



# ***Giotto Basic***

Tube to tubesheet 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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# Giotto Basic

## High-quality tube-tubesheet TIG orbital welding system

Maus Italia presents the Giotto Basic orbital welding system for tube-tubesheet welding in heat exchangers. Its in-house design and manufacture has enabled us to optimise the design in order to offer a high-quality system, comprising:

- A Giotto FC 250 orbital head for tube-tubesheet TIG welding
- microprocessor inverter generator Giotto Power 200 complete with cooling unit

Extremely precise

Revolutionary features

Robust

Fixed angle - Electrode incidence setting

Adjustable wire feed unit

Single key adjustments



## **| Focus features**



### **Digital interface**

Digital programming panel which facilitates the setting of welding parameters.



### **Standard application range**

For tubes with **ID** 80 to 51,0 mm ( from 0.315" to 2.008" ).  
Possibility of extension to increase the max  $\theta$ .



### **Precise position**

Optical control of angular position without mechanical contact with resolution of 120 pulses per revolution (  $3^\circ$  ).



### **Sectors**

The division of the welding cycle into 4 sectors makes it possible to compensate for the negative effects of gravity on the welding pool.



### **Speed adjustment in mm/min**

Programming of the head rotation speed in mm/min, as generally indicated in the WPS.



### **24/7 use**

The enhanced cooling system, inside the head, allows intensive use of the system.



### **Electrode incidence setting**

The use of the electrode holder system with preset angles allow any welding geometry and makes the "setup" easy and repeatable.



### **Test gas**

The operator is able to check and adjust the flow of the gas using the flow meter before the weld cycle begins.



### **Filer wire drive unit ( Optional )**

The constant flow and rotation of the reel on the orbital axis increases the precision and quality of the weld.



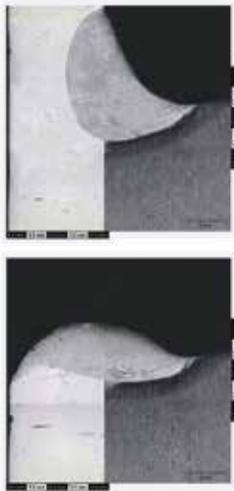
### **Adjustement with a single key**

All adjustment available for the different welding geometries only require the single supplied key.



# TIG Orbital welding

Prime technology for tube to tubesheet junctions.

