multiSpot3

Welding station

OPERATING INSTRUCTIONS

List of contents

1 TECHNICAL DATA 3

2 OPERATING AND DISPLAY ELEMENTE 4

3 FUNCTIONAL DESCRIPTION 6

3.1 Electrode 6

3.1.1 Hot start 6

3.1.2 Arc force 6

3.1.3 Antistick Inverter control 6

3.2 TIG 7

3.2.1 TIG 4-phase with HF 7

3.2.2 TIG 2- phase with HF 7

3.2.3 TIG 2- phase without HF 8

3.2.4 TIG 4- phase without HF 8

3.3 TIG DC pulse welding 8

3.4 multiSpot pulse function 9

3.5 AC mode 9

4 SAFETY INSPECTION 10

5 POSITION DESCRIPTION FOR PARTS LIST 11

6 PARTS LIST 13

7 SAFETY REGULATIONS 15

7.1 Protection against gas, radiation and vapours 15

7.2 Precautionary measures against fire and/or explosion 16

7.3 Noise protection 16

7.4 Precautionary measures against electrical risks 17

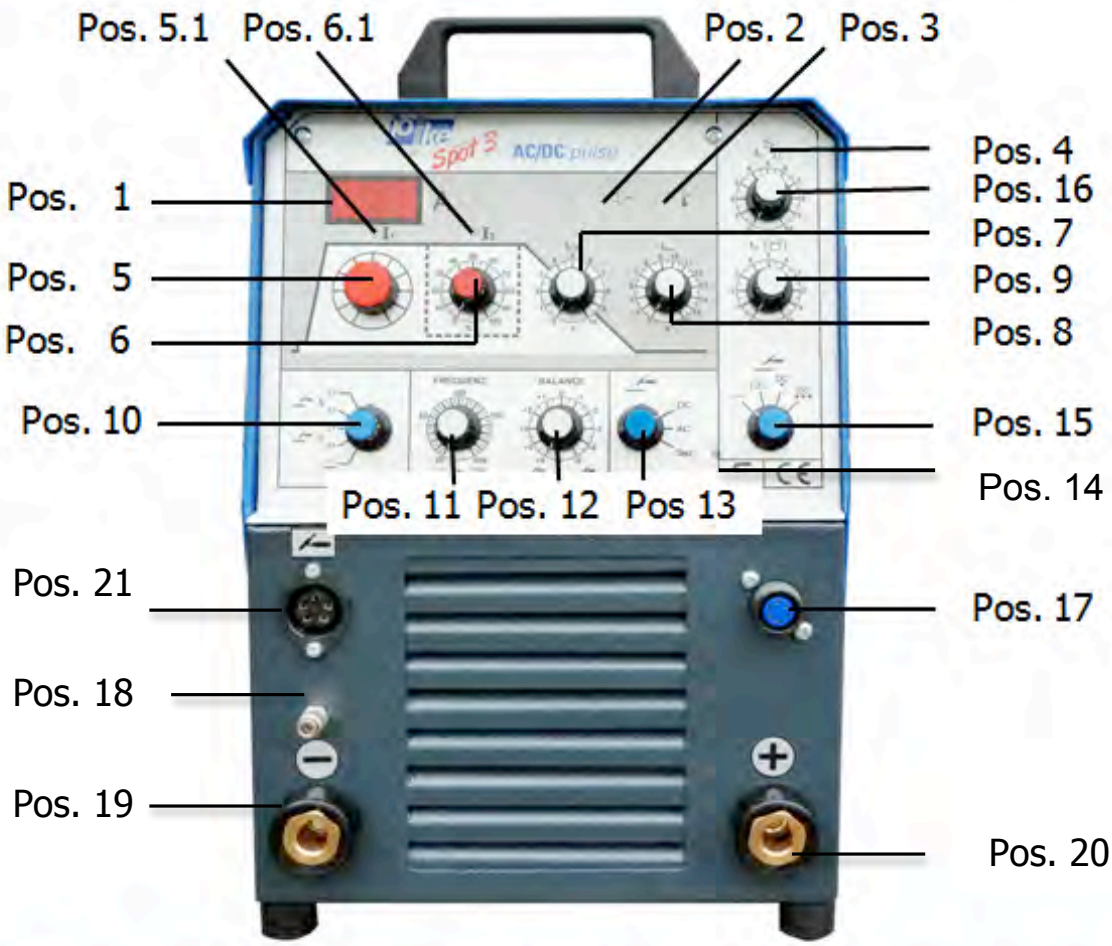
7.5 Regulations intended to guarantee the intrinsic electromagnetic conformity of the product 17

