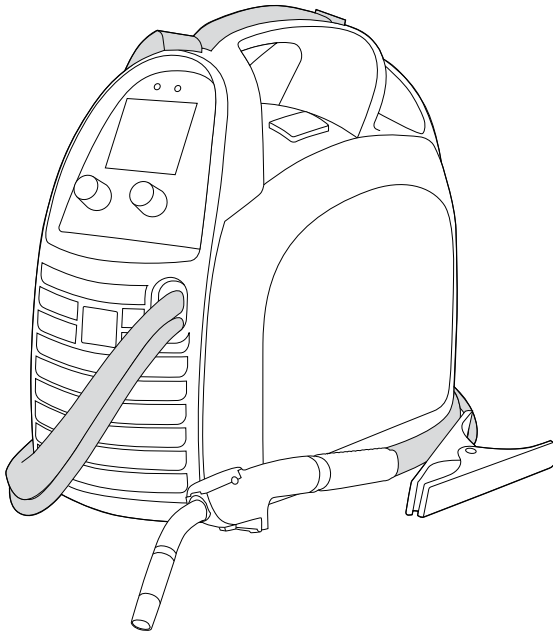


MinarcMig | Adaptive 180 AU

Operating manual • English *EN*



OPERATING MANUAL

English

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1. PREFACE

1.1 GENERAL

Congratulations on choosing the MinarcMig 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.

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

Important notes

Items in the manual that require particular attention in order to minimise damage and personal harm are indicated with the '**NOTE!**' notation. 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 PROPERTIES

MinarcMig™ Adaptive 180 is an easy-to-use MIG welding machine suitable for both hobby and professional use. The welding machine is small, efficient and extremely light. It is easy to carry with the help of a shoulder strap. The machine is suitable for a range of different purposes and the possibility to use a long extension cord eases operation in various sites. It is also suitable for generator use on construction sites.

The machine has both an automatic and manual mode. 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 according to the thickness of the welded sheet. 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 a display which also displays the welding current, welding voltage and wire feed speed.

You can also use steel wire (solid or cored wire), stainless steel wire or aluminium wire as filler wire in the machine. The steel wire can be 0.6 mm, 0.8 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 and the aluminium wire 1.0 mm.

1.3 ABOUT WELDING

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

During welding electric current is led with the welding gun's current nozzle to the filler wire and via that to the welded piece. Earthing cable attached to the workpiece guides the current back to the machine, forming the needed closed circuit. Unrestricted current flow is possible when the earthing clamp is properly attached to the workpiece and the fixing point of the clamp on the workpiece is clean, paintless and rustfree.

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 suitable for steel wire shielding gas. Argon + 2 % CO₂ mixture is suitable for stainless steel wires. Argon is suitable for welding aluminium wires. Some filler wires form a shielding gas from the wire's filling as it melts thus eliminating the need for a separate shielding gas.

2. MACHINE USE

The machine is delivered ready for operation without adjustments with 0.8 mm diameter filler wire.

If you use different thickness filler wire, make sure that the feed roll groove, welding gun contact tip and machine polarity are suited for the used wire size and type. If you mainly use aluminium or stainless steel wire, we recommend you change the wire guide to a plastic one which is better suited for the wire type.

2.1 BEFORE IMPLEMENTATION

The products are packed to durable packages especially designed for them. However, always make sure before use that the products have not been damaged during transportation. Check also, that you have received the products you ordered and the instruction manuals needed. Product packing material is recyclable.

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.*

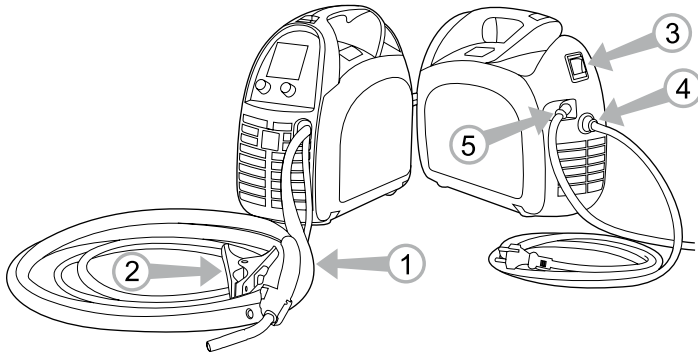
Environment

The machine is suitable for both indoor and outdoor use, but it should be protected from heavy 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 °C ... +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 GENERAL VIEW OF THE MACHINE



1. Welding gun
2. Earthing cable
3. Main switch
4. Supply voltage cable
5. Shielding gas hose connector

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.

