

MAGstcs: Magnetic Security Threads Control Systems



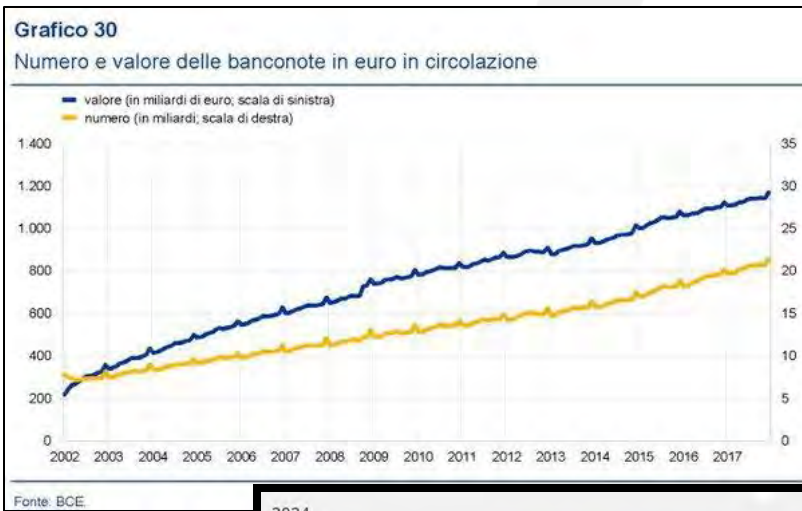
PRODUCTS CATALOGUE

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MARKET CONTEXT

In a market that is evolving towards a greater use of electronic money, the paper currency is still a widely used payment method.



Denomination	Quantity (in millions of banknotes)	Value (€ millions)	NCBs commissioning production
€5	313.8	1,568.9	GR, ES
€10	424.2	4,241.5	ES
€20	564.9	11,297.6	BE, DE, HR, LV, LT, AT, PT
€50	1,538.4	76,920.0	EE, IE, FR, IT, CY, LU, MT, NL, SI, SK, FI
€100	527.5	52,751.0	DE
€200	164.2	32,846.0	DE
€500	-	-	
TOTAL	3,533.0	179,625.0	

The goal of Central banks like ECB (European Central Bank) is to monitor that the number of counterfeited banknotes remains under control.

For this reason during the release of Euro Series2 new security features has been implemented. One of the most innovative has been the magnetic security thread printed inside all the banknotes denominations.



CUSTOM 2.0 EXPERIENCE

CustoM 2.0 started its experience with the business of Security Threads Control in 2011 in the context of sensors design and development to verify the quality of the security thread of Euro Series 2.



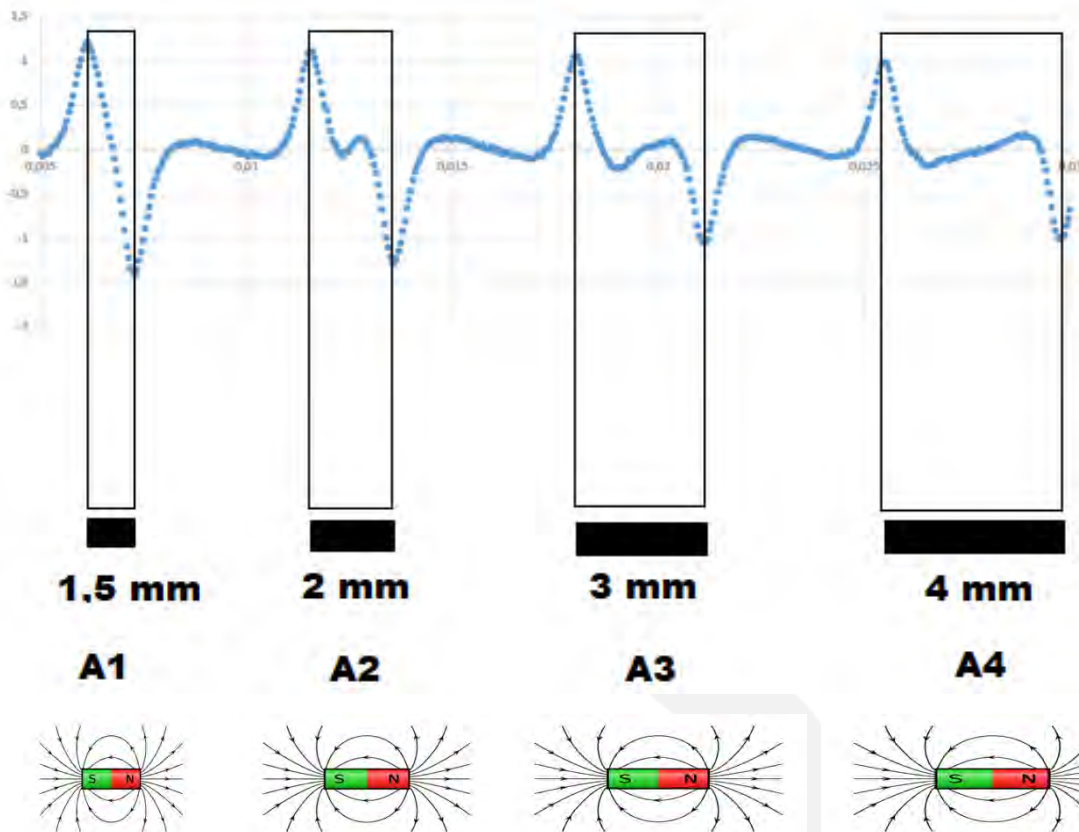
Design of sensors and tools
In 2011 CustoM 2.0 designed sensors and tools for security thread control

