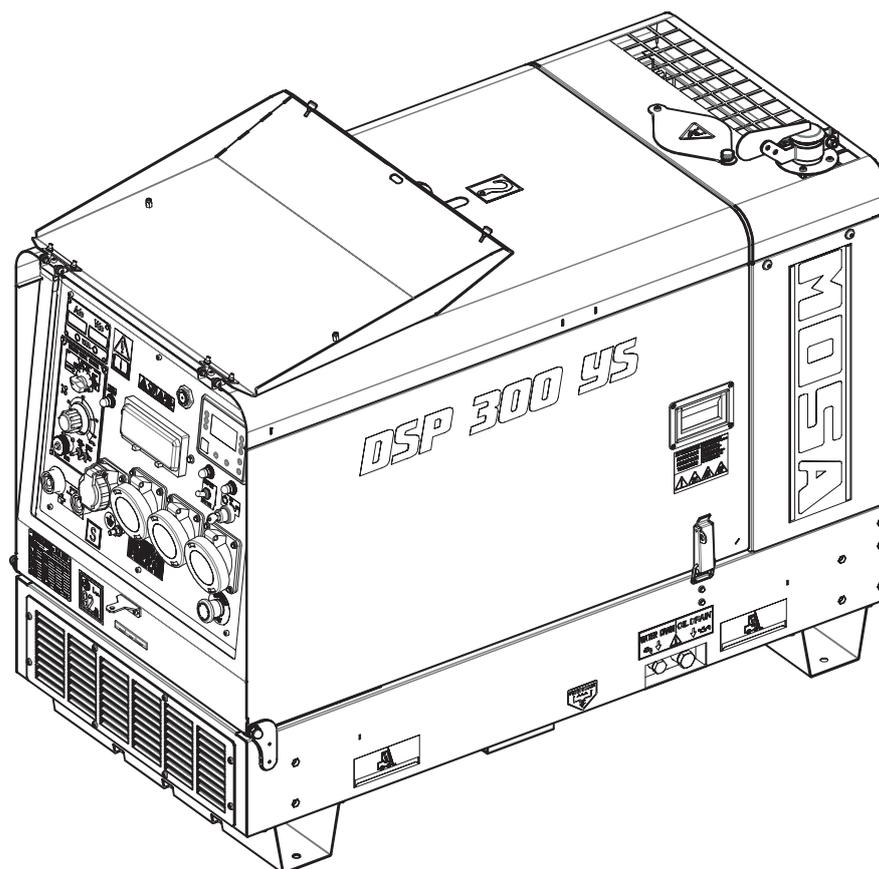


Use and Maintenance Manual



D5267420

Engine driven welder **DSP 300 YS**



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 DSP 300 YS engine driven welder (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 machine:

DSP 300 YS

Complies 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
- Noise Emission Directive for machines intended to operate outdoors 2000/14/EC as amended by 2005/88/EC and by Regulation 2024/1208/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
- The Noise Emission in the Environment by Equipment for use Outdoors - Regulations 2001/1701

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.

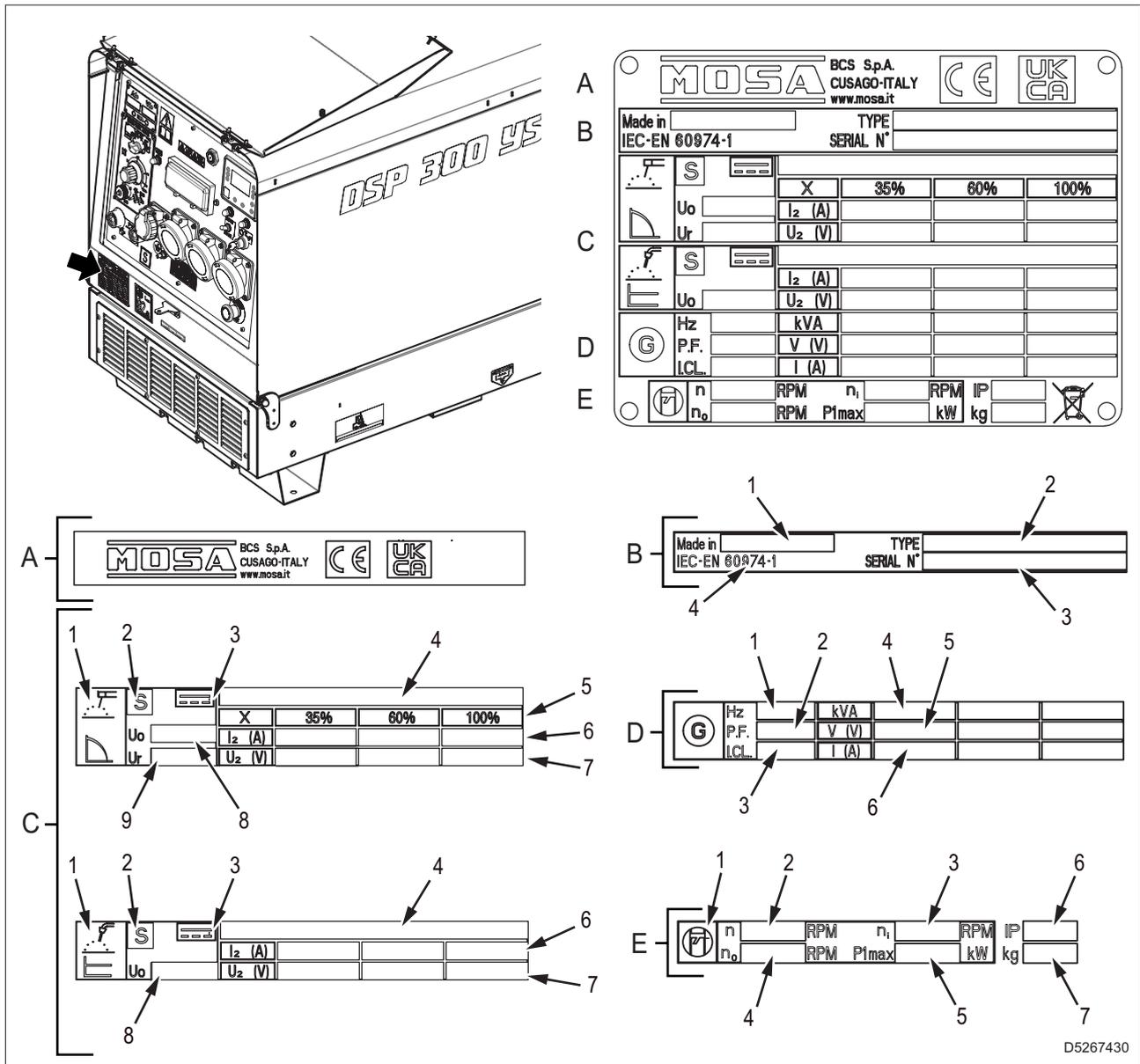


WARNING

- **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 specified on the ID plate applied in the area indicated in the figure. They are necessary for spare parts requests and communications with the Customer Service Department.

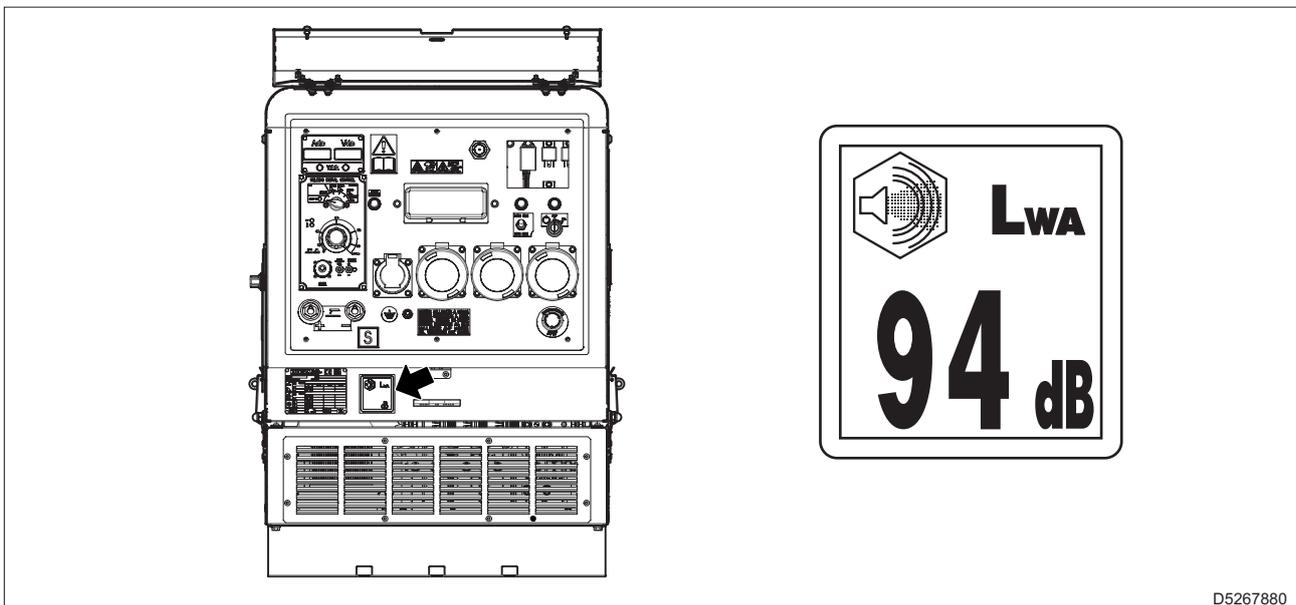


- A - Manufacturer's data
- B - Machine data
 - (1) Country and year of manufacture
 - (2) Model
 - (3) Serial number
 - (4) Technical standard reference
- C - Welding data
 - (1) Welding process
 - (2) Symbol for engine driven welders that can be used in environments with a higher risk of electric shock
 - (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(Hz)
 - (2) Rated $\cos \phi$ (power factor)
 - (3) Insulation class
 - (4) Rated power (kVA)
 - (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

1.9 Sound power level

The sound power level of the engine driven welder is given on the decal applied in the area indicated in the figure.



The value indicates the guaranteed sound power level in compliance with Directive 2000/14/EC.

- Sound power level (LWA) - 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.

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.

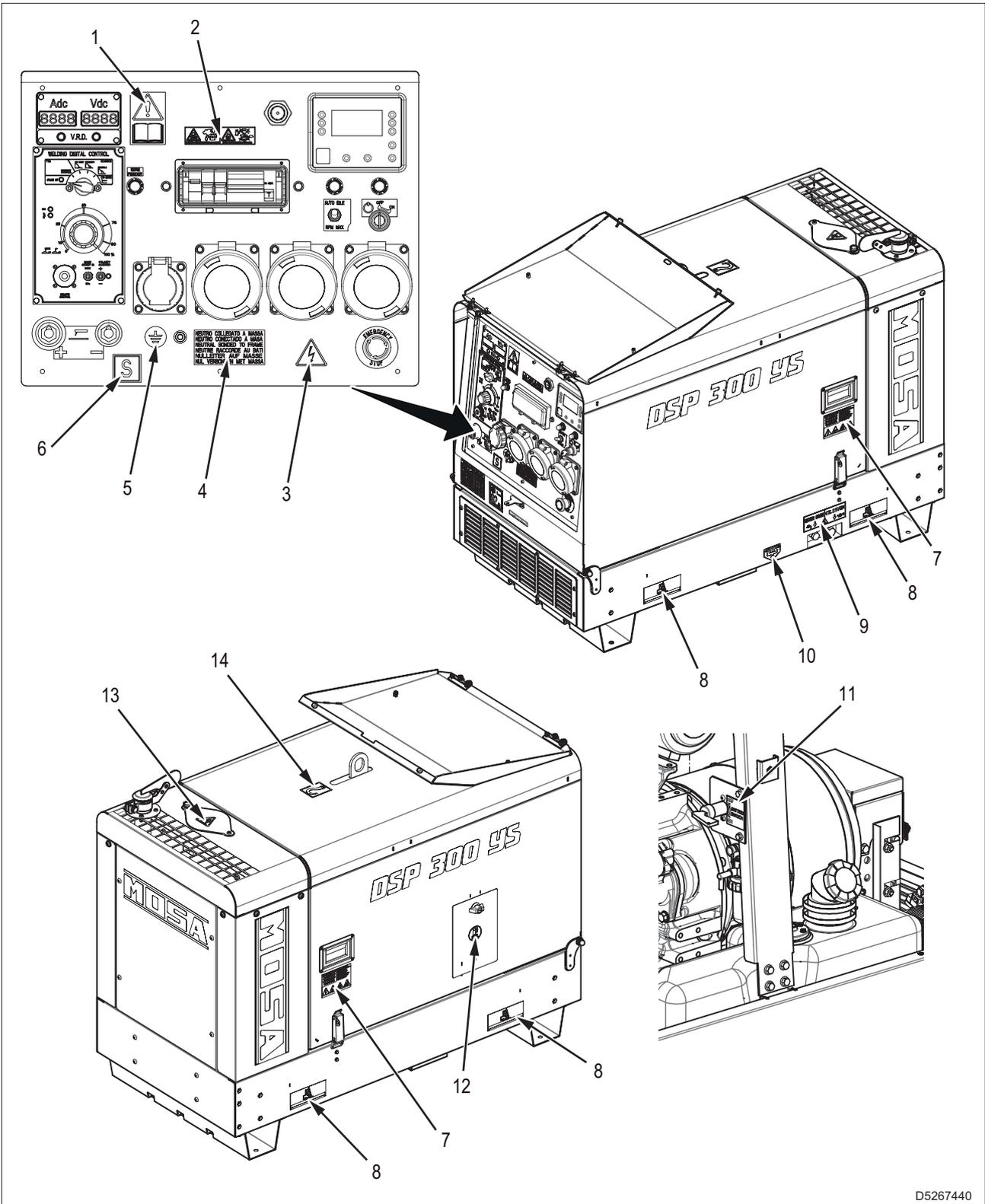
Important

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

Note

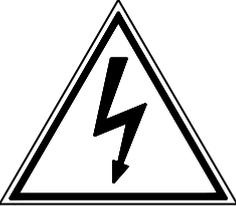
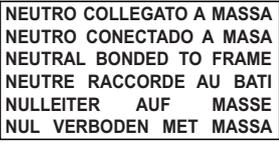
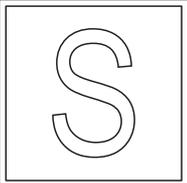
- This word is used to indicate further useful information.

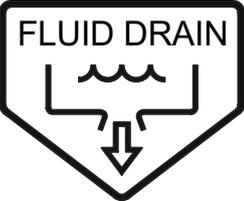
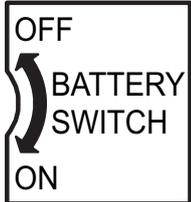
2.2 Positioning of safety decal and information

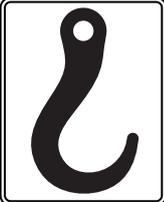


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2.2.1 Decal explanation

 <p>M734500253</p>	<p>Pos. 1 - Consult the manual Read the contents of the manual carefully before using the machine or carrying out maintenance operations on it.</p>
 <p>D5263040</p>	<p>Pos. 2 - 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>
 <p>M734500250</p>	<p>Pos. 3 - Electrical voltage hazard Stop the machine before carrying out checks or maintenance.</p>
 <p>D5264030</p>	<p>Pos. 4 - Neutral connected to ground Indicates that the star centre of the generator (Neutral) is connected to the grounding system.</p> <p> Important The absence of the decal on the machine indicates that the star centre of the generator (Neutral) is floating.</p>
 <p>D5264830</p>	<p>Pos. 5 - Ground terminal Indicates the connection point of the machine to a grounding system.</p>
 <p>D5260960</p>	<p>Pos. 6 - Safety marking Indicates that the engine driven welder may be used in environments with a higher risk of electric shock.</p>

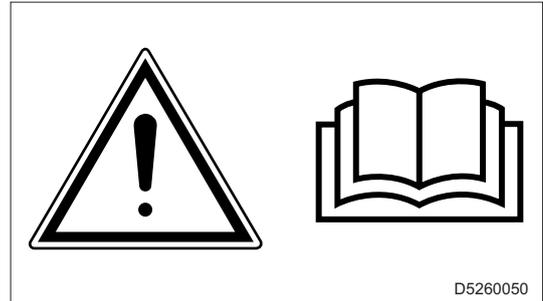
<div data-bbox="212 349 654 689"> <p>ATTENZIONE Fermare il motore prima di effettuare qualsiasi manutenzione ATTENTION Stop the engine before making any maintenance ATTENTION Arrêter le moteur avant d'effectuer toute manutention WARNUNG Motor abstellen, bevor man die Wartung durchführt</p>  </div> <p>MCP2T50G10250</p>	<p>Pos. 7 - 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>
 <p>M840760202</p>	<p>Pos. 8 - Lifting points with forklift truck</p>
<div data-bbox="183 1025 686 1205"> <p>WATER DRAIN OIL DRAIN</p>  </div> <p>M849000250</p>	<p>Pos. 9 - Draining the coolant and the engine oil</p>
<div data-bbox="300 1281 550 1482"> <p>FLUID DRAIN</p>  </div> <p>MCN4F40510250</p>	<p>Pos. 10 - Base liquids drainage</p>
<div data-bbox="338 1534 529 1736"> <p>OFF</p>  <p>ON</p> </div> <p>MC1PN10430271</p>	<p>Pos. 11 - Battery disconnect switch</p>
<div data-bbox="331 1792 539 1998">  </div> <p>M107011150_02</p>	<p>Pos. 12 - Fuel filling neck</p>

 <p>M8B9700250</p>	<p>Pos. 13 - Coolant high temperature hazard Do not remove the cap when the engine is at the working temperature (high). Steam or the high temperature of the coolant leaking from the radiator can cause injury and/or burns to people.</p>
 <p>M209710202</p>	<p>Pos. 14 - Lifting hooking point</p>

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.



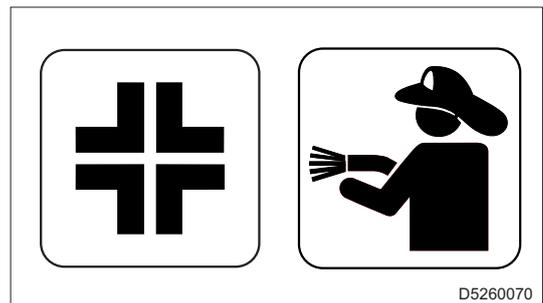
2.3.1 Personal protective equipment

- 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, coolant

- Avoid approaching any flame to flammable substances such as fuel, oil, coolant.
- 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 engine, exhaust manifold, muffler, battery, or inside the bottom guards.

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.

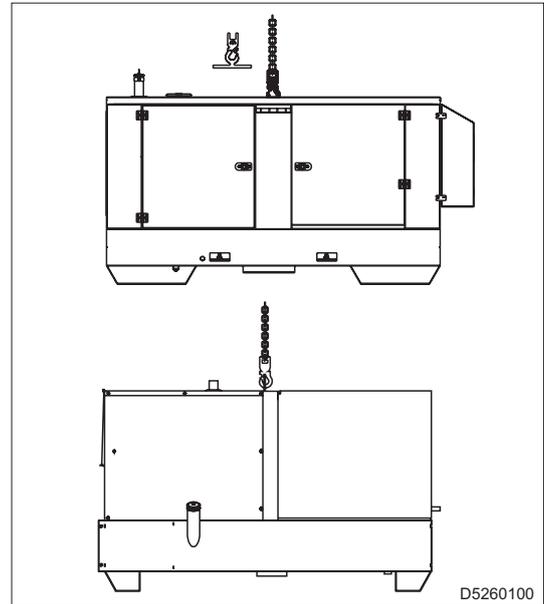
2.4.4 Fire caused by piping

- 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 Handling precautions

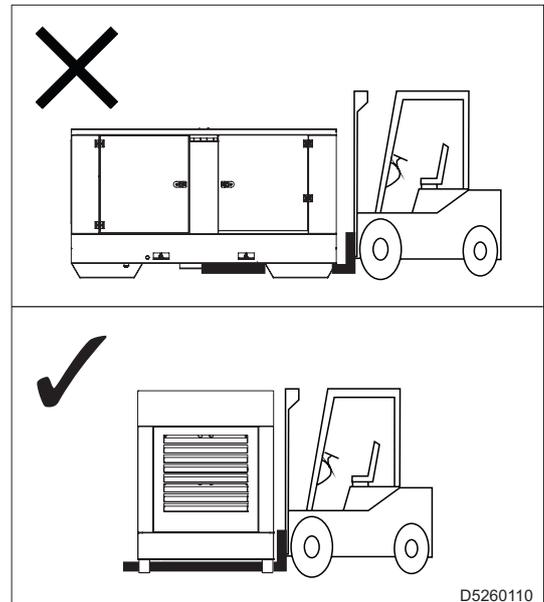
2.5.1 Lifting by chains or ropes

- Make sure that the handling area is clear of obstacles and people.
- Lift the machine using only the lifting points provided and indicated by the decals.
- The operator carrying out the lifting work must be qualified to work with the crane.
- Always use lifting equipment adequately sized and controlled by authorized bodies.
- 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.
- It is forbidden to fix on the frame of the machine objects or accessories that modify the weight and centre of gravity and subject the lifting points to unexpected stresses.
- 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.

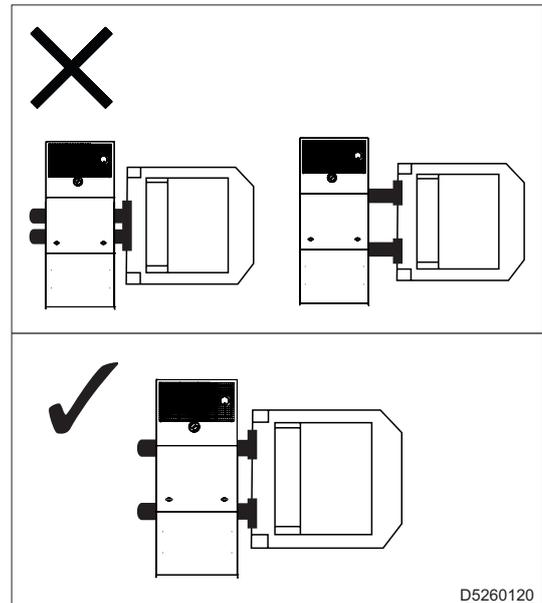


2.5.2 Lifting by forklift

- Insert the frame using the pockets indicated by the relative decals.
- Fork the machine sideways to allow the forks to protrude from the opposite side.



- Widen the forks as much as possible to distribute the weight evenly while keeping the machine horizontal.



