



Calibration system

**KLE
LS 600 A**

099-008060-EW501

Observe additional system documents!

19.02.2013

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General instructions

CAUTION



Read the operating instructions!

The operating instructions provide an introduction to the safe use of the products.

- Read the operating instructions for all system components!
- Observe accident prevention regulations!
- Observe all local regulations!
- Confirm with a signature where appropriate.

NOTE



In the event of queries on installation, commissioning, operation or special conditions at the installation site, or on usage, please contact your sales partner or our customer service department on +49 2680 181-0.

A list of authorised sales partners can be found at www.ewm-group.com.

Liability relating to the operation of this equipment is restricted solely to the function of the equipment. No other form of liability, regardless of type, shall be accepted. This exclusion of liability shall be deemed accepted by the user on commissioning the equipment.

The manufacturer is unable to monitor whether or not these instructions or the conditions and methods are observed during installation, operation, usage and maintenance of the equipment.

An incorrectly performed installation can result in material damage and injure persons as a result. For this reason, we do not accept any responsibility or liability for losses, damages or costs arising from incorrect installation, improper operation or incorrect usage and maintenance or any actions connected to this in any way.

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2 Safety instructions

2.1 Notes on the use of these operating instructions

DANGER

Working or operating procedures which must be closely observed to prevent imminent serious and even fatal injuries.

- Safety notes include the "DANGER" keyword in the heading with a general warning symbol.
- The hazard is also highlighted using a symbol on the edge of the page.

WARNING

Working or operating procedures which must be closely observed to prevent serious and even fatal injuries.

- Safety notes include the "WARNING" keyword in the heading with a general warning symbol.
- The hazard is also highlighted using a symbol in the page margin.

CAUTION

Working or operating procedures which must be closely observed to prevent possible minor personal injury.

- The safety information includes the "CAUTION" keyword in its heading with a general warning symbol.
- The risk is explained using a symbol on the edge of the page.

CAUTION

Working and operating procedures which must be followed precisely to avoid damaging or destroying the product.

- The safety information includes the "CAUTION" keyword in its heading without a general warning symbol.
- The hazard is explained using a symbol at the edge of the page.

NOTE








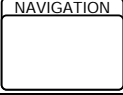





Special technical points which users must observe.

- Notes include the "NOTE" keyword in the heading without a general warning symbol.

Instructions and lists detailing step-by-step actions for given situations can be recognised via bullet points, e.g.:

- Insert the welding current lead socket into the relevant socket and lock.

2.2 Explanation of icons

Symbol	Description
	Press
	Do not press
	Turn
	Switch
	Switch off machine
	Switch on machine
	ENTER (enter the menu)
	NAVIGATION (Navigating in the menu)
	EXIT (Exit the menu)
	Time display (example: wait 4s/press)
	Interruption in the menu display (other setting options possible)
	Tool not required/do not use
	Tool required/use

2.3 General

DANGER



Electromagnetic fields!

The power source may cause electrical or electromagnetic fields to be produced which could affect the correct functioning of electronic equipment such as IT or CNC devices, telecommunication lines, power cables, signal lines and pacemakers.

- Observe the maintenance instructions! (see Maintenance and Testing chapter)
- Unwind welding leads completely!
- Shield devices or equipment sensitive to radiation accordingly!
- The correct functioning of pacemakers may be affected (obtain advice from a doctor if necessary).



Do not carry out any unauthorised repairs or modifications!

To avoid injury and equipment damage, the unit must only be repaired or modified by specialist, skilled persons!

The warranty becomes null and void in the event of unauthorised interference.

- Appoint only skilled persons for repair work (trained service personnel)!



Electric shock!

Welding machines use high voltages which can result in potentially fatal electric shocks and burns on contact. Even low voltages can cause you to get a shock and lead to accidents.

- Do not touch any live parts in or on the machine!
- Connection cables and leads must be free of faults!
- Switching off alone is not sufficient!
- Place welding torch and stick electrode holder on an insulated surface!
- The unit should only be opened by specialist staff after the mains plug has been unplugged!
- Only wear dry protective clothing!
- Wait for 4 minutes until the capacitors have discharged!

WARNING



Risk of accidents if these safety instructions are not observed!

Non-observance of these safety instructions is potentially fatal!

- Carefully read the safety information in this manual!
- Observe the accident prevention regulations in your country.
- Inform persons in the working area that they must observe the regulations!

CAUTION



Noise exposure!

Noise exceeding 70 dBA can cause permanent hearing damage!

- Wear suitable ear protection!
- Persons located within the working area must wear suitable ear protection!

CAUTION**Obligations of the operator!**

The respective national directives and laws must be observed for operation of the machine!

- National implementation of the framework directive (89/391/EWG), as well as the associated individual directives.
- In particular, directive (89/655/EWG), on the minimum regulations for safety and health protection when staff members use equipment during work.
- The regulations regarding work safety and accident prevention for the respective country.
- Setting up and operating the machine according to IEC 60974-9.
- Check at regular intervals that users are working in a safety-conscious way.
- Regular checks of the machine according to IEC 60974-4.

**Damage due to the use of non-genuine parts!**

The manufacturer's warranty becomes void if non-genuine parts are used!

- Only use system components and options (power sources, welding torches, electrode holders, remote controls, spare parts and replacement parts, etc.) from our range of products!
- Only insert and lock accessory components into the relevant connection socket when the machine is switched off.

**Mains connection****Requirements for connection to the public mains network**

High-performance machines can influence the mains quality by taking current from the mains network. For some types of machines, connection restrictions or requirements relating to the maximum possible line impedance or the necessary minimum supply capacity at the interface with the public network (Point of Common Coupling, PCC) can therefore apply. In this respect, attention is also drawn to the machines' technical data. In this case, it is the responsibility of the operator, where necessary in consultation with the mains network operator, to ensure that the machine can be connected.

CAUTION



EMC Machine Classification

In accordance with IEC 60974-10, welding machines are grouped in two electromagnetic compatibility classes (see technical data):

Class A machines are not intended for use in residential areas where the power supply comes from the low-voltage public mains network. When ensuring the electromagnetic compatibility of class A machines, difficulties can arise in these areas due to interference not only in the supply lines but also in the form of radiated interference.

Class B machines fulfil the EMC requirements in industrial as well as residential areas, including residential areas connected to the low-voltage public mains network.

