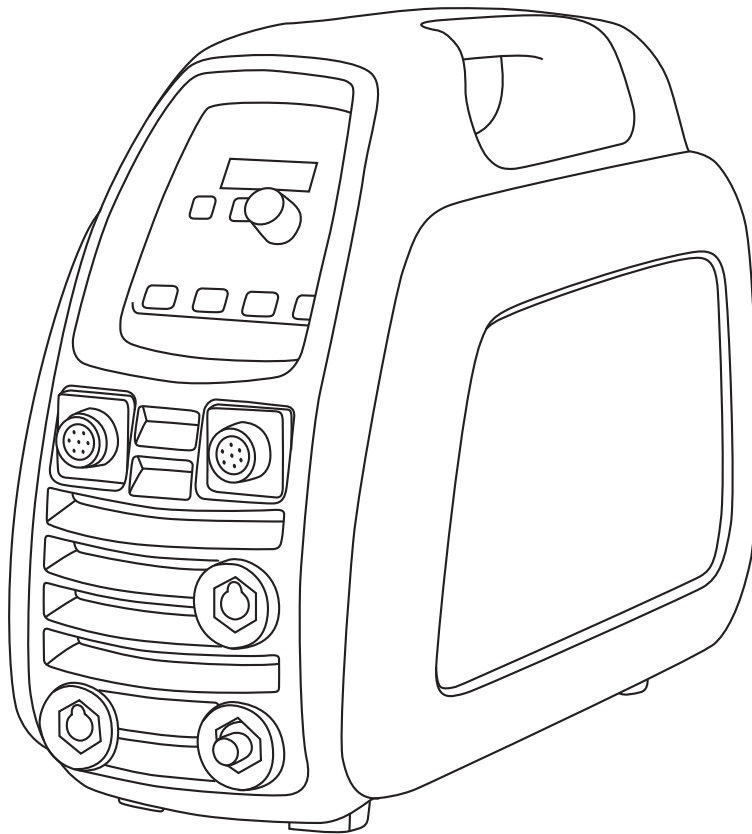


MinarcTig

Evo 200, 200MLP



Operating manual	EN
Käyttöohje	FI
Bruksanvisning	SV
Bruksanvisning	NO
Brugsanvisning	DA
Gebrauchsanweisung	DE
Gebruiksaanwijzing	NL
Manuel d'utilisation	FR
Manual de instrucciones	ES
Instrukcja obsługi	PL
Инструкции по эксплуатации	RU
Manual de utilização	PT
Manuale d'uso	IT

OPERATING MANUAL

English

CONTENTS

1. Preface	3
1.1 General	3
1.2 Product Introduction	3
2. Before you start using the unit	4
2.1 Unpacking.....	4
2.2 Positioning and location of the machine.....	4
2.3 Distribution network.....	4
2.4 Serial number.....	4
2.5 General view of the machine	5
2.6 Connecting cable connections	5
3. Use	6
3.1 About welding.....	6
3.2 Manual metal arc welding (MMA).....	7
3.3 TIG welding.....	7
3.4 Operating functions	9
3.4.1 Welding current regulation and remote control	10
3.4.2 MMA welding settings	10
3.4.3 TIG welding function.....	10
3.4.4 Additional features for MLP models.....	11
3.5 Using the shoulder strap	12
4. Setup features	13
5. Error codes	14
5.1 Troubleshooting	14
6. Maintenance	15
6.1 Daily maintenance	15
6.2 Storage	15
6.3 Disposal of the machine	15
7. Ordering numbers	16
8. Technical data	17

1. PREFACE

1.1 General

Congratulations on choosing the MinarcTig Evo 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.

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

MinarcTig Evo machines are compact, robust direct current welding machines suitable for professional industry, site and repair TIG and MMA welding. Light in weight for their output power, the machines are easy to carry to the work place with either the inbuilt moulded carry handle or the shoulder strap provided.

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

Welding and earth return cables and gas hose are supplied in the delivery package, including torch, earth clamps and connections.

