



INDUSTRIAL EQUIPMENTS PVT. LTD.

AquaWeld 15 • AquaWeld 20

Water Cooling Unit for Welding Torches

Closed-circuit recirculation • 15 and 20 litre tank • single phase



INSTRUCTION MANUAL

Please read this manual carefully before using the unit

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Before You Begin

About this manual

This manual covers the Cruxweld **AquaWeld 15** and **AquaWeld 20** water cooling units. The two models are identical in principle and differ only in tank capacity, cooling capacity and the way they are moved about the shop. Where a statement applies to one model only, the model is named. Everything else applies to both.

The unit circulates clean water through a water-cooled welding torch and its cables, carries the heat back to a radiator and returns the cooled water to the tank. It is not a welding power source and produces no welding current of its own.

READ THIS FIRST

Before the unit is started, read the contents of this manual. Keep the manual in a place known to every user for the whole working life of the machine. Only a qualified electrician may connect the unit to the supply, and only a trained operator may work with it.

Declaration

- This cooling unit is intended for industrial and professional use and conforms to the international safety standards for arc welding equipment and its accessories.
- Cruxweld provides a guarantee of one year on this equipment from the date of purchase, on the terms set out at the end of this manual.
- The contents of this manual may be revised without prior notice.
- This machine is not designed to be serviced in the field. Return it to the Cruxweld service centre for any repair work.

How this manual is arranged

Section	What it covers
1. Safety	Hazards, safety symbols and the precautions that must be taken
2. General description	What the unit does, its main parts and the two models
3. Technical data	Ratings for both models, the rating plate and its symbols
4. Principle of operation	The closed cooling circuit and how it works
5. Installation	Siting, supply, filling and connection to the welding machine
6. Controls and operation	Controls, starting, running and stopping the unit
7. Coolant	Which fluid to use, antifreeze, and changing the coolant
8. Maintenance	Schedule, cleaning, draining and storage
9. Fault finding	Symptoms, causes and remedies
10. Parts list	Exploded views and part numbers for both models

Conventions used in this manual

- Panel controls are printed in small capitals, for example **INLET**, **OUTLET**.
- A boxed **WARNING** marks a hazard that can cause death or serious injury.
- A boxed **CAUTION** marks a hazard that can damage the machine or spoil the work.
- A shaded note gives practical advice that is not a safety matter.

Throughout this manual the word **coolant** means the fluid circulating in the system: clean water, or clean water mixed with the correct antifreeze.

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1 Safety

Welding and cutting are dangerous to the operator, to people in or near the work area and to the surroundings if the equipment is not used correctly. The cooling unit works with mains electricity, with a rotating fan and pump, and with hot fluid. Read and understand this manual before the unit is installed and used, and follow the safety regulations that apply at your site.

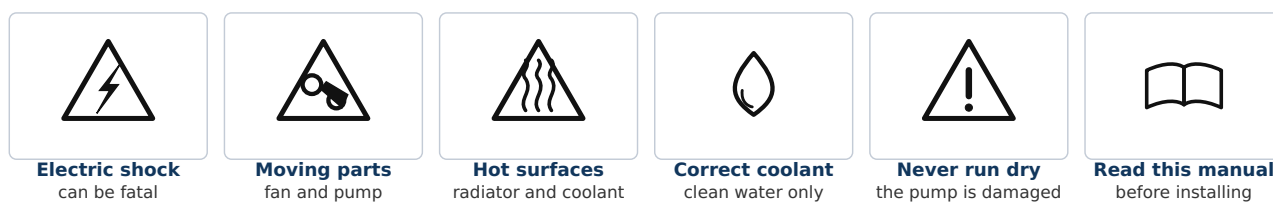


Figure 1.1 Safety symbols used in this manual

1.1 General precautions

- Install and earth the unit in accordance with the regulations that apply at your site.
- Never operate the unit with a cover removed.
- Do not touch live electrical parts.
- Keep the unit in good, safe working order. Take a damaged unit out of service at once.
- Only a trained and qualified person may operate the equipment.
- Disconnect the unit from the supply before any internal inspection.

WARNING - ELECTRIC SHOCK CAN KILL

- Connect the earth conductor in accordance with the applicable standard before the unit is switched on. A unit that is not earthed is dangerous.
- Never touch live parts of the welding circuit, the electrode or the wire with bare hands. Always wear dry welding gloves.
- Fit a residual-current device or a comparable safety switch upstream of the unit to protect against earth-leakage current.
- Switch off and isolate the unit at the distribution board before opening any cover, changing a hose or working on the wiring.
- The unit contains a motor and must never be used in the rain. Water inside the motor windings causes a short circuit and burns the motor out.

WARNING - MOVING PARTS

- The fan and the pump run whenever the unit is switched on, including while the machine is idling between welds.
- Moving parts can cause injury and can catch loose clothing, long hair, jewellery and gloves.
- Make sure that every panel and cover is fitted before the unit is operated or before any maintenance is carried out on the machine it feeds.
- Keep hands, tools and rags clear of the fan grille.

WARNING - HOT SURFACES AND HOT COOLANT

- The radiator, the hoses and the coolant itself become hot in service. Let the unit run for a few minutes after welding and then cool before any hose is opened.
- Do not open the filler cap while the unit is running.
- A hose that bursts under pressure sprays hot fluid. Check the hoses and the clips regularly.

CAUTION - PROTECT THE PUMP

- Never run the unit with the tank empty or with the level below the **MIN** mark. The pump is lubricated and cooled by the fluid it moves, and it is damaged within seconds if it runs dry.
- Use clean water, or clean water with the correct antifreeze. An unsuitable or electrically conductive fluid damages the pump, the torch and the cables.
- Check that the supply voltage matches the rating plate before the unit is switched on. An incorrect voltage burns the motor out.

1.2 Precautions against toppling over

If the unit is tilted too far, the coolant in the tank can flow out of the filler opening, and the pump can be left without fluid. Stand the unit on a firm, level floor. If it has to stand on a sloping surface, chock it and secure it against toppling over. On the AquaWeld 20, apply the caster brakes where they are fitted, or chock the casters.

1.3 Personal protective equipment

Work	Requirement
Handling and filling	Gloves and safety glasses. Antifreeze irritates the eyes and the skin.
Draining hot coolant	Gloves, safety glasses and a suitable container. Let the unit cool first.
Cleaning the radiator	Safety glasses and, in a dusty shop, a dust mask. Compressed air blows dust into the eyes.
Working near the welding arc	The full protection required for the welding process itself.

1.4 Environmental conditions

- The unit is designed for use indoors, in an industrial environment.
- The enclosure protection class is **IP 21**. The **1** in the second place means that the unit is **not** suitable for use outdoors in the rain.
- Do not use the unit in an acid, alkaline or salt-laden atmosphere. Corrosion damage of this kind is not covered by the guarantee.
- Keep the unit away from heat sources and out of direct sun, and leave the air path to the radiator clear.

The user is responsible for installing and using the equipment in accordance with the instructions given in this manual.

2 General Description

2.1 What the unit does

The Cruxweld AquaWeld is a water cooling unit for water-cooled welding and cutting torches. It recirculates coolant through the torch and its cables in a closed system: the pump draws cool fluid from the tank and delivers it to the torch, the fluid picks up the heat of the arc, and it returns through a fan-cooled radiator to the tank.