Setting up and operating

When operating arc welding systems, in some cases, electro-magnetic interference can occur although all of the welding machines comply with the emission limits specified in the standard. The user is responsible for any interference caused by welding.

In order to **evaluate** any possible problems with electromagnetic compatibility in the surrounding area, the user must consider the following: (see also EN 60974-10 Appendix A)

- Mains, control, signal and telecommunication lines
- Radios and televisions
- Computers and other control systems
- Safety equipment
- The health of neighbouring persons, especially if they have a pacemaker or wear a hearing aid
- Calibration and measuring equipment
- The immunity to interference of other equipment in the surrounding area
- The time of day at which the welding work must be carried out

Recommendations for **reducing interference emission**

- Mains connection, e.g. additional mains filter or shielding with a metal tube
- Maintenance of the arc welding equipment
- Welding leads should be as short as possible and run closely together along the ground
- Potential equalization
- Earthing of the workpiece. In cases where it is not possible to earth the workpiece directly, it should be connected by means of suitable capacitors.
- Shielding from other equipment in the surrounding area or the entire welding system

2.4 Transport and installation

CAUTION



Risk of tipping!

There is a risk of the machine tipping over and injuring persons or being damaged itself during movement and set up. Tilt resistance is guaranteed up to an angle of 10° (according to EN 60974-A2).

- Set up and transport the machine on level, solid ground!
- Secure add-on parts using suitable equipment!
- Replace damaged wheels and their fixing elements!
- Fix external wire feed units during transport (avoid uncontrolled rotation)!



Damage due to supply lines not being disconnected!

During transport, supply lines which have not been disconnected (mains supply leads, control leads, etc.) may cause hazards such as connected equipment tipping over and injuring persons!

- Disconnect supply lines!

2.5 Calibration device (KLE)

WARNING



Risk of accident due to improper transport of machines that may not be lifted!

Do not lift or suspend the machine! The machine can fall down and cause injuries! The handles and brackets are suitable for transport by hand only!

- The machine may not be lifted by crane or suspended!

2.6 Load simulation unit (LS 600 A)

2.6.1 Lifting by crane

DANGER



Risk of injury during lifting by crane!

When lifting the equipment by crane, serious injuries can be inflicted by falling equipment or add-on units.

- Transport on all lifting lugs at the same time (see Fig. Lifting principle)!
- Ensure that there is an even load distribution! Only use ring chains or suspension ropes of the same length!
- Observe the lifting principle (see Fig.)!
- Remove all accessory components before lifting (e.g. shielding gas cylinders, tool boxes, wire feed units, etc.)!
- Avoid jerky movements when raising or lowering!
- Use shackles and load hooks of the appropriate size!

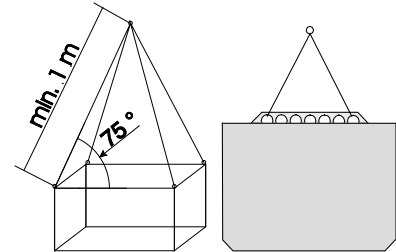


Fig. Lifting principle



Risk of injury due to unsuitable lifting eye!

In case of improper use of lifting eyes or the use of unsuitable lifting eyes, persons can be seriously damaged by falling equipment or add-on components!

- The lifting eye must be completely screwed in!
- The lifting eye must be positioned flat onto and in full contact with the supporting surfaces!
- Check that the lifting eyes are securely fastened before use and check for any damage (corrosion, deformation)!
- Do not use or screw in damaged lifting eyes!
- Avoid lateral loading of the lifting eyes!

2.6.2 Ambient conditions

CAUTION



Installation site!

The machine must not be operated in the open air and must only be set up and operated on a suitable, stable and level base!

- The operator must ensure that the ground is non-slip and level, and provide sufficient lighting for the place of work.
- Safe operation of the machine must be guaranteed at all times.

CAUTION



Equipment damage due to dirt accumulation!

Unusually high quantities of dust, acid, corrosive gases or substances may damage the equipment.

- Avoid high volumes of smoke, vapour, oil vapour and grinding dust!
- Avoid ambient air containing salt (sea air)!



Non-permissible ambient conditions!

Insufficient ventilation results in a reduction in performance and equipment damage.

- Observe the ambient conditions!
- Keep the cooling air inlet and outlet clear!
- Observe the minimum distance of 0.5 m from obstacles!

2.6.3 In operation

Temperature range of the ambient air:

- 0 °C to +30 °C

Relative air humidity:

- Up to 50% at 40 °C
- Up to 90% at 20 °C

2.6.4 Transport and storage

Storage in an enclosed space, temperature range of the ambient air:

- -25 °C to +55 °C

Relative air humidity

- Up to 90% at 20 °C

3 Intended use

This machine has been manufactured according to the latest developments in technology and current regulations and standards. It must only be operated in line with the instructions on correct usage.

WARNING



Hazards due to improper usage!

Hazards may arise for persons, animals and material objects if the equipment is not used correctly. No liability is accepted for any damages arising from improper usage!

- The equipment must only be used in line with proper usage and by trained or expert staff!
- Do not modify or convert the equipment improperly!

3.1 Applications

Calibration or validation of arc welding machines.

3.2 Documents which also apply

3.2.1 Warranty

NOTE



For further information, please see the accompanying supplementary sheets "Machine and Company Data, Maintenance and Testing, Warranty"!

3.2.2 Declaration of Conformity



The designated machine conforms to EC Directives and standards in terms of its design and construction:

- EC Low Voltage Directive (2006/95/EC),
- EC EMC Directive (2004/108/EC),

This declaration shall become null and void in the event of unauthorised modifications, improperly conducted repairs, non-observance of the deadlines for the repetition test and / or non-permitted conversion work not specifically authorised by the manufacturer.

The original copy of the declaration of conformity is enclosed with the unit.

3.2.3 Welding in environments with increased electrical hazards



In compliance with IEC / DIN EN 60974, VDE 0544 the machines can be used in environments with an increased electrical hazard.

3.2.4 Service documents (spare parts and circuit diagrams)

DANGER



Do not carry out any unauthorised repairs or modifications!

To avoid injury and equipment damage, the unit must only be repaired or modified by specialist, skilled persons!

The warranty becomes null and void in the event of unauthorised interference.

