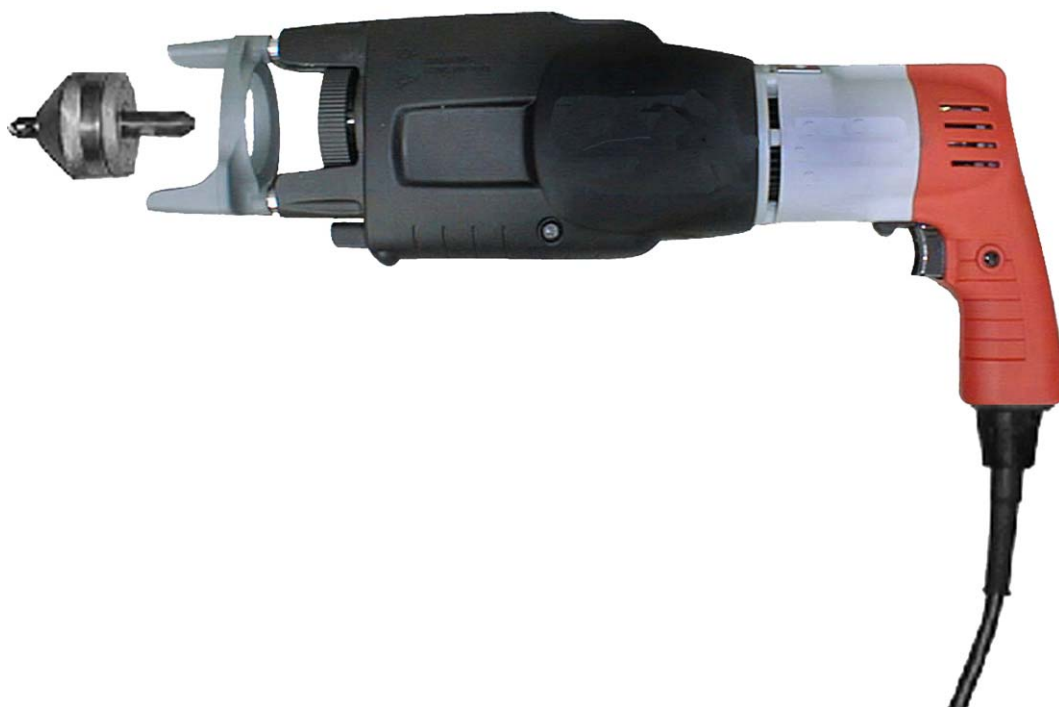


ROTHENBERGER

TD-35 ***COLLARING MACHINE***



Machine nr.: 3308

INSTRUCTION MANUAL

Version

3308-10-02
25.01.2002 /LM

Instruction Manual

This instruction manual includes a spare parts list and instructions for set-up for operation and maintenance of the Rothenberger TD-35 tee forming machine. Type code of manual is 3304-10-01.

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This manual has been produced with a great deal of care and attention. All information has been checked for accuracy. No liability will be accepted for any incorrect or incomplete information.

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1. Introduction

1.1 Symbols for warning used in this manual



NOTE! May cause an accident or damage other property, if the right precautionary measures have not been taken.



DANGER! Will or may cause a serious accident or death, if the right precautionary measures have not been taken.

This instruction manual includes instructions for set-up for operation, operation and maintenance of the Rothenberger TD-35 tee forming machine. This book also includes instructions on how to use and select heads for hand tools.



NOTE! Before attempting to put TD-35 into service, read chapter 2 "Safety Instructions".

Read the operation sequence described in the instruction manual thoroughly before starting installation, operating or maintenance of the machine.



NOTE! Save these instructions for future use!

1.2 Symbolism

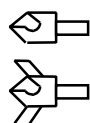
The following list defines the symbols on the battery pack, charger or tool.



Read the instruction manual before using this tool



Double Insulated (charger)



Warning! Rotating tool.

2. General safety instructions

Read all instructions.

Know your power tool - Read the instruction manual carefully. Learn to know your own skill and limitations as well as the specific potential hazards peculiar to this tool.



DANGER! - The use of any accessory or attachment other than the ones recommended in this operating instruction or Rothenberger catalogue may create a risk of personal injury.



DANGER! Never detach the power unit from the tee forming unit. Never use the power unit in any other way than combined with the tee forming unit.

Detaching the power unit will damage the alignment made in factory.

Warranty is void if the power unit is detached from the tee forming unit!



DANGER! - This power unit has to be used only with TD-35 tee forming unit. Likewise, using any other power units is not allowed with the TD-35 tee forming unit.

Warranty is void if the power unit is detached from the tee forming unit!

2.1 General safety instructions for work area

Keep work area clean – Cluttered areas and benches invite injuries.

Consider work area environment – Don't use power tools in damp or wet locations. Keep work area well lit. Don't use power tools in the presence of flammable liquids or gases.

Keep children away – Do not let visitors touch tool or extension cord. All visitors should be kept away from work area.

Stay alert – Be aware of what you are doing. Use common sense. Do not operate tool when you are tired.

2.2 Safety instructions for tool

Store idle tools – when not in use, tools should be stored in dry, high, or locked-up place, out of the reach of children.

Don't force tool – It will do the job better and safer at the rate for which it is intended.

Dress properly – Do not wear loose clothing or jewelry. They can be caught in moving parts. Rubber gloves and non-skid footwear are recommended when working outdoors. Wear protective hair covering to contain long hair.

Use safety glasses – Also use face or dust mask if cutting operation is dusty.

Secure work – Use clamps or a vise to hold your work piece. It's safer than using your hand and it frees both hands to operate the tool.

Don't overreach – Keep proper footing and balance at all times.

Maintain tools with care – Keep tools sharp and clean for better and safer performance. Follow instructions for lubricating and changing accessories. Inspect tool cords periodically and, if damaged, have them repaired by authorised service workshop. Inspect extension cords periodically and replace if damaged. Keep handles dry, clean and free from oil and grease.

Disconnect tools – When not in use, before servicing, and when changing accessories such as blades, bits and cutters.

