

DRILLFLEX

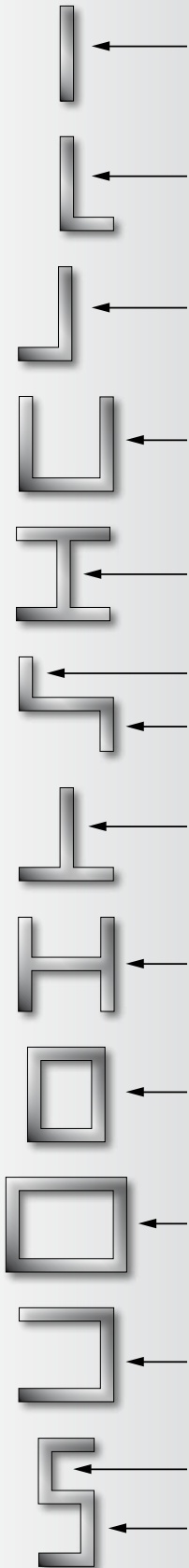
■ CNC HORIZONTAL MACHINING CENTER



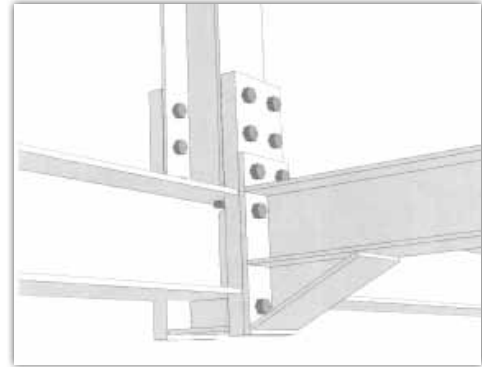
SYSTEMS



MUBEA DRILLFLEX - DF 1100



TIME IS MONEY



MUBEA SYSTEMS (DIVISION OF THE WORLDWIDE HACO GROUP) has developed a new automatic CNC MACHINING CENTER. Designed specially for the steel construction industry, a new concept, unique in **saving time, floor space, precision and money.**

INTRODUCTION

This CNC controlled machine, originating from German roots, incorporates **special features as follows:**

- Heavy Duty, robust designed machine
- High driving power
- High traveling speeds
- Optimal material and components choice
- Accurate and fine finish
- High safety standards and EC execution
- User friendly and reliable operation
- Designed with the most practical experience
- Optimal Price/Quality ratio
- International service offered by the HACO group

USER PROFILE

This **affordable machine concept** is specially designed for fabrication shops that wish to machine all kinds of profiles with high accuracy.

The principal profiles are Flat Bars, Angles, Channels, I-Beams, Z-Beams T-Beams, H-beams and Square / Rectangular tube sections and steel frames.

Hole patterns are programmed into the CNC Control System.

The machine can process workpieces either before or after the cut to length operation.

The customer can make this choice based on production requirements.



PROFILES THAT CAN BE PROCESSED

The MUBEA-DRILLFLEX type DF-1100 is capable of processing the following profiles: The horizontal Drill Head features a maximum diameter of 40 mm (1-1/2"). (Option 50mm – 2"). The position and accuracy of the holes to be drilled and milled is determined by the CNC program.

The sections than can be processed are:

- | | | | |
|---|---|--|---|
| – Flat bar : positioned vertically |  | – Z profiles : DIN 1027 |  |
| – Angles : qual or unequal leg according to DIN1028 and DIN1029 ... |  | – T-beams : DIN 1024 |  |
| – U-sections (Channels) : (UPN) DIN 1026 |  | – H-beams : HE |  |
| – I-beams : (IPN) (IPE) DIN 1025 |  | – Square/rectangular hollow sections : |  |
| | | – Various steelframes | |

Profile sections limits – Minimum 30 mm (1-1/16") – Maximum 1100 mm (43.3") both horizontal and vertical.



