

CZ - svařovací stroj  
SK - zvärací stroj  
EN - welding machine  
DE - Schweißgeräte  
PL - maszyna spawalnicza

# 1500 / 1700 / 1900 HF

- CZ** Návod k obsluze a údržbě
- SK** Návod na obsluhu a údržbu
- EN** Instruction for use and maintenance
- DE** Bedienungsanleitung
- PL** Instrukcja obsługi i konserwacji



MADE IN EU



## Contents

- Introduction
- Description
- Technical data
- Usage limits
- Safety standards
- Installation
- Connection to the electrical supply
- Control apparatus
- Connection of the welding cables
- Adjustment of welding parameters
- Prior to welding
- Maintenance
- The pointing out of any difficulties and their elimination
- Procedure for welder assembly and disassembly
- Ordering spare parts
- Key to graphic symbols
- Rating plate symbols
- Electrical diagram
- List of spare parts
- Testing certificate and warranty certificate

## Introduction

Thank you for purchasing one for our products.



**Read carefully the instructions included in this manual before using the equipment.**

Before using the equipment you should carefully read the instructions included in this manual. In order to get the best performance from the system and ensure that its parts last as long as possible, you must strictly follow the usage instructions and the maintenance regulations included in this manual. In the interest of customers, you are recommended to have maintenance and, where necessary, repairs carried out by the workshops of our service organisation, since they have suitable equipment and specially trained personnel available. All our machinery and systems are subject to continual development. We must therefore reserve the right to modify their construction and properties.

## Description

Inverters 1500 – 1900 HF are professional welding machines designed for welding by MMA method (coated electrode) and TIG with touch and touchless HF start (welding in protective atmosphere with unmelting electrode). In other words, they are sources of welding current with steep characteristics. Inverters are solved as portable sources of welding current. Machines are equipped with a strap to make manipulation and carrying easier. Welding inverters are constructed with utilization of high-frequency transformer with ferrite core, transistors and digital control. For MMA method they are equipped with electronic functions HOT START - adjustable within 0 up to 0.5 sec. (for easier striking

Table 1

| Technical data             | 1500 HF            | 1700 HF  | 1900 HF  |
|----------------------------|--------------------|----------|----------|
| Input voltage 50 Hz        | 1x230 V            | 1x230 V  | 1x230 V  |
| Welding current range      | 10-150 A           | 10-170 A | 10-180 A |
| Open voltage circuit       | 88 V               | 88 V     | 88 V     |
| Duty cycle 30% (45%*)      | 150 A              | 170 A    | 180 A*   |
| Duty cycle 60%             | 120 A              | 120 A    | 150 A    |
| Duty cycle 100%            | 95 A               | 95 A     | 110 A    |
| Protection degree - slowly | 16 A               | 16 A     | 20 A     |
| Protection class           | IP 23 S            | IP 23 S  | IP 23 S  |
| Diameters LxWxH            | 390 x 143 x 245 mm |          |          |
| Weight                     | 6.6 kg             | 6.7 kg   | 7.1 kg   |

the arc), ANTI STICK (which prevents sticking the electrode, its activation is shown on display by symbols ---) and ARC FORCE enables automatic setting up the dynamics of el. arc. For TIG method they are equipped with HF contactless striking the arc and digital control for all parameters with a possibility of welding in modes **PULSE, CYCLE and four-time cycle**. Machines are mainly designed for production, maintenance and assembly.

Welding machines are in accord with appropriate standards and regulations of European Union and the Czech Republic.

## Technical data

The general technical data of the machines are summarised in table 1.

## Usage limits

### (EN 60974-1)

The use of a welder is typically discontinuous, in that it is made up of effective work periods (welding) and rest periods (for the positioning of parts, the replacement of wire and underflushing operations etc. This welder is dimensioned to supply a 150, 170 and 180 A nominal current in complete safety for a period of work 30% or 45% of the total usage time. The regulations in force establish the total usage time to be 10 minutes. The 45% work cycle is considered to be 4.5 minute of the ten-minute period of time. If the permitted work cycle time is exceeded, an overheat cut-off occurs to protect the components around the welder from dangerous overheating. This is indication of switch on „Err“ on display (pos.4 pict. 1). After several minutes reach to the cooling and the notice will be cut off automatically and the welder is ready for use again. Machines are constructed in compliance with the IP 23 S protection level.

## Safety standards

Welding machines must be used for welding and not for other improper uses. The machine can not be used in any way for thawing pipes. Never use the welding machines with its removed covers. By removing the covers the cooling efficiency is reduced and the machine can be damaged. In this case the supplier does not take his responsibility for the damage incurred and for this reason you cannot stake a claim for a guarantee repair. Their use is permitted only by trained and experienced persons. The operator must observe CEI 26-9-CENELEC 4D407, EN 050601, 1993, EN 050630, 1993 safety standards in order to guarantee his safety and that of third parties.



## DANGERS WHILE WELDING AND SAFETY INSTRUCTIONS FOR MACHINE OPERATORS ARE STATED:

**EN 05 06 01/1993 Safety regulations for arc welding of metals. EN 05 06 30/1993 Safety rules for welding and plasma cutting.** The welding machine must be checked through in regular inspections according to EN 33 1500/1990. Instructions for this check-up, see § 3 Public notice ČÚPB number 48/1982 Digest, EN 33 1500:1990 and EN 050630:1993 Clause 7.3.

### KEEP GENERAL FIRE-FIGHTING REGULATIONS!

Keep general fire-fighting regulations while respecting local specific conditions at the same time.

Welding is always specified as an activity with the risk of a fire. **Welding in places with flammable or explosive materials is strictly forbidden.**

There must always be fire extinguishers in the welding place. **Attention!** Sparks can cause an ignition many hours after the welding has been finished, especially in unapproachable places.

After welding has been finished, let the machine cool down for at least ten minutes. If the machine has not been cooled down, there is a high increase of temperature inside, which can damage power elements.

### SECURITY OF WORK WHILE WELDING OF METALS CONTAINING LEAD, CADMIUM, ZINK, MERCURY AND GLUCINUM

Make specific precautions if you weld metals containing these metals:

- Do not carry out welding processes on gas, oil, fuel etc. tanks (even empty ones) because there is **the risk of an explosion. Welding can be carried out only according to specific regulations!!!**
- **In spaces with the risk of an explosion there are specific regulations valid.**

**Before any interference in electrical part, removing the cover or cleaning it is necessary to switch off the machine from the supply.**

### ELECTRICAL SHOCK PREVENTION

- Do not carry out repairs with the generator live.
- Before carrying out any maintenance or repair activities, disconnect the machine from the mains.
- Ensure that the welder is suitably earthed.
- The equipment must be installed and run by qualified personnel.
- All connections must comply with the regulations in force (EN 60974-1) and with the accident prevention laws.



- Do not weld with worn or loose wires. Inspect all cables frequently and ensure that there are no insulation defects, uncovered wires or loose connections.
- Do not weld with cables of insufficient diameter and stop soldering if the cables overheat, so as to avoid rapid deterioration of the insulation.
- Never directly touch live parts. After use, carefully replace the torch or the electrode holding grippers, avoiding contact with the parts connected to earth.

#### SAFETY REGARDING WELDING FUMES AND GAS



- Carry out purification of the work area, from gas and fumes emitted during the welding, especially when welding is carried out in an enclosed space.
- Place the welding system in a well-aired place.
- Remove any traces of varnish that cover the parts to be welded, in order to avoid toxic gases being released. Always air the work area.
- Do not weld in places where gas leaks are suspected or close to internal combustion engines.
- Keep the welding equipment away from baths for the removal of grease where vapours of trichlorethylene or other chlorine containing hydrocarbons are used as solvents, as the welding arc and the ultraviolet radiation produced by it react with such vapours to form phosgene, a highly toxic gas.

#### PROTECTION FROM RADIATION, BURNS AND NOISE



- Never use broken or defective protection masks
- Do not look at the welding arc without a suitable protective shield or helmet
- Protect your eyes with a special screen fitted with adiacinic glass (protection grade 9-14 EN 169)
- Immediately replace unsuitable adiacinic glass
- Place transparent glass in front of the adiacinic glass to protect it
- Do not trigger off the welding arc before you are sure that all nearby people are equipped with suitable protection.
- Pay attention that the eyes of nearby persons are not damaged by the ultraviolet rays produced by the welding arc
- Always use protective overalls, splinter-proof glasses and gloves
- Wear protective earphones or earplugs

- Wear leather gloves in order to avoid burns and abrasions while manipulating the pieces.

