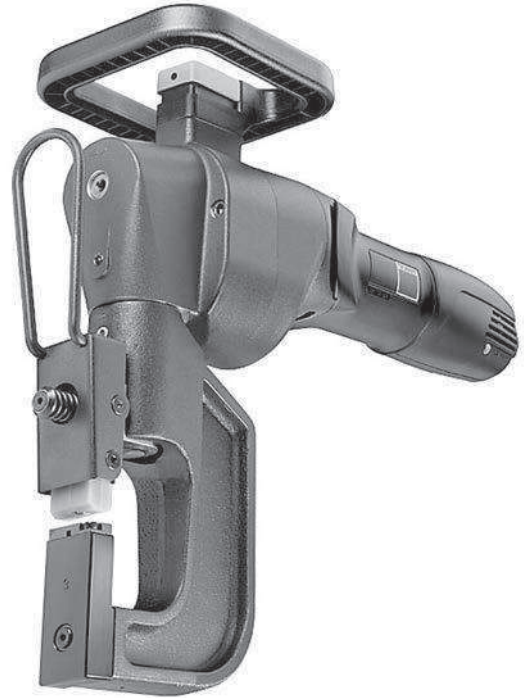


Operator's manual



TruTool TF 350 (2A1)

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1. Safety

1.1 General safety information

 **WARNING**



- Read all the safety information and instructions including those in the brochure also supplied.
- Failure to comply with the safety information and instructions can cause electric shock, burns and/or serious injury.
- Retain all the safety information and instructions for future use.

 **DANGER**

Electrical voltage! Risk of fatal injury due to electric shock!

- Remove the plug from the plug socket before undertaking any maintenance work on the machine.
 - Check the plug, cable and machine for damage each time before using the machine.
 - Keep the machine dry and do not operate it in damp rooms.
 - Connect the fault current (FI) circuit breaker with a maximum breaking current of 30 mA when using the electric tool outside.
 - Only use original TRUMPF accessories.
-

 **WARNING**

Damage to the machine due to improper handling.

- Wear safety glasses, hearing protection, breathing protection, protective gloves and working shoes when working.
 - Connect the plug only when the machine is switched off. Pull the power plug after use.
 - Do not carry the machine by the cable.
 - Have maintenance carried out by specialists.
-

1.2 Specific safety information for power fastener

 **DANGER**

Electrical voltage! Risk of fatal injury due to electric shock!

- Always keep the power cable behind the device and do not pull it over sharp edges.
 - Do not perform any work that may cause the machine to come into contact with hidden power lines or its own cable. Contact with a live conductor can cause metallic machine parts to become live and can lead to an electric shock.
-

 **WARNING****Risk of injury to hands.**

- Do not reach into the processing line with your hands.
- Use both hands to hold the machine.

 **WARNING****Risk of injury from falling machinery**

The entire weight of the machine must be taken up after machining the workpiece.

- Use slewing ring (option) with balancer.

2. Description

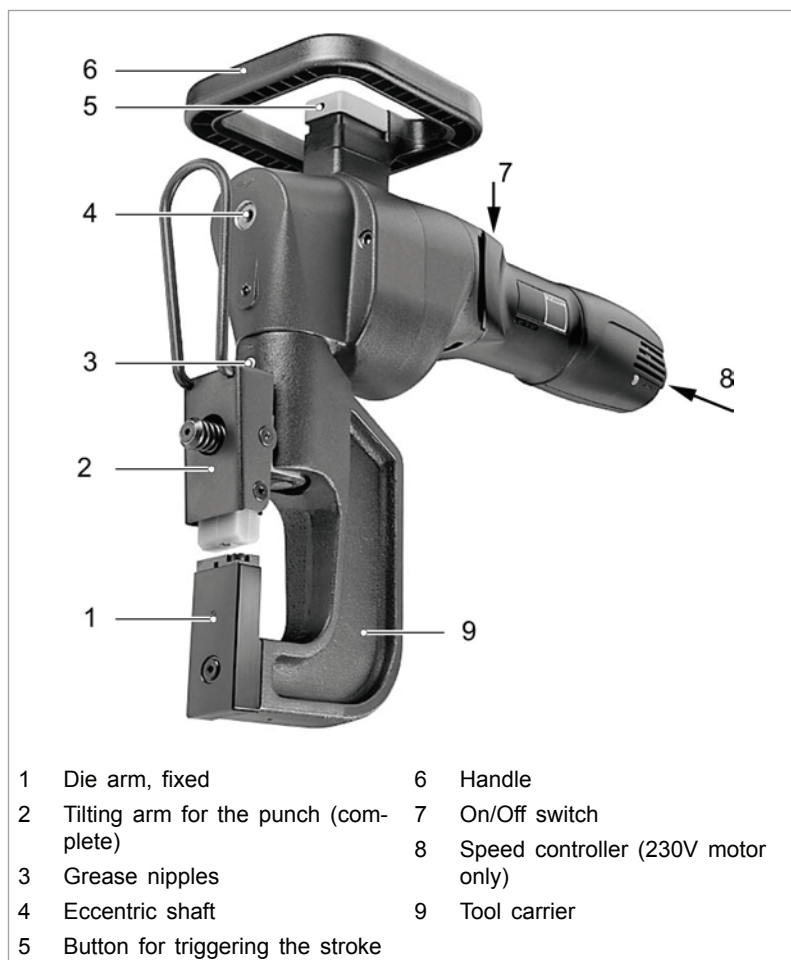


Fig. 28214

2.1 Intended use

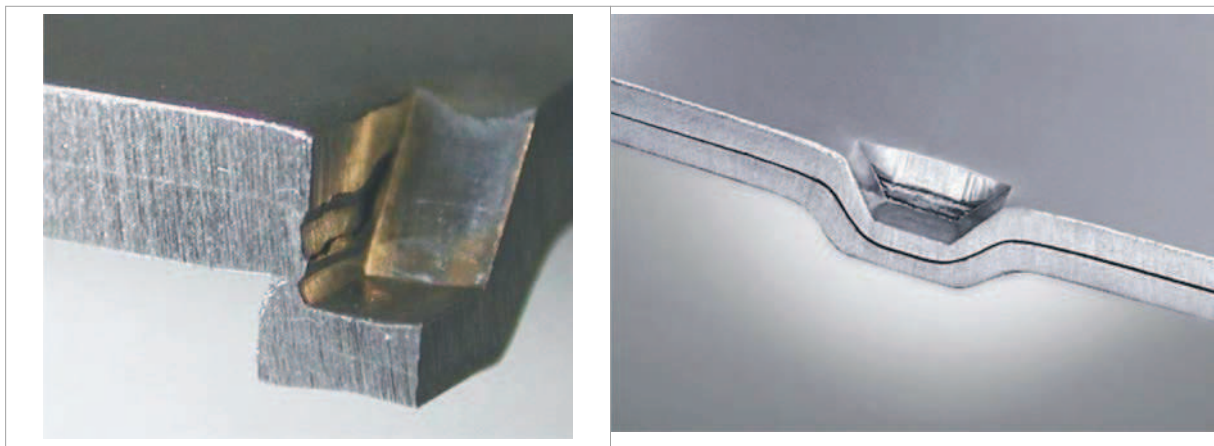
The TRUMPF jointing press TruTool TF 350 (2A1) is an electrically powered hand-held device designed for the following applications:

- Connecting sheet metal parts in overlapping alignment by means of a cold forming process.
- This process involved with this mechanical sheet joining technique is the "displacement jointing" (DIN 8593) manufacturing method.

Characteristics

- The joint arises during an uninterrupted ram stroke.
- A movable punch and a fixed die together make up the set of tools for this "one-step displacement jointing".

