

# SD700 Series

VARIABLE SPEED DRIVE



## Getting Started Manual Touch-Graphic Display



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VARIABLE SPEED DRIVE

### Getting Started Manual

# Touch-Graphic Display

**Edition: June 2008**

SD70IM02BI Rev. B



## SAFETY SYMBOLS

Always follow safety instructions to prevent accidents and potential hazards from occurring.



### WARNING

This symbol means improper operation may result in serious personal injury or death.



### CAUTION

Identifies shock hazards under certain conditions. Particular attention should be given because dangerous voltage may be present. Maintenance operation should be done by qualified personnel.



Identifies potential hazards under certain conditions. Read the message and follow the instructions carefully.



Identifies shock hazards under certain conditions. Particular attention should be given because dangerous voltage may be present.

### Edition of June 2008

This publication could present technical imprecision or misprints. The information here included will be periodically modified and updated, and all those modifications will be incorporated in later editions. To consult the most updated information of this product you might access through our website [www.power-electronics.com](http://www.power-electronics.com) where the latest version of this manual can be downloaded.

### Revisions

Date	Revision	Description
26 / 09 / 2007	A	Update to Software version SW 1.3 (08)
11 / 06 / 2008	B	Adaptation to new name SD700



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# SAFETY INSTRUCTIONS

## IMPORTANT!

- Read this manual carefully to maximise the performance of this product and to ensure its safe use.
- In this manual, safety messages are classified as follows:



## WARNING

---

**Do not remove the cover of the drive while the power is applied or the unit is in operation.**  
Otherwise electric shock could occur.

---

**Do not run the drive with the front cover removed.**  
Otherwise you may get an electric shock due to the high voltage terminals or exposure of charged capacitors.

---

**Do not remove the cover except for periodic inspections or wiring, even if the input power is not applied.**  
Otherwise you may access the charged circuits and get an electric shock.

---

**Wiring and periodic inspections should be performed at least 10 minutes after disconnecting the input power and after checking the DC Link voltage is discharged with a meter (below 30VDC).**  
Otherwise you may get an electric shock.

---

**Operate the switches with dry hands.**  
Otherwise you may get an electric shock.

---

**Do not use cables with damaged insulation.**  
Otherwise you may get an electric shock.

---

**Do not subject the cables to abrasions, excessive stress, heavy loads or pinching.**  
Otherwise, you may get an electric shock.

---



## CAUTION

---

**Install the drive on a non-flammable surface. Do not place flammable material nearby.**  
Otherwise fire could occur.

---

**Disconnect the input power if the drive gets damaged.**  
Otherwise it could result in a secondary accident or fire.

---

**After the input power is applied or removed, the drive will remain hot for a couple of minutes.**  
Touching hot parts may result in skin burns.

---

**Do not apply power to a damaged drive or to a drive with parts missing even if the installation is complete.**  
Otherwise you may get an electric shock.

---

**Do not allow lint, paper, wood chips, dust, metallic chips or other foreign matter into the drive.**  
Otherwise fire or accident could occur.

---



## WARNINGS

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### RECEPTION

- The equipment is carefully tested and perfectly packed before leaving the factory.
  - In the even of transport damage, please ensure that you notify the transport agency and POWER ELECTRONICS: 902 40 20 70 (International +34 96 136 65 57) or your nearest agent, within 24hrs from receipt of the goods.
- 

### UNPACKING

- Make sure model and serial number of the equipment are the same on the box, delivery note and unit.
  - Each graphic display is supplied with a getting started manual.
- 

### SAFETY

- Before operating the drive by using the graphic display, read this manual thoroughly to gain and understanding of the unit. If any doubt exists then please contact POWER ELECTRONICS, (902 40 20 70 / +34 96 136 65 57) or your nearest agent.
  - Wear safety glasses when operating the drive with power applied and the front cover is removed.
  - Handle the drive with care according to its weight.
  - Install the drive according to the instructions within this manual.
  - Do not place heavy objects on the drive.
  - Ensure that the mounting orientation of the drive is correct.
  - Do not drop the drive or subject it to impact.
  - The SD700 drives and the graphic display contain static sensitive printed circuits boards. Use static safety procedures when handling these boards.
  - Avoid installing the drive in conditions that differ from those described in the *Technical Characteristics* section in 'Getting Started Manual' for SD700.
- 

### CONNECTION PRECAUTIONS

- To ensure correct operation of the drive it is recommended to use a SCREENED CABLE for the control wiring.
  - For EMERGENCY STOP, make sure supply circuitry is open.
  - Do not disconnect motor cables if input power supply remains connected. The internal circuits of the SD700 Series will be damaged if the incoming power is connected and applied to output terminals (U, V, W).
  - It is not recommended to use a 3-wire cable for long distances. Due to increased leakage capacitance between conductors, over-current protective feature may not operate correctly.
  - Do not use power factor correction capacitors, surge suppressors, or RFI filters on the output side of the drive. Doing so may damage these components.
  - Always check whether the DC Link LED is OFF before wiring terminals. The capacitors may hold high-voltage even after the input power is disconnected. Use caution to prevent the possibility of personal injury.
-

---

**TRIAL RUN**

- Verify all parameters before operating the drive. Alteration of parameters may be required depending on application and load.
  - Always apply voltage and current signals to each terminal that are within levels indicated within the manual. Otherwise, damage to the drive may result.
- 

**OPERATION PRECAUTIONS**

- When the Auto Restart function is enabled, keep clear of driven equipment, as the motor will restart suddenly after a fault is reset.
  - The “STOP / RESET” key on the keypad is active only if the appropriate function setting has been made. For this reason, install a separate EMERGENCY STOP push button that can be operated at the equipment.
  - If a fault reset is made with the reference signal still present then a restart will occur. Verify that it is permissible for this to happen, otherwise an accident may occur.
  - Do not modify or alter anything within the drive.
  - Before programming or operating the SD700 Series, initialise all parameters back to factory default values.
- 

**EARTH CONNECTION**

- The drive is a high frequency switching device and leakage current may flow. Ground the drive to avoid electrical shock. Use caution to prevent the possibility of personal injury.
  - Connect only to the dedicated ground terminal of the drive. Do not use the case or the chassis screw for grounding.
  - When installing, grounding wire should be connected first and removed last.
  - The earth cable must have a minimal cross sectional area that meets local country electrical regulations.
  - Motor ground must be connected to the drive ground terminal and not to the installation’s ground. We recommend that the section of the ground connection cable should be equal or higher than the active conductor.
  - Installation ground must be connected to the drive ground terminal.
-



# 1. DESCRIPTION

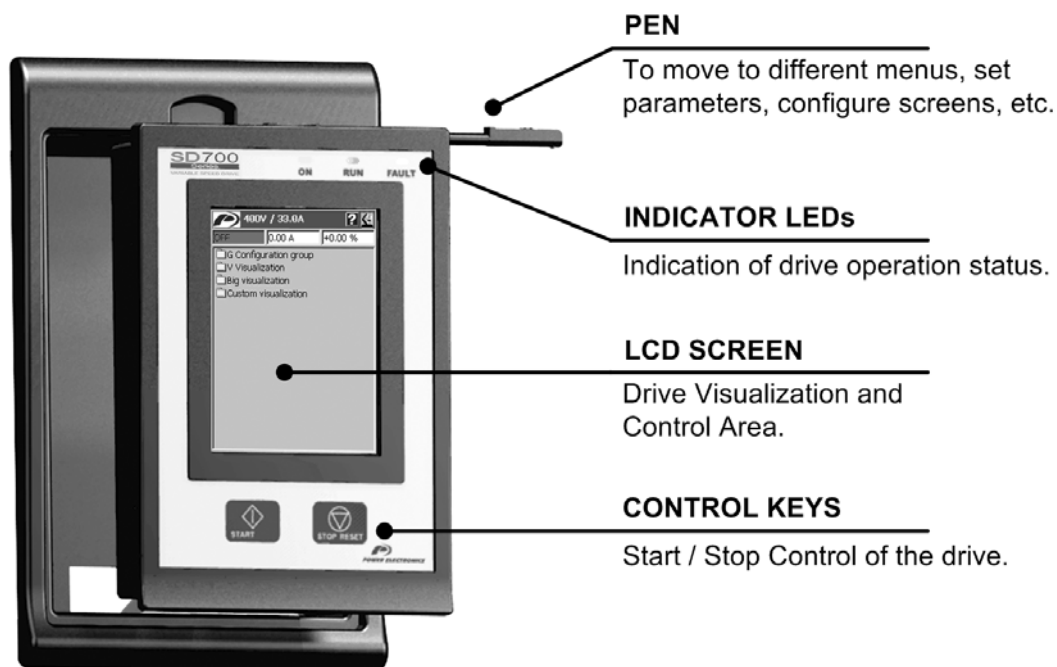
The touch-graphic display provides a much more intuitive data presentation, an easy navigation through the control parameters and allows saving thousands of customized configurations defined by the user.

Some of the outstanding characteristics of the touch-graphic display are:

- TFT-LCD Touch screen of 3,5 inches and 240x320 pixels
- Customized visualization by the user
- GSM and GPRS communication (SMS Service)
- System help built-in
- Fault Register (Logs)
- Language selection



The touch-graphic display for the SD700 is a removable display unit for its remote installation, as the following figure shows:



SD70ITC0025BI

Figure 1.1 Touch-Graphic Display Unit

There are three indicator leds integrated on the display that supply information about the drive operational status. Also there are a LCD screen of 3,5" and two control keys to Start / Stop the drive.

Additionally, there is a pen on the right upper corner of the display unit that is used to access to the different screens and to adjust all of the parameters of the drive that appear in the display. This is possible by only touching over the LCD screen.

## 1.1. Status LEDs

Leds offer an easy method of identifying if the SD700 is powered up, if the drive is supplying output voltage, or if the drive has tripped.

- **Led ON:** Yellow colour. When it is lit, indicates equipment is powered up.
- **Led RUN:** Green colour. When it is lit, indicates the motor is powered by the SD700.
- **Led FAULT:** Red colour. When it is blinking, indicates the equipment is in fault status.

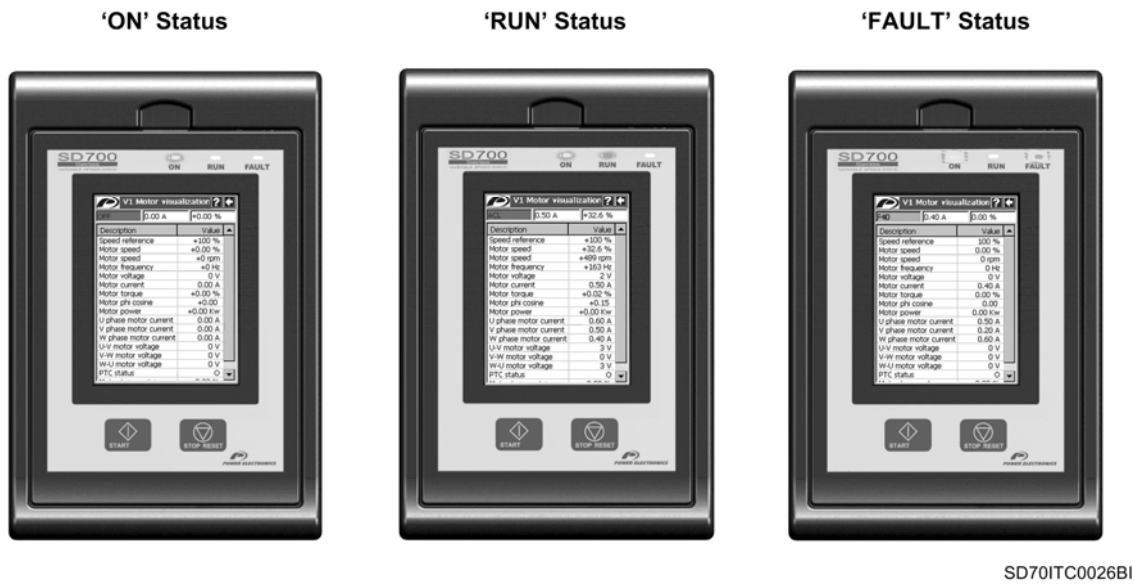


Figure 1.2 Status visualization

## 1.2. Control Keys

There are two keys on the bottom of the display unit that are:



To start the drive from the keypad when the control has been set as local control (check drive configuration).

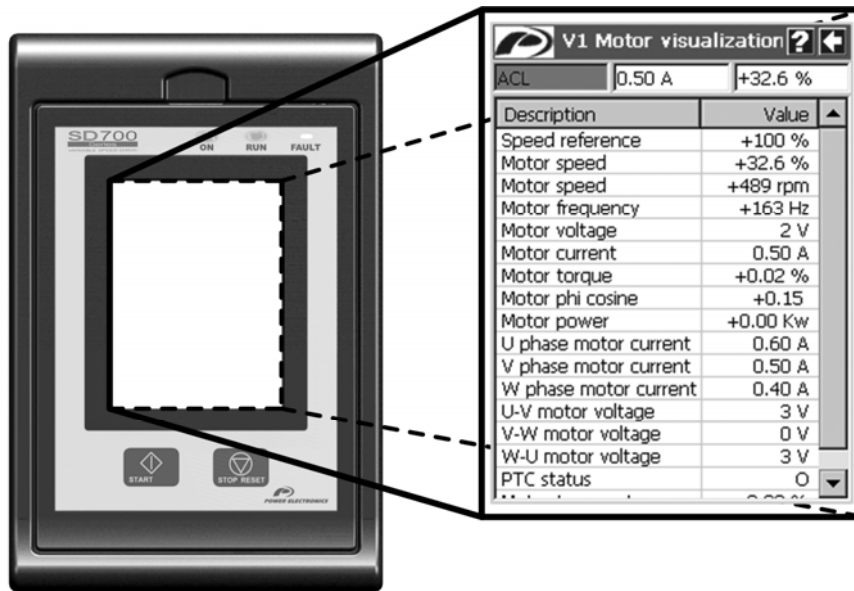


To stop the drive from the keypad when the control has been set as local control. In the case of tripping this key can be used to reset the drive, if local control is enabled.

### 1.3. LCD Screen

The 3,5" LCD screen of the SD700 is the main visualization and interaction area between the drive and the user.

In order to interact with the graphic display, the LCD screen should be only touched over with the pen located on the top-right side of the display unit.



SD70ITC0027BI

Figure 1.3 LCD screen of the graphic display

### 1.4. Pen Interfacing

The pen, which is located on the top-right side of the display as it is mentioned above (see figure 1.1), should be only used over the LCD screen. The possible interactions are:

- **Tap:** Just a slight and quick touch over the LCD surface. It is used in many of the interactions with the GUI (Graphic User Interface). It is used to select items, to set the focus for input text, etc, ...
- **Tap and Hold:** Touch over the LCD screen and keep touching it without moving the pen for more than 2 seconds. It is used mainly to show up floating menu options.
- **Sliding:** Touch over the LCD screen with the pen moving it around the screen and releasing it. It is only used to move scroll bars.