Sensor for EOL machine
To test 100% fo the banknotes during finishing process



Quality control tool
To test the quality of the magnetic thread

QUALITY CONTROL ON MAGNETIZED INKED AREAS AND REMANENCE



In principles, the voltage signal reflects the **Faraday's** Law when we move an inductive reading head over the magnetized inked areas with a certain speed.

The position of the voltage peak are used to calculate the printed length while the amplitudes can be processed to evaluate the remanence of the magnetization.

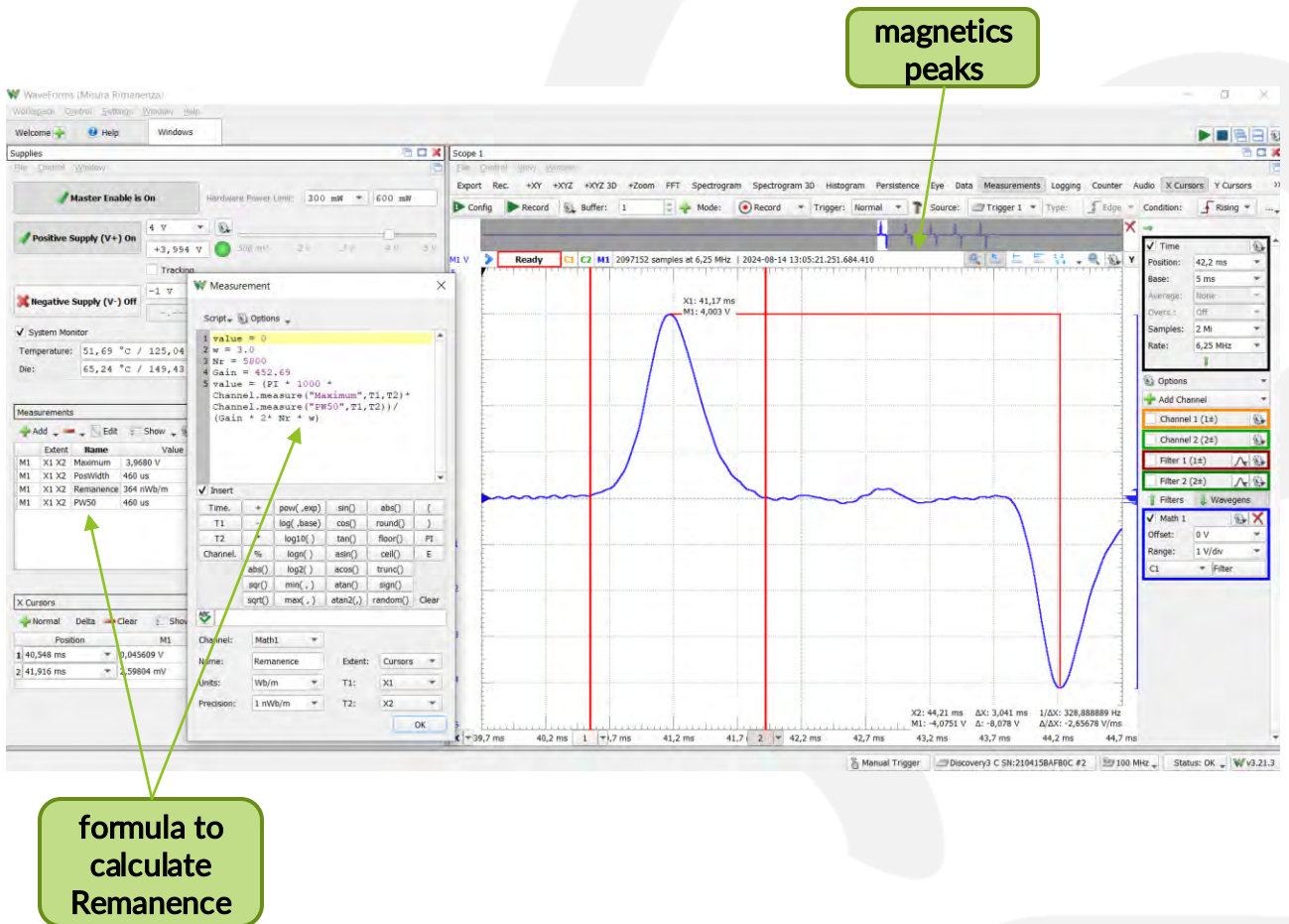
Normally the voltage is very amplified using a large number of turns inside the reading head. Furthermore increasing the speed we increase the voltage amplitude.

