

OPERATION AND MAINTENANCE MANUAL

aquatherm welding device Art.-No. 50336, 50337, 50341

Fusion for

aquatherm green pipe, aquatherm blue pipe, aquatherm lilac pipe, aquatherm red pipe and aquatherm ti
pipesystems from 16 up to 125 mm



aquatherm
state of the pipe

PART A: MOUNTING OF THE TOOLS

IMPORTANT!

Only use the original aquatherm welding devices and aquatherm welding tools, except devices and tools which are especially approved by aquatherm.



2. Assemble and tighten the cold welding tools manually.
3. Before fusing the distribution block, in which two connections are fused simultaneously, the welding tools have to be placed into the respective holes as described in the adjoining table A and drawing B.
4. All welding tools must be free from impurities. Check if they are clean before assembling. If necessary clean the welding tools with a non fibrous, coarse tissue and with methylated spirit.

Place the welding tools on the welding device so that there is full surface contact between the welding tool and the heating plate. Welding tools over $\varnothing 40$ mm must always be fitted to the rear position of the heating plate.

Electric supply:

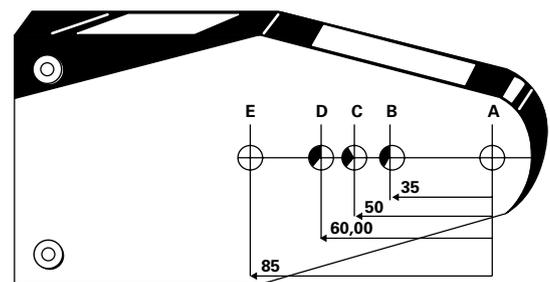
The power supply must coincide with the data on the type plate of the welding device and must be protected according to the local regulations. To avoid high power loss, the conductor cross-section of the used extension cables must be selected according to the power input of the welding devices.

