

Operation manual

Inverta Puls IP6 – 2 ACT



May 2013
REV 2.0



CONTENT

1	PREFACE	4
1.1	PRODUCT INTRODUCTION	4
1.2	ASSEMBLY REQUIREMENTS	4
1.3	SELECTING THE ACCESSORIES	4
2	PUTTING INTO OPERATION	5
2.1	CONNECTING TO THE ELECTRIC NETWORK.....	5
2.2	CONNECTING THE MIG/MAG TORCH.....	5
2.3	SELECTING THE FEEDING WHEEL	6
2.4	CONNECTING THE PRESSURE BOTTLE CONTAINING PROTECTIVE GAS	6
2.5	CONNECTING THE RETURN CABLE.....	7
2.6	MMA – TIG WELDING CONNECTION	7
2.7	WELD AREA PREPARATION	7
3	SAFETY AND FIRE INSTRUCTION	8
3.1	PROTECTION	8
3.2	REMOVING THE FIRE HAZARD	8
3.3	HANDLING THE PRESSURE BOTTLES.....	9
3.4	PROTECTION AGAINST ELECTRICAL ACCIDENTS.....	9
3.5	EXTRAORDINARY MENACE DURING WELDING.....	9
4	OPERATION	10
4.1	TURNING THE DEVICE ON	10
4.1.1	<i>Power-on sequence</i>	10
4.2	OPERATING PANEL.....	10
4.2.1	<i>Manual wire inching & Gas testing</i>	11
4.2.2	<i>Welding mode selection</i>	11
4.2.3	<i>Welding process selection</i>	11
4.2.4	<i>Filler wire material selection</i>	11
4.2.5	<i>Filler wire diameter selection</i>	11
4.3	SET UP, ADJUSTMENT AND DISPLAY DESCRIPTION	12
4.3.1	<i>Material thickness window</i>	12
4.3.2	<i>Amperage window</i>	12
4.3.3	<i>Voltage window</i>	12
4.3.4	<i>Wire speed window</i>	12
4.4	JOB MODE	13
4.4.1	<i>Editing / saving the JOB</i>	13
4.5	MENU	14
4.5.1	<i>List of MENU parameters</i>	14
4.6	SELECTING THE ACTIVE FEEDER	15
4.7	PARAMETERS SETUP FOR DIFFERENT FEED UNITS	15
4.8	2-TACT MODE / 4-TACT MODE.....	15
4.9	NO ARC TIMEOUT	16
4.10	SPECIAL PULSE PARAMETERS ADJUSTMENT	16
5	CARE AND MAINTENANCE	17
5.1	DISPOSAL OF THE MACHINE.....	17

6 TECHNICAL DATA 18

7 TROUBLESHOOTING 19

1 PREFACE

Dear customer!

Congratulation to purchasing of this quality inverter welding machine. Please read whole Operation manual before you start.

1.1 Product introduction

Inverta Puls IP6 -2 welding machine is compact pulse MIG-MAG welding inverter especially developed for car body repair. The unique benefit is double wire feed unit which together with its excellent brazing characteristic as well as good aluminum welding possibilities enables to use this device to repair all kinds of vehicles with fine quality results.

Be aware of danger resulted from welding and follow the safety and fire instructions (see the Part 7).

It is necessary to keep the device on a dry place, to protect device against moisture. It is not advisable to use the device on the open air during rain.

1.2 Assembly requirements

It is necessary to set the device for welding in protection atmosphere on a dry place with the sufficient area for cooling. The device is designed for use in covered area (under roof).

1.3 Selecting the accessories

Before using the machine, please make sure it was not damaged during transport!

All accessory equipment parts are present in the package or in wire feeding area.

List of accessories:

- front wheels set.....1pc
- rear wheel.....2pcs
- rear shaft.....1pc
- gas hose.....1pc
- belt for gas bottle fixing.....2pcs
- screw M10x35.....4pcs
- spring washer M10.....4pcs
- plain washer M10.....4pcs
- plain washer M24.....2pcs
- splint 3.5x40.....2pcs



2 PUTTING INTO OPERATION

2.1 Connecting to the electric network

Check if the voltage stated on the device label complies with rated voltage of alternate voltage of your electric network.

