

## EN Operating instructions



# inoMIG 350/400/500

EN Welding power source



## Translation of the original operating instructions

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## 1 Identification

The **inoMIG 350/400/500** MIG/MAG welding machines were developed for industrial applications. Their features and functions were therefore designed for professional use.

### 1.1 Marking

This product fulfils the requirements that apply to the market to which it has been introduced. A corresponding marking has been affixed to the product, if required.

## 2 Safety

Please observe the attached "Safety instructions" document.

### 2.1 Designated use

The device described in these instructions may be used only for the purpose and in the manner described in these instructions. In doing so, observe the operating, maintenance and servicing conditions.

- Any other use is considered improper.
- Unauthorised modifications or changes to enhance the performance are not permitted.

### 2.2 Responsibilities of the user

Only the following personnel may work on the device:

- those who are familiar with the basic regulations on occupational safety and accident prevention;
- those who have been instructed on how to handle the device;
- those who have read and understood these operating instructions;
- those who have read and understood the attached "Safety instructions" document;
- those who have been trained accordingly;
- those who are able to recognize possible risks because of their special training, knowledge, and experience.

Keep other people out of the work area.

Please observe the occupational health and safety regulations of the relevant country.

- Observe the regulations on occupational safety and accident prevention. According to DIN EN 60974-10, this device is considered class A welding equipment. Class A welding equipment is not intended for use in residential areas with a public low-voltage power supply system. Such use can cause electromagnetic interferences that may result in equipment damage and malfunctions. Only use the device in industrial areas.




### 2.3 Personal protective equipment

To prevent danger to the user, these instructions recommend the use of personal protective equipment (PPE).

This consists of protective clothing, safety goggles, a class P3 respiratory mask, protective gloves and safety shoes.

## 2.4 Classification of the warnings

The warnings used in the operating instructions are divided into four different categories and are indicated prior to potentially dangerous work steps. Arranged in descending order of importance, they have the following meanings:

 <b>DANGER</b>
Describes an imminent threatening danger. If not avoided, this will result in fatal or extremely critical injuries.
 <b>WARNING</b>
Describes a potentially dangerous situation. If not avoided, this may result in serious injuries.
 <b>CAUTION</b>
Describes a potentially harmful situation. If not avoided, this may result in slight or minor injuries.
<b>NOTICE</b>
Describes the risk of impairing work results or potential material damage to the equipment.




## 2.5 Product safety

The product has been developed and manufactured in accordance with state-of-the-art technology and the recognized safety standards and regulations. These operating instructions warn you against unavoidable residual risks to users, third parties, devices or other material property. Disregarding these warnings may result in risks to human life and health, environmental damage or material damage.

- The product may only be operated in an unmodified, technically perfect condition, within the limits described in these instructions.
- Always observe the limit values specified in the technical data. Overloads lead to destruction.
- Safety features on the device must never be disassembled, bridged or otherwise bypassed.
- During welding work outdoors, use suitable protection against the weather conditions.
- Check the electrical device for any damage and for proper functioning in accordance with its designated use.
- Never expose the electrical device to rain and avoid damp or wet environments.
- Protect yourself from electrical accidents by using insulating mats and wearing dry clothing.
- Never use the electrical device in areas subject to a risk of fire or explosion.
- Arc welding may cause damage to the eyes, skin and hearing. When working with the device, always wear the prescribed protective equipment.
- Metal vapours, especially from lead, cadmium, copper and beryllium, are all harmful to health! Ensure sufficient ventilation or extraction. Always ensure compliance with the legal limit values.
- Rinse workpieces that have been degreased with chlorinated solvents using clean water to prevent the risk of phosgene gas formation. Do not place degreasing baths containing chlorine in the vicinity of the welding area.
- Adhere to the general fire protection regulations and remove flammable materials from the vicinity of the welding work area prior to starting work. Keep suitable fire extinguishing equipment at the workplace ready for use.

## 2.6 Warning and information signs

The following warning and information signs can be found on the product:

Symbol	Meaning
	Read and observe the operating instructions!
	Disconnect the mains plug before opening!
	Warning against hot surfaces.

## 2.7 Emergency information

In the event of an emergency, immediately disconnect the following supplies:

- Electrical power supply
- Compressed air supply
- Gas supply

Further measures can be found in the operating instructions for the power source or the documentation for other peripheral devices.

### 3 Product description

#### 3.1 Technical data

**Fig. 1** inoMIG 350 compact and with DVK3



**Tab. 1** inoMIG 300/400 technical data

Power source	inoMIG 350	inoMIG 400
Mains voltage 50/60 Hz	400 V, 3 phase (350-480 V)	400 V, 3 phase
Current consumption	Imax. = 20 A, Ieff = 13 A	Imax. = 25 A, Ieff = 19 A
Fuse	16 A	32 A
Max. power consumption	14 kVA	17 kVA
Setting range	40-350 A	40-400 A
Operating voltage	16-31.5 V	16-34 V
Idle voltage	13 V (reduced), 80 V (maximum)	13 V (reduced), 80 V (maximum)
Duty cycle 40%	350 A/31.5 V	
Duty cycle 60%	310 A/29.5 V	400 A/34 V
Duty cycle 100%	260 A/27 V	360 A/32 V
Protection type	IP 23	IP 23
Insulation class	H (180 C)	H (180 C)
Type of cooling	F	F
Weight	35 kg (solo), 48 kg (with moving carriage FB10), 95 kg (KG10 + FG10)	
Dimensions L × W × H (mm)	720 × 350 × 530 (solo), 720 × 350 × 830 (FB10), 1030 × 540 × 1000 (KG10)	
Noise emission	< 70 dB (A)	

**Tab. 2** Wire feeder technical data

Wire feeder	Compact/DVK3
Wire feeder motor	42 V, 110 W
Conveying speed	0.8–24 m/min
Wire diameter	0.8–1.6 mm
Weight DVK3 (solo)	20 kg
Dimensions DVK3 L × W × H (mm)	580 × 270 × 560

Manufactured in accordance with the European standards EN 60974-1 and EN 60974-10

**Fig. 2** inoMIG 500**Tab. 3** inoMIG 500 technical data

Power source	inoMIG 500
Mains voltage 50/60 Hz	400 V, 3 phases (350 V to 480 V – maximum values)
Current consumption	$I_{max} = 42 \text{ A}$ , $I_{eff} = 32 \text{ A}$
Max. power consumption	29.9 kVA
Setting range	40–500 A
Operating voltage	12–39 V (automatic)/12–42 V (manual)
Idle voltage	13 V (standby mode), 72 V (maximal)
Duty cycle 60% (40 °C)	500 A/39 V
Duty cycle 100% (40 °C)	450 A/36.5 V
Protection type	IP 23
Insulation class	H (180 °C)
Type of cooling	F
Weight (solo)	111 kg
Dimensions L × W × H (mm)	1050 × 540 × 970
Noise emission	< 70 dB (A)

Tab. 4 DVK3 and DVK4 technical data

Wire feeder	DVK3	DVK4
Wire feeder motor	42 V, 110 W	42 V, 140 W
Conveying speed	0.8-24 m/min	0.8-24 m/min
Wire diameter	0.8-1.6 mm	0.8-1.6 mm
Weight DVK3 (solo)	20 kg	28 kg
Dimensions DVK3 L × W × H (mm)	580 × 270 × 560	650 × 450 × 360

Manufactured in accordance with the European standards EN 60974-1 and EN 60974-10

### Generator operation

The generator must generate at least 30% more power than the maximum power output of the device.  
Example: 14 kVA (device) + 30% = 18 kVA. A 18 kVA generator must be used for this device.

NOTICE
A smaller generator must not be used, as this will result in damage to the Jäckle & Ess welding device and to the generator itself.

### 3.2 Ambient conditions

The welding power source must only be operated at a temperature between  $-10^{\circ}\text{C}$  and  $+40^{\circ}\text{C}$  and at a relative air humidity of up to 50% at  $+40^{\circ}\text{C}$  or up to 90% at  $+20^{\circ}\text{C}$ . The ambient air must be free of unusually high quantities of dust, acids, corrosive gases or substances etc., other than those that arise during the welding process. To prevent damage to the machine, the control system monitors the ambient temperature of the machine. If this temperature is below  $-10^{\circ}\text{C}$  or above  $+40^{\circ}\text{C}$ , the following text appears in the display and the machine cannot be started.

"t°C - int gemessener Temperaturwert" (t°C - int. measured temperature value)

The welding process cannot begin until the temperature is within the correct range.

### 3.3 Nameplate

The welding power source is labelled with a nameplate on the housing as follows:

Fig. 3 inoMIG 350 nameplate

Jäckle & Ess System GmbH Riedweg 4+9, 88339 Bad Waldsee		<b>JESS</b> WELDING			
<b>inoMIG 350</b>		Fabr. Nr.			
		IEC 60974-1 IEC 60974-10 Klasse A			
	U <sub>b</sub> 80 V	40 A / 16 V - 350 A / 31,5 V			
		X, T=40°C	40%	60%	100%
<b>S</b>	U <sub>b</sub> 80 V	I <sub>2</sub>	350A	310A	260A
		U <sub>2</sub>	31,5V	29,5V	27V
	3 ~ 50/60 Hz	U <sub>1</sub> 400V	I <sub>max</sub> 20 A	I <sub>int</sub> 13 A	
IP 23S			<b>CE EAC</b> 		



Fig. 4 inoMIG 400 nameplate

Jäckle & Ess System GmbH Riedweg 4+9, 88339 Bad Waldsee		<b>JESS</b> WELDING	
inoMIG 400		Fabr. Nr.	
		IEC 60974-1 IEC 60974-10 Klasse A	
	40 A / 16 V - 400 A / 34 V	X, T=40°C	60% 100%
		$I_2$	400A 360A
<b>S</b>	$U_s$ 80 V	$U_2$	34V 32V
	3 ~ 50/60 Hz	$U_1$ 400V	$I_{max}$ 25 A $I_{min}$ 19 A
IP 23S		<b>ERC</b>	

Fig. 5 inoMIG 500 nameplate

Jäckle & Ess System GmbH Riedweg 4+9, 88339 Bad Waldsee		<b>JESS</b> WELDING	
inoMIG 500		Fabr. Nr.	
		IEC 60974-1 IEC 60974-10 Klasse A	
	40 A / 16 V - 500 A / 39 V	X, T=40°C	60% 100%
		$I_2$	500A 450A
<b>S</b>	$U_s$ 70 V	$U_2$	39V 36.5V
	3 ~ 50/60 Hz	$U_1$ 400V	$I_{max}$ 42 A $I_{min}$ 32 A
IP 23S		<b>ERC</b>	

### 3.4 Signs and symbols used

Symbol	Description
•	Bullet symbol for instructions and lists
⇒	Cross reference symbol refers to detailed, supplementary or further information
1.	Step(s) described in the text to be carried out in succession

## 4 Scope of delivery

• Welding power source	• Operating instructions	• "General safety information" instruction leaflet
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Order the equipment parts and wear parts separately.

The order data and ID numbers for the equipment parts and wear parts can be found in the current product catalogue. Contact details for advice and orders can be found online at [www.jess-welding.com](http://www.jess-welding.com).

### 4.1 Transport

Although the items delivered are carefully checked and packaged, it is not possible to fully exclude the risk of transport damage.


<b>Goods-in inspection</b>	Use the delivery note to check that everything has been delivered. Check the delivery for damage (visual inspection).
<b>In case of complaints</b>	If the delivery has been damaged during transportation, contact the last carrier immediately. Retain the packaging for potential inspection by the carrier.
<b>Packaging for returns</b>	Where possible, use the original packaging and the original packaging material. If you have any questions concerning the packaging and/or how to secure an item during shipment, please consult your supplier.

### 4.2 Storage

Physical storage conditions in a closed environment:

⇒ See 3.2 Ambient conditions on page EN-7

## 5 Maintenance and safety inspection

<b> DANGER</b>
Always disconnect from the mains before all servicing and maintenance work.

The machine is virtually maintenance-free. However, the following maintenance tasks are essential:

- Clean the contact tip and gas nozzle regularly to remove weld spatter and dirt. Apply anti-spatter agent to nozzles after cleaning to reduce spatter adhesion.
- Check the contact tip regularly for wear and damage and replace it in good time.
- Vacuum clean the interior of the machine if necessary, depending on the level of dirt present.

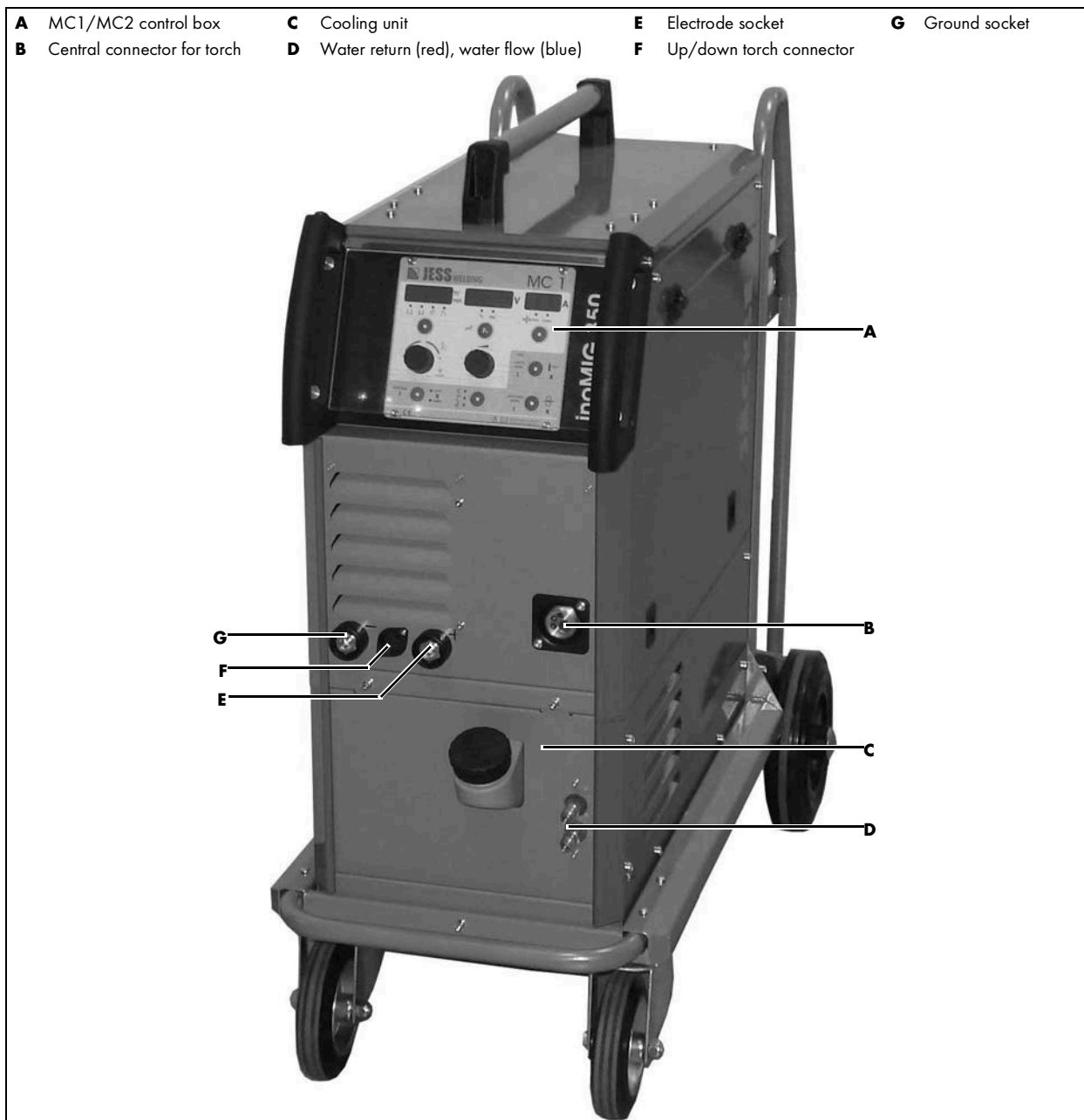
<b>NOTICE</b>
For safety reasons, the machine must be subjected to an annual safety inspection by JÄCKLE & ESS System GmbH or another authorised specialist pursuant to <ul style="list-style-type: none"> <li>• DIN IEC 60974 part 4: "Arc welding equipment. Periodic inspection and testing".</li> </ul>

## 6 Functional description

### 6.1 inoMIG 350 functional description

**Fig. 6** inoMIG 350 functional description

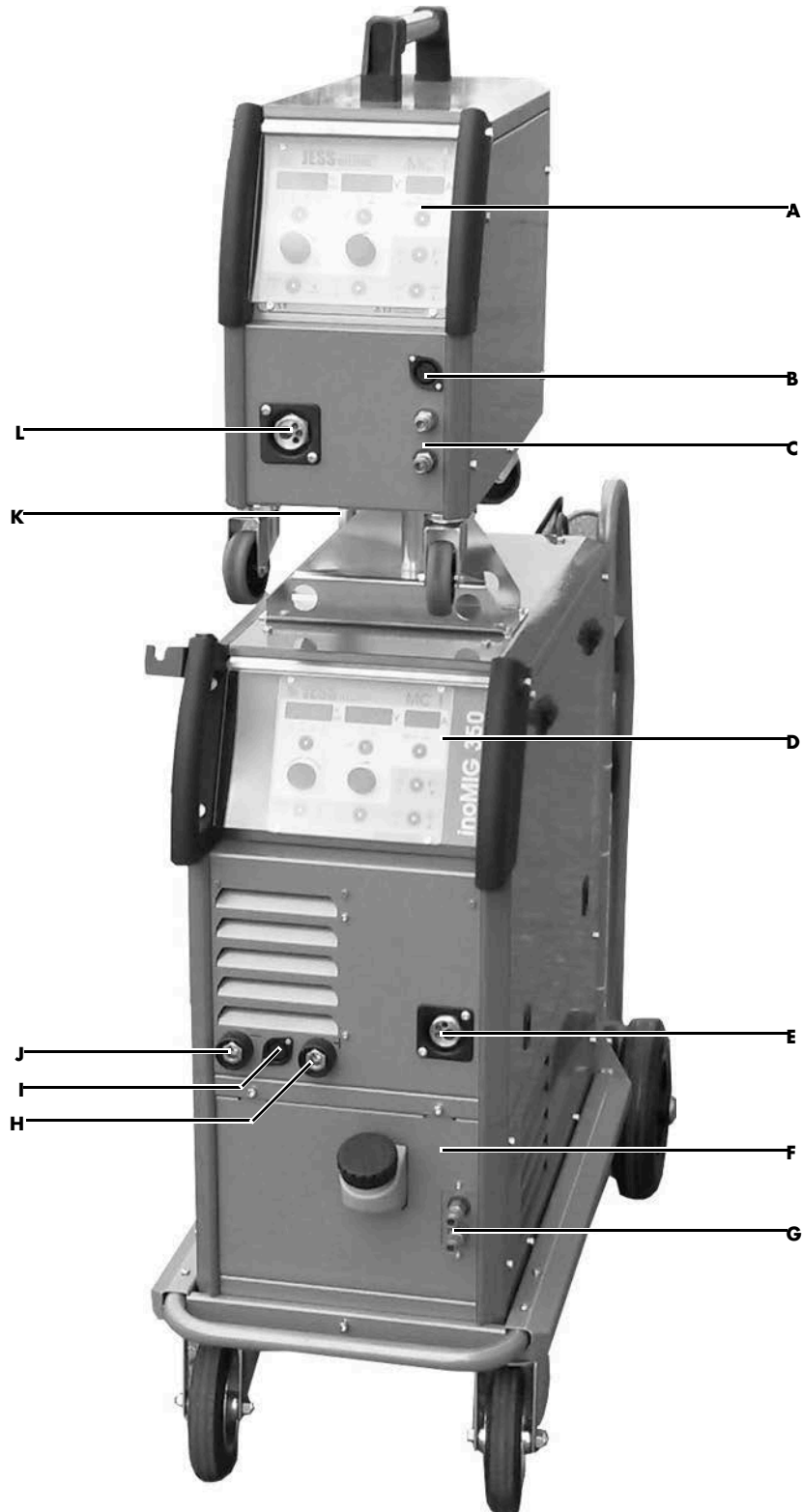
- |                                      |  |                                  |                        |
|--------------------------------------|--|----------------------------------|------------------------|
| <b>A</b> MC1/MC2 control box         | <b>C</b> Cooling unit                          | <b>E</b> Electrode socket        | <b>G</b> Ground socket |
| <b>B</b> Central connector for torch | <b>D</b> Water return (red), water flow (blue) | <b>F</b> Up/down torch connector |                        |



