

Operating instructions

For responsible bodies and persons using the machine

Tube Squaring Machines

RPG 4.5

RPG 4.5 S

RPG 8.6



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

Machine no.:

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1. ABOUT THESE 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
 DANGER	Direct danger! Non-observance could result in death or critical injury. ⊙ Restrictions (if applicable). ► Measures to prevent danger.
 WARNING	Possible danger! Non-observance could result in serious injury. ⊙ Restrictions (if applicable). ► Measures to prevent danger.
 ATTENTION	Dangerous situation! ► Non-observance could result in minor injuries.
ATTENTION	Dangerous situation! ► Non-observance could result in material damage.

1.2 Further symbols and displays

Symbol	Meaning
IMPORTANT NOTE	Notes: Contain particularly important information for comprehension.
	Instruction: You must take notice of this symbol.
1.	Request for action in a sequence of actions: You have to do something here.
►	Single request for action: You have to do something here.
▷	Conditional request for action: You have to do something here if the specified condition is met.

1.3 Abbreviations

Abbr.	Meaning
RPG 4.5	Tube Squaring Machine for tubes with an outer diameter of up to 4.5 inches
RPG 4.5 S	Tube Squaring Machine for tubes with an outer diameter of up to 4.5 inches with vice
RPG 8.6	Tube Squaring Machine for tubes with an outer diameter of up to 8.6 inches
MFW	Multifunctional Tool
WH	Tool Holder
QTC®	Quick Tool Change

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 machine should be exclusively used for the squaring and beveling of materials and tube dimensions as specified in chap. 4.2, p. 14.
- The machines must only be operated using the voltage levels specified on the drive identification plate and in the "technical data" (see chap. 5, p. 15).
- Only the RPG17 motor (Code 790 038 190 to 790 038 192) should be used as the drive for the electrical variant.
- The drive motor may only be used in connection with the machine.
- The machine may only be used on tubes and containers that are empty, unpressurized, do not have explosive atmospheres and are not contaminated.



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
- processing only materials set out in the operating instructions.

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 responsible body shall be solely responsible for damages that arise through improper use and the manufacturer shall assume no liability whatsoever.
- No tools should be used that have not been authorized by the manufacturer for this machine.
- Tubes from non-metallic materials must not be machined.
- The removal of safety equipment is not permitted.
- Do not misuse the machine.
- The machine is not intended for use by private consumers.
- The technical values defined for normal operation must not be exceeded.
- Do not use the machine as a drive for applications other than those listed under proper use (chap. 2.2.1).



2.2.3 Machine constraints

- Keep your working area clean. Disorder or unlit working areas can lead to accidents.
- The workplace can be in pipe preparation, in plant construction or in the plant itself.
- A radial space requirement/freedom of movement of approx. 1 m around the machine is required for people.
- Work lighting: min. 300 Lux.
- Operator age: at least 14 years old and without physical impairments.
- Operated by one person.
- Climate conditions: temperature range for machine operation: –15 °C to 40 °C (< 80% rel. humidity).
- Only work with the machine in dry surroundings (not in misty, rainy or stormy conditions).

2.2.4 Shutting down the machine

Information on the EMERGENCY STOP or the shutting down function, see chap. 9.1, p. 25.

2.3 Environmental protection/disposal

2.3.1 Chips and gear lubricant

Dispose of chips and used gear lubricant according to the regulations.

2.3.2 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 at the side 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 environment-friendly 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.



(as per RL 2002/96/EC)

2.4 Basic safety instructions

The machine (hereinafter referred to as the RPG 4.5 (S) or RPG 8.6) is a state-of-the-art machine designed for safe use. The risks involved in using the machine 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.
- In addition to this operating instructions, the general warning messages for electric tools (see supplement), which should always be retained.
- Keep complete documentation close by the machine.
- Generally valid regulations for the prevention of accidents must be observed.
- Observe country-specific regulations, standards and guidelines.
- Always ensure that the machine is in good working order. Observe the maintenance information (chap. 10, p. 28).
- The machine may only be operated if all safety equipment such as restarting block and overload protection is in proper working order, the viewing window is closed and the machine has a solid footing. Check whether the substrate is able to take sufficient loads.
- 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.
- Use only original tools, spare parts, materials and accessories from 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 and do not use the machine to pull out the mains plug except in an emergency. Protect the cable from heat, oil and sharp edges (chips).
- During operation, keep hands away from the tools.
- Check that the tube is correctly clamped.
- Switch on the machine only when the tube has been clamped.
- Do not use the machine in wet surroundings. Only work in canopied surroundings.
- In extreme conditions of use, conductive dust can settle inside the machine. For this reason and for better safety, an on-site SPE-PRCD or ground-fault circuit is required between the mains network and the machine, to be installed and tested if necessary by a professional electrician.
- When working with the machine wear safety shoes (as per EN ISO 20345 at least S1), safety goggles (as per DIN EN 166 Class 2, basic strength S), snug-fitting safety gloves (as per DIN EN 388, Class 2 resistance to abrasion, cut resistance Class 3, tear resistance Class 2, perforation resistance Class 3 and as per EN 407 at least Performance level 1 against contact heat) and hearing protection (as per DIN EN 352-4 or comparable).
- Do not use click-in socket outlets and click-in power plugs (blue CEE power plugs) for power connection, otherwise the EMERGENCY STOP does not function. The user must check whether the power plug can be pulled out of the outlet by the cable (shutdown, see chap. 9.1, p. 25).
- Do not use angled power plugs.

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.



DANGER

If the mains cable is damaged, live parts may cause death if touched directly!
Fatal electric shock.

- ⊘ **Do not** allow the power cable of the motor to be near the machine, especially the cutting tool (MFW).
- ⊘ **Do not** run the machine unattended.
- ▶ During processing, always keep an eye on the position of the mains cable.
- ▶ Keep the machine clean. Always remove lubricant residues from the machine.

