T-DRILL

T-65 & T-65B
Tee forming machine

Instruction manual
Spare parts list

Version

6330705ENU C USA
21.4.2016 / MT

Type code of the machine this book concerns is 3305.

Instruction Manual
This instruction manual includes a spare parts list and instructions for set-up for operation, operation and maintenance of the **T-DRILL T-65 tee forming machine**.

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1. Notes on the use of the instruction manual

1.1. Symbols for warning used in this manual

IMPORTANT! Gray base color is used to emphasize 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-65 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".

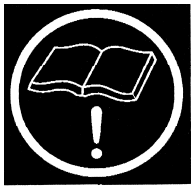
Get acquainted with the instruction manuals of the MILWAUKEE DRILL delivered with the machine before using the T-65 machine.

Do not use the machine until you are familiar with its operation. Read the operation sequence described in the instruction manual thoroughly before preparing, operating or maintenance of the machine.

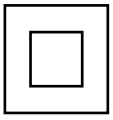
IMPORTANT! Save these instructions for future use!

1.2. Symbolism

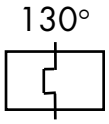
The following list defines the symbols on the tool.



Read the instruction manual carefully before using this tool.

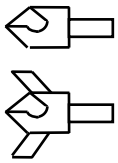


Double Insulated



Thermally protected to 130°C

Warning! Do not throw to trash. Please recycle.



Warning! Watch 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. 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 T-DRILL catalogue may create a risk of personal injury.

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

NOTE! The T-DRILL T-65 is designed for use with MILWAUKEE power unit. **Using any other power units** with the T-DRILL T-65 tee forming unit **is not allowed.**

IMPORTANT! 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 tool in humid or wet conditions. Keep work area well illuminated. Don't use power tool in the presence of flammable liquids or gases.

Keep children away – Do not let visitors touch the tool or it`s 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. Use appropriate gloves and footwear. 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.

Don't abuse cord – Never carry a tool by its cord or yank it to disconnect it from receptacle. Keep cord from heat, oil and sharp edges.

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 determinate 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 authorised service unless otherwise indicated elsewhere in this instruction manual. Have defective switches replaced by an authorised service. Do not use tool if switch will not turn it on and off.

Have your tool repaired only by T-DRILL – 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.

Use ear protectors. During operation the noise level of the tee forming machine may exceed 95 dB (A).

The vibration excercised on the operator's hand is less than 2.5 m/s.

2.2.1. T-65B battery and charger specific warnings

	**DANGER!**	To reduce the risk of injury or explosion, never burn or incinerate a battery pack even if it is damaged, dead or completely discharged. When burned, toxic fumes and materials are created.
	**DANGER!**	Charge only MILWAUKEE 28 Volt Lithium-Ion battery packs in MILWAUKEE 28 V Li-ion battery chargers. Other types of batteries may cause personal injury and damage.
	**DANGER!**	To reduce the risk of injury, always unplug the charger and remove the battery pack from the charger before performing any maintenance. Never disassemble the battery pack or charger. Contact a MILWAUKEE service facility for ALL repairs. To reduce the risk of injury and damage, never immerse your battery pack or charger in liquid or allow a liquid to flow inside them.

2.3. Safety instructions for tee forming

Do not touch the rotating tool when the work cycle is on.

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

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

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

The lubricating oil you use may cause irritation of the skin. Use protective gloves.

The fumes emitted by the lubricant may irritate your eyes and hinder your respiration. Pay attention to an adequate ventilation.

Make yourself familiar with the contents of the safetly data sheet regarding the lubricants.

The loosening chips are hot and sharp. Provide adequate protection in order not to get damaged.

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

When cleaning the outlet always use protecting gloves. The edges of the outlet use to be sharp.

Do not use inadequate protecting gloves, because they may get caught by the rotating tool. Keep your hands off the dangerous area.

3. T-DRILL T-65, general

3.1. Introduction

The **T-DRILL T-65** is a special tool intended for mechanically forming tees in copper tube typically found in domestic, commercial and industrial tubing systems. The T-65 extrudes in the run tube an outlet, to which the branch tube can be joined by brazing.

Before attempting to put the T-65 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 **T-DRILL T-65** includes an electric network driven power unit with accessories. The power unit is grounded 120V /60Hz or double insulated 230V /50Hz (sold in Europe). The **T-DRILL T-65B** is a cordless version of the machine with 28V Lithium-ion battery.

3.2. The Parts of the T-65 and T-65B

1. T-DRILL head, 2. Chuck ring, 3. Tube support, 4. T-DRILL tee forming unit, 5. Power unit, 6. Connecting cord, 7. Battery of the T-65B

3.3. Information about Accessories

For proper use of T-DRILL T-65 the following accessories are available:

Notcher ND-54

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

Gauge Block and rings

Correct size settings of the T-DRILL head for various tube sizes can easily be checked with the gauge block. The range of size is NS 1/4" - 1" with the gauge block; 1¼", 1½" and 2" with the rings).

Standard Counter Plate

The counter plate assists forming of the outlet and improves the quality of the outlet by supporting the tee forming machine against the run tube. The counter plate is used for run tube sizes from NS 2 ½" (66,7 mm) to 4" (108 mm).

6'' Retrofit kit

The 6'' retrofit kit (168,3mm) comes as an option. It increases the capacity of the run tube up to 6''. Kit includes special counter plate and support feet.

Lubrication for copper

A bottle of lubricant to be used for forming the outlet in copper tube (Included). Read the safety data sheet enclosed.

3.4. Operating Range of the Machine

T-65 works with all standard copper tubing wall thicknesses (K-L-M-DWV-ACR). The branch tube is joined to the run tube by brazing.

The outlet size range of T-65 is NS 1/2" to 2" (10 - 54 mm).

The diameter of the run tube can be 1/2 " to 4" (15 - 108 mm). *With optional retrofit kit up to 6'' (168,3mm) run tubes. 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-65	Value	NOTE!
Type Code	3305	
Tee diameter	NS 1/2" - 2" / 10 - 54mm	
Run tube	NS 1/2" - 4" / 15 - 108mm	Up to 6" / 168,3 mm with optional retrofit kit
Max. wall-thickness	See Capacity chart	
Materials	Copper (Cu)	
Cycle	1 min. 45 s	
Rotation speed of spindle	T-65: 500 / 50 RPM T-65B: 400 / 40 RPM	
A-accentuated equivalent level of sound pressure	82,5 dB (A)	Use ear protectors!
Vibration	less than 2,5 m/s2	
Dimensions of the unit	22.4"(l) x 4.9" (h) x 7.1" (d) 570 (l) x 125 (h) x 180 (d) mm	
Weight of the unit	T-65: 11,9 lbs /5,4 kg T-65B: 14 lbs / 6,35 kg	
Supply voltage of the unit	120 V / 60 Hz / 7,0 A 230 V / 50 Hz / 4,0 A 110 V /50 Hz / 8,4 A T-65B: 28 VDC	