Cooling the torch in this way lets a torch of a given size carry far more current than an air-cooled torch of the same weight, keeps the handle comfortable for the operator, and greatly extends the life of the torch neck, the cable and the consumables.

2.2 Main parts

Part	Function
Single-phase motor	Drives the pump. It runs from an ordinary single-phase supply and starts through a capacitor.
Brass pump	Moves the coolant round the circuit. The brass body resists corrosion and gives long life.
Coolant tank	Holds the fluid and lets air separate out of it. A level gauge on the front shows the contents at a glance.
Radiator	Gives the heat picked up at the torch back to the air. Copper or aluminium core, depending on the model.
Fan	Draws air through the radiator. It runs whenever the unit is switched on.
Mains switch	Switches the whole unit on and off.
Quick connectors	Red for the coolant return IN , blue for the coolant supply OUT , so that the hoses cannot be crossed by mistake.

2.3 Key features

- **Corrosion free.** Brass pump body and a sealed circuit, so the fluid path stays clean.
- **No priming required.** The pump picks up from the tank as soon as it is switched on.
- **Quick fill and drain.** A large filler opening on top and a drain under the tank.
- **Level always visible.** A gauge on the front face shows the contents without opening the unit.
- **Low and easy maintenance.** Nothing to adjust in normal service; keep the fluid clean and the radiator clear.
- **Quick connectors.** The torch hoses come off without tools when a torch is changed.

2.4 The two models

	AquaWeld 15	AquaWeld 20
Tank capacity	15 litres	20 litres
Build	Compact bench unit with a carry handle	Trolley unit on four casters, two of them swivelling
Typical use	A single water-cooled TIG or MIG torch up to about 350 A	A heavier torch, longer cables, or continuous production work
Sits	On the bench, on a shelf or on top of the welding machine	On the floor, usually under the welding machine
Radiator	Two-row or three-row copper core, or aluminium core	Larger core for continuous duty

Both models use the same pump, motor, fan and connectors, so the consumable and service parts are common to the two machines wherever the parts list in section 10 gives the same part number.

2.5 What the unit can be used with

Application	Notes
Water-cooled TIG torches	The commonest use. The unit cools the torch head, the collet body and the power cable.
Water-cooled MIG / MAG torches	For high-current or long-duty work, where an air-cooled torch would overheat.
Water-cooled plasma torches	Where the torch maker specifies a cooling unit of this capacity and pressure.
Automatic and robot torches	Provided that the flow and pressure at the torch meet the torch maker's figures.

CAUTION

Always check the flow and the pressure the torch maker requires against section 3 before the unit is put to work. A torch starved of coolant is destroyed in a few seconds at full current.

2.6 Items supplied

No.	Item	Quantity
1	AquaWeld cooling unit	1
2	Input cable with plug	1
3	Coolant hose set	1 pair
4	Quick connectors, red inlet and blue outlet	optional
5	Filler cap, large, and small cap with washer	1 each
6	Instruction manual	1

Check the delivery against this list as soon as the unit is unpacked, and report any shortage or transport damage to Cruxweld at once. Keep the packing until the machine has been commissioned.

2.7 Unpacking and handling

1. Cut the straps and lift the unit out of the carton; do not tip it on its side.
2. Check that the tank is empty and dry before the unit is filled for the first time.
3. Lift the AquaWeld 15 by its carry handle only. Do not lift it by the hoses or the connectors.
4. Move the AquaWeld 20 on its casters. Lift it by the base, not by the top tray, if it has to be lifted.
5. Stand the unit upright at all times. A unit laid on its side spills coolant into the motor compartment.

If the unit has been transported or stored below freezing, let it stand in the work area until it has reached room temperature before it is filled and started.

3 Technical Data

The figures in this section are given for guidance. The rating plate riveted to the machine is the authority for the unit in front of you; where the two differ, the plate is correct. Cruxweld improves its products continuously and the data may change without notice.

3.1 Rating

Item	AquaWeld 15	AquaWeld 20
Supply	1 ~ 220 - 240 V, 50 / 60 Hz	1 ~ 220 - 240 V, 50 / 60 Hz
Rated input current, $I_{1\max}$	1.6 A	2.0 A
Motor rating	0.37 kW	0.37 kW
Cooling capacity, P	about 1.0 kW	about 1.3 kW
Flow rate at the torch	3.0 l/min	3.5 l/min
Maximum pressure, $P_{\max}$	0.35 MPa (3.5 bar)	0.40 MPa (4.0 bar)
Tank capacity	15 litres	20 litres
Protection class	IP 21	IP 21
Insulation class	H	H
Cooling	Fan-cooled radiator	Fan-cooled radiator
Connectors	Quick connector, red IN / blue OUT	Quick connector, red IN / blue OUT
Dimensions, L × W × H	540 × 260 × 440 mm	590 × 300 × 500 mm
Weight, empty	21 kg	26 kg
Weight, filled	36 kg	46 kg

The rated values are based on an ambient temperature of 20 – 25 °C. Cooling capacity falls as the ambient temperature rises, and the flow falls if the torch hoses are longer than those supplied.

3.2 Working conditions

Condition	Limit
Ambient temperature, running	-10 °C to +40 °C
Ambient temperature, transport and storage	-25 °C to +55 °C
Relative humidity	up to 90 % at 20 °C, up to 50 % at 40 °C
Altitude	up to 1000 m without derating
Air quality	Free of unusual amounts of dust, acid, corrosive gas and conductive particles
Siting	Indoors, upright, on a firm level floor, clear of rain and splashing water
Tilt	Not more than 10° in any direction

CAUTION

Below +10 °C the coolant must contain antifreeze. Water that freezes inside the radiator or the pump splits them, and the damage is not covered by the guarantee.

3.3 The rating plate

Every unit carries a rating plate. Quote the model and the serial number from this plate in any enquiry, order or service request.

CRUXWELD AquaWeld 20		S/N EN 60974-2 EN 60974-10
1 ~ 50 / 60 Hz	U1 = V	I1max = A
IP 21	P = l / min	Pmax = MPa

Model	- the Cruxweld model name of the unit
S/N	- serial number - always quote it with any enquiry
EN 60974-2 / -10	- the standards the unit is built to
1 ~ 50 / 60 Hz	- single-phase supply at 50 Hz or 60 Hz
U1	- rated input voltage
I1max	- maximum input current
IP 21	- enclosure protection class. The 1 in the second place means the unit must not be used outdoors in the rain
P	- cooling capacity, in litres per minute
Pmax	- maximum pump pressure

Figure 3.1 The rating plate

3.4 Coolant data

Item	Requirement
Normal fluid	Clean water. Distilled or de-mineralised water is preferred.
Below +10 °C	Clean water with an ethylene-glycol antifreeze, mixed as in section 7.3.
Not to be used	Propylene-glycol antifreeze, engine coolant with additives, oil, any conductive or corrosive fluid.
Fill to	The MAX mark on the level gauge, with the unit standing level and switched off.
Top up at	Before the level reaches the MIN mark, or 30 mm below the warning line.
Change interval	Every six months, or sooner if the fluid is discoloured or carries debris.

