GB OPERATING INSTRUCTIONS

LEISTER®

LEISTER Twinny T
Combination wedge automatic hot air welding machine

Please read operating instructions carefully before use and keep for further reference.

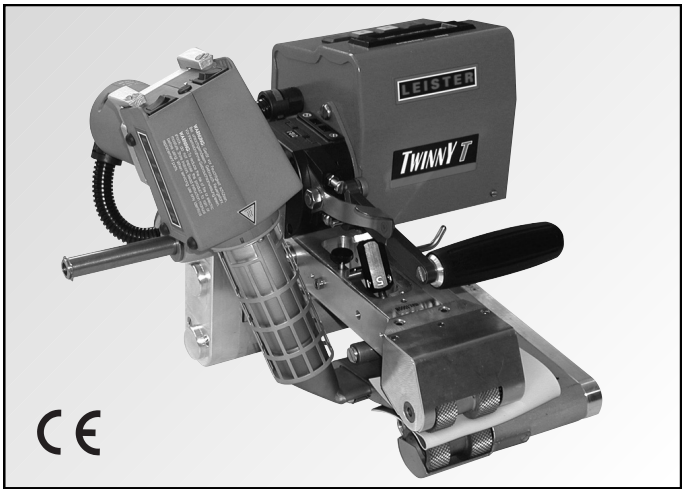
APPLICATION

The LEISTER Twinny T is a combination wedge automatic hot air welding machine for overlap welding and manufacturing of films and geomembrane liners in tunnels as well as in earthwork and civil engineering. The heat transmission occurs through optimum combination of contact and hot air.

Type	Heating System	Type of Material	Material Thickness
Civil engineering Tunnel construction	combination wedge long	PE-HD, PE-C, PFA, PD, PP PVC-P, PE-LD, ECB, EVA	0,8 – 2,0 mm / 32 – 80 mil 1,0 – 3,0 mm / 40 – 120 mil
	tube nozzle short	PE-HD, PE-C, PFA, PD, PP PVC-P, PE-LD, ECB, EVA	0,3 – 1,0 mm / 12 – 40 mil 0,3 – 2,0 mm / 12 – 80 mil

- **Overlap** max. 125 mm / 5 inch
- **Type of seam** Welding seams are produced in accordance with DVS 2225 part I and BAM. Other dimensions are possible on request

DVS: German Welding Association
BAM: Federal Institute for Materials Research and Testing, Berlin.



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WARNING

Danger! Unplug the tool before opening it as live components and connections are exposed.

Incorrect use of the hot air tool can present a **fire and explosion hazard** especially near combustible materials and explosive gases.

Do not touch the element housing and hot wedge when hot as they can cause **burns**. Allow the tool to cool down. Do not point the hot air flow in the direction of people or animals.

Connect the tool to a socket outlet with a protective earth conductor. Any interruption of the protective earth conductor inside or outside the tool is dangerous! **Use only extension cables with a protective earth conductor!**

CAUTION

The **voltage rating** stated on the tool should correspond to the mains voltage.

For personal protection, we strongly recommend the tool be connected to an **RCCB** (**R**esidual **C**urrent **C**ircuit **B**reaker) before using it on construction sites.

The tool **must be** operated under supervision. The heat can reach combustible materials which are out of sight.

Protect the tool from **damp and wet**.

APPROVAL MARKS

TECHNICAL DATA

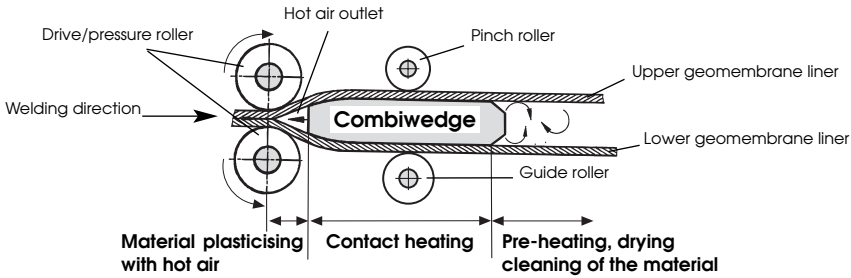
Protection class I

Voltage	**V~**	100, 120, 200, 230 ★
Power consumption	**W**	1600, 1900, 2200, 2300
Frequency	**Hz**	50 / 60
Temperature	**°C /°F**	max. 560 stepless
Welding pressure	**N/lbs (pound)**	max. 1000 stepless
Drive	**m/min. /feet**	0,8 – 3,2 stepless
Emission level	**L_{pA} (dB)**	71
Size LxBxH	**mm**	340 × 360 × 245
Weight	**kg**	7,9 (Civil engineering below ground) / 6,9 (tunnel construction)

