FastMig
M 320, 420, 520

Operating manual
Brugsanvisning
Gebrauchsanweisung
Manual de instrucciones
Käyttöohje
Manuel d'utilisation
Manuale d'uso
Gebruiksaanwijzing
Bruksanvisning
Instrukcja obsługi
Manual de utilização
Инструкции по эксплуатации
Bruksanvisning
操作手册

KEMPPI
The Joy of Welding
CONTENTS

1. Preface ........................................................................................................... 3
1.1 General ........................................................................................................... 3
1.2 Product introduction ....................................................................................... 4
   1.2.1 Operation control and connectors ........................................................... 4
1.3 Accessories .................................................................................................... 4
   1.3.1 Remote control devices ........................................................................... 4
   1.3.2 Cables ......................................................................................................... 5
2. Installation ....................................................................................................... 6
   2.1 Positioning of the machine ......................................................................... 6
   2.2 Distribution network ..................................................................................... 6
   2.3 Connection to the mains supply ................................................................. 7
   2.4 Welding and earth return cables ............................................................... 8
3. Operation controls .......................................................................................... 8
   3.1 Main switch I/O ............................................................................................. 8
   3.2 Pilot lamps .................................................................................................... 8
   3.3 Operation of cooling fan ............................................................................. 8
4. Manual metal arc welding ............................................................................. 9
5. Maintenance .................................................................................................... 9
   5.1 Daily maintenance ....................................................................................... 9
   5.2 Periodic maintenance .................................................................................. 9
   5.3 Service Workshop maintenance ................................................................. 10
6. Operation disturbances .................................................................................. 10
7. Disposal of the machine ............................................................................... 11
8. Ordering numbers .......................................................................................... 11
9. Technical data ................................................................................................ 12
1. PREFACE

1.1 General

Congratulations on choosing the FastMig welding 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.

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 Product introduction

FastMig M 320, 420 and 520 are multi-purpose power sources designed for demanding professional use. They are suitable for MMA and MIG welding in DC.

1.2.1 Operation control and connectors

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>F11</td>
<td>Fuse for connection for control table</td>
<td>6,3 A delayed</td>
<td>X12</td>
</tr>
<tr>
<td>H11</td>
<td>Signal lamp</td>
<td>I/O</td>
<td>X14, X15</td>
</tr>
<tr>
<td>H12</td>
<td>Warning lamp for thermal protection</td>
<td></td>
<td>01</td>
</tr>
<tr>
<td>S11</td>
<td>Main switch</td>
<td>I/O</td>
<td></td>
</tr>
<tr>
<td>X11, X13</td>
<td>Welding connection</td>
<td>parallel</td>
<td></td>
</tr>
</tbody>
</table>

1.3 Accessories

1.3.1 Remote control devices

R10


R20

1. Wire feed adjustment, electrode current adjustment.
2. 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

**NOTE!** Always check before use that the mains cable, earth return cable and its clamp, interconnection cable and shielding gas hose are in a serviceable condition. Ensure that connectors are correctly fastened. Loose connectors can impair welding performance and damage connectors.

**Liquid cooled system: FastMig power source + MXF + FastCool 10**

1. MXF wire feed unit
2. FastMig power source
3. FastCool water cooler and power connection
4. Gas supply
5. MMA electrode holder
6. Remote control device
7. Liquid cooled welding Gun
8. Power cable
9. Earth return cable and clamp
2. **INSTALLATION**

2.1 **Positioning 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 machine's 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 aim metallic grinding spray/sparks towards the equipment.

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.

**FastMig M 520:**

This equipment complies with IEC 61000-3-12 provided that the short-circuit power $S_{sc}$ is greater than or equal to 5.8 MVA at the interface point between the user's supply and the public supply network. 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 is connected only to a supply with a short-circuit power $S_{sc}$ greater than or equal to 5.8 MVA.

**FastMig M 420:**
This equipment complies with IEC 61000-3-12 provided that the short-circuit power $S_{sc}$ is greater than or equal to 5.6 MVA at the interface point between the user's supply and the public supply network. 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 is connected only to a supply with a short-circuit power $S_{sc}$ greater than or equal to 5.6 MVA.

