orbitalum
orbital | cutting + welding

precision.
power.
simplicity.

Operating instructions
for responsible bodies and persons using the machine

Enclosed Orbital Welding Heads
ORBIWELD

OW 65, OW 115, OW 170
OW 38S, OW 76S, OW 115S
OW 12, OW 19

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.

TABLE OF CONTENTS

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

2. INFORMATION AND SAFET Y 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, p. 4 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. DThe 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

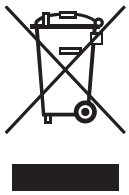
- The workplace can be in pipe preparation, in plant construction or in the plant itself.
- A radial space requirement/freedom of movement of approx. 2 m around the machine is required for people.
- Work lighting: min. 300 lux.
- Maintenance as described in chapter 8.1
- Operated by one person.

- User qualification: operator inmates with specialized training in welding technology.
- 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



(nach RL 2002/96/EG)

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.

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 leastS1).

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.

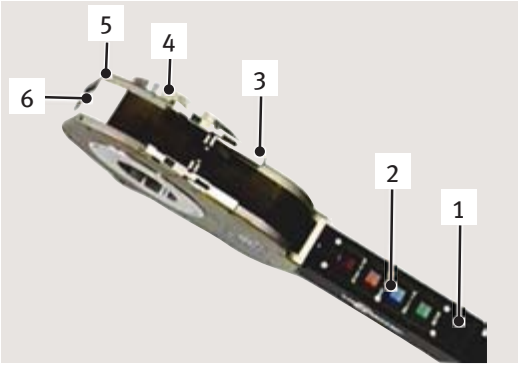
DANGER