 DANGER	<p>Damaged insulation! Fatal electric shock.</p> <ul style="list-style-type: none"> ⊘ Do not screw any indicators or signs to the drive motor. ▶ Use stickers.
 DANGER	<p>Metal dust can collect in the motor housing and cause loss of insulation! Fatal electric shock.</p> <ul style="list-style-type: none"> ▶ Depending on the level of contamination, clean the machine at least once a day using the brush supplied.
 DANGER	<p>Damaged mains plug! Fatal electric shock.</p> <ul style="list-style-type: none"> ⊘ Do not use adapter plugs with ground protected electrical tools. ▶ The machine connector plug must fit the socket.
 DANGER	<p>Risk of danger through the use of the machine outdoors! Fatal electric shock.</p> <ul style="list-style-type: none"> ⊘ Do not use the machine outdoors.
 DANGER	<p>Danger! The electrical motor can overheat with operation in a 110 V network. Serious injury or death.</p> <ul style="list-style-type: none"> ▶ Only use the machine in the specified temperature range.
 DANGER	<p>Grounded body! Fatal electric shock.</p> <ul style="list-style-type: none"> ▶ Avoid contact with grounded surfaces such as tubes, heating, cookers or refrigerators.
 DANGER	<p>Loose/baggy clothing, long hair or jewelry can get caught in rotating machine parts! Serious injury or death.</p> <ul style="list-style-type: none"> ▶ Wear tight-fitting clothing during work. ▶ Tie up long hair to prevent it from being caught.
 DANGER	<p>Safety components that are contaminated or worn are defective! The failure of safety components can cause physical injury.</p> <ul style="list-style-type: none"> ⊘ Do not misuse the cable, e.g. such as using it to suspend or carry the machine. ▶ Replace defective safety components immediately and check them daily to ensure proper operation. ▶ Clean and perform maintenance on the machine after each use. ▶ Keep cables away from heat, oil, sharp edges and moving equipment parts. ▶ Inspect the machine daily for visible signs of damage or defects, and have them repaired by a specialist if necessary.
 WARNING	<p>Flying parts/breaking tool! Diverse physical injuries and material damage.</p> <ul style="list-style-type: none"> ⊘ No damaged or deformed cutting tools (MFW) should be used. ▶ Firmly clamp the tube to be machined into the clamping unit. ▶ Immediately replace worn-out tools. ▶ Ensure that the cutting tools are correctly fitted. ▶ The inner diameter of the clamping shells must be identical to the outer diameter of the tube to be machined. The specific inner diameter is specified on the clamping shells. The outer diameter of the tube must be determined. ▶ Avoid tool breakage by ensuring low (measured) infeed (max. clamping thickness: 0.05 mm) and correct setting of speed (see chap. 9.2, p. 26). ▶ Check that the tool holder (WH) and multifunctional tool (MFW) are seated firmly, and tighten if required.
 WARNING	<p>Falling objects or tilting and bending tubes! Irreversible crushing.</p> <ul style="list-style-type: none"> ▶ Wear safety shoes (in accordance with EN ISO 20345, at least S1). ▶ Place sufficient supports under the tube. ▶ Transport the machine as shown in chap. 7.1, p. 17.



WARNING

Danger caused by vibration and unergonomic, monotonous work!

Discomfort, tiredness and disruptions to the locomotor system.

Limited ability to react, and cramps.

- ▶ Do relaxation exercises.
- ▶ Ensure activity is varied.
- ▶ Assume an upright, fatigue-free and comfortable body position during operation.



WARNING

Pressing the ON-OFF switch unintentionally!

Diverse physical injuries and material damage.

- ▶ 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.
-

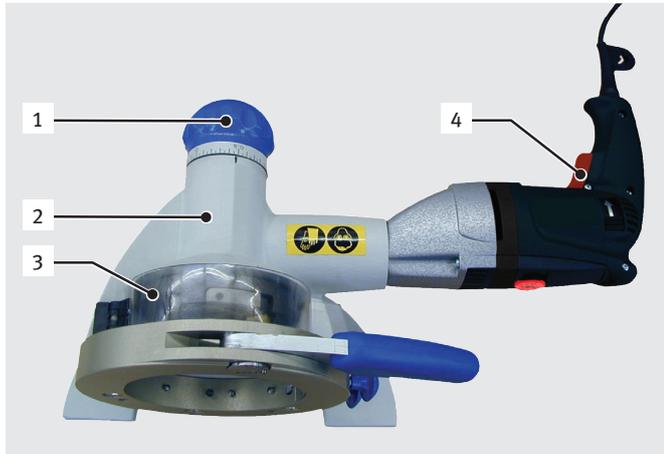
2.5 Warning symbols

Observe all of the warnings and safety instructions affixed to the machines.
The following labels also appear on the machine:

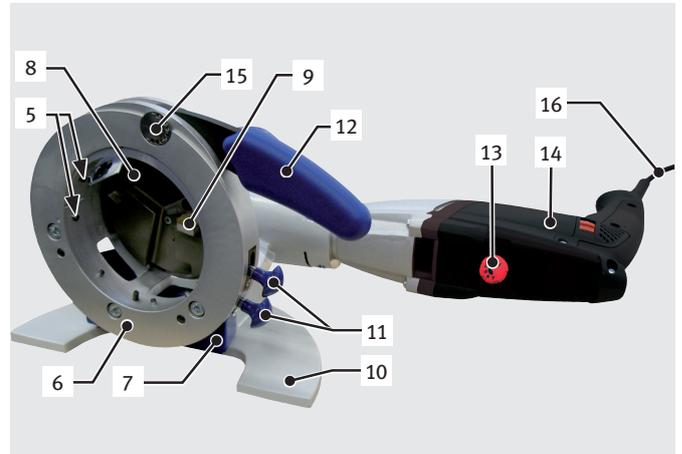
Image	Position on machine	Meaning	Code
	Housing, top	WARNING: Danger of injury from rotating tool.	790 046 196
	Housing, top	INSTRUCTION: Wear safety goggles in accordance with DIN EN 166, ear protection in accordance with DIN EN 352 and tightfitting safety gloves in accordance with DIN EN 388 and EN 407. Read the operating instructions.	790 086 200
	Motor (only with US version 120 V)	WARNING: Remove the power plug before tool change or maintenance. Wear safety clothing. Keep hands away from moving parts.	790 086 199