#### AVOIDANCE OF FLAMES AND EXPLOSIONS



- Remove all combustibles from the workplace
- Do not weld close to inflammable materials or liquids, or in environments saturated with explosive gasses
- Do not wear clothing impregnated with oil and grease, as sparks can trigger off fame's
- Do not weld on recipients that have contained inflammable substances, or on materials that can generate toxic and inflammable vapours when heated.
- Do not weld a recipient without first determining what it has contained. Even small traces of an inflammable gas or liquid can cause an explosion.
- Never use oxygen to degas a container.
- Avoid gas-brazing with wide cavities that have not been properly degassed.
- Keep a fire extinguisher close to the workplace
- Never use oxygen in a welding torch; use only inert gases or mixtures of these.

#### RISKS DUE TO ELECTROMAGNETIC FIELDS



- The magnetic field generated by the machine can be dangerous to people fitted with pace-makers, hearing aids and similar equipment. Such people must consult their doctor before going near a machine in operation.
- Do not go near a machine in operation with watches, magnetic data supports and timers etc. These articles may suffer irreperable damage due to the magnetic field.
- This equipment complies with the set protection requirements and direc-tives on electromagnetic compatibility (EMC). Welding machines in terms of interference suppression are determined for industrial space - classification according to EN 55011 (CISPR - 11) group 2, inclusion class A. Is assumed that their wide use in all industrial area, but it is not for using at home! In particular, it complies with -the technical prescriptions of the EN 60974-10 standard and is foreseen to be used in all industrial spaces and not in spaces for domestic use. If electromagnetic disturbances should occur, it is the user's responsibility to resolve the situation with the technical assistance of the producer. In some cases the remedy is

schormare the welder and introduce suitable filters into the supply line.

#### **WARNING:**

This inclusion class A is not made for using in residential premises where is electrical energy supplied by low-voltage system. Here can be some problems with ensuring electromagnetic compatibility in these premises caused by interference spread wiring the same as radiate interference.

#### **MATERIALS AND DISPOSAL**

- These machines are build from materials that do not contain substances which are toxic or poisonous to the operator.
- During the disposal phase the machine should be disassembled and its components should be separated according to the type of material they are made from.



#### **DISPOSAL OF USED MACHINERY**

- Collecting places/banks designed for back withdrawer should be used for disposal of machinery put out of the operation.
- Don't throw away machinery into common waste and apply the procedure mentioned above.



#### **HANDLING AND STOCKING COMPRESSED GASES**

- Always avoid contact between cables carrying welding current and compressed gases cylinder and their storage systems.
- Always close the valves on the compressed gas cylinders when not in use.
- The valves on inert gas cylinder should always be fully opened when in use.
- The valves on flammable gases should only be opened full turn so that quick shut off can be made in an emergency.
- Care should be taken when moving compressed gas cylinders to avoid damage and accidents which could result in injury.
- Do not attempt to refill compressed gas cylinders, always use the correct pressure reduction regulators and suitable base fitted with the correct connectors.
- For further information consult the safety regulation governing the use of welding gases.



#### **PLACEMENT OF THE MACHINE**

When choosing the position of the machine placement, be careful to prevent the machine from conducting impurities and getting them inside (for example flying particles from the grinding tool).

#### **Installation**

The installation site for the system must be carefully chosen in order to ensure its satisfactory and safe use. The user is responsible for the installation and use of the system in accordance with the producer's instructions contained in this manual.

Before installing the system the user must take into consideration the potential electromagnetic problems in the work area. In particular, we suggest that you should avoid installing the system close to:

- Signalling, control and telephone cables
- Radio and television transmitters and receivers
- Computers and control and measurement instruments
- Security and protection instruments

Persons fitted with pace-makers, hearing aids and similar equipment must consult their doctor before going near a machine in operation. The equipment's installation environment must comply to the protection level of the frame i.e. IP 23 S. The system is cooled by means of the forced circulation of air, and must therefore be placed in such a way that the air may be easily sucked in and expelled through the apertures made in the frame.

#### **Connection to the electrical supply**

Before connecting the welder to the electrical supply, check that the machines plate rating corresponds to the supply voltage and frequency and that the line switch of the welder is in the „0“ position. Only connect the welder to power supplies with grounded neutral.

This system has been designed for nominal voltage 230 V 50/60 Hz. It can however work at 220 V and 230 V 50/60 Hz without any problem. Connection to the power supply must be carried out using the four polar cable supplied with the system, of which:

- 2 conducting wires are needed for connecting the machine to the supply
- the fourth, which is YELLOW GREEN in colour is used for making the „EARTH“ connection.

Connect a suitable load of normalised plug to the power cable and provide for an electrical socket complete with fuses or an automatic switch. The earth terminal must be connected to the earth conducting wire (YELLOW-GREEN) of the supply.



Picture 1

**NOTE:** any extensions to the power cable must be of a suitable diameter, and absolutely not of a smaller diameter than the special cable supplied with the machine.

**WARNING:** Inverter 1900 HF are - from their production - equipped with a supply plug which complies with protection 16 A only. When using these machines with more than 160 A of output current, it is necessary to change the supply plug for the plug conforming to the protection of 20 A. At the same time this protection must be in accordance with implementation and protection in the distribution of electricity.

Table 2 shows the recommended load values for retardant supply fuses chosen according to the maximum nominal current supplied to the welder and the nominal supply voltage.

Table 2

| Type             | 1500 HF               | 1700 HF               | 1900 HF               |
|------------------|-----------------------|-----------------------|-----------------------|
| I max 30% (*45%) | 150 A                 | 170 A                 | 180 A*                |
| Instal power     | 4.5 kVA               | 5 kVA                 | 5.7 kVA               |
| Protection       | 16 A                  | 16 A                  | 20 A                  |
| Supply cable     | 3x2.5 mm <sup>2</sup> | 3x2.5 mm <sup>2</sup> | 3x2.5 mm <sup>2</sup> |
| Earth cable      | 16 mm <sup>2</sup>    | 16 mm <sup>2</sup>    | 16 mm <sup>2</sup>    |

Table 3

| Extension cable | Diameter            |
|-----------------|---------------------|
| 1-20 m          | 2,5 mm <sup>2</sup> |

## Control apparatus

### PICTURE 1

- Position 1** LED diode welding current
- Position 2** Supply cable
- Position 3** Gas input connection

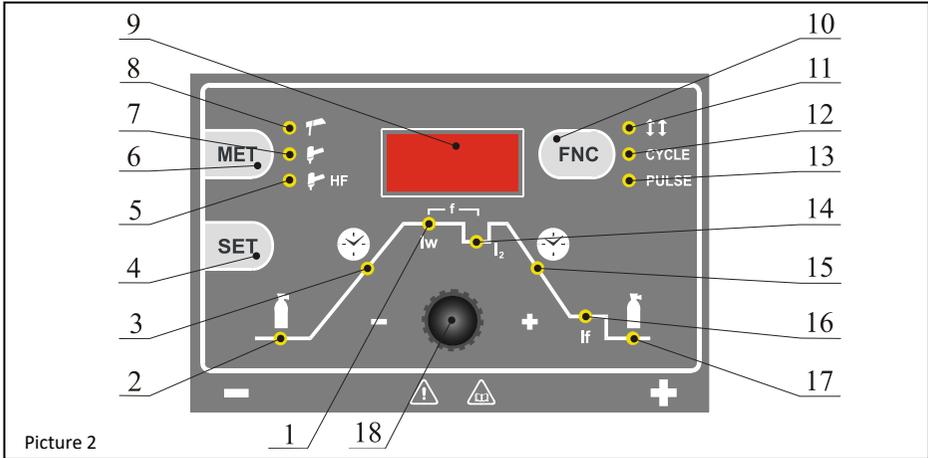
- Position 4** Digital drawing panel
- Position 5** Quick connection - negative
- Position 6** Connector of the torch
- Position 7** Gas connection - out let
- Position 8** Quick connection – positive

### PICTURE 2

- Position 1** Parameters adjustment knob - lw
- Position 2** LED diode pre gas 0-20 sec.
- Position 3** LED diode UP slope 0-10 sec.
- Position 4** Button the selection of setting
- Position 5** LED diode method TIG with HF start
- Position 6** Button of the method
- Position 7** LED diode method TIG with LIFT start
- Position 8** LED diode method MMA
- Position 9** Display
- Position 10** Button regime (four stroke, CYCLE, PULS)
- Position 11** LED diode four stroke
- Position 12** LED diode function CYCLE
- Position 13** LED diode function PULS
- Position 14** LED diode second current I<sub>2</sub> 5- 150, 170, 190 A
- Position 15** LED diode down slope 0-10 sec.
- Position 16** LED diode end current value 5 - 150, 170, 190 A
- Position 17** LED diode post gas 0-20 sec.
- Position 18** Mine switch

## Connection of the welding cables

With the machine disconnected from the supply, connect the welding cables to the out terminals (positive and negative) of the welder, connecting them to the gripper and the earth, with the correct polarity. Provided for the type of electrode to be used. Choosing the indications supplied by the electrode manufacturer, the welding cables must be as short as possible, close to one other, and positioned at flowl or close to it.



