

Operation Manual REV 1.0







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1 INTRODUCTION

Dear customer!

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

1.1 Product introduction

IM 240-i welding machine is compact MIG-MAG welding inverter especially developed for car body repair. Its excellent brazing characteristic as well as good steel 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.

2 SETUP

2.1 Setup conditions

It's 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).

2.2 Selecting the accessories

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

List of accessories:

- Hose package MB15 3-meter, for steel with wire guide spiral
- DV rollers steel 0,8/0,6 mm
- Ground cable 4 m
- Operation manual



2.3 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 (TN system according IEC 60364). Current circuit of socket must be protected with 16Amp melting safety fuse or circuit breaker.

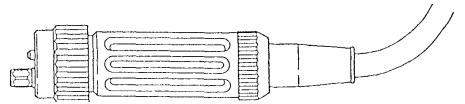
The device is delivered with plug according to CEE standard. For other connections remove delivered plug and use certified plug according national standard..

230V Supply			
Net Wire color			
L	Brown		
N	Blue		
PE	Yellow/Green		

110V Supply		
Net	Wire color	
L1	Brown	
L2	Blue	
PE	Yellow/Green	

2.4 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.



2.5 Torch wire liner

For mild steel, the wire feed tube - a liner for welding - consists of a steel spiral. When using wire electrodes made of chromium / nickel steel and of aluminum and other metals, a tube of wear-resistant plastic (for example Teflon) is used. Plastic guides have a lower friction coefficient than steel.

Material	Wire diameter	Liner material	Liner color
	0,6mm	Steel spiral	
Fe	0,8mm	or	
	1,0mm	Teflon	
Inox	0,8mm	Teflon	
	1,0mm		
AIMg, AISi	0,8mm	Teflon	
	1,0mm		
CuSi3	0,8mm	Teflon	
	1,0mm		
CuAl8	0,8mm	Teflon	
	1,0mm		

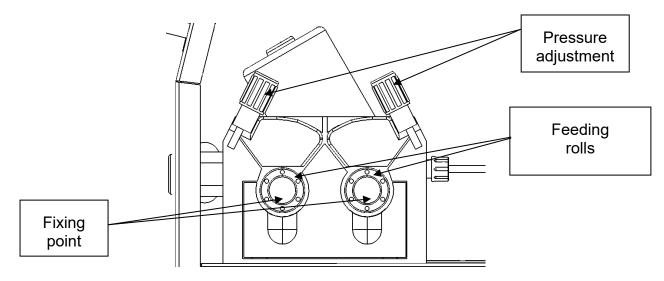
Liner color:

Blue: Art.N° 337139 Green: Art.N° 337107 Red: Art.N° 337142

Black: Art.N° 337147



2.6 The feeding unit



Please choose the feeding rolls correspond to used welding wire.

Material	Shape	Diameter	Article-Number
Fe Inox CuSi CuAl		0,6/0,8mm 0.8/1.0mm	337219 337220
AIMg AISi		0,8/1,0mm	ххх

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



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.

2.8 Connecting the pressure bottle

Make sure You are using right gas according welded material.

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 toggle 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's not allowed to repair pressure valves. It's necessary to send the defective reduction valves to service.

2.9 Connecting the return cable

It's 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.



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 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's 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's necessary to ensure air supply and exhaustion in closed rooms and buldings. 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's 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 tu 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 presure 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's 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 switched 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

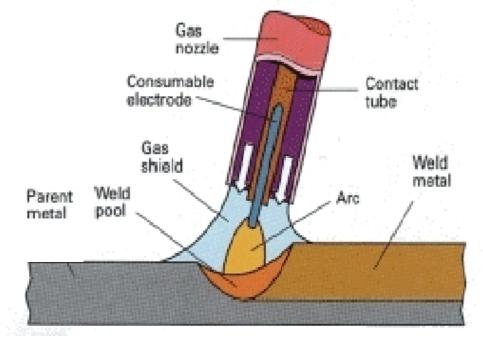
- It's not allowed to weld in rooms with increased "danger" of fire or explosion. The special regulations must be followed in this areas.
- It's not allowed to weld in tanks for gas, fuel, oil, paint etc., even if they are empty for a long time. The remnant of content could cause an explosion.
- The 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 WELDING PROCESSES

