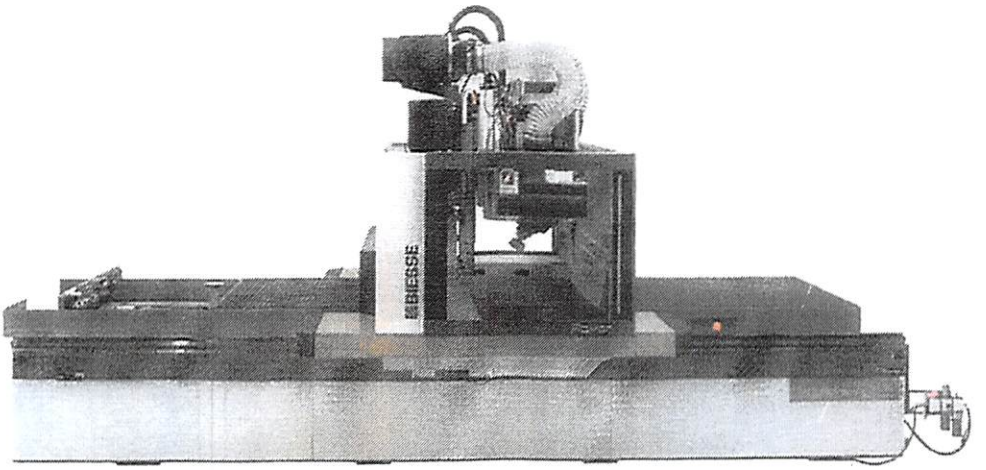
BIESSECANADA

ROVER A FT 1536

Numerically controlled machining centre



	QUANTITY
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Numerically controlled machining centres ROVER A FT

BIESSE has been certified ISO 9001 since 1995 and works in accordance with the UNI EN ISO 9001:2015 norms.

The running tests of each machining centre include the following stages:

- Intermediate control of operating units and pre-assembled components
- Non-stop running test as machining simulation for a minimum period of 10 hours
- Control of X and Y axes precision and positioning repeatability by means of an interferometric laser (VDI/3441 norm)
- Gauging of the X and Y axes through a software function: the values detected during the laser tests are elaborated by the N.C. and transmitted to the axes drives to improve the positioning precision
- Functional tests for routing and boring operations on panels positioned on all the machine origins

Structure

Biesse design is based on a CAD/FEM product for solid modelling and structural analysis which allows to determine the possible structural distortions caused by static and dynamic loads and to dimension the most critical components, highlightening the most stressed areas which need strengthening.

- **Machine frame**
  The machine frame is made of thick electrowelded steel with a closed ring structure, properly strengthened in the most stressed areas.

- **Upright beam**
  The upright beam, mobile in the longitudinal direction (X axis) is made of electrowelded steel with gantry structure: thick steel sheets and reinforcing transversal elements grants a higher rigidity and allow to obtain the maximum accuracy.

- Transversal and vertical carriages
  The transversal carriage (Y axis) and the vertical carriage (Z axis) are made of an aluminium light alloy casting which is stabilized and then machined for maximum precision.

Movement of controlled axes

- Axes drives and motor systems
  Biesse uses Brushless motors, controlled by digital axes drives.
  The digital system Mechatrolink allows the following:
  - Higher machining speed, since a portion of the toolpath is controlled by the axis drive instead of the numerical control
  - Higher working precision, thanks to a faster data processing
  - Higher reliability, thanks to a reduced wiring system which eliminates electrical interferences that may occur on analogue systems
  - Reduced machine stops and downtime, thanks to the errors diagnostic with explanatory messages displayed directly on the N.C.

- X and Y axes transmission system
  For the operating unit movements along the longitudinal axis (X axis) and transversal axis (Y axis), Biesse uses the solution with pinion, rack with helical teeth and a precision reducer with single pinion. Both rack and pinions are built in accuracy class 6 (DIN 3962 norm).
  The mobile upright beam has two independent motors, one on each side of the machine frame.

- Z axis transmission
  As the operating unit moves in the vertical direction (Z axis), BIESSE uses the ball-screw system in accuracy class ISO 5 with preloaded nut for backlash compensation and repeatability in positioning precision. The movement is transmitted to the screw through a flexible joint.

- Axes guides
  All axes move on tempered and rectified steel linear guides by preloaded recirculating balls bearings. Each balls bearing is equipped with 4 sliding gaskets of which 2 internal and 2 external, to protect the bearing from chips and dust intrusion.

Manual centralized lubrication system

The centralized lubrication system with 2 greasing points allows using the pump supplied with the machine, to manually convey the grease to:

- Recirculating balls bearings of the X, Y and Z axes
- Rack and pinions system of the X and Y transmissions
- Ballscrew nut of the Z axis transmission

A warning appears on the screen signaling the lubrication needed.

Work area

- FT Worktable
  The worktable is available in 2 different technological choices and interfaces depending from the application and customer final product : HFT and FT PLUS.
  * not included in the base machine.

- Working areas
  The machine has 1 working area with 2 left origins, 1 front and 1 rear and 2 right origins, 1 front and 1 rear.

- Pneumatic reference stops
  The machine's origins are determined by a set of stops with pneumatic movement which grants maximum positioning precision.
  The base machine includes:
  - 4 pin reference stops for rear LH area with 60 mm stroke
  - 6 pin reference stops for front LH area with 60 mm stroke
  - 2 side stops (LH side) with 60 mm stroke
  - 2 side stops (RH side) with 60 mm stroke

- Vacuum system and locking zones
  The vacuum system, needed for part locking, includes a buffer chamber which grants a constant and high level of vacuum ensuring a quick spread on the worktable during locking cycle and maximum vacuum force during machining operations.
  The worktable is divided in 2 locking zones to optimize locking of panels with smaller dimension.
  Vacuum locking is activated by 2 photocells positioned underneath the basement matching the right and left area.

