T-DRILL

Tee forming machine

T-35

Instruction manual
Spare parts list

Version

3311-10-02
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Instruction Manual

This instruction manual includes a spare parts list and instructions for set-up, operation and maintenance of the **T-DRILL T-35 tee forming machine**
Type code of manual is 3311-10-02

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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.

Table of contents

1. How to use the instruction manual

1.1 Warning symbols used in this manual

IMPORTANT! A grey base colour is used to emphasise an important detail

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, operation and maintenance of the **T-DRILL T-35 tee forming machine.** This book also includes instructions on how to use and select T-DRILL heads for hand tools.

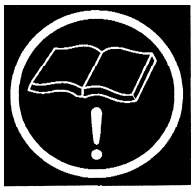
NOTE! Before carrying out any actions, read chapter 2 "Safety Instructions".

Familiarize yourself with the machine before using it. Read the operation sequence described in the instruction manual thoroughly before preparing, operating or maintaining the machine.

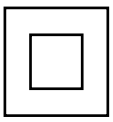
IMPORTANT! Save these instructions for future use!

1.2 Symbols on the tool

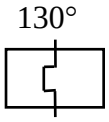
The following list identifies the symbols on the tool.



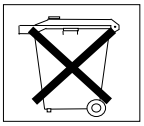
Read the instruction manual carefully before using this tool.



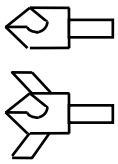
Double Insulated



Thermally protected to 130°C



Warning! Do not throw away. Please recycle



Warning! Mind your fingers. Rotating tool.

2. General safety instructions

Read all the instructions before using the machine.

Know your power tool - Read the instruction manual carefully. Get to know your own skills and limitations as well as the potential hazardous characteristics to this tool.

DANGER! - The use of any accessories or attachments other than the ones recommended in these operating instructions or the T-DRILL catalogue may lead to a risk of personal injury.

NOTE! Never detach the power unit from the T-DRILL tee forming unit. Detaching the power unit will damage the alignment produced in factory.

NOTE! - The T-DRILL T-35 is designed for use with power unit T-DRILL has chosen. **Using any other power units** with the T-DRILL T-35 tee forming unit **is not permitted.**

IMPORTANT! The warranty is void if the power unit is detached from the tee forming unit!

2.1 Work area

a) **Keep the working area clean and well lit**.Cluttered or dark areas and invite injuries.

b) **Do not operate power tools in explosive atmospheres, suchs as in the presence of flammable liquids, gases and dust**. Power tools create sparks which may ignite the dust or fumes.

c) **Keep children and bystanders away while operating a power tool**. Distractions can cause you to lose control.

2.2 Electrical safety

a) **Power tool plugs must match the outlet**. **Never modify the plug in any way. Do not use any adapter plugs**

with earthed (grounded) power tools. Unmodified plugs and matching outlets will reduce risk of electric shock.

b) **Avoid body contact with earthed or grounded surfaces, such as pipes, radiators, ranges and refigerators.** There is an increased risk of electric shock if your body is earthed or grounded.

c) **Do not expose power tools to rain or wet conditions.** Water entering a power tool will increase the risk of electric shock.

d) **Do not abuse the cord. Never use the cord for carrying, pulling or unplugging the power tool. Keep cord away from heat , oil, sharp edges or moving parts.** Damaged or entangled cords increase the risk of electric shock.

e) **When operating a power tool outdoors, use an extension cord suitable for outdoor use.** Use of cord suitable for outdoor use reduces the risk of electric shock.

2.3 Personal safety

a) **Stay alert, watch what you are doing and use common sense when operating a power tools. Do not use a power tool while you are tired or under the influence of drugs, alcohol or medication.** A moment of in attention while operating power tolls may result in serious personal injury.

b) **Use personal protective equipment. Always wear eye protection.** Protective equipment such as dust mask, non-skid safety shoes, hard hat, or hearing protection used dor appropriate conditions will reduce personal injuries.

c) **Prevent unintentional starting. Ensure the switch is in the off-position before connecting to power source and/or battery pack, picking up or carrying the tool.** Carrying power tools with your finger on the switch or energising power tools that have the switch on invites accidents.

d) **Remove any adjusting key or wrench before turning the power tool on.** A wrench or a key left attached to a rotating part of the power tool may result in personal injury.

e) **Do not overreach. Keep proper footing and balance at all times.** This enables better control of the power tool in unexpected situations.

f) **Dress properly. Do not wear loose clothing or jewellery. Keep your hair, clothing and gloves away from moving parts.** Loose clothes, jewellery or long hair can be caught in moving parts.

g) **If devices are provided for the connection of dust extraction and collection facilities, ensure these are connected and properly used.** Use of dust collection can reduce dust-related hazards

2.4 Power tool use and care

a) **Do not force the power tool. Use the correct power tool for your application.** The correct power tool will do the job better and safer at the rate for which it was designed.

b) **Do not use the power tool if the switch does not turn it on and off.** Any power tool that cannot be controlled with the switch is dangerous and must be repaired.

c) **Store idle power tools out of the reach of children and do not allow persons unfamiliar with the power tool or these instructions to operate the power tool.** Power tools are dangerous in the hands of untrained users.

d) **Disconnect the plug from the power source from the power tool before making any adjustments, changing accessories, or storing power tools.** Such preventive safety measures reduce the risk of starting the power tool accidentally.

e) **Maintain power tools. Check for misalignment or binding of moving parts, breakage of parts and any other condition that may affect the power tool's operation. If damaged, have the power tool repaired before use.** Many accidents are caused by poorly maintained power tools.

f) **Keep cutting tools sharp and clean.** Properly maintained cutting tools with sharp cutting edges are less likely to bind and are easier to control.

g) **Use the power tool, accessories and tool bits etc. in accordance with these instructions and in the manner intended for the particular type of power tool, taking into account the working conditions and the work to be performed.** Use of the power tool for the operations different from those intended could result in a hazardous situation.

2.5 Service

Repairs must be carried out by an authorised T-DRILL service agent – This electric tool complies 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.

2.6 Safety instructions for tee forming

Do not touch the rotating tool when the work cycle is in progress.

Mind your fingers. When fixing the machine to the tube, be careful not to leave your fingers between the machine and the tube.

Use protective gloves. When handling the tools, be careful with the cutting blades.

Use protective shoes. A falling machine or tool may damage your feet.

Use safety glasses. Also use a face or dust mask if the cutting operation creates dust.

Use protective gloves. Lubricating oil may irritate the skin.

Pay attention to adequate ventilation. The fumes emitted by the lubricant may irritate your eyes and respiratory system.

Familiarise yourself with the contents of the safety data sheet regarding the lubricants.

Provide adequate protection in order to prevent damage. Loose chips are hot and sharp.

Never carry the tool with your finger on the trigger. Be careful to avoid accidental starting of the machine when handling it.

Always use protective gloves when cleaning the collar. The edges of the collar are sharp.

Keep your hands away from the danger area. Do not use inadequate protective gloves as they may get caught in the rotating tool.

Never use the machine with the trigger lock on.

The vibration passed on to the operator's hand is less than 2.5 m/s (8.2 ft/s).

3. T-DRILL T-35, general

3.1 Introduction

T-DRILL T-35 is a special tool designed for forming tees mechanically in copper tubes typically found in domestic, commercial and industrial tubing systems. The T-35 extrudes an outlet in the run tube and the branch tube can be joined to the outlet by brazing.

Before using the T-35, make sure that you have read and fully understood the safety instructions, which apply to all power tools and to the capabilities of this special tool.

