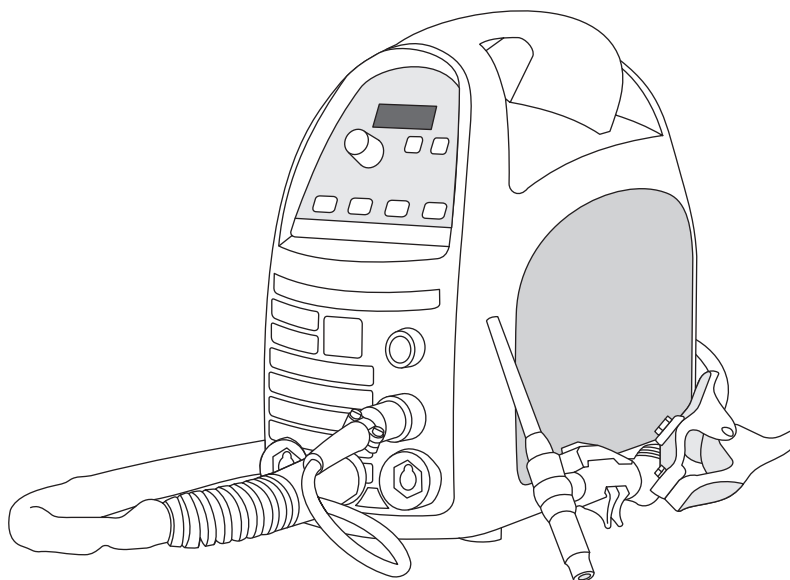


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MinarcTig™ 180



OPERATION INSTRUCTIONS
ENGLISH

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1. INTRODUCTION

Congratulations on purchasing the Kemppi MinarcTig™ 180 TIG/MMA machine. MinarcTig™ 180 is designed as a professional welding tool, and with correct use and maintenance, the robust design will provide reliable service throughout its life.

Please read this operation manual completely before using the machine!

Protective safety equipment must be used at all times when using this equipment!

1.1. General product profile

MinarcTig™ 180 is designed to be a compact and efficient direct current TIG/MMA machine. Extremely light in weight for its high 180 A output power, MinarcTig™ 180 is easy to carry to the work place with either the inbuilt moulded carry handle or the shoulder strap provided. The machine is suitable for a range of welding applications and environments including operation with long power cables. It is also suitable for generator use on construction sites.

1.2. About welding performance

MinarcTig™ 180 is a precise welding tool and will provide high quality results time after time provided the correct operational procedures are followed. Welding quality is not only influenced by the machine itself. Personal expertise, ancillary equipment and consumables also play an essential role as does the correct, fused supply power.

Welding is carried out when an electric arc is established between the welding electrode and work piece. Welding is not possible unless the equipment is correctly set-up, including the 'earth return lead' attached to the work piece. This return lead creates the welding 'circuit' that allows the welding current to flow. Please check the earth return lead clamp is on the work piece to be welded, and that the area of the clamps contact is clean and free from paint.

MMA welding

The MMA welding process is simple in operation. A coated MMA electrode is short circuited to the work piece and the resulting electric arc creates a molten pool into which the electrode wire melts. The coating around the electrode burns to create a protective gaseous atmosphere and slag, which directly protects the molten weld pool from atmospheric contamination. The slag floats on the molten weld pool and solidifies on the surface of the resulting weld bead, protecting the cooling weld. The burning electrode is moved slowly along the weld seam. The speed of travel is directly proportional to the size of the electrode and welding current selected. The slag is finally removed with a chipping hammer to reveal the weld (Always use eye protection).

TIG welding

In TIG welding, the welding arc is formed between a non-consumable tungsten electrode and the work piece. The resulting high temperature arc melts the work piece to form a molten pool into which a consumable filler wire, of a similar alloy composition, is slowly melted. The molten weld pool and filler wire are protected from the harmful affects of atmospheric contamination by an inert shielding gas that flows out from the TIG welding torch ceramic nozzle, at a rate of approximately 8–15 litres per minute. (Gas regulator, flow meter and pure Argon are not provided in this package).

2. SAFETY INSTRUCTIONS

MinarcTig™ 180 is safe and easy to use. The plastic case is strong and does not conduct electricity. The machine has inbuilt over temperature protection to prevent use when thermal protection is established. The machine is also protected against under and over voltage supply conditions.

However, there are some risks factors connected to welding. Please read these following instructions and also follow correct operation safety procedures during welding. Always be aware of others, around the immediate working environment. Always think of protecting yourself and others from the harmful effects of arc light and heat radiation, and also resulting welding fumes.