## 2. APPLICATION MANAGEMENT

### 2.1. Graphic User Interface

The Graphic User Interface (GUI) is based on:

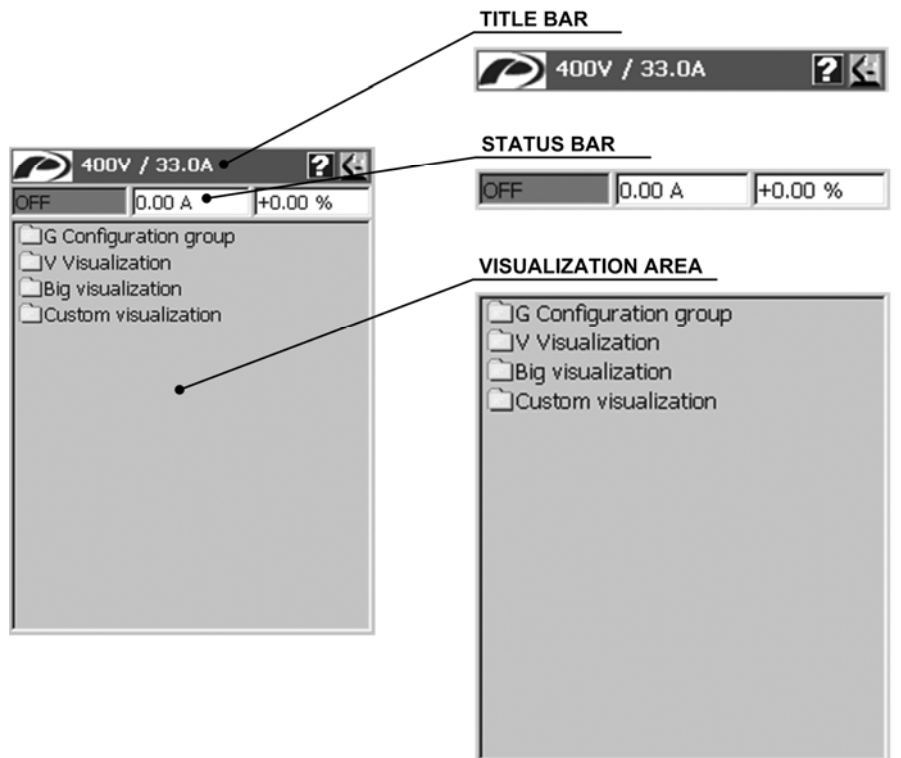
- The main application screen.
- Floating menus.
- The virtual keyboard.

#### 2.1.1. Main Application Screen

The main application screen is the most important element on the GUI. From it, the drive is controlled and monitored and it is the starting point of the remaining components of the GUI.

The main application screen is divided in three main areas:

- **Title Bar**
- **Status Bar**
- **Visualization Area**



SD70ITC0028AI

Figure 2.1 Main Application Screen

## Title Bar

From left to right (see figure 2.1):

- Power icon 'P' (Power logo): When the user taps on it, the system menu is shown.
- Title: This bar shows the drive rated voltage and current, or the name of the visualized window depending on the visualized screen. For example, if the initial screen is on the Visualization Area, this bar will show the drive rated voltage and current, but after accessing to any menu, the name of which is shown on the Title Bar.
- Help button '?': It displays the Help Screen on the Visualization Area.
- Back button '←': To return to the previous screen.

## Status Bar

It shows the main status indicators of the drive. From left to right (see figure 2.1):

- Drive status: Drive operation status, warnings and trips (see chapters '8. STATUS MESSAGES' and '12. FAULT MESSAGES. DESCRIPTIONS AND ACTIONS' of the SD700 'Getting Started Manual' for further information).
- Average motor current: It shows the average current consumption by the motor in Amps.
- Actual motor speed: It shows the actual motor speed as %. The sign indicates that the motor rotates in a direction. A positive sign does not only mean that the motor rotates clockwise.

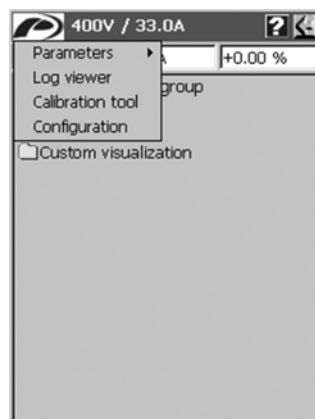
## Visualization Area

This area is where the different application menus (configuration and visualization), drive parameters and configuration options are shown. It is also used for the Help and Fault log screens (see figure 2.1).

### 2.1.2. Floating Menus

A Floating Menu is a group of commands related between them arranged in columns. There are only two types of them in the application:

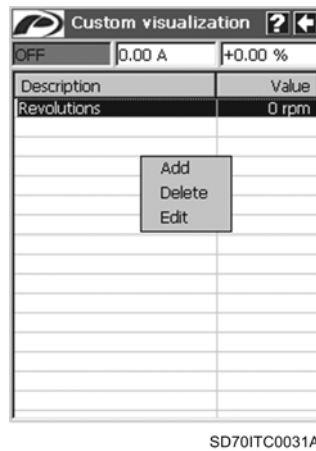
- **System menu:** Main configuration and system tools menu of the graphic display. It is accessed just tapping the 'P' icon. From this menu the user can:
  - Manage the parameter files.
  - View the fault logs.
  - Calibrate the LCD's Touch Panel
  - Set up the language of the display and the SMS service



SD70ITC0030AI

Figure 2.2 System menu

- **Custom Visualization Floating menu:** It is accessed doing a tap-and-hold on the Custom Visualization screen. It manages the variable configuration on the screen. The user can add, edit or delete variables on the Custom Visualization screen.



SD70ITC0031AI

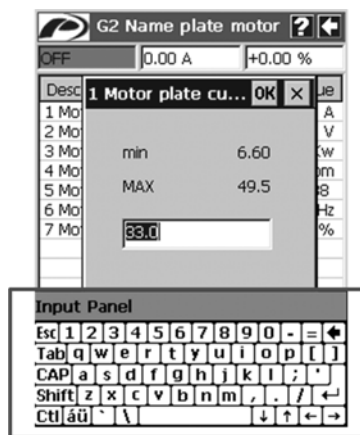
Figure 2.3 Custom visualization floating menu

### 2.1.3. Virtual Keyboard

The virtual keyboard appears automatically whenever the user taps on an edit box. This keyboard hides itself when the user closes the configuration dialogue window or taps into another non-edit-box control.

Whenever the user has to write any text or value in any field of any configuration dialogue window, he will use the virtual keyboard.

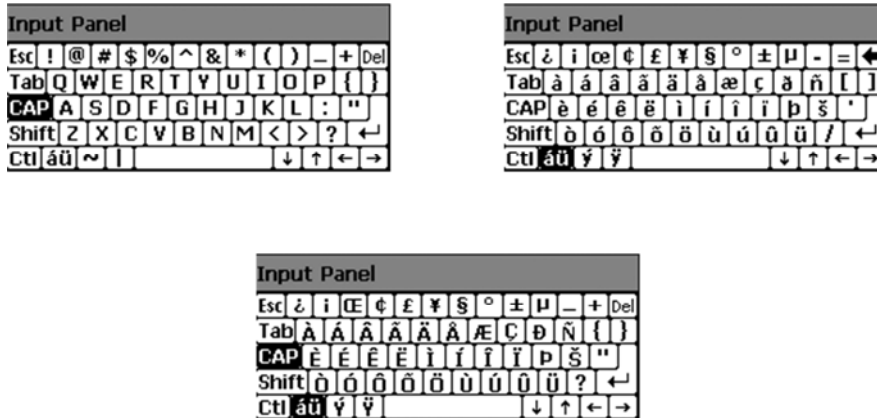
The default virtual keyboard which always appears when tapping on an edit box is shown in the next figure:



SD70ITC0067AI

Figure 2.4 Default virtual keyboard

Additionally, the user can write capital letters and other symbols by tapping on specific keys of the default keyboard to access to special keyboards. Next, it is shown the different virtual keyboards and what keys the user should tap on to access to these keyboards from the default board.



SD70ITC0068AI

Figure 2.5 Different virtual keyboards

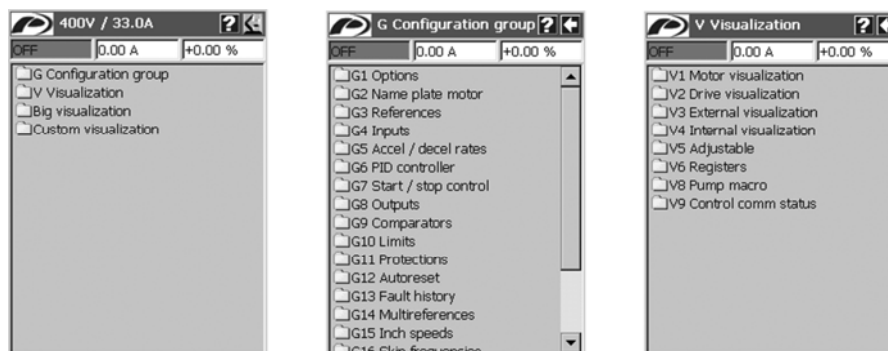
## 2.2. Navigation Structure

- The setting and the visualization of the parameters of the drive is managed through Configuration and Visualization groups respectively (see section ‘2.3.1. Configuration Group (G) and Visualization (V) Menus’ for additional information).
- Through the Custom Visualization screen, the user can select some specific visualization parameters of the drive to be visualized (see section ‘2.3.3. Custom Visualization Menu’ for additional information).
- The Big Visualization screen is another customizable screen to visualize two drive visualization parameters in big format (see section ‘2.3.2. Big Visualization Menu’ for additional information).

### 2.2.1. Menu Screens

In the menu screens, a group of items appear in form of lists. The user can access to other menu screen or to a parameter screen by tapping on any of the items.

This allows the user to navigate through the different groups of configuration or visualization parameters.



SD70ITC0063AI

Figure 2.6 Example of menu screens

## 2.2.2. Parameter Screens

In the parameter screens, each row is a drive parameter. These ones can be visualization parameters or configuration parameters. For each parameter, its name, value and the unit (depending on the parameter type) are defined.

There are two types of parameters:

- **Configuration parameters:** They are used to set up the drive. All of these parameters are grouped in groups or subgroups and included in 'G Configuration group' menu screen.
- **Visualization parameters:** They are used to visualize and monitor the operation status of the drive. All of these parameters are grouped in groups or subgroups and included in 'V Visualization' menu screen.

If the user taps on a parameter in the description column, the whole row is selected.

If the user taps on a configuration parameter value in the value column, a pop up configuration dialog will appear in order to edit the parameter value, and so the user can modify its value.

If the user taps on any part of a row, the whole row is selected.

The visualization parameters cannot be modified.

G7 Start / stop contro	
OFF	+0.00 %
Description	Value
1 Main stop mode	RAMP
2 Alt stop mode	SPIN
3 Stop mode switch speed	OFF
4 Main start mode	RAMP
5 Alt start mode	RAMP
6 Start delay	OFF
7 Stop delay	OFF
8 Stop at min speed	NO
9 Restart delay	OFF
10 Run on supply loss	YES
11 Spin start tune	OFF
12 Restart delay 2	OFF

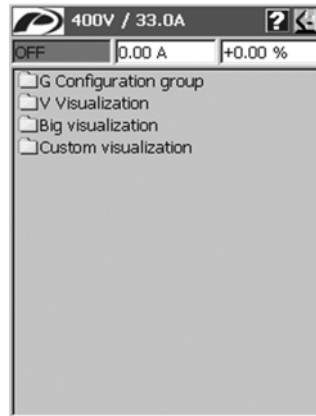
V1 Motor visualization	
ACL	+32.6 %
Description	Value
Speed reference	+100 %
Motor speed	+32.6 %
Motor speed	+489 rpm
Motor frequency	+163 Hz
Motor voltage	2 V
Motor current	0.50 A
Motor torque	+0.02 %
Motor phi cosine	+0.15
Motor power	+0.00 Kw
U phase motor current	0.60 A
V phase motor current	0.50 A
W phase motor current	0.40 A
U-V motor voltage	3 V
V-W motor voltage	0 V
W-U motor voltage	3 V
PTC status	0

SD70ITC0071AI

Figure 2.7 Example of parameter screens

## 2.3. Visualization Area Menus

When the drive is powered, the graphic display shows the following initial screen:



SD70ITC0032AI

Figure 2.8 Initial screen

There are four menus in the initial screen:

- **G Configuration group:**

This menu contains all programmable parameters of the drive. These parameters are grouped in subgroups or submenus to make their location easier. The user can set all of the parameters by accessing them through this menu to configure the drive. See section '2.3.1. Configuration Group (G) and Visualization (V) Menus'.

- **V Visualization:**

This menu contains all visualization parameters of the drive. User should access to these parameters in order to monitor the operation status of the drive and visualize the values of these parameters. Visualization parameters are also grouped in subgroups or submenus to make their location easier. See section '2.3.1. Configuration Group (G) and Visualization (V) Menu'.

- **Big Visualization:**

Through this menu, the user access to other screen where he can visualize the values of two parameters pre-defined by him in big size. The user can customize the visualization for each parameter (name, scale factor and unit). See section '2.3.2. Big Visualization Menu'.

- **Custom Visualization:**

This menu allows user to create a parameter list to visualize their values. The user can add as many parameters as he wants. The user can customize the visualization for each parameter (name, scale factor and unit). Also, the added parameters can be edited or deleted at any moment. See section '2.3.3. Custom Visualization Menu'.

### 2.3.1. Configuration Group (G) and Visualization (V) Menus

The user can access to all of the configuration parameters of the drive and modify their values in order to configure the drive.

In the same way, user can access to all visualization parameters in order to monitor the operation status of the drive and visualize their values. All of these parameters are only to be visualized except for parameters of group V5 (programmable parameters). The parameters included here can be set in both group V5 and the corresponding group or subgroup from the configuration group menu. Visualization parameters inform about the signals status and input and output dynamic parameters of the drive all the time.

Both configuration parameters and visualization parameters are grouped in subgroups that correspond with submenus. When user taps on configuration group menu or visualization menu, a new menu appears with all included parameter groups. To access to a specific parameter, the user should tap on the parameter group where the desired parameter is included.

The next figure is an example of how to access to specific configuration parameter. In this case, the user wants to access to a configuration parameter of group G7. The full navigation tree is observed here.

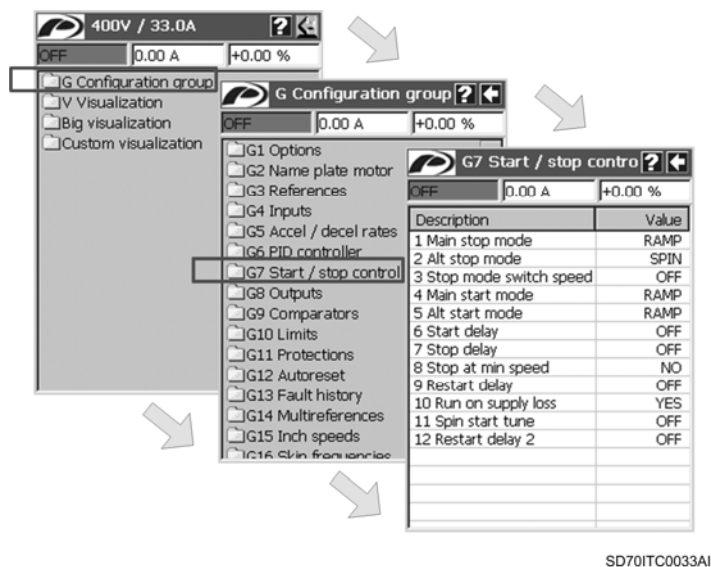


Figure 2.9 Configuration group menu. Navigation tree

In section '2.4. Parameter Setting', you can obtain information about how to adjust the parameters.