The **T-DRILL T-35** includes an electric network-driven power unit with accessories. The power unit is grounded 120 V or double insulated 110 V or 230 V.

3.2 The Parts of the T-35

Main parts: 1. **T-DRILL** tee forming unit, 2. Power unit, 3. Connecting cord, 4. **T-DRILL** head, 5. Tube support

3.3 Information about Accessories

For easier use of **T-DRILL** T-35 the following accessories are available:

3.3.1 Notcher ND-54

The tube end notcher shapes the end of the branch pipe to match the inner curve of the run tube. In this way maximum flow is achieved in the joint. The notcher also presses two dimples simultaneously in the end of the branch tube, one acting as a depth stop and the other for inspection of the joint after brazing.

1. Notcher, 2. Gauge block, 3. Ring

3.3.2 Gauge block and ring

The correct size settings of the **T-DRILL** head for various tube sizes can easily be checked with the gauge block. The size range is NS 1/4"-1" with the gauge block and 1¼" with the ring.

3.3.3 Lubrication for copper

A bottle of lubricant to be used for forming the outlet in copper tube, is included.

3.4 Operating Range of the Machine

The **T-DRILL** T-35 is intended for forming a tee in copper tube. The branch tube is joined to the run tube by brazing.

The outlet size range of T-35 is NS ½" to 1¼" (10 –35mm).

The diameter of the run tube can be ½ " to 2½" (15 – 76,1 mm). The maximum wall thickness of the tube to be branched depends on the tube diameter and the size of the **T-DRILL** head used.

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

3.5 Technical specifications

T-35	Value	NOTE!
Type Code	3311	
Tee diameter	NS ½" - 1¼" / 10– 35mm	
Run tube	NS ½" – 2½" / 15– 76,1mm	
Max. wall-thickness	See Capacity chart	
Materials	Copper (Cu)	
Cycle	20 s	
Rotation speed of the spindle	470 RPM	
A-accentuated equivalent level of sound pressure	89 dB (A)	Use ear protectors!
Vibration	less than 8.2 foot/ s^2 (2.5 m/ s^2)	
Dimensions of the unit	20"(l) x 8" (h) 3"(d) 500 (l) x 200 (h) x 80 (d) mm	
Weight of the unit	9 lbs /4,1 kg	
Supply voltage of the unit	120V AC / 6,0AMPS 230V AC / 730W 110V AC / 680W	

4. Transport, Handling and Storage

4.1 T-35

The **T-35** is delivered in a transport box, dimensions 25.2" (640mm) x 6.5" (165mm) x 14.2" (360mm) (w x h x d). Depending on the accessories included, the weight of the box is between 29 - 49 lbs (13 and 23 kg) .

Storage

Keep the T-35 stored in a cool, dry place, covered to protect it from dust, etc.

5. Commissioning

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

The T-35 power unit is equipped with a connecting cord which allows quick changeovers in field conditions.

Detachment and attachment of the connecting cord

Detachment of the cord

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

Attachment of the cord

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

5.2 T-35 start-up check

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

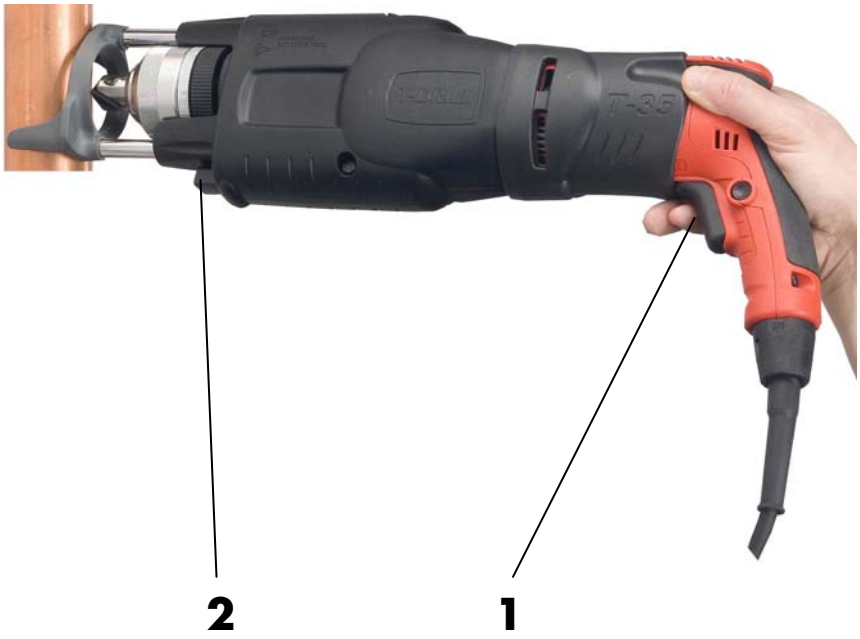
Before using the machine, proceed as follows:

1. Check that the cord is connected to the machine
2. Check that the cord is connected to the mains.
3. Test functioning before attaching a tube.

6. Operation of the machine

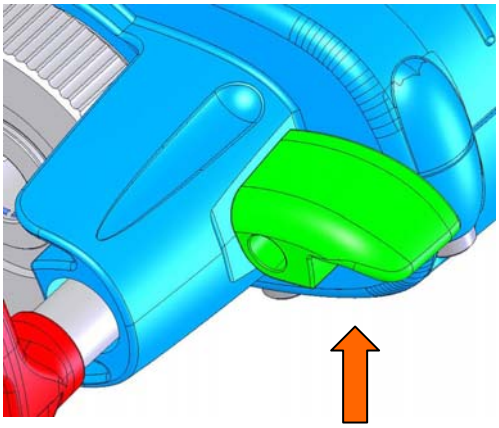
6.1 Description of control devices

6.1.1 T-DRILL T-35



Control devices: 1. Trigger, 2. Feed mechanism engagement lever

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



Feed mechanism lever

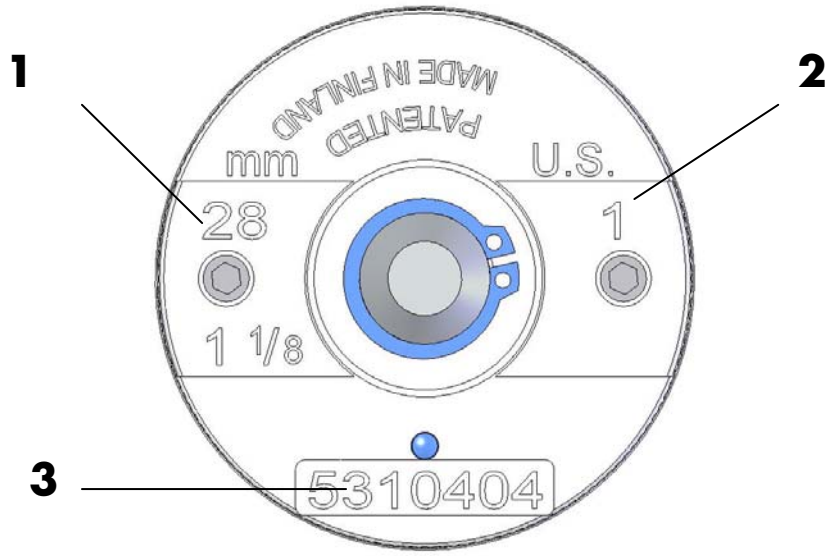
The feed mechanism lever **is situated near the chuck-ring. The feed mechanism is engaged (on) when the lever is turned down, i.e. as shown on the illustration.** If the feed mechanism lever does not engage smoothly, rotate the motor by "bumping" the trigger for a while.

NOTE! Do not force lever.