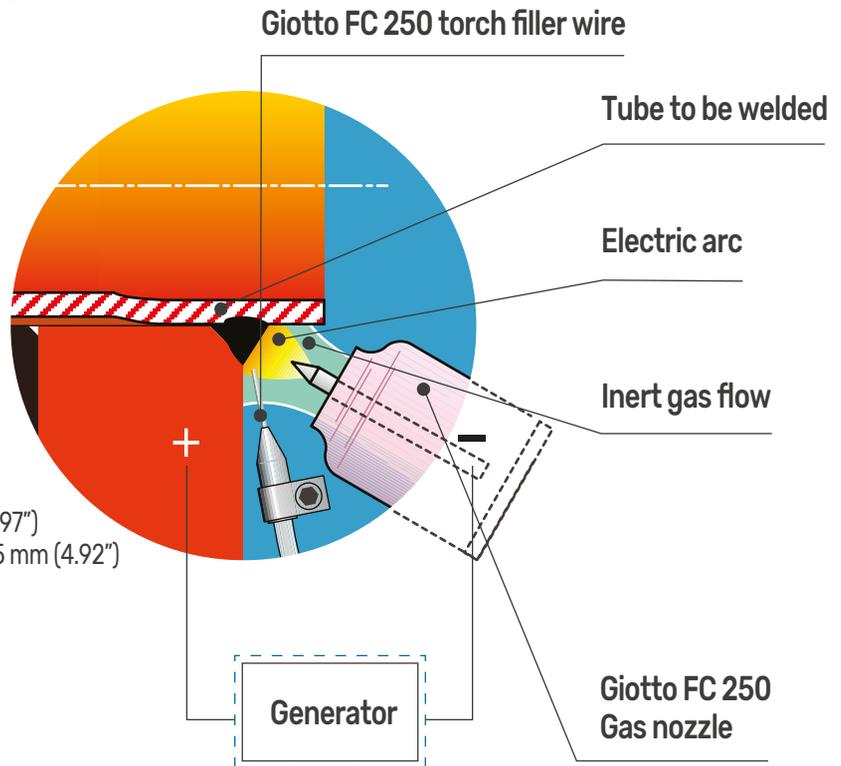


## Test X-ray

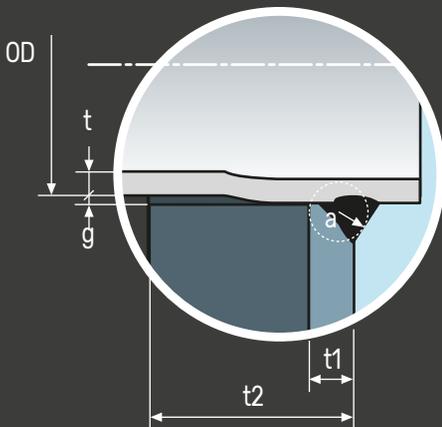
3/4" Tube 14 BWG  
Material 316L  
Tube overhang 5 mm (0.197")  
Tube-sheet thickness 125 mm (4.92")

## Test X-ray

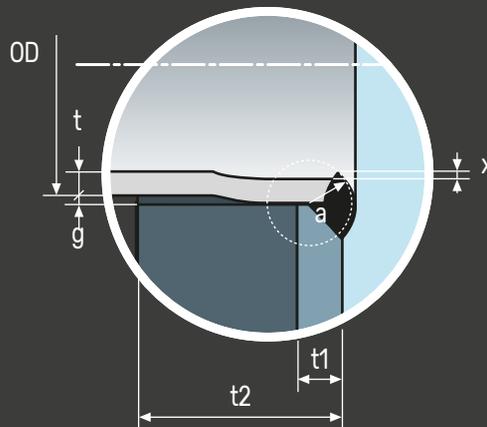
1" Tube 18 BWG  
Material 304L  
Flush tube  
Tube-sheet thickness 72 mm (2.83")



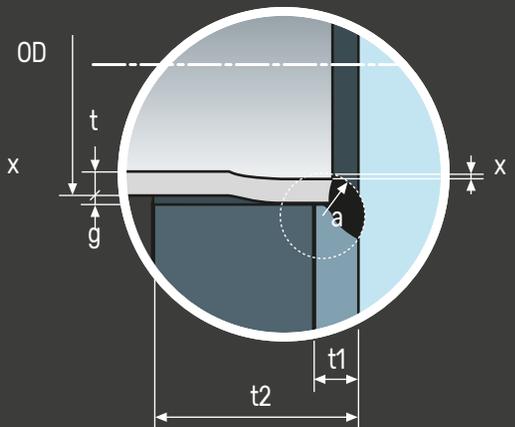
## Protruding tube



## Flush tube



## Recessed tube



- a welding thickness
- OD external diameter of the pipe
- g gap between external tube diameter and tube sheet hole
- t tube thickness
- t1 thickness of plating
- t2 thickness of the tube-sheet
- x weld overflow

# **Giotto Basic**

## Tube to tubesheet TIG orbital welding system

Portable entry-level product, suitable for simple applications. It stands out for its value for money, easy to use and robustness.

Robust

Value for money

### Standard supply

- **Giotto 250B** Orbital head with cables (torch power/cooling)
- **Giotto Power 200** Digital programmer inverter generator on wheels
- Remote control with metal keys
- Ground cable
- Digital calibration
- Electrode holder brackets kit with different angles of incidence
- Welding head adjustment and maintenance kit
- Instruction manual
- Carrying case

### Optionals

- Filler wire unit
- Anti-dazzle protection





**Micrometer adjustment**

Device for adjusting the distance of the electrode from the tube-sheet.