2.1. Use of personal protective equipment

The arc and its reflecting radiation damage unprotected eyes. Always protect your eyes and face with an appropriate welding shield. Make others aware that welding is taking place and advise them of the associated risks. The arc and welding spatters burn unprotected skin. Always wear welding gloves and suitable protective clothing.

2.2. Safe use of the welding equipment

Parts of the equipment such as the welding torch and filler wire become burning hot during use. The tungsten electrode may also be very sharp and the alumina ceramic will remain hot for a period after the arc is extinguished. A loosely connected return lead may also get hot during use – take care!

Never carry the machine during welding. Place the machine on an even, sound surface. Never store the machine hanging it from the shoulder strap. The strap is for transporting the machine easily between welding sites, when it is disconnected from the mains power supply.

Do not keep the machine near or on hot objects, as the plastic case may melt and damage.

Do not move the shielding gas cylinder when the reducing valve/regulator is connected and open. Always fix the gas cylinder securely in an upright position, against a cylinder wall rack or purpose made cylinder cart. Always close the gas cylinder valve after use.

2.3. Fire Safety

Welding is always classified as hot work, so pay attention to the fire safety regulations and protect the welding environment from welding spatters. Remove flammable materials and fluids from the welding vicinity and supply the welding site with adequate fire fighting equipment.

Take into account the dangers caused by special workplaces, such as the dangers of fire risk and the danger of explosion. Containers and enclosed work spaces present very high risks. Never work alone in these environments and never enter the space unless an authorisation work permit has been issued, correct risk assessment is completed, correct ventilation is established and personal protective equipment is available and used.

2.4. Supply voltage

- Do not take the welding machine inside a work piece. For example: into a container, vessel or car.
- Do not place the welding machine on a wet surface.
- Change faulty and damaged power supply cables immediately as they are life threatening and may cause electrocution and or fire.
- Ensure cables are not squashed by heavy objects or in contact with sharp edges or hot work piece.

2.5. Welding circuit

- Insulate yourself from the welding circuit by using dry and undamaged protective clothing.
- Do not work on a wet surface.
- Do not use damaged welding cables.
- Do not place the welding torch or earth return clamp on the welding machine during or directly after use or any other electrical device. Only wrap the torch and cables around the machine for storage when torch and clamp components are cold.

2.6. Welding fumes

Ensure adequate ventilation in the work area. If possible, wear a good quality filtered welding mask or fresh air supplied mask. Take extra special precautions when welding metals containing lead, cadmium, zinc, mercury or beryllium.

3. MACHINE USE

3.1. Before commissioning machine

MinarcTig™ is packed in purpose made, recyclable packaging. However, always ensure that the equipment has not been damaged in transportation. Please ensure that any damage to the equipment is notified to your supplier immediately. (Retain all packaging under these circumstances). Check that you have received all of the goods/items you ordered.

Transportation

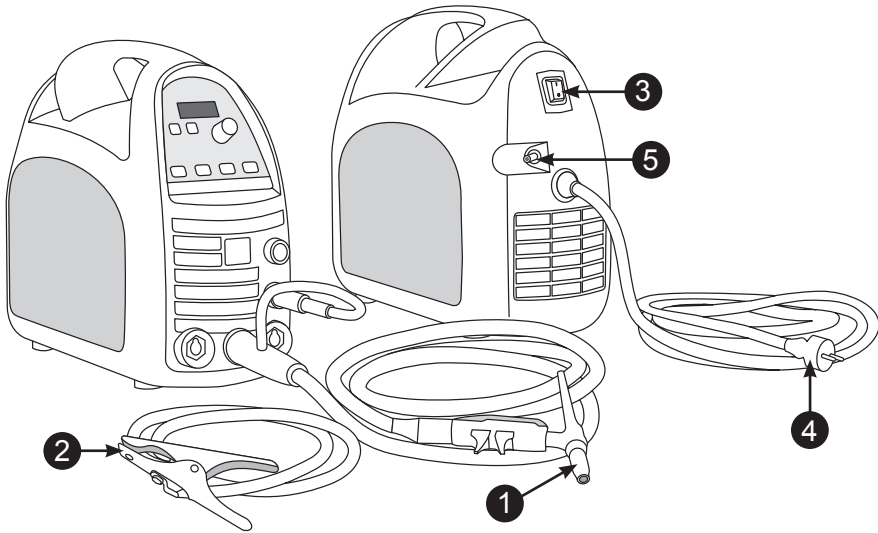
The machine should be transported in an upright position.

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 to +40 degrees Celsius.

Site the machine so it does not come into contact with hot surfaces and welding spatter. Make sure the air flow to and from the machine is unrestricted.

