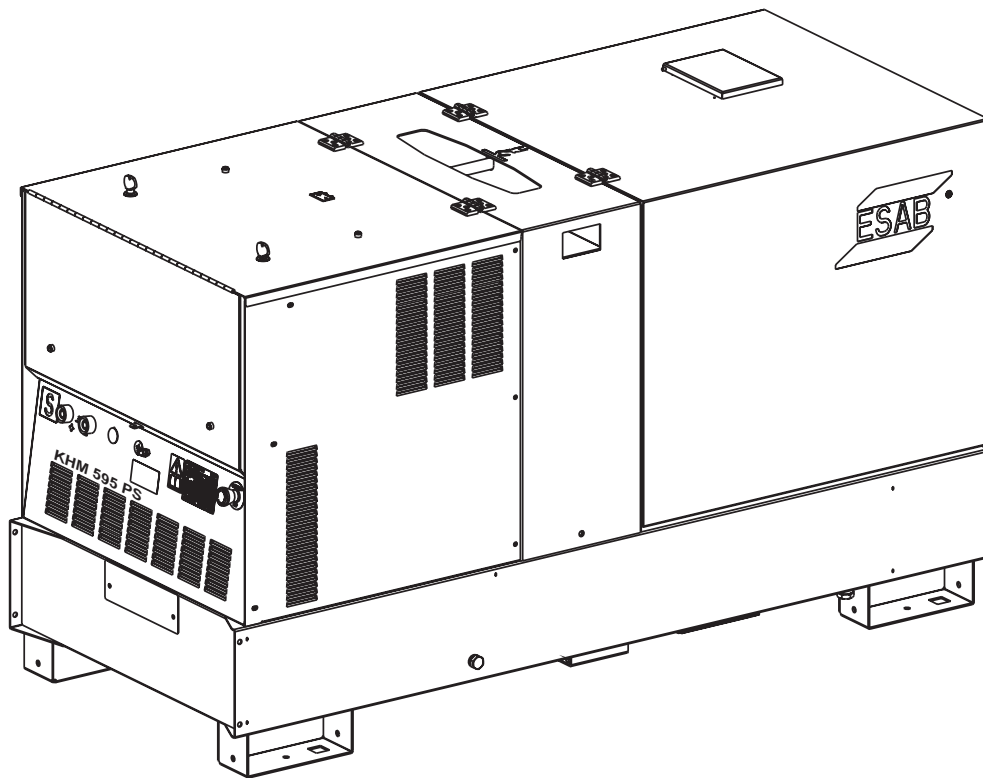




# ***KHM 595 PS***



Instruction manual



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.

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## 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

Indicates a strong possibility of severe personal injury or death if instructions are not followed.



### WARNING

Indicates a possibility of personal injury or equipment damage if instructions are not followed



### CAUTION

Indicates 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 water as it can cause shortcircuits or other damage.



**NO SMOKING** - Cigarettes, 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 out 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 operating 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.



**FIRST AID.** In case the operator should 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.

**ENGINE FUELLING**

- ⇒ Stop engine when fuelling.
- ⇒ Do not smoke, avoid open flames and sparks, and do not use electric tools when fuelling.
- ⇒ 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.

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

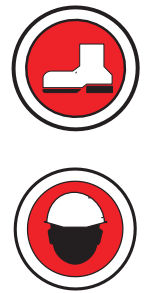


**FIRE PREVENTION.** In case the working zone, for whatsoever cause goes on fire with flames liable to cause severe wounds or death, follow the first aid as described by the ruling norms or local ones.

**EXTINCTION MEANS**

Appropriated	Carbonate anhydride (or carbon dioxide) 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 inflammability point is very low.

<b>WARNING</b>					<b>CAUTION</b>	



<b>WARNING</b>	<b>THE MACHINE MUST NOT BE USED IN AREAS WITH EXPLOSIVE ATMOSPHERE</b>
----------------	--

## 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 flammable material away from the welding area.
- ▣▣▣▣ Do not weld on containers which contain flammable material.
- ▣▣▣▣ Do not weld near refuelling areas.
- ▣▣▣▣ Do not weld on easily flammable 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-flammable protective clothes).





Ⓛ  
ⓖⓑ TRANSPORT  
ⓕ

M  
4-2



## 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.**

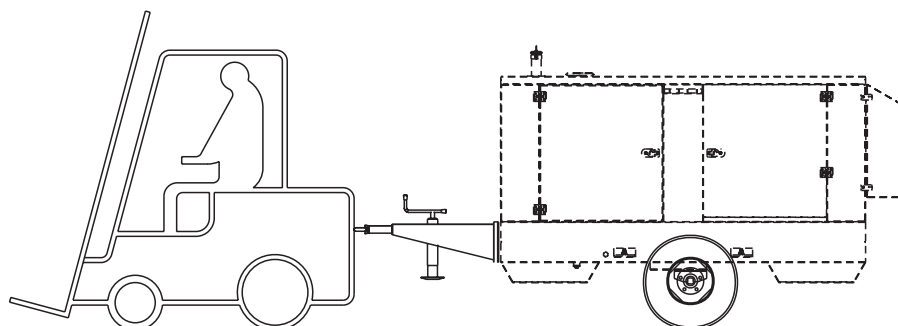
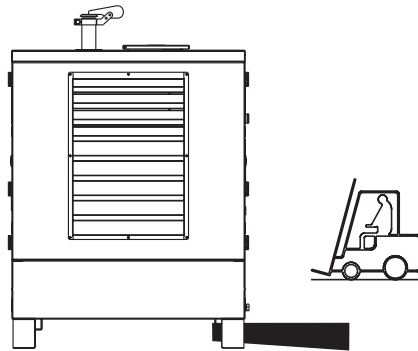
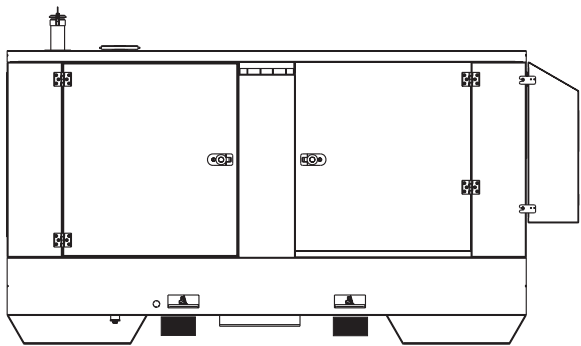
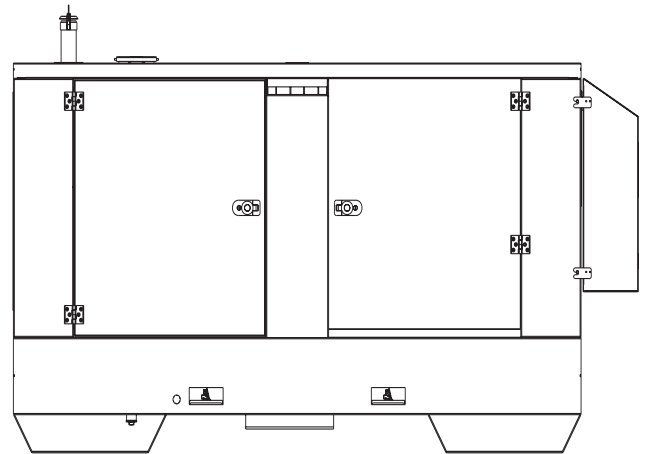
**DO NOT DRAG THE MACHINE OR TOW IT ON PUBLIC ROADS UNLESS IT IS MOUNTED ON A HOMOLOGATED TRAILER.**

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 possession 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.