Complete range of devices for centring in the tube consisting of HS cartridge spindles and HC self-centring cartridges.

Different WTC thrust devices to be selected on the based of tube geometry and material, with Maus Italia BlockOut screens for anti-dazzle protection.



**Single key Adjustable filler wire feed unit**

All adjustments are made with a single supplied key.



**New electrode tightening system**

The tangential screw does not require service keys and speeds up replacement of the worn electrode without touching other parts that could change the geometric setting.

# **Giotto 250B**

## Tube-tube-sheet TIG orbital welding head

The Giotto 250B "Protruding tube" geometry head is the result of extensive development and prototyping. Each component is designed and manufactured by Maus Italia.



*In-house production*



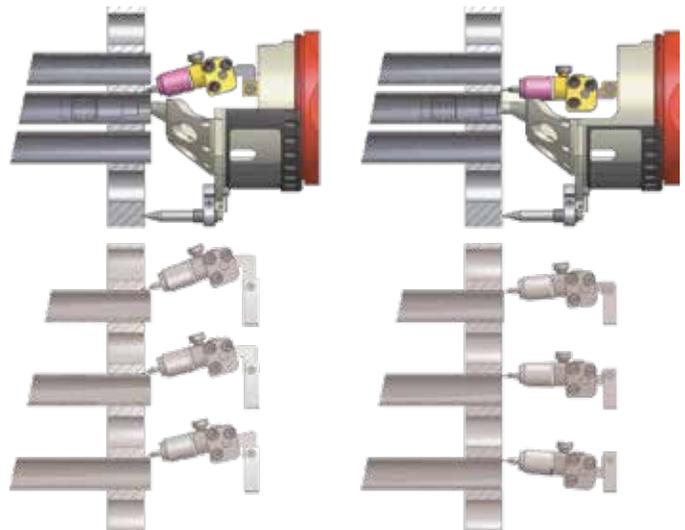
**"Protruding tube" geometry**

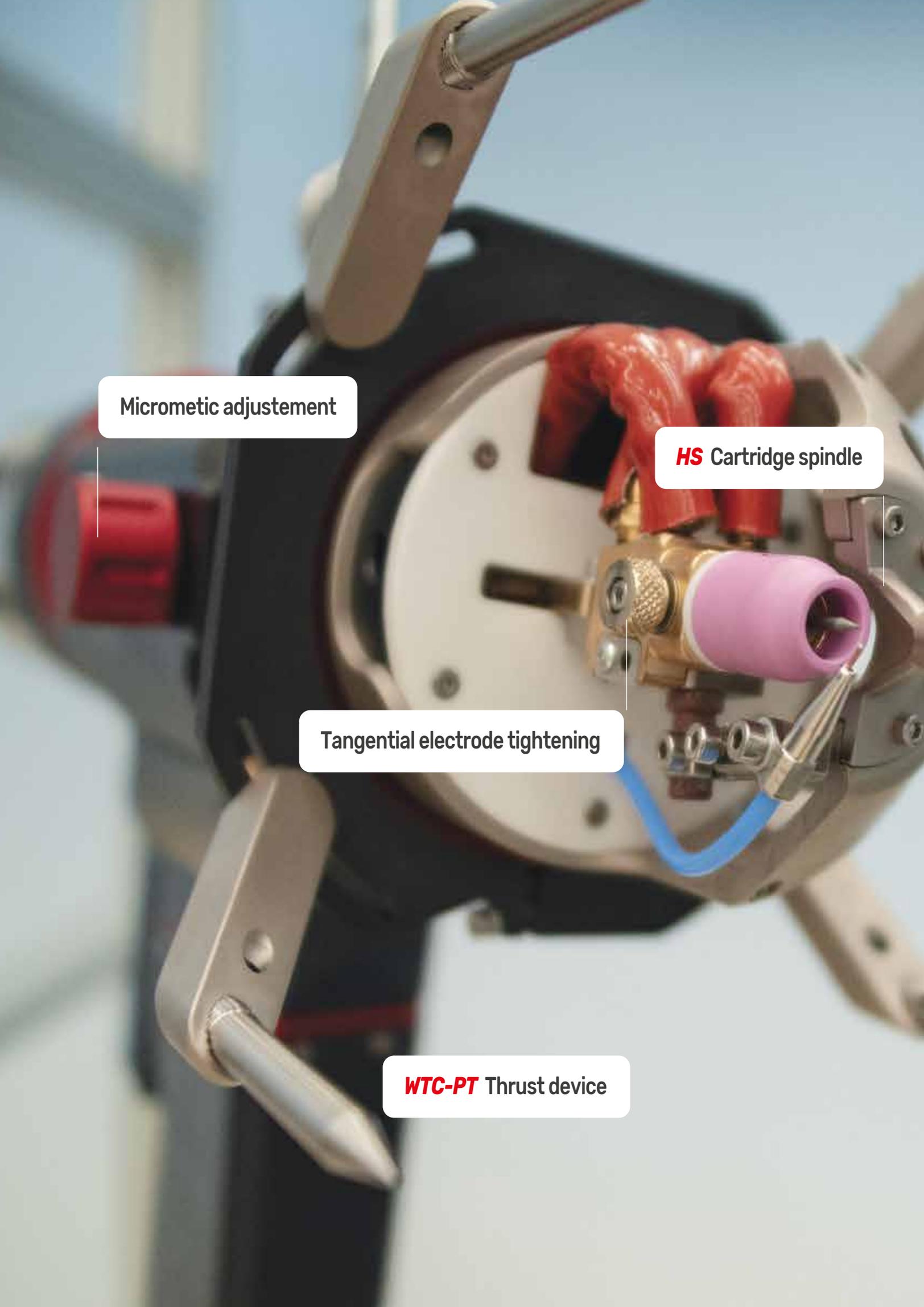
**"Flush tube" geometry**



### Electrode angle setup guaranteed

Thanks to components with predetermined angles, the proposed system for each welding geometry is absolute and repeatable. It facilitates geometric setup operations as well as being extremely stable and robust.