- The die consists of the fixed anvil, on which two lateral spring-loaded non-rigid cutting segments are aligned.
- A positive locking connection is created by this process (without additional connection elements such as screws or rivets), by means of a combined forming and shearing sequence with a subsequent cold extrusion procedure.
- Joining of both uncoated and coated workpieces.
- Joining without application of heat.
- No zinc vapors with galvanized sheets.
- Joining of parts made of different sheet materials is possible.
- Joining of two or three workpieces is possible.
- No preliminary roughing or finishing.
- Work also possible in upside-down position.







Cross-section of the joint

Tab. 1

2.2 Technical data

	Other countries			USA
Voltage	230 V	120 V	110 V	120 V
Frequency	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz
Permissible total material thickness: steel up to 400 N/mm²	3.5 mm	3.5 mm	3.5 mm	0.135 in
Permissible total material thickness: steel up to 600 N/mm²	2.5 mm	2.5 mm	2.5 mm	0.1 in
Permissible total material thickness: aluminum up to 250 N/mm²	4.0 mm	4.0 mm	4.0 mm	0.16 in
Min. total material thickness	0.8 mm	0.8 mm	0.8 mm	0.031 in
Max. jointing force	25 kN	25 kN	25 kN	5600 lbf
Nominal power consumption	1400 W	1200 W	1140 W	1200 W
Stroke cycle	2/s	2/s	2/s	2/s




	Other countries			USA
Max. height of flange with flanged material	36 mm	36 mm	36 mm	1.42 in
Weight	8.3 kg	8.3 kg	8.3 kg	18.4 lbs
Min. edge spacing	8 mm	8 mm	8 mm	0.315 in
Max. edge spacing	58 mm	58 mm	58 mm	2.28 in
Safety class	II / 	II / 	II / 	II / 

Tab. 2

2.3 Icons

Note

The following symbols are important for reading and understanding the operator's manual. The correct interpretation of the symbols will help you operate the machine better and safer.

Icon	Name	Meaning
	Read operator's manual	Read the operator's manual and safety information in their entirety before starting up the machine. Closely follow the instructions given.
	Safety class II	Indicates a doubly insulated tool.
	Alternating current	Type or property of current
V	Volt	Voltage
A	Ampere	Current, current input
Hz	Hertz	Frequency (oscillations per second)
W	Watt	Power, power input
mm	Millimeters	Dimensions e.g.: material thickness, chamfer length
in	Inch	Dimensions e.g.: material thickness, chamfer length
n_o	Idle speed	Revolution speed without load
.../min	Revolutions/strokes per minute	Revolution speed, stroke rate per minute

Tab. 3

2.4 Noise and vibration information



Noise emission value may be exceeded.

- Wear hearing protection.

⚠ WARNING**The vibration emission value can be exceeded!**

- Select the right tools and exchange them in time in the event of wear.
- Have maintenance carried out by trained specialized technicians.
- Define additional safety measures for protecting the operator from the effect of vibrations (e. g. keep hands warm, organization of working procedures, machining at normal feed force).
- Depending on the operating conditions and state of the electric tool, the actual load might be higher or lower than the specified measured value.

Notes

- The specified vibration emission value was measured in accordance with a standardized testing procedure and can be used to compare one electric tool with another.
- The specified vibration emission value can also be applied for a provisional estimate of the vibration load.
- Times during which either the machine is switched off or running but not actually in use can considerably reduce the vibration load during the entire working period.
- Times during which the machine works independently and self-propelled do not have to be calculated.

Designation of measured value	Unit	Value according to EN 60745
Vibration emission value a_h (vector sum of three directions)	m/s ²	2.6
Uncertainty K for vibration emission value	m/s ²	1.5
A-class acoustic pressure level L_{pA} typically	dB (A)	84
A-class acoustic power level L_{WA} typically	dB (A)	95
Uncertainty K for noise emission value	dB	3

Tab. 4

3. Setting work

3.1 Setting the stroke rate (230 V motor only)

⚠ CAUTION

Property damage resulting from incorrect alignment of the tools!

- Check the alignment of punch and die (both lengthwise or both diagonal).



1 Setting wheel for speed controller on 230V motor

Fig. 71200

1. Setting wheel for speed controller on motor.
2. Reduced stroke rates result in:
 - less engine noise.
 - less heating and wearing on the gears.
 - slightly increased jointing time.

3.2 Select tool

The jointing press TruTool TF 350 (2A1) can be equipped with tools in various ways depending on the particular application.

Five different types of dies are available to make it possible to utilize tools corresponding to different types of materials and material thicknesses.

A special tool holder belongs with each type of die (= fixed arm or tilting arm), which is used as a receptacle for the die.

The following example help for the selection of the tools.

Example 1

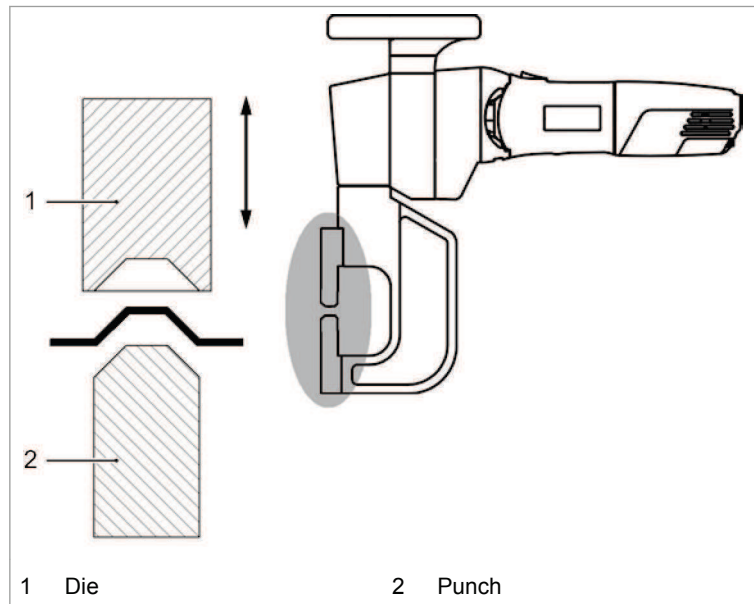


Fig. 50433

1. Select material and total material thickness.

	Total material thickness [mm]				
Steel up to 400 N/mm²	0.8 - 1.5	1.6 - 2.0	2.1 - 2.5	2.6 - 3.0	3.0 - 3.5
Steel up to 600 N/mm²	0.8 - 1.5	1.6 - 2.0	2.1 - 2.5	-	-
Non-ferrous heavy metal to 250 N/mm²	0.8 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	-
Die arm label	1	2		3	
Die no. (Order number)	1 0111969	2 0111968	2+ 0122272	3- 0053875	3 0111967
Tilting arm to die, cpl. no. (order no.)	1 0128792	2 0128793	2+ 0129723	3- 0129724	3 0128794
Die arm, fixed, cpl. no. (order no.)	1 0118130	2 0118131	2+ 0129763	3- 0129764	3 0118132
Fixed punch arm (order no.)	0118129				

Tab. 5

2. Find out which die is the right one from the table.
3. Select the die with fixed arm or with tilting arm.
4. Select fixed stamp arm (here standard).