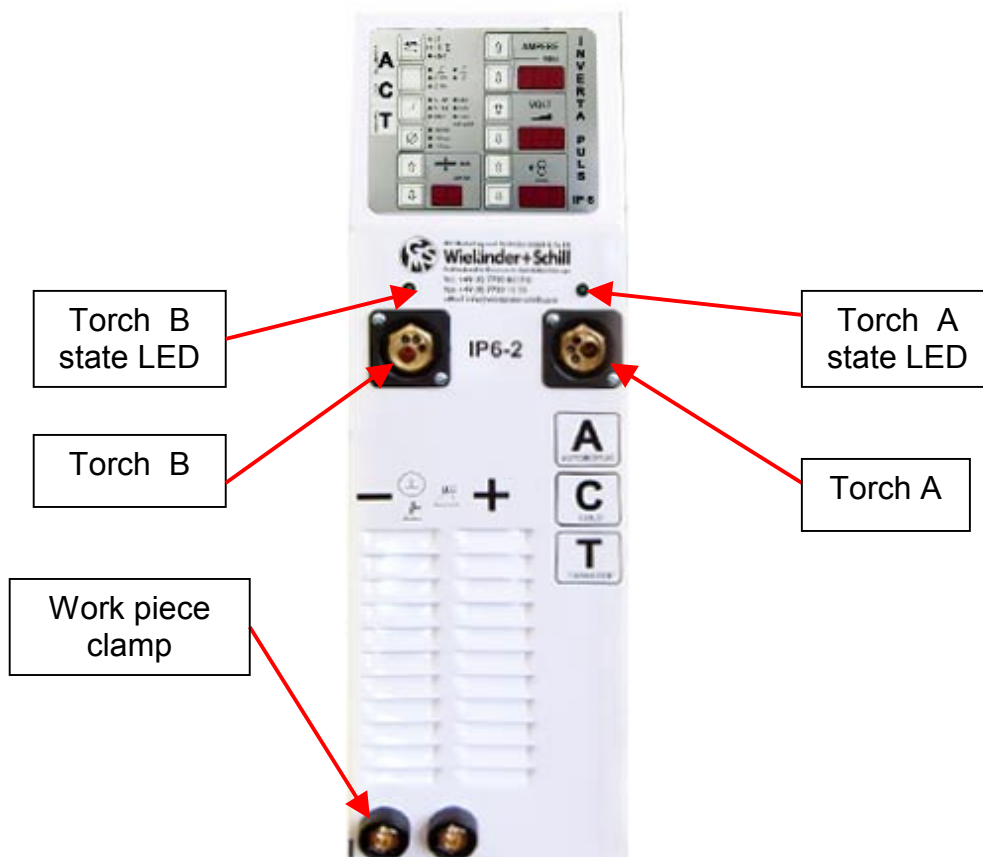
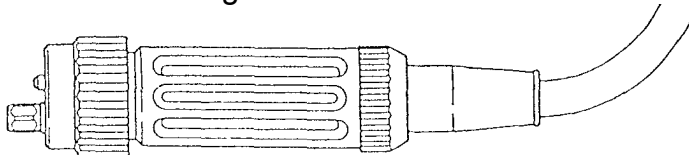
The device can be connected to electric socket equipped with protective contact installed by authorized electrician. Current circuit of socket must be protected with 16Amp melting safety fuse or circuit breaker.

The device is delivered without plug. For connections can be used only plugs and sockets according to CEE standard.

2.2 Connecting the MIG/MAG torch

For torch connecting is used EURO Standard torch connector.

Please, tighten the connector well to eliminate the conduction losses. A loose connection can cause damage of the machine and torch.

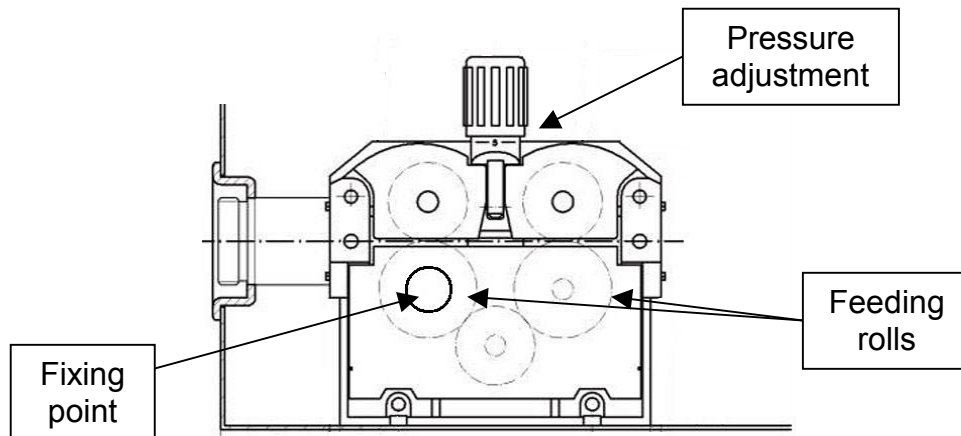


Never use damaged torch!

Make sure the contact tip match the manufacturer’s recommendations for type and diameter of used wire. Connect the welding conduction main connecting plug into the main socket on the front side. Secure it with the lock nut.

In case Teflon liner is used is it necessary to use contact neck liner out of brass to provide good current conduction to the fill wire.

2.3 Selecting the feeding wheel



Please choose the feeding rolls correspond to used welding wire.

Materials	Shape	φ	Ordering Nr.
Fe, SS, CuSi, CuAl		0.6/0.8mm	E017100008
		0.8/1.0mm	E017100015
		1.0/1.2mm	E017100018
		1.2/1.6mm	E017100009
CuSi, CuAl, Al		1.0/1.2mm	E017100010
		1.2/1.6mm	E017100017
		1.6/2.4mm	E017100011
Fe, MC, FC		1.0/1.2mm	E017100055
		1.2/1.6mm	E017100056

When the feeding wheel is set up, you can see on the front side of wheel the assigned welding wire diameter (value is in mm).

2.4 Connecting the pressure bottle containing protective gas

Make sure You are using right gas according welded material (see part 3.3.5)

Set the pressure bottle to the stand intended for it and fasten it by belt to the holder on the back side of the device. Open a cover and after that open the bottle valve for a short time in order that the gas flows away from your body. Screw a reduction valve on the pressure

bottle. Connect a hose to the MIG-MAG welding device reduction valve. The recommended gas flow is 8 – 15 liter/minute in a room without draft.

