

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

1913270E

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# MASTER

## 5001



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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

Master 5001 is a 3-phase inverter power source for demanding professional use. Master 5001 is suitable for MMA welding and carbon arc gouging. It is also suitable as power source for arc powered wire feeders. Master 5001 can also be used as power source for scratch-start/contact TIG. Due to its high effect and excellent welding properties as well as due to its small size and light weight it is very suitable for site welding as well as for repair and production welding.

In order to enable a good following of welding current the machine is equipped with well-visible displays for welding current and welding voltage. Properties of Master 5001 can be improved with remote control units and transport carts which are delivered as accessory.

## 1.3. OPERATION SAFETY

Never watch the arc without a face shield designed for arc welding!

The arc damages unprotected eyes! The arc burns unprotected skin!

Protect yourself and the surroundings against the arc and hot spray!

Remember general fire safety!

Pay attention to the fire safety regulations. Welding is always classified as a fire risk operation. Welding where there is flammable or explosive material is strictly forbidden. If it is essential to weld in such an area remove inflammable material from the immediate vicinity of the welding site. Fire extinguishers must always be on site where welding is taking place.

Note! Sparks may cause ignition many hours after completion of welding.

Watch the mains voltage!

Take care of the cables - the connection cable must not be compressed, touch sharp edges or hot work pieces. Faulty cables are always a fire risk and highly dangerous. Do not locate the welding machine on wet surfaces. Do not take the welding machine inside the work piece (i.e. in containers, cars etc.)

Ensure that neither you nor gas bottles or electrical equipment are in contact with live wires or connections!

Do not use faulty welding cables. Isolate yourself by using dry and not worn out protective clothes. Do not weld on wet ground. Do not place the welding cables on the power source or other electrical equipment.

Watch the welding fumes!

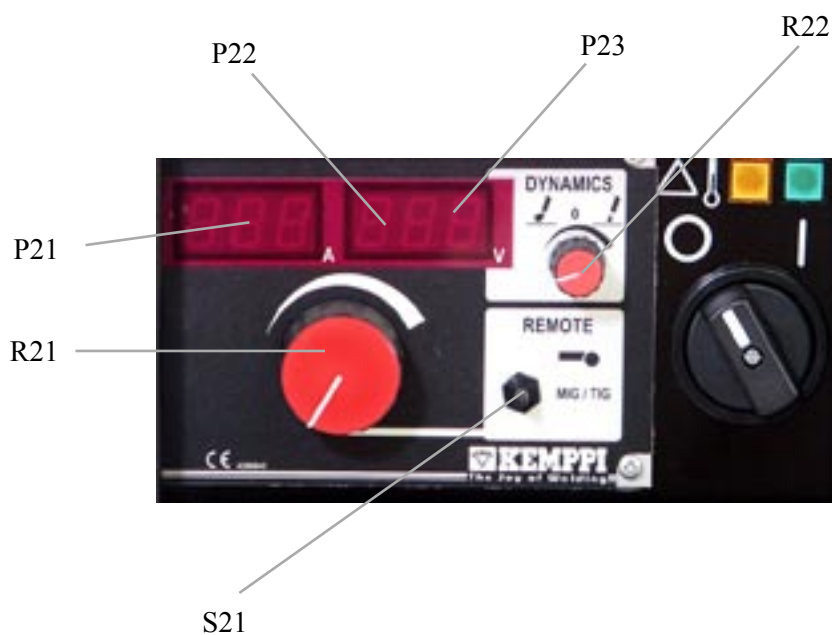
Ensure that there is sufficient ventilation. Follow special safety measures when you weld metals which contain lead, cadmium, zinc, mercury and beryllium.

Note the danger caused by special welding jobs!

Watch the fire and explosion danger when welding container type work pieces.