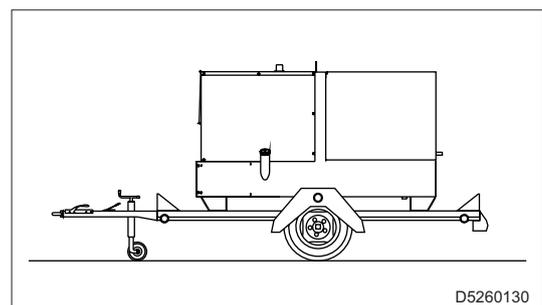
2.5.3 Transport with towing carriages

- Do not tow the machine manually or with tow vehicles without the intended towing carriage.
- Check the correct assembly of the machine to the drive device.
- Always check that the towing vehicle hook is suitable for towing the total mass (trolley+machine).
- Do not tow the trolley if the coupling devices are worn out or damaged.
- Check the correct pressure of the carriage tires.
Do not replace the tyres with types other than the original ones.
- Check that the fixing bolts of the carriage wheels are present and pulled.
- Do not park the machine with the towing carriage on heavily tilted surfaces.
- In case of stops during transport, always apply the parking brake or lock the wheels with safety wedges.
- Do not tow the trolley on rough roads.

Transport with fast towing trolley

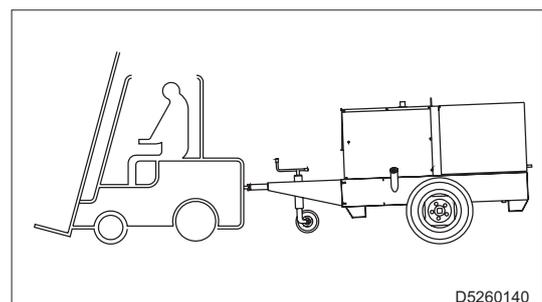
The fast towing trolley is approved for transport on public roads.

- Check the efficiency of the optical braking and signalling devices of the towing carriage.
- Do not exceed the maximum speed of 80 km/h with the towing carriage and comply with the regulations in force for road traffic.



Transport with slow towing trolley

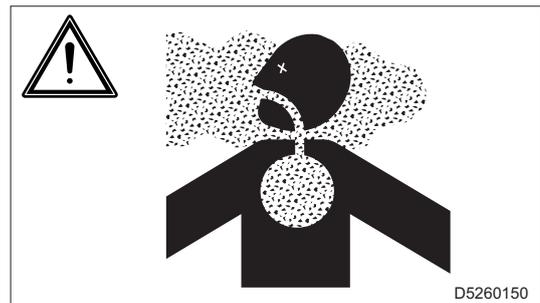
- Do not use the slow towing trolley on public roads. It can only be used in private and enclosed areas.
- The maximum speed allowed is 40 km/h on level surfaces (asphalt or concrete).
In any case, adjust the speed to the type of terrain.



2.6 Precautions for positioning the machine

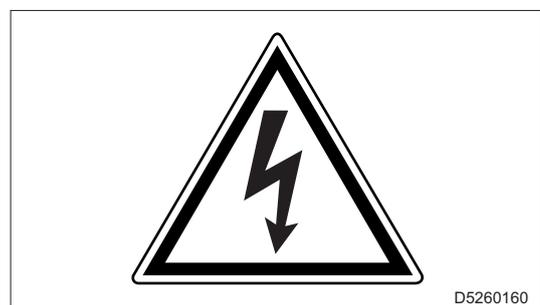
2.6.1 Positioning site precautions

- 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, the installation should be designed by specialized technicians and carried out in a workmanlike manner.



2.6.2 Precautions for electric connections

- Connect the machine to a grounding system according to the regulations in force at the place of installation.
- Use the ground terminal located on the front of the machine.
- 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 the doors 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. When the machine is stopped, before covering it, 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 generator could cause a fire.
- Exhaust gases must be conveyed so that they are not sucked out of the fans of the alternator or engine.
- The cover materials must be non-combustible; incandescent pins can escape from the exhaust pipe.

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

- The machine complies with the Noise Emission Directive for machines intended to operate outdoors 2000/14/EC. However, there is still a risk from noise that can cause temporary or permanent hearing problems.
- The actual risk depends on the operating conditions of the machine, the distance between the operator and the machine and how long the operator remains near the machine.
- The guaranteed sound power level indicated, along with the sound pressure level at 7 metres, given in Chapter "3. Technical data", provide an indication of the machine's noise contribution, allowing for an assessment of the noise risk in the work environment.
- The adoption of specific measures to reduce the noise risk (barriers, earmuffs, earplugs) must be evaluated by the workplace safety manager.

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.
 - Equipment used for calibration or measurement.

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

- 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

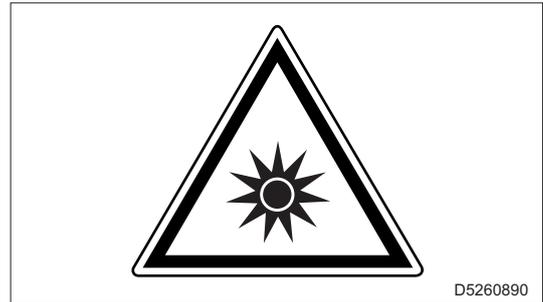
Selective screening and shielding of other cables and equipment in the surrounding area may alleviate problems of interference. Screening of the entire welding installation may be considered for special applications

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.

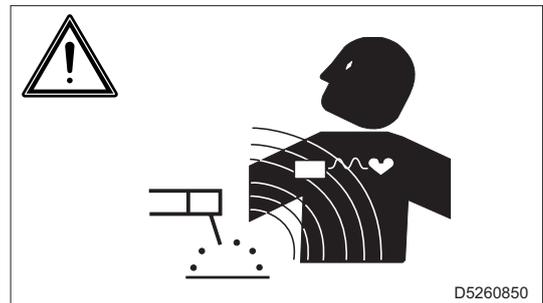
2.11.1 Precautions in the workplace

- 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.

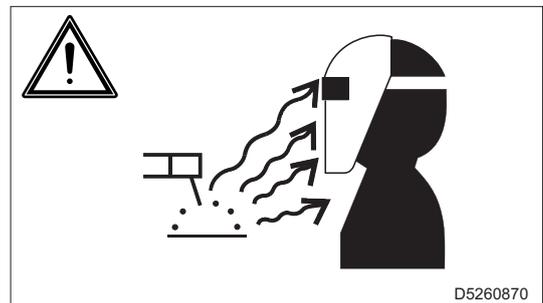


2.11.2 Welding precautions

- 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.

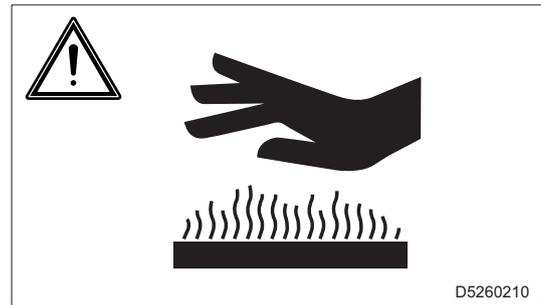


- During welding, sparks can cause burns. Adopt the following Personal Protection Equipment (PPE):
 - Welding mask with filters according to Standards EN169 or EN379.
 - Soldering iron caps for head protection.
 - Clothing and gloves resistant to heat and direct contact with flames or sparks.
 - Shoes 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.

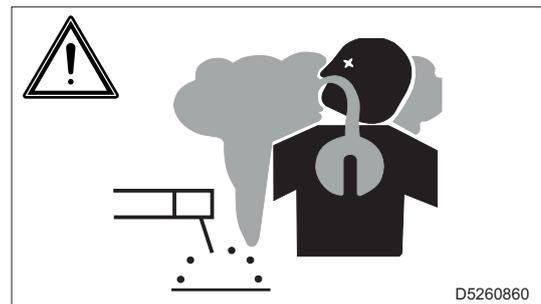


Safety

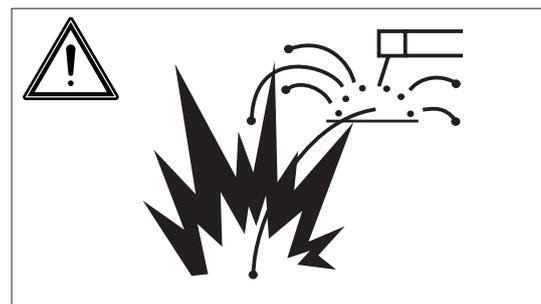
- Welding generates large amounts of heat. Welded surfaces and materials can cause serious burns. Use gloves and pliers when touching or moving materials in the work area.



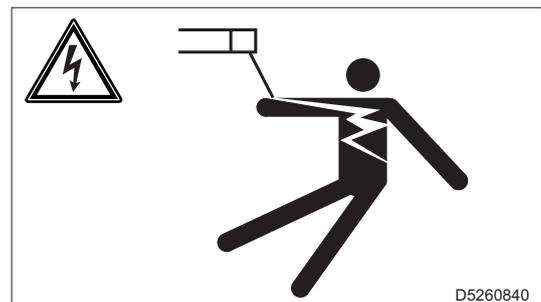
- Welding generates fumes and gases that are hazardous to health. Use sufficient ventilation or a fume extractor to keep fumes and gases away from the breathing area.



- 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 sealer on the welding table or on any other surface to prevent the risk of accidental ignition of the sealer.



2.12 Checks and precautions when using gas cylinders

- Follow the manufacturer's instructions and consult local safety regulations.
- Check that the gas cylinder is not damaged.
- Check that the gas cylinder contains the correct shielding gas for the process.
- Check that the control valve is in good working order, is suitable for the gas and pressure being used and is in good condition.
- Check that the hoses and fittings connected to the cylinder are suitable for the application and are in good condition.
- If necessary, use a soapy solution or a gas detector to check for gas leaks.
- Keep cylinders upright and securely chained to a trolley or fixed support.
- Do not drop or hit the cylinders to avoid damaging the valves or cylinder body.
For transport, use suitable trolleys or supports.
- Position cylinders away from areas where they may be subject to impact or damage and away from welding areas and sources of heat, sparks or flame.
- Do not expose the cylinders to extremes of temperature, such as excessive heat or cold, as this may affect the internal pressure of the cylinders.
- Use gas cylinders in ventilated areas to prevent the accumulation of gas in the air.
- Keep your face away from the gas control valve when opening it.
- Observe the maximum working pressure specified for the cylinder.
The use of higher pressures may cause damage to the cylinder and increase the risk of accidents.
- Do not use naked flames near gas cylinders.
- Carry out regular checks and maintenance.
- When the cylinder is not in use, put on the valve protection caps.



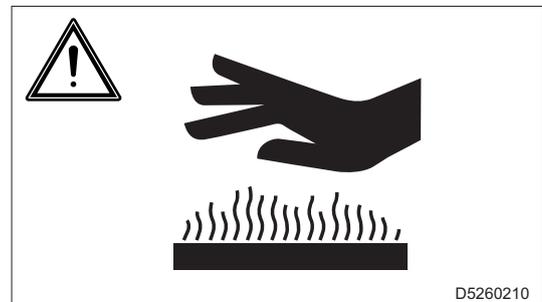
2.13 Maintenance precautions

- Maintenance must be performed by qualified personnel.
- During maintenance, if unauthorized persons start the machine, there is a danger of serious personal injury or death. Do not allow unauthorized persons to approach the machine.
- Stop the machine and turn the battery disconnect switch to off.
- To avoid injury, do not perform maintenance with the engine running, if it is not necessary.

- 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.

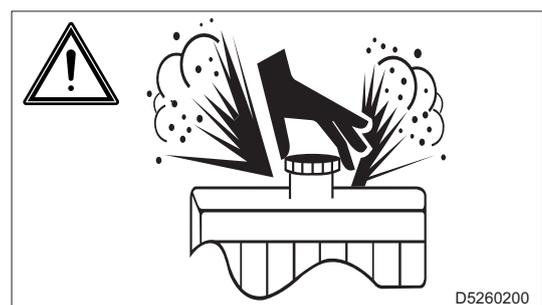


- Do not touch the engine, pipes and muffler during operation or immediately after shut-off. Allow the engine to cool before performing any operation.
- When discharging the engine oil, the engine must be hot. Engine oil may come into contact with the skin and cause burns.
- Do not remove the guards 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.

- Do not remove the radiator cap with the engine running or hot. The coolant may leak and cause serious burns.



- Do not operate the battery without using protective gloves. The battery liquid contains corrosive sulphuric acid.

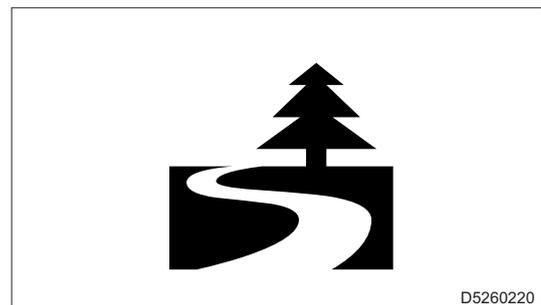


- Do not smoke, avoid open flames and sparks near the battery; exhaled vapours may cause the battery to explode.



2.14 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.
- For further information, visit <https://bcsgroup.it/it-it/sostenibilita/#etichettatura-ambientale> or scan the QR code.



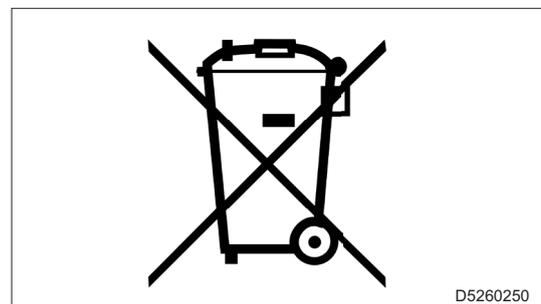
2.15 Disposal of the machine

This machine is classified as Electrical Equipment.

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

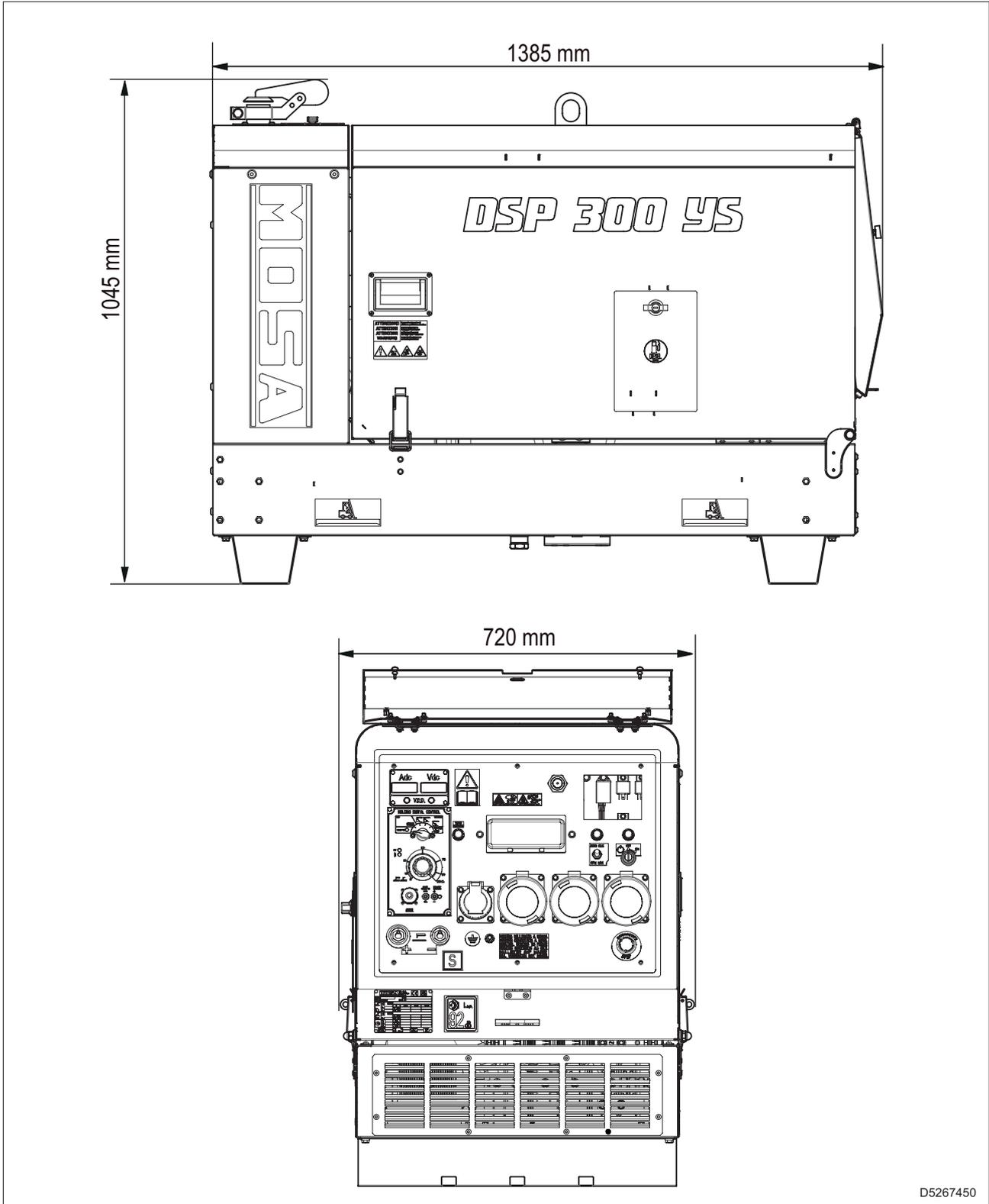
The symbol affixed to the product or to the documentation states that, at the end of its useful life, the machine must be disposed of separately.

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 Machine dimensions



D5267450

3.2 Technical data

Welding	
SMAW (Stick - Coated Electrode) - DC Direct Current	
GTAW (Tig - Tungsten Electrode) - DC Constant Current	
GOUGING - DC constant current	
GMAW (Mig - Solid wire) - DC constant voltage	
FCAW (Flux Cored Wire) - DC constant voltage	

Welding current	
SMAW (Stick - Coated Electrode)	20A/20.8V - 350A/28V
IEC - Rating	20A/20.8V - 300A/32V
Duty Cycle	300A / 32V / @ 60%
	250A / 30V @100%
Current adjustment	Continuous
No-load voltage (ignition)	67 Vdc
GTAW (Tig - Tungsten Electrode)	20A/10.8V - 350A/24V
Duty Cycle	350A / 24V / @ 35%
	300A / 22V / @ 60%
	250A / 20V / @ 100%
Current adjustment	Continuous
No-load voltage (ignition)	67 Vdc
GMAW (Mig - Solid Wire) FCAW (Flux Cored wire)	40A/16V - 350A/28V
IEC - Rating	40A / 16V – 300A/29V
Duty Cycle	300A / 29V / @ 60%
	250A / 26.5V / @ 100%
Voltage regulation	Continuous : 15-40 V

Auxiliary generation	
Auxiliary generation 400V 3~ Cosφ 0.8	10 kVA (8 kW) / 400V / 14.4A
Auxiliary generation 400V 3~ Cosφ 1	11.5 kVA / 400V / 16.6A
Auxiliary current generation 230V 1~	5 kVA (5 kW) / 230V / 21.7A
Auxiliary generation 110V 1~ (CTE)	2.5 kVA (2.5 kW) / 110V / 22.7A
Auxiliary current generation 48V 1~	5.0 kVA (5.0 kW) / 48V / 104A
Frequency	50 Hz
Cosφ	0.8 - 1

Engine	
Brand/Model	YANMAR 3TNM74
Cooling system/type	4-stroke / water diesel
Cylinders / Displacement	3/0.993 l (993 cm ³)
Net stand-by power ⁽¹⁾	14.1 kWm (19.2 HP)
Net PRP power ⁽²⁾	12.8 kWm (17.4 HP)
Speed	3000 rpm
Fuel consumption (75% PRP)	3.3 l/h
Oil sump capacity (max.)	3.4 l
Starter	Electric

General specifications	
Fuel tank capacity	38 l
Running time (60% welding)	13 h
Protection	IP 23S
Weight (Dry)	410 kg
Acoustic pressure LpA	66dB(A) @ 7m
Guaranteed sound power LWA	94 dB(A)

Alternator	
Type	Asynchronous three-phase-brushless
Insulation class	H

Engine horsepower

Power declared according to ISO 8528-1 (temperature 25°C, relative humidity 30%, altitude 100 m above sea level).

⁽¹⁾ Stand-by = maximum power available for use at variable loads for a number of hours/year limited to 500h. Overloading is not allowed.

⁽²⁾ Prime power PRP = maximum power available for use at variable loads for an unlimited number of hours/year.

The average power withdrawable during a 24h period must not exceed 80% of the PRP.

An overload of 10% is allowed for one hour every 12 hours.

Operating temperature

The welding current and auxiliary generation power values are indicated for operation within the following temperature range: - 10°C ÷ + 40°C.

For temperatures above 40°C, it is necessary to apply a reduction.

Information on IP protection rating

The IP protection rating declared for this engine driven welder is IP 23S.

The machine is designed to be used and stored outdoors, but it cannot be used in case of rain, unless it is adequately protected.

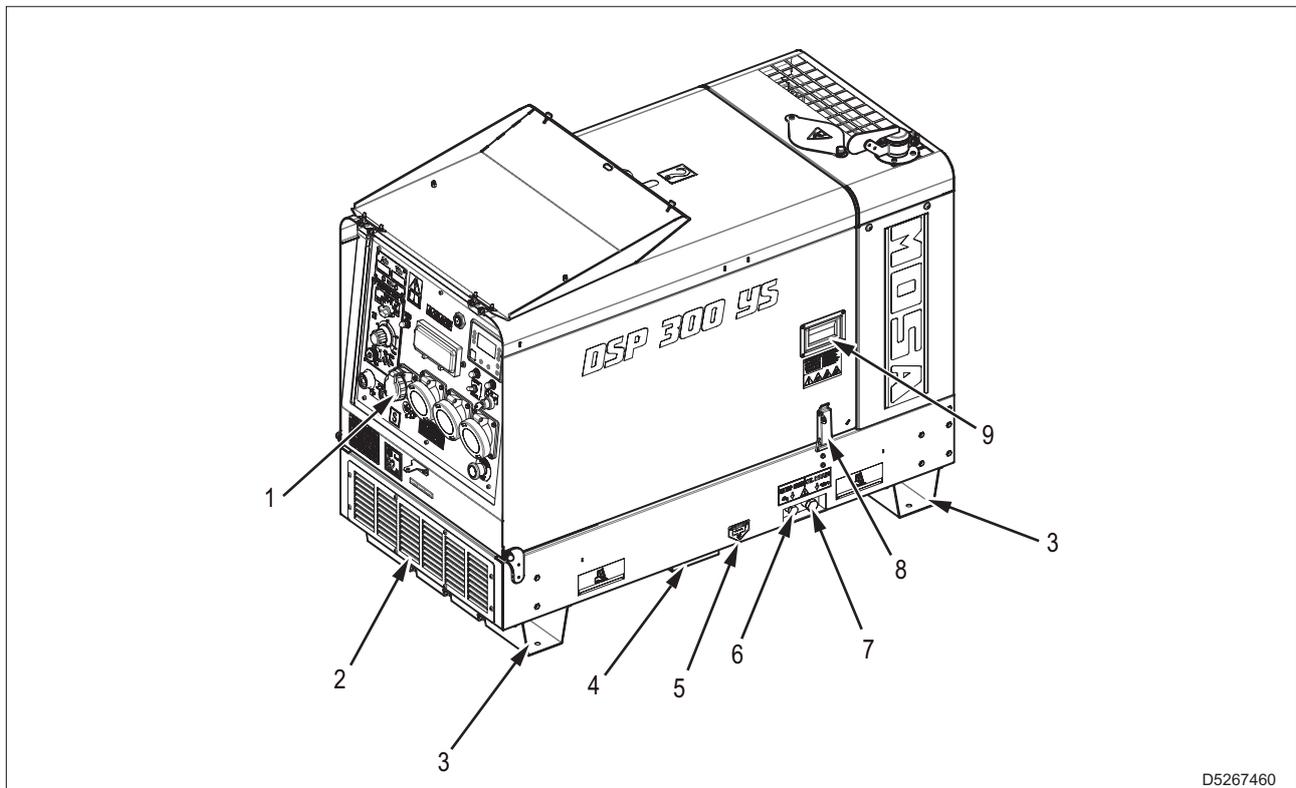
4. Description

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

It can also supply three-phase and single-phase alternating current to power electrical equipment.

