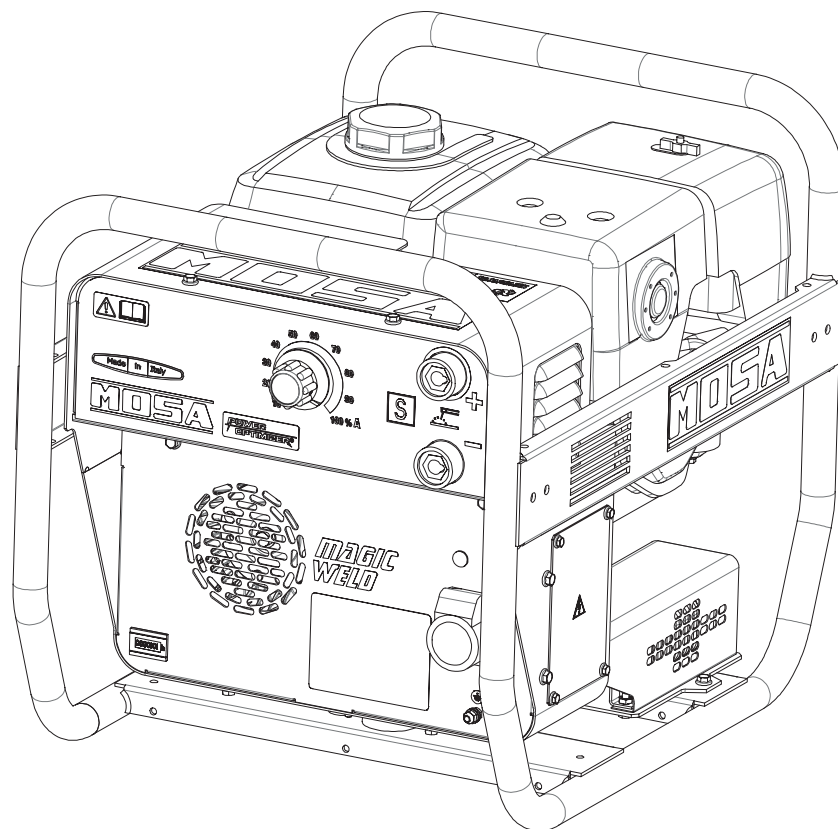


Use and Maintenance Manual



D5260800

Engine driven welder MAGIC WELD 200 MAGIC WELD 250



Original instructions

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1. Introduction

1.1 Foreword

This manual supplies the Operator and qualified and authorised Technicians with technical information on the "MAGIC WELD" 200 and "MAGIC WELD" 250 engine driven welders set (hereinafter also referred to as the "machine") produced by MOSA Div. of BCS S.p.A. (hereinafter also referred to as the "manufacturer").

In this manual, the Operator in charge and the qualified Technicians will find the indications for:

- Getting familiar with the safety measures and basic standards to be adopted, to prevent hazards and damage to people, to the engine driven welder and to the environment.
- Getting to know the main components of the engine driven welder and its operation.
- Performing the programmed routine maintenance.
- Getting to know any extraordinary maintenance operation.

This manual is an integral part of the engine driven welder and must follow it in any changes of ownership, until the final dismantling.

The manual and all the publications attached to it must be kept with care, in an easily accessible place, known to the operator and to the qualified technicians authorized for maintenance. Read the descriptions carefully before starting to work or carrying out the required adjustments or maintenance.

If the manual is lost, damaged or becomes illegible, request a copy to MOSA, indicating the model of the engine driven welder, the serial number and the year of construction.

If the engine driven welder is transferred, the transferor must deliver this manual to the new owner.

The engine driven welder is subject to updates to improve its performance; this manual summarises the information regarding the current state of technology at the moment of the supply.

MOSA reserves the right to make improvements and modifications to parts and accessories, without promptly updating this manual, except in exceptional cases of fundamental integrations concerning safe operation.



CAUTION

- **Improper use or maintenance can cause serious damage to people and shorten the "useful life" of the engine driven welder.**
- **The Operator and the qualified Technicians must be familiar with all the indications given in this manual before using the engine driven welder or carrying out maintenance operations on it.**
- **The procedures contained in this manual are intended to be applicable to engine driven welders only for permitted uses, and with all safety devices in function.**
If the engine driven welder is used for purposes other than those indicated or in safety conditions other than those indicated, the Customer becomes directly responsible for any person possibly involved in accidents or injuries and for abnormal wear and tear of the machine.

1.2 Supplied documentation

The documentation supplied with the engine driven welder includes this Use and Maintenance Manual and the main component manuals (e.g. engine).

1.3 Customer service

The Technical Assistance and Spare Parts Service are available to the Customers.

MOSA recommends that you contact the nearest authorised service centre for specialised intervention for all control and overhaul operations.

In order to obtain quick and effective responses, indicate the Model and Serial Number shown on the identification plate (see "1.8 Identification data").

1.4 Spare parts

Only original spare parts that guarantee functionality and durability must be used.

The use of non-original spare parts will void all warranty and Technical Support obligations.

1.5 Declaration of conformity

The manufacturer:

MOSA Div. of BCS S.p.A.

Viale Europa, 59 20047 Cusago (Milano) Italy

Declares that the machines:

MAGIC WELD 200

MAGIC WELD 250

Comply with the requirements of the following EC/EU Directives:

- Machine Directive 2006/42/EC
- Low Voltage Directive 2014/35/EU
- Electromagnetic Compatibility Directive 2014/30/EU

and with the requirements of the following UK regulations:

- The Supply of Machinery (Safety) Regulations 2008/1597
- The Electrical Equipment (Safety) - Regulations 2016/1101
- Electromagnetic Compatibility - Regulations 2016/1091

1.6 Unauthorized changes

No changes can be made to the machine without MOSA'S authorization.

Unauthorized changes void any form of warranty on the machine and any civil and/or criminal liability in case of accidents or injuries

1.7 Allowed and non-allowed use

These engine driven welders perform the following functions:

- Direct current generator for arc welding with manual electrode (stick).
- 50/60 Hz alternating current generator to supply power tools (grinding wheels, drills, etc.) used during welding operations.



WARNING

- **The engine driven welder is designed for industrial and professional use, and must only be used by qualified and/or trained personnel.**

1.8 Identification data

The data identifying the machine are given on the EC plate applied in the area indicated in the figure. They are necessary for spare parts requests and communications with the Customer Service Department.

A

MOSA		BCS S.p.A.	Stabilimento di Cusago
		V.le Europa, 59	20090 CUSAGO (MI) ITALY
		www.mosa.it	tel. +39-0290352,1

B

CE	Made in UE-ITALY	TYPE	
		SERIAL N°	

C

S	X		
	U ₀	I ₂ (A)	
	U ₂ (V)		

D

Hz	KVA		
P.F.	V (V)		
I.C.L.	I (A)		

E

n	RPM	n _i	RPM	IP
n ₀	RPM	P1max	KW	Kg

D5260810


- A - Manufacturer's data
- B - Machine data
 - (1) Year of manufacture
 - (2) Model
 - (3) Serial number
 - (4) Technical standard reference
- C - Welding data
 - (1) Welding process
 - (2) Symbol for engine driven welders that can be used in environments with a higher risk of electric shock
 - (3) Welding current symbol
 - (4) Minimum and maximum welding current value and corresponding voltage value

- (5) Duty cycle values
 - (6) Rated welding current values
 - (7) Welding voltage values
 - (8) Rated no-load welding voltage or adjustment range between minimum and maximum value
 - (9) Reduced rated no-load welding voltage with a voltage reduction device (VRD)
- D - Auxiliary generation data
- (1) Rated frequency
 - (2) Rated $\cos\phi$ (power factor)
 - (3) Insulation class
 - (4) Rated power (kVA/kW)
 - (5) Rated voltage (V)
 - (6) Rated current (A)
- E - Engine and machine data
- (1) Motor symbol
 - (2) Rated speed
 - (3) Rated minimum speed
 - (4) Rated no-load speed
 - (5) Rated engine power
 - (6) IP protection degree
 - (7) Dry weight

2. Safety

2.1 Safety information

Always respect the warnings contained in this manual and present on the decal applied to the machine. This allows the machine to be used safely, avoiding damage to property and injury or death to people. The following words and symbols were used to identify important safety messages.

Symbol  identifies important safety messages on the machine, in the manual and elsewhere. When you see this symbol, follow the instructions in the safety messages.

DANGER

- This word indicates a situation of imminent risk that, if not avoided, could cause serious injury or even death to people and serious damage to property.

WARNING

- This word indicates a potential risk situation which, if not avoided, could result in serious injury or even death to people and serious damage to property.

CAUTION

- This word indicates a potential risk situation that, if not avoided, could cause minor or moderate injuries.
It can also be used to prevent dangerous operations that can cause damage to the machine.

The following terms are used to transmit the information to be followed to the user, to avoid damage to the machine.