## 2. INSTALLATION

### 2.1. INSTALLATION



P21 Current meter

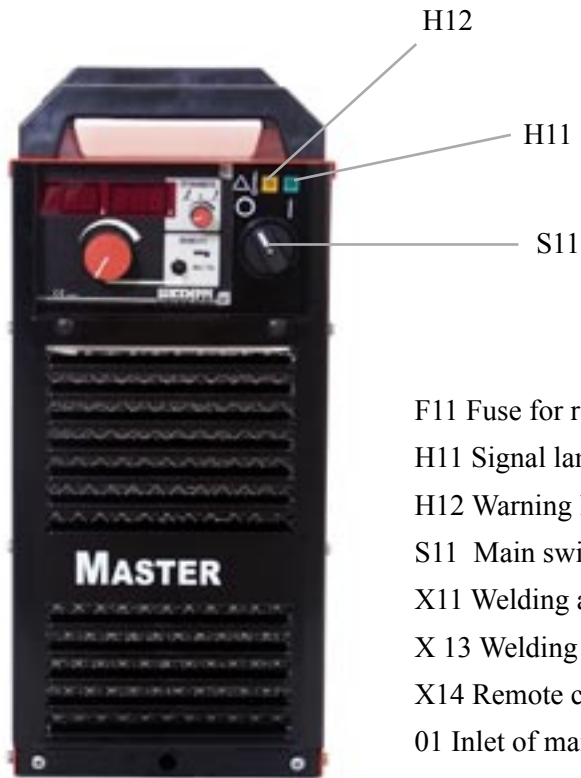
P22 Voltage meter

P23 Display for adjustment value of MMA welding dynamics -9..0...9

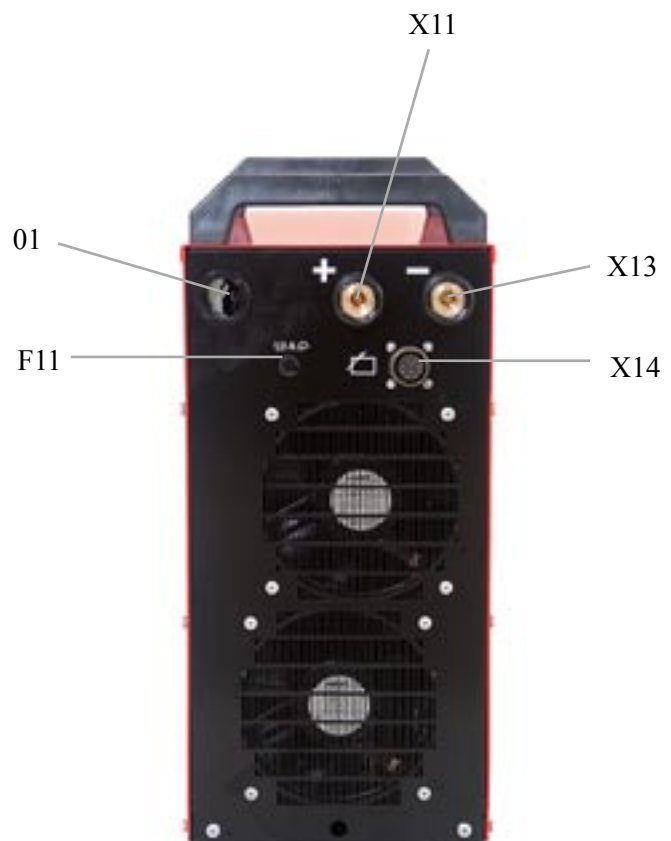
R21 Adjustment of welding current

R22 Adjustment of MMA welding dynamics

S21 Selection for local/remote control/TIG/MIG



- F11 Fuse for remote control connection 1,0 A delayed
- H11 Signal lamp I/O
- H12 Warning lamp for thermal shield
- S11 Main switch I/O
- X11 Welding and earth connection
- X 13 Welding and earth connection
- X14 Remote control connection
- 01 Inlet of mains cable



## 2.2. SITING THE MACHINE

Site the machine on a stationary, horizontal, dry base from which there does not come any dust etc. into cooling air (front grate).

- Preferably site the machine somewhat higher above the floor level.
- See to that in front of the machine as well as at 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 free circulation of the cooling air.



**Degree of protection of machine IP23 allows at its maximum the water jet 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.

## 2.3. CONNECTION TO MAIN SUPPLY

Master 5001 power source is 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 them.



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

Remove machine's right side plate for the time you are mounting mains cable.

By change of the mains cable pay attention to the following:

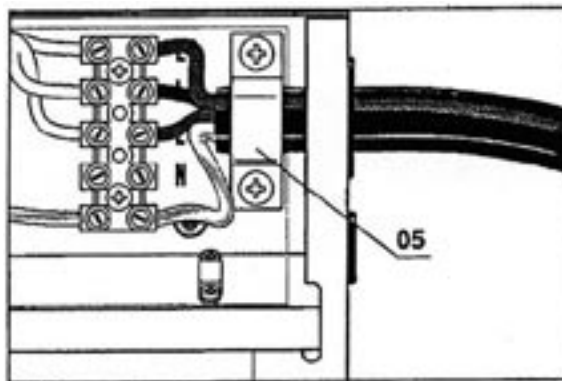
The cable is entered into the machine through the inlet ring on the rear panel of the machine and fastened with a cable clamp. The phase conductors of the cable are coupled to connectors L1, L2 and L3. The earth protection coloured green-yellow is coupled to connector.