Example 2

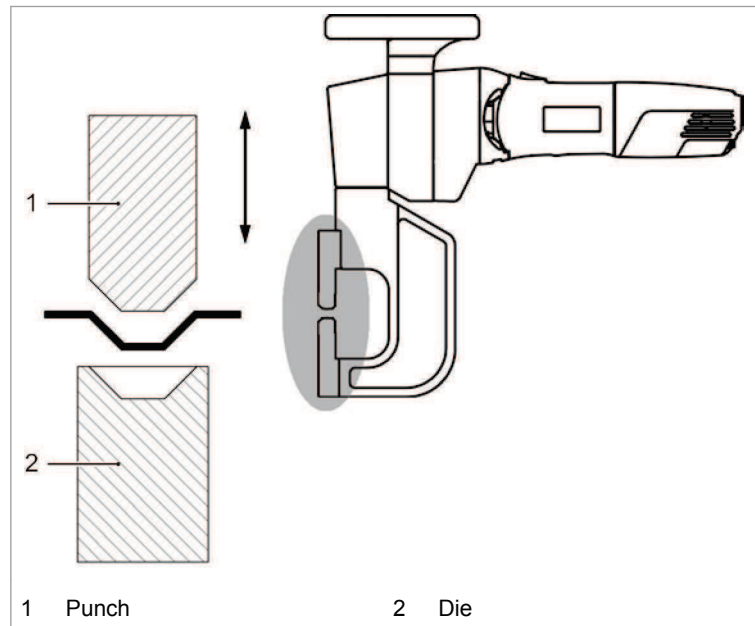


Fig. 50435

- Select material and total material thickness.

	Total material thickness [mm]				
Steel up to 400 N/mm ²	0.8 - 1.5	1.6 - 2.0	2.1 - 2.5	2.6 - 3.0	3.0 - 3.5
Steel up to 600 N/mm ²	0.8 - 1.5	1.6 - 2.0	2.1 - 2.5	-	-
Non-ferrous heavy metal to 250 N/mm ²	0.8 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	-
Die arm label	1	2		3	
Die no. (Order number)	1 0111969	2 0111968	2+ 0122272	3- 0053875	3 0111967
Die arm, fixed cpl. no. (order no.)	1 0118130	2 0118131	2+ 0129763	3- 0129764	3 0118132
Fixed punch arm (order no.)	0118129				
Tilting arm for punch (order no.)	0128748				

Tab. 6

- Find out which die is the right one from the table.
- Select the die with fixed arm (here standard).
- Select the punch with fixed arm or tilting arm.

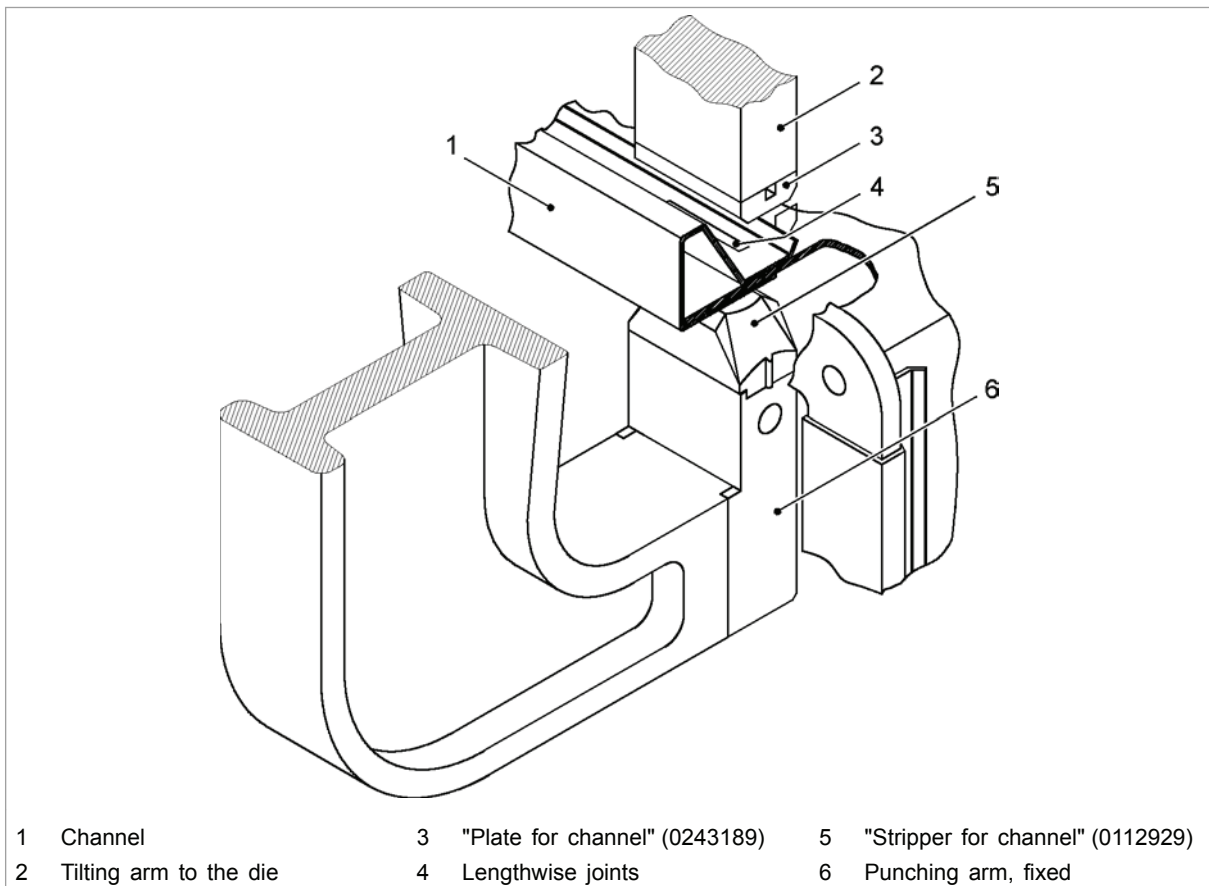
3.3 Selecting tools for ventilation duct construction

Whether or not the joint faces inwards (optical reasons) or outwards (fluidic reasons) depends on the respective tool set selected for application.

The "plate for channel" makes it possible to have the joining on the flange profiles. When doing this, joints are possible in the depressions of the flange profiles.

Note

The joints with "Plate for channel" are only possible in the longitudinal direction.

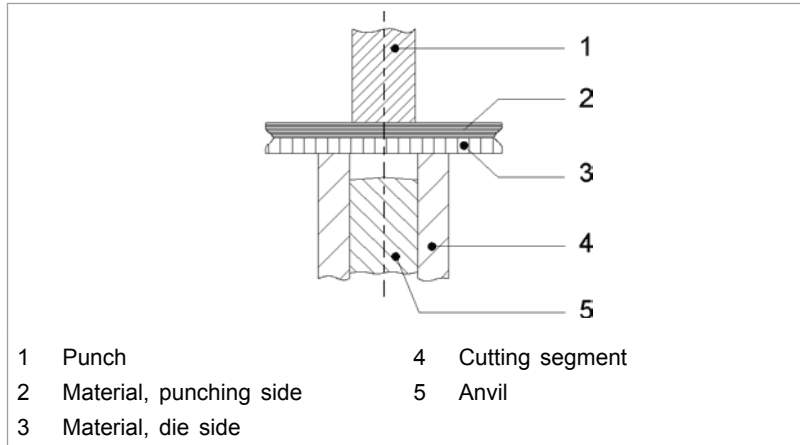


Tools for ventilation duct construction

Fig. 50436

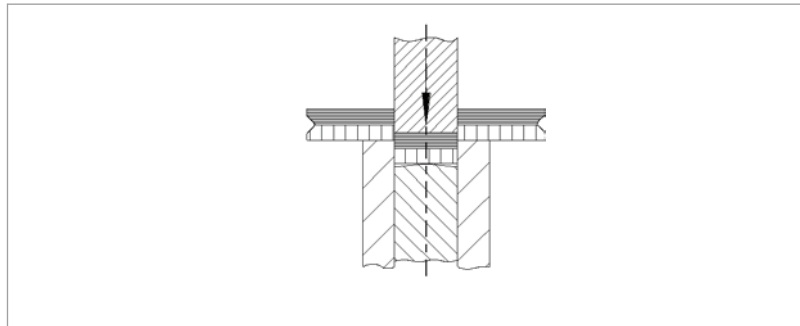
The "Stripper for channel" makes working across the corners easier.

