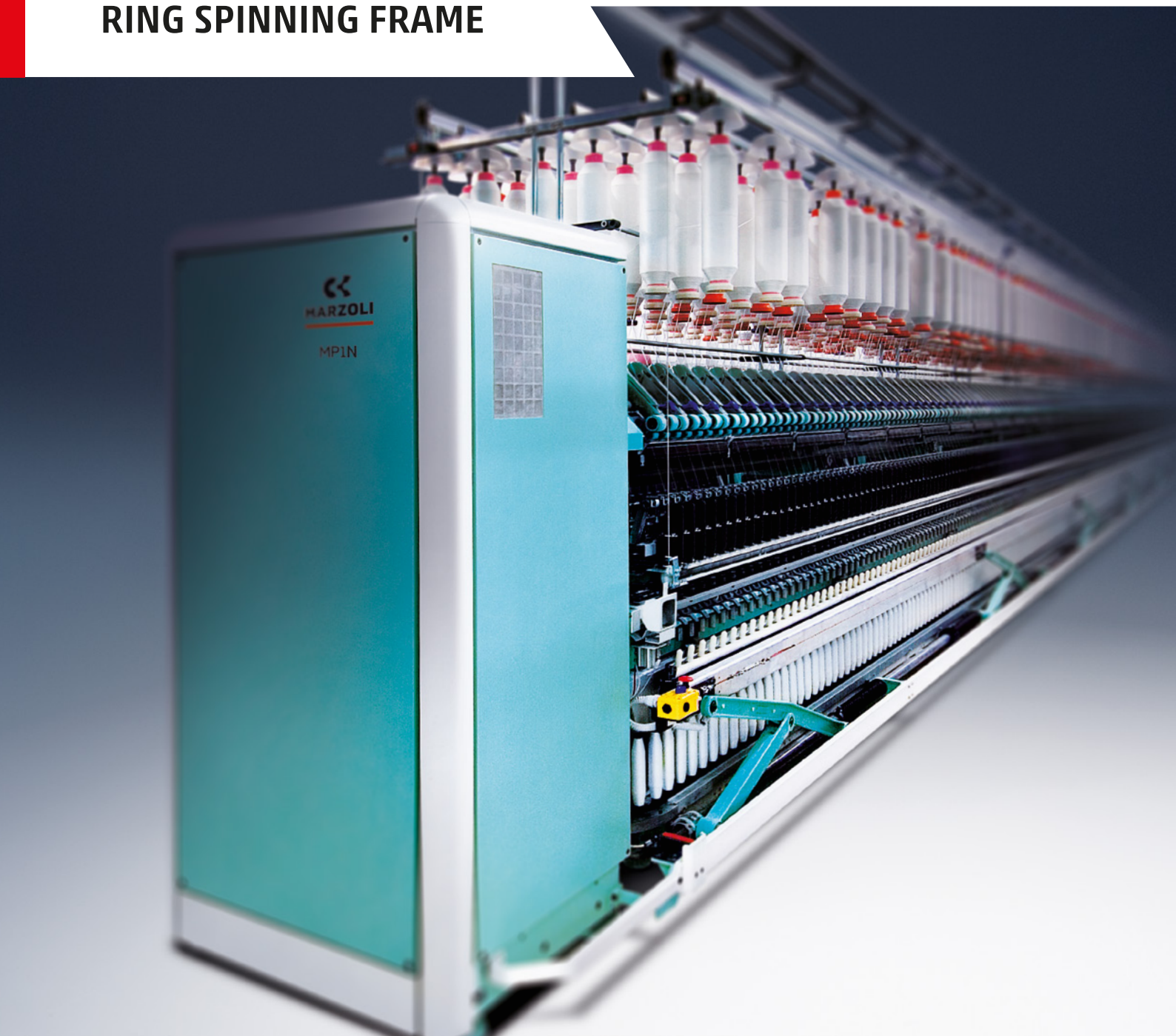
OVERVIEW

MARZOLI
Textile Engineering

GALILEO - MP1N
RING SPINNING FRAME



Marzoli
Complete spinning line,
components and digitalized
solutions for the best perfomance
of the spinning process

THE ONE SOURCE FOR A FULLY-AUTOMATED AND DIGITALIZED SPINNING MILL

MARZOLI
Textile Engineering

Marzoli, one of the major brands of the textile sector worldwide, is a unique European manufacturer of the complete line of machines for the opening, preparation and spinning of short-staple fiber. From the bale opener to the ring spinning frame, Marzoli offers the most advanced technology for a completely-automated spinning mill. Through its global sales and service network, its expertise on each type of fiber and application and the competence on the entire process, Marzoli represents a competent and reliable partner. And through its experience, know-how and commitment, it provides its customers with:

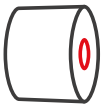
- Advanced spinning solutions through a careful activity of textile engineering. Marzoli assists its customers from the study of the spinning plan, throughout sourcing, erection and commissioning, up to maintenance of the resulting turnkey spinning plant, which can comprise Marzoli but also third-party machinery. The customer can rely on the competence and capability of a unique partner, responsible for the quality and productivity of the entire spinning mill.

- The advantages of smart spinning. No matter what the brand(s) of the machinery is, Marzoli can install its software platforms, YarNet and MRM, its hardware applications for gathering data on waste percentages and its composition, quality values, productivity indexes and other kpi data to let the customer build on the potential of Industry 4.0, optimize the entire spinning process through well-informed decisions and reach the highest performance in production operations.

