
HMI (Human Machine Interface) Description

for

YAMAMA GT6 - GT9

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1 Introduction

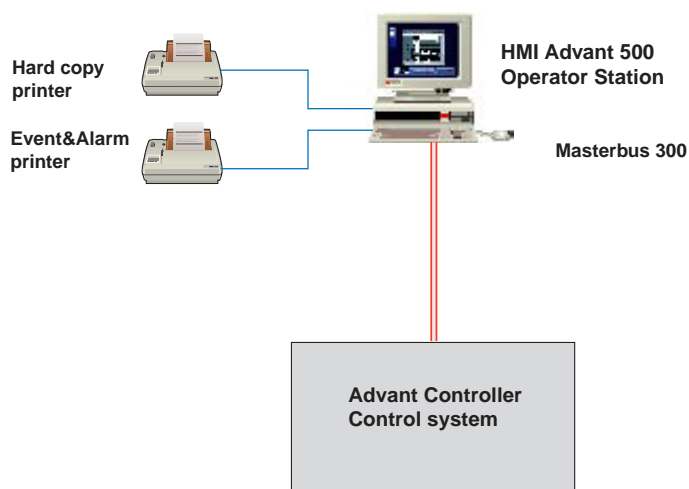
1.1 Purpose

This document describes how the operator communicates with the gas turbine plant and its systems.

2 The Control System

2.1 Purpose of the control system

The main purpose of the control system is to take care of all information from the process, such as digital and analog input and output signals, and perform the calculations necessary for the start up, continuous operation and cooling down of the gas generator plant. In the figure shown below you can overview the control system with the operator station.



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3 The Control Station

3.1 Overview

The AdvaCommand User Interface is the link between the operator and the process in Advant Station 500 Series Operator Stations. It supports

- presentation of process and system information on screen
- command/dialogue handling using keyboard and pointing device

3.2 Workplace

The operator's workplace is based on a HP-UX workstation and contains one keyboard, a screen and a pointing service (mouse).

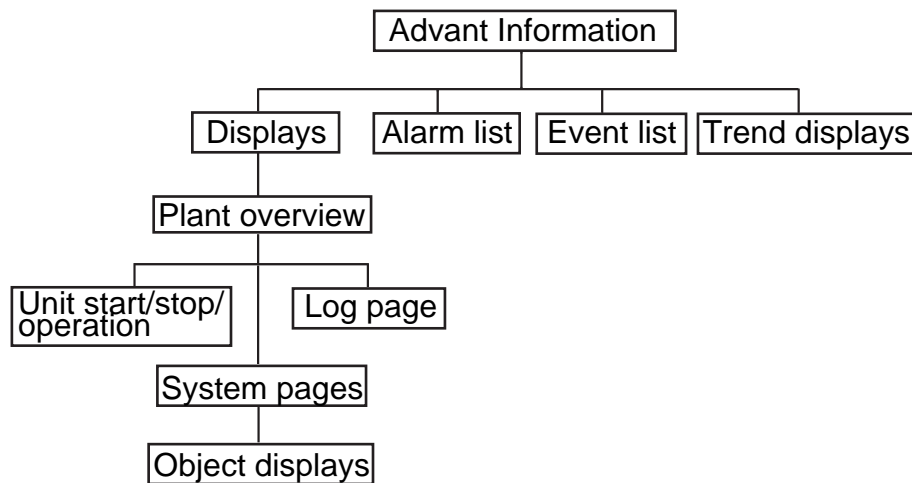
The keyboard is an operator keyboard. Other devices which are part of the operator station configuration are printers (e.g. for hardcopy), alarm printouts, reports etc.

4 Information structure

4.1 General

The ABB operator station has several different types of displays depending on the kind of information you need or what actions you want to carry out. The different types of information are for example:

- process displays
- alarm list
- event list
- trend displays



4.2 The display block

The display block contains the process displays of the plant, i.e. displays showing diagrams of the plant or parts thereof with dynamic values and state of objects etc. You can also operate the plant from the displays.

4.3 The alarm list block

This block contains a list showing the unacknowledged and remaining alarms.

4.4 The event list block

This block contains a list showing the latest 1 000 events, when the list is full the “oldest” event will be deleted.

4.5 The trend display block

This block contains trend displays, that makes it possible to check the trend curves for a certain object.

4.6 Introducing the displays and lists

The display menu

If you are going to start, stop, supervise or adjust setpoints, you may select the display menu by pushing the button Display menu on the keyboard. This menu shows all the displays in the plant in numerical order.

The plant overview display

From the display menu you can select to show all process displays by clicking on Plant Overview display. When in this position you can select from start/stop displays, log page and system displays.

Unit start/stop display

This display is to be preferred when starting and stopping the gas turbine. It will show you the start and stop sequence and will give you the information needed to supervise the start and stop.

