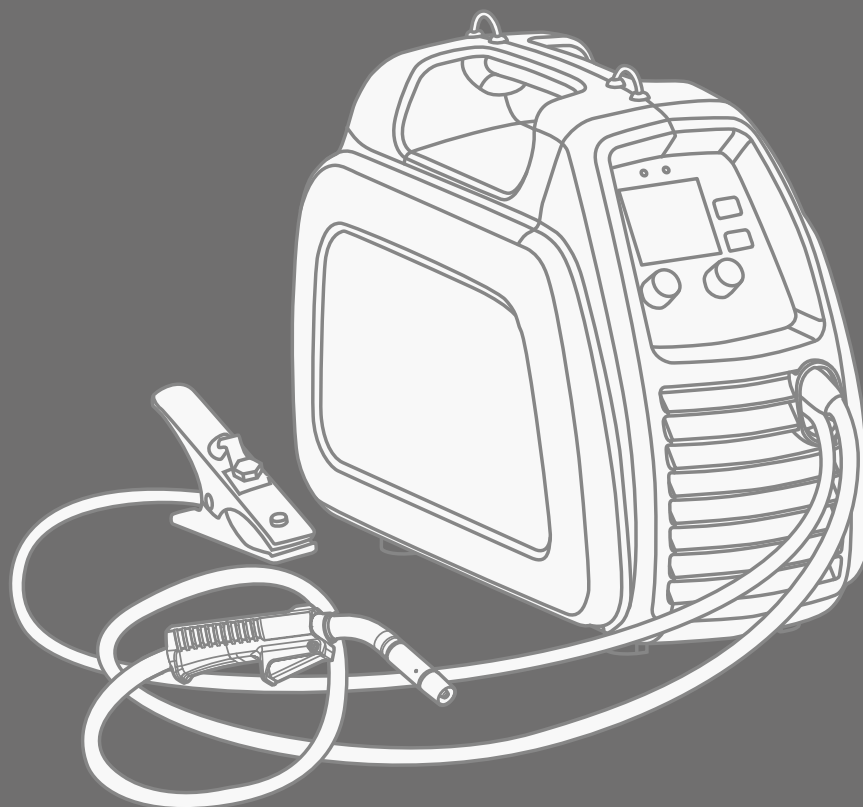


1922330
R00

MinarcMig

190 AUTO, 220 AUTO



OPERATING MANUAL

English

CONTENTS

1.	Preface	3
1.1	General	3
1.2	Product introduction	3
1.2.1	Properties.....	3
1.2.2	About welding.....	4
2.	Before you start using the unit	4
2.1	Unpacking.....	4
2.2	Positioning and location of the machine.....	5
2.3	Distribution network.....	5
2.4	Serial number.....	5
2.5	General view of the machine	5
2.6	Cable connections	6
2.7	Filler wire.....	8
2.7.1	Changing the feed roll groove.....	8
2.7.2	Loading and threading the filler wire.....	9
2.7.3	Reversing polarity.....	10
2.8	Controls and indicator lights.....	11
2.8.1	Display in automatic mode	12
2.8.2	Welding power adjustment in automatic mode	12
2.8.3	Arc length trimmer in automatic mode	13
2.8.4	Display in manual mode	13
2.8.5	Adjustments in manual mode	14
2.9	MIG/MAG welding.....	14
2.10	Using the shoulder strap	16
3.	Maintenance.....	17
3.1	Daily maintenance	17
3.2	Maintenance of the wire feed mechanism.....	17
3.2.1	Cleaning the wire liner	18
3.2.2	Changing wire liner	18
3.3	Troubleshooting	22
3.4	Storage	22
3.5	Disposal of the machine	22
4.	Ordering numbers.....	23
5.	Technical data	24

1. PREFACE

1.1 General

Congratulations on choosing MinarcMig welding equipment. Used correctly, Kemppi products can significantly increase the productivity of your welding, and provide years of economical service.

This operating manual contains important information on the use, maintenance and safety of your Kemppi product. The technical specifications of the equipment can be found at the end of the manual.

Please read the manual carefully before using the equipment for the first time. For your own safety and that of your working environment, pay particular attention to the safety instructions in the manual.

For more information on Kemppi products, contact Kemppi Oy, consult an authorised Kemppi dealer, or visit the Kemppi web site at www.kemppi.com.

For Kemppi's standard safety instructions and warranty terms and conditions, please visit our web site at www.kemppi.com.

The specifications presented in this manual are subject to change without prior notice.

NOTE! *Items in the manual that require particular attention in order to minimise damage and personal harm are indicated with this symbol. Read these sections carefully and follow their instructions.*

Disclaimer

While every effort has been made to ensure that the information contained in this guide is accurate and complete, no liability can be accepted for any errors or omissions. Kemppi reserves the right to change the specification of the product described at any time without prior notice. Do not copy, record, reproduce or transmit the contents of this guide without prior permission from Kemppi.

1.2 Product introduction

MinarcMig 190 and 220 AUTO are easy-to-use MIG/MAG welding machines suitable for professional industry, site and repair welding. Before use or doing any maintenance work on the machine, read the operating manual and keep it for further reference.

MinarcMig tolerates input voltage fluctuation and is suitable for work on sites using power generators and use with long power cables. The power source utilises PFC technology, ensuring optimum usage on single phase power supplies. The IGBT inverter design delivers reliable arc ignition and welding performance, with all filler wire types.

Welding and earth return cables are supplied in the delivery package, including gun, earth clamp and connections.

1.2.1 Properties

The device is small, efficient and light. It is easy to carry with the handle or shoulder strap. It is suitable for a wide range of welding applications, and the possibility to use long power extension cables makes it easy to use in worksite conditions. It is also suitable for use with power generators.

MinarcMig 190/220 AUTO has both automatic and manual operation modes. In the automatic mode, you must first select the filler wire material after which the welding voltage and wire feed speed can be adjusted with one control knob, according to the thickness of the sheet to be welded. Thus, selecting the right parameters is easy. In automatic mode, the length of the arc, or welding heat, is trimmed with another control. In manual mode, the welding voltage and wire feed speed are adjusted separately with their own controls. The use of the machine is aided with an LCD display which indicates the welding current, welding voltage and wire feed speed.

You can use steel (solid or cored wire), stainless steel, aluminium and CuSi as filler wire in the machine. The steel wire can be 0.6 mm, 0.8 mm, 0.9 mm or 1.0 mm thick, but the machine's welding properties are optimum with a steel wire of 0.8 mm diameter. The stainless steel wire can be 0.8 mm, 0.9 mm or 1.0 mm in diameter, the aluminium wire 1.0 mm and CuSi wire 0.8, 0.9 and 1.0 mm.

1.2.2 About welding

In addition to the welding machine, welding outcome is influenced by the work piece to be welded, welding technique and the welding environment. Therefore, recommendations in this manual must be followed.

During welding, an electric welding circuit is created between the positive and negative poles of the machine. On delivery, the welding gun is connected to the positive pole of the machine terminals. The terminals are located inside the case door and should not be changed unless you intend to run a filler wire that is directed to be used in reverse polarity, electrode negative. When a filler wire is loaded to the machine, the wire feed mechanism drives the filler wire through the contact tip mounted in the welding gun, and thus transfers electrical power from the contact tip to the filler wire. The earth return clamp and cable (already connected to the machine on delivery to the negative terminal) connects to the workpiece to be welded. When the filler wire touches the work piece a short circuit occurs, forming the needed closed electrical circuit, an arc is formed and welding commences. Unrestricted current flow is possible only when the earth return clamp is properly attached to the workpiece and the fixing point of the clamp to the workpiece is clean, and free from paint and rust.

Shielding gas must be used during welding in order to prevent air from mixing with the weld pool. Pure carbon dioxide or a mixture of argon and carbon dioxide is a suitable shielding gas for steel filler wire. Argon + 2 % CO₂ mixture is suitable for stainless steel wires. Argon is suitable for welding aluminium and CuSi wires. Some filler wires (referred to as self shielded) form a gas shield from the burning composition of the wire's core, thus eliminating the need for a separate shielding gas supply.

