WIDOS
W. Dommer Söhne GmbH
Einsteinstr. 5
D-71254 Ditzingen-Heimerdingen
Website: www.widos.de
Phone +49 (0) 71 52 99 39 - 0
Fax +49 (0) 71 52 99 39 - 40
Email: info@widos.de

Kunststoffschweißtechnik

Working Instructions Translation

Heating Element Butt Welding Machine with CNC Control Unit

WIDOS 4600 CNC 3.5

CE

Keep for further use!

Model:	Heating element butt welding machine with CNC control unit
Type:	WIDOS **4600 CNC 3.5**
Serial number, year of construction:	see nameplate

Customer entries

Inventory No.:	
Location:	

Order of spare parts and after sales service:

Address of manufacturer

WIDOS
Wilhelm Dommer Söhne GmbH
Einsteinstrasse 5
D-71254 Ditzingen-Heimerdingen
Phone: ++49 7152 / 99 39 - 0
Fax: ++49 7152 / 99 39 - 40

Address of the subsidiary companies:

WIDOS GmbH
An der Wiesenmühle 15
D-09224 Grüna / Sachsen
Phone: ++49 371 / 8 15 73 - 0
Fax: ++49 371 / 8 15 73 - 20

WIDOS
Wilhelm Dommer Söhne AG
St. Gallerstr. 93
CH-9201 Gossau
Phone:++41 71 / 3 88 89 79
Fax: ++41 71 / 3 88 89 73

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
D-71254 Ditzingen-Heimerdingen

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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 4600 CNC 3.5** has been designed only for heating element butt welding of pipes and fittings made out of the materials PE, PP, and PVDF with their diameter range going from OD_{min} = 75 mm up to OD_{max} = 250 mm in the way as described below.

All use of this machine 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!

The control unit is reliable in the use when it is used according to the prescriptions in connection with a welding machine designed by WIDOS.
Also part of the purpose oriented use is

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

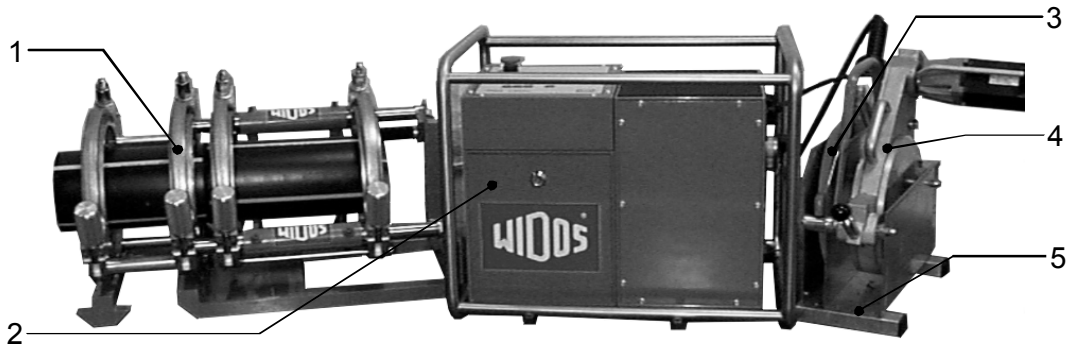
1.2 Safety measures

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 thoroughly 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 Machine overview



No.	*Name*
1	Basic machine
2	Control unit
3	Heating element
4	Planer
5	Reception box

1.5 Structure of the CNC 3.5 control unit

No.	*Name*
6	Display
7	Operation field
8	SD - card

1.6 Designation of the product

The product is designated by type labels.
The type labels are attached at the control unit, at the heating element, at the planer and at the basic machine.
They contain the type, the serial number and the year of construction of the machine.

1.6.1 Technical data

All important technical data of each single component are listed. This allows a quick information about working capacity and structure.

1.6.1.1 **WIDOS CNC 3.5** General data

Weight (without transport box): Dimensions (l x w x h):	40.5 kg appr. 630x430x510 (mm)
Power:	370 Watt
Voltage:	230 V (± 10%)
Current:	3,0 A
Frequency:	50 Hz
Phase shift:	appr. 18°
Control voltage:	5 V
Insulation system:	IP 44
Hydraulic oil tank:	appr. 1 l
Power of emergency set:	4.0 kVA / 230 V/1~
Electro motor and pump:	
Driving speed (t/min):	1340
Max. working pressure of pump:	120 bar
Working pressure:	100 bar
Volume flow:	1.9 l/min.

1.6.1.2 Basic frame

Material of frame:	Construction steel
Material of clamping shells:	Aluminium
Weight:	44 kg
∅ of cylinder / ∅ of piston rod:	35 / 30 mm
Stroke length of cylinder:	150 mm
Max. force: (F=PxA)	5100 N (at 100 bar)
Velocity of piston rod:	6,2 cm/s

1.6.1.3 Heating element

Power:	1.5 kW
Voltage:	230V (± 10 %)
Current:	6.5 A
Frequency:	50 Hz
Outer ∅:	320 mm
Surface:	nonstick-coated
Attached elements:	- Control lamps - Connecting cable with multiple pole plug
Weight:	appr. 6 kg

1.6.1.4 Planer

Motor:	Monophase-alternating current motor
Power:	1050 Watt
Voltage:	230 V (± 10 %)
Current:	3.8 A
Frequency:	50 Hz (± 10 %)
Driving speed n2 of the planer (t/min)	appr. 60
Weight:	appr. 14 kg

1.6.1.5 Automatic heating element (optional)

Power:	1.5 KW
Voltage:	230 V (± 10 %)
Current:	6.5 A (± 10 %)
Frequency:	50 Hz
Outer ∅:	320 mm
Surface:	nonstick-coated
Attached elements:	- Control lamps - Connecting cable with multiple pole plug
Weight:	appr. 17 kg

1.6.1.6 Reception box for automatic heating element (optional)

Weight:	appr. 6 kg

See spare parts list (chapter 10) for order numbers and single parts

1.7 Equipment and accessories

Following accessories are part of the delivery:

1 x	- Key for front plate / hydraulic system
1 x	- SD - card (64 MB memory capacity)
1	Tool bag for 10 parts
je 1	Allan key angle size 5 / 6 / 8
je 1	Allan key with T grip size 4 / 5
1	Socket spanner size 27
1	Torx screw driver T10

Following optional accessories are available on request:

- Program WICON for reading out the data (possibility of displaying included in SD-card)
- Automatic heating element

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 sSymbols and indications

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

This symbol means a possible 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 light 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 dangerous situation by moving parts of the machine
- The disrespect of these indications may cause heavy crushings of parts of the body resp. damages of parts of the machine.

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 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.

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 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

- 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.
- Only skilled and trained persons are allowed to work at the machine.
- 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 heating element butt welding machine **WIDOS 4600 CNC 3.5** 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 should 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.

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.

- All electric tools (heating element, planer, basic machine with clamps and control unit) have 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.
- Replace damaged front foil at the control unit in order to avoid water coming in.

System parts and pressure hoses should be depressurized before beginning of any repair works.
There is a danger of injuring the eyes by hydraulic oil squirting out. The hydraulic oil can be hot !

- Damaged hydraulic hoses have to be immediately replaced.
- Make a visual inspection of the hydraulic hoses before each work beginning.
- The hydraulic oil is inedible !
- The hydraulic oil has to be handled and disposed of **properly**.

2.8 Specific dangers

2.8.1 Danger of stumbling over hydraulic and electric wires

Make sure that nobody has to step over the cables.
Make sure that the cables lay in such a way that the danger is maintained in a minimum. Do not squeeze, buckle, etc. the cables. Avoid the hydraulic cables from being heated up (increase of pressure !).

2.8.2 Danger of catching clothes by the planer

You can cut yourself or even get bones broken !
For some machines the planer may shortly turn when switching the machine on !

- Only wear clothes tight to the body.
- Do not wear rings or jewellery during the work.
- If necessary wear a hair-net.
- Always put the planer back into the reception box after and before each use.
- Only transport the planer at the handle. Do not touch the surfaces.

2.8.3 Danger of combustion by heating element and welding area

You can burn parts of your body and inflammable materials can also be ignited !
The heating element is heated up to more than **200°C** !

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

2.8.4 Danger of squeezing by clamping devices and guideways

There is a danger of serious injuries: on the one hand between the inner clamping devices and on the other hand between the outer clamping device and the end of the guideway.

- Do not stand or put hands between clamped pipe ends.
- Do not stand or put hands between the inner clamping tools with not yet clamped pipes.
- Do not block opening and closing of the machine sledge.

2.9 Structural modifications on the machine

- No modifications, extensions or reconstructions may be made on the machine without permission of the manufacturer. In case of non-compliance, any claims to warranty or liability are excluded.
- 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 and version number !

2.10 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 building-up, starting, operating, maintenance and transport 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

The WIDOS **CNC 3.5** control unit performs a butt welding process with the plastic welding machine WIDOS **4600** after entering the type of material, the pipe diameter and the pipe wall thickness.

The welding processes are recorded and can be saved on a SD-card.

The corresponding pipe data are entered manually through the operation field.

Welding with the WIDOS **4600 CNC 3.5** works as follows:

The plastic pipes are clamped by means of the clamping devices (basic machine) and the pipe ends are cut plane and parallel by means of the planer.

As soon as the pipes are plane (i.e. a circulating cutting has been produced) and parallel and the misalignment is smaller than 0,1 X pipe wall thickness you can start welding.

The heating element has to be cleaned and checked before insertion and the desired temperature prescribed by the DVS must have been reached.

The clamped pipes drive under pressure in direction of the heating element and are heated up under the defined adjustment pressure (**adjusting**), the duration of the adjustment is called **adjusting time**.

During the adjustment the **bead** prescribed by the DVS is performed.

After reaching the prescribed bead height, the control unit automatically switches into the **heating time**.

During the heating time the basic machine is in a depressurized state and the pipe ends are heated.

After expiration of the heating time, the sledges move apart and the heating element should be removed as fast as possible.

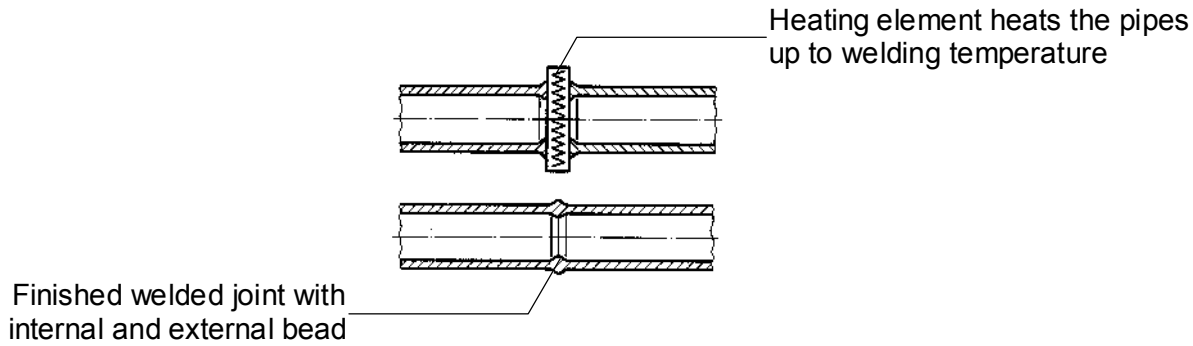
The time period between the removal of the heating element and the closing of the pipes is called **change over time**.

After the maximum time prescribed by the DVS, the pipe ends are driven together and a continuous welding pressure is built up.

The pipe then cools down under the prescribed welding pressure (**cooling time**).

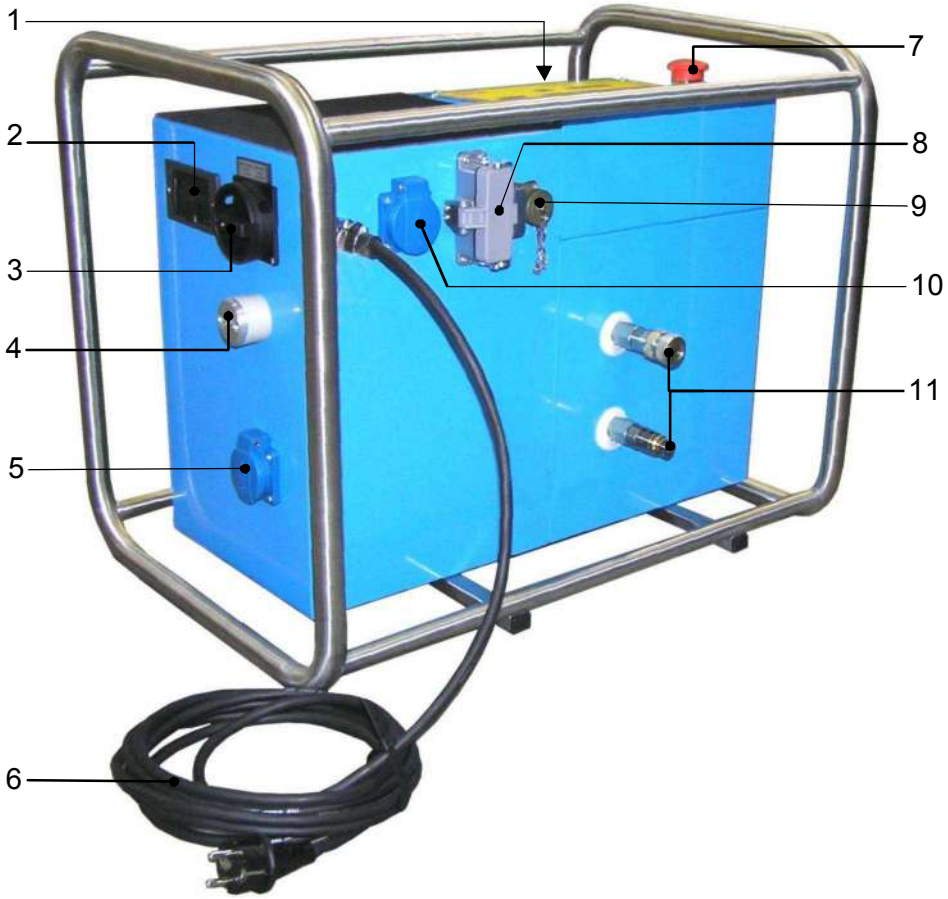
After completion of the cooling time, the pressure on the pipe is automatically released and the welded pipe can be unclamped.

The welding process is completed.



4. Operating and indicating elements

4.1 Elements on the CNC 3.5 control unit



No.	*Name*
1	Operation field with display
2	Reading unit for SD - card
3	Main switch
4	Outside temperature sensor
5	Plug box (fuse protection 1 A)
6	Mains connection cable for the control unit
7	EMERGENCY-Stop push button
8	Plug box with safety stirrup for heating element
9	Connection for the travel sensor
10	Plug for planer
11	Connections for hydraulic hoses

4.2 EMERGENCY-Stop push button

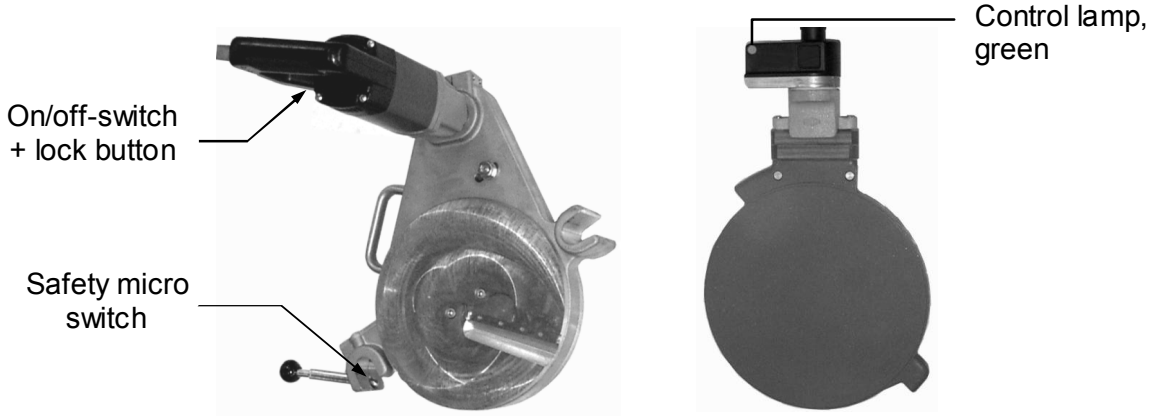
There is an EMERGENCY-Stop push button (see chapter 4.1 / No. 9) on the CNC control unit, for interrupting the working process if the work piece, tools or persons are endangered by the working pressure.

- The EMERGENCY-Stop push button snaps when it is operated.
- In case the EMERGENCY-Stop push button was pushed, the system is pressure-less and the sledge can only be moved manually.
- After elimination of the danger the EMERGENCY-Stop push button must be unlocked again by turning it in clockwise direction and the functions of buttons <+> and <-> (open and close the sledge) are possible again.

There is a high risk of being burnt since the heating element cools down very slowly.

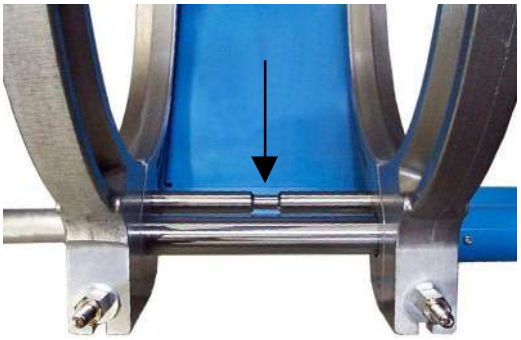
- Switch the machine off and on again over the main switch to return to the welding operation.

4.3 Elements on planer and heating element



Name	***Function***
Safety micro switch (Planer)	- The planer starts only when the safety micro switch is pressed. - Locking device of the planer
On/off-switch (Planer)	- During the planing process, the planer has to be switched on at the switch and its corresponding lock button. The planing process is operated by the CNC control.
Control lamp green (Heating element)	There are 3 different states: • **lightening,** only interrupted by short switch-off pulses: the heating element is being heated up, the desired temperature is not yet reached. The desired and the actual temperature are displayed alternating on the display of the control. • **blinking:** the temperature of the heating element is maintained by a pulse-position ratio. • **off:** the desired temperature has been exceeded, the heating element is cooled automatically onto desired temperature, or the heating element is switched off.