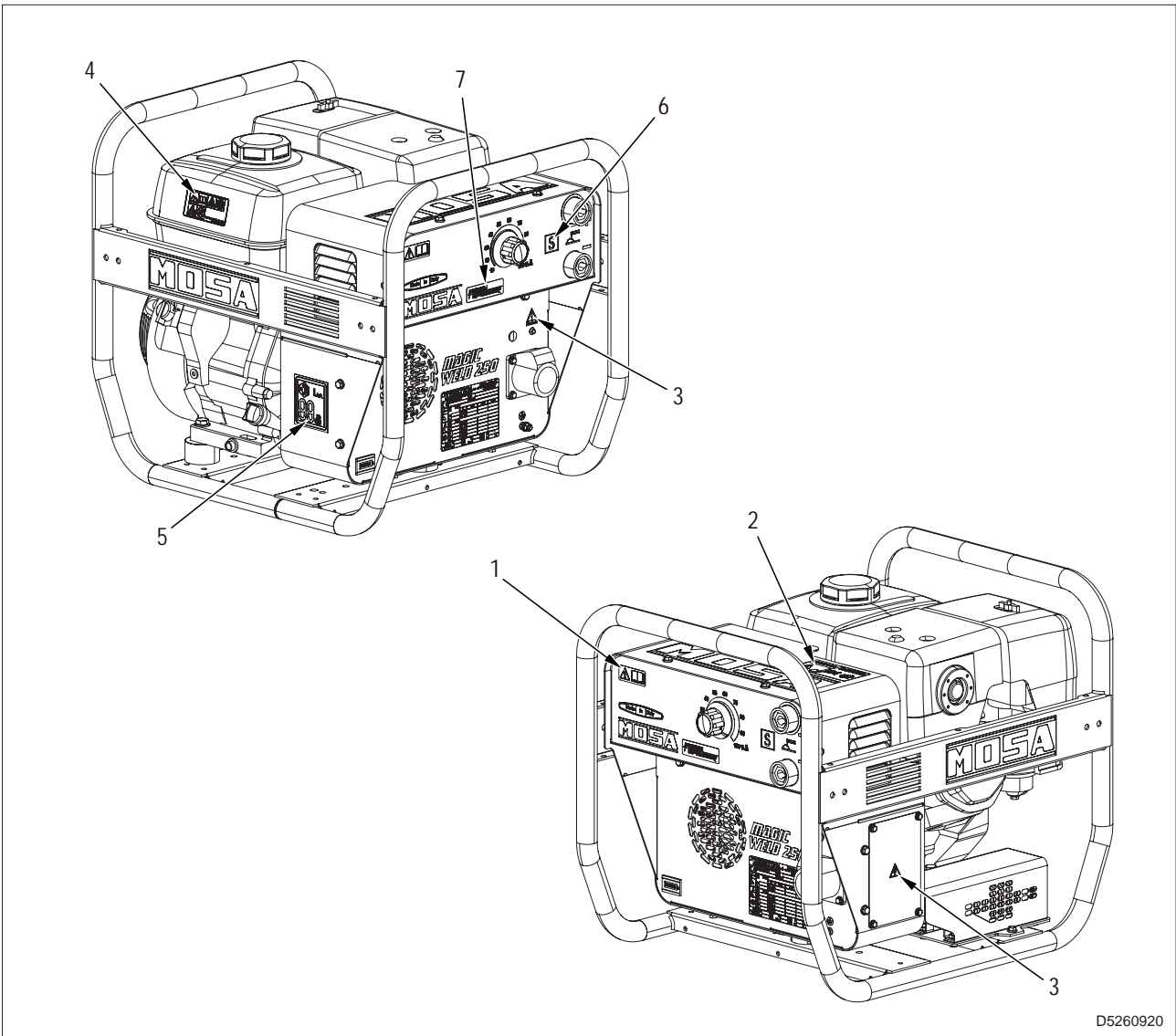
Important

- If the precautions described are not observed, the machine could be damaged and its useful life reduced.

Note:

- This word is used to indicate further useful information.

2.2 Positioning of safety decal and information



D5260920

2.2.1 Decal explanation

<p style="text-align: right;">D5260930</p>	<ul style="list-style-type: none"> • Pos. 1 Consult the manual Read the contents of the manual carefully before using the machine or carrying out maintenance operations on it.
<p style="text-align: right;">D5260940</p>	<ul style="list-style-type: none"> • Pos. 2 - Stop the engine before servicing To avoid burns due to contact with hot parts, before carrying out checks or servicing of the machine, stop the engine and wait until they have cooled sufficiently. To avoid serious injury, do not insert limbs near the rotating parts without stopping the engine.
<p style="text-align: right;">M734500250</p>	<ul style="list-style-type: none"> • Pos. 3 - Electrical voltage hazard Stop the machine before carrying out checks or maintenance.
<p style="text-align: right;">D5260950</p>	<ul style="list-style-type: none"> • Pos. 4 - Fire and exhaust gas inhalation hazard Fuel is highly flammable. Turn the engine off and allow it to cool before fuelling. Engine carbon monoxide emissions are highly toxic and poisonous. Use the machine in outdoor and ventilated places.
<p style="text-align: right;">D5260820</p>	<ul style="list-style-type: none"> • Pos. 5- Sound power level Unit of measurement dB(A); represents the amount of acoustic energy emitted in the unit of time, regardless of the distance of the measuring point.
<p style="text-align: right;">D5260960</p>	<ul style="list-style-type: none"> • Pos. 6 - Safety marking Indicates that the engine driven welder may be used in environments with a higher risk of electric shock.



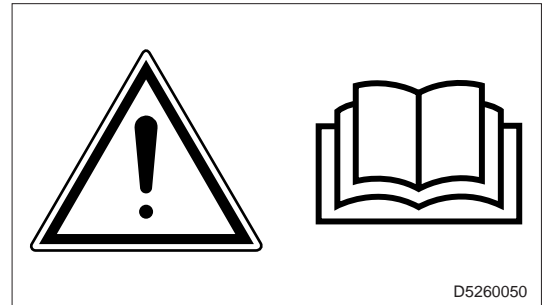
D5260970

- **Pos. 7 - Power Optimizer**
Function patented by MOSA that prevents engine overload during welding operations.

2.3 General precautions

Any errors during use, checks or maintenance could cause the risk of injury, even serious

- Before performing the operations, read this manual and the decals applied to the machine and follow the warnings.
If you don't understand any part of the manual, ask your Safety Officer for explanations.
- The machine can only be used and repaired by trained and authorized personnel.
- Do not work if you feel unwell, have drunk alcohol or take medicines that impair your ability to work safely or repair the machine.
- Before starting the operations, check the machine. If anomalies are detected, do not operate on the machine before having completed the necessary repairs.
- Comply with the provisions and laws in force in the country in which you work.



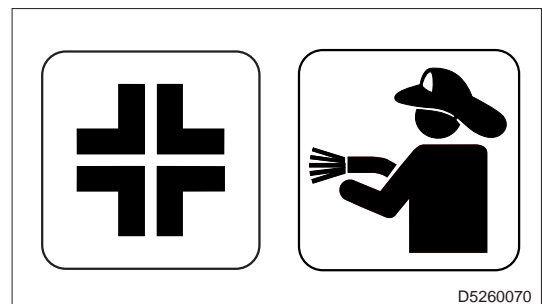
2.3.1 Personal protective equipment

- Do not wear clothes that are too loose or accessories, to prevent them from becoming entangled, causing personal injury.
- Always wear the personal protective equipment prescribed for the place where you work, such as a protective helmet, safety footwear, safety glasses, gloves and noise protection headphones.
- Before using personal protective equipment, check that it is in perfect condition.



2.3.2 Check the work area

- Ask the site safety manager for information on the regulations to be observed.
- Understand the signs and indications on site.
- Make sure that fire extinguishers and first aid kit are available on site and inquire about where they are located.
- Check that the area is clear of materials that may be hazardous during the operation of the machine (such as flammable materials or liquids).
- Make sure that there are no unauthorized persons in the area.



2.4 Fire prevention

2.4.1 Fire due to fuel, oil

- Avoid approaching any flame to flammable substances such as fuel and oil.
- Do not smoke or use open flames near flammable substances.
- Stop the machine before refuelling.
- Make sure not to spill flammable substances on overheated surfaces or on parts of the electrical system.
- After refuelling, remove any spills and tighten all filling caps tightly.
- For safety in the workplace, store the cloths soaked in flammable materials in a container.
- Store oil and fuel in pre-established and well-ventilated locations and prohibit the entry of unauthorised personnel.
- When cleaning the machine, do not use flammable substances such as diesel or gasoline.



2.4.2 Fires caused by flammable material build-up

- Remove dry leaves, chips, pieces of paper, carbon dust, or other flammable materials accumulated from the machine.

2.4.3 Fire caused by electrical wiring

- Always keep the electrical wiring clean and tightened.
- Periodically check that there are no loose or damaged parts. Tighten loose wiring connectors or terminals.
- Repair or replace any damaged cables.

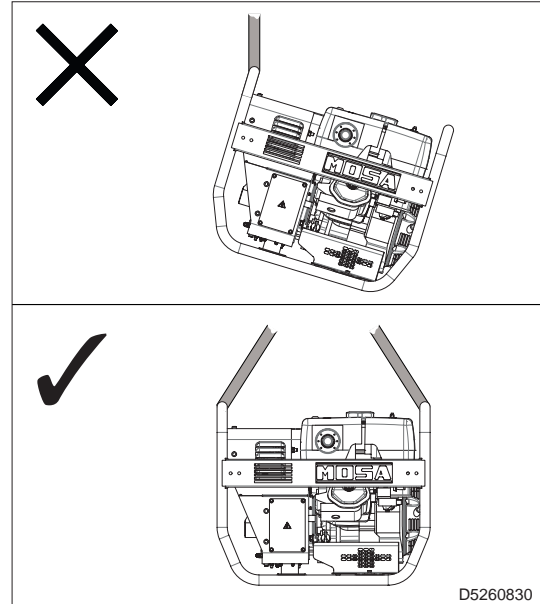
2.4.4 Fire caused by piping

- Periodically check that the hose clamps are firmly fixed.
- If loosened, they may vibrate during machine operation and cause leakage of liquids, provoking fires and serious injuries, including fatalities.

2.5 Lifting and transport precautions

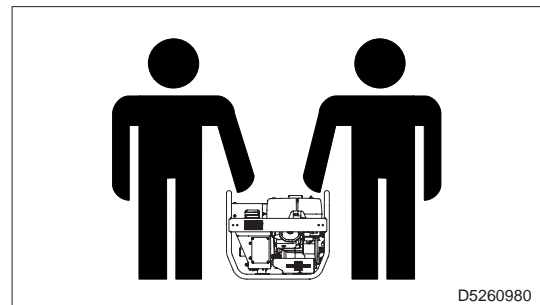
2.5.1 Lifting by chains or ropes

- Make sure that the handling area is clear of obstacles and people.
- Handle the machine with the engine off, the electrical cables disconnected and the fuel tank empty.
- Lift the machine only by the frame. A central hook can be mounted on request (optional).
- Check the condition of the frame. If it is damaged, replace it before lifting the machine.
- Always use lifting equipment adequately sized and controlled by authorized bodies.
- Do not harness the machine with a single rope. Use two ropes placed symmetrically to keep the machine in a horizontal position.
- Do not subject the machine and the lifting equipment used to undulating or abrupt movements that transmit dynamic stresses to the structure.
- Do not lift the machine at a height higher than that necessary for handling.
- Do not leave the machine suspended for longer than necessary for handling.

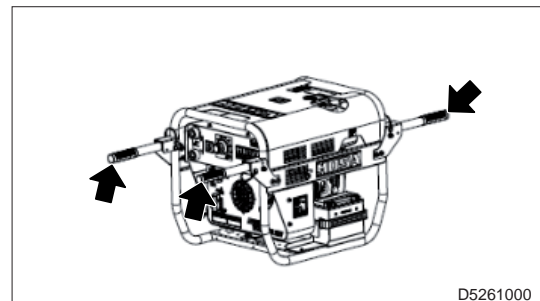


2.5.2 Lifting and manual transport

- The machine should be lifted and transported by at least 2 people.
- Handle the machine with the engine off, the electrical cables disconnected and the fuel tank empty.



- On request, the machine can be equipped with an optional kit consisting of 4 handles for easier handling.



