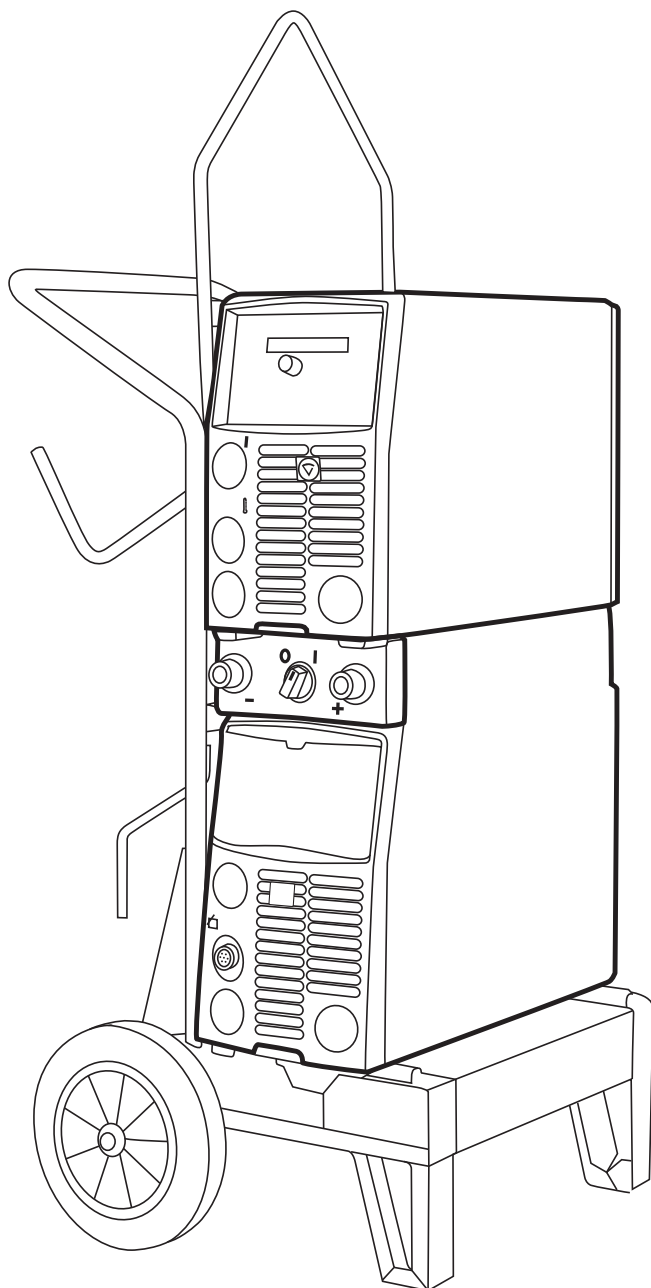




# KempGouge

ARC 800



Operating manual • English *EN*

Käyttöohje • Suomi *FI*

Bruksanvisning • Svenska *SV*

Bruksanvisning • Norsk *NO*

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Инструкции по эксплуатации • По-русски *RU*



# **OPERATING MANUAL**

**English**

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## 1. PREFACE

### 1.1 GENERAL

Congratulations on your choice of KempGouge™ ARC 800 carbon arc gouging solution. Used correctly, Kemppe 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 Kemppe 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 Kemppe products, contact Kemppe Oy, consult an authorised Kemppe dealer, or visit the Kemppe web site at [www.kemppe.com](http://www.kemppe.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. Kemppe 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 Kemppe.

### 1.2 GENERAL ABOUT CARBON-ARC GOUGING

Carbon-arc gouging refers to a method where metal is removed by melting it with a welding arc and blowing the melted metal away with compressed air.

Carbon-arc gouging can be used with the majority of metals, such as steel, stainless steel, cast iron, nickel, copper, magnesium and aluminium.

The equipment used in carbon-arc gouging comprises the gouging power source, a carbon holder and its cables, and the gouging carbon, which can be round or flat. Also a sufficient compressed air supply must be available.