4.4 Separating device for heating element



There is a tear-off bar mounted between the movable and the fixed clamping shells on the basic machine. It prevents the heating element from sticking to the heated-up pipe ends.
When inserting the heating element take care that it lies in the zone of the throat of the tear-off bar (see arrow).

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 Safety indications

- 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 EMERGENCY-Stop push button or the main switch have to be activated 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.
- According to VDE 0100, the use on construction sites is only allowed with a power distributor with a FI-safety switch.

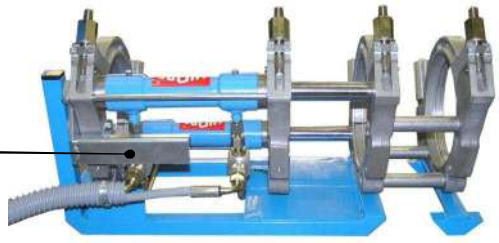
Check the oil level of the hydraulic system before each starting of the control unit in order to avoid damages on the pump.
If necessary, add hydraulic oil of the quality HLPD 32

The heating element surfaces must be clean, 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 – cleaning agent or pipe cleaning tissues which are available at the WIDOS company).
The anti-adhesive coating of the heating element must remain undamaged in the working area.

Take care that all hydraulic and electric connections are connected.

Never lift or transport the basic machine at path measuring system!

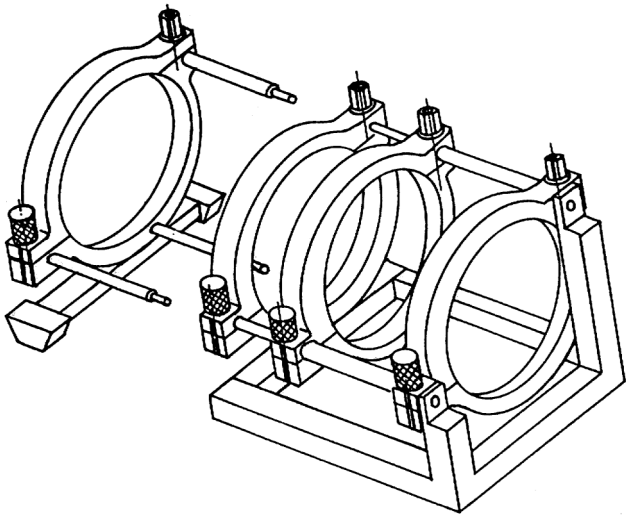
Path measuring system



- 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.

5.2 Replacing the reduction inserts

- Unscrew the mounted reduction inserts.
- Screw the reduction inserts with the corresponding diameter into the clamping devices.
- If necessary (e.g. for T-pieces) the outer fixed clamping device can be dismantled by unscrewing the three hexagon socket screws.

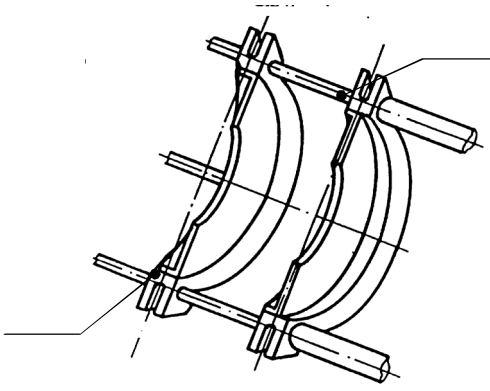


Dismantling of the outer fixed clamping device

5.2.1 Using narrow and large reduction inserts

Small Reduction Inserts:

- Pipe fittings often have only a short straight surface area on which they can be clamped.
- Fittings mostly need to be clamped in the inner clamping devices with the small reduction inserts.
- When fittings are to be welded (bends, T-pieces etc.), the inner small reduction insert can also be used flush to the inside or to the outside.



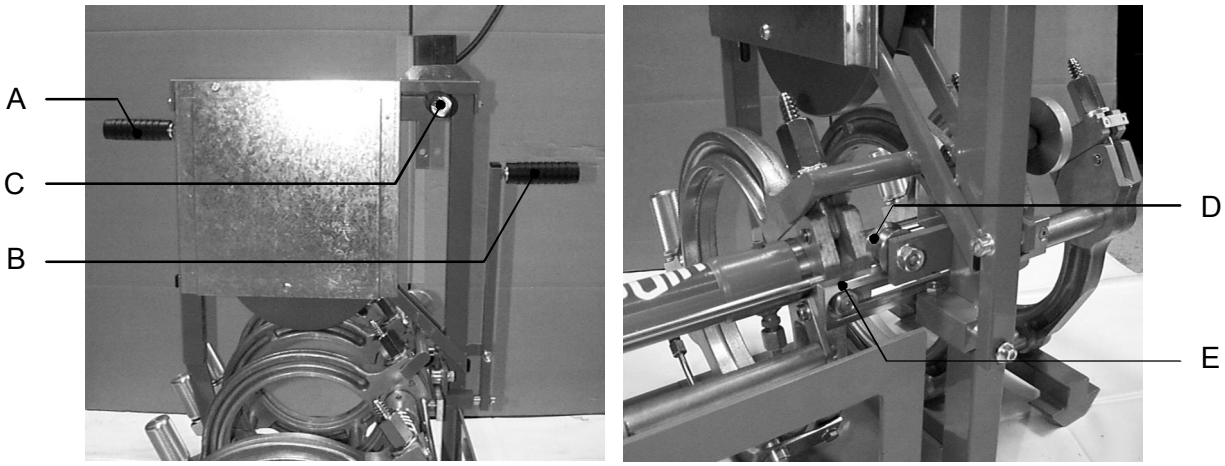
Shown here:
Small reduction insert,
flush to the inside
(for bends, T-pieces)

Large reduction inserts:

- They are mainly used for a good tightening and are generally mounted on the inner clamping devices.

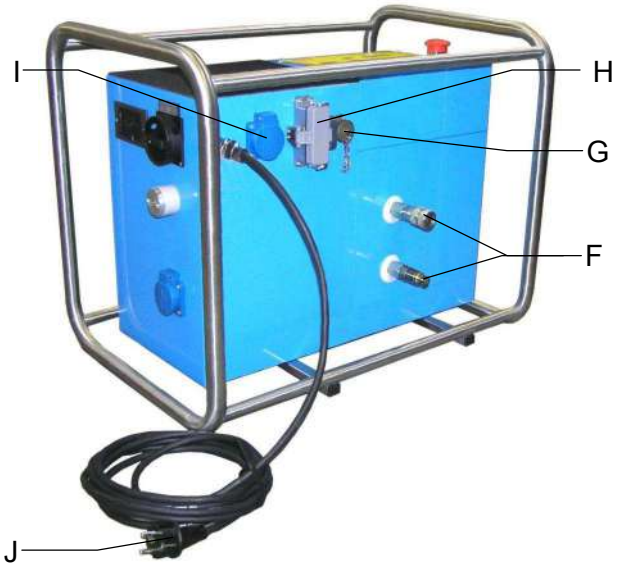
Extra large reduction inserts have a especially high guidance quality and are mainly used during the welding of fittings with long legs which can only be clamped with a single clamping device.

5.3 Automatic heating element (optional)



For inserting the heating element, please use in any case the handle provided for this purpose (A and B).
Pressing the handle (B) in the direction of the heating element plate will lock or release the heating element in the heat protected box or on the basic machine. The rollers (D) have to be supported on the guideway (E) before the heating element is locked by releasing the handle (B).
For welding, the heating element is pressed downwards by means of the handles (C) (sledges must not be opened completely).
After expiration of the adjusting or heating time, the heating element is unlocked by opening the sledge and is moved automatically out of the basic machine.

5.4 Connection with the basic machine



- Connect the hydraulic hoses and travel measuring systems of the basic machine at the CNC 3.5 (Pos. F and G) .
- Connect the heating element at the CNC 3.5 (Pos. H) by means of the special plug and secure it by means of the safety stirrup.
- Connect the planer to the corresponding plug box of the CNC 3.5 (Pos. I).
- Connect the power line plug of the CNC 3.5 to the mains, and be sure to have a correct mains voltage (230 V / 50 Hz).

5.5 Operation with emergency power supply

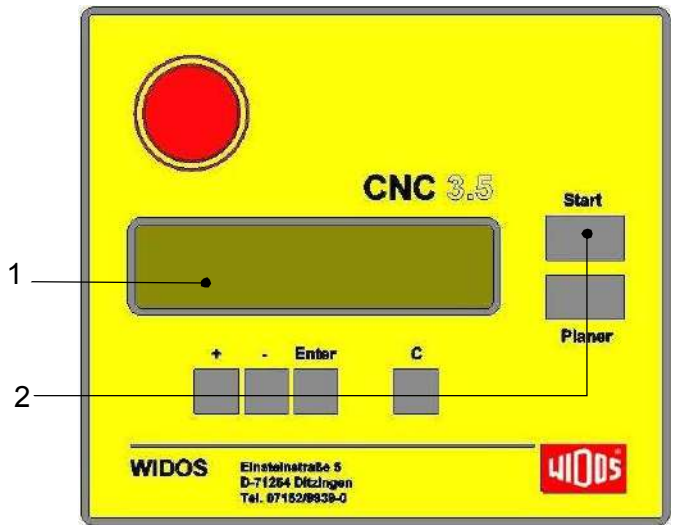
Do not connect any other current consumers to the emergency power supply.
Current consumers, such as drilling machines, fluorescent lamps or motors, can generate spikes (more than 1000 V) which can **disturb the welding process** and might **destroy the welding aggregate** !

The emergency power supply should be maintained periodically.

For further details see the working instructions of the emergency power supply.

Important: first start the emergency power supply and then the other current consuming devices.

5.6 Description of the display



No.	*Name*	*Function*
1	Display	• shows the required parameters (for welding and programming) • 3 values can be displayed simultaneously
2	Buttons	• Setting the pipe data and the project number • Setting the machine type • Setting the welding parameters • Saving and printing the welding data • Diagnostics menu

5.7 SD – card and drive

The unit CNC 3.5 has a drive for a SD - card.

The machine stores the welding data in the internal memory as well as on the SD – card if a card is in the drive.

On a card with 64 MB memory capacity, the welding data of about 32000 weldings can have place.

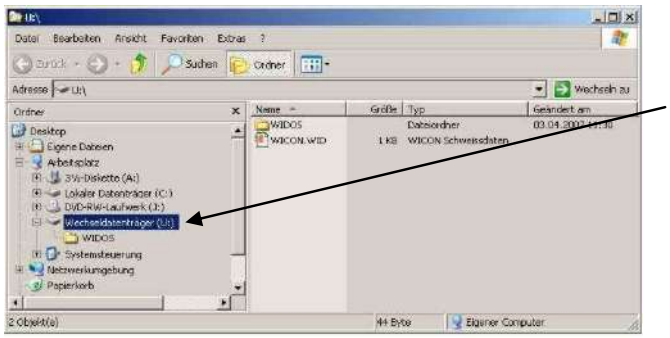
- The SD - card must be formatted by **"FAT 16"** necessarily before usage.
- Insert the card with its inscription to the top **carefully** and with low force into the reading unit.
- The card can be read out with a WICON program.
- The card may not be bent, opened, overheated and become wet!

Please only use SD cards purchased from WIDOS. We will not be liable for any cards from other manufactures!

5.8 Read-out WICON with USB card reader

You may read out the welding data onto a PC by the USB card reader.
Remove the card from the SD card drive of the CNC - aggregate.

Remove the rear cap and plug card according to the image into the USB card reader.
Remove the front cap and plug USB card reader into the USB interface in your PC.



As soon as the USB card reader has been plugged, it appears as removable medium in the drive list.
Open the WIDOS folder, there you will find:
- WICON2000 viewer for considering and printing the welding data,
- working instructions for WICON2000 viewer as PDF file.

5.9 Switching the CNC 3.5 on

As soon as the control unit **CNC 3.5** is connected to the mains and switched on at the main switch, the display is lightened (the computer is being initialised).

Display:
2. line:

```
    WIDOS GmbH
     Germany
```

after a few seconds, the display changes

Display:
2. line:

```
version: 0.00.00
serial no: 0000000
```

Number of the software version
Serial number of the machine

after a few seconds, the display changes

Display:
2. line:

```
000 free weldings
0000       SD-card
```

Number of free memory capacity (RAM)
Number of free memory capacity SD - card

after a few seconds, the display changes

Display:
2. line:

```
WIDOS 4600 CNC
welcomme XXX
```

after a few seconds, the display changes

Display:
2. line:

```
initial position
```

button <Start> → machine moves into initial position

Display:
2. line:

```
   WIDOS 4600 CNC
22.11.2000 10:10
```

The type of the machine is displayed
Current date and time

„Basic menu“

5.10 Programming and welding

As soon as the control unit CNC 3.5 is switched on, you can start welding.

Display:
2. line:

```
   WIDOS 4600 CNC
22.11.2000 10:10
```

Basic menu
Current date and time

In the basic menu, following functions are possible:

button <+> and <–>: moving the sledge
button <Enter>: menu / setting
button <Start>: welding process

5.10.1 Setting the pipe data

Display:
2. line:

```
   WIDOS 4600 CNC
 22.11.2000 10:10
```

basic menu

button <Enter>: menu / setting

Display:
2. line:

```
mat  diam wall temp
PE80  225  20.5  206°
```

The last welding parameters are displayed

button <+> or <–>: select material
button <Start>: confirm and jump to the next parameter

Display:
2. line:

```
mat  diam wall temp
PE80  225  20.5  206°
```

button <+> or <–>: change the diameter
button <Start>: confirm and jump to the next parameter

Display:
2. line:

```
mat  diam wall temp
PE80  225  20.5  206°
```

button <+> or <–>: change the wall thickness
button <Start>: confirm and jump to the next parameter

Display:
2. line:

```
mat  diam wall temp
PE80  225  20.5  206°
```

Display of the heating element temperature calculated according to the prescriptions of the DVS.

button <Start>: back to basic menu

Display:
2. line:

```
   WIDOS 4600 CNC
 22.11.2000 10:10
```

basic menu

5.11 Welding process

The basic machine is connected with the control unit **CNC 3.5**, the planer and the heating element.

The control unit **CNC 3.5** is switched on and set.

Now you can start the welding process. Please proceed as follows:

Display:
2. line:

```
  WIDOS 4600 CNC
22.11.2000 10:10
```

The type of the machine is displayed
Current date and time

button <Start>: menu welding parameters

Abort with button <C> if need be → basic menu

Display:
2. line:

```
mat  diam wall temp
PE80  225  20.5  206°
```

The welding parameters to be used for the following welding are displayed

❷ button <Start>: confirm welding parameters

Abort with button <C> if need be → basic menu

Only appears in case shortened cooling time is entered (Chapter: 5.14.4)

Display:
2. line:

```
Attn! shortened
cooling time
```

In case you have selected shortened cooling time, it is reduced by appr. 40% compared to the one of DVS.

Activate the shortened cooling time with button <+>
Abort with button <C> if need be → basic menu

Display:
2. line:

```
name of project
WIDOS .....
```

Enter name of project

button <+> and <->: select letters
button <Enter>: cursor jumps for 1 position to the right
button <Planer>: 5 storage locations for projects can be called
(when a new project is created, the oldest one is overwritten)
button <Start>: confirm
Abort with button <C> if need be → basic menu

Display:
2. line:

```
number of joint
0000
```

Number of joint of the selected project
Enter and display the number of joint

button <+> and <->: select numbers
button <Enter>: cursor jumps for 1 position to the right

button <Start>: confirm

Abort with button <C> if need be → basic menu

Display:
2. line:

```
weather    protect
  34         31
```

Weather character and protective measures to be taken (according to prescriptions of the DVS).

Weather character	Protective measures
1 = sunny	1 = none
2 = dry	2 = umbrella
3 = rain or snowfall	3 = tent
4 = wind	4 = preheat
In case of multiple statement respect the above mentioned order of the numbers (e.g.: 24 = dry and wind)	

Setting the weather data: numbers by pressing buttons <+> and <->
for 1 pos. to the right by pressing button <Enter>
confirm by pressing button <Start>

Abort with button <C> if need be → basic menu

Display:
2. line:

```
opening machine
```

This message appears only if the machine is not opened completely

button <Start>: confirm (sledge opens)

Display:
2. line:

```
insert pipes
clean pipes
```

Insert, clean and clamp the pipes

button <Start>: confirm

Display:
2. line:

```
closing machine
measuring dragpress.
```

The sledge opens and closes several times the dragpressure is measured herewith

after a few seconds, the display changes

Display:
2. line:

```
closing machine
calibrating
```

Sledge closes
Pressure systems is calibrated

after a few seconds, the display changes

Display:
2. line:

```
opening machine
```

Sledge opens

after a few seconds, the display changes

Display:	insert planer
2. line:	start planer

❶ Suspend the planer into the basic machine, keep button <Planer> pressed until **a circular chip running 2-3 times around the pipe ends is formed** and the pipe ends are plane

Display:	planer working	During the planing process, the desired, actual and drag pressures are displayed
2. line:	Ps=000 Pi=000 P▯=0.0	

after a few seconds, the display changes

Display:	alignment check
2. line:	start planer

Take planer out of the machine, remove chips without touching the worked surface

button <Start>: alignment check is started

Display:	closing machine	Sledge closes
2. line:		

after a few seconds, the display changes

Display:	confirm alignment	Keep pressed button <+> to check the pressure build-u (e.g. whether pipes slip through)
2. line:	test pressure	

If the alignment of the pipes is correct, confirm with button <Start>.
The misalignment may not be higher than 10 % of the wall thickness.
If the misalignment is too high, re-adjust the pipe ends in the basic clamping devices and repeat the planing process.

