



# MaTIG 502

Automatic positioning tube-to-tube sheet  
TIG orbital welding system

Welding

TIG Orbital welding





## A winning story since 1961

### The Beginning

At the end of the 1950s, Domenico Franco Agostino became the Italian representative of Albert Otto, a German manufacturer of tube expanders. In 1961 Franco Agostino's Albert Otto Italiana was founded and in 1972, after purchasing an area of 10,000 square metres in the municipality of Bagnolo Cremasco, Maus Italia Sas was established.

### The Growth

In 1976 his son Stefano, a mechanical engineer, joined the company. Together with his father, he studied products, introduced new machinery onto the market and filed the first patents by Maus Italia. Above all, Stefano was firmly convinced that people are the very heart of a company's success. Therefore, he invested in human capital by valuing people and roles, and he surrounded himself with skilled operators as well as technical, commercial and administrative collaborators. The result was a winning, competent and proactive team.

His daughter Anna - also a mechanical engineer - has been working in the company since 2016, giving new impetus and energy to the business her father and grandfather had built.

Father and daughter work together side by side every day to guarantee the excellence of Maus Italia and support all customers worldwide with competence and passion: the company's distinctive traits.



**Stefano Agostino**

CEO - Mechanical Engineer

**Anna Agostino**

COO - Mechanical and Management Engineer





## ***In-house production of each component***

### ***Workshop 4.0 and 24/7 production control***

The production of Maus Italia branded items is entirely carried out in Bagnolo Cremasco, in the heart of an Italian industrial area 30 km southeast of Milan.

The company boasts a 4.0 workshop equipped with state-of-the-art machinery, an in-house heat treatment room and a final inspection department that allow Maus Italia to independently manage every phase of the manufacturing process of its wide range of products whilst maintaining high quality standards.



## ***Quality first.***

### ***Design and development***

One of Maus Italia's strengths is its willingness to understand its customers' needs.

Our technical department is always ready to find operational solutions to the most complex applications, even via feasibility studies. We develop accurate work processes, draw with FEM analyses to verify our mechanical-structural performance and optimise the manufacturing process of each component.

## ***Ready To Deliver***

A well-stocked and complete warehouse of finished products enables Maus Italia ship quickly to customers all over the world according to a ready-to-deliver logic.

The warehouse is fully located within our premises in Bagnolo Cremasco at controlled temperatures and conditions to guarantee the maximum safety and quality of Maus Italia products for all our customers.

## ***Quality, environment and safety policy***

**Research, quality and safety are the watchwords of Maus Italia Spa.**

Maus Italia has several projects underway aimed at increasingly sustainable development and integrates environmental concerns into its business model. The company's actions, behaviour and development choices are focused not only on the short run but rather mainly on a medium and long-term horizon.



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# MaTIG 502

## Automatic positioning tube-to-tube sheet TIG orbital welding system

Maus Italia presents the revolutionary MaTIG 502 CNC work station.

Decades of experience with hundreds of clients across five continents have guaranteed the consolidation of the R&D division ( automation and new technologies ), allowing us offer today, to an ever more demanding market, an outstanding range of machines for the completely automated construction of tube bundle heat exchangers, of which the brand new MaTIG 502 is proud a part.

Fully automatic

High speed

Extreme cost reduction

High precision

for tubes from 1/4" to 2"  
( from 6,35 to 50,80 mm )



XY working are 59"x71"  
( 1500 x 1800 mm )





## **/Main features**

### ***From extraordinary to revolutionary in 4 key points***

With its Giotto 250 Auto welding head, graphic interface, MausCAM software and many other components of the highest quality, a milestone has been reached in the quality control of the tube-tubesheet welded joint.



#### **Fully automatic**

The only machine in this sector which is completely autonomous and automatic.



#### **High speed**

The complete torch rotation control allows more than 10 rpm.



#### **High saving**

Rapid positioning, ease of programming and optimisation of the welding cycle reduce production costs.



