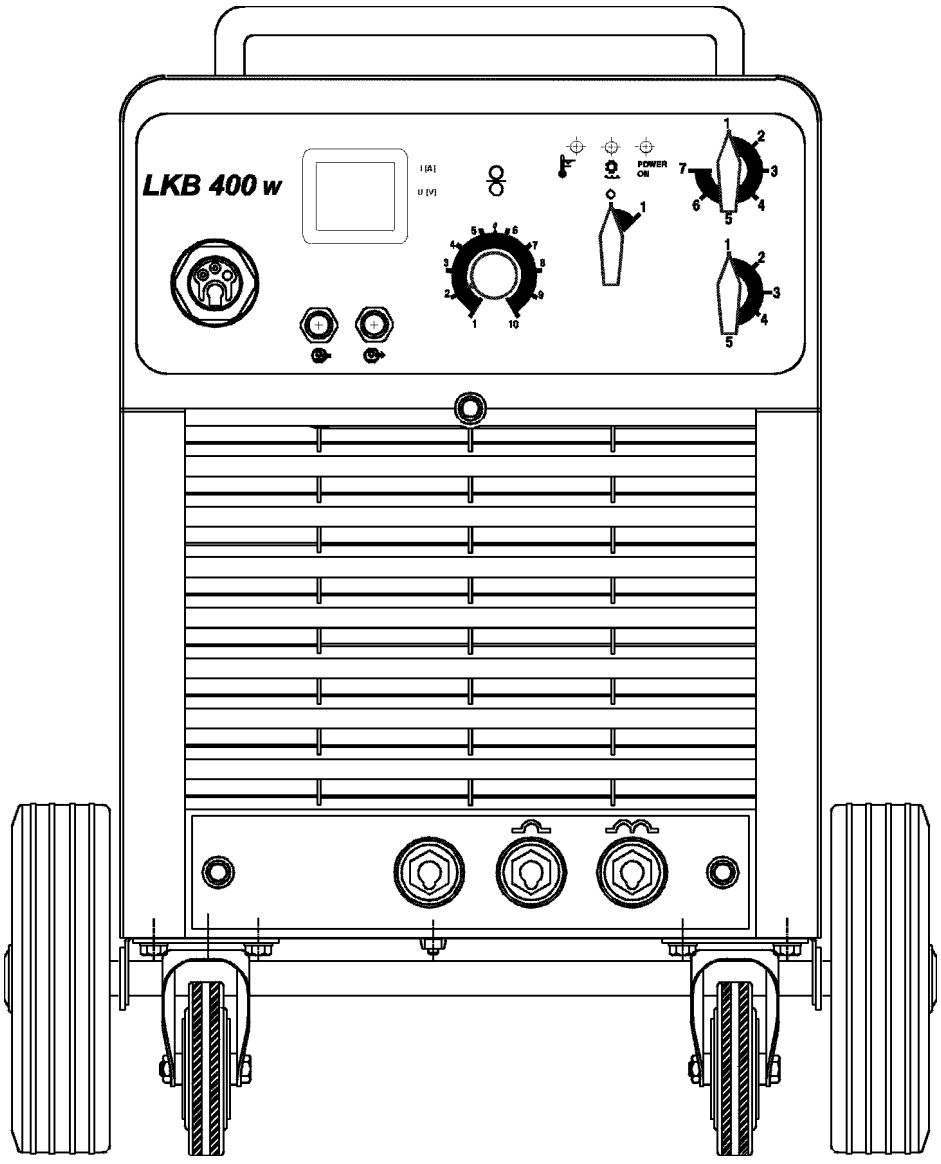
LKB 400W

WELDING RECTIFIER



Service manual

0349 300 020 01-01-24

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! WARNING !

ARC WELDING AND CUTTING CAN BE INJURIOUS TO YOURSELF AND OTHERS. TAKE PRECAUTIONS WHEN WELDING. ASK YOUR EMPLOYER FOR SAFETY PRACTICES THAT SHOULD BE BASED ON MANUFACTURER'S HAZARD DATA.

ELECTRIC SHOCK - Can kill
- Install equipment in accordance with obligatory standards.
- Do not touch live electrical parts or electrodes with bare skin, wet gloves or wet clothes.
- Insulate yourself from earth and workpiece.
- Ensure your work position is safe.

FUMES AND GASES - Can be dangerous to your health
- Keep your head away from fumes.
- Use ventilation and/or extraction to keep fumes and gases away from your breathing zone and surroundings.

ARC RAYS - Can injure eyes and burn skin
- Protect your eyes and skin. Use correct welding screens, filter lens and wear protective clothes.
- Protect bystanders with suitable screens or curtains.

FIRE HAZARD
- Sparks (spatter) can cause fire. Make therefore sure there are no inflammable materials nearby.

NOISE - Excessive noise can damage your hearing.
- Protect your ears. Use ear defenders or other hearing protection.
- Warn bystanders of the risk.

READ AND UNDERSTAND THE INSTRUCTION MANUAL BEFORE INSTALLING OR OPERATING UNIT

PROTECT YOURSELF AND OTHERS !

1. CONNECTION DIAGRAM, LKB400W, 400V

Switch positions for switch Q3

	1	2	3	4	5
1-2	x				
3-4	x				
5-6	x				
7-8		x			
9-10		x			
11-12		x			
13-14			x		
15-16			x		
17-18			x		
19-20				x	
21-22				x	
23-24				x	
25-26					x
27-28					x
29-30					x

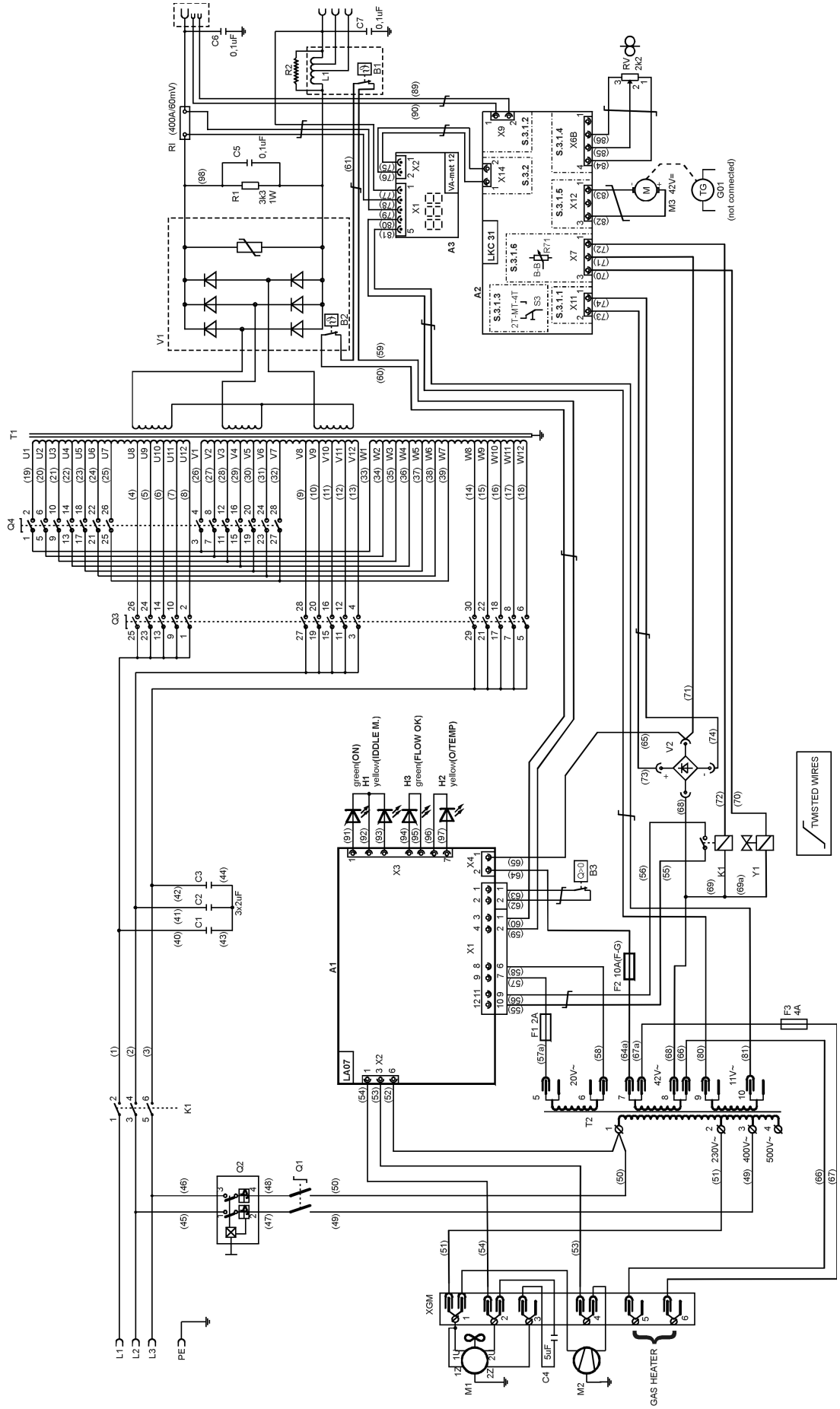
Switch positions for switch Q4

	1	2	3	4	5	6	7
1-2	x						
3-4	x						
5-6		x					
7-8		x					
9-10			x				
11-12			x				
13-14				x			
15-16				x			
17-18					x		
19-20					x		
21-22						x	
23-24						x	
25-26							x
27-28							x

COMPONENT DESCRIPTION

A1	Circuit board LA07
A2	Circuit board LKC31
A3	V/A - meter
T1	Transformer
V1	Diode bridge
L1	Inductor
RI	Shunt
K1	Contactor
Q1	Rotary cam switch
Q3	Rotary cam switch
Q4	Rotary cam switch
Q2	Circuit breaker
T2	Control transformer
C1,C2,C3	Capacitor 2uF 450V
C5,C6,C7	Capacitor 0,1uF/275V
R1	Resistor 3,3k 1W
M1	Fan
M2	Pump
M3	Drive unit motor
V2	Rectifier bridge
B1,B2	Temperature switch
B3	Flow switch
RV	Wire speed reference potentiometer
R2	Resistor
F1	Fuse 2A slow-blow
F2	Fuse 10A slow-blow
F3	Fuse 4A slow-blow
H1	LED (green/yellow)
H2	LED (yellow)
H3	LED (green)
XGM	Terminal block

