Operating units

The spindle moulders are equipped with the following operating/functional units:

- Spindle moulder unit



The spindle moulders are equipped with the following operating/functional units:

- Spindle moulder unit
- Spindle moulder fence



The spindle moulders are equipped with the following operating/functional units:

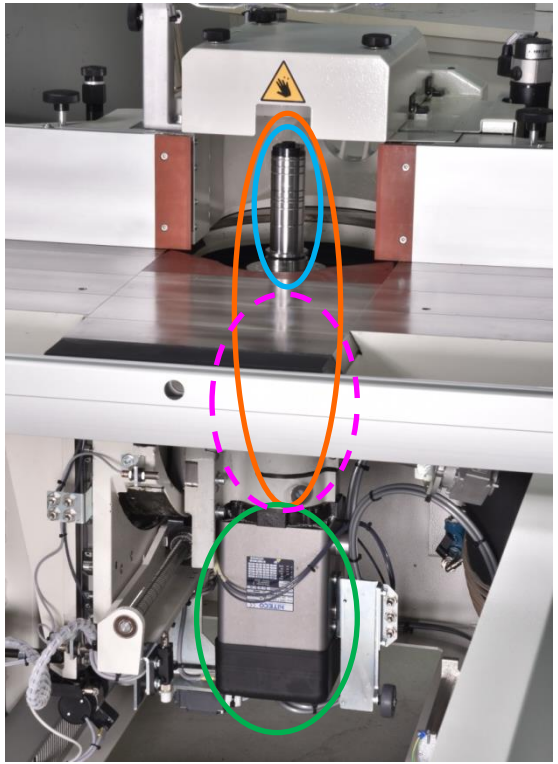
- Spindle moulder unit
- Spindle moulder fence
- Electronic control

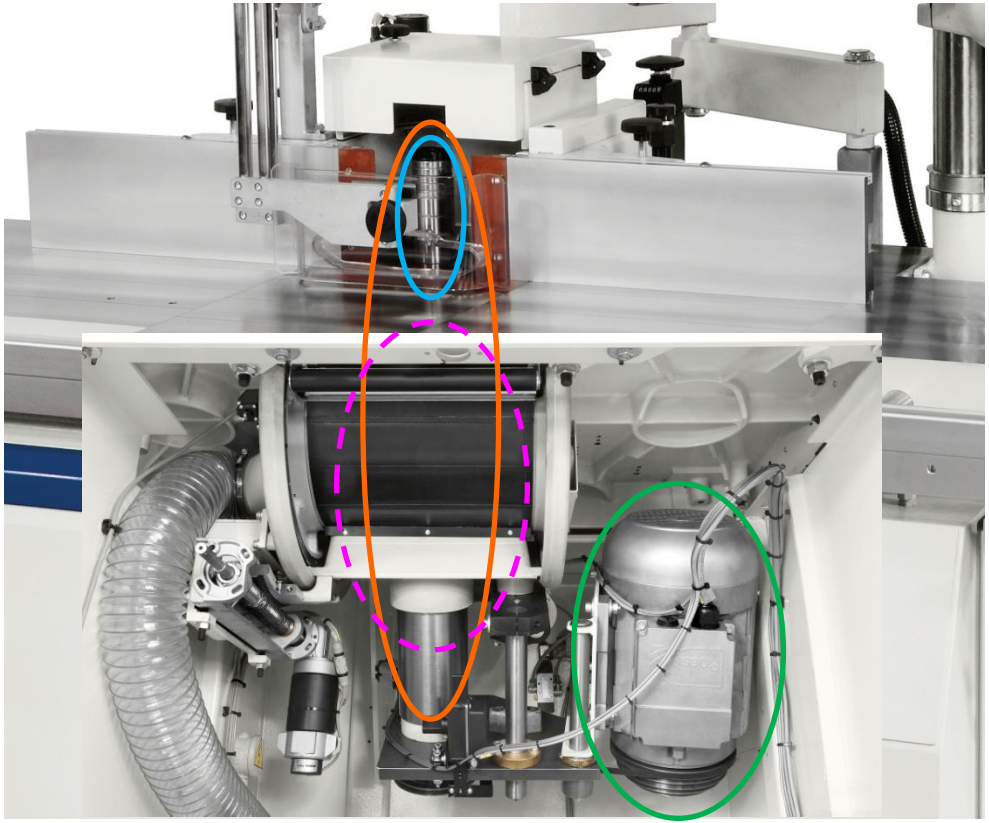


Operating units

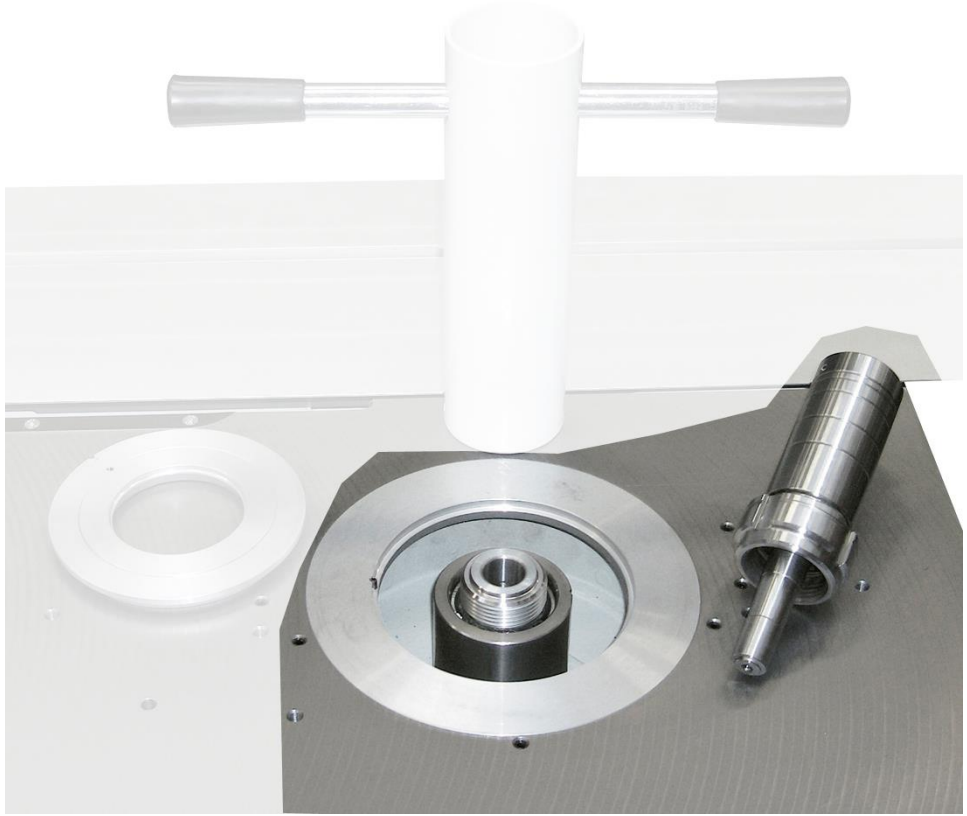
Spindle moulder unit

The spindle moulder unit consists of a shaft (spindle moulder) housed inside a column and connected to a motor that gives it rotary motion.
In the case of an interchangeable shaft, the upper part (interchangeable) of the same is called "counter shaft".





In the interchangeable shafts the countershaft can be interchanged, for example, with another whose cutter requires a different diameter from the first, or in case it is required the use of a countershaft with a collet chuck for routing, etc.

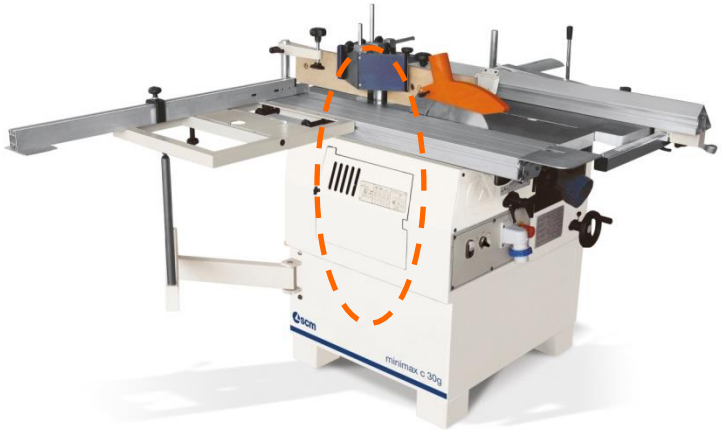




“genius” spindle moulder unit (only combined machines), features:

- Aluminum unit structure
- Spindle moulder unit shaft: 75 mm
- Spindle speed: 5000/7500 rpm
- Motor power: 1,8 ÷ 2,2 kW
- Fixed spindle moulder shaft

Machines: minimax c 26g, minimax c 30g, minimax st 1g





“lab-classic” spindle moulder unit, features:

- Cast-iron unit structure
- Spindle moulder shaft length: 100 mm
- Spindle speed: 3500/7000/10.000 rpm
- Motor power: 5 kW
- Fixed spindle moulder shaft (interchangeable spindle moulder shaft available as option)

Machines: minimax t 45c, minimax tw 45c





“elite-elite s-nova” spindle moulder unit, features:

- Cast-iron unit structure
- Spindle moulder shaft length: 125 mm
- Spindle speed : 3500/6000/ 8000/10.000 rpm
- Motor power: 4 ÷ 7 kW
- Fixed spindle moulder shaft (interchangeable spindle moulder shaft available as option)

Machines: minimax t 55es, minimax tw 55es, nova tf 100, nova ti 105





“nova” spindle moulder unit, features:

- Cast-iron unit structure
- Spindle moulder shaft length: 140/180 mm
- Spindle speed: 3000/4500/6000/7000/10.000 rpm
- Motor power: 5 ÷ 7 kW
- Fixed spindle moulder shaft (interchangeable spindle moulder shaft available as option)

Machine: nova tf 110





“class tf 130” spindle moulder unit, features:

- Cast-iron unit structure
- Spindle moulder shaft length: 140/180 mm
- Spindle speed: 3000/4500/6000/7000/10.000 rpm
- Motor power: 7 ÷ 9 kW
- Fixed spindle moulder shaft (interchangeable spindle moulder shaft available as option)

Machines: class tf 130, class tf 130ps,





“class ti 120” spindle moulder unit, features:

- Cast-iron unit structure
- Spindle moulder shaft length: 140/180 mm
- Spindle speed: 3000/4500/6000/7000/10.000 rpm
- Motor power: 5 ÷ 9 kW
- Fixed spindle moulder shaft (interchangeable spindle moulder shaft available as option)

Machines: class ti 120, class ti 120e





“class ti 145ep” spindle moulder unit, features:

- Cast-iron unit structure
- Spindle moulder shaft length: 140/180 mm
- Spindle speed: 3000/4500/6000/7000/10.000 rpm
- Motor power: 7 ÷ 9 kW
- Interchangeable spindle moulder shaft

Machines: class ti 145ep



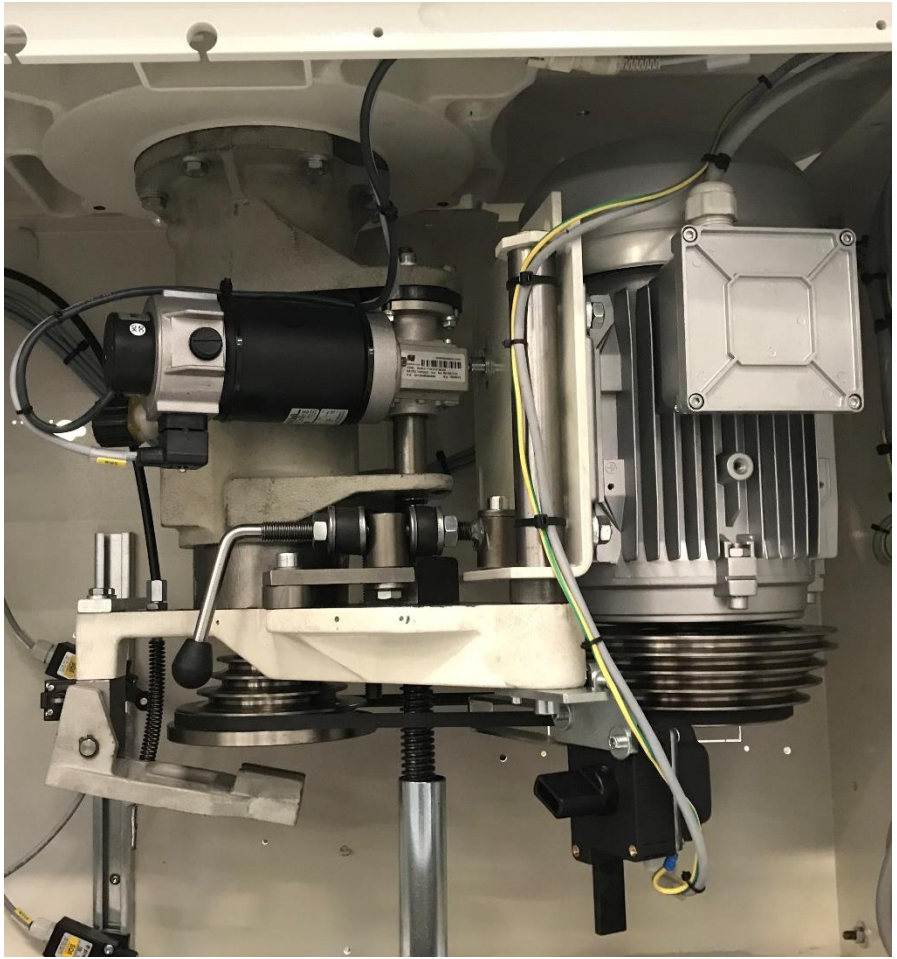


“L’invincibile tf 5” spindle moulder unit, features:

- Cast-iron unit structure
- Spindle moulder shaft length: 140/180 mm
- Spindle speed: 3000/4500/6000/7000/10.000 rpm
- Motor power: 7 ÷ 9 kW
- Interchangeable spindle moulder shaft

Machines: L’invincibile tf 5

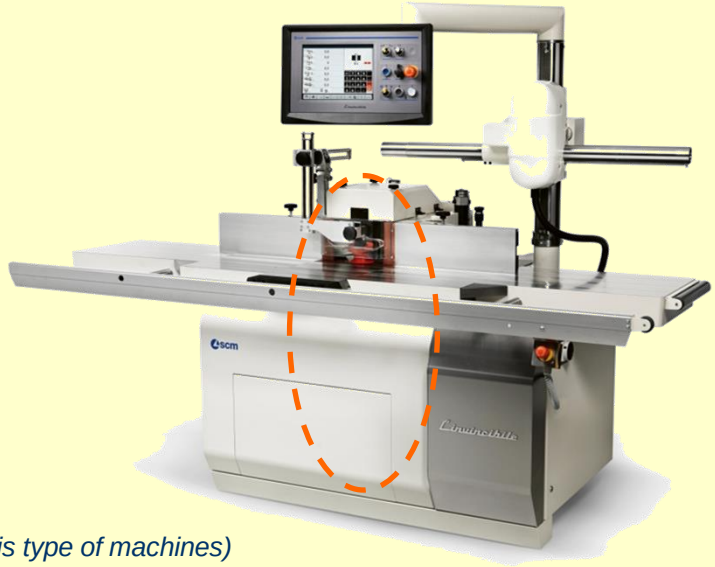




“L’invincibile ti 5” spindle moulder unit, features:

- Cast-iron unit structure
- Spindle moulder shaft length: 140/180 mm
- Spindle speed: 900 ÷ 12.000 rpm
- Motor power(**electrospindle – SCM patent***):7,5÷11 kW
- Interchangeable spindle moulder shaft

