

Operating instructions

for responsible bodies and persons using the machine

Open-Arc Orbital Welding Heads **ORBIWELD**

TP 250
TP 400
TP 600
TP 1000



Machine no.:

.....
.....



To work safely with this machine, please read through the operating instructions in full before initial operation.
[Retain the operating instructions for future reference.](#)

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1. ABOUT THIS INSTRUCTIONS

To allow quick understanding of these instructions and safe handling of the machine, all the warning messages, notes and symbols used in these instructions are presented here along with their meaning.

1.1 Warning messages

In these instructions, warning messages are used to warn you against the dangers of injury or material damage. Always read and observe these warning messages!



This is a warning symbol. It should warn you against dangers of injury. Follow all instructions which are identified with this safety symbol in order to avoid injuries or death.

Warning symbol	Meaning
ATTENTION	This note refers to dangers, which can cause damage at the system or to the product.
 WARNING	This note refers to dangers, which can cause injuries for operators, technical personal or unconcerned persons in the working area.
 DANGER	This note refers to dangers, which can cause danger for life or heavy injuries for operators, technical personal or unconcerned persons in the working area.



1.2 Abbreviations

Abbr.	Meaning
OW	ORBIWELD
TP	Tube & Pipe

2. INFORMATION AND SAFETY INSTRUCTIONS FOR THE RESPONSIBLE BODY

2.1 Requirements for the responsible body

- Workshop/outdoor/field application: The responsible body is responsible for safety in the danger zone around the machine, and should allow only qualified personnel to enter the zone or operate the machine in the danger zone.
- Employee safety: The safety regulations described in chap. 2 must be observed and work must be carried out with safety in mind using the prescribed protective equipment.

2.2 Using the machine

2.2.1 Proper use

The orbital welding equipment (Orbital Welding Power Supplies CA/CB 165/300 and Orbitwin in connection with the orbital welding heads OW/TP/P/OP/HX and the manufacturer's recommended accessories) are to be used with metal pipes and tubes up to the specified pipe/tube dimensions of the heads.



The machine may only be used on pipes and containers that are empty, unpressurized, do not have explosive atmospheres and are not contaminated.

The cassette (only for ORBIWELD welding heads) is entirely closed and thereby forms a room, which keeps the atmospheric air away from the welding zone. All necessary power supply and controls have to be provided by the orbital power supply.

The welding head is clamped by means of collets or clamp jaws onto the tube joint, which is to be welded. The arrangement is made in such a way, that the welding-electrode is located radially over the tube joint.

After ignition of the welding arc, the electrode is turned around the tube according to the preselected speed. Thereby the tube is being welded.

Proper use also includes the following:

- observing all safety instructions and warning messages included in these operating instructions
- carrying out all inspection and maintenance work
- sole use in the original condition with original accessories, spare parts and materials

2.2.2 Improper use

A use other than that defined under "proper use" or a use that goes beyond this or the specified constraints shall be considered improper use due to the potential risks involved.



The removal of safety equipment is not permitted. The machine is not intended for use by private consumers. The technical values defined for normal operation must not be exceeded.

2.2.3 Machine constraints

- The workplace can be in pipe preparation, in plant construction or in the plant itself.
- A radial space requirement/freedom of movement of approx. 2 m around the machine is required for people.
- Work lighting: min. 300 lux.
- Maintenance as described in chapter 8.1
- Operated by one person.

- User qualification: instructed operator.
- Climate conditions:

temperature range for machine operation: -10°C to 40°C, (<70% rel. humidity).

temperature range for machine storage: -20°C to 40°C, (<70% rel. rel. humidity).

Do not use outdoors in fog, rain or during a thunderstorm.

The cooling performance is only guaranteed when full water tank.

2.3 Environmental protection/disposal

2.3.1 Electric tools and accessories

Discarded electric tools and accessories contain large quantities of valuable raw and synthetic materials that can be recycled. Therefore:

- Electrical (electronic) devices that are marked with the symbol to the left may not be disposed of with household waste in accordance with EU regulations.
- By actively using the available return and collection systems, you actively contribute to the reuse, recycling and utilization of electrical (electronic) devices.
- Used electrical (electronic) devices contain parts that must be handled selectively according to EU regulations. Separate collection and selective treatment is the basis for environmentfriendly disposal and the protection of human health.
- Appliances and products that you bought from us after August 13, 2005 will be disposed of in accordance with legal standards after they have been supplied to us at no cost.
- We may refuse to accept old appliances that pose a risk to human health or safety due to contamination produced during use.
- The end user is responsible for disposing of used appliances introduced to the market before August 13, 2005. Please contact a disposal center near you for this purpose.
- **Important for Germany:** our products may not be disposed of in municipal disposal sites as they are only used for industrial purposes.



(nach RL 2002/96/EG)

2.4 Basic safety instructions

All products which are produced and market by Orbitalum Tools GmbH are state-of-the-art machines designed for safe use. The risks involved in using the machines are described in the operating instructions below. Using this machine in a way other than that described in these instructions can lead to serious physical injury and material damage.