3. PRODUCT DESIGN

3.1 Tube Squaring Machines RPG 4.5, RPG 8.6

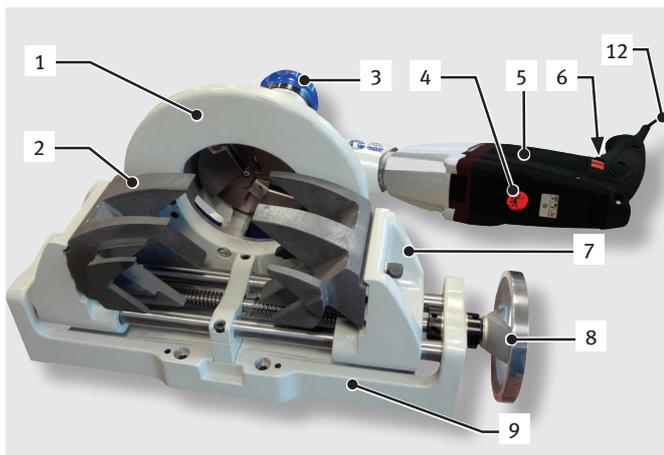


1. Feed handle with adjustable dial
2. Housing
3. Cover
4. ON/OFF switch
5. Stop bolt
6. Clamping unit
7. Chip container
8. Tool support

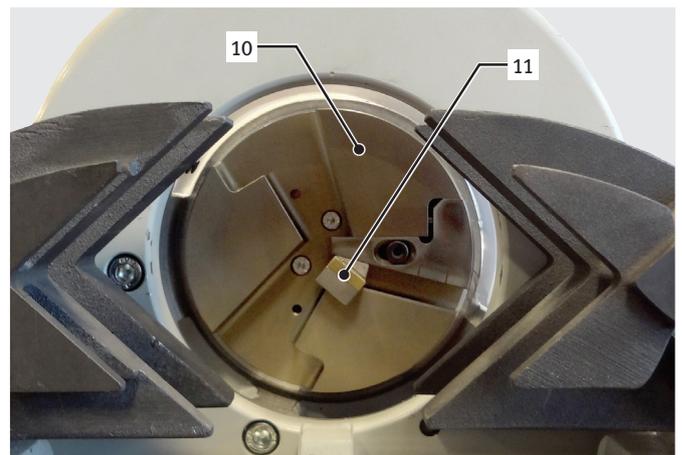


9. Tool holder with multifunctional tool
10. Base plate
11. Unlock handles
12. Clamping lever
13. Adjusting wheel for pre-setting the speed
14. Driving motor
15. Adjusting bolts for compensation of tube tolerances
16. Cable with power plug

3.2 Tube Squaring Machine RPG 4.5 S



1. Flange
2. Aluminum clamping jaws
3. Feed handle with adjustable dial
4. Adjusting wheel for pre-setting the speed
5. Driving motor
6. ON/OFF switch



7. Slide jaws
8. Turning handle for clamping jaws
9. Vice
10. Tool support
11. Tool holder with multifunctional tool
12. Cable with power plug

3.3 Accessories



WARNING

Danger presented by using poor-quality accessories and tools not approved by Orbitalum Tools!
Diverse physical injuries and material damage.

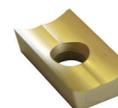
► Use only original tools, spare parts, materials and accessories from Orbitalum Tools.

NOTE

Please check the outer diameter of the tubes before ordering the clamping shells. The different standards sometimes involve a special size (particularly for tubes in accordance with DIN 2430).

3.3.1 Multifunctional tool (MFW)

1 multifunctional tool (MFW) (Code 790 038 314) is included with standard supply.
Two-sided tool bit with high-performance Balinit® Futura protective coating against tool wear.
Usable for all machines of the RPG series.



Article	Quantity	Code
Multifunctional tool MFW-P-2	1	790 038 314
Multifunctional tool MFW-P-2	10	790 038 315
Torx screw	1	790 086 220

3.3.2 Tool holder (WH) for beveling and squaring

1 tool holder (WH) (Code 790 038 320) is included with standard supply.
Fits multifunctional tool 790 038 314.
Incl. Torx fixing screw.

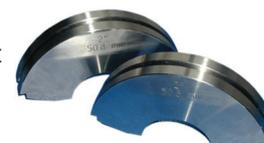


Beveling with the RPG 4.5 S is not recommended.

Article	Squaring	Beveling	Beveling angle [°]	Code
Tool holder WH12-I	x	–	–	790 038 320
Tool holder WH12-V-30°	–	x	30	790 038 329
Tool holder WH12-V-35°	–	x	35	790 038 282
Tool holder WH12-V-45°	–	x	45	790 038 280
Tool holder WH12-U-20°	–	x	20	790 038 326

3.3.3 Clamping shells

Cannot be used with the RPG 4.5 S. For deformation-free clamping of tubes.
Extremely resistant. Ensures precise clamping of tubes and rapid clamping shell change without tools. For all tube materials with outer diameters from 12.7 to 219.0 mm.



Please see our current product catalog for a selection of clamping shell dimensions with code numbers.

3.3.4 Warning symbols

Overview of warning symbols with order numbers, see chap. 2.5, p. 11.

4. FEATURES AND SCOPE OF APPLICATION

4.1 Features

The Tube Squaring Machine RPG 4.5 (S) or RPG 8.6 are distinguished by the following main features:

- Tube end preparation for welds conforming to standards
- Squaring and beveling with the RPG 4.5 and RPG 8.6. Beveling mode with the RPG 4.5 S is not recommended
- Tool holding system QTC® (Quick Tool Change)
 - Rapid locking for fixing the tool holder to the tool support
- Only one multifunctional tool is necessary for:
 - Different tube wall thicknesses (up to 3 mm)
 - Different tube materials (exclusively ferritic materials)
- Multifunctional tool:
 - Cutting geometry adapted to application
 - Multi-cutting tool
 - Only one screw is needed to fix and secure the tools
 - Tool coating TiN
- Machine: Hand-operated
- Drive:
 - Twistable/detachable
 - Speed-controlled electric motor with speed stabilization
 - Restart protection to prevent the machine from starting in an uncontrolled way after it has been re-connected to the electric mains or after the voltage supply has been re-established after a power failure
- Quick clamping system for tubes with adjusting facility
- Quick change system for clamping shells (not with RPG 4.5 S)
- Advance:
 - Total: 15 mm (0.591 inch)
 - Per revolution: 3 mm (0.118 inch)
- Dial with zero position
- The cover and the chip container guarantee clean working

4.2 Range of applications

Application range		RPG 4.5	RPG 4.5 S	RPG 8.6
Tube OD min. - max.	[mm]	12.7 - 114.3	12.7 - 114.3	50.8 - 219.1
	[inch]	0.5 - 4.5	0.5 - 4.5	2 - 8.6
Wall thickness max.	[mm]	3.0	3.0	3.0
	[inch]	0.118	0.118	0.118
Tube materials		High-alloy steels, unalloyed and low-alloy steels and aluminum. Others on request.		