4.1 Main components

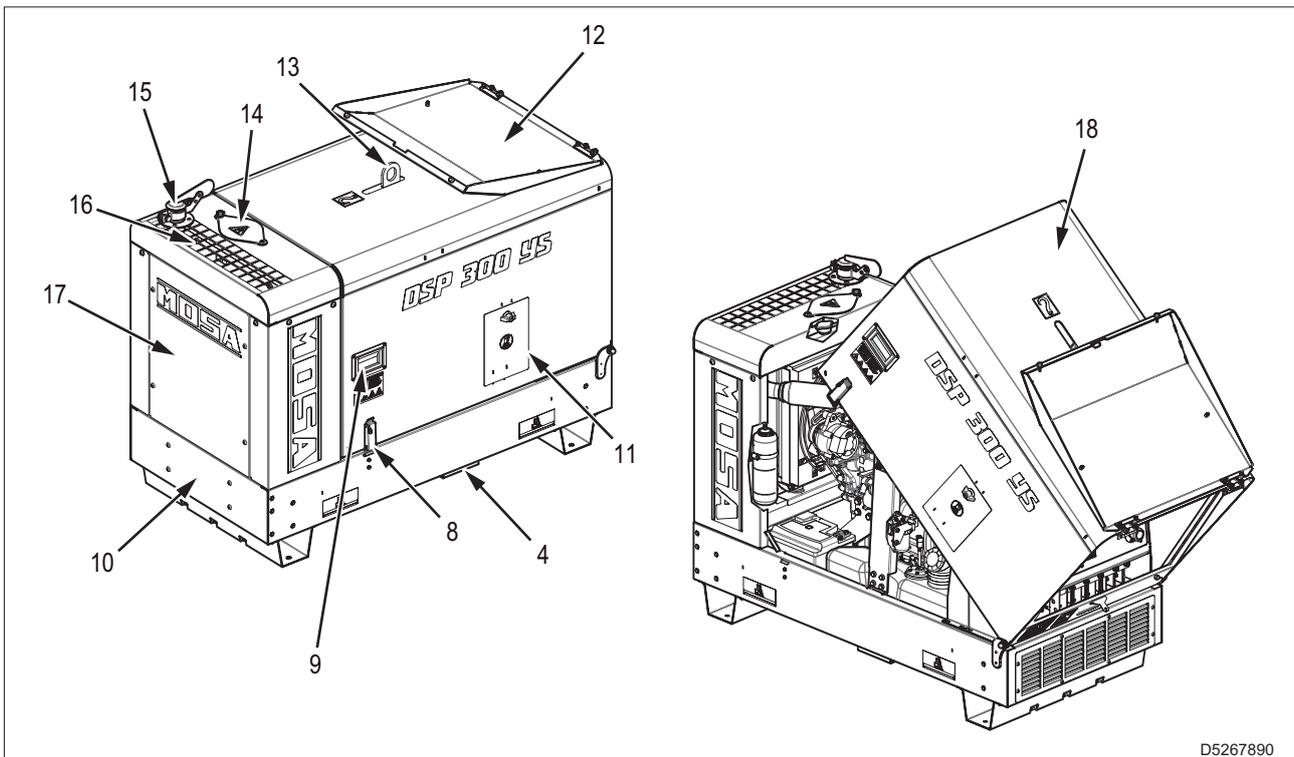
4.1.1 External components



D5267460

- 1 - Control panel
- 2 - Air intake grid
- 3 - Support feet with fixing holes
- 4 - Axle fixing bracket for towing trolleys
- 5 - Fluid drain plug in the base
- 6 - Coolant drain plug
- 7 - Engine oil drain plug
- 8 - Fairing closing hook (padlockable)
- 9 - Fairing opening handles

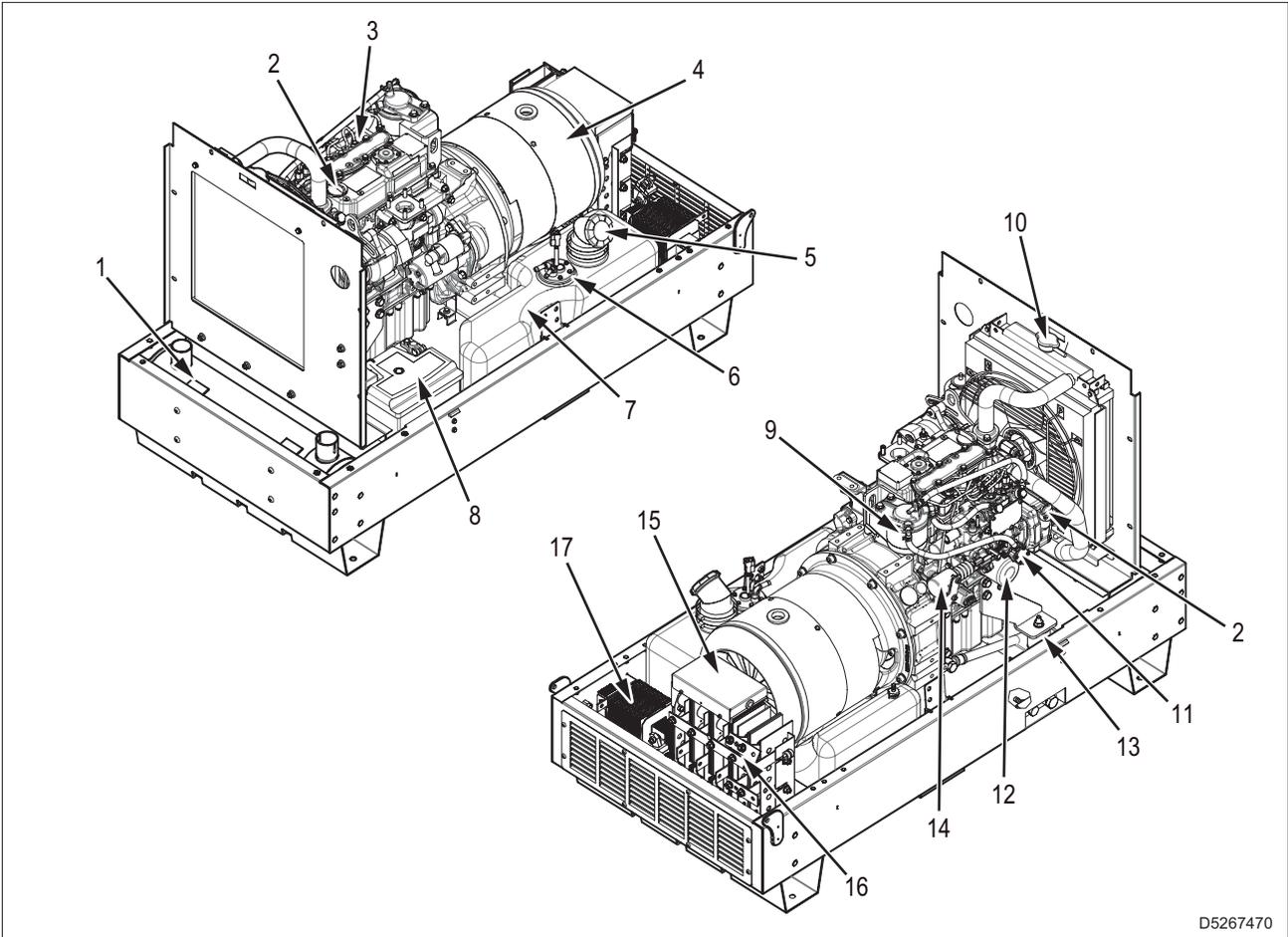
Description



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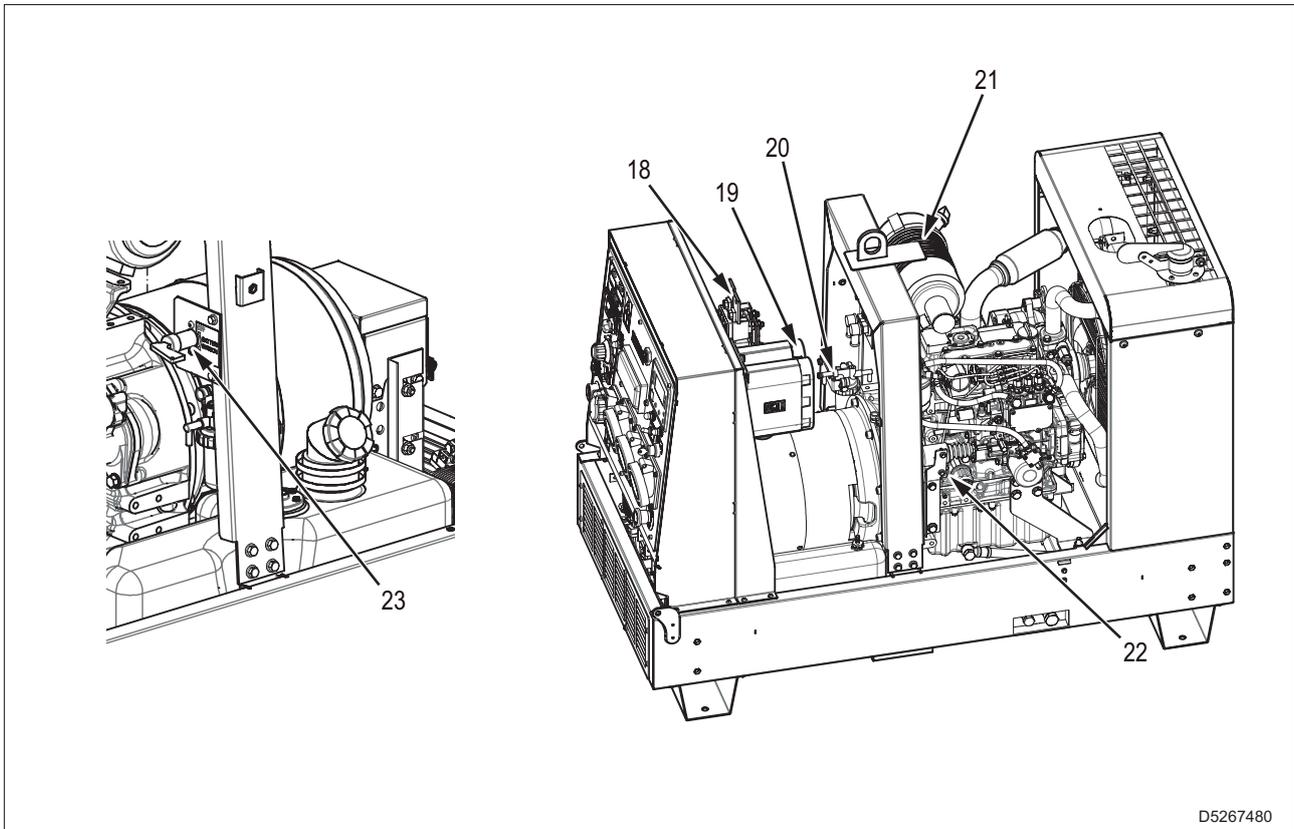
- 10 - Liquid sealed base
- 11 - Fuel tank cap access door
- 12 - Control panel cover (padlockable)
- 13 - Lifting hook
- 14 - Radiator cap access door
- 15 - Rain cover for exhaust gas outlet pipe
- 16 - Air ejection grid
- 17 - Radiator compartment access cover
- 18 - Engine compartment access fairing

4.1.2 Internal components



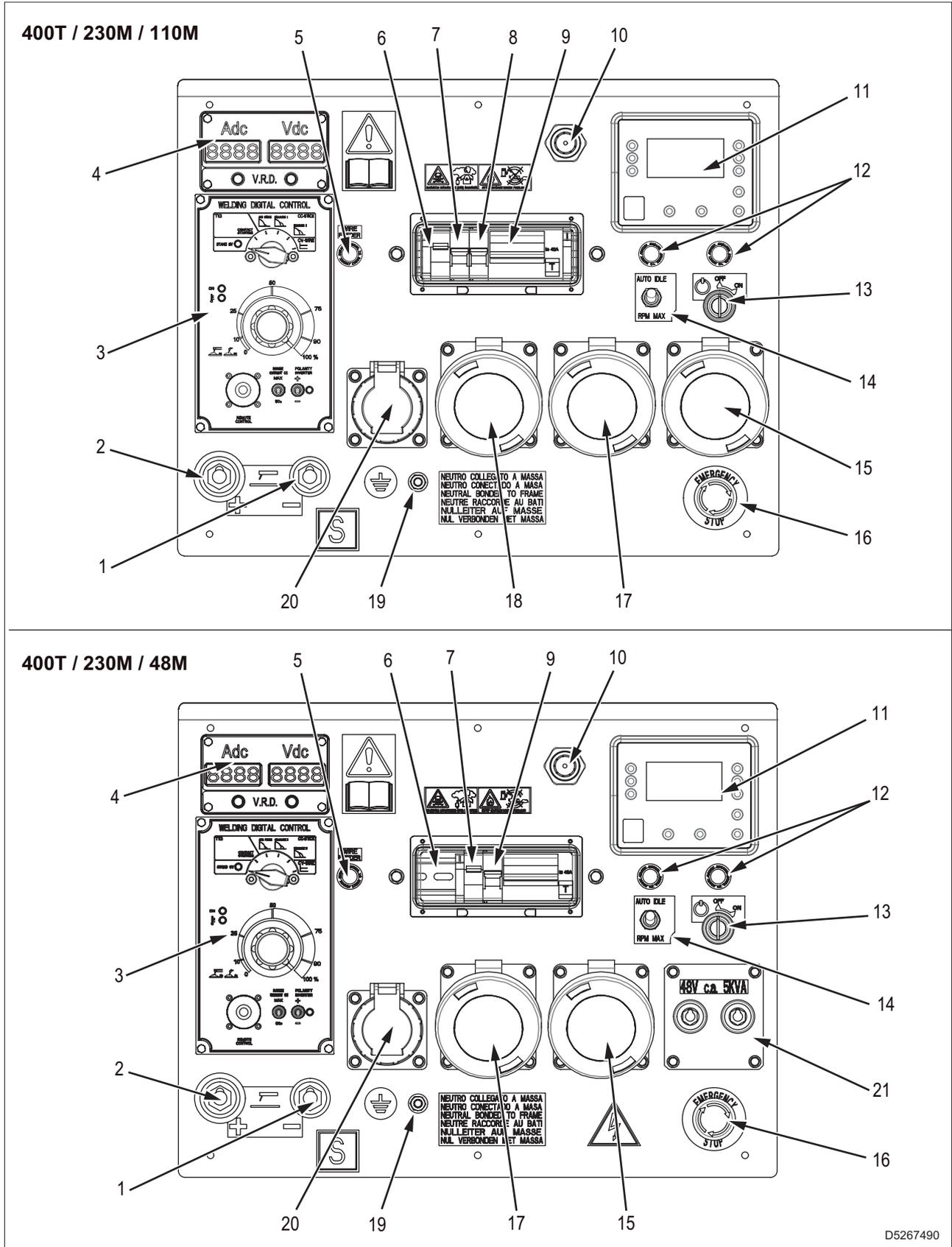
D5267470

- 1 - Exhaust silencer
- 2 - Oil filler plug
- 3 - Engine
- 4 - Electrical alternator
- 5 - Fuel tank cap
- 6 - Fuel level sensor
- 7 - Fuel tank
- 8 - Battery
- 9 - Fuel filter
- 10 - Radiator cap
- 11 - Fuel supply pump
- 12 - Oil filter
- 13 - Vibration dampers
- 14 - Auto Idle solenoid
- 15 - Driver board
- 16 - Chopper bridge
- 17 - Welding level reactor



- 18 - Polarity inversion contactor
- 19 - Alternator excitation capacitors
- 20 - Fuel pre-filter
- 21 - Engine air filter
- 22 - Oil level dipstick
- 23 - Battery cut-off switch

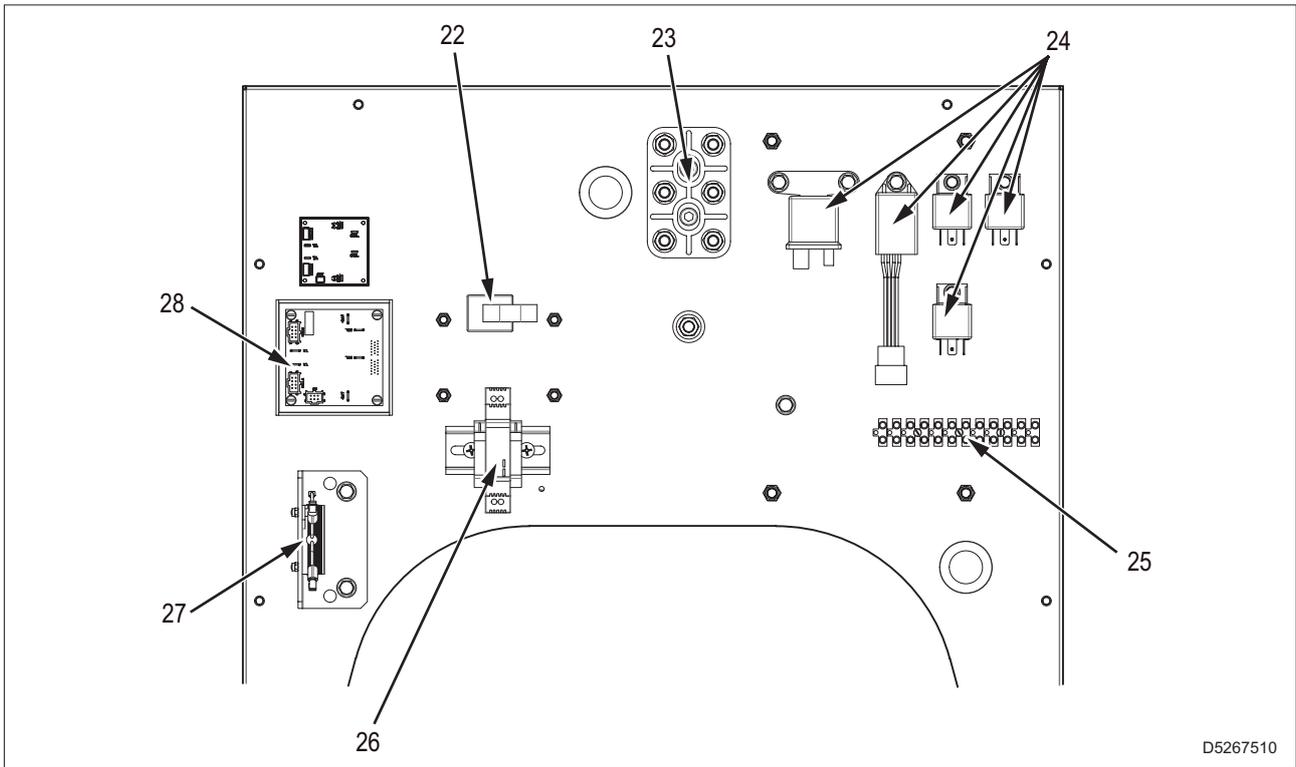
4.1.3 Control panel and electrical panel components



D5267490

Description

- 1 - Welding socket (-)
- 2 - Welding socket (+)
- 3 - WDC Welding control unit
- 4 - Digital instrument board
- 5 - Wire feeder thermal protection
- 6 - Magnetic circuit breaker 2P 16A for 16A 110V sockets (Version 400T / 230M / 110M)
Magnetic circuit breaker 2P 16A for 16A 230V sockets (Version 400T / 230M / 48M)
- 7 - Magnetic circuit breaker 2P 20A for 32A 110V sockets (Version 400T / 230M / 110M)
Magnetic circuit breaker 2P 20A for 32A 230V sockets (Version 400T / 230M / 48M)
- 8 - Magnetic circuit breaker 2P 20A for 32A 230V sockets (Version 400T / 230M / 110M)
- 9 - 30mA Type A residual current circuit breaker for 230V / 400V sockets
- 10 - Buzzer
- 11 - Engine control unit
- 12 - Engine thermal protections
- 13 - Engine control unit power switch (ON-OFF)
- 14 - Auto Idle switch
- 15 - 32A 400V 3P+N+T CEE IP67 socket
- 16 - Emergency button
- 17 - 32A 230V 2P+T CEE IP67 socket
- 18 - 32A 110V 2P+T CEE IP67 socket (Version 400T / 230M / 110M)
- 19 - Ground terminal
- 20 - 16A 110V 2P+T CEE IP67 socket (Version 400T / 230M / 110M)
16A 230V 2P+T CEE IP67 socket (Version 400T / 230M / 48M)
- 21 - 48Vac output bushings (Version 400T / 230M / 48M)



