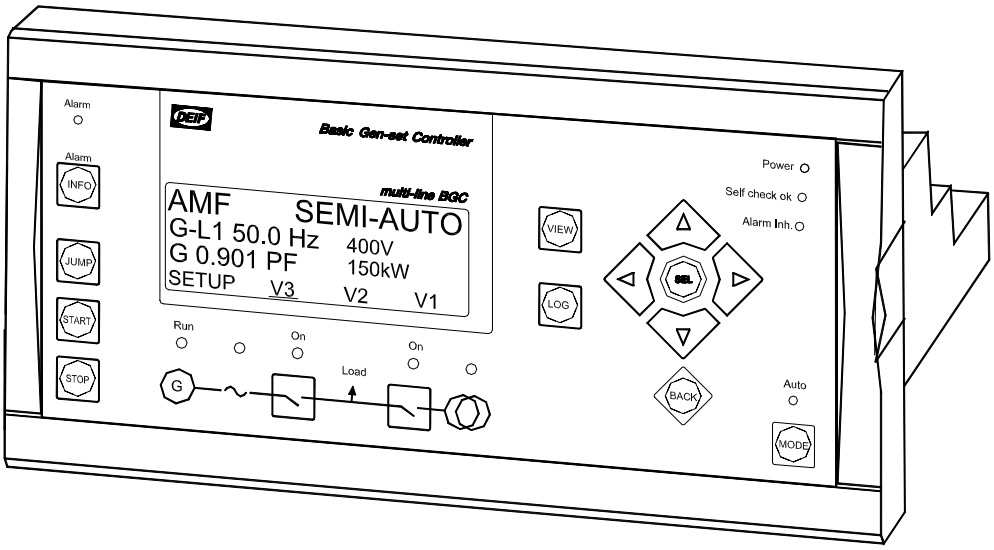
DEIF A/S

# Operator's Manual

# Basic Gen-set Controller

***4189340315C (UK)***




- *Display readings*
- *Push-button functions*
- *Alarm handling*
- *Log list*

***DEIF A/S**, Frisenborgvej 33*
*DK-7800 Skive, Denmark*

*Tel.: +45 9614 9614, Fax: +45 9614 9615*
*E-mail: deif@deif.com, URL: www.deif.com*

Table of contents

# 1. About this document

This chapter includes general user information about this manual concerning the general purpose, the intended users and the overall contents and structure.

## General purpose

This document is the Operator's Manual for DEIF's basic gen-set controller, the BGC. The document mainly includes general product information, display readings, push-button functions, alarm handling descriptions and presentation of the log list.

The general purpose is to give the user important information to be used in the daily operation of the unit.

## Intended users

This operator's manual is mainly intended for the daily user. On the basis of this document the daily user will be able to carry out simple procedures such as start/stop and control of the generator set.

## Contents/overall structure

The document is divided into chapters, and in order to make the structure simple and easy to use, each chapter will begin from the top of a new page. The following will outline the contents of each of the chapters.

### About this document

This first chapter includes general information about the Operator's manual as a document, e.g. it deals with the general purpose and the intended users of it. Furthermore, it outlines the overall contents and structure of the document.

### Warnings and legal information

The second chapter includes information about general legal issues and safety precautions relevant in the handling of DEIF products. Furthermore, this chapter will introduce a note symbol, which will be used throughout this document.

### General product information

The third chapter will deal with the BGC unit in general and its place in the DEIF product range.

### Display push-buttons and LEDs

Chapter four provides an overview of the individual push-buttons and LEDs on the front of the BGC. The functionality of these will be presented.

### Display and menu structure

The fifth chapter will provide specific information as to which readings can be made in the display.

### Alarm handling and log list

The sixth chapter will present the handling of alarms and log list.

# 2. 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, which will be used throughout this document, are presented.

## Legal information and responsibility

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

**The BGC units are not to be opened by unauthorized 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 the BGC unit implies work with dangerous currents and voltages. Therefore, the installation of the BGC should only be carried out by authorized personnel who understand the risks involved in the working with live electrical equipment.

