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Kunststoffschweißtechnik

Working Instructions Translation

Heating Element Butt Welding Machine

WIDOS MINIPLAST 2

Keep for further use!

Model:	Heating element butt welding machine
Type:	WIDOS **MINIPLAST 2**
Serial number / year:	see type plate

Customer entries

Inventory-No.:	
Place of working:	

Order of spare parts and sales service:

Address of manufacturer

WIDOS
W. Dommer Söhne GmbH
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Address of the Subsidiary Companies:

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Purpose of the document

These working instructions give you information about all important questions which refer to the construction and the safe working of your machine.

Just as we are, you are obliged to engage in these working instructions, as well.

Not only to run your machine economically but also to avoid damages and injuries.

Should questions arise, contact our service team in the factory or in our subsidiary companies.

We will help you with pleasure.

According to our interest to continuously improve our products and working instructions, we kindly ask you to inform us about problems and defects which occur in exercise.

Thank you.

Structure of the working instructions

This manual is arranged in chapters which belong to the different using phases of the machine.

Due to this structure, the searched information can be easily found.

W.Dommer Söhne GmbH
Einsteinstraße 5
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1. Description of the product

This chapter gives important basic information about the product and its prescribed use.
All technical details of the machine are put together as a general arrangement.

1.1. Usage and purpose-oriented use

The WIDOS **MINIPLAST 2** has been designed for heating element butt welding of pipes and fittings out of PE, PP and PVDF with a diameter range of Ø = 20 - 110 mm.
The machine is kept small so that it can easily be used in the pipe system.
For moulded narrow bends and fittings, special small basic clamping devices are available.

All use going beyond is not purpose-oriented.
The manufacturer is not responsible for damages caused by misuse.
The risk is held only by the user.

Also part of the purpose-oriented use is

- respecting all the indications of the working instructions and
- performing the inspection and maintenance works.

1.2. Overview

No.	*Denomination*
1	Basic machine
2	Table support
3	Heating element
4	Electric planer (optional)
5	Clamping devices for fittings (optional)
6	Manual planer

1.3. Safety measures

In case of wrong use, wrong operation or wrong maintenance, the machine itself or products standing nearby can be damaged or destroyed.

Persons being in the endangered area may be injured.

Therefore these working instructions have to be thouroughly read and the corresponding safety regulations must be necessarily adhered to.

1.4. Conformity

The machine corresponds in its construction to the valid recommendations of the European Community as well as to the according European standard specifications.

The development, manufacturing and mounting of the machine were made very carefully.

1.5. Designation of the product

The product is designated by a sign at the basic frame.
It contains the type of the machine, the serial number and the year of construction.

1.5.1 Technical data

1.5.1.1 WIDOS **MINIPLAST 2** General Data

Material:	PP, PE-HD, PVDF, PE 100
Pipe diameter range:	Outside ∅ = 20 - 110 mm
Sheet steel carrying case (lxwxh):	450 x 300 x 365 mm
Weight (without packing):	30 kg
Fuse:	10 A
Wire cross section:	1.5 mm²
Emissions:	- Noises exceeding 80 dB (A) may occur; during planing it is obligatory to wear ear protection! - When using the named pipe materials and when welding below 260 °C no toxicant damp arises.
Ambient conditions in the welding area:	- Keep the workshop clean (no dust at the welding area) - If secured by an appropriate measurement that allowed conditions for welding are indicated, it is possible to work in any outside temperature condition as far as the welder is not constrained in its manual skill. - Avoid humidity, if necessary use a welding tent - Avoid strong sun rays influence - Protect from wind, shut the pipe ends

1.5.1.2 Heating element

Power:	500 Watt	500 Watt
Voltage:	230 V (± 10 %)	110 V (± 10 %)
Current:	2,2 A (± 10 %)	4,5 A (± 10 %)
Frequency:	50 Hz	60 Hz
Outside ∅ :	145 mm	
Surface:	nonstick-coated	
Attached elements:	- electronic temperature control - control lamp - connecting cable with plug	
Weight:	appr. 2 kg	

1.5.1.3 Manual planer

Weight:	appr. 2 kg

1.5.1.4 Basic machine and table support

Material frame and clamping devices:	Aluminium
Max. force	600 N

1.5.1.5 Electric planer (optional)

Power:	550 W	550 W
Voltage:	230 V (± 10 %)	110 V (± 10 %)
Current:	2,4 A	5,0 A
Frequency:	50 Hz	60 Hz
Weight:	on request	

See spare parts list for order numbers and single parts, when ordering, please state the machine number!

1.6. Equipment and accessories:

Following tools and accessories are part of the delivery:

1	Allan key, angled size 3 for screwing in / out the reduction inserts
1	Allan key, angled size 4, for mounting the fitting clamping devices (option)
1	Annular fork wrench size 10
1	Torx screwdriver T10, for changing the knifes
8 each	Pan-head screws M 4x16 / 20 DIN 912, for mounting the reduction inserts
8	Flat-head screws M 6x12 DIN 7991, for mounting the fitting clamping devices (option)

2. Safety rules

The base for the safe handling and the fault-free operation of this machine is the knowledge of the basic safety indications and rules.

- These working instructions contain the most important indications to run the machine safely.
- The safety indications are to be followed by all persons working on the machine.

2.1. Explanation of the symbols and indications

In the working instructions, the following denominations and signs are used for dangers:

This symbol means a possibly danger for the life and the health of persons.

- The disrespect of these indications may have heavy consequences for the health.

This symbol means a possible dangerous situation.

- The disrespect of these indications may cause slight injuries or damages on goods.

This symbol means a possible dangerous situation due to hot surfaces.

- The disrespect of these indications may conduct to heavy burns, respectively to self-ignition or even fire.

This symbol means a possible risk of injury by noises exceeding 80 dB (A).

- Ear protection is obligatory

This symbol gives important indications for the proper use of the machine.

- The disrespect of these indications may conduct to malfunctions and damages on the machine or on goods in the surrounding.

Under this symbol you get user tips and particularly useful information.

- It is a help for using all the functions on your machine in an optimal way and helps you to make the job easier.

The regulations for the prevention of accidents are valid (UVV).

2.2. Obligations of the owner

The owner is obliged only to let persons work at the machine who

- know about basic safety and accident prevention rules and are instructed in the handling of the machine, as well as who
- have read and understood the safety chapter of this manual and certify this by their signature.

The safety-conscious working of the staff has to be checked in regular intervals.

2.3. Obligations of the worker

All persons who are to work at the machine are obliged before working:

- to follow the basic safety and accident protection rules.
- to have read and understood the safety chapter and the warnings in this manual and to confirm by their signature that they have well understood them.

2.4. Measures of organisation

- All equipment required for personal safety is to be provided by the owner.
- All available safety equipment is to be inspected regularly.
- The working instructions have to be permanently kept at the place of use of the machine. They are to be at the operator‘s disposal at any time and without much effort.
- In addition to the manual, the common valid and the local accident protection rules and regulations for the environmental protection must be available and followed.
- Every time the machine changes hands or is being rent to third persons, the working instructions are to be sent along with and their importance is to be emphasized.

2.5. Instructions for the staff

- Only skilled and trained persons are allowed to work at the machine.
- It must be clearly defined who is responsible for transport, mounting and dismounting, starting the operation, setting and tooling, operation, maintenance and inspection, repair and dismounting.
- A person who is being trained may only work at the machine under supervision of an experienced person.

2.6. Structural modifications on the machine

- No modifications, extensions or reconstructions may be made on the machine without permission of the manufacturer.
- Machine parts which are not in a perfect condition are to be replaced immediately.
- Only use original **WIDOS** spare and wear parts.

2.7. Cleaning the machine

The used materials and tissues are to be handled and disposed of properly, especially:

- when cleaning with solvents
- when lubricating with oil and grease.

2.8. Danger while handling the machine

The machine WIDOS **MINIPLAST 2** is constructed according to the latest technical standards and the acknowledged technical safety rules.

However, dangers for the operator or other persons standing nearby may occur.

Also material damages are possible.

The machine may only be used

- according to the purpose-oriented usage
- in safety technical impeccable status

Disturbances which may affect the safety of the machine must be cleared immediately.

2.9. Dangers caused by electric energy

Only skilled persons are allowed to work at electrical appliances.

- The electrical equipment of the machine has to be checked regularly.
  Loose connections and damaged cables have to be replaced immediately.
- The heating element has to be protected from rain and dropping water, if need be use a welding tent.
- According to VDE 0100, the use on construction sites is only allowed with a power distributor with a FI-safety switch.

2.10. Specific dangers

2.10.1 Danger of being burnt by heating element, reception box and welding area

You can burn yourself, inflammable materials can be ignited!

The heating element is heated up to more than **200° C** !

- Do not leave the heating element unsupervised.
- Take enough safety distance to inflammable materials.
- Do wear safety gloves.
- Always put the heating element back into the reception box before and after each use.
- Transport the heating element at the handle only, do not touch the surfaces of the heating element.

2.10.2 Danger of stumbling over electric wires

- Make sure that no person has to step over the wires.

2.10.3 Danger of cutting / squeezing / catching clothes

- Always put the planer back into the reception box before and after each use.
- Transport the planer at the handle only and do not touch surfaces.
- Do not put hands between clamped pipe ends.
- Make sure that your clothes are not caught by the planer.

2.10.4 Risk of injury by noises

Noises exceeding 80 dB (A) may occur; during planning (with electrical planer) it is obligatory to wear ear protection!

2.11. Warranty and liability

Fundamentally our "General Sales and Delivery Conditions" are valid.
They are at the owner's disposal latest when signing the contract.
Guarantee and liability demands referring to personal injuries or damages on objects are excluded if they are caused by one or several of the following reasons:

- Not using the machine according to the prescriptions.
- Inexpert transport, mounting, starting , operating and maintenance of the machine.
- Running the machine with defective or not orderly mounted safety appliances.
- Ignoring the information given in this manual.
- Structural modifications on the machine without permission.
- Unsatisfactory checking of parts of the machine which are worn out.
- Repairs performed in an inexpert way.
- In case of catastrophes and force majeure.

3. Functional description

Basically the international and national guidelines are to be followed.

The plastic pipes are clamped by means of the clamping devices.

Then the front sides of the pipes are cut plane and parallel by means of the **planer** and the misalignment of the pipes is checked.

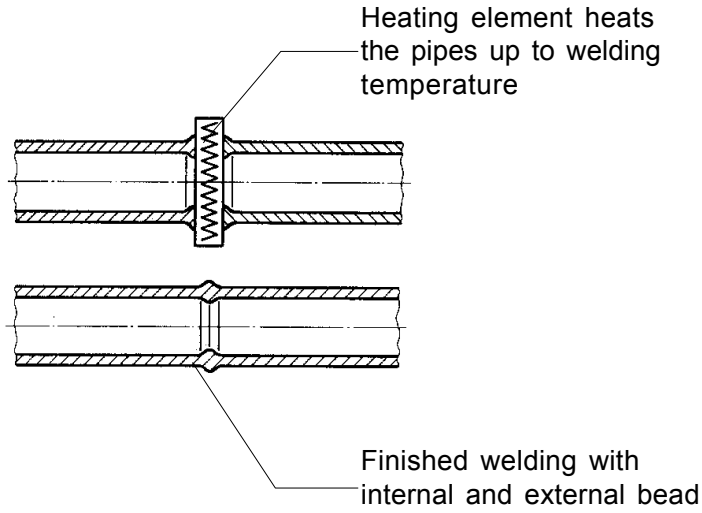
The heating element is inserted and the pipes are pressed against the heating element under defined adjusting pressure. This process is called **"adjusting"**.

After the prescribed bead height being reached, pressure is reduced, the **heating time** begins. The function of this time is to heat up the pipe ends.

After expiration of the heating time, the slides are opened, the heating element is removed quickly and the pipes are driven together again. The time gap from the removal of the heating element to joining the pipes is called **change over time**.

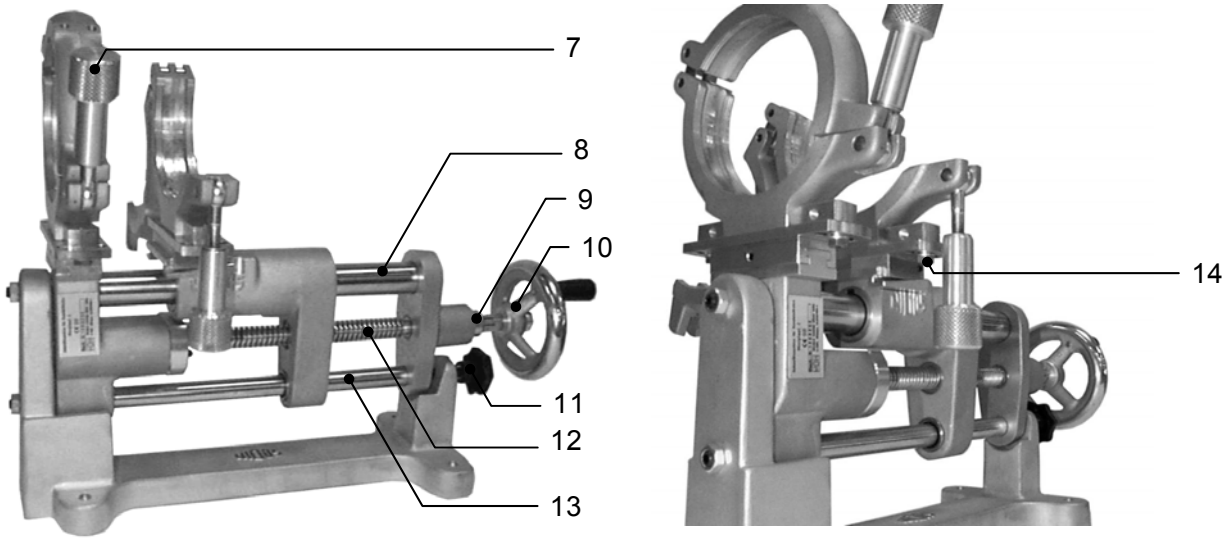
The pipes are joined under prescribed welding pressure and then cool down under pressure (**cooling time**).

The welded joint can be unclamped, the welding process is finished.