4. Transport, Handling and Storage

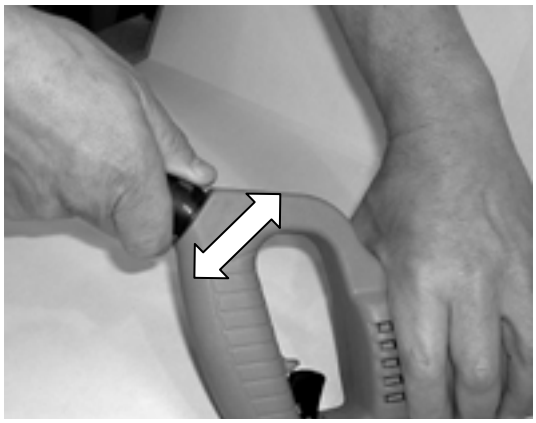
The **T-65** is delivered in a transport box, dimensions 25.2″ (640 mm) x 6.5″ (165 mm) x 14.2″ (360 mm) (w x h x d). The weight of the box is, depending on the accessories, between 29 - 49 lbs (13 and 23 kg).

Storage
Keep the T-65 stored in a cool, dry place, covered against dust etc.

5. Preparing before use

5.1. T-65, Detachment and attachment of the connecting cord

When delivered the T-65 power unit is fitted with a connecting cord, which allows quick changing in field conditions.



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

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

5.2. Start-up check for T-65

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.

5.3. Start-up check for T-65B

NOTE! Before using the machine check that the battery is fully charged and accurately installed to the machine.

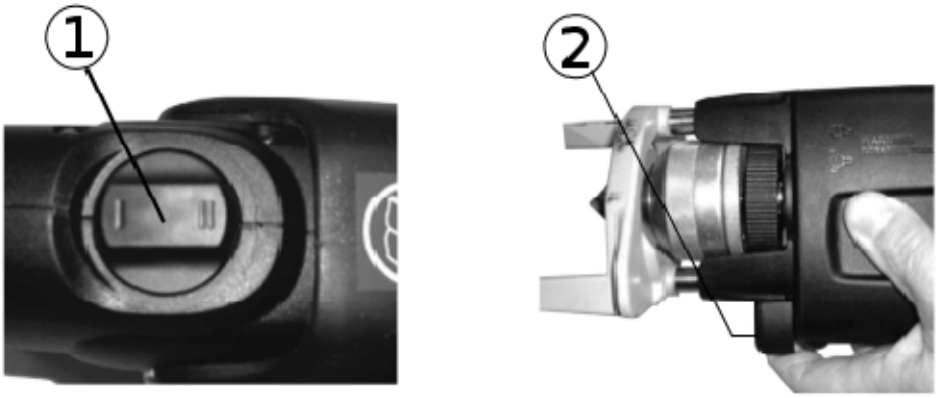
6. Operating the T-65 machine

6.1. Description of the control devices

6.1.1. T-DRILL T-65

Control devices: 1. Feed mechanism engagement lever, 2. Speed selector, 3. Trigger

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



Control devices: 1. Speed selector, 2. Feed mechanism lever

The speed selector knob is on the top of the gearbox of the T-65. Slow speed is marked "I" and fast speed is marked "II". To shift from fast to slow speed, turn the selector knob 180 degrees. **Drilling is always done in fast speed (II)**. The forming of the tee is done in either slow speed or fast speed depending on the run tube and outlet sizes. See the capacity chart chapter 11.1.

If the speed selector knob does not engage smoothly, rotate the motor by "pumping" the trigger.

The feed mechanism lever is situated near the chuck ring. The feed mechanism is engaged (on) when the lever is turned downward, i.e. as shown on the illustration.

If the feed mechanism lever does not engage smoothly, rotate the motor by "pumping" the trigger.

NOTE! Do not force the feed lever.

6.2. Selection and adjustment of the T-DRILL heads

6.2.1. The identification of the T-DRILL head

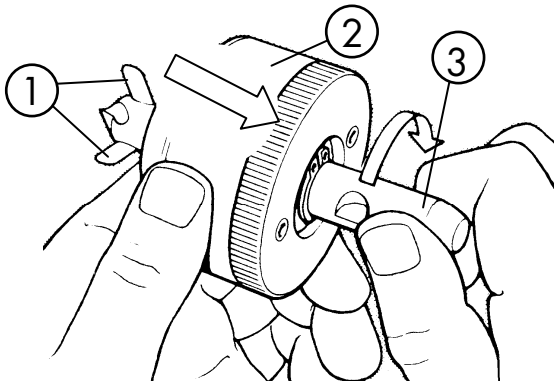
The size of the T-DRILL head is stamped on the cover plate:

Identification: 1. Actual size in millimetres, 2. Nominal size in inches (NS), 3. The ordering and identification number of the T-DRILL head, 4. Actual size in inches

6.2.2. The fine adjustment of the outlet diameter

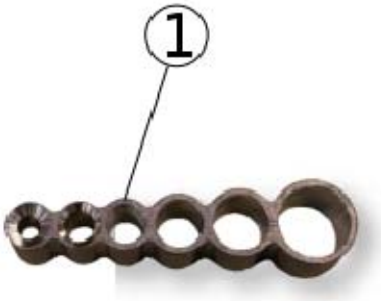
NOTE! When adjusting the outlet diameter, extend the forming pins first.

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.



To extend the forming pins (1) press the cover (2) in direction of the shank. Twist the shank (3) at the same time clockwise until a positive stop is reached and the forming pins extend.

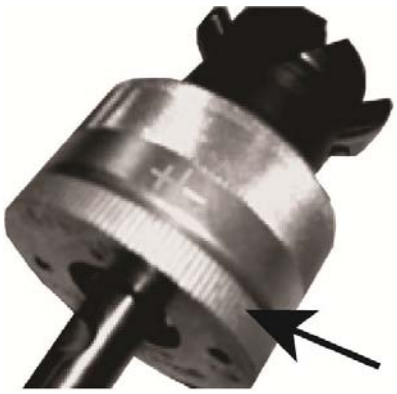
Check the forming pin span diameter "T" with an adjusting ring, gauge block (1) or slide gauge.



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 outer diameter (O.D.)

Changing the outlet size:

1. Loosen the screws on the cover plate by about one circle using a 3 mm hexagon wrench that is supplied with the T-DRILL package.



2. To enlarge the outlet rotate **the conical cover** with respect to the cover plate in plus (+) direction. Hold the cover plate stationary.
To make a smaller outlet **rotate the conical cover** in 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 measurement across the pins or by forming a trial outlet.

