles concerning the TNC 4xx

Meaning of the symbols used in the table:

– **Parameter not available** in this software version
o Parameter or cycle available in this software version
x **Cycle not available** in this software version

Cycle	Additional parameters	TNC 426/ TNC 430, software version					TNC 410
		280 476	280 474	280 472	280 470	280 462	286 060
20, Contour data	–	o	o	o	o	o	x
21, Pilot drilling	–	o	o	o	o	o	x
22, Rough-out	Q208 Q401 Q404	– – –	– – –	– – –	– – –	– – –	x x x
23, Floor finishing	Q208	–	–	–	–	–	x
24, Side finishing	–	o	o	o	o	o	x
25, Contour train	–	o	o	o	o	o	x
27, Cylinder surface	–	o	o	o	o	o	x
28, Cylinder surface	–	o	o	x	x	x	x
30, Run CAM data	–	o	o	o	o	o	x
32, Tolerance	HSC-MODE TA	– –	– –	– –	x x	x x	x x
200, Drilling	Q211	o	o	–	–	–	–
202, Boring	Q336	o	o	–	–	–	–
203, Universal drilling	Q256	o	o	–	–	–	–
204, Back boring	Q336	o	o	–	x	x	x
205, Universal pecking	Q379 Q253	– –	– –	x x	x x	x x	– –
206, Tapping with floating tap holder	–	o	o	x	x	x	x
207, Rigid tapping, new	–	o	o	x	x	x	x
208, Bore milling	Q342 Q351	o –	– –	x x	x x	x x	x x
209, Tapping with chip breaking	Q403	–	–	x	x	x	x
210, Slot with reciprocating plunge	Q338 Q206	o –	o –	– –	– –	– –	– –

Cycle	Additional parameters	TNC 426/ TNC 430, software version					TNC 410
		280 476	280 474	280 472	280 470	280 462	286 060
211, Circular slot	Q338	o	o	o	o	o	–
	Q206	–	–	–	–	–	–
220, Polar pattern	Q301	o	o	–	–	–	–
	Q365	–	–	–	–	–	–
221, Cartesian pattern	Q301	o	o	–	–	–	–
225, Engraving	–	x	x	x	x	x	x
232, Face milling	–	x	x	x	x	x	x
240, Centering	–	x	x	x	x	x	x
241, Single-lip deep-hole drilling	–	x	x	x	x	x	x
247, Datum setting	–	o	x	x	x	x	x
251, Rectangular pocket (complete)	–	x	x	x	x	x	x
252, Circular pocket (complete)	–	x	x	x	x	x	x
253, Slot milling (complete)	–	x	x	x	x	x	x
254, Circular slot (complete)	–	x	x	x	x	x	x
256, Rectangular stud (complete)	–	x	x	x	x	x	x
257, Circular stud (complete)	–	x	x	x	x	x	x
262, Thread milling	Q512	o	x	x	x	x	x
263, Thread milling/counter sinking	Q512	o	x	x	x	x	x
264, Thread drilling/milling	Q512	o	x	x	x	x	x
265, Helical thread drilling/milling	–	o	x	x	x	x	x
267, Outside thread milling	Q512	o	x	x	x	x	x
270, Contour train data	–	x	x	x	x	x	x
275, Trochoidal slot	–	x	x	x	x	x	x
276, 3-D contour train	–	x	x	x	x	x	x
290, Interpolation turning (option)	–	x	x	x	x	x	x

Differences in machining cycles with respect to older software versions of the iTNC 530

Meaning of the symbols used in the table:

– **Parameter not available** in this software version

o Parameter or cycle available in this software version

x **Cycle not available** in this software version

Cycle	Additional parameters	iTNC 530, software version	
		340 422	340 420
22, Rough-out	Q208 Q401 Q404	o – –	– – –
205, Universal pecking	Q379	o	–
	Q253	o	–
208, Bore milling	Q351	–	–
225, Engraving	–	x	x
240, Centering	–	x	x
241, Single-lip deep-hole drilling	Q435	x	x
251, Rectangular pocket (complete)	–	o	x
252, Circular pocket (complete)	–	o	x
253, Slot milling (complete)	–	o	x
254, Circular slot (complete)	–	o	x
256, Rectangular stud (complete)	–	x	x
262, Thread milling	Q512	o	o
263, Thread milling/counter sinking	Q512	o	o
264, Thread drilling/milling	Q512	o	o
267, Outside thread milling	Q512	o	o

Cycle	Additional parameters	iTNC 530, software version	
		340 422	**340 420**
241, Single-lip deep-hole drilling	Q435	x	x
270, Contour train data	–	x	x
275, Trochoidal slot	–	x	x
276, 3-D contour train	–	x	x
290, Interpolation turning	–	x	x

Differences in touch probe cycles concerning the TNC 4xx

Meaning of the symbols used in the table:

–   **Parameter not available** in this software version
o   Parameter or cycle available in this software version
x   **Cycle not available** in this software version

Cycle	Additional parameters	TNC 426/ TNC 430, software version					TNC 410
		280 476	280 474	280 472	280 470	280 462	286 060
1, Polar datum	–	o	o	o	x	x	x
2, Calibrate TS	–	o	o	o	x	x	x
3, Measuring	MB	–	–	x	x	x	x
	REFERENCE SYSTEM	–	–	x	x	x	x
	ERROR MODE	–	–	x	x	x	x
4, Measuring in 3-D	–	x	x	x	x	x	x
9, Calibrate TS length	–	x	x	x	x	x	x
400, Basic rotation	Q305	–	–	–	x	x	x
401, Rotation of 2 holes	Q305	–	–	–	x	x	x
	Q402	–	–	–	x	x	x
	Q337	–	–	–	x	x	x
402, Rotation of 2 studs	Q305	–	–	–	x	x	x
	Q402	–	–	–	x	x	x
	Q337	–	–	–	x	x	x
403, Rotation in rotary axis	Q337	–	–	–	x	x	x
	Q305	–	–	–	x	x	x
	Q303	–	–	–	x	x	x
	Q380	–	–	–	x	x	x
404, Set basic rotation	Q305	–	–	x	x	x	x
405, Rotation in C axis	–	o	o	x	x	x	x
408, Slot center reference point	–	x	x	x	x	x	x
409, Ridge center reference point	–	x	x	x	x	x	x