Therefore:

- Observe warning messages at all times.
- Keep complete documentation close by the machine.
- Observe country-specific regulations, accident prevention regulations, standards and guidelines.
- Always ensure that the machine is in good working order. Observe the maintenance information. (chap. 8.1).
- Report any unusual machine behavior to the person responsible immediately.
- Only use the dimensions and materials specified in these instructions. Other materials should be used only after consulting with Orbitalum Tools customer service.
- Only use tools, spare parts, Ersatzteile, operational materials and accessories of Orbitalum Tools.
- Repair and maintenance work on the electrical equipment may only be carried out by a qualified electrician..
- At the end of each working cycle, before transportation, changing tools, cleaning and performing any maintenance, adjustment or repair work, switch off the machine, allow it to run to a stop and pull the mains plug.
- Do not carry the machine by the cable assembly and protect them from heat, oil and sharp edges.
- During operation, keep hands away from the tools.
- Check that the work piece is correctly clamped.
- Switch on the machine only when the pipe has been clamped.

- In extreme usage conditions, conductive dust can settle in the machine's interior. For this reason, the installation of a SPE-PRCD or fault current (FI) protect switch (30 mA) between the main power supply and the machine is required. Such protection is to be provided by the customer and installed by a qualified electrician.
- When working with the machine, wear safety shoes in accordance with EN ISO 20345 (at least S1).

NOTE

The recommendations concerning "Personal protective equipment" only apply to the product being described

Other requirements resulting from the ambient conditions on site or of other products, or from combining with other products, are not taken into account.

These recommendations do not in any way release the responsible body (employer) from its statutory health and safety at work obligations towards its employees.

**WARNING**

Danger of unit toppling over (Orbicar welding trolley, gas cylinder, welding power supply, cooling unit) as a result of external application of force.

Diverse physical injuries and property damage are possible!

- Install machine securely against external force and keep moving masses at minimum clearance of 1 meter.

**DANGER**

Danger through operation by more than one person

Diverse physical injuries and property damage are possible!

- Ensure that only one person operates the machine and welder head at a time.

**DANGER**

Danger through improper maintenance of the unit

Diverse physical injuries and property damage are possible!

- Maintenance work must be performed in accordance with the "Maintenance" section.

**DANGER**

Electrical forms of danger from contact and/or incorrect or damp personal protective equipment.

Electric shock!

- ⊗ Do not touch any live parts (pipes), especially during arc ignition!
- ⊗ Persons with increased sensitivity to electrical forms of danger (e.g. cardiac insufficiency) must not work with the unit.
- Dry safety shoes, dry metal-free (rivet-free) leather gloves and dry protective suits minimize the danger presented by electricity.
- Work on dry ground.

**DANGER**

Accidentally activated ignition function

Electric shock!

- Always switch off the orbital welding power supply when connecting or disconnecting a welding head.

**WARNING**

Electromagnetic incompatibility of surrounding devices when conducting high-frequency ignition and devices without ground conductor in operation

Diverse physical injuries and property damage are possible!

- Only use insulated electrical devices in the working area of the welding unit.
- Observe electromagnetically sensitive devices when the unit is ignited



WARNING

Ultra-violet radiation caused by the arc during welding operation

Damage to eyes and burns to the skin!

- ▶ During operation, wear EN 170-compliant visor and protective clothing that covers the skin.
- ▶ In the case of closed heads, check that the visor is in perfect working order.



WARNING

Hot emergent liquids and hot plug connections during intense operation

Danger of scalding!

- ▶ Observe safety measures put in place by the supervisor/safety officer.



DANGER

Incorrect handling of pressure containers and other parts of the unit (e.g. forming gas cylinder)

Diverse physical injuries and property damage are possible!

- ▶ Observe safety regulations, especially for pressure containers.
- ▶ Observe safety data sheets.
- ▶ If > 25 kg, lift unit and its components with the help of several people/hoisting equipment.



DANGER

Flammable materials in the vicinity of the welding zone or solvents in the ambient air

Danger of explosion and fire!

- ⊘ Do not perform welding tasks in the vicinity of solvents (e.g. painting work)
- ⊘ Do not perform welding tasks in the vicinity of explosive materials
- ▶ Ensure there are no flammable materials or contaminations in the vicinity of the welding zone or being used as an underlay



ATTENTION

Surfaces of the welding heads and welding point remain hot for some time after welding

Danger of burning!

- ▶ Wear protective gloves



WARNING

Toxic vapors and materials in the welding process and handling electrodes

Damage to health, such as cancer!

- ⊘ Do not use electrodes that contain thorium
- ▶ Use extraction device in accordance with official regulations (e.g. BGI: 7006-1)
- ▶ Particular attention should be paid when working with chromium, nickel, or manganese



DANGER

Incorrect ignition when welding head has not been attached or brought into the correct position.

Electric shock, physical injury, and property damage to other devices!

- ⊘ Do not play with welding heads
- ▶ Switch to "test" function if head is not ready for operation



DANGER

Improper access and opening of ORBIMAT unit

Electric shock!

- ⊘ Never connect an open unit to the power supply
- ▶ Disconnect unit from the power supply
- ▶ Remove all devices connected externally to the unit (welding heads, etc.)
- ▶ If previously in use, allow to cool
- ▶ Only allow qualified electricians to access the electronics



DANGER

Liquid in housing as a result of improper use and/or transport

Electric shock!

- ⊘ Do not place any liquids (drinks) on the unit
- ▶ Keep vents free
- ▶ Check housing for moisture on the inside after transporting the machine and leave open to dry if necessary.



DANGER

Damaged plug!

Fatal electric shock.

