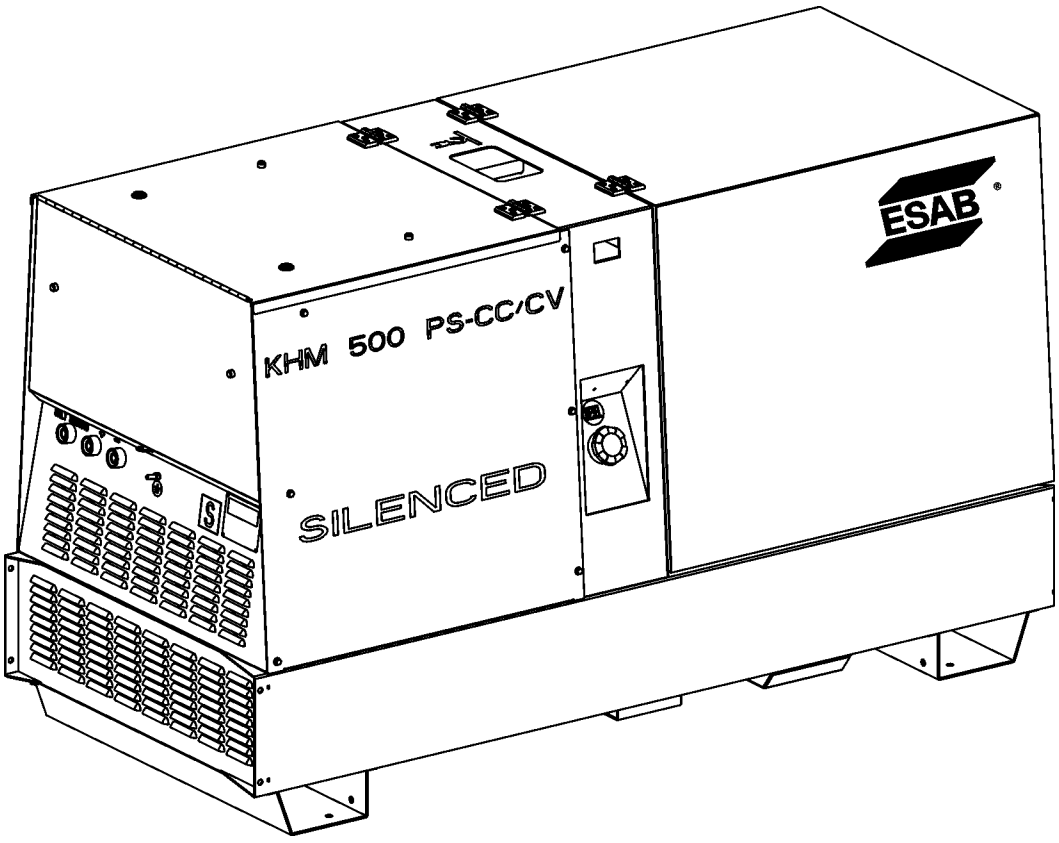
KHM 500 PS CC/CV



Instruction manual

Valid for serial No. 135 – XXX – XXXX (50Hz version)
Valid for serial No. 135 – XXX – XXXX (60Hz version)
for serial No. 135 – XXX – XXXX (110V version)

0794 999 920 GB 01/10

GB

DECLARATION OF CONFORMITY

ESAB Welding Equipment AB, S--695 81 Laxå, Sweden, gives its unreserved guarantee that the engine driven welder KHM 500 PS – CC/CV with the code number 0794003880/1/2 complies with the Community Directives and related modifications 98/37/CE - 73/23/CE - 89/336/CE and, in order to check the conformity, the following harmonized standards EN 292-1 - EN 292-2 - EN 60974-1 - EN 60204-1 - EN 50199 and other standards or directives like 84/535/CE - ISO 8528 have been consulted .

Laxå 2001

Joakim Cahlin
ESAB Welding Equipment AB
695 81 LAXÅ
SWEDEN Tel. + 46 58 481000 fax +46 584 411924

10/4/01 DC 500 P-GB

Dear Customer,

We wish to thank you for having bought this product.

Please take time to read this manual and familiarize yourself with the machine before attempting to use it.

If you should have questions or problems please contact the nearest authorized Service Center. They have the experience and original spare parts. The use of non-original spare parts will void the warranty.

TABLE OF CONTENTS

DESCRIPTION	PAGE
GENERAL INFORMATION	
INFORMATION ABOUT THIS MANUAL	M 2
DESCRIPTION - SYMBOLS	M 2.1
PRECAUTIONS - GENERAL	M 2.5
PRECAUTIONS - ENGINE DRIVEN WELDERS	M 2.5.1
INSTALLATION	M 2.7
TRANSPORT	M 4
ASSEMBLY OF SITE TOW FOR KHM 500/600	M 6.3
INSTALLATION INFORMATION	M 2.6
OPERATION	
UNPACKING	M 3
PREPARING THE UNIT	M 20
STARTING THE ENGINE THE USE	M 21.3
STOPPING THE DIESEL ENGINE	M 22.1
CONTROLS	M 31
OPERATING	M 32
REMOTE CONTROL PHG 1	M 38.7
MAINTENANCE	M 43, M 43.3,M 44.2
STORAGE	M 45
TECHNICAL DATA AND MACHINE DESCRIPTION	M 51, M 52,
TECHNICAL DATA	M 53
SCHEMATICS AND SPARE PARTS	
ORDERING SPARE PARTS	R 1,
WIRING DIAGRAM – ENGINE EP5	M 61.1,
WIRING DIAGRAM – CONTROL WELDING	M 61.2,
WIRING DIAGRAM – POWER WELDING	M 61.3,
WIRING DIAGRAM – AUXILIARY Y400V / 3x I230V	M 61.4,
WIRING DIAGRAM – AUXILIARY Y400V / I230V / I110Vx2 60Hz	M 61.5,
WIRING DIAGRAM – AUXILIARY Y400V / I230V / I110Vx2 c.t.e.	M 61.6,
DESCRIPTION - ELECTRICAL SYSTEM	M 60
SPARE PARTS	EE 1, EE 1.1,
SPARE PARTS	EE 2, EE 2.1,
SPARE PARTS	EE 3, EE 3.1,
SPARE PARTS	EE 4, EE 4.1,
KIT DECAL	
SITE TOW FOR KHM 500/600	KA 9
PHG 1	KD 10

20/3/01 76503M1GB

GENERAL INFORMATION

- In the envelope where you found this manual you will also find an Owner's manual for the engine, and accessories (if required).

This product has been designed for welding and generation of electrical power for tools and other electrical devices used in construction; ANY OTHER USE, is not permitted and we cannot be held responsible for injuries or damages resulting from such incorrect use.

Our products are made in conformity with the safety norms in force in order to avoid injury to persons or damage to the machine or other things.

☞ **Warranty is not valid if not carried out by ESAB authorized service agent.**

Making modifications to the machine without our written authorization will void the warranty and release us from any liability.

ABOUT THIS MANUAL

Before using the machine please read this manual attentively and follow the instructions contained in it. This will help avoid problems, possible injury and damage to the machine.

The manual is written for experienced, qualified personnel, who are familiar with health and safety laws and related regulations.

This manual is an integral part of the product and should be kept in a safe place so that it will be available for consultation during the life of the product. If the machine is sold the manual should be transferred to the new owner.

Some figures contained in this manual are designed to help identify certain parts and may not correspond to the machine in your possession.

☞ ***Notice:*** *the manufacturer may make improvements or modifications to the product or its accessories as described in this manual without updating the manual.*

HEADINGS USED IN THIS MANUAL

The headings used in this manual are designed to call your attention to potential hazards and important aspects of the operation of the machine…

⚠ DANGEROUS

Indìcates a strong possíbility of severe personal injury or death ìf ínstructions are not followed.

⚠ WARNING

Indìcates a possibìlìty of personal ínjury or equipment damage if ìnstructions are not followed

⚠ CAUTION

Indícates that equipment or property damage can result if instructions are not followed.

⚠ IMPORTANT

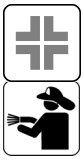
⚠ NOTE

⚠ ATTENTION

These headings give helpful information about the preparation, operation and care of the machine.

GENERAL SYMBOLS

STOP – Read with great attention



Read with attention

WRENCH - Use the correct tools for the type of work being done

WARNING SYMBOLS

ATTENTION - If this advice is not followed people or things can be hurt or damaged.

HIGH VOLTAGE - Do not touch – risk of injury or death.

FIRE - Risk of fire.

HEAT - Hot surfaces.

EXPLOSIVE - Explosive material or danger of explosion, in general.

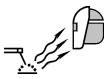
NO WATER - *Do not use w*ater as it can cause shortcircuits or other damage.

NO SMOKING - *C*igarettes, matches or lighters can start a fire or explosion.

ACIDS - Danger of corrosion or burns.

SAFETY SYMBOLS

Use the correct protective devices for the type of welding being done



Use protective clothing, etc. specifically designed for the type of welding being done.

Protect yourself when doing maintenance on the machine -

It is advisable to protect yourself when carrying out maintenance, such as filling the battery, refuelling, etc.

Pay attention to safety precautions when moving the machine

Refer to the instructions before moving the machine

Wear indicated safety clothing -

It is compulsory to wear the personal protection items shown when using the equipment.

Use required safety devices -

Safety devices suitable for the type of welding and the location of the job must be used.

Do not use water on electrical fires -

It is prohibited to use water to put our fires in electrical equipment.

Do not touch without having disconnected the electricity -

It is prohibited to work on the machine until the electricity has been turned off.

Welding prohibited -

It is forbidden to weld in areas containing explosive gases.

⚠ IMPORTANT

☞ Read and understand these instructions.
☞ Before installing, operating or servicing this equipment, read the operating manuals of the welder and of the engine.
☞ Not observing the information in the manuals can result in personal injury and/or damage to the equipment and other property.
☞ Respect all safety regulations and laws when operting this equipment.

⚠ WARNING

Do not remove or disable protective devices

Removing or disabling protective devices on the machine is prohibited.

Do not use the machine if it is not in good technical condition

The machine must be in good working order before being used. Defects, especially those which. regard the safety of the machine, must be repaired before using the machine.

ENGINE FUELLING

⇒ Stop engine when fuelling.
⇒ Do not smoke, avoid open flames and sparks, and do not use electric tools when fueling.
⇒ Unscrew the fuel cap slowly to let out the fuel vapours.
⇒ Do not over-fill the tank.
⇒ Avoid spilling fuel on hot engine.
⇒ Wipe up spilled fuel before starting engine.
⇒ Shut off fuel cock, if present, or remove fuel from tank before moving machine

FOR BATTERY EQUIPPED UNITS ONLY

⇒ Sparks may cause the explosion of battery vapours

WATER COOLED ENGINES ONLY

⇒ Slowly unscrew the cooling liquid cap of a hot engine to allow vapours to escape.
⇒ Hot vapor and heated cooling liquid under pressure can burn face, eyes, skin.