THE DRILLING-MILLING HEAD

The head is mounted horizontally to the machine frame and performs the Y- and Z-axis movements. It consists out of 2 components: the motor drive and the spindle. The whole constitutes a **heavy and deformation free unit**. The automatic electronic control of drill/milling feed and drill-milling speed ensures optimal work. The travelling motion of the Y- and Z-axis is by means of ball screws, driven by servo motors and servo regulators. The 2x2 ball-prism guiding ensures a perfect movement of both axes.



■ Drill spindle specifications:

- Clamping unit ISO 40 (optionally ISO 50)
- Max. Axial force: 10.000 N (2250 Lbs)
- Min. Speed: 100 RPM
- **Max. Speed: 2.750 RPM, the high speed and small feed ensure a short working time and a low wear.**
- Max. Length clamping unit: 300 mm (11.8")
- Tool Clamping : 12.500 N (2810 Lbs)

The Y- and Z-axis of the head is also suitable for:

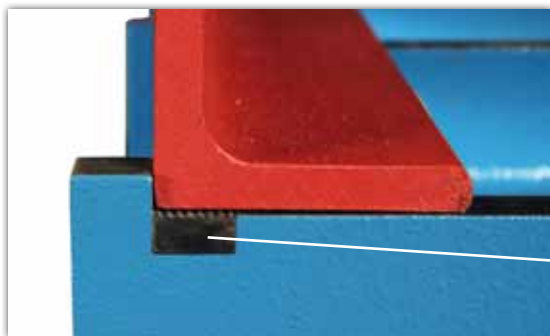
- Vertical and horizontal milling of slots
- Shape contour form milling
- Marking
- Tapping M4-M24 (M4-M30 for 15 kW option) (An expensive, delicate tapping unit is unnecessary).

■ Technical specifications of the drilling/milling head :

- Motor type : asynchronous
- Motor power : 11 kW (15 Hp)
- Encoder measuring system



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■ **ANTI-SLIP
TOOTH**



■ **SENSOR PROFILE
LIMIT**

■ **SENSOR
DRILL LENGTH**



■ THE MACHINE TABLE AND SUPPORTING SYSTEM

Together these items constitute the SUPPORTING SURFACE for the profiles to be processed. The supporting surface is leveled horizontally with high precision by means of a LASER BEAM measuring device. This can be accomplished quickly and precisely because of the very robust substructure of the separated table, supporting arms, and leveling bolts.

The supporting surface needs to be precisely aligned both longitudinally and transversally since it forms the basic reference for the complete machine.

Summary of Features:

- Highest flatness in both transversal and longitudinal direction.
- Robust substructure provides:
 - No vibrations
 - No deformations
 - No loss of flatness
- Another major reason for the robust substructure of the table, is that it is supporting the traveling column, and deformations are not permitted.
- The table supports are mounted with an interval of 250mm (9.8") and feature all an anti-slip reference tooth in order to enable proper profile clamping. The reference teeth forms a perpendicular reference in the length direction of the machine, the ZERO LINE.
- Standard dimensions are :
 - Basic length: 12.200 mm (40 Ft.)
 - total length: 14.450 mm (47,4 Ft.)
 - Width table: 280 mm (11")
 - width table supports: 1240 mm (48,8")
- Total width: 1.520 mm (60")
 - Height reference teeth: 10 mm (3/8")
 - Working height : 980 mm (39")
 - For sections from 30 up to 1100 mm (1.2" - 43")

The width of the table supports enables buffering more profiles when the machine is drilling. Maximum weight on the table supports: ± 10 ton (22,000 lbs).

■ POWER RAIL

Is the most modern and safe execution, this power rail is located underneath the drill table. The current is connected to a fixed point (at the right hand side) via a main switch. In the ON position, the inside of the rail is under constant power. Power from the electrical column to the traveling column is provided by **TOW CONTACTS** that run with the traveling column. The whole system is reliable, safe and clean. No disturbing cable chains and litter on the floor.

■ SENSORS FOR FINDING PROFILES

The machine is equipped with sensors to optically find the limit of the profile, and to measure the length of the toolbit.



■ PROFILE MEASURING SYSTEM (optional)

This **ingenious system** is required to measure the camber of the profile. The value of any distortion is measured by means of 1 or 2 sensors and a correction of the height of the hole to be drilled is performed **automatically**. In other words: the hole pattern follows the camber of the profile.