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



**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.**



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Sizes of the mains cables and fuseratings for the machine at 100 % dury cycle are specified in the table below:

**Master 5001**

Rated voltage	3~ 400 V
Mains voltage range	400 V ± 10 %
Fuses, delayed	35 A
Connection cable mm <sup>2</sup>	4 x 6,0 S

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

## 2.4. WELDING AND EARTH CABLES

Use only copper cables with cross-sectional area of at least 50 ...95 mm<sup>2</sup>.

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.

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

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

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

Clean the fastening surface from paint and rust.

## 2.5. MOUNTING OF POWER UNIT TO TRANSPORT CARRIAGE

Read mounting instructions for Master 5001 power source delivered with carriage T12. Fasten power source carefully of that the equipment should withstand lifting with lifting device.

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## 3. OPERATION CONTROL SWITCHES AND POTENTIOMETERS AND THEIR USE

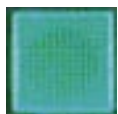
### 3.1. MAIN SWITCH I/O

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

Always start and switch off the machine with the main switch, never use the mains plug as a switch.

### 3.2. PILOT LAMPS

The pilot lamps of the machine report about the electric operation:



The green pilot lamp H11 for readiness for use is always lighted, when the machine is connected to mains supply and the main switch is in I-position.



Yellow pilot lamp H12 of thermal protection is lighted when thermostat has released due to overheating of machine. The cooling fan is cooling down the machine and when the pilot lamp is switched off, the machine is again ready for welding.

### 3.3. LOCAL OR REMOTE CONTROL OF WELDING CURRENT

You can control welding current either from local control unit R21 of the machine or from remote control unit C100C which is connected to remote control connector X14. When you are using the remote control unit, the switch S21 must be in remote control position:

During the control, the set value of welding current can be seen on current meter display P21 and at the same time the no-load voltage of the machine can be seen on voltage display. During welding the current meter P21 and the voltage meter P22 show welding current respectively welding voltage.

Note! Voltage which can be seen during welding on display P22, is terminal voltage of machine, which is voltage between terminals X11 and X13.

Accuracy of digital meter is as follows:

Accuracy of current true value in respect to real value is  $\pm 2,5\%$ ,  $\pm 2A$ .

Accuracy of voltage true value in respect to real value is  $\pm 2,5\%$ ,  $\pm 0,2 V$ .

Depending on welding cable length and copper cross-section, real arc voltage and meter display might differ many volts from each other. Error will increase when current is growing. See table in paragraph "welding and earthing cables". In current measurement the same error won't appear.

### 3.4. OPERATION OF COOLING FAN

In Master 5001 there are two simultaneously operating fans.

- Fan is started for a moment, when main switch is placed into position I.
- Fan is started after welding start after machine has been heated and runs still for 1...10 min time after welding stop.
- On no-load fan is started in intervals of ca. half an hour for a minute's time.



### 3.5. CONTROL FOR MMA WELDING DYNAMICS

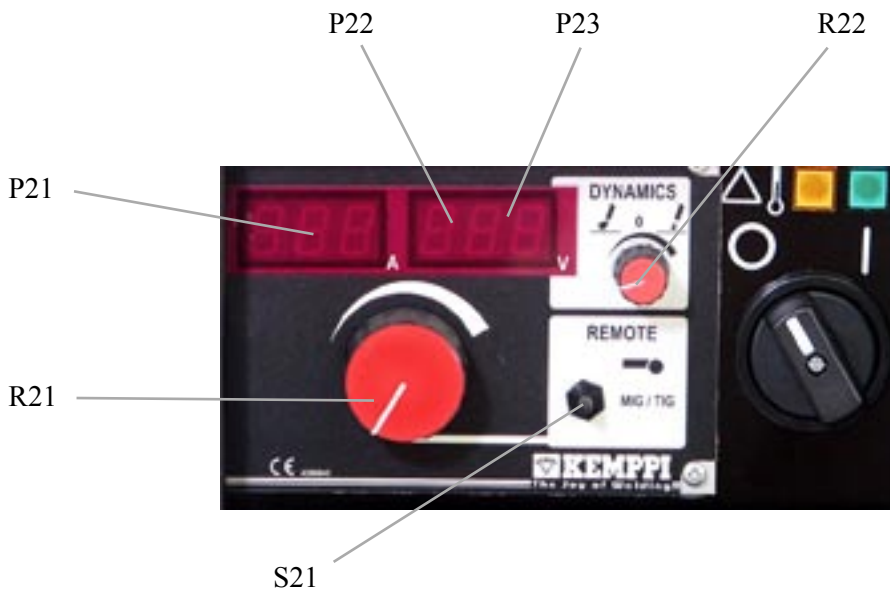
MMA welding dynamics is controlled with potentiometer R22. The potentiometer R22 has the reference scale -9...0...9 can be seen also on the V display P22, which otherwise is showing no-load/welding voltage. Setups for dynamics remain on the display still for approx. 3 s after you have finished the control.