2. BEFORE YOU START USING THE UNIT

NOTE! Please read the separate safety instruction booklet provided before you commence welding. Pay particular attention to the risks associated with fire and explosion.

2.1 Unpacking

When machine leaves factory, it is set up for use with 0.8 mm diameter filler wire. If you wish to use an alternative thickness filler wire or type, make sure that you suitably adjust the feed roll groove, welding gun contact tip and machine polarity for the material type selected.

If you mainly use aluminium or stainless steel filler wire, we recommend you change the wire liner to a Kemppi plastic type, which is better suited for the material.

Always before using the equipment, make sure it was not damaged during transportation. Also check that you have received what you ordered and that there are instructions for it.

The packaging material of the products is suitable for recycling.

Transportation

The machine should be transported in an upright position.

NOTE! Always move the welding machine by lifting it from the handle. Never pull it from the welding gun or other cables.

Environment

The machine is suitable for both indoor and outdoor use, but it should be protected from rain and sunshine. Store the machine in a dry and clean environment and protect it from sand and dust during use and storage. The recommended operating temperature range is -20...+40 °C. Place the machine in such a way that it does not come in contact with hot surfaces, sparks and spatters. Make sure the air flow in the machine is unrestricted.

2.2 Positioning and location of the machine

Place the machine on a firm, dry and level surface. Where possible, do not allow dust or other impurities to enter the machine's cooling air flow. Preferably site the machine above floor level; for example on a suitable carriage unit.

Notes for positioning the machine

- The surface inclination should not exceed 15 degrees.
- Ensure the free circulation of the cooling air. There must be at least 20 cm of free space in front of and behind the machine for cooling air to circulate.
- Protect the machine against heavy rain and direct sunshine.

NOTE! The machine should not be operated in the rain as the protection class of the machine, IP23, allows for outside preserving and storage only.

NOTE! Never use a wet welding machine.

NOTE! Never aim metallic grinding spray/sparks towards the equipment.

2.3 Distribution network

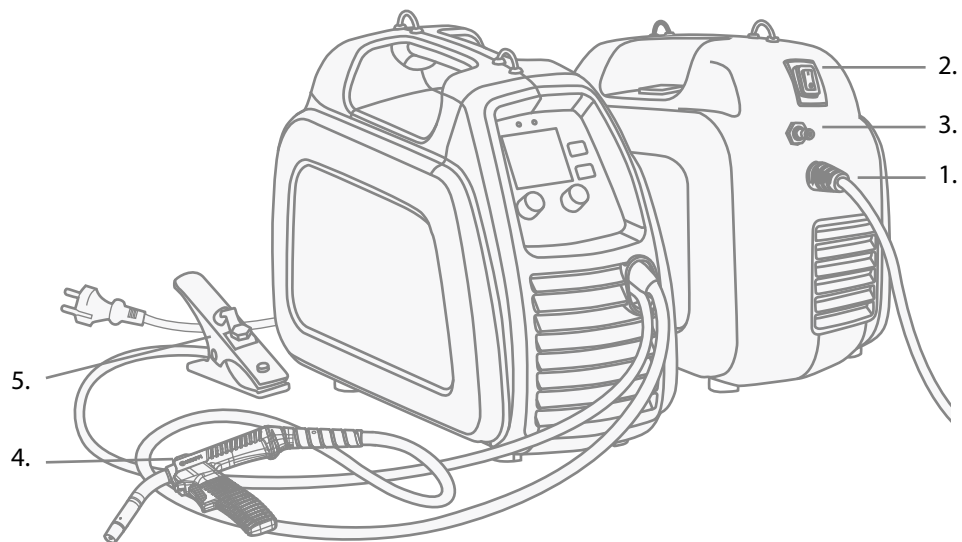
All regular electrical devices without special circuits generate harmonic currents into distribution network. High rates of harmonic current may cause losses and disturbance to some equipment.

MinarcMig 190 AUTO and 220 AUTO comply with IEC 61000-3-12.

2.4 Serial number

The serial number of the unit is marked on the rating plate. The serial number makes it possible to trace product manufacturing series. You might need the serial number when placing spare parts orders or when planning maintenance.

2.5 General view of the machine



1. Supply voltage cable
2. Main switch
3. Shielding gas hose connector
4. Welding gun and cable
5. Earth return clamp and cable

2.6 Cable connections

Connection to the mains

The machine is fitted with a 3 m long supply voltage cable and plug. Connect the supply voltage cable to the mains. Should you need to fit an alternative plug or mains cable, ensure installation is completed by an authorised electrician.

NOTE! *The fuse size needed is 16 A delayed.*

If you use an extension cable, its cross-sectional area should be at least as large as the machines supply cable (3 x 1.5 mm²). It is recommended to use 3 x 2.5 mm² extension cable. The maximum length for the extension cable is 100 meters.

The machine can also be used with a generator. The minimum power for the generator is 4.2 kVA, and the recommended power 8.0 kVA in order for the machine to be used at maximum capacity.

Earth return

The welding circuit earth return cable is already connected to the machine. Clean the workpiece surface and fix the earth return clamp to the work piece in order to create a welding circuit.

Welding gun

The welding gun is already connected to the machine. The filler wire, shielding gas and electric current is delivered to the weld inside the welding gun cable. When you press the gun trigger, shielding gas starts to flow and filler wire feed begins. The arc ignites when the filler wire touches the work piece. Inside the gun cable there is a factory-installed wire liner that is best suited for welding with steel and CuSi filler wires. It can temporarily be used also with stainless steel and aluminium wires. However, this is not recommended because of greater friction and reduced welding performance, and it may finally lead into failure of filler wire delivery.

If you mainly use aluminium or stainless steel filler wire, we recommend that you replace the wire liner with a Kemppi plastic type, which is better suited for the material. For instructions on how to change the wire liner, please refer to the Maintenance section later in this manual.

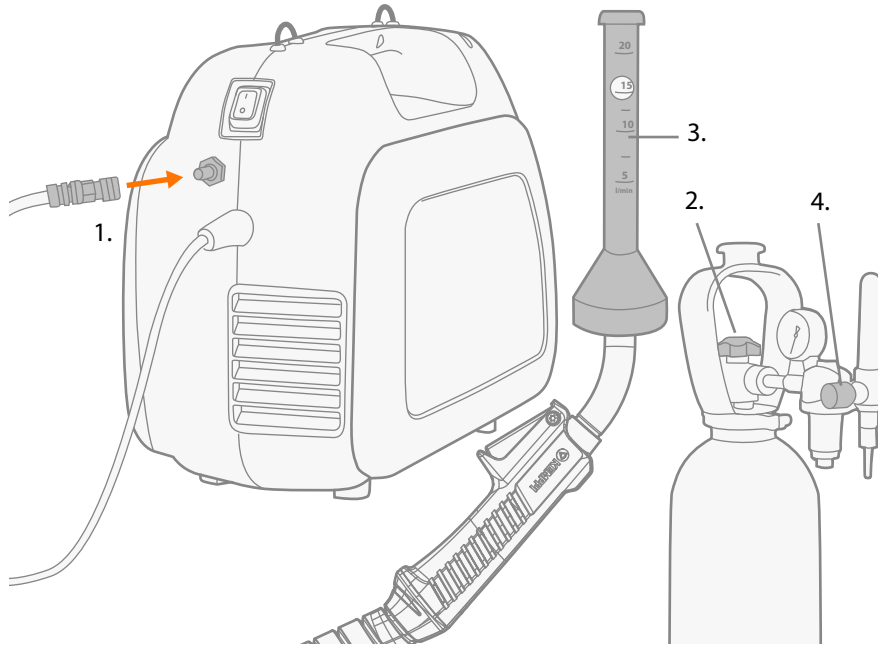
The gun neck can be rotated 360° to suit different welding positions. The neck is connected via a standard clockwise screw thread. Always make sure that the neck is almost fully connected to the bottom thread. This prevents damaging and overheating the neck.

