

*Instruction and Mounting Manual
for the WRW Welding System*





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Congratulations for choosing our high-quality WRW welding system.

With this joining technology you make use of the expertise knowledge of the practice-proven welding technology for all your projects. To allow you an easy and quick start and a successful installation of our WRW welding system on a long term, we have gathered for you on the following pages all necessary information and hints for a secure application and an appropriate handling.

Please carefully read the following instructions before the installation process and handling of all devices and tools.

WRW Westfälische Rohrwerke GmbH

1. Handling of welding tools

1.1 Description and technical data

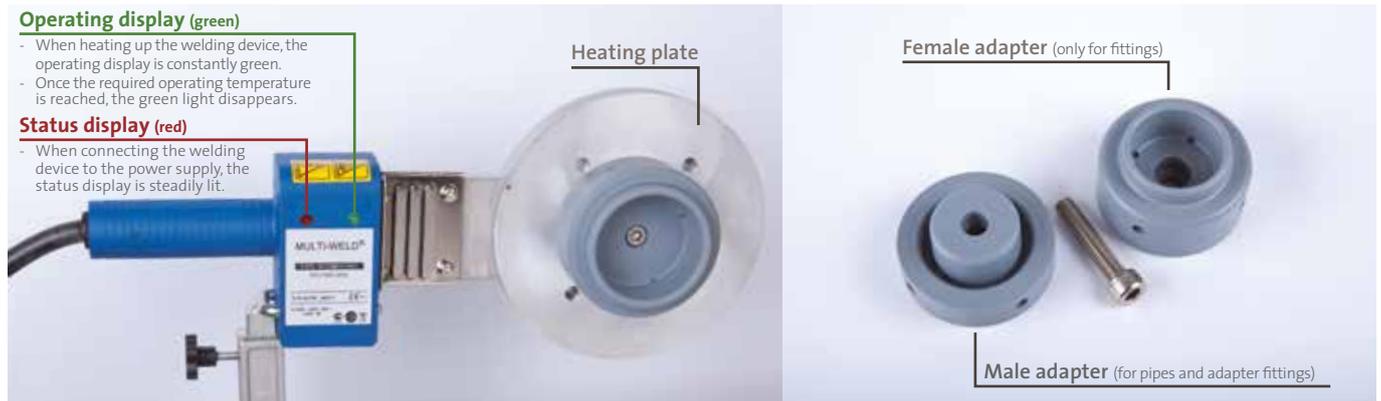


Fig. 1: Welding device

Fig. 1.1: Welding tools

Type of machine:	MULTI-WELD welding device
Outer diameter of pipe:	20 mm - 110 mm
Performance:	watts (W)
Power supply:	230 V - 50/60 Hz
Operating temperature:	220 - 240 °C

1.2 Safety instructions for mandatory observation!

- Just original MULTI-WELD welding devices and MULTI-WELD welding tools must be used.
- The heating device may not be left unattended while it is being under operation. Please note that there must be enough distance to any flammable objects. Pull out the power plug!
- Caution when handling! Check always whether the welding device is still hot.
- Caution: Risk of burns! Please consider the heat still left after disconnecting the power supply!
- We recommend wearing appropriate clothing while welding e.g. protective gloves against heat.
- During the welding process, please make sure that there is sufficient ventilation! Do not inhale fumes!

2. Commissioning

Control whether the power plug has been disconnected! Check the welding device temperature with a surface temperature measuring instrument!

3. Mounting of welding tools

Check whether all welding devices and tools are free from damage and impurities. If necessary clean the welding tools with a non fibrous, coarse tissue dampened with spirit. When the welding tools are still cold they have to be screwed manually always in pairs opposite each other on the heating plate until being hand-tight.

Mount the welding tools by ensuring that the relevant contact surface does not pass or rather slightly pass over the edge of the heating plate. (e.g.: fig. 2 and 3). After reaching the operating temperature the welding tools must be eventually retightened!

Attention!

Please note that no sharp-edged objects shall be used for cleaning purposes! Those could damage the TEFLON coating of the welding tools and thus may have a negative influence on the welding result. Damaged welding tools are to be exchanged.