With control of MMA dynamics you can influence on arc in different situations. When you make the arc harder, blow and at the same time spatter is increased.

-9...-1 Softer arc. Object: minimizing spatter in welding at upper end of recommended currents for electrode.

0 Factory setup. Normal setting for all electrode types.

1...9 Harder arc. Object: eg cellulose covered electrodes (9) and thin stainless electrodes in welding at lower end of recommended currents for electrode.



P21 Current meter

P22 Voltage meter

P23 Display for adjustment value of MMA welding dynamics -9...0...9.

R21 Adjustment of welding current

R22 Adjustment of MMA welding dynamics

S21 Selection for local/remote control/TIG/MIG

## Use of arc powered wire feeder

Master 5001 can be connected as power source to an arc powered wire feeder. In that case set switch S21 of control panel to centre position. Power source operates then on constant voltage characteristic curves (cv), which provides the best welding properties for arc powered units. Set voltage is set with potentiometer or with remote control unit, if installed.

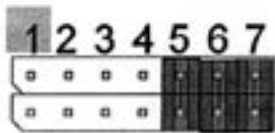
## Scratch-start/contact TIG

Master 5001 can be used in TIG welding by switching the jumpers of control card to position TIG (see jumper settings below). TIG welding is selected by setting switch S21 to centre position. Set value of TIG is selected with control panel or with remote control unit, if installed. When TIG electrode touches work piece welding current is on so called pilot current, which is 25 A. Current is raised or reduced to actual welding current by pulling the electrode away from work piece. Note that there is always voltage in the electrode when unit is set on TIG welding.

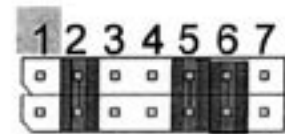
## Jumpers

Jumpers on card A001:

Jumper 2	MIG/TIG
Jumpers 5 - 7	not in use
Jumpers 1, 3, 4	reserved (to be left open)