Unit operation display

When the gas turbine has been started and you require an overview of the gas turbine process, it is preferable to select this display.

Log page 1

This display gives you a total overview of the most important values of the gas turbine's system.

Log page 2

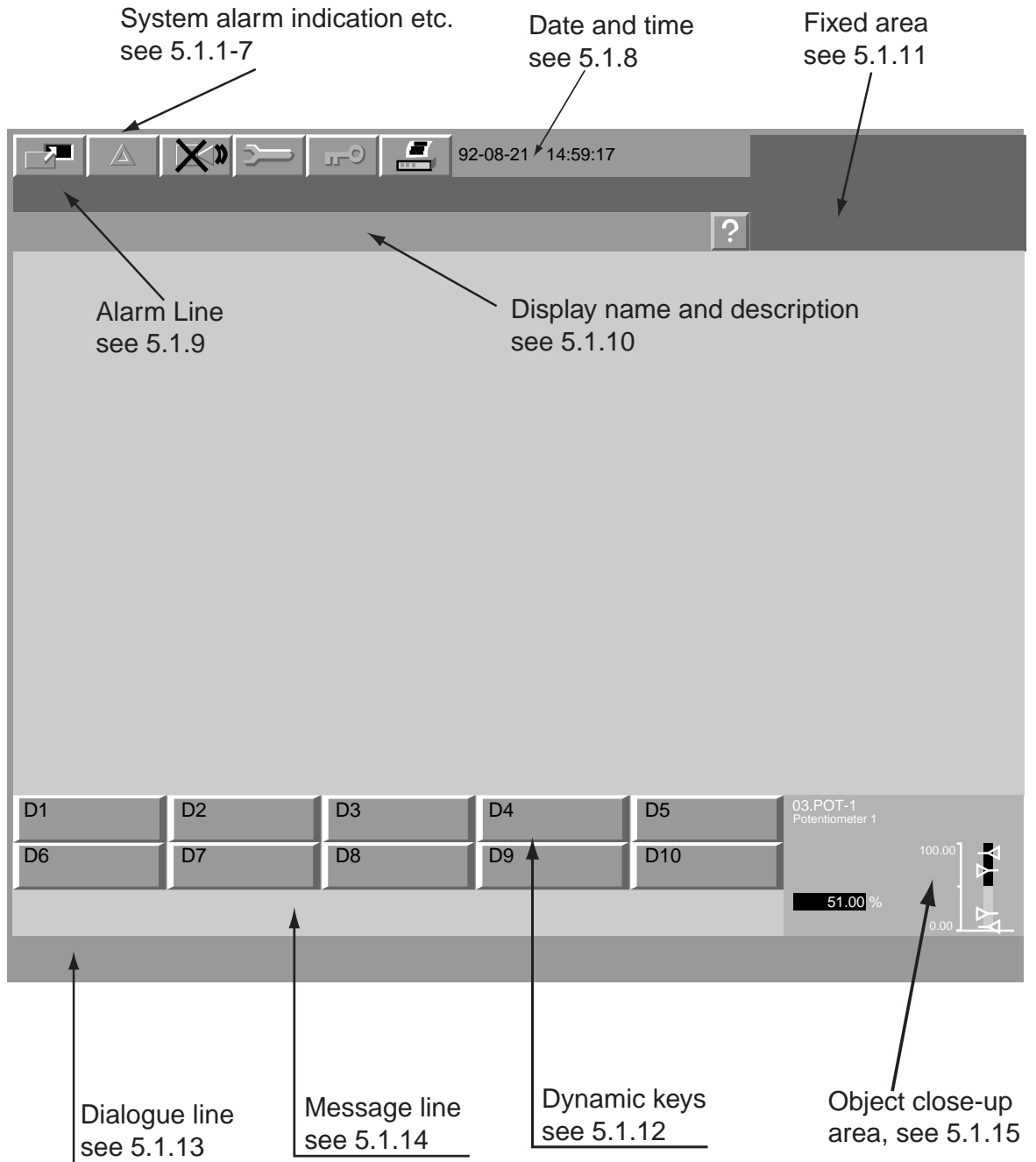
This display is an extended version of Log Page 1 and gives, for example, all measuring points from the exhaust temperature (T7).

System displays

If you require a closer look at a specific system you may select one of the system displays.

5 The ABB Advant Screen Layout

The basic layout of the ABB Advant display is shown below

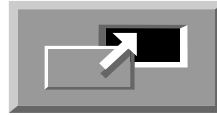


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5.1 Different screen areas

The different screen areas are as described below.

5.1.1 Dedicated screen



A dedicated screen means that object displays and object trend displays are displayed on the screen independent of which of the two screens you work on when calling up these kinds of displays.