Picture 2

### WELDING PART

The part to be welded must always be connected to earth in order to reduce electromagnetic emission. Much attention must be afforded so that the earth connection of the part to be welded does not increase the risk of accident to the user or the risk of damage to other electric equipment. When it is necessary to connect the part to be welded to earth, you should make a direct connection between the part and the earth staff. In those countries in which such a connection is not allowed, connect the part to be welded to earth using suitable capacitors, in compliance with the national regulations.

### Adjustment of welding parameters

#### Adjustment of welding method

After switching the machine on, the display is lit up and one of LED diodes signalling the welding method is lit up. (MMA, TIG with touch ignition or TIG HF with non-touch ignition, pos. 5, 7 or 8 pic. 2). The diode Iw will be on at the same time (pos. 1 pic. 2) which marks the welding current or some of LED diodes (pos. 11, 12, or 13), according to the method and function used for the last time.

#### ADJUSTMENT OF WELDING PARAMETERS FOR INDIVIDUAL METHODS

##### METHOD MMA:

With welding method MMA we have a possibility to adjust the following parameters:

- welding current in A
- time of HOTSTART activity in seconds

LED diode (pos. 8 pic. 2) signalizes method MMA (welding with coated electrode). Method is chosen

by pressing the button MET repeatedly. (pos. 6 pic. 2)

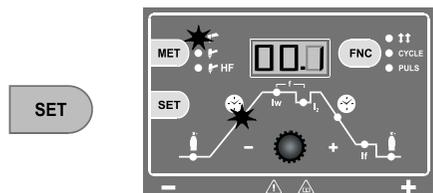


**Adjustment of welding current** – with glowing LED diode marked as Iw (pos. 1 pic. 2) we adjust with the use of the coder (pos. 18 pic. 2) the welding current 5- 150, 170 or 180 A (according to the type of the machine).

##### Adjustment of HOTSTART time

By pressing the button of method MET (pos. 6, pic. 2) turn the machine into method MMA, which is signalized by LED diode (pos. 8 pic. 2).

By pressing the button SET (pos. 4 pic. 2), we lit LED diode up (pos. 3 pic. 2). For about 6 seconds LED diodes will remain glowing as shown in the picture. During this time we can adjust with the use of the coder (pos. 18 pic. 2) the time of active hot start function. Time is expressed with numbers 0,0 up to 10,0. With the adjusted item 0,0 the function hot start is switched off and with item 10.0 the time is maximum. It means about 0,5 seconds.



## METHOD TIG

Welding invertors 1500 – 1900 HF enable welding with method TIG with touch start and TIG HF with non-touch start. Both methods enable welding in two-cycle and four-cycle modes.

### METHOD TIG (with touch start):

LED diode (pos. 7, pic. 2) signalizes method TIG (with touch start). Activation of the arc is carried out through the direct electrode contact with the welding material. The method is chosen by pressing the button MET repeatedly (pos. 6, pic. 2).



With this method the following parameters can be adjusted:

- time of starting of welding current in seconds
- welding current in A
- time of decrease from welding current to end current in seconds
- end current in A
- time of gaseous shield post-gas in seconds and the following functions chosen:
  - two-cycle
  - four-cycle
  - CYCLE
  - PULS

There is a possibility of setting all the parameters after pressing the button SET (pos. 4 pic. 2) with the coder (pos. 18 pic. 2). Glowing LED diode indicates the parameter whose values can be adjusted at that moment. If the parameters are not chosen within 6 seconds and the coder is not regulated, the machine turns into the adjustment state of welding current in an automatic way. LED diode lw (pos. 1 pic. 2) will be lit up.

## FUNCTION TWO-CYCLE

Function two-cycle is active if LED diode (pic. 2 pos. 11) is not glowing. LED diode can be turned off by pressing the button FNC (pic. 2 pos. 10) repeatedly.



With turned on function two-cycle and TIG with touch start, the machine is operated in the following way: electric arc is ignited with the contact of the electrode and the welding material and pressing the

torch button. The current will be increased in an automatic way according to the adjusted time of the starting up to the value of the adjusted welding current. The torch button must be pressed all the time. After releasing the button, the welding current will decrease in an automatic way up to the value  $I_f$  depending on the adjusted time of the decrease and will switch off when there is the value adjusted for  $I_f$ .

## FUNCTION FOUR-CYCLE

LED diode (pos. 11, pic. 2) signalizes function four-cycle. This function can be used with the connection with methods TIG and TIG HF. Function can be chosen by pressing the button FNC (pos. 10 pic. 2) repeatedly.



With turned on function four-cycle and TIG with touch start, the machine is operated in the following way: The electric arc is ignited with the contact of the electrode and the welding material and pressing the torch button. The current will remain value 20 A for all the time the torch switch is pressed. After releasing the button, the welding current will increase automatically up to the adjusted value  $I_w$ . After repressing and immediate releasing the torch button, the welding arc will switch off immediately. However, if the button is still pressed, the welding current will start decreasing in an automatic way up to the value  $I_f$  and will remain this value for all the time the torch button is pressed.

Function four-cycle is activated by pressing the button FNC repeatedly. The turned on function is indicated by glowing LED diode (pic. 2 pos. 11).

Function two-cycle is active if LED diode is not glowing (pic. 2 pos. 11).

Function two-cycle cannot be used with the connection with function CYCLE.

## FUNCTION CYCLE

Two values of welding current are switched between with the function cycle by pressing the torch button.

## FUNCTION PULS

Switching between two values of current is carried out with adjusted frequency with the pulse function in an automatic way. The ratio of upper and lower current in the pulse period is 50% to 50%

**METHOD TIG HF (with non-touch start)** LED diode (pos. 5 pic. 2) signalizes method TIG HF (with non-

touch start). Activation of the arc is carried out with a high voltage discharge without a contact of the electrode and the welding material. Methods can be chosen by pressing the button MET repeatedly (pos. 6 pic. 2).



By pressing the button METHOD (pos. 6 pic. 2), adjust method TIG HF (LED diode is glowing, pos. 5 pic. 2). With this method the following parameters can be adjusted:

- time of gas pre-gas in seconds
- time of starting the welding current in seconds
- welding current in A
- time of the decrease from welding current to end current in seconds
- end current in seconds
- time of post-gas of gaseous shield in seconds and the following functions can be chosen:
  - two-cycle
  - four-cycle
  - CYCLE
  - PULS

A possibility of adjustment of all the parameters is enabled after pressing the button SET (pos. 4 pic. 2) with the coder (pos. 18 pic. 2). Glowing LED diode indicates the parameter whose values can be adjusted at that moment. If the parameters are not be chosen within 7 seconds and the coder is not regulated, the machine turns into the adjustment state of welding current in an automatic way. LED diode Iw (pos. 1 pic. 2) is lit up.

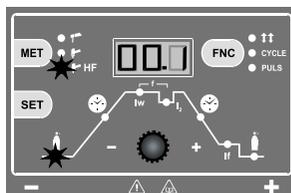
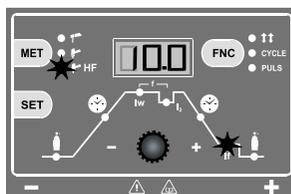
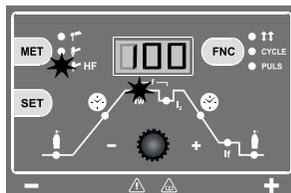
Function four-cycle can be recalled by pressing the button FNC repeatedly. Turned on function four-cycle is indicated by lit up LED TIG HF and four-cycle (pic. 2 pos. 5 and 11).