If we can have accurate information about:

- Turns Number of reading head (N_r)
- Amplifier (gain)
- Velocity (v)

the remanence calculation is feasible.

QUALITY CONTROL ON MAGNETIZED INKED AREAS AND REMANENCE



Example to calculate remanence with number of turns $N_r = 5800$, speed $v = 1$ m/s, width = 1 mm, gain = 452,69 , PW50 = 625 μm , $V_{\text{peak}} = 0,978$ Volt

$$\Phi_r / \text{m (remanence)} = (625 \cdot 10^{-6} \cdot \pi \cdot 0,978 / 452,69) / (2 \cdot 5800 \cdot 1 \cdot 1 \cdot 10^{-3}) = 3,6568 \cdot 10^{-7} = 366 \text{ nWb/m}$$

CUSTOM 2.0 PRODUCTS

The set of systems proposed by Custom 2.0 is the following:



MaQC



MaLC



ILC - Printing



ILC - Slitting

MaQC | Quality Control Instrument

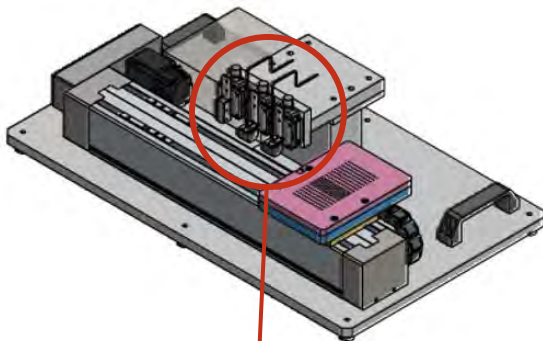


The multi-standard solution to decode and measure the magnetic code printed in security threads for banknotes applications.

MaQC hardware/software tool is a complete system to measure accurately the quality of security threads embedded in banknote paper.

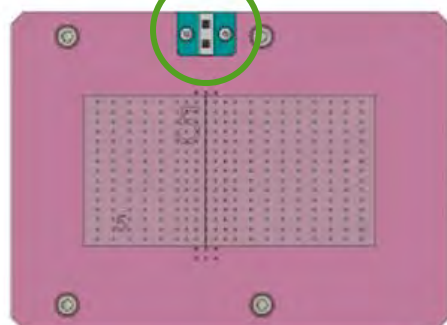
The tool can be used with:

- threads
- paper with embedded threads
- printed banknotes



Magnetic head group replaceable with other types of sensors

Calibration sample for inked square area



MaQC | Quality Control Instrument

Software

The software is capable to decode and measure:

- High-Coercivity printing ink
- Low-Coercivity printing ink
- Combined ink

Bits with 100µm spatial resolution and ±5% signal amplitude resolution.

Reporting services tool allows the quick and easy production of customized reports.



MaQC technical specifications

Coercivity 3500 Oe

Thread width max 10 mm

Reading length max 80 mm

Remanence 100 - 1000 nWb/m ±5%

Bit length ±0,01 mm

Magnetization inline

Dimensions (height, width, length) 370, 720, 620 mm

Weight 75 Kg

Electrical supply 220 V

Connectivity USB

Accessories Management Software MaQC Suite

MaLC | Laser Cut Machine



MaLC Laser Cut Machine is the customized Custom 2.0 machine to carry out the laser cutting of magnetic security threads.