5. TECHNICAL SPECIFICATIONS

Type of machine		RPG 4.5	RPG 4.5 S	RPG 8.6
Dimensions (including motor)	[mm]	460 x 260 x 230	610 x 380 x 270	500 x 350 x 350
	[inch]	18.1 x 10.2 x 9.1	24 x 15 x 10.6	19.7 x 13.8 x 13.8
Total weight (without clamping shells)	[kg]	10.5	23.0	20.5
	[lbs]	23.2	50.7	45.2
Power	[W]	1010	1010	1010
	[HP]	1.475	1.475	1.475
Mains supply	[V, Hz]	230 V, 50/60 Hz EU	230 V, 50/60 Hz EU	230 V, 50/60 Hz EU
		110 V, 50/60 Hz EU	120 V, 50/60 Hz US	110 V, 50/60 Hz EU
		120 V, 50/60 Hz US		120 V, 50/60 Hz US
Speed (max. idling speed)	[min ⁻¹]	8 - 52	8 - 52	7 - 18
Noise level at the workplace ^{*)}	[dB (A)]	Idle running approx. 83	Idle running approx. 83	Idle running approx. 83
Vibration level according to EN 60745	[m/s ²]	< 2.5	< 2.5	< 2.5

* The noise level measurement was carried out under normal operating conditions according to EN 23741.

6. INITIAL OPERATION

6.1 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.

6.2 Included with the machine

Subject to modifications.

Type of machine		RPG 4.5	RPG 4.5 S	RPG 8.6
Tube squaring machine	Pc.	1	1	1
Durable storage and shipping case	Pc.	1	1	1
Tool holder WH (Code 790 038 320)	Pc.	1	1	1
Multifunctional tool MFW (Code 790 038 314)	Pc.	1	1	1
Tool set	Set	1	1	1
Operating instructions and spare parts list	Set	1	1	1

6.3 Connection requirements

The mains supply must meet the following requirements:

- 1-phase alternating current, protection class II:
 - 230 V, 50/60 Hz
 - 110 V, 50/60 Hz
 - 120 V, 50/60 Hz
- Mains fuse at least 10 A
- Residual current protective switch

7. STORAGE AND TRANSPORT



ATTENTION

Incorrect machine storage!

Diverse physical injuries and material damage.

- ▶ Store the machine in its original case in dry surroundings.



DANGER

Fatal electric shock!

- ▶ Before transportation or changing the workplace, allow the machine to run to a stop and pull the mains plug.



WARNING

During transportation, the ON/OFF switch may unintentionally be activated causing the machine to start up!

Diverse physical injuries and material damage.

- ▶ Before transportation or changing the workplace, allow the machine to run to a stop and pull the mains plug.



WARNING

Heavy weight when transporting the RPG!

Danger of being injured through overstraining.

- ▶ Transport RPG over long stretches with corresponding lifting aids.

7.1 Transporting the machine

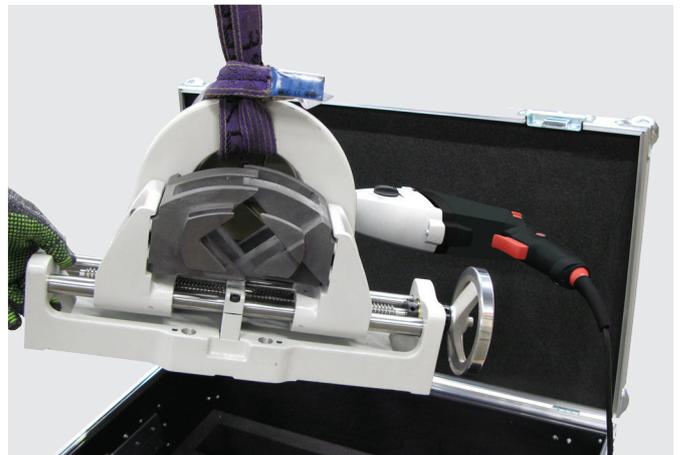
NOTE

Transport the RPG in packaged condition only on a pallet and with suitable lifting equipment.

1. Attach the transport belt to the machine (see figure below right).
2. Lift the machine and position it directly onto the workbench (or into the transport box),
3. Check that the machine has a solid footing.



Transport in packaged condition on a pallet with suitable lifting equipment (e.g. lifting truck).



Remove the machine from the packaging and replace again.

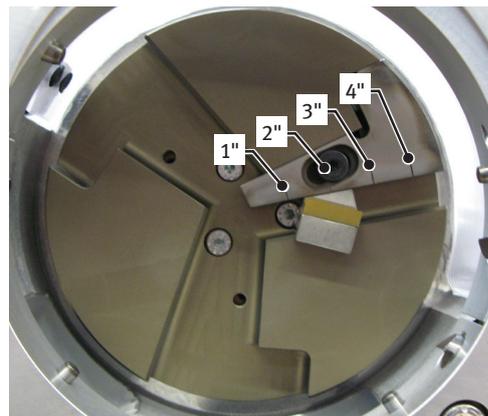
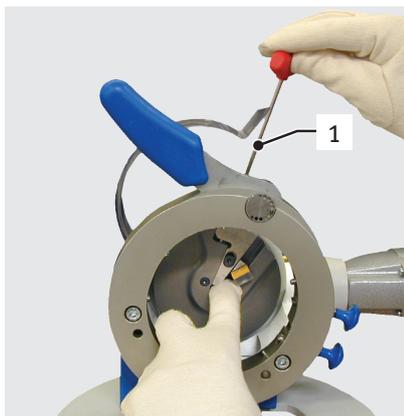
8. SETUP AND ASSEMBLY