LKB 400W, 400V



2. COMPONENT POSITIONS, CIRCUIT BOARD LA07 (A1)

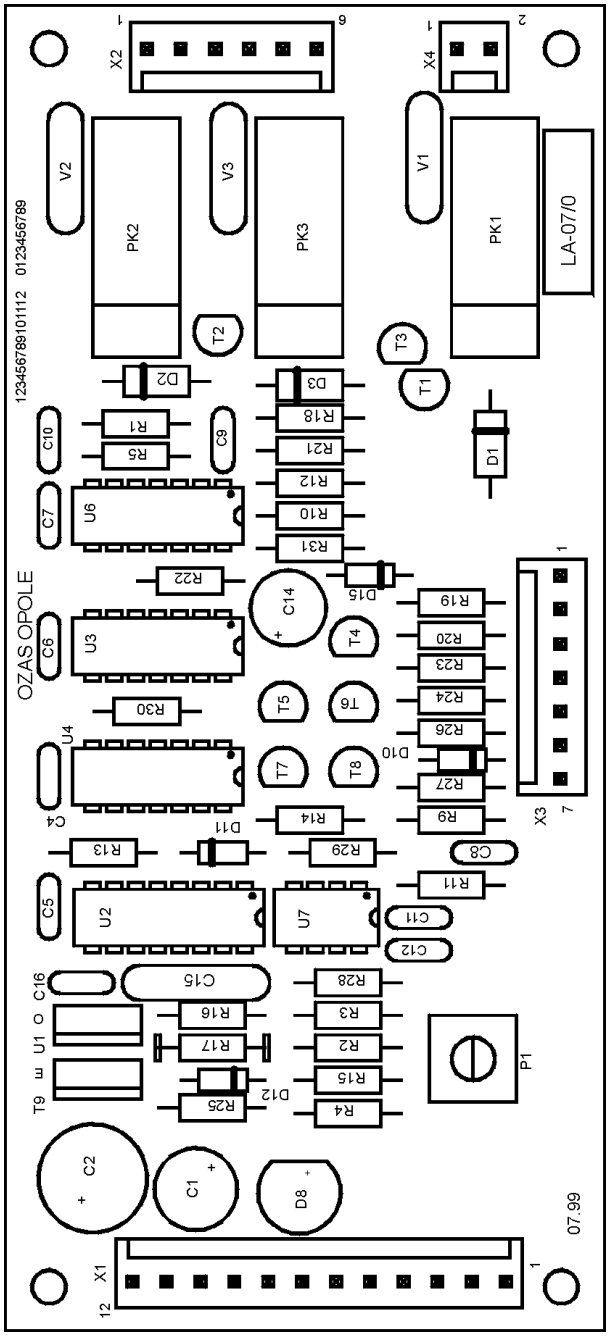
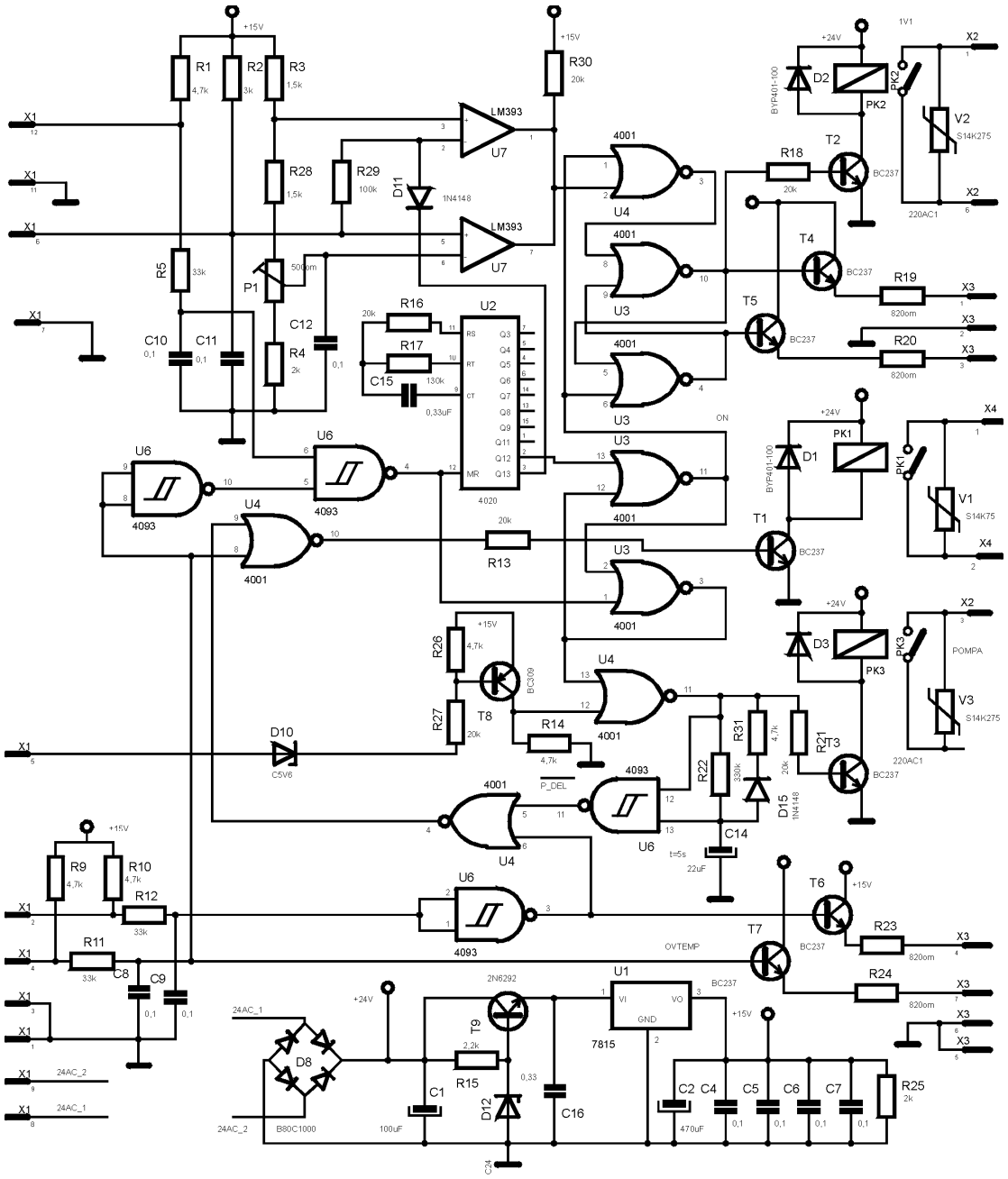


DIAGRAM LA07 (A1)



DESCRIPTION OF BOARD LA07 (A1)

Power supply

The board is supplied 20V AC voltage (contacts 8,9 connector X1). Two step voltage regulation (elements T9, U1) provide voltage 15 V ± 5% required for control system power supply.

Inputs

1. Auxiliary contact of main contactor type NO - 11,12 X1,
2. Contact of temperature sensor type NC - 4,3 X1,
3. Contact of liquid pressure sensor type NO - 2,1 X1,
4. Reserved input - 6,7 X1,
5. Reserved input - 5,10 X1.

Outputs

1. Fan switch contact NO, MOV 275V - 1,6 X2, (6- common phase contact)
2. Pump switch contact NO, MOV275V - 3,6 X2, (6- common phased contact)
3. Power supply switch for feeder type NO , MOV 75V - 1,2 X4,
4. Power supply for LED diode green-yellow (H1) - 1,2,3 X3 (2-common cathode)
5. Power supply for LED diode yellow (H2) - 6,7 X3 (6-cathode)
6. Power supply for LED diode green (H3) - 4,5 X3 (5-cathode)