  · For size 1224 only one locking zone is possible

- Prearrangement for the connection of minimum nr. 2 250 m3/h or 300 m3/h vacuum pumps, or more pumps when selected (max. 3).
  It includes the electrical components, vacuum distribution pipes, 1 analogic and 1 digital vacuum meter. The digital vacuum meter splits the vacuum minimum level, used during the spoilboard surfacing operation, from the higher level used during the standard production.

Operating unit

- Prearrangement for Electrospindle
  Inclusive of electrical wiring to the electrical cabinet and pneumatic connections for the electrospindle.

  · Requires the selection of 1 electrospindle among those present in the pricelist.

Safety protections

It's required the selection of a safety coverage and one safety system among those present in the pricelist.

Electric system

The machine can be powered at 380/400/415V - 50/60Hz.
The electrical cabinet and the internal components comply with the CEI EN 60204-1 and CEI EN 60439-1 norms.
An auxiliary transformer supplies the connection voltage for the personal computer, the air conditioner and the electrospindle cooling fan, avoiding the use of the middle neutral wire, not always available.
The electronic equipment is powered by a stabilized 24V DC power supply.

- Air conditioner for electrical cabinet
  It allows:
  - The perfect working of all the electronic components inside the electric cabinet, even at very high temperatures, up to 40°C (104°F);
  - A dust-free environment, since there are no aeration fans.

Control system

- Numerical Control

  Biesse property BH660 control system is PC based.
  The new Biesse technology WRT (Windows Real Time) extends the functionalities of Windows operative system by making it work in real time and able to directly control the machine avoiding not necessary hardware and increasing reliability and performance
  The WRT machine control software is available in the following languages: Croatian, Danish, Finnish, French, Japanese, English, Italian, Norwegian, Dutch, Polish, Portuguese, Romanian, Russian, Slovak, Slovenian, Spanish, Swedish, German, Turkish, Hungarian.

- Desktop Personal Computer

  Main technical specifications:
  - CPU Intel Core I5 or superior
  - 8 GB RAM memory
  - 128 SSD GB hard disk or superior
  - Dedicated graphic card
  - 21.5" LCD
  - Keyboard
  - Mouse
  - USB ports
  - Ethernet card for network connection to an office PC

  The technical specifications above may be subject to updates without prior notification.
  Since the personal computer controls the machine processes BIESSE does not allow the installation of additional non-authorized software, under penalty of losing warranty.

- Standard Hand-held control keyboard

  Inclusive of:
  - Override for manual control of the programmed axes speed
  - Emergency push button

- Prearrangement for controls on remote keyboard or bPad

  Inclusive of all the wirings inside the electrical cabinet.

- Statistic report

  Machine statistics is a software environment capable of collecting general information on machine events in order to monitor productivity and reliability over time
  Customers can choose directly which events to be recorded, in example the machine set-up, production, authorized pauses, lubrication cycles, etc.

- Emergency recovery procedure

  This function allows operators to restart an interrupted working due to a machine emergency stop. The program restarts exactly from where it was interrupted, by following a specific procedure. The working can be restarted when the emergency stop happened during:
  - A routing cycle with the electrospindle
  - A drilling cycle with the boring head
  - A cutting cycle with a blade
  - An automatic tool changing cycle
  - Any ISO instruction programmed movement

  The introduction of this functionality avoids to discard half-finished components, saving money in case of valuable materials (rare woods, etc.) and time in case of long time execution parts.

- Tool life calculation function
  The NC memorizes the distance covered by each routing tool and compares it to a value set by the operator.
  When this set value is reached, a persistent warning message is displayed on the screen and repeated each time a given tool has reached the value set by the operator.

Industry 4.0 - Integration with factory systems
In trend with the evolution of industrial automation, the machine integrates some features able to improve the production quality of the plants.
In particular, it is possible to:

- Interconnect the machine to the IT systems of the factory, with remote loading of instructions and / or part programs by means of connection to the Ethernet network, with TCP-IP protocol, with IP address set by the user, for sending programs and job lists through appropriate interfacing libraries, supplied on customer request (PCQUO);
- Integrate the machine to the factory logistics system in an automated way. The machine publishes information about programs (unique ID, program status, distinguished name, time and start / end date, etc.), elementary machine states and tool changes. The information can be read by a MES thanks to the exchange protocol OPC-UA.

* The software development to acquire the data exposed by the Rover machine through the OPC UA Server, the relative aggregation and integration in the MES / management systems are charged to the customer
* For activation, please contact the authorized Biesse Service department

Teleservice
It allows an immediate and direct access to the machine numerical control via network. In this way it is possible to check machine data, user programs, input/output signals and system variables, and to install software updates, therefore granting:

- Real-time service intervention
- Quicker problem solving
- Consistent reduction of machine downtime
- Real-time software updates

The Teleservice support is free of charge for the whole warranty period.