Remove adjusting keys and wrenches – Make it a rule to check that keys and adjusting wrenches are removed from tool before turning it on.

Avoid accidental starting – Do not use a tool if the power switch does not turn the tool on and off. Do not carry the tool with your finger on the switch.

Outdoor use extension cords – When tool is used outdoors, use only extension cords intended for use outdoors and so marked.

Check damaged parts – Before further use of tool, a guard or other part that is damaged should be carefully checked to determine that it will operate properly and perform its intended function. Check for alignment of moving parts, binding of moving parts, breakage of parts, mounting, and any other conditions that may affect its operation. A guard or other part that is damaged should be properly repaired or replaced by an authorized service unless otherwise indicated elsewhere in this instruction manual. Have defective switches replaced by an authorized service. Do not use tool if switch will not turn it on and off.

Have your tool repaired only by a person authorized to do the job by ROTHENBERGER – This electric tool is in accordance with the relevant safety requirements. Repairs should be carried out only by certified persons using original spare parts; otherwise, this may result in considerable danger to the user.

Keep tools away from items that may be damaged by magnets – The motor contains a powerful magnet that may damage magnetic tape, credit cards, computer disks and watches.



NOTE! Save these instructions.

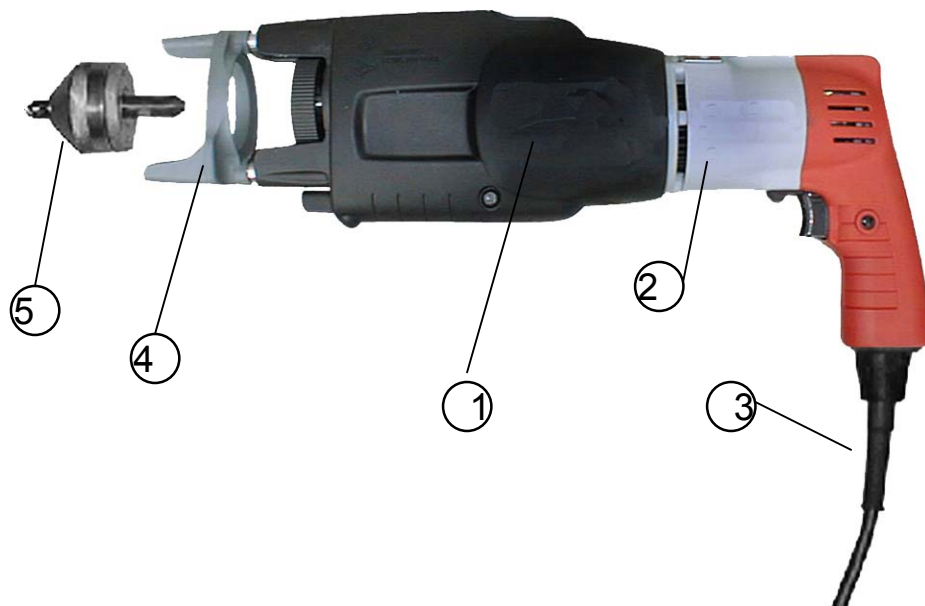
3. RODRILL TD-35, general

3.1 Introduction

TD-35 is special tool intended for mechanically forming tees in copper tube typically found in domestic, commercial and industrial tubing systems. Before attempting to put the TD-35 machine into service, make sure you have read and fully understood the safety instructions which apply to all power tools and capabilities of this special tool.

The TD-35 tee forming machine includes an electric network driven by a double insulated power unit with accessories. The machine can be delivered either for 230V.

3.2 The Parts of the TD-35



Main parts: 1. Tee forming unit, 2. Power unit, 3. Connecting cord, 4. Tube support, 5. head

3.3 Operating Range of the Machine

The TD-35 tee forming machine is intended for branching in copper tube. The branch tube is joined to the run tube by brazing.

The tee size range of the TD-35 is 10 – 35 mm (3/8" to 1 3/8").

The diameter of the run tube can be 15 – 76.1 mm (1/2" to 3"). The maximum wall thickness of the tube to be branched depends on the tube diameter and the size of the head used.

Accurate capacity values: diameters and wall thicknesses of the tube are specified in the capacity chart (chapter 11.1).

3.4 Technical specifications

TD-35	Value	NOTE!
Type Code	3304	
Tee diameter	10– 35mm	
Run tube	15– 76.1mm	
Max. wall-thickness	See Capacity chart (11.1)	
Materials	Copper (Cu)	
Cycle	20 s	
Rotation speed of spindle	470/min	
Noise level	less than 80,5 dB (A)	Use ear protectors!
Vibration	less than 2,5 m/s ²	
Dimensions of the unit	80 (h) x 440 (l) x 200 (d) mm	
Weight of the unit	3.8 kg	
Supply voltage of the unit	230V AC / 50 Hz / 3,0A / 620W	

4. Transport, Handling and Storage

TD-35 is delivered in a transport box, dimensions 630mm x 160mm (6.4") x 350mm (w x h x d). The weight of the box is, depending on the accessories.

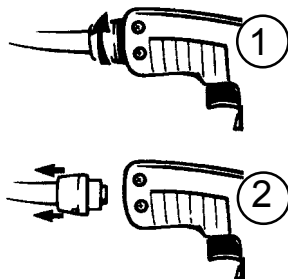
Storage

Keep the TD-35 stored in a cool, dry place, covered against dust etc.

5. Preparing before use

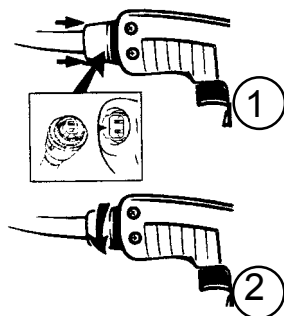
5.1 TD-35, Detachment and attachment of the connecting cord

When delivered the TD-35 power unit is fitted with a connecting cord, which allows quick changing in field conditions.



Detachment of the cord

1. Turn the nut of the cord 1/2 turn to the left in order to be able to remove the cord.
2. Draw the cord out of the power unit.