3.2. General View of the machine



1. Welding torch
2. Earth return clamp
3. On/off main switch (16 amp mains supply should also be switched at the socket)
4. Supply voltage cable
5. Shielding gas hose snap connector

3.3. 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.

! The fuse size needed for full duty operation is 16 A delayed.

If you use an extension power supply cord, its cross sectional area should be at least as large as the supply voltage cable fitted to the machine (3 x 2.5 mm²). The maximum length for the extension cable is 50 m.

The machine can also be used with a generator. The minimum power for the generator is 3.5 kVA, and the recommended power is 7.0 kVA in order for the machine to operate at maximum capacity.

Earth return cable

Connect the earth return cable to the negative pole when welding with an MMA electrode. Connect the earth return cable to the positive pole when welding with the TIG process. Clean the work piece surface and fix the earth return clamp to the work piece in order to create a closed and interference free welding circuit.

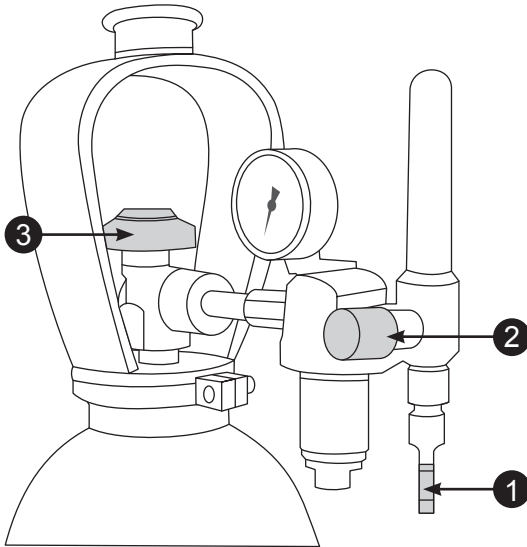
Welding torch (TIG)

The TIG welding torch is used to supply shielding gas and electrical arc energy to the weld piece. When you press the welding torch trigger, the shielding gas begins to flow and the arc is established. The TIG torch is connected to the negative pole (Electrode negative).

Shielding gas

In TIG welding, shielding gas (normally argon) is used to prevent atmospheric contamination of the molten weld pool and cooling weld. Normally the gas flow rate is approximately 8–15 litres per minute, but this can vary according to the welding current used and the size of gas nozzle.

The machine is delivered with a 4.5 m long shielding gas hose. Connect the gas hose snap connector to the male connector on the machine. The other end of the gas supply hose should be connected to the outlet of the regulator. **UNDER ANY CIRCUMSTANCES, DO NOT CONNECT THE HOSE DIRECTLY TO THE CYLINDER VALVE. ALWAYS USE A REGULATOR AND FLOW METER FOR SAFE AND ACCURATE OPERATION.**



1. Connect the hose to the reduced pressure side of the cylinder regulator, or flow meter and tighten the connector.
2. Adjust the shielding gas flow rate with the flow regulation adjustment screw. A suitable gas flow rate of between 8–15 l/min.
3. Close the cylinder valve after use.

3.4. Welding power selection and electrodes

TIG welding electrodes and gas nozzles

In TIG welding we recommend the use of the WC20 (Grey) type electrode for DC TIG welding, however other types are available. The welding electrode size (diameter) is selected depending on the welding current/power to be used. If too small an electrode is selected for a given the current, the electrode will melt, and conversely too large an electrode selected for a given current will affect arc ignition. Generally speaking a 1.6 mm Ø tungsten will cover currents up to 150 amps, and 2.4 mm Ø tungsten up to 250 amps DC current. Grind the tungsten electrode to a sharp point at approximately 1.5 times the diameter of the tungsten (length of point). If you touch the electrode to the work piece during welding, please re-sharpen your tungsten electrode.

MMA welding electrodes

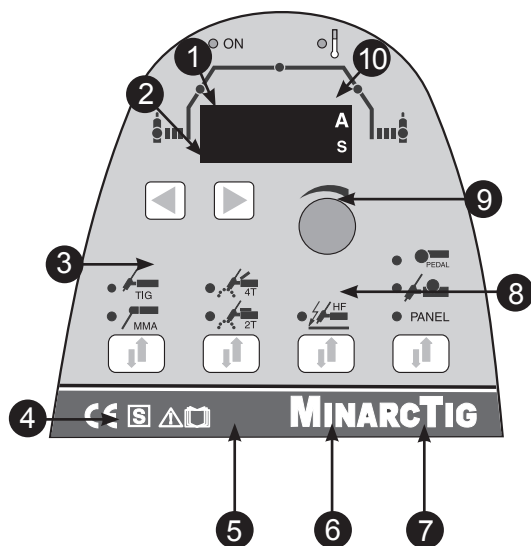
MMA welding electrodes must be used with the correct welding polarity (Normally the electrode holder is connected to the positive socket, earth return in the negative socket)

and also the correct welding current selection, to ensure the core electrode filler material and flux coating melt and burn efficiently for effective welding. The following table provides a selection of welding current ranges for the various electrode sizes covered by the output of the 180 amp MinarcTig™ machine in MMA welding mode.