2.5.3 Transport with towing carriage

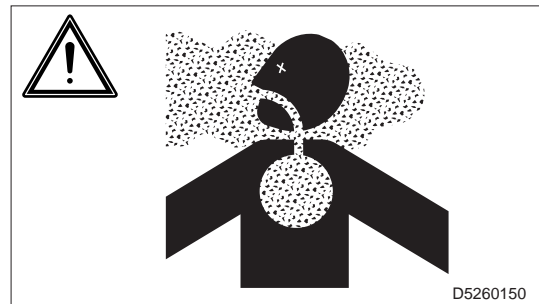
- Handle the machine with the engine off, the electrical cables disconnected and the fuel tank empty.
- On request, the machine can be equipped with an optional trolley that facilitates handling.



2.6 Precautions for positioning the machine

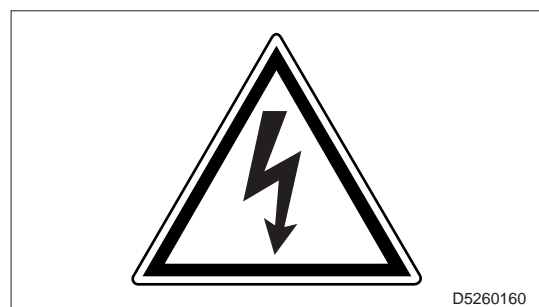
2.6.1 Positioning site precautions

- This machine has been designed for outdoor use and can therefore be positioned outdoors. In case of meteorological precipitation (rain, snow, etc.), place the machine in an adequately sheltered place. If this is not possible, do not use the machine.
- Do not place machines or equipment near heat sources, in areas at risk with explosion hazard or fire hazard. Place the machine at a safe distance from fuel tanks, from flammable material (rags, paper, etc.), from chemicals. Follow the instructions of the competent authorities.
- To limit potentially dangerous situations, isolate the area around the machine, thus preventing any unauthorized personnel from getting close to it.
- Although the machines produced comply with the regulations on electromagnetic compatibility, do not place the machine near equipment influenced by the presence of magnetic fields.
- Make sure that the area immediately surrounding the machine is clean and free of debris.
- Always place the machine on a flat, solid surface that is not subject to failure in order to avoid tipping, slipping or falling during operation. Avoid using the machine on land with a slope greater than 10°.
- The machine must always be positioned so that exhaust gases disperse into the air without being inhaled by people or animals. The exhaust gases of an engine contain carbon monoxide: this substance is harmful to health and, in high concentration, can cause poisoning and death.
- If the machine is used indoors, make sure that the area is well ventilated.



2.6.2 Precautions for electric connections

- Use appropriate electrical plugs at the machine output sockets and make sure that the electrical cables are in good condition.
- Do not use the machine with wet or damp hands and/or clothing.



2.7 Precautions during operation

- Keep all panels closed during normal operation.
- Access to the internal parts of the machine must only be carried out for maintenance purposes.
- Keep the area near the muffler free from objects such as rags, paper, cartons.
The high temperature of the muffler could cause the objects to burn and cause a fire.
- Immediately stop the machine in case of malfunctions.
Do not restart the machine without first identifying and solving the problem.
- Do not wrap or cover the machine with cloths while it is running.
Before covering the machine, make sure that the engine parts are cold
If the engine parts are still warm, there is a risk of damage to the machine and fire.
- Do not place objects or obstacles near the air suction and expulsion windows; a possible overheating of the machine could cause a fire.

2.8 Precautions during fuel and engine oil filling

- Fuel and engine oil are flammable.
Refill with the engine off.
- Refuel only outdoors or in well-ventilated environments.
- Do not smoke or use naked flames during refuelling.
- Do not fuel with the engine running or hot.
- Clean and dry any leaks of engine oil and fuel before restarting the machine.
- After refuelling, fully tighten the tank caps.
- Do not fill the fuel tank completely to allow expansion of the fuel inside it.
- Do not exceed the MAX level line of the engine oil level dipstick.



2.9 Precautions against noise

- Excessive noise can cause temporary or permanent hearing problems.
The actual risk arising from the use of the machine depends on its use conditions.
- There is a decal on the machine that declares the sound power level dB(A) emitted by it. The value provides an indication of the noise level emitted by the machine when used, in order to assess the noise in the workplace.
- The adoption of specific measures (such as headphones or earplugs) must be assessed by the operator.

2.10 Electromagnetic Compatibility (EMC)¹

The machine is compliant with European Directive 2014/30/EU on electromagnetic compatibility, and with harmonized standard: EN 60974-10 Electromagnetic Compatibility (EMC) Product Standard for Arc Welding Equipment.

All electrical equipment generates small amounts of electromagnetic emission.

Electrical emission may be transmitted through power lines or radiated through space, similar to a radio transmitter.

When emissions are received by other equipment, electrical interference may result.

Electrical emissions may affect many kinds of electrical equipment; other nearby welding equipment, radio and TV reception, numerical controlled machines, telephone systems, computers, etc.



WARNING

- **This Class A equipment is not intended for use in residential locations where the electrical power is provided by the public low-voltage supply system. There may be potential difficulties in ensuring electro-magnetic compatibility in those locations, due to conducted as well as radiated disturbances.**

2.10.1 Installation and use

- The user is responsible for installing and using the welding equipment according to the manufacturer's instructions.
- If electromagnetic disturbances are detected, the user of the welding equipment is responsible for solving the situation with the technical assistance of the manufacturer.
In some cases, this remedial action may be as simple as grounding the welding circuit.
In other cases, it could involve constructing an electromagnetic screen enclosing the generating set and the entire welding area, with related input filters.
In all cases electromagnetic disturbances must be reduced to the point where they are no longer troublesome.

Note:

The welding circuit could be earthed for safety reasons.

Follow your local and national standards for installation and use.

Changes to grounding connections should only be authorized by someone competent to assess whether the changes will increase the risk of injury, e.g., by allowing parallel welding current return paths which may damage the earth circuits of other equipment.

2.10.2 Assessment of the area

- Before installing the welding equipment, assess any potential electromagnetic problems in the surrounding area.
Check for the presence of:
 - Supply cables, control cables, signalling and telephone cables, above, below and adjacent to the welding equipment.
 - Radio and television transmitters and receivers.
 - Computer and other control equipment.
 - Safety critical equipment, e.g., industrial equipment guards.
 - Presence of people with pacemakers, implantable defibrillators, neurostimulators and other active devices.

¹ Portions of this text are contained in EN 60974-10: "Electromagnetic Compatibility (EMC) product standard for arc welding equipment."

- Equipment used for calibration or measurement.
- Check that the other equipment in the environment is immune against electromagnetic disturbances. Ensure that the other equipment being used in the environment is compatible. This may require additional protection measures.
- Check the time of day that welding or other activities are to be carried out.
- The size of the surrounding area to be considered will depend on the structure of the building and other activities taking place there. The surrounding area may extend beyond the boundaries of the work site.

2.10.3 Emission-reducing methods

Welding equipment maintenance

The welding equipment should be routinely maintained according to the manufacturer's recommendations. All access and service doors and covers should be closed and properly fastened when the welding equipment is running.

The welding equipment should not be modified in any way except for those changes and adjustments covered in the manufacturer's instructions.

Welding cables

The welding cables should be kept as short as possible and should be positioned close together, running at or close to floor level.

Equipotential bonding

Bonding of all metallic components in the welding installation and adjacent to it should be considered. However, metallic components bonded to the work piece will increase the risk that the operator could receive a shock by touching these metallic components and the electrode at the same time.

The operator should be insulated from all such bonded metallic components.

Earthing of the workpiece

Where the workpiece is not bonded to earth for electrical safety, not connected to earth because of its size and position, e.g., ships hull or building steelwork, a connection bonding the workpiece to earth may reduce emissions in some, but not all instances. Care should be taken to prevent the grounding of the workpiece increasing the risk of injury to users, or damage to other electrical equipment. Where necessary, grounding of the workpiece should be achieved by a direct connection to the workpiece; however, in some countries where direct connection is not permitted, grounding should be achieved by suitable capacitors, selected according to national regulations.

Screening and shielding

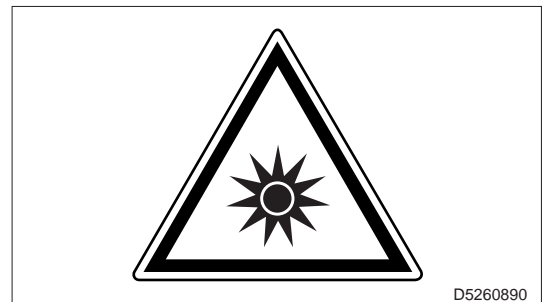
Selective screening and shielding of other cables and equipment in the surrounding area may alleviate problems of interference. Screening of the entire welding installation may be considered for special applications

2.11 Precautions during welding

- Access to the internal parts of the machine must only be carried out for maintenance purposes.
- Immediately stop the machine in case of malfunctions.
Do not restart the machine without first identifying and solving the problem.

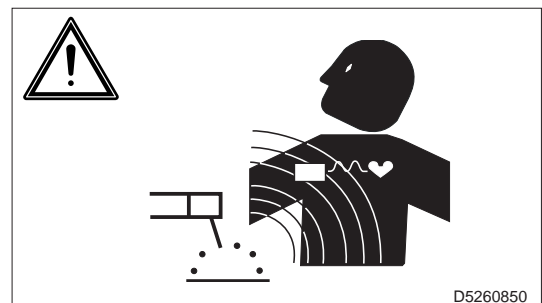
2.11.1 Precautions in the workplace

- Do not use the welding equipment near heat sources, in areas at risk with explosion hazard or fire hazard.
Place the welding equipment at a safe distance from fuel tanks, from flammable material (rags, paper, etc.), from chemicals.
- Delimit the areas where welding operations are carried out with self-extinguishing curtains, to prevent people not directly involved in welding from being exposed to optical radiation emissions or being reached by flammable material.
- Make sure that the area immediately surrounding the welding site is clean and free of debris.