8 ANNEXE 18

1 Technical data

Type of power source:	multiSpot 3
Mains voltage:	230 V (+10% -15%)
Phases:	1
Frequency:	50/60 Hz
Fusing:	16 A (slow-blow)
Open-circuit voltage:	85 V
Maximum output current:	210 A
Power output operating factor 50/35 % (TIG/electrode):	5.0 kVA
Welding current operating factor 100 %:	3.7 kVA
Usable in temperature range:	0 – 40 °C
Current down slope:	0 – 10 s
Postpurge gas-flow time:	3 – 16 s
Electrode welding:	
Setting range:	10 –160 A
Welding current operating factor 35 %:	160 A (26 V)
Welding current operating factor 100 %:	100 A (24 V)
TIG DC welding:	
HF ignition:	yes
Setting range:	3 –210 A
Welding current operating factor 50 %:	210 A (18 V)
Welding current operating factor 100 %:	130 A (15.2 V)
TIG AC welding:	
HF ignition:	yes
AC frequency range:	20 – 200 Hz
Balance setting:	10 – 90 %
Setting range:	3 - 210 A
Welding current operating factor 50 %:	210 A (18 V)
Welding current operating factor 100 %:	130 A (15.2 V)
Degree of protection:	IP 23
Insulation class:	H
Dimensions (HxLxW):	430x510x260 mm
Weight:	26.0 kg
Standards:	EN 6097.4, IEC 974.1,
	S / CE certification

2 Operating and display elements (AC/DC, multiSpot-pulse)



Position description of operating/display elements

Pos. 1: Ampere display

Pos. 2: LED status indication for **operation**

Pos. 3: LED status indication for **temperature overloading**

Pos. 4: Potentiometer pulse width of 20 ms – 300 ms. Potentiometer is active during TIG pulsing + multiSpot single pulse and continuous pulse

Pos. 5: Precise current setpoint setting via rotary pulse generator (I1) and LED status indications for **I1 active**

Pos. 6: Potentiometer current setpoint setting for two-value operation (pulsing, two values) (I2) and LED status indication for **I2 active**

Pos. 7: Potentiometer down slope time

Pos. 8: Potentiometer postpurge gas-flow time (3 – 16 s)

Pos. 9: Potentiometer pulse pause 20 ms – 1000 ms.
In the TIG continuous-arc pulse mode the pulse pause corresponds to the current flow I2.
In the multiSpot-pulse continuous pulse mode there is no current during the pulse pause.

Pos. 10: Rotary switch to select electrode operation and TIG 2/4-phase operation with/without HF-ignition.

Pos. 11: Potentiometer frequency of welding current (AC)

Pos. 12: Potentiometer balance of welding current (AC)

Pos. 13: Rotary switch to select welding operation AC, DC or S-test function

Pos. 14: LED status indication for safety monitoring **S**

Pos. 15: Rotary switch for programme selection TIG/TIG pulsing/multiSpot single and continuous pulse
☞ **IMPORTANT:** This switch must be set to the desired function before startup!

Pos. 16: Socket for foot switch and plug connector: Length of hose package

Pos. 17: Socket for foot control
⇨ If the rotary switch Pos. 15 is positioned on TIG and the foot control connected changeover to foot control mode is effected automatically.
⇨ Rotary switch Pos. 15 on TIG pulsing: When foot control is contacted pulsing + foot control mode is active.
⇨ without foot control only mode pulsing.

Pos. 18: Rapid-action coupling for gas connection

Pos. 19: Tubing pack connection

Pos. 20: Earthing cable connection

3 Functional description

The following operating modes can be set using rotary switch **Pos. 10**:

1. TIG 2-phase without HF
2. TIG 4-phase without HF
3. TIG 2-phase with HF
4. TIG 4-phase with HF
5. Electrode

3.1 Electrode

- There is no triggering of the ignition unit and gas valve.
- The power unit is active, regardless of the status of the welding torch button.

3.1.1 Hot start

- During the hot start, there is a 30% current overshoot in relation to the set and displayed setpoint value I1.
- After recognition of “current flowing”, the hot start time runs down from 600ms and the unit switches back to the set current setpoint value.