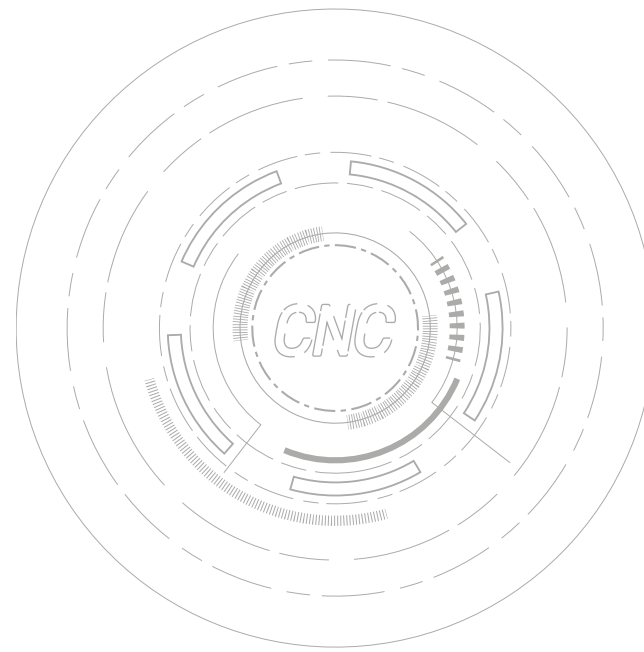
#### **High precision**

Welding geometries with an accuracy that has never been reached before.





## **Innovations and features**



### **Unique TIG welding torch**

The new TIG orbital torch has been designed and manufactured in its entirety by Maus Italia.



### **Filler wire automation**

Control of the flow, the end of the reel and the rotation of the spool on the orbital axis increases the repeatability of the weld.



### **Electrode angle of incidence**

Thanks to a set up with predetermined angles, repeatability of the weld is guaranteed over time.



### **Laser centring feeler**

Unique centring system guarantees the highest precision in the geometries of the welded joints.



### **Hi tech hardware**

Electronic management in compact hi-tech SIEMENS CNC unit.



### **Dedicated CAD/CAM software**

Intuitive DXF programming for building the coordinate matrix of the tube sheet holes.



### **Management of the welding arc**

Continuous monitoring of the welding current ensures constant penetration across the whole weld.



### **Variable radius - AVC-3D**

In multi-pass welding, the radius is controlled and interpolated by CNC, reducing production times even further.



### **Protection of the tube**

The integrated rotating purging system guarantees protection of the tube interior during welding.



### **Additional gas**

Introduction of a third gas line and separate flow management on each line.



### **24/7 use**

Water cooling system inside the head for significant improvement of the weld and guaranteed repeatability.



### **Components of the highest class**

Each component used is sourced from world-leading companies such as as FESTO, SIEMENS and BOSCH.



### **Electrical cabinet**

Installed on the machine and complete with air conditioner for automatic internal temperature control.

### **Machine status signalling**

A complete range of signals and alarms inform the operator about the status of the machine and facilitates its use during both the set up and operating phases.

### **Controls console**

Positioned so as to ensure maximum visibility of the work zone.



### **Base**

Lightweight electrowelded structure with 4 pivoting wheels and 4 adjustable parking feet for guaranteed flexibility and positioning stability.

### **X axis carriage**

Column supporting carriage for horizontal positioning.

### **Y axis carriage**

Vertical stroke carriage and Z axis support carrying the welding head.

