

# Start-up and control panel

---

## What this chapter contains

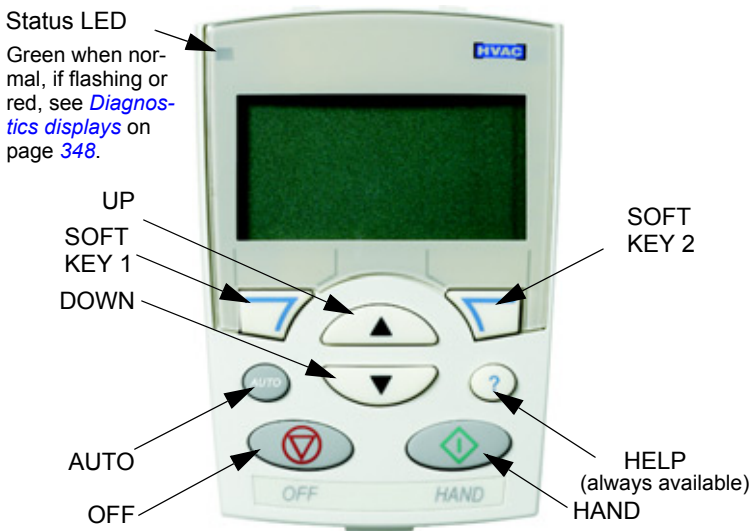
This chapter contains a brief description of the assistant (HVAC) control panel (operator keypad), start-up assistant and application selection.

## Control panel compatibility

The manual is compatible with the HVAC control panel ACH-CP-B Rev H with panel firmware version 1.7 or later.

## HVAC control panel (ACH-CP-B) features

The ACH550 HVAC control panel (operator keypad) ACH-CP-B features:



- language selection for the display
- drive connection that can be made or detached at any time
- start-up assistant to facilitate drive commissioning
- copy function for moving parameters to other ACH550 drives
- backup function for saving parameter sets

- context sensitive help
- real-time clock.

## Start-up






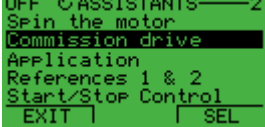


Start-up can be performed in two ways:


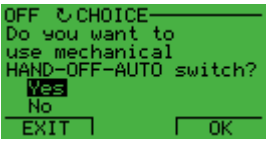

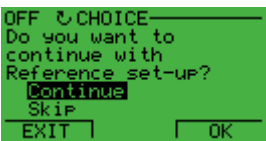
1. using the Start-up assistant or
2. changing the parameters individually.

At the first start, the drive activates the Start-up assistant. You can restart it and its individual tasks in the Start-up assistant mode as described in section [Start-up assistant mode](#) on page 70.

### 1. Start-up by using the Start-up assistant

To start the Start-up assistant, follow these steps:


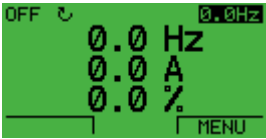












1	Press MENU to go to the main menu		
2	Select ASSISTANTS with the UP/DOWN keys and press ENTER.		
3	Scroll to Commission drive with the UP/DOWN keys.		
4	Change the values suggested by the Start-up assistant to your preferences and then press SAVE after every change.		

<p>5</p>	<p>After selecting the macro, specify whether you want to use the mechanical HAND-OFF-AUTO switch. To be able to use the switch, EXT1 (HAND) Start command must be connected to DI1 and EXT2 (AUTO) Start command to DI6.</p>		
<p>6</p>	<p>After completing a task, the Start-up assistant asks if you want to continue with the next one. Press OK (when Continue is highlighted) to continue with the next task, select Skip with the UP/DOWN keys and press OK to move to the next task without doing this one or press EXIT to stop the Start-up assistant.</p>		

The Start-up assistant will guide you through the start-up. For more information, see section [Start-up assistant mode](#) on page 70.

## 2. Start-up by changing the parameters individually

To change the parameters, follow these steps:

1	Press MENU to go to the main menu.		
2	Select the PARAMETERS mode with the UP/DOWN keys and press ENTER to go to the Parameters mode.		
3	Select the appropriate parameter group with the UP/DOWN keys and press SEL.		
4	Select the appropriate parameter in a group with the UP/DOWN keys. Press EDIT to change the parameter value.		
5	Press the UP/DOWN keys to change the parameter value.		
6	Press SAVE to store the modified value or press CANCEL to leave the set mode. Any modifications not saved are cancelled.		
7	Press EXIT to return to the listing of parameter groups, and again to return to the main menu.		

