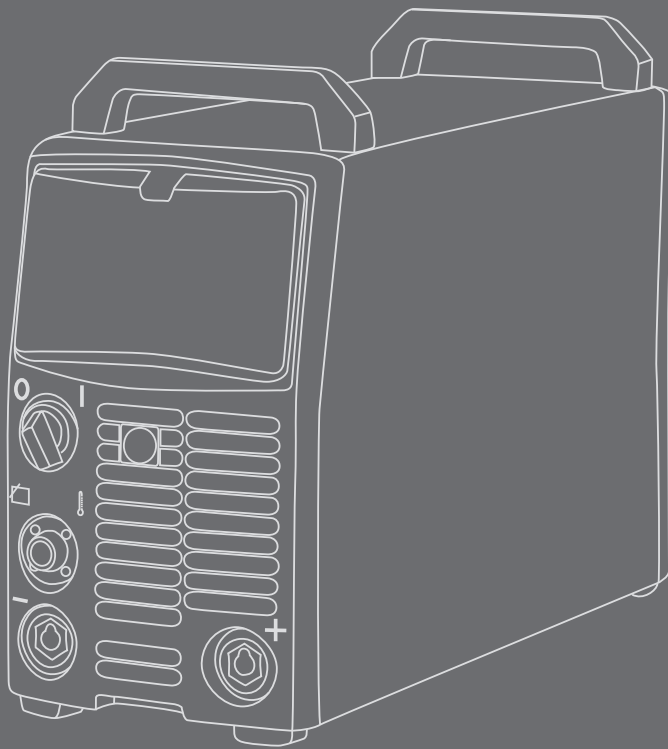


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R04

FastMig

M 320, 420, 520



OPERATING MANUAL

English

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EN

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.

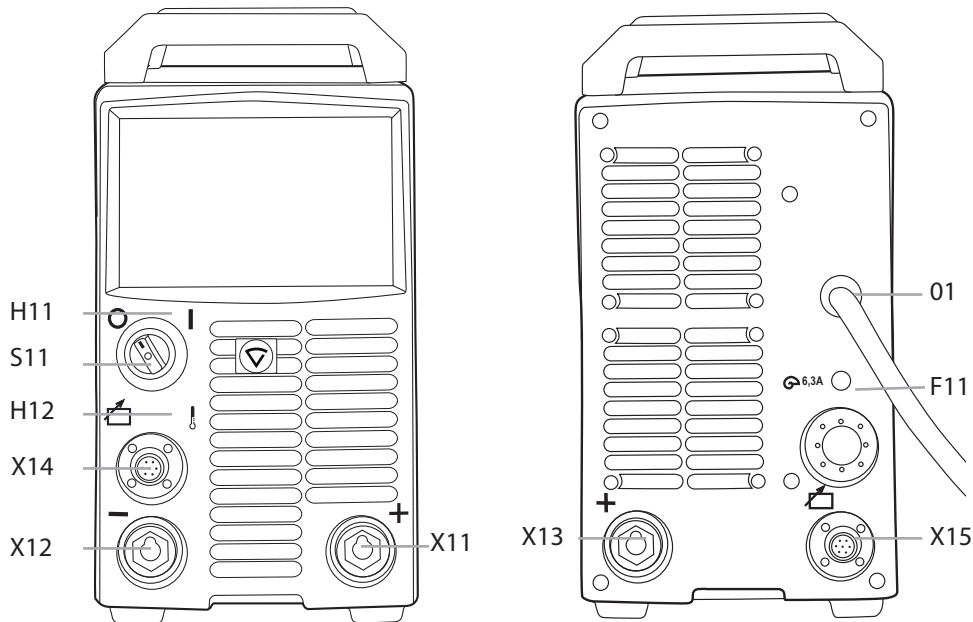
Disclaimer

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.

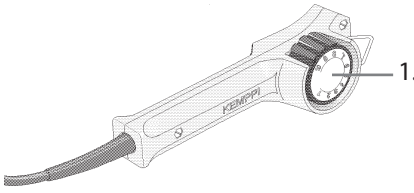
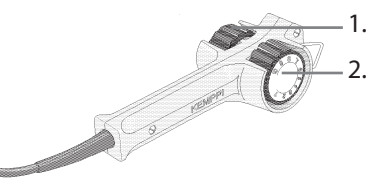
1.2.1 Operation control and connectors