- Appoint only skilled persons for repair work (trained service personnel)!

Original copies of the circuit diagrams are enclosed with the unit.

Spare parts can be obtained from the relevant authorised dealer.

3.2.5 Calibration/Validation

We hereby confirm that this machine has been tested using calibrated measuring equipment, as stipulated in IEC/EN 60974, ISO/EN 17662, EN 50504, and complies with the admissible tolerances.

Recommended calibration interval: 12 months

4 About this calibration system

4.1 What is calibration?

In measuring technology, calibration means:

Determination of measurement errors on the finished measuring instrument. For measuring instruments with displays, the measurement error between the display and the value which is correct or regarded as correct is determined by calibration. There is no technical intervention in the measuring instrument.

4.2 What is validation?

With transmitting machines, the measurement error between the value of the output signal and the set nominal value which the signal would show under ideal transmission conditions and at a given input value is determined by validation. There is no technical intervention in the machine.

4.3 What is adjustment (matching)?

In measuring technology, adjustment means:

Setting up (matching) a measuring instrument so that the measurement errors are as small as possible, or the size of the measurement errors do not exceed the margins of error.

4.4 Why calibrate?

Optimum reproducibility of welding processes and parameters.

Inaccurate display instruments affect the quality of welding results.

To maintain a certain delivery quality, generally for particular requirements such as e.g. pressure tanks, equipment, pipelines etc.

4.5 Calibrate how often?

An annual check of the displays in 1-shift operation is sufficient.

In 2-shift operation we recommend a half yearly check.

If welding machines are involved in development work, process trials etc. a correspondingly shorter period is recommended.

4.6 Calibration certificate

After calibration, each machine is provided with a test plate showing the next checking date.

You are issued with a test log and a calibration certificate as documentation.

4.7 Calibration device (KLE)

The calibration device serves the purpose of calibrating arc welding machines.

The following measured values can be indicated with the calibration device:

Primary (on the power side)

Measurement data indication with one ammeter each for three mains currents and a voltmeter with changeover switch for three phases.

Secondary (power source output quantity)

Measurement data indication using digital ammeter for the welding current, digital voltmeter for the voltage.

General

Measurement data indication, digital instrument for ambient temperature

4.8 Load simulation unit (LS 600 A)

The load simulation unit simulates the arc so that welding machines can be calibrated and tested without the arc.

Welding currents of up to 600A (10% DC) can be simulated with this system.

The load voltage can be matched to the various welding processes (MIG/MAG, TIG and MMA).

5 Machine description – quick overview

5.1 Calibration device (KLE)

5.2 Front view

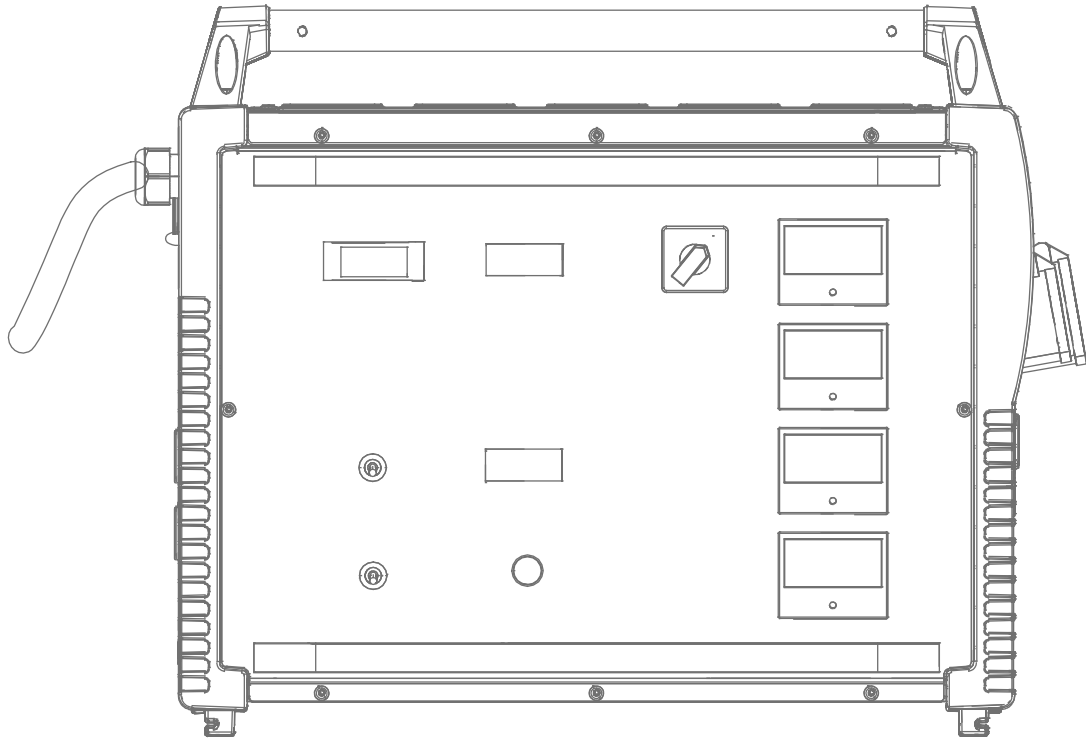









Figure 5-1

Item	Symbol	Description
1		Transport bar
2		Digital welding current display
3		Digital ambient temperature display
4		Voltage measurement point switch The voltage can be measured either in the calibration device or by means of separate measuring leads on the machine's welding current sockets. Internal voltage measurement in the calibration device External voltage measurement by means of separate measurement leads
5		Open circuit voltage / load voltage changeover switch $U_{0(60974-1)}$ Measurement of open circuit voltage U_{Load} Measurement of load voltage
6		Digital welding voltage display
7		Open circuit voltage rotary knob In order to determine the open circuit voltage in accordance with EN 60974-1, the rotary knob has to be rotated for as long as the highest voltage is indicated on the digital welding voltage display.
8		Analogue mains current display for phase L3 (I_{L3})
9		Analogue mains current display for phase L2 (I_{L2})
10		Analogue mains current display for phase L1 (I_{L1})
11		Analogue mains voltage display Measurement of the mains voltages according to primary voltage switch
12		Primary voltage switch The mains voltage selected with the changeover switch is measured by means of the analogue voltage display (U - Prim.). Position 0 = No measurement of the mains voltages Position L1N = Measurement between phase L1 and neutral conductor N Position L1L2 = Measurement between phase L1 and phase L2 Position L2L3 = Measurement between phase L2 and phase L3 Position L1L3 = Measurement between phase L1 and phase L3