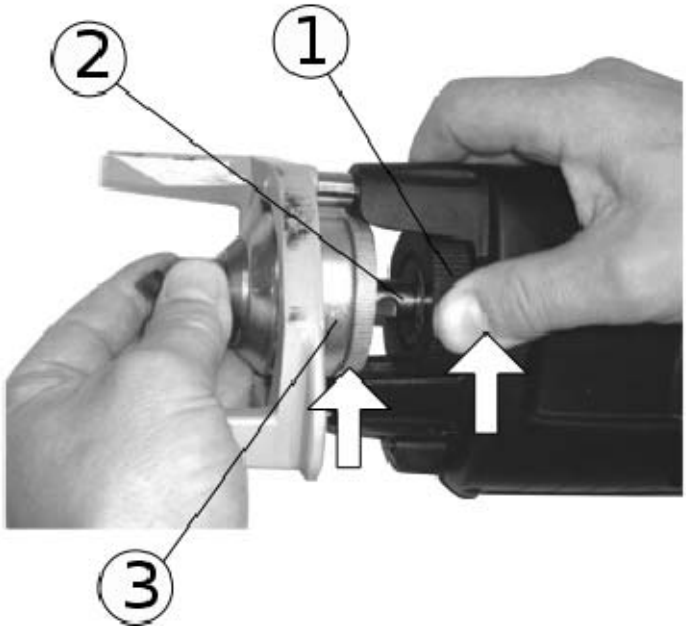
6.3. Chucking the T-DRILL head

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 shaft into the chuck (2). 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

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



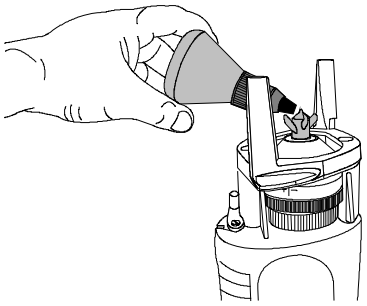
Chucking the T-DRILL head and removing it.

6.4. The tee forming process with the T-DRILL T-65

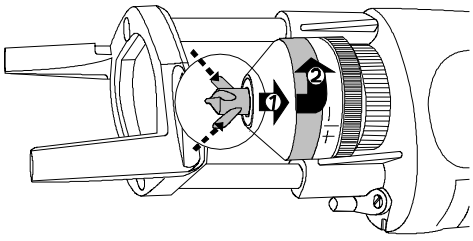
Since the process may be new to you, we recommend that you read the following instructions carefully and then practice a few times on some pieces of scrap tubing.

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 chapter 6.2.2).
3. Chuck the T-DRILL head.

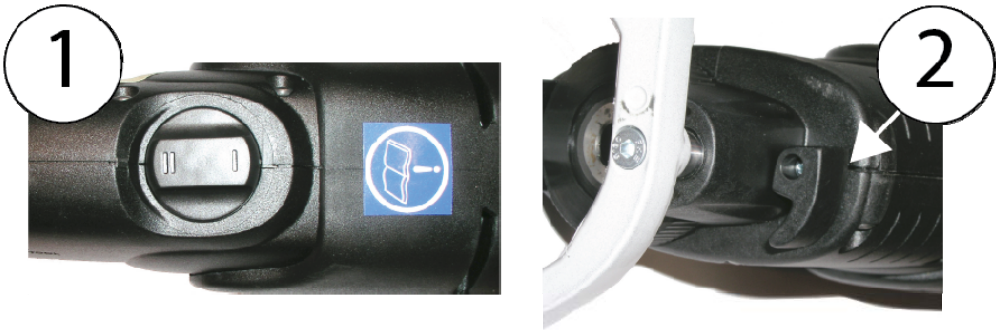


4. **Lubricate the T-DRILL head** before every tee forming operation! Extend the forming pins and lubricate them as well as the cutting edges of the T-DRILL head as illustrated. **Always use T-DRILL lubricant.**

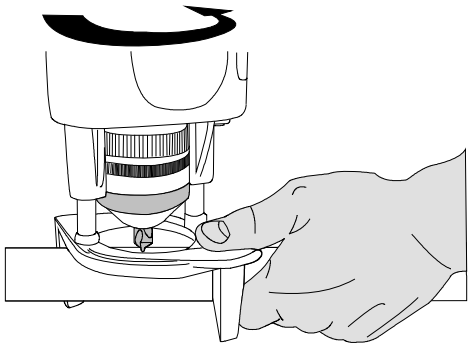


5. **Retract forming pins.** Press the conical cover towards the tool and rotate it clockwise to retract the forming pins.

6. Check that the **speed selector** knob is in position **II** and the **feed mechanism lever** in **"off"-position**.



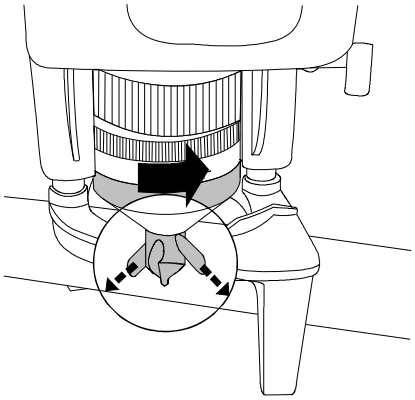
T-65 control devices: 1. Speed selector 2. Feed mechanism lever in off-position



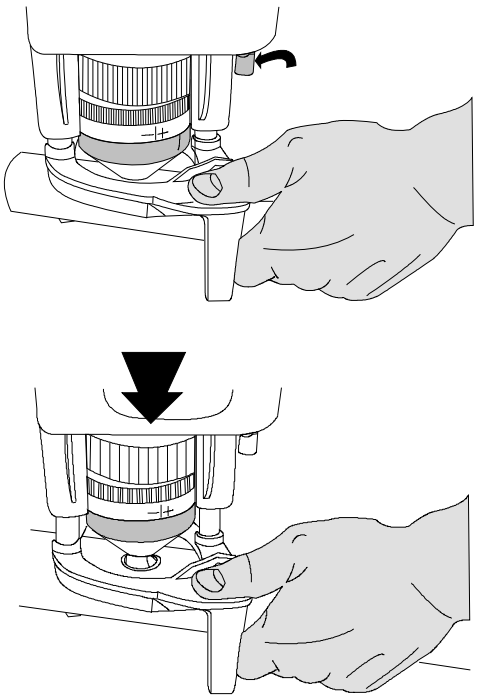
7. Pull the **support legs out** and place the tube support firmly onto the point where the tee is to be formed on the tube, as shown on the illustration. Press the tube support with the thumb against the tube and **twist** the machine **counterclockwise** at the handle of the tool. This **centers**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

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

NOTE! If the tool does not have enough power to drill – select the low speed **I** and continue drilling. This may be necessary if a long extension cord is used.



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!**



10. Select speed. (Slow speed or fast speed depending on the run tube and outlet sizes. See the capacity chart chapter 11.1.) **Engage the feed mechanism** as shown. If it does not engage smoothly, rotate the motor by "pumping" the trigger.

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 insures that you obtain a circular outlet.