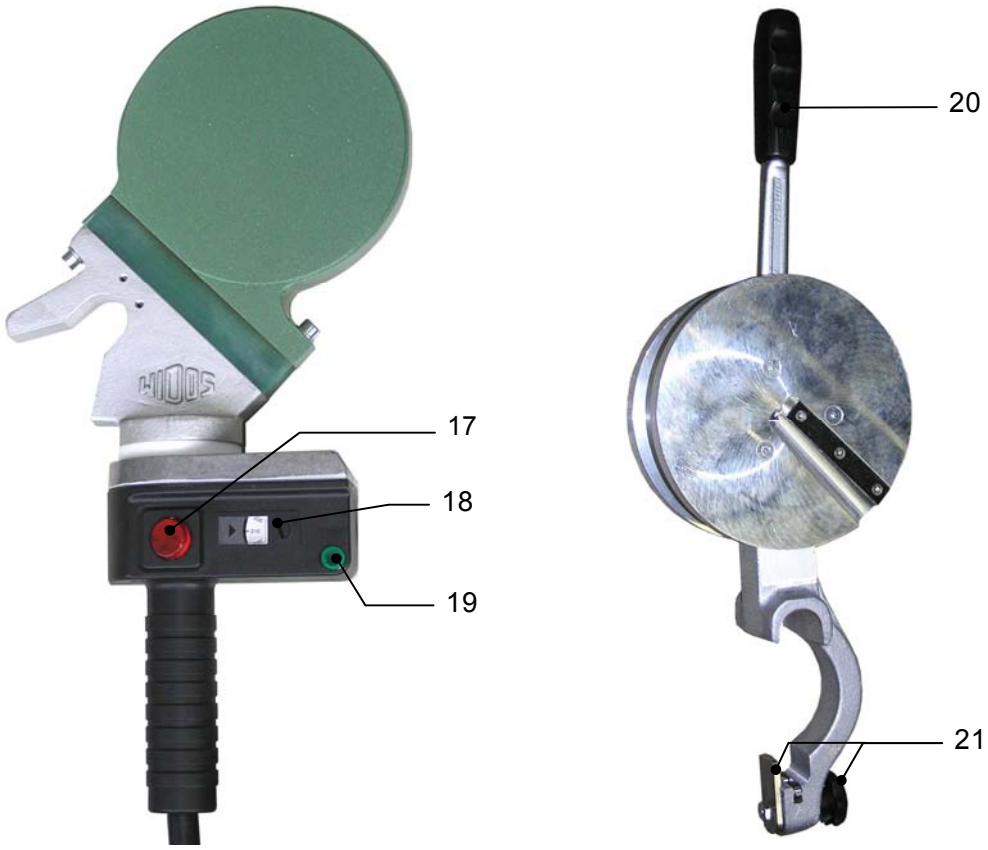
4. Operating and indicating elements

4.1. Elements on the basic machine / table support



No.	*Denomination*	*Function*
7	Tightening nut	- Tightening of the pipes
8	Upper guide bar	- Guidance for the slide
9	Scale	- Display of the applied welding force - max. 60 kp displayed
10	Handwheel	- Opening / closing the slides - application of the adjusting force
11	Star grip for basic machine	- Attaching the basic machine at the table support.
12	Spindle	- Advance of the slide
13	Lower guide bar	- Guidance for the slide - Fixing the planer - Rest for the heating element
14	Hexagon screw (4x)	- Setting the angle

4.2. Elements at heating element and planer



No.	*Denomination*	*Function*
17	On- / off – switch for heating element	- “ON”, the control lamp illuminates - “OFF”, the control lamp extinguishes
18	Knob with slot	- Setting the temperature for the heating element
19	Control lamp green	- There are three different states: • Out: signalizes that the heating element is not heated up at the moment or that it cools down • Blinking: the temperature of the heating element is maintained by a pulse-position ratio. • On: signalizes that the heating element is heated up at the moment and has not yet reached the desired temperature.
20	Ratchet	- Turning around the planer
21	Star grip screw and tin disc	- Attaching the planer at the guidance bar by turning the screw and tin disc

4.3. Elements at the electric planer (optional)

No.	*Name*	*Function*
22	Button on/off	The button must be pushed for planing. The planer has to be switched off after each planing process
23	Locking knob	Keeps the on/off button in position: ON
24	Star grip screw and tin disc	- Attaching the planer at the guidance bar by turning the screw and tin disc

Be especially cautions, there ist the danger of cuttings!

Only activate the planer if it has been placed into the machine and secured by locking tin disc and star grip screw.

5. Starting and operating

The instructions of this chapter are supposed to initiate in the operation of the machine and lead during the appropriate starting of the machine.

This includes

- the safe operation of the machine
- using all the possible options of the machine
- economic operation of the machine

5.1. Starting

The machine may only be operated by initiated and authorized persons.
For the qualification, a plastic welding exam can be taken according to DVS and DVGW.

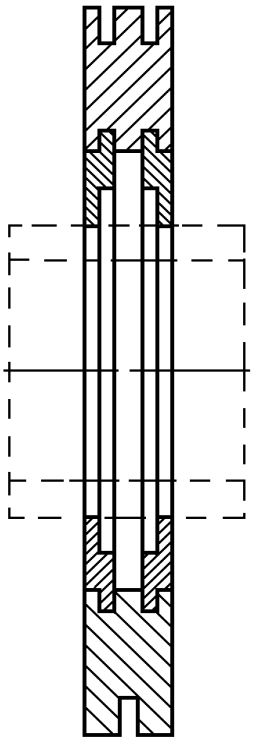
- In situations of danger for persons and the machine, the mains plug has to be unplugged immediately.
- After completion of the welding work and during breaks the machine has to be switched off. Further take care that no unauthorized person has access.
- Protect the machine from wetness and humidity.
- According to VDE 0100, the use on construction sites is only allowed with a power distributor with a FI-security protective switch.
- Connect the heating element and the electric planer (optional) to the mains supply (230 V / 50 Hz).

Lay electric cables carefully (danger of stumbling) !

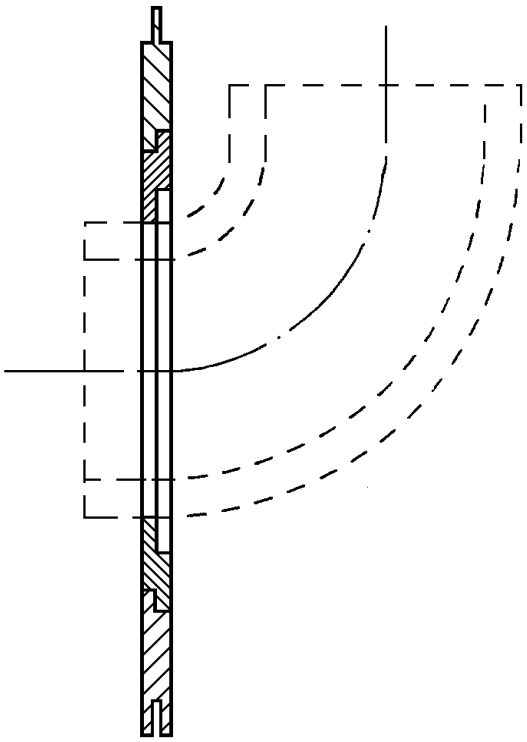
- Take into account the surrounding conditions:
  - The welding may not be performed under direct sun rays influence, use a welding umbrella if necessary.
- If the surrounding temperature is under 5° C, measures have to be taken:
  - Use a welding tent or preheat the pipe ends if necessary.
- In addition, take measures against rain, wind and dust.

5.1.1 Exchanging the reduction Inserts

- Unscrew the mounted reduction inserts by means of the provided Allan key.
- Screw the reduction inserts with the corresponding diameter into the clamping devices.
- When welding bends, the angle can be set on the basic clamping devices (on each side between -15° to +15°).
- If necessary (e.g. for T-pieces) a special basic clamping device can be provided by means of which very short sections can be clamped.



Large clamping device



Small clamping device
(Fitting clamping device)

5.2. Welding process

The respectively valid welding prescriptions (ISO / CEN / DVS ...) are to be basically followed.

- Do wear safety gloves as protection against burning.
- A stop-watch must be available for recording the actual times for heating up and cooling.
- A welding table must be available from which the parameters for the pipe dimensions to be welded prescribed by the welding prescriptions may be taken.
- The heating element surfaces must be clean and especially non greasy. Therefore they need to be cleaned shortly before each welding or in case of dirtiness by means of a **fibre-free paper** and a cleaning agent (e.g. PE cleaner or WIDOS pipe cleaning tissues).

  The anti-adhesive coating of the heating element must remain undamaged in the working area.

- Switch on heating element and set the required welding temperature (standard value PE-HD: 210° C) on the adjustment screw on the handle.
  - As soon as the control light blinks, the nominal temperature has been reached and is maintained at a constant level by a pulse-position ratio.
- Screw in reduction inserts according to the outer diameter of the pipes to be welded, if necessary set the angle.
- Attach the basic frame at the table support, if required fix the table support at the support surface or insert machine without table support directly into the pipe system.

Machine working directly in the pipe system

- Put the workpieces into the clamping device, fasten clamping nuts tightly and align the workpieces with respect to one another.
- Insert the manual planer between the ends of the workpieces, lock it by turning the star grip on the guide bar and plane with low force.
- Insert the electric planer (optional) between the ends of the workpieces, lock it by turning the star grip at the guide rod. Switch on planer at the on/off button and keep it switched on with the locking knob. Plane the pipes with low force. For releasing the locking knob, push shortly the button.
- Planing should be carried out until a revolving cutting has been formed on both sides.
- Open slide again, remove the planer and put it into the reception box. Remove the produced cuttings without contacting the worked surfaces.
- Close slide again.
- Check pipe mismatch and gap on the joining pipe ends.

  According to DVS 2207, the mismatch on the pipe outer side must not exceed 0.1 x pipe wall thickness, the admissible gap must not exceed 0.5 mm.

  The mismatch compensation is carried out by further tightening or releasing the clamping nuts. In case mismatch compensation was carried out, planing must be repeated afterwards.
- The adjustment force for the pipe dimension to be welded can be gathered from the welding table. Add the movement force.
- Open slide again somewhat.
- Gather heating time, maximum change over time, cooling time and bead height for the pipe dimension to be welded from the table.

- Move the heating element which has been cleaned and brought to desired temperature between the pipes with the handle facing downwards (hang into guide bar).
- Close the slide smoothly with the determined adjustment force.

  The applied force can be read at the force scale on the handwheel.

  When the prescribed revolving bead height is reached, reduce the force (heating force = approx. 10 % of the adjustment force).
- The heating time starts now. Press the stop-watch and compare the actual time with the nominal time taken from the table.
- After expiration of the heating time, open the slide, remove the heating element as quickly as possible, put it into the heat protection box and close the slide smoothly.

  The maximum time frame for this process is predetermined by the value for the change over time taken from the table.
- Press the stop-watch when the welding pressure is built up.

  If necessary, readjust the force during cooling (the force for cooling is the same as the adjustment pressure).
- After expiration of the cooling time, release the force, remove the welded part and open the slide.

6. Welding tables

Table for PE

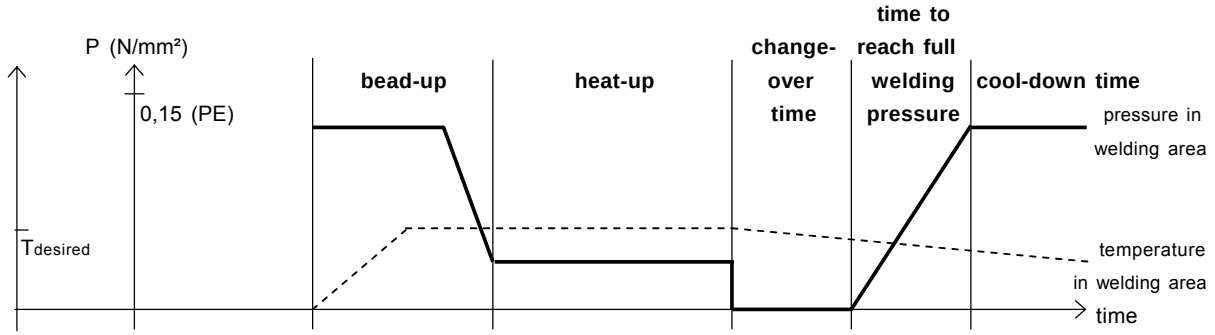
Foundation: 2207, 2208 DIN 16932 German association for welding

Use for:		
	Miniplast 2 / 110	OD 20 - 110
	Maxiplast / 501 / 900 / 955	OD 50 - 160
	Instaweld 160	OD 50 - 160
	2000 / 3000 Kombi	OD 50 - 250
	2500 DO 160 / 250 / 315	OD 50 - 315
	ASM 160 / ASM 315	OD 50 - 315

PE 80 The value for heating element temperature is between 200° C - 220° C.
The **smaller** the pipe wall the **higher** the temperature.

PE 100 The standard value for heating element temperature is 220° C.
Increase the change-over time and the welding pressure time at PE 100 as fast as possible !

Additional to the given bead-up force and to the welding force the moving force of the support must be added !
1 kp = 10 N



pipe diameter OD [mm]	pipe wall (s) [mm]	SDR	bead-up force [kp] [daN]	circular bead min. [mm]	heat-up time [s]	max. change-over time [s]	time to reach welding pressure [s]	welding force [kp] [daN]	cool-down time [min] ❶
20	1,9	11	2	0,5	20	4	4	2	2
	2,3	9	2	0,5	23	4	4	2	2
	2,8	7,4	3	0,5	28	4	4	3	3
25	2,3	11	3	0,5	23	4	4	3	2
	2,8	9	3	0,5	28	4	4	3	3
	3,5	6	4	0,5	35	5	5	4	4
32	1,8	17	3	0,5	20	4	4	3	2
	1,9	17	3	0,5	20	4	4	3	2
	2,4	13,6	4	0,5	24	4	4	4	3
	2,9	11	4	0,5	29	4	4	4	3
	3,6	9	5	0,5	36	5	5	5	5
40	1,8	26	4	0,5	20	4	4	4	2
	1,9	21	4	0,5	20	4	4	4	2
	2,3	17,6	5	0,5	23	4	4	5	2
	2,4	17	5	0,5	24	4	4	5	3
	3,7	11	7	0,5	37	5	5	7	5
	4,5	9	8	1	45	5	5	8	6
	5,5	7,4	9	1,0	55	5	5	9	8

Table for PE

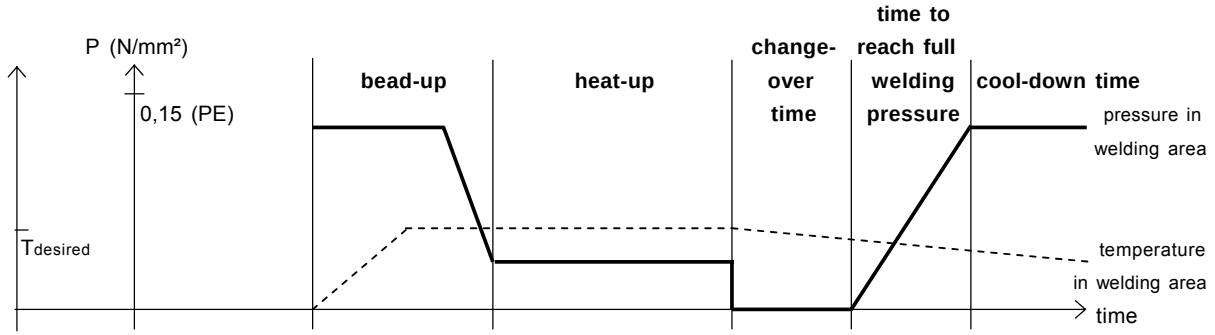
Foundation: 2207, 2208 DIN 16932 German association for welding

Use for:		
	Miniplast 2 / 110	OD 20 - 110
	Maxiplast / 501 / 900 / 955	OD 50 - 160
	Instaweld 160	OD 50 - 160
	2000 / 3000 Kombi	OD 50 - 250
	2500 DO 160 / 250 / 315	OD 50 - 315
	ASM 160 / ASM 315	OD 50 - 315

PE 80 The value for heating element temperature is between 200° C - 220° C.
The **smaller** the pipe wall the **higher** the temperature.

