NEW

MAUS ITALIA

MA 400

Automatic CNC tube rolling work centre with machine vision and pallet change

CE

MADE IN ITALY

ENG REV 1

MA 400

Automatic work centre for rolling of tube bundle tubes

MAUS ITALIA has solved the problem of **production of tube bundle batches with small dimension** with an automatic tube rolling work centre complete with innovative solutions, such as:

- **machine vision system** for rapid centring of holes;
- **multiple fixing templates with vertical loading** for the assembly of tube bundles and precise positioning for bundle;
- **pallets for the loading/unloading** of tube bundle batches in front of the ***MA-400***

MA-400

Automatic CNC tube rolling work centre with machine vision and pallet change

Quality, uniformity and repeatability of the tube-tubesheet joint guaranteed

High speed

Unparalleled productivity

A series of measures and applied technologies allow the ***MA-400*** to work at high speed with the achievement of more than 600 tube expansions per hour

Fully Automatic

Total automation

The ***MA-400*** productive process does not require the continual presence of an operator who can then, as a result, dedicate his time to the preparation of the next pallet to avoid machine down times

CAD/CAM

Immediate programming directly from the tube sheet design

The software created by MAUS ITALIA, known as ***MausCAM***, has evolved to aid the ***MA-400*** as an interface for X-Y programming by reading the CAD drawing of the drilling pattern of the tube sheet

Camera feeler

Self-learning machine vision centring system

The necessity of reducing production times has led the MAUS ITALIA technical staff to make use of a camera, thus avoiding any type of mechanical contact for the centring of the tubes.

User-friendly.

Operational simplicity

The extremely user-friendly control console ensures access to all parameters by the operator

Report data

Tube rolling always certified

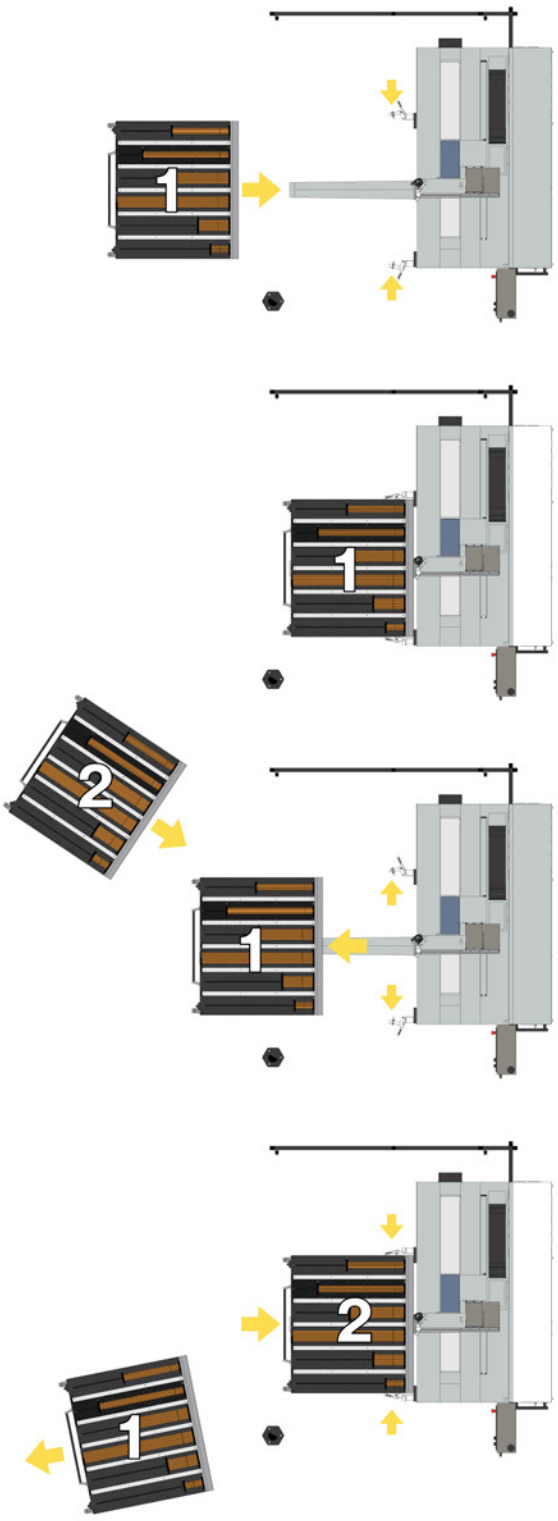
Each tube expansion with X-Y position, expansion and torque data is monitored in real time and the information collected constitutes the report for certifying the completed work

