

Operation instructions • english
Gebrauchsanweisung • deutsch
Gebruiksaanwijzing • nederlands
Manuel d'utilisation • français

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MINARC

150 VRD



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1. PREFACE

1.1. INTRODUCTION

Congratulations on having purchased a KEMPPI product. Properly installed and used KEMPPI products should prove to be productive machines requiring only a small amount of regular maintenance.

This manual is arranged to give you a good understanding of the equipment and its safe use. There is also information on both servicing the unit as well as its technical data. Read the instructions before taking the machine into use or servicing it for the first time. Additional information on Kemppi products and their use can be obtained from Kemppi or a Kemppi dealer.

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

In this document, for danger to life or injury the following symbol is used:



Read the warnings carefully and follow the instructions. Please also study the operation safety instructions and respect them when installing, operating and servicing the machine.

1.2. PRODUCT INTRODUCTION

Kemppi Minarc 150 VRD is a manual metal arc welding machine, small in size, suitable for industry, site and repair welding. The unit uses one phase connection voltage. Minarc VRD is equipped with so called Voltage Reduction Device (VRD) function. VRD maintains open circuit voltage under 35 V. Minarc tolerates a great fluctuation of input voltage and is thus suitable for work on sites using generator as well as to be used with long power cables. Inverter technology has been used when designing the unit. Power regulation in power source is done with IGBT transistors. Welding and earth cables are supplied with the unit. They are equipped with suitable connections for the unit electrode holder, earth clamps and connections.

Minarc can also be used for TIG welding. TIG arc is started by scratching. Ordering numbers of additional equipment for TIG welding can be found in chapter 5. Ordering numbers.

1.3. OPERATION SAFETY

Read the warning texts carefully and follow the instructions.

Arc and welding spatter

Arc and the reflected radiation from it can damage unprotected eyes. Shield your eyes and protect your surroundings appropriately before you start welding. Arc and welding spatter will burn unprotected skin. When welding, use protective gloves and clothing.

Danger of fire and explosion

Observe the fire safety instructions. Remove flammable material around the place where you will weld. Have necessary fire extinguishing equipment at hand when you weld. Note dangers caused by special jobs, such as risk of fire and explosion when welding tanks. Note! Sparks may ignite fire even hours later!

Welding is working with fire, note special instructions for such work.

Mains voltage

Never take welding machine inside the work piece (e.g. container or car). Never set the welding machine on wet surface. Replace faulty cables immediately, they create a danger to life and can cause a fire. See that the connecting cable does not stick nor touch sharp edges or a hot welding piece.

Welding current circuit

Isolate yourself from the welding current circuit by wearing dry and undamaged protective clothing. Never work on a wet surface. Never use damaged welding cables. Never set neither electrode holder, earth clamp nor the welding cables on top of the power source or other electric equipment.

Welding fumes

Ensure adequate ventilation. Always take special measures when welding metals containing lead, cadmium, zinc, mercury or beryllium.

2. BEFORE YOU START USING THE UNIT

2.1. UNPACKING

The equipment is packed in durable packages, designed specially for them. Nevertheless, 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. NOTE! The packaging material of the products is suitable for recycling.

2.2. PLACING THE UNIT

Place the unit on horizontal, solid and clean surface. Shield it from heavy rain and scorching sun. Make sure that cooling air circulates freely.

2.3. SERIAL NUMBER

Serial number of the unit is marked on the rating plate of the unit. 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.

2.4. MAIN COMPONENTS

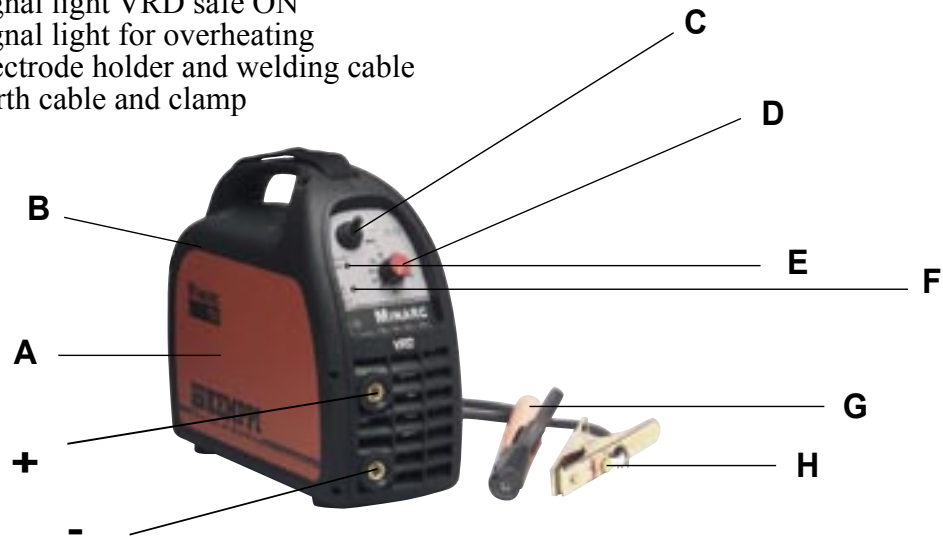
Connect welding cable and earth cable to their connections on the power source. Mains cable and wall plug are already installed.