PE 100 The standard value for heating element temperature is 220° C.
Increase the change-over time and the welding pressure time at PE 100 as fast as possible !

Additional to the given bead-up force and to the welding force the moving force of the support must be added !
1 kp = 10 N



pipe diameter OD [mm]	pipe wall (s) [mm]	SDR	bead-up force [kp] [daN]	circular bead min. [mm]	heat-up time [s]	max. change-over time [s]	time to reach welding pressure [s]	welding force [kp] [daN]	cool-down time [min] ❶
50	1,8	33	5	0,5	20	4	4	5	2
	2,0	26	5	0,5	20	4	4	5	2
	2,4	21	6	0,5	24	4	4	6	3
	2,9	17,6	7	0,5	29	4	4	7	3
	3,0	13,6	7	0,5	30	4	4	7	4
	3,7	13,6	9	0,5	37	5	5	9	5
	4,6	11	10	1,0	46	5	5	10	6
	5,6	9	12	1,0	56	5	5	12	8
63	1,8	41	6	0,5	20	4	4	6	2
	2,0	33	6	0,5	20	4	4	6	2
	2,5	26	8	0,5	25	4	4	8	3
	3,0	21	9	0,5	30	4	4	9	4
	3,6	17,6	11	0,5	36	5	5	11	5
	3,8	17	11	0,5	38	5	5	11	5
	4,7	13,6	13	1,0	47	5	5	13	6
	5,8	11	16	1,0	58	6	6	16	8
	7,1	9	19	1,5	71	6	6	19	10
	8,6	7,4	23	1,5	86	7	7	23	12

Table for PE

Foundation: 2207, 2208 DIN 16932 German association for welding

Use for:		
	Miniplast 2 / 110	OD 20 - 110
	Maxiplast / 501 / 900 / 955	OD 50 - 160
	Instaweld 160	OD 50 - 160
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	2500 DO 160 / 250 / 315	OD 50 - 315
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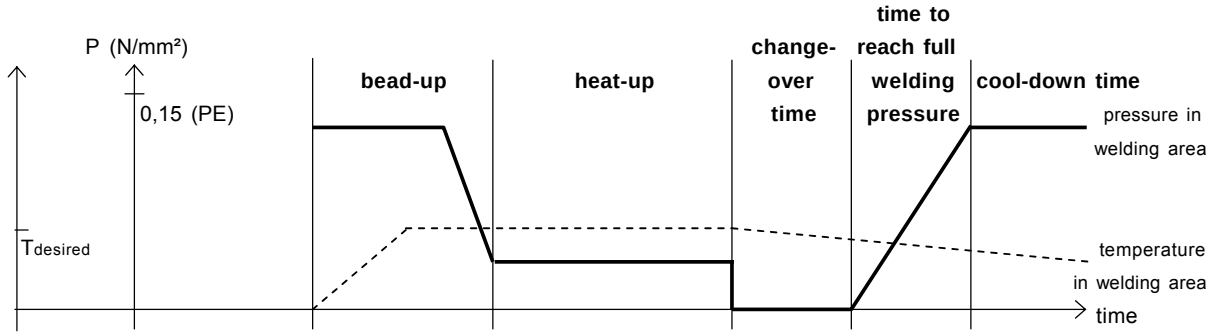
PE 80 The value for heating element temperature is between 200° C - 220° C.
The **smaller** the pipe wall the **higher** the temperature.

PE 100 The standard value for heating element temperature is 220° C.
Increase the change-over time and the welding pressure time at PE 100 as fast as possible !

Additional to the given bead-up force and to the welding force the moving force of the support must be added !
1 kp = 10 N



pipe diameter OD [mm]	pipe wall (s) [mm]	SDR	bead-up force [kp] [daN]	circular bead min. [mm]	heat-up time [s]	max. change-over time [s]	time to reach welding pressure [s]	welding force [kp] [daN]	cool-down time [min] ❶
75	1,9	41	7	0,5	20	4	4	7	2
	2,3	33	8	0,5	23	4	4	8	2
	2,9	26	10	0,5	29	4	4	10	3
	3,6	21	13	0,5	36	5	5	13	5
	4,3	17,6	15	0,5	43	5	5	15	6
	4,5	13,6	15	1,0	45	5	5	15	6
	5,6	13,6	19	1,0	56	5	5	19	8
	6,8	11	22	1,0	68	6	6	22	10
	8,4	9	27	1,5	84	7	7	27	12
	10,3	7,4	32	1,5	103	7	7	32	14
90	2,2	41	10	0,5	22	4	4	10	2
	2,8	33	12	0,5	28	4	4	12	3
	3,5	26	15	0,5	35	5	5	15	4
	4,3	21	18	0,5	43	5	5	18	6
	5,1	17,6	21	1,0	51	5	5	21	7
	5,4	17	22	1,0	54	5	5	22	7
	6,7	13,6	27	1,0	67	6	6	27	10
	8,2	11	32	1,5	82	6	6	32	11
	10,1	9	39	1,5	101	7	7	39	14
	12,3	7,4	46	2,0	123	8	8	46	16

Table for PE

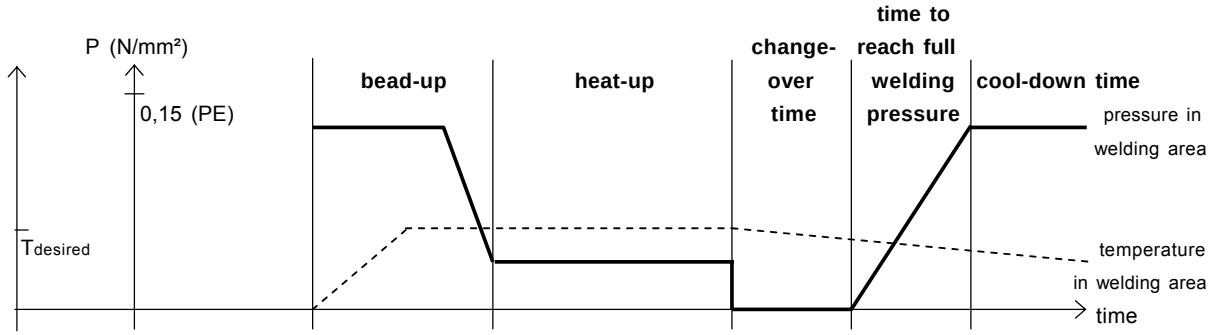
Foundation: 2207, 2208 DIN 16932 German association for welding

Use for:		
	Miniplast 2 / 110	OD 20 - 110
	Maxiplast / 501 / 900 / 955	OD 50 - 160
	Instaweld 160	OD 50 - 160
	2000 / 3000 Kombi	OD 50 - 250
	2500 DO 160 / 250 / 315	OD 50 - 315
	ASM 160 / ASM 315	OD 50 - 315

PE 80 The value for heating element temperature is between 200° C - 220° C.
The **smaller** the pipe wall the **higher** the temperature.

PE 100 The standard value for heating element temperature is 220° C.
Increase the change-over time and the welding pressure time at PE 100 as fast as possible !

Additional to the given bead-up force and to the welding force the moving force of the support must be added !
1 kp = 10 N



pipe diameter OD [mm]	pipe wall (s) [mm]	SDR	bead-up force [kp] [daN]	circular bead min. [mm]	heat-up time [s]	max. change-over time [s]	time to reach welding pressure [s]	welding force [kp] [daN]	cool-down time [min] ❶
110	2,7	41	14	0,5	27	4	4	14	3
	3,4	33	18	0,5	34	5	5	18	4
	4,2	26	21	0,5	42	5	5	21	6
	5,3	21	27	1,0	53	5	5	27	7
	6,3	17	31	1,0	63	6	6	31	9
	6,6	17	33	1,0	66	6	6	33	9
	8,1	13,6	39	1,5	81	6	6	39	11
	10,0	11	48	1,5	100	7	7	48	14
	12,3	9	57	2,0	123	8	8	57	16
	15,1	7,4	68	2,0	151	9	9	68	20
125	3,1	41	18	0,5	31	4	4	18	4
	3,9	33	23	0,5	39	5	5	23	5
	4,8	26	28	1,0	48	5	5	28	6
	6,0	21	34	1,0	60	6	6	34	8
	7,1	17,6	40	1,5	71	6	6	40	10
	7,4	17	42	1,5	74	6	6	42	10
	9,2	13,6	51	1,5	92	7	7	51	13
	11,4	11	62	1,5	114	8	8	62	15
	14,0	9	74	2,0	140	9	9	74	18
	17,1	7,4	87	2,0	171	9	10	87	22

Table for PE

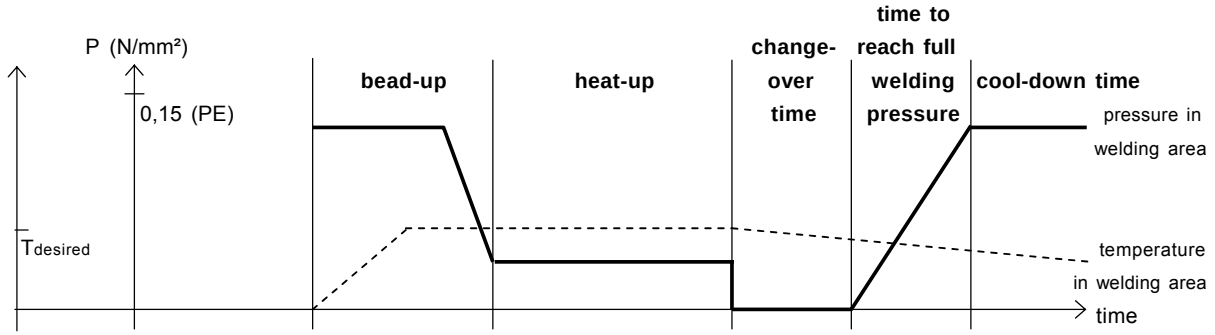
Foundation: 2207, 2208 DIN 16932 German association for welding

Use for:		
	Miniplast 2 / 110	OD 20 - 110
	Maxiplast / 501 / 900 / 955	OD 50 - 160
	Instaweld 160	OD 50 - 160
	2000 / 3000 Kombi	OD 50 - 250
	2500 DO 160 / 250 / 315	OD 50 - 315
	ASM 160 / ASM 315	OD 50 - 315

PE 80 The value for heating element temperature is between 200° C - 220° C.
The **smaller** the pipe wall the **higher** the temperature.

PE 100 The standard value for heating element temperature is 220° C.
Increase the change-over time and the welding pressure time at PE 100 as fast as possible !

Additional to the given bead-up force and to the welding force the moving force of the support must be added !
1 kp = 10 N



pipe diameter OD [mm]	pipe wall (s) [mm]	SDR	bead-up force [kp] [daN]	circular bead min. [mm]	heat-up time [s]	max. change-over time [s]	time to reach welding pressure [s]	welding force [kp] [daN]	cool-down time [min] ❶
140	3,5	41	23	0,5	35	5	5	23	4
	4,3	33	28	0,5	43	5	5	28	6
	5,4	26	35	1,0	54	5	5	35	7
	6,7	21	43	1,0	67	6	6	43	10
	8,3	17	52	1,5	80	6	6	52	11
	10,3	13,6	63	1,5	83	7	7	63	12
	12,7	11	77	1,5	103	7	7	77	14
	15,7	9	92	2,0	127	8	8	92	17
	19,2	7,4	110	2,0	157	9	10	110	20
	23,3	6	129	2,5	192	10	11	129	24
160	4,0	41	30	0,5	40	5	5	30	5
	4,9	33	36	1,0	49	5	5	36	7
	6,2	26	45	1,0	62	6	6	45	9
	7,7	21	56	1,5	77	6	6	56	11
	9,1	17,6	65	1,5	91	7	7	65	13
	9,5	17	68	1,5	95	7	7	68	13
	11,8	13,6	83	1,5	118	8	8	83	16
	14,6	11	101	2,0	146	9	9	101	19
	17,9	9	120	2,0	179	10	11	120	23
	21,9	7,4	143	2,5	219	11	12	143	27

Table for PE

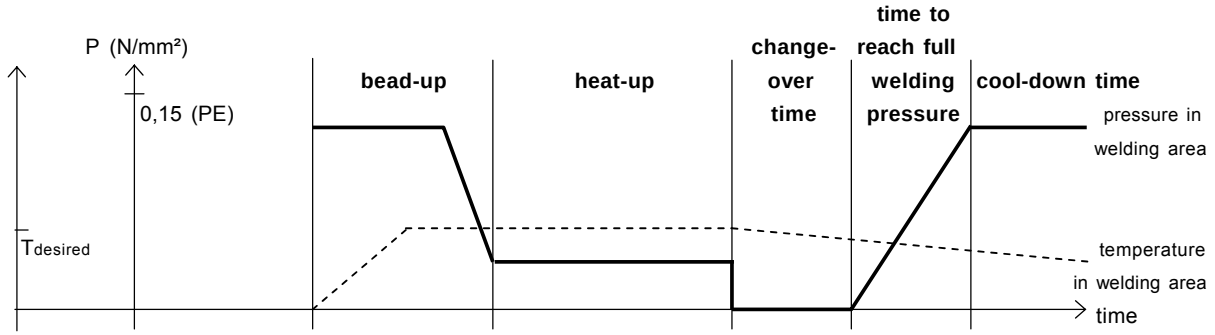
Foundation: 2207, 2208 DIN 16932 German association for welding

Use for:		
	Miniplast 2 / 110	OD 20 - 110
	Maxiplast / 501 / 900 / 955	OD 50 - 160
	Instaweld 160	OD 50 - 160
	2000 / 3000 Kombi	OD 50 - 250
	2500 DO 160 / 250 / 315	OD 50 - 315
	ASM 160 / ASM 315	OD 50 - 315

PE 80 The value for heating element temperature is between 200° C - 220° C.
The **smaller** the pipe wall the **higher** the temperature.

PE 100 The standard value for heating element temperature is 220° C.
Increase the change-over time and the welding pressure time at PE 100 as fast as possible !