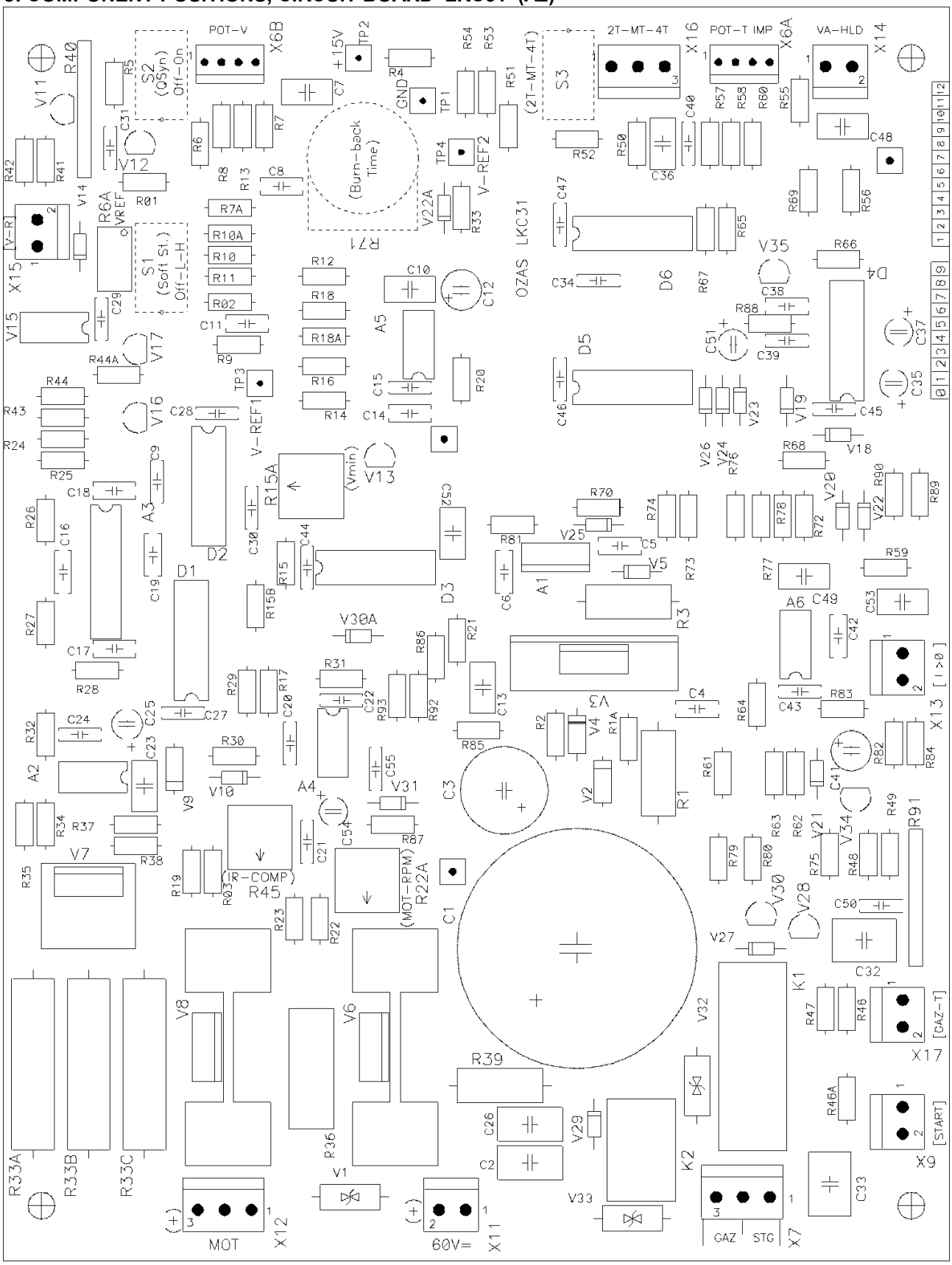
LED diodes– external

1. H1 – two colours: green - unit on signal,
   yellow – unit off signal,
2. H2 - yellow: on when unit overheated,
3. H3 – green: on when cooling liquid flow correct.

Operation

After switching the unit, feeding unit is powered (relay PK1) and fan (relay PK2) and pump (relay PK3) are switched on. If within 5s the signal from liquid pressure sensor (NO contact) is not supplied, wire feeding unit power supply shall be disconnected. Power supply shall be restored on signal from pressure sensor. Proper pressure (liquid flow) is indicated by green diode placed on the front panel of the unit (H3).
Wire feeder power supply is disconnected as well by means of signal from external thermal NC-type switches. Overheating is indicated by yellow diode (H2) placed on the front panel of the unit. Wire feeder power supply shall be restored on absence of overheating.
Oscillator-counter U2 is reset during main contactor operation and during overheating. After 5 minutes from the last switch-off of contactor and end of overheating period, pump is switched off (relay PK3) and after 10 minutes – fan is switched off (relay PK2). On the fan switch-off unit goes into the idle mode indicated by yellow lighting of diode H1 placed on the front panel of the unit. Wire feeder remains powered (relay PK1).
In the idle mode, with switched off pump, it is possible to start welding by means of button on torch.
Then, contactor is switched on again, counter U2 is reset, fan and pump are activated. Within 5s signal from liquid pressure sensor should appear. If not, wire feeder power supply circuit (relay PK1) is disconnected. Power supply shall be restored on signal from pressure sensor.

3. COMPONENT POSITIONS, CIRCUIT BOARD LKC31 (A2)

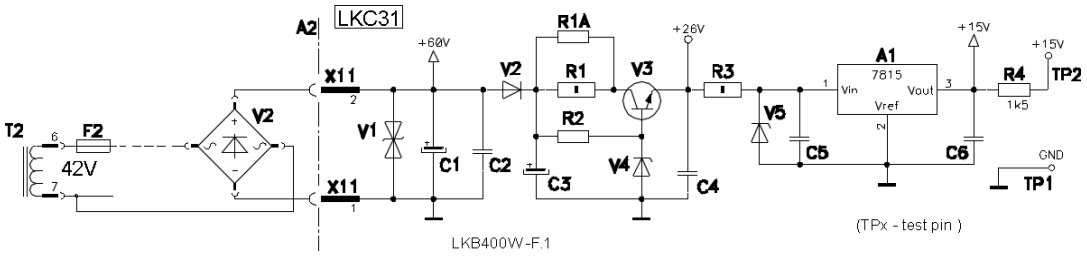


3.1 CONTROL CIRCUIT FUNCTION LKC31

Sections 3.1.1-3.1.6 below refer to the diagrams in chapter 1.

3.1.1 POWER SUPPLY

The circuit board uses one supply voltage: 42VAC – rectified by the bridge V2 for power supply to the motor and control circuitry.



- Power supply to the electronic circuitry

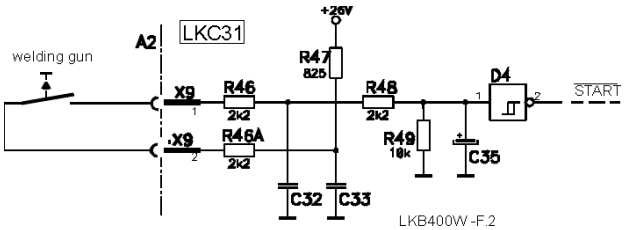
- the +26V power supply from V3 through R3 – is regulated to 15V by voltage regulator A1,
- +15V is used for powering of motor control electronic

- +60V power supply is used for motor control,

  This voltage may vary (with load/mains voltage deviation) – from –15% to +10%.

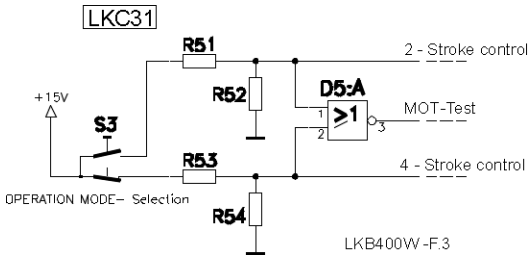
- +26V (intermediate voltage for A1) – is also used for powering of relays K1 and K2 (on PCB) and for input control circuit (“START/STOP”).

3. 1.2 START/STOP



Closing contact S1 on the welding torch starts the welding process – or only motor M3 depending on control mode selection (see – section 3.1.3)

3. 1.3 CONTROL MODES – 2-STROKE/MOTOR-TEST/4-STROKE

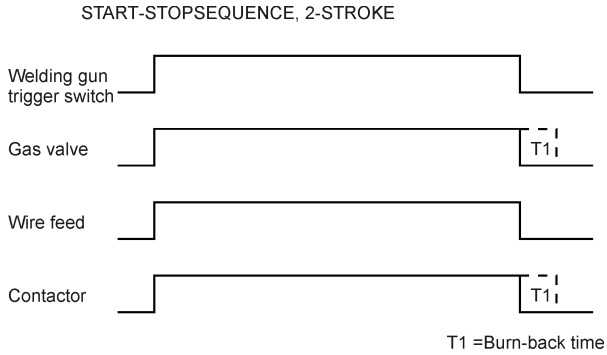


By the switch S3 on the PCB (pos. M) – in the motor compartment – welder may select the following control modes:

A) 2-STROKE CONTROL

When the trigger switch (welding gun-S1) is depressed – welding process starts (wire feed motor, gas valve and power unit contactor).

When trigger switch is released – welding process stops (motor and gas valve – immediately, contactor – when burnback time is elapsed).

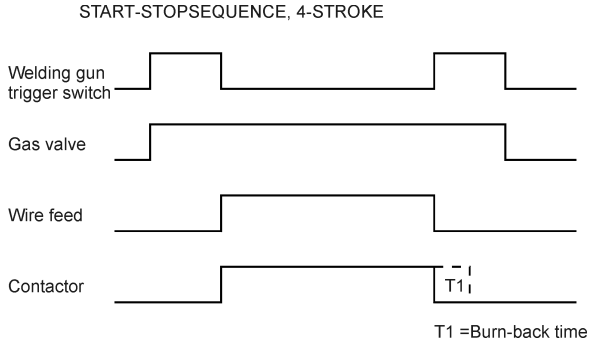


B) MOTOR TEST

When trigger switch is closed – only feed motor starts, gas valve and contactor remain disenergised.

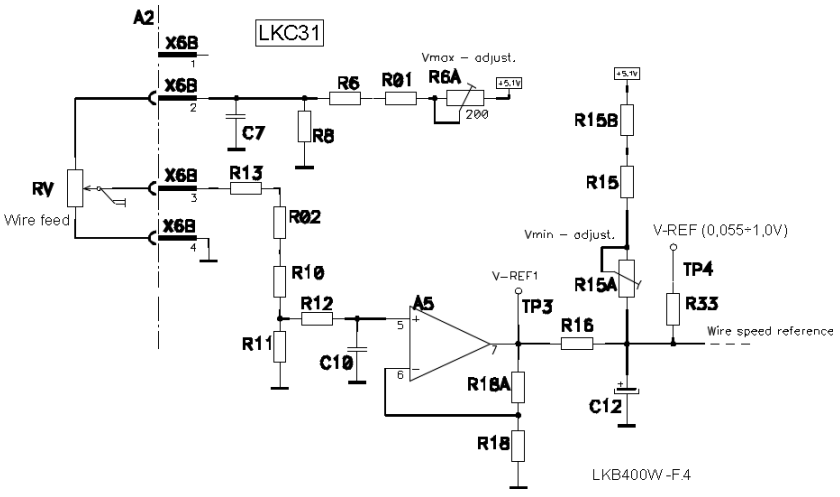
C) 4-STROKE CONTROL

The welding process is controlled by trigger switch S1 (welding gun) – as shown below:



NOTE: On the LKC31 – for selected 2-S/4-S mode – active signals are high!