- ⊘ Do not use adapter plugs with ground protected electrical tools.
- ▶ The machine connector plug must fit the socket.



DANGER

Loose/baggy clothing, long hair or jewelry can get caught in rotating machine parts!

Serious injury or death.

- ⊘ During operation, do not wear loose/baggy clothing, e.g. neckties.
- ▶ Tie up long hair to prevent it from being caught.



DANGER

Safety components that are contaminated or worn are defective!

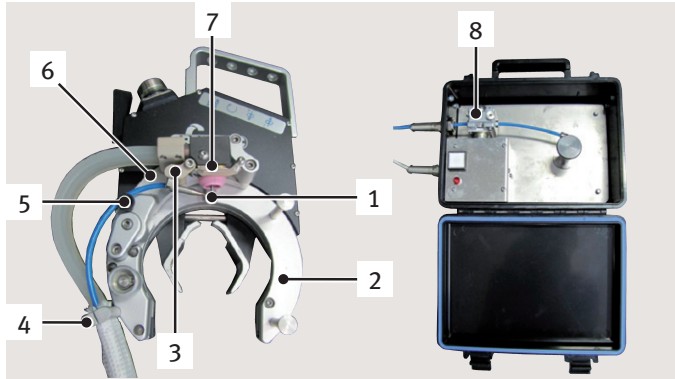
The failure of safety components can cause physical injury.

- ▶ Replace defective safety components immediately and check them daily to ensure proper operation.
- ▶ Inspect the machine daily for visible signs of damage or defects, and have them repaired by a specialist if necessary.

3. PRODUCT DESIGN

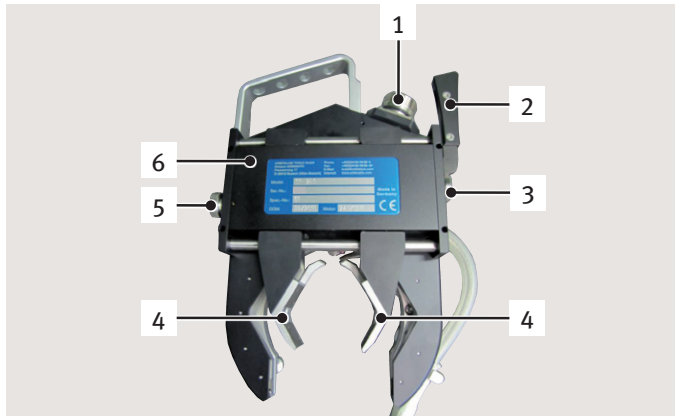
3.1 TP 250

3.1.1 Front view with external Wire feed



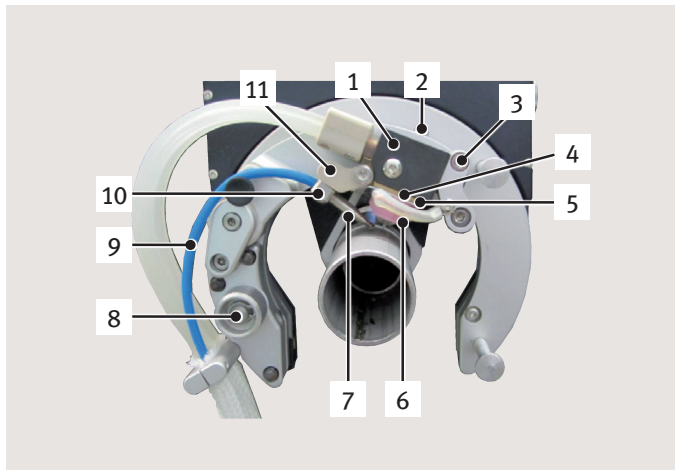
1. Follower roller
2. Rotation ring
3. Wire adjustment
4. Strain relief hose assembly
5. Plunger pin
6. Torch arm
7. Torch assembly
8. Wirefeeder assembly

3.1.2 Rear View



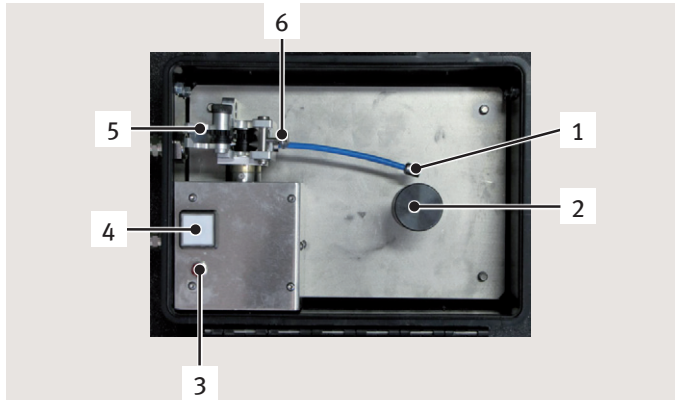
1. Connector control cable
2. Clamping lever
3. Clutch
4. Clamp arms
5. Adjustment knob clamp arms
6. Clamping unit

3.1.3 Front view with pipe



1. Torch holder
2. Arc adjustment screw
3. Torch angle adjust screw
4. Torch
5. Insulating plate
6. Gas lence
7. Wire guide exit
8. Horizontal adjustment
9. Wire guide
10. Wire horizontal adjustment screw
11. Wire angle adjustment screw