This equipment's electromagnetic compatibility (EMC) is designed for use in an industrial environment. Class A equipment is not intended for use in residential location where the electrical power is provided by the public low-voltage supply system.

Parts of the unit

- A Body of machine
- B Main power switch
- C Selector switch for welding process
- D Welding current regulator
- E Signal light VRD safe ON
- F Signal light for overheating
- G Electrode holder and welding cable
- H Earth cable and clamp



2.5. CONNECTING TO POWER SUPPLY MAINS

The unit has a mains cable and a wall plug. You can find fuse and cable sizes in the end of these instructions in Technical data.

2.6. FILLER MATERIALS AND EQUIPMENT

See also 2.4. Main components. You can use all electrodes intended for welding with DC. Suitable electrode sizes for the unit are listed in the table on unit's front panel as well as in the end of these instructions in Technical data.

1. Use welding specifications given on electrode package.
2. Check that you have selected the correct welding process before starting to weld.
3. Check that welding cable and earth cable connections are tight. If a connection is slack, it will result in voltage drop that will cause the connection to heat.
4. Mount the electrode firmly in holder.

3. USE



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

3.1. WELDING PROCESSES

3.1.1. Manual Metal Arc welding (MMA)

In manual metal arc (MMA) the welding filler material is melted from the electrode to the weld pool. Filler and rate of welding current is selected on the basis of electrode size used and 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.

3.1.2. TIG welding

In DC TIG welding, the arc between a non-melting 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. Filler and rate of welding current is selected on the basis of diameter of tungsten electrode and welding position.

3.2. OPERATING FUNCTIONS

See also 2.4. Main components and 3.4. Welding selections.

- A Signal light VRD safe ON
- B Welding process selecting switch
- C Welding current adjuster
- D Signal light for overheating
- E Suitable electrodes



Main switch and signal light

When you turn the main switch to position I, signal light on main switch is lit and the unit is ready for welding. Signal light is always on, when the unit is connected to the mains and the main switch is in position I.

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

Signal light VRD safe ON (A) The machine is equipped with an OCV reduction circuit. The signal light is lit when the circuit is activated and the unit is in working order.

Welding process selector, MMA \nearrow / TIG \nwarrow (B) Switch is used for selecting either MMA or TIG welding, depending on welding target. When you have switched the unit to TIG welding, VRD is constantly active, thus reducing terminal voltage to 30 V. This facilitates arc cut-off when you stop welding.

Regulating welding current (C) Welding current rate is regulated steplessly with an adjusting potentiometer.

Signal light for overheating (D) A yellow signal light of overheating is lit, when thermostat has tripped due to the unit's overheating. Fan will cool the unit and after the signal light goes off, the unit is again ready for welding.

3.3. WELDING SELECTIONS

3.3.1. Manual Metal Arc welding (MMA)

Select welding parameters according to filler manufacturer's recommendations.

1. Select polarity (+ or -) of welding current cable and return current cable according to filler.
2. Select MMA welding with the switch \nearrow .
3. Select suitable welding current by adjusting potentiometer according to table of suitable electrodes (E).


3.3.2. DC TIG welding

Select welding parameters according to filler manufacturer's recommendations.

1. Connect TIG torch to - pole and earth cable to + pole
2. Select TIG welding with the switch \nwarrow .
3. Select suitable welding current by adjusting potentiometer.

3.4. WELDING

Welding fumes may be dangerous to your health, see that there is ample ventilation during welding!

 **Never look at the arc without face shield made for arc welding! Protect yourself and your surroundings from the arc and hot spatter!**

3.4.1. EARTHING

If possible, always fix earth cable clamp directly on the welding piece.

1. Clean connection surface of earth clamp from paint and rust.
2. Connect the clamp carefully so that contact surface is as large as possible.
3. Finally check that the clamp sits tight.

3.4.2. Welding

See also 3.1. Welding processes and 3.3 Welding selections. Note! It is recommended that you try welding and rate of welding current first on something else than the actual work piece.

You can start welding after having made the necessary selections. Arc is lit by scratching the welding piece with electrode. Length of arc is regulated by holding electrode tip at a suitable distance from welding piece. Suitable arc length is usually about half the diameter of the electrode core wire. When arc is lit move the electrode slowly forwards tilting it to appr. 10-15° pulling angle. If necessary, adjust current value.

Shielding gas is used in DC TIG welding. Your dealer will give you advice on choosing gas and equipment. Open the gas valve on the TTM 15V TIG torch. When gas starts to flow, arc is lit by lightly scratching work piece with the tip of the tungsten electrode. When arc is lit, its length is regulated by holding the tip of the tungsten electrode at a suitable distance from the work piece. Move the torch forwards from the starting point, usually in appr. 10-15° pushing angle forwards. If necessary, regulate current rate. Stop welding by lifting the torch off the welding piece and by closing the gas valve on the torch.

Note! Always fix the gas cylinder so that it stays steadily in upright position either in specially made wall rack or cylinder trolley. Always close the cylinder valve after having finished welding.