### **Vertical column**

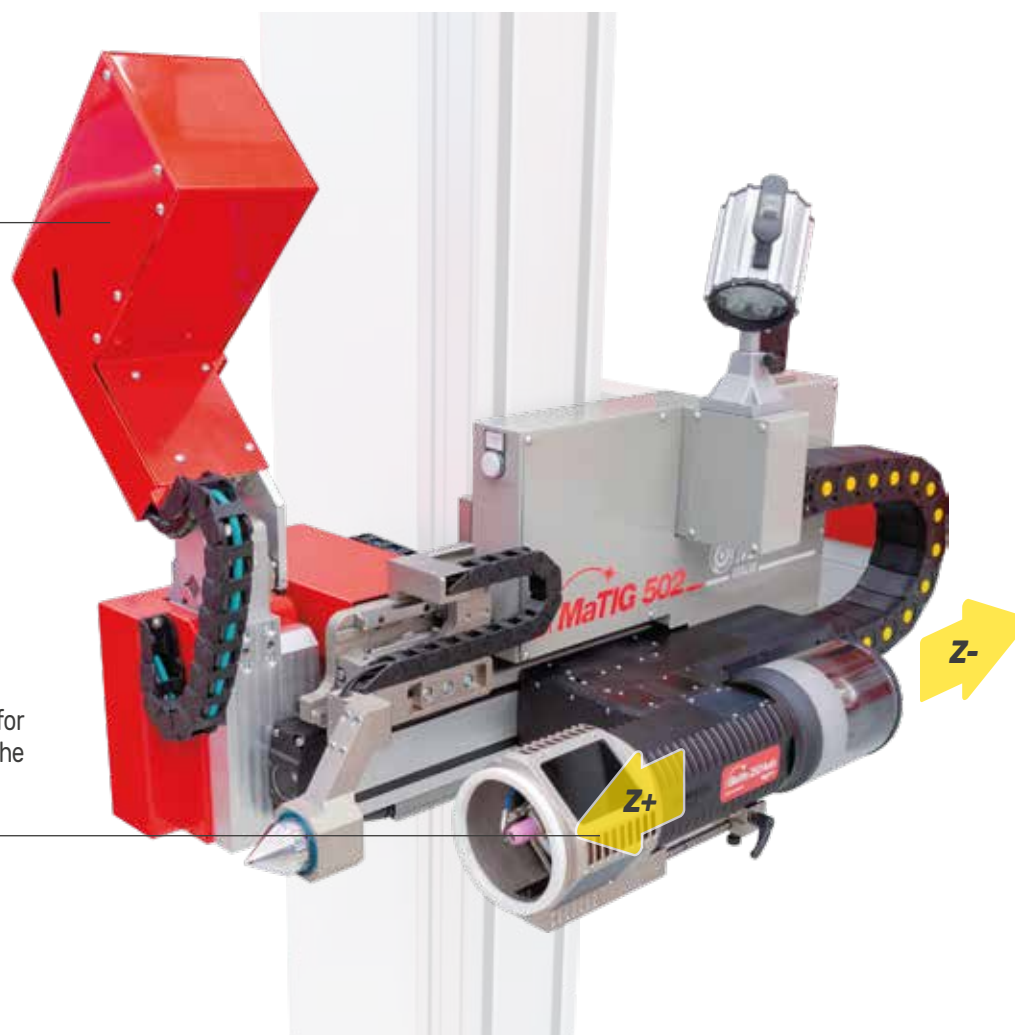
Compactly shaped in extremely robust aluminium with integrated ball guides and protection for the internal components.



**Electrode wear  
detection system  
"check vision 01" model**

**Z axis carriage**

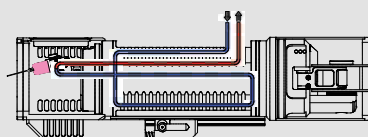
Transverse stroke carriage for managing the distance between the electrode and the tube sheet.



**FOCUS 3**

**Self-learning electropneumatic  
centring probe**

Used in large Maus Italia work centres, it performs all centring and correction of the distance from the tubesheet using a laser measuring system.



**Cooling system inside the torch**

Effective water cooling system inside the MaTIG 502 orbital welding head guarantees:

- control of the internal temperature of the rotating joint even at high welding amperages;
- continuous use in 24/7 shifts;
- high quality of the weld puddle (the lower average temperature of the electrode and of the protection gas crossing it);
- significant improvement in welding performance;