NOTE! *If you intend to use other than 0.8 mm diameter steel filler wire, change the welding gun contact tip, gun liner, and drive roll to match the selected filler wire type and thickness.*

Shielding gas

Shielding gas is used for replacing air around the welding arc. For steel wires, use CO₂ (carbon dioxide) or a mixture of Ar (argon) and CO₂ for shielding gas. Welding performance will be improved when using mixed gas products. For stainless steel wires, use mixture of Ar and CO₂ (2 %), and for aluminium and CuSi wires, use pure argon. The required flow rate of the shielding gas is determined by the thickness of the welded sheet and the used welding power. The machine is delivered with a 4.5 m long gas hose. Connect the supplied female snap connector of the gas hose to the machine's male connector. Connect the other end of the gas hose to the gas cylinder via a suitable and approved single stage regulator valve, where outlet flow rates can be adjusted.

NOTE! Never attempt to connect directly to a compressed gas cylinder. Always use an approved and tested regulator and flow meter.



Connecting the gas hose to a typical welding regulator control valve

1. Connect the hose to the welding machine snap connector
2. Open the regulator valve of the gas cylinder
3. Measure the gas flow
4. Adjust the flow with the adjustment knob (10–20 l/min)

NOTE! Use a suitable shielding gas for the welding application. Always secure the gas cylinder in an upright position with either a specially made wall rack or cylinder trolley. Always close the cylinder valve after welding.

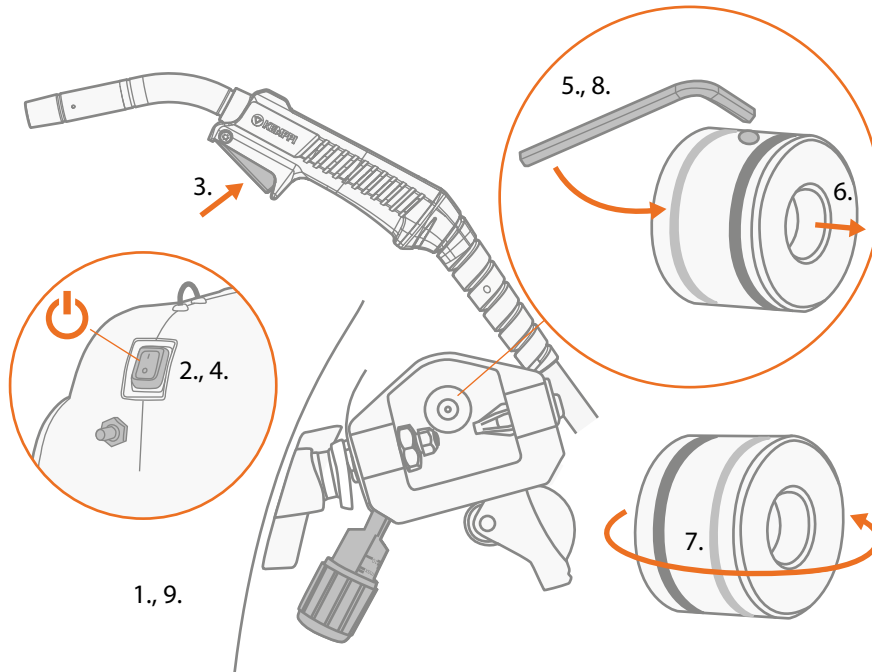
2.7 Filler wire

The machine is delivered with the welding gun connected to the positive pole (+) making it suitable for welding with solid steel, stainless steel, aluminium and CuSi filler wires without extra adjustments.

2.7.1 Changing the feed roll groove

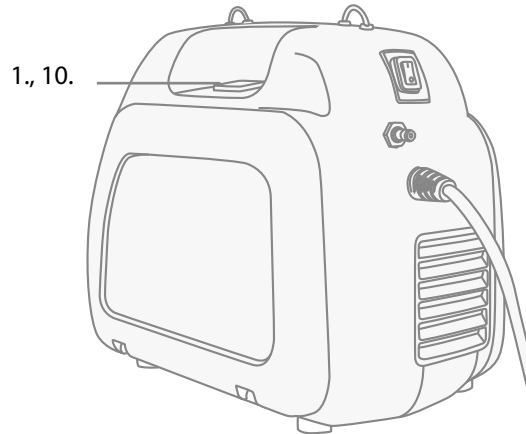
When the machine leaves factory, the feed roll groove is set for welding with filler wires of 0.8–1.0 mm diameter. The feed roll groove must be changed, if you use 0.6 mm thick filler wire.

Changing the feed roll groove

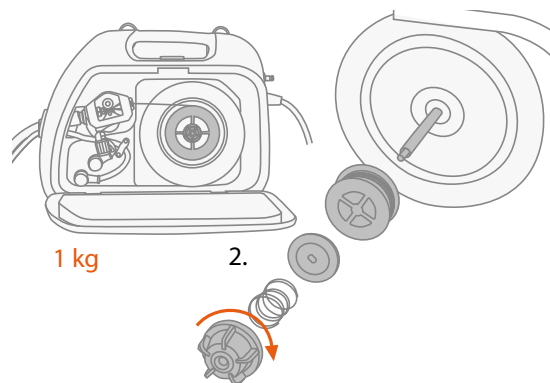
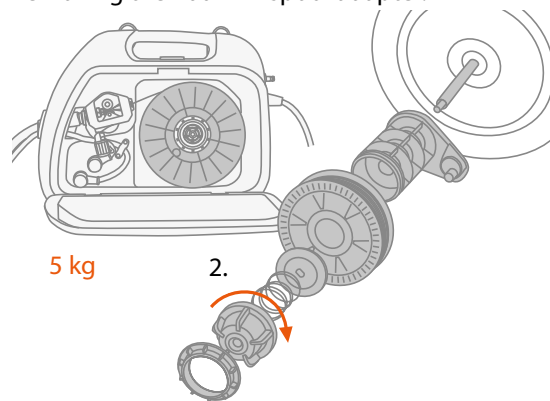


1. Release the pressure control lever.
2. Switch the machine on from the main switch.
3. Press the welding gun trigger and drive the feed roll in such a position that the locking screw is clearly visible and can be accessed.
4. Switch the power off from the main switch.
5. Release the feed roll locking screw with a 3.0 mm Allen wrench approximately half a turn.
6. Pull the feed roll from its shaft.
7. Turn the feed roll around and reinstall it to the shaft all the way to the bottom stop, making sure that the screw is parallel to the flat area ground onto the shaft.
8. Tighten the feed roll locking screw.
9. Close the pressure control lever.

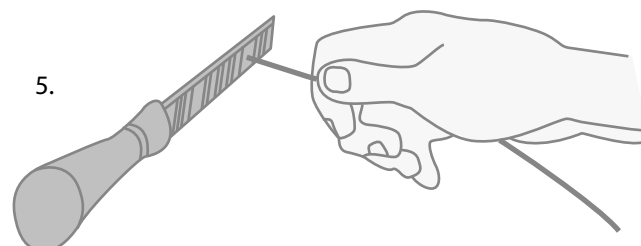
2.7.2 Loading and threading the filler wire

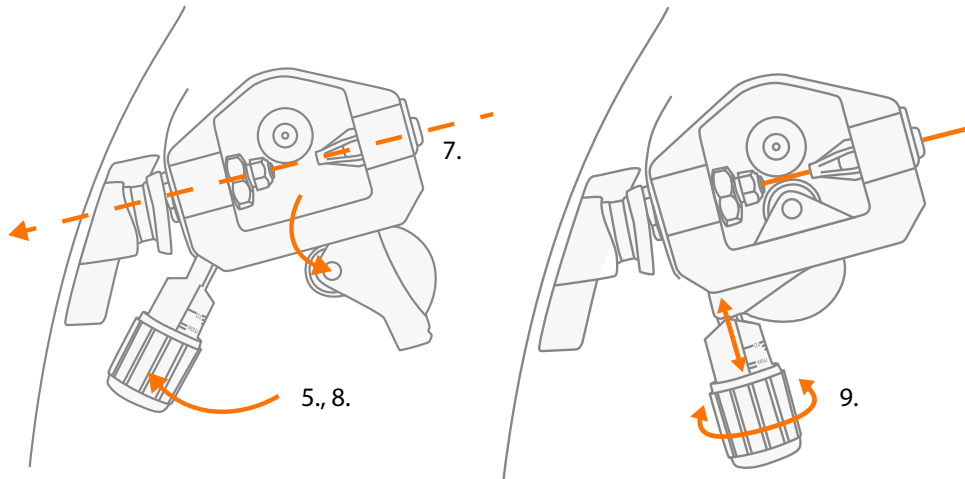


1. Open the filler wire cabinet door by pressing the orange door latch button and installing the filler wire spool in such a way that it rotates counter clockwise. You can use either a 5 kg (diameter 200 mm) or 1 kg (100 mm) filler wire spool with MinarcMig by adding or removing the 200 mm spool adapter.