To complete the control connections by manually entering the parameters, see chapter [Parameter listing and descriptions](#).

For detailed hardware description, see chapter [Technical data](#).

---

**Note:** The current parameter value appears below the highlighted parameter.

---

---

**Note:** To replace the displayed value of a parameter with the default value, press the UP/DOWN keys simultaneously.

---

---

**Note:** The most typical and necessary parameters to change are the following parameter groups: [Group 99: START-UP DATA](#), [Group 10: START/STOP/DIR](#), [Group 11: REFERENCE SELECT](#), [Group 20: LIMITS](#), [Group 21: START/STOP](#), [Group 22: ACCEL/DECEL](#), [Group 26: MOTOR CONTROL](#) and [Group 30: FAULT FUNCTIONS](#).

---

---

**Note:** To restore the default factory settings, select the HVAC default application macro.

---

## Modes

The HVAC control panel (operator keypad) has several different modes for configuring, operating and diagnosing the drive. The modes are:

- [Standard display mode](#) – Shows drive status information and operates the drive.
- [Parameters mode](#) – Edits parameter values individually.
- [Start-up assistant mode](#) – Guides the start-up and configuration.
- [Changed parameters mode](#) – Shows changed parameters.
- [Drive parameter backup mode](#) – Uploads or downloads the parameters between the drive and the control panel.
- [Clock set mode](#) – Sets the time and date for the drive.
- [I/O settings mode](#) – Checks and edits the I/O settings.

## Standard display mode

Use the standard display mode to read information on the drive's status and to operate the drive. To go to the standard display mode, press EXIT until the LCD display shows status information as described below.

### Status information

**Top.** The top line of the LCD display shows the basic status information of the drive.

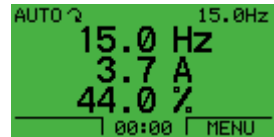
- HAND – Indicates that the drive control is local, i.e., from the control panel (operator keypad).
- AUTO – Indicates that the drive control is remote, such as the basic I/O (X1) or fieldbus.
- ↻ – Indicates the drive and motor rotation status as follows:

Control panel display	Significance
Rotating arrow (clockwise or counterclockwise)	<ul style="list-style-type: none"> <li>• Drive is running and at setpoint.</li> <li>• Shaft direction is forward or reverse.</li> </ul>
Dotted rotating arrow	Drive is running but not at setpoint.
Stationary arrow	Drive is stopped.
Dotted stationary arrow	Start command is present, but the motor is not running, e.g. because start enable is missing.

- Upper right – shows the active reference.

**Center.** Using parameter *Group 34: PANEL DISPLAY*, the center of the LCD display can be configured to display:

- Three signals from *Group 01: OPERATING DATA* – The default display shows parameters 0103 (OUTPUT FREQ) in hertz, 0104 (CURRENT) in amperes and 0120 (AI1) as a percentage.
- A bar meter instead of each signal value.



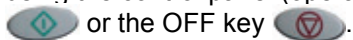
**Bottom.** The bottom of the LCD display shows:

- Lower corners – Show the functions currently assigned to the two soft keys.
- Lower center – Displays the current time (if configured to show the time).


## Operating the drive




**AUTO/HAND** – The very first time the drive is powered up, it is in the AUTO mode (remote control), and controlled from the Control terminal block X1.

To switch to HAND mode (local control) and control the drive using the control panel (operator keypad), press the HAND key



- Pressing the HAND key switches the drive to local control while keeping the drive running.
- Pressing the OFF key switches to local control and stops the drive.

To switch back to AUTO mode, press the  key.






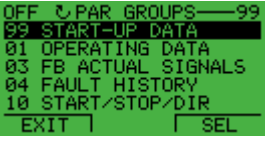



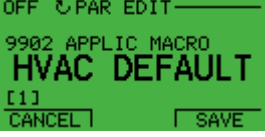



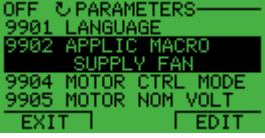
**Hand/Auto/Off** – To start the drive, press the HAND () or AUTO key (). To stop the drive press the OFF key (.

**Reference** – To modify the reference (only possible if the display in the upper right corner is highlighted in inverted color) press the UP or DOWN keys (the reference changes immediately).