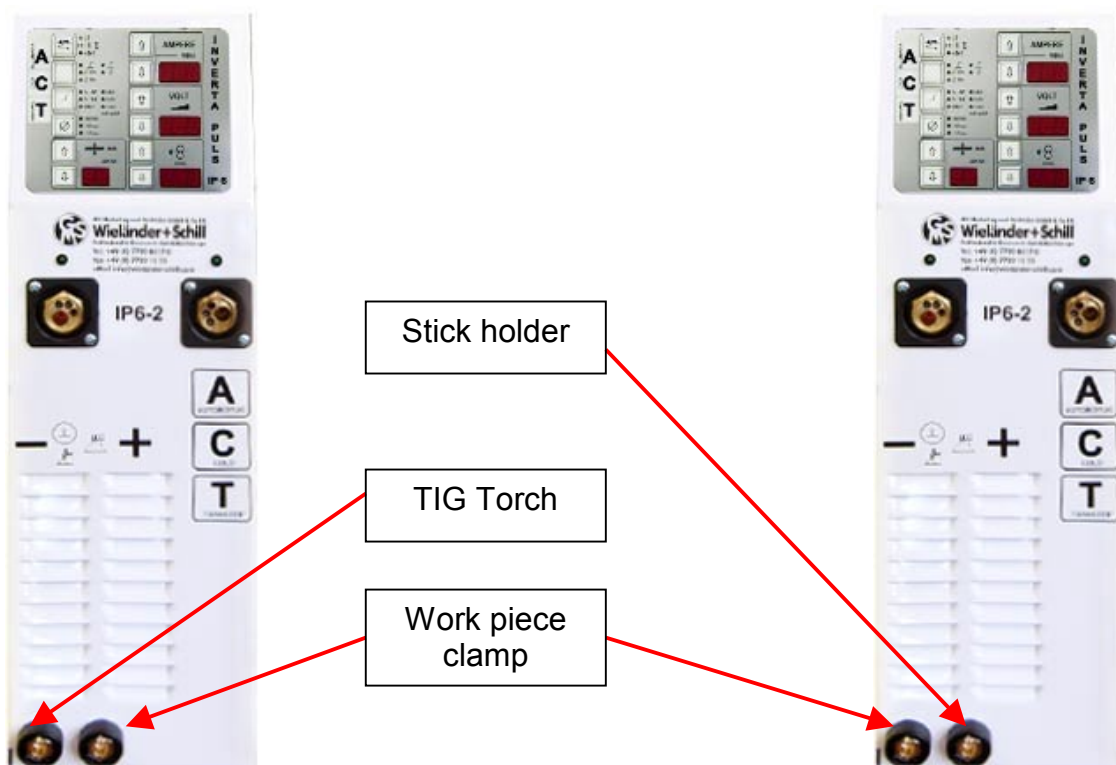
If you use an adjustable reduction valve, you can adjust a gas flow with a wing nut with a liter scale. The device must be turned on and Gas-check function activated the welding button must be pressed during adjustment.

It is not allowed to repair pressure valves. It is necessary to send the defective reduction valves to service.

2.5 Connecting the return cable

It is necessary to connect the grounding clamp in the very vicinity of welded place. The transfer contact must be metallic clear free of dust and color.

2.6 MMA – TIG welding connection



TIG Connection

MMA Connection

2.7 Weld area preparation

A work piece must be clean in the welding area, free of paint, metallic coat, dirt, rust, fat and moisture. The preparation of weld must be according to technical instructions for welding.

3 SAFETY AND FIRE INSTRUCTION

Keep this device out from children. You have to follow the safety and fire instruction when you work with welding device for welding in protective atmosphere. Regulations for preventing of accidents during "welding, cutting and similar working activities".

3.1 Protection

A welder should wear a closed and dry working dress (non-flammable welding dress is the best), firm insulating shoes (jackboots), cap and leather sleeve gloves.

- Clothing made from synthetic materials and half shoes are improper.
- Insulating gloves on the both hands protect against electricity (welding circuit no load run), harmful radiation (heat and U.V. radiation), and also against flaming metal and slag drops. The effect of U.V. radiation on the uncovered body parts is similar as sunburn.

It is necessary to wear an appropriate eye protection against sparks, heat, visible and invisible radiation (protective shield or protective helmet equipped with protective glass from the 10-th to 15-th grade according to DIN 4647 standard, depending on used current).

- Do not look into an electric arc with unprotected eyes (you can go blind or you can burn). Invisible U.V. radiation causes a very painful eye conjunctiva inflammation without eyes protection, which rises even after couple of hours.
- Weld nearby the other persons, which are able to help you fast in a case of emergency. .
- The persons or assistants present nearby an electric arc have to be advised about hazard and must be equipped with a necessary protective equipment.
- A working places situated in the neighborhood have to be protected with proper shields against radiation.
- It is necessary to ensure air supply and exhaustion in closed rooms and buildings. The toxic vapors evaporate from metal coats and anticorrosive paints due to heat from the electric arc during welding.

3.2 Removing the fire hazard

Follow this instructions before welding starts:

- Remove inflammable materials and objects in 5 meter ring from the welding place.
- The inflammable materials and objects which could not be removed must be protected by covering with steel plates, wet rags etc...
- It is necessary to cover or tighten the holes, cracks in walls etc... due to uncontrollable sparking.
- Prepare the fire extinguisher, bucket of water etc...
- Be conscious of possibility of hidden fire on covered objects or in another rooms due to heat transfer.
- After finishing of welding check up the welding place for smoking parts or small fires in the time interval up to 6 or 8 hours.

3.3 Handling the pressure bottles

You have to follow respective safety regulations (technical regulations for pressure gas TRG 253 and 303).

Due to high pressure inside the bottles (up to 200 bar) it is necessary to secure them against mechanical damage, overturning, downfall, heating up (max 50°C), against sunshine exposure for a longer time and against strong frost.

- When the MIG/MAG device is being equipped with pressure bottle, you have to keep on mind that the bottle could cause overturn of device on an uneven surface. To prevent this kind of accident you should use an appropriate pressure bottles.
- Filling of the bottles is allowed only by specialized companies.