Additional to the given bead-up force and to the welding force the moving force of the support must be added !
1 kp = 10 N



pipe diameter OD [mm]	pipe wall (s) [mm]	SDR	bead-up force [kp] [daN]	circular bead min. [mm]	heat-up time [s]	max. change-over time [s]	time to reach welding pressure [s]	welding force [kp] [daN]	cool-down time [min] ❶
180	4,4	41	37	0,5	44	5	5	37	6
	5,5	33	46	1,0	55	5	5	46	8
	6,9	26	57	1,0	69	6	6	57	10
	10,2	17,6	82	1,5	86	7	7	82	12
	10,7	17	86	1,5	102	7	7	86	14
	13,3	13,6	105	1,5	107	7	7	105	14
	16,4	11	127	2,0	133	8	9	127	17
	20,1	9	152	2,0	164	9	10	152	21
	20,1	9	152	2,5	201	10	11	152	25
	24,6	7,4	181	2,5	246	12	13	181	30
200	4,9	41	46	1,0	49	5	5	46	7
	6,2	33	57	1,0	62	6	6	57	9
	7,7	26	70	1,5	77	6	6	70	11
	9,6	21	87	1,5	96	7	7	87	13
	11,4	17,6	102	1,5	114	8	8	102	15
	11,9	17	106	1,5	119	8	8	106	16
	14,7	13,6	129	2,0	149	9	9	129	19
	18,2	11	156	2,0	182	10	11	156	23
	22,4	9	188	2,5	224	11	12	188	28
	27,4	7,4	223	3,0	274	13	15	223	34

Table for PE

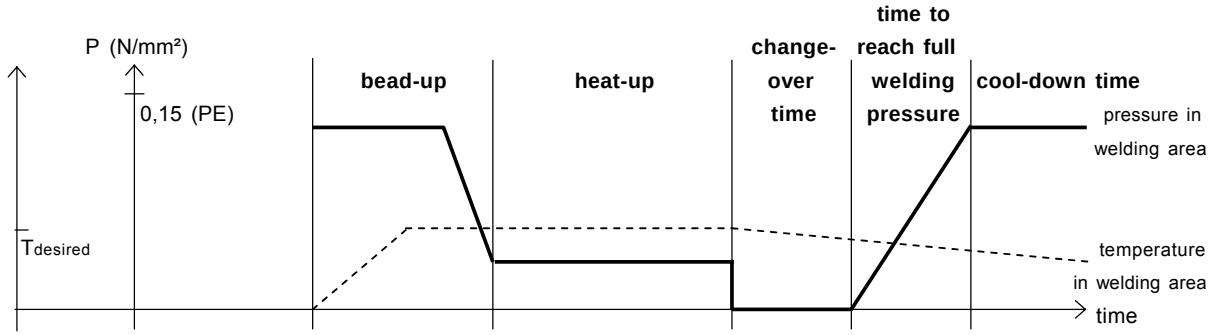
Foundation: 2207, 2208 DIN 16932 German association for welding

Use for:		
	Miniplast 2 / 110	OD 20 - 110
	Maxiplast / 501 / 900 / 955	OD 50 - 160
	Instaweld 160	OD 50 - 160
	2000 / 3000 Kombi	OD 50 - 250
	2500 DO 160 / 250 / 315	OD 50 - 315
	ASM 160 / ASM 315	OD 50 - 315

PE 80 The value for heating element temperature is between 200° C - 220° C.
The **smaller** the pipe wall the **higher** the temperature.

PE 100 The standard value for heating element temperature is 220° C.
Increase the change-over time and the welding pressure time at PE 100 as fast as possible !

Additional to the given bead-up force and to the welding force the moving force of the support must be added !
1 kp = 10 N



pipe diameter OD [mm]	pipe wall (s) [mm]	SDR	bead-up force [kp] [daN]	circular bead min. [mm]	heat-up time [s]	max. change-over time [s]	time to reach welding pressure [s]	welding force [kp] [daN]	cool-down time [min] ❶
225	5,5	41	57	1,0	55	5	5	57	8
	6,9	33	71	1,0	69	6	6	71	10
	8,6	26	88	1,5	86	7	7	88	12
	10,8	21	110	1,5	108	8	8	110	15
	12,8	17,6	128	2,0	128	8	8	128	17
	13,4	17	134	2,0	134	8	9	134	18
	16,6	13,6	164	2,0	166	9	10	164	21
	20,5	11	198	2,5	205	10	12	198	26
	25,2	9	238	2,5	252	12	14	238	31
	30,8	7,4	282	3,0	308	14	16	282	38
250	6,2	41	72	1,0	62	6	6	72	9
	7,7	33	88	1,5	77	6	6	88	11
	9,6	26	109	1,5	96	7	7	109	13
	11,9	21	134	1,5	119	8	8	134	19
	14,2	17,6	158	2,0	142	9	9	158	16
	14,8	17	165	2,0	148	9	9	165	19
	18,4	13,6	201	2,0	184	10	11	201	23
	22,7	11	244	2,5	227	11	13	244	28
	27,9	9	293	3,0	279	13	15	293	34
	34,2	7,4	348	3,0	342	15	18	348	42

Table for PE

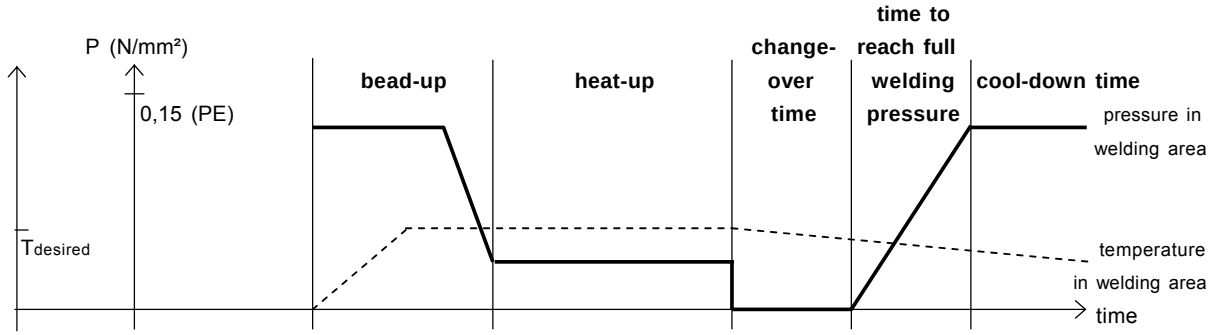
Foundation: 2207, 2208 DIN 16932 German association for welding

Use for:		
	Miniplast 2 / 110	OD 20 - 110
	Maxiplast / 501 / 900 / 955	OD 50 - 160
	Instaweld 160	OD 50 - 160
	2000 / 3000 Kombi	OD 50 - 250
	2500 DO 160 / 250 / 315	OD 50 - 315
	ASM 160 / ASM 315	OD 50 - 315

PE 80 The value for heating element temperature is between 200° C - 220° C.
The **smaller** the pipe wall the **higher** the temperature.

PE 100 The standard value for heating element temperature is 220° C.
Increase the change-over time and the welding pressure time at PE 100 as fast as possible !

Additional to the given bead-up force and to the welding force the moving force of the support must be added !
1 kp = 10 N



pipe diameter OD [mm]	pipe wall (s) [mm]	SDR	bead-up force [kp] [daN]	circular bead min. [mm]	heat-up time [s]	max. change-over time [s]	time to reach welding pressure [s]	welding force [kp] [daN]	cool-down time [min] ❶
280	6,9	41	89	1,0	69	6	6	89	10
	8,6	33	110	1,5	86	7	7	110	12
	10,7	26	136	1,5	107	7	7	136	14
	13,4	21	169	2,0	134	8	9	169	18
	15,9	17,6	198	2,0	159	9	10	198	20
	16,6	17	207	2,0	166	9	10	207	21
	20,6	13,6	252	2,5	206	10	12	252	26
	25,4	11	305	2,5	254	12	14	305	31
	31,3	9	367	3,0	313	14	16	367	38
	38,3	7,4	437	3,5	383	16	20	437	47
315	7,7	41	112	1,5	77	6	6	112	11
	9,7	33	140	1,5	97	7	7	140	13
	12,1	26	173	2,0	121	8	8	173	16
	15,0	21	213	2,0	150	9	9	213	19
	17,9	17,6	251	2,0	179	10	11	251	23
	18,7	17	262	2,0	187	10	11	262	24
	23,2	13,6	320	2,5	232	11	13	320	29
	28,6	11	386	3,0	286	13	15	386	35
	35,2	9	465	3,0	352	15	18	465	43
	43,1	7,4	553	3,5	431	18	22	553	52

❶ **Remaining under the cool-down time for up to 50% is allowed under the following conditions:**

- prefabrication under workshop conditions
- low additional pressure at unclamping
- no additional pressure during further cooling down
- load onto the workpieces only after being completely cooled down
- Join parts with wall thickness ≥15 mm

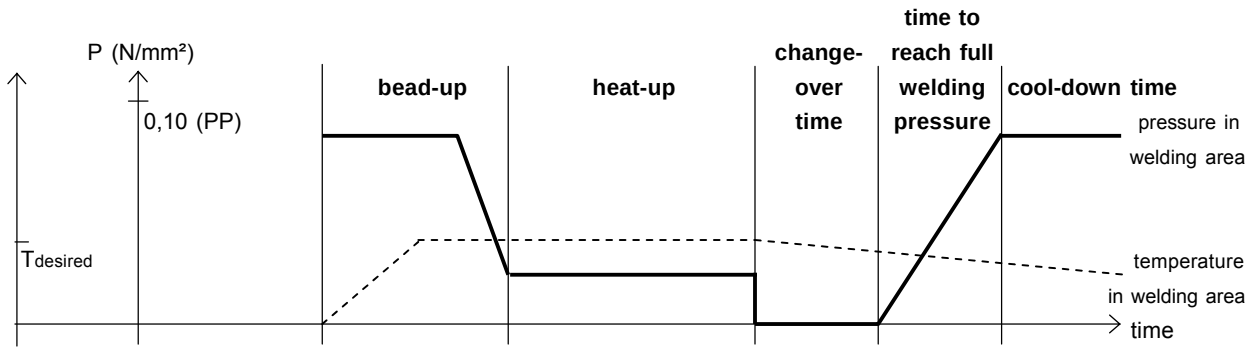
Table for PP

Foundation: 2207, 2208, DIN 16932 German association for welding

Use for:		
	Miniplast 2 / 110	OD 20 - 110
	Maxiplast / 501 / 900 / 955	OD 50 - 160
	Instaweld 160	OD 50 - 160
	2000 / 3000 Kombi	OD 50 - 250
	2500 DO 160 / 250 / 315	OD 50 - 315
	ASM160 / ASM 315	OD 50 - 315

The standard value for heating element temperature is 210° C +/- 10° C.
The **smaller** the pipe wall the **higher** the temperature.

Additional to the given bead-up force and to the welding force the moving force of the support must be added !
1 kp = 10 N



pipe diameter OD [mm]	pipe wall (s) [mm]	SDR	bead-up force [kp] [daN]	circular bead min. [mm]	heat-up time [s]	max. change-over time [s]	time to reach welding pressure [s]	welding force [kp] [daN]	cool-down time [min] ❶
20	1,9	11	2	0,5	90	4	5	2	2
	2,8	7,4	2	0,5	104	4	5	2	3
	3,4	6	2	0,5	115	5	6	2	4
	4,1	5	3	0,5	128	5	6	3	5
25	2,3	11	2	0,5	95	4	5	2	2
	3,5	7,4	3	0,5	117	5	6	3	4
	4,2	6	3	0,5	130	5	6	3	6
	5,1	5	4	0,5	145	5	6	4	7
32	1,8	17,6	2	0,5	90	4	5	2	2
	2,9	11	3	0,5	106	4	5	3	3
	4,4	7,4	4	0,5	133	5	6	4	6
	5,4	6	5	0,5	149	5	6	5	8
	6,5	5	6	0,5	167	6	7	6	11
40	1,8	26	3	0,5	90	4	5	3	2
	2,3	17,6	3	0,5	95	4	5	3	2
	3,7	11	5	0,5	121	5	6	5	5
	5,5	7,4	6	0,5	151	5	6	6	8
	6,7	6	8	0,5	170	6	7	8	11
	8,1	5	9	1,0	190	6	8	9	14

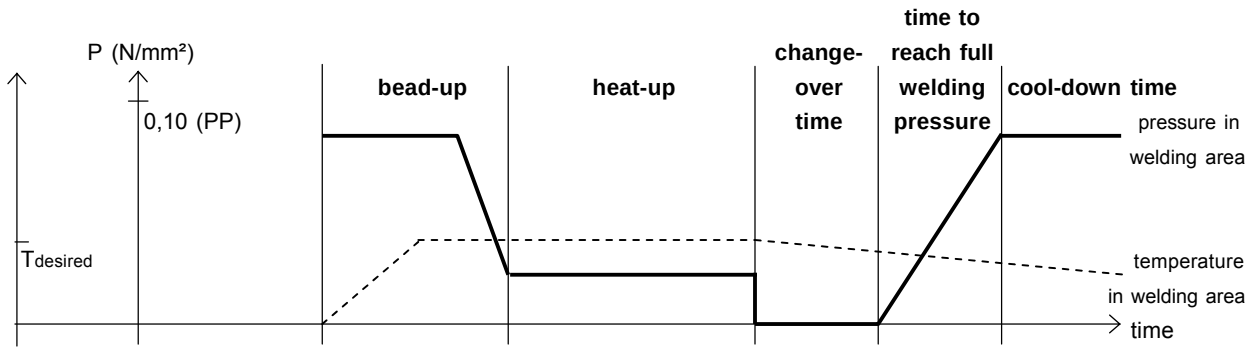
Table for PP

Foundation: 2207, 2208, DIN 16932 German association for welding

Use for:		
	Miniplast 2 / 110	OD 20 - 110
	Maxiplast / 501 / 900 / 955	OD 50 - 160
	Instaweld 160	OD 50 - 160
	2000 / 3000 Kombi	OD 50 - 250
	2500 DO 160 / 250 / 315	OD 50 - 315
	ASM160 / ASM 315	OD 50 - 315

The standard value for heating element temperature is 210° C +/- 10° C.
The **smaller** the pipe wall the **higher** the temperature.