Attachment of the cord

1. Push the connector of the cord into the bracket of the power unit, pushing the connector as far as it will go.
2. In order to lock the cord, turn the nut 1/2 turn to the right.

5.2 Start-up check



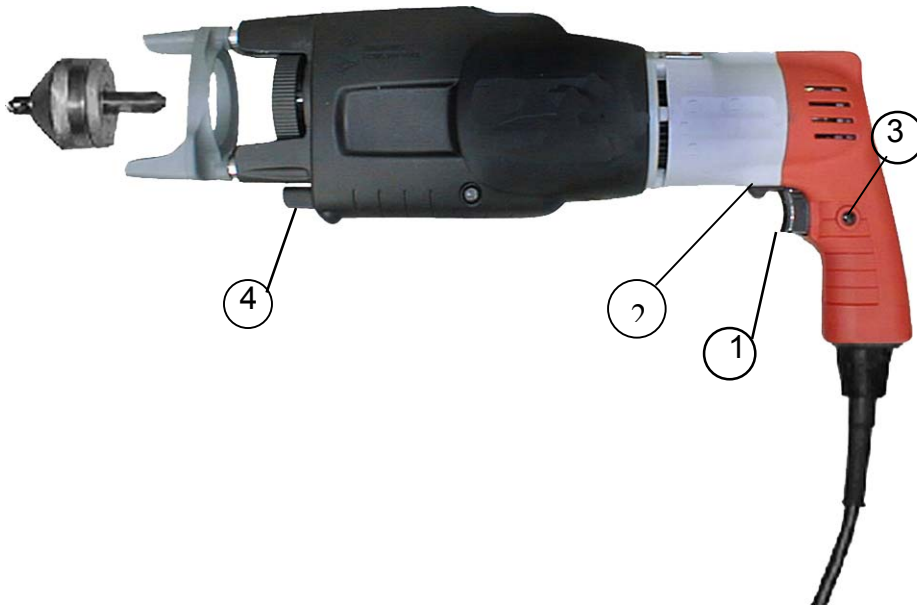
NOTE! Carry out the start-up checks before using the machine.

Before using the machine, proceed as follows:

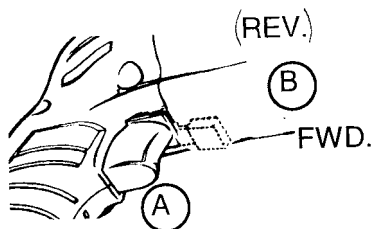
1. Check that the cord is connected to the machine
2. Check that the cord is connected to the mains.

6. The operation of the machine

6.1 Description of the control devices



Control devices: 1. Trigger, 2. Reverser 3. Locking knob, 4. Feed mechanism engagement lever



The reverser B has two directions: clockwise (FWD), which is the working direction of TD-35 and counterclockwise (REV), **which never should be used**. With *the trigger A* you can regulate the rotation speed of the motor.



NOTE! The reversing switch must always be in its original position: clockwise (FWD). This direction of rotation is the TD-35 working direction. **Use only the clockwise position of the control switch in your work! Operation of unit in reverse will cause damage not covered by warranty.**

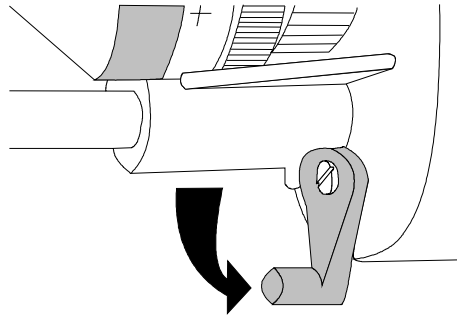


NOTE! Use maximum speed of rotation when drilling and forming the tee - **when working press the trigger completely down!**



NOTE! Do not use the locking knob of the trigger when working. Locking the trigger may create a risk situation.

Feed mechanism engagement lever

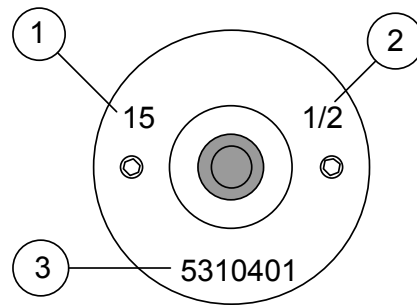


The feed mechanism lever is situated near the chuck-ring. The feed mechanism has been engaged (on) when the lever is turned ***downward***, i.e. in the position as shown on the illustration. If the feed does not engage smoothly rotate the motor by “bumping” the trigger. ***Do not force lever.***

6.2 Selection and adjustment of the heads

6.2.1 The identification of the head

The size of the head is stamped on the cover plate:



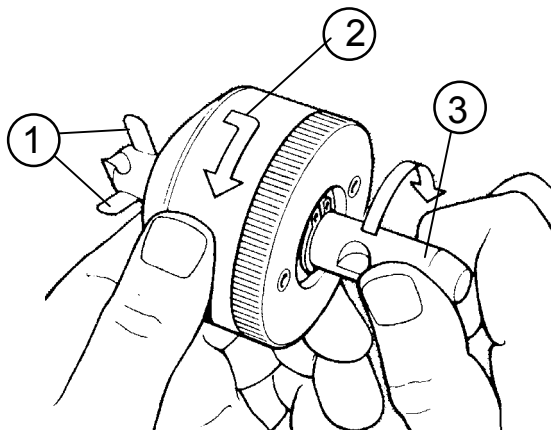
Identification: 1. Actual size in millimetres, 2. Nominal size in inches (NS), 3. The ordering and identification number of the head

6.2.2 The fine adjustment of the tee diameter



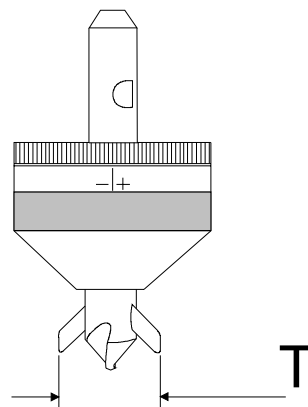
NOTE! Always when adjusting the tee diameter, extend the forming pins.

