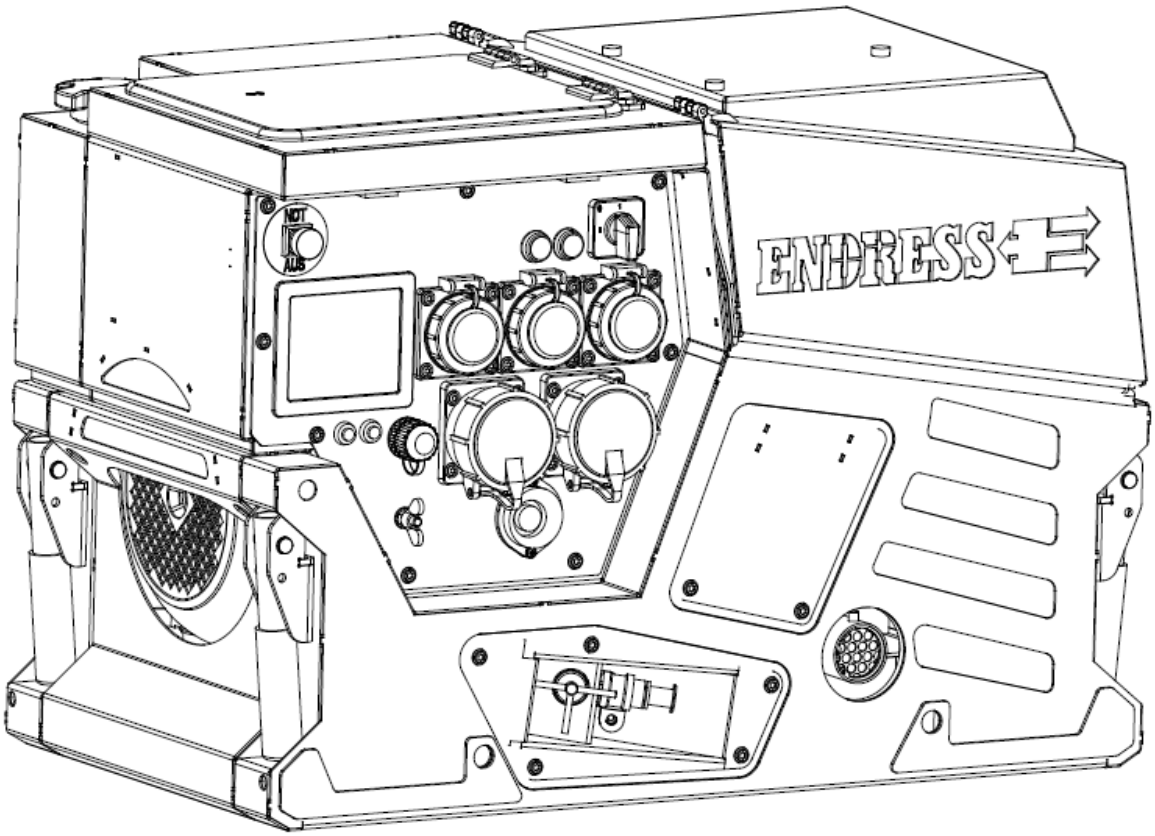
OPERATING INSTRUCTIONS

Power generators in accordance with DIN 14685-1

ESE 1408 DBG ES DIN **Article No. 156519**



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General note:

The illustrations in these operating instructions do not always comply completely with the actual design, in particular with regard to the colour, and are to be considered a representation of basic principles.

We reserve the right to make modifications in terms of ongoing technical development.

These instructions do not include technical modifications that occurred after printing.

1 General information

These operating instructions must be read carefully and understood before using the generator.

These operating instructions are intended to familiarise you with the basic operation of the generator.

These operating instructions contain important information on using the generator safely and appropriately.

Complying with this information helps to:

- avoid hazards
- reduce repair costs and downtime
- increase the reliability and service life of the generator.

However, not only these operating instructions but also the laws, regulations, guidelines, and standards applicable in the country of use and at the site of operation must be observed.

These operating instructions only describe the generator operation.

A copy of these operating instructions must be available to the operating personnel at all times.

Documentation

In addition to these operating instructions, the following documents are relevant for the generator:

- Operating instructions and maintenance instructions for the engine (Briggs & Stratton Corporation)
- Circuit diagram for the generator
- Declaration of Conformity
- Regulations for handling the battery
- Test protocol for the power generator

The operating manual and the maintenance instructions from the engine manufacturer are integral components of these instructions and must be observed.

Safety symbols

The safety warning symbol indicates that a source of danger exists. The safety warning symbols used in the work area of the machine/plant and the entire technical documentation correspond to the EC Directive 2006/42 - Minimum requirements for the provision of safety and/or health signs at work.

Warning of a general hazard

This warning symbol indicates activities where several causes can lead to risks.

Warning of potentially explosive materials

This warning symbol indicates activities during which there is an explosive hazard, possibly with lethal consequences.

Warning of a dangerous electrical voltage

This warning symbol indicates activities during which there is the danger of an electric shock, possibly with lethal consequences.

Warning of toxic substances

This warning symbol indicates activities during which there is the danger of poisoning, possibly with lethal consequences.

Warning of environmentally damaging substances

This warning sign indicates activities during which the environment could be endangered, possibly with catastrophic consequences.

Warning of hot surfaces

This warning symbol indicates activities during which there is the danger of burns, possibly with lasting consequences.

Notes

2 General Safety Regulations

This section describes the basic safety regulations for operating the generator.

Whoever operates the generator or works with it must read this chapter and comply with its regulations in practice.

2.1 Important safety warning

ENDRESS generators are designed to operate electrical equipment with appropriate power output requirements. Other applications can lead to injury to the operating personnel and to damage to the generator as well as other damage to equipment.

The majority of injuries and damage to equipment can be avoided if all instructions given in this manual and all instructions attached to the generator are followed.

The generator must not be modified in any way. This can lead to an accident occurring and damage to the generator as well as devices.

WARNING!

The following actions are not permitted.

- Operation in explosion-prone environments
- Operation in fire-prone environments
- Operation in confined areas
- Operation from a vehicle platform that has not been swung out
- Operation without the necessary safety redundancies
- Operation in existing power supply networks
- Refuelling when hot
- Refuelling during operation
- Spraying with high-pressure cleaners or fire-extinguishing equipment
- Removal of protective equipment
- Incorrect vehicle installation
- Non-compliance with maintenance intervals
- Failure to measure and test for early damage identification
- Failure to replace wearing parts
- Incorrectly performed maintenance or repair work
- Defectively performed maintenance or repair work
- Unintended use

2.2 Intended use

The generator serves to supply electrical equipment for authorities and organisations with safety tasks (*BOS*) such as the fire brigades, THW, DRK and other aid organizations.

The generator is only to be used outdoors within the indicated voltage, output, and nominal rpm ranges (see nameplate).

You are also permitted to use it on a vehicle extension or swivelling platform in both extended and swung out states, providing that the air circulation is uninterrupted on all sides of the alternator and that the exhaust gases are dispersed correctly. This is especially relevant as access to the side with the instrument panel and the side with the exhaust gas connection must be unrestricted.

The methods that will be used to install the generator on these vehicle platforms require written approval from the distributor that supplied the generator.

The generator is not to be connected up to other energy distribution systems (e.g. public power supply) or to other energy generation systems (e.g. other generators).

The generator is not to be used in explosion-prone environments.

The generator is not to be used in fire-prone environments.

The generator must be operated according to the specifications in the technical documentation.

Every inappropriate use or all activities on the generator which are not described in these instructions are forbidden misuse outside the legally defined limits of liability of the manufacturer.

2.2.1 Residual risks

The points analysed and evaluated before beginning the design and planning of the generator were the residual risks using a risk analysis tool according to DIN EN ISO 12100:2011-03 with DIN EN 12601:2011-07.

Residual risks which cannot be avoided by implementing design measures during the whole life cycle of the generator can be:

- Risk of death
- Risk of injury
- Environmental hazards
- Material damage to the generator
- Material damage to other property
- Limited performance or functionality

You can avoid existing residual risks by observing and following these guidelines:

- the special warning notices on the generator
- the general safety instructions given in these operating instructions

- the specific warnings given in these operating instructions
- the specific service instructions (for the respective operating conditions) of BOS.

Risk of death

Risk of death to persons at the generator can be caused by:

- Incorrect use
- Inappropriate handling
- Missing protective equipment
- Defective or damaged electrical components
- Fuel vapours
- Engine exhaust
- Too large a distribution network configuration

Risk of injury

Risk of injury to persons at the generator can be caused by:

- Inappropriate handling
- Transport
- Hot components
- Recoiling starter rope on the engine

Environmental hazards

Environmental hazards involving the generator may be caused by:

- Inappropriate handling
- Operating fluids (fuel, lubricants, engine oil, etc.)
- Exhaust gas emission
- Noise emission
- Fire hazard
- Leaking battery acid

Material damage to the generator

Material damage to the generator can occur through:

- Inappropriate handling
- Overloading
- Overheating
- Too low/high oil level of the engine
- Non-compliance with the operating and maintenance specifications
- Unsuitable operating fluids
- Unsuitable hoisting gear

Material damage to other property

Material damage to other equipment in the operating area of the generator can be caused by:

- Inappropriate handling
- An overvoltage or an undervoltage
- Incorrect installation in a vehicle

Limits to performance or functionality

The generator's performance or functionality can be limited by:

- Inappropriate handling
- Inappropriate maintenance or repair work
- Unsuitable operating fluids
- An installation altitude greater than 100 metres above sea level
- An ambient temperature exceeding 25°C
- Too large a distribution network configuration

2.3 Operating personnel - Qualifications and Obligations

Only appropriately authorised personnel may work with or on the generator.

The authorised operating personnel must:

- be of age.
- be trained in first aid and able to provide it.
- be familiar with the accident prevention regulations and generator safety instructions and be able to apply them.
- have read the chapter “General Safety Regulations”.
- has understand the content of the chapter “General Safety Regulations”.
- be able to use and implement the content of the chapter “General Safety Regulations” in practice.
- be trained and instructed according to the rules of conduct in the event of a malfunction occurring.
- have the physical and mental abilities to carry out his responsibilities, tasks, and activities on the generator.
- be trained and instructed in his responsibilities, tasks and activities on the alternator.
- have understood the technical documentation concerning his responsibilities, tasks and activities on the alternator and be able to implement these in practice.

2.4 Personal protective equipment

This personal protection equipment must be worn during all activities at the generator described in these operating instructions:

- hearing protection
- protective gloves
- hard hat
- protective shoes
- fireproof protective clothing (in areas where the danger of fire is high)

2.5 Danger zones and work areas

The danger zones and work places (work areas) around the generator are determined by the activities to be undertaken within the individual life cycles:

Life cycle	Activity	Danger zone	Work area
Transport	in the vehicle	Radius of 1.0 m	none
	by the operating personnel		Radius of 1.0 m
Operation	Setting up		
	Operating	Radius of 5.0 m	
	Refuelling	Radius of 2.0 m	
Service and maintenance	Cleaning	Radius of 1.0 m	
	Shutting down		
	Maintenance		

Table 2.1: Danger zones and work areas on the generator

2.6 Signs on the generator

These signs must be fitted on the generator and be kept in a clearly legible condition:

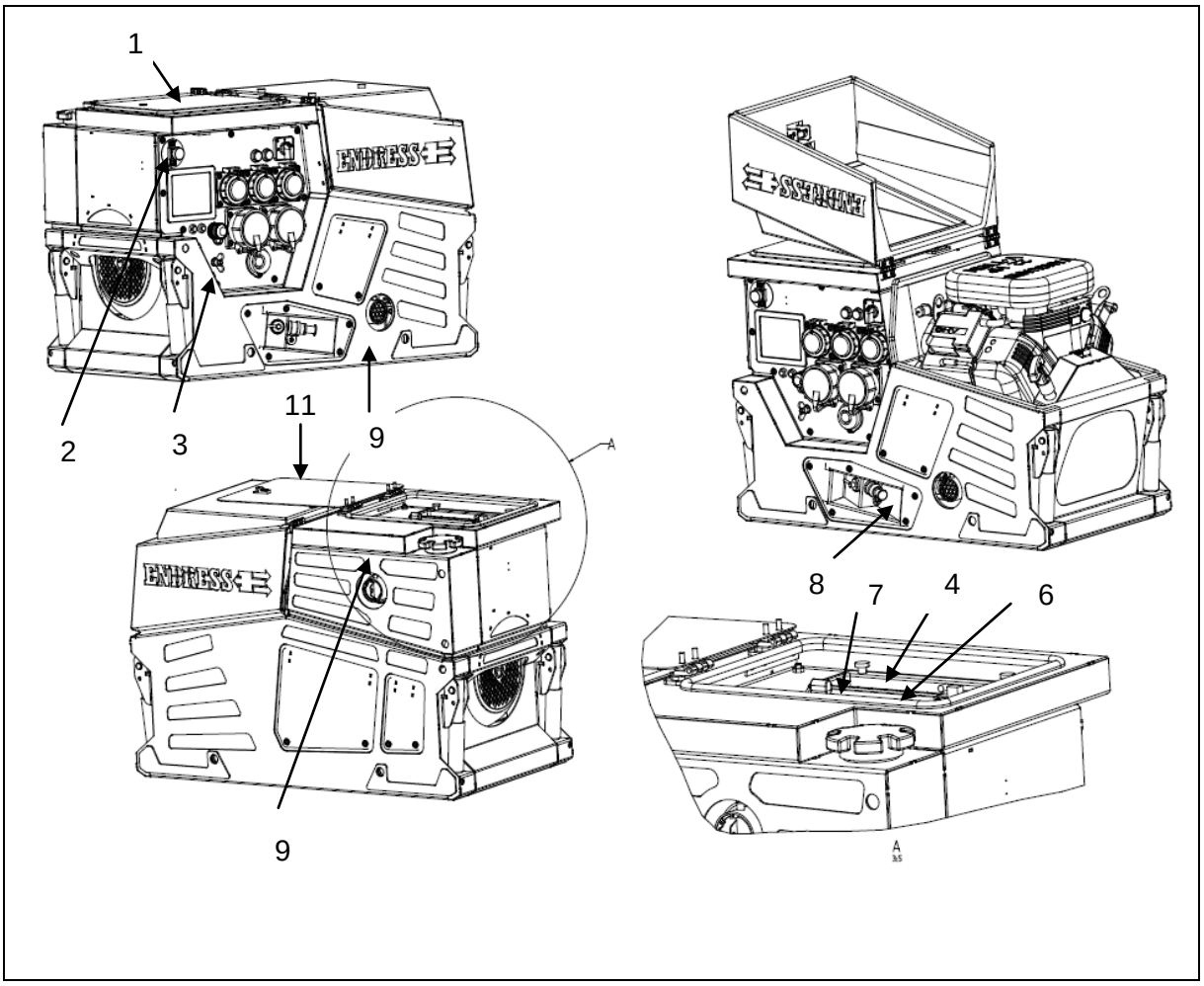
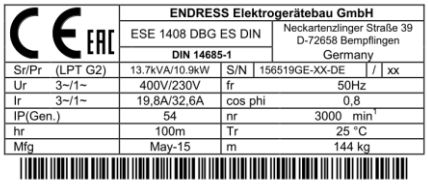
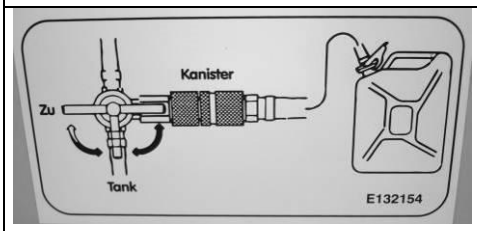


Figure 2-1: Signs on the generator

1	Reference note - read operating instructions	7	Reference note - maintenance intervals
2	Note EMERGENCY-STOP		
3	Potential equalisation screw (earthing for an optional FI)	8	Note re external refuelling
4	Cable extension	9	Note on the hot surface
5	Reference note - noise emission	10	Fuel note
6	Nameplate	11	Short operating instructions

Sign	Name
	Reference note - read operating instructions
	Note EMERGENCY-STOP
	Connection Potential equalization
	Earthing connection for the option with the TN-S system with RCD 30mA
	Generator model plate
	Reference note - maintenance intervals
	External refuelling
	Note hot surface

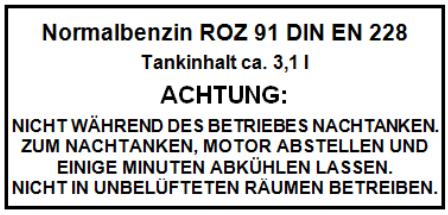
Sign	Name
	Fuel note
	Note Line extension
	Reference note - noise emission

Table 2.2: Signs on the generator

2.7 General safety warnings

The generator's construction may not be modified in any way.