4.1 MIG/MAG Welding



Partial mechanical gas shielded arc welding (MIG), optionally as MIG (inert gas welding, EN ISO 4063: process 131) or MAG welding (metal welding with active, ie reactive gases, EN ISO 4063: process 135), is an arc welding process in which the consumable welding wire is continuously tracked by a variable speed motor. The usual welding wire diameters are between 0.8 and 1.2 mm (more rarely 0.6 mm). Simultaneously with the wire feed the welding point is supplied via a nozzle the protective or mixed gas with about 10 I / min (rule of thumb: inert gas volume flow 10 I / min per mm welding wire diameter). This gas protects the liquid metal under the arc from oxidation, which would weaken the weld. In metal active gas (MAG) welding, either pure CO2 or a mixed gas of argon and small amounts of CO2 and O2 (e.g., "Corgon") is used. Depending on their composition, the welding process (penetration, drop size, splash losses) can be actively influenced; Metal inert gas welding (MIG) uses argon as a noble gas, and more rarely also the expensive noble gas helium. The MAG process is primarily used for steels, the MIG process preferred for non-ferrous metals.



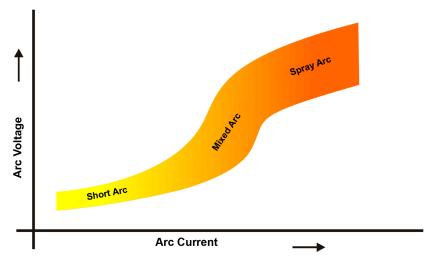
MIG/MAG welding process

For the MIG / MAG welding process, a DC current with decreasing characteristic and plus potential at the welding wire is used.

MIG / MAG welding uses different types of arc used based on voltage and wire feed speed - short arc, mixed arc, spray arc.

In addition to the standard arc types, there are other special shapes for special applications.

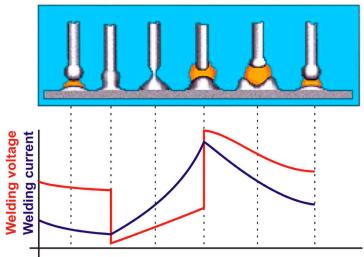




Arc ranges for 1.0mm Fe G3Si wire

4.1.1 Short Arc

The short arc occurs in the **lower power range**, at lower current intensities and arc voltages.

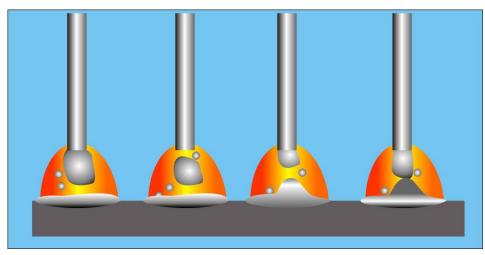


Short arc transfer time

The arc length changes cyclically. Thus, working point shifts of welding current and welding voltage are connected. In the phase of droplet detachment, by approaching the droplet to the melt, the arc flash voltage decreases until the droplet passes into the molten bath. There is a short circuit, the current increases according to the inductance of the welding circuit up to the maximum short-circuit current. The current increase rate of the current source determines the type of droplet separation significantly. After re-ignition of the arc, the voltage increases suddenly. The welding current drops again and adjusts itself according to the position of the arc operating point on the current source characteristic. The course of the welding current is essentially determined by the dynamic properties of the welding current source. In modern welding power sources, these properties are generated selectively by means of control and regulation. During the drop short, the measurable voltage does not completely collapse, as the heated free wire length has a distinctively dynamically changing resistance. This process is repeated between 20 to 100 times per second.