Cycle	Additional parameters	TNC 426/ TNC 430, software version					TNC 410
		280 476	280 474	280 472	280 470	280 462	286 060
410, Datum inside rectangle	Q303	–	–	–	x	x	x
	Q381	–	–	–	x	x	x
	Q382	–	–	–	x	x	x
	Q383	–	–	–	x	x	x
	Q384	–	–	–	x	x	x
	Q333	–	–	–	x	x	x
411, Datum outside rectangle	Q303	–	–	–	x	x	x
	Q381	–	–	–	x	x	x
	Q382	–	–	–	x	x	x
	Q383	–	–	–	x	x	x
	Q384	–	–	–	x	x	x
	Q333	–	–	–	x	x	x
412, Datum inside circle	Q303	–	–	–	x	x	x
	Q381	–	–	–	x	x	x
	Q382	–	–	–	x	x	x
	Q383	–	–	–	x	x	x
	Q384	–	–	–	x	x	x
	Q333	–	–	–	x	x	x
	Q423	–	–	–	x	x	x
	Q365	–	–	–	x	x	x
413, Datum outside circle	Q303	–	–	–	x	x	x
	Q381	–	–	–	x	x	x
	Q382	–	–	–	x	x	x
	Q383	–	–	–	x	x	x
	Q384	–	–	–	x	x	x
	Q333	–	–	–	x	x	x
	Q423	–	–	–	x	x	x
	Q365	–	–	–	x	x	x

Cycle	Additional parameters	TNC 426/ TNC 430, software version					TNC 410
		280 476	280 474	280 472	280 470	280 462	286 060
414, Datum outside corner	Q303	–	–	–	x	x	x
	Q381	–	–	–	x	x	x
	Q382	–	–	–	x	x	x
	Q383	–	–	–	x	x	x
	Q384	–	–	–	x	x	x
	Q333	–	–	–	x	x	x
415, Datum inside corner	Q303	–	–	–	x	x	x
	Q381	–	–	–	x	x	x
	Q382	–	–	–	x	x	x
	Q383	–	–	–	x	x	x
	Q384	–	–	–	x	x	x
	Q333	–	–	–	x	x	x
416, Datum circle center	Q303	–	–	–	x	x	x
	Q381	–	–	–	x	x	x
	Q382	–	–	–	x	x	x
	Q383	–	–	–	x	x	x
	Q384	–	–	–	x	x	x
	Q333	–	–	–	x	x	x
	Q320	–	–	–	x	x	x
417, Datum in TS axis	Q303	–	–	–	x	x	x
418, Datum at center of four holes	Q303	–	–	–	x	x	x
	Q381	–	–	–	x	x	x
	Q382	–	–	–	x	x	x
	Q383	–	–	–	x	x	x
	Q384	–	–	–	x	x	x
	Q333	–	–	–	x	x	x
419, Datum in one axis	–	x	x	x	x	x	x
420, Measure angle	–	o	o	o	x	x	x
421, Measure hole	Q423	–	–	–	x	x	x
	Q365	–	–	–	x	x	x
422, Measure circle outside	Q423	–	–	–	x	x	x
	Q365	–	–	–	x	x	x

Cycle	Additional parameters	TNC 426/ TNC 430, software version					TNC 410
		280 476	280 474	280 472	280 470	280 462	286 060
423, Measure rectangle inside	–	o	o	o	x	x	x
424, Measure rectangle outside	–	o	o	o	x	x	x
425, Measure inside width	Q301	–	–	–	x	x	x
	Q320	–	–	–	x	x	x
426, Measure ridge width	–	o	o	o	x	x	x
427, Measure coordinate	–	o	o	o	x	x	x
430, Measure bolt hole circle	–	o	o	o	x	x	x
431, Measure plane	–	o	o	o	x	x	x
440, Measure axis shift	–	o	x	x	x	x	x
441, Fast probing	–	x	x	x	x	x	x
450, Save kinematics	–	x	x	x	x	x	x
451, Measure kinematics	423	x	x	x	x	x	x
	431	x	x	x	x	x	x
	432	x	x	x	x	x	x
452, Preset compensation	–	x	x	x	x	x	x
460, Calibrate TS	–	x	x	x	x	x	x
480, Calibrate TT	–	o	x	x	x	x	x
481, Calibrate tool length	–	o	x	x	x	x	x
482, Calibrate tool radius	–	o	x	x	x	x	x
483, Measure tool	–	o	x	x	x	x	x
484, Calibrate IR TT	–	o	x	x	x	x	x

Differences in touch probe cycles concerning older software versions of the iTNC 530

Meaning of the symbols used in the table:

– **Parameter not available** in this software version
o Parameter or cycle available in this software version
x **Cycle not available** in this software version

Cycle	Additional parameters	iTNC 530, software version	
		340 422	340 420
4, Measuring in 3-D	–	x	x
9, Calibrate TS length	–	o	x
400, Basic rotation	Q305	–	–
401, Rotation of 2 holes	Q305	–	–
	Q402	–	–
	Q337	–	–
402, Rotation of 2 studs	Q305	–	–
	Q402	–	–
	Q337	–	–
403, Rotation in rotary axis	Q337	–	–
	Q305	–	–
	Q380	–	–
404, Set basic rotation	Q305	–	–
408, Slot center reference point	–	x	x
409, Ridge center reference point	–	x	x
410, Datum inside rectangle	Q303	–	–
	Q381	–	–
	Q382	–	–
	Q383	–	–
	Q384	–	–
	Q333	–	–
411, Datum outside rectangle	Q303	–	–
	Q381	–	–
	Q382	–	–
	Q383	–	–
	Q384	–	–
	Q333	–	–

Cycle	Additional parameters	iTNC 530, software version	
		340 422	340 420
412, Datum inside circle	Q303	–	–
	Q381	–	–
	Q382	–	–
	Q383	–	–
	Q384	–	–
	Q333	–	–
	Q423	–	–
	Q365	–	–
413, Datum outside circle	Q303	–	–
	Q381	–	–
	Q382	–	–
	Q383	–	–
	Q384	–	–
	Q333	–	–
	Q423	–	–
	Q365	–	–
414, Datum outside corner	Q303	–	–
	Q381	–	–
	Q382	–	–
	Q383	–	–
	Q384	–	–
	Q333	–	–
415, Datum inside corner	Q303	–	–
	Q381	–	–
	Q382	–	–
	Q383	–	–
	Q384	–	–
	Q333	–	–

Cycle	Additional parameters	iTNC 530, software version	
		340 422	340 420
416, Datum circle center	Q303	–	–
	Q381	–	–
	Q382	–	–
	Q383	–	–
	Q384	–	–
	Q333	–	–
	Q320	–	–
417, Datum in TS axis	Q303	–	–
418, Datum at center of four holes	Q303	–	–
	Q381	–	–
	Q382	–	–
	Q383	–	–
	Q384	–	–
	Q333	–	–
419, Datum in one axis	–	–	x
421, Measure hole	Q423	–	–
	Q365	–	–
422, Measure circle outside	Q423	–	–
	Q365	–	–
425, Measure inside width	Q301	–	–
	Q320	–	–
441, Fast probing	–	x	x
450, Save kinematics	–	x	x
451, Measure kinematics	–	x	x
460, Calibrate TS	–	x	x
450, Save kinematics	–	x	x
484, Calibrate IR TT	–	x	x