#### **A round gouging carbon can be used in:**

- opening a root weld
- opening faulty welds and cracks
- manufacturing welding grooves
- cutting metal
- making holes

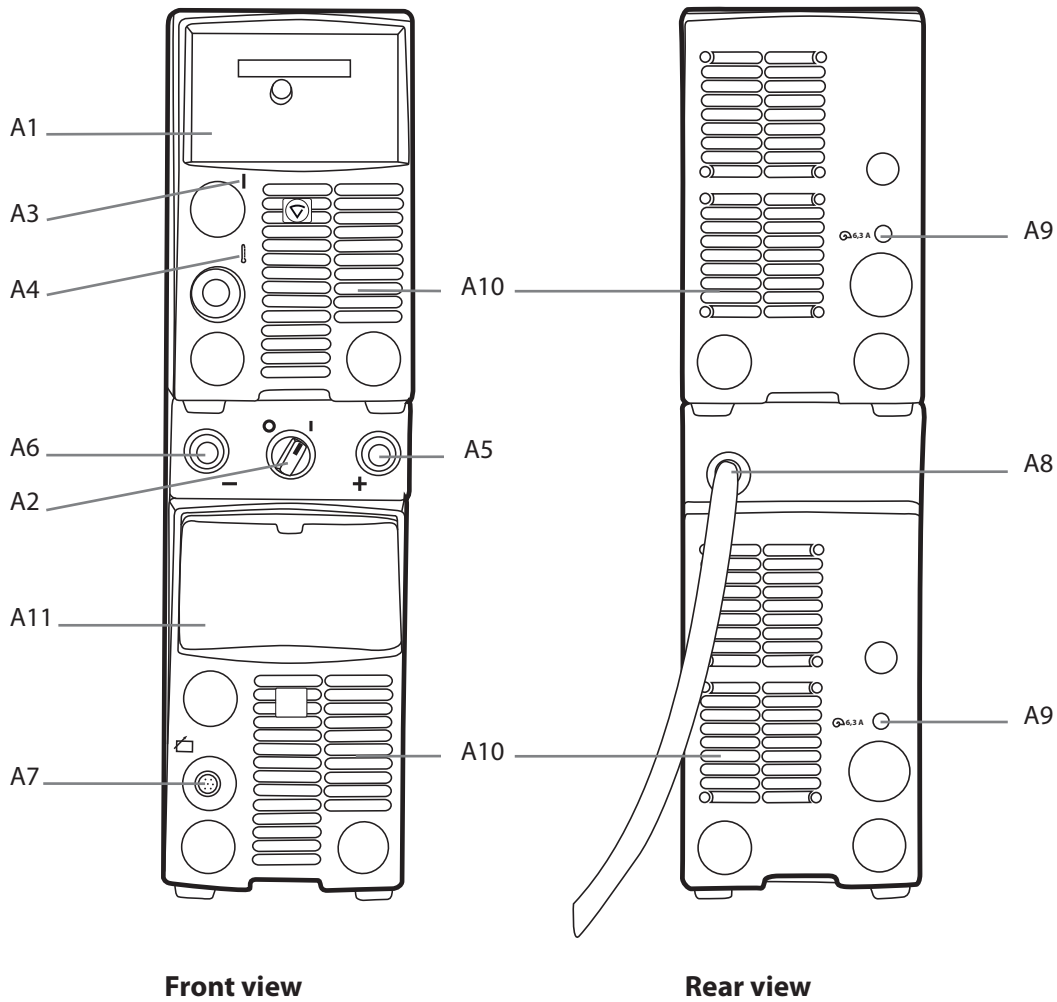
#### **A flat carbon can be used in:**

- arc grading of surface errors in roller slabs
- cleaning steel casts
- opening faulty casts
- arc grading of weld caps

