



Translation of the
ORIGINAL OPERATING INSTRUCTIONS

ESE 604 DHG DIN

Article No. 156001

ESE 604 DHG ES DIN

Article No. 156011



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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 as the depiction 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.

1.1 Further documents and 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)
- Briggs & Stratton Service Germany (Briggs & Stratton Corporation)
- Circuit diagram for the generator
- Test protocol for the power generator
- Regulations for handling the battery

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

1.2 Used signs and symbols

The signs and symbols in these operating instructions help you to use the operating instructions and the device quickly and safely.

1.2.1 General signs / symbols



Advanced Organizer

The Advanced Organizer informs you briefly about the contents of the following chapter.

NOTE Note

The reference note informs you about the most effective and/or most practicable way to use the equipment and these operating instructions.

1. Operating steps

2. ...

3. The defined sequence of the operating steps facilitates correct and safe use of the equipment.

✓ Result

The result of a sequence of operating steps is described here.

1.2.2 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 Council Directive 92/58/EEC - 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.

Potentially explosive materials



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

Dangerous electrical voltage



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

Poisonous substances



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

Environmentally damaging substances



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

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
- Safety equipment removal
- 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

2.1.1 Intended use

The generator produces electricity in place of the power grid, in order to supply a mobile distribution system.

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 can be uninterrupted on all sides of the generator and that the exhaust gases are dispersed correctly. This is especially relevant when 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 is forbidden misuse outside the legally defined limits of liability of the manufacturer.

2.1.2 Foreseeable incorrect use or inappropriate handling

Foreseeable incorrect use or inappropriate handling of the generator nullifies the manufacturer's EC Declaration of Conformity and automatically thereby the operating licence.

Foreseeable incorrect use or inappropriate handling include:

- 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
- Safety equipment removal
- 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

2.1.3 Residual risks

The residual risks were analysed and evaluated using a risk analysis tool before beginning the design and planning of the generator according to DIN EN 12100 and DIN EN ISO 60204 in their respectively valid version.

Structurally unavoidable residual risks during the entire service life of the ESE 604 DBG (ES) DIN 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 standing instructions (the relevant operational conditions) issued by fire-brigades, civil defence and other relief organisations

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 gases
- 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

**Welding generator's
performance or
functionality limitations**

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

2.2 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 be 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.

2.3 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)

2.4 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	Radius of 5.0 m	
	Operating		
	refuel		
Service and maintenance	Cleaning	Radius of 1.0 m	
	Shutting down		
	Maintenance		

Table 2.1: Danger zones and work areas on the generator

2.5 Signs on the generator

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

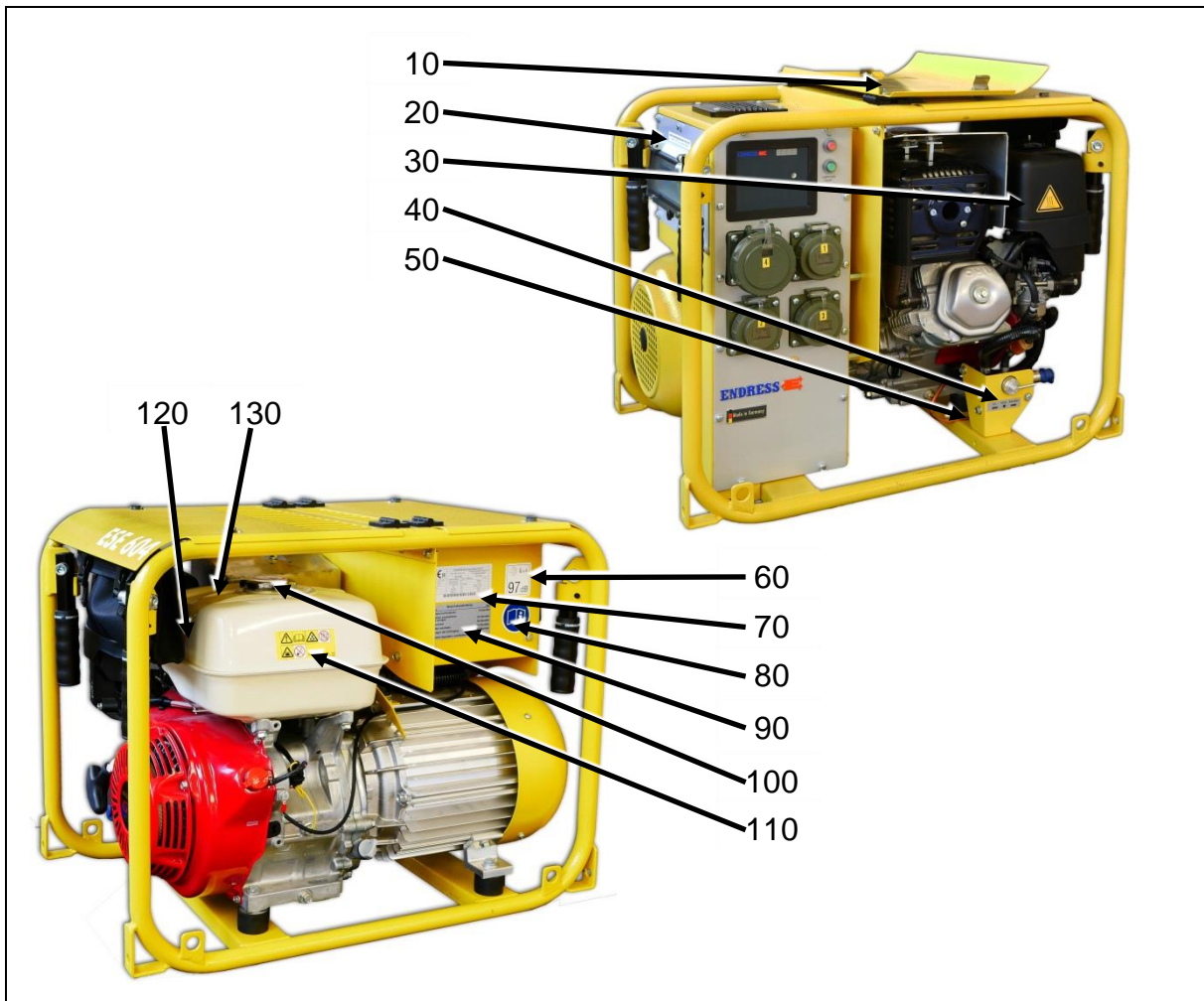


Fig. 2-1: Signs on the generator

10	Abridged operating instructions (inside cover)	80	Reference note - read operating instructions
20	Note on power network	90	Reference note - maintenance intervals
30	Note on the hot surface	100	Reference note - no naked flames
40	Note - 3-way fuel valve	110	Warning of dangers incurred during engine operation
50	Terminal for potential equalisation (earthing for RCD)	120	Note - do not adjust the engine speed set at the works
60	Note - sound emission	130	Note - fuel quantity / quality
70	Type plate		








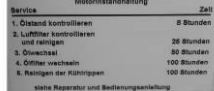



Pos.	Label	Name
10		Short operating instructions (inner side of the flap)
20	Gesamtes Leitungsverlängerungsnetz maximal 100 m bei 2,5 mm ² Bei größerer Ausdehnung, Bedienungsanleitung beachten!	Note Line extension
30		Hot surfaces
40		Potential equalization (earthing for FI)
50		External refuelling
60		Note - sound emission
70		Type plate
80		Read the operating manual
90		Reference note - engine maintenance
100		Reference note - no naked flames
110		Motor model plate
120		Note on engine speed set at the works
130	min. Normalbenzin ROZ 91 DIN EN 228 Tankinhalt ca. 6,5 l ACHTUNG: NICHT WÄHREND DES BETRIEBES NACHTANKEN. ZUM NACHTANKEN; MOTOR ABSTELLEN UND EINIGE MINUTEN ABKÜHLEN LASSEN. NICHT IN UNBELÜFTETEN RÄUMEN BETREIBEN.	Fuel note

Table 2.2: Signs on the generator

2.6 General safety instructions

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.

Consuming alcohol, drugs, medicines, or other consciousness-expanding and/or changing 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 may only be transported in a vehicle after being 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.

Maintenance and repair work It is prohibited to clean the generator when it is still hot.

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.

Always remove the ignition key and the spark plug sockets before beginning maintenance and/or repair work.

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 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 power generator ESE 604 DHG DIN



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

3.1 Components of the power generator ESE 604 DHG DIN

The generator components are distributed on all four sides.



Fig. 3-1: Views of the generator

- | | | | |
|---|------------------|---|--------------|
| 1 | Alternator side | 3 | Engine side |
| 2 | Maintenance page | 4 | Control side |

3.1.1 Components of the operating and generator side



Fig. 3-2: Components of the operating and generator side

1	Carrying handle	2	Exhaust
3	Spark plug connector	4	Fuel filter
5	3-way fuel valve (optional)	6	Fixing points according to DIN 14685
7	Control panel	8	Alternator
9	Fuse box	10	Cover flaps

3.1.2 Engine and maintenance side components

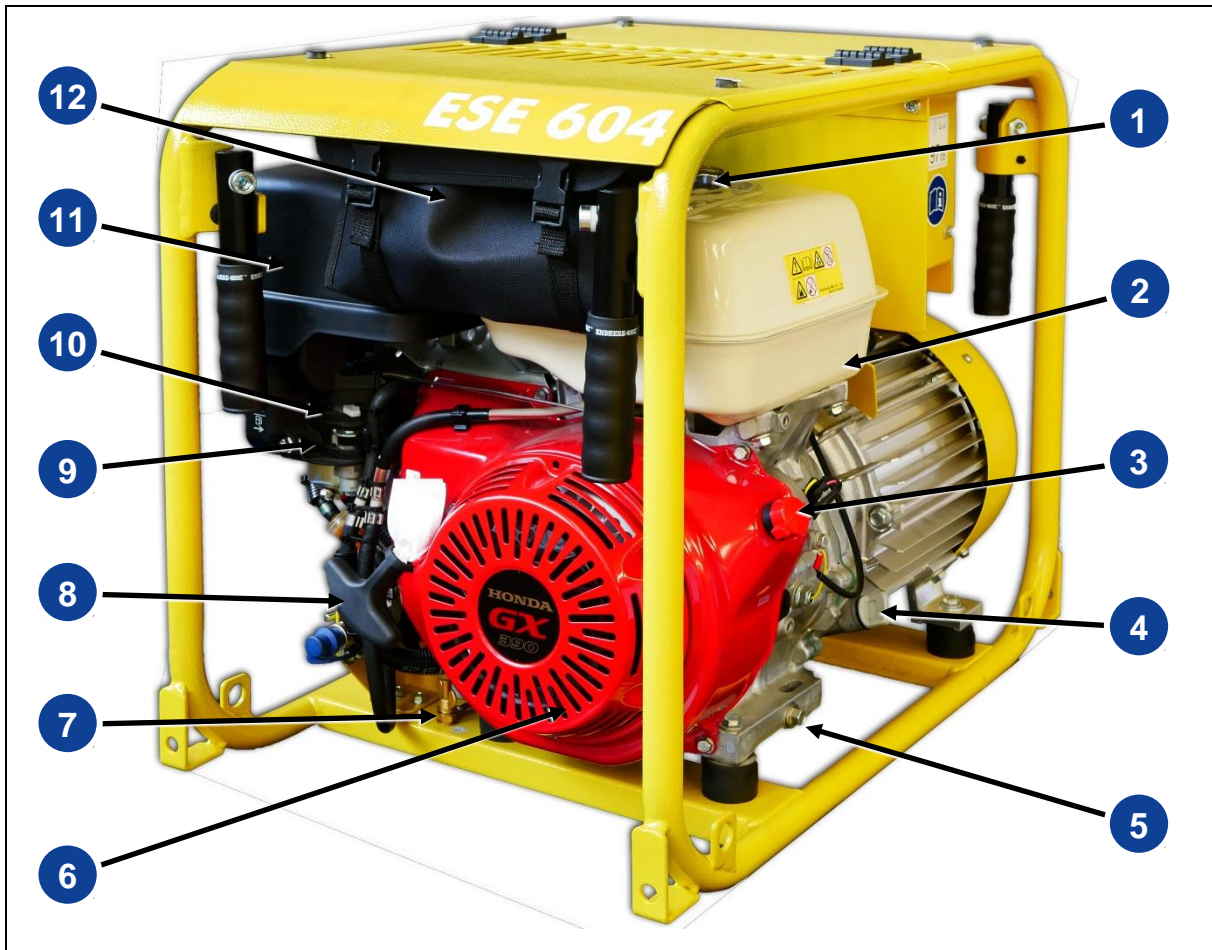


Fig. 3-3: Engine and maintenance side components

1	Tank cover	2	Fuel tank
3	Motor switch	4	Oil filling screw with a dipstick
5	Oil drain screw	6	Drive motor
7	Potential equalization (earthing for FI)	8	Cable pull starter hand grip
9	fuel valve	10	Choke lever
11	Air filter	12	Tool pouch