OVER **170** YEARS OF SUCCESSES

OVER **70** COUNTRIES WITH ACTIVE CLIENTS

OPENING SECTION
- Openers & Cleaners
- Mixers & Blenders
- Card



COMBING SECTION
- Draw Frames
- Lap Winder
- Comber
- Lap Transport

SPINNING SECTION
- Roving Frame
- Ring Spinning Frame
- Bobbin Transport System

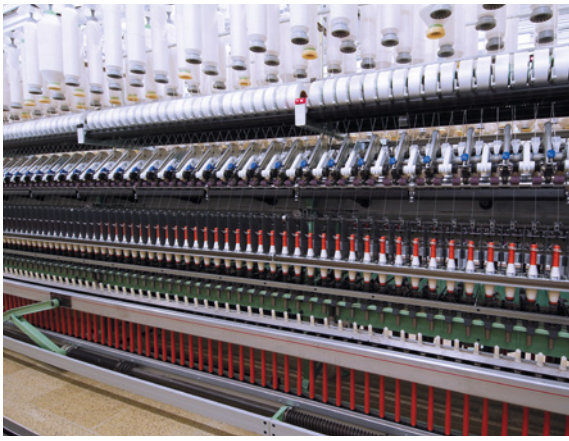
MP1N RING SPINNING FRAME

Marzoli 4-spindles tape drive machine

KEY POINTS

- ELECTRONIC MACHINE WITH UP TO 1,824 SPINDLES
- OUTSTANDING PERFORMANCE WITH HIGHER FLEXIBILITY
- BUILT IN FANCY YARN APPLICATION

Electronic machine with independent drives for spindles, ring rail and drafting system.
All technological parameters (draft, S or Z twist, tpi, speed, etc.) are set directly on the touch screen.
All working programs can be saved and reloaded at any time.
The revised drafting system, even on the long machine (up to 1,824 spindles), minimizes torsion forces on the drafting rollers for no vibrations, fewer ends down at start up and better control of the fiber during draft. A very important feature especially when processing hard fibers and spinning slub yarns. The independent drive of the middle and rear drafting rollers allows to set draft from the touch screen display.
The software of the machine can be upgraded for the production of fancy yarn.
The sturdy design, the high quality components (e.g. Camozzi pneumatics, cast iron structure by Camozzi's foundries, technological components from market-leading companies) and the most advanced Siemens electronics (Siemens Sinamics and Siemens Simotion) ensure excellent performance, full reliability and great flexibility.



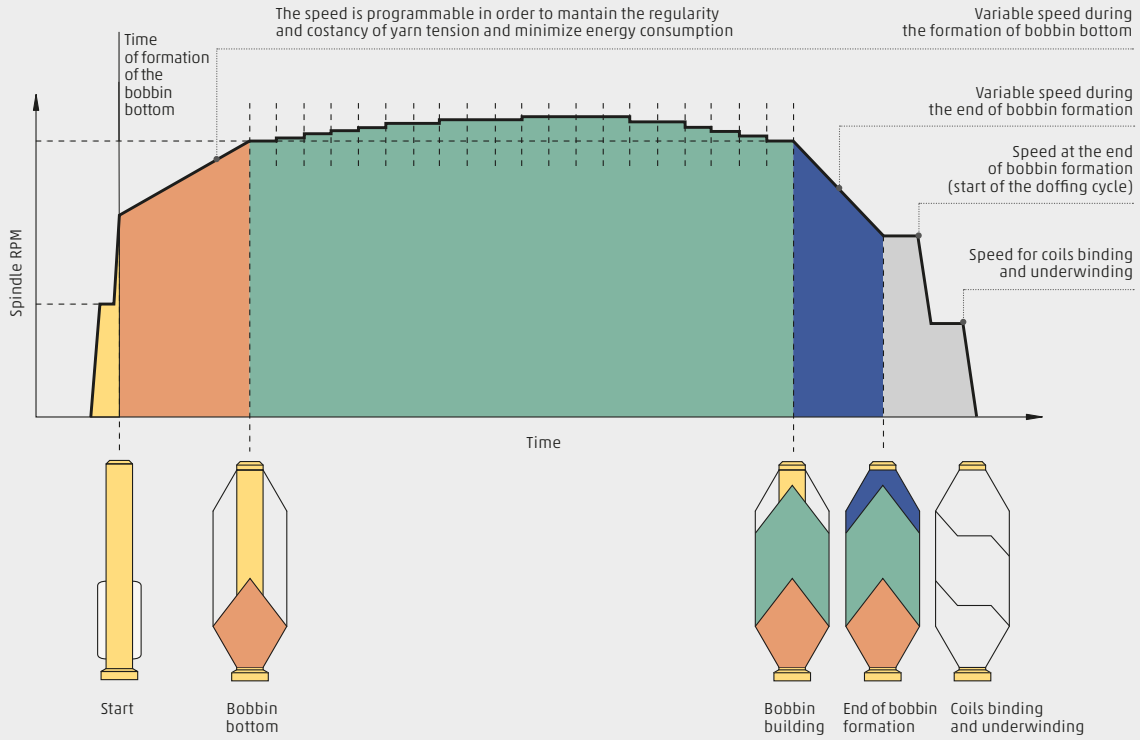
Spinning geometry

Efficient spinning is related to the spinning geometry, i.e. the distance between ring rail, balloon checking rings, thread guides and delivery of the drafting system. The MP1N is available in three different spinning geometries, one for tubes with length from 180 mm to 200 mm, one for tubes with length from 210 mm to 230 mm and one for tubes with length from 240 mm to 260 mm.
The lower geometry with a higher position of the spindle supports is particularly suited for high speeds and finer counts. Higher geometries allow to host longer tubes, reach higher cop weights and reduce the number of doffs. There are two available gauges, 70 mm and 75 mm, for the installation of rings with inner diameters ranging from 36 mm to 54 mm. With rings with inner diameter of 54 mm the MP1N can produce cops with diameter up to 52 mm. This is possible because the auto doffing of cops relies on a parking rail that momentarily hosts the empty tubes. This way throughout doffing the bottom peg trays host either empty tubes or full cops, not both at the same time.