**Note:** In order to get the information about the setting range and the default value of all of the parameters, refer to 'Getting Started Manual' of the SD700.

### 2.3.2. Big Visualization Menu

This menu shows the values of two parameters of the drive. These parameters are selected by the user.

This visualization type is a customized visualization, that means, as well as selecting the parameters to visualize, the user define the text (as parameter or variable name), the unit (units of measurement for the magnitude represented by the parameter) and a scale factor for each parameter.

Once tapped on the Big visualization menu, it appears a new screen where the visualization area is divided in two parts. The upper half area corresponds to the first selected parameter and the lower half area corresponds to the second selected parameter.



Figure 2.10 Big visualization menu

To edit a parameter, the user should tap on one of the two areas. Depending on the position where user taps, the first or the second parameter will be edited. After tapping on it, a dialogue window of parameter configuration will appear with the following fields from top to bottom:

- **Customized parameter name:**

This field is an edit box. The user should write here the name or the text that he wants to be shown for this parameter.

- **Drive parameter:**

This field is a combo box. When the user taps on the '▼' a list box is spread out with all of the visualization parameters in alphabetical order. The user should select one parameter from the list by tapping on it. For this, the user can scroll the list up and down in order to look for the desired parameter. When the user selects a parameter from the list, this one disappears and the selected parameter is shown in the field as present selection.

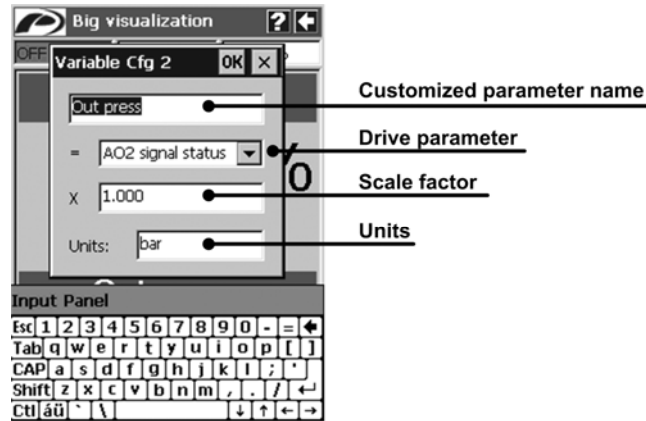
- **Scale factor:**

This field is a numerical edit box. The user can write here a float number. This number is a multiplicative scale factor. Once the parameter is configured, the value of which is multiplied by the adjusted scale factor, and the result is the value visualized in the screen. The scale factor field is only enabled when the value of the selected parameter is numerical value. If the value is a configuration option, this field is disabled.



- **Units:**

This field is an edit box. The user can write on it the unit of measurement that he wants to be shown in the visualization. This field is only enabled if the value of the selected parameter is a numerical value like the scale factor. If the value of the selected parameter is a configuration option, the field will be disabled. The units appear on the right of the visualized value.



SD70ITC0035AI

Figure 2.11 Variable configuration for Big visualization menu

When the user taps on 'OK' button the dialogue window will check if a parameter is selected in the combo box, and next, the window will be closed and the data introduced by the user will be accepted and updated, showing them in the visualization screen. If there is not a parameter selected in the combo box, the window will not be closed.

When the user taps on 'X' button the dialogue window will be closed and changes are discarded.

**Note:** In order to get detailed information about the functionality and the units of all of the parameters, refer to 'Getting Started Manual' of the SD700.

### 2.3.3. Custom Visualization Menu

This menu allows the user to create a parameter list in order to visualize the values. The user can add as many parameters as he wants. Once tapped on this menu, a new screen appears with a structure similar to a normal parameter screen, but the parameters shown in this screen are selected by the user, and additionally, the visualization of which can be customized.

The user can add new parameters, edit the existing ones and deleted them. The user can customize the visualization of the parameters by selecting a name for them and, in case of parameter with numerical value, setting a scale factor and defining the units.

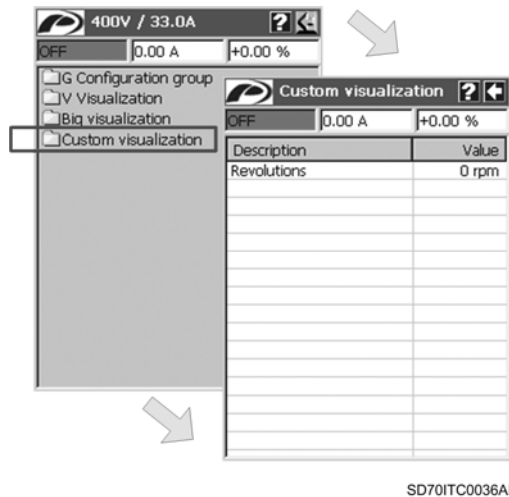


Figure 2.12 Custom visualization menu

As above mentioned, after tapping on the custom visualization menu and once the screen with the customized parameter list is shown, if the user taps and holds on anywhere of the visualization area, a floating menu for the custom visualization will appear. See figure 2.3.

There are three available options in the floating menu:

- **Add:**

This option allows user to add a new parameter to be visualized. The user should fill the fields in like in big visualization menu, writing the customized name for the parameter, selecting the referred parameter and setting a scale factor and the units (this only in case of the selected parameter value is numerical). The new parameter is added at the end of the parameter list.

**Note:** To get more detailed information about the refillable fields of the dialogue window, see section '2.3.2. Big Visualization Menu'.

- **Delete:**

This option allows user to delete a parameter after selecting it by tapping on its row. Then, the selected parameter will be erased from the list. If any parameter has not been selected, this option has no effect.

- **Edit:**

This option allows user to edit a parameter after selecting it by tapping on its row. Then, the user can modify the customized name for the parameter, select a new referred parameter, and set a new scale factor and the units (this only in case of the selected parameter value is numerical). The edited parameter will be updated with the new settings.

**Note:** To get more detailed information about the refillable fields of the dialogue window, see section '2.3.2. Big Visualization Menu'.

## 2.4. Parameter Setting

There are two kinds of parameters in the drive according to the data type:

- **Parameters with adjustable numerical values:**

They are parameters, the values of which are numerical value. These values can be float or integer.

- **Parameters with selectable configuration options:**

They are parameters, the values of which are configuration options. These options are enumerated internally for the management of the drive, but the user can only see the associated labels, that means, the texts that represent the possible configuration options.

All of the programmable parameters are grouped in 'G Configuration group' menu, and additionally, the most common parameters to configure the drive are also available in 'V5 Programmable parameters' from 'V Visualization' menu. The user can set the parameters from the subgroup where the specific parameter are included in 'G Configuration group' menu and from subgroup 'V5 Programmable parameters' in 'V Visualization' menu, if that parameter is included on it. Also, the user can adjust the parameters from the 'Custom visualization' menu, whenever the desired parameter has been added to the parameter list by him before.

To adjust a parameter, the user should follow the next steps:

1. Access to the parameter group where the desired parameter is included by tapping on the corresponding menus in the visualization area.
2. Once the parameters of the group are shown in the screen, search the desired parameter in the rows of the 'Description' column.
3. After finding it, tap on the value cell located in the same row of the desired parameter.
4. After tapping on the corresponding cell, it will appear a configuration dialogue window where the parameter is set. Depending on the parameter type (numerical value or configuration option), the dialogue window is different.

In this point, the user should consider the following:

- Some parameters cannot be modified when motor is running.  
These ones are only adjustable when the motor is completely stopped (led RUN is OFF). If the motor is running and the user taps on the value cell of a non-adjustable parameter during run, a notification message will appear with the text: *'Parameter can't be modified. Motor must be OFF'*. In this case, the user should wait for the motor is completely stopped and try it again.
- Most of the parameters are affected by the parameter lock.  
If the user tries to set one of these parameters and taps on the value cell, a notification message will appear with the text: *'Parameter can't be modified. Parameter lock enabled'*. In this case, the user should unlock parameters and try it again. For additional information, see section '2.5. Parameters Lock'.
- Some parameters are not adjustable.  
No effect is produced when the user tap on the value cell of a non-adjustable parameter. These parameters are the visualization parameters grouped in 'V Visualization' menu and the configuration parameters from 1 to 6 included in group 'G13 Fault history' inside the 'G Configuration group' menu.

### 2.4.1. Parameter Setting in case of Numerical Values

The following figure shows an example of full navigation tree (step sequence) in order to adjust a parameter, the value of which is a numerical value. In the last step, it is shown the configuration dialogue window for numerical value.

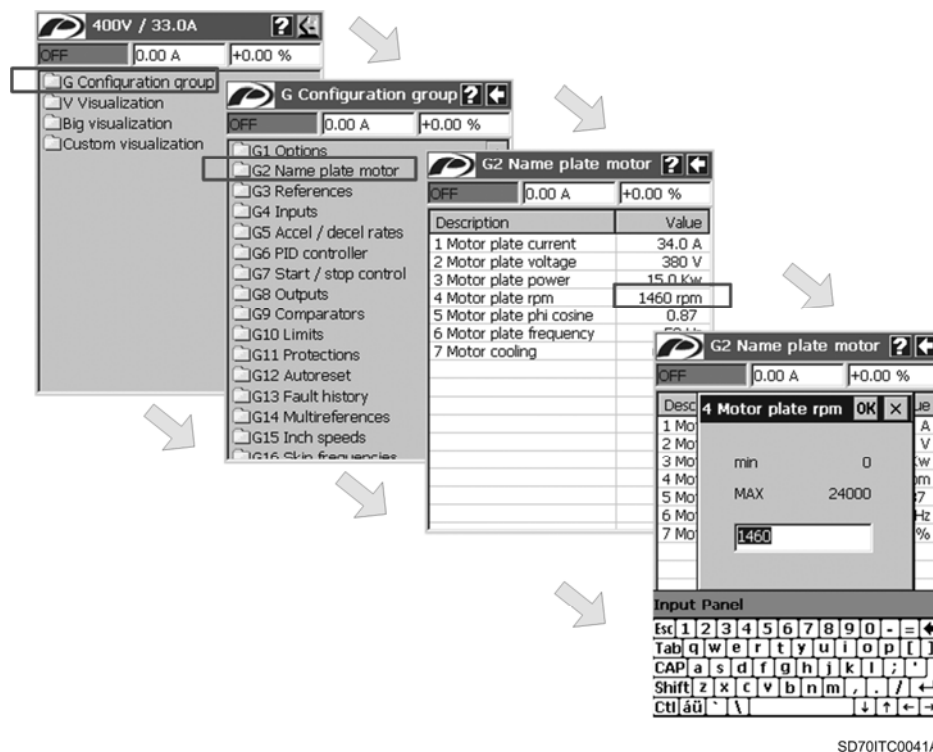


Figure 2.13 Parameter setting in case of numerical value. Navigation tree

The dialogue window shows minimum and maximum allowed values for the parameter and an edit box with the present value of the parameter. The user can modify the parameter value writing a new one here. Then, the user should confirm the change by tapping on the 'OK' button. On the other hand, by tapping on 'X' button, the changes are discarded.

If the introduced value is incorrect (not between minimum and maximum values), the dialogue window will be not closed.

### 2.4.2. Parameter Setting in case of Configuration Options

The following figure shows an example of full navigation tree (step sequence) in order to adjust a parameter, the value of which is a configuration option. In the last step, it is shown the configuration dialogue window for configuration options.

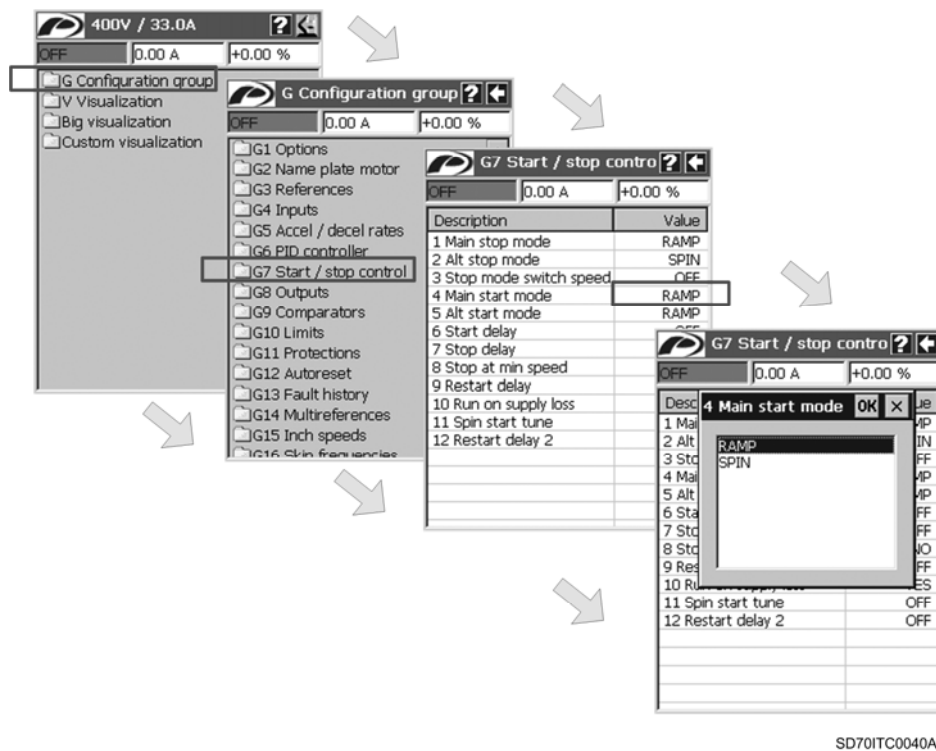


Figure 2.14 Parameter setting in case of configuration option. Navigation tree

The dialogue window shows a list box with all available configuration options for the parameter. The user should select one of the configuration options from the list by tapping on it, and confirm the new selection by tapping on 'OK' button. In order to discard the changes, tap on 'X' button.

## 2.5. Parameters Lock

The user can lock and unlock the parameters setting through a parameter included in group 'G1 Options'. Concretely, the parameter is 'G1.1 → Lock parameters' and there are three available configuration options for this one:

- **NO:**  
Parameters lock is not active.
- **PARTIAL:**  
When the partial lock of the parameters is activated, the user can only modify the value of the parameters:
  - 'G1.1 → Lock parameters' and 'G1.2 → Password' of group 'G1 Options'. That means, the parameters related to the parameters lock and unlock.
  - 'G3.3 → Speed local reference' of group 'G3 References'.
  - 'G6.2 → Local process setpoint' of group 'G6 PID controller', whenever the option adjusted in this parameter is 'LOCAL' or 'locPID'.
- **TOTAL:**  
When the total lock of the parameters is activated, the user can only modify the value of the parameters 'G1.1 → Lock parameters' and 'G1.2 → Password' of group 'G1 Options' until the password is introduced again to unlock the parameters.