## 6.2 inoMIG 400 functional description

Fig. 7 inoMIG 400 functional description

- |   |                                      |   |                                      |
|---|--------------------------------------|---|--------------------------------------|
| <b>A</b> MC1/MC2 control box                      | <b>D</b> MC 1/MC 2 control box       | <b>G</b> Water return (red),<br>water flow (blue) | <b>J</b> Ground socket               |
| <b>B</b> Up/down torch connector                  | <b>E</b> Central connector for torch | <b>H</b> Electrode socket                         | <b>K</b> Main switch (rear)          |
| <b>C</b> Water return (red),<br>water flow (blue) | <b>F</b> Cooling unit                | <b>I</b> Up/down torch connector                  | <b>L</b> Central connector for torch |



## 6.3 inoMIG 500 functional description

Fig. 8 Functional description inoMIG 500 front

- |  |                           |                                |                                      |
|--|---------------------------|--------------------------------|--------------------------------------|
| <b>A</b> MC1/MC2 control box                   | <b>D</b> Electrode socket | <b>G</b> Primary fuse          | <b>I</b> Main switch (rear)          |
| <b>B</b> Up/down torch connector               | <b>E</b> Cooling unit     | <b>H</b> Mains indicator light | <b>J</b> Central connector for torch |
| <b>C</b> Water return (red), water flow (blue) | <b>F</b> Ground socket    |                                |                                      |

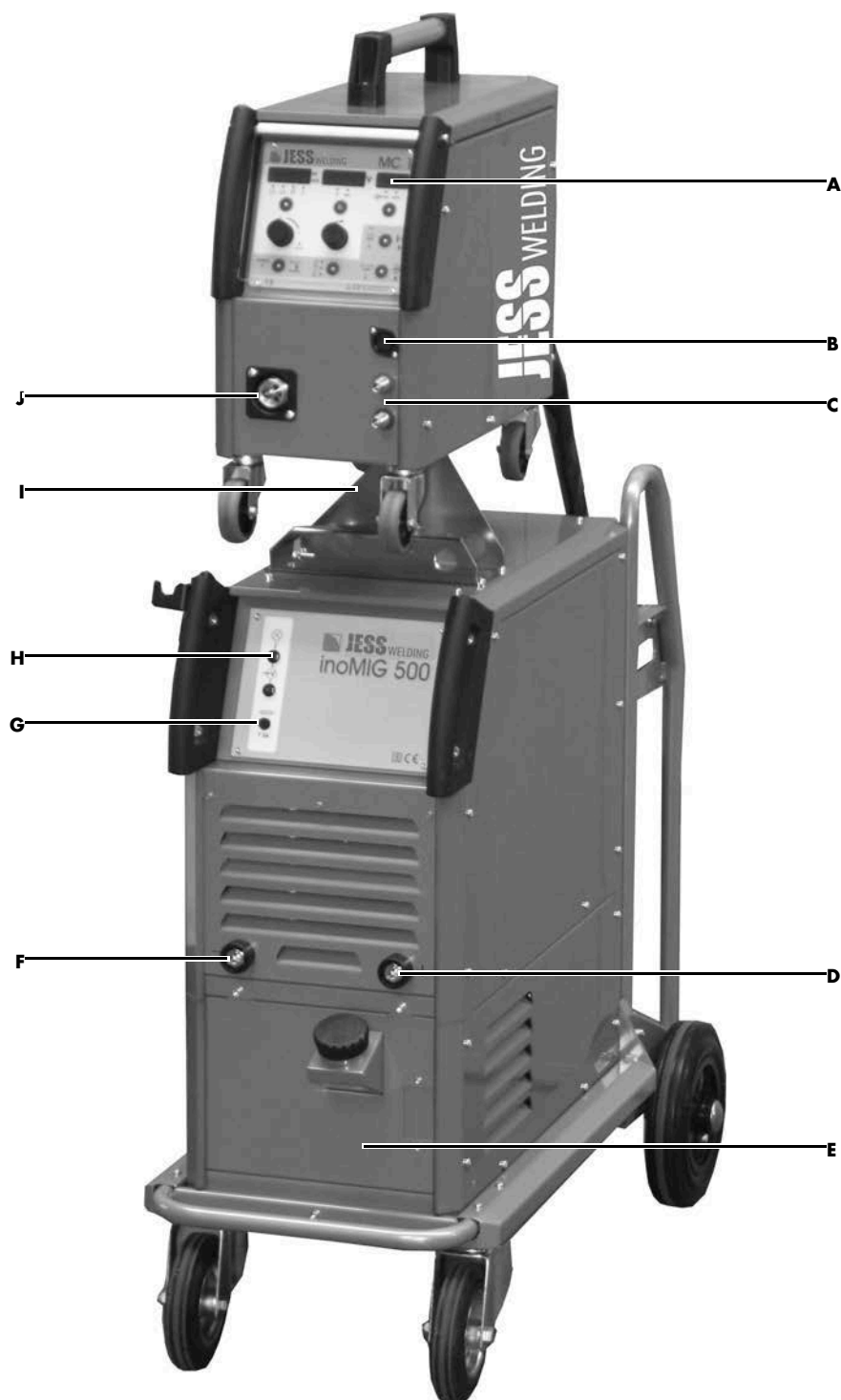
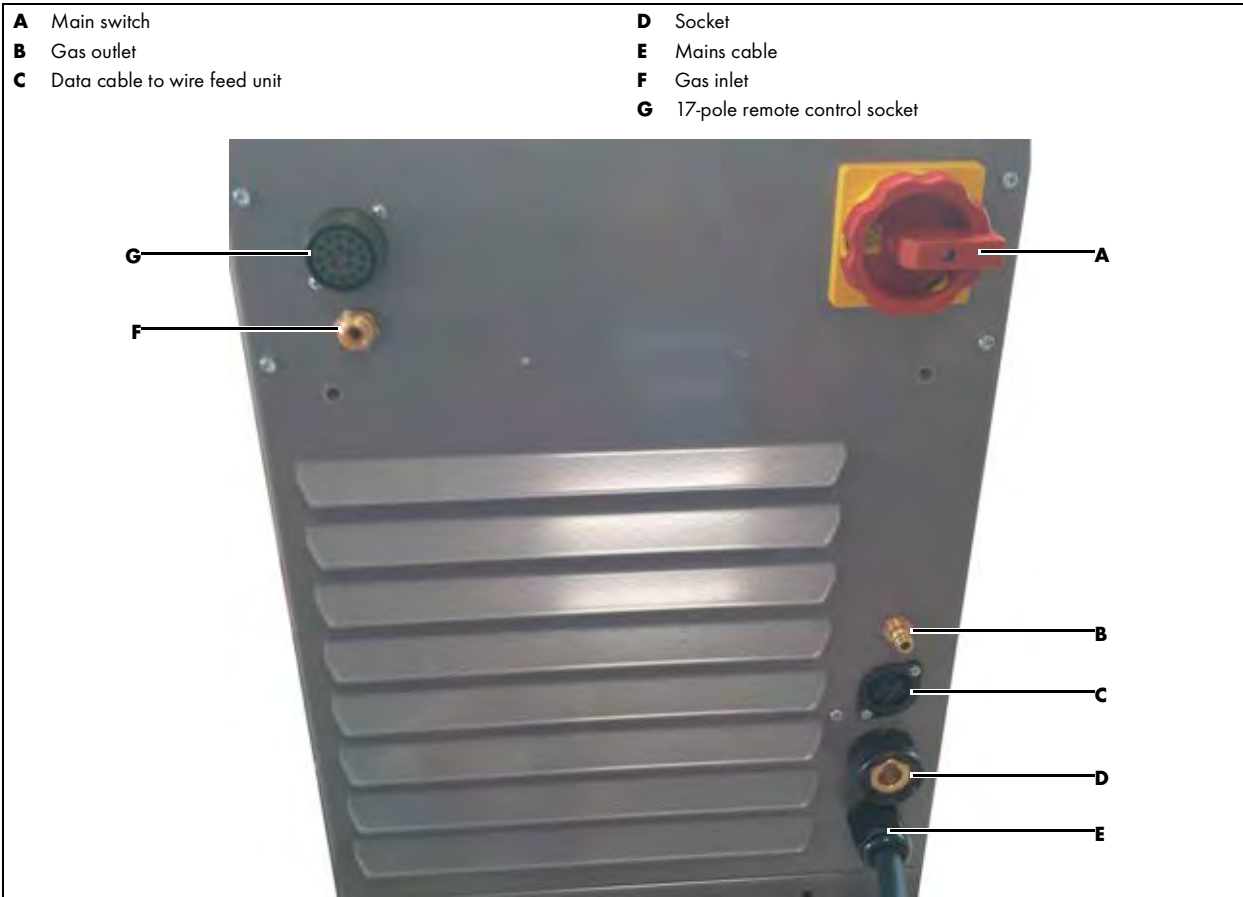


Fig. 9 Functional description inoMIG 500 rear



## 7 Putting into operation

### **⚠ DANGER**

#### **Risk of injury due to unexpected start**

The following instructions must be adhered to during all maintenance, servicing, assembly, disassembly and repair work:

- Switch off the power source.
- Close off the gas supply.
- Close off the compressed air supply.
- Disconnect all electrical connections.
- Switch off the entire welding system.

### **⚠ CAUTION**

#### **Risk of injury**

Increased noise pollution.

- Wear personal protective equipment: ear protectors.

### **⚠ WARNING**

#### **Electric shock**

Dangerous voltage due to defective cables.

- Check all live cables and connections for proper installation and damage.
- Replace any damaged, deformed or worn parts.

### **⚠ WARNING**

#### **Risk of injury**

Feet may be crushed due to sudden rolling movement of the power source.

- Inspect the safety of the machine.
- Position on flat, even surfaces only.

**⚠ CAUTION****Risk of injury**

Heavy weight.

- Ensure that you slow down in good time when moving the device.

**NOTICE**

- Note the following instructions:

⇒ 3 Product description on page EN-5

- Only qualified personnel are permitted to perform work on the device or system.
- Components must only be used in environments with sufficient ventilation.

When setting up the machine, ensure that you leave sufficient space for the entry and exit of cooling air so that the specified duty cycle can be completed. Do not expose the machine to moisture, weld spatter or directly to sparks during welding. Do not use the machine outdoors during rain.

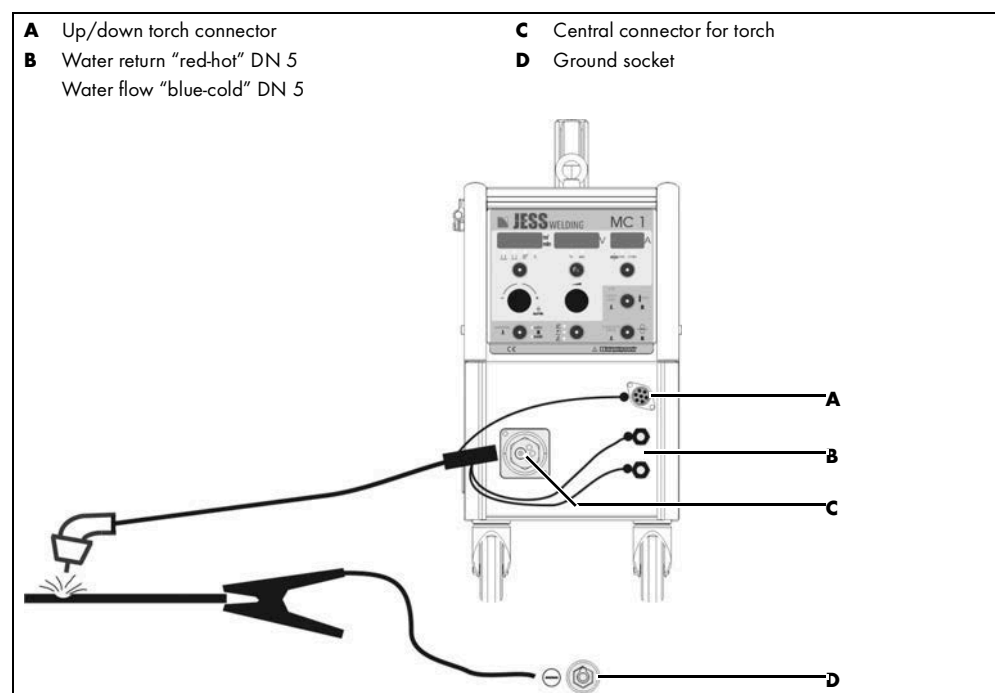
**Connecting the shielding gas cylinder**

Position the shielding gas cylinder on the rear of the shielding gas welding unit and secure it in place with the chain. Connect the cylinder pressure regulator and check the connections for leaks. Set the required shielding gas volume using the pressure regulator (6-18 l/min). The required gas volume largely depends on the strength of the welding current.

**7.1 MIG/MAG welding****7.1.1 Connecting the welding torch cable assembly**

Position the shielding gas cylinder on the rear of the shielding gas welding unit and secure it in place with the chain. Connect the cylinder pressure regulator and check the connections for leaks.

**Fig. 10** Connecting the cable assembly



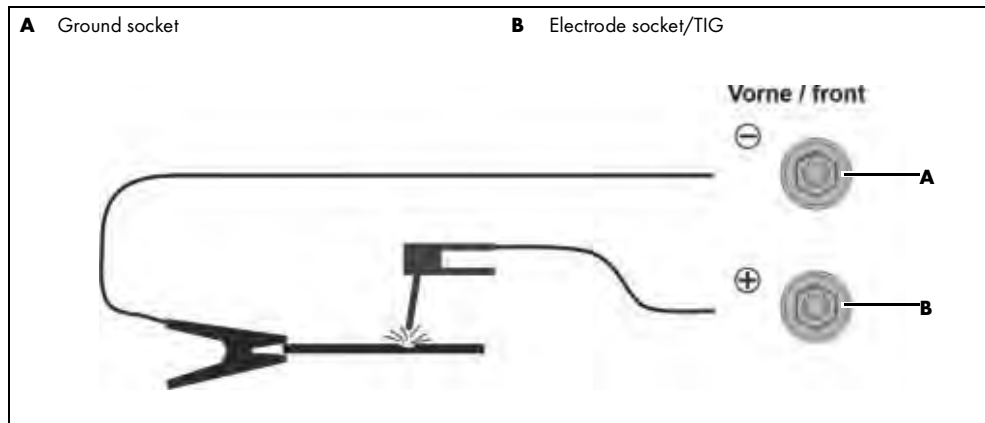
Connect the welding torch to the central connectors, water connections and, where relevant, to the up/down torch as illustrated. Please observe the colours of the water connections. For the PIN assignment of the up/down torch, refer to the circuit diagram.

**7.1.2 Starting the welding process**

Set the control box to MIG/MAG operating mode, set the parameters for the welding tasks, and press the torch trigger to start the welding process.

## 7.2 Electrode welding

**Fig. 11** Connecting the electrode holder



Connect the electrode holder to the Plus socket as illustrated. Please always observe the specifications of the electrode manufacturer in relation to polarity! The wire feed unit with control lead must remain plugged into the machine.

### 7.2.1 Potentiometer for welding current control

In order to regulate the strength of the welding current in electrode operating mode, the potentiometer must be connected to the 17-pole remote control socket as shown in the circuit diagram. In MIG mode, you must also call the remote control function via Fx and, for EC1, you must set the "Curr - CAn" parameter.

### 7.2.2 Starting the welding process

Set the control box to electrode operating mode, set the parameters for the welding task, and place the electrode on the workpiece.