User documentation

- Installation instructions
- Machine user manual
- Software user manual instructions
- Pneumatic and electrical diagrams
- InDocs CD containing the spare parts catalogue
- Factory assembling and testing declaration

Maintenance equipment

- Device for locking and unlocking tools from tool-holders
- Set of wrenches
- Greasing pump
- Grease for linear guides, rack and pinion lubrication
- Grease for boring head and aggregates lubrication

Technical specifications		
Maximum axes speed X - Y - Z	85 - 60 - 20	m/min
Z axis stroke	378	mm
Z axis piece passage	200	mm
Z axis piece passage with Sweeper Arm	170	mm

* The technical data shall be verified on detailed layout according to the operating units chosen on the machine
* It requires the selection of one type of working table between HFT or FT PLUS
* It requires the selection of the advanced EC safety coverage or NCE safety systems

Numerically controlled machining center ROVER A FT 1536
HFT or FTPLUS worktable dimension: X=3765mm; Y=1560mm

* The dimensions indicate the distance between the stops in X and Y respectively; the maximum size of the panel that can be loaded automatically in Y is equal to the distance between the stops minus 5 mm

Optional units

7022345 1

Opening front door for machine safety coverage in replacement of the fixed panel installed in the basic machine.
It increases the accessibility of the operator to the front operating units of the machine.
A safety device prevents the machine from starting when the door is open.

* Mandatory for 5-axes unit and boring head

7000059 1



Wired remote keyboard
Keyboard controlling the main functions available for work area set-up, operating unit tooling and tool changers tooling.
The wired remote keyboard has an ergonomic shape, an easy-to-read display and is equipped with a magnetic device for its positioning on the panel support handles or the control cabinet.
The wired remote keyboard supports the following languages: Croatian, Danish, Finnish, French, English, Italian, Norwegian, Dutch, Polish, Portuguese, Slovenian, Spanish, Swedish, German.
In the presence of languages with special types, it can be selected one of the alternative languages that can be managed with ASCII types (32 to 127).

It includes:
- ☑ Emergency push-button
- ☑ 2 potentiometers
- ☑ Membrane keys to access the menus available on the display

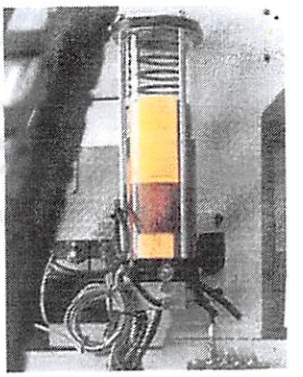
3 programmable keys allow the immediate access to the most used functions.

It allows the operator to:
- ☑ Reset the axes
- ☑ Move the axes in manual mode
- ☑ Adjust the axes speed by means of a potentiometer
- ☑ Control the vertical movement of the spindles of the boring unit for tooling purposes

- ✓ Control the vertical movement of the dust extraction hood during the work phases, for the visual control of all the operations being performed on the test panel
- ✓ Display all information relating to the work area set-up: panel supports positioning dimensions along the X axis, sliding bases positioning dimensions along the Y axis, type of vacuum module positioned on each sliding base with the respective orientation
- ✓ Check the state of input and output signals
- ✓ Activate the belt for the removal of chips, if present
- ✓ Perform tool change operations.

* If present, the selectors for the selection of the locking areas are not enabled

7000205 1



Automatic lubrication system
At each set time interval, adjustable in the numerical control, the pump automatically sends the lubricant to the machine moving parts (linear guides and bearings, recirculating ball screws), with no machine downtime and no operator's intervention.
When the quantity of lubricant in the tank reaches the minimum, a warning message appears on the NC screen.

7022319 1

X axes linear guides seal cover strips.
Protects the X axes linear guides and bearings from the intrusion of abrasive dust which compromises the proper functionality over time.

Safety devices

7022317 1

CE safety system for standalone machine with front side access
The solution complies with the essential requirements of applicable European Directives:
- Machine Directive 2006/42/CE
- Electromagnetic Compatibility Directive 2014/30/UE
- Low Voltage Directive 2006/95/CE.

Inclusive of :
- Perimeter safety fences of 2 m height around 3 sides of machine for a greater distance from any moving part
- Anti-climb over barriers on RH and LF machine sides
- Additional hardware control unit for safety systems
- Vertical photocells for the operator front side access control
- Safety fence side access door control with automatic gates locking and anti-panic system
- Dynamic control of tool's rotation and unlocking
- EC declaration of conformity

* Metal no climb over extension on the right side of the base frame (only with pendulum functionality)
* For stand-alone machine.

Operating group guard

7022377 1

Safety coverage of the operating units.
It includes a rigid sheet and polycarbonate protection, fixed around the beam of the machine and translating with it, able to protect the operator from accidental ejections.

* Includes a rear side access door for machine tooling equipped with a safety device that does not allow the machine to be turned on when open
* Includes a fixed transparent front window with LED light band for viewing the status of the machine
* The selection is mandatory

Working table

7300453 1

FT PLUS Working table - size 1536
The phenolic worktable (approx. 33 mm thickness) contains a wide internal vacuum distribution room of 15 mm depth able to guarantee the maximum exploitation of the available flow rate and a high vacuum degree at all points of the table.
The worktable is externally equipped with a 30 mm pitch grid for the rapid placement of gasket or standard vacuum modules through an adaptor: the entire worktable is equipped with vacuum inlets (D=12mm) with 150mm centerdistance, and is supplied with patented plugs for a quick removal.
The worktable is powered on the bottom face by pipes and unions of 60 mm diameter.

* It Includes an MDF spoilboard of 12 mm thickness
* It requires the selection of the Multizone

7351075 1

8-zones Multizone vacuum system.
The HFT or FT PLUS working table is divided into zones activated independently by the NC, granting the best vacuum optimization according to the used board.
The size and arrangement of the zones allows to properly lock the most common panel formats, minimizing vacuum dispersion without any operator intervention.
The activation of each zone is configured in the NC with a coverage percentage.

* Requires the Multizone vacuum system in presence of FT PLUS working table

Front Linear Stops

PL2003320 1

High precision linear stop - Size xx36/xx43.
The stops form a continuous high-precision reference line along the entire length X of the machine table on the back or front of the working table.

