



Transmig 413S/513S (W)

Welding Power Source

SERVICE MANUAL

Note: For Transmig 413S/513S refer to LAW 420/520 – 400/415V only



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READ THIS FIRST

Maintenance and repair work should be performed by an experienced person, and electrical work only by a trained electrician. Use only recommended replacement parts.

This service manual is intended for use by technicians with electrical/electronic training for help in connection with fault-tracing and repair.

Use the connection diagram as a form of index for the description of operation. The circuit board is divided into numbered blocks, which are described individually in more detail in the description of operation. All component names in the connection diagram are listed in the component description.

This manual contains details of all design changes that have been made up to and including July 1999.

The LAW 420 and LAW 520 are designed and tested in accordance with European standard EN 60974-1 and EN 50199.
On completion of service or repair work, it is the responsibility of the person(s) etc. performing the work to ensure that the product does not depart from the requirements of the above standard.



WARNING



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

ELECTRIC SHOCK - Can kill

- Install and earth the welding unit in accordance with applicable standards.
- Do not touch live electrical parts or electrodes with bare skin, wet gloves or wet clothing.
- Insulate yourself from earth and the workpiece.
- Ensure your working stance is safe.

FUMES AND GASES - Can be dangerous to health

- Keep your head out of the fumes.
- Use ventilation, extraction at the arc, or both, to keep fumes and gases from your breathing zone and the general area.

ARC RAYS - Can injure eyes and burn skin.

- Protect your eyes and body. Use the correct welding screen and filter lens and wear protective clothing.
- Protect bystanders with suitable screens or curtains.

FIRE HAZARD

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

NOISE - Excessive noise can damage hearing

- Protect your ears. Use ear defenders or other hearing protection.
- Warn bystanders of the risk.

MALFUNCTION - Call for expert assistance in the event of malfunction.

READ AND UNDERSTAND THE INSTRUCTION MANUAL BEFORE INSTALLING OR OPERATING.

PROTECT YOURSELF AND OTHERS!

COMPONENT DESCRIPTION

The LAW welding rectifiers are 6-pulse thyristor rectifier units intended for semi-automatic welding. They are available for different mains voltages and with or without integral cooling units: see the table in the spare parts list on page 33. The component description below refers to the electrical circuit diagrams on page 6 to 9.



WARNING !

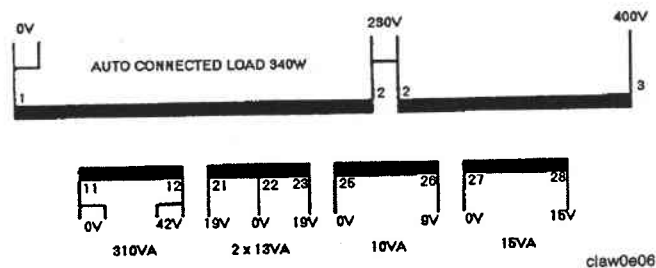
STATIC ELECTRICITY can damage circuit boards and electronic components.

- Observe precautions for handling electrostatic sensitive devices.
- Use proper static-proof bags and boxes.

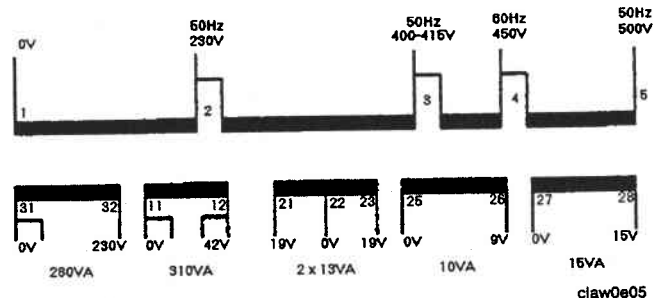
AP1	Circuit board with control electronics: see the description on page 11.
AP2	Suppression circuit board, see circuit diagram on page 23.
C1	Capacitor, 3 μ F 400 V. Start and run capacitor for fan motor EV1.
C2-C4	Suppression capacitors 0.1 μ F 250 V.
C5	Capacitor, 5 μ F 400 V. Start and run capacitor for pump motor M1. Only machines with water cooler.
C6	Capacitor, 6 μ F 400 V. For speed reduction of the cooling fan.
EV1	Fan
FU1	Circuit breaker, 10 A. Protects the 42 V supply to the wire feed unit.
HL1	Indicating lamp, 42 V, white. Lights when switch QF1 is in the ON position.
KM2	Contactors 42 V 50 Hz. For speed control of the fan: see ST2 below.
L1	Interphase transformer. When connecting the interphase transformer to the inductor, it is important that all parts are fitted exactly as shown in Figure A on page 39.
L2	Inductor. When connecting the inductor, it is important that all parts are fitted exactly as shown in Figures A, C and D on page 39.
M1	Pump motor, 230 V 50 Hz 0.2 kW. Only machines with water cooler.
P1	Digital display. Accessory, see the list on page 32. The instrument is described in the service manual for the wire feeder MEK 4.
QF1	Main ON/OFF switch.
QF2	Cooling water pump switch. Only on machines with water cooler.
RS1	Shunt, 60 mV / 600 A
ST1	Thermal switch. Protects the machine against excessive temperature. See the function description, item 6, on page 14.

ST2 Thermal switch. Controls the speed of fan motor EV1. The switch closes when the temperature exceeds 80 °C, energising contactor KM2. This short-circuits capacitor C6, allowing the fan to run at full speed. The switch opens when the machine temperature has fallen to 60 °C.
 LAW 420: ST2 is fitted in the interphase transformer winding, L1.
 LAW 520: ST2 is fitted in the inductor winding, L2.

TC1 Control power supply transformer for LAW with 400-415V mains voltage.



TC1 Control power supply transformer for LAW with 230-500V mains voltage.



TM1 Main transformer. Connection instructions for the LAW 420 and LAW 520 with 230 - 500 V mains connection are on page 30.

V1-V6 Thyristor module. See the fault-tracing instructions on page 18 and the fitting instructions on page 26.

V7 LED, yellow. Lights to indicate operation of the thermal cutouts.

XS1 Connector, 23-pole. For connection to/from the wire feed unit.

XS2-XS4 Main welding current contact, single-pole.

XS5-XS8 Sleeve contacts

XS9 4-pole contact. Only on the LAW 520.

XS10-XS15 Sleeve contacts

XT1 9-pole terminal block. Only on machines with 230 - 500 V mains connection. See the connection instructions on page 30.

XT2 3-pole terminal block.

Z1-Z6 RC filter.