**FastMig M 320:**
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 Connection to the mains supply

FastMig power sources are delivered as standard with 5 meters of mains power cable. No mains plug is fitted at the Kemppi factory.

*NOTE!* If local country-based regulations state an alternative power cable is required, the mains cable must be replaced in conformity with the regulations. Connection and installation of the mains cable and plug should only be carried out by a suitably qualified person.

Remove the machine cover plate to enable mounting of a mains cable. FastMig M power sources can be connected to the mains supply of 400 V 3~.

**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 the marked connector.

*NOTE!* If you are using 5-lead cable, do not connect neutral conductor.

*) In cables of S type there is a protective grounding conductor coloured green-yellow.
2.4 Welding and earth return cables

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

- FastMig M 320 50 – 70 mm²
- FastMig M 420 70 – 90 mm²
- FastMig M 520 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.

<table>
<thead>
<tr>
<th>Cable</th>
<th>Duty cycle ED</th>
<th>Voltage loss / 10 m</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>100 %</td>
<td>60 %</td>
</tr>
<tr>
<td>50 mm²</td>
<td>285 A</td>
<td>370 A</td>
</tr>
<tr>
<td>70 mm²</td>
<td>355 A</td>
<td>460 A</td>
</tr>
<tr>
<td>95 mm²</td>
<td>430 A</td>
<td>560 A</td>
</tr>
</tbody>
</table>

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

**NOTE!** Always check the serviceability of the earth return cable and clamp. Ensure the metal surface to which the cable is connected is clean from metal oxide or paint. Check the connector to the power source is fastened correctly.

3. OPERATION CONTROLS

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.

**NOTE!** 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 FastMig power sources 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.
4. MANUAL METAL ARC WELDING

The FastMig power source can be used in electrode welding by connecting a FastMig MXF 63, MXF 65 or MXF 67 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

When considering and planning routine maintenance, please consider the frequency of machine use and the working environment.

Correct operation of the machine and regular maintenance will help you avoid unnecessary downtime and equipment failure.

NOTE! Disconnect the machine from the mains before handling the electrical cables.

5.1 Daily maintenance

- Check the overall condition of the welding gun. Remove welding spatter from the contact tip and clean the gas nozzle. Replace worn or damaged parts. Only use original Kemppi spare parts.
- Check the condition and connection of the welding circuit components: welding gun, earth return cable and clamp, sockets and connectors.
- Check the condition of the feed rolls, needle bearings and shafts. Clean and lubricate bearings and shafts with a small quantity of light machine oil if necessary. Assemble, adjust and test function.
- Check that the feed rolls are suitable for the filler wire you are using, and that their pressure adjustment is correct.

5.2 Periodic maintenance

NOTE! Periodic maintenance should only be carried out by a suitably qualified person. Disconnect the plug of the machine from the mains socket and wait about 2 minutes (capacitor charge) before removing the cover plate.

Check at least every half year:
- Electric connectors of the machine – clean any oxidized parts and tighten loose connections.

NOTE! You must know the correct tension torques values before starting the reparation of the loose 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 grill.

Do not use compressed air, there is a risk that the dirt will compact even more tightly into gaps of cooling profiles.

Do not use pressure washing devices.

Only an authorized trained electrician should carry out repairs to Kemppi machines.
5.3 Service Workshop maintenance
Kemppi Service Workshops complete maintenance according to their Kemppi service 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 condition are replaced by new ones
- Maintenance testing.
- Operation and performance values of the machine are checked, and when necessary adjusted by means of software and test equipment.

Software loading
- Kemppi Service Workshops can also test and load firmware and welding software.

6. OPERATION DISTURBANCES

Should you experience a malfunction from your machine, please consult the basic troubleshooting text above first, and complete some basic checks.

If the machine malfunction cannot be corrected with these measures, contact your Kemppi maintenance service workshop.

Operation of the overload protection
Yellow thermal protection lamp is lit when the thermostat is operating due to loading beyond the stated duty cycle.

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

Internal fans will cool the machine, and when the pilot lamp is not lit the machine is automatically ready for welding.