3.5 Hoses and connections

Item	Data
Connector type	Quick connector, male on the unit, female on the hose
Colour code	Red = coolant IN , the warm return from the torch. Blue = coolant OUT , the cold supply to the torch.
Standard hose length	3 m
Maximum hose length	10 m. Beyond this the flow at the torch falls below the figure in section 3.1.
Hose bore	8 mm
Minimum bend radius	80 mm. A kinked hose starves the torch.

3.6 Electrical supply

Item	AquaWeld 15	AquaWeld 20
Supply voltage	1 ~ 220 - 240 V	1 ~ 220 - 240 V
Permitted voltage variation	± 10 %	± 10 %
Frequency	50 / 60 Hz	50 / 60 Hz
Recommended fuse, slow	6 A	6 A
Input cable	3 × 1.0 mm ²	3 × 1.0 mm ²
Earth	Protective conductor, connected in every case	Protective conductor, connected in every case

Units wound for 110 V and for 380 V supplies are available to order. The voltage a particular unit is wound for is stamped on its rating plate, and a unit must never be connected to any other voltage.

4 Principle of Operation

4.1 The closed cooling circuit

The unit works as a closed loop. The same fluid goes round and round; nothing is consumed except the small amount lost through evaporation and at the connectors when a torch is changed.

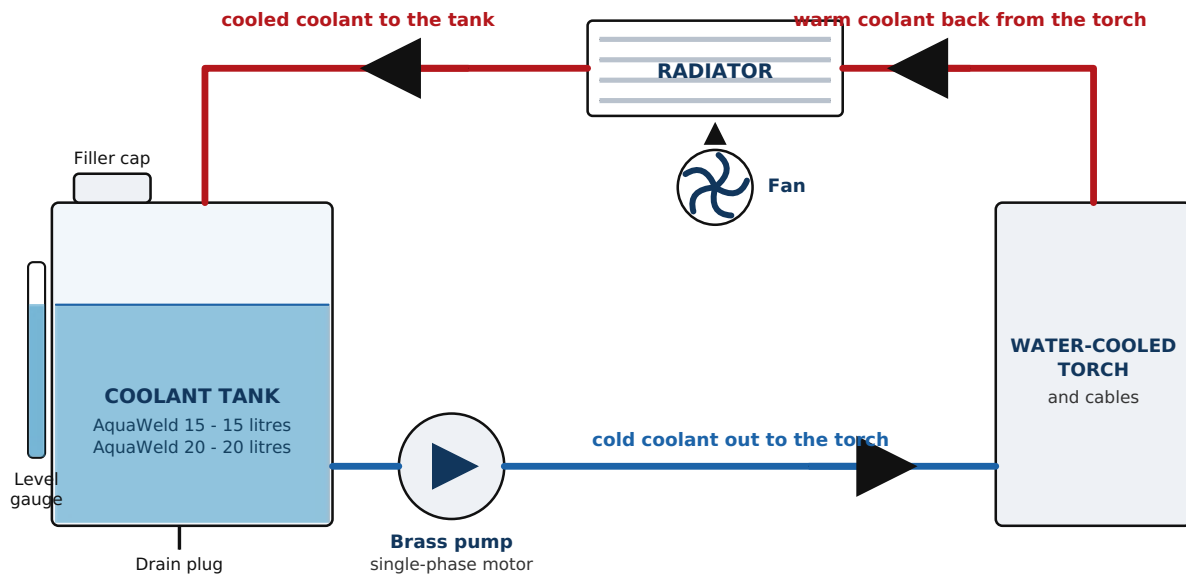


Figure 4.1 The closed cooling circuit

1. The pump draws cool fluid from the bottom of the tank.
2. It delivers it through the blue **OUT** connector and the blue hose to the welding machine, and through the machine to the torch.
3. In the torch the fluid runs round the torch head and back along the power cable, picking up the heat of the arc and the resistive heat of the cable.
4. The warm fluid returns through the red hose to the red **IN** connector.
5. It passes through the radiator, where the fan draws air over the fins and takes the heat away.
6. The cooled fluid runs back into the tank, where any air it has picked up separates out, and the cycle begins again.

4.2 Why the tank matters

The tank does three jobs beyond holding the fluid. It gives the system enough thermal mass to ride through a burst of heavy welding without the temperature climbing; it lets entrained air rise out of the fluid instead of being pumped round to the torch; and it settles out any debris that finds its way into the circuit, so that the debris does not reach the narrow passages in the torch head.

That is why the level must be kept up. A tank run half empty gives less thermal mass, mixes air into the fluid and puts the pump inlet close to the settled debris.

4.3 What limits the cooling

Factor	Effect
Ambient temperature	The radiator can only cool the fluid towards the temperature of the air around it. In a hot shop the whole circuit runs hotter.
Air path	A radiator blocked by dust, or a unit pushed against a wall, loses cooling capacity quickly.
Hose length	Long hoses reduce the flow at the torch and add heat pick-up on the way.
Welding current and duty	The heat to be removed rises roughly with the square of the current and directly with the duty cycle.
Coolant condition	Dirty fluid or a heavy antifreeze mix carries less heat than clean water.

4.4 Protective behaviour

Feature	What it does
Motor thermal protection	The motor winding is protected against a sustained overload. If it cuts out, the unit stops and restarts by itself when the winding has cooled.
Starting capacitor	Gives the single-phase motor its starting torque. A failed capacitor is the commonest reason for a motor that hums but does not turn.
Pressure relief in the circuit	The pump characteristic limits the pressure if the outlet is blocked, but a blocked outlet must still be cleared at once.
Sealed circuit	Keeps dirt and air out of the fluid path between changes of coolant.

WARNING

This unit has **no** flow switch and **no** low-level cut-out. Nothing stops the welding machine if the coolant stops flowing. It is the operator's responsibility to check the level before every shift and to watch the flow while working.

4.5 Keeping the unit running during welding

The cooling unit must be switched on for the whole time the welding machine is in use, and should be left running for a few minutes after the last weld. The torch and the cables hold a great deal of heat at the end of a run, and that heat has to be carried away rather than left to soak into the torch head.

A torch that is left hot with the coolant standing still is the commonest cause of a burnt torch neck and a hardened, cracked torch hose.

4.6 The unit in the welding installation

In a typical installation the cooling unit stands under or beside the welding machine and is plugged into its own single-phase socket. It is connected to the welding machine with two hoses, and the welding machine carries the coolant on to the torch through the torch cable assembly. Section 5 describes the connection in detail.

Arrangement	Notes
Cooler under the machine	The usual arrangement for the AquaWeld 20. Keep the radiator face clear of the machine's own air path.
Cooler beside the machine	Suits the AquaWeld 15 on a bench. Keep the hoses out of the walkway.
Cooler on a separate socket	Always. Do not take the supply for the cooler from inside the welding machine unless the machine provides a socket for exactly that purpose.

5 Installation

WARNING

Switch off and lock off at the distribution board before the unit is connected. Only a qualified electrician may make the supply connection.