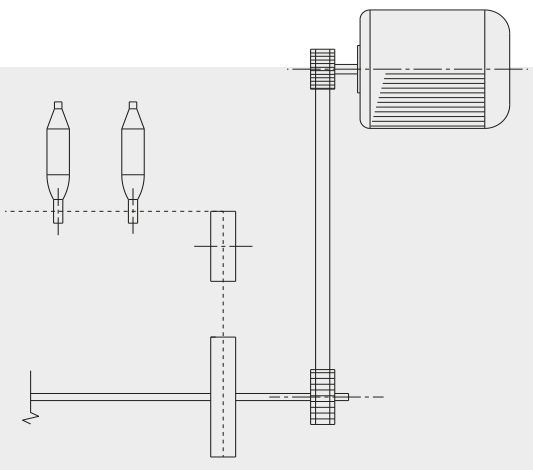
Increased cop weight

The high taper value (1:64) of Marzoli tubes allows to wind on more yarn and therefore reach a higher cop weight.

MP1N DRIVING SYSTEM



The MP1N has a set of independent frequency-controlled drives for the spindles, for the ring rail, balloon checking rings and thread guides, for the drafting system.
The user-friendly software allows to set different speeds during cop build up so that spindles can accelerate as yarn tension decreases. This entails higher productivity, energy savings, lower number of ends down and minimization of irregularities. In case of power fault the computerized system controls the stop of the machine to avoid yarn breaks.



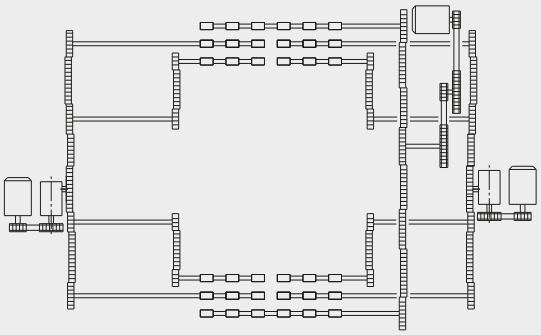
Drive for spindles

Drive for spindles

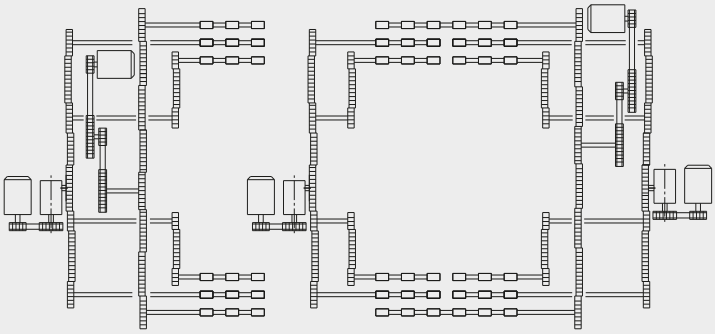
The MP1N is equipped with an advanced 4-spindles tape drive. The main motor drives a shaft with pulleys installed on it. These pulleys drive tapes whose short length and material guarantee no elongation and consequently a constant pressure on the spindle's wharve.
The MP1N is equipped with high performance spindles with small diameter of the wharve for reduced speed of driving elements and consequently lower energy consumption. Longer and lowered sleeves for absorption of vibrations are available for tubes with length up to 260 mm.

Drive for the drafting system

The drafting system drive has different configurations depending on the length of the machine. For machines with 1,200 spindles or less, the machine has one motor to drive the front drafting roller. Middle and rear drafting rollers are driven by two motors: one in the head and one in the rear of the machine. For machines with more than 1,200 spindles there is one motor in the head and one motor in the rear of the machine to drive the front drafting rollers; one motor in the head, one in the rear and one in the intermediate stock to drive middle and rear drafting rollers. The sturdy mechanical configurations minimize torsion force and vibrations are eliminated. This entails better control of the fiber strand during draft and minimum number of ends down at start up. In all configurations front drafting roller and middle and rear drafting rollers are driven by independent frequency-controlled drives. Draft is therefore set by the operator directly on the touch screen.



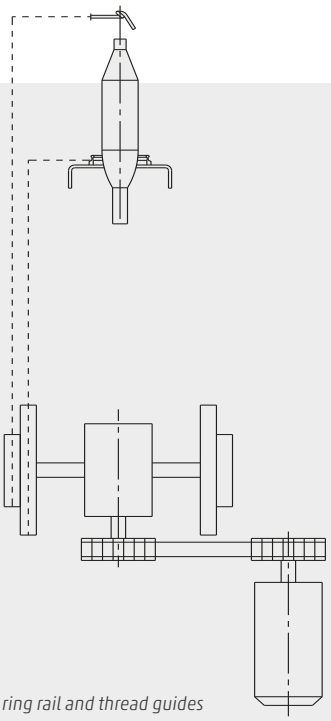
Up to 1,200 spindles



From 1,248 up to 1,824 spindles

Drive for the ring rail and thread guides

A frequency controlled motor with gearbox drives the ring rail, the balloon checking rings and the thread guides.
No counter weight installed for a better control during lowering of the rail.
The electronic drive grants precise setting of all parameters related to cop buildup: cone height, ascent of the ring rail, yarn length per ring rail traverse, etc.; allowing proper setting of the machine with every fiber and count.
The cross bars on which the ring rail and the thread guides supports are installed move along two guiding rods to prevent bi-directional oscillations and to ensure their perfect and smooth movement.



