

# OPERATION MANUAL

Robot Pulse Welding Unit  
Model KPU 400 L



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Dear customer,

we wish to thank you for choosing a MERKLE welding machine. In doing so, you have demonstrated to us the trust you place in our products.

With best wishes

**MERKLE**  
**Schweissanlagen Technik GmbH**

## **1 General Information MIG/MAG and Pulse Welding Units**

MIG/MAG welding is a system where the welding wire is the carrier of the electric arc. Surrounding the contact tip (wire feed nozzle) is the gas nozzle, that emits the protective gas. The welding bead is protected in this way from oxygen contamination.

### **Metal Inert Gas Welding (MIG)**

In this technology inert gases are used. Mostly used are argon, helium, and mixtures of these components. These gases do not react with other materials, they are inert. They are mainly used for welding aluminum, copper, titanium or other non ferrum metals.

### **Metal Active Gas Welding (MAG)**

For MAG welding gases like CO<sub>2</sub>, argon, and mixtures of these components are used. For special purposes also mixtures of CO<sub>2</sub>, argon and oxygen can be used. Mild steel and stainless steel is welded with these gases.

### **Protective Gases**

The gas flow is dependent on several parameters:

- gas density
- material of workpiece
- distance gas nozzle to workpiece
- diameter of gas nozzle
- geometry of weld

For welding steel and stainless steel the gas flow is in the range of about 8 to 16 l at welding currents of 40 - 400 A. For welding aluminum the gas flow is about 30 % more.

## **Welding Wires**

Different diameters of welding wires are available:

0.6 / 0.8 / 0.9 / 1.0 / 1.2 / 1.6 / 2.4 mm.

Core wires:

1.2 / 1.6 / 2.4 mm.

## **2 Duty cycle**

The duty cycle is measured at temperature of 40°C and a 10 minutes period. At lower temperatures the duty cycle is higher.

## **3 Installation**

### **3.1 Main Supply**

The main supply must be connected by a trained person. The main supply voltage is displayed on the front or rear panel of the machine. A connection to protection earth must be done.

### **3.2 Earth Lead (Work Cable)**

The earth lead must have an excellent ground. The clamp should be attached to a clean, paint and rust free area on the workpiece or on the welding table.

### **3.3 Welding Torch**

Attach the hose assembly to the Euro-connector with the flange nut.

### **3.4 Gas Connection**

Secure the gas cylinder with the safty chain. Remove the cap and open the bottle momentarily to purge the valve. Install the regulator on the bottle valve. Connect the gas hose from the machine to the regulator. Slowly open gas valve and set the gas flow.

### **3.5 Wire Installation**

Place the wire spool. Take off the end and cut off the bent end section. Hold the wire to prevent unwinding of the spool. Open the tightning lever and lift the pressure finger. Feed the wire into the wire feed guide. Push the wire forward onto the wire drive roller grooves. Close the tightning lever and swich on the machine.

Check the wire feeding: Place your hand 10 cm in front of the contact tip. Let the wire run into your hand but be careful not to hurt your hand. If the wire is running, the pressore of the drive rollers is o.k.

## 4 Installation of the Machine

Place the machine at least 0.80 m from a wall etc. to guarantee the cooling air can go through the unit. The room temperature should not exceed 40°C and should not be lower than -10°C.

## 5 Welding Stainless Steel

Exchange the parts according to the table listed in section 'wire feeder' A teflon liner in the torch hose must be used.

### 5.1 Welding Aluminum

**Do not use wire diameters less than 1.0 mm. Max. length of the torch should not exceed 3 m. Use teflon liner in the torch hose. See section 'wire feeder' for exchange of parts for welding of aluminum.**

## 6 Technical data

### 6.1 Pulse-Arc- machine Typ: KPU 400 L

#### Primary:

Supply:	3 x 400 V
Frequency:	50 (60) Hz
Contin. power:	14.5 kVA
Contin. current:	21 A
Max. current:	27 A
cos phi:	0.95

#### Secondary:

Open circuit voltage:	80 V
Welding voltage:	15-34 V
Welding current:	20-400 A
Duty cycle 60 %:	400 A (10 min.)
Duty cycle 100 %:	310 A (40°C)

Protection class:	IP 23
Insulation class:	H
Cooling:	AF
Main switch:	3-phase
Frequency:	20-500 Hz
Pulse shape:	144 pulse shapes programmable
Ignition process:	13 parameters programmable
Arc length:	automatic energy control
Power source:	IGBT inverter
Program storage:	EPROM and EEPROM
Programms:	2 pulse and 2 MIG/MAG programms MIG/MAG, Pulse-Arc, Interpuls, MIG brazing, programms for mild steel, aluminium, alloys, stainless steel, special programms Automated functions: wire burn back, soft start, gas pre and gas post flow

Control voltages: energy and voltage trim (0-10 V)  
 LEDs: mains, failure, temp. protection  
 Interface: CAN device net  
 0-10 V input: energy  
 0-10 V input: voltage trim  
 input: welding ON  
 input: pulse-arc - MIG/MAG  
 input: emergency STOP  
 input: programm selection  
 output: power source o.k.  
 output: arc o.k.  
 output: crash contact  
 output: welding active  
 emergency STOP  
 Socket 6-pol:  
 Stabilization: ± 10 % power mains fluctuation  
 Norm: EN 60974-1 "S" / CE"  
 Sockets (95 mm<sup>2</sup>): earth lead and electrode  
 Serial interfaces: RS 232  
 Weight: 65 kg  
 Dimensions: l x w x h: 605 x 370 x 700 mm  
 Mains supply cable: 4 x 4.0 mm<sup>2</sup>, 5 m long  
 Handles: 2 pieces  
 Lifting eyes: 4 pieces (option)  
 Robot connection: socket 24 pol.

**Wire feeder: Model ROB DV-25**  
 Voltage: 42 V-AC / 24 V-DC  
 Wire feeder: 4-roller-drive 0.5 -25 m/min.  
 motor incl. planet gear and tacho generator  
 Button: wire feed  
 Button: gas test  
 Weight: 7,3 kg without platform  
 Socket: 10-pole for crash contact, push pull motor,  
 button wire feed, button gas test  
 Valves: gas valve, blow out valve

## 6.2 Water Cooling Unit: Model WK 370

Supply: 1 x 230 V  
 Frequency: 50 Hz  
 Mains current: 1.6 A  
 Pump: 230 V  
 Water pressure: 3.5 bar  
 Water capacity: 3 l  
 Water pressure switch: integrated  
 Water flow controller: (option)  
 Electr. connection: cable with 6-pole plug  
 Water connection: 2 quick couplings  
 Weight: 22 kg  
 Dimensions L x B x H: 600 x 370 x 260

Changes reserved.

## 7 Trouble Shooting

### **LED “mains ON“ (green) does not go on after switching on the machine**

- Check main supply
- Check main fuses

### **LED “failure“ (red) is on**

Supply voltage too low or too high

Emergency stop pressed, emergency stop circle interrupted

- Over current protection of water pump is activated

### **Water pump is running after switching on and LED “failure“ (red) is on**

- No or too low water pressure
- Cooling circle interrupted, flow controller (option) does not react
- No welding programme chosen

### **LED “failure“ (red) goes on for a short time**

- Safty cut off device for primary current protection is activated:  
Switch off and after aprox. 3 s switch on again.

### **LED “Temp. protection“ (yellow) and LED “failure“ (red) are on**

- Too high temperature at the transformer or IGBT heat sink:  
Let machine cool down.

### **Machine has no or too low welding current**

- Wrong programm chosen
- Check main supply of the welding unit (fuses)
- Bad or no contact of the welding leads
- Electrical contact in the torch is completely or partially interrupted

### **Welding quality is not good**

- Wrong adjustment of voltage trim.
- Wrong protective gas
- Pressure at the wire feeder wrong adjustment.
- Wire core is extremly dirty or broken.

### **Porosity**

- No or too little protective gas
- Air is mixed into the protective gas (leaky gas hose). Check gas hose as following:  
Open cylinder and close again, the pressure at the regulator may not decrease within a short time.
- Gas nozzle or tip holder are covered with spatters (gas flow is not o.k.)
- Extremly oxidated workpiece
- Air is coming to the welding area because of wind (increase gas flow rate; protect welding area).
- Use of a wrong gas pressure reduction device or wrong assembly of two reduction devices at the regulator.
- Gas flow is too high.

### **Burning of the welding wire to the contact tip or feeding problems inside the wire feeder**

- Friction resistance inside the torch is too high
- Wire core is extremely dirty
- Wire core is knicked
- Wrong diameter of the wire core
- Check welding wire as following:
  - The diameter of the unspooled mild steel wire has to be three times more than the diameter of the wire spool.
  - Bad coating quality of the welding wire.
  - Diameter tolerance of the wire is not correct.
  - Twist of the welding wire is too big.
- Wrong or spatter coated contact tips.
- Too low pressure at the pressure rollers of the wire feeder.
- Wrong or old drive rollers.
  - Bad alignment of the wire axis inside the wire feeder.
  - Friction resistance of the reel hub is too high.

### **Burning of the wire core**

Water current cable of the torch is interrupted. The welding current is flowing along the welding wire and the wire core.

### **Overheating of the torch**

- Check cooling systems.
- Check water flow of the torch:
  - unplug red water hose connector; switch on the machine and check if water is running.
  - Not sufficient air flow for the cooling system (heat exchanger).

## **8 Maintenance**

The machine should be cleaned in regular intervals to guarantee a proper operation. The length of the cleaning interval depends on the operation time, surrounding atmosphere etc.

**IMPORTANT:** Before opening the machine disconnect the main supply!

## **9 Cleaning**

**Filter:** If a filter is installed, clean it at least once a week. Exchange filter if it is too dirty.

**Welding unit:** Open the side covers. Remove dust from all parts of the machine.

**Welding torch:** Control the welding torch and wire feeder after welding of 50 kg wire.

Remove, clean and replace the wire core. Clean with a cleaning solvent. Blow dry with compressed air. When replacing the wire core, insure that there are no kinks. The gas nozzle must be sprayed with a silicon-free spray to prevent the weld spatters from sticking to the nozzle. The contact tip is a consumable item and must be replaced as required.

**Attention: Do not put oil to the wire core or the drive roller on the wire feed unit.**

## 10 Robot-Interface with CAN Device-Net

The CAN device net is based on a bus interface BK 5200, an analog output connector KL4002, a digital input connector KL1114 and a digital output connector KL2114.

At the analog output connector KL4002 the control voltages “energy“ and “voltage trim“ are generated.

The control voltage 0-10 V “energy“ is changing the pulse and MIG/MAG parameters according to the selected characteristic curve (welding programm) in the range from 0 to 100 %. The value for current, voltage and wire feed speed are dependent on material and diameter of the wire.