Parameters setting are unlocked by default. To lock and unlock parameters, the user should introduce a password. This password is a number, the range of which goes from 1 to 9999, and the user should create or register it to activate any lock (options 'PARTIAL' or 'TOTAL'). To unlock parameters (option 'NO'), user should introduce the password registered when parameters was locked.

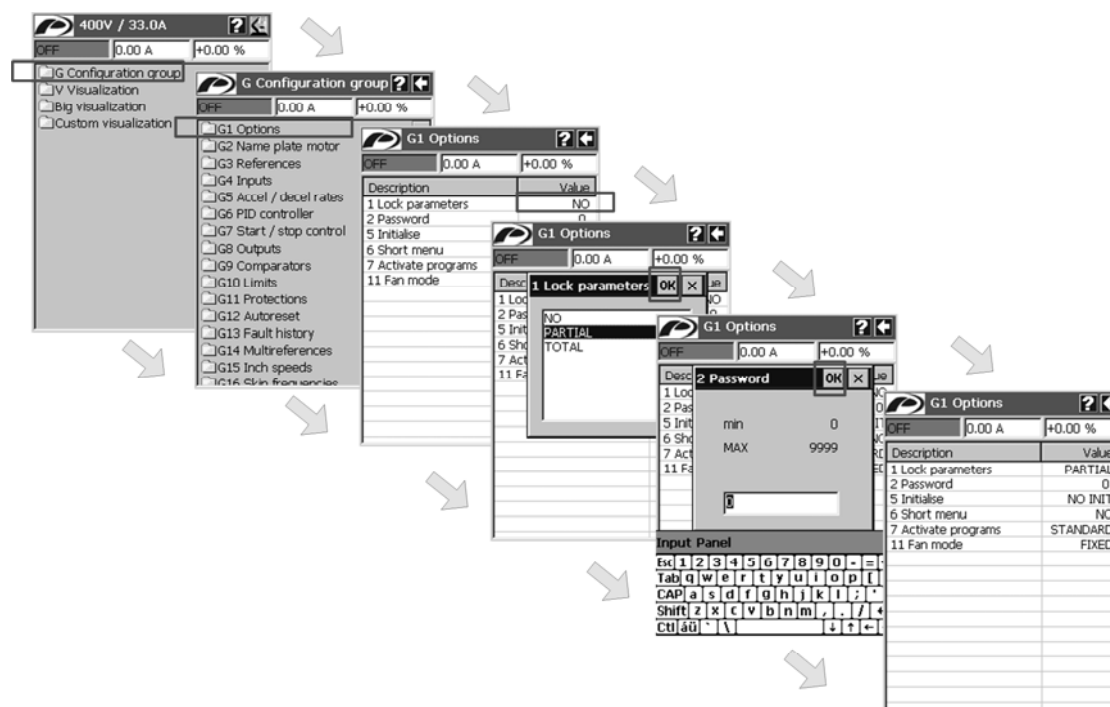
## 2.5.1. Lock Parameters

In order to lock parameters, it is necessary that they are unlocked. Then, the user should follow the next steps:

1. Access to the configuration parameter 'G1.1 → Lock parameters' in group 'G1 Options'. For this, tap on 'G Configuration group' menu in the initial screen firstly, and then, tap on group 'G1 Options'. See the full navigation tree in the figure below.
2. Tap on the value cell of the parameter 'G1.1 → Lock parameters'. A dialogue window of parameter configuration will appear with the available configuration options.
3. Tap on option 'PARTIAL' or 'TOTAL', depending on the locking level. After selecting the option, tap on 'OK' button. The dialogue window of password configuration will appear. This dialogue window shows the minimum and maximum allowed values for the password.
4. Introduce the password number (any value from 1 to 9999) and tap on 'OK' button. The password is registered, the dialogue window will be closed and the parameter is updated. Now, the parameters lock is activated (the locking level depending on the user selection).

**Note:** Remember the password introduced when locking parameters since the same password should be introduced again to unlock parameters.

Finally, the following figure shows the full navigation tree to lock parameters with option 'PARTIAL'.



SD70ITC0064AI

Figure 2.15 Parameters lock. Navigation tree

## 2.5.2. Unlock Parameters

In order to unlock parameters, it is necessary that they are locked. Then, the user should follow the next steps:

1. Access to the configuration parameter 'G1.1 → Lock parameters' in group 'G1 Options'. For this, tap on 'G Configuration group' menu in the initial screen firstly, and then, tap on group 'G1 Options'. See the full navigation tree in the figure below.
2. Tap on the value cell of the parameter 'G1.1 → Lock parameters'. A dialogue window of parameter configuration will appear with the available configuration options.
3. Tap on option 'NO', and then, tap on 'OK' button. The dialogue window of password configuration will appear. This dialogue window shows the minimum and maximum allowed values for the password.
4. Introduce the password number registered when parameters were locked and tap on 'OK' button. The dialogue window will be closed and the parameter is updated. Now, the parameters lock is deactivated. In this way, all of the configuration parameters are unlocked and the user can modify them.

The following figure shows the full navigation tree to unlock parameters.

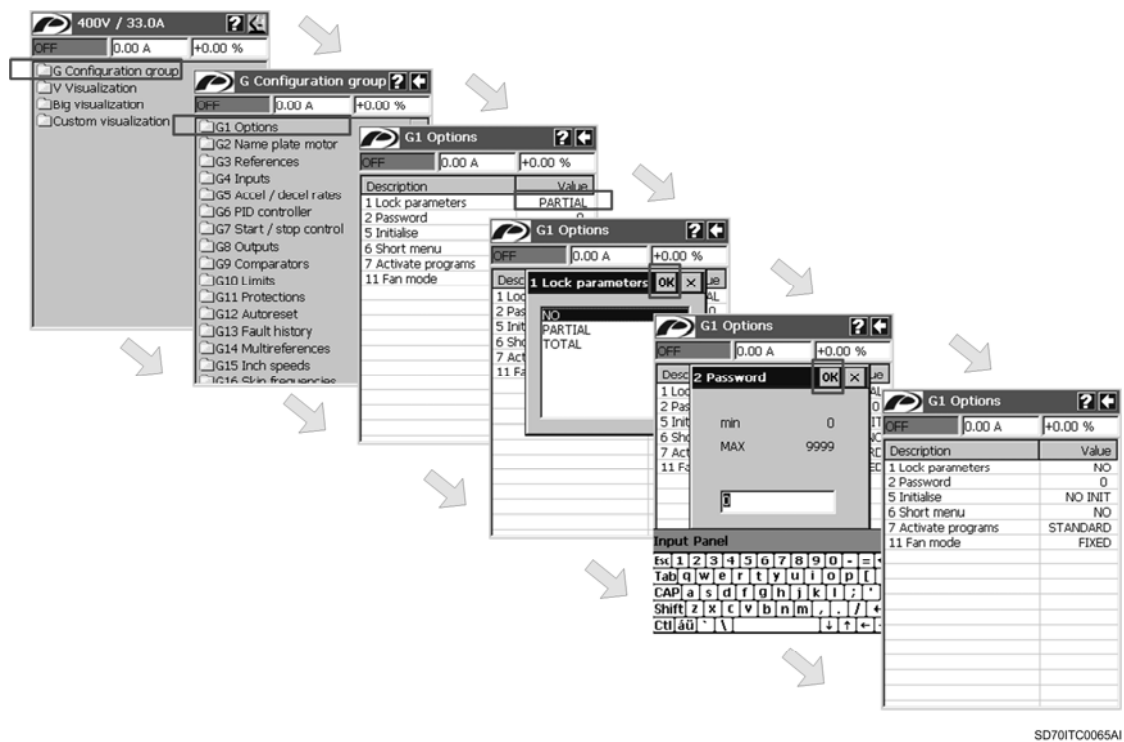


Figure 2.16 Parameters unlock. Navigation tree

**Note:** After introducing the password and tapping on 'OK' button, if the password number does not match with the registered one, the dialogue window of password configuration will be closed but the parameters will remain locked.

To know what password should be introduced, the user should resolve the following equation:

$$\text{Password} = ('XXXX' / 2) - 3$$

where 'XXXX' is the value of parameter 'G1.2 → Password' (unlock key) in group 'G1 Options'. This value is updated every time the user introduces an incorrect password to unlock parameters.

Now, when the user tap on the value cell of parameter 'G1.1 → Lock parameters', the dialogue window will show the minimum and maximum allowed values and below them the 'Unlock key' which is the value shown in parameter 'G1.2 → Password'. After introducing the correct password (result of the previous equation), the dialogue window will be closed and the parameter 'G1.1 → Lock parameters' is updated. At this moment, the parameters lock is deactivated. In this way, all of the configuration parameters are unlocked and the user can modify them.

The next figure shows the step sequence to unlock parameters in case of introducing an incorrect password (unregistered password). In this example, the 'unlock key' (value of parameter 'G1.2 → Password') is '252'. If this value is replacing in the previous equation, the correct password that user should introduce to unlock parameters will be '123' [(252/2) – 3].

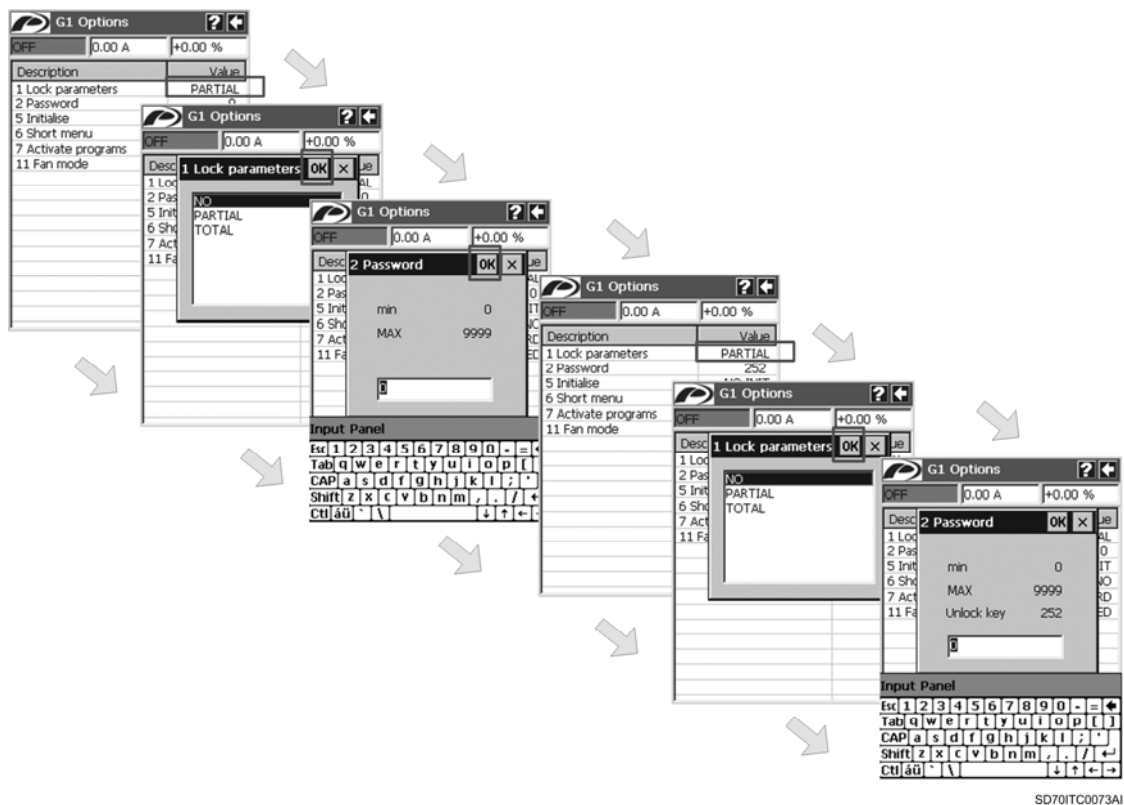


Figure 2.17 Parameters unlock with incorrect password

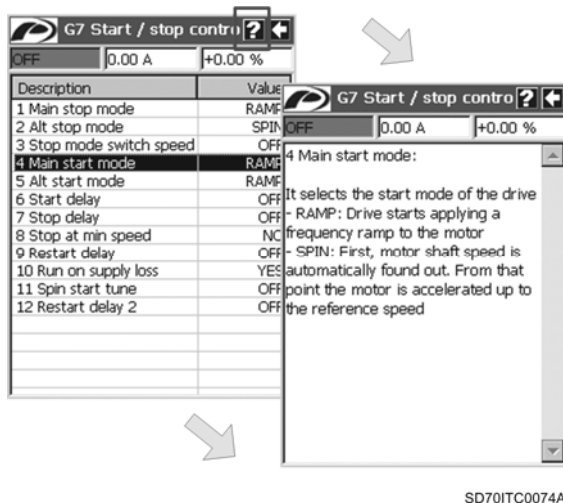


## 2.6. Application Assistant (Help System)

The graphic display includes a help system that provides with information about all parameters individually, parameter screens, and menu screens.

The help button '?' is located on the title bar and the user can access to the help screen through it. To escape from the help screen, the user should tap on the back button '←' or the help button '?' again.

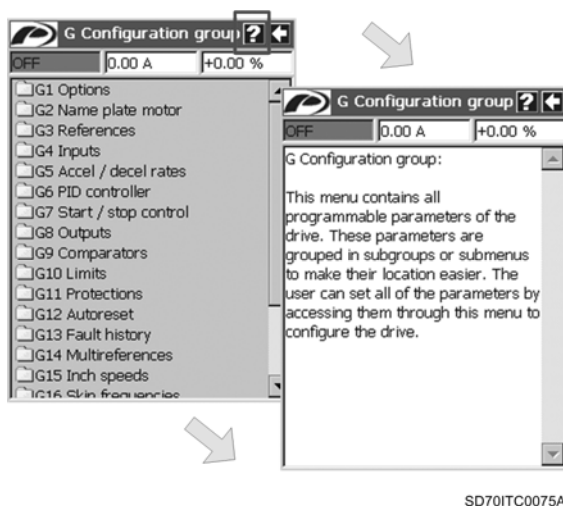
When the graphic display is showing a parameter screen where the user has selected a row (a parameter), and he taps on the help button '?', the help screen will show information about the selected parameter.



SD70ITC0074AI

Figure 2.18 Help screen with information about parameters

When the graphic display is showing a menu screen, or a parameter screen without any row selected (this is also valid for 'Big visualization' screen and 'Custom visualization' screen), and the user taps on the help button '?', the help screen will show information about the displayed screen.

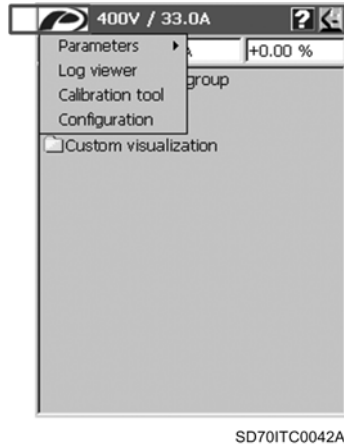


SD70ITC0075AI

Figure 2.19 Help screen with information about displayed screens

## 2.7. System Menu

The main configuration options and the system tools for the graphic display are included in the system menu. To access to this menu, the user should tap on the 'P' icon (Power logo), located on the left upper corner on the title bar.