### 1.3 INTRODUCTION

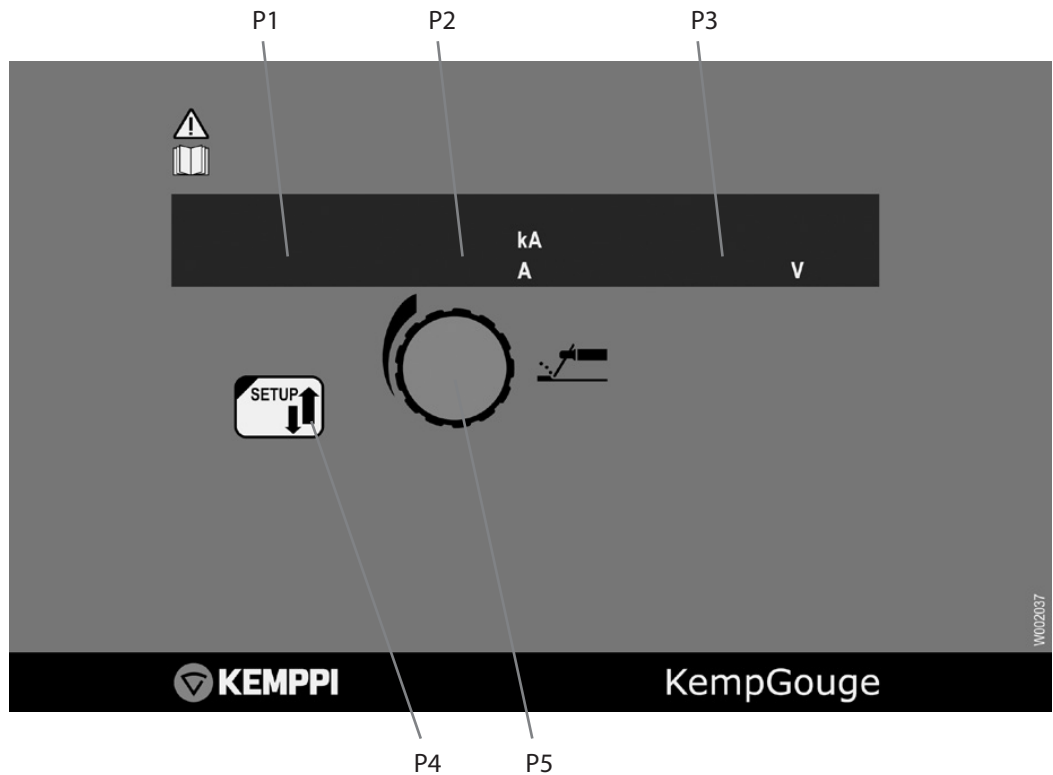
KempGouge™ ARC 800 is a solution for all arc gouging needs. An 800-A power source with a control panel is included in the package. The gouging carbon and carbon holder must be acquired separately.

#### 1.3.1 Power source



- A1 Control panel
- A2 Main switch
- A3 Signal light (I/O)
- A4 Thermal warning light
- A5 Gouging cable connection
- A6 Earth connection
- A7 Remote control and service connection
- A8 Connection cable input
- A9 Fuse for control cable connection (6.3 A slow)
- A10 Fan grill
- A11 Accessory box

### 1.3.2 Control panel



- P1 Left display (gouging current or name of adjustable parameter)
- P2 Indicator lights for the current area
- P3 Right display (gouging voltage or value of adjustable parameter)
- P4 Setup button
- P5 Control knob (gouging current adjustment, factory reset)

## 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 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.*

## 2.2 CONNECTION TO MAINS

The KempGouge™ ARC 800 gouging power source is connected to a 400-V three-phase network. The machine is delivered without a connection cable. The cable can be ordered separately in length of 5 or 10 metres (see Ordering numbers).