Machine: L’invincibile ti 5



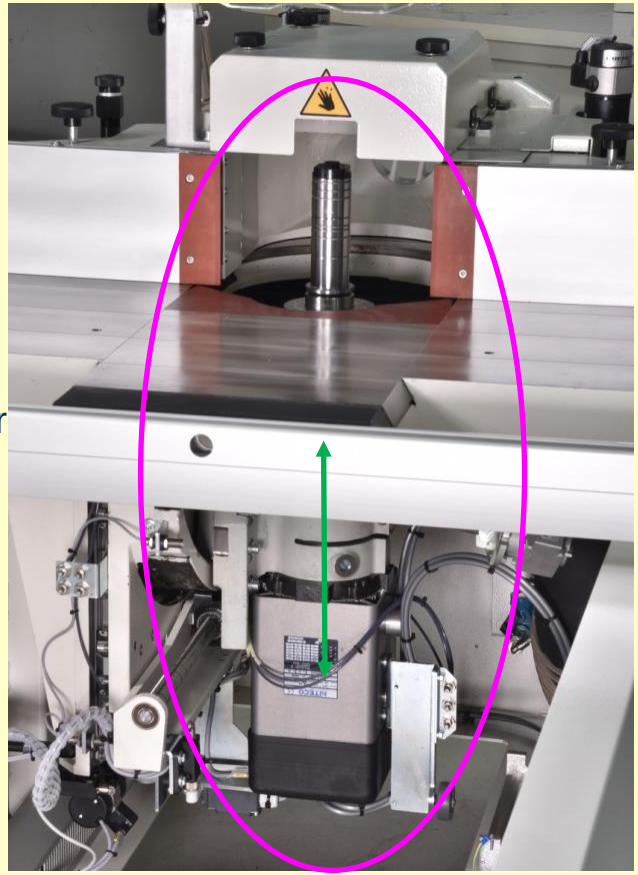


*(*On this type of machines)*

The L’invincibile ti 5 and L’invincibile ti 7 spindle moulder units (option for L’invincibile tf 5) are equipped with **electrospindle (SCM patent*).**

The **electrospindle** is equipped with a special motor directly connected to the spindle shaft and which gives the rotary motion to the shaft without transmission belts and this grant:

- **Higher performance:** higher motor power with higher rotating rpm
- **No maintenance**





The unit tilts from -45,50° to +45,50°

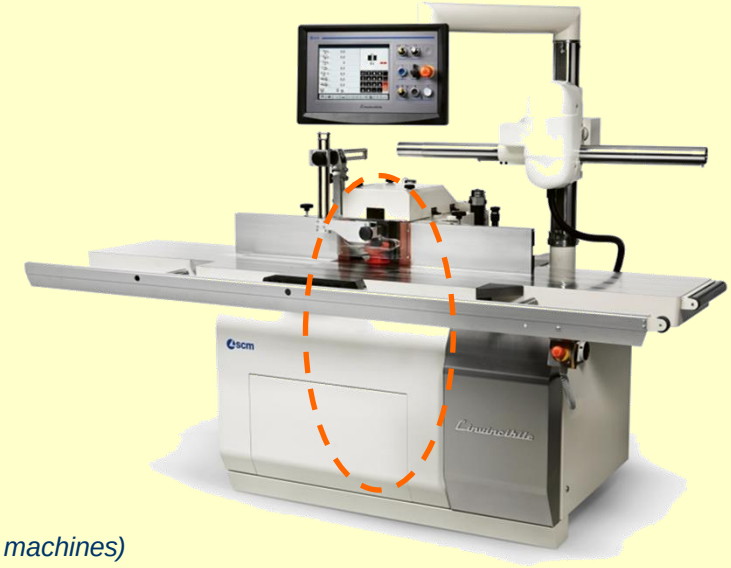
with "dove-tail" arch-formed cast-iron fence and movement through recirculating ball screw (SCM patent*).

(On this type of machines)*

“L’invincibile ti 7” spindle moulder unit, features:

- Cast-iron unit structure
- Spindle moulder shaft length : 140 mm
- Spindle speed: 900 ÷ 12.000 giri/min
- Motor power(**electrospindle – SCM patent***): 7,5÷11 kW
- Interchangeable shaft with spindle **with HSK taper**

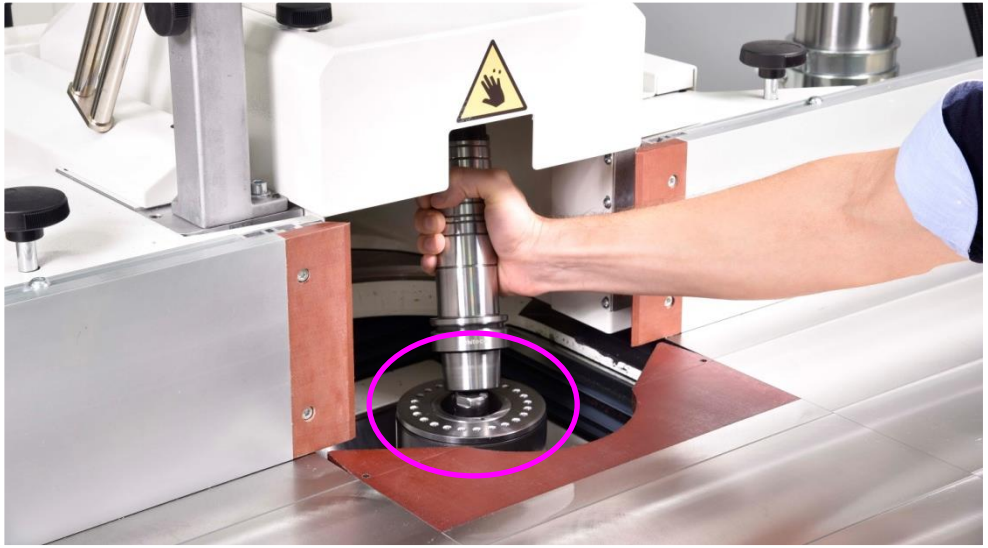
M*achine: L’invincibile ti 7*





(On this type of machines)*

The L’invincibile ti 7 spindle moulder unit (option for L’invincibile tf 5 and L’invincibile ti 5) is equipped with spindle with **HSK taper**







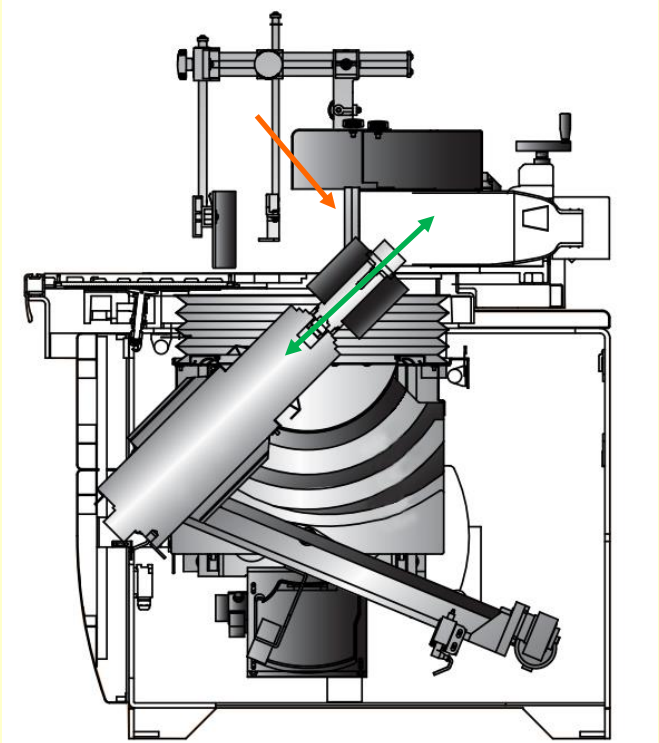
The spindle with **HSK taper** uses the **same technology already used on the spindles of the Machining Centers, i.e. it is a particular pneumatic taper (of the countershaft to the spindle moulder shaft) that allows:**

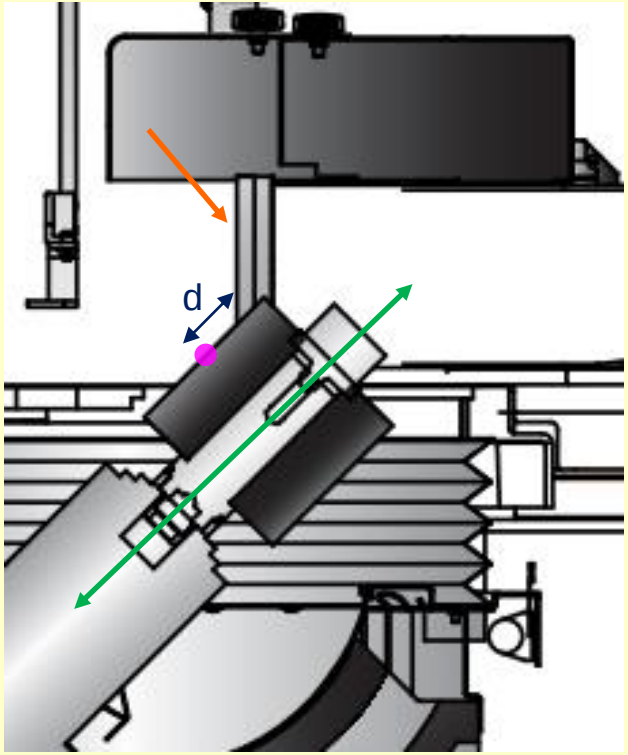
- **a very easily and quickly countershaft replacement and, above all, with the cutter mounted**
- **a direct countershaft transfer with the cutter mounted on a machining center** (not vice versa), for example to carry out further work on the piece to be processed with an automatic machine

The L’invincibile ti 7 spindle moulder unit is equipped with an **exclusive system for the electrospindle movement <u>of all the unit</u> on two linear precision guides through preloaded recirculating ball bearing pads (SCM Patent).**



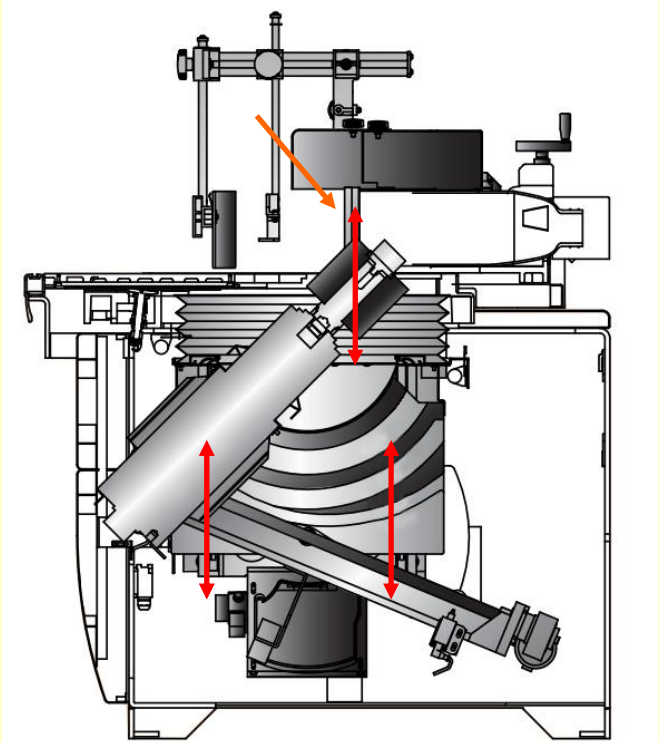
The **lifting system of the entire L'invincibile ti 7 unit (SCM patent)** has an important advantage with respect to the traditional spindle moulder shafts lifting: **in case of spindle moulder shaft height repositioning with the tilted shaft, it is not necessary to reposition also the spindle moulder fence** (with the re-calculation of possible collisions), therefore there is a one less step in the machine setup phase.

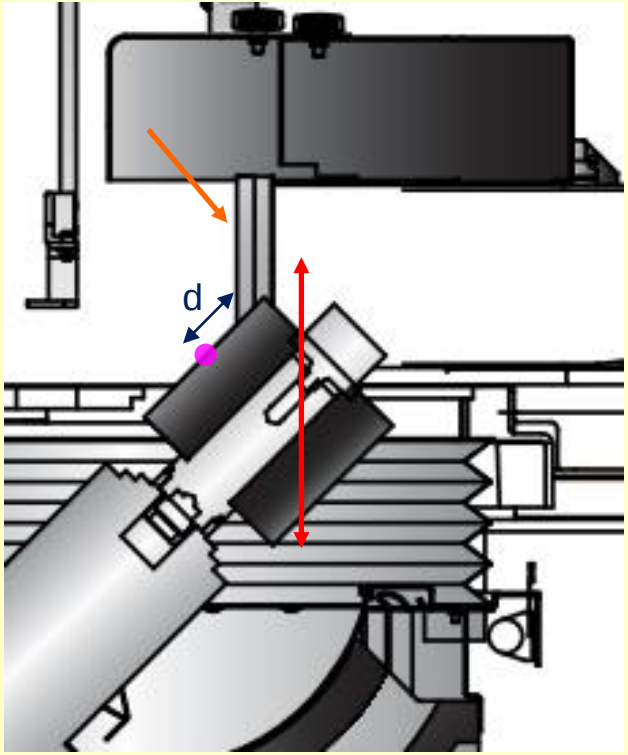




With the traditional spindle moulder shaft lifting systems, the distance of one point of the tool from the spindle moulder fence guide changes as the shaft rises.

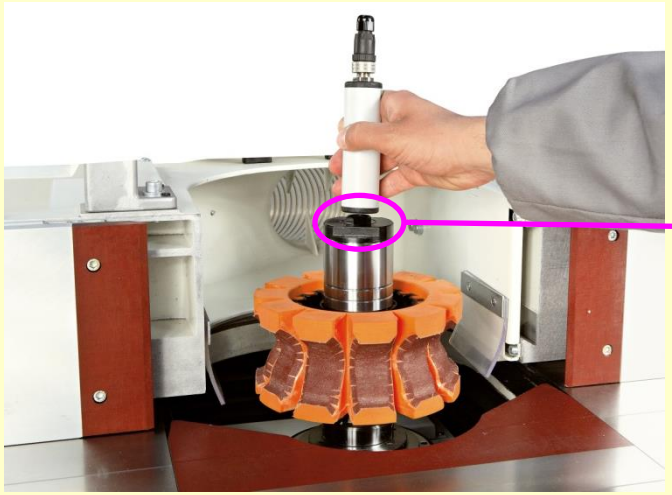
The **lifting system of the entire L'invincibile ti 7 unit (SCM patent)** has an important advantage with respect to the traditional spindle moulder shafts lifting: **in case of spindle moulder shaft height repositioning with the tilted shaft, it is not necessary to reposition also the spindle moulder fence** (with the re-calculation of possible collisions), therefore there is a one less step in the machine setup phase





With the **lifting system of the entire L'invincibile ti 7 unit (SCM patent),** the distance of a tool point from the spindle moulder fence **remains the same.**

The L’invincibile ti 7 spindle moulder shafts are equipped with a **tool detecting system by means of trasponder (SCM patent)** which communicates with the electronic control.







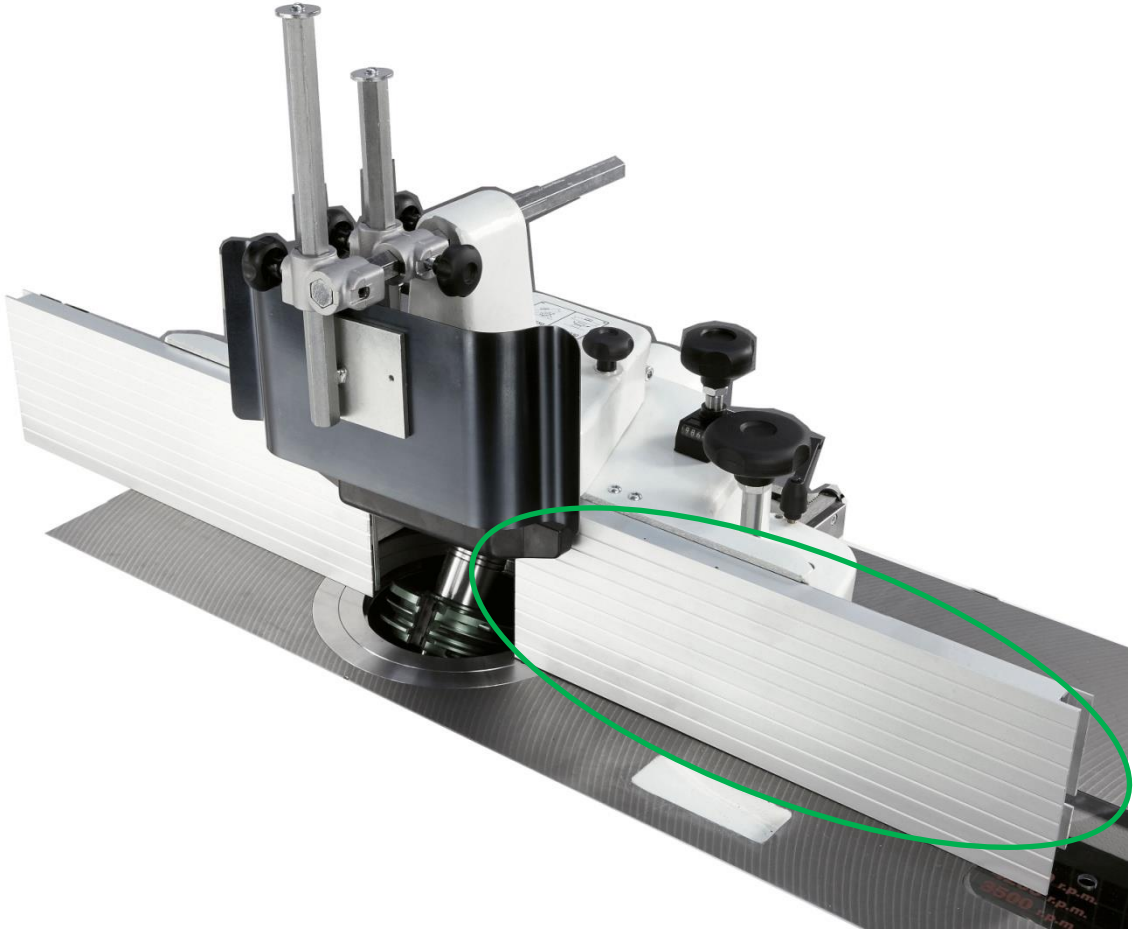
The system recognizes the tool (previously stored in the control archive) mounted on the shaft and sends all the data to the electronic control which recall it along with all programs associated with that tool: in this way the set up is easy and fast and no manual interventions are required.