Drive for the ring rail and thread guides

AUTOMATION

Automatic doffing of cops

The auto doffer is accurate and efficient.
Full bobbins are replaced with empty tubes and the machine is restarted in almost 2 minutes.
The auto doffing system includes a doffing rail with grippers, a parking rail and individual peg trays always aligned with the spindles sliding in horizontal guides.

Image 1

The doffing process is designed as follows:

- Empty tubes are transferred from the peg trays to the intermediate parking rail *(1)*.
- At the end of cop build up the yarn winds around the spindle's underwinding position, the machine stops and thread guides tilt. Cops are removed from the spindles and transferred to the peg trays *(2)*.
- Empty tubes are moved from the parking rail to the spindles and the machine restarts automatically *(3)*.

Image 2

Restart of the machine is carried out after tightening of the yarn to further reduce ends down (average ends down after doffing: 8/1000 spindles).
Because of the design of the auto doffing process the peg trays either host empty tubes or full cops, not both at the same time. This allows to produce cops with bigger diameters.
The peg trays are always aligned with the spindles because they are driven within horizontal guides by a system of levers and pneumatic cylinders with no metallic band or chain which can eventually over-stretch.

Image 3

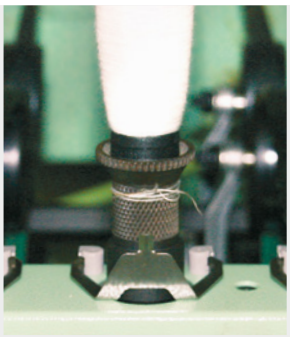
Cleaning of thread reserve

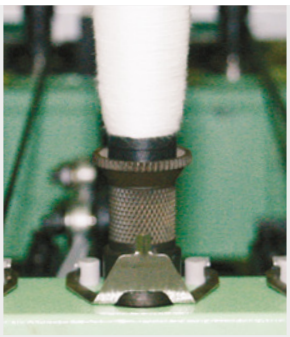
Marzoli offers three different systems to clean the thread reserve on the spindle's underwinding position.

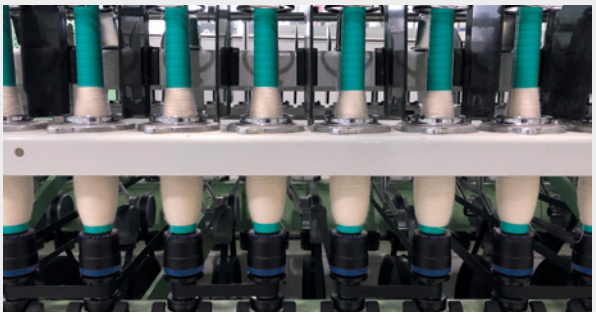
1. A metallic cutter cuts the thread reserve when the blower pushes it against the spindle. The solution works well for medium and fine counts.

2. The Wondercleaner moves with the overhead traveling cleaner, cuts the thread reserve which is then sucked.

3. A clamping device installed on the spindle's underwinding position clamps the yarn at the end of cop buildup and releases it when the machine restarts after doffing.



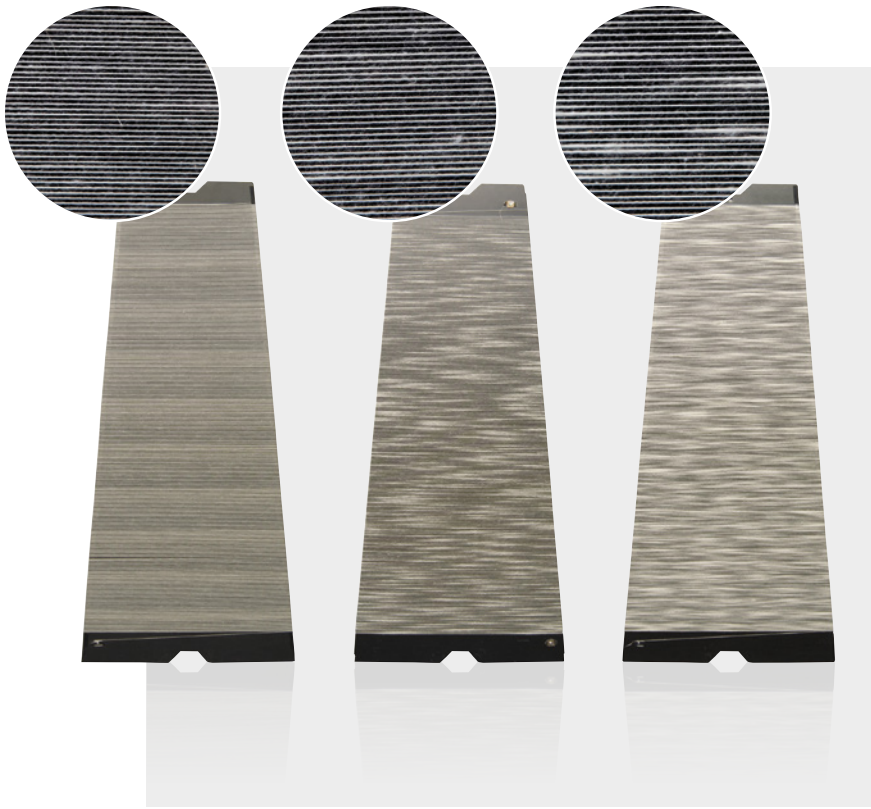




Discharge in box vs. direct link to cone winder

The MP1N can discharge the cops in a box or can be linked to any of the main cone winders available today on the market. When discharging into a box the machine is equipped with a large box where tubes are manually sorted. Loading on the peg trays is automatic.