Differences in miscellaneous functions M concerning the TNC 4xx

Meaning of the symbols used in the table:

x   **Function not available** in this software version
o   **Function available** in this software version

M function	TNC 426/ TNC 430, software version					TNC 410
	280 476	280 474	280 472	280 470	280 462	286 060
Two miscellaneous functions can be programmed in one NC block	o	x	x	x	x	o
M01	o	x	x	x	x	o
M104	o	o	x	x	x	x
M128	o	o	o	x	x	x
M129	o	o	o	x	x	x
M130	o	o	o	o	x	x
M134	o	o	o	x	x	x
M135	o	o	o	x	x	x
M136	o	o	x	x	x	x
M137	o	o	x	x	x	x
M138	o	o	x	x	x	x
M140	o	x	x	x	x	x
M141	o	x	x	x	x	x
M142	o	x	x	x	x	x
M143	o	x	x	x	x	x
M144	o	x	x	x	x	x
M145	o	x	x	x	x	x

Differences in miscellaneous functions M concerning older software versions of the iTNC 530

Meaning of the symbols used in the table:

x   **Function not available** in this software version

o   **Function available** in this software version

M function	iTNC 530, software version	
	340 422	340 420
M150	x	x

Differences in Q-parameter programming concerning the TNC 4xx

Meaning of the symbols used in the table:

x   **Function not available** in this software version

o   **Function available** in this software version

Function	TNC 426/ TNC 430, software version					TNC 410
	280 476	280 474	280 472	280 470	280 462	286 060
Formula entry: **SGN**	x	x	x	x	x	o
Formula entry: **%**	x	x	x	x	x	x
FN16	o	o	o	o	o	x
FN20	o	o	o	x	x	x
FN23	o	o	o	x	x	x
FN24	o	o	o	x	x	x
FN25	o	o	o	x	x	x
FN26	o	o	x	x	x	x
FN27	o	o	x	x	x	x
FN28	o	o	x	x	x	x
Contour formula **QC...**	x	x	x	x	x	x
String formula **QS...**	x	x	x	x	x	x
Local parameters **QL...**	x	x	x	x	x	x
Nonvolatile parameters **QR...**	x	x	x	x	x	x

Differences in Q-parameter programming concerning older software versions of the iTNC 530

Meaning of the symbols used in the table:

x   **Function not available** in this software version
o   **Function available** in this software version

Function	iTNC 530, software version	
	340 422	340 420
String formula **QS...**	x	x
Local parameters **QL...**	x	x
Nonvolatile parameters **QR...**	x	x

Differences in other functions concerning the TNC 4xx

Meaning of the symbols used in the table:

x   **Function not available** in this software version
o   **Function available** in this software version

Function	TNC 426/ TNC 430, software version					TNC 410
	280 476	280 474	280 472	280 470	280 462	286 060
CYCL CALL PAT	o	x	x	x	x	o
CYCL CALL POS	x	x	x	x	x	x
Cutting data tables (**WMAT** block)	o	o	o	x	x	x
Feed rate **F** in the **CHF** block	o	o	o	x	x	o
Contour definition **DECLARE CONTOUR**	x	x	x	x	x	x
Tilting the working plane: **PLANE**	x	x	x	x	x	x
Positioning behavior of rotary axes: **FUNCTION TCPM**	x	x	x	x	x	x
FK programming: **FL P2X/FLT P2X**	o	o	o	o	o	x
FK programming: **FL P2Y/FLT P2Y**	o	o	o	o	o	x
FK programming: **FL RX/FLT RX**	o	o	o	o	o	x
FK programming: **FL RY/FLT RY**	o	o	o	o	o	x
FK programming: **FL RPR/FLT RPR**	o	o	o	o	o	x
FK programming: **FL RPA/FLT RPA**	o	o	o	o	o	x
FK programming: **FL RAN/FLT RAN**	o	o	o	o	o	x
FK programming: **FC LEN/FCT LEN**	o	o	o	o	o	x
FK programming: **FC AN/FCT AN**	o	o	o	o	o	x

Function	TNC 426/ TNC 430, software version					TNC 410
	280 476	280 474	280 472	280 470	280 462	286 060
FK programming: **FC P2X/FCT P2X**	o	o	o	o	o	x
FK programming: **FC P2Y/FCT P2Y**	o	o	o	o	o	x
FK programming: **FC P3X/FCT P3X**	o	o	o	o	o	x
FK programming: **FC P3X/FCT P3Y**	o	o	o	o	o	x
FK programming: **FC RX/FCT RX**	o	o	o	o	o	x
FK programming: **FC RY/FCT RY**	o	o	o	o	o	x
FK programming: **FC RPR/FCT RPR**	o	o	o	o	o	x
FK programming: **FC RPA/FCT RPA**	o	o	o	o	o	x
FK programming: **FC RAN/FCT RAN**	o	o	o	o	o	x
FK programming: **FC RCCX/FCT RCCX**	o	o	o	o	o	x
FK programming: **FC RCCY/FCT RCCY**	o	o	o	o	o	x
FK programming: **FC RCCPR/FCT RCCPR**	o	o	o	o	o	x
FK programming: **FC RCCPA/FCT RCCPA**	o	o	o	o	o	x

Differences in other functions concerning older software versions of the iTNC 530

Meaning of the symbols used in the table:

x   **Function not available** in this software version
o   **Function available** in this software version

Function	iTNC 530, software version	
	340 422	**340 420**
Tilting the working plane: **PLANE**	o	x
Tilting the working plane: **PLANE AXIS**	x	x
Tilting the working plane: **PLANE TURN MB..**	x	x
Positioning behavior of rotary axes: **FUNCTION TCPM**	o	x
Defining machining positions: **PATTERN DEF**	x	x
Defining a simple contour formula: **CONTOUR DEF**	x	x
Defining global cycle parameters: **GLOBAL DEF**	x	x
File functions: **FUNCTION FILE**	x	x
Datum shift: **TRANS DATUM**	x	x

1.2 Working with the iTNC 530 Programming Station

Starting the programming station

Start the iTNC 530 programming station as you would any other Windows application. Either double-click the HEIDENHAIN icon on your desktop or use the Start menu. The iTNC Control Panel appears (see figure at right). As soon as the programming station software is started, the iTNC Control Panel automatically minimizes.