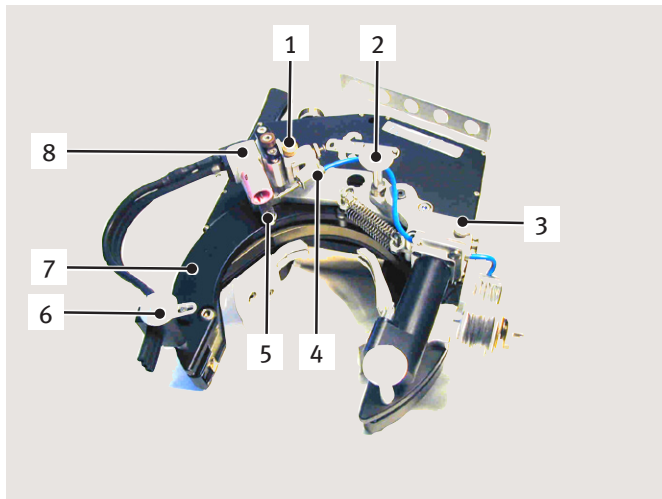
3.1.4 Wirefeed motor assembly



1. Wire guide inlet
2. Wire reel support
3. Feeding operation light
4. Feeding button
5. Pressure roll
6. Pressure adjust screw

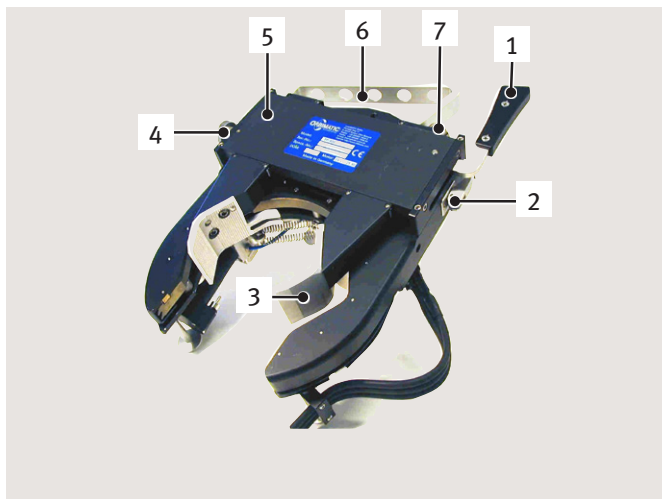
3.2 TP 400 - 1000

3.2.1 Front View



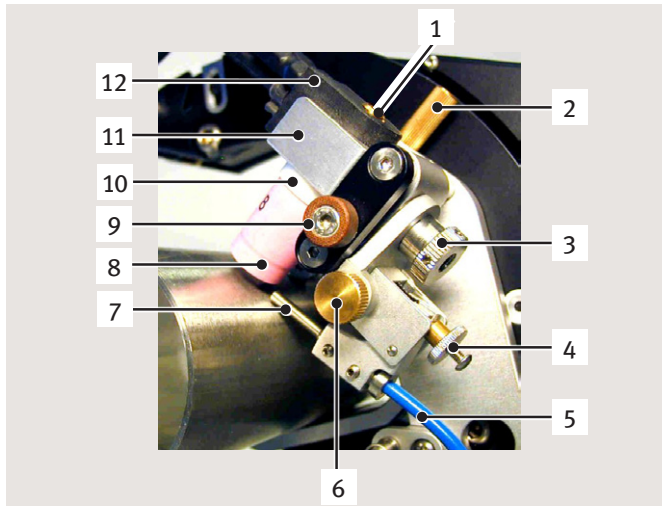
1. Wire adjustment
2. Plunger pin
3. Wire feeder assembly
4. Torch arm
5. Follower roller
6. Strain relief hose assembly
7. Rotation ring
8. Torch assembly

3.2.2 Rear View



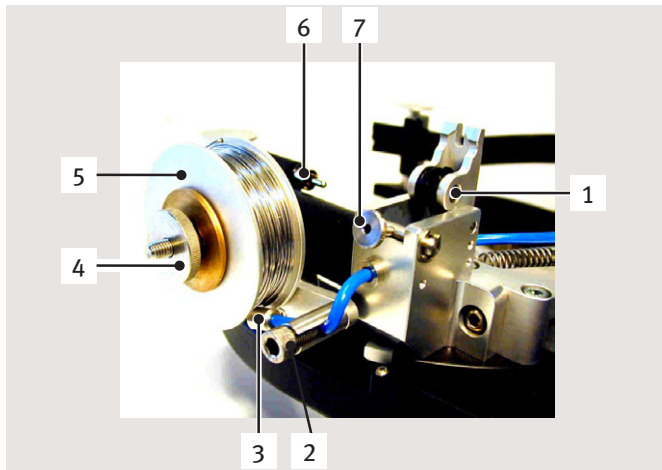
1. Clamping lever
2. Clutch
3. Clamp arms
4. Adjustment knob clamp arm
5. Clamping unit
6. Handle
7. Connector control cable

3.2.3 Front View with Pipe



1. Electrode clamping screw
2. Arc adjust knob
3. Torch angle adjust knob
4. Wire angle adjustment
5. Wire guide
6. Set screw
7. Wire guide exit
8. Gas lance
9. Horizontal adjustment
10. Insulating ring
11. Torch holder
12. Torch

3.2.4 Wirefeeder Motor Assembly (optional)



1. Pressure roll
2. Wire guide set screw
3. Wire guide inlet
4. Settin retarder
5. Wire reel
6. Connector wire cable
7. Pressure adjust screw

3.2.5 Remote Control



1. LED, red „process runs“
2. Button „START/STOP“
3. Button „MOTOR“
4. Button „WIRE FORWARD“
5. Button „WIRE BACKWARD“

3.3 Accessories

Not included as standard.



