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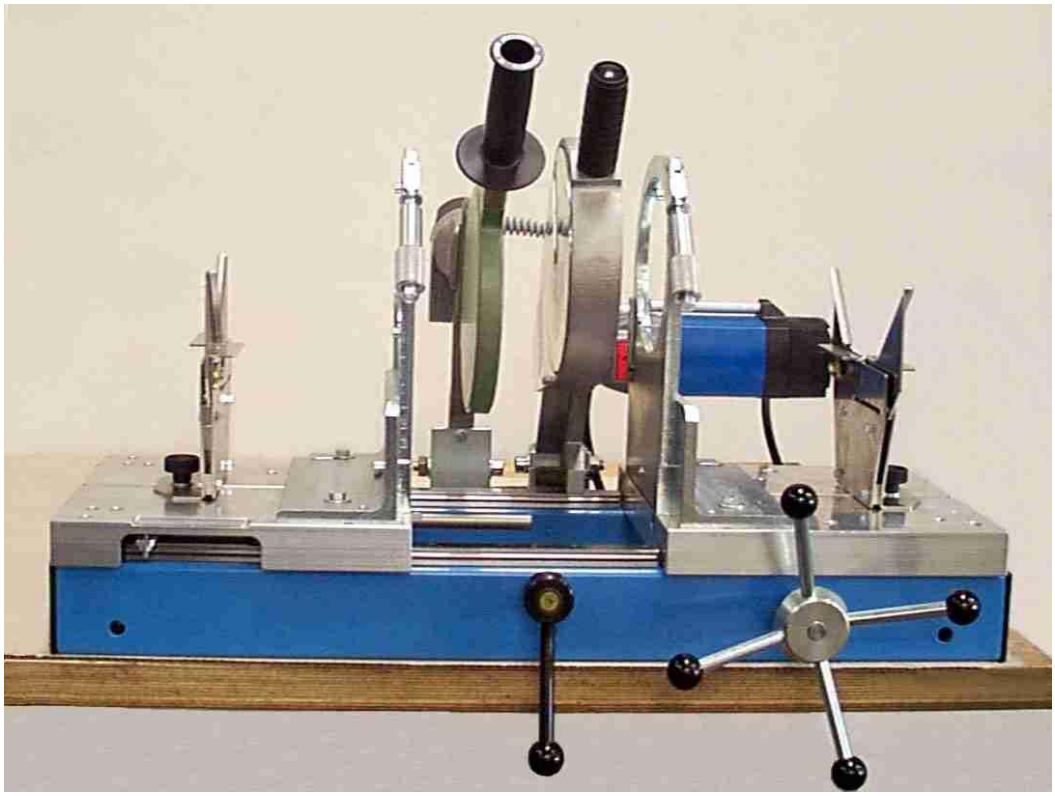
Kunststoffschweißtechnik

Working Instructions Translation

Heating element butt welding machine

WIDOS 2500 / OD 160



CE

Keep for further use!

Type:	WIDOS 2500 / OD 160
Serial number / year of construction:	see type lable

Customer entries

Inventory-No.:	
Place of working:	

Order of spare parts and after sales service:

Address of manufacturer

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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

The 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 **2500 / OD 160** has been designed for heating element butt welding of pipes and fittings out of PE, PP and PVDF with a diameter range of OD = 50 – 160 mm, standart diameters: 50 / 63 / 75 / 90 / 110 / 125 / 160 mm.
(OD 20 / 25 / 32 / 40 mm, option).

The following pipes are weldable: OD 50 to 160 mm → SDR 7,25.

The basic clamping device is swivelling up to 15° on each side for welding segmented bends and fittings.

All use going beyond is not purpose-oriented.

The machine is only to be used in a technically perfect condition, as well as purpose-oriented, safety- and danger-conscious in compliance with the working instructions and the relevant safety regulations (especially the regulations for the prevention of accidents).

The described plastic welding machine may only be operated, maintained and repaired by persons who are trained and informed about the dangers.
The manufacturer is not responsible for any damages caused by inexpert handling or operation.
For personal injuries, material and immaterial damages resulting herefrom, only the user is responsible!

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. 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.

1.3. 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.

1.4. Designation of the product

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

1.4.1. Technical data

1.4.1.1. WIDOS **ASM 2500 / OD 160** General data

Dimensions of pipes:	Outside-Ø = 50 - 160 mm (20 – 40 mm option
Material:	PP, PE 80, PE 100
Fuse protection:	16 A
Wire cross section:	1.5 mm²
Emissions	- The sound intensity level is appr. 86 dB (A) - When using the named plastic materials and when welding within the temperature range up to 260° C no toxicant damp arises.
Environment	- Take care for cleanness (no dust at the welding area) - Do not weld below 5° C, if necessary preheat - Avoid humidity, if necessary use a welding tent - Avoid strong sun rays influence - Protect from wind, shut the pipe ends

1.4.1.2. Heating element

Power:	800 Watt
Current:	3.5 A (± 10 %)
Voltage:	230 V (± 10 %)
Frequency:	50 Hz
Surface:	Nonstick-coated
Attached elements:	- Electronic temperature control - Control lamp - Connecting cable with plug

1.4.1.3. Planer

Power:	950 Watt
Current:	4.1 A (± 10 %)
Voltage:	230 V (± 10 %)
Frequency:	50 Hz
Attached elements:	- connecting cable with plug

1.4.2. Equipment and accessories

The following tools and accessories are part of the first delivery:

1	Tool bag for 10 parts
1 each	Allan key with T-grip, size 4 / 5 / 6 for mounting / dismounting the reduction inserts
1 each	Allan key tilted, size 5 / 6 / 8
1	Fork wrench size 13 (for clamping devices)
1	Torx screw driver T10

For article no. and component parts please see the „spare parts list“, in case of order please always give the machine number!

2. Safety rules

The base for the safe handling and the fault-free operation of this machine is the knowledge of the basic safety advises 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, 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 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.
- to inform themselves about the functions of the machine before using it.

2.4. Measure of organisation

- All equipment required for personal safety is to be provided by the owner.
- All available safety equipment is to be inspected regularly.

2.5. Information about safety precautions

- 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.
- All safety and danger indications on the machine have to be in a clear readable condition.
- 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.

2.6. 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, and starting the operation.
- A person who is being trained may only work at the machine under supervision of an experienced person.

2.7. Dangers while handling the machine

The machine **WIDOS 2500 / OD 160** is constructed according to the latest technical standard 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 use
- in safety technical impeccable status

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

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.
- Protect the heating element from rain and dropping water.
- According to VDE 0100, the use on construction sites is only allowed with a power distributor with a FI-safety switch.

2.8. Specific dangers

2.8.1. Danger of stumbling over electric wires

- Make sure that no person has to step over the wires of the heating element and the planer.

2.8.2. Danger of being burnt by heating element and welding area

You can burn yourself, inflammable materials can be ignited.

The heating element temperature is heated up to more than **250° C** !

- Do not leave the heating element unsupervised.
- Do not touch the surfaces of the heating element.
- Take enough safety distance to inflammable materials.
- Do wear safety gloves.
- Take care that no person is standing in the swivelling area of the heating element.
- When cleaning the hot heating element with detergents (e.g. with PE cleaner) there is the danger of inflammation. For this reason take care that the inflammation point is above the actual temperature of the heating element. Do not bring any fire sources (e.g. cigarettes) close thereto.

2.8.3. Danger of Cutting and Catching Clothes by the Planer, Danger of Squeezing at the Guide Rods

You can cut yourselve or even get bones broken.

- Only wear clothes tight to the body.
- Do not wear jewellery during the work.
- If necessary, wear hair-net.
- Do not touch the faces of the planer.
- Take care that no person is standing in the swivelling area of the planer.
- Do not grip between clamped pipe endings.

2.9. Structural modifications on the machine

- No modifications, extensions or reconstructions may be made on the machine without permission of the manufacturer. In cases of non-compliance, any guarantee and liability demands expire.
- Machine parts which are not in a perfect condition are to be replaced immediately.
- Only use original **WIDOS** spare and wear parts.
- In case of purchase orders please always state the **machine number and version number!**

2.10. 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

2.11. 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, starting and operation of the machine and maintenance.
- Ignoring the information given in this manual.
- Structural changes 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 process guidelines are to be followed.

The plastic pipes are clamped by means of 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“**.

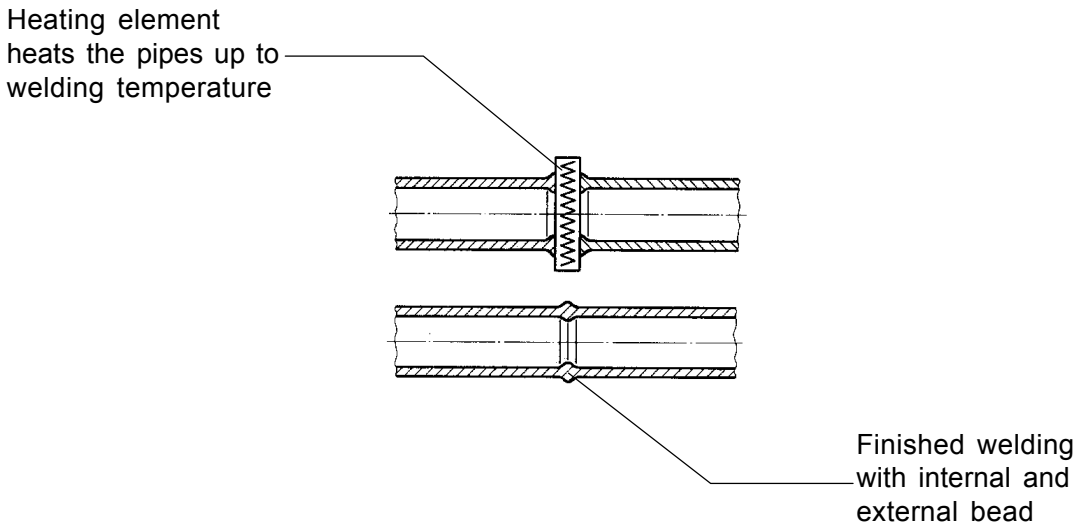
The applied force can be read on the scale mounted at the machine.

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**.

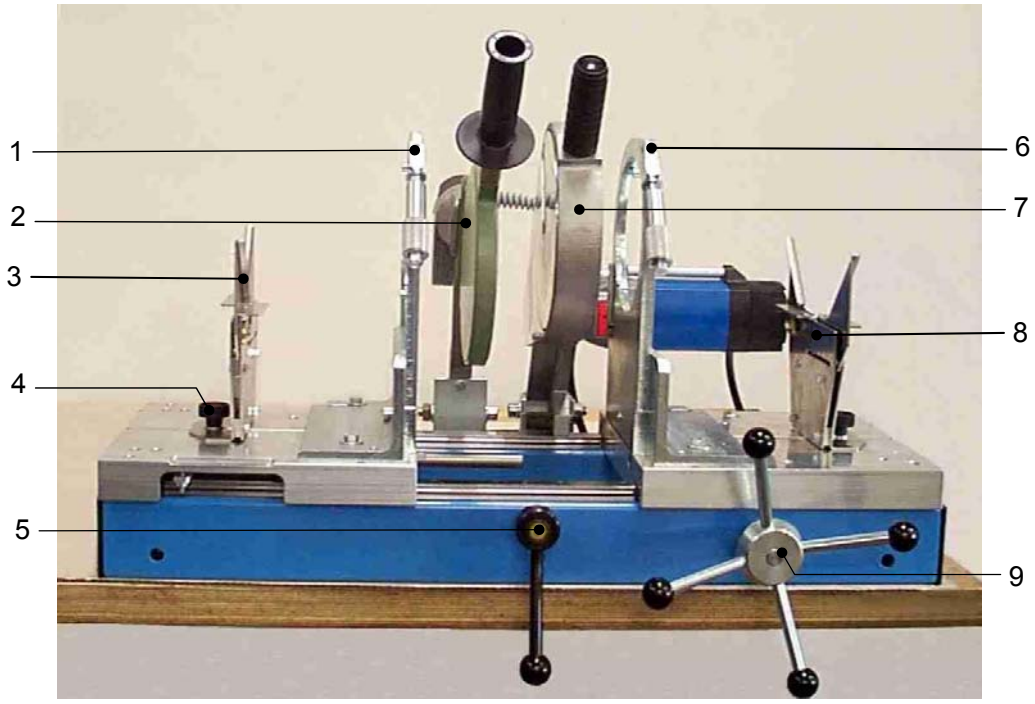
The pipes are joined under prescribed welding pressure and then cool down under pressure (**cooling time**).