➡ The TNC functions (e.g. **L**, **C**, **CC** etc.) are sent internally over certain key combinations (shortcuts) to the programming station software. Remember that such key combinations are also used by other Windows programs, which can result in undesired effects.
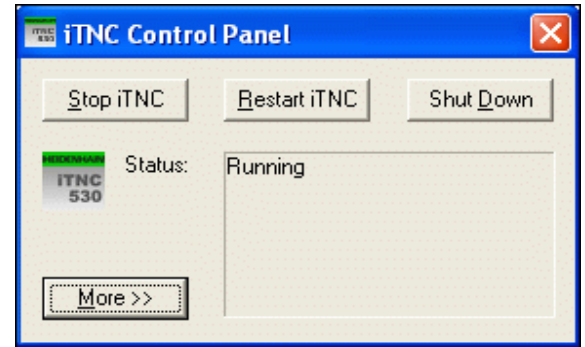
Defining the window mode

In the standard setting, the programming station software starts in full screen mode. If your PC permits a resolution higher than 1024x768, you can also start the programming station in the window mode so that the programming station behaves like any other Windows application.

To select the window mode, proceed as follows:

▶ Start the programming station software.

▶ Double-click the green HEIDENHAIN symbol in the taskbar for the iTNC Control Panel to appear (see figure).

▶ Click the **More >>** button: Additional settings are displayed.

▶ Click the **Settings** button: Display options are displayed.

▶ Select the **1024 x 768 window** option. Confirm with **OK**.

➡ Changes do not take effect until you restart the programming station software: Press the **Restart iTNC** button.

Showing the virtual keyboard

→ Your active screen resolution must be higher than 1024x768 in order to work effectively with the virtual keyboard.

You use the mouse in combination with the virtual keyboard to simulate keys available on the TNC keyboard. You can activate the soft keys directly with the mouse in the TNC window, or with the F1 to F8 function keys on the PC keyboard. The keys normally available on the TNC screen housing are also operated via the function keys on the PC keyboard:

- Scroll the soft-key row to the left: F9
- Scroll the soft-key row to the right: F10
- Set the screen layout: F11
- Switch between the foreground and background operating mode: F12

Proceed as follows to show the virtual keyboard:

▶ Start the programming station software.
▶ Double-click the green HEIDENHAIN symbol in the taskbar for the iTNC Control Panel to appear.
▶ Click the **More >>** button: Additional settings are displayed.
▶ Click the **Keypad** button: The virtual keyboard is shown.

If you want to automatically show the keyboard when starting the programming station software, proceed as follows:

▶ Start the programming station software.
▶ Double-click the green HEIDENHAIN symbol in the taskbar for the iTNC Control Panel to appear.
▶ Click the **More >>** button: Additional settings are displayed.
▶ Click the **Settings** button: Display options are displayed.
▶ Select the **Launch keypad at startup** option. Confirm with **OK**.

→ Changes do not take effect until you restart the programming station software: Press the **Restart iTNC** button.
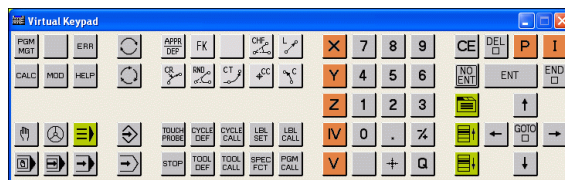
Exiting the programming station

Fundamentals

In order to avoid losing data when exiting the program, you must quit the programming station correctly. The following sections describe the two possibilities for doing this.

> Inappropriate exiting of the programming station can lead to data loss.

Exiting the programming station completely

▶ Select the Manual Operation mode.

▶ Shift the soft-key row until the soft key for shutting down the system appears.

▶ Select the function for shutting down and confirm the following dialog prompt with the YES soft key.

Exiting the programming station temporarily

▶ Press the Windows key on the ASCII keyboard for the screen to display the last active application and the taskbar.

▶ Double-click the green HEIDENHAIN symbol in the taskbar for the iTNC Control Panel to appear (see figure at right).

▶ Select the function for exiting the iTNC 530 application by pressing the **Stop iTNC** button. The iTNC Control Panel remains active. To restart the programming station software, press the **Restart iTNC** button.
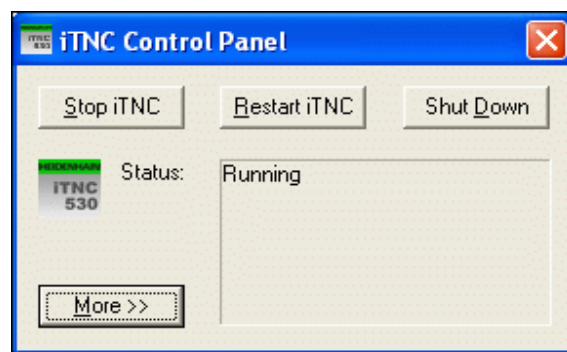
1.3 Data Transfer from the Programming Station to the Machine Tool

Prerequisites

Before you can transfer the data, you must connect the machine tool to the PC on which the iTNC programming station has been installed. Refer to the section in the User's Manual about the Ethernet interface.

You can start the data transfer only from the machine tool.

Preparations at the programming station

In order to transfer programs created with the programming station to the machine tool, you must create a transfer directory on the PC, in which you temporarily store the programs to be transferred. Proceed as follows:

▶ If such a directory does not yet exist, create either on your PC or on any network drive a new directory (e.g. <c:\pgmtransfer>) using Windows Explorer.

▶ Return to the programming station software.

▶ Select the Programming and Editing operating mode.

▶ Press the PGM MGT key to call the file manager.

▶ Select the program you want to transfer to the machine.

▶ Select the split-screen view.

▶ In the right-hand window select the <c:\pgmtransfer> path.

▶ Copy the program to the <pgmtransfer> directory.

Refer to the TNC User's Manual for more information about copying files.

Calling a program from the machine tool

▶ Select the Programming and Editing operating mode

▶ Press the PGM MGT key to call the file manager.

▶ Select the target directory to which you want to copy the program created with the programming station.

▶ Select the split-screen view

▶ In the right-hand window, select the <c:\pgmtransfer> directory on the programming station PC.

▶ Select the program to be transferred, and transfer it to the machine tool.

> Refer to the TNC User's Manual for more information about copying files.

Connection between the programming station and HEIDENHAIN PC software

So that a connection between HEIDENHAIN PC software (e.g. TNCremo NT or CycleDesign) and the programming station can be established, the programming station has a special IP address called the **loop-back IP**. This loop-back IP is **127.0.0.1** and must be entered in the appropriate configuration menu of the HEIDENHAIN PC software. Then you can set up a connection with the programming station, as if you were connected with a machine.