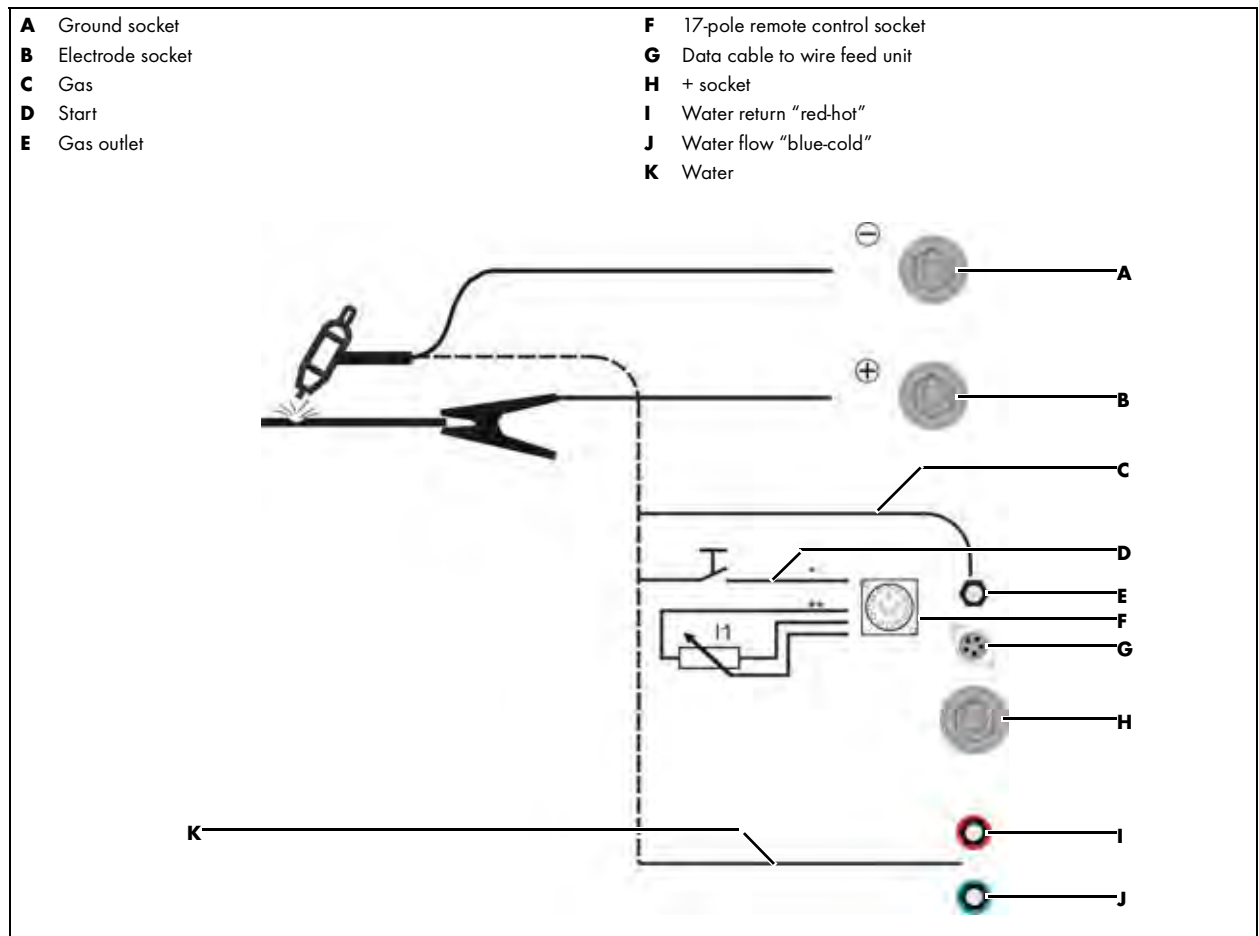
### 7.2.3 Setting the hotstart and arc force parameters

For an enhanced start to the welding process, you can set an increased start current using the hotstart parameter (tap the Fx button). You can choose a start current within the range of 0% (no increase) to 150% of the welding current. The duration for hotstart is set at 1 second and cannot be changed. You can use the arc force parameter to minimize adherence of the electrode during welding. If the electrode seems likely to adhere in the weld pool, it is burned free with short pulses of current. You can choose an arc force value between 100% and 250% of the welding current. A value greater than 200% is recommended for cell electrodes.



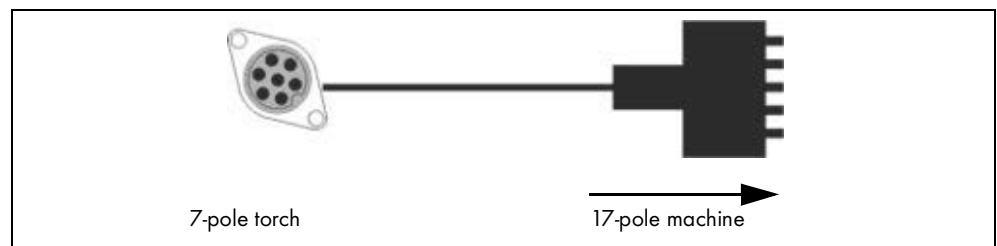
### 7.3 TIG welding

**Fig. 12** Connect the TIG welding torch/hose torch



#### 7.3.1 TIG intermediate cable assembly (option)

**Fig. 13** Intermediate cable assembly option, item 802.015.215



#### 7.3.2 TIG welding torch cable assembly

Connect the welding torch to the ground socket, remote control socket, water connections, and gas outlet. Please observe the colours of the water connections. The wire feed unit with control lead must remain plugged into the machine.

#### 7.3.3 Potentiometer for welding current control

In order to regulate the strength of the welding current in TIG operating mode, the potentiometer must be connected to the 17-pole remote control socket as shown in the circuit diagram. In MIG mode, you must also call the remote control function via Fx and, for EC1, you must set the "Curr - CAn" parameter.

#### 7.3.4 Starting the welding process

Set the control box to TIG operating mode, set the parameters for the welding tasks, and press the torch trigger to start the welding process.

### 7.3.5 Downslope and gas post-flow time parameters

You can use the downslope parameter (tap on the Fx button) to set the length of time it takes the welding current to drop to the minimum current of 15 A after the end of welding. The gas post-flow time is the length of time during which the gas continues to flow to cool the torch after the end of welding.

## 7.4 Mains port

### DANGER

#### Electric shock

Dangerous voltage due to defective cables.

- Check all live cables and connections for proper installation and damage.
- Replace any damaged, deformed or worn parts.

### DANGER

#### Personal injuries and material damage

Incorrect mains connection can result in personal injuries and material damage.

- Do not mount the components until the mains plug is disconnected.
- Connect the system only to the sockets which have protective earthing conductor.
- Only qualified personnel are permitted to perform work on the device or system.

**1** Insert the mains plug into the corresponding socket.

Connect the mains plug to the mains cable as specified on the rating plate. Connect the yellow/green lead to the protective conductor terminal PE. The three phases (black, brown, and grey) can be connected to L1, L2 and L3 in any order.

## 8 Overview of control functions

**Tab. 5** Overview of MC1 and MC2 control functions

Functions	MC1	MC2
Inverter system	■	■
Manual mode	■	■
Automatic mode	■	■
Arc length correction	■	■
Material selection	■	■
Power can be individually adjusted	■	■
MIG mode	■	■
TIG mode - gas pre-flow time and slope-down time adjustable	■	■
2-step, 4-step, spot	■	■
Crater filling - Hotstart - reduce	■	
Save/delete individual jobs (max. 100)	■	
Gas test	■	■
Feeding in the wire	■	■
Coolant flow display	■	
Minimum coolant flow adjustable	■	
Power selection based directly on material thickness	■	■
Creep (StS) adjustable	■	■
Wire burn-back (bUb) adjustable	■	■
Gas pre-flow time (PrG) adjustable	■	
Gas post-flow time (PoG) adjustable	■	
Spot time (SPt) adjustable	■	■
Throttle strength can be individually adjusted	■	■
Remote control functions adjustable	■	
Welding cable lengths adjustable	■	
Water pump On/Off	■	
Machine type adjustable	■	
Software update for curves	■	■
Lock/unlock control system (CODE)	■	
Fan/water pump (where relevant) regulated	■	■
Display HOLD time adjustable	■	■
Reset control system to factory settings	■	■

### 8.1 Welding

To ensure high-quality welding, it is important to select the correct welding voltage step and, based on this, the best possible wire feeder speed and gas volume.

- 1** Adjust the pressure regulator: Set the required shielding gas volume using the pressure regulator (6–18 l/min). The required gas volume largely depends on the strength of the welding current.
- 2** Insert the welding wire: select the welding wire based on the material that is to be processed. Use a suitable correct contact tip and wire feed roller for the welding wire.  
⇒ See 9.1 Control functions on page EN-19
- 3** Adjust the wire feeder speed.  
⇒ See 9.1 Control functions on page EN-19
- 4** Start the welding process by pressing the torch trigger.

## 9 Operation

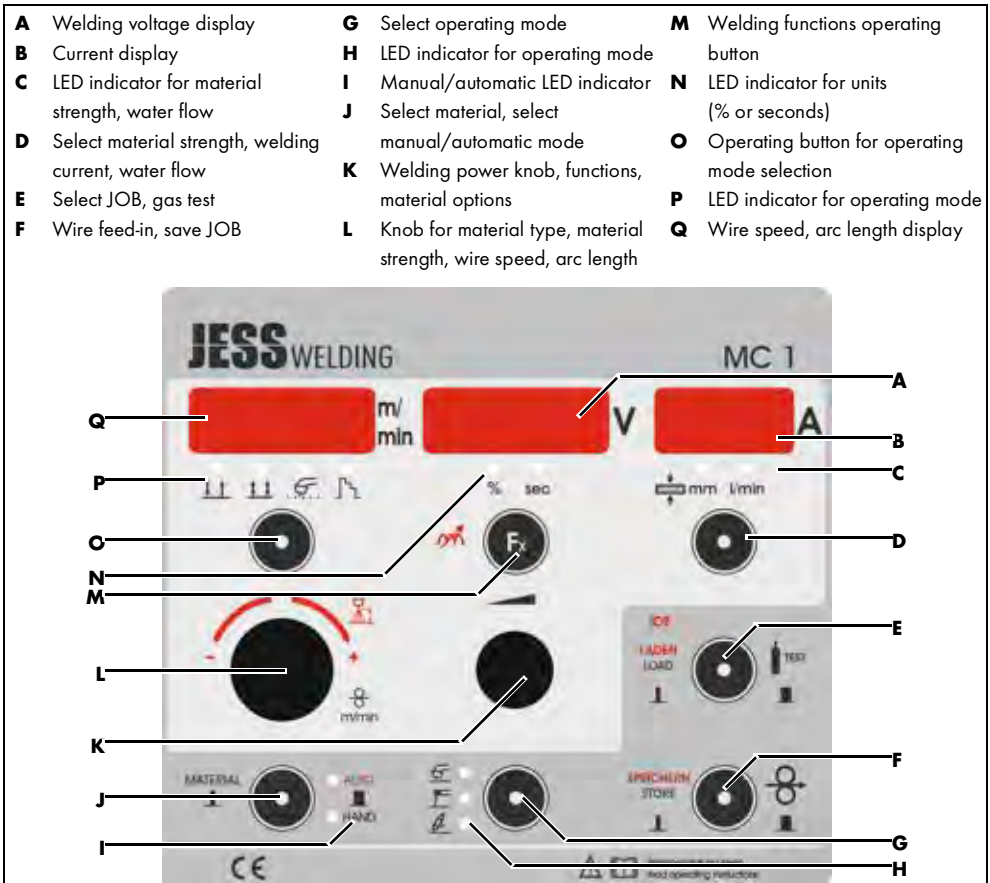
## NOTICE

- Only qualified personnel are permitted to perform work on the device or system.

## 9.1 Control functions

## 9.1.1 MC1 control system

Fig. 14 MC1 control box



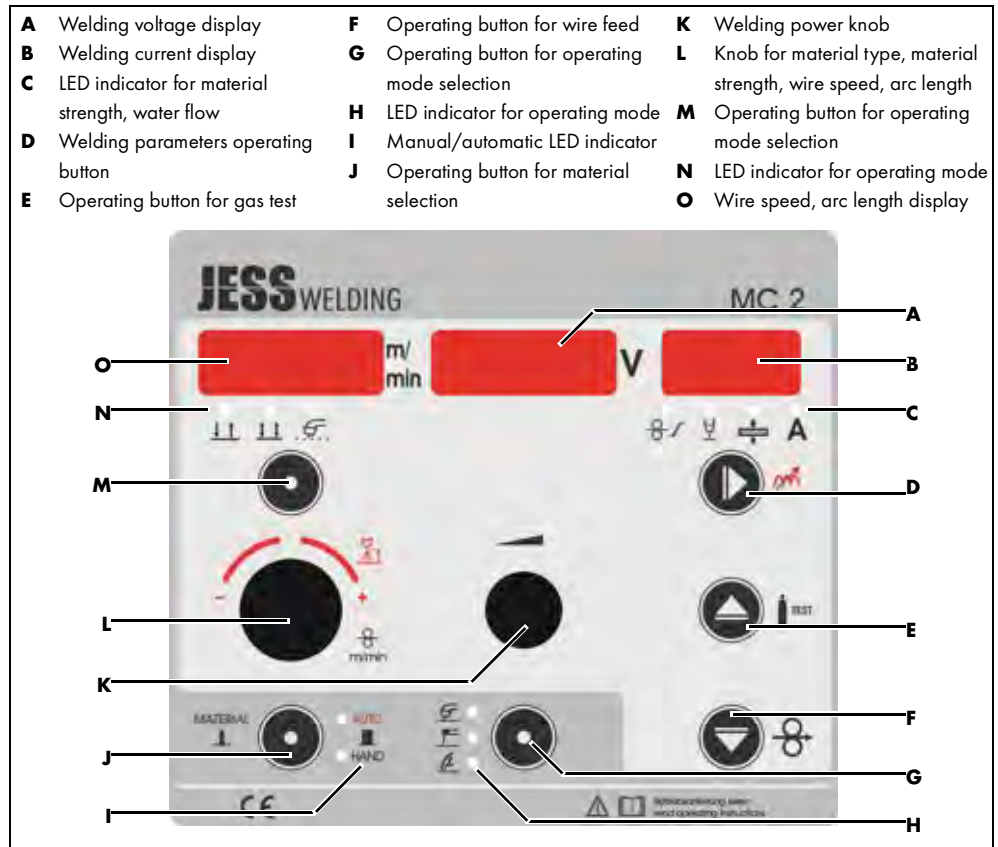
## Pos. Description

- |          |   |
|----------|---|
| <b>A</b> | Display for the welding voltage in volts, flashing dot: HOLD function active, adjustable function and option values   |
| <b>B</b> | Display for the welding current in amperes or the material thickness, as well as coolant flow volume, and other parameters  |
| <b>C</b> | LED indicator for material thickness in mm or water flow in l/min   |
| <b>D</b> | Operating button for switching between welding current and material thickness (tap for less than 0.5 seconds) and water flow (press for more than 1 second)           |
| <b>E</b> | Operating button for retrieving and loading programs (tap for less than 0.5 seconds) or for activating the gas test (press for more than 1 second)                    |
| <b>F</b> | Operating button for activating the wire feed-in function or for storing programs   |
| <b>G</b> | Mode operating button for switching between MIG, electrode and TIG operating modes  |
| <b>H</b> | LED indicator for active operating mode (MIG, electrode or TIG)   |
| <b>I</b> | LED indicator, HAND/AUTO (MANUAL/AUTOMATIC) mode  |
| <b>J</b> | Operating button for material selection (tap for less than 0.5 seconds) or select manual (HAND) or automatic (AUTO) mode (press for more than 1 second)               |
| <b>K</b> | Knob for setting welding power, all functions, options, material thickness, or other values in the middle or right-hand display                                       |
| <b>L</b> | Knob for setting the material type, adjusting the arc length (AUTO-(I)), setting the wire speed in m/min (HAND-(I)), and changing all values in the left-hand display |

Pos.	Description
<b>M</b>	Fx operating button for setting welding functions (e.g. for throttle strength, tap for less than 0.5 seconds) or options (e.g., for remote control, press for more than 1 second)
<b>N</b>	LED indicator for the units % or seconds if these values are shown in the middle display
<b>O</b>	Operating button for switching between 2-step, 4-step, 2-step spot and crater filling (tap)
<b>P</b>	LED indicator showing whether 2-step, 4-step, 2-step spot or 2T/4T crater filling is active
<b>Q</b>	Display of wire speed in m/min (HAND-9) or adjustment of the arc length in the range -3.0 V to +3.0 V (AUTO-9), flashing dot: HOLD function active

### 9.1.2 MC2 control system

**Fig. 15** MC2 control box



Pos.	Description
<b>A</b>	Display for the welding voltage in volts, flashing dot: HOLD function
<b>B</b>	Display for the welding current in amperes or the material thickness, as well as the throttle, creep speed and wire burnback time
<b>C</b>	LED indicator for display of creep speed, wire burnback time, material thickness or welding current
<b>D</b>	Operating button for switching between throttle strength, creep speed, wire burnback time, material thickness, and welding current (spot time if spot welding is activated)
<b>E</b>	Operating button for activating the gas test or, in setup mode, for increasing the values for throttle, creep speed, wire burnback time, material thickness, and power (LED <b>(C)</b> flashing)
<b>F</b>	Operating button for activating the wire feed-in function or, in setup mode, for reducing the values for throttle, creep speed, wire burnback time, material thickness, and power (LED <b>(C)</b> flashing)
<b>G</b>	Mode operating button for switching between MIG, electrode and TIG operating modes
<b>H</b>	LED indicator for active operating mode (MIG, electrode or TIG)
<b>I</b>	LED indicator, HAND/AUTO (MANUAL/AUTOMATIC) mode
<b>J</b>	Operating button for material selection (tap for less than 0.5 seconds) or select manual (HAND) or automatic (AUTO) mode (press for more than 1 second)

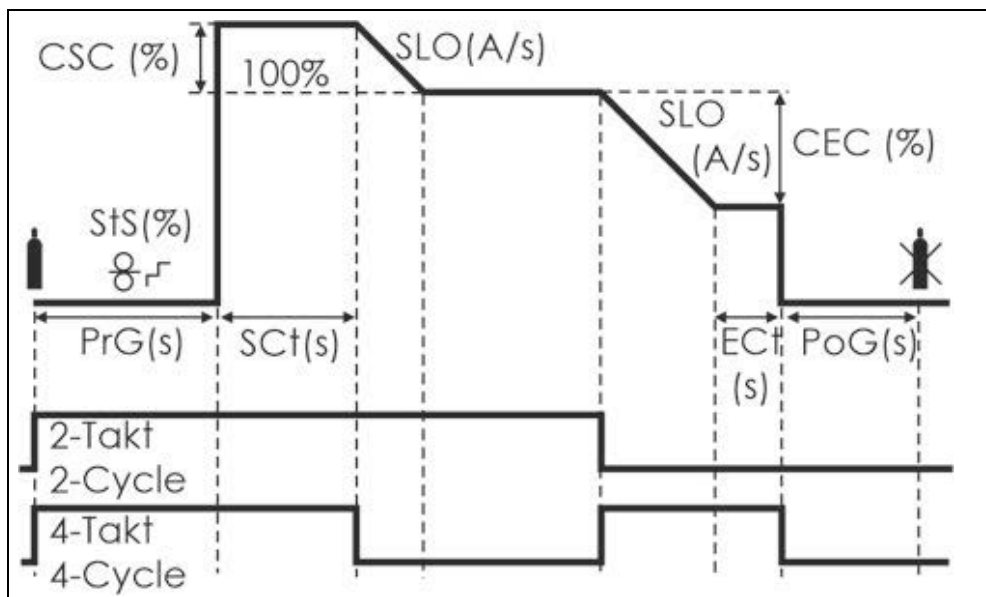
Pos.	Description
K	Knob for adjusting the welding power in the middle display
L	Knob for setting the material type, adjusting the arc length (AUTO-(I)), setting the wire speed in m/min (HAND-(I)), and changing all values in the left-hand display
M	Operating button for switching between 2-step, 4-step and 2-step spot (tap)
N	LED indicator showing whether 2-step, 4-step or 2-step spot is active
O	Display of wire speed in m/min (HAND-(I)) or adjustment of the arc length in the range -3.0 V to +3.0 V (AUTO-(I)), flashing dot: HOLD function active

10 Operation/welding

10.1 2-/4-step, spot (MC1-2), crater filling (MC1)

You can tap on the operating button (pos. J ) to switch between 2-step, 4-step, 2-step spot (MC1-2) and 2T/4T crater filling (MC1). The activated function is indicated by the LEDs.