ADVANCED YARNS

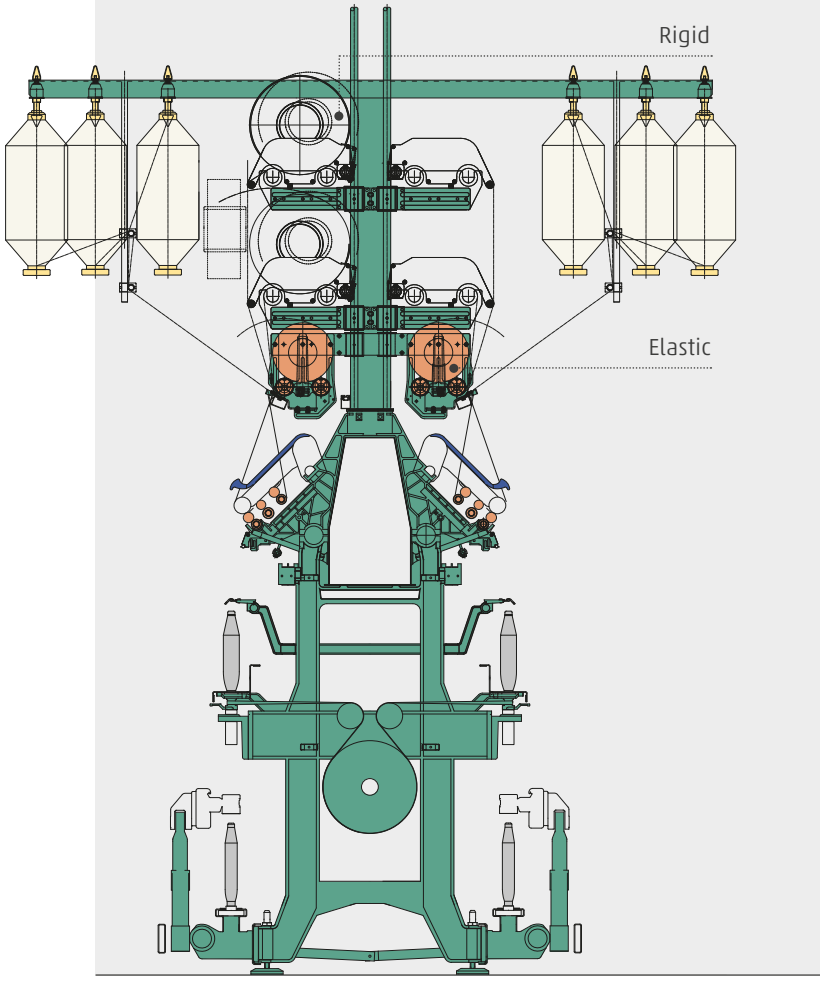


Fancy yarns

The independent drives of the drafting system of the MP1N allow to spin fancy yarns without any mechanical modification or attachment on the machine.
The upgrade of the software allows to spin any type of fancy yarn with high performances. Moreover, the software, versatile and easy to use, has unique features: the special randomization pattern co-designed with an international leader in denim, independently-settable acceleration and deceleration ramps of the motors, the possibility of rounding the deceleration curve at the end of the slub to avoid the formation of weak points.

Compact yarn

Mac3000 by Marzoli is an apron compacting system with an independent frequency-controlled suction drive. The constant tension, flexion and relaxation of the aprons grant an auto cleaning effect of the holes of the apron. This allows to maintain constant compacting performances.
The suction system is independent from the one of the machine. Therefore, the amount of dust in the filter box of the spinning frame is reduced. The suction system has a self-cleaning filter-box and a frequency-controlled motor fan which allows to set the right compacting force according to fiber type and yarn count.



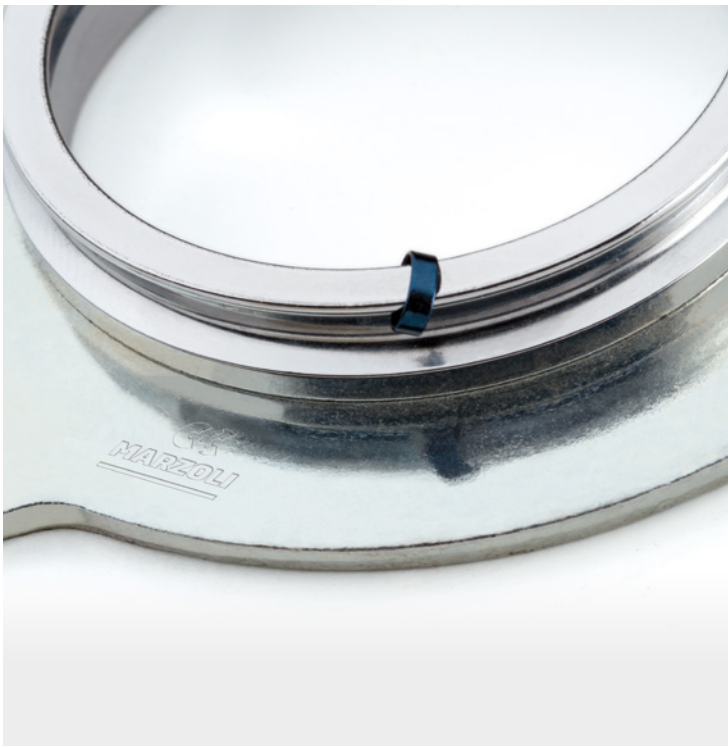
Core spun yarns

The MP1N's creel can be predisposed for the production of core spun and dual core spun yarns. An additional line of bobbins can be added on the creel for spinning of double roving yarns.