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

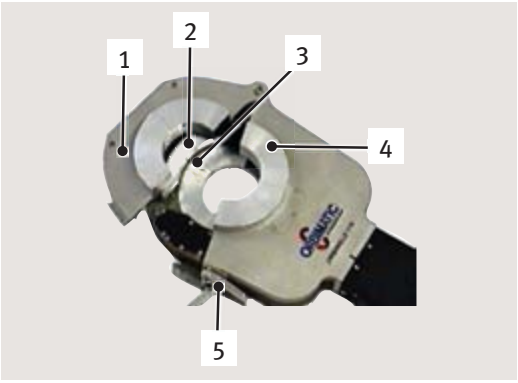
3.1 ORBIWELD 65 - 170

3.1.1 Front view



1. Handle
2. Function keys
3. Clamp latches
4. Collets
5. Latch
6. Viewing window

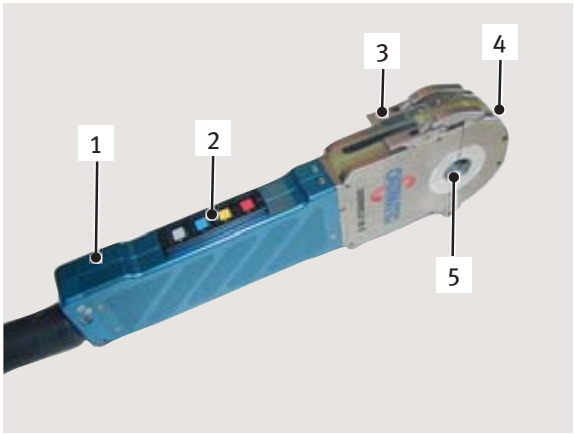
3.1.2 Welding head view



1. Clamp
2. Rotor
3. Electrode
4. Collets
5. Clamp latches

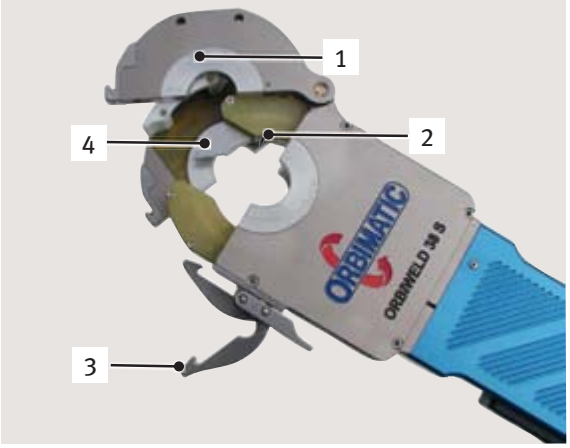
3.2 ORBIWELD 38S, 76S

3.2.1 Front view



1. Handle
2. Operation keys
3. Clamp latches
4. Collets
5. Viewing window

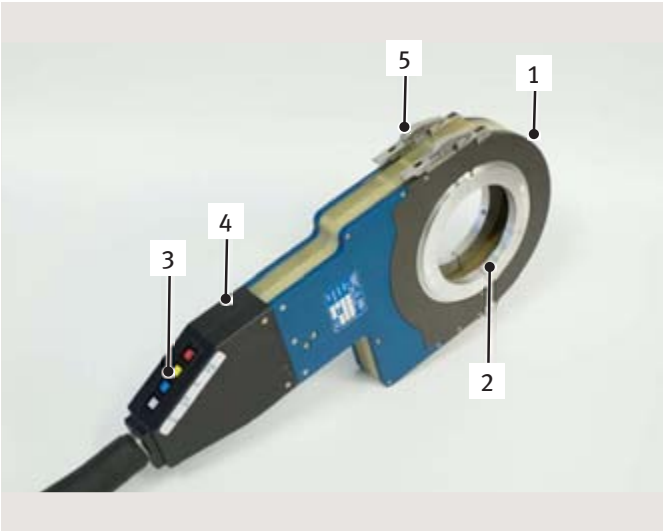
3.2.2 Welding head view



1. Collets
2. Electrode
3. Clamp latches
4. Rotor

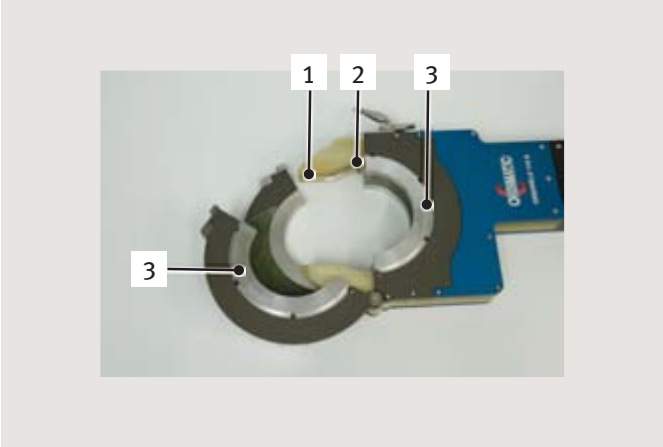
3.3 ORBIWELD 115S, 170S

3.3.1 Front view



1. Viewing window
2. Collets
3. Operation keys
4. Handle
5. Latch

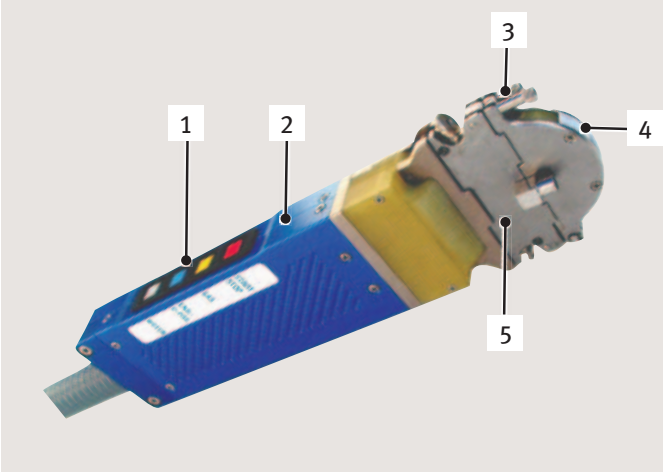
3.3.2 Welding head view



1. Rotor
2. Electrode
3. Collets

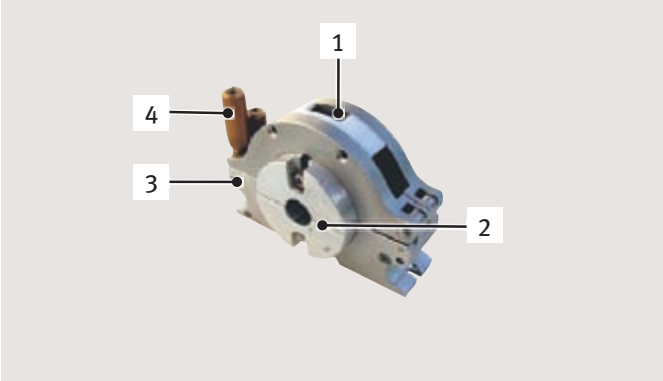
3.4 ORBIWELD 12, 19

3.4.1 OW 12 - front view



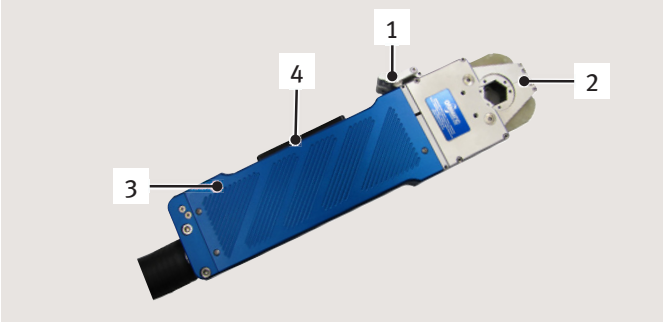
1. Operation keys
2. Handle
3. Knurled nut
4. Viewing window
5. Clamping cartridge

3.4.2 OW 12 - clamping cartridge



1. Viewing window
2. Clamping shells
3. Wide clamping cartrige
4. Rändelschraube

3.4.3 OW 19 - front view



1. Clamp latches
2. Latch
3. Handle
4. Operations keys

3.5 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.