Before using or doing any maintenance work on the machine, read the operating manual and keep it for further reference.

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

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 torch 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 °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 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 machines 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, IP23S, 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

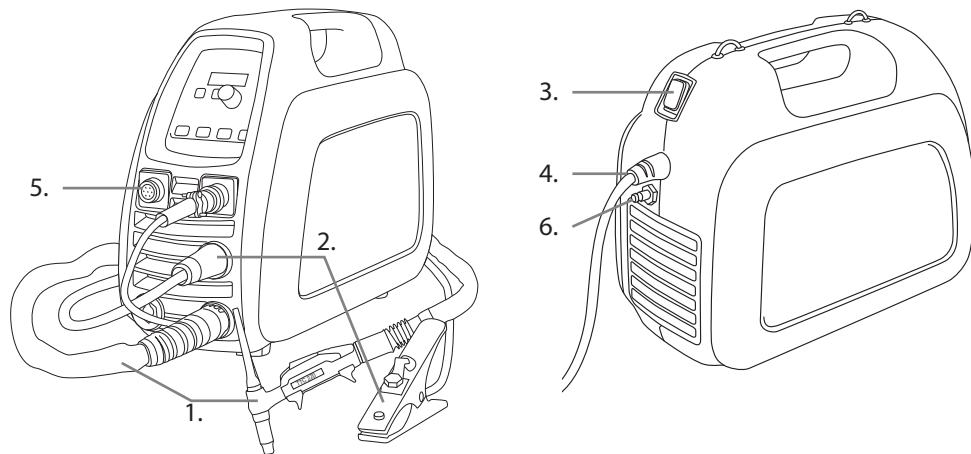
All regular electrical devices without special circuits generate harmonic currents into distribution network. High rates of harmonic current may cause losses and disturbance to some equipment.

MinarcTig Evo 200 and MinarcTig Evo 200MLP complies 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. Welding torch
2. Earthing cable and earthing clamp
3. Main switch
4. Mains cable
5. Remote control connector
6. Shielding gas hose connector

2.6 Connecting cable connections

Connection to mains

The machine is equipped with a 3 m long supply voltage cable and plug. Connect the supply voltage cable to the mains. The mains supply cable and electrical plug are already installed to the machine. Should you need to fit an alternative plug type, 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 ($3 \times 1.5 \text{ mm}^2$). It is recommended to use $3 \times 2.5 \text{ mm}^2$ extension cable. The maximum length for the extension cable is 100 meters.

The minimum power of a single-phase machine generator must be 5.6 kVA. The recommended power is 8.0 kVA for using the machine at maximum power.

Earthing cable

Connect the earthing cable to the negative pole in MMA welding, and to the positive pole in TIG welding.

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

3. USE

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!

Prepare to weld

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. If when igniting the arc or during welding, the electrode stick's or freezes' to the work piece, note that it will quickly heat up, and may start to glow red hot. To release the electrode, twist the electrode holder away from the work piece and start again. If this fails, switch off the machine at the main switch and then release the electrode after it has cooled down.

NOTE! The electrode and 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.

3.1 About welding

MinarcTig Evo 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.

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.

Welding is carried out when an electric arc is established between the welding electrode and work 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.

3.2 Manual metal arc welding (MMA)

In Manual Metal Arc (MMA) welding the filler material is melted from the electrode to the weld pool. The rate of welding current is selected on the basis of the welding electrode size used and welding position. The arc forms between the electrode tip and work piece. The melting electrode coating forms a gas and slag shield, which protects the molten metal in transfer to the weld pool and during solidification. As the slag solidifies over the hot weld metal, it prevents weld metal oxidation. This slag coating is removed after welding e.g. with a chipping hammer. When removing the slag coating, ensure you protect your eyes and face with suitable equipment.

For more info www.kemppi.com > Welding ABC.

MMA welding electrodes

In MMA welding, the welding electrodes must be connected to the correct pole. Normally, the electrode holder is connected to the positive and the earthing cable to the negative connector.

