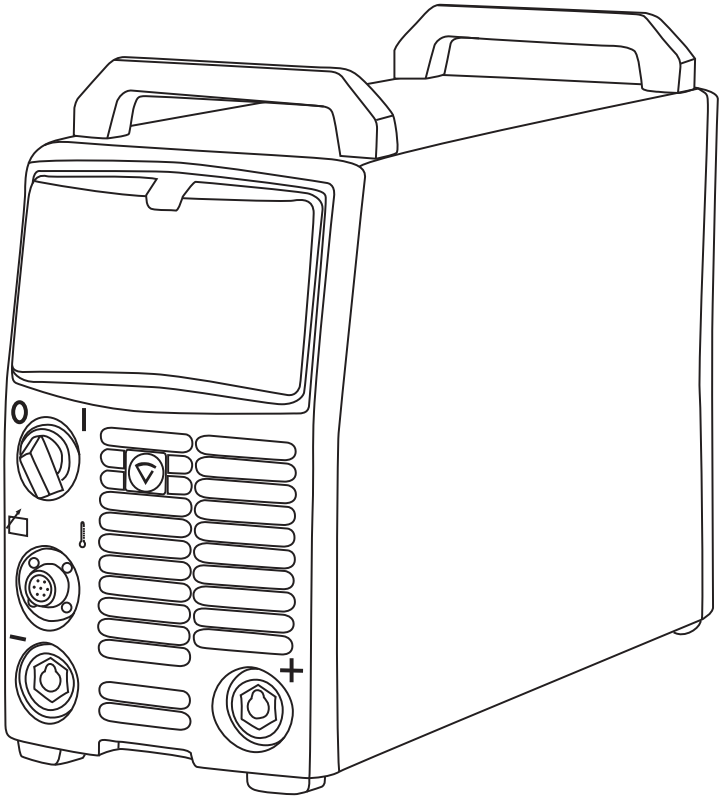
FastMig

KMS 400 AS



Operating manual EN

KEMPPI
The Joy of Welding

OPERATING MANUAL

English

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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 About FastMig KMS AS product

FastMig KMS 400 AS is CC (constant current) / CV (constant voltage) power source designed for demanding professional use. It is suitable for MMA and MIG welding in DC.

FastMig KMS 400 AS is compatible with MSF, MXF and ArcFeed wire feeders.

2. INSTALLATION

2.1 Before use

The product is packed in specially designed transport cartons. However, before use always make sure the products have not been damaged during transportation.

Check also that you have received the components you ordered and the instruction manuals needed, as described in the Quick start guide pack. Product packaging material is recyclable.

NOTE! *When moving the welding machine, always lift it from the handle, never pull it from the welding gun or other cables.*

Operating environment

This machine is suitable for both indoor and outdoor use. Always make sure that the air flow to the machine is unrestricted. The recommended operating temperature range is –20…+40°C.

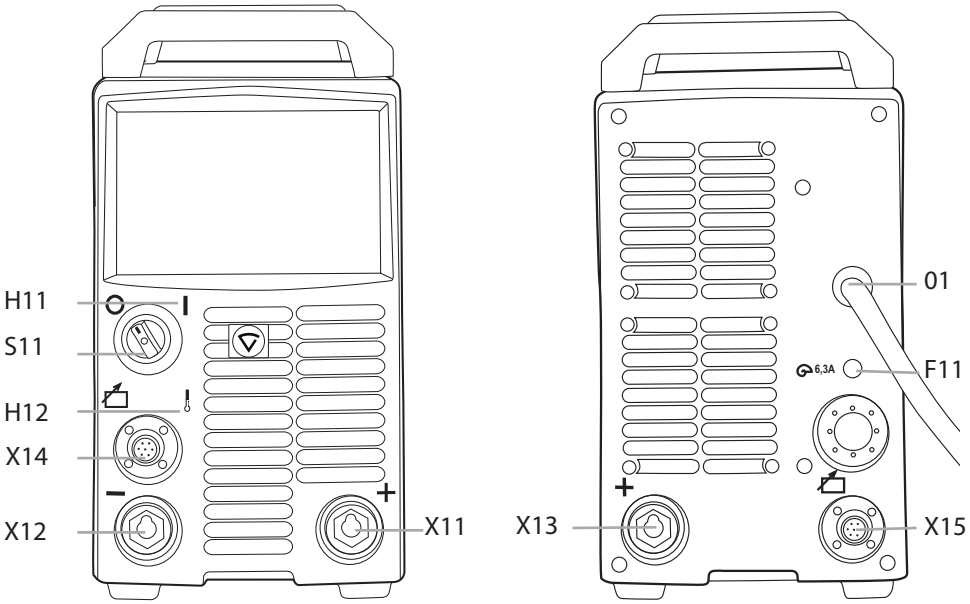
Please ensure you read the safety instructions concerning operating environments supplied in this manual.