★ mains voltage cannot be switched over

- **Heating** system → The hot air temperature is steplessly adjustable and electronically controlled. The heat transmission occurs with optimum combination of all the advantages of contact hot air. The flexible combination wedge contains **three heating zones**:

Heating system cross sectional diagram

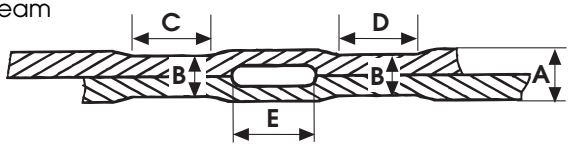


- **Welding Pressure** → steplessly adjustable. The welding pressure is transmitted via a toggle lever to the pressure rollers. The **swivel head guarantees the equalisation of the pressure to both** welded sections (C and D) as well as on a welded seam without test channel.
  This allows T-joints to be welded easily. During the welding process the welding pressure adjusts itself linearly to the change in material thickness of the geomembrane liner.

Cross sectional diagram of an overlap weld

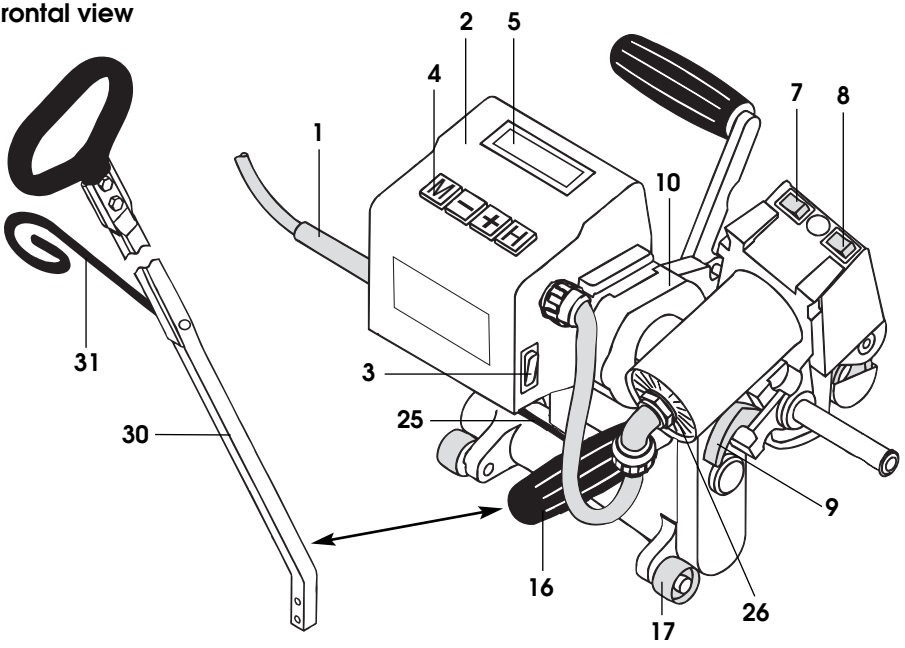
Seam thickness reduction = A – B

A : Thickness of the upper and lower membrane
B : Thickness of the welded seam
C : Welded section 1
D : Welded section 2
E : Test channel