Display:	opening machine
2. line:	

after a few seconds, the display changes

Display:	insert heating elem.	Button <Start>
2. line:	repeat planing	by pressing the button <Planer>, the planing process is repeated ❶

Insert the heating element in the machine and make sure that it is lying in the necking of the tear off rod, (Chapter 4.4), then press button <Start>

Display:
2. line:

```
closing machine
measuring dragpress.
```

after a few seconds, the display changes

Display:
2. line:

```
bead up
Ps=000 Pi=000 P▯=0.0
```

The bead up pressure is displayed

Display shows alternating bead up pressure and heating element temperature

Display:
2. line:

```
bead up
heat.elem.t. 000°C
```

The heating element temperature is displayed

after the bead height being reached, the display changes

Display:
2. line:

```
heat up Taw= 0000s
heat.elem.t. 000°C
```

Remaining heating time
Heating element temperature

5 seconds before end of the heating time you will hear several beeps

Display:
2. line:

```
change over
remove heating elem.
```

Take heating element out of the machine

after a few seconds, the display changes

Display:
2. line:

```
change over
```

after a few seconds, the display changes

Display:
2. line:

```
ramp Tf= 000s
Ps=000 Pi=000 P▯=0.0
```

Remaining pressure build-up time (sec.)

after a few seconds, the display changes

Display:
2. line:

```
cooling Tk=00:00
Ps=000 Pi=000 P▯=0.0
```

Remaining cooling time (min and sec)

After expiration of the cooling time you will hear 5 beeps

Display:
2nd line:

```
SD-card    0000
```

The welding is stored on the SD - card

after a few seconds, the display changes

Display:
2nd line:

```
remove pipes
parameter OK
```

Or: welding is finished with shortened cooling time:

Display:
2nd line:

```
shorten cooling time
parameter OK
```

Welding completed, unclamp the pipes
button <Start>: back to basic menu

Display:
2nd line:

```
   WIDOS 4600 CNC
 22.11.2000 10:10
```

Basic menu
Current date and time

5.11.1 Welding process with traceability

Display:
2. line:

```
   WIDOS 4600 CNC
 22.11.2000 10:10
```

The type of the machine is displayed
Current date and time

button <Start> to confirm

Display:
2. line:

```
please read pipe
code (1st pipe)
```

Simultaneously pres all buttons <+ / - / Enter>.
Then manually enter barcode of 1st pipe: Select first digit with <+/-> and jump to the next digit with <Enter>.

Display:
2. line:

```
Traceability 1:
RB PE80  160  9.1
```

The pipe data is displayed

After e few seconds, the display changes

Display:
2. line:

```
please read addit.
pipe code (2nd pipe)
```

Read with bar code reader

Simultaneously pres all buttons <+ / - / Enter>.
Then manually enter barcode of 2nd pipe: Select first digit with <+/-> and jump to the next digit with <Enter>.

Display:
2. line:

```
Traceability 2:
RB PE80  160  9.1
```

The pipe data is displayed

in case of different pipe data, an error message appears:

Display:
2. line:

```
error: not possible
to weld those pipes
```

Confirm the error message by pressing button <Enter>

If the length of pipe is entered additional, disapears:

Display:
2. line:

```
length of 1. pipe
+000.00 mm
```

Enter the length of the last (read in) barcode pipe 1 up to the joint by buttons <+ / - / Enter>
Press button <Start>

Display:
2. line:

```
length of 2. pipe
+000.00 mm
```

Enter the length of the last (read in) barcode pipe 2 up to the joint by buttons <+ / - / Enter>
Press button <Start>

Display:
2. line:

```
mat. diam wall temp
PE80  225  20.5  206°
```

The welding parameters are displayed

next menu by pressing <Start> button
Continue as described in chapter: 5.11 Welding process ❷

5.12 Error messages

If during the work with the machine

- the prescriptions of the DVS are not followed;
- the working steps necessary for the welding process are not correctly or not at all performed;
- certain measuring devices do not function,

the following error messages will appear on the display:

T	Heating element temperature
A	Adjusting
W	Heating
U	Change over
R	Pressure build-up ramp
t	Joining time
p	Joining pressure

In case of an error, these error codes will also appear in the first line of the display. All error messages are logged.

5.13 Administration of the welding data

The battery-buffered CNC memory (RAM) can store about 400 weldings. Make sure not to go over this quantity (in the display the error message "memory full" appears) because otherwise the first stored welding will be over-written.
If necessary, copy the welding data on SD-card and read out in time.

5.13.1 Copying internal data onto SD-card and deleting them (RAM)

Abort and back to basic menu by pressing <C>.
One menu item back by pressing <Enter> (keep pressed) and <->.

Display:
2. line:

```
WIDOS 4600 CNC
09:43 03.05.2007
```

basic menu

next menu by pressing <Enter> button

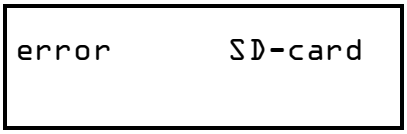
Display:
2. line:

```
copy
_
```

By pressing <+> the data from the internal memory is transferred to the SD-card.

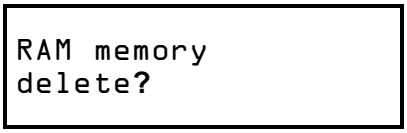
Only appears in case no SD-card is in the slot:

Display:
2. line:



By pressing <Enter> confirm the error message.

Display:
2. line:

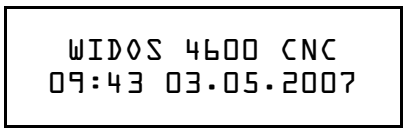


By pressing <+> the internal memory (RAM) is deleted.
By pressing <-> the internal memory (RAM) is **not** deleted.

Display:
2. line:

Either: press <Enter> several times,
or: wait until the basic menu appears after a while

Display:
2. line:



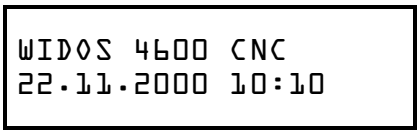
Indication of the currently entered machine type
current time and date
alternating with: **21°C HE= - - - °C** current ambient and heating element temperature

„*Basic menu*“

5.13.2 Storing data on the SD - card

When pressing the button <Enter>, the stored welding parameters can be printed or stored on a PCMCIA card.

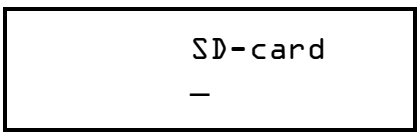
Display:
2. line:



Basic menu
Current date and time

next menu by pressing <Enter> button

Display:
2. line:



Storing the welding data on the PCMCIA

button <+> for menu "storing"

Display:
2. line:

SD-card 0000

Data is stored on the SD-card

press button <Start> until the basic menu appears

Display:
2. line:

WIDOS 4600 CNC 22.11.2000 10:10

Basic menu

5.14 More adjustemends

5.14.1 Setting the time and the date

Display:
2. line:

WIDOS 4600 CNC 22.11.2000 10:10

Basic menu
Current date and time

next menu by pressing button <Enter>

Display:
2. line:

SD-card _

next menu by pressing button <Start>

Display:
2. line:

Diag Clk WICON Param _ 10:10

next menu by pressing button <Start>

Display:
2. line:

Diag Clk WICON Param 10:10

Setting the time

buttons <+> and <->: change the time
button <Enter>: confirm

Display:
2. line:

Diag Clk WICON Param 22.11.2000

Setting the date

buttons <+> and <->: change the date
button <Enter>: confirm
press several times button <Start> or after a short while appears automatically:

Display:
2. line:

```
   WIDOS 4600 CNC
 22.11.2000 10:10
```

Basic menu

5.14.2 Setting the language

Display:
2. line:

```
   WIDOS 4600 CNC
 22.11.2000 10:10
```

Basic menu
Current date and time

next menu by pressing button <Enter>

Display:
2. line:

```
          copy
          _
```

next menu by pressing button <Start>

Display:
2. line:

```
Diag Clk WICON Param
_    10:10
```

press several times button <Start> until language appears

Display:
2. line:

```
Language   german?
_
```

several languages are entered

buttons <+> and <->: change the language
button <Enter>: confirm
press several times button <Start> or after a short while appears automatically:

Display:
2. line:

```
   WIDOS 4600 CNC
 22.11.2000 10:10
```

Basic menu

5.14.3 Setting information of traceability and lenght of pipe

Display:
2. line:

```
   WIDOS 4600 CNC
 22.11.2000 10:10
```

Basic menu
Current date and time

next menu by pressing button <Enter>

Display:
2. line:

```
          copy
          _
```

next menu by pressing button <Start>

Display:
2. line:

```
Diag Clk WICON Param
_    10:10
```

press several times button <Start> until language appears

Display:
2. line:

```
Traceability
Yes
```

traceability can be enterd: yes or no

buttons <+> and <->: set traceablity
Select “yes” with <+> if traceability is required.

Only appears if traceability has been selected with “yes”:

Display:
2. Zeile:

```
pipe length
Yes
```

Length of pipe, yes or no, can be entered

Wth button <+> - enter length of pipe (yes)

press several times button <Start> or after a short while appears automatically:

Display:
2. line:

```
   WIDOS 4600 CNC
 22.11.2000 10:10
```

Basic menu

5.14.4 Setting of shortened cooling time

Display:
2. line:

```
   WIDOS 4600 CNC
 22.11.2000 10:10
```

Basic menu
Current date and time

next menu by pressing button <Enter>

Display:
2. line:

```
          copy
          _
```

next menu by pressing button <Start>

Display:
2. line:

```
Diag Clk WICON Param
_    10:10
```

press several times button <Start> until shortened cooling time appears

Display:
2. line:

```
shorted cool. time?
yes
```

shortened cooling time can be entered

Select “yes” with <+> if shortened cooling time is required.

It is allowed to use the shortened cooling time under the following conditions:

- Welding material: **PE** and **PP**
- Prefabrikation under workshop conditions
- Low additional pressure at unclamp
- No additional pressure during further cooling down
- Load onto the workpieces only after being completely cooled down

press several times button <Start> or after a short while appears automatically:

Display:
2. line:

```
   WIDOS 4600 CNC
 22.11.2000 10:10
```

Basic menu

6. Diagnosis program

The purpose of the diagnosis program is the modification of stored machine parameters.

In the following lines all important diagnosis numbers for the function tests are described.

Inappropriate operation of the diagnosis functions may lead to disturbances in the machine and may destroy components.
The diagnosis functions allow a direct access to the specific parameters of the machine and have to be operated only by skilled staff.

Display:
2. line:

```
WIDOS 4600 CNC
22.11.2000 10:10
```

The type of the machine is displayed
Current date and time

Button <Enter> for next menu

Display:
2. line:

```
SD-card
_
```

Button<Start> for next menu

Display:
2. line:

```
Diag Clk WICON Param
_    10:10
```

Setting the diagnosis number

The respective diagnosis number can be set with buttons <+>, <–> and <Enter>.

No.	***Signification***
0008	The actual position of the sledge is displayed
0010	The actual temperature (°C) of the heating element is displayed
0011	The environmental temperature (°C) is displayed
0012	The actual pressure (bar) is displayed
0013	The required bead height (in 1/10 mm) which was calculated by the programmed welding parameters is displayed
0014	The required heating time which was calculated by the programmed welding parameters is displayed
0015	The required change over time which was calculated by the programmed welding parameters is displayed
0016	The required pressure build-up time which was calculated by the programmed welding parameters is displayed
0017	The required cooling time which was calculated by the programmed welding parameters is displayed
0018	The required joining pressure which was calculated by the programmed welding parameters is displayed

No.	***Signification***
0021	The operation and printout language can be chosen: • 0000 German • 0001 English • 0003 French • 0004 Spain
0023	The automatic change to summer or winter time may be switched onor off: • 0000 change summer / winter time switched off • 0001 change summer / winter time switched on
0030	All stored weldings are deleted: • By entering of „0001“, all weldings stored in the RAM up to that time are deleted. • By repeated entering of „0001“, all weldings stored on the SD-card up to that time are deleted.
0034	Bit values from 0-1023 appear which will change together with the change of the corresponding analog values: • 0005 Travel • 0008 Heating element temperature PT 1000 • 0010 Environmental temperature • 0011 Pressure (4-20 mA)
0044	A self-test of the machine and the control unit is performed, including a weld log on SD-card.

Abort with button <->.
Press several times button <Start> or after a short while appears automatically.

7. Equipment care / maintenance / repair

Goal of the chapter is:

- Keeping the nominal state and the operation capacity of the machine.
- Increasing the efficiency by avoiding non-planned outage.
- Efficient planning of the maintenance works and the maintenance tools.

7.1 Storage

- The cylindrical waves of the basic machine are to be kept free from dirtiness and need to be covered with a thin oil film if they are not being used.
- Store dry.

7.2 Cleaning the machine

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

- when cleaning with solvents.

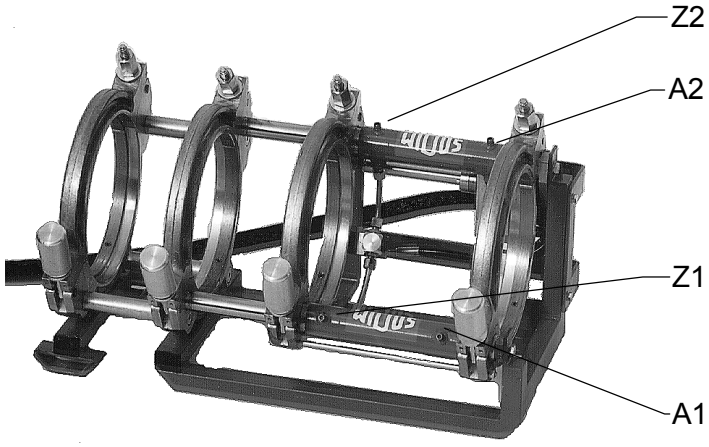
7.3 Clamping elements

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

7.4 Checking the hydraulic oil level

- To avoid damages check the oil level of the hydraulic pump before each starting of the control unit.
- Open front plate on the left-hand side of the control unit.
- Unscrew the cover of the filler neck of the tank (with integrated oil dipstick).
- Clean the oil dipstick with a fiber-free tissue and insert it again in the tank groove.
- Remove the oil dipstick again and check the oil level by means of the two marks on it (the oil level should be between both marks).
- If the oil level is under the lower mark, then hydraulic oil of the quality HLPD 32 must be added.
- The oil level may not be over the upper mark because otherwise there is the risk of spilling over.
- After completion of the works, close the tank cover again tightly and close the front plate.

7.5 Venting the hydraulic cylinders



- Venting the hydraulic cylinder **is <u>not</u> required** if
- the hoses have been disconnected from the quick-action couplings at the control unit because the remaining oil in the hose is being kept by valves and for this reason no air can enter.
- The hydraulic cylinder **must be vented** if
  - there has been too less oil in the tank and air has been attracted.
  - there were leaky spots at the hoses or in the connections.
  - the hoses were unscrewed from the basic machine.
- Eliminate the cause of the air entrance.
- Switch the machine on, legitimate with the card, then the main menu appears.
  With buttons <+> and <->, the machine can be opened or closed.
- Press button <-> and open the machine completely.
- First unscrew the lower vent screw (Z1) for closing (left-hand side).
- Connect the transparent venting hose and insert it in the collecting vessel.
- Close by pressing button <+> until there is no more air visible in the venting hose.
- Tighten again the vent screw (Z1).
- Press button <+> and close the machine completely.
- Then unscrew the lower vent screw (A1) for opening (right-hand side).
- Connect the transparent venting hose and insert it in the collecting vessel.
- Open by pressing button <-> until there is no more air visible in the venting hose.
- Tighten again the vent screw (A1).
- When the venting procedure at the lower rent screws is finished, repeat the same at the upper vent screw (Z2) for closing (left-hand side), and the upper vent screw (A2) for opening (right-hand).

The lower vent screws always have to be vented at first because there is a direct connection between the upper and the lower cylinders.

- If air remains in the lower cylinder, it will ascend in the upper cylinder when pressure is applied

There must always be enough oil in the tank (see chapter 7.4).

7.6 Maintenance, inspection and repair

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 an especially high usage percentage the testing cycle should be shortened.
The works should be performed at the WIDOS GmbH company or by an authorized partner.

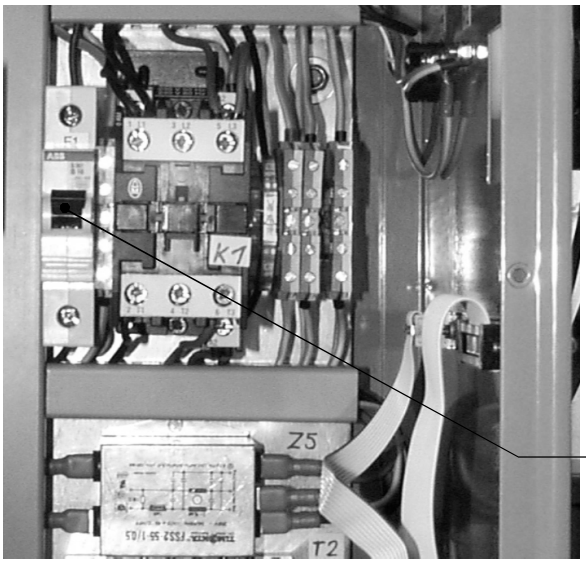
- The operating staff has to be informed before the starting of the maintenance works.
- Check the tightness of all screwed connections and tighten again if need be.
- Check the function of the safety devices after completion of the maintenance works. Check especially insulation and tension resistance and protective cables resistance.

7.7 Saving the welding data

The battery buffer for the CNC memory (RAM) goes empty. Without current connection, the batteries necessary for the storage of the welding data work for about 1 month.
Remedy: connect the machine to power, switch it on and leave it switched on for 24 hours in order to completely load the batteries.

Make sure that before a longer non operation period of the machine the welding data is read out so that it can not get lost!

7.8 Fuse for overload safety device



The control unit does **not** function although the control unit is connected to the power supply, the main switch is on, and the Emergency-Stop has **not** been pressed and locked.

In the case above the fuse (overload protection) must be checked.

For this purpose unscrew the right-hand cover plate, check the fuse (F1) and switch it on again, if necessary.

7.9 Error signals

If during the work with the machine

- the DVS prescriptions are not followed;
- the necessary steps for the welding process are not correctly or not at all performed;
- certain measuring devices do not function;

an error message will appear on the display.

By pressing the button <Enter>, the error message can be deleted on the display.

