

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

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WELDFORCE

KPS 3500

KPS 4500

KPS 5500

KPS 3500 MVU

KPS 4500 MVU

KPS 5500 MVU



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1. PREFACE

1.1. INTRODUCTION

Congratulations on having purchased this product. Properly installed Kemppi products should prove to be productive machines requiring maintenance at only regular intervals. This manual is arranged to give you a good understanding of the equipment and its safe operation. It also contains maintenance information and technical specifications. Read this manual from front to back before installing, operating or maintaining the equipment for the first time. For further information on Kemppi products please contact us or your nearest Kemppi distributor.

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 warning texts 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 WeldForce KPS3500, 4500 ja 5500 are multi-operator power sources designed for demanding professional use. They are suitable for MMA/MIG and pulsed MIG as well as for TIG welding in DC.

1.2.1. Operation control and connectors

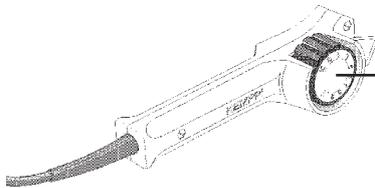
F11	Fuse for connection for control table	6,3 A delayed
H11	Signal lamp	I/O
H12	Warning lamp for thermal protection	
S11	Main switch	I/O
X11,	Welding connection	parallel
X12		
X13	Earth connection	
X14,	Connection for control cable	parallel
X15		
01	Inlet of mains cable	



1.3. ACCESSORIES

1.3.1. Remote control devices

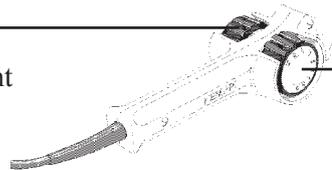
R10



Control of MMA/TIG welding current, reference scale 1 ... 5.

R20

Wire feed adjustment,
electrode current adjustment



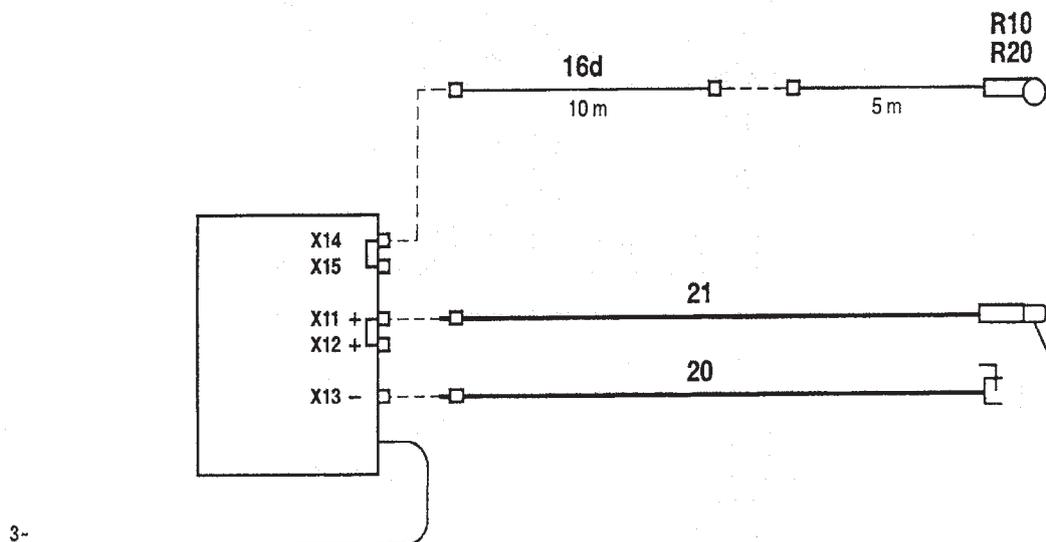
Voltage adjustment

MIG-MAG remote control device with controls for wire feed and voltage, memory scales 1 ... 5. You can use control device also for control of MMA current.

1.3.2. Cables

WeldForce KPS3500, WeldForce KPS4500, WeldForce KPS5500

WeldForce KPS3500 MVU, WeldForce KPS4500 MVU, WeldForce KPS5500 MVU



- 16d Extension cable for remote control
- 20 Earth cable
- 21 MMA welding cable
- R10, Remote control devices
- R20

1.4. OPERATION SAFETY

Please study these Operation safety instructions and respect them when installing, operating and servicing the machine.

Welding arc and spatters

Welding arc hurts unprotected eyes. Be careful also with reflecting arc flash. Welding arc and spatter burn unprotected skin. Use safety gloves and protective clothing.

Danger for fire or explosion

Pay attention to fire safety regulations. Remove flammable or explosive materials from welding place. Always ensure that you have sufficient fire fighting equipment available where you are welding. Be prepared for hazards in special welding jobs, eg. for the danger of fire or explosion when welding container type work pieces. Note! Fire can break out from sparks even several hours after the welding work has been finished!