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

1.3 Accessories

1.3.1 Remote control devices

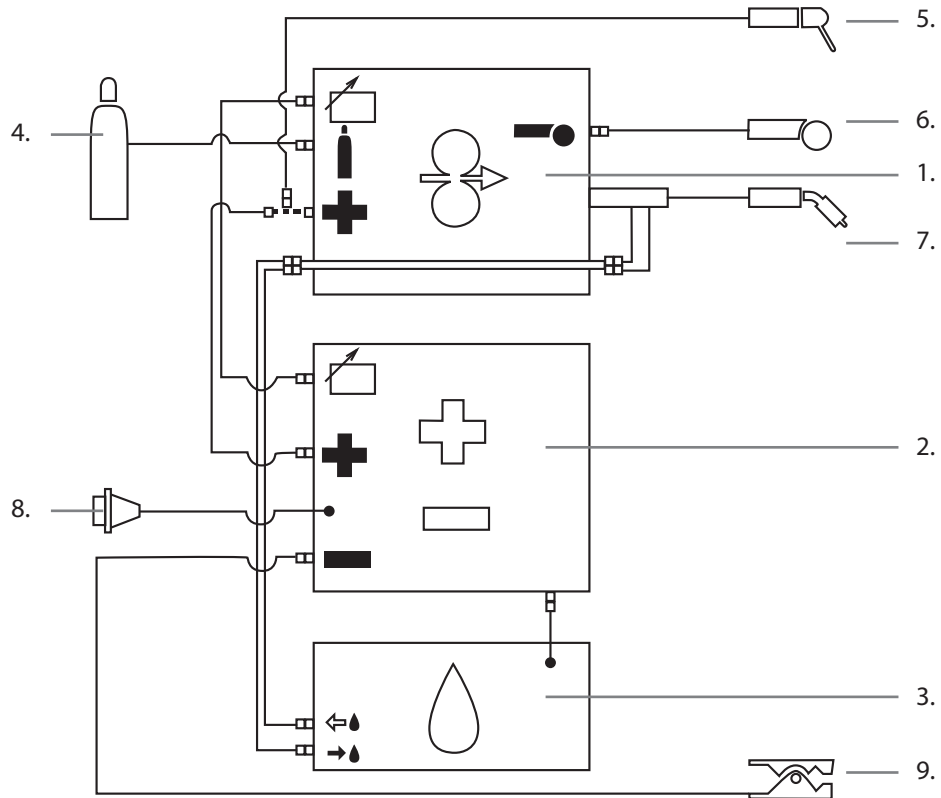
R10		1. Control of MMA welding current, reference scale 1 – 5.
R20		1. Wire feed adjustment, electrode current adjustment. 2. Voltage adjustment.

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

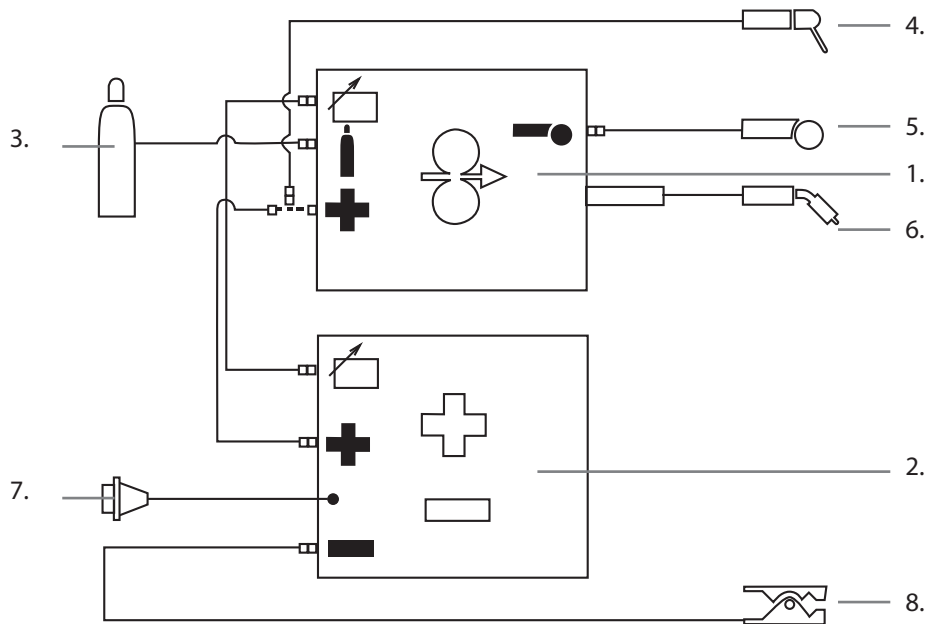
NOTE! Always check before use that the mains cable, earth return cable and its clamp, interconnection cable and shielding gas hose are in a serviceable condition. Ensure that connectors are correctly fastened. Loose connectors can impair welding performance and damage connectors.