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



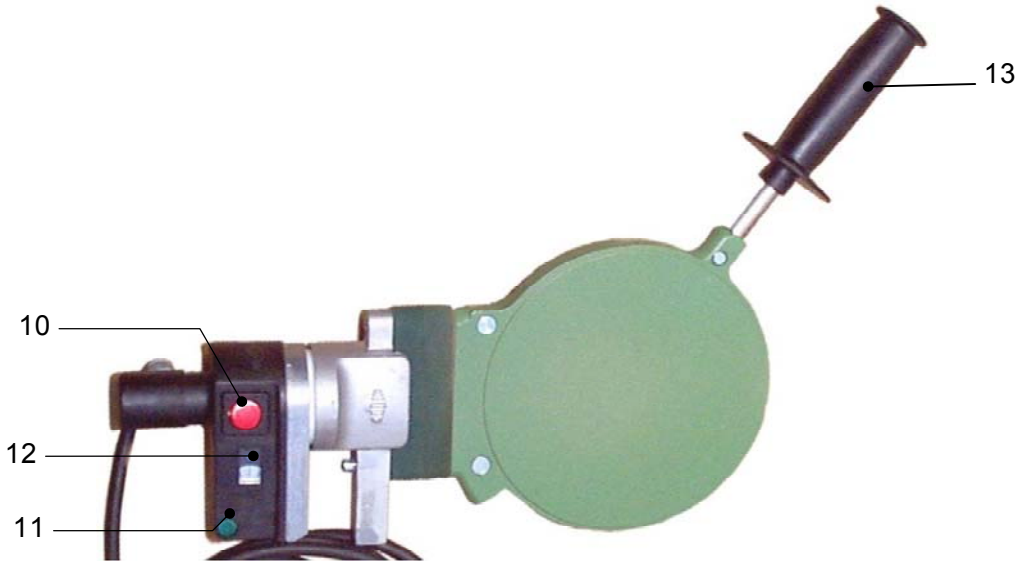
4. Operating and indicating elements

4.1. Elements on the basic machine



No.	*Denomination*	*Function*
1	Clamping device, left-hand	- Clamping the pipe / fitting
2	Heating element	- Heating up the pipes - Can be swivelled in and out
3	Pipe support, left-hand	- Supporting the pipe / fitting
4	Scale	- Display of the applied welding force - max. display: 150 daN (kp)
5	Tension lever	- Arresting the support
6	Clamping device, right-hand	- Clamping the pipe / fitting
7	Planer	- Planing the pipes - Can be swivelled in and out.
8	Pipe support, right-hand	- Supporting the pipe / fitting
9	Cross handle	- Opening / closing the support. - Application of the adjusting force and of the jointing force.

4.2. Elements at the heating element



No.	*Denomination*	*Function*
10	Switch on/off with lamp	- As soon as the heating element is switched on, it is heated up. - The red lamp lightens when the heating element is connected to the mains.
11	Control lamp, green	- There are three different states: • off: signalizes that the heating element is not heated up at the moment or that it cools down • blinking: the heating element temperature is maintained by a certain pulse-position ratio • on: signalizes that the heating element is heated up at the moment. It has not yet reached the desired temperature
12	Adjusting screw	- Setting the temperature of the heating element.
13	Grip	- Swinging the heating element into / out of the machine

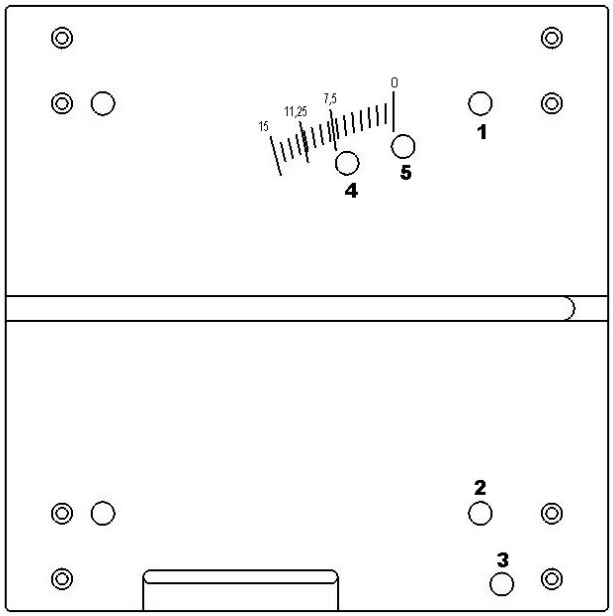
4.3. Elemente am Planhobel

No.	*Denomination*	*Function*
14	Taster	- Wenn der Planhobel eingeschaltet ist und der Taster gedrückt wird, dreht sich die Fräserscheibe
15	Ein / Aus - Schalter	- schaltet den Planhobel ein / aus

4.4. Elements for welding bends- / fittings

There are severals bore holes on the machine slide as well as an engraved scale for welding bends / fittings. Tee angles have three bore holes and one long hole.

View onto left table:

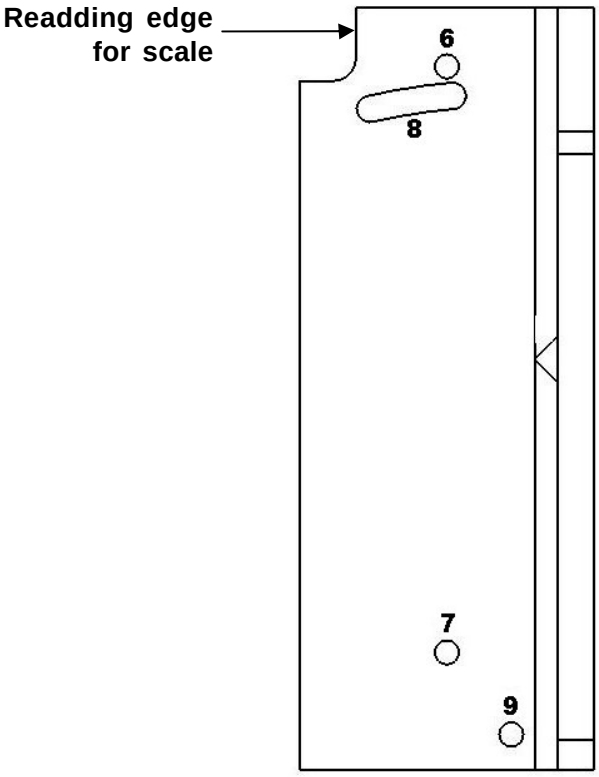


When welding straight pipes, the pieces with the following bore holes are screwed together:
Table **1** with angle **6**
Table **2** with angle **7**

When welding bends 0 – 7,5°, the following bore holes are screwed:
Table **5** with angle **8**
Table **3** with angle **9**

When welding bends 7,5 – 15°, the following bore holes are screwed:
Table **4** with angle **8**
Table **3** with angle **9**

View onto left angle:



Tee desired can be read at the reading edge.

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 DVWG.

- 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 to the mains (230 V / 50 Hz).

Lay electric lines thoroughly (danger of stumbling) !

- Take into account the surrounding conditions:
  – The welding may not be performed under direct sun rays influence.
- If the surrounding temperature is under 5° C, measures have to be taken:
  – If need be, heat-up the pipe ends.
- In addition, take measures against rain, wind and dust.

5.2. Welding process

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

- Do wear safety gloves as a protection against burning!
- A stop-watch must be available for recording the actual times for heating up and cooling.
- A welding table is to be available from which the parameters (times and forces) for the pipe dimensions to be welded prescribed by the welding prescriptions may be taken.
- The heating element surfaces are to be clean and, above all, free from grease.
  Therefore they need to be cleaned with fibre-free paper and a cleaning agent (e.g. PE cleaner) before each welding or in case of dirtiness.
  The anti-adhesive coating of the heating element must remain undamaged in the working area.
- Switch on the heating element and set the necessary welding temperature at the adjusting screw at the handle.
  - If the control lamp blinks, the nominal temperature has been reached and is kept constant by means of a defined pulse-position ratio.
- Screw in the reduction inserts according to the outside diameter of the pipes to be welded.
- Lay the workpieces into the clamping devices, tighten firmly the clamping nuts and align the pipes with respect to each other.
- Swivel the planer between the ends of the workpieces, switch it on and keep the on-key pressed. Plane with low pressing force.
  Planing has to be carried out until a revolving cutting has been formed on both sides.
- Open again the support and swivel out the planer.
- Remove the produced cuttings without touching the worked surfaces.
- Close the support.
- 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 of the clamping nuts. In case mismatch compensation was carried out, planing must be repeated afterwards.
- The adjusting pressure for the pipe dimension to be welded can be gathered from the welding table.
- Open support again slightly.
- Gather heating time, maximum change over time, cooling time and bead height for the pipe dimension to be welded from the table.
- Swivel in the heating element which has been cleaned and brought to desired temperature. If necessary wait until the control lamp at the heating element is blinking in regular intervals.

- Close the support smoothly to the set adjusting pressure.
  The applied force can be seen on the scale (3) at the left-hand support.
  By means of the tension lever (4), the support can be arrested and the adjusting pressure can be maintained.
  When the prescribed revolving bead height is reached, reduce pressure (heating pressure = approx. 10 % of adjusting pressure).
- The heating time starts now. Press the stop-watch and compare the actual time with the nominal time taken from the welding table.
- After expiration of the heating time, loose the tension lever, open the support, swivel out the heating element as quickly as possible and close the support smoothly.
  The maximum time frame for this process is predetermined by the value for the change over time taken from the table.
- When the welding pressure is built up, arrest the support and press the stop-watch.
  If necessary, re-adjust pressure during the cooling time (the pressure for cooling is the same as the set adjusting pressure).
- After expiration of the cooling time, release pressure, remove the welded parts and open the support.

5.3. Welding of angles

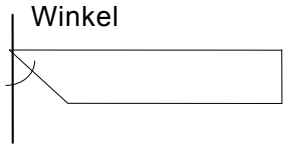
When welding angles, the welding surface of the pipe and thus the necessary pressure changes.

Calculate the necessary pressure as follows:

- Take the prescribed value for adjusting or cooling from the table.
- Multiplicate the pressure value with factor /cos (angle).

  This will give the following factors:

Welding 15°	(chamfered pipe with 7,5°):	1,01
Welding 22,5°	(chamfered pipe with 11,25°):	1,02
Welding 30°	(chamfered pipe with 15°):	1,04
Welding 45°	(chamfered pipe with 22,5°):	1,08
Welding 60°	(chamfered pipe with 30°):	1,15
Welding 90°	(chamfered pipe with 45°):	1,41



- Add the motional pressure as usual.

All the other welding parameters remain as usual.