3.5.1 Exchangeable clamping cartridges for OW 12

Clamping cartridges with a total width of only 12.7 mm (0.5 inch) can be supplied (version A, see below) for welding microfittings and other applications with very limited chuck lengths.
For version A a separate clamping cartridge is required for every tube diameter (please specify the required tube diameter). A set of clamping shells is also required for each tube diameter when using the wider version B.

Article	Code	kg
Exchangeable clamping cartridge for OW 12, version A	821 050 001	58,200
Exchangeable clamping cartridge for OW 12, version B	821 050 002	0,095

3.5.2 Clamping shells for OW 12 (clamping cartridge, version B)

An additional set of clamping shells is required for each tube diameter. Can only be used in conjunction with the clamping cartridge for OW 12, version B, code no. 821 050 002.
Please specify the required tube diameter when placing the order.

Article	Code	kg
Clamping shells for OW 12 (clamping cartridge, version B)	821 050 003	0,040

3.5.3 Clamping shell for OW 19

An additional clamping shell is required for each tube diameter.
Please specify the required tube diameter when placing the order.

Article	Version	Code	kg
Clamping shell for OW 19	standard	822 050 012	40,000
Clamping shell for OW 19	slim	889 000 002	40,000

3.5.4 Clamping shells for OW 38S, OW 76S, OW 115S, OW 170S

A clamping shell is required for each tube diameter, consisting of 4 narrow shells.
Please specify the required tube diameter when placing the order.

Article	Code	kg
Clamping shell for OW 38S, complete	826 050 008	0,096
Clamping shell for OW 76S, complete	827 050 001	0,442
Clamping shell for OW 115S, complete	828.050.014	-
Clamping shell for OW 170S, complete	on request	-

3.5.5 Special clamping shells for orbital welding heads

T-Piece clamping shells
Clamping shell with capability of taking the hollowed tube and the tube to be welded.
A complete set is required for each task and dimension.

Inner centering with simultaneous forming system consisting of:

- Mandrel
- Milled nut
- Welded part retainer
- Hollowed tube piece retainer

Article	Tube OD max. [mm]	Tube OD max. [inch]	Code	kg
T-piece clamping shells for OW 76S	48,30	1.902	827 050 005	0,800
Inner centering for OW 76S	48,30	1.902	827 050 006	1,200

3.5.6 Plastic case for clamping shells

With separate compartments to take up to 10 sets of standard shells.

Article	Code	kg
Plastic case for clamping shells for OW 38S	826 020 001	0,350
Plastic case for clamping shells for OW 65 and OW 76S	827 020 006	1,388
Plastic case for OW 115 and 115S	824 020 002	1,443

3.5.7 Cavity shell for moldings (2 shells)

Clamping shell for welding shaped pieces (e.g. flange, flanged wheels and screw fittings in the food industry).

Article	Code	kg
Cavity shell for moldings OW 38S	826 050 010	0,146
Cavity shell for moldings for OW 76S	827 050 007	0,266
Cavity shell for moldings for OW 115S	824 050 003	0,660
Cavity shell for moldings for OW 170S	825 050 002	0,852

3.5.8 Special clamping shell

Special clamping shell, slotted made high alloy steel. Consisting of 4 shells.
Please specify the required tube diameter when placing the order.

Article	Code	kg
Special clamping shell for OW 38S	826 050 029	0,221
Special clamping shell for OW 76S	827 050 024	0,610

3.5.9 Shells for arc welding

For welding standard elbows without straight side attachment (elbow-to-elbow welding without straight side is not possible). When using this shell on a welding head side (left or right) only the gas protection around the elbow is guaranteed. There is no clamping so that the elbow has to be tacked in place before welding.

Shell consisting of:
- 2 basic retainers independent of the tube diameter.
- 2 covers independent of the tube diameter – Please submit a drawing of the elbow or a sample part when placing the order.

Retainer/Cover
The covers are placed into the retainer and can be turned so that the side of the elbow can exit at any angle from the welding held. The tube to be welded on the other side of the welding held must be straight and be clamped with shells from the particular standard clamping shell (standard shells not included).

Clamping shell for OW 38S
With the welding head OW 38S the covers are made to customer specification (2 halves) without retainers are placed directly into the head. A retainer is therefore not required. Please specify the required tube diameter when placing the order.