### Method TIG/TIG HF - adjustment of welding current

By repeated pressing the button SET, lit up LED diode Iw (pic. 2 pos. 1), as it is shown in the picture. Set the welding value with the coder (pic. 2 pos. 18). The current can be adjusted from 5 A up to the value of maximum welding current.

The value of welding current can also be changed during the welding.

With the remote control (buttons UP/DOWN) the value of welding current can be changed in all welding methods.



### Method TIG/TIG HF - adjustment of end current value

By pressing the button SET repeatedly, lit up LED diode I2 (pic. 2 pos. 16). For about 6 seconds LED diodes remain glowing as shown in the picture. During this time the coder (pic. 2 pos. 18) can adjust the end current value. The value can be adjusted from 5 A up to the value of maximum current of the machine. However, you cannot adjust more than the present welding current. Value is given in amperes.

### Method TIG HF - adjustment of pre-gas

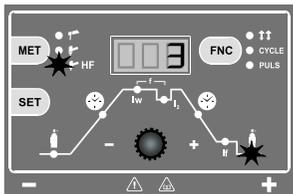
By pressing the button SET repeatedly, lit up LED diode (pic. 2, pos. 2). For about 6 seconds LED diodes remain glowing as shown in the picture. During this time the coder (pic. 2, pos. 18) can adjust time of pre-gas. Time is given in numbers 0,1 up to 10,0 and it is in seconds.

### Method TIG/TIG HF - adjustment of pulse frequency between upper and lower current

By pressing the button SET repeatedly, lit up at the same time LED diodes Iw and I2 (pic. 2 pos. 14 and 1). For about 6 seconds LED diodes remain glowing as shown in the picture. During this time the coder (pic. 2, pos. 18) can adjust value of pulse frequency. The value can be adjusted within the range of 0 up to 500 Hz.



SET



### Adjustment of two-cycle welding mode

If LED diode (pos. 11 pic. 2) is not on, function two-cycle is active. This function can be used with the connection with methods TIG and TIG HF and combined with function PULS. Function can be chosen by pressing the button FNC (pos. 10 pic. 2) repeatedly.



### Signalization of four-cycle function CYCLE

At the same time glowing LED diodes (pos. 11 a 12 pic. 2) signalise turning function four-cycle on with the connection with function CYCLE. This function can be used with the connection with methods TIG and TIG HF. Function is chosen by pressing the button FNC (pos. 10 pic. 2) repeatedly.



### Signalization of four-cycle function PULS

At the same time glowing LED diodes (pos. 11 a 13 pic. 2) signalise turning function four-cycle on with the connection with function PULS. This function can be used with the connection with methods TIG and TIG HF. Function is chosen by pressing the button FNC (pos. 10 pic. 2) repeatedly.



### Method TIG/TIG HF - adjustment of the second current value for cycle function four-cycle

By pressing the button SET repeatedly, lit up LED diode I2 (pic. 2, pos. 14). For about 6 seconds LED diodes remain glowing, as it is shown in the picture. During this time the value of the second current can be adjusted with the coder (pic. 2, pos. 18). The value can be adjusted from 5 A up to the adjusted value of maximum current of the machine. However, you cannot adjust more than the present welding current. Value is given in amperes.

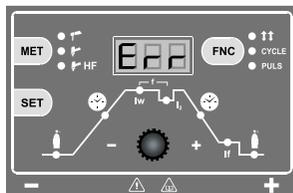
SET



**NOTE:** Adjusted values, except the value of welding current, cannot be changed during the welding process.

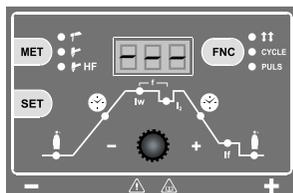
### Sign Err

The sign Err on the display means that there has been an activity of the temperature protection of the welding machine (overheating). The machine will not react to any button until the machine is cooled down and the temperature sensor switches on.



### Signaling ---

--- on the display it is signalised that function anti stick has been activated (limiting the welding current for the reason of output short-circuit), for example sticking of the electrode.



### WELDING PARAMETERS - METHOD MMA

Table no. 3 shows some general indications for the choice of electrode, based on the thickness of the part to be welded.

The values of current to use are shown in the table with the respective electrodes for the welding of common steels and low-grade alloys. These data have no absolute value and are indicative data only. For a precise choice follow the instructions provided by the electrode manufacturer. The current to be used depends on the welding positions and type of joint, and it increases according to the thickness and dimensions of the part.

Table 3

| WELDING THICKNES (mm) | ELECTRODE (mm) |
|-----------------------|----------------|
| 1,5-3                 | 2              |
| 3-5                   | 2.5            |
| 5-12                  | 3.25           |
| more than 12          | 4              |

In chart number 4 general values for electrode choice are given, depending on its diameter and the thickness of the basic material. Values of used current are given in the chart with particular electrodes for welding common steel and low-doped alloys. These values do not have an absolute value and they are informative only. For a precise choice refer to the instructions given by the electrode producer. The used current depends on the welding position and type of the weld and is increased according to the thickness and size of the part.

Table 4

| ELECTRODE (mm) | CURRENT (A) |
|----------------|-------------|
| 1.6            | 30-60       |
| 2              | 40-75       |
| 2.5            | 60-110      |
| 3.25           | 95-140      |
| 4              | 140-190     |
| 5              | 190-240     |
| 6              | 220-330     |

The current intensity to be used for the different types of welding, within the field of regulation shown in table 4 is:

- High for plane, frontal plane and vertical upwards welding
- Medium for overhead welding
- Low for vertical downwards welding and for joining small pre-heated pieces

A fairly approximate indication of the average current to use in the welding of electrodes for ordinary steel is given by the following formula:

$$I = 50 \times (e - 1)$$

WHERE:

I= intensity of the welding current

e= electrode diameter

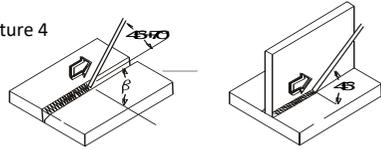
EXAMPLE:

For electrode diameter 4 mm

$$I = 50 \times (4 - 1) = 50 \times 3 = 150 \text{ A}$$

### Holding and position of the electrode during the welding

Picture 4



### Preparation of basic material:

Table 6 shows values for preparation of material. Sizes are determined according to picture 5.

Picture 5

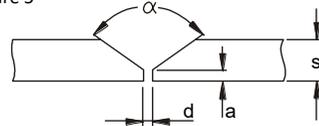


Table 6

| s (mm) | a (mm) | d (mm)    | α (°) |
|--------|--------|-----------|-------|
| 0-3    | 0      | 0         | 0     |
| 3-6    | 0      | s/2 (max) | 0     |
| 3-12   | 0-1.5  | 0-2       | 60    |

### WELDING BY TIG METHOD

Welding invertors 1500HF to 1900HF enable welding by TIG method with touch start and TIG HF with touchless start. Both methods enable welding in two-cycle time mode and four-cycle time mode.

### CONNECTING WELDING TORCH AND EARTHING CABLE

Turn on the welding torch on minus pole and the earthing cable on plus pole - direct polarity. Connect the gas hose in the gas quick coupler and then connect the connector. Connecting the connector on the welding torch should be given to the trained and qualified staff.

### CHOICE AND PREPARATION OF TUNGSTEN ELECTRODE

Chart 7 states values of welding current and diameter for tungsten electrode with 2% of thorium - red indicator of the electrode.

Table 7

| Diameter of electrode (mm) | Welding current (A) |
|----------------------------|---------------------|
| 1.0                        | 15-75               |
| 1.6                        | 60-150              |
| 2.4                        | 130-240             |

Tungsten electrode shall be prepared according to the values in table 8 and picture 6.

Picture 6

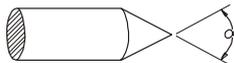


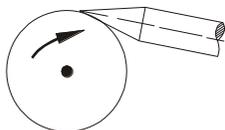
Table 8

| $\alpha$ (°) | Welding current (A) |
|--------------|---------------------|
| 30           | 0-30                |
| 60-90        | 30-120              |
| 90-120       | 120-250             |

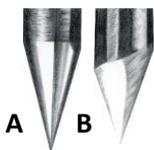
**Sharpening of tungsten electrode:**

By the right choice of tungsten electrode and its preparation we can influence qualities of welding arc, geometry of the weld and durability/service life of the electrode. It is necessary to sharpen the electrode softly in the traverse/horizontal direction according to picture 7.