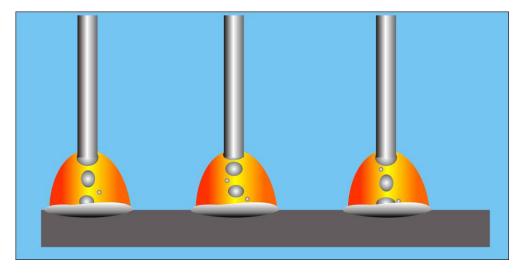


4.1.2 Mixed Arc



Mixed arc transfer time view

Between the arc types short and spray arc is the mixed arc which is characterized by strong spatter formation.



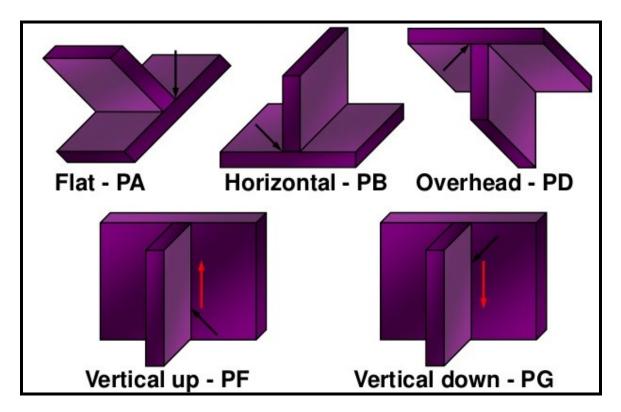
4.1.3 Spray Arc

Spray arc transfer time view

The spray arc burns continuously without a short-circuit interruption. The material transfer from the wire electrode into the weld pool is fine-droplet. It is relatively high thermal energy introduced into the weld metal, which is why heat affected zone and thus the workpiece distortion are greater than the short arc. This type of arc is used to weld thicker sheets.



4.2 Welding Positions





5 Operation

5.1 Turning the device ON

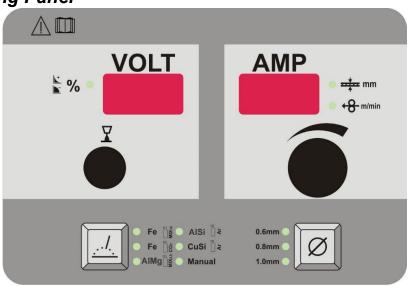
Always use the main switch to turn On and Off the device, never use the power plug for this purpose!

5.1.1 Power-on sequence

After powered special power on sequence is started on the operating panel, to give the user information about the firmware.

- a) Firmware type (in voltage window) Fm – Front panel IM
- b) Amperage rating (in Ampere window) 200 – 200Amp
- c) Firmware revision (in Ampere window) "r1.1" = major . minor revision numbers.

5.2 Operating Panel



5.2.1 Filler wire material selection

AISi

📋 ຼິ 🔵 CuSi

AlMg

Fe 🎬

Fe

	FeSg2 (MIX)	- Standard, not alloyed steel,
40		shielding gas: 82%Ar + 18%CO ₂
Ar 📙	FeSg2 (CO ₂)	- Standard, not alloyed steel,
¥ []		shielding gas: 100% CO ₂
ual	AlMg	- Aluminium + Magnesium
		shielding gas: 100%Ar
	AlSi5	- Aluminium + 5% Silicium,
		shielding gas: 100%Ar
	AlSi12	- Aluminium + 12% Silicium,
		shielding gas: 100%Ar
	CuSi3	- Kupfer + 3% Silizium
		shielding gas: 100%Ar
	Manual	- Manual setup of wire speed and welding voltage



