



-power in control



OPERATOR'S MANUAL



Remote Maintenance Box, RMB

- Warnings and legal information
- Operating procedure
- Voltage measurement



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1. Warnings and legal information

This chapter includes important information about general legal issues relevant in the handling of DEIF products. Furthermore, some overall safety precautions will be introduced and recommended. Finally, the highlighted notes and warnings, which will be used throughout this handbook, are presented.

Legal information and responsibility

DEIF takes no responsibility for installation or operation of the generator set or the remote maintenance box. If there is any doubt about how to install or operate the generator set controlled by the unit, the company responsible for the installation or the operation of the set must be contacted.

The units are not to be opened by unauthorised personnel. If opened anyway, the warranty will be lost.

Electrostatic discharge awareness

Sufficient care must be taken to protect the terminals against static discharges during the installation. Once the unit is installed and connected, these precautions are no longer necessary.

Safety issues

Installing and operating the unit implies work with dangerous currents and voltages. Therefore, the installation should only be carried out by authorised personnel who understand the risks involved in working with live electrical equipment.



Be aware of the hazardous live currents and voltages. Do not touch any AC measurement inputs as this could lead to injury or death.

Definitions

Throughout this document, a number of notes and warnings will be presented. To ensure that these are noticed, they will be highlighted in order to separate them from the general text.

Notes



The notes provide general information which will be helpful for the reader to bear in mind.

Warnings



The warnings indicate a potentially dangerous situation which could result in death, personal injury or damaged equipment, if certain guidelines are not followed.

2. RMB operating procedure

To make sure that the operator understands the different functions and situations, this document gives a step-by-step description of the operation of the generator and the use of the remote maintenance box.

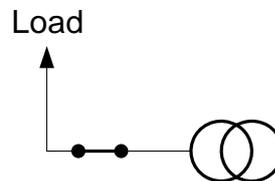
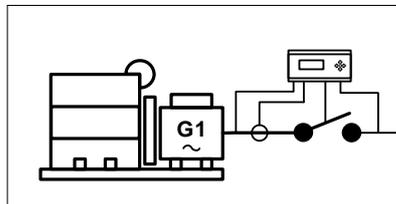
A picture of the function selector switch's position together with a simple diagram of the application will be given for each step.



Before operating the RMB or using this document, it is recommended to have read the Designers Reference Handbook.



DEIF recommends that the operator always uses this manual for reference when operating the RMB – if questions should arise.



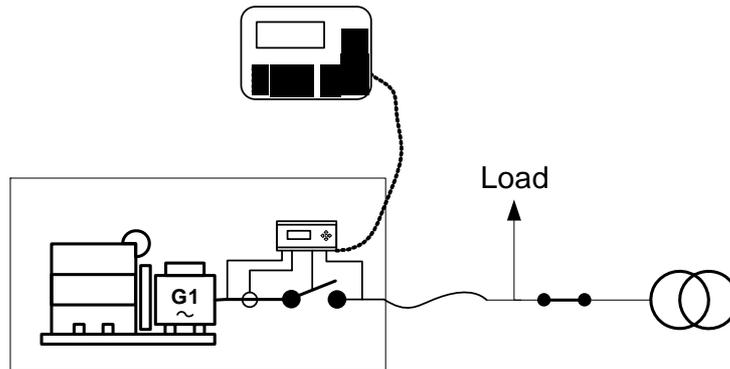
Before the genset is started:

- Manually connect the cables from the generator to the busbar or transformer.
- Connect the two cables (voltage measurement and data cable) from the RMB to the generator's connections plug and socket.
- Select Remote maintenance at parameter; Genset Mode menu 6070.



Make sure that the cable between the genset and busbar or transformer is correctly mounted and properly tightened.

Start generator



Start the generator by turning the function selector to “Start generator”.

Phase sequence

A check of the phase sequence (rotation) is especially required when connecting equipment to a new voltage source, therefore it is strongly recommended that the phase rotation is checked, this can for instance be checked with a DEIF phase sequence relay – type RMT-111Q96.