Fig. 16 Crater filling program MC1 (Led S)



Operating mode	Description
<b>2-step</b>	Press the torch trigger and the arc is ignited after the gas pre-flow time (PrG) with the pre-defined hotstart current (CSC). Once the hotstart time (tCSC) has ended, the welding current drops to the pre-defined welding at slope-down speed (SLO). Release the torch trigger and the welding current drops to the pre-defined crater end welding current (CEC) at slope-down speed (SLO). Once the end crater time (tCEC) ends, the arc is extinguished. The shielding gas continues to flow for the set time (PoG).
<b>4-step</b>	Press the torch trigger and the arc is ignited with the pre-defined hotstart current (CSC). The welding current remains at this level. Release the torch trigger and the welding current drops to the pre-defined welding current at the pre-defined slope-down speed (SLO). Press the torch trigger and the welding current drops to the pre-defined crater end current (CEC) at the pre-defined slope-down speed (SLO). Release the torch trigger and the arc is extinguished. The shielding gas continues to flow for the set time (PoG).

10.2 Material selection (MC1-2)

When you briefly tap the material button, the material type (e.g. steel) appears on the left-hand display, the gas (e.g. CO<sub>2</sub>) on the middle display and the wire diameter (e.g. 1.0 mm) on the right-hand display. You can then turn the left knob to make the required material selection. The last selection shown on the display is adopted.

### 10.3 Automatic/manual mode (MC1–2)

Press and hold the material button (for more than 1 second) to switch between automatic and manual mode. In automatic mode, all parameters required for welding are set and maintained automatically by the control system. In manual mode, you can use the left knob to set the wire feeder speed in m/min and, if necessary, use the middle knob to set the power (with these two settings being independent of one another).

### 10.4 Power pre-selection/material thickness (MC1–2)

When using the MC1–2 control systems, the welding power can be adjusted using the knob in the middle. In automatic mode, the wire speed, throttle and welding current are always adjusted at the same time. It is also possible to display the material thickness instead of the welding current. To do so, simply tap the mm (MC1) or ► (MC2) button until the mm LED or the material thickness icon illuminates. You can then set the required material thickness using the middle knob (MC1) or the ▲ ▼ buttons (MC2).

### 10.5 Arc length adjustment (AUTO)

The arc length can be adjusted for special welding tasks. You can turn the left button to decrease or increase the arc length by 3 V around the current operating point (in increments of 0.1). The change from –3.0 V to +3.0 V is shown in the left-hand display. The new welding current is displayed synchronously in the middle display. The wire feeder speed remains constant throughout and is never changed. During welding, the symbols “–” or “+” are shown in the middle display to indicate whether a lower  $\perp$  or higher  $\lrcorner$  welding voltage is set. No symbol is visible at the normal operating point.

### 10.6 Fx functions (MC1)

In idle mode (when not welding). Briefly tap the Fx operating button to set the following functions for each individual welding curve:

### 10.7 MIG operating mode

<b>Throttle (Cho)</b>	Continuous adjustment of the welding choke in the range +15 (softer) to –15 (harder) with “0” as standard
<b>Start speed (StS)</b>	10% to 100% of the welding speed
<b>Wire burn-back (bUb)</b>	–60 ms (long, tip) to +90 ms (short, ball at wire end)
<b>Gas pre-flow time (PrG)</b>	0.0 to 1.0 seconds
<b>Gas post-flow time (PoG)</b>	0.5 to 10 seconds
<b>* Crater hotstart current (CSC)</b>	–50% to +100% of the current welding current
<b>* Crater hotstart time (tCSC)</b>	0.1 to 5.0 seconds
<b>* Crater filling end current (CEC)</b>	–100% to +50% of the current welding current
<b>* Crater end time (tCEC)</b>	0.1 to 5.0 seconds
<b>* Slope-down speed (SLO)</b>	1 volt/second (slow) to 20 V/s (fast)
<b>Spot time (SPt)</b>	0.5 to 10 seconds
<b>Code (CODE)</b>	For locking the control system (see 10.15 on page EN-23)

#### NOTICE

\*MC1 only if crater filling (LED S) is active

### 10.8 Electrode operating mode

<b>Hotstart (HSt)</b>	0 to 150% of the welding current
<b>Arc force (Arcf)</b>	100 to 250% of the welding current

### 10.9 TIG operating mode

<b>Gas post-flow time (PoG)</b>	2 to 20 seconds
<b>Down slope (i.e. reduce current) (dSLP)</b>	0.0 to 10.0 seconds

Use the middle knob to adjust the values within their ranges. If the value is not changed for more than 2 seconds, the display switches to default and saves the value.

### 10.10 During welding (MIG operating mode)

During welding, you can tap on the Fx button to call up the throttle function and adjust the throttle value. "Choc" is shown in the left-hand display, while the current value is shown in the middle display. You can now use the middle knob to change the value in the range between -15 (hard) and +15 (soft). With welding in automatic mode, you can tap the Fx operating button again to display the current arc adjustment. You can then use the left knob to change the value in the range between -3.0 V and +3.0 V.

### 10.11 MC2 functions

Briefly tap the ► (D) operating button to set the following functions for each individual welding curve:

### 10.12 MIG operating mode

<b>Throttle ("Choc" in the display)</b>	Continuous adjustment of the welding choke in the range -80 (harder) to +80 (softer) with "0" as standard
<b>Start speed</b>	10% to 100% of the welding speed
<b>Wire burn back</b>	-90 ms to +60 ms

Tap the ▲ ▼ buttons to adjust the values within their ranges. If the value is not changed for more than 2 seconds, the display switches to default and saves the value.

### 10.13 Electrode operating mode

<b>Hotstart (HSt on the display)</b>	0 to 150% of the welding current
<b>Arc force (Arct)</b>	100 to 250% of the welding current

### 10.14 TIG operating mode

<b>Gas post-flow time (PoG)</b>	2 to 20 seconds
<b>Down slope (i.e. reduce current) (dSLP)</b>	0.0 to 10.0 seconds

Use the middle knob (MC2) to adjust the values within their ranges. If the value is not changed for more than 2 seconds, the display switches to default and saves the value.

If you press the ► (D) operating button again, the most recently changed parameter is displayed.

Pressing the button again switches to the next parameter.

### 10.15 Lock control system – CODE (MC1)

Optimally configure the control system for the welding task. The control system can then be locked to prevent third parties from changing the settings. To do this, press the Fx button until CODE appears on the display, then use the left-hand knob to select any number between 0001 and 9999. Once the number has been set, the control system is locked by tapping the "Drahteinfädeln" (Wire feed) button. The only functions that can now be used are "Gastest" (Gas test), "Drahteinfädeln" (Wire feed) and "Korrektur der Drahtgeschwindigkeit" (Wire speed correction). All other functions are locked. To unlock the control system, tap the Fx button again until CODE appears on the display. Now use the knob to select the same number as before and press the "Drahteinfädeln" (Wire feed) button. The control system returns to normal mode. Note: 0000 is not permitted – no function assigned.



### 10.16 Fx options (MC1)

This function can be used to change the lower-level basic settings. Press and hold the Fx operating button (for more than 1 second) to access the options. The following options can be changed:

- EC 1/2: Select the functions for the remote control potentiometer (see 10.23 on page EN-25)
- Hold: Set the display hold time in seconds (0 = infinite to 25 s)
- Reset the control system/memory locations (see next point)
- Set the torch type and length: Tap until "tch" appears on the left-hand display. The following 3-digit number appears in the middle display: First digit: 1 = gas-cooled torch, 2 = water-cooled torch; second and third digits: Length of the torch in meters (2, 3 or 4 m). Use the knob to set the connected torch type accurately

Example: 204 = water-cooled torch with a length of 4 m

- Enter the remaining cable lengths (earth cable and intermediate cable assembly): tap until "cbl" is displayed in the left-hand display and then enter the total length of all cables (not including the torch length!) in the right-hand display. (The cable cross-section used as a basis appears in the middle display, e.g. 35 mm<sup>2</sup>)

Example: 12 = total cable length of 12 m (maximum 40 m possible)

#### NOTICE

The torch type and cable length must be precisely set in order for the control system to work optimally. Incorrect values can lead to a non-optimal welding result.

To save the new settings, exit options menu by tapping the "Drahteinfädeln" (Wire feed) button.

### 10.17 Accessing and saving jobs (MC1)

100 user-specific jobs can be stored in the control box. To open the job menu, briefly tap the "JOB laden" (Load job) operating button. "Job" appears on the left-hand display.

The middle display indicates the status of the memory location. This can be:

<b>free</b>	Memory location free
<b>used</b>	Memory location used
<b>==</b>	The data for this memory location are currently being loaded

The job number appears on the right-hand display. Once the job menu is open, the middle knob can be used to select the desired memory location. You can now either load a job that has already been saved by tapping the "JOB laden" (Load job) operating button or save the current settings by tapping the "Speichern" (Save) operating button (the symbol == appears on the middle display). To overwrite a memory location, press the "save" operating button for more than 1 second.

### 10.18 Coolant – flow display (MC1)

To display the current flow of coolant in the cooling circuit, press the "l/m" operating button. The "l/min" LED illuminates and the current value is shown in the right-hand display (e.g. 1.45). If the flow drops below the minimum flow value of 0.25 l/m for more than 5 seconds, the error "Err H2o" is displayed. Welding is no longer possible at this point. The machine must be switched off. If the shortage of water is eliminated, normal operation of the machine can re-commence.

### 10.19 Deleting jobs/factory setting (MC1)

The control system has two separate options:

1. Delete all jobs saved by the user (display: "rES 1 - Job") or
  2. Reset the entire control system to the factory settings (display: "rES 2 - ALL").
- 1** To use these options, press and hold the Fx button until EC 1 appears on the display. Now tap the Fx button several times until "rES 1 - Job" appears on the display.
  - 2** Turn the middle knob to select "rES 1" or "rES 2".
  - 3** Press and hold the "Gastest" (Gas test) button until "clr" disappears from the right-hand display.
  - 4** The procedure is now complete.

**NOTICE**

After the reset "ALL", all parameters must be checked to ensure they are correctly set for the machine type.

**10.20 MIG, electrode, TIG operating modes (MC1-2)**

Tap the operating button to switch between MIG, electrode and TIG operating modes. The relevant LED illuminates. The TIG function is only possible in lift-arc mode without HF.

**10.21 Gas test (MC1-2)**

To open the gas valve, press the "Gastest" (Gas test) operating button for more than 1 second. The gas valve then remains open for 20 seconds, after which it closes automatically. You can also close it sooner by pressing the operating button again during this 20-second period.

**10.22 Wire feed (MC1-2)**

In normal mode (not in job mode!), you can feed the wire in by pressing the "Drahteinfädeln" (Wire feed) operating button. The feed continues for as long as the button is held down. You can adjust the feed speed by turning the left-hand knob. The wire is fed in at a speed of 5 m/min by default.

**10.23 Remote control EC1/2 (MC1) (option)**

A remote control with either 1 or 2 potentiometers can be connected to the control system. You have the option of configuring the following functions on the potentiometers:

<b>Choc</b>	Manually set the wire feeder speed (in manual mode)
<b>Hand</b>	Adjust the wire feeder speed in automatic mode
<b>Auto</b>	Wire creep speed
<b>StS</b>	Wire burn-back adjustment
<b>bUb</b>	Gas pre-flow time
<b>PrG</b>	Gas post-flow time
<b>PoG</b>	Spot time
<b>SPt</b>	The welding power of the machine in MIG mode (MC1 only)
<b>Soll ("Target")</b>	The welding power of the machine in TIG and electrode mode (MC1 only)
<b>Curr</b>	The welding power of the machine in TIG and electrode mode (MC1 only)

To set the functions, press the Fx button until EC 1 appears in the display. EC 1 stands for potentiometer 1, EC 2 for potentiometer 2. You can select EC 1 or EC 2 by tapping the Fx button. Then use the middle (MC1) knob to set the relevant function (the function is in the middle display). When you tap the "Drahteinfädel" (wire feed) button, the setting is saved

**NOTICE**

With this machine type, "CAn" must be displayed in the middle display. The values do not work if "int" is displayed for this machine type!

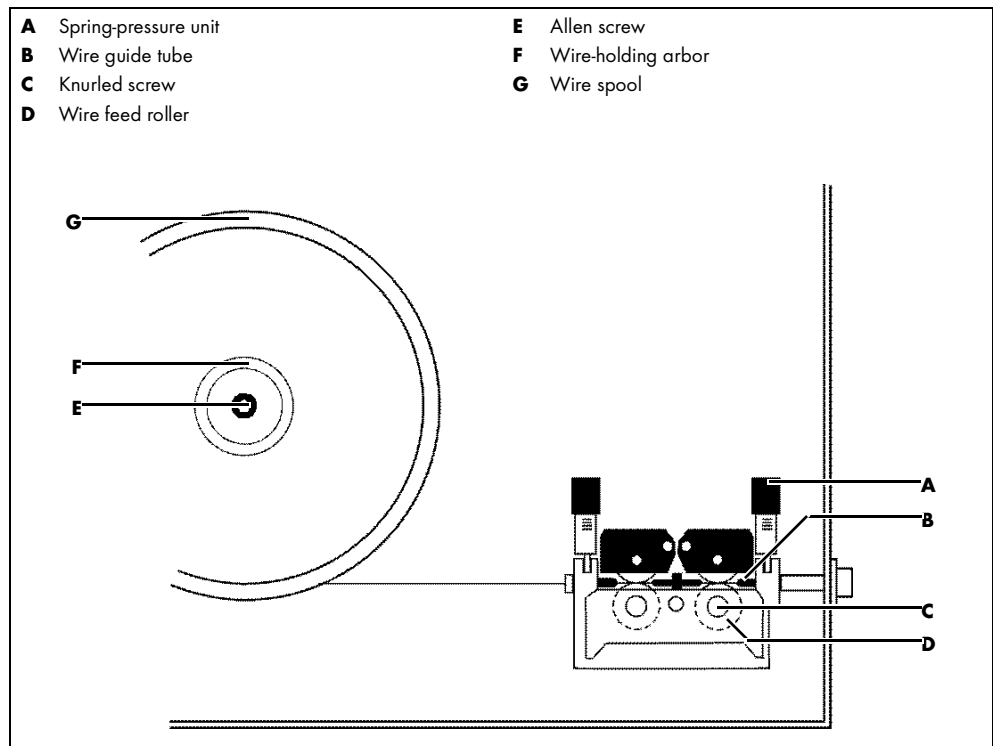
Example: EC1 - Choc - CAn

⇒ The throttle can then be changed with potentiometer 1.

## 11 Wire feeder DVK3/DVK4

### 11.1 DVK3 – 100 W motor

**Fig. 17** 100 W wire feed motor



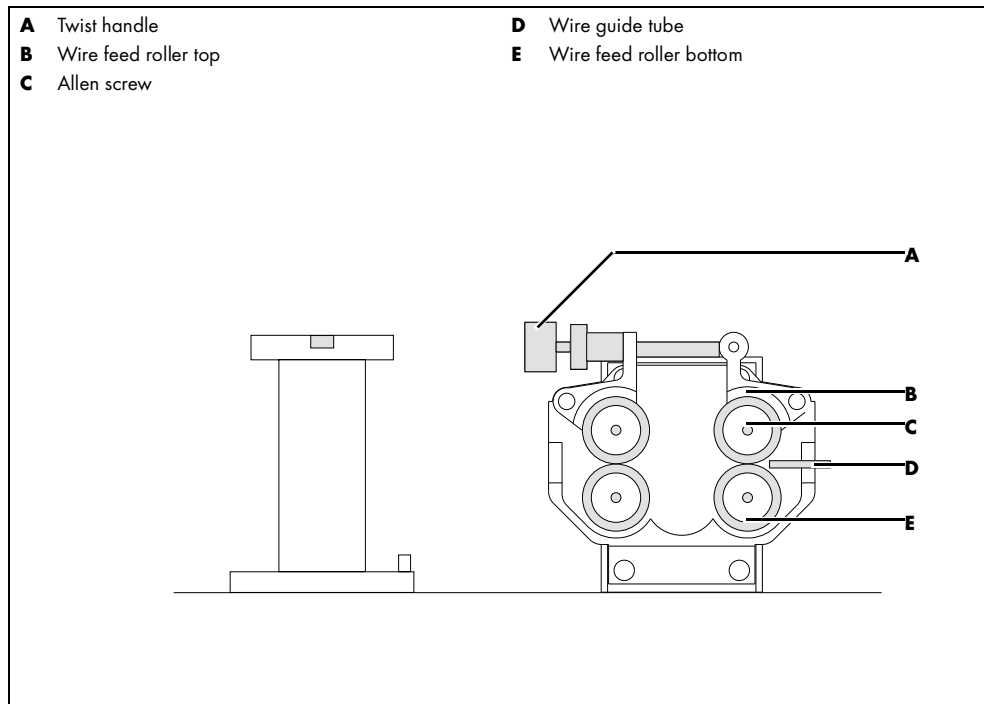
Replacing the wire feed roller (**D**). The correct wire feed roller with the corresponding groove must be inserted for the wire used in each case. To replace the wire feed rollers, unscrew the knurled screws (**C**). Ensure that the groove of the wire feed rollers is perfectly aligned with the wire guide tubes (**B**). The contact pressure of the wire feed roller must be set with the spring-pressure unit (**A**) in such a way that the wire is fed in uniformly when the cable assembly is extended, and that the wire slides rather than buckles when it is held at the contact tip nozzle.

#### Wire spool brake

The wire-holding arbor (**F**) is equipped with a spool brake to prevent the wire spool (**G**) from continuing to run when the wire feeder motor stops. Turn the Allen screw (**E**) clockwise to increase the braking effect.

## 11.2 DVK4 – 140 W motor

**Fig. 18** 140 W wire feed motor



### 4-roller drive

Four interlocking wire feed rollers ensure that the welding wire is conveyed securely. The correct wire feed roller with the corresponding groove must be inserted for the wire used in each case. Both sides of each wire feed roller can be used. To turn or replace the wire feed rollers, unscrew the Allen screws (**C**). Ensure that the groove of the wire feed rollers (**B**) and (**E**) is perfectly aligned with the wire guide tube (**D**). The wire feed rollers are to be inserted as follows for the processing of solid wire:

- 1 The upper wire feed rollers (**B**) with a smooth surface
- 2 The lower wire feed rollers (**E**) with a V-shaped groove according to the wire diameter to be processed (0.8/1.0/1.2/1.6 mm).

The knurled groove is designed for the processing of flux-cored wire or tubular wire. The contact pressure of the wire feed roller must be set with the twist handle (**A**) in such a way that the wire is fed in uniformly when the cable assembly is extended and that the wire slides rather than buckles when it is held at the contact tip nozzle.

## 11.3 Wire guiding in the welding torch cable assembly

The friction resistance of the welding wire in the wire guide coil increases with the length of the cable assembly. Therefore, the cable assembly should only be as long as necessary. When processing aluminium welding wire, it is recommended that you replace the wire guide spiral with a Teflon wire guide liner. The torch cable assembly must not exceed a length of 3 m. It is recommended that you air-blast the wire guide spiral and the wire guide tube with compressed air after you finish welding one roll of wire. The gliding quality of the wire guide spiral deteriorates in accordance with the amount of wire that is fed and the wire properties. If wire guiding deteriorates noticeably, replace the wire guide spiral.