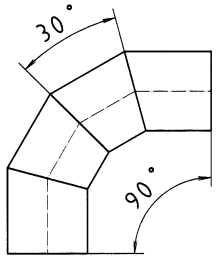
5.4. Welding segmented bends

Calculate the sawing angle to be set (corresponding to the required angle at the clamping tools or clamping inserts) as follows:

$$\text{Sawing angle} = \frac{\textbf{Angle of the bend}}{\textbf{number of all welding surfaces}}$$

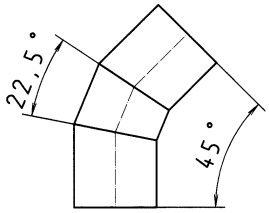
Example: 1 bend of 90°, 4 segments (6 welding surfaces)

$$\text{Sawing angle} = \frac{90°}{6} = 15°$$



Example: 2 bend of 45°, 3 segments (4 welding surfaces)

$$\text{Sawing angle} = \frac{45°}{4} = 11{,}25°$$



6. Welding log and tables

Report for heated plate welding of tubular components

❑ Laid above ground
❑ Laid underground

Material

Sheet of

Employer	Contracting company	Welding machine:	Weather conditions	Protective measures
Order tittle	Name of the welder / Identity no.	Make:	1 = sunny 2 = dry	1 = none 2 = screen
Order no.	Name a. company of the welding inspector	Type: Machine no.: Year of manufacture:	3 = rain or snowfall 4 = wind	3 = tent 4 = heating

In the case of multiple designations follow the figures as above:
(e.g. 34 = rain and wind)

Weld no.	Date	Pipe size Ø d x s mm	Heating element temperature 1) °C min / max	Movement pressure bar	Joining pressure bar	adjusted values 2) heat-up bar	adjusted values 2) bead-up bar	heat-up time 3) s	time to complete joining pressure 3) s	Change-over time 3) s	Cooling time under joining pressure 3) s	Ambient temperature °C	Code no. Weather	Code no. protect measures	Remarks

Signature of welder:

Date and signature of the welder inspector:

1) From normal internal, frequency according to 4.2.
2) The settings are the sum of the movement pressure and the indications of the manufacturer of the welding machine concerning equalization and joining pressure.
3) The measured values must be entered.

Table for PE

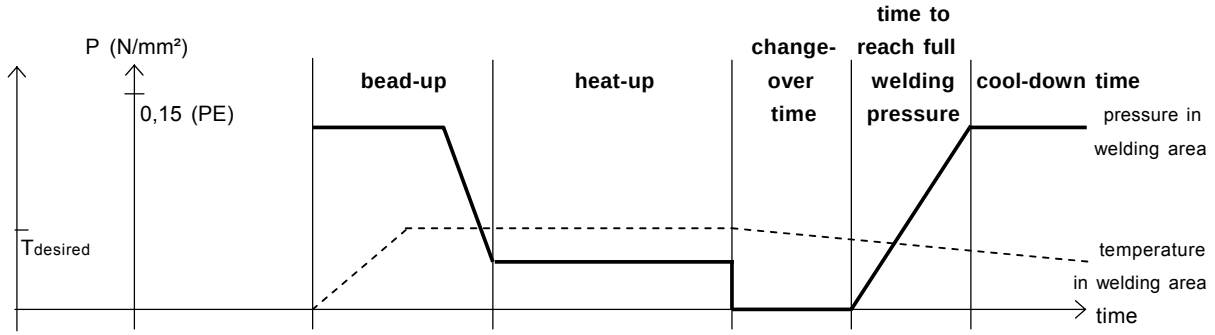
Foundation: 2207, 2208 DIN 16932 German association for welding

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

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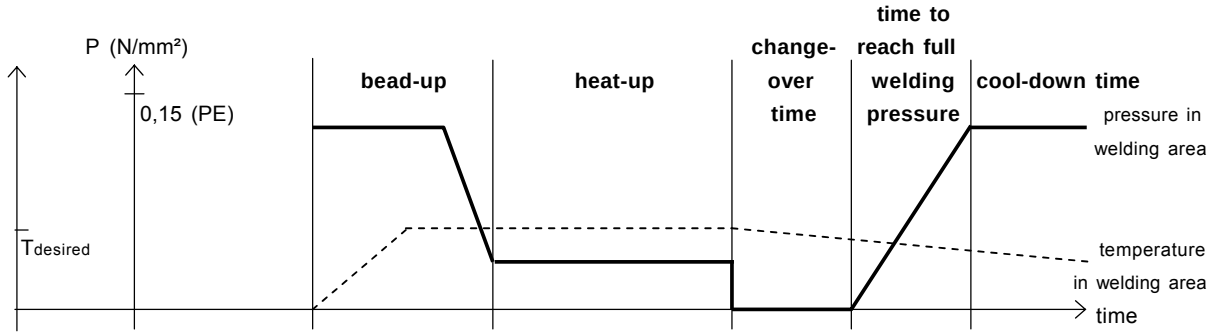
The **smaller** the pipe wall the **higher** the temperature.

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

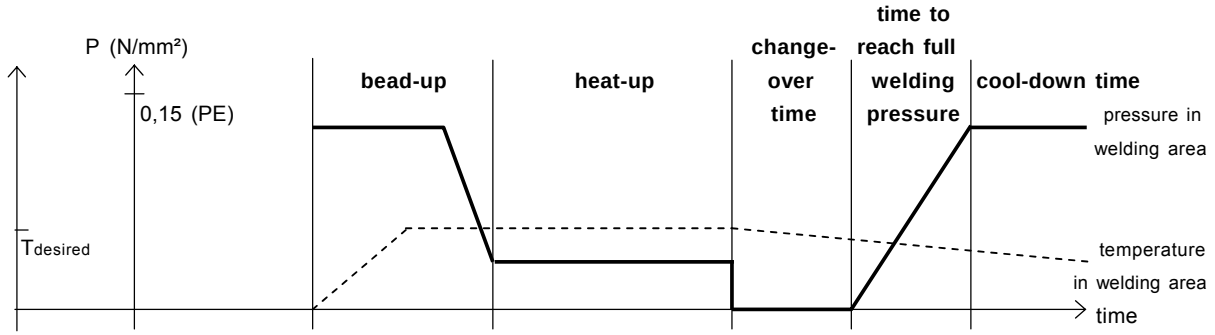
Foundation: 2207, 2208 DIN 16932 German association for welding

Use for:		
	Miniplast 2 / 110	OD 20 - 110
	Maxiplast / 501 / 900 / 955	OD 50 - 160
	Instaweld 160	OD 50 - 160
	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
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

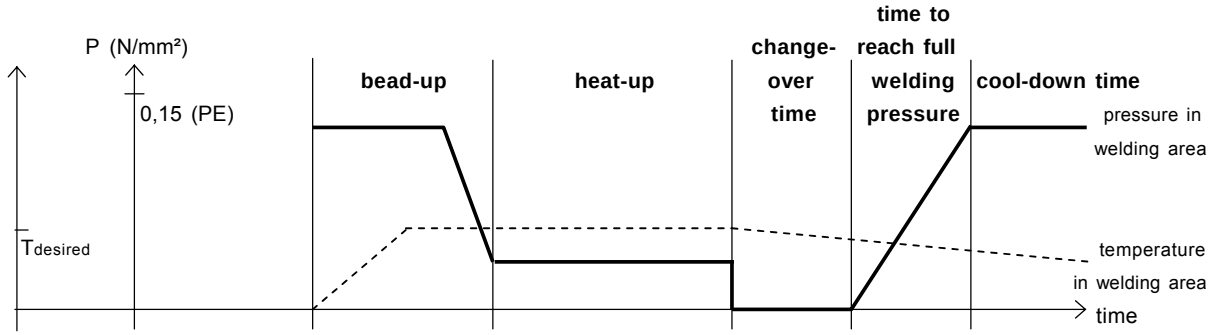
Foundation: 2207, 2208 DIN 16932 German association for welding

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

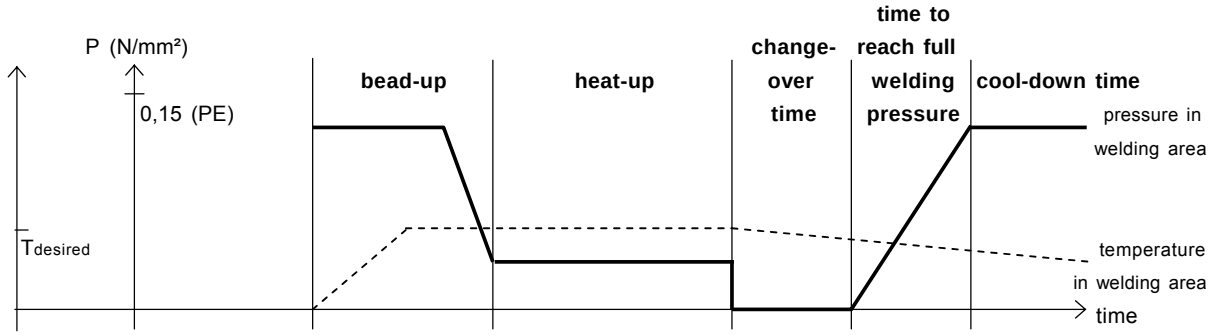
Foundation: 2207, 2208 DIN 16932 German association for welding

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

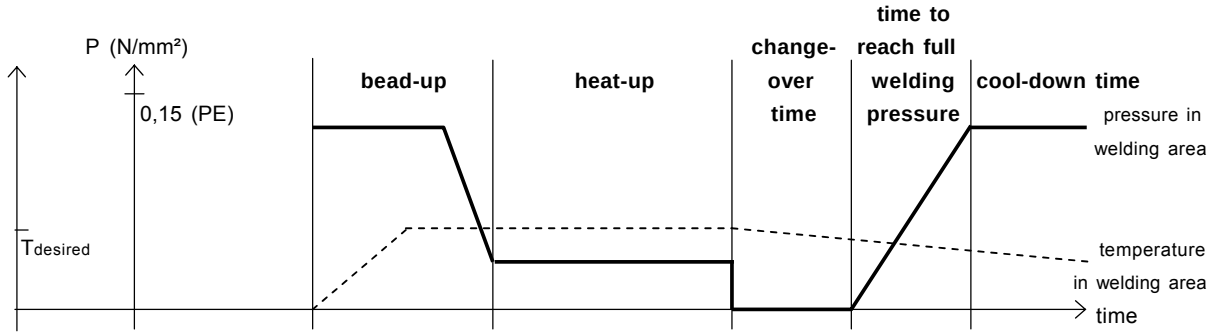
Foundation: 2207, 2208 DIN 16932 German association for welding

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

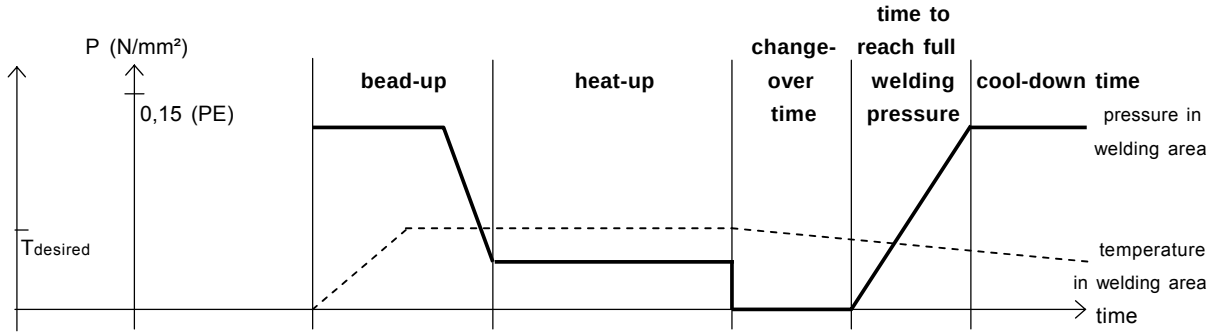
Foundation: 2207, 2208 DIN 16932 German association for welding