TOP COMPONENTS

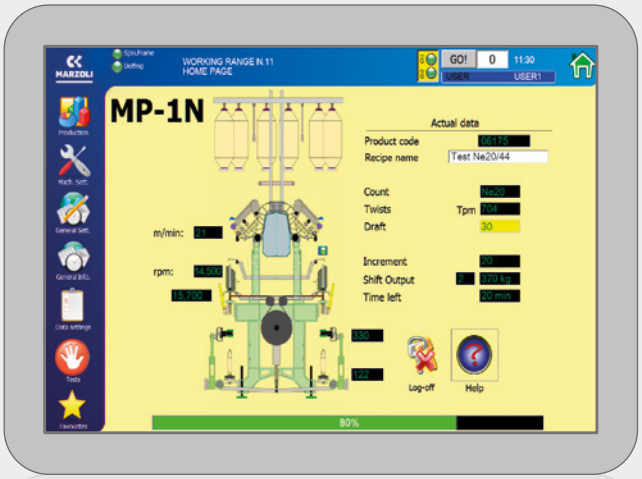
Ring

The MRC is a coated ring with a hardness value of 1, 100 HV and a roughness value of 0.05 µ. This minimizes the friction coefficient between ring and traveler allowing higher speeds with lower heating. Available with flanges number 1 and 2 and inner diameters from 36 mm to 54 mm, these rings represent state of the art technology for the efficient production of high quality yarn.



Drafting system

Double apron drafting system, three over three. The drafting rollers have large diameters (27mm – 30 mm - 27 mm) to avoid any torsion even on long machines. The middle roller with a knurled surface guarantees perfect retention of the apron driving the fibers through the main drafting area. Customized according to the type of fibers and counts to be spun, the weighting arms installed on Marzoli machines guarantee the best output quality and efficiency of the machine.



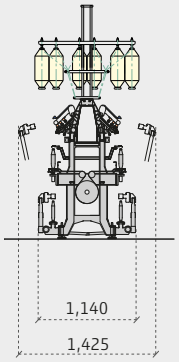
Spindles

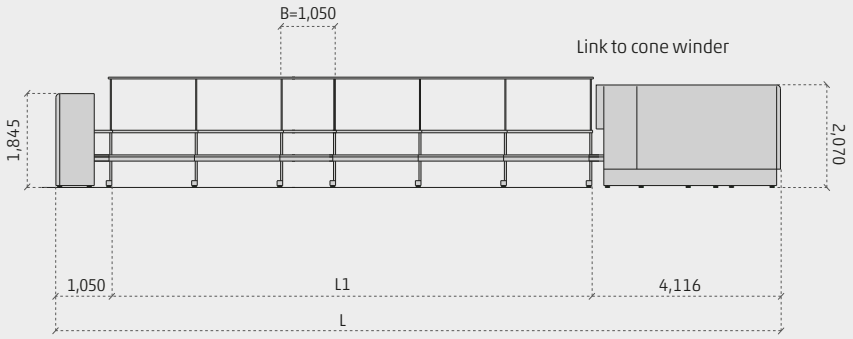
All spindles installed on Marzoli spinning frames are high performance spindles. For special production requirements where vibrations may arise at the top of the spindle, Marzoli can install bearing houses with longer sleeve for harder damping.

Electronic components and PLC

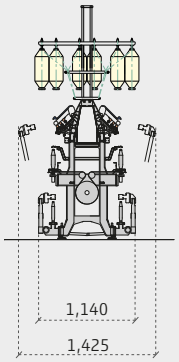
All electronic components by Siemens. The ring frame MP1N is managed by a modern PLC. All production data are saved during the production cycle. The multi-language touch screen is user friendly and permits a simple use with clear diagrams and tables for the insertion of all main working parameters, detailed monitoring pages and step-by-step troubleshooting procedures.

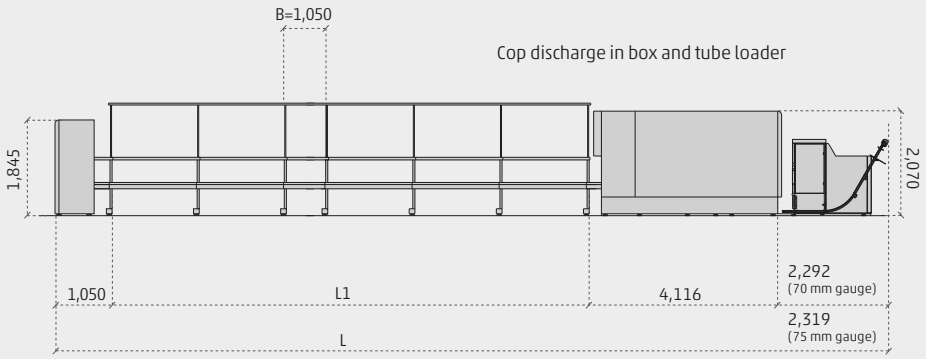
TECHNICAL DATA





MP1N with link to cone winder	
Gauge 70 mm Up to 1,200 spindles	Gauge 70 mm from 1,248 to 1,824 spindles
L1= (spdl/48 x 1,680)	L1 = (spdl/48 x 1,680) + B
L= L1 + 5,166	L= L1 + 5,166
Gauge 75 mm Up to 1,200 spindles	Gauge 75 mm from 1,248 to 1,824 spindles
L1= (spdl/48 x 1,800)	L1= (spdl/48 x 1,800) + B
L= L1 + 5,166	L= L1 + 5,166