The motor's nominal rpm has been set in the factory and may not be changed.

All protective covers must be at hand and functional.

All signs on the generator must be in place and be in a clearly legible condition.

The operational reliability and functionality must be checked before and after each use/operation.

The generator is only be used outdoors and with sufficient ventilation.

Do not use open flames, lights, or spark-inducing devices in the generator’s danger area.

Protect the generator against moisture and precipitation (rain, snow) during operation.

Protect the generator against dirt and foreign matter during operation.

The authorised personnel are responsible for the operational reliability of the generator.

The authorised personnel are responsible for safeguarding the generator against unauthorised operation.

The authorised personnel are obligated to observe the applicable accident prevention regulations.

The authorised personnel are obligated to obey the safety and work instructions of superiors and/or safety officers.

The authorised personnel are obligated to wear personal protective equipment.

Only authorised personnel may remain in the generator's danger zone.

Smoking is absolutely prohibited in the generator's danger zone.

Open flames and light are prohibited in the generator's danger zone.

Consumption of alcohol, drugs, medications, or other mind-altering substances is prohibited.

The authorised personnel must be familiar with the generator components and their function and know how to use them.

Transport

The generator is only be transported after it has cooled down.

The generator is only be transported in a vehicle after it has been fastened in place correctly (on the transport device).

The generator is only be lifted by the carrying handles provided.

The generator is to be carried by at least one person per carrying handle.

Setting up

The generator is only be set up on sufficiently firm ground.

The generator may only be set up on even ground.

Generating electricity

The electrical safety must be checked before each start-up.

Do not cover the equipment during use.

Do not obstruct or block the air supply.

Do not use starting aids.

Devices must not be connected during start-up.

Only tested and authorised cables may be used for the power network.

It is prohibited to establish a connection between existing neutral conductors, potential equalisation conductors and/or equipment components (safety-separated circuit).

The entire drawn output must not exceed the maximum nominal output of the generator.

Do not operate the generator without a sound damper.

It is prohibited to operate the generator without air filters and with an opened air filter cover.

Refuelling

It is prohibited to refill the generator's fuel tank during operation.

It is prohibited to refill the fuel tank on the generator when it is still hot.

Use filling aids for refuelling.

Cleaning

It is prohibited to clean the generator during operation.

It is prohibited to clean the generator when it is still hot.

Maintenance and repair work

Operating personnel may only carry out the maintenance or repair work described in these operating instructions.

All other maintenance or repair tasks may only be carried out by specially trained and authorised specialists.

Before beginning the maintenance and/or repair work, always pull out the spark plug connector and set the Start-Stop switch at the position Off (0)

The maintenance intervals specified in these operating instructions must be observed.

It is prohibited to service the generator during operation.

It is prohibited to service the generator when it is still hot.

Decommissioning

The generator should be put out of service if it is not required for more than 30 days.

Store the generator in a dry and locked room.

Use a petrol additive to prevent resinous residues in the fuel system.

Documentation

One copy of these operating instructions must always be kept in the generator's manual compartment.

The operating instructions and the maintenance instructions for the engine (Briggs & Stratton Corporation) are integral parts of this instruction manual.

Environmental protection

The packaging material must be recycled according to the environmental protection regulations applicable at the place of use.

The workplace must be protected against contamination by leaking operating fluids.

Used or leftover fuels and lubricants must be recycled according to the environmental regulations applicable at the place of use.

Notes

3 Description of the generator 1408 DBG ES DIN

The components and functionality of the generator are described in this section.

3.1 Views of the generator

The generator components are distributed on all four sides. The standard equipment is described here.

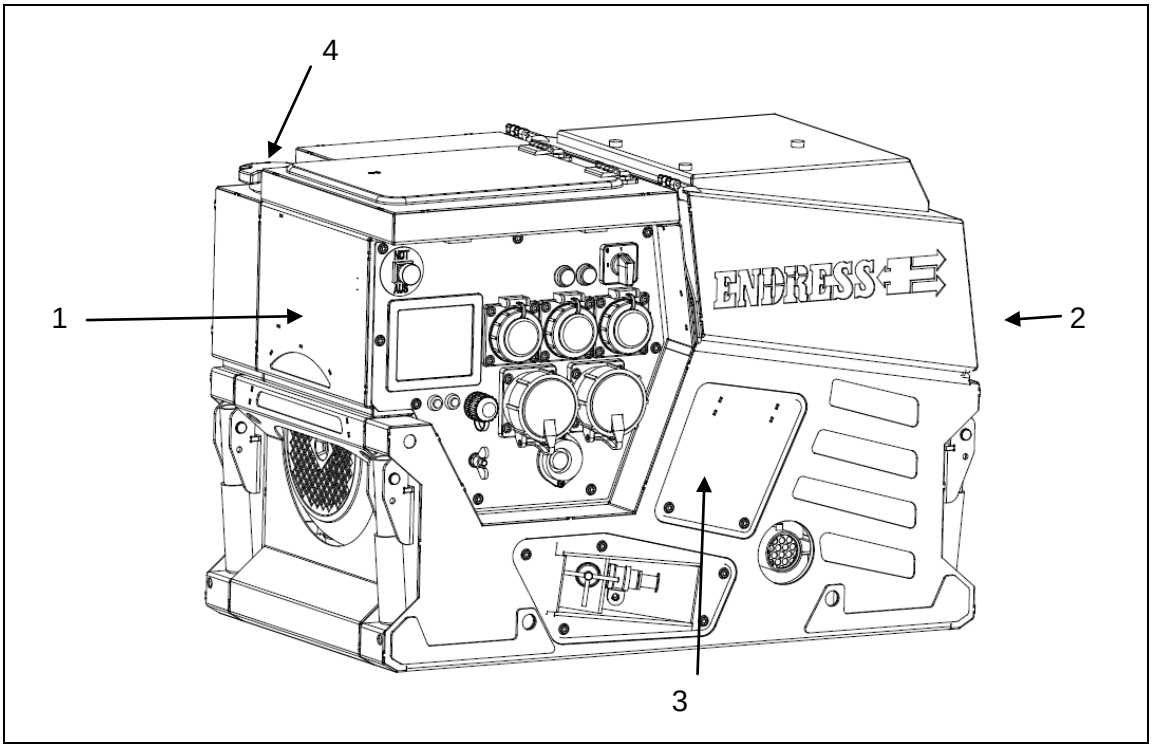


Fig. 3-1: Views of the generator

1	Generator side	3	Operating side/exhaust side on the right
2	Engine / start side	4	Exhaust side on the left (standard)

3.1.1 Operating and engine side components

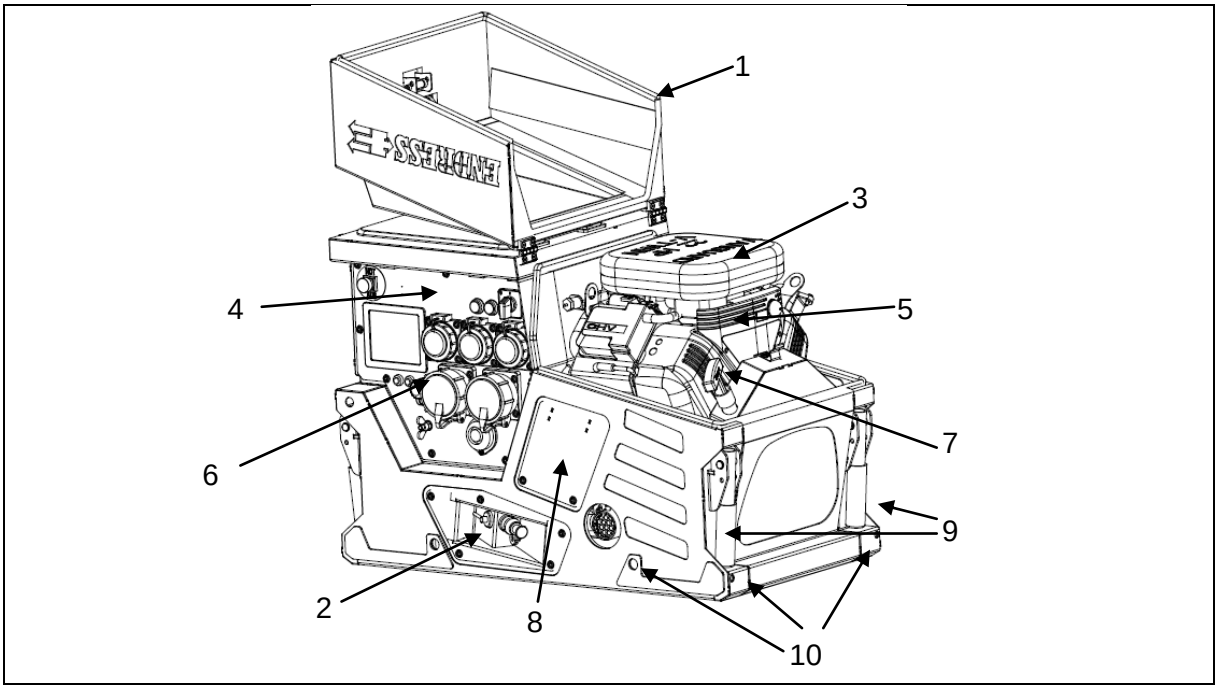


Figure 3-2: Components on the operating and engine side

1	Engine side covering hood	6	Control panel
2	External refuelling connection	7	Reversing starter (rope handle)
3	Air filter	8	Oil filter cover
4	Electrical compartment	9	Carrying handle
5	Briggs & Stratton engine	10	Fastening points according to DIN14685

3.1.2 Exhaust and generator side components

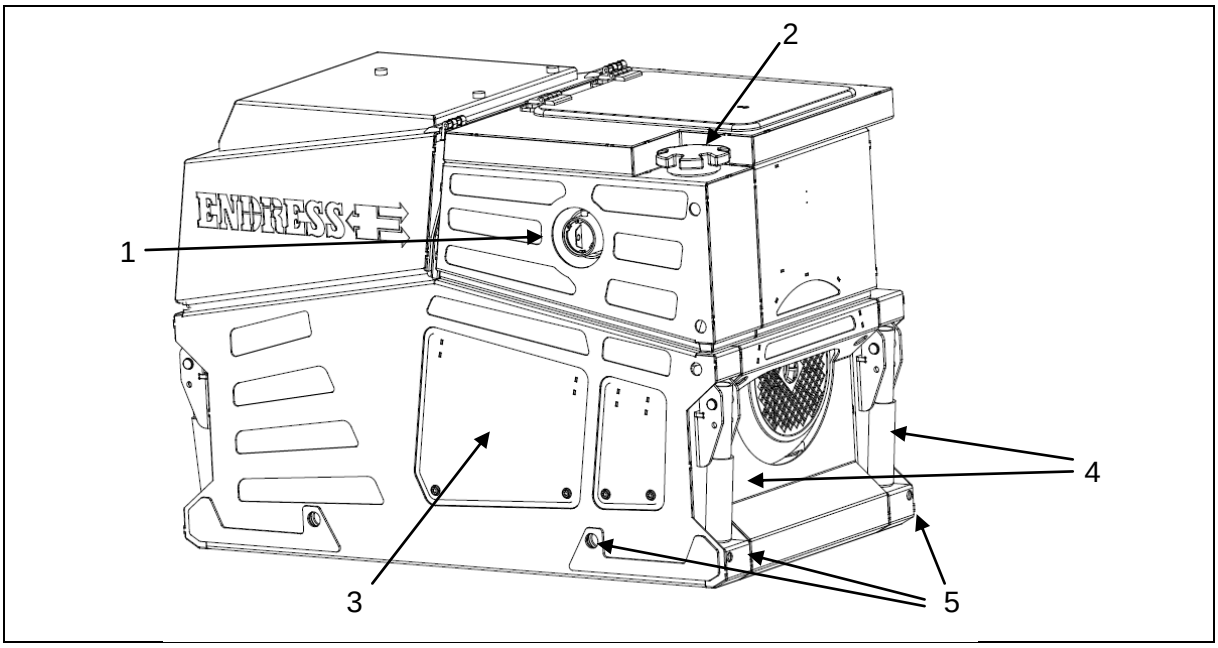


Figure 3-3: Components on the exhaust and generator side

1	Exhaust side on the left (standard)	5	Fastening points according to DIN 14685
2	Filler cap		
3	Battery compartment cover		
4	Carrying handle		

3.1.3 Control panel components

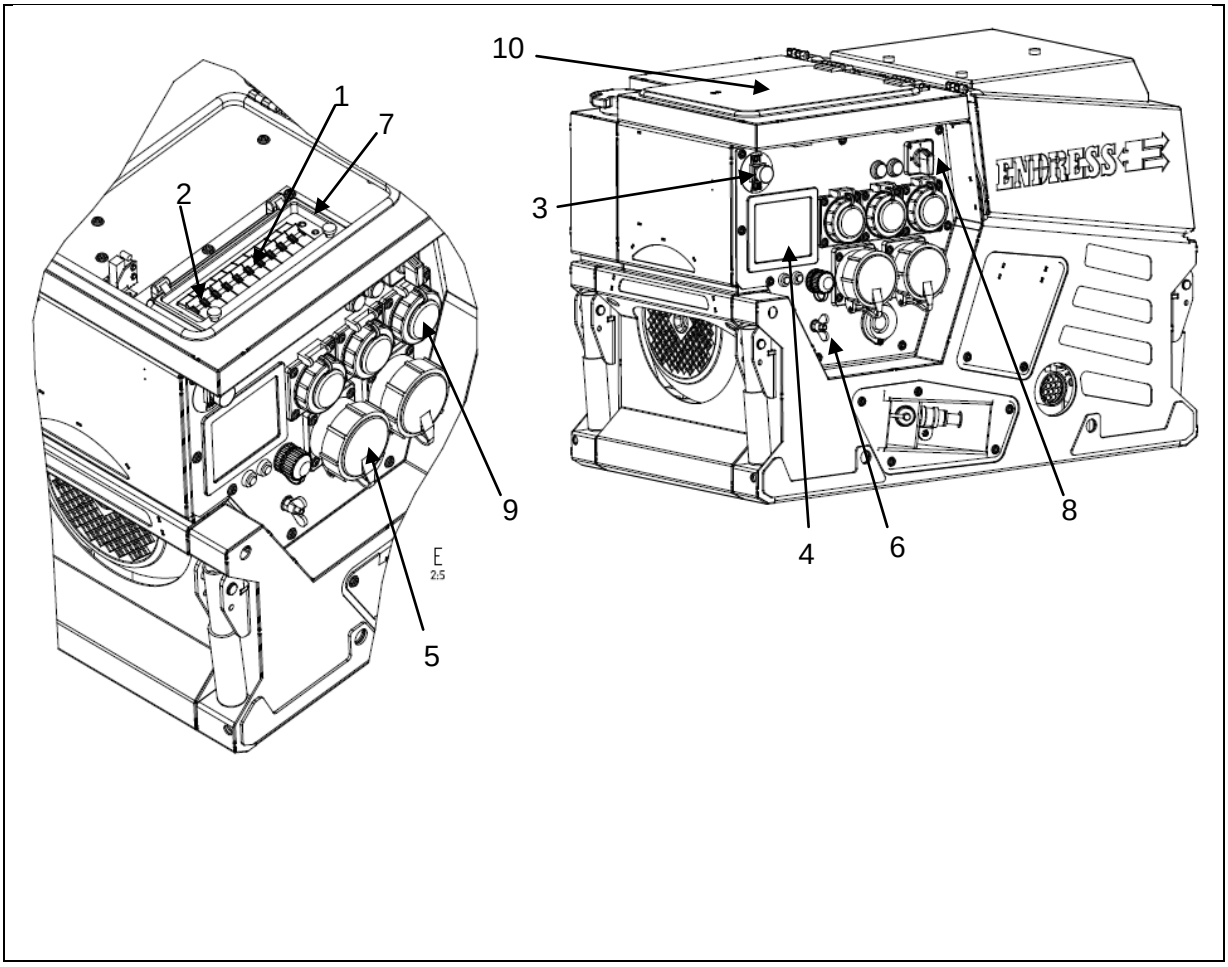


Fig. 3-4: Control panel components

1	Line circuit breaker	6	Potential equalisation screw (earthing for an RCD)
2	Line circuit breaker window	7	Socket for protective earthing conductor test (valid for devices up to year of construction 12/2015)
3	EMERGENCY-STOP switch	8	START-STOP switch
4	Multi-functional display	9	Schuko socket 230V / ~
5	CEE socket 400 V 3~	10	Generator side covering hood (includes accessories see *(Figure 3-5)*