Operating units

Spindle moulder fence

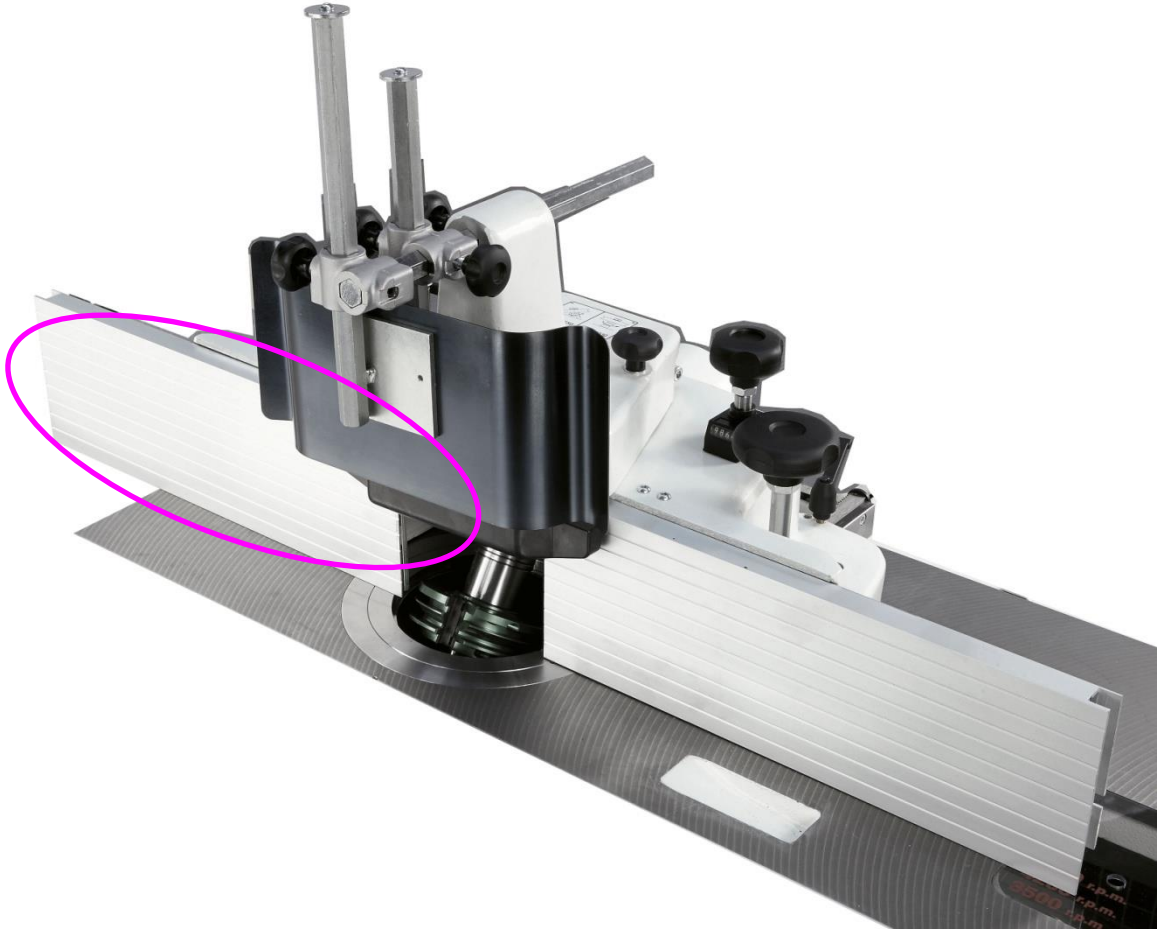
The spindle moulder fence is equipped with the main following devices:

- Infeed fence



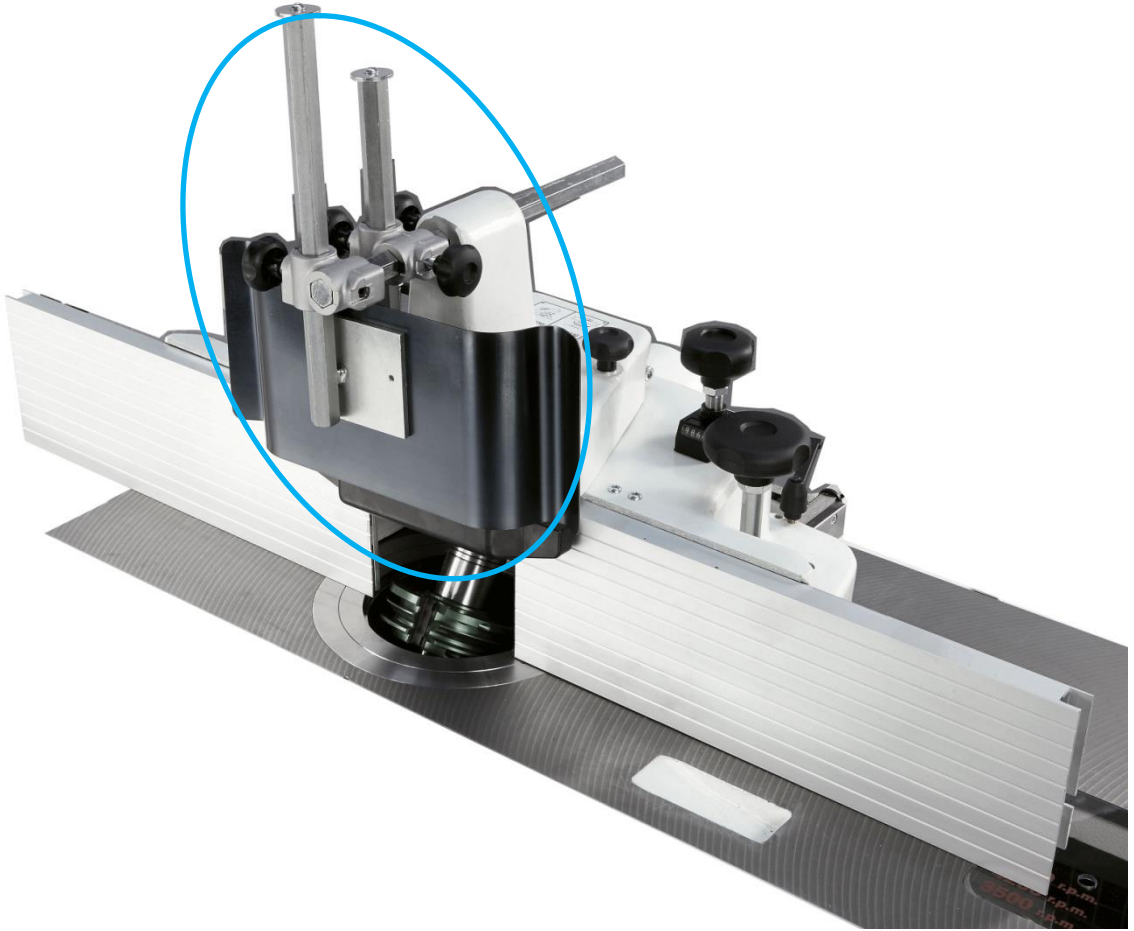
The spindle moulder fence is equipped with the main following devices:

- Infeed fence
- Outfeed fence



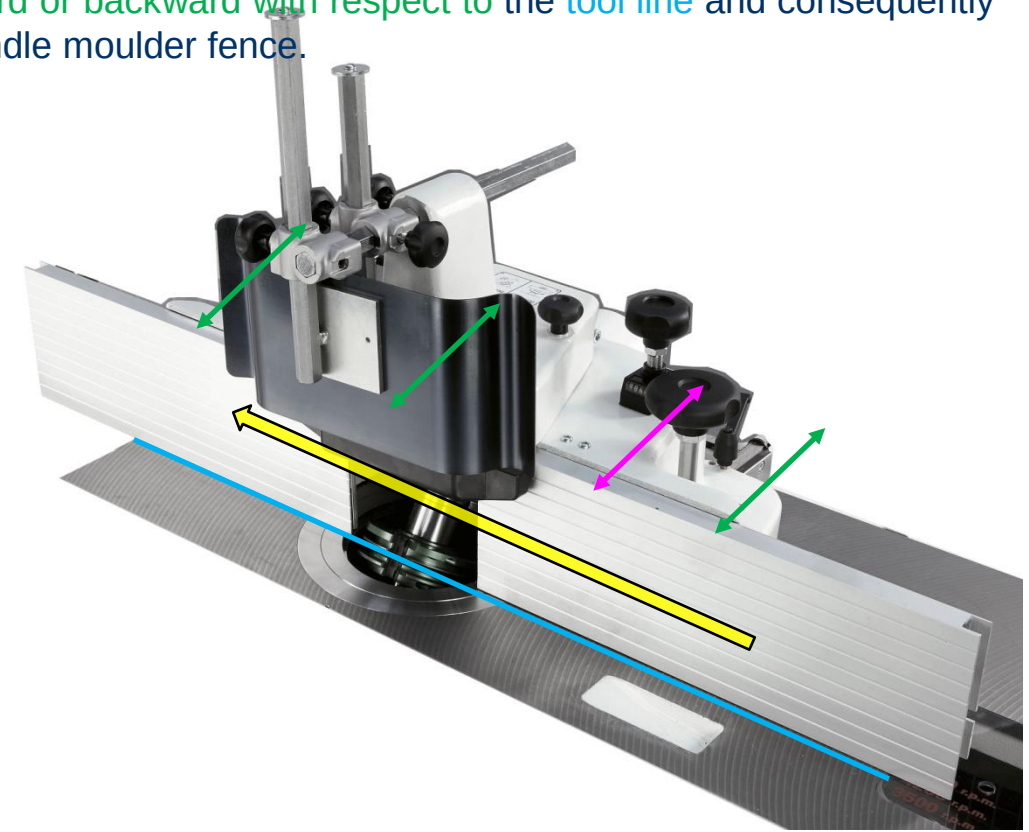
The spindle moulder fence is equipped with the main following devices:

- Infeed fence
- Outfeed fence
- Pressers (vertical and horizontal)

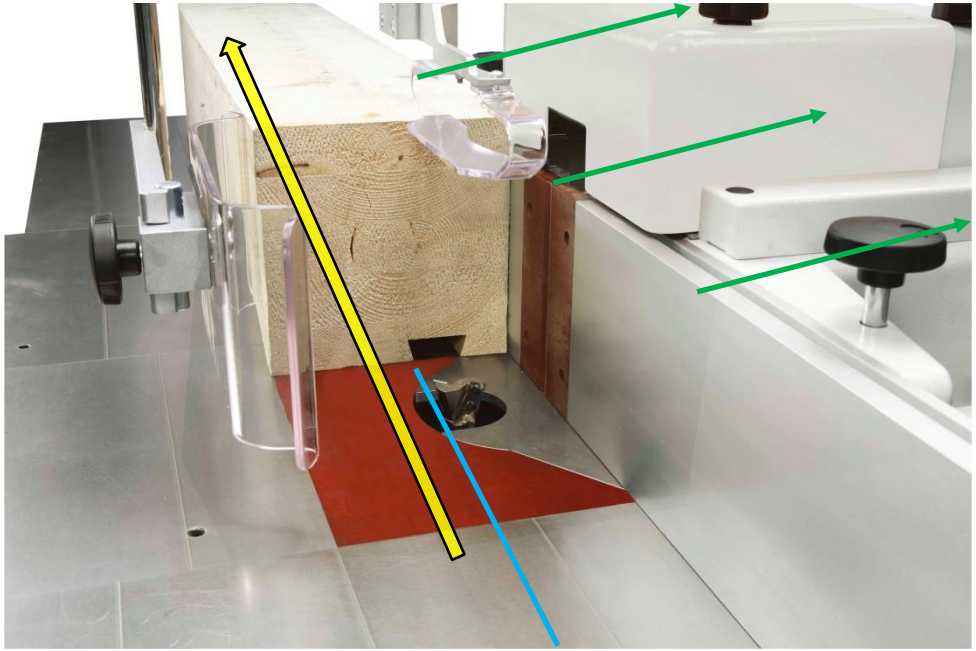


Infeed and outfeed fences are the supports for the piece when machining.
By moving the fence forward or backward with respect to the tool line it is possible to adjust the material removal. The outfeed fence is fixed acting as a support for the outfeed workpiece: however it is possible to move the entire spindle moulder fence forward or backward with respect to the tool line and consequently the outfeed fence will move together the spindle moulder fence.

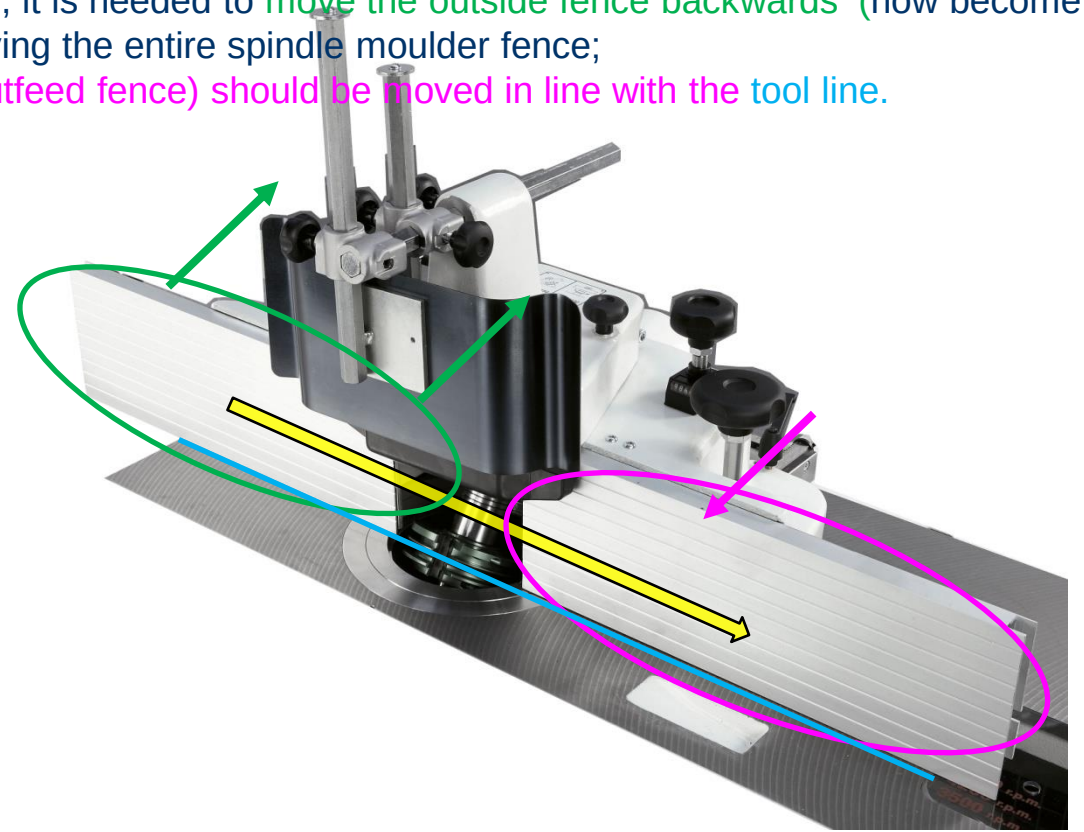
r.