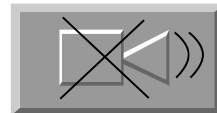
Note! This function is only valid with two monitors connected

5.1.2 System alarm



The icon, a red triangle with yellow background, indicates an unacknowledged system alarm, otherwise the colour is grey.

5.1.3 Audible alarm



Silence an audible alarm by positioning the cursor on the icon and click. The audible alarm consists of an audible signal from the keyboard or from external alarm.

5.1.4 Authority key



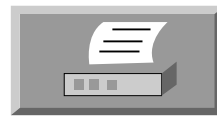
The icon indicates that the enlarged dialogue is valid (maximum dialogue). This is obtained with the key in horizontal position.

5.1.5 Configuration tool



The icon, a spanner, indicates that at least one configuration tool is active. By clicking this icon, a window is presented that shows a list of the currently active tools.

5.1.6 Printer



The printer icon indicates that one or more of the printers or the hard copy connected to the operator station is faulty.

5.1.7 Help display



The question mark indicates that the present base display has a help display (explanation buttons, functions etc.).

5.1.8 Date and time

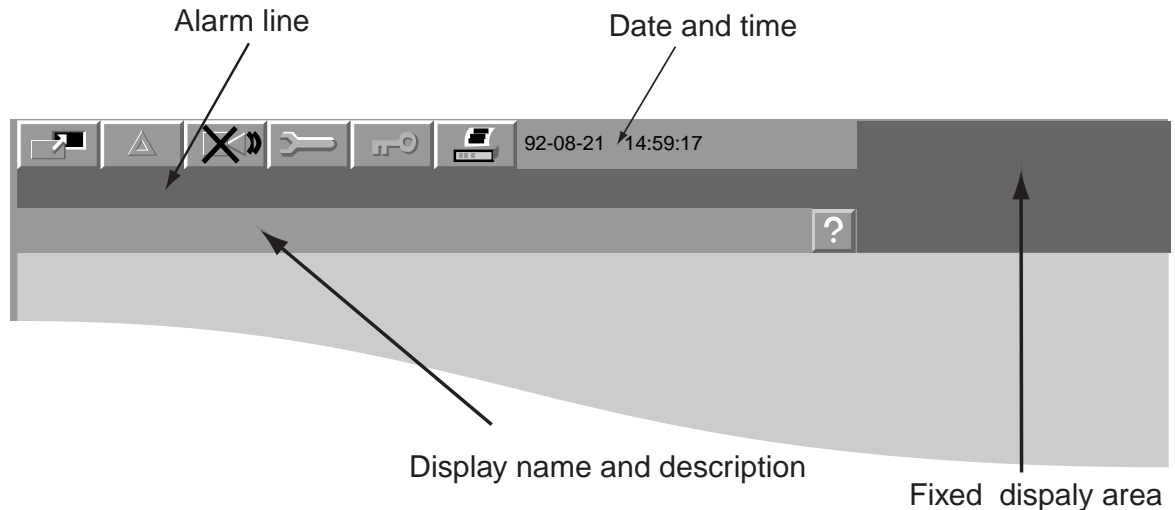
Shows the current time and date measured by the system clock.

5.1.9 Alarm line

The latest unacknowledged process alarm is displayed in the alarm line. You can select the object causing the alarm by positioning the cursor on the alarm line and then pressing the key.

5.1.10 Display name and description

Name and description of the presented base display in the display area. The name of an overlap display is in its title bar



5.1.11 Fixed display area

The fixed display is always shown on the screen independent of what is shown in the display area. The fixed display can contain static as well as dynamic information. In this area the different process sections are presented.

5.1.12 Dynamic function keys

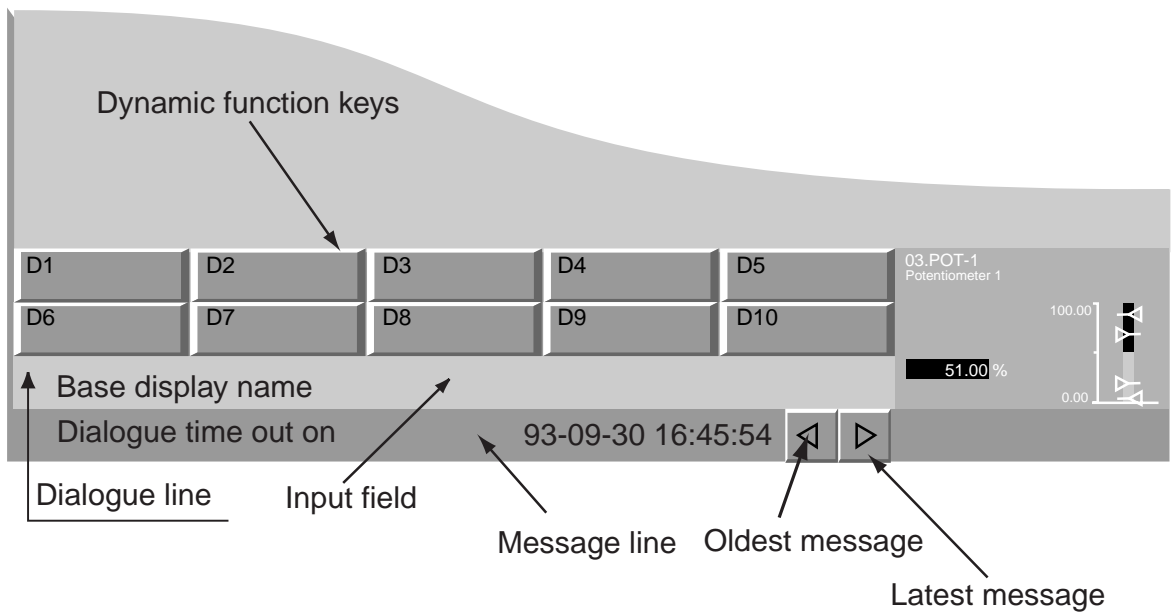
The dynamic function keys give you access to a large dialogue repertoire, such as display selection and dialogue for operations and settings of object parameters. The keyboard keys correspond to the screen buttons D1-D10