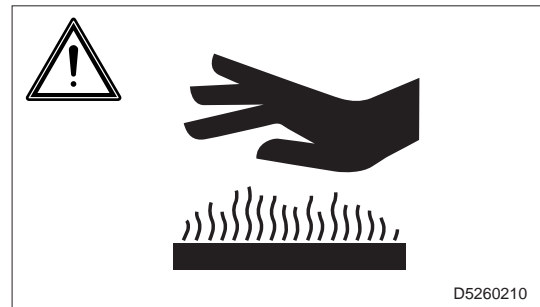


2.11.2 Welding precautions

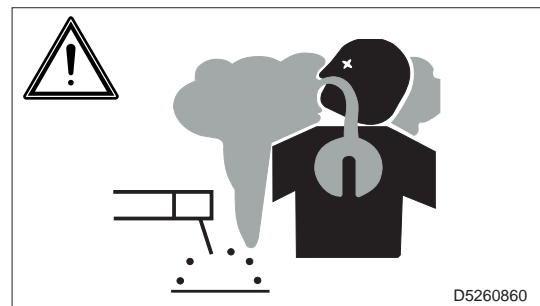
- The electric current flowing through the conductors creates electric and magnetic fields (EMF) that can interfere with pacemakers, implantable defibrillators, neurostimulators and other active devices. Consult your doctor before using the engine driven welder.
- During welding, sparks can cause burns. Adopt the following Personal Protection Equipment (PPE):
 - Welding mask with filters according to Standards EN169 or EN379.
 - Soldering iron caps for head protection.
 - Clothing and gloves resistant to heat and direct contact with flames or sparks.
 - Shoes with an antistatic sole resistant to high temperatures.
- Make sure that all the equipment is in good condition and that it is not cut, damaged, wet or oily.



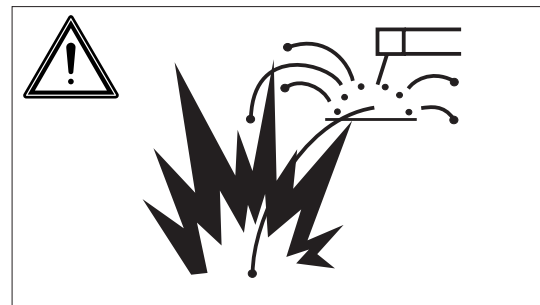
- Welding generates large amounts of heat. Welded surfaces and materials can cause serious burns. Use gloves and pliers when touching or moving materials in the work area.



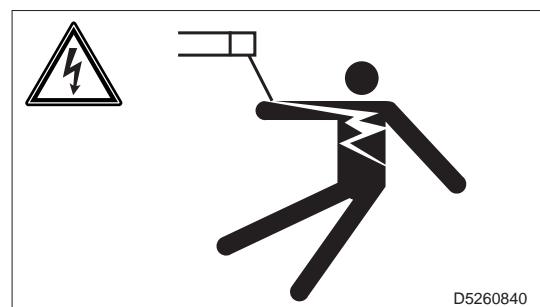
- Welding generates fumes and gases that are hazardous to health. Use sufficient ventilation or a fume extractor to keep fumes and gases away from the breathing area.



- Weld tanks, drums, or containers only when you are sure that there are no flammable or toxic vapours. Do not use the engine driven welder in the presence of flammable gases, vapours or liquid fuels.



- The engine driven welder generates dangerous voltages. Do not touch the electrode, electrode holder or any connected parts when it is switched on.
- Check the cables, electrode and electrode holder regularly. In case of damage to the insulation, repair or replace it immediately. Do not place the electrode holder on the welding table or on any other surface in contact to prevent the risk of accidental ignition of the arc.

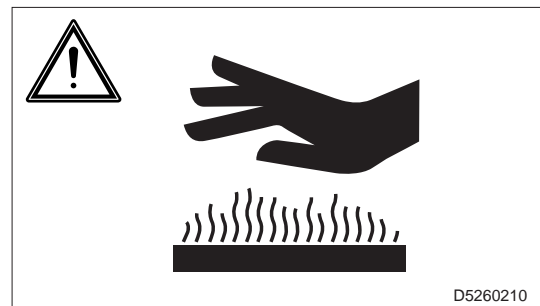


2.12 Maintenance precautions

- Stop the machine and turn the engine switch and fuel valve to OFF.
- To avoid injury, do not perform maintenance with the engine running.
 - Rotating parts, such as the fan, are dangerous and can get entangled on body parts or a worn object. When performing maintenance, be careful to approach rotating parts.
 - Make sure not to drop or insert tools or other objects in the fan or other rotating parts. They can touch the rotating parts and be projected.

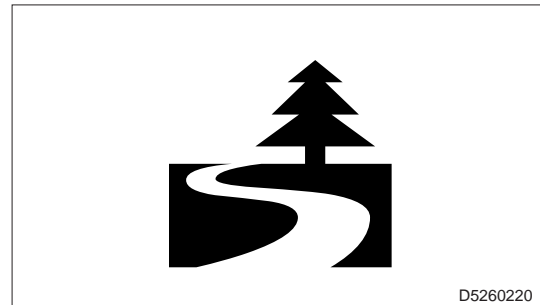


- Do not touch the engine, pipes and muffler during operation or immediately after shut-off. Allow the engine to cool before performing any operation.
- When discharging the engine oil, the engine must be hot. Engine oil may come into contact with the skin and cause burns.
- Do not remove the guards and safety devices. If it is necessary to remove them, after completing the maintenance, install the removed guards and restore the safety devices.
- Use work tools in good condition and suitable for the work to be performed. If you use a damaged or deformed tool or if you use a tool for a purpose other than its intended purpose, there is a danger of causing serious personal injury or death.



2.13 Precautions for disposal of waste material

- Be sure to store the waste liquid in containers or tanks.
- Do not discharge the oil directly into the soil or sewage system, rivers, seas or lakes.
- When disposing of harmful waste such as oil, fuel, coolant, solvents, filters and batteries, follow current laws and regulations.
- Entrust the authorized companies with the disposal of rubber material, plastic and components that contain them (hoses, cables, wiring, etc.) in accordance with the applicable laws and regulations.



2.14 Disposal of the machine

This machine is classified as Electrical Equipment.

For disposal, comply with *Directive 2012/19/EU* on waste of electric and electronic equipment (WEEE).

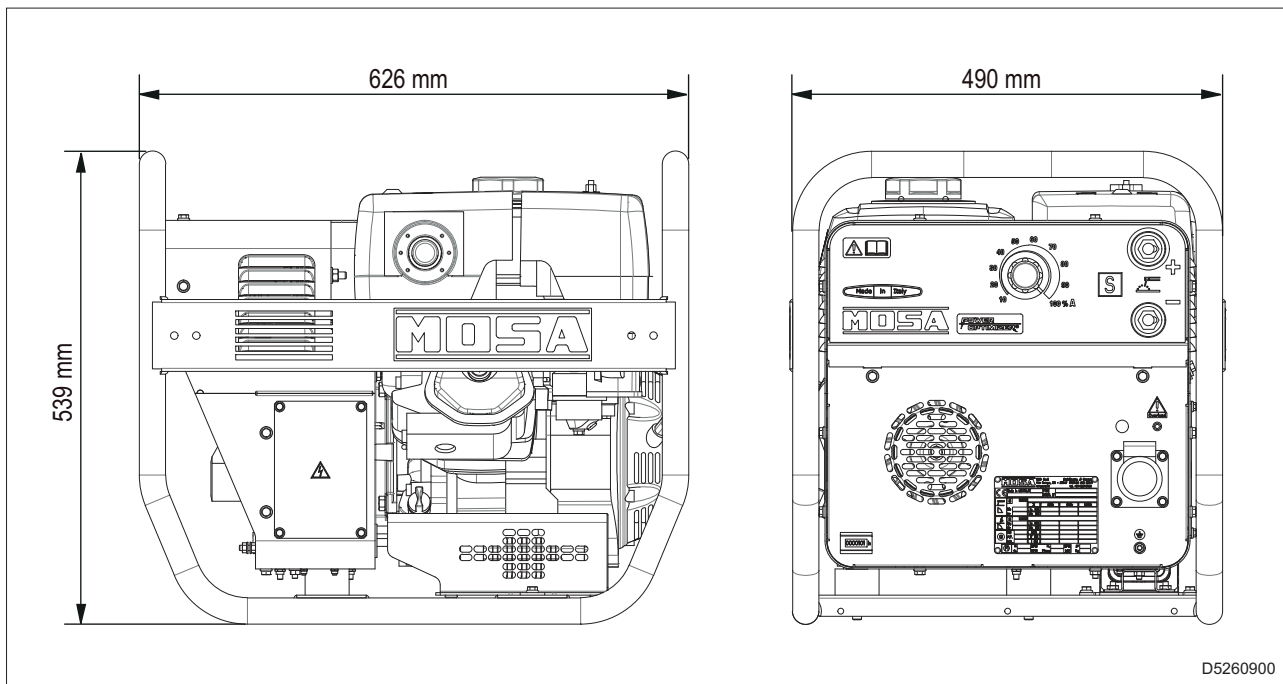
The symbol affixed to the product or to the documentation states that, at the end of its useful life, the machine must be disposed of separately.

Adequate separate collection helps avoid possible negative effects on the environment and health and promotes the reuse and/or recycling of the materials that make up the equipment.



3. Technical data

3.1 Dimensions



3.2 MAGIC WELD 200 technical data

Welding

Welding Process	SMAW (Stick - Coated Electrode) - DC Direct Current
Welding current range	20A / 20.8V - 200A / 24V
IEC - Rating	20A / 20.8V - 175A / 27V
Duty Cycle	-
	-
	175A / 27V @100%
Current adjustment	Continuous
No-load voltage (ignition)	70 VDC (peak)

Auxiliary generation 230Vac

Maximum single-phase power	3.3 kVA / 230V / 14.3A
Single-phase rated power	3.0 kVA / 230V / 13.0A
Frequency	50Hz o 60Hz
Cosp	0.8

Auxiliary generation 110Vac

Maximum single-phase power	2.1 kVA / 110V / 19A
Single-phase rated power	1.8 kVA / 110V / 16.4A
Frequency	50Hz o 60Hz
Cosp	0.8

Engine

Brand/Model	HONDA / GX 270 (Stage V)
Type/Cooling system	4-stroke OHV gasoline / Air
Cylinders / Displacement	1 / 270 cm ³
Net stand-by power	6.3 kW (8.5 HP)
Net PRP power	5.1 kW (6.9 HP)
Speed	3600 rpm
Fuel consumption (75% PRP)	1.8 l/h
Oil sump capacity (max.)	1.1 l
Starter	recoil

General specifications

Fuel tank capacity	5.3 l
Running time (60% welding)	3.5 h
Protection	IP 23
Weight (Dry)	65 kg
Acoustic power LwA	99 dB(A)
Acoustic pressure LpA	74dB(A) @ 7m

3.3 MAGIC WELD 250 technical data

Welding

Welding Process	SMAW (Stick - Coated Electrode) - DC Direct Current
Welding current range	20A / 20.8V - 250A / 25V
IEC - Rating	20A / 20.8V - 220A / 28.8V
Duty Cycle	220A / 28.8V @35%
	200A / 28V @60%
	175A / 27V @100%
Current adjustment	Continuous
No-load voltage (ignition)	70 VDC (peak)

Auxiliary generation 230Vac	
Maximum single-phase power	3.3 kVA / 230V / 14.3A
Single-phase rated power	3.0 kVA / 230V / 13.0A
Frequency	50Hz o 60Hz
Cosφ	0.8