**Picture 8** shows the influence of sharpening the electrode on its durability/service life.



Picture 7



Picture 8

**Picture 8A:** soft and well-proportioned sharpening the electrode in traverse/horizontal direction - durability up to 17 hours

**Picture 8B:** rough and irregular sharpening in vertical direction - durability up to 5 hours

Parameters for comparing the influence of the way of sharpening the electrode are given with the utilization:

HF striking the el. arc, electrodes  $\varnothing$  3.2 welding current 150 A and welding material pipe.

**PROTECTIVE GAS**

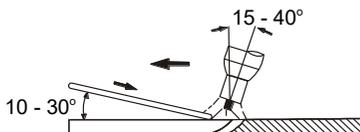
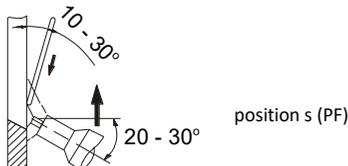
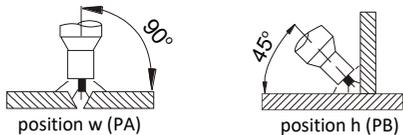
For welding by method TIG it is necessary to use Argon with the purity 99,99%. The amount of the flow shall be determined according to the table 9.

**DETERMINATION OF THE WELDING ELECTRODE**

Table 9

| Welding current (A) | Electrode $\varnothing$ (mm) | Welding nozzle |                    | Gas follow (l/min) |
|---------------------|------------------------------|----------------|--------------------|--------------------|
|                     |                              | n (°)          | $\varnothing$ (mm) |                    |
| 6-70                | 1.0                          | 4/5            | 6/8,0              | 5-6                |
| 60-140              | 1.6                          | 4/5/6          | 6,5/8,0/9,5        | 6-7                |
| 120-240             | 2.4                          | 6/7            | 9,5/11,0           | 7-8                |

**HOLDING OF THE WELDING TORCH DURING WELDING**



**PREPARATION OF BASIC MATERIAL**

In table 10 there are given values for preparing material. Sizes shall be determined according to picture 9.

Picture 9

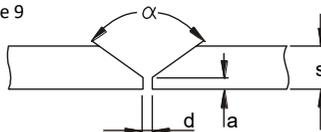


Table 10

| s (mm) | a (mm) | d (mm)    | $\alpha$ (°) |
|--------|--------|-----------|--------------|
| 0-3    | 0      | 0         | 0            |
| 3      | 0      | 0.5 (max) | 0            |
| 4-6    | 1-1.5  | 1-2       | 60           |

**BASIC RULES DURING WELDING BY TIG METHOD**

1. Purity - grease, oil and other impurities must be removed from the weld during welding. It is also necessary to mind purity of additional material and clean gloves of the welder during welding.
2. Leading additional material - oxidation must be prevented. To do so, flashing end of additional material must be always under the protection of gas flowing from the hose.
3. Type and diameter of tungsten electrodes - it is necessary to choose them according to the values of the current, polarity, type of basic material and composition of protective gas.
4. Sharpening of tungsten electrodes - sharpening the tip of the electrode should be done in trav-

erse/horizontal direction. The tinier the roughness of the surface of the tip is, the calmer the burning of the el. arc is as well as the greater durability of the electrode is.

5. The amount of protective gas - it has to be adjusted according to the type of welding or according to the size of gas hose. After finishing the welding gas must flow sufficiently long to protect material and tungsten electrode against oxidation.

### Typical errors of TIG welding and their influence on the quality of weld:

Welding current is too:

**Low:** unstable welding arc

**High:** damage of the tip of tungsten electrode causes broken burning of the arc.

Errors can be also caused by bad leading of the welding torch and bad adding of additional material.

### Prior to welding

**IMPORTANT:** before switching on the welder, check once again that the voltage and frequency of the power network correspond to the rating plate.

1. Adjust the welding current using the panel potentiometer (pos. 18 pic. 1).
2. Adjust the PROCESS switch (pos. 5 pic. 1) to the most suitable position according to the type of welding to be carried out.
3. Turn on the welder by selecting pos. 1 on the supply switch (pos. 18 pic. 1)
4. The display shows that the welder is switched on and ready to be operated.

### Maintenance

**WARNING:** Before carrying out any inspection of the inside of the generator, disconnect the system from the supply. Repairs on the welding machine can be carried out only by the staff with professional qualification!

### SPARE PARTS

Original spare parts have been specially designed for our equipment. The use of non-original spare parts may cause variations in performance or reduce the foreseen level of safety.

We decline all responsibility for the use of non-original spare parts.

### THE GENERATOR

As these systems are completely static, proceed as follows:

- Periodic removal of accumulated dirt and dust from the inside of the generator, using com-

pressed air. Do not aim the air jet directly onto the electrical components, in order to avoid damaging them.

- Make periodical inspections in order to individualize worn cables or loose connections that are the cause of overheating.
- Periodical revision inspection of the machines has to be done once in a half of year by an authorised staff in accord with CSN 331500, 1990 and CSN 056030, 1993.

### The pointing out of any difficulties and their elimination

The supply line is attributed with the cause of the most common difficulties. In the case of breakdown, proceed as follows:

1. Check the value of the supply voltage
2. Check that the power cable is perfectly connected to the plug and the supply switch
3. Check that the power fuses are not burned out or loose
4. Check whether the following are defective:
  - The switch that supplies the machine
  - The plug socket in the wall
  - The generator switch

**NOTE:** Given the required technical skills necessary for the repair of the generator, in case of breakdown we advise you to contact skilled personnel or our technical service department.

### Procedure for welder assembly and disassembly

Proceed as follows:

- Before dismantling the side covers, the lead-in cable must always be switched off from the mains socket outlet!
- Unscrew the 2 screws at the top and 4 screws in the both sides and take off the cover
- Proceed the other way round to re-assemble the welder.

### Ordering spare parts

For easy ordering of spare parts includes the following:

1. The order number of the part
2. The name of the part
3. The type of the machine or welding torch
4. Supply voltage and frequency from the rating plate
5. Serial number of the machine

**EXAMPLE:** 2 pcs., code 30451 ventilator, for machine 1500 HF, 1x230V 50/60Hz, serial number ...

Použité grafické symboly  
 Použité grafické symboly  
 Key to the graphic symbols  
 Verwendete grafische Symbole  
 Zastosowane symbole graficzne

|  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|
| 1   | 2   | 3   | 4   | 5   | 6   | 7   |
| 8   | 9 <b>PULS</b>  | 10 <b>CYCLE</b>  | 11  | 12  | 13 <b>I<sub>2</sub></b>  | 14 <b>If</b>   |
| 15 <b>lw</b>   | 16 <b>f</b>  | 17  | 18  | 19  | 20  | 21  |
| 22  | 23  | 24  | 25  |  |  |  |