5.1.13 Dialogue line

The dialogue line displays information about selected objects. On the right there is an input field for the operator to enter display name, object names and object parameters such as analogue values.

5.1.14 Message line

The message line displays error messages and information about current activity. The time of the message is also displayed. To recall the latest 10 messages, use the arrow keys. The error messages are in pale yellow, the current one has a frame, the other messages are grey.



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5.1.15 Object close up area

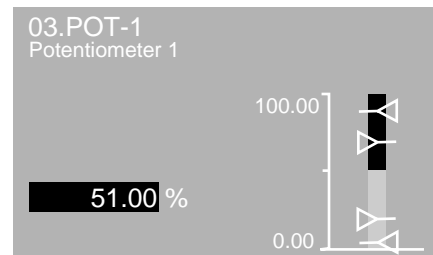
Reserved area for detailed information of a selected process object.



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Object close-up area with no objekt selected.



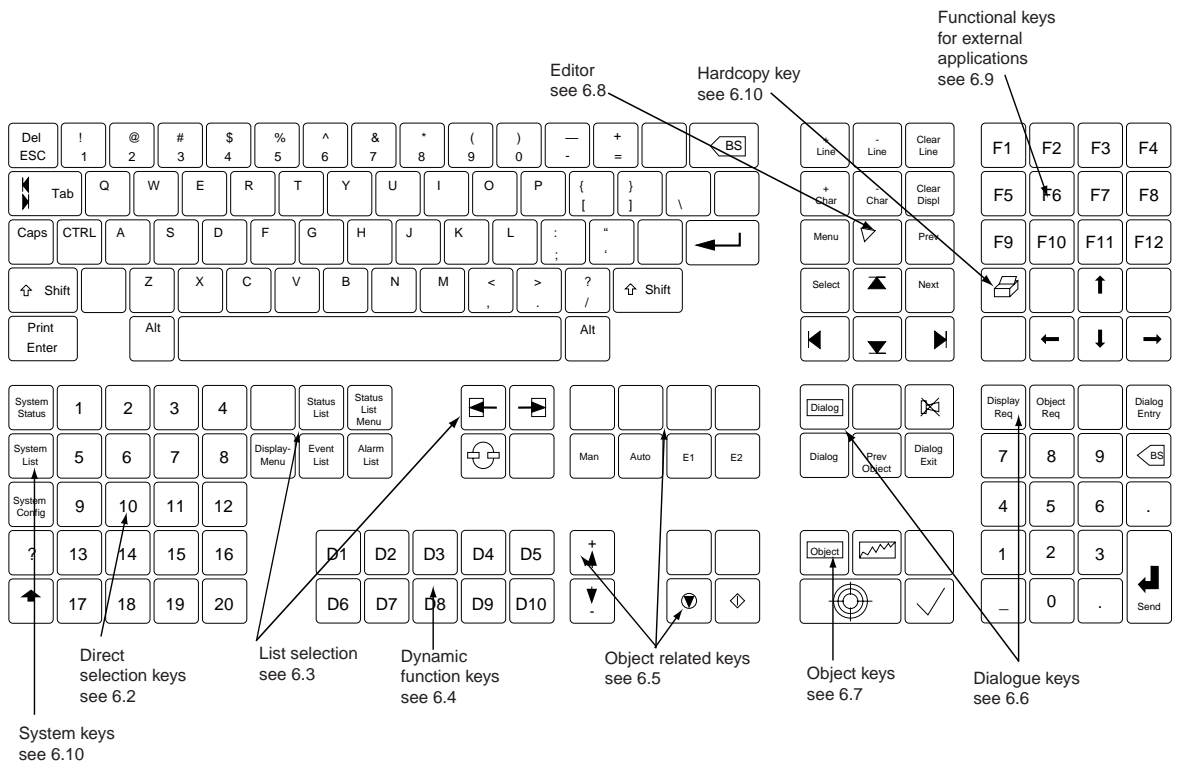
Object close-up area with object selected.