1.4 The Demo Version

General information

After you have installed the iTNC 530 programming station on your PC, you can call the TNC features with your standard PC keyboard for test purposes. All features of the iTNC 530 are available. As an alternative, you can also use the virtual keyboard for the demo version (see "Showing the virtual keyboard" on page 29).

> The demo version of the iTNC 530 programming station permits you to save up to 100 NC blocks per NC program.
>
> When extracting contours from DXF files, the TNC saves no more than 50 NC blocks in the corresponding contour program. The same constraint applies to extracting machining positions into a point table.

Starting the demo version

After you have started the demo version of the programming station using the Windows Start menu, a pop-up window appears and informs you about the special features of the demo version. In this case, proceed as follows:

▶ To confirm the information about the demo version, press the CE key on the TNC's virtual keyboard. If you are using the standard PC keyboard, press the period (.) key in the numeric keypad of your keyboard. If you are using a laptop, activate the NUM LOCK function and then press the period (.) key in the numeric keypad of your keyboard. Then the TNC software closes the pop-up window and displays the **Power interrupted** message.

▶ To confirm the power interruption, again press the CE key on the TNC keyboard or the appropriate PC key. The programming station software is now ready for use in the Manual Operation mode.

> There is more information on the keyboard assignment (see "Keyboard assignment" on page 34).

Keyboard assignment

The assignment of the TNC's special keys (axis keys and dialog keys) and the TNC number pad are shown in the figure at right. The assignment of the screen keys is shown in the **Function of the screen keys** table below. All other TNC functions are called with shortcut commands, which are listed in the **TNC functions** table on the next page.

Keys on the TNC screen

➡ Functions for vertical soft keys are available only if you use a special PLC program for the programming station.

To press a vertical soft key, you must also press and hold the **CTRL+ALT+SHIFT** keys in the PC keyboard.

Function of the screen keys	TNC key	PC key
Horizontal soft key 1		F1
Horizontal soft key 2		F2
Horizontal soft key 3		F3
Horizontal soft key 4		F4
Horizontal soft key 5		F5
Horizontal soft key 6		F6
Horizontal soft key 7		F7
Horizontal soft key 8		F8
Horizontal soft key 9 for large screen resolution (1280x1024)		**CTRL+ALT+** F1
Horizontal soft key 10 for large screen resolution (1280x1024)		**CTRL+ALT+** F2
Shift soft-key row left	◁	F9
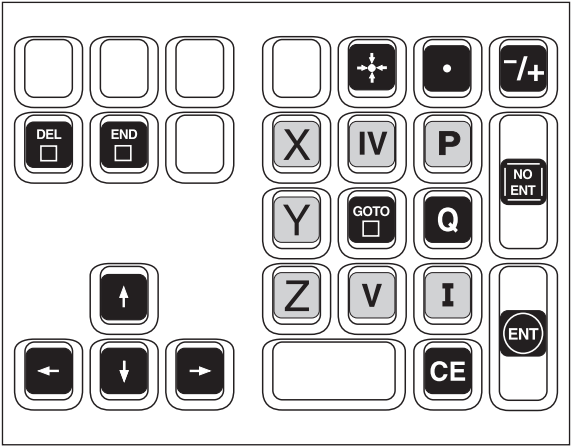
Function of the screen keys	TNC key	PC key
Shift soft-key row right	▷	F10
Select the screen layout	⟳	F11
Toggle the display between machining and programming modes	⟳	F12
Vertical soft key 1	☐	F1
Vertical soft key 2	☐	F2
Vertical soft key 3	☐	F3
Vertical soft key 4	☐	F4
Vertical soft key 5	☐	F5

Keys for TNC functions

➡ In order to call the TNC functions below with the PC keyboard, you must also press and hold the **CTRL+ALT** keys of the PC keyboard.

TNC function	TNC key	PC key
Select or delete programs and files, external data transfer	PGM MGT	P
Show calculator	CALC	N
Select MOD functions	MOD	M
Display help text for NC error messages	HELP	H
Display all current error messages	ERR	L
Approach/depart contour	APPR DEP	% 5

TNC function	TNC key	PC key
FK free contour programming	FK	& 6
Program a chamfer	CHF	(8 [
Program a straight line segment	L	) 9]
Program a circular arc with radius	CR	T
Program a corner rounding	RND	Z
Program a circular arc with tangential connection	CT	U
Program the circle center/pole for polar coordinates	CC	I
Program a circular arc with center	C	O
Select the Manual Operation mode		! 1
Select the smarT.NC operating mode		§ 3
Select the Handwheel operating mode		" 2
Select the Positioning with MDI operating mode		Q
Select the Program Run, Single Block operating mode		W
Select the Program Run, Full Sequence operating mode		E
Select the Programming and Editing operating mode		$ 4
Select the Test Run operating mode		R
Define touch probe cycles	TOUCH PROBE	A

TNC function	TNC key	PC key
Define fixed cycles	CYCL DEF	S
Call fixed cycles	CYCL CALL	D
Define subprograms and program section repeats	LBL SET	F
Call subprograms and program section repeats	LBL CALL	G
Enter a program stop	STOP	Y
Define tool in the program	TOOL DEF	X
Call the tool	TOOL CALL	C
Call the soft-key menu for special functions	SPEC FCT	V
Enter program call	PGM CALL	B

Keyboard assignment to American PC keys arrangement

The following keys are arranged differently if you use a PC keyboard with an American key layout.

TNC function	TNC key	PC key
FK free contour programming	FK	^ 6
Program a chamfer	CHF	* 8
Program a straight line segment	L	(9
Select the smarT.NC operating mode		# 3
Select the Handwheel operating mode		@ 2
Program a corner rounding	RND	Y
Enter a program stop	STOP	Z