|    | CZ - popis                                  | SK - popis                                    | EN - description                           | DE - Beschreibung                                     | PL - Opis   |
|----|---|---|--|---|---|
| 1  | Výstraha riziko úrazu elektrickým proudem   | Výstraha riziko úrazu elektrickým prúdom      | Warning risk of electric shock             | Warnung Risikounfall durch el. Strom                  | Ostrzeżenie - ryzyko porażenia prądem elektrycznym      |
| 2  | Mínus pól na svorce                         | Mínus pól na svorke                           | Negative pole snap-in connector            | Minuspol auf der Klemme                               | Biegun ujemny na listwie                                |
| 3  | Plus pól na svorce                          | Plus pól na svorke                            | Positive pole snap-in connector            | Pluspol auf der Klemme                                | Biegun dodatni na listwie                               |
| 4  | Ochrana zemněním                            | Ochrana zemením                               | Grounding protection                       | Erdungsschutz   | Ochrona uziemieniem                                     |
| 5  | Elektroda                                   | Elektróda                                     | Electrode                                  | Elektrode   | Elektroda   |
| 6  | TIG   | TIG   | TIG  | TIG   | TIG   |
| 7  | TIG HF                                      | TIG HF  | TIG HF                                     | TIG HF  | TIG HF  |
| 8  | Čtyřtakt                                    | Štvortakt                                     | Four-cycle                                 | 4-takt-funktion                                       | Czterotak   |
| 9  | Pulsace                                     | Pulzácie                                      | Pulsation                                  | Pulsation   | Pulsacja  |
| 10 | Přepínání mezi dvěma nastavenými proudy     | Prepínání medzi dvoma nastavenými prúdmi      | Switching between the two setting currents | Umschalten zwischen zwei eingestellten Schweißströmen | Przełączanie między dwoma nastawionymi prądami          |
| 11 | Předfuk, dofuk                              | Predfuk, dofuk                                | Pre-gas, post-gas                          | Gasvorströmung, Gasnachströmung                       | Dmuchięcie początkowe, dmuchięcie końcowe               |
| 12 | Časový průběh                               | Časový priebeh                                | Time path                                  | Zeitverlauf   | Przebieg czasowy  |
| 13 | Druhý proud                                 | Druhý prúd                                    | Second current                             | Zweitstrom  | Drugi prąd  |
| 14 | Koncový proud                               | Koncový prúd                                  | End current                                | Endstrom  | Prąd końcowy  |
| 15 | Svařovací proud                             | Zvárací prúd                                  | Welding current                            | Schweißstrom  | Prąd spawania   |
| 16 | Frekvence                                   | Frekvencie                                    | Frequency                                  | Frequenz  | Częstotliwość   |
| 17 | Likvidace použitého zařízení                | Likvidácie použitého zariadení                | Disposal of used machinery                 | Entsorgung der benutzten Einrichtung                  | Utylizacja zużytego urządzenia                          |
| 18 | Pozor nebezpečí                             | Pozor nebezpečenstvo                          | Caution danger                             | Vorsicht Gefahr                                       | Uwaga niebezpieczeństwo                                 |
| 19 | Seznamte se s návodem k obsluze             | Zoznámte sa s návodom k obsluhu               | Read service instructions                  | Lernen Sie die Bedienanweisung kennen                 | Proszę zapoznać się z Instrukcją Obsługi                |
| 20 | Zplodiny a plyny při svařování              | Spłodiny a plyny pri zváraní                  | Safety regarding welding fumes and gas     | Produkte und Gase beim Schweißen                      | Czynniki szkodzące i gazy powstające w trakcie spawania |
| 21 | Ochrana před zářením, popáleninami a hlukem | Ochrana pred žiarením, popáleninami a hlukom  | Protection from radiation, burns and noise | Schutz vor Strahlung, Brandwunden und Lärm            | Ochrona przed napromieniowaniem, oparzeniami i hałasem  |
| 22 | Zabránění požáru a exploze                  | Zabránenie požiaru a explóziei                | Avoidance of flames and explosions         | Brandverhütung und Explosionverhütung                 | Unikanie pożaru i wybuchu                               |
| 23 | Nebezpečí spojené s elektromagnet. polem    | Nebezpečenstvo spojené s elektromagnet. polom | Risks due electromagnetic fields           | Die mit electromagn. Strahlung verbundene Gefahr      | Niebezpieczeństwo związane z polem elektromagnetycznym  |
| 24 | Suroviny a odpad                            | Suroviny a odpad                              | Materials and disposal                     | Rohstoffe und Abfälle                                 | Surowce i odpad   |
| 25 | Manipulace a uskladnění stlačených plynů    | Manipulácie a uskladnení stlačených plynů     | Handling and stocking compressed gases     | Manipulation und Lagerung mit Druckgas                | Manipulacja i przechowywanie gazów sprężonych           |

**Grafické symboly na výrobním štítku**  
**Grafické symboly na výrobnom štítku**  
**Rating plate symbols**  
**Grafischen Symbole auf dem Datenschild**  
**Symbole graficzne na tabliczce produkcyjnej**

|   |                         |                            |                           |                           |      |       |
|---|-------------------------|----------------------------|---------------------------|---------------------------|------|-------|
|   |                         |                            |                           | 10                        |      |       |
|   |                         |                            |                           | 11                        |      |       |
| 3 | Type: 1900HF            | S.No.:                     |                           | 12                        |      |       |
| 4 |                         | ISO / IEC 60974-1 EN 50199 |                           | 13                        |      |       |
| 5 |                         | 10A/10.4V - 180A/17.2V     |                           | 14                        |      |       |
| 6 |                         | $U_0 = 85V$                | x                         | 45%                       | 60%  | 100%  |
|   |                         |                            | $I_2$                     | 180A                      | 150A | 110A  |
|   |                         |                            | $U_2$                     | 17,2V                     | 16V  | 14,4V |
|   |                         | $U_1 = 230V$               | $I_1 \text{ max} = 26A$   | $I_1 \text{ eff} = 17,4A$ |      |       |
|   | $1 \sim 50/60\text{Hz}$ |                            |                           |                           |      |       |
|   |                         | 10A/20.4V - 180A/27.2V     |                           | 15                        |      |       |
|   |                         | $U_0 = 85V$                | x                         | 45%                       | 60%  | 100%  |
|   |                         |                            | $I_2$                     | 180A                      | 150A | 110A  |
|   |                         |                            | $U_2$                     | 27,2V                     | 26V  | 24,4V |
|   |                         | $U_1 = 230V$               | $I_1 \text{ max} = 35,5A$ | $I_1 \text{ eff} = 23,8A$ |      |       |
|   | $1 \sim 50/60\text{Hz}$ |                            |                           |                           |      |       |
|   | WELDING MACHINE         | I.C.L. F                   | IP23S                     |                           | 9    |       |
|   |                         |                            |                           |                           | 8    |       |
|   |                         |                            |                           |                           | 7    |       |

|    | CZ - popis  | SK - popis  | EN - description   | DE - Beschreibung   | PL - Opis   |
|----|---|---|--|---|---|
| 1  | Jméno a adresa výrobce  | Meno a adresa výrobcu   | Name and address of manufacturer   | Name und Anschrift des Herstellers                            | Nazwisko i adres  |
| 2  | Typ stroje  | Typ stroje  | Name of the machine  | Gerätetyp   | Rodzaj maszynny   |
| 3  | Stejnoseměrný proud   | Stejnoseměrný prúd  | Direct current   | Gleichstrom   | Prąd stały  |
| 4  | Jmenovité napětí na prázdkno  | Menovité napätí na prázdno  | Secondary no-load voltage  | Nennleerlaufspannung  | Napięcie znamionowe bez obciążenia  |
| 5  | Jmenovité napájecí napětí   | Menovité napájací napätí  | Rated supply voltage   | Nenneingangsspannung  | Napięcie znamionowe zasilania   |
| 6  | Svařovací metoda  | Zvárací metóda  | Welding method   | Schweißverfahren  | Metoda spawania   |
| 7  | Vhodné pro svařování v prostředí se zvýšeným nebezpečím úrazu el. proudem | Vhodné pre zváraní v prostredí sa zvýšeným nebezpečenstvom úrazu el. prúdom | Appropriate for welding in setting with increased danger of electric shock | Geeignet für Schweißen unter erhöhter elektrischer Gefährdung | Nadaje się do spawania w środowisku z podwyższonym niebezpieczeństwem urazu prądem elektrycznym |
| 8  | Napájení  | Napájání  | Power supply   | Stromversorgung   | Zasilanie   |
| 9  | Svařovací inverter  | Zvárací invertor  | Welding inverter   | Inverterschweißgerät  | Inwertor spawalniczy  |
| 10 | Krytí   | Krytí   | Degree of protection   | Schutzgrad  | Stopień ochrony   |
| 11 | Třída izolace   | Trieda izolácie   | Insulation class   | Isolierungsklasse   | Klasa izolacji  |
| 12 | Max. jmenovitý napájecí proud   | Max. menovitý napájací prúd   | Max. rating supply current   | maximaler Nennversorgungsstrom                                | Maks. prąd znamionowy zasilania   |
| 13 | Max. činný napájecí proud   | Max. činný napájací prúd  | Max effective supply current   | maximaler effektiver Versorgungsstrom                         | Maks. prąd aktywny zasilania  |
| 14 | Normalizované pracovní napětí   | Normalizované pracovné napätí   | Normalized operating voltage   | Norm-Arbeitsspannung  | Znormalizowane napięcie robocze   |
| 15 | Jmenovitý svař. proud   | Menovitý zvárací prúd   | Rated welding current  | Nennschweißstrom  | Maks. prąd znamionowy zasilania   |
| 16 | Pracovní cyklus   | Pracovný cyklus   | Working cycle  | Arbeitszyklus   | Cykl roboczy  |
| 17 | Rozsah výstupu  | Rozsah výstupu  | Range of exit  | Ausgangsbereich   | Zakres wyjścia  |
| 18 | Normy   | Normy   | Standards  | Ausgangsbereich   | Normy   |
| 19 | Výrobní číslo   | Výrobné číslo   | Serial number  | Seriennummer  | Numer fabryczny   |

