HiArc
T 180

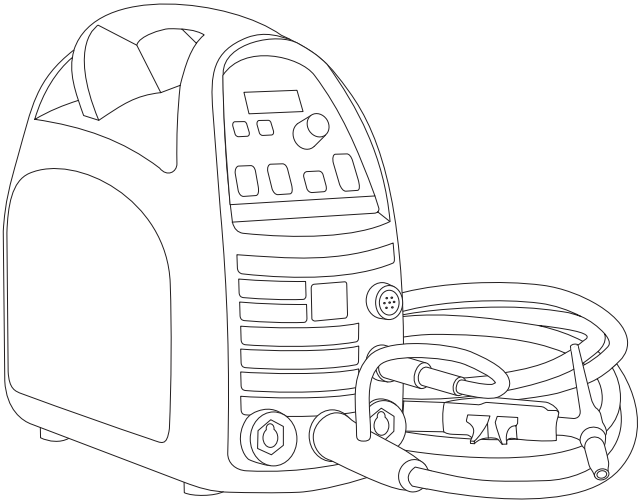
Operating manual EN

Manual de instrucciones ES

Manuel d'utilisation FR

Manual de utilização PT

Инструкции по эксплуатации RU



KEMPPI
The Joy of Welding

OPERATING MANUAL

English

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1. INTRODUCTION

1.1 General

Congratulations on choosing the HiArc 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 included with the package.

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 About the product

HiArc T 180 is a compact and robust direct current welding machine suitable for MMA and TIG welding. Extremely light in weight for its output power, the machine is easy to carry to the work place with either the inbuilt moulded carry handle or the shoulder strap provided.

The T 180 model can be used in regular lighting circuits, i.e., in single-phase electric networks.

2. BEFORE STARTING

HiArch is packed in purpose made, recyclable packaging. However, always ensure that the equipment has not been damaged in transportation. Even so, make sure that all in-transport damage is reported to the machine supplier. Do not unpack the machine under these circumstances. In addition, before commissioning, check that you have received all of the items you ordered along with their operating instructions.

Transportation

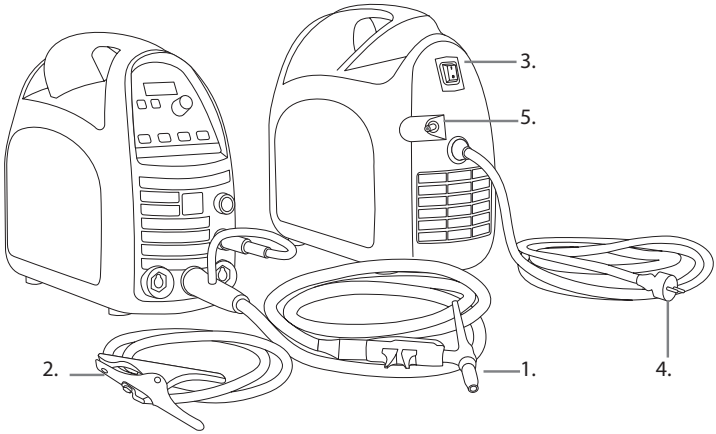
The machine should be transported in an upright position.

Environment

The machine is suitable for both indoor and outdoor use. In outdoor use, protect it 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 centigrade.

Site the machine so that it does not come into contact with hot surfaces, sparks and welding spatter. Make sure the airflow to and from the machine is unrestricted.

2.1 Main components



1. Welding torch
2. Earth return cable and clamp
3. Main switch
4. Mains cable
5. Shielding gas hose connector

2.2 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.

HiArc T 180

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.

2.3 Cable connections

Connection to mains

The machine is equipped with a 3.3 m supply voltage cable and plug. Plug the mains cable to a single-phase electric network.

NOTE! *Check the fuse size in Technical specifications. The plug may be installed only by electrical contractors and installers specialised in performing such operations.*

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. The maximum length for the extension cable is 50 m.

The minimum power of a single-phase machine generator must be 3.5 kVA. The recommended power is 7.0 kVA for using the machine at maximum power.

Restrictions on generator type and power may apply in generator use. Fault-free operation of a three-phase machine also requires a sufficiently high-power generator. The power recommendation is more than 15 kVA.