3.1.4 Accessory components

Standard accessories

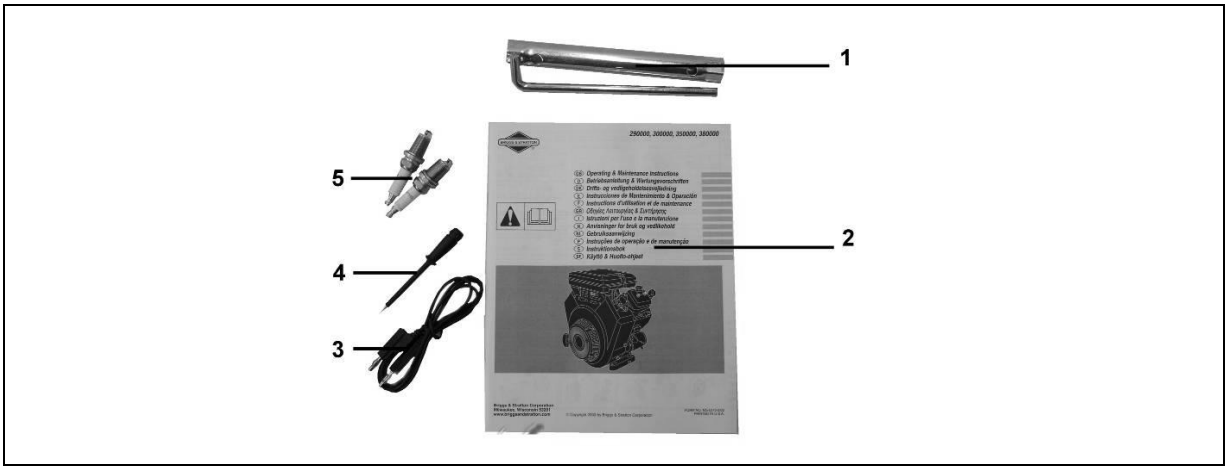


Figure 3-5: Components of the standard accessories

1	Spark plug wrench	4	Test probes (valid for devices up to year of construction 12/2015)
2	User information (operating instructions for the engine, as well as these operating instructions)	5	Spark plugs (2x)
3	Testing cable (valid for devices up to year of construction 12/2015)		

Special accessories

Fig. 3-6: Components of the special accessories

1	Fuelling device	3	Exhaust hose DN 50 – 1500 mm
2	20 litre standard container		according to DIN 14572

3.2 Function and operating mode

The synchronous generator is firmly coupled to the drive engine. The assembly is installed in a stable frame and equipped with a flexible, low-vibration suspension.

Splash-proof and dust protected earthed power and CEE sockets in the Protection Class IP67 with a nominal voltage of 230 and/or 400 V/50 Hz, supply the power.

An integrated voltage regulator controls the voltage of the generator in the nominal speed range of the generator.

The generator is designed for mobile operation with one or more electrical consumers (safety-separated circuit according to VDE 100-410:2007-06 while observing Annex C.3). The protective conductor of the safety plug and sockets act as the potential equalisation conductor.

Notes

4 Operation

The operation of the generator is described in this section.

4.1 Transporting the generator

Proceed as follows to transport the generator.

Requirements

The following requirements must be met:

- The generator must be turned off
- The generator must have cooled down.
- The installed fuel valve is in the “OFF” position
- The fuelling device (a special accessory, see 5.8) is disconnected
- Exhaust hose (a special accessory, see 5.9) is not attached
- At least one person per carrying handle

WARNING!

A slipping or falling device can crush hands or feet.

- Take the weight of about 150kg into account.
- Carry the alternator using at least one person per carrying handle.
- Only lift the alternator by the carrying handles.
- Lift / lower the alternator evenly.
- Walk slowly.

Carrying the generator

1. Unfold carrying handles.
2. Lift generator evenly.
3. Carry the generator to the work site.
4. Lower generator evenly.
5. Fold carrying handles.

✓ The generator has been carried to its work site.

4.2 Setting up the generator

Proceed as follows to set up the generator.

Requirements

The following requirements must be met:

- An even and firm substratum outdoors
- There are no inflammable materials at the operating site
- There are no explosive materials at the operating site
- If necessary create the potential equalization using other electrically conductive parts, for example a vehicle.

WARNING!

Leaking engine oil and petrol can contaminate the soil and groundwater.

- Prevent leaking of engine oil and petrol.

Setting up the generator

Set up the generator as follows:

1. Prepare the work site.
2. Transport the generator to the work site.
3. Attach the exhaust hose if necessary (a special accessory, see 5.9)

✓ The generator is set up and ready for use.

4.3 Refuelling the generator

Proceed as follows to refuel the generator.

Requirements The following requirements must be met:

- switched off generator (see 4.5)
- The device must be cooled down.
- adequate supply and removal of air
- Appliances switched off or disconnected

WARNING!

Leaking engine oil and petrol can burn or explode!

- Prevent leaking of engine oil and petrol.
- Generator is switched off.
- Generator has cooled down.
- Avoid open flames and sparks.

WARNING!

Leaking engine oil can contaminate the soil and groundwater.

- Do not fill the tank completely.
- Use a filling aid.

WARNING!

Using the wrong fuel will destroy the engine.

- Only refuel with lead-free regular grade petrol RON 91/95.

Refuelling the device **Refuel the generator as follows:**

1. Set any fuel cock present to “closed” *(Fig. 5.12(1))*.
2. Unscrew tank cover.
3. Insert filler aid into the filler neck.
4. Add petrol.
5. Remove filler aid.
6. Screw on tank cap

✓ The device is refuelled.

4.4 Starting the generator

Requirements The following requirements must be met:

- checked electrical reliability (see 6.3)
- filled fuel tank (see 4.3)

- A possibly connected fuelling device (special accessory)
- sufficient oil level (fill with engine oil before initial use, see the engine operating and maintenance instructions)
- adequate supply and removal of air
- Fit push-on exhaust gas pipe (special accessory) if needed
- a connected and operational starter battery
- Appliances switched off or disconnected

WARNING!

Operating fluids can burn or explode.

- Prevent leaking of engine oil and petrol.
- Do not use starting aids.
- Avoid open flames and sparks.

WARNING!

Exhaust gases can cause fatal asphyxiation.

- Provide for sufficient ventilation.
- Use an exhaust gas pipe.
- Only operate the generator outdoors.

WARNING!

Hot parts can ignite flammable and explosive materials.

- Avoid flammable materials at the operating site.
- Avoid explosive materials at the operating site.

WARNING!

Heat or moisture destroys the device.

- Avoid overheating (sufficient ventilation).
- Avoid moisture.

Starting the motor

Start the engine as follows:

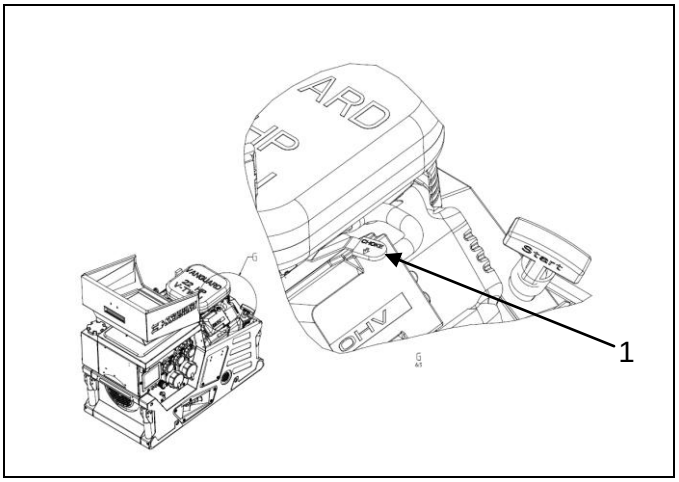


Figure 4-1: Actuate manual choke

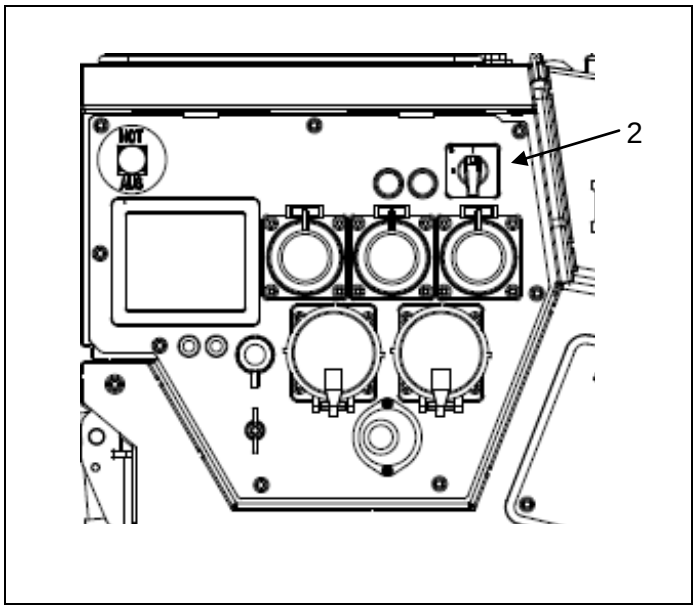


Figure 4-2: Standard design of operating panel

ELECTRICAL START

1. Pull on the manually-operated choke *(Figure 4-1-(1))* in < (completely for a cold engine / appropriately less for a warm engine) and hold firmly.
2. Turn the START-STOP switch *(Figure 4-2-(2))* completely to the right into the position “START” until the engine starts and then release.

✓ The motor starts.

NOTE Only activate the starter briefly (max. 5-10 seconds). Never start or run the engine with the battery disconnected.

3. Bring the choke *(Figure 4-1-(1))* into the basic position again.

✓ The engine has started.

NOTE The electrical devices can be connected and/or hooked up after a warming-up phase of about one minute.

WARNING!

Devices with a remote start device are fitted with an automatic choke. You do not need to use the manual choke (on the engine).

Alternatively for a very weak /discharged battery

(a manual start can be realised more easily by two people)

HAND START

1. Covering hood *(Figure 3-2-(1))* wide open.

2. Pull on the choke *(Figure 4-1-(1))* < (completely for a cold engine / appropriately less for a warm engine) and hold firmly.

Actuate the manual fuel pump *(Figure 4-4(1)* 3x
Actuate *(1)* 3x

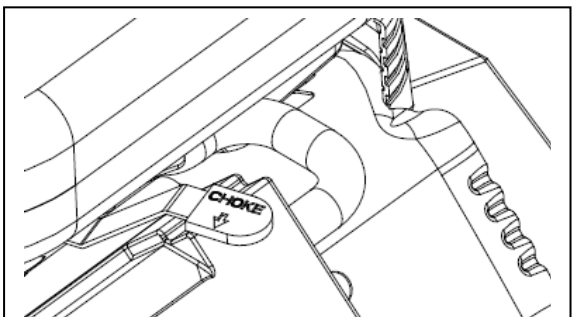
3. Set the START-STOP switch *(Figure 4-2-(2))* to position “1”
4. Advance engine at the handgrip of the reversing starter *(Figure 3-2-(7))*.

NOTE Support oneself with one hand on the device grip in order to simplify advancing the engine.

✓ The motor starts.

5. Move the choke slowly back into its start position.

✓ The engine has started



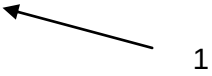


Fig. 4-3: Choke on the engine side

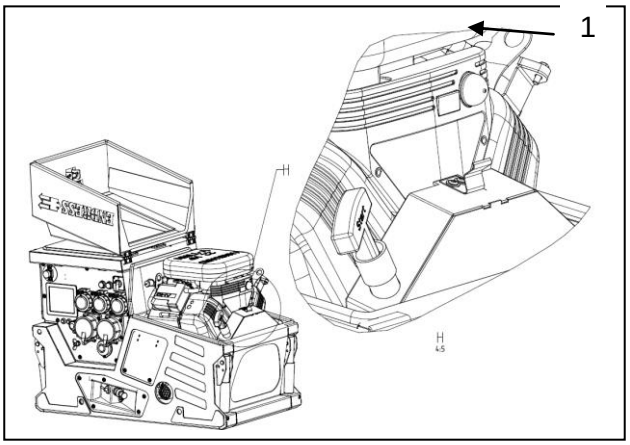


Figure 4-4: Fuel pump for an emergency start

4.5 Switching the generator off

Proceed as follows to shut down the generator.

WARNING!

Hot parts can ignite flammable and explosive materials.

- Avoid flammable materials at the operating site.
- Avoid explosive materials at the operating site.
- Allow the generator to cool down.

Switching the device off

The device is switched off as follows:

Electrical start

1. Switch off or disconnect devices.
2. Continue to run the engine for about two minutes.
3. Set the START-STOP switch *(Figure 4-2-(2))* to position “0”

Note

We request that you only switch off the device using the EMERGENCY-STOP switch in an emergency. Switching off using the EMERGENCY-STOP switch only interrupts the ignition so it is still possible for fuel to ignite in the silencer due to residual amounts of fuel in the carburet-tor.

Notes

4.6 Connecting up to consumers

Proceed as follows to connect appliances to the generator.

Requirements

The following requirements must be met:

- a started generator (see 4.4)
- protective earthing conductor test completed (see 4.7)
- device switched off

WARNING!

Electric shocks cause injury or death.

- Maximum line length 100m for 2.5mm^2
- If necessary create the potential equalization using other electrically conductive parts, for example a vehicle.
- Do not connect the generator to an existing electrical grid.

Connecting up to consumers

You can connect devices using Schuko or CEE sockets.