Article	**Code**	**kg**
Elbow shell for OW 38S complete*	826 050 031	0,018
Retainer for elbow shell for OW 76S	827 002 018	0,089
Cover for elbow shell for OW 76S*	827 050 021	0,029
Retainer for elbow shell for OW 115S	824 050 006	0,149
Cover for elbow shell for OW 115S*	828 050 016	0,035
Retainer for elbow shell for OW 170S	825 050 005	0,260
Cover for elbow shell for OW 170S*	825 050 020	0,043

** Please submit a drawing of the elbow or a sample part when placing the order.*

3.5.10 Electrode adapters

Robust brass adapter for transverse alignment of the tungsten electrode.
With the set or can be ordered individually. For Electrode adapter for OW 115S see page 30. OW 170S on request. Please note that the maximum tube diameter that can be welded is reduced by using an electrode adapter.

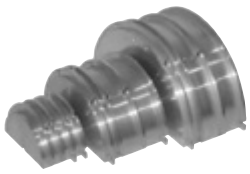
Sets consisting of:
- Basic part for extension arms.
- For each extension arm 15°, 30°, and 45°.

Complete sets:	**Code**	**kg**
Electrode adapter for OW 38S, complete set	826 050 034	0,015
Electrode adapter for OW 76S, complete set	827 050 027	0,015
Individual parts to OW 38S:	**Code**	**kg**
Base part to electrode adapter OW 38S	826 004 003	0,024
10 mm 15° extension arm for electrode adapter OW 38S	823 004 008	0,003
10 mm 30°extension arm for electrode adapter OW 38S	823 004 009	0,003
10 mm 45° extension arm for electrode adapter OW 38S	823 004 010	0,003

Individual parts to OW 76S:	Code	kg
Base part to electrode adapter OW 76S	827 004 003	0,024
15mm 15/90° extension arm for electrode adapter OW 76S	823 004 002	0,003
15mm 30°/90° extension arm for electrode adapter OW 76S	823 004 003	0,003
15 mm 45°/90° extension arm for electrode adapter OW 76S	823 004 004	0,003

3.5.11 Clamping shells for OW 65, OW 115, OW 170

A clamping shell is required for each tube diameter, consisting of 2 wide and 2 narrow shells. Please specify the required tube diameter when placing the order.



Article	Code	kg
Clamping shell for OW 65	823 050 009	0,536
Clamping shell for OW 115	824 050 001	1,814
Clamping shell for OW 170	825 050 001	3,759

3.5.12 Special clamping shells for orbital welding heads

T-Piece clamping shells
Clamping shell with the ability to take the hollowed tube and the tube to be welded.
A complete set is required for each task and dimension.

Inner centering with simultaneous forming system consisting of:
- Mandrel
- Milled nut
- Welded part retainer
- Hollowed tube piece retainer

Article	Tube OD max. [mm]	Tube OD max. [inch]	Code	kg
T-piece clamping shells for OW 115	85,00	3.346	826 050 010	0,146
Inner centering for OW 115	85,00	3.346	827 050 007	0,266
T-piece clamping shells for OW 170	154,00	6.063	824 050 003	0,660
Inner centering for OW 170	154,00	6.063	825 050 002	0,852

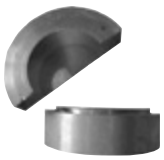
3.5.13 Plastic case for clamping shells

With separate compartments to take up to 5 sets of standard shells.
Without clamping shells.

Article	Code	kg
Plastic case for clamping shells for OW 65 and OW 76S	827 020 006	1,388
Plastic case for clamping shells for OW 115	824 020 002	1,443

3.5.14 Cavity shells for moldings (2 shells)

Clamping shell for welding shaped pieces (e.g. flange, flanged wheels and food industry screw fittings).



Article	Code	kg
Cavity shell for moldings OW 65	823 050 010	0,612
Cavity shell for moldings OW 115	824 050 003	0,660
Cavity shell for moldings OW 170	825 050 002	0,852

3.5.15 Extension cable assembly

Extension cable assembly suitable for all Orbitalum orbital welding heads, beside the AVC/OSC versions of the ORBIWELD TP heads.
Further lenghts on request.

Article	Length (meter)	Code	kg
Extension cable assembly 5M	5	826 050 010	0,146
Extension cable assembly 10M	10	827 050 007	0,266
Extension cable assembly 15M	15	824 050 003	0,660

3.5.16 Shells for arc welding

For welding standard elbows without straight side attachment (elbow-to-elbow welding without straight side is not possible). When using this shell on 1 welding head side (left or right) only gas protection around the elbow is guaranteed. The work piece is not clamped, so that the elbow has to be stapled.