SD70ITC0042AI

Figure 2.20 System menu

The following options are included:

- **Parameters:**

This option allows the user to save the all of the drive parameters settings (drive configuration) on the graphic display memory (upload), and then, load this configuration to the same equipment or other drive (download). Additionally, the saved configurations can be deleted. See section '2.7.1. Save, Load and Delete Parameters'.

- **Log viewer (Fault Registers):**

With this option, the user can access to the Fault Registers screens which shows the last ten fault registers. A fault register (log) is an internal file created when a fault occurs and which stores information about some parameters of the drive at the moment of the fault. See section '2.7.2. Fault Registers (Log Viewer)'.

- **Calibration tool:**

This option allows the user to calibrate the touch panel of the display. See section '2.7.3. Touch Panel Calibration'.

- **Configuration:**

This option allows the user to setup the graphic display and the SMS service. See section '2.7.4. Graphic Display Configuration'.

## 2.7.1. Save, Load, and Delete Parameters

The graphic display allows storing multiple parameter configurations of different drives and downloading them to other equipments (or to the same drive).

The graphic display can store up to thousands of parameter configurations. This functionality allows the user to:

- Save different configurations for different applications. User can select the configurations of the drive parameters according to the application where the drive is going to be used. In this way, the user downloads the proper configuration to the drive.
- Configure multiple drives with the same parameter configuration. The user should only configure one drive, save the configuration and download it to the remaining drives.
- Save the drive configuration as backup.

### Save Parameters (Upload to the Display)

This option allows the graphic display to read all values of the configuration parameters from the drive and store them locally in a file. Each created file contents a drive configuration.

Before saving the parameters configuration, the user should verify that the drive is not in a fault status and the motor is stopped (OFF).

To save parameters, follow the next steps:

1. Tap on the 'P' icon on the title bar. The system menu is opened.
2. Tap on option 'Parameters' in the menu. A new menu with three available options will appear.
3. Tap on option 'Save'. It will appear the configuration dialogue window for 'Save parameters'. In this dialogue window is observed the next:
  - **Edit box** for the 'File name': It is used to write the file name for the new drive configuration.
  - **List box** with the existing files: All of the existing files with different saved drive configurations are shown in the list.
4. Write a name for the new parameters configuration file in the edit box or select an existing file from the list box (if you want to overwrite the file), and tap on 'OK' button.
5. If the written name matches with the name of some existing file or if the user selects an existing file from the list box, a question message will appear with the text *'There is already a file with the same name. If you accept, the data on the file will be overwritten. Continue?'*. If the user wants to overwrite the file, then he should tap on 'OK' button. If not, user should tap on 'X' button to go back to the previous dialogue window in order to write a different file name.
6. After tapping on 'OK' button to execute the saving process, a progress message window appears with the text *'Reading parameters from drive'*.
7. When the process is finished, if parameters are correctly saved, a notification message appears with the text *'Parameters have been successfully saved'*. In case of error, the shown notification will be *'Error saving parameters. Parameters haven't been saved'*. In any case, tap on 'OK' button.

**Note:** In case of error when saving parameters, repeat the process above described.

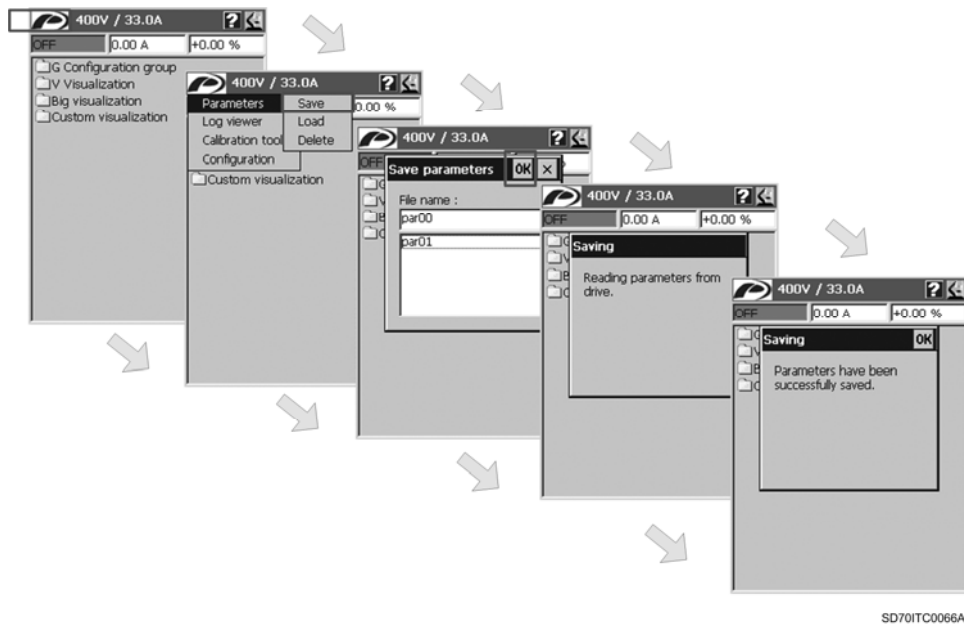


Figure 2.21 Save parameters. Navigation tree

### Load Parameters (Download to the Drive)

This option allows the user to configure a drive with a parameters configuration stored in the graphic display previously.

Before loading the parameters configuration, the user should verify that the drive is not in a fault status and the motor is stopped (OFF).

To load parameters, follow the next steps:

1. Tap on the 'P' icon on the title bar. The system menu is opened.
2. Tap on option 'Parameters' in the menu. A new menu with three available options will appear.
3. Tap on option 'Load'. It will appear the configuration dialogue window for 'Load parameters'. In this dialogue window is observed the next:
  - o **Edit box** for the 'File name': It is used to write the file name of the saved parameters configuration file that is going to be loaded.
  - o **List box** with the existing files: All of the existing files with different saved drive configurations are shown in the list.
4. Write the name of the existing configuration file to be loaded in the edit box or select it from the list box and then, tap on 'OK' button.
5. If the written name does not match with the name of some existing file, an error notification message will appear with the text *'The file doesn't exist'*. In this case, the user should tap on 'OK' button to confirm and go back to the previous dialogue window to write the name of some existing configuration file or select it from the list box.
6. After tapping on 'OK' button to execute the loading process, a progress message window appears with the text *'Sending parameters to drive'*.
7. When the process is finished, if parameters are correctly loaded, a notification message appears with the text *'Parameters have been successfully loaded'*. In case of error, the shown notification will be *'Error loading parameters. Some parameters may not be loaded'*. In any case, tap on 'OK' button.

**Note:** In case of error when loading parameters, repeat the process above described.

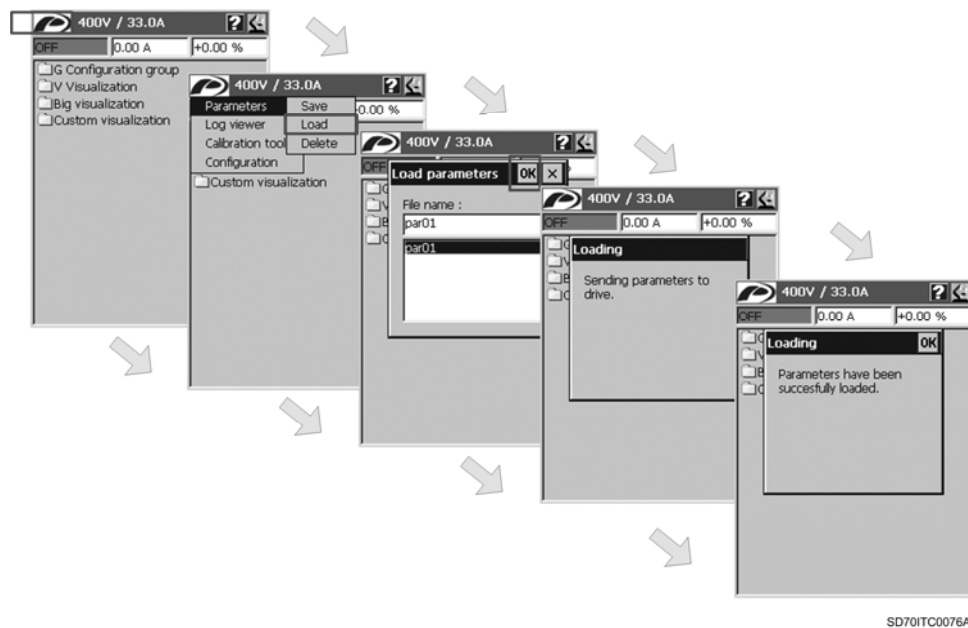


Figure 2.22 Load parameters. Navigation tree

### Delete Parameters

With this option the user can delete a saved parameters configuration file from the list.

To delete a parameters configuration file, follow the next steps:

1. Tap on the 'P' icon on the title bar. The system menu is opened.
2. Tap on option 'Parameters' in the menu. A new menu with three available options will appear.
3. Tap on option 'Delete'. It will appear the configuration dialogue window for 'Delete parameters'. In this dialogue window is observed the next:
  - o **Edit box** for the 'File name': It is used to write the file name of the saved parameters configuration file to be deleted.
  - o **List box** with the existing files: All of the existing files with different saved drive configurations are shown in the list.
4. Write the name of the existing configuration file to be deleted in the edit box or select it from the list box and then, tap on 'OK' button.
5. If the written name does not match with the name of some existing file, an error notification message will appear with the text *'The file doesn't exist'*. In this case, the user should tap on 'OK' button to confirm and go back to the previous dialogue window to write the name of some existing configuration file or select it from the list box.
6. After tapping on 'OK' button to execute the deleting process, a notification message appears with the text *'File "<name>" successfully deleted'*.
7. Tap on 'OK' button on the notification message. The selected configuration file is already deleted.

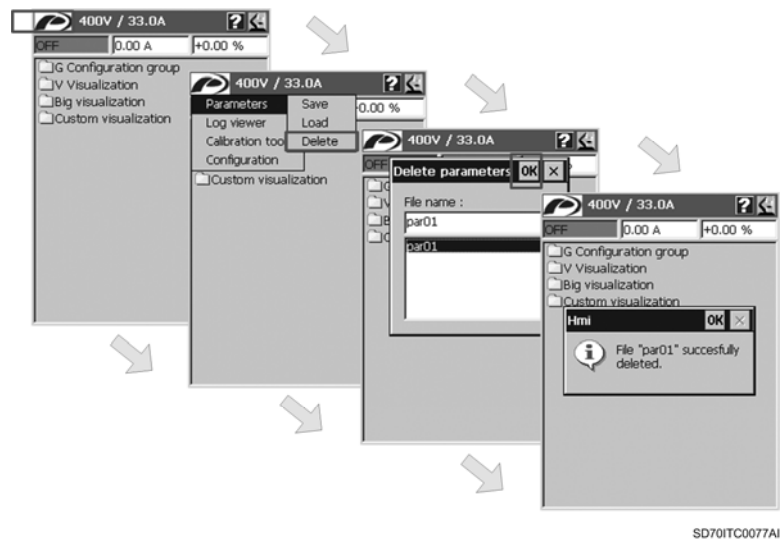


Figure 2.23 Delete parameters. Navigation tree

## 2.7.2. Fault Registers (Log Viewer)

When a fault occurs in the drive, the values of some parameters are “frozen” while the fault is not reset. This information is saved in internal files that are the fault registers. Later, these registers are revised after the system is reset.

This function is a valuable source of information for both the technicians and the final user. In this way, anyone can know what was happening in the system at the time of the fault.

The graphic display includes two screens, shown in the visualization area, in order to access to the information stored in the fault registers:

- **Main screen for fault registers:** It shows the list of available files which are the fault registers of the system.



Figure 2.24 Main screen for fault registers

- **Visualization screen for fault registers:** This screen shows the content of a specific fault register.

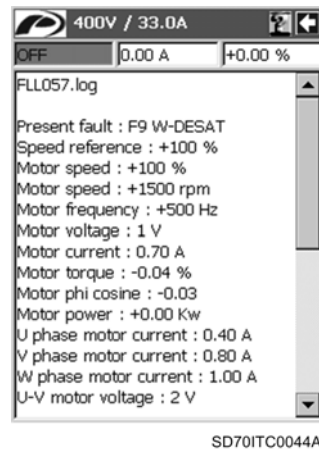


Figure 2.25 Visualization of fault registers

The following figure shows the step sequence to access to the information stored in a file created (fault register) when a specific fault was produced.

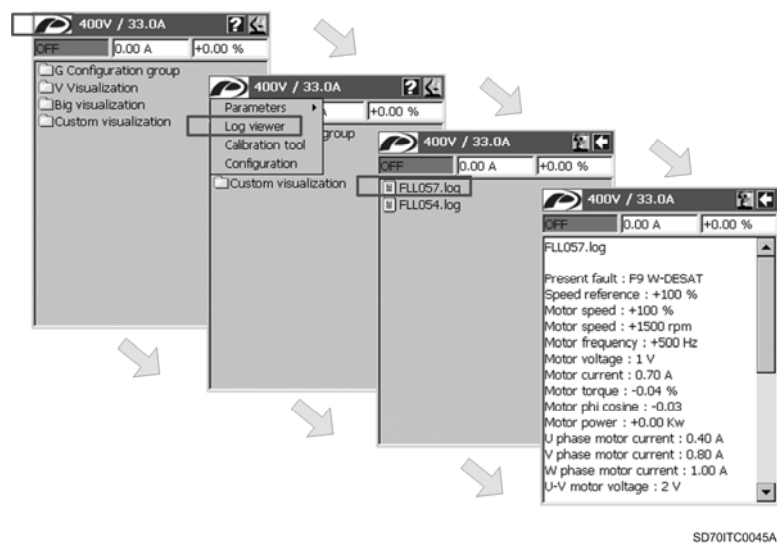


Figure 2.26 Screens for fault registers. Navigation tree

In order to escape from the visualization screen to the main screen for fault registers, tap on '←' button. To return to the displayed screen before accessing to this main screen, tap on '←' button or select option 'Log viewer' by tapping on it from the system menu.

### 2.7.3. Touch Panel Calibration

The graphic display is supplied with a factory calibration, but its calibration can be set by the user anytime.

The touch panel is a transparent sensitive film located in front of the LCD display. It needs to be calibrated in order to translate the position of the user interactions with the pen into screen coordinates.

To access to the tool for the touch panel calibration the user should tap on option 'Calibration' from the system menu. This calibration tool consists of a white screen with a black cross, located in the centre of the screen firstly. The user should tap and hold on the cross centre until the cross is moved to different position. At the end, the user should tap and hold on the cross five times (centre, upper and bottom left corners, upper and bottom right corners). After this, the user should tap on somewhere on the LCD area to deactivate the calibration tool. The new calibration is used from that moment on.