Each head is adjusted at the factory to correspond to the nominal size stamped on the cover of each head. Changing the tube sizes or the way of joining may require adjustment of the head in order to achieve the right joint.

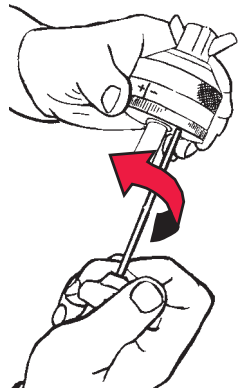


1. Extend the forming pins (1). To extend the forming pins press the cover (2) toward the end of the drill core and twist the shank (3) clockwise until a positive stop is reached.

2. Check the forming pin span diameter T with a vernier or adjusting ring.



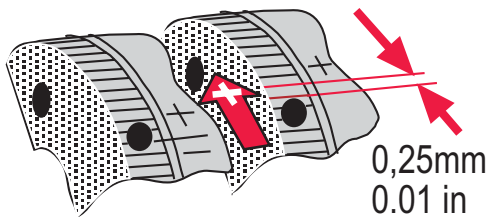
Depending on the size of the head, the forming pin span T should be 0,5 – 1,4 mm bigger than the branch pipe outer diameter (O.D.)



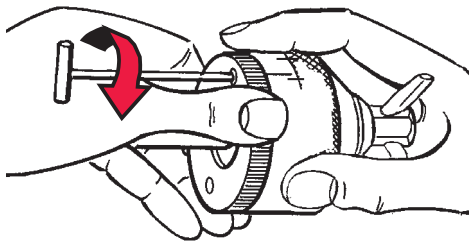
3. Loosen the screws on the cover plate by about one turn using a 3 mm hexagon wrench.

4. To enlarge the tee rotate **the conical cover** with respect to the cover plate in plus (+) direction. Hold the cover plate stationary.

To make a smaller tee **rotate the conical cover** in minus (-) direction while holding the cover plate stationary.



One notch on the cover-plate equals to 0,25 mm on the forming pin span.



5. Tighten the two screws on the cover plate and check the adjustment either by measurement across the pins or by forming a trial tee.

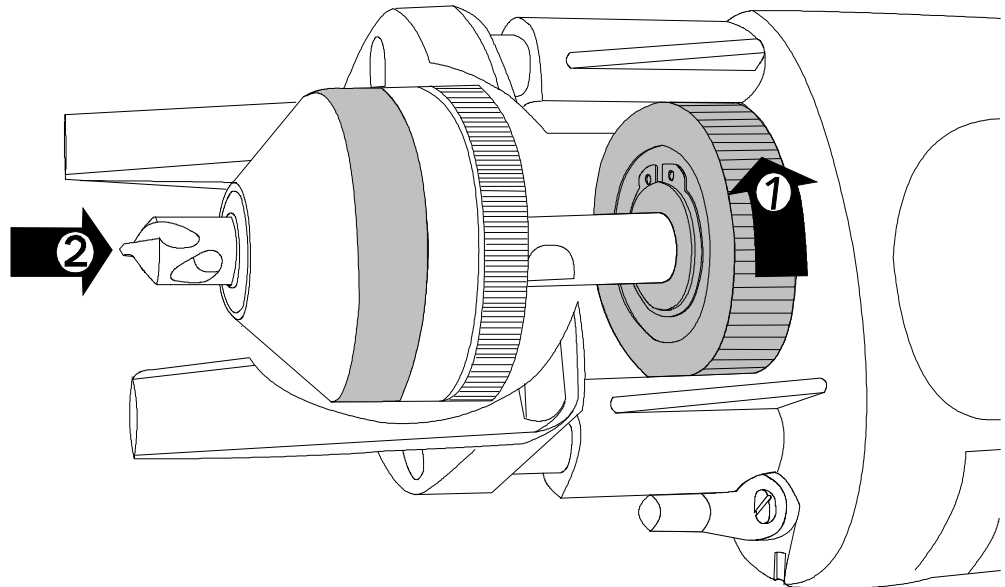
6.3 Chucking the head

Chucking

To insert the head into the chuck, rotate the locking ring (1) clockwise and slide the head shaft into the chuck. (2) Release the locking ring. Rotate the head in the chuck until it locks. Make sure the head is tightly chucked.

Removal

To remove the head (2) from the chuck (1), rotate the locking ring as far it will go. Turn the head to the same direction one quarter of a turn (1/4) at the same time pulling it out. Release the lock ring.



Chucking the head and removing it.

6.4 The tee forming process with the TD-35 machine

Since the process may be new to you, we recommend that you read the following instructions carefully and then practice a few times on some pieces of scrap tubing.

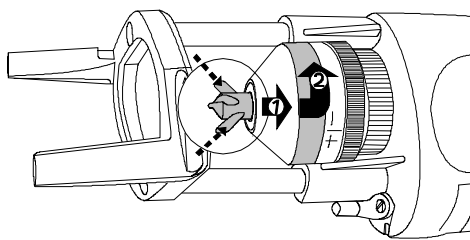


NOTE! Before forming any tee always make sure that the pipe is completely drained and that it is not under pressure

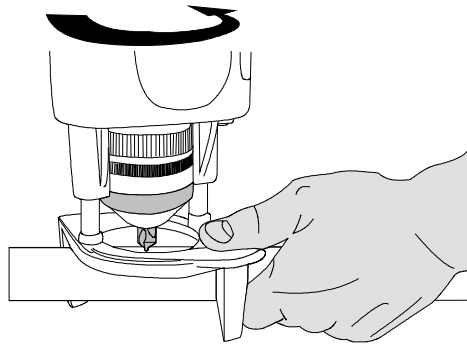
1. Select the correct head.
2. Check the forming pin span (T). Adjust if necessary. (See chapter 6.2.2).
3. Chuck the head.