Error message	***Cause***	***Remedial action***
heating element temperature not o.k. !	Heating element did not yet reach the nominal temperature and is out of the tolerance of ± 10° C	Wait until the heating element is heated up and the setting process is finished
pipes clamped too long !!	Pipes are clamped too close one to the other and the planer does not fit between the pipe ends	Clamp the pipes with more distance one to the other
insert heating element !!	Message "insert heating element" has been confirmed with <Start> although the heating element has not yet been inserted	Insert heating element and confirm with <Start>
pipes slipped in clamps	Pipes were not properly clamped and are slipping through the clamping devices	Clamp the pipes tightly
heating element is still inserted !!	After completion of the change over time, the heating element was not removed	Abort the welding process and restart welding
error SD-card	Any other SD-card error	Check if SD-card card is present or is inserted in a wrong way
error SD-card card full	Memory space of the SD-card is full	Read data out from the SD-card and perform new formatting
error SD-card write protect	SD-card has a write protection	Remove the write protection at the SD-card
error SD-card not formatted	SD-card is not formatted and no data can be stored	Format SD-card with PC **necessarily** using „**FAT16**“
Power failure at last welding	Power supply of the control unit has been interrupted during the welding process	Eliminate the cause of the power failure and restart welding
no welding in memory	Internal memory is empty	
memory full !	Internal memory is full (more than 400 weldings stored)	Copy internal memory onto SD-card and then delete it

Error message	*Cause*	*Remedial action*
ambient temp. not o.k. !	Ambient temperature is higher than 50° C or lower than 0° C	Use a welding tent or umbrella or pre-heat pipe ends
error des. temp. choose material !	No pipe parameters were set	Set pipe parameters
error: check cable to way measuring !	Travel measuring cable is not connected or defective	Connect or replace travel measuring cable
error: time between plan./warm. too long !	The time between planing and heating up has exceeded 10 min.	Repeat planing process
Error: pipes not well in place !	In the depressurising phase, the pipes open the clamping devices	Prevent the clamping devices from opening

7.10 Possible defects and their elimination

Defect	*Possible Cause*	*Identification and Elimination*
Machine does not move forward nor backward	- Emergency-stop is pressed - A valve is not getting its command - Travel cable is not plugged - Travel cable is interrupted	- Unlock the Emergency-Stop - Start "Test and diagnosis program" - Perform diagnosis No. 0008 travel test
Planer works the whole time or not at all	- Button at the planer is not pressed - Semi-conductive relays is defective	- Check the button - Perform diagnosis No. 0003 planer
After the planer program the planer is needed again and again	- No 2 mm material were planed - The travel measurement varies too much due to a defective travel recorder or a defective travel recorder cable	- Make sure that min. 2 mm material are being planed (circular chip!)
Machine does not switch from bead up program to "heating"	- No travel change is recognized	- Perform diagnosis No. 0008 travel test
The pressure falls very fast, the pump keeps on working	- Pipes have slipped through - Hydraulic bloc is leaky - Cylinder is leaky	- Clamp pipes correctly - Check oil leakage - Inform service-team

8. Transport

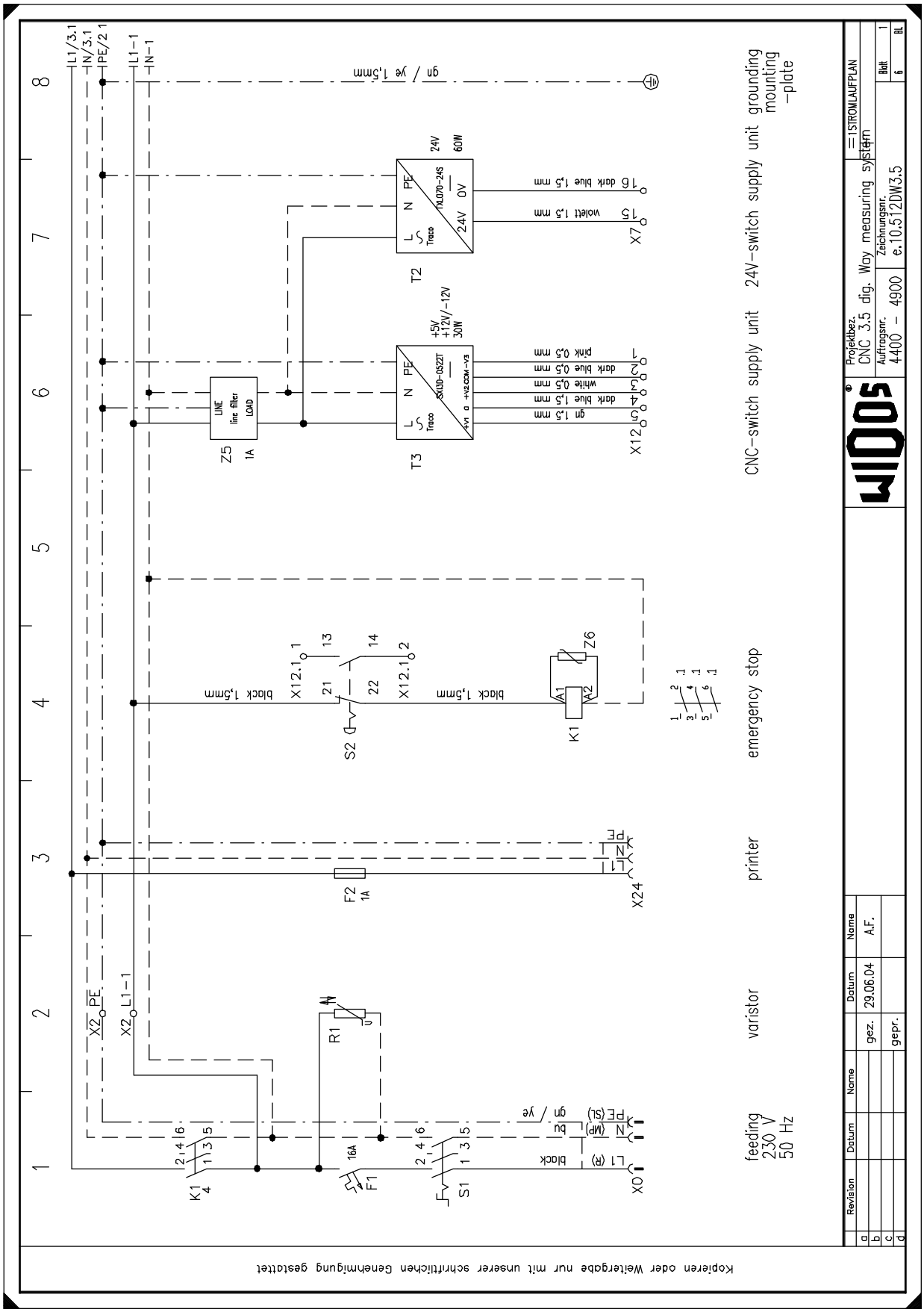
The machine can be transported in 3 transport boxes or 1 packing box.
Due to its compact design, the packing box is more suitable for longer transports.

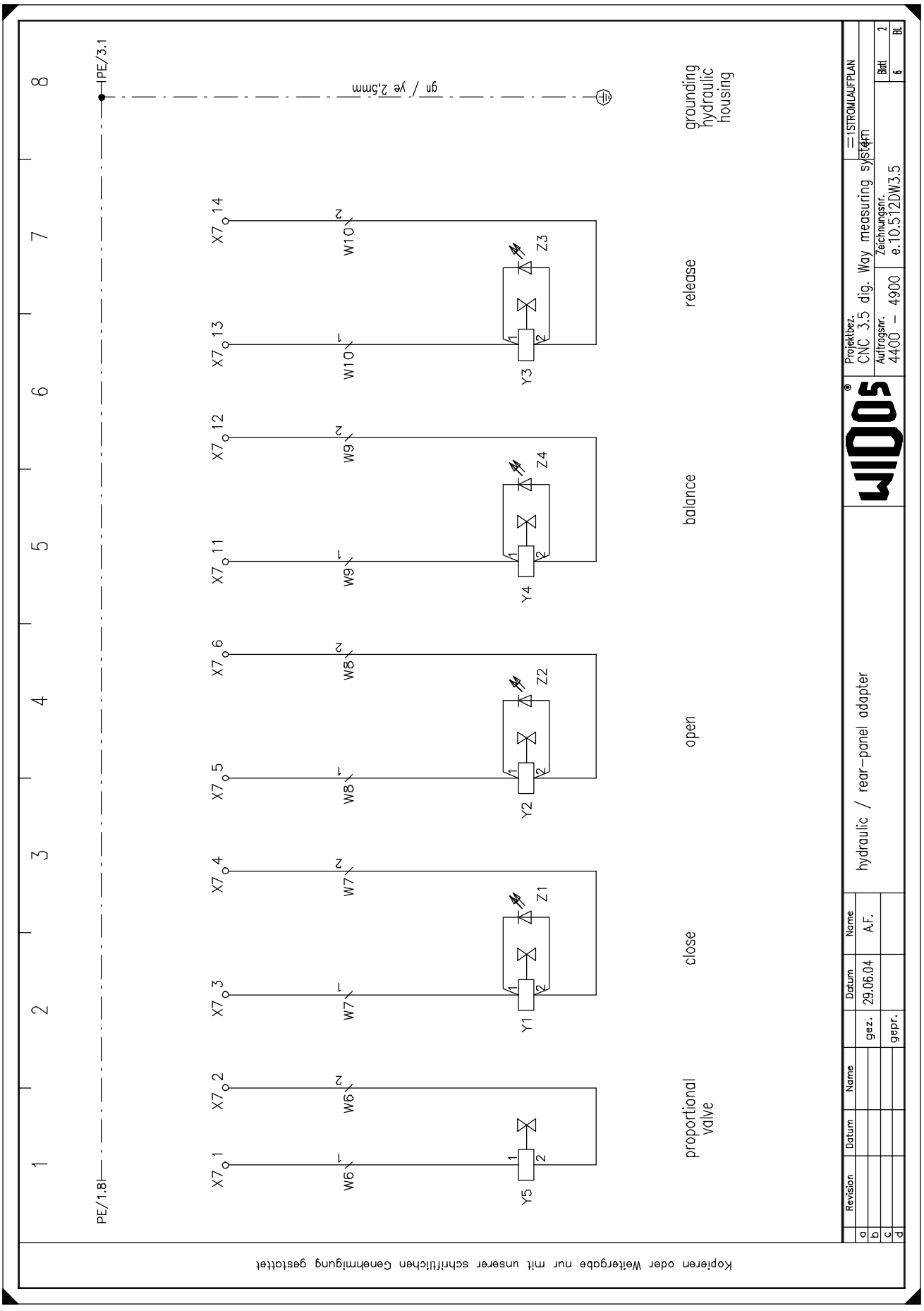
In each box holders are included which are suitable for each single element of the machine in order to avoid slipping.

- Put the elements into the box in such a way that they are fitting in the holders.
- The hydraulic hoses at the basic machine should not be unscrewed (air penetration). Make sure that they are not squeezed.
- The sensors integrated in the machine are sensitive high precision devices which need to be handled carefully in order to reach a longer life.
  - Do not tilt the machine too much.
  - Protect the machine from heavy chocs.
  - Make sure that the box cover is closed correctly.
  - **Never** lift or transport the basic machine at path measuring system!
- During the construction of the transport box a stress was put on a light-weight construction.
  - Take much care when using automatic handling and carrying machines.

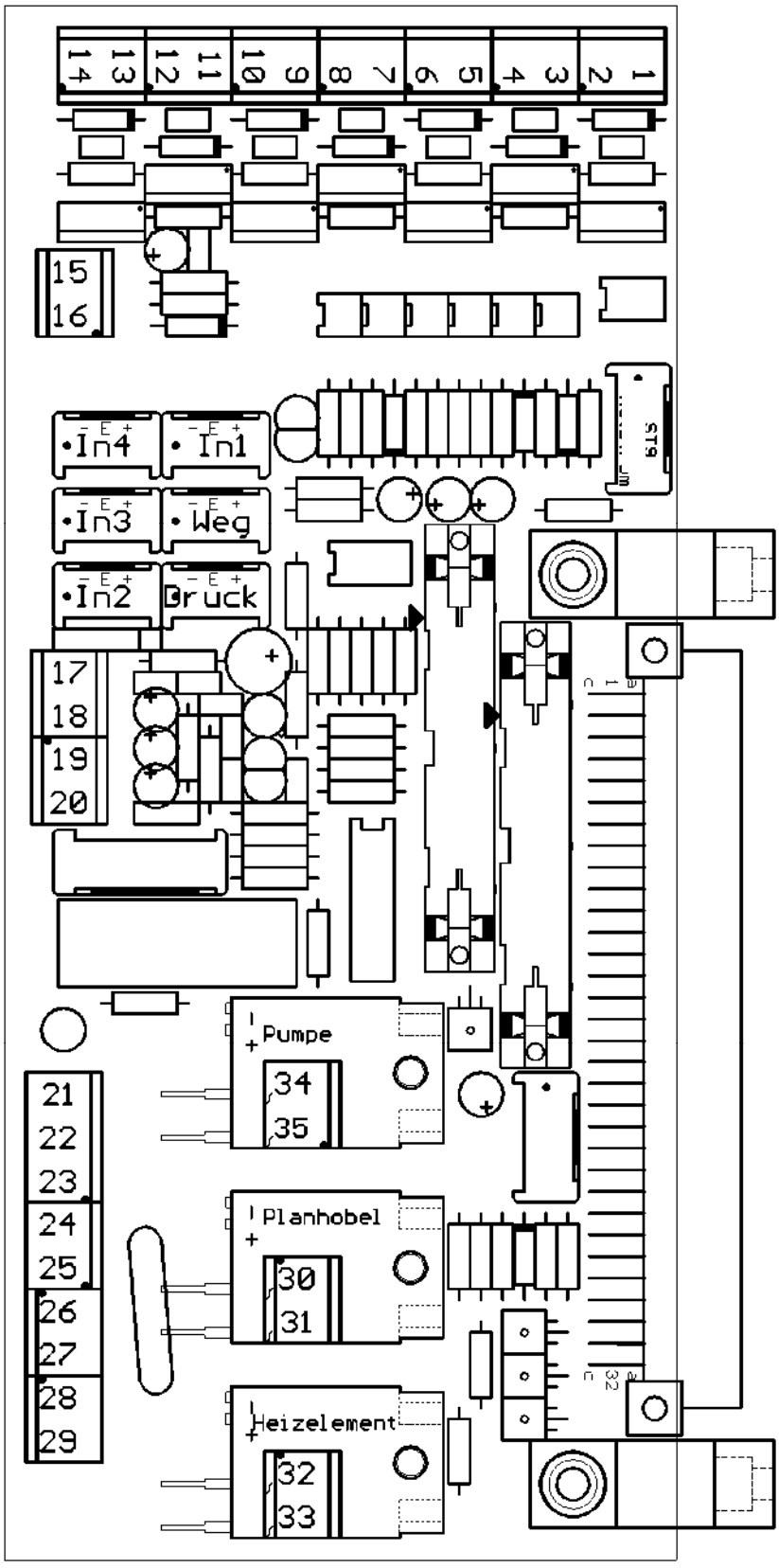
Transport the planer in the reception box.
If the planer is transported in the basic machine grease the holders with PTFE-spray because otherwise damages at piston and sealings may occur.