Distribution network

All regular electrical devices without special circuits generates harmonic currents into the distribution network. High rates of harmonic current may cause losses and disturbance to some equipments.

This equipment complies with IEC 61000-3-12 provided that the short-circuit power S_{SC} is greater than or equal to 4.7 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 4.7 MVA.

2.2 Machine introduction



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			

2.3 Positioning and location 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 machines 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.*

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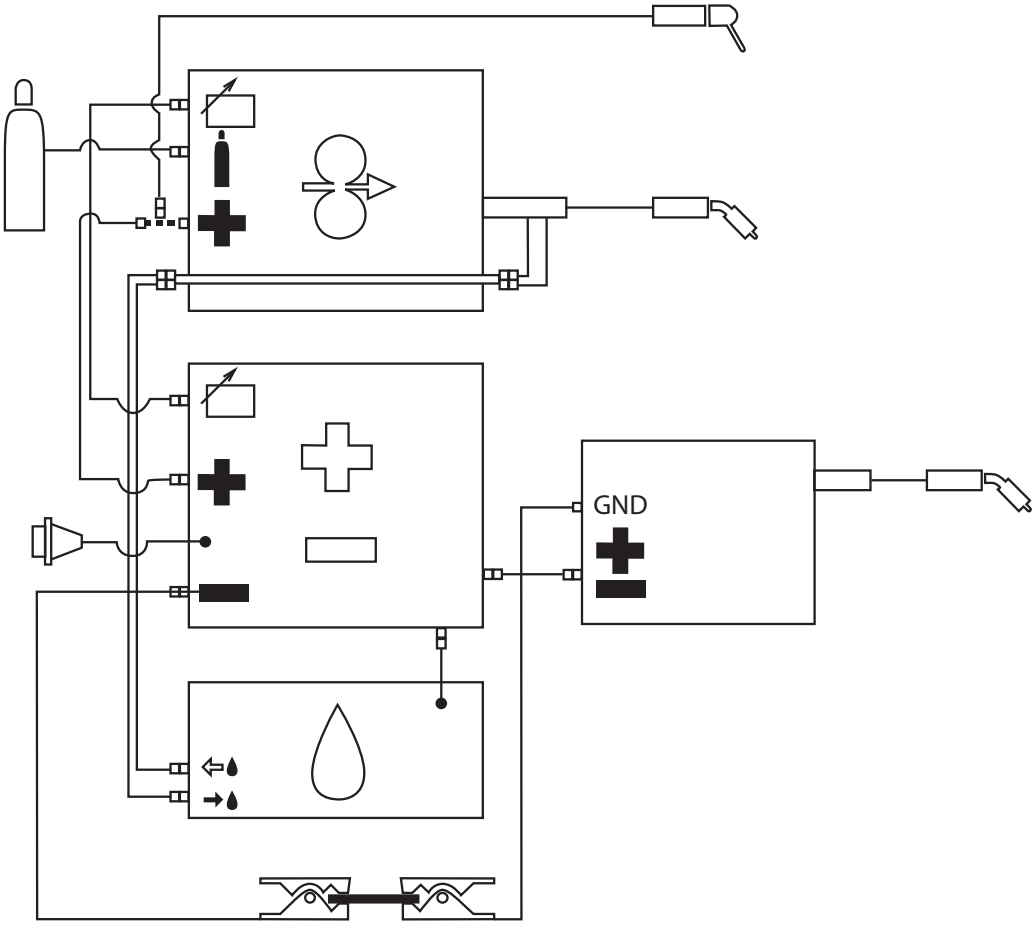
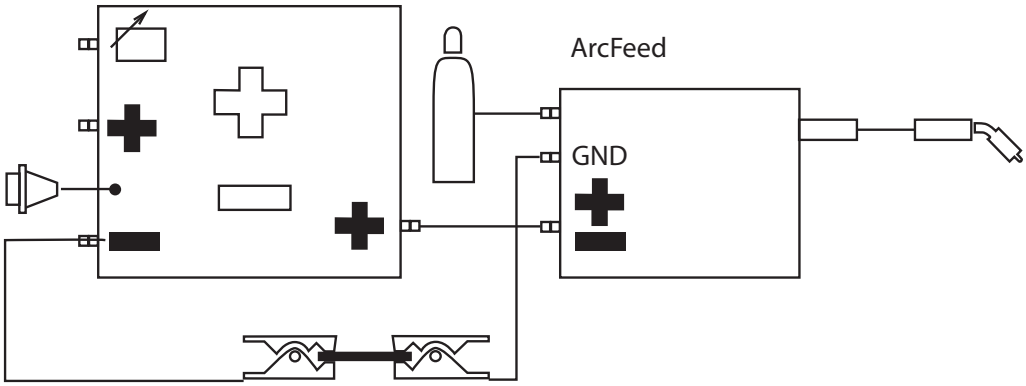
2.4 Connecting cables