3.1.3 Control panel components

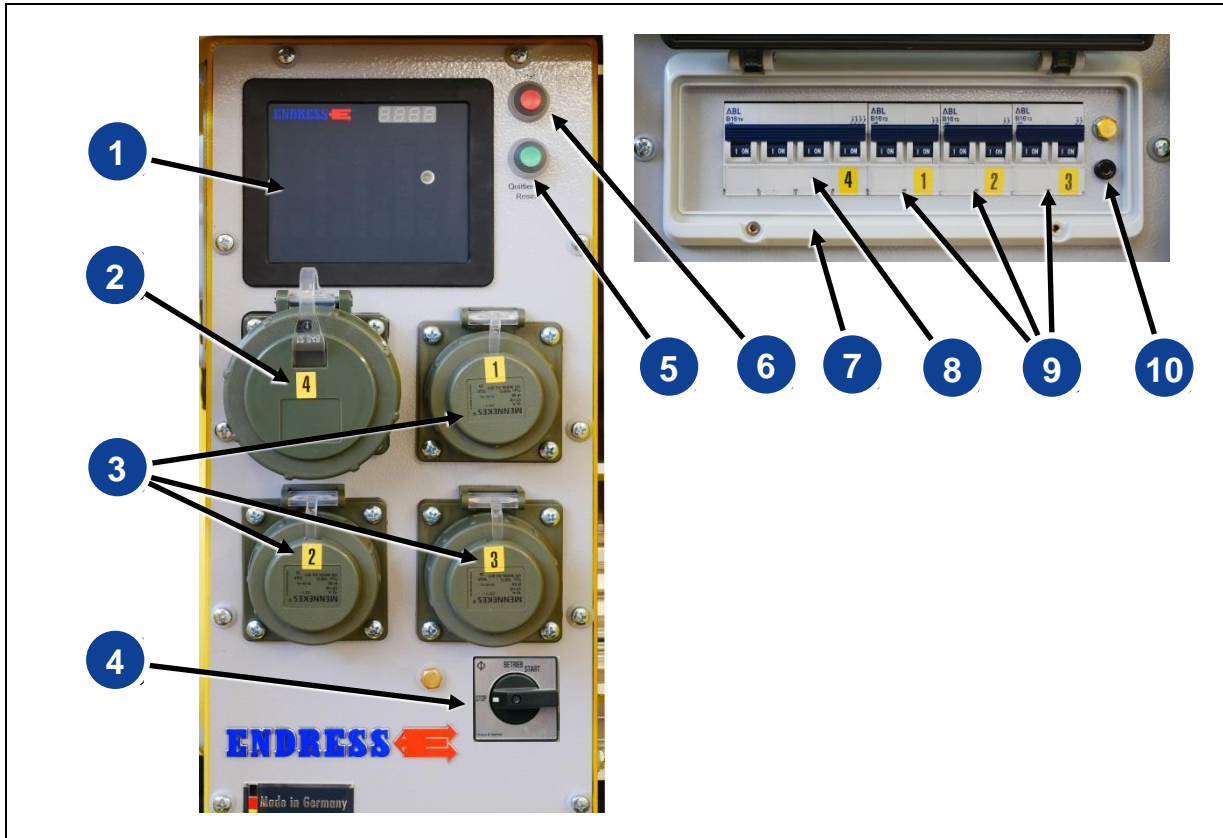


Fig. 3-4: Control panel components

- | | | | |
|---|---|----|--|
| 1 | Multifunction display E-MCS 4.0 | 2 | CEE socket 400V/16A DIN49462 |
| 3 | Schuko (shockproof) power sockets
230 V DIN49442 | 4 | Motor starter switch |
| 5 | Reset button for the insulation monitoring | 6 | Test button for the insulation monitoring |
| 7 | Fuse box with inspection window | 8 | 4-pin 16 A circuit breaker for socket 2 |
| 9 | 2-pin 16 A circuit breaker for socket
3 | 10 | Protective earthing conductor test equipment |

3.1.4 Accessory components

3.1.4.1 Standard accessories

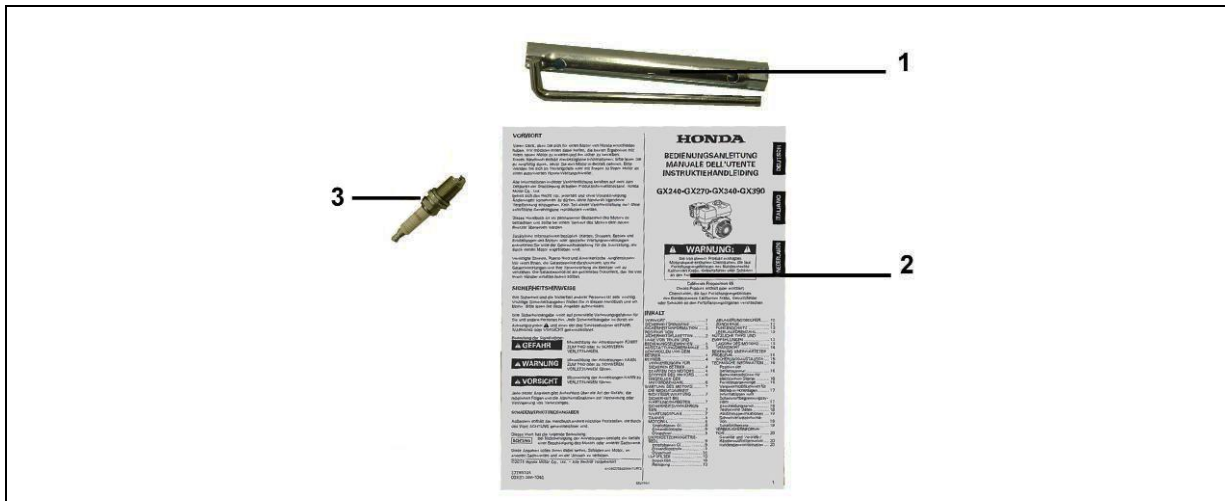


Fig. 3-5: Components of the standard accessories

- | | | | |
|---|-------------------|---|---|
| 1 | Spark plug wrench | 2 | User information (operating instructions for the engine, as well as these operating instructions) |
| 3 | Spark plug | | |

3.1.4.2 Special accessories



Fig. 3-6: Components of the special accessories

- | | | | |
|---|---|----|-----------------------------|
| 1 | Fuelling device | 23 | 20 litre standard container |
| 3 | Exhaust hose DN 50 – 1500 mm as per DIN 14572 | | |

3.2 Function and mode of operation

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 earthed power and CEE sockets 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, Part 551). The protective conductor of the ground contact socket assumes the function of the potential equalisation line.

Notes

4 Operate power generator ESE 604 DHG DIN



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 is cooled down
- The fuel valve is in the "OFF" position
- The fuelling device (a special accessory see 3.1.4.2) is disconnected
- Exhaust hose (a special accessory see 3.1.4.2) 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 110kg into account.
- Carry the alternator using at least one person per carrying handle.
- Only lift the device using 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

**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 3.1.4.2)
- ✓ 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:

- The generator must be switched off (see 0).
- the device must be cooled down.
- Adequate ventilation must always be available
- 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 ground-water.

- 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 or higher.

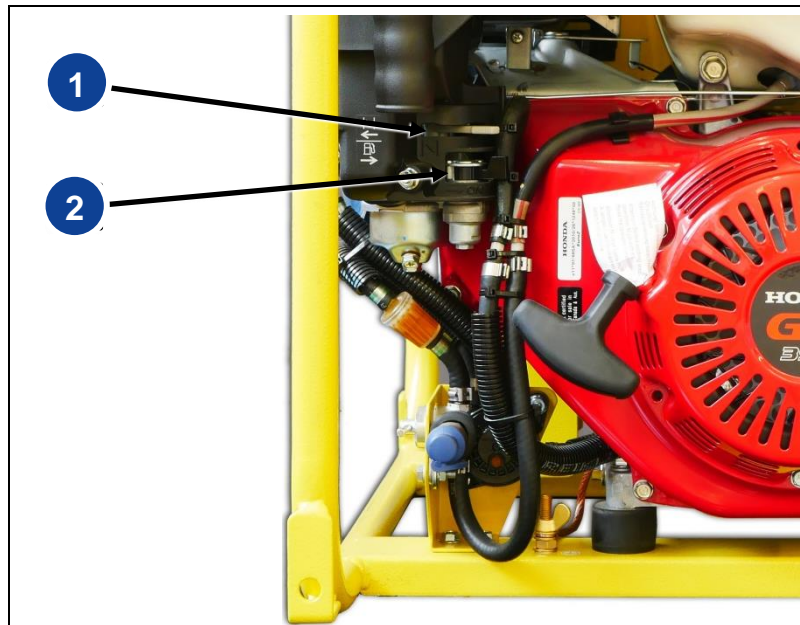


Fig. 4-1: Fuel valve and choke lever

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

1. Push the lever on the fuel valve **2** up to the left stop (closed).
 2. Open cover flap above the tank Fig. 3-3- **2**.
 3. Unscrew tank cover Fig. 3-3- **1**.
 4. Insert filler aid into the filler neck.
 5. Add petrol.
 6. Remove filler aid.
 7. Screw on tank cover
- ✓ The device is refuelled.

4.4 Starting the generator

Proceed as follows to start the generator.