6.2 Selection and adjustment of the T-DRILL heads

6.2.1 Identification of the T-DRILL head

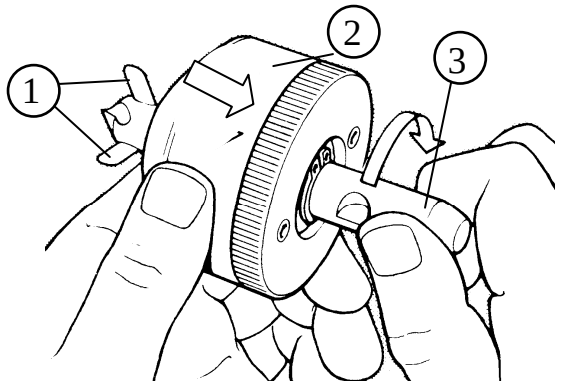
The size of the **T-DRILL** head is stamped on the cover plate:



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

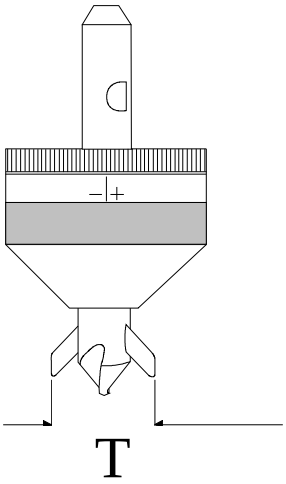
6.2.2 Fine adjustment of the outlet diameter

NOTE! Extend the forming pins before adjusting the outlet diameter.

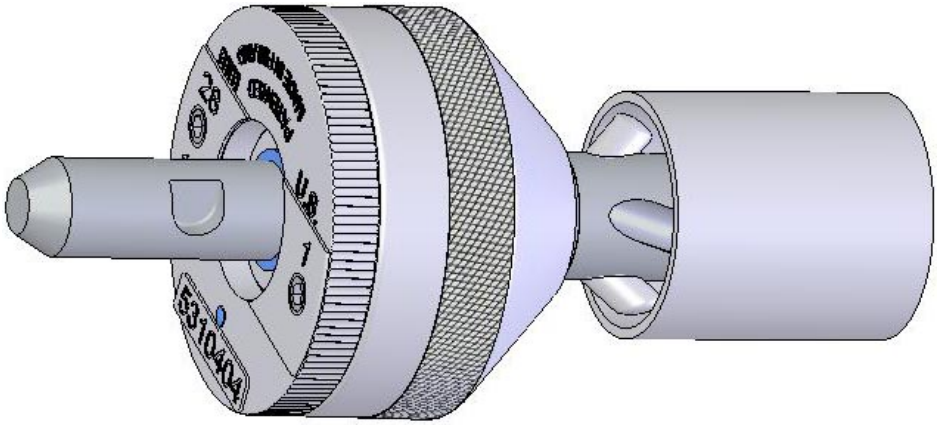


To extend the forming pins (1) press the conical cover (2) in the direction of the shank. At the same time twist the shank (3) clockwise until a positive stop is reached, and the forming pins extend. Make a location mark on the cover and the conical cover.

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

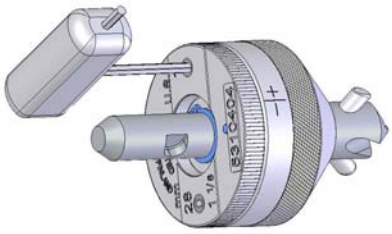


Check the forming pin span diameter T



You can check the forming pin span diameter T with an adjusting ring (option)

Depending on the size of the T-DRILL head, the forming pin span T should be 0,020" – 0,055" (0,5 – 1,4mm) bigger than the branch pipe's outer diameter (O.D.)



1. Loosen the screws on the cover plate by about one turn using a 3 mm hexagon wrench as supplied with the **T-DRILL** package.

2. To enlarge the outlet rotate **the conical cover** in the plus (+) direction. Hold the cover plate stationary.
To make a smaller outlet **rotate the conical cover** in the minus (–) direction while holding the cover plate stationary.

One notch on the cover-plate equals to 0.01" or 0,25 mm on the forming pin span.

3. Tighten the two screws on the cover plate and check the adjustment either by measuring across the pins or by forming a trial outlet.

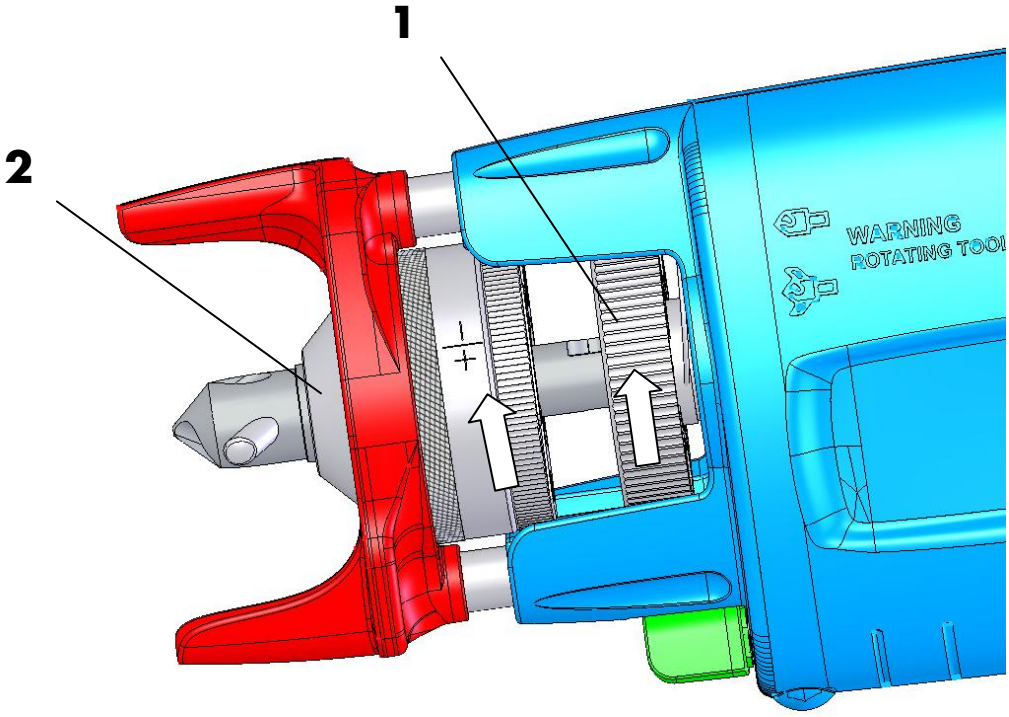
6.3 Chucking the T-DRILL head

6.3.1 Chucking

To insert the **T-DRILL** head into the chuck, rotate the locking ring (1) clockwise and slide the **T-DRILL** head (2) shaft into the machine. Release the locking ring. Rotate the **T-DRILL** head (3) in the chuck until it locks. Make sure the **T-DRILL** head is tightly chucked.

6.3.2 Removal

Rotate the locking ring (1) and head (2) in the same direction one quarter of a turn (1/4) and simultaneously pull the **T-DRILL** head straight out. Release the locking ring.