The reference can be modified in the HAND mode. It can be parameterized (using [Group 11: REFERENCE SELECT](#)) to also allow modification in the AUTO mode.

## Parameters mode

To change the parameters, follow these steps:

1	Press MENU to go to the main menu.		
2	Select the PARAMETERS mode with the UP/DOWN keys and press ENTER to go to the Parameters mode.		
3	Select the appropriate parameter group with the UP/DOWN keys and press SEL.		
4	Select the appropriate parameter in a group with the UP/DOWN keys. Press EDIT to change the parameter.		
5	Press the UP/DOWN keys to change the parameter value.		
6	Press SAVE to store the modified value or press CANCEL to leave the set mode. Any modifications not saved are cancelled.		
7	Press EXIT to return to the listing of parameter groups, and again to return to the main menu.		

To complete the control connections by manually entering the parameters, see chapter [Parameter listing and descriptions](#).



For detailed hardware description, see chapter [Technical data](#).

---

**Note:** The current parameter value appears below the highlighted parameter.

---

---

**Note:** To replace the displayed value of a parameter with the default value, press the UP/DOWN keys simultaneously.

---

---

**Note:** The most typical and necessary parameters to change are the following parameter groups: [Group 99: START-UP DATA](#), [Group 10: START/STOP/DIR](#), [Group 11: REFERENCE SELECT](#), [Group 20: LIMITS](#), [Group 21: START/STOP](#), [Group 22: ACCEL/DECEL](#), [Group 26: MOTOR CONTROL](#) and [Group 30: FAULT FUNCTIONS](#).

---


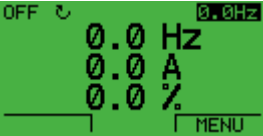



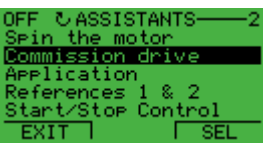



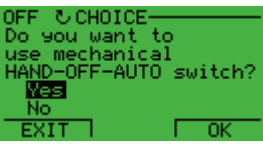

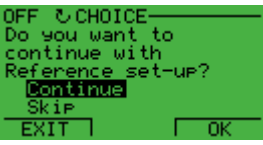
---

**Note:** To restore the default factory settings, select the HVAC default application macro.

---

## Start-up assistant mode

To start the Start-up assistant, follow these steps:

1	Press MENU to go to the main menu.		
2	Select ASSISTANTS with the UP/DOWN keys and press ENTER.		
3	Scroll to Commission drive with the UP/DOWN keys and press SEL.		
4	Change the values suggested by the assistant to your preferences and then press SAVE after every change.		
5	After selecting the macro, specify whether you want to use the mechanical HAND-OFF-AUTO switch.		
6	After completing a task, the Start-up assistant asks if you want to continue with the next one. Press OK (when Continue is highlighted) to continue with the next task, select Skip with the UP/DOWN keys and press OK to move to the next task without doing this one or press EXIT to stop the Start-up assistant.		

The Start-up assistant will guide you through the start-up.

The Start-up assistant guides you through the basic programming of a new drive. (You should familiarize yourself with basic control panel operation and follow the steps outlined above.) At the first start, the drive automatically suggests entering the first task, Language Select. The assistant also checks the values entered to prevent entries that are out of range.

The Start-up assistant is divided into tasks. You may activate the tasks one after the other, as the Start-up assistant suggests, or independently.

---

**Note:** If you want to set the parameters independently, use the Parameters mode.

---

The order of tasks presented by the Start-up assistant depends on your entries. The following task list is typical.







Task name	Description
Spin the motor	<ul style="list-style-type: none"> <li>• Prompts for the control panel display language selection</li> <li>• Prompts for motor data</li> <li>• Guides user through the rotation check</li> </ul>
Commission drive	<ul style="list-style-type: none"> <li>• Prompts for motor data</li> </ul>
Application	<ul style="list-style-type: none"> <li>• Prompts for the application macro selection</li> </ul>
References 1 & 2	<ul style="list-style-type: none"> <li>• Prompts for the source of speed references 1 and 2</li> <li>• Prompts for reference limits</li> <li>• Prompts for frequency (or speed) limits</li> </ul>
Start/Stop Control	<ul style="list-style-type: none"> <li>• Prompts for the source of the start and stop commands</li> <li>• Prompts for the start and stop mode definition</li> <li>• Prompts for acceleration and deceleration times</li> </ul>
Protections	<ul style="list-style-type: none"> <li>• Prompts for current and torque limits</li> <li>• Prompts for the use of Run enable and Start enable signals</li> <li>• Prompts for the use of the emergency stop</li> <li>• Prompts for the Fault function selection</li> <li>• Prompts for the Auto reset functions selection</li> </ul>