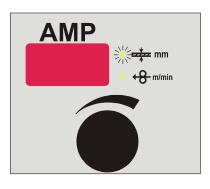
5.2.2 Filler wire diameter selection



5.3 Set up, adjustment and display description

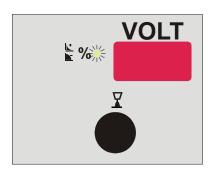
5.3.1 Synergic mode

5.3.1.1 Welding power set up

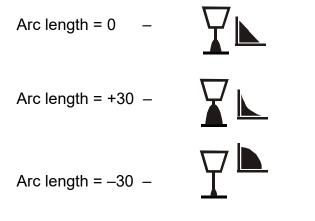


IM 240-i machines can be controlled with full synergic feature. The welding power is to adjust just with one main rotary encoder. By setup of material thickness (in millimeters) are automatically set all welding parameters .

5.3.1.2 Arc length correction

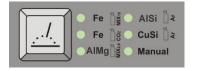


There is possible to adjust length of the welding arc. By turning the encoder in any direction is display switching from Voltage mode to Arc length correction mode (% LED Active).

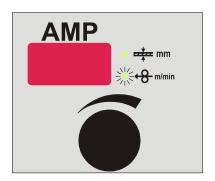




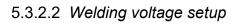
5.3.2 Manual mode

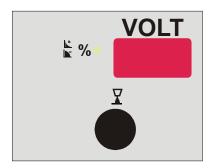


5.3.2.1 Wire speed setup



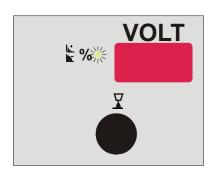
Set up wire feed speed in m/min by turning the encoder.





Set up the welding voltage in Volts by turning the encoder.

5.3.2.3 Arc length correction



There is possible to adjust length of the welding arc. By turning the encoder in any direction is display switching from Voltage mode to Arc length correction mode (% LED Active).

Arc length = 0

Arc length = +30 –

Arc length = -30 –





6 CARE AND MAINTENANCE

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

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 regulary.

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.

6.1 Disposal oft 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 separately and returned to an environmentally compatible recycling facility. IM 240-i:

7 TECHNICAL DATA

Mains connection		1~ 230V +10/-15%
		2~200V +15/-5%
Mains cable		3x2.5qmm
Fusing		16Amp delayed
Load capacity		20% @200Amp/24V
		60% @140Amp/21V
		100% @ 120Amp/20V
Peak input current I1p	230V	32Amp @200Amp/24V
	200V	37Amp @200Amp/24V
Effective maximum input current I1eff	230V	15Amp @200Amp/24V/20%
	200V	16Amp @200Amp/24V/20%
No load output voltage Uo		40.2V
Efficiency		85%
Idle power consumption in MIG mode		25W
Power factor		0.75
Current adjustment range		20 – 200Amp
Voltage adjustment range		10 – 35V / 0.1V step
Wire speed range		1.5 – 15 m/min
Wire feed roll diameter		37mm
Wire spool diameter		300mm max / 17kg max
Thermal class		H(180°C)
Temperature range		-10+40°C - operating temp.
		-40+80°C - storage temp.
Dimensions LxWxH		900x500x840mm
Weight		40kg
Degree of protection		IP23
EMC Class		A

The product meet requirements for CE and S marking.



8 AVERAGE CONSUMPTION VALUES FOR WELDING

8.1 Average welding wire consumption for MIG / MAG welding

8.1.1 Steel welding wire

Wire feed rate	0,6 mm Welding wire diameter	0,8 mm Welding wire diameter	1,0 mm Welding wire diameter
2m/min	0,4kg/h	0,6kg/h	0,7kg/h
3m/min	0,7kg/h	0,9kg/h	1,1kg/h
5m/min	1,1kg/h	1,5kg/h	1,9kg/h
7m/min	1,6kg/h	2,1kg/h	2,6kg/h
10m/min	2,2kg/h	3kg/h	3,7kg/h
12m/min	2,7kg/h	3,6kg/h	4,4kg/h