3.4 Joining materials



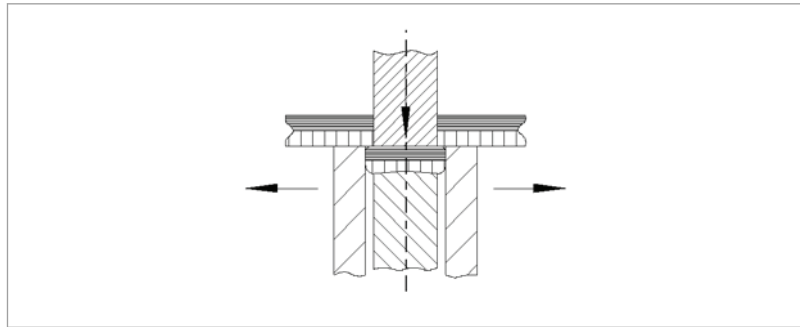
Tool and workpiece arrangement

Fig. 10043



Cutting

Fig. 10044



Forming

Fig. 10045

Note

Additional cutting and extruding merge together seamlessly during the course of the stroke movement.

Information concerning the workpiece and the joint

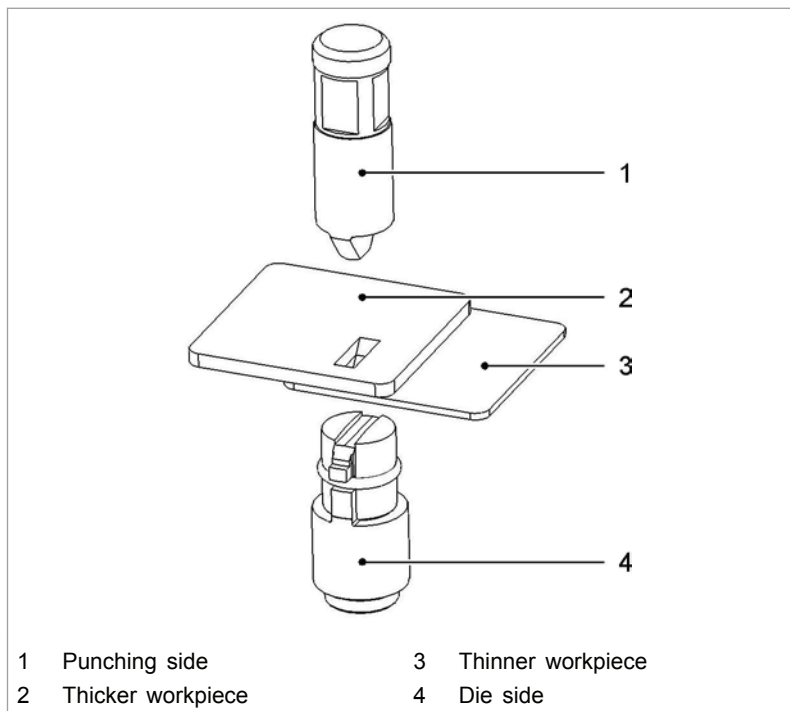


Fig. 50427

- Adjust the set of tools to match the material thickness actually present.
- In case of different material thicknesses, the thinner workpiece has to be on the die side (see "Fig. 50427", pg. 14). Joints can be achieved with material thickness differences of up to ratios of approximately 1 : 2.
- The thinner workpiece determines the maximum shear strength of the component.
 - Work with lubricants when processing aluminum and V2A (increases service life).
- The direction of the joint can be rotated by 90° (not possible if "Plate for channel" (order no. 0243189) is used). For this, the die is mounted in the desired position and the punch is aligned accordingly.

Note

The total material thickness measured counts as the recommended value for selecting the die arm. It is also possible to connect more than two workpieces with each other. In general, the more workpieces that are joined together, the less the holding force of the joint/bond will be.

Joint

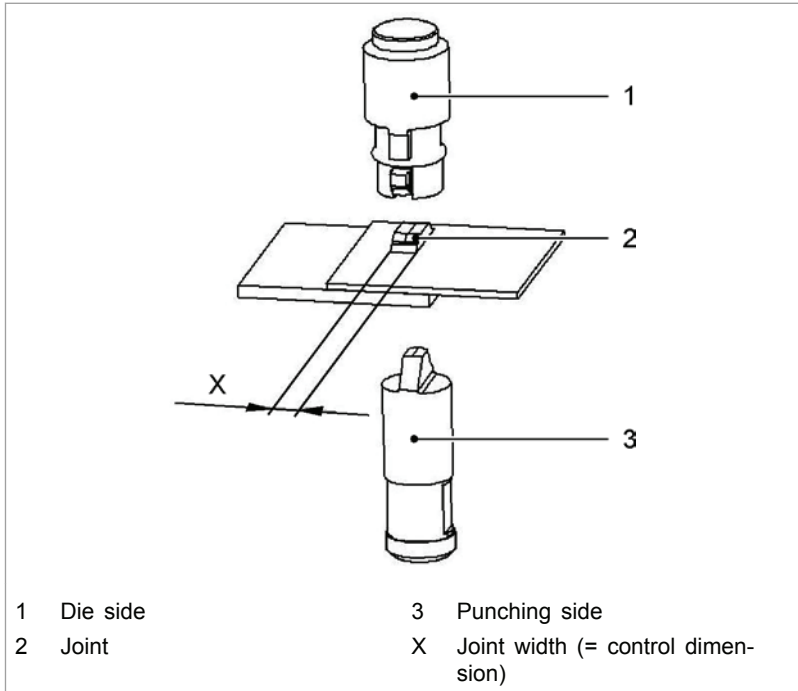
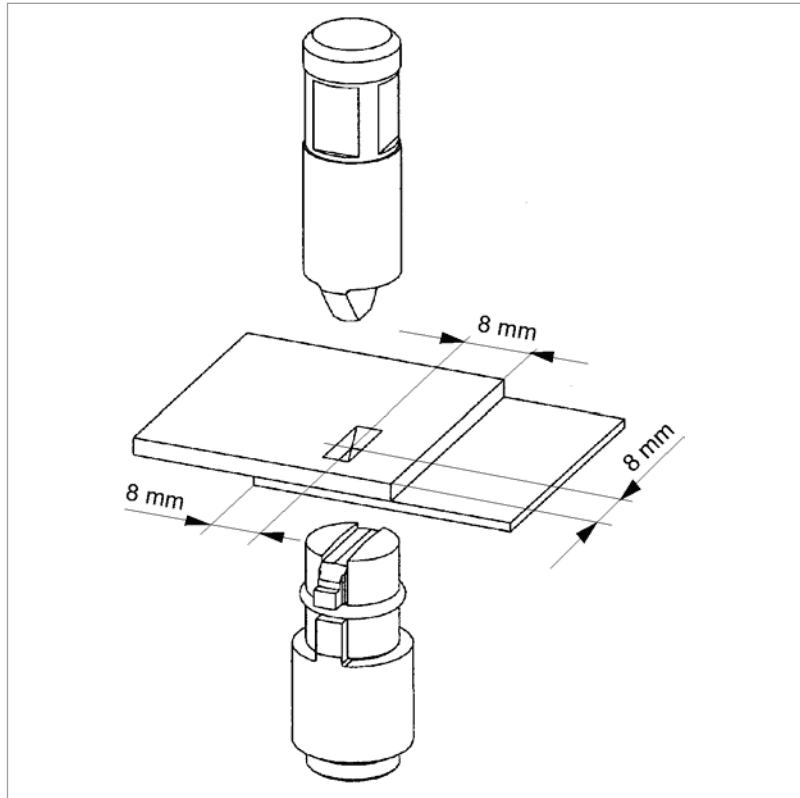


Fig. 50428

Die	Total material thickness, steel	Control dimension, joint width
1	1.5 mm	4.0 - 4.5 mm
2	2.0 mm	3.5 - 4.5 mm
2+	2.5 mm	3.4 - 4.5 mm
3-	3.0 mm	3.8 - 4.5 mm
3	3.5 mm	3.6 - 4.5 mm

Tab. 7

Distance of the joints from the edge of the material



Minimum edge spacing of the joint

Fig. 50429

The middle of the joint has to be at least 8 mm from the edge of the material. Otherwise, a joint of lesser quality will be created.