Control fuses
Fuse, 6.3 A delayed, on the rear wall of machine provides protection for auxiliary devices.

Use the same type and rating of fuse as marked beside the fuse adapter. Damage caused by incorrect fuse selection is not covered by the guarantee.

Under and over voltages in the mains supply
Primary circuits of the machine are protected against sudden, transient overvoltages. The machine is designed to withstand 3 x 440 V voltage continuously. Ensure that voltage is kept within this permissible limit, especially when the mains supply is provided by a combustion engine generator. If the mains has under voltage (under approx. 300 V) or overvoltage (over approx. 480 V) machine control stops operation automatically.

Loss of a phase in the mains supply
Loss of a mains power phase causes noticeably poor welding properties. In some cases the machine won’t start at all. Loss of a phase can be due to following:

- Blowing of mains supply fuse
- Defective mains cable
- Bad connection of mains power cable on machine terminal block or plug of machine.
7. 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.

8. ORDERING NUMBERS

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Ordering Number</th>
</tr>
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<tbody>
<tr>
<td>FastMig M 320</td>
<td>613220</td>
</tr>
<tr>
<td>FastMig M 420</td>
<td>6132420</td>
</tr>
<tr>
<td>FastMig M 520</td>
<td>6132520</td>
</tr>
<tr>
<td>Wire feeders</td>
<td></td>
</tr>
<tr>
<td>MXF 65 EL</td>
<td>To be used with MS panels 6152100EL</td>
</tr>
<tr>
<td>MXF 67 EL</td>
<td>To be used with MS panels 6152200EL</td>
</tr>
<tr>
<td>MXF 63 EL</td>
<td>To be used with MS panels 6152300EL</td>
</tr>
<tr>
<td>MXF 65</td>
<td>To be used with MR panels 6152100</td>
</tr>
<tr>
<td>MXF 67</td>
<td>To be used with MR panels 6152200</td>
</tr>
<tr>
<td>MXF 63</td>
<td>To be used with MR panels 6152300</td>
</tr>
<tr>
<td>Panels for wire feeders</td>
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<tr>
<td>FastMig MR 200</td>
<td>6136100</td>
</tr>
<tr>
<td>FastMig MR 300</td>
<td>6136200</td>
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<td>FastMig MS 200</td>
<td>6136300</td>
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<td>FastMig MS 300</td>
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<tr>
<td>Accessories</td>
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<tr>
<td>Earth return cable</td>
<td>5 m, 50 mm² 6184511</td>
</tr>
<tr>
<td>Earth return cable</td>
<td>5 m, 70 mm² 6184711</td>
</tr>
<tr>
<td>Cable for MMA welding</td>
<td>5 m, 50 mm² 6184501</td>
</tr>
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<td>Cable for MMA welding</td>
<td>5 m, 70 mm² 6184701</td>
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<tr>
<td>R10</td>
<td>6185409</td>
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<tr>
<td>AS KIT</td>
<td>6264263</td>
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<tr>
<td>Remote controlled interconnecting cable</td>
<td>10 m 6185481</td>
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<tr>
<td>Cooling unit FastCool 10</td>
<td>6068100</td>
</tr>
<tr>
<td>Transport unit PM 500</td>
<td>6185291</td>
</tr>
<tr>
<td>Gun holder GH 30</td>
<td>6256030</td>
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## TECHNICAL DATA