Mains voltage

Never take welding machine inside a work piece (eg. container or truck). Do not place welding machine on a wet surface. Always check cables before operating the machine. Change damaged cables without delay. Damaged cables may cause an injury or set out a fire. Connection cable must not be crushed, it must not touch sharp edges or hot work pieces.

Welding power circuit

Isolate yourself by using proper protective clothing, do not wear wet clothing. Never work on a wet surface or use defect cables. Do not put the MIG-gun or welding cables on welding machine or on other electric equipment. Do not press the MIG-gun switch, if the gun is not directed towards a work piece.

Welding fumes

Take care that there is sufficient ventilation during welding. Take special safety precautions when welding metal, which contain lead, cadmium, zinc, mercury or beryllium.

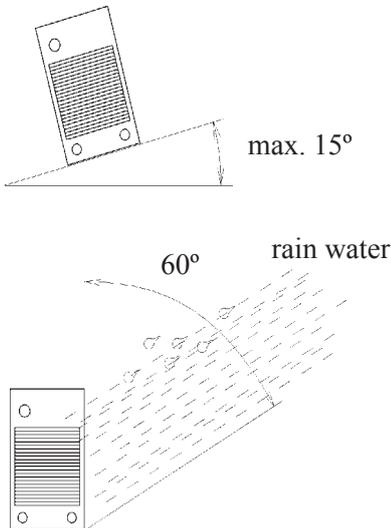


This equipment's electromagnetic compatibility (EMC) is designed for use in an industrial environment. Class A equipment is not intended for use in residential location where the electrical power is provided by the public low-voltage supply system.

2. INSTALLATION

2.1. SITING THE MACHINE

! Site the machine on a stationary, horizontal, dry base in a position that does NOT allow dust, dirt or metal particles to enter the machines cooling air flow.



- Preferably site the machine somewhat higher above the floor level.
- Ensure that the front as well as the rear of the machine there is at least 20 cm free distance to allow good circulation of the cooling air through the machine.
- Protect the machine against heavy rain and in hot circumstances against direct sunshine. Ensure the free circulation of the cooling air.

! Degree of protection of machine IP23 allows at its maximum the water spray coming in 60° angle to hit machine's outer covering.

See to that the machine is positioned away from the line of particle spray, created by grinding tools etc.

2.2. CONNECTION TO THE MAINS SUPPLY

Kemppi WeldForce power sources are delivered equipped with 5 m mains cable without plug. If local electricity regulations of operating country are stating otherwise, the mains cable should be replaced in conformity with the local regulations.

Connection of the mains cable, mounting and change of the plug should only be carried out by a competent electrician.

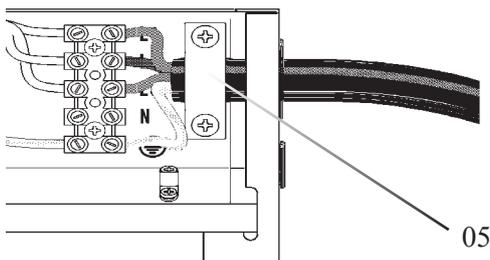
Remove the machine's right side plate to enable the mounting of a mains cable.

KPS power sources can be connected to the mains supply of 400 V 3~ . KPS MVU power sources can be connected to 230 V 3~ or 400 V 3~ . Power source automatic recognize the mains voltage.

If changing the mains cable take into consideration the following:

The cable is entered into the machine through the inlet ring on the rear panel of the machine and fastened with a cable clamp (05). The phase conductors of the cable are coupled to connectors L1, L2 and L3. The earth protection coloured green-yellow is coupled to connector. 

! If you are using 5-lead cable, you must connect neutral conductor with terminal N.



Sizes of the mains cables and fuse ratings for the machine at 100 % duty cycle are specified in the table below:

	Rated voltage	Mains voltage range	Fuses, slow-blow	Connection cable *) mm ²
KPS3500	400 V 3~	360 V... 440 V	25 A	4 x 6.0 S
KPS4500	400 V 3~	360 V... 440 V	35 A	4 x 6.0 S
KPS5500	400 V 3~	360 V... 440 V	35 A	4 x 6.0 S
KPS3500MVU	400 V 3~ 230 V 3~	360 V... 440 V 200 V... 260 V	35 A	4 x 6.0 S
KPS4500MVU	400 V 3~ 230 V 3~	360 V... 440 V 200 V... 260 V	50 A	4 x 10 S
KPS5500MVU	400 V 3~ 230 V 3~	360 V... 440 V 200 V... 260 V	60 A	4 x 16 S

*) In cables of S type there is a protective grounding conductor coloured green-yellow.