Additional to the given bead-up force and to the welding force the moving force of the support must be added !
1 kp = 10 N



pipe diameter OD [mm]	pipe wall (s) [mm]	SDR	bead-up force [kp] [daN]	circular bead min. [mm]	heat-up time [s]	max. change-over time [s]	time to reach welding pressure [s]	welding force [kp] [daN]	cool-down time [min] ❶
50	1,8	33	3	0,5	90	4	5	3	2
	2,0	26	4	0,5	90	4	5	4	2
	2,9	17,6	5	0,5	106	4	5	5	3
	4,6	11	7	0,5	137	5	6	7	6
	6,9	7,4	10	0,5	173	6	7	10	12
	8,3	6	11	1,0	193	6	8	11	14
	10,1	5	13	1,0	218	7	9	13	17
63	1,8	41	4	0,5	90	4	5	4	2
	2,0	33	4	0,5	90	4	5	4	2
	2,5	26	5	0,5	99	4	5	5	3
	3,6	17,6	7	0,5	119	5	6	7	4
	5,8	11	11	0,5	156	6	7	11	9
	8,6	7,4	15	1,0	197	6	8	15	15
	10,5	6	18	1,0	224	7	10	18	18
	12,7	5	21	1,0	254	7	12	21	21
75	1,9	41	5	0,5	90	4	5	5	2
	2,3	33	6	0,5	95	4	5	6	2
	2,9	26	7	0,5	106	4	5	7	3
	4,3	17,6	10	0,5	131	5	6	10	6
	6,8	11	15	0,5	172	6	7	15	12
	10,3	7,4	21	1,0	221	7	10	21	17
	12,5	6	25	1,0	251	7	11	25	21
	15,1	5	29	1,0	283	8	14	29	24

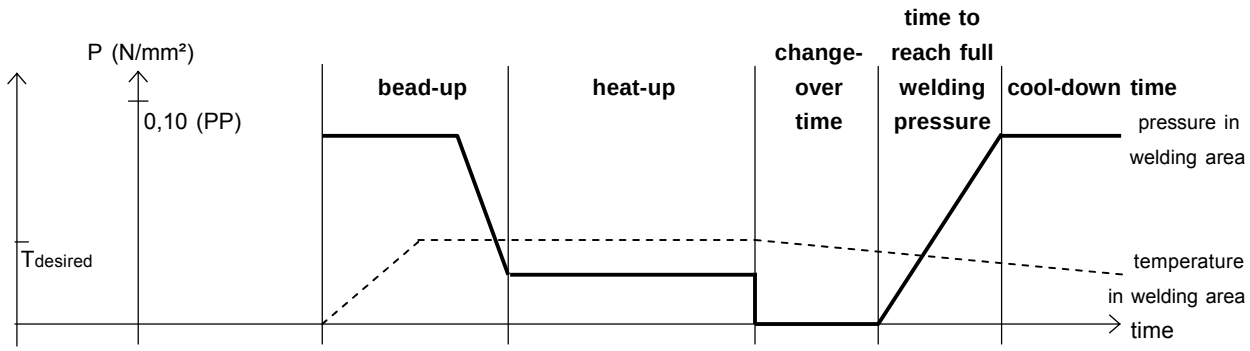
Table for PP

Foundation: 2207, 2208, DIN 16932 German association for welding

Use for:		
	Miniplast 2 / 110	OD 20 - 110
	Maxiplast / 501 / 900 / 955	OD 50 - 160
	Instaweld 160	OD 50 - 160
	2000 / 3000 Kombi	OD 50 - 250
	2500 DO 160 / 250 / 315	OD 50 - 315
	ASM160 / ASM 315	OD 50 - 315

The standard value for heating element temperature is 210° C +/- 10° C.
The **smaller** the pipe wall the **higher** the temperature.

Additional to the given bead-up force and to the welding force the moving force of the support must be added !
1 kp = 10 N



pipe diameter OD [mm]	pipe wall (s) [mm]	SDR	bead-up force [kp] [daN]	circular bead min. [mm]	heat-up time [s]	max. change-over time [s]	time to reach welding pressure [s]	welding force [kp] [daN]	cool-down time [min] ❶
90	2,2	41	7	0,5	94	4	5	7	2
	2,8	33	8	0,5	104	4	5	8	3
	3,5	26	10	0,5	117	5	6	10	4
	5,1	17,6	14	0,5	145	5	6	14	7
	8,2	11	22	1,0	192	6	8	22	14
	12,3	7,4	31	1,0	249	7	11	31	20
	15,0	6	36	1,0	281	8	14	36	24
	18,1	5	41	1,0	319	9	16	41	29
110	2,7	41	10	0,5	103	4	5	10	3
	3,4	33	12	0,5	115	5	6	12	4
	4,2	26	14	0,5	130	5	6	14	6
	6,3	17,6	21	0,5	164	6	7	21	10
	10,0	11	32	1,0	217	7	9	32	17
	15,1	7,4	46	1,0	283	8	14	46	24
	18,3	6	53	1,0	322	9	16	53	29
	22,1	5	62	1,5	361	10	19	62	34
125	3,1	41	12	0,5	110	4	5	12	4
	3,9	33	15	0,5	124	5	6	15	5
	4,8	26	19	0,5	140	5	6	19	7
	7,1	17,6	27	1,0	176	6	7	27	12
	11,4	11	41	1,0	237	7	11	41	19
	17,1	7,4	58	1,0	307	8	15	58	27
	20,8	6	69	1,5	348	10	18	69	33
	25,1	5	79	1,5	391	11	21	79	39

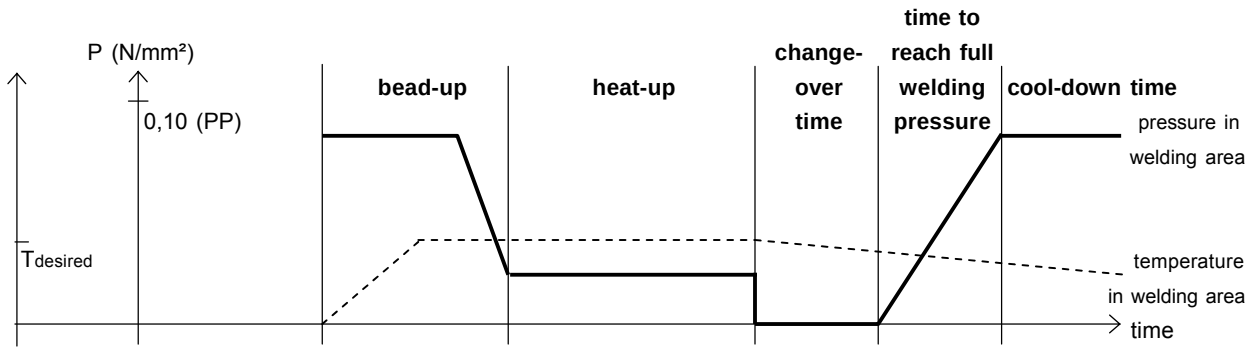
Table for PP

Foundation: 2207, 2208, DIN 16932 German association for welding

Use for:		
	Miniplast 2 / 110	OD 20 - 110
	Maxiplast / 501 / 900 / 955	OD 50 - 160
	Instaweld 160	OD 50 - 160
	2000 / 3000 Kombi	OD 50 - 250
	2500 DO 160 / 250 / 315	OD 50 - 315
	ASM160 / ASM 315	OD 50 - 315

The standard value for heating element temperature is 210° C +/- 10° C.
The **smaller** the pipe wall the **higher** the temperature.

Additional to the given bead-up force and to the welding force the moving force of the support must be added !
1 kp = 10 N



pipe diameter OD [mm]	pipe wall (s) [mm]	SDR	bead-up force [kp] [daN]	circular bead min. [mm]	heat-up time [s]	max. change-over time [s]	time to reach welding pressure [s]	welding force [kp] [daN]	cool-down time [min] ❶
140	3,5	41	16	0,5	117	5	6	16	4
	4,3	33	19	0,5	131	5	6	19	6
	5,4	26	23	0,5	149	5	6	23	8
	8,0	17,6	34	1,0	189	6	8	34	14
	12,7	11	51	1,0	254	7	12	51	21
	19,2	7,4	73	1,5	332	9	17	73	30
	23,3	6	86	1,5	373	10	20	86	36
	28,1	5	99	2,0	416	12	24	99	43
160	4,0	41	20	0,5	126	5	6	20	5
	4,9	33	24	0,5	141	5	6	24	7
	6,2	26	30	0,5	162	6	7	30	10
	9,1	17,6	44	1,0	204	6	9	44	15
	14,6	11	67	1,0	277	8	13	67	24
	21,9	7,4	96	1,5	359	10	19	96	34
	26,6	6	112	2,0	405	11	23	112	41
	32,1	5	129	2,0	447	13	28	129	48
180	4,4	41	25	0,5	133	5	6	25	6
	5,5	33	31	0,5	151	5	6	31	8
	6,9	26	38	0,5	173	6	7	38	12
	10,2	17,6	55	1,0	220	7	10	55	17
	16,4	11	85	1,0	298	8	15	85	26
	24,6	7,4	121	1,5	386	11	21	121	38
	29,0	6	138	2,0	423	12	25	138	44
	36,1	5	164	2,0	478	14	31	164	54

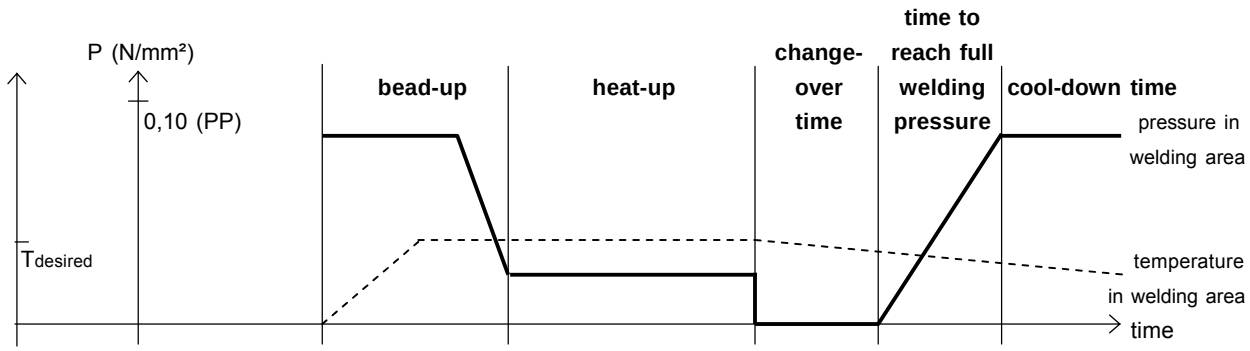
Table for PP

Foundation: 2207, 2208, DIN 16932 German association for welding

Use for:		
	Miniplast 2 / 110	OD 20 - 110
	Maxiplast / 501 / 900 / 955	OD 50 - 160
	Instaweld 160	OD 50 - 160
	2000 / 3000 Kombi	OD 50 - 250
	2500 DO 160 / 250 / 315	OD 50 - 315
	ASM160 / ASM 315	OD 50 - 315

The standard value for heating element temperature is 210° C +/- 10° C.
The **smaller** the pipe wall the **higher** the temperature.

Additional to the given bead-up force and to the welding force the moving force of the support must be added !
1 kp = 10 N



pipe diameter OD [mm]	pipe wall (s) [mm]	SDR	bead-up force [kp] [daN]	circular bead min. [mm]	heat-up time [s]	max. change-over time [s]	time to reach welding pressure [s]	welding force [kp] [daN]	cool-down time [min] ❶
200	4,9	41	31	0,5	141	5	6	31	7
	6,2	33	38	0,5	162	6	7	38	10
	7,7	26	47	1,0	185	6	8	47	13
	11,4	17,6	68	1,0	237	7	11	68	19
	18,2	11	104	1,0	320	9	16	104	29
	27,4	7,4	149	2,0	411	11	23	149	42
	33,2	6	174	2,0	456	13	29	174	50
225	5,5	41	38	0,5	151	5	6	38	8
	6,9	33	48	0,5	173	6	7	48	12
	8,6	26	59	1,0	197	6	8	59	15
	12,8	17,6	86	1,0	255	7	12	86	21
	20,5	11	132	1,5	345	9	18	132	32
	30,8	7,4	188	2,0	437	12	26	188	47
	37,4	6	221	2,5	487	14	32	221	55
250	6,2	41	48	0,5	162	6	7	48	10
	7,7	33	59	1,0	185	6	8	59	13
	9,6	26	73	1,0	211	7	9	73	16
	14,2	17,6	106	1,0	272	8	13	106	23
	22,7	11	163	1,5	367	10	20	163	35
	34,2	7,4	232	2,0	463	13	29	232	51

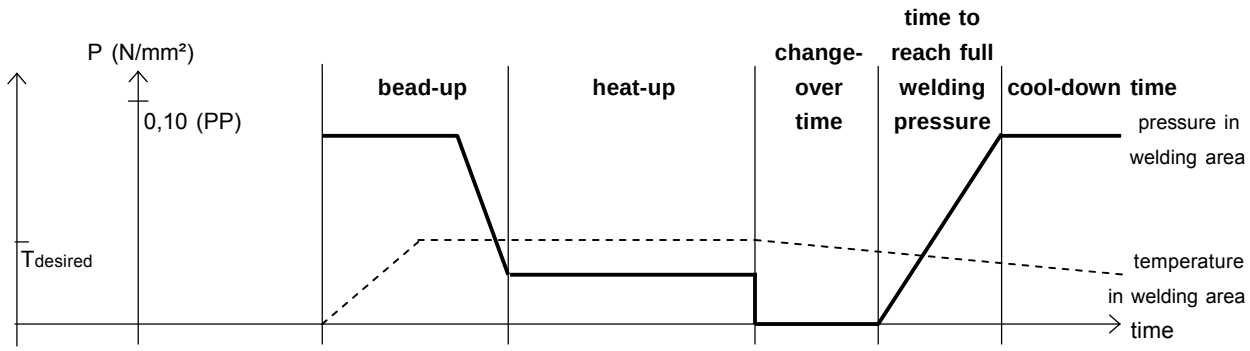
Table for PP

Foundation: 2207, 2208, DIN 16932 German association for welding

Use for:		
	Miniplast 2 / 110	OD 20 - 110
	Maxiplast / 501 / 900 / 955	OD 50 - 160
	Instaweld 160	OD 50 - 160
	2000 / 3000 Kombi	OD 50 - 250
	2500 DO 160 / 250 / 315	OD 50 - 315
	ASM160 / ASM 315	OD 50 - 315

The standard value for heating element temperature is 210° C +/- 10° C.
The **smaller** the pipe wall the **higher** the temperature.

