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# **FORVET NC WORKING CENTRE “FRANCESCA” MODEL FC 16M 1600 MILL**

## **MACHINE INFORMATION AND SPECIFICATIONS**



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## **THE MACHINE**

The FRANCESCA FC 1600 is a glass working Numerically Controlled (NC) working centre, capable of performing drilling, countersinking and milling operations on flat glass sheets, ranging in thickness from 3 to 25 mm. including “out of square” pieces.

The drilling operation is capable of drilling a maximum diameter of 70 mm with larger diameters achieved by the milling feature.

The useful working field for width is 1600 mm and without limits for length. Additionally, there is no inter-axis restriction between holes locations.

The clever machine design, that always characterizes the Forvet productions, has an open front end. While all other similar drilling equipment does not allow for glass larger than the specs., FC 1600 can process glass width that exceed the machine size. This means that glass 1800, 2000, 2200 mm can be loaded and operated, with a minimum of discomfort.

The working cycle is completely automatic, without any manual intervention. The NC optimizes the approaching speed of the heads, controls the glass transport feed, drilling speed and water quantity and adjusts the drill height to compensate for its wear. The operator is required only to provide the hole diameter and its coordinates.

### **Drilling**

Two opposing multi-spindle drilling heads, each one capable of holding 8 tools, compose the drilling group.

The multi-spindle heads are manufactured of a light alloy material and have a particular patented method of operation. It permits the rotation of only one spindle at a time (the spindle in working position), allowing a speed of 10,000 rpm without any vibrations, providing the advantage of high processing quality and fast execution time.

### **Countersinking**

The countersinking operations, if requested, are performed in fully automatic cycle without manual operation or data input requested to the operator. The NC automatically manages the desired countersinking depth, for both the upper and lower sides of the hole.

### **Milling**

In addition to the drilling and countersinking operations, the machine is capable of milling in various shape of glass, ranging in thickness up to 25 mm.

Producing straight slots in the glass work-piece either the X or Y axes, it is also capable of interpolating the axes, allowing any possible design to be achieved.

Speed of operation may be set in accordance to the glass thickness, tool condition and may vary between 3 to 35 mm/sec.

The milling tool can be installed regardless the position over both heads.

The two multiple rotating heads are completely released from each other which offers the following advantages:

- Drastic reduction of the masses to be positioned, with evident increase of the movement speed.
- Higher acceleration and deceleration thanks to the reduced inertia of the masses in movement.
- Extreme high speed in the execution of the milling operations, which can be performed directly in the glass without the necessity of the previous holes of emptying.
- Better access for ordinary and extraordinary maintenance

### **Compact Main Structure**

The structure is built with a 4 tons compact body

- This warrants sturdiness and solidity in the time.
- It will be not necessary to adjust the machine leveling, as even the transport system of the glass is "built-in" on the main structure itself.

### **Glass Transport and Dynamic Vacuum System**

This system, based on the well-proven technology developed and patented by Forvet, makes the Francesca 1600 very unique.

The innovative "dynamic vacuum belts" system (patented) allows the glass to be held with a capacity without equal, both in the simple movement of glass transport positioning and during the milling operations.

The vacuum in every sector of the belts is activated/deactivated according to the glass position. The control system also keeps in consideration the geometry of the shaped glass optimizing the maximum glass grip in all situations.

In case the control system considers the ability of the vacuum insufficient, (i.e. in case of particularly complex geometric forms or very small glasses with many holes), two hold-down devices with rollers are automatically activated to guarantee the necessary glass holding on the transport belts.

The advantages are:

- One only belt is sufficient to transport and process even big glass dimensions
- There are no components in contact with the coated side of the glass and therefore any LOW-E glass can be processed without risk
- High glass positioning speed
- High positioning accuracy and repeatability
- The absence of natural rubber carried over the surface of the belts increases their life and performances in the time

The height of the working level (920mm) and the disposition of the control panel make the machine ready to be inserted in line with other machines (grinders, washers).

In the electrical box the space for two additional inverters is foreseen to drive additional entry/exit conveyors.

## **Additional "Cascading" Tool Cooling System**

Inside the central hold-down a circular conic passage forces the cooling water, to escape with speed ten times more than the one of entry.