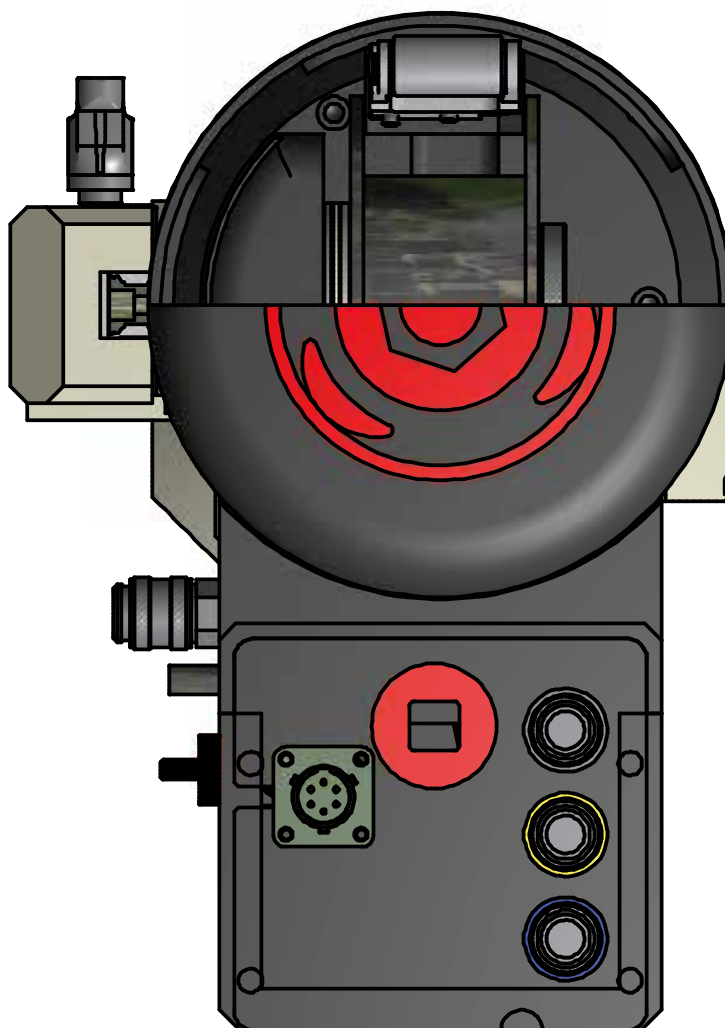
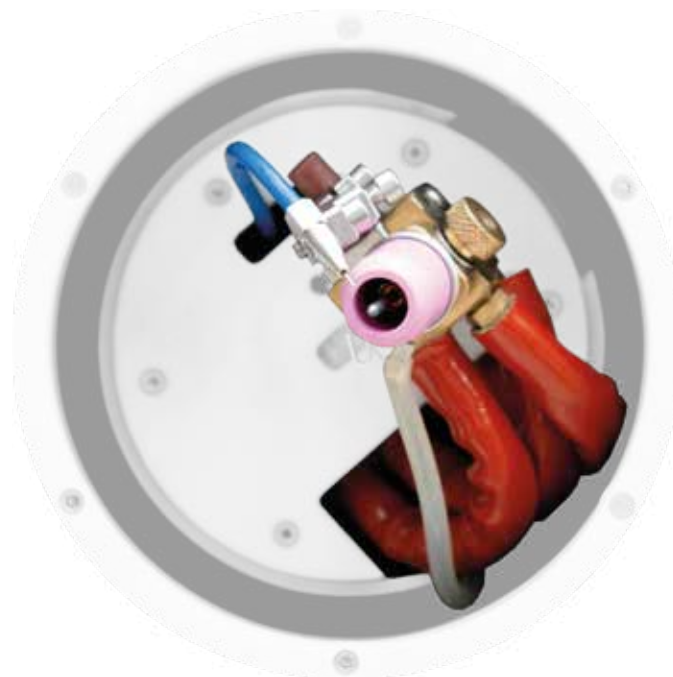
## Unique TIG welding torch

### The only product of its kind.

The new orbital TIG welding torch has been designed and manufactured in its entirety by Maus Italia.

The new electrode clamping system with tangent screws does not require service keys and makes replacing the worn electrode quick (it is no longer necessary to dismantle the ceramic nozzle, the relevant gas diffuser and the filler wire guide).

The wire feed assembly is fully adjustable in all directions. All operations are carried out with a single supplied key.



## Automation of the filler wire

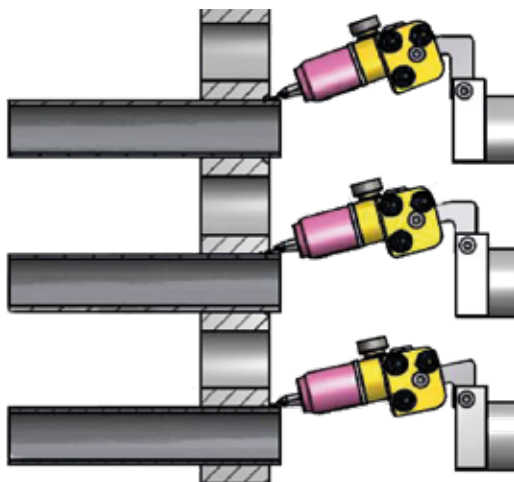
- Control of the actual flow of the filler material
- End of reel control and signalling
- Wire feed system ( indefinitely ) rotates on orbital axis to allow a regular and constant flow of filler wire to the weld puddle during welding