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

2.4.1 Liquid cooled system: FastMig KMS AS + MSF/MXF + FastCool 10 + ArcFeed



2.4.2 FastMig KMS AS + ArcFeed



2.5 Connection to the mains supply

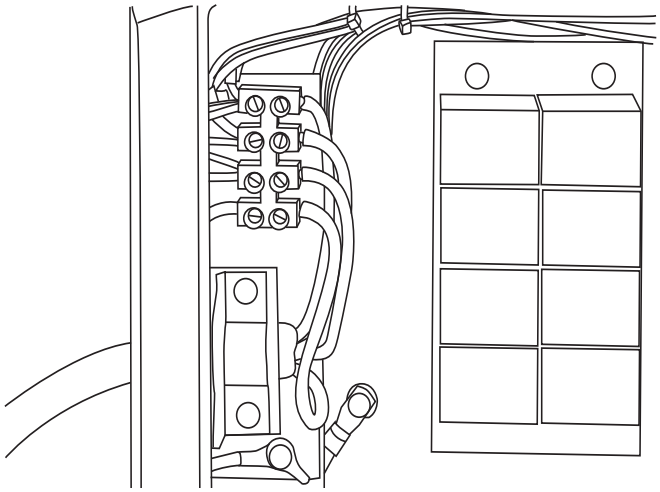
FastMig power sources are delivered as standard with 5 meters of mains power cable. No mains plug is fitted at the Kemppi factory.

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 Pulse 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. 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 ⏚. If you are using 5-lead cable, do not connect the neutral conductor.



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 *) mm²
KMS 300	400 V 3~	360 V – 440 V	20 A	4 x 6.0 S
KMS 400	400 V 3~	360 V – 440 V	25 A	4 x 6.0 S
KMS 500	400 V 3~	360 V – 440 V	35 A	4 x 6.0 S

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

2.6 Welding and earth cables

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

FastMig KMS 400 AS 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.