The control voltage 0-10 V “voltage trim“ is adjusting the arc length. At 5 V the correction is +/- 0 %, at 0 V it is -30% of the selected arc voltage and at 10 V it is +30 % of the selected arc voltage.

At the digital input connector KL1114 the signals “power source ok“, “arc o.k.“, “crash contact“ und “welding active“ are transferred to the robot control.

Signal “power source ok.“: the supply voltages are o.k. and no over temperatures or failures are detected.

Signal “arc o.k.“: as soon as the welding arc is on the robot is enabled.

Signal “crash contact“: in case of a crash the contact is interrupted.

Signal “welding active“: if the arc goes off during the welding, the movement of the roboter is stopped.

The digital output connector KL2114 transfers the signals “welding ON“, “pulse arc - MIG/MAG“, “blow out“ and “programm selection“.

Signal “welding ON“: if this signal is activated, the arc is ignited after aprox. 0.5 s. If within 2 s. no arc consists, the welding unit switches off the wire feeder, the protection gas and the welding voltage.

Signal „pulse arc - MIG/MAG“: if this signal is active, the operation mode “pulse arc“ is selected.

Signal “blow out“: this signal activates the blow out device to clean the torch with compressed air.

Signal “programm selection“: this signal selectes the second welding programm.

Emergency stop connection X12:

The internal emergency stop relais is operated at 24 V from the roboter. Emergency stop relais activated means that the emergency stop button at the roboter is not pressed.

## 11 Aluminium Welding

### Aluminium welding wire:

Wire diameter 0.8 mm only with push pull torch

Wire Al-Mg 3/5/4.5 Mn (1.0 mm), Al-Si, Al 99.5 (1.0 and 1.2 mm) torch lead max. 3 m

For welding wire 1.6 mm we recommend a torch with a long torch head

Do not store alu wire without the plastic protection cover. Do not use alu wires with oxid.

### Teflon liner:

For wire 1.0 mm we recommend the carbon teflon liner 2.0 x 4.7 mm (part-no. 022.1.0586)

For 1.2 and 1.6 mm carbon teflon liner 2.7 x 4.7 mm (part-no. 022.1.0588)

The carbon teflon liner must be installed without any break from the contact tip to the drive roller

Fix the clamping nut at the Euro connector only by hand

### Wire feeder:

Exchange the brass guidance nozzle to a pvc guidance nozzle (between the two drive rollers)

DV-25: part-no. 012.0.0373, DV-30: part-no. 012.0.0269

Exchange the insertion nozzle at DV-30 from brass to pvc (part.-no: 012.0.0267)

Exchange the guidance core at DV-30 to pvc (part-no: 022.1.0237)

Install the outgoing tube in the Euro connector to support the teflon liner

DV-20: part-no.012.0.0383,

DV-25: part-no. 012.0.0369,

DV-30: part-no. 012.0.0269.

### Wire feeding rollers:

Exchange the two lower roller to aluminium rollers (U-groove), the rollers at the top may remain pressure rollers without a groove

### Pressure of the rollers:

Reduce the pressure to a minimum.

When the alu wire is stopped at the contact tip the rollers must turn without transporting the wire.

### Insertion of the wire:

Insert the wire without a contact tip at the torch.

Hold the torch cable straight, otherwise the wire could go through the line and the torch lead.

### Welding torch:

We do not recommend the torch SB/SBT 154 G for aluminium welding. Use a ceramics gas distributor (not fibre glass). Due to the high temperatures the fibre glass may emit a gas which influences the welding process.

The torches SB/SBT 502 W and SB/SBT 600 W have an open cooling system. Assures that the components are tightly fitted. Only minimum parts of water will make the aluminium welding impossible.

### Protective gas:

We recommend argon 4.6, mixtures argon-helium can be used for thick aluminium plates to avoid or reduce a pre-heating.

Gas flow for a gas nozzle 17 mm:

wire 1.0 mm: aprox. 12-14 l/min.  
wire 1.2 mm: aprox. 14-16 l/min.  
wire 1.6 mm: aprox. 18-22 l/min.

Avoid smaller gas nozzles.

If the gas hose between gas valve and cylinder is long, an impulse of too much gas is ejected during the ignition process which could cause porosity. Our wire feeder boxes have a special reduction device installed.

For gas hoses longer than 10 m we recommend the installation of a pressure regulator inside the welding unit.

We recommend a regulator with an integrated ball-flowmeter.

#### Position and distance of the torch:

Aluminium is welded in forward position, the torch is tilt aprox. 10 - 20°.

Distance torch to work piece aprox. 10-15 mm. If the distance is too large, the protective gas shield is not assured.

Avoid draught (air movement in the room).

#### Cleanliness:

Aluminium work pieces must be without any dirtying. Clean with alcohol or special aluminium cleaner

Avoid the storage under high humidity.

Remove oxid when aluminium pieces have been stroed a lon time.

#### Additional wire equipment:

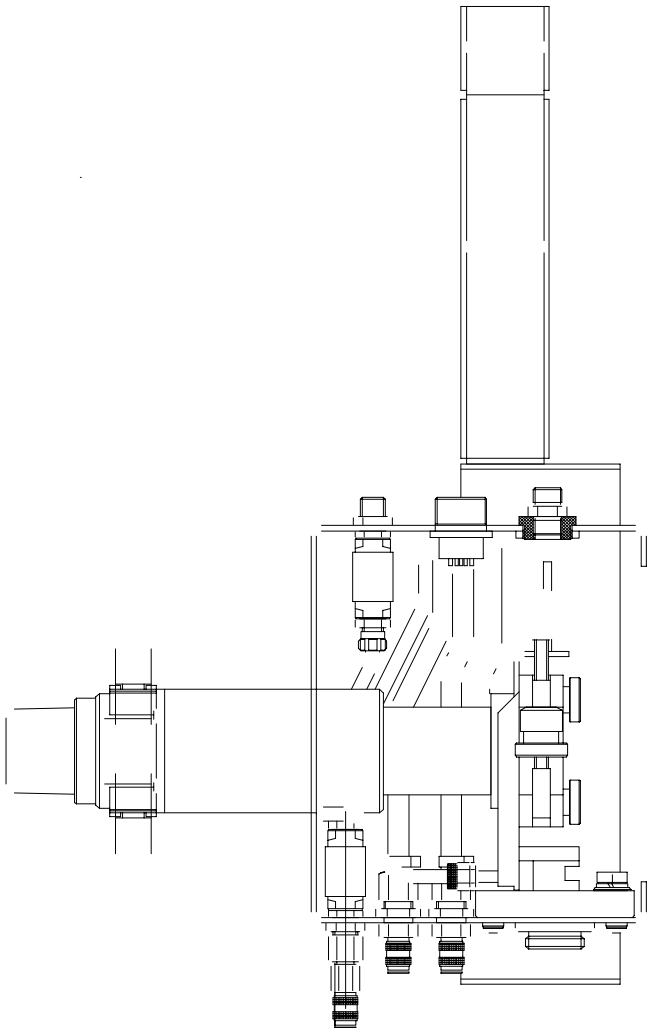
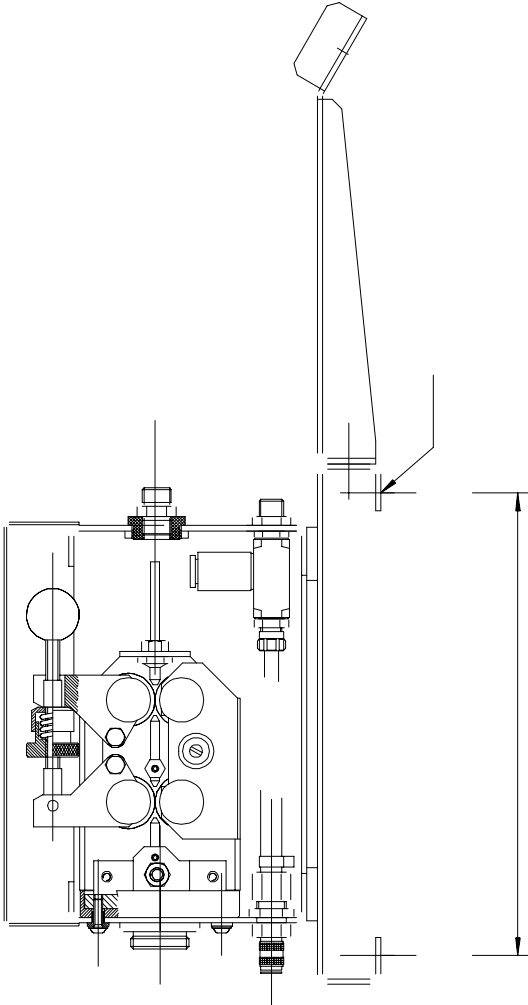
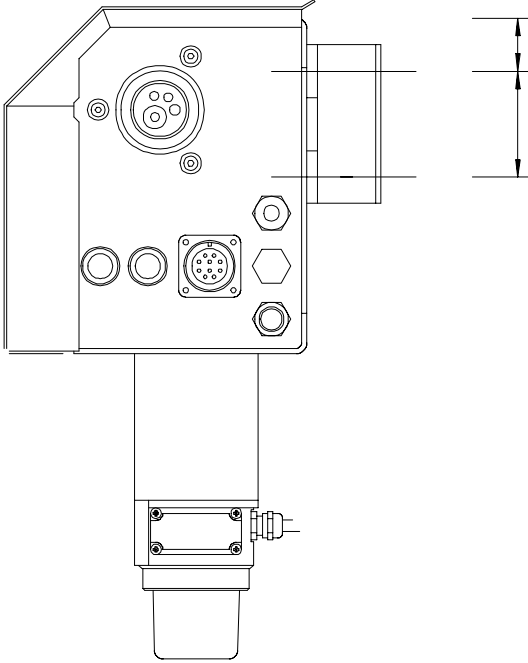
In our general catalogues in section 10 we offer complete packages for wire equipments.

