



**KARL MAYER**

# Warp Preparation NEWS LETTER



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Yarn changing in the hands of robots – automatically better performance

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## Automatic loading of rotary creels – a development from KARL MAYER and Primon Automazioni for optimising the doffing/donning process on a Gir-O-Matic at Loro Piana

Automatic rotary creel loading is one technical solution that can be used for automating the processing sequences when changing the bobbins on KARL MAYER's sample warping machines. This innovative system comprises a robot, which is responsible for changing the yarn bobbins and knotting-on the yarns. This development was on show at the last ITMA trade fair as a simulation, and was used in practice for the first time in spring 2009 at Loro Piana's Quarona plant.

This robot technology was developed jointly by KARL MAYER and Primon Automazioni. This leading producer of warp preparation machinery brought its special expertise in building warping machines to bear in this joint project, whilst the Italian producer of automation and rationalisation systems proved to be extremely adept at developing automatic sequences for warp preparation. Primon Automazioni has been supplying the market for some years now with automated solutions for e.g.

doffing and donning creels with full and empty bobbins. The objective of these two specialist suppliers was to optimise the already extremely efficient operations of the Gir-O-Matic even further. The aim was to make this machine, which is already extremely reliable, flexible and productive, even more beneficial to its users, especially when working with yarns that have to be changed frequently and with short warp lengths.



### Exceptional performance from the Gir-O-Matic

KARL MAYER's Gir-O-Matic sample warping machine is designed for the production of multi-coloured or single-colour sample and production warps in warp lengths of up to 1,050 metres. Depending on the number of bobbin positions on the rotary creel, this warp preparation machine is available as the GOM 8, GOM 16S, GOM 16 or GOM 24, and these are all extremely efficient, high-precision production machines. More specifically, a patented band build-up control system guarantees perfect band build and stepper motors ensure that the yarns are transported accurately.

Other features include a drum having a circumference of 7 m, a leasing and beaming unit and, on the GOM 16 and GOM 24, an optional pre-draw-off drum and pressure roller device. The separating device enables from one to nine separate bands to be laid, and is controlled automatically, which guarantees a fully automatic warping sequence.

The pre-draw-off drum and beaming unit handle the warps to guarantee perfect further processing. All these features can be accessed easily via the relevant software. An Operator Interface in the form of a touchscreen allows data to be input easily, and

enables all the operations to be seen “at-a-glance”. This interface is also responsible for communicating with the KAMCOS® system, the link to the machine’s modular computer units. The Gir-O-Matic can be networked via an Ethernet system and linked up to the KARL MAYER Teleservice system.

The advantages of this clever configuration include:

- perfect handling of the yarn
- perfect warp beam build

- perfect length accuracy
- productivity is increased by as much as 40 % when processing single-col-our warps and by up to 600 % when sample warping, compared to the sectional warping technology.

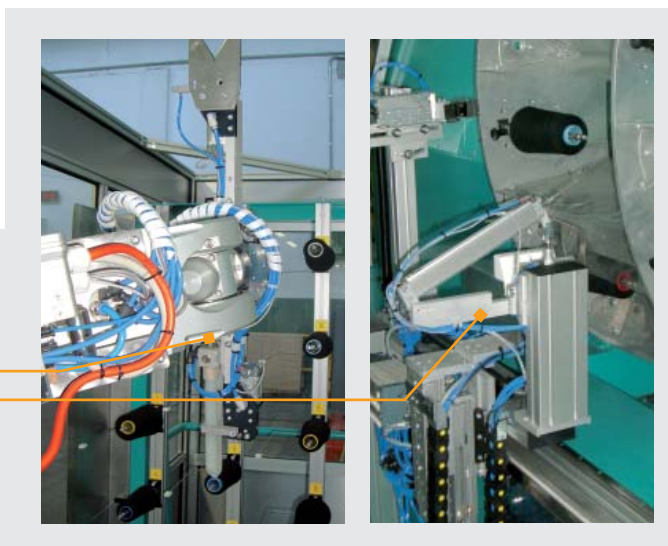
Optimising specific sequences, such as yarn donning using robots, has enabled the performance of the Gir-O-Matic to be increased even further.

**Exceptional performance from the Gir-O-Matic**

This innovative solution enables bobbins to be changed during total or partial yarn creeling at the Gir-O-Matic. Once the bobbins have been exchanged, the yarn ends are also knotted automatically. This is done by the robot.

This independent “assistant” can move with six degrees of freedom, and is equipped with specific tools for carrying out its various jobs. These include:

- a pick&place device for removing bobbins from the loading trolley and doffing or donning the bobbins
- a device for sucking the yarns
- a device for cutting and positioning the yarns (Fig.)
- a mobile knotting device (Fig.)
- a device for releasing the bobbin holder on the rotary creel
- a loading trolley
- a KARL MAYER laser monitoring system for measuring the diameter of the bobbins that are running out.



KARL MAYER has also modified its sample warping machine to enable the creel to execute a separate movement.

With this arrangement, bobbin changing at the Gir-O-Matic is fully automatic and, as required, is carried out in the conventional way. However, there are some deviations from the “business as usual” principle. The new bobbins are no longer mounted directly onto the rotary creel but onto the loading trolley at the robot station. This means less work for the operators and

greater operating efficiency. Once the bobbin trolley is loaded as required, it moves into the robot’s operating zone and, at just the right moment and without any further intervention, all the necessary sequences are carried out – from removal of the tubes to knotting of the yarns. At the same time, the warp beam that has just been produced can be removed at the other side of the machine – this is real “multitasking”, which increases the productivity of the Gir-O-Matic even more.

**Automated, high-precision operations**

Automatic loading of the rotary creel operates with a high level of precision. The processing steps required are carried out accurately according to a predetermined plan. The pick&place device first of all removes a new bobbin from the loading trolley and the creel moves to the changing position. The robot then intervenes in the working zone of the Gir-O-Matic. It removes the bobbin that has to be changed from the creel, cuts the yarn that is left on it, rotates its arm about an angle of 180°,

and inserts the new bobbin. Automatic knotting is then carried out. The bobbin that has been removed is then placed in the trolley by executing another 180° movement. This operation is both accurate and fast.

The complete cycle for changing the bobbins and knotting the yarns together takes just 30 seconds. If only partial creeling is required, the bobbins that have to be replaced are detected first by a laser system.

**Benefits for Loro Piana**

The bobbin changing and knotting robot has been operating on the Gir-O-Matic at Loro Piana since March 2009, and has been extremely successful.

At warp lengths averaging 200 m, machine utilisation has increased by 2.5 to 3.5 hours a day, so that productivity has risen by 15 %.

The productivity is even higher when the running lengths of the warp beams are short and the yarn changing cycles are short.

This integrated robot solution not only guarantees a high level of efficiency when using the Gir-O-Matic, it also offers maximum flexibility – an important benefit to the company in terms

of its competitiveness, although not normally the prime consideration in an automation and rationalisation project. Companies operating several machines can use their staff more effectively as a result of the increased productivity of the Gir-O-Matic, and normal production output can be achieved either in less time or with fewer machines.

At any rate, the robot for automatically changing bobbins and knotting the yarns together is a piece of equipment that will quickly pay for itself (ROI).

Source: Stefania Parisi, Automazione in orditura, Selezione Tessile, settembre 2009, pagine 48-51

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