Other optionals

PL2003943 1

Sensorization of machine stops for the detection of lowered stops.
The selection applies the sensors to all the stops present in the machine
* Mandatory in presence of a 5-axes unit
* Mandatory in presence of an unloading sweeper arm or loading / unloading group

Vacuum system and devices for vacuum locking

7300817 2

290 m3/h rotary claws vacuum pump
Oil-Free operation through non-contacting claws which grants high efficiency without the need of lubrication. Rotary claws pumps maintain a constant efficiency over-time and it doesn't require expensive maintenance services. Flow rate:
- ☑ 290 m3/h at 50Hz
- ☑ 348 m3/h at 60Hz

* Vacuum system required
* Cannot be used at an altitude over 1000 meters above sea level

Operating unit

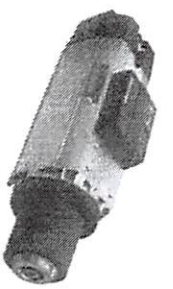
7800313 1

Configuration 1A.
Configuration with high flexibility, for the production of panels and solid wood.
Allows the tool change in masked time.
It includes at maximum:
- ☑ Y and Z carriages for the movement of the main operator units
- ☑ one 3- or 4-axes unit
- ☑ one revolving toolchanger
- ☑ 1 boring head with pneumatic lowering along Z
- ☑ 1 optional unit with pneumatic lowering along Z

* For Rover A FT

PL1903130 1

13.2 kW (17.7 HP) Electrospindle with HSK F63 adaptor and air cooling
Main specifications:
- ☑ 11 kW (14.7 HP) from 12,000 to 15,000 rpm in S1 duty
- ☑ 13.2 kW (17.7 HP) from 12,000 to 15,000 rpm in S6 duty
- ☑ Ceramic bearings
- ☑ RH and LH rotation
- ☑ Rotation speed from 1,000 to 24,000 rpm, programmable by N.C



The suction hood is automatically deactivated when the electrospindle is not working.
The quality of the finished product depends on the working conditions and the processing parameters such as the number of passes, the feed speed, the processing depth, the type of material and the suitability of the tools. The tools used must have the features prescribed by the technical data of the machine and shown in the user manual.
* Requires at least one automatic tool changer magazine or Pick-Up, where expected
* Requires the selection of a dust extraction hood (not included)

PL1903138 1

Optimized suction hood for the removal of chips and dust with continuous positioning in Z.
It includes a sensor that allows the optimal positioning at a certain distance from the workpiece.
It also includes the positioning mode in predefined steps.
It is equipped with 75 mm long bristles and an inner fabric core

* Incompatible with 5-axes operating unit

7210016 1

Flange for the assembly of aggregates on an electrospindle
The Flange is mounted on the electrospindle and is equipped with 4 conical slots for aggregate reference every 90°.
Allows loading aggregates on the electrospindle with the same orientation as they are stored in the tool changer or as they are manually loaded.
In machines with multiple electrospindles the slot has to be specified.

* Requires the ISO or HSK electrospindle
* Incompatible with the 360° rotation interpolating unit (C-Axis)
* Any use of aggregates not supplied with Biesse pricelist and without evaluation of usability required to Biesse, will compromise the recognition of the guarantee of electrospindles and devices connected.

7210090 1

Prearrangement for the assembly of a 360° rotation interpolating unit (C axis)
It includes all the wiring to the electrical cabinet.
It allows reducing machine downtime for the installation of this unit on a machine already at customer's premises.

7212874 1

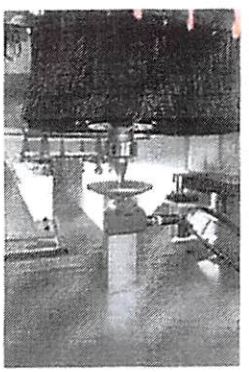
Blowing unit with 4 ring nozzles
The unit is made of a ring diffuser with 4 nozzles, positioned every 90°, capable of blowing compressed air during machining operations and increase dust collection efficiency.
The unit is strongly suggested for nesting applications.

* Requires ISO or HSK electrospindle
* Incompatible with 5-axes unit

7550008 1

Presetter for the measurement of the tool length with diameter up to 130mm
Digital device for tool length measurement by contact plate
The device checks the tool length and updates the values in the tool schedule of Numerical Control.
The diameter of the contact plate is 130mm.
We recommend the use of the blowing device for the cleaning of the reading surface.
The measurable lengths (min/max) must be verified on the specific layout.

*Includes a special tool holder for the device setting.



7212271 1

Additional Z carriage installed on rear Y carriage, for operating units with BHZ.

* It does not allow the subsequent retrofit of a boring head, a probe or other operating units
* Retrofitting not available

7200465 1

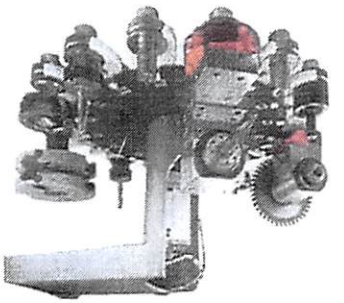
BH21 Boring Head
Working unit which can be equipped with 21 independent tools for single and multiple borings on the top face of the panel
The spindles have a RH/LH alternated rotation and are driven by precision helical ground teeth gears which grant minimum noise emission and maximum machining accuracy.
The boring head is equipped with a manual lubrication system to be performed at a set time through the greasing pump, and it's reminded by a warning message on the N.C. screen.
The head is air cooled.
The spindles are driven by 1 inverter-controlled motor (motor power 1.7 kW at 2800 rpm - 3 kW at 6000 rpm). the spindles rotation speed is programmable up to 6000 rpm to perform fast drilling cycles and reduce machining time.
Furthermore, it is possible to program the correct rotation speed based on the tool and material to be processed.
The boring head is equipped with a dedicated dust collection hood which is automatically activated when the unit is in operation.