#### Special 4-stroke:

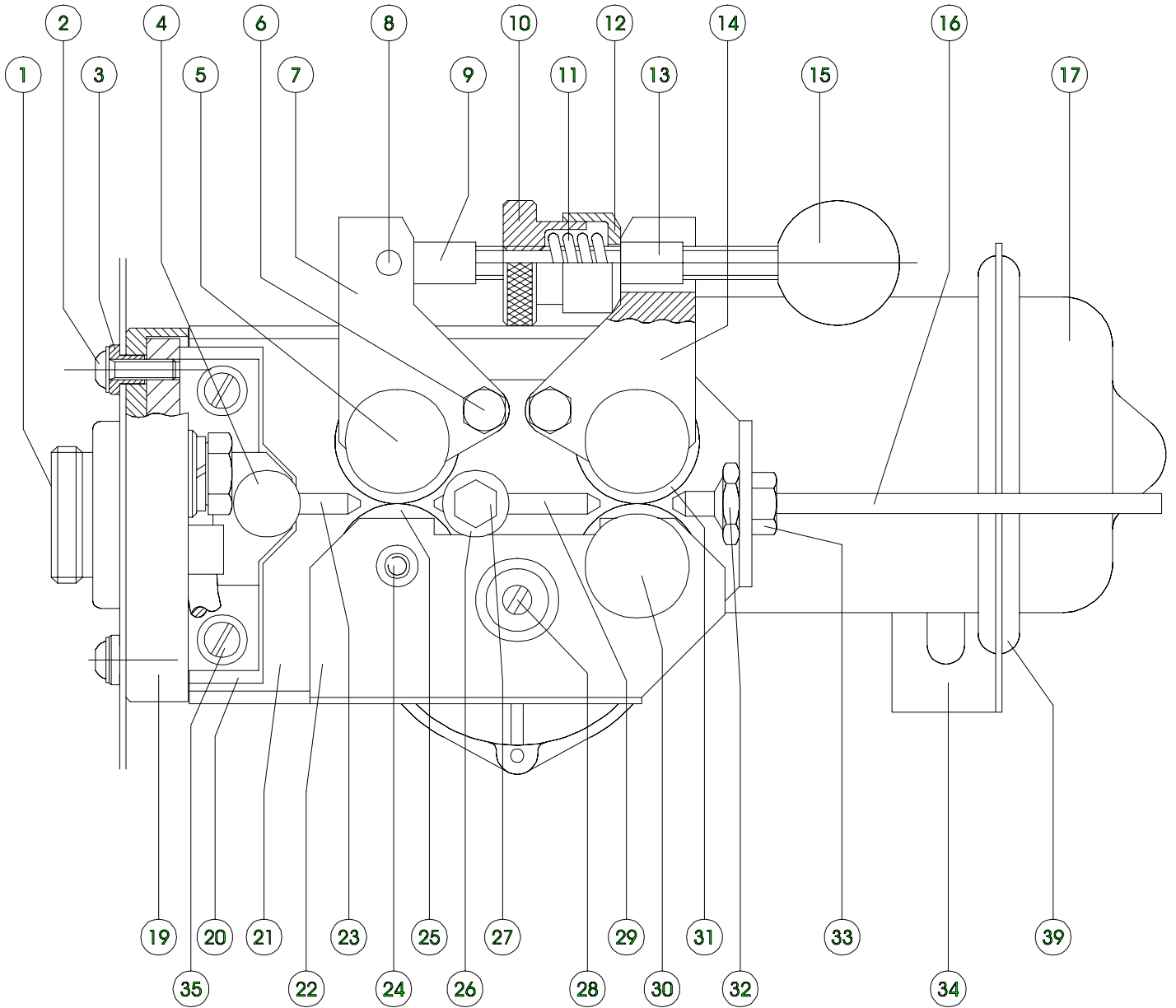
We recommend to operate in the special 4-stroke mode with a higher start current. The start current, the down slop and the final current can be adjusted inside the machine behind the front panel.

# 12 Wirefeeder

ROB-DV-25/4



12.1



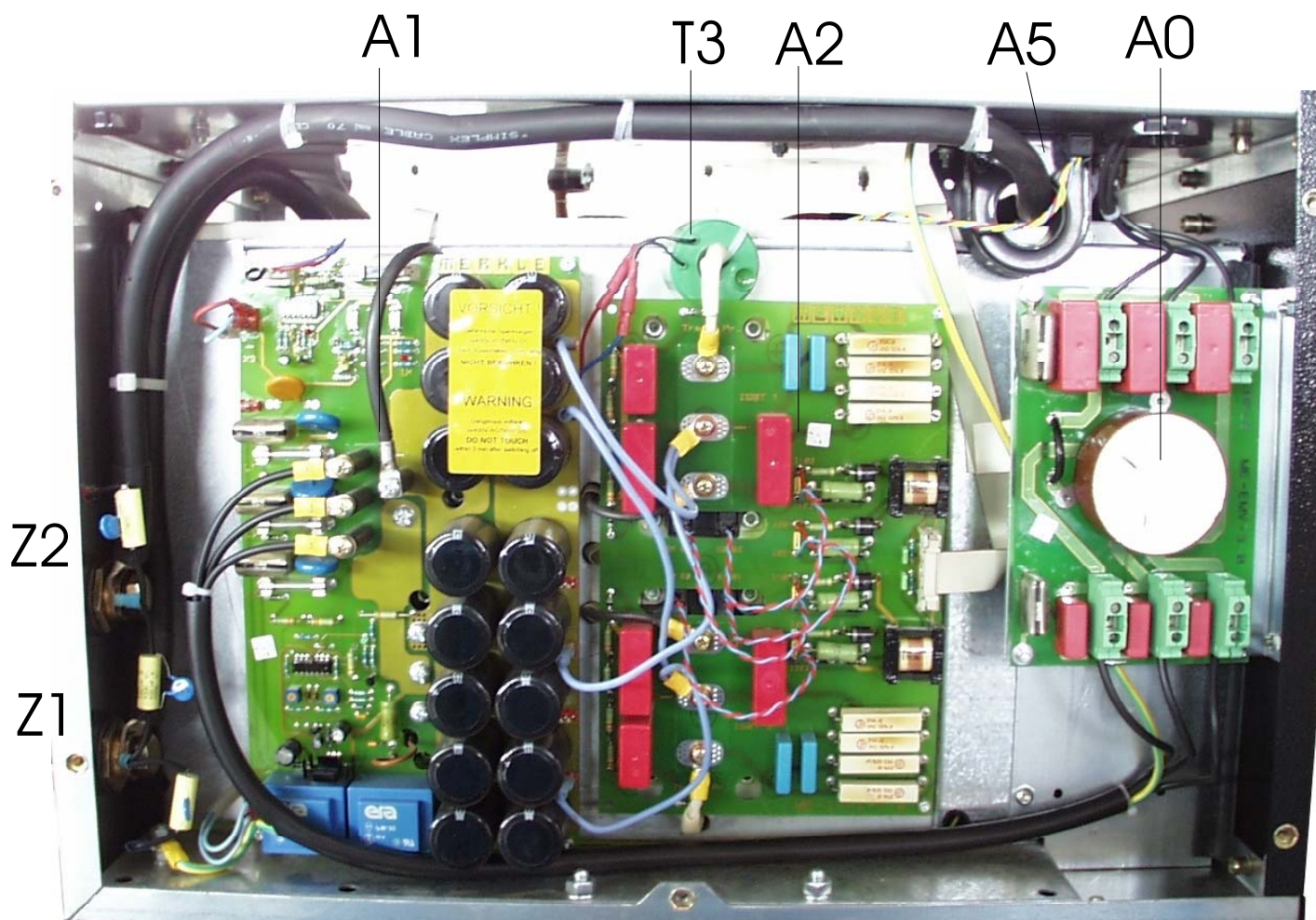
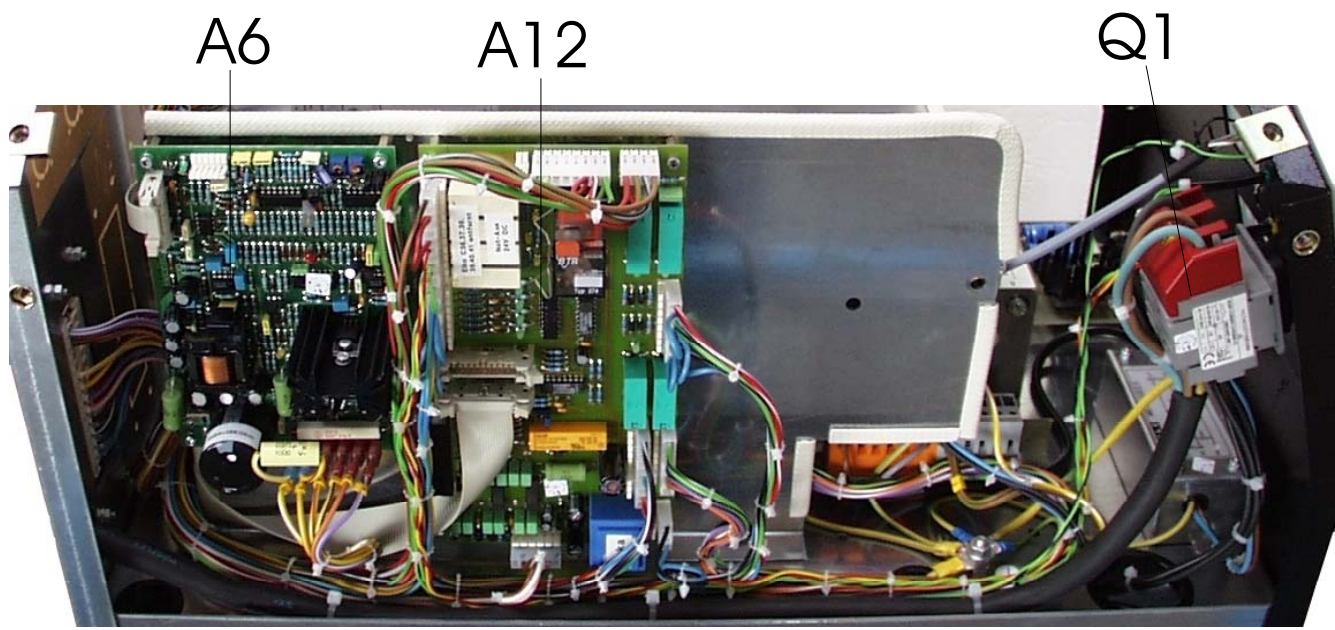


## 12.2 Spare Part List Wire Feeder ROB DV-25/4

<b>Pos.</b>	<b>article</b>	<b>part no.</b>
DV-25 wire feeder incl. motor and rollers		
1	flansh (brass body)	002.0.2875
	flansh complete (Euro connector)	012.0.0287
2	screw	090.0.0825
3	insulator	002.0.2877
4	screw M 4 x 20	090.0.1002
5	roller pin	002.0.2859
6	pin	002.0.2864
7	teeter	002.0.2865
8	cylinder pin	090.0.0571
9	bold M 8 x 90	002.0.2863
10	nut	002.0.2862
11	spring	002.0.2690
12	pressure piece	002.0.2861
13	screw nozzle	002.0.2860
14	button	002.0.2866
15	head	002.0.2856
16	teflon liner	012.0.0377
17	motor 42 V-DC incl. planet gear and tacho generator	002.0.2514
18	screw	090.0.4335
	washer	090.0.1208
	ring	090.0.1408
19	insulation plate	002.0.2876