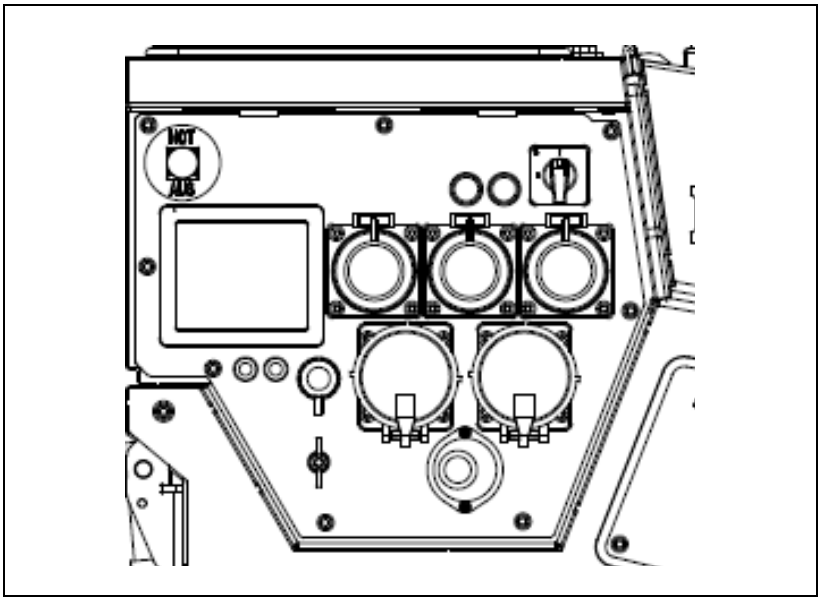


Fig. 4-5: Connecting up to consumers

4.7 Check the protective conductor (valid for devices up to year of construction 12/2015)

Requirements

Proceed as follows to check the protective conductor connection between the generator and the consumer.
The following requirements must be met:

- a started generator (see 4.4)
- device is connected (see 4.6)
- device switched off

WARNING!

Electric shocks cause injury or death.

- Maximum line length 100m for 2.5mm^2.
- If necessary create the potential equalization using other electrically conductive parts, for example a vehicle.
- Do not connect the generator to an existing electrical grid.

Check the protective conductor

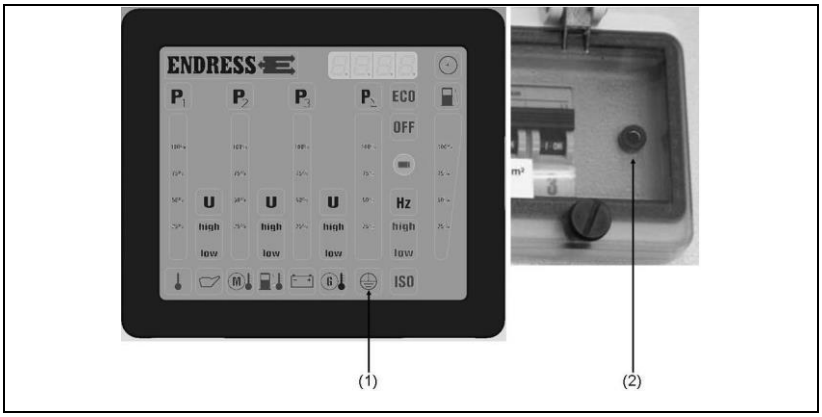


Figure 4-6: Check the protective conductor

Proceed as follows to check the protective conductor between the consumer and the generator:

1. Insert test cable into socket *(Figure 4-6-(2))*.
2. Hold a test tip an a metallic, blank location on the device.

✓ The test lamp *(Figure 4-6-(1))* on the multifunction display shows the result:

Test lamp	Significance
lights up green	protective conductor is OK
stays off	Protective conductor defective / not present

Table 4.1: Test lamp protective conductor

✓ The protective conductor / potential equalization for this device has been checked.

4.8 Monitoring the operating status using the multifunction display

All LEDs light up for about 2 seconds to allow checking as soon as the START-STOP switch is set to the position “Operate”. The normal operational lighting is then shown afterwards for about 30 seconds. If the engine is not started within this period, the E-MCS 4.0 goes into energy saving mode and the indicator goes dark. To bring the E-MCS 4.0 back into a ready-to-operate condition again, the START-STOP switch must first be turned into the position “STOP”. The display intensity depends on the ambient light.

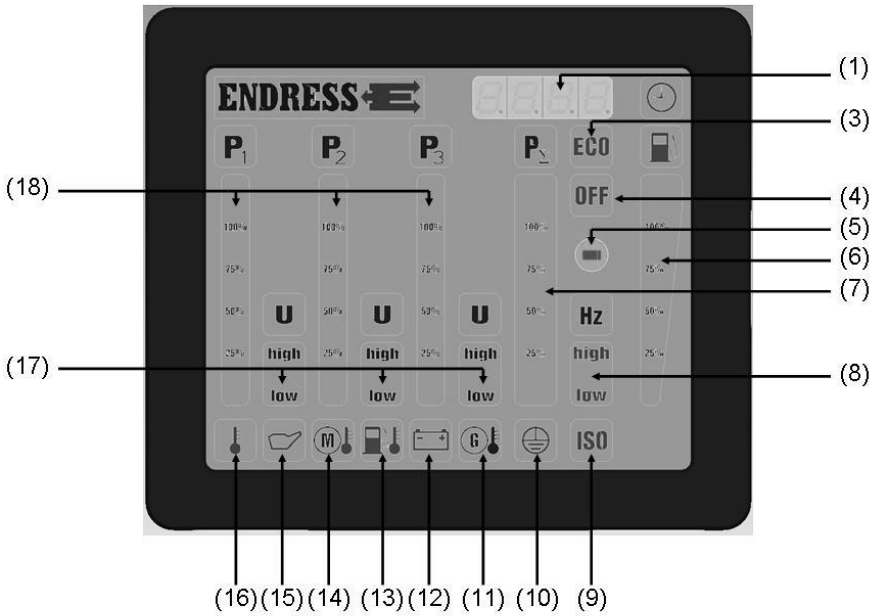


Figure 4-7: Multi-functional display

Operating hours: Displayed *(see Figure 4-7-(1))* when the generator starts or is activated for 30 seconds when the START / STOP switch is turned to the “Operate” position.

Ambient temperature: If the display is red *(see Figure 4-7-(16))* whilst the generator is running then the temperature is too high and the generator must be switched off.

Oil pressure: If the display *(see Figure 4-7-(15))* lights up red whilst the generator is running then the oil pressure is too low and the generator switches automatically or the buzzer sounds, this can be acknowledged using the acknowledgement button.

Engine temperature: If the display is red *(see Figure 4-7-(14))* whilst the generator is running then the engine temperature is too high and the generator must be switched off.

Fuel temperature: If the display is red *(see Figure 4-7-(13))* whilst the generator is running then the engine temperature is too high and the generator must be switched off.

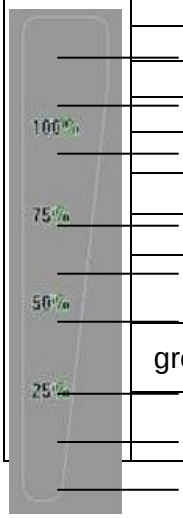
Battery charge check: If the display glows red (see *Figure 4-7-(12))* then the generator's recharging function is not working.
If the display flashes red then the charge voltage of the alternator is too high.

Insulation monitoring: If the display lights up red *(see Figure 4-7-(9))* or if the buzzer sounds then there is an insulation fault present. (see Chapter 5 Insulation monitoring).

Protective earthing conductor test: If the display glows green *(see Figure 4-7-(10))* during the protective earth lead test (see chapter 0 Protective earth lead test), the protective earth leads for the attached devices are OK. If the protective earth conductor function is not available, the display remains blank.

Fuel tank filling level:

The display *(see Figure 4-7-(10))* gives a rough indication of the contents of tank.



Symbol	Display	Significance
	green	Fill level 100%
	green	Fill level 100%
	green	Fill level 90%
	green	Fill level 70%
	green	Fill level 60%
	green	Fill level 40%
	green, red	Fill level below 30%
	green, red flashes	Fill level below 20%
	red flashes	it must be topped up

Frequency:

If the display glows green *(see Figure 4-7-(8))*, the frequency is within the correct range (47.5–52.5 Hz).
If the “high” display is red then the frequency is too high. If the “low” display is red then the frequency is too low.

L1, L2 & L3 phases:

The single L1 to L3 phases *(see Figure 4-77-(18))* are displayed separately:

Voltage (U) *(see Figure 4-7-(17)):*
If the field is green then the voltage is OK.
If “high” or “low” is displayed in red then the voltage is too high or too low.

Load (P) *(see Figure 4-7-(18))*:
The utilisation will be displayed in 10% steps for 3-phase loads. 10 - 80% green, 80 - 100% yellow and 100 - 110% red.

If the display is red for single phase utilisation (asymmetric load) then the load should be distributed evenly over the 3 existing phases.

Relative load indicator:

Load (P∑) *(see Figure 4-7-(7))*

For a 1 and 3 phase load the total load on the generator is displayed in steps of 10%. 10 - 80% green, 80 - 100% yellow and 100 - 110% red.

EMERGENCY-STOP button:

If the “OFF” symbol glows red (see *Figure 4-7-(4))* and the buzzer sounds, the EMERGENCY OFF button has been

pressed. The buzzer can be acknowledged using the acknowledgement button.

4.9 Putting the generator out of service

The generator should be put out of service if it is not required for more than 30 days. It is best to use a cloth to cover the generator.

NOTE The correct putting out of service procedure is described in the engine's operating manual and maintenance instructions (Briggs & Stratton Corporation) *(Figure 3-5-(2))*.

4.10 Disposal

Due to environmental protection considerations the generator, battery, engine oil etc. cannot simply be thrown into the refuse bin. Observe all local laws and regulations concerning correct disposal of such parts and substances. Your authorised ENDRESS generator dealer is happy to advise you.

Please observe the pertinent environmental protection regulations when disposing of the old oil. We recommend bringing the oil in a closed container to an old oil collection centre for disposal. Do not throw away used engine oil into the refuse bin or pour it onto the ground.

An inappropriately disposed of battery can damage the environment. Always comply with the local regulations when disposing of batteries. Please contact your ENDRESS maintenance dealer for a replacement.

5 Using special fittings / accessories

5.1 TN-S system with 30mA FI protection switch

The 30mA FI protection switch option can only be supplied by the factory.

The FI circuit breaker (RCD) is a protective measure against dangerous body currents according to DIN VDE 0100-551.

Earthing requirements:

1. The assembly's earthing connection clamps must be connected to the earthing spike by at least 16mm² of earthing cable (green/yellow). The spike must be driven into the ground. BG Bau recommends an earthing resistance of ≤ 50Ω (see BGI 867).
2. Alternatively, a proper earthing device conforming to VDE 0100-540 can be used (such as the main earthing line in buildings).

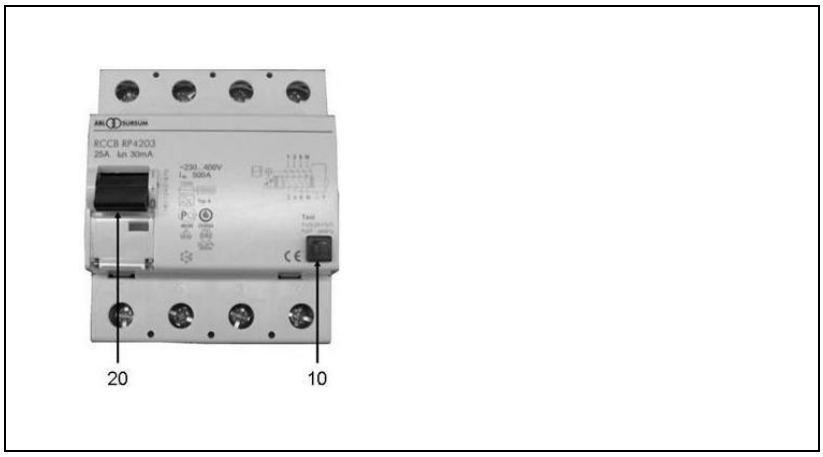


Fig. 4.8: FI protection switch

WARNING!

The generator must be earthed.

- In this special case the generator must be earthed! The above-mentioned safety warnings with other wording are not relevant for this special fitting.

Attention!

1. The effectiveness of this protective measure should be checked by an electrician.
2. Additionally, the user must check after every putting into operation by activating the test button *(see below Figure*
3. *4.8-(10))* of the residual current protection device (RCD), to check the mechanical function of the triggering

Checking the FI protection switch:

1. The generator must be started.
2. Move the protection switch *(see Figure 4.8)* into Pos. 1.
3. Activate the test switch *(see Figure 4.8-(10))*.

✓ The switch position displays the result *(see Figure 4.8-(20))*:

Symbol	Significance
Position I	Switch does not trigger. FI protection switch is defective.
Position 0	Switch triggers. FI protection switch is working properly.

Table 4.2: FI protection switch test

✓ The device has been tested in compliance with DIN VDE 0100-551.

5.2 Insulation monitoring using E-MCS 4.0

The insulation monitoring option can only be supplied by the factory.

5.2.1 Insulation monitoring without switching off

(acc. to DIN 14685-1)

Requirements

The following requirements must be met:

- a started generator (see 4.4)

Testing the insulation monitoring:

1. Unplug the device
2. Press the test button *(see Fig. 4--(1))*

   ✓ The displayed symbol *(see Fig. 4.7-(9))* indicates the result, the buzzer also sounds for insulation monitoring with this and it can be acknowledged over the acknowledgement button *(see Fig. 4--(2))*:

Symbol	Significance
lights up red The buzzer sounds	Insulation monitoring is OK
stays off	Insulation monitoring is defective

Table 4.3: Insulation monitoring without switching off

✓ The insulation monitoring test has been run.

3. The reset button *(see Fig. 4--(2))* must be pressed after the test, so that the unit can be operated again.

Insulation monitoring whilst running:

1. Plug in the device and switch on.

✓ The displayed symbol *(see Figure 4-7-(9))* indicates the result:

Symbol	Significance
lights up red The buzzer sounds	Insulation fault (≤ 23 kΩ)
stays off	Connected unit is OK

Table 4.4: Insulation monitoring whilst running without switching off

- ✓ If an insulation fault exists and the unit was previously OK when tested without a device connected (see insulation monitoring above), the insulation fault has been caused by the device.
- ✓ The reset button *(see Fig. 4--(2))* must be pressed after switching off and disconnecting the consumer so that the unit can be operated again.

Function reset/acknowledgement button:

Action	Operation
Press once	Acknowledge the buzzer
Press twice	Reset ISO

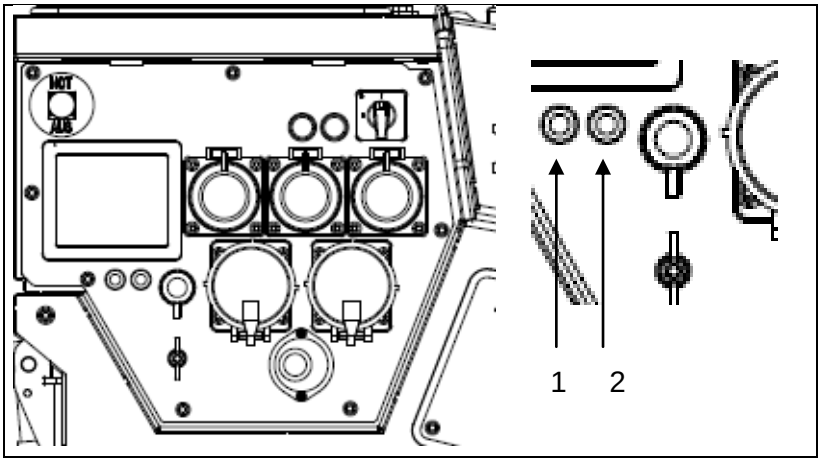


Fig. 4-9: Insulation monitoring using E-MCS 4.0

5.2.2 Insulation monitoring with switching off(Optional, on when requested by the customer)

Requirements

The following requirements must be met:

- Generator started

Testing the insulation monitoring:

1. Unplug the device
2. The circuit breaker must be in Pos. 1.
3. Press the test button *(see Fig. 4--(1))*

✓ The displayed symbol (see *Figure 4-7-(9))* and the position of the circuit breaker indicate the result:

Symbol	Result	Significance
lights up red	Circuit breaker jumps to Pos. 0 and the generator cuts out	Insulation monitoring is OK
stays off	Circuit breaker stays in Pos. 1 and the generator continues to run	Insulation monitoring is defective

Table 4.5: Insulation monitoring plus switching off

✓ The insulation monitoring test has been run.