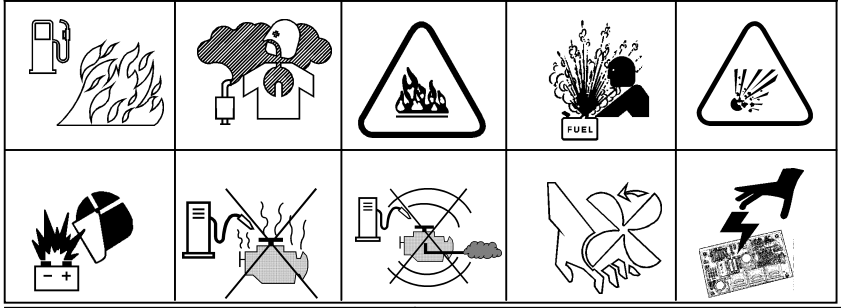
☞ **FIRST AID.** In case the operator shold be sprayed by accident, from corrosive liquids a/o hot toxic gas or whatever event which may cause serious injuries or death, predispose the first aid in accordance with the ruling labour accident standards or of local instructions.

Skin contact	Wash with water and soap
Eyes contact	Irrigate with plenty of water, if the irritation persists contact a specialist
Ingestion	Do not induce vomit as to avoid the intake of vomit into the lungs, send for a doctor
Suction of liquids from lungs	If you suppose that vomit has entered the lungs (as in case of spontaneous vomit) take the subject to the hospital with the utmost urgency
Inhalation	In case of exposure to high concentration of vapours take immediately to a non polluted zone the person involved

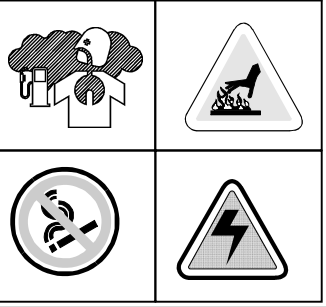
☞ **FIRE PREVENTION.** In case the working zone,for whatsoever cause goes on fire with flames liable to cause severe wounds or death, follow the first aid as described by the ruling norms or local ones.

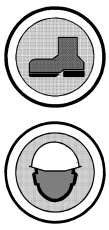
EXTINCTION MEANS	
Appropriated	Carbonate anhydride (or carbon dioxyde) powder, foam, nebulized water
Not to be used	Avoid the use of water jets
Other indications	Cover eventual shedding not on fire with foam or sand, use water jets to cool off the surfaces close to the fire
Particular protection	Wear an autorespiratory mask when heavy smoke is present
Useful warnings	Avoid, by appropriate means to have oil sprays over metallic hot surfaces or over electric contacts (switches,plugs,etc.). In case of oil sprinkling from pressure circuits, keep in mind that the inflamability point is very low.

⚠ WARNING



⚠ CAUTION





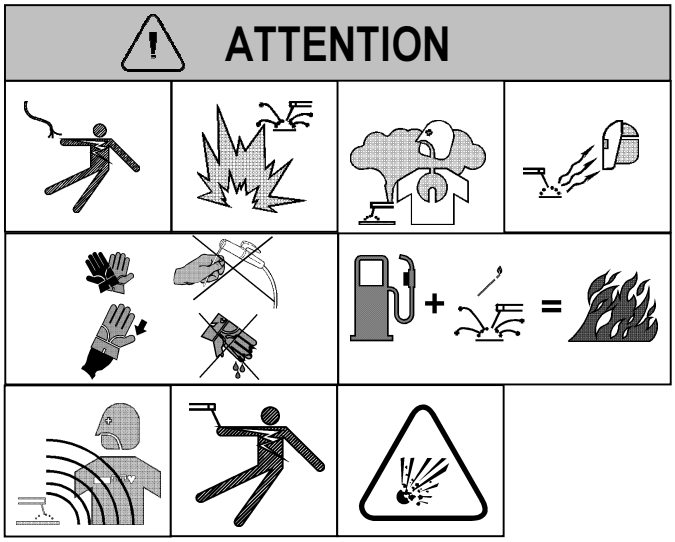
WARNING — ***THE MACHINE MUST NOT BE USED IN AREAS WITH EXPLOSIVE ATMOSPHERE***

PRECAUTIONS

The operator of the welder is responsible for the security of the people who work with the welder and for those in the vicinity.

The security measures must satisfy the rules and regulations for engine driven welders.

The information given below is in addition to the local security norms.



⇒ Make sure that the area is safe before starting any welding operation.

⇒ Do not touch any bare wires, leads or contacts as they may be live and there is danger of electric shock which can cause death or serious burns. The electrode and welding cables, etc. are live when the unit is operating.

⇒ Do not touch any electrical parts or the electrode while standing in water or with wet hands, feet or clothes.

⇒ Insulate yourself from the work surface while welding. Use carpets or other insulating materials to avoid physical contact with the work surface and the floor.

⇒ Always wear dry, insulating gloves, without holes, and body protection.

⇒ Do not wind cables around the body.

⇒ Use ear protections if the noise level is high.

⇒ Keep flamable material away from the welding area.

⇒ Do not weld on containers which contain flamable material.

⇒ Do not weld near refuellng areas.

⇒ Do not weld on easily flamable surfaces.

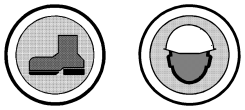
⇒ Do not use the welder to defrost (thaw) pipes.

⇒ Remove the electrode from the electrode holder, when not welding.

⇒ Avoid inhaling fumes by providing a ventilation system or, if not possible, use an approved air breather.

⇒ Do not work in closed areas where there is no fresh air flow.

⇒ Protect face and eyes (protective mask with suitable dark lens and side screens), ears and body (non-flamable protective clothes).



⚠ NOTE

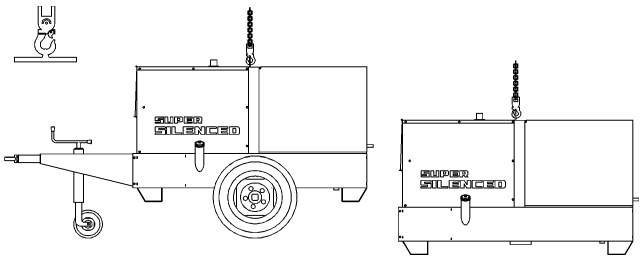
In case you have to move or transport or move the machine, follow the instructions as shown in the figures.
Transport the machine **without** petrol in the tank, **without** oil in the engine and **without** electrolyte in the battery. Be sure that the transportation devices are adequate for the size and weight of the machine.

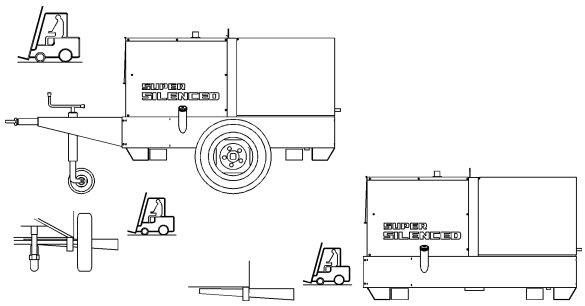
DO NOT TRANSPORT ACCESSORIES OR OTHER ITEMS WHICH COULD INCREASE THE WEIGHT AND/OR CHANGE THE CENTER OF GRAVITY OF THE MACHINE.
DO NOT DRAG THE MACHINE OR TOW IT ON PUBLIC ROADS UNLESS IT IS MOUNTED ON A HOMOLOGATED TRAILER.

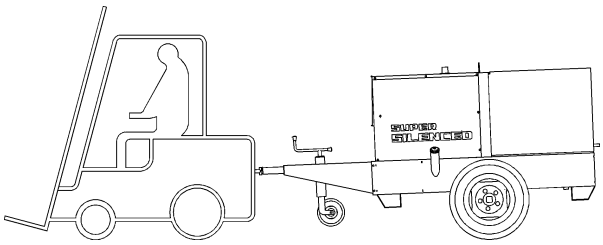
Not following these instructions could cause injury or damage to the machine.

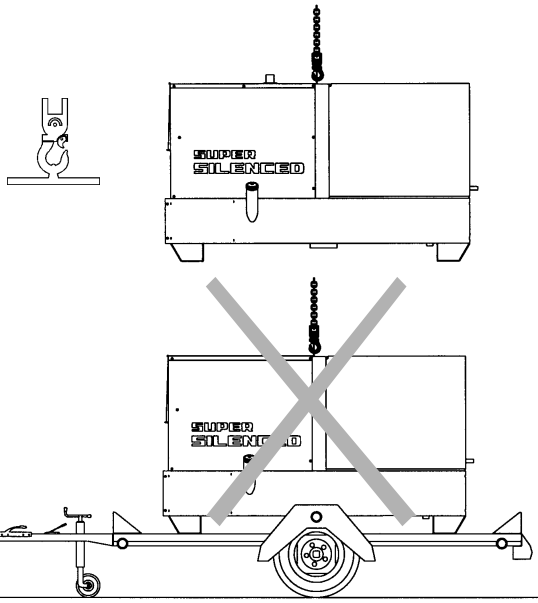
"CTL" SITE TOW

The machines provided for assembling the CTL accessory (slow towing trolley) can be towed up to a **maximum** speed of **40 Kms/hour** on asphalted surfaces.
☞Towing on public roads or turnpikes of any type **IS EXCLUDED**, because **not** in possesion of the requirements by national and foreign traffic norms.







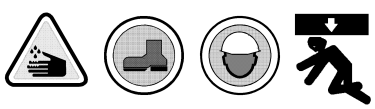


LIFT ONLY THE MACHINE

DO NOT LIFT THE MACHINE AND TRAILER

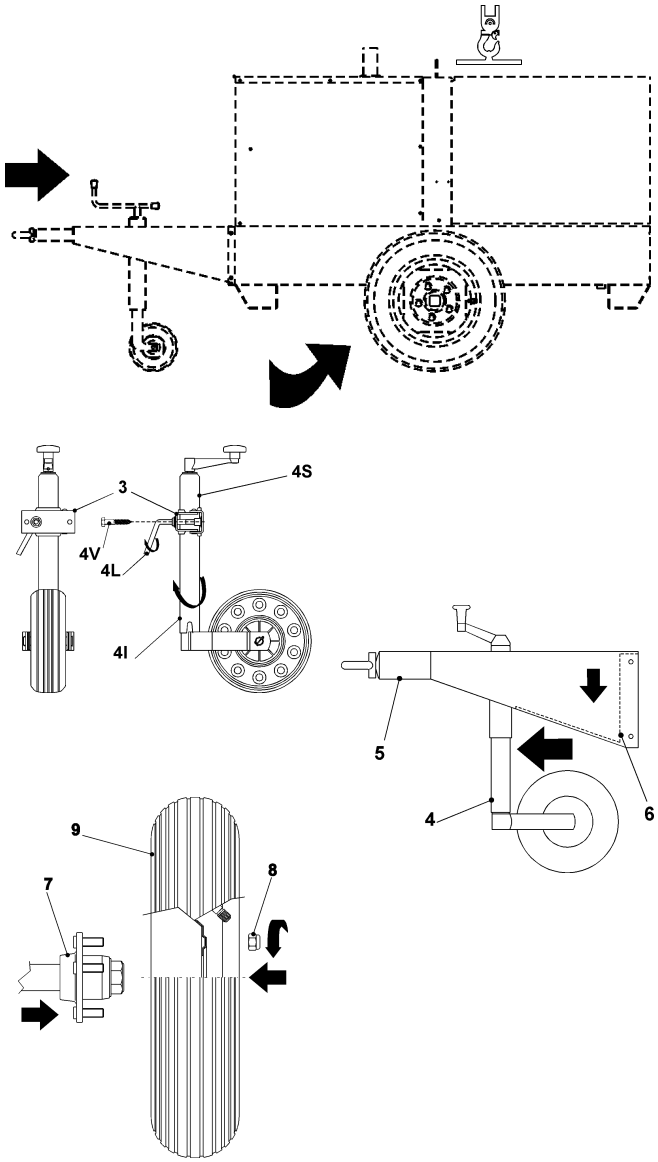
DANGER: LIFTING EYE IS NOT DESIGNED TO SUPPORT ADDED WEIGHT OF ROAD TOW TRAILER

.