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

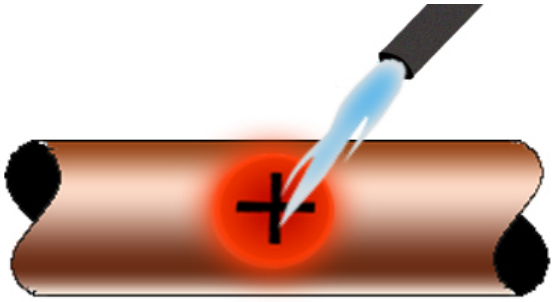
IMPORTANT! Release the drill trigger as soon as the T-DRILL head clears the rim of the outlet.

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 excess lubricant which may have remained inside the outlet before brazing. **Use sand cloth or Scotchbrite to clean the inside of the rim of the outlet!**

6.5. Annealing of tube

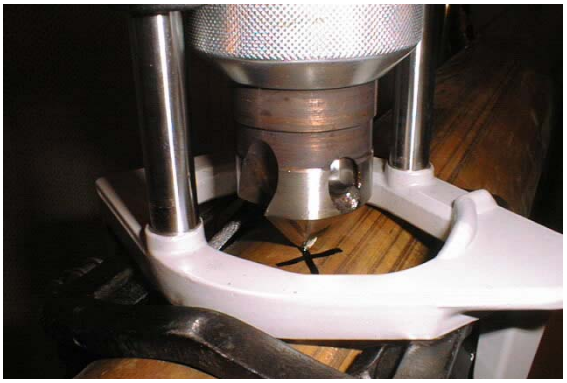
DANGER! The annealed work piece is extremely hot after annealing. When working with the tube protective gloves should be used.



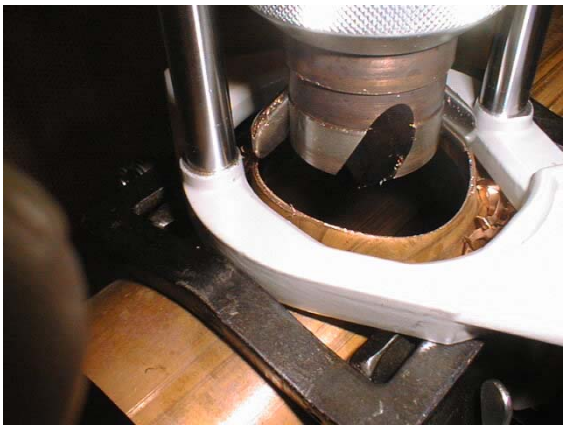
1. Anneal the area where outlet is to be formed to a dull red.The area will remain annealed even when cool. It is not necessary to form the outlet on hot tube!

2. Attach counterplate to the tube where annealing has been done.

3. Lubricate forming pins and cutting edges on T-DRILL head.



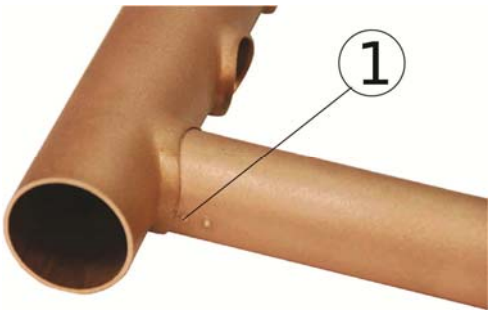
4. Retract forming pins on T-DRILL Head and attach T-DRILL T-65 to counterplate. Notches on tube support fit on tabs of counterplate.



5. Drill pilot hole, extend forming pins, reduce speed, engage feed mechanism, pull trigger to form the outlet.

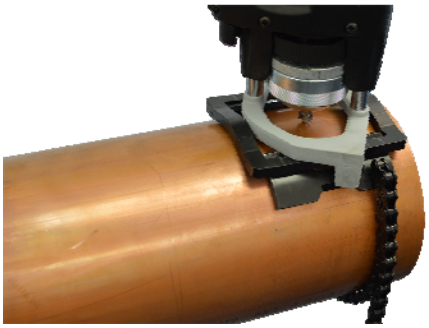
Release trigger when forming pins clear the rim of the outlet.

6. Notch and dimple both sides of branch tube.



7. Align dimples with the run of the tube after insertion into the outlet. Braze the joint.

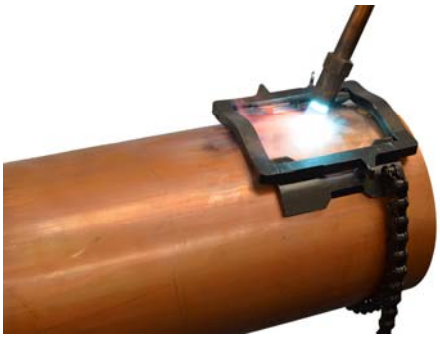
6.6. Forming a tee to run tubes > 4″



1. Install optional retrofit kit # 5540120 support feet

    - When making an outlet larger that 1″ continue from section 6.5
    - When making an outlet ½″ or ¾″ (to bigger that 4″ run tube), continue:

2. Use the retrofit kit counter plate.
3. Drill pilot hole.



4. Remove T-65 from counter plate, but leave counter plate on tube.
5. Anneal pilot hole area to dull red about 1400F (760°C).
6. Deburr the inside of of pilot hole to make way for the forming pins to extend.
7. Continue from chapter 6.5 step 3.

7. Maintenance

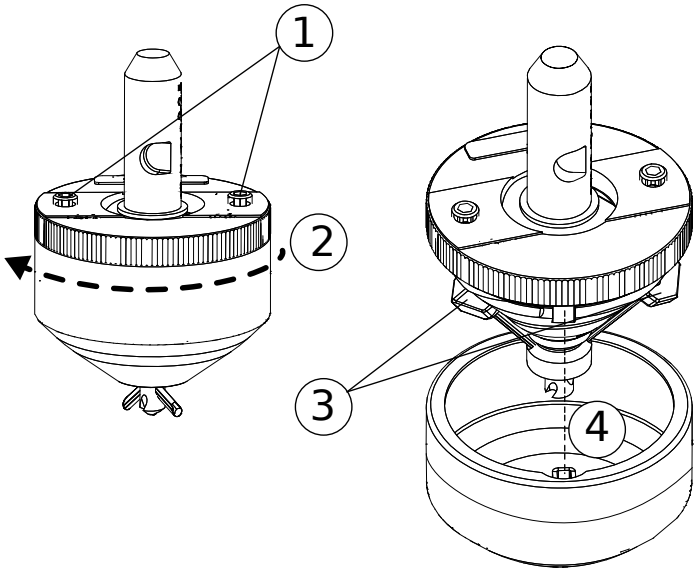
7.1. The maintenance of the T-DRILL T-65

Clean dust and dirt from machine surface and power unit vents periodically.

The T-DRILL T-65 is prelubricated and does not need special attention for maintenance.