3.4 Protection against electrical accidents

It is not allowed to carry the torch under armpit or to hold it in such way, that a current could flow through human body. The device must be turned off during the longer breaks. When the welding is finished and before moving, the device must be un-plugged from the power supply. It is necessary to cut immediately off the power supply in a case of accident.

To prevent uncontrollable welding back current you have to connect the welding supply directly to the work piece by working clamp. The pipes, steel constructions etc... must not be „electric conductors“ in any case, if they are not welded themselves.

Follow this instructions in any case:

The welding current must not have any conductive connection with protective or zero conductor of the power supply network. Because the protective contact of power supply is connected to welding device, you must not put the grounding clamp down on the welding device body, when the device is connected to power supply network. The workpiece must be insulated from power supply protective and zero conductor and from the grounding conductor.

3.5 Extraordinary menace during welding

- It is not allowed to weld in the rooms with increased danger of fire or explosion. The special regulations must be followed in this areas.
- It is not allowed to weld in the tanks for gas, fuel, oil, paint etc..., even if they are empty for a long time. The remnant of content could cause an explosion.
- The welds exposed to an extraordinary strain must comply to strict safety regulations and can be welded only by trained and examined welders (e.g. pressure tanks, rails, drawing devices for cars, supporting structures).

4 Operation

4.1 Turning the device ON

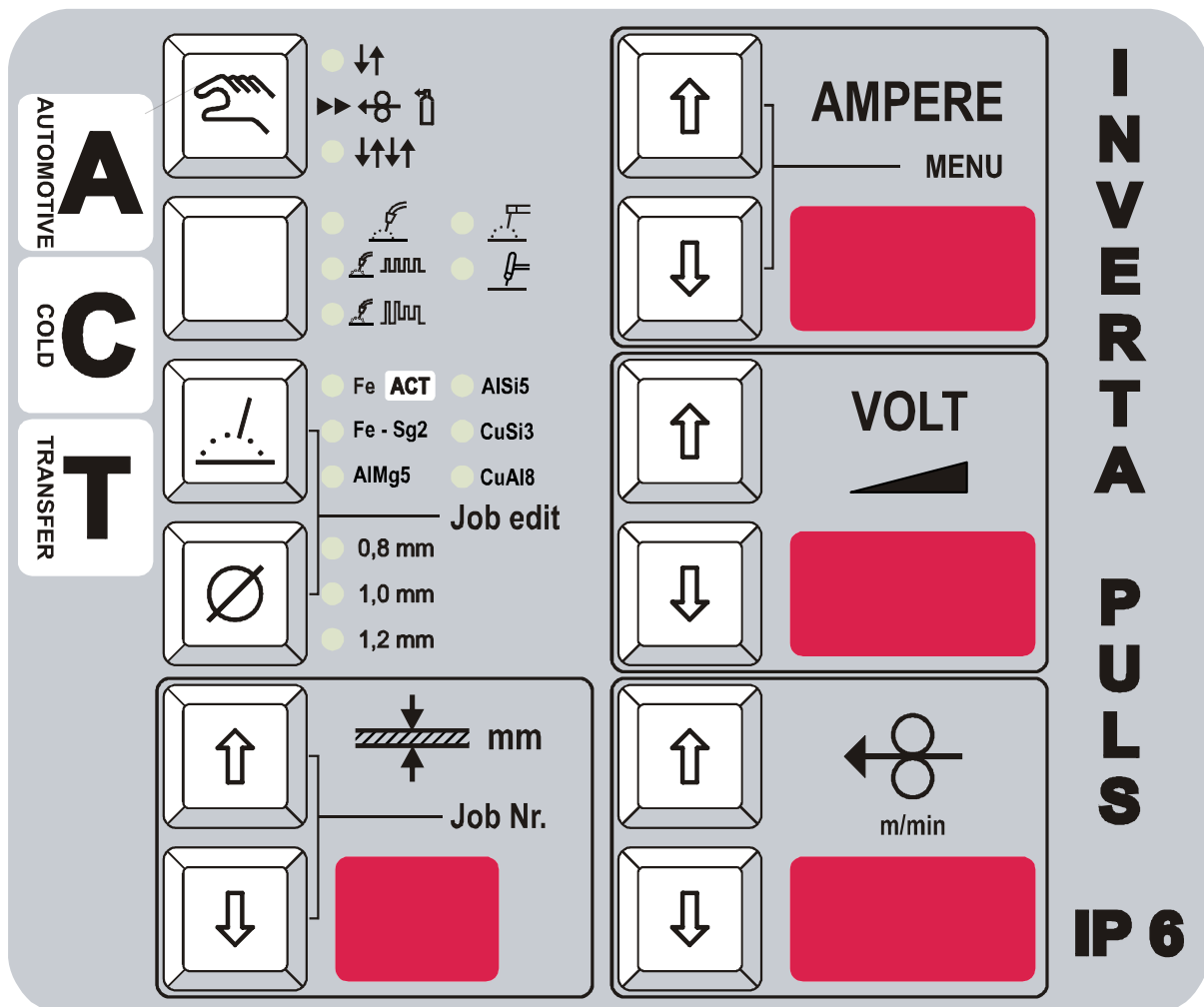
Always use the main switch on the back side of the machine to turn On and Off the device, never use the power plug for this purpose!