WARNING: This equipment does not comply with IEC 61000-3-12. If it is connected to a public low voltage system, it is the responsibility of the installer or user of the equipment to ensure, by consultation with the distribution network operator if necessary, that the equipment may be connected.

2.4 CABLE CONNECTIONS

Connection to the mains

The machine is equipped with a 3.3 m long supply voltage cable and plug. Connect the supply voltage cable to the mains.

NOTE! The fuse size needed is 16 A delayed.

If you use an extension cord, its cross-sectional area should be at least as large as the supply voltage cable's ($3 \times 2.5 \text{ mm}^2$). The maximum length for the extension cord is 50 m.

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.

Earthing

The earthing cable is already connected to the machine. Clean the workpiece surface and fix the earthing cable clamp to the piece in order to create a closed and interference-free circuit needed for welding.

Welding gun

The welding gun is already connected to the machine. The welding gun leads the filler wire, shielding gas and electric current to the weld. When you press the welding gun trigger, shielding gas flow and wire feed begin. The arc ignites, when the filler wire touches the welded piece.

The factory-installed wire guide in the welding gun is best suited for steel wire welding. However, it can temporarily be used for stainless steel wire and aluminium wire welding. Then, however, friction is greater and thus the wire feed may tangle. If you mainly use stainless steel or aluminium wire, we recommend you change the wire guide to a plastic wire guide.

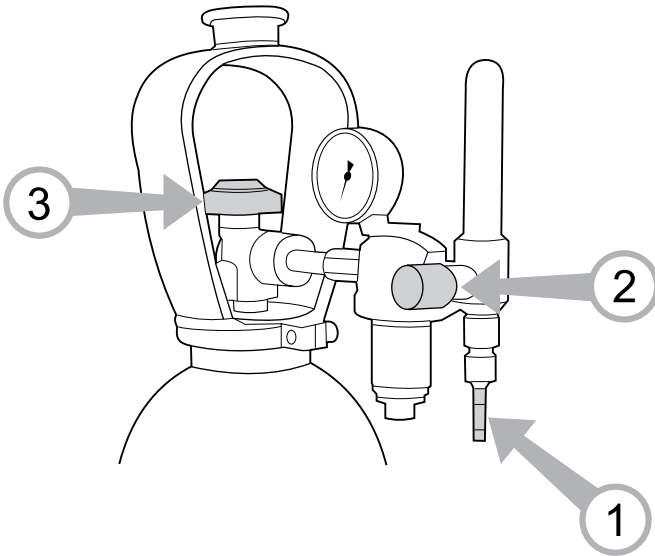
The gun neck can be rotated 360°. When turning the neck, always make sure that the neck is twisted almost all the way to the bottom. This prevents damaging and overheating the neck.

***NOTE!** If you use other than 0.8 mm diameter filler wire, change the welding gun contact tip to match the wire thickness.*

Shielding gas

The shielding gas used for steel wires is carbon dioxide or a mixture of argon and carbon dioxide which replaces air in the arc's area. Shielding gas for stainless steel wires is a mixture of argon and carbon dioxide (2 %) and argon for aluminium wires. Thickness of the welded sheet and welding power define the flow rate of the shielding gas.

The machine is delivered with a 4.5 m long shielding gas hose. Connect the bayonet socket of the shielding gas hose to the machine's hose connector and the hose connector end to the gas bottle's control valve.



1. Connect the hose to the gas bottle's control valve and tighten the connector.
2. Adjust the flow rate with the control valve screw. A suitable shielding gas flow rate is 8–15 l/min.
3. Close the bottle's valve after use.

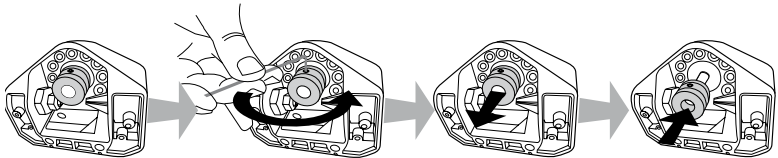
NOTE! Use a shielding gas suitable for the material's welding. Fix the gas bottle securely in an upright position before installing the control valve.

2.5 FILLER WIRE

The machine is delivered with the welding gun connected to +pole making it suitable for steel solid wire, stainless steel wire and aluminium wire welding without adjustments.