NOTE! All maintenance operations for the T-DRILL T-65 and MILWAUKEE power unit sold in North America are to be carried out only by T-DRILL Industries, Inc. in Norcross, Georgia, USA.

7.2. The replacement of the forming pins



1. Screws, 2. Rotation, 3. Forming pins, 4. Alignment

1. Loosen the two screws (1) on the cover plate one turn and rotate the conical cover (2) plate so that the it can be removed.

   When the conical cover is removed rotate the cone so that the forming pins (3) will slide from the shank.

2. Change the forming pins.
3. Check the alignment (4) when assembling.
4. Reassemble the T-DRILL head using new forming pins and adjust to the right outlet diameter.

8. Trouble-shooting

Problem	Cause	Remedy
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.
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. Insufficient lubricant during forming of the outlet. Lubricant not suitable to the material The wall thickness of the tube exceeds the maximum allowable thickness.	Anneal area to be drilled Change drill bit Use more lubricant Only lubricant ecommended by T-DRILL is to be used 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. 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	Lack of annealling when called for in instructions. Burrs in the pilot hole -drill bit dull	Resharpen or change the drill bit
	The wall-thickness of the tube exceeds the max. allowable 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.
	Tool is not straight against the pipe.	Use counterplate. (extra equipment)
	Slow speed was not used when referenced on the capacity chart.	Use slow speed when indicated on the capacity chart.

9. Disposing

Disposing of the T-DRILL machine

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

10. Warranty

T-DRILL guarantees that every T-DRILL T-65 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 T-65 be proved to **T-DRILL**'s satisfaction to be defective, 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 the reclamation in writing within 10 days after a defect having been noticed and, at **T-DRILL**'s option, buyer will have to return the complete tool to the nearest **T-DRILL** Representative or Distribution Center. **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 THEORIES OF LAW, WITH RESPECT TO PRODUCTS SOLD OR SERVICES IMPLICATED, OR ANY UNDERTAKINGS, ACTS OR OMISSIONS RELATING THERETO. **T-DRILL** SHALL NOT BE LIABLE FOR AND DISCLAIMS ALL CONSEQUENTIAL, INCIDENTIAL 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 and instruction chart for T-DRILL T-65 on M, L, & K tubing

		RUN TUBE SIZE					
		½"	¾"	1"	1¼"	1½"	2"
O	½"	A,H	H	H	H	H	H
U	¾"		A,H	H	H	H	H
T	1"			A,H	H	H	H
L	1¼"				A,H	H	H
E	1½"					A,C,L	L
T	2"						A,C,L
		2½"	3"	4"	5"	6"	
T	½"	A,C,D,H,L	A,C,D,L	A,C,D,L	A,C,D,L,R	A,C,D,L,R	
U	¾"	A,C,D,H,L	A,C,D,L	A,C,D,L	A,C,D,L,R	A,C,D,L,R	
B	1"	A,C,H,L	A,C,L	A,C,L	A,C,L,R	A,C,L,R	
E	1¼"	A,C,H,L	A,C,L	A,C,L	A,C,L,R	A,C,L,R	
	1½"	A,C,L	A,C,L	A,C,L	A,C,L,R	A,C,L,R	
	2"	A,C,L	A,C,L	A,C,L	A,C,L,R	A,C,L,R	

A = Anneal outlet area to dull red 1400°F.
C = Use counter plate.
D = Deburr pilot hole to make way for pins to extend.
H = High speed tee forming is allowed.
L = T-65 requires low speed tee forming.
R = Requires additional retrofit kit #5540120

NOTE: Lubricate drill bit and forming pins with T-DRILL lubrication on every outlet. After outlet is formed clean lubricant from inside edge of the rim with sand cloth or Scotchbrite.

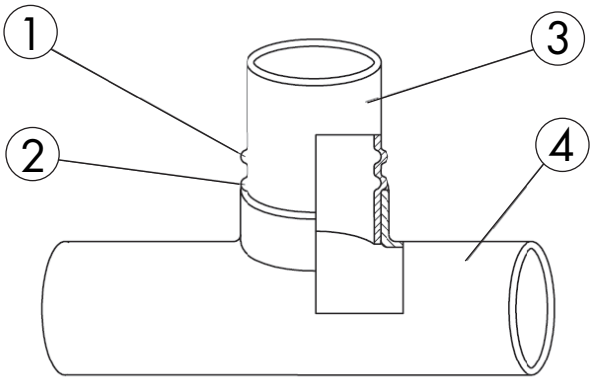
Have A Question?
Call Toll Free in USA 1-800-554-2730 Ext. 216

12. Notcher ND-54

12.1. General

12.1.1. Purpose of the notcher

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 6 mm (1/4") 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.



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

12.1.2. Operating range of the notcher

mm	Inches
12	½
14 - 16	5/8
18	¾
22	7/8
28	1 1/8
35	1 3/8
42	1 5/8
54	2 1/8

12.1.3. Dimensions of the notcher ND-52

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

12.1.4. Description of parts of the notcher ND-52

See chapter 12.4.1

12.2. Operating instructions of the notcher ND-52

1. Lay the notcher on an even surface.
2. 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.
3. Insert the tube into proper die.
4. Push the lever all the way down to ensure that the notch and dimple are properly formed.
5. Release the lever.
6. Turn the tube 180° so that the dimples that have been formed line up with the two set screws in the holder pin.
7. Push the lever again.
8. Release.
9. 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. Notcher 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 socket 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 12.3.1). 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 2 mm 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 19 mm hex nut under the base as follows:
Put lever in down position. Turn notcher on its side and loosen the nut.
Now 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 4 pieces of 6 mm socket head cap screws (M8x30). Loosen with a 6 mm hex socket 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 hex socket wrench and remove lock screw of 54 mm (2″) 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 - 50 mm 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 6 mm are on the same line. Upper die's position must be such that the two smallest dies are on the left of 54 mm (2″) dies.

Hammer the pins Ø 6 mm (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 28 - 54 mm (1″, 1¼″, 1½″, 2″)* and four different from 12 mm (3/8″) up to 22 mm (3/4″). **
Insert appropriate holder pins and tighten the nut 19mm as instructed in part 12.3.2.

* The 54mm (2″) pin has the notcher tips that are extended the most

** 22 mm (3/4″) holder pin has a slight bevel at the end
18 mm (5/8″) holder pin has a slight bevel at the end and a thinner profile
15 mm (1/2″) holder pin also has a slight bevel plus an even thinner profile
12 mm (3/8″) holder pin has the bevel plus a half round profile.