High safety

Particular attention to safety

Physical, photoelectric and sensor barriers ensure total safety for the operator from all potentially dangerous moving parts

Operation with tube bundle batches pallet change



Fully Automatic

Easy positioning

References and mechanical feedback on the ***MA-400*** and its pallets make positioning of the tube bundle batch easy and precise

Automatic workpiece zero

Thanks to the use of a machine vision system, the procedure for centring the tubes is guaranteed automatically and in short times without any mechanical contact

Operation

The ***MA-400*** works autonomously by following the program set using the dedicated ***MausCAM*** software and expand each tube of the tube bundle batch by passing from one bundle to the next

New pallet preparation

While the pallet is being processed, the operator can get the next pallet ready so as to reduce downtime

Pallet change

When processing is finished, the ***MA-400*** waits in stand-by mode for the pallet to be changed by the operator who replaces it and unloads the tube bundles which have already been processed

Example of a trolley-mounted pallet

MA 400

Machine status signals

Complete range of signals and alarms which facilitate the operator during the operational phase and during job setup

Control console

Positioned to ensure the maximum visibility of the work zone. The CNC display guarantees extreme operational simplicity

Y Axis carriage

Vertical stroke carriage and Z axis support with work axes

Centring camera

Self-learning machine vision system which can work both in sync with the CNC and autonomously

Z axis carriage

Transverse stroke carriage up to the tubesheet

Tool holder head

For tube rolling with manual changing of the tube expanding mandrel

Column

Electrowelded structure in normalised steel - extremely robust and compact - located on the X axis carriage

X axis carriage

Column support carriage for horizontal positioning

Base

Electrowelded structure in normalised steel with 6 adjustable feet for fixing to the floor

Photo-electric barrier

Fixed component of the integrated safety system to prohibit access to the moving axes area

Electrical cabinet

Installed on the machine, comes complete with air conditionng for automatic control of internal temperature

Remote control

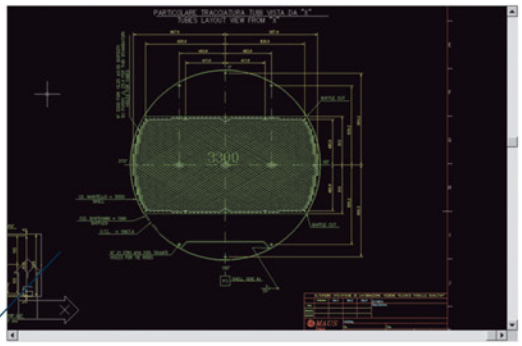
Allows the operator to manipulate the principal movements in manual mode whilst staying close to the operating area

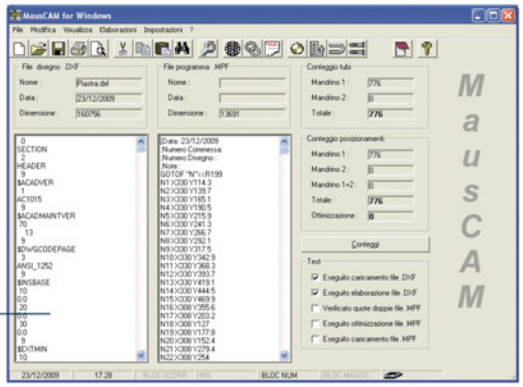
MausCAM

CAD/CAM

Interface software for X-Y programming

Created by MAUS ITALIA technical staff to facilitate the expansion of work cycles, it allows the automatic processing of a CAD design of the tubesheet hole pattern