Task name	Description
Constant Speeds	<ul style="list-style-type: none"> <li>• Prompts for the use of constant speeds</li> <li>• Prompts for constant speed values</li> </ul>
PID control	<ul style="list-style-type: none"> <li>• Prompts for PID settings</li> <li>• Prompts for the source of the process reference</li> <li>• Prompts for reference limits</li> <li>• Prompts for the source, limits and units of the process actual value</li> <li>• Defines the use of Sleep function</li> </ul>
Low Noise Set-up	<ul style="list-style-type: none"> <li>• Prompts for the switching frequency</li> <li>• Prompts for the definition of Flux optimization</li> <li>• Prompts for the use of Critical speeds</li> </ul>
Panel Display	<ul style="list-style-type: none"> <li>• Prompts for display variable and unit settings</li> </ul>
Timed Functions	<ul style="list-style-type: none"> <li>• Prompts for the use of Timed functions</li> </ul>
Outputs	<ul style="list-style-type: none"> <li>• Prompts for the signals indicated through the relay outputs</li> <li>• Prompts for the signals indicated through the analog outputs AO1 and AO2. Sets the minimum, maximum, scaling and inversion values.</li> </ul>

## Changed parameters mode

The Changed parameters mode is used for viewing changed parameters. The mode shows those parameters whose values differ from the default values of the application macro currently in use.

To access the Changed parameters mode, follow these steps:

1	Press MENU to go to the main menu.		
2	Select CHANGED PAR with the UP/DOWN keys and press ENTER.		
3	A list of the changed parameters is displayed. Press EXIT to exit the Changed parameters mode, and again to return to the main menu.		

## Drive parameter backup mode

Parameter backup mode is used to export parameters from one drive to another or to make a backup of the drive parameters. Uploading to panel stores all parameters, including two user sets and an override set, to the drive control panel (operator keypad). The full set, partial parameter set (application), user sets and override set can then be downloaded from the control panel to another drive or the same drive.

The control panel memory is non-volatile and does not depend on the panel battery.

Depending on the motor and application, the following options are available in the Drive parameter backup mode:

- **UPLOAD TO PANEL** – Copies all parameters from the drive to the control panel. This includes all defined user parameter sets, override parameter set and internal (not adjustable by the user) parameters such as those created by the ID Run).
- **BACKUP INFO** – Shows the following information about the drive whose parameters have been uploaded to the panel: drive type, drive rating and FW (firmware) version.
- **DOWNLOAD FULL SET** – Restores the full parameter set from the control panel to the drive. This writes all parameters, including the internal non-user-adjustable motor parameters, to the drive. It does not include the user parameter sets or the override parameter set.

---

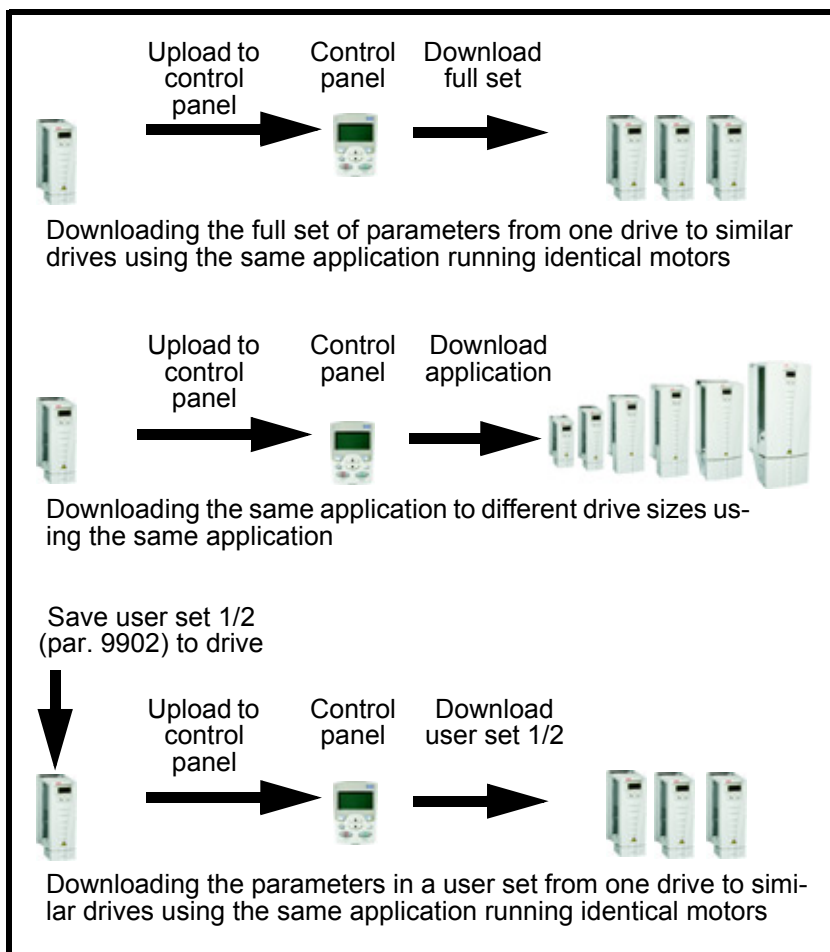
**Note:** Use the Download full set function only to restore a drive from a backup if something has gone wrong or to transfer parameters to systems that are identical to the original system.