✓ The reset button *(see Fig. 4--(2))* must be pressed after switching off and the circuit breaker must be turned back to Pos. 1 so that the unit can be used again.

Insulation monitoring whilst running:

1. Plug in the device and switch on.

✓ The displayed symbol (see *Figure 4-7-(8))* and the position of the circuit breaker indicate the result:

Symbol	Significance
Yellow	Insulation fault (≤ 23 kΩ)
stays off	Connected unit is OK

Table 4.6: Insulation monitoring whilst running without switching off

✓ If an insulation fault exists and the unit was previously OK when tested without a device connected (see above), the insulation fault has been caused by the device.

2. After the device has been switched off and unplugged**, the circuit breaker must be returned to Pos. 1, and** the generator must be restarted, in order for the device to be operated again.

5.3 LED switch for instrument lighting

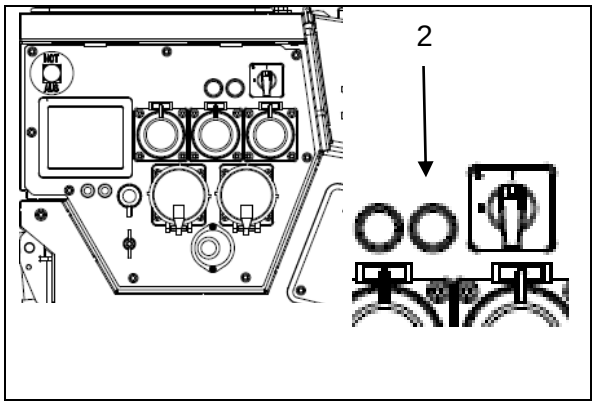


Fig. 5-3: LED switch for instrument lighting

Switching on the der LED lighting

Pressing the switch(Fig. 5-3-(2)) switches on the LED instrument lighting. The LED lights up independently of the operating condition of the generator, position of the START-STOP switch.

Note

The LEDs have a low power consumption of about 3W/0.25Ah. In this way the starter battery is not discharged to an impermissibly deep state, should the lighting have to be switched on for a number of hours with the generator not running.

5.4 Speed reduction at idle

- Proceed as follows to operate the generator with idling speed reduction.

Requirements

The following requirements must be met:

- generator is ready for operation
- generator started

Switching the idle down on

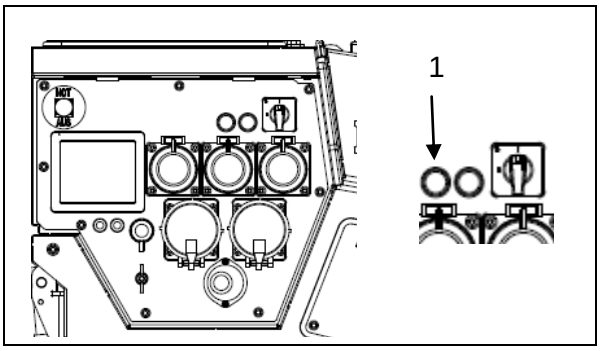


Fig. 5-5: Switching the idle down on pressure switch

Switch on idle speed reduction as follows:

Press pressure switch *(Figure 5-3-(1))* until it engages (LED lights up green).

✓ Idle down is activated.

Note

The idling speed reduction is active for about 5 minutes after engine start and then lowers the rotational speed of the engine, in as far as no load is engaged, to about 1800 rpm. The engine speed will be increased to the nominal speed as soon as a load is switched on. The engine always runs within the nominal speed range if the idling speed reduction is in the “OFF” position.

Switching idle down off

Switch the idle down off as follows:

Press the press switch again (LED goes out).

✓ Idle down is switched off.

5.5 Remote start device

Proceed as follows to operate the generator using the remote start device.

Requirements

The following requirements must be met:

- generator is ready for operation

WARNING!

Devices with a remote start device are fitted with an automatic choke. You do not have to use the manual choke during an electrical start.

Connecting up a remote start device

Connect up the remote start device as follows (with the Harting socket):

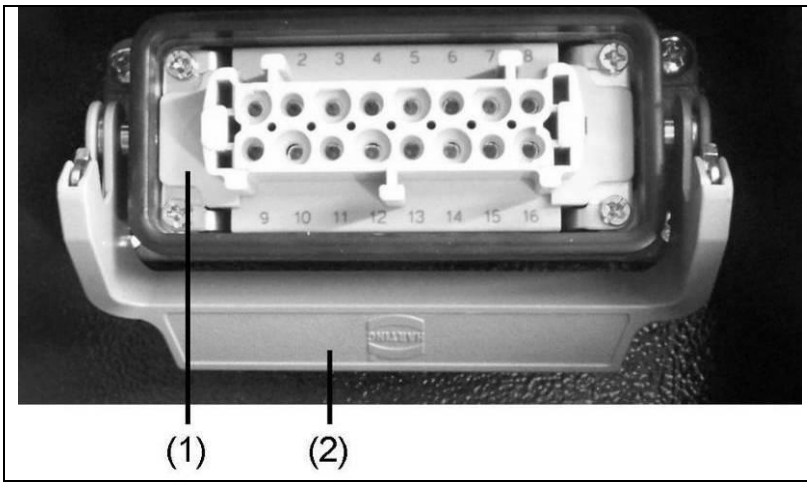


Fig. 5-6: Remote start device with Harting plug

Note

Battery charging retention might occur simultaneously when using the remote start device.

1. Fold away any protective caps on the remote start socket after unlocking the clip *(Fig. 5-6(2))*.
2. Insert plug for the remote start operating status / generator connecting cable into the remote start socket *(Fig.* .Insert *5-6(1))* and secure with the clip *(Fig. 5-6 (2))*.

✓ Remote start device is ready for use.

Disconnecting the remote start device

Disconnect the remote start device as follows:

1. Release the clip and then pull the remote start operating status / generator connecting cable plug out.
2. Fold down the protective cap (if fitted) onto the remote start socket and lock in place using the clip.

✓ Remote start device is disconnected.

Connecting up a remote start device

Connect up the remote start device as follows (with the CAN plug)

FIRECAN compatible with action

CAN interface in accordance with

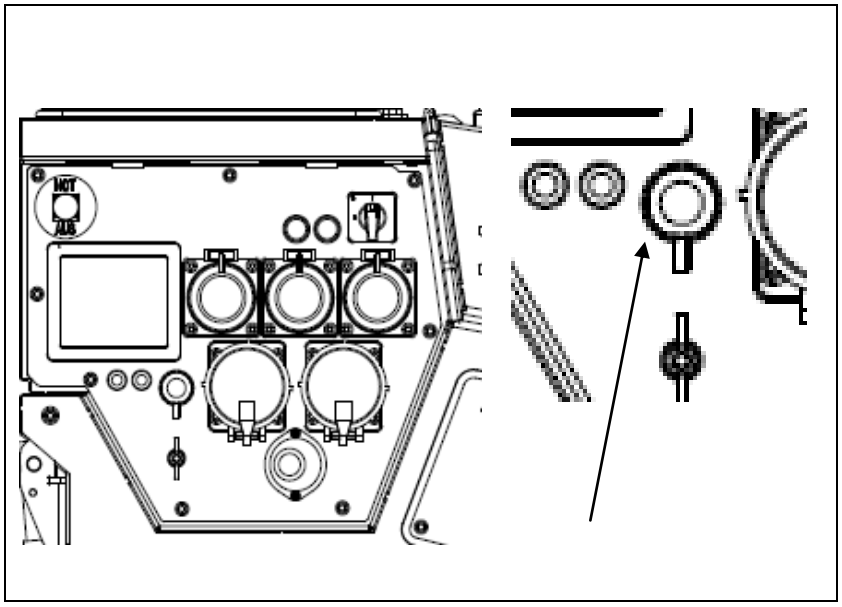


Fig. 5-7: Remote start device with CAN plug

Note

Battery charging retention might occur simultaneously when using the remote start device.

1. Insert plug for the remote start operating status / generator connecting cable into the remote start socket and lock in place by turning to the right.

✓ Remote start device is ready for use.

5.6 External start device

Proceed as follows to operate the generator using the external start device.

Requirements

The following requirements must be met:

- generator is ready for operation

Connecting up an external start device

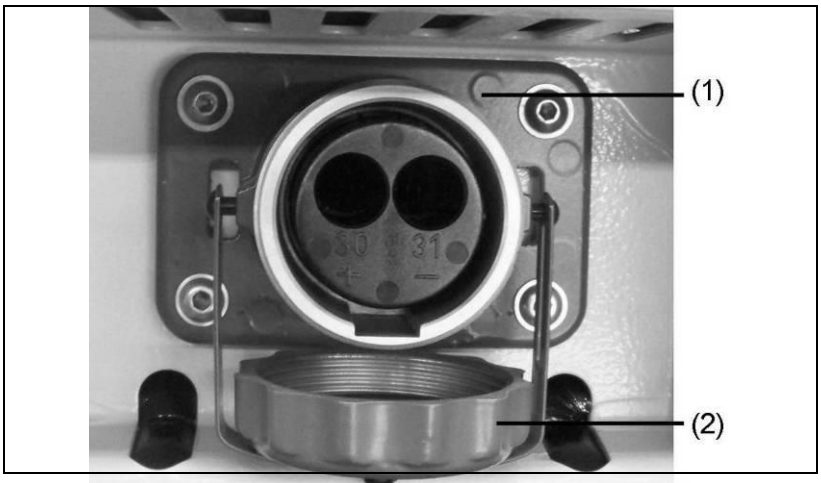


Fig. 5-8: Connecting up an external start device

Connect up the external start device as follows:

1. Unscrew cover *(Figure 5.8 (2))* on the external start socket *(Figure 5.8 (1))*.
2. Insert plug for the external energy source connecting cable (e.g. starter battery) / external start socket into the external start socket and lock in place by turning to the right.

✓ External start device is ready for use.

✓ The engine can be started using the electrical start.

Disconnecting the external start device

Disconnect the external start device as follows:

1. Release the plug by turning to the left and then pull the external energy source / external start socket plug out.
2. Screw protective cap for the external start socket back on again.

✓ External start device is disconnected.

5.7 Battery charge retention device

Proceed as follows to charge the starter battery for the generator over the battery charge retention device.

Requirements

The following requirements must be met:

- generator is ready for operation

Connecting up the battery charge conservation device

Connect up the battery charge conservation device (charge current socket A DIN 14690) as follows:

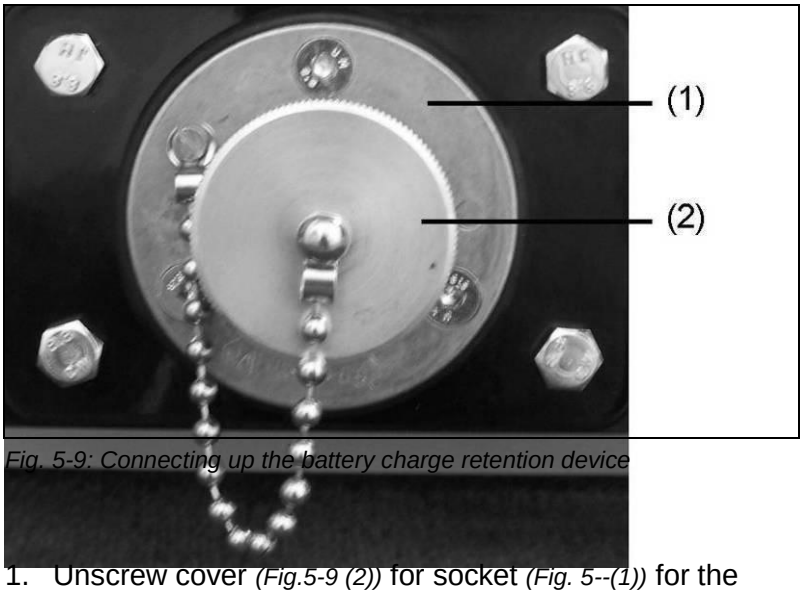


Fig. 5-9: Connecting up the battery charge retention device

1. Unscrew cover *(Fig.5-9 (2))* for socket *(Fig. 5--(1))* for the starter battery charge conservation device.
2. Insert plug for the external energy source (e.g. a battery charging device) / charge retention device socket connecting cable and lock in place by turning to the right.

✓ The battery charge conservation device is ready to operate.

Disconnect the battery charge conservation device as follows:

1. Release the plug by turning to the left and then pull the plug for the external energy source (e.g. a battery charging device) / charge conservation device socket connecting cable out.
2. Screw on protective cap *(Fig. 5-9(2))* for charge conservation device socket.

✓ The charge conservation device is disconnected

Connecting up the battery charge conservation device

Connect up the battery charge conservation device (charge current socket BEOS) as follows:

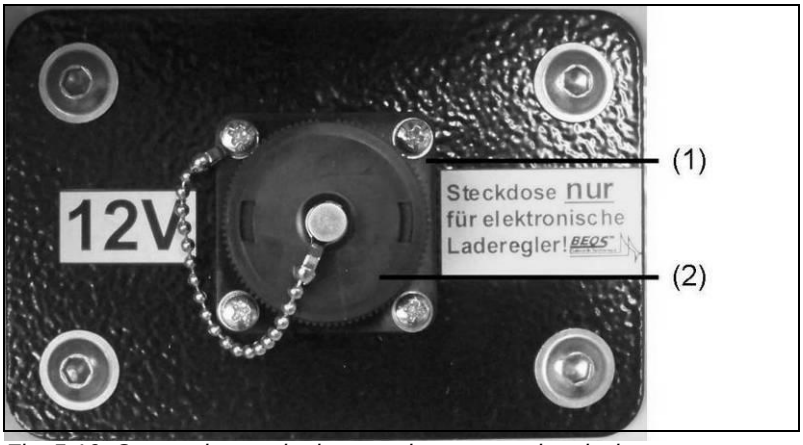


Fig. 5-10: Connecting up the battery charge retention device

1. Unscrew cover *(Fig. 5-10(2))* for socket *(Fig. 5-10(1))* for the starter battery charge conservation device.
2. Insert plug for the external energy source (e.g. a battery charging device) / charge retention device socket connecting cable and lock in place by turning to the right.

✓ The battery charge conservation device is ready to operate.

Connecting up the battery charge conservation device

Connect up the battery charge conservation device (MagCode socket) as follows:

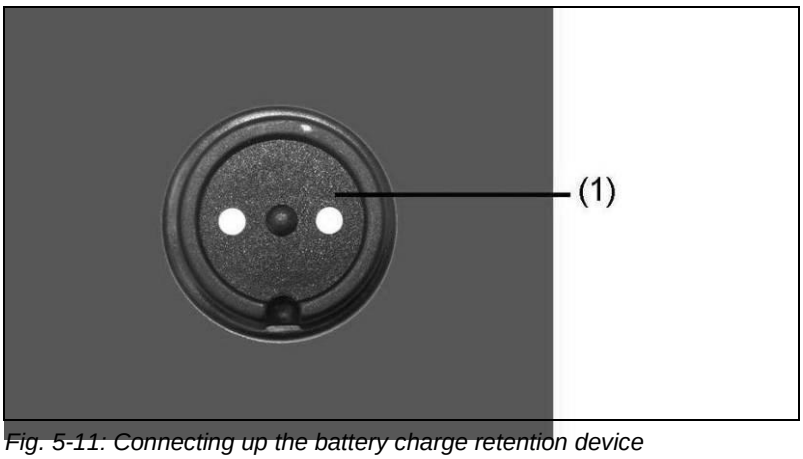


Fig. 5-11: Connecting up the battery charge retention device

1. Put plug for the external energy source (e.g. a battery charging device) / charge retention device socket connecting cable in place.