It is also important to properly adjust the welding current so that the filler material and coating will melt properly and the welding is efficient. The table below presents the electrode sizes available with the MinarcTig Evo welding machine and the corresponding welding current values.

MMA Electrodes and corresponding current settings range

Electrode diameter	1.6 mm	2.0 mm	2.5 mm	3.25 mm	4.0 mm
Fe-Rutile	30–60 A	40–80 A	50–110 A	80–150 A	120–210
Fe-Basic	30–55 A	50–80 A	80–110 A	110–150 A	140–200

3.3 TIG welding

The TIG process forms an arc between the tungsten electrode and the work piece. The arc melts the work piece forming a molten weld pool. The arc and tungsten electrode mounted in the TIG torch, are shielded by an inert shielding gas that is connected to, and flows through, the nozzle of the TIG torch. The gas required is Argon and the flow rate is approximately 8 to 15 litres per minute. If necessary, suitable filler material is added to the weld pool to complete the weld joint. Filler wire is fed into the weld pool from the outside of the arc and gas shield. The filler wire and the welding current level are decided according to the base material type and thickness, joint form and welding position. (Gas regulator, flow meter and pure argon shielding gas are not provided in this package.)

TIG welding electrodes and gas nozzles

In DC TIG welding we recommend the use of the WC20 (grey) type electrode, however other types are available.

The welding electrode size (diameter) is selected depending on the welding current/power to be used. An electrode with an insufficient diameter compared to the welding current will melt, while excessive electrode size will make it more difficult to ignite the arc.

Generally speaking, a 1.6 mm tungsten electrode will cover currents up to 150 A, and 2.4 mm tungsten electrode up to 250 A DC current.

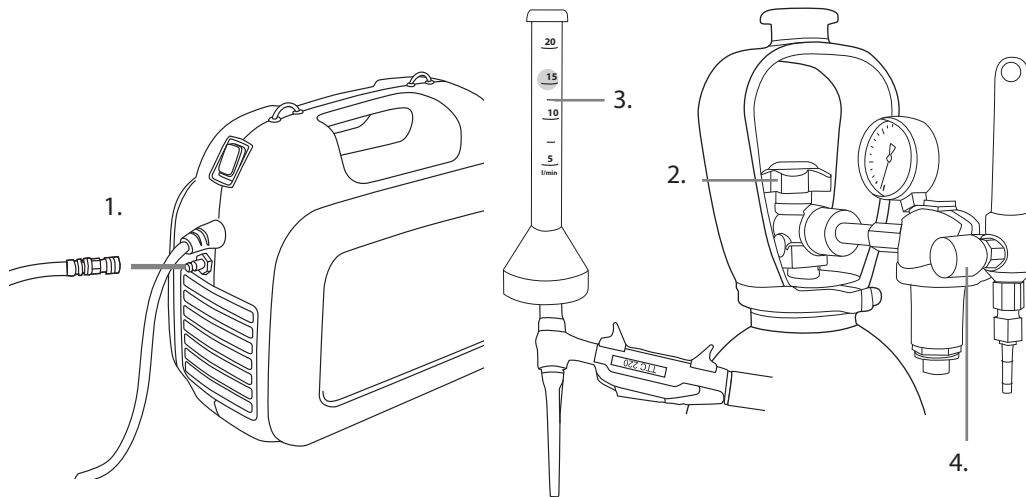
Before use, grind the tungsten electrode to a sharp point at approximately 1.5 times the diameter of the electrode. If the electrode touches the work piece during welding, re-sharpen the electrode.

Shielding gas

In TIG welding, shielding gas is used to prevent atmospheric contamination of the molten weld pool. Normally, the shielding gas is argon (Ar), and 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 supplied female snap connector of the shielding gas hose to the machine's male hose connector. Connect the free end of the shielding gas hose to the gas bottle, 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.