6 The ABB Advant Keyboard

6.1 Keyboard operation

The operator's keyboard will be described in this chapter. As a pointing device you can use the mouse. You may use this keyboard for both operation and configuration.

Figure The operator's keyboard



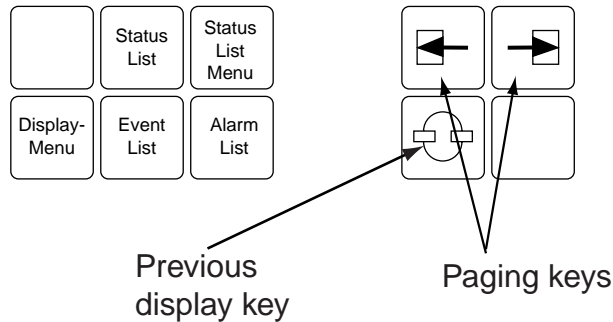
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6.2 Direct selection keys

Direct selection keys are used to call up displays, dialogues or external applications. Each key has two functions by means of the SHIFT key.

Frequently used keys can be assigned to these keys.

6.3 List selection keys



Display menu

This key calls up a menu containing the display libraries. Select a library and all installed displays within the library will be listed.

Event list

Press EVENT LIST and the last page in the Event list will be displayed. With the paging keys you can go through the whole list. The last 1 000 events are listed.

Alarm list

Press ALARM LIST and the last page in the Alarm list will be displayed. With the paging keys you can go through the whole list. Unacknowledged and remaining alarms are listed.

Status list and Status list menu

The function is an option.

Paging keys

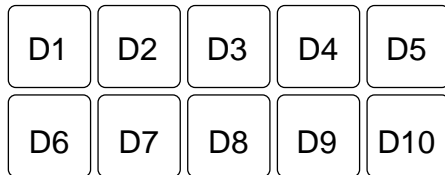
With the page left and the page right keys you can go backwards or forward as many pages as there are in chosen list. You can also page through chained displays.

Previous display key

With the previous display key you can toggle between the last on-screen display and the present one. The paging keys are only valid for base displays.

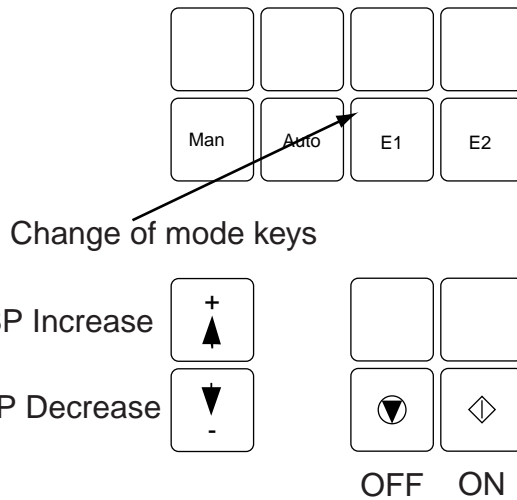
6.4 Dynamic function keys

Ten keys, marked D1 to D10 on the keyboard, correspond to the ten buttons at the bottom of the screen. Each key represents a dialogue and shows all possible actions the operator can choose for the selected object or display. See figure below.



6.5 Object related keys

These keys are used for the basic operation of the selected process objects. The fixed keys are usually more convenient and faster to use than the dynamic function keys.



Change of mode keys

Change of mode of the controllers: Man, Auto, E1 and E2.

Setpoint change

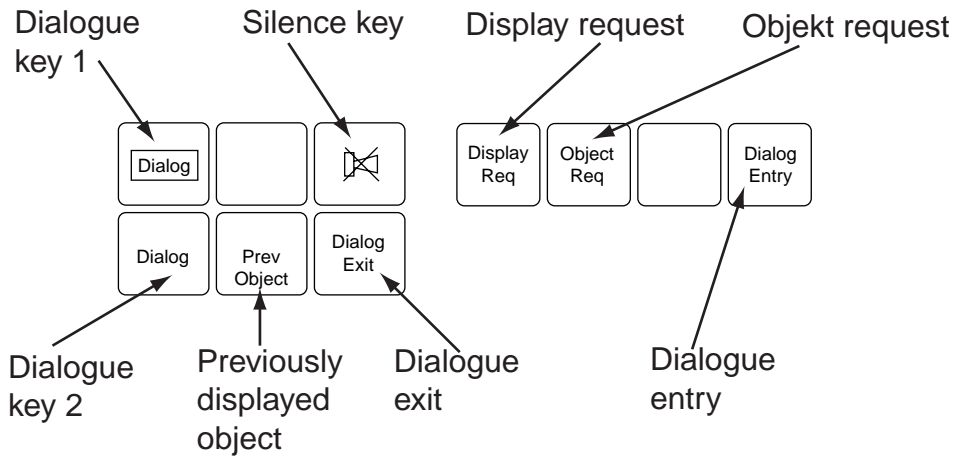
You can increase or decrease the setpoint value by ramping the SP keys up or down. The increase/decrease value will be changed by 1% of the present value. If SHIFT is pressed simultaneously the value will be changed in steps of 10%.