Fig. 2: Heating element with welding tools



Fig. 3: Heating element with welding tools \varnothing 75 mm \varnothing 40 mm / \varnothing 50 mm / \varnothing 40 mm / \varnothing 50 mm and \varnothing 63 mm

4. Heating up of MULTI-WELD welding device incl. welding tools

Plug in the MULTI-WELD welding device to 220 to 230 V power supply and check whether the operating display is green and the status display is constantly red. Depending on the ambient temperature it takes 10 to 30 minutes to heat up the heating plate including the welding tools mounted on it.

When reaching the operating temperature (220 – 240 °C) the green lamp turns off.

According to the DVS welding guideline the surface temperature of both welding extensions have to be checked by means of a rapidly registering temperature measurement instrument before the welding procedure.

Appropriate commercial practice measuring devices have to measure a temperature of up to 350 °C with a high accuracy such as the measuring instrument EGB Infra Therm 380 (Art.-no. 758 955)! Control the firm hold of the welding tools in hot state and if necessary retighten them with a suitable fixing screw.

Attention!

The first welding can be done soonest 5 minutes after reaching the welding temperature!



Fig. 4: Example of a surface temperature measurement on a front bead of a heating element \varnothing 75 mm



Fig. 5: MULTI-WELD signal watch

To guarantee the required heating up times of the pipe end and the relevant socket of the fitting, a MULTI-WELD signal watch shall be used. For the duration of the heating phase for each dimension, please refer to the table being printed on the top of the signal watch. These data and further requirements for the processes during and after the corresponding welding process are indicated in table 1 (page 10) of this instruction manual.

5. *Instructions for handling the MULTI-WELD welding device and the welding tools*

- a) After each reassembly and after each change of welding tools, also on a heated device, the operating temperature must be checked by means of a surface temperature measuring device once the heating up procedure is finished. The complete fixation of the welding tools on the heating plate must be controlled and if necessary to be corrected. Subsequently, the surface temperature has to be measured on the front edge of the heating plate and on the welding tools (fig. 4).
- b) In case the device has been switched off for a longer period, the heating up process has to be restarted. The surface temperature of the welding tools has to be checked by measuring.
- c) After use, turn off the welding device and let it cool down. Never cool down the welding device with water. Otherwise the heating resistances could be destroyed.
- d) To avoid any damages, do not lay the welding device on the TEFLON coated tools, but place it on a suitable heat resistant pad or on the rack which is included to each delivery and which shall be fixed to a workbench.
- e) Damaged or dirty welding tools may not be used anymore and must be replaced as only with technically flawless processing tools perfect connections can be made.
- f) Never attempt to open or repair defective devices. Return a defective device for repair!
- g) To ensure a permanent and adequate function, the surface temperature of the MULTI-WELD welding device must be checked on a regular basis by means of a suitable measuring instrument.
- h) For the handling of welding tools the „General Regulations for Protection of Labour and Prevention of Accidents“, and particularly the ‘Regulations of the Employers Liability Insurance Association of the Chemical Industry regarding Machines for the Processing of Plastics, (chapter: Welding Machines and Welding Equipment)’ must be observed.
- i) For the handling of the MULTI-WELD welding device and tools, please observe the General Regulations DVS 2208 Part 1 of the German Association for Welding Engineering, Registered Society (Deutscher Verband für Schweißtechnik e.V.

6. Handling of MULTI-WELD signal watch

For a reliable observance of welding times and the prevention of inaccuracy, it is recommended to use a MULTI-WELD signal watch which is to be handled as follows:

- Step 1:** While pressing the buttons MIN and SEC at the same time, the measuring instrument is reset to baseline conditions and the indication „00 00“ appears on the display.
- Step 2:** Insert the second value by repeatedly pressing the button SEC. (Please pay attention to the note in the column under remarks in table 1 regarding welding times to be adapted!)
- Step 3:** Start the countdown by pressing once the button START/STOP.
- Step 4:** Once the specified time has elapsed, a signal tone sounds. Pressing the START/STOP button mutes the alarm. The previously set duration appears on the display again. By pressing the START/STOP button, a countdown is now ready to be started again.