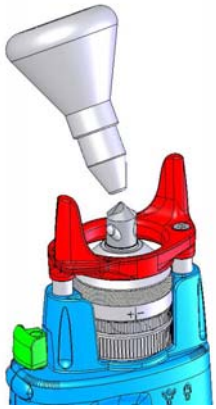
Chucking the T-DRILL head and removing it. 1. Locking ring, 2. **T-DRILL** head

6.4 Tee forming process with the T-DRILL T-35

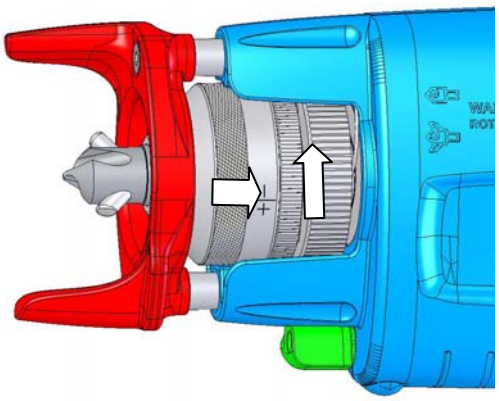
Since the process may be new to you, we recommend that you read the following instructions carefully and then practice a few times on some pieces of scrap tubing.

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

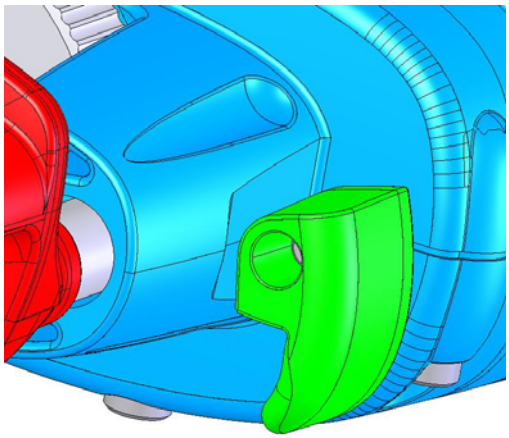
1. Select the correct **T-DRILL** head.
2. Check the forming pin span (T). Adjust if necessary. (See section 6.2.2).
3. Chuck the **T-DRILL** head.



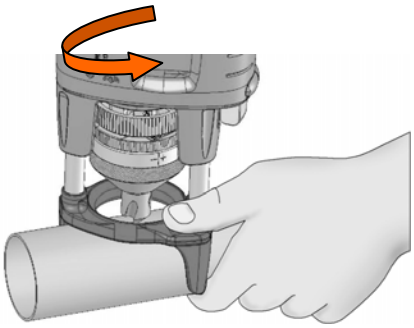
4. **Lubricate the T-DRILL head** before every tee forming operation! Extend the forming pins and lubricate them as well as the cutting edges of the T-DRILL head as illustrated. **Always use T-DRILL lubricant.**



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

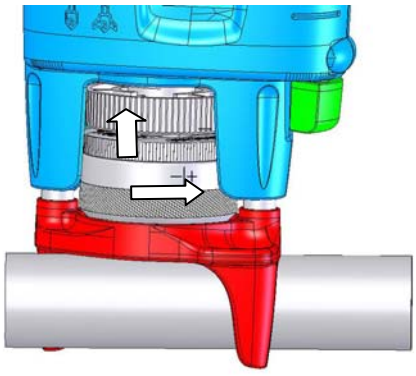


6. Check that the **feed mechanism lever** is in the **"off" position**.



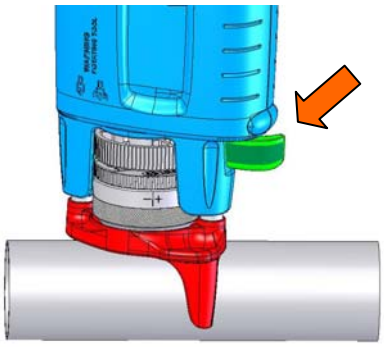
7. Pull the **support legs out** and place the tube support firmly onto the point where the tee is to be formed on the tube, as shown on the illustration. Press the tube support with the thumb against the tube and **twist** the machine **counterclockwise** at the handle of the tool. This **centers**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

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

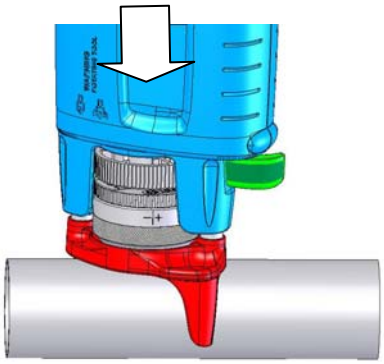


9. **Extend the forming pins** on the T-DRILL head by pressing the conical cover towards the tool and rotating it counterclockwise until the **T-DRILL** head locks into the tee forming position. **Do not extend the forming pins while the motor is running!**

NOTE! Do not extend the forming pins while the motor is running!



10. Turn the selector knob. **Engage the feed mechanism** as shown. If it does not engage smoothly, rotate the motor by "bumping" the trigger for a while.



11. Start **forming the outlet** by pulling the trigger and continue until the **T-DRILL** 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 ensures that you obtain a circular outlet.

12. Once the **T-DRILL** head has come **completely out** of the outlet, release the trigger. The outlet is now ready.

IMPORTANT! Release the drill trigger as soon as the **T-DRILL** head clears the rim of the outlet.

NOTE! Never attempt to "help" the tool by pulling it out of the tube. This would result in an oval outlet!

NOTE! Wipe away any exess lubricant which may have remained inside the outlet before brazing.

6.5 Annealing of tube

DANGER! The annealed work piece is extremely hot after annealing. Protective gloves should be used when working with the tube.

1. Heat the point of the tube where the tee will be formed until it is glowing red.
2. Allow the tube to cool. You can speed up the cooling process with water, for example. The tube will retain its workability properties after annealing even once the tube has cooled down.
3. Drill a pilot hole into the tube.
4. Start the tee-forming process.

NOTE! Always lubricate the **T-DRILL** head before drilling and tee-forming.

NOTE! T-DRILL recommends that tubes are annealed whenever the formed outlet is as large as the tube itself. The tube should also be annealed if the machine does not have sufficient power to form the tee.

NOTE! Any burrs or lubricant left on the inner surface of the tee must be removed from the tube before brazing.

NOTE! The branch tube is joined to the run tube by brazing.

7. Maintenance

7.1 The maintenance of the T-DRILL T-35

The **T-DRILL T-35** is prelubricated and does not need special attention for maintenance. Clean dust and dirt from tool vents.

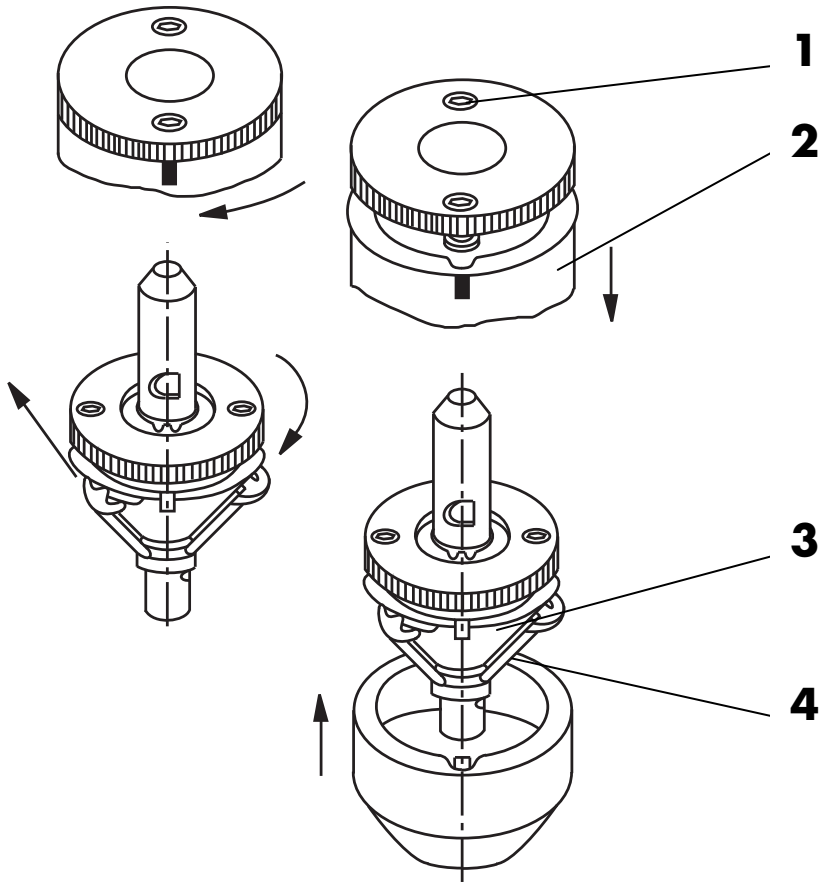
NOTE! All other maintenance measures that need to be performed on the T-35 tee-forming machine or the power unit during the warranty period must be carried out by certified T-DRILL service agents.