ON/OFF keys

On and Off keys for valves, switches, motors, pumps etc.

6.6 Dialogue keys

These keys control the process objects by means of process dialogues. They are displayed as the dynamic keys when the object is selected.



Dialogue key 1

This key takes you to subordinated dialogues.

Dialogue key 2

This key restores the dynamic function keys (to the original dialogue).

Dialogue exit

Press this key to cancel a selection. This will free the object. It can now be selected by other operators in case of more than one operator station. The key can also be used to remove the input field, e.g. when you have used the object request or displayed request functions.

Dialogue entry

Press this key to bring the cursor to the dialogue field. This key is used for special applications.

Previously displayed objects

Press this key to select the previously displayed object.

Silence key

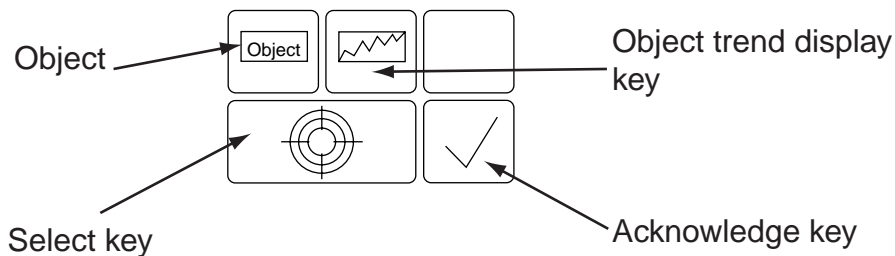
To silence an audible alarm in the keyboard or an external audible alarm: press the silence key or click on the corresponding icon in the icon bar.

Display and Object Request

Call up a base display by pressing the display request key and typing the display name. Select an object by pressing the object request key and typing the object name (KKS).

Call up an overlap display: Hold SHIFT and press the display request, and then type the display name.

6.7 Object keys



Object

Press this key and the object displayed for a marked process object is displayed. The display contains all the information available about the object. The display layout is the same for all objects, but its contents varies depending on the object type. If you press OBJECT and SHIFT simultaneously you will get the object display as an overlap display.

Object trend display

This key calls up the Object trend display for a marked process object. If you press this key and SHIFT simultaneously you will get the display as an overlap display.

Select key

Use this key to select a process object for control or to select displays from lists and menus. You can also make a selection by using the select button on the mouse or trackball. Press SHIFT and SELECT simultaneously for the object close up display (without dialogue).

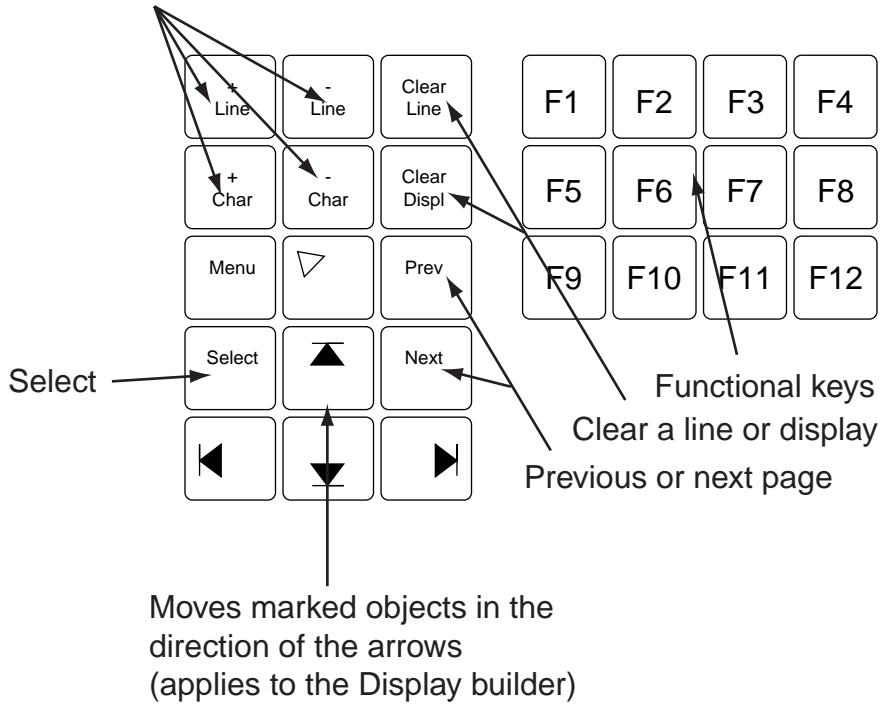
Acknowledge key

Process alarms that are active in the process have red flashing light. Acknowledge the alarm by positioning the cursor on the object name or symbol and press on the corresponding icon in the icon bar.