13. Spare parts list

Part No.	Complete Assembly
5330678	T-DRILL T-65 120 V USA
5330682	T-DRILL T-65 230 V Europe
5330688	T-DRILL T-65B

13.1. T-65 machine

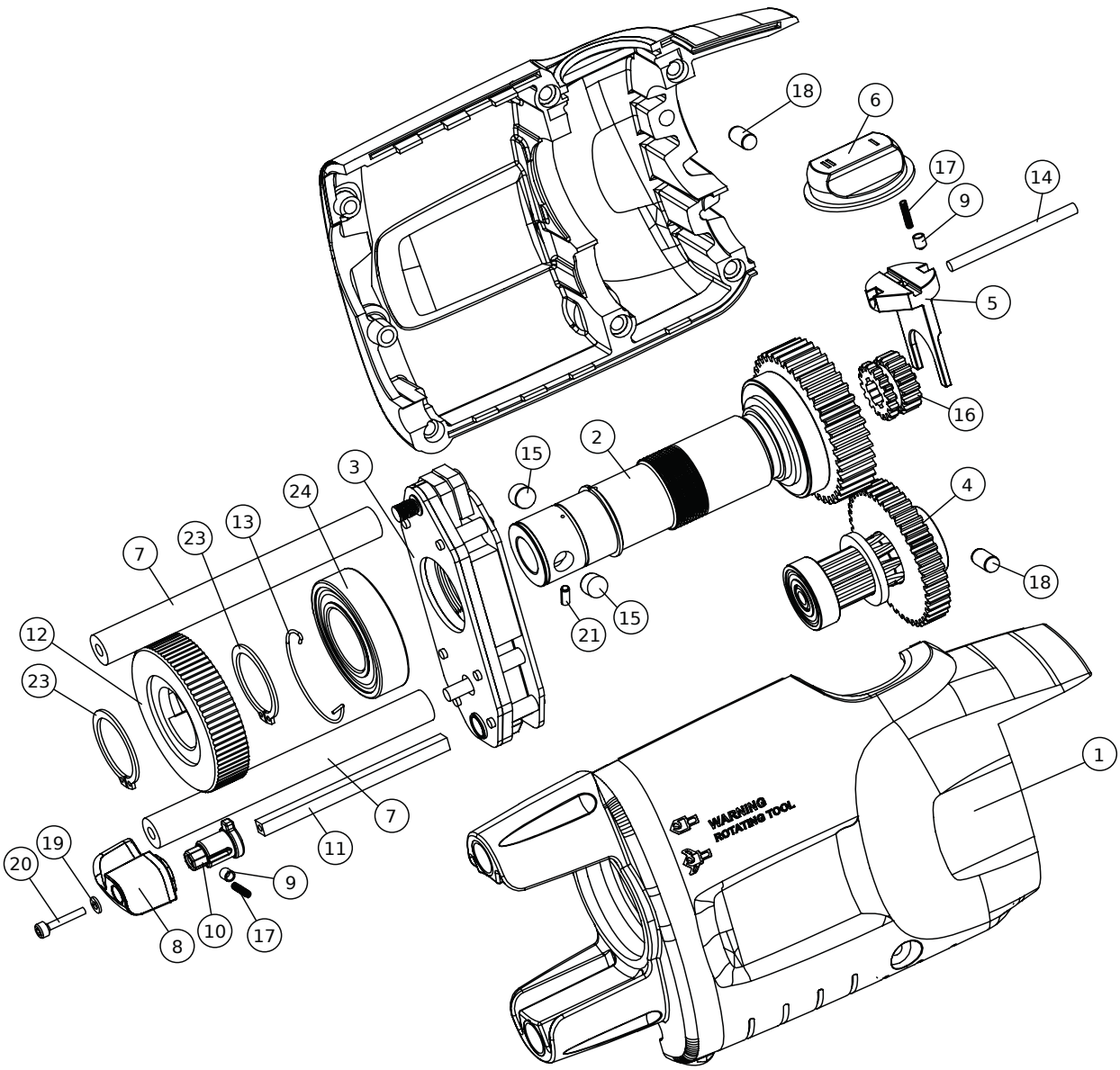
Item	Part No.	Description	Size/type	Qty
1	5330158 5330160 5330691	Power Unit 120 V USA Power Unit 230 V Europe Power Unit T-65B		1
2	5330154	T-65 Tee Forming Unit		1
3	6330680	Adapter PUR		1
4	3330032	Tube Support		1
5	9114027	Socket head cap screw		2
6	6330674 6330673 6330687	Name plate 120 V USA Name plate 230 V Europe Name plate T-65B		1
7	9146622	Sticker, read the instr.		1
8	9048335 9048320	Cord 120 V USA Cord 230 V Europe	T-65 only	1
9	8001898	Charger	T-65B only	1
10	8001897	Battery	T-65B only	1

13.2. The T-65 Tee Forming Unit

Part No.	Complete Assembly
5330154	T-65 Tee Forming Unit

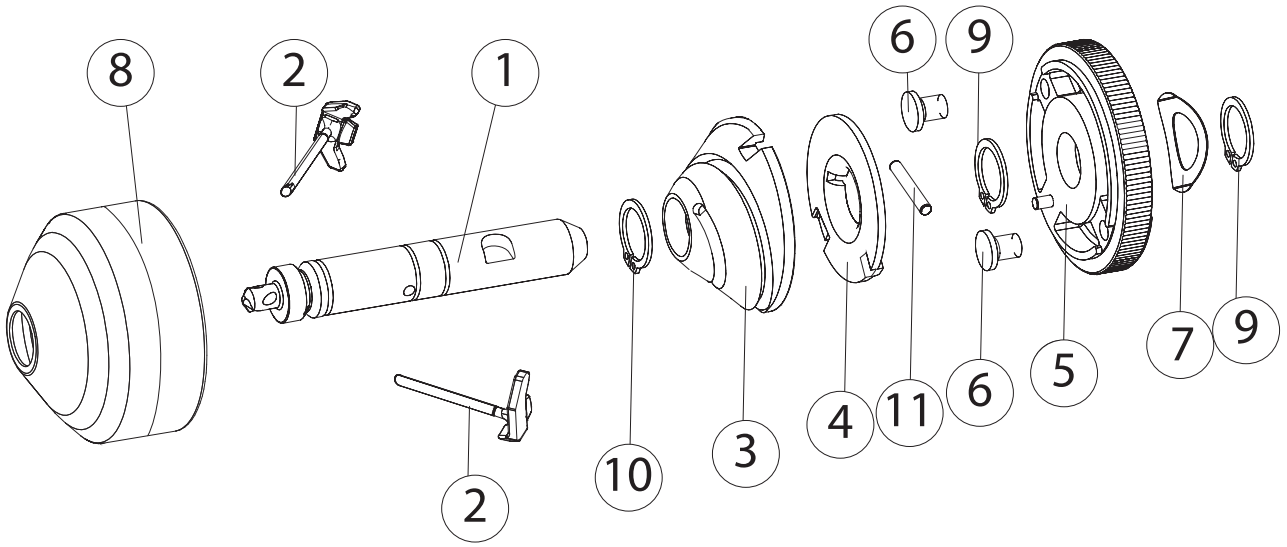
Item	Part No.	Description	Qty
1	5330156	Housing	1
2	5330117	Lead Screw	1
3	5330097	Nut Assy Complete	1
4	5540031	Reduction Gear	1
5	3330178	Gear Changer	1
6	5330115	Shift Knob	1
7	4330099	Push Rod	2
8	3330074	Lever	1
9	4540068	Pin	2
10	3330075	Drive Piece	1
11	4540056	Bar	1
12	3300056	Locking Ring	1
13	4300055	Chuck Ring Spring	1
14	4540069	Shaft	1
15	4300054	Chuck Drive Pin	2
16	3540045	Selector Gear	1
17	9026146	Spring	2
18	9018089	Parallel Pin	2
19	9012205	Spring Washer	1
20	9017033	Slot-headed screw	1
21	9018206	Spring Pin 3x8	1
23	9019007	Retaining Ring	2
24	9021006	Groove Ball Bearing 6005 2RS	1