✓ The battery charge conservation device is ready to operate.

5.8 3-way fuel valve / Refuelling device

Proceed as follows to use the refuelling device with the generator.

Requirements The following requirements must be met:

- generator is ready for operation
- 3-way fuel valve

In the course of supplying fuel you can select between the device's own tank and the refuelling device.

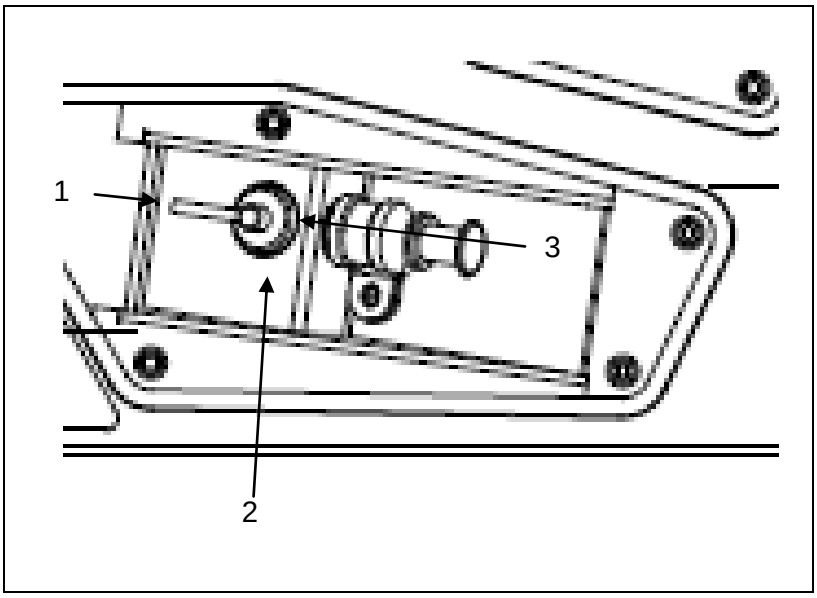


Fig. 5-12: 3-way fuel valve

Switch position	Operation
1	CLOSED
2	OWN TANK
3	EXTERNAL REFUELLING

Table 4.7: Switchingpositions of the 3-way fuel tap

Establish a connection to the fuel supply system as follows:

1. Set the fuel valve to the required fuelling mode.

✓ The fuel supply is established.

WARNING!

Leaking engine oil and petrol can contaminate the soil and groundwater.

- Do not fill the canister completely.
- Allow the fuelling device to drain off.

WARNING!

Using the wrong fuel will destroy the engine.

- Use regular grade petrol RON 91/95 DIN EN 228.

Connect up fuelling device

Note The canister may stand at a maximum of 0.5 m below the level of fuel pump.

Connect up fuelling device:

Connect up fuelling device as follows:

1. Pull off cover plugs from quick-action coupling.

2. Put quick-action coupling *(Fig. 5-13-(2))* onto connection (Fig.5-*13-(1))*

3. The quick-action coupling engages.

✓ The fuelling device is attached.

Disconnect fuelling device:

Disconnect fuelling device from the generator by:

1. Pulling back the knurled sleeve on the quick-action coupling *(5-13-(2))*.

✓ The coupling is released.

2. Pull off quick-action coupling with hose from the connector.

3. Insert the cover plugs again on the quick-action coupling.

✓ The fuelling device is disconnected from the generator.

Connect up canister

Connect the canister to the fuelling device as follows:

1. Open sealing cap on the canister.
2. Introduce hose.
3. Engage catch on the fuelling device.

✓ The canister is attached.

Changing the canister during operation

Change an empty canister during operation as follows:

1. Place the full canister next to the empty canister.
2. Open sealing cap on the full canister.
3. Set the fuel cock to the internal tank *(Fig. 5-12-(2))*.

✓ The engine is supplied with fuel over its own tank.

4. Loosen the fuelling device latch on the canister.
5. Remove hose.
6. Introduce hose into the full canister.
7. Engage catch on the fuelling device.

✓ The canister is attached.

8. Set the fuel cock to “external fuelling” *(Fig. 5-12-(3))*.

✓ The empty canister is exchanged.

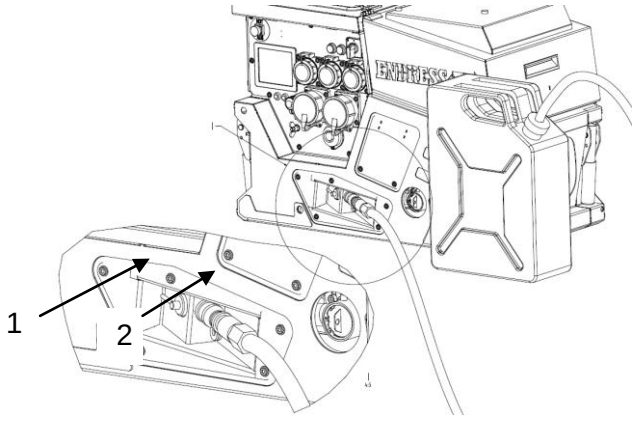


Fig. 5-13: Connect up fuelling device

5.9 Exhaust hose

Proceed as follows to use the exhaust hose with the generator.

Requirements

The following requirements must be met:

- Generator is ready for operation

WARNING!

Exhaust gases can cause fatal asphyxiation.

- Provide for sufficient ventilation.
- Use an exhaust gas hose.
- Only operate the generator outdoors.

Connecting up the exhaust hose

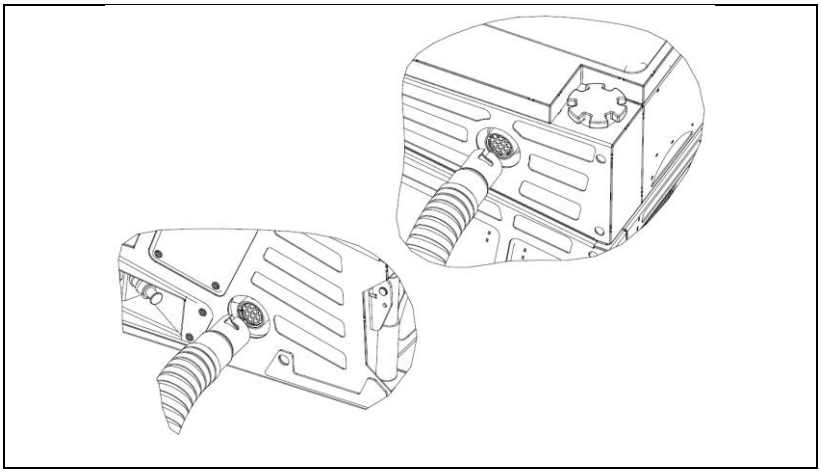


Fig. 5-14 Connect exhaust gas pipe

Connect up the exhaust hose as follows:

1. Push the exhaust hose's grip with the larger opening onto the muffler's connection.
1. Turn the exhaust hose to the right to lock it in place.

✓ Exhaust hose is now plugged in.

Disconnecting the exhaust hose

Disconnect the exhaust hose from the generator by:

1. Turn the exhaust hose grip to the left.
2. Pull the exhaust hose off the muffler's exhaust hose connection.

✓ Exhaust hose is now disconnected.

6 Maintaining the generator

Generator maintenance is described in this section.

Only personnel from the manufacturer may carry out maintenance or repair work not described in this section.

6.1 Maintenance plan

Only authorised personnel are allowed to carry out maintenance tasks.

Perform all work in the maintenance plan according to the information in the engine's operating and maintenance manual *(Figure 3-5-(2))*. These operating and maintenance instructions of the engine manufacturer are an integral component of these operating instructions.

6.2 Maintenance work

Only authorised personnel are allowed to carry out maintenance tasks.

Carry out maintenance work according to the specifications in the enclosed operating and maintenance instructions for the engine *(Figure 3-5-(2))*. These operating and maintenance instructions of the engine manufacturer are an integral component of these operating instructions.

6.2.1 Charge the battery

Important Charge the battery according to the regulations for handling from the manufacturer supplied in order to maximise the service life.

6.2.2 Changing the starter battery

1. Unscrew the battery holder.
2. Remove the battery from the battery compartment.
3. Unscrew the battery cable. Push the protective terminal caps back for this purpose and loosen the screws. Always disconnect the cable from the NEGATIVE terminal first and then disconnect the cable from the POSITIVE terminal.

✓ Battery is disconnected.

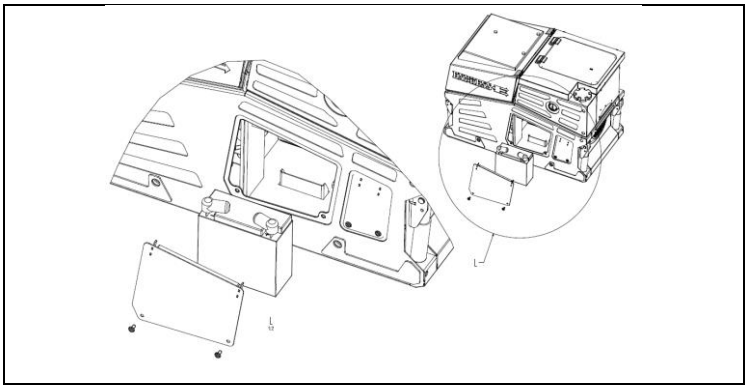


Fig. 6-1: Replacing the battery

4. Prepare a new battery.
5. The battery cables must first be screwed onto the POSITIVE terminal, then onto the NEGATIVE-terminal and then put on the terminal caps.
6. Put the battery back into the battery compartment.
7. Put the battery holder back.

✓ The battery has been replaced.

WARNING!

A highly explosive electrolytic gas mixture develops from gassing when charging batteries.

- Flames, sparks, an open light and smoking are prohibited.
- Avoid sparks when handling cables and electrical devices, as well as electrostatic discharge.
- Avoid short-circuits.

WARNING!

The Endress battery is maintenance-free throughout its entire service life. See regulations for handling the battery

- Never open the battery.

6.2.3 Engine oil

WARNING!

Leaking engine oil can contaminate soil and groundwater.

- Use an oil collection container.
- Recycle used motor oil

WARNING!

Engine oil can be hot — risk of burns.

- Allow motor to cool

Requirements The following requirements must be met:

- The engine should ideally be slightly warm (allow a cold engine to run for 5 min., then stop it and allow it to cool for 2 min.).

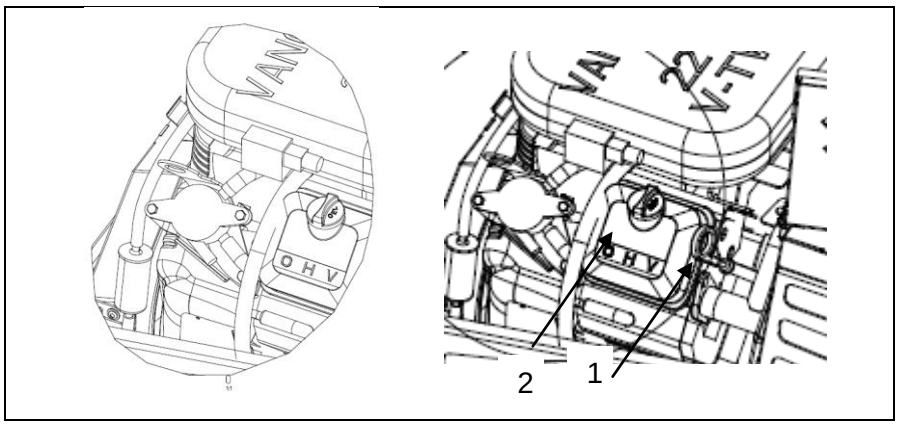


Fig. 6-2: Oil dipstick

Checking the oil **Check the oil level as follows:**

1. Pull out the dipstick *(Fig. 6-2-(2))* and wipe it off with a clean cloth.

2. Reinsert the dipstick and take it out again. Drain off some of the oil if the level is above the upper mark and refill with oil if the level is under the lower mark (see below).

✓ The oil level has been checked.

Refilling with oil

Pour in oil as follows:

1. Remove oil screw plug *(Fig. 6-2-(1))*. Pull out the dipstick for easier filling (*(Fig. 6-2-(2))*.
2. Fill with oil using a filling aid.
3. Check oil level and add oil if necessary.

✓ The engine has been refilled with oil.

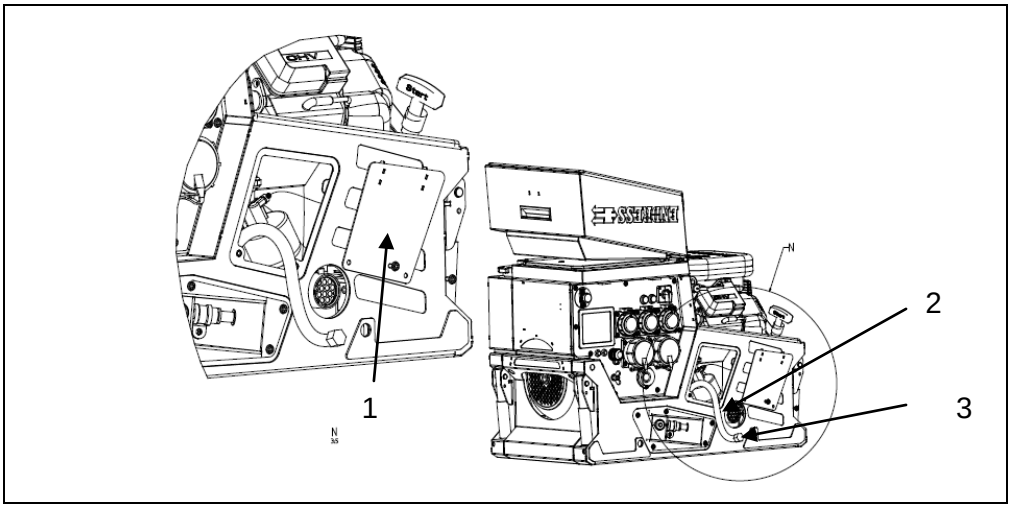


Fig. 6-3: Changing the oil

WARNING!

The oil escapes immediately after opening the oil drainage valve.

Changing the oil

1. Unscrew the oil filter side plate *(Fig.6-3(1))* on the generator.
2. Pull out oil drainage hose *(Fig. 6-3-(2))* completely.
3. Direct oil drainage hose into an oil collection container.
4. Remove oil screw plug *(Fig. 6-3-(3))*.

5. Tip the device slightly so that the oil can run off completely

6. Then close the oil screw plug *(Fig. 6-3-(3))* again and screw the side plate on again.
7. Then pour in new oil as already described.
- ✓ The engine oil has been changed.

Change oil filter

The procedure is as described in the operating instructions for the engine. To do this the side plate oil filter *(Fig. 6-3(1)*on the generator must be unscrewed and the flap must be opened.

6.2.4 Replacing fuses

Replacing fuses (only for the special accessory external start socket, socket, charging retention and/or remote start device)

1. Open the fuse holder.
2. Replace the fuse.
3. Close the fuse holder

✓ The fuse has been replaced.