* Requires the additional Z carriage with pneumatic stroke

Toolchangers installed on X carriage

7291167 1

16 positions Revolver Tool changer, positioned on the X axis carriage
On-board of the X axis carriage, allows to store up to 16 tools always available on each position of the machine and to perform tool changing operations in a short time.
Technical specifications:



- ✓ Wheelbase between grippers: 114mm
- ✓ Maximum loadable tools: 16 with 110mm maximum diameter
- ✓ Loadable aggregates: Refer to the tool changer layout
- ✓ Maximum tool diameter: Refer to the tool changer layout
- ✓ Maximum tool length: Refer to the tool changer layout
- ✓ Maximum weight of a tool or aggregate inclusive of the tool: 7.5Kg
- ✓ Maximum total weight: 55Kg

If the standard chip deflector is loaded on the tool changer, the two adjacent grippers must be manually removed.
* Incompatible with the 22 or 33 positions chain tool changer, positioned on the X axis carriage
* On Rover B FT is not compatible with conf. 3C, 4A, 4B, 4C, 5A
* Not compatible with full bumper safety systems

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Software

7530392 1

BSolid

3D CAD-CAM program to design, simulate and manage the machining processes of the Biesse machining centers and boring machines. The use of additional optional modules allows to expand and specialize the performance of the bSolid base module whether it is installed in the machine or in the office.
The software package running in Windows environment allows designing the final product, defining its machining, defining working table set-up, simulating the part machining on the 3D machine model and generating the machine needed programs.

CAD/CAM environment with the following functionalities:

CAD design and project:

- ☑ Commands for defining and editing parametric objects such as geometries, surfaces and texts.
- ☑ Commands for generating and modifying vertical, inclined and curved custom parametric faces.
- ☑ Non- parametric commands dedicated to the modification of geometries, surfaces and texts, such as: displacement, wheel, scale, symmetrical copy, trim, automatic fillet, union, etc.
- ☑ Manual dimensioning tools.
- ☑ Environment for inserting and modifying variables, using geometries, surfaces and all processes.
- ☑ Design visualization tools such as: zoom, view rotation, orthogonal view on customized faces.
- ☑ DXF (Technologic DXF), CIX, BPP, BMP, PNT, DAT, ICP file import. Importing files of large dimensions or containing many elements (e.g. points, lines, etc.) is not guaranteed.

CAD/CAM design and project:

- ☑ Fast and immediate 3D simulation of workpiece processing with visualization of material removal, useful for quickly and visually checking whether the programmed working sequence actually corresponds to the desired one until observing the machining results on the finished piece.
- ☑ Commands for routing, boring and cuts design on horizontal, vertical, inclined and curved faces with the capability to work on these faces in a 2D simplified way (therefore the 4 axis machining).
- ☑ Commands for 2D simple pockets design on standard faces and custom faces; the function automatically considers the characteristics of the geometry and the tool, with the possibility of choosing different types of path (eg: concentric, single direction, etc.).
- ☑ Independent management of multiple machines.
- ☑ Management of 5 axis machining only in positioning.
- ☑ Environment for creating and modifying of macros (also parametric).
- ☑ Custom tool design (routers, drill-bits, saw blades and their 3D shape). Graphic environment for simplified creation of 3D custom tools. The tool thus created, together with the 3D graphic environment with chip removal, allows to obtain immediate views of the finished piece. It allows to import drawings in dxf format provided by external suppliers or created with other CAD systems. It also allows to assign control points for simplified programming.
- ☑ Management of aggregates supplied on the price list.
- ☑ Creation of simplified personalized aggregates. The use of this category of objects does not provide for collision control.
- ☑ Management of the deflectors supplied on the price list.
- ☑ Possibility to search and clone tools, aggregates and deflectors.
- ☑ Definition of machining sequences.
- ☑ 3D graphic environment to simplify the tooling of tools, aggregates and deflectors on the various magazines on the machine, with the possibility of perceiving even the overall dimensions.

3D Graphic simulation

- ✓ 3D graphic environment to help you manage the working surface, with the possibility of adding and removing the various types of vacuum modules available for machine configuration; it is also possible to graphically configure the panel supports and sliding bases present. Possibility of using the semi-automatic positioning command, which allows you to provide, when feasible, a proposal to configure the entire working surface, which can then be refined manually.
- ✓ Possibility to simulate the movements generated by the numerical control without the need to start the machine, with the removal of the material removed from the tools, ensuring the collision check with the volume of the piece not machined, excluding programs that require the repositioning of the piece.
- ✓ Ability to graphically verify or from the worklist the main causes of collision between the elements of the machine as represented in the graphic simulation environment. The graphic representation includes tools, electrospindles, aggregates, panel supports, sliding bases, locking systems provided in the price list and the volume of the workpiece as shown. Excluded are controls of machine components handled manually if not equipped with automatic control systems or customized that are not represented consistently in the 3D graphic environment. The supporting structures, the external protections and the mechanical organs equipped with copying systems are not included from the machine control. Collision checking is more accurate if performed at 1x simulation speed or from the worklist by activating the appropriate function. It is advisable to check the technical documentation on the best modes to obtain more accurate simulations of the machine, equipment and tools. The simulation and automatic collision detection systems do not exclude the need to perform simulation in the machine.
- ✓ Easy programming for Multi-Piece machining. By activating this mode, in the graphic environment it is possible to display and modify the position of several pieces at the same time in the same working area. The pieces can easily be referred to the various origins or rotated according to the processing needs.
- ✓ bSolid allows to manage multiple Biesse machines with a single platform. A single software version installed in a computer allows to generate programs for different compatible Biesse machines with a simple selection of the same in the programming environment; for these uses the machines that must be managed by a single software version must have also installed a homogeneous version. The Biesse Service can be consulted to verify the possibility of making different Biesse machines homogeneous; this service could involve costs.