Earth return cable

Connect the earth return 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)

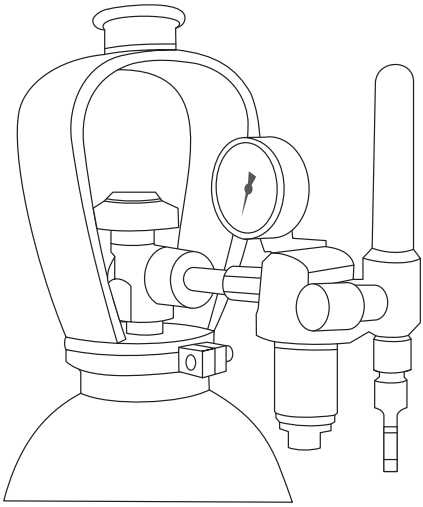
The welding torch is used to supply shielding gas and electrical arc energy to the weld piece. When you press the welding torch switch, the shielding gas begins to flow and the arc is established. The TIG torch is connected to the negative pole.

Shielding gas

In TIG welding, shielding gas is used to prevent atmospheric contamination of the molten weld pool and cooling weld. Normally, the shielding gas is argon (Ar). 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 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.

NOTE! *Under no circumstances should you 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 is 8–15 l/min
3. Close the cylinder valve after use.

2.4 Welding power selection and electrodes

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.

In general, a 1.6 mm tungsten electrode will cover currents up to 150 A.

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.

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 earth return 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 HiArc T 180 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
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. USE

NOTE! *It is forbidden to weld in places where there is a danger of fire or explosion!*

3.1 Welding processes

HiArc T 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 cable attached to the work piece. This cable creates the welding circuit that allows the welding current to flow. Please check that the earthing clamp is on the work piece and that the contact area of the clamp is clean and free from paint and rust.

3.1.1 Manual Metal Arc welding (MMA)

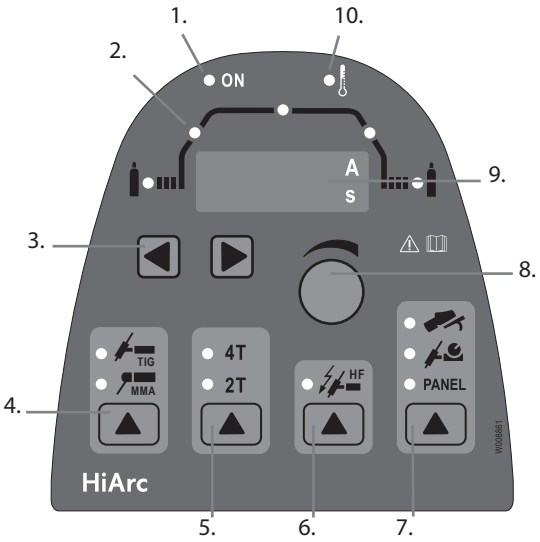
In manual metal arc welding (MMA) the welding filler material is melted from the electrode to the weld pool. The rate of the welding current is selected based on the electrode size used and the welding position. Arc forms between electrode tip and welding piece. The melting electrode coating forms gas and slag, which protects the weld pool. Slag solidified over the weld is removed after welding e.g. with a chipping hammer (use of eye protection is strongly advised).

3.1.2 TIG welding

In DC TIG welding, the arc between the tungsten electrode and the welding piece melts the welding piece, thus forming a weld pool. Arc and electrode are shielded by an inert shielding gas (argon). If necessary, filler is used. Filler wire is fed into the weld pool from the outside of the arc. 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.)

3.2 Operating functions



1. Standby indicator.
2. Pre/Post gas, upslope/downslope and main current parameter indicator.
3. Welding parameter selector arrow keys.
4. Welding process selection button (MMA or TIG).
5. 2T or 4T TIG torch switch selection button. Select 2T for short welds or 4T for long welds.
6. Ignition method selection button.
7. Current adjustment selector: panel control, TIG Torch remote or foot pedal remote.
8. Welding current and parameter value control knob.
9. Welding current and parameter value display: time and amperes.
10. Overheating indicator.

Switching the machine on

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

If the machine overheats or the supply voltage is too high or too low, the welding operation automatically switches off, and the yellow overheating indicator is illuminated. The light switches off again, when the machine is ready for operation. Make sure that there is enough space around the machine to allow the air to freely circulate and flow into and out off the machine.