## 12 Remote control socket

Tab. 6 Remote control socket pin assignment

PIN	Name	Description
A/1	U-actual	Output signal between 0 V and +10 V. The current welding voltage is output here in the ratio 10:1 for control purposes. Example: 40 V welding voltage = 4.0 V signal voltage, input impedance must be $\geq 10\text{k}\ \Omega$ . The reference potential is pin 3.
B/2	I-actual	Output signal between 0 V and +10 V. The current welding current is output here in the ratio 100:1 for control purposes. Example: 100 A welding current = 1 V signal voltage, input impedance must be $\geq 10\text{k}\ \Omega$ . The reference potential is pin 3.
C/3	GND	Ground (mass) potential for pin 1, 2, 4, 5
D/4	Master voltage 2	Input signal for function EC 2 1. A potentiometer (between pin 3 (0 V) and pin 6 (+10 V)) can be used here to create and change the control signal. 2. A master voltage of between 0 V and max. +10 V can also be created (reference potential pin 3).
E/5	Master voltage 1	Input signal for function EC 1 1. A potentiometer (between pin 3 (0 V) and pin 6 (+10 V)) can be used here to create and change the control signal. 2. A master voltage of between 0 V and max. +10 V can also be created (reference potential pin 3).
F/6	+10 V	+10 V reference output voltage for potentiometer control pin 4, 5. The maximum permitted output current is 10 mA.
G/7	+24 V	+24 V reference output voltage for the switch signals pin 8, 9, 10. The maximum permitted output current is 10 mA.
H/8	T-BT	Torch trigger input signal for MIG/TIG torch, supply with pin 7. Start signal for automation.
J/9	T up	Input signal of an up/down torch; here the increasing (up) signal, supply with pin 7.
K/10	T down	Input signal of an up/down torch; here the decreasing (down) signal, supply with pin 7.
L/11	Power is flowing	Potential-free make contact. When power is flowing in the machine, this contact is closed. It is opened as soon as power is interrupted. Maximum voltage 48 V, maximum power 1 A.
M/12	Power is flowing	
13-17	Free	Not assigned

⇒ More details in the circuit diagram

## 13 Welding torch with display

### NOTICE

Only replace the torch when the machine is switched off.

### 13.1 Functions (sorted by control box)

**Tab. 7** Functions sorted by control box

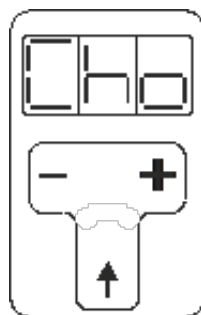
	Hnd	Cor	Sol	Mod	Cho	Sts	bUb	PrG	PoG	Job	CSC	CEC	SPt
MC1	■	■	■*	■	■	■	■	■	■	■	■	■	■
MC2	■	■	■*	■	■	■	■						■

⇒ \* This function is active during welding.

**Tab. 8** Description of abbreviations from Tab. 7 on page EN-29

Abbreviation	Description
Hnd	Manual mode
Cor	Voltage adjustment (automatic mode)
Sol	Power
Mod	Mode (see 14.1 on page EN-30)
Cho	Throttle strength
Sts	Start speed
bUb	Burn back
PrG	Gas pre-flow time
PoG	Gas post-flow time
Job	Job (see 14.2 on page EN-30)
CSC	Crater start current
CEC	Crater end current
SPt	Spot time

⇒ CSC and CEC are only active when the crater function is used



Tap the arrow button to switch between the individual functions. You can use the "+" and "-" buttons to change the value. The changes are displayed simultaneously on the MC control box

## 14 Functions with extended selection

### 14.1 MODE function (Mod)

2-Step/4-step/spot - crater mode:

Use the “-” button to switch between 2-step (2) and 4-step (4) mode. (Left-hand display shows 2 or 4)

Use the “+” button to switch between normal operation (-), spot (S) or crater (C) welding. (Right-hand display shows - or S or C)

#### 14.1.1 Automatic or manual welding mode

Display: “Mod”:

Press and hold the “-” button to switch between automatic (A) and manual (H) mode (middle display shows A or H).

### 14.2 Job function

#### 14.2.1 Access a single job

Repeatedly press the arrow button until ‘Job’ appears on the display. Use the “+” or “-” button to select the relevant job number and confirm this using the arrow button. The job, e.g. no. 2, is selected (= appears on the display). Note: = → job selected, u → job number used, F → job number free

#### 14.2.2 Several jobs in sequence

It is possible to store several jobs in sequence and to switch between the individual jobs during welding. This is useful if, for example, a component has to be welded using different levels of welding power but the welding process must not be interrupted.

##### NOTICE

The jobs must all have the same wire diameter and gas type. It is, however, possible to use e.g. standard MIG/MAG and adjust the power setting. The job sequence must always be delimited with a free job at the start and end.

Example: Job 1 - free, Job 2 - MIG 160 A, Job 3 - power 250 A, Job 4 - MIG 100 A, Job 5 - free. In this example, you can use the “+” and “-” buttons during welding to switch between jobs 2, 3 and 4.

Several such job sequences can be programmed. These must always be separated by a free job. To activate a job sequence, select a job from this sequence and use the arrow button to call it up. When the torch display has returned to normal (approx. 3 seconds), you can use the “+” and “-” buttons to switch between the jobs.

##### NOTICE

If an error occurs in the job sequence (e.g. different gases/material), the sequence cannot be activated.

To switch the “+” and “-” buttons back to their power regulation function, select a free job, e.g. (F 1), in the “Job” menu and press the arrow button to confirm it.

## 15 Welding torch cooling/coolant

### NOTICE

Max. operating pressure: 3.2 bar

### Procedure

Welding torch cooling is based on the function of a recooling system, i.e., the coolant is cooled down to a temperature close to room temperature by a heat exchanger, using the room air circulated by the fan.

### Water-cooled torch

An integrated water cooling system with a low-noise pump cools the torch. The water tank should be almost full. If water is lost when the torch or intermediate cable assembly is replaced, the water level in the tank must be checked.

### Monitoring water flow

In the event of insufficient cooling water or flow (less than 0.25 l/min), a sensor switches the control system off and the error message "Err H2o –" is shown in the display.

Once the cause of the water shortage is eliminated, you can switch the machine off and back on again to continue working.

### Checking water flow

If you press and hold down the "l/min" button, the water pump is activated and the current water flow volume is immediately displayed in the right-hand display (e.g. 1.15 l/min). If this value is less than 0.25 l/min, the current water flow is insufficient and the pump is automatically switched off after 5 seconds. Troubleshooting see section 17 Troubleshooting on page EN-31.

### NOTICE

ONLY use JPP coolant (order no. 900.020.400)

- Unsuitable coolant may cause damage and result in loss of the manufacturer's warranty.
- Do not add water or other coolant.
- Do not weld without coolant! The tank must always be full.
- The pump must now be allowed to run dry, even for a short time. Vent the pump.
- Harmful to health – keep out of reach of children!
- The SAFETY DATA SHEET can be accessed on [www.jess-welding.com](http://www.jess-welding.com)
- Frost-resistant to  $-30^{\circ}\text{C}$

## 16 Overheating

If extended use and very hot ambient conditions lead to the machine overheating, it will be switched off and welding can no longer continue until it has cooled down again. Should this occur, text such as the following will appear on the control panel's display:

⇒ t°C -03 - hot

⇒ t°C = hot = temperature too high

## 17 Troubleshooting



### DANGER

Risk of injury and device damage when handled by unauthorized persons  
Improper repair work and modifications to the product may lead to serious injuries and damage to the device. The product warranty will be rendered invalid if work is carried out on the product by unauthorized persons.

Only qualified personnel are permitted to perform work on the device or system.



Tab. 9 Troubleshooting

Fault	Cause	Troubleshooting
Display shows T°C - 01/02/03 - hot	Machine is overheating	Allow the machine to cool down with the fan running
	Thermal sensor cable interrupted	Find and eliminate the interruption
	Incorrect machine type set in the control box	Contact the service partner
Display shows T°C - int - e.g. +56	Ambient temperature is below -10°C or above +50°C	Restore the machine to the normal temperature range
	Thermal sensor in the control box is defective	Replace the control box, have the sensor repaired
Display shows Err H2o – (continuously) (To delete, switch the machine off and back on again)	Water tank is empty	Refill with water and methylated spirit in the ratio 4:1
	Water flow is below 0.5 l/min	Check the water flow (torch/lines)
	Flow meter is defective	Replace flow meter
Main switch ON, 1 or 2 green control lamps on the front panel do not light up (see 6 Functional description on page EN-10)	One or more supply phases have stopped working	Check the mains supply cable and fuse
	Fuse in front panel is defective	Replace 2 AT fuse
Main switch ON, green control lamps are lit, MC control box not functioning	Fuse for the secondary control transformer is faulty	Replace 6.3 AT fuse
	Fuse in the MC control box is defective	Remove and open the control box, replace 6.3 AT fuse
	Cable in the intermediate cable assembly is defective	Check the 5-pole cable in the intermediate cable assembly
No function when pressing the torch trigger	Torch trigger is defective	Repair the torch trigger
	Torch control line interrupted	Check the torch control line
	MC control box is defective	Replace the control box, have the control box checked
Wire feeder motor is not running	MC control box is defective	Replace the control box, have the control box checked
	Wire feed motor is defective	Replace the wire feed motor, check the contact pins (carbons)
	Cable connection between the control box and motor interrupted	Check the cable connection
The wire between the wire feed roller and the wire guide tube buckles	Contact pressure of the wire feed rollers is too high	See 11.1 on page EN-26
	The distance between the wire feed roller and the guide tube is too great	Check the distance/re-adjust the wire guide tube
Irregular wire feed	Poor uncoiling of the wire from the wire spool	Check/re-insert the wire coil
	Wire-holding arbor does not run smoothly	Check the wire-holding arbor
	Incorrect wire feed roller	See 11.1 on page EN-26
	Wire guide tube or wire guide spiral is soiled/defective	See 11.1 on page EN-26
	Contact tip blocked/defective	Clean/replace the contact tip
	Welding wire dirty/starting to rust	Replace the welding wire
	Wire guide tube is not aligned with the groove of the wire feed roller	See 11.1 on page EN-26

Tab. 9 Troubleshooting

Fault	Cause	Troubleshooting
Porous weld seam	Surface of workpiece is soiled (dye, rust, oil, grease)	Clean the surface
	No shielding gas (solenoid valve does not open)	Check/replace the solenoid valve, check the gas cylinder
	Insufficient shielding gas	Check the shielding gas volume at the pressure regulator
Use a gas measuring tube to check the gas duct for gas loss		
Wire burns back into the contact tip at the start of welding	Defective wire feed; wire feed rollers slipping	See 11.1 on page EN-26

## 18 Table of ERROR CODES and errors

Tab. 10 Table of error codes and errors

Error CODE	Cause	Troubleshooting
E02	Mains overvoltage (>480 V) or mains undervoltage (<350 V)	Check the mains voltage
E11 to E14 E24	Temperature sensors 1-4 Interruption/short circuit	Check temperature sensor lines, check sensors
E80	Incorrect machine configuration inoMIG / tecMIG / conMIG	Check the machine type in the control box
E81	Incorrect software version in machine or control box	Update the software
E88	Encoder motor defective, cable interruption, incorrect motor type set	Check the encoder and cable, check the motor type
E91/E92	Control box configured incorrectly, e.g. duplicated case location	Check the control box configuration
E94/E95	Incorrect data transmission via CAN line	Check the line
E96/E97	Incorrect CAN protocol	Check the control box configuration
E99 - CAN	Communication between the case (control box MC) and welding device completely disconnected	Defective intermediate cable assembly, defective plug, defective control box MC or control board in the machine

Tab. 11 Table of error codes and errors with MC-R board

Error CODE	Cause	Troubleshooting
E71	Overheating on the MC-R board	Check the ambient temperature of the MC-R board
E73/74/75	Faulty data transmission via CAN line, incorrect CAN protocol	Check line, check the control box configuration
E78	Encoder motor defective, cable interruption, incorrect motor type set	Check the encoder and cable, check the motor type
E79	Incorrect data transmission via CAN line, communication between case and welding device completely disconnected	Check the line, check for cable breakage in the intermediate cable assembly, a defective plug or defective control board in the machine

## 19 Material table

The following materials are programmed in the control system by default:

Tab. 12 Material table

Material	Display MC	Gas	Display MC	Diameter (mm)
Steel*	St	Argon 82%, CO <sub>2</sub> 18% - MIX 18	Ar82	0.8-1.0-1.2-1.6
Steel*	St	Argon 90%, CO <sub>2</sub> 5%, O <sub>2</sub> 5%	Ar90	0.8-1.0-1.2-1.6
Steel*	St	CO <sub>2</sub>	CO <sub>2</sub>	0.8-1.0-1.2-1.6
CrNi 4316 - ER308	4316	Argon 98%, CO <sub>2</sub> 2% - MIX 2	Ar98	0.8-1.0-1.2
CrNi 4576	4576	Argon 98%, CO <sub>2</sub> 2% - MIX 2	Ar98	0.8-1.0-1.2
ALMG 5	ALnG	Argon 100% (Ar)	Ar	1.0-1.2
ALSi 5	ALSi	Argon 100% (Ar)	Ar	1.0-1.2
CuSi 3	CuSi	Argon 100% (Ar)	Ar	0.8-1.0
Metal flux-cored wire T424 MC2 H5	nEPU	Argon 82%, CO <sub>2</sub> 18% - MIX 18	Ar82	1.2
Basic flux-cored wire T424 BC4 H5	bASI	Argon 82%, CO <sub>2</sub> 18% - MIX 18	Ar82	1.2
Rutile flux-cored wire T422 PC1 H5	ruti	Argon 82%, CO <sub>2</sub> 18% - MIX 18	Ar82	1.2

## \* Special programs (arcs) available

1. CSt: Reduced-power, cold short arc (cold steel)

Welding with a cold arc with reduced power.

Advantages: excellent gap bridging (including vertical down), low heat input, reduced distortion. Suitable for root welds and sheet-metal welds, including in the MIG soldering process.

Material	Display MC	Gas	Display MC	Diameter (mm)
Steel	CSt	Argon 82%, CO <sub>2</sub> 18% - MIX 18	Ar82	0.8-1.0-1.2

2. PSt: concentrated, high-pressure spray arcs (Power Steel)

Welding with a concentrated, high-pressure arc.

Advantages: very good root and side fusion, high welding speed, low heat input. Stable and controllable welding arc in the upper welding power range.

Material	Display MC	Gas	Display MC	Diameter (mm)
Steel	PSt	Argon 82%, CO <sub>2</sub> 18% - MIX 18	Ar82	0.8-1.0-1.6

3. rSt: Spatter-reduced short arcs (root steel):

Welding with a concentrated, high-pressure arc

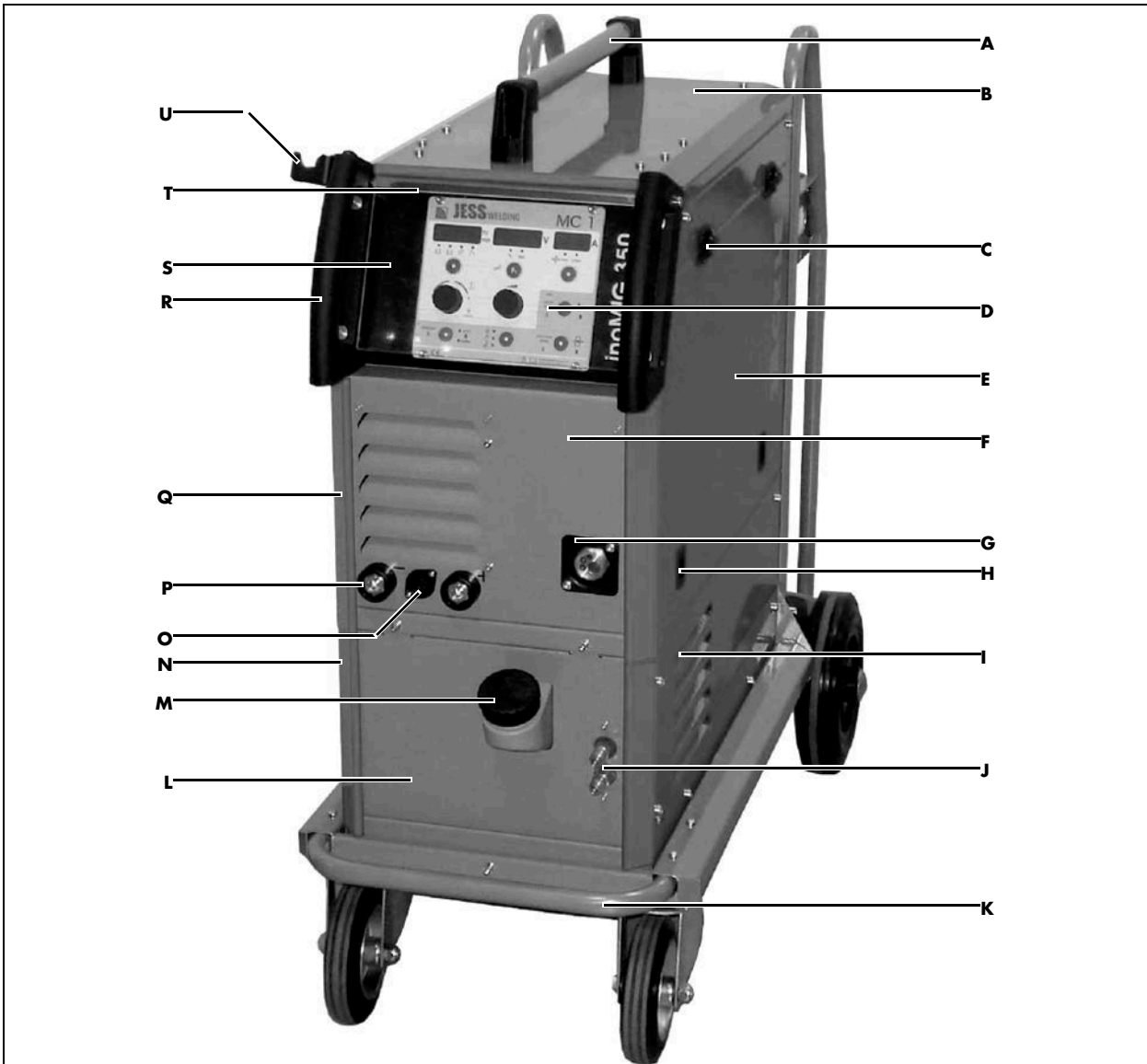
Advantages: very good root and side fusion, high welding speed, low heat input. Stable and controllable welding arc in the upper welding power range.