5.3 Rear view

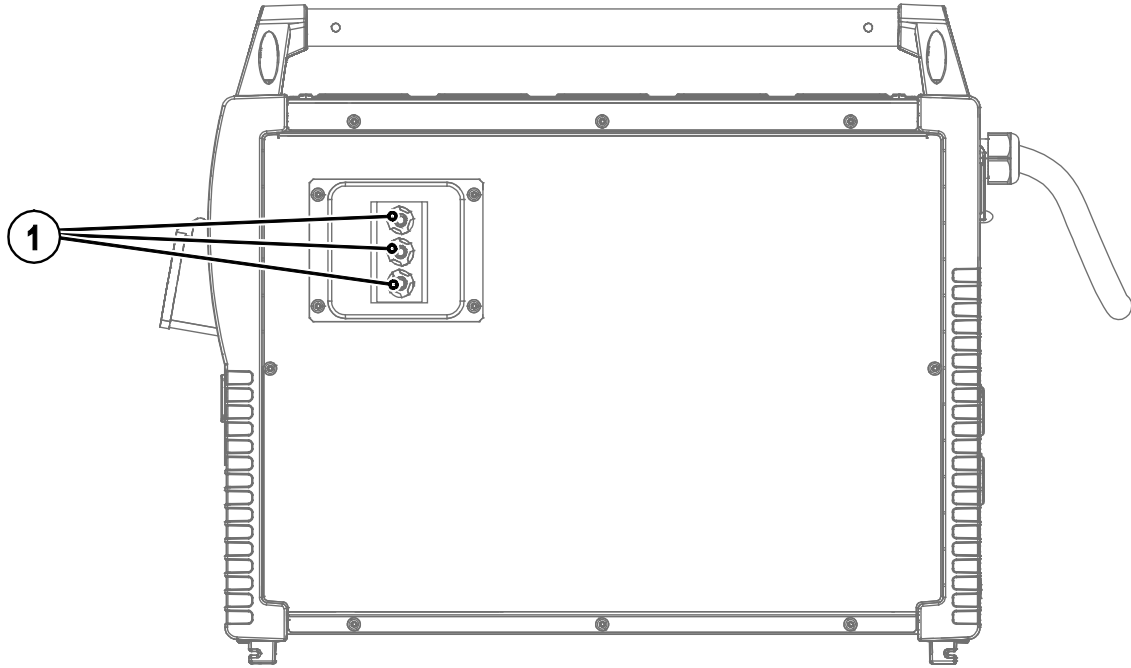


Figure 5-2

Item	Symbol	Description
1		Mains fuses (20 A) for welding machine mains sockets <ul style="list-style-type: none">• 230 V CEE 7/4• 400 V CEE