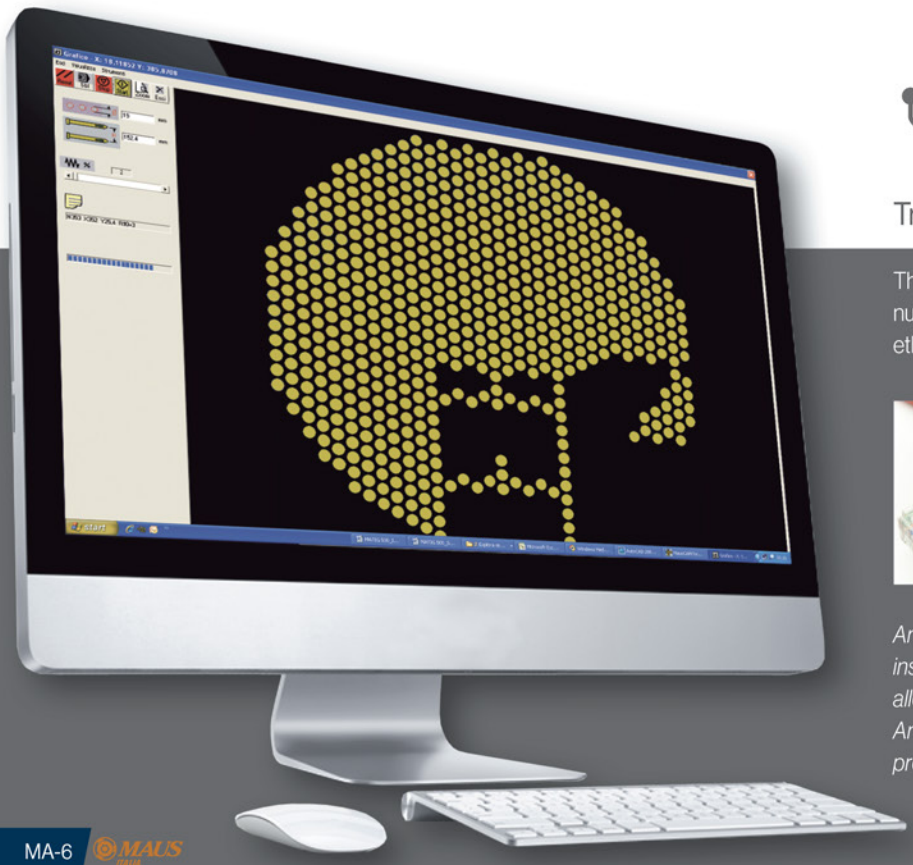


DXF from standard CAD

The system is based on reading the DXF drawing interchange format and is able, in a few steps, to process the CAD file of the tube sheet and automatically obtain the matrix of the coordinates of the tubesheet holes

Interactive processing

During processing, you can check and optimise the path according to its position or geometry. If the tubesheet is larger than the available stroke, you can subdivide the tubesheet into multiple sectors that will be processed at different times



Transfer of programs to CNC

The program files can be easily saved or loaded onto the numerical control of the machine using a USB pen drive or by ethernet connection

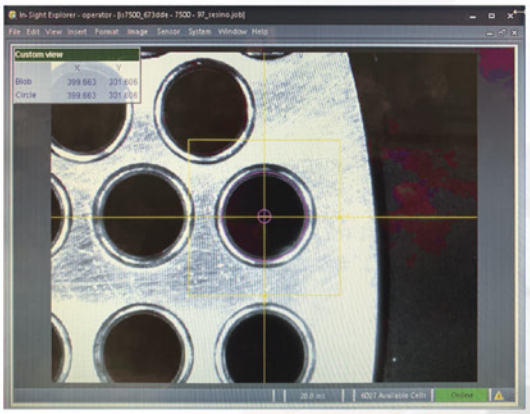
An ethernet connection is installed as standard to allow connection to the net. An (optional) diagnostic program is available online.

