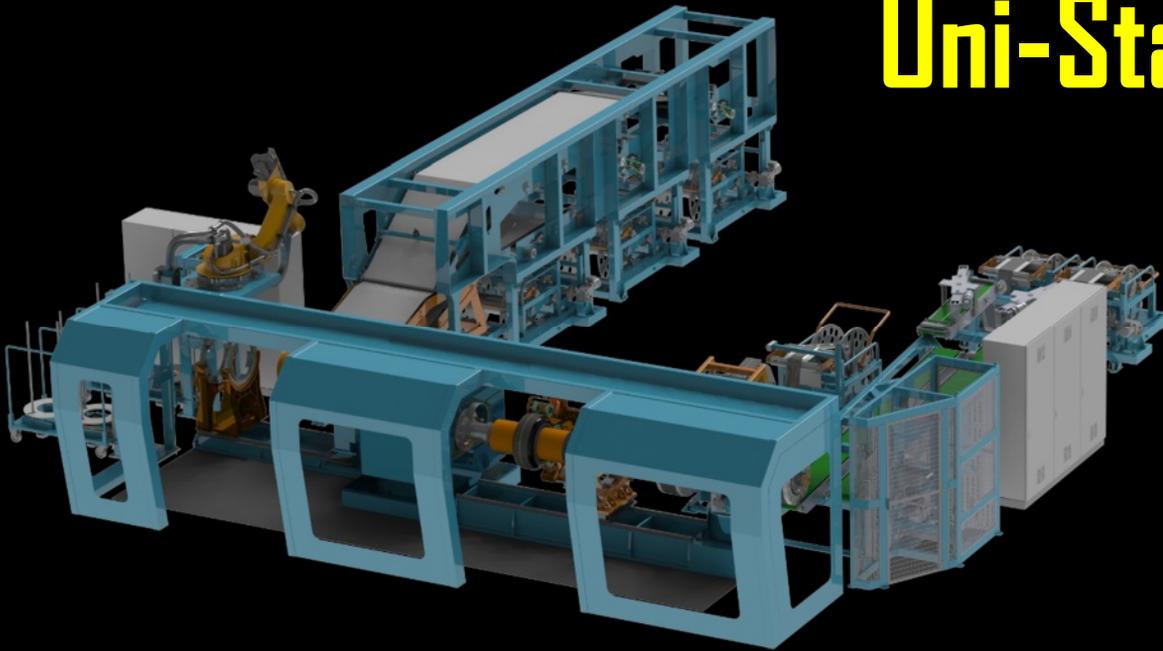


Uni-Stage TBM



Machine Body



Automatic Servicers

The Intereuropean Uni-Stage TBMs provide a fully automatic solution for building high performance tires with uni-stage technology.

The Uni-Stage TBM is equipped with active guiding systems for all the rubber components, automatic cutting and application systems, flat drum tire assembling technology, advanced control and supervision system with touch screen computer interface and advanced receipt management and diagnostics.

The machine cycle time is as low as **30 sec** per tire in fully automatic mode.

Beads loading into the bead setters is performed by a robot, while the finished green tire unloading from the uni-stage drum is performed by the transfer ring.

Machine configuration can be adapted to any customer's specifications, including 1 or 2 plies, steel or textile chafers, online / off-line preassembling of IL+SW, Tread out of Spool / Precut to length etc.

The Uni-Stage Drums used in the machine can be supplied by INTEREUROPEAN (double bladder / single bladder / mechanical turn-up type), or the machine can be designed to use the Customer's own standard uni-stage drums.

Twin breaker drums and twin uni-stage drums are used to achieve the 30 sec./tire cycle time in the top machine configuration.

One preassembly line for off-line Innerliner+Sidewalls preassembling can be supplied by INTEREUROPEAN with the machines in order to reduce costs and increase the productivity of the Uni-Stage TBMs.

The machine cycle time depends on the drum type and servicers configuration and varies from **30** to **40** seconds per tire in fully automatic mode.

As an option, Innerliner and Sidewalls can be applied separately on the uni-stage drum for maximum tire design flexibility and optimum splice distribution on the circumference of the tire.

Tire size range covers all the PCR & LT tires up to 24", including ultra-high performance tires.

Special cassettes with beads and separators arrive from the company's well-known Bead Apexing Lines, working in fully automatic mode and equipped with a robot that places the beads and separators into the cassettes. One bead apexing line can produce enough beads for two Uni-Stage TBMs and is offered as standard with the building machine (see the picture on the left).

The same type of robot is used in the Uni-Stage TBM for loading the beads into the automatic bead setters, providing for precise automatic placement of the beads on the uni-stage drum during the machine cycle.