7.2 Replacement of the forming pins

1. Loosen the **two screws (1) on the cover plate** one turn and rotate the conical cover (2) with respect to the cover plate so that the conical cover can be removed. When the conical cover is removed rotate the cone (3) so that the forming pins (4) will slide from the shank.

2. The forming pins can now be replaced.

3. Reassemble the **T-DRILL** head using new forming pins and **adjust** to the correct outlet diameter.



1. Screws, 2. conical cover, 3. cone, 4. forming pins

8. Trouble-shooting

Problem	Cause	Remedy
The feed mechanism does not engage.	The threads of the screw and the nut are not merging.	Rotate the motor by "bumping" the trigger and turning the lever at the same time.
The power unit is not running.	The connection cord is loose, or the plugs are not making contact with the wires inside the cord. The trigger is not fully pressed. The machine is not powerful enough to form a tee in the tube.	Insert the cord into the bracket, or replace the cord with a new one. Press the trigger fully. Anneal the tube.
Burrs in the formed tee	Burrs in the pilot hole - the drill bit is dull - not enough lubricant - poor-quality lubricant The forming pins are worn or dirt is stuck to their surface. Not enough lubricant during formation of the outlet. Lubricant not suitable for the material. The wall thickness of the tube exceeds the maximum permitted thickness.	- Anneal area to be drilled - Change drill bit - Use more lubricant - Only use lubricant recommended by **T-DRILL** Clean or change the forming pins Always lubricate the **T-DRILL** head carefully before every outlet forming operation Consult your local **T-DRILL** representative Consult the capacity charts
The size of the tee varies.	Dirt stuck to the surface or the holes of the forming pins. The adjusting screws of the head are too loose.	Clean the forming pins. Tighten the screws.

Problem	Cause	Remedy
The forming pins break off or the drill shank breaks	Burrs in the pilot hole: - drill bit dull	Resharpen or change the drill bit.
	The wall thickness of the tube exceeds the max. allowed thickness.	See the capacity charts.
	Not enough lubricant during forming of the tee.	Lubricate the **T-DRILL** head carefully before forming the outlet.
	The lubricant is not suitable for your material.	Consult your local **T-DRILL** representative.
	The tool is not straight against the pipe.	Check the angling of the machine.

If you cannot resolve the problem with the help of our trouble-shooting information, please get in touch with your own **T-DRILL** representative.

State the following details:

- Name of your company
- Your own name and function in the company
- Your telephone number
- Your fax number
- Your e-mail address

In order to speed up the solution to your problem, please state the following information regarding the machine:

- The name of the machine
- The manufacturing code
- A short description of the problem

9. Disposal

Disposal of the T-DRILL machine

Various kinds of metals, plastics and lubricants have been used in the manufacture of the **T-DRILL** machines. Dispose of your **T-DRILL** machine according to federal, state and local regulations.

10. Warranty

T-DRILL guarantees that every T-DRILL T-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. If within this period any T-35 machine is found to be defective and the defects are acknowledged by **T-DRILL,** such product shall be repaired or replaced. Such repair or replacement shall be **T-DRILL**'s sole obligation, whereas the buyer's only obligation is to inform **T-DRILL** of any such defect. **T-DRILL** must receive a complaint in writing within 10 days after a defect has been noticed and, if **T-DRILL** so decides, the buyer will have to return the complete tool to the nearest **T-DRILL** Representative or Distribution Centre. **THIS WARRANTY IS PRIMARY.**

T-DRILL's warranty shall be limited to the aforesaid warranty stipulations. **T-DRILL** SHALL NOT BE SUBJECT TO ANY OTHER OBLIGATIONS OR LIABILITIES, WHETHER ARISING OUT OF BREACH OF CONTRACT, TORT (INCLUDING NEGLIGENCE) OR OTHER BRANCHES OF LAW, WITH RESPECT TO PRODUCTS SOLD OR RELATED SERVICES, OR ANY UNDERTAKINGS, ACTS OR OMISSIONS RELATING THERETO. **T-DRILL** DISCLAIMS ANY LIABILITY FOR ANY CONSEQUENTIAL, INCIDENTAL AND CONTINGENT DAMAGES WHATSOEVER.

Please register your purchase by filling in and returning the warranty registration card enclosed. Keep your receipt.

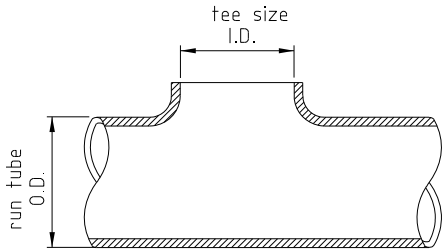
11. Supplement

11.1 Capacity chart

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

Instructions for the use of the capacity charts:

1. Use the unit of measure that is correct for you: the measures of the charts are in both millimetres and inches.
2. From the vertical black row, find the inner diameter of the tee size you need (I.D.), and from the horizontal black column the outer diameter of your run tube (O.D.).



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.

Capacity chart for forming tees in copper tubes

T-35 capacity and instruction chart for M, L, & K tubing

Run Size	1/2"	3/4"	1"	1 1/4"	1½""	2"	2½"
Nominal Branch Size	Braze all joints. Notch and dimple all branch tubes. Place dimples in line with the run of the tube.						
1/2"	2	1	1	1	1	1	1 *
3/4"		2	1	1	1	1 *	1 *
1"			2	1	1	1 *	1 *
1 1/4"				2	1 *	1 *	1 *

NOTE! Drill bit & forming pins should be lubricated every time an outlet is formed.

When annealing is required, heat area to a dull red color. Make sure T-DRILL head is away from flame.

1. Extend tube supports, place tube supports on either side of tube. Drill pilot hole, extend forming pins, engage feed mechanism, form tee (Use high speed). Maintain some pressure towards the tube.

2. After drilling pilot hole, remove drill by engaging feed mechanism. Anneal briefly below each side of pilot hole. Reinsert drill, extend forming pins and form tee. It may be necessary to slightly oversize forming pins to compensate for springback in copper tube wall.