NOTE	Because setup, assembly and operation with the tube squaring machine variants are mostly identical, the diagrams in this chapter show work steps only with examples of the RPG 4.5 and RPG 4.5 S machines.
 DANGER	<p>Machine start-up due to unintentional pressing of the ON/OFF switch! Fatal electric shock. Diverse physical injuries and material damage.</p> <ul style="list-style-type: none"> ▶ 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.
 WARNING	<p>Protruding tool holder! Hands may be crushed and the machine damaged.</p> <ul style="list-style-type: none"> ⊘ The tool holder with fitted MFW must not project over the edge of the tool support. ▶ Before switching on the machine, make sure that the distance between the MFW and the housing is sufficient. ▶ Close the viewing window before switching on the machine.
 WARNING	<p>Risk of machine and tube falling! Irreversible crushing.</p> <ul style="list-style-type: none"> ▶ Check the machine's position and secure it so it cannot fall. ▶ Ensure that the machine has a solid footing. ▶ Place sufficient supports under the tube.
 WARNING	<p>Fingers jammed between the clamping unit, clamping shells and tube! Irreversible crushing.</p> <ul style="list-style-type: none"> ⊘ Do not place fingers between the clamping unit, clamping shells and tube. ▶ 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. ▶ Always close the viewing window after removing chips.
 WARNING	<p>Flying parts/breaking tool! Diverse physical injuries and material damage.</p> <ul style="list-style-type: none"> ⊘ No damaged or deformed cutting tools (MFW) should be used. ▶ Firmly clamp the tube to be machined into the clamping unit. ▶ Immediately replace worn-out tools. ▶ Ensure that the cutting tools are correctly fitted. ▶ The inner diameter of the clamping shells must be identical to the outer diameter of the tube to be machined. The specific inner diameter is specified on the clamping shells. The outer diameter of the tube must be determined. ▶ Avoid tool breakage by ensuring low (measured) infeed (max. clamping thickness: 0.05 mm) and correct setting of speed (see chap. 9.2, p. 26). ▶ Check that the tool holder (WH) and multifunctional tool (MFW) are seated firmly, and tighten if required.
 WARNING	<p>Flying, hot and sharp-edged chips, tube surfaces, cutting edges and tools! Danger of injury to eyes and hands.</p> <ul style="list-style-type: none"> ⊘ Do not reach into the rotating tool during working. ⊘ Never work without the cover attached. ▶ Wear recommended protective clothing, as described in chap. 2.4, p. 8. ▶ At the end of each working cycle switch off the machine, allow it to run to a stop and pull the mains plug. Remove chips with tightfitting safety gloves (in accordance with DIN EN 388 and EN 407) using suitable tools (e.g. tongs). ▶ Ensure that the cover is functional.
 ATTENTION	<p>The MFW multifunctional tool may be damaged by wrong inserting of a tube! Damage to tool.</p> <ul style="list-style-type: none"> ▶ Before clamping the tube, ensure sufficient distance between the MFW and the tube.

8.1 Fitting the multifunctional tool (MFW) and the tool holder (WH)

1. Screw the multifunctional tool (MFW) onto the tool holder using a Torx screwdriver.
2. Insert the tool holder with fitted MFW laterally into the guiding groove and position it.
3. Press the tool holder against the bearing surface of the tool support and, at the same time, tighten the screw using the Allan key (1).

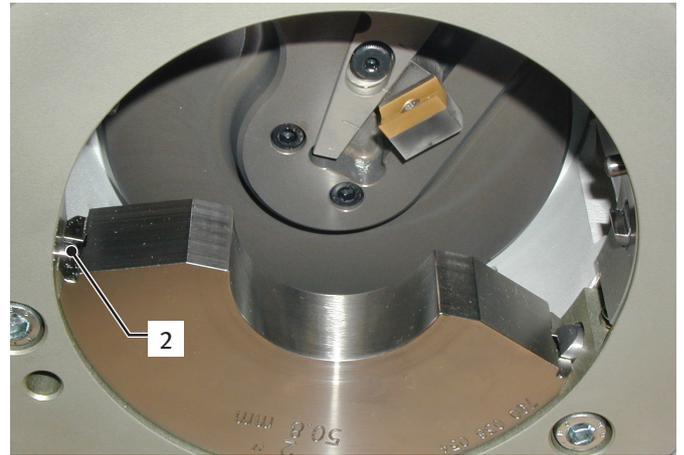
NOTE To facilitate the adjustment process, the tool support of the RPG 4.5 (S) has been provided with 4 visible marks for 1", 2", 3" and 4" tubes (see the illustration below). At the RPG 8.6 there are 5 visible marks for 4", 5", 6", 7" and 8" tubes.



8.2 Inserting/replacing the clamping shells (not with RPG 4.5 S)

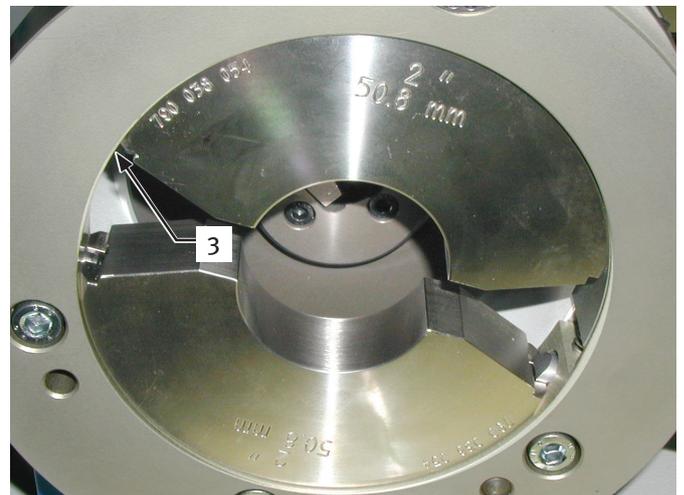
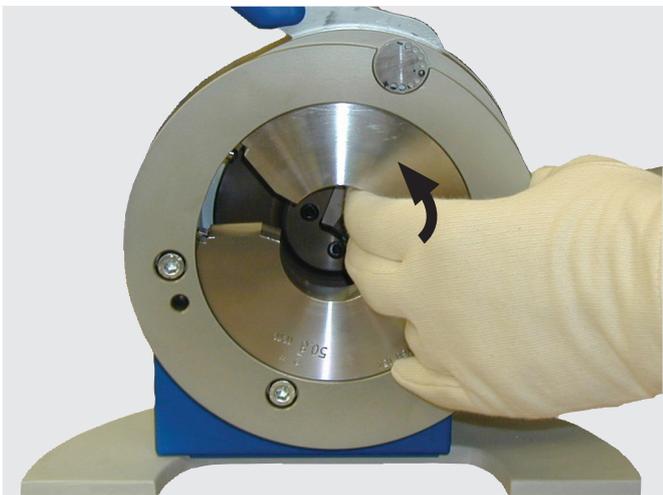
8.2.1 Inserting the lower clamping shell

1. Select the clamping shells according to the tube diameter.
2. Move the clamping lever to the open-position.
3. Place the lower clamping shell at the stop bolt (2).
4. Swivel the clamping shell around the stop bolt in the direction of the arrow until the unlock handle locks into place.