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

Air cooled system: FastMig power source + MXF



1. MXF wire feed unit
2. FastMig power source
3. Gas supply
4. MMA electrode holder
5. Remote control device
6. Air cooled welding Gun
7. Power cable
8. 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.

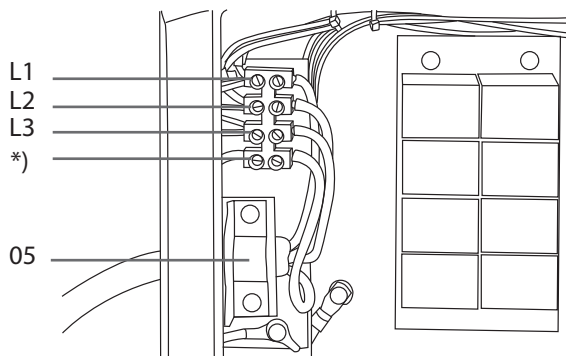
NOTE! If local country-based regulations state an alternative power cable is required, the mains cable must be replaced in conformity with the regulations. Connection and installation of the mains cable and plug should only be carried out by a suitably qualified person.

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 mm ²
FastMig M 420	70 – 90 mm ²
FastMig M 520	70 – 90 mm ²

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.

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

FastMig M 320		6132320
FastMig M 420		6132420
FastMig M 520		6132520
Wire feeders		
MXF 65 EL	To be used with MS panels	6152100EL
MXF 67 EL	To be used with MS panels	6152200EL
MXF 63 EL	To be used with MS panels	6152300EL
MXF 65	To be used with MR panels	6152100
MXF 67	To be used with MR panels	6152200
MXF 63	To be used with MR panels	6152300
Panels for wire feeders		
FastMig MR 200		6136100
FastMig MR 300		6136200
FastMig MS 200		6136300
FastMig MS 300		6136400
Accessories		
Earth return cable	5 m, 50 mm ²	6184511
Earth return 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
AS KIT		6264263
Remote controlled interconnecting cable	10 m	6185481
Cooling unit FastCool 10		6068100
Transport unit PM 500		6185291
Gun holder GH 30		6256030

9. TECHNICAL DATA

	FastMig M 320	FastMig M 420	FastMig M 520
Connection voltage			
3~, 50/60 Hz	400 V -15 %...+20 %	400 V -15 %...+20 %	400 V -15 %...+20 %
Rated power			
60 % ED	-	20 kVA	27 kVA
100 % ED	15 kVA	18 kVA	20 kVA
Connection cable	H07RN-F 4G6 (5 m)	H07RN-F 4G6 (5 m)	H07RN-F 4G6 (5 m)
Fuse (delayed)	25 A	35 A	35 A
Output 40 °C			
60 % ED	-	420 A	520 A
100 % ED	320 A	380 A	430 A
Welding current and voltage range			
MMA	15 A/20 V – 320 A/45 V	15 A/20 V – 420 A/44 V	15 A/20 V – 520 A/43 V
MIG	20 A/12 V – 320 A/45 V	20 A/12 V – 420 A/44 V	20 A/12 V – 520 A/43 V
Max. welding voltage	45 V	45 V	45 V
Open circuit voltage MMA	U ₀ = 48 – 53 V U _{av} = 50 V	U ₀ = 48 – 53 V U _{av} = 50 V	U ₀ = 48 – 53 V U _{av} = 50 V
Open circuit voltage MIG/MAG	U ₀ = 50 – 58 V	U ₀ = 50 – 58 V	U ₀ = 50 – 58 V
Idle power	25 W	25 W	25 W
Efficiency at max. current	88 %	89 %	89 %
Power factor at max. current	0.80	0.87	0.90
Operating temperature range	-20 ... +40 °C	-20 ... +40 °C	-20 ... +40 °C
Storage temperature range	-40 ... +60 °C	-40 ... +60 °C	-40 ... +60 °C
Degree of protection	IP23S	IP23S	IP23S
EMC class	A	A	A
Minimum short circuit power S _{sc} of supply network*	-	5.6 MVA	5.8 MVA
External dimensions			
length	590 mm	590 mm	590 mm
width	230 mm	230 mm	230 mm
height	430 mm	430 mm	430 mm
weight	34 kg	35 kg	36 kg
Voltage supply for auxiliary devices	50 V DC	50 V DC	50 V DC
X14, X15	fuse 6.3 A delayed	fuse 6.3 A delayed	fuse 6.3 A delayed
Operating voltage (for cooling unit)	400 V -15 %...+20 %	400 V -15 %...+20 %	400 V -15 %...+20 %

*) See paragraph 2.2.