D5267510

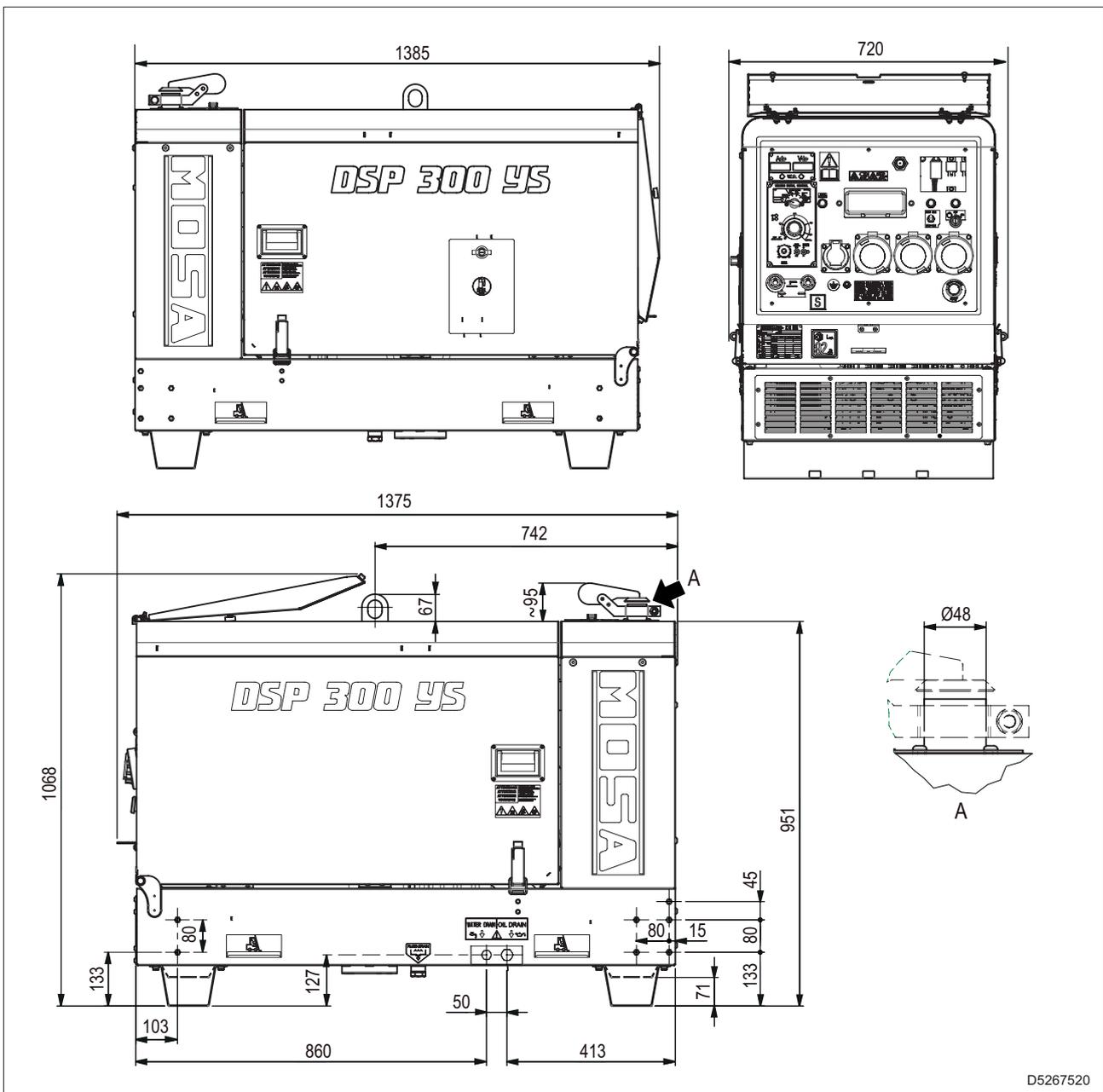
- 22 - TA (current transformer) Auto Idle
- 23 - Current generation terminal board
- 24 - Engine relay
- 25 - Engine terminal board
- 26 - WDC Welding control unit power supply
- 27 - Resistor for VRD
- 28 - Auto Idle control board

5. Installation

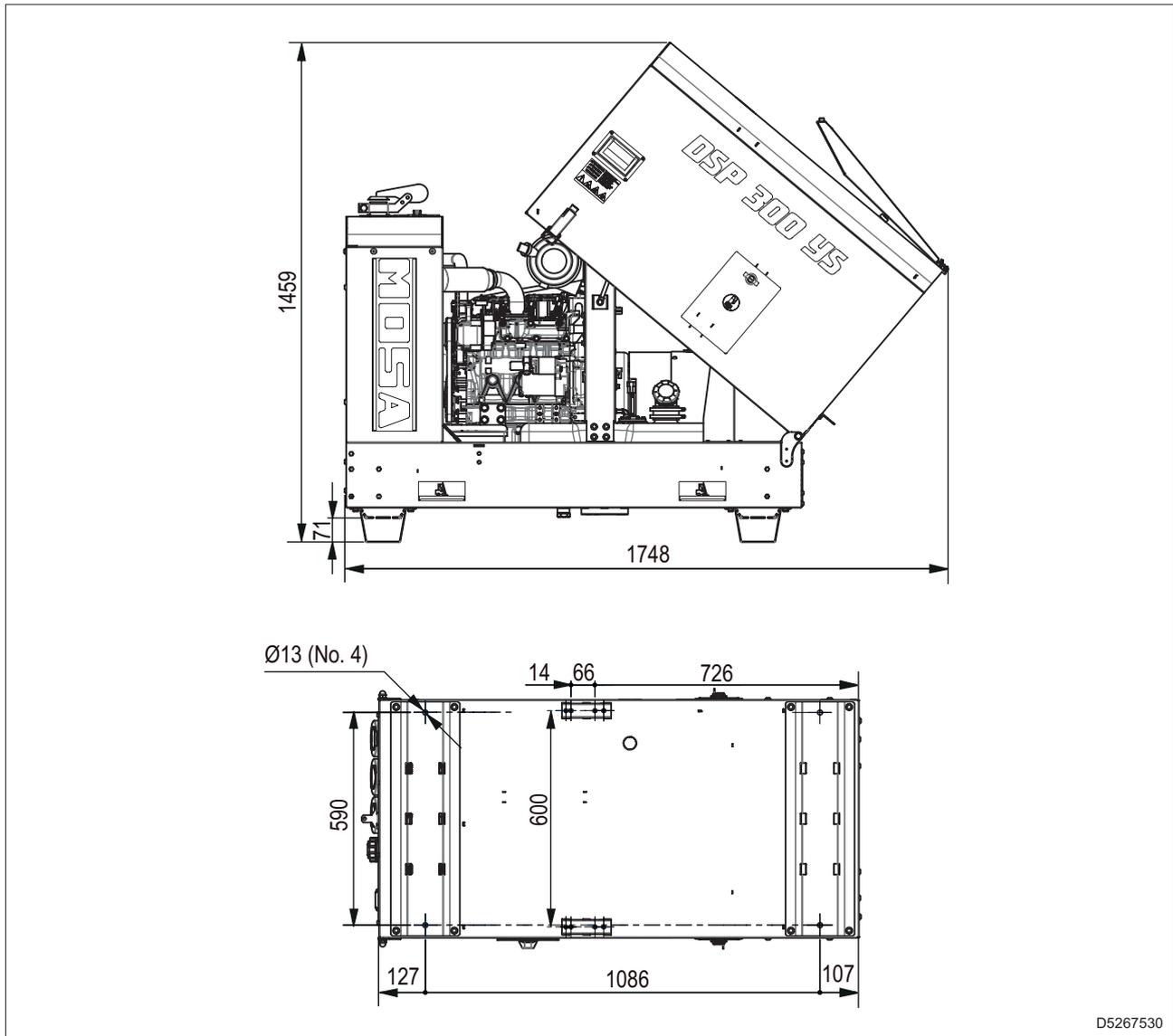
WARNING

- Before proceeding with the installation, carefully read section Safety - “2.6 Precautions for positioning the machine” and “2.7 Precautions during operation”.
- The installation and the electrical connection described in this chapter are indicative. For these operations, it is necessary to contact Specialized Technicians who must issue the necessary certifications.

The following drawings show the measurements required to install the machine correctly.



D5267520



D5267530

5.1 Fixed installation

- Fix the machine on rigid pitches, isolated against vibrations coming from other structures and with a mass equal to at least three times the mass of the machine. This guarantees an adequate absorption of the vibrations produced by the machine.
- Do not place the machine on terraces or raised floors that have not been adequately sized and verified beforehand.

5.2 Installation on a vehicle

Incorrect machine's load distribution can cause vehicle instability and damage to tyres and other components.

To transport the machine, use only efficient vehicles suitable for transporting the load.

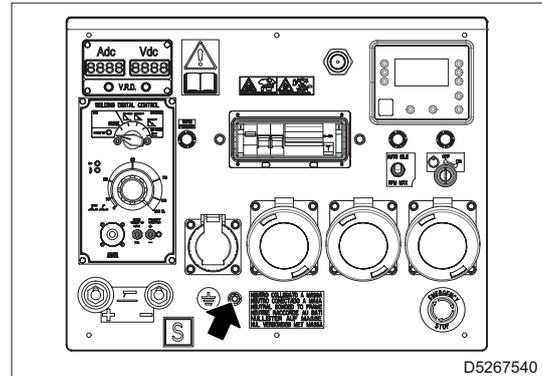
- Do not exceed the maximum load capacity of the vehicle components (suspension, axles and tyres).
- Distribute, balance and secure the machine so that the vehicle is stable.
- Place the base of the equipment on the metal vehicle floor.
- Consult and follow the instructions contained in the vehicle manual.

5.3 Grounding

Important

- Comply with local and/or current regulations on installation and electrical safety.

The grounding terminal is in the position shown in figure.



5.3.1 Grounding with residual current circuit breaker

Connection to a grounding system is mandatory for all models equipped with a residual current circuit breaker.

Use the grounding terminal for connection.

In these groups, the star centre of the generating set is generally connected to the machine ground.

By adopting the TN or TT distribution system, the residual current circuit breakers guarantees protection against indirect contacts.

Grounding is also required when the machine is installed on a vehicle.

In this case, connect the ground terminal to the vehicle structure.

In the event that the machine supplies grounded electrical devices (not installed on the vehicle), the ground terminal must also be connected to a grounding system.

5.3.2 Grounding with isolation monitor

In machines equipped with an insulation monitor, connection of the grounding terminal to a grounding system is not required.

Located on the front of the machine, the isolation monitor continuously monitors the ground insulation of the active parts.

If the isolation resistance drops below the set fault value, the isolation monitor interrupts the power supply to the connected equipment.

It is important that the power cables of the equipment are equipped with the protective conductor (yellow-green cable) so as to ensure the equipotential connection between all the masses of the equipment and the mass of the machine.

This provision is not valid for double insulated or reinforced insulated equipment.

Note

You can connect the grounding terminal to your own grounding system.

In this case, an IT-type system is created, that is, with the active parts isolated from the ground and the ground plane earthed.

In this case, the isolation monitor controls the isolation resistance of the active parts both towards ground and towards earth (for example, ground insulation of the power cables).

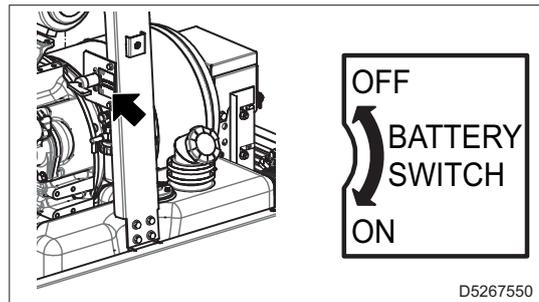
6. Operation

WARNING

- Before starting the machine, carefully read section “2. Safety”.
- It is forbidden to connect the machine to the public grid and/or other source of electricity.
- **Continuous operation at low load**
In general, all machinery (in particular those equipped with engines with after-treatment devices) must operate with a load (i.e. absorbed power) equal to or greater than 30% of the nominal mechanical power indicated on the ID plate (value expressed in kW). This ensures a consistent efficiency and performance throughout their lives.
With loads below 30%, the machine should never be operated for more than 5 hours. Subsequently, the machine must be operated with a load greater than 30% for at least 30 consecutive minutes.

6.1 Checks before start-up

- 1 - Check that the battery disconnect switch is turned ON.
- 2 - Check the oil, fuel and coolant levels.
- 3 - Check that the engine compartment access fairing is closed with the closing hooks hooked on both sides.
- 4 - Check that there are no oil, fuel and coolant leaks.
- 5 - Check that there is no flammable or dirty material around the exhaust pipe.
- 6 - Check that there are no unauthorized persons in the area adjacent to the machine.
- 7 - Before each work session, if the distribution system adopted requires it, check the effectiveness of the ground connection of the machine (e.g., TT and TN systems).

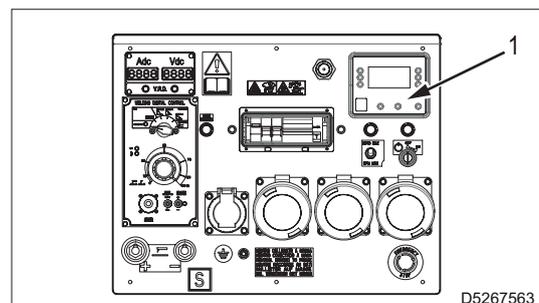


6.2 Starting the engine

WARNING

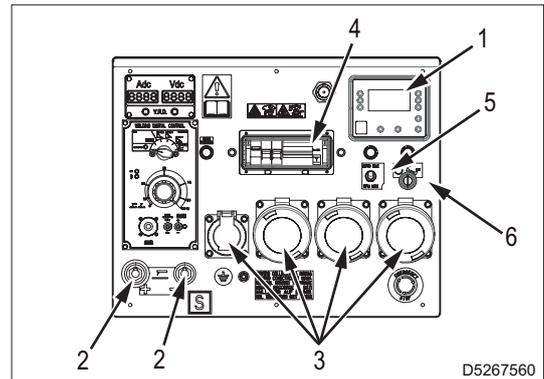
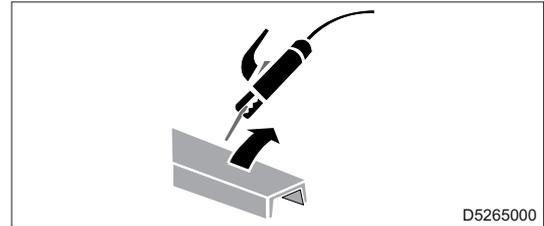
- Do not alter the primary adjustment conditions and do not tamper with sealed parts.

The engine is started and stopped by acting directly on the engine control unit (1). Consult the control unit manual for complete knowledge of its characteristics and performance.

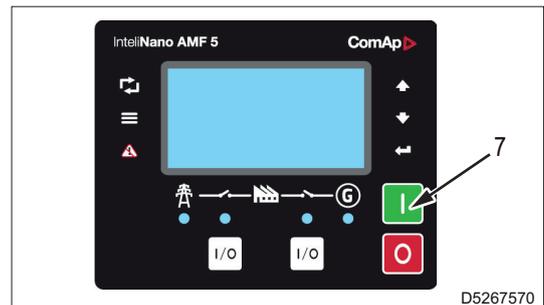


Operation

- 1 - Check that the welding cables are not plugged into the sockets (2) or that there is no electrical contact between the components of the external welding circuit (electrode, electrode holder, workpiece, etc.).
When the engine is started, the welding circuit is immediately operational, i.e. energized.
- 2 - Check that the plugs of the electrical loads are disconnected from the sockets (3) or that the ground leakage circuit breaker(s) (4) is/are open (lever down), so as to ensure that the engine can be started without loads connected to it.
- 3 - Turn the Auto Idle switch (5) to the Auto Idle position to start the engine at idle speed (if present).
- 4 - Turn the control panel power switch (6) ON.



- 5 - Press the start button (7) on the engine control unit to initiate the starting sequence.

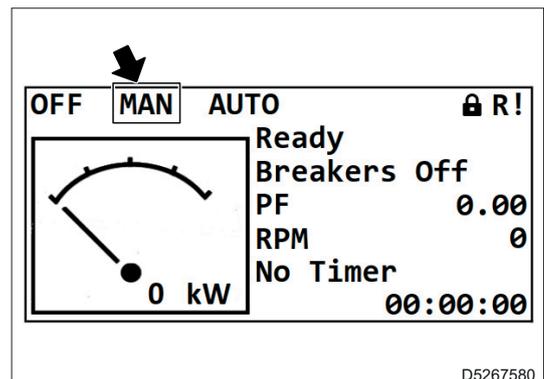


Note

- The start button only works in MAN mode.

- 6 - Before drawing a load, let the engine run for the time shown in the following table.

Ambient temperature	Time required
-10°C	2 minutes
-9°C – -5°C	1 minute
≤ -4°C	30 seconds

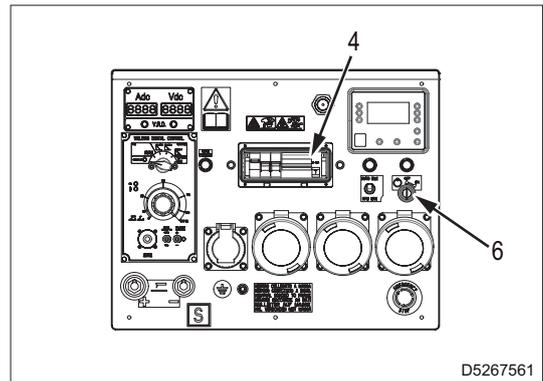
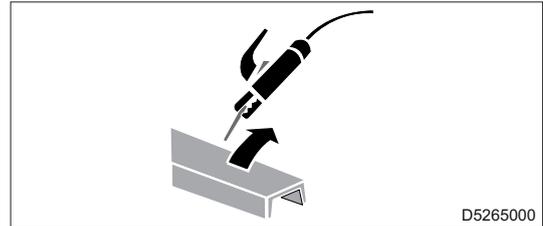


Note

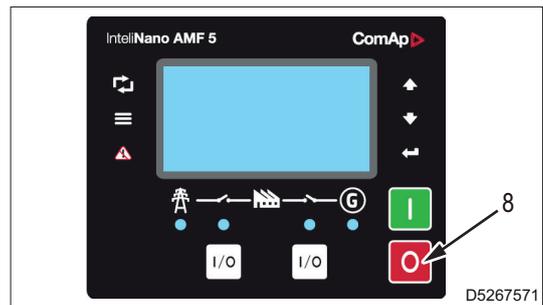
- For starting and use at temperatures below -10°C, refer to the engine instruction manual or contact the Technical Support Service.

6.3 Stopping the engine

- 1 - Stop the welding process.
- 2 - Turn off the loads connected to the machine.
- 3 - Set the residual current circuit breaker(s) (4) to OFF (insertion lever downwards).



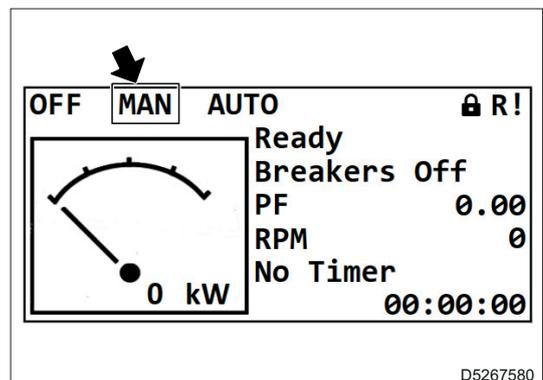
- 4 - Press the stop button (8) on the engine control unit to start the motor stop sequence. The engine stops at the end of the cooling cycle. For immediate stop, press the stop button (8) again.



Note

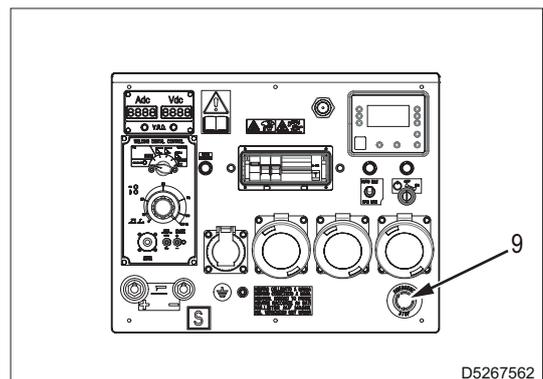
- The stop button only works in MAN mode.

- 5 - Turn the engine control unit start switch (6) to OFF and remove the ignition key.
- 6 - Turn the battery disconnect switch to OFF.



6.4 Emergency stop

For an emergency stop, press the emergency button (9). To reset the button, turn it clockwise.



6.5 Auto Idle (Optional)

Important

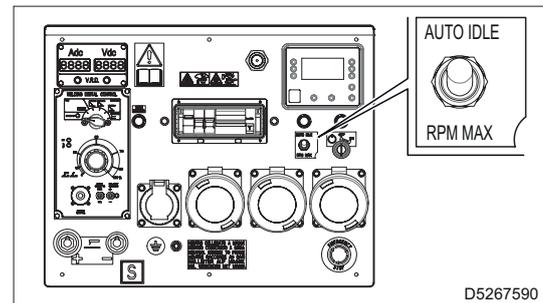
- Run the engine for the time indicated in the table below before drawing power to supply loads.

Ambient temperature	Time required
-10°C	2 minutes
-9°C – -5°C	1 minute
≤ -4°C	30 seconds

The 'Auto Idle' function is used to reduce the number of revolutions when the machine is not welding and no loads are connected and therefore no energy is required.

As a result, both the fuel consumption and the noise generated by the machine are reduced.

- Selector switch set to AUTO IDLE.**
When the machine is started, the engine runs at idle speed.
The engine automatically switches to nominal speed, allowing power to be drawn when needed.
When the power supply is disconnected, the engine will continue to run at nominal speed for approximately 10 seconds, after which it will return to idle speed.
- Selector switch set to RPM MAX.**
The engine always runs at the nominal speed.



6.6 Welding

WARNING

- Before carrying out any welding operations, carefully read section “2. Safety”.
- Do not use the DSP 300 YS engine driven welder to defrost pipes.

The machine model DSP 300 YS is a multi-process engine driven welder that supplies welding current in all permissible welding processes.

Constant Direct Current Processes (CC Constant Current):

- SMAW / STICK coated electrode
- GTAW / TIG tungsten electrode

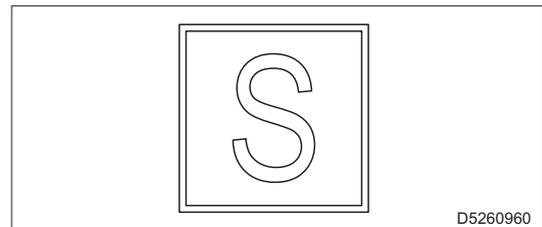
Continuous Constant Voltage (CV Constant Voltage) Processes:

- GMAW / MIG solid wire
- FCAW / FLUX CORED flux-cored wire with and without shielding gas.

The machine can also be used for Arc Gouging with carbon electrodes up to 6.4 mm in diameter.

6.6.1 Electrical safety

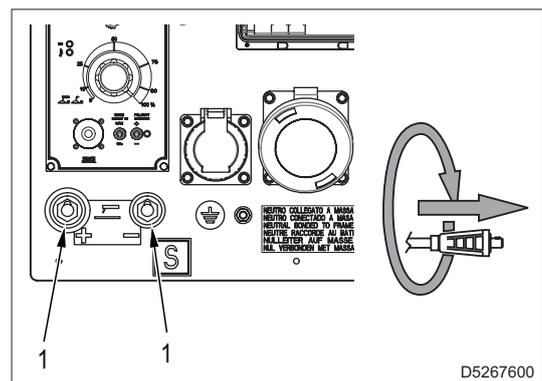
This symbol (standard EN 60974-1 – safety requirements for arc welding equipment) indicates that the engine driven welder is designed to be used in environments with an increased risk of electric shock.



6.6.2 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.
- 3 - Carefully tighten the output cables to the sockets. If they are loose, they can cause overheating issues and damage sockets, cables, etc.



Note

- Periodically check the connection of the welding cables to the sockets and tighten them if necessary.

6.6.3 Welding cables

- The welding cable cross-section depends on the welding current used, the duty cycle and the distance between the welding machine and the welding position.