Overview of keyboard assignment

To program a TNC function, press CTRL+ALT+desired function
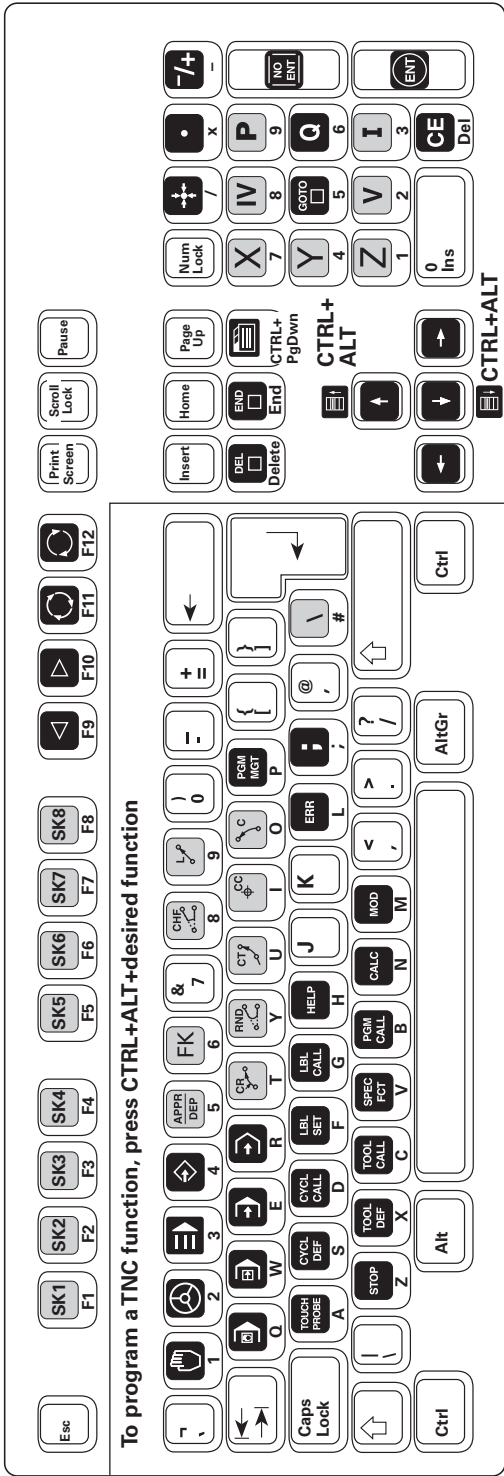
Key assignment on portable computers

On portable computers (laptops, notebooks), the number of available key is less than on a desktop PC (see figure at right). With the NUM key you activate the numeric keypad, which usually has its own color on the keyboard (see illustration below). Refer to the operating instructions of your laptop/notebook. In addition, some functions such as DEL (delete) or the cursor keys can be activated with an FN key. Refer also to the operating instructions of your laptop/notebook.
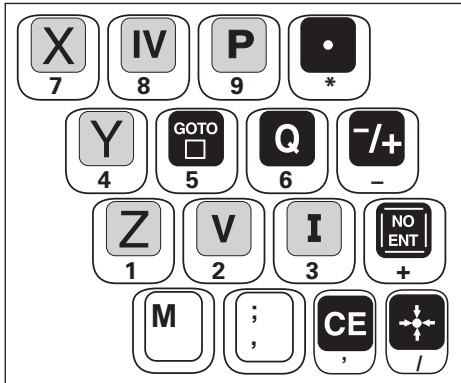
On many portable computers the ENT key is not available. In most cases you can then continue the dialog with the rightward cursor key.

To program a TNC function, press CTRL+ALT+desired function
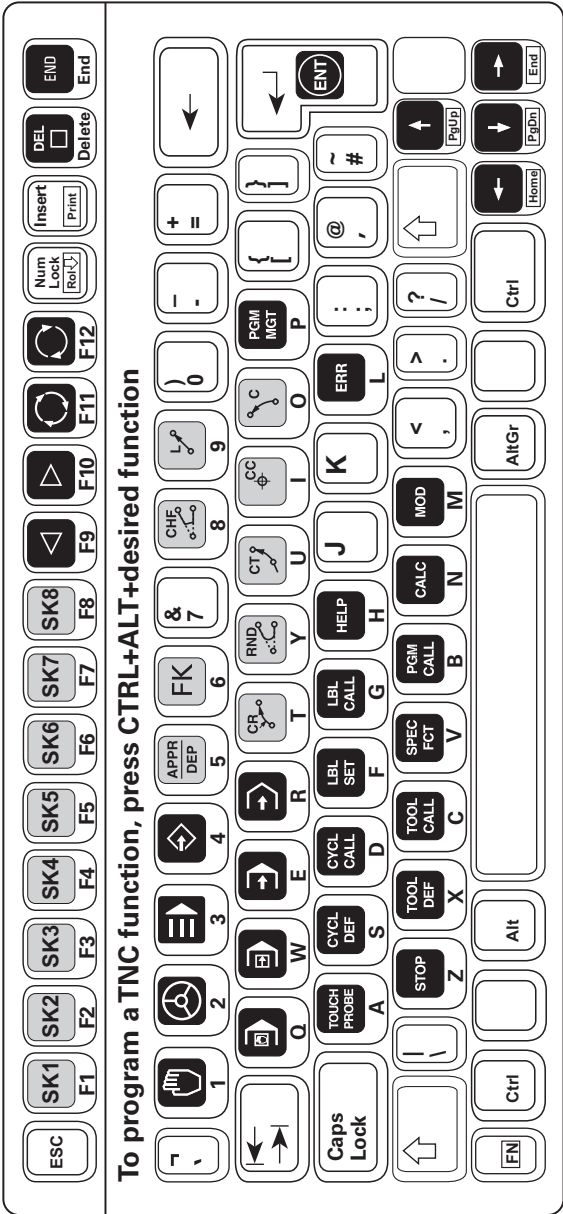
2

Items Supplied / Installation

2.1 Items Supplied / System Requirements

Items supplied

Three versions of the iTNC programming station are available.

iTNC programming station with TNC keyboard

Included in delivery are:

- The programming station software on CD
- The TE 530 L keyboard for connection to your PC via the USB port
- 1 USB cable (2 meters)
- 4 cable clamps for mounting on the programming station housing
- Self-adhesive stickers for soft-key labels
- User documentation on DVD

iTNC programming station with virtual keyboard

Included in delivery are:

- The programming station software on CD
- USB dongle, single-station license for avoiding the memory restrictions
- User documentation on DVD

iTNC programming station with network license

Included in delivery are:

- The programming station software on CD
- USB dongle with 14 or 20 network licenses for avoiding the memory restrictions
- User documentation on DVD

System requirements

The programming station software runs on PCs that meet the following requirements:

- Standard PC with Windows 2000, Windows XP, Windows Vista, Windows 7; microprocessor at least Pentium III with 800 MHz
- USB interface
- 512 MB RAM minimum
- Graphics card: At least 16-bit color depth
- At least 400 MB available memory on the hard disk
- At least 15-inch screen with a resolution of 1024x768 pixels; the virtual keyboard requires a minimum resolution of 1280x1024 pixels
- LAN connection when using the iTNC programming station with a network license

➡ Please note that you need administrator rights both for installing and for operating the programming station software.

In order to operate the programming station software, it suffices if you have administrator rights to the installation directory of the programming station software.

2.2 Connecting the Programming Station

Connecting the keyboard for the programming station

Connect the programming station keyboard to an available USB port on your computer.