## Notes

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

*Xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx*

# 3. General product information

This chapter will deal with the BGC unit in general and its place in the DEIF product range.

## Introduction

The BGC is a part of the DEIF multi-line 2 product family. Multi-line 2 is a complete range of multi-function generator protection and control products integrating all the functions you need into one compact and attractive solution.

The multi-line 2 product range consists of different basic versions, which can be supplemented with the flexible options needed to provide the optimum solution.

The concept of the BGC is to offer a cost-effective solution to gen-set builders who need a simple generator protection and control unit. Being a part of the multi-line product family the standard functions of the BGC can be supplemented with a variety of optional functions.

## Type of product

The BGC is a micro-processor based control unit containing all necessary functions for protection of a gen-set and of mains and generator breaker control.

The BGC contains all necessary 3-phase measuring circuits and presents all values and alarms on the LCD display. The design of the BGC allows it to be built directly into the engine side panel or the switchboard door.

# 4. Display push-buttons and LEDs

This chapter will present the display push-buttons and LEDs of the unit.

## Push-button functions

The display unit holds a number of push-button functions, which are presented below.

INFO: Shifts the display 3 lower lines to show the alarm list.

JUMP: Enters a specific menu number selection. All settings have a specific number attached to them. The JUMP button enables the user to select and display any setting without having to navigate through the menus (see later).

VIEW: Shifts the first line displaying in the setup menus.

LOG: Shifts the display 3 lower lines to show the event and alarm list. The list holds 150 events. These events are deleted, when the BGC is switched off.

 : Moves the cursor left for manoeuvring in the menus.

 : Increases the value of the selected set point (in the setup menu). In the daily use display, this button function is used for scrolling the second line displaying of generator values.

SEL: Is used to select the underscored entry in the fourth line of the display.

 : Decreases the value of the selected set point (in the setup menu). In the daily use display, this button function is used for scrolling the second line displaying of generator values.

 : Moves the cursor right for manoeuvring in the menus.

BACK: Jumps one step backwards in the menu (to previous display or to the entry window).

START: Start of the gen-set *if 'SEMI-AUTO' is selected*.

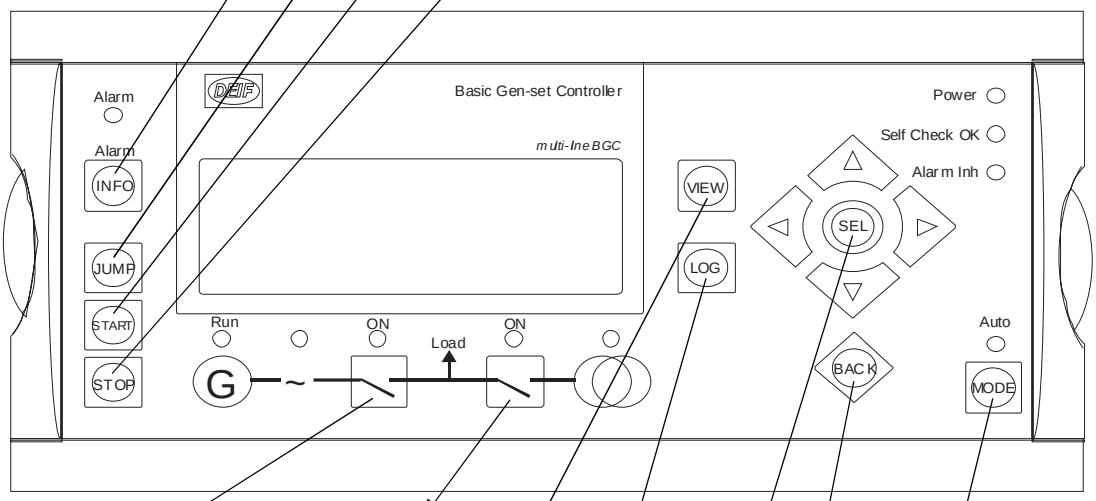
STOP: Stop of the gen-set *if 'SEMI-AUTO' is selected*.