When all three phases are used to measure the voltage, the AGC-3 and AGC-4 will automatically run a phase sequence check.



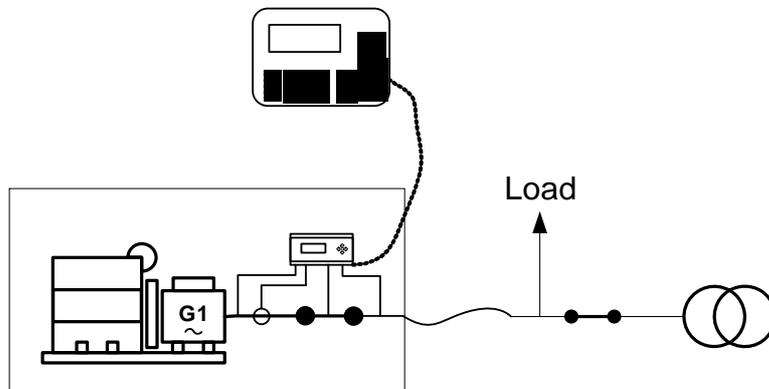
When measurement is carried out with one phase and neutral only, phase sequence check is not possible at the AGC-3 or AGC-4.

Generator synchronisation



When the generator is running (is shown on the display), the operator has to:

- Make sure that the voltage and frequency is OK. This is indicated by a LED on the display.
- Turn the function selector to “Generator synchronisation”. This will force the generator to make a dynamic synchronisation to the mains and close the generator breaker. The synchronisation will be shown on the display.
- The generator will run with a minimum of load until the next step is activated.



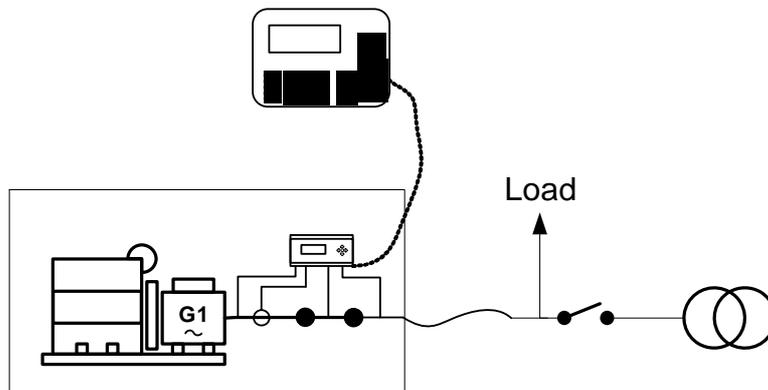
Minimum load is adjusted in parameter 7023, and the default value is 5% of the nominal power.

Deload mains



Deload mains (load takeover) is done by:

- Adjusting the control settings for the power factor; this is done in parameter 7050.
- Turning the function selector to “Deload mains”.
- The operator can now adjust the generator power by means of the power switch.
- The operator can measure the current flow by means of a hand-held ammeter, this is done at the mains side cable, and when the mains is deloaded, the mains breaker can be opened or the fuses can be removed.



When controlling the generator power via the power switch, it is recommended to have both actual and current power reference in the display view. It is described in the Installation Instructions and Reference Handbook of the RMB how to programme this, and it applies to both AGC-3 and AGC-4.



When deloading the mains, a short activation, up to 1 sec., of the power switch will change the setpoint with 1 kW. If the power switch is activated for more than 1 sec., it will add 5 kW to the setpoint, and if it is activated for more than 3 sec., it will add 10 kW to the offset.



When the fuses are removed, the generator will still be in fixed power mode, so to force the generator to switch from power regulation to frequency regulation, the operator has to turn the function selector to “Island” as quickly as possible.



Be aware that in some cases a second source may provide power to the busbar without the operator's knowledge (ring coupling or wrapped busbar).

Island



When the load is taken by the generator and the mains is disconnected:

- Turn the function selector to “Island”, and the generator will now run in a normal island operation with frequency regulation.



When the genset is running in island, it is possible to disconnect the Remote Maintenance Box without stopping the genset. The generator will continue running in island mode.