8.2.2 Inserting the upper clamping shell

1. Place the upper clamping shell at the stop bolt (3).
2. Swivel the clamping shell around the stop bolt in the direction of the arrow until the unlock handle locks into place.



8.2.3 Replacing the clamping shells

1. To replace the clamping shells, pull at the unlock handles.
2. Remove the upper and lower clamping shell.

8.3 Clamping the tube



WARNING

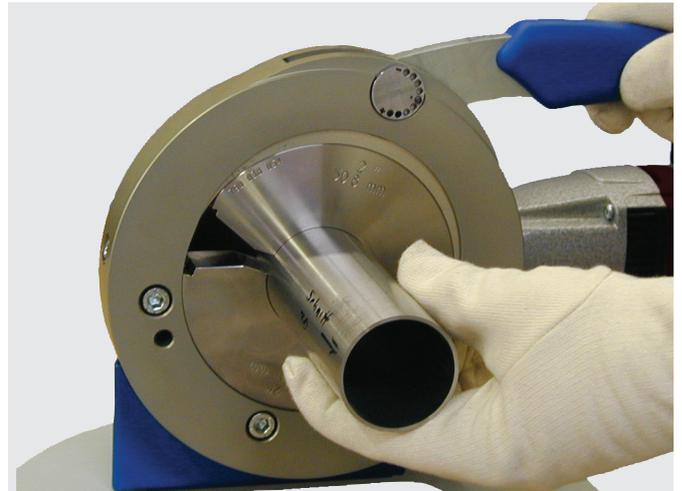
Flying parts/breaking tool!

Diverse physical injuries and material damage.

- ⊘ **No** damaged or deformed cutting tools (MFW) should be used.
- ▶ Firmly clamp the tube to be machined into the clamping unit.
- ▶ Immediately replace worn-out tools.
- ▶ Ensure that the cutting tools are correctly fitted.
- ▶ The inner diameter of the clamping shells must be identical to the outer diameter of the tube to be machined. The specific inner diameter is specified on the clamping shells. The outer diameter of the tube must be determined.
- ▶ Avoid tool breakage by ensuring low (measured) infeed (max. clamping thickness: 0.05 mm) and correct setting of speed (see chap. 9.2, p. 26).
- ▶ Check that the tool holder (WH) and multifunctional tool (MFW) are seated firmly, and tighten if required.

8.3.1 RPG 4.5 and RPG 8.6

1. Open the clamping shells by shifting the clamping lever.
2. Insert the tube allowing it to have distance to the tool.
3. Clamp the tube in by means of the clamping lever.
4. Check the tube for correct clamping.

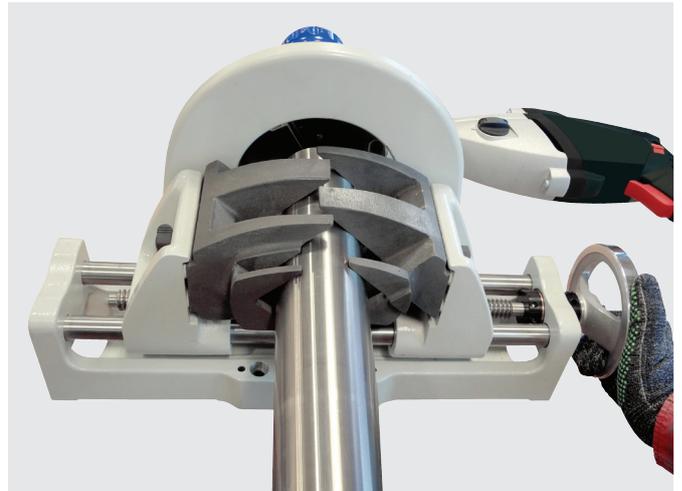


5. The tube can now be machined.

- ▶ To release the tube from the machine, move the clamping lever to open it.

8.3.2 RPG 4.5 S

1. Open the clamping jaws of the vice by turning the handwheel.
 2. Insert the tube with distance to the tool.
 3. Clamp the tube via the clamping jaw handwheel.
 4. Check the tube for correct clamping.
 5. The tube can now be machined.
- To release the tube from the machine, turn the handwheel to open the vice.



8.3.3 Adjustment options with the clamping lever and adjusting bolt for offsetting tube tolerances (RPG 4.5 and RPG 8.6)

The RPG offers the possibility to offset tube tolerances (deviations from nominal size) by means of an adjusting bolt (adjusting wheel) at the clamping lever. The adjusting bolt has 3 visible marks; the factory's setting or neutral position respectively is marked by • .

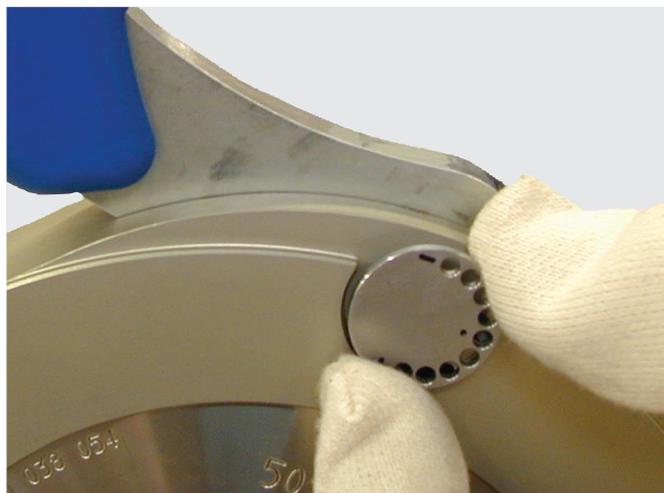
- Example:
 A tube with an outer diameter of 51 mm is to be processed with the clamping shell set of 50.8 mm. As a consequence, it is not possible to move the clamping lever right to the stop. Therefore, the adjusting bolt has to be set towards + .
 Now, the tube clamping is correct.

All adjustment possibilities are shown in the following table:

Adjustment options	Tube has exactly the nominal size	Tube size smaller than nominal size	Tube size larger than nominal size
Position of clamping lever	The adjustment of the clamping lever is correct.	The clamping lever sits on the clamping frame (tube not clamped).	It is not possible to turn the clamping lever.
Re-adjustment required towards:	●	—	+
Result (position of adjusting bolt)			

8.3.4 Shifting the adjusting bolt

1. Loosen the clamping lever and remove the tube, if necessary.
2. Loosen the hexagon socket screw of the adjusting bolt using the Allan key.
3. Turn the adjusting bolt towards + or - .
4. Allow the pin to engage into the adjusting bolt and re-tighten the hexagon socket screw.
5. Now, the tube can be clamped in.