Infeed and outfeed fences are the supports for the piece when machining.
By moving the fence forward or backward with respect to the tool line it is possible to adjust the material removal. The outfeed fence is fixed acting as a support for the outfeed workpiece: however it is possible to move the entire spindle moulder fence forward or backward with respect to the tool line and consequently the outfeed fence will move together the spindle moulder fence.
This condition could be necessary for particular routing operations.



As mentioned previously, In some spindle moulders it is possible the reverse rotation of the spindle moulder shaft (for the use of special cutters) and therefore for these spindles the direction of the work piece to be machined and consequently of the infeed fence and the support outfeed fence can be reversed.
In this case, in order to adjust the removal, it is needed to move the outside fence backwards (now become infeed fence) and it can only be done moving the entire spindle moulder fence;
logically the infeed fence (now become outfeed fence) should be moved in line with the tool line.

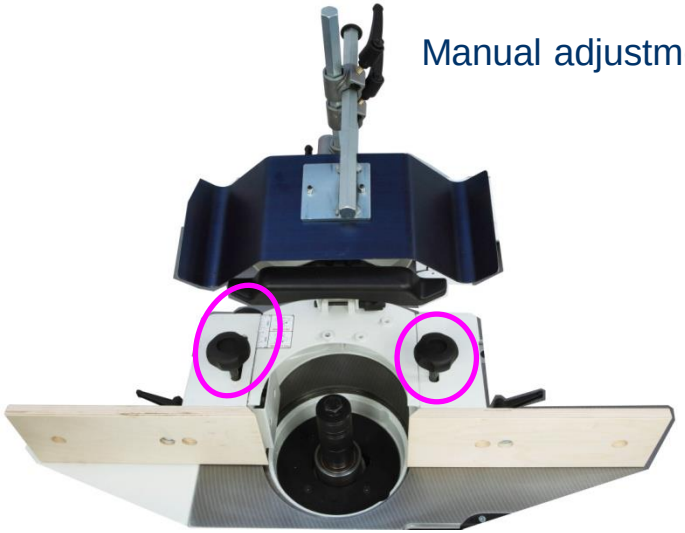


The infeed fence and the entire spindle moulder fence can be adjusted as follows:

Manual adjustment by means of knobs or handwheels, analogic indicators (mechanic programming) and reference stops for the repositioning



Manual adjustment with knobs





Automatic adjustment from electronic control

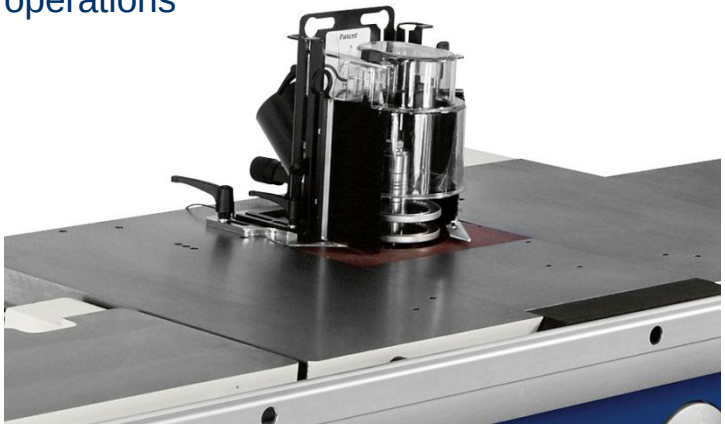
For certain processes, such as tenoning or shaping, it is necessary to remove the spindle moulder fence to be replaced by a fence / protection dedicated to these processes ...



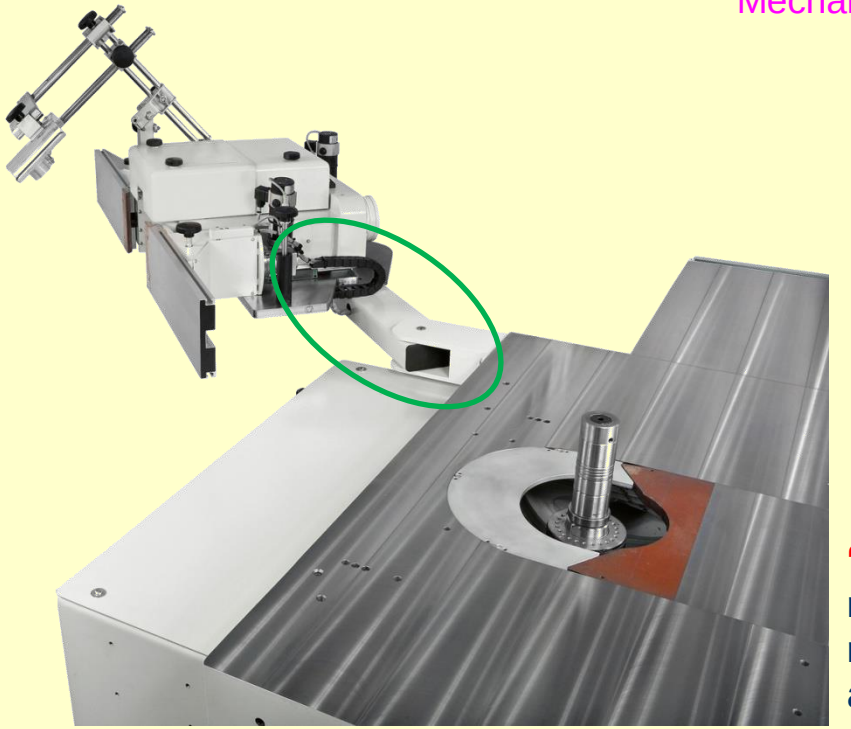
Fences (protection hoods) for tenoning operations



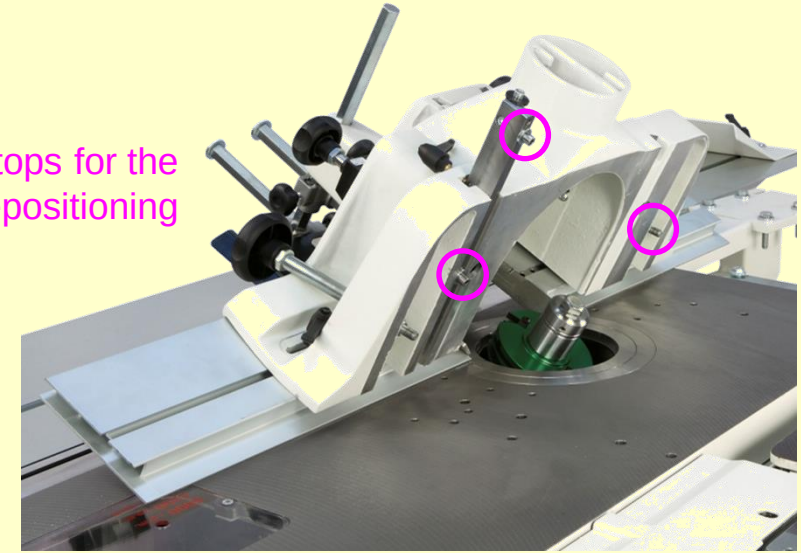
Fences (protection hoods) for shaping operations



Some SCM spindle moulder fences have systems to facilitate the operator during fence removal/repositioning, for example:

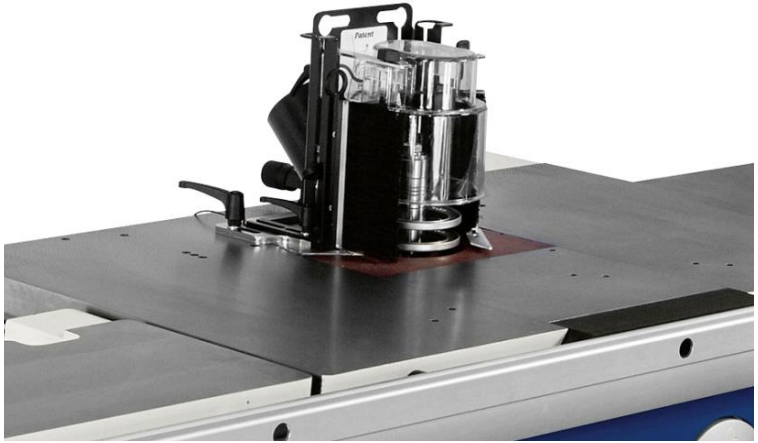


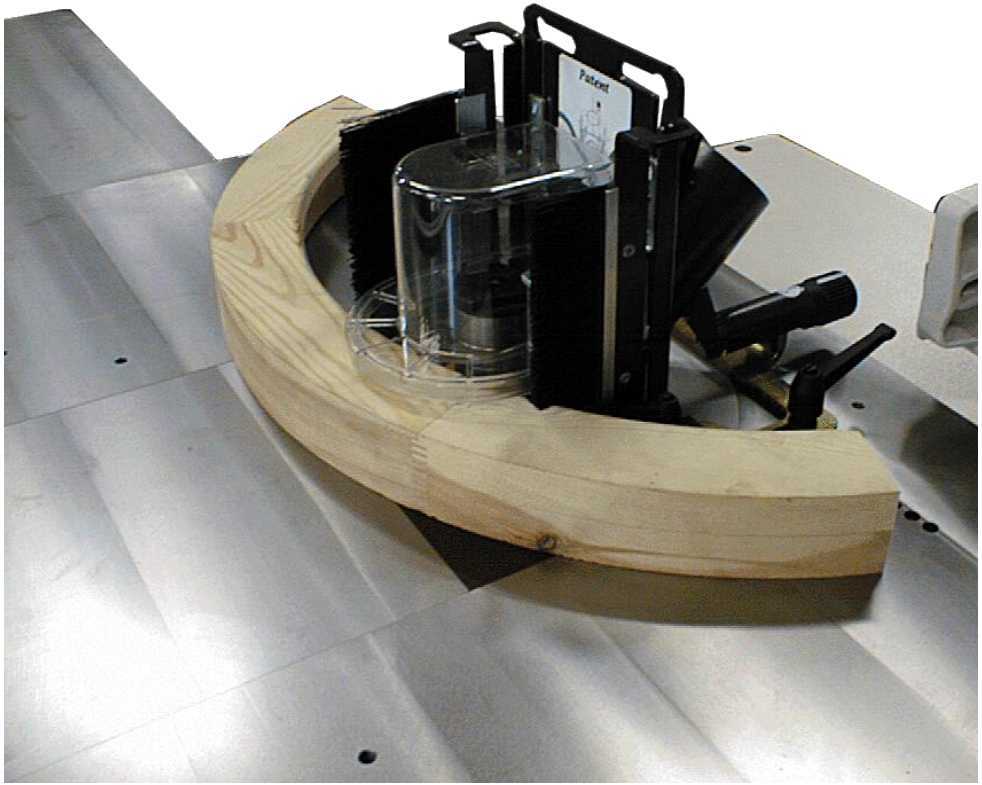
Mechanical stops for the repositioning



“Flex” system (SCM patent): the fence is quickly retracted by means of an exclusion arm and also repositioned instantly and accurately thanks to the arm and the references on the work table.

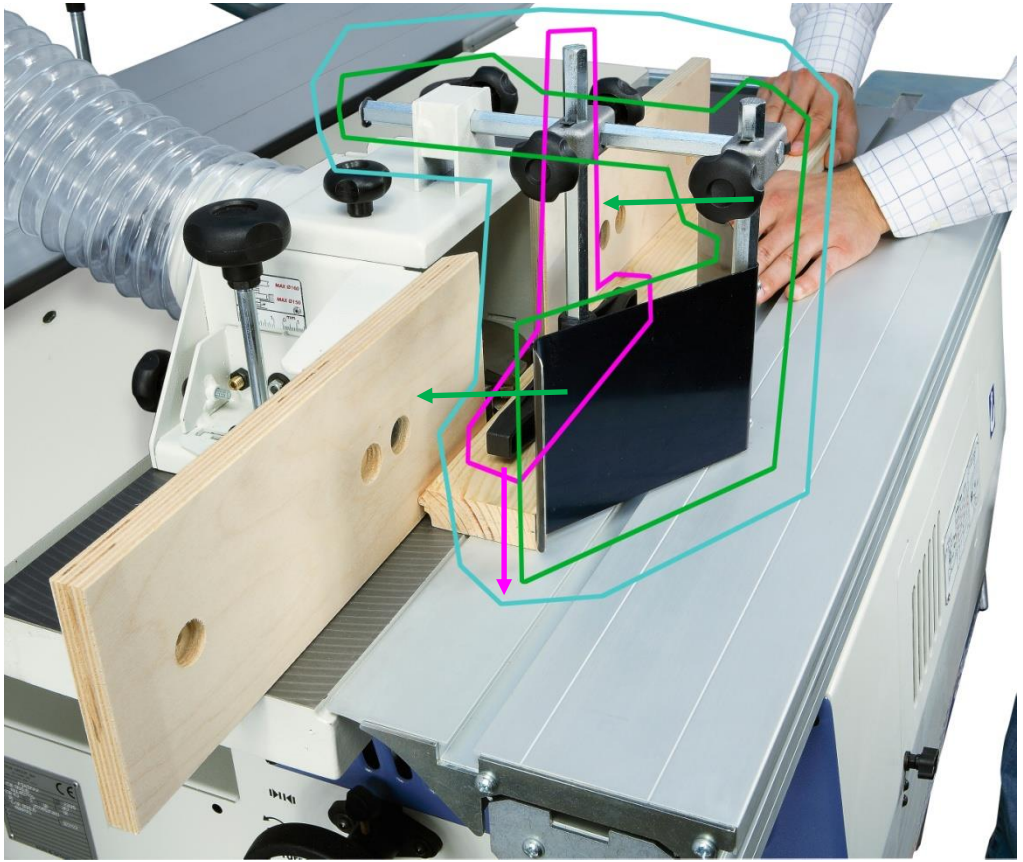
The "shaping" is that particular type of processing carried out close to the spindle and on particular pieces to be processed, with a non-linear profile.
As previously mentioned, a special fence (protection hood) is required for shaping operations instead of the traditional spindle moulder fence.