MMA Electrodes and corresponding current settings range.

Electrode diameter	1,6 mm	2,0 mm	2,5 mm	3,25 mm
Fe-Rutile	30–60 A	40–80 A	50–110 A	80–140 A
Fe-Basic	30–55 A	50–80 A	80–110 A	110–140 A

3.5. Function controls and indicator lights



1. Power ON indication lamp.
2. Pre/Post gas, slope up/slope down and main current parameter indicator lamps.
3. Welding parameter selector arrow keys for items 2.
4. Welding process selection button for MMA or TIG.
5. 2T or 4T TIG torch switch selection button. Select 2T – short welds. 4T – long welds.
6. High frequency ignition selection button.
7. Panel control, TIG Torch remote or foot pedal remote – current control selection button.
8. Parameter adjustment and control encoder potentiometer.

9. Digital welding current meter and parameter value display. Displays time or Amperes.
10. Thermal temperature indicator lamp.

Switching the machine on

When you switch the machine on, a green standby light is illuminated. The main power switch indicator lamp is also on. If the machine overheats or the supply voltage is too high or too low, the welding operation automatically switches off, and the yellow thermal temperature indicator lamp is illuminated. The light switches off again when the machine is ready for operation. Make sure that there is enough space around the machine body to allow the air to freely circulate and flow into and out off the machine.

3.5.1. Welding current regulation and remote control

Welding current can be controlled using the digital encoder potentiometer on the control panel, when PANEL is selected (item 7). If you want to regulate the current using a remote control, first select and connect the remote control device and then select the 'remote control device type' on the control panel button (item 7). See remote control options – RTC10/RTC20/R10 and R11F. The remote foot pedal R11F can only be used in 2T operation mode.

3.5.2. MMA welding settings

MMA welding is selected when the indicator lamp next to the MMA symbol is illuminated. Press the process button to select the MMA process (item 4). The electrode ignition time, the ignition pulse, and the arc dynamics are automatically adjusted.

3.5.3. TIG welding function

Select the TIG welding process by pressing the MMA/TIG button.

Standard 2T torch trigger control, and HF arc ignition.

The shielding gas starts to flow when the torch trigger is depressed and the welding arc is established automatically via HF ignition. The current starts to rise, (if slope up time is established) to the pre determined welding current level, and starts to drop (if slope down time is established) when the trigger is released. The arc stops at the end of the cycle and the post gas time elapses as set.

4T torch trigger latching, and HF arc ignition.

The shielding gas starts to flow when the torch trigger is pressed. The arc is automatically established when the trigger is released via HF ignition. The current starts to rise (if slope up time is established) to the pre determined welding current level. When ready to end the welding cycle, press and release the torch switch again. The welding current starts to drop (if slope down time is established) until the arc is extinguished and the post

gas time elapses as set.

HF or Contact ignition selection

The TIG arc can be established with or without an HF pulse. If the HF lamp is not illuminated the arc can be established by lightly contacting the tungsten electrode to the work piece. Press the torch trigger and then quickly rock back onto the torch ceramic, so lifting the contact of the tungsten electrode from the work piece (2T function); the arc is established simultaneously and effectively. For HF ignition, press the HF button so that the lamp is on (item 6). Press the TIG torch trigger and hold or release, depending on whether 2T/4T is selected. The shielding gas flows and the HF (High Frequency arc) ignites the welding arc.

Setting parameters

Welding parameters (items 2) are selected via the arrows selection keys (items 3). Setting adjustments are made via the encoder potentiometer (item 8). The numerical and parameter values will be automatically displayed on screen at parameter selection and adjustment. After 3 seconds, the screen will return to welding current set value.

4. SERVICE

All electro mechanical devices require routine service maintenance depending on usage. We recommend that you schedule a service inspection of your welding machine every six months if used regularly. An authorised Kemppi service agent will inspect and clean your machine, ensuring that all power connections are tight and secure. Power connections can become loose and oxidised with frequent and high changes in temperature. This type of routine maintenance will prevent unnecessary malfunctions.