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

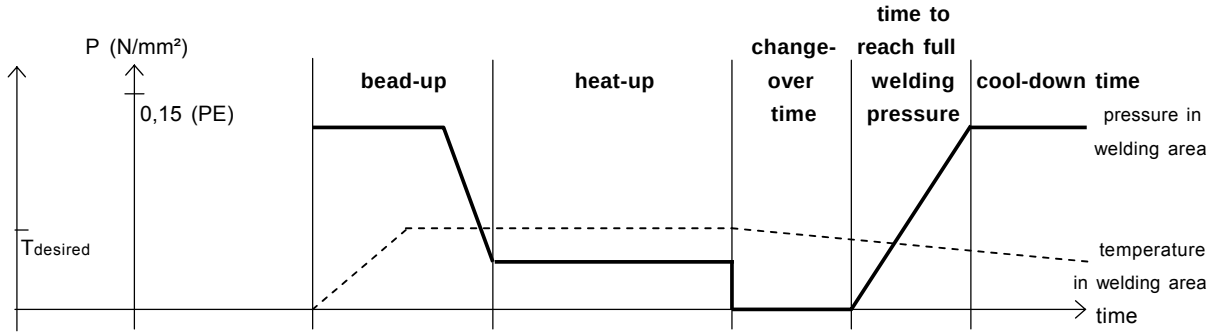
Foundation: 2207, 2208 DIN 16932 German association for welding