Material	Display MC	Gas	Display MC	Diameter (mm)
Steel	rSt	Argon 82%, CO <sub>2</sub> 18% - MIX 18	Ar82	0.8-1.0-1.2

20 Spare parts list

20.1 Spare parts list for the inoMIG 300/400

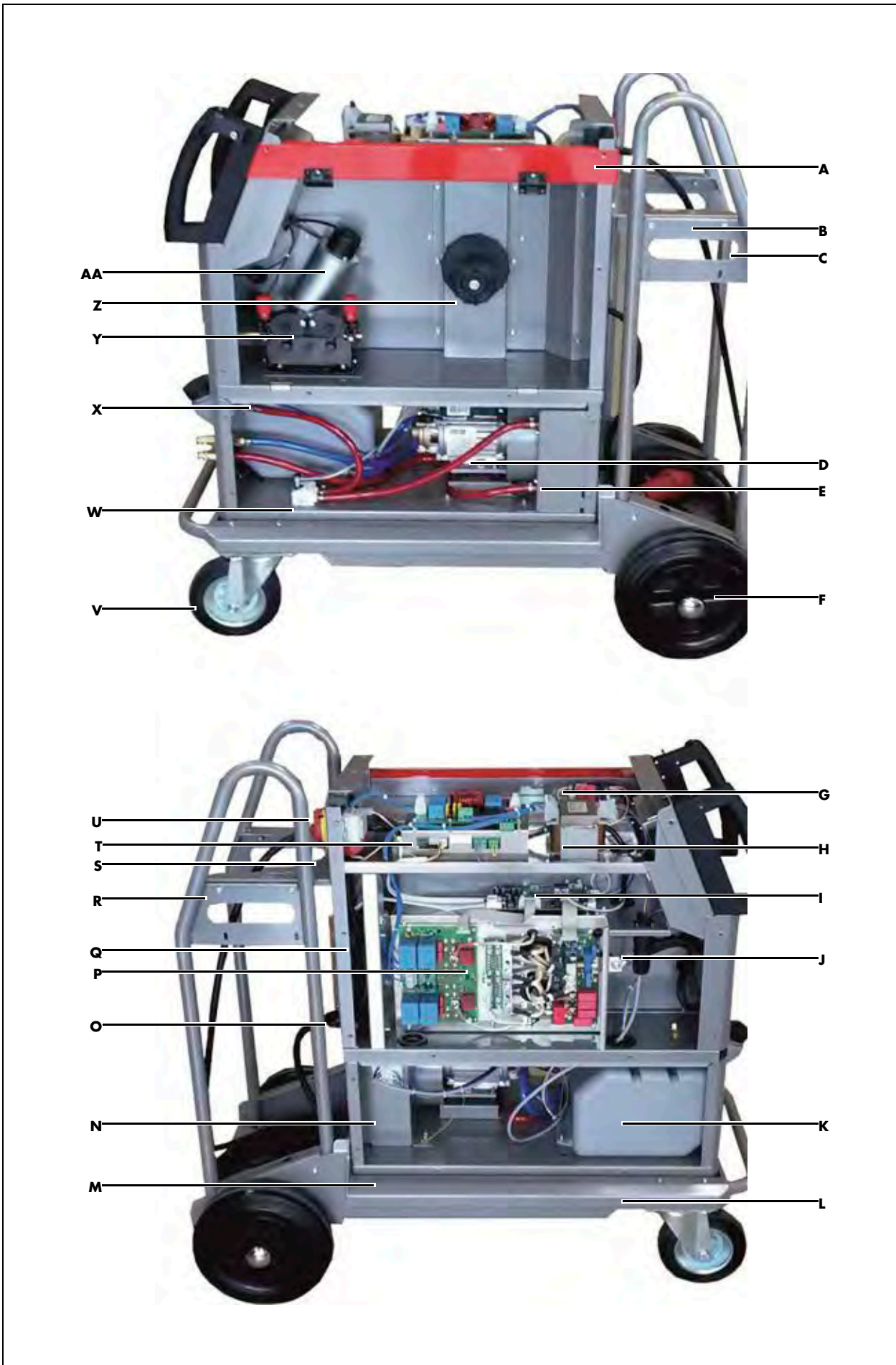
Fig. 19 Front view of inoMIG 300/400



**Tab. 13** External spare parts list for **inoMIG 300/400**

<b>No.</b>	<b>Name</b>	<b>Item no.</b>
<b>A</b>	Handle, complete	715.032.059
<b>B</b>	Hood	715.032.071
<b>C</b>	Hinge plate	715.032.073
	Hinge	303.032.005
<b>D</b>	MC1 control box	851.044.001
	MC2 control box	851.044.002
	Fine-wire fuse T 6,3 A control board	464.036.010
	Knob 28 mm	305.042.010
	Cover for knob	305.042.010
<b>E</b>	Right flap	715.032.072
<b>F</b>	Front section inoMIG 350/400	715.032.032
<b>G</b>	Insulating flange for central connection socket	455.042.011
<b>H</b>	Plastic lock (seal)	303.625.007
<b>I</b>	Right side panel KG 10	715.032.555
<b>J</b>	Quick-action coupling DN5-G1/4I	355.014.007
<b>K</b>	Protective guard, front FG 10	715.032.650
<b>L</b>	Front panel KG 10	715.032.553
<b>M</b>	Tank cap screw thread	308.400.010
<b>N</b>	Left side panel KG10	715.032.556
<b>O</b>	7-pole remote control socket	410.007.111
	7-pole remote control plug	410.007.092
<b>P</b>	Panel socket BEB 35-50	422.031.024
<b>Q</b>	Left side panel	715.032.165
<b>R</b>	Handle, large 2010	305.044.001
<b>S</b>	Front panel for MC box	715.032.318
<b>T</b>	Protective glass pane cpl. for handle	705.032.311
<b>U</b>	Torch holder left	715.044.229

Fig. 20 inoMIG 300/400 Side view

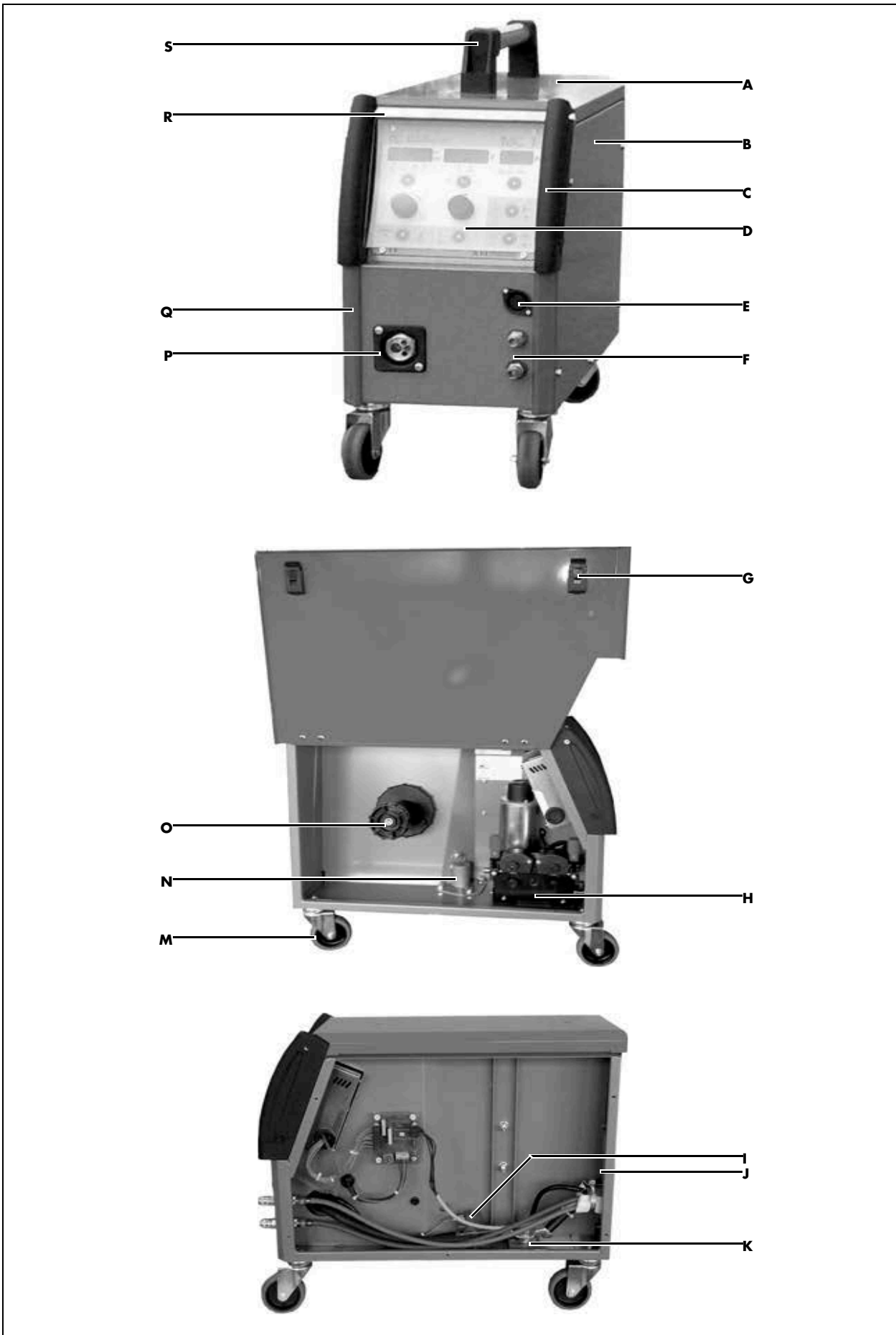


Tab. 14 Internal spare parts list for inoMIG 300/400

Pos.	Name	Item no.
<b>A</b>	Solenoid valve DN 2.5/42 V G 1/8	465.018.009
	Gas hose	709.150.001
<b>B</b>	Chain, 20 links	101.040.020
<b>C</b>	Retaining bracket for bottle, right FG10	715.032.642
<b>D</b>	Pump with fan propeller 400 V/50-60 Hz	456.220.300
	Stop buffer type A20 × 15-M6	310.215.030
	Capacitor 6.0 µF	453.230.002
<b>E</b>	Heat exchanger KG10	521.001.501
	Cooling side panel pump KG10	715.044.327
<b>F</b>	Solid rubber wheel, diameter 250 mm	301.250.009
	Starlock cap 25 mm	301.025.010
<b>G</b>	PCB MC - DVV V1.00	600.044.030
<b>H</b>	Control transformer 230/400 V 42 V 160 VA	462.042.016
<b>I</b>	PCB RPI1-CONT	600.032.011
<b>J</b>	Plug, 9-pole KG10 complete	410.009.001
<b>K</b>	Tank, plastic KG10	305.044.050
<b>L</b>	Moving carriage FG10	715.032.640
<b>M</b>	Bottom panel KG10	715.032.551
<b>N</b>	Mounting panel KG10	715.044.322
<b>O</b>	Mains cable 4 × 2.5 mm <sup>2</sup> , 5 m, plug 16 A	704.025.013
	Mains cable 4 × 4 mm <sup>2</sup> , 5 m, plug 32 A	704.040.014
	Cable gland M25 × 1.5	420.025.001
	Counternut cable connection M25 × 1.5	420.025.002
<b>P</b>	Inverter block inoMIG 350	600.032.010
	Inverter block inoMIG 400	600.032.025
<b>Q</b>	Fan 12 V DC (3212 JH) - inoMIG 350	450.092.005
	Fan 24 V DC - inoMIG 400	450.119.005
<b>R</b>	Bottle holder FG10	715.032.649
	Retaining bracket for bottle, left FG10	715.032.645
<b>S</b>	17-pole panel socket for remote control	410.017.099
	17-pole cable plug	410.017.100
	Protective cap	310.350.051
<b>T</b>	EMC/power supply unit RPI-SUP32/150 W	600.032.020
<b>U</b>	Main switch	440.233.010
<b>V</b>	Guide castor, diameter 160 mm	301.160.001
<b>W</b>	Water flow meter	444.000.001
<b>X</b>	Bottom panel for inoMIG 350/400	715.032.031
<b>Y</b>	Complete wire feed unit: Drive plate and motor/encoder	455.042.120
	Wire feed roller 0.8/1.0 for steel	455.037.001
	Wire feed roller 1.0/1.2 for steel	455.037.002
	Wire feed roller 1.0/1.2 for aluminium	455.037.003
<b>Z</b>	Wire-holding arbor	306.050.001
<b>AA</b>	Wire feed motor 110 W, 42 V solo with encoder SE22-150	455.042.500

20.2 Spare parts list for DVK3

Fig. 21 Spare parts list for DVK3



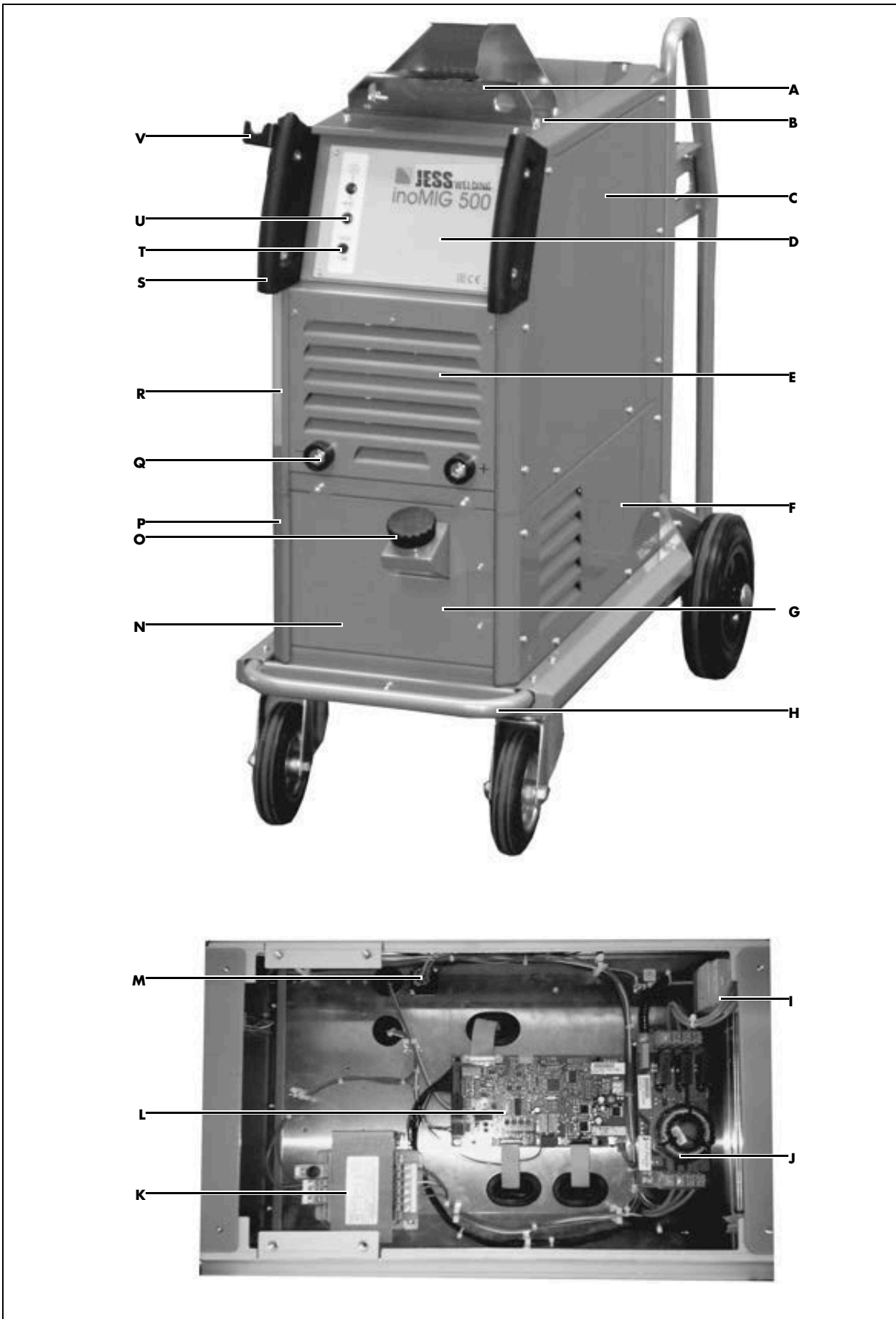


Tab. 15 Spare parts list for DVK3

Pos.	Name	Item no.
<b>A</b>	Hood DVK3 - 2010	715.042.206
<b>B</b>	Right side panel DVK3 - 2010	715.042.207
<b>C</b>	Plastic handle, small	305.044.002
<b>D</b>	MC1 control box	851.044.001
	Fine-wire fuse T 6,3 A control board	464.036.010
	Knob 28 mm	305.042.010
	Cover for knob	305.042.011
<b>E</b>	7-pole Tuchel plug	410.007.111
<b>F</b>	Quick-action coupling DN 5- G 1/4 I	355.014.007
	PVC washer, red	101.011.047
	PVC washer, blue	101.011.048
<b>G</b>	Plastic lock (seal)	303.625.007
<b>H</b>	Complete wire feed unit: Drive plate and motor/encoder	455.042.120
	Wire feed motor 110 W, 42 V solo with encoder SE22-150	455.042.500
	Wire feed roller 0.8/1.0 for steel	455.037.001
	Wire feed roller 1.0/1.2 for steel	455.037.002
	Wire feed roller 1.0/1.2 for aluminium	455.037.003
<b>I</b>	Solenoid valve DN 2.5/42 V G 1/8	465.018.009
<b>J</b>	Connection plate for internal connection	715.042.041
<b>K</b>	Current connection plate	703.011.006
<b>L</b>	PCB MC - DVV V2.20	600.044.031
<b>M</b>	Guide castor D75 × 22 mm	301.075.007
<b>N</b>	Case holder	715.042.014
<b>O</b>	Wire-holding arbor	306.050.001
<b>P</b>	Insulating flange for central connection socket	455.042.011
<b>Q</b>	Left flap DVK3 - 2010	715.042.204
<b>R</b>	Protective glass pane, small handles	705.042.260
<b>S</b>	Handle, plastic part	305.235.002
	Handle tube DVK3 - 2010	715.042.220