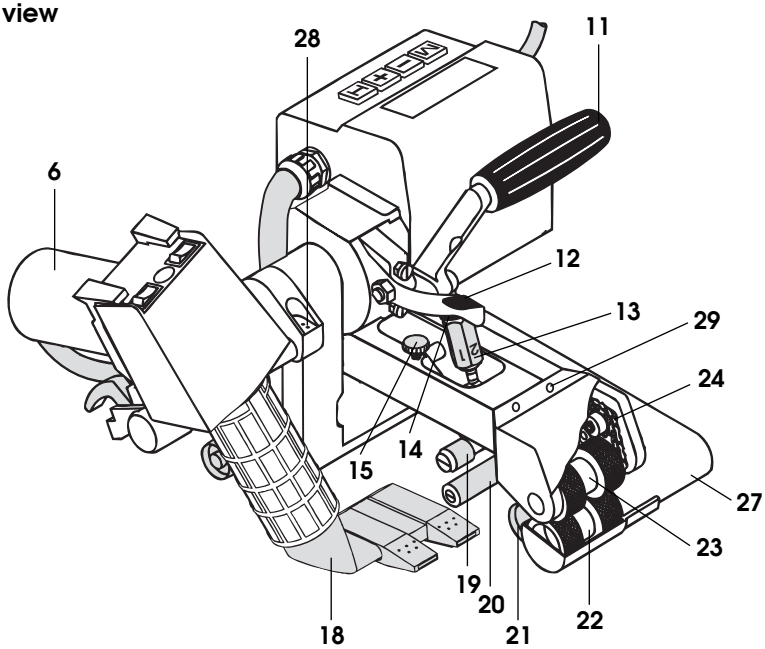


- **Drive** → Double drive system, is steplessly adjustable and electronically controlled. The automatic control system with tachogenerator is designed in such a way, that the adjusted welding speed remains constant independently of the load. The power transmission to the drive/pressure rollers works through a **three stage planetary gear**.

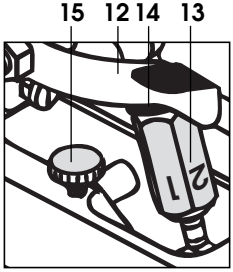
Frontal view



Back view



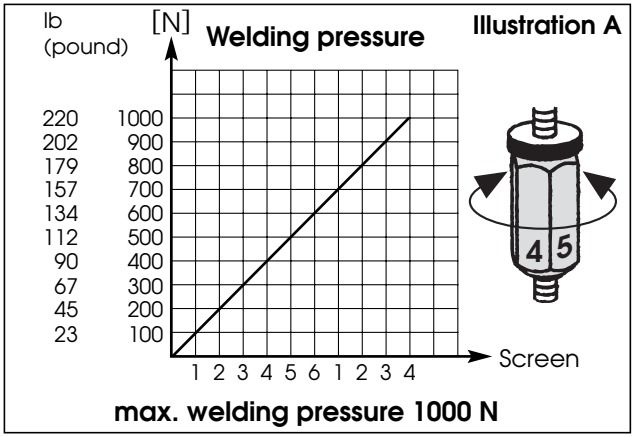
1. Cable to mains
2. Housing for drive motor and electronics
3. Main switch
4. Keyboard
5. Display
6. Hot air blower
7. Blower switch/heating ON/OFF
8. Two-step switch for air volume
9. Locking lever
10. Drive/power transmission
11. Lever for welding pressure
12. Lever for locking mechanism
13. Adjustment screw for welding pressure
14. Locking screw
15. Adjustment screw for restraining device
16. Guide handle
17. Travelling wheel
18. Combination wedge
19. Pinch roller
20. Guide roller
21. Rear travelling wheel
22. Lower drive/pressure roller
23. Upper drive/pressure roller
24. Chain
25. Restraining bar
26. Air filter
27. Lower part of the chassis
28. Guide shaft set screw
29. Adjusting screw for swivel head
30. Guide bar
31. Cable holder



– Welding Pressure

Engage and position the automatic welding machine onto the material to be welded. Pull the **lever (11)** without engaging the combination wedge.

By turning the **adjusting screw (13),** the **drive/pressure rollers (22/23)** should lightly touch the material to be welded. Release the **locking mechanism (12)** of the lever and at the same time release the tension of the **lever (11)**.



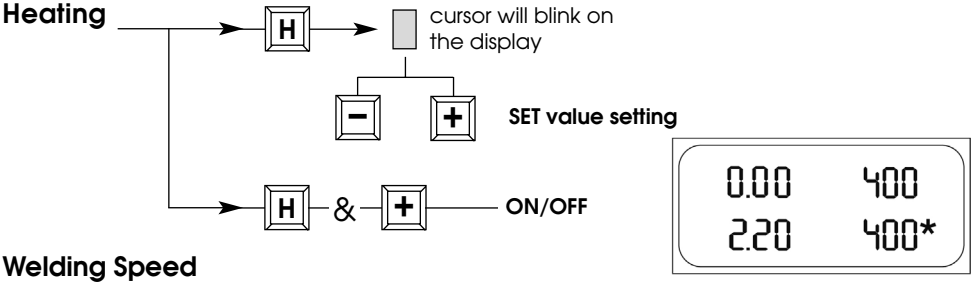
Following **illustration A**, rotate the **adjustment screw (13)**. Tighten the **locking screw (14)** by hand. As required adjust the pressure of the **pinch roller (19)** with the **adjustment screw** for the **restraining device (15)**.