(GB) ON: Manual activation of close breaker and open breaker sequence *if 'SEMI-AUTO' is selected*.

(MB) ON: Manual activation of close breaker and open breaker sequence *if 'SEMI-AUTO' is selected*.

MODE: Changes the menu line (line 4) in the display to mode selection.

Push-buttons are placed as follows:




INFO:
Shifts the display three lower lines to show the alarm list

JUMP:
Enters a specific menu number selection

START:
Start of the gen-set *if 'SEMI-AUTO' is selected*

STOP:
Stop of the gen-set *if 'SEMI-AUTO' is selected*

Generator breaker ON/OFF

Mains breaker ON/OFF

VIEW:
Shifts the first line displaying in the setup menus

LOG:
Shifts the display three lower lines to show the event and alarm list

SEL:
Selects the underscored entry in the fourth display line

BACK:
Jumps one step backwards in the menu

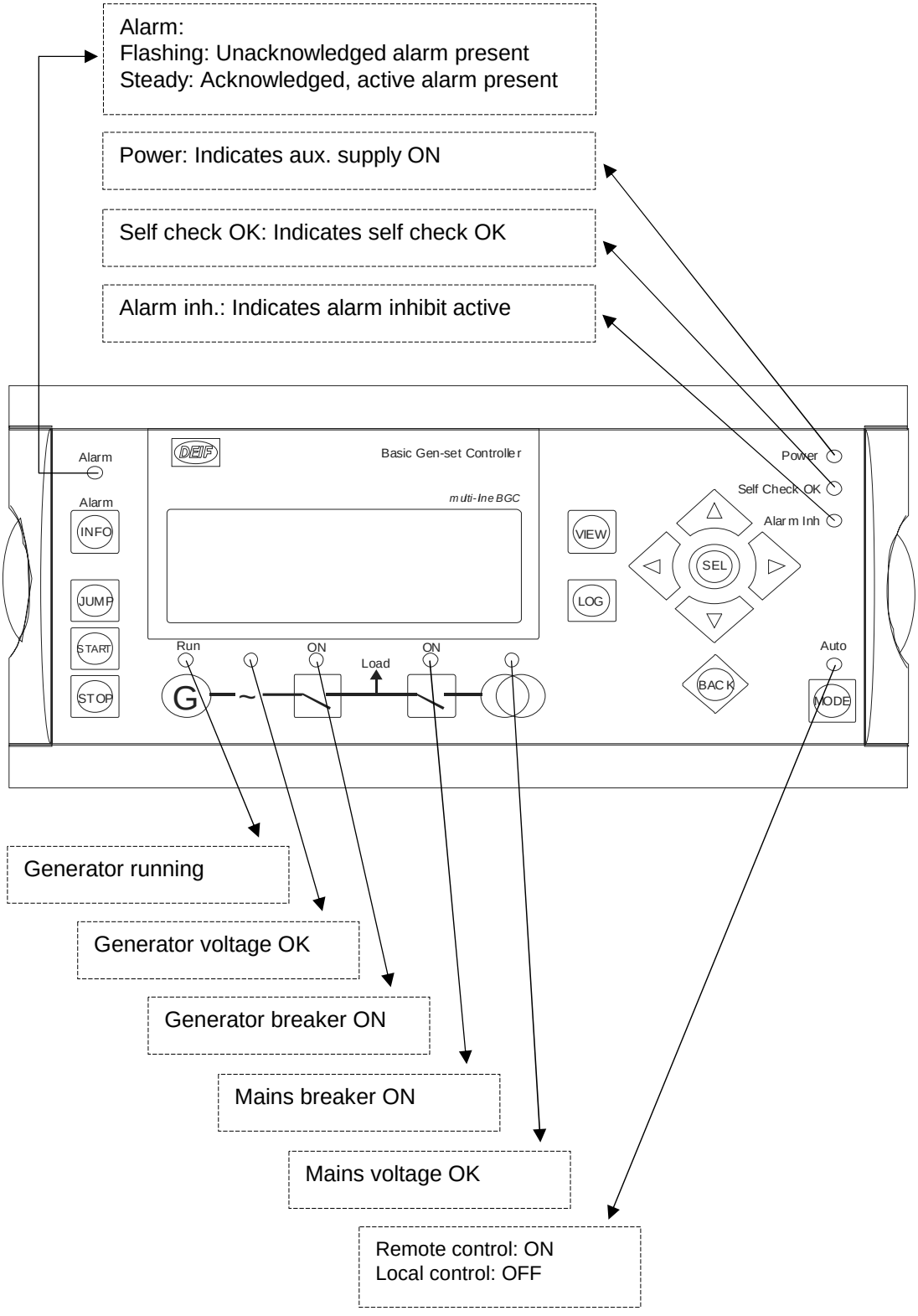
MODE:
Changes the display menu line (line four) to mode selection