Micrometric adjustment

**HS** Cartridge spindle

Tangential electrode tightening

**WTC-PT** Thrust device



### Speed adjustment

Programming of the peripheral speed of head rotation.



### Precise position

Absolute optical control of the angular position using an encoder.



### Protective gas line

There is an additional gas line, inside the body of the Giotto **FC 250**, dedicated to the external protection of the weld for combination with the **WTC-Gas2** thrust device.

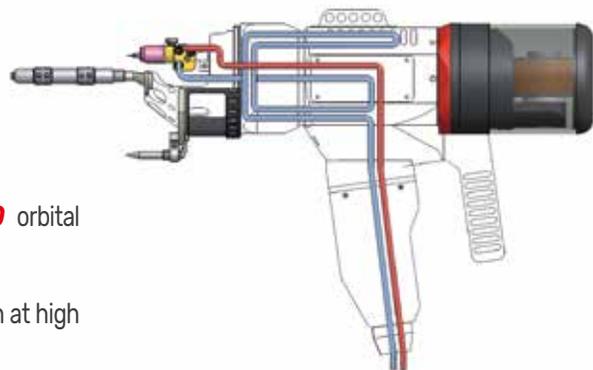
### **HC** Self-centring cartridge



### Welding with the ideal temperature

The effective internal cooling system of the **Giotto FC 250** 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 welding puddle with a lower average temperature of the electrode and the protective gas passing through it;
- significant improvement in welding performance.



# Giotto Power 200

## Digital inverter generator with integrated control microprocessor and digital interface

Lightweight and compact, the Giotto Power 200 generator is proposed by Maus Italia for controlling the Giotto 250B orbital welding head. Mounted on a "carriage pickUP" with a gas bottle holder, the Giotto Power 200 generator is also for onsite service operations.

