



HEIDENHAIN



Product Information

UV 106B

Power Supply Unit
HEIDENHAIN Contouring
Controls for Analog Servo
Drive Control

**Information for the
Machine Tool Builder**

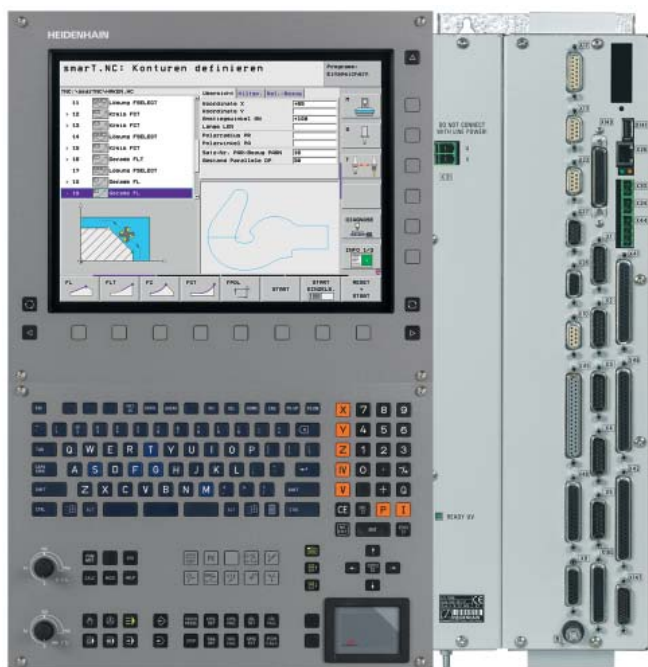
November 2009

HEIDENHAIN Contouring Controls for Analog Drive Control

Digital drive control is very widespread on today's machine tools. For its controls, inverter systems and motors, HEIDENHAIN offers solutions that are powerful and adaptable for many machine types. However, some applications still justify analog drive control, especially for retrofitting or modernizing NC controlled machines. If for example you want to replace an old control but keep your motors and drive control, in most cases the existing command interface is analog.

Now HEIDENHAIN is offering an economically attractive solution with the **iTNC 530** as milling machine control and the **MANUALplus 620** as lathe control for such applications: the user interface is the same operating panel and flat-panel display as for the digital version. The MC 420 or MC 422 B provides the computing power. Instead of the controller unit—which is not needed in the analog version—the new **UV 106B power supply unit** provides the electrical power for the computer.

The UV 106B supply unit has the same power pack as the UV 105, which means that 20 A are available for the 5 V operating voltage of the computer. In their basic versions, both the MC 422 B and MC 420 feature four enabled control loops (iTNC 530) or three (MANUALplus 620). Additional control loops and software options are enabled as usual by entering the SIK number and a code number. Please note that **none** of the control functions realized in the current controller and rotational speed controller software, such as the master-slave torque control or certain filter functions, are available in this configuration.