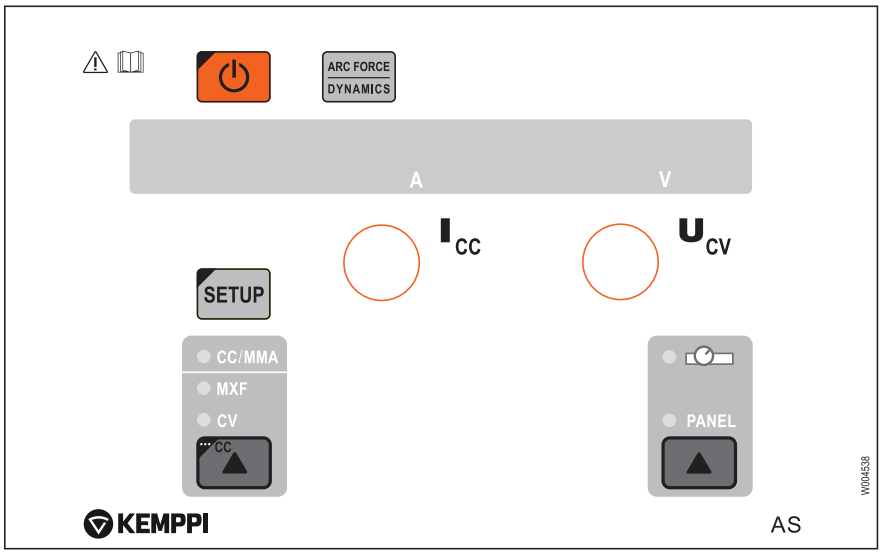
Cable	Duty cycle ED			Voltage loss / 10 m
	100 %	60 %	30 %	
50 mm²	285 A	370 A	520 A	0,35 V / 100 A
70 mm²	355 A	460 A	650 A	0,25 V / 100 A
95 mm²	430 A	560 A	790 A	0,18 V / 100 A

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.

2.7 Functions of AS panel



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	ON/OFF button
ARC FORCE DYNAMICS	MIG dynamics / MMA Arc Force adjustment • When CV is selected, parameter name 'dYn' and the adjustable value between -9 ... 9 are shown • When CC/MMA is selected, parameter name 'Arc' and the adjustable value between -9 ... 9 are shown • In MXF mode the dynamics cannot be adjusted with the AS panel and '--- ---' is shown. In this case the adjustment is done through the wire feeder panel
CC/MMA MXF CV CC	CC/MMA = Constant current mode. Selection with a long press. Selected when operated with ArcFeed with CC-mode or MMA welding MXF mode = Use with MSF or MXF feeders CV mode = Constant Voltage. Selected when operating with ArcFeed CV-mode
PANEL	Remote selection • In CC/MMA mode the current can be adjusted with the remote • In CV mode the voltage can be adjusted with the remote

MIG/MAG welding

FastMig KMS AS is designed for MIG/MAG welding with either the Kemppi ArcFeed voltage sensing wire feed unit, or FastMig series MSF and MXF wire feeding units. When using MSF or MXF wire feed units, connect the unit as described in picture on page 6, and select the MXF mode from the AS panel. For further information see MSF or MXF manuals.

When you use the ArcFeed voltage sensing wire feed unit, you must select either CC or CV (Constant Current or Constant Voltage) mode from the AS control panel. Ensure that the ArcFeed control panel has been set to correspond with the power source control panel. For example if power source is set to CC mode, the ArcFeed should also be set to CC mode. In CV mode FastMig AS has two welding programs for ArcFeed welding: one for self shielding filler wires and the other for standard cored and solid filler wires. The welding program can be changed in SETUP function.

It is possible to connect MSF or MXF and ArcFeed feeders to FastMig KMS AS power source simultaneously. For example, this can be an efficient combination when using Kemppi

WiseRoot process for root pass welding and then completing hot pass and filler runs with ArcFeed system using self-shielded filler wire.

MMA welding

FastMig KMS AS is also suitable for MMA welding with basic or rutile electrodes. MMA welding works with CC (Constant current) mode set from the AS power source panel.

NOTE! *In CC/MMA mode FastMig KMS AS has two welding programs: one for ArcFeed CC welding and the other for MMA welding. The desired welding program can be chosen from the KMS AS 'SETUP' function.*

TIG welding

By connecting MasterTig LT 250 to FastMig M with AS panel, TIG welding can be done. You must select either CC or CV (Constant Current or Constant Voltage) mode from the AS control panel.