4.1.1 Power-on sequence

After powered special power on sequence is started on the operating panel, to give the user information about the firmware. First all segments are lighted up, than after following information are displayed:

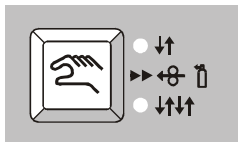
- a) **Firmware type** (in material thickness window)
DA – Digital Automotive
- b) **Amperage rating** (in Ampere window)
270 – 270Amp
- c) **Supply voltage** (in Voltage window)
400 – 400V/50-60Hz
- d) **Firmware revision** (in wire speed window)
r11 major . minor revision numbers.

4.2 Operating Panel



4.2.1 Manual wire inching & Gas testing

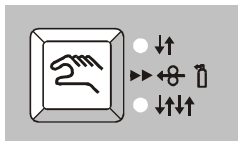
(Not available if MMA/TIG selected)



Manual wire inch mode is activated by pressing the Mode button for 2sec. In wire speed window is possible to adjust the speed for manual feed. Feeding is activated by pressing the trigger button. If the Mode button is pressed again, the Gas test function is active. Gas valve is activated by pressing the trigger button.

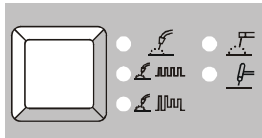
4.2.2 Welding mode selection

(Not available if MMA/TIG selected)



- ↕↕ - Two cycle mode
- ↕↕↕↕ - four cycle mode

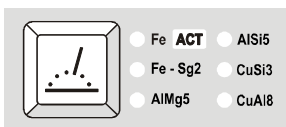
4.2.3 Welding process selection



- Standard MIG/MAG process
- Pulsed MIG/MAG Process
- MIG/MAG Double Pulse
- MMA welding process
- TIG welding with Lift Arc ignition

4.2.4 Filler wire material selection

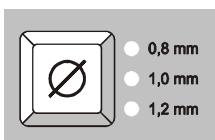
(Not available if MMA/TIG selected)



- Fe ACT** - Standard, not alloyed steel, shielding gas: 82%Ar + 18%CO₂
- FeSg2** - Standard, not alloyed steel, shielding gas: 82%Ar + 18%CO₂
- AlMg5** - Aluminum + 5% magnesium, shielding gas: 100%Ar
- AISi5** - Aluminum + 5% silicium, shielding gas: 100%Ar
- CuSi3** - Copper silicium wire, shielding gas: 100%Ar
- CuAl8** - Copper aluminum wire, shielding gas: 100%Ar

4.2.5 Filler wire diameter selection

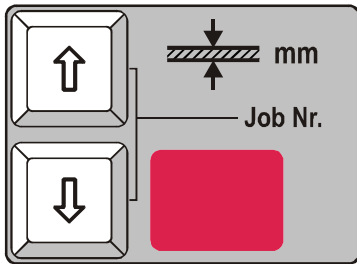
(Not available if MMA/TIG selected)



- 0,8mm**
- 1,0mm**
- 1,2mm**

4.3 Set up, adjustment and display description

4.3.1 Material thickness window

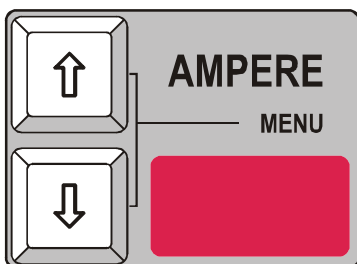


To have an advance of synergy functionality must be welding power set by setting up the material thickness. Pre-programmed synergy tables are supposed for flat butt weld.

By setting up the material thickness all appropriate values are automatically set and can be check in Amperage, Voltage and Wire speed windows.

In case higher / lower power is needed adjust the material thickness in needed direction to increase or decrease welding power.

4.3.2 Amperage window

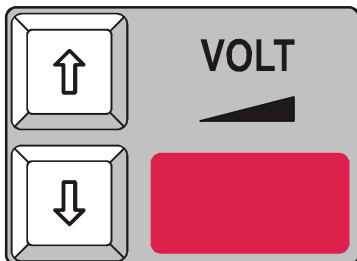


In MMA/TIG mode is it possible to adjust welding current in this window.

In the MIG modes is shown welding current in this window, but it is not possible to adjust it. **Please use Material thickness to adjust the current.**

During welding is actual values of the current displayed and held after stopping the weld.

4.3.3 Voltage window

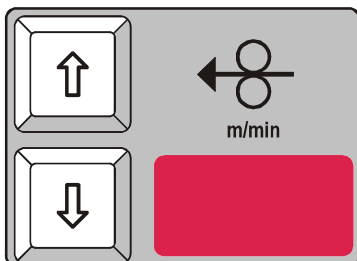


There is welding voltage shown on this display.

In the MIG modes is possible to adjust the welding voltage, but after different point is chosen from synergy tables (material thickness is changed, or material...) the adjusted value is overwritten by default value.

During welding is actual values of the Voltage displayed and held after stopping the weld in this display.

4.3.4 Wire speed window

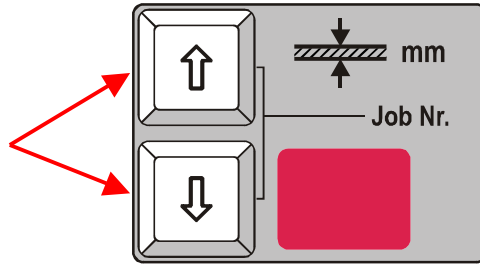


In all MIG modes is wire speed value shown in this value. There is possible to adjust the speed of the filling wire, but after different point is chosen from synergy tables (material thickness is changed, or material...) the adjusted value is overwritten by default value.

In MMA and TIG mode the displays remains empty.

4.4 JOB Mode

Press both buttons simultaneously to enter to the job mode



After entered to the Job mode, actual job number is shown in the Material thickness window - as example J1.