### 2.7.4. Graphic Display Configuration

To access to the graphic display configuration, the user should tap on option 'Configuration' from the system menu. After tapping on it, the 'Options' configuration dialogue window will appear, where there are two tabs:

- **General:** It is used to configure the main properties of the graphic display.
- **SMS:** The SMS service is configured through this tab, but all the needed information is detailed in a different chapter '3 SMS SERVICE', since it is too extended.

As above mentioned, the 'General' tab is used to configure the main properties of the graphic display. Once accessed to this tab, the user can set two fields:

- **Language:** It is a combo box that allows the user to select one of the three available languages (Spanish, English and German). In order to apply completely the language selection to all of the dialogue items, the graphic display should be power cycled (either by unplugging – plugging from the drive or by powering off and on the whole drive).
- **Display COM speed:** It is a combo box through which the communication speed between the graphic display and the drive is adjusted. The factory setting is '4800' bauds and the user should not modify this setting unless an authorized technician indicates it. Available options are values '600', '1200', '2400', '4800' and '9600' bauds.

The step sequence to access to the graphic display configuration is shown below.

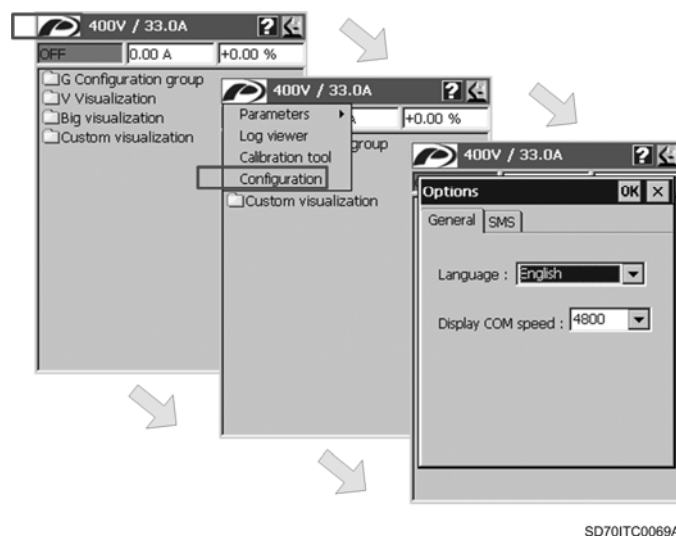


Figure 2.27 Graphic display configuration. Navigation tree



## 2.8. Fault Visualization

When the drive is in normal operation, the drive status field located on the left hand of the title bar displays the operation status and warnings and its background colour is green. When a fault occurs, the background colour turns red and the field displays the present status 'OFF' and the fault number in alternative way.

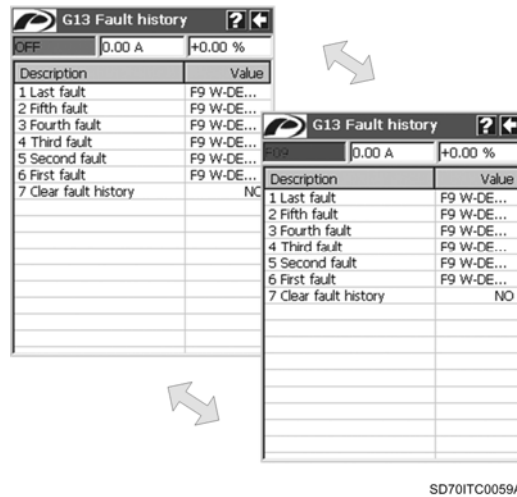


Figure 2.28 Alternation in the visualization of the present fault and OFF status

The user can obtain more information about the present fault status by accessing to the visualization parameter 'Present fault' included in the visualization parameter group 'V4 Internal visualization' from 'V Visualization' menu.

Additionally, the user can visualize the fault history of the drive through the configuration parameter group 'G13 Fault history' included in 'G Configuration group' menu.

In order to get more detailed information about the fault descriptions and their possible causes and solutions, refer to 'Getting Started Manual' of SD700, chapter '12. FAULT MESSAGES. DESCRIPTION AND ACTIONS'.

## 3. SMS SERVICE

The SMS service provides user with a limited remote access to the drive by means of SMS messages (Short Messages Service) where GSM/GPRS networks are available.

Thanks to this service, the user can remotely:

- Check the status or value of some visualization parameters (included in 'V Visualization' menu). This information is obtained as a result of a request by the user (response from the drive), and additionally, with a configurable periodicity if it is required.
- Start, stop and reset the drive.
- Be notified about any start, stop and fault event that have been produced.

The service interfacing is quite easy. There are two types of interactions:

- The user sends a SMS with a specific command to the graphic display. The graphic display processes the message and sends user a response. First, the display will check the user rights or permissions, and if the user is authorized, then the display will process the SMS and send user the requested response.

The command can be configured in the graphic display just to read the value for some parameters of the drive and send the values back to the user. This type of commands is called 'query messages'.

Also, the command can be a start, stop and reset order for the drive. This type of commands is called 'special messages'.

All attributes for the commands (labels, associated parameters, parameter alias, etc.) are customizable by the user.

- The graphic display sends user (or user group) a SMS at specific moments. The service can be configured in order to advise the user when motor starts or stops and when a fault is generated in the drive. These messages are called 'notification messages'.

There is other type of messages maybe it could be included in this group. These ones are messages sent by the display graphic to the user at specific moments, based on a periodicity predefined by the own user, where the values of some drive parameters are shown. These messages are not 'notification messages', they are a query message subtype.

The graphic display adds a header on all messages sent to the user. In this way, it is easy for the user to identify the sender.

The service includes a user management system. When a specific user wants to use this service, he should be registered and the proper rights or permissions should be assigned to him.

The system is highly configurable. The user can set:

- The header to identify the drive.
- User phone numbers and rights for each user.
- Labels for all messages.
- User defined messages.

## 3.1. Message Management

There are three types of messages:

- **Query messages:**

The user can monitor any visualization parameter or group of visualization parameters by sending queries in SMS messages to the graphic display. In this way, the user will receive the responses with the corresponding values by the graphic display. These response messages can be configured to be sent periodically, according to the user setting. In this way the values can be updated continuously.

- **Special messages:**

The user can start, stop and reset the drive by sending this type of SMS messages to the graphic display. The display responds with an acknowledge message.

- **Notification messages:**

The graphic display itself can send this type of messages to inform the user when the motor starts or stops, and when the drive is in a fault status.

When the graphic display receives a SMS message, it follows the next steps:

1. Check if the phone number exists in the user database. If the number is included in the database, the process continues in step 2. If not, then it stops here and does not respond anything to the phone number of the incoming SMS.
2. Check if the incoming SMS is a query or special message. In this case, the process continues in step 3. If SMS is not a query or special message, the display responds the user with an error SMS message with the text *'ERROR. There isn't any command with that name.'* and stops here.
3. Check if the user has the proper rights or permissions. If the user has them, the process continues in step 4. If not, the display responds the user with an error SMS message with the text *'ERROR. User is not allowed to perform the request action.'* and stops here.
4. Process the incoming query or special message. To arrive at this point, the incoming SMS is identified with one of the two previous message types and user has enough rights.

On the other hand, the graphic display can send the user SMS messages at specific moments depending on the circumstances:

- If the motor starts or stops, or the drive is in a fault status, and whenever the SMS service is configured to alert user to such events, the graphic display will send 'notification messages' to all users that have the 'Notification' right.
- When a query message is configured to be periodic (user set the periodicity in hours), the graphic display internally assigns a timer to it. Every time this timer expires, the display send user the present value for all parameters associated to this query message through a SMS message. In this way, these parameters values are periodically updated.

### 3.1.1. Query Messages

This type of messages consists of a group of parameters associated to the query name (text label). When the user sends a SMS message to the graphic display with the query name, the graphic display will verify the user has the corresponding right or permission, collect the values from the associated parameters, arrange the response message and send it back to the user through SMS.

Query messages can be periodic with a configurable period between 1 and 24 hours. For example, the user selects a periodicity of 10 hours for a query. When the user sends this query name to the graphic display through SMS, this periodic query is activated. The first response received by him is a regular response (the same one when query is non-periodic) sent by the display. But as this query has assigned to it a periodicity of 10 hours, the graphic display sends user the same response with the updated values of the associated parameters every 10 hours from the activation moment. The query is deactivated when the user send the query name to the display through SMS again. In that moment, the user receives the last response by the display with the updated variable values.

Another question to be considered in normal operation is when another registered user (user which did not activate the periodic query before) sends a SMS with the query name while this query is activated. The second user will receive the first response in that moment, and from that moment on, he will receive the following responses every 10 hours based on the time in which the first user activated the query. The operation is the same in case of more users requests this query. Finally, the query will be deactivated by the last one of the users that sends a SMS with the query name again.

In summary, the periodic query is activated when one of the registered users sends to the display a SMS with the query name. In that moment, the display sends to the user the first response, and from that moment on, the display will send to all users (to the first user that activated the query and to the remaining users that have been added to the query after the first user activated it) a response every period set in the query from the activation moment. Finally, the query will be deactivated by the last one of the users that sends a SMS with the query name again. To understand better the operation of the periodic queries, see the example of section '3.4.2. Example for Query Messages'.

The user should configure the query before using it. The user can create as many query messages as he wants. The number of the query messages is limited by the storage space.

In order to create a query, the user should configure the following attributes:

- **Query name:** The query name sent by the user to the graphic display through SMS.
- **Query help text:** The text the user wants to receive when requesting 'help' or information about the query.
- **Periodic check box:** To select the periodicity attribute for the query.
- **Period in hours:** In case of selecting the periodicity attribute, the period should be set here. The allowed value range is from 1 to 24 hours.
- **Variable list:** Each variable represents a drive parameter. For each variable the user should define the following attributes:
  - Drive parameter associated: The drive parameter, the value of which will be read.
  - Short name: A very short name to identify the read parameter. This is due to the SMS is just 160 characters long.
  - Help text: The text the user wants to receive when requesting help about the variable.

The response format for the query is the next:

```
<HEADER>. <QUERY NAME>
<ALIAS VARIABLE 1>=<VALUE 1>
...
<ALIAS VARIABLE N>=<VALUE N>
```

For additional information about how to configure a query message, see section '3.3.4. Query Configuration'.

### 3.1.2. Special Messages

There are four predefined types of special messages: Help message, motor start, motor stop and drive reset.

For each message type, the user should configure two attributes:

- **Check box:** User can use or not this message type depending on the selection.
- **Label:** The text the user should send through the SMS message in order to execute the associated action.

The help messages provide the user with information about the 'query messages'. Depending on the format of the request, the user can obtain the following help information:

- '**<HELP\_LABEL>**': The graphic display returns to the user the list of available queries.
- '**<HELP\_LABEL> <QUERY\_NAME>**' (**separated by blank**): The graphic display returns to the user the help text that user defined for query when creating it.
- '**<HELP\_LABEL> <QUERY\_NAME> <VARIABLE\_ALIAS>**' (**separated by blanks**): The graphic display returns to the user the help text that user defined for the variable when creating the query.

When the user send messages to either start or stop the motor, or reset the drive, the graphic display responds the user with a confirmation message and executes the corresponding action. Otherwise, the graphic display responds to the user with an error message and the action will not be executed.

For additional information about how to configure a special message, see section '3.3.5. Special Messages Configuration'.

### 3.1.3. Notification Messages

There are three types of notification messages associated to the following events: motor started, motor stopped and system fault.

For each message type, the user should configure two attributes:

- **Check box:** This type of event will generate a message or not according to the user selection.
- **Label:** The text that the graphic display will send the user to notify such event.

This message type requires no action from the user. If one of the three previous events occurs, the graphic display checks if the associated message has been activated by the user when configuring the notification message. In this case, the graphic display searches all users with the 'notification' right and send to all of them the label associated to the event. If the event is a system fault, the display will also add the fault description to the message.

For additional information about how to configure a notification message, see section '3.3.6. Notification Messages Configuration'.

## 3.2. User Management

The SMS service implements a strict user management system.

Any user must be registered in the system to use the SMS service. Every user needs to have the necessary rights or permissions to execute any single action with the service.

It is necessary to register a name and a phone number for every new user introduced in the database.

The user rights are configured by the user himself. The available rights are the following ones:

- **QUERY:** It allows the user to send query messages.
- **NOTIFICATION:** User will receive all activated notifications messages.
- **START:** User can start the motor (special messages).
- **STOP:** User can stop the motor (special messages).
- **RESET:** User can reset the drive (special messages).

## 3.3. SMS Service Configuration

The SMS service is configured through many different configuration dialogue windows.

To access to the SMS service in order to configure it, the user should tap on option 'Configuration' from the system menu. After this, the 'Options' dialogue window will appear and the user should tap on tab 'SMS'. That is the main configuration dialogue for the SMS service. The following figure shows the step sequence to access to it.

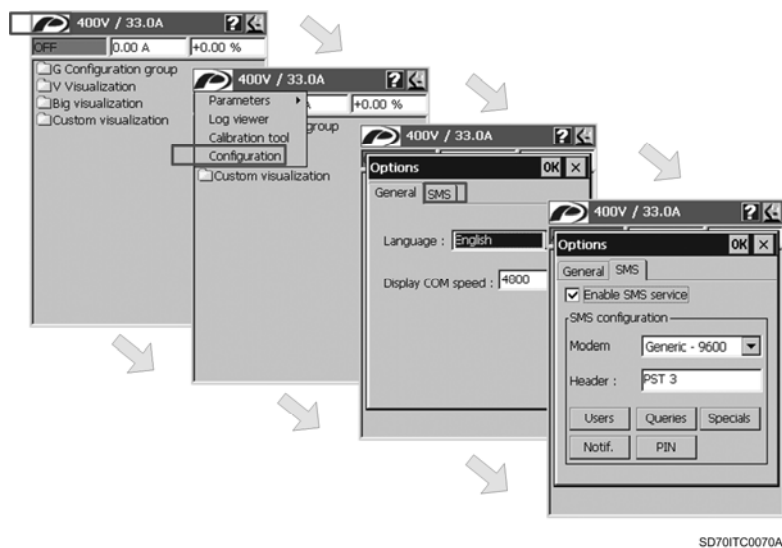


Figure 3.1 Main configuration dialogue for the SMS service. Navigation tree

### 3.3.1. Main Configuration Dialogue

The next figure shows the main configuration dialogue for the SMS service.



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Figure 3.2 Main configuration dialogue for the SMS service

From top to bottom:

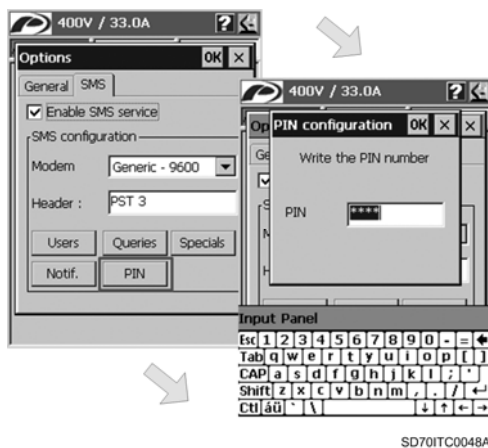
- **'Enable SMS service' check box:** It is activated or deactivated by tapping on it. When it is deactivated, the SMS service is disabled and the rest of the controls in the dialogue are disabled too. If it is activated, the SMS service is running and the rest of the controls are enabled.
- **'Modem' combo box:** It includes the list with the compatible Modems. The user should select a Modem compatible with his hardware. Currently, there is only support for generic Modems from 2400 to 38400 baud.
- **'Header' edit box:** The user should write in this field a 'header' for all messages sent from the graphic display.
- **Buttons 'Users', 'Queries', 'Specials', 'Notif.', 'PIN':** With this buttons, the user access to the configuration dialogues for users, query messages, special messages, notification messages, and the PIN code of the SIM card respectively.