Then install the **correct driver** for the USB dongle from the programming station CD. HEIDENHAIN is currently shipping the programming station keyboard with two different USB dongles. You can tell which dongle is installed in your keyboard by the ID number printed on the black ID label on the rear of the keyboard:

■ **Alladin dongle:**
  Programming station keyboards with ID number 532 524-**01** have the Alladin dongle.
■ **Marx dongle:**
  Programming station keyboards **as of** ID number 532 524-**02** have the Marx dongle.

> Please note the driver installation instructions on the programming station CD.

The programming station software then automatically recognizes the connected programming station keyboard.

The rear of the programming station keyboard also has a USB port, to which you can attach another USB device, such as another dongle for another TNC programming station.

> The additional USB device attached to the programming station keyboard must not draw more than 200 mA of current.

Mounting the cable clamps for the USB cable

The rear panel of the programming station keyboard has five pockets (see figure at right) in which you can glue the provided cable clamps. The cable clamps serve to relieve the strain on the USB connector.

> ➡ HEIDENHAIN recommends using these cable clamps to prevent loosening of the USB connector and damage to the connection on the PCB.

To fasten the cable clamps, proceed as follows:

▶ Lay the programming station keyboard with the keys downward on a flat surface.

▶ Remove the protective film on the bottom of the cable clamp.

▶ Place the cable clamp into the desired pocket on the programming station keyboard and press:
  ■ Use pockets 1, 2 or 5 if the cable is to exit to one side.
  ■ Use pockets 3 or 4 if the cable is to exit straight out.

▶ Connect the USB cable and insert it in the cable clamp.

▶ Place the fastener from above on the clamp and press downward until the USB cable is fastened.

Number stickers

The self-adhesive number stickers included with the programming station keyboard enable the user to recognize which manually pressed soft key belongs to which soft key displayed on the PC's monitor.

You can apply the large sticker to the programming station keyboard and the individual numbers to the PC screen.

Connecting the USB dongle (only for the version with a virtual keyboard)

Connect the USB dongle to an available USB port on your computer.

Then install the **correct driver** for the USB dongle from the programming station CD. HEIDENHAIN is currently shipping two different USB dongles:

- **Marx dongle:**
  The Marx dongle has a silver surface; see image at upper right
- **Alladin dongle:**
  The Alladin dongle is blue; see image at lower right

> Please note the driver installation instructions on the programming station CD.

The programming station software detects the connected dongle automatically after the installation.

Connecting the USB network dongle (only for the version with a virtual keyboard)

Connect the USB network dongle to an available USB port on the computer you want to use as a server.

Then install the **correct driver** for the USB dongle from the programming station CD. HEIDENHAIN is currently shipping two different USB dongles:

■ **Marx dongle:**
The Marx dongle has a silver surface; see image at upper right

■ **Alladin dongle:**
The Alladin dongle is blue; see image at lower right

> Please note the driver installation instructions on the programming station CD.

The programming station software on the computer automatically recognizes the connected dongle after the network driver has been installed successfully. You must appropriately configure the computers to which you want to give access to the network dongle after installing the programming station software (see "Configuring the programming station software for use with a USB network dongle" on page 49).

Installing the programming station software

➡️ Note that the following files are normally overwritten during installation of an update:

- Configuration file **OEM.SYS**
- Machine parameter file **DEMO.MP**
- All example NC programs in the **TNC:\DEMO** directory

Should you have made changes to any of these files, make a backup copy before installation, or rename the files.

▶ Place the programming station CD in the CD-ROM drive.

▶ The CD browser starts automatically if your CD-ROM drive has been appropriately configured. If Autostart is not active, run the <Start.exe> file.

▶ Choose the language to be used for the CD navigation.

▶ Select <Install software>.

▶ Select <Select software version>.

▶ In order to start the installation program, select <Setup> for the software version you want to install.

▶ Follow the installation program instructions.

➡️ When installing the iTNC 530 programming station for the first time, you can decide whether the HEIDENHAIN basic PLC program for the programming station with programming examples is to be installed as well. Select the setup type **User** and then **Basic PLC Program** or **Standard (User)** (see "Working with the HEIDENHAIN basic PLC program" on page 54).

You can install this programming station version on your PC even if another version is already installed on your PC, but you cannot run both versions at the same time.

Configuring the programming station software for use with a USB network dongle

HEIDENHAIN is currently shipping two different USB dongles:

- **Marx dongle:**
  The Marx dongle has a silver surface; see image at upper right
- **Alladin dongle:**
  The Alladin dongle is blue; see image at center right

➡ Please note the driver installation instructions on the programming station CD.

Configuring the Alladin dongle

All computers that are to access a network dongle must be configured as follows:

▶ Start the programming station software.

▶ Double-click the green HEIDENHAIN symbol in the taskbar for the iTNC Control Panel to appear.

▶ Click the **More >>** button: Additional settings are displayed.

▶ Click the **Settings** button: Programming station settings are displayed (see figure).

▶ Select the **Use Hardlock Server** option.

▶ If required, select whether you are using a programming station (**Programming Station** is the default setting) or VirtualTNC (**Virtual Machine**). The **Marx Crypto-Box** setting is only necessary for special applications in combination with virtual machines, which are programmed by the respective software manufacturer.

▶ In the **Server** input field, enter the IP address or the network name of the computer which you are using as a server, i.e. the computer to which you have connected the USB network dongle.

▶ Press **OK** to confirm your settings.

➡ Changes do not take effect until you restart the programming station software: Press the **Restart iTNC** button.

You do not need to install **any additional drivers** on the client PC to be able to access the USB network dongle.
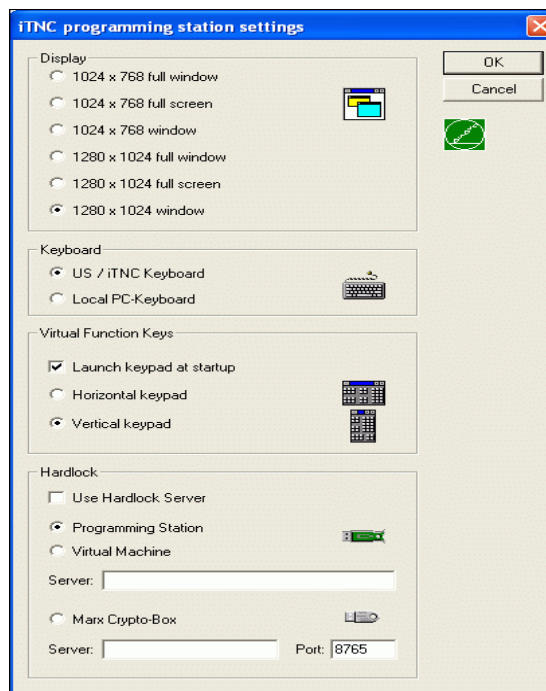
Configuring the Marx dongle

Before you can use a network license for multiple workstations, you must start the server program "SmarxOS" on one of the computers, and connect the USB dongle. This computer is then designated the "dongle server," and monitors the connections to the client PCs on which the programming stations are installed.