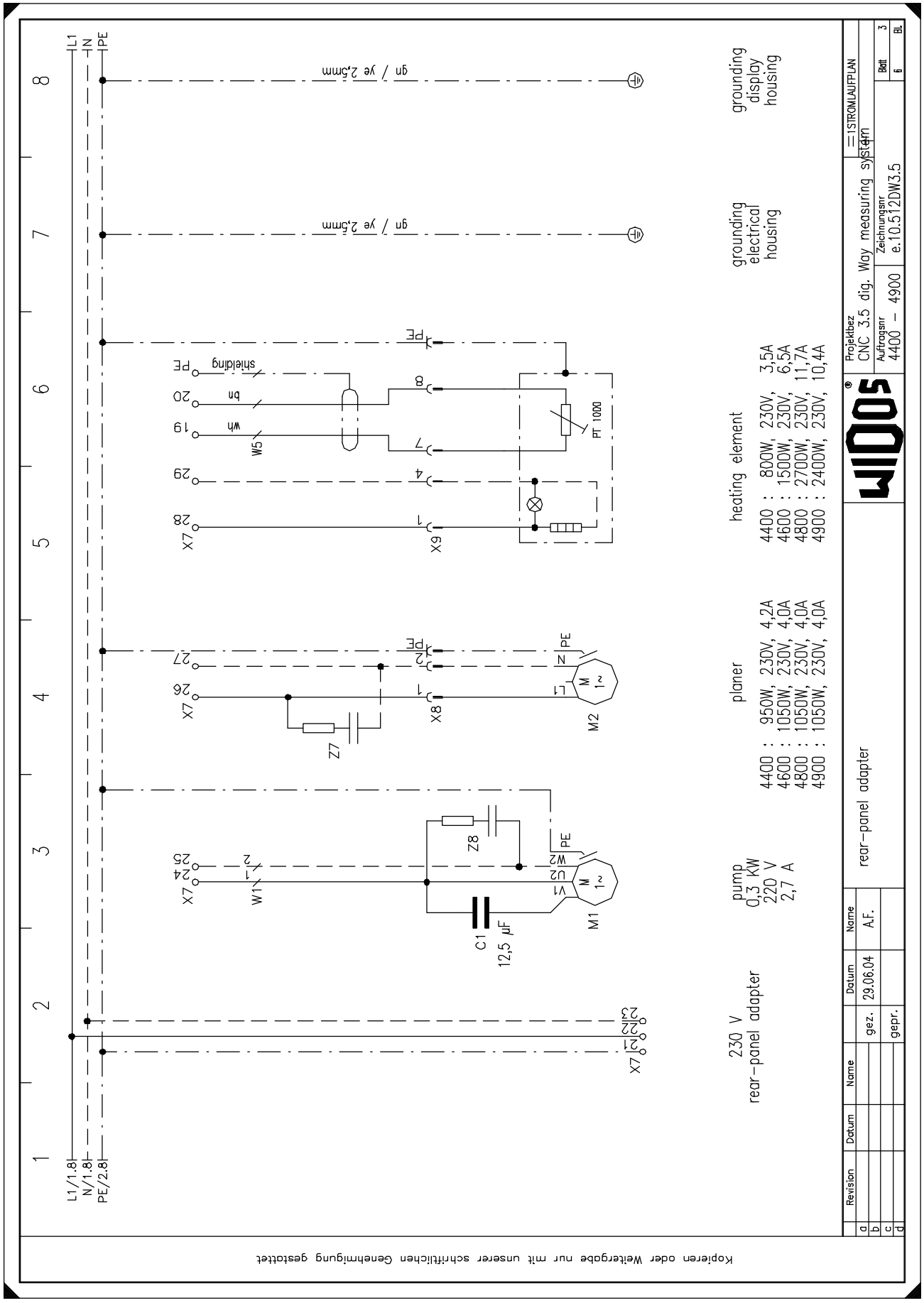
9. Electric and hydraulic diagrams

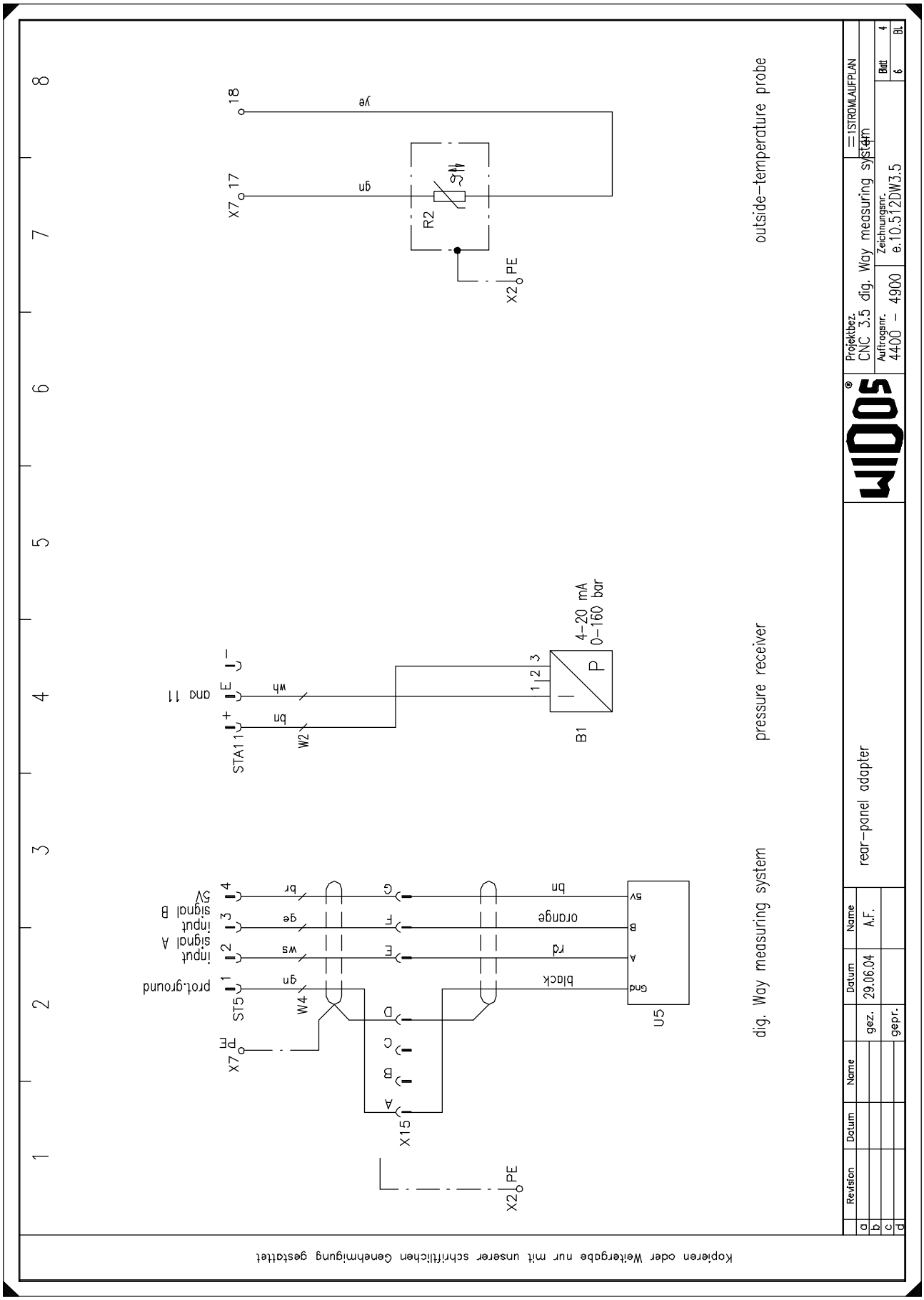




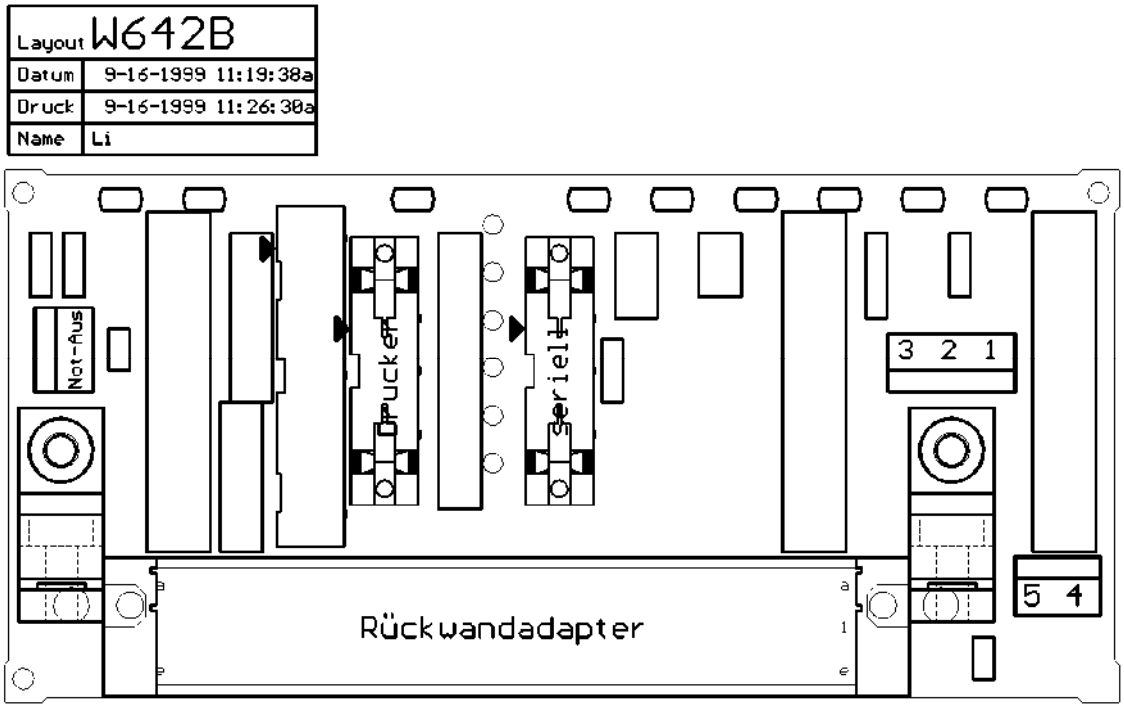
Rear Panel Adapter X7
CNC 3.5




L1
N
PE
gn / ye 2,5mm
grounding display housing
grounding electrical housing
heating element
4400 : 800W, 230V, 3,5A
4600 : 1500W, 230V, 6,5A
4800 : 2700W, 230V, 11,7A
4900 : 2400W, 230V, 10,4A
planer
4400 : 950W, 230V, 4,2A
4600 : 1050W, 230V, 4,0A
4800 : 1050W, 230V, 4,0A
4900 : 1050W, 230V, 4,0A
pump
0,3 kW
220 V
2,7 A
230 V
rear-panel adapter
PT 1000
shielding
wh
bn
W5
W1
M1
M2
Z7
Z8
C1
12,5 µF
X6
X7
X8
rear-panel adapter
=1STROMLAUFPLAN
Projektbez
CNC 3.5 dig. Way measuring system
Auftragsnr
4400 - 4900
Zeichnungsnr
e.10.512DW3.5
Name
A.F.
Datum
29.06.04
gez.
gepr.
Revision
Kopieren oder Weitergabe nur mit unserer schriftlichen Genehmigung gestattet


outside-temperature probe
pressure receiver
dig. Way measuring system
rear-panel adapter
Projektbez. CNC 3.5 dig. Way measuring system
Auftragsnr. 4400 – 4900
Zeichnungsnr. e.10.512DW3.5
Kopieren oder Weitergabe nur mit unserer schriftlichen Genehmigung gestattet

Rear Panel X 12



Kunststoffschweißtechnik

Klemmleiste =STROMLAUFPLAN-X2

Bemerkung	W1 Ölflex 3x1,5mm (Nr. Typ Querschn. Kabel Laenge)	Aderbezeichnung	von =Anlage+Ort-BMK:Anschl	Querverweis	Bruecke	Klemmen-Nr.	Querverweis	nach =Anlage+Ort-BMK:Anschl	Aderbezeichnung	W0 5,0m H07RN-F 3x1.5mm (Nr. Typ Querschn. Kabel Laenge)	Bemerkung
					•	L1−1	1.4	S2:1	bk 1,50mm		emergency stop
line filter		bk 1,50mm	Z5	1.6	•	L1−1	1.1	K1:1	bk 1,50mm		emergency stop
varistor		blue 1,50mm	S1:6	1.2		R3	1.2	F1	bk 1,50mm		varistor
line filter /		gn / ye 1,50mm	Z5:PE / X24:PE	1.6 / 1.3		PE	3.8 / 3.7	display / electrical	gn / ye 2,50mm		electrical housing / display housing
CNC−switching power supply unit / pump	X	gn / ye 1,50mm	T3:PE / M1:PE	1.6 / 3.3		PE	2.8 / 4.1	hydraulic / X15	gn / ye 2,50mm		hydraulic / way sensor
24V−switching power supply unit / rear−panel adapter		gn / ye 1,50mm	T2:PE / X7:21	1.7 / 3.2		PE	3.6 / 3.4	X9:PE / X8:PE	gn / ye 1,50mm		heating element / planer
mounting plate /		gn / ye 1,50mm	mounting plate /	1.7 /		PE	1.1 / 4.7	X0:PE / R2	gn / ye 1,50mm	X	feeding / outside−temperature probe

Revision	Datum	Name		Datum	Name
a			gez.	29.06.04	A.F.
b					
c			gepr.		
d					

=Stromlaufplan−X2
control voltage 230 V

WIDOS®

Projektbez.: CNC 3.5 dig. Way measuring system
=2KLEMMENPLAN
Auftragsnr.: 4400 − 4900
Zeichnungsnr.: e.10.512DW3.5
Blatt 6, 100 Bl.

Klemmleiste =STROMLAUFPLAN−X7

Kabel: W1 Ölflex 3x1,5mm; W4 Tronic CY 4x0,34mm abg; W5 Tronic CY 2x0,34mm abg; W6 Ölflex 2x0,75mm; W7 Ölflex 2x0,75mm; W8 Ölflex 2x0,75mm; W9 Ölflex 2x0,75mm; W10 Ölflex 2x0,75mm; W2 Ölflex 2x0,34mm

von =Anlage+Ort−BMK:Anschl	Quer-verweis	Bruecke	Klemmen-Nr.	nach =Anlage+Ort−BMK:Anschl	Aderbe-zeichnung	W1	W4	W5	W6	W7	W8	W9	W10	W2	Bemerkung
	2.1		1	Y5:1	1				X						proportional valve
	2.2		2	Y5:2	2				X						proportional valve
	2.2		3	Y1:1	1					X					close
	2.3		4	Y1:2	2					X					close
	2.4		5	Y2:1	1						X				open
	2.4		6	Y2:2	2						X				open
			7												
			8												
			9												
			10												
	2.5		11	Y4:1	1							X			balance
	2.6		12	Y4:2	2							X			balance
	2.6		13	Y3:1	1								X		release
	2.7		14	Y3:2	2								X		release
	1.6		15	T3:24V	violett 1,5mm										24V−switch supply unit
	1.6		16	T3:0V	dark blue 1,5mm										24V−switch supply unit
	4.7		17	R2	gn 0,5mm										outside−temperature probe
	4.8		18	R2	ye 0,5mm										outside−temperature probe
	3.6		19	X9:7	white			X							heating element
	3.6		20	X9:8	brown			X							heating element
	3.6	•	PE	PT1000−sensor	shielding			X							heating element
	3.2		21	X2:PE	gn / ye 1,5mm										voltage supply
	3.2		22	K1:2	bk 1,5mm										voltage supply
	3.2		23	K1:6	blue 1,5mm										voltage supply
	3.3		24	M1:U2	1	X									pump
	3.3		25	M1:W2	2	X									pump
	3.4		26	X8:1	bk 1,5mm										planer
	3.4		27	X8:2	blue 1,5mm										planer
	3.5		28	X9:1	bk 1,5mm										heating element
	3.5		29	X9:4	blue 1,5mm										heating element
	4.1		ST5:1	X15:A	gn		X								way sensor
	4.2	•	PE	X15:D	shielding		X								way sensor
	4.2		ST5:2	X15:E	white		X								way sensor
	4.3		ST5:3	X15:F	ye		X								way sensor
	4.3		ST5:4	X15:G	brown		X								way sensor
	4.4		STA11:+	B1:3	brown									X	pressure receiver
	4.4		STA11:E	B1:1	white									X	pressure receiver
	4.4		STA11:−												pressure receiver

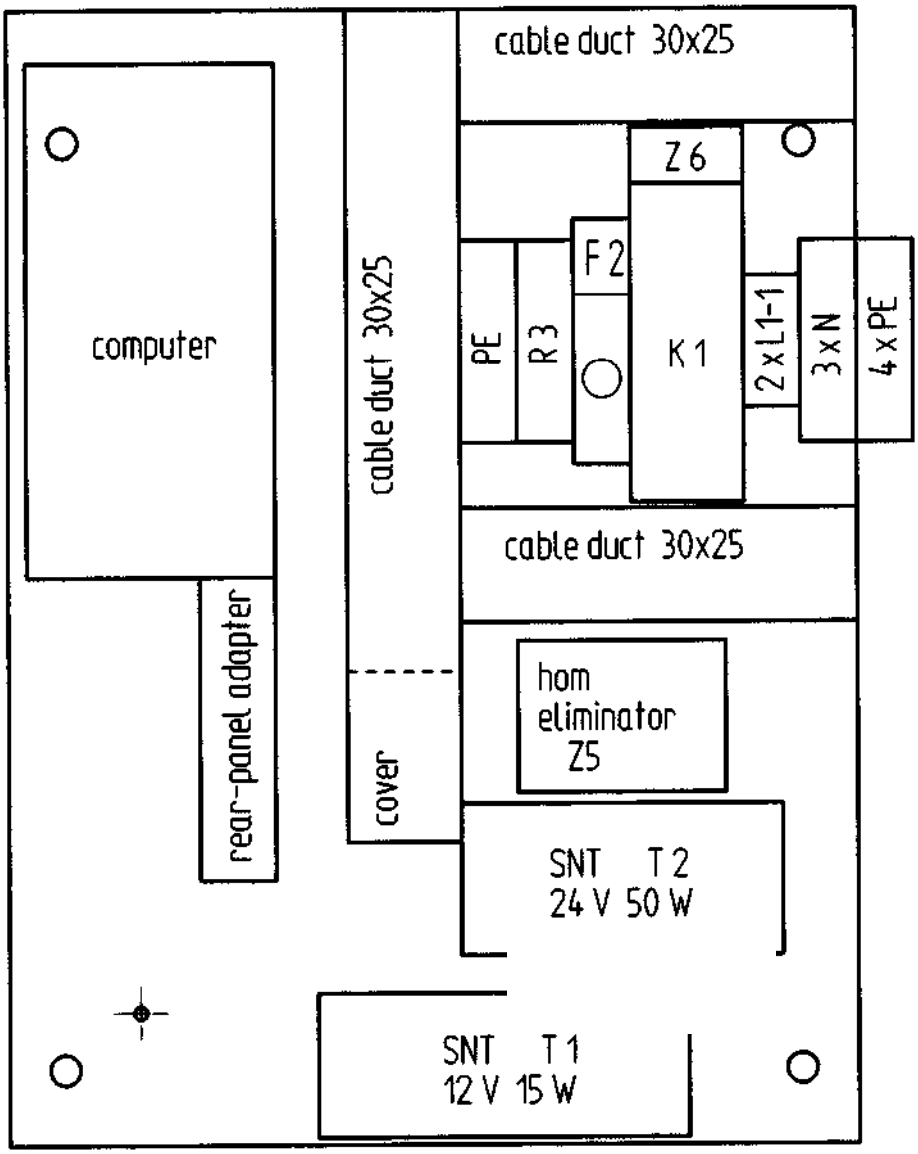
Kopieren oder Weitergabe nur mit unserer schriftlichen Genehmigung gestattet