3.1.2 Arc force

- If the arc voltage falls below a specific minimum value during welding, the setpoint current is increased by 50%. Nevertheless, the value is limited to the maximum electrode current.
- When the voltage value is reached again, the unit switches back to the set current setpoint value.

3.1.3 Antistick inverter control

- If the inverter control detects a short circuit in the welding process, the unit switches back to the minimum current after 0.5 seconds in order to prevent electrode burnout.
- Once the short circuit has been eliminated, the set setpoint value is outputted again.

3.2 TIG

The following applies in all TIG operating modes:

- Gas preflow 0.5 sec.
- Forced cut-off: if ignition does not occur within 5 seconds after pressing the welding torch button in 2-phase and 4-phase welding mode, a forced cut-off occurs.
- Welding interrupt: if the sequence is terminated by the welding torch button before current flows, a direct interrupt without post-purge gas flow occurs.
- HF in AC mode: the HF remains switched on in AC mode, even when current is flowing.

3.2.1 TIG 4-phase with HF

1st phase: Press and hold down the welding torch button on the hand torch. After the gas preflow time, the arch ignites with 20% of I1 (search arc).

2nd phase: Release the welding torch button. The welding current increases to the set value of I1.

3rd phase: Press and hold down the welding torch button. The welding current decreases to the minimum current during the set down slope time.

4th phase: Release the welding torch button. The arc is extinguished. The inert gas continues to flow during the set gas post-purge time.

3.2.2 TIG 2-phase with HF

1st phase: Press and hold down the welding torch button on the hand torch. After the gas preflow time, the arch ignites. The welding current can be infinitely adjusted with rotary knob I1. If the 2-phase softstart/softdown function is activated, the setpoint current will be increased according to the pre-selected softstart time.

2nd phase: Release the welding torch button. The arc is extinguished. The inert gas continues to flow during the set gas post-purge time. If the 2-phase softstart/softdown function is activated, the arc current will be reduced according to the preset softdown time. If the welding torch button is operated during the softdown phase, the preselected arc current will be readjusted.

3.2.3 TIG 4-phase without HF

1st phase: The tungsten electrode must be in contact with the workpiece. Press and hold down the welding torch button.
After the gas preflow time, the arch ignites with 20% of I1 (search arc).

2nd phase: Release the welding torch button. The welding current increases to the set value of I1.

3rd phase: Press and hold down the welding torch button. The welding current decreases to the minimum current during the set up slope time.

4th phase: Release the welding torch button. The arc is extinguished. The inert gas continues to flow during the set gas post-purge time.

3.2.4 TIG 2-phase without HF

Ignition operates according to the “soft contact ignition” principle.

1st phase: The tungsten electrode must be in contact with the workpiece.
Press and hold down the welding torch button. The arc ignites once the gas preflow time has elapsed. The welding current can be infinitely adjusted with rotary knob I1. If the 2-phase softstart/softdown function is activated, the setpoint current will be increased according to the pre-selected softstart time after the arc has ignited.

2nd phase: Release the welding torch button. The arc is extinguished. The inert gas continues to flow during the set gas post-purge time. If the 2-phase softstart/softdown function is activated, the arc current will be reduced according to the pre-selected down slope time. If the welding torch button is operated during the down slope phase, the pre-selected arc current will be readjusted.

3.3 TIG DC pulse welding

- The main current (I_1) is controlled by adjusting the rotary pulse generator (Pos. 5) and the
- secondary current value (I_2) by adjusting the potentiometer (Pos. 6)
  (For example: 3 = 30 % of I_1; 8 = 80 % of I_1)
- Adjustment of current flow I_1 on the potentiometer Pos. 4
- Adjustment of current flow I_2 on the potentiometer Pos. 9

3.4 multiSpot-pulse function

- Turn switch **Pos. 10** to 2-phase with HF
- Set switch **Pos. 13** to DC
- Set down slope potentiometer **Pos. 7** to minimum
- Turn switch **Pos. 15** to multiSpot single or continuous pulse

3.5 AC mode

Rotary switch **Pos. 13** allows the following selections:

- Direct current welding
- Alternating current welding:
  The AC frequency can be set to between 30 and 200 Hz with **Pos. 11** and the AC balance with potentiometer **Pos. 12.** The AC balance is defined as the time ratio between the positive and negative current half-wave, the current amplitude being constant.
- Test function to guarantee welding with an increased electrical hazard:
  Switch on the power unit with the control unit connected.
  The green “S-Test” LED **Pos. 14** illuminates.
  Set rotary switch **Pos. 13** to the “Test” position.
  The green LED **Pos. 14** is no longer illuminated and the power source is no longer operational.
  Switch off the power unit at the main switch.
  Set the rotary switch to the desired operating mode.
  Switch on the power unit again; the power source is now operational again.