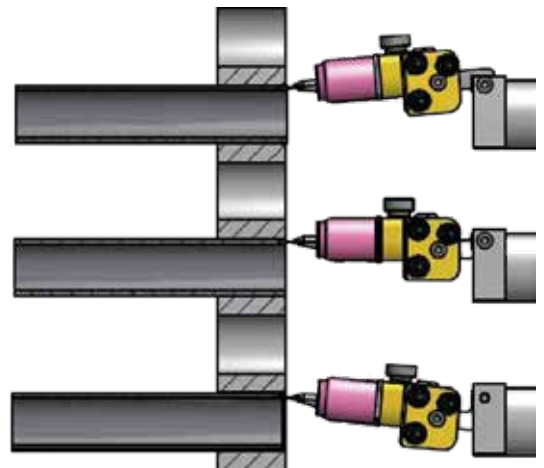
## Electrode angle of incidence

Thanks to components with preset angles, the system setting is absolute and repeatable for all welding geometries is absolute and repeatable.

Facilitates geometric set up operations as well as being extremely stable and robust.



***Protruding tube geometry***



***Flush tube geometry***

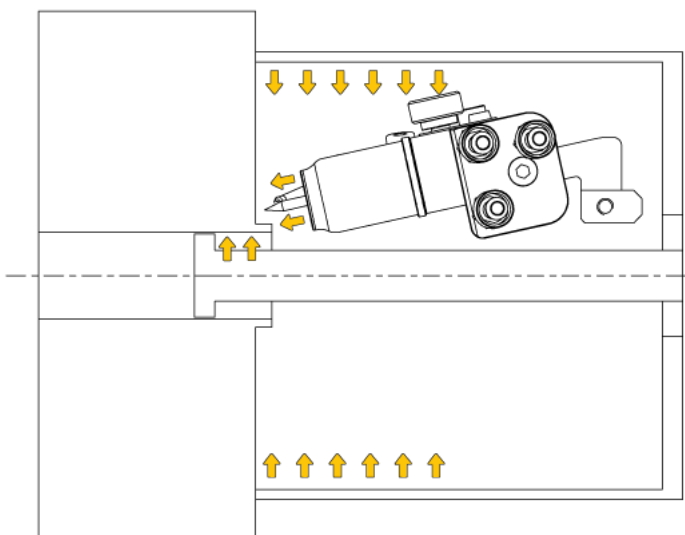


## Management of the welding arc

Continuous monitoring of the welding current in conjunction with the numerical control digital system, ensures constant penetration across the whole weld.







## "Purging" system

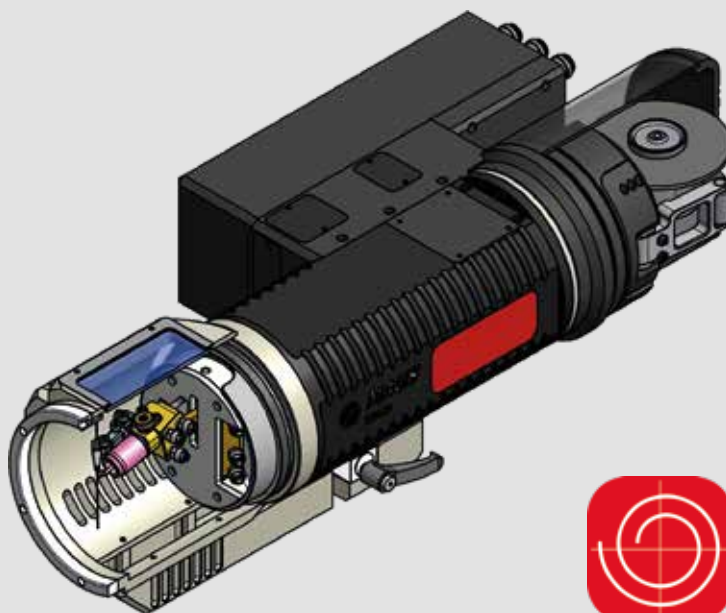
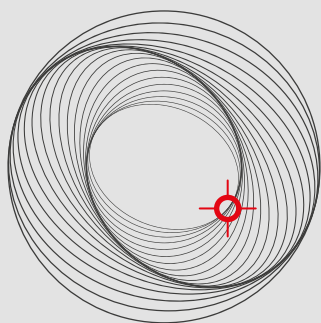
### Protection of the tube.