■ LUBRICATING SYSTEMS

Machines require well designed lubrication systems.

The basic machine is provided with following systems:

- Centralized manual lubricating system to lubricate all important places with only 1 hand movement. (auto lubricating optionally)
- Drill/milling and threading unit lubrication: i.e. cooling of the cutting tools. Tools are cooled internally /externally, the threading unit is cooled externally only. Cooling is performed by means of an oil mist (micro-drop). This mist is produced by an independent lubricating group.

■ TOOL-TOOLHOLDER MAGAZINE

- With a clamping unit ISO40
- Drill diameter 3 – 40 mm (1.8" – 1-1/2")
- Milling diameter 12 – 30 mm
- Tapping arrangement for M4 – M30.

Three different systems are available for tool changes:

- Manual insertion with a magazine of 12 tools (standard execution)
- Automatic linear magazine of 5 tools with ATC (Automatic Tool Change) (Optional)
- Automatic rotary magazine of 10 tools with ATC (Optional)





HORIZONTAL RACK

The rack is solidly attached to the drill table which insures (via a driven pinion) the horizontal movement of the traveling column along the X-axis.

MACHINE GUIDINGS

Since the traveling column is traveling on the guides of the table, it is important that the table substructure is very robust. The horizontal and vertical threads of the table (which support the traveling column via over dimensioned and adjustable eccentric roller bearings) has the additional feature of brushing and air blowing of the chips. This prevents damage and results in a long lifetime of the threads.

Dimensions of the roller bearings:

- 4 x D 90 mm (3.54")
- 2 x D 160 mm (6.30")



TRAVELLING COLUMN

The traveling column is the most important part of the machine, supported by both table threads. The traveling column supports the following machine elements:

X-AXIS

Horizontal movement along the length direction via a rack and pinion drive system and 3.3 kW (4 Hp) motor, with a lubrication point on the rack. The horizontal travelling plane is provided with air blowers, brushes and scrapers in order to keep it clean.

- Linear traveling speed 45 m/min (1.770 IPM) (adjustable).
- Laser zero-point X-axis
- The traveling column does not touch the floor surface (it features only a springy supporting roller). Externally, underneath the platform, a safety buffer is provided. This buffer stops the machine instantly when an obstacle on the floor is detected; an extremely reliable safety arrangement. The traveling column features a housing of metal sheets and transparent windows which allow control of the operation of the machine, as well as a door with electrical safety lock (EC).

Y-AXIS

This is the horizontal longitudinal movement of the drilling head, through a ball screw drive system:

- Stroke of the Y-axis: 550 mm (21.6")
- Linear traveling speed: 15 m/min (590 IPM)
- Motor Power: 2.14 kW (3 Hp)
- Ball screw drive system: dia. 40 x 5 mm
- 2 X ball-prism guiding: size 35 mm

The advantage of the Y-axis drive against a hydraulic push-movement, is the controlled tool spindle feed when drilling/milling and especially when tapping. In this case, a special tapping unit is not necessary, and there is no danger for fracture. This means genuine synchronous tapping. The application of modern hard metal cutting tools (working with inserts) which allows a very short working time is another big advantage of the principle of working with controlled drill/milling spindle feed combined with high speeds (RPM). As an example: drilling a hole with diameter 40mm (1/12") in 10mm (3/8") profile thickness only requires 4,5 seconds.

Z-AXIS

This is the vertical movement of the complete machining unit:

- Stroke (height): 1100 mm (43.3")
- Ball screw drive system: D 40 X 10 mm
- Motor Power: 3.3 KW (4 Hp)
- Linear traveling speed : 30 m/min (1.180 IPM)
- 2 X ball-prism guiding : size 35 mm

The Z-axis, together with the X-axis, in the vertical plane, determines the position of the work to be executed.

CLAMPING SYSTEMS

The machine houses 3 hydraulic clamping systems

1 - Clamping of the traveling column.

The traveling column is clamped by a hydraulic cylinder, prior to drilling/milling, to the table.