Warning:

If the maximum welding pressure of 1000 N is exceeded mechanicall damage may occur.

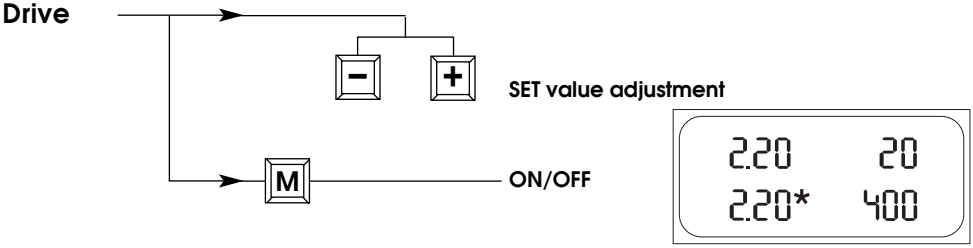
Welding temperature

Set the welding temperature with the H , − + **keys**. The temperature is dependent on the material and the ambient temperature. The in-put SET value will be shown on the display. Switch the heating on by pressing the H and + keys simultaneously. Heating up time approx. 5 minutes.



Welding Speed

Depending on the film or geomembrane liner and the influence of the weather, set the welding speed with the − + **keys**. The in-put SET value will be shown on the display.



Welding Preparation

– *Laying* Width of overlap 80 mm to 125 mm
Geomembrane liners must be clean between the overlap as well as above and below.

– *Mains supply* at least 4kW (generator)
supplied with an RCCB

– *Cable to mains* a minimum cable cross section in accordance with the table.

230 V~	to 50 m	**3 x 1,5 mm² / 3 x 14 AWG**
	to 100 m	**3 x 2,5 mm² / 3 x 12 AWG**
120 V~	to 50 m	**3 x 1,5 mm² / 3 x 14 AWG**
	to 100 m	**3 x 2,5 mm² / 3 x 12 AWG**

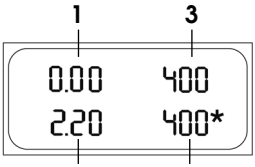
Operating conditions

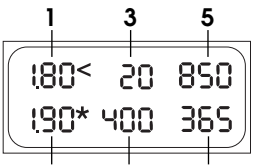
- Attach **guide bar (30)** or **guide handle (16).**
- Move the **hot air blower (6)** out and lift up until it locks.
- Connect tool to the mains.
- Start the tool with Main– or Control–Level.

Version: **Standard** **Memory card**

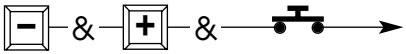
Main – Level

main switch (3) ON

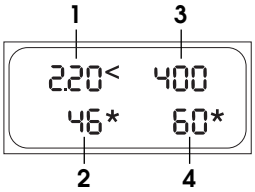


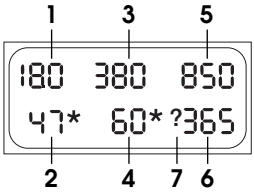


Control – Level



main switch (3) ON





Welding process control and fault finding by displaying the power consumption.

< Overload Indication
*** Heating / Drive active**

Display no.	**Level**	
Drive/heating	Main	Control
1. Welding speed	ACTUAL value	
2. Welding speed	SET value	Power consumption
3. Temperature	ACTUAL value	
4. Temperature	SET value	Power consumption
5. Welding pressure	ACTUAL value	
6. Memory card	Residual capacity	

Memory card	Autostart	No.7	Residual capacity (Pos.7)	Led green	Led red
Not inserted	No / Yes	(none)	0	Off	Off
Inserted	No	?	365*	On	Off
	Yes	I			
Protocol on	No /Yes	→	364*	On	flashing

Display (4)	**Heating reason for fault** **after heating up time**
100 % 100 %	• mains under-voltage • heating element faulty

Display (2)	**Drive reason for fault**
100 % 100 % or < 100 % or < 100 % or < 100 % or <	• mains under-voltage • overlap of the geomembrane liner too wide • dirt on the drive rollers (22/23) • max. welding pressure (1000 N) has been exceeded. • high welding speed with a large sudden overload (ie anchoring trench, T-joints....)