The integrated rotating purging system guarantees under head protection of the tube during welding.

## Interpol 3

### Variable digital radius

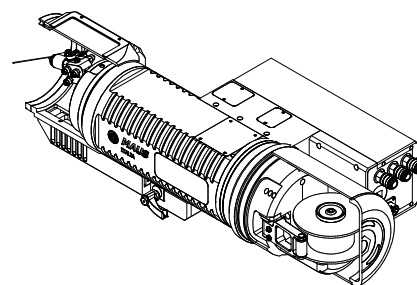
In multi-pass welding, the rotation radius of the electrode can be controlled and interpolated by the CNC.



## Unique design of the welding head

After thousands of hours of R&D, testing and prototyping, the result is an outstanding and unprecedented orbital welding head.

A masterpiece which has been developed and manufactured in Italy, with the extreme precision and quality that you would expect from Maus Italia.





## Electrode wear detection system "check vision 01" model

The new automatic electrode wear detection system has been designed and built to further improve the level of automatic controls performed by the automatic welding machine MATIG502.

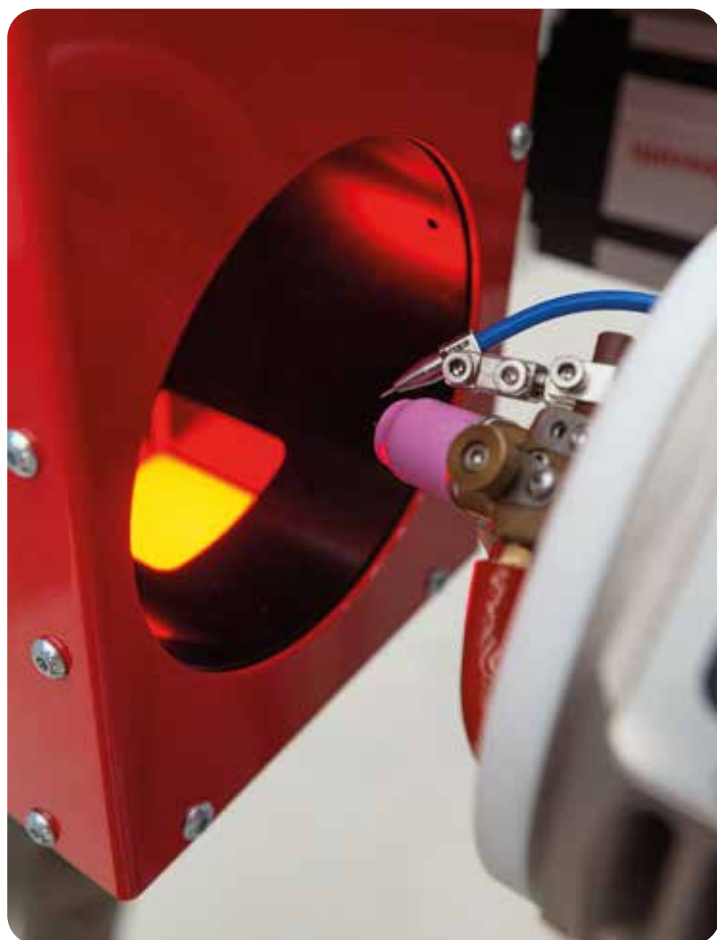
In fact, the control of the welding electrode has always been a crucial and fundamental point in the welding process where automatic machines are used.

The system is implemented through a vision sensor placed inside a dedicated chamber where the electrode is positioned for its control.

A dimensional check is performed which is able to verify various anomalies, such as:

- Wear of the electrode tip
- Possible presence of molten filler material on the electrode
- Errors due to incorrect sharpening of the electrode
- Errors due to incorrect protrusion of the electrode

The operator is setting the frequency and the acceptance tolerance of the check.





## **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.



### **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.

The new MausCAMNet software processes DXF files importing all graphic entities so that the operator can set up a machine program assigning a specific work sequence. In particular, CAM ( Computer Aided Manufacturing ) is the computer support to the programming of CNC machines which through functions developed over time and industry experience makes it possible to transform drawings into a machine program in a simple way. Specific rules pertaining to the work to be carried out as well as the operator's choices are thereby applied.

MausCAMNet is the result of years of work and study by Maus Italia S.p.A. technicians. It provides for the download of the X-Y coordinates of the centre of the tube sheet holes and the selection of the optimized working optimum machining path, as desired by the user.