The following table gives the cross-section of the copper cables to be used under different conditions.

Cable Length	Cross-section sq. mm	
	150A @ 60%	300A @ 60%
Up to 20m	25 sq. mm	50 sq. mm
Up to 40m	35 sq. mm	50 sq. mm
Up to 60m	50 sq. mm	70 sq. mm

The cable cross-sections are increased for longer lengths, mainly in order to minimise the loss of tension in the cable.

- To reduce the risk of electromagnetic interference, use the minimum length of welding cables and keep them close and low (e.g. on the ground).
- Excessive cable inductance causes degradation of the welding performance. There are several factors that contribute to the overall inductance of the wiring system, including cable size, length and number of coils. To reduce cable inductance, avoid using welding cables wound in coils. If it is not possible to unwind the cables, separate them as much as possible so that the coil has a larger diameter.
- Maintain a straight or zig-zag course between the machine and the welding position.
- If a cable reel is used to store welding cables, unwind the cables as much as possible, leaving a minimum amount of cable on each reel. If possible, the welding cables should be completely unwound.

6.6.4 Duty cycle



WARNING

- If the declared time or current values of the duty cycle are exceeded, the machine 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 machine run without taking welding current.

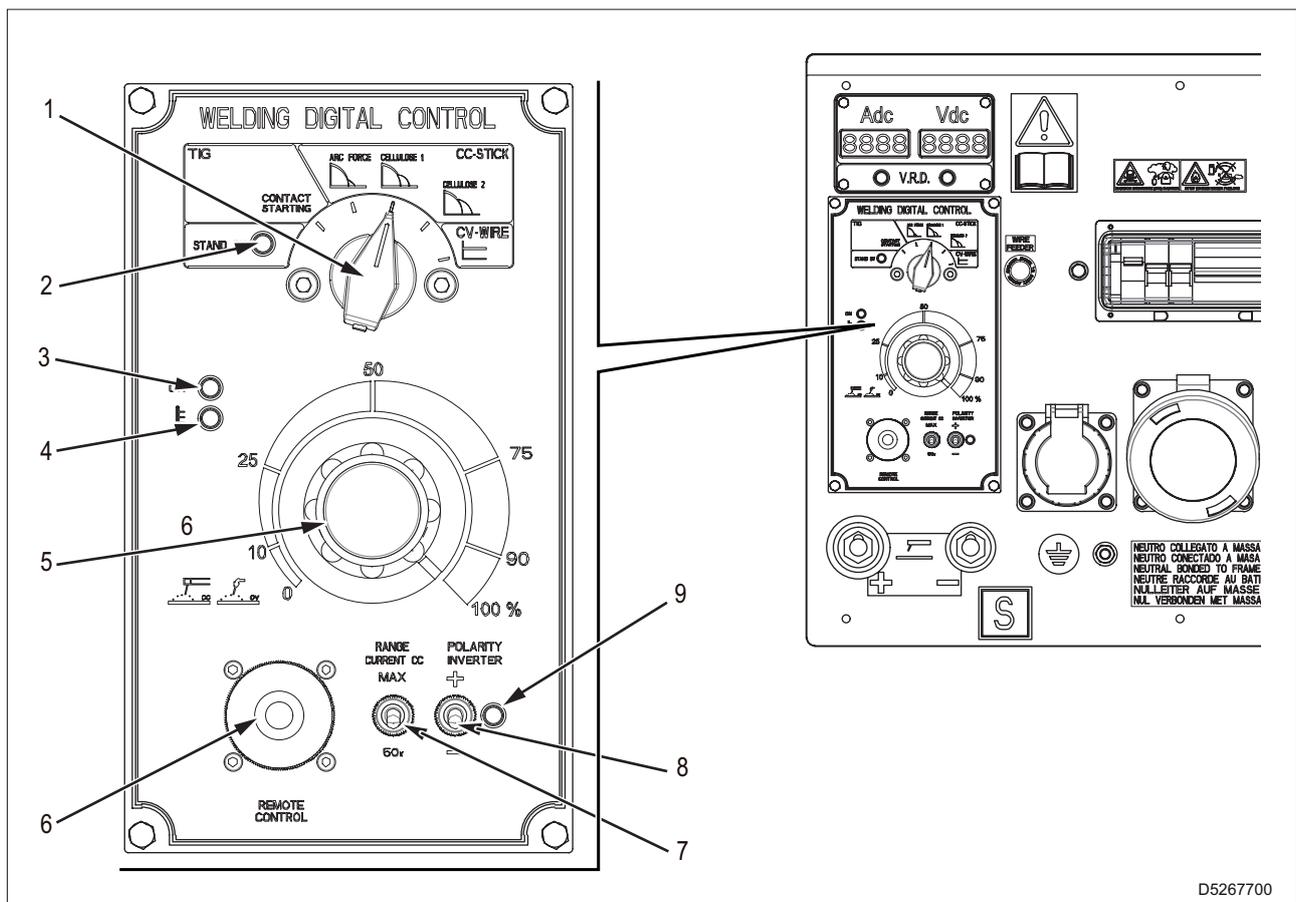
6.6.5 Welding Digital Control (WDC)

DSP series MOSA engine driven welders feature the WDC control panel to adjust the welding parameters. The acronym DSP (Digital Signal Processor), which names this series of engine driven welders, indicates that the welding parameters are adjusted digitally.

The WDC features pre-installed programs that control the various welding processes supported.

Control is achieved by means of a “Chopper” type converter (Chopper System), which operates at a high conversion frequency (20 kHz), allowing for superior welding characteristics compared to those possible with more traditional, low-frequency techniques.

Description of controls



D5267700

(1) Welding mode and STAND BY selector switch

This selector switch is used to choose from 5 different welding programs.

- **TIG** Constant Current (CC) GTAW Welding with tungsten electrode LIFT ARC striking.
- **CC - STICK** Constant Current (CC) SMAW Welding with coated electrode Three programs that differ by three distinct arc penetration levels (Arc Force) with increasing short-circuit currents.
- **CV – WIRE** Constant Voltage (CV) Welding
GMAW (MIG) solid wire FCAW flux-cored wire

(2) STAND BY LED

The STAND BY LED lights up green when the selector switch (1) is turned to the STAND BY position.

In this position, the welding circuit is disabled and there is no voltage at the welding output sockets.

When the machine is started, regardless of the position of the selector switch (1), the WDC is in STAND BY.

Turn the selector knob (1) to select a different mode.

The LED (2) will go out and, at the same time, the green ON LED (3) will light up, indicating that the welding voltage is present at the output sockets.

(3) ON LED

The ON LED (3) lights up:

- when the engine driven welder is ready for use
- when the welding operations are being performed.

When the welding mode is changed, the LED (3) goes out for about 1 second as the WDC needs to load the selected program and perform a self-diagnosis on the current sensor.

If there is a fault on the current sensor, the LED (3) will start flashing, indicating the fault, and the system will cut the welding voltage to the output sockets.

(4) Thermal protection indicator LED

If the operating temperature exceeds the 85°C threshold, a thermal protection located on the chopper bridge is triggered and the LED (4) starts flashing red, indicating that the WDC is cutting voltage to the welding sockets.

Note

Do not switch off the engine driven welder, as the alternator fan cools the chopper bridge faster.

After a few minutes, the LED (4) will go out automatically and the welding voltage will become available again at the output sockets.

When an abnormal current is detected on the chopper bridge, the LED (4) lights up red, and the WDC cuts voltage to the welding sockets.

It is necessary to reset the system by turning off the engine driven welder.

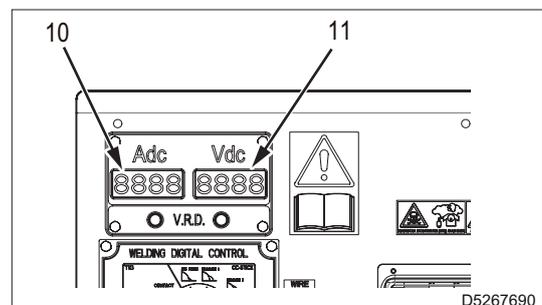
If the problem persists after resetting the engine driven welder, it is necessary to contact an authorised service centre.

(5) Welding current or voltage adjustment knob

The knob (5) adjusts the welding current continuously when used in TIG and CC-STICK welding modes.

When used in CV-WIRE mode, it adjusts the welding voltage.

The current value adjusted in CC-STICK or TIG welding modes is indicated on the Adc display (10), while the voltage value adjusted in CV-WIRE mode is indicated on the Vdc display (11).

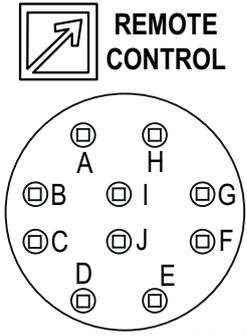


(6) REMOTE CONTROL connector

The 10-pin REMOTE CONTROL connector (6) is used to connect remote controls (not supplied with the engine driven welder). For the details, see "6.6.8 Remote control (Optional)".

It must also be used to connect the MOSA WF4 wire feeder. For the details, see "6.7.3 Constant Voltage (CV) Welding – WIRE: solid wire MIG (GMAW) - flux-cored wire (FCAW)".

10-pin connector contact function table

 <p>D5267710</p>	Contacts	Description
	A	<ul style="list-style-type: none"> Ampere adjustment on remote control - GND terminal Volt adjustment on wire feeder - GND terminal
	B	<ul style="list-style-type: none"> Ampere adjustment on remote control - contr. V terminal Volt adjustment on wire feeder - contr. V
	C (5 Vdc)	<ul style="list-style-type: none"> Ampere adjustment on remote control – ref. V terminal Volt adjustment on wire feeder - ref. V
	D	Bridged with contact “C” <ul style="list-style-type: none"> Ampere adjustment enabling on remote control Volt adjustment enabling on wire feeder
	E	Polarity inversion control (Closed with F controls polarity inversion)
	F (5 Vdc)	Reverse polarity control
	G (44-48 Vac)	Return contact for MIG / Flux Cored torch of the wire feeder
	H	Welding negative (for instruments on wire feeder)
	I (44-48 Vac)	Wire feeder power supply 48 VAC
J (44-48 Vac)	Wire feeder power supply 48 VAC	

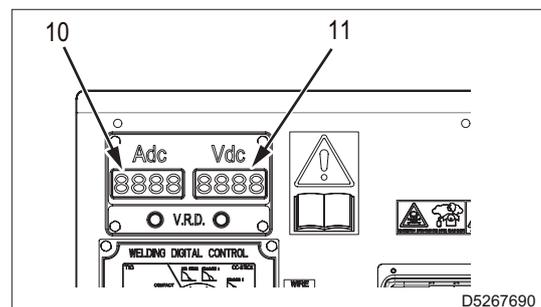
(7) CURRENT RANGE switch

The CURRENT RANGE CC switch (7), when set to [50%], limits the welding current or voltage set with the adjustment knob (5).

Reducing the adjustment range to 50% allows for greater precision of the desired current or voltage value when welding with low current or voltage values.

When the switch is set to [MAX], the welding current or voltage adjustment varies for the entire nominal adjustment range.

The current value adjusted in CC-STICK or TIG welding modes is indicated on the Adc display (10), while the voltage value adjusted in CV-WIRE mode is indicated on the Vdc display (11).



(8) POLARITY INVERTER switch - (9) POLARITY INVERTER LED

The POLARITY INVERTER switch (8) and the LED (9) control and indicate the polarity of the welding circuit on the output sockets.

For details on the operation of the switch and LED, see “6.6.7 Polarity inversion (Optional)”.

(10) Adc display

In TIG and CC-STICK welding modes, the Adc display (10) indicates the Ampere (A) value of the welding current set with the adjustment knob (5).

During the welding process, for all modes, the Adc display (10) indicates the Ampere (A) value of the actual welding current.

(11) Vdc display

During set-up operations, the Vdc display (11) indicates the Volt (V) value of the open-circuit voltage (OCV) for TIG and CC-STICK welding modes.

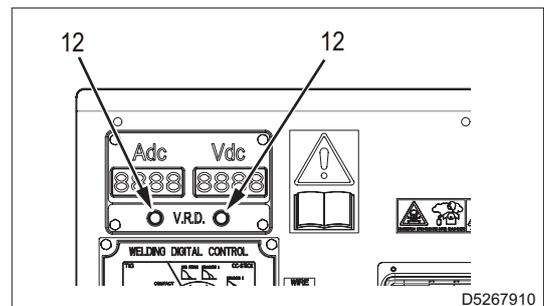
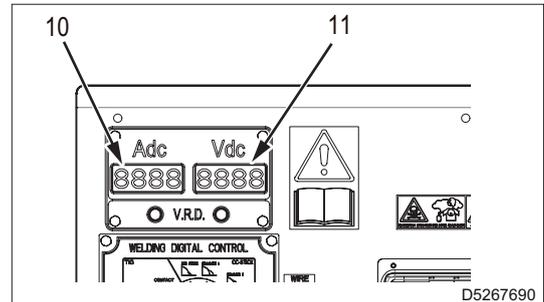
In CV-WIRE mode, it indicates the Volt (V) value of the welding voltage set with the adjustment knob (5).

During the welding process, for all modes, the Vdc display (11) indicates the Volt (V) value of the actual welding voltage.

(12) V.R.D. LEDs

The V.R.D. LEDs light up green and red and allow for the open-circuit voltage (OCV) value to be monitored.

For details on the operation of the V.R.D. LEDs, see “6.6.6 VRD (Voltage Reduction Device) function”.



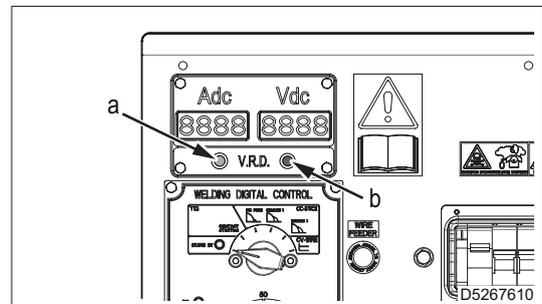
6.6.6 VRD (Voltage Reduction Device) function

DANGER

- The machine is delivered with the VRD function active.
- The VRD function should only be disabled on the machine after careful consideration by the person responsible for safety at work.

The purpose of the VRD function is to reduce the risk of electric shock caused by accidental operator contact with the electrode and workpiece during welding interruptions.

- The protection acts by reducing the open-circuit voltage (OCV) present at the welding output terminals to a safety value (<13V).
- The protection activates in about 0.5 seconds.
- The protection is active in TIG and CC-STICK welding modes.
In CV WIRE mode, the VRD function is disabled.
- A pair of LEDs: one red (a) and one green (b) allow for the open-circuit voltage (OCV) value to be continuously monitored, by indicating the voltage value:
green LED lit: voltage <13V
red LED lit: voltage > 13V.
- During the welding process, the VRD function is disabled, but the pair of LEDs continues to show the voltage value.
Since the voltage value during the process is > 13V, the red LED remains lit; occasionally, the green LED will light up (e.g. during the arc striking phase where the voltage is < 13V).

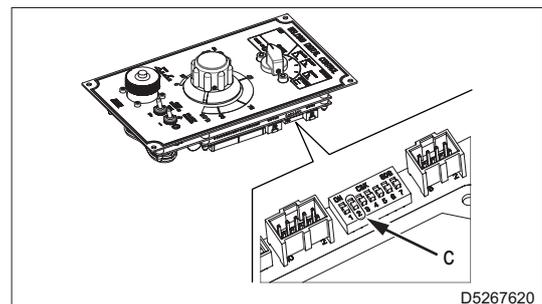


Disabling the VRD function

Important

The VRD function can be disabled only by the workplace safety manager.

- The VRD function can be excluded by acting on microswitch "2" (c) located on the WDC:
 - Pos. ON: VRD activated
 - Pos. OFF: VRD disabled.
- With the VRD function disabled, the open-circuit voltage (OCV) is not reduced to the safety value < 13V, but remains at its nominal value.
The LEDs (a) and (b) will, in any case, indicate the welding voltage value.
green LED lit: voltage <13V
red LED lit: voltage > 13V.



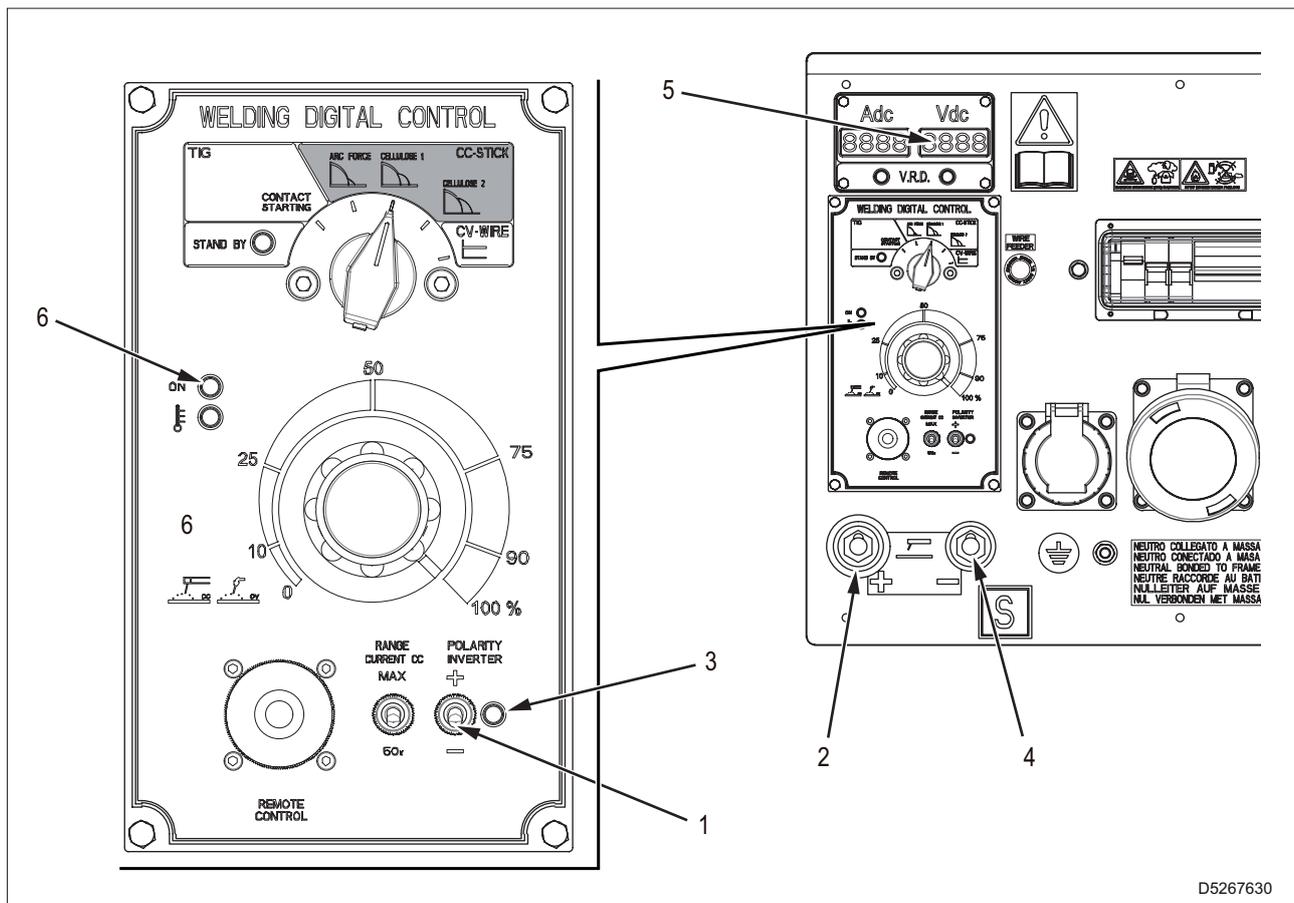
6.6.7 Polarity inversion (Optional)

In CC – STICK (SMAW) coated electrode welding mode, the connection of the electrode holder to the positive or negative pole of the welder mainly depends on the type of electrode used or on the specific welding requirements.

For this reason, it may be necessary to change the connection of the electrode holder on the welder multiple types during the welding operations.

The polarity inversion function allows the operator to reverse the polarity of the welding circuit directly at the welding output sockets without turning off the welder and manually reversing the electrode holder clamp and the ground clamp on the sockets.

Polarity inversion operation



D5267630

Note

- When the machine does not feature polarity inversion, the POLARITY INVERTER switch (1) and the LED (3) will not work.

Important

- In TIG operating mode, regardless of the position of the POLARITY INVERTER switch (1), the system automatically performs polarity inversion. The positive polarity of the welding circuit is at the output socket (4) marked with [-] The LED (3) is lit.
- In CV-WIRE operating mode or in STAND BY, the Polarity Inversion function is disabled and any switching of the POLARITY INVERTER switch (1) has no effect.

Conditions for polarity inversion operation.

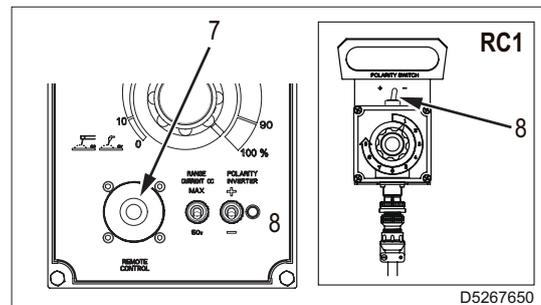
- CC-STICK welding mode
- Engine driven welder on
- No welding current output.

Reverse the polarity by means of the POLARITY INVERTER switch (1) on the WDC:

- 1 - POLARITY INVERTER (1) turned to position [+]: the positive pole of the welding circuit is on the welding output socket (2) marked with [+]. The LED (3) remains off.
 - 2 - POLARITY INVERTER (1) turned to position [-]: the positive pole of the welding circuit is on the welding output socket (4) marked with [-]. The LED (3) lights up green.
- The welding voltage indicated on the Vdc display (5) is always shown as its absolute value. The polarity inversion of the welding circuit, with respect to the indication on the output sockets, is therefore indicated only by the lighting of the green LED (3).
 - Each time the polarity is inverted, the welding voltage drops to 0 Volts for a few seconds, as indicated on the Vdc display (5) and, at the same time, the ON LED (6) goes out. Once the inversion is complete, the welding voltage returns to its nominal value, and the ON LED (6) lights up.

Polarity inversion can also be performed using the RC1 remote control, by connecting it to the 10-pin REMOTE CONTROL (7) connector on the WDC.

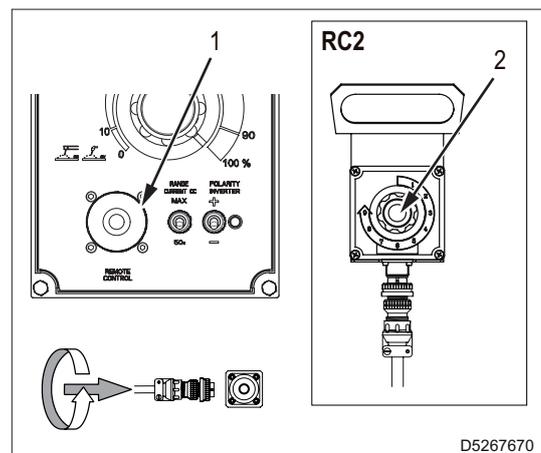
- Polarity inversion is then performed by operating the switch (8) located on the RC1 remote control; this works in the same way and provides the same indications as described above for the POLARITY INVERTER switch (1) located on the WDC.
- By connecting the RC1 remote control, the POLARITY INVERTER switch (1) on the WDC is automatically disabled.