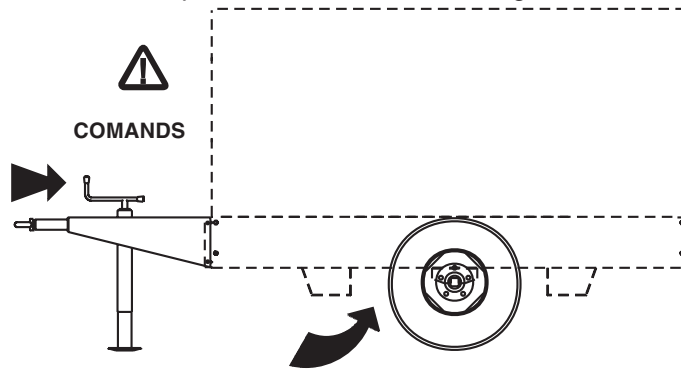
### TRAILERS

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 possession of the requirements by national and foreign traffic norms.

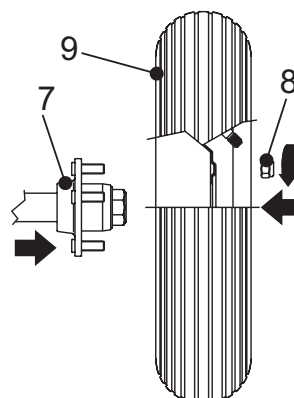
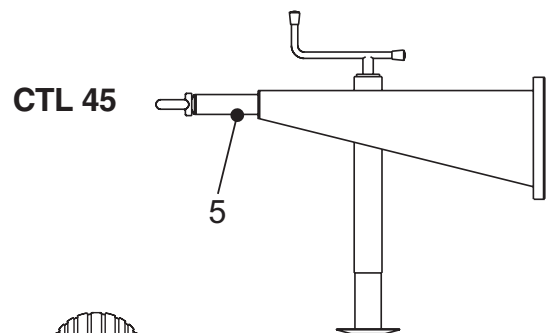
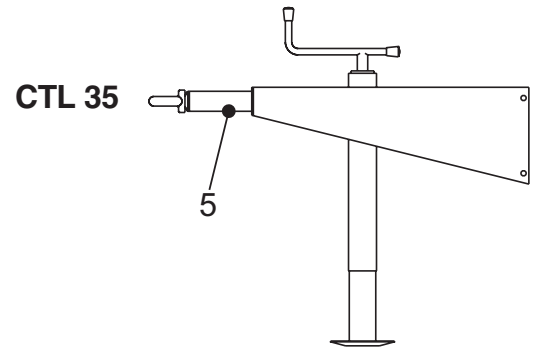
**Nota:** Lift the machine and assemble the parts as shown in the drawing

CTL 35  
CTL 45



For assembling the generating set on the trolley CTL 35-45 please keep to following instructions:

- 1) - Lift the generating set (by means of suitable hook)
- 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 M10x20 screws and relative washers (two per part) so that their supports coincide.
- 8) - Insert the wheel (9) on the axle then twist the selflocking nut (8).
- 9) - Pump the tyre (9) bringing the pressure to 4 atms for the CTL 35-45.
- 10) - Lower the machine to the ground and place the parking foot definitively (regulating at the best height).



### ATTENTION

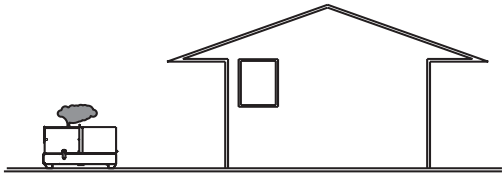
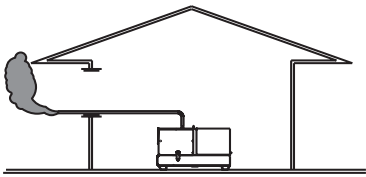
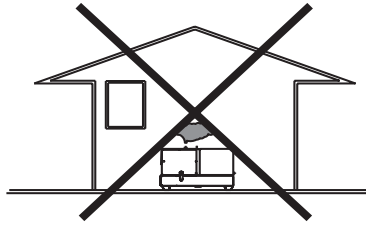
Do not substitute the original tyres with other types.





### DIESEL ENGINES

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



☞ 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 will cause overheating of the machine and poor combustion in the engine

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

### MOVES OF THE MACHINE

☞ At any move check that the engine is **off**, that there are no connections with cables which impede the moves.

### PLACE OF THE MACHINE

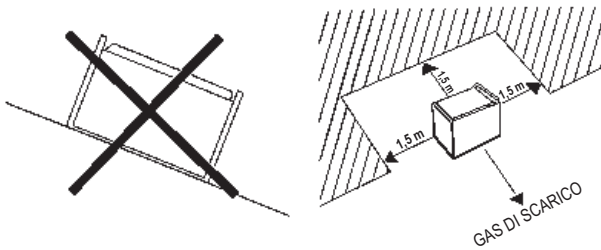
ATTENTION

For a safer use from the operator **DO NOT** fit the machine in locations with high risk of flood.

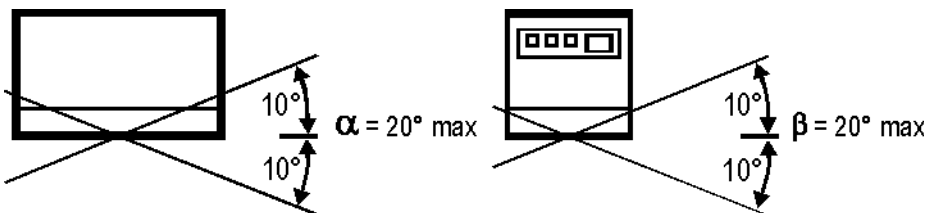
Please do not use the machine in weather conditions which are beyond IP protection shown both in the data plate and on page named "technical data" in this same manual.