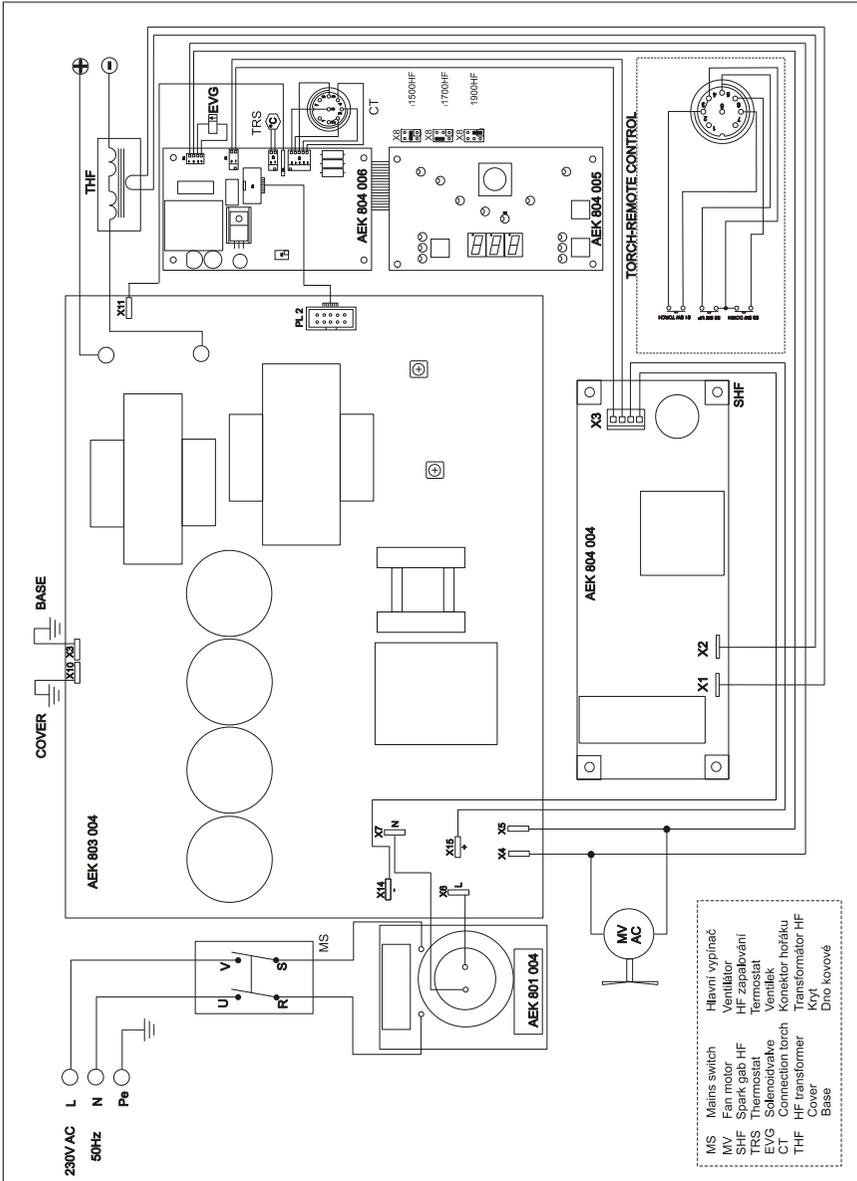
# Elektrotechnické schéma

# Elektrotechnické schéma

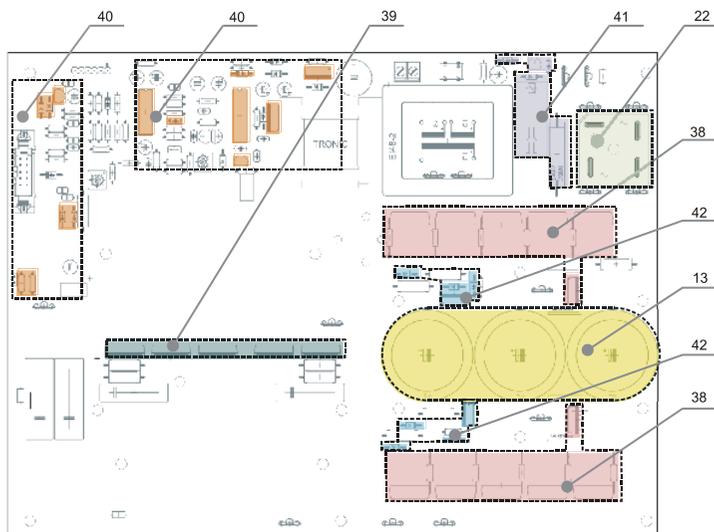
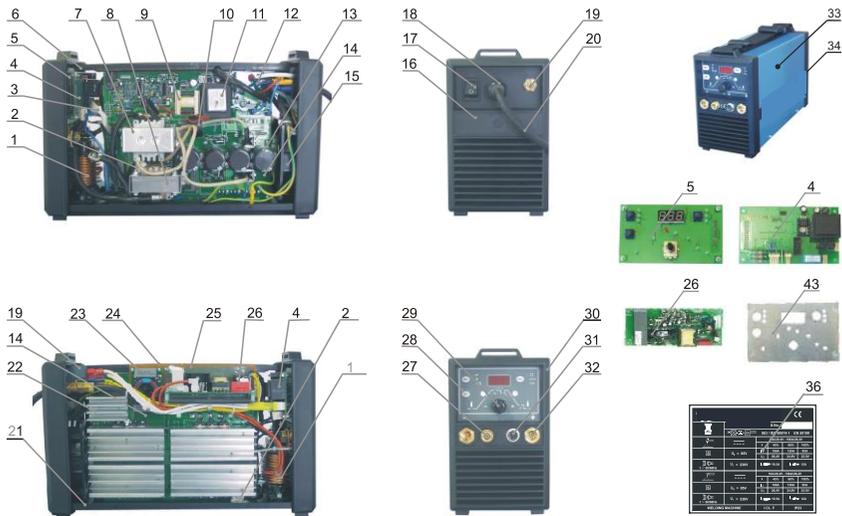
# Electrical diagram

# Schema

# Schemat elektrotechniczny



**Seznam náhradních dílů**  
**Zoznam náhradných dielov**  
**List of spare parts**  
**Ersatzteilliste**  
**Lista części zamiennych maszyn**