Calculation of processing time

- ✓ Graphic simulation allows a calculation of the program execution time on the machine. The calculation is representative of reality because the movements of the machine are simulated using Numeric Control of the same. Keeping the production machines in line with the data present with the systems present in the office, it is possible to obtain data necessary for calculating estimates, as well as analyzing the actual feasibility with the tools and the technical characteristics of the machine itself. The calculation of the cycle times cannot consider the manual interventions of the operator.

Work list

- ✓ Environment in which to collect and manage the list of programs to be executed with the possibility of importing it from external files in csv format, calculating the processing times of the entire program list, activating the preventive collision check and having the view of the workpiece for a fast recognition of the program. It allows to modify the data of the parametric programs in the same environment. Multiple lists can be created.

Use with machine optional items

- ✓ Barcode reader. The presence of a barcode reading tool, through the bSolid program, allows an easy use of the working process. bSolid allows to start programs directly by reading the data of individual programs or upload them to the work list.
- ✓ External loading and unloading systems. bSolid provides for the presence of automatic loading and unloading systems and their use through specific macros. The specific services are requested to be checked with the Biesse qualified staff.

* The use of the bSolid application can require optional modules to complete the specific performance of some Biesse working centers technologies; contact the qualified Biesse staff to get the correct information.

* Recommended requirements of the PC for installation in office:

- ☑ PC Intel Core I5 or I7
- ☑ At least 8 GB RAM
- ☑ Windows 7 64-bit or Windows 10 64-bit Operating System
- ☑ nVidia Graphic Card compatible with OpenGL 4.3 with at least 2 GB RAM
- ☑ Resolution 1440x900 with 16M colors
- ☑ SSD Hard Disk
- ☑ At least 20 GB of free space on the Hard Disk

* bSolid is available in the following languages: Bulgarian, Czech, Traditional Chinese, Croatian, Danish, Hebrew (supplied manuals in English), Estonian, Finnish, French, Japanese, English, Italian, Norwegian, Dutch, Polish, Portuguese, Romanian, Russian, Slovenian, Spanish, Swedish, German, Turkish, Hungarian

bNest - Software module for nesting process applications

bNest allows to create nesting projects including the item list with related quantities to be produced and the list of boards to be used with the target of minimize the used material and the machining timings. The optimization process result is a list of bSolid programs (.bSolid) containing all the machining of parts positioned inside the used boards.
It includes the following features:

Environment for manual nesting project creation

- ☑ It's possible to add or take items off an existing nesting project, optimize or delete them, check the nesting optimized cut layouts.

Data import from ERP or external design application

- ☑ A standard solution as spreadsheet file (.csv format) is used in order to keep easy the data exchange between software applications.
- ☑ The imported data will be used for production and labelling as well.
- ☑ The import rules are configurable thus they can easily adapt to customer needs.

Item, board and material management

- ☑ Dedicated environments where the operator can edit, check and fix all the information of parts, boards and materials.
- ☑ The item registry describes the item properties (dimensions, material, program, parameters).
- ☑ The material registry lists all usable materials. The material registry can be filled in also with a data import from the company ERP system (through .csv files).
- ☑ bNest will automatically split the list of processable items in groups according material, thickness and grain.

Supported formats

- ☑ It's possible to import the following file formats: bSolid, cix, bpp, cid, dxf (in the bNest compatible format).

Nesting optimization methods

- ☑ **Free-form** shape is supported.
- ☑ **Sizing**: piece arrangement following pattern bands along X direction
- ☑ **Guillotine cut**: piece arrangement as a beam saw pattern replacing the saw with a router
- ☑ **Common cut**: piece arrangement so that almost all cut paths are in common between the pieces

* In methods 3 and 4 the detachment routing paths are in part (4) or in whole (3) in common between adjacent pieces thus the operator should take this into account

Integration with bSolid

- ☑ It's possible to create items directly in the bSolid Cad-Cam environment joining each designed program with the materials defined by the operator.
- ☑ It allows opening the nesting results when the operator needs to edit, simulate or get the machining cycles times.

Generation of complementary programs

- ☑ Automatic generation of complementary programs containing all the machinings, concerning the single piece, programmed on faces different from the upper one
- ☑ The complementary programs can be used only on Rover machining centers.

Automatic cluster management

- ☑ Automatic cluster management can be enabled. The pieces are coupled and then inserted into the nesting resulting scheme following a grid layout

* Compatible only with Free-Shape nesting or Common Cut methods

Cloning results

- ☑ It is possible to enable the cloning of the nesting scheme (and related labels) along the X and / or Y direction. This option allows the splitting of board into bands of equal size (band length and width) and space them according to an offset set by the user.

* Compatible only with Free Shape or Sizing methods

Management of holes

- ☑ Automatic recognition of internal holes management. This option prevents the labels from being put on scraps and that these are considered in the percentage calculation of panel occupation.
  * for pieces with open path it's compatible only with the "Workpiece dimensions" option as overall size to be considered

* It does not allow the piece insertion inside the holes

Off-cuts crumbling

- ☑ Using specific parameters, it's possible to break the cut-off parts to simplify their offloading by the operator.

Cleaning cycles

- ☑ It's possible to add to the nesting results one or more cleaning cycles using the sweeping arm.