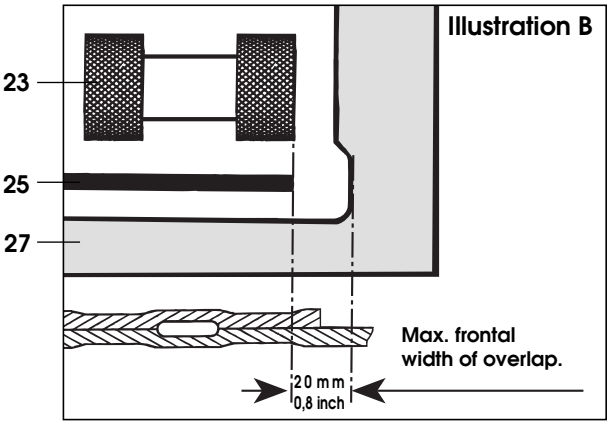
If malfunction is still present, contact the Service Centre.

Welding procedure

- Check: – **Drive rollers/pressure rollers (22/23)** as well as the **combination wedge (18)** must be clean before engaging with the geomembrane liner or foil.
  – Mains cable length/cable guide
  – Cable length/cable guide
- Guide and position the automatic welding machine into the over-lapped geomembrane liner or film.
- Adjust welding parameters, see page 5/6.
- The welding temperature must be achieved.
- Perform a test welding according to the welding instructions of the material manufacturer and the national stand-ards or guidelines.
- Check the test welding.
- Switch on drive motor with key [M] on **keyboard (4)**.
- Engage **combination wedge (18).**
- Pull the **lever (11).**

Beginning of welding process

- Check the welded seam (wash/seam thickness reduction). as required, adjust the welding speed with keys [–] [+] on **keyboard (4)**.
- The automatic welding machine is guided along the overlap with the **guide bar (30)** or at the **guide handle (16)**, so that the frontal width of the overlap is kept within the 20 mm / 0,8 inch zone (see illustration B).

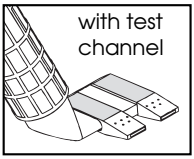


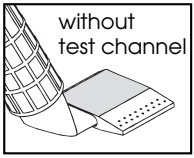
End of welding process

- Release **tensioning lever (11).** Withdraw **combination wedge (18)** from the overlap and swing upwards.
- Switch off the drive motor with [M] key on the **keyboard (4).**
  Switch off heater with keys [H] and [+] on **keyboard (4)** (by pressing them simultaneously).

Depending upon the materials to be welded, the heating system with a **long or short combination wedge** should be employed.

Combination wedge long

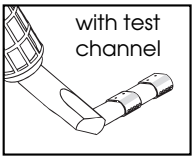


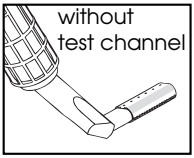


- Application/guidelines
  Depending on the material, possibly deviating
  PE-HD, PE-C, PFA, PP material thickness of **0,8 – 2,0 mm / 32 – 80 mil**
  PVC-P, PE-LD, ECB, EVA material thickness of **1,0 – 3,0 mm / 40 – 120 mil**
- Contains three heating zones: pre-heating, contact heating, material plasticising

Through the combination of contact heat and hot air, the long combination wedge permits very good quality of the welding seam and high welding speed.