### 3.3.2. PIN Configuration

The 'PIN configuration' dialogue will appear when the user taps on the 'PIN' button from the main configuration dialogue for the SMS service. This dialogue window has only an edit box (type 'password') where the user should write the PIN code of the SIM card inserted in the Modem device. The user will visualize '\*' instead of numbers due to a safety question.

After writing the PIN code and tapping on 'OK' button to accept it, the dialogue window is closed and the main configuration dialogue is shown again.

**Note:** Take care when writing the PIN code. If the PIN code is incorrect, then the service can lock the SIM card. In that case, the user should remove the Modem and unlock it externally (in mobile phone with the PUK number).



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Figure 3.3 'PIN configuration' dialogue window

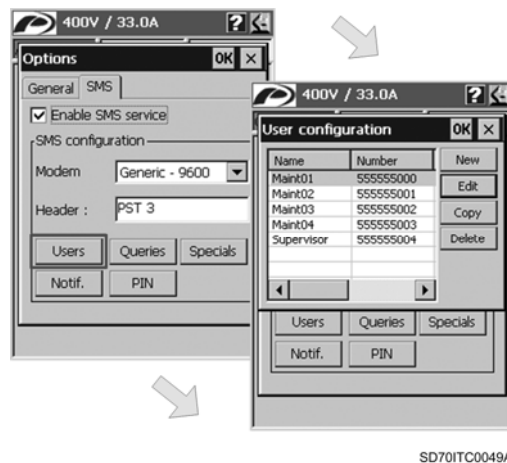
### 3.3.3. User Configuration

The 'User configuration' dialogue will appear when the user taps on the 'Users' button from the main configuration dialogue for the SMS service.

This configuration dialogue allows adding new users, edit, copy and delete users that are already registered by means of the different buttons included in the dialogue itself.

In order to accept the user list configuration, the user should tap on 'OK' button. After this, the dialogue is closed and the main configuration dialogue is shown again. To cancel the configuration, tap on 'X' button and the changes will be discarded.

**Note:** To obtain further information, see section '3.2. User Management'.

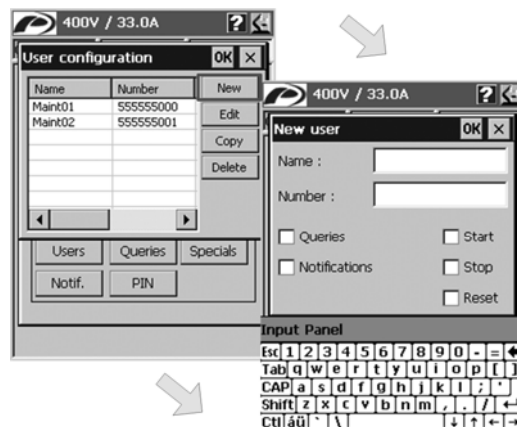


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Figure 3.4 'User configuration' dialogue window

#### New User

The user accesses to the 'New user' configuration dialogue by tapping on 'New' button from the 'User configuration' dialogue.



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Figure 3.5 'New user' configuration dialogue window



From top to bottom:

- **'Name' edit box:** The user should write in this field a name for the new user of the service. The service does not require this user name, but it is always easier to recognise names than mobile phone numbers for the users themselves.
- **'Number' edit box:** The user should write in this field the mobile phone number of the user that is going to be added. This field is very important because it is used to check the rights of the incoming SMS message sender.
 

**Note:** The phone number must be introduced with the same format than the displayed one in the SMS message. The recommendation is to include the country code and write the phone number without any blank. For example: +34123456789 or 123456789, where '34' is the country code (for Spain in this example).
- **User rights:** They are a group of check boxes. To assign any right to the user, it should activate the corresponding check box. All user rights are assigned from here. The user rights are the following ones:
  - **Queries:** The user is allowed to send queries.
  - **Notifications:** The user is allowed to receive notifications.
  - **Start:** The user is allowed to start the motor remotely.
  - **Stop:** The user is allowed to stop the motor remotely.
  - **Reset:** The user is allowed to reset the drive remotely.

To accept the new user configuration, the user should tap on 'OK' button. This dialogue will be closed and the 'User configuration' dialogue is shown again with the new user added to the end of the list. To cancel the configuration, tap on 'X' button and the changes will be discarded.

### Edit User

The user accesses to the 'Edit user' configuration dialogue by tapping on 'Edit' button from the 'User configuration' dialogue. In order to edit a user, it should select a registered user by tapping on the corresponding row of the user list.

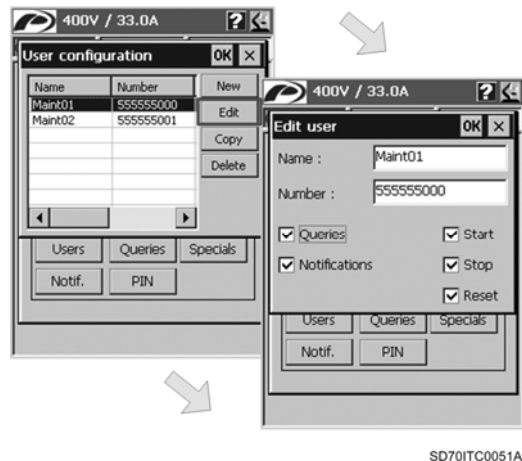


Figure 3.6 'Edit user' configuration dialogue window

The 'Edit user' configuration dialogue has the same format and includes the same fields than the 'New user' configuration dialogue. All fields of the dialogue show the present attributes for the selected user and the rights assigned to him. The user can modify the name, the mobile phone number and assign the user rights again. See paragraph 'New User' in section '3.3.3. User Configuration' in order to obtain more detailed information about all fields of the 'Edit user' configuration dialogue.

After editing the selected user and modifying its attributes, the user should tap on 'OK' button to accept the new configuration for the edited user. This dialogue will be closed and the 'User configuration' dialogue is shown again with the user list updated with the new introduced data for the selected user. To cancel the configuration, tap on 'X' button and the changes will be discarded.

### Copy User

The user can copy a registered user by tapping on 'Copy' button from the 'User configuration' dialogue. For this, it should select the user by tapping on the corresponding row of the user list firstly. Once selected the user, if the 'Copy' button is tapped on, a copy of the selected user is created and added to the end of the list.

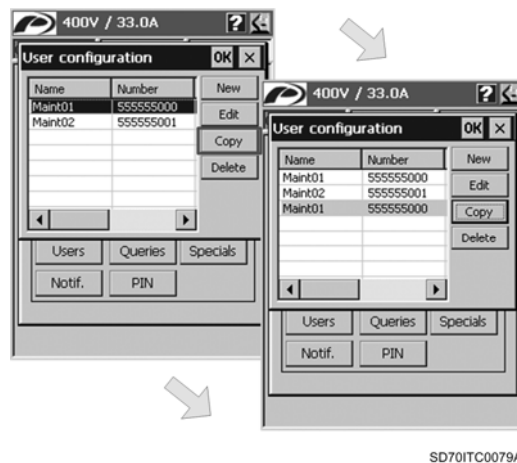


Figure 3.7 Copy user

### Delete User

The user can delete a registered user by tapping on 'Delete' button from the 'User configuration' dialogue. For this, it should select the user by tapping on the corresponding row of the user list firstly. Once selected the user, if the 'Delete' button is tapped on, a question message appears to confirm the delete process. If it accepts by tapping on 'OK' button, then the user will be deleted and the user list will be rearranged.

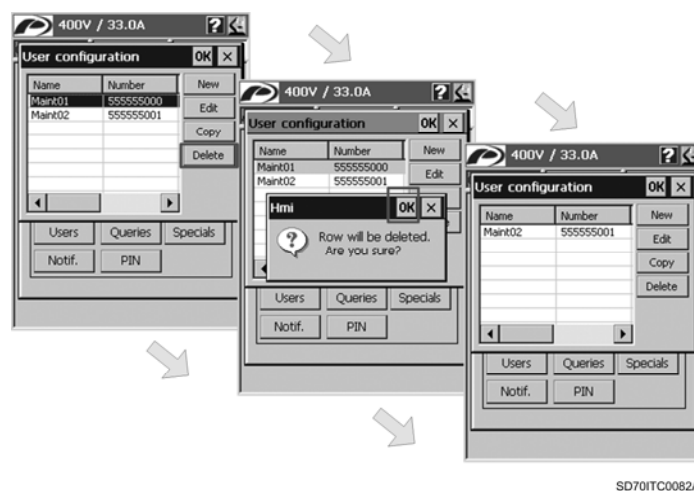


Figure 3.8 Delete user

### 3.3.4. Query Messages Configuration

The 'Query configuration' dialogue will appear when the user taps on the 'Queries' button from the main configuration dialogue for the SMS service.

This configuration dialogue allows the user to add new queries, edit, copy and delete existing queries by means of the different buttons included in the dialogue itself. As well as the user can manage the list of queries, he can also manage the variable list included for each query. Each query includes a list of variables associated to it and the user can also add new variables, or edit, copy and delete existing variables (like in queries).

In order to accept the query list configuration, the user should tap on 'OK' button. After this, the dialogue is closed and the main configuration dialogue is shown again. To cancel the configuration, tap on 'X' button and the changes will be discarded.

**Note:** To obtain further information, see section '3.1.1. Query Messages'.

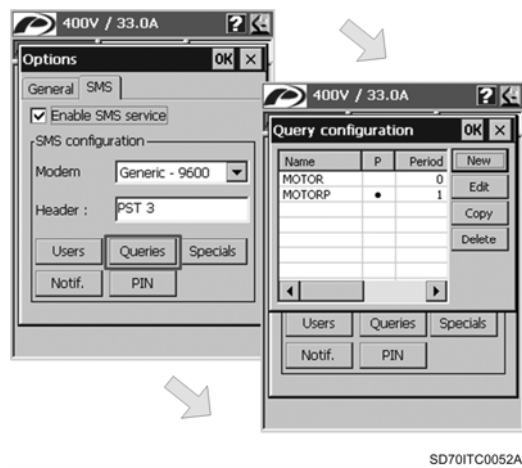


Figure 3.9 'Query configuration' dialogue window

#### New Query

The user accesses to the 'New query' configuration dialogue by tapping on 'New' button from the 'Query configuration' dialogue.

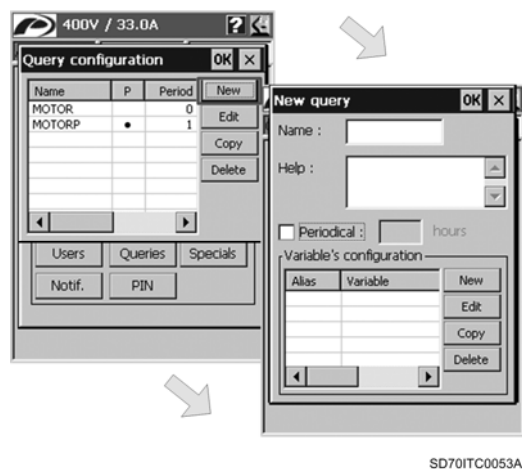


Figure 3.10 'New query' configuration dialogue window

From top to bottom:

- **'Name' edit box:** The user should write in this field a name for the new query. This name is the label that users should send to the graphic display to get the information from this query.
- **'Periodical' check box:** The user can assign a periodicity to the query by activating this check box. This activation enables the edit box to set the period.
- **Period setting (edit box):** After assigning a periodicity to the query, the user can set the period from 1 to 24 hours.
- **Variable list:** The list of the variables associated to the query is shown. The user can add new variables, and edit, copy and delete existing variables through the different available buttons.

#### Variable management

The user can add new variables, and edit, copy and delete existing variables by using the available buttons, located near the variable list, from the 'New query' or 'Edit query' configuration dialogue.

In order to associate a new variable to a query, the user should tap on 'New' button. In this way, the user accesses to the 'New variable' configuration dialogue and should define the displayed fields. To accept the new variable configuration, tap on 'OK' button. In this case, this dialogue will be closed and the 'New query' or 'Edit query' configuration dialogue (depending on the way to access to the variable management) is shown again with the new variable added to the end of the list. To cancel the configuration, tap on 'X' button and the changes will be discarded.

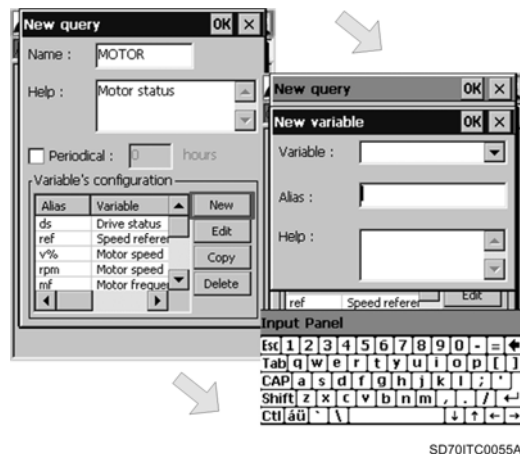


Figure 3.11 'New variable' configuration dialogue window

If the user wants to edit an existing variable, first, he should select it by tapping on the corresponding row in the variable list and then, tap on 'Edit' button. In this way, the user accesses to the 'Edit variable' configuration dialogue. This dialogue window has the same format and includes the same fields than the 'New variable' configuration dialogue. All fields of the dialogue show the present attributes for the selected variable. The user can modify these fields. After editing the selected variable and modifying its attributes, the user should tap on 'OK' button to accept the new configuration for the edited variable. This dialogue will be closed and the 'User configuration' dialogue is shown again with the variable list updated with the new introduced data for the selected variable. To cancel the configuration, tap on 'X' button and the changes will be discarded.

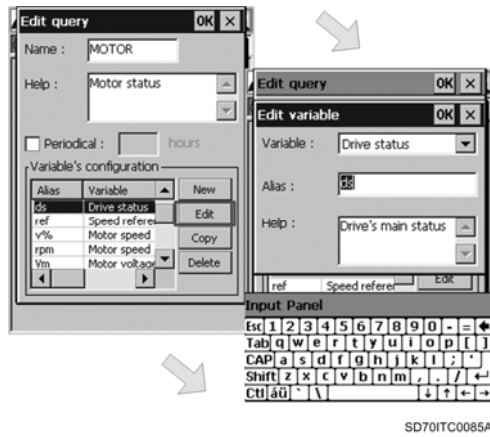


Figure 3.12 'Edit variable' configuration dialog window

Also, the user can copy any existing variable after selecting it from the variable list. A copy of the selected variable is created and added to the end of the list after the user taps on 'Copy' button.