* Pre-anneal area where outlet is to be formed

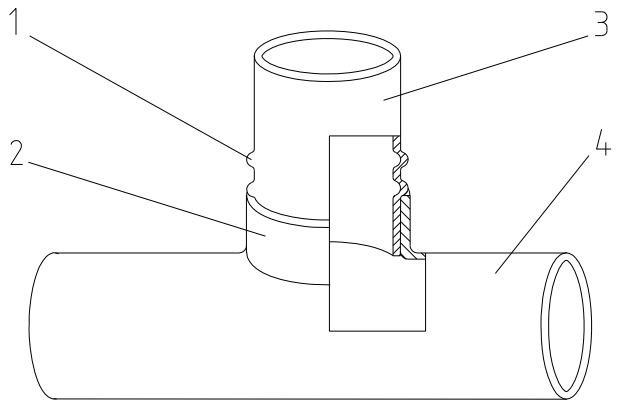
12. Notcher

12.1 General

12.1.1 Purpose of the tool

The tube end notcher is a device for the preparation of the end of the tube before insertion into the T-branch collar. It cuts a curved notch and produces two dimples simultaneously, one ¼" (6mm) atop the other. When these dimples are placed in line with the run of the tube, one acts as a depth stop and the other as a point of inspection.

NOTE! Bottom dimple rests on top of the rim of the outlet.



1. Point of inspection, 2. Depth stop, 3. Branch tube, 4. Run tube

12.1.2 Operating range

In /NS	mm
3/8	12
½	14-16
5/8	18
¾	22
1	28
1¼	35
1½	42
2	54

12.1.3 Dimensions

Measure	in	mm
Length	16,5	410
Operational width	6,5	160
Height, lever in upright position	20	500
Height, lever in down position	7	175
Weight	15 lbs	6,8 kg

12.1.4 Description of parts

See chapter 13.6

12.2 Operation instructions

Lay the notcher on an even surface. Line up the appropriate die with the base by rotating the body plate. The appropriate die size should face away from the base for maximum leverage. Insert the tube into proper die. Push the lever all the way down to ensure that the notch and dimple are properly formed. Release the lever. Turn the tube 180° so that the dimples that have been formed line up with the two set screws in the holder pin. Push the lever again. Release. If the tube is already brazed with one end to the pipework, operate the notcher like pliers by using the lever and base as handles.

12.3 Maintenance

12.3.1 Loose holder pins

In case holder pins are loose, unscrew both screws on the name plate, lift up name plate and tighten the set screw for the holder pin with a 3 mm hex wrench.

12.3.2 Dimple /depth stop are too shallow

The notcher tips in the holder pins are preadjusted at the factory to provide dimple /depth stop of the proper depth.

In the dimples become too shallow the reason can be loose holder pins. Check and tighten (point 4.1). If this doesn't help, put lever in the down position, turn notcher on its side and tighten the 19 mm nut under the base plate until it is firmly screwed down.

The indicator that the nut is properly tightened is that the lever stays in the down position when it is picked up and has to be physically brought to the up position.

12.3.3 Adjustment of notcher tips

In case notcher tips need fine adjustment do the following:
Heat holder pin with a flame until tips can be turned with 2mm wrench to the proper depth. Heating is necessary because of glue on tip's screw.

12.3.4 How to replace lower die

Remove the 19mm nut under the base as follows:
Put lever in down position. Turn notcher on it's side and loosen the nut.
Noe you can remove screw rod, upper and lower die assemblies, spring and base from each other.
Lower die has been tightened on the body plate with the help of 4 pieces of 6mm screws. Loosen with a 6mm hex wrench and remove.

12.3.5 How to replace upper die

Remove upper die assy as above (point 12.3.4). To remove name plate, unscrew the two screws and lift off name plate. Secure tube shaft to vise. Only loosen lock screws of holder pins with 3mm wrench and remove lock screw of 2″ (54mm) holder pin (this will help to position upper die to the right spot when assembling).

Remove all holder pins. Loosen lock nut on the top and remove that + washer with the help of hook key. 45-50mm hook key is required or loosen with screw driver and mallett. Remove two pins in the assy by hammering them trough the holes with center punch. Remove holder pin plate and replace upper die. Assembly may be done as follows: Assemble upper die and holder pin plate on support plate for upper die so that holes Ø 6mm are on the same line. Upper die's position must be such that the two smallest dies are on the left of 2″ (54mm) dies.

Hammer the pins Ø 6mm (2 pcs) into the holes.

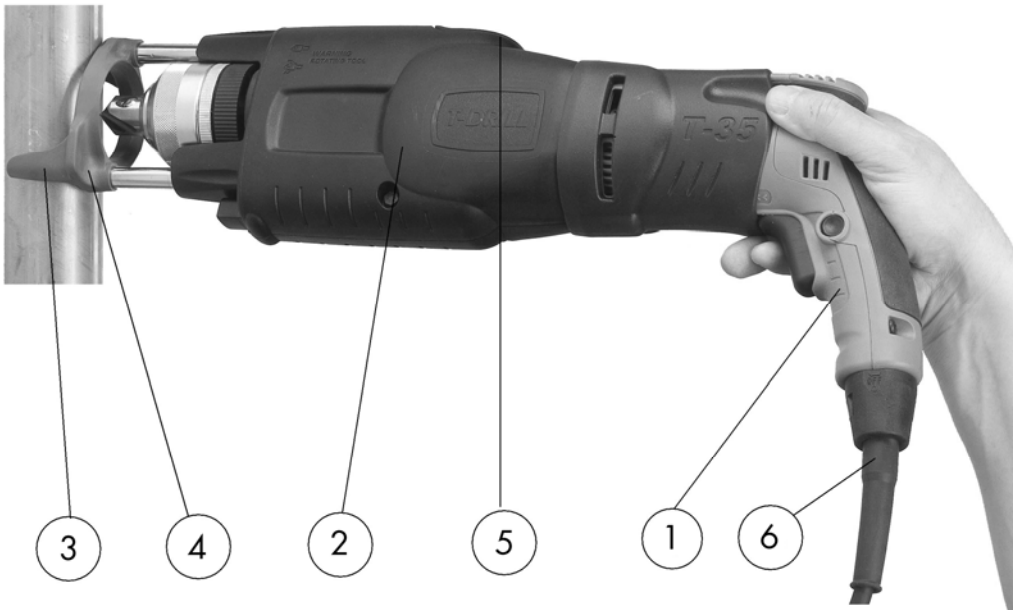
Assemble the washer and lock nut and tighten. Assemble the holder pins and tighten the lock screw of those. There are similar holder pins 1″, 1¼″, 1½″, 2″ (28-54mm)# and four different from 3/8″ (12mm) up to ¾″ (22mm). ##
Insert appropriate holder pins and tighten the nut 19mm as instructed in part 12.3.2.

the 2″ pin has the notcher tips that are exteded the most

¾″ holder pin has a slight bevel at the end
5/8″ holder pin has a slight bevel at the end plus a thinner profile
½″ holder pin also has a slight bevel plus an even thinner profile
3/8″ holder pin has the bevel plus a half round profile

13. Spare parts list

13.1. T-DRILL T-35



	Part No.	Complete Assembly	
	5330624	T-35 120V USA	

Item	Part No.	Description	Qty
1	5330628	Power unit 120V USA	1
2	5330174	Tee Forming Unit	1
3	3330076	Tube support	1
4	9114027	Socket head cap screw	2
5	6330633	Machine plate, 120V USA	1
6	9048335	Cable, 120V USA	1