iTNC 530 Milling Machine Control



MANUALplus 620 Lathe Control

Specifications

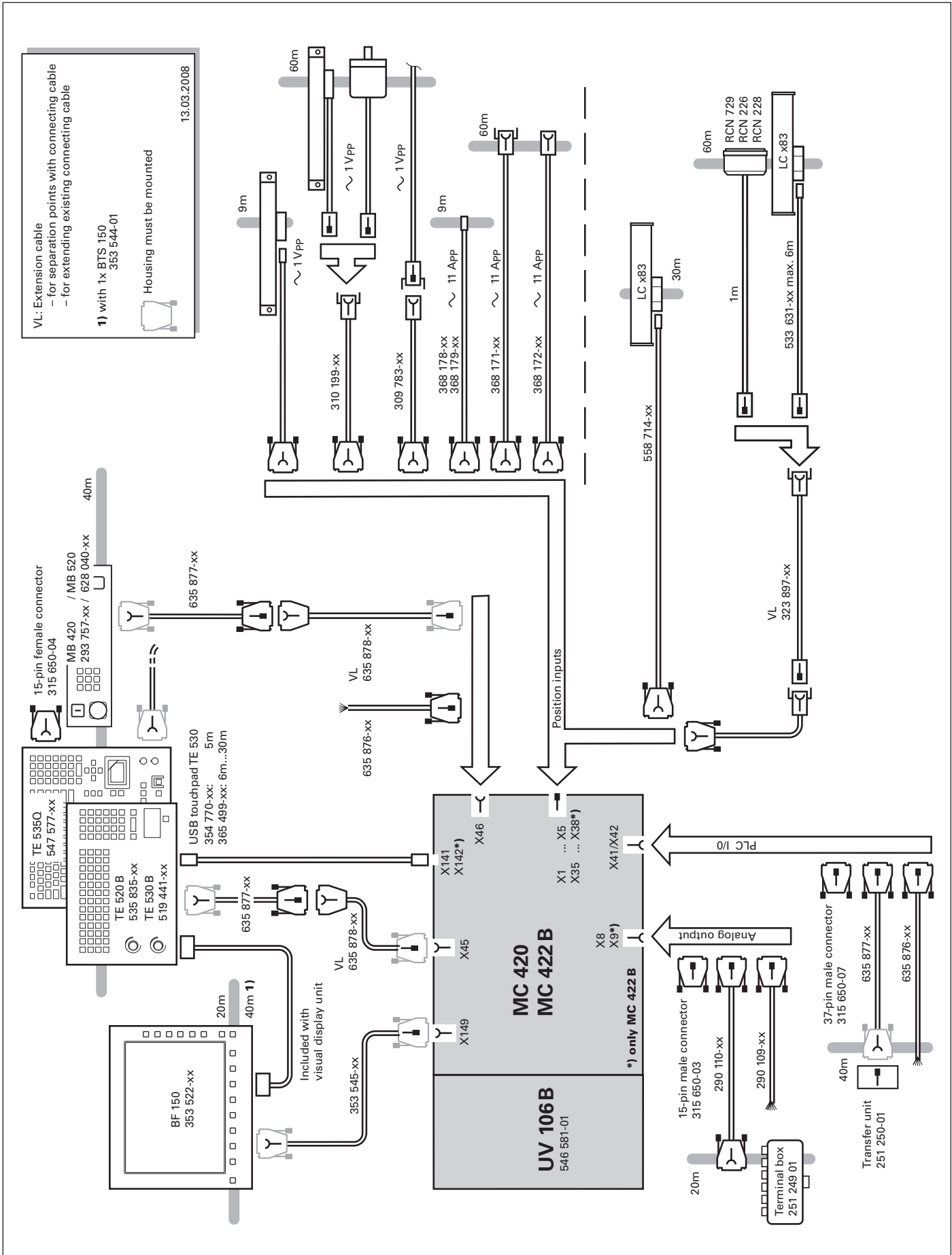
The table below shows the specifications for iTNC 530 and MANUALplus 620 for analog drive control insofar as they differ from digital control. All unchanged data are provided together with information on

machine interfacing, user functions and software options in the respective brochures titled "Features and Specifications for the Machine Manufacturer."