4 Safety inspection

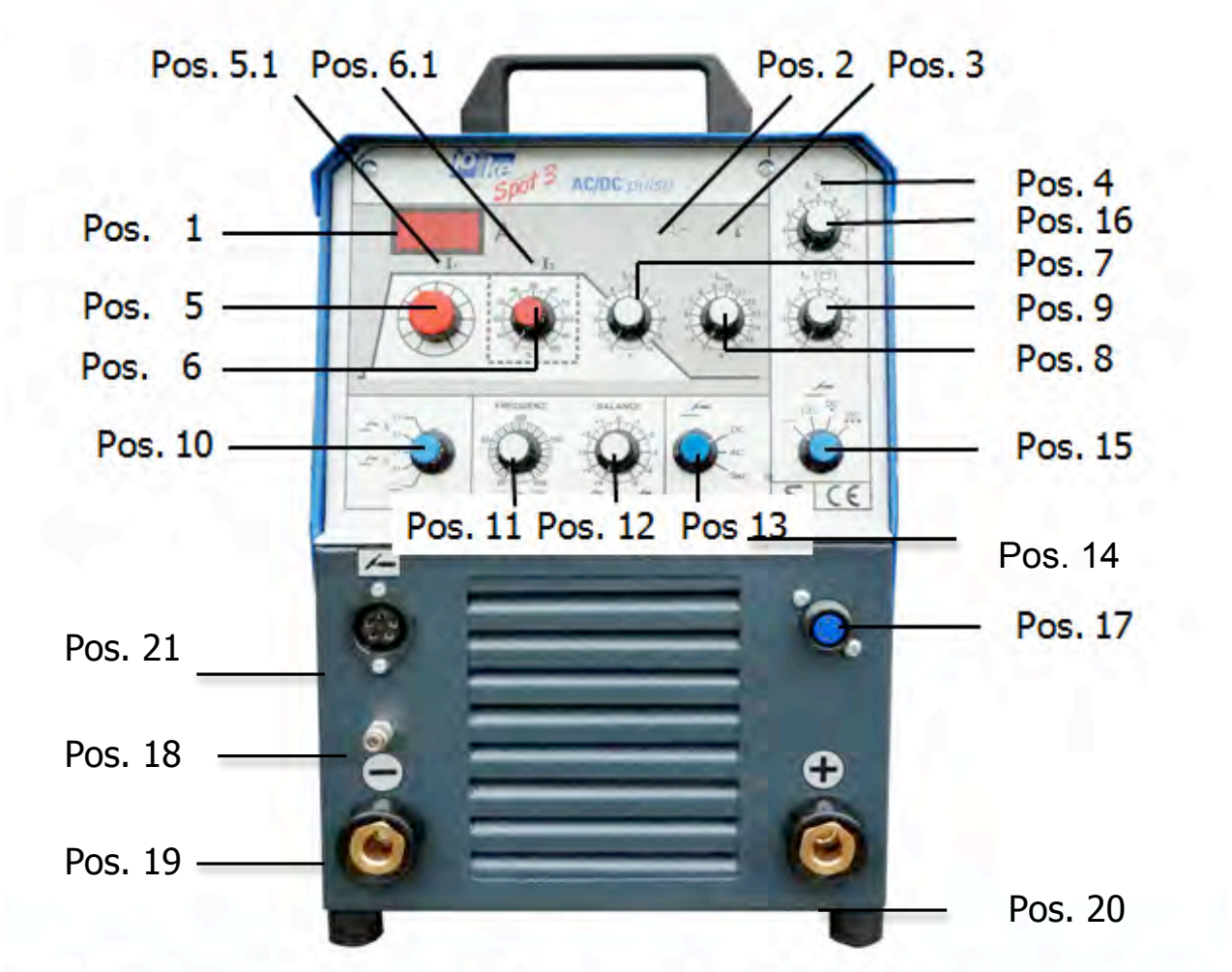
Warning! Switch off the unit before opening the welding device; disconnect the mains connector and affix a notice warning against switching on the power source again.