Additional to the given bead-up force and to the welding force the moving force of the support must be added !
1 kp = 10 N



pipe diameter OD [mm]	pipe wall (s) [mm]	SDR	bead-up force [kp] [daN]	circular bead min. [mm]	heat-up time [s]	max. change-over time [s]	time to reach welding pressure [s]	welding force [kp] [daN]	cool-down time [min] ❶
280	6,9	41	60	0,5	173	6	7	60	12
	8,6	33	74	1,0	197	6	8	74	15
	10,7	26	91	1,0	227	7	10	91	18
	15,9	17,6	132	1,0	292	8	14	132	26
	25,4	11	204	1,5	394	11	22	204	39
	38,3	7,4	291	2,5	493	14	33	291	57
315	7,7	41	75	1,0	185	6	8	75	13
	9,7	33	94	1,0	213	7	9	94	16
	12,1	26	116	1,0	246	7	11	116	20
	17,9	17,6	168	1,0	317	9	16	168	28
	28,6	11	258	2,0	420	12	24	258	44

❶ **Remaining under the cool-down time for up to 50% is allowed under the following conditions:**

- prefabrication under workshop conditions
- low additional pressure at unclamping
- no additional pressure during further cooling down
- load onto the workpieces only after being completely cooled down
- Join parts with wall thickness ≥15 mm

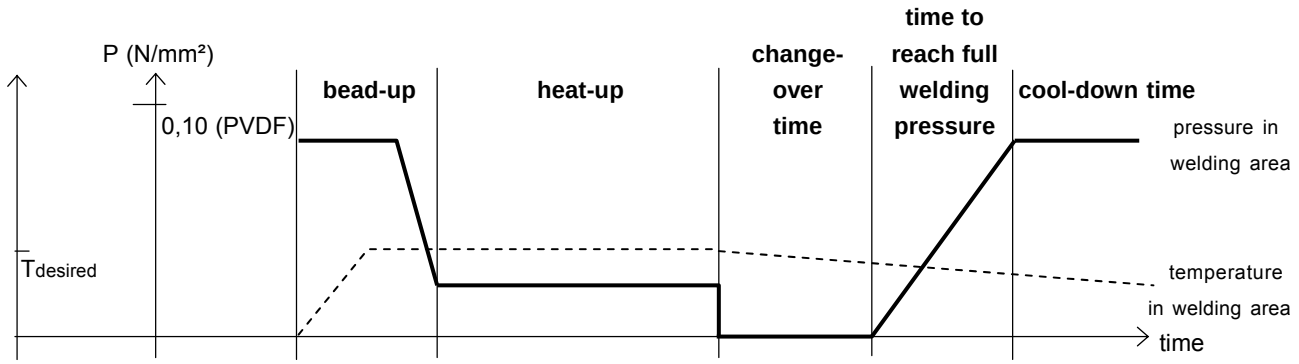
Table for PVDF

Foundation: 2208, 2207 Part 15 German association for welding

Use for:		
	Miniplast 2 / 110	OD 20 - 110
	Maxiplast / 501 / 900 / 955	OD 50 - 160
	Instaweld 160	OD 50 - 160
	2000 / 3000 Kombi	OD 50 - 250
	2500 OD 160 / 250 / 315	OD 50 - 315
	ASM 160 / ASM 315	OD 50 - 315

The standard value for heating element temperature is 240° C +/- 8° C.
The **smaller** the pipe wall the **higher** temperature.

Additional to the given bead-up force and to the welding force the moving force of the support must be added !
1 kp = 10 N



pipe diameter OD [mm]	pipe wall (s) [mm]	bead-up force [kp] [daN]	circular bead min. [mm]	heat-up time [s]	max. change-over time [s]	time to reach welding pressure [s]	welding force [kp] [daN]	cool-down time [min]
20	1,9	2	0,5	59	3	3	2	4,5
25	1,9	2	0,5	59	3	3	2	4,5
32	2,4	3	0,5	64	3	3	3	5,0
40	2,4	3	0,5	64	3	3	3	5,0
50	3,0	5	0,5	70	3	4	5	5,5
63	2,0	4	0,5	60	3	3	4	4,5
	3,0	6	0,5	70	3	4	6	5,5
	3,8	8	0,5	78	3	4	8	6,5
75	2,3	6	0,5	63	3	3	6	5,0
	3,6	9	0,5	76	3	4	9	6,5
	4,5	10	0,5	85	3	5	10	7,5
90	2,8	8	0,5	68	3	4	8	5,5
	4,3	12	0,5	83	3	4	12	7,0
	5,4	15	0,5	94	3	5	15	8,5
110	3,4	12	0,5	74	3	4	12	6,0
	5,3	18	0,5	93	3	5	18	8,5
	6,6	22	0,6	106	4	5	22	10,0
125	3,9	15	0,5	79	3	4	15	6,5
	6,0	23	0,6	100	4	5	23	9,0
140	4,3	19	0,5	83	3	4	19	7,0
	6,7	29	0,6	107	4	6	29	10,0
160	4,9	24	0,5	89	3	5	24	8,0
	7,7	37	0,7	117	4	6	37	11,0

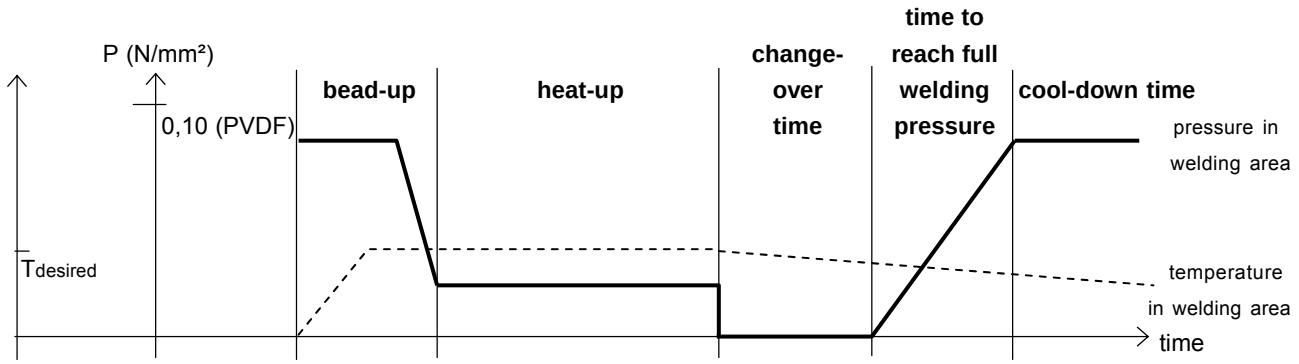
Table for PVDF

Foundation: 2208, 2207 Part 15 German association for welding

Use for:		
	Miniplast 2 / 110	OD 20 - 110
	Maxiplast / 501 / 900 / 955	OD 50 - 160
	Instaweld 160	OD 50 - 160
	2000 / 3000 Kombi	OD 50 - 250
	2500 OD 160 / 250 / 315	OD 50 - 315
	ASM 160 / ASM 315	OD 50 - 315

The standard value for heating element temperature is 240° C +/- 8° C.
The **smaller** the pipe wall the **higher** temperature.

Additional to the given bead-up force and to the welding force the moving force of the support must be added !
1 kp = 10 N



pipe diameter OD [mm]	pipe wall (s) [mm]	bead-up force [kp] [daN]	circular bead min. [mm]	heat-up time [s]	max. change-over time [s]	time to reach welding pressure [s]	welding force [kp] [daN]	cool-down time [min]
180	5,5	31	0,5	95	4	5	31	8,5
	8,6	47	0,8	126	4	6	47	12,5
200	6,2	38	0,6	102	4	5	38	9,5
	9,6	58	1,0	136	4	7	58	13,5
225	6,9	48	0,7	109	4	6	48	10,5
	10,8	73	1,0	148	4	7	73	15,0
250	7,7	59	0,7	117	4	6	59	11,0
	11,9	90	1,1	159	4	8	90	16,5
280	8,6	74	0,8	126	4	6	74	12,5
315	9,7	94	1,0	137	4	7	94	13,5

7. Maintenance and repair

7.1. General

Replace damaged parts immediately, be particularly carefull with electrical parts. Dirt and wetness are very good current conductors.

Prescribed maintenance and inspection works should be performed in time. The DVS gives the advice of inspection works after 1 year.

For machines with a specially high usage percentage the testing cycle should be shortened .

The works should be performed at the WIDOS GmbH company or by an authorized partner.

7.2. Clamping elements

- For a long service life clean and grease regularly the threaded spindles and the joint parts which are used for clamping the pipes.

7.3. Planer

- Do not lay the planer on its blades!
- Check the blades of the planer for sharpness, turn them if necessary (grinded on both sides, max. thickness of the shavings: 0,2 mm !).

7.4. Storage

- Cover the guide bars and the spindle with a thin oil film.
- Store dry.

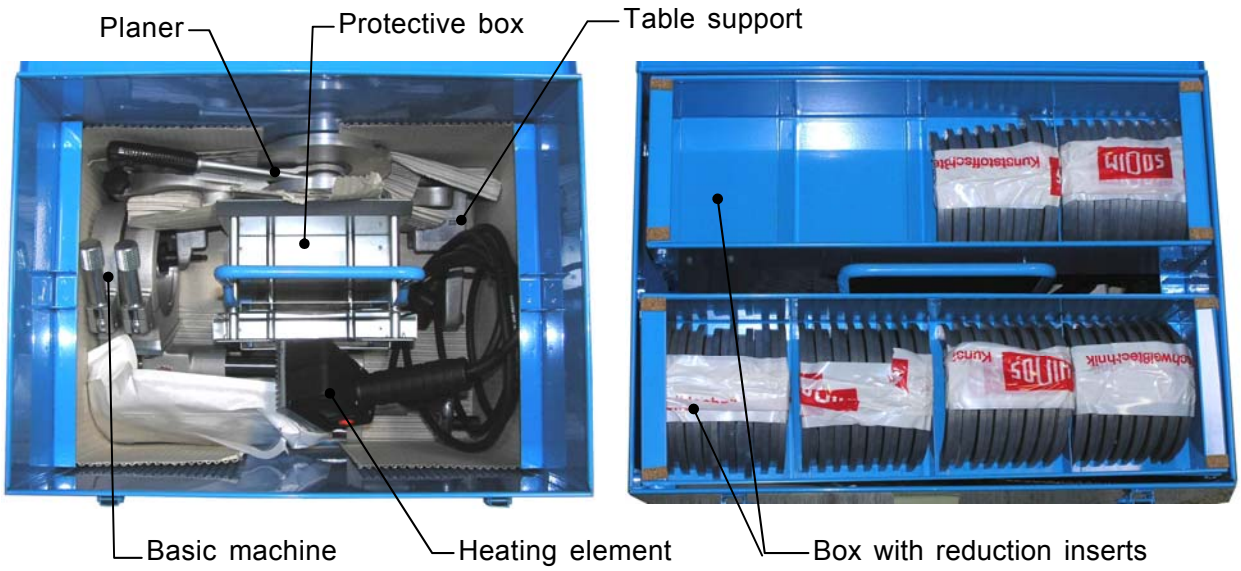
7.5. Disposal

At the end of the life time, the machine has to be disposed of properly, non-polluting and in accordance with the national laws of waste disposal.

8. Transport

- Protect the machine from heavy chocs.
- Handle the machine carefully.
- Make sure that the case is closed correctly.

The machine is transported in a sheet steel carrying case.

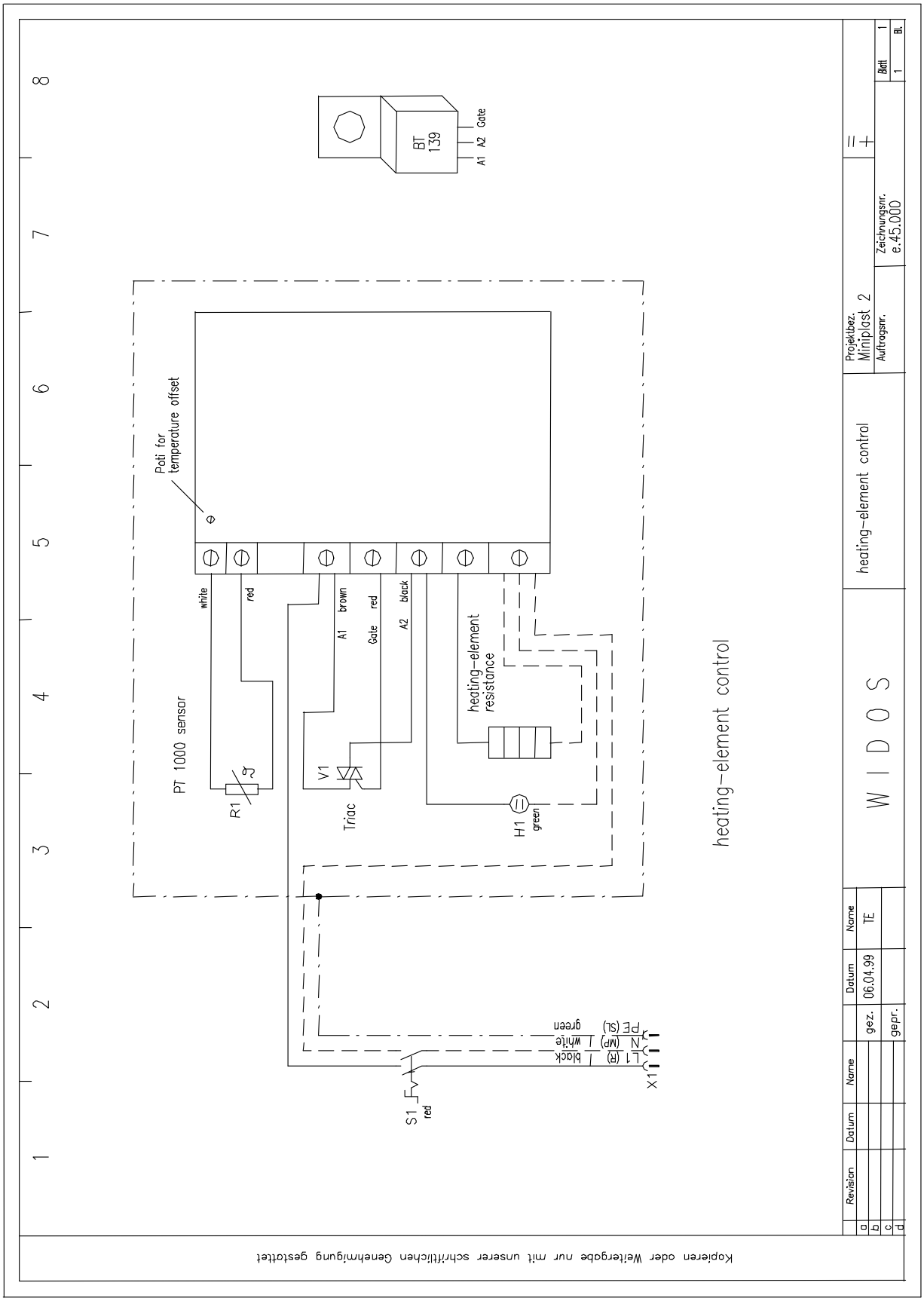


- The table support, protective box and the basic machine are placed into the bottom of the sheet steel carrying case, the protective box with its handle must be standing in the center of the case.
- Place the planer in a way that it is located below the rails for the reducer inserts.
- Place the heating element with cable and the temperature control in a way that is still located below the rail for the reducer inserts.

Please place corrugated cardboard, plastic film or similar between each element in order to protect the machine parts.