Requirements

The following requirements must be met:

- Electrical safety check (see 6.3)
- Fuel tank has been filled (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)
- ventilation must be adequate.
- 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:

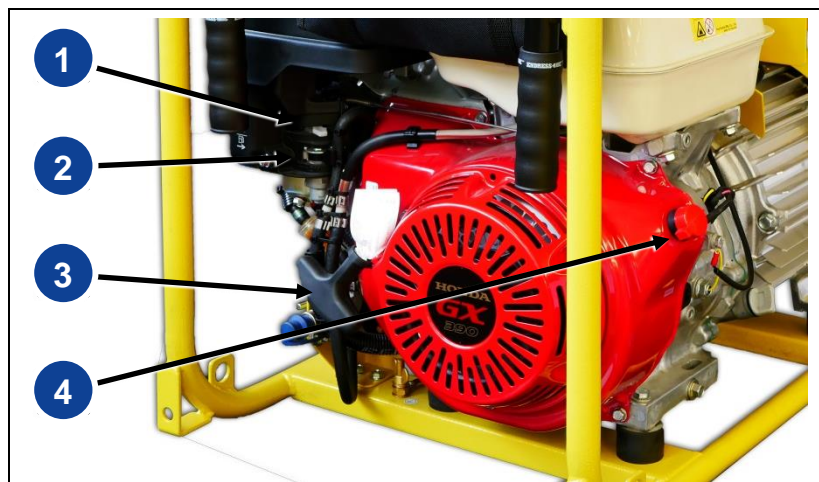


Fig. 4-2: A hand start

HAND START

1. Push the choke lever (Fig. 4-2-**1**) to the far left (completely for a cold engine / appropriately less for a warm engine).
2. Push the lever on the fuel valve (Fig. 4-2-**2**) up to the right stop.
3. Place the engine switch (Fig. 4-2-**4**) in Pos. "I".

4. Motor - strongly pull the cable pull starter hand grip (Fig. 4-2-**3**).

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

- ✓ The motor starts.
5. Slowly move the choke lever **1** back into its start position.
- ✓ The engine has started.

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

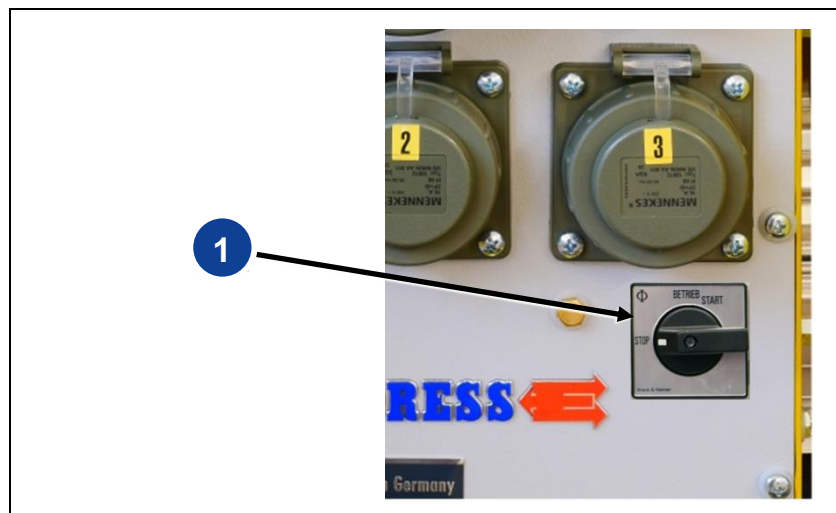


Fig. 4-3: Electrical start

- ELECTRICAL**
1. Push the choke lever (Fig. 4-2-**1**) to the far left (completely for a cold engine / appropriately less for a warm engine).
 2. Push the lever on the fuel valve (Fig. 4-2-**2**) up to the right stop.
 3. Place the engine switch (Fig. 4-2-**4**) in Pos. "I".
 4. Place the engine start switch (Fig. 4-3-**1**) in Pos. "START".

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

- ✓ The engine starts.

5. Release the key switch (it springs back into the "OPERATE" position).
 6. Move the choke slowly back into its start position.
- ✓ The engine has started.

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

When the special equipment Remote Start is installed

(Type No: 151022 / 151024)

See Chapter 5.4 Remote start device



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).

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:

A hand start

1. Switch off or disconnect consumers.
 2. Continue to run the engine for about two minutes.
 3. Place the engine switch (Fig. 4-2-4) in Pos. "0".
- ✓ The generator is switched off.

Electrical start

1. Switch off or disconnect consumers.
2. Continue to run the engine for about two minutes.

3. Turn the key switch (*Fig. 4-3-1*) into pos. "STOP".
 - ✓ The generator is switched off.

Special equipment Remote Start See Chapter 5.4 Remote start device

4.6 Connecting up to consumers

Proceed as follows to connect appliances to the generator.

Requirements The following requirements must be met:

- generator started
- protective earthing conductor tested
- device switched off



WARNING!

Electric shocks cause injury or death.

- Do not earth the generator.
- Do not connect protective conductor to an existing potential equalisation line.
- Do not connect the generator to an existing electrical grid.

Connecting up to consumers

You can connect devices using Schuko or CEE sockets.



Fig. 4-4: Connecting up to consumers

Connecting up to consumers

Proceed as follows to connect a device to the control panel:

1. Unscrew covering on the socket.
 2. Push the plug into the socket.
- ✓ The consumer is connected to the generator.

Switching the consumer on

Switch the consumer on as follows:

1. Switch consumer on.

- ✓ Consumer is connected.

**Switching the consumer
off****Switch the consumer off as follows:**

1. Switch consumer off.
- ✓ Consumer is switched off.

**Disconnecting an
appliance****Disconnect a consumer from the control panel as follows:**

1. Remove plug.
 2. Screw cover onto the socket.
- ✓ The consumer is disconnected from the generator.

4.7 Check the protective conductor

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

Note The protective earthing conductor is no longer required in the new version of DIN 14685-1:2015-12, but its additional functionality was retained. A suitable test cable can be obtained from the ENDRESS service.

Requirements The following requirements must be met:
 generator has been started (see 4.4)
 device is connected (see 4.6)
 device switched off

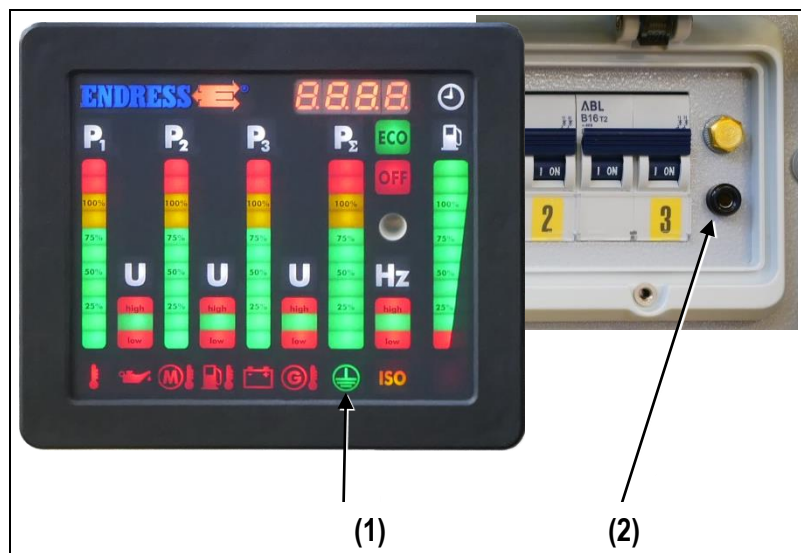


Fig. 4-5: Check the protective conductor

Check the protective conductor

1. Insert test cable into socket (Fig. 4-5-(2)).
2. Hold a test tip (as an accessory) at a metallic, blank location on the consumer.

The test lamp (Fig. 4-5-(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: Protective conductor test lamp

- ✓ 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 is dependent on the ambient brightness (sensor see Fig. 4-5-(5)).

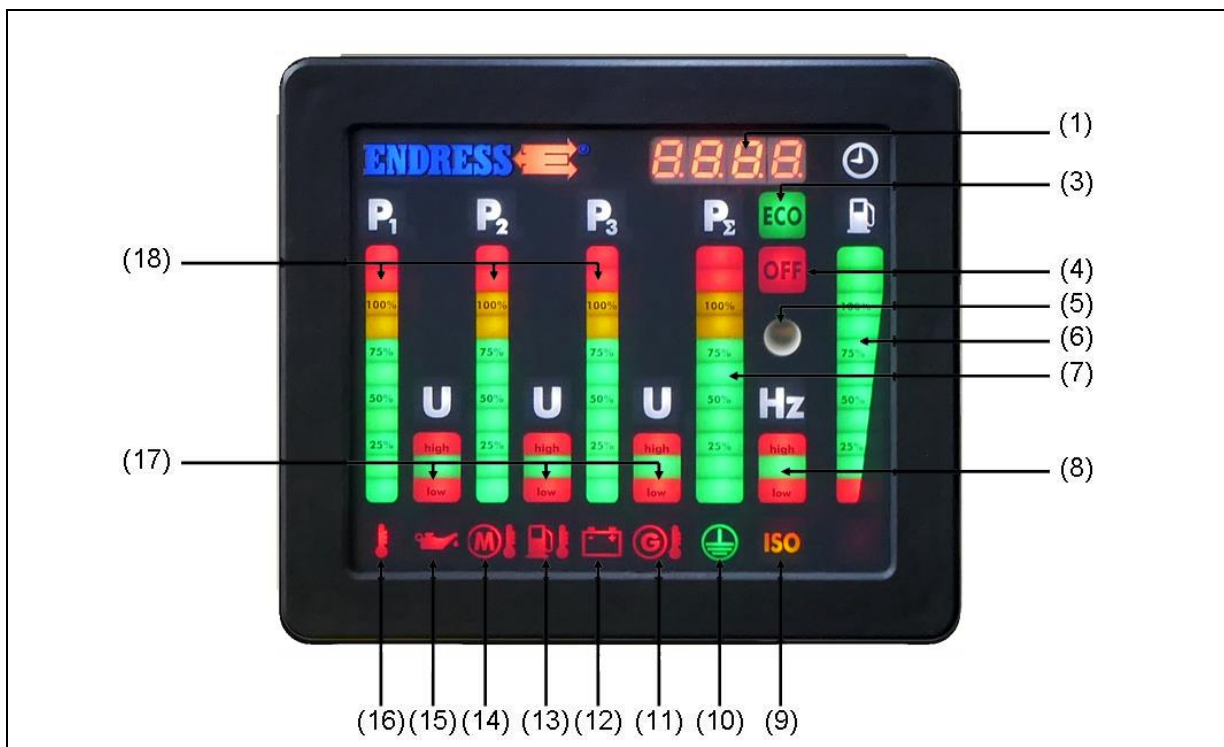


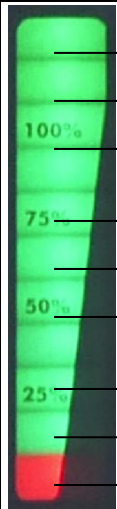
Fig. 4-6: Multi-functional display

Operating hours: The display (Fig. 4-6-(1)) is active 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 Fig. 4-6-(16)) whilst the generator is running, the temperature is too high and the generator must be switched off.

Oil pressure: If the display (see Fig. 4-6-(15)) lights up red whilst the generator is running, the oil pressure is too low and the generator switches automatically or the buzzer sounds; this can be acknowledged using the acknowledgement button.
(Buzzer only active for the ordered “Insulation monitoring without switching off” special fitting)

- Engine temperature:** If the display is red (see Fig. 4-6-(14)) whilst the generator is running, the engine temperature is too high and the generator must be switched off.
- Fuel temperature:** If the display is red (see Fig. 4-6-(13)) whilst the generator is running, the fuel temperature is too high and the generator must be switched off.
- Battery charge check:** If the display is red (see Fig. 4-6-(12)) then the generator's re-charging 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 Fig. 4-6-(9)) or if the buzzer sounds, there is an insulation fault present. (see Chapter 5.2 Insulation monitoring).
- Protective earthing conductor test:** If the display lights up green (see Fig. 4-6-(10)) during the protective earth lead test (see chapter 4.7 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 Fig. 4-6-(6)) 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 lights up green (see Fig. 4-6-(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 Fig. 4-6-(18)) are displayed separately:

Voltage (U) (see Fig. 4-6-(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 Fig. 4-6-(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_{Σ}) (see Fig. 4-6-(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 lights up red (see Fig. 4-6-(4)) and the buzzer sounds, the EMERGENCY OFF button has been pressed. The buzzer can be acknowledged using the acknowledgement button.