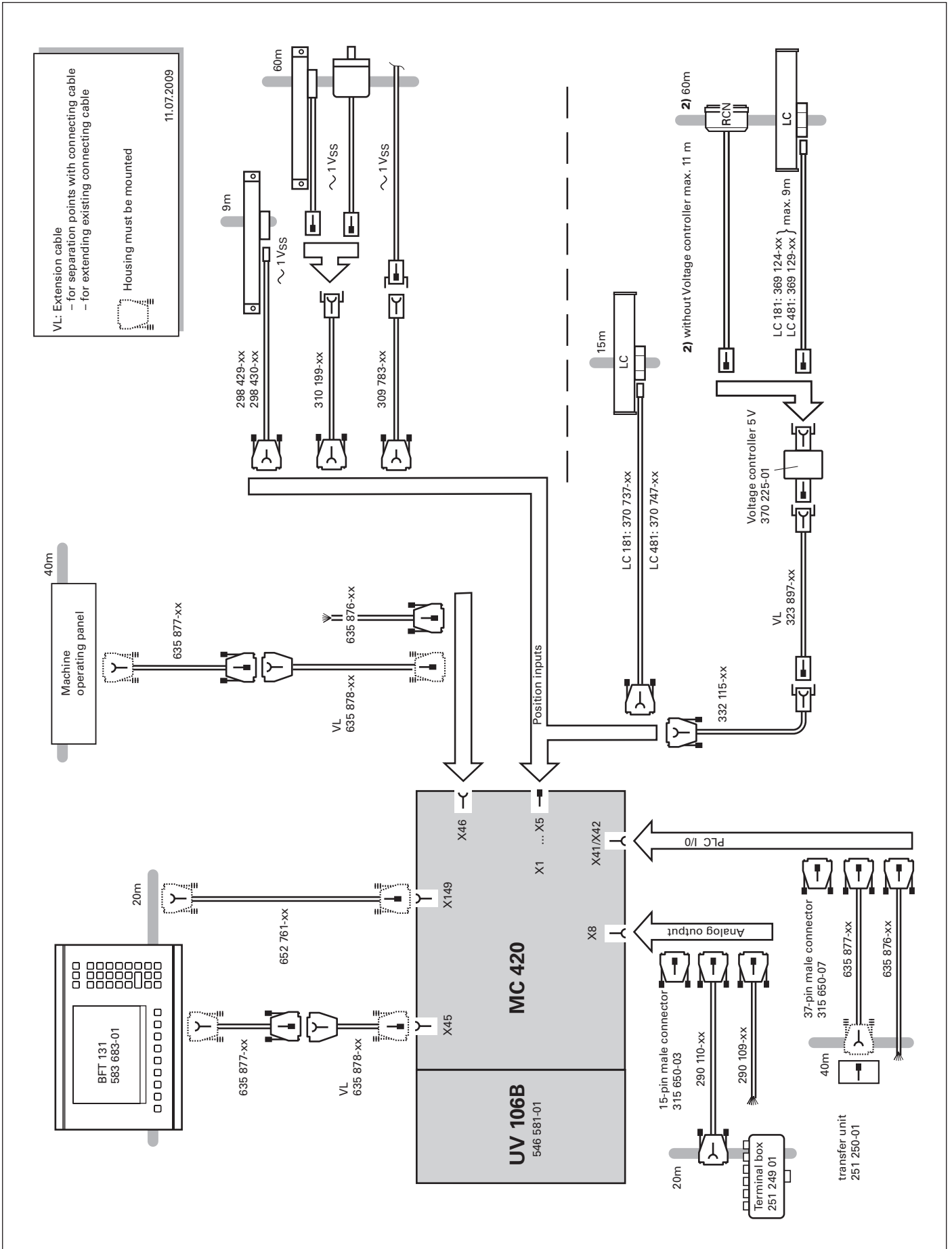
Specifications	iTNC 530 for analog drive control	MANUALplus 620 for analog drive control
Control systems	Starting with software 34049x-xx	
Main computer	MC 422 B (also with Windows 2000) MC 420	MC 420
Screen Operating panel	BF 150 TE 530 B or TE 520 B	BFT 131
Power supply	UV 106 B 400 V ± 10%, 50 Hz to 60 Hz, 400 W ID 546581-01	
Inverter systems	External via ± 10 V analog interface	
Control loops depending on SIK version	MC 422 B: Basic version 4; max. 10 MC 420: Basic version 4; max. 5	Basic version 3; options for C axis, driven tool, and Y and W axis
Spindle		
Shaft speed (input value)	≤ 100 000 min ⁻¹	
Axis feedback control		
Nominal speed value	Analog, ± 10 V	
Maximum feed rate	60 m/min using encoders with 20 µm signal period	
Control loop cycle time	1.8 ms	3 ms (6 ms for mixed operation of analog and digital control)
Block processing time	MC 422 B: 0.5 ms MC 420: 3.6 ms 0.5 ms with software option 2	MC 420: 3 ms

Machine Interfacing	iTNC 530 for analog drive control	MANUALplus 620 for analog drive control
Encoder inputs		
Position	MC 422 B: 5 or 10 MC 420: 5	MC 420: 5
Incremental	~ 1 V _{PP} or ~ 11 µA _{PP}	
Absolute	EnDat 2.1	