☛ ***Note*:** For assembling the generating set on the site tow please keep to following instructions:

1) - Lift the generating set (by means of suitable hook).
2) - Slightly fix the jaw (3) of the parking foot to the bar with the M10x20 screws, the M10 nuts and the washers (so as to let the foot sprag go through.
3) - Split (unscrewing them) the two parts of the foot (4S-4I) to be able later to assemble them on the jaw.
4) - Introduce into the jaw (3) the upper part (4S) of the foot and screw again the lower part (4I), then tighten the screws (4V) of the jaw to the towbar and block momentaneously with the lever (4L) the whole foot.
5) - Assemble the tool holder (6) on the towbar with the M8x14 screws, nuts and washers.
6) - Assemble on the machine the towbar (5) complete of foot with the M10x20 screws, nuts and washers 7) - Assemble the axle (7) to the base of the machine with the M 10x25 screws and relative washers (two per part) so that their supports coincide.
8) - Insert the wheel (9) on the axle then screw the self blocking nuts (8).
9) - Pump the tyre (9) bringing the pressure to four atms.
10) - Lower the machine to the ground and place the parking foot definitively (regulating at the best height).



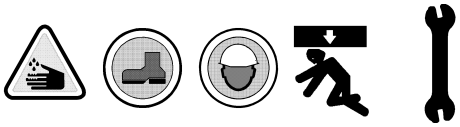
⚠ **ATTENTION**
Do not substitute the original tires with other types.

TRAILERS
The machines provided for assembling the CTL accessory (slow towing trolley) can be towed up to a **maximum** speed of **40 Kms/hour** on asphalted surfaces.

Towing on public roads or turnpikes of any type **IS EXCLUDED**, because **not** in possesion of the requirements by national and foreign traffic norms.

⚠ **ATTENTION**

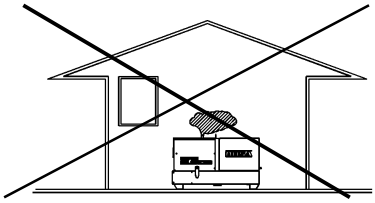
The accessory cannot be removed from the machine and used separately (actioned manually or following vehicles) for the transport of loads or anyway for used different from the machine movements.

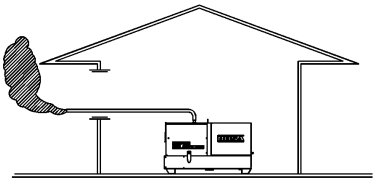


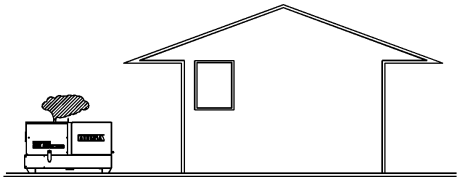
INSTALLATION INFORMATION

DIESEL ENGINES

- Use in open space with fresh air flow or vent exhaust gases far from the work area.

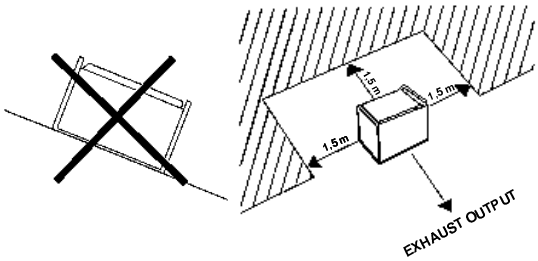




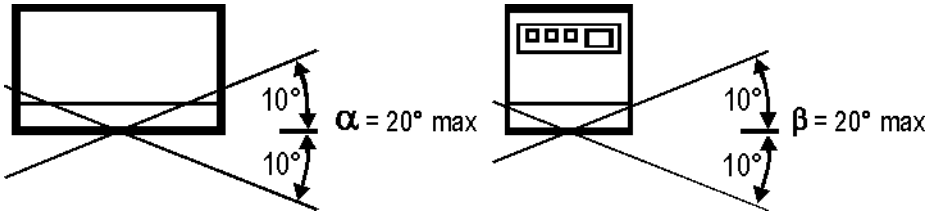


POSITIONING THE MACHINE

Place the machine on a level surface at a distance of at least 1,5 m from buildings or other structures.



If the surface is not level be sure that the angle of the machine does not exceed the values shown in the drawings below.



☞ Assure that the hot air and/or exhaust gas from the machine are vented and are not recirculated in the machine. Hot air and/or exhaust gas which is recirculated wll cause overheating of the machine and poor combustion in the engine

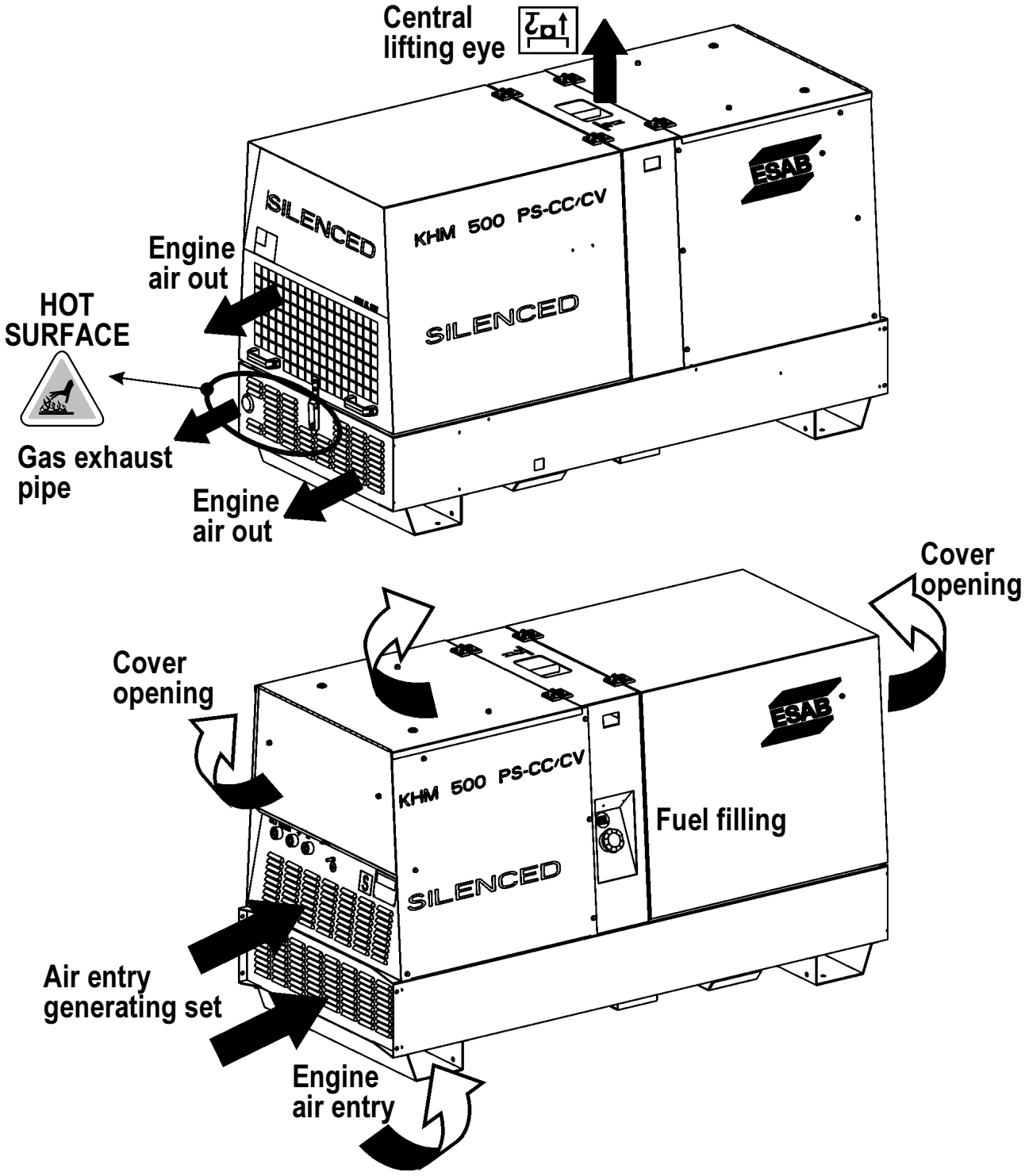
☞ Make sure that the machine does not move during operation.

Protect the machine from rain and do not put it in a location where there is danger of flooding.

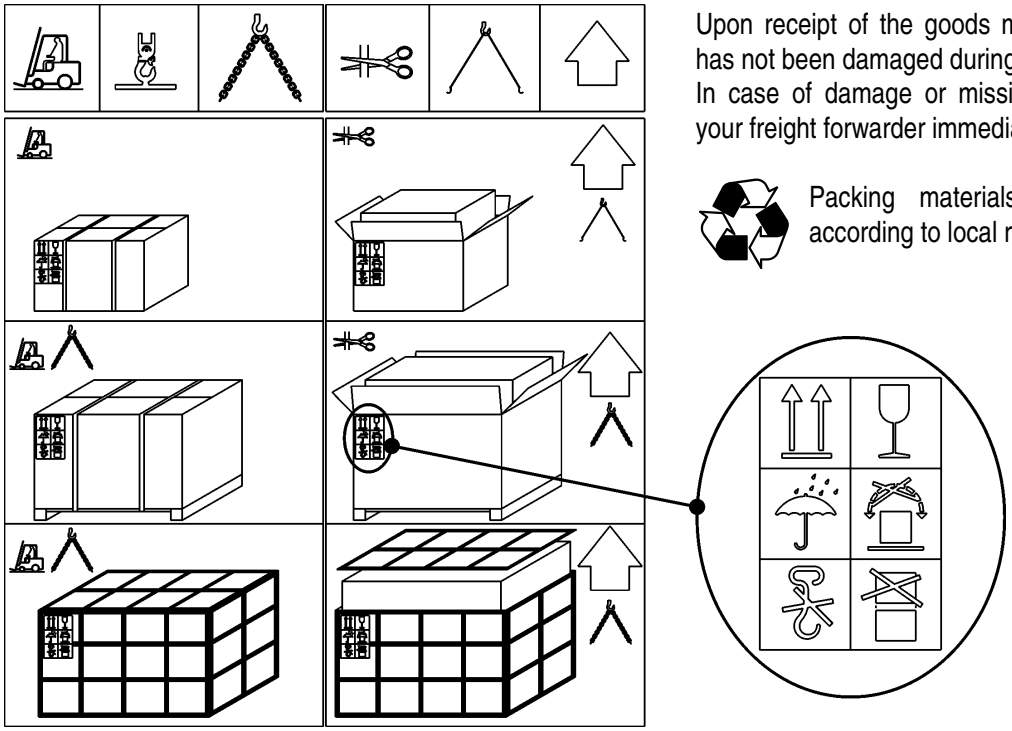
Water infiltration can cause short circuits, which can be dangerous for persons and can damage the machine.
The degree of protection, of the machine is written the rating plate and in this manual at the "Technical Data" page.