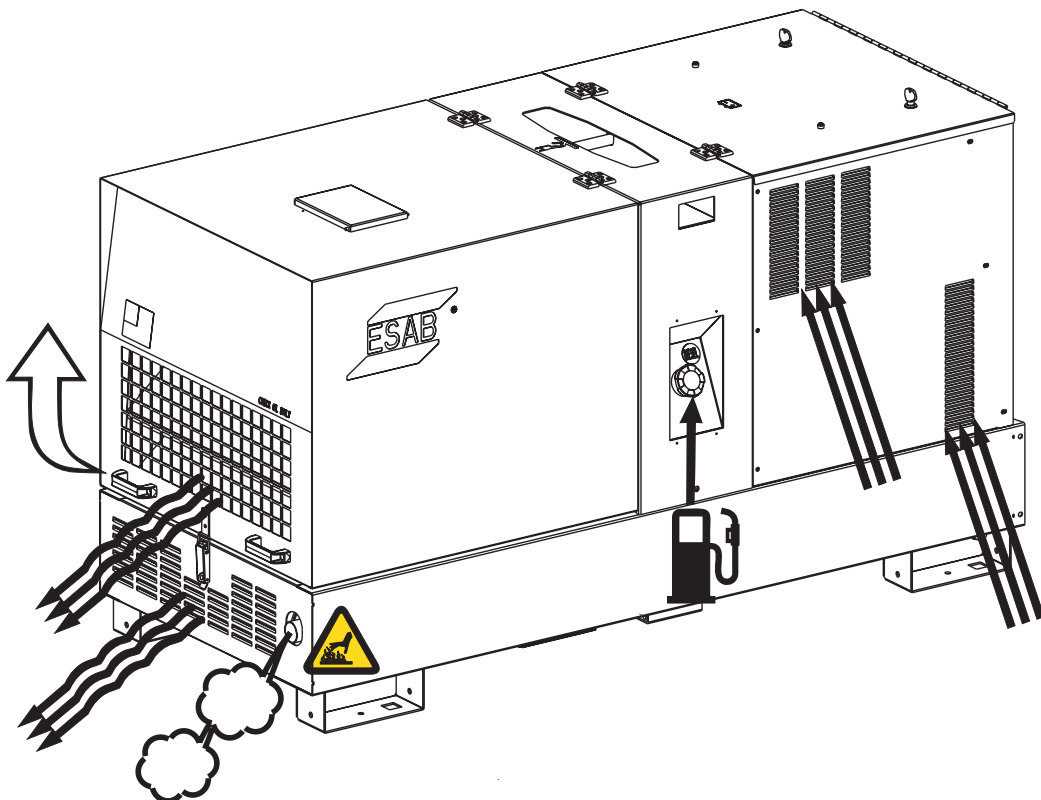
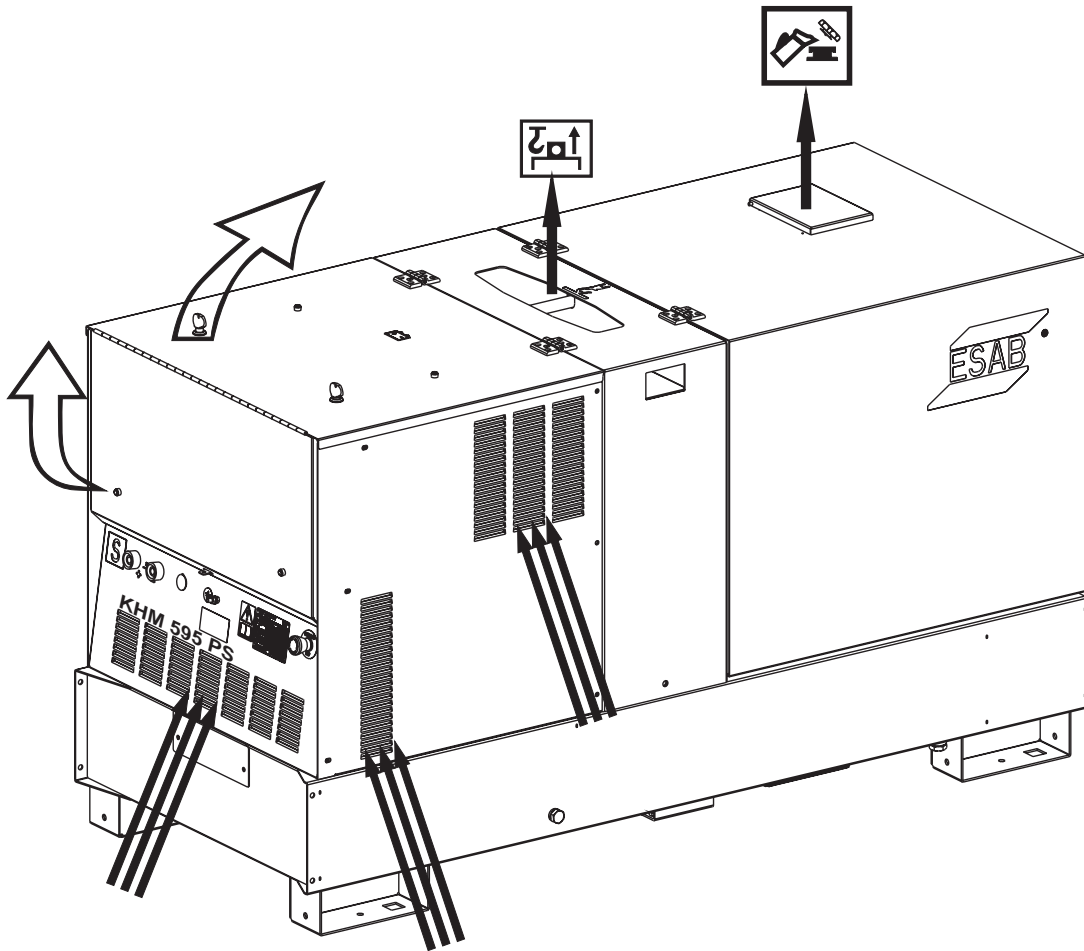
### POSITIONING THE MACHINE

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

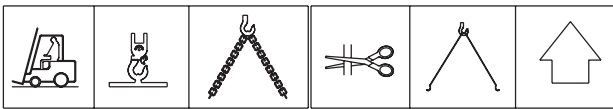


If the surface is not level be sure that the angle of the machine does not exceed the values shown in the drawings below.





## ⚠ GENERAL PACKING INFORMATION

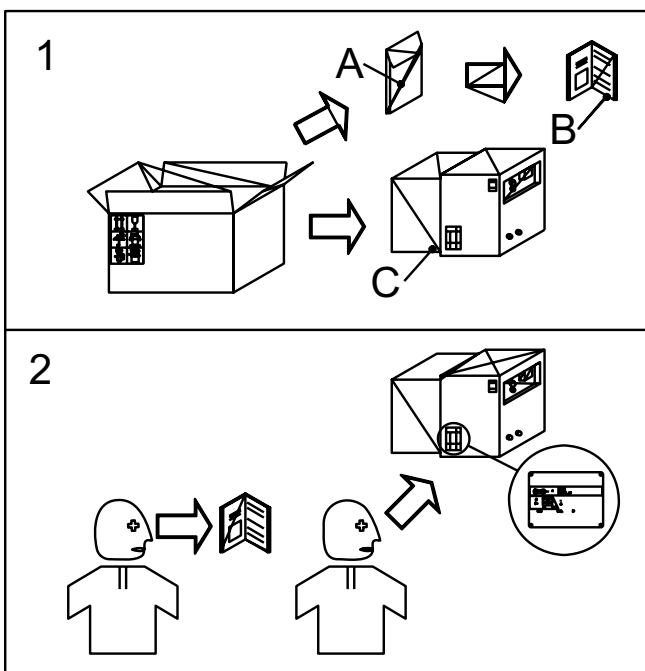
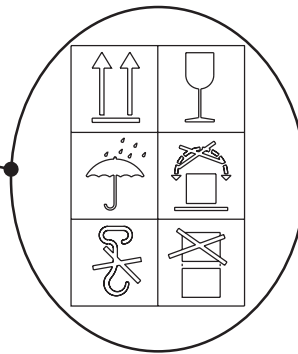
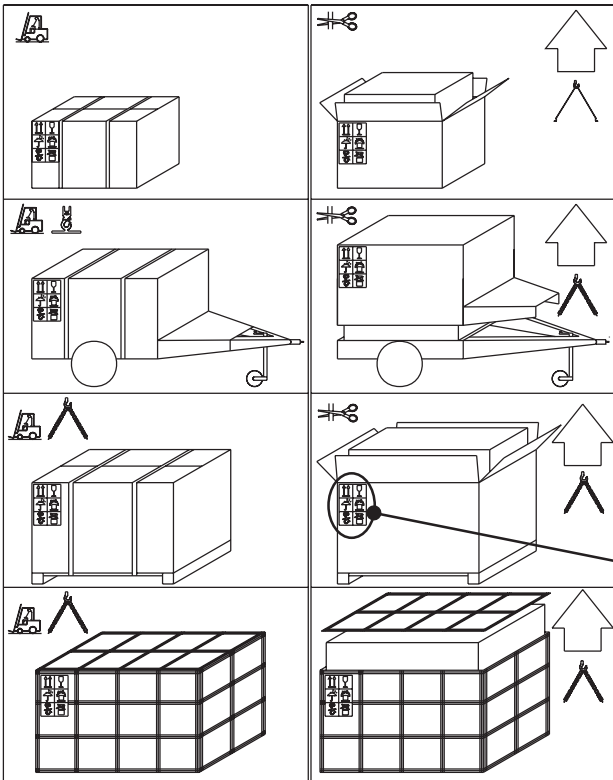


Upon receipt of the goods make sure that the product has not been damaged during transport.

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.






The KHM 595 engine driven welder is a unit which ensures the function as:

- a) a current source for arc welding
- b) a current source for the auxiliary power generation

It is meant for industrial and professional use, powered by an endothermic engine; it is composed of various main parts such as: engine, alternator, electric and electronic controls, the fairing or a protective structure.

The assembling is made on a steel structure, on which are provided elastic support which must damp the vibrations and also eliminate sounds which would produce noise.