The carcass components, such as IL+SW complex, ply 1 and ply 2, are automatically centered by active guiding systems, precut to length and applied on the uni-stage drum by the Carcass Components Servicer (see the picture above).

IL+SW complex cutting is performed by a special ultrasonic cutting device with a vertically adjustable cutting angle. This solution enables extremely low angle cutting, thus increasing the contact surface between the layers of the material in the splice area to avoid any possibility of air entrapment. Special multi-disk presser roll helps to push the air out during material application on the drum.

At the same station, the beads are placed into the bead setters by a robot at the beginning of each cycle and the bead setting and turn-up operations are performed on the uni-stage drum.

Carcass always stays on the same uni-stage drum during the whole assembling process. After

Uni-Stage TBM

for PCR & LT Tires

Technical Data	PCR-LT20	PCR-LT24
Bead Diameter (inch)	13"-20"	15"-24"
Green tire diameter	800mm	1000mm
Bead Setting width – max	600mm	700mm
Breaker drum diameter	750mm	980mm
IL+SW complex width, max	1000mm	1200mm
1 st Ply width	900mm	1000mm
2 nd Ply width	900mm	1000mm
Sidewalls width max	240mm	260mm
Steel/Textile chafers width	25mm – 90mm	25mm – 90mm
Breaker width	280mm	350mm
Breaker cutting angle	18° - 30°	18° - 30°
Tread Band width	350mm	450mm
Tread length	2500mm	3200mm
JLB/Spiral Nylon Overlay width	10mm - 25mm	10mm - 25mm
PLC type	Allen Bradley SLC 5000	Allen Bradley SLC 5000
Pneumatics	FESTO	FESTO
Cycle time per carcass	30 sec.	40 sec.
Production output, up to	~2000 tires/day *	~1500 tires/day *
Operators required	1 machine operator	1 machine operator
Required floor space (with 2 plies configuration)	12.510 x 12.940mm	13.010 x 13.450mm

(*) - depending on production conditions, skill level and efficiency

The belt and tread package is assembled in two steps on two independent breaker drums, installed on a rotating turret.

The new generation of breaker servicer enables high-speed and butt-splice application of breakers on the drum from the bottom by means of magnetic-type conveyor belts. Active guiding of breakers is executed by high-resolution cameras, while length measurement is checked by various electronic systems, enabling the material length to be distributed evenly on the circumference of the drum.

Spiral nylon overlay is applied immediately after the breakers by a high-speed application head with tension-control system, ensuring constant material tension during the various stages of application.

Any spiral winding patterns can be programmed and memorized in the machine recipes.

At the next station, the tread band is applied out of spool. The tread band is automatically applied and cut over the drum after application by ultrasonic blade. This application system, called the 7/8th, gives maximum precision of the tread splicing, as the positioning tolerance is limited only to the short tail of the material remaining to be applied after cutting over the drum. The ultrasonic cutting device has a vertically adjustable cutting angle, enabling extremely low angle cutting, thus considerably increasing the contact surface between the layers of tread in the splice area and making the splice almost invisible to the human eye. A multi-disk presser roll with adjustable pressure stitches the tread during material application on the drum. The active guiding system ensures precise centering of the tread before application.

After tread application, a transfer ring picks up the belt & tread package from the breaker drum and moves it to the uni-stage drum over the pre-shaped carcass. The final shaping, dynamic stitching and green-tire unloading by the transfer ring completes the machine's cycle.

Every let-off station is equipped with a double set of removable let-off carriages. This enables a service technician to replace the bobbins outside the let-off station while the machine continues operating. Replacing a let-off carriage with a new one is simply a matter of switching the carriages and splicing the ends of the material in the let-off station. This system enables very quick spool changes, reducing machine downtime.

The Uni-Stage TBM control system is designed with a modular architecture using the newest hardware components available on the market. Based on customer preference, the machine can be supplied with Allen Bradley or Siemens PLCs and components.

A touchscreen HMI is provided as standard, with graphical interface and dedicated screens for every machine function, recipe management, extensive alarms handling and production statistics.

Other optional components and servicers can be added, such as chafers, strips, nylon cap-ply, etc. Different versions of uni-stage drums (bladder / mechanical turn-up type), breaker drums with motorized diameter adjustment, and full range transfer rings can be supplied upon request to speed up tire size changes.

Intereuropean's Uni-Stage TBM is supplied with motorized adjustments of all the key machine parameters according to the recipe settings. This includes motorized conveyor angle adjustments based on the new drum diameter, centering device adjustments based on the material width, stitching device adjustment based on the new tire size, etc.

All these additional functions help to minimize the time required for size changes, which is the key to achieving the winning combination of high flexibility and high production output in this new tire building system



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