## LED functions

The display unit holds 10 LED functions. The colour is green or red or yellow according to the running situation.

| | |
|---|---|
| ALARM: | LED flashing indicates that unacknowledged alarms are present.<br>LED fixed light indicates that ALL alarms are acknowledged, but some alarms remain.<br>LED turned off indicates that no alarms are present. |
| POWER: | LED indicates that the auxiliary supply is switched on. |
| Self check OK: | LED indicates that the unit is OK. |
| ALARM INH.: | LED fixed light indicates that the inhibit input is ON. |
| RUN: | LED indicates that the generator is running. |
| (GEN.) OK: | LED green light indicates that the voltage/frequency is present and OK. |
| (GB) ON: | LED indicates that the generator breaker is closed. |
| (MB) ON: | LED indicates that the mains breaker is closed. |
| (MAINS) OK: | LED is green, if the mains is present and OK.<br>LED is red at a mains failure.<br>LED is flashing green when the mains returns during the 'Mains OK delay' time. |
| AUTO: | LED indicates that auto mode is selected. |

The display LEDs are indicating as follows:



# 5. Display and menu structure

In this chapter the display and the unit menu structure will be presented.

## LCD display

The BGC display is a backlit LCD text display containing 4 lines with 20 characters in each line. There is no control of the light intensity of the display (no dimmer). Basically, all measured and calculated values can be read in the display. These may be selected via the PC utility software (USW).

For selection of values see the Designer's reference handbook.

## Menu structure

The BGC display includes two menu systems, which can be used without password entry:

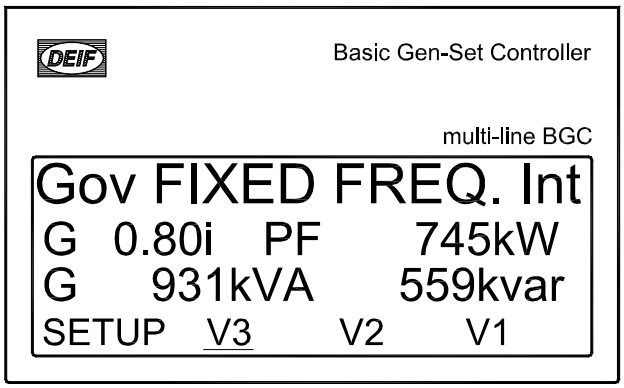
*View menu system*
This is the daily use menu system designed for the operator. 15 windows are configurable and can be entered by using the arrow push-buttons.

*Setup menu system* **(not commonly used by the operator)**
This menu system is used for setting up the unit, and if the operator needs detailed information which is not available in the view menu system. Changing of parameter settings is password protected.