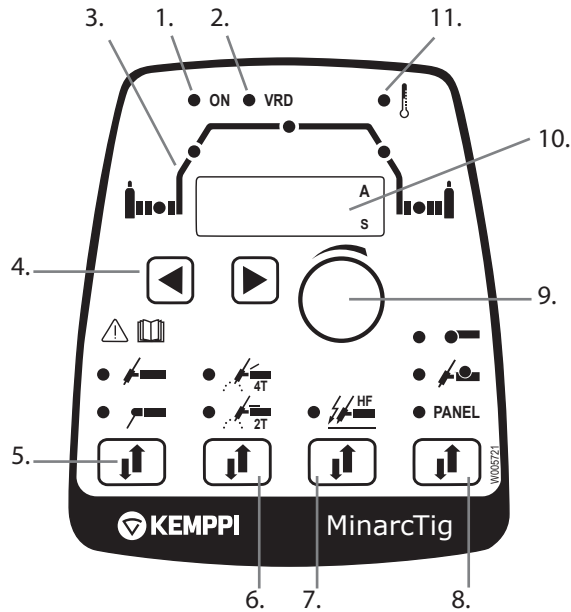


Connecting the gas hose to a typical welding regulator control valve

1. Connect the supplied shielding gas hose to machine and via a suitable coupling to the gas regulator control valve outlet and tighten the connector.
2. Open the valve of the bottle
3. Measure the flow.
4. Adjust the flow by the knob (8–15 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.

3.4 Operating functions



1. Machine 'ON' green light
2. VRD SAFE light. Solid green VRD safe 'ON'. Solid red if VRD failure.
3. Pre/Post gas, upslope/downslope and main current parameter indicator.
4. Welding parameter selector arrow keys.
5. Welding process selection button (MMA or TIG).
6. 2T or 4T TIG torch switch selection button. Select 2T for short welds or 4T for long welds.
7. Ignition method selection button.
8. Current adjustment selector: panel control, TIG Torch remote or foot pedal remote.
9. Welding current and parameter value control knob.
10. Welding current and parameter value display: time and amperes.
11. Overheating indicator.

Switching the machine on

When you power on the machine, the green standby indicator and the main switch is lit.

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.

Main switch and 'ON' indicator

When you turn the main switch to position I, the machine 'ON' indicator light (item 1) is illuminated and the unit is ready for welding. The indicator light is always on when the unit is connected to the mains and the main switch is in position I. In normal conditions the machine panel 'ON' lights status is solid green. But if the machine is locked down, the light status is flashing and the machine will not weld. The machine should be reset via the main switch. If the light continues to flash, contact your Kemppi service shop.

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

Indicator 'VRD safe ON'

MinarcTig Evo VRD models reduce the open circuit voltage (OCV) at a low level. At switch on, the VRD indicator light (item 2) is solid green, indicating normal VRD safe limits. If VRD limits are exceeded the machine switches to 'LOCK DOWN' state and the VRD safe light changes colour to solid 'RED'. Welding is prevented and the main 'ON' panel light is also flashing. The machine should be reset via the main switch. If the machine locked status continues, contact your Kemppi service shop.

3.4.1 Welding current regulation and remote control

The welding current can be adjusted with the control knob, if panel adjustment (PANEL) is selected.

If you want to adjust the welding current with the remote control, connect the remote control to the machine and then select remote control with the current adjustment selector (7). The following remote control options are available: RTC10, RTC20, R10 and R11F. The remote foot pedal R11F can only be used with TIG welding in 2T operation mode.

3.4.2 MMA welding settings

MMA welding is selected when the indicator next to the MMA symbol is lit. If needed, press the process selection button to select the MMA process (4). The machine automatically sets suitable values to the ignition time, ignition pulse and arc dynamics.

3.4.3 TIG welding function

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

Torch switch control in 2T mode and HF arc ignition

The shielding gas starts to flow when the torch switch is pressed and the welding arc is established automatically via HF ignition. The current starts to rise (if an upslope time is established) to the set welding current level. When you release the switch, the current starts to decrease. After the specified downslope time, the arc is disconnected and the set post-gas time begins.