MOVING THE MACHINE

Before moving the machine turn off the engine and disconnect all cables, which could impede the move.

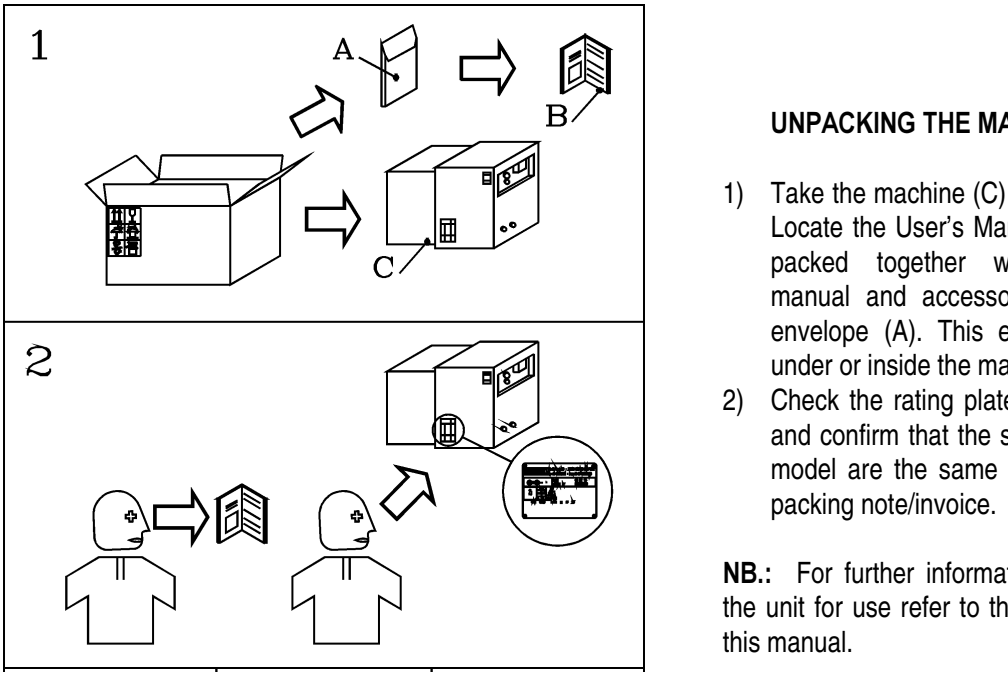

Central
lifting eye
SILENCED
KHM 500 PS-CC/CV
SILENCED
ESAB
Engine
air out
HOT
SURFACE
Gas exhaust
pipe
Engine
air out
Cover
opening
Cover
opening
KHM 500 PS-CC/CV
SILENCED
ESAB
Fuel filling
Air entry
generating set
Engine
air entry

⚠ GENERAL PACKING INFORMATION



Upon receipt of the goods make sure that the product has not been damaged during transport.
In case of damage or missing items you must inform your freight forwarder immediately.

Packing materials must be disposed of according to local regulations.

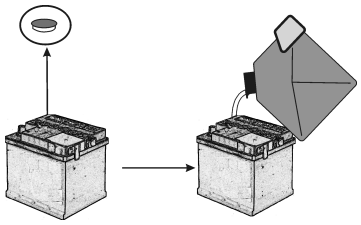


UNPACKING THE MACHINE

1) Take the machine (C) out of the carton. Locate the User's Manual (B), which is packed together with the engine manual and accessories in a plastic envelope (A). This envelope may be under or inside the machine.
2) Check the rating plate on the machine and confirm that the serial number and model are the same as shown on the packing note/invoice.

NB.: For further information on preparing the unit for use refer to the related parts of this manual.

BATTERY



Take the battery out of the machine.

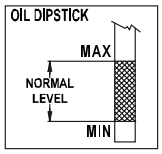
Fill the battery to the maximum level with electrolyte. Wait for about 30 minutes and top up with electrolyte.

In case of spilled acid, rinse with water before putting the battery back into the machine and reconnecting cables.

⚠ WARNING

Sulfuric acid is corrosive.
Protect hands, eyes and *clothes,* ....
Take the battery out of the machine for filling.
Warranty **VOIDED** for damages due to spilled acid.

LUBRICANT



Check the level of the engine oil using the oil dipstick. The level should be between the minimum and maximum marks. If necessary, add more oil.

If the air filter is of the oil bath type, fill it with the same oil up to the level indicated on the filter.

RECOMMENDED SAE VISCOSITY GRADES

For the type and viscosity of oil refer to owner's manual for the engine (supplied with the machine).

☞ ***NOTE**: Before starting the engine read the instructions in the owner's manual for the engine.*

FUEL

Fill the tank with good quality diesel fuel.

☞ ATTENTION: Diesel fuel is highly inflammable; before filling the tank, stop the engine. Do not fuel in the presence of open flames.

If fuel is spilled on the engine, clean it immediately before starting up the engine.

COOLING LIQUID

Pour the cooling liquid through the hole at the top of the radiator until it reaches the opening.
For the type of cooling liquid to be used and for maintenance of the cooling system, refer to the engine manual..

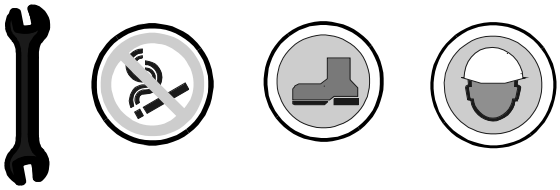
GROUND CONNECTION

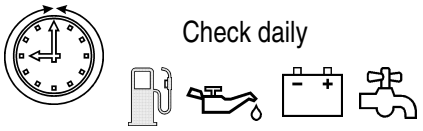
A good ground is obligatory for all models with GFI (ground fault interrupter). This protective device will not protect the operator unless there is a good ground.

☞ Use a good quality ground cable and connect it to the grounding point of the machine. Follow all local rules and/or regulations in force.

Machines with Isometer protection do not need to be grounded.

Once the above operations have been completed, the machine can be used.





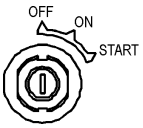
NOTE

Do not alter the factory adjustment of the engine and do not touch the sealed parts.

1500 / 1800 RPM ENGINES

These engines start their normal operating speed.

IGNITION KEY



The ingnition key is a part of the EP5 engine protection device and has three positions.

PREHEATER

The preheater must be used for starting these engines at low temperatures (below –5°C) and is activated by a push button.

STARTING THE ENGINE

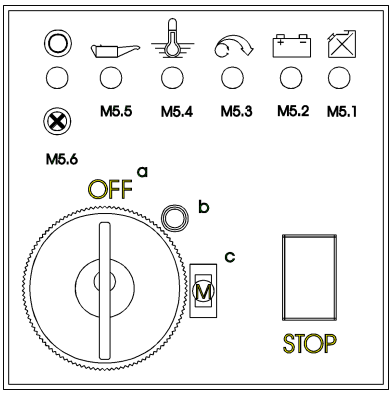
At temperatures below –5°C push and hold the glow plug button for about 10 seconds. The glow plug indicator will come on. After 10 seconds release the glow plug button and turn the starter key completely clockwise to the START position. Once the engine starts release the key and leave it in the ON postion.

At normal tempertures the glow plug is not required. Turn the starter key completely clockwise to the START position. Once the engine starts release the key and leave it in the ON postion.

Let the engine run for a few minutes to warm-up before loading it.

ENGINE PROTECTION (EP5)

The EP5 device monitors the engine oil pressure, the engine water temperature and the rpm of the engine. If the oil pressure is too low, the water temperature too high or the speed too high, the device shuts-down the engine. For a few seconds after the engine is started the shut-down function is inhibited to allow the engine to start.



M5.1(yellow) Fuel reserve
M5.2(yellow) Battery charge
M5.3(red) Overspeed
M5.4(red) High temperature
M5.5(red) Low oil pressure
M5.6(green)Protection unit on

LOW OIL PRESSURE (M5.5)
In the event of low oil pressure the LED lights and the engine is shut-down.

HIGH TEMPERATURE (M5.4)
If the water temperature is too high the LED lights and the engine is shut-down.

OVERSPEED (M5.3)
If the engine speed goes over the preset value the LED lights and the engine is shutdown. The nominal frequency (50 or 60 Hz) is monitored .

FUEL RESERVE (M5.1)
If the fuel level reaches the reserve level the LED lights and the sirene sounds and the engine is shut-down.

BATTERY CHARGE (M5.2)
It the battery is not being charged the LED light but the engine does not stop.The visual signal will stay on until until the charging system is repaired.

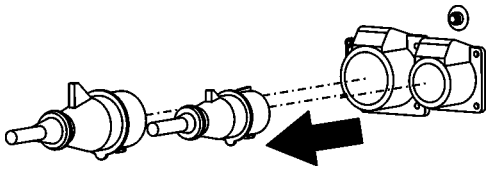
STOP BUTTON
The stop button can be used to stop the engine at any time. Push and hold the button until the engine stops.

CAUTION

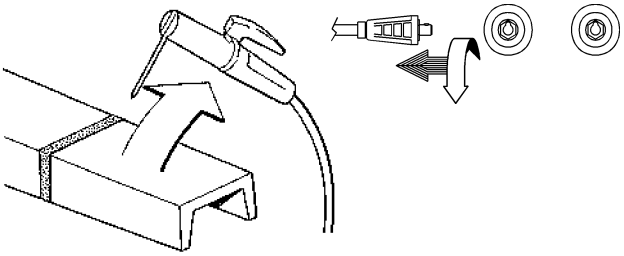
RUNNING-IN
During the first 50 hours of operation, do not use more than 60% of the maximum output power of the unit and check the oil level frequently, in any case please stick to the rules given in the engine use manual.

☞ Before stopping the engine **it is compulsory** to:

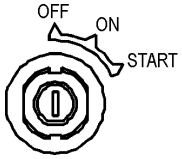
- disconnect or shut off any loads which are connected to the unit auxiliary outputs.