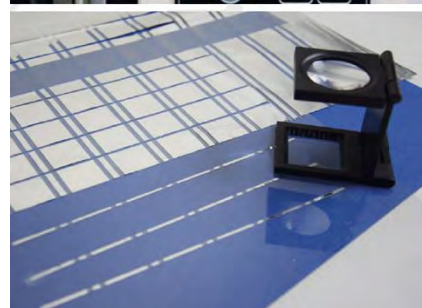
The small size (600 x 400 mm working area) and a 50W CO2 laser source with an internal smoke vacuum are the features that make MaLC the perfect table machine to use in high precision laboratories.

Equipped with integrated software, **it's** able to carry out positioning and magnetic security threads cutting in few seconds. MaLC is the cheapest of CO2 laser cutting machines and requires only one maintenance intervention per year.

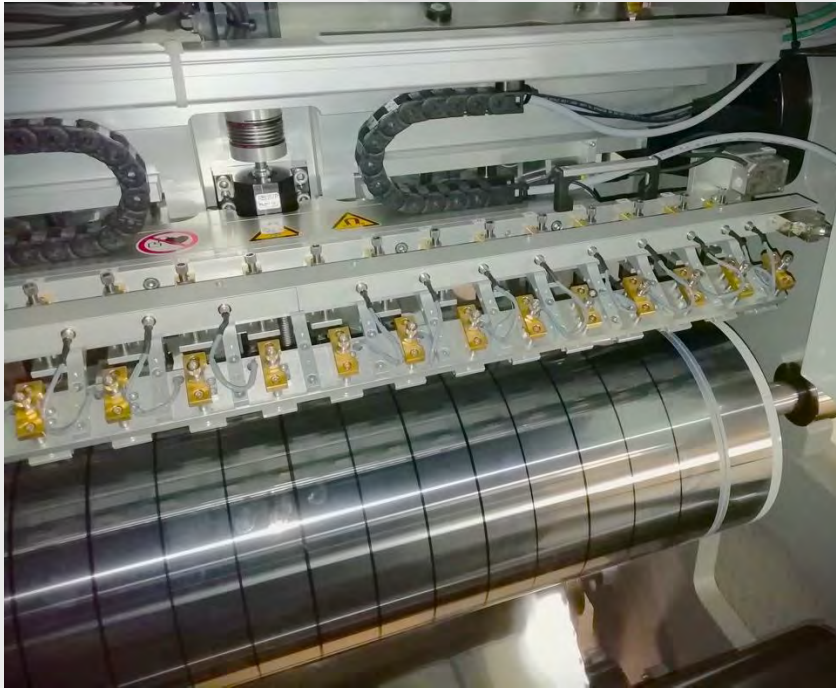
MaLC | Laser Cut Machine

MaLC technical specifications

Working area	600 X 400 mm
Laser Type	Laser CO2
Laser source power	50 W
Z-axis	100 mm Manual
Velocity Max	800 mm/s
Resolution	1000 DPI
Electrical supply	220 V / < 1000 W
Connectivity	USB 3 / USB Disk / Ethernet
Supported Formats	HPGL, BMP, GIF, JPG, JPEG, DXF, DST, PLT, AI
Dimensions	W. 1200 x L. 800 x H. 460 mm
Weight	80 kg
Standard accessories included	Software, Chiller, Smoke extractor fan, Blower, USB Cable, UE Cable, Optics, Laser Tube, Positioning laser pointer, Honeycomb laser bed, Smoke Filter



ILC-Printing | Ink Printing in-Line Control



To reach a complete traceability of the quality control during the whole production process, Custom 2.0 proposes the implementation of one or more control stations on the rotogravure machine used by paper and thread producers.