---


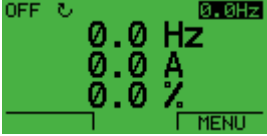








- **DOWNLOAD APPLICATION** – Copies a partial parameter set (part of the full set) from the control panel to the drive. The partial set does **not** include user sets, override set, internal motor parameters, parameters 9905...9909, 1605, 1607, 5201, nor any [Group 51: EXT COMM MODULE](#) and [Group 53: EFB PROTOCOL](#) parameters. This is recommended when using the same application for drives of different sizes.
- **DOWNLOAD USER SET 1** – Copies the parameters in user set 1 from the control panel to the drive. A user set includes [Group 99: START-UP DATA](#) parameters and the internal motor parameters.

User set 1 must be first saved using parameter 9902 APPLIC MACRO and then uploaded to the control panel before downloading is possible.

- DOWNLOAD USER SET 2 – Copies the parameters in user set 2 from the control panel to the drive. As DOWNLOAD USER SET 1 above.
- DOWNLOAD OVERRIDE SET – Copies the parameters in the override set from the control panel to the drive. The override must be first saved (automatically, as defined by [Group 17: OVERRIDE](#)) and then uploaded to the control panel before downloading is possible.















To upload parameters to the control panel, follow these steps:


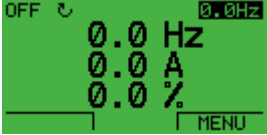








1	Press MENU to go to the main menu.		
2	Select PAR BACKUP with the UP/DOWN keys and press ENTER.		
3	Scroll to UPLOAD TO PANEL and press SEL.		
4	Text "Copying parameters" and a progress diagram are displayed. Press ABORT if you want to stop the process.		
5	Text "Parameter upload successful" is displayed. Press OK to return to the PAR BACKUP menu. Press EXIT twice to go to the main menu. Now you can disconnect the control panel.		



To download the full set of parameters to a drive, follow these steps:

1	Press MENU to go to the main menu.		
2	Select PAR BACKUP with the UP/DOWN keys.		
3	Scroll to DOWNLOAD FULL SET and press SEL.	 	
4	Text “Downloading parameters (full set)” is displayed. Press ABORT if you want to stop the process.		
5	After the download stops, the message “Parameter download successfully completed.” is displayed. Press OK to return to the PAR BACKUP menu. Press EXIT twice to go to the main menu.		 

To download the application (partial parameter set) to a drive, follow these steps:












1	Press MENU to go to the main menu.		
2	Select PAR BACKUP with the UP/DOWN keys.		
3	Scroll to DOWNLOAD APPLICATION and press SEL.		
4	Text “Downloading parameters (application)” is displayed. Press ABORT if you want to stop the process.		
5	Text “Parameter download successfully completed.” Press OK to return to PAR BACKUP menu. Press EXIT twice to go to the main menu.		