<b>Pos.</b>	<b>article</b>	<b>part no.</b>
20	gear insulator	012.0.0285
21	gear holder	002.0.2874
22	protector	002.0.2870
23	outgoing nozzle (brass) 6 x 2 x 48	002.0.0367
	outgoing tube for teflon liner alu/stainless steel (brass) 6 x 0,6 x 45	012.0.0369
24	roller pin	002.0.2873
25	<b>steel/stainless steel</b>	
	roller V Ø 0.6 mm	002.0.2879
	roller V Ø 0.8 mm	002.0.2880
	roller V Ø 1.0 mm	002.0.2881
	roller V Ø 1.2 mm	002.0.2882
	<b>aluminium</b>	
	roller Ø 0.8 mm alu	002.0.2884
	roller Ø 1.0 mm alu	002.0.2885
	roller Ø 1.2 mm alu	002.0.2886
	roller Ø 1.6 mm alu	002.0.2887
26	screw M 4 x 10	090.0.1001
27	holder	002.0.2869
28	driver gear	002.0.2871
29	guidance nozzle steel (brass) 5 x 1.5 x 40	002.0.2867
	guidance nozzle alu/stainless steel (pvc) 5 x 1.5 x 40	012.0.0373
30	screw	002.0.2857
31	pressure roller	002.0.2878
32	brass nut	025.1.1610
33	insertion nozzle brass	002.0.2891



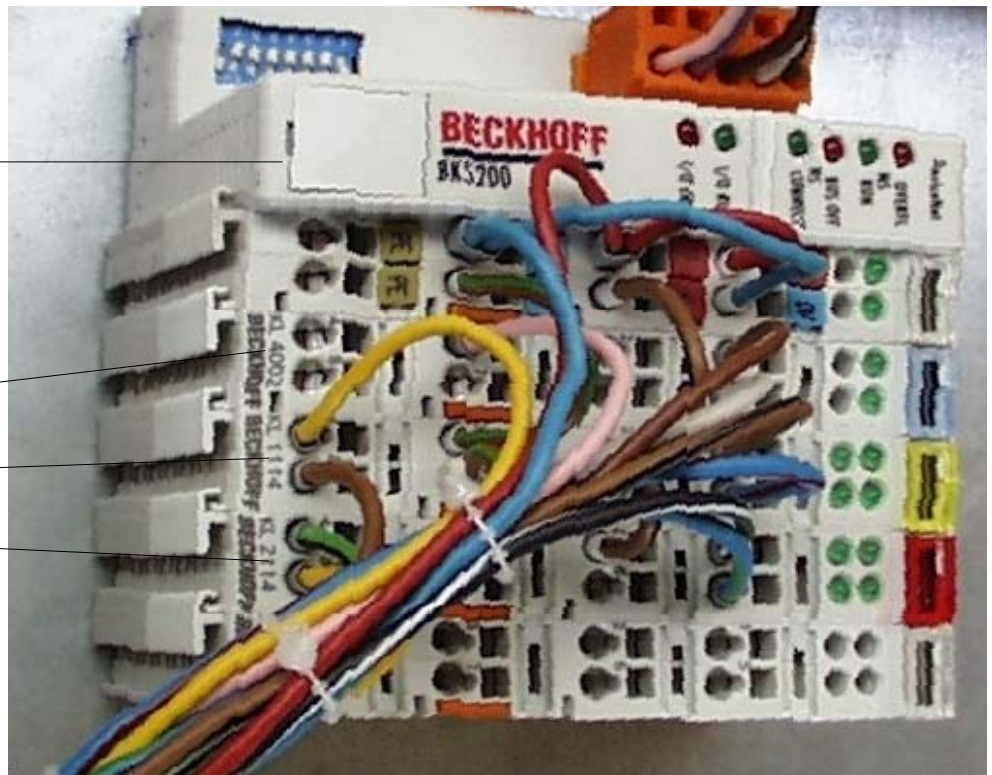


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A15

A16

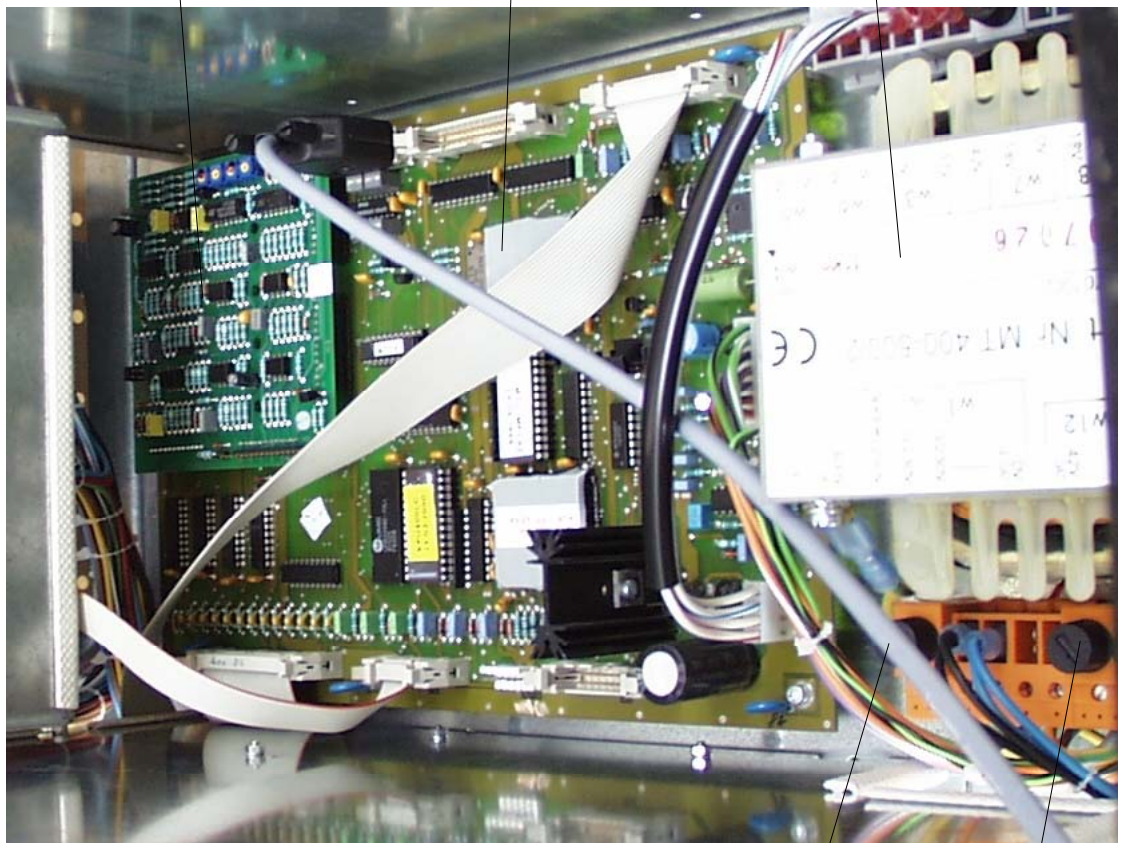
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A9

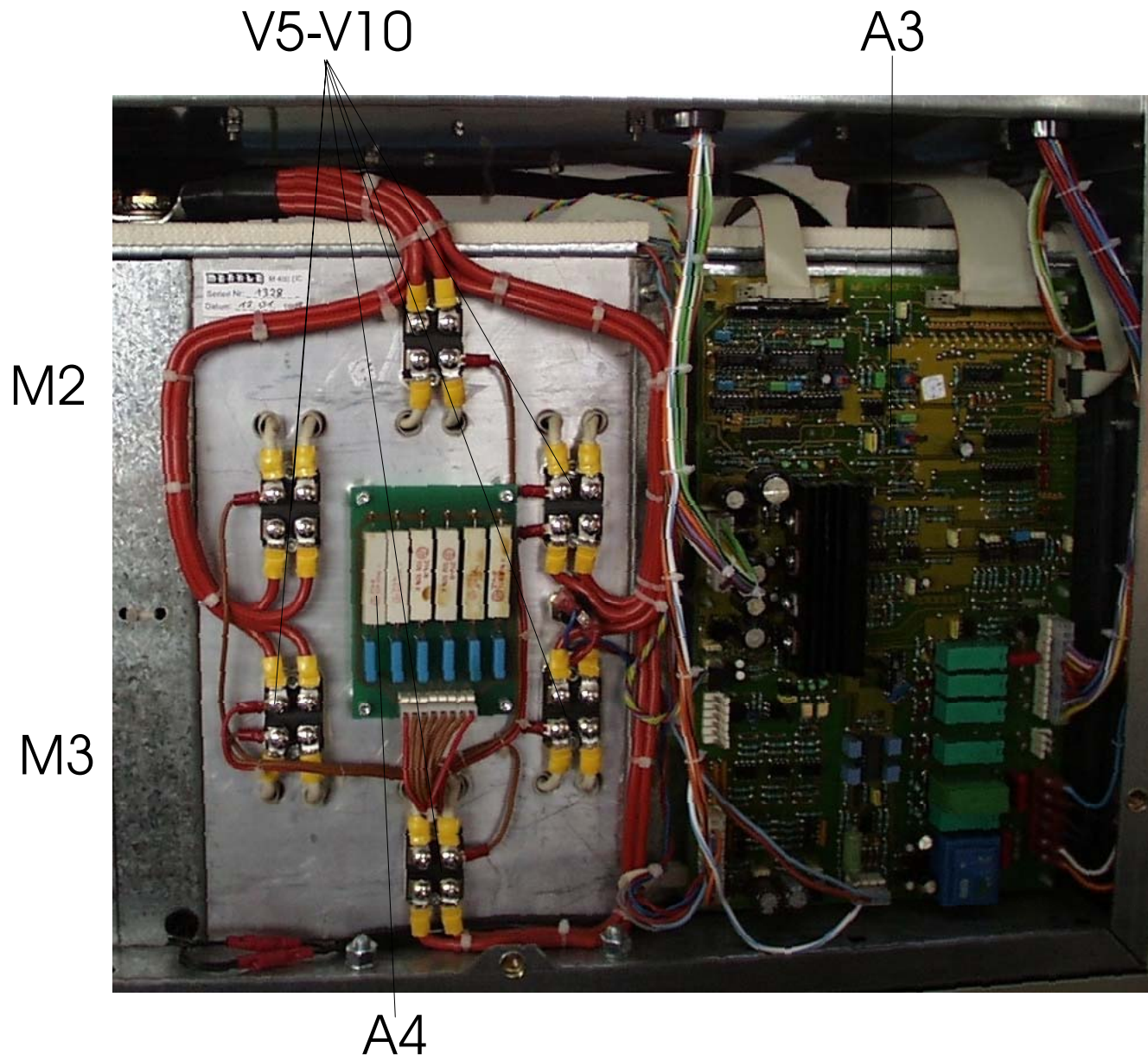
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T2