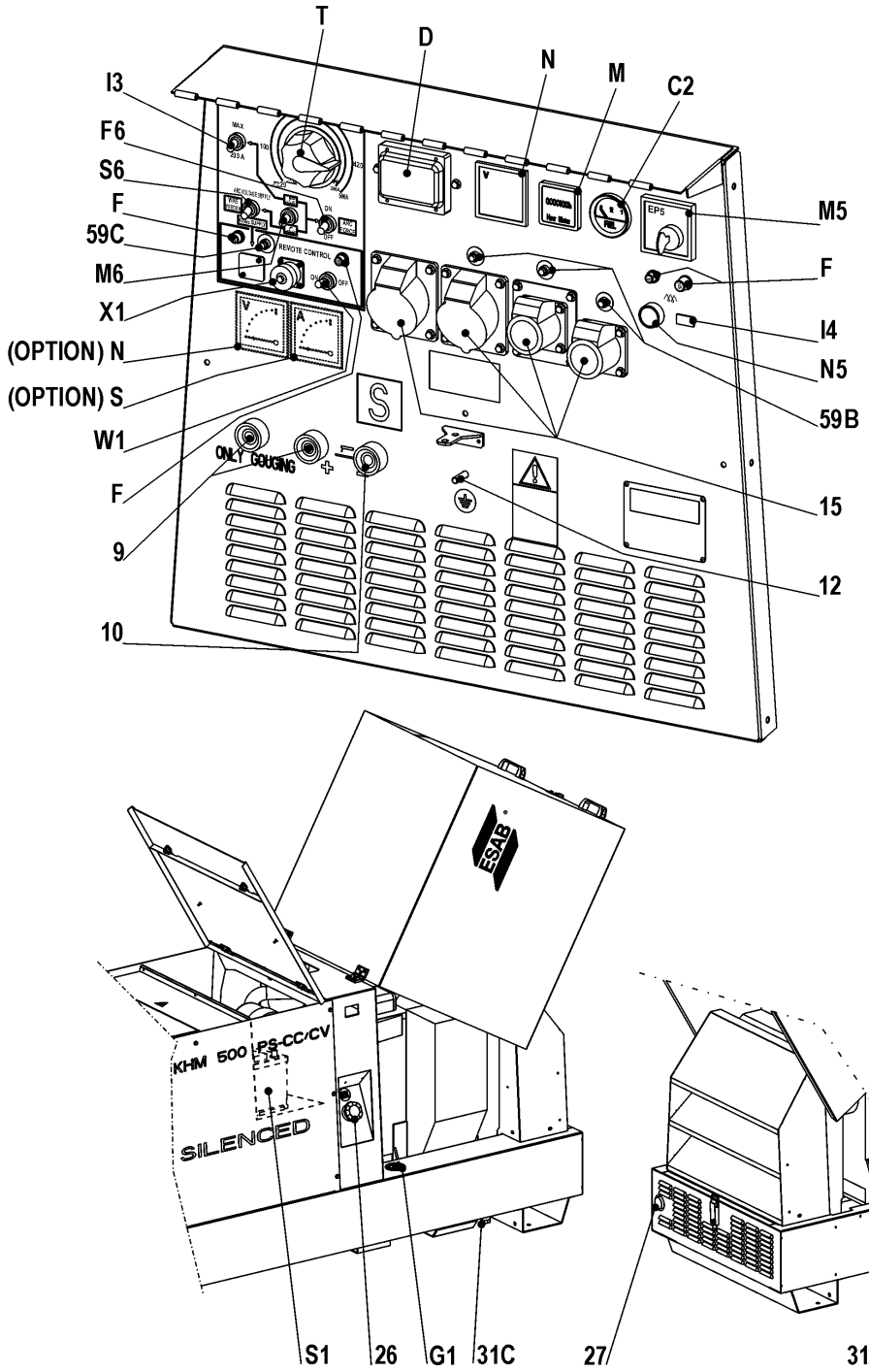
- stop welding.



To stop the engine:



Turn the starter key to the off position.



DESCRIPTION	9	Welding socket (+)	G1	Fuel level transmitter
	10	Welding socket (-)	I3	Welding scale switch
	12	Earth terminal	I4	Preheating indicator
	15	A.C. socket	M	Hour counter
	26	Fuel tank cap	M5	Engine control unit EP5
	27	Muffler	M6	Switch CC/CV
	31	Oil drain tap	N	Voltmeter
	31C	Exhaust tap for tank fuel	N5	Pre-heat push-button
	59B	Aux current circuit breaker	S	Welding ammeter
	59C	Supply thermal switch wire feeder-42V	S1	Battery
	C2	Fuel level light	S6	Wire feeder supply switch
	D	Ground fault interrupter (30 mA)	T	Welding current regulator
	F	Fuse	X1	Remote control socket
	F6	Arc-Force selector	W1	Remote control switch

17/3/01 76503M31GB

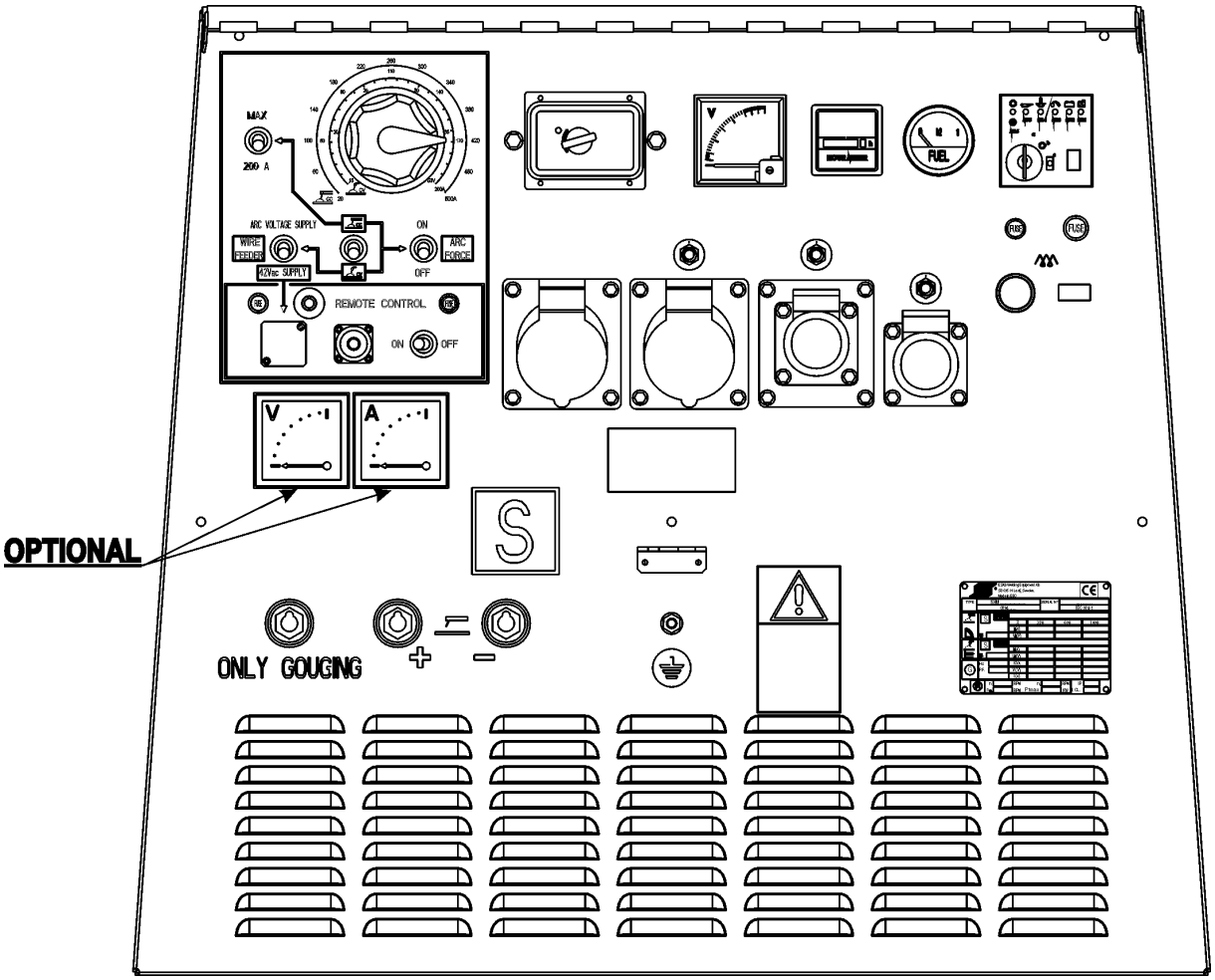
After having prepared the machine (charged the battery, put in oil and fuel) the machine is ready for operation.

Before starting the engine please note the following:

- The welder should only be operated by qualified personnel with experience in working with engine driven welders.
- Check the oil level daily. Fuel should be put in before starting the engine.
- Before using the welder or the auxiliary power let the engine warm up and before stopping the engine let it run without load to cool down.

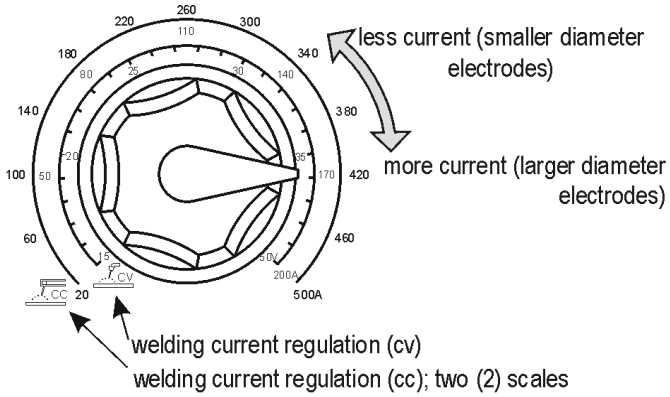
Refer to the following instructions regarding the function of the various controls on the front panel.

Controls and Instruments

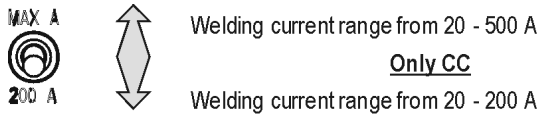


Welding current/voltage regulation

The welding current/voltage potentiometer regulates the welding current when the CC/CV switch (see below) is in the CC (constant current) position. Select the appropriate current scale (20-200A and 20-500A) for the size of electrodes to be welded using current range selector (see below).
The welding current/voltage potentiometer regulates the welding voltage when the CC/CV switch (see below) is in the CV (constant voltage) position. Select the correct voltage for the type and size of wire being used.

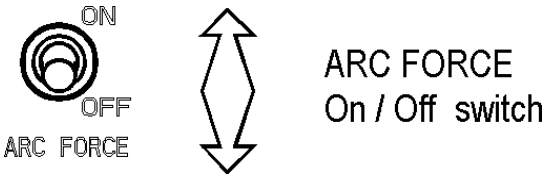


Welding current range selection



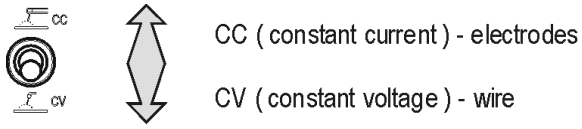
Arc Force Selector

This welder is equipped with base current for improved welding with cellulose electrodes. The base current functions when the arc force selector is turned on. This base current can also be used when welding with wire.



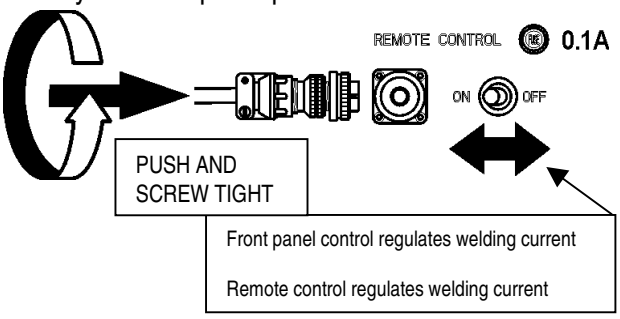
Mode Selection – CC or CV

This switch is used to select the CC (constant current) mode for welding electrodes or the CV (constant voltage) mode for welding wire. The current or voltage is regulated by the welding current/voltage regulation potentiometer (see above).



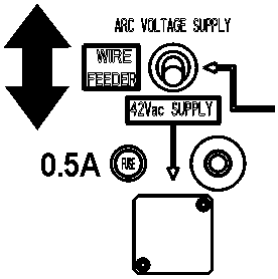
Remote control connection

The optional PHG1 remote control is used to control the current or voltage at a distance. When the switch is “ON” (pointing toward the remote control connector), the current/voltage is regulated by the remote control. When the switch is “OFF” the current/voltage is regulated by the front panel potentiometer.