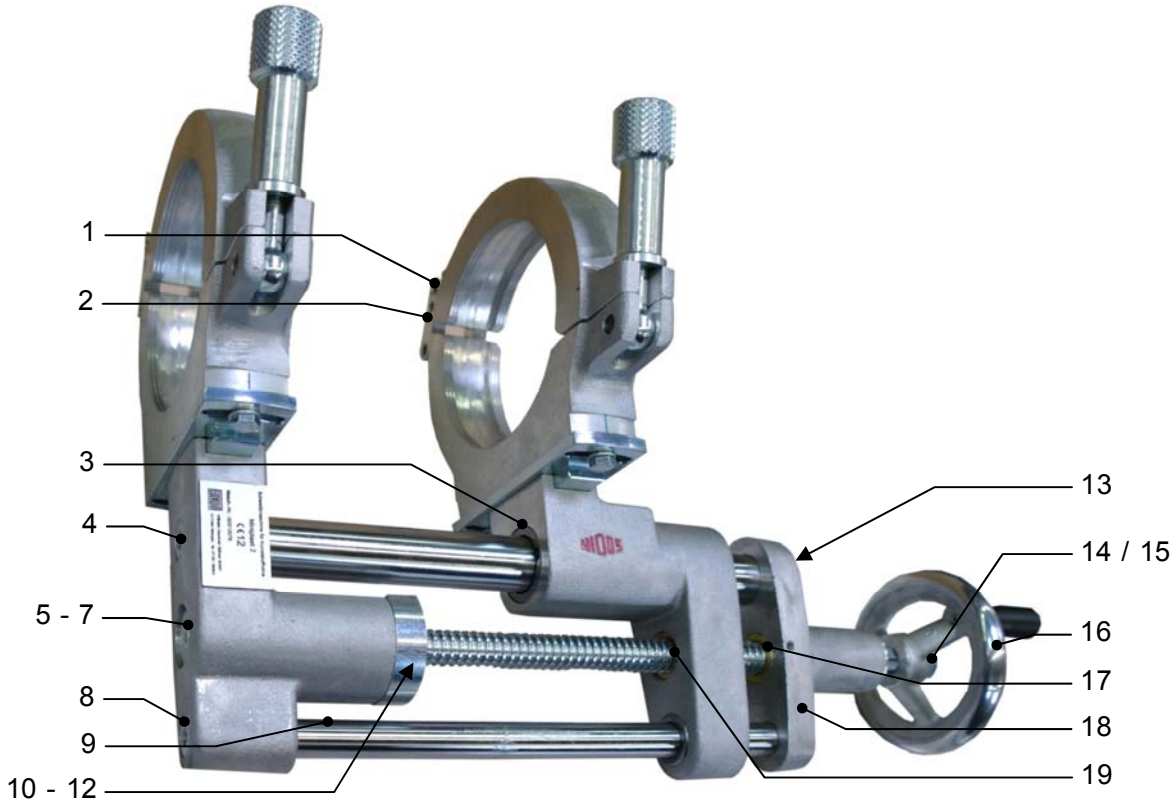
- Place both cases with the reducer inserts onto the rails.

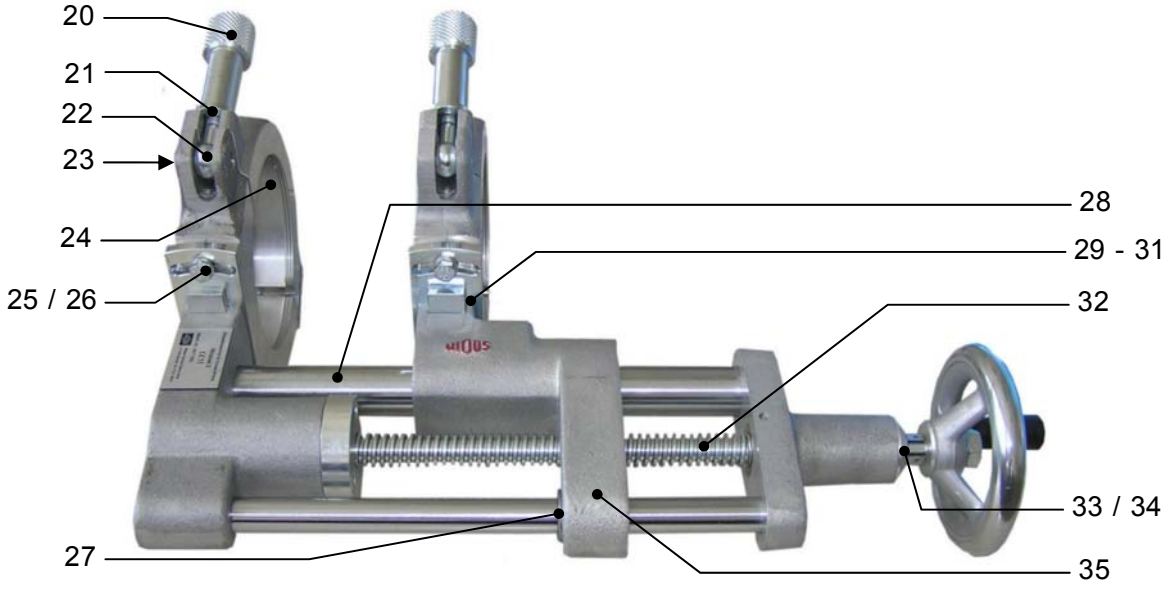
9. Wiring diagram



10. Spare parts list

10.1. Basic machine with clamping devices and reduction inserts





Basic Machine with Clamping Devices and Reduction Inserts Miniplast 2

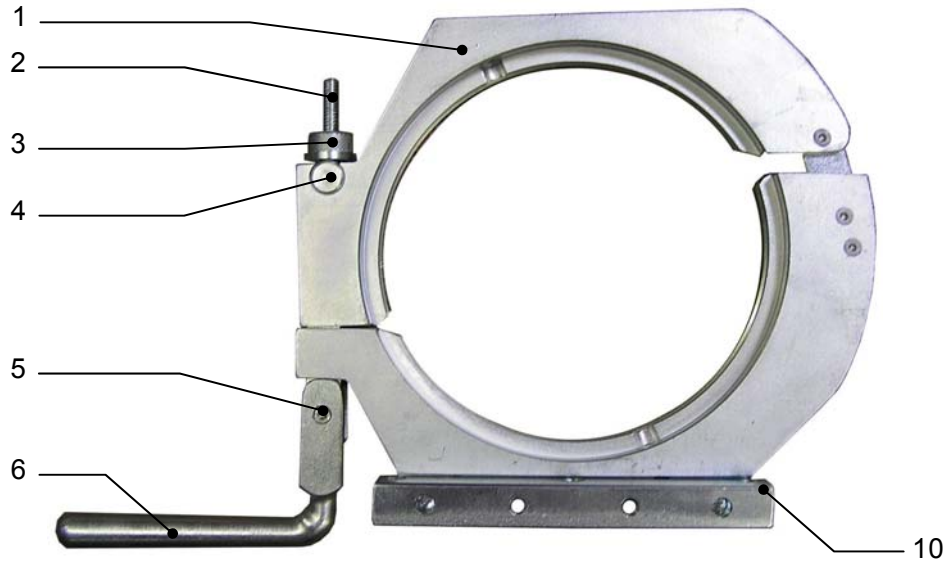
Pos.	Name	Piece	Order no.
1	Straight pin 6 M 6x32 DIN 6325	6	0007F032
2	Coupling	4	454713
3	Ball bushing	2	LKH 2540
4	Spring block	1	450113
5	Spring washer	1	450108
6	Pressure spring	1	200113
7	Flat-head screw M 5x10 DIN 7991	1	7991E010
8	Flat-head screw M 8x35 DIN 7991	1	7991E035
9	Lower guide bar	1	450111
10	Flat-head screw M 5x25 DIN 7991	3	7991E025
11	Bearing plate	1	450107
12	Thrust ball bearing	1	L51103
13	Flat-head screw M 8x25 DIN 7991	3	7991E025
14	Hexagon nut M 10 DIN 934	1	0934J
15	Washer M 10 DIN125	1	0125J
16	Handwheel	1	BH100
17	Sleeve	1	450109
18	Counter bracket	1	450103
19	Trapezoidal nut	1	450105
20	Clamping nut	2	450705
21	Disc	2	4507052
22	Eye bolt BM 8x45 DIN 444	2	0444H045
23	Straight pin 8 M6x26 DIN 6325	2	6325H026
24	Pipe clamp, upper part	2	450701
25	Washer M 6 DIN125	4	0125F
26	Hexagon-head screw M 6x16 DIN 933	4	0933F016
27	Ball bushing	1	LKH1630
28	Upper guide bar	1	450112
29	Pan-head screw	2	450706
30	Straight pin 4 M 6x20 DIN 7	4	0007D020
31	Disk with scale	2	450707
32	Spindle	1	450104
33	Ring with pressure display	1	450110
34	Scale	3	450114
35	Guidance	1	450102
--	Reducer inserts OD 20-90	1 set	2008*
--	Pan-head screw M 4x20 DIN 912 (OD 20-75)	8	0912D020
--	Pan-head screw M 4x16 DIN 912 (OD90)	8	0912D016
--	Annular fork wrench CV DIN 3113 Ak size 10	1	ZRG10
--	Allan key, angled DIN 911 B size 3	1	ZIG03
	* When ordering necessarily give the dimensions !		

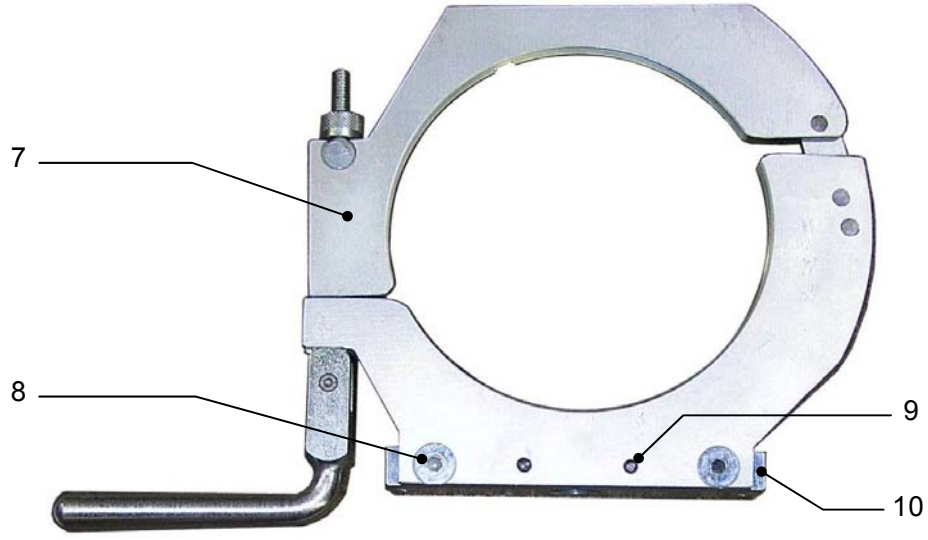
10.2. Table support

Table support WIDOS MINIPLAST 2

Pos.	Name	Piece	Order no.
1	Basic frame	1	4501010
2	Hexagon nut M 8 DIN 934	2	0934H
3	Threaded bolt	2	450116
4	Star grip DIN 6336-KT-40-M8-K	1	on request
5	Headless pin GN 632-M8-50	1	0632H050
6	Threaded insert M 8x12	1	GEW-M8

10.3. Clamping devices for fittings

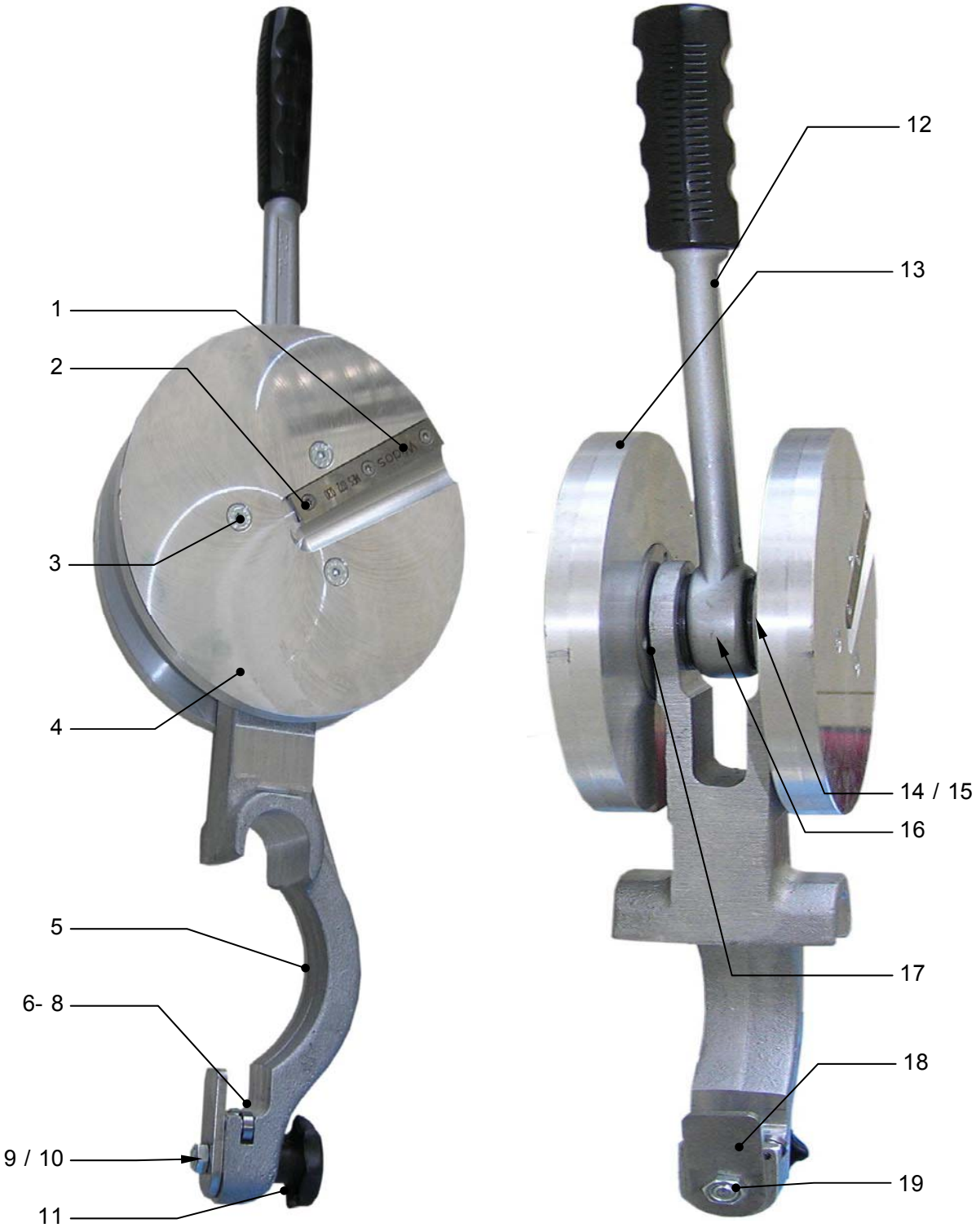




Clamping device for fittings WIDOS MINIPLAST 2

Pos.	Name	Piece	Order no.
1	Right-hand clamping device for fitting	1	4508110R
2	Draw bar	2	S0115067
3	Knurled screw	2	S0113
4	Hinge	2	S0112
5	Rivet	2	S0110
6	Handle	2	451714
7	Left-hand clamping device for fittings	1	4508110L
8	Flat-head screw M 6x12 DIN 7991	4	7991F012
9	Straight pin 4 M6x12 DIN 6325	4	6325D012
10	Gib for screwing	2	450703
--	Clamping insert OD 20-90	1 set	2008…*
--	Pan-head screw M 4x20 DIN 912 (OD 20-75)	4	0912D020
--	Pan-head screw M 4x16 DIN 912 (OD 90)	4	0912D016
--	Allan key DIN 911 B size 4	1	ZIG04