A USB communication port has been installed for a rapid and secure exchange of information between the machine and the office.

Camera feeler

FOCS4Sight

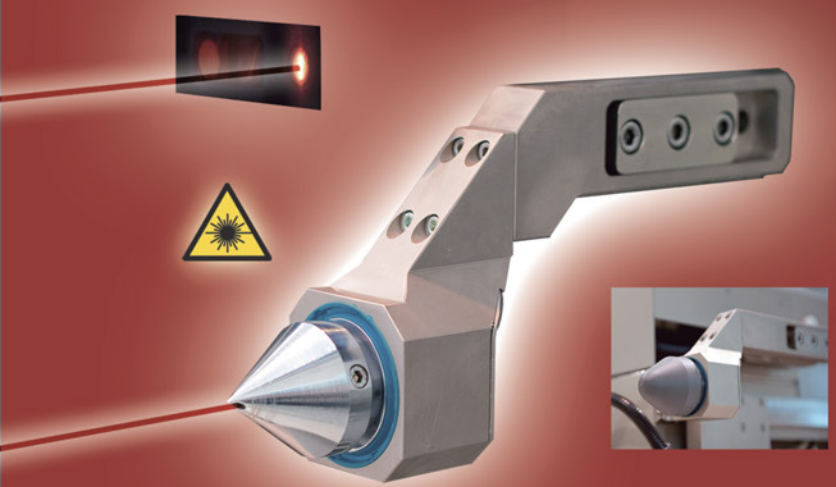
Self-learning centring system with camera



Machine vision system for the automatic centring of tubes without mechanical contact. Combines higher rapidity with extreme precision guaranteeing:

- Immediate identification of the zero work piece
- Detection and automatic correction of any hole positioning errors
- Programmable intervention for each tube and at regular intervals

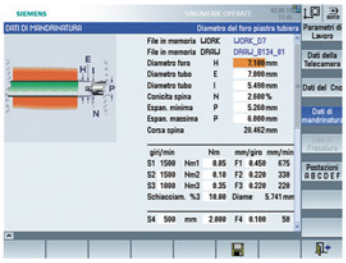
FOCS3



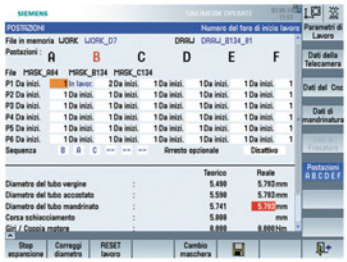
MA400 User-friendly.

CNC control console

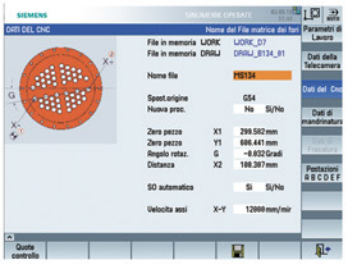
Located to ensure maximum visibility of the work zone, it is extremely user-friendly and ensures maximum operational simplicity and access to all parameters by the operator



Definition of theoretical geometry



Workstation management



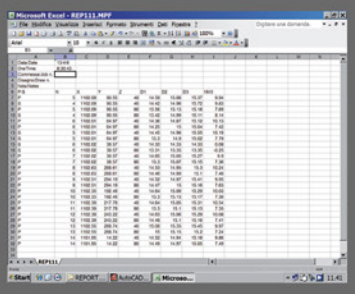
Setting of CNC data

Real-time report for a tube expansion which is always certified

The constant and growing demand for documentation suitable for certifying the total quality of the jobs is satisfied by thorough and detailed data archiving.