Torch switch control in 4T mode and HF arc ignition

The shielding gas starts to flow when the torch switch is pressed. When the switch is released, the arc is automatically established via HF ignition. The current starts to rise (if an upslope time is established) to the set welding current level. When ready to end the welding cycle, press and release the torch switch again. The welding current starts to drop (if a downslope time is established) until the arc is extinguished and the set post-gas time begins.

HF or Contact ignition

The TIG arc can be established with or without an HF pulse.

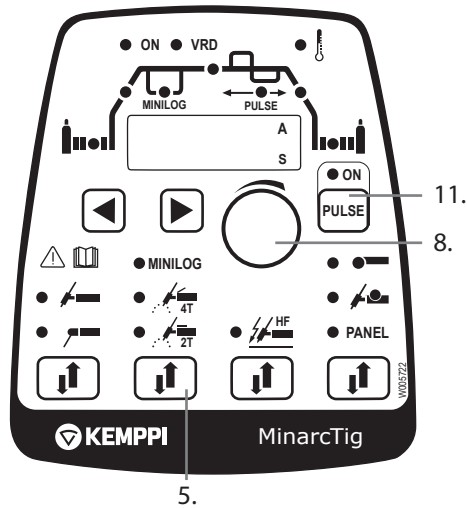
If the HF indicator is not lit, the arc can be established by lightly contacting the tungsten electrode to the work piece. Press the torch trigger and then quickly lift the contact of the tungsten electrode from the work piece (2T function); the arc is established simultaneously and effectively.

For HF ignition, press the HF button so that the indicator is on (item 6). Press the TIG torch trigger and hold or release, depending on whether 2T or 4T is selected. The shielding gas flows and the HF (High Frequency arc) ignites the welding arc.

Setting parameters

Select the welding parameters with the arrow keys (3) and adjust the parameter values with the control knob (8). When setting the parameters, the display (9) will show the parameter being adjusted as well as the numeric value that will be set for it. After three seconds, the display returns to normal state and shows the welding current value.

3.4.4 Additional features for MLP models



Minilog

With the Minilog feature, you can switch between two current levels by pressing the switch briefly. The levels are the welding current and the Minilog current.

To use the Minilog feature, press the button (5) so that the MINILOG indicator is lit. Use the arrow buttons to move the selector to Minilog current and then set the desired Minilog current level with the control knob (8).

The shielding gas starts to flow when the torch switch is pressed. When you release the switch, the current starts to rise (if an upslope time is established) to the set welding current level.

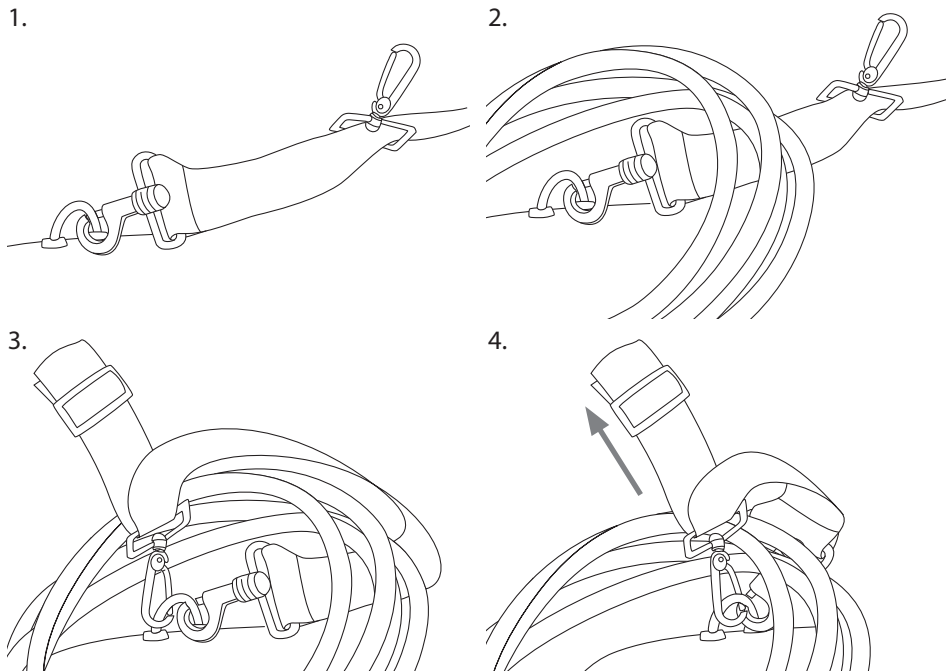
Press the torch switch shortly (<1 sec) you can then easily switch up and down between the two levels: welding current and Minilog current.