6. Plug in the welding device. Depending on the ambient temperature it takes 10-30 minutes to heat up the heating plate.

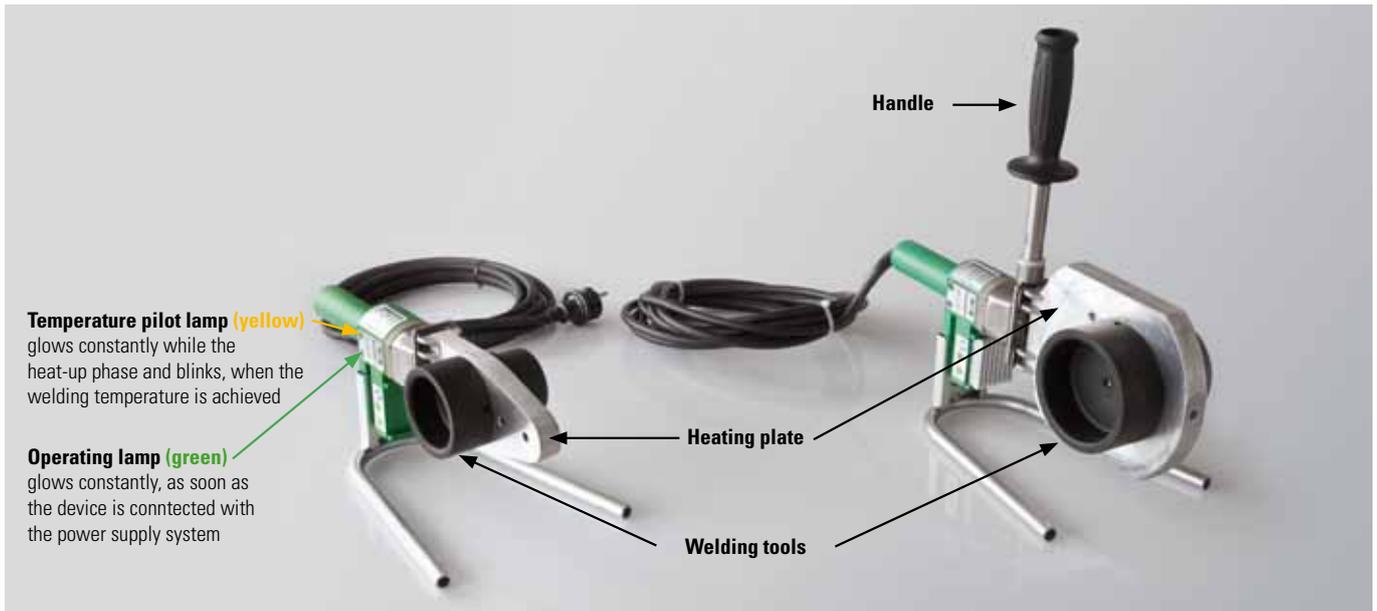
A

Art.-No.	Passage	Hole	Branch	Hole
30115	$\varnothing 25$ mm	A + E	$\varnothing 20$ mm	A + C
85123	$\varnothing 20$ mm	A + B	$\varnothing 16$ mm	A + C
85124	$\varnothing 20$ mm	A + B	$\varnothing 16$ mm	A + C

B



PART A: HEATING UP PHASE / HANDLING



Temperature pilot lamp (yellow)

glows constantly while the heat-up phase and blinks, when the welding temperature is achieved

Operating lamp (green)

glows constantly, as soon as the device is connected with the power supply system

Part A: Heating up phase

7. During the heating up phase tighten the welding tools carefully with the Allan key.

Take care that the tools completely contact the heating plate. Never use pliers or any other unsuitable tools, as this will damage the coating of the welding tools.

8. The temperature of 260° C is required for the welding of aquatherm PP-R pipes.

Acc. to DVS-Welding Guidelines the temperature of the welding device has to be checked at its tool before starting the welding process.

This can be done with a fast indicating surface thermometer.

ATTENTION:

First welding - soonest 5 minutes after reaching of the welding temperature. DVS 2207, Part 11.

Part A: Handling

9. A tool change on a heated device requires another check of the welding temperature at the new tool (after its heating up).
10. If the device has been unplugged, e.g. during longer breaks, the heating up process, has to be restarted (see item 6).
11. After use unplug the welding device and let it cool down. Water must never be used to cool the welding device, as this would destroy the heating resistances.
12. Protect aquatherm-welding devices and tools against impurities. Burnt particles may lead to an incorrect fusion. The tools may be cleaned with aquatherm cleaning cloths, Art.-No. 50193.

Always keep the welding tools dry.

13. After welding, do not lay the the device on the Teflon coated tool, but put it down in the provided supporting stand.

14. For a perfect fusion, damaged or dirty welding tools must be replaced, as only impeccable tools guarantee a perfect connection.

15. Never attempt to open or repair a defective device. Return the defective device for repair.

16. Check the operating temperature of aquatherm-welding devices regularly by means of suitable measuring instruments.

PART A: GUIDELINES

PART B: CHECKING OF DEVICES AND TOOLS

Part A: Guidelines

17. For the correct handling of welding machines the following must be observed:

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“.

18. For the handling of aquatherm-welding machines, devices and tools please observe General Regulations DVS 2208 Part 1 of the German Association for Welding Engineering, Registered Society (Deutscher Verband für Schweißtechnik e. V.).

Part B: Checking of devices and tools

1. Check, if the aquatherm-welding devices and tools comply with to the guidelines "Fusion Part A".

2. All used devices and tools must have reached the necessary operating temperature of 260 °C. This requires acc. to "Fusion Part A, item 8" a separate test, which is indispensable (DVS - Welding Guidelines):

Suitable measuring instruments have to measure a temperature of up to 350° C with a high accuracy.

NOTE:

aquatherm recommends the original aquatherm temperature measuring device art.-no. 50188

PART B: PREPARATION FOR THE FUSION

3. Cut the pipe at right angles to the pipe axis. Only use aquatherm pipe cutters or other suitable cutting pliers. Take care that the pipe axis is free from burrs or cutting debris and remove where necessary.