3.1.4 WIRE FEED SPEED



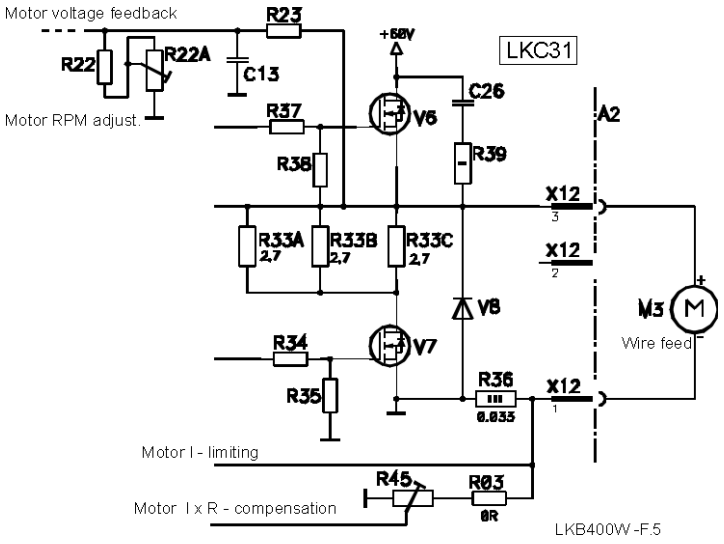
The wire feed speed setting range is 1,6 to 25 meter/minute, the upper speed may be adjusted by R6A, minimum speed is adjusted by R15A.

V-REF voltage is reference signal for motor speed control circuit.

Note: By the potentiometer R6A and R15A – there is set the ratio Vmax : Vmin; fine adjusting of the motor speed (depending on the motor characteristic) – is performed by the R22A (see – section 3.1.5).

As well the motor speed (especially the lower range) – is influenced by the setting of I x R compensation(R45 – see section 3.1.5).

3. 1.5 MOTOR CONTROL/DYNAMIC BRAKING



The motor is powered by the smoothed +60 V supply. Pulse width modulation of transistor V6 controls the motor voltage. The pulse frequency is about 16 kHz, and maximum conduction time of the pulses is about 95% of the pulse cycle time. During the Off parts of the pulse cycle, the motor current freewheels through diode V8.

- Speed control

  The gate pulses to transistor V6 are generated by a PWM circuit, which compares speed reference from microprocessor electronic with signal proportional to the motor voltage (R22, R22A,R23).

- Current limit

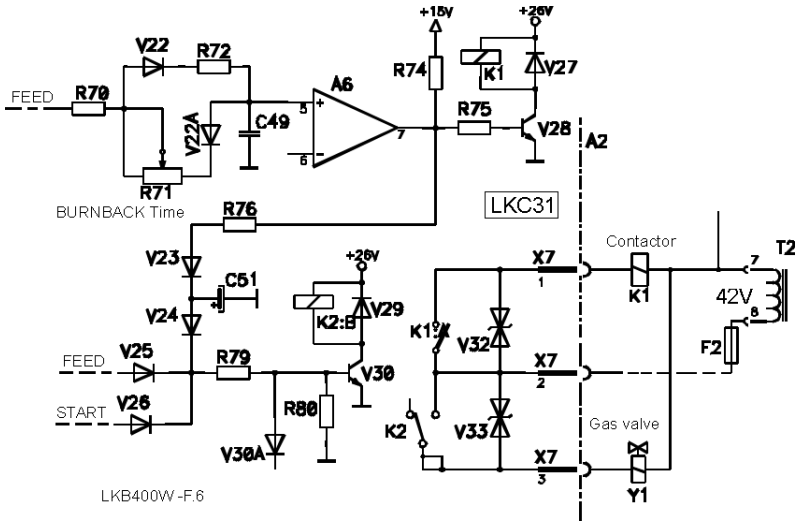
  The current limit is set at 12 A. The motor current is measured by resistor R36 which produces a voltage drop proportional to the current (1A = 33mV). The current limit restricts the conduction time of the gate pulses to transistor V6.

- Compensation of motor I x R voltage

  Potentiometer R45 allows to compensate voltage drop on motor armature resistance so as to improve wire transportation at low speed settings.

  Warning: too high settings may cause drive control instability! Recommended setting is 0,50 – 0,60, if drive becomes instable – decrease the setting.

  Dynamic braking is performed by the loop: R33A,B,C, V7 and R36.



3.1.6 BURNBACK TIME, CONTACTOR, GAS VALVE

- BURNBACK TIME

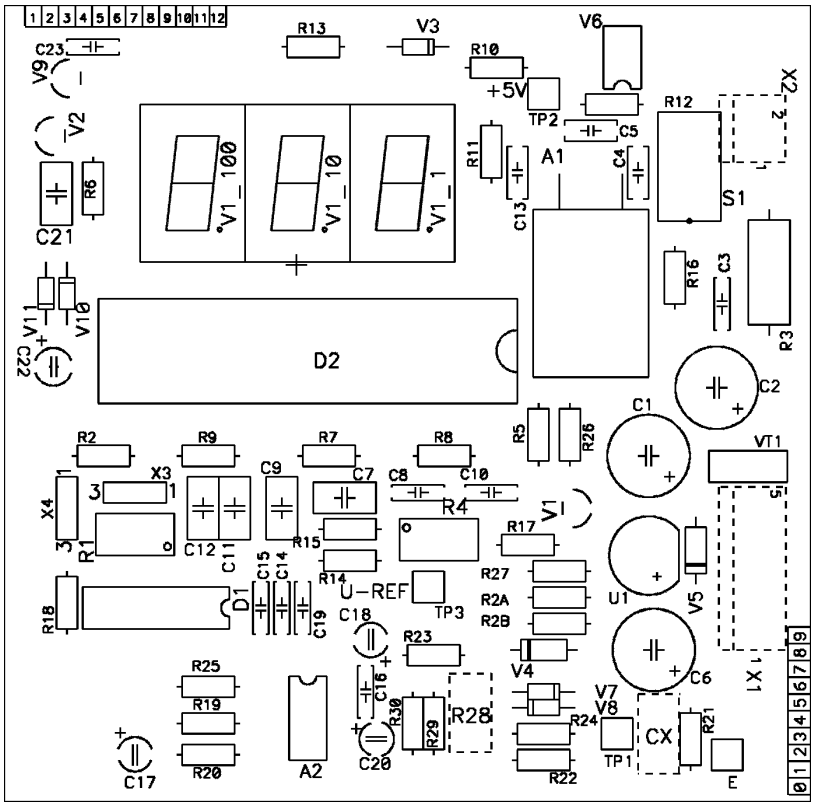
  The burnback time is the time from when motor braking starts until the main contactor opens. The burnback time can be adjusted from 0 to 0,35 seconds – by the potentiometer R71. (R71 is located in the drive unit – compartment pos. L).

- ENERGISING THE CONTACTOR AND GAS VALVE

  Contactor is switched - on by relay K1, which is controlled by transistor V28; gas valve Y1 is controlled by V30 and K2.

3.2 V/A-METER OPTION (STANDARD CONTROL)

COMPONENT POSITIONS, CIRCUIT BOARD VA-MET12 (A2)



V/A-meter for measuring of welding voltage or current (readout is selected by switch S1 on the front of meter) may be installed as optional accessory. (Assembling details – see section 9.1, connections are also shown in section 1).

V/A-meter is supplied with 11VAC; input signal for current is delivered from standard 60mV shunt, voltage is measured directly across welding rectifier output.

Depending on required current range (determined by applied shunt rating) – first the jumpers X3&X4 on the PCB must be properly arranged, and the reference voltage U-REF must be adjusted by R4 – as indicated in the diagram herewith (see the table). The final adjusting of U-REF is necessary so as to calibrate accurate current indication (S1 – in position for current display)

- apply 60mV signal to inputs X1:2 (+) and X1:3 (-) – using reference voltmeter;
- adjust R4 – so as to display value corresponding to shunt rating – 150, 250 or 400A (jumper X4 in correct position!)

When current calibration is completed change over the S1 to voltage position (locate jumper X3 properly) and perform voltage calibration.

Voltage indication is adjusted by potentiometer R1 on the PCB – comparing with reference voltmeter at the input.
(**Note:** voltage adjusting is to be made only when jumpers are properly located and U-REF setting is completed!)

Recommended voltage metering range is: 0V to –40V. (Calibration is performed for –25V).