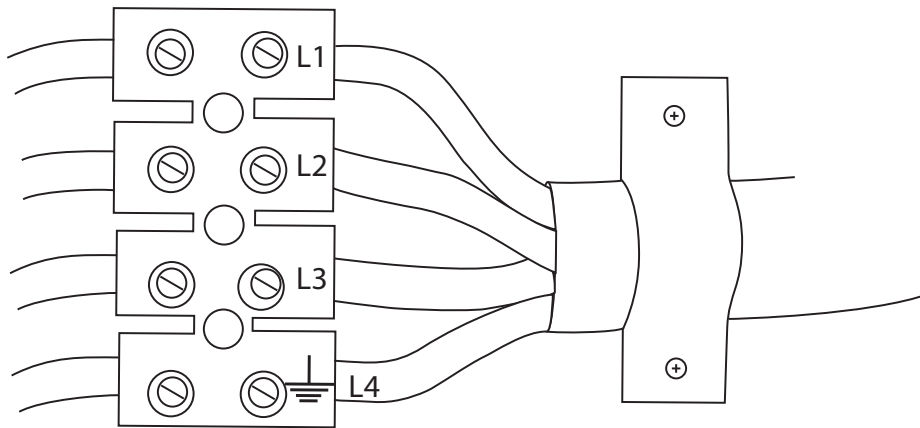
Before use, check the connection cable and install a mains plug. If the cable does not comply with the local electrical regulations, replace it with a compliant cable. For more information, see the section Technical specifications.

**NOTE!** The connection cable or plug may be installed or replaced by only an electrical contractor or installer authorised to perform such operations.

### Connecting the connection cable

1. Remove the right side plate. Be careful when you unscrew the mounting screws of the plastic edge, cause retaining nuts come out easily.
2. Pass the cable to the machine through the inlet ring at the rear of the machine, and secure the cable with a cable clamp. Remember to use isolation between the cable and the cable clamp.
3. Connect the leads to the connectors as seen in the picture.
4. Fasten the side plate.

**NOTE!** Do not connect the zero lead if you are using a five-lead cable.



- |    |              |
|----|--------------|
| L1 | red          |
| L2 | black        |
| L3 | grey         |
| L4 | yellow-green |

## 2.3 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. This equipment complies with IEC 61000-3-12 provided that the short-circuit power  $S_{sc}$  is greater than or equal to 7.6 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 7.6 MVA.



## 2.4 GOUGING AND EARTHING CABLES

### 2.4.1 Connecting the gouging cable

The gouging cable is connected to the power source with a 120 mm<sup>2</sup> DIX connector. The cable is connected either to the positive (+) or negative (-) connector of the power source, depending on the metal that is to be worked. The power source has one negative connector and two positive connectors. For information on the connector locations, see Introduction.

Connect the gouging cable as follows:

Work metal	Gouging cable connection
Steel	Positive (+)
Cast iron Non-iron metal	Negative (-)

The gouging cable is rubber-insulated copper cable. The table below shows the typical load capacities of the cables when the ambient temperature is 25 °C and the lead temperature is 85 °C.

Cable	Duty cycle (ED)				Voltage loss / 10 m
	100 %	60 %	35 %	20 %	
50 mm <sup>2</sup>	285 A	316 A	371 A	458 A	0.35 V / 100 A
70 mm <sup>2</sup>	355 A	403 A	482 A	602 A	0.25 V / 100 A
95 mm <sup>2</sup>	430 A	498 A	606 A	765 A	0.21 V / 100 A
120 mm <sup>2</sup>	500 A	587 A	721 A	917 A	0.18 V / 100 A

*NOTE! Do not overload the gouging cables, as an overload may cause voltage loss and overheating.*

### 2.4.2 Connecting the earthing cable

The earthing cable is connected to the negative or positive connector in the power source, depending on the connector used for the gouging cable (see Connecting the gouging cable). The recommended cross-sections of the cable are listed in the table above.

Connect the earthing clamp directly to the work piece in such a way as to maximise the contact surface of the clamp. The point of connection must be unpainted and free of corrosion.