(Buzzer only active for the "Insulation monitoring without switching off")

4.10 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) (*Fig. 3-5-(2)*).

4.11 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.

Notes

5 Using special fittings / accessories

5.1 FI circuit breaker (RCD)

The FI protection switch (RCD) serves as 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 $\leq 50\Omega$ (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).



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 must be checked at least once a month by an electrical expert or, if suitable measuring and testing devices are available, by an electrotechnically trained person under the guidance and supervision of an electrical expert.
2. Additionally, every work day, the user must check the mechanical operation of the release by activating the test button (*see unterhalb Fig. 5-1-(10)*) on the residual current protection device (RCD).

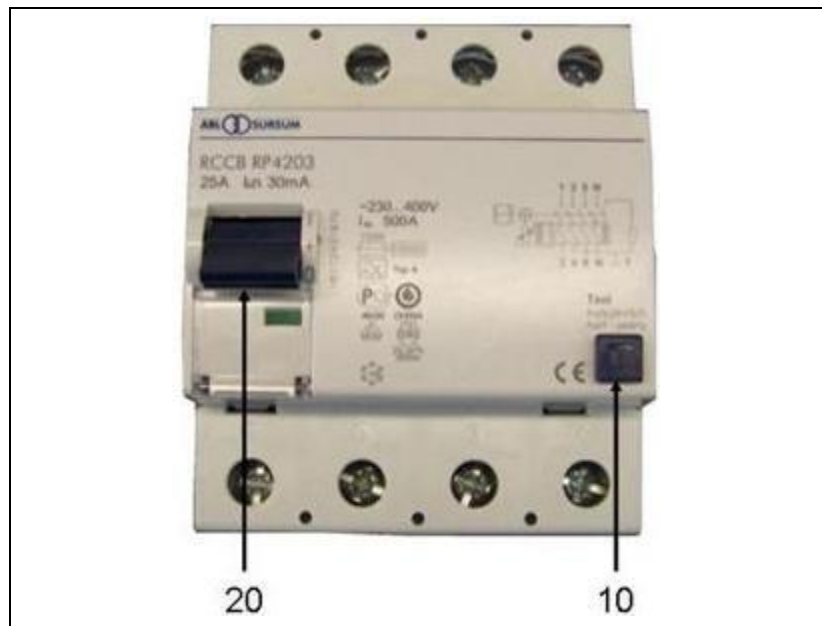


Fig. 5-1: FI protection switch

Checking the FI protection switch:

1. The generator must be started.
 2. Put the protection switch (see Fig. 5-1-(20)) into position 1.
 3. Activate the test switch (see Fig. 5-1-(10)).
- ✓ The switch position displays the result (see Fig. 5-1-(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 5.1: 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

Important note The operating personnel must check the function of the insulation monitoring for every start-up by pressing the appropriate test button (see also Chapter 6.3 Electrical safety check).

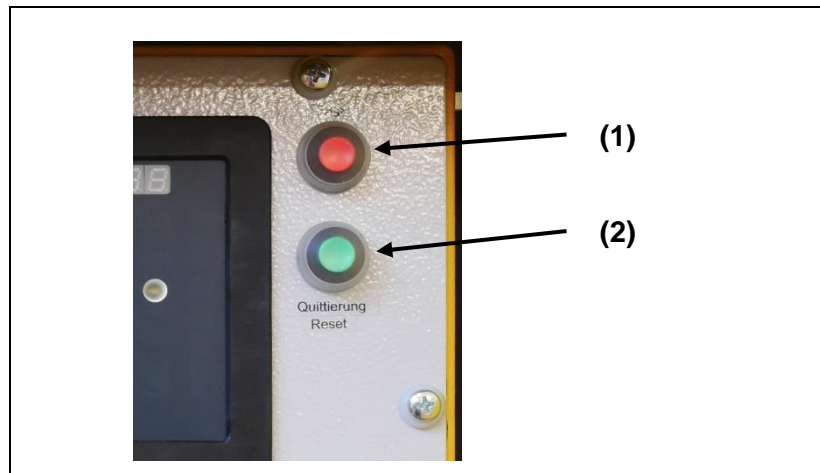


Fig. 5-2: Insulation monitoring using E-MCS 4.0

5.2.1 Insulation monitoring without switching off

(Standard for a DIN generator)

Requirements The following requirements must be met:

generator has been started (see 4.4)
Circuit breaker (see Fig. 3-4-(1)) in Pos. 1

Testing the insulation monitoring:

1. Disconnect all consumers from the generator
2. Press the test button see Fig. 5-2-(1)

The displayed symbol (see Fig. 4-6-(9)) and the horn indicate the result:

Signal	Result
Symbol lights up red Horn sounds	Insulation monitoring is OK
Symbol does not light up and/or the horn does not sound	Insulation monitoring is defective

Table 5.2: Insulation monitoring without switching off

The insulation monitoring test has been run.

3. After testing, press the Reset button (see Fig. 5-2-(2)), to acknowledge the error message.

The horn is muted.

4. Press the Reset button again and hold it down until the symbol goes out in the display (min. 2 seconds), to delete the error message.

The symbol in the display remains dark.

The generator can be operated further.

Insulation monitoring whilst running:

Proceed as follows when the insulation fault is displayed while operating. The displayed symbol (see Fig. 4-6-(9)) and the horn can display the following signals:

Signal	Result
Symbol flashes yellow Horn does not sound	Insulation fault Stage 1 ($\leq 46 \text{ k}\Omega$)
Symbol lights up red Horn sounds	Insulation fault Stage 2 ($\leq 23 \text{ k}\Omega$)

Table 5.3: Insulation monitoring without switching off during operation

1. Press the Reset button (see Fig. 5-2-(2)), to acknowledge the error message.
 - ✓ The horn is muted (only for Stage 2).
 - ✓ The symbol in the display continues to be lit up.
2. Switch off all of the consumers or disconnect them and all connecting lines from the generator. If the horn sounds again before you have disconnected all consumers, press the Reset button again.
3. Press the Reset button again and hold it down until the symbol goes out in the display (min. 2 seconds), to delete the error message.

- ✓ The symbol in the display goes out.

The generator can be operated further.

4. Now connect up the consumers **INDIVIDUALLY** one after another until the insulation monitoring signals a fault again.
 - ✓ The consumer which triggers the signal again is damaged and must be repaired or exchanged, see below.
5. Repeat steps 1 to 4 until all consumers and connecting lines have been checked.

The generator insulation monitoring signals an insulation fault in two secured stages:

Insulation fault Stage 1 When the symbol in the display flashes yellow without the horn sounding, the protective insulation of the consumer or the connecting line is damaged. In this case the insulation fault is less than or equal to about 46 k Ω , but is greater than the limit required in VDE 0100 Part 551 of 23k Ω . You should only use the consumer again when it has first been checked and repaired by an electrician.

Insulation fault Stage 2 When the symbol in the display flashes red and the horn sounds, the protective insulation of the consumer or the connecting line is so strongly damaged that the insulation fault is less than or equal to 23k Ω . According to the above-mentioned standard the consumer should only be used again when it has first been checked and repaired by an electrician.

5.2.2 Insulation monitoring with switch off

Requirements The following requirements must be met:

- generator has been started (see 4.4)

Testing the insulation monitoring:

1. Unplug the device
 2. The circuit breaker must be in Pos. 1.
 3. Press the test button *see Fig. 5-2-(1)*
- ✓ The displayed symbol (*see Fig. 4-6-(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 5.4: Insulation monitoring plus switching off

- ✓ The insulation monitoring test has been run.
4. The circuit breaker must be returned to Pos. 1 after the test has been completed and the generator must be re-started so that it can be used again.

Insulation monitoring whilst running:

1. Plug in the device and switch on.
 - ✓ The displayed symbol (see Fig. 4-6-(9)) and the position of the circuit breaker indicate the result:

Symbol	Significance
lights up red	Insulation fault ($\leq 23 \text{ k}\Omega$)
Yellow	Insulation fault ($\leq 34.5 \text{ k}\Omega$)
stays off	Connected unit is OK

Table 5.5: 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 Speed lowering in idle

Proceed as follows to operate the generator with idle down.

Requirements The following requirements must be met:

- generator is ready for operation
- generator has been started (see 4.4)

Switching the idle down on

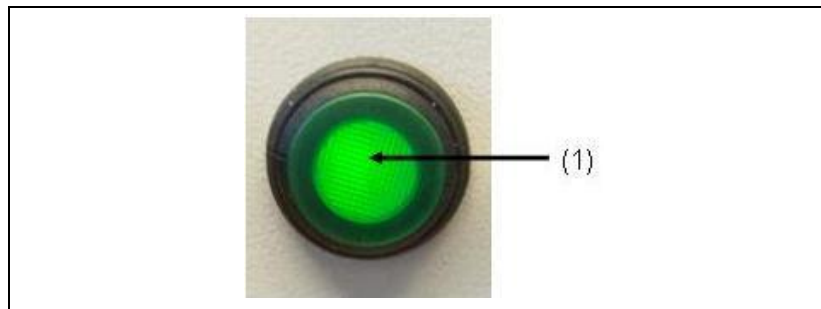


Fig. 5-3: Switching the idle down on pressure switch

Switch on idle speed reduction as follows:

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

- ✓ Idle down is activated.

ATTENTION 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 rocker switch 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.

5.4 Remote start device

Standard for type no.: 151022 / 151024

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:

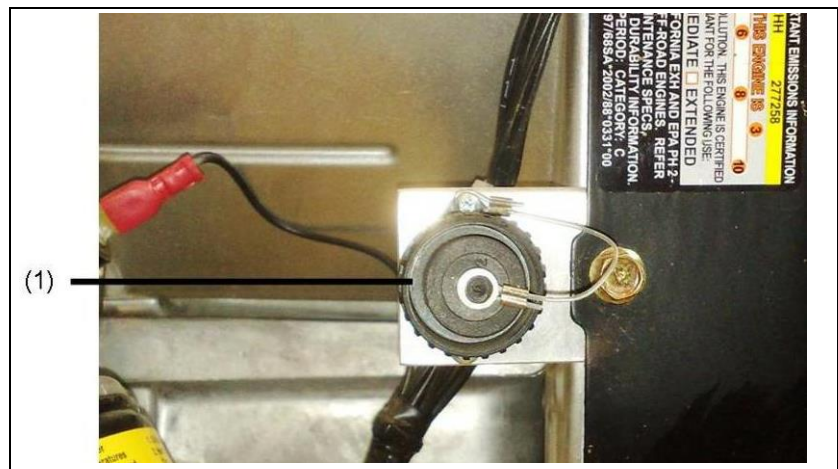


Fig. 5-4: Connecting up a remote start device

1. Unscrew protective cap on the remote start socket (Fig. 5-4-(1)).
 2. 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.

Disconnecting the remote start device

Disconnect the remote start device as follows:

1. Release the plug by turning to the left and then pull the remote start operating status / generator connecting cable plug out.
 2. Screw protective cap onto the remote start socket (Fig. 5-4-(1)).
- ✓ Remote start device is disconnected.