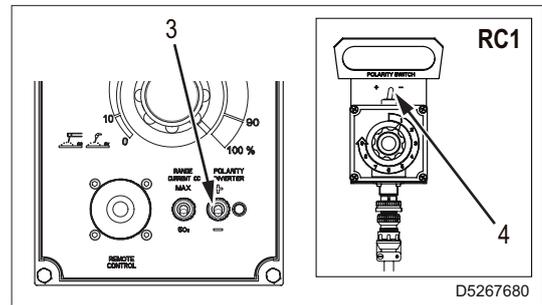
6.6.8 Remote control (Optional)

The remote control allows the operator to adjust the welding current or voltage while remaining near the welding station, without having to approach the engine driven welder.

- The machine is set up for connection to a remote control; the connection is made via the 10-pin connector (1) located directly on the WDC (Welding Digital Control) of the engine driven welder.
- When a remote control is connected, the welding current or voltage control function is automatically switched to the knob (2) on the remote control.
- The remote control is supplied with a standard 20-metre cable, to which a 30-metre extension can be connected, bringing the total distance between the welding station and the engine driven welder to 50 metres.



- A version of the remote control is available that allows for polarity inversion by operating a switch (4) located on the same remote control. The POLARITY INVERTER switch (3) located on the WDC is automatically disabled. For the details, see “6.6.7 Polarity inversion (Optional)”.



6.7 Welding mode

6.7.1 Constant Current (CC) - STICK coated electrode welding (SMAW)

The CC - STICK mode is designed for horizontal and vertical welding with all types of coated electrodes. The machine has three CC - STICK welding modes:

- ARC FORCE
- CELLULOSE 1
- CELLULOSE 2

The three modes have increasing “Arc Force” characteristics to provide different arc penetrations depending on the type of electrode and/or welding position.

The term “Arc Force” refers to the possibility of adjusting the short-circuit current of the welder.

Adjusting this parameter changes the dynamic increase in welding current when the welding arc is short-circuited.

ARC FORCE mode is ideal for rutile, rutile-basic and basic electrodes.

CELLULOSE 1 and CELLULOSE 2 modes are ideal for cellulosic electrodes where there is a need for greater material penetration based on different welding positions.

Use

- 1 - Start the engine driven welder.
- 2 - Exit STAND BY mode by turning the selector knob (1) and making sure that the STAND BY LED (2) goes out.
- 3 - Turn the knob (1) and select one of the three CC-STICK modes.
- 4 - Check the following indications on the WDC:
 - ON LED (3) lit
 - Open-circuit voltage present at the welding sockets indicated on the Vdc display (4).

Note

The open-circuit voltage value depends on the functions active on the engine driven welder:

- V.R.D. function indicated by the green LED (5) being lit.
- Auto Idle function, low engine RPM.

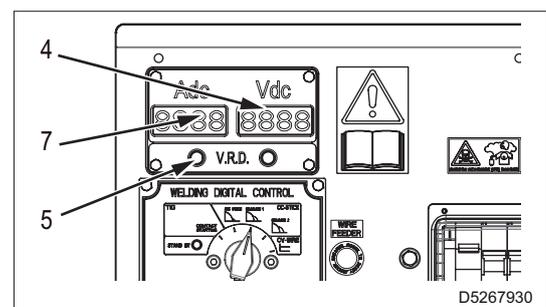
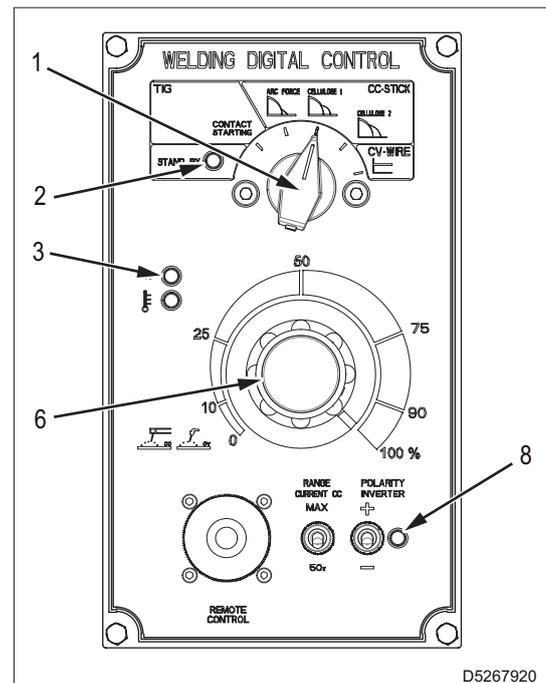
- 5 - Set the welding current using the adjustment knob (6). The current value in Amperes (A) is shown on the Acd display (7).

Note

With the adjustment knob (6) at minimum (0 %), the Amperage value indicated on the Acd display (7) is not equal to 0 (zero), but it is the minimum current value that can be supplied by the engine driven welder.

- 6 - For engine driven welders with the “Polarity inversion” function, check that the polarity of the welding circuit is correct for the type of welding to be carried out. The POLARITY INVERTER LED (8) lighting up indicates that the polarity is inverted with respect to the indication on the welding output sockets. For the details, see “6.6.7 Polarity inversion (Optional)”.

- 7 - Start the welding process.



Parameter display

During the welding process, the Avc display (7) shows the actual current and the Vdc display (4) shows the actual voltage.

Hot Start function

In CC – STICK mode, the Hot Start function is always enabled to facilitate arc striking.

At the start of welding, the current is higher than the set current for a defined period.

The increase in Hot Start current and its duration are fixed and non-editable parameters.

Welding arc striking

A slight delay in electrode striking may occur due to the low open-circuit voltage (OCV) of the machine in the following cases:

- machine with V.R.D. function activated
- machine with Auto Idle function activated

Always ensure a good metal-to-metal contact between the metal core of the electrode and the workpiece.

After the electric arc is interrupted, the tip of the electrode forms a cone.

To use the same electrode it is necessary to remove the cone to allow the metal core of the electrode to make contact.

6.7.2 Constant Current (CC) Welding - TIG tungsten electrode (GTAW)

TIG mode is a type of constant current welding used without or with filler material.

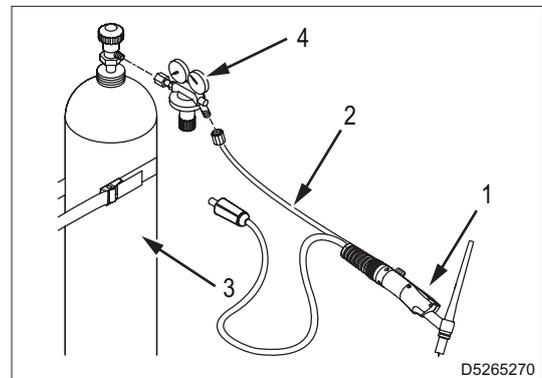
Preliminary Operations

The following devices are required for GTAW/TIG welding:

- GTAW/TIG torch with gas valve (1) and accessories
- Hose (2) for connecting the torch to the gas regulator
- Argon gas cylinder (3)
- Argon gas regulator (4)
- Tungsten electrode

Gas pressure regulation

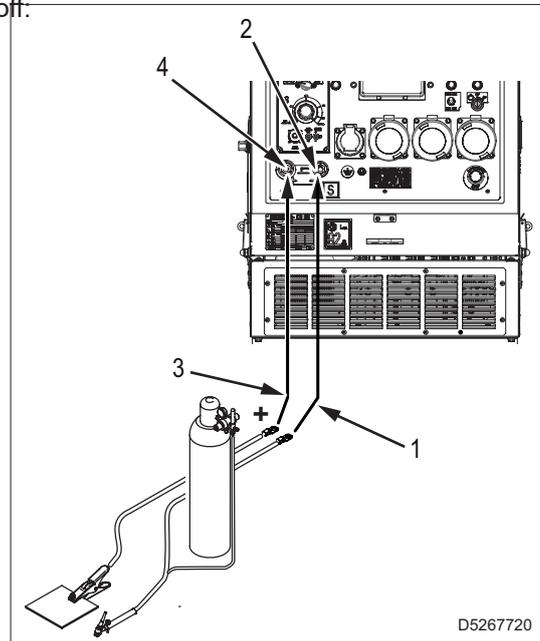
- 1 - Open the gas valve of the TIG torch (1). The inert gas flow is activated.
- 2 - Adjust the desired gas flow rate on the pressure regulator (4).
- 3 - Close the gas valve of the TIG torch (1).



Connections for engine driven welder without polarity inversion

The operations must be carried out with the machine switched off:

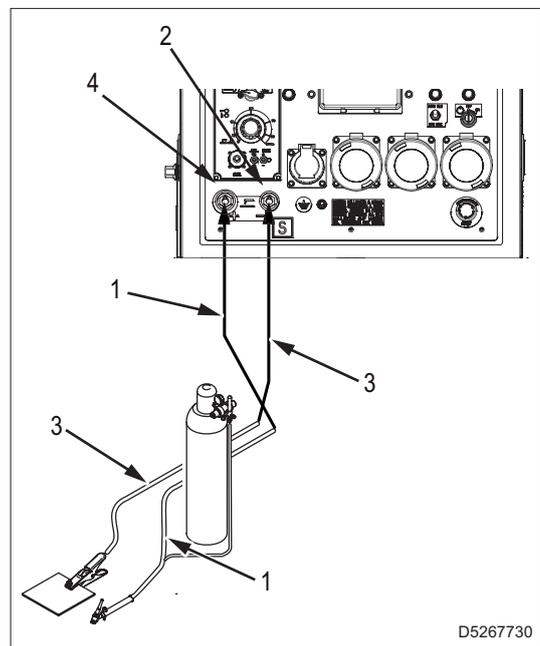
- 1 - Insert the plug of the TIG welding torch (1) into the welding socket (2) (negative pole of the welding circuit), turning clockwise to lock it.
- 2 - Mount the welding torch according to the torch operating instructions.
- 3 - Insert the ground cable plug (3) into the welding socket (4) (positive pole of the welding circuit) and turn it clockwise to lock it.
- 4 - Connect the other end of the ground cable (3) to the workpiece.



Connections for engine driven welder with polarity inversion

The operations must be carried out with the machine switched off:

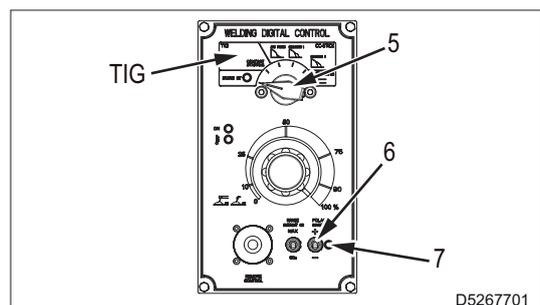
- 1 - Insert the plug of the TIG welding torch (1) into the welding socket (4) (negative pole of the welding circuit), turning clockwise to lock it.
- 2 - Mount the welding torch according to the torch operating instructions. Mount the welding torch according to the torch operating instructions.
- 3 - Insert the ground cable plug (3) into the welding socket (2) (positive pole of the welding circuit) and turn it clockwise to lock it.
- 4 - Connect the other end of the ground cable (3) to the workpiece.



Note

In engine driven welders with polarity inversion, when the welding mode selector switch (5) is set to TIG, the WDC automatically performs polarity inversion on the welding sockets (2) and (4), regardless of the position of the POLARITY INVERTER switch (6).

Polarity inversion is indicated by the LED (7) lighting up. For the details, see "6.6.7 Polarity inversion (Optional)".



How to use

- 1 - Start the engine driven welder.
- 2 - Exit STAND BY mode by turning the selector knob (1) and making sure that the STAND BY LED (2) goes out.
- 3 - Turn the knob (1) and select TIG mode.
- 4 - Check the following indications on the WDC:
 - ON LED (3) lit
 - Open-circuit voltage present at the welding sockets indicated on the Vdc display (4).

Note

The open-circuit voltage value depends on the functions active on the engine driven welder:

- V.R.D. function indicated by the green LED (5) being lit.
- Auto Idle function, low engine RPM.

- 5 - Set the welding current using the adjustment knob (6). The current value in Amperes (A) is shown on the Adc display (7).

Note

With the adjustment knob (6) at minimum (0 %), the Amperage value indicated on the Adc display (7) is not equal to 0 (zero), but it is the minimum current value that can be supplied by the engine driven welder.

- 6 - Open the gas valve of the TIG torch
- 7 - Start the welding process.

Parameter display

During the welding process, the Adc display (7) shows the actual current and the Vdc display (4) shows the actual voltage.

Welding arc striking

Welding arc striking for TIG mode is of the Lift Arc type (CONTACT STARTING).

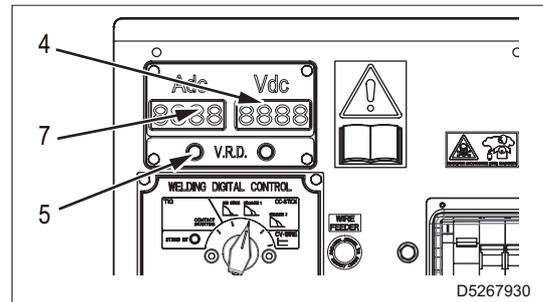
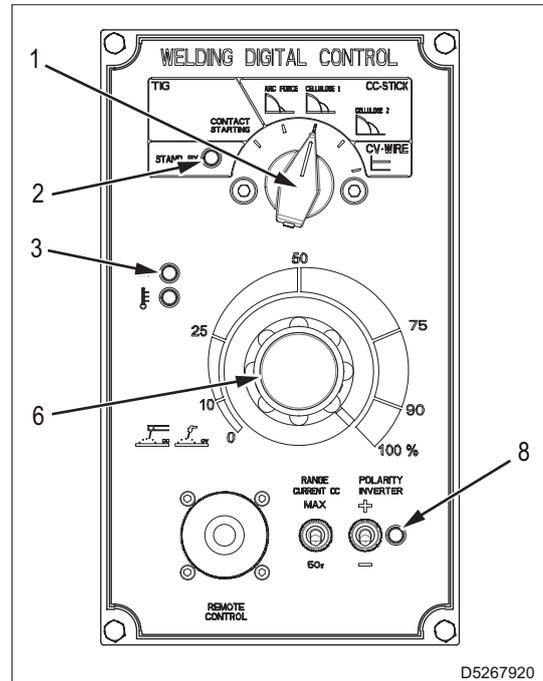
During arc striking, the welding current is minimal to avoid contamination of the weld bead with tungsten and the destruction of the electrode tip.

The welding current gradually increases until it reaches the set value.

To strike the electric arc, simply touch the workpiece with the tip of the tungsten electrode, then slowly lift it and start welding.

Welding arc quenching

- 1 - Slowly move the torch away until the electric arc extinguishes.
- 2 - Close the gas valve of the TIG torch.



6.7.3 Constant Voltage (CV) Welding – WIRE: solid wire MIG (GMAW) - flux-cored wire (FCAW)

CV - WIRE welding mode is a type of constant voltage welding. For this process, it is necessary to connect the MOSA WF 4 wire feeder to the welder (not supplied with the machine).

Important

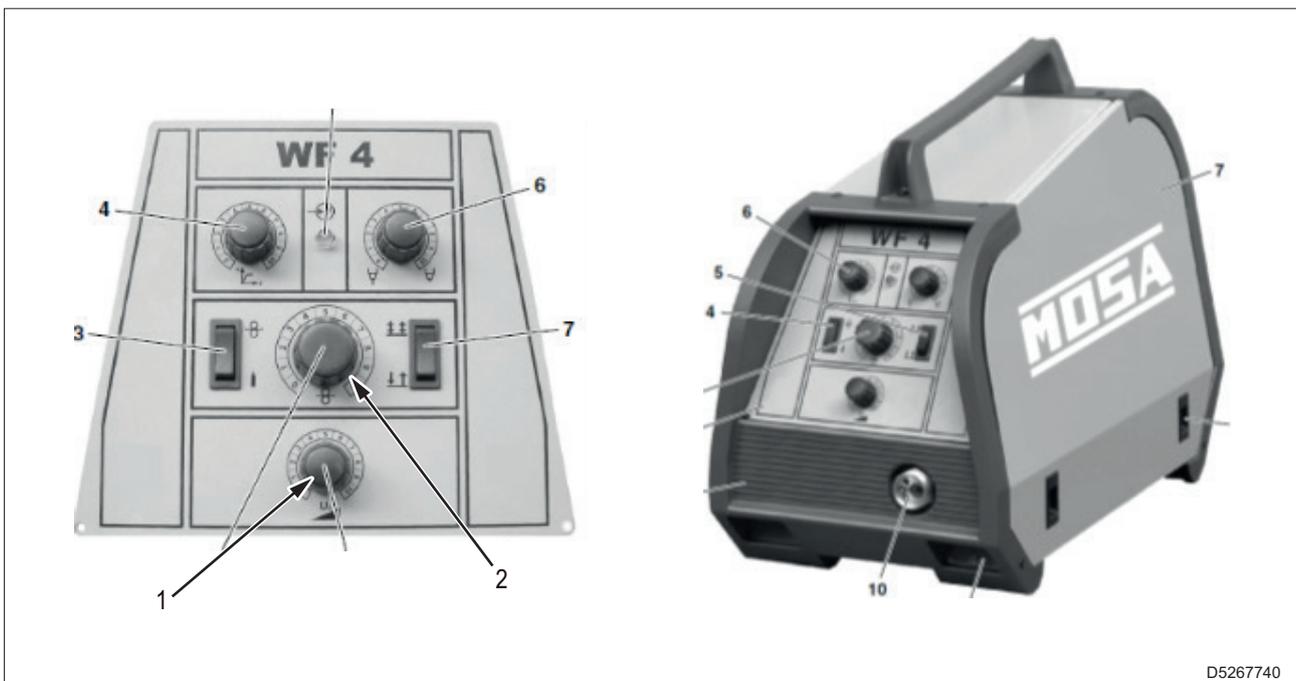
MOSA does not guarantee the operation of the engine driven welder with wire feeders other than the MOSA WF 4 model.

In constant voltage (CV) welding processes, it is necessary to adjust the welding current and voltage.

The welding voltage can be adjusted on the MOSA WF 4 wire feeder connected, using the Volt adjustment knob (1)

The welding current is directly proportional to the wire speed, which is also adjusted on the MOSA WF 4 wire feeder, using the adjustment knob (2).

- An increase in the wire output speed corresponds to an increase in the current.
- A decrease in the speed corresponds to a decrease in the current.



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Preliminary Operations

The following devices are required for MIG (GMAW) or Flux Cored (FCAW) welding:

- MOSA WF 4 wire feeder
- Reel of welding wire
- MIG torch
- Argon gas cylinder (MIG) or argon- CO2 mixture (MAG)
- Gas hose connected to the wire feeder and gas regulator
- Gas regulator

Connections with MOSA WF 4 wire feeder

Make the connections between the engine driven welder and the MOSA WF 4 wire feeder with the machine off:

- 1 - Connect the welding cable (1) between the welding socket (positive pole of the welding circuit) (2) of the machine and the socket (3) on the back of the wire feeder.
Use the 20 m - 50 mm² cable supplied with the WF 4 wire feeder
- 2 - Connect the control / power cable (4) between the 10-pin connector (5) of the machine and the connector (6) on the back of the wire feeder (20 m cable supplied with the WF 4 wire feeder).
- 3 - Connect the ground cable (7) between the welding socket (negative pole of the welding circuit) (8) of the machine and the workpiece to be welded.

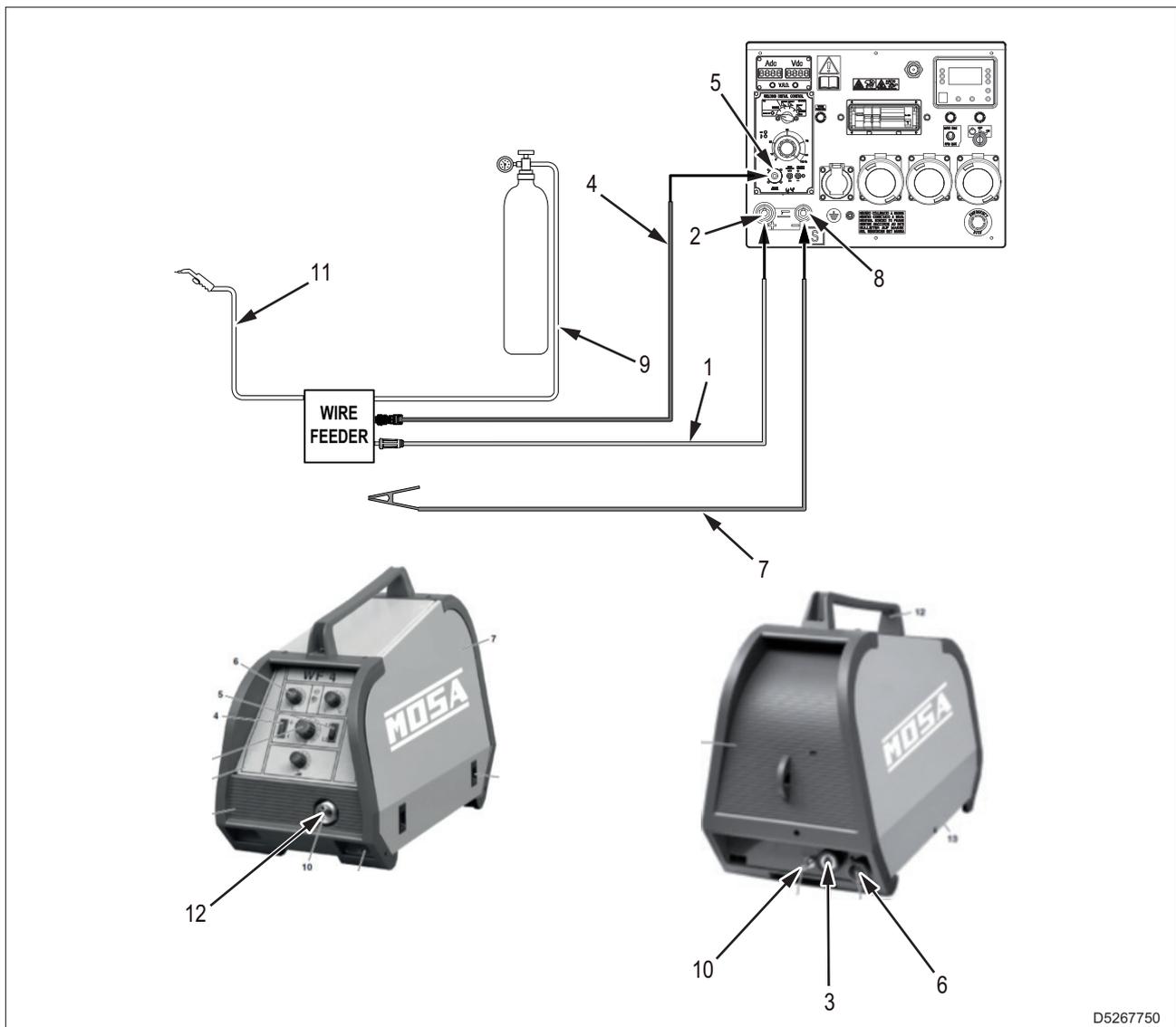
Note

The ground cable (7) is not supplied with the WF 4 wire feeder.