20.3 Spare parts list for the inoMIG 500

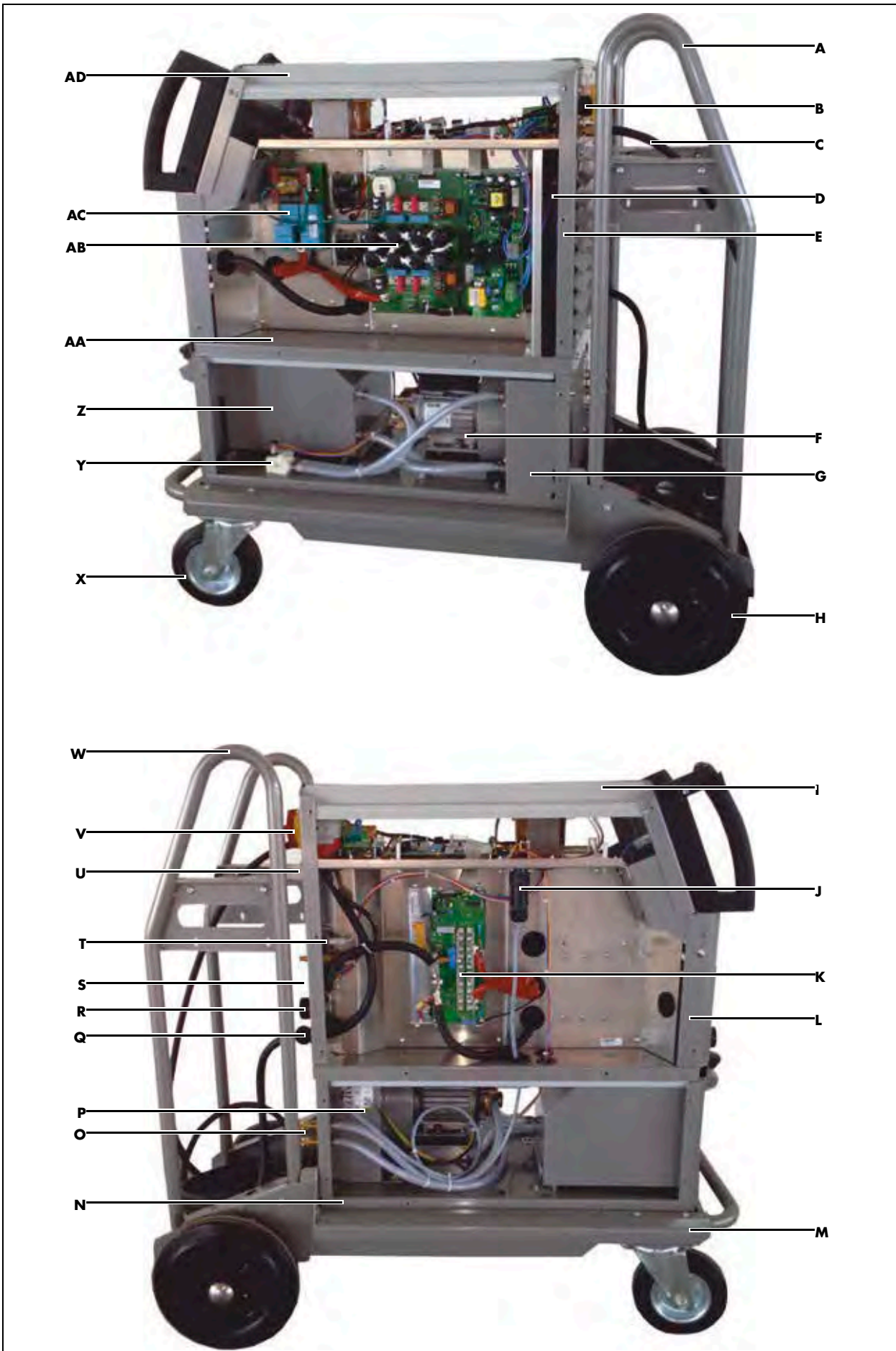
Fig. 22 Front view of inoMIG 500



**Tab. 16** External spare parts list for **inoMIG 500**

<b>Pos.</b>	<b>Name</b>	<b>Item no.</b>
<b>A</b>	Turning mandrel DVK3	715.032.163
	Turning mandrel DVK4	715.044.342
<b>B</b>	Hood	715.032.160
<b>C</b>	Right side panel	715.032.166
<b>D</b>	Front foil inoMIG 500	304.032.305
<b>E</b>	Front section inoMIG 500	715.032.152
<b>F</b>	Right side panel KG10	715.032.555
<b>G</b>	Blind plate KG10	715.032.510
<b>H</b>	Protective guard, front FG10	715.032.650
<b>I</b>	Main switch	440.233.010
<b>J</b>	EMC filter INV41EMV	600.032.305
<b>K</b>	Control transformer 42 V, 160 VA	462.042.016
<b>L</b>	Control PCB J11-Cont	600.032.311
<b>M</b>	9-pole socket, round	999.004.196
<b>N</b>	Front panel KG 10	715.032.553
<b>O</b>	Tank cap screw thread	308.400.010
<b>P</b>	Left side panel KG10	715.032.556
<b>Q</b>	Panel socket BEB 35-50	422.031.024
<b>R</b>	Left side panel	715.032.165
<b>S</b>	Handle, large 2010	305.044.001
<b>T</b>	Fuse holder, complete	464.601.001
	2 AT fuse	464.020.014
<b>U</b>	Indicator lamp, 400 V green	463.400.001
<b>V</b>	Torch holder left	715.044.229

Fig. 23 Side view of inoMIG 500

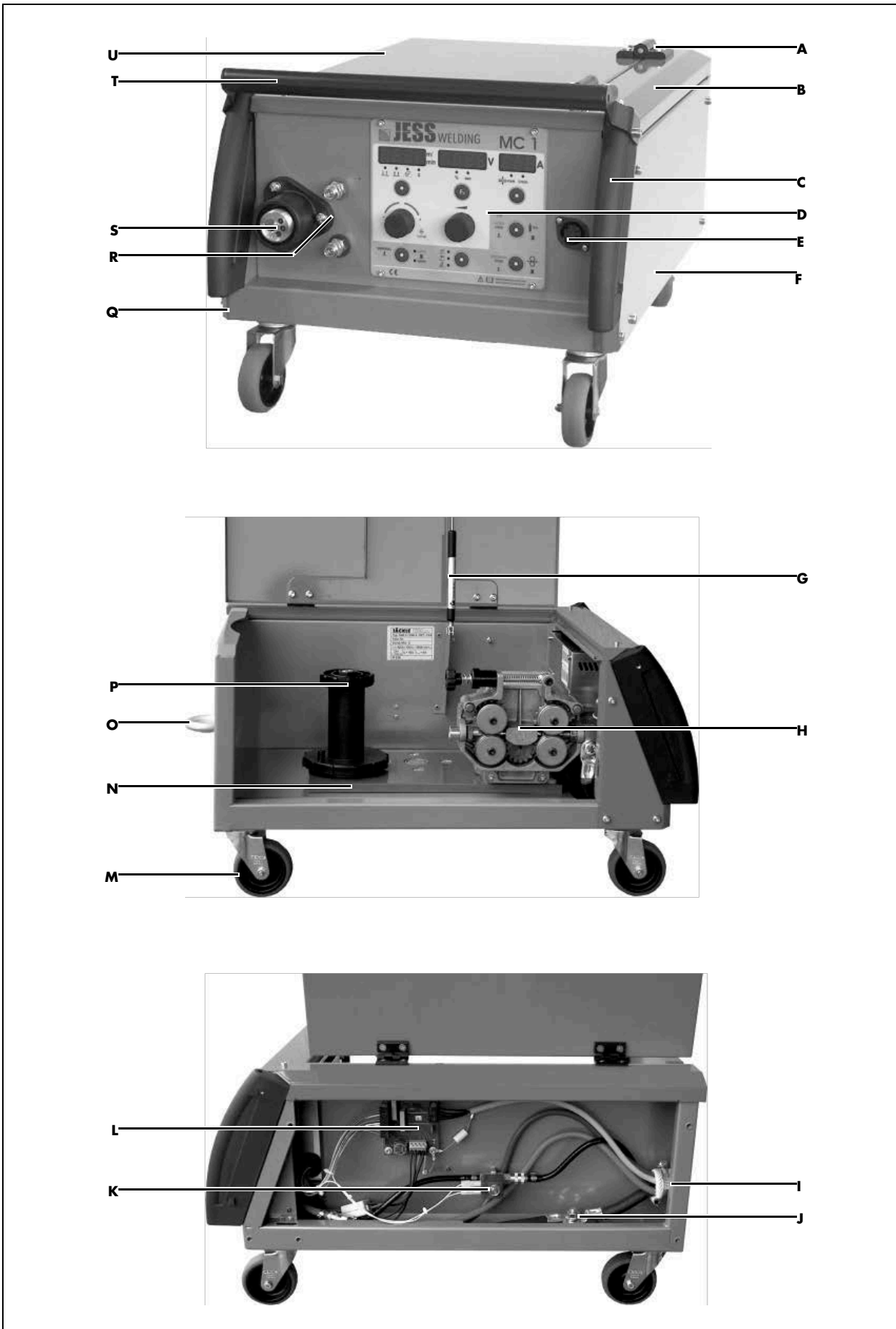


Tab. 17 Internal spare parts list for inoMIG 500

Pos.	Name	Item no.
<b>A</b>	Retaining bracket for bottle, right FG10	715.032.642
<b>B</b>	17-pole panel socket for remote control	410.017.099
	17-pole cable plug	410.017.100
	Protective cap	310.350.051
<b>C</b>	Gas hose	709.150.001
<b>D</b>	Axial fan 130 mm; H = 38 mm	450.130.002
<b>E</b>	Rear section inoMIG 500	715.032.360
<b>F</b>	Pump with fan propeller 400 V/50-60 Hz	456.220.400
	Stop buffer type A20 × 15-M6	310.215.030
	Capacitor 6.0 µF	453.230.002
<b>G</b>	Heat exchanger KG10	521.001.501
	Cooling side panel pump KG10	715.044.327
<b>H</b>	Solid rubber wheel, diameter 250 mm	301.250.009
	Starlock cap 25 mm	301.025.010
<b>I</b>	Left strut ProPuls 2010	703.032.155
<b>J</b>	Plug, 9-pole KG10 complete	410.009.001
<b>K</b>	Secondary block PCB INV41SEK-E	600.032.304
<b>L</b>	Front section inoMIG 500	715.032.152
<b>M</b>	Moving carriage FG10	715.032.640
<b>N</b>	Bottom panel KG10	715.032.551
<b>O</b>	Quick-action coupling DN 5-G1/4 A	355.014.001
<b>P</b>	Mounting panel KG10	715.044.322
<b>Q</b>	Mains cable 4 × 4 mm <sup>2</sup> , 5 m, plug 32 A	704.040.014
	Cable gland M25 × 1.5	420.025.001
	Counternut cable connection M25 × 1.5	420.025.002
<b>R</b>	Panel socket BEB 35-50	422.031.024
<b>S</b>	7-pole Tuchel plug with PE	410.007.092
<b>T</b>	Solenoid valve DN 2.5/42 V G 1/8	465.018.009
<b>U</b>	Bottle holder FG10	715.032.649
	Chain, 20 links	101.040.020
<b>V</b>	Main switch	440.233.010
<b>W</b>	Retaining bracket for bottle, left FG10	715.032.645
<b>X</b>	Guide castor, diameter 160 mm	301.160.001
<b>Y</b>	Water flow meter	444.000.001
<b>Z</b>	Tank, metal KG10	715.044.316
	Tank, plastic KG10	305.044.050
<b>AA</b>	Bottom panel	715.032.301
<b>AB</b>	Primary block PCB INV42PRIM	600.032.303
<b>AC</b>	PCB INV40PLC2	690.000.289
<b>AD</b>	Right strut ProPuls 2010	703.032.154

20.4 Spare parts list for DVK4

Fig. 24 Spare parts list for DVK4

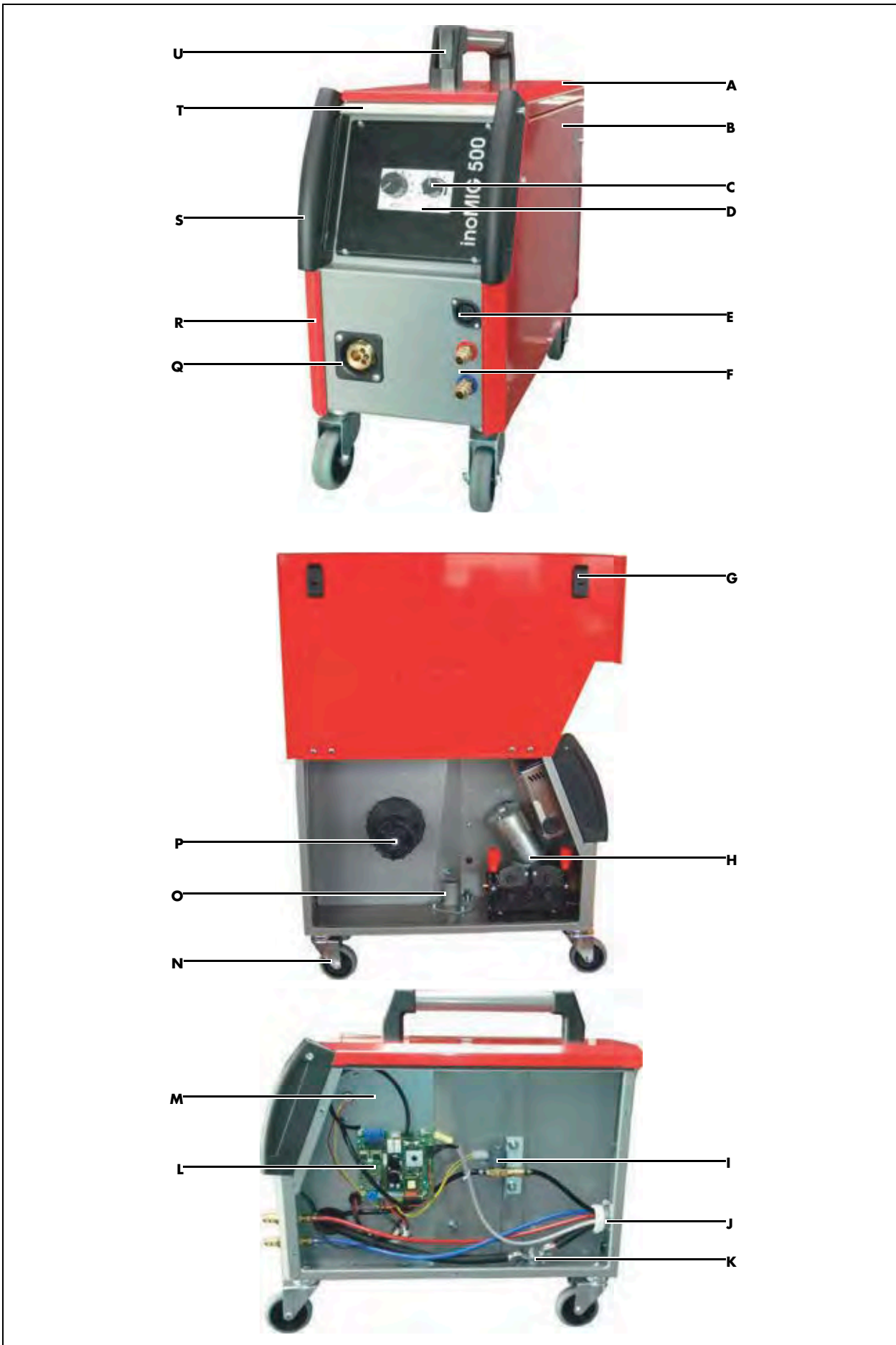


Tab. 18 Spare parts list for DVK4

Pos.	Name	Item no.
<b>A</b>	Hinge 40 × 40 mm	303.056.003
<b>B</b>	Hinge plate DVK4 - 2010	715.013.211
<b>C</b>	Plastic handle, small	305.044.002
	Torx screw PT60	271.060.001
<b>D</b>	MC1 control box	851.044.001
	Fine-wire fuse T 6,3 A control board	464.036.010
	Knob 28 mm	305.042.010
	Cover for knob	305.042.011
<b>E</b>	7-pole Tuchel plug	410.007.111
<b>F</b>	Right side panel DVK4 - 2010	715.013.213
<b>G</b>	Gas struts	303.013.010
<b>H</b>	Wire feed motor 140 W 42 V 4-roller	454.140.023
	Wire feed roller 0.8-1.0 mm	454.010.024
	Wire feed roller 1.0-1.2 mm	454.012.025
	Wire feed roller 1.6 mm, knurled	454.016.026
	Wire feed roller, smooth - knurled	454.000.027
<b>I</b>	Connection plate for internal connection	715.042.041
<b>J</b>	Current connection plate	703.011.006
<b>K</b>	Solenoid valve DN 2.5/42 V G 1/8	465.018.009
<b>L</b>	PCB MC - DVV V2.00	600.044.031
<b>M</b>	Guide castor D75 × 22 mm	301.075.007
<b>N</b>	Motor insulation plate DVK4 - 2010	101.013.039
<b>O</b>	Hoisting eye M12	D582 M12 V
<b>P</b>	Wire-holding arbor	306.050.003
<b>Q</b>	Hood corner DVK4 - 2010	715.013.212
<b>R</b>	Quick-action coupling DN 5- G 1/4 I	355.014.007
	PVC washer, red	101.011.047
	PVC washer, blue	101.011.048
<b>S</b>	Central socket, long DVK4 - 2010	425.133.010
	Wire guide tube 124 mm	425.124.001
	Insulating flange for Binzel central adapter	425.501.004
<b>T</b>	Transverse handle DVK4 - 2010	715.013.127
<b>U</b>	Hinged hood DVK4 - 2010	715.013.210

20.5 Spare parts list for DVK3-MC-R

Fig. 25 Spare parts list for DVK3-MC-R





Tab. 19 Spare parts list for DVK3-MC-R

Pos.	Name	Item no.
<b>A</b>	Hood DVK3 - 2010	715.042.206
<b>B</b>	Right side panel DVK3 - 2010	715.042.207
<b>C</b>	Knob 21 mm (optional)	305.020.050
	Cover for knob (optional)	305.020.051
<b>D</b>	Front panel MC-R	715.011.061
	Knob 28 mm (optional)	305.042.010
	Cover for knob (optional)	305.042.011
<b>E</b>	7-pole Tuchel plug	410.007.111
<b>F</b>	Quick-action coupling DN 5- G 1/4 I	355.014.007
	PVC washer, red	101.011.047
	PVC washer, blue	101.011.048
<b>G</b>	Plastic lock (seal)	303.625.007
<b>H</b>	Complete wire feed unit: Drive plate and motor/encoder	455.042.120
	Wire feed motor 110 W, 42 V solo with encoder SE22-150	455.042.500
	Wire feed roller 0.8/1.0 for steel	455.037.001
	Wire feed roller 1.0/1.2 for steel	455.037.002
	Wire feed roller 1.0/1.2 for aluminium	455.037.003
<b>I</b>	Solenoid valve DN 2.5/42 V G 1/8	465.018.009
<b>J</b>	Connection plate for internal connection	715.042.041
<b>K</b>	Current connection plate	703.011.006
<b>L</b>	Control board MC-R	600.044.045
<b>M</b>	Gas test trigger	441.507.009
<b>N</b>	Guide castor D75 × 22 mm	301.075.007
<b>O</b>	Case holder	715.042.014
<b>P</b>	Wire-holding arbor	306.050.001
<b>Q</b>	Insulating flange for central connection socket	455.042.011
<b>R</b>	Left flap DVK3 - 2010	715.042.204
<b>S</b>	Plastic handle, small	05.044.002
	Torx screw PT60	271.060.001
<b>T</b>	Protective glass pane, small handles	705.042.260
<b>U</b>	Handle, plastic part	305.235.002
	Handle tube DVK3 - 2010	715.042.220