2. Attach the wire spool friction plate, lock and secure the spool.
3. Release the filler wire end from the spool, but carefully holding on to it all the times.
4. Straighten the wire end for approximately 20 cm and cut the wire in the middle of the straightened section.
5. Smooth the sharp filler wire end



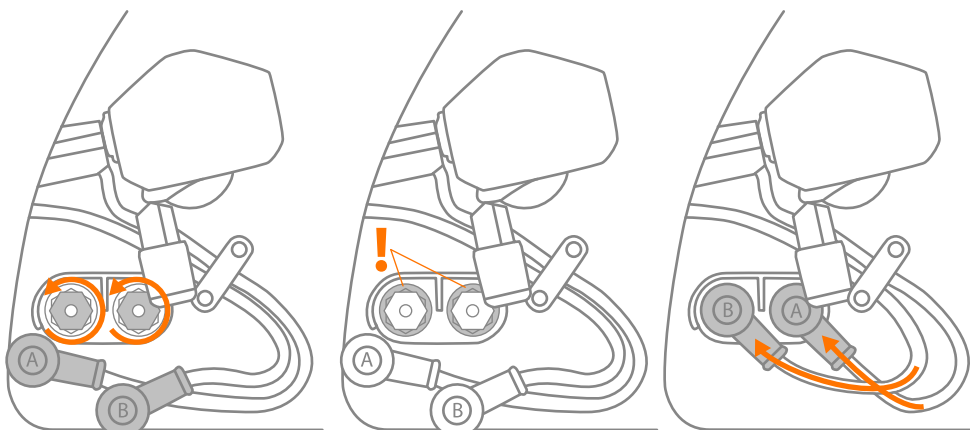


6. Open the pressure control arm which then opens the feed mechanism.
7. Thread the filler wire through the wire guide to the wire liner inside the gun cable.
8. Close the feed gear and secure it with the pressure control arm. Make sure that the filler wire runs in the feed roll groove.
9. Adjust the filler wire compression with the pressure control arm, no higher than to the middle of the scale. If the pressure is too high, the feed rolls may remove metal fragments from the wire surface. On the other hand, if the pressure is too low, the feed gear slips and the wire does not feed and run smoothly.
10. Switch on the welding machine.
11. Press the welding gun trigger and wait for the filler wire to exit the welding gun.
12. Close the wire cabinet door.

NOTE! When feeding the welding wire into the gun, be sure that you are not pointing the gun at anyone and that there isn't anything in front of the gun. Also, do not put your fingers near the feed rolls, because they might get trapped

2.7.3 Reversing polarity

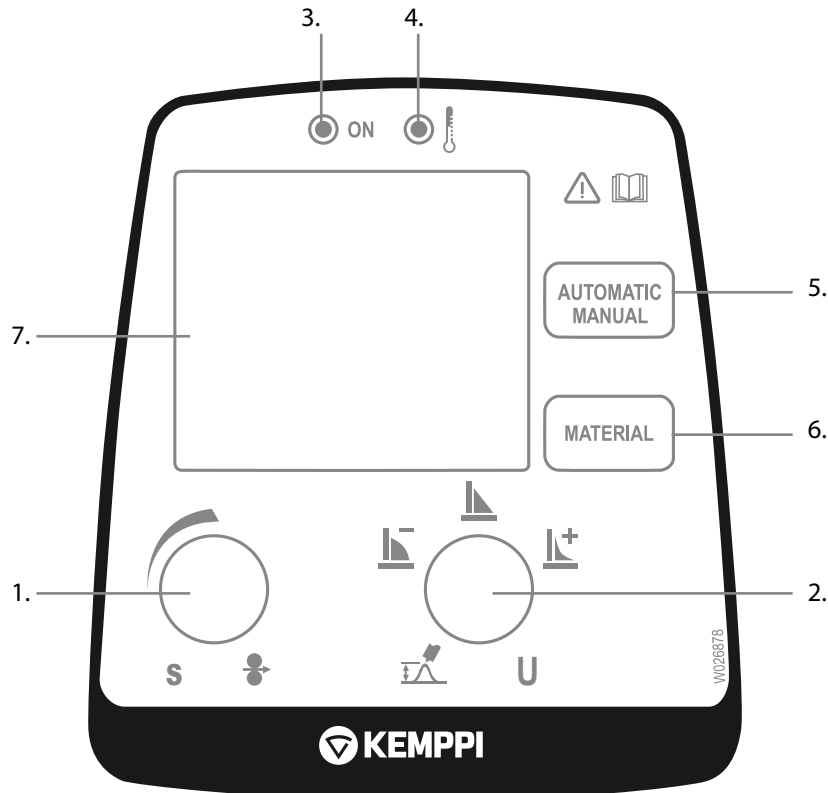
Some filler wires are recommended to be welded with the gun in the –pole, so the polarity should be reversed. Check the recommended polarity from the filler wire package.



1. Disconnect the machine from the mains.
2. Expose the terminal connections by bending the protective rubber covers away from the terminal.
3. Unscrew the fixing screws. Do not change the tension of the terminal nuts and washers.
4. Interchange the cables.
5. Tighten the screws to max. 5 Nm torque.
6. Replace the rubber terminal covers. The rubber covers must always protect the terminals during use.

2.8 Controls and indicator lights

MinarcMig 190 AUTO and 220 AUTO control panel



Machine's control panel in automatic mode

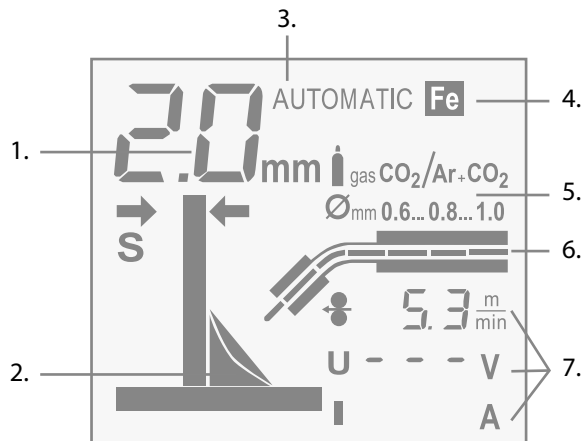
1. Welding power control (automatic mode) OR Wire feed speed control (manual mode)
2. Arc length trimmer (automatic mode) OR Welding voltage control (manual mode)
3. Standby indicator light, machine 'ON' indicator
4. Overheating indicator light
5. Mode selection button
6. Material selection button (automatic mode)
7. Display

In automatic mode, the welding power is adjusted according to the thickness of the material to be welded. The machine also has a trimmer for arc length in automatic mode, which also influences the weld seam surface shape. There are four material options for filler wires in automatic mode, and you can browse through them with the material selection button. In manual mode, the wire feed speed and welding voltage are adjusted separately. Operation mode can be changed with the mode selection button. Note that material or sheet thickness selections made in the automatic mode are not valid in manual mode.

Indicator lights display the machine's standby mode and inform of a possible welding duty cycle temperature limit. When you switch the machine on, a green standby light switches on. If the machine reaches its duty cycle limit during welding or the supply voltage is too low or too high, the welding operation automatically switches off and the yellow overheating indicator light switches on. The light switches off when the machine has cooled and is ready for operation again. Make sure that there is enough space around the machine to allow fresh air to freely circulate and cool the machine.