F1

F2





## 13 Spare Part List and wired diagramm

### 13.1 Spare Part List KPU 400 L

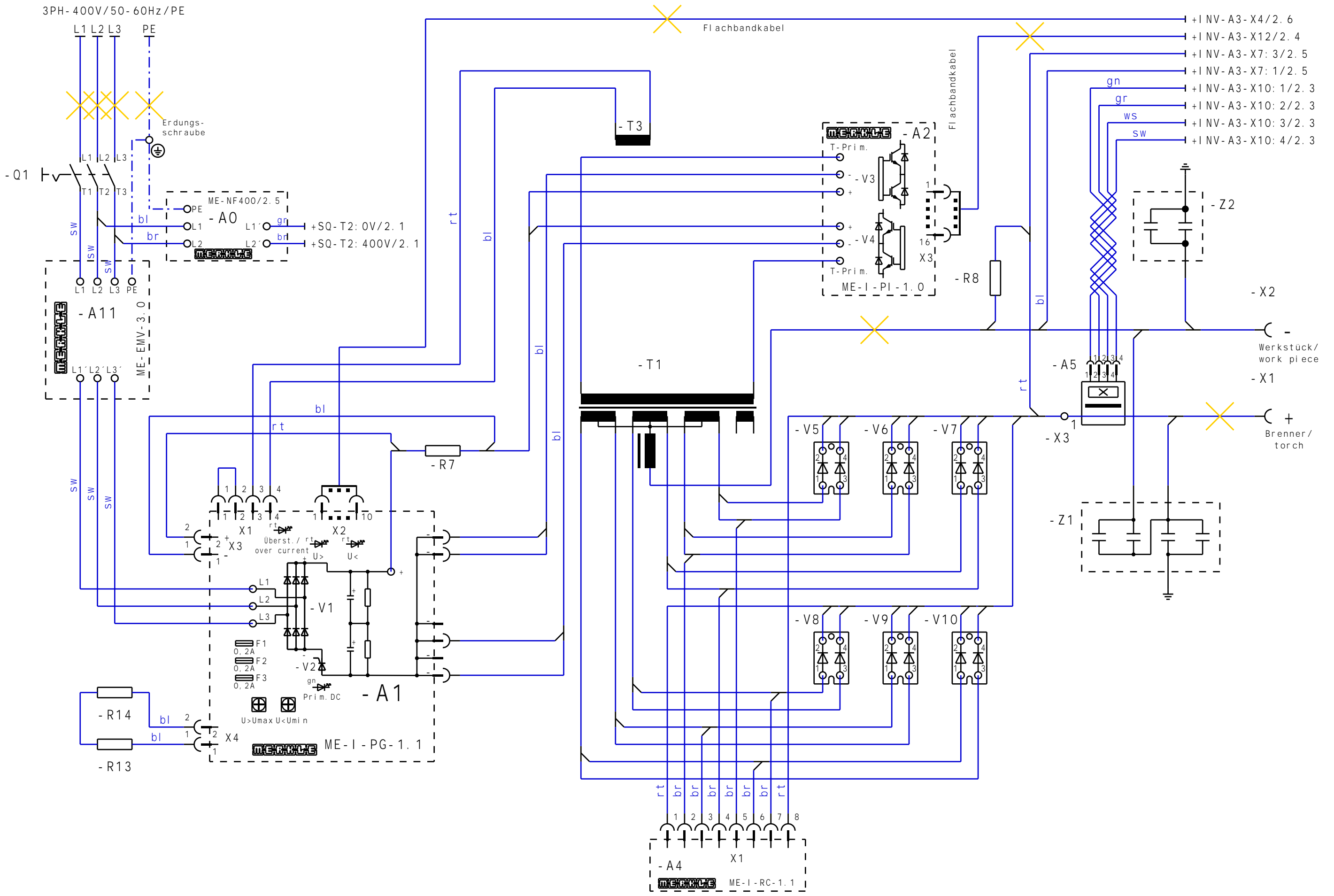
<u>electr.</u>	<u>article</u>	<u>part no.</u>
-A0	pc board ME-NF400/2.5	102279
-A1	pc board ME-I-PG-1.1	00300001
-A2	pc board ME-I-PI-1.0	00300002
-A3	pc board ME-I-SD-1.1	00300003
-A4	pc board ME-I-RC-1.1	00300004
-A5	LEM converter	01001615
-A6	pc board ME-2QR-24/42-2 motor controller	00300046
-A7	pc board ME-PPMR-2.1 (option for push pull and remote control)	00300493
-A8	pc board ME-MTC-1.2	00310042
-A9	pc board ME-MTC/M-2.0	100198
-A10	pc board ME-MTC/MF-1.1 (option front panel)	00310000
-A11	pc board ME-EMV-3.0	102281
-A12	pc board ME-ROB-4.0	00300013
-A13	pc board ME-PPMR/AN-2.0 (option for push pull and remote control)	00300485
-A14	bus interface CAN device net BK 5200	100185
-A15	2 channel analog output KL 4002	100188
-A16	4 channel digital input KL 1114	100186
-A17	4 channel digital output KL 2114	100187
	final bus connector KL 9010	100189
-A18	voltage supply GZK 80V-3	02011103
-F1	fuse 4 A/250 V, M, 6.3x32 mm	00301251
-F2	fuse 4 A/250 V, M, 6.3x32 mm	00301251
-F3	fuse 10 A/250 V, T, 5x20	00301199
-F4	fuse 1 A/250 V, T, 5x20 mm	00301212
-F7	temperature switch 80°C opening	00100406
-F9	prussure switch 0.5 bar (option gas control)	00400200
-H1	LED green (mains)	00100442
-H2	LED yellow (over temperature)	00100440
-H3	LED red (failure)	00100441
-M1	wire feed motor	00202514
	wire feed motor for ROB DV-25T	00202511
-M2	fan 230V	00101323
-M3	fan 230V	00101323
-Q1	main switch HLT 40/3ZM/X99/NS	00100014

<b>electr.</b>	<b>article</b>	<b>part no.</b>
-R3	resistor 330 R 50W	03004583
-R4	resistor 330 R 50W	03004583
-R5	NTC resistor 47 kOhm	01001933
-R7	resistor 0.02 R 50W	03004580
-R8	resistor 330 R 50W	03004583
-R9	resistor 470 OHM 0,5 W	03001533
-R10	resistor 470 OHM 0,5 W	03001533
-R11	resistor 470 OHM 0,5 W	03001533
-S4	button green wire feed	01000325
-S5	button green gas test (option gas test)	01000325
-T1	tranformer and choke unit	02011661
-T2	control transformer MT 400-500/2	00300242
-T3	current converter (green)	02011124
-V1	prim. rectifier	00100285
-V2	prim. thyristor	00100286
-V3	IGBT 600 V	00100288
-V4	IGBT 600 V	00100288
-V5	sec. rectifier	00100287
-V6	sec. rectifier	00100287
-V7	sec. rectifier	00100287
-V8	sec. rectifier	00100287
-V9	sec. rectifier	00100287
-V10	sec. rectifier	00100287
-V11	diode 1 N 4007	00100435
-X1	socket 70/95mm <sup>2</sup> 500 A	00101102
-X2	socket 70/95mm <sup>2</sup> 500 A	00101102
-X6	Euro connector	01200287
-X8	socket set 24-pol. protection 24-pol. pin set 24-pol. protection 24-pol.	01500501 01500510 01500500 01500513
-X9	pin set 24-pol. protection 24-pol. socket set 24-pol. protection 24-pol.	01500500 01500510 01500501 01500513
-X9a	plug 10-pol. for ROB DV-25T cable holder for ROB DV-25T socket 10-pol. for ROB DV-25T	02110384 02110388 02110382
-X9b	plug 10-pol. for ROB DV-25T cable holder for ROB DV-25T socket 10-pol. for ROB DV-25T	02110383 02110388 02110386
-X10	socket 10-pol.	02110382


<b>electr.</b>	<b>article</b>	<b>part no.</b>
-X11	socket set 6-pol. (option WK 370)	01500103
	protection 6-pol. (option WK 370)	01500101
-X12	pin set 6-pol. (emergency OFF)	01500102
	protection 6-pol. (emergency OFF)	01500101
-X13	plug 70/95 mm <sup>2</sup>	01201510
-X14	RS-323 interface	102283
-X15	CAN socket.	01500106
-Y1	valve 42 V	00201603
-Y2	valve 42 V (option blow out device)	00201603
-Z1	protection circuit	100894
-Z2	protection circuit	00300334

### 13.2 Wired diagramm KPU 400 L

Vervielfältigung oder Weitergabe nur mit unserer schriftlichen Genehmigung gestattet



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b				
c			gepr. 15.03.00	Vogg
d				