WARNING

Danger presented by using poor-quality accessories and tools not approved by Orbitalum Tools!

Diverse physical injuries and material damage.

► Use only original tools, spare parts, materials, and accessories from Orbitalum Tools.

3.3.1 Cold wire feed KD 4 for ORBIWELD TP 250

Cannot be used for ORBIWELD TP 400/600/1000.

Consisting of:

- Axis drive motor.
- Adjustable wire feed tips.
- Wire reel retainer for D 100 mm (3.937 inch) standard reels.
- External cold wire box.



Article	Code	kg
Cold wire feed KD 4 for ORBIWELD TP 250	811 050 001	2,000

3.3.2 Cold wire feed KD 3-62 for ORBIWELD TP 400

Can be assembled directly on the welding head, also making pulse synchronous wire feed possible.

Consisting of:

- Axis drive motor.
- Adjustable wire feed tip.
- Wire reel retainer with D 62 mm special wire reel (empty reel).

Article	Code	kg
Cold wire feed KD 3-62 for ORBIWELD TP 400 including empty reel	812 050 001	5,500
Additional empty reel for KD 3-62	812 018 019	0,038

3.3.3 Cold wire feed KD 3-100 for ORBIWELD TP 600

Can be assembled directly on the welding head, also making pulse synchronous wire feed possible.

Consisting of:

- Axis drive motor.
- Adjustable wire feed tip.
- Wire reel retainer for D 100 standard wire reels



Article	Code	kg
Cold wire feed KD 3-100 for ORBIWELD TP 600	813 050 001	0,680

3.3.4 Cold wire feed KD 3-100 for ORBIWELD TP 1000

Can be assembled directly on the welding head, also making pulse synchronous wire feed possible.

Consisting of:

- Axis drive motor.
- Adjustable wire feed tip.
- Wire reel retainer for D 100 standard wire reels.

Article	Code	kg
Cold wire feed KD 3-100 for ORBIWELD TP 1000	814 050 008	0,720

3.3.5 Expansion clamping shell set for ORBIWELD TP 250

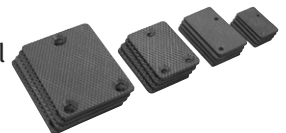
To extend the clamping area up to a minimum diameter of Ø 12 mm (0.472 inch).



Article	Version	Tube OD [mm]	Tube OD [inch]	Code	kg
Expansion clamping shell set for ORBIWELD TP 250	Stainless steel	12,00 - 45,00	0.472 - 1.772	811 050 002	0,096
Expansion clamping shell set for ORBIWELD TP 250	Hardened steel	12,00 - 45,00	0.472 - 1.772	811 050 009	0,023

3.3.6 Additional stainless steel clamping sheet set for ORBIWELD TP

The TP series are made from hardened tool steel as standard. For applications in stainless steel we recommend the following additional clamping shell sets made from stainless steel.



Article	Code	kg
Additional clamping shell set for ORBIWELD TP 250	811 050 006	0,069
Additional clamping shell set for ORBIWELD TP 400	812 050 002	0,100
Additional clamping shell set for ORBIWELD TP 600	813 050 002	0,150
Additional clamping shell set for ORBIWELD TP 1000	814 050 001	0,071

3.3.7 Control cable

Suitable for all ORBIWELD TP and MH heads.



Article	Length [mm]	Length [ft]	Code	kg
Control cable TP/MH	7,5	24.6	855 030 110	1,202

3.3.8 Earth cable



Article	Length [mm]	Length [ft]	Code	kg
Earth cable for power supplies with 165 ampere	5,0	16.4	811 050 004	2,351
Earth cable for power supplies with 300 ampere	5,0	16.4	811 050 005	2,400
Earth cable for 300 AVC/OSC power supplies	5,0	16.4	812 050 006	2,850

4. FEATURES AND SCOPE OF APPLICATION

4.1 ORBIWELD TP 250 - 1000

The ORBIWELD TP series has a unique design and functionality. An extremely compact design has been achieved thanks to the drive motor that is fully integrated into the housing. The completely new drive concept has made the well-known large and costly drives associated with conventional welding heads unnecessary.

Features:

- Can be used with and without cold wire attachment, as the cold wire feed nozzle can be adjusted exactly in both a vertical and horizontal direction via an adjustment unit.
- Open arc system.
- The arc length is kept at a constant gap mechanically.
- Infinitely variable clamping mechanism.
- The water-cooled TIG Torch head can be swiveled in any direction and allows fillet welds or short hollowed out tubes to be welded. In the models TP 400, 600, and 1000 the TIG Torch head is secured to a slide unit that allows the position of the electrodes to be finely adjusted with great accuracy even during welding.
- With a simple to operate control knob, it is possible to adjust the clamping area across the welding head's entire nominal range.
- The ORBIWELD TP welding heads with clamping shells made from tool steel ensures optimum retention to the tube's surface (very good grip properties). Alternatively, stainless steel clamping shells can be supplied on special request at no additional cost. The additional prices given under the individual welding head positions are only incurred if these clamping shells are also ordered.
- The welding heads are easily centered to the tube and are clamped in place with the help of a tension lever. No additional remote control is required thanks to the keys integrated directly into the welding head housing.