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

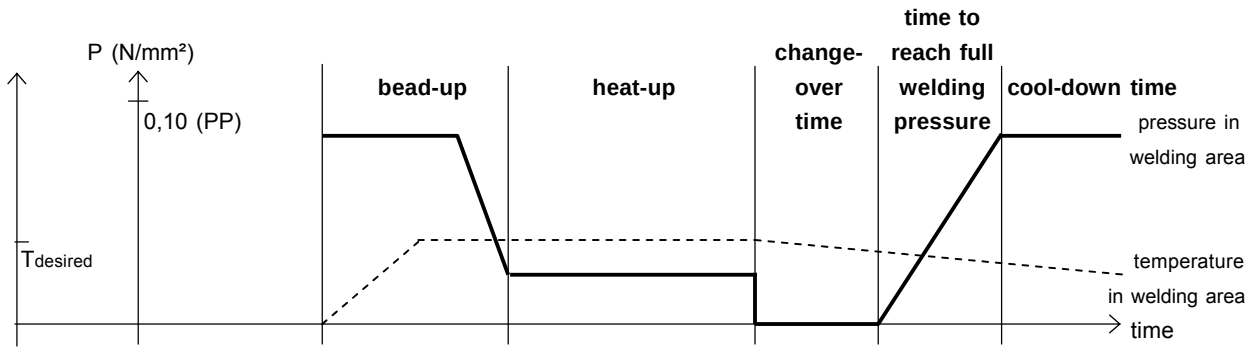
Table for PP

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

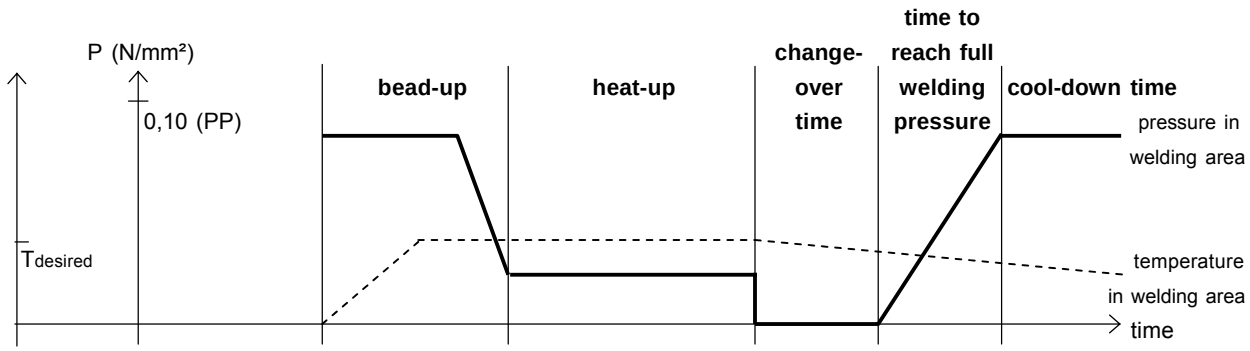
Table for PP

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

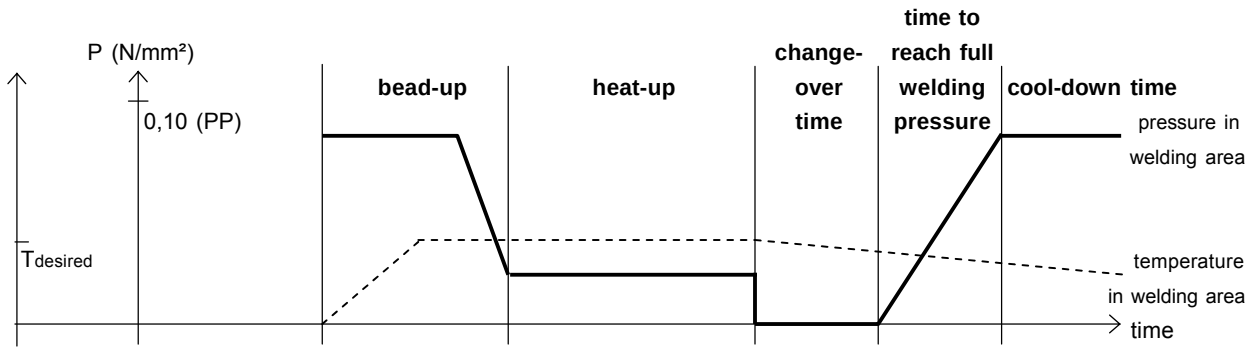
Table for PP

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

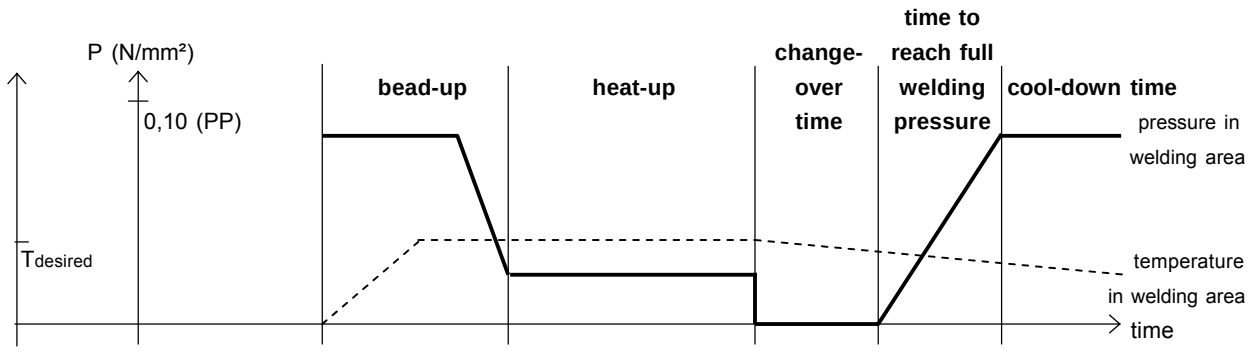
Table for PP

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

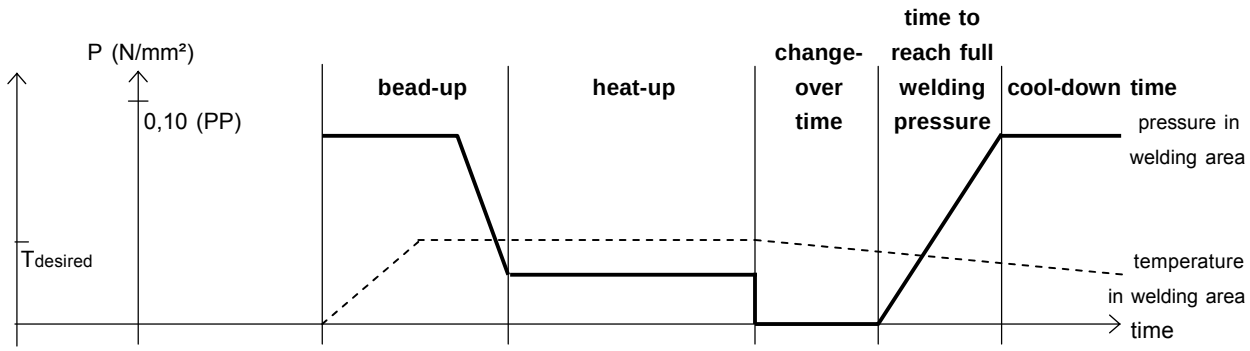
Table for PP

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

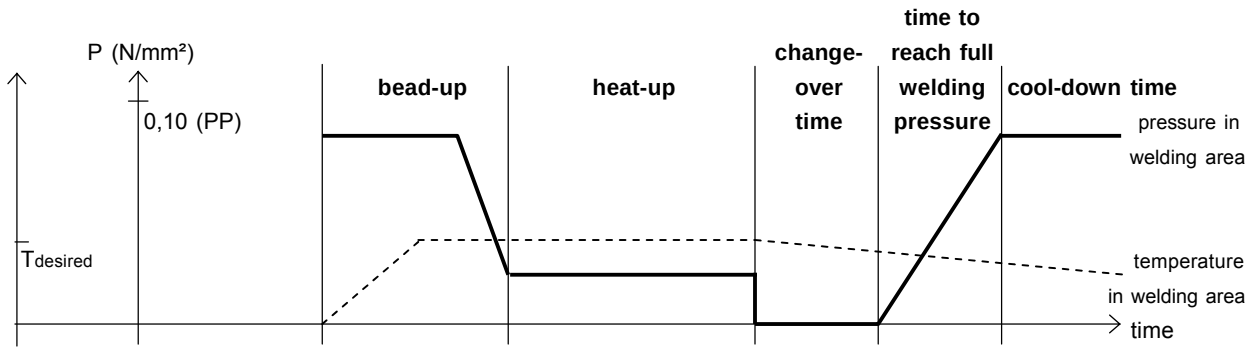
Table for PP

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

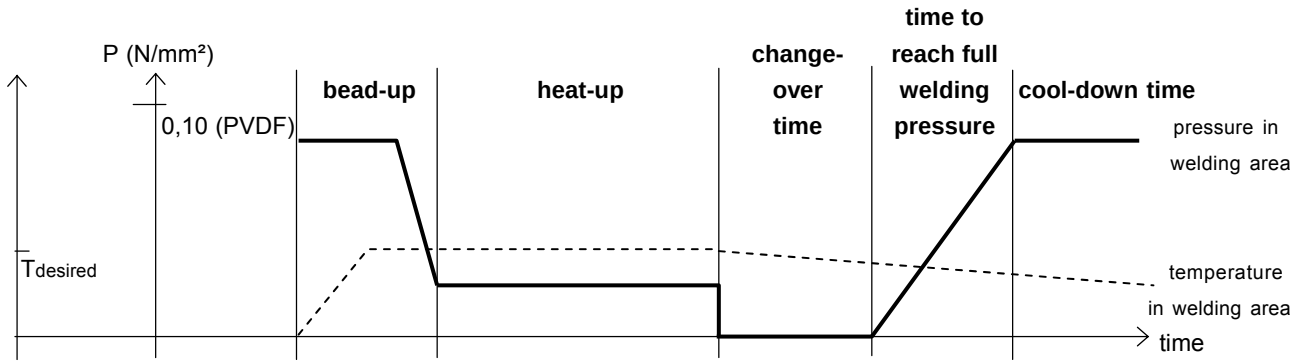
Table for PVDF

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

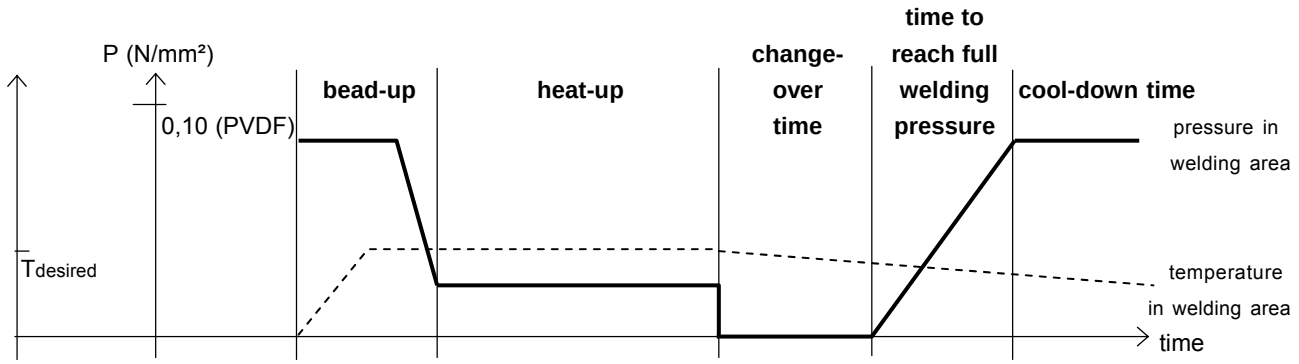
Table for PVDF

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 / storage / transport

7.1. General

- Replace damaged parts immediately, be particularly careful with electrical parts - dirt and wetness are very good current conductors.
- Only use original **WIDOS-spare parts**.
- Check the tightness of all screwed connections **every three month**.

All maintenance and repair works have to be basically performed with the machine in off position.

During this the machine has to be secured against unauthorized switching on.

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 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

Never 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 cuttings: 0.2 mm!).

Check the stress of the drive chain in the planer and grease it regularly. The cover of the planer can be screwed off for this purpose.

7.4. 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.

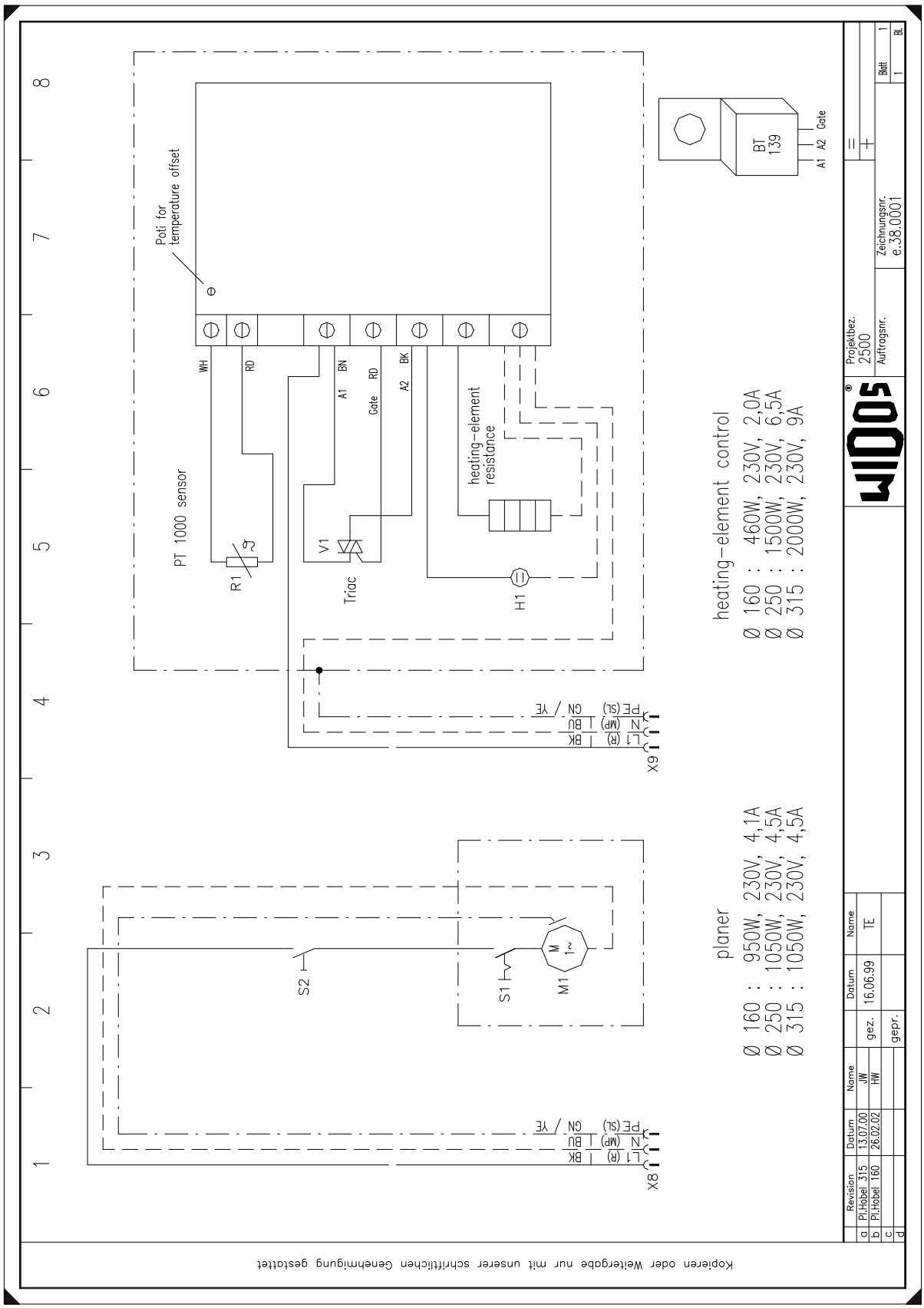
7.5. Transport

- Handle the machine carefully.
- Protect it from heavy vibrations and shocks.

7.6. Disposal

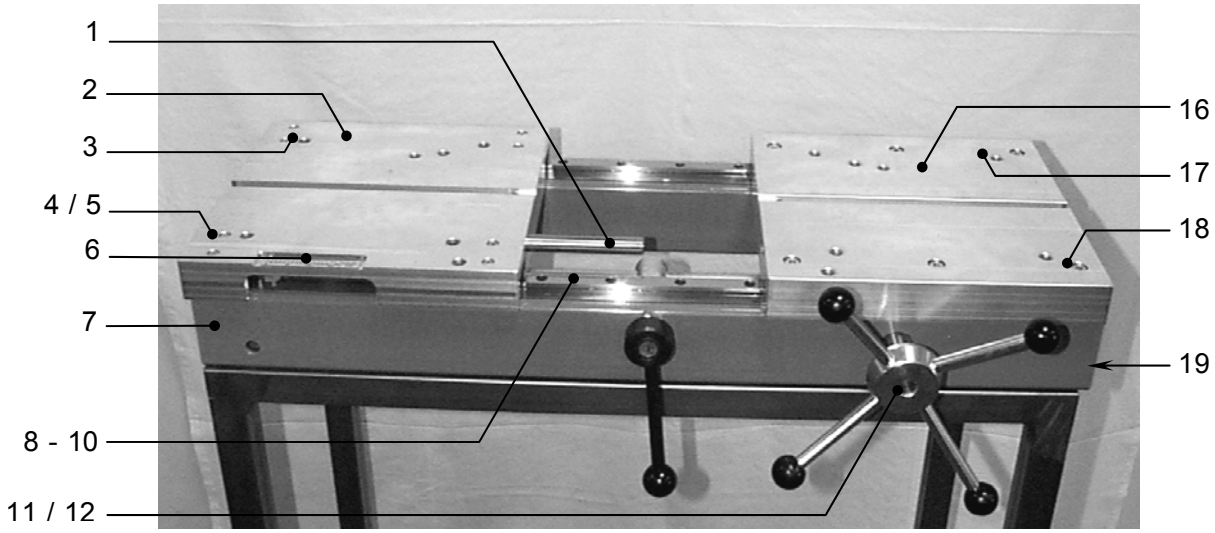
At the end of their life time, the machine and the wear parts have to be disposed of properly and non-polluting, and in accordance with the national laws of waste disposal.

