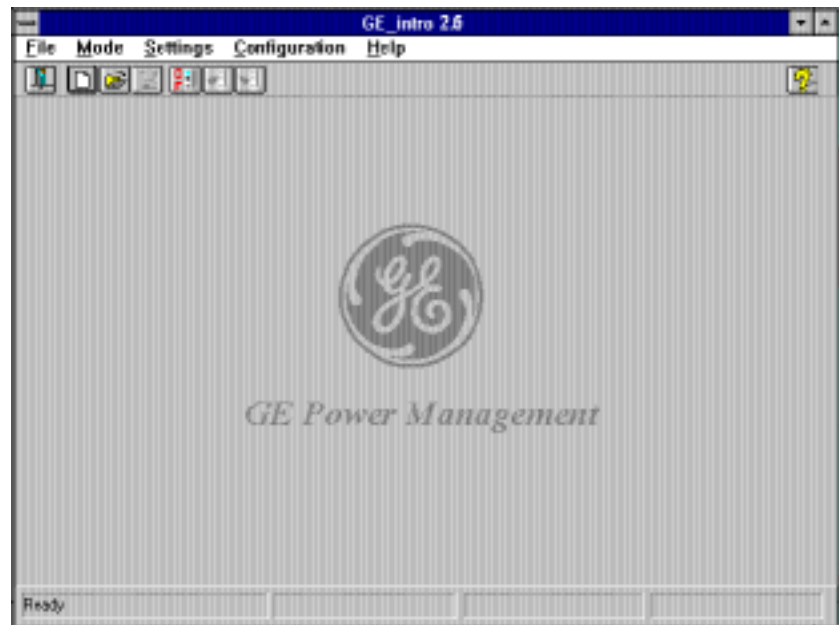




# *GE Power Management*

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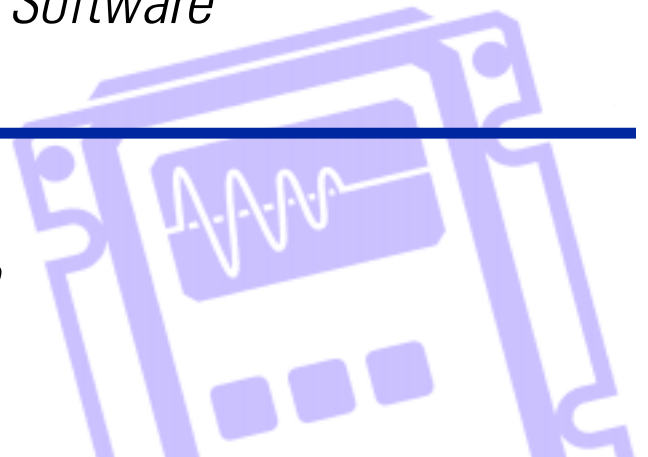
*Configuration Software*

***GE-INTRO***

---



*Instructions*  
*GEK 105594B*



# **GE-INTRO CONFIGURATION PROGRAM.**

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# 1.

# ***INTRODUCTION***

---

GE-INTRO has been designed to set the desired configuration into the DDS family of relays (SMOR-B relay models included).

The final objective of the program is to generate a configuration file, which contains all the parameters and settings to define the desired configuration (Digital Inputs, Digital Outputs, Events, LEDs, Control Operations, etc.). Settings are grouped together following a functional criterion.

There are two different operation modes: Emulation and Relay Connection. For both modes the GE-INTRO program works using a settings file.

Working in the Emulation mode, the user can only generate a new file or modify an existing one.

Working in the Relay Connection mode, the user can also communicate with the relay, and then get its configuration or download a file into the relay to set it with a different configuration.

The GE-INTRO program can also automatically generate a configuration report, in order to have a print out of all the parameters and settings.

GE-INTRO is a Windows based program, and has been designed like that in order to have a very user-friendly program, following the Windows system, menus, mouse handling, etc.

From the graphical-interface point of view, the program has a main window with the working menu, and inside this window, the user will have all the windows associated to a particular group of settings.



## 2.

# INSTALLATION

---

### 2.1. System Requirements.

PC minimum requirements are:

- 386 microprocessor or better (486 is recommended).
- 4 Mb RAM (8 Mb recommended).
- 3.5" floppy disk drive.
- RS 232 C communication port.
- Parallel printer port.
- Windows 3.1 or better.

### 2.2. GE-INTRO Installation Procedure.

Before starting the GE-INTRO installation procedure it is mandatory to start Windows.

#### 2.2.1. Installation with disks

The installation package is a set of three 3.5" disks.

Once you are inside the Windows program, follow this procedure:

1. Insert the first disk into the floppy drive of your computer.
2. From the Program Manager menu, select 'Run' and then choose the 'setup.exe' program from your floppy drive.
3. Follow the steps described on the 'setup.exe' program. If GE-INTRO is the first GE-NESIS program to be installed into your computer, you can select the directory in which you prefer GE-INTRO to be installed, otherwise, the directory will be automatically selected.
4. Once the installation is completed, a new windows group called 'GE-NESIS' will be created, and the corresponding icon will be added.

#### 2.2.2. Installation from Internet or from the Products CD.

The Setup program is also available in the GE Power Management Products CD, and can be downloaded from the Internet ([www.ge.com/indsys/pm](http://www.ge.com/indsys/pm)). The user will find a file named **ge\_intro.exe**. This is a compressed file

The Installation procedure in this case will be the following:

1. Create a new directory and extract the files included in **ge\_intro.exe** to it.
2. From the above mentioned directory, run the **setup.exe** file, created during the previous step.
3. Follow the steps described on the 'setup.exe' program. If GE-INTRO is the first GE-NESIS program to be installed into your computer, you can select the directory in which you prefer GE-INTRO to be installed, otherwise, the directory will be automatically selected.
4. Once the installation is completed, a new windows group called 'GE-NESIS' will be created, and the corresponding icon will be added.

**NOTE:** GE-INTRO requires to have a relay model description file installed to work properly. Read next section to install a relay model description file.

### ***2.3. Installing a New Relay Model Description File.***

With every new relay, GE adds a floppy disk containing the appropriated data base, which describes that particular relay model. GE-INTRO requires the data base file in order to be able to communicate with the new relay, as well as to generate the configuration files associated to this new model.

To install a new relay model follow this steps:

1. Insert the disk into your floppy disk drive.
2. From Program Manager select 'Run', and then choose the 'setup. exe' program from your floppy disk drive.
3. Follow the steps described into the setup program.
4. Once the setup is completed successfully, the new relay model can be used by the GE-INTRO program.

In case a previous relay model description file already exists in your computer associated to the same relay model you are installing, the one corresponding to the most recent version will remain installed.

### 3. GRAPHICAL INTERFACE DESCRIPTION

In this chapter and in the following one, we will describe the items and nomenclature used in this instruction book to refer to the different control push-buttons and objects you will find in all the windows in this application.

The program has basically two types of windows:

1. Main window: It is the one you will see when you start the application.
2. Settings window: Each setting group has an associated window, which will appear inside the main window. You can only have one setting window open at a time.

#### 3.1. Main Window.