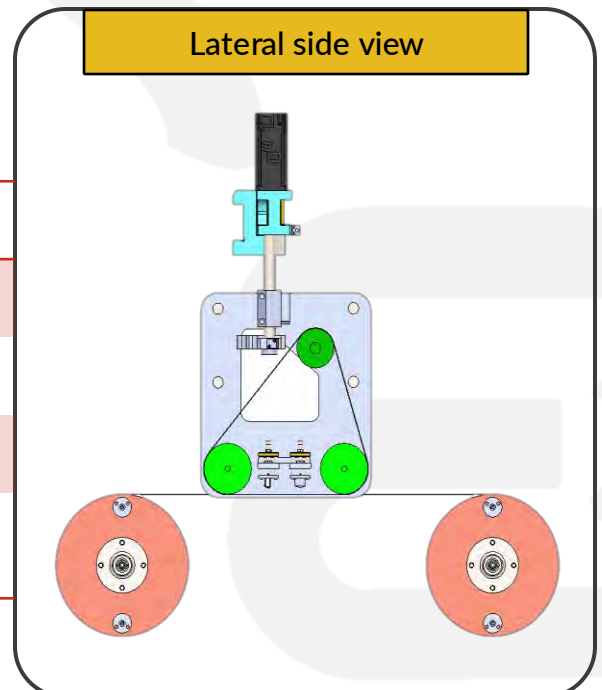
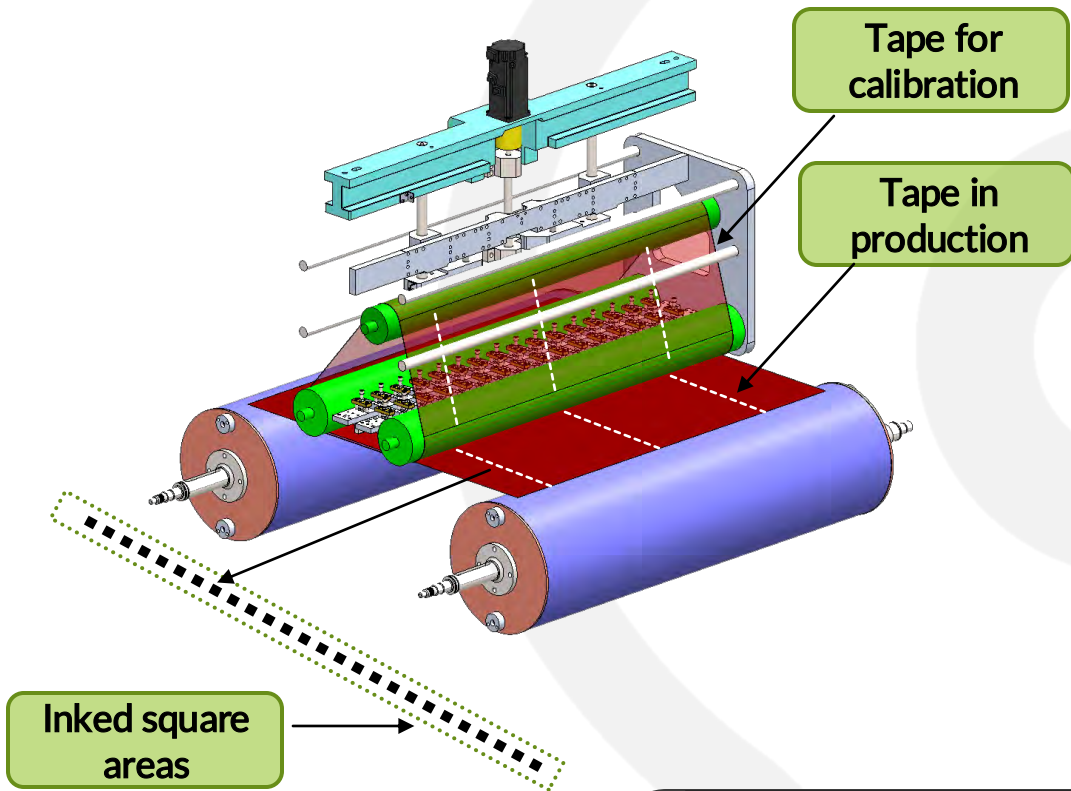
The measurement system is adapted on the original machine, depending by:

- Mechanical constraints
- Number of detection points to read (min 3 for the remanence + 3 points for inked area)
- Available space





The main parts of the installation are:

- Precision encoders to measure revolution and speed of the cylinder
- A set of heads and magnets holder supports
- Bars with supports moved automatically to adjust the reading distance with a guide with endless screw and actuator
- Laser sensors to check in real-time the distance between the supports and the external diameter of the cylinder