8. Electric diagram

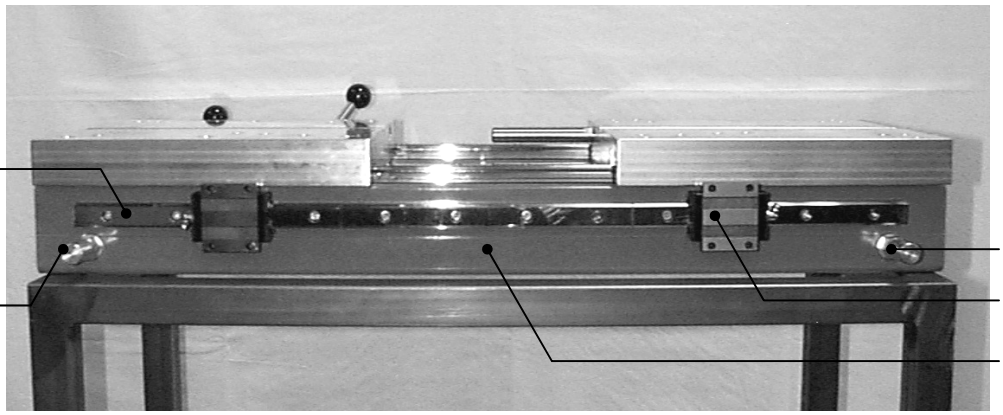


9. Spare parts list

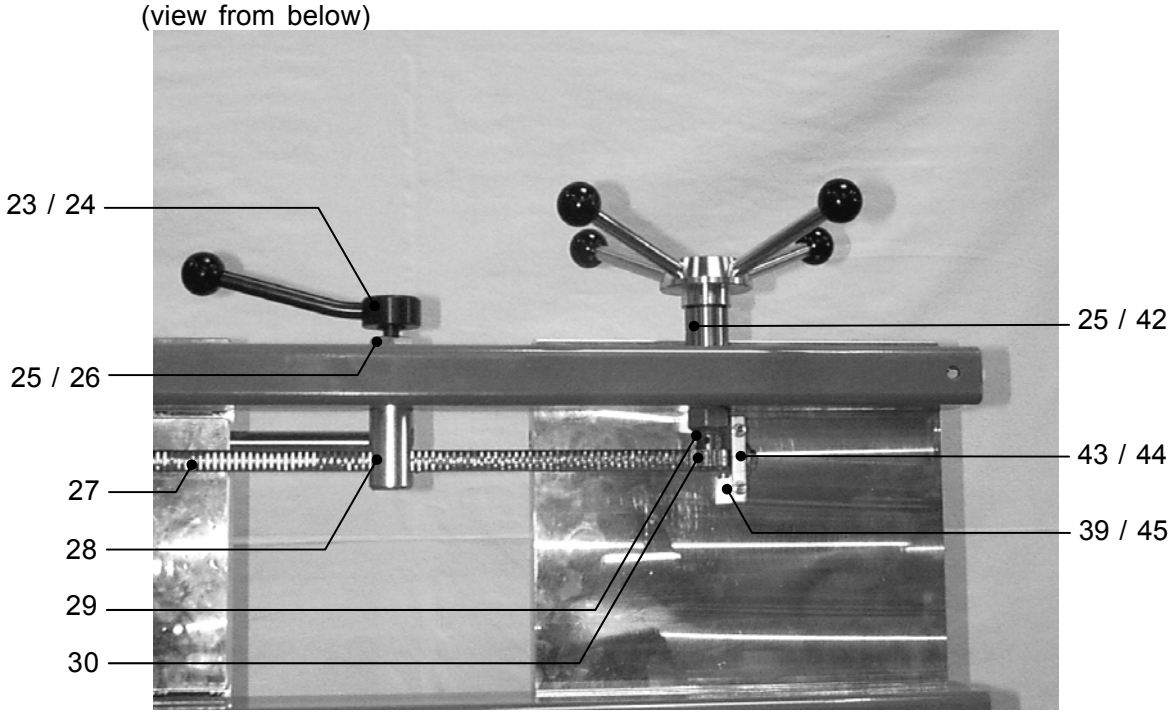
9.1. Basic machine with motion



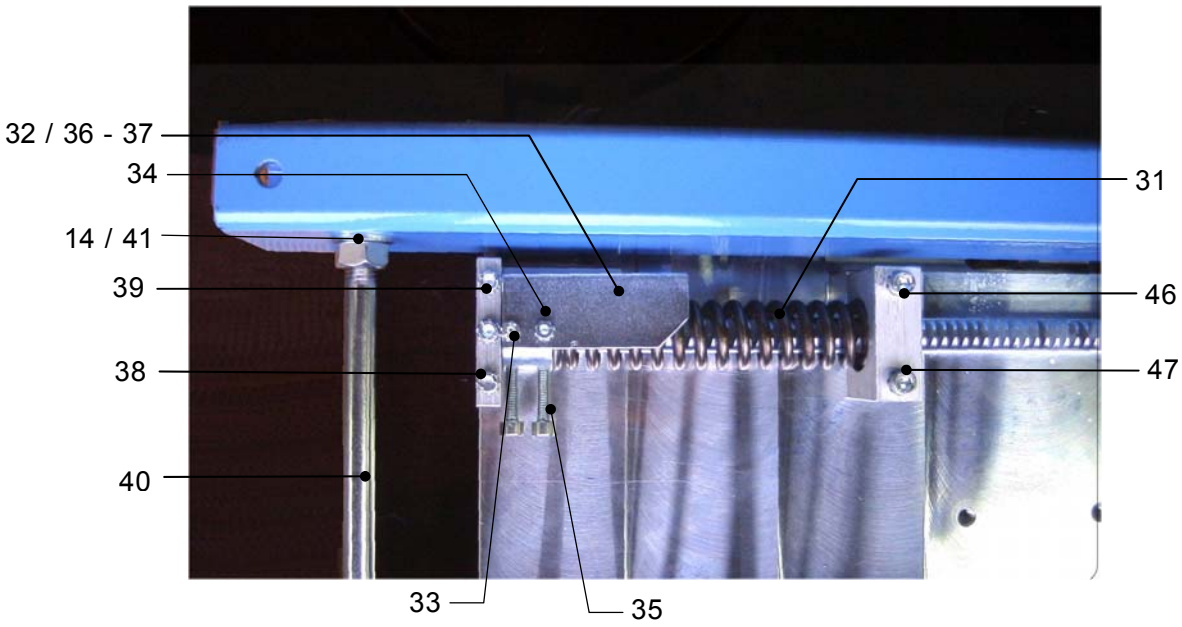
(rear view)



(view from below)



(view from below



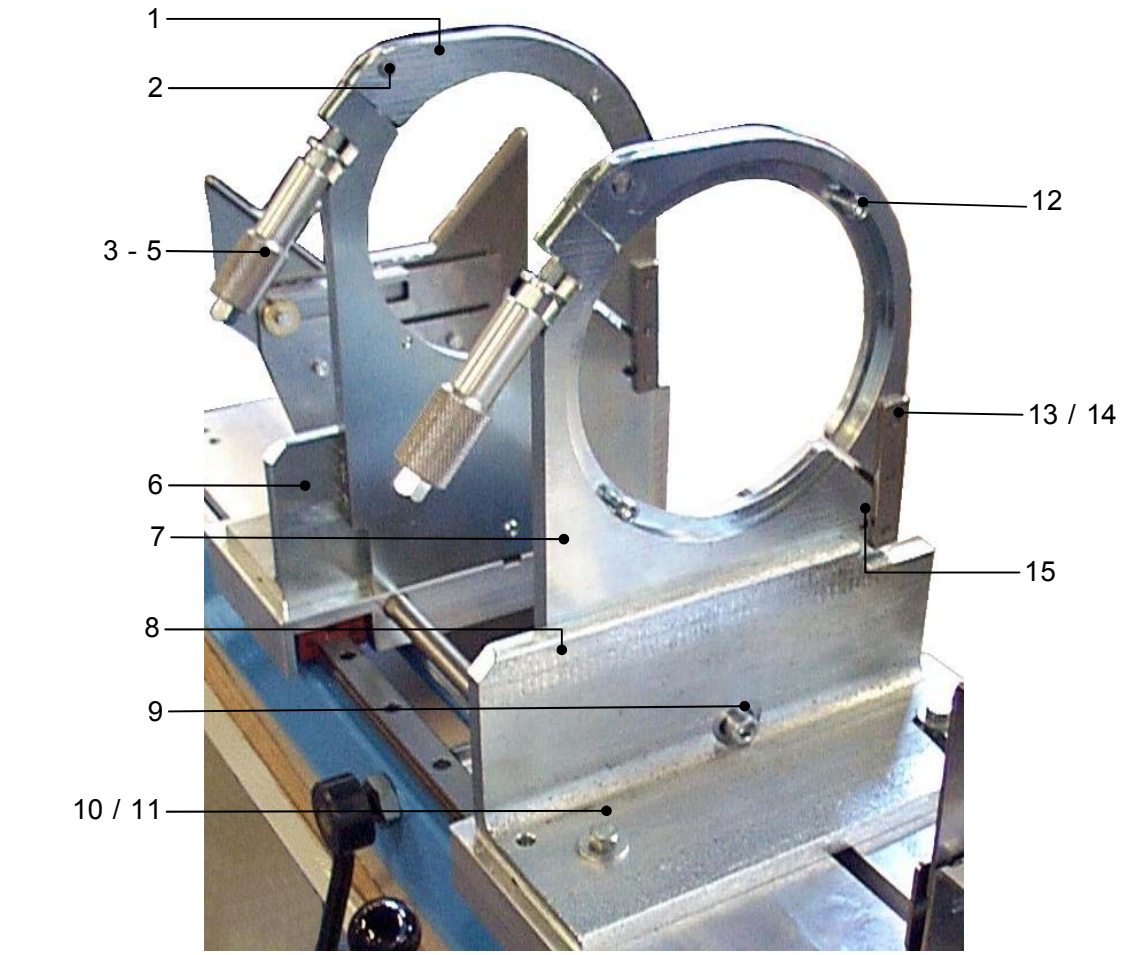
Basic Machine with Motion WIDOS 2500 / OD 160

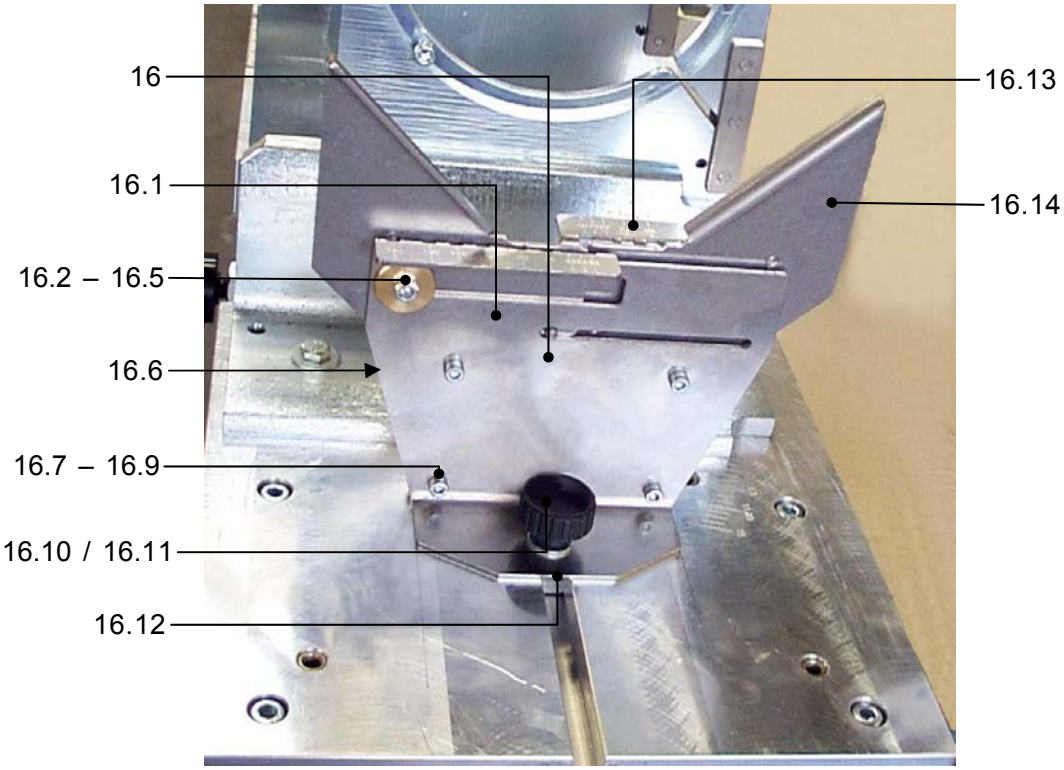
Pos.	*Name*	*Piece*	*Order no.*
1	Bolt for planer fixing device	1	3804081
2	Support, movable	1	380103
3	Thread insert M 8x9	5	GEWK-M8
4	NSK-guide carriage	4	L20CLZ
5	Cylinder head screw M 5x12 DIN 912	8	0912E012
6	Pressure scale	1	380120
7	Rail, frontal	1	380101
8	NSK-guide rail 500 mm	2	L20500
9	Cylinder head screw M 5x16 DIN 912	30	0912E016
10	Cap	30	L20501
11	Cross handle	1	B6516
12	Headless pin M 6x10 DIN 913	1	0913F010
13	NSK-guide rail 700 mm	1	L20700
14	Washer M 12 DIN 125	4	0125L
15	Stop nut	2	380114
16	Support, fixed	1	380104
17	Thread insert M 8x15	9	GEW-M8
18	Cylinder head screw M 8x40 DIN 912	6	0912H040
19	Sealing cap	4	J0204
20	Hexagon head screw M 12x16 DIN 933	1	0933L016
21	NSK-guide carriage	2	L20ELZ
22	Rail, rear side	1	380102
23	Bolt for clamping lever	1	380110
24	Clamping lever	1	BM1240I
25	Nut for toothed rack	2	380109
26	Thrust pad	1	3801101
27	Toothed rack	1	380139
28	Sleeve for toothed rack	1	380108
29	Long-face pinion and gearwheel	1	380106KP
30	Clamping sleeve 3x18 DIN 1481	1	1481C018
31	Pressure spring	1	380135
32	Indicator angle	1	380137
33	Sleeve for indicator angle	1	380138
34	Cylinder head screw M 4x8 DIN 912	2	0912D008
35	Cylinder head screw M 6x30 DIN 912	2	0912F030
36	Hexagon nut M 6 DIN 934	1	0934F
37	Headless pin for indicator angle	1	380116
38	Cylinder head screw M 5x40 DIN 912	5	0912E040
39	Support limit stop, movable	1	3801033
40	Threaded spindle	1	380113
41	Hexagon nut M 12 DIN 934	3	0934L
42	Sleeve for long-face pinion	1	380117
43	Washer M 8 DIN 933	1	9021H
44	Hexagon head screw M 8x12 DIN 933	1	0933H012