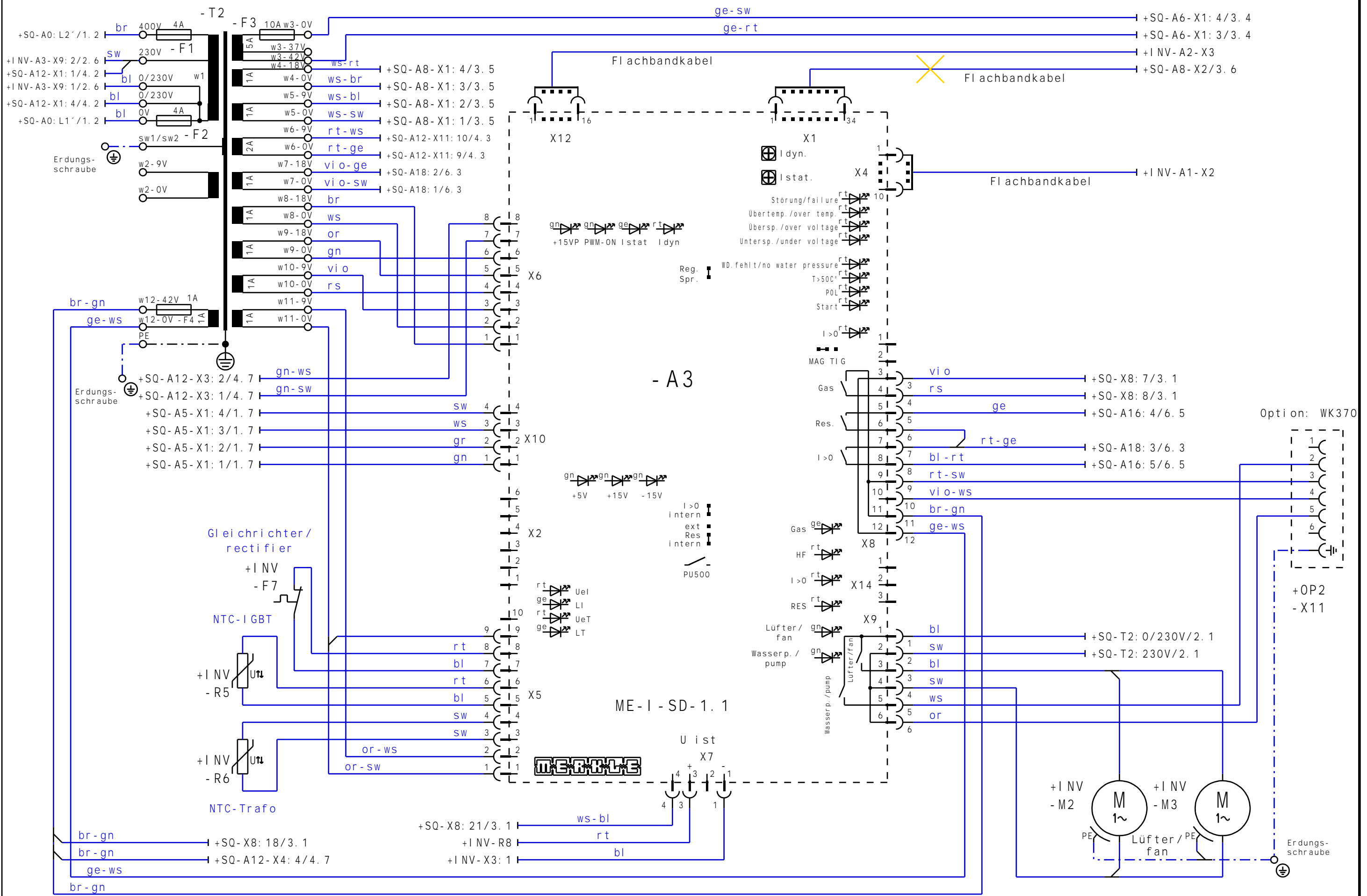


**Merkle**  
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 D - 89359 Kötz  
 Telefon 08221 - 915 - 0  
 Telefax 08221 - 32596

Schweißstromkreis

Projektbez.	KPU400L lowcost Kuka Augsb.	=
Auftragsnr.	Zeichnungsnr.	Blatt 1
		11 Bl.

Vervielfältigung oder Weitergabe nur mit unserer schriftlichen Genehmigung gestattet



Änderung	Datum	Name	Datum	Name
a			gez. 12.03.00	Konrad
b				
c			gepr. 15.03.00	Vogg
d				



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 Telefax 08221 - 32596

**Steuerstromkreis**

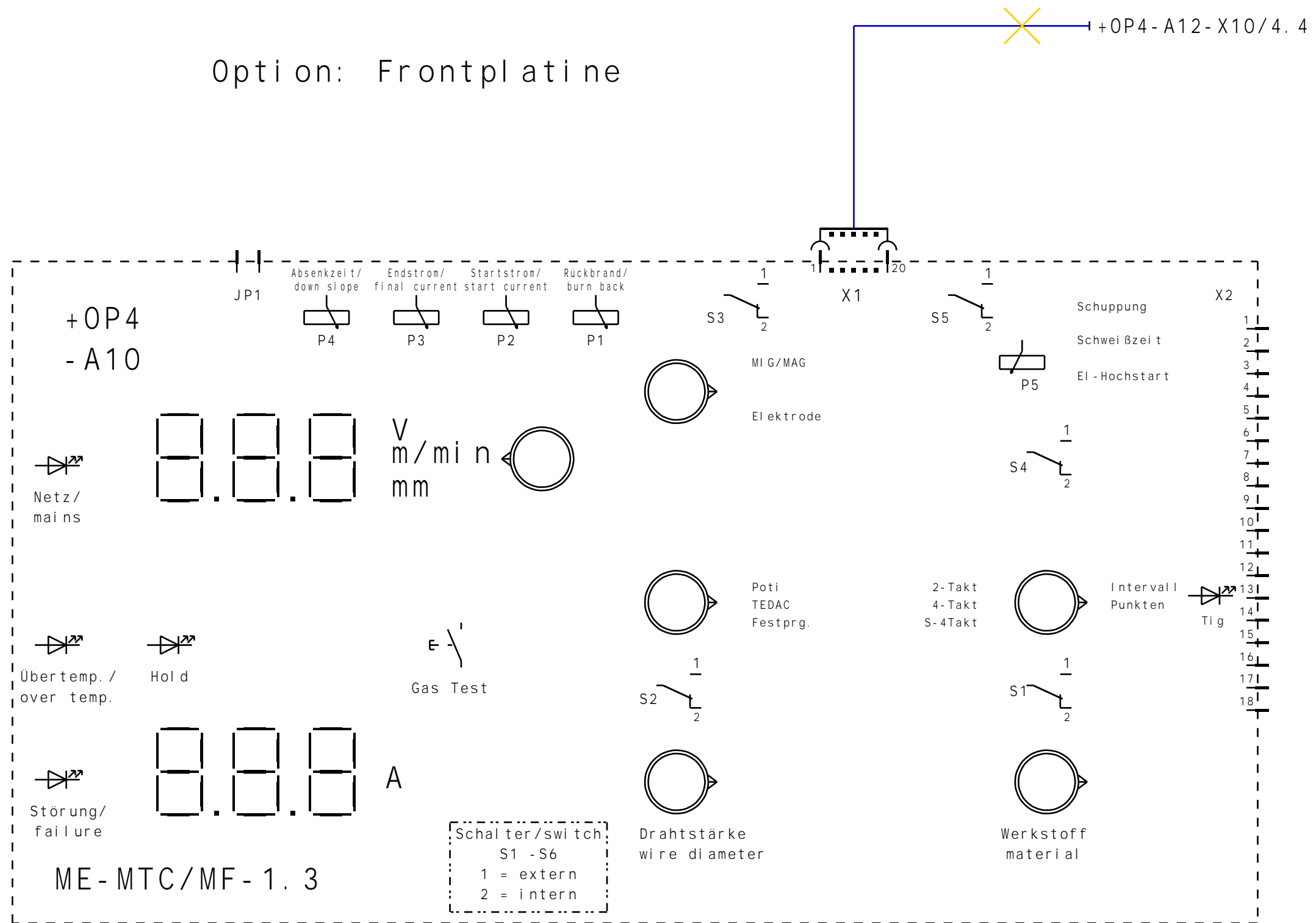
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Auftragsnr.	Zeichnungsnr.	Blatt 2
		11 Bl.





Vervielfältigung oder Weitergabe nur mit unserer schriftlichen Genehmigung gestattet

## Option: Frontplatte



Anderung	Datum	Name	Datum	Name
a			gez. 12.03.00	Konrad
b				
c			gepr. 15.03.00	Vogg
d				



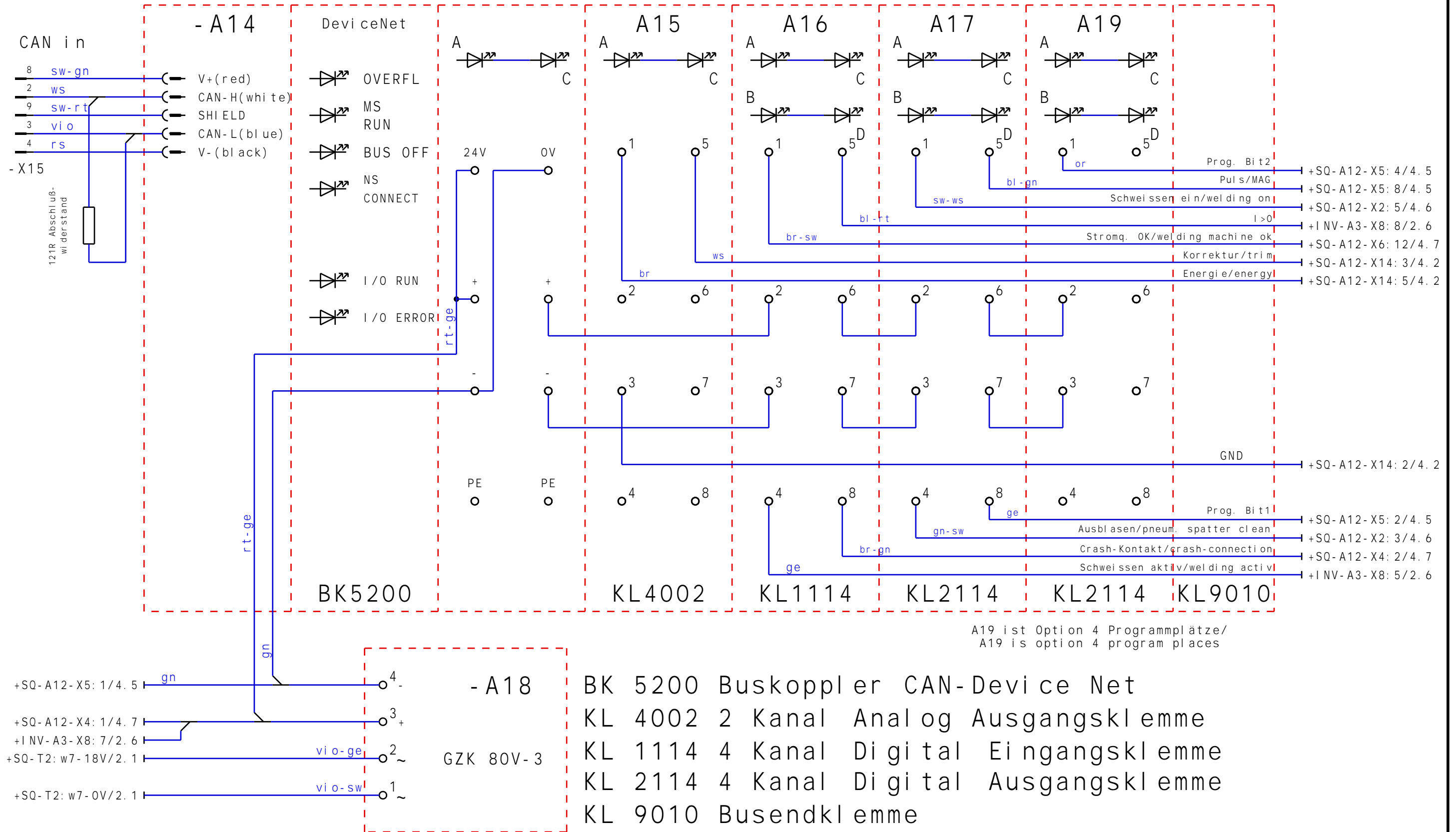
**Merkle**  
 Schweißanlagen-Technik GmbH  
 Industriestraße 3  
 D - 89359 Kötz  
 Telefon 08221 - 915 - 0  
 Telefax 08221 - 32596

Frontplatte

Projektbez.  
 KPU400L lowcost Kuka Augsb.  
 Auftragsnr.      Zeichnungsnr.

=
+ SQ
Blatt 5
11 Bl.