6.8 Editor

See the figure below for explanation:

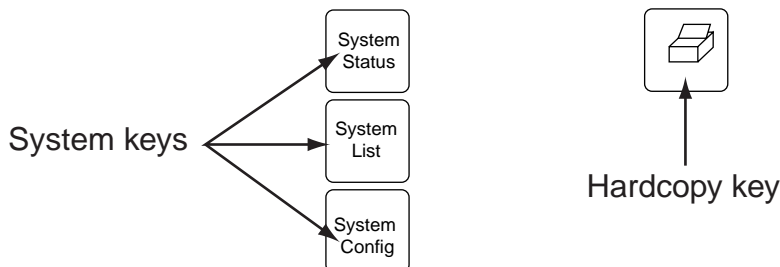
Add or remove
a line or character



6.9 Functional key for external applications

12 keys marked F1 to F12 can be used for external applications.

6.10 System and hardcopy keys



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System keys

The System Status key presents the status of the I/O boards, peripheral devices and communication links.

The system List key presents system alarms. These keys are mostly used for monitoring and troubleshooting in the system.

The system Config key calls up a menu from which you can start configuration and maintenance functions.

Hardcopy key

The hardcopy key is used to get printouts of screen on a printer.

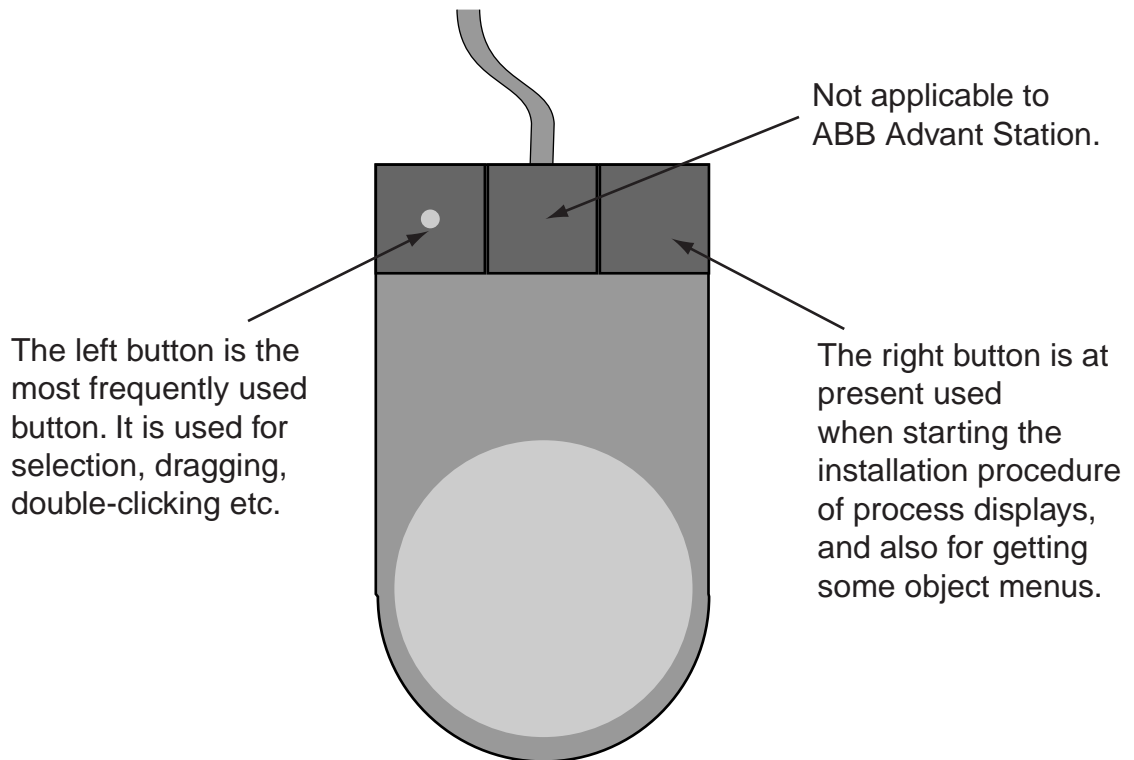
7 Mouse

7.1 HP Mouse

If you are working with the HP keyboard you cannot use the trackball. You have to use the HP mouse.