When you press the switch for 1 second and then release it, the current starts to decrease. After a predetermined downslope time, the arc is disconnected.

Pulse welding

To use the pulse welding feature, press the PULSE button (11) so that the ON indicator is lit. Specify the desired welding current average (A) and pulse time (s). The machine will set the remaining pulse values automatically. Manual adjustment for the peak and background current and time settings are not available with this model.

3.5 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.*

4. SETUP FEATURES

Configuring additional features

The machine has additional features that can be selected and adjusted with the SETUP feature. To activate and deactivate it, press both arrow buttons (3) simultaneously for at least 5 seconds.

In the SETUP mode, the display will show the name of the parameter to be adjusted and its numerical value. Select the parameter to be adjusted with the arrow buttons and change the parameter value with the control knob. The following parameters and values are available:

Name displayed	Parameter values	Factory setting	Description
A	1/0	0	End current level selection, 1=I min / 0 =15%
b	1/0	1/0*)	Open-circuit voltage selection: 0 = 95 V, 1 = VRD 30 V / AU VRD 12 V
C	1/0	0	Forced stop during downslope with a brief pressing of the switch, 1 = On / 0 = Off
d	0...4	1	0 = 4T-LOG, 1 = Minilog, 2 = 4T-LOG + Minilog, 3 = Minilog + Search arc, 4 = 4T-LOG_4
E	5% ... 40%	20%	Start current level selection (% of the welding current)
F	1/0	0	Restore factory settings **), 1 = Restore / 0 = No restore
h	0.0...2.0 s	0	Minimum setting for pre-gas time
J	0...10 s	1 s	Minimum setting for post-gas time
L	5...20 s	10 s	Maximum setting for pre-gas time
o	15...99 s	30 s	Maximum setting for post-gas time
S	-3...5	0	Arc dynamics (Arc Force)
t	-9...0	0	Electrode ignition pulse (-9 = No pulse / 0 = Max pulse)

*) Factory setting is 1 or 0 depending on the country where the product is sold. Restoring factory settings does not change the value of this parameter.
**) Happens when exiting SETUP mode and value is 1.

5. ERROR CODES

The machine always checks its operation automatically during start-up and reports any failures detected. If failures are detected during start-up, they are shown as error codes on the control panel display.

Error 2: Power source undervoltage

The device has stopped because it has detected a mains undervoltage that disturbs welding. Check the quality of the supply network.

Error 3: Power source overvoltage

The machine has stopped the welding because it has detected momentary voltage spikes or continuous overvoltage dangerous to the machine in the electric network. Check the quality of the supply network.

Error 4: Power source overheating

The power source has overheated. The cause may be one of the following:

- The power source has been used for a long time at maximum power.
- The circulation of cooling air to the power source is blocked.
- The cooling system has experienced a failure.

Remove any obstacle to air circulation, and wait until the power source fan has cooled down the machine.

Other error codes:

The machine can show codes not listed here. In the event of an unlisted code appearing, contact an authorised Kemppei service agent and report the error code shown.

5.1 Troubleshooting

Problem	Cause
The main switch indicator will not light up.	<ul style="list-style-type: none">• 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">• Ensure that the welding current selected is adequate for the selected electrode type and size.• Ensure the cable connections are correct and secure.• Ensure the process selection is correct.• Check that the earth return clamp connection area is clean and that the cable and clamp is not damaged.• For TIG welding, check that the shielding gas flow is switched on and set correctly. Poor ignition and arc quality in TIG welding may be a result of a poorly prepared tungsten electrode. Always maintain and grind a point on the TIG torch electrode tip before welding.
Overheating indicator is illuminated.	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 re-start. <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 Kemppei service.