# CAN-BUS



A19 ist Option 4 Programmplätze/  
A19 is option 4 program places

Vervielfältigung oder Weitergabe nur mit unserer schriftlichen Genehmigung gestattet

Änderung	Datum	Name	Datum	Name
a			gez. 12.03.00	Konrad
b				
c			gepr. 15.03.00	Vogg
d				

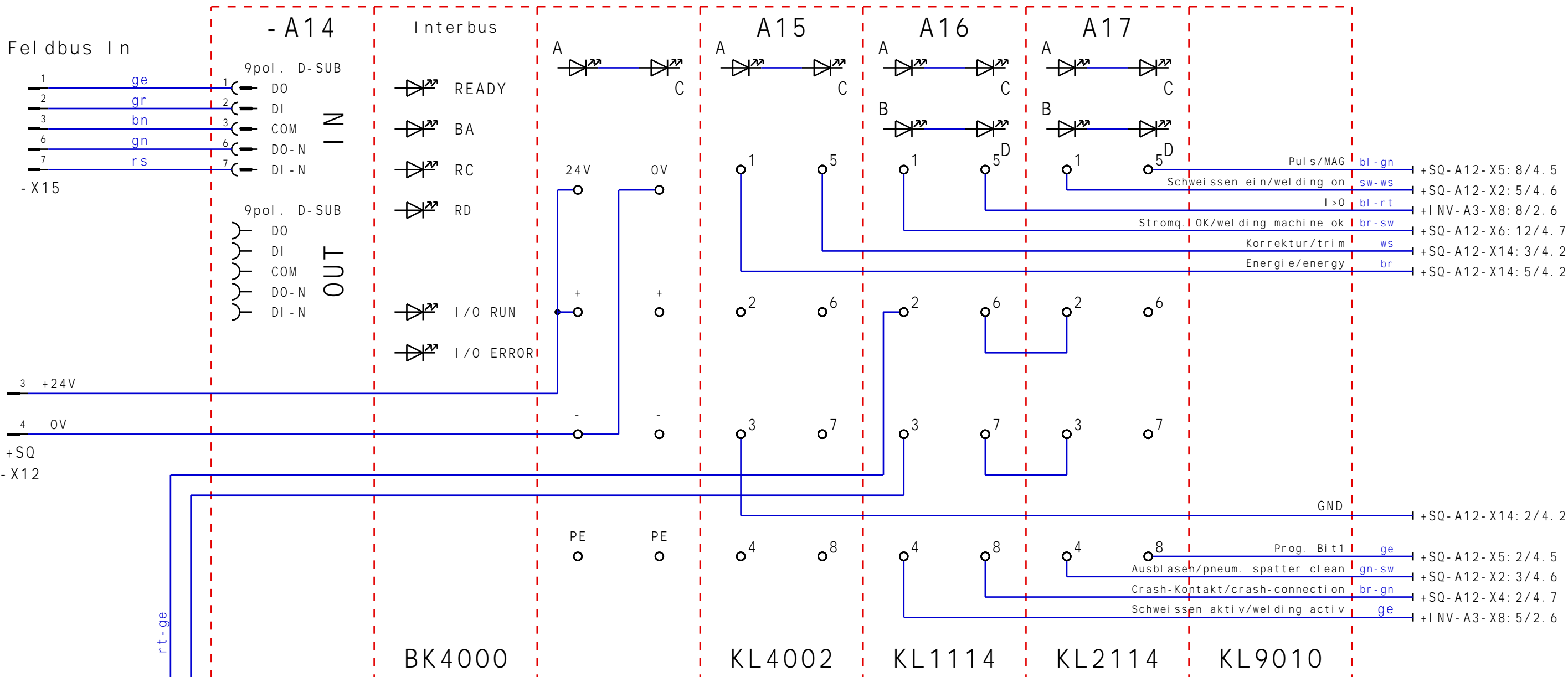


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**CAN-BUS**


Projektbez.	KPU400L lowcost Kuka Augsb.	=
Auftragsnr.	Zeichnungsnr.	Blatt 6
		11 Bl.

# Interbus-S-Koppler



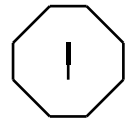
- BK 4000 Interbus-S-Koppler
- KL 4002 2 Kanal Analog Ausgangsklemme
- KL 1114 4 Kanal Digital Eingangsklemme
- KL 2114 4 Kanal Digital Ausgangsklemme
- KL 9010 Busendklemme

Vervielfältigung oder Weitergabe nur mit unserer schriftlichen Genehmigung gestattet

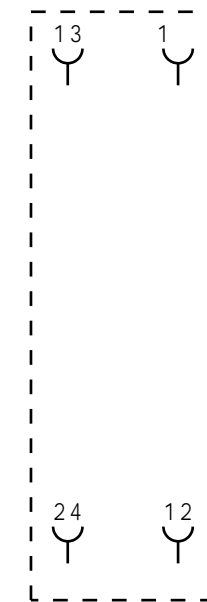
Änderung	Datum	Name	Datum	Name	 Merkle Schweißanlagen-Technik GmbH Industriestraße 3 D - 89359 Kötz Telefon 08221 - 915 - 0 Telefax 08221 - 32596	DV-Gerät ROB-DV30	Projektbez.	= + OP Blatt 7 11 Bl.	
a			gez.	27.05.00			Konrad		KPU400L lowcost Kuka Augsb.
b			gepr.	15.03.00			Vogg		Auftragsnr.
c									Zeichnungsnr.
d									



CAN in

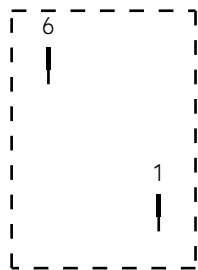


X8



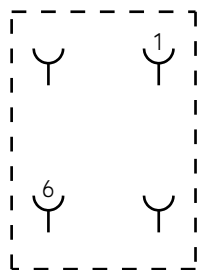
DV-Gerät

X12



Not-Aus vom  
Roboter

X11



WK 370

┆ Stifteinsatz

┆ Buchseneinsatz

Vervielfältigung oder Weitergabe nur mit unserer schriftlichen Genehmigung gestattet

Aenderung	Datum	Name	Datum	Name
a			gez. 12.03.00	Konrad
b				
c			gepr. 15.03.00	Vogg
d				



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Telefon 08221 - 915 - 0  
Telefax 08221 - 32596

**Schnittstellen-  
ansicht**

Projektbez. KPU400L lowcost Kuka Ausgb.	=
Auftragsnr.	+ SQ
Zeichnungsnr.	Blatt 9
	11 Bl.

Vervielfältigung oder Weitergabe nur mit unserer schriftlichen Genehmigung gestattet

- X8	
PIN-NR.	STROMPFAD
1	/3.1
2	/3.1
3	/3.1
4	/3.1
5	/3.1
6	/3.1
7	/3.1
8	/3.1
9	/3.1
10	/3.1
11	/3.1
12	/3.1
13	/3.1
14	/3.1
15	/3.1
16	/3.1
17	/3.1
18	/3.1
19	/3.1
20	/3.1
21	/3.1
22	/3.1
23	/3.1
24	/3.1

+VB - X8	
PIN-NR.	STROMPFAD
1	/8.1
2	/8.1
3	/8.1
4	/8.1
5	/8.1
6	/8.1
7	/8.1
8	/8.1
9	/8.1
10	/8.1
11	/8.1
12	/8.1
13	/8.1
14	/8.1
15	/8.1
16	/8.1
17	/8.1
18	/8.1
19	/8.1
20	/8.1
21	/8.1
22	/8.1
23	/8.1
24	/8.1

+VB - X9	
PIN-NR.	STROMPFAD
1	/8.4
2	/8.4
3	/8.4
4	/8.4
5	/8.4
6	/8.4
7	/8.4
8	/8.4
9	/8.4
10	/8.4

+DV - X9	
PIN-NR.	STROMPFAD
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

+I NV - A3- X8	
PIN-NR.	STROMPFAD
1	
2	
3	/2.6
4	/2.6
5	/2.6
6	/2.6
7	/2.6
8	/2.6
9	/2.6
10	/2.6
11	/2.6
12	/2.6

+I NV - A3- X5	
PIN-NR.	STROMPFAD
1	/2.3
2	/2.3
3	/2.3
4	/2.3
5	/2.3
6	/2.3
7	/2.3
8	/2.3
9	/2.3
10	

+DV - X10	
PIN-NR.	STROMPFAD
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

+VB - X9a	
PIN-NR.	STROMPFAD
1	/8.4
2	/8.4
3	/8.4
4	/8.4
5	/8.4
6	/8.4
7	/8.4
8	/8.4
9	/8.4
10	/8.4

+DV - X9a	
PIN-NR.	STROMPFAD
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

+I NV - A3- X10	
PIN-NR.	STROMPFAD
1	/2.3
2	/2.3
3	/2.3
4	/2.3

- A6- X1	
PIN-NR.	STROMPFAD
1	/3.4
2	/3.4
3	/3.4
4	/3.4
5	/3.4
6	/3.4

+0P2 - X11	
PIN-NR.	STROMPFAD
1	/2.8
2	/2.8
3	/2.8
4	/2.8
5	/2.8
6	/2.8

+I NV - A4- X1	
PIN-NR.	STROMPFAD
1	
2	
3	
4	
5	
6	
7	
8	

+I NV - A3- X6	
PIN-NR.	STROMPFAD
1	/2.3
2	/2.3
3	/2.3
4	/2.3
5	/2.3
6	/2.3
7	/2.3
8	/2.3

- A8- X4	
PIN-NR.	STROMPFAD
1	/3.5
2	/3.5
3	/3.5
4	/3.5
5	/3.5
6	/3.5
7	/3.5
8	

+0P1 - A7- X2	
PIN-NR.	STROMPFAD
1	/3.6
2	/3.6
3	/3.6
4	/3.6
5	/3.6
6	/3.6

+I NV - A1- X1	
PIN-NR.	STROMPFAD
1	
2	
3	
4	

- A12- X1	
PIN-NR.	STROMPFAD
1	/4.2
2	
3	
4	/4.2

+DV - X6	
PIN-NR.	STROMPFAD
1	
2	
3	

+I NV - A3- X7	
PIN-NR.	STROMPFAD
1	/2.5
2	
3	/2.5
4	/2.4

- A5- X1	
PIN-NR.	STROMPFAD
1	/1.7
2	/1.7
3	/1.7
4	/1.7

- A8- X1	
PIN-NR.	STROMPFAD
1	/3.5
2	/3.5
3	/3.5
4	/3.5

+I NV - A3- X9	
PIN-NR.	STROMPFAD
1	/2.6
2	/2.6
3	/2.6
4	/2.6
5	/2.6
6	/2.6

+I NV - A1- X3	
PIN-NR.	STROMPFAD
1	
2	

- A12- X12	
PIN-NR.	STROMPFAD
1	/4.4
2	/4.4
3	/4.4
4	/4.4
5	/4.4
6	/4.4
7	/4.4
8	

- A12- X4	
PIN-NR.	STROMPFAD
1	/4.7
2	/4.7
3	/4.7
4	/4.7

	Änderung	Datum	Name		Datum	Name
a				gez.	12.03.00	Konrad
b						
c				gepr.	15.03.00	Konrad
d						



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Querverweise

Projektbez.	KPU400L lowcost Kuka Augsb.	=
Auftragsnr.	Zeichnungsnr.	+ SQ
		Blatt 10
		11 Bl.