There is 10 jobs available: J0 – J9. By pressing the Up/Down keys in Material thickness window You can choose wanted job.

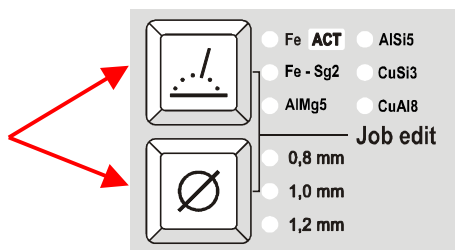
While in JOB mode, there are no set up and adjustments available except the JOB number and welding mode. If adjustment is required, JOB editing must be activated – see following section

To quit from JOB mode press Up/Down keys in Material thickness window simultaneously again.

4.4.1 Editing / saving the JOB

Select the JOB number, You want to edit, than after press Material Button together with wire diameter button to eddit actual JOB.

Press both buttons simultaneously to edit/save actual job



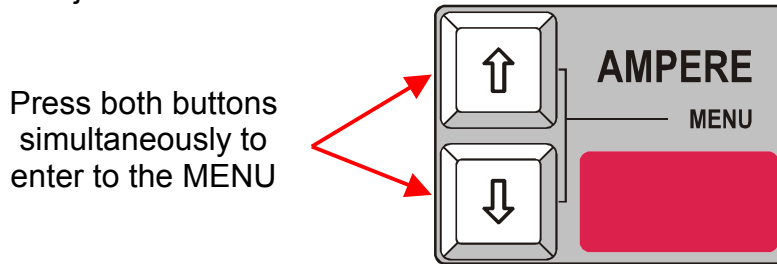
After entered to the editing, in the Material thickness window start to flash the material thickness. From this point You can operate with the panel the same way as in normal mode (select the welding process, Filler material, wire diameter, material thickness). There can be made adjustment of all possible parameters.

If all adjustments are finished, JOB can be stored. Saving of the job is done by pressing The Material Button together with wire diameter button again.

After saving all changes and adjustments, which was done are stored to appropriate JOB number.

4.5 MENU

For enhanced adjustment is available MENU function.



4.5.1 List of MENU parameters

Par. Nr	Displayed Name	Description	Min.	Max.	Step	Unit	MIG	Pulse MIG	Double Pulse MIG	MMA	TIG
11	Arc	Arc length trimming	-30,0	30,0	1	%	X	X	X	-	-
12	GPr	Gas pre-flow time	0,0	10,0	0,1	sec	X	X	X	-	-
13	GPo	Gas post-flow time	0,0	10,0	0,1	sec	X	X	X	-	-
14	cSS	Creep start speed	1,5	22,0	0,1	m/min	X	X	X	-	-
15	hSL	Hot-start level	100	199	1	%	X	X	X	X	-
16	cFL	Crater-fill level	1	100	1	%	X	X	X	-	-
17	hSt	Hot-start time	0,0	10,0	0,1	sec	X/-	X/-	X/-	X	-
18	cFt	Crater-fill time	0,0	10,0	0,1	sec	X/-	X/-	X/-	-	-
21	L	Inductance trimming	-9,0	9,0	1	-	X	-	-	-	-
22	EPL	End pulse voltage	10,0	50,0	0,1	V	X	-	-	-	-
23	EPT	End pulse time	1	100	1	msec	X	-	-	-	-
24	bbt	Burn-back time	10	250	1	msec	X	X	X	-	-
31	PF	Pulse frequency	10	500	1	Hz	-	X	X	-	-
32	PL	Pulse length	0,10	3,50	0,05	msec	-	X	X	-	-
33	Prr	Peak rise rate	1	10	1	-	-	X	X	-	-
34	PFr	Peak fall rate	1	10	1	-	-	X	X	-	-
35	bcL	Base current level	10	500	1	A	-	X	X	-	-
36	FcL	Fall current level	10	500	1	A	-	X	X	-	-
41	dPF	Double pulse frequency	0,5	5	0,1	Hz	-	-	X	-	-
42	dPA	Double pulse amplitude	5	95	1	%	-	-	X	-	-
61	cLc	Cable length compensation	0,0	25,0	0,1	m	X	X	X	-	-
62	CoL	Water cooling unit installed	No	Yes	-	-	X	X	X	-	X

4.6 Selecting the active feeder

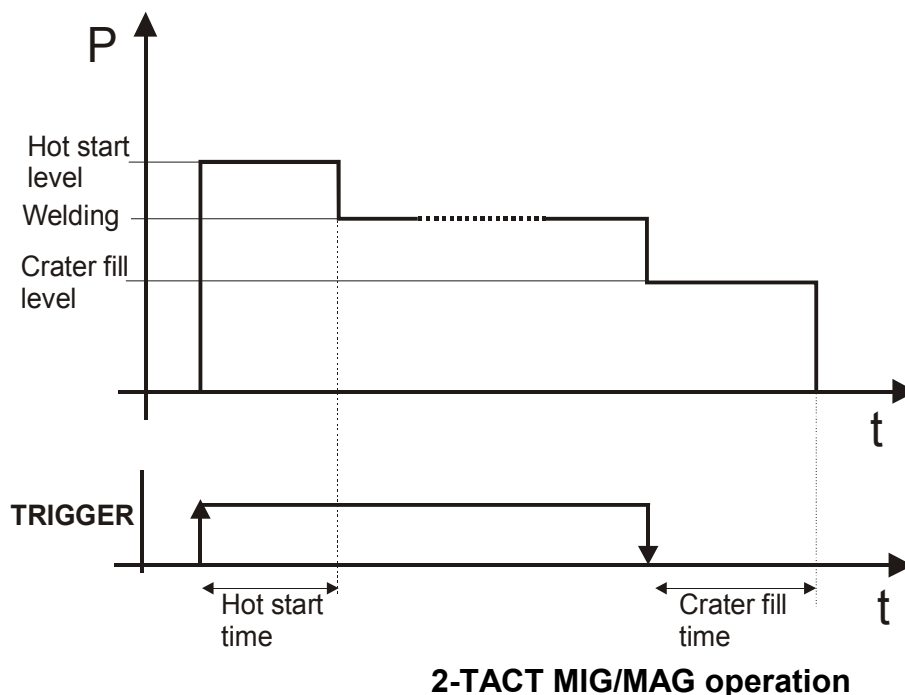
Active feed unit selection is indicated by LED indicator above the corresponding euro torch connector. To switch the idle feed unit on, must be just pressed the trigger button on the corresponding torch. By pressing the trigger button on the not active feed unit, it will switch to active state with automatic up-loading of all appropriate settings on the front panel. After releasing the torch button and pressing it again the welding process will start.