4. Mark the welding depth at the end of the pipe with the enclosed pencil and template.

5. Mark the desired position of the fitting on the pipe and / or fitting. The markings on the fitting and the uninterrupted line on the pipe may be used as a guide.



Measurement of temperature at the aquatherm manual welding device (800W)



Measurement of temperature at the aquatherm welding machine



Measurement of temperature at the aquatherm butt-welding machine



Cutting of the pipe



Marking of the welding depth

PART B: HEATING OF PIPE AND FITTING

Heating of pipe and fitting

6. Push the end of the pipe, without turning, up to the marked welding depth into the welding tool.

It is essential to observe the above mentioned heating times.

Pipes and fittings of the dimensions \varnothing 75 to 125 mm can only be welded with welding device Art.-No. 50141 (or with machine Art.-No. 50147). On using the aquatherm-welding machine Art.-No. 50147 a separate operating instruction has to be observed.

ATTENTION:

The heating time starts, when pipe and fitting have been pushed to the correct welding depth on the welding tool. Not before!

PART B: SETTING AND ALIGNMENT

7. After the required heating time quickly remove pipe and fitting from the welding tools. Joint them immediately, and without turning, until the marked welding depth is covered by the PP-bead from the fitting.

ATTENTION:

Do not push the pipe too far into the fitting, as this would reduce the bore and in an extreme case will close the pipe.

8. The joint elements have to be fixed during the specified assembly time. Use this time to correct the connection. Correction is restricted to the alignment of pipe and fitting. Never turn the elements or align the connection after the processing time.
9. After the required cooling time the fused joint is ready for use.

The result of the fusion of pipe and fitting is a permanent material joining of the system elements. Connection technique with security for a life-time.

The fusion is subject to the following data

Pipe external- \varnothing	Welding depth	Heating time		Welding time	Cooling time
		sec. DVS	sec. AQE*		
16	13,0	5	8	4	2
20	14,5	5	8	4	2
25	16,0	7	11	4	2
32	18,0	8	12	6	4
40	20,5	12	18	6	4
50	23,5	18	27	6	4
63	27,5	24	36	8	6
75	30,0	30	45	8	8
90	33,0	40	60	8	8
110	37,0	50	75	10	8
125	40,0	60	90	10	8



Heating-up of pipe and fitting



Joining, fixing and...



...aligning



The result: a permanent connection!

*heating times recommended by aquatherm at ambient temperatures below + 5 °C

Dimension 160 - 630 mm:

The dimension 160 - 630 mm are joined by butt-welding.

PART B: UNIVERSAL PEELING TOOLS

By using the aquatherm universal peeling tools the end pieces of the aquatherm OT (oxygen tight), UV (UV-resistant) and MS (multilayer stabi) pipes can be peeled. By the uniform removal of the outer layer of the pipe any extension of the pipe system by electrofusion socket or fitting is possible. The universal peeling tools are available in the sizes Ø 20- Ø 125 mm (Art.-No. 50479 – 50488). The peeling process is done either mechanically or manually. For the mechanical processing two attachment plates for pipe sizes Ø20- Ø63 mm (Art.-No. 50499) and Ø75- Ø125 (Art.-No. 50500) mm are available. For the mechanical processing of the electrofusion sockets the peeler is extended by an attachment (Art.-No. 50489 – 50498). The power drill should have a high torque.

1. INSTRUCTIONS FOR THE MECHANICAL PEELING PROCESS

- 1.1. The attachment plate is clamped with the hexagon bolt in the power drill.
- 1.2. The peeler is fixed with its screws in the slot matching the diameter of the attachment plate and rotated clockwise so that the peeler adheres to the attachment plate.
- 1.3. The peeling tool clamped on the chuck is set by the lead to the end of the pipe.
- 1.4. The peeling process starts with rotation of the peeling tool upon slight force in axial direction. The peeling operation is completed when the attachment plate strikes against the pipe end.
- 1.5. The pipe now can be welded by socket welding method.