|    | <b>CZ - Seznam náhradních dílů</b>     | <b>SK - Zoznam náhradných dielov</b> | <b>EN - List of spareparts</b>          | <b>Code</b> |
|----|--|--------------------------------------|---|-------------|
| 1  | HF transformátor                       | HF transformátor                     | HF transformer                          | 31987       |
| 2  | Termostat                              | Termostat                            | Thermostat                              | 30150       |
| 3  | Propoj 10 pinový                       | Prepoj 10 pinový                     | 10 pin cable                            | 10539       |
| 4  | Plošný spoj AEK 804-006                | Plošný spoj AEK 804-006              | PCB AEK 804-006                         | 10283       |
| 5  | Plošný spoj AEK 804-005                | Plošný spoj AEK 804-005              | PCB AEK 804-005                         | 10339       |
| 6  | Výztuha (1500-1700 HF)                 | Výztuha (1500-1700 HF)               | Cross piece (1500-1700 HF)              | 10326       |
| 6  | Výztuha 1900 HF                        | Výztuha 1900 HF                      | Cross piece 1900 HF                     | 10506       |
| 7  | Transformátor hlavní                   | Transformátor hlavni                 | Main Transformer                        | 10150       |
| 8  | Tlumička                               | Tlmička                              | Inductor                                | 10117       |
| 9  | Transformátor budící                   | Transformátor budiaci                | Exciting transformer                    | 30403       |
| 10 | Transformátor měřicí                   | Transformátor merici                 | Feedback impedance transformer          | 10118       |
| 11 | Transformátor pomocný                  | Transformátor pomocny                | Auxiliary transformer                   | 40374       |
| 12 | Varistor                               | Varistor                             | Varistor                                | 40942       |
| 13 | Set filtračních kondenzátorů           | Set filtračných kondenzátoru         | Filter capacitors set                   | 10540       |
| 14 | Plošný spoj AEK 803-003 1500           | Plošný spoj AEK 803-003 1500         | PCB AEK 803-003 1500                    | 10352       |
| 14 | Plošný spoj AEK 803-003 1700           | Plošný spoj AEK 803-003 1700         | PCB AEK 803-003 1700                    | 10354       |
| 14 | Plošný spoj AEK 803-004 1900           | Plošný spoj AEK 803-004 1900         | PCB AEK 803-004 1900                    | 10418       |
| 15 | Ventilátor                             | Ventilátor                           | Fan                                     | 30451       |
| 16 | Čelo zadní                             | Čelo zadni                           | Rear panel                              | 10286       |
| 17 | Vypínač hlavní                         | Vypínač hlavni                       | Main switch                             | 30452       |
| 18 | Vývodka kabelová                       | Vývodka káblová                      | Main cable clamp                        | 30810       |
| 19 | Plynový ventil 220V                    | Plynový ventil 220V                  | Selenoid valve 220V                     | 30911       |
| 20 | Kabel přívodní s vidlicí 3x2,5         | Kábel prívodni s vidlici 3x2,5       | Mains cable 3x 2,5                      | 31064       |
| 21 | Dno HF plechové                        | Dno HF plechové                      | Base HF metal                           | 31882       |
| 22 | Můstek vstupní                         | Mostik vstupni                       | Primary bridge                          | 40945       |
| 23 | Plošný spoj filtr EMC + varisor        | Plošný spoj filter EMC + varisor     | PCB EMC filter + varistor               | 10387       |
| 24 | Podložka pod držák HF zapalovací       | Podložka pod držiak HF zapalovani    | Pillow under the HF ignition            | 10284       |
| 25 | Držák HF zapalování                    | Držiak HF zapalovani                 | HF sparkgap holder                      | -           |
| 26 | Plošný spoj HF zapalování              | Plošný spoj HF zapalovani            | Sparkgap HF PCB                         | 10416       |
| 27 | Plynová rychlospojka čelní             | Plynová rýchlospojka čelni           | Front gas quick connection              | 30825       |
| 28 | Samolepka čelní                        | Samolepka čelni                      | Front panel sticker                     | 31076       |
| 29 | Knoflík přístrojový HF                 | Gombik prístrojovy HF                | Current adjustment knob HF              | 30860       |
| 30 | Čelo přední                            | Čelo predni                          | Front panel                             | 10606       |
| 31 | Propoj konektoru hořáku                | Prepoj konektoru horaku              | Extation cable of connect of torch      | 10295       |
| 32 | Rychlospojka komplet 25mm <sup>2</sup> | Rýchlospojka komplet 25mm2           | Quick connection core 25mm <sup>2</sup> | 30409       |
| 33 | Kryt plechový HF                       | Kryt plechovy HF                     | Metal cover HF                          | 31883       |
| 34 | Samolepka boční 1500 HF                | Samolepka bočni 1500 HF              | Side sticker 1500 HF                    | 31055       |
| 34 | Samolepka boční 1700 HF                | Samolepka bočni 1700 HF              | Side sticker 1700 HF                    | 30916       |
| 34 | Samolepka boční 1900 HF                | Samolepka bočni 1900 HF              | Side sticker 1900 HF                    | 31071       |
| 36 | Samolepka výkonnostní 1500 HF          | Samolepka výkonnostni 1500HF         | Efficiency sticker 1500 HF              | 31057       |
| 36 | Samolepka výkonnostní 1700 HF          | Samolepka výkonnostni 1700HF         | Efficiency sticker 1700 HF              |             |
| 36 | Samolepka výkonnostní 1900 HF          | Samolepka výkonnostni 1900HF         | Efficiency sticker 1900 HF              | 31070       |
| 38 | Set N-MOSFET                           | Set N-MOSFET                         | N-MOSFET set                            | 10546       |
| 39 | Set výstupního usměrňovače             | Set výstupného usmerňovače           | Output rectifier set                    | 10550       |
| 40 | Set řídicí elektroniky                 | Set riadiaci elektroniky             | Driving control set                     | 10552       |
| 41 | Set ochranného obvodu                  | Set ochranného obvodu                | Protection circuit set                  | 10543       |
| 42 | Set buzení výkon. tranzistorů          | Set budeni výkon. tranzistoru        | Exciting set                            | 10553       |
| 43 | Panel čelní displej                    | Panel čelni displej                  | Front panel display                     | 10290       |
|    | Konektor invertoru                     | Konektor invertoru                   | Connector of inverter                   | 31162       |
|    | Konektor hořáku                        | Konektor horaku                      | Connector of torch                      | 31374       |

**Osvědčení o jakosti a kompletnosti výrobku / Osvedčenie o akosti a kompletnosti výrobku**  
**Testing certificate / Qualitätszertifikat des Produktes / Deklaracja Jakości i Kompletności**

|  |   |                                  |                                  |
|--|---|----------------------------------|----------------------------------|
| Název a typ výrobku<br>Názov a typ výrobku<br>Type   | <input type="checkbox"/> 1500 HF  | <input type="checkbox"/> 1700 HF | <input type="checkbox"/> 1900 HF |
| Benennung und Typ<br>Nazwa i rodzaj produktu   | <input type="checkbox"/> KITin  | <input type="checkbox"/> TIGER   |                                  |
| Výrobní číslo stroje:<br>Výrobné číslo stroje:<br>Serial number:<br>Herstellungsnummer der Maschine:<br>Numer produkcyjny maszyny: | Výrobní číslo PCB:<br>Výrobné číslo PCB:<br>Serial number PCB:<br>Herstellungsnummer PCB:<br>Numer produkcyjny PCB: |                                  |                                  |
| Výrobce / Výrobca<br>Producer / Produzent<br>Producent   |   |                                  |                                  |
| Razítko OTK<br>Pečiatka OTK<br>Stamp of Technical Control Department<br>Stempel der technische Kontrollabteilung<br>Pieczętka OTK  |   |                                  |                                  |
| Datum výroby / Dátum výroby<br>Date of production / Datum der Produktion /<br>Data produkcji                                       |   |                                  |                                  |
| Kontroloval / Kontroloval<br>Inspected by / Geprüft von<br>Sprawdził   |   |                                  |                                  |

**Záruční list / Záručný list / Warranty certificate / Garantieschein / Karta Gwarancyjna**

|  |  |
|--|--|
| Datum prodeje / Dátum predaja<br>Date of sale / Verkaufsdatum<br>Data sprzedaży  |  |
| Razítko a podpis prodejce<br>Pečiatka a podpis prodajca<br>Stamp and signature of seller<br>Stempel und Unterschrift des Verkäufers<br>Pieczętka i podpis sprzedawcy |  |

**Záznam o provedeném servisním zákroku / Záznam o prevedenom servisnom zákroku / Repair note**  
**Eintrag über durchgeführten Serviceingriff / Zapis o wykonaniu interwencji serwisowej**

|   |  |  |  |
|---|--|--|--|
| Datum převzetí servisem<br>Dátum prevzatia servisom<br>Date of take-over<br>Datum Übernahme durch<br>Servisabteilung<br>Data odbioru przez serwis | Datum provedení opravy<br>Dátum prevedenia opravy<br>Date of repair<br>Datum Durchführung der Re-<br>paratur<br>Data wykonania naprawy | Číslo reklamač. protokolu<br>Číslo reklamač. protokolu<br>Number of repair form<br>Nummer des Reklamations-<br>protokoll<br>Numer protokotu reklamacyj | Podpis pracovníka<br>Podpis pracownika<br>Signature of serviceman<br>Unterschrift von Mitarbeiter<br>Podpis pracownika |
|   |  |  |  |
|   |  |  |  |
|   |  |  |  |



Výrobce si vyhrazuje právo na změnu.  
Výrobca si vyhradzuje právo na zmenu.  
The producer reserves the right to modification.  
Hersteller behaltet uns vor Recht für Änderung.  
Producent zastrzega sobie prawo do zmian.