13.2. The T-65 Tee Forming Unit



13.3. T-DRILL Head

Item	Description	Qty		Part No.								
	Complete head		5310408	5310399	5310400	5310401	5310402	5310403	5310404	5310411	5310412	5310413
	Tee size Ø mm		8	10	12	15	18	22	28	35	42	54
	Nominal tee size Ø inch		5/16″	1/4″	3/8"	1/2″	5/8"	3/4"	1″	1 1/4″	1 1/2″	2″
1	Drill Core	1	2310130	2310140	2310150	2310160	2310170	2310180	2310210	4310221	4050253	2050254
2	Forming Pin	2	3310235	3310468	3310469	3310470	3310470	4310473	4310474	3430033	3430033	3430034
3	Cone	1	2310283	2310283	2310283	2310283	2310283	2310283	2310283	2310451	2310451	2310451
4	Adjustment Plate	1	3310289	3310293	3310293	3310297	3310310	3310304	3310304	3310304	3050151	3050151
5	Cover Plate As.	1	4310317	4310323	4310329	4310335	4310341	4310347	4310359	4310362	4310364	4310365
6	Screw	2	4310372	4310372	4310372	4310372	4310372	4310372	4310372	4310372	4310372	4310372
7	Spring	1	4310376	4310376	4310376	4310376	4310376	4310376	4310376	4310376	4310376	4310376
8	Conical Cover	1	3310380	3310380	3310380	3310380	3310380	3310389	3310389	3050149	3050149	3050149
9	Circlip	2	9019003	9019003	9019003	9019003	9019003	9019003	9019003	9019003	9019003	9019003
10	Circlip	1	9019201	9019201	9019201	9019201	9019201	9019201	-	-	-	-
11	Pin	1	9018038	9018038	9018038	9018038	9018038	9018038	9018038	9018038	9018038	9018038



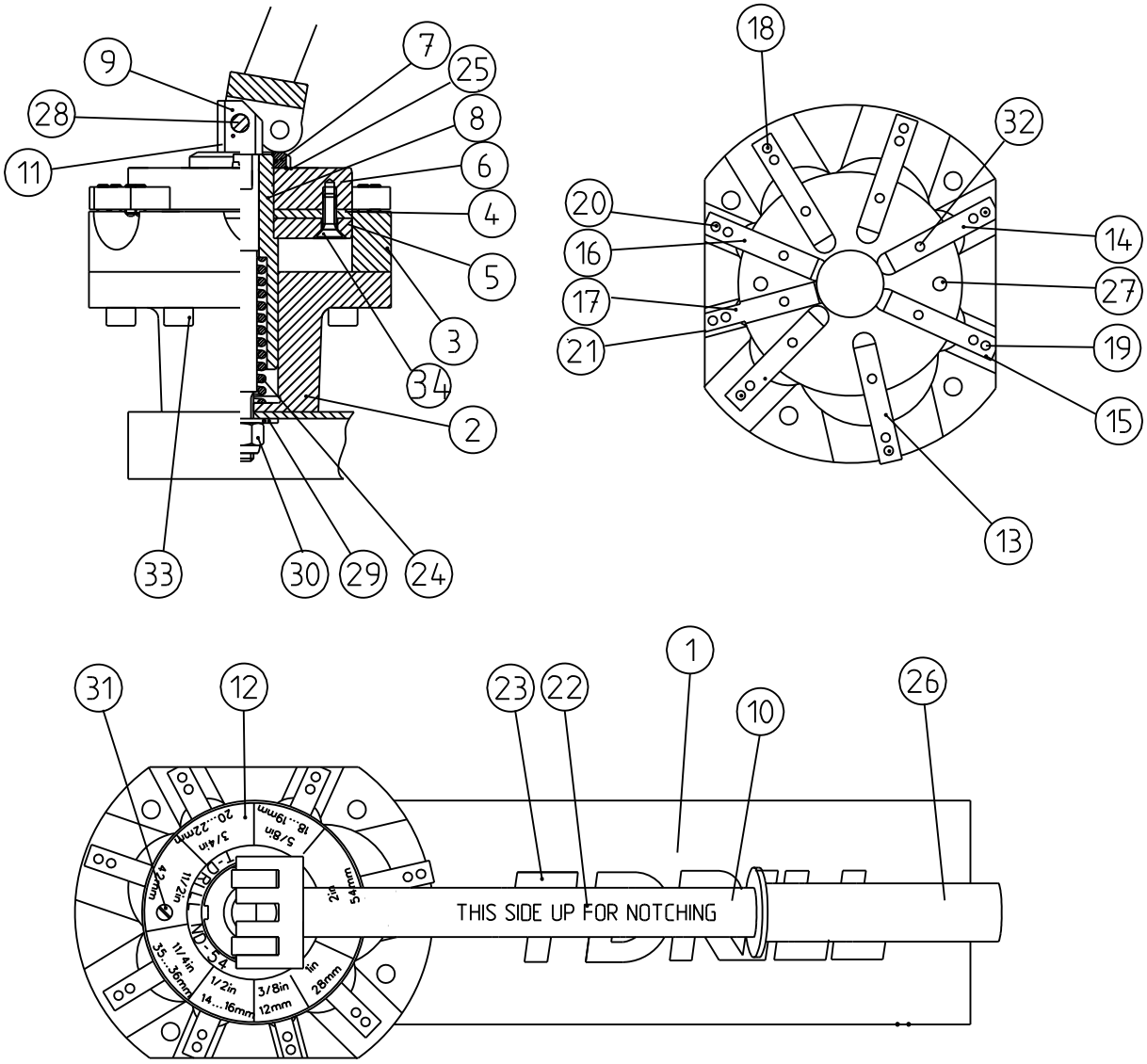
13.4. Optional Equipment

Part No.	Description
5090294	Notcher ND-54
3310461	Gauge Block
5540085	Counter Plate
5540201	Chain
9010205	Lubricant for copper 1 litre bottle
5540120	6″ Retrofit kit
5330672	Universal chuck