Auxiliary generation 110Vac	
Maximum single-phase power	2.1 kVA / 110V / 19A
Single-phase rated power	1.8 kVA / 110V / 16.4A
Frequency	50Hz o 60Hz
Cosφ	0.8

Engine	
Brand/Model	HONDA / GX 390 (Stage V)
Type/Cooling system	4-stroke OHV gasoline / Air
Cylinders / Displacement	1 / 389 cm ³
Net stand-by power	8.7 kW (11.8 HP)
Net PRP power	7 kW (9.5 HP)
Speed	3600 rpm
Fuel consumption (75% PRP)	2.7 l/h
Oil sump capacity (max.)	1.1 l
Starter	recoil

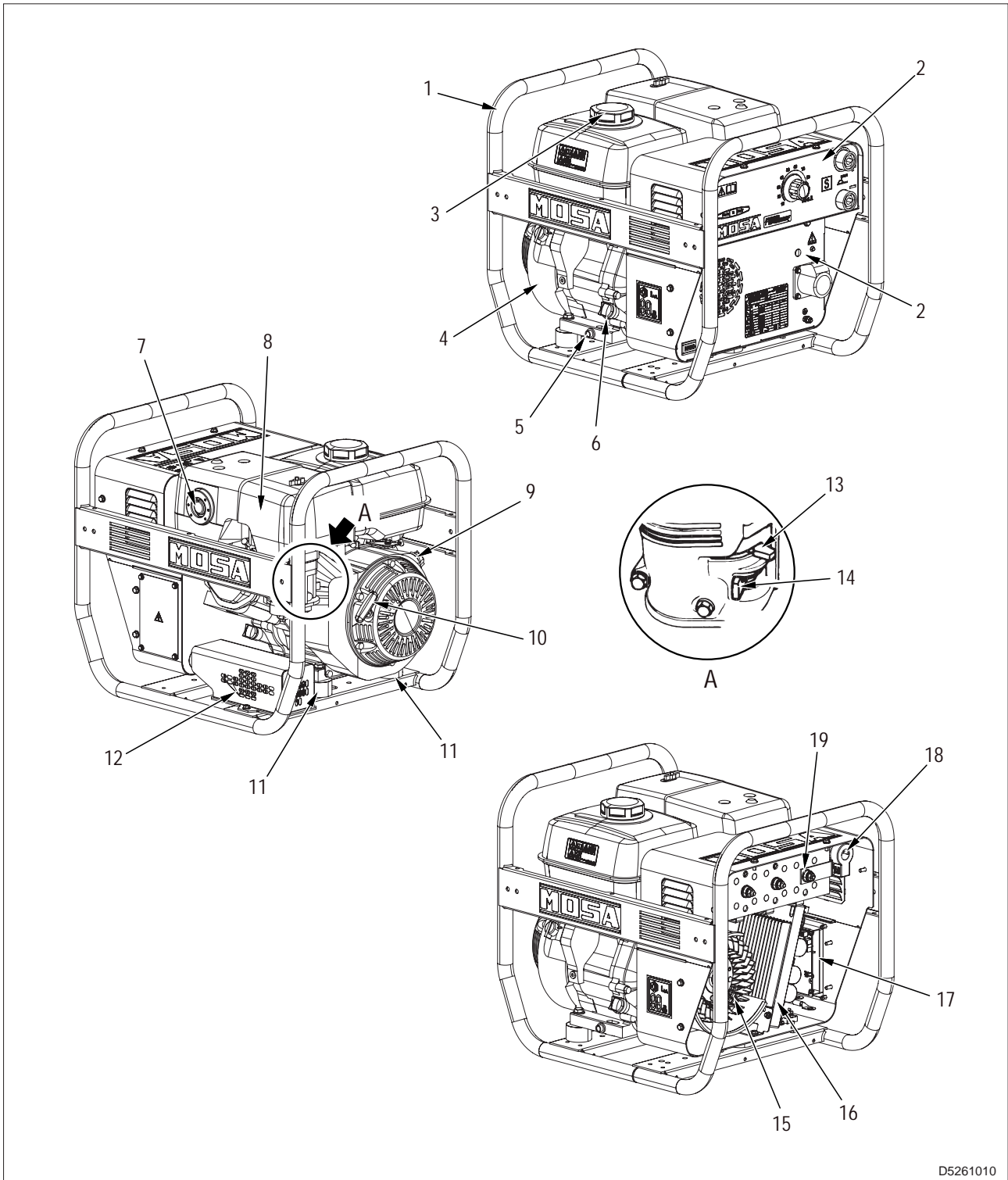
General specifications	
Fuel tank capacity	6.1 l
Running time (60% welding)	2.8 h
Protection	IP 23
Weight (Dry)	71 kg
Acoustic power LwA	99 dB(A)
Acoustic pressure LpA	74dB(A) @ 7m

4. Description

The engine driven welder is a machine that transforms the mechanical energy generated by an engine into a source of electrical energy suitable for arc welding processes.

It is also able to supply AC to power tools (grinding wheels, drills, etc.) used during welding operations.

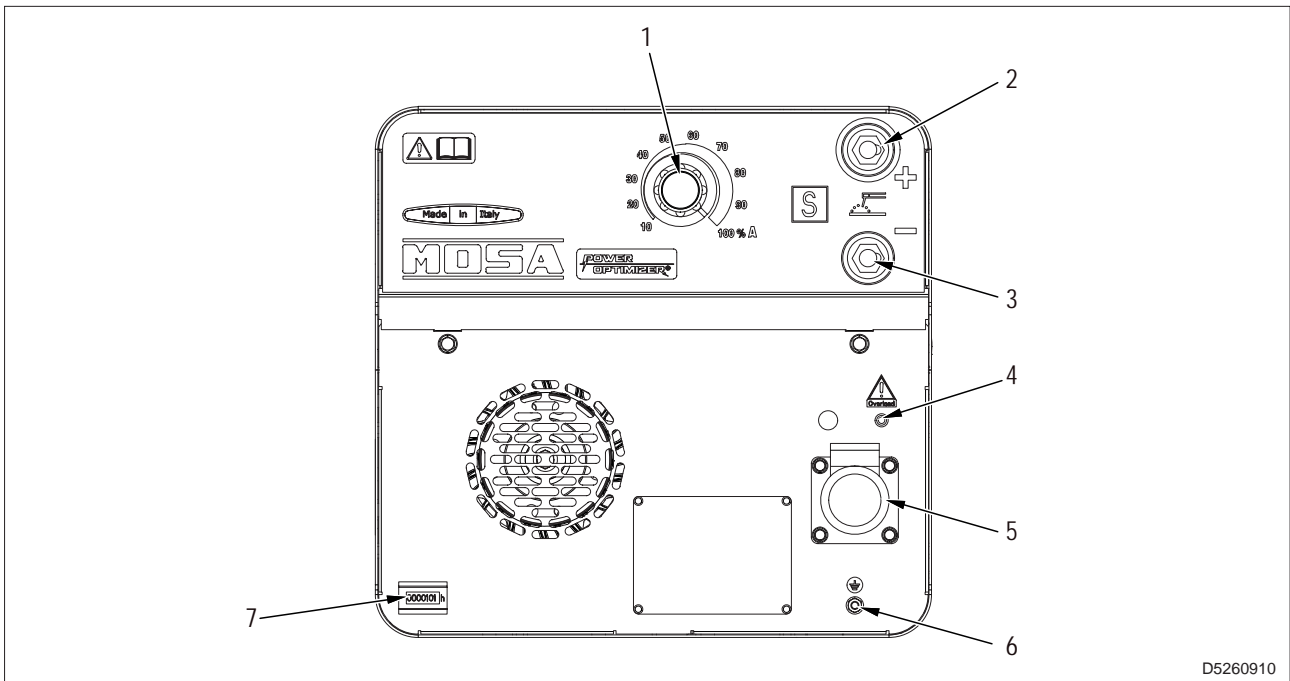
4.1 Main components



D5261010

- 1 - Frame
- 2 - Control panel
- 3 - Fuel tank cap
- 4 - Engine
- 5 - Oil drain plug
- 6 - Oil filler cap / Oil level dipstick
- 7 - Muffler
- 8 - Engine air filter
- 9 - Engine switch
- 10 - Starter handle
- 11 - Vibration dampers
- 12 - Welding level reactor
- 13 - Choke control
- 14 - Fuel valve
- 15 - Alternator
- 16 - AC inverter
- 17 - Welding current control board
- 18 - Hall sensor
- 19 - Chopper bridge

4.2 Control panel components



D5260910

- 1 - Welding current adjustment
- 2 - Welding socket (+)
- 3 - Welding socket (-)
- 4 - Auxiliary generation overload LED
- 5 - Auxiliary AC power outlet socket
- 6 - PE ground terminal
- 7 - Hour meter

5. Delivery and unpacking

5.1 Delivery

- The machine is normally transported and delivered packed in a suitable cardboard box.
- All shipped equipment is checked before being delivered to the Client.
- Check the material delivered against the detailed shipment list.

Important

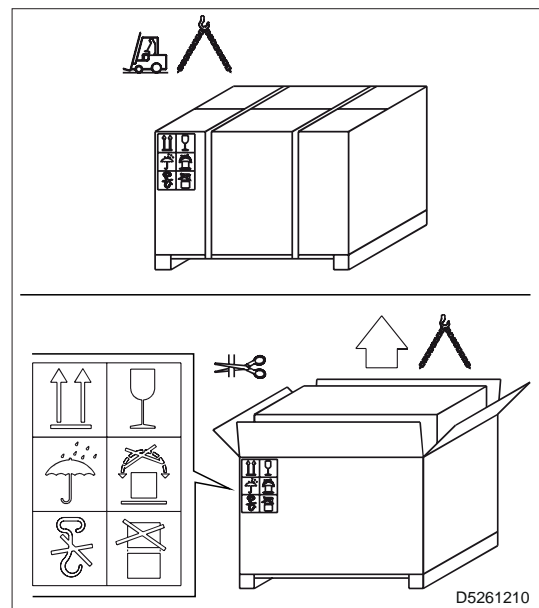
- Upon receipt, check the equipment for damage (breakage or significant dents) caused by transport. If this occurs, immediately inform the transport company and write down the "Conditional Acceptance" clause in the delivery note.
- In the event that, at the time of delivery, significant damage is found, caused during transport, together with any missing parts that may be found, promptly notify MOSA Div. of BCS S.p.A.