Starting the motor

Start the engine manually as follows:

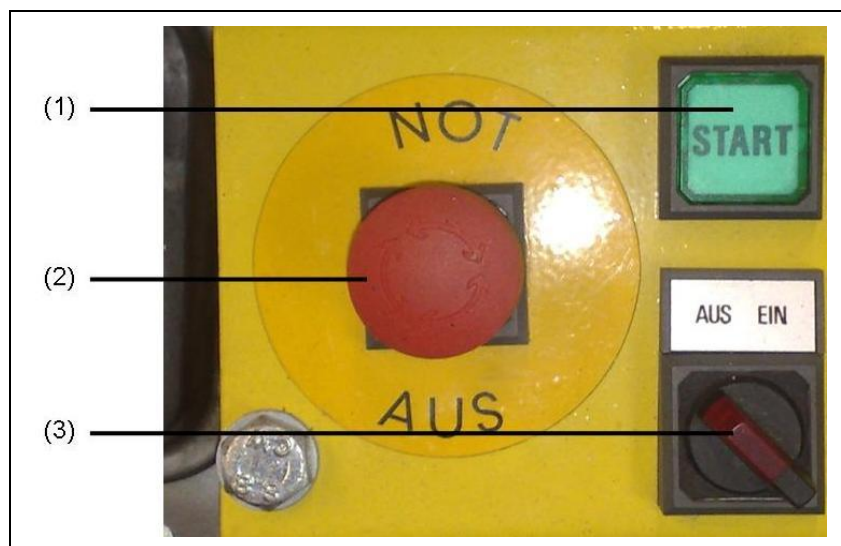


Fig. 5-5: Example of an electrical start in combination with a remote start device

ELECTRICAL

1. The EMERGENCY-OFF button (Fig. 5-5-(2)) must not be pressed.
2. Place operating switch (Fig. 5-5-(3)) in pos. ON.
3. Press the start knob (Fig. 5-5-(1)).

NOTE

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

- ✓ The engine starts.
- 4. Release the start knob.
- ✓ The engine has started.

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

Switching the device off **The device is switched off as follows:**

- Electrical start**
1. Switch off or disconnect consumers.
 2. Continue to run the engine for about two minutes.
 3. Place operating switch (*Fig. 5-5-(3)*) in Pos. OFF.

**WARNING!**

In an emergency, the generator can be stopped by pressing the “EMERGENCY-OFF switch” (*Fig. 4-3-(1)*). The button is turned to the left or the right to restart the aggregate until the locking is removed again.

Note We request that you only switch off the device using the EMERGENCY-STOP switch in an emergency. Otherwise always switch off using the START-STOP switch! 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 carburettor.

5.5 External start device

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

Requirements The following requirements must be met:

- generator has been started (see 4.4)

Connecting up an external start device

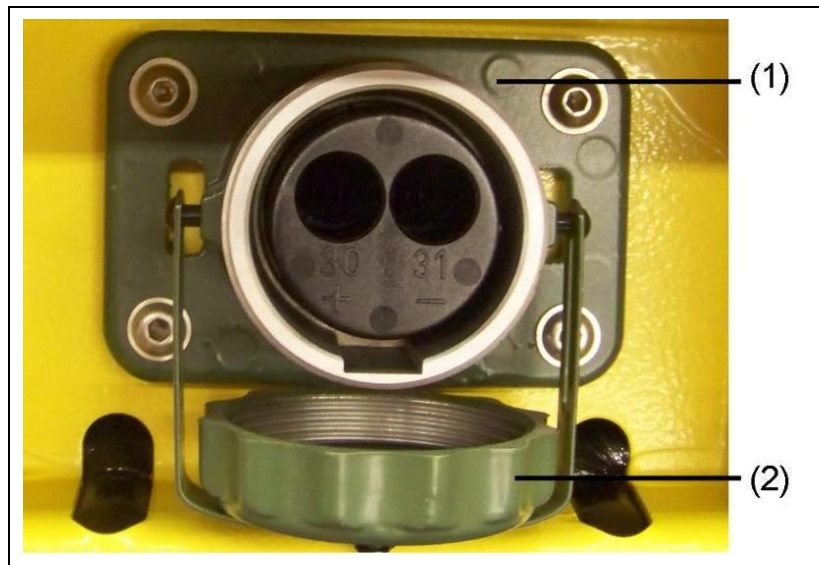


Fig. 5-6: Connecting up an external start device

Connect up the external start device as follows:

1. Unscrew cover (Fig. 5-6-(2)) on the external start socket (Fig. 5-6-(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.

5.6 Battery charge maintenance

The battery charge maintenance allows you to charge the starter battery on the generator over an external charging device and thus to secure the full state of charge. There are various different standardised sockets available for connection which is described as follows.

Proceed as follows to use the battery charge maintenance option.

Requirements The following requirements must be met:

- generator is ready for operation
- a suitable external charging device, ready for operation

12V connection socket according to DIN 14690

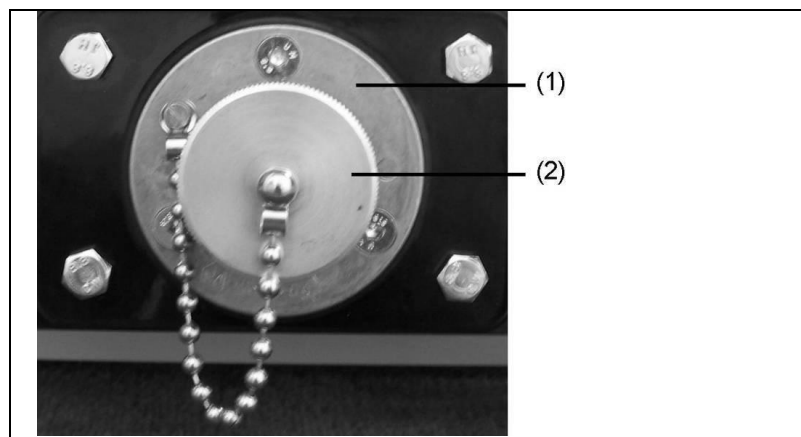


Fig. 5-7: 12V connection socket according to DIN 14690

Connect the battery charge maintenance unit

1. Unscrew protective cap (Fig. 5-7-(2)) of the socket (Fig. 5-7-(1)) anti-clockwise.
 2. Connect the plug on the external charging device (e.g. battery charging device) with the socket
 3. Tighten the screw connection on the external charge plug clockwise in order to lock the connection.
- ✓ The battery charge maintenance unit is ready for use.

Disconnect the battery charge maintenance unit

4. Unfasten the plug on the external charging device (e.g. battery charging device) by turning anti-clockwise
 5. Remove plug.
 6. Screw on protective cap (Fig. 5-7-(2)) of the 12V connection socket by turning clockwise.
- ✓ The battery charge maintenance unit is disconnected.

BEOS charge current socket



Fig. 5-8: BEOS charge current socket

Connect the battery charge maintenance unit

1. Unscrew protective cap (Fig. 5-8-(2)) of the socket (Fig. 5-8-(1)) anti-clockwise.
 2. Connect the plug on the external charging device (e.g. battery charging device) with the socket
 3. Tighten the screw connection on the external charge plug clockwise in order to lock the connection.
- ✓ The battery charge maintenance unit is ready for use.

Disconnect the battery charge maintenance unit

4. Unfasten the plug on the external charging device (e.g. battery charging device) by turning anti-clockwise
 5. Remove plug.
 6. Screw on protective cap (Fig. 5-8-(2)) of the connection socket by turning clockwise.
- ✓ The battery charge maintenance unit is disconnected.

MagCode charge current socket

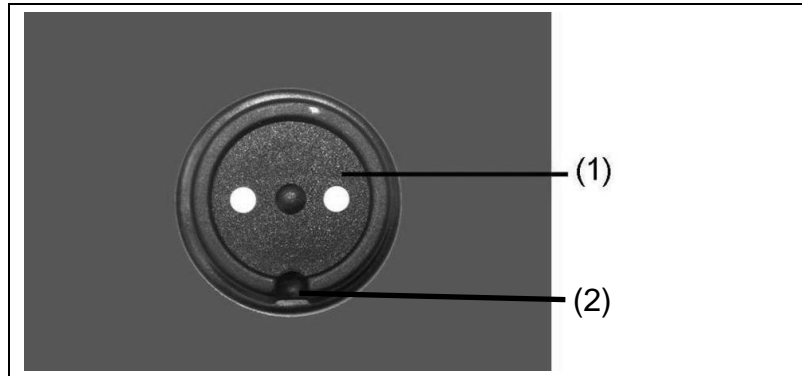


Fig. 5-9: MagCode charge current socket

Connect the battery charge maintenance unit

1. Align the MagCode plug of the external charging device (e.g. battery charging device) using the locking device (Fig. 5-9-(2)).
2. Place the plug on the MagCode socket (Fig. 5-9-(1)).
- ✓ The plug is held on the MagCode socket by magnetic force.
- ✓ The battery charge maintenance unit is ready for use.

Disconnect the battery charge maintenance unit

3. Detach the MagCode plug of the external charging device (e.g. battery charging device).
- ✓ The battery charge maintenance unit is disconnected.

5.7 12V connection for supplying accessories with power

Apart from charge maintenance, the 12V connection socket according to DIN 14690 (see Fig. 5-7) also offers the option to supply suitable accessories with a 12V DC voltage.

Proceed as follows to supply an external 12V accessory with power at the 12V connection socket:

Requirements

The following requirements must be met:

- generator is ready for operation
- a suitable external accessory, ready for operation
- fully charged starter battery

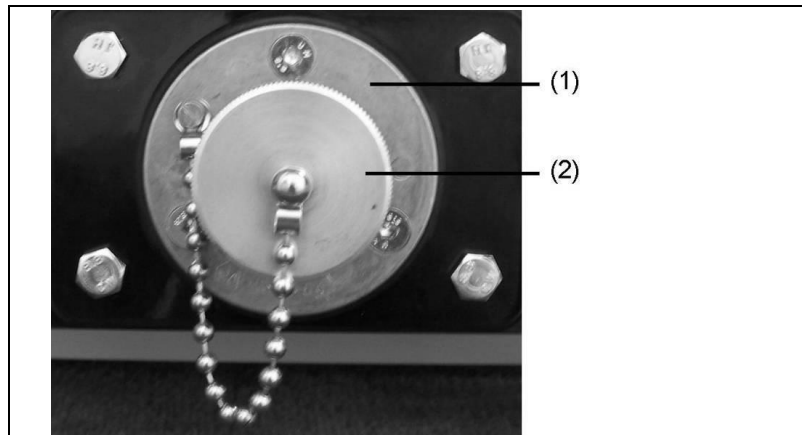


Fig. 5-10: Connection socket for a 12V accessory

Connecting up the 12V accessory

1. Unscrew protective cap (Fig. 5-10-(2)) of the 12V connection socket (Fig. 5-10-(1)) anti-clockwise.
 2. Connect the plug for the 12V accessory (e.g. an LED spotlight) with the socket
 3. Tighten the screw connection on the accessory plug clockwise in order to lock the connection.
- ✓ The 12V accessory is ready for use.

Disconnect the 12V accessory

4. Unfasten the plug on the accessory plug by turning anti-clockwise
 5. Remove plug.
 6. Screw on protective cap (Fig. 5-10-(2)) of the 12V connection socket by turning clockwise.
- ✓ The 12V accessory is disconnected.



CAUTION!