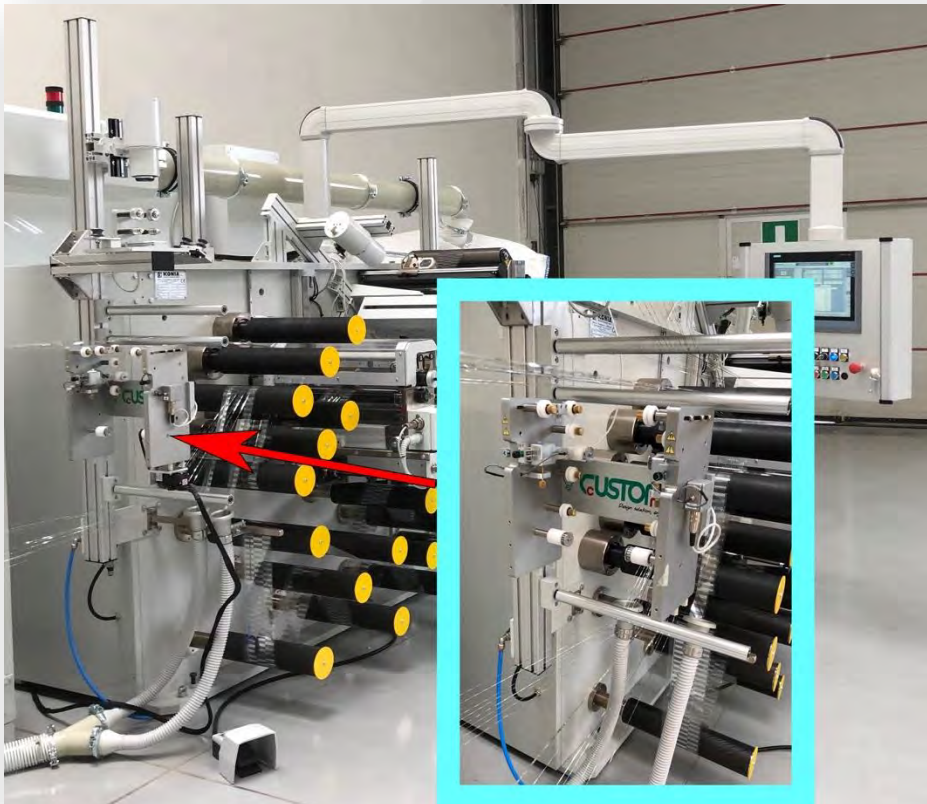
ILC-Printing | Ink Printing in-Line Control



HIGHLIGHTS

- 
LoCo measurements
- 
HiCo+LoCo measurements
- 
Remanence measurements
- 
Dedicated mechanical structure for the calibration of the system

ILC-Slitting | Thread Slitting in-Line Control System



To reach a complete traceability of the quality control during the whole production process, Custom 2.0 proposes the implementation of one control station on each Slitting machine used by thread producers.

The measurement system is adapted on the original machine, depending by:

- Mechanical constraints
- Number of detection points to read (2 points for inked area)
- Available space

The main parts of the installation are:

- Precision encoders to measure revolution and speed of the machine
- A set of 2 heads and magnets holder supports
- Customized mechanics

Software

This control system uses the same base software of the Printing control system.