NOTE! Always start and stop the machine from the main switch, never use the plug as a switch!

2.8.1 Display in automatic mode



Machine display in automatic mode

1. Material thickness
2. Visual material thickness and weld shape indicator
3. Operating mode reference
4. Material selection
5. Shielding gas and wire diameter recommendation
6. Wire feed graphic
7. Welding values: Wire feed speed, welding voltage and welding current

MinarcMig automatically sets the machine based on your input selections for plate thickness in mm, weld shape and material type. The material thickness graphic display shows the selected plate thickness to be welded. Your machine is automatically set for welding following these parameters inputs.

As you make your selections you will see the displayed parameters change. For example, as you adjust the power/plate thickness control, you will see the graphic indicating plate thickness become thicker or thinner.

The selected operating mode and material type are also shown on the display. The display also shows a recommendation for shielding gas and filler wire diameter for the material in question. During welding, the graphical display shows that wire feeding is active including the wire feed rate. Of all the welding parameters, only filler wire feed speed is visible on the display all the time. Welding voltage and welding current are only visible on the display during welding. The last used values remain on the display until welding is restarted or parameter settings are changed.

When adjusting the arc length, weld shape, or voltage control, the voltage display shows a comparative scale (-9...0...9) which will disappear from the display after a preset time following adjustment.

2.8.2 Welding power adjustment in automatic mode

Adjusting the welding power according to sheet thickness affects simultaneously both wire feed speed and amount of current delivered to the filler wire. This is a good starting point for welding in different operating situations. However, welding joint type and root opening may influence the amount of welding power required. Select the correct welding power using the power control, whilst viewing the graphical display of the fillet weld and sheet thickness indicator. If the fillet weld's sheets are of different thickness, use their average as a default parameter and test weld. The sheet thickness display is given in millimetres and with steel and stainless steel wires, is based on 0.8 mm filler wire diameter. When using a 0.6 mm filler wire, set the welding power control slightly higher than the used sheet thickness and correspondingly slightly lower with 0.9–1.0 mm wires. With aluminium wires, the welding power adjustment is based on 1.0 mm wire diameter.

2.8.3 Arc length trimmer in automatic mode

The arc length/weld shape/voltage trimmer adjusts the length of the arc, either shorter or longer, and affects the welding temperature. A shorter arc is colder and a longer one hotter. The arc length trimmer also affects the arc's welding properties and influences weld spatter with different combinations of filler wire diameters and shielding gases. The trimmer range is -9...0...9: negative values shorten and positive values lengthen the arc. The trimmer is preset at 0 which is, in most cases, a suitable basic setting.

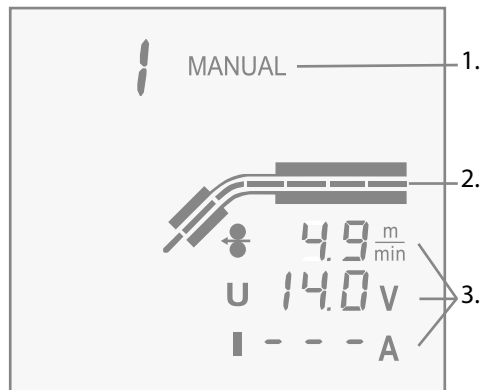
If the weld is too convex, the arc is too short or cold. Then adjust the arc longer or hotter by turning the control clockwise.

If, on the other hand, you want to weld with a colder arc to prevent for example the parent material from burning through, adjust the arc shorter by turning the control counter clockwise. You can also adjust the welding power, if needed.

When adjusting the arc length, the cross sectional weld joint graphic on the machines display changes correspondingly to either a more concave, flat or convex weld result.

NOTE! When welding for the first time, we recommend that you set the arc length trimmer to 0.

2.8.4 Display in manual mode



1. Operating mode
2. Wire feed graphic
3. Welding values: wire feed speed, welding voltage and welding current

The selected 'Manual' operating mode is confirmed on the display. During welding, the wire feed speed graphic displays the wire's speed. Wire feed speed is the only welding parameter always visible on the display. When adjusting welding voltage, the display shows the set value for the voltage, and only during welding does the display show the actual value. Welding current is visible on the display only during welding. Values for actual welding voltage and welding current remain on the display after welding, until welding is restarted or settings are changed.

Arc dynamics



In Manual mode you can select from two different arc dynamics settings. Press Manual mode button once to pre-select either arc dynamic value I or value II. Changing between setting I and setting II will adjust the short circuit characteristics to suit different welding applications.

2.8.5 Adjustments in manual mode

In manual mode, the wire feed speed and welding voltage are both adjusted separately. Welding current and power are defined according to wire feed speed. The desired arc and welding properties can be reached by adjusting the voltage.

2.9 MIG/MAG welding

NOTE! *Welding fumes may be dangerous to your health. Ensure that there is ample ventilation during welding! Never look at the arc without a face shield specifically designed for arc welding! Protect yourself and your surrounding area from the arc and hot welding spatter!*

NOTE! *Always wear protective clothing, gloves, face and eye shields suitable for welding. It is recommended that you make practice welds before you commence welding your main work piece.*

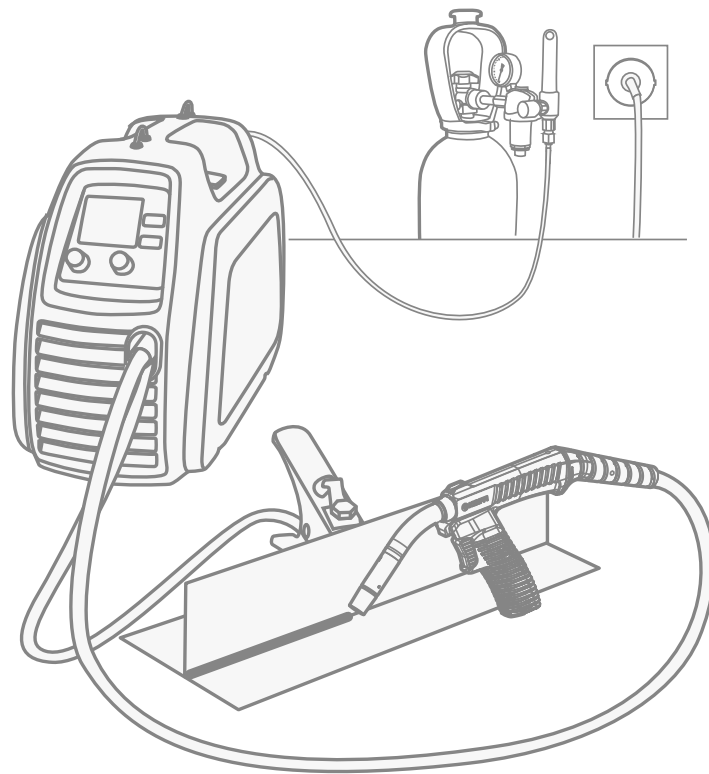
NOTE! *The work piece will be very hot. Protect yourself and others at all times.*

You can start welding after you have made the necessary preparation described throughout these instructions.

Providing you ensure that the MinarcMig equipment is correctly prepared and set for the material type and joint to be welded, you will achieve exceptionally high quality welding results.

- Ensure that the correct filler wire type and size is selected for the work piece.
- Ensure that the correct wire liner and contact tip size is fitted to the welding gun.
- Ensure that the correct shielding gas type is connected and the flow rate adjusted before welding starts.
- Ensure the earth return clamp is connected to the work piece
- Ensure that you are wearing the correct safety equipment before you start welding - including: suitable welding clothing, the correct welding face shield with a suitable shade welding lens, welding gloves and when necessary, a welding mask.

NOTE! *Please read section 1.2.2 before proceeding further.*



Having checked that the MinarcMig is prepared in the correct way for the welding task ahead, and that you are wearing the necessary protective equipment, you are ready to commence welding.