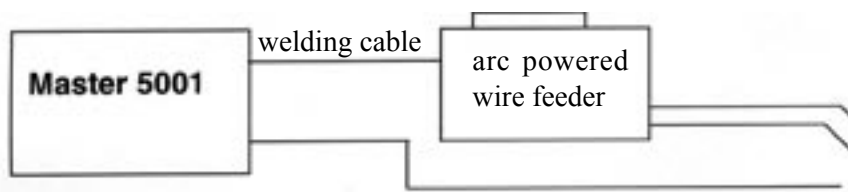


MMA and arc powered MIG

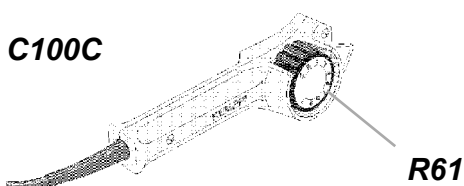


MMA and scratch-start/contact TIG

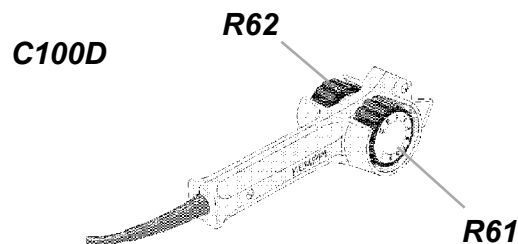
S 21



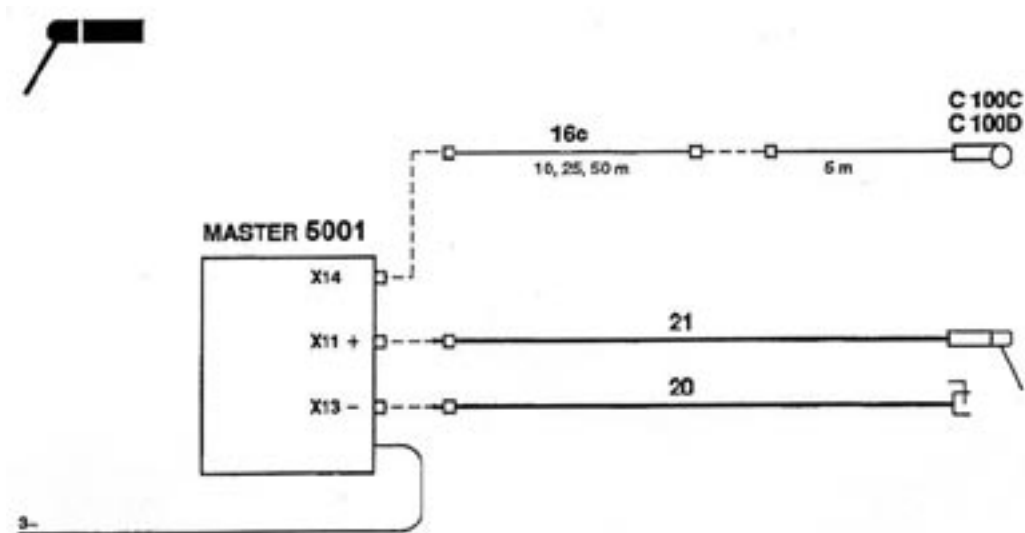
## Accessories and cables



C100C  
Control of MMA welding current (R61), reference scale 1...10



C100D  
Rough control (R61), reference scale 1...10, and fine control +/- (R62) for MMA welding current.



16c Extension cable for remote control

20 Earth cable

21 MMA welding cable

C100C

C100D Remote control devices

## 4. 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 of the machine. Careful use and preventive maintenance will help to ensure trouble-free operation.

### 4.1. CABLES

Check the condition of welding and connection cables daily. Do not use faulty cables. Make sure that the mains connection cables in use are safe and according to laid down regulations.

The repairs and mounting of mains connection cables should be carried out only by an authorised electrician.

### 4.2. 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 connections of the machine - clean the oxidized parts and tighten the loosened ones. Note! You must know correct tension torques before starting the reparation of the joints.
- Clean the inner parts of the machine from dust and dirt eg 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.

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## 4.3. REGULAR MAINTENANCE

Kemppi service repair shops 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
- meter checking
- checking of mains cable and plug
- damaged parts of 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.

## 5. OPERATION DISTURBANCES

In case of problems contact the Kemppi works in Finland or your Kemppi dealer.

Check the maintenance objects before the machine is sent to the service repair shop.

### ***Operation of the overload protection***

Yellow pilot lamp H12 of thermal protection is lighted 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 lighted the machine is automatically ready for welding.

### ***Control fuses***

Fuse F11, 1,0 A delayed, on the rear wall of machine is as protection for connection of auxiliary devices X14.

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

### ***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 to it that voltage is kept within admissible limits especially when mains supply is taken eg from combustion engine generator. If the mains has undervoltage (under ca. 300 V), machine control stops automatically.

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### **Loss of a phase in the mains supply**

Loss of a phase causes noticeably 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.

## **6. 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!

## **7. ORDER NUMBERS**

Master 5001	6130512
20/5 m 50mm <sup>2</sup>	6184511
20/5 m 70mm <sup>2</sup>	6184711
21/5 m 50mm <sup>2</sup>	6184501
21/5 m 70 mm <sup>2</sup>	6184701
C100C	6185410
C100D	6185413
16c/10 m	6185451
/25 m	6185452
/50 m	6185453
T12	6185228

## 8. TECHNICAL DATA

### **Master 5001**

Mains voltage	3~, 50/60 Hz	400 V ± 10 %
Rated power	80 % ED	500 A / 25,6 kVA
	100 % ED	440 A / 20,2 kVA
Connection cable		4 x 6S - 5 m
Fuse		35 A delayed
Loading capacity	80 % ED	500 A / 40 V
	100 % ED	440 A / 37,6 V
Control range for welding current		10 A ... 500 A
Max. welding voltage		50 V / 500 A
Open circuit voltage		68 V
Open circuit power		< 75 W
Efficiency at nominal values		85 %
Power factor		0,93
Storage temperature range		- 40 ... + 60 oC
Operation temperature range		- 20 ... + 40 oC
Temperature class		H (180 oC) / B (130 oC)
Degree of protection		IP 23 C
External dimensions (without handles)	length	530 mm
	width	230 mm
	height	520 mm
Weight		48 kg
Voltage supply for auxiliary devices		50 V DC
	fuse	1 A / delayed

The product meets conformity requirements for CE marking.

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## 9. 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-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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