4. **Lubricate the head** before every tee forming operation! Extend the forming pins and lubricate them as well as the cutting edges of the head as illustrated. **Always use Rothenberger lubricant.**

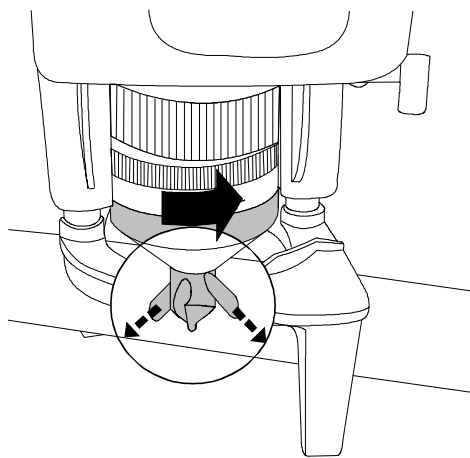


5. **Retract forming pins.** Press the conical cover towards the tool and rotate it clockwise to retract the forming pins.

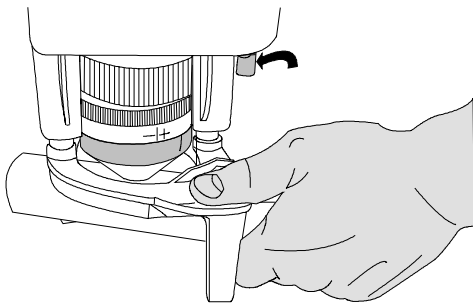


6. Pull the **support legs out** and place the tube support firmly onto the point where the tee is to be formed on the tube, as shown on the illustration. Press the tube support with the thumb against the tube and **twist** the machine **counterclockwise** at the handle of the tool. This **centers** the head onto the tube.

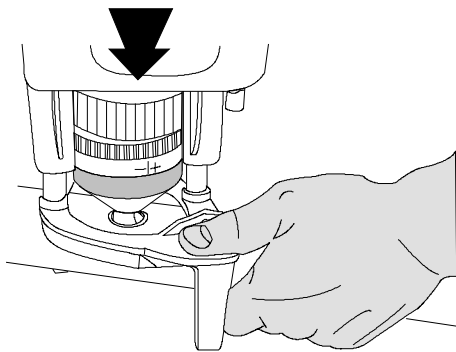
7. Start the tool by pressing the trigger and **drill** until the bit has fully penetrated into the tube. Release the trigger - the machine will stop.



8. **Extend the forming pins** on the head by pressing the conical cover towards the tool and rotating it counterclockwise until the head locks into the tee forming position. Do not extend the forming pins while the motor is running.



9. **Engage the feed mechanism** as shown. If it does not engage smoothly, rotate the motor by “bumping” the trigger only a short moment.



10. Start **forming the tee** by pulling the trigger and continue until the head is completely out of the tube. During the forming of the tee, keep the tube support against the tube and push the tool toward the tube. This insures that you obtain a circular tee.

IMPORTANT! Release the drill trigger as soon as the head clears the tee. This prevents damage to tee forming unit



NOTE! Never attempt “help” the tool by pulling it out of the tube. This would result in an oval tee!

11. Once the head has come **completely out** of the tee, release the trigger. Now the tee has been formed!



NOTE! Any burr or lubricant which may be inside the tube must be removed before brazing.

6.5 Annealing of pipe



DANGER! The annealed work piece is *extremely hot* after annealing. When working with the tube protective appliances should be used.



NOTE! Lubricate heads before each tee is formed.



NOTE! recommends annealing of the tube if the tee form is same size as the branch tube. The tube must anneal if the machine is not able to draw the tee form.

1. Heat the tube where the tee is to be formed, until it is dull red.
2. Let the tube cool down.
3. Drill the pilot hole.
4. Form the tee.



NOTE! Any burr or lubricant which may be inside the tee must be removed before brazing.



NOTE! The tubes must be joined together by brazing.

7. Maintenance

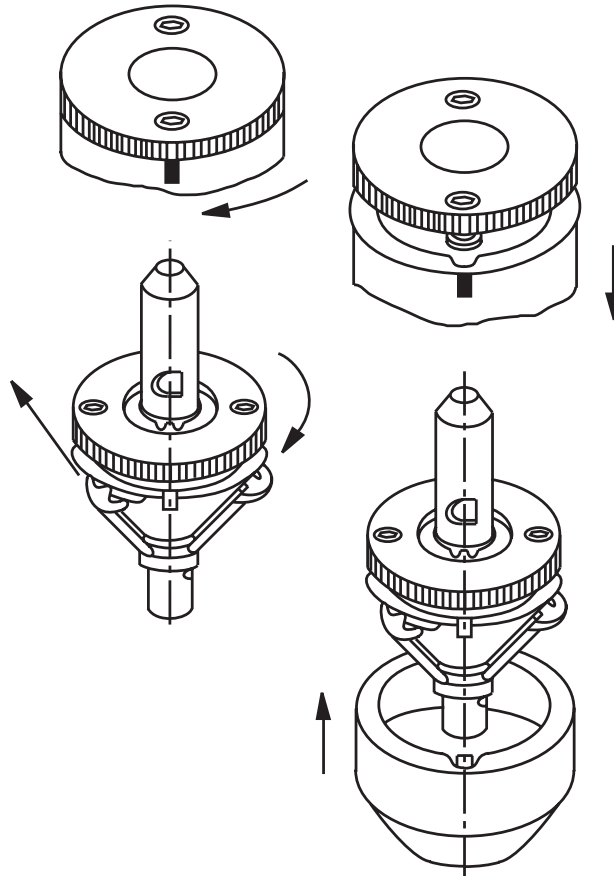
7.1 The maintenance of the TD-35

Rothenberger TD-35 tee forming machine is prelubricated and do not need special attention for maintenance. Clean dust and dirt from tool vents.



NOTE! All maintenance operations for the TD-35 tee forming machine and power unit are to be carried out only by authorized Rothenberger service workshops.

7.2 The replacement of the forming pins



1. Loosen the *two screws on the cover plate* one turn and rotate the conical cover with respect to the cover plate so that the conical cover can be removed. When the conical cover is removed rotate the cone so that the forming pins will slide from the shank.