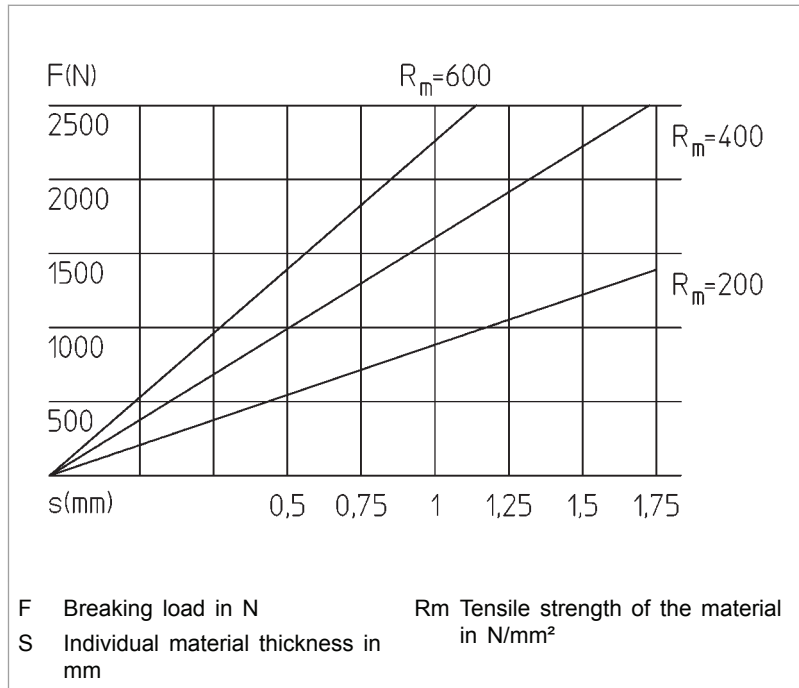
3.5 Selecting processing strategy

Die and punch can be arranged in two different directions.

<p>Load example: shear diagonal, maximum shear strength</p>	<p>Load example: shear lengthwise, 50% of the maximum shear strength</p>

Tab. 8

Maximum transferable shear force



Max. transferable lateral shearing forces depending on the material thickness and the tensile strength of the material Fig. 50430

A maximum shear strength is achieved from joining two materials which each have:

- have the same material stability.
- have the same material thickness.

4. Operation

WARNING

Damage to the machine due to improper handling.

- Make sure the machine is always in a stable position when operating it.
- Never touch the tool while the machine is running.
- Always operate the machine away from your body.
- Do not operate the machine above your head.

Electromagnetic faults

The appliance may switch off prematurely when affected by electromagnetic interference. The appliance will resume operation when the faults have been cleared.

Lubricating oil

In order to improve the seaming result and increase the service life of the punch, coat the seam point or the tool with oil before processing the workpiece.

Material	Oil
Steel, chromium steel	Punching and nibbling oil (0.5 l, order no. 0103387)
Aluminum	Punching and nibbling oil for aluminum (1 l, order no. 0125874)

Tab. 9

4.1 Working with TruTool TF 350 (2A1)

Condition

- All setting work has been carried out.

CAUTION

Damage to property possible as a result of unnecessarily long engine running times!

- Switch the machine off following processing.

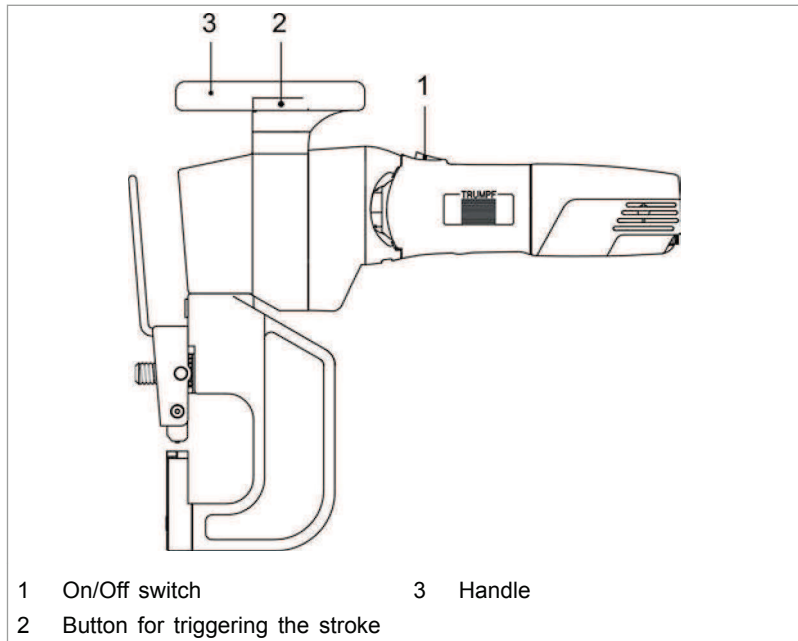


Fig. 28377

Switching on the machine

1. Insert the mains plug.
2. Move the On/Off switch (1) to the front.



Correct holding of the machine

Fig. 50437

3. Triggering the stroke:
 - Actuate the button (2) which is located inside the handle (3).
 - If full revolution speed has been reached, trigger the stroke.
4. Move the On/Off switch (1) to the rear.
5. Pull out the mains plug.

Switching off the machine

4.2 Overload protective device on the motor

Notes

- The appliance may switch off prematurely when affected by electromagnetic interference. The appliance will resume operation when the faults have been cleared.
- If the motor temperature is too high, the motor will switch off.

1. Allow the machine to run in idle until it has cooled down.

2. Operate the machine normally after it has cooled down.

4.3 Slewing ring (option)

The machine can be swivelled into any processing position desired with the help of the auxiliary "slewing ring" device (order no. 0976671). The use of the slewing ring makes the work of the machine operator easier.

The slewing ring is suspended over an eyelet (total weight of the machine TruTool TF 350 (2A1) with slewing ring is 15 kg).

A balancer is used to provide optimal handling.



TruTool TF 350 with installed slewing ring

Fig. 50438

1. Align the machine in the plate (1) over the centering hole.
2. Clamp the machine on the tool carrier (4) in the clamping bracket (3) and tighten the screw (2).

4.4 STAND TruTool TF 350 (2A1) (option)

The joining station (order no. 1224803) is used for the stationary operation of the TruTool TF 350 jointing press. This allows small workpieces to be joined quickly and easier.



TruTool TF 350 with joining station

Fig. 50439

5. Maintenance

⚠ DANGER

Electrical voltage! Risk of fatal injury due to electric shock!

- Remove the plug from the plug socket before undertaking any maintenance work on the machine.
- Check the plug, cable and machine for damage each time before using the machine.
- Keep the machine dry and do not operate it in damp rooms.
- Connect the fault current (FI) circuit breaker with a maximum breaking current of 30 mA when using the electric tool outside.
- Only use original TRUMPF accessories.

⚠ WARNING

Risk of injury due to incorrect repair work

Machine does not work properly.

- Maintenance may be carried out by trained specialist technicians only.

⚠ WARNING

Risk of injury due to joining station tipping over

- Anchor the joining station securely to the floor.

⚠ CAUTION

Damage to property caused by blunt tools!

Machine overload.

- Check the cutting edge of the punch hourly for wear. A sharp punch produces good seaming results and prevents machine damage. Change the punch in due time.