The pressers (vertical and horizontal) are safety devices that force the piece during working to move on the work table (vertical presser) and against the tool and the infeed and outfeed fences (horizontal presser); in this way the pressers guarantee:

- Protection for the operator (the tool is always covered from the piece during working or the horizontal presser)
- Working precision (the piece during machining is forced into movement)

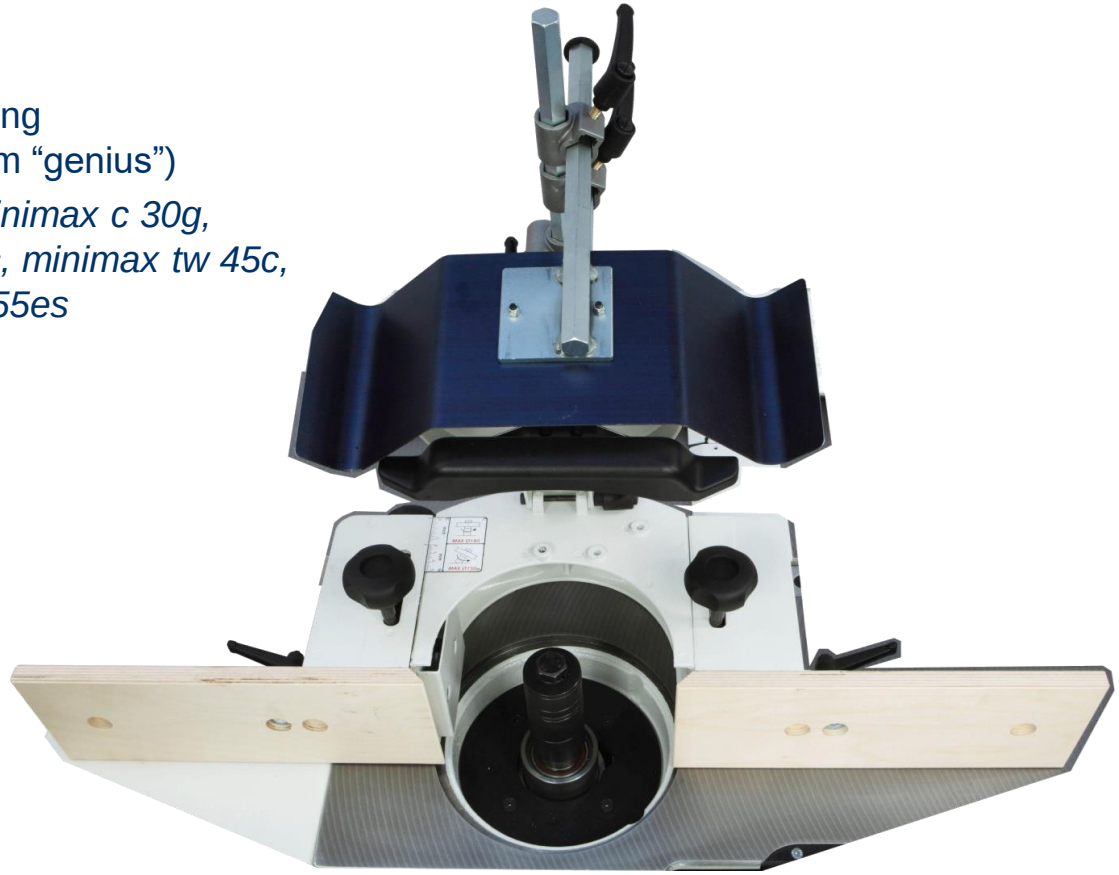


“genius (only combined machines)-lab-classic-elite-elite s” spindle moulder fence, features:

- Aluminum fence
- Manual fence adjustment
- Maximum diameter of profiling tool (cutter): 210 mm (160 mm “genius”)

Machines: minimax c 26g, minimax c 30g, minimax st 1g, minimax t 45c, minimax tw 45c, minimax t 55es, minimax tw 55es



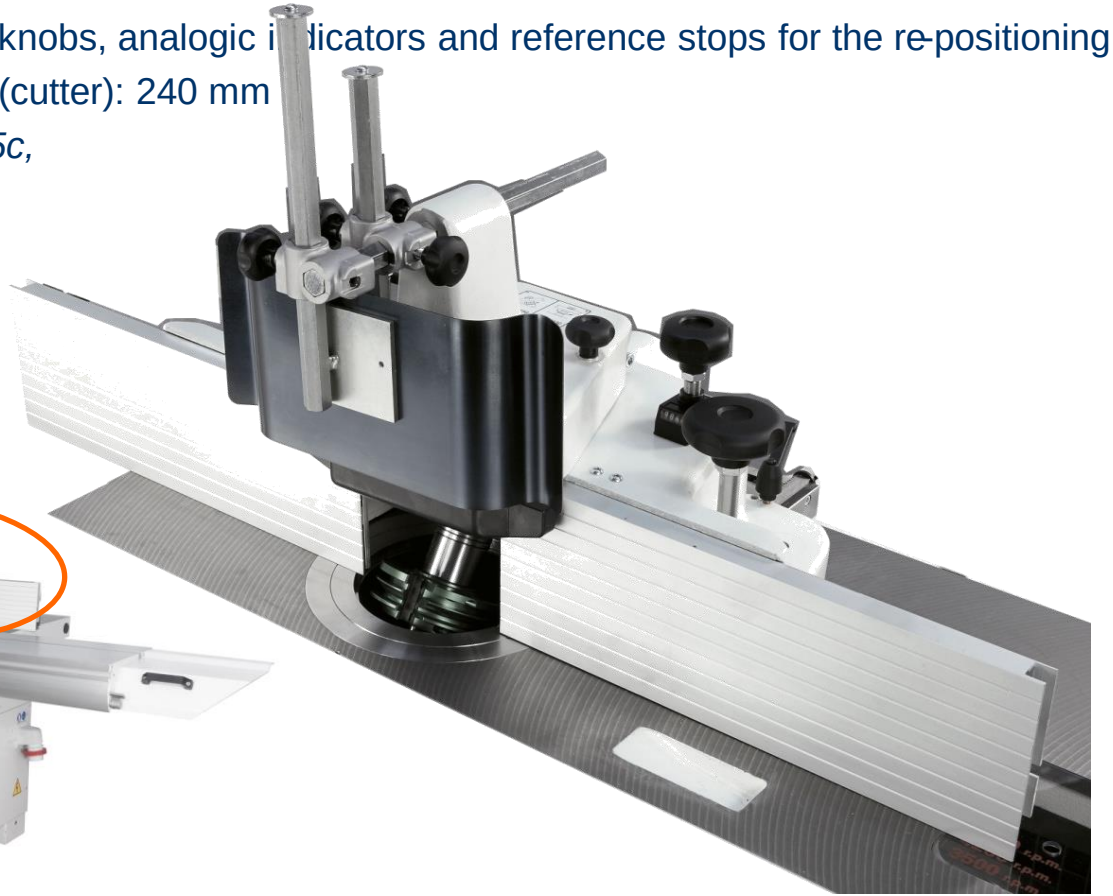


“classic-elite-elite s” optional spindle moulder fence, features:

- Aluminum fence
- Manual fence adjustment by means of knobs, analogic indicators and reference stops for the re-positioning
- Maximum diameter of the profiling tool (cutter): 240 mm

Option for: minimax t 45c, minimax tw 45c,
minimax t 55es, minimax tw 55es



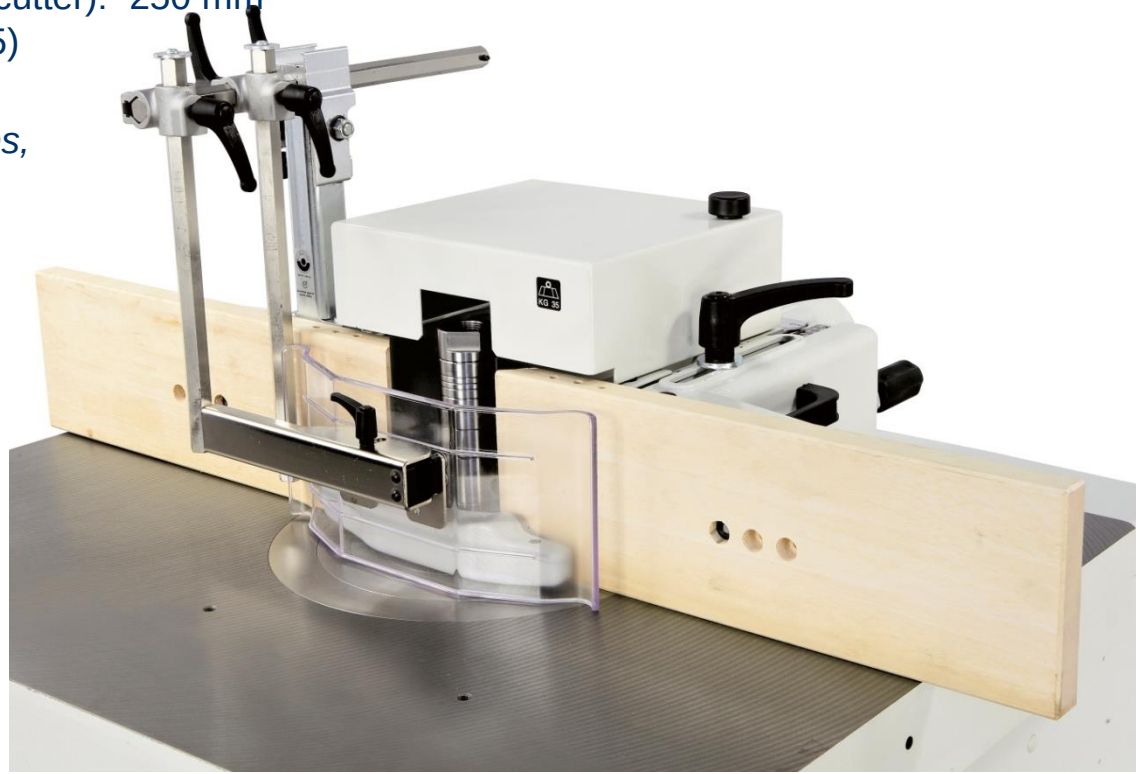


“nova-class” spindle moulder fence, features:

- Aluminum fence
- Manual fence adjustment
- Maximum diameter of profiling tool (cutter): 250 mm
  (240 mm nova tf 100 and nova ti 105)

Machines: nova tf 100, nova tf 110, nova ti 105, class tf 130, class tf 130ps, class ti 120





“class *e”* spindle moulder fence, features:

- Aluminum fence
- Manual fence adjustment by means of handwheels, analogic indicator (mechanical programming) and reference stops for the re-positioning
- Maximum diameter of profiling tool (cutter): 250 mm

Machines: class tf 130e, class ti 120e, class ti 145ep





“Flex One” spindle moulder (option), features:

- Aluminum fence
- Automatic fence (movement of the entire fence) with electronic control
- “Flex One” system for the rapid removing and re-positioning of the fence from work table by means of handwheel
- Maximum diameter of profiling tool (cutter): 250 mm

Machines: nova ti 105, class ti 145ep





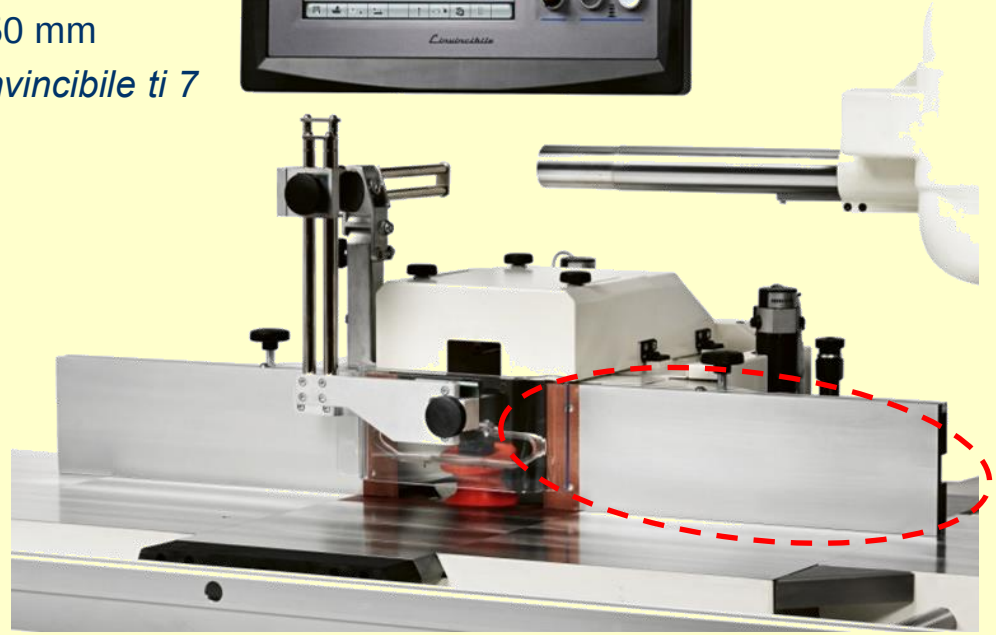
“Flex L’invincibile” spindle moulder fence, features:

- Aluminum fence
- Automatic fence (movement of the entire fence and the infeed fence), electronically controlled
- **“Flex” system (SCM patent)** for the rapid removing and re-positioning of the fence from work table by means of pratical locking lever
- Maximum diameter of profiling tool (cutter): 250 mm

Machines: L’invincibile tf 5, L’invincibile ti 5, L’invincibile ti 7







SCM spindle moulder fences:		minimax	nova	class	L'invincibile
"genius"		Standard	-	-	-
"lab-classic-elite-elite s"		Standard	-	-	-
"classic-elite-elite s as option"		Option	-	-	-
"nova-class"		-	Standard	Standard*	-
"class *e*"		-	Option	Standard/ Option*	-
"Flex One"		-	Option nova ti 105	Option class ti 145ep	-
"Flex L'invincibile"		-	-	-	Standard

(according to the models)*

Operating units

Machine controls and electronic controls

As previously mentioned the spindle moulders have different movement (of the operating units) :

Manual





Powered



Electronic programmed:
Ready



Electronic-programmed:
Easy



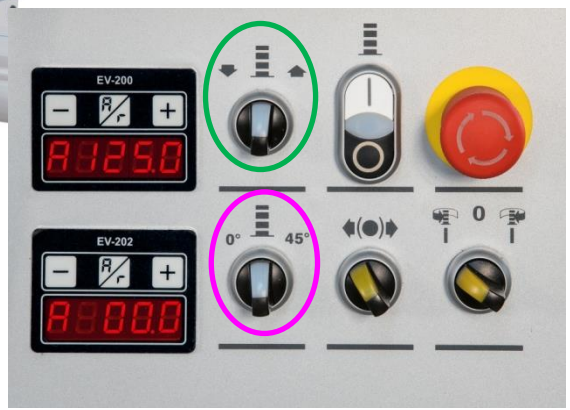
Electronic-programmed:
Easy Touch

The manual machines are equipped with practical handwheel for the spindle movement (lifting and tilting when present).

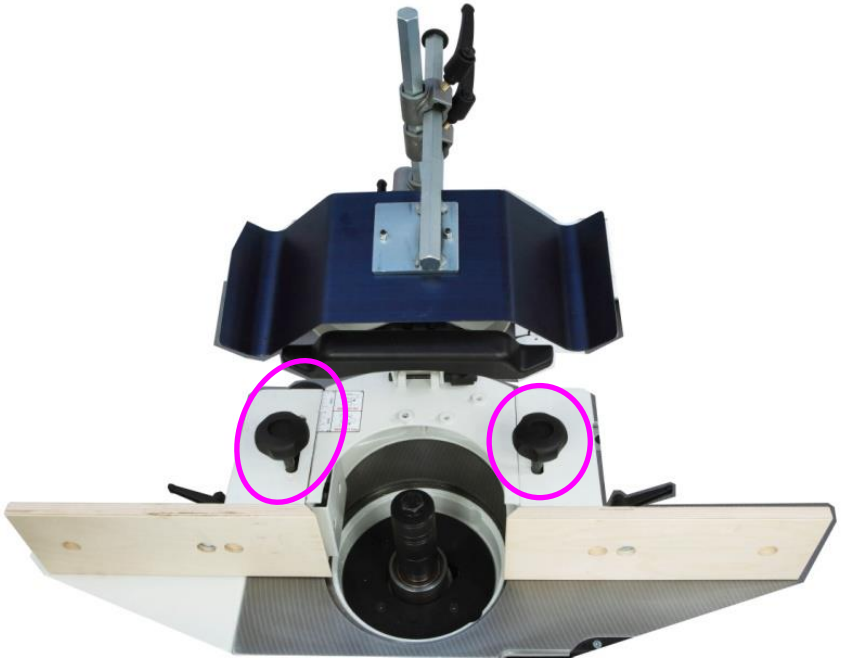


The powered versions have spindle selectors on the control panel for lifting and tilting (when present).