2. The forming pins can now be changed.

3. Reassemble the head using new forming pins and *adjust* to the right tee diameter.

8. Trouble-shooting

Problem	Cause	Remedy
Tool stops in the middle of working process.	Mechanism of tee forming Unit is jammed in a extreme position There is not enough power for tee forming. Connecting Cord unplugged	Push the control switch to (FWD) position. Anneal the tube. Plug Connecting Cord
The power unit doesn't run.	The connection cord loose, or the plugs do not make contact with the wires inside the cord. Trigger not fully pressed.	Insert the cord into the bracket, or substitute the cord with a new one. Press the Trigger fully.
The size of the tee varies.	Dirt stuck to the surface or the holes of the forming pins. Adjusting screws of the head are too slack.	Clean the forming pins. Tighten the screws
Burrs in the tee that has been formed	Burrs in the pilot hole - the drill bit is dull - lubricant insufficient - lubricant of bad quality The forming pins are worn or dirt stuck on their surface.	- Change drill bit - Use more lubricant - Only lubricant recommended by Rothenberger is to be used Clean or change the forming pins

Problem	Cause	Remedy
Burr in the tee that has been formed	Insufficient lubricant during forming of the tee.	Always lubricate the head carefully before every tee forming operation
	Lubricant not suitable to the material	Consult your local Rothenberger representative
	The wall thickness of the tube exceeds the maximum allowable thickness	Consult the capacity charts
The forming pins break off or the drill shank breaks	Burr in the pilot hole -drill bit dull	Resharpener or change the drill bit
	The wall-thickness of the tube exceeds the max. allowable value.	See the capacity charts.
	Not enough lubricant during forming of the tee.	Lubricate the head carefully before forming the tee.
	The lubricant is not suitable for your material	Consult your local Rothenberger representative.
	Tool is not straight against the pipe.	Use counterplate. (extra equipment)

9. Disposing

Disposing of the tee forming machine

In the manufacturing of tee forming machines various kinds of metals, plastic and lubricants have been used. Dispose of your tee forming machine according to federal, state and local regulations.

10. Warranty

ROTHENBERGER guarantees that every TD-35 tee forming machine is free from defects in materials and workmanship (other than normal wear and tear) for a period of one (1) year from date of shipment. Should within this period any TD-35 be proved to Rothenberger's satisfaction to be defective, such product shall be repaired or replaced. Such repair or replacement shall be Rothenberger's sole obligation; whereas the buyer's only obligation is to inform Rothenberger of any such defect. Rothenberger must receive the reclamation in writing within 10 days after a defect having been noticed and, at Rothenberger's option, buyer will have to return the complete tool to the nearest Rothenberger dealer or authorised service workshop. ***THIS WARRANTY IS PRIMARY.***

Rothenberger's warranty shall be limited to the aforesaid warranty stipulations. Rothenberger SHALL NOT BE SUBJECT TO ANY OTHER OBLIGATIONS OR LIABILITIES, WHETHER ARISING OUT OF BREACH OF CONTRACT, TORT (INCLUDING NEGLIGENCE) OR OTHER THEORIES OF LAW, WITH RESPECT TO PRODUCTS SOLD OR SERVICES IMPLICATED, OR ANY UNDERTAKINGS, ACTS OR OMISSIONS RELATING THERETO. ROTHENBERGER SHALL NOT BE LIABLE FOR AND DISCLAIMS ALL CONSEQUENTIAL, INCIDENTAL AND CONTIGENT DAMAGES WHATSOEVER.

Please register your purchase by filling out and returning the warranty registration card enclosed. Save your receipt.

11. Supplement

11.1 Capacity chart of the TD-35

Use the capacity chart to determine the maximum wall-thickness of the tube and to select the right head.

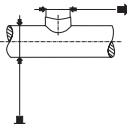
Instructions for the use of the capacity chart:

1. Use the unit of measure that is correct for you: the measures of the charts are in millimeters.
2. From the horizontal black row, find the tee size you need, and from the vertical black column the diameter of your run tube.
3. The intersection of the horizontal and vertical rows will show you the maximum wall-thickness of the tube. This thickness is not to be exceeded.

The head number is indicated in the second horizontal row.

Capacity chart for forming tees in copper tubes

Max wall-thicknesses (mm)



	10	12	15	18	22	28	35
	5310409	5310410	5310401	5310402	5310403	5310404	5310406
15	1.0	1.2	X				
18	1.0	1.2	1.2	X			
22	1.0	1.2	1.2	1.2	X		
28	1.2	1.2	1.2	1.2	1.2	X	
35			1.5	1.5	1.5	1.5	X
42			1.5	1.5	1.5	1.5	1.5
54			1.5	1.5	1.5	1.5	1.5
64					X	X	X
76,1					X	X	X

X = Annealing before forming the tee is recommended!

■ = Not allowed

11.2 EC Declaration of conformity for machinery

(Directive 89/392/EWG)

Manufacturer: ***Rothenberger Werkzeuge AG***

Address: ***Industriestr. 7, 65779 Kelkheim***

herewith declares that

TUBE BRANCHING MACHINE ***RODRILL TD-35 TYPE 3304***

- is in conformity with the provisions of the Machinery Directive, as amended, and with national implementing legislation;
- (Directive 89/392/EWG), including the alterations as well as the corresponding national legislation
- is in conformity with the provisions of the following other EC directives