- Clamping force : 65 kN (14,600 Lbs)
- Cylinder stroke : 10 mm (3/8")

2 - Clamping of the profile/work piece

The work piece is clamped and immovable during the working operation.

- Clamping force : 60 kN (13,500 Lbs)
- Cylinder stroke : 1.100 mm (43,3")

This clamping shoe also contains a vertical measuring system to measure the height of the profile.

3 - The tool holder is clamped to the spindle of the head with a clamping force of 5 kN (1,124 Lbs).

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■ TECHNICAL GROUPS

Hydraulic group

This compact unit is housed in the cabinet of the traveling column, and powers the 3 machine clamping systems, ensuring proper functioning of the machine.

- Power : 2.2 KW (3 Hp)
- Max. pressure : 175 bar (2,538 PSI)
- Pump flow : 20 l/min. (5.3 gal/min.)

Pneumatic group

This compact unit is also housed in the cabinet of the traveling column. All necessary elements to produce compressed air are present, such as:

- Compressor : 1.3 KW (1.5 Hp)
- Compressed air tank
- Flow 180 l/min at pressure of 6 bar (47gal/min. at 87psi.).

With all elements such as filter, water separator and pressure regulator.

Electrical equipment

The spacy electrical cabinet is free from dust and splash water.

The current originating from the power rail feeds the electrical cabinet. This cabinet includes all electrical high and low voltage components as well as electronic hardware, such as drivers, etc...

Standard Voltage:

- 3 x 400 Volt – 50 Hz (3x220-440-60 Hz)
- Fuses 40 Amp
- Total installed power: 25 KW

■ COMPUTERCONTROL

The control system is based on a SIEMENS SINUMERIK 840 D SOLUTION LINE, CNC controller with Sinamics S120 motors. The complete Siemens hardware is located in the electrical cabinet, ensuring shock-and dust free operation.

Specifications Sinumerik 840D SL:

- 24 V Inputs and Outputs with transistor protection
- NCU 710.2 with Intel Celeron D processor
- Digital CNC – Drive system with integrated Simatic S300 – PL317-2DP CPU
- Controller with maximum 6 axes
- Basic memory 3MB SRAM for programs and user parameters
- Siemens industrial PC for graphical visualization of machine, work pieces and diagnostics
- Siemens PCU50.3 with Intel Celeron M Mobile processor – 512 MByte Ram – 40Gbyte hard disk.
- Windows XP-ProEmbSys operating System.
- 2 X Ethernet 10/100Mbps/s Inputs
- 4 X USB 2.0 Modems
- Input for RS232 cable
- Software for online assistance

■ ROBOSOFT-MUBEA USER INTERFACE

- This unit is mounted to the outside of the housing of the traveling column. The machine operator programs the machine in a user friendly, disturbance free environment. The user interface allows for easy following all machine operations.
- Robosoft industrial 19" Touch Screen TFT.
- Graphic monitor with resolution 1024 X 768 pixels for graphical visualizing of axes positions, parameter tables and graphical diagnostic functions.
- Flat, integrated numerical keyboard
 - "Touch Screen" keyboard
 - Push buttons and signal lamps
 - Import of work piece programs via USB-stick or optionally with wireless network connection or others.

■ SOFTWARE "ADAT STEEL"

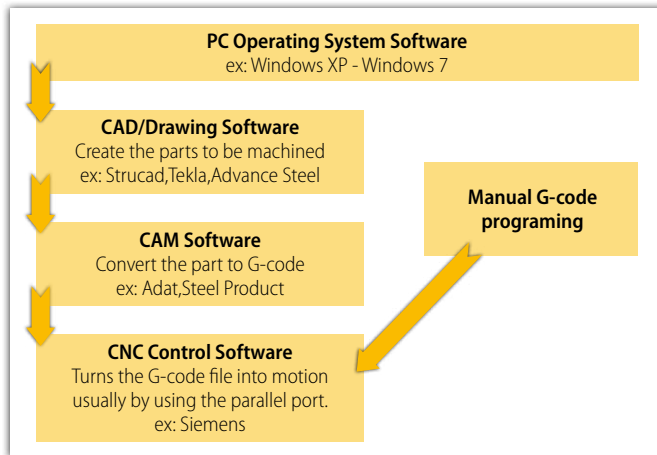
The machine is executed with integrated software with the following characteristics:

- Manual input of work pieces
- Manual input of operations
- Correction or modification of existing work pieces
- Selection from a list with DSTV files
- Graphical visualization of work pieces on the screen
- Software package for successive processing of separate profiles located on the supporting table
- Integration with the program preparing office provide that additional software packages are ordered, see Options E2-14
- Diagnostics: overview of most important control points of the machine, such as sensors, switches, etc...



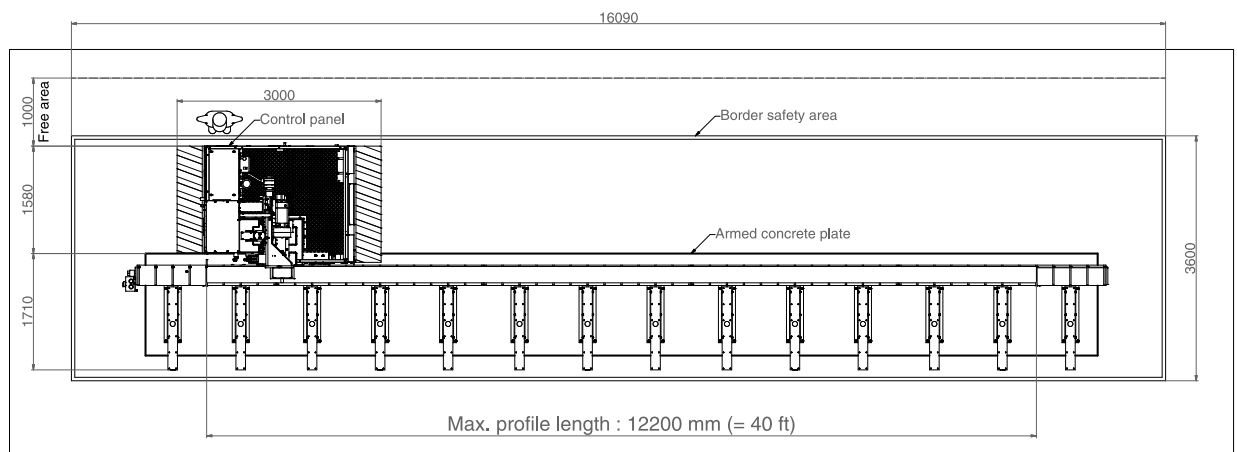
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TECHNICAL SPECIFICATIONS



TYPE	WORKING LENGTH	TOTAL LENGTH	WIDTH	Z-STROKE	Y-STROKE	WEIGHT
DF-1100/12	12.200 mm (40 Ft.)	14.450 mm (47.5 Ft.)	3.600 mm (11.9 Ft.)	1.100 mm (43.31")	550 mm (21.6")	9.850 kg (21.670 Lbs)
DF-1100/15	15.250 mm (50 Ft.)	17.500 mm (57.5 Ft.)	3.600 mm (11.9 Ft.)	1.100 mm (43.31")	550 mm (21.6")	11.230 kg (24.700 Lbs)
DF-1100/18	18.300 mm (60 Ft.)	20.550 mm (67.5 Ft.)	3.600 mm (11.9 Ft.)	1.100 mm (43.31")	550 mm (21.65")	12.610 kg (27.740 Lbs)
DF-1100/21	21.350 mm (70 Ft.)	23.600 mm (77.5 Ft.)	3.600 mm (11.9 Ft.)	1.100 mm (43.31")	550 mm (21.65")	13.990 kg (30.770 Lbs)
DF-1100/24	24.400 mm (80 Ft.)	26.650 mm (87.5 Ft.)	3.600 mm (11.9 Ft.)	1.100 mm (43.31")	550 mm (21.65")	15.370 kg (33.815 Lbs)

VIEW ABOVE



MUBEA SYSTEMS

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