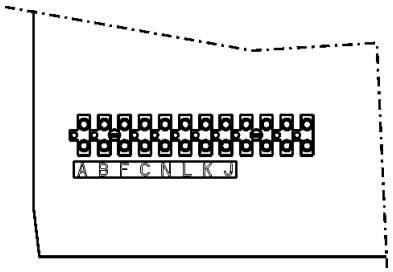


Wire feeder – CV mode

The welder is equipped with the output for the wire feeder connection; on the front panel you can choose the voltage supply between the d.c. arc voltage or the 42 V a.c.:



in this case, behind the front panel, the wires at the connector are available : follow the letters and colours shown on the terminal strip and on the electrical diagram.

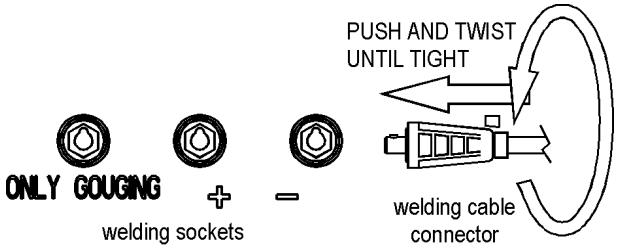


⚠ **ATTENTION:** disconnect the remote control PHG1 when the wire feeder is connected in CV mode.

Welding cable connections

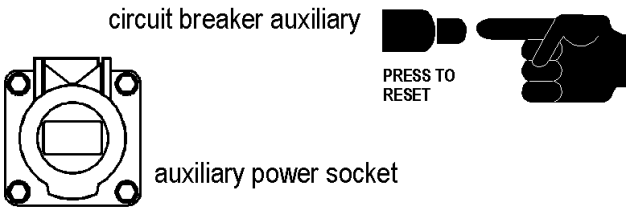
For direct current electrode positive, connect work cable to negative (-) terminal and electrode holder to positive (+) terminal. For direct current electrode negative, reverse cable connections. When gouging connect the positive lead to the socket marked "ONLY GOUGING."

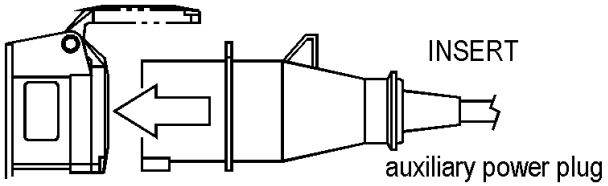
☞ Make sure that the ground clamp makes a good connection and is near the welding posítion.



Auxiliary power outlets and thermal circuit breaker

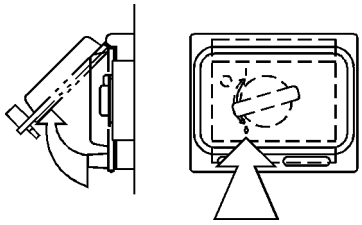
The unit is equipped with 4 auxiliary output sockets – one three phase and three single phase. The voltages depend on the version selected. The three phase socket requires no protection as the asynchronous alternator protects itself. The single phase sockets are supplied with thermal circuit breakers which pop out when overloaded. After they have been activated give them a short time to cool down before re-inserting. If they continue to pop out check that the load is not too large for the output of the socket.





Ground fault interrupter

The ground fault interrupter protects the operator from injury in the event of a ground fault. If it is activated, raise the plastic cover and push the lever up to reset.



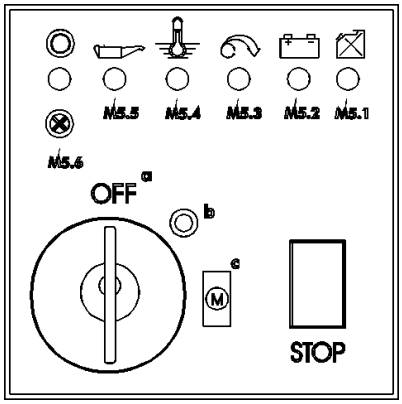
ground fault interrupter
raise lever to reset

EP5 engine protection module and starter key

The engine protection module contains the starter key, an emergency stop switch and a set of LED's which show the status of the alarms. The fuse located below the module protects the engine starting system.

Fuse for engine electrical circuit 

IGNITION KEY
The ignition key has three positions:
a) OFF
b) ON
c) START(with automatic return)



STOP BUTTON
Stops the engine at any time.
Push the button until the engine stops.

OVERSPEED (M5.3)
It signals the intervention of the overspeed protection.
The optical and acoustic signal is activated, and the engine stopped.

HIGH TEMPERATURE (M5.4)
It signals, through the temperature sensor, a high temperature anomaly.
The optical and acoustic signal is activated, and the engine stopped.
Check: the air inlets (there must be no obstruction), the cooling liquid
(if engine is water-cooled), the oil level, etc....

LOW OIL PRESSURE (M5.5)
It signals, through the pressure sensor, a low oil pressure anomaly.

The optical and acoustic signal is activated, and the engine stopped.
Check the oil level and, if it is correct, call the Service.

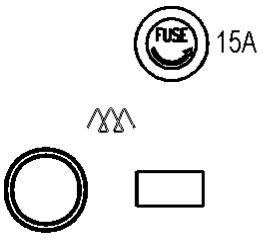
FUEL RESERVE (M5.1)
It signals the fuel running out, acoustically with the siren and optically,
without stopping the engine (the signal lasts until the cause is eliminated).

BATTERY CHARGE (M5.2)
It signals a failure of the battery charge generator and therefore the battery charging.
The visual signal will last without stopping the engine, until the cause is eliminated.

UNIT OK (M5.6)
The signal shows that the device is working.

Cold starting

The engine has a glow plug for cold starting. Turn the starter key to the “ON” position, push the black glow plug button for 10 seconds. Release the button and turn the starter key to the start position until the engine starts. The glow plug lamp shows that the glow plug is energized.



GLOW PLUG
cold starting
(max. 10 seconds)

Instruments

Standard instruments include a fuel level gauge, an operating hour counter and a voltmeter for the auxiliary power which shows the three phase voltage (400V). If the voltmeter does not show any voltage check that the GFI (ground fault interrupter) is inserted. The voltage shown will vary depending on the load and the welding current being drawn. At no load and when not welding, the voltage can be as high as 440V. The auxiliary power cannot be used when it drops below 360V.

fuel gauge

operating hours

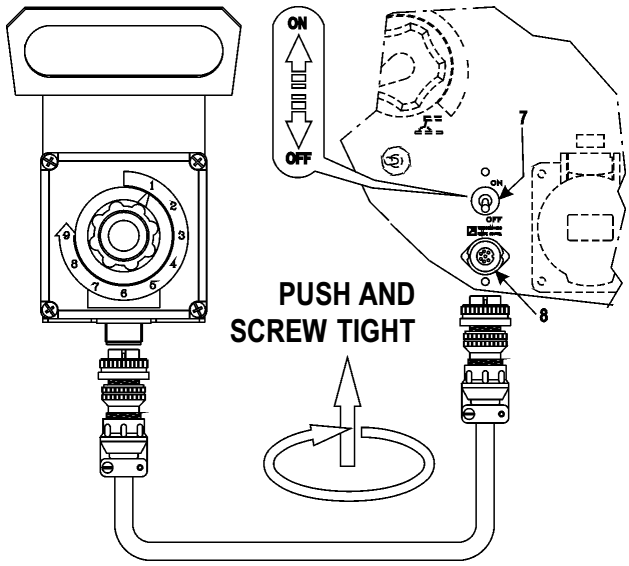
Auxiliary power voltmeter

Optionally an ammeter and a voltmeter for the welding output are available.

The remote control device for regulating the welding current is connected to the front panel by means of a multipole connector.

To regulate the current from the PHG 1, move the switch (7), located above the multipole connector (8), to "ON" position.

Position welding current adjusting knob at the necessary current value for the diameter and type of electrode.



⚠ MAKE SURE

When the PHG 1 is not used, make sure that the switch is in the "OFF" position

⚠ WARNING

MOVING PARTS can injure

- Maintenance and repair work should only be done by **qualified** personnel.
- Stop the engine before doing any work on the machine. If for any reason the machine must be operated while working on it, **be careful not to touch** rotating parts, hot surfaces, live wires, etc. which may be unprotected.
- Remove protective guards only when necessary to perform maintenance and replace them immediately after the maintenance is completed.
- Use suitable tools and wear suitable clothes.
- Do not modify the machine without prior authorization.

HOT surface can hurt you

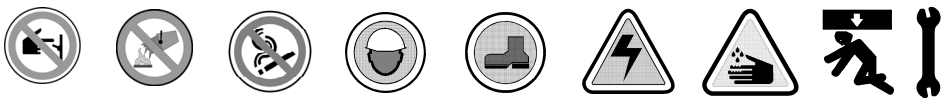
MAINTENANCE OF THE MACHINE

Maintenance refers to all operations regarding the control and replacement of mechanical and electrical parts subject to wear. In addition it refers to the control and topping up or replacement of fluids such as fuel, oil and battery acid, and the regular cleaning of the machine.

Repairs refers to the substitution of worn or damaged parts and repairs should be carried out by Authorized Service Centers.

Refer to the Engine Manufacturer's Manual for the maintenance instructions for the engine. Periodic maintenance should be performed according to the schedule shown in this manual.

On a regular basis check that there are no obstructions in the aspiration/exhaust ducts of the alternator, the engine or the housing which could restrict the flow of cooling air.



BATTERY

Check the electrolyte level in the battery periodically, especially after long periods of inactivity.

☞ **ATTENTION**: the battery must have all its elements in good condition and must be filled with electrolyte.

The battery is automatically charged while the engine is running.

☞ If the battery does not charge check the circuit breaker.

PROCEDURE FOR RECHARGING BATTERY

Remove the breather caps.
Check the electrolyte level in all compartements and, If necessary, add distilled water to the indicated level.
Replace the breather caps.
Use a densimeter to determine the charge state of the battery.

SPECIFIC WEIGHT	CHARGE PERCENTAGE
1.265	100%
1.230	75%
1.200	50%
1.170	25%

DRY AIR FILTER

Replace the air filter cartridge every 200 hours under normal conditions and every 100 hours in dusty environents.

RADIATOR

Check the liquid level in the radiator regularly and refill as required. In the fall check the amount of anti-freeze and add required to prevent freezing during the winter months.

ASYNCHRONOUS ALTERNATOR

No maintenance is necessary, as the alternator has no brushes or slip rings, and there are no devices for regulation of the output.

WARNING LABELS AND DECALS

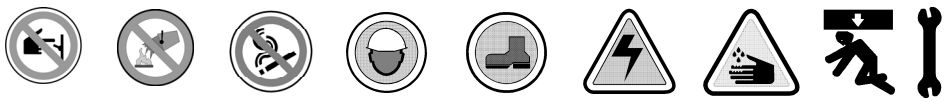
Check warning labels and decals once a year and **replaced** if missing or unreadable.

CABLES AND CONNECTIONS

Periodically check the condition of the cables and tighten the connections.