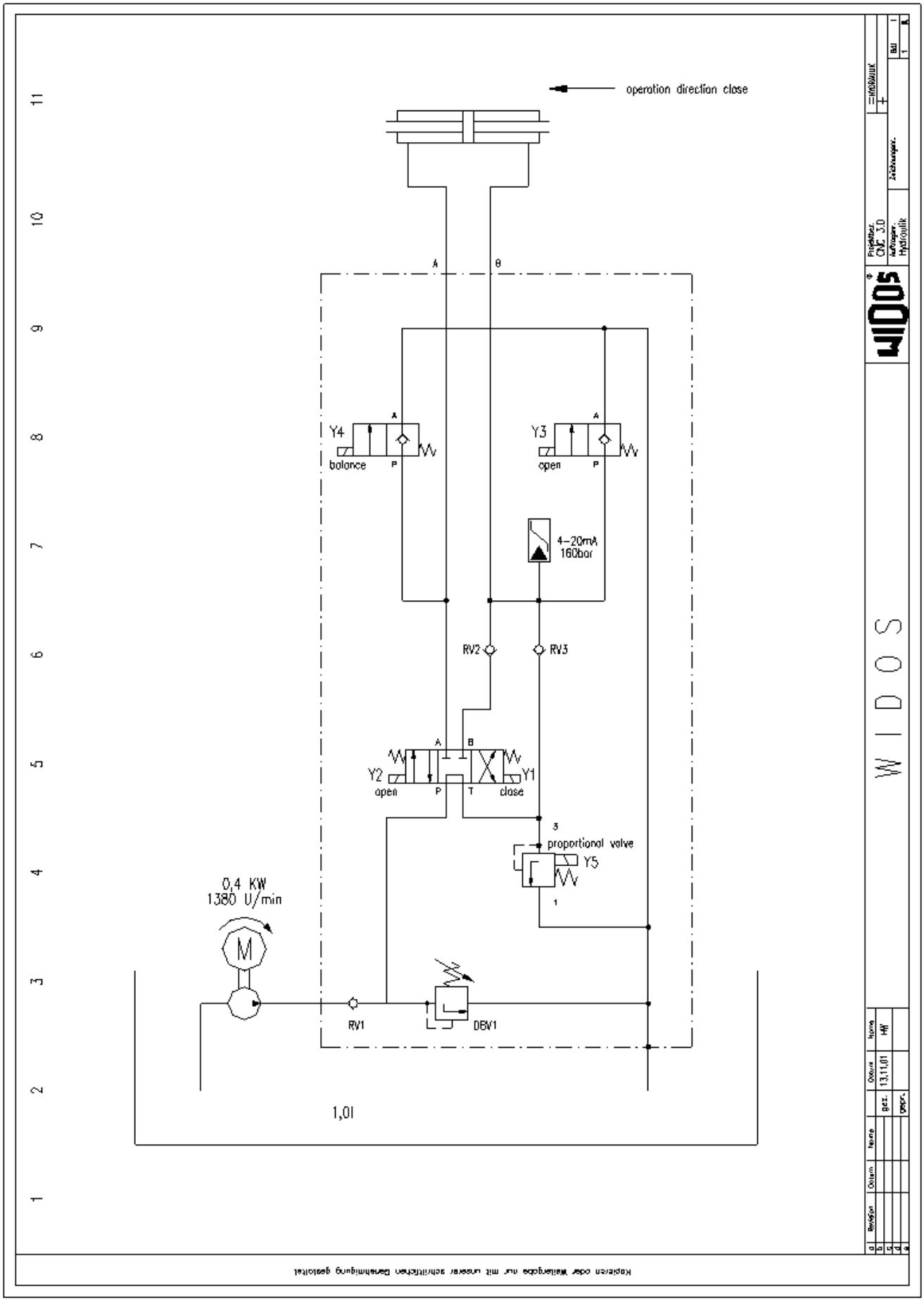
Revision	Datum	Name		Datum	Name		
a			gez.	29.06.04	A.F.	=Stromlaufplan−X7 rear−panel adapter	WIDOS®
b			gepr.				
c							
d							

Projektbez.: CNC 3.5 dig. Way measuring system — =2KLEMMENPLAN

Auftragsnr.: 4400 − 4900 — Zeichnungsnr.: e.10.512DW3.5 — Blatt 6 — 101 Bl.

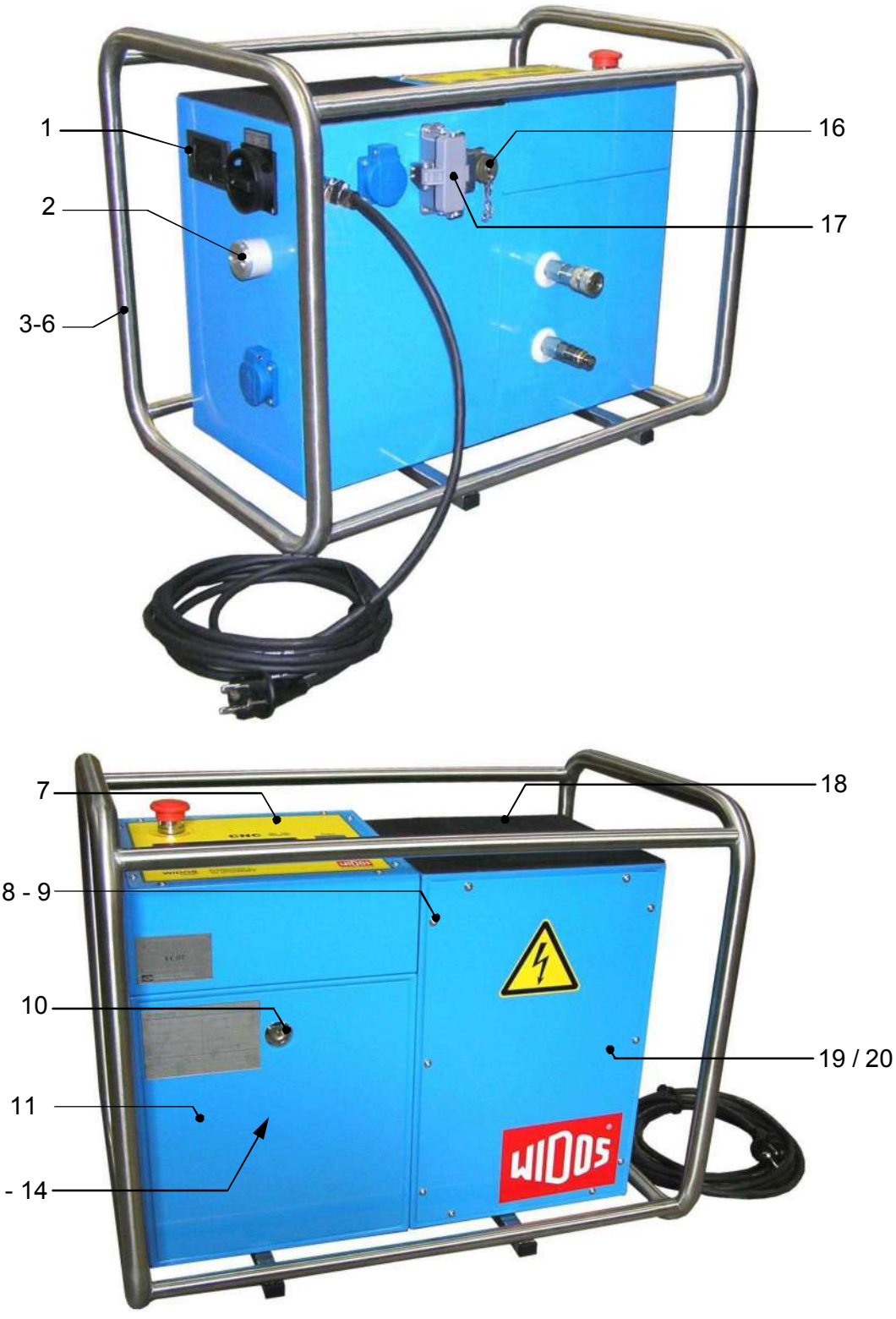
Mounting Plate




operation direction close
A
B
Y4
balance
P
A
Y3
open
P
4–20mA
160bar
RV2
RV3
A
B
Y2
open
P
T
Y1
close
3
proportional valve
Y5
1
0,4 KW
1380 U/min
M
RV1
DBV1
1,0l

10. Spare parts list

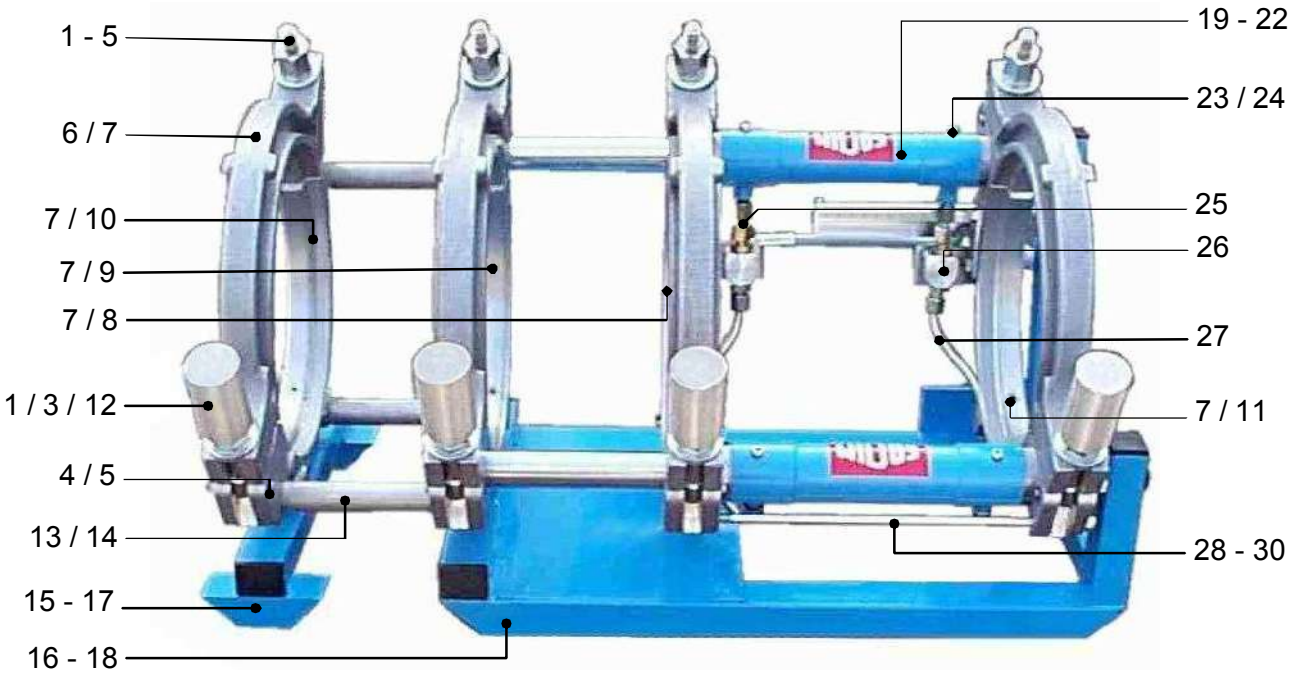
10.1 CNC control unit 3.5

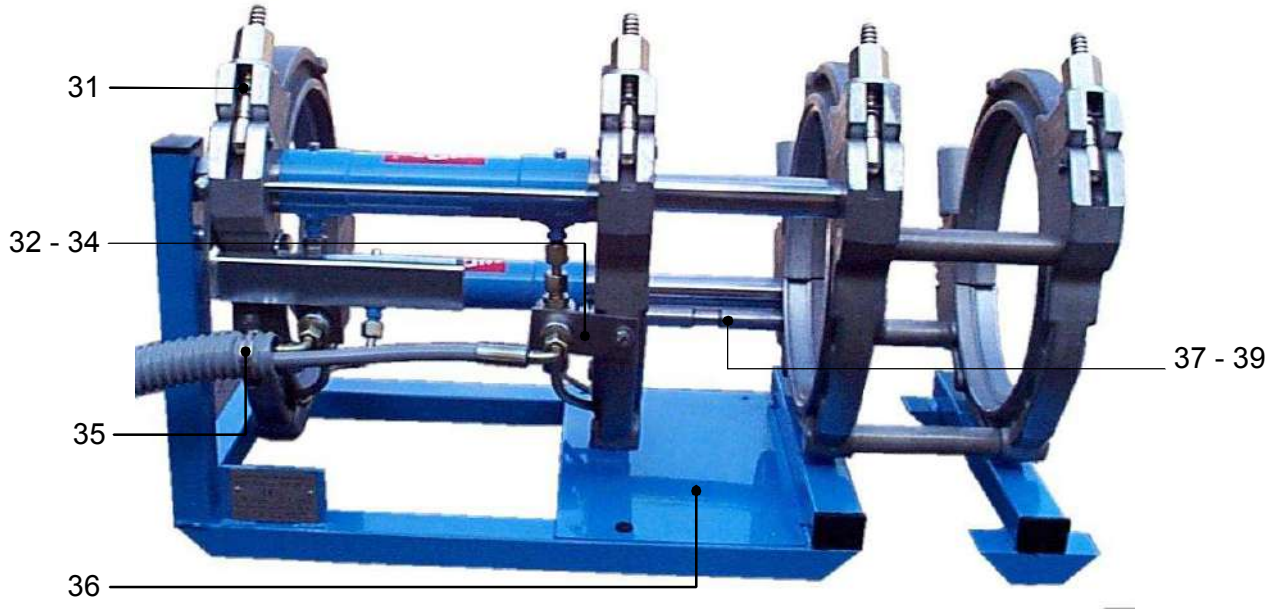


CNC-control unit WIDOS 4600 CNC 3.5

Pos.	Denomination	Piece	Order no.
1	Flat head screw M 3x16 DIN 965	2	0965C016
2	Outside temperature sensor	1	EE0404
3	Carrying frame	1	105010
4	Pan head screw M 8x40 DIN 912	4	0912H040
5	Disk M 8 DIN 125	4	0125H
6	Hexagon nut M 8 DIN 934	4	0934H
7	Sheeting for front panel	1	EF0601
8	Flat head screw M 4x10 DIN 7991	8	7991D010
9	Rosette M4	8	ROSM4
10	Lock for front panel	1	J1001
--	Key	1	on request
11	Front panel for hydraulic	1	105011
12	Filler pipe	1	C1002002
13	Oil dip rod	1	C102001
14	Conical nipple for filler pipe	1	D24x18,5
15	Hydraulic oil	1 l	HLPD032
16	Protecting cover (position sensor)	1	EST0508
17	Protecting cover for 16-chanel plug	1	EST0548
18	Rubber plate	1	105006
19	Front panel for electric	1	105012
20	Seal for front panel	1	105013

10.2 Basic machine





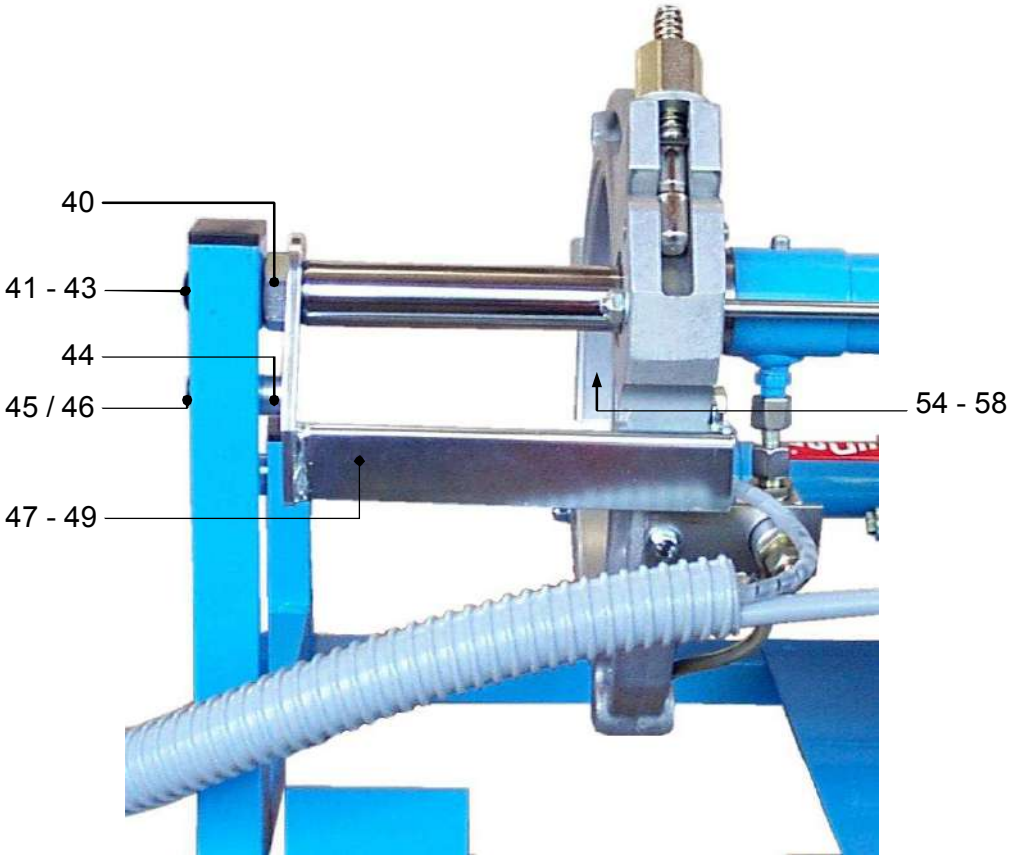
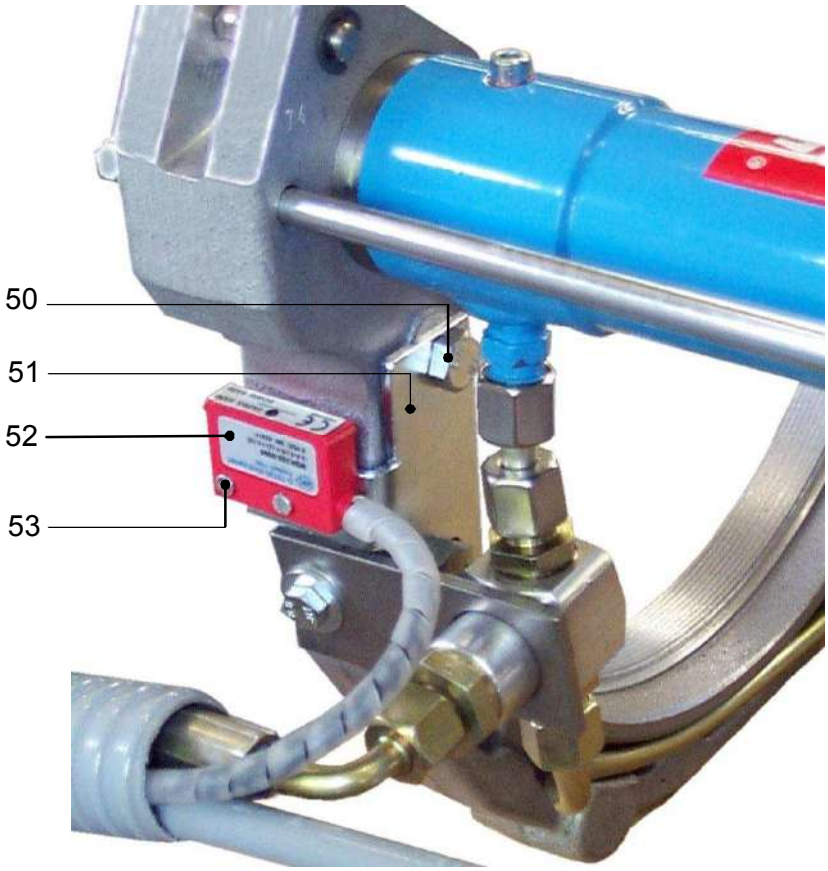