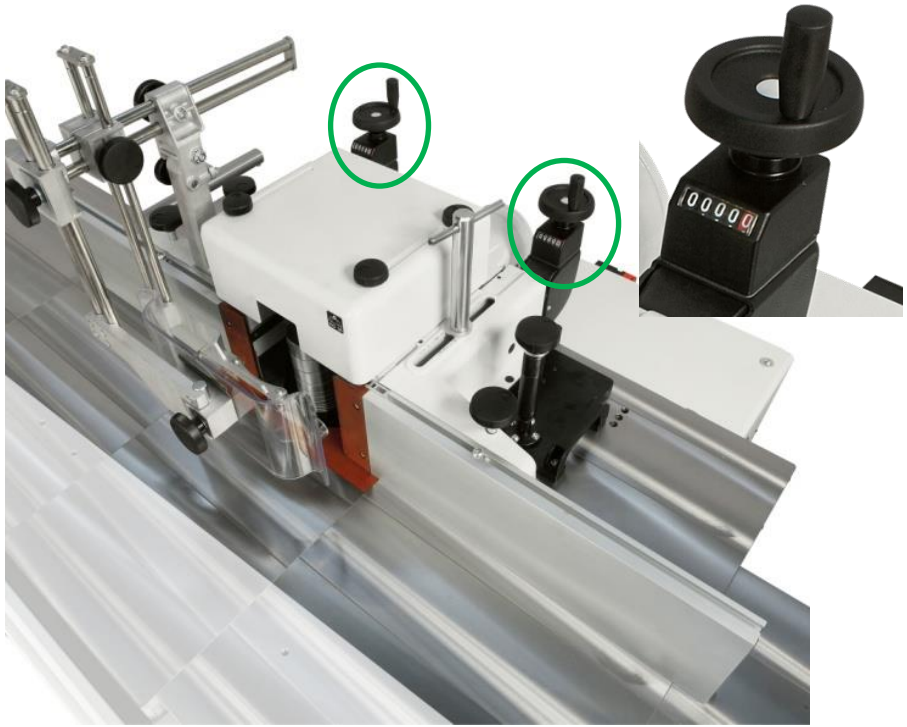




Infeed fence and entire spindle moulder fence movements:



Manual movement adjustment with knobs



Manual movement adjustment with knobs or handwheels, analogic indicators (mechanical programming) and reference stops for the re-positioning.

class ti 145ep: electronic-programmed spindle moulder, Ready control:

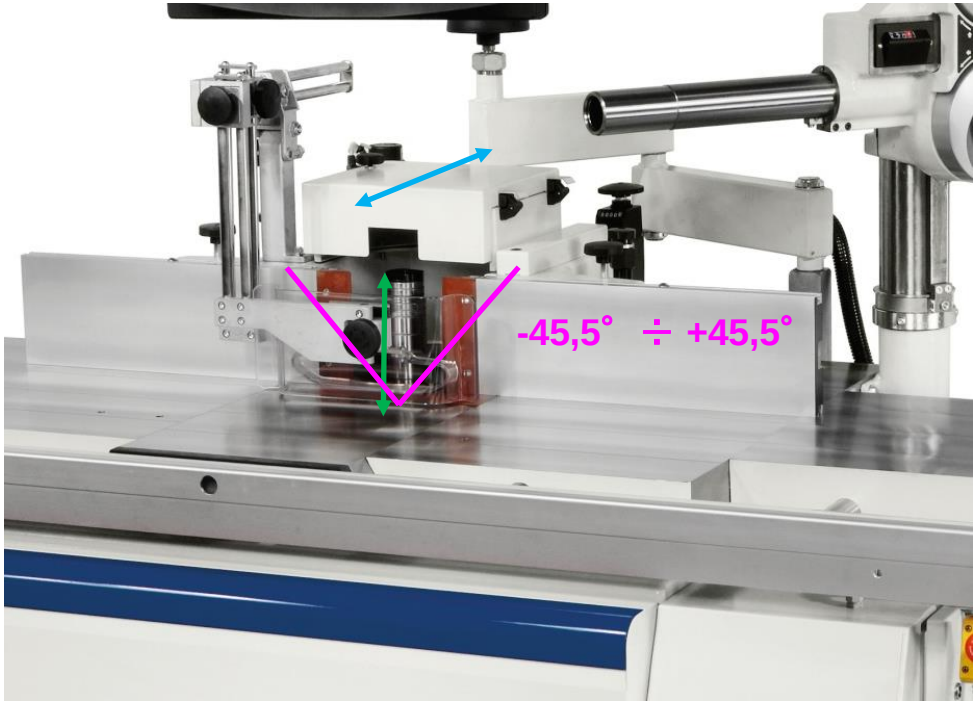


- Control of max. 3 adjustments:
  - 1) Spindle lifting
  - 2) Spindle tilting
  - 3) Entire spindle moulder fence adjustment
- memory capacity up to 99 programs with related tools



class ti 145ep: electronic-programmed spindle moulder, Easy control:





- Control of 4 adjustments:
  1) Spindle lifting
  2) Spindle tilting
  3) Entire spindle moulder fence adjustment
  4) Inverter management for electronic programming of the spindle rotating speed
- memory capacity up to 300 programs with related tools and management of the “cutting lines”*

(see the following slides)*

Electronic-programmed machines, Easy Touch control:

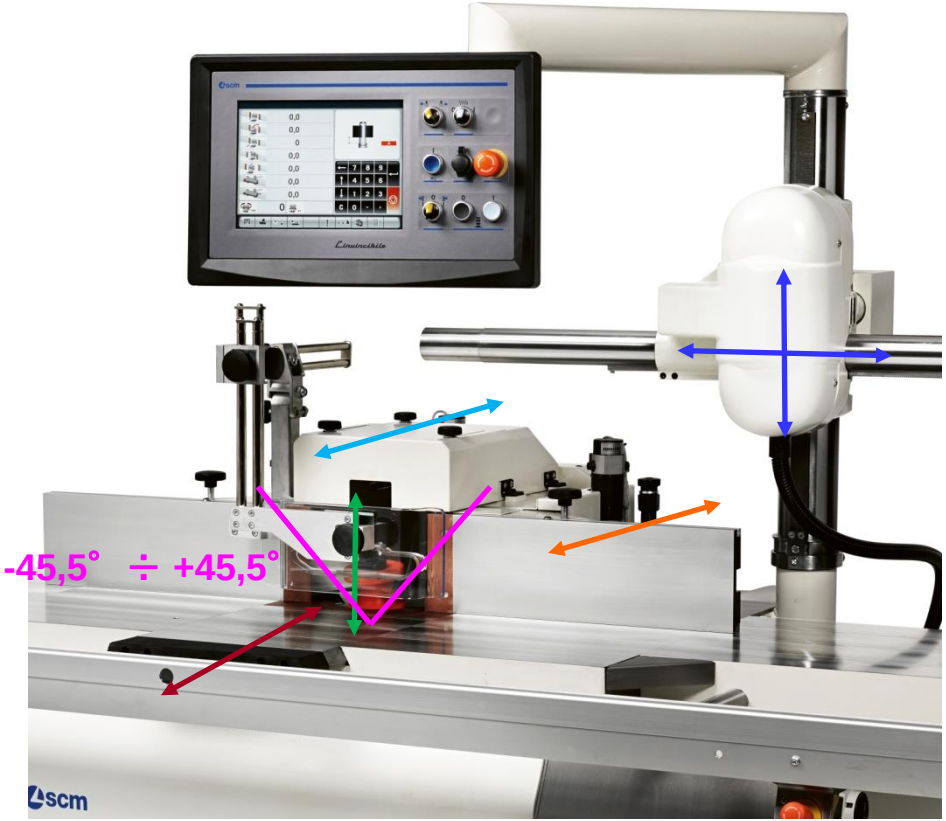


- 7” or 12” Touch screen colour display

Electronic-programmed machines, Easy Touch control:



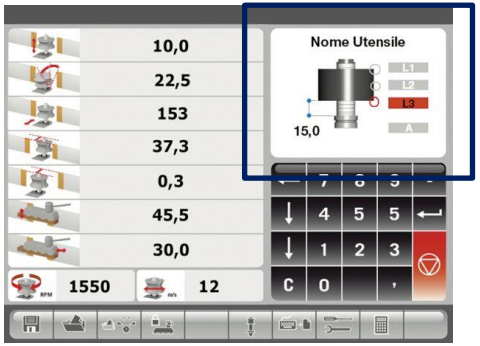
- 7” or 12” Touch screen colour display
- Control of 7 adjustments:
  - 1) Spindle lifting
  - 2) Spindle tilting
  - 3) Entire spindle moulder fence adjustment
  - 4) Infeed fence adjustment
  - 5) Inverter management for electronic programming of the spindle rotating speed
  - 6-7) Feeder support adjustment*
  - 8) “Fast” sectional table adjustment*

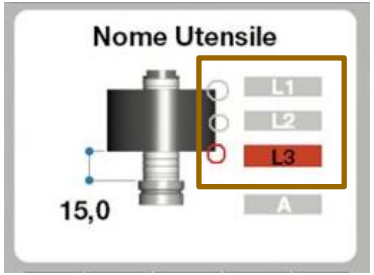


(see the following slides)*

Electronic-programmed machines, Easy Touch control:







- 7” or 12” Touch screen colour display
- Control of 7 adjustments:
  1) Spindle lifting
  2) Spindle tilting
  3) Entire spindle moulder fence adjustment
  4) Infeed fence adjustment
  5) Inverter management for electronic programming of the spindle rotating speed
  6) Feeder support adjustment*
  7) “Fast” sectional table adjustment*
- Storage capacity up to 1000 programs with relevant tools and “cutting lines” management

For each tool it is possible to define 3 "cutting lines", i.e. 3 tool identification points whose position is stored in the electronic control which will report to these identified points all the dimensions related to the various movements:
in this way the electronic control will always know the exact position of the tool identification points and will prepare the machine set up according to the required machining operation.
For the most recurring machining jobs it is possible to set the dimensions of the required profile and select the tool to be used.
The controls will create the dedicated program to carry out the required machining operations.

(see the following slides)*

Electronic-programmed machines, Easy Touch control:







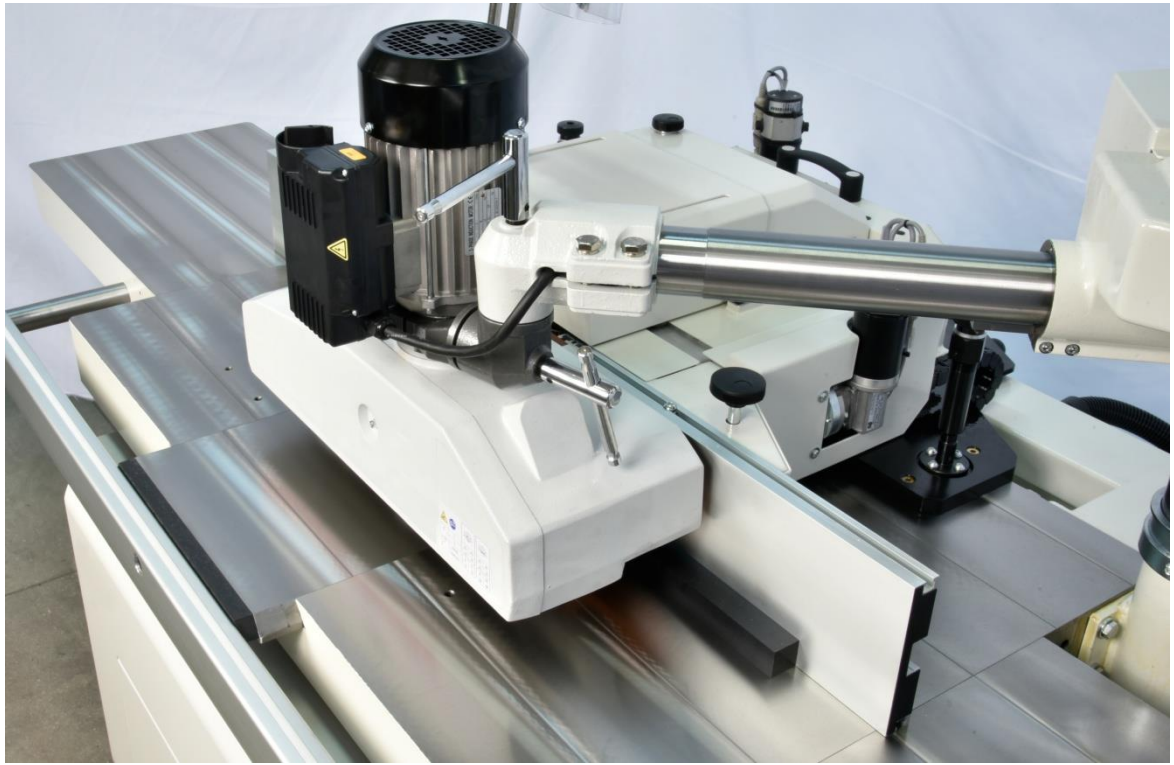
- 7” or 12” Touch screen colour display
- Control of 7 adjustments:
  1) Spindle lifting
  2) Spindle tilting
  3) Entire spindle moulder fence adjustment
  4) Infeed fence adjustment
  5) Inverter management for electronic programming of the spindle rotating speed
  6) Feeder support adjustment*
  7) “Fast” sectional table adjustment*
- Storage capacity up to 1000 programs with relevant tools and “cutting lines” management
- Advances operator’s support (L’invincibile ti 7)

The control recognizes the tool (previously stored in the control archive) by means of a transponder and recall it together with all the programs associated with that tool, including all the **anti-collision constraints** (of shaft + tool against spindle moulder fence, against «Fast» sectional table*, etc – **SCM Patent**): in this way the set up is quick and easy and the operator’s safety is safeguarded.

(see the following slides)*

The spindle moulders can be equipped with a “feeder” (sold separately to the machine).

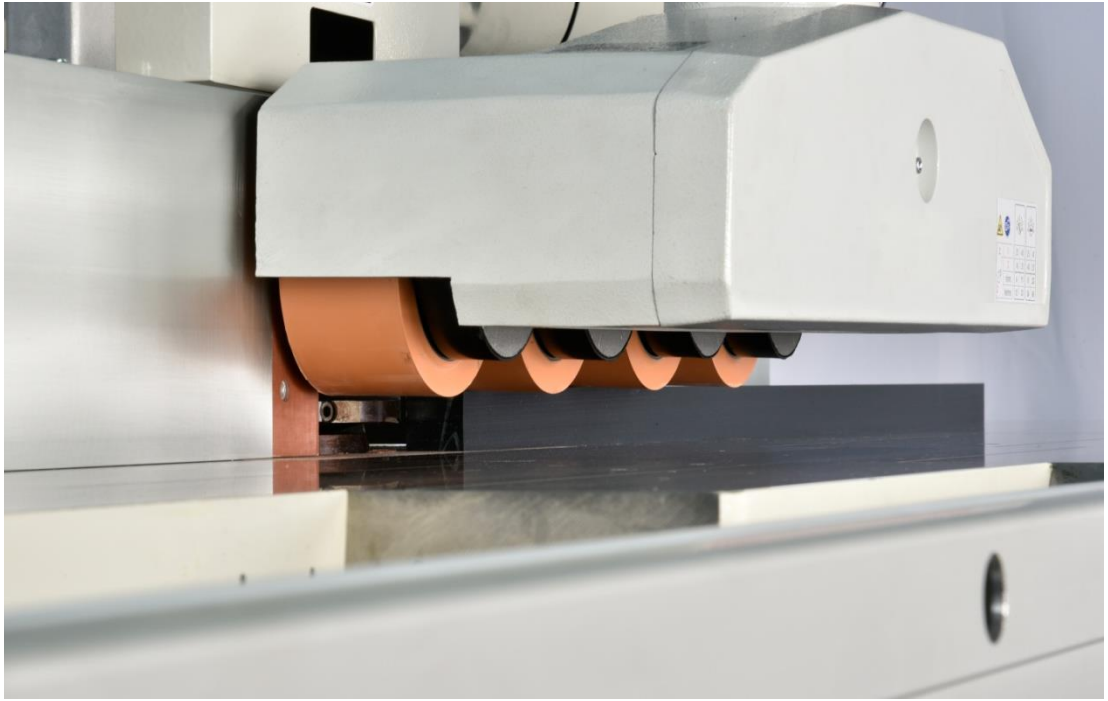




The spindle moulders can be equipped with a “feeder” (sold separately to the machine).