3.5. STORING

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

4. MAINTENANCE

 **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.

4.1. 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 in front of and back of the unit for ventilation.

4.2. TROUBLESHOOTING

Main switch signal light is not lit.

Unit does not get electricity.

- Check mains fuses and replace when necessary.
- Check mains cable and plug, replace damaged parts.

Unit does not weld well.

Arc is uneven and goes off. Electrode gets stuck in weld pool.

- Check welding settings and adjust when necessary. See 3. Use.
- Check that earth clamp is properly fixed and that contact surface is clean and the cable is undamaged. See 3.4. Welding and 4.1. Daily maintenance.

Overheat signal light is lit.

The unit has overheated. See 3.2. Operating functions.

- Check that there is ample space in front of and back of the unit for ventilation.
- Check welding settings. See 3.3. Welding selections.

If problems in use are not solved with above mentioned measures, please contact a Kemppi service workshop.

4.3. DISPOSAL OF THE MACHINE



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!

5. ORDERING NUMBERS

Item	Ordering number
Minarc 150 welding machine (includes earth- and welding cables)	6102150VRD
Earth cable and clamp	6184015
Welding cable and electrode holder	6184005
Carrying strap	9592162
Optional:	
TIG torch TTM15V, 4 m	6271432

6. TECHNICAL INFORMATION

	Minarc 150 VRD
Connection voltage, 1 ~ phase 50/60Hz	230 V ±15%
Connection capacity	
35 % ED MMA	140 A/7,5 kVA
35 % ED TIG	150 A/5,0 kVA
100 % ED MMA	100 A/5,1 kVA
100 % ED TIG	110 A/3,3 kVA
Mains cable/fuse, delayed	2,5 mm ² S - 3,3 m / 16 A
Welding current range, TIG	5 A/10 V... 150 A/16 V
Metal arc welding (MMA)	10 A/20,5 V...140 A/25,6 V
Electrodes, diameter	Ø1,5...3,25 mm
Welding current control	stepless
Open circuit voltage (VRD)	30 V
Open circuit power	<10 W
Efficiency	80%
Power factor	0,60 (140A/25,5 V))
Degree of protection	IP 23C
Temperature class	B (130°C)/H (180°C)
Range of working temperature	-20...+40°C
Range of storage temperature	-40...+60°C
External dimensions:	
length	320 mm
width	123 mm
height	265 mm
Weight	4,0 kg without connection cable 4,6 kg with connection cable
Norms	IEC 60974-1 IEC 60974-10 EN 50199

The products meet conformity requirements for CE marking.

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. Note: 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-authorized 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.

KEMPPI OY
PL 13
FIN – 15801 LAHTI
FINLAND
Tel (03) 899 11
Telefax (03) 899 428
www.kemppi.com

KEMPPIKONEET OY
PL 13
FIN – 15801 LAHTI
FINLAND
Tel (03) 899 11
Telefax (03) 7348 398
e-mail: myynti.fi@kemppi.com

KEMPPI SVERIGE AB
Box 717
S – 194 27 UPPLANDS VÄSBY
SVERIGE
Tel (08) 59 078 300
Telefax (08) 59 082 394
e-mail: sales.se@kemppi.com

KEMPPI NORGE A/S
Postboks 2151, Postterminalen
N – 3103 TØNSBERG
NORGE
Tel 33 34 60 00
Telefax 33 34 60 10
e-mail: sales.no@kemppi.com

KEMPPI DANMARK A/S
Literbuen 11
DK – 2740 SKOVLUNDE
DANMARK
Tel 44 941 677
Telefax 44 941 536
e-mail:sales.dk@kemppi.com

KEMPPI BENELUX B.V.
Postbus 5603
NL – 4801 EA BREDA
NEDERLAND
Tel (076) 5717 750
Telefax (076) 5716 345
e-mail: sales.nl@kemppi.com

KEMPPI (UK) Ltd
Martti Kemppi Building
Fraser Road
Priory Business Park
BEDFORD, MK443WH
ENGLAND
Tel 0845 6444201
Fax 0845 6444202
e-mail: sales.uk@kemppi.com

KEMPPI FRANCE S.A.
S.A. au capital de 5 000 000 F.
65 Avenue de la Couronne des Prés
78681 EPONE CEDEX
FRANCE
Tel (01) 30 90 04 40
Telefax (01) 30 90 04 45
e-mail: sales.fr@kemppi.com

KEMPPI GmbH
Otto – Hahn – Straße 14
D – 35510 BUTZBACH
DEUTSCHLAND
Tel (06033) 88 020
Telefax (06033) 72 528
e-mail:sales.de@kemppi.com

KEMPPI SP. z o.o.
Ul. Piłsudskiego 2
05-091 ZĄBKI
Poland
Tel +48 22 781 6162
Telefax +48 22 781 6505
e-mail: info.pl@kemppi.com

KEMPPI WELDING
MACHINES AUSTRALIA PTY LTD
P.O. Box 404 (2/58 Lancaster Street)
Ingleburn NSW 2565, Australia
Tel. +61-2-9605 9500
Telefax +61-2-9605 5999
e-mail: info@kemppi.com.au