7.1.1 *Mouse operations*

This figure describes the buttons of the mouse:



8 Operation Related Actions

8.1 How to select a display

In general there are the following listed ways to select a display:

1. Selecting a display from the Display menu
2. By pressing one of the direct selection keys
3. By pressing one of the ten dynamic function keys (if implemented)
4. By pressing one of the request keys and selected display number
5. By selecting the latest unacknowledged alarm
6. By selecting a close up display (bottom, right on the process display)

8.2 Operator's guide to the lists and displays

8.2.1 Alarm list

By pressing the key ALARM LIST the last page of the alarm list is obtained. By pressing the keys page left, page right you may go backwards or forward in the list

Alarm handling

You can acknowledge an alarm from the following displays:

- Process alarm list
- System list
- Process displays
- Object displays

How to acknowledge an alarm from the process alarm display:

1. Press the key ALARM LIST to open the process alarm list
2. "Freeze" the display by pressing the key D5

All unacknowledged alarms will flash red.

3. You can acknowledge in two ways: Either acknowledge all alarms by pressing key D4, or acknowledge the alarms one by one by position the alarm you wish to acknowledge with the cursor, and then press the Acknowledge key (see page 20).
4. For further information see the document Fault Procedures.
5. You may print out the alarm list by pressing the key D1.

How to acknowledge an alarm from another display:

- Process diagram
Position the cursor on the icon or value
- Object displays
Select the object

After these actions acknowledge the alarm by pressing Acknowledge key.

System alarms

The system list contains the latest occurred events and alarms in the ABB Advant-system. The 20 latest are presented on the screen when pressing the key SYSTEM LIST. If there are unacknowledged alarms the icon System alarm (see page 8) will shine.

You can acknowledge the alarm by position the cursor on the actual line in the system list and press the key ACKNOWLEDGE.

Object alarms

Different types of alarms can occur, for instance: Position in fault. In all situations the present position will be showed.

Selecting an object from alarm list and alarm line

1. “Freeze” the display by pressing the key D5
2. Mark the alarm list (click with the mouse) and press the Select key (see page 20) or double-click.
3. Reset the alarm list.

8.2.2 Event list

By pressing the key event list, the last page of the event list will appear on the screen. By pressing the keys page left, page right you may go backward or forward in the list.

In the list there are 35 pages available for these events (30 events on each page). All events in the event list will be printed out.

8.2.3 Process display

The displays can be opened from the display menu or from the direct selection keys. For each process display you can program the ten dynamic function keys to easier open ten process or trend displays etc.

8.2.4 Trend Display

Values from a transmitter can be stored and be presented as trend displays. Each display can contain up to 6 trend curves.

Trends are presented when pressing the keys:

1. Display menu
2. Position the cursor on the required line in the menu and press the selection key or clicking the mouse.

To open a single object trend:

Position the cursor on the object required and press the key OBJECT TREND DISPLAY (see page 18).

8.2.5 Selecting a process object for manoeuvring**A process object can be selected by**

- cursor positioning
- input of object name

The operator selecting a certain object has full admission to the selected object. Other operators have to wait until the object no longer is selected. This will happen when


















- the operator “in command” press the key DIALOG EXIT.
- the operator “in command” selecting a new object
- the operator “in command” changes display, though not when changing to object display.
- or when
- the maximum time for inactivity (3 minutes) is exceeded.

8.2.6 Object Display

An object display can be selected by clicking on an icon and pressing the object key.

9 Legend to Symbols

Explanations of display symbols used in the process displays are shown below

	Selectable alternative
	Indication if function in operation
	Indication if function not in operation
	Valve closed
	Valve open (Valve colour = media colour)
	Control valve position
	Generator circuit breaker open
	Generator circuit breaker closed
	Pump in operation
	Pump not in operation
	Fan in operation
	Fan not in operation
	Auto mode indication
	Stand-by mode indication
	Manual mode indication
	Measuring point
	Object that has not obtained requested position

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9.1 Colour of Display Symbols

Display symbols used in the process displays are presented with different colours depending on the actual status of the corresponding process object.

The following colours are used for different status

Green	Normal status
Red flashing	Unacknowledged alarm status in process display and in ALARM list to indicate "SHUTDOWN" alarms.
Red	Acknowledged alarm with remaining alarm status in process displays. Also used for acknowledged "SHUTDOWN" alarms in the EVENT and ALARM list.
Yellow	Blocked status. The object has been blocked by the operator or by the control system. Also used for acknowledged alarm presentation with START-INTERLOCK in the EVENT and ALARM list.
White	Used to indicate that an object is selected by the operator. Also used as receipt of operator input at the operator input field.
Purple	Used for acknowledged "ALARM" presentation in the EVENT and ALARM list.

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