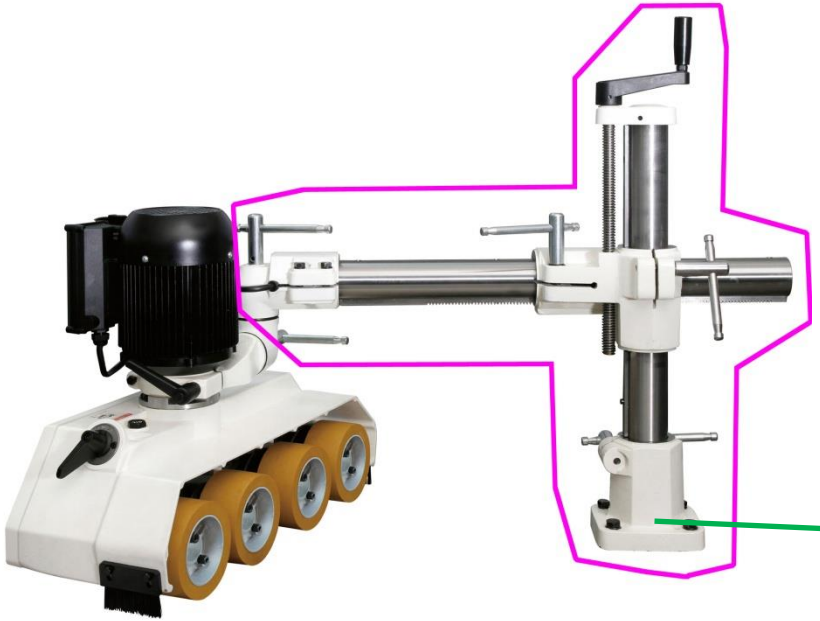
The feeder moves the piece being worked on the spindle moulder work table and against the cutter and this guarantees:

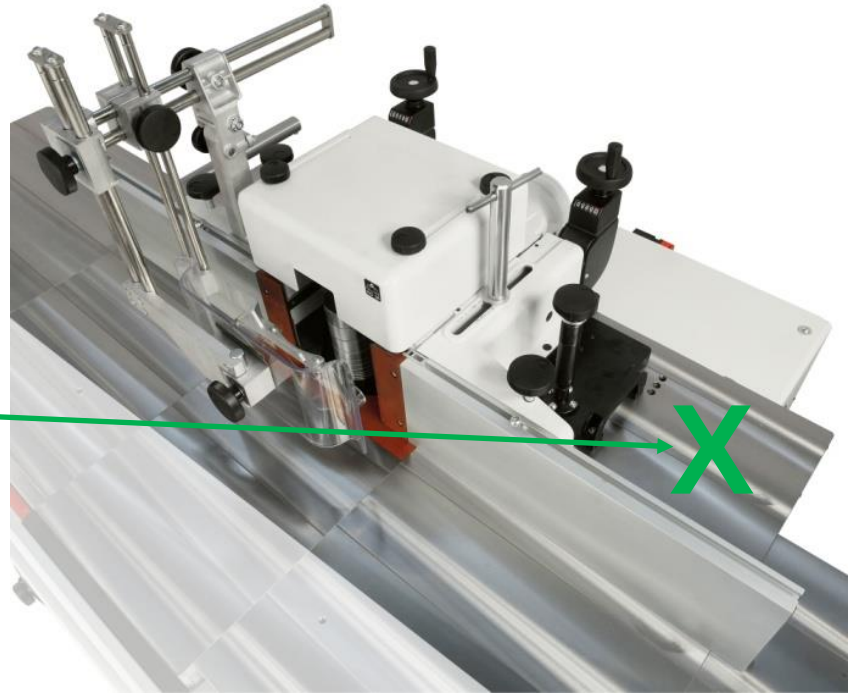
- greater operator’s safety, especially when processing very small and / or thin pieces
- a (likely) better finish, as the feed speed is constant compared to the operator’s manual speed



The feeder is installed on a support which can be:

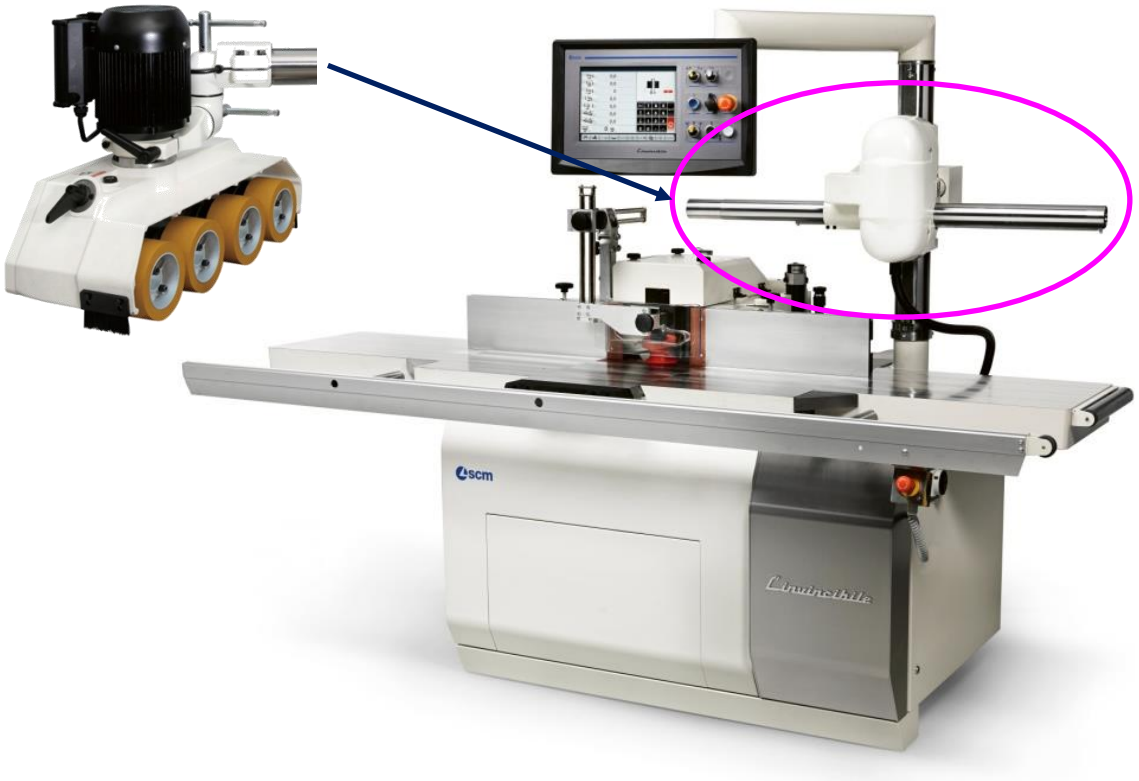
- or purchased separately from the machine and in this case it is generally fixed on the spindle moulder work table in an area that does not interfere with the working area.





The feeder is installed on a support which can be:

- or purchased separately from the machine and in this case it is generally fixed on the spindle moulder work table in an area that does not interfere with the working area.
- or purchased as an option when purchasing the machine…



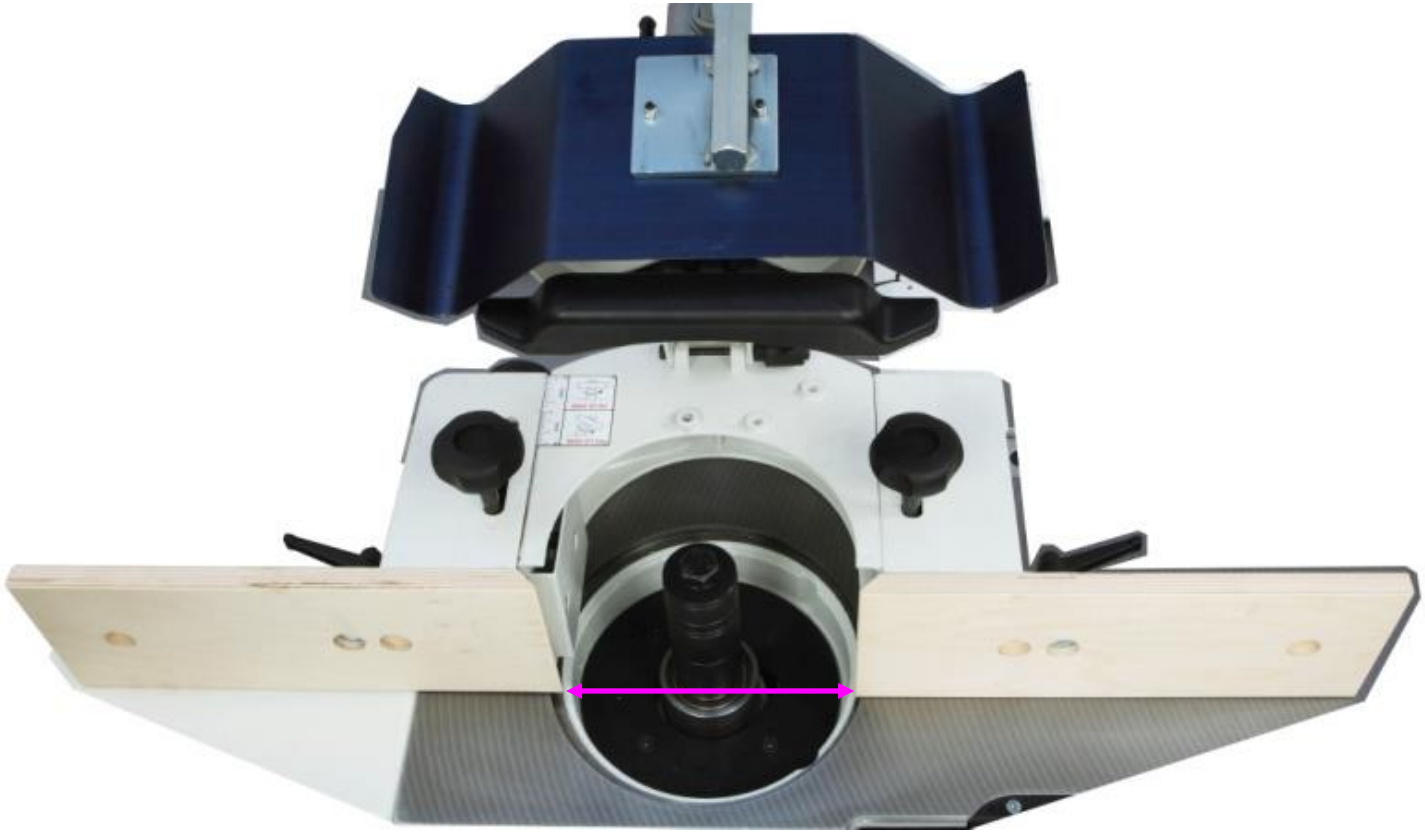
The feeder is installed on a support which can be:

- or purchased separately from the machine and in this case it is generally fixed on the spindle moulder work table in an area that does not interfere with the working area.
- or purchased as an option when purchasing the machine… In this second case the support can be equipped with manual or electronically-controlled adjustment.

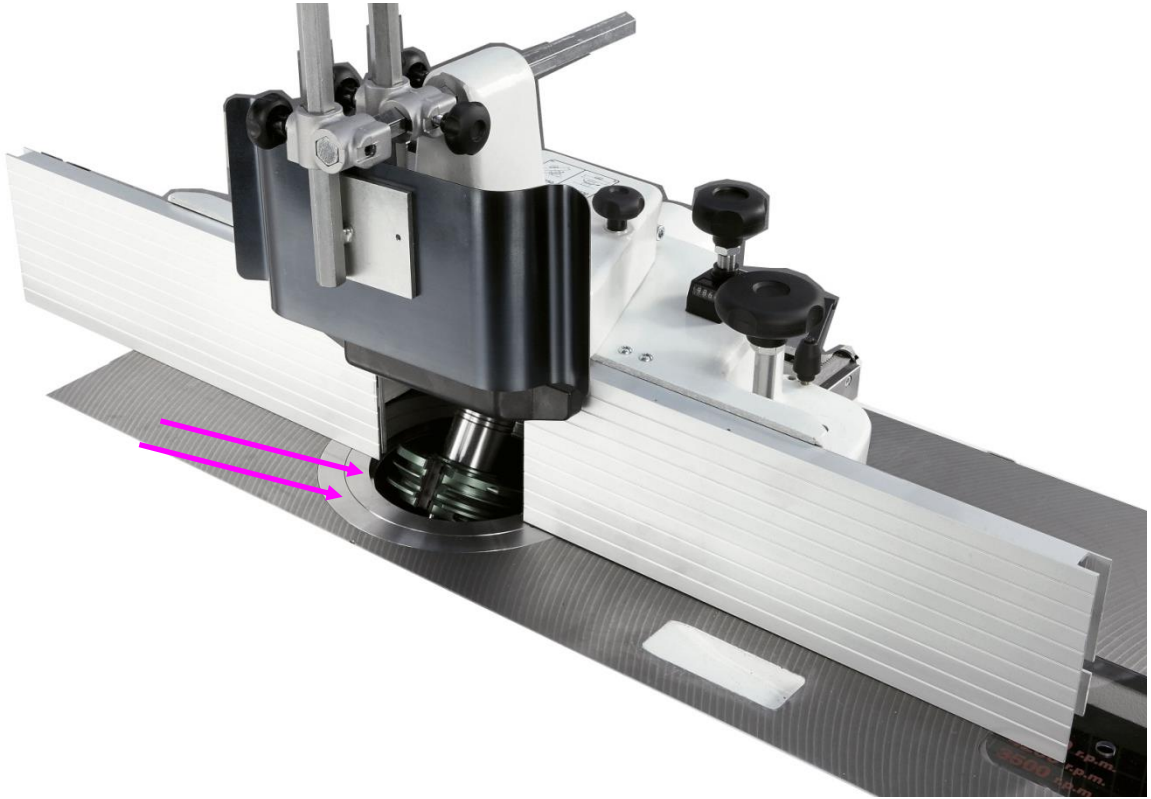




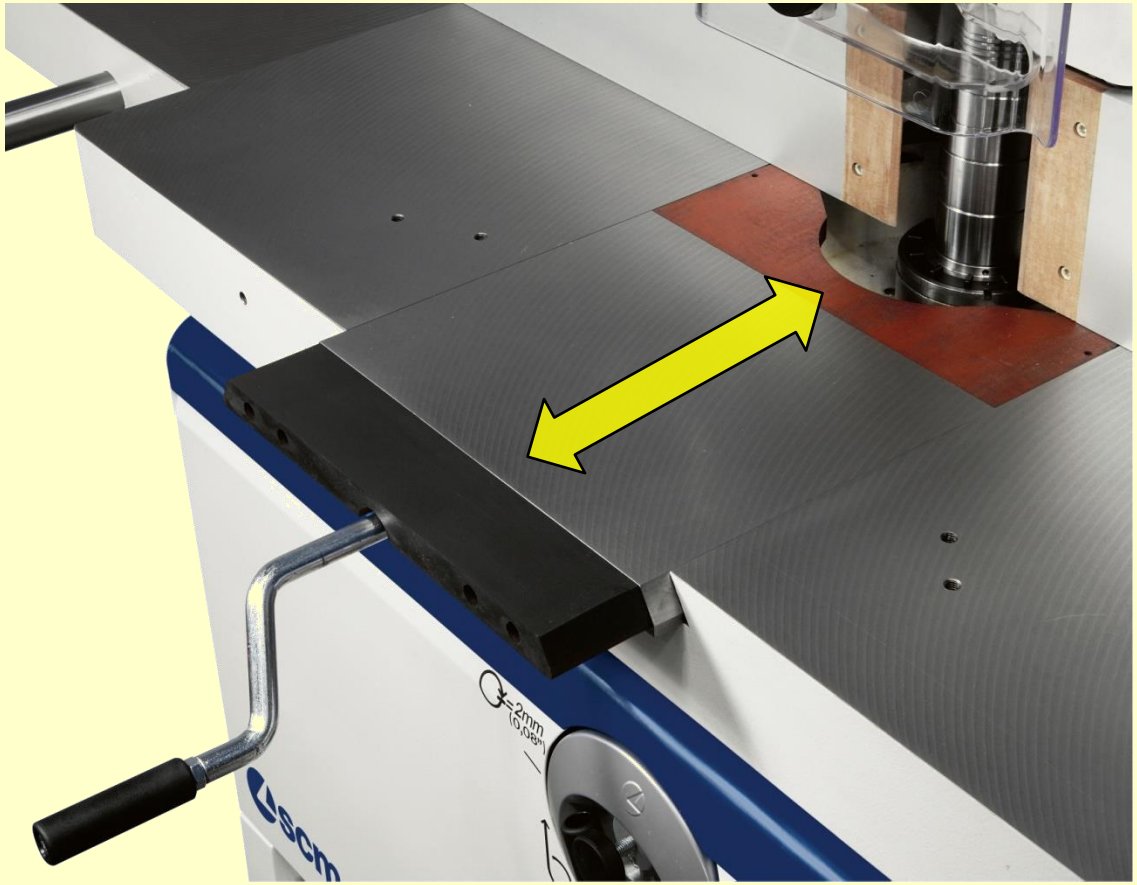
In correspondence of the spindle, the spindle moulder work table has (obviously) the hole to accommodate the cutter of maximum diameter, retractable under the work table.