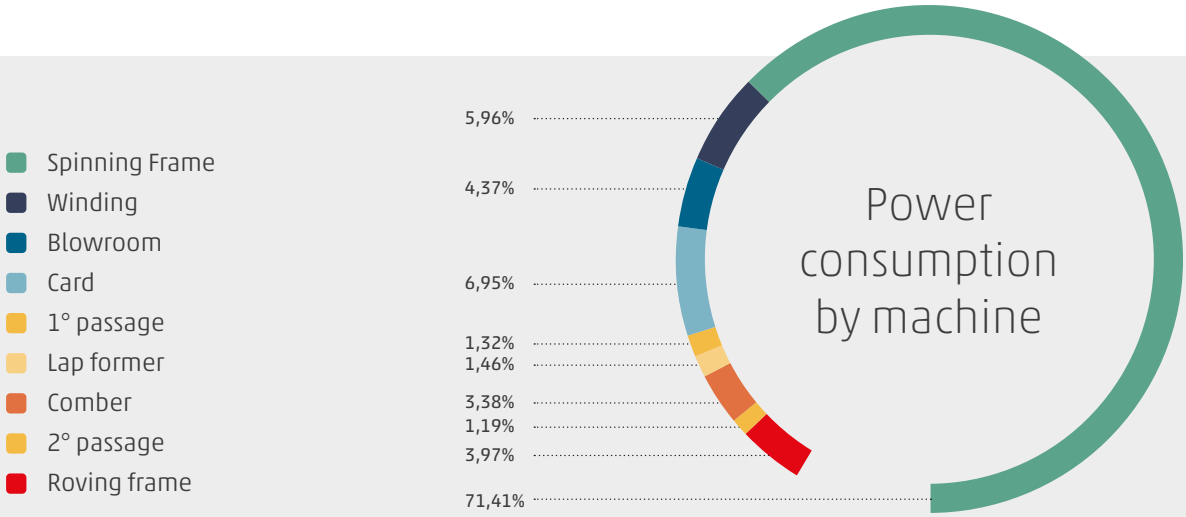


MP1N with cops discharge in box and tube loader	
Gauge 70 mm Up to 1,200 spindles	Gauge 70 mm from 1,248 to 1,824 spindles
L1= (spdl/48 x 1,680)	L1 = (spdl/48 x 1,680) + B
L= L1 + 7,458	L= L1 + 7,458
Gauge 75 mm Up to 1,200 spindles	Gauge 75 mm from 1,248 to 1,824 spindles
L1= (spdl/48 x 1,800)	L1= (spdl/48 x 1,800) + B
L= L1 + 7,485	L= L1 + 7,485

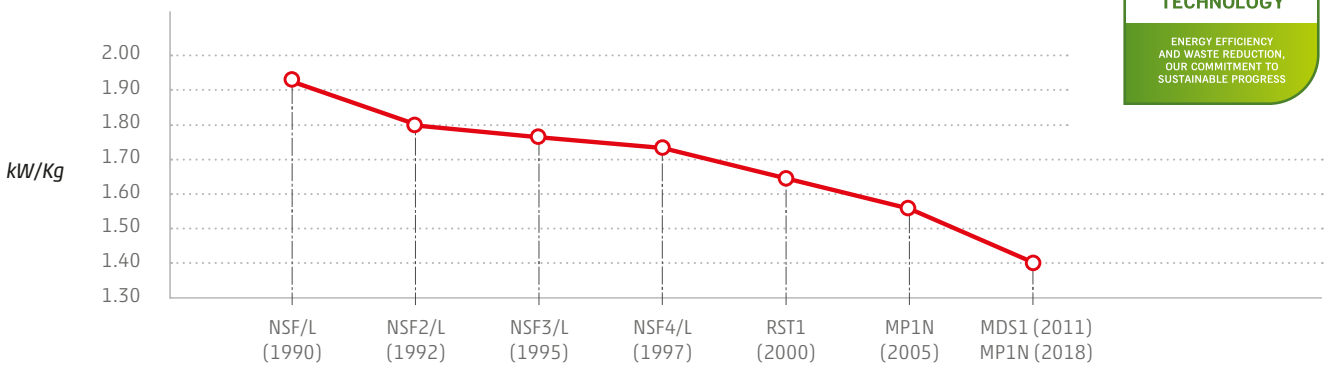
Material	Carded and combed cotton, man-made fibers and blends, up to 60 mm			
Yarn count range	Ne 4 - Ne 350 / Nm 6 - Nm 678 / Tex 150 - Tex 1,68			
Yarn twist range	Tw/" 4 - 56 / T/M 160 - 2,210			
Direction of twist	Z-S twist			
Draft	7.5-80			
Number of splindles:	· max 1,824			
	· min 96			
	· per section 48			
Splindles gauge	70 mm - 75 mm			
Ring diameter	36 - 54 mm			
Tubes lenght	180 - 260 mm			
Cylinder dimensions:	27 mm - 30 mm - 27 mm	Standard		
	27 mm - 30 mm - 27 mm - 27 mm	Compact		
	30 mm - 30 mm - 30 mm	Option for long fibers		
Machine lenght	See p. 12			
Total width:	Doffer retracted 1,140 mm			
	Doffer extended 1,425 mm			
Spindles speed	max 25,000 rpm (mechanical)			
Installed power:	· Spindles motor	30, 45, 55, 75 kW (depending on the n° of spindles and yarn count)		
	· Drafting rollers motors	8.5 kW (until 576 spindles)		
		11.5 kW (from 624 to 1,200 spindles)		
		20 kW (from 1,248 to 1,824 spindles)		
	· Ring rail motor	3 kW		
	· Pantograph upward drive motor	3 kW		
Electrical	3 PH 400/440 Volts + PE Hz 50/60 IEC EN 60204-1 (4,3,2)			
Compressed air:	· Supply pressure	7 bar		
	· Consumption	7 nl/spindle – 500 nl/3min/machine for each doffing		
Suction for spindle	4.5 m³/h			
	· Single suction motor	N. spindles	50 Hz	60 Hz
		Up to 576	4 kW	4.6 kW
		624 - 960	5.5 kW	6.3 kW
		1,008 – 1,344	7.5 kW	8.6 kW
		1,392 – 1,584	11 kW	12.6 kW
		1,632 – 1,824	15 kW	17.3 kW
	· Double suction motor	1,200 - 1,344	2 x 2.2 kW	2 x 2.5 kW
		1,392 – 1,584	2 x 3 kW	2 x 3.5 kW
		1,632 – 1,824	2 x 4 kW	2 x 4.6 kW