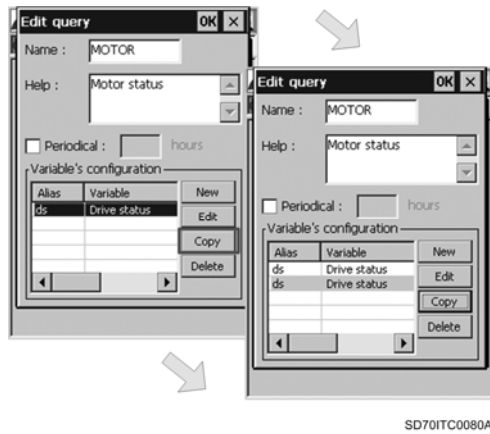


Figure 3.13 Copy variable

Finally, the user can also delete any existing after selecting it from the variable list. For this, the user should tap on 'Delete' button. Before deleting it, a question message will appear to confirm the delete process. In case of confirming, the variable will be deleted and the variable list will be rearranged.

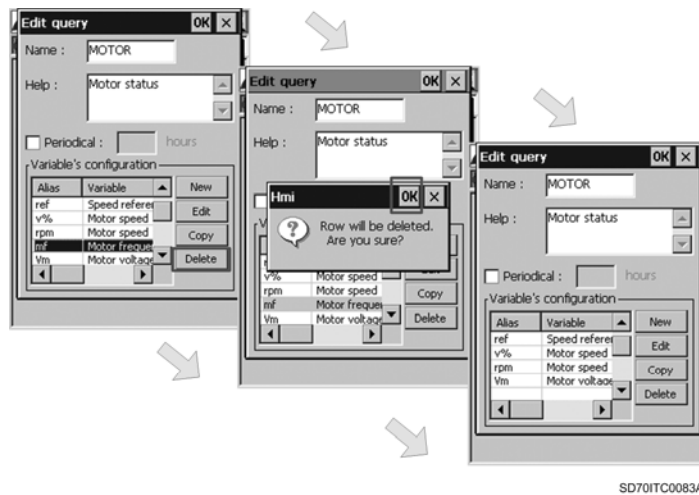


Figure 3.14 Delete variable

The fields that the user should define for each variable are:

- **'Variable' combo box:** If the user spread this combo box, he will see a list with all of the available parameters that can be associated to the query. The user should select one of them.
- **'Alias' edit box:** It is a short name for the variable. This is the name that the message will display for the variable.
- **'Help' edit box:** It is the help text associated to this variable.

After configuring the list of variables associated to the new query, the user should tap on 'OK' button in order to accept the new query configuration. This 'New query' configuration dialogue will be closed and the 'Query configuration' dialogue is shown again with the new query added to the end of the list. To cancel the configuration, tap on 'X' button and the changes will be discarded.

### Edit Query

The user accesses to the 'Edit query' configuration dialogue by tapping on 'Edit' button from the 'Query configuration' dialogue. For this, the user should select an existing query by tapping on the corresponding row of the query list.

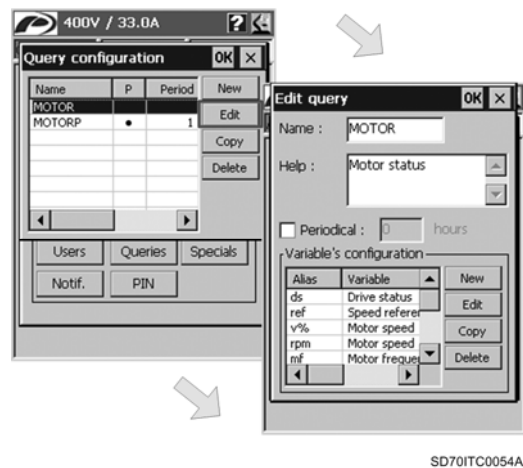


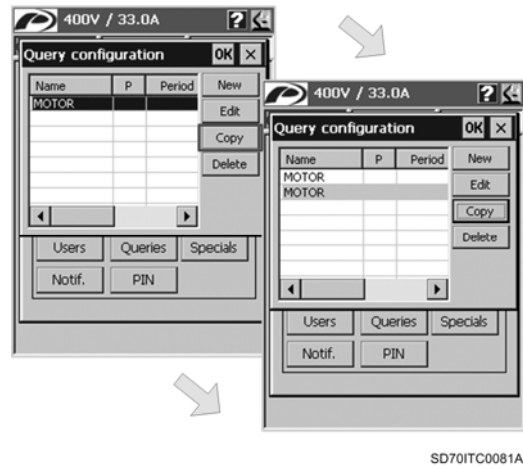
Figure 3.15 'Edit query' configuration dialogue window

The 'Edit query' configuration dialogue has the same format and includes the same fields than the 'New query' configuration dialogue. All fields of the dialogue show the present attributes for the selected query and the list of variables associated to it. The user can modify the name, the help text and associate variables again. See paragraph 'New Query' in section '3.3.4. Query Configuration' in order to obtain more detailed information about all fields of the 'Edit query' configuration dialogue.

After editing the selected query and modifying its attributes, the user should tap on 'OK' button to accept the new configuration for the edited query. This dialogue will be closed and the 'Query configuration' dialogue is shown again with the query list updated with the new introduced data for the selected query. To cancel the configuration, tap on 'X' button and the changes will be discarded.

### Copy Query

The user can copy an existing query by tapping on 'Copy' button. For this, the user should select an existing query by tapping on the corresponding row of the query list firstly. Once selected the query, if the 'Copy' button is tapped on, a copy of the selected query is created and added to the end of the list.

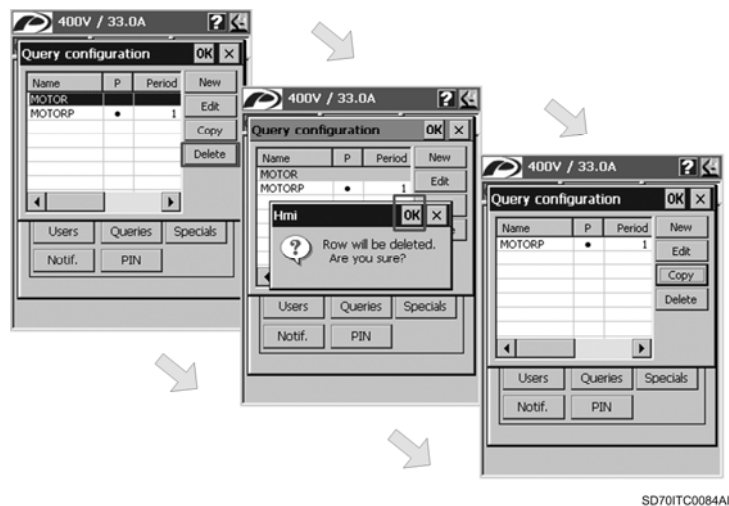


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Figure 3.16 Copy query

### Delete Query

The user can delete an existing query by tapping on 'Delete' button. For this, the user should select an existing query by tapping on the corresponding row of the query list firstly. Once selected the query, if the 'Delete' button is tapped on, a question message appears to confirm the delete process. If the user accepts by tapping on 'OK' button, then the query will be deleted and the query list will be rearranged.



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Figure 3.17 Delete query

### 3.3.5. Special Messages Configuration

The 'Special messages' configuration dialogue will appear when the user taps on the 'Specials' button from the main configuration dialogue for the SMS service.

The dialogue has a check box and an edit box for every message type. The four types of special messages are: help, start, stop and reset messages.

When a check box is activated, the corresponding message type is activated. By checking or activating the check box, the associated edit box is also enabled. The user should write the text label that user will send to the graphic display in order to execute the action.

In order to accept the special messages configuration, the user should tap on 'OK' button. After this, the dialogue is closed and the main configuration dialogue for the SMS service is shown again. To cancel the configuration, tap on 'X' button and the changes will be discarded.

**Note:** To obtain further information about special messages, see section '3.1.2. Special Messages'.

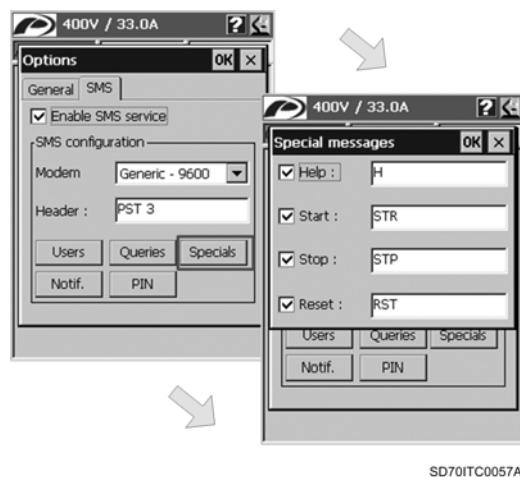


Figure 3.18 'Special messages' configuration dialogue window

### 3.3.6. Notification Messages Configuration

The 'Notification messages' configuration dialogue will appear when the user taps on the 'Notif.' button from the main configuration dialogue for the SMS service.

The dialogue has the same format than 'Special messages' configuration dialogue. There are three check boxes with their corresponding edit boxes. Each check box corresponds with one of the notification message types. The three types of notification messages are: fault, started and stopped.

When a check box is activated, the corresponding message type is activated. By checking or activating the check box, the associated edit box is also enabled. The user should write the text label that user wants to receive in the notification message when the associated event occurs.

In order to accept the notification messages configuration, the user should tap on 'OK' button. After this, the dialogue is closed and the main configuration dialogue for the SMS service is shown again. To cancel the configuration, tap on 'X' button and the changes will be discarded.

**Note:** To obtain further information about notification messages, see section '3.1.3. Notification Messages'.



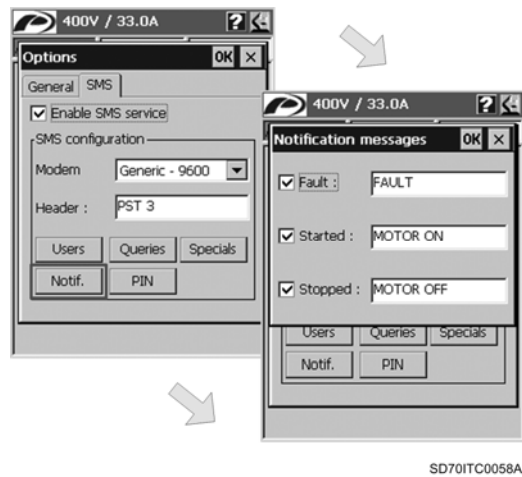


Figure 3.19 'Notification messages' configuration dialogue window

### 3.4. SMS Service Use. Examples

For better understanding of the SMS service operation, some examples are exposed below.

#### 3.4.1. SMS Service Configuration Example

For the following examples of the use of the SMS service, the configuration of the service will be the next:

**Header**

DRIVE01

**Users**

Name	Number	QRY	NTF	STR	STP	RST
User1	XXXXXXXX	Y	Y	Y	Y	Y
User2	XXXXXXXX	Y	Y	N	N	N

**Queries**

Name	Help	P	Period	Variables		
MOTOR	Help Motor	N	-	<b>Parameter</b>	<b>Alias</b>	<b>Help</b>
				Drive status	sta	Help Drive status
				Motor speed	sp	Help Motor spd %
MOTORP	Help Motor P	Y	1 hour	<b>Parameter</b>	<b>Alias</b>	<b>Help</b>
				Drive status	sta	Help Drive status
				Motor speed	sp	Help Motor spd %

**Special messages**

	Active	Label
Help	Y	HLP
Start	Y	STR
Stop	Y	STP
Reset	Y	RST

**Notification messages**

	Active	Label
Fault	Y	FAULT
Started	Y	MOTOR ON
Stopped	Y	MOTOR OFF

**3.4.2. Example for Query Messages****Regular query (non periodic query)**

User1 sends a SMS message to the graphic display with the text:

MOTOR

The graphic display responds the following:

```
DRIVE01. MOTOR
sta=OFF
sp=+0.0%
```

**Periodic query**

See the following time graph:

Time	User1 → Graphic Display	User2 → Graphic Display	Graphic Display → User1	Graphic Display → User2
09:00	MOTORP		DRIVE01. MOTORP sta=OFF sp=+0.0%	
10:00			DRIVE01. MOTORP sta=OFF sp=+0.0%	
10:45		MOTORP		DRIVE01. MOTORP sta=OFF sp=+0.0%
11:00			DRIVE01. MOTORP sta=OFF sp=+0.0%	DRIVE01. MOTORP sta=OFF sp=+0.0%
12:00			DRIVE01. MOTORP sta=OFF sp=+0.0%	DRIVE01. MOTORP sta=OFF sp=+0.0%
12:15	MOTORP		DRIVE01. MOTORP sta=OFF sp=+0.0%	
13:00				DRIVE01. MOTORP sta=OFF sp=+0.0%
13:15				
13:20		MOTORP		DRIVE01. MOTORP sta=OFF sp=+0.0%
14:00				
14:20				

### 3.4.3. Example for Special and Notification Messages

#### Motor Starting

User1 sends a SMS message to the graphic display with the text:

```
STR
```

The graphic display responds to User1 the following:

```
DRIVE01. Command has been run correctly.
```

Once the motor is started, as the start notification message is active and User1 and User2 have the notification right, both users will receive the next start notification message from the graphic display:

```
DRIVE01. MOTOR ON
```

#### Motor Stopping

User1 sends a SMS message to the graphic display with the text:

```
STP
```

The graphic display responds to User1 the following:

```
DRIVE01. Command has been run correctly.
```

Once the motor is stopped, as the stop notification message is active and User1 and User2 have the notification right, both users will receive the next stop notification message from the graphic display:

```
DRIVE01. MOTOR OFF
```

#### Drive Reset

User1 sends a SMS message to the graphic display with the text:

```
RST
```

The graphic display responds to User1 the following:

```
DRIVE01. Command has been run correctly.
```

#### Help Request (Info)

See the following table:

User1 → Graphic Display	Graphic Display → User1
HLP	DRIVE01. HLP MOTOR MOTORP
HLP MOTORP	DRIVE01. HLP MOTORP Help Motor P
HLP MOTORP sta	DRIVE01. HLP MOTORP sta Help Drive status

#### Fault Notification Message

For example, the fault 'F40 EXT/PTC' is generated in the drive while it was running.

The graphic display will send User1 and User2 the following fault notification message:

```
DRIVE01. FAULT  
F40 EXT/PTC
```

### 3.4.4. Considerations on Message Sending

#### **Non registered User tries to use the Service**

A non registered user sends a query to the graphic display:

```
MOTOR
```

The graphic display will ignore the user command and will not respond anything to this non registered user.

#### **User2 tries to start the motor**

User2 sends the start command to the drive through SMS message:

```
STR
```

The graphic display will respond to User2 the next:

```
DRIVE01. ERROR. User is not allowed to perform the request action.
```

#### **User1 makes a typo**

User1 tries to send message MOTOR to the drive, but he makes a typo:

```
MOTPR
```

The graphic display will respond:

```
DRIVE01. ERROR. There isn't any command with that name.
```





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