The starter battery discharges during operation of the 12V accessory when the generator is switched off.

When the battery is discharged the generator can only be started electrically!

- When using take account of the current consumption and period of use of the accessory.
- If necessary start the generator before operating the respective accessory.

5.8 3-way fuel valve / Refuelling device

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

Requirements These requirements must be fulfilled:

- 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.

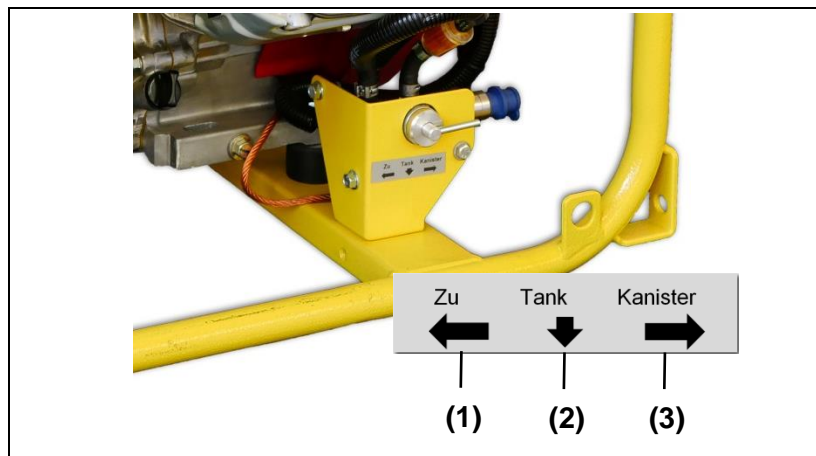


Fig. 5-11: 3-way fuel valve

Switch position	Operation
1	CLOSED
2	OWN TANK
3	EXTERNAL REFUELLING

Table 5.6: Switching positions 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.

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

Connect up fuelling device

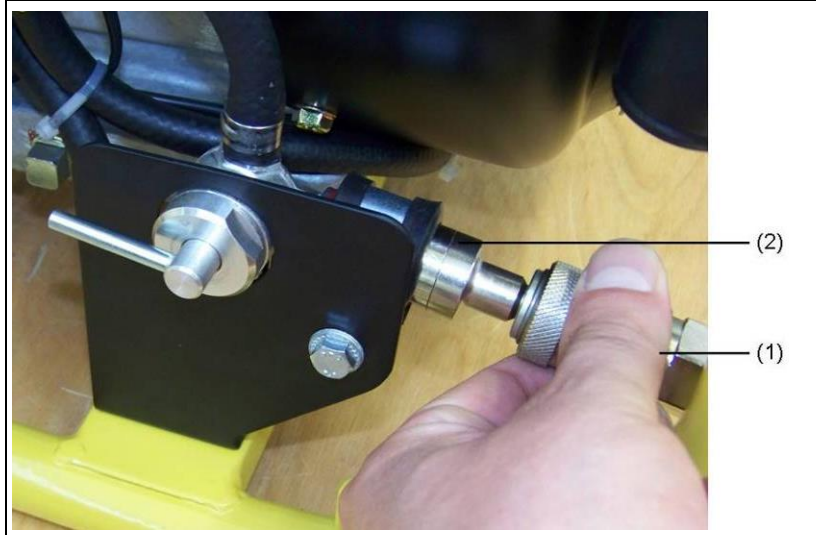


Fig. 5-12: Connect up fuelling device

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. Place the quick-action coupling (Fig. 5-12-(1)) on the external fuelling connection (Fig. 5-12-(2)).
 3. The quick-action coupling engages.
- ✓ The fuelling device is attached.

Disconnect fuelling device:

Disconnect fuelling device from the generator by:

1. Pull back the knurled sleeve on the quick-action coupling (Fig. 5-12-(1)).
- ✓ 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 on the internal tank (*Fig. 5-11-(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. 5-11-(3)*).
- ✓ The empty canister is exchanged.

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

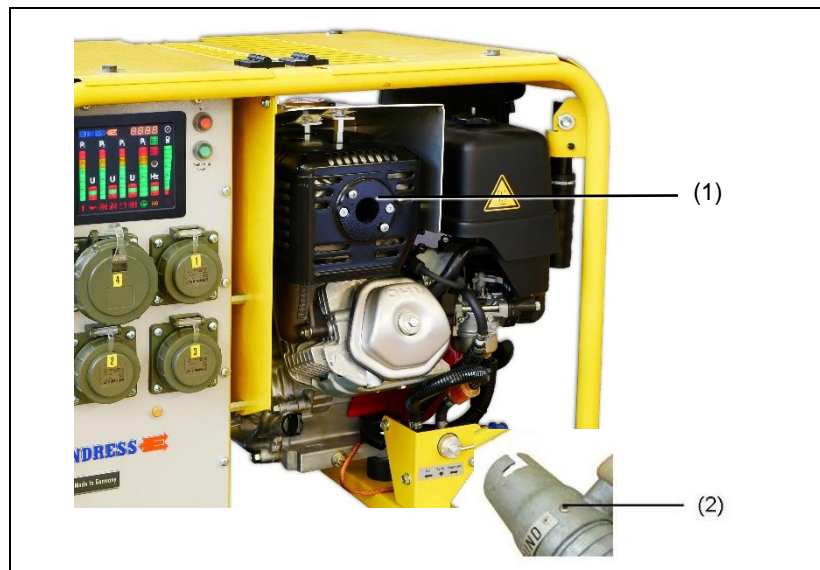


Fig. 5-13 Connecting the exhaust hose

Connect up the exhaust hose as follows:

1. Push the exhaust hose's grip with the larger opening onto the muffler's connection.
 2. 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 Service the power generator ESE 604 (ES) DHG DIN



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

The maintenance work specified in this summary must be carried out after the indicated time intervals.

Maintenance work	Maintenance interval, according to what arises first				
	First month / 20h	every 3 months / 50h	every 6 months / 100h	Every year / 300 h	HONDA instructions for use
Checking the electrical safety	before each start-up				
Check and top off motor oil					
Check fit of screws, nuts, and bolts					
Changing the oil	(X) ¹		X		P.9
Cleaning the air filter	(X) ²	X	X		P.10-11
Replace air filter insert				X	
Clean the deposits beaker			X		12
Clean the spark plug and adjust the distance between electrodes			X		12
Change the spark plug				X	
Cleaning the spark catcher				X	13
Check and adjust valve clearance				X	Workshop manual
Remove combustion residues from the cylinder head					
Clean and adjust carburettor				(X) ³	
Fuel tank and filter				(X) ³	
Overhaul engine if necessary	every 1000h⁽³⁾				

Table 6.1: Generator maintenance plans

1) Check after the first 20 operating hours

2) Check

3) Have performed by a specialist or the Endress Service Station

6.2 Maintenance work

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 (*Fig. 3-5-(2)*). These operating and maintenance instructions of the engine manufacturer are an integral component of these operating instructions.

6.2.1 Engine oil

The drive motor for your generator, like every internal combustion engine, requires the required engine oil for cooling and inner cooling. It is also very important to use the correct engine oil, both for refilling and when changing the oil, and to adhere the stipulated maintenance intervals. Refer to the accompanying operating and maintenance instructions provided by the engine manufacturer for all necessary information.

HONDA recommends engine oil for four-stroke engines which meets or exceeds the requirements for API service class SJ or higher. The second criterion is the suitable viscosity class which depends on the ambient conditions. HONDA recommends SAE 10W-30 or 5W-30 for general use. For start/operating temperatures between -15°C and -25°C use fully synthetic engine oil SAE 5W-30.

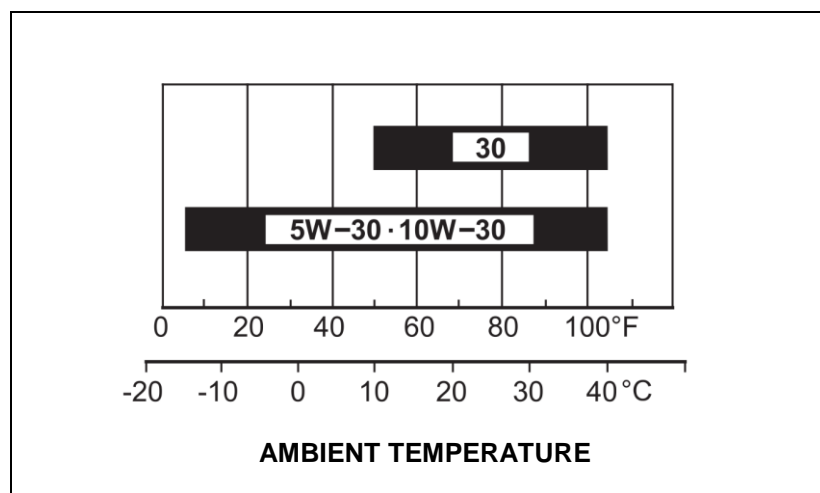


Fig. 6-1: Viscosity ranges for engine oil



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.).

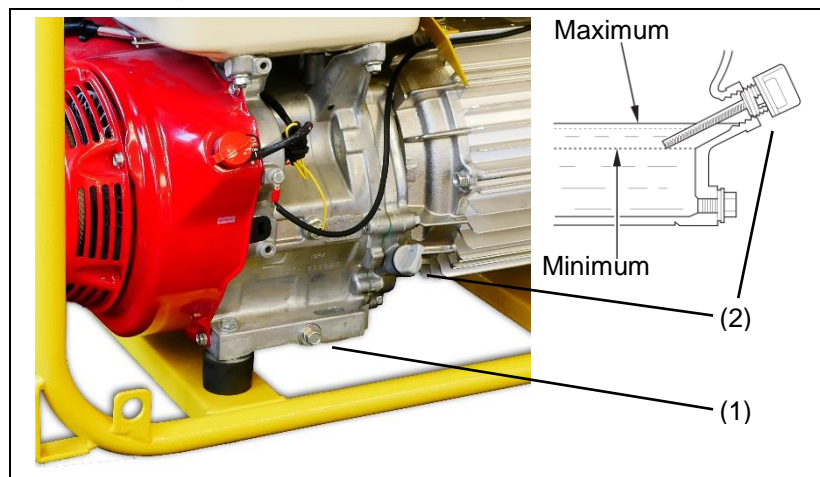


Fig. 6-2: Oil dipstick

Checking the oil level Check the oil level as follows:

1. Unscrew the dipstick (Fig. 6-2-(2)) anti-clockwise and wipe it off with a clean cloth.
 2. Screw in the dipstick again and remove again. If the level is above the upper marking, drain off some of the oil 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 the oil dipstick (*Fig. 6-2-(2)*).
 2. Fill with oil using a filling aid.
 3. Check oil level and correct if necessary.
- ✓ The oil has been refilled.

Changing the oil Change the oil as follows:

1. Remove the oil dipstick (*Fig. 6-2-(2)*).
 2. Prepare the oil collecting tray.
 3. Unscrew oil drain screw (*Fig. 6-2-(1)*) carefully and wait until oil has completely run off into the collection container.
 4. Screw in the oil drain screw (*Fig. 2-1-(1)*) again.
 5. Then refill with fresh oil.
- ✓ The engine oil has been changed.

**WARNING!**

The oil escapes immediately after unscrewing the oil drain screw.

6.2.2 Replacing the starter battery

1. Unscrew the battery holder (*Fig. 6-3-(1)*).
 2. Remove the battery (*Fig. 6-3-(2)*) 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.