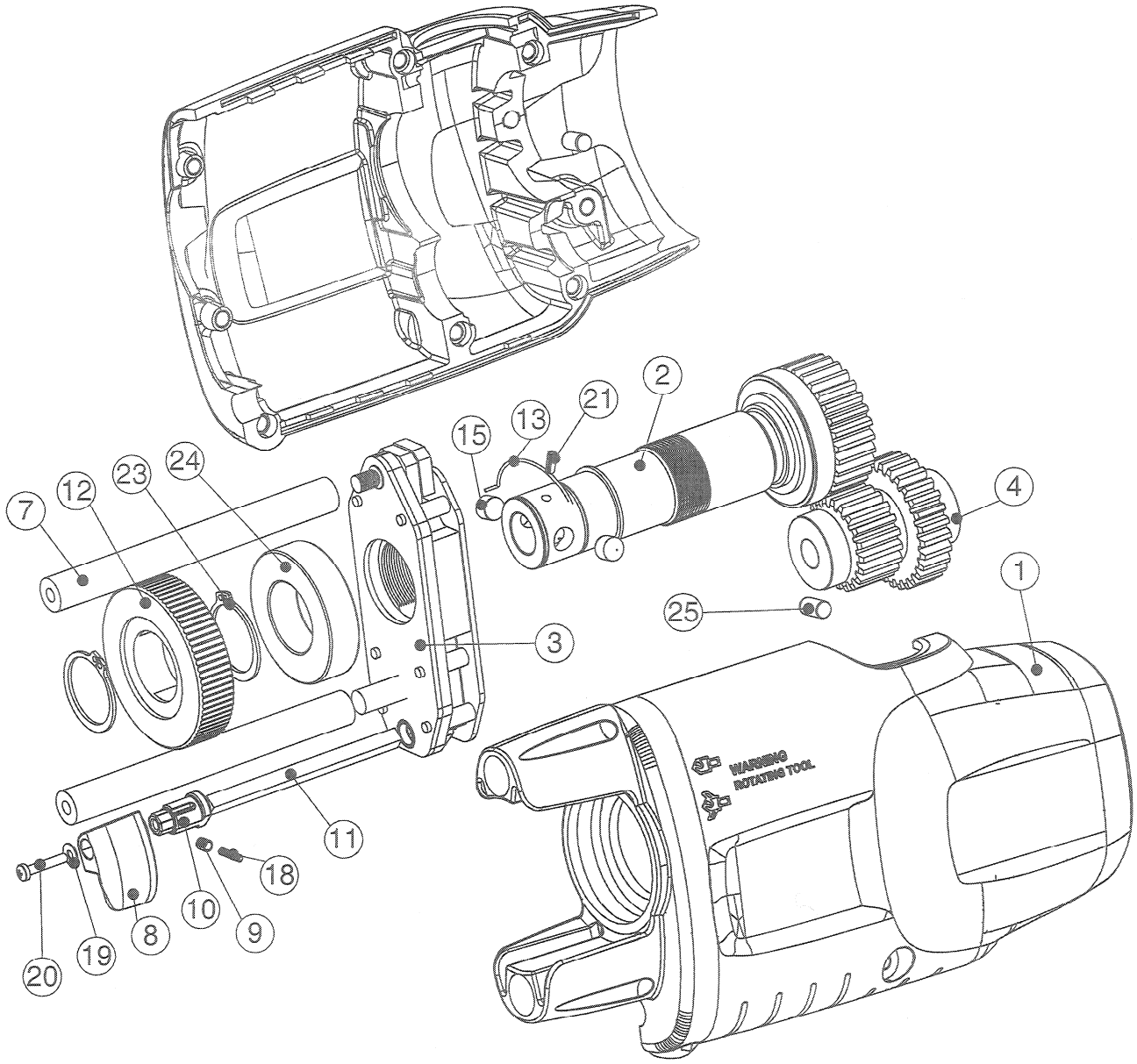
13.2 Power unit

	Part No.	Complete Assembly	
	5330628	Power unit 120V USA	

Item	Part No.	Description	Qty
1	8000226	Hand drill 120V USA	1
2	4330016	Gearwheel	1
3	6330604	Bushing	1
4	6330622	Adapter	1

Notes

13.3 The T-DRILL Tee Forming Unit

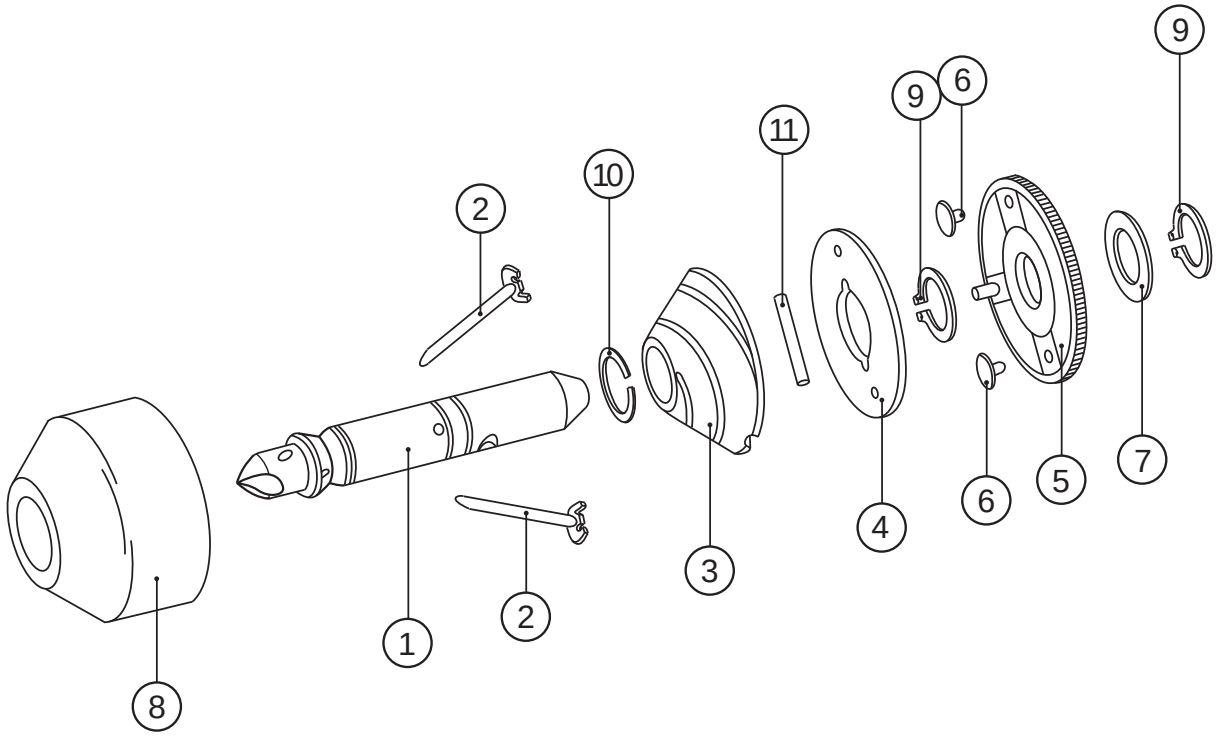


TheT-DRILL Tee Forming Unit

	Part No.	Complete Assembly	
	5330174	T-DRILL Tee Forming Unit	

Item	Part No.	Description	Qty
1	5330171	Housing	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	2
24	9021006	Groove ball bearing	1
25	9018089	Cylinder pin	2

13.4 T-DRILL Head



	Tee Size ∅ mm	10	12	15	18	22	28	35
	Nominal Tee Size ∅ in	1/4	3/8	1/2	5/8	3/4	1	1/1/4
	Order No.	5310399	5310400	5310401	5310402	5310403	5310404	5310411

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	3430033
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	4310362
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