5.4 Right side

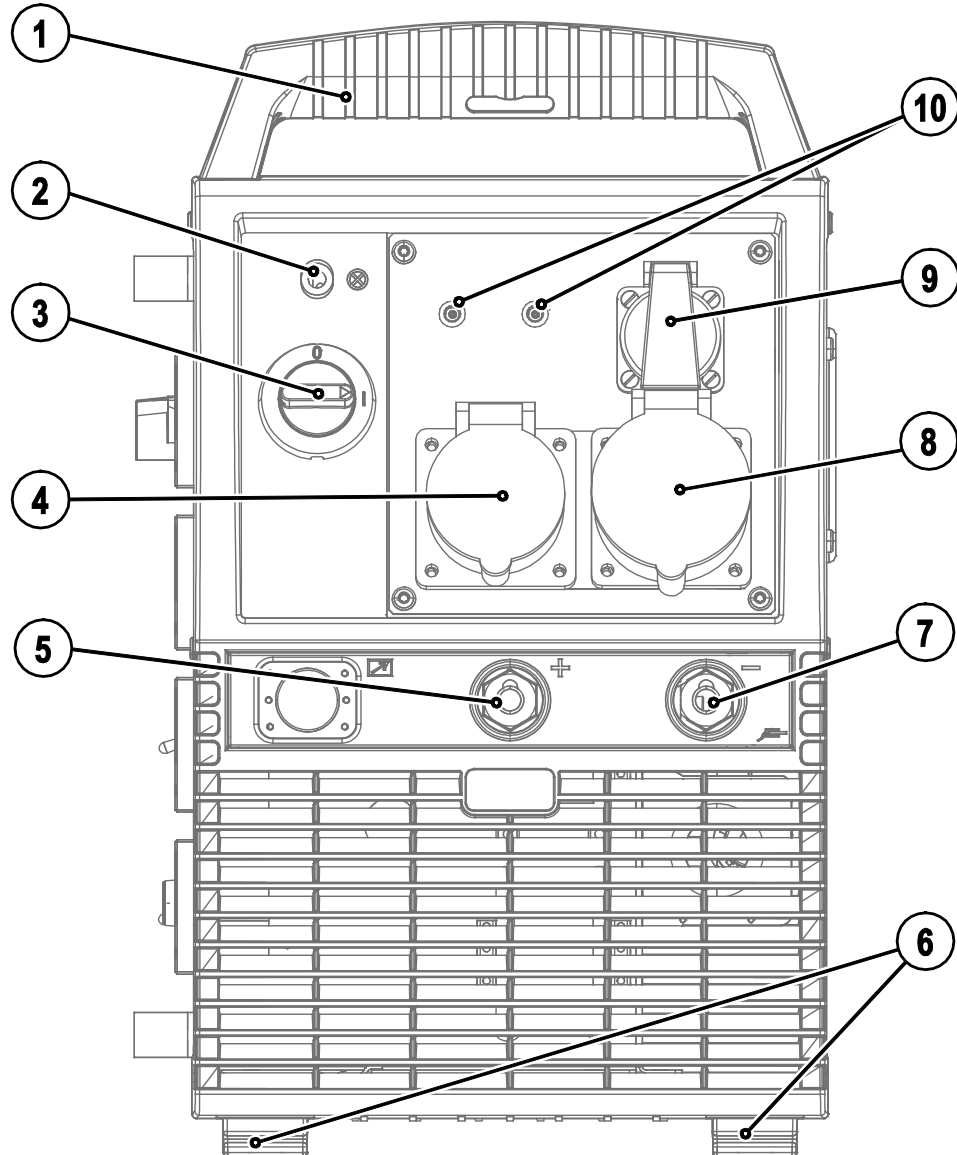



Figure 5-3

Item	Symbol	Description
1		Carrying handle
2		Machine „ON/OFF“ control lamp
3		Main switch, machine on/off
4		Welding machine mains connection socket – 400 V CEE Protected by the fuses in the calibration device (20 A)
5		„Input“ welding current socket Connection to welding machine, socket „+“
6		Machine feet
7		„Input“ welding current socket Connection to welding machine, socket „-“
8		Welding machine mains socket – 32 A 400V CEE Protected by mains fuse of calibration device
9		Welding machine mains connection socket - 230 V CEE 7/4 Protected by the fuses in the calibration device (20 A)
10		Voltage measuring connection sockets (External) Connection of the separate measuring leads to the external voltage measurement on the welding machine's welding current connections. The voltage measuring point changeover switch has to be set to the External position.

5.5 Left side

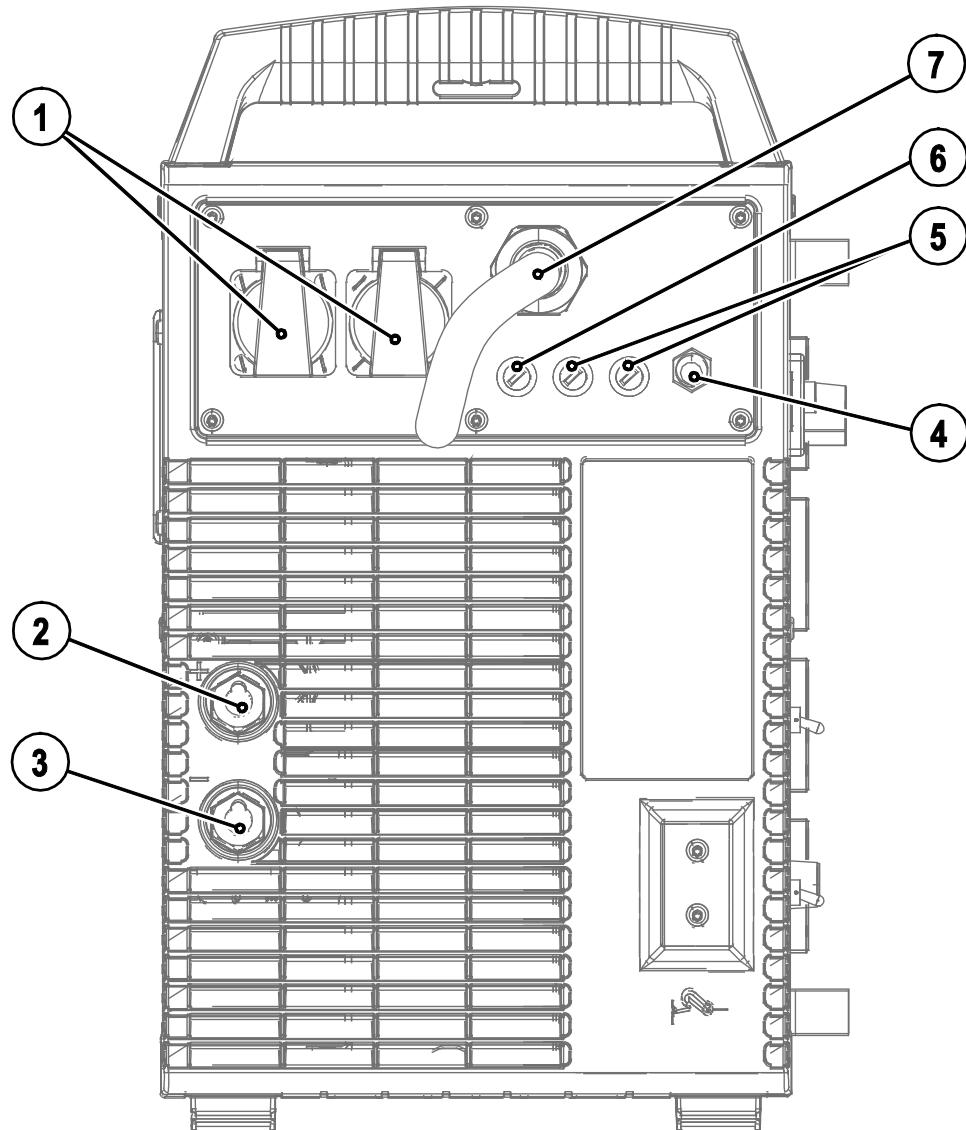


Figure 5-4

Item	Symbol	Description
1		Mains sockets for accessory components 6.3 A CEE 7/4 Connection possibility for further accessory components e.g. PC, printer
2	+	Load current connection socket + Connection to load simulation unit
3	-	Load current connection socket - Connection to load simulation unit
4		Ambient temperature sensor
5	F2/F3	Machine fuse (1 AT) Protection of machine's electronics
6	F1	Machine fuse (6,3 AT) Protection of accessory components mains connection sockets 16 A CEE 7/4
7		Mains connection lead with 32A CEE plug