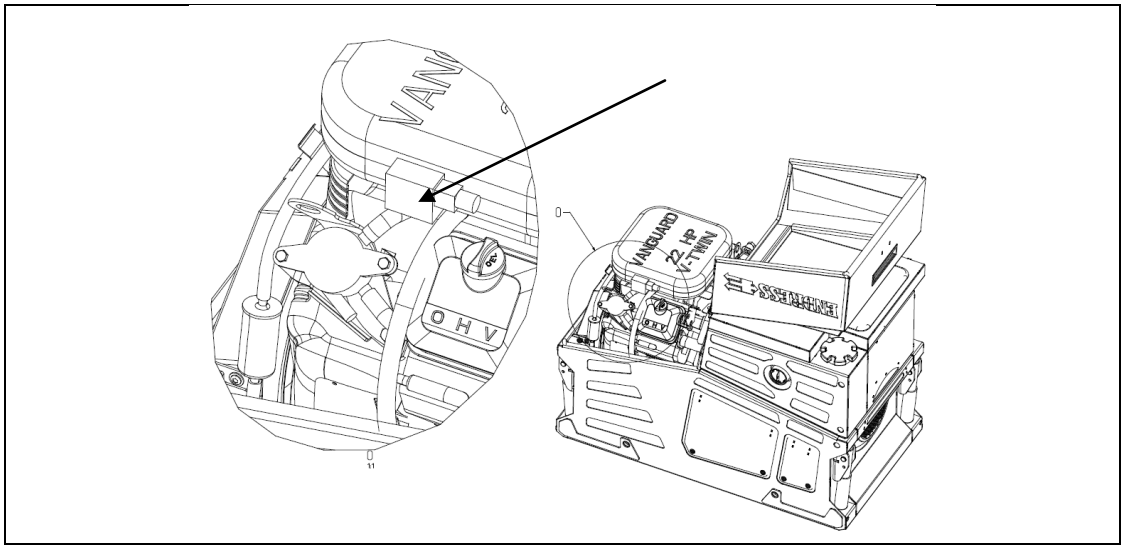


Fig. 6-4: Replacing a fuse

Fuse type	Amperes	needed for
2	20	Control system
2	15	Charging retention socket
1	150	External start (Nato) socket

Table 6.1: Location of the fuses

6.3 Checking the electrical safety/repeat checking

Only specifically authorised personnel may check the electrical reliability.

The electrical reliability must be checked in accordance with the applicable VDE regulations, EN and DIN standards and especially the current version of the BGV A3 accident prevention regulations.

The generator should be submitted to repeat checking at regular intervals. The fixed dates and type of repeat checking is based on specifications from BOS as well as the Fire Brigade, THW, DRK etc.

7 Troubleshooting

This section describes problems during operation that authorized personnel can remove.

Each occurring problem is described with its possible cause and the respective corrective measure.

The authorised personnel must immediately shut down the generator and inform the responsible and authorised service personnel if a problem cannot be solved with the aid of the following table.

Malfunction	Possible cause	Correction
No or insufficient voltage available during idling.	The rotational speed of the engine was adjusted afterwards.	Call service staff.
	The electronic controller has been altered.	Call service staff.
	The electronic controller is defective.	Call service staff.
Strong voltage fluctuations occur.	The engine runs irregularly.	Call service staff.
	The speed control works erratically or insufficiently.	Call service staff.
The engine does not start.	The engine is being operated incorrectly.	Follow the engine operating manual instructions.
	Maintenance of the engine was inadequate.	Follow the engine maintenance instructions.
	The oil level monitor actuates.	Check oil level and refill if necessary.
	Oil pressure switch plug is loose.	Check fit of the oil pressure plug.
	Too little fuel in the tank.	Refuel
	The fuel filter is clogged.	Replace the fuel filter.
	Bad fuel in the tank.	Call service staff.
	The ignition cable does not have any connection to the spark plug.	Attach ignition cable to the spark plug.
	The choke is not activated in a cold condition.	Actuate choke.
	The EMERGENCY-STOP button is pressed and locked in place.	Unlock the EMERGENCY-STOP button.

Malfunction	Possible cause	Correction
	The battery connecting cables are unclamped.	Clamp or screw on the battery connecting cables.
Starter battery has no power.	Battery is discharged.	Charge battery.
	Battery is defective.	Exchange battery.
	Battery terminals are oxidized.	Clean battery terminals and if necessary apply terminal grease.
Starter battery is not being charged.	Alternator / charge regulator defective.	Call service staff.
The engine does not rotate.	Engine defective.	Call service staff.
The engine smokes.	Too much oil in the engine.	Drain excess oil.
	Paper element of the air filter is dirty or oil-soaked.	Clean paper element or replace if necessary.
	Foam element of the air filter is dirty or dry.	Clean foam element and if necessary moisten.
The engine turns briefly and then shuts down.	Too little fuel in the tank.	Refuel
	Ventilation holes on tank cover are clogged.	Clean ventilation holes.
	The oil level is too low.	Add oil.
	The fuel filter is clogged.	Replace the fuel filter.
The engine splutters.	The 20 litre standard container is empty.	Change the canister
	The refuelling device's sieve is blocked.	Clean the sieve.
	Carburettor/fuel filter/tank are covered with resin.	Call service staff.
The power output is insufficient.	The electronic controller has been altered.	Call service staff.
	The electronic controller is defective.	Call service staff.
	Maintenance of the engine was inadequate.	Follow the engine maintenance instructions.
	Too much power is drawn.	Reduce power draw.
The generator runs jerkily.	The generator is loaded beyond the nominal output.	Reduce power draw.
The red lamp on the load meter lit up.	Too much power is being taken off / the load is being taken off on one one side.	3~: reduce power take-off / 1~: Distribute the load evenly
The oil pressure is too low.	Too little engine oil in the engine.	Refill engine oil.
The protective conductor test lamp does not light up.	The test cable is not inserted properly.	Insert the test cable properly.

Malfunction	Possible cause	Correction
	The test tip is not touching a metallic blank location on the device.	Hold the test tip on a metallic blank location
	Test lamp is defective	Call service staff.
	The protective conductor is defective.	Disconnect the device from the generator.
	The protective conductor is missing.	Select the device with a protective earth.
Faults on the special equipment		
The engine does not start in remote start mode.	The remote start equipment connecting plug is not inserted properly.	Insert the remote start equipment connecting plug correctly.
	The automatic choke lifting magnet is defective.	Call service staff.
	The remote start equipment fuse is defective.	Replace the fuse.
The engine does not start in external start mode.	The external start equipment plug is not inserted properly.	Insert the external start equipment plug correctly.
	The high performance external start fuse is defective.	Replace the fuse.
The battery is not charging in charge retention mode.	The charge retention plug is not inserted properly.	Insert the charge retention plug correctly.
	The charge retention fuse is defective.	Replace the fuse.
Reduce idle speed does not work.	Rocker switch is in the OFF position.	Set the rocker switch to the ON position.
	The engine does not run for 5 minutes.	Wait for the minimum running time since an engine start.
	There is a load / electrical device switched in.	Switch off load / electrical device.
	The lifting magnet for speed lowering in idle is defective.	Call service staff.

Table 7.1: Difficulties operating the generator

8 Technical specifications

The technical specifications concerning use of the generator are described in this section.

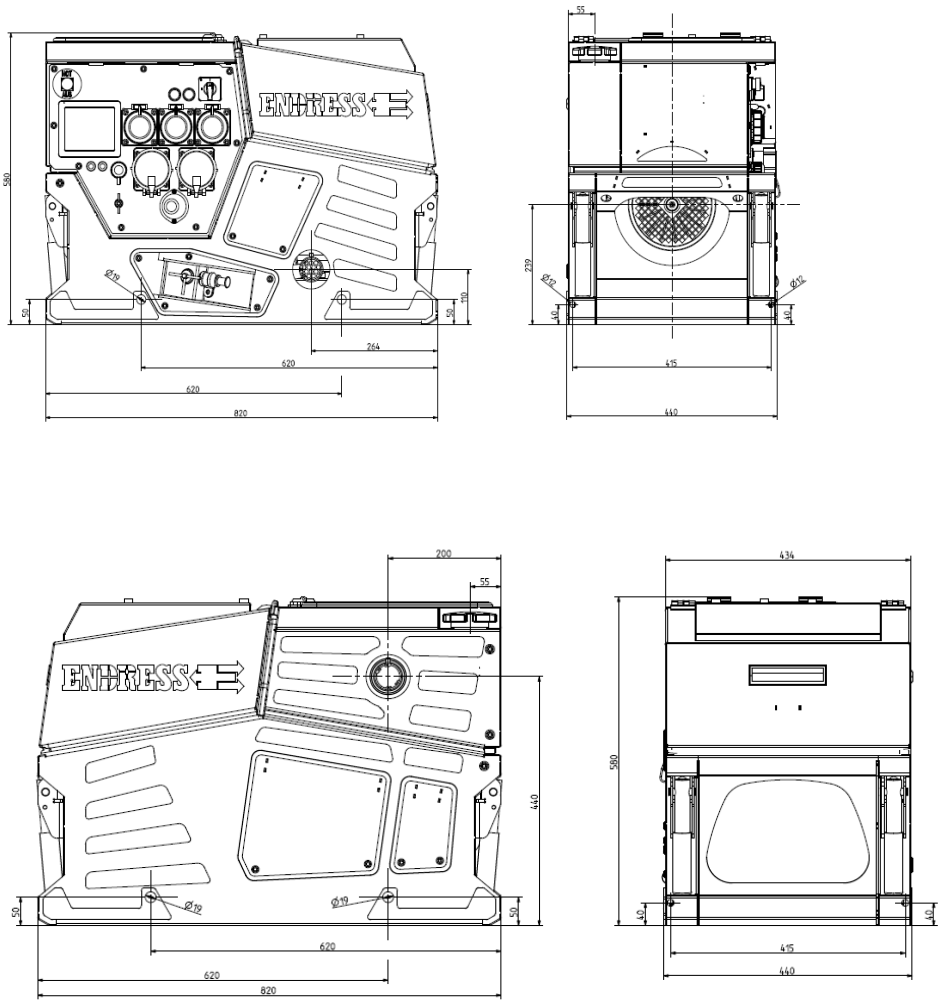


Fig. 8-1: Generator dimensions

Technical specifications

Name	Value	Unit
Type	1408 DBG ES DIN	
Nominal output Sr/Pr (LPT)	13.7/10.9	[kVA]/[kW]
Nominal output factor 3~	0.8	[cosφ]
Nominal output factor 1~	0.9	[cosφ]
Nominal frequency fr	50	[Hz]
Nominal speed nr	3000	[min^{-1}]
Nominal voltage 3~ Ur	400	[V]
Nominal voltage 1~ Ur	230	[V]
Rated current 3~ Ir	19.8	[A]
Rated current 1~ Ir	32.6	[A]
Voltage tolerance	± 5	[%]
Weight (ready for use)	144	[kg]
Tank contents regular grade petrol RON 91	12	[l]
Length	820	[mm]
Width	440	[mm]
Height	580	[mm]
Sound power level L_{WA} *	96	[dB(A)]
Sound pressure level L_{PA} at a distance of 7 m *	71	[dB(A)]
Sound pressure at the work place L_{PA} (1.6m above the machine, 1m distance) *	85	[dB(A)]
Protection Class	IP 54	

** measured according to ISO 3744 (Part 10)*

Ambient conditions

Name	Value	Unit
Setting up height above sea level	< 100	[m]
Temperature	< 25	[°C]
Relative air humidity	< 30	[%]

Table 8.1: Reference conditions Output of the generators

Reduced power

Power reduction	for each additional	Unit
1 %	100	[m]
4 %	10	[°C]

Table 8.2: Generator power reduction dependent on ambient conditions

Distribution network

Line	max. line length	Unit
HO 7 RN-F or an equivalent 1.5 mm^2	60	[m]
HO 7 RN-F or an equivalent 2.5 mm^2	100	[m]

Table 8.3: Maximum line length of the distribution network as a function of the cable cross-section

To observe the switching off conditions for a second failure there is a general limitation required of an overall length of 100 m. Larger dimensioning of the distribution network is only to be undertaken by a qualified electrician or trained personnel. One should ensure in all cases that the impedance of the fault loop does not exceed 1.5Ohm.

9 Replacement parts

The replacement parts needed to run the generator are described in this section.

The generator is divided into these component groups:

- Frame with covers, tank and engine
- Generator and electronics
- Standard accessories
- Special accessories
- Special equipment

9.1 Sound-absorbing hood

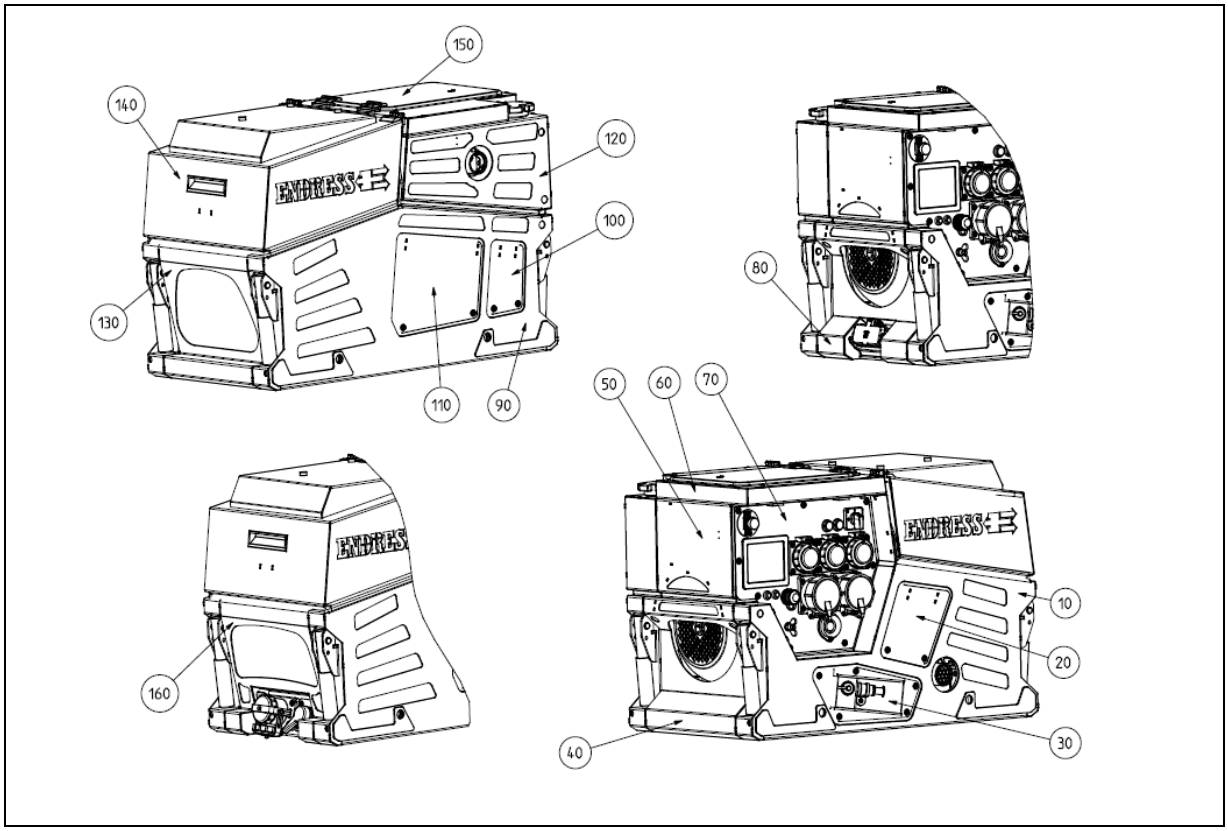


Fig. 9-1: Sound-absorbing hood

Item	Part number	Quantity	Item designation
01	E135206	1	Sound-absorbing hood complete. RAL 1012 (includes the whole frame) (color code 11)