2.8 Setup functions

With a long press of the SETUP button you can move to the Setup menu

Start Power	StA	-9 ... +9	0	Strength of start pulse
Device address	Add	3 or 6	6	System bus address. Each device in same system must have different address.
Welding program CC/MMA	Pro	Stl, FEE		Stl is for MMA welding FEE is for ArcFeed
Welding program CV	Pro	Std, InS		InS is for innershield wires Std for other wires
Restore factory settings	FAC	OFF, PAn, ALL	OFF	Restores factory settings, when PAn or ALL is selected
Remote control	rc	OFF, on	OFF	Manual control / remote control unit selection

3. OPERATION CONTROL SWITCHES AND POTENTIOMETERS

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 KMS 400 AS power source there is 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. BASIC TROUBLESHOOTING

NOTE! *The problems listed and the possible causes are not definitive, but serve to suggest some standard and typical situations that may present during normal environmental use when using the MIG/MAG process with FastMig.*

Problem	Check the following
Machine won't work?	• Check mains plug is connected • Check mains power distribution is switched on • Check the mains fuse and or circuit breaker • Check power source 0/I switch is ON • Check interconnection cable set and connectors between the power source and wire feed unit are correctly fastened. See the manual schematic • Check earth return lead is connected • Check function panels are switched on – Orange buttons top left, long press.
Dirty, poor quality weld?	• Check shielding gas supply • Check and set gas flow rate • Check gas type for application • Check gun/electrode polarity. Example: Fe solid filler wire: Earth return should be connected to the – pole, wire feed unit to the + pole connector • Check correct welding curve selected • Check correct Channel (job) number selected on PF65 function panel • Check power supply – Phase down?
Variable welding performance?	• Check wire feed mechanism is correctly adjusted • Check correct drive rolls are fitted • Check wire spool overrun tension is correctly adjusted • Check gun liner is not blocked. Replace if necessary • Check correct gun liner is fitted for the filler wire size and type • Check contact tip for size, type and wear • Check gun is not over heating in application • Check cable connections and earth return clamp • Check welding parameter settings.
Filler wire won't feed?	• Check wire feed mechanism. Pressure arms are closed? Close and adjust • Check welding gun switch function. • Check euro gun collar is correctly fastened to euro block • Check gun liner is not blocked • Check contact tip, size, type, wear • Check and try alternative gun.
High spatter volume?	• Check welding parameter values • Check inductance/Dynamics values • •Check cable compensation value if long cables are fitted • Check gas type and flow • Check welding polarity – cable connections • Check filler material selection • Check correct welding curve selected • Check correct Channel (job) number selection • Check filler wire delivery system • Check power supply – 3 x phase present?

NOTE! *Many of these checks may be carried out by the operator. However certain checks relating to mains power must be completed by an authorised trained electrician.*

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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.

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 approx.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 shop 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.

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.

6.1 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.

6.2 Control fuses

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

NOTE! *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.*

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6.3 Under- and overvoltages 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 (see technical data). Ensure that voltage is kept within this admissible 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.

6.4 Loss of a phase in the mains supply

Loss of a main 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 connection cable on 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 KMS 400 AS		6054001
Wire feeders		
ArcFeed 200		6120200
ArcFeed 300		6120300
ArcFeed 300P		6120310
MXF 65		6152100EL
MXF 67		6152200EL
MXF 63		6152300EL
MXF 65		6152100
MXF 67		6152200
MXF 63		6152300
Panels for MSF and MXF feeders		
SF 51		6085100
SF 52W		6085200W
SF 53W		6085300W
SF 54		6085400
Accessories		
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
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 KMS 400 AS	
Connection voltage	
3~, 50/60 Hz	400 V -15 %...+20 %
Rated power	
60 ED	-
80 % ED	19.5 kVA
100 % ED	18.5 kVA
Connection cable/fuse delayed	
H07RN-F	4G6 (5 m)
Fuse (delayed)	35 A
Load capacity 40 °C	
60 % ED	-
80 % ED	400 A
100 % ED	380 A
Welding current and voltage range	
MMA	10 A ... 400 A
MIG	10 V ... 39 V
Max. welding voltage	46 V
Open circuit voltage	50 V
Open circuit power	25 W
Efficiency at max. current	87 %
Power factor at max. current	0.9
Operating temperature range	-20 ... +40 °C
Storage temperature range	-40 ... +60 °C
Degree of protection	IP23S
EMC class	A
Minimun short circuit power S_{SC} of supply network*	4.7 MVA
External dimensions (LxWxH)	590x230x430 mm
Weight	35 kg
Voltage supply for auxiliary devices	50 V DC
X14, X15	fuse 6.3 A delayed
Voltage supply for cooling unit	1~ 400 V AC and 24 V DC

* See paragraph 3.1.

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