Attention: The device is equipped with a fold-out supporting unit as well as a permanent magnetic surface on its back!



7. Preparation of a WRW welding system connection

The procedure described in the following is significant for correct WRW welding system connections!

- Step 1:** Heat up the MULTI-WELD welding device according to the instructions as specified under section 4.
- Step 2:** Preparation of the multilayer pipe of the WRW welding system as described under section 7, see figures 6 and 7.
- Step 3:** Make an optical check of fitting (fig 8) and pipe (fig 9 and 10). To insure a perfect connection of pipe and fitting, all parts must be free from impurities and grease. Eventually, pipe and fitting must be cleaned with PE cleaner e.g. Tangit PE Special Cleaner before welding and protected against an anew impurity. Do not store the fittings together with grease or other material and also avoid any contact with such materials.
- Step 4:** Mark the insertion depth of the pipe into the fitting according to the specifications given in table 1 (see page 10, fig 11). In order to weld pipe and fitting together according to the installation planning, you can place opposite the marking of the insert depth on the pipe an additional marking on the edge of the fitting sleeve!
- Step 5:** Introduce the pipe into the plug and the fitting onto the socket. Insert straight, don't turn or align (fig 12)! The duration of this process is not part of the heating up time!
- Step 6:** The heating up time according to the specifications given in table 1 (see below) only starts when pipe and fitting are fully inserted until the stop.
- Step 7:** Start the countdown, preferably by means of a MULTI-WELD signal watch (for operating instruction, see below). Keep pipe and fitting in the correct position during the heating up procedure which depends on the heating up time of the relevant pipe outer diameter according to the specifications given in table 1.
- Step 8:** After the prescribed heating up time (signal watch starts beeping) remove pipe and fitting rapidly and without rotation from the welding machine and push them directly in an appropriate alignment together without any rotation. When additionally marking the fitting, both markings have to be positioned appropriately before assembling. The correct insertion depth must be checked using the previously set marking (see fig. 13).
- Step 9:** The pipe must not be overheated or inserted too deep into the fitting. This could lead to counterproductive narrowing flow channels by uncontrolled flow of material.
- Step 10:** During the processing period according to table 1 (see below), a slight allignment of the joint is allowed, but a pipe rotation within the fitting has to be avoided. Afterwards the joint has to be fixed according to the specifications as given in table 1 until the cooling period has finished so that an unintentionally influence on the welding connection is avoided. After cooling time is finished, the joint has reached its full strength!

Caution!

To guarantee a reliable welded joint, the following indications especially regarding safety introductions, temperatures and processing times (see table 1) are strictly to be observed.



Fig. 6: Cut the multilayer pipe of the WRW welding system (diameter range \varnothing 20 mm to \varnothing 75 mm) right angled with a pipe cutter.



Fig. 7: Make a visible edge all over the pipe end (inside the pipe) by using a universal beveling tool.



Fig. 8 Make an optical check of fittings if the connection profile is free of impurities and if appropriate to remove any existing dirt and the protective caps!



Fig. 9 Make an optical check of pipe end if the chamfer is running around the pipe and if the parts are free from impurities.

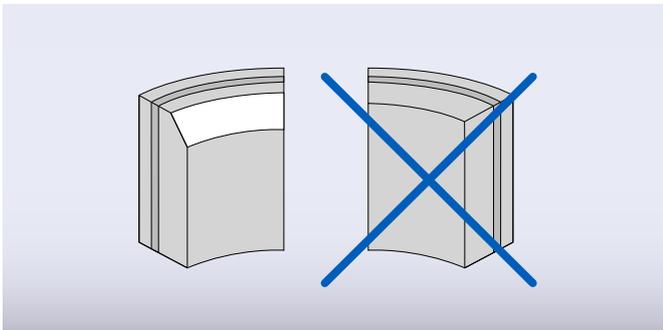


Fig. 10: Right/Wrong



Fig. 11: Mark the welding insertion depth on the pipe end.