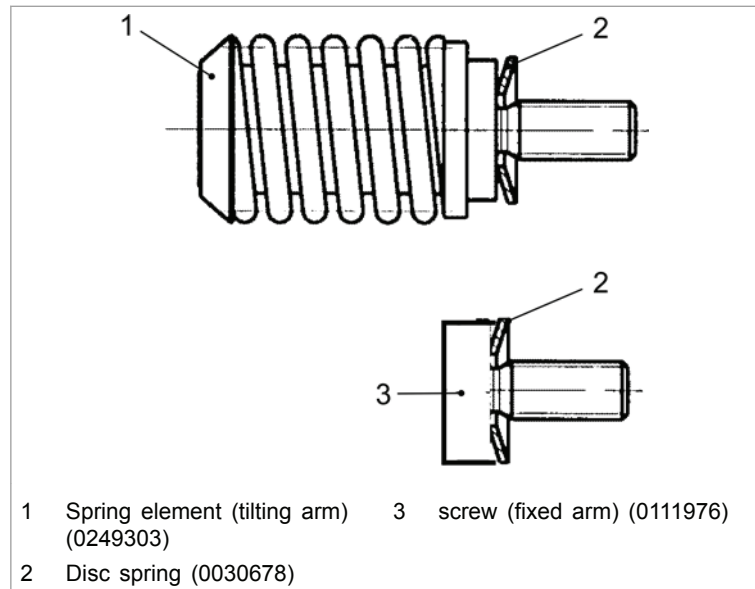
Maintenance point	Interval	Recommended lubricants
Punch	Change as needed.	-
Die	Change as needed.	-
Tool carrier	Clean as needed.	-
Ventilation slots	Clean as needed.	-
Ram	Relubricate after 20 operating hours.	Lubricating grease "G1"
Coupling	Relubricate after 20 operating hours.	Lubricating grease "G1"
Gearbox and gear head	After 300 operating hours, arrange for a trained specialist to relubricate or to replace the lubricating grease.	Lubricating grease "G1"

Maintenance points and intervals

Tab. 10

5.1 Replacing the tool

Cleaning the tool holder

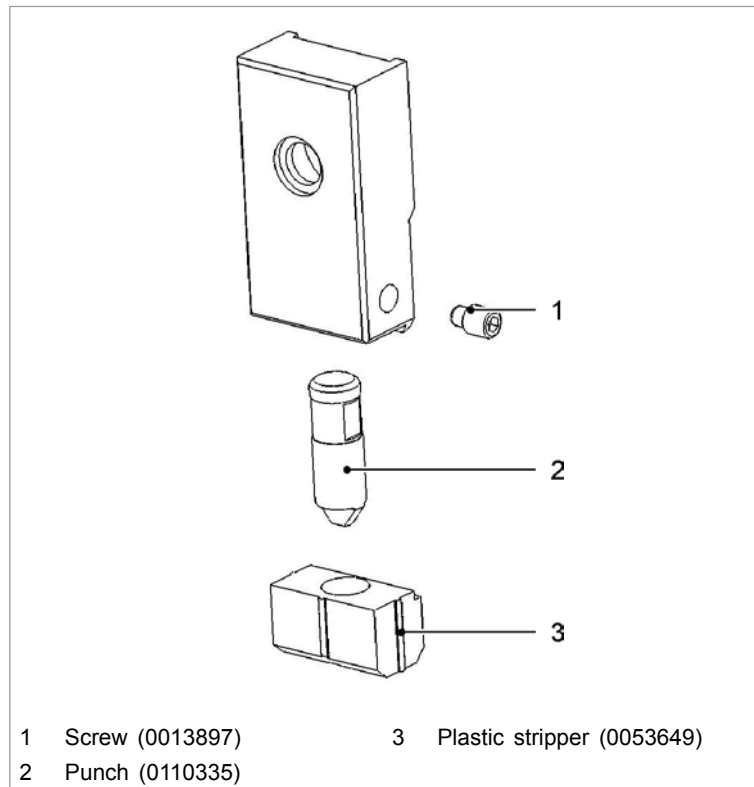


Tool adapter

Fig. 64014

1. Cleaning the tool holder.
2. Check for damage.
3. Lubricate location bolt with lubricating grease "G1" (order no. 344969).
4. Mount the disc spring (2) on the screw (3) / the spring element (1) as shown in the illustration.
5. Mount the tool arm on bolts.
6. Tighten screw (3) / spring element (1) firmly.

Changing the punch arm

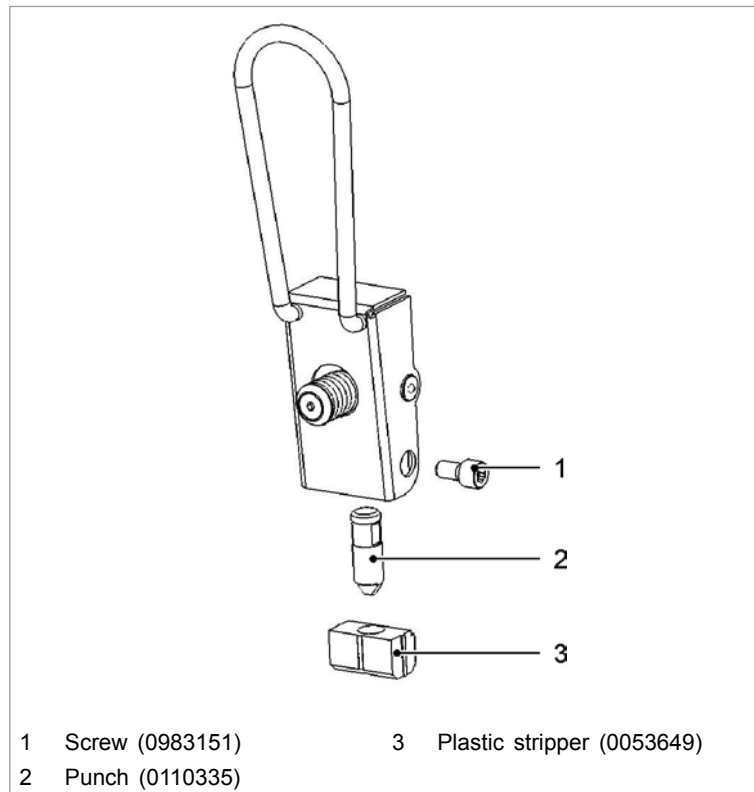


Fixed punch arm

Fig. 50440

1. Remove the complete punch arm from the machine.
2. Remove the stripper (3).
3. Loosen screw (1).
4. Pull out punch (2).
5. Install new punch.
6. Align punch (2).
7. Tighten screw (1) firmly.