9. OPERATION



DANGER

Machine start-up due to unintentional pressing of the ON/OFF switch!

Fatal electric shock.

Diverse physical injuries and material damage.

- ▶ 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.



DANGER

Unexpected start-up!

Serious injury or death.

- ▶ Before connecting the machine to the power supply, check the on/off switch is switched off.



DANGER

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

Serious injury or death.

- ▶ Wear tight-fitting clothing during work.
- ▶ Tie up long hair to prevent it from being caught.



WARNING

Flying parts/breaking tool!

Diverse physical injuries and material damage.

- ⊘ **No** damaged or deformed cutting tools (MFW) should be used.
- ▶ Firmly clamp the tube to be machined into the clamping unit.
- ▶ Immediately replace worn-out tools.
- ▶ Ensure that the cutting tools are correctly fitted.
- ▶ The inner diameter of the clamping shells must be identical to the outer diameter of the tube to be machined. The specific inner diameter is specified on the clamping shells. The outer diameter of the tube must be determined.
- ▶ Avoid tool breakage by ensuring low (measured) infeed (max. clamping thickness: 0.05 mm) and correct setting of speed (see chap. 9.2, p. 26).
- ▶ Check that the tool holder (WH) and multifunctional tool (MFW) are seated firmly, and tighten if required.



WARNING

Risk of machine and tube falling!

Irreversible crushing.

- ▶ Check the machine's position and secure it so it cannot fall.
- ▶ Ensure that the machine has a solid footing.
- ▶ Place sufficient supports under the tube.



WARNING

Fingers jammed between the clamping unit, clamping shells and tube!

Irreversible crushing.

- ⊘ Do **not** place fingers between the clamping unit, clamping shells and tube.
- ▶ 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.
- ▶ Always close the viewing window after removing chips.



WARNING

Body parts can fit between the cutting tools and the tube!

Serious injury.

- ⊘ Do **not** place body parts between the cutting tools and the tube.



WARNING

Flying, hot and sharp-edged chips, tube surfaces, cutting edges and tools!

Danger of injury to eyes and hands.

- ⊘ **Do not** reach into the rotating tool during working.
- ⊘ **Never** work without the cover mounted.
- ▶ Wear recommended protective clothing, as described in chap. 2.4, p. 8.
- ▶ At the end of each working cycle switch off the machine, allow it to run to a stop and pull the mains plug. Remove chips with tightfitting safety gloves (in accordance with DIN EN 388 and EN 407) using suitable tools (e.g. tongs).
- ▶ Ensure that the cover is functional.



ATTENTION

Restarting the machine following blockage!

Diverse physical injuries and material damage.

- ▶ In the event of a blockage, always disconnect the machine from the power supply before clearing it.
- ▶ If necessary, remove any tensioned parts before restarting the machine.



ATTENTION

A tube that is not sawn off at right-angles can damage the tool (MFW) if the distance between the cutting edge and the tube end is too small!

Tool breakage.

- ▶ Before switching on the machine ensure that the tool has sufficient axial distance around the complete tube circumference.
- ▶ Only drive the rotating tool with limited feed to the tube.
- ▶ General trouble shooting, see chap. 10.2, p. 28.

9.1 Shutting down (even in an emergency)



WARNING

EMERGENCY STOP function not available by unplugging the power plug!

Diverse physical injuries and material damage.

- ⊘ Do not use angled power plugs.
- ⊘ Do not use click-in socket outlets and click-in power plugs (blue CEE power plugs) for power connection, otherwise the EMERGENCY STOP does not function. The user must check whether the power plug can be pulled out of the outlet by the cable.
- ▶ Only use original Orbitalum Tools parts.
- ▶ Ensure free access to the power plug.

To be able to stop the machine (also in case of emergency), perform the corresponding steps and immediately remove from the danger area, until the machine comes to a stop:

If the locking button (4) is not activated:

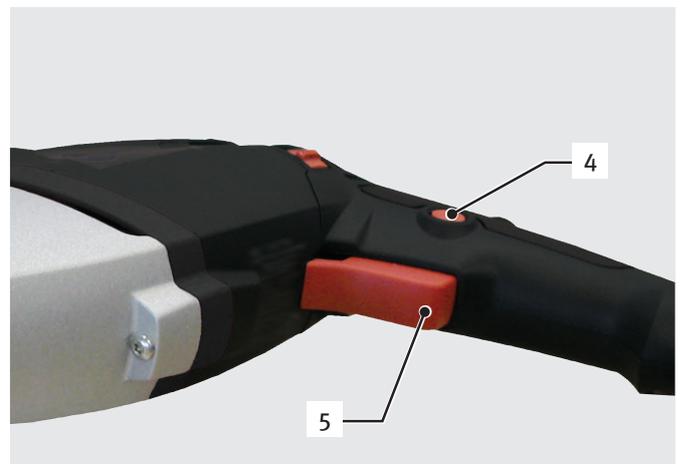
- ▶ Release the ON/OFF switch (5).

If the locking button (4) is activated:

- ▶ Press and release the ON/OFF switch (5).

If the ON/OFF switch (5) does not function:

- ▶ Unplug the power plug, or leave the danger zone as quickly as possible and then unplug the power plug.



9.2 Determining and setting the speed

9.2.1 Determining the cutting speed

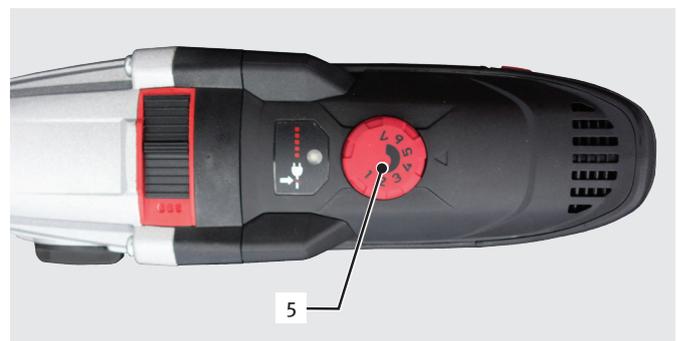
Standard values for the revolutions per minute (n)	Tube OD		Adjusting wheel for presetting the speed	High-alloy steel	
	Type of machine	[mm]			[inch]
RPG 4.5 (S)		25,4	1.0	4	31
RPG 4.5 (S)		38,1	1.5	3	23
RPG 4.5 (S)		50,8	2.0	3	23
RPG 4.5 (S)		63,5	2.5	2	14
RPG 4.5 (S)		76,2	3.0	2	14
RPG 4.5 (S)		88,9	3.5	1	9
RPG 4.5 (S)		101,6	4.0	1	9
RPG 4.5 (S)		114,3	4.5	1	9
RPG 8.6		50,8	2.0	5	18
RPG 8.6		101,6	4.0	4	15
RPG 8.6		114,3	4.5	4	15
RPG 8.6		141,3	5.6	3	11
RPG 8.6		152,4	6.0	3	11
RPG 8.6		168,3	6.6	3	11
RPG 8.6		219,1	8.6	2	7