Lightweight

Compact

## Work parameters

- Pre-gas time
- Initial current
- Upslope time
- Weld pool formation time
- Weld current
- Base current
- Pulse frequency
- Pulse balancing
- Downslope time
- Final current
- Post gas time
- Weld speed
- Filler wire quantity
- Programmable sectors: from 1 to 4
- Programmable upslope and downslope ramps
- Program diagnosis simulation cycle



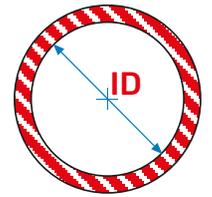




**Expandable sector cartridge mod. *HSE***

Self-centring system particularly suitable in tube to tube-sheet welding of boilers for internal diameters greater than 57 mm (2.1/4") and in vertical negative head applications ( sugar refinery exchangers ) where the support of the orbital welding head is guaranteed by the expansion of the sectors.

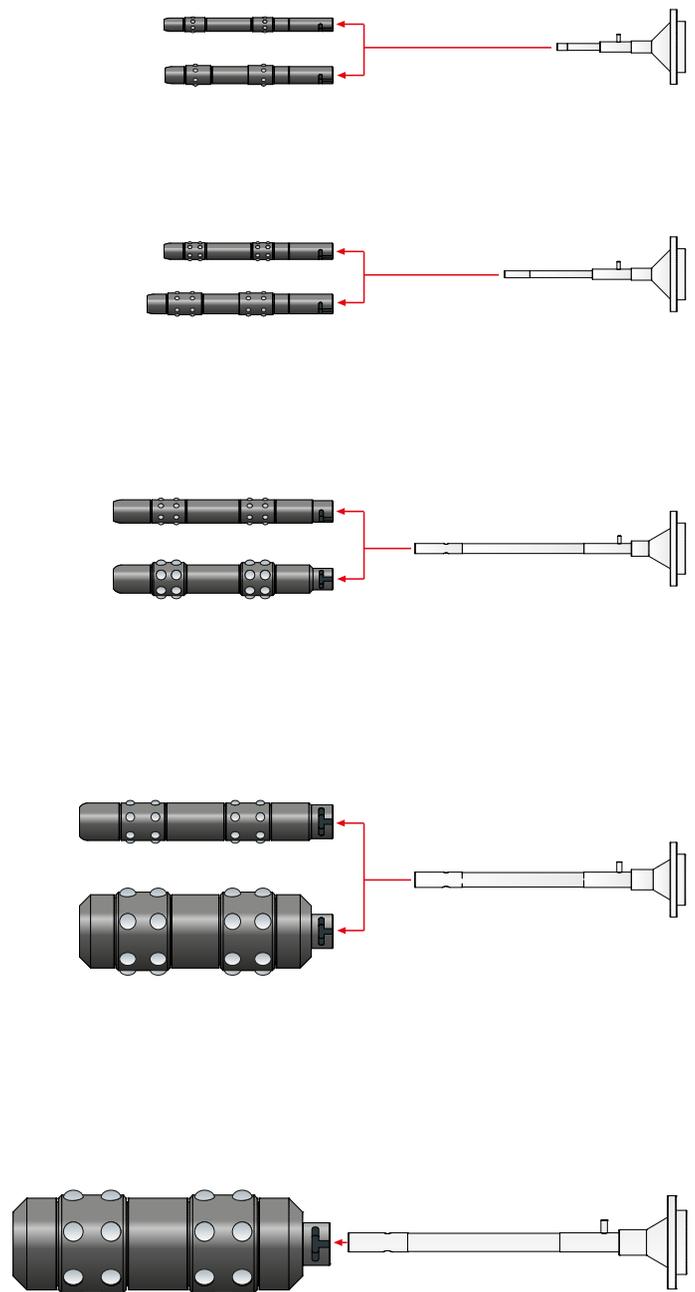
# Centring



## HS cartridge holder spindles and HC self-centring cartridges for the tube to tubesheet Giotto 250B TIG orbital welding head

The centring of the torch is ensured by the spindle + cartridge system. Select the correct combination of **HS** Series spindle and **HC** Series cartridge according to the internal diameter of the tube by referring to the table.