<b>Technical data</b>		<b>KHM 595 PS</b>
<b>GENERATOR</b>		
Output three-phase		30 kVA / 400 V / 43.4 A
Output single-phase		15 kVA / 230 V / 65.2 A
Frequency		50 Hz
Cos φ		0.8
<b>ALTERNATOR</b>		
		Self-excited, self-regulated, brushless
Type		three-phase, asynchronous
Insulating class		H
<b>ENGINE</b>		
Mark / Model		PERKINS / 1103C - 33G3
Type / Cooling system		4-Stroke / Liquid
Cylinders / Displacement		3 / 3300 cm <sup>3</sup>
Output max		30.4 kW (40.7 HP)
Speed		1500 rpm
Fuel / Fuel consumption (P.R.P.)		Diesel / 242 g/kWh
Cooling system capacity		10.2 l
Engine oil capacity		7.9 l
Starter		Electric
<b>GENERAL SPECIFICATIONS</b>		
Tank capacity		65 l
Running time		16 h
Protection		IP 23
Dimensions Lxwxh (mm) *		2050x850x1135
Weight *		980 Kg
Measured acoustic power		95 LWA (70 dB(A) - 7m) 
Guaranteed acoustic power		96 LWA (71 dB(A) - 7m)

\* Dimensions and weight are inclusive of all parts without wheels and towbar.

### POWER

Declared power according to ISO 3046-1 (temperature 25°C, 30% relative humidity, altitude 100 m above sea level). It's admitted overload of 10% each hour every 12 h.

In an **approximative** way one reduces: of 1% every 100 m altitude and of 2.5% for every 5°C above 25°C.

### ACOUSTIC POWER LEVEL

**ATTENTION:** The concrete risk due to the machine depends on the conditions in which it is used. Therefore, it is up to the end-user and under his direct responsibility to make a correct evaluation of the same risk and to adopt specific precautions (for instance, adopting a I.P.D. - Individual Protection Device)

**Acoustic Noise Level (LWA) - Measure Unit dB(A):** it stands for acoustic noise released in a certain delay of time. This is not submitted to the distance of measurement.

**Acoustic Pressure (Lp) - Measure Unit dB(A):** it measures the pressure originated by sound waves emission. Its value changes in proportion to the distance of measurement.


The here below table shows examples of acoustic pressure (Lp) at different distances from a machine with Acoustic Noise Level (LWA) of 95 dB(A)

Lp a 1 meter = 95 dB(A) - 8 dB(A) = 87 dB(A)

Lp a 7 meters = 95 dB(A) - 25 dB(A) = 70 dB(A)

Lp a 4 meters = 95 dB(A) - 20 dB(A) = 75 dB(A)

Lp a 10 meters = 95 dB(A) - 28 dB(A) = 67 dB(A)

**PLEASE NOTE:** the symbol  when with acoustic noise values, indicates that the device respects noise emission limits according to 2000/14/CE directive.

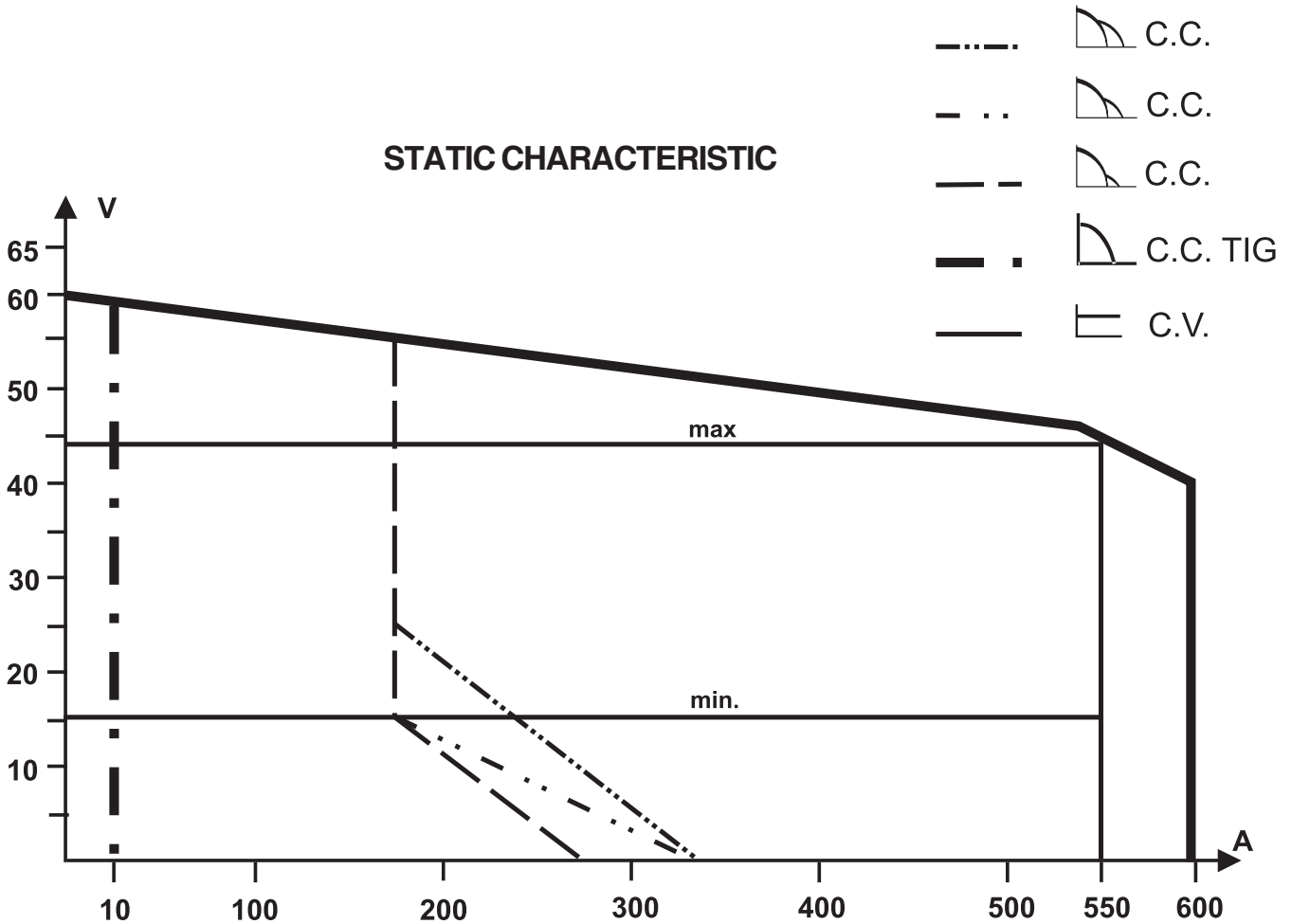


**C. C. WELDING**

Welding current 550A -60%, 500A -100%  
 Starting voltage 60V

**C. V. WELDING**

Welding current 550A-60%; 500A-100%  
 Welding voltage 16 - 40V



**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:

WELDING CURRENT	595A	500A	400A	300A	200A	100A	0
AUXILIARY POWER	0	7kVA	13kVA	17kVA	21kVA	24kVA	30kVA


**BATTERY WITHOUT MAINTENANCE**


Connect the cable + (positive) to the pole + (positive) of the battery (after having taken away the protection), by properly tightening the clamp. Check the state of the battery

from the colour of the warning light which is in the upper part.

- Green colour: battery OK
- Black colour: battery to be recharged
- White colour: battery to be replaced

**DO NOT OPEN THE BATTERY.**


**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 (Water-cooled engines only)**

Pour the cooling liquid through the hole (24B) 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) / ELCB (earth leakage circuit breaker). These protective devices 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 (12). 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.



Check daily



**NOTE**

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

**STARTING THE ENGINE**

**1500 / 1800 RPM ENGINES**

These engines start their normal operating speed.

**IGNITION KEY**



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

To start the engine introduce the key (Q1), turn it clockwise completely, leaving it as soon as the engine starts.

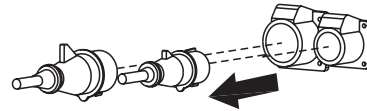
**NB.:** for safety reason the key must be kept by qualified personel.

Let the engine run for some minutes before drawing the load.