Changing the punch on the tilting arm

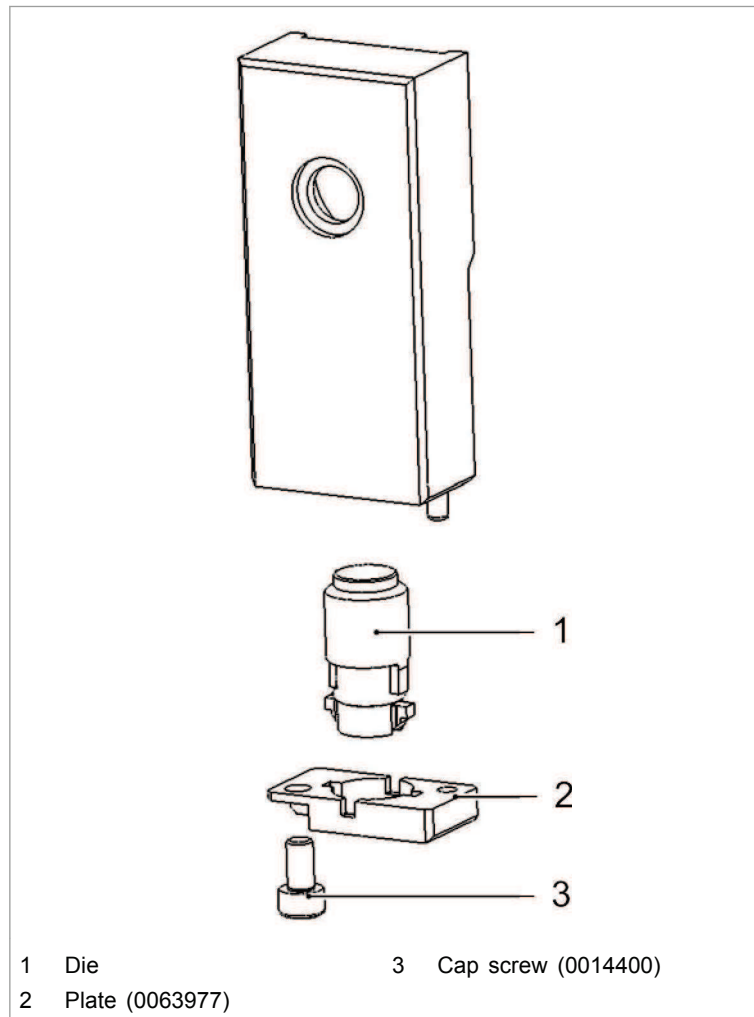


Tilting arm on the punch

Fig. 50441

1. Remove the complete punch arm from the machine.
2. Remove the stripper (3).
3. Loosen screw (1).
4. Pull out punch (2).
5. Install new punch.
6. Align punch (2).
7. Tighten screw (1) firmly.

Replace die arm



Fixed die arm

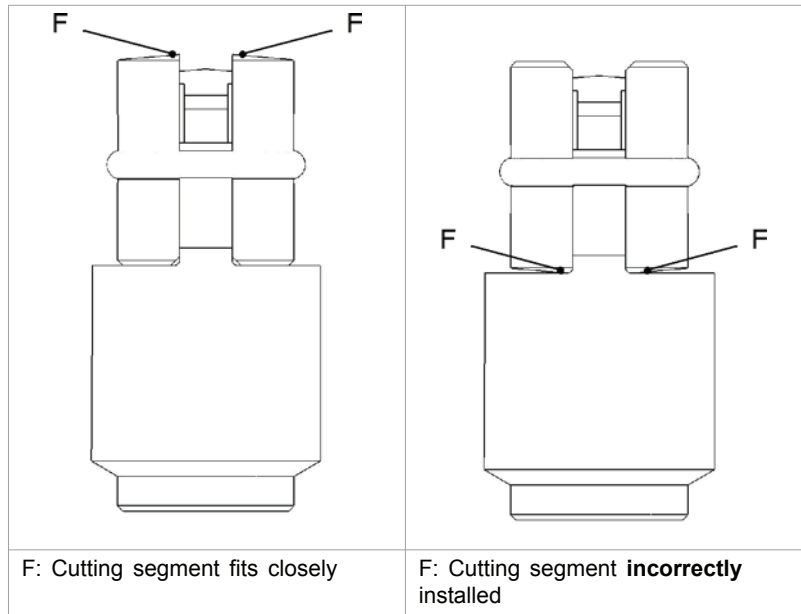
Fig. 50442

1. Remove the complete fixed die arm from the machine.
2. Loosen cap screw (3).
3. Remove the plate (2).
4. Remove the die (1).

Note

Do not install the cutting segment backwards.

5. Install new die (be sure that the cutting segments fit closely to the anvil).



Tab. 11

6. Install the plate (2).
7. Tighten screw (3) firmly.

Changing the die tilting arm

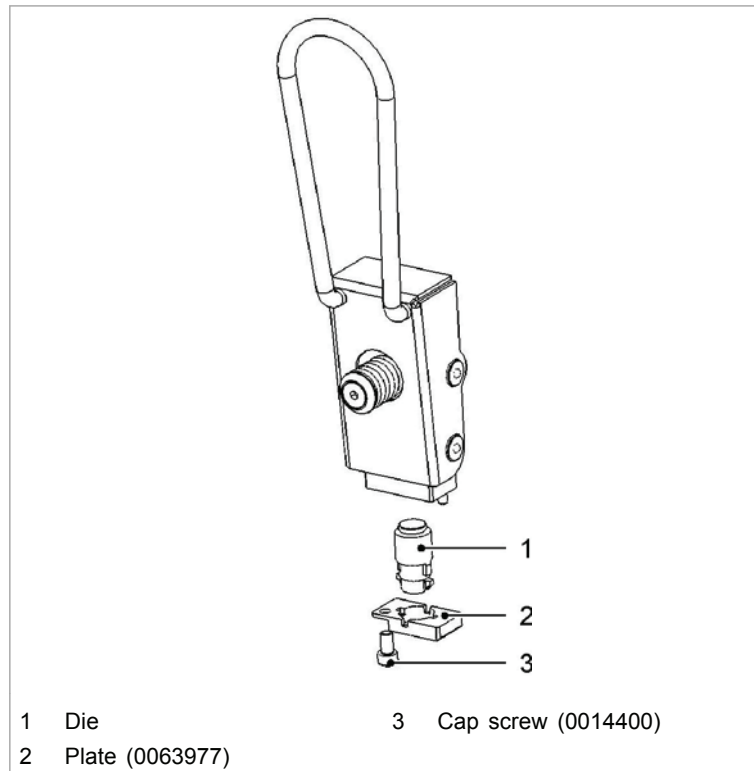


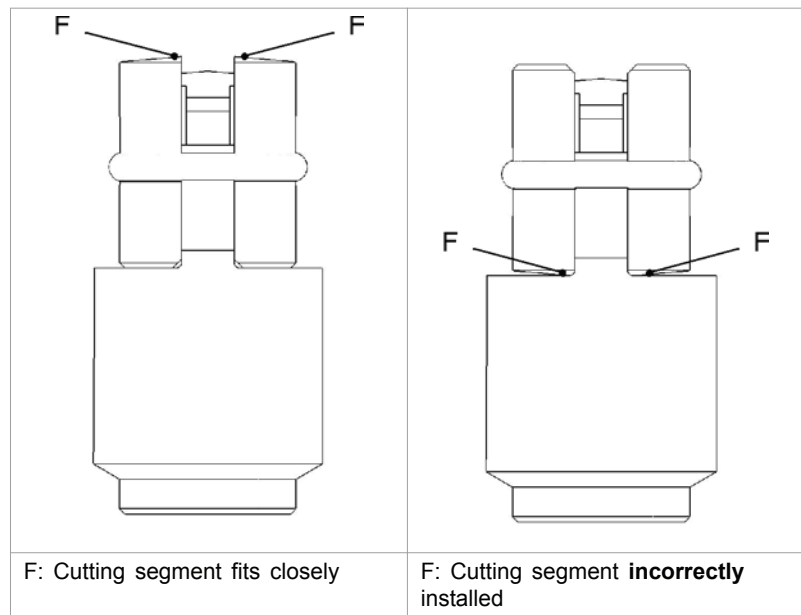
Fig. 50443

1. Pull the bracket towards the front and swivel the whole fir arm so that the cap screw (3) can be accessed.
2. Loosen cap screw (3).
3. Remove the plate (2).
4. Remove the die (1).

Note

Do not install the cutting segment backwards.