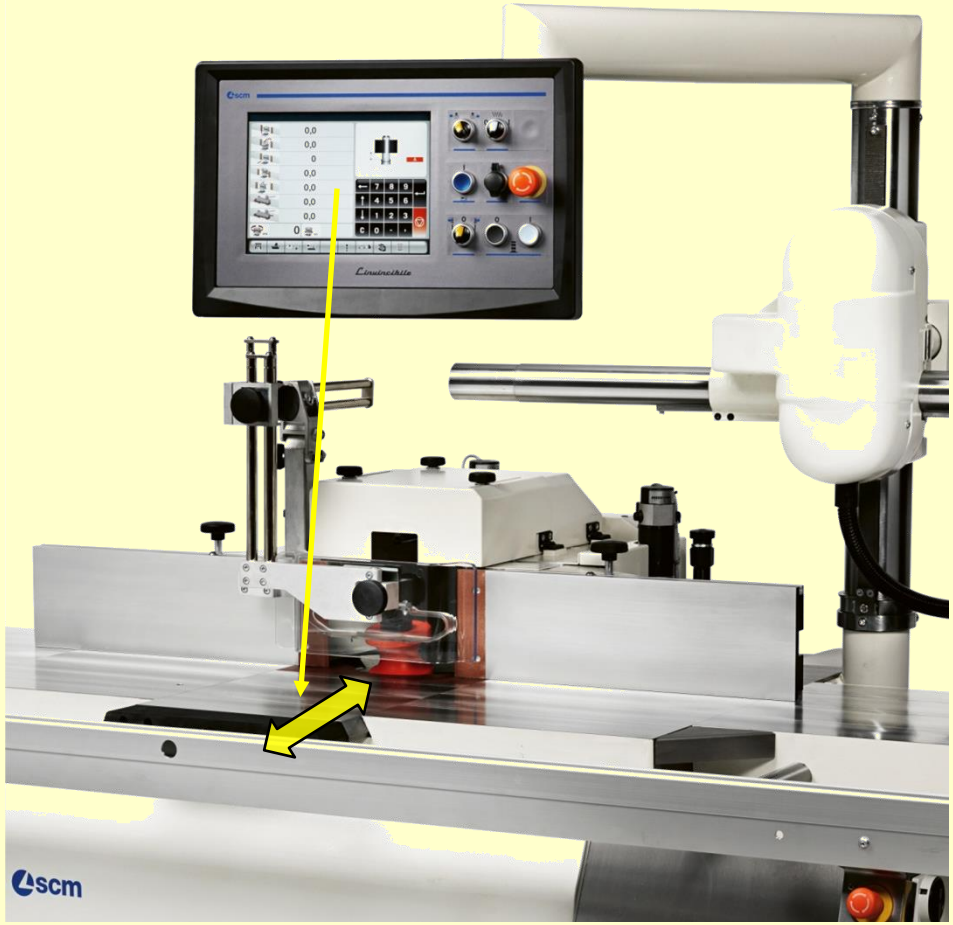
For an optimal processing, it is necessary to have the maximum possible support on the work table for the the piece being processed, especially under the cutting tool…; for this reason the spindle moulder is equipped with a series of rings of different diameter which can be added or removed in order to optimize the support for the piece being processed in the equipped tool.



In the class tf 130 (option), class tf 130e and class ti 145ep models, these rings have been substituted by a **mobile sectional table (“Fast sectional table” - SCM patent)** with manual movement by means of handwheel.



In the L’invincibile spindle moulders, the **“Fast sectional table” (SCM patent)** adjustment is carried out by the electronic control.





Machine versions

As previously mentioned, the spindle moulder is a very flexible machine… in fact it can be configured for different use needs

The **“LL” versions** are ideal for the machining of very long and/or wide and large dimensioned work pieces due to the different lateral and front work table extensions according to the model…

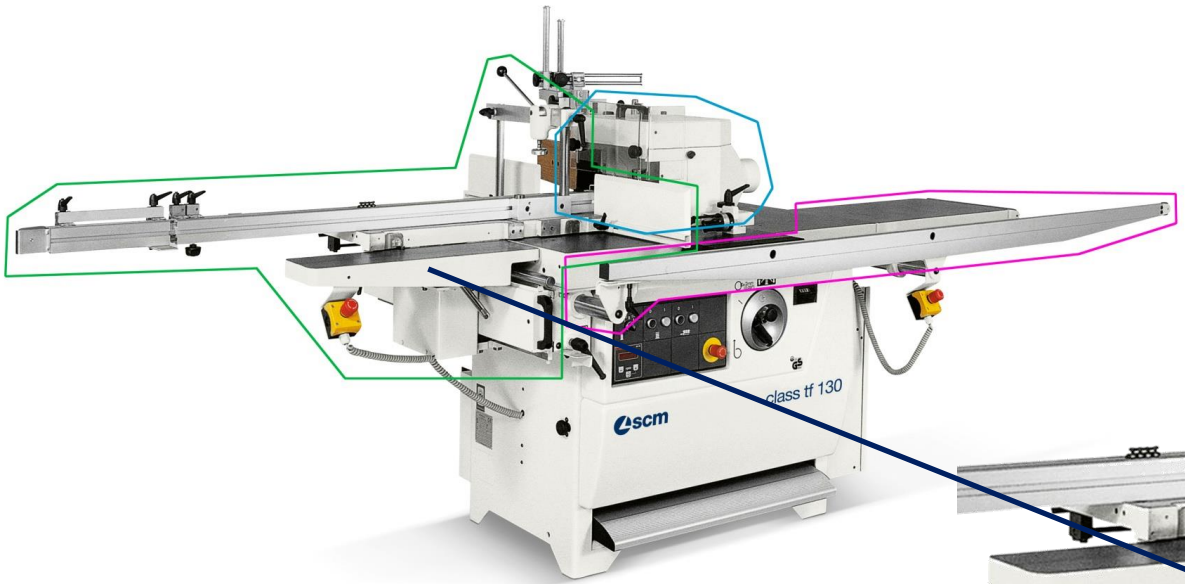


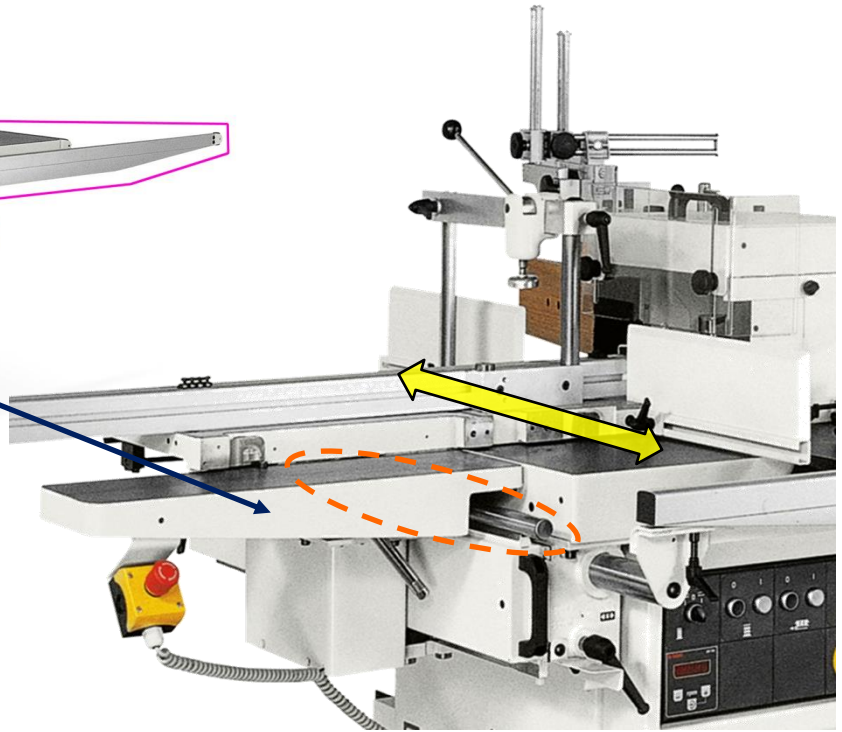


…or the **versions with sliding table and support frames**; these versions are particularly suitable also for the tenoning of large dimensioned work pieces.



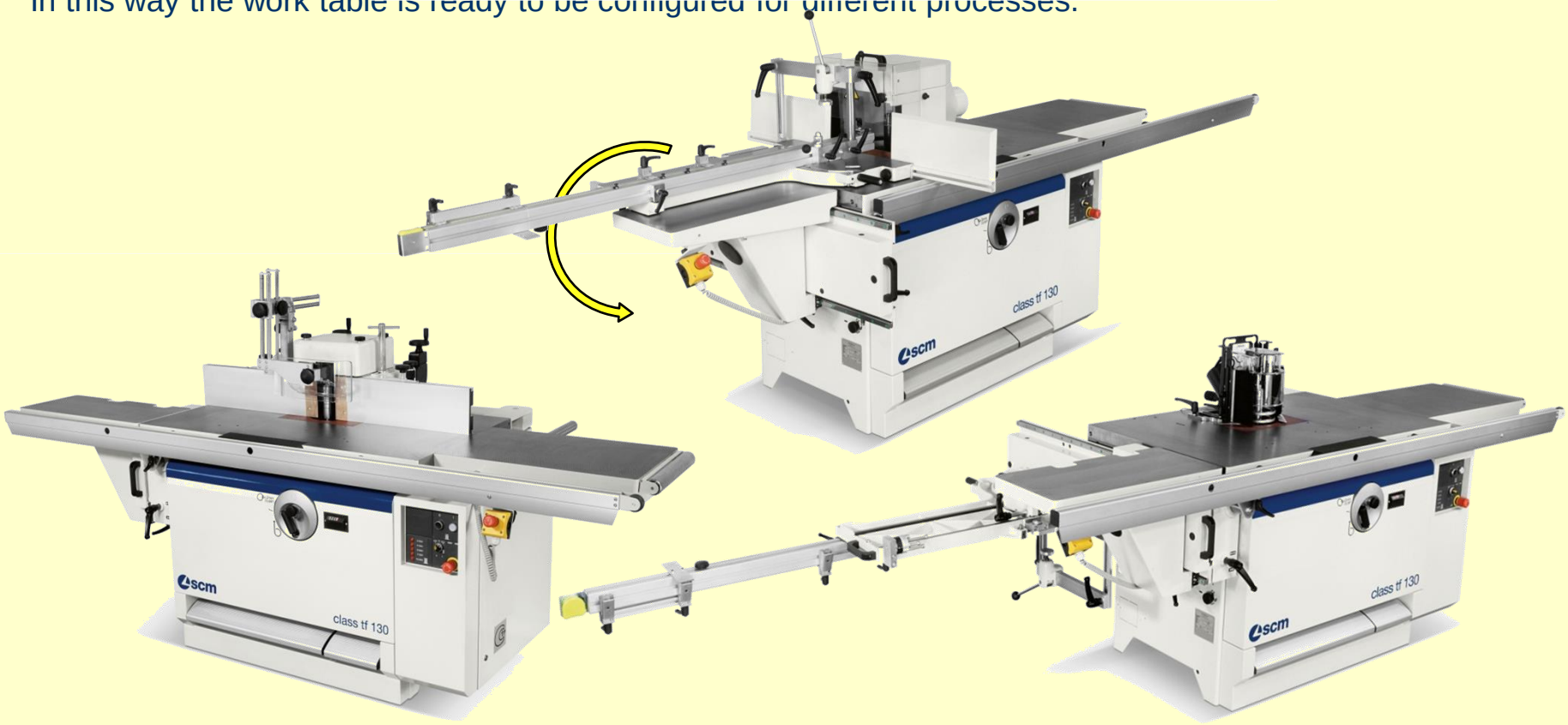
In addition to the versions with sliding table and support frames it is possible to choose also machine versions particularly suitable for the profiling and tenoning of large dimensioned work pieces, i. e. the **“TL” versions** which are also equipped with extensions for the piece support and a tenoning “carriage” with dedicated exhaust hood, to be substituted to the profiling and moulding hood, when needed.



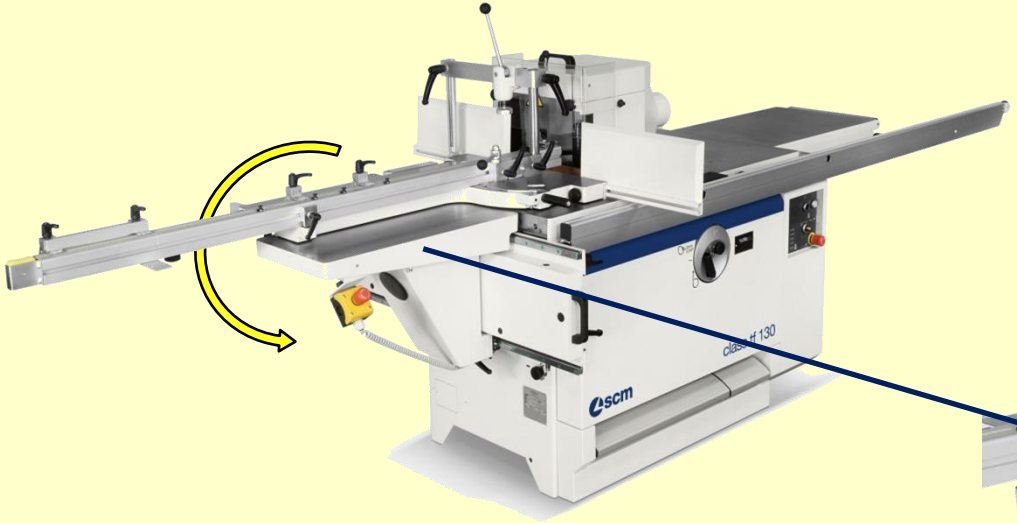


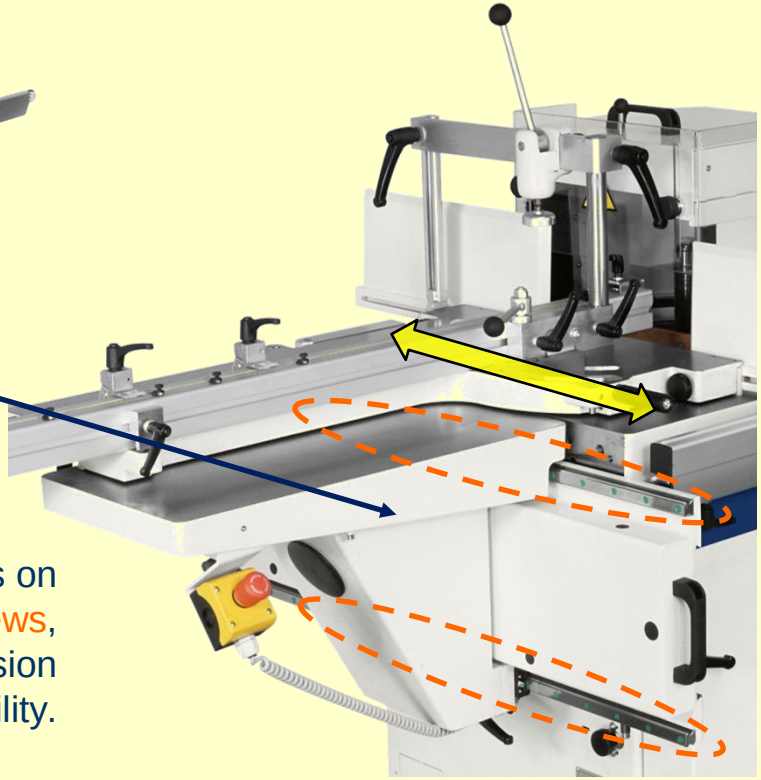
Manual feed carriage on axial bearings running on slideways made from hardened and ground bar.

The **“TL Pro-10” version (SCM patent)** is a very versatile solution, option for Class tf 130, Class tf 130e, Class ti 145ep and L’invincibile spindle moulder. The tenoning table of this version can be easily retracted and overturned under the work table (with possibility to reposition it in the reverse manner), when not used. In this way the work table is ready to be configured for different processes.



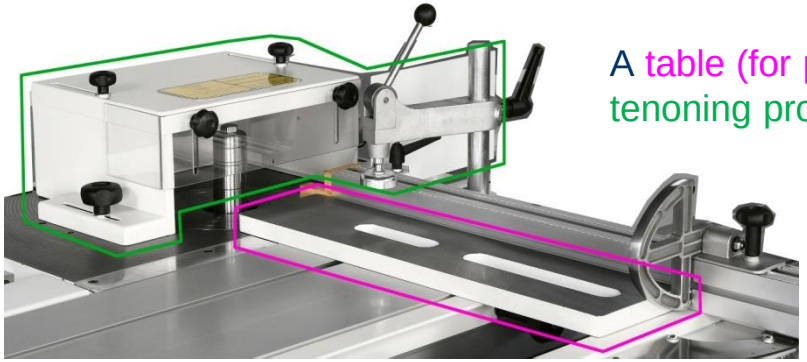
The **“TL Pro-10” version (SCM patent)** is a very versatile solution, option for Class tf 130, Class tf 130e, Class ti 145ep and L’invincibile spindle moulder. The tenoning table of this version can be easily retracted and overturned under the work table (with possibility to reposition it in the reverse manner), when not used. In this way the work table is ready to be configured for different processes.





The “TL Pro-10” manual feed carriage runs on linear slideways with recirculating ball screws, guaranteeing maximum machining precision and stability.

For tenoning operations of small pieces are available:



A table (for piece raising), can be fitted on the sliding table, with tenoning protection hood.

A tenoning carriage fixed on the work table.
Ideal for versions without sliding table;
Easy fitting and removal due to the fixing system on the work table.