The report file, as well as recording the dimensional measurement of the rolled tube, also saves its position on the matrix of tubesheet holes, ensuring total traceability of each operation without the possibility of error.

Report data

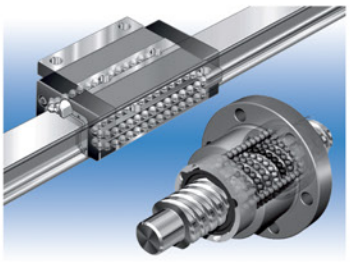


- hole N°
- Coordinate X,Y,Z
- Ø of the tube
  - before expansion
  - during offering up
  - expanded
- torque achieved

Tube expansion mandrel internal lubrication control

SIEMENS ®
SINUMERIK 840D sl

Ergonomic console and remote control



Lubrication of sliding components

Air-conditioned electrical cabinet

Lamp

USB communication port

Alarm signals

Immediate colour signalling of machine status.

- Green: automatic cycle in progress
- Red: alarm status
- No-light: standby

Safety systems

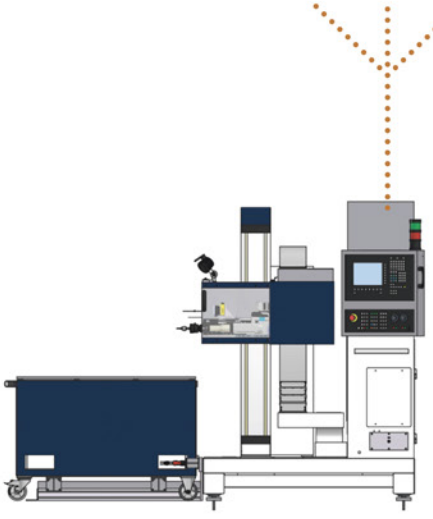
High safety

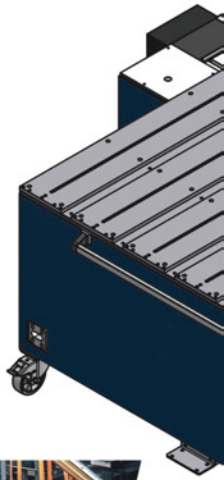
The set of safety photo-electric barrier and the fixed protective structure delimits the machine, preventing access to the area of moving axes.
The sliding door with electro-mechanical interlock completes the protection of the spindle rotation area.

4.0 INDUSTRY

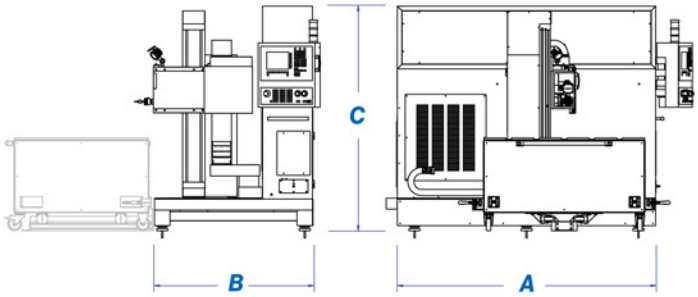
Maus Italia machinery will transform you into a Smart Factory!

The compliance of the **MA-400** with the requirements of the "INDUSTRY 4.0" system has been examined by an accredited third party and has been deemed adequate to allow interconnection between the machine and company systems.