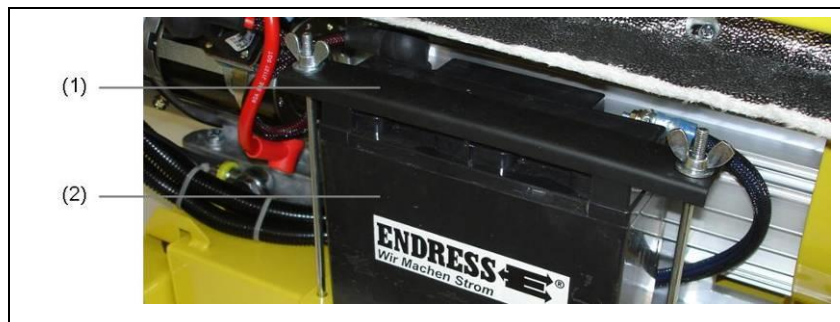


Fig. 6-3: Replacing the battery

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 (*Fig. 6-3-(1)*) back on.
- ✓ 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.



CAUTION!

The Endress battery is maintenance-free throughout its entire service life.

- Never open the battery — this may destroy it.

6.2.3 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.

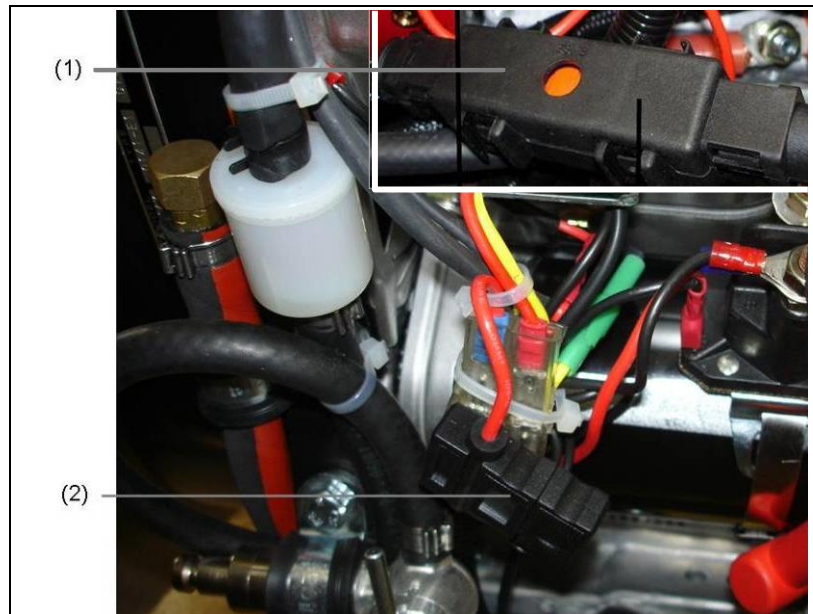


Fig. 6-4: Replacing a fuse

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

Table 6.2: Location of the fuses

6.3 Checking the electrical safety

Checking of electrical safety requires different measures to be taken which may only be undertaken by respectively authorised personnel. In doing so the respective, pertinent VDE provisions, EN and DIN standards, in their respectively valid versions, must be observed.

One must, in particular, not use defective or damaged consumers, cable connections and plug connectors. There must be checking for an orderly condition at regular intervals.

The generator is designed for manual or automatic operation (remote start) with one or more electrical consumers. Hereby the protective conductor system of the attached consumer takes over the function of the potential equalization device. The terminal (*Fig. 3-4-(12)*) is connected with this potential equalization device. It is not necessary to earth the generator. For devices with a built-in RCD (FI protection switch) observe Chapter 5.1.

In addition to the details given above, the electrical safety of the generator is to be checked by a qualified electrician at regular intervals. The frequency of checking must be set in such a way that the generator and all connected work equipment can be used safely according to general knowledge, operational experience or on the basis of specific evidence, in the period between two inspections (examples in TRBS 1201, operational instructions re §5 of BGV/GUV-V A3, BGI 594, BGI 608, Annex 2, recommendation of BGI/GUV-I 5090 concerning "Repeated inspections of movable electrical equipment").

We recommend the following checks and deadlines as general guideline values:

When	How/what	Who
First start-up at the operating location	<ul style="list-style-type: none"> • See Chapter 4, also abide by the operating manual provided by the engine manufacturer • Visual inspection for externally visible defects such as transport damage. 	Operating personnel
start-up on a daily basis	<ul style="list-style-type: none"> • See Chapter 4.4, also abide by the operating manual provided by the engine manufacturer • Visual inspection for externally visible defects (such as damaged insulation, connectors, cable; leaks, noises) • If the generator is fitted with insulation monitoring, a function check of the protective devices must be performed daily (press the test button) by the user. The user must be instructed on how to do this. 	Operating personnel
Retest at the latest once every six months	<ul style="list-style-type: none"> • According to BGI/GUV-I 5090 "Repeated testing of mobile electrical equipment") • Sample test report according to DGUV information 203-032 *) 	Qualified electrician

*) Download as a text file at → www.dguv.de Webcode: d138299

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 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: Problems arising during generator operation

Notes

8 Technical specifications



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

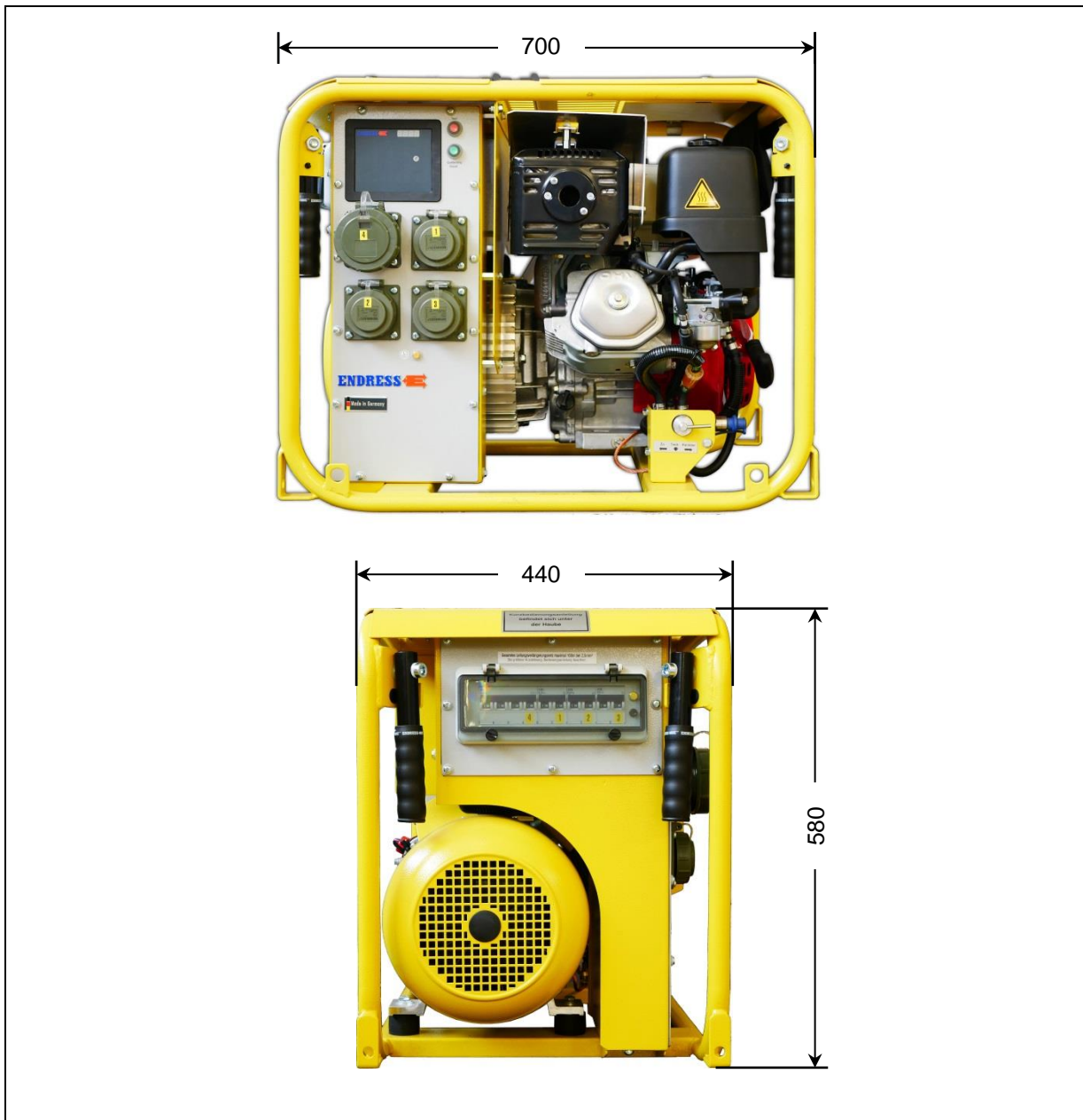


Fig. 8-1: Generator dimensions

Technical specifications

Name	Value	Unit
	ESE 604 DHG (ES) DIN	
Nominal output factor 3~	6.0	[kVA]
Nominal output factor 1~	4.8	[kVA]
Nominal output factor 3~ / 1~	0.8 / 0.9	[cosφ]
Nominal frequency	50	[Hz]
Nominal speed	3000	[min ⁻¹]
Nominal voltage 3~	400	[V]
Nominal voltage 1~	230	[V]
Rated current 3~	8.7	[A]
Rated current 1~	17.4	[A]
Voltage tolerance (idling – nominal output)	± 1	[%]
Weight (ready for use)	110	[kg]
Tank capacity (lead-free normal ROZ91 fuel)	6.5	[l]
Fuel consumption at a 75% load approx.*	2.1	[l/h]
Running time at a 75% load PRP approx.*	3.1	[h]
Length	700	[mm]
Width	440	[mm]
Height	580	[mm]
Sound pressure level L _{PA} at a distance of 7 m **	74	[db (A)]
A-evaluated emission sound pressure level at the workplace L _{PA} **	91	[db (C)]
Sound power level L _{WA} **	99	[db (A)]
Protection Class	IP 54	

Table 8.1: Generator technical data

* Average value; deviations might occur in specific cases, therefore they are non-binding

** Measurement procedure according to ISO 3744 (Part 10)

*** 1.6m above the machine at a distance of 1m

Ambient conditions

Name	Value	Unit
Setting up height above sea level	max. 2,000	[m]
Temperature	-20 to +40	[°C]
Relative air humidity	max. 95, not condensing	[%]

Table 8.2: Ambient conditions for the generator

Standard reference conditions

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

Table 8.3: Standard reference conditions for the generators

Reduced power

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

Table 8.4: Generator power reduction dependent on standard reference conditions

Distribution network

Line	max. line length	Unit
HO 7 RN-F (NSH öu) 1,5 mm ²	60	[m]
HO 7 RN-F (NSH öu) 2,5 mm ²	100	[m]

Table 8.5: Maximum line length of the distribution network as a function of the cable cross-section



WARNING!

The general limitation of 100 m for the overall length was selected in the interest of safe handling during practical use. Larger dimensioning of the distribution network is only to be undertaken by a qualified electrician or trained personnel.