Auxiliary geometries

- ☑ It's possible the automatic generation of auxiliary geometries used i.e. for detensioning cuts.

These geometries creation is based on the routing machining.

Labelling:

- ☑ Automatic management of label applier or manual label printing with dedicated touch-screen device
- ☑ Only for automatic management, it's possible to automatically optimize the label positions to avoid any label scratch or damage during the router machining.

* It requires the automatic adhesive label printing and application system or the auxiliary working station for adhesive labels visualization and printing.

Manual management of re-usable material:

- ☑ Manual definition of re-usable parts (dimensions, material, grain and thickness).
- ☑ Manual integration of available re-usable parts for their use in any nesting projects.

Automatic management of re-usable material:

- ☑ bNest provides the automatic definition of the material not used in the nesting layouts (re-usable part creation) and the labelling of re-usable defined parts (using a dedicated label editor).

* It requires the dedicated module for re-usable part management.

Machining sequence

- ☑ The machining are listed in the right order able to minimize both the tool-changers and the machine movements leaving as last the through machining for optimize the vacuum part locking.
- ☑ It's possible to create machining sequence to separate the parts from the smallest to the widest ones.

Project report:

- ☑ Board used quantity exportable in a .csv file
- ☑ Optimized pieces quantity exportable in a .csv file

* It requires bSolid

* The Nesting optimization (and the relative collision check with the table) is not compatible with bSolid programs containing curved faces, projections, wrappings, and machining programmed with "5 axes finishing" (including "Swarfing") and "5 axes roughing" modules. The generation of such machinings in a nesting result may occasionally occur but is not guaranteed by Biesse.

* It is not possible to export the programs resulting from the nesting in CIX format

* The resulting schemes will include only the compatible machinings (see above) programmed on upper face (0) or on face coplanar to it. All the compatible machinings defined on a face other than the upper one can be inserted in complementary programs that, appropriately programmed, can be used only on Rover machining centers

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SOPHIA - IoT Connection

SOPHIA is the IIoT platform (Industrial Internet of Things) which aims to generate greater value for the customer through the connection of the machine and the collection and analysis of processing data. A project that fits fully into the digital transformation movement that is characterizing the fourth industrial revolution.

SOPHIA detects, verifies, points out and resolves problems encountered by the user during the use of the machine, as well as plans, on the basis of the data provided, maintenance operations/technical interventions and spare parts supply. Specifically, it includes:

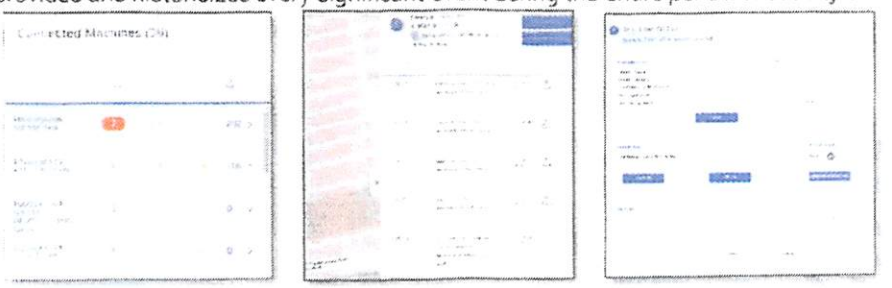
SOPHIA
GREATER VALUE FROM MACHINES

- ☑ Permanent connection of the machine to service centers.
- ☑ Team dedicated to the diagnostic monitoring of the single machine.
- ☑ Mobile App with continuous monitoring of the status and performance of the machine

SERVICES DETAILS

Remote Diagnostics

The Biesse service, through the control panel, continuously monitors the machine in operation. The constant flow of data provides and historicizes every significant event during the entire period of activity of the machine.



SOPHIA IoT provides a bidirectional communication between the end user and the service, thus ensuring the shortest reaction time.

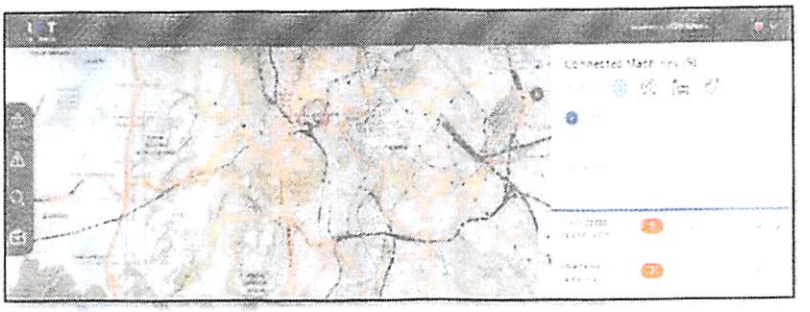
The data is transmitted via Internet, encrypted and certified, to our cloud platform and made available to customer service for remote assistance.

A faster and more efficient service:

SOPHIA IoT optimizes intervention times and increases their effectiveness.

SOPHIA IoT automatically recognizes the most common causes of machine downtime and immediately activates the reference service.

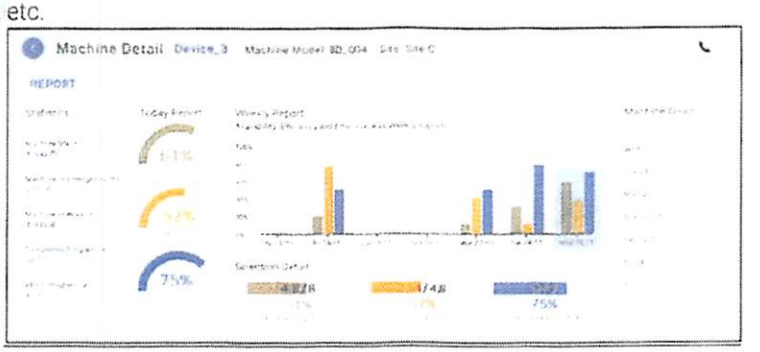
SOPHIA IoT is based on a constantly evolving dynamic architecture. This guarantees a constant increase in performance.