5.1 Siting the unit

1. Stand the unit upright on a firm, level floor or bench, indoors and under cover.
2. Leave at least **300 mm** clear in front of the radiator and behind the fan so that the air can get in and out.
3. Keep the unit out of the direct path of welding spatter, grinding sparks and cutting fume.
4. Do not stand the unit where water can drip or splash onto it, and never use it in the rain.
5. Position it so that the hoses reach the welding machine without being stretched, trodden on or run over.
6. On the AquaWeld 20, chock or brake the casters once the unit is in place.

CAUTION

Do not stand the unit at an angle of more than 10°. Beyond that the coolant can flow out of the filler opening and the pump can be left dry.

5.2 Checking the supply

1. Read the voltage stamped on the rating plate of **this** unit.
2. Measure the voltage at the socket the unit will be plugged into.
3. Check that the two agree, within $\pm 10\%$.
4. Check that the socket is protected by a fuse or a breaker of the size given in section 3.6, and that a residual-current device is fitted.
5. Check that the protective conductor in the socket is continuous and properly earthed.

CAUTION

An incorrect supply voltage burns the motor out, and that damage is not covered by the guarantee. If the voltage at the socket is too low the motor will hum and fail to start, which also damages it if the condition is left uncorrected.

5.3 Filling with coolant

1. Make sure the unit is switched off and unplugged.
2. Unscrew the large filler cap on the top of the tank.
3. Fill with clean water – distilled or de-mineralised water for preference – up to the **MAX** mark on the level gauge.
4. If the shop temperature falls below 10 °C, mix antifreeze into the water first, as in section 7.3.
5. Refit the filler cap and wipe up any spillage.

5.4 Connecting to the welding machine

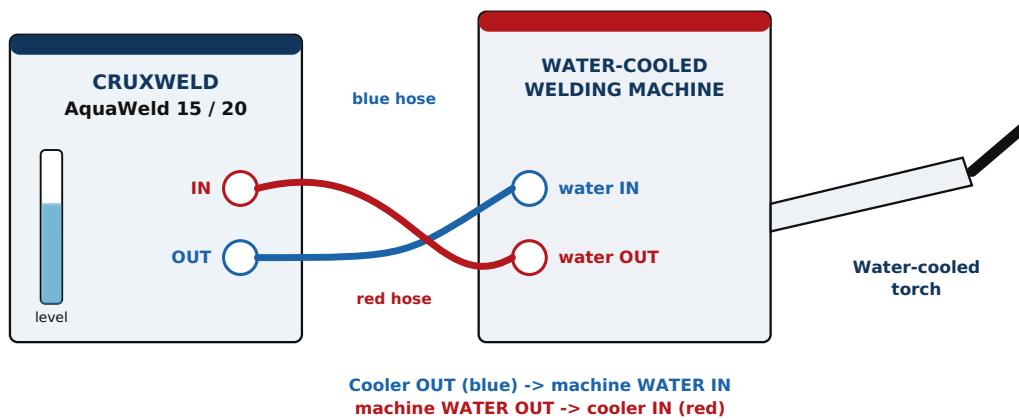


Figure 5.1 Connecting the AquaWeld to a water-cooled welding machine

1. Connect the **OUTLET** of the cooling unit – the blue connector – to the **water inlet** of the welding machine, using the blue hose.
2. Connect the **INLET** of the cooling unit – the red connector – to the **water outlet** of the welding machine, using the red hose.
3. Push each quick connector home until it clicks, then pull gently on the hose to check that it has latched.
4. Check that the torch is connected to the welding machine and that its coolant hoses are seated in the machine.
5. Route the hoses so that they are not kinked, stretched or trapped, and so that nobody can trip over them.
6. Plug the unit into its socket.

The colour code is the same on every Cruxweld machine: **blue is cold fluid going out to the work, red is warm fluid coming back**. If the two are crossed the torch is still cooled, but the reading on any flow indicator in the machine will be wrong and the hoses will be connected the opposite way round from every other machine in the shop.

5.5 Bleeding the system

A new installation is full of air, and the level in the tank drops sharply as the hoses and the torch fill for the first time.

1. Switch the unit on and let it run for two to three minutes.
2. Watch the level gauge. It will fall as the circuit fills.
3. Switch off, top up to the **MAX** mark, and run again.
4. Repeat until the level stays steady with the unit running.
5. Check every joint and connector for leaks while the pump is running.

5.6 Commissioning check

	Check
1	The supply voltage matches the rating plate and the earth is proved.
2	The unit stands level, with clear air in front of the radiator and behind the fan.
3	The tank is filled to MAX with the correct coolant.
4	The blue hose runs from the cooler OUT to the machine water IN.
5	The red hose runs from the cooler IN to the machine water OUT.
6	Every connector is latched and no joint leaks with the pump running.
7	The fan turns and air comes out of the grille.
8	Coolant returns to the tank; the return can be seen or heard at the tank.
9	The system has been bled and the level holds steady while running.
10	The hoses are clear of walkways, hot work and moving machinery.

CAUTION

Do not weld until coolant has been seen returning to the tank. If the pump has stood unused for a long period it may need the treatment described in section 9.3 before it will prime.

6 Controls and Operation

6.1 Controls and connections

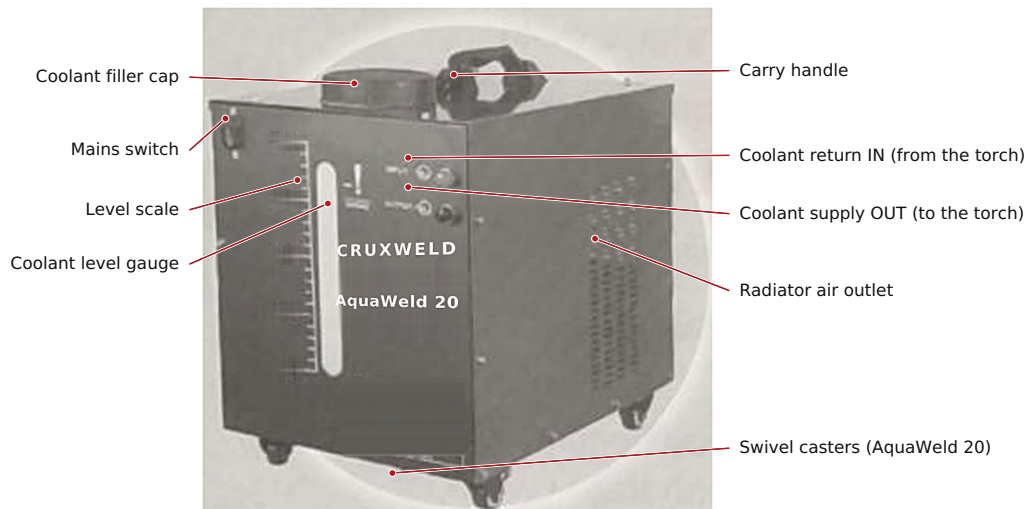


Figure 6.1 Controls and connections (AquaWeld 20 shown)

Item	Function
Mains switch	Switches the whole unit on and off. The pump and the fan both run whenever the switch is on.
Coolant filler cap	Large cap on the top of the tank. Open it only with the unit switched off and cool.
Coolant level gauge	Shows the contents of the tank against a scale. Read it with the unit standing level and switched off.
Coolant supply, OUT (blue)	Cold fluid leaves the unit here, on its way to the welding machine and the torch.
Coolant return, IN (red)	Warm fluid comes back into the unit here from the torch.
Radiator air outlet	Warm air leaves through this grille. Keep it clear.
Drain	Cap under the tank, for draining the coolant when it is changed.
Carry handle / casters	Handle on the AquaWeld 15; four casters, two of them swivelling, on the AquaWeld 20.