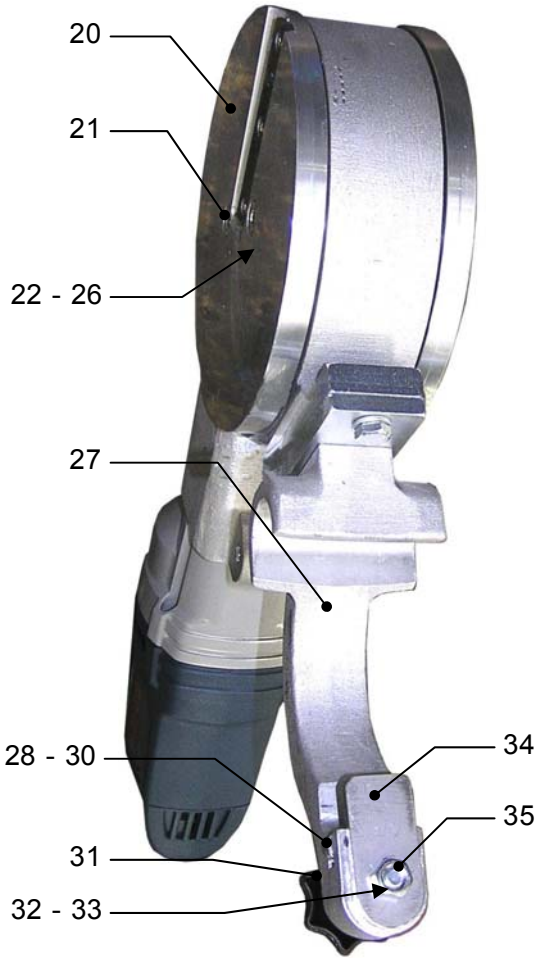
10.4. Manual planer



Manual Planer WIDOS MINIPLAST 2

Pos.	Name	Piece	Order no.
1	Blade	2	MES072
2	Flat-head screw M 3x6 DIN 965	6	0965C006TX
3	Flat-head screw M 5x12 DIN 7991	6	7991E012
4	Planer disk, right-hand	1	450402
5	Holder for planer	1	450401
6	Ball bearing 623ZZ	2	L0623ZZ
7	Washer M 3 DIN 125	4	0125C
8	Grooved taper pin 3x20 DIN 1472	2	1472C020
9	Pressure spring	1	450409
10	Ball Ø 4,5	1	L0005
11	Star grip screw	1	BG3230
12	Mechanical drive	1	ZK002
13	Planer disk, left-hand	1	450403
14	Bearing ring	2	450405
15	Driving plate, right-hand	1	450406
16	Pan-head screw M 5x25 DIN 912	1	0912E025
17	Driving plate, left-hand	1	450407
18	Closing disc	1	450408
19	Hexagon nut M 6 DIN 934	1	0934F
--	Torx screwdriver T 10	1	ZT10

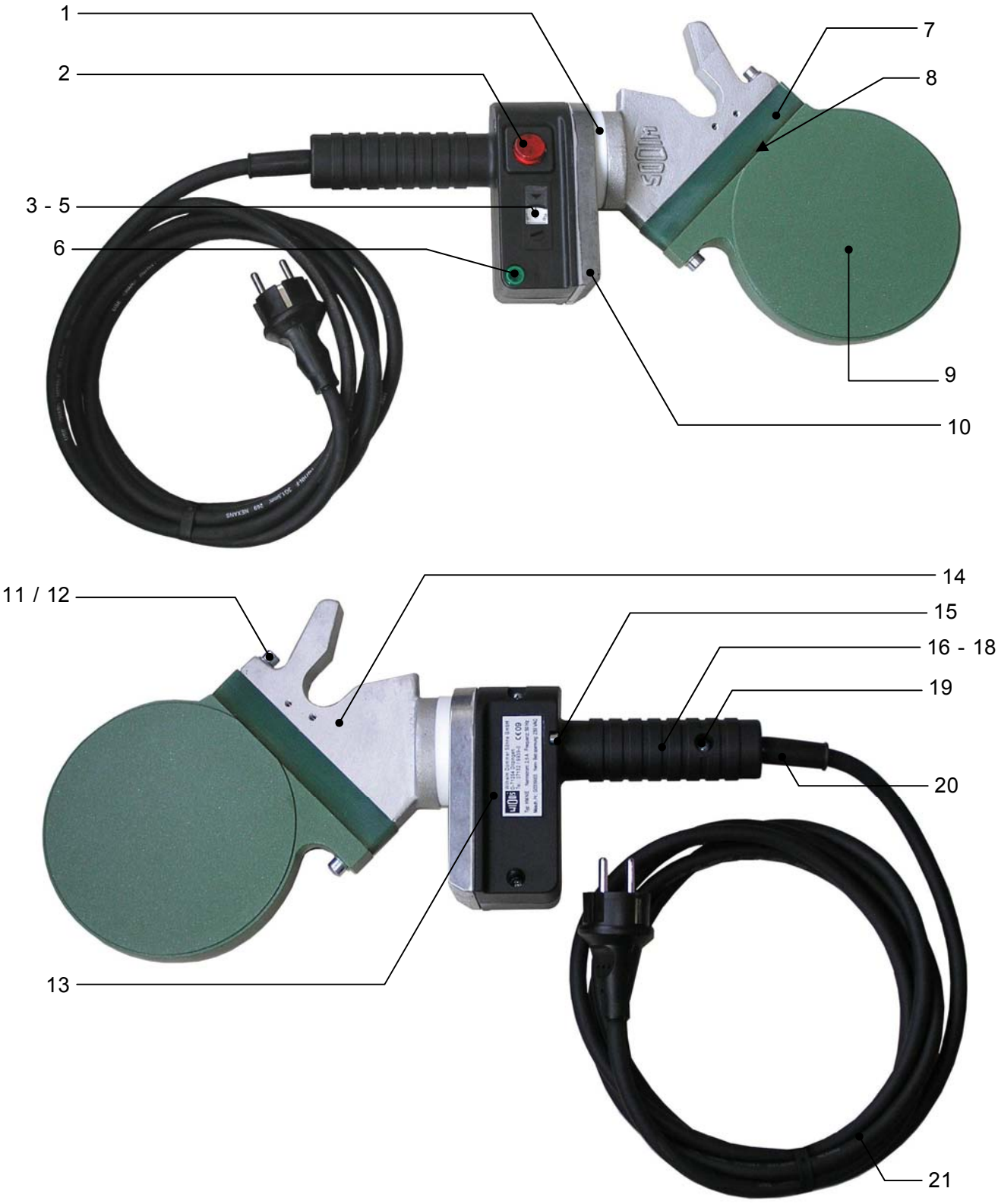
10.5. Electric planer (optional)



Electric Planer WIDOS MINIPLAST 2

Pos.	Name	Piece	Order no.
1	Planer housing	1	450431
2	Coupling piece	1	450443
3	Nut M 10x1, hardened and tempered	1	0934J1
4	Washer M 10 DIN 125	1	0433J
5	Disc	1	450441
6	Shaft for pinion	1	450440
7	Pinion M 1,5; Z 15; Ü 5:1	1	454408
8	Flat-head screw M 6x16 DIN 7991	2	7991F016
9	Flat-head screw M 3x6 DIN 965	6	0965C006TX
10	Knife	2	MES072
11	Planer disk, right-hand	1	450432
12	Connection flange housing side	1	450439
13	Flat-head screw M 5x16 DIN 7991	4	7991E016
14	Pan-head screw M 6x16 DIN 912	2	0912F016
15	Straight pin 4h8 x 12 DIN 6325	4	6325D012
16	Connection flange holder side	1	450438
17	Washer M 6 DIN 125A	1	0125F
18	Pan-head screw M 6x30 DIN 912	1	0912F030
19	Driving motor 230 V	1	A0550230
(19)	Driving motor110 V	1	A0550110
20	Planer disk, leftt-hand	1	450436
21	Flat head screw M 6x25 DIN 7991	2	7991F025
22	Bolt for planer disk	1	450436
23	Ball bearing 6010 RS	1	L6010ZR
24	Adapter ring	1	450437
25	Bevel gear m=1,5 / z=75	1	450438
26	O-ring 3x105	1	D105x3
27	Planer holder	1	4514012
28	Ball bearing 623 2Z	2	L0623
29	Washer M 3 DIN 125	4	0125C
30	Straight pin 3 x 20 DIN 6325	2	6325C020
31	Star grip screw	1	BG3230
32	Compression spring	1	450409
33	Ball Ø 4,5	1	L0005
34	Closing disc	1	450408
35	Hexagon nut inherently safe	1	0985F006
--	Torx screwdriver T 10	1	ZT10

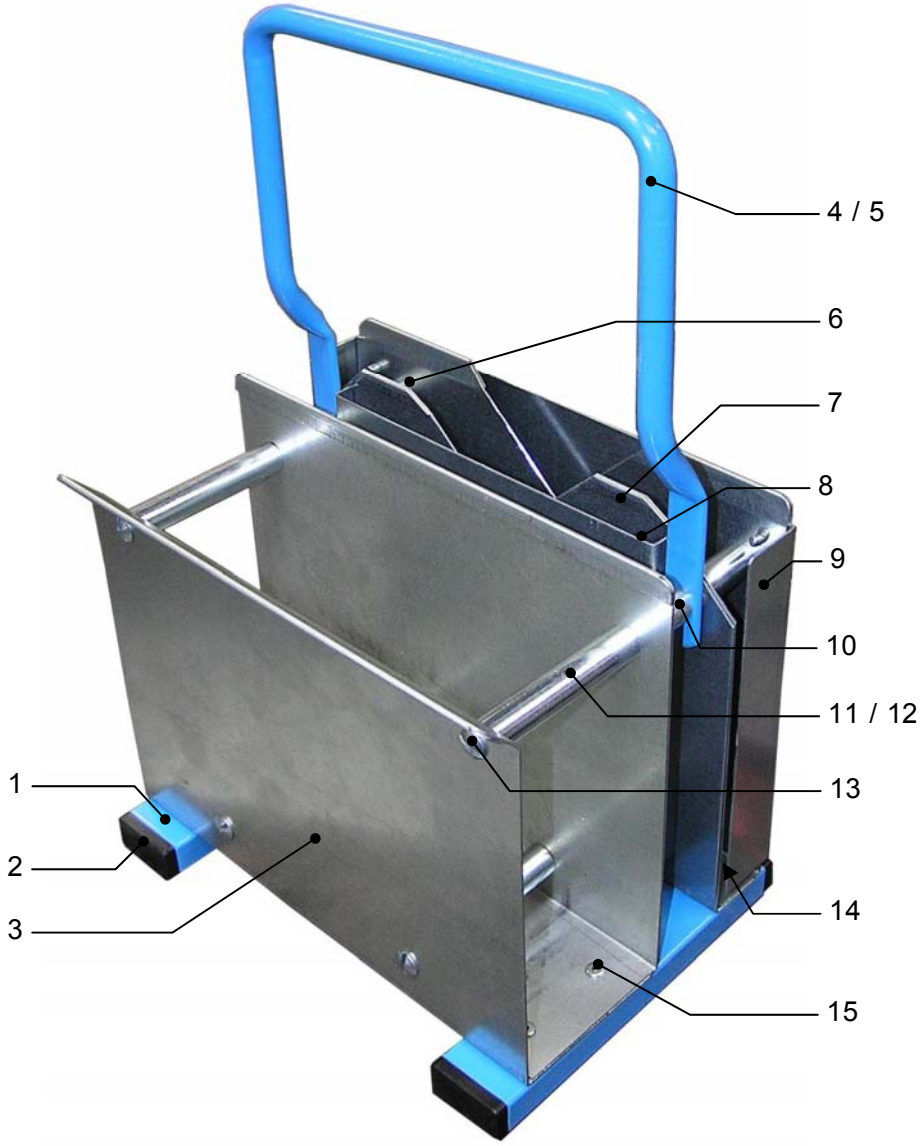
10.6. Heating element



Heating Element WIDOS MINIPLAST 2

Pos.	Name	Piece	Order no.
1	Teflon-conical nipple	1	H09091
2	Switch on/off with red illuminated	1	H0903
3	Control cnob with slot	1	H09075
4	Scale 180°-280° (d33)	1	H09074
5	Window cap for handle shell (white)	1	H09072
6	Control lamp (green)	1	H2105
7	Isolator piece	1	450503
8	Temperature probe PT1000	1	H09082
9	Heating element, complete 230 V	1	HMINIE
	Heating plate new, 230V	1	HPMINIE
	Heating plate for change, 230V	1	HPTMINIE
(9)	Heating element, complete 110 V	1	HMINIE110
	Heating plate new, 110V	1	HPMINIE110
	Heating plate for change, 110V	1	HPTMINIE110
10	Triac with heat sink	1	H09081
11	Pan-head screw M 6x45 DIN 912	2	0912F045
12	Spring washer 6 DIN 128	2	0128FF
13	Electronic control without probe GZ4 230V	1	H0918220
(13)	Electronic control without probe GZ4 110V	1	H0918110
14	Connection piece	1	450504
15	Pan-head screw M 4x70 DIN 912	3	0912D070
16	Handle shell	1	H0907
17	Strain relief	1	H09076
18	Sheet metal screw C 2,9x13 DIN 7981	2	7981C013
19	Sheet metal screw C 4,2x19 DIN 7981	3	7981E019
20	Cable bushing	1	EKT08
21	Connection cable with plug 230V	1	EK3220
(21)	Connection cable with plug 110V	1	on request

10.7. Protective box



Protective Box WIDOS MINIPLAST 2

Pos.	Name	Piece	Order no.
1	Foot	2	450517
2	Screw cap	4	J0207
3	Insert for planer	1	450511
4	Hoop	1	450516
5	Washer 10,5 DIN 125	4	0125J
6	Bar for distance 4	2	450521
7	Insert for heating element	1	450512
8	Protective sheet, inside	1	450519
9	Protective sheet, outside	1	450513
10	Bar for distance 2	4	450515
11	Bar for distance 1	4	450514
12	Threaded bolt	4	450518
13	Sleeve nut M 6	8	J0106
14	Bar for distance 3	2	450520
15	Rivet Ø 3x8 DIN 7337	10	7337C008

11. Declaration of conformity

In the sense of the EC-Machinery Directive 2006/42/EGC

Corporation

WIDOS GmbH
Einsteinstr. 5
D-71254 Ditzingen-Heimerdingen

declares under own responsibility that the product

Plastic Welding Machine
WIDOS **MINIPLAST 2**

to which this declaration refers corresponds to the following norms and norming documents:

1. DIN EN ISO 12100 – 1 and 2 (replacement for DIN EN 292 part 1 and 2)
   Safety of machines, basic terminology, general guidelines for design

2. DIN EN 60204.1
   Electric equipment of industrial machines

3. DIN EN 60555, DIN EN 50082, DIN EN 55014,
   Electro-magnetic resistance

The technical documentation is completely available.

Ditzingen-Heimerdingen, 14.04.2014

Martin Dommer (Technical director)