3.3 Welding selections

3.3.1 Welding current regulation and remote control

The welding current can be adjusted steplessly 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.

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3.3.2 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.

3.3.3 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 indicators (2) will show the parameter being adjusted and the display (9) will show the numeric value that will be set. After three seconds, the display returns to normal state and shows the welding current value.

3.4 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	Open-circuit voltage selection, 1 = 30 V (VRD) / 0 = 95 V
C	1/0	0	Forced stop during downslope with a brief pressing of the switch, 1 = On / 0 = Off
d	1/0	1	Alternative switch logic of the MLP panel, 1 = Minilog / 0 = 4T-LOG
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	0,0…10,0 s	1.0 s	Minimum setting for post-gas time
L	5.0…20.0 s	10.0 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)
U	1/0	0	Disable automatic remote control recognition. 0 = Enable automatic recognition, 1 = Disable automatic recognition.
*) Happens when exiting SETUP mode and value is 1.			

Voltage reduction device (VRD)

HiArc T 180 contains a voltage reduction device (VRD), which reduces the open-circuit voltage below 35 V. This reduces the risk of electric shock in particularly dangerous environments, such as closed or damp spaces. VRD is activated through the setup menu.

4. 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.

E 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.

E 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.

E 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 Kemppi service agent and report the error code shown.

5. TROUBLESHOOTING

Problem	Cause
The main switch indicator will not light up	No electricity connected to the machine • Check the mains supply fuses. • Check the mains cable and plug.
Poor welding result	Several factors affect the welding quality. • Check that the earthing clamp is properly attached, the point of attachment is clean and that the cable and its connectors are intact. • Check that the shielding gas flows out of the torch tip. • The electric network voltage is irregular, too low or too high.
Overheating indicator lit	The device has overheated. • Ensure that cooling air has unrestricted flow. • The machine's duty cycle has been exceeded. Wait for indicator to turn off. • Too low or high supply voltage.

If the machine's malfunction is not eliminated with these measures, contact KEMPPI 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! *Disconnect the machine from the mains power supply before handling electric cables.*

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6.1 Daily maintenance

- Check the welding torch electrode. Sharpen the electrode or replace a damaged one.
- Check the tightness of the earth return cable connections.
- Check the condition of mains and welding cables and replace damaged cables.

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

7. ORDERING NUMBERS

Product	Part number
Power Sources	
HiArc T 180, TTC 160 4 m	P350
HiArc T 180, TTC 160 8 m	P351
Cables	
Welding cable, 16 mm^2 5 m	6184103
Welding cable, 25 mm^2 5 m	6184201
Welding cable, 25 mm^2 10 m	6184202
Earth return cable, 16 mm^2 5 m	6184113
Earth return cable, 25 mm^2 5 m	6184211
Earth return cable, 25 mm^2 10 m	6184212
Torches	
TTC 160, 4 m	627016004
TTC 160, 8 m	627016008
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	9592162
Remote control units	
R10	6185409
R11F	6185407

8. TECHNICAL DATA

HiArc T 180		
Connection voltage	1 ~, 50/60 Hz	230 V ±15 %
Rated power at max. current	TIG	6.7 kVA (180 A/17.2 V)
	MMA	7.0 kVA (140 A/25.6 V)
Supply current, I1max	TIG	29 A (180 A/17.2 V)
	MMA	31 A (140 A/25.6 V)
Supply current, I1eff	TIG	18 A (120 A/14.8 V)
	MMA	22 A (100 A/24.0 V)
Connection cable	H07RN-F	3G2.5(3x2.5 mm^2) - 3 m Euro Schuko
Fuse (delayed)		16 A
Duty cycle 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 (VRD 30 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 dimensions (L × W × H)		400 × 180 × 340
Weight		7.8 kg (8.4 kg with connection cable)
Temperature class		H (B)
Degree of protection		IP23S

EMC class		A
Operating temperature range		-20 °C...+40 °C
Storage temperature range		-40 °C...+60 °C
Recommended generator		> 7 kVA
Standards		IEC 60974-1 IEC 60974-3 IEC 60974-10

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