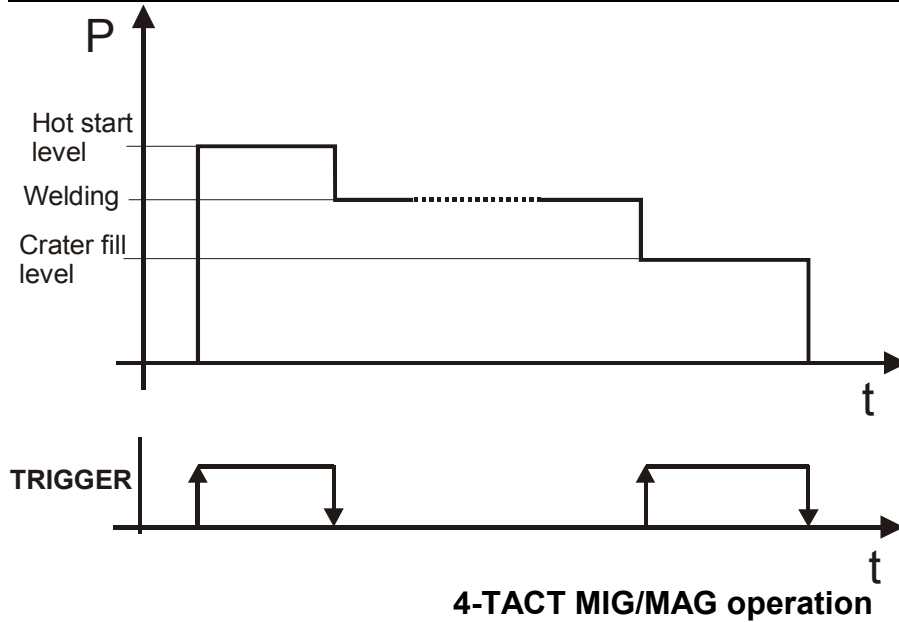
4.7 Parameters setup for different feed units

There can be made specific setup for each feed unit. All settings made on the front panel are belonging to the active feed unit and will be stored in internal memory in case of switching the feed unit to idle state or switching the machine off. Always if some setup should be done, the feed unit must be set as active.

4.8 2-TACT mode / 4-TACT mode

2-TACT/4-TACT relates to the function of starting button (trigger) on the welding torch. Differences in operation of this two modes are shown in following pictures:



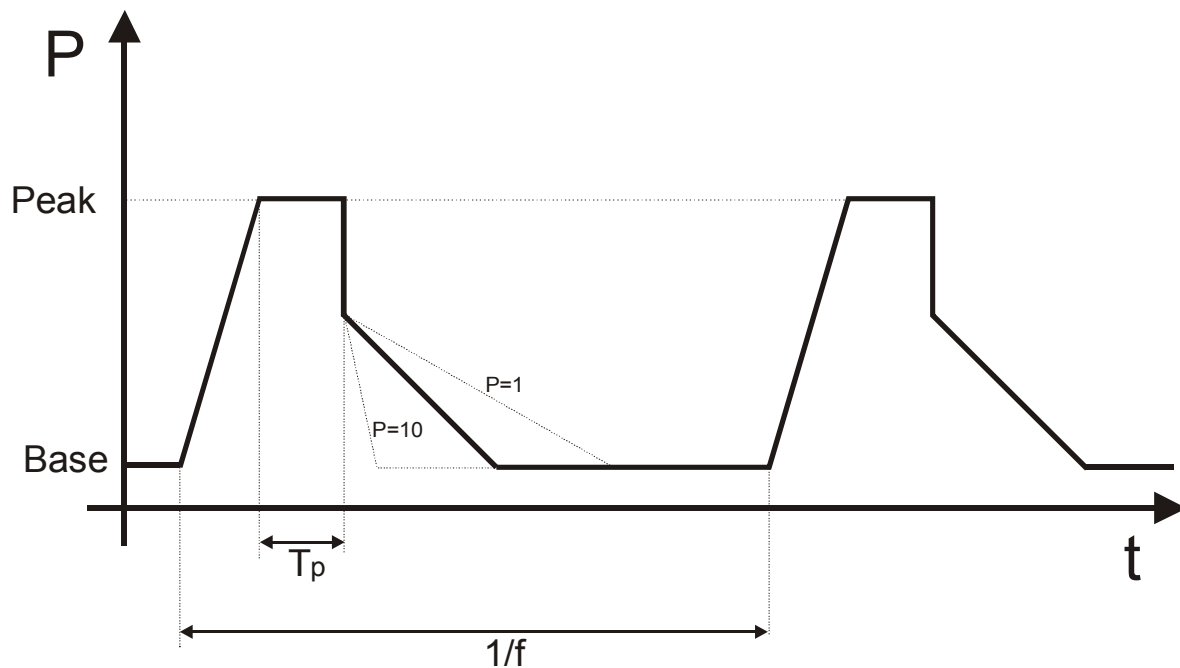


4.9 NO ARC timeout

If there is no arc detected for more than 3 seconds during active welding the inverter will be automatically switched off.
 This feature may prevent user from some desired actions. In case of feeding the wire in the torch, please use Manual feed mode described before.