Shell consisting of:
- 2 retainers halves independent of the tube diameter.
- 2 cover halves independent of the tube diameter – Please submit a drawing of the elbow or a sample part when placing the order.

Retainer/Cover
The covers are placed into the retainer and can be turned so that the side of the elbow can exit from the welding head at any angle. The tube to be welded on the other side of the welding head must be straight and be clamped with shells from the particular standard clamping shell (shells not included as standard).

Article	Code	kg
Retainer for elbow shell for OW 65	823 050 029	0,089
Cover for elbow shell for OW 65*	823 050 030	0,028
Retainer for elbow shell for OW 115	824 050 006	0,149
Cover for elbow shell for OW 115*	824 050 020	0,035
Retainer for elbow shell for OW 170	825 050 005	0,260
Cover for elbow shell for OW 170*	825 050 020	0,043

** Please submit a drawing of the elbow or a sample part when placing the order.*

3.5.17 Electrode adapters

Robust brass adapter for transverse alignment of the tungsten electrode.
In the set or can be ordered individually. Please note that the maximum tube diameter that can be welded is reduced by using an electrode adapter.

Sets consisting of:
- Basic part for extension arms.
- For each extension arm 15°/90° and 45°/90°.

Complete sets:	**Code**	**kg**
Electrode adapter for OW 65, complete set	823 050 028	0,045
Electrode adapter for OW 115/115S, complete set	824 050 021	0,064
Electrode adapter for OW 170, complete set	825 050 022	0,094
Individual parts for OW 65:	**Code**	**kg**
Base part to electrode adapter OW 65	823 004 011	0,018
15 mm 15°/90° extension arm for electrode adapter OW 65	823 004 002	0,003
15 mm 30°/90° extension arm for electrode adapter OW 65	823 004 003	0,003
15 mm 45°/90° extension arm for electrode adapter OW 65	823 004 004	0,003
Individual parts for OW 115/115S:	**Code**	**kg**
Base part to electrode adapter OW 115/115S	824 004 004	0,037
25 mm 15°/90° extension arm for electrode adapter OW 115/115S	823 004 006	0,009
25 mm 30°/90° extension arm for electrode adapter OW 115/115S	823 004 005	0,009
25 mm 45°/90° extension arm for electrode adapter OW 115/115S	823 004 007	0,009
Individual parts for OW 170:	**Code**	**kg**
Base part to electrode adapter OW 170	825 004 001	0,067
25 mm 15°/90° extension arm for electrode adapter OW 170	823 004 006	0,009
25 mm 30°/90° extension arm for electrode adapter OW 170	823 004 005	0,009
25 mm 45°/90° extension arm for electrode adapter OW 170	823 004 007	0,009

4. FEATURES AND SCOPE OF APPLICATION

4.1 ORBIWELD 12

The ideal solution for welds in the semiconductor industry and in all applications where space is very limited. Also particularly suitable for welding all common microfittings.

With its extremely compact design and different clamping cartridges, the ORBIWELD 12 microwelding head offers a uniquely versatile functionality and a high power-on time previously unknown for welding heads of this size thanks to the water coolant system. With an Orbitalum series power supply you now have a highly accurate welding system that is yet simple to handle.

- Quick change system for clamping shells.
- Remote control built into the handle.
- Clamping shells for virtually all standard moldings and elbows.
- Extremely narrow clamping cartridges especially for welding microfittings (a clamping cartridge is required for each tube diameter when welding microfittings).
- Wide clamping cartridge with exchangeable clamping shells for standard applications.
- The removable clamping cartridge enables accurate alignment with the parts to be welded, even where there is very little space.

4.2 ORBIWELD 19

Enclosed orbital welding heads for tubes and microfittings.
Extremely narrow design and yet highly durable thanks to intensive water cooling system.

The small dimensions of the OW 19 welding head make it ideal for applications where space is very limited, as is often the case in the semiconductor, air and aerospace, pharmaceutical and ultra pure water supply sectors.

- The 3-part clamping mechanism ensures that the head can be clamped in the most confined spaces, as even when open no parts protrude beyond the contour of the head. Equally, an exact alignment, with no misalignment is guaranteed with the parts to be welded.
- Using the keypad built into the handle, it is possible to specify all the necessary commands to the power supply without an additional remote control.
- Using a special kit, it is also possible to weld microfittings with the OW 19.

4.3 ORBIWELD 38S, 76S, 115S, 170S

Enclosed orbital welding heads with extremely narrow design and therefore highly durable thanks to the intensive water cooling system. The small dimensions of the ORBIWELD S-welding head series make it ideal for applications where space is very limited, as is often the case in pharmaceutical and similar application sectors.