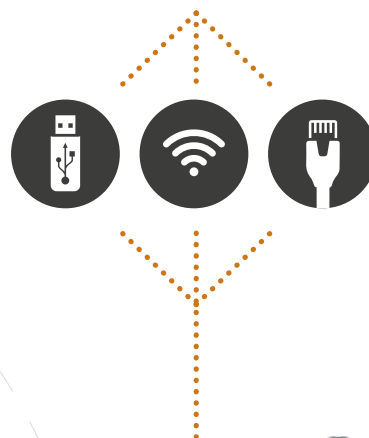
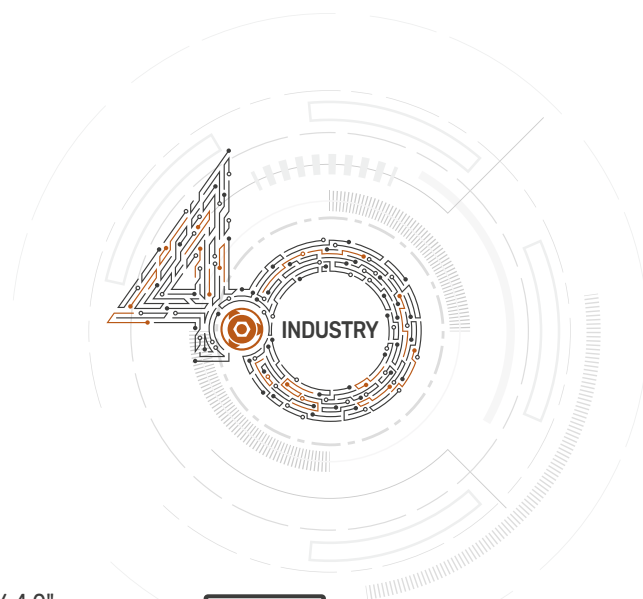
**Transfer of programs to CNC**



# Industry 4.0

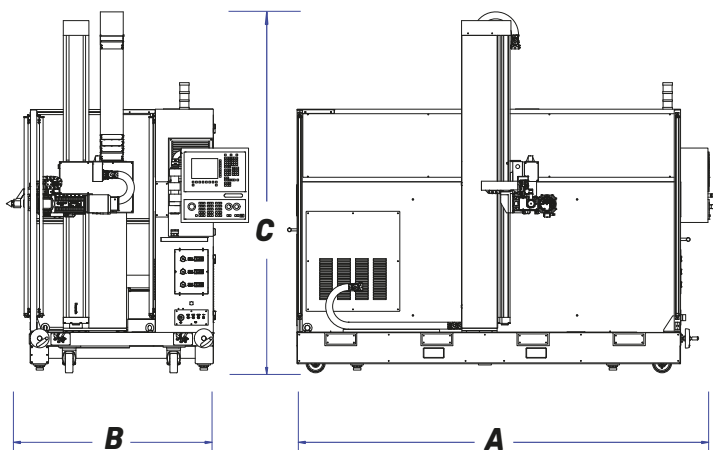
*Maus Italia machinery will transform you into a Smart Factory!*

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.





# Technical features



### Power supply

Voltage	V-ph	400 - 3
Frequency	Hz	50/60
Installed power	kW	16

### Dimensions

Lenght	<b>A</b>	mm (ft)	3200 (10.50)
Width	<b>B</b>	mm (ft)	1450 (4.75)
Height	<b>C</b>	mm (ft)	2750 (9.00)
Weight		kg (lb)	1560 (3439)
Colours		RAL	7030 - 7035 - 3020