6. MAINTENANCE

All electromechanical devices require routine service maintenance depending on usage. This type of routine maintenance will prevent hazards and malfunctions.

We recommend that you schedule a service inspection of your welding machine every six months. 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.

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.

6.1 Daily maintenance

Perform the following maintenance daily:

- Clean electrode holder and TIG torch's gas nozzle. Replace damaged or worn parts.
- Check TIG torch's electrode. Replace or sharpen, if necessary.
- Check tightness of welding and earth cables connections.
- Check condition of mains and welding cables and replace damaged cables.
- See that there is enough space around the unit for ventilation.

6.2 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.

6.3 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.

7. ORDERING NUMBERS

MinarcTig Evo models	
MinarcTig Evo 200, TTC 220 4 m	P0640
MinarcTig Evo 200, TTC 220 8 m	P0641
MinarcTig Evo 200MLP, TTC 220 4 m	P0642
MinarcTig Evo 200MLP, TTC 220 8 m	P0643
MinarcTig Evo 200 AU, TTC 220 4 m	P0672
MinarcTig Evo 200 AU, TTC 220 8 m	P0673
MinarcTig Evo 200MLP AU, TTC 220 4 m	P0674
MinarcTig Evo 200MLP AU, TTC 220 8 m	P0675
MinarcTig Evo 200 DK, TTC 220 4 m	P0676
MinarcTig Evo 200 DK, TTC 220 8 m	P0677
MinarcTig Evo 200MLP DK, TTC 220 4 m	P0678
MinarcTig Evo 200MLP DK, TTC 220 8 m	P0679
Cables	
Welding cable, 25 mm ² 5 m	6184201
Welding cable, 25 mm ² 10 m	6184202
Earthing cable, 25 mm ² 5 m	6184211
Earthing cable, 25 mm ² 10 m	6184212
Torches	
TTC 220, 4 m	627022004
TTC 220, 8 m	627022008
Ancillary devices	
TIG welding torch controls	
RTC 10	6185477
RTC 20	6185478
Gas flow gauge AR/clock	6265136
Shielding gas hose (4.5 m)	W001077
Carrying straps	9592163
Remote control units	
R 10	6185409
R11F	6185407

8. TECHNICAL DATA

MinarcTig Evo models		
Connection voltage	1 ~ 50/60 Hz	230 V ±15 %
Connection voltage (AU)	1 ~ 50/60 Hz	240 V ±15 %
Rated power at max. current	35% ED TIG	200 A/4.9 kVA
	35% ED MMA	170 A/5.7 kVA
Supply current, I _{1max}	TIG	21.1 A
	MMA	24.8 A
Supply current, I _{1eff}	TIG	12.7 A
	MMA	14.7 A
Connection cable	H07RN-F	3G1.5 (1.5 mm ² , 3 m)
Fuse	type C	16 A
Output 40 °C	TIG	35 % ED 200 A/18.0 V
		100 % ED 140 A/15.6 V
	MMA	35 % ED 170 A/26.8 V
		100 % ED 110 A/24.4 V
Welding range	TIG	5 A/10.2 V–200 A/18.0 V
	MMA	10 A/20.4 V–170 A/26.8 V
Open circuit voltage	average	95 V; VRD 30 V; AU VRD 12 V
Idle power	TIG	10 W
	MMA	30 W
Power factor at 100 % ED	TIG	0.99
	MMA	0.99
Efficiency at 100 % ED	TIG	77 %
	MMA	83 %
Arc striking voltage		6–12 kV
MMA welding electrodes	MMA	ø 1.5–4.0 mm
External dimensions (L × W × H)		449 × 210 × 358
Weight		11 kg
Temperature class		F (155 °C)
Degree of protection		IP23S
EMC class		A
Operating temperature range		-20 °C...+40 °C
Storage temperature range		-40 °C...+60 °C
Standards IEC 60974-1 IEC 60974-3 IEC 60974-10 IEC 61000-3-12		

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