Vervielfältigung oder Weitergabe nur mit unserer schriftlichen Genehmigung gestattet

- A12- X13	
PIN-NR.	STROMPFAD
1	
2	/4.2
3	
4	
5	
6	
7	
8	
9	/4.3
10	
11	
12	
13	
14	
15	
16	

- A12- X11	
PIN-NR.	STROMPFAD
1	/4.4
2	/4.3
3	/4.3
4	
5	
6	/4.3
7	
8	
9	/4.3
10	/4.3

- A12- X5	
PIN-NR.	STROMPFAD
1	/4.5
2	/4.5
3	/4.5
4	/4.5
5	/4.5
6	
7	/4.5
8	/4.5

- A8- X9	
PIN-NR.	STROMPFAD
1	
2	/3.5
3	
4	/3.5

- A12- X3	
PIN-NR.	STROMPFAD
1	/4.7
2	/4.7
3	
4	
5	
6	/4.7
7	/4.7
8	/4.7

- A12- X2	
PIN-NR.	STROMPFAD
1	/4.6
2	/4.6
3	/4.6
4	/4.6
5	/4.6
6	/4.5
7	
8	/4.5

- A12- X14	
PIN-NR.	STROMPFAD
1	
2	/4.2
3	/4.2
4	
5	/4.2
6	

- A12- X6	
PIN-NR.	STROMPFAD
1	/4.6
2	
3	/4.6
4	/4.6
5	
6	/4.6
7	/4.6
8	
9	
10	/4.6
11	
12	/4.7

- X12	
PIN-NR.	STROMPFAD
1	/4.8
2	/4.8
3	/7.1
4	/7.1
5	
6	

	Änderung	Datum	Name		Datum	Name
a				gez.	12.03.00	Konrad
b						
c				gepr.	15.03.00	Vogg
d						



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 Telefon 08221 - 915 - 0  
 Telefax 08221 - 32596

Querverweise

Projektbez.  
 KPU400L lowcost Kuka Augsb.  
 Auftragsnr.      Zeichnungsnr.

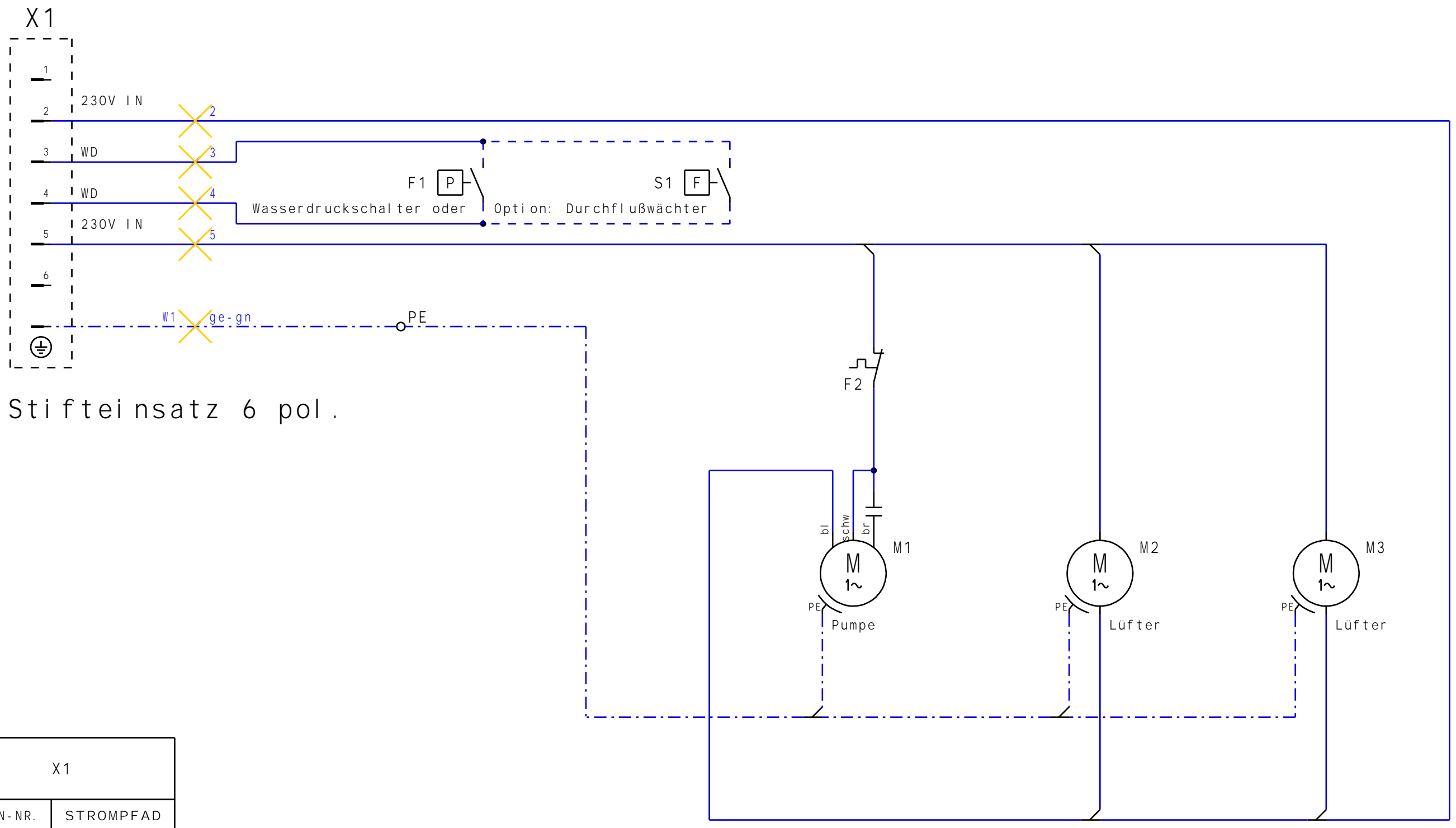
=  
 + SQ  
 Blatt 11  
 11 Bl.

### 13.3 Spare Part List Water Cooling Unit WK 370

<b>electr.</b>	<b>article</b>	<b>part no.</b>
F1	pressure switch 0.5 bar	00400204
F2	over current protection 1.4 A	00300320
M1	water pump 230 V, 50 Hz, 0.12 kW	00400530
M2	fan 230V	00101301
M3	fan 230V	00101301
S1	water flow controller FL 200	02610156
W1	control cable 7x1.5 mm <sup>2</sup>	00700600
X1	pin set 6-pol. protection 6-pol.	01500102 01500100

### 13.4 Wired diagramm Watercooler WK 370


Vervielfältigung oder Weitergabe nur mit unserer schriftlichen Genehmigung gestattet



Stiftensatz 6 pol.

X1	
PIN-NR.	STROMPFAD
1	.1
2	.1
3	.1
4	.1
5	.1
6	.1

Anderung	Datum	Name	Datum	Name
a			gez. 15.10.99	Konrad
b				
c			gepr.	
d				



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 D - 89359 Kötz  
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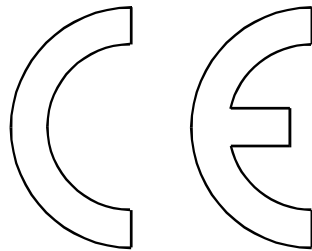
Stromlaufplan

Projektbez. WK370		=
Auftragsnr.	Zeichnungsnr.	+
		Blatt 1
		1 Bl.

## 14 Konformitätserklärung KPU 400 L



MERKLE Schweißanlagen-Technik GmbH  
Industriestraße 3  
D-89359 Kötz



### EG - Konformitätserklärung

Bezeichnung der Maschine: Roboter-Pulse-Arc-Schweißanlage

Maschinentyp: KPU 400 L

Die obengenannte Maschine entspricht aufgrund ihrer Konzeption und Bauart in der von uns in Verkehr gebrachten Ausführung den Anforderungen folgender Richtlinien:

EG-Niederspannungsrichtlinie 73/23/EWG

EG-Richtlinie über elektromagnetische Verträglichkeit 89/336/EWG

Im Fall von unbefugten Veränderungen, unsachgemäßen Reparaturen oder Umbauten, die nicht ausdrücklich von Merkle autorisiert sind, verliert diese Erklärung ihre Gültigkeit.

Angewandte Normen: EN 60974 - 1 / IEC 974 - 1 / VDE 0544 Teil 1  
EN 60204 - 1 / IEC 204 - 1 / VDE 0113 Teil 1  
EN 50199

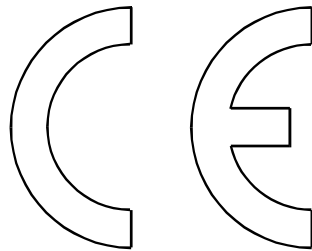
Kötz, den 20. Mai 1998

Wilhelm Merkle, Geschäftsführer  
Merkle Schweißanlagen-Technik GmbH

## 15 Konformitätserklärung WK 370



MERKLE Schweißanlagen-Technik GmbH  
Industriestraße 3  
D-89359 Kötz



### EG - Konformitätserklärung

Bezeichnung der Maschine: Wasserkühlgerät

Maschinentyp: WK 370

Die obengenannte Maschine entspricht aufgrund ihrer Konzeption und Bauart in der von uns in Verkehr gebrachten Ausführung den Anforderungen folgender Richtlinien:

EG-Niederspannungsrichtlinie 73/23/EWG

EG-Richtlinie über elektromagnetische Verträglichkeit 89/336/EWG

Im Fall von unbefugten Veränderungen, unsachgemäßen Reparaturen oder Umbauten, die nicht ausdrücklich von Merkle autorisiert sind, verliert diese Erklärung ihre Gültigkeit.

Angewandte Normen: EN 60974 - 1 / IEC 974 - 1 / VDE 0544 Teil 1  
EN 60204 - 1 / IEC 204 - 1 / VDE 0113 Teil 1  
EN 50199

Kötz, den 08. April 1999

Wilhelm Merkle, Geschäftsführer  
Merkle Schweißanlagen-Technik GmbH



**MERKLE**

Schweißanlagen-Technik GmbH



**MERKLE**  
**Schweißanlagen-Technik GmbH**  
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**Tel.: (08221)915-0**  
**Fax.: (08221)915-40**  
**[www.merkle.de](http://www.merkle.de)**

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1. Auflage 2002

Technische Änderungen vorbehalten