EC directive 73/23/EEC

EC directive 93/68/EEC

And furthermore declares that

- the following (parts/clauses of) harmonized standards have been applied

EN 50144-1:95

EN 50144-2-1:95

Kelkheim, 20.06.00

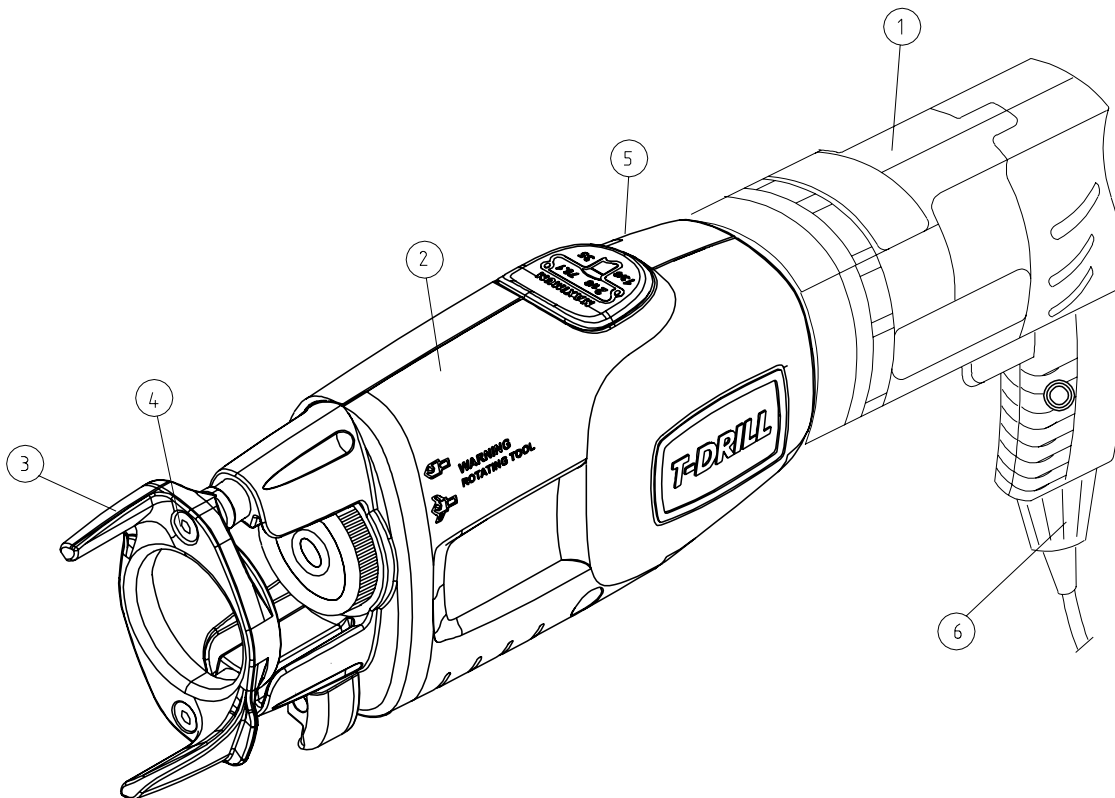
Gerhard Goldbach

(Place and date of issue)

(Name and job function of authorized person)

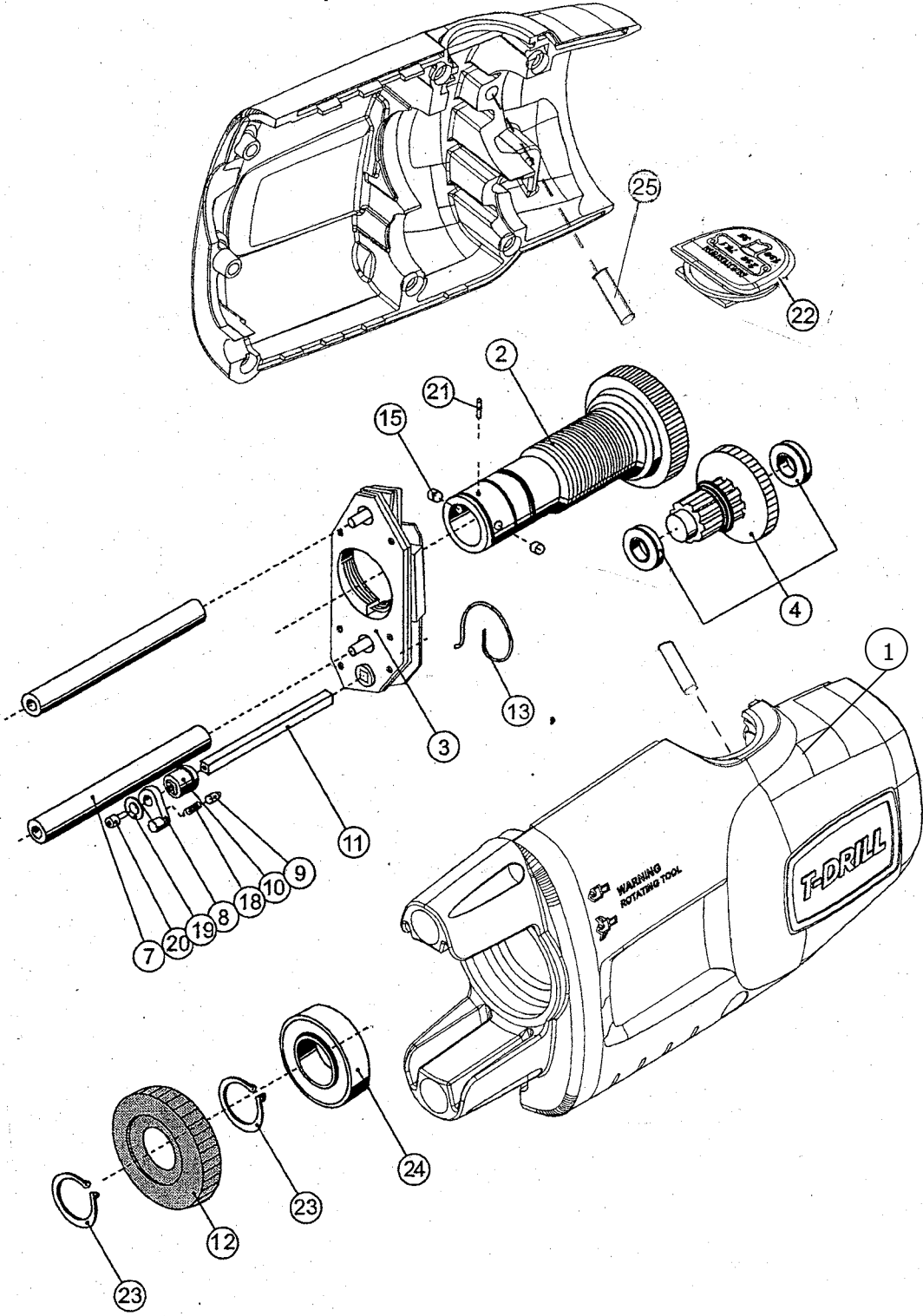
12. Spare parts list

12.1 RODRILL TD-35



	Part No.	Complete Assembly	
	022351X	Rothenberger TD-35	
Item	Part No.	Description	Qty
1	5330086	Power unit Euro	1
2	5330176	TD-35 gear box	1
3	3330076	Tube support	1
4	9114027	Socket head cap screw	2
5	4330088	Name plate	1
6	9048320	Cord, 230V Europe	1