2.3. WELDING AND EARTH CABLES

Recommended copper cables with cross-sectional area are as follows:

Kemppi WeldForce KPS3500 50 ... 70 mm²

Kemppi WeldForce KPS4500 70 ... 90 mm²

Kemppi WeldForce KPS5500 70 ... 90 mm²

In enclosed table are shown typical load capacities of rubber insulated copper cables, when ambient temperature is 25 °C and lead temperature is 85 °C.

Cable	Duty cycle ED			Voltage loss / 10 m
	100 %	60 %	30 %	
50 mm ²	285 A	370 A	520 A	0,35 V / 100 A
70 mm ²	355 A	460 A	650 A	0,25 V / 100 A
95 mm ²	430 A	560 A	790 A	0,18 V / 100 A

Do not overload welding cables due to voltage losses and heating.

Fasten the earth clamp of the return current cable carefully, preferably direct onto the piece to be welded. The contact surface of the earth clamp should always be as large as possible.

Clean the fastening surface from paint and rust.

3. OPERATION CONTROL SWITCHES AND POTENTIOMETERS AND THEIR USE

3.1. MAIN SWITCH I/O

When you turn the switch into I-position, pilot lamp H11 on the front face is illuminated and the machine is ready for use.

 **Always turn the machine on and off with the mains switch, never use the mains plugs as a switch.**

3.2. PILOT LAMPS

The pilot lamps of the machine report the electric operation:

The green pilot lamp H11 when lit indicates that the machine is on and ready for use and it is connected to the mains supply with the main switch in the I-position.

H12 indicates when lit that the thermal protection of the machine has been activated due to over heating. The cooling fan will continue to run and cool the machine down and when the lamp is off the machine is ready to weld.

3.3. OPERATION OF COOLING FAN

In Kemppi WeldForce KPS3500 there is one and in Kemppi WeldForce KPS4500 and Kemppi WeldForce KPS5500 there are two simultaneously operating fans.

- The fan is started for a moment when main switch is placed into position I.
- The fan will start during welding as the machine heats up and it will run for 1 to 10 minutes after the welding has stopped.
- On no-load fan is started in intervals of approx. half an hour for minute's time.

4. MANUAL METAL ARC WELDING

The Kemppi WeldForce power source can be used in electrode welding by connecting a Kemppi WeldForce KWF200, KWF300 wire feeder to it. The power source can be made suitable for electrode welding without a wire feeder by connecting an R10 or R20 remote control to the X14 or X15 terminal at the back of the power source for welding current adjustment, and the welding power cable connected to the power source's (+) connector X11 or X12.

5. MAINTENANCE

The amount of use and the working environment should be taken into consideration when planning the frequency of maintenance of the machine. Careful use and preventive maintenance will help to ensure trouble-free operation.

5.1. CABLES

Check the condition of welding and connection cables daily. Do not use damaged cables. Make sure that the mains cables in use are safe and according to laid down regulations. The repair and mounting of a mains connection cable should be carried out only by an authorised electrician.

5.2. POWER SOURCE



Note! Disconnect the plug of the machine from the mains socket and wait approx. 2 minutes (capacitor charge) before removing the cover plate.

Check at least every half year:

- Electric connectors of the machine - clean the oxidised parts and tighten the loosened ones.
- Note! You must know correction tension torques before starting the reparation of the joints.
- Clean the inner parts of the machine from dust and dirt e.g. with a soft brush and vacuum cleaner. Also clean the ventilation net behind the front grate.
- Do not use compressed air, there is a risk that dirt is packed even more tightly into gaps of cooling profiles.
- Do not use pressure washing device.
- Only authorised electrician shall carry out repairs to the machines.

5.3. REGULAR MAINTENANCE

Kemppi Service Workshops make regular maintenance according to agreement.

The major points in the maintenance procedure are listed as follows:

- Cleaning of the machine
- Checking and maintenance of the welding tools
- Checking of connectors, switches and potentiometers
- Checking of electric connections
- Checking of mains cable and plug

- Damaged parts or parts in bad connection are replaced by new ones
- Maintenance testing. Operation and performance values of the machine are checked, and adjusted when necessary by means of test equipment.

6. OPERATION DISTURBANCES

In case of problems contact the Kemppi works in Lahti, Finland, or your local Kemppi dealer. Check the maintenance objects before the machine is sent to the Service Workshop.

6.1. OPERATION OF THE OVERLOAD PROTECTION

Yellow pilot lamp H12 of thermal protection is lit when thermostat has operated due to overheating of machine.

The thermostat of machine will operate, if machine is continuously loaded over rated values or cooling air circulation is blocked.

Cooling fan cools down the machine and when the pilot lamp is not lit the machine is automatically ready for welding.

6.2. CONTROL FUSES

Fuse F11, 6,3 A delayed, on the rear wall of machine is as protection for connection of auxiliary devices X14-15.