### Dimensional capacity

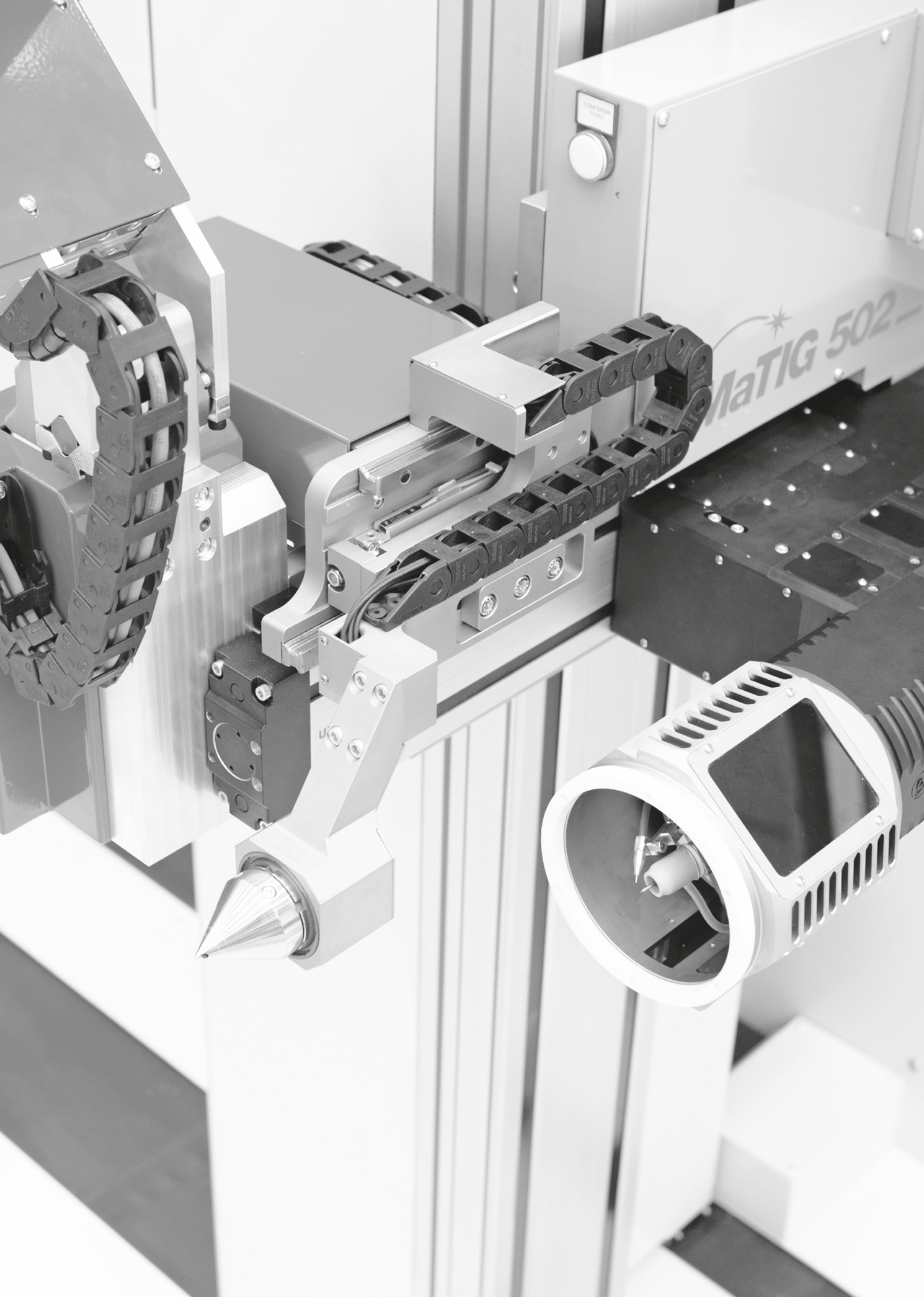
X stroke	mm (inches)	1800 (70.866)
Y stroke	mm (inches)	1800 (70.866)
Z stroke	mm (inches)	300 (11.811)
Minimum height	mm (inches)	530 (20.86)

### Work capacity

Tube sheet diameter	mm (inches)	1800 (70.866)
Workable tube diameter ( max )	mm (inches)	6÷51 (1/4"÷2")
Welding current ( max )	A	6÷200
No-load voltage	V	85
Orbital speed	giri/min (RPM)	0÷10
Filler wire speed	mm/min	0÷2500
Filler wire reel	kg/Ømm (Lb/Øinches )	1-100(2.2/3.937)
Cooling unit	L (GalUS)	4 (1.06)
Cooling capacity	kW	1
Electrode diameter	mm (inches)	1,6 (0.06)
	mm (inches)	2,4 (0.09) standard
	mm (inches)	3,2 (0.12)
Filler wire diameter	mm (inches)	0,8÷1,2 (0.031÷0.047)

Each component has been entirely designed by Maus Italia technical staff and checked in a virtual environment before production.







# Heat exchanger's world

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