Basic Machine with Motion WIDOS 2500 / OD 160

Pos.	*Name*	*Piece*	*Order no.*
45	Bearing support, fixed	1	3801042
46	Bearing support, movable	1	380136
47	Cylinder head screw M 6x40 DIN 912	2	0912F040

9.2. Clamping devices

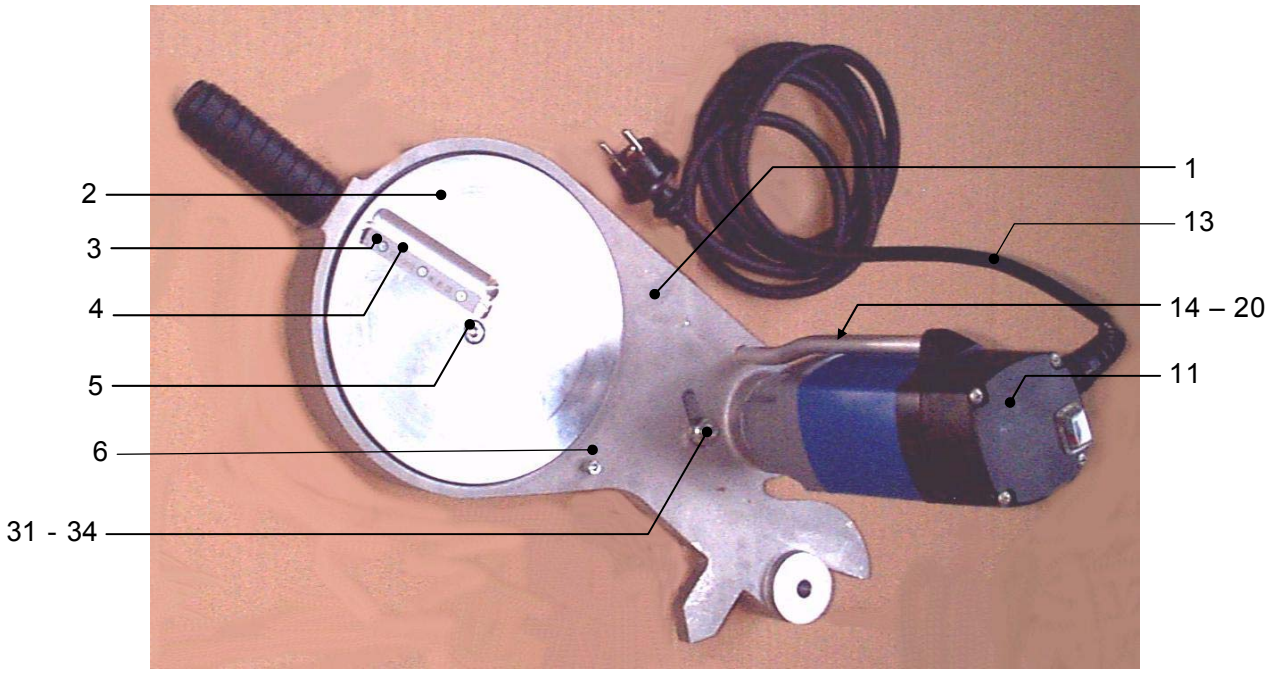




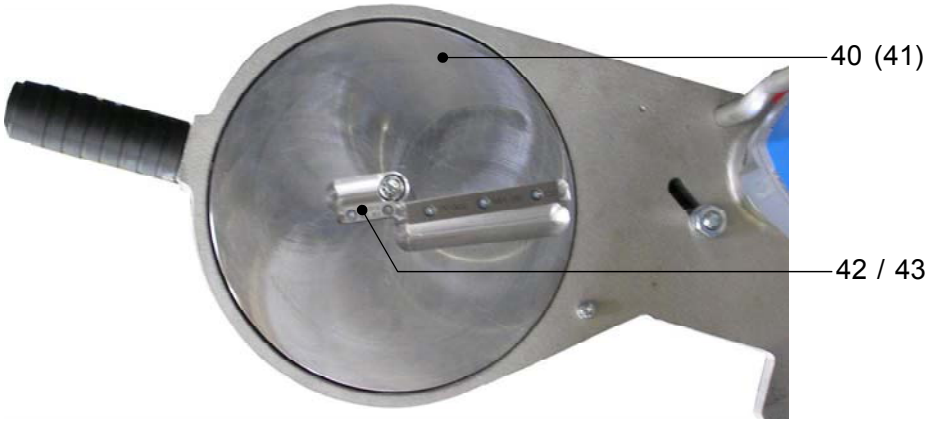
Clamping Devices WIDOS 2500 / OD 50 - 160

Pos.	*Name*	*Piece*	*Order no.*
1	Clamping device, left	1	S0127160L
2	Rivet	2	012705
3	Eye bolt	2	012706
4	Hexagon nut	2	012702
5	Washer M8 DIN 125	2	0125H
6	Angle, left	1	380127
7	Clamping device, right	1	S0127160R
8	Angle, right	1	380126
9	Pan-head screw M 10x25 DIN 912	2	0912J025
10	Hexagon-head screw M 8x20 DIN 933	4	0933H020
11	Washer M8 DIN 9021	4	9021H
12	Pan-head screw M 6x14 DIN 912	4	0912F014
--	Reduction insert, 2 pieces (OD 50 - 140)	2	0128.... *
--	Reduction insert option, 2 pieces (OD 20 - 40)	2	0128.... *
13	Joint shackle	4	012703
14	Spiral pin 4x20 DIN 7343	2	7343D020
15	Dowel pin 4x20 DIN 2338	6	2338D020
16	Pipe support complete	2	3817160
16.1	Holder for pipe support, in front	2	3806312
16.2	Flat head screw M4x12 DIN 7991	4	7991D012
16.3	Sliding washer	4	380635
16.4	Lock washer M4 DIN 137	4	0137D
16.5	Hexagon nut M4 DIN 934	4	0934D
16.6	Intermediate plate	4	380633
16.7	Pan-head screw M4x16 DIN 912	4	0912D016
16.8	Lock washer M4 DIN 137	4	0137D
16.9	Hexagon nut M4 DIN 934	4	0934D
16.10	Knurled screw GN591-32-M10-30	2	on request
16.11	Washer M10 DIN 125	2	0125J
16.12	Sliding block M 10 DIN 508	2	0508J
16.13	Holder for pipe support, behind	2	3806322
16.14	Support for pipes	4	380634
	* When ordering, please state the dimension of the diameter!		

9.3. Planer



(Planer OD 20 – 160 mm option)

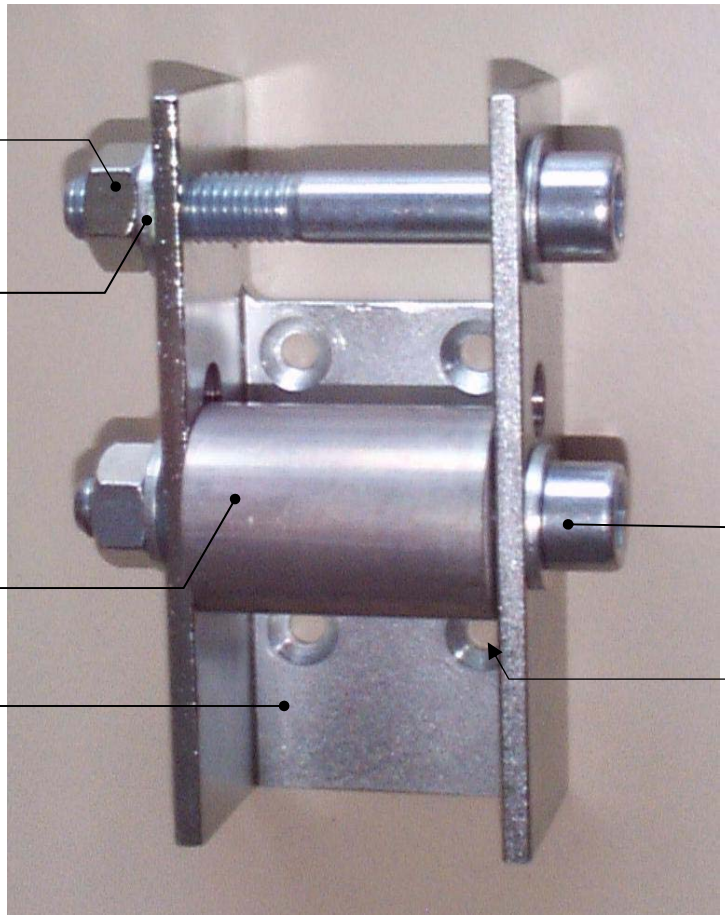


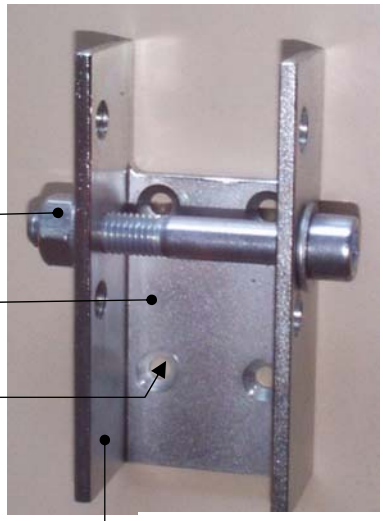
Planer WIDOS 2500 / OD 160

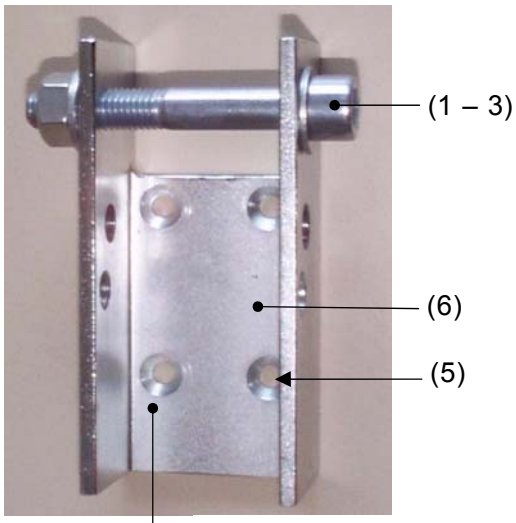
Pos.	*Name*	*Piece*	*Order no.*
1	Holder for planer	1	0124011
2	Planer disk, right	1	012402
3	Flat head screw M 3x8 DIN 965	6	0965C008
4	Blade	2	MES085
5	Pan-head screw M 8x25 DIN 912	1	0912H025
6	Pan-head screw M 5x8 DIN 912	1	0912E008
7	Cover	1	012405
8	Pan-head screw M 8x25 DIN 912	1	0912H025
9	Flat head screw M 3x8 DIN 965 (Torx)	4	0965C008TX
10	Rosette M3	3	ROSM3
11	Driving machine 950 W, 230 V	1	AMBF13
--	Switch for driving motor	1	ESMBF13
12	Chain wheel (small) 11 teeth	1	K38011
13	Connection cable	1	EK3220
14	Cable (l= 0,85 m)	1	EL03075
15	Lustre terminal	2	EA1002
16	Brass screwing Pg7	1	EV0107
17	Hydraulic hose 10x1,5	1	RSR010
18	Bracket	1	EA0307
19	Pan-head screw M 4x5 DIN 84	4	0084D005
20	Pressed cable lug	1	EA0541
21	Grip for planer holder	1	012404
22	Button	1	ES110
23	Synthetic sleeve	1	200407
24	Headless pin M5x8 DIN 913	1	0913E008
25	Planer disk, left	1	012403
26	Ball bearing	1	L6013
27	Chain wheel (large) WIDOS 2500/160	1	012406
28	Flat head screw M 5x12 DIN 7991	4	7991E012
29	Chain 3/8", 85 links for 501, 2500/ 160, 900	1	K38085
30	Chain joint 3/8"	1	KSCH38
31	Pan-head screw M10x50 DIN 7984	1	7984J050
32	Ball bearing	1	L6000Z
33	Washer M10 DIN 125	2	0125J
34	Hexagon nut M10 DIN 934	1	0934J