Notes

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 frame with covers, tank and engine

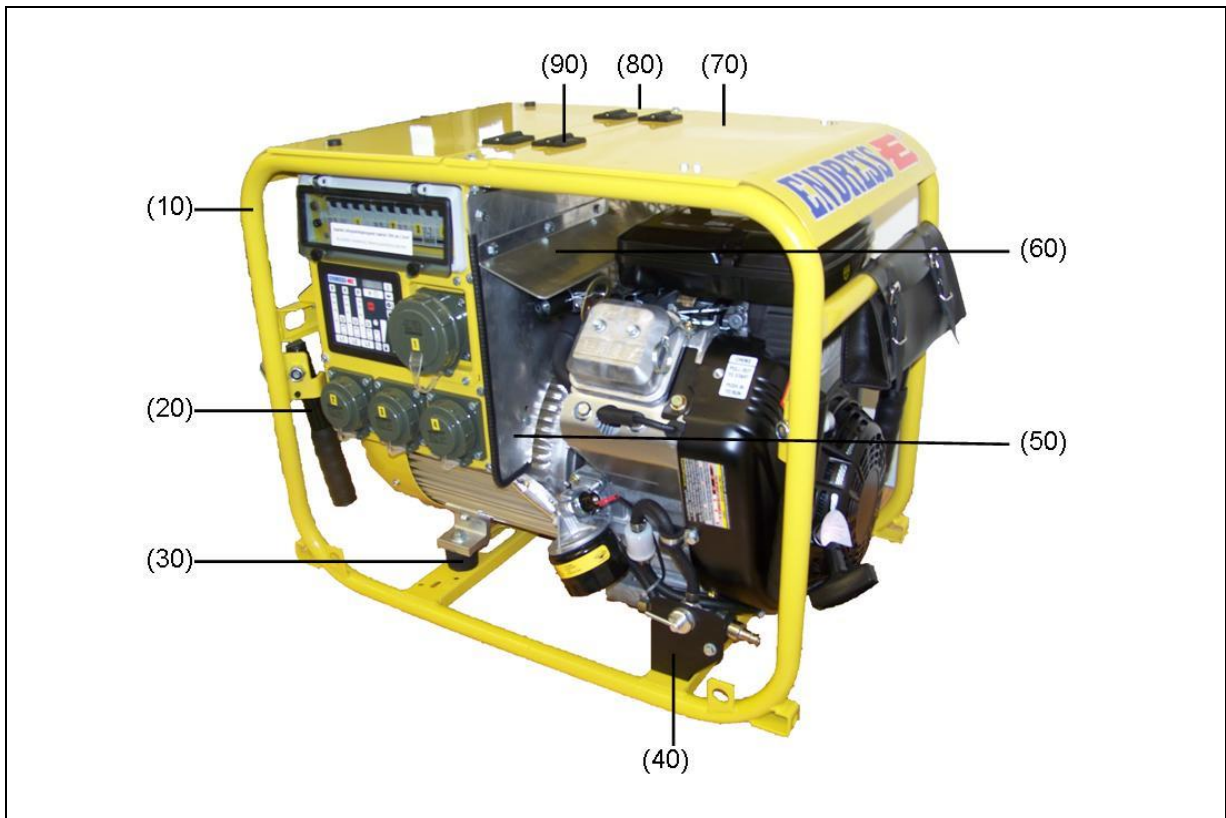


Fig. 9-1: Operating and alternator side replacement parts



Fig. 9-2: Engine and exhaust side replacement parts

Item	Part number	Quantity	Article name
10	E503828/10	1	Frame complete, yellow
20	E502064/90	4	Carrying handle, black
	E130579	4	Inset handle made of soft PVC
	E133316	4	Plastic end cap for pipe, 25x2
	E130186	4	Polyamide expansion rivets
	E130692	4	12.8-18-3 spacer sleeve
	E133023	4	M12 x 45 cylindrical screw
	E130350	4	Hexagon nut M 12
30	E131296	4	Vibration dampers
40	E503877/99	1	Refuelling bracket (for a three-way valve)
50	E503868/00	1	Heat protection plate - middle
60	E503869/00	1	Smoke deflector
70	E503863/10	1	Yellow hood (alternator side)
	E503864/10	1	Hood with a yellow panel (engine side)
80	E502082/10	1	Hoods with a yellow reinforcing plate
90	E100641	4	Screw-on hinge, 1056-U6
100	E130471	1	Tool pouch

Item	Part number	Quantity	Article name
110	E133415	1	Engine Vanguard.16HP/ES Cooler clean (for 854 and 604)
120	E130563	1	M8 wingnut
	E131063	1	Earth strap in copper
130	E503873/00	1	Engine heat conduction plate
140	E503882/92	1	Silencer elbow
150	E131975	1	Silencer
160	E503871/90	1	Heat protection grid, black
170	E503841/10	1	Yellow tank

Table 9.1: Replacement parts for frame with covers

9.2 Generator and electronics

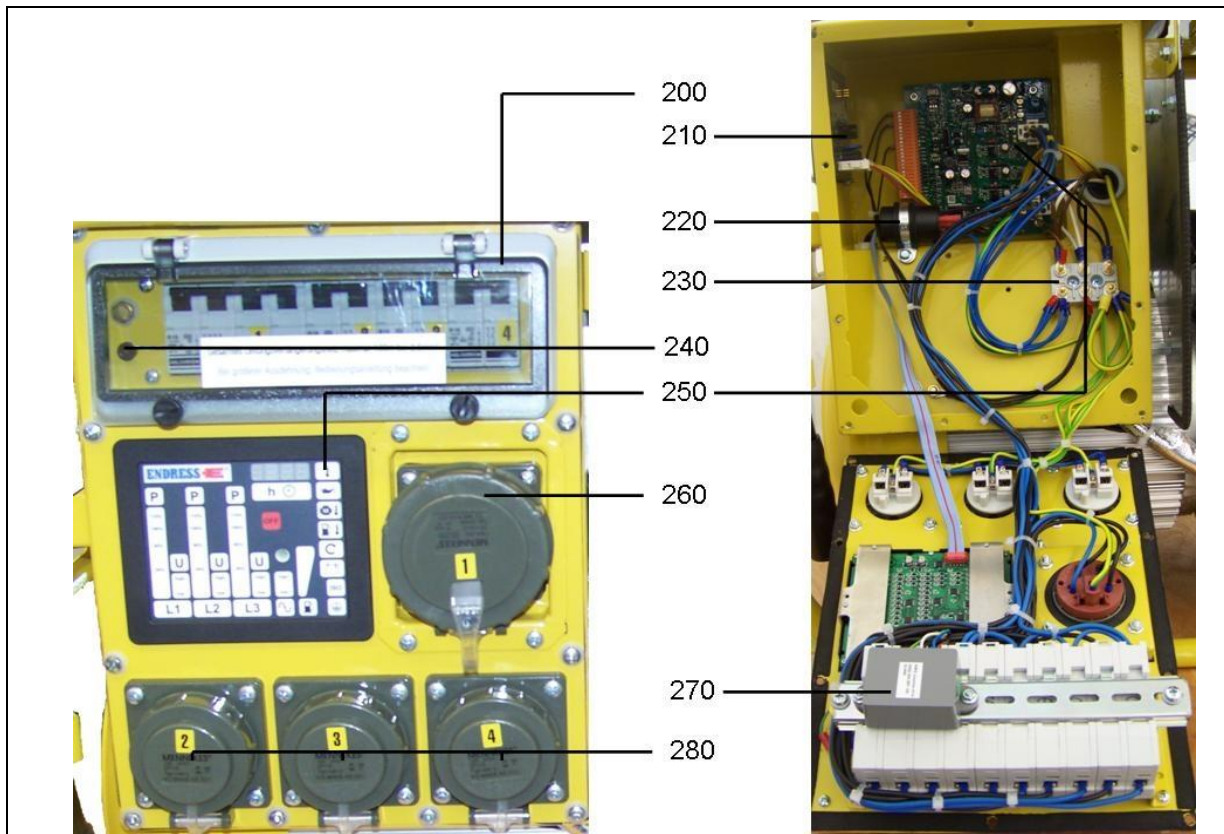


Fig. 9-3: Replacement parts Generator and electronics

Item	Part number	Quantity	Article name
	E130959	1	Gen syn. 7 kVA IP 54 50Hz (for ESE 604)
	E130960	1	Gen syn. 9 kVA IP 54 50Hz (for ESE 854)
	163040	1	Battery, 12V – 18h
200	E130422	1	Hinged window No. 40980
	E100091	1	Mounting rail TS 35/7.5 (0.21 m)
	E503858/10	2	Terminal strip holder yellow
	E130177	3	Circuit breaker 2B.16, 2-pin
	E100541	1	Circuit breaker 4B.16, 4-pin 415V
210		1	Alternator regulator
220	E130760	1	Oil monitoring 2-cyl.B&S
230	E100076	1	6-pin motor terminal board
240	E130442	1	Telephone socket 16A, 4-mm
250	162314	1	Multi-functional display with a circuit board and connecting cable

Item	Part number	Quantity	Article name
260	E130424	1	CEE panel mounting socket
270	E131799	1	EFX3R2 interference elimination filter
280	E133007	3	Schuko attachment socket

Table 9.2: Replacement parts for an engine with an exhaust and fuel system

* When placing an order, please also enter the serial number on the model plate.

** When placing an order, please also enter the design variant.

9.3 Fuses

Only for the devices remote start, battery charge retention or external start.

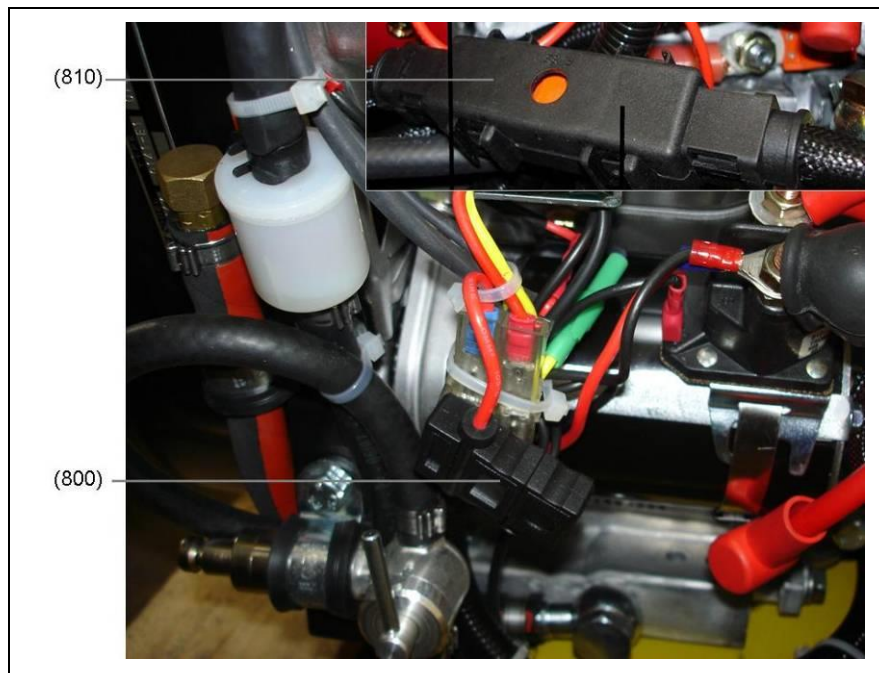


Fig. 9-4: Replacement parts for fuses

Item	Part number	Quantity	Article name
800	E132672	1	Flat fuse holder
	E132680	1	Flat fuse insert 20 A, DIN 72581 Part 3
	E132735	1	Flat fuse insert 15 A, DIN 72581 Part 3
810	E133255	1	Fuse holder for a high performance fuse
	E130915	1	150 A high performance fuse

Table 9.3: Replacement parts for fuses



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