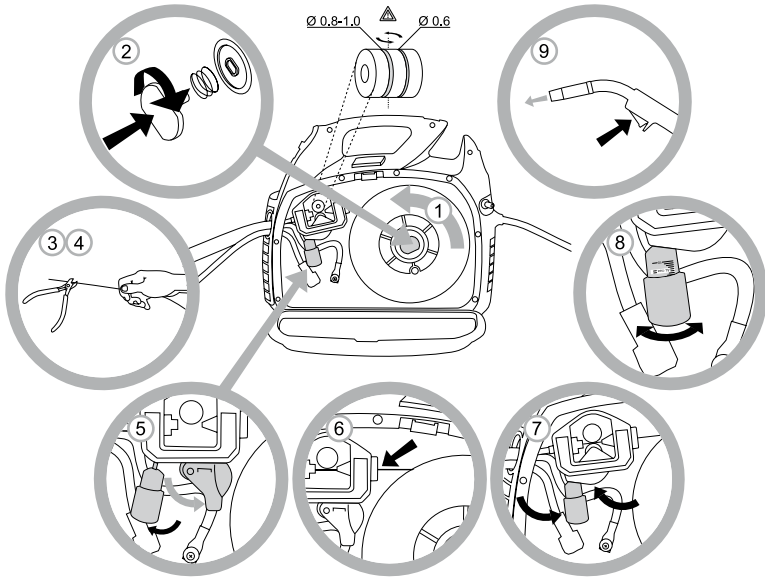
2.5.1 Changing the feed roll groove

The feed roll groove is factory set for welding 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.



1. Open the feed roll from 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 its locking screw is up and can be opened.
4. Switch the power off from the main switch.
5. Open the feed roll locking screw with a 2.0 mm Allen wrench approximately half a turn.
6. Pull the feed roll from its shaft.
7. Turn the feed roll and reinstall it to its shaft all the way to the bottom making sure that the screw is on the shaft's level.
8. Tighten the feed roll locking screw.

2.5.2 Threading the filler wire

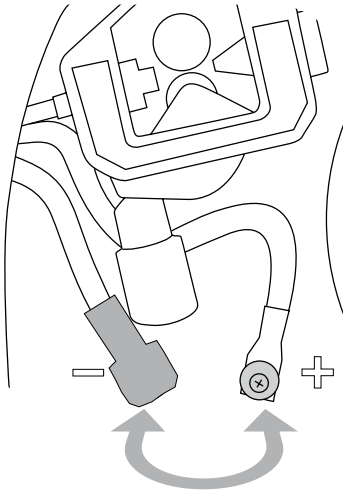


1. Open the reel housing by pressing on the opening button and install the wire reel in such a way that it rotates counter clockwise. You can use either a 5 kg (diameter 200 mm) or 1 kg (100 mm) wire reel in the machine.
2. Attach the reel with a reel lock.
3. Unfasten the wire end from the reel, but hold on to it all the time.
4. Straighten the wire end for approximately 20 cm and cut the wire in the straightened location.
5. Open the pressure control lever which then opens the feed gear.
6. Thread the wire through the wire's rear guide to the gun's wire guide.
7. Close the feed gear and fasten it with the pressure control lever. Make sure that the wire runs in the feed roll groove.
8. Adjust the compression pressure with the pressure control lever no higher than to the middle of the scale. If the pressure is too high, it removes metal fragments from the wire surface and may damage the wire. On the other hand, if the pressure is too low, the feed gear slips and the wire does not run smoothly.
9. Press the welding gun trigger and wait for the wire to come out.
10. Close the reel housing cover.

CAUTION! When driving the wire in to the gun, do not point the gun at yourself or others or put, for example, your hand in front of the tip, because the cut wire end is extremely sharp. Also, do not put your fingers near the feed rolls, because they might get squeezed between the rolls.