Combination wedge short





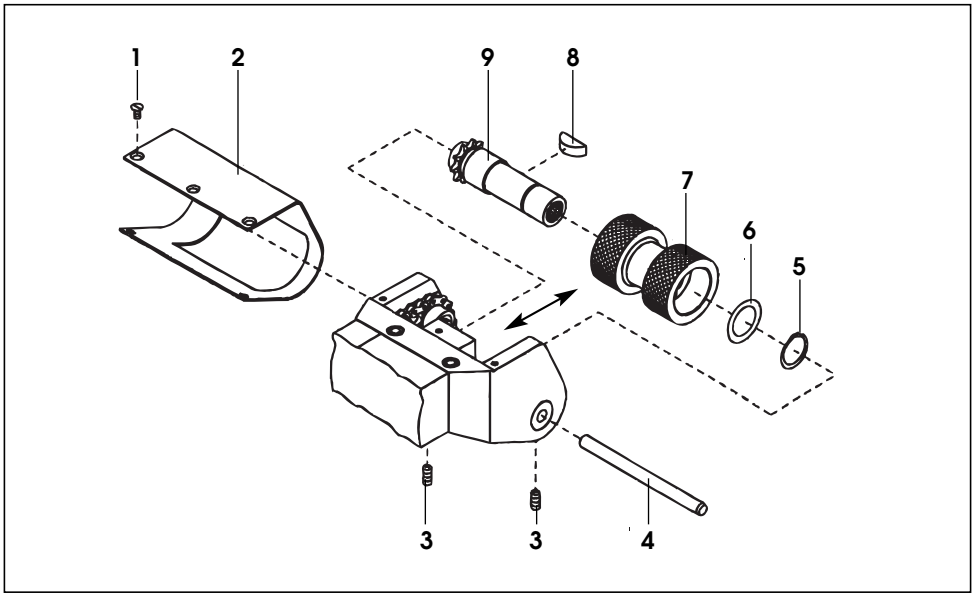
- Application/guidelines
  Depending on the material, possibly deviating
  PE-HD, PE-C, PFA, PP material thickness of **0,3 – 1,0 mm** / **12 – 40 mil**
  PVC-P, PE-LD, ECB, EVA material thickness of **0,5 – 2,0 mm / 20 – 80 mil**
- **Makes welding of films from 0,3 mm / 12 mil thickness possible**
- In order to prevent thin materials melting onto the contact area, the material to be welded is carried by a hot air cushion. Thus this has only brief contact with the combination wedge.

- Maximum possible width of welding seam without test channel 50 mm / 2 inch
- Welding seam width, with test channel in accordance with DVS 2225 part I and BAM
- Other dimensions possible on request.

Work process

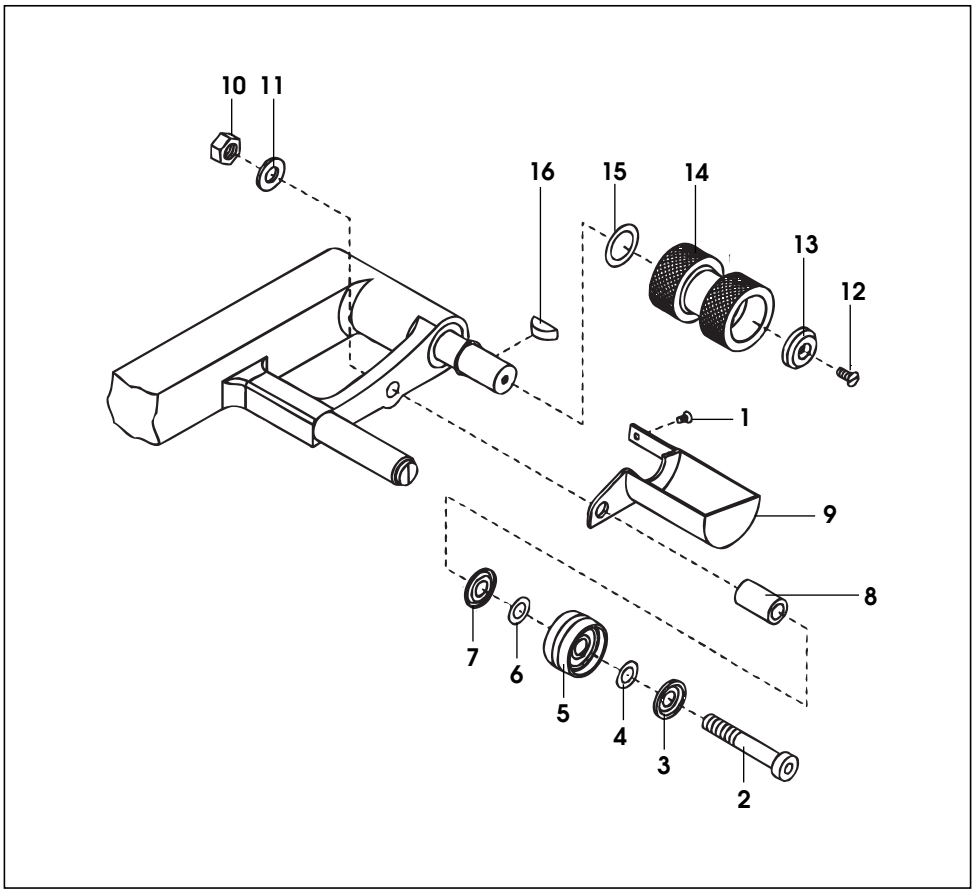
- Loosen four screws on the **combination wedge (18)**.
- Install the new heating system.
- Lightly tighten screws.
- Drive **combination wedge (18)** between the drive/pressure rollers.
- Check: align **combination wedge (18)** in the **pressure rollers (22/23)**.
- Tighten screws.
- Test–weld/check: The test channel must be in the centre of the welding seam.
- As required, adjustments can be made to the running–in depth of the heating system with the **guide shaft set screw (28)**, in order to run the test channel off–centre.