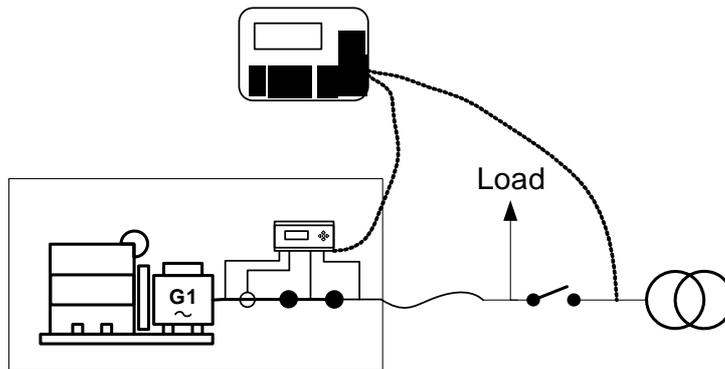
Reconnection of the RMB is easily done via the data cable, and the communication is automatically started.

Synchronisation to mains



The synchronisation to mains is done by:

- Connecting the voltage measurement line between the voltage mains connection points on the box and the mains connection point (fuses/breaker).
- Check the phase rotation
- Switching the function selector to “Synchronisation to mains”. The generator will now make a static synchronisation, and when the synchroscope in the display is stable at 12 o'clock, a lamp will come on and a buzzer will be activated to give a clear signal to the operator.
- Closing the mains breaker or connecting the fuses.



Three-phase measurement

All three phases are connected on the Remote Maintenance Box. When using three-phase measurement, it is not necessary to connect the neutral, as it is calculated internally by the AGC-3 and AGC-4 controllers.



One-phase measurement

Only one phase (L1) and neutral are connected on the Remote Maintenance Box. This can only be done if the neutral of the generator and the transformer are correctly connected, so the common measurement point is the same.



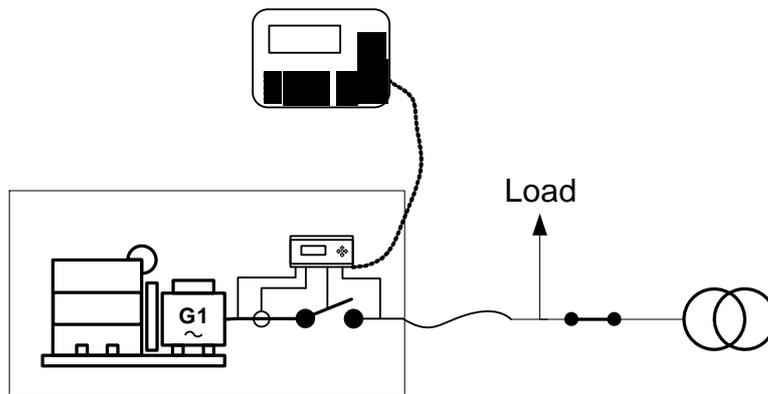
It is the operator's responsibility to make sure that the voltage reference line is connected correctly and the phase sequence is OK, before closing the breaker or connecting the fuses.

Deload generator



The mains is now reconnected and the generator can be deloaded:

- Turn the function selector to “Deload generator”, and the generator will automatically deload and open the generator breaker.

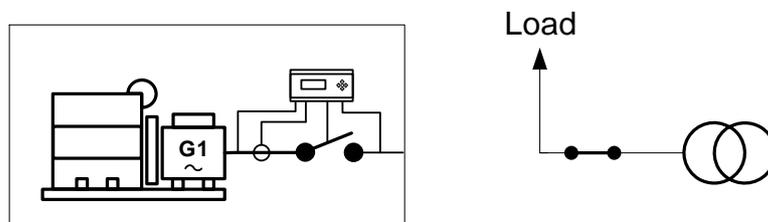


Stop



The generator can now be disconnected:

- The operator can stop the generator by turning the function selector to “Stop”. After a cooling down time, set by the operator, the generator will stop automatically. Now the generator has fulfilled a maintenance job, and it can be moved to another job.



DEIF A/S reserves the right to change any of the above.