13.4.1. Notcher ND-54 5090294

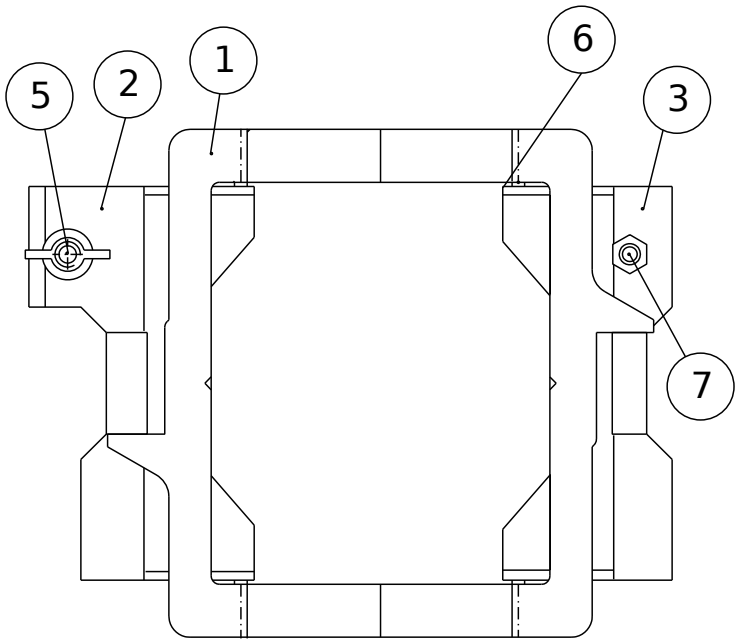
Item	Part No.	Description	Qty
1	4090275	Base	1
2	2090276	Body plate	1
3	2090277	Lower die	1
4	6090304	Blade	1
5	6090305	Support plate	1
6	6090303	Plate	1
7	4090298	Nut	1
8	4090281	Tube shaft	1
9	3090282	Screw rod	1
10	3090293	Lever	1
11	4090094	Spacer roll	2
12	3090284	Name plate	1
13	4090285	Holder 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	6090306	Slab	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	Socket head cap screw M8x30 8.8	4
34	9014308	Socket head cap screw M6x16	4

13.4.1. Notcher ND-54 5090294



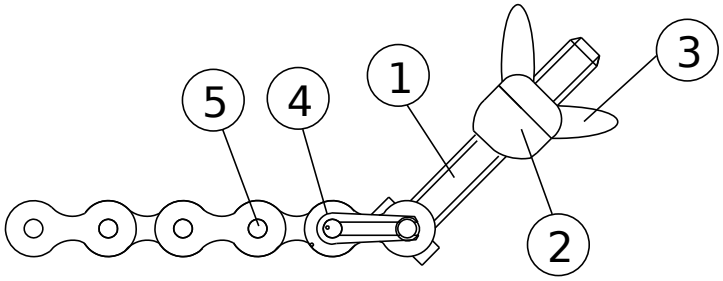
13.4.2. Counter plate 5540085

Item	Part No.	Name	Size/Type	Std./Manuf.	Qty
1	3540011	Counterplate			1
2	3540012	Counter plate mask.			1
3	3540013	Counterplate fem.			1
5	5540201	Chain			1
6	9018038	Parallel pin	Ø3m6x20	DIN 6325	4
7	4540070	Pin			1



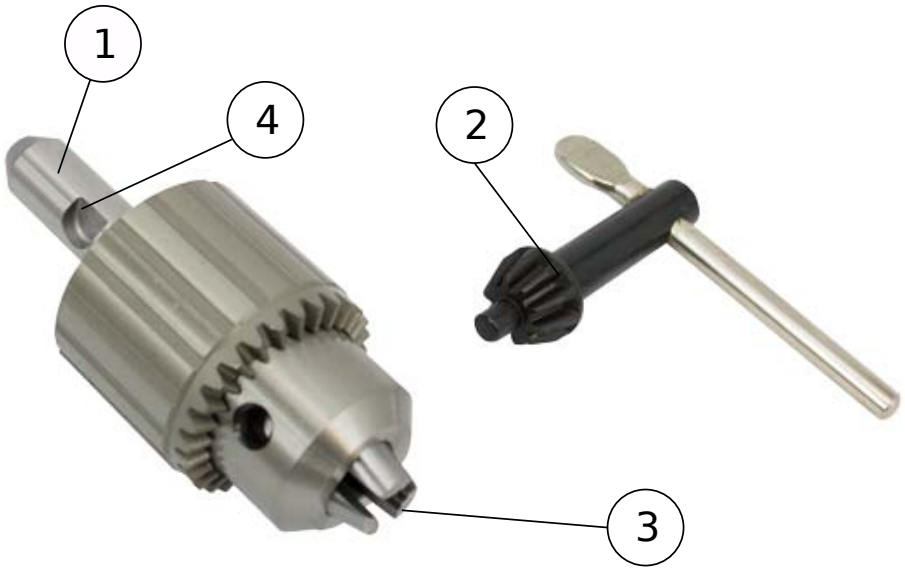
13.4.3. Chain 5540201

Item	Part No.	Name	Size/Type	Std./Manuf.	Qty
1	4050090	Screw			1
2	4540015	Knob			1
3	9013201	Wing nut	M6	DIN 315	1
4	9024117	Coupler link	1/2" Wipperman 332		1
5	9024102	Roller chain	1/2" Wipperman 332 250	DIN 8187	1



13.4.4. Universal chuck 5330672

Item	Part No.	Name	Size/Type	Std./Manuf.	Qty
1	6310530	Shaft			1
2	6330669	Wrench			1
3	6330670	Chuck	T-35/T-60 2-13mm		1
4	6330671	Screw			1



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.

Contact information:	USA, Mexico, Canada	Global
Spare part enquiries and orders	sales@t-drill.com	sales@t-drill.fi
Techical support	service@t-drill.com	service@t-drill.fi
Fax:	(+1) 770-925-3912	+358-6-4753 383
Telephone:	(+1)770-925-0520 ext. 245	+358-6-4753 344

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

More T-DRILL products for cutting and collaring

HFT-2000

Semiautomatic unit for small volume production of T-DRILL collars.
-Collar sizes 10-54 mm
-Run tube sizes 15-108 mm

T-60 SS

Tube Collaring System for stainless steel pipes
-Collar sizes 20-51 mm
-Run tube sizes 32 - 219.1 mm

S-54

Automatic Collaring Unit for producing single collars on straight and bent tubes.
-Collar sizes 6 - 54 mm
-Run tube sizes 8 - 108 mm

S-54 AFT

S-54 collaring unit with Automatic Feed Table (AFT).

TCC-50 MCS

Transportable manually operated cutting machine with optional cut to length setting adjustment. For tube diameters 1.5 - 45 mm

TCC-28

Automatic tube cutting machine for chipless tube cutting from coil and straight lengths. Automatic cut length setting tube diameters 4.76 - 22 mm