## 3. USE

### 3.1 BEFORE YOU START

Before you start carbon-arc gouging, do the following:

- Select a gouging carbon suitable for the work piece and attach it to the carbon holder.
- Connect the gouging cable to the positive or negative connector depending on the type of metal to be worked. For more information, see Connecting the gouging cable.
- Adjust the gouging current to a suitable level. By default, the machine uses the adjustment of the last time the machine was used. For more information on the gouging current, see the table below.
- Start the power source and start gouging. For more information on the proper way of performing carbon-arc gouging, see Gouging techniques.

The currents recommended for various gouging carbons.

Round carbon size	5/32"	3/12"	1/4"	5/16"	3/8"	1/2"
	4.0 mm	5.0 mm	6.35 mm	8.0 mm	10.0 mm	13.0 mm
Current (A)	80 – 150	110 – 200	170 – 330	230 – 450	300 – 550	460 – 900
Voltage (V)	38 – 41	39 – 42	43 – 46	44 – 48	46 – 50	46 – 50

## 3.2 HOW TO USE THE REMOTE CONTROL

1. Connect the R10 remote control unit to the service connection A7. Power source detects the new device automatically, and the reference value of the remote control unit appears on the display.
2. Set the desired gouging current with the remote control adjusting knob.
3. To stop using the remote control, disconnect it from the power source. The display starts to show the gouging current that was used before connecting the remote control unit, and the current control returns to the control panel.

## 3.3 STARTING OF THE POWER SOURCE

Start the power source by turning the main switch A2 on the front panel to the I position. The standby indicator A3 turns on.

The cooling fan is started for a moment when the main switch is turned to the 'I' position. The fan turns off after a while and then restarts during gouging when the machine has warmed up sufficiently. The fan continues running up to 10 minutes after gouging, depending on the temperature of the machine.

*NOTE! Always turn the device on and off using the main switch, not via the mains socket.*

### 3.3.1 Automatic function test

During the power source start-up, the machine automatically performs a function test. The test covers the following functions:

- Software version check. The left-hand side display shows the program version of the control panel for one second. The display on the right displays the power source program version.
- Indicator light and button functionality. All indicator lights and display segment LEDs blink.
- System functions. If the system encounters a fault, a fault code is shown on the display.
- Implementation of factory settings or preset settings.

If the function test is successful, the machine is ready for use and the current and voltage values are shown in the control panel.

If a fault has been detected in the function test, the display flashes the error code and the yellow indicator light in the front panel of the power source blinks. For instructions, see Troubleshooting.

### 3.3.2 Front panel indicators

The following indicators can be found on the front panel of the device:

- When the green indicator A3 is on, the power source is in standby mode. This indicator is on when the machine is connected to the mains supply with the main switch in the 'I' position.
- When the yellow overheating indicator A4 is on, the machine has overheated. When the indicator turns off, the machine can be used again.
- When indicator A4 blinks, the machine has encountered a failure. For instructions, see Troubleshooting.

## 3.4 CONTROL PANEL FUNCTIONS

The control panel allows the user to control and monitor the operation of the machine. The buttons and the control knob are used to adjust the current used in gouging and other machine parameters. The current and voltage values are shown on the control panel displays while working.

### 3.4.1 Adjusting the gouging current

The required gouging current is set with the control knob in the control panel. The accuracy of adjustment is 10 A, which means that turning the control knob one notch increases or decreases the current by 10 amperes.

If you turn the control knob quickly, you can quickly adjust the gouging current in increments of 100 A for each notch.

The adjustment value of the gouging current is shown on the display when you turn the control knob. The adjustment value is shown at the accuracy of 1 A. The indicator light A is shown on the display. The values you use are stored in the control panel memory and will be used when you start the machine again.

### 3.4.2 Actual gouging current and voltage display

While gouging, the control panel display shows the actual current and voltage values. The gouging current is shown in amperes at the accuracy of 1 A, while the voltage is shown in volts at the accuracy of 0.1 V.

### 3.4.3 Restoring factory settings

The control panel of the gouging power source has only one setting that the user can modify: restore factory settings. This allows the user to restore the original welding current value and clear the memory.