Mobile APP:

All SOPHIA IoT Biesse technology in a simple app!

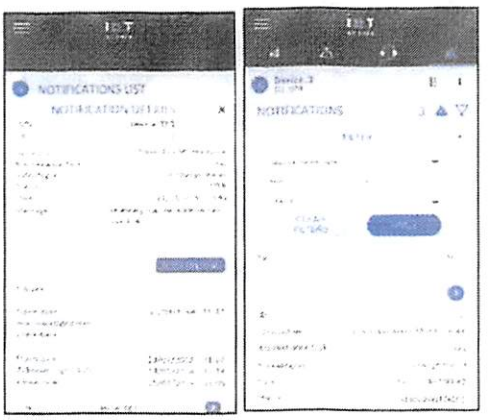
- ☑ Performance indicators and Statistics: monitoring of machine performance on the basis of three fundamental indicators: Availability, Efficiency and Effectiveness. The indicators are viewable both in real time and as aggregation of historical data, in order to have a temporal and detailed view of the machine. The statistics show the main operating data of the machine: hours of ignition and automatic downtime, etc.



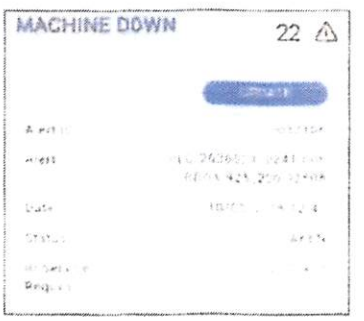
- ☑ Advanced indicators: indicators specific to the type of machine, with the possibility to select the indicator of interest, the period of analysis and the level of aggregation desired (month, day, hour or half hour)



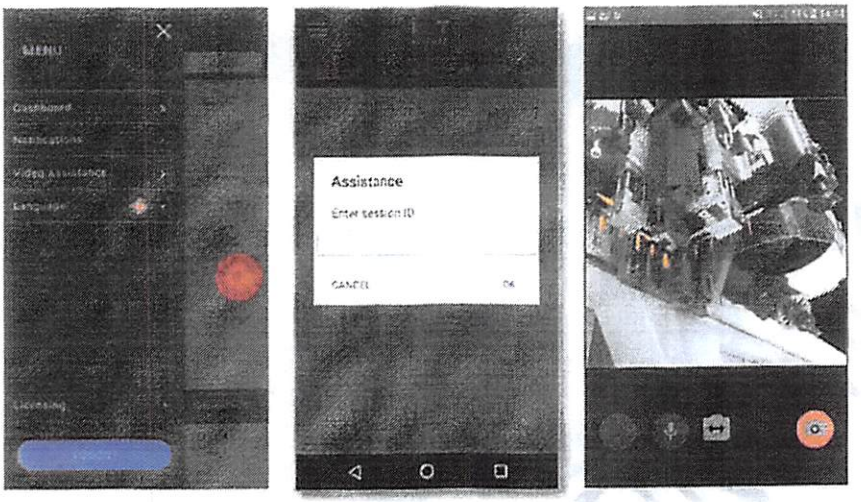
- ☑ Notifications in the app: push notification system for production and maintenance management. The notifications in question can be sent at the beginning of an event, or independently when the end of the useful life of a component or a maintenance expiry approaches (preventive maintenance). For each notification it is possible to consult and / or modify its status, declaring to have read the notification itself.



- ☑ Assistance requests and machine downtime: real-time tracking of service requests and machine down events. For each event it is possible to monitor, facilitate and make the resolution process effective by attaching documents, comments, photos or videos.



- ☑ Video Assistance: ability to communicate in streaming, chat, take photos and record videos, share documents in order to make the resolution process faster and more effective



- ☑ Technical Documentation: access to the complete technical documentation of the machine (manuals, diagrams, exploded view and spare parts list) in the SOPHIA Parts application, and the possibility to download the documents, so as to have access also in offline mode.

The SOPHIA IoT app is accessible, via compatible mobile devices, with a non-exclusive and non-transferable license, subject to the conditions to be accepted on first use.
The SOPHIA services are available in Italian, English, French, German, Spanish, Russian, Chinese.

The SOPHIA services are provided to the Purchaser for a period of 12 months from the moment they are activated (or 12 months from the purchase of the Machine) and are automatically renewed for a fee at the price list of SOPHIA package, unless buyer's cancellation takes place within 30 days before the end of the service.
The price for renewals may vary depending on market requirements or correlation with changes in production costs, staffing or auxiliary services, subject to any legislative provisions with impact on sales prices.

DATA MANAGEMENT
Technical data and information related to SOPHIA services can be collected and used by Biesse to perform its performance, and be used in aggregate and statistical form to supply, improve and develop, in general, products / services Biesse technologies.

PRE-INSTALLED SOFTWARE
The terms of use of the BIESSE Software (including those functional to the "Sophia" Services) are detailed in the applicable sales conditions. The Software, pre-installed and / or made available are licensed without exclusivity and will be usable only for Machines purchased, excluding any transfer right or sublicense. The Software Property, and any rights not expressly granted, are and will remain of the property of BIESSE (and / or its software vendors).
The costs of physical connection and the costs of connectivity are charged to the Purchaser.

The SOPHIA IoT platform requires:
- Internet connection,
- Online registration for service, above, as specified in the separate user manual and/or document supplied to Buyer.