MIG/MAG welding can be performed down hand, vertically and overhead: either right to left (Right handed operators) or left to right (left handed operators)

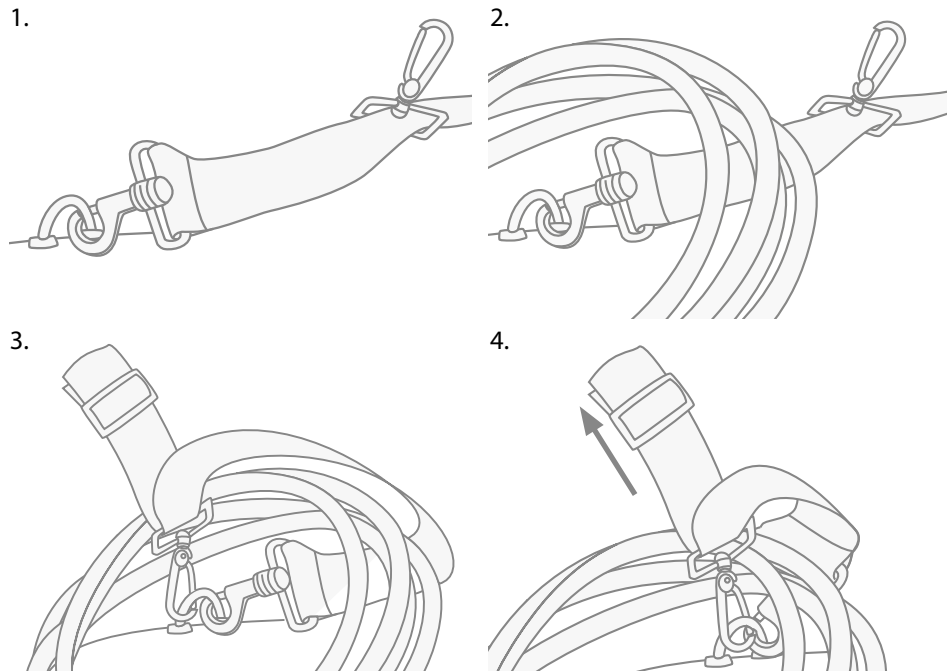
First, present the welding gun nozzle to a practice work piece. The gun nozzle should be approximately 15 mm away from the surface of the work piece and weld joint. If welding a T fillet joint, the gun should be held at an angle of approximately 45 degrees, bisecting the 90 degree joint at the midway point. Starting at the right hand side of the joint (Right handed operators only), lean the gun backwards slightly, so the gun nozzle is pointing forwards, towards the centre of the work piece. This is called a 'pushing technique' and is suitable for most applications.

Pull the welding gun trigger. The filler wire will move forward, and a short circuit will occur and the arc will be established. Keeping the gun trigger depressed, the molten weld pool will start to form. Begin to travel the gun forwards, in a controlled manner and travel speed. Not too fast and not too slow. Providing you have correctly set your MinarcMig, your welding power should be correctly set for the material thickness and type, and the quality of your weld deposit is now determined by your skill and technique.

The resulting weld deposit, width and shape, should be consistent in appearance and quality. If you are welding too fast the weld bead may be too thin or even intermittent in appearance. Try to slow your travel speed slightly and maintain an even approach to the joint. If you are welding too slowly, you may find the weld deposit is too heavy, the weld piece overheats and possibly burns a hole through the plate. All that may be required to ensure a successful result here is an increase in forward travel speed, but you may also need to reduce the power setting slightly, to achieve the desired result.

As with all craft skills – practice will make perfect! For more info www.kemppi.com > Welding ABC.

2.10 Using the shoulder strap



Using and fixing the shoulder strap

The machine is delivered with a fabric shoulder strap and metal clip set. The shoulder strap can be used as a convenient and comfortable way to transport both the machine and cables set. There are two identical metal clips. Fix one clip to each of the metal lifting eyes, located at the top of the machine. Adjust the shoulder strap to a comfortable length. The machine can now be carried.

Should you also wish to transport and secure the cables set, place the cable bundle over the strap as shown, bring the strap and remaining free clip over the top of the cable bundle and secure to the already fastened clip. As you take the weight of the machine with the strap, the cable set is clamped securely into position ready for transport.

NOTE! *The machine should not be used when hanging from the shoulder strap.*

3. MAINTENANCE

NOTE! Be careful when handling electrical cables!

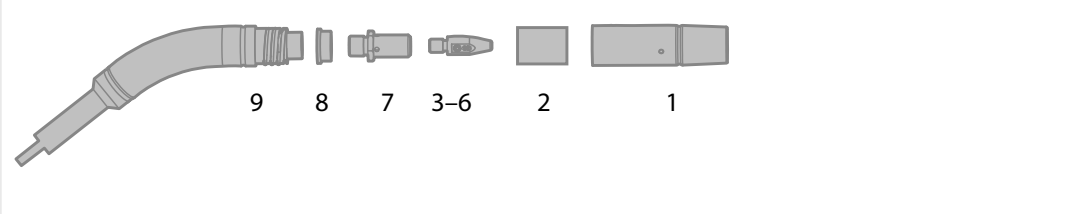
In maintaining the unit, take into consideration the rate of use and the environment it is used in. When the unit is used properly and serviced regularly, you will avoid unnecessary disturbances in use and production.

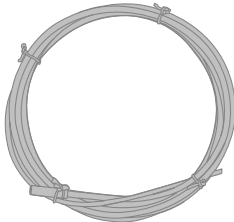
3.1 Daily maintenance

- Remove welding spatters from the welding gun's tip and check the condition of the parts. Change damaged parts to new ones immediately. Only use original Kemppi spare parts.
- Change damaged insulation parts to new ones immediately.
- Check the tightness of the welding gun's and earthing cable's connections.
- Check the condition of the supply voltage and welding cable and replace faulty cables.
- Check condition of mains and welding cables and replace damaged cables.
- See that there is enough space around the unit for ventilation.

3.2 Maintenance of the wire feed mechanism

Parts of the welding gun and wire liner



1	9580101		 10, 11
2	958010101		
3	CT06C1SD003	0.6 mm	
4	CT08C1SD003	0.8 mm	
5	CT09C1SD003	0.9 mm	
6	CT10C1SD003	1.0 mm	
7	9580173		
8	9591079		
9	4153040	40°	
10	4307650	0.6–1.0 mm (Fe)	
11	4307660	0.6–1.0 mm (Ss, Al)	

Service the wire feed mechanism at least every time the spool is changed.

- Check the wear of the feed roll groove and change the feed roll when necessary.
- Carefully clean the welding gun wire liner with dry compressed air.

NOTE! When using compressed air pistols, ensure you are wearing adequate safety equipment including, suitable work clothing, gloves and eye protection. Never direct compressed air pistols or the end of the liner at your skin, face or others in the vicinity.

3.2.1 Cleaning the wire liner

Pressure of the feed rolls remove metal dust from the filler wire's surface which then travels in the wire liner inside the gun cable. If the wire liner is not cleaned, it gradually clogs up, increasing drag, impairing wire feed performance and weld quality. Ultimately this will cause wire feed malfunctions. Clean the liner in the following manner:

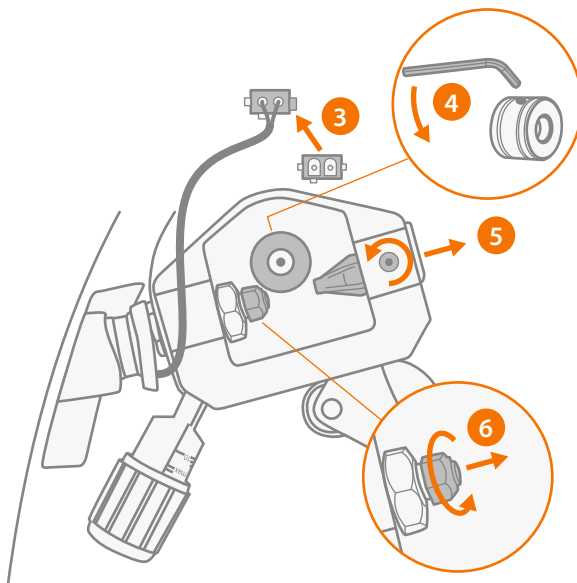
1. Remove the welding gun's gas nozzle, contact tip and contact tip adapter.
2. With a pneumatic pistol, blow dry and filtered compressed air through the wire liner.
3. Clean the wire feed mechanism and spool housing with compressed air.
4. Reassemble the welding gun. Firmly tighten the contact tip and contact tip's adapter.