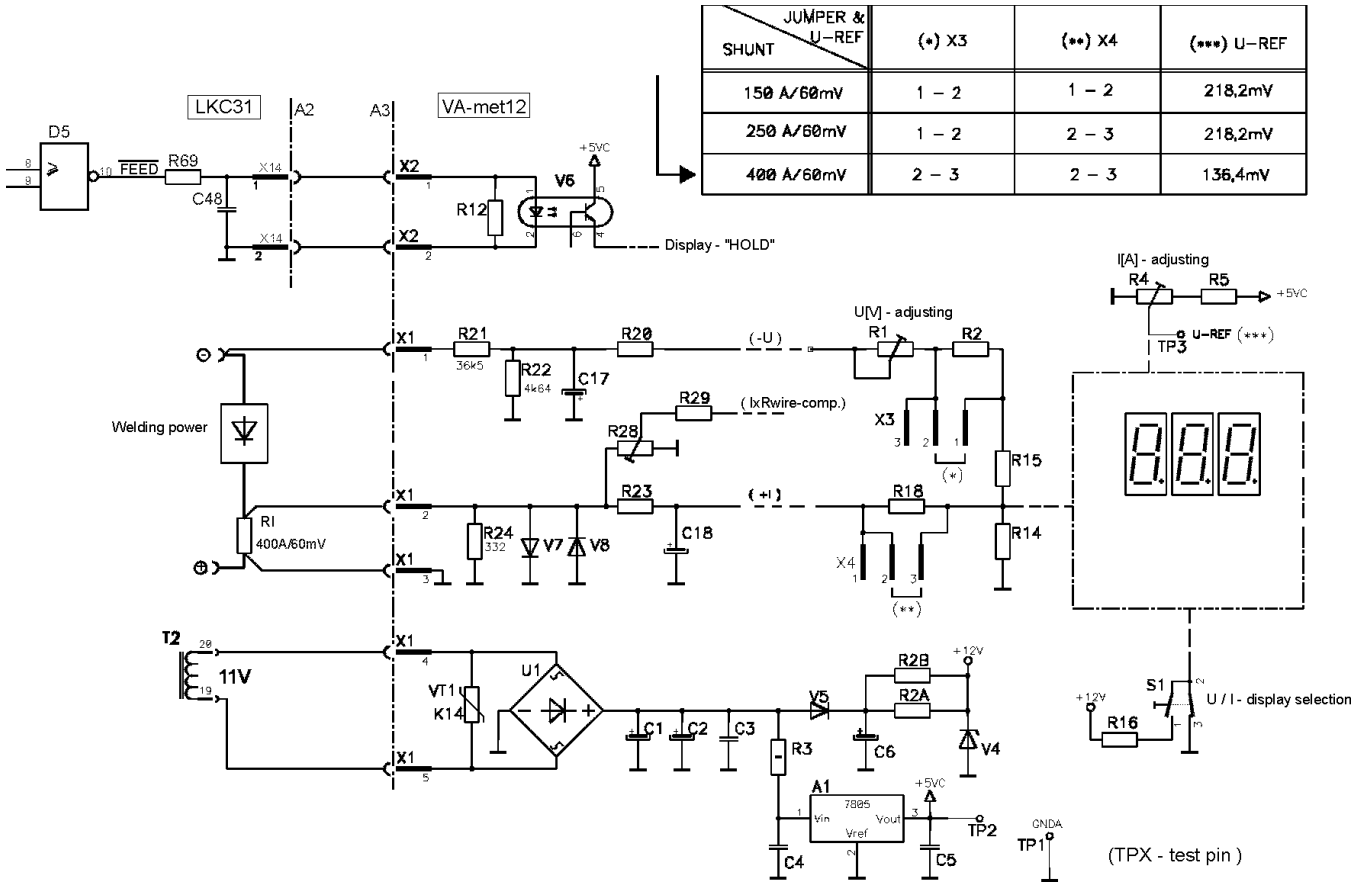
Recommended current input range is: 0mV to +60mV. (Calibration for 60mV)

(**Note:** the above described procedure is applied only - when re-calibration of the factory setting is necessary!)
V/A meter has “HOLD” function – i.e. after stop of welding, there is memorised the last displayed value (current or voltage – depending on S1 position).
There is also possibility to compensate the voltage drop on current wires – i.e. to get indication of the actual welding arc voltage.

Compensation is adjusted by potentiometer R28 (on the bottom side of PCB); when utmost CCW position – there is no compensation, turning CW increases the compensation step.

NOTE: Factory setting is “no compensation”; if necessary – use reference voltmeter and artificial load – so as to adjust compensation depending on the wire length.

JUMPER & SHUNT / U–REF	(•) X3	(••) X4	(•••) U–REF
150 A/60mV	1 – 2	1 – 2	218,2mV
250 A/60mV	1 – 2	2 – 3	218,2mV
400 A/60mV	2 – 3	2 – 3	136,4mV



4.TECHNICAL DATA

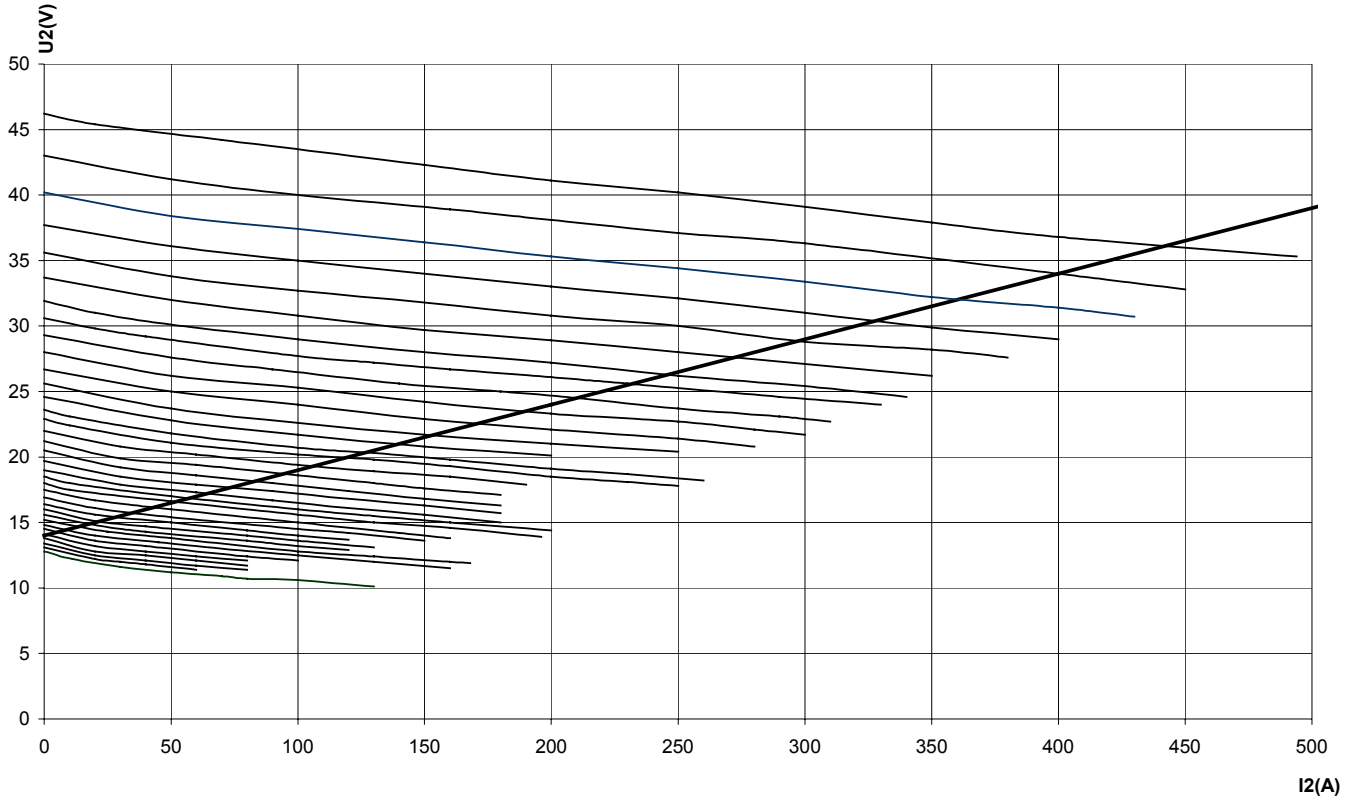
Mains voltage			400V-415V 3~ 50Hz
Mains cable cross-section			4x4mm^2
Mains fuse			25 A delayed
Rated power consumption			18,8 kVA
Rated primary current @ P35%			26 A
Rated welding current	Duty cycle* 35%		400 A
	Duty cycle* 100%		237 A
Welding current range			30A÷400A
Open circuit voltage			14÷47V
Dimensions		length width height	1100 630 845
Weight			215 kg
Working flow of cooling liquid at pressure of 2,5 bar			1 dm^3/min (60l/h)
Selection of cooling liquid depending on ambient temperature - Distilled water - Solution of 30% Antifreeze Coolant + 70% distilled water			 from 0°C to +40°C from -10°C
Tank capacity			6 dm^3

*Duty cycle is based on 10-minute period. Duty cycle 30% means that after 3 minutes of unit operation, 7 minutes break is required. Duty cycle 100% means that unit can operate continuously.

Warning:
The unit is characterised by the following :

- Enclosure class IP 23 indicates that unit is designed for indoor and outdoor use.
- Application class S means that the unit is designed for use in areas of elevated electric hazard.

5. LOAD CHARACTERISTIC



6. INSTALLATION

A competent and authorised person must install the equipment.
Connect the mains cable, and protect it with the appropriate fuses, in accordance with regulations.
Make sure that the power unit is not covered or installed such that cooling is impeded.

PRIMARY CURRENT, MAINS FUSE AND MAINS CABLE

Voltage	**400V-415V 3~ 50 Hz**
Primary current at:	
100% duty cycle	16A
35% duty cycle	26A
Conductor	4x4mm²
Fuse, slow-blow	25A

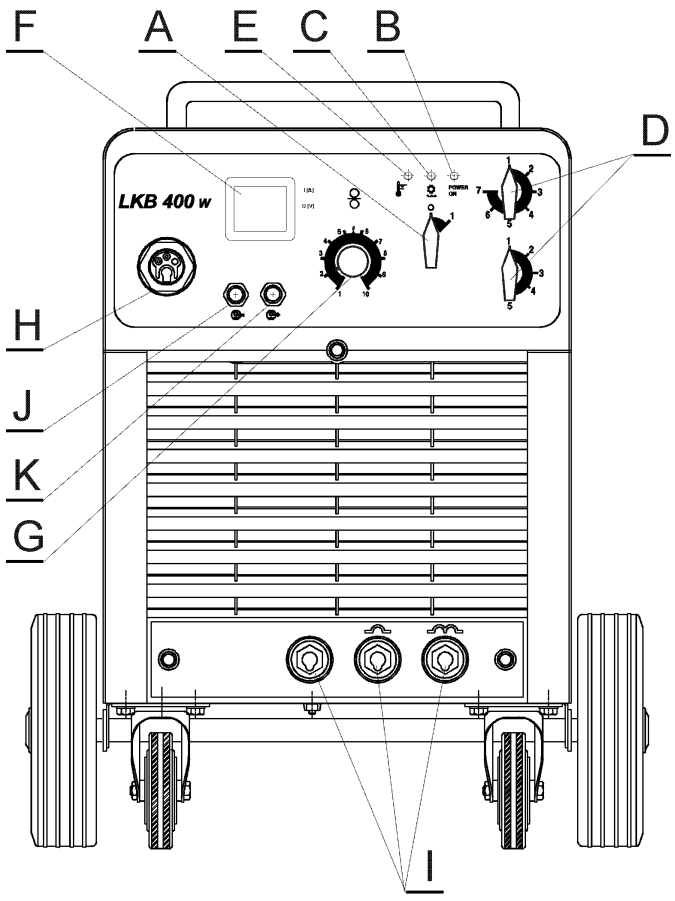
7. INSTRUCTION FOR USE

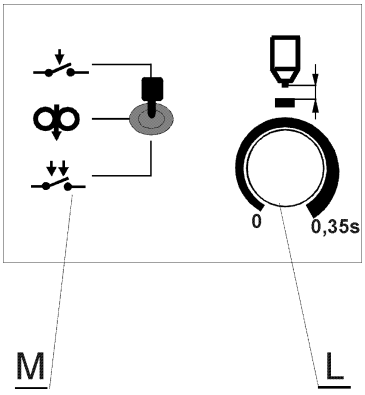
The **LKB 400W** is step-switched welding power unit, intended for welding with solid filler wires of steel, stainless steel or aluminium, and cored wires with or without shielding gas.