- Quick change system for clamping shells. The clamping shells are simply clipped in and out without any additional tools.
- Integrated water cooling.
- Thanks to the extremely narrow design of the ORBIWELD S series, parts with short straight welding lengths can also be processed.
- Durable clamping connections in conjunction with clamping shells available for all tube dimensions guarantee that the parts to be welded are clamped securely without misalignment.
- All the important commands for welding can be transmitted to the power supply via a control panel built into the robust and durable aluminum handle, so that no additional

remote control is required.

4.4 ORBIWELD 65, 115, 170

The ORBIWELD series is characterized by very high thermal load bearing capacity: It is therefore particularly suitable for applications in the chemical, pharmaceutical, and food industry, where ever greater demands are made on the closed welding heads by ever greater tube diameters and wall thicknesses.

Coolant channels running through the entire welding head body have provided for excellent heat dissipation that enable the ORBIWELD welding heads to work continuously even at high welding currents and intensive load. The closed design of the ORBIWELD series and the gas management system of the head ensure a permanent infiltration of the weld seam with during welding with insert gas, guaranteeing seams that are very low in welding colors.

- Quick change system for clamping shells. The clamping shells are simply clipped in and out without any additional tooling.
- Integrated water cooling, inside and outside.
- Stable clamp connections in conjunction with clamping shells available for all tube dimensions guarantee secure clamping and centering of the parts to be welded without misalignment.
- All the important commands for welding can be transmitted to the power supply via a control panel built into the robust and durable aluminum handle, so that no additional remote control is required.

5. TECHNICAL DATA

5.1 Technial Data

ORBIWELD	**OW**	**65**	**115**	**170**	**38S**	**76S**	**115S**	**170S**	**12**	**19**
Tube outer diameter, max.	[mm]	70	115	170	38	76,2	115	170	12,7	19,05
Tube outer diameter, min.	[mm]	6	20	50	3	6	15	30	3	3
Weight	[kg]	11,2	15,2	20,1	6,5	7,5	8,5	9,5	4,7	2,5
Electrode diameter	[mm]	1,6 or 2,4	1,6 or 2,4	1,6 or 2,4	1,6 or 2,4	1,6 or 2,4	1,6 or 2,4	1,6 or 2,4	1,0	1,0 or 1,6
Electrode adjustment length	[mm]	15	15	15	10	10	15	15	3	5
Welding-current, max.	[A]	100	150	150	100	100	150	150	40	75
Rotor turning drive power, max.	[W]	21	21	21	19	19	21	21	17	9
Rotor turning drive, nominal voltage	[VDC]	24	24	24	24	24	24	24	24	24
Rotor speed, max.	[1/min]	6	3,5	2,5	9	7	9	7	15	19
Rotor speed, min.	[1/min]	0,06	0,035	0,025	0,09	0,07	0,09	0,07	0,15	-
Control mode		Speed control by means of tachogenerator								
Gas flow max.	[l/min]	25	25	25	25	25	25	25	8	15
Gas flow min.	[l/min]	7	7	7	7	7	7	7	0,1	6
Ignition voltage, max.	[kV]	9	9	9	9	9	9	9	9	9
Ignition power, max.	[J]	1	1	1	1	1	1	1	1	1
Coolant		water with Glycol as anti freeze Custom Glycol with corrosion protection can lead to ignitionproblems!								
Glycol part	%	25 - 50	25 - 50	25 - 50	25 - 50	25 - 50	25 - 50	25 - 50	25 - 50	25 - 50
Circulation		to be provided externally								
Pressure, max.	bar	3,5	3,5	3,5	3,5	3,5	3,5	3,5	3,5	3,5
Content of coolant	l	0,4	0,5	0,6	0,25	0,3	0,25	0,3	0,15	0,45
Welding head housing temperature, max.	[°C]	50	50	50	50	50	50	50	50	50

In case of exceeding the permissible housing-temperature, operation-breaks have to be added for this welding head.

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.

ATTENTION

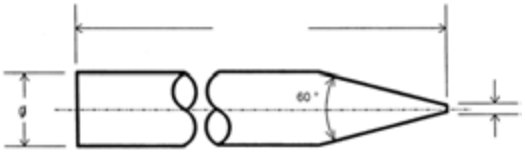
Danger of hose-burst! Never use pressure of more than 3,5 bar on the coolant hoses!

Therefore, blow out all the cooling agent inside the system by means of compressed air into a container.
Always store this system in it's delivery box. Make sure, that no corrosive conditions can occur during time of storage
In such cases, we recommendhumidity absorbing material for use inside the delivery box.

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.