6.2 Before every shift

1. Check the coolant level with the unit switched off and standing level. Top up if it is anywhere near the **MIN** mark.
2. Look at the fluid in the gauge. It should be clear. Change it if it is discoloured or carries debris.
3. Check the hoses along their whole length for cuts, kinks, hardening and weeping joints.
4. Check that the connectors are latched.
5. Check that the radiator grille and the fan are clear.
6. Check that the input cable and plug are undamaged.

6.3 Starting

1. Switch the cooling unit on **before** the welding machine.
2. Listen: the pump should pick up at once and the fan should turn.
3. Watch for fluid returning to the tank. On most installations the return can be seen through the filler opening or heard at the tank.
4. Only when coolant is circulating, switch the welding machine on and begin work.

WARNING

Never strike an arc with a water-cooled torch before coolant is circulating. A water-cooled torch run dry at full current is destroyed in seconds, and the torch neck can split and spray hot fluid.

6.4 While welding

- Leave the cooling unit switched on at all times while welding, including between welds and during set-up.
- Keep an eye on the level gauge through the shift. A level that falls steadily means a leak.
- If the torch handle becomes hot, stop and find out why before carrying on.
- Keep the radiator grille clear of rags, gloves and workpieces.
- Do not stand hot workpieces on the unit.

What you notice	What it means
Steady flow, warm return hose	Normal. The unit is carrying the heat away.
Return hose cold after long welding	Little or no flow. Stop and check for a blockage or a kink.
Torch handle getting hot	Flow too low, level too low, or a blocked torch passage.
Level falling through the shift	A leak, at a connector, a hose or the torch.
Pump noisy or surging	Air in the circuit, or the level is too low.

6.5 Stopping

1. Stop welding and switch the welding machine off.
2. Leave the cooling unit running for two to three minutes, so that the heat held in the torch and the cables is carried away.
3. Switch the cooling unit off.
4. At the end of the working day, switch off at the distribution board as well.
5. Coil the hoses loosely. Sharp bends crack the hose and restrict the flow.

6.6 After a long idle period

A pump that has stood still for weeks may not pick up on its own.

1. Check the level and top up to **MAX**.
2. Switch the unit on and let it run for a minute.
3. If no fluid circulates, switch off and follow the procedure in section 9.3.
4. Do not weld until fluid is seen returning to the tank.

Before any long shutdown, run the unit until the circuit is clear, and make sure the water is pumped out of the torch. Fluid left standing in a torch over a long break attacks the torch from the inside.

7 Coolant

The fluid is the part of this machine that is most often got wrong, and the wrong fluid is the most common reason for a cooling unit and a torch to fail early. This section sets out what to use.

7.1 Coolant level



- Check the level before every shift, with the unit switched off.
- Never run the pump with the level below MIN, it will be damaged.

7.2 Which fluid to use

Fluid	Use it?	Why
Distilled or de-mineralised water	Yes	First choice. It carries heat well and leaves no scale in the torch passages.
Clean tap water	Yes	Acceptable where the water is soft. Hard water leaves scale, which narrows the torch passages over time.
Water with ethylene-glycol antifreeze	Yes	Required below 10 °C. Mix as in section 7.3.
Antifreeze containing propylene	No	It makes the pump seize.
Engine coolant with additives	No	The additives attack the seals and leave deposits.
Any oil	No	It does not carry heat and it ruins the seals.
Conductive or corrosive fluid	No	It corrodes the copper in the torch and the cable, and it can carry welding current.
Dirty or used water	No	Impurities build up, block the narrow passages in the torch and wear the pump.

CAUTION

Damage caused by an unsuitable cooling fluid is not covered by the guarantee. The fluid must be pure water or distilled water, so that the copper passages in the torch do not fur up and the torch is not burnt out.

7.3 Antifreeze

Water that freezes expands, and the ice splits the radiator core, the pump body and the torch passages. Below 10 °C ambient, mix an ethylene-glycol antifreeze into the water.

Lowest expected temperature	Antifreeze by volume	Notes
down to 0 °C	none needed	Clean water alone.
down to -10 °C	about 20 %	Normal winter mix for an unheated shop.
down to -20 °C	about 33 %	Cooling capacity begins to fall noticeably.
down to -30 °C	about 45 %	Maximum recommended. A heavier mix carries too little heat.

- Mix the antifreeze with the water **before** pouring it into the tank, so that the strength is even throughout the circuit.
- Never exceed 50 % antifreeze. Above that the mixture carries less heat than plain water and the torch runs hotter, not cooler.
- Check the strength of the mix at the start of each winter.
- Antifreeze is harmful if swallowed and irritates the skin and the eyes. Wear gloves and safety glasses, and keep it away from food and from animals.

CAUTION

If antifreeze has not been added and the room temperature falls below 10 °C, the coolant may freeze and damage the unit. That damage is not covered by the guarantee.

7.4 Changing the coolant

Change the fluid every six months, and at once if it is discoloured, cloudy or carries debris.

1. Switch the unit off, unplug it and let it cool.
2. Stand a container of at least 25 litres under the drain.
3. Open the cap under the bottom of the tank and let the tank empty.
4. Disconnect the hoses at the unit and let the torch and the cables drain into the container.
5. Where the fluid was dirty, flush the tank with clean water and drain it again.
6. Close the drain, reconnect the hoses and fill with fresh coolant to the **MAX** mark.
7. Run the unit, bleed the circuit as in section 5.5 and top up.
8. Dispose of the old fluid in accordance with local regulations. Never pour antifreeze into a drain.

7.5 Topping up

- Top up before the level reaches the **MIN** mark, or when the level is about 30 mm below the warning line on the gauge.
- Top up with the same fluid that is already in the system. Adding plain water to an antifreeze mix weakens the mix.
- Top up with the unit switched off, standing level, and only when it is cool.
- If the unit needs topping up often, look for a leak rather than simply adding more fluid.

8 Maintenance

WARNING

Before carrying out any internal inspection, disconnect the unit from the mains supply. The capacitor holds a charge for some minutes after the supply is removed.

8.1 Maintenance schedule

Interval	Work
Every shift	Check the coolant level and its condition. Check the hoses and connectors for leaks. Check that the radiator grille is clear.
Weekly	Check that all joints are tight. Look along the full length of both hoses for cuts, kinks and hardening. Wipe the unit down.
Monthly	Blow the radiator through with clean, dry compressed air at low pressure. Check the input cable and the plug. Check the earth connection with an instrument.
Every 6 months	Change the coolant. Flush the tank if the old fluid was dirty. Check the pump for weeping at the water seal.
Yearly	A trained service person blows the dust out of the inside of the machine, checks for loose fasteners, and carries out a full electrical safety test.