5.2 Unpacking

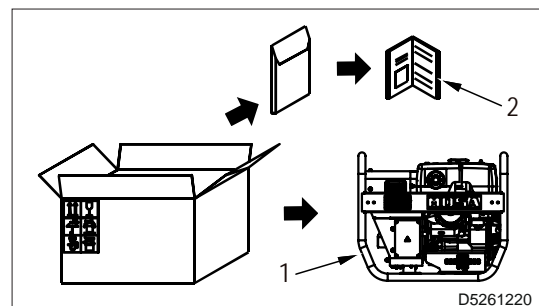
- Unloading of the packaging must be carried out with the utmost care, using lifting equipment of a suitable capacity (e.g. forklift truck), if necessary.
- Place the packaging on a stable and horizontal surface.
- Load handling operations must be carried out by qualified personnel, in compliance with the current regulations on safety in the workplace of the country of use.



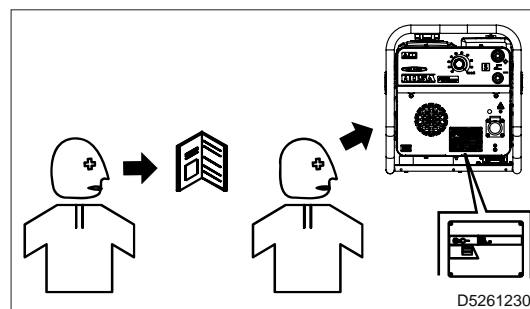
Do not dump the packaging into the environment; comply with the regulations in force in the country of use.



- 1 - Remove the machine (1) and the documents (2) from the packaging.



2 - Check the machine identification plate, the integrity of the decal and data, and read the use and maintenance manual before proceeding with use.



6. Operation



WARNING


- Before positioning and starting the machine, read section “2. Sicurezza” carefully.
- After starting the machine, the power outlets are live, even without cables connected.

6.1 Grounding



WARNING

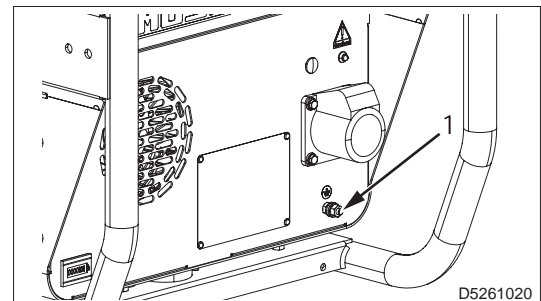
- The machine is not equipped with a residual current circuit breaker, and must not be connected to a grounding system.

- Protection against electric shock from indirect contacts is ensured by the "electrical separation" protection, with equipotential connection between all the masses of the machine.
- The limitation of the electrical circuit extension is essential for safety purposes; do not power systems with a length greater than 200 meters.
- The power cables of the equipment must be equipped with the protective conductor (yellow-green cable) to ensure the equipotential connection between the mass of the equipment and the mass of the machine; this provision is not valid for double insulated or reinforced insulated equipment recognizable by the symbol .
- The cables must be suitable for the environment in which they are operated.
In case of temperatures below 5°C, PVC cables become rigid and the PVC insulation tends to be cut at the first fold.
- Electrical separation protection is not suitable if the machine is intended to power complex systems, or located in particular environments with a higher risk of electric shock.
In these cases, it is necessary to adopt the electrical safety measures required by current regulations.

Example:

It is possible to install a high sensitivity, 30mA, residual current circuit breaker and ground the machine Neutral. This operation must be performed by a qualified electrician or at an authorised service centre. In this case, machine grounding is mandatory to ensure protection against indirect contacts by the residual current circuit breaker.

Connect the machine to a grounding system via a cable using the grounding terminal (1).



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6.2 Checks before start-up

- 1 - Check the oil and fuel levels. For the details, see "7. Maintenance".
- 2 - Check that there are no oil and fuel leaks.
- 3 - Check that there is no flammable or dirty material around the muffler.
- 4 - Check that there are no unauthorized persons in the area adjacent to the machine.

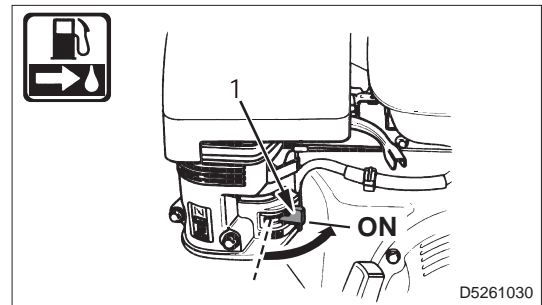
6.3 Starting and stopping the engine

WARNING

- Do not alter the primary adjustment conditions and do not tamper with sealed parts.

6.3.1 Starting the engine

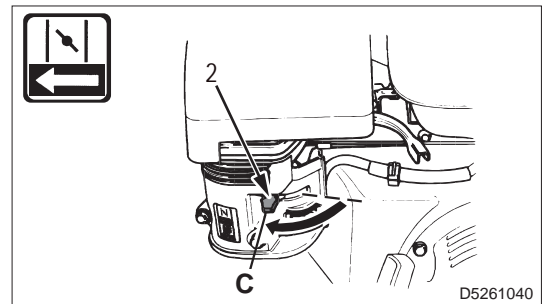
- 1 - Turn the fuel valve (1) to the ON position.



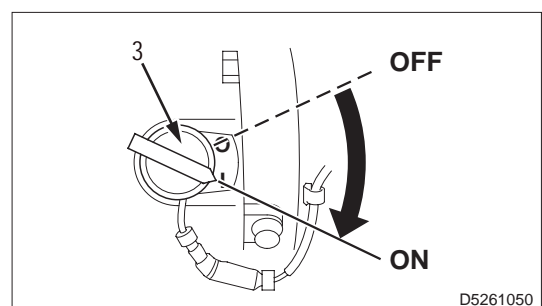
- 2 - Turn choke control (2) to the closed position (C).

WARNING

- Do not leave the choke control closed when the engine is hot or the air temperature is high.



- 3 - Turn the engine switch (3) to the ON position.

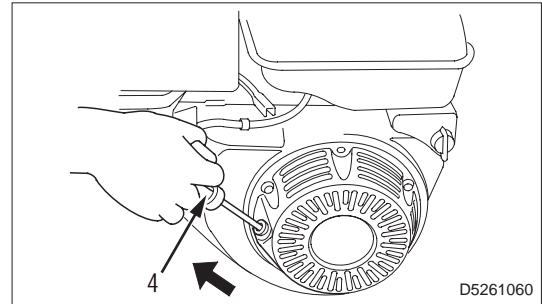


6. Operation

- 4 - Pull the start handle (4) until you feel resistance, then pull vigorously in the arrow's direction.
- 5 - Gently return the starter handle to its position, without hitting the engine.

Important

- When the engine starts, the machine immediately reaches maximum speed for about 7 seconds, and then automatically decreases to the lowest speed.
- During operation, the engine speed increases to a maximum when power is drawn during welding or auxiliary power supply of power tools.

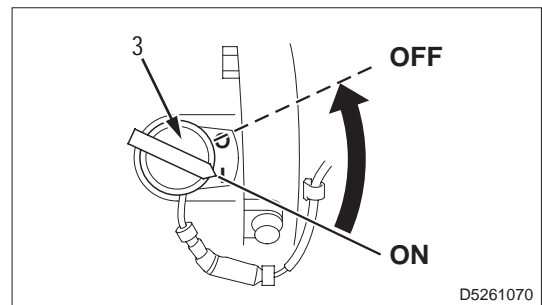


6.3.2 Stopping the engine

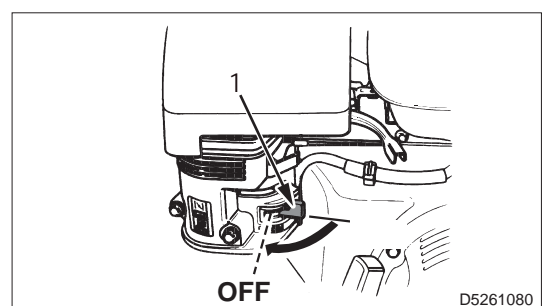
WARNING

- Before stopping the engine, disconnect or close any load connected to the system auxiliary generation and stop the welding.
- In case of emergency, turn the engine switch (3) to the OFF position.

- 1 - Wait for the engine to decrease the rotations to the minimum speed (about 6-7 seconds after the loads are disconnected), then wait a few minutes for it to cool down.
- 2 - Turn the emergency switch (3) to the OFF position.



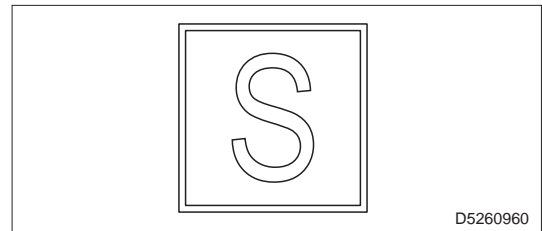
- 3 - Turn the fuel valve (1) to the OFF position.



6.4 Engine driven welder operation

This symbol (standard EN 60974-1 – safety requirements for arc welding equipment) indicates that the engine driven welder is designed to be used in environments with an increased risk of electric shock.

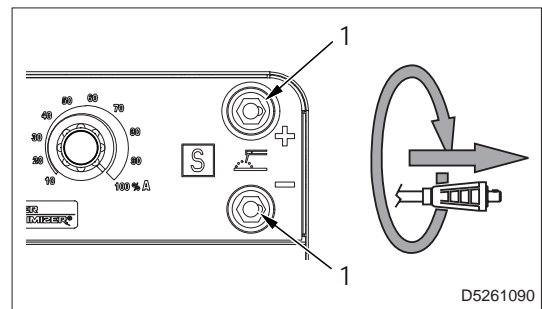
- To reduce the risk of electromagnetic interference, use the minimum length of welding cables and keep them close and low (e.g. on the floor).
- For welding cables up to 10 m long, a section of 35 mm² is recommended; if it is necessary to use longer cables, increase the section proportionally.
- All electrodes on the market can be used.



6.4.1 Welding cables connection

The cables must be connected with the engine off.

- 1 - Insert the welding cable plugs in sockets (1) and turn them clockwise to lock them.
- 2 - Make sure that the grounding clamp - whose cable must be connected to the negative socket or to the positive socket according to the type of electrode - makes a correct contact and that it is as close as possible to the welding position.



WARNING

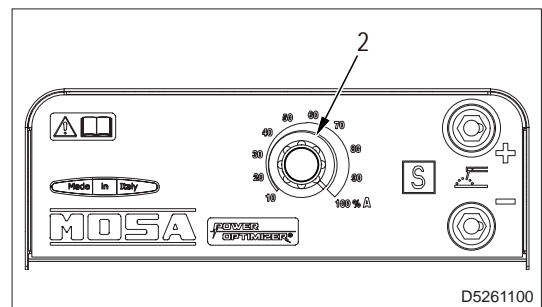
- Make sure that the two polarities of the welding circuit do not come into contact with each other.