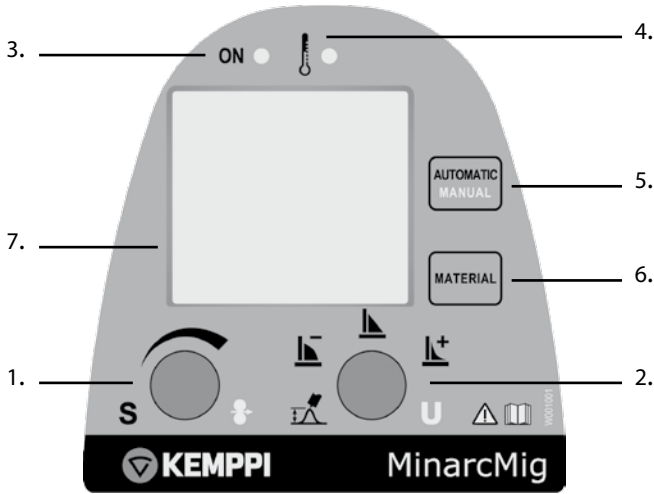
2.5.3 Reversing polarity

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. Bend the rubber cover of the earthing cable's pole in such way that the cable can be disconnected.
3. Remove poles' tightening nuts and washers. Note the correct order of the washers!
4. Interchange the cables.
5. Install the washers in place and close the tightening nuts to spanner tightness.
6. Put the rubber cover of the earthing cable's pole firmly in place. The rubber cover must always protect the earthing cable's pole.

2.6 CONTROLS AND INDICATOR LIGHTS



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
4. Overheating indicator light
5. Mode selection button
6. Material selection button (automatic mode)
7. Display

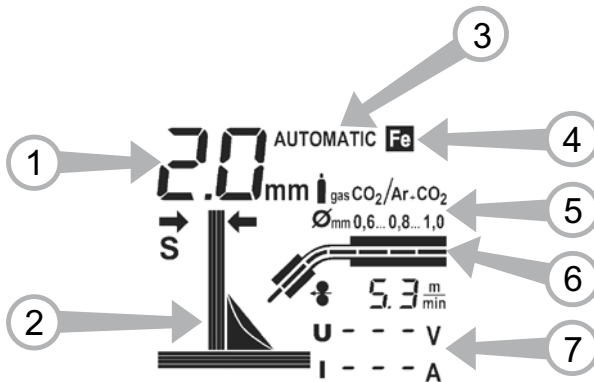
In automatic mode, the welding power is adjusted according to the thickness of the welded sheet. The machine also has a trimmer for arc length in automatic mode. There are three material options for filler wires and you can browse through them with the material selection button.

In manual mode, the wire feed speed and welding voltage are adjusted separately. Modes 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 or manual mode's selections in automatic mode.

Indicator lights display the machine's standby mode and inform of a possible overheating.

When you switch the machine on, a green standby light switches on. Simultaneously, the main switch indicator light switches on. If the machine overheats 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 is ready for operation again. Make sure that there is enough space around the machine allowing air to freely flow and cool the machine.

2.6.1 Display in automatic mode



1. Sheet thickness
2. Chart for sheet thickness and arc length trimmer
3. Operating mode
4. Material
5. Shielding gas and wire diameter recommendation
6. Wire feed speed chart
7. Welding values: wire feed speed, welding voltage and welding current

Sheet thickness displays the selected welding power setting which is based on the fillet weld's sheet thickness in millimetres. When you adjust the welding power according to sheet thickness, the sheet thickness in the chart changes thinner or thicker correspondingly.

The selected operating mode and material are shown on the display. The display also shows a recommendation as to what shielding gas and wire diameter should be used with the material in question.

During welding, the wire feed speed chart displays the wire's speed.

Of all the welding parameters, only filler wire feed speed is visible on the display all the time. Welding voltage and welding current are visible on the display during welding. The last used values remain on the display until welding is restarted or settings are changed.

When adjusting the arc length, the voltage display shows a comparative scale (-9 ... 0 ... 9) which will disappear from the display after some time once the adjustment is made.

2.6.2 Welding power adjustment in automatic mode

Adjusting the welding power according to sheet thickness affects simultaneously both wire feed speed and amount of current lead to the wire. This is a good starting point for welding in different operating situations. However, connection type and root opening may influence the amount of welding power needed.

Select the correct parameter with the welding power control according to the welded fillet weld's sheet thickness. If the fillet weld's sheets are of different thickness, use their average as a default parameter.

Sheet thickness display has been given in millimetres and it is based on , with steel and stainless steel wires, 0.8 mm wire diameter. When using a 0.6 mm 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.

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

2.6.3 Arc length trimmer in automatic mode

The arc length trimmer adjusts the length of the arc 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 spatters 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.

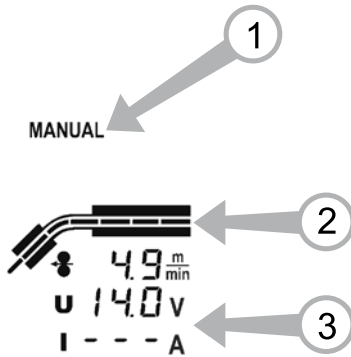
If the weld is too convex, the arc is too short or cold. Then adjust the arc longer or hotter by turning the control clockwise.