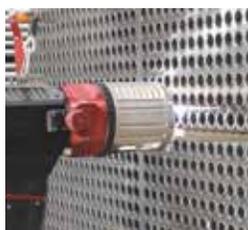
STANDARD - in stock	Tube dimensions		Cartridge	Spindle
	ID		HP	HS
	mm	inches	Cod.	Cod.
	7,7 ÷ 8,3	0.303 ÷ 0.327	HC-80	HS-MINI
	8,2 ÷ 8,9	0.323 ÷ 0.350	HC-87	
	8,5 ÷ 9,3	0.335 ÷ 0.366	HC-90	
	8,8 ÷ 9,7	0.346 ÷ 0.381	HC-95	
	10,0 ÷ 10,5	0.394 ÷ 0.413	HC-1	HS-A
	10,5 ÷ 11,0	0.413 ÷ 0.433	HC-2	
	11,0 ÷ 11,5	0.433 ÷ 0.453	HC-3	
	11,5 ÷ 12,0	0.453 ÷ 0.472	HC-4	
	12,0 ÷ 12,5	0.472 ÷ 0.492	HC-5	
	12,5 ÷ 13,0	0.492 ÷ 0.512	HC-6	
	12,8 ÷ 14,0	0.504 ÷ 0.551	HC-7	
	13,8 ÷ 15,0	0.543 ÷ 0.590	HC-8	
	18,8 ÷ 16,0	0.583 ÷ 0.630	HC-9	HS-B
	15,8 ÷ 17,0	0.622 ÷ 0.669	HC-10	
	16,8 ÷ 18,0	0.661 ÷ 0.709	HC-11	
	17,8 ÷ 19,0	0.701 ÷ 0.748	HC-12	
	18,8 ÷ 20,5	0.740 ÷ 0.807	HC-13	
	19,8 ÷ 22,5	0.779 ÷ 0.886	HC-14	
	22,3 ÷ 25,0	0.878 ÷ 0.984	HC-15	HS-C
	24,5 ÷ 27,0	0.965 ÷ 1.06	HC-16	
	26,5 ÷ 29,0	1.043 ÷ 1.141	HC-17	
	28,5 ÷ 31,0	1.122 ÷ 1.220	HC-18	
	30,5 ÷ 33,0	1.201 ÷ 1.299	HC-19	
	32,5 ÷ 36,0	1.279 ÷ 1.417	HC-20	
	35,5 ÷ 39,0	1.398 ÷ 1.535	HC-21	
	38,5 ÷ 42,0	1.516 ÷ 1.653	HC-22	
	41,5 ÷ 45,0	1.634 ÷ 1.772	HC-23	
	44,5 ÷ 48,0	1.752 ÷ 1.890	HC-24	
	47,5 ÷ 51,0	1.870 ÷ 2.008	HC-25	HS-D
	50,5 ÷ 54,0	1.988 ÷ 2.126	HC-26	
	53,5 ÷ 58,0	2.106 ÷ 2.283	HC-27	
	57,5 ÷ 62,0	2.264 ÷ 2.441	HC-28	
	61,5 ÷ 68,0	2.421 ÷ 2.677	HC-29	
	65,5 ÷ 70,0	2.579 ÷ 2.756	HC-30	
	69,5 ÷ 74,0	2.736 ÷ 2.913	HC-31	
	73,5 ÷ 78,0	2.894 ÷ 3.071	HC-3,2	
	77,5 ÷ 82,0	3.051 ÷ 3.228	HC-33	





## IWFG

Rotating power supply unit  
for filler wire from  $\varnothing 0,8$  to 1mm  
(0.0315" to 0.0394")  
in 1 Kg reels (2.2 lb)