To restore the factory settings, do this:

1. Keep the Setup button in the control panel pressed for at least 5 seconds. The display will read Set Up.
2. Release the Setup button. The display will read FAC OFF.
3. Turn the control knob until the display reads FAC ALL.
4. Briefly press the Setup button in the control panel to perform factory reset.

## 3.5 TECHNIQUES FOR CARBON-ARC GOUGING

In practical carbon-arc gouging, note the following:

- Before you start working, make sure that the equipment is ready to use and that the gouging current and the carbon have been selected according to the work piece.
- The pressure of the compressed air required in carbon-arc gouging is 500 – 700 kPa (5 – 7 bar).
- Attach the gouging carbon (maximum size  $\varnothing$  13 mm) to the holder in such a way that the free length of the carbon is 100 – 150 mm.
- Open the compressed air valve and take the tip of the carbon to the work piece.
- Ignite the arc by scratching the work piece with the gouging carbon.
- Move the gouging carbon in such a position that the compressed air flow hits the molten material between the gouging carbon and the groove created.
- A suitable angle for gouging carbon is 20° – 45°. If the angle is greater, compressed air cannot blow the molten metal away.
- Note that a gouged surface is not immediately ready for welding. Before welding, the surface must be cleaned by grinding, for example.

*NOTE! You must not exceed the maximum current specified for a gouging carbon as it will accelerate carbon wear. The gouging current is too high if the copper coating melts faster than the gouging carbon.*

## 4. TROUBLESHOOTING

In the event of a failure of the machine, contact an authorised KempPi service agent. Before taking your unit for servicing, check the list below.

### 4.1 OVERLOAD (YELLOW INDICATOR LIT)

Two simultaneously operating fans cool both power sources of the machine. The machine may, however, overheat if continuously loaded above the rated values or if the circulation of cooling air is prevented.

The yellow indicator A4 is lit in the event of overheating. You then must stop gouging and let the machine cool down. The indicator light turns off when gouging can be resumed.

## 4.2 CONTROL CABLE CONNECTOR FUSE

The rear wall of the power source contains fuse A9, which protects the control cable connector A7. Using an incorrect fuse may cause damage to the power source. It is important that you always use the right kind of fuse. The type and size of the fuse are indicated next to the fuse socket.

## 4.3 CABLE NETWORK WITH OVER VOLTAGE OR UNDER VOLTAGE

If the power source is used in an electric network with insufficient voltage (less than 300 V), the control features of the device are automatically disabled.

The primary circuits of the power source are protected against power spikes. The product's mains voltage range is broad enough to prevent over-voltage problems at up to 440 V (see Technical specifications). Make sure that the voltage remains within the allowed range, especially if the operating power is supplied by a generator set.

## 4.4 MISSING PHASE IN THE ELECTRIC NETWORK

If a phase is missing from the mains current, the gouging features will be adversely affected or the machine may have problems starting. Loss of a phase can be caused by a:

- Blown mains fuse.
- Damaged connection cable.
- Poor connection cable connection in the machine's terminal block or mains socket.

## 4.5 MACHINE ERROR CODES

The machine always checks its operation automatically during start-up and reports any failures detected. If failures are detected during start-up, they are shown as error codes on the control panel display.

### **Err3: Power source overvoltage**

Gouging has been interrupted because dangerously high temporary voltage surges or a continuous over-voltage has been detected in the electric network. Check the fuse size and the quality of the supply network.

### **Err4: Power source overheating**

The power source has overheated. The cause may be one of the following:

1. The power source has been used for a long time at maximum power.
2. The circulation of cooling air to the power source is blocked.
3. The cooling system has experienced a failure.

Remove any obstacle to air circulation, and wait until the power source fan has cooled down the machine.

### **Err23: Power source overvoltage warning**

The power source has detected voltage spikes in the electric network. Short power spikes can be managed. They do not lead to interruptions in gouging but may decrease the quality of the work. Check the quality of the supply network.

### **Other error codes:**

The machine can show codes not listed here. In the event of an unlisted code appearing, contact an authorised KempPi service agent and report the error code shown.