3.2.2 Changing wire liner

This section describes how to replace the wire liner.

Removing the wire liner

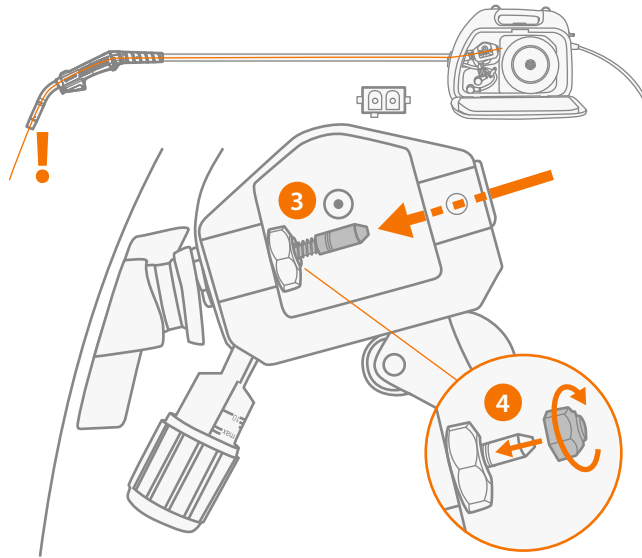
1. Straighten the gun cable.
2. Remove the wire spool and wire from the wire feeder and welding gun.



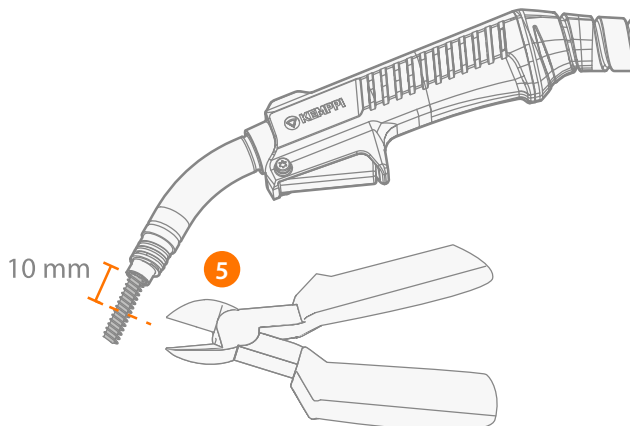
3. Detach the start cable connector.
4. Loosen the wire feed roll fixing screw with a 3 mm Allen key and remove the wire feed roll. For the screw to be properly accessible, press the welding gun trigger and drive the feed roll so that the feed roll fixing screw points up (towards the top of the machine).
5. Loosen the guide tube fixing screw with a Torx screwdriver (T10) and remove the guide tube.
6. Remove the wire liner end nut assembly.
7. Remove the wire liner. First, pull the wire liner out of the welding gun by guiding the wire liner end (with the cone) through the guide tube aperture.

Installing steel spiral wire liner

1. Ensure that the welding gun cable is straightened.
2. Remove the gas nozzle, contact tip and contact tip adapter from the gun.



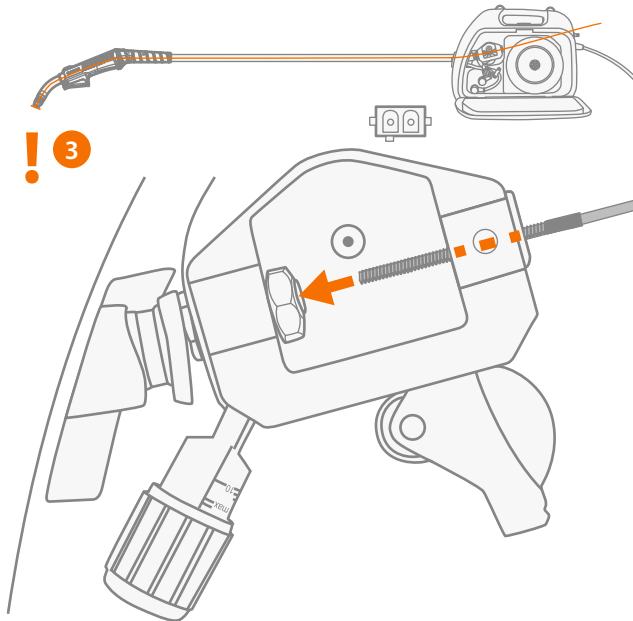
3. Guide the new wire liner first through the guide tube aperture and into the welding gun until the cone in the end of the wire liner is properly in position (until it stops).
4. Attach the wire liner end nut assembly and tighten it with a 10 mm spanner.



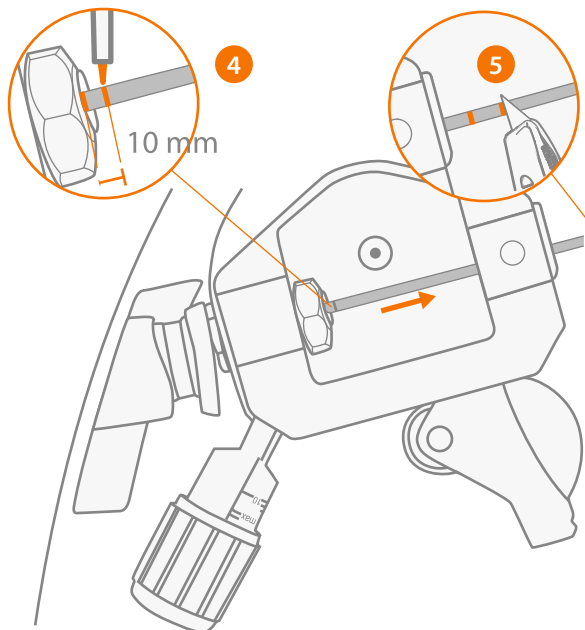
5. Cut the wire liner leaving 10 mm of excess wire liner measured from the insulating ring.
6. File the end of the liner. Don't leave any rough, inward edges that could potentially damage the filler wire.
7. Replace the contact tip adapter, contact tip and gas nozzle.
8. Replace the feed roll.
9. Replace the guide tube.
10. Reattach the start cable connector.

Installing DL Chili wire liner

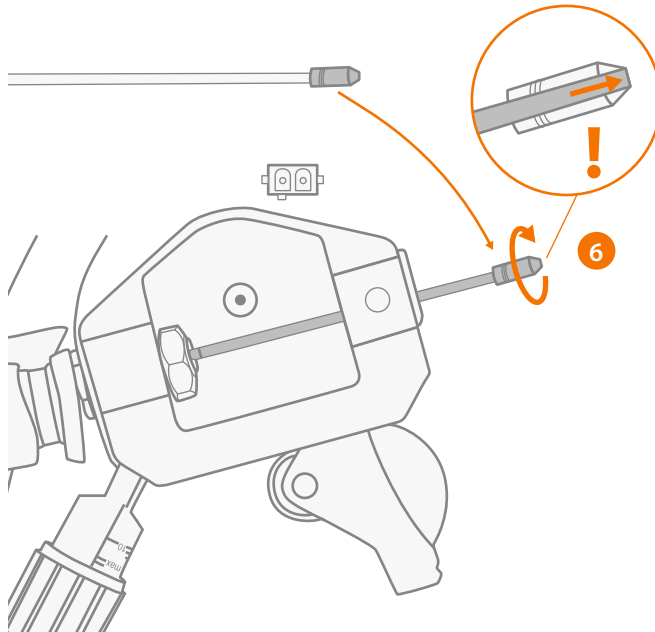
1. Ensure that the welding gun cable is straightened.
2. Remove the gas nozzle and contact tip from the gun.