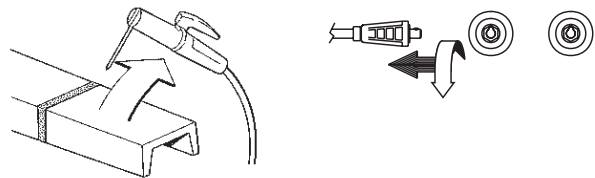
**STOPPING THE ENGINE**

Before stopping the engine it is compulsory to:

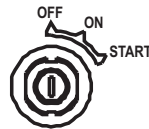
- disconnect or shut off any loads which are connected to the unit auxiliary outputs.



- stop welding.



**To stop the engine:**



Turn the starter key to the off position.

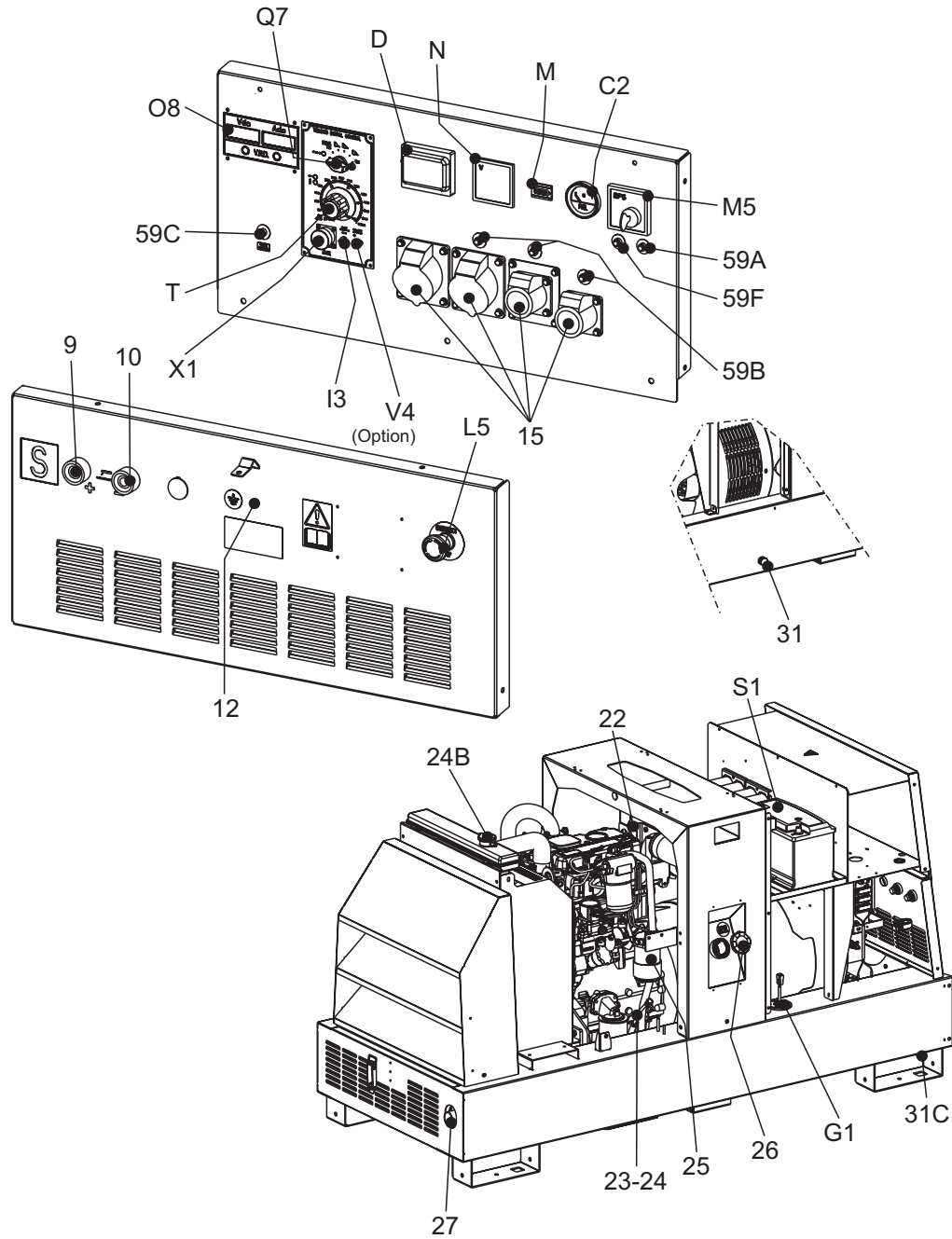


**CAUTION**

**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.





Pos.	Description	Description	Pos.	Description	Description
9	Welding socket (+)	Prise de soudage (+)			
10	Welding socket (-)	Prise de soudage (-)			
12	Earth terminal	Prise de mise à terre			
15	A.C. socket	Prises de courant en c.a.			
22	Engine air filter	Filtre air moteur			
23	Oil level dipstick	Jauge niveau huile moteur			
24	Engine oil reservoir cap	Bouchon rempl. huile moteur			
24B	Water filling cap	Bouchon rempl. liquide refroid.			
25	Fuel prefilter	Préfiltre carburant			
26	Fuel tank cap	Bouchon réservoir			
27	Muffler	Silencieux d'échappement			
31	Oil drain tap	Bouchon décharge huile moteur			
31C	Exhaust tap for tank fuel	Bouchon vidange carb. réservoir			
59A	Engine thermal switch	Protection thermique moteur	C2	Fuel level light	Indicateur niveau carburant
59B	Aux current thermal switch	Protection therm.courant aux.	D	Ground fault interr. (30mA)	Inter. différentiel (30mA)
59C	Supply thermal switch wire feeder-42V	Protection thermique alimentation 42V fil	G1	Fuel level transmitter	Niveau carburant
59D	Preheating thermal switch	Protection thermique bougies de réchauffement	I3	Welding scale switch	Commutateur échelle soudage
			L5	Emergency button	Bouton d'urgence
			M	Hour counter	Compte-heures
			M5	Engine control unit EP5	Protection moteur EP5
			N	Voltmeter	Voltmètre
			O8	V/A digital instruments PCB and Led V.R.D. PCB	Platine Volt/Amp.-mètre digitale et platine LED V.R.D.
			Q7	Welding selector mode	Sélecteur modalité soudage
			S1	Battery	Batterie
			T	Welding current regulator	Régulateur courant soudage
			V4	Polarity inverter control	Commande inverseur polarité
			X1	Remote control socket	Prise pour télécommande



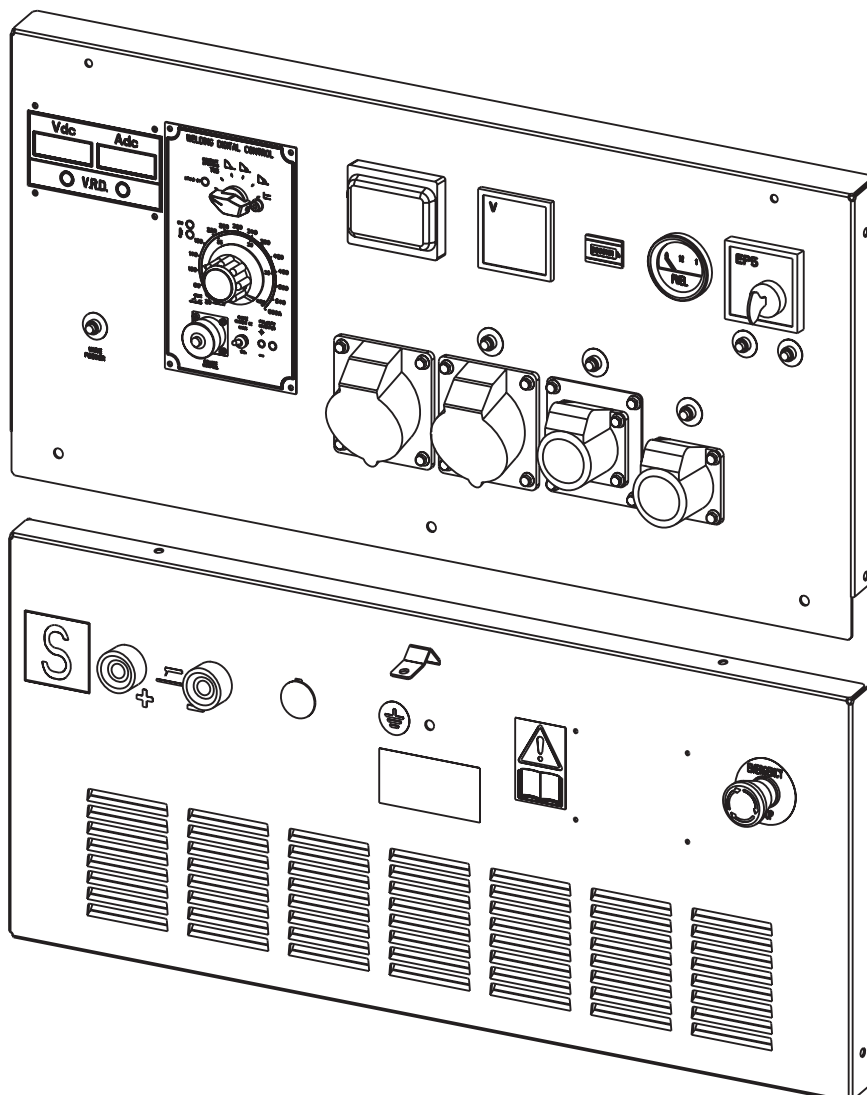
After having prepared the machine (charged the battery, put in oil and fuel) the machine is ready for operation.