	OW	**65 - 170**	**38S - 170S**	**12**	**19**
Arc length (distance) min.	[mm]	0,8	0,8	0,8	0,8
Arc length (distance) max.	[mm]	2	2	1,0	1,5
			For determination of the electrode-length, please see 6.7.2		
Tip-angle	[°]	60	60	60	60
Electrode adjusting range max.	[mm]	-	-	-	5,0



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

How to make the tip	exclusively by grinding;
Direction of grinding	exclusively longitudinal;
Recommended tool	Tungsten Grinder ESG Plus from Orbitalum Tools

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. Words in cursive letters mean, that this term is explained in a separate chapter.

6.1 Keys

6.1.1 LED-Indicator

he LED is “on“ during flow of welding 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›

OW 65, 115, 170	OW 38S, 76S, 115S, 170S, OW 12, 19	
		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 ‹GAS/TEST›

		Using this welding head with power supplies type ORBIMAT C, single push leads to switch on the supply of welding gas and coolant, the next push stops it again. Using this welding head with power supplies type ORBIMAT, this button causes supply of welding gas, so long as this button is being pushed. During execution of a welding program, this button has no function.
		

6.1.4 ‹END/ 0-POS›

		the power supply is in stand-by-mode, pushing this button leads to a turning of the welding head rotor into its home position. When the open and weld-start-position is reached, the drive stops automatically. Using this function while welding, this function leads to the controlled termination of the executed program (including slope-down).
		

6.1.5 ‹MOTOR›

		If the power supply is in stand-by-mode, pushing this button leads to turning the welding head rotor. During execution of a welding program, this button has no function.
		

6.2 Handle

The handle incorporates the drive for turning the welding head. Also, the control elements (according to 6.1) 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.

6.3 Rotor

The rotor is part of the welding head body and carries the electrode. As well, there are provisions to lead the welding gas into the welding chamber. This rotor is driven around the workpiece during the welding process with the preselected, controlled speed.

An opening within the rotor circle permits You to put the welding head into welding-position and to remove it afterwards. This open position can be accessed automatically with the ‹0-POS›-function. (Please see the power supply manual).

6.4 Top-Clamp-Side

Both „ top-clamps“ work as holders for the upper collets. The workpieces become fixed in working position by means of closing the top-clamps and tightening them. One of the top-clamps holds a sight glass for observation of the welding process.

After tightening even only one side, the weldhead should be held in position.

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

WARNING

Danger of dropping! Before opening the clamp latches, hold the weldhead with one hand to avoid dropping.

Open the welding head by release of the clamp latch and opening both top-clamps. After opening the top-clamps, the welding head can be removed from the workpiece.

6.4.1 Adjustment of the Clamp-Latches

If the attachment between workpiece and welding head is not tight enough, the tube may be out of tolerance. But there may also be some misadjustment or “wear“ on the clamp-latches, which is adjustable.

Therefore, please adjust the grub screw on the top-clamp side. This grub screw is located in the counterpart of the clamp latch.

6.5 Collets

By means of these collets, welding head and workpiece are attached together. Additionally, a centralisation takes place between welding head and both tube-ends, so that a tack-weld will not be necessary in most cases.

For each tube diameter, an own set (consisting of 2 upper- and 2 lower parts) is necessary.

Both upper parts additionally have 2 integrated spring plunger set screws. Owing to mechanical reasons, the upper parts shall only be mounted into the top-clamp-side.

Attachment takes place automatically by spring-snappers. For release, You push these spring-snappers aside by means of a tool or Your fingernails.

6.5.1 Spring Plungers

Inside the upper collets, spring plunger set screws are incorporated.
Their function is the compensation of tube tolerances in a range of 0,1 to 0,2 mm

Adjustment of these spring plunger set screws can be made even with mounted tube and top-clamp-side closed by simply using the screwdriver, being supplied.

Adjustment should be carried out in such a way, that the full spring distance becomes usable.

6.6 Electrical Ground Connection

The supply of welding power to the welding head is ensured by means of the cable package. Groundcontacting of the workpiece takes place automatically by means of the collets. So this need is always fulfilled with this welding head.

Please note, that dirt or non-conductive support items can cause trouble in operation by losing this contact.

6.7 Electrodes

WARNING

Toxic vapors and materials in the welding process and handling electrodes
Damage to health, such as cancer!

- ▶ 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
- ⃠ Do not use electrodes that contain thorium

6.7.1 Electrode Set Screw

By means of this grub screw an electrode is tighened after sliding it into one of the electrode holderholes. Access to this grub screw is made by a screwdriver from the side of the rotor.

Please note, that two different holder-holes are provided.

6.7.2 Electrode Length

The necessary length of the electrode can be figured out with the tube in place.
Please note, that this electrode never should reach into the sprocket area of the gear.
This would lead to a blockage of the head. Overlength has to be cut off.
For correct electrode preparation please see 5.3.

6.7.3 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 equialent to the wall thickness of the welded tube. Improve the adjusment according to the results.