Only use original spare parts, which have been designed for this equipment. The use of alternative parts affects the performance of the unit and may invalidate the guarantee.

8.2 Cleaning the radiator

A radiator clogged with dust loses cooling capacity long before anyone notices a problem at the torch. Clean it on the monthly schedule, and more often in a dusty shop.

1. Switch off and unplug the unit.
2. Blow clean, dry compressed air through the radiator core at low pressure, from the fan side towards the grille, so that the dust comes out the way it went in.
3. Keep the air nozzle far enough back not to bend the fins.
4. Straighten any bent fins carefully with a fin comb.
5. Wipe the grille and the fan guard.

CAUTION

Use dry, oil-free air. Compressed air that carries oil or water leaves a film on the radiator fins that dust then sticks to, and the radiator blocks faster than before.

8.3 Checking for leaks

A slow leak shows up first as a level that falls faster than evaporation can explain.

1. Fill to **MAX**, note the level and run the unit for ten minutes.
2. Switch off and look at the quick connectors, the hose clips, the pump water seal and the tank seams.
3. Run a dry hand along the hoses; a weeping joint leaves a damp patch.
4. Check the torch and the welding machine as well. A leak inside a torch cable shows as damp at the machine end.
5. Tighten or replace whatever is leaking, then top up.

8.4 Draining and flushing

1. Switch off, unplug and let the unit cool.
2. Place a container under the drain and open the cap on the bottom of the tank.
3. When the tank is empty, refit the cap and fill with clean water.
4. Run the unit for two minutes with the hoses connected, so that the water passes through the torch as well.
5. Drain again. Repeat until the water runs clear.
6. Fill with fresh coolant and bleed as in section 5.5.

8.5 Storage

- Store the unit between -25 °C and +55 °C in a dry place, upright.
- Before a long shutdown, run the motor and make sure the water is pumped out of the torch, so that fluid is not left standing in the torch passages.
- Where the store is unheated and can freeze, drain the unit completely or fill it with the correct antifreeze mix.
- Cover the unit to keep dust out, but not with a sheet that traps condensation against the cover.
- Before putting a stored unit back into service, blow the dust out, fill with fresh coolant, check the earth and run it for a few minutes before any welding.

8.6 Consumable and wear parts

Part	Replace when	Notes
Hoses	Hardened, cut, kinked or weeping	Check the whole length, not just the ends. A hose that has been run over is suspect even if it looks sound.
Quick connectors	They no longer latch, or they drip when parted	Replace as a pair so that the red and blue ends stay matched.
Water seal	The pump weeps at the shaft	A service item. Fit a new seal before the leak reaches the motor.
Starting capacitor	The motor hums but does not start	Use the capacitor for the voltage the unit is wound for; see section 10.3.
Filler cap washer	Perished, or the cap leaks	Cheap, and it stops coolant creeping out when the unit is moved.
Casters (AquaWeld 20)	A wheel binds or a swivel is stiff	Replace fixed and swivel casters with the same type.

9 Fault Finding

WARNING

Only a qualified technician may repair this unit. Switch off and isolate at the distribution board, and observe every safety note in this manual, before any repair work is started.

9.1 The motor will not run

No.	Symptom	Cause	Remedy
1	Nothing happens when the unit is switched on	No supply at the socket; the fuse or breaker has operated; the plug or cable is damaged; the mains switch has failed	Check the supply and the protection; check the cable and plug end to end; replace the switch
2	The motor hums but does not turn	The starting capacitor has failed; the supply voltage is too low; the pump is seized after standing idle	Replace the capacitor with the correct one for the voltage; correct the supply; free the pump as in section 9.3
3	The motor runs for a while and then stops	Thermal protection has operated because the air path is blocked, the ambient temperature is too high, or the pump is labouring	Clear the radiator and the grille; improve the ventilation; check for a blocked or kinked hose
4	The motor is burnt out	It has been run on the wrong voltage, or run for a long time with a failed capacitor, or water has entered the windings	Replace the motor. Correct the cause first, or the new motor will fail in the same way
5	The breaker or fuse operates each time the unit is switched on	A short circuit in the cable, the switch or the motor; water in the motor	Have the unit examined by a qualified technician before it is switched on again

9.2 The motor runs but there is no flow

No.	Symptom	Cause	Remedy
6	Air comes from the radiator, but little or no water is delivered	The pump has lost its prime after standing idle; there is air trapped in the circuit	Follow section 9.3; then bleed the system as in section 5.5
7	Flow falls away during the shift	The level has dropped; a hose is kinked or trodden on; the torch passages are furring up	Top up; free the hose; flush the torch or fit a new one
8	The pump is noisy or surges	Air is being drawn in because the level is too low, or a joint on the suction side is leaking	Top up to MAX; find and seal the leaking joint
9	Flow is good at the unit but the torch still overheats	The hoses are too long; the torch passages are blocked; the welding current is above what the torch is rated for	Shorten the hose run; flush or replace the torch; work within the torch rating
10	Coolant leaks from the pump shaft	The water seal is worn	Fit a new water seal before the leak reaches the motor

9.3 Freeing a pump that has stood idle

A pump left standing for a long period may not pick up, even though the motor turns and air comes from the radiator. In most cases the following clears it.

1. Switch the unit off and unplug it.
2. Check that the tank is filled to the **MAX** mark.
3. Disconnect the hose from either the **INLET** or the **OUTLET** connector.
4. Apply clean, dry compressed air at low pressure to that connector for about **20 seconds**. This pushes the standing water through and frees the impeller.
5. Reconnect the hose, switch on and check that fluid returns to the tank.
6. Repeat once if necessary. If the pump still will not deliver, it needs service.

CAUTION

Use low pressure only. High-pressure air forced into the circuit can burst a hose or damage the torch, and it drives water out of the filler opening.

Avoid the problem altogether: if the unit is to stand unused for more than a few weeks, run the motor for a minute every fortnight so that the pump does not dry out and seize.

9.4 Cooling is poor

Check	What to look for
Coolant level	At or near MAX with the unit switched off and level.
Coolant condition	Clear, not discoloured, no debris, not an over-strong antifreeze mix.
Radiator	Fins clear of dust, no bent fins, nothing leaning against the grille.
Fan	Turning freely, moving air, blades undamaged.
Air path	At least 300 mm clear in front and behind; not recirculating its own hot air.
Hoses	No kinks, no more than 10 m in total, no flattened sections.
Ambient	Within 40 °C; the unit is not standing next to a heat source.
Duty	The welding current and duty cycle are within what the torch and the unit are rated for.

9.5 A logical order of checks

1. **Level first.** More cooling complaints come back to a low tank than to anything else.
2. **Then the flow path.** Kinked hose, blocked torch, unlatched connector.
3. **Then the air path.** Radiator, fan, clearance round the unit.
4. **Then the fluid.** Condition, cleanliness, antifreeze strength.
5. **Then the supply.** Voltage at the socket, on load.
6. **Only then the machine itself.** By this point the fault really is internal, and the unit should go to a qualified service engineer.