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.

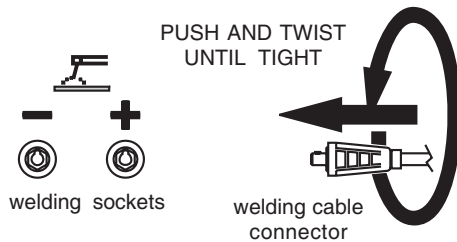
### Controls and Instruments



### Welding cable connections

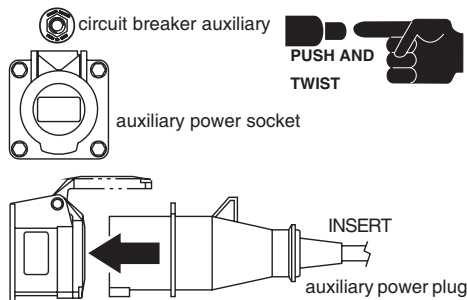
For direct current electrode positive, connect work cable to negative (-) terminal and electrode holder to positive (+) terminal. For direct current electrode negative, reverse cable connections.

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



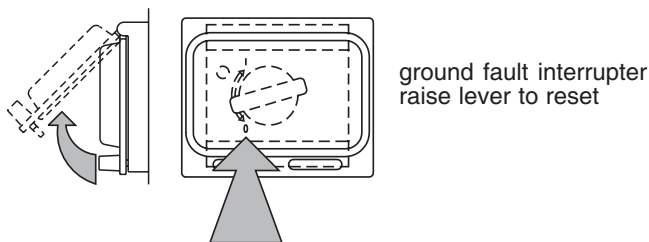
### Auxiliary power outlets and thermal circuit breaker

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.



### 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. For a few

seconds after the engine is started the shut-down function is inhibited to allow the engine to start. The two thermal switches located below the module protect the starting system (30A) and the fuel injection pump thermal switch (10A).

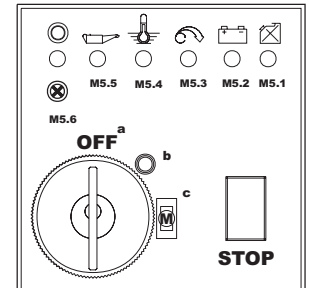
Starting system thermal switch 30A  
Fuel injection pump thermal switch 10A



### IGNITION KEY

The ignition key has three positions:

- OFF
- ON
- 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.



**OPERATING**

**KHM 595 PS**

**M  
32.2**

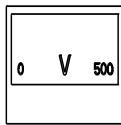
### Instruments

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.

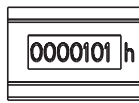
Optionally an ammeter and a voltmeter for the welding output are available.



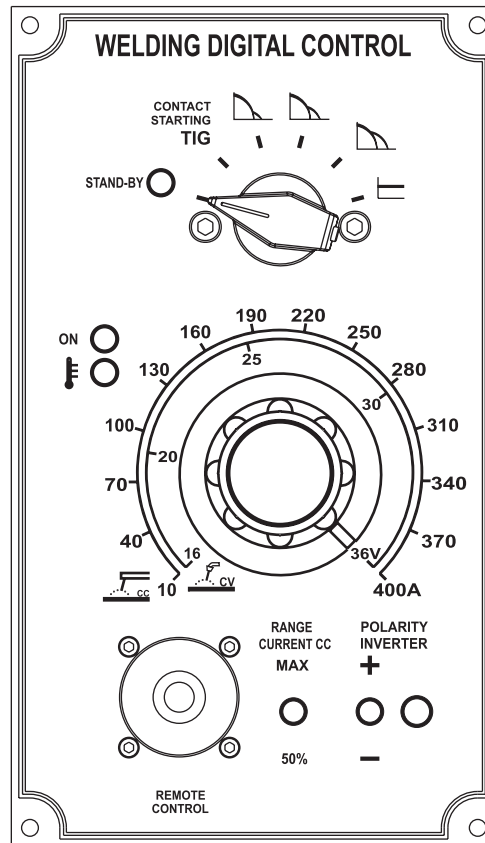
Fuel gauge



auxiliary power voltmeter



operating hours



**GETTING STARTED**

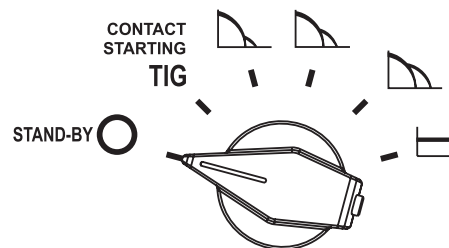
**SETTING THE WELDING PROCESS**

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

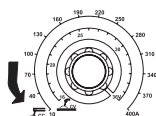
Before starting the engine please note the following:

- 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.



2) Start the engine of the welder



3) Turn the welding current/voltage adjusting knob to the minimum setting.

There is a manual switch for selecting the various welding processes on the welding control panel.

There are 5 processes to choose from:

- 1 for TIG welding
- 3 for STICK welding (electrode)
- 1 for MIG/MAG welding (continuous wire).

The switch can also be set to “stand-by” (first position). In this position there is no current at the welding connections; led “ON” off.

The process can be selected either before or after starting the motor powered welder.

After selecting the mode, the “ON” LED lights up. If the wirefeeder connector is connected on remote control connector the “ON” LED light only when the button torch is pressed.

## TIG MODE

Contact starting TIG

This position is specifically for TIG welding. To create the arc simply place the tip of the TIG electrode on the piece that requires welding then gently move the tip away. The arc starts automatically and at the same time the welding current rises to the preset value, first using the welding current adjustment knob which is on the lower part of the control panel. The welding current can be adjusted continuously from a minimum of 10 A to a maximum which depends on the power of the machine 400 A, 500 A, 600 A.



## WARNING

For EP1 version it is compulsory to accelerate the engine manually.

## STICK MODE (Electrode)

Features C.C. (Constant Current)

There are three stick modes which feature increasing "arc forces" so that the arc has different levels of penetration according to the electrode and/or welding position.

## MIG/MAG MODE (continuous wire)

Features C.V. (Constant Voltage)

All wire type welding processes can be carried out, naked or coated.

The voltage can be adjusted using the same knob which adjusts the current in STICK mode. Adjustment is continuous and goes from a minimum of 15 V to a maximum of 36V, 40 V.

## Optional remote control

The welding current can also be set from a distance using the optional remote control. Once the remote control is connected to the connector (X1), the current is controlled by the remote control. To return to front panel control remove the connector.

## Optional VRD program (Voltage Reduction Device VRD)

When you choose the program stick or stick arc force the Open Circuit Voltage (OCV) go up, red light switch ON and green light switch OFF, but only for about 3", then the OCV go down, green light switch on and red light switch OFF, about 11V and stop there, until the welder start welding. When you make a short circuit with the stick the OCV immediately go up, so you can start to welding. VRD don't work with the program MIG-MAG.