5.6 Load simulation unit (LS 600 A)

5.7 Front view

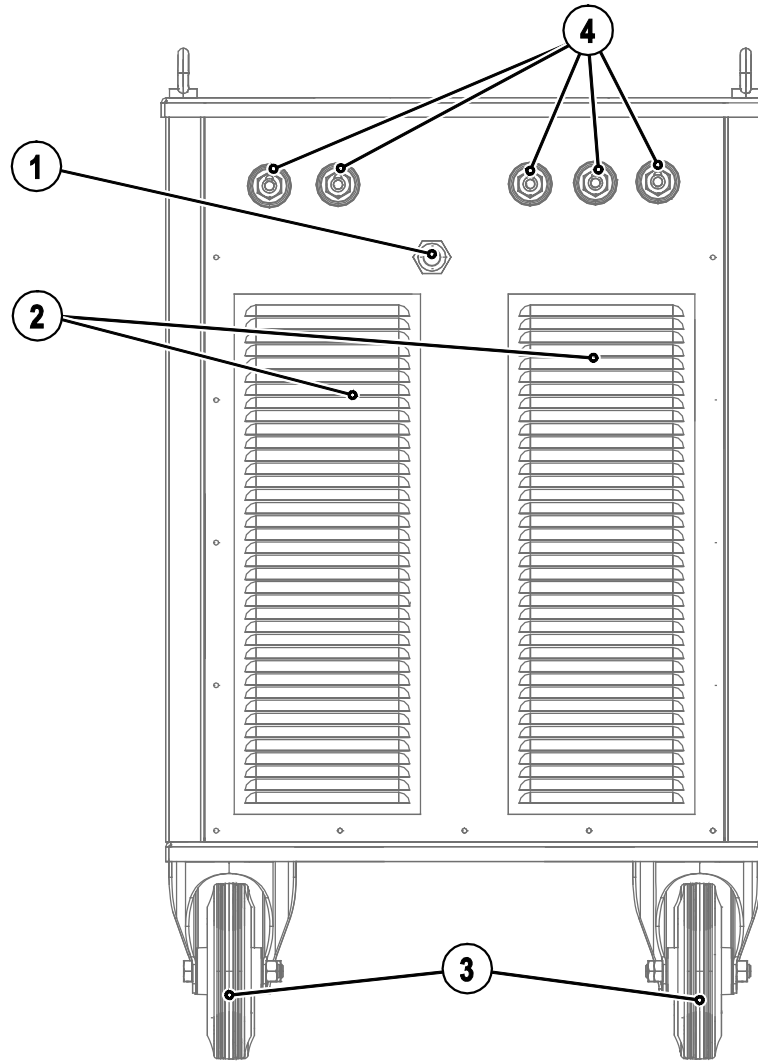


Figure 5-5

Item	Symbol	Description
1		Excess temperature signal light Error display for excess temperature
2		Air outlet
3		Wheels, guide castors
4		Load current connection sockets (characteristics selection) Establish power bridge according to the intended purpose

5.8 Rear view

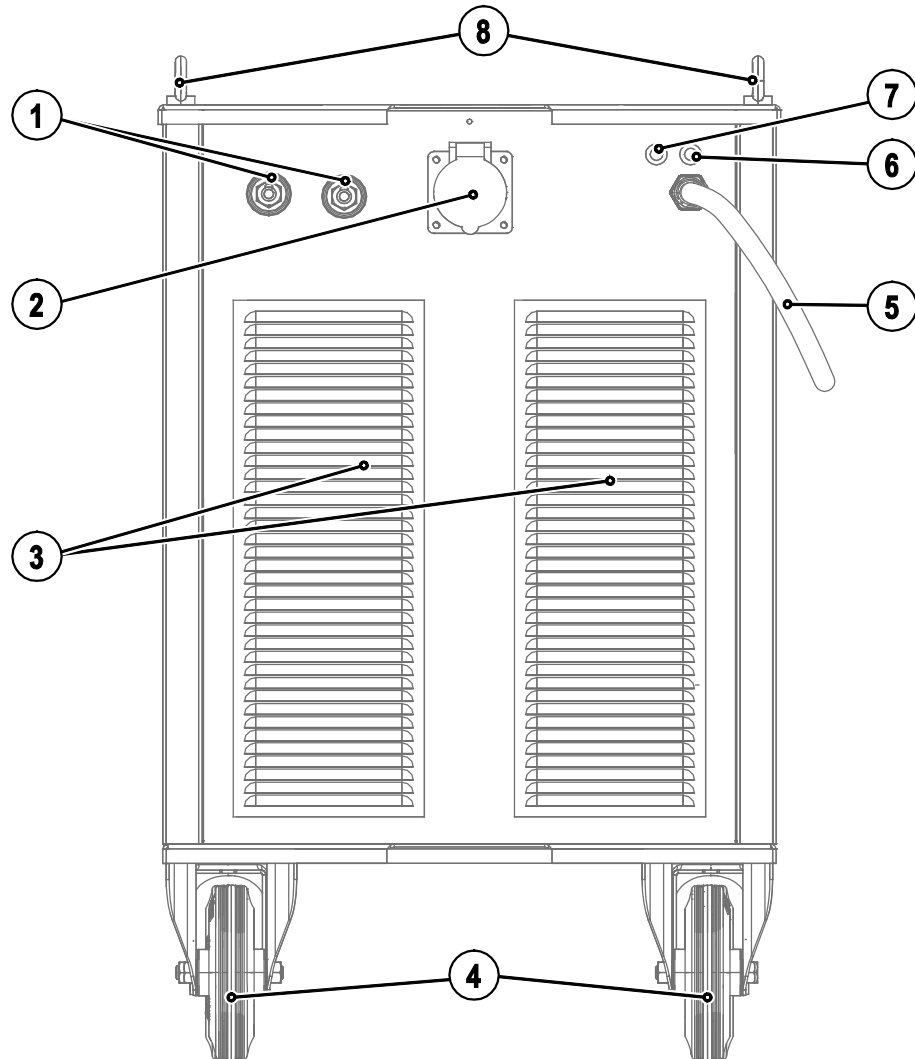


Figure 5-6

Item	Symbol	Description
1		Load current sockets (polarity-independent) Connection to calibration device
2		Calibration device mains connection socket - 32 A CEE
3		Air inlet
4		Wheels, fixed castors
5		Mains connection lead with 32A CEE plug
6	F7	Mains fuse (630 mA) Protection of machine's electronics
7	F6	Machine fuse (4 AT) Protection of the machine's fan
8		Lifting lug

6 Design and function

6.1 General

DANGER



Maintenance work on EWM machines may only be carried out by qualified persons.

A qualified person is someone who

- can prove to have successfully passed the final examination for a recognised electronic profession requiring formal training and
- has been trained accordingly by EWM.

A qualified person is someone who

- has been instructed in the current legal electronics provisions, has adapted his work according to these provisions and
- has been trained accordingly by EWM.



Do not carry out any unauthorised repairs or modifications!

To avoid injury and equipment damage, the unit must only be repaired or modified by specialist, skilled persons!

The warranty becomes null and void in the event of unauthorised interference.

- Appoint only skilled persons for repair work (trained service personnel)!

WARNING



Risk of injury from electric shock!