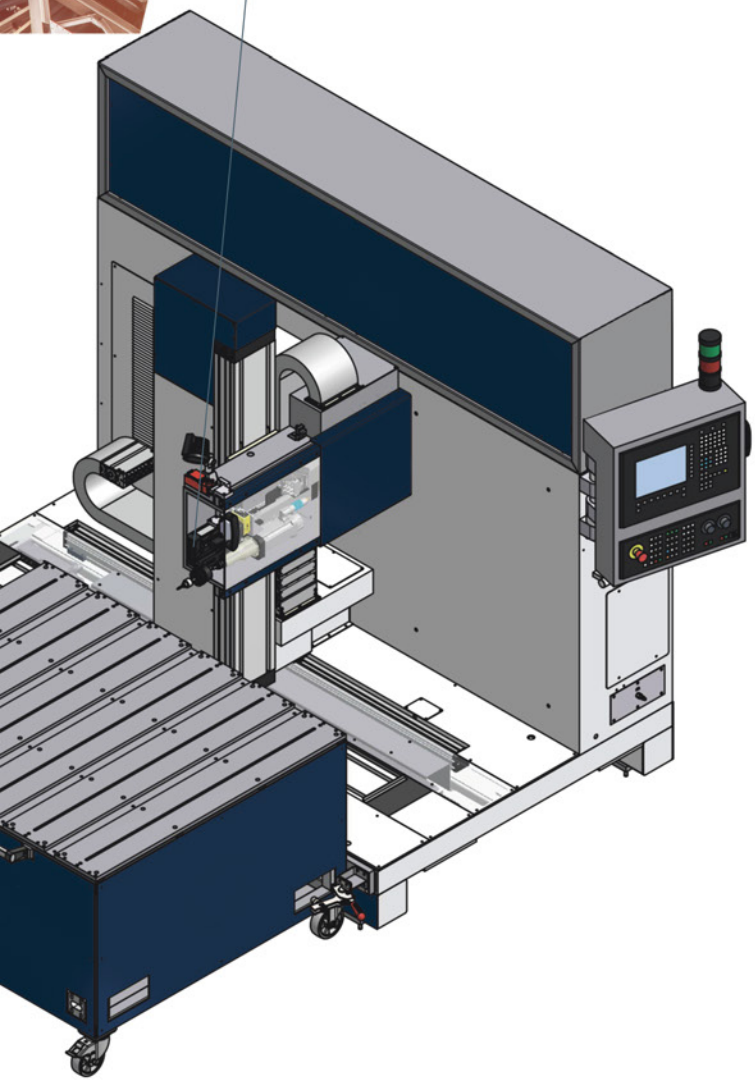
MA400
Technical features



Electric power supply			
Voltage		V-ph	400 - 3
Frequency		Hz	50
Installed power		kW	10
Pneumatic power supply			
Min-max pressure		Bar *(psi)*	5-8 *(72.52-116.03)*
Flow rate		lt/min *(USgpm)*	100 *(26.42)*
Dimensions			
Length	A	mm *(ft)*	2330 *(7.64)*
Width	B	mm *(ft)*	1425 *(4.67)*
Height	C	mm *(ft)*	2026 *(6.64)*
Weight		kg *(lb)*	1000 *(2205)*
Colours		RAL	7030-7035-5014
Dimensional capacity			
X stroke		mm *(inches)*	1500 *(59.055)*
Y stroke		mm *(inches)*	1000 *(70.866)*
Z stroke		mm *(inches)*	300 *(11.811)*
Minimum work height		mm *(inches)*	500 *(19.685)*
Tool lubrication tank		l *(US gal)*	3 *(0.793)*
Processing capacity			
Tubesheet diameter		mm *(inches)*	1000 *(39.370)*
Max. tubesheet thickness		mm *(inches)*	200 *(7.874)*
Tubes diameter		mm *(inches)*	6,3÷15,9 *(1/4"÷5/8")*
Max mandrel torque		Nm *(ft lb)*	3,4 *(2.508)*
Mandrel rotation speed		giri/min *(R.P.M)*	0÷6000
Max mandrel motor power		kW	0,4
Operating temperature		°C *(°F)*	-5 ÷ 50 *(23 ÷ 122)*
Relative humidity *(in absence of condensation)*		%	30 ÷ 90

3D virtual environment

Each component has been entirely designed by MAUS ITALIA technical staff and checked in a virtual environment before production



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