2. INSTRUCTIONS FOR THE MECHANICAL PEELING PROCESS FOR ELECTROFUSION SOCKETS

- 2.1. The extension is centered with the peeler through the superimposed chamfer fit and fastened with three Allen screws.
- 2.2. The attachment plate is clamped with the hexagon bolt in the power drill and connected with the peeling tool (see photo 1.2.).
- 2.3. The peeling process starts with rotation of the peeling tool upon slight force in axial direction. The peeling operation is completed when the carrier plate strikes against the pipe end.
- 2.4. The peeling tool is withdrawn from the pipe and the E-socket welding process can start.

3. PEELING INSTRUCTIONS FOR MANUAL PEELING

- 3.1. For the manual peeling two handles are mounted at the peeling tool.
- 3.2. The peeling tool is pushed onto the untreated pipe up to the stop.
- 3.3. The peeling tool is turned clockwise as long as the marked peeling depth (see table) is reached.
- 3.4. If the specified/marked peeling depth (see table) is reached, the peeling tool is removed and the socket welding process can start. If the electric socket can be used as a sliding sleeve, the peeling depth for the electric socket welding (see table) must be doubled.





**TABLE OF PEELING DEPTH:
SOCKET AND ELECTRIC SOCKET WELDING**

Diameter	Peeling depth Socket welding	Peeling depth Electric socket welding
ø 20	16 mm	39 mm
ø 25	20 mm	43 mm
ø 32	22 mm	45 mm
ø 40	25 mm	50 mm
ø 50	28 mm	56 mm

Diameter	Peeling depth Socket welding	Peeling depth Electric socket welding
ø 63	32 mm	65 mm
ø 75	34 mm	69 mm
ø 90	37 mm	77 mm
ø 110	42 mm	85 mm
ø 125	44 mm	90 mm

PART C: WELD-IN SADDLES

aquatherm-weld-in saddles are available for pipe outer diameter of 40 - 630 mm.

Weld in saddles are used for

- branch connections in existing installations
- the substitution of a reduction-tee
- branch connections in risers
- sensor wells, etc.

1. Before starting the welding process, check whether the aquatherm-welding devices and tools comply with the requirements of "Fusion Part A".
2. The first step is to drill through the pipe wall at the intended outlet point by using the aquatherm-drill (Art.-No. 50940-50956).

3. IMPORTANT!

Only the oxygen barrier layer of the aquatherm blue pipe OT Art.-No. 2170708-2170138 must be removed with the mentioned aquatherm special peeling drills mentioned in the table beside.

For this the special peeling drill is inserted into the bore hole and swayed 2-3 times with light pressure and low rotating speed between the pipe walls until the oxygen barrier layer is completely peeled off.

Remove burrs, debris and other dirt with a chamfering tool or the aquatherm cleaning wipes. Do not touch the peeled surface any more and protect it from new pollution.

When using aquatherm green pipe -stabi composite pipes remove the rest of the aluminium remaining at the bore hole with the aquatherm-chamfering device.

4. The welding device/saddle welding tool must have reached the required operating temperature of 260 °C (check with reference to "Fusion Part B, item 2").
5. The welding surfaces have to be clean and dry.
6. Insert the heating tool on the concave side of the weld in saddle tool into the hole drilled in the pipe wall until the tool is completely in contact with the outer wall of the pipe. Next the weld-in saddle tool is inserted into the heating sleeve until the saddle surface is up against the convex side of the welding tool. The heating time of the elements is generally 30 seconds.
7. After the welding tool has been removed, the weld-in saddle tool is immediately inserted into the heated, drilled hole. Then the weld-in saddle should be pressed on the pipe for about 15 seconds. After being allowed to cool for 10 minutes the connection can be exposed to its full loading. The appropriate branch pipe is fitted into the sleeve on the aquatherm-weld-in saddle using conventional fusion technology.

By fusing the weld-in saddle with the pipe outer surface and the pipe inner wall the connection reaches highest stability.