3. Feed the new wire liner through the guide tube aperture into the welding gun until it stops at the gun end (contact tip adapter).



4. Measure 10 mm of excess wire liner and mark the point.
5. Pull the wire liner temporarily back out and cut the wire liner at the marked point.



6. Remove the cone from the cut piece of the wire liner and install it onto the end of the shortened wire liner. Tighten the cone so that the end of the wire liner is flush with the end of the cone.
7. Feed the new wire liner into the welding gun until it stops at the gun end (contact tip adapter).
8. Attach the wire liner end nut assembly and tighten it with a 10 mm spanner.
9. Replace the contact tip and gas nozzle.
10. Replace the feed roll.
11. Replace the guide tube.
12. Reattach the start cable connector.

3.3 Troubleshooting

Problem cause	
The wire does not move or wire feed entangles	Feed rolls, wire liner or contact tips are defective <ul style="list-style-type: none"> • Check wire mechanism adjustment is not too tight or too loose • Check that the feed roll groove is not too worn • Check that the wire liner is not blocked • Check that the contact tip and wire liner are suitable for the wire size used • Check that spatter is not blocking the contact tip and that the hole is not closed or damaged
The machine 'ON' indicator will not light up	<ul style="list-style-type: none"> • The machine has no supply voltage light • No electricity connected to the machine • Check the mains supply fuses • Check the mains cable and plug
Poor welding results	Several factors affect the welding quality <ul style="list-style-type: none"> • Check that the wire feed is constant • Check the trimming settings of welding power control and arc length • Check the material selection setting • Check that the earth return clamp is fixed properly, fixing point is clean, and both cable and its connections are undamaged • Check that the shielding gas is suitable for the wire material used • Check the flow of shielding gas from the tip of the welding gun • Supply voltage is uneven, too low or too high
Overheating indicator is illuminated	The machine has overheated Normally, this indicates that the device has reached its maximum designed operating temperature. The thermostat has become active, switching the welding power off. Allow the unit to cool and the machine will soon automatically reset and allow welding to restart. <ul style="list-style-type: none"> • Ensure that cooling air has unrestricted flow. • If the machine's duty cycle has been exceeded, wait for indicator to turn off. In certain circumstances, this light may also indicate irregularity in the supply voltage. Too low or high supply voltage.

If the machine's malfunction is not eliminated with the above measures, contact Kemppi service.

3.4 Storage

Store the unit in a clean and dry place. Shield it from rain, and in temperatures exceeding +25 °C from direct exposure to sun.

3.5 Disposal of the machine



Do not dispose of electrical equipment with normal waste!

In observance of European Directive 2002/96/EC on waste electrical and electronic equipment, and its implementation in accordance with national law, electrical equipment that has reached the end of its life must be collected separately and taken to an appropriate environmentally responsible recycling facility.

The owner of the equipment is obliged to deliver a decommissioned unit to a regional collection centre, per the instructions of local authorities or a Kemppi representative. By applying this European Directive you will improve the environment and human health.

4. ORDERING NUMBERS

MinarcMig 190 AUTO	includes gun, cables, gas hose and shoulder strap	61008190
MinarcMig 190 AUTO AU	includes gun, cables, gas hose and shoulder strap	61008190AU
MinarcMig 220 AUTO	includes gun, cables, gas hose and shoulder strap	61008220
MinarcMig 220 AUTO AU	includes gun, cables, gas hose and shoulder strap	61008220AU
Welding gun GC 223 G MIM 3M	3 m	GC223GMIM3
Earth return cable and clamp	3 m	6184004
Shielding gas hose	4.5 m	W001077
Shoulder strap		9592163
Consumables for wire feed mechanism		
Feed roll	0.6 – 1.0 mm	W000749
	0.8 – 1.0 mm, knurled	W001692
Pressure roll		9510112
Wire rear guide		W000651
Parts for wire spool hub		
Spool flange		W000728
Spring		W000980
Wire spool lock		W000727
Consumables for GC223GMIM3 gun		
Gas nozzle		9580101
Gas nozzle insulating bush		958010101
Contact tip M6	0.6 mm	CT06C1SD003
Contact tip M6	0.8 mm	CT08C1SD003
Contact tip M6	0.9 mm	CT09C1SD003
Contact tip M6	1.0 mm	CT10C1SD003
Contact tip adapter		9580173
Neck insulating ring		9591079
Wire guide	0.6 – 1.0 mm (Fe)	4307650
Wire guide	0.6 – 1.0 mm (Ss, Al)	4307660
Bend protector		W026893
GC additional handle assembly		W020542

5. TECHNICAL DATA

MinarcMig 190 AUTO		
Connection voltage	1 ~ 50/60 Hz	230 V ± 15 %
Connection voltage (AU)	1 ~ 50/60 Hz	230 V ... 240 V ± 15 %
Rated power at max. current	20 % ED	190 A/6 kVA
Supply current	20 % ED I_{1max}	24.3 A
	100 % ED I_{1eff}	12.0 A
Connection cable	H07RN-F	3G1.5(1.5 mm ² , 3 m)
Fuse	type C	16 A
Output 40 °C	35 % ED	190 A/23.5 V
	60 % ED	140 A / 21 V
	100% ED	100 A/19 V
Welding range		20 A/15 V – 190 A/26 V
No-load voltage		70 – 75 V
Idle power		12 W
Voltage steps		0.1 V
Power factor at 100 % ED		0.99
Efficiency at 100 % ED		84 %
Filler wires ø	Fe solid wire	0.6 ... 1.0 mm
	Fe cored wire	0.8 ... 1.0 mm
	Ss	0.8 ... 1.0 mm
	Al	1.0 mm
	CuSi	0.8 ... 1.0 mm
Wire feed speed adjustment range		1 ... 13 m/min
Wire spool	max. ø	200 mm/5 kg
Shielding gases		CO ₂ , Ar + 8-25% CO ₂ , Ar + 2 % CO ₂ , Ar
External dimensions	LxWxH	450 x 227 x 368 mm
Weight	incl. gun and cables 3.0 kg	14.2 kg
EMC class		A
Degree of protection		IP23
Operating temperature range		-20 ... +40 °C
Storage temperature range		-40 ... +60 °C
Standards IEC 60974-1 IEC 60974-5 IEC 60974-10 IEC 61000-3-12		

MinarcMig 220 AUTO		
Connection voltage	1 ~ 50/60 Hz	230 V ± 15 %
Connection voltage (AU)	1 ~ 50/60 Hz	230 – 240 V ± 15 %
Rated power at max. current	20 % ED	220 A/7 kVA
Supply current	20 % ED I_{1max}	30 A
	100 % ED I_{1eff}	15 A
Connection cable	H07RN-F	3G1.5(1.5 mm ² , 3 m)
Fuse	gG, slow	16 A
Output 40 °C	20% ED	220 A/25 V
	60% ED	160 A/22V
	100% ED	120 A/20 V
Welding range		20 A/15 V – 220 A/28 V
No-load voltage		70 – 75 V
Idle power		12 W
Voltage steps		0.1 V
Power factor at 100 % ED		0.99
Efficiency at 100 % ED		84 %
Filler wires ø	Fe solid wire	0.6 – 1.0 mm
	Fe cored wire	0.8 – 1.0 mm
	Ss	0.8 – 1.0 mm
	Al	1.0 mm
	CuSi	0.8 – 1.0 mm
Wire feed speed adjustment range		1 – 14 m/min
Wire spool	max. ø	200 mm/5 kg
Shielding gases		CO ₂ , Ar + 8-25% CO ₂ , Ar + 2 % CO ₂ , Ar
External dimensions	LxWxH	450 x 227 x 368 mm
Weight	incl. gun and cables 3.0 kg	14.2 kg
EMC class		A
Degree of protection		IP23
Operating temperature range		-20 – +40 °C
Storage temperature range		-40 – +60 °C
Standards IEC 60974-1 IEC 60974-5 IEC 60974-10 IEC 61000-3-12		

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