## Inversion of polarity (Optional, available on request)

In order to invert polarity, press the switch on the remote control unit.

By selecting "inversion" the "ON" LED switches off and the voltage at the welding socket becomes zero. The power contactor is witted inside the electrical box and the voltage reappears at the welding sockets. The "ON" LED switches back on at the same time.

The "Invert polarity" LED on the front panel near the welding current adjuster switches on .

You cannot invert polarity in "MIG/MAG" mode.

## PROTECTIONS

The Welding Digital Control features 3 protections for the control and chopper.

### 1) "ON" LED blinking



**ON**

When the engine of the welder is started the control unit automatically goes to the stand by mode for few instants (stand-by LED on) and performs a self-diagnosis of the current sensor connector and power source voltage + 15V; than the last process is loaded (on led turned ON). In case of malfunction the "ON" LED blinks.

### 2) Red LED blinking



The chopper has a thermal protection, which intervenes in case the operating temperature exceeds 85°C.

If the protection intervenes, the red LED begins to flash and the welding current/voltage goes to zero. In this case do not switch off the welder, since the alternator fan will help cool down the chopper more quickly.

After a few minutes, the LED will automatically switch itself off and the welding voltage/current will once again be available at the plugs.

### 3) Red LED continuously lit



If an anomalous current is detected in the chopper, the control blocks the conversion immediately, the output welding current/voltage goes to zero and the red LED lights up. To reset everything, it is necessary to switch off the machine.

If the protections 1) and 3) should intervene, it is best to immediately contact the nearest authorised Service Centre.

## DIGITAL INSTRUMENTS

Two digital instruments showed the operating value of welding current and welding voltage.

**WIRE FEEDER CONNECTED WITH REMOTE CONTROL CONNECTOR**

**Wire feeder connection**

Connect the wire feeder to the welder with the welder turned off:

- Welding cable between the machine's (9) welding plug (+) and the wire feeder.
- Welding cable between the machine's (10) welding plug (-) and the piece to be welded.
- Control/power cable between the machine's connector (X1) and the corresponding connector on the wire feeder.

**Start the machine welder**

The "ON" LED will be off and will turn on only when there is voltage at the welding plugs (and therefore at the wire).

The voltage is only present when the welding torch button is pressed.

The setting of the welding voltage is done using the knob on the wire feeder.

The adjusting knob on the welder is automatically inhibited.



**WARNING**

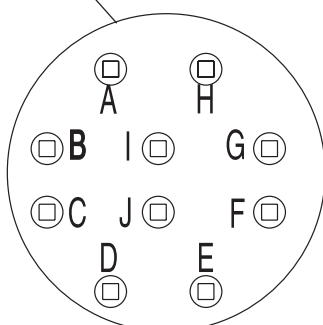
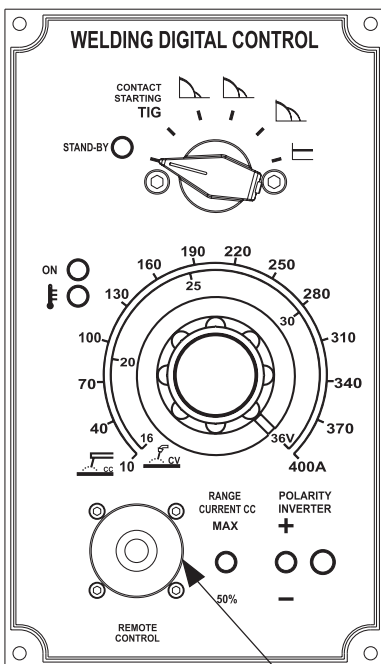
You can use the wire feeder only by respecting the pin configuration as shown on the below mentioned table.

**"WIRE FEEDER NOT CONNECTED WITH REMOTE CONTROL CONNECTOR"**

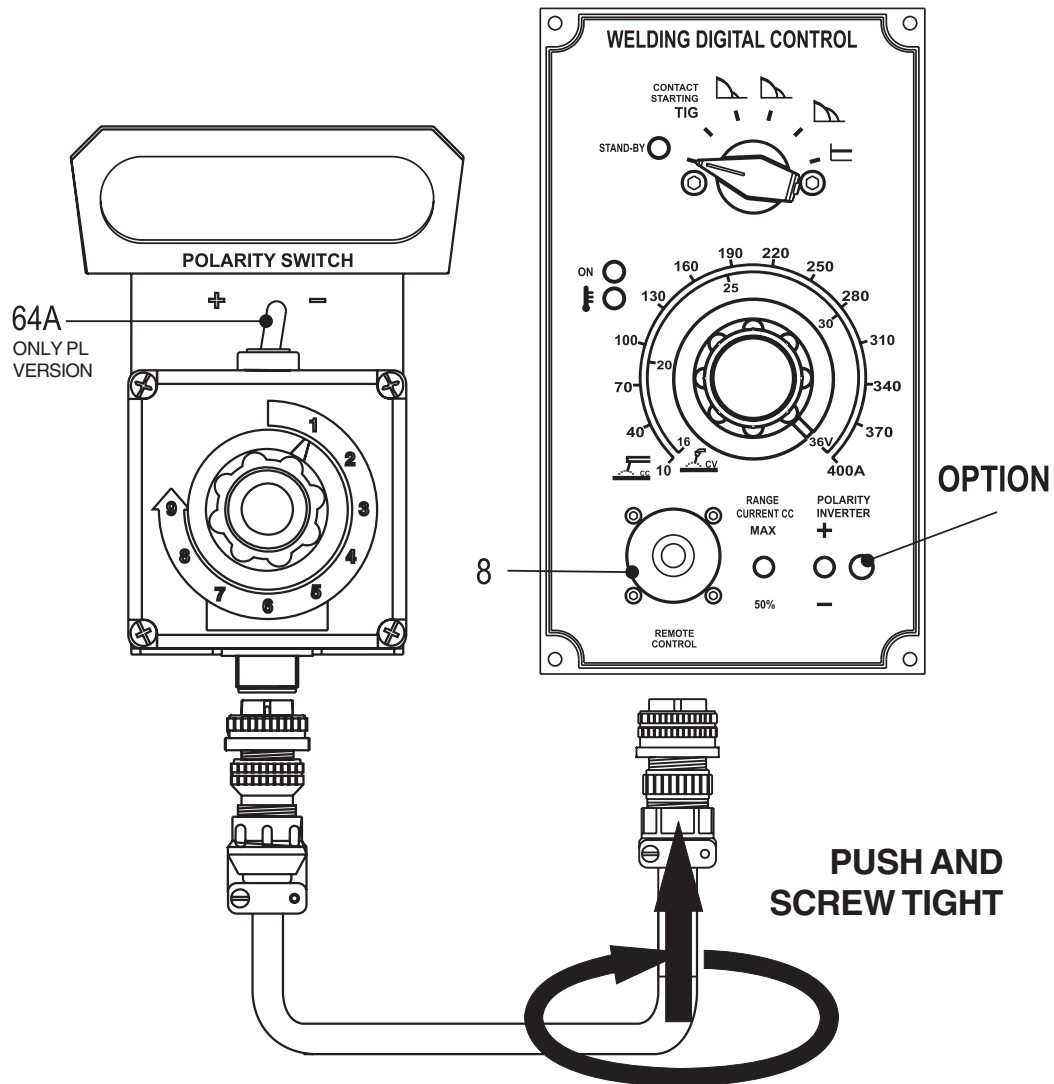
Welding voltage is always present on welding sockets and also VRD is active.

- Welding cable between the machine's (9) welding plug (+) and the wire feeder.
- Welding cable between the machine's (10) welding plug (-) and the piece to be welded.

The setting of the welding voltage is done by using the knob on the front panel.