- 4 - Connect the flexible gas hose (9) from the cylinder to the MOSA WF 4 wire feeder in the dedicated gas connection (10) located on the back of the wire feeder.
- 5 - Connect the welding torch (11) to the output socket (12) of the WF 4 wire feeder located on the front.

Note

The torch is not supplied with the WF 4 wire feeder.



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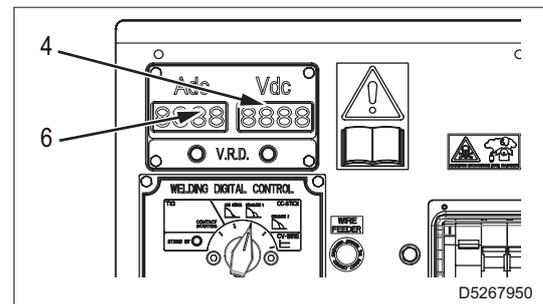
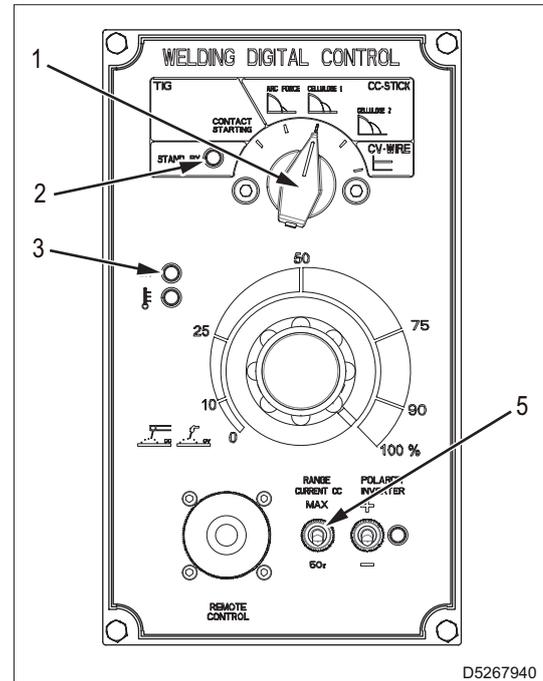
Use

- 1 - Connect the MOSA WF 4 wire feeder to the engine driven welder.
- 2 - Start the engine driven welder.
- 3 - Exit STAND BY mode by turning the selector knob (1) and making sure that the STAND BY LED (2) goes out.
- 4 - Turn the knob (1) and select CV-WIRE mode.
- 5 - Check the following indications on the WDC:
 - ON LED (3) lit
 - Open-circuit voltage present at the welding sockets indicated on the Vdc display (4).

Note

The range of values indicated on the Vdc display (4) depends on the functions active on the engine driven welder

- Set the CURRENT RANGE CC switch (5) to 50%.
 - Auto Idle function, low engine RPM.
- 6 - Set the welding voltage and the welding wire output speed by adjusting the Volt adjustment knob and the wire speed adjustment knob, respectively, located on the WF 4 wire feeder. The set welding voltage is indicated on the Vdc display (4).
 - 7 - Open the gas valve.
 - 8 - Press the Mig torch button and start welding.



Parameter display

During the welding process, the Adc display (6) shows the actual current and the Vdc display (4) shows the actual voltage.

SELF-POWERED wire feeder

The electrical power for these types of wire feeders is supplied directly by the welding circuit, so it is not necessary to connect the machine to the wire feeder with a control/power cable.

Important

MOSA does not supply this type of wire feeder and cannot guarantee the full functionality of a MOSA engine driven welder connected to a SELF-POWERED wire feeder produced by other companies.

6.8 Simultaneous use of welding and auxiliary current generation functions

The welding currents indicated in paragraph “3.2 Technical data” 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 current generation are used simultaneously, refer to the operating limits for the engine driven welder, shown in the following table.

The welding current values are valid for all welding processes used.

Welding current	175A	150A	125A	100A	75A	50A	25A	0A
Pow. 3 ~ / 400V - Cos φ 0.8	4kVA	5kVA	6kVA	7kVA	8kVA	9kVA	9.4kVA	10kVA
Pow. 3 ~ / 400V - Cos φ 1 ~	6kVA	7kVA	8kVA	8.5kVA	9.5kVA	10kVA	11kVA	11.5kVA
Pow. 1 ~ / 230V - Cos φ 0.8 / 1	4kVA	5kVA						
Pow. 1 ~ / 110V - Cos φ 0.8 / 1	1.5kVA	2.5kVA						

Welding current	350A	325A	300A	275A	250A	225A	200A
Pow. 3 ~ / 400V - Cos φ 0.8	0kVA	0kVA	0kVA	0kVA	1kVA	2kVA	3kVA
Pow. 3 ~ / 400V - Cos φ 1 ~	0kVA	0kVA	1kVA	2kVA	3kVA	4kVA	5kVA
Pow. 1 ~ / 230V - Cos φ 0.8 / 1	0kVA	0kVA	0kVA	0kVA	1kVA	1.5kVA	2.5kVA
Pow. 1 ~ / 110V - Cos φ 0.8 / 1	0kVA	0kVA	0kVA	0kVA	0kVA	0.5kVA	1kVA

6.9 Generating set operation



WARNING

- Before using the machine as generator, carefully read section. “2. Safety”
- It is forbidden to connect the machine to the public grid and/or other source of electricity.
- The machine is not designed for emergency use in the event of a commercial grid power failure.

6.9.1 Auxiliary generation in AC 400V/50Hz - 230V/50Hz - 110V/50Hz

The machine is capable of supplying three-phase and single-phase AC current, to power electrical equipment.



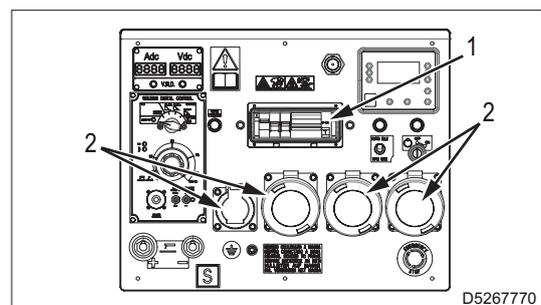
Important

- Check that the electrical characteristics of the devices to be supplied, power, voltage, and frequency, match the declared values.
- Connect the machine to a grounding system according to the regulations in force at the place of installation.

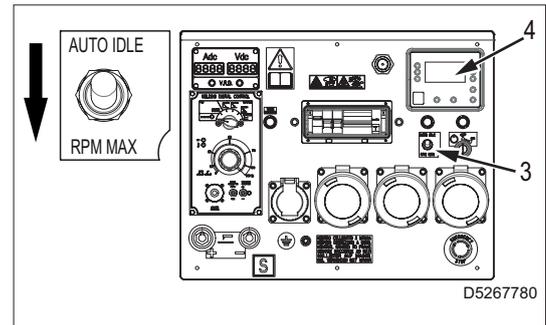
Use the ground terminal located on the front of the machine.

Check the efficiency of the ground connection before each work session if the distribution system used requires it, e.g. TT and TN systems.

- 1 - Check that the machine's main switch (1), located under the protective cover, is set to OFF (insertion lever downwards).
- 2 - Connect the load cables to the output sockets (2) on the control panel.
- 3 - Start the machine, set the machine's main switch to ON (insertion lever upwards).



- 4 - Set the Auto Idle switch (3) to the RPM MAX position. (if present).
- 5 - Check the operation of the machine's electrical safety device, residual current circuit breaker or insulation monitor located under the protective cover (2), by pressing the TEST button on the device and checking that the machine's main switch is open.
- 6 - Before supplying power to the equipment, check the voltage and frequency values on the display of the engine control unit (4).
- 7 - For three-phase electrical systems, check that the three line voltages and the three phase voltages are equal and that the direction of rotation is correct (clockwise rotation).



Note

- In the absence of a load, the voltage and frequency values may be higher than their nominal values. For details, see “Voltage” and “Frequency”.

Auto Idle selector switch (if present)

It is possible to use the machine as an AC generator also by setting the Auto Idle switch (3) to the AUTO IDLE position.

The motor automatically switches to the rated speed, allowing energy to be drawn when required by the connected load.

When powering equipment or devices with an electric motor (pumps, compressors, fans, etc.), keep the Auto Idle switch (3) in the RPM MAX position to facilitate starting the electric motor.

6.9.2 Operating conditions

Electrical powers

The declared electrical powers refer to the absence of welding current, (see “6.8 Simultaneous use of welding and auxiliary current generation functions”) and the combined use of available AC currents.

The declared electrical powers are the maximum powers that can be supplied by the machine for single use.

The declared electrical power is usable for 100% continuous operation, but cannot be overloaded.

The electrical power of the generating set, expressed in kVA, is the available output power at the reference environmental conditions (Ambient temperature 25 °C - Relative humidity 30% - Altitude 100 m a.s.l.) and at the rated values of voltage, frequency, power factor (cos ϕ).

Important

- During use, DO NOT EXCEED the declared powers, paying particular attention when powering multiple loads at the same time.

Voltage

For asynchronous generators, the voltage is specified with an accuracy of $\pm 10\%$ of the nominal value.

In the absence of a powered electrical load, the open circuit voltage (e.g. 400V 3~) could have a value of 440V 3~; instead, while the maximum power/current is being drawn, the voltage could drop to 360V 3~.

Always check that the electrical devices to be powered have a supply voltage with an operating range of at least $\pm 10\%$ of its nominal supply voltage. Failure to do so may cause the electrical equipment to malfunction, resulting in a dangerous situation or serious damage to the machine.

Frequency

Frequency is a parameter directly dependent on engine revolutions.

With a 2-pole alternator, you have a frequency of 50/60 Hz with a rotational speed of 3000/3600 rpm.

With a 4-pole alternator, you have a frequency of 50/60 Hz with a rotational speed of 1500/1800 rpm.

The frequency, and thus the engine speed, is kept constant by a mechanical regulator.

The mechanical speed regulator has an idle to full load speed droop of less than 5 %, while under static conditions, the accuracy is maintained within ± 1 %.

- For 50Hz generators, the no-load frequency is 52-52.5 Hz
- For 60Hz generators, the no-load frequency is 62.5-63 Hz.

In some engines or for special requirements, the speed controller is electronic.

In this case, the accuracy under static operating conditions reaches $\pm 0.25\%$ and the frequency remains constant from no-load to load operation (isochronous operation).

Always check that the supply frequency of the electrical equipment to be powered, particularly motors, is compatible with the declared frequency of the machine and has a working range of at least $\pm 5\%$ of its rated supply frequency.

Failure to do so may cause the electrical equipment to malfunction, resulting in a dangerous situation or serious damage to the machine.

Power factor - $\cos \phi$

The power factor is a data that depends on the electrical characteristics of the load.

It indicates the ratio between the Active Power (kW) and the Apparent Power (kVA).

The apparent power is the total power required for the load, given by the sum of the active power delivered by the engine (after the alternator has transformed the mechanical power into electrical power) and the Reactive Power (kVAR) delivered by the alternator.

The rated value of the power factor is $\cos \phi = 0.8$.

If the electrical device and the power machine, voltage and frequency are the same, for $\cos \phi$ values ranging between $0.8 \div 1$, no precautions are necessary for connecting and operating the equipment.

Starting motors

Starting a motor with the machine can be critical due to the high starting current required by motors (I_{avv.} = up to 8-10 times the rated current I_n).

Asynchronous type alternators are not recommended for starting electric motors, as the starting current of the motor must not exceed the rated current of the alternator.

Before connecting any equipment or device (pumps, compressors, fans, etc.) to an electric motor, always check that the starting or inrush current of the motor does not exceed the declared maximum current of the machine.

6.9.3 Connectable electrical devices



WARNING

- **MOSA, a division of BCS S.p.A., shall not be held responsible for any damage caused by electrical components incorrectly connected to this machine.**

This machine is not suitable for powering certain electrical devices.

The following table is an indicative and non-exhaustive list of the machine's compatibility with certain devices.

Electrical devices	Type	Connection possibilities
Heaters, toasters, incandescent light bulbs, electric cookers, electric pans	Resistive	These devices can be connected.
Motors, pumps, grinders, small refrigerators, lawn mowers and hedge trimmers.	Inductive	<p>These devices can be connected, but it is necessary to follow the instructions given in paragraph "Starting motors".</p> <ul style="list-style-type: none"> • These devices require a large inrush current for starting. • Some motors can also be sensitive to frequency variation during their start-up.
Televisions, radios, microwave ovens, electronically controlled appliances.	Capacitive	<p>These devices CANNOT be connected.</p> <ul style="list-style-type: none"> • Voltage spikes or high voltages can cause the capacitive element to fail. • Surge and transient protection must be installed and an additional purely resistive load connected. • Even if these precautions are taken, the correct operation of the electrical device cannot be guaranteed.
Computers, high resolution televisions, complex electrical equipment.	Capacitive/inductive	<p>These devices CANNOT be connected.</p> <ul style="list-style-type: none"> • Voltage spikes or high voltages can cause the capacitive element to fail. • Surge and transient protection must be installed and an additional purely resistive load connected. • Even if these precautions are taken, the correct operation of the electrical device cannot be guaranteed.

6.10 Electrical protection

6.10.1 Machine's main switch

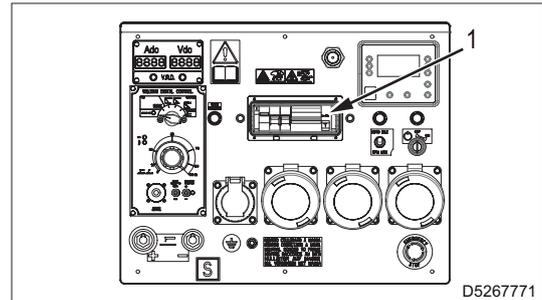
These machines are manufactured with a three-phase asynchronous alternator and do not require electrical protection against short circuits and overcurrents, as the alternator protects itself by de-energising and the voltages generated by the asynchronous alternator cancel each other out.

The function of the main circuit breaker is taken over by the residual current circuit breaker.

6.10.2 Residual current circuit breaker

The residual current circuit breaker located on the control panel under the cover (1) guarantees protection against indirect contacts due to ground fault currents. When the switch detects a fault current greater than the rated one, it opens interrupting the electric circuit connected.

The residual current circuit breakers differ according to their characteristics: tripping differential current, maximum rated current, type of differential correction detected.



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6.10.3 Insulation monitor

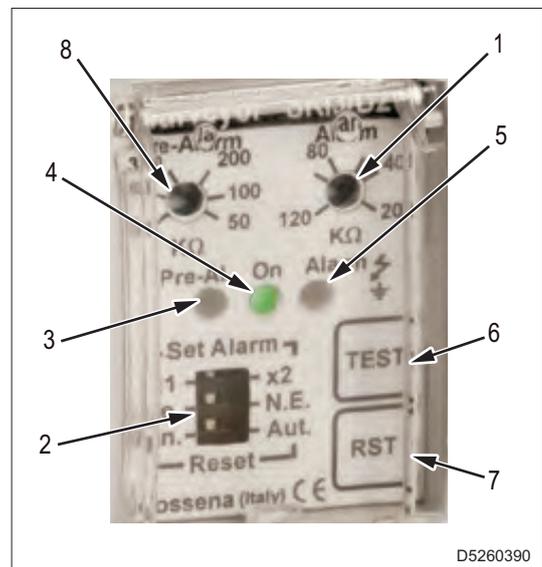
Important

- Isolation monitor calibration changes must only be performed by qualified personnel. If necessary, contact Technical Support.

The isolation monitor is a device that continuously controls the ground insulation of the electrical circuit.

When the device detects a resistance value (isolation) lower than the set value, it intervenes by signalling the fault and opening the main machine switch.

- 1 - Alarm threshold adjustment
- 2 - Dip-switch
- 3 - Pre-alarm indication led
- 4 - Power supply presence indication led
- 5 - Alarm indication led
- 6 - Test button
- 7 - Reset button
- 8 - Pre-alarm threshold adjustment



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SRI3/ D2 operation

- ON indicator (4) indicates that the equipment is powered.
- Pressing the test button (6) for at least 5 seconds, turns on the Alarm (5) and Pre-alarm (3) LEDs.
- When the button (6) is released, the Pre-alarm led (3) turns off and the Alarm led (5) remains ON. Press the test button (6) again to turn off the Alarm led (5).
- If the isolation resistance drops below the set pre-alarm value, the Pre-alarm led (3) lights up and the contact of the Pre-alarm relay switches.

- If the isolation resistance drops further below the alarm value threshold, the Alarm led (5) turns on, along with the contact of the Alarm switch relay.
- After checking the system and removing the cause of the problem, reset the circuit by pressing the reset button (7).

SRI3/ D2 model factory settings

- Microswitches
- Resistive value multiplier: x 1
- Output relay: N.De (Normally de-energized)
- Reset: Man. (manual)
- Potentiometers
- Alarm: 40 k Ω
- Pre-Al. : 100 k Ω

6.10.4 Circuit breaker

When the insulation monitor is present, a magnetic circuit breaker fulfils the function of the main switch.

In the electrical panel there are several magnetic circuit breakers that protect the equipment connected to the sockets on the machine.

Overload protection tripping is not instantaneous; it follows an overcurrent/time characteristic. The greater the overcurrent, the shorter the tripping time.

The rated tripping current refers to an operating temperature of 30°C.

Each variation of 10°C corresponds approximately to a variation of 5% on the current value.

6.11 Troubleshooting

Important

- Service and repairs may only be carried out by the Technical Support Service or Authorised Service Centres.
- Unauthorised repairs carried out on this machine may endanger people and invalidate the warranty.

This troubleshooting guide is provided to assist the technician in locating, identifying and repairing any machine malfunctions.

- Problem (first column): the faults or malfunction found on the machine are listed here.
- Possible cause (second column): the possible causes that could have generated the problem are listed here.
- Solution (third column): the actions to be performed to solve the problem are listed here.

6.11.1 Engine

Issue	Possible cause	Solution
The engine doesn't start	• Emergency button pressed	• Check and release
	• Battery cut-off switch open	• Check and close
	• Preheating failure	• Insufficient engine preheating phase, failure in the preheating circuit. Repair
	• Faulty engine control unit	• Replace
	• Flat battery	• Recharge or replace. Check the engine battery charging circuit.
	• Loose or corroded battery cable terminals	• Tighten and clean. Replace if corroded.
	• Faulty starter motor	• Repair or replace.
	• Lack of fuel or presence of air in the fuel circuit	• Refill tank and de-aerate the circuit.
	• Faulty power supply circuit: faulty pump, blocked injector, etc.	• Request the intervention of the Technical Support Service
	• Clogged air or fuel filter	• Clean or replace.
	• Faulty engine stop device	• Replace.
	• Faulty starter electrical circuit	• Check and repair.
Black smoke	• Air filter clogged.	• Clean or replace.
	• Overload.	• Check the connected load and reduce it.
	• Faulty injectors. Jogged injection pump	• Request the intervention of the Technical Support Service.
White smoke	• Oil level too high.	• Eliminate any excess oil.
	• Engine cold or in prolonged operation with little or no load.	• Insert the load only when the engine is sufficiently warm.
	• Worn-out segments and/or cylinders.	• Request the intervention of the Technical Support Service

Issue	Possible cause	Solution
The engine does not accelerate Unsteady speed	• In the absence of load	• Check the position of the Auto Idle switch
	• Fault in the Auto Idle system	• Check and repair or replace.
	• Clogged air or fuel filter	• Clean or replace.
	• Faulty power supply circuit: faulty pump, blocked injector, etc.	• Request the intervention of the Technical Support Service.
	• Oil level too high.	• Eliminate any excess oil.
Poor power output from the engine	• Air filter clogged.	• Clean or replace
	• Insufficient supply of fuel; impurities or water in the power supply circuit.	• Check the supply circuit, clean and refuel.
	• Poor quality fuel or fuel that has been left in the tank too long.	• Empty the tank and the carburettor
	• Dirty or faulty injectors.	• Request the intervention of the Technical Support Service
Low oil pressure	• Low oil level	• Restore the level. Check that there are no leaks.
	• Oil filter clogged.	• Replace the filter.
	• Faulty oil pump.	• Request the intervention of the Technical Support Service
	• Alarm malfunction	• Check the sensor and the electrical circuit Repair or replace
High temperature	• Overload.	• Check the connected load and reduce it.
	• Insufficient ventilation	• Check the cooling fan and its drive belts
	• Insufficient amount of coolant	• Restore the level. Check the entire cooling circuit, pipes, sleeves, etc. for leaks or breaks.
	• Clogged water or oil radiator	• Clean radiator cooling fins
	• Faulty water circulation pump	• Request the intervention of the Technical Support Service
	• Faulty injectors. Jogged injection pump	• Request the intervention of the Technical Support Service
	• Alarm malfunction.	• Check the sensor and the electrical circuit Repair or replace

6.11.2 AC auxiliary current circuit

Issue	Possible cause	Solution
No voltage on output sockets	• Machine's main switch open, OFF position	• Check and close the switch, set to ON
	• Residual current circuit breaker tripped	• Check connected devices for insulation defects that cause ground fault currents.
	• Overcurrent protection tripped	• Check the current of the connected load.
	• Faulty electrical protections	• Replace
	• Defective or discharged capacitors.	• See "6.11.3 Welding circuit".
	• Faulty alternator	• See "6.11.3 Welding circuit".
Open circuit voltage too low or too high	• Incorrect engine speed	• Adjust the speed to its rated no-load value.
	• Defective or discharged capacitors.	• See "6.11.3 Welding circuit".
	• Faulty alternator	• See "6.11.3 Welding circuit".
Correct open circuit voltage too low at load	• Overload.	• Check the connected load.
	• Load with $\cos \varphi$ less than 0.8	• Type of load that cannot be supplied with this machine.
	• Defective or discharged capacitors.	• See "6.11.3 Welding circuit".
	• Faulty alternator	• See "6.11.3 Welding circuit".
Unstable voltage	• Loose electrical contacts	• Check and tighten the machine's electrical connections and the power cord.
	• Irregular engine rotation.	• Check and request the intervention of the Technical Support Service

6.11.3 Welding circuit

Issue	Possible cause	Solution
No voltage on welding sockets. • STAND BY LED on WDC lit	• Welding mode selector switch on the WDC control panel in the STAND BY position.	• No problem. Normal condition.
	• Welding mode selector switch on the WDC control panel in a position other than the STAND BY position.	• Machine just started. Exit the STAND BY condition by moving the welding selector knob.
No voltage on welding sockets. • STAND BY LED on WDC off • ON LED on WDC off	• Welding current / voltage adjustment knob minimum too low.	• Adjust the minimum setting of the welding current / voltage adjustment knob located on the WDC or on the connected remote control.
	• WDC Welding control unit power supply faulty	• Start the machine. Check the input and output voltages: $V_{in} = 9 - 14 \text{ Vdc}$ $V_{out} = 24 \text{ Vdc}$ Check the power supply connection cables
	• Fault in the WDC power supply section	• Replace the WDC
No voltage on welding sockets. • STAND BY LED on WDC off • ON LED on WDC flashing.	• Current sensor faulty or not connected correctly.	• Check the current sensor connection on the WDC (see WDC CONNECTORS) Replace the faulty current sensor
No voltage on welding sockets. • STAND BY LED on WDC off • ON LED on WDC off • LED  on WDC flashing	• Chopper bridge thermal protection tripped.	• Leave the engine running to allow the chopper bridge to cool down. After a few minutes, the LED  will go out and the voltage will become available again at the output sockets.
	• Chopper bridge thermal protection (NTC resistor) faulty.	• Check the resistive value of the thermal protection on the chopper connector (see chopper bridge TEST) between pins 8-16: it should be $10 \text{ K}\Omega$ (20°C). For very different values, short-circuit or open-circuit, bypass the thermal protection by cutting the two wires connected to pins 8 and 16 and connect a $10 \text{ K}\Omega / 0.25\text{W}$ resistor to the connector. If the system is working properly, it is still necessary to replace the chopper bridge as soon as possible.
	• WDC faulty	• If the thermal protection has not tripped or it is not faulty, replace the WDC.