Cable Overview for iTNC 530



Cable Overview for MANUALplus 620

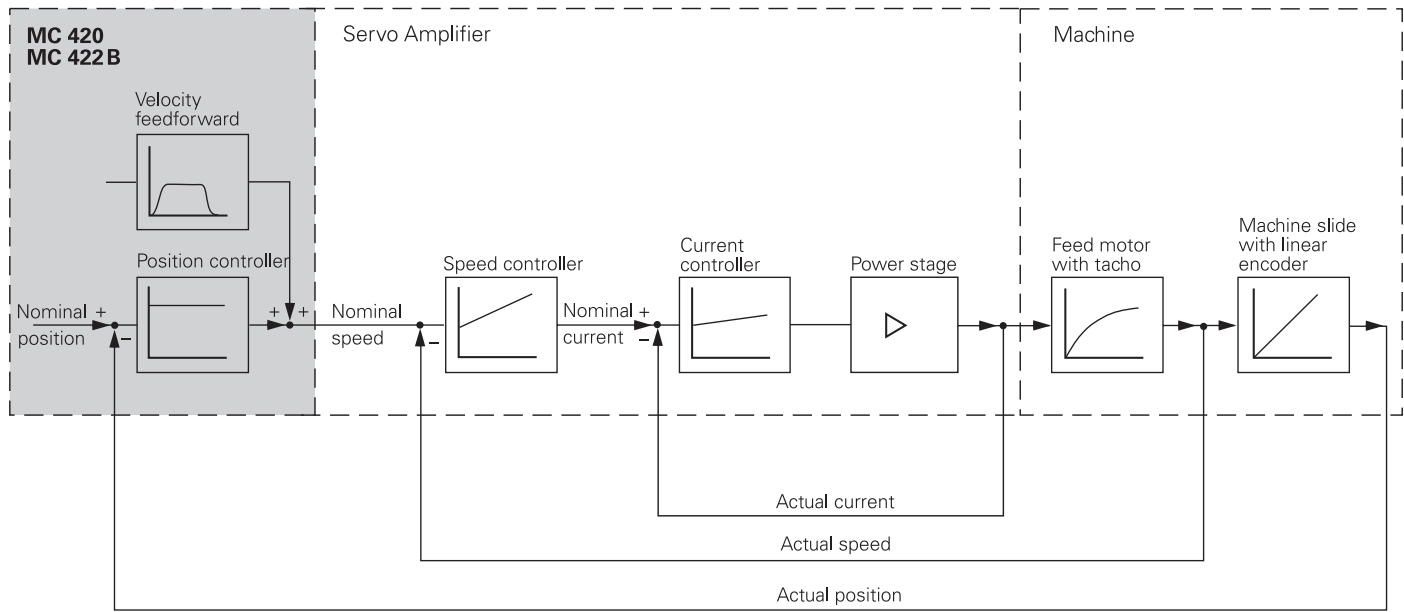


Servo Control of Axes

Analog speed command interface

The position controller is integrated in the control. The motor speed control and the current controller are located in the servo amplifier.

The control transmits the nominal speed value (i.e. speed command signal) through an analog $\pm 10\text{ V}$ interface to the servo amplifier.



Axis feedback control

HEIDENHAIN contouring controls can be operated with following error (also called lag) or with velocity feedforward control.

Operation with following error (servo lag)

The term "following error" denotes the distance between the momentary nominal position and the actual position of the axis.

The velocity is calculated as follows:

$$v = k_v \cdot s_a \quad \begin{array}{l} v = \text{speed} \\ k_v = \text{position loop gain} \\ s_a = \text{following error} \end{array}$$

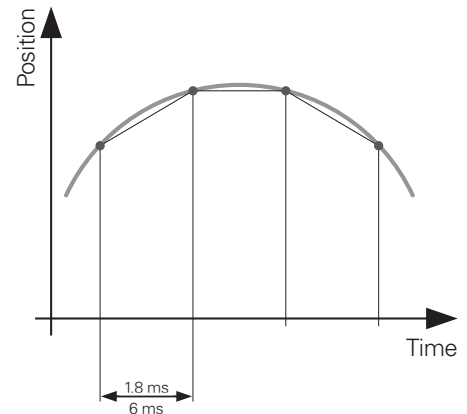
Operation with feedforward control

"Velocity feedforward" means that the speed command signal is adjusted to fit the machine. Together with the values calculated from the following error, it forms the nominal value. This greatly reduces the following error (in the range of a few μm).

Control loop cycle times

The cycle time for path interpolation is defined as the time interval during which interpolation points on the path are calculated.