4.2 ORBIWELD TP 400 - 1000 AVC/OSC

Can be used for thick wall tubes (multiple layer welds). As ORBIWELD TP (see p. 35). The welding heads of the ORBIWELD TP AVC/OSC series are also provided with a motorized travel option for the TIG Torch across the nominal diameter, so that no additional mechanical basic presetting is required for any change in the tube diameter.

Additional properties of the tube-to-tube welding heads ORBIWELD TP AVC/OSC with oscillation OSC and arc voltage control AVC:

- The oscillation width is 20 mm (0.787 inch).
- Cold feed wire feed unit with mount for D 100 wire reels fitted directly on the welding head.
- With a simple to operate control knob, it is possible to adjust the clamping area across the welding head's entire nominal range.

5. TECHNICAL DATA

5.1 Technical Data

	TP 250	TP 400	TP 600	TP 1000
Welding current, max.	200 A	200 A	200 A	200 A
Ignition, max.	9 kV	9 kV	9 kV	9 kV
Workpiece diameter range	8 - 28 / 28 - 76,2 mm	30 - 115 mm	70 - 170 mm	120 - 275 mm
Voltage, max. [VDC]	24 VDC	24 VDC	24 VDC	24 VDC
Current, max. [A]	1,0 A	1,0 A	1,0 A	1,0 A
Control mode	Speed control by means of tachogenerator			
Tacho voltage, max.	10 VDC	10 VDC	10 VDC	10 VDC
Rotor-speed, max.	6,1 U/min.	3,7 U/min.	0,8 U/min.	0,4 U/min.
Cold wire feed (optional)				
Voltage, max. [VDC]	24 VDC	24 VDC	24 VDC	24 VDC
Current, max. [A]	0,4 A	0,4 A	0,4 A	0,4 A
Control mode	Speed control by means of tachogenerator			
Wire feed	pulsable according to the program settings, Feed is synchronous to the high current phase			
Wire diameter [mm]	0,8 mm	0,8 mm	0,8 mm	0,8 mm
Coolant	water with Glycol as anti freeze Custom Glycol with corrosion protection can lead to ignitionproblems!			
Glycol part. max. [%]	50	50	50	50
Glycol part. min. [%]	25	25	25	25
Content of coolant [l]	0,9	0,9	0,9	0,9
Circulation	to be provided externally			
Control	automatically			
Pressure, max. [bar]	3,5	3,5	3,5	3,5

5.2 Storage of the System

If the system should not be needed for a longer time, the removal from the place of work is to be recommended.

Before storage (place in a stockroom), we recommend the following procedure:

- Clean the welding head
- Remove all cooling agent.



WARNING

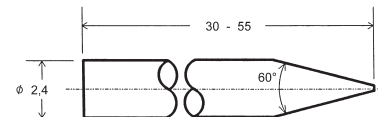
Danger of hose burst! Never use pressure of more than 3,5 bar on the coolant hoses!

Therefore, blow out all the cooling agent inside the system by means of compressed air into a container.

5.3 Electrodes

As electrode-base-material, tungsten is used. To optimize the time of use, we recommend an electrodematerial with 4 % Thorium-content. We remind, that special applications may require different electrodematerials.

	TP 250	TP 400	TP 600	TP 1000
Arc length (distance) min.	1,0 mm	1,0 mm	1,0 mm	1,0 mm
Arc length (distance) max.	3,0 mm	3,0 mm	3,0 mm	3,0 mm
Electrode length, max.	18 mm	55 mm	55 mm	55 mm
Electrode length, min.	32 mm	30 mm	30 mm	30 mm
Electrode diameter (standard)	2,4 mm	2,4 mm	2,4 mm	2,4 mm
Arc voltage (2,4 mm) max.	200 A	200 A	200 A	200 A
Arc voltage (2,4 mm) min.	50 A	50 A	50 A	50 A
Arc voltage (1,6 mm) max.	120 A	120 A	120 A	120 A
Arc voltage (1,6 mm) min.	30 A	30 A	30 A	30 A
Tip-angle	30°	30°	30°	30°



we recommend You break the tip after grinding (see scetch)

How to make the tip	exclusively by grinding;
Direction of grinding	exclusively longitudinal;
Recommended tool	ORBITALUM TOOLS Tungsten Grinder ESG plus
At frequent welding current below 100 A, the use of electrode-diameter of 1,6 mm is recommended.	

5.4 Generated Noise Level

The noise level, generated by this system is below 70 dB (A) with operating coolant circulation.

6. OPERATIONAL ELEMENTS AND FUNCTIONS

Afterwards, the elements of operation are explained.

6.1 Operational Elements

6.1.1 LED-Indicator

The LED is “on” during flow of weld gas and coolant. If the preset minimum values are not achieved within 8 seconds, the indicator goes off again and an error report should be monitored on the power supply.

Indicator “on” means the manual switch on of welding gas, but also, that a welding procedure is being performed.

6.1.2 <START/STOP>

If the power supply is on stand-by-mode, use of this function leads to execution of a preset welding program. In the case of welding with our ORBIMAT-system, this function leads to immediate interruption (stop) of the executed welding program. Welding with the ORBIMAT C- system, one push of this button leads to slope down of the welding current and regular termination of the welding procedure. Double push leads to immediate termination of the executed welding procedure.