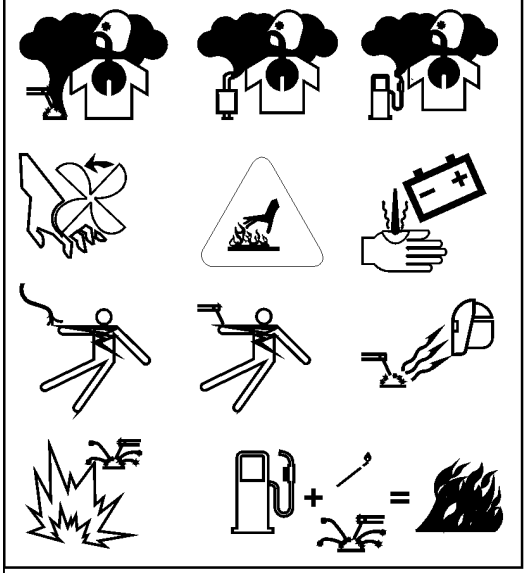
⚠ IMPORTANT

When carrying out maintenance operations be careful to avoid polluting the environment with the materials used during maintenance. Follow all local health and safety regulations.



IMPORTANT

WARNING



Have qualified personnel do maintenance and troubleshooting work.

Stop the engine before doing any work inside the machine. If for any reason the machine must be operated while working inside, pay attention to rotating parts and hot surfaces which may be unprotected when the machine is open.

Remove guards only when necessary to perform maintenance, and replace them when the maintenance requiring their removal is complete.

ARC WELDING SAFETY PRECAUTIONS

WARNING: PROTECT YOURSELF AND OTHERS FROM POSSIBLE SERIOUS INJURY OR DEATH

FUMES AND GASES CAN BE DANGEROUS
- Use ventilator or exhaust to system remove fumes from breathing zone.

FOR ENGINE POWERED EQUIPMENT
- Moving parts can injure.
- Hot surface can hurt you.

BATTERY
- Sulfuric acid is corrosive; protect hands, eyes and clothes, etc.

ELECTRIC SHOCK CAN KILL
- Do not touch electrically live parts or electrodes with skin or wet clothing.
- Insulate youself from work and ground.
- Always wear dry insulating gloves.

ARC RAYS CAN BURN
NOISE CAN DAMAGE HEARING
- Wear eyes, ear and body protection

WELDING SPARKS CAN CAUSE FIRE OR EXPLOSION
- Keep flammable material away
- Do not weld containers which have held flammable materials.

DIESEL IS VERY FLAMMABLE

PERIODICAL MAINTENANCE

TYPE OF MAINTENANCE / TIME PERIOD			EVERY DAY	EVERY 100 HOURS	EVERY 150 HOURS	EVERY 300 HOURS	EVERY 500 HOURS	EVERY 1000 HOURS	EVERY 2000 HOURS
CHECK	Air filter condition		●						
	Crankcase oil level		●						
	Battery electrolyte level			●					
	Amount of coolant		●						
	Belt - Fan and fan belt		●		●				
	Tighten nuts and bolts					●			
	Valves, rocker arms						●		
	Injector regulation								●
	Water in the fuel pre-filter		●						
CLEANING	Filters	Dry air filter		●					
		Fuel pump filter		●					
	Radiator	Air passages	●				●		
		Fan	●						
	Injectors						●		
	Fuel tank							●	
REPLACEMENT	Change oil	Crankcase (1)			●				
	Cartridge	Dry air filter					●		
		Fuel filter				●			
		Oil filter (1)				●			
	Brushes, starter motor								●
	Fan belt								●

1) Replace oil and oil filter after the first 50 working hours.

Note: Under extreme operating conditions (frequent stops and starts, dusty environment, cold weather,extended periods of no load operation, fuel with over 0.5% sulphur content) do maintenance more frequently. Check condition of cables and connections daily!

For detailed maintenance instructions refer to manuals.

In case the machine will not be used for more than 30 days, it should be stored in a suitable area where it is protected from the elements to prevent rusting, corrosion and other damage to the machine.

DIESEL ENGINES

If the machine will be stored for short periods of time it is advisable to start the engine every 10 days and operate it for 15-30 minutes under load. This will distribute the oil, recharge the battery and prevent blockage of the injection system.

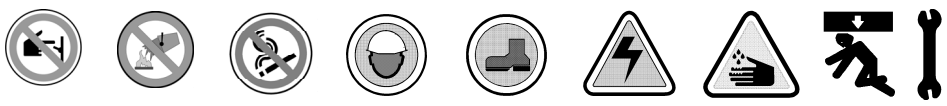
For long periods of storage, refer to the engine manufacturer's manual.

Clean the machine carefully.

Cover the machine with a plastic cover and store in a dry place.

⚠ IMPORTANT

When carrying out the operations to prepare the machine for storage, be careful to avoid polluting the environment with the materials used during maintenance. Follow all local health and safety regulations.



The KHM 500 engine driven welder is a unit which function as:

a) a current source for arc welding

b) an electric auxiliary power generator

It is meant for industrial and professional use, powered by an internal combustion engine. It is composed of an engine, alternator, electric and electronic controls, and a protective housing.

A.C. GENERATOR	Type: 3/1-phase, asynchronous, self-excited, self-regulated, brushless						
	Insulation	class	H				
	PERFORMANCE		T 400 V		M 230 V	M 110V c.t.e	
	Duty cycle	%	100		100	100	
	Power (50 Hz)	kVA	20		12	6	
	Power (60 Hz)	kVA	24		12	6	
	Voltage	V	400		230	110	
	Current (50 Hz)	A	28.8		52.2	54.5	
	Current (60 Hz)	A	34.7		52.2	54.5	
	Frequency	Hz	50/60		50/60	50/60	
	Cos	Ø	0.8		0.8	0.8	
ENGINE	Make		PERKINS				
	Model		3.1524				
	Type		4 – stroke				
	Displacement	cc	2500				
	Cylinder	nr.	3				
	Power (50 Hz – 60 Hz) (**)	kW (HP)	27.1 (36.3) – 32 (42.9)				
	Speed (50 Hz – 60 Hz)	rpm	1500 / 1800				
	Cooling system		Liquid				
	Cooling system capacity	Liter	12				
	Engine oil capacity	Liter	6.2				
	Starter		Electric				
	Battery	12V	100Ah				
	Acid capacity	Liter	10				
	Fuel		Diesel				
GENERAL SPECIFICATION	Protection	IP	23				
	Weight, version on base	Kg	925				
	Dimensions Lxwxh version on base	mm	1950x872x1120				
	Fuel tank capacity	Liter	60				

Note :T=three-phase M=single-phase (**) = Maximum output (not overloadable) according to ISO 3046/1

OUTPUT - ACOUSTIC POWER LEVEL

☞ The output indicated is guaranteed at 20°C and at a pressure of 1 bar (up to 1000 m no correction for atmosphere pressure is required). At high temperature and above 1000 m altitude the engine output will decrease and the engine may need adjustment for optional performances.

☞ **N.B.:** at high altitudes, the standard mix air-fuel is excessively rich, the efficiency of the engine is reduced and, therefore, the fuel consumption will increase.

☞ Max. acoustic power level admitted according to the EEC norms of 17/09/84 n. 84/535-536.

The machine respects the noise limits, expressed in sound power, given in the a.m. directives.

These limits can be used to judge the sound level produced on site.

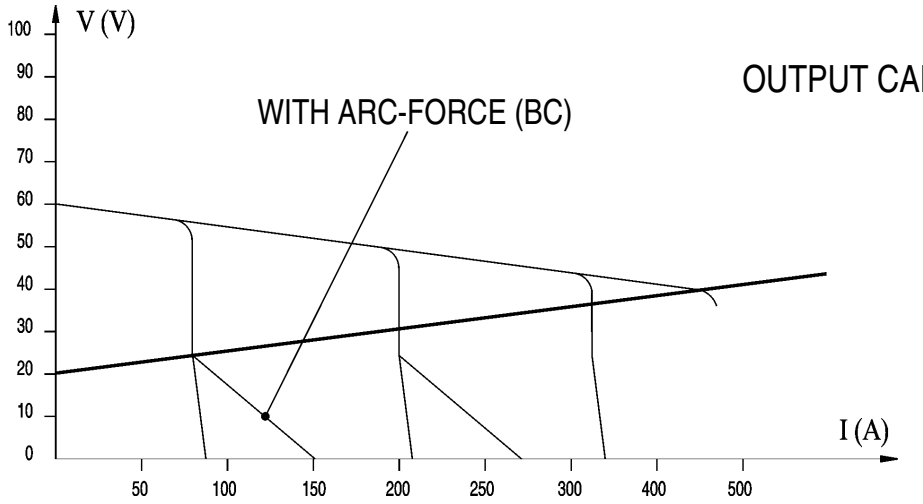
For example: the sound power level of 100 LWA.

The sound pressure (noise produced) at 7 meters distance is about 75dBA (the limit value less 25).

To calculate the sound level at other distances use this formula:

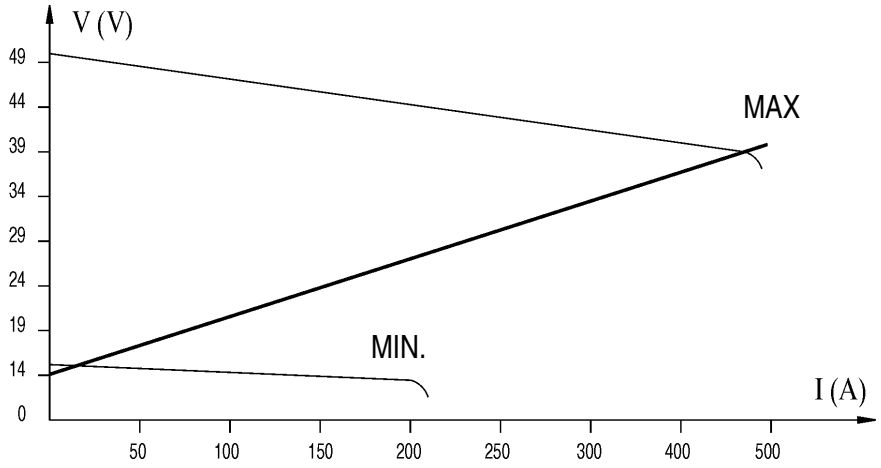
$dBA_X = dBA_Y + 10 \log \frac{ry^2}{rx^2}$ At 4 meters the noise level becomes: 75 dBA + 10 log $\frac{7^2}{4^2}$ = 80 dBA

WELDING UNIT CC	Max DC welding current (50 Hz)	A	500/35% - 450/60% - 400/100%
	Max DC welding current (60 Hz)	A	500/35% - 470/60% - 430/100%
	Welding current electronic regulation (on two scales)	A	20 - 200 20 - 500
	Striking voltage (OCV)	V	60
	Electrode diameter (rutile, basic, cellulosic)	mm	2 - 8



OUTPUT CARACTERISTIC

WELDING UNIT CV	Max DC welding current (50 Hz)	A	450/60% - 400/100%
	Max DC welding current (60 Hz)	A	470/60% - 430/100%
	Welding voltage - Electronic regulation	V	15 - 50
	Wire diameter	mm	0.8 – 2..8