### Entry window

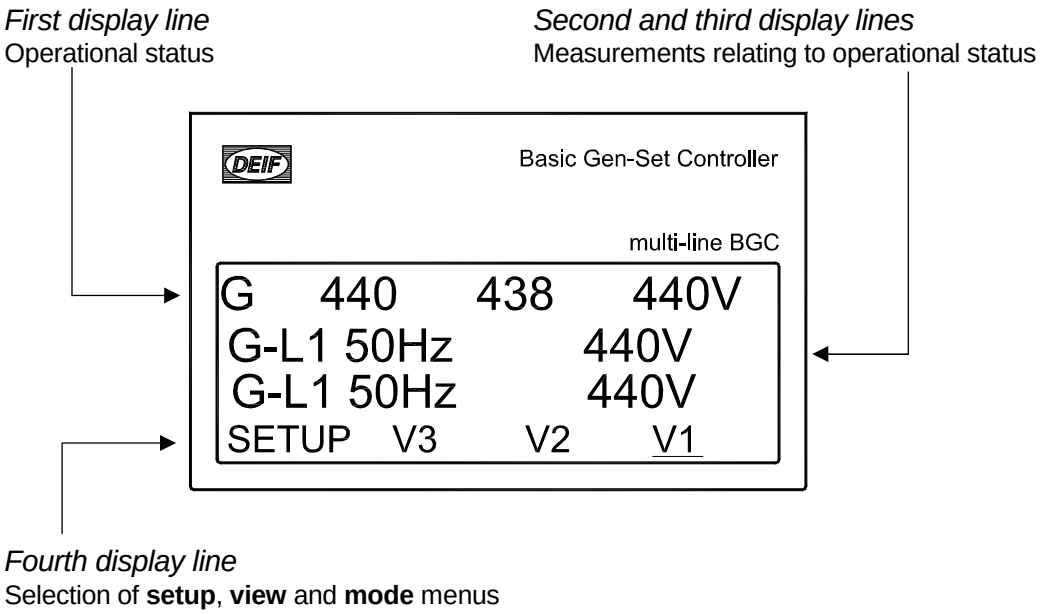
When the unit is powered up, an entry window appears. The entry window is the turning point in the menu structure and as such the gateway to the other menus. It can always be reached by pressing the BACK push-button 3 times.

The event and alarm list will appear at power up, if an alarm is present.



**View menu**

The view menus (V1, V2 and V3) are the daily use menus designed for the operator.




In the view menus various measured values are on display.

**Selection of views in the display**

The readings etc. are all selected by moving the cursor (fourth display line (note the underscore on V1 - this is the cursor)):

The cursor is moved using the ◄ and ► push-buttons on the right side of the display.

View window 1

Display of measured values according to the selections made during configuration.

For detailed info about configuration see the Designer's reference handbook.

V1 contains 15 different windows, which can be selected using the ▲ and ▼ push-buttons on the right side of the display.

View window 2

Display of measured values according to the selections made during configuration.

Display V2 follows the selection in V1 as follows:

1: Window 1: (Start prepare)
2: Window 2: (Synchronising)
3: Window 3: (Ramp up/down)
4: Window 4:
5: Window 5: (Default (when none of the above are in operation))

View window 3

Display of measured values according to the selections made during configuration.

The V3 display changes with running modes:

First display line indicates running status of the unit. Statuses are:

- Manual: No regulation, protections are active.
- AMF: Automatic start/stop according to Automatic Mains Failure selected functionality.
- Island: Island (stand alone) generator or island load sharing with other generators (option G3).
- Peak shaving (option G3): Parallel with mains (grid) cutting the top load off the mains supply according to selected values.
- Fixed power (option G3): Delivering a predefined amount of power to the mains (grid).

Second and third display lines display measured values.
Fourth display line displays the selection line.

Display V3 follows the selection in V1 as follows:

1: Window 1: (Start prepare)
2: Window 2: (Synchronising)
3: Window 3: (Ramp up/down)
4: Window 4:
5: Window 5: (Default* (when none of the above are in operation))