Adjustment of the arc-length is done by means of adjustment the electrode position.

6.7.4 Electrode Change

Slide the electrode after preparing the length into the right electrode hole and tighten it by means of it’s tightning bolt at the rotor.

To remove an electrode, You disengage the grub screw and pull the electrode out of the rotor.

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 Orbital Welding Head
- 1 Carrying case (Code 821.030.001)
- 1 Tool set (for appropriate code no. please see spare parts list)
- 1 operating manual, 1 spare parts list

7.3 Preparations

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

7.4 Attaching the Welding Head

Prerequisites/Status	Action	Function
Is the welding preparation according to the burdens?	Refinish, if necessary;	
Is a welding procedure preset or selected?	Regard the power-supply manual.	
Is the rotor in it's home position?	Move it!	
	insert the collets ;	
	position the welding head at the workpiece;	
	make sure, that the electrode is positioned exactly at the welding-jointt;	
	close and tighten this top-clamp;	
Is the arc length adjusted correctly?	Adjust the electrode according to 6.7.3;	
the welding head should now be fixed in a way, so that it just can't slip away anymore	Bring the tube counterpiece into position and tighten this other top-clamp as well;	

WARNING

Regard the safety requirements according to the selected welding gas!

WARNING

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

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	

7.5 Setting-Up the System for Operation

WARNING

Regard the safety requirements according to the selected welding 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
Preparations completed?	Start of a welding program can also be initiated on the power-supply. Please regard the respective manual!	

7.6 Welding

WARNING

Danger to health! Avoid breathing the welding vapours!

WARNING

Please always use Your specifically assigned protection equipment!

Prerequisites/Status	Action	Function
	Watch the welding as far as possible;	
	Please regard the operation manual for the power supply!	

7.7 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;	
Welding can also be stopped from the power supply;	Please regard the operation manual for the power supply!	

7.8 Remove Welding 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 rotor is possibly not in the „home“- position:	drive the rotor into “HOME”-position;	
Has the gas post purge time elapsed?	Hold the welding head with one hand; with the other hand You open both clamplatches and remove the welding head from the tube;	

8. SERVICE AND MAINTENANCE

	With this welding head-family you can never use lubricants! Discovery, that lubricants have been used, leads to loss of warranty!
GENERAL	Based on the layout of these welding heads, the gear is open tu 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 of the rotor-contact-surface, clean by red „Scotchbrite“, if necessary.
weekly	check the spring-plunger-bolts inside the collets for correct position. (The springs should permit full penetration of the contact-balls) 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.	wrong tube tolerance.	use adapted collets.
	Clamp latches are wrongly adjusted.	adjust grub screw on top clamp side.
Arc does not ignite.	bad or no contact between collets and tube.	clean surfaces and/ or remove insulating layers.
	no welding gas.	check on gas supply.
	electrode gap too high.	adjust.
	Eelectrode tip is worn.	regrind electrode.
	bad contact between electrode and rotor.	clean.
	cable broken.	exchange.
	conductivity of coolant is too high.	only use Orbitalum antifreeze! exchange the nonfunctional coolant!
Arc is pulled aside.	electrode tip is worn.	Elektrode nach Vorgabe schleifen.
	electrode is ground incorrectly.	
	bad electrode quality.	use Orbitalum electrodes.
Arc ignites against parts of welding head. (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.
Rotor turn 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.	pening position not achieved.	‹0-POS›.

10. EU DECLARATION OF CONFORMITY

10.1 ORBIWELD 65 | 115 | 170 | 38S | 76S | 115S | 170S | 12 | 19

CE

EG-Konformitätserklärung
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 2004/108/EC.

Die Bauart der Maschine: The following product: Il seguente prodotto: Le produit suivant: El producto siguiente:	**OW 65** Orbital Welding Head incl. Power Supply **OW 115** Orbital Welding Head incl. Power Supply **OW 170** Orbital Welding Head incl. Power Supply **OW 38S** Orbital Welding Head incl. Power Supply **OW 76S** Orbital Welding Head incl. Power Supply **OW 115S** Orbital Welding Head incl. Power Supply **OW 170S** Orbital Welding Head incl. Power Supply **OW 12** Orbital Welding Head incl. Power Supply **OW 19** Orbital Welding Head incl. Power Supply
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 2004/108/EG
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:	**EN ISO 13849- 2 : 2008** **EN ISO 12100:2010** **EN 60974-1:2005** **EN 60974-2:2011** **EN 60204-1:2009** **EN 50445:2009**

Authorised to compile the technical file is Mr. Gerd Riegraf, Orbitalum Tools GmbH, D-78224 Singen.

Singen, 22.01.2010

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We value your opinion!

Please send us your comments and queries.

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orbital | cutting + welding

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