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 need be.

When adjusting the arc length, the weld on the arc trimmer chart on the display correspondingly changes more concave or convex.

Once the arc has been trimmed, it usually does not need to be changed when the welded sheet thickness changes.

2.6.4 Display in manual mode



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

The selected operating mode is visible on the display. During welding, the wire feed speed chart 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.

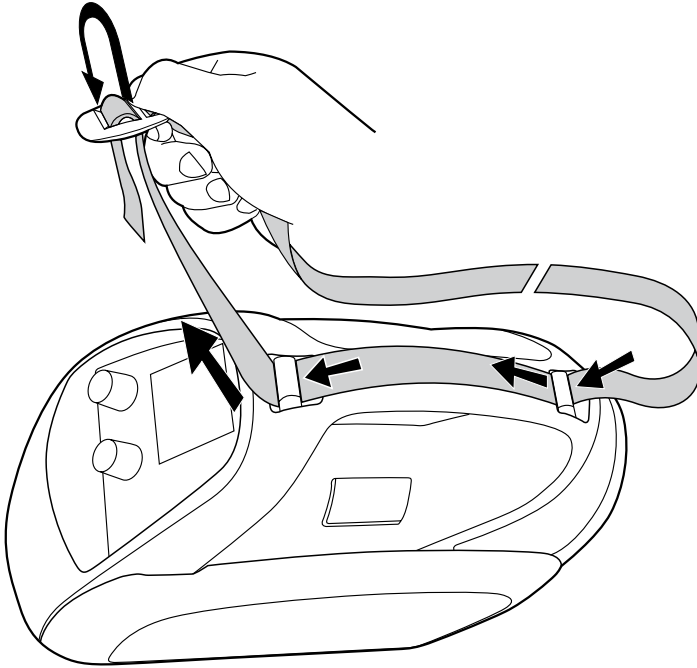
Welding current is visible on the display only during welding.

Values for actual welding voltage and welding current remain on the display after welding until welding is restarted or settings are changed.

2.6.5 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.

2.7 THREADING THE SHOULDER STRAP



The machine is delivered with a shoulder strap which helps carrying the machine. Thread the shoulder strap in place according to the picture.

NOTE! The machine should not be hung up from the shoulder strap.

3. SERVICE

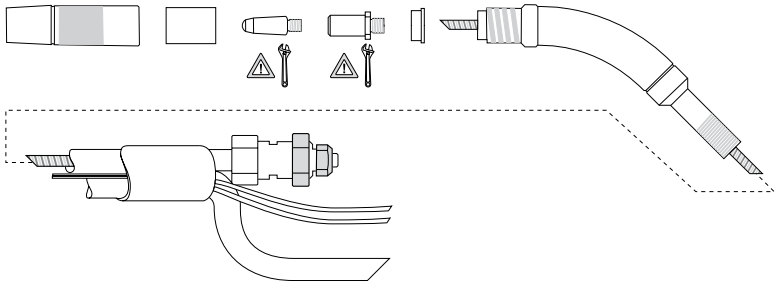
When servicing the machine, its utilization degree and environmental circumstances should be taken into account. If you use the machine appropriately and service it regularly, you will spare yourself from unnecessary malfunctions.

CAUTION! Disconnect the machine from the mains before handling the electrical cables.

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.
- Check that the insulating tips of the welding gun's neck are undamaged and in place. 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.

3.2 MAINTENANCE OF THE WIRE FEED MECHANISM



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

- Check the wear of the feed roll groove and change the feed roll when necessary.
- Clean the welding gun wire guide with compressed air.

Cleaning the wire guide

Pressure of the feed rolls remove metal dust from the filler wire's surface which then finds its way to the wire guide. If the wire guide is not cleaned, it gradually clogs up and causes wire feed malfunctions. Clean the wire guide in the following manner:

1. Remove the welding gun's gas nozzle, contact tip and contact tip's adapter.
2. With a pneumatic pistol, blow compressed air through the wire guide.
3. Blow the wire feed mechanism and reel housing clean with compressed air.
4. Reattach the welding gun's parts. Tighten the contact tip and contact tip's adapter to spanner tightness.

Changing the wire guide

If the wire guide is too worn or totally clogged, change it to a new one according to the following instructions. The wire guide should also be replaced with a plastic one, if you mainly use stainless steel or aluminium wire.