Contact with live parts, e.g. welding current sockets, is potentially fatal!

- Follow safety instructions on the opening pages of the operating instructions.
- Commissioning may only be carried out by persons who have the relevant expertise of working with arc welding machines!
- Connection and welding leads (e.g. electrode holder, welding torch, workpiece lead, interfaces) may only be connected when the machine is switched off!



Risk of accidents if these safety instructions are not observed!

Non-observance of these safety instructions is potentially fatal!

- Carefully read the safety information in this manual!
- Observe the accident prevention regulations in your country.
- Inform persons in the working area that they must observe the regulations!

NOTE



Observe documentation of other system components when connecting!

6.2 Transport and installation

CAUTION



Installation site!

The machine must not be operated in the open air and must only be set up and operated on a suitable, stable and level base!

- The operator must ensure that the ground is non-slip and level, and provide sufficient lighting for the place of work.
- Safe operation of the machine must be guaranteed at all times.

7 Technical data

NOTE

 Performance specifications and guarantee only in connection with original spare and replacement parts!

7.1 Calibration device (KLE)

Mains voltage	3 x 400 V (at 50/60Hz)
Mains fuse protection (safety fuse - slow-blow)	3 x 35 A
Max. connection load at 60% duty cycle	600 A
Max. connection load at 100% duty cycle	500 A
Load cycle	10 min
Ambient temperature	0 °C - +30 °C
Machine cooling	Fan
Protection classification	IP 23
Dimensions (L/W/H)	625 mm / 300 mm / 535 mm
Weight without accessories	25 Kg
Tolerance of display instruments	
Current I_{actual}	0.4% of scale end value 500 A
Voltage U_{actual}	1.0% of scale end value 100 V
Wire feed speed WF_{actual}	0.4% of scale end value 25.0 m/min
EMC class	A
Constructed to standards	IEC 60974-1, -10 IEC 60664-1 S / C €

7.2 Load simulation unit (LS 600 A)

Max. connection current load at 10% duty cycle	600 A
Max. connection current load at 100% duty cycle	300 A
Max. connection voltage	120 V DC 50 V AC
Mains fuse (slow-blow safety fuse)	3 x 35 A
Load cycle	10 min
Mains voltage	3 x 400 V (at 50/60Hz)
Ambient temperature	0 °C - +30 °C
Machine cooling	Fan
Protection classification	IP 23
Dimensions L/W/H	1110 mm / 550 mm / 890 mm
Weight without accessories	139.5 Kg
EMC class	A
Constructed to standards	IEC 60974-1, -10 IEC 60664-1 S / C €

8 Accessories

8.1 General accessories

Type	Designation	Item no.
WVTA	Welding voltage of test adapter	098-004571-00000
2M/SW	Measuring lead, black	094-019507-00000
2M/RT	Measuring lead, red	094-019508-00000

9 Circuit diagrams

NOTE

Original format circuit diagrams are located inside the machine.