---

**Note:** If upload or download of parameters is aborted, the partial parameter set is not implemented.

---


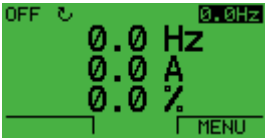










To download the user set 1, user set 2 or override set to a drive, follow these steps:
























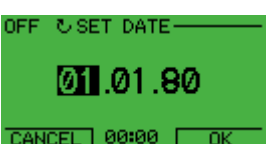


1	Press MENU to go to the main menu.		
2	Select PAR BACKUP with the UP/DOWN keys.		
3	Scroll to DOWNLOAD USER SET1 / USER SET2 / OVERR SET and press SEL.		
4	Text "Downloading parameters (user set 1 / user set 2 / override set)" is displayed. Press ABORT if you want to stop the process.		
5	After the download stops, the message "Parameter download successfully completed." is displayed. Press OK to return to the PAR BACKUP menu. Press EXIT twice to go to the main menu.		 





## Clock set mode

The clock set mode is used for setting the time and date for the internal clock of the ACH550. In order to use the timed functions of the ACH550, the internal clock has to be set first. Date is used to determine weekdays. It is shown in Fault logs.

To set the clock, follow these steps:

1	Press MENU to go to the main menu.		
2	Scroll to CLOCK SET with the UP/DOWN keys and press ENTER to go to the Clock set mode.		
3	Scroll to CLOCK VISIBILITY with the UP/DOWN keys and press SEL to change the visibility of the clock.		
4	Scroll to SHOW CLOCK with the UP/DOWN keys and press SEL to make the clock visible.		
5	Scroll to TIME FORMAT with the UP/DOWN keys and press SEL.		
6	The time formats are displayed. Select a format with the UP/DOWN keys and press SEL to confirm the selection.		






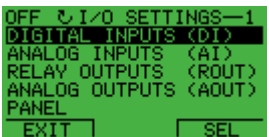






7	Scroll to DATE FORMAT with the UP/DOWN keys and press SEL.	  	
8	The date formats are displayed. Select a format with the UP/DOWN keys and press OK to confirm the selection.	  	
9	Scroll to SET TIME with the UP/DOWN keys and press SEL.	  	
10	Change the hours and minutes with the UP/DOWN keys and press OK to save the values. The active value is highlighted in inverted color.	  	
11	Scroll to SET DATE with the UP/DOWN keys and press SEL.	  	
12	Change the days, months and year with the UP/DOWN keys and press OK to save the values. The active value is highlighted in inverted color.	  	
13	Scroll to DAYLIGHT SAVING with the UP/DOWN keys and press SEL.		

14	<p>To disable automatic clock transitions according to the daylight saving changes, select Off with the UP/DOWN keys and press OK.</p> <p>To enable automatic clock transitions, select the country or area whose daylight saving changes are followed and press OK. (If you press HELP, you can view the begin and end dates of the period during which daylight saving time is used in each country or area.)</p>		
15	<p>Press EXIT twice to return to the main menu.</p>		

## I/O settings mode

The I/O settings mode is used for viewing and editing the I/O settings.

To view and edit the I/O settings, follow these steps:






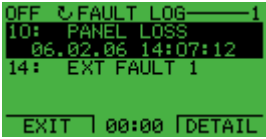
1	Press MENU to go to the main menu.		
2	Scroll to I/O SETTINGS with the UP/DOWN keys and press ENTER.		
3	Scroll to the I/O setting you want to view with the UP/DOWN keys and press SEL.		
4	Select the setting you want to view with the UP/DOWN keys and press OK.		
5	You can change the value with the UP/DOWN keys and save it by pressing SAVE. If you do not want to change the setting, press CANCEL.		
6	Press EXIT three times to return to the main menu.		

## Fault logger mode

The Fault logger mode is used for viewing faults. You can:

- view the drive fault history of maximum ten faults (after a power off, only the three latest faults are kept in the memory)
- see the details of the three latest faults (after a power off, the details of only the most recent fault is kept in the memory)
- read the help text for the fault.

To view the faults, follow the steps below. For more information on faults, see section [Correcting faults](#) on page 349.

1	Press MENU to go to the main menu.		
2	Scroll to FAULT LOGGER with the UP/DOWN keys and press ENTER to go to the Fault logger mode.		
3	The display shows the fault log starting with the latest fault. The number on the row is the fault code (see the listing on page 350). To see the details of a fault, select it with the UP/DOWN keys and press DETAIL.		
4	Scroll the details with the UP/DOWN keys. To show the help text, press DIAG. Scroll the help text with the UP/DOWN keys. After reading the help, press OK to go back to the previous display. Press EXIT three times to return to the main menu.	