	Planer OD 20 - 160 (option)		
40	Planer disk, right	1	0124021
41	Planer disk, left	1	0124031
42	Blade	2	MES285
43	Flat head screw M 3x8 DIN 965 (Torx)	2	0965C008TX

9.4. Planer holder



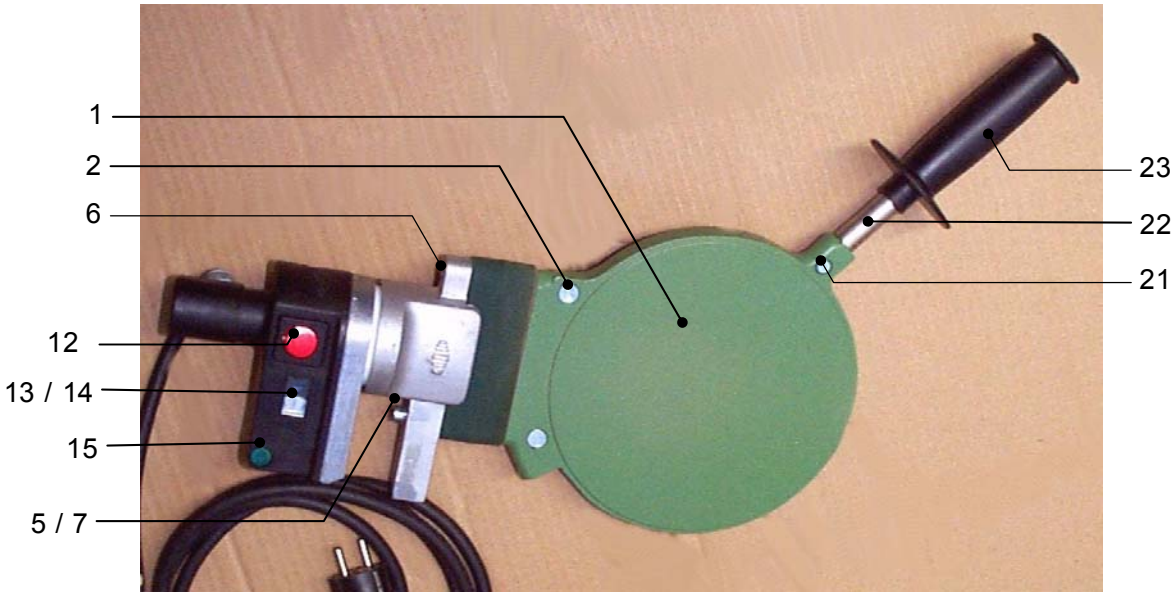


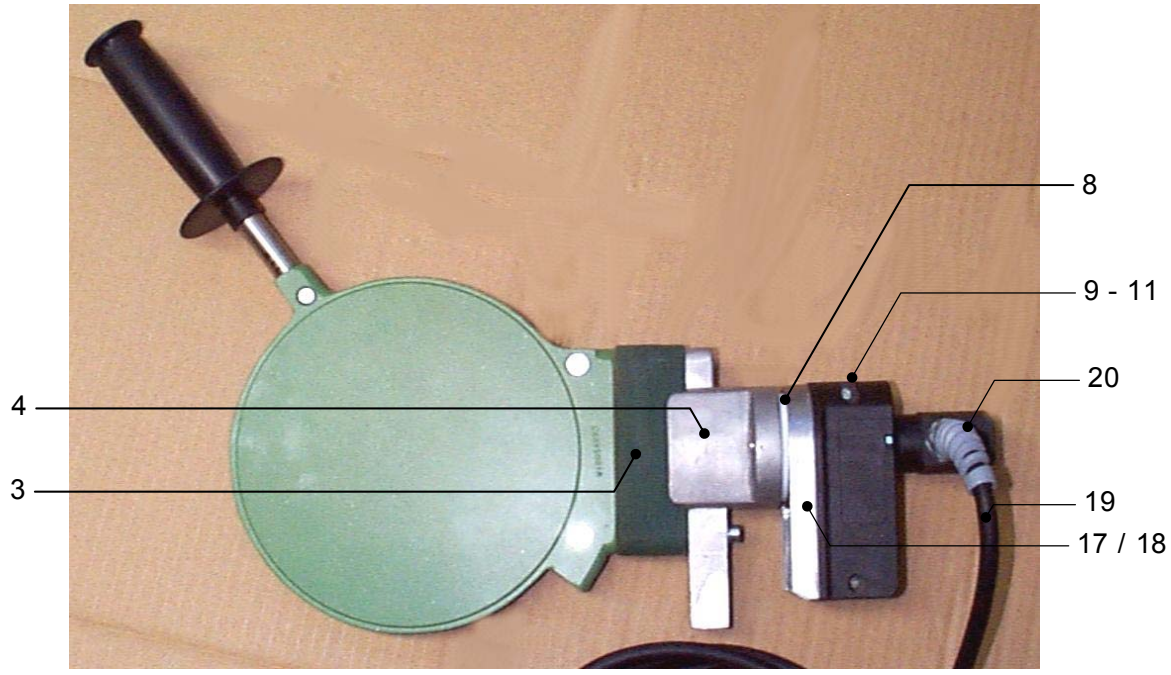


Planer Holder WIDOS 2500 / DA 160

Pos.	*Name*	*Piece*	*Order no.*
1	Washer M 12 DIN 125	4	0125L
2	Hexagon nut M 12 DIN 934	2	0934L
3	Cylinder head screw M 12x80 DIN 912	2	0912L080
4	Distance bushing for end stop of planer	1	380409
5	Pan head screw with low head M 6x14 DIN 7984	4	7984F014
6	U-beam	1	3804041

9.5. Heating element

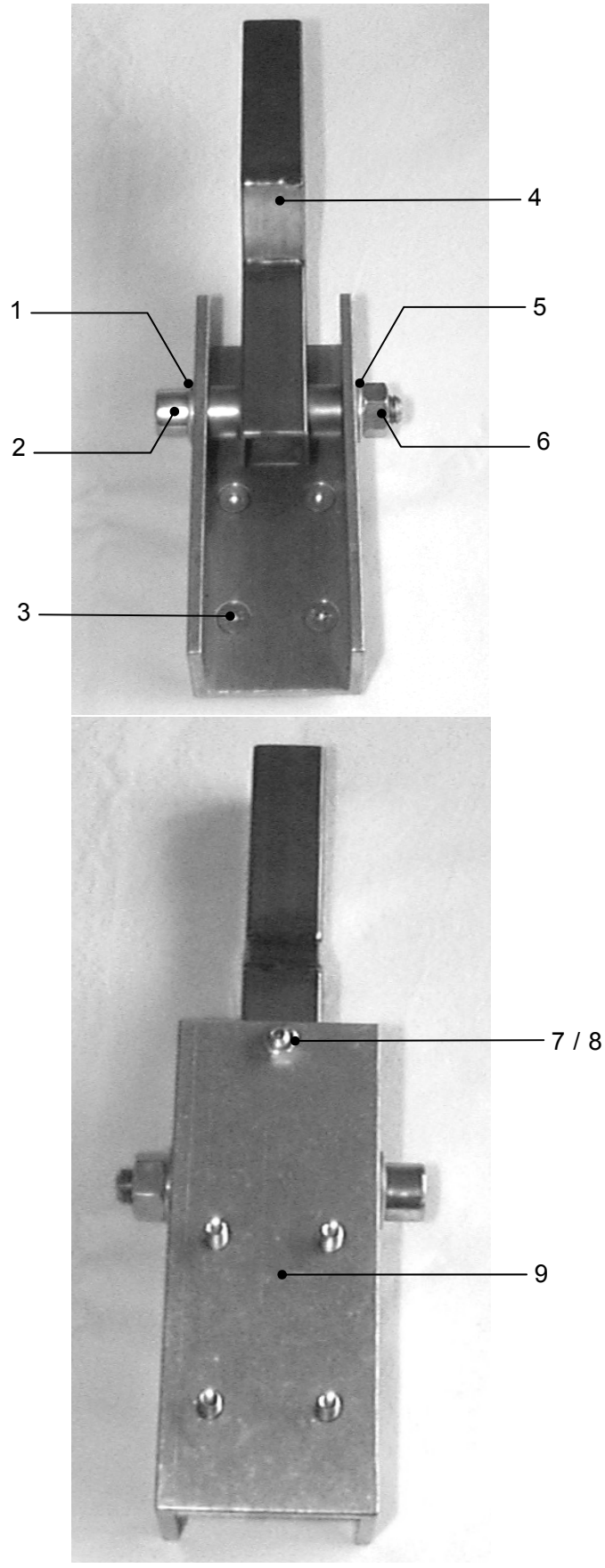




Heating Element WIDOS 2500 / OD 160

Pos.	*Name*	*Piece*	*Order no.*
1	Heating element complete, 800 W, 230 V	1	H0900E
	Heating plate new	1	HP0900E
	Heating plate in exchange	1	HPT0900E
2	Gripping form for joining piece	2	012505
3	Insulating board	2	H0902
4	Joining piece	1	012503
5	Cylinder head screw M 6x90 DIN 912	1	0912F090
6	Cylinder head screw M 6x80 DIN 912	1	0912F080
7	Washer M 6 DIN 125	2	0125F
8	Insulating washer	1	012504
9	Grip housing, short	1	H3807
10	Cylinder head screw M 4x70 DIN 912	3	0912D070
11	Sheet metall screw C 4,8x16 DIN 7981	3	7981E016
12	Rocker switch, red	1	H0903
13	Turning knob with slot	1	H09075
14	Scale 180 - 280° (d 33)	1	H09074
15	Control lamp, green	1	H2105
16	Electronic control GZ4, 230 V	1	H0918220
17	Triac with heat sink	1	H09081
18	Sensor PT 1000	1	H09082
19	Connection cable with plug	1	EK3220
20	Antikink gommet	1	EKT08
21	Gripping form for handlebar	1	HGEW-M6
22	Handlebar	1	3805051
23	Grip	1	H0205

9.6. Heating element holder



Heating Element Holder WIDOS 2500 / OD 160

Pos.	*Name*	*Piece*	*Order no.*
1	Washer M 12 DIN 125	2	0125L
2	Cylinder head screw M 12x80 DIN 912	1	0912L080
3	Pan head screw with low head M 6x14 DIN 7984	4	7984F014
4	Heating element holder	1	380508
5	Washer M 12 DIN 125	1	0125L
6	Hexagon nut M 6 DIN 934	1	0934F
7	Grub screw M 6x14 DIN 913	1	0913F014
8	Hexagon nut M 6 DIN 934	1	0934F
9	U-beam	1	380502

10. Declaration of conformity

In the sense of the EC guideline, EC Machinery Directive 2006/42/EC

Corporation

WIDOS GmbH
Einsteinstr. 5
D-71254 Ditzingen-Heimerdingen

declares under own responsibility that the product

Heating element butt welding machine

WIDOS 2500 / OD 160

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

1. DIN EN ISO 12100 – 1 and 2 (substitute 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, the 20.01.2014

Martin Dommer (Technical director)