Fig. 12: Heating up fitting profile and pipe end.



Fig. 13: Join pipe and fitting up to the marking.

Important indication!

The specifications given in table 1 are dependent on the relevant outer diameter of the pipe with regard to insert depths, heating up, processing and cooling times are to be observed. These values apply at ambient temperatures of +5 up to +25 °C!

Pipe ends which have been heated once on a welding tool and have not been connected within the processing time given have to be trimmed to length of 3 x D!

Fittings which have been heated once on a welding tool and have not been connected within the processing time given must not be used anymore!

8. Table 1: Relevant data for welding procedure

Pipe outer Ø mm	Insertion depth mm	Heating up time*) sec.	Processing time**) sec.	Cooling time min.	Remarks
20	5	5	4	10	The times given are valid for ambient temperatures of +5 up to +25 °C. Outside this temperature range, heating up times have to be increased or reduced! *) Specification of heating up times of WRW welding system: The required welding temperature of the welding tools must be between 220 and 240 °C! **) When heating time has expired, the pipe must not be inserted into the fitting sleeve anymore!
25	5	6	4	10	
32	6	6	4	10	
40	7	10	5	15	
50	8	12	5	15	
63	9	12	5	15	
75	9,5	14	6	20	

9. Types of WRW welding system connections

The WRW welding system offers two different alternatives for welding connections:

Type A: Welding of a fitting (couplings, elbows, tee pieces, etc.) to a multilayer pipe.

Type B: Welding of a fitting (preferably elbows and tee pieces) by means of an adaptor fitting for reduction. For this, the connection parts of the adapter to be inserted into the fitting body corresponds to the pipe dimensions and thus is the only fitting type to be heated up with a suitable male adapter whereas the fitting sleeve to be adapted is heated up simultaneously by using a female adapter!

Important indication!

All instructions with regard to WRW welding system connections according to table 1 are applicable for both connection types (A and B) and must be strictly observed during all welding procedures!

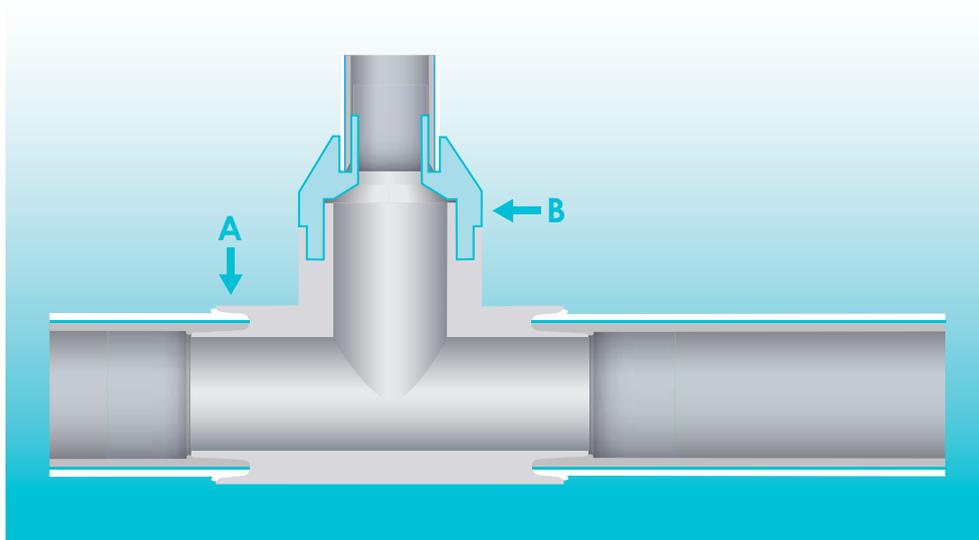


Fig 14: Welded WRW welding system tee piece in cross section

Type A: The multilayer pipe is bonded directly with the inlet and outlet sleeves of the tee piece.

Type B: The adapter fitting is bonded with the outlet sleeve of the tee piece whereas the welding sleeve of the adapter fitting is welded with a multilayer pipe having a smaller outer diameter.

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