Drilling through the pipe wall



Removal of the oxygen barrier layer from the aquatherm blue OT-pipe

aquatherm saddle peeling tools for **aquatherm blue pipe ot** pipes ø 50-125 mm

Art.-No.	Dimension
50921	for weld-in saddles ø 20 & 25 mm
50922	for weld-in saddles ø 32 mm
50924	for weld-in saddles ø 40 mm
50926	for weld-in saddles ø 50 mm
50928	for weld-in saddles ø 63 mm

aquatherm saddle peeling tools for **aquatherm blue pipe ot** pipes ø 160-250 mm

Art.-No.	Dimension
50421	for weld-in saddles ø 20 & 25 mm
50422	for weld-in saddles ø 32 mm
50424	for weld-in saddles ø 40 mm
50426	for weld-in saddles ø 50 mm
50428	for weld-in saddles ø 63 mm



The welding tool is inserted into the pipe wall ...



...heating-up of the elements



Joining



Ready!

SAFETY STANDARDS

1. This equipment must only be used in full compliance with the instructions given in this manual. All other uses are to be considered improper and forbidden. Improper use may cause injury to the machine operator or third parties and/ or cause damage to the machine or other objects.

2. All standards concerning health and safety in the workplace must be implemented at all times.

3. Before using the machine personnel must be properly trained in its operation and in applicable accident-prevention regulations.

4. The components used in the construction of the machine and its operating principles are such that special care should be taken to carry out the following instructions:

4.1. Electric power supply:

Make sure the mains electricity supply is suitable for the machine. Do not use an electricity supply which is subject to voltage surges or drops. Use a guaranteed mains supply or power generators fitted with voltage stabilizers. Make sure the machine's power socket is protected with a high sensitivity differential switch ($I_{\Delta}=30$ mA) and that the machine has an earth connection.

4.2. Electricity:

Even if designed and manufactured in full accordance with applicable standards and fitted with all the required safety devices, electrically powered machinery nonetheless poses a risk to safety due to the nature of this type of energy (i.e. risk of electric shock). Do not expose the machinery and its electrical cables to the rain, to chemicals, to mechanical stress (e.g. vehicles driving across the cables). Use perfectly dry pipes and connectors. Do not use the machine if your hands are wet or the workplace is moist or damp.

4.3. Avoiding burns:

Do not touch the heating element, metal components or plastic parts close to the welding surface during heating, welding or cooling, since the plate reaches very high temperatures. Operate the machine with the utmost care. Wear heatproof gloves and protective clothing suitable for preventing burns.

4.4. The workplace:

Make sure that unauthorized persons are unable to gain access to the workplace. The workplace must be clean, tidy, properly ventilated and well lit. There should not be any gases, fumes or flammable materials present, such as solvents, oils, paints, etc. These may constitute a fire risk if they come close to the heating element. Keep any objects or materials susceptible to heat damage well away from the machine. When working in tight, awkward places an external supervisor must be present to provide assistance to the machine operator in case of need.

4.5. Checks and repairs:

Before using the machine check that no components are damaged. Replace cables or components as soon as they become worn. Repairs must be carried out only by an expert or specially trained technician using exclusively original spare parts. Dismantling the machine involves a risk of electric shock. No alterations may be made to the machine.

4.6. Presence of the operator at all times during operation:

The machine operator must not leave the machine while it is welding or heating up.

4.7. Use pipes that are chemically inert: Do not carry out any welding operations on pipes containing, or which may have contained, substances which when heated generate explosive gases or other gases dangerous to the human body.

4.8. Support: Position the welding machine using only the proper fork or bench supports.

4.9. Take care with cables: Do not disconnect plugs, sockets or connectors or move the machine by pulling on the electric cables.

4.10. Finally...: After work, remember to disconnect the welding machine from the mains or supply socket.

4.11. The machine must not be used in areas where there is a risk of explosion or fire. Only specially designed and manufactured machines must be used in workplaces of this kind.

5. The manufacturer and dealer will not be liable for personal injury or damage to property arising from the improper use of the machine.

6. WARNING

In the event of a fault of any kind during the guarantee period, send the machine to the manufacturer or an authorized repair centre. Having repair work carried out by personnel not authorized by aquatherm will immediately invalidate the warranty