Different overlap joints can be produced with the LEISTER Twinny T for various applications, e.g. in tunnel construction or civil engineering. These differ in width of the welded seam and in width of the test channel. Welding seams without test channel can also be produced. In order to achieve these different welding seams, the appropriate drive/pressure rollers have to be installed. These drive/pressure rollers are manufactured either in aluminium or stainless steel depending on customers' requests.



1. Countersunk screw M3x6
2. Guard plate for swivel head
3. Setscrew M4x8
4. Cylinder pin 6x80
5. Guard ring (shaft Ø 15)
6. Spacer
7. **Drive/pressure roller**
8. Woodruff key
9. Upper drive shaft complete

Dismantling of the drive pressure rollers, in sequence Nos. 1 – 9
Assembly of the drive/pressure rollers, in reverse order Nos. 9 – 1



1. Countersunk screw M3x6
2. Cylinder screw M8x50
3. Nilos ring Ø 8/20x1,8
4. Shim Ø 8/14x0,1
5. Rear travelling wheel complete
6. Shim Ø 8/14x0,1
7. Nilos ring Ø 8/20x1,8
8. Spacer brush
9. Guard plate drive/pressure roller
10. Hexagon nut M8
11. Washer M8
12. Countersunk screw M4x12
13. Locking washer
14. **Drive/pressure roller**
15. Spacer Ø 15/22x0,3
16. Woodruff key 5x6,5

Dismantling of the drive/pressure rollers, in sequence Nos. 1 – 16
Assembly of the drive/pressure rollers, in reverse order Nos. 16 – 1

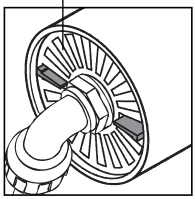
TRAINING

- LEISTER Process Technologies and their authorised Service Centres offer free welding courses and training.

ACCESSORIES

- Only LEISTER accessories should be used.

MAINTENANCE



- The tool's **air filter (26)** should be cleaned with a fine brush when dirty.
- Clean **combination wedge (18)** with a wire brush.
- The **drive and pressure roller (22/23)** should be cleaned with a wire brush.
- Treat the **chain (24)** with a suitable spray as required.
- Check **mains cable (1)** and plug for electrical and mechanical damage.

SERVICE AND REPAIR

- The tool should be checked after a maximum of approx. 1000 hours running time by an authorised Service Centre
- Repairs have to be carried out by authorised **LEISTER Service Centres** only. They guarantee a specialized and reliable **repair service within 24 hours** using original LEISTER spare parts.

WARRANTY

- For this tool, we generally provide a warranty of one (1) year from the date of purchase (verified by invoice or delivery document). Damage that has occurred will be corrected by replacement or repair. Heating elements are excluded from this warranty.
- Additional claims shall be excluded, subject to statutory regulations.
- Damage caused by normal wear, overloading or improper handling is excluded from the guarantee.
- Guarantee claims will be rejected for tools that have been altered or changed by the purchaser.

Technical data and specifications are subject to change without prior notice.

Your authorized Service Centre is:

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