The power units can be fitted with an instrument for display of current and voltage. It incorporates a sample-and-hold function.

A thermal overload cutout protects against overheating. The cutout resets automatically when the unit has cooled.

CONTROL PANEL





A. POWER SWITCH switches unit on when set at „I" position, green LED diode is on (pos. B) which signals power supply to electric circuits of unit. Cooling fan and pump engine will also be switched on. Green LED diode on (pos. C) indicates correct liquid circulation in installation. Pump is switched off 5 minutes after welding process has been stopped. After another 5-minute period cooling fan is switched off and unit turns into stand-by mode. Yellow LED diode is on at that time (pos. B). After welding process has been started, fan and pump are activated automatically.

***WARNING:** If pump emits irregular noises, it signifies presence of air inside. In such a case unit must be switched off and immediately switched on again.*

B. OPERATION INDICATOR - diode indicating that unit is on (green colour) or in stand-by mode (yellow colour)

C. COOLING INDICATOR - diode indicating correct circulation of cooling liquid (green colour)

D. WELDING VOLTAGE REGULATION is carried out in steps with 5-step switch of coarse regulation and 7-step switch of precise regulation. It means that it is possible to select 35 values of welding voltage.

***WARNING:** Setting of voltage by means of switches during welding (loaded power source) can cause damage to unit!*

E. OVERHEATING causes automatic switching off of unit, welding is stopped and it is not possible to activate welding process with trigger switch on torch. Signal LED diode is on (E). It is possible to continue welding process after temperature has dropped inside the unit.

F. DIGITAL METER indicates actual values of welding current and voltage. Required value is obtained by setting lever of the switch to a proper position. Semi-automatic welder LKB 400W is manufactured without meter. Meter is delivered with necessary equipment and assembly instruction KIT (meter has HOLD function).

G. POTENTIOMETER to set wire feeding speed (in the range of 1,6 ÷ 25 m/min)

H. CONNECTION (Euro connection) to connect welding torch

I. CURRENT SOCKETS to connect current cable with clamp

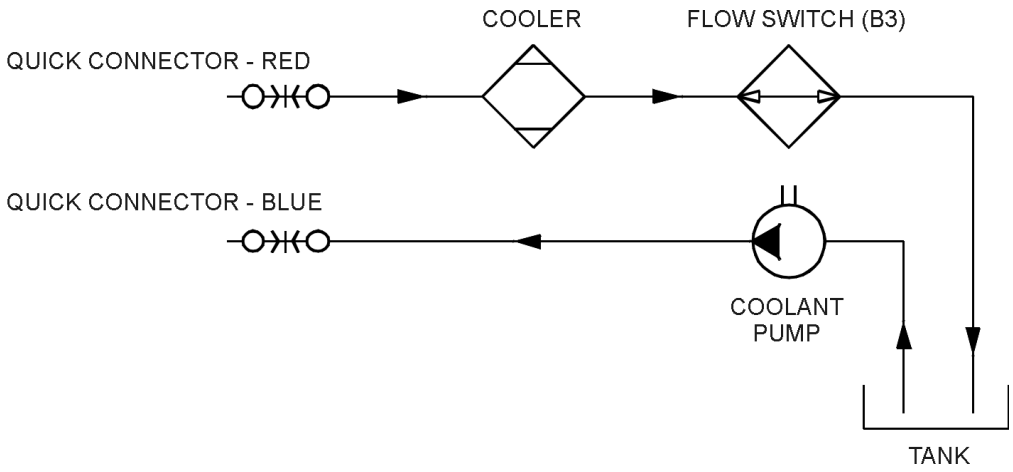
J. CONNECTION PIPE for cooling liquid outlet (cold liquid)

K. CONNECTION PIPE for cooling liquid inlet (hot liquid)

L. POTENTIOMETER of burnback time regulation

M. MODE SELECTOR 2-stroke – motor test – 4-stroke

8. COOLING CIRCUIT DIAGRAM



9. MAINTENANCE

Regular maintenance is important for reliable, safe operation.

- Blow the power until clean with dry compressed air at reduced pressure.
- For problem-free wire feed, clean and replace the wearing parts in the wire feed mechanism regular intervals.
  Note that an excessive pressure setting can cause abnormal wear on the drive roller, feed roller and wire conduit.
- Blow the wire conduit clean at regular intervals and clean the gas nozzle.

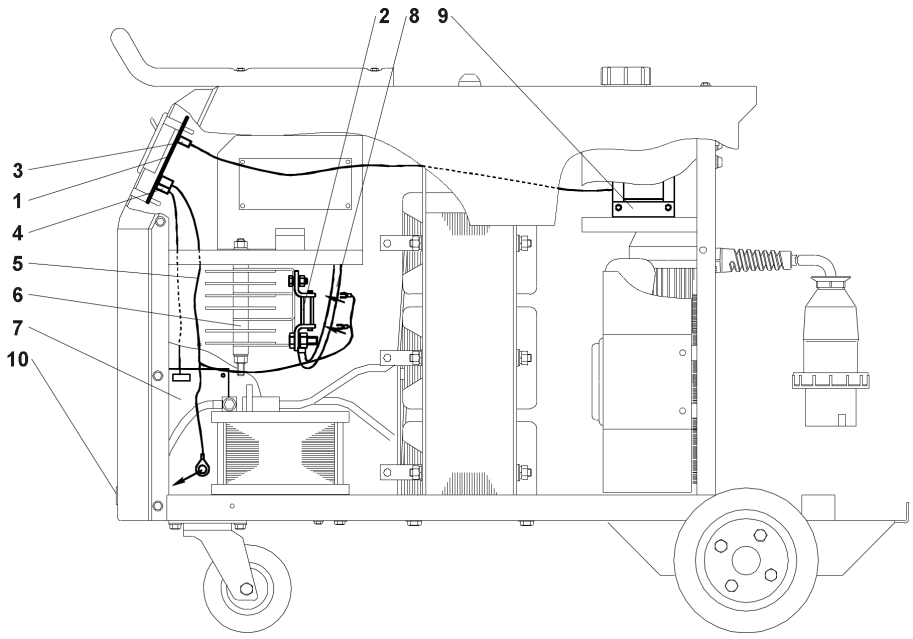
<u>WARNING:</u> If periodical HV tests have to be carried out according to local safety regulations (in some countries obligatory!) – the following control circuits must be isolated during the test – by means of disconnecting the connectors X6B(A2), X9(A2), X14(A2).

10. ACCESSORIES

V/A meter kit 0349 302 118

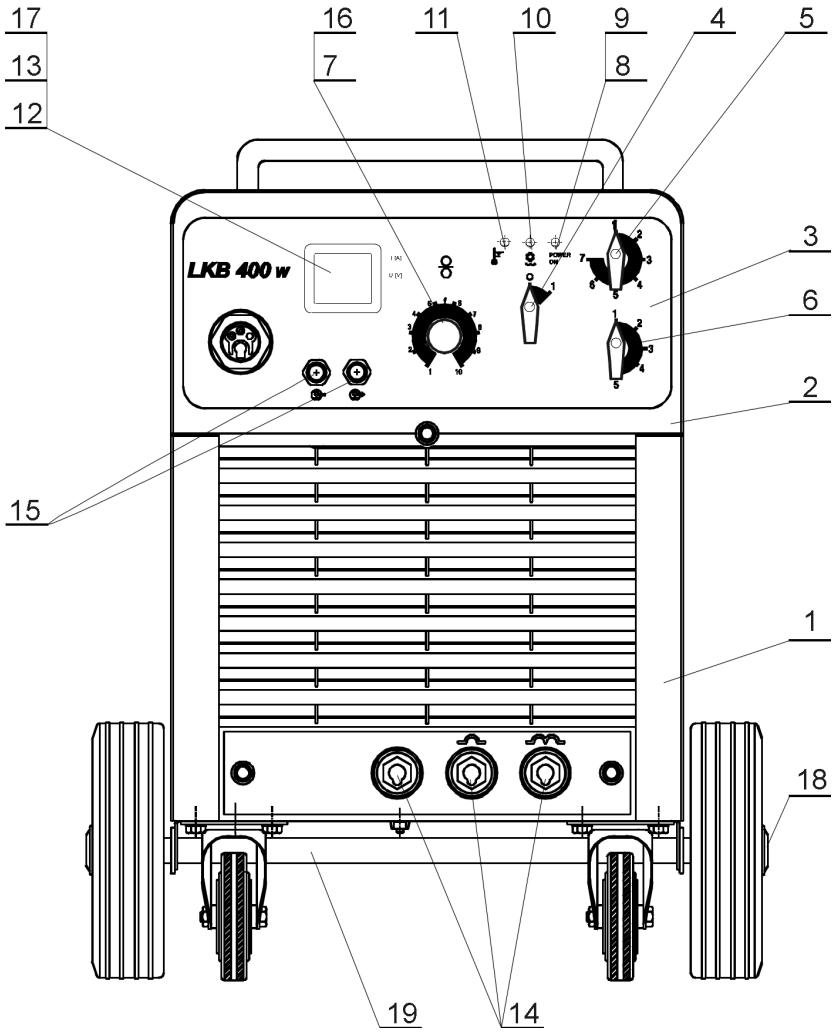
10.1 V/A METER ALLEMBLY INSTRUCTION

1. Take off side panels of unit.
2. Put plastic sleeve on the axle of switch on meter's board.
3. Fasten meter's board and sleeve to front panel of unit.
4. Assemble cover of meter to partition of unit.
5. Disconnect current cable (+) from the bridge.
6. Connect shunt with reducing sleeve and bridge, and next connect current cable (+) to free end of shunt.
7. Connect wiring of meter according to schematic diagram of LKB 400W.