- 3 - Carefully tighten the output cables to the welding sockets. If they are loose, they can cause overheating issues and damage bushings, cables, etc.

6.4.2 Adjusting the welding current

The welding current is continuously regulated by the knob (2).

- If brought to a minimum (fully rotated counter-clockwise), the output current is about 20A.
 - If rotated to a maximum (fully rotated clockwise), the current is adjusted to its maximum value.
- 1 - Place the knob (2) on the required current value according to the electrode diameter and type.



Knob reference	Welding current range		
	MW 200	MW 250	Accuracy
10 %	20A	25A	± 10 %
20 %	40A	50A	± 10 %
30 %	60A	75A	± 10 %
40 %	80A	100A	± 10 %
50 %	100A	125A	± 10 %

Knob reference	Welding current range		
	MW 200	MW 250	Accuracy
60 %	120A	150A	± 10 %
70 %	140A	175A	± 10 %
80 %	160A	200A	± 10 %
90 %	180A	225A	± 10 %
100 %	200A	250A	± 10 %

6.4.3 Duty cycle



CAUTION

- If the declared time or current values of the duty cycle are exceeded, the engine driven welder could be irreparably damaged.

The duty cycle is the percentage of time for which it is possible to weld, at the declared welding current, in a 10 minute period.

For instance, a 60% duty or service cycle, with declared current of 200A, indicates that it is possible to weld for 6 minutes with a maximum welding current of 200A, and that in the next 4 minutes it is necessary to let the engine driven welder run without taking welding current.

6.4.4 Welding arc striking

- When the machine runs without load and with the engine running at idle speed, there may be a slight delay in the ignition of the electrodes, due to the low no-load voltage of the engine driven welder.
- Always ensure a good metal-to-metal contact between the metal core of the electrode and the work-piece.
- After the electric arc is interrupted, the tip of the electrode forms a cone.
To use the same electrode in welding operations, it may be necessary to remove the cone to allow the metal core of the electrode to make contact.

6.4.5 Simultaneous use of welding and auxiliary generation functions

The declared welding currents refer to the absence of electrical power supplied; similarly, the declared electrical power refers to the absence of welding current supplied.

If welding and auxiliary generation are used simultaneously, refer to the operating limits for the engine driven welder, shown in the following table.

MAGIC WELD 200						
Welding current range	≥ 175A	150A	125A	100A	75A	0A
230V generation power	0kVA	1kVA	2kVA	2.7kVA	3kVA	3kVA
110V generation power	0kVA	1kVA	1.8kVA	1.8kVA	1.8kVA	1.8kVA

MAGIC WELD 250						
Welding current range	≥ 200A	175A	150A	125A	100A	0A
230V generation power	0kVA	1kVA	2kVA	2.7kVA	3kVA	3kVA
110V generation power	0kVA	1kVA	1.8kVA	1.8kVA	1.8kVA	1.8kVA

6.5 Setting the engine speed

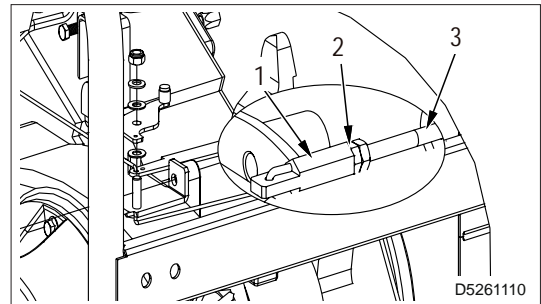
- When the engine starts, the machine immediately reaches maximum speed for about 6/7 seconds, and then automatically decreases to the lowest speed.
- During operation, the engine speed increases to a maximum when power is drawn during welding or auxiliary power supply of power tools.
- The engine speed increases to a maximum during welding at the minimum contact of the electrode tip on the workpiece, and during power generation by withdrawing a minimum load of 250-300W.
- If no power is withdrawn, it returns to the minimum speed after about 7 seconds.

6.5.1 Checking and calibrating the minimum speed

- Perform the check with a cold engine.
- Start the engine and wait for about 7 seconds until the speed drops to a minimum.
The correct value of the minimum speed corresponds to 47-50 Vdc on the welding sockets, equivalent to about 2650 rpm.

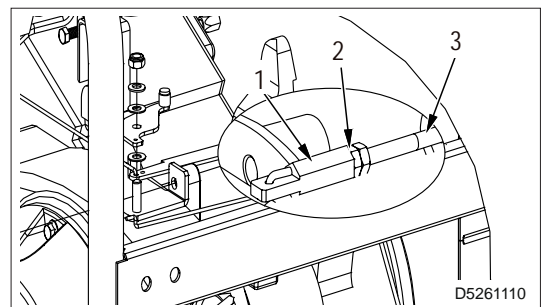
If the minimum welding voltage is too low

- 1 - Using an 8mm wrench, hold the pin (1).
- 2 - Using a 7 mm wrench, loosen the nut (2).
- 3 - Using a 7 mm wrench, rotate the pin (3) clockwise by 1-3 mm; extending the length of the pin increases the minimum speed.
- 4 - Tighten the nut (2) on the pin (1) and check the minimum speed value.



If the minimum welding voltage is too high

- 1 - Using an 8mm wrench, hold the pin (1).
- 2 - Using a 7 mm wrench, loosen the nut (2).
- 3 - Using a 7 mm wrench, rotate the pin (3) counter-clockwise until the nut (2) and the pin (3) are in contact.
- 4 - Tighten the nut (2) on the pin (1) and check that the value is correct.



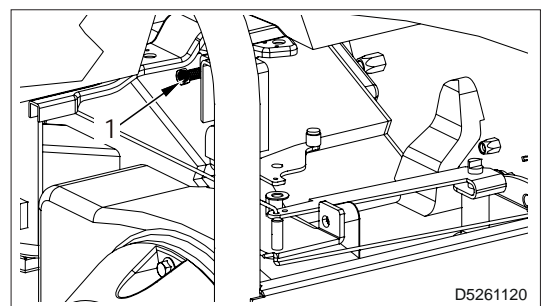
6.5.2 Checking and setting the maximum speed

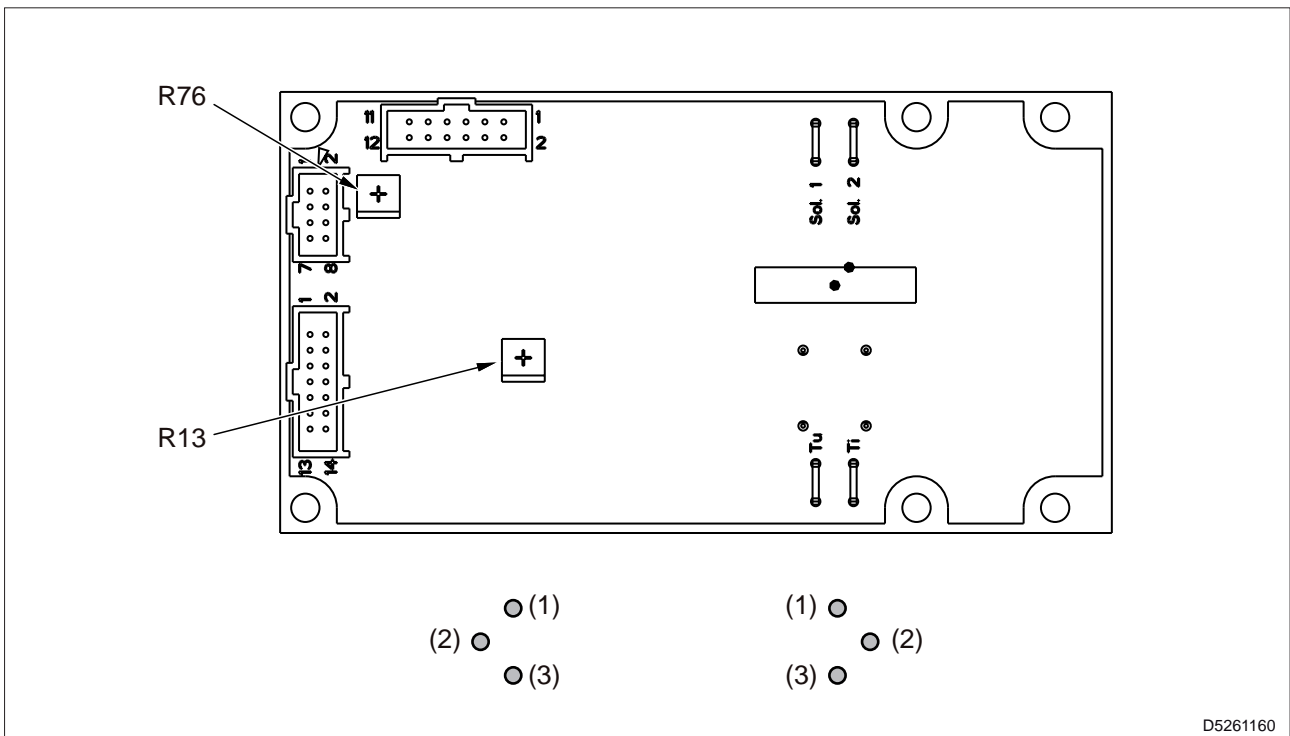
Check

- 1 - Measure the no-load welding voltage at the maximum engine speed.
Voltage must be 69-71V.

Set-up

- 1 - Loosen the nut that secures the throttle lever.
- 2 - Turn the screw (1) clockwise to decrease the maximum speed and counter-clockwise to increase it.
- 3 - Tighten nut to lock the throttle lever.





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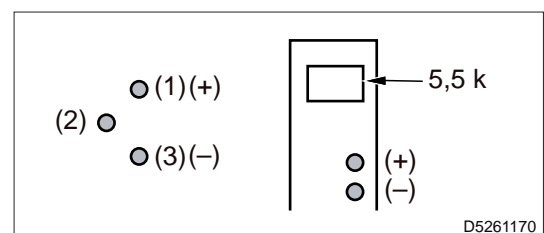
Each time the welding board is replaced, you should check the settings before installing it on the engine driven welder.

Check the settings by measuring the ohmic resistance of the 2 trimmers R13 and R76, and checking that they correspond to the values indicated in the following table.

		Magic Weld 200	Magic Weld 250
R13	Max. welding current	5.5 k Ω \pm 5%	3.1 k Ω \pm 5%
R76	Power Optimizer	45-46 k Ω	43-44 k Ω

Resistance should be measured between terminals (1) and (3) of the two trimmers R13 and R76. Terminal (2) should not be considered.