Proceed as follows in order to start the "SmarxOS" server program on the dongle server PC:

▶ Copy the entire "CBServer" directory from the CD (\JH\CBServer) to a local drive on your PC

▶ Start the server by running "CBIOSSrv.exe"

The icon is shown in the taskbar after the server program has started.

The programming station PCs log on to the dongle server when they start. During operation the server checks whether a logged-on programming station is active. If the programming station PC has not contacted the dongle server for some time, the dongle server logs that PC off (default setting: 15 minutes). When you exit the programming station, the respective PC logs off from the dongle server.

You can also install the "SmarxOS" server program as a service on the dongle server PC. Services are automatically run when Windows is started, and run in the background. That way you don't need to start the server program manually each time you boot the PC. To install the server program as a service, proceed as follows:

▶ Copy the entire "CBServer" directory from the CD (\JH\CBServer) to a local drive on your PC

▶ Start the server by running "CBIOSSRV.exe"

▶ Stop the server by pressing the "Stop" button in the server window

▶ Select the option "Run as Service"

▶ Start the server by pressing the "Start" button in the server window

The service is now run automatically when Windows is started. The icon will no longer be shown in the taskbar once the system is booted again.

> You may have to enter the CBIOSSRV.SRV program as an exception in the Windows firewall software.
>
> You can also check and change the settings for the "CBIOS Server" service in the Control Panel under Administrative Tools\Services.
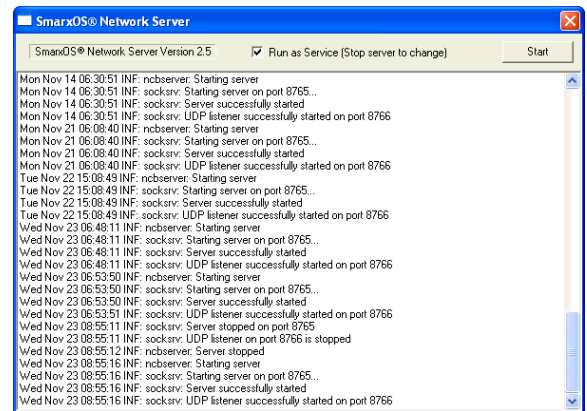
You can make other changes to the server settings with the Server Administration program. Start the AdminApp.exe program (directory: CBServer) for this:

- Press the "Search" button to show all PCs to which a dongle is connected.

- Click an IP address to add it to the address block for connection settings.

- The IP address 127.0.0.1 (default setting) is used to load the data from the local dongle server.

- Press the "Connect" button to open a window with information about the dongle and other possible settings (e. g. "Connection timeout").

You will find more information on the Server Administration program in the readme.txt file (directory: CBServer).

Setting the conversational language

The default language for the programming station software is German.
Follow the procedure below to switch to another conversational
language:

▶ Start the programming station software.

▶ Select the Programming and Editing mode of
operation.

▶ Select the MOD functions.

▶ Enter the code number 123 and confirm with the ENT
key.

▶ To select machine parameter 7230: Press the GOTO
key, enter 7230, and confirm with the ENT key

▶ Set the desired conversational language (see the table
below), and confirm with the END key.

Conversational language	Value in MP7230
English	0
German	1
Czech	2
French	3
Italian	4
Spanish	5
Portuguese	6
Swedish	7
Danish	8
Finnish	9
Dutch	10
Polish	11
Hungarian	12
Russian	14
Chinese (simplified)	15
Chinese (traditional)	16
Slovenian	17
Norwegian	18
Slovak	19

Conversational language	Value in MP7230
Latvian	20
Korean	21
Norwegian	22
Turkish	23
Romanian	24
Lithuanian	25

Working with the HEIDENHAIN basic PLC program

⚠ Some machine tool builders provide more than one PLC program for the programming station, each specific to a different type of machine.

In order to increase protection of files and other data, the machine tool builder can encrypt the PLC, making it more difficult for third parties to access this information.

HEIDENHAIN points out that no data encryption method offers 100% protection of the data, especially against access, damage or destruction by unauthorized persons, etc. Therefore, HEIDENHAIN cannot guarantee that data stored there will not be tampered with, and as a consequence cannot assume liability for any resulting damages.

After you have started the programming station with active PLC, the TNC displays the **98 TNC programming station active** error message.

▶ Press the HELP key to display a list with the most important programming station functions for machine operation

The following table lists these functions:

Function	Keys
NC start	CTRL+S
NC stop	CTRL+X
Move the active axis in the positive direction	CTRL+Arrow up
Move the active axis in the negative direction	CTRL+Arrow down
Emergency stop	ALT+X

Use the mouse in combination with the vertical soft-key row to simulate various machine functions of the basic PLC program:

Soft key	Keys
M	■ NC start ■ NC stop ■ Move axes in positive and negative direction ■ Exit the programming station
S	■ Spindle ON ■ Spindle OFF ■ Incremental spindle jog M3 ■ Incremental spindle jog M4 ■ Oriented spindle stop M19
T	■ Acknowledge tool change ■ Clamp/release tool
DIAGNOSIS	■ Show PLC error table ■ Diagnostic functions ■ Status functions ■ Documentation on M functions

If you do not want to use the standard axis configuration, you can choose from various kinematics setups available via the MOD function in the **Programming and Editing** operating mode:

▶ Select the Programming and Editing mode of operation.

▶ Select the MOD functions.

▶ Enter the keyword **kinematic** and confirm with the ENT key. The TNC displays a pop-up window with various axis configurations.

▶ Move to the desired axis configuration with the arrow keys, and select it with the ENT key or SELECT soft key. The TNC resets, and activates the axis configuration you selected.

Working with a machine-specific PLC program

Some machine tool builders provide more than one PLC program for the programming station, each specific to a different type of machine. Please contact your machine tool builder to request a description of the adapted PLC program's functions.

In order to increase protection of files and other data, the machine tool builder can encrypt the PLC, making it more difficult for third parties to access this information.

HEIDENHAIN points out that no data encryption method offers 100% protection of the data, especially against access, damage or destruction by unauthorized persons, etc. Therefore, HEIDENHAIN cannot guarantee that data stored there will not be tampered with, and as a consequence cannot assume liability for any resulting damages.