NAME OF CONTACT	DESCRIPTION
A (electric ground)	To potentiometer RC1 "terminal a"
B	To potentiometer RC1 "central b"
C (5 V d.c.)	To potentiometer RC1 "terminal c"
D	short circuit with contact "C"
E	To switch "Polarity Inverter"
F (5 V d.c.)	(Close for negative polarity)
G	Return from switch on CV welding gun, 1-phase (44 - 48V a.c.)
H (welding ground)	Welding ground for d.c. voltmeter on wire feeder
I (44 - 48V a.c.)	Voltage supply for wire feeder
J (44 - 48V a.c.)	



The remote control PHG1B, which regulates the welding current in the CC mode and the welding voltage in the CV mode, is connected to the front panel by means of a multipole connector.

When the remote control is connected to the remote control connector (8), it is functional and automatically excludes the front panel regulation. The remote control can also be connected to the connector on the wire feeder front panel but in this case it is necessary to switch the wire feeder commutator so it can operate.

The polarity inverter (64A), if installed, can be operated from the remote control.

Adjust the welding current control knob to the correct current for the diameter and type of electrode being welded.



**ATTENTION**

When the PHG1B is not used, it is necessary to disconnect the multipole connector



**IMPORTANT**



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.

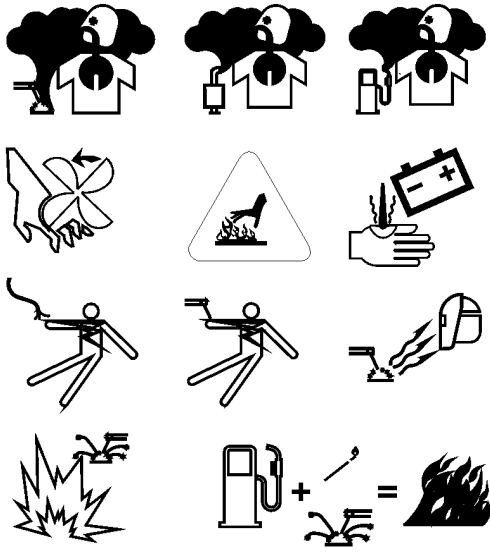


**WARNING**



**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 yourself 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		•						
CHECK	Battery electrolyte level			•					
	Amount of coolant		•						
CHECK	Belt - Fan and fan belt		•		•				
	Tighten nuts and bolts		•			•			
CHECK	Valves, rocker arms		•				•		
	Injector regulation		•						•
CHECK	Water in the fuel pre-filter		•						
CLEANING	Filters	Dry air filter	•	•					
		Fuel pump filter	•	•					
CLEANING	Radiator	Air passages	•				•		
		Fan	•						
CLEANING	Injectors						•		
	Fuel tank							•	
REPLACEMENT	Change oil	Crankcase (1)			•				
	Cartridge	Dry air filter					•		
REPLACEMENT		Fuel filter					•		
		Oil filter (1)					•		
REPLACEMENT	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.**





(D)

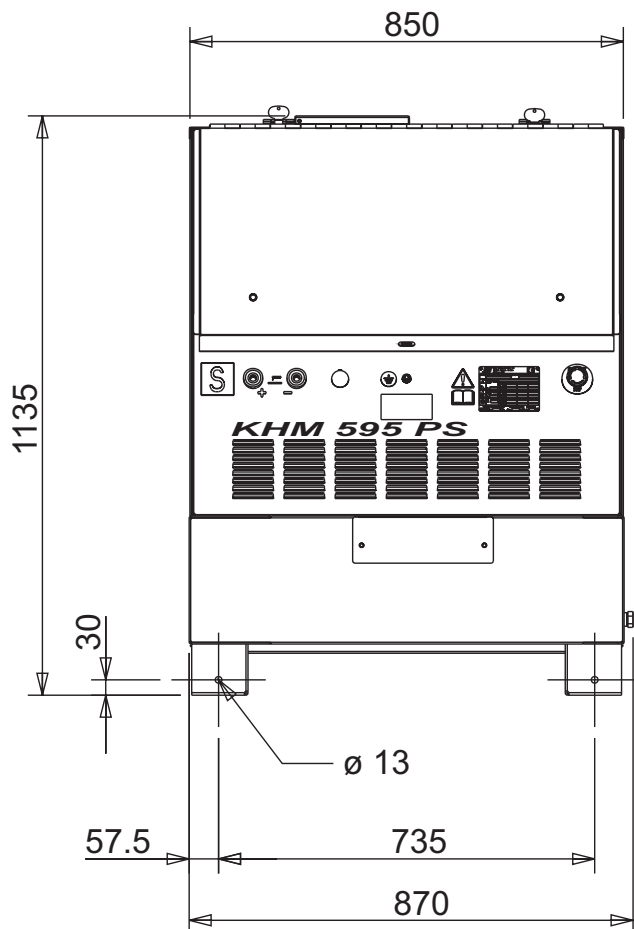
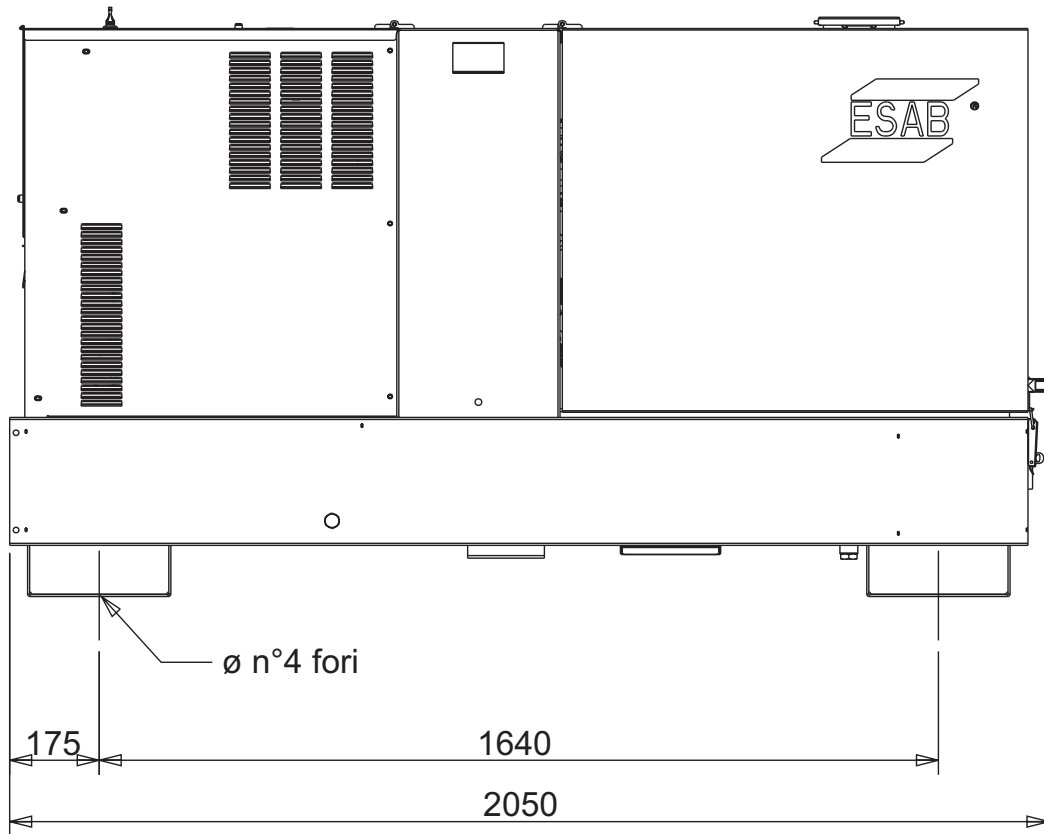
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TECHNICAL DATA

KHM 595 PS

M  
53



# 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.  
Mississauga, 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

### THAILAND

ESAB (Thailand) Ltd  
Samutprakarn  
Tel: +66 2 393 60 62  
Fax: +66 2 748 71 11

### 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](http://www.esab.com)



ESAB AB SSC Nordic Region  
Box 80040  
S-402 77 Göteborg  
SWEDEN  
Phone + 46 31 509000  
Fax +46 31 509195



[www.esab.com](http://www.esab.com)