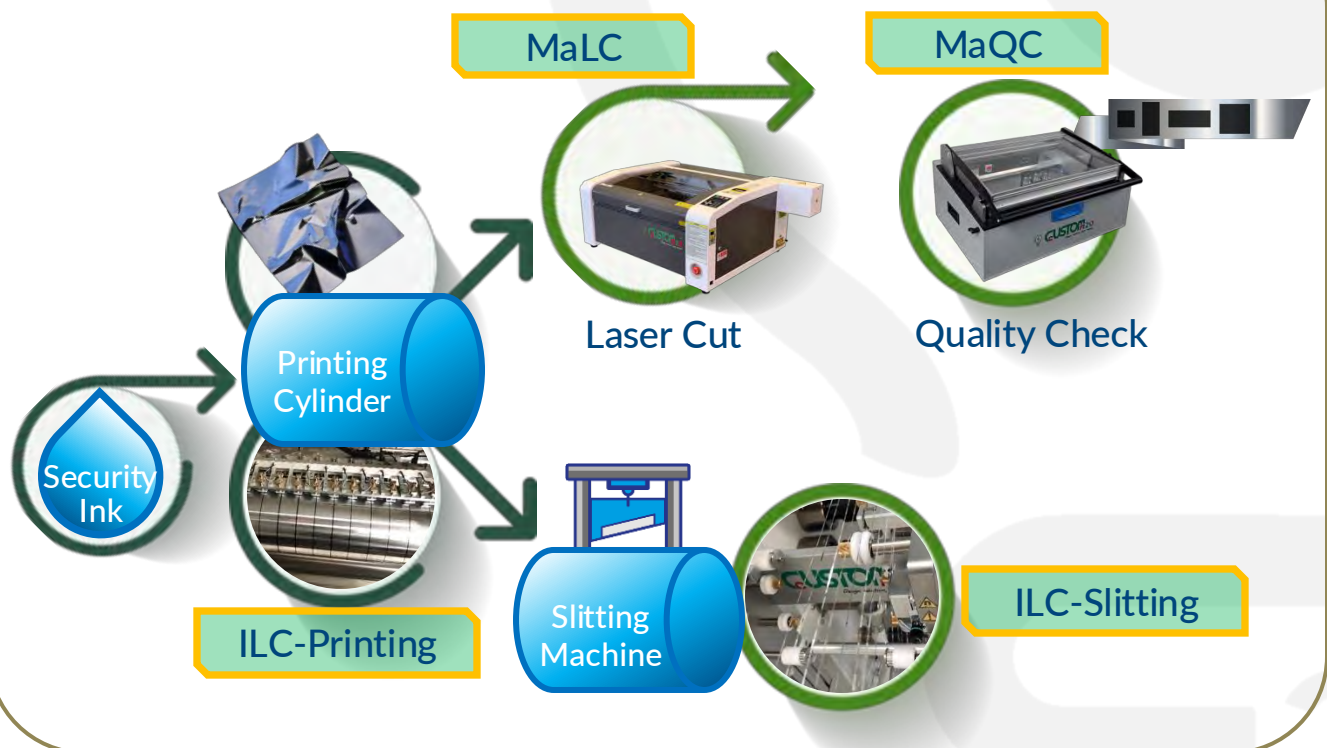
Quality and process control with our products

Our product range is able to cover several needs of different customers. Most of the key production steps of the banknotes can benefit from implementing our systems within their production process.

Our customers are:

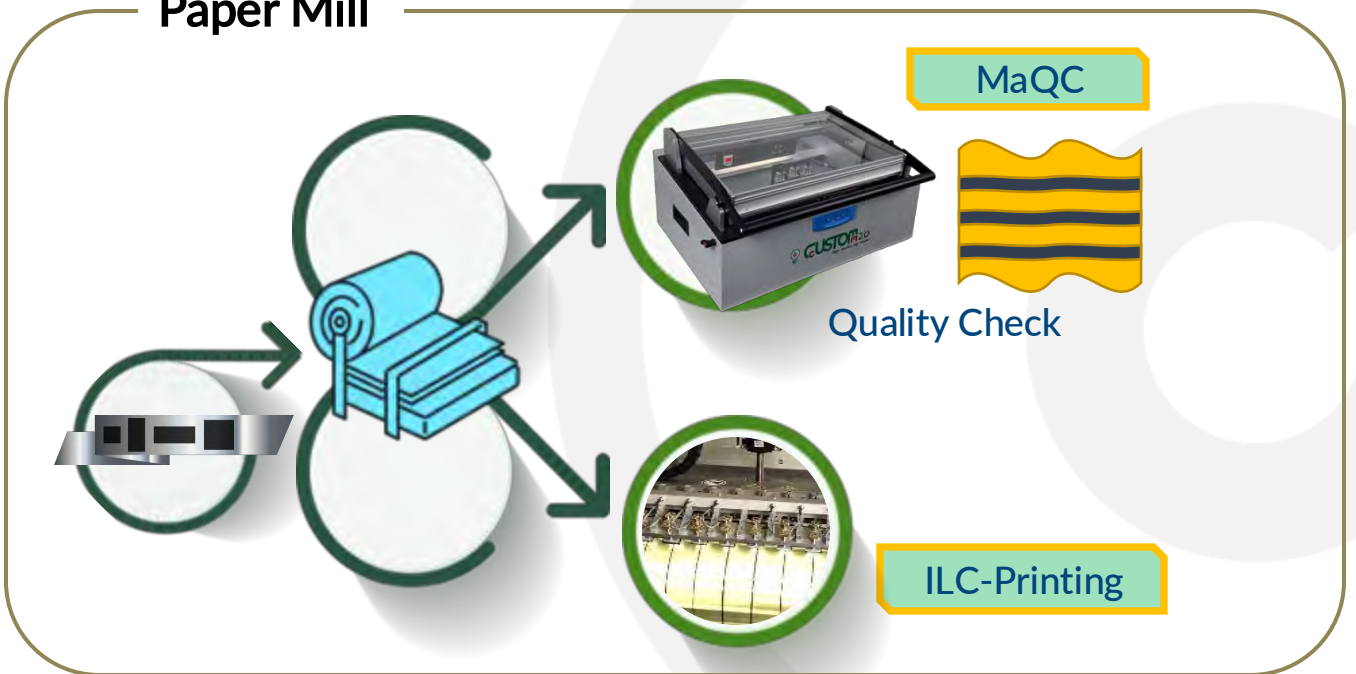
- Security threads and foils producers
- Paper Mills
- Printing Works