21 Circuit diagrams

21.1 inoMIG 350/400

Fig. 26 Compact machine

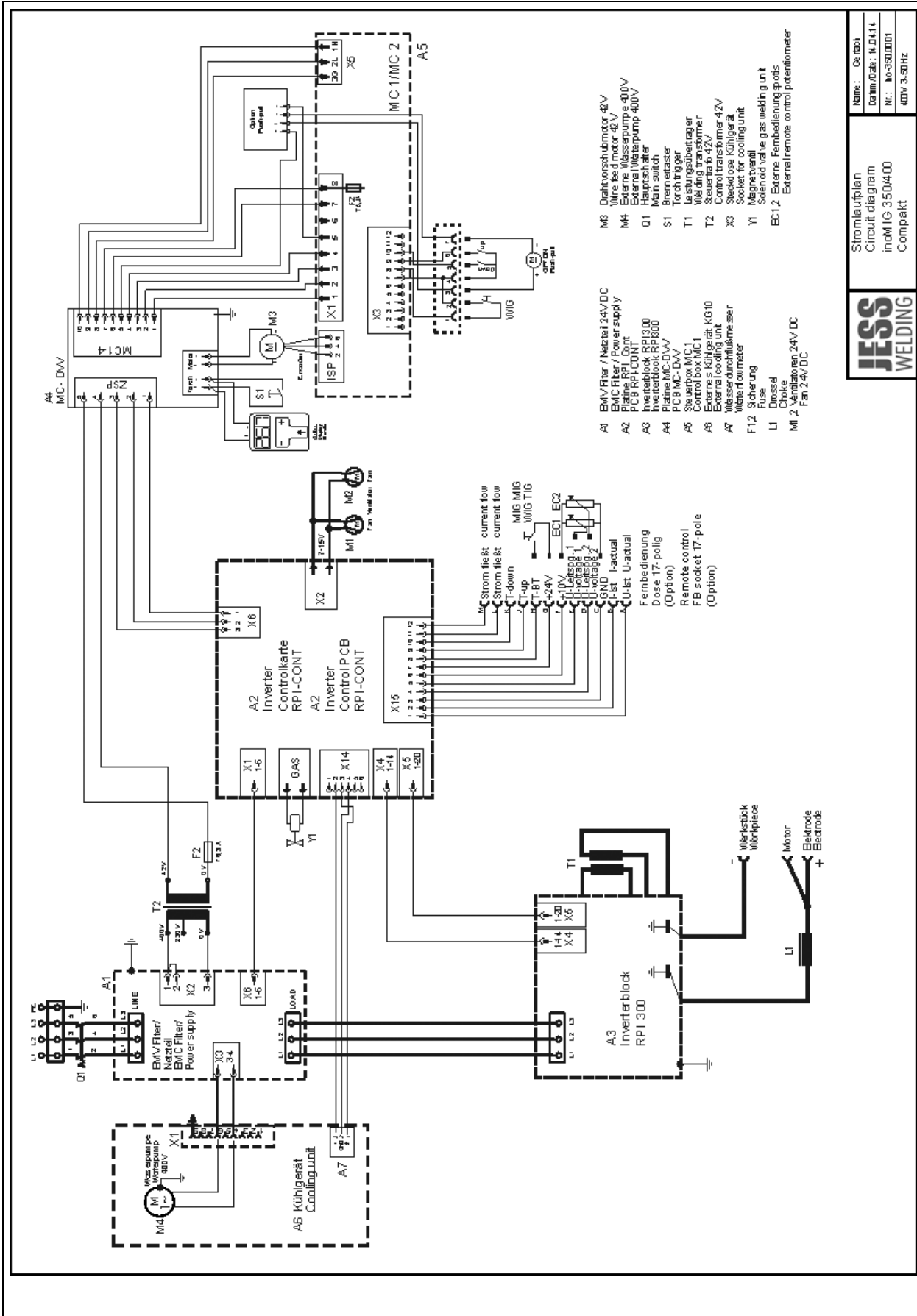
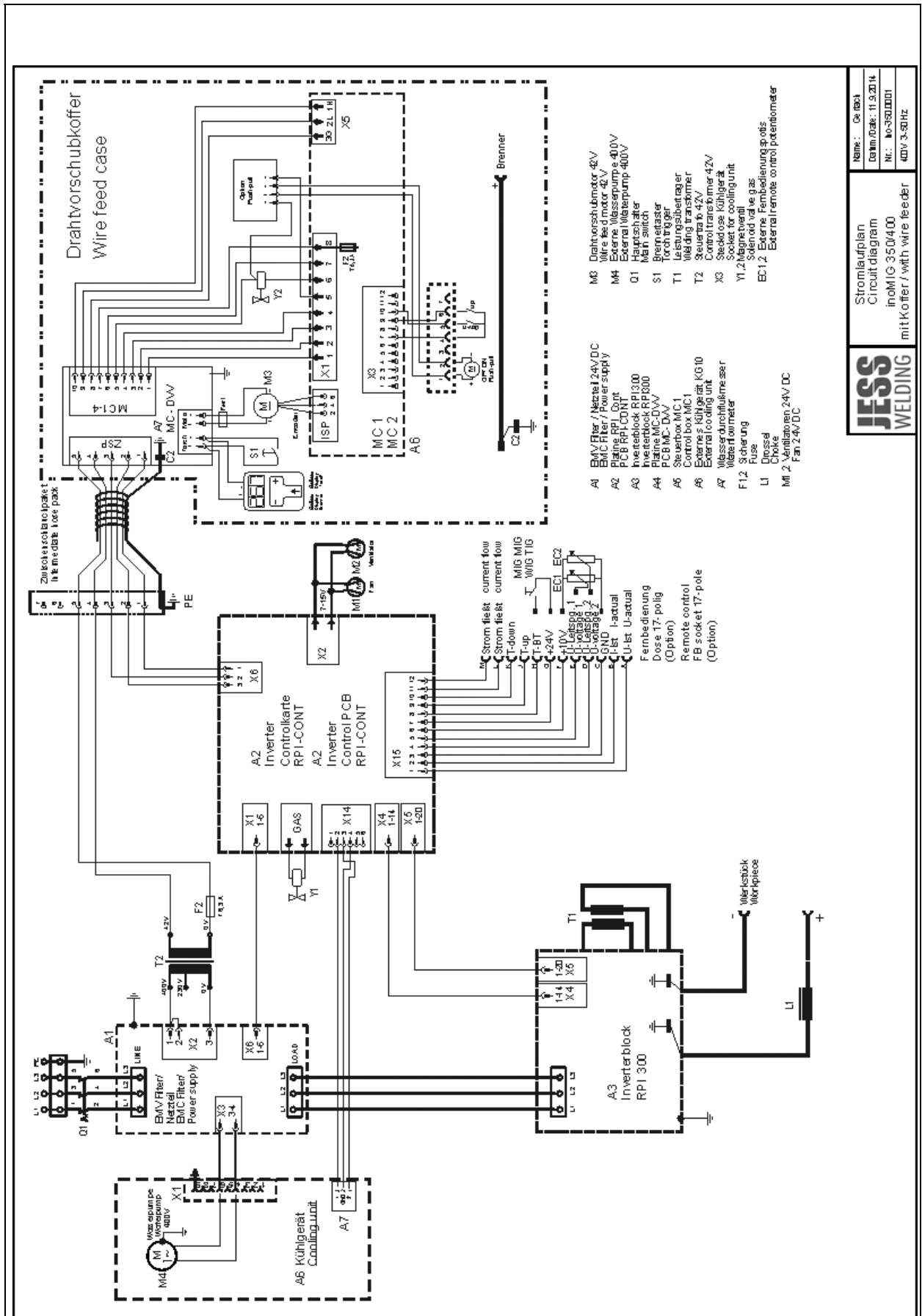


Fig. 27 Machine with case

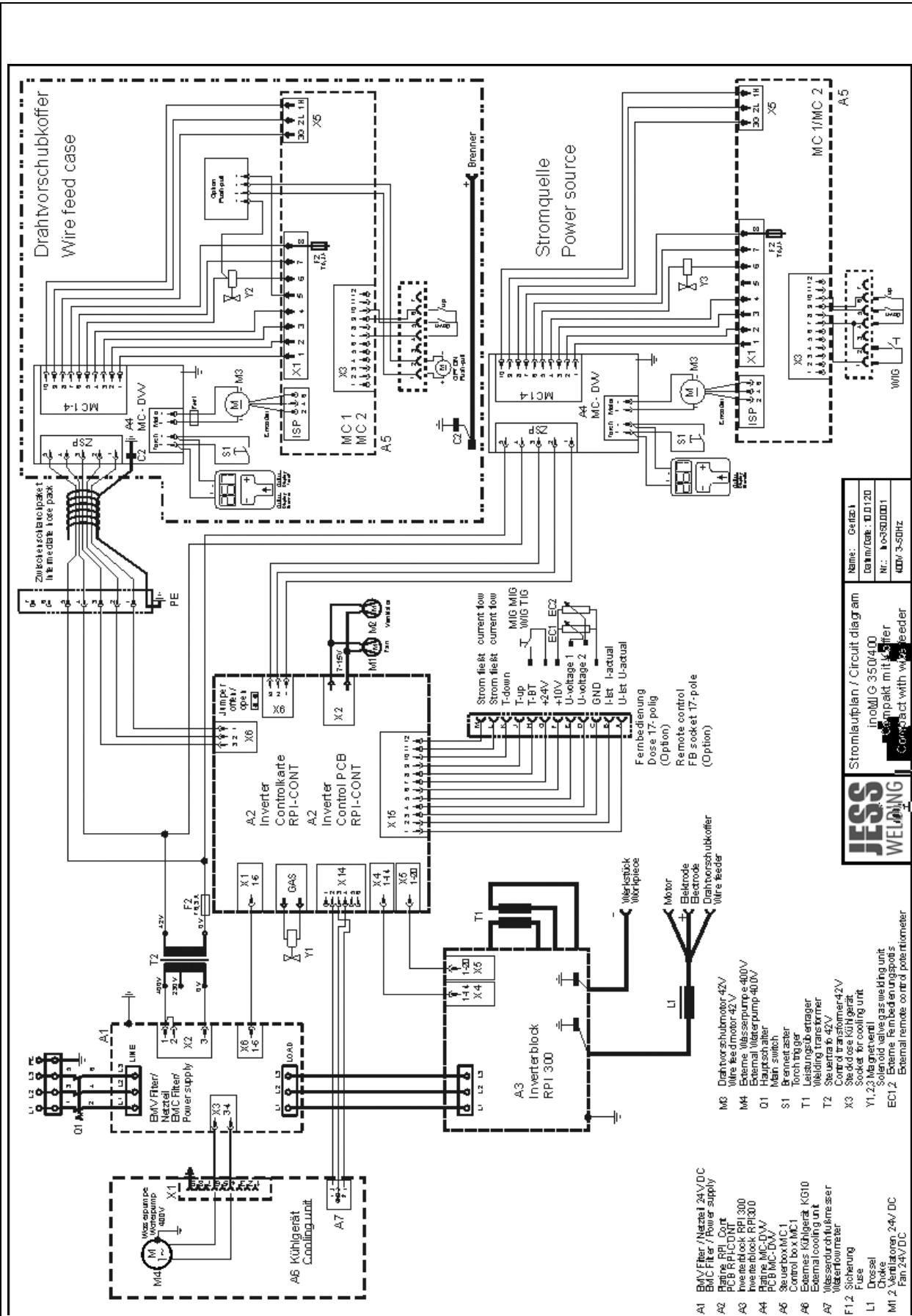


Stromlaufplan  
Circuit diagram  
inoMIG 350/400  
mit Koffer / with wire feeder



Name: De 1001  
Datum: 11.9.2014  
Nr.: ino-350/400/500  
40V 3-50Hz

Fig. 28 Compact machine with case



21.2 inoMIG 500

Fig. 29 inoMIG 500 standard

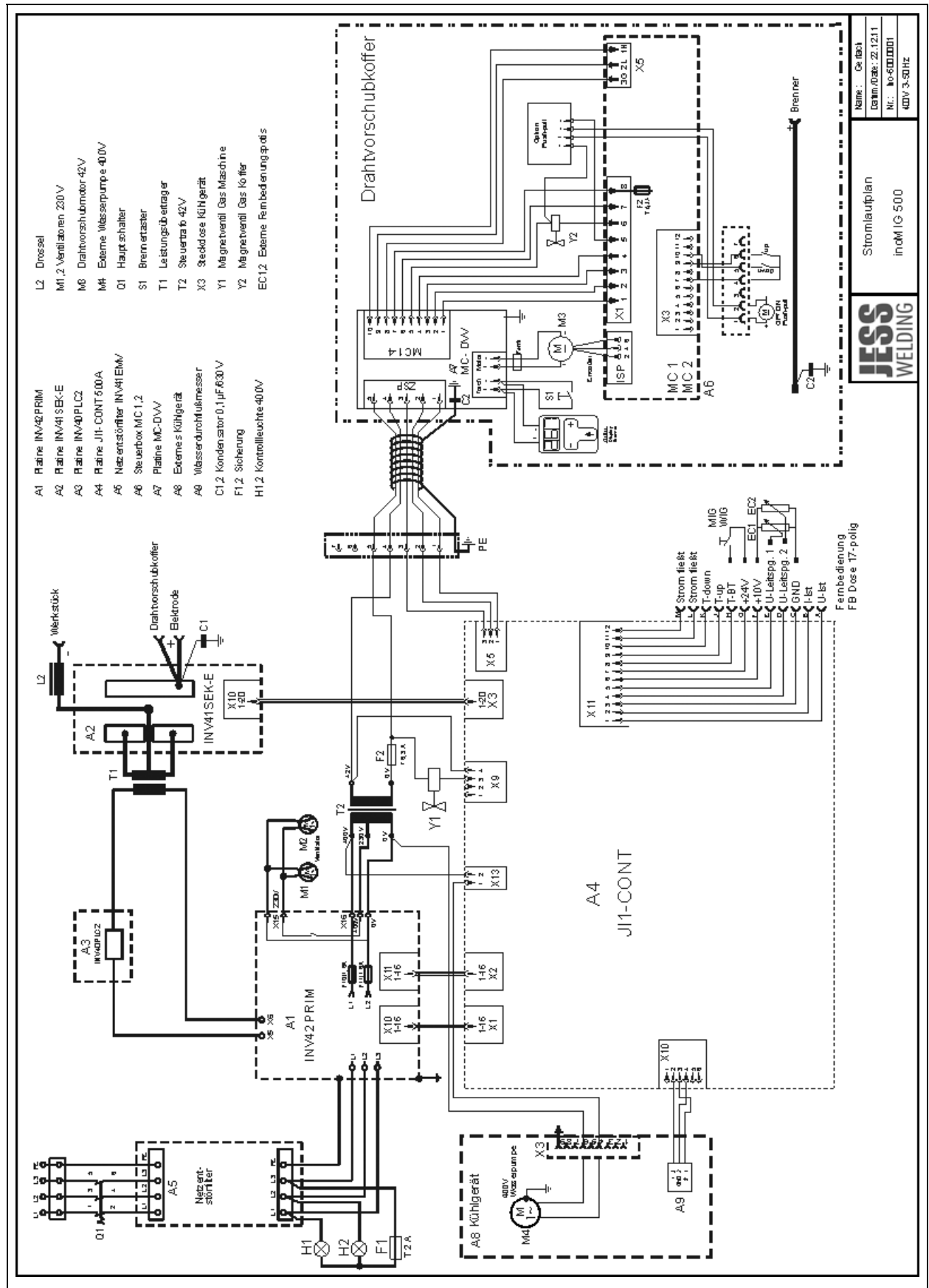
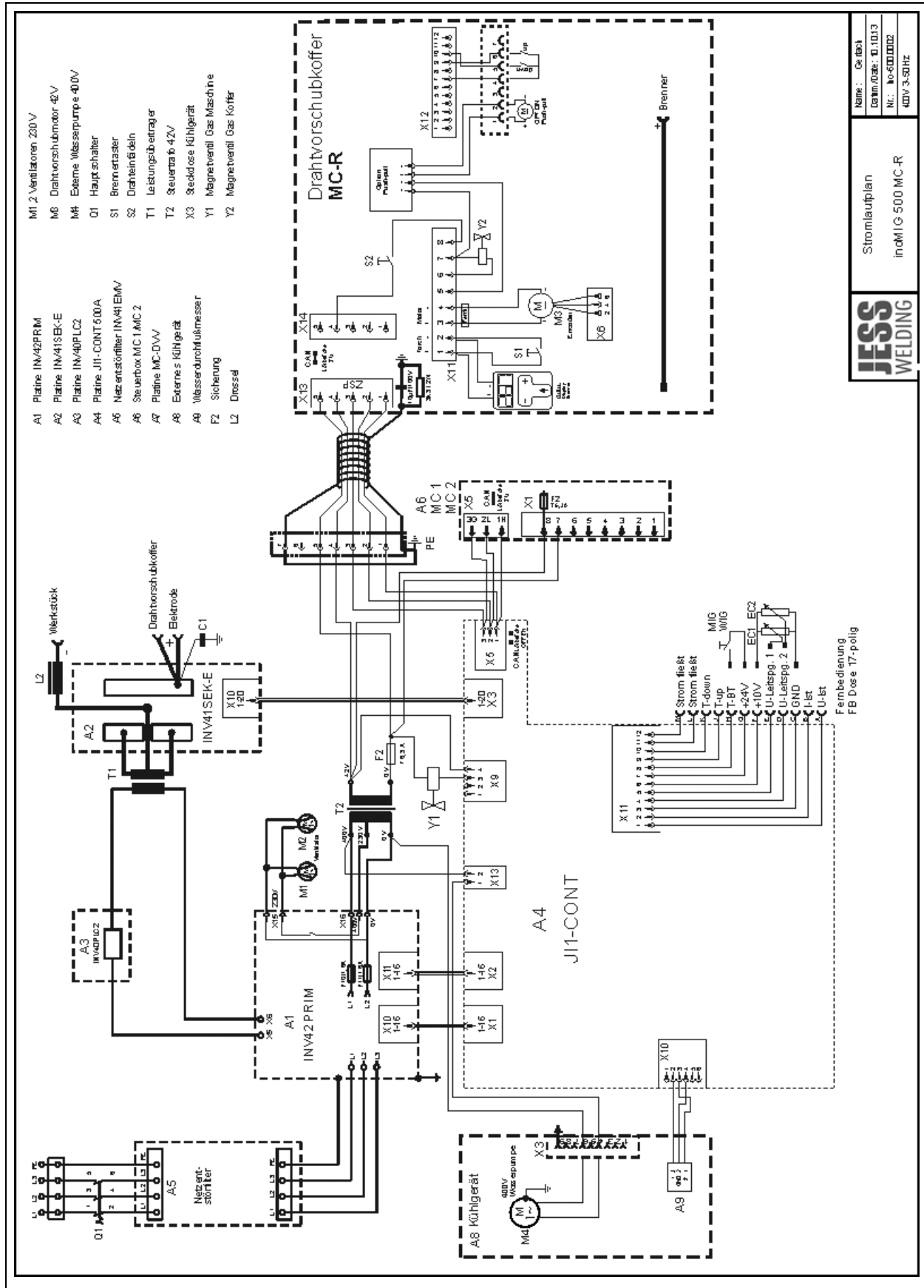


Fig. 30 inoMIG 500 with MC-R - PCB in case







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