Use same type and rating of fuse which is marked beside the fuse adapter. Damage caused by a wrong type fuse is not covered by the guarantee.

6.3. UNDER- AND OVERVOLTAGES IN THE MAINS SUPPLY

Primary circuits of machine are protected against sudden, transient overvoltages.

Machine is designed to withstand 3 x 440 V voltage continuously (see technical data). See to it that voltage is kept within admissible limits especially when mains supply is taken e.g. from combustion engine generator.

If the mains has undervoltage (under approx. 300 V), machine control stops to operate automatically.

6.4. LOSS OF A PHASE IN THE MAINS SUPPLY

Loss of a phase causes noticeable poorer welding properties than normally or the machine doesn't get started at all. Loss of a phase can be due to following:

- blowing of mains supply fuse
- defective mains cable
- bad connection of mains connection cable on terminal block or plug of machine

7. 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!

8. ORDERING NUMBERS

Kemppi WeldForce KPS 3500		6131350
Kemppi WeldForce KPS 4500		6131450
Kemppi WeldForce KPS 5500		6131550
Kemppi WeldForce KPS 3500MVU		613135003
Kemppi WeldForce KPS 4500MVU		613145003
Kemppi WeldForce KPS 5500MVU		613155003
Return current cable	5 m - 50 mm ²	6184511
Return current cable	5 m - 70 mm ²	6184711
Cable for MMA welding	5 m - 50 mm ²	6184501
Cable for MMA welding	5 m - 70 mm ²	6184701
R10		6185409
Remote controlled interconnecting cable	10 m	6185481
T400		6185267
P40		6185264
P40L		6185264L

9. TECHNICAL DATA

	Kemppi WeldForce KPS 3500/ KPS 3500MVU	Kemppi WeldForce KPS4500/ KPS 4500MVU	Kemppi WeldForce KPS5500/ KPS 3500MVU
Mains voltage KPS 3~50/60 Hz			
	400 V -15 %...+20 %	400 V -15 %...+20 %	400 V -15 %...+20 %
Mains voltage KPS MVU 3~50/60 Hz			
	400 V -15 %...+20 %	400 V -15 %...+20 %	400 V -15 %...+20 %
	230 V -10 %...+10 %	230 V -10 %...+10 %	230 V -10 %...+10 %
Rated power			
60 ED	-	21,5 kVA	28 kVA
80 % ED	15 kVA	20 kVA	24,5 kVA
100 % ED	13,5 kVA	18,5 kVA	21 kVA
Connection cable/fuse delayed			
KPS	4 x 6 S - 5 m / 25 A	4 x 6 S - 5 m /35 A	4 x 6 S - 5 m / 35 A
KPS MVU	4 x 6 S - 5 m / 35 A	4 x 10 S - 5 m /50 A	4 x 16 S - 5 m / 63 A
Max. loadability 40 °C			
60 % ED	-	450 A	550 A
80 % ED	350 A	420 A	500 A
100 % ED	320 A	380 A	440 A
Max. loadability 20 °C			
100 % ED	320 A	400 A	450 A
Welding current and voltage range			
MMA	10 A ... 320 A	10 A ... 420 A	10 A ... 520 A
MIG	12 V ... 37 V	12 V ... 39 V	12 V ... 42 V
Max. welding voltage			
	46 V / 300 A	46 V / 400 A	50 V / 500 A
Open circuit voltage			
	approx. 65 V	approx. 65 V	approx. 65 V
Open circuit power			
	< 75 W	< 75 W	< 75 W
Efficiency at nominal values			
	approx. 85 %	approx. 85 %	approx. 85 %
Power factor at nominal values			
	approx. 0,93	approx. 0,93	approx. 0,93
Storage temperature range			
	-40 ... +60 °C	-40 ... +60 °C	-40 ... +60 °C
Operating temperature range			
	-20 ... +40 °C	-20 ... +40 °C	-20 ... +40 °C
Temperature class			
	H (180 °C) / B (130 °C)	H (180 °C) / B (130 °C)	H (180 °C) / B (130 °C)
Degree of protection			
	IP 23 C	IP 23 C	IP 23 C
External dimensions			
length	690 mm	690 mm	690 mm
width	230 mm	230 mm	230 mm
height	520 mm, MVU 630 mm	520 mm, MVU 630 mm	520 mm, MVU 630 mm
Weight	37 kg/ MVU 45 kg	41 kg/MVU 49 kg	48 kg/MVU 56 kg
Voltage supply for auxiliary devices			
	50 V DC	50 V DC	50 V DC
X 14, X 15	fuse 6,3 A delayed	fuse 6,3 A delayed	fuse 6,3 A delayed
Voltage supply for cooling unit			
	1~, 400 V / 250 VA	1~, 400 V / 250 VA	1~, 400 V / 250 VA

10. 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.

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