Illustration without rail for the travel sensor



Basic unit WIDOS 4600 CNC 3.5

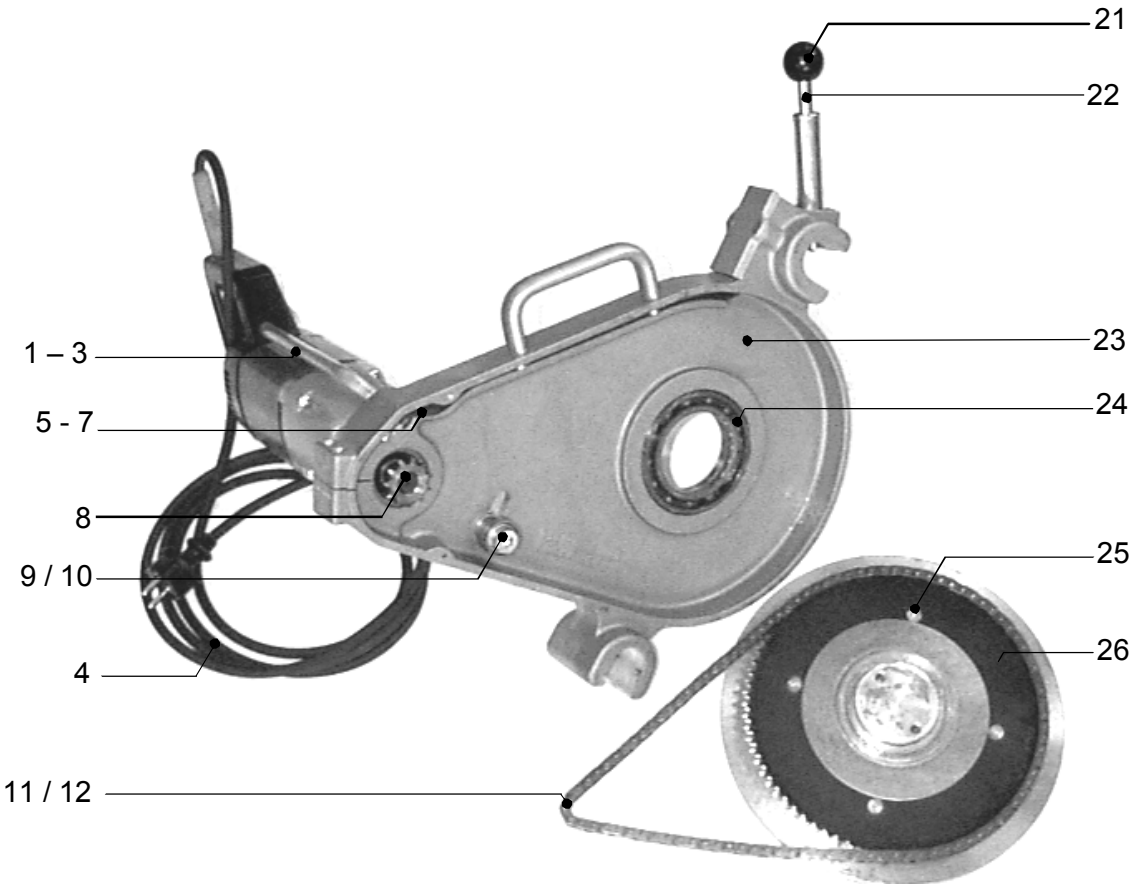
Pos.	Denomination	Piece	Order no.
1	Threaded rod	8	091108
2	Nut	4	091109
3	Pressure disc M 14 DIN 6340	8	6340N
4	Rivet	8	091111
5	Lock washer Gr. 7 DIN 6799	8	6799G
6	Upper clamp	4	091105
7	Thread insert M 6	8	GEW-M6
8	Outer clamp, fixed	1	091101
9	Inner clamp, fixed	1	091102
10	Inner clamp, movable	1	091103
11	Outer clamp, movable	1	091104
12	Knurled nut	4	092109
13	shaft	3	091131
14	Flat head screw M 12x30 DIN 7991	6	7991L030
15	Support	1	091141
16	Pan head screw M 8x25 DIN 912	3	0912H025
17	Protective cap 40 x 30 x 2	6	J0203
18	Base frame	1	091118
19	Hydraulic cylinder	2	092106
20	Guide bearing	4	LKH3050
21	Gasket set for cylinder	2 set	D092106
22	Flat head screw M 12x20 DIN 7991	2	7991L020
23	Pan head screw M 6x10 DIN 912	4	0912F010
24	Retainer ring 6x9,3x1	4	D6x9,3
25	Hydraulic tube, length 40 mm	2	V094012
26	Filter	2	V092114
27	Hydraulic hose (320 mm)	2	091112
28	Pull shaft	2	091107
29	Hexagon nut M 8 DIN 985	2	0985H
30	Disc M 8 DIN 125	2	0125H
31	Spiral pin Ø 4x40 DIN 7343	4	7343D040
32	Holder for filter	2	092120
33	Washer M 8 DIN 9021	2	9021H
34	Hexagon-head screw M 8x20 DIN 933	2	0933H020
35	Hose bunch	1	on request
36	Floor plate * 4 rivets	1set	911182
37	Tear off bar	1	091503
38	Washer M 8 DIN 6340	2	6340H
39	Hexagon-head screw M 8x12 DIN 933	2	0933H012
40	Stop bolt	1	091117
41	Hexagon screw M 10x20 DIN 933	2	0933J020
42	Washer M 10 DIN 125	2	0125J
43	Protective cap Ø 20 x 1-2	2	J0215

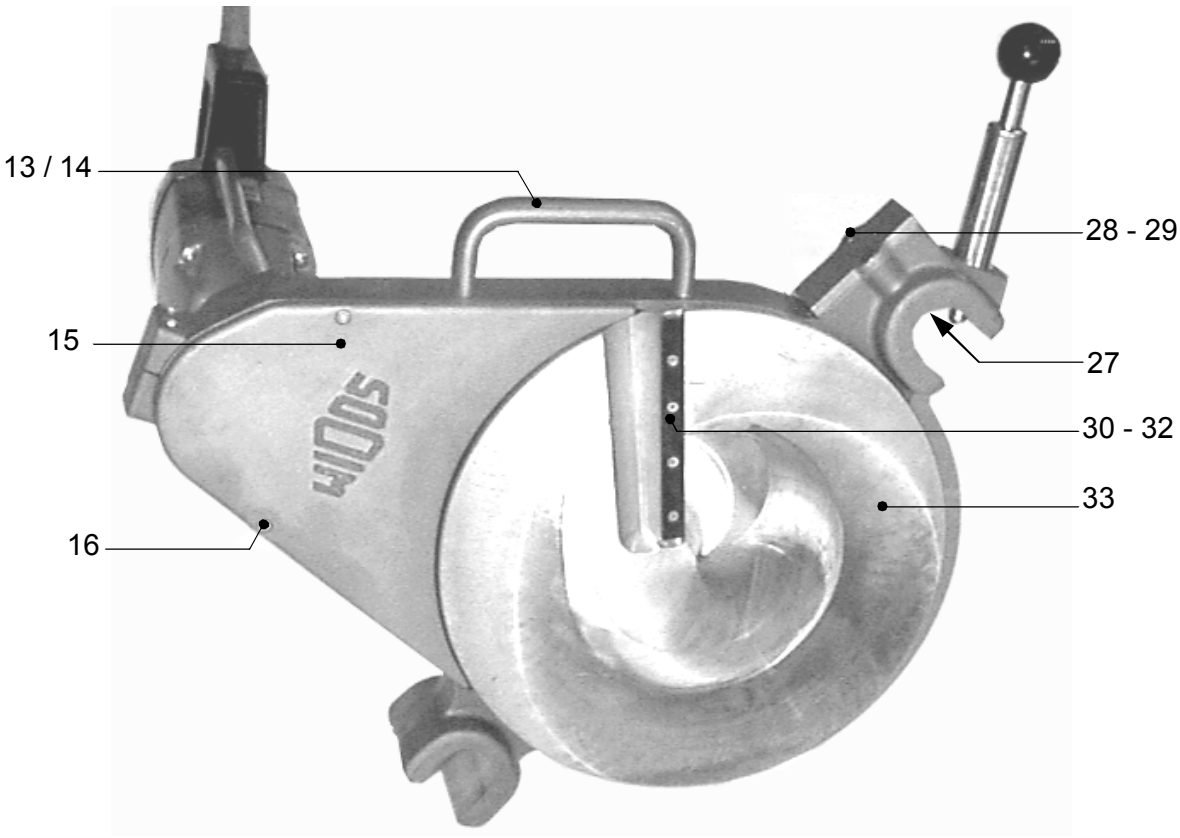
Basic unit WIDOS 4600 CNC 3.5

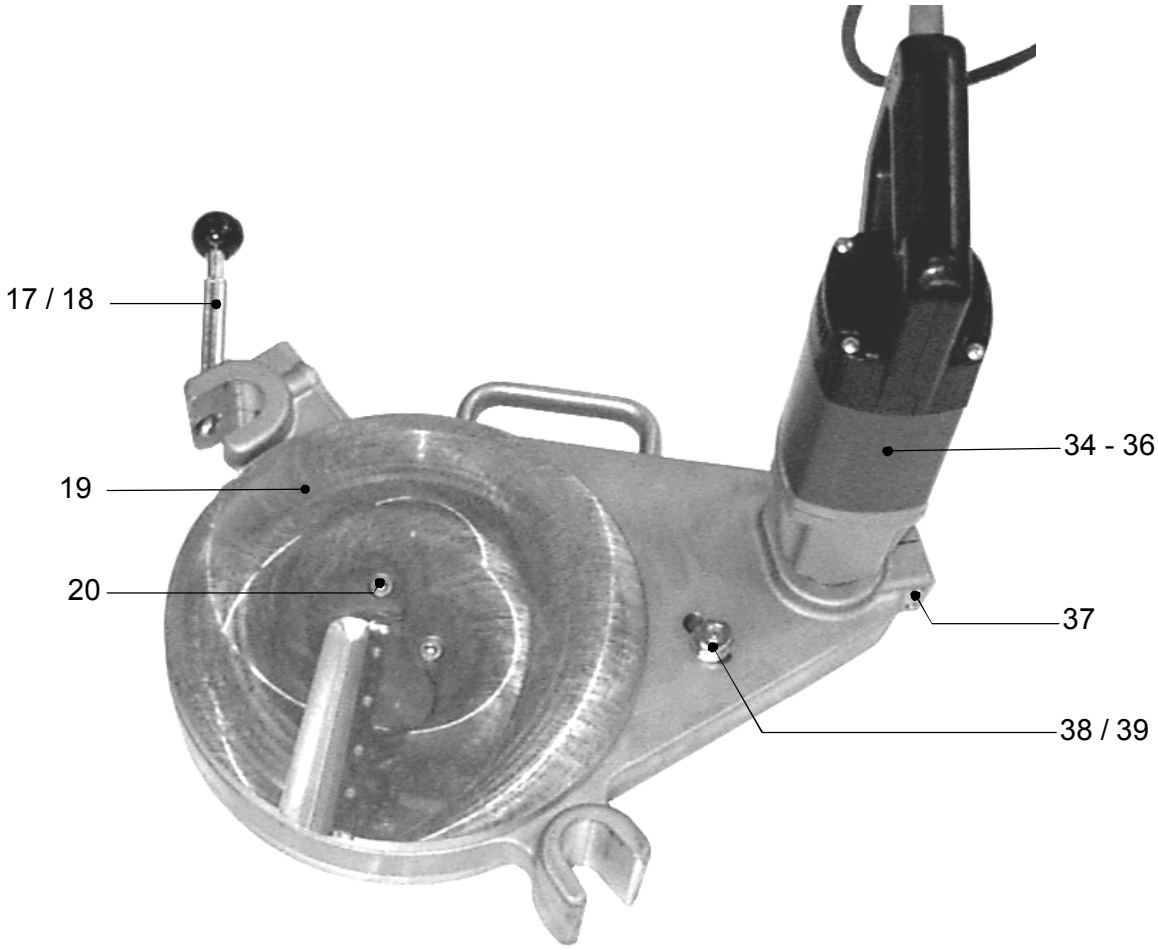
Pos.	Denomination	Piece	Order no.
44	Distance bush	1	091173
45	Pan head screw M 6 x 20 DIN 912	1	0912F020
46	Washer M 6 DIN 125	1	0125F
47	Rail for travel sensor	1	091171
48	Magnetic tape	1	on request
49	Guard band	1	on request
50	Hexagon screw M 8 x 12 DIN 933	2	0933H012
51	Holder for sensor	1	091172
52	Flat head screw with slot M 3 x 12 DIN 85	2	0085C012
53	Reduction inserts DA 75 - 225 *)	1 set	0908...
54	Reduction inserts, wide DA 75 - 225 *)	1 set	0918...
55	Reduction inserts, extra wide DA 75 - 225 *)	1 set	0928...
56	Pan head screw M 6x25 DIN 912 (to 200)	8	0912F25X
57	Flat head screw M 6x20 DIN 7991	8	7991F20X
--	Type plate WIDOS 4600 CNC	1	SCHT4600
--	Hydraulic oil	2 l	HLPD35
--	Socket spanner size 27	1	ZRS27
--	transport box	1	TKA10

*) For ordering necessarilly give the dimensions !

10.3 Planer






17 / 18
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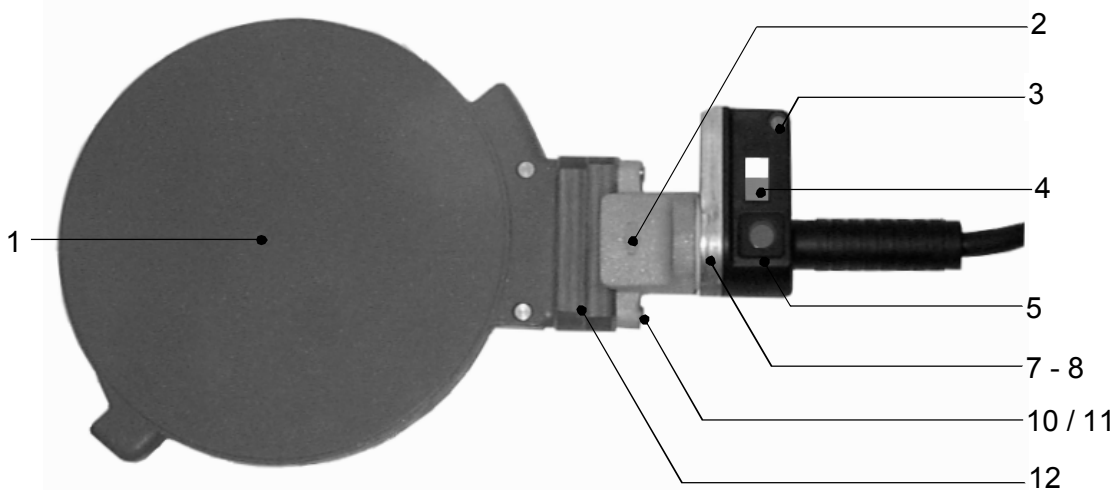
34 - 36
37
38 / 39

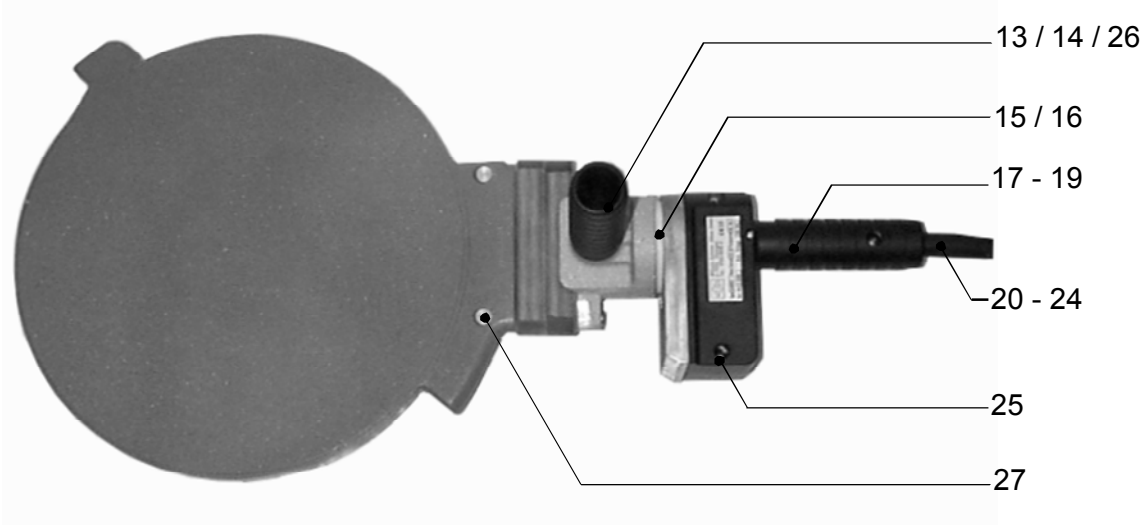
Planer WIDOS 4600 CNC 3.5

Pos.	Denomination	Piece	Order no.
1	Cover tube	1	091405
2	Underground line 1x1,5 mm²	1	EL3015GG
3	Headless pin M 5x6 DIN 916	1	0916F006
4	Connecting cable	1	EK3220
5	End sleeve for strands with ring M 4	1	EA05425
6	Toothed locked washer A 4,3 DIN 6797	1	6797D
7	Cylinder head screw M 4x6 DIN 84	1	0084D006
8	Large wheel	1	K38011
9	Ball bearing	2	L6003Z
10	Thrust washer	4	160110
11	Chain 38, 99 link	1	K38099
12	Chain joint	1	KSCH38
13	Bow grip	1	BG56520
14	Cylinder head screw M 6x16 DIN 912	2	0912F016
15	Cover	1	091404
16	Cylinder head screw M 4x16 DIN 912	2	0912D016
17	Locking bolt	1	091422
18	Grooved taper pin 4x16 DIN 1471	1	1471D016
19	Milling cutter disc, right	1	091402
20	Cylinder head screw M 8x30 DIN 912	2	0912H030
21	Shercial button	1	0319-C32
22	Pressure spring	1	FE006
23	Pipe reamer holder	1	091401
24	Ball bearing	1	L6013
25	Flat head screw M 6x16 DIN 7991	4	7991F016
26	Small wheel	1	K38076
27	Limit switch, complete	1	ES0102
28	Cover switch for planer	1	091420
29	Flat head screw M 5x10 DIN 7991	2	7991E010
30	Knife	2	MES120
31	Flat head screw M 3x8 DIN 965	8	0965C008
32	Spacer	2	MU120
33	Milling cutter disc, left	1	091403
34	Driving motor C251050 W, 230V	1	AMBF16
35	Motor switch	1	ESMBF16
36	Coal collector	1 Set	EKMBF16
37	Cylinder head screw M 8x30 DIN 912	2	0912H030
38	Bolt	1	0914101
39	Hexagon nut M 12 DIN 934	1	0934L