<table>
<thead>
<tr>
<th></th>
<th>FastMig M 320</th>
<th>FastMig M 420</th>
<th>FastMig M 520</th>
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<tbody>
<tr>
<td><strong>Connection voltage</strong></td>
<td>3~, 50/60 Hz</td>
<td>400 V -15 %...+20 %</td>
<td>400 V -15 %...+20 %</td>
</tr>
<tr>
<td><strong>Rated power</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>60 % ED</td>
<td>-</td>
<td>20 kVA</td>
<td>27 kVA</td>
</tr>
<tr>
<td>100 % ED</td>
<td>15 kVA</td>
<td>18 kVA</td>
<td>20 kVA</td>
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<td><strong>Connection cable</strong></td>
<td>H07RN-F 4G6 (5 m)</td>
<td>H07RN-F 4G6 (5 m)</td>
<td>H07RN-F 4G6 (5 m)</td>
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<tr>
<td><strong>Fuse (delayed)</strong></td>
<td>25 A</td>
<td>35 A</td>
<td>35 A</td>
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<tr>
<td><strong>Output 40 °C</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60 % ED</td>
<td>-</td>
<td>420 A</td>
<td>520 A</td>
</tr>
<tr>
<td>100 % ED</td>
<td>320 A</td>
<td>380 A</td>
<td>430 A</td>
</tr>
<tr>
<td><strong>Welding current and voltage range</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MIG</td>
<td>20 A/12 V – 320 A/45 V</td>
<td>20 A/12 V – 420 A/44 V</td>
<td>20 A/12 V – 520 A/43 V</td>
</tr>
<tr>
<td><strong>Max. welding voltage</strong></td>
<td>45 V</td>
<td>45 V</td>
<td>45 V</td>
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<tr>
<td><strong>Open circuit voltage MMA</strong></td>
<td>$U_0 = 48 – 53 V$</td>
<td>$U_0 = 48 – 53 V$</td>
<td>$U_0 = 48 – 53 V$</td>
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<tr>
<td></td>
<td>$U_{av} = 50 V$</td>
<td>$U_{av} = 50 V$</td>
<td>$U_{av} = 50 V$</td>
</tr>
<tr>
<td><strong>Open circuit voltage MIG/MAG</strong></td>
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<td>$U_0 = 50 – 58 V$</td>
<td>$U_0 = 50 – 58 V$</td>
</tr>
<tr>
<td><strong>Idle power</strong></td>
<td>25 W</td>
<td>25 W</td>
<td>25 W</td>
</tr>
<tr>
<td><strong>Efficiency at max. current</strong></td>
<td>88 %</td>
<td>89 %</td>
<td>89 %</td>
</tr>
<tr>
<td><strong>Power factor at max. current</strong></td>
<td>0.80</td>
<td>0.87</td>
<td>0.90</td>
</tr>
<tr>
<td><strong>Operating temperature range</strong></td>
<td>-20 ... +40 °C</td>
<td>-20 ... +40 °C</td>
<td>-20 ... +40 °C</td>
</tr>
<tr>
<td><strong>Storage temperature range</strong></td>
<td>-40 ... +60 °C</td>
<td>-40 ... +60 °C</td>
<td>-40 ... +60 °C</td>
</tr>
<tr>
<td><strong>Degree of protection</strong></td>
<td>IP23S</td>
<td>IP23S</td>
<td>IP23S</td>
</tr>
<tr>
<td><strong>EMC class</strong></td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td><strong>Minimum short circuit power $S_{sc}$ of supply network</strong></td>
<td>-</td>
<td>5.6 MVA</td>
<td>5.8 MVA</td>
</tr>
<tr>
<td><strong>External dimensions</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>length</td>
<td>590 mm</td>
<td>590 mm</td>
<td>590 mm</td>
</tr>
<tr>
<td>width</td>
<td>230 mm</td>
<td>230 mm</td>
<td>230 mm</td>
</tr>
<tr>
<td>height</td>
<td>430 mm</td>
<td>430 mm</td>
<td>430 mm</td>
</tr>
<tr>
<td>weight</td>
<td>34 kg</td>
<td>35 kg</td>
<td>36 kg</td>
</tr>
<tr>
<td>Voltage supply for auxiliary devices</td>
<td>50 V DC</td>
<td>50 V DC</td>
<td>50 V DC</td>
</tr>
<tr>
<td>X14, X15</td>
<td>fuse 6.3 A delayed</td>
<td>fuse 6.3 A delayed</td>
<td>fuse 6.3 A delayed</td>
</tr>
<tr>
<td>Operating voltage (for cooling unit)</td>
<td>400 V -15 %...+20 %</td>
<td>400 V -15 %...+20 %</td>
<td>400 V -15 %...+20 %</td>
</tr>
</tbody>
</table>

*) See paragraph 2.2.