## 5. SERVICE

The utilisation level of the power source and its working environment should be taken into consideration in planning the frequency of maintenance of the machine. Appropriate use and preventive maintenance guarantee the trouble-free use of the equipment. This allows you to avoid interruptions in use and increases the productivity of the machine.

### 5.1 CABLES

Check the condition of gouging and connection cables daily. Do not use damaged cables. Also make sure that all extension cables used in the mains connection are in proper condition and compliant with regulations.

*NOTE! The connection cables may be repaired and installed only by electrical contractors and installers authorised to perform such operations.*

### 5.2 POWER SOURCE

Before cleaning the interior of the machine, you need to remove the case by unscrewing the mounting screws at the top and sides of the machine.

*NOTE! To prevent damage, wait approximately two minutes after disconnecting the connection cable before removing the machine's case.*

Perform the following cleaning and maintenance at least every six months:

1. Clean the interior of the machine and the fan grill's net of any dust and stains – for example, with a soft brush and vacuum cleaner.
  - Do not use pressurised air. The stain may become compressed into the grooves of the coolers.
  - Do not use a pressure-washing device.
2. Check the electrical connections of the machine. Clean any oxidised connections, and tighten the loosened ones.
  - Check for the right tension before you start repairing the connections.

*NOTE! Remember that the machine may be repaired only by an electrical contractor or installer authorised to perform such operations.*

### 5.3 REGULAR MAINTENANCE

Authorised Kempki service agents perform regular maintenance by agreement.

Tasks included in regular maintenance:

- Cleaning of equipment.
- Inspection and maintenance of the carbon holder.
- Checking of connectors, switches and adjusters.
- Checking of electrical connections.
- Checking of the connection cable and plug.
- Replacement of damaged or worn parts.
- Calibration testing, with adjustment of the functions and operational values of the machine, if necessary.

### 5.4 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 Kempki representative. By applying this European Directive you will improve the environment and human health.

## 6. ORDERING NUMBERS

<b>KempGouge ARC 800 (incl. transport unit)</b>		6284000
Connector cable	4 X 16 mm <sup>2</sup> , 5 m	W000869
Connector cable	4 X 16 mm <sup>2</sup> , 10 m	W003408
Earthing cable	95 mm <sup>2</sup> , 5 m (DIX120)	61840951
Earthing cable	95 mm <sup>2</sup> , 10 m (DIX120)	61840952
Earthing cable	120 mm <sup>2</sup> , 5 m	61841201
Earthing cable	120 mm <sup>2</sup> , 10 m	61841202
Remote control R10		6185409

## 7. TECHNICAL SPECIFICATIONS

<b>KempGouge ARC 800</b>		
Connection voltage	3~ 50/60 Hz	400 V -15 ... +20%
Rated power	50% ED	44 kVA
	100% ED	35 kVA
Primary current	50% ED I <sub>1max</sub>	65 A
	100% ED I <sub>1</sub>	51 A
Connection cable	H07RN-F	4G16 (16 mm <sup>2</sup> )
Fuse (recommended)		63 A delayed
Idle power		120 W
Efficiency		0.90
Power factor		0.90
Load capacity at 40 °C	50% ED	800 A / 44 V
	100% ED	600 A / 44 V
Current adjustment range		20 A – 800 A
Open circuit voltage		50 V
Gouging carbon		max. size ø 13 mm
Recommended pressure of the compressed air		500 – 700 kPa (5 – 7 bar)
Storage temperature range		-40 °C ... +60 °C
Operating temperature range		-20 °C ... +40 °C
EMC class		A
Minimum short circuit power S <sub>sc</sub> of supply network *		7.6 MVA
Degree of protection		IP23S
Dimensions (without/with transport unit)	Length	590/700 mm
	Width	230/660 mm
	Height	885/1,400 mm
	Weight	94/115 kg
Maximum load of lifting lug		200 kg

\* See paragraph 2.3.



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