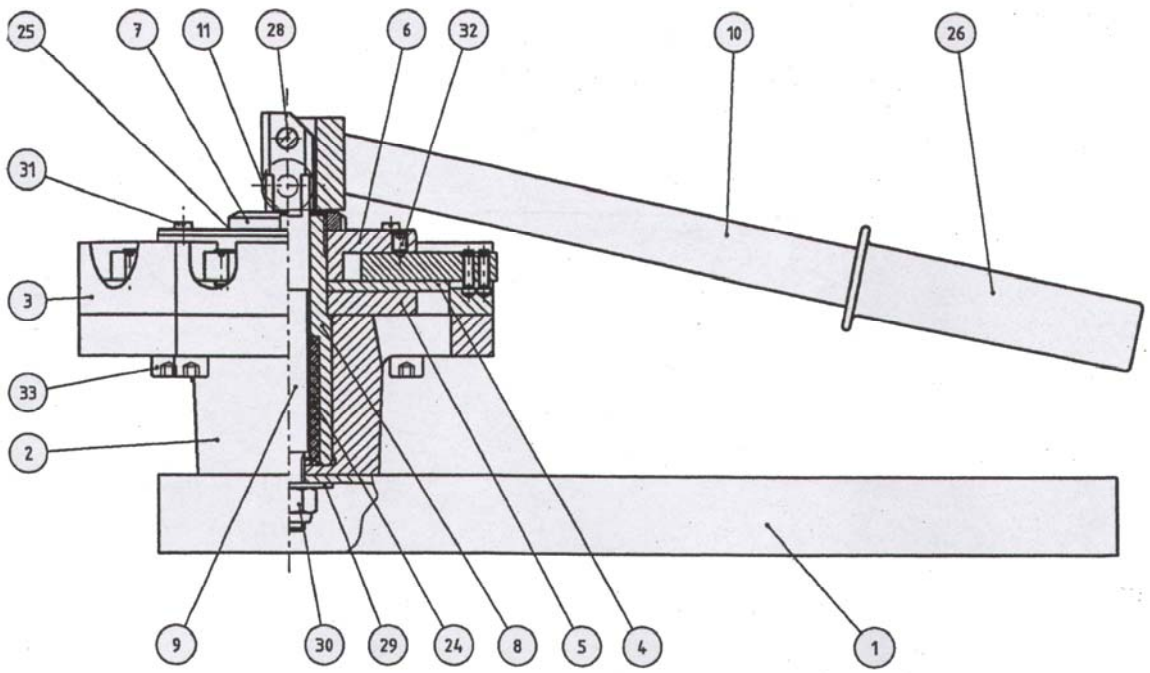
13.5 Optional Equipment

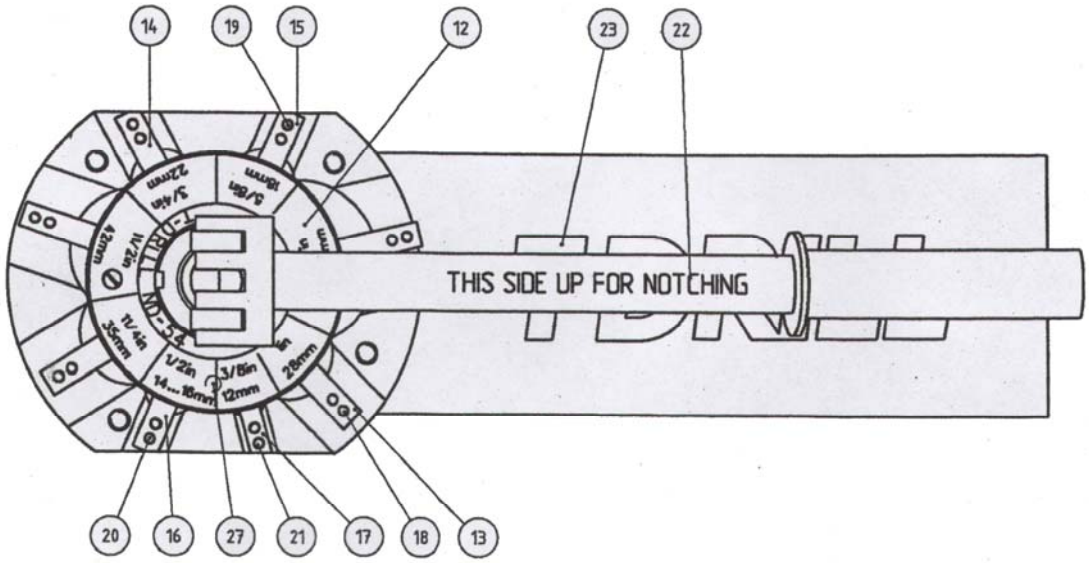
Item	Part No.	Description	Qty
1	5090294	Notcher ND-54	1
2	3310461	Gauge block	1
3	4050165	Ring	1
4	9010205	Bottle of lubrication	1

13.6 Notcher ND-54

Item	Part No.	Description	Qty
1	4090275	Base	1
2	2090276	Body plate	1
3	2090277	Lower die	1
4	3090278	Upper die	1
5	4090279	Support plate for upper die	1
6	3090280	Holder pin plate	1
7	4090298	Nut	1
8	4090281	Tube shaft	1
9	3090282	Screw rod	1
10	3090293	Lever	1
11	4090094	Spacer roll	2
12	3090284	Name plate	1
13	4090285	Holder pin 1", 1¼",1½", 2", 28, 25, 42, 54mm	4
14	4090286	Holder pin ¾",22mm	1
15	4090287	Holder pin 5/8", 18	1
16	4090288	Holder pin ½", 14-16	1
17	4090289	Holder pin 3/8", 12	1
18	4090290	Notcher tip ¾", 1", 1¼",1½", 2", 22-54mm	10
19	4090291	Notcher tip 5/8", 18	2
20	4090292	Notcher tip ½", 14-16	2
21	4090099	Notcher tip 3/8", 12	2
22	4090258	Decal	1
23	3090297	Decal	1
24	9026111	Spring	1
25	9020111	WasherØ30/Ø40x0.3	1
26	9028013	Handle	1
27	9018021	Pin Ø6m6x28	2
28	9018039	Parallel pin Ø8m6x20	3
29	9012014	Washer	1
30	9013014	Lock nut M12 8.8	1
31	9017209	Screw AB3,5x6,5	2
32	9016303	Lock screw M6x8 12.9	8
33	9014038	Screw M8x30 8.8	4

13.6 Notcher ND-54





14. Ordering spare parts

When ordering spare parts, please state the following details:

-The type code of the machine

-Manufacturing code of the machine

-The part number

-A description of the part

-The quantity of the parts required

The type code and the manufacturing code of the machine are indicated on the nameplate of the machine. The other information can be found from parts list.

For example:

XX: Assembly name 5XXXXXX 2(4)

Item	Part No.	Designation	Std. /Manuf.	Qty
33	4800220	Left Hand Slide Gib		3
34	9014313	Flat Head Cap Screw M5x8	DIN7991	12
37	3801440	Lever		2
38	4800276	Rod Eye		1
39	4800299	Clamp Ring		4

1 2 3

1. Part number 2. Description 3. Quantity

When ordering spare parts, make a copy of the Service Sheet, fill it out and fax or mail it.

To proceeding this way you will prevent misunderstandings and you make sure to receive the correct spare parts and a prompt service.

T-DRILL Service Sheet

Copy this form first! Fill it out with care. Then Fax or Mail it to your T-Drill representative.

CUSTOMER

Name _____

Company _____

Address _____

City _____ Postal _____

Country _____ Phone _____

Purchase Order _____

MACHINE INFORMATION

You will find this information from machine plate.

Machine _____

Serial _____ Type _____

Pos.	Part	Description	Qty Ordere

Date _____

_____
Authorized

T-DRILL
REPRESENTAT