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

4.1. Daily maintenance

- Check the welding torch electrode. Sharpen or replace damaged electrodes.
- Check the tightness of the grounding cable connections.
- Check the condition of the power and welding cables and replace any that are damaged.

4.2. Machine disposal



Do not dispose of electrical equipment together 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 returned to an environmentally compatible recycling facility. As the owner of the equipment, you should get information on approved collection systems from our local representative.

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

4.3. Ordering numbers

Produkt	Ordering number
Power sources	
MinarcTig™ 180, TTC 160 4 m	MINARC180TTC4
MinarcTig™ 180, TTC 160 8 m	MINARC180TTC8
Cables	
Welding cable, 16 mm ² 5 m	6184103
Earthing cable, 16 mm ² 5 m	6184113
Torches	
TTC 160, 4 m	627016004
TTC 160, 8 m	627016008
TTC 220, 4 m	627022004
TTC 220, 8 m	627022008
Accessories	
TIG welding torch controls	
RTC 10	6185477
RTC 20	6185478
Gas flow gauge AR/clock	6265136
Shielding gas hose (4.5 m)	W001077
Shoulder strap	9592162
Remote controls	
R 10	6185409
R11F	6185407

5. TROUBLESHOOTING

Problem	Cause
Main switch indicator light does not switch on	The machine has no supply voltage <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 <ul style="list-style-type: none">• Check that the earthing clamp is fixed properly, fixing point is clean, and both cable and its connections are undamaged• Check the flow of shielding gas from the tip of the welding torch• 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 KEMPPI maintenance service.

6. TECHNICAL DATA

The machine complies with the CE mark standards.

MinarcTig™ 180		
Mains voltage		1 ~ 230 V ±15%, 50/60 Hz
Rated power	TIG	max 6,7 kVA (180 A/17,2 V)
	MMA	max 7,0 kVA (140 A/25,6 V)
Connection cable/fuse		3 × 2,5 mm ² S–3 m long with Euro Schuko/16 A delayed
Load capacity 40 ° C	TIG	35 % ED 180 A/17,2 V
		100 % ED 120 A/14,8 V
	MMA	35 % ED 140 A/25,6 V
		100 % ED 100 A/24 V
Welding range	TIG	5 A/10,2 V–180 A/17,2 V
	MMA	10 A/20,4 V–140 A/25,6 V
Open circuit voltage		95 V
Idle power	TIG	–
	MMA	25 W
Power factor at max current	TIG	0,62
	MMA	0,63
Efficiency at max current	TIG	0,75
	MMA	0,81
Striking voltage		10 kV
Stick electrodes	MMA	Ø 1,5–3,25 mm
External dimensios (L×W×H)		400 x 180 x 340
Weight		7,8 kg (8,4 kg with supply cabel)
Temperature class		H (B)
Degree of protection		IP23C
Operating temperature range		-20 °C...+40°C
Storage temperature range		-40 °C...+60°C
Recommended generator		> 7 kVA

7. TERMS OF GUARANTEE

Kemppi Oy provides a guarantee for products manufactured and sold by them if defects in manufacture and materials occur. Guarantee repairs must be carried out only by an Authorised Kemppi Service Agent. Packing, freight and insurance costs to be paid by orderer.

The guarantee is effected on the date of purchase. Verbal promises which do not comply with the terms of guarantee are not binding on guarantor.

Limitations on guarantee

The following conditions are not covered under the terms of guarantee: defects due to natural wear and tear, non-compliance with operating and maintenance instructions, connection to incorrect or faulty supply voltage (including voltage surges outside equipment spec.), incorrect gas pressure, overloading, transport or storage damage, fire or damage due to natural causes i.e. lightning or flooding. This guarantee does not cover direct or indirect travelling costs, daily allowances or accommodation.

Under the terms of guarantee, welding torches and their consumables, feeder drive rolls and feeder guide tubes are not covered.

Direct or indirect damage due to a defective product is not covered under the guarantee.

The guarantee is void if changes are made to the product without approval of the manufacturer, or if repairs are carried out using non-approved spare parts.

The guarantee is also void if repairs are carried out by non-authorised agents.

Undertaking guarantee repairs

Guarantee defects must be informed to Kemppi or authorised Kemppi Service Agents within the guarantee period.

Before any guarantee work is undertaken, the customer must provide proof of guarantee or proof of purchase, and serial number of the equipment in order to validate the guarantee. The parts replaced under the terms of guarantee remain the property of Kemppi.

Following the guarantee repair, the guarantee of the machine or equipment, repaired or replaced, will be continued to the end of the original guarantee period.

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