6.1.3 MOTOR

If the power supply is in stand-by-mode, pushing this button leads to a turning of the welding head rotation plate. When the open and weld start position is reached, the drive stops automatically. During execution of a welding program, this button has no function.

6.1.4 Wire Forward

If the power supply is in stand-by-mode, pushing this button with start the wire feed motor in a forward direction which will advance the wire. During execution of a welding program, this button has no function.

6.1.5 Wire Backward

If the power supply is in stand-by-mode, pushing this button with start the wire feed motor in a reverse direction which will retract the wire. During execution of a welding program, this button has no function.

6.1.6 Clutch

The clutch allows the rotation arm to be freely rotated. Lift the clutch lever and then move the rotation ring by hand. When the rotation ring is in the desired position reengage the clutch by lowering the clutch lever and ensure the gears have reengaged by trying to move the rotation ring.

6.1.7 Fixing the Weld Head



WARNING

Danger of dropping!

Before opening the clamp latches, hold the weld head with one hand to avoid dropping.

The weld head body incorporates the drive for turning the welding head.

Also, the control elements are located there.

Holding the welding head by means of a vice makes working on the head easier.

To avoid damage, this may only be done carefully at the lower part of the welding head body.

A prerequisite for positioning and removal of the weld head is the home position of the rotor.

Open the welding head by release of the clamp latch and opening both top clamps.

After opening the topclamps, the welding head can be removed from the workpiece.

6.1.8 Adjustment of the Clamp Arms

The weld head is attached to the pipe being welded with an adjustable clamp which should be adjusted to suit the pipe size being welded.

To adjust the clamp, use the handle to place the weld head over the pipe to be welded and use the clamping lever to ensure the clamp arms are in the closed position. Then use the Adjustment Knob to close the clamp arms onto the pipe to be welded, continue until the Adjustment Knob is tight, then release the Clamping Lever and tighten the Adjustment Knob a little further and re-engage the clamp arms with the Clamping Lever.

Repeat these steps until the weld head is held securely on the pipe to be welded. The clamps should be tight enough to stop the head rotating freely on the pipe, but should be so tight that the operator cannot move the head by hand.

6.1.9 Clamp Jaws

The clamp jaws are used to connect the weld head to the work piece. For smaller diameter tubes the clamp jaws can be replaced by an application specific collet set.

To fit a collet set the clamp jaws must be removed by removing the two fixing screws.

6.1.10 Electrical Ground-Connection

The supply of welding power is made via a separate ground cable which should always be connected to the work piece before the welding cycle commences. The ground cable should not be connected to the work piece close to the clamp jaw of welding torch, because of the danger of a short circuit.

6.1.11 Electrode-Collet

The tungsten electrode is held in the welding torch with a standard welding torch collet. The electrode is secured by applying a slight pressure to the collet with the back cap. The electrode should be inserted into the collet and then the back cap gradually tightened until the tungsten electrode is held securely.

6.1.12 Electrode-Length

The electrode should be trimmed to allow it to fit into the torch body.

The electrode should be long enough to enable it to be secured by the collet.

For correct electrode-preparation please see 5.3.

6.1.13 Adjustment of Arc-length

The useful length of the arc may be determined depending on parameters like tube wall thickness, tube and electrode diameter. As a first guess, you can start with a gap equivalent to the wall thickness of the welded tube. Improve the adjustment according to the results.

Before welding can start the arc gap will need to be set. The Arc Gap can be set using the Arc Adjust Knob and should be rotated until the desired arc gap is achieved.

6.1.14 Electrode Change

When the tungsten electrode requires re-grinding or changing the electrode can be removed by loosening the back cap and then pulling the tungsten electrode from the bottom of the welding torch. When the electrode has to be replaced it should be inserted into the collet and then the back cap gradually tightened until the tungsten electrode is held securely.

7. INITIAL OPERATION AND OPERATION SEQUENCE

7.1 Checking the parts of delivery

- Check delivery for completeness and damage caused by transport.
- Report any missing parts or damage caused by transport to your supplier immediately.

7.2 Included with the machine (subject to change without notice)

- 1 ORBIWELD TP Welding Head
- 1 Carrying case (TP 250: Code 811 030 030; TP 400: Code 812 030 030; TP 1000: Code 814 030 030)
- 1 Control Handle (TP 400 - 1000 821.007.012, bei TP 1000 2 pieces; TP 250 811.050.014)
- 1 Tool set (TP 400 - 1000 811.050.030, for TP 250 811.050.023)
- 1 Manual instruction, 1 Spare parts list

7.3 Operation Sequence

7.3.1 Preparations

For operation of the system, please always read the power supply operation manual.

7.3.2 Attaching The Weld Head



WARNING

Regard the safety requirements according to the selected weld gas!



WARNING

Danger of overpressure!

Make sure, that no pressure rise can occur inside the tube by means of backup gas!

Prerequisites/ Status	Action	Function
Is the weld preparation according to the burdens?	Refinish, if necessary;	
Is a welding procedure preset or selected?	Regard the power supply manual.	
Is the rotation plate in it's home position?	Move it!	
	position the welding head at the workpiece.	
	make sure, that the electrode is positioned exactly at the welding joint.	
Is the arc length adjusted correctly?	Adjust the electrode according to 5.3;	
the welding head should now be fixed in a way, so that it just can't slip away anymore		
Is the backup gas ready?	Regard the operation manual for the backup gas system For backup gas control we recommend the use of the Orbitalum oxygen analyzer ORB 1001.	