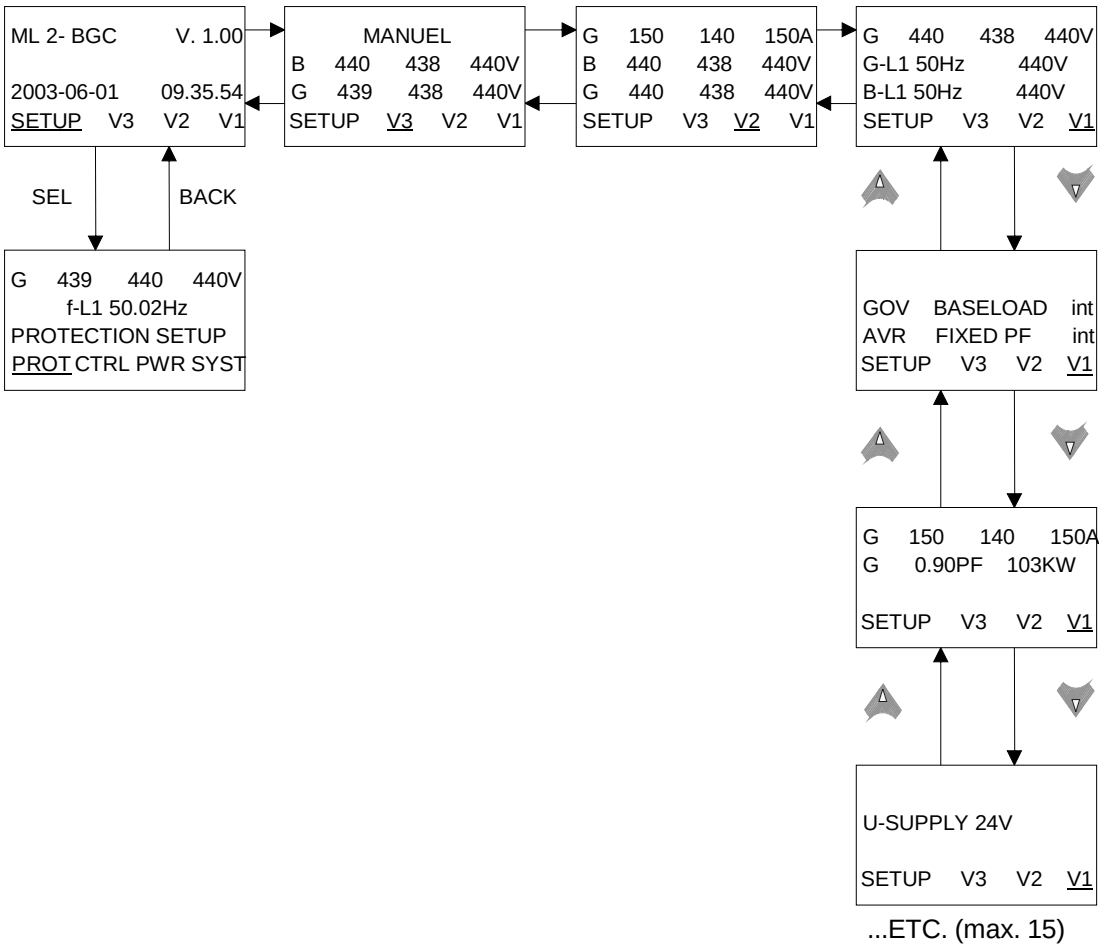
View window overview

| **Windows** | **View 1** | **View 2** | **View 3** |
|---|---|---|---|
| Window 1 (used in V2, V3) | Manual selection with UP or DOWN push-buttons | Changes automatically between the 5 first windows:<br><br>1. Window 1 (Start prepare)<br>2. Window 2 (Sync.)<br>3. Window 3 (Ramp up/down)<br>4. Window 4<br>5. Window 5 (Default*)<br><br>No manual selection. All three lines show measurements | Changes automatically between the 5 first windows:<br><br>1. Window 1 (Start prepare)<br>2. Window 2 (Sync.)<br>3. Window 3 (Ramp up/down)<br>4. Window 4<br>5. Window 5 (Default*)<br><br>No manual selection. Line 1 shows the text 1…5. Line 2 and line 3 show measurements |
| Window 2 (used in V2, V3) | | | |
| Window 3 (used in V2, V3) | | | |
| Window 4 (used in V2, V3) | | | |
| Window 5 (used in V2, V3) | | | |
| Window 6 | | | |
| Window 7 | | | |
| Window 8 | | | |
| Window 9 | | | |
| Window 10 | | | |
| Window 11 | | | |
| Window 12 | | | |
| Window 13 | | | |
| Window 14 | | | |
| Window 15 | | | |

** The default window is automatically selected after the ramping up, when the gen-set is in normal operation, e.g. fixed power mode.*

View menu example

The following is an example of a configured view menu system. In this example 4 of 15 windows have been configured in view 1.