5. Install new die (be sure that the cutting segments fit closely to the anvil).



Tab. 12

6. Install the plate (2).
7. Tighten screw (3) firmly.

5.2 Lubricating the ram

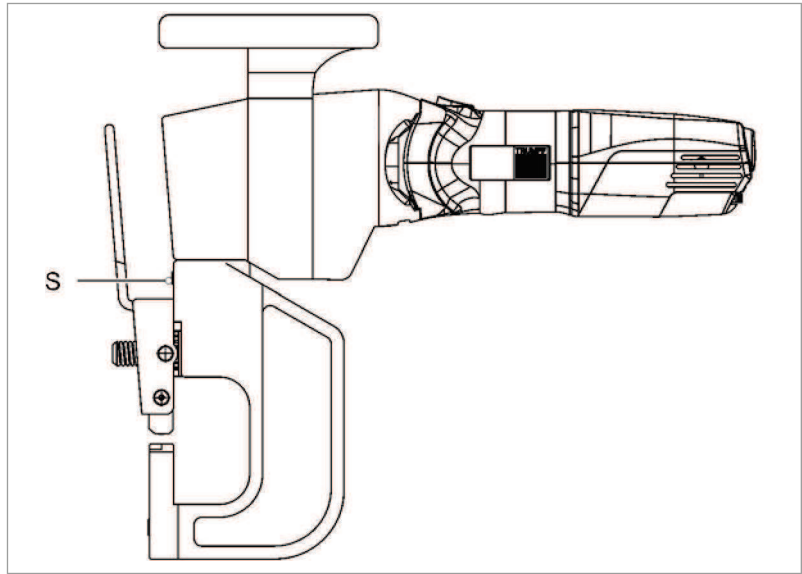


Fig. 64015

- Lubricate the grease nipple (S) on the tool with a grease gun.

5.3 Lubricating the coupling

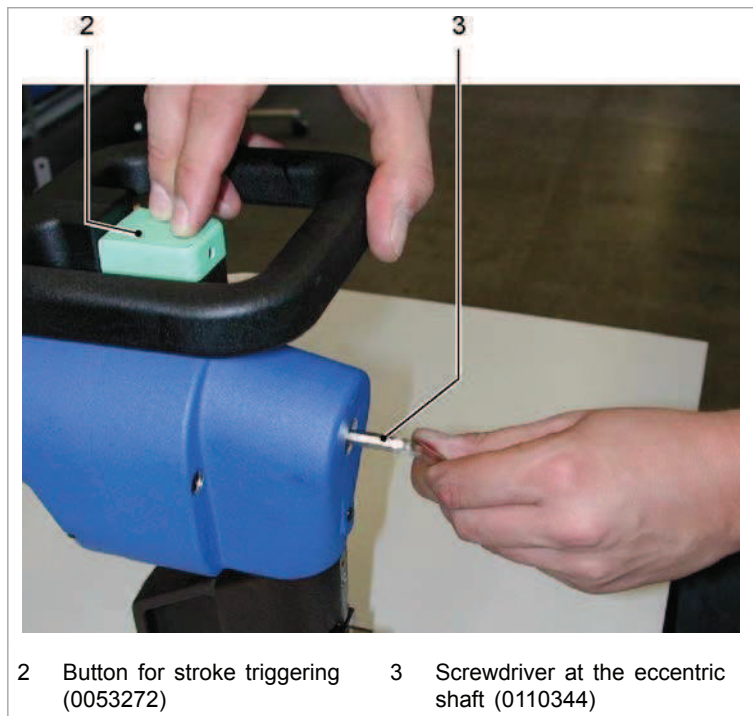
1. Pull the power plug out of the plug socket.



1 Sealing screw

Fig. 50449

2. Unscrew the screw plug (1).



2 Button for stroke triggering (0053272)

3 Screwdriver at the eccentric shaft (0110344)

Fig. 50448

3. Press and hold the button for stroke triggering (2) and rotate the eccentric shaft (3) clockwise (see arrow at the machine's face end) until the lubrication port becomes visible.

or

- Put the grease gun through the bore hole in the end sign and rotate the eccentric shaft clockwise until the grease gun engages in the lubrication port.

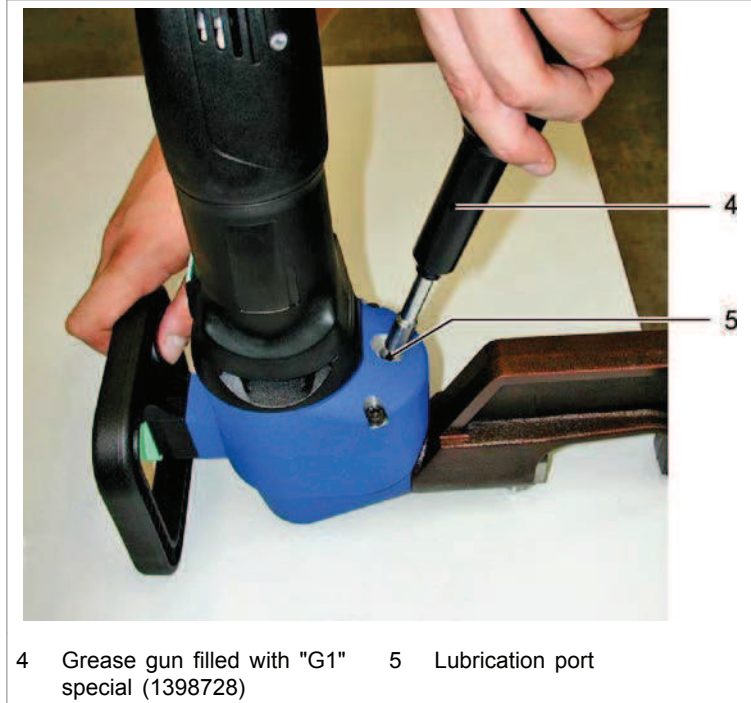


Fig. 50447

4. Relubricate the coupling with the grease gun (4) through the lubrication port (5) (one stroke).
5. Screw in the screw plug again.
6. Put the machine in a safe position.
7. Connect the power plug.
8. Switch on the motor.

The machine completes the stroke which was manually started.

9. Press the button for stroke triggering and trigger a test stroke.

5.4 Changing the power cable

If the power cable is to be replaced, it should be procured from the manufacturer or an authorized dealer to avoid safety hazards.

Note

For TRUMPF service addresses, see www.trumpf-power-tools.com.

5.5 Replacing carbon brushes

The motor comes to a standstill whenever the carbon brushes are worn out.

Note

For TRUMPF service addresses, see www.trumpf-power-tools.com.

- Change the carbon brushes.

6. Accessories and consumables

Consumables	Order number	Scope of delivery
Punch	0110335	X
Die no. 1	0111969	-
Die no. 2	0111968	-
Die no. 2+	0122272	-
Die no. 3-	0053875	-
Die no. 3	0111967	X
Stripper for flat materials	0053649	X
Stripper for channels	0112929	X
Grease gun filled with "G1" special	1398728	X
Punching and nibbling oil for steel (0.5 l)	0103387	X
Punching and nibbling oil for aluminum (1 l)	0125874	-

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Tab. 13

Accessories	Order number	Scope of delivery
Die arm fixed (complete)		-
No. 1	0118130	
No. 2	0118131	
No. 2+	0129763	
No. 3-	0129764	
No. 3	0118132	
Tilting arm for die (complete)		-
No. 1	0128792	
No. 2	0128793	
No. 2+	0129723	
No. 3-	0129724	
No. 3	0128794	
Punch arm fixed (complete)	0118129	-
Tilting arm to the punch (complete)	0128748	-
Plate for channels	0243189	-
Operator's manual	1893447	X
Safety information, other countries	0125699	X
Safety information (red document), USA	1239438	X
Slewing ring	0976671	-
STAND TruTool TF 350	1224803	-

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Tab. 14

6.1 Ordering consumables

Note

The following data must be specified in order to ensure that parts are delivered correctly and without delay.

1. Specify the order number.

-
2. Enter further order data:
 - Voltage data
 - Quantity
 - Machine type
 3. Specify the complete shipping information:
 - Correct address.
 - Desired delivery type (e.g. air mail, courier, express mail, ordinary freight, parcel post).

Note

For TRUMPF service addresses, see
www.trumpf-powertools.com.

4. Send the order to the TRUMPF representative office.

**7. Appendix: Declaration of conformity,
guarantee, replacement parts lists**