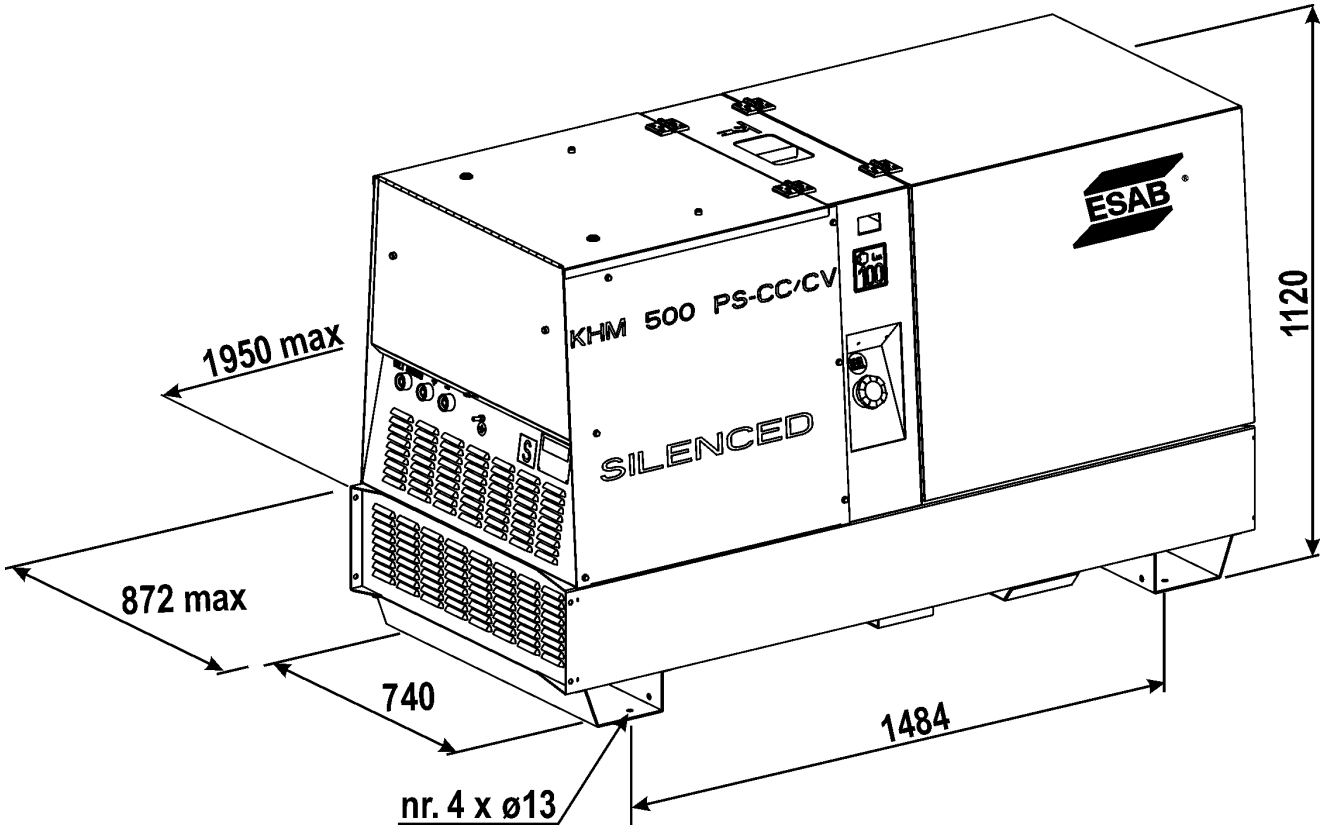


SIMULTANEOUS UTILIZATION FACTORS

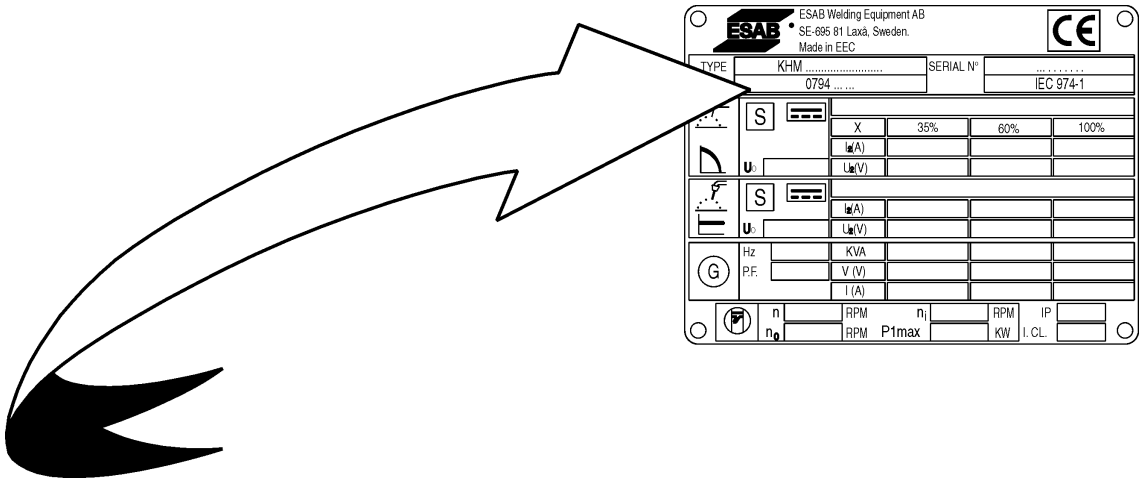
In case **Welding** and **Generation** can be used simultaneously, however, the engine **cannot** be overloaded.
The table below gives the maximum limits to be respected:

50 Hz	**WELDING CURRENT**	>300 A	225 A	150 A	80 A	0
	AUXILIARY POWER	0	6.5 kVA	14 kVA	20 kVA	20 kVA

60 Hz	**WELDING CURRENT**	>300 A	250 A	200 A	100 A	0
	AUXILIARY POWER	0	6.5 kVA	11 kVA	24 kVA	24 kVA


1950 max
872 max
740
1484
1120
nr. 4 x ø13
KHM 500 PS-CC/CV
SILENCED
ESAB

Spare parts are ordered through your nearest ESAB representative, see back cover.
When ordering spare parts, please state machine type and number as well as designation and spare part number, according to the spare parts list.
This will simplify dispatch and ensure you get the right part.



When ordering the spare parts, it is recommended to indicate:

1) ✹ serial number
2) ✹ model of welder and/or generating set
3) ◆ part number
5) quantity

☞ ✹The requested data are to be found on the rating plate of the machine.

ESAB subsidiaries and representative offices

Europe

AUSTRIA
ESAB Ges.m.b.H
Vienna-Liesing
Tel: +43 1 888 25 11
Fax: +43 1 888 25 11 85

BELGIUM
S.A. ESAB N.V.
Brussels
Tel: +32 2 745 11 00
Fax: +32 2 726 80 05

THE CZECH REPUBLIC
ESAB VAMBERK s.r.o.
Prague
Tel: +420 2 819 40 885
Fax: +420 2 819 40 120

DENMARK
Aktieselskabet ESAB
Copenhagen-Valby
Tel: +45 36 30 01 11
Fax: +45 36 30 40 03

FINLAND
ESAB Oy
Helsinki
Tel: +358 9 547 761
Fax: +358 9 547 77 71

FRANCE
ESAB France S.A.
Cergy Pontoise
Tel: +33 1 30 75 55 00
Fax: +33 1 30 75 55 24

GERMANY
ESAB GmbH
Solingen
Tel: +49 212 298 0
Fax: +49 212 298 204

GREAT BRITAIN
ESAB Group (UK) Ltd
Waltham Cross
Tel: +44 1992 76 85 15
Fax: +44 1992 71 58 03

ESAB Automation Ltd
Andover
Tel: +44 1264 33 22 33
Fax: +44 1264 33 20 74

HUNGARY
ESAB Kft
Budapest
Tel: +36 1 20 44 182
Fax: +36 1 20 44 186

ITALY
ESAB Saldatura S.p.A.
Mesero (Mi)
Tel: +39 02 97 96 81
Fax: +39 02 97 28 91 81

THE NETHERLANDS
ESAB Nederland B.V.
Utrecht
Tel: +31 30 248 59 22
Fax: +31 30 248 52 60

NORWAY
AS ESAB
Larvik
Tel: +47 33 12 10 00
Fax: +47 33 11 52 03

POLAND
ESAB Sp.z.o.o
Warszaw
Tel: +48 22 813 99 63
Fax: +48 22 813 98 81

PORTUGAL
ESAB Lda
Lisbon
Tel: +351 1 837 1527
Fax: +351 1 859 1277

SLOVAKIA
ESAB Slovakia s.r.o.
Bratislava
Tel: +421 7 44 88 24 26
Fax: +421 7 44 88 87 41

SPAIN
ESAB Ibérica S.A.
Alcobendas (Madrid)
Tel: +34 91 623 11 00
Fax: +34 91 661 51 83

SWEDEN
ESAB Sverige AB
Gothenburg
Tel: +46 31 50 95 00
Fax: +46 31 50 92 22

ESAB International AB
Gothenburg
Tel: +46 31 50 90 00
Fax: +46 31 50 93 60

SWITZERLAND
ESAB AG
Dietikon
Tel: +41 1 741 25 25
Fax: +41 1 740 30 55

North and South America

ARGENTINA
CONARCO
Buenos Aires
Tel: +54 11 4 753 4039
Fax: +54 11 4 753 6313

BRAZIL
ESAB S.A.
Contagem-MG
Tel: +55 31 333 43 33
Fax: +55 31 361 31 51

CANADA
ESAB Group Canada Inc.
Missisauga, Ontario
Tel: +1 905 670 02 20
Fax: +1 905 670 48 79

MEXICO
ESAB Mexico S.A.
Monterrey
Tel: +52 8 350 5959
Fax: +52 8 350 7554

USA
ESAB Welding & Cutting Products
Florence, SC
Tel: +1 843 669 44 11
Fax: +1 843 664 44 58

Asia/Pacific

AUSTRALIA
ESAB Australia Pty Ltd
Ermington
Tel: +61 2 9647 1232
Fax: +61 2 9748 1685

CHINA
Shanghai ESAB A/P
Shanghai
Tel: +86 21 6539 7124
Fax: +86 21 6543 6622

INDIA
ESAB India Ltd
Calcutta
Tel: +91 33 478 45 17
Fax: +91 33 468 18 80

INDONESIA
P.T. Esabindo Pratama
Jakarta
Tel: +62 21 460 01 88
Fax: +62 21 461 29 29

MALAYSIA
ESAB (Malaysia) Snd Bhd
Selangor
Tel: +60 3 703 36 15
Fax: +60 3 703 35 52

SINGAPORE
ESAB Singapore Pte Ltd
Singapore
Tel: +65 861 43 22
Fax: +65 861 31 95

ESAB Asia/Pacific Pte Ltd
Singapore
Tel: +65 861 74 42
Fax: +65 863 08 39

SOUTH KOREA
ESAB SeAH Corporation
Kyung-Nam
Tel: +82 551 289 81 11
Fax: +82 551 289 88 63

UNITED ARAB EMIRATES
ESAB Middle East
Dubai
Tel: +971 4 338 88 29
Fax: +971 4 338 87 29

Representative offices

BULGARIA
ESAB Representative Office
Sofia
Tel/Fax: +359 2 974 42 88

EGYPT
ESAB Egypt
Dokki-Cairo
Tel: +20 2 390 96 69
Fax: +20 2 393 32 13

ROMANIA
ESAB Representative Office
Bucharest
Tel/Fax: +40 1 322 36 74

RUSSIA-CIS
ESAB Representative Office
Moscow
Tel: +7 095 937 98 20
Fax: +7 095 937 95 80

ESAB Representative Office
St Petersburg
Tel: +7 812 325 43 62
Fax: +7 812 325 66 85

Distributors

For addresses and phone numbers to our distributors in other countries, please visit our home page

www.esab.com

ESAB AB
SE-695 81 LAXÅ
SWEDEN
Phone +46 584 81 000
Fax +46 584 123 08

www.esab.com

020314