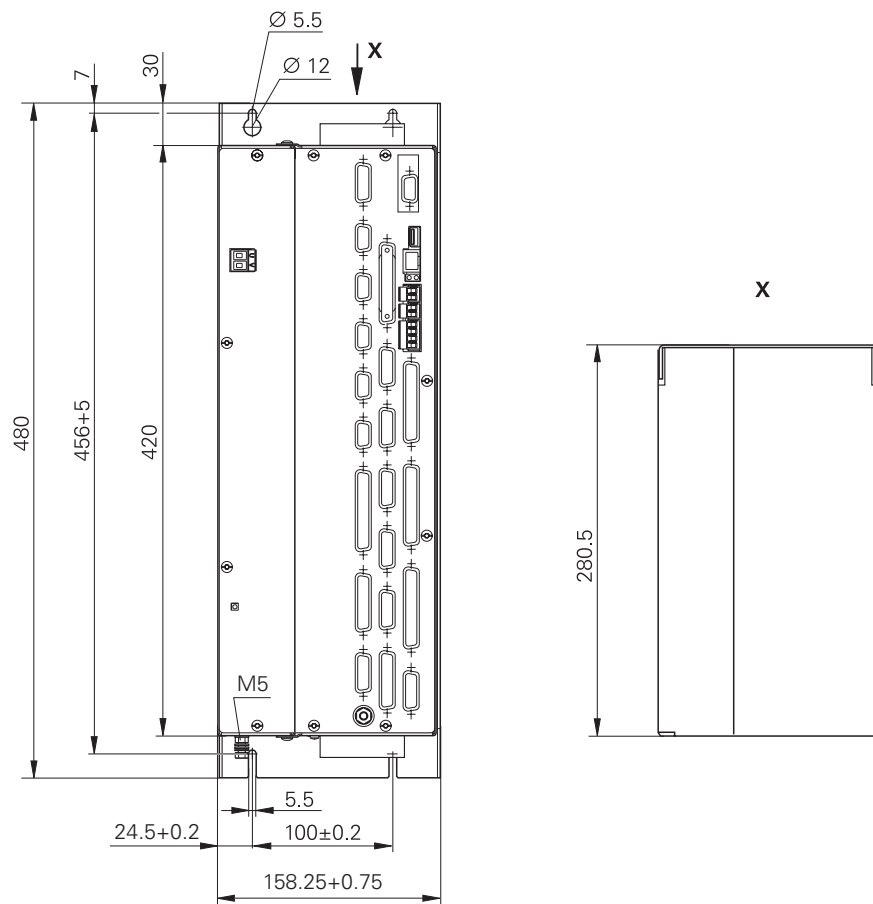
	Path interpolation
iTNC 530	1.8 ms
MANUALplus 620	3 ms



Axis clamping

The control loop can be opened through the PLC in order to clamp specific axes.

Dimensions

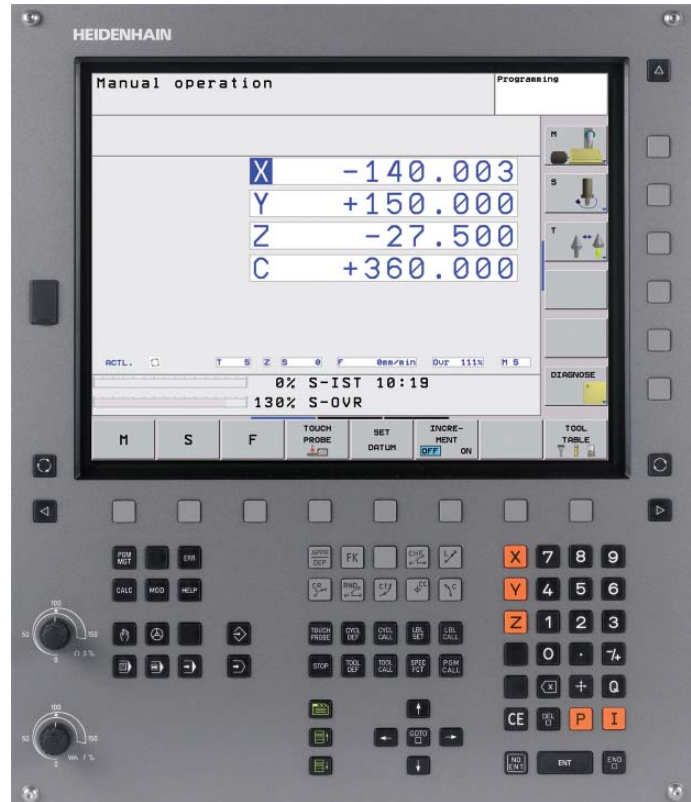


Other HEIDENHAIN Controls

With Analog Speed Command Interface

TNC 320 Contouring Control

- Compact contouring control for **milling, drilling and boring machines**
- Three (optionally four) closed-loop **axes** plus one closed-loop spindle
- Analog speed command interface
- Integrated keyboard and flat-panel color display (15-inch)
- Program memory: 10 MB on Compact Flash memory card (CFR)
- Program input in HEIDENHAIN conversational language, execution of ISO programs
- FK free contour programming
- Subprogramming and fixed cycles
- **User aids:** Programming graphics, verification graphics, program-run graphics
- **Programming aids:** Milling, drilling and boring cycles, parametric programming, coordinate transformation, subprogramming
- Machining with rotary tables (option)
- Tool and reference-point tables
- Connection for one HR electronic handwheel and one TS workpiece touch probe
- Data interfaces: Ethernet 100BaseT, RS-232-C/V.24, USB 1.1



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For more information

- Brochure: *iTNC 530—Features and Specifications for the Machine Manufacturer*
- Brochure: *MANUALplus 620—Features and Specifications for the Machine Manufacturer*