POWER CONSUMPTION

Research demonstrates that spinning frames can consume over 70% of the power consumed by machinery in a spinning mill. The MP1N with its high efficiency motors and drives and the suction system, designed to maintain constant suction at every nozzle, guarantees leading edge energy consumption standards.



REDUCTION IN POWER CONSUMPTION IN THE LAST 20 YEARS NE 30



MARZOLI GREEN TECHNOLOGY
ENERGY EFFICIENCY AND WASTE REDUCTION, OUR COMMITMENT TO SUSTAINABLE PROGRESS

MP1N power consumption				
Yarn Count Ne	10	30	40	60
Speed Rpm	10,000	17,500	18,000	19,000
Production gr/sp/h (100% efficency)	69.4	24.6	19.4	8.4
kW/kg (suction and blower included)	0.38 - 0.44	1.24 - 1.42	2.27 - 2.63	3.58 - 4.15

The kW/kg values may vary according to the operational conditions of the machines.

SOFTWARE PLATFORMS

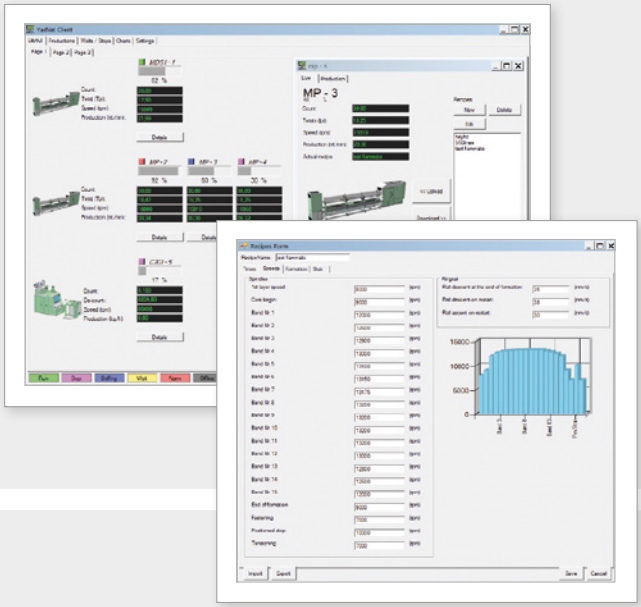
KEY POINTS

- EASY & FAST CONTROL OF EVERY STAGE OF THE SPINNING PROCESS
- IMPROVED SPEED OF RESPONSE IN PRODUCTION OPERATIONS
- EASY MANAGEMENT OF PRODUCTION RECIPES
- SUPERIOR, EASIER AND FASTER MAINTENANCE

END2END PRODUCTION MANAGEMENT PLATFORM: YARNET

YarNet is Marzoli production management software. It enables the monitoring of production levels, efficiency rates and downtime for both individual machines and the entire spinning mill. Comparisons between machines on selected periods of time are made very simple so that improvement opportunities can be easily identified. YarNet enables the operator to edit production recipes, downloading and uploading them between any machine and their computer. He can also export them in Excel format to share with colleagues as necessary. YarNet gathers and analyses data about production and energy consumption, giving a visual representation of the tradeoffs (kW/kg).

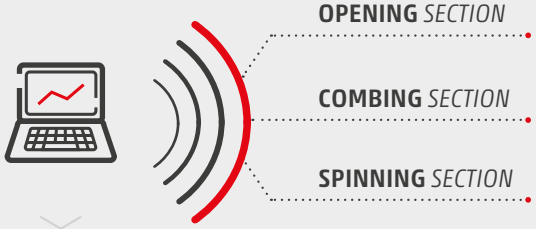
YARNET
Marzoli Production Management



MRM

MRM is Marzoli software to continuously monitor the operating conditions of textile machines. It can identify developing malfunctions before a fault occurs and highlight improvement opportunities on efficiency rates and energy consumption levels. Data about temperature, power consumption, speed and vibration are collected from PLCs (programmable logic controllers) and sensors installed on each machine. The software verifies the monitored parameters are within the nominal operating ranges; it can even adjust for room temperature variations to ensure continuous optimisation. If any parameter is out of tolerance, an automatic email alert is sent to the customer. The customer can also access the dedicated online portal to see information for predictive maintenance and of the overall efficiency of the plant. Through dedicated modules (Optimisation Tools) it is possible to optimise the performance of every machine, in particular on energy consumption and levels of efficiency. If required, Marzoli's customer service team can access the data to diagnose actual and developing problems and recommend appropriate actions.

MRM Marzoli Remote Maintenance
IoT Platform by Microsoft®



BENEFITS

- Higher productivity
- No machines unplanned downtimes
- Prevention from major machine failures
- Longer plant lifespan
- Higher efficiency
- Complete reliability
- Trouble free spinning experience
- Better maintenance planning

MIX COMUNICAZIONE - MI

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