12.2 The Gear Box of the Rothenberger Tee Forming Unit

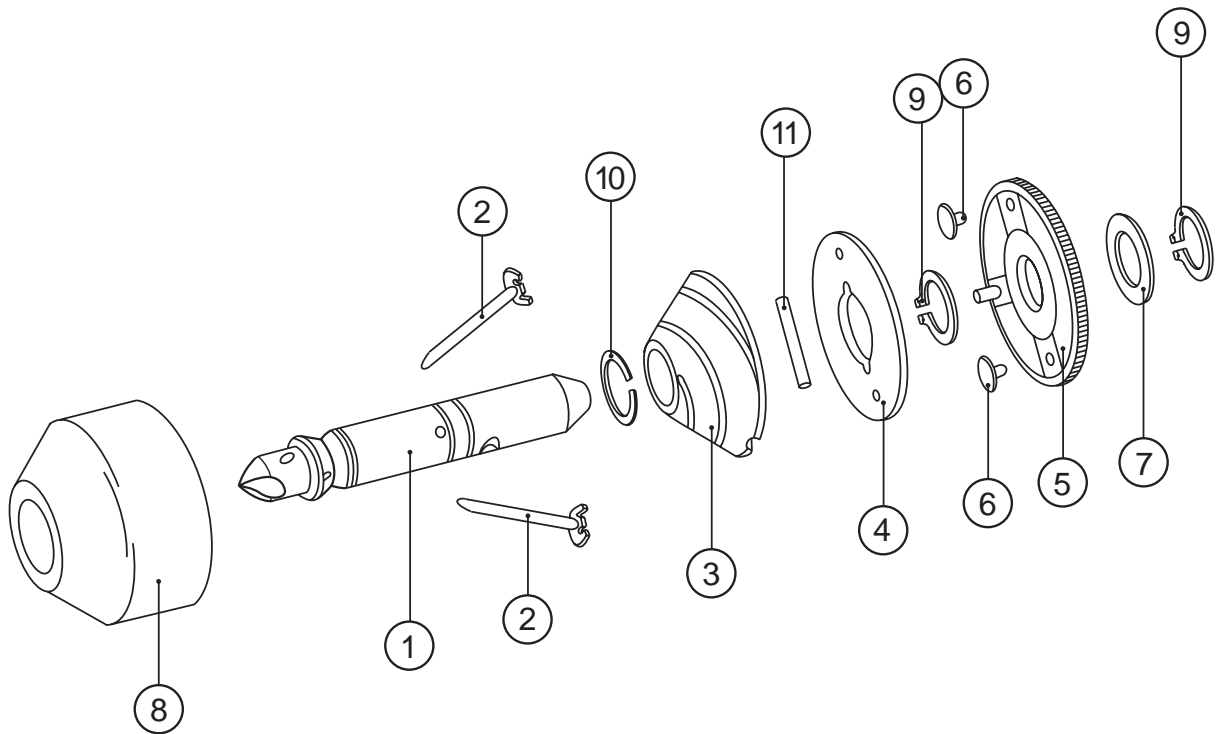


The Gear Box of the Rothenberger Tee Forming Unit

	Part No.	Complete Assembly	
	5330176	TD-35 Gear Box	

Item	Part No.	Description	Qty
1	5330175	Housing Rothenberger	1
2	5330138	Lead screw	1
3	5330097	Nut assy complete	1
4	5330017	Reduction gear	1
7	4330099	Push rod	2
8	3330074	Lever	1
9	4540068	Pin	1
10	3330075	Drive piece	1
11	4540056	Bar	1
12	3300056	Locking ring	1
13	4300055	Chuck ring spring	1
15	4300054	Chuck drive pin	2
18	9026146	Pressure spring	1
19	9012205	Spring washer, curved	1
20	9017033	Slot-headed screw	1
21	9018206	Spring pin	1
22	3330073	Plug	1
23	9019007	Retaining ring	1
24	9021006	Groove ball bearing	1

12.3 The head



Tee Size Ø mm	10	12	15	18	22	28	35
Nominal Tee Size Ø inch	1/4	3/8	1/2	5/8	3/4	1	1 1/4
Order No.	5310399	5310400	5310401	5310402	5310403	5310404	5310406

Item	Description	Qty	Part No.						
1	Drill Core	1	2310140	2310150	2310160	2310170	2310180	2310210	4310221
2	Forming Pin	2	3310240	3310245	3310250	3310250	4310466	4310467	3060105
3	Cone	1	2310283	2310283	2310283	2310283	2310283	2310283	2310451
4	Adjustment Plate	1	3310293	3310293	3310297	3310310	3310304	3310304	3310304
5	Cover Plate Assemb	1	4310323	4310329	4310335	4310341	4310347	4310359	4310363
6	Screw	2	4310372	4310372	4310372	4310372	4310372	4310372	4310372
7	Spring	1	4310376	4310376	4310376	4310376	4310376	4310376	4310376
8	Conical Cover	1	3310380	3310380	3310380	3310380	3310389	3310389	3050149
9	Circlip	2	9019003	9019003	9019003	9019003	9019003	9019003	9019003
10	Circlip	1	9019201	9019201	9019201	9019201	9019201	-	-
11	Pin	1	9018038	9018038	9018038	9018038	9018038	9018038	9018038

12.4 Optional Equipment

Item	Part No.	Description	Qty
1	2.2080	Dimpler pliers	1
2	2.2399	ROCOL lubricant	1