Item	Part number	Quantity	Item designation
	E135252	1	Sound-absorbing hood complete. RAL 3000 (includes the whole frame) (color code 31)
	E135313	1	Sound-absorbing hood complete. RAL 3000 version Magirus (includes the whole frame) (color code 31)
	E135276	1	Sound-absorbing hood complete. RAL 5002 (includes the whole frame) (color code 51)
	E135298	1	Sound-absorbing hood complete. RAL 6031 (includes the whole frame) (color code 62)
	E135281	1	Sound-absorbing hood complete. RAL 7016 (includes the whole frame) (color code 71)
	E135282	1	Sound-absorbing hood complete. Lemon-green (includes the whole frame) (color code 69)
10	E508646/11	1	G-R side-01
	E508646/31	1	
	E508646/51	1	
	E508646/62	1	
	E508646/71	1	
	E508646/69	1	
20	E508658/11	1	G-R-side oil
	E508658/31	1	
	E508658/51	1	
	E508658/62	1	
	E508658/71	1	
	E508658/69	1	
30	E508663/11	1	G-plate-R-side-3-W.
	E508663/31	1	
	E508663/51	1	
	E508663/62	1	
	E508663/71	1	
	E508663/69	1	
40	E508905/11	1	G-Front wall
	E508905/31	1	
	E508905/51	1	
	E508905/62	1	
	E508905/71	1	
	E508905/69	1	
50	E508688/11	1	G-E-box-01
	E508688/31	1	
	E508688/51	1	
50	E508688/62	1	G-E-box-01
	E508688/71	1	

Item	Part number	Quantity	Item designation
	E508688/69	1	
60	E508934/11	1	G-cover
	E508934/31	1	
	E508934/51	1	
	E508934/62	1	
	E508934/71	1	
	E508934/69	1	
70	E508697/11	1	G-E-box-02
	E508697/31	1	
	E508697/51	1	
	E508697/62	1	
	E508697/71	1	
	E508697/69	1	
80	E509043/11	1	G-R-wall-special
	E509043/69	1	
	E509043/69	1	
	E509043/69	1	
	E509043/69	1	
	E509043/69	1	
90	E508668/11	1	G-L-side-01
	E508668/31	1	
	E508668/51	1	
	E508668/62	1	
	E508668/71	1	
	E508668/69	1	
100	E508679/11	1	G-L-side-03
	E508679/31	1	
	E508679/51	1	
	E508679/62	1	
	E508679/71	1	
	E508679/69	1	
110	E508669/11	1	G-L-side-02
	E508669/31	1	
	E508669/51	1	
	E508669/62	1	
	E508669/71	1	
110	E508669/69	1	G-L-side-02
120	E508921/11	1	
	E508921/31	1	

Item	Part number	Quantity	Item designation
	E508921/51	1	G-sound-wall
	E508921/62	1	
	E508921/71	1	
	E508921/69	1	
130	E508917/11	1	G-back-wall
	E508917/31	1	
	E508917/51	1	
	E508917/62	1	
	E508917/71	1	
	E508917/69	1	
140	E509316/11	1	G-hood with logo - 01
	E509316/31	1	
	E509316/51	1	
	E509316/62	1	
	E509316/71	1	
	E509316/69	1	
140/1	E509352/31	1	G-hood-logo-MAGIRUS
150	E508944/11	1	Plate-cover-04
	E508944/31	1	
	E508944/51	1	
	E508944/62	1	
	E508944/71	1	
	E508944/69	1	
160	E508905/11	1	G-Front wall
	E508905/31	1	
	E508905/51	1	
	E508905/62	1	
	E508905/71	1	
	E508905/69	1	

Tab.9.1: Sound-absorbing hood replacement parts

9.2 Engine alternator and exhaust

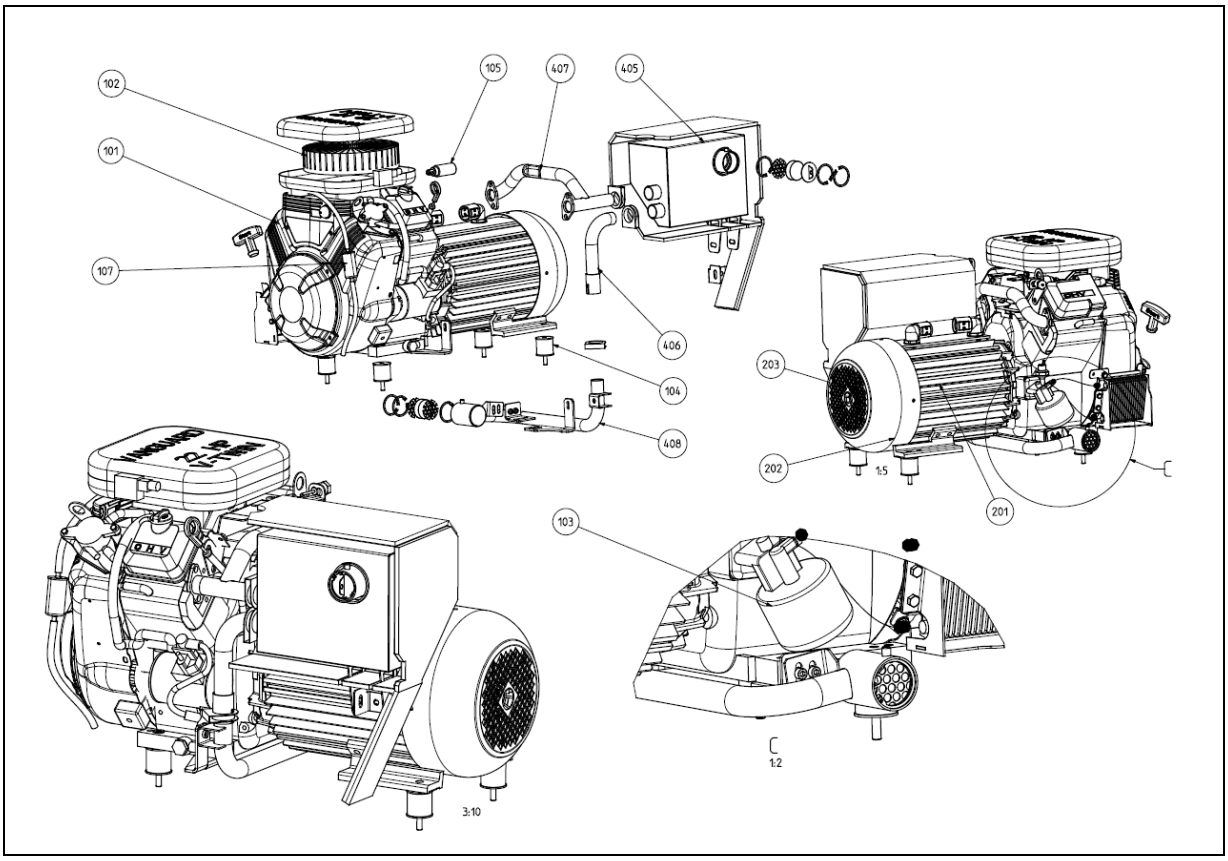


Fig. 9-2: Replacement parts for engine, alternator and exhaust

Item	Part number	Quantity	Item designation
101	E131590	1	MotVan23HP/ES Cooler clean
102	692520	1	Air filter replacement
103	842921	1	Oil filter
104	E133301	4	Vibration damper Form B
105	808624	1	Solenoid fuel
107	841729	1	Starter−rewind
201	E133049	1	Alternator 13 kVA IP 54 50Hz
405	E508978/92	1	G-muffler-01
406	E509012/92	1	G-exhaust-pipe-02
407	E509011/92	1	G-exhaust-pipe-01

Table 9.2: Replacement parts for engine, alternator and exhaust

9.3 Generator

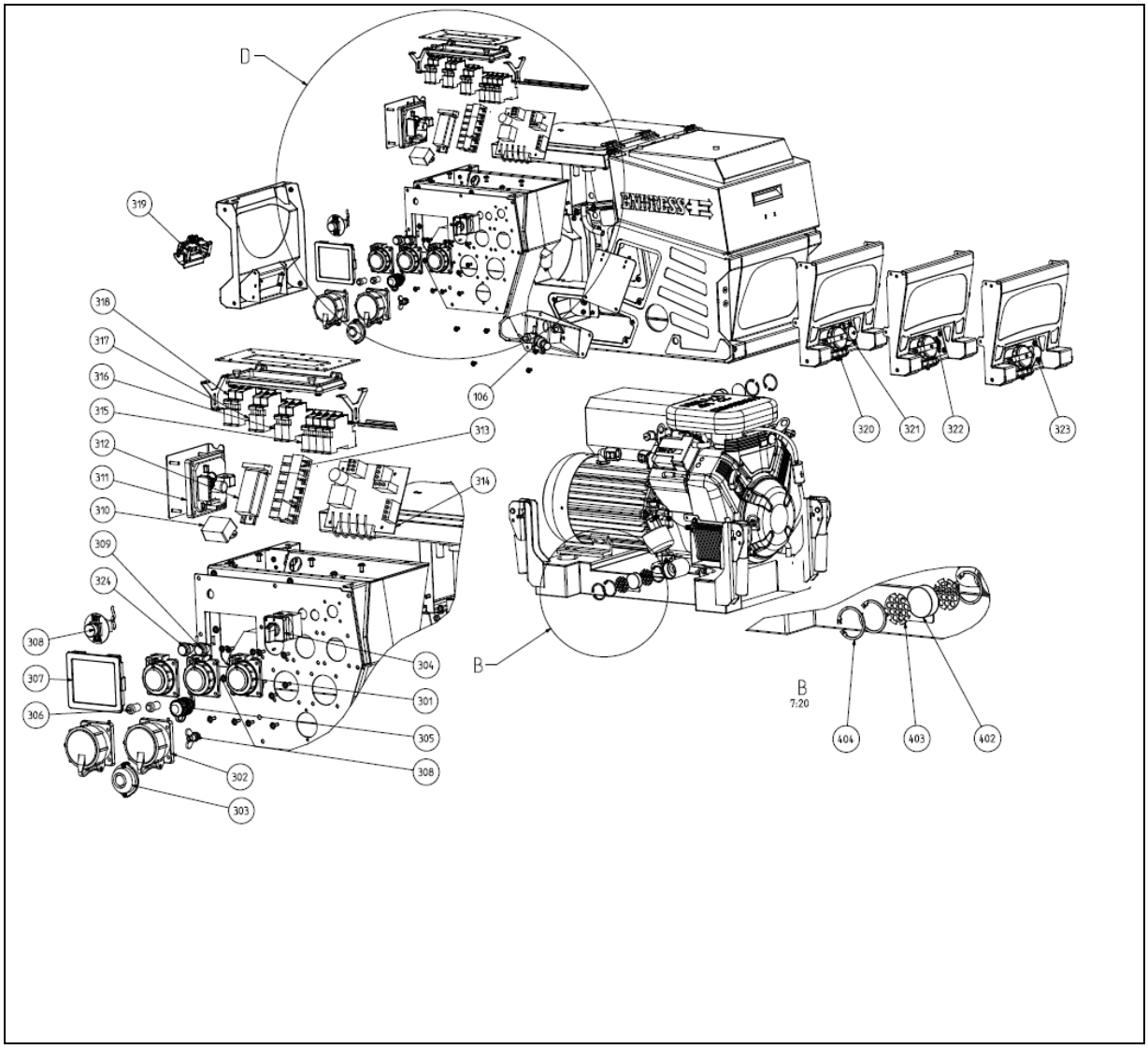


Fig. 9-3: Replacement parts Generator

Item			Article name

Item			Article name
106	E133317	1	Three-way valve 38.343-60
	E100776	1	Lock nipple with inside thread
	E100616	1	“Copper seal 12x16x1,5
	E131017	1	Protective cap for hose nipple
301	E133007	3	Schuko panel mounting socket outlet TM
302	E130424	2	CEE panel mounting socket outlet TM
303	E134171	1	Piezo siren RSP-5018
304	E131540	1	EMERGENCY-STOP switch
305	E134413	1	Green pressure switch
	E133822	1	7-pin line plug shell
306	E130439	1	Red push button closer
	E131173	1	Green push button closer
307	E503301/99	1	E-MCS frame
	E503302	1	Frame with dispenser seal
	E507660	1	Foil display MCOR II
	E507661	1	MCOR-II insert
	E503307/00	1	Multi-functional clamping sheet
	E134269	1	Display board
308	E132976	1	EMERGENCY-STOP button, 25 x 25 mm
	E130674	1	EMERGENCY-STOP sign
	E131748	1	Switching element, 2Ö + 2S
		1	Earthing screw complete
309	E134413	1	Green pressure switch / rotational speed reduction
310	E131799	1	EFXY3R2 interference elimination filter
311		1	Controller
312	E134933	7	2-conductor through clamp
	E134934	4	4-conductor through clamp
313	E130975		Mini-changer relay
	E130974		Micro-relay plug-in socket
314	E134268	1	Processor board - 50Hz
315	E134047	1	Line circuit breaker C16T4
316 - 318	E134046	3	Line circuit breaker C16T2
319	E130908	1	Housing bottom part BG 16 B
	E130019	1	Insert connector for screw connection
320	E133424	1	Socket n. VG 96917A-001
321	E132737	1	2-pin charging socket
322	E132178	1	Beos charging socket

Item			Article name
323	E130388	1	MagCode PowerSystem 12 V
324	E134413	1	Green pressure switch / lighting
402	E131863	1	Muffler cushion
403	E504507/92	1	Perforated plate D. 45
404	E131010	1	“Circlip 45 x 1,75

Tab.9.3: Replacement parts for generator

***Attention! Line circuit breaker with a characteristic specially adapted to the alternator. Do not use a line circuit breaker with a standard characteristic.**

9.4 Accessories and markings

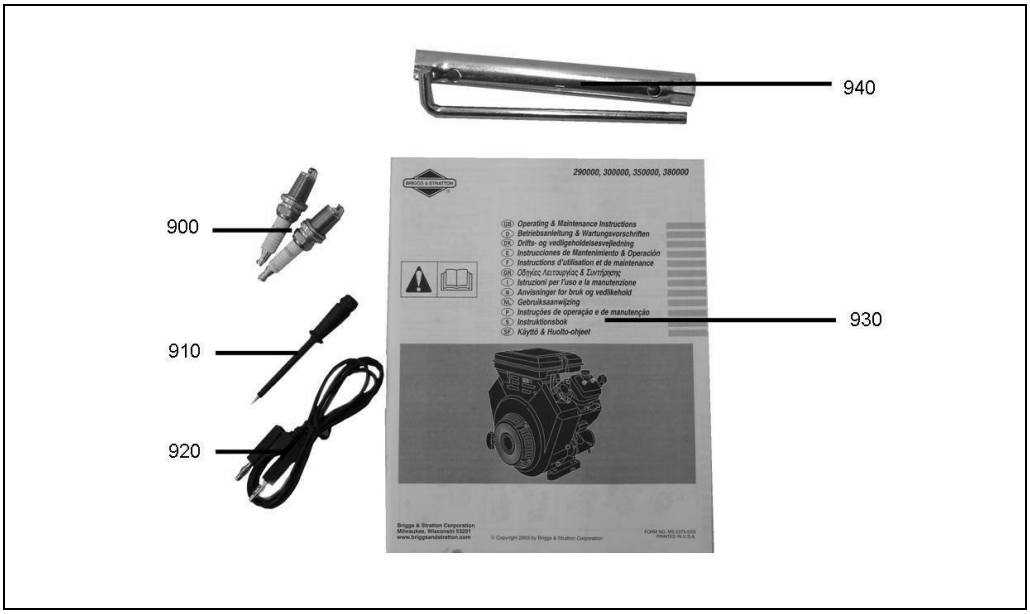


Fig. 9-4: Replacement parts for accessories

Fig. 9-5: Replacement parts forspecial accessories

Item	Part number	Quantity	Article name
900	E130472	2	Champion 12YC spark plugs (no other type may be used)
910	E130545	1	Test probes (valid for devices up to year of construction 12/2015)
920	E130446	1	100 cm measuring line (valid for devices up to year of construction 12/2015)
930		1	Engine operating manual B&S
940	E130534	1	Spark plug wrench
1000	E100592	1	Fuelling device (special accessory)
1010	E100593	1	20 litre canister, Nato standard (special accessory)
1020	E130473	1	DN 50 exhaust hose according to DIN 14572 (special accessory)

Table 9.4: Replacement parts for accessories / special accessories