9.6 Information to have ready

- The model and the serial number from the rating plate.
- The supply voltage measured at the socket.
- The coolant in use, and when it was last changed.
- The torch type, the hose length and the welding current and duty in use.
- Exactly what happens and when: at switch-on, after a few minutes, or only under load.
- What has been tried already, and what changed just before the fault appeared.

If the unit has to be returned, drain it first, pack it in its original packing or in equivalent protective packing, and enclose a note describing the fault and the conditions under which it occurs.

10 Parts List

The numbers in the tables below are the numbers on the exploded views. Always quote the model, the serial number and the Cruxweld part number when ordering.

10.1 AquaWeld 15

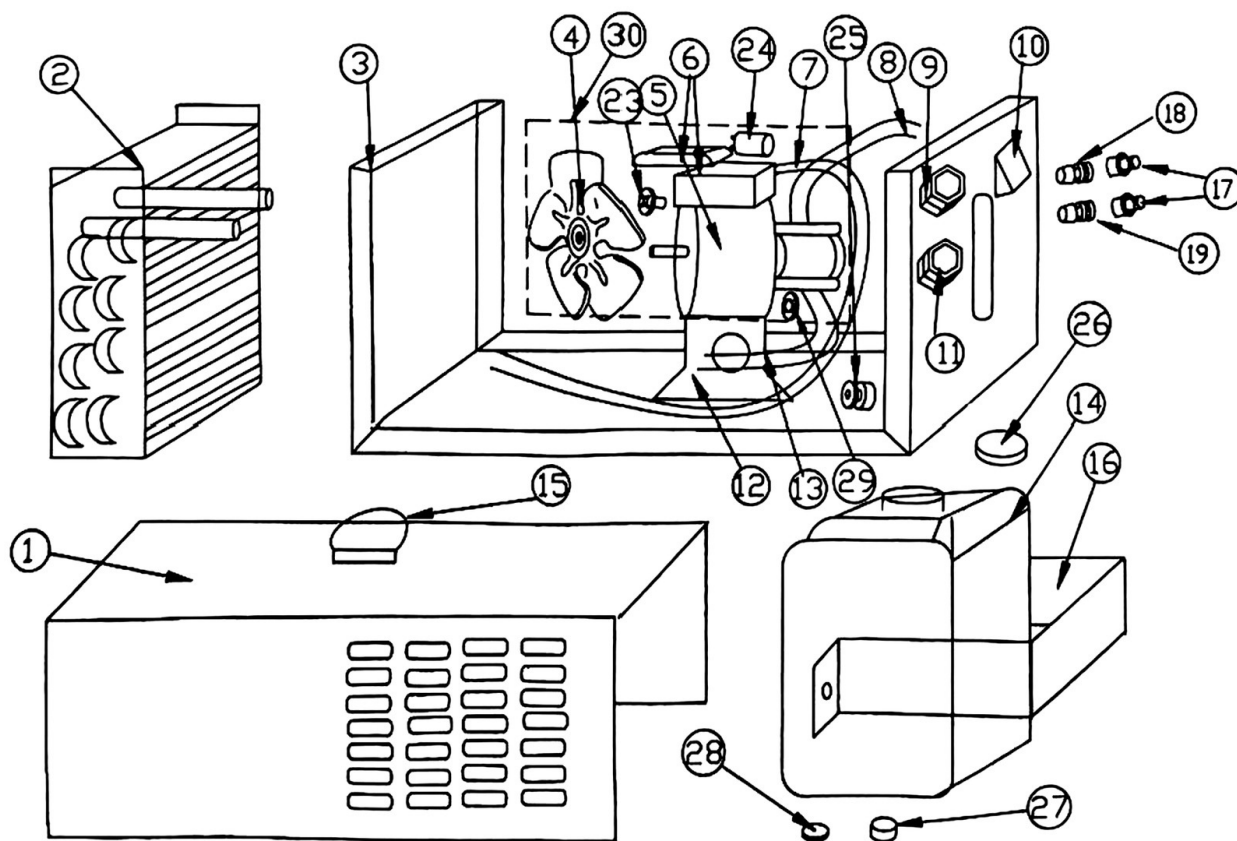


Figure 10.1 AquaWeld 15 - exploded view

No.	Part number	Description
1	CW-AW15-01	Top cover
2	CW-AWC-02C2	Radiator, copper, 2-row
	CW-AWC-02C3	Radiator, copper, 3-row
	CW-AWC-02AL	Radiator, aluminium
3	CW-AW15-03	Bottom panel
7	CW-AW15-07	Input cable with plug
8	CW-AWC-08	Hose, tank to pump
9	CW-AWC-09	Inlet connector, red (coolant IN)
10	CW-AWC-10	Mains switch
11	CW-AWC-11	Outlet connector, blue (coolant OUT)
12	CW-AW15-12	Motor holder
13	CW-AWC-13	Hose, radiator to tank
14	CW-AW15-14	Water tank, 15 litre
15	CW-AW15-15	Carry handle
16	CW-AW15-16	Tank holder
17	CW-AWC-17	Quick connector, male (optional)
18	CW-AWC-18	Red inlet quick connector, female (optional)
19	CW-AWC-19	Blue outlet quick connector, female (optional)
26	CW-AWC-26	Filler cap, large
27	CW-AWC-27	Filler cap, small
28	CW-AWC-28	Washer for the small cap
30	CW-AWC-30	Motor and pump assembly - see section 10.3

Items 4, 5, 6, 23, 24, 25 and 29 on the exploded view are part of the motor and pump assembly, item 30. They are listed in section 10.3 and are common to both models.

