

AFFOLTER AF140

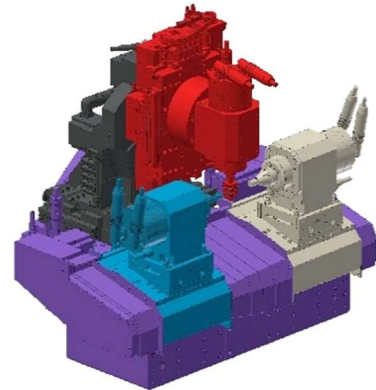
AFFOLTER AF140 CNC gear hobbing machine has a horizontal working axis for hobbing or milling teeth on straight and helical spur gears, pinions, wheels and shafts. It is equipped with a AFFOLTER Pegasus® digital control system. The machine frame is made of mineral cast iron, providing excellent thermal stability and better vibration damping, which increases tool life. The frame is mounted at 3 points on a mechanically welded base. The tool and workpiece are driven by a motor spindle (direct drive). The tilt angle of the hobbing head as well as the shifting are automatic and programmable.



1 MACHINE SPECIFICATION

1.1 Machine capacity

Max. part diameter	40 mm
Max. part length	125 mm
Max. machining part	50 mm
Max. module	1.0 mm
Max. hob cutter diameter (gear hobbing)	32 mm
Max. hob cutter length	30 mm
Tilt angle of the hobbing head (A axis)	+/- 30°
Max. rotation of the hob spindle (B axis)	16'000 min-1
Max. rotation of the workpiece spindles (C-C' axis)	5'000 min-1



1.2 Axes controlled by CNC

Axis	Description	Power	Torque	Vitesse	Course
A	Angular positioning of the hobbing head			18 tr/min	+/-30°
B	Hob cutter motor-spindle drive ACF30	2.1 kW	2.7 Nm	16'000 min-1	360°
C	Headstock motorspindle drive	0.5 kW	2.7 Nm	5'000 min-1	360°
C'	Tailstock motorspindle drive	0.5 kW	2.7 Nm	5'000 min-1	360°
X	Radial feed			10 m/min	46 mm
Y	Tangential feed "shifting"			10 m/min	60 mm
Z'	Headstock axial feed (without clamping option F)			10 m/min	60 mm
Z	Axial feed against tailstock			10 m/min	60 mm
C, C'	Headstock/tailstock clearance without driving centers and holders				223 mm

1.3 Motorspindles description and options

- Encoder position-controlled motorspindles;
- Temperature stabilisation by means of a water-Glycol circuit;
- Continuous speed variation;
- Tool holder clamping ACF30 ;
- Part clamping on C-C' : Standard driving center, optional collet clamping type F10/L10 ;
- Retractable pin system, part clamping control.

1.4 Linear axes

- Servomotors coupled to ballscrews by means of notched belts and couplings ;
- Ballscrew nuts with high preload ;
- Guiding rails with rollers on all axes ;
- Position monitoring by means of an optical ruler with a linear resolution of 0.5 µm on the X- and Y-axes as standard ;

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	TITRE	TECHNICAL DATA SHEET AF140	
	DOCUMENT	ATSA-R01-DO-025-e	001 03.07.2025

1.5 Commissioning data / electrical connection

- Power consumption (without AF73) 3.8 kVA
- Power consumption (with AF73) 6 kVA
- Connection value 3 x 400 V ($\pm 5\%$)
- Cross-section of the feed wire 5 x 2.5 mm²
- Power supply fuse 16 A type D delayed
- Frequency 50 Hz ($\pm 2\%$)
- Control voltage 24 V DC

2 HOBBING PRODUCTION

2.1 Hobbing features

- Straight
- Helical gear
- Straight bevel gear
- Face gear
- Crowned gear : straight / helical

2.2 Quality features

CNC GEAR line hobbing machines are highly accurate (VHP). The quality of hobbing is strongly dependent on several factors such as the quality of the cutting tool (hobbing cutter), the precision of the clamping tool and, finally, the quality of the blank parts. The quality is commonly classed DIN 6 according to DIN 3962. In any case, only machining tests with specific parts will allow us to make a statement based on the quality of hobbing.

2.3 Production analysis

Machining time, production per hour, Shifting number counter, total number of parts. Pre-heating program and machine stop by programming the time or number of parts.

2.4 Electrical distribution cabinet

Includes all control and drive units. Cooling by air circuit.

2.5 Chip removal - filtration

- The cooling liquid tank is integrated in the machine base. It can be easily removed for cleaning, draining and chips evacuation.
- The coolant flows out of the machining environment through an opening in the machine base and frame.

2.6 Oil cooling system

- Tank with a capacity of about 90 liters, with a pump with a flow rate of 25 l/min at 1 bar (10 bars en option).
- A hose is available to rinse manually the machining zone.

2.7 Centralized lubrication

Automatic and programmable lubrication of linear guides and ball screws by means of a minimum- flow system.

2.8 Full protection

Retractable, transparent Plexiglas cover of the machine makes it easier to access during machine set-up.

3 NUMMERICAL CONTROL

3.1 CNC AFFOLTER Pegasus numerical control

The AFFOLTER digital control is equipped with a high-performance industrial PC offering high processing power and ensuring extremely fast regulation and interpolation cycle times. It controls all machine axes as well as a multitude of peripherals for various options and automations. The programming is simple and user-friendly with its 19" colour TFT touch screen. Among other things, there is the possibility to connect the machines to the workshop network and to load the programs on a PC.

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- 12 axes interpolated simultaneously at high speed;
- Human machine interface with 19-inch touch screen;
- Simple handling and programming, no CNC knowledge required;
- Specially developed software for hobbing with full functionality such as jog mode, tool definition, program editor and production monitoring;
- Creation and editing of the part program by simple parameterization or in APD (Affolter Plaintext Dialog) with plain-text program functions, specially adapted for hobbing;
- Saving part-programs on the CNC, or on a PC ;
- Program transfer via USB stick or optionally via Ethernet or WLAN (wireless) workshop network.

4 HOBBING OPTIONS

4.1 Deburring

The AF140 machine offers 2 deburring modes:

- Double hob deburring: 2 hobs mounted on the same cutter holder shaft for milling in opposite directions (this mode is included in the basic machine);
- Deburring with a cutter or deburring wheel: AF51 and AF52 plus deburring unit (mechanical option);

4.2 Skiving

4.3 Part orientation

4.4 Part clamping detection

4.5 Types of hob and cutters

1. Single start hob
2. Multi start hob
3. Single start index cutter
4. Multi start index cutter
5. CYLKRO cutter
6. Straight bevel gear cutter (CONIXS / CONIKRON).
7. Shank type hob

5 OTHERS

5.1 Paint

Machine standard colour

- RAL 7035 light Gray
- RAL 7016 charcoal Gray

5.2 Size and weight

- Basic machine dimensions (L / D / H)* 850 mm / 1'050 mm / 1'810 mm
- Weight (base machine without liquids)* 990 kg

**Les dimensions et le poids peuvent varier en fonction des types d'automation et d'options.*

5.3 Basic technical documentation on USB stick

- Instruction manual (use and maintenance)
- Technical manual (mechanical and electrical)
- Electrical circuit diagrams