4.10 Special pulse parameters adjustment

There are possibilities for user to change some of the parameters for Pulse welding process.



For parameters refer chapter 4.5.1.

5 CARE AND MAINTENANCE

Pull out the power cable from the socket before every maintenance and troubleshooting. The device is almost maintenancefree.

It is necessary to check feeding wheel, pressure roller and inflow nozzle regularly, if there is not some dirt. If it is, you have to clean it out.

Please, change the contact tip on the torch regularly

The complete set of pressure hoses should be cleaned up from time to time, because of embedded dust and parts.

The contact nozzle of the torch is wearing up subsequently. When the hole in the nozzle is too large, it is necessary to change the nozzle. The metal drops are embedding in the inner walls of the torch cover. Take them out if necessary. The separator is helpful and it is also a prevention against the firm caking of the drops.

You have to change the damaged cables at once.

5.1 Disposal of the machine



Do not dispose of electrical equipment together with the normal waste!

In observance of European Directive 2002/96/EC on Waste Electrical and Electronic Equipment and its implementation in accordance with national law, electrical equipment that has reached end of its life must be collected separately and returned to an environmentally compatible recycling facility.

6 TECHNICAL DATA

Inverta Pulse IP6:

Mains connection	3~ 400V +/-10%
Mains cable	4x2.5qmm
Fusing	16Amp delayed
Load capacity	40% @270Amp/27.5V 60% @240Amp/26V 100% @ 180Amp/23V
Peak input current I _{1p}	19Amp @270Amp/30.8V
Effective maximum input current I _{1eff}	10Amp @240Amp/26V/60%
No load output voltage U ₀	82V for MIG 82V for TIG 43V for MMA
Efficiency	85%
Power factor	0.7
Current adjustment range	4 – 270Amp / 1Amp step
Voltage adjustment range	10 – 50V / 0.1V step
Wire speed range	1.5 – 22 m/min
Wire feed roll diameter	37mm
Wire spool diameter	2 x 200mm / 6kg max
Thermal class	H(180°C)
Temperature range	-10+40°C - operating temp. -40+80°C - storage temp.
Dimensions LxWxH	920x350x740mm
Weight	57kg
Degree of protection	IP23

The product meet requirements for CE and S marking.

7 TROUBLESHOOTING

Mechanical defects are mostly the result of irregular wire feeding or its blocking.

Electrical defects cause partial or full device failure. Only an authorized electrician can repair the electrical part of welding device.

The troubleshooting should be executed in the OFF mode first and in the following sequence:

- Check up the solidity of electrical connections on switches, current transformer, suppressor and also the solidity of plugged and soldered connections.
- Check up the conductivity and fuse contacts.
- Check up visually possible short circuits or winding overload (coloration).

Possible malfunction

Troubleshooting

Possible reason

Electric arc is irregular or unstable

- | | |
|--|---|
| 1. wrong welding voltage setup | adjust the voltage |
| 2. too much/little wire | adjust the wire feed regulator |
| 3. The workpiece clamp is loose or transfer resistance is too high (rust, paint) | make a good contact between workpiece and clamp |
| 4. The contact nozzle is worn up or the diameter is wrong | change it |
| 5. The gas flow is not correct | adjust the gas flow |
| 6. The workpiece is not clear in the welding area | remove paint, rust, fat etc. |
| 7. Performance grade malfunction | take the device to service |
| 8. Plug-in spiral is dirty | clean it up or change it |
| 9. Feeding malfunction | see thereinafter |

Too much metal drops during welding

- | | |
|--------------------------------|--------------------------------|
| 1. too much wire | adjust the wire feed regulator |
| 2. welding voltage is too high | set up lower voltage |
| 3. workpiece is dirty | clean it up |

Feeding engine is not rotating

- | | |
|--|---|
| 1. Power malfunction | check up the connection to the socket |
| 2. Button on the torch was not pressed | press the button |
| 3. Fuse | change it (must be changed by authorized electrician) |
| 4. Engine malfunction | take the device to service |

Wire feeding malfunction

- | | |
|---|--|
| 1. Pressing roller is loosen | Increase the pressure to the leaf spring by using the grooved screw |
| 2. Wire has got out from feeding | Center the intake nozzle |
| 3. Wire feed wheel grove is worn up | Change the wire feed wheel |
| 4. Wire is welded to the contact nozzle | Change the contact nozzle, if the wire is deformed, lower the pressure on wire |

Device turns OFF and the “Err t” is displayed

- | | |
|----------------------------------|--|
| 1. Time of make is exceeded (TM) | Let the device cool down and follow the instructions for TM according to device type |
|----------------------------------|--|

The protective gas still flows

- | | |
|---|--|
| 1. Magnetic valve is dirty and it is still open | Disconnect the torch connector and connecting hose, alternately flow a pressure air into the torch connector and connecting hose and in the same time often press the button on the torch. |
|---|--|

Only an authorized electrician can repair the electric part of device.