10.2 AquaWeld 20

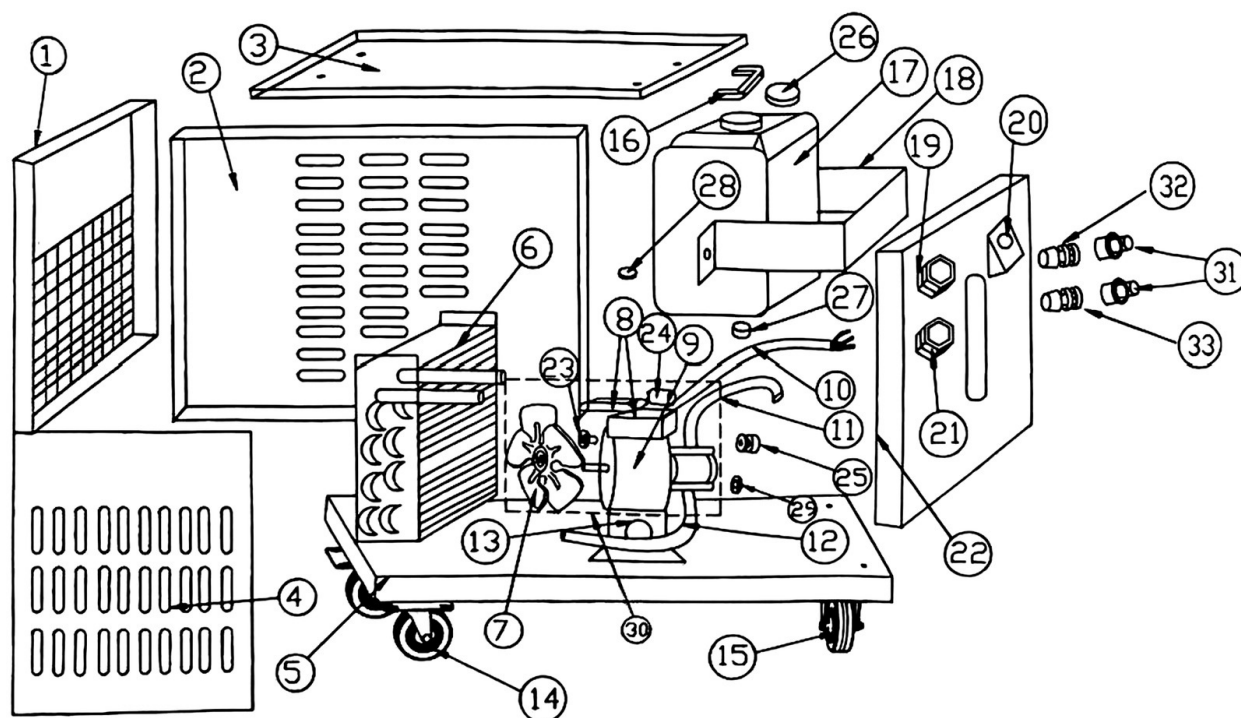


Figure 10.2 AquaWeld 20 - exploded view

No.	Part number	Description
1	CW-AW20-01	Back panel
2	CW-AW20-02	Right side panel
3	CW-AW20-03	Top tray
4	CW-AW20-04	Left side panel
5	CW-AW20-05	Bottom board
6	CW-AWC-06R	Radiator
10	CW-AW20-10	Input cable with plug
11	CW-AWC-08	Hose, tank to pump
12	CW-AWC-13	Hose, radiator to tank
13	CW-AW20-13	Motor holder
14	CW-AW20-14	Fixed wheel
15	CW-AW20-15	Swivel caster
16	CW-AW20-16	Handle
17	CW-AW20-17	Water tank, 20 litre
18	CW-AW20-18	Tank holder
19	CW-AWC-09	Inlet connector, red (coolant IN)
20	CW-AWC-10	Mains switch
21	CW-AWC-11	Outlet connector, blue (coolant OUT)
22	CW-AW20-22	Front panel
26	CW-AWC-26	Filler cap, large
27	CW-AWC-27	Filler cap, small
28	CW-AWC-28	Washer for the small cap
31	CW-AWC-17	Quick connector, male (optional)
32	CW-AWC-18	Red inlet quick connector, female (optional)
33	CW-AWC-19	Blue outlet quick connector, female (optional)

Items 7, 8, 9, 23, 24, 25, 29 and 30 on the exploded view are part of the motor and pump assembly. They are listed in section 10.3.

10.3 Motor and pump assembly

These parts are common to the AquaWeld 15 and the AquaWeld 20. The standard unit is wound for 220 V; 110 V and 380 V versions are available to order and must be ordered as a matched set of motor, motor body and capacitor.

Part number	Description	Remark
CW-AWC-30-110	Motor, 110 V	Optional
CW-AWC-30-220	Motor, 220 V	Standard
CW-AWC-30-380	Motor, 380 V	Optional
CW-AWC-05-110	Motor body, 110 V	Optional
CW-AWC-05-220	Motor body, 220 V	Standard
CW-AWC-05-380	Motor body, 380 V	Optional
CW-AWC-24-110	Starting capacitor, 110 V motor	Optional
CW-AWC-24-220	Starting capacitor, 220 V motor	Standard
CW-AWC-24-380	Starting capacitor, 380 V motor	Optional
CW-AWC-04	Fan	Common to all versions
CW-AWC-23	Fan socket	Common to all versions
CW-AWC-06	Cable box	Common to all versions
CW-AWC-25	Pump head, brass	Common to all versions
CW-AWC-29	Water seal	Service item

CAUTION

The motor, the motor body and the capacitor must all match the voltage the unit is wound for. Fitting a capacitor of the wrong rating leaves the motor humming without starting, and burns the winding out if the condition is left uncorrected.

10.4 Ordering spare parts

To make sure the right part is sent first time, give Cruxweld the following with every order.

Give	Where to find it
Model	Rating plate, or the front panel of the unit
Serial number	Rating plate
Supply voltage the unit is wound for	Rating plate
Item number on the exploded view	Sections 10.1 and 10.2 of this manual
Cruxweld part number	The tables in this section
Quantity	

Only use original spare parts. The use of alternative parts affects the performance of the unit, and damage caused by non-original parts is not covered by the guarantee.

Warranty and Service

Warranty

Cruxweld Industrial Equipments Pvt. Ltd. provides a guarantee of **one year** on this cooling unit from the date of purchase, against defects in material and workmanship under normal use and service. The detailed terms are those stated on the invoice or in the supply contract.

What the warranty does not cover

Free maintenance will not be given in the following circumstances.

No.	Circumstance	Why, and how to avoid it
1	An unsuitable cooling fluid has been used and has damaged the unit	Use pure water. Replace the coolant regularly so that impurities do not accumulate; accumulated impurities damage the pump and block the torch.
2	Antifreeze was not added although the room temperature was below 10 °C	At low temperature the coolant freezes and splits the radiator, the pump and the torch. Add antifreeze whenever the room temperature can fall below 10 °C.
3	An incorrect input voltage has been used	Use the input voltage stamped on the rating plate of the unit. A wrong voltage burns out the motor.
4	Insufficient coolant has damaged the pump	The pump is damaged if it is run with insufficient coolant. Make sure there is enough coolant in the tank before the unit is used, every time.
5	The unit has been used in a corrosive environment	Acid, alkaline and salt-laden atmospheres corrode the unit. Site it in a clean, dry part of the shop.

The warranty also does not cover damage caused by installation or wiring that does not follow this manual, by running the unit without a proper earth, by mechanical impact, or by equipment that has been opened or modified without authorisation. Consumable and wear parts – hoses, quick connectors, seals and filler-cap washers – are not covered.

Service

This product is not designed to be serviced in the field. Return it to the Cruxweld service centre for any repair work. Work through section 9.5 before calling; most faults are settled there without a visit. Drain the unit before it is sent for service.

Spare parts and accessories

Item	Remark
Coolant hose set	8 mm bore, 3 m; longer sets to order up to 10 m
Quick connector set	Male on the unit, red female inlet, blue female outlet
Water seal	Service item for the pump
Starting capacitor	To suit the voltage the unit is wound for
Radiator	Copper 2-row, copper 3-row or aluminium
Filler caps and washer	Large cap, small cap and washer
Casters	Fixed and swivel, for the AquaWeld 20

When ordering spares, always quote the model and the serial number of the unit.

Machine record

Fill this in when the unit is commissioned and keep the manual with the machine.

Model	AquaWeld 15 / AquaWeld 20
Serial number	
Date of purchase	
Supplier	
Supply voltage of the unit	
Coolant in use	
Coolant last changed	
Last service	



INDUSTRIAL EQUIPMENTS PVT. LTD.

AquaWeld 15 • AquaWeld 20

Water cooling unit for welding torches

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Cruxweld improves its products continuously. The technical and hardware data in this manual may change without notice.

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