NOTE The table is based on a cutting speed of approx. 3 m/min with high-alloy steel.

NOTE The higher the cutting speed, the higher the attrition of the multifunctional tool.

9.2.2 Setting the cutting speed

- ▶ Set the adjusting wheel for presetting the speed to the desired level (RPG 4.5 (S): 1 – 4, RPG 8.6: 2 – 4) “1” corresponds to the lowest, and “7” to the highest number of revolutions.



9.3 Switching the machine on

1. Connect the RPG (for connection requirements, see chap. 6.3, p. 16).
2. Ensure the tube has a solid footing.
3. Press the ON/OFF switch.

► The machine starts up.

NOTE ⚠ **Do not** use the locking button as this hampers shutdown, see chap. 9.1, p. 25.

NOTE If the tool vibrates after starting up, the cutting speed is too high.
 ► Reduce the cutting speed, see chap. 9.2, p. 26.

9.4 Processing the tube

NOTE When cutting, do not exceed a chip thickness of 0.05 mm (0.002 inch).
 By exceeding the load-limiting device (adapter, code 790 038 126) can be cut.
 ► General trouble shooting, see chap. 10.2, p. 28.

1. Move the tool towards the tube by means of the feed handle until the tool touches the tube.

If the cutting edge of the tool is cutting into the entire circumference of the tube:

2. Guide the tool further with the same amount of pressure.

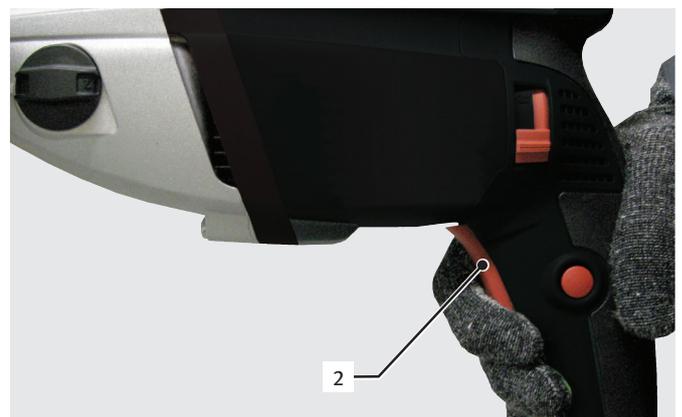
NOTE The dial can be set to zero in accordance with the marking on the housing.
 Each division mark corresponds to a feed motion of 0.05 mm (0.002 inch).

9.5 Switching the machine off

1. Release the ON/OFF switch (2).

The machine comes to a stop.

2. Unplug the power plug from the power source.
3. Release the tube from the machine (see chap. 8.3, p. 21).
4. Remove the chips from the housing with suitable tools (tongs) after each machining process.
5. Close the cover after removing chips.



10. SERVICING, MAINTENANCE, TROUBLESHOOTING

NOTE Some of the work mentioned depends a great deal on the use and on the ambient conditions. The cycles specified are minimum specifications. In individual cases, differing maintenance cycles are possible. To ensure the safety of the machine, perform maintenance annually using an authorized service center with VDE testing. If the machine does not function as previously described, the machine must also be sent into an authorized service center.

 **DANGER** **Danger of death by electric shock!**
 Non-observance could result in death or serious injury.

- ▶ 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.

 **DANGER** **Risk of electric shock due to poor electrics!**
 Fatal electric shock.

- ▶ 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.
- ▶ Repair and maintenance work on the electrical equipment may only be carried out by a qualified electrician.

10.1 Maintenance

Time/Interval	Activity
Before starting work	▶ Check the tube clamping if the tube is already mounted in the machine.
Every time the cutter is cleaned	▶ Clean the clamping shells and the tool supports for the multifunctional tool.
Every time the tool is changed	▶ Clean the tool support and the multifunctional tool. ▶ Remove any dirt from the bearing surface of the tool holder.

10.2 What to do if ...? – General trouble shooting

Problem	Possible cause	Remedy
The tool (multifunctional tool) is catching during machining.	Too much feed.	▶ Disassemble tool holder and take out tube from the machine. ▶ Remove chip using side cutting pliers and file off section. ▶ Introduce carefully during new processing.
	MFW or WH loose.	▶ Screw in MFW or WH tightly.
Tool tends to vibrate.	Speed too high.	▶ Reduce speed (see chap. 9.2, p. 26).
High level of vibration.	Axial or radial play in the components.	▶ Check machine for freedom from play.
	MFW loose.	▶ Check MFW on fixed seat.
The processed tube is jagged or has a burr which is too big.	MFW blunt.	▶ Replace MFW.

10.3 Servicing/customer service

For ordering spare parts, refer to the separate spare parts list.
For troubleshooting, please contact the branch responsible directly.

Please indicate the following details:

- Type of machine: Tube Squaring Machine
 - **RPG 4.5**
 - **RPG 4.5 S**
 - **RPG 8.6**
- Machine-no.: *(see type plate)*

11. EU DECLARATION OF CONFORMITY



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

Orbitalum Tools GmbH
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According to machine guideline 2006/42/EG (MaschR).

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

RPG 4.5 Tube Squaring Machine*
RPG 4.5 S Tube Squaring Machine*
RPG 8.6 Tube Squaring Machine*

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:

Maschinen-Richtlinie (2006/42/EG)
EMV-Richtlinie (2014/30/EU)
Niederspannungsrichtlinie (2014/35/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 62841-1: 2016.07

* including all accessories of *Orbitalum Tools*.

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

Singen, 03.08.2017

Markus Tamm
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