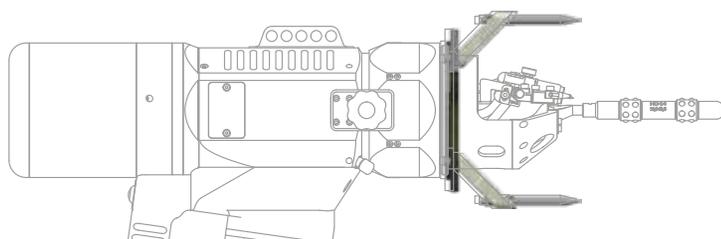
Ensures regular supply of wire to weld pool.  
Wire consumption is always in full view  
of the operator thanks to the transparent  
protective cloche.



## WTC-PT

Driving head for the welding  
of protruding tubes with 4 points of contact

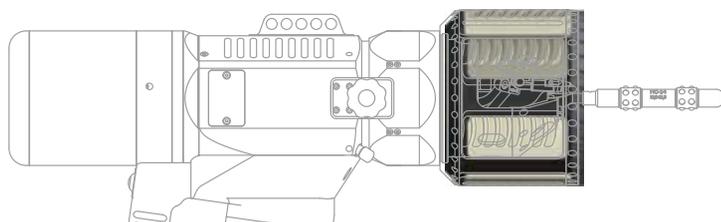
With manual control levers to rapidly adapt to geometric  
passage of the tubes.



## WTC-FT

Thrust device for welding flush or recessed  
tubes with rotating **BlockOut** anti-dazzle screen

Multiple welders can work simultaneously on the same  
tubesheet thus increasing productivity.



# Giotto 250B



## TPB-3A

(Optional)

Spring balancer for the support and vertical movement of the welding head with a capacity of 10 to 14 kg (22.0 to 30.8 lb).

### Work cycle

270 A (40°C./104°F.) **60%**  
250 A (40°C./104°F.) **100%**

General features			
Duty Cycle	A (65%)		250
Orbital welding speed (max)	rpm		6
ID Tube (min.)	mm	inches	8 0.315
OD Tube standard (max.)	mm	inches	51 2.008
Welding head cooling			Closed liquid circuit

Welding geometry			
Flush tube			✓
Recessed (max.)	mm	inches	3,0 0.118
Protruding (max.)	mm	inches	12,0 0.472

Tungsten			
Ø 1.6			optional
Ø 2.4			standard
Ø 3.2			optional
Electrode distance adjustment	mm	inches	12 (±6) 0.472 (±0.236)

Filler wire			
Wire coil (weight/Ø)	kg/mm	lbs/inches	1/100 2.21/3.937
Recommended wire diameter	mm	inches	0,8 0.0315
• Wire diameter (optional)	mm	inches	0,6 0.0236
• Wire diameter (optional)	mm	inches	1,0 0.0394
• Wire diameter (optional)	mm	inches	1,2 0.0472
Wire speed (max.)	mm/min	inches/min	2000 78.5

Dimensions				
Width	<b>W</b>	mm	inches	150 6
Depth (without centring)	<b>D</b>	mm	inches	510 20
Height	<b>H</b>	mm	inches	400 16
Weight excluding cables and oil		kg	lb	12 26.45
Cable length		m	ft	6 19.7

Power supply		
Power supply voltage (±15%)	Volt - Ph	400 - 3
Absorbed power	kW	10
Fuses	A	16
Cos phi		0,99
Open circuit voltage	Vdc	70
Utilisation factor (40°C/104°F. - X=60%)	A	270
(40°C/104°F. - X=100%)	A	250

Capacity		
Cooling power (25°C./77°F.)	W	650
Liquid coolant tank	l US Gal	2,0 0.53
Liquid coolant capacity (max.)	l/min US gpm	3,3 0.87

Dimensions			
Lenght	mm	inches	650 25.6
Width	mm	inches	420 16.5
Height	mm	inches	1250 27.0
Weight without remote control	kg	lb	53 117
Level of protection	IP		23

# Giotto Power 200

# Heat exchanger's world

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