Issue	Possible cause	Solution
<p>No voltage on welding sockets.</p> <ul style="list-style-type: none"> • STAND BY LED on WDC off • ON LED on WDC off • LED  on WDC lit steadily 	<ul style="list-style-type: none"> • Temporary current anomaly on the chopper bridge. • WDC faulty. 	<ul style="list-style-type: none"> • Turn off the machine to perform a system RESET and restart it. • If the LED  remains off after restarting, try welding and check that the weld is normal. The system has detected an abnormal current circulation in the chopper bridge. • Turn off the machine to perform a system RESET and restart it. • If the LED  lights up again steadily, it is necessary to replace the WDC.
<p>No voltage on welding sockets. Incorrect operation in CV-WIRE mode with WF 4 wire feeder connected</p> <ul style="list-style-type: none"> • STAND BY LED on WDC off • ON LED on WDC off 	<ul style="list-style-type: none"> • No enable signal from the torch button or fault in the torch control circuit in the WDC • WDC faulty. 	<ul style="list-style-type: none"> • Check the control/power cable between the machine and the WF 4, particularly the continuity of the cables connected to the WDC connector at pins C – D (presence of connection) and G-I (torch contact return) • If the control/power cable is not faulty, it is necessary to replace the WDC
<p>Welding current always at maximum or always at minimum</p>	<ul style="list-style-type: none"> • Potentiometer on WDC faulty • Current sensor faulty • WDC faulty 	<ul style="list-style-type: none"> • Check the voltage from connector P2 (pin 1÷12) (see POTENTIOMETER TEST) • Replace the sensor • Replace the WDC
<p>Remote control not working</p>	<ul style="list-style-type: none"> • Remote control (or cable) faulty • WDC faulty 	<ul style="list-style-type: none"> • Check the remote control. (see REMOTE CONTROL TEST) • Replace the WDC
<p>Incorrect operation of the POLARITY INVERSION function</p>	<ul style="list-style-type: none"> • Function disabled on the WDC • Low engine RPM in the AUTO-IDLE position • Polarity inversion contactor faulty. • WDC faulty 	<ul style="list-style-type: none"> • Request the intervention of the technical assistance service to enable it • Check the engine RPM in the AUTO-IDLE position. The should must be 2200 RPM (see machine data plate) or 36 Hz. • Replace the contactor • Replace the WDC
<p>Incorrect operation of the V.R.D. function</p>	<ul style="list-style-type: none"> • Function disabled on the WDC • RC network faulty or not connected • WDC faulty 	<ul style="list-style-type: none"> • Request the intervention of the technical assistance service to enable it • Check the RC network. Repair or replace • Replace the WDC

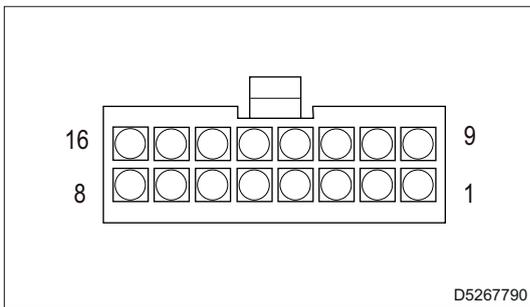
Issue	Possible cause	Solution
No welding current and no output voltages on the welding and auxiliary current circuit	Short circuit on chopper bridge	<p>Leave the alternator connected to the capacitor box battery.</p> <p>Disconnect the alternator cables connected to the chopper bridge.</p> <p>If the alternator output voltages go back to being correct in this condition, there may be a short circuit on the chopper bridge, which must be replaced.</p>
	Short circuit on AC auxiliary current circuit	<p>Leave the alternator connected to the capacitor box battery.</p> <p>Disconnect the AC auxiliary current circuit cables from the terminal board inside the electrical box.</p> <p>If the alternator output voltages go back to being correct in this condition, there may be a short circuit on the AC auxiliary current circuit.</p> <p>Check and repair.</p>
	Defective or discharged capacitors.	<p>Check the nominal capacity of the excitation capacitor boxes.</p> <p>The check must be carried out on the individual box not connected to the alternator and to the other boxes.</p> <p>If the capacitance of even a single box is not within the tolerance of its nominal capacitance, it is recommended to replace the entire capacitor box battery.</p>
	Faulty alternator	<p>Leave the alternator connected to the capacitor box battery only.</p> <p>Disconnect the welding cables from the chopper bridge and the AC auxiliary current circuit cables from the terminal board inside the electrical box.</p> <p>If the alternator output voltages are incorrect in this condition, the alternator is faulty and must be replaced.</p>

Chopper bridge test

Check the following resistive values on the chopper bridge connector

Chopper bridge connector pin	Resistive value
1 - 9	3.33 KΩ ± 5%
2 - 10	3.33 KΩ ± 5%
3 - 11	3.33 KΩ ± 5%
8 - 16	1.8 ÷ 25 KΩ ± 5% (depending on the temperature)

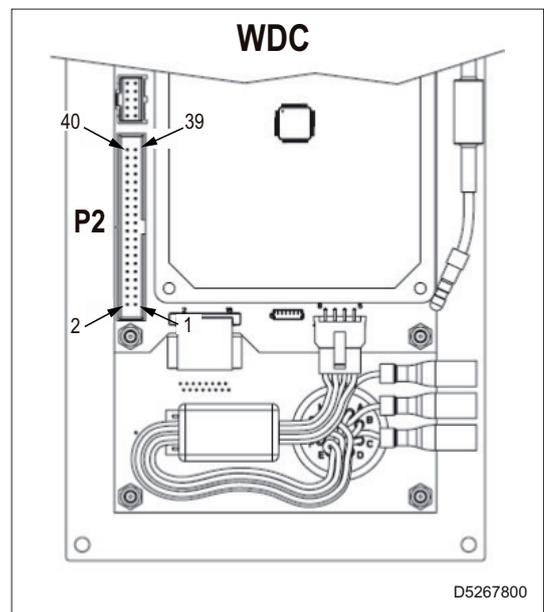
Cable insertion side view



Potentiometer test

To check whether the WDC potentiometer is working properly, perform the following test.

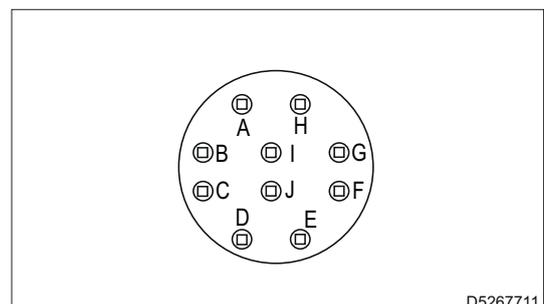
- 1 - Start the welder and bring it to its nominal operating speed.
- 2 - Connect a multimeter set for DC voltage measurement between pins 1 (-) and 12 (+) of connector P2.
- 3 - Rotate the potentiometer completely counter-clockwise and check that the voltage is ≤ 0.5V.
- 4 - Slowly rotate the potentiometer clockwise and check that the voltage increases up to a value ≥ 4.5V when it has reached the end of its stroke. The voltage must vary smoothly as the potentiometer is turned.

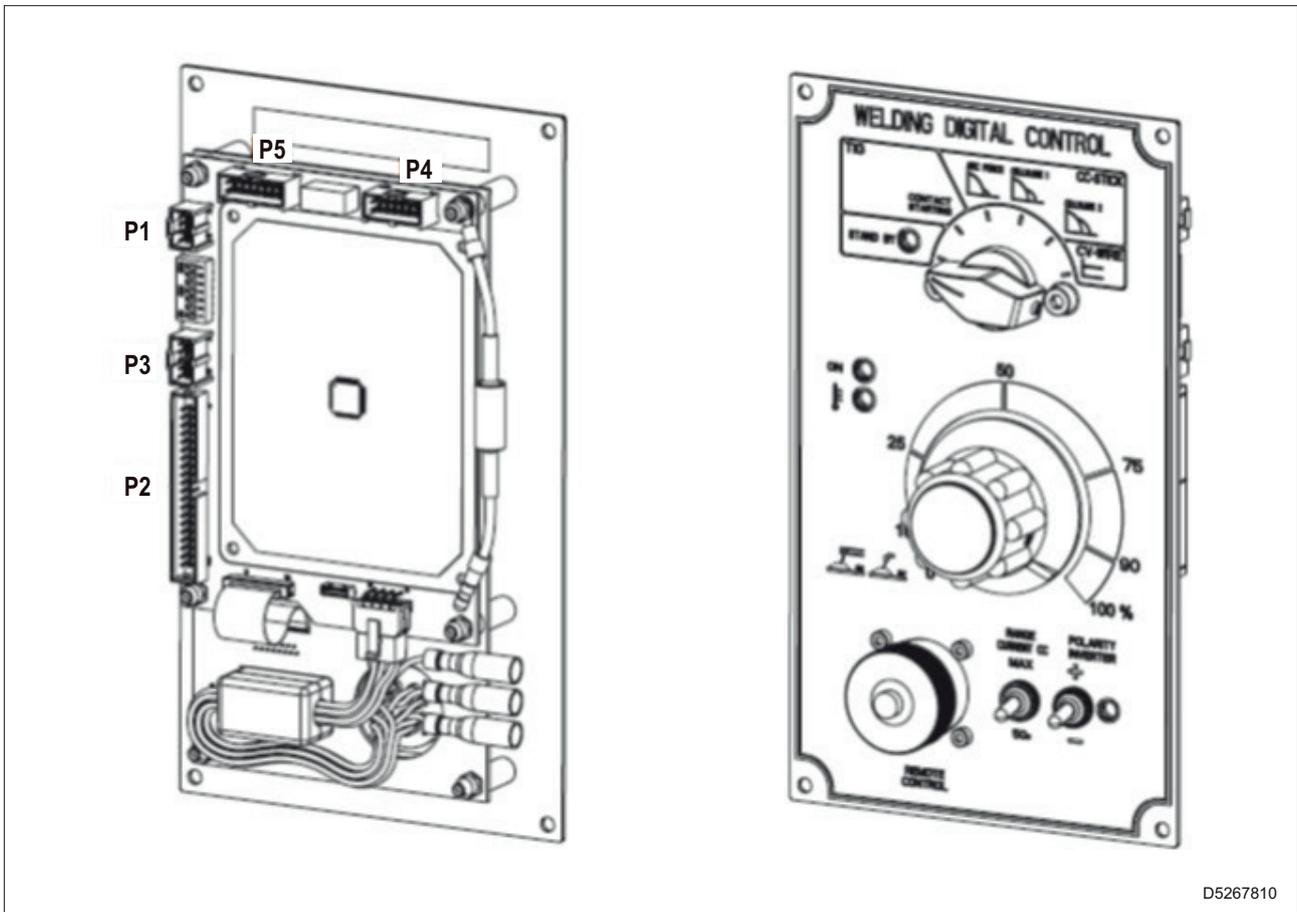


Remote control test

Turn the knob to minimum and then to maximum, checking the resistive value with an ohmmeter between pins A and B of the 10-pin connector of the remote control.

Knob position	Resistive value
Minimum	50 ÷ 100 Ω
Maximum	4.5 ÷ 4.7 KΩ



WDC connectors

D5267810

- P1 Current sensor connector
- P2 Free
- P3 Digital instrument board connector
- P4 Driver board connector
- P5 Power connector

7. Maintenance



WARNING

- Before proceeding with maintenance, carefully read section “2. Safety”.

7.1 Refuelling

Use fuel, coolant and lubricants according to the ambient temperature.

7.1.1 Fuel

The fuel must comply with EN590 and ASTM D975.

The cetane number of the fuel should be at least 45.

In order to ensure an efficient and long service life of the engine, the fuel must be sulphur-free diesel fuel:

- EN 590
- DIN 5168
- ASTM D975 Grade 2-D S15,
- ASTM D975 Grade 1-D S15

Using fuel with a high sulphur content could reduce the life of the engine, or cause damage to the machine or decrease its performance.

Do not use dirty diesel or mixtures of diesel and water, as this would cause serious engine failure.

Clean fuel prevents clogging of fuel injectors.

Do not store the diesel in zinc coated containers.

Use the fuel in the storage tank or the fuel tank of the machine within 6 months.

Fuel deterioration reduces the quality of combustion and can cause engine power loss, increased fuel consumption, and damage to engine components.

To use other types of fuel, such as low-temperature fuels, biodiesel, synthetic, non-road fuel, etc., consult the engine manual.

Refuelling



WARNING

- Before refuelling, read “2.8 Precautions during fuel and engine oil filling” carefully.

Do not fill the tank completely. Leave a gap of about 10 mm, between the fuel level and the top wall of the tank, to allow expansion.

Keep the engine off during refuelling.

7.1.2 Engine oil

- To ensure adequate protection of the engine and keep it efficient for a long time, use only the recommended oil. 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 the following specifications:

API	CJ-4 Low S.A.P.S
ACEA	E6 Low S.A.P.S.

Low S.A.P.S. (low sulphated ash, phosphorus, sulphur oil) keeps the catalyst in good working condition.

SAE oil classification

In the SAE classification, oils are identified according to the viscosity.

The code is composed of two numbers, which indicate, and must correspond to the ambient temperature at which the engine operates.

The first number refers to the cold viscosity, for winter use (W), while the second number refers to the viscosity at high temperatures.

SAE 10W-30	-25°C to +40°C
SAE 10W-40	-25°C to +50°C
SAE 5W-30	-30°C to +40°C
SAE 0W-40	-40°C to +50°C

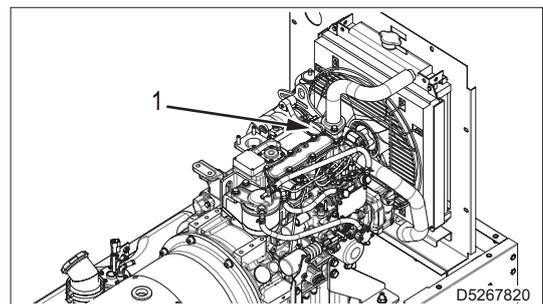
Refuelling and checks



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.

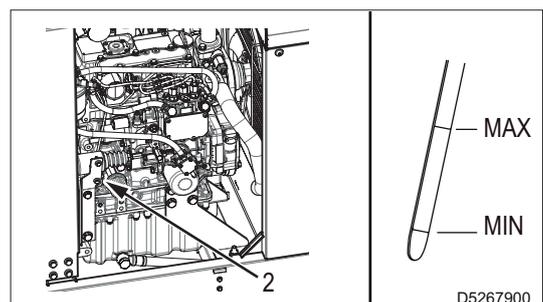
1 - Remove the engine fill cap (1).



2 - Refuel and refit the cap.

3 - Check the level with the rod (2).

The level must be between the minimum and maximum notches.



7.1.3 Coolant

The engine cooling system is originally supplied with OAT coolant, mixed 50% with demineralised water. It is recommended to continue using the same coolant.

If the type of coolant is changed for refuelling, the system must be thoroughly washed.

By mixing with each other, the residues of additives of different types contained in the different liquids would create gelatinous substances that could obstruct the system.

Use a mixture of 50% demineralised water and 50% low silicate ethylene glycol coolant.

Use a coolant free from silicates, phosphates, borates, nitrites and amines.

The following ethylene glycol based engine coolants may be used:

- low silicate OAT (Organic Acid Technology): ASTM D 3306 - D6210 - D4985

- low silicate HOAT (Hybrid Organic Acid Technology): ASTM D 3306 - D6210 - D4985

Important

- Do not mix OAT and HOAT coolants.
- Never use automotive coolants. These coolants do not contain the correct additives to protect heavy-duty diesel engines.

Oat coolants are maintenance-free for up to 6 years or 6000 operating hours, provided that the cooling system is topped up using the same type of coolant.

Do not mix different types of coolant.

Test the coolant condition annually with coolant test strips.

HOATs are not all maintenance-free and it is recommended to add SCA (Supplemental Coolant Additives) at the first maintenance interval.

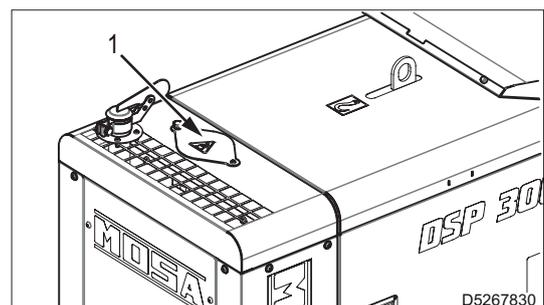
Refuelling

WARNING

- Before refuelling, read “2.13 Maintenance precautions” carefully.

Check the coolant level when the engine is cold.

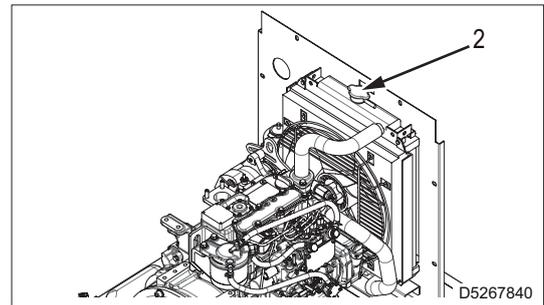
1 - Open the radiator cap access door (1).



- 2 - Remove the cap (2) and pour the coolant into the radiator.
- 3 - Top up the liquid until it covers the pipes inside the radiator by about 5 mm.

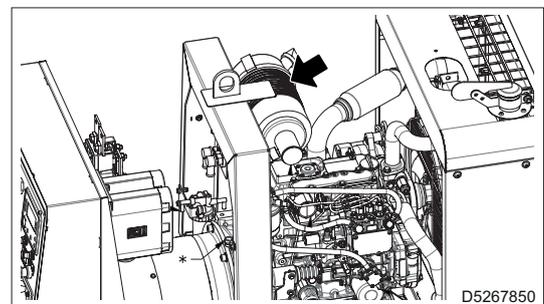
Note

- Do not overfill the radiator; allow room for coolant expansion.
- 4 - Refit the cap (2) and tighten securely.
 - 5 - After the top-up operations, run the engine for a short period, check the coolant level again and refill if necessary.



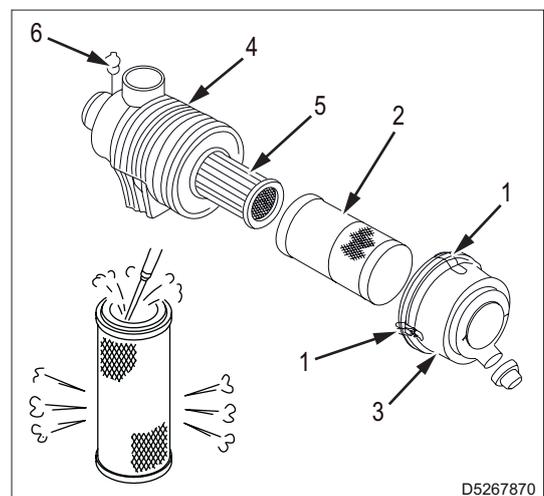
7.1.4 Checking and cleaning the engine air filter

- 1 - Release the hooks (1).
- 2 - Remove the outer filter element (2); the filter is equipped with two elements.
- 3 - Using a damp cloth, clean the inside of the cover (3) and the outer element (4).
- 4 - Blow air through the element (2) using compressed air at 0.29 - 0.49 MPa (3.0 - 5.0 kgf/cm²).



Important

- Use low-pressure compressed air to prevent filter damages.
- 5 - Replace the filter element (2) if it is damaged, very dirty or stained with oil.
 - 6 - Remove and replace the inner filter element (5) only if the engine loses power or if the optical clogging indicator (6) activates.
 - 7 - Insert the filter element (2) into the outer element (4).
 - 8 - Fit the cover (3) in the direction indicated on the cover arrow, and couple it using the hooks (1).



7.2 Routine maintenance

Note

For engine maintenance, refer to the engine maintenance manual.

Every day

- Check coolant level
- Check engine oil level
- Check fuel level
- Check for sediment and water in fuel filter/separator

After the first 50 hours

- Check cooling fan belt
- Replace the engine oil filter and engine oil

Every 50 hours

- Check and clean radiator fins
- Check battery charge
- Clean sediment and water in fuel filter/separator

Every 250 hours

- Check cooling fan belt
- Replace the engine oil filter and engine oil
- Drain fuel from tank
- Clean air filter

Every 500 hours

- Clean fuel filter/separator
- Replace the fuel filter
- Replace the air filter element

Every 1000 hours

- Adjust intake/discharge valve clearance

Every 1500 hours

- Check fuel injectors
- Check engine base ventilation system

Every 2000 hours

- Replace coolant (or every 2 years, even if the 2000 hours have not been reached)
- Check fuel line, coolant, oil and ventilation pipes (or every 2 years, even if the 2000 hours have not been reached)

7.3 Storage

- Carefully clean the fairings and all other machine parts.
- Run the machine with load every 10 days for 15-30 minutes.
Doing so ensures proper lubrication of the engine, keeps the battery charged and prevents any blockage of the injection system.
- 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.
- 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 “2.14 Precautions for disposal of waste material” and “2.15 Disposal of the machine”.

In the event of disposal of the machine 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.

- For further information, visit <https://bcsgroup.it/it-it/sostenibilita/#etichettatura-ambientale> or scan the QR code.





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