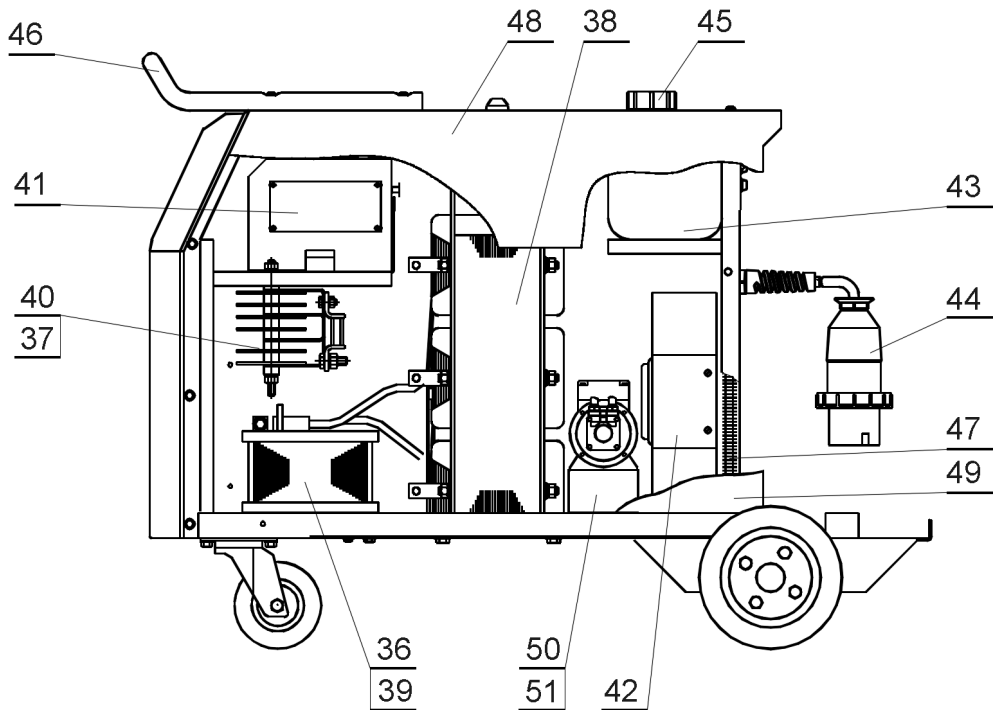
1. Meter VA-MET12
2. Shunt
3. Wiring for transformer T2
4. Wiring for board LKC31
5. Wiring for shunt and socket (⎍)
6. Rectifier bridge
7. Board LKC31
8. Current cable (+)
9. Transformer T2
10. Socket (⎍)

11. SPARE PARTS LIST

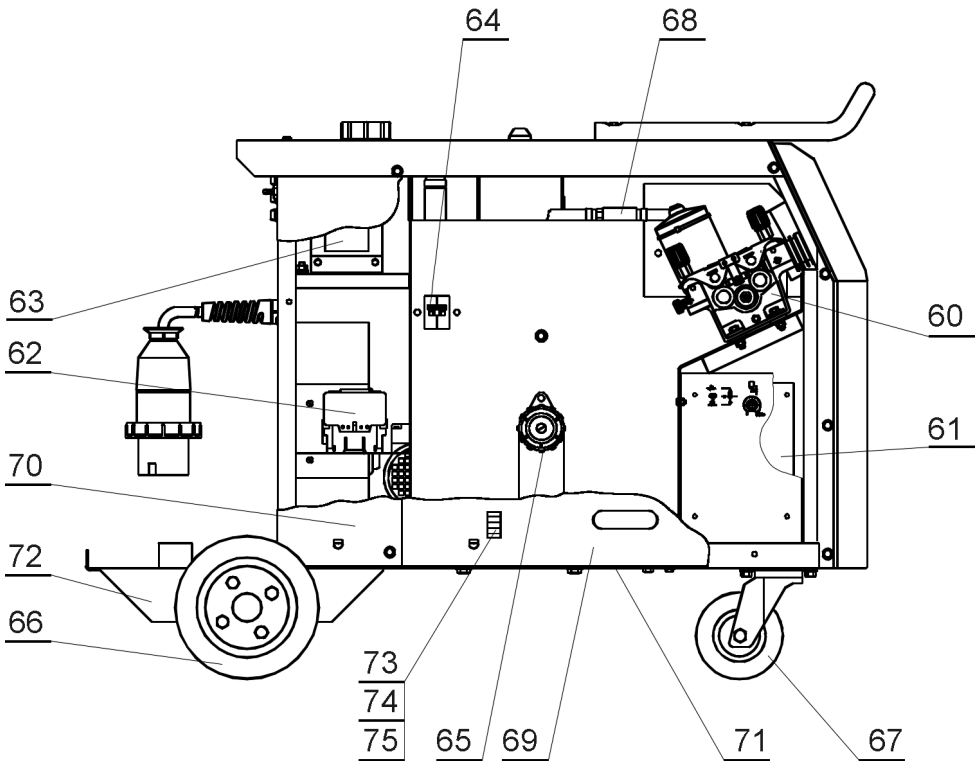


Ordering No. 0349 302 111 LKB400W 400V-415V 3~ 50/60Hz
0349 302 156 LKB400W 230V 3~ 50Hz

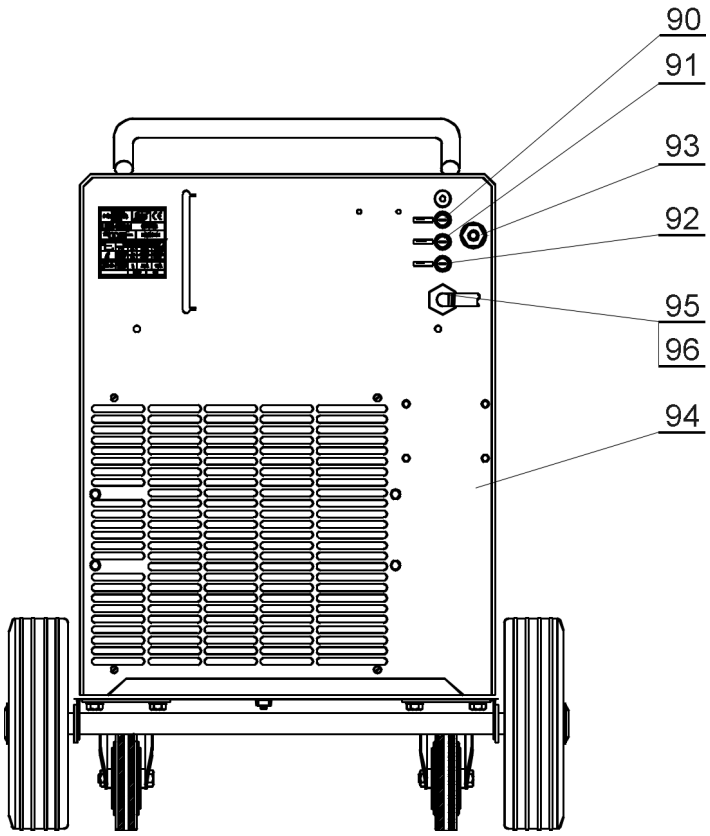
Item no.	Qty 400V-415V	Qty 230V	Ordering no.	Denomination	Notes
1	1	1	0349 302 135	Front grill	
2	1	1	0349 302 134	Front panel	
3	1	1	0349 302 137	Panel	
4	1	1	0349 302 149	Rotary cam switch	Q1
5	1	-	0349 302 150	Rotary cam switch	Q4
	-	1	0349 302 190	Rotary cam switch	Q4
6	1	-	0349 302 151	Rotary cam switch	Q3
	-	1	0349 302 191	Rotary cam switch	Q3
7	1	1	0349 302 133	Potentiometer	RV
8	3	3	0457 290 003	LED-holder (socket)	
9	1	1	0349 302 026	LED (green/yellow)	H1
10	1	1	0457 290 004	LED (green)	H3
11	1	1	0457 290 006	LED (yellow)	H2
12	1	1	0455 172 001	Protection glass	
13	1	1	0455 174 001	Seal	
14	3	3	0349 302 022	Current connector-socket	
15	2	2	0349 302 136	Quick connector	
16	1	1	0349 302 092	Knob	
17	1	1	0349 302 119	Circuit board VA-MET12	A3
18	1	1	0192 859 126	Locking washer	
19	1	1	0349 302 173	Shaft	



Item no.	Qty 400V-415V	Qty 230V	Ordering no.	Denomination	Notes
36	1	1	0457 290 042	Temperature switch (90°)	B1
37	1	1	0349 302 048	Temperature switch (135°)	B2
38	1	-	0349 302 143	Transformer	T1
	-	1	0349 302 205	Transformer	T1
	1	-	0349 302 206	Transformer with switches	T1
	-	1	0349 302 207	Transformer with switches	T1
39	1	1	0349 302 144	Inductor	L1
40	1	1	0349 302 145	Diode bridge	V1
41	1	1	0349 302 005	Circuit board LA07	A1
42	1	1	0457 290 063	Fan	M1
43	1	1	0349 302 146	Water tank	
44	1	-	0349 302 147	Mains cable	
	-	1	0349 302 194	Mains cable	
45	1	1	0469 689 002	Lid	
46	1	1	0469 868 001	Handle	
47	1	1	0349 302 007	Cooler	
48	1	1	0349 302 175	Top plate	
49	1	1	0349 302 177	Side plate	
50	1	1	0349 302 029	Pump	M2
51	1	1	0349 302 196	Pump bracket	