	Accessories:		
--	Beam for one-sided cutting	1	091417
--	Wood grip	1	091418

10.4 Heating element

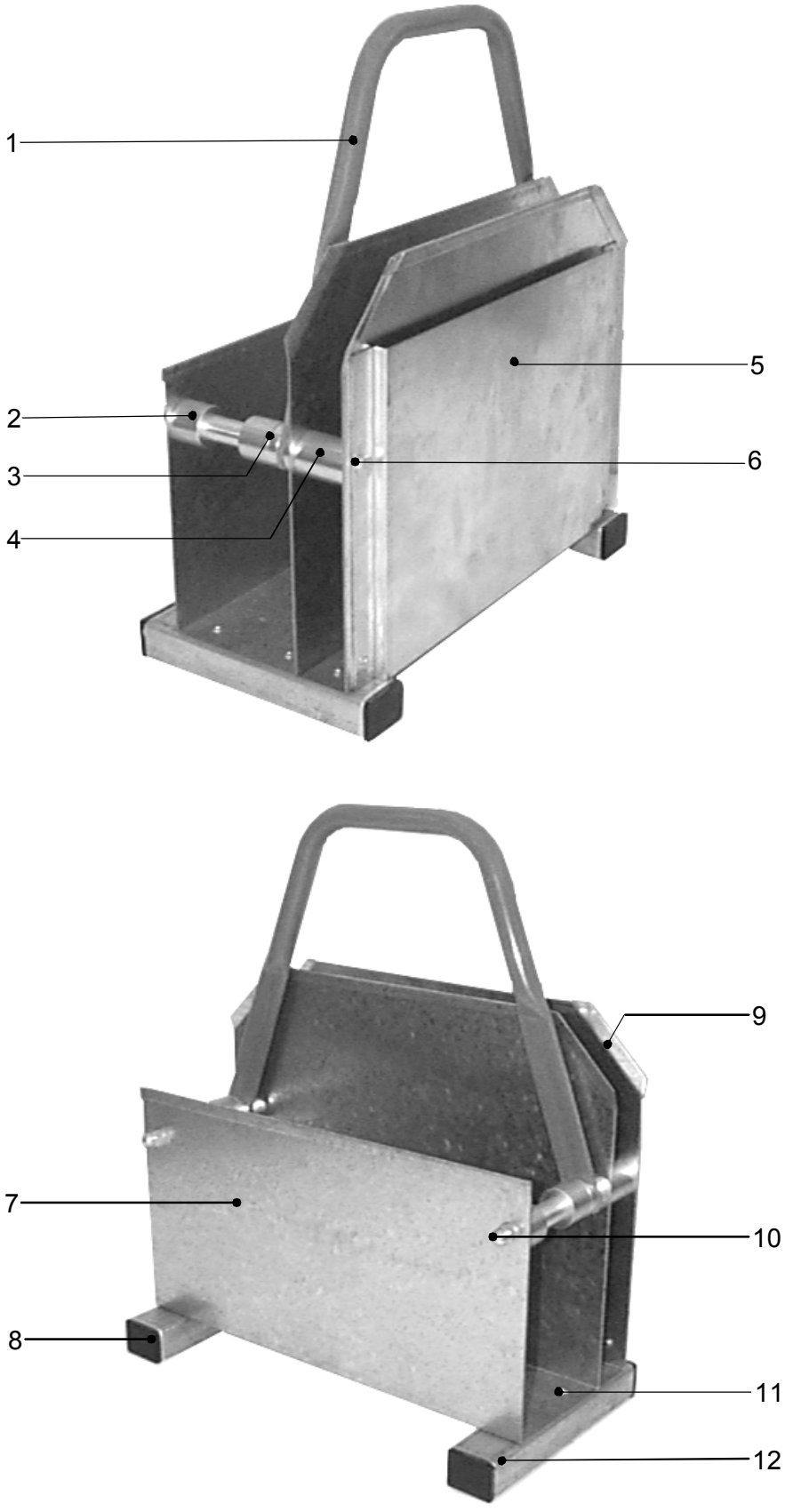




Heating element WIDOS 4600 CNC 3.5

Pos.	Denomination	Piece	Order no.
1	Heating element H 4600, 230 V	1	H4600C1
	Heating plate H 4600 C1	1	HP4600C1
	Heating plate for change	1	HPT4600C1
2	Grip joining piece	1	H0909
3	Control lamp, green	1	H2105
4	Window cap, black	1	H0907C1
5	Window cap, black	1	J0206
7	Covering	1	097558
8	PT 1000	1	H09082
10	Pan head screw M 36x75 DIN 912	2	0912F070
11	Spring ring M 6 DIN 7980	2	7980F
12	Insulator plate	2	H0902
13	Grip	1	H0906
14	Cap for heating element grip	1	H09073
15	Teflon-conical nipple for heating element	1	H09091
16	Cylinder sheet metal screw M 4,8x13 DIN 7981	3	7981E013
17	Grip shell	1	H0907C
18	Cylinder sheet metal screw M 2,9x13 DIN 7981	2	7981C013
19	Strain relief	1	H09076
20	Cable socket 16/15 f. Pg.16	1	EVK1615
21	Rubber cable (H07RN-F) 5x1,5 mm²	1	EL02515
22	Nozzle housing, 16 pole	1	EST0542
23	Bolt insert, 16 pole	1	EST0543
24	HKL-cable gland Pg 16/15	1	EVH1615
25	Pan head screw M 4x70 DIN 912	3	0912D070
26	Notch cone	1	GEW-M8
27	Threaded bolt	2	HGEW-M8

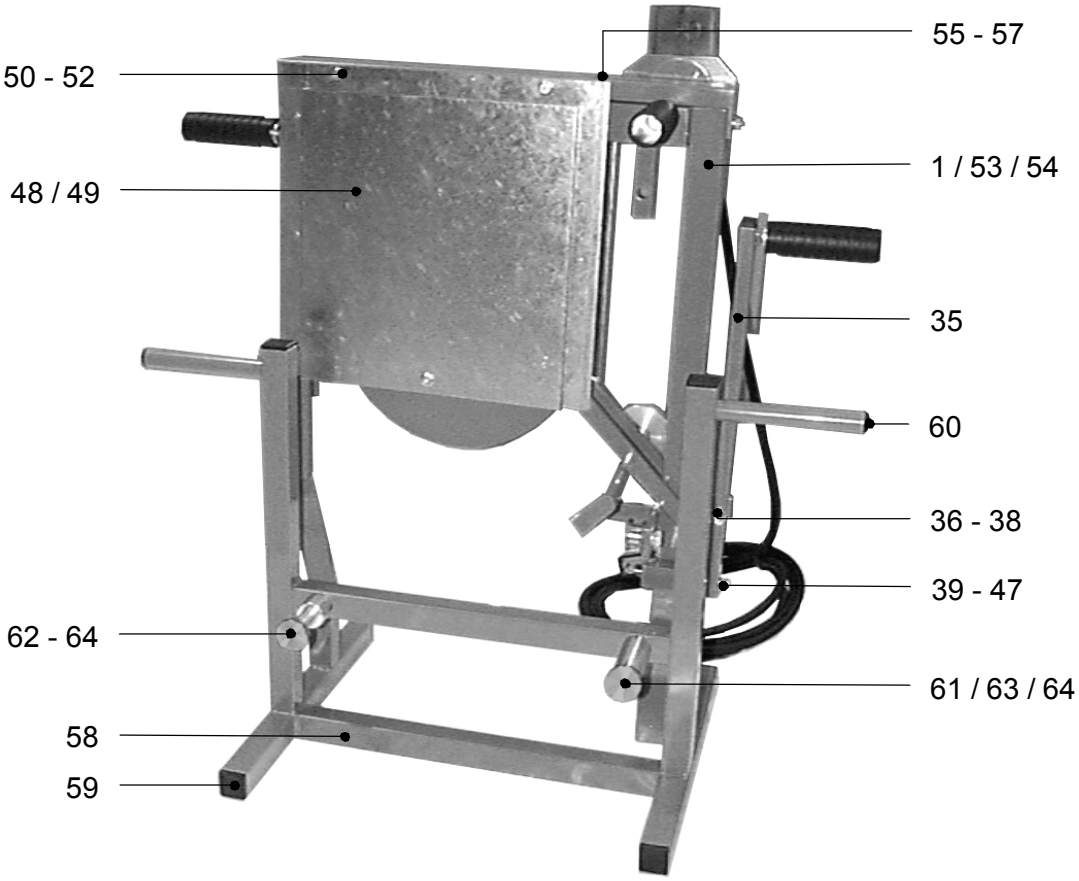
10.5 Reception box



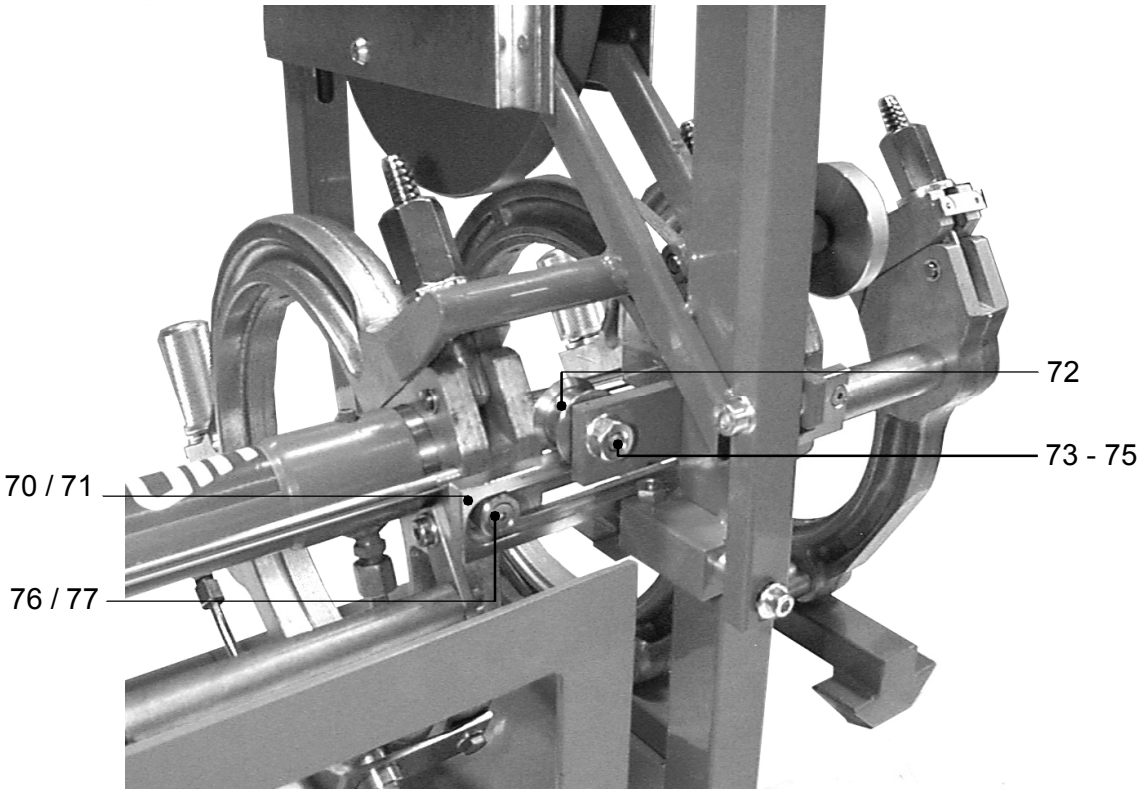
Reception box WIDOS 4600 CNC 3.5

Pos.	Denomination	Piece	Order no.
1	Stirrup	1	094527
2	Spacing bolt for planer	2	092524
3	Spacing disk for stirrup	4	094526
4	Spacing bolt for heating element	2	092525
5	Heat absorbing steel sheet	1	094528
6	Hexagon bolt M 8x160 DIN 933	2	0933H160
7	Insertion for planer	1	094522
8	Fitting cap for 4-edges Pipes, 40x30x2	4	J0203
9	Insertion for heating element	1	094523
10	Hexagon domed cap nuts 6AU M 8 DIN 1587	2	1587H
11	Blind rivet 4x10 DIN 7337	8	7337D010
12	Foot-mounting	2	094521

10.6 Automatic heating element (option)



Add-on pieces for basic machine (option)



Automatic heating element 4600 CNC 3.5 **(option)**

Pos.	Denomination	Piece	Order no.
1	Mounting for heating element	1	097530
2	Heating element holder	1	097540
3	Heating element	1	H0250E
	Heating plate new	1	HP0250E
	Heating element for change	1	HPT0250E
4	Insulator	1	H0902
5	Intermediate piece for heating plate	1	097558
6	Cup spring Ø12,5xØ6,2x0,5	8	2093F006
7	Cylinder-head screw M6x75 DIN 912	2	0912F075
8	Plug in nut	2	on request
9	Set screw M5x6 DIN 913	2	0913E006
10	Grip shell	1	H0907
11	control lamp green	1	H2105
12	Covering cap for heating element box	1	H09073
13	Insulating disc	1	H09091
14	Protection for grip shell	1	097553
15	Pan-head screw M 4x70 DIN 912	3	0912D070
16	Cylinder-self-tapping screw M4,8x16 DIN 7981	3	7981E013
17	PT 1000	1	H09082
18	Strain relief	1	H09076
19	Cylinder-self-tapping screw M2,9x13 DIN 7981	2	7981C013
20	Cable bushing 16/15 f. Pg16	1	EVK1615
21	Rubber cable (H07RN-F) 5x1,5 mm²	1	EL02515
22	Nozzle housing (16 pole)	1	EST0542
23	Pin insert (16 pole)	1	EST0543
24	HKL-screwed connection PG 16/15	1	EVH1615
25	Heating element grip	3	H0906
26	Retention pin for mouvable support	1	094544
27	Pressure spring	1	on request
28	Set collar for retention pin	1	094545
29	Pan-head screw M8x10 DIN 912	1	0912H010
30	Set screw M8 x 10 DIN 913	1	0913H010
31	Supporting roller	2	094548
32	Pan-head screw M10x25 DIN 7984	2	7984J025
33	Washer M10 DIN 125	2	0125J
34	Hexagon nut M10 DIN 934	2	0934J
35	Lever for stop	1	094547
36	Pan-head screw M8x40 DIN 912	1	0912H040
37	Washer M8 DIN 125	3	0125H
38	Hexagon nut M8 DIN 934	1	0934H
39	Unlocking pin	1	094534
40	Insert nut for support	1	094546
41	Grub screw M6x16 DIN 913	1	0913F016

Automatic heating element 4600 CNC 3.5 **(option)**

Pos.	Denomination	Piece	Order no.
42	Pressure spring	1	FE018
43	Set screw M8x10 DIN 913	1	0913H010
44	Hexagon nut M8 DIN 934	1	0934H
45	Washer M6 DIN 9021	1	9021F
46	Distance bush for unlocking pin	1	945341
47	Cylinder-head screw M6x10 DIN 912	1	0912F010
48	Heat absorbing steel sheet, inside	2	097554
49	Heat absorbing steel sheet, outside	2	097555
50	Distance washer for heat absorbing steel sheet	6	094556
51	Disc of roses M5	8	ROSM5
52	Flat-head screw M 5x15 DIN 7991	8	7991E015
53	Pneumatic cushion GS-22-300-BB-X, F=160N	1	on request
54	Hexagon nut M8 DIN 934	1	0934H
55	Upper cover for frame	1	097550
56	Washer M6 DIN 125	2	0125F
57	Hexagon nut M6 DIN 934	2	0934F
58	Reception box	1	097559
59	Fitting cap 30x30x2	6	J0206
60	Fitting cap Ø20x2	2	on request
61	Bolt, right hand for recetion box	1	167556
62	Bolt, left hand for reception box	1	167557
63	Hexagon-head screw M8x45 DIN 933	2	0933H045
64	Washer M8 DIN 125	2	0125H
	Add-on pieces for basic machine:		
70	Guide for supporting rollers	1	094549
71	Pan-head screw M6x30 DIN 912	2	0912F030
72	Supporting roller	2	094548
73	Pan-head screw M10x40 (shortened)	2	on request
74	Hexagon nut M 10 DIN 934	2	0934J
75	Washer M 10 DIN 125	2	0125J
76	Roller for guide	1	094536
77	Flat-head screw M6x30 DIN 7991	1	7991F030

11. Declaration of conformity

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

Company WIDOS GmbH
Einsteinstr. 5
D-71254 Ditzingen-Heimerdingen

declares under own responsibility that the product

Heating element butt welding machine with CNC control unit
WIDOS **4600 CNC 3.5**

to which this declaration refers corresponds to the following norms and normative 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 60950
   Safety of equipments of the information technology

4. DIN EN 4413
   Safety specifications for fluid technical installations and components

5. EN 60555, EN 50082, EN 55014
   Electro-magnetic resistance

The technical documentation is completely available.

Ditzingen-Heimerdingen, 21.05.2012

Martin Dommer (Technical director)