8.1.2 CrNi welding wire

Wire feed rate	0,6 mm Welding wire diameter	0,8 mm Welding wire diameter	1,0 mm Welding wire diameter
2m/min	0,5kg/h	0,6kg/h	0,8kg/h
3m/min	0,7kg/h	0,9kg/h	1,1kg/h
5m/min	1,1kg/h	1,5kg/h	1,9kg/h
7m/min	1,6kg/h	2,1kg/h	2,7kg/h
10m/min	2,3kg/h	3kg/h	3,8kg/h
12m/min	2,7kg/h	3,6kg/h	4,6kg/h

8.1.3 Aluminium welding wire

Wire feed rate	1,0 mm Welding wire diameter	1,2 mm Welding wire diameter	
2m/min	0,3kg/h	0,3kg/h	
3m/min	0,4kg/h	0,5kg/h	
5m/min	0,7kg/h	0,8kg/h	
7m/min	0,9kg/h	1,1kg/h	
10m/min	1,3kg/h	1,6kg/h	
12m/min	1,6kg/h	1,9kg/h	



8.1.4 CuSi welding wire

Wire feed rate	0,6 mm Welding wire diameter	0,8 mm Welding wire diameter	1,0 mm Welding wire diameter
2m/min	0,5kg/h	0,6kg/h	0,8kg/h
3m/min	0,7kg/h	1kg/h	1,2kg/h
5m/min	1,2kg/h	1,6kg/h	2kg/h
7m/min	1,7kg/h	2,2kg/h	2,8kg/h
10m/min	2,4kg/h	3,2kg/h	4kg/h
12m/min	2,9kg/h	3,8kg/h	4,8kg/h

8.2 Average shielding gas consumption for MIG / MAG welding

8.2.1 MIG / MAG steel welding

Welding wire diameter	0,6mm	0,8mm	1,0mm	1,2mm
Average gas consumption	8 l/min	9l/min	10l/min	

8.2.2 MIG / MAG aluminium welding

Welding wire diameter	0,6mm	0,8mm	1,0mm	1,2mm
Average gas consumption			12I/min	15l/min



9 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	make a good contact between workpiece
	or transfer resistance is too high (rust,	and clamp
	paint)	
4.	The contact nozzle is worn up or	change it
	the diameter is wrong	
5.	The gas flow is not correct	adjust the gas flow
6.	The workpiece is not clear in the	remove paint, rust, fat etc.
	welding area	
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 below

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.	Burner switch not actuated	Press the button, good contact between workpiece and make workpiece clamp	
4.	Fuse	change it (must be changed by authorized electrician)	



5.	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.
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Only an authorized electrician can repair the electric part of device.



10 Distributors Worldwide

Here you can find our worldwide distributors:

https://www.wielanderschill.com/service/vertretungen-weltweit/ https://www.wielanderschill.com/en/service/distributors-worldwide/



11 EU- Declaration of Conformity

EU De	claration	of confo	ormity
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Manufacturer:

Equipment type: Tool type:

Model name:

Applied harmonized standards

WS Wieländer+Schill GmbH & Co.KG Professionelle Karosserie-Spezialwerkzeuge Neue Wiesen 8 78609 Tuningen

MIG-MAG Welding Inverter Welding device for body repair

IM 240-i

Developed and manufactured in accordance with the standards and guidelines listed below by

EN 60974-1 / 2012 EN 60974-5 / 2013 EN 60974-10 / 2014 EMV-guideline 2014/30/EU Low Voltage Directive 2014/35/EU

EU-Machinery directive:

2006/42/EG

We hereby declare that:

The products marked accordingly comply with the requirements of the referenced guidelines and standards.

Tuningen, 12.11.2012 Germany

Manfred Bäurer Managing Director





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Tel. +49 (0)7464 9898 0 Fax +49 (0)7464 9898 289 info@wielanderschill.com www.wielanderschill.com Adresse: Neue Wiesen 8 D-78609 Tuningen