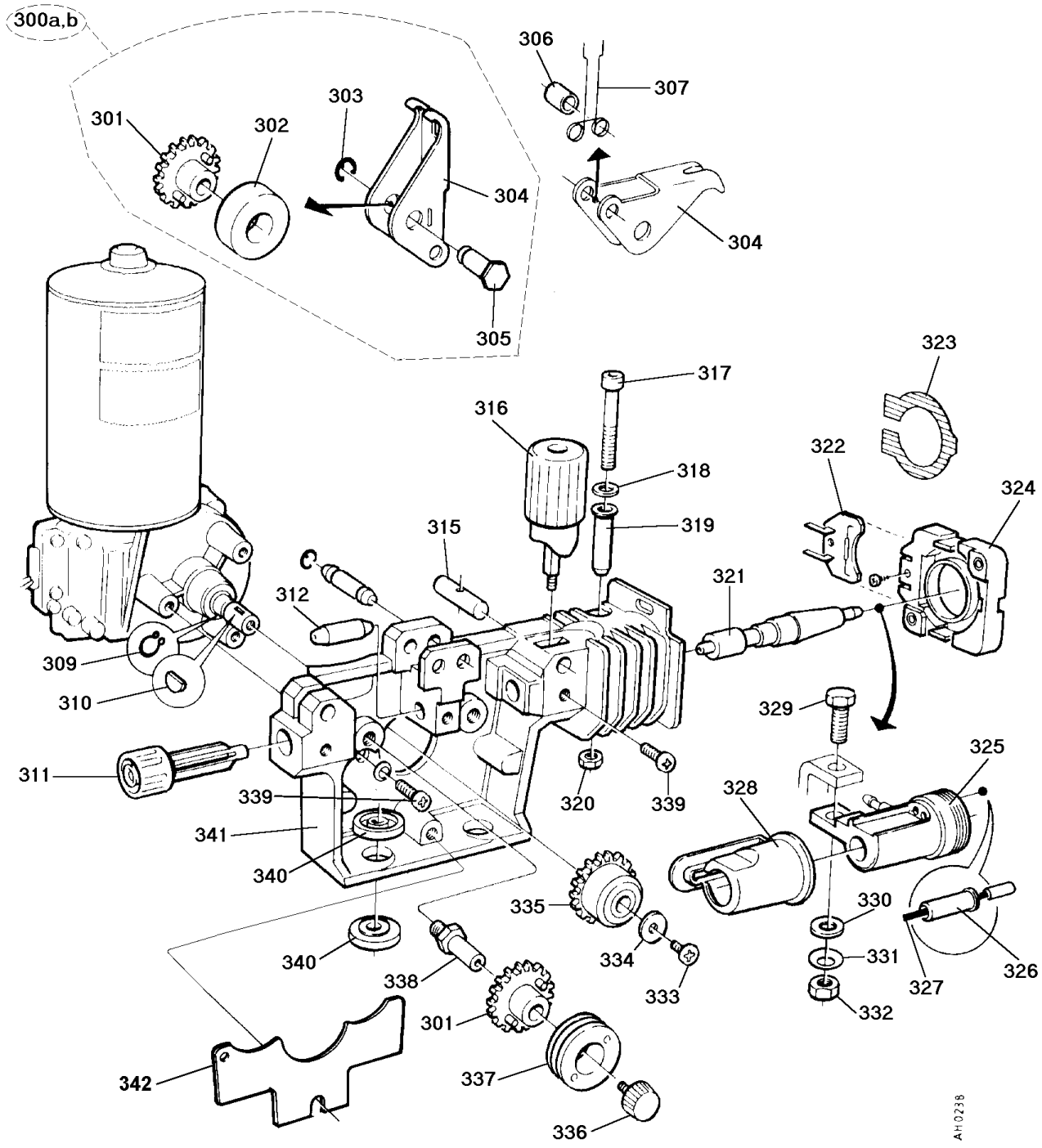
Item no.	Qty 400V-415V	Qty 230V	Ordering no.	Denomination	Notes
60	1	1	0469 834 881	Feed unit	
61	1	1	0349 302 148	Circuit board LKC31	A2
62	1	-	0349 302 152	Contactor	K1
	-	1	0349 302 192	Contactor	K1
63	1	1	0349 302 153	Control transformer	T2
64	1	-	0349 302 027	Circuit breaker	Q2
	-	1	0349 302 193	Circuit breaker	Q2
65	1	1	0146 967 881	Brake hub	
66	2	2	0349 302 037	Wheel	
67	2	2	0349 302 174	Swivel wheel assy	
68	1	1	0349 302 169	Flow switch	B3
69	1	1	0349 302 176	Cover of reel	
70	1	1	0349 302 178	Side plate	
71	1	1	0349 302 171	Bottom plate	
72	1	1	0349 302 172	Clamp	
73	2	2	0349 302 199	Bolt	
74	2	2	0349 302 200	Washer	
75	2	2	0349 302 201	Plate of lock	



Item no.	Qty 400V-415V	Qty 230V	Ordering no.	Denomination	Notes
90	1	1	0349 302 030	Fuse element	F1
91	1	1	0349 302 032	Fuse element	F2
92	1	1	0349 302 031	Fuse element	F3
93	1	1	0349 302 138	Gas valve	
94	1	-	0349 302 139	Rear shield	
	-	1	0349 302 195	Rear shield	
95	1	-	0457 289 032	Cable gland	
	-	1	0457 290 079	Cable gland	
96	1	-	0457 289 033	Locknut	
	-	1	0457 290 080	Locknut	

Item no.	Qty	Ordering no.	Denomination	Notes
300a	1	0469 833 880	Pressure arm, left	Contains items 301, 302, 303, 304 and 305, one of each.
300b	1	0469 833 881	Pressure arm, right	Contains items 301, 302, 303, 304 and 305, one of each. The same items as 300a, they are only fitted differently.
301	4	0455 053 880	Geared adapter **(W)**	Knurled
302	2	0369 728 001	Pressure roller **(W)**	
	2	0466 262 001	Pressure roller **(W) (A)**	
303	2		Locking washer	Included in item 300a and 300b
304	2		Holder	Included in item 300a and 300b
305	2		Shaft	Included in item 300a and 300b
306	2	0455 070 001	Sleeve	
307	1	0455 050 001	Spring	
308a	1	0455 077 001	Drive unit	With tachometer M01, G01
308b	1	0322 351 012	Drive shaft with pinion	Included in item 308a
309	1	0215 701 007	Locking washer	Included in item 308a
310	1	0191 496 114	Key	Included in item 308a
311	1	0455 049 001	Inlet nozzle **(W)**	
312	1	0455 072 001	Adapter nozzle **(W)**	
	1	0456 615 001	Adapter nozzle **(W) (A)**	For aluminium
313	4	0215 702 706	Locking washer	
314	2	0455 071 001	Shaft	
315	2	0367 528 001	Pin bolt	
316	2	0368 749 880	Pressure transducer	
317	1		Screw	M6x40
318	1		Washer ∅12/6.4x1.5	
319	1	0455 048 001	Insulating tube	
320	1		Nut	M6
321	1	0469 837 880	Outlet nozzle **(W)**	
	1	0469 837 881	Outlet nozzle **(W) (A)**	For aluminium
322	1	0481 004 880	Printed circuit board **(NA)**	Current relay
323	1	0455 079 001	Plate **(NA)**	
324	1	0455 047 001	Front flange	
325	1	0455 044 001	Current junction	
326	2	0368 750 001	Insulating sleeve	
327	1	0469 964 882	Cable set	
328	1	0455 045 001	Insulating sleeve	
329	1		Screw	M8x25
330	1		1 Washer	∅16/8.4x1.5
331	1		Spring washer	∅16/8.2x0.9
332	1		Nut	M8
333	1		Screw	M4x12
334	1		Washer	∅16/5x1
335	1	0455 052 001	Drive gear **(W)**	
336	2	0455 075 001	Screw	
337	2	0369 557 001	Feed roller **(W) (A) (V)**	For ∅0.6 - 0.8 mm Fe, Ss and cored wire
	2	0369 557 002	Feed roller **(W) (A) (V)**	For ∅0.8 - 1.0 mm Fe, Ss and cored wire
	2	0369 557 003	Feed roller **(W) (V)**	For ∅1.0 - 1.2 mm Fe, Ss and cored wire
	2	0369 557 007	Feed roller **(W) (A) (V)**	For ∅1.2 - 1.6 mm Fe, Ss and cored wire
	2	0369 557 010	Feed roller **(W) (A) (V)**	For ∅1.2 mm x 2 Fe, Ss and cored wire
	2	0369 557 013	Feed roller **(W) (A) (V)**	For ∅1.4 -1.6 mm Fe, Ss and cored wire
	2	0369 557 004	Feed roller **(W) (A) (K)(V)**	For ∅1.0 - 1.2 / 1.4 - 1.6 mm cored wire
	2	0369 557 005	Feed roller **(W) (A) (K)(V)**	For ∅1.4 - 1.6 / (2.0-2.4) mm cored wire
	2	0369 557 006	Feed roller **(W) (A) (U)**	2 For ∅1.0 - 1.2 mm Al wire
	2	0369 557 008	Feed roller **(W) (A) (U)**	For ∅1.6 mm Al wire
	2	0369 557 011	Feed roller **(W) (A) (U)**	For ∅0,8 - 0,9 mm Al wire
338	2	0455 068 001	Shaft	
339	6		Screw	M6x16
340	4	0153 043 002	Insulating washer	
341	1	0455 046 001	Gear housing	
342	1	0469 838 001	Protection plate	

(W) = wear part (A) = accessory (K) = knurled rollers (V) = V--groove (U) = U--groove
(NA) = not applied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