7.3.3 Setting up the System for Operation



WARNING

Please always use Your specifically assigned protection equipment!



WARNING

Danger of electric shock!

Do not touch workpiece and/or welding head while ignition!

Prerequisites/ Status	Action	Function
Preparations completed?	Start of a welding program can also be initiated on the power supply. Please regard the respective manual.	"START/STOP"

7.3.4 Welding



WARNING

Avoid breathing the welding vapours!



WARNING

Please always use Your specifically assigned protection equipment!

Prerequisites/ Status	Action	Function
	Watch the welding during operation;	
	Please regard the operation manual for the power supply;	

7.3.5 Interrupt Welding



WARNING

Burning hazard at the workpiece and in the welding zone of the welding head!

Prerequisites/ Status	Action	Function
If something is wrong.	stop welding.	"START/STOP"
Welding can also be stopped from the power supply.	Please regard the operation manual for the power supply.	

7.3.6 Remove Weld Head



WARNING

Burning hazard at the workpiece and in the welding zone of the welding head!

Prerequisites/ Status	Action	Function
After termination of the welding program, the rotation arm is not in the „home“ position.	Move the rotation arm into “HOME”	
Has the gas post purge time elapsed?	Hold the welding head handle with one hand; with the other hand open both clamp arms and remove the welding head from the tube.	

8. SERVICE AND MAINTENANCE

General	With this welding head-family you can never use lubricants! Discovery, that lubricants have been used, leads to loss of warranty! Based on the layout of these welding heads, the gear is open to the head-side. To this reason, particles can fall into the gear and cause blockage. Damage, caused by particles in the gear, are also excluded from warranty!
After each 10th weld seam:	Change or regrind the electrode.
daily	Check the condition of the rotating surfaces, clean by red „Scotchbrite“, if necessary.
weekly	check the plunger-pin and torch adjuster. Check all bolts for tight seating.

9. TROUBLESHOOTING

Observation/ Report	Possible Reason	Actions
Welding head is not in fixed position on the tube after tightning.	Clamp adjustment is not tight enough	Adjust clamp arms use adapted collets
Arc does not ignite.	Ground Cable is not connected.	clean surfaces and/ or remove insulating layers.
	no welding gas.	check on gas supply.
	electrode gap too high.	adjust.
	electrode tip is worn.	regrind electrode.
	cable broken.	exchange.
	conductivity of coolant is too high.	clean.
		only use Orbitalum antifreeze! Exchange the nonfunctional coolant!
Arc is pulled aside.	electrode-tip is worn.	Regrind electrode.
	electrode is ground incorrectly.	
	bad electrode quality.	use Orbitalum-electrodes.
Arc ignites against parts of weldhead: (can lead to heavy damage at the welding head)	electrode not OK.	exchange.
	electrode gap too high.	adjust.
	weld chamber dirty.	clean.
	pre-purge-time too short.	increase
	no electrode	assemble electrode.
Rotation Ring does not start.	particles inside gear.	Remove and clean.
	electrical connection defective.	check plug.
		check cable.
		check power supply.
Welding head cannot be removed from tube.	opening position not achieved.	Move Rotation Ring to "Home Position".

11. EG DECLARATION OF CONFORMITY



EG Declaration of Conformity
Declaration of conformity
Dichiarazione di conformità
Déclaration de conformité
Declaración de conformidad

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As in appendix II A of the EC Machinery Directive 2006/42/EC and the EMC Directive 2014/30/EU.

Die Bauart der Maschine:
The following product:
Il seguente prodotto:
Le produit suivant:
El producto siguiente:

TP 250 Orbital Weld Head incl. Orbital Power Source
TP 400 Orbital Weld Head incl. Orbital Power Source
TP 600 Orbital Weld Head incl. Orbital Power Source
TP 1000 Orbital Weld Head incl. Orbital Power Source

Seriennummer:
Series number:
Numero di serie:
Nombre de série:
Número de serie:

Baujahr / Year / Anno / Année / Año:

ist entwickelt, konstruiert und gefertigt in Übereinstimmung mit folgenden EG-Richtlinien:
was designed, constructed and manufactured in accordance with the following EC guidelines:
è stata progettato costruito e commercializzato in osservanza delle seguenti Direttive:
a été dessiné, produit et commercialisé selon les Directives suivantes:
ha sido proyectado construido y comercializado bajo observación de las siguientes Directivas:

EG-Maschinen-Richtlinie 2006/42/EG (MaschR)
EMV-Richtlinie 2014/30/EU

Folgende harmonisierte Normen sind angewandt:
The following harmonized norms have been applied:
Le seguenti norme armonizzate ove applicabili:
Les normes suivantes harmonisées où applicables:
Las siguientes normas armonizadas han sido aplicadas:

DIN EN ISO 12100:2011-03
DIN EN ISO 13849-2:2013-02
DINE EN 60204-1:2007-06
DIN EN 60974-1:2014-09
DIN EN 60974-2:2013-11
DIN EN 50445:2009-02

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Singen, 22.02.2017

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CUTTING & WELDING



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