9.1 Calibration device (KLE)

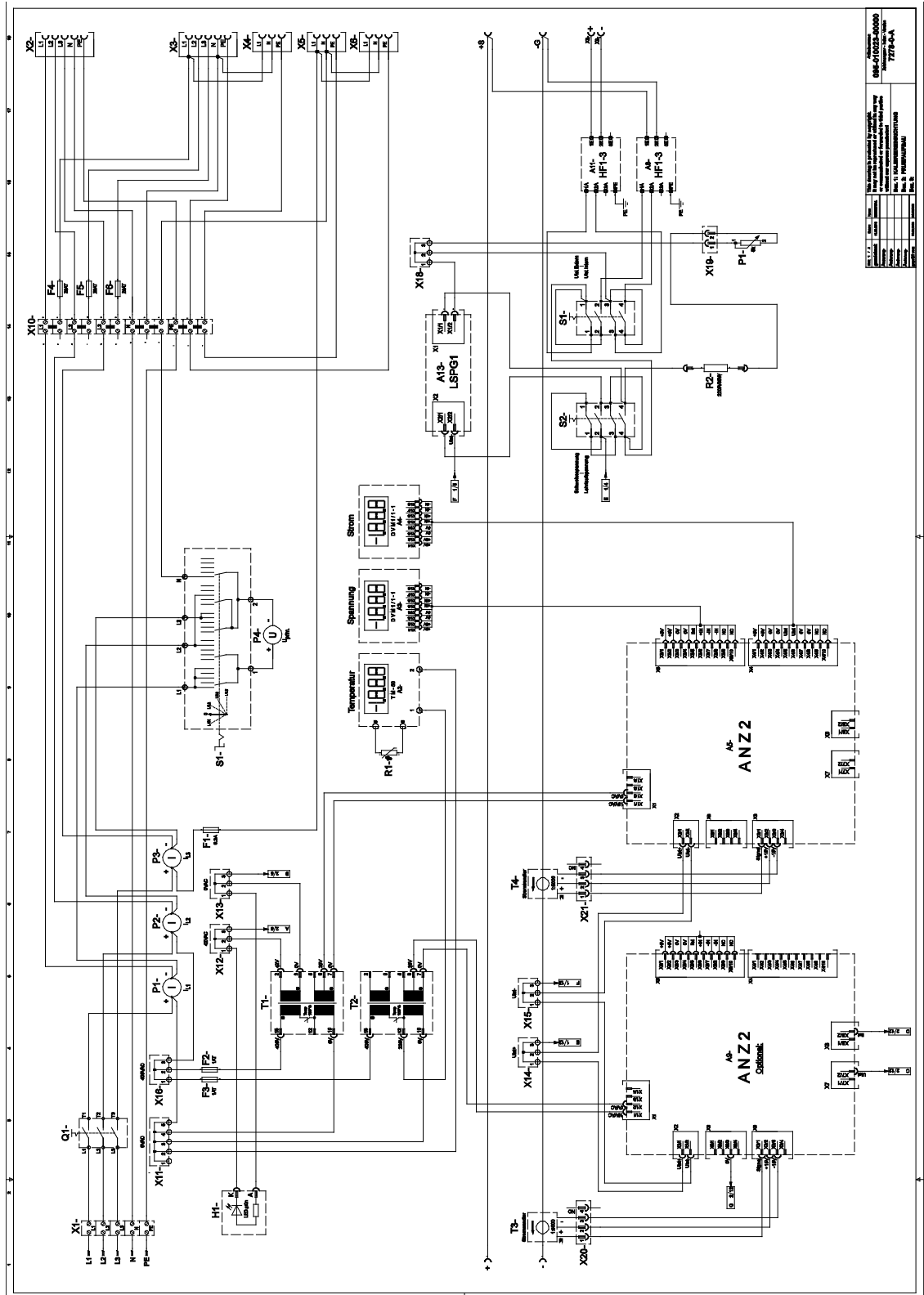


Figure 9-1

9.2 Load simulation unit (LS 600 A)

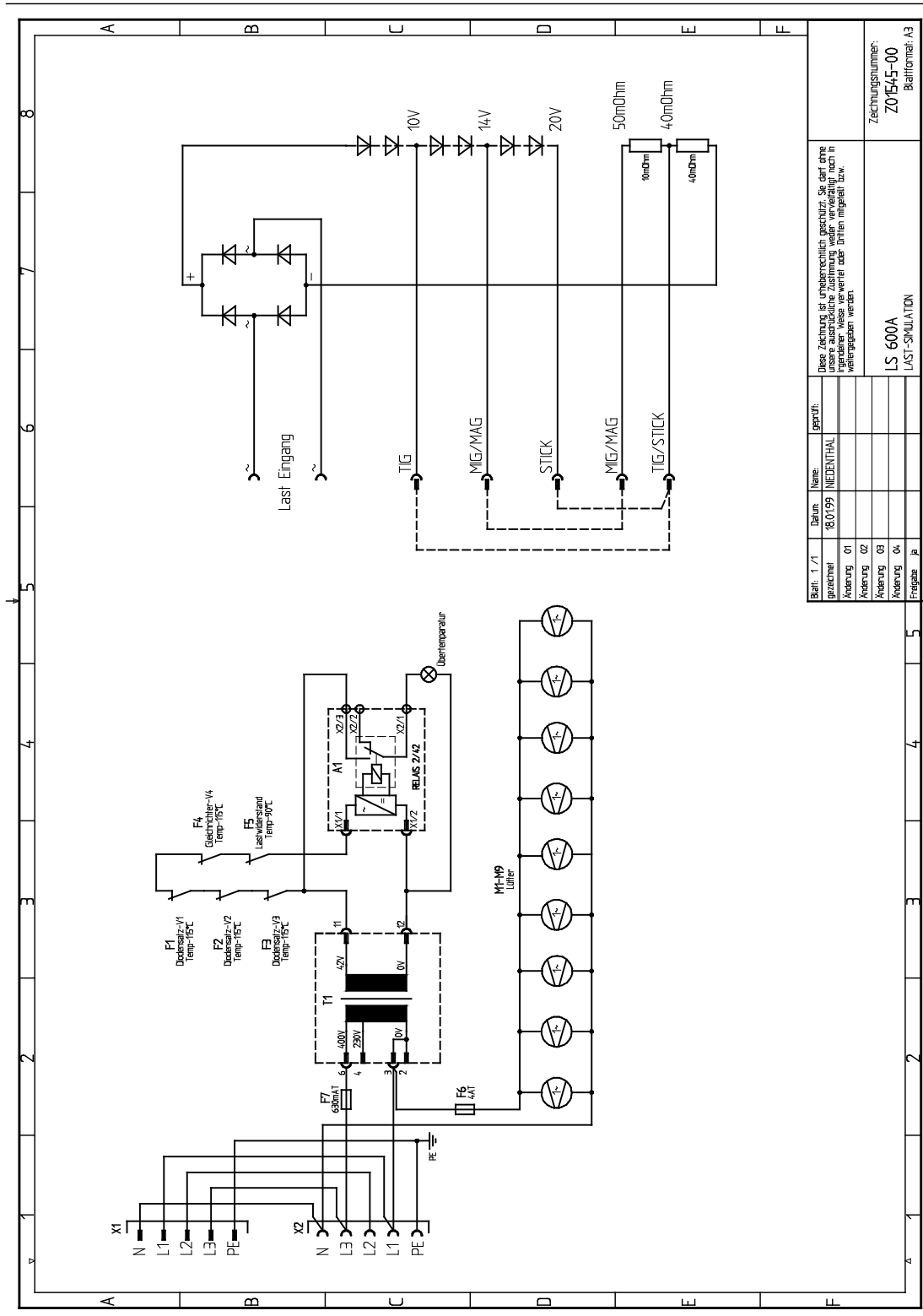




Figure 9-2

10 Appendix A

10.1 Calibration certificate sample

	
Kalibrierschein <i>Calibration Certificate</i>	Kalibrierzeichen <i>Calibration label</i>
<p>Gegenstand <i>Object</i></p> <p>Hersteller <i>Manufacture</i></p> <p>Typ <i>Type</i></p> <p>Serien-Nr. <i>Serial Number</i></p> <p>Artikel-Nr. <i>Articleno.</i></p> <p>Auftraggeber: <i>Customer</i></p> <p>Autragnummer: <i>Work Order No.</i></p> <p>Seitenzahl Kalibrierschein 4 <i>Number of pages of the certificate</i></p> <p>Datum der Kalibrierung <i>Date of calibration</i></p> <p>Firmenstempel</p> <div data-bbox="347 1823 826 2069" style="border: 1px solid blue; height: 100px; width: 100%;"></div>	<p>Nr.: _lfd._Nr.:</p> <p>Dieser Kalibrierschein dokumentiert die Rückführbarkeit auf nationale Normale, Normalmeßeinrichtungen und -verfahren zur Darstellung der physikalischen Einheiten in Übereinstimmung mit dem Internationalen Einheitensystem (SI).</p> <p>Für die Einhaltung einer angemessenen Frist zur Wiederholung der Kalibrierung ist der Benutzer/Betreiber verantwortlich.</p> <p><i>This calibration certificate documents the tracibility to national standards, standard national equipment and methods for the realization of physikal units measurement according to the International System of Units (SI).</i></p> <p><i>The user/operator is responsible for the observance of suitable recalibration period.</i></p> <p>Unterschrift des Prüfers</p> <hr/> <div data-bbox="1069 1937 1388 2060" style="text-align: right;">  </div>

11 Appendix B

11.1 Overview of EWM branches

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 Plants

 Branches

● More than 300 EWM sales partners worldwide