**Mode menu**

If the MODE push-button is pushed, a selection of possible running modes appears in the fourth display line.

Using the  and  push-buttons moves the cursor, and the mode can be selected by pressing the SEL button:

| | |
|---|---|
| SEMI: | - The display push-buttons (START, STOP, GB ON, GB OFF) are active and can be used by the operator.<br>- The regulators are also active, i.e. the speed control will bring the generator to nominal speed upon start (only if option G2/G3 (sync.) is present).<br>- When pushing a breaker button for closing, the BGC will synchronise (if allowed) the breaker. When the breaker closes, the controls stop. |
| TEST: | - The BGC will start the generator, carry out the test sequence (predefined time period) and stop the generator again. Hereafter the generator will return to AUTO mode. The mains breaker will remain closed, and the generator breaker will remain open. NB: If option G2/G3 (sync.) is selected, the test running can be selected to be parallel to the mains and take load to a predefined value. |
| AUTO: | - The BGC will automatically carry out the control type selected (AMF, fixed power etc.).<br>- The display control push-buttons (START, STOP, GB ON, GB OFF) are disabled.<br>- If the selected running mode is fixed power or island, timer start/stop (week watch) or binary input, then start/stop can be used. |
| MAN: | - The display push-buttons (START, STOP, GB ON, GB OFF) are active and can be used by the operator.<br>- The regulators are not active, i.e. speed (and voltage) control has to take place using binary inputs for UP and DOWN control (only if option G2/G3 is present).<br>- When pushing a breaker button for closing, the BGC will be a check synchroniser (if allowed) for the breaker. When the breaker closes, the speed/load/voltage/power factor can be controlled using the binary control inputs. |

To return to the other display functions from MODE selection, press the BACK push-button.

# 6. Alarm handling and log list

## Alarm handling

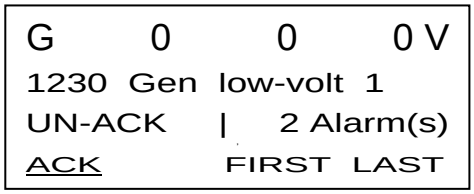
When an alarm occurs, the BGC will automatically go to the alarm list for display of the alarm.

If reading of the alarms is not desired, use the BACK push-button to exit the alarm list.

If you decide to enter the alarm list later, use the INFO push-button to jump directly to the alarm list reading.

The alarm list contains both acknowledged and unacknowledged alarms provided that they are still active meaning that the alarm condition is still present. Once an alarm is acknowledged and the condition has disappeared, the alarm will no longer be displayed in the alarm list.

This means that if there are no alarms, the alarm list will be empty.




This display example indicates an unacknowledged alarm. The display can display only one alarm at a time. Therefore, all other alarms are hidden.

To see the other alarms use the and push-buttons to scroll in the display.

To acknowledge an alarm, place the cursor (underscore) under 'ACK' and then press SEL.

To jump to the first (oldest) or the last (youngest) alarm, place the cursor under the selection (FIRST or LAST) and press SEL.

## Log list

The log list in the BGC contains up to 150 events and/or historical alarms.

An event is e.g. closing of breaker and starting of engine.
An alarm is e.g. overcurrent or high cooling water temperature.

To enter the log list, press LOG.

To scroll up and down in the list, use the and push-buttons.

It is also possible to go to the first (oldest) logging or the last (youngest) logging by placing the cursor (underscore) under the selection (move the cursor using the and push-buttons) and press the SEL push-button.