Advantages:

- perfect lubrication and forced cooling on the milling and countersinking tools
- the glass surface is always cleaned

## **Electrical and Electronic Features**

All the electric and electronic devices, the pneumatics, water, vacuum and automatic lubrication systems are well compacted inside two cabinets set to the sides of the machine. In this way a global vision of all the systems is available, very useful and comfortable also in case of troubleshooting.

## **Machine Design**

Advantages:

- The machine is "Plug & Play". The installation and the technical checks and test require just one day!
- There are not electric cables, terminal block or derivation boxes to disconnect for the shipment and to re-connect for the installation: this allows an easy installation and it avoids any possible human error.
- It is not necessary to make again the leveling of the glass transport belts because they are integral part of the machine.
- With equal glass dimensions the FC 1600 requires less space even respect to the vertical drilling machines.

## **CAM "FOR-EASY" Programming**

To ease the operator's life in programming the machine, new software has been generated. FOREASY is the latest addition to the company technology. Fully developed in house, this software is the easiest way to program any kind of cut out with the help of a built in catalogue or parametric program. The program proposes either to the user the specific pre-programmed contour of the notch requiring the operator only to "drag and click" to the final position or to add dimensions and diameters for any specific variations of the contour. This program is extremely intuitive and can be easily used by operators without extensive mathematical or geometrical knowledge.

## **CNC**

The entire system includes:

- Siemens 64 axes Numerical Control  
Industrial keyboard with mouse incorporated
- Industrial Personal Computer with Pentium processor (800 MHz with DVD Rom integrated)
- Operative system Window XP
- Industrial colour monitor, TFT 15"
- Auto CNC-PLC diagnostic

\*During each productive process, the NC analyses all the machine's functions in real time, identifies eventual faults and defines their causes.

## Remote Service

Software package to support technical interventions provided from remote locations (i.e. Forvet Service Department) by connecting into customer's computer through dedicated international analog telephone line.

## TECHNICAL DATA

• Working area:	
X axis	free
Y axis	max. 1600 mm.
• Glass thickness	from 3 to 25 mm.
• Max drilling diameter	70 mm.
• Number of spindles	16 (8+8)
• Spindles rotation speed	0-10.000 rpm
• Spindles feed	0,2-3 mm/sec.
• Milling speed	from 3 to 35 mm/sec.
• Axes positioning speed	30 m./min.
• Axes positioning accuracy	+/- 0,25 mm/m.
• Compressed air	> 6 BAR
• Water pressure	> 4 BAR
• Installed electrical power	12KW, 380V 50Hz
• Max glass weight	350 kg

## OPTIONS

- 2nd FOREASY Cam software package for office operations
- RS code – Bar Code system
- Automatic sharpening system

### **RS Bar Code Software**

The Forvet RS & Bar Code Software Program enables a machine operator to load a program file for the Forvet by scanning a glass label barcode that contains the order number and item number information, thus streamlining the production process by eliminating the operator's step of navigating to a folder on the file server to select and import the file to the Forvet. The software will read labels with maximum eight (8) characters to identify the product.

Once installed, the operator is only required to point the scanner over the label and to press the start cycle button. If the requested job includes a cut out or holes with tools not available on the machine turret, the cycle does not start and a message will ask the operator to fit the requested tooling. This package includes the software and the connection cables but does not include the scanner. Please see recommended models below:

DATALOGIC TOUCH 65 (connection RS232)

DATALOGIC GRIPHON (connection RS232)

DATALOGIC DRAGON (connection RS232)

<http://www.scanning.datalogic.com/>.

NOTE: The connection between the Barcode scanner (reader gun) and the PC *must* be an RS232 - 9 Pin Connection. For the system's operability, it is important that the preprogrammed jobs are resident into the machine memory.

### **Automatic Tool Sharpening Device**

This system automatically performs the tools sharpening when necessary, without manual interventions.

When the tool has reached its "life limit" (set from the operator according to the tools quality) a special tile of commercial dimensions is automatically interposed among the tools that performed a cycle of auto-sharpening. The software manages the sharpening position to optimize the consumption of the tile. A message advises the operator when the tile has to be replaced.