1. Disconnect the welding gun from the machine.
 - A. Disconnect the cable clamp of the gun's power cable by opening the screws.
 - B. Disconnect the gun's power cable from the machine's pole.
 - C. Disconnect the connector of the trigger conductors from the machine.
 - D. Open the gun's mounting nut.
 - E. Extract the gun gently from the machine whereupon all parts come through the front part's cable hole.
2. Open the mounting nut of the wire guide which exposes the end of the wire guide.
3. Straighten the welding gun's cable and withdraw the wire guide from the gun.
4. Push a new wire guide in to the gun. Make sure that the wire guide enters all the way into the contact tip's adapter and that there is an o-ring at the machine-end of the guide.
5. Tighten the wire guide in place with the mounting nut.
6. Cut the wire guide 2 mm from the mounting nut and file the sharp edges of the cut round.
7. Reattach the gun in place and tighten the parts to spanner tightness.

3.3 DISPOSAL



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 Kemppt representative. By applying this European Directive you will improve the environment and human health.

4. TROUBLESHOOTING

Problem	Cause
The wire does not move or wire feed entangles	Feed rolls, wire conduit or contact tips are defective <ul style="list-style-type: none"> • Check that feed rolls are not too tight or too loose • Check that the feed roll groove is not too worn • Check that the wire conduit is not blocked • Check that the contact tip and wire guide are suitable for the wire used • Check that there are no spatters on the conduit tip and that the hole is not cramped or worn loose
Main switch indicator does not switch on	The machine has no supply voltage light <ul style="list-style-type: none"> • Check supply voltage fuses • Check supply voltage cable and plug
Machine welds badly	Welding outcome is influenced by several factors <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 earthing 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
Over-heating indicator light switches on	The machine has over-heated <ul style="list-style-type: none"> • Check that cooling air can flow without obstructions • Machine's volume-capacity ratio has been exceeded; wait for the indicator light to switch off • The supply voltage is too low or too high

If the machine's malfunction can not be corrected with these measures, contact the KEMPT maintenance service.

5. ORDERING NUMBERS

Product	Ordering number
MinarcMig™ Adaptive 180 AU (including gun, cables, gas hose and shoulder strap)	6108180AU
Welding gun MMG20 (3 m)	6250200
Earthing cable and clamp (3 m)	6184003
Shielding gas hose (4.5 m)	W001077
Shoulder strap	9592162
Consumables for wire feed mechanism	
Feed roll 0.6 – 1.0 mm	W000749
Feed roll 0.8 – 1.0 mm, knurled	W001692
Pressure roll	9510112
Wire rear guide	W000651
Parts for wire reel hub	
Reel flange	W000728
Spring	W000980
Wire reel lock	W000727
Consumables for MMG20 gun	
Gas nozzle	9580101
Gas nozzle insulating bush	9591010
Contact tip M6 ø 0.6 mm	9876634
Contact tip M6 ø 0.8 mm	9876635
Contact tip M6 ø 0.9 mm	9876633
Contact tip M6 ø 1.0 mm	9876636
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

6. TECHNICAL DATA

MinarcMig™ Adaptive 180 AU	
Connection voltage	1 ~ 230 V ±15%, 50/60 Hz
Connection power:	
• 25% ED	8.6 kVA 180 A
• 60% ED	5.3 kVA 120A
• 100% ED	4.2 kVA 100A
Supply current	
	I_{1max} 30 A
	I_{1eff} 15 A
Connection cable/fuse	2.5 mm ² S–3.3 m / 16 A delayed
Load capacity:	
• 25% ED	180 A / 23.0 V
• 60% ED	120 A / 20.0 V
• 100% ED	100 A / 19.0 V
Adjustment range	20–180 A / 12–23 V
Wire feed adjustment range	1–12 m/min
Open-circuit voltage	15.5– 42.5 V
Power ratio	0.60 (180 A / 23.0 V)
Operating efficiency	0.81 (180 A / 23.0 V)
Filler wires:	
• Fe solid wire	ø 0.6 – 1.0 mm
• Fe cored wire	ø 0.8 – 1.0 mm
• Ss	ø 0.8 – 1.0 mm
• Al	ø 1.0 mm
Shielding gases	CO ₂ , Ar, Ar+CO ₂ -mixed
Maximum size of the wire reel	ø 200 mm / 5 kg

Temperature class	H (180 °C) / F (155 °C)
Dimensions	L 400 x W 180 x H 340 mm
Weight (incl. gun and cables 3.0 kg)	9.8 kg
Operating temperature range	-20 °C ... +40 °C
Storage temperature range	-40 °C ... +60 °C
Protection class	IP23C

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