Example of R13 set-up for the Magic Weld 200 model



D5261170

6.6 Generating set operation



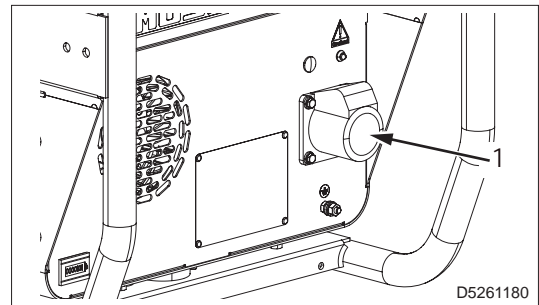
WARNING

- It is forbidden to connect the set to the public grid and/or other source of electricity.
- The machine must not be grounded.

6.6.1 Auxiliary generation in AC 230V/50Hz (60Hz) or 115V/50Hz (60Hz)

Auxiliary power generation is available via the 3-pole socket (1).

- The machine single-phase generation has been designed to supply small power tools (grinding wheels, drills, etc.), generally at the service of welding operations with fast and safe connections, and with no mandatory ground rod. For the details, see “6.1 Grounding”.
- Check that the electrical characteristics of the devices to be supplied (voltage, power, frequency) are compatible with those of the machine.
Different voltage or frequency values can irreparably damage the electrical equipment.
- Connect the utilities to be powered using suitable cables and plugs, in excellent condition.



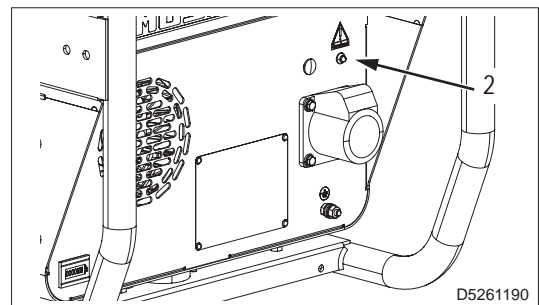
6.6.2 Overload protection (overcurrent)

- Auxiliary power generation is provided by the AC Inverter positioned inside the engine driven machine.
- The AC Inverter is equipped with a circuit for overload (overcurrent) protection that limits the current supplied to a preset value.
- If the protection is tripped, the AC voltage is immediately disconnected on the socket, signalled by the flashing red LED (2).

Note:

When the red LED (2) lights up with a fixed light during auxiliary generation, it warns that the current supplied has exceeded the declared value and that the voltage at the socket will be interrupted within a short time. Immediately decreasing the connected load prevents the protection from tripping.

- If the protection is tripped, check that the current absorbed by the load does not exceed the declared auxiliary current.
- After the protection has tripped, switch off the machine; wait for the red LED (2) to stop flashing (about 30-40 seconds), then restart the machine to power the output socket again.



7. Maintenance



WARNING

- Before proceeding with maintenance, carefully read section “2. Safety”.
- For engine maintenance, refer to the engine maintenance manual.

7.1 Refuelling

- Use fuel and lubricants according to the ambient temperature.

7.1.1 Fuel

- Only use gasoline and fill the tank with clean fuel.
- Keep the engine off during refuelling.
- Fill the fuel tank up to the lower edge of the maximum level, and immediately dry any spilled fuel.

7.1.2 Engine oil

- To ensure adequate protection of the engine and keep it efficient for a long time, use only detergent oil for 4-stroke automotive engines. Using different oils can reduce the life of the engine.
- The viscosity must be appropriate to the ambient temperature.
- The oil to be used must comply with API SJ specifications or subsequent (or equivalent) specifications.

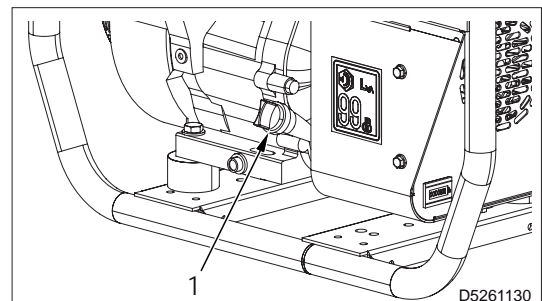
Refuelling and checks



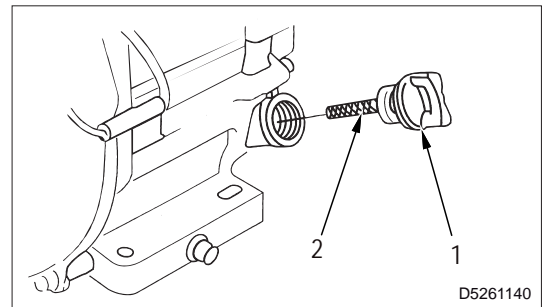
WARNING

- Before refuelling, read “2.8 Precautions during fuel and engine oil filling” carefully.
- Do not introduce more oil than indicated in the engine manual. Combustion of excess oil may result in increased engine revolutions.

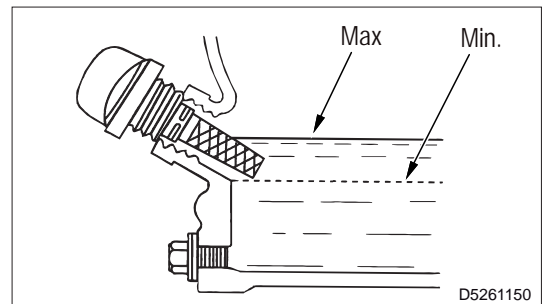
- 1 - Remove the engine fill cap (1) and wipe the oil level dipstick with a cloth.



- 2 - Insert the cap into the filler neck without screwing it in, and remove it again to check the oil level on the dipstick (2).



- 3 - If the oil level is near or below the lower limit mark (Min.), fill the oil to the upper limit mark (Max.) (lower edge of the filler hole).



7.2 Clean air filter

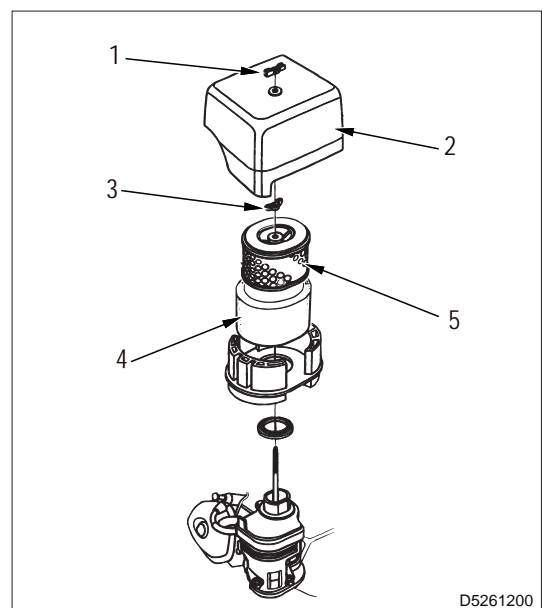
7.2.1 Inspection

- 1 - Remove the air filter cover and inspect the filter elements.
- 2 - Clean any dirty filter elements and replace the damaged ones. If an oil bath air filter is present, also check the oil level.

7.2.2 Cleaning

Double filtering element type

- 1 - Remove the air filter cover (2) nut (1), then remove the cover (2).
- 2 - Remove the wing nut (3) from the air filter and remove the filter.
- 3 - Remove the foam filter (4) from the paper filter (5).
- 4 - Inspect both filter elements and replace them if damaged. Always replace the paper element at the scheduled interval



7.3 Storage

- Carefully clean the fairings and all other machine parts.
- If the machine is not used for more than 30 days, make sure that the machine is protected from heat sources and from weather phenomena that can cause rust, corrosion of the components and damage to the machine.
- Completely empty the tank and the carburettor from the gasoline present, as it could irreparably damage the components of the engine power supply circuit if it deteriorates. Also, this reduces the fire risk of gasoline vapours.
- Protect the machine with a case and store it in a dry place.
- Use qualified personnel to carry out the operations necessary for storage.
- For the correct engine storage, follow the instructions in the manual or contact the engine manufacturer's Technical Support.

7.4 Disposal



WARNING

- **Before refuelling, read “2.13 Precautions for disposal of waste material” and “2.14 Disposal of the machine”.**

In the event of disposal of the equipment or parts of it (oils, hoses, plastic materials, etc.), comply with the regulations in force in the country in which this operation is carried out.

8. Troubleshooting

8.1 Engine

Issue	Possible cause	Solution
The engine will not start, or starts and stops immediately.	1) Engine switch (28) in the OFF position. 2) No or insufficient oil in the engine. 3) Faulty engine stop device (oil-alert). 4) No fuel in tank or fuel tap closed. 5) Faulty or dirty spark plug. 6) Engine cold. 7) Other causes.	1) Set the switch to ON. 2) Refill or top up. 3) Replace. 4) Fill the tank. Open the fuel tap. 5) Clean or check and replace it if necessary. 6) Keep the CHOKE control in the "CLOSE" position for a longer period, after starting the engine 7) Refer to the Engine Operation Manual.
The engine does not speed up. Inconstant speed. Poor power output from the engine.	1) Air or fuel filter clogged. 2) Poor fuel. 3) Overload.	1) Check the air filter. 2) Empty the tank and the carburettor. Fuel up with fresh petrol. 3) Check the connected loads and reduce them if necessary.
Other engine issues or inconveniences	Refer to the Engine Use and Maintenance manual.	

8.2 Welding circuit

Issue	Possible cause	Solution
Lack of no-load voltage during welding.	1) Faulty welding control board. 2) Faulty Hall sensor. 3) Faulty chopper welding bridge. 4) Faulty alternator.	1) Request the intervention of the Support Service to replace the board. 2) Request the intervention of the Support Service to replace the Hall sensor. 3) Request the intervention of the Support Service to replace the chopper bridge. 4) Disconnect the welding and auxiliary output cables, and, using an ohmmeter, check the electrical resistance of the windings, as shown in "Table (1)".

Issue	Possible cause	Solution
Welding current not regular or not constant	1) Faulty welding control board 2) Faulty Hall sensor 3) Chopper bridge short circuit	1) Request the intervention of the Support Service to replace the board. 2) Request the intervention of the Support Service to replace the Hall sensor. 3) Request the intervention of the Support Service to replace the chopper bridge.
Engine always idling Engine always at maximum speed	1) Faulty welding control board 2) Auto Idle - Economizer system failure	1) Request the intervention of the Support Service to replace the board. 2) Check the resistance of the solenoid winding, it must be about 10 Ohms. Replace. Request the intervention of the Support Service.

Table (1)

Magic Weld 200 and Magic Weld 250 Winding resistors at 20 °C	
Outputs	mΩ
Welding	20.5
Yellow Cables R1 – S1 – T1 Auxiliary	560
Black Cables R2 – S2 – T2 Auxiliary	560



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