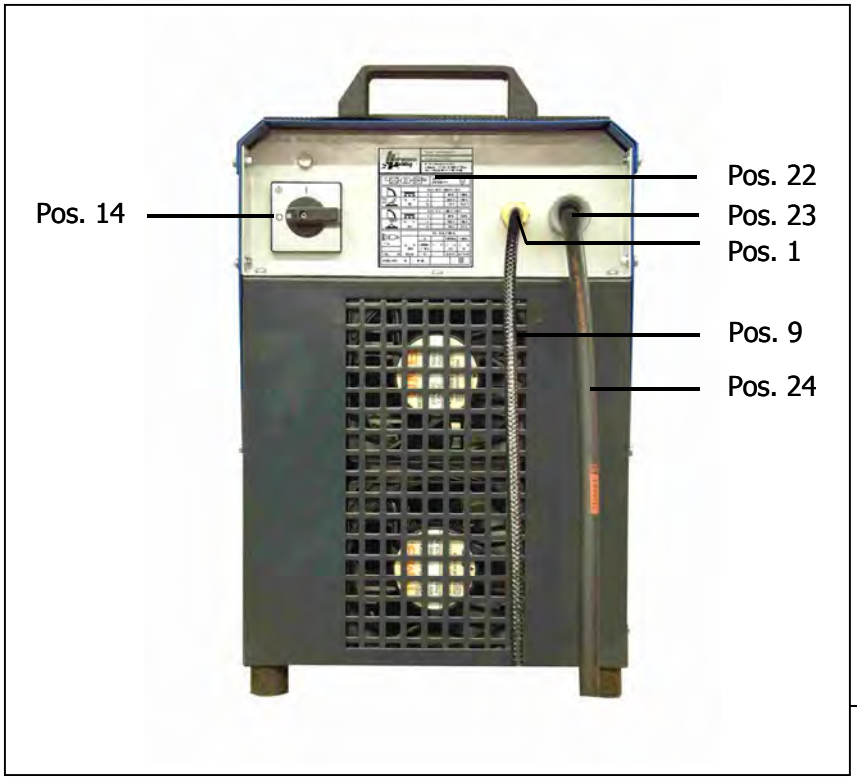
The operator undertakes to have the welding device inspected by an electrician for perfect operational status as part of a safety inspection after modifications (e.g. installation, conversion), repair and maintenance and regardless of the latter, at least every 12 months.

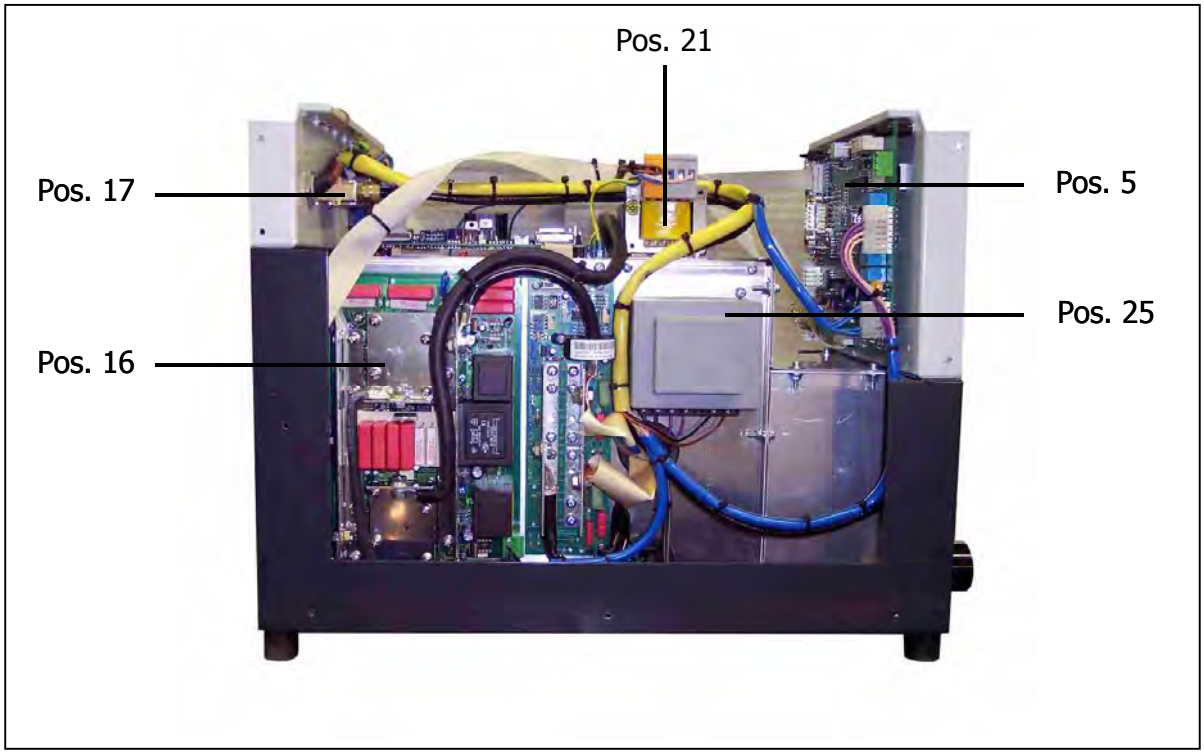
At least the following regulations must be complied with during this inspection:

- BGV A3 – Electrical installations and operational equipment (formerly BGV A2, previously VBG 4)
- BGR 500 sect. 2.26 – Welding, cutting and related procedures (formerly BGV D1, previously VBG 15)
- VDE 0701-1 – Corrective maintenance, modification and testing of electrical devices

5 Position description for parts list







Lateral view

6 Parts list

As of: 11.03.2005

Pos.No.	Spare part
1	Double nipple 1/4"-1/8"
2	Flange socket, 5-pole, bayonet
3	Flange socket, 6-pole, DMS 3102A14S-6S
4	„multiSpot2“ front sticker
5	Front board f. inverter 210 AC/DC (multiSpot2) with operating and display unit, standard setting 210 A
6	"multiSpot2" foot control with lead 75² (5 m), coupling plug 6-pole thread, AMP, potentiometer 10 kOhm
7	"multiSpot2" foot switch with coupling plug 5-pole bayonet
8	Gas connection 1/8" quick-action coupling
9	Gas hose 6 x 3 (1.5 m)
10	"multiSpot2" housing, coated H (incl. handle) x W x L: 43 x 26 x 50 cm RAL colours: dark grey/body: RAL 7016 light grey/front: RAL 7035 blue/cover, side parts: RAL 5010
11	Handle black, ELSA
12	Rubber feet (4 pieces)
13	Rubber mat 380 mm x 230 mm
14	Main switch 0-1/CA T303 E10 Kraus-Naimer
15	HF filter SLF7 (2 pieces)

Pos.No.	Spare part
16	Inverter 210 A- AC/DC Inverter with pulse blocking pressure 200 A / 230 V / 50/60 Hz V3.0 Balance up to 90 : 10 max. adjustable frequency: 100 Hz
17	Solenoid valve CEME 24 V/AC, 1/8"
18	Earthing bush M12 type DIX BE 70/95 (2 pieces)
19	Earthing cable 25² (length: 4.0 m) with earthing tongs and earthing plug 35 mm²
20	Earthing pin plug f. lead, blue, BALS type 73
21	Control power transformer, single-phase Type HMN/00005 Pri: 230 V / sec: 0/15/20 V
22	Name plate multiSpot2
23	Screwed connection PG 13.5 with metal counternut
24	Lead 3x2.5² (length: 6,25 m) type H07RN-F
25	Ignition unit SIG 8.31

7 Safety regulations for inert gas welding machines

The following safety regulations represent an overview of (and are no replacement for!) the obligations to comply with the currently applicable laws regarding norms for safety and prevention of accidents (incl. BGR 500 section 2.26 “Welding, cutting and related procedures“ (contents from the previous VBG15). During work with inert gas welding machines, the welder must comply with the same safety regulations as for arc welding with electrodes.