Security Threads and Foils Production

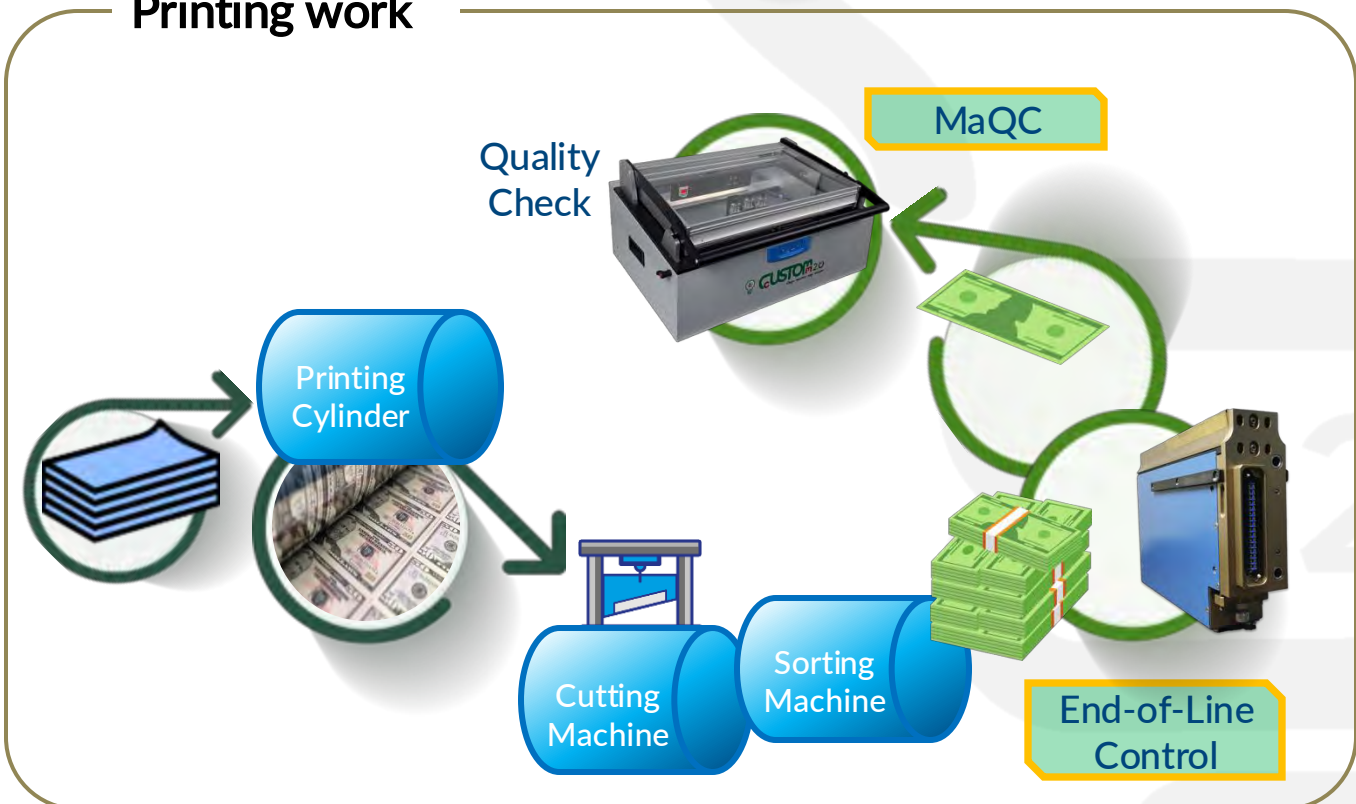


Quality and process control with our products

Paper Mill



Printing work




To learn more, explore your needs with us, and receive a quote for a customized solution, please do not hesitate to contact us.




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