With reference to the contents of these safety regulations, Joisten & Kettenbaum GmbH & Co. KG decline any responsibility in the following cases:

- Use incompatible with the national safety and accident prevention laws
- Defects in the mains voltage
- Alterations of the machine at the customer’s own initiative
- Use of the machine by incompetent/untrained operators

7.1 Protection against gas, radiation and vapours:

- Since a high level of infrared to ultraviolet radiation (UV radiation at various wavelengths) owing to the high current density occurs during inert gas welding and can result in skin burns, the welder must be protected by suitable protective clothing. A leather apron and gloves protecting the fingers are sufficient during carbon dioxide welding.
- With higher current intensities and during argon welding, tight fitting leather clothing (with a large cutout at the back) must be worn.
- Furthermore, attention must be drawn to a risk to the eyes from generation of UV rays. Consequently, a welding helmet with reflective protective goggles according to DIN 888 (protection class 12 according to DIN 4646, DIN 4747/1957) must be used in all cases as protection for the head and eyes. Never look directly at an electric arc without eye protection!
- It is essential to avoid exposed body areas.
- Owing to the high arc temperature during welding, portions of the CO2 decompose into carbon monoxide and oxygen (CO + O). The formation of harmful welding vapours is also possible (e.g. vapours containing lead, copper, zinc, nickel and chromium). Consequently, artificial ventilation in addition to aeration (air extraction) must be provided when welding in rooms with a smaller volume of 300 m². In larger premises or manufacturing sheds, overall ventilation is completely adequate, provided that a good air exchange can be guaranteed.

7.2 Precautionary measures against fire and/or explosion:

- The workpieces reach very high temperatures during the welding process. Sparks occur during this phase. The following observations are intended to prevent and restrict the risks incurred by fire and/or explosion:
- All potentially inflammable materials must be removed from the welding area or must be suitably covered.
- Welding operations must not be performed on uncleaned containers/tanks. The same applies to containers/tanks for which it cannot be ruled out that toxic or explosive vapours will accumulate.
- Never use inflammable gases and/or combustive materials such as acetylene, propane, hydrogen or oxygen.
- Never place the welding tongs or the welding torch directly on the welding table or any other metal surface connected to the earthing tongs in order to avoid any possible unintentional triggering of the arc.
- The gas cylinder must be handled according to the regulations for pressurised containers containing explosive gases.
- An appropriate number of fire extinguishers must be provided in the working area for use by the properly trained personnel. Sufficient escape routes must be kept free for the welding area.

7.3 Noise protection:

- During normal use, the welding device does not generate a noise level of more than 80 dBA. In the case of specific welding processes (TIG welding) with AC current, MIG/MAG welding (conventional or pulsed) and due to welding parameter settings, it is possible that higher noise levels may result. The operators must observe the legally stipulated conditions in such cases.

7.4 Precautionary measures against electrical risks:

- The welding device must be disconnected from the mains before it is opened. All repairs must be performed by our authorised specialists.
- The machine must be switched off when not in use. Caution: the running machine must be allowed to cool down sufficiently after heavy use!
- Insulation is required if it is necessary to lean on the workpiece during the welding process. Under no circumstances must there be any contact with metal parts.

- The welding and power supply cables, plugs, connection pieces and fan lights must be fully operational and must be replaced immediately if damaged. Under no circumstances must they be exposed to mechanical or electrical overload.
- It must be ensured that all devices and objects within the welding area are dry.
- The electrode of the TIG fan lamp must be replaced carefully without the machine being powered up (main switch set to Off and power supply plug disconnected).

7.5 Regulations intended to guarantee the intrinsic electromagnetic conformity of the product:

- Each time the unit is connected to the mains, safe earthing of the welding rectifier and the inert glass cylinder must be checked with the mains switch set to On. Otherwise, this control should be performed once a week.
- The machine must be operated with all the metallic protective devices stipulated by the manufacturer in order to reduce the electromagnetic emissions and possible interference by external disturbances to a minimum.
- The internal components of the machine must not be modified (e.g. by changing the position of cables or mains filters).
- Accessories unauthorised by the manufacturer must not be used.
- The welding cable length must not be altered.
- It must be ensured that no equipment sensitive to electromagnetic emissions (e.g. computers, measuring devices) are located in the vicinity of the welding area. Persons wearing pacemakers must not use the welding machine.
- It must be ensured that electrical appliances in the vicinity of the welding machine remain free of interference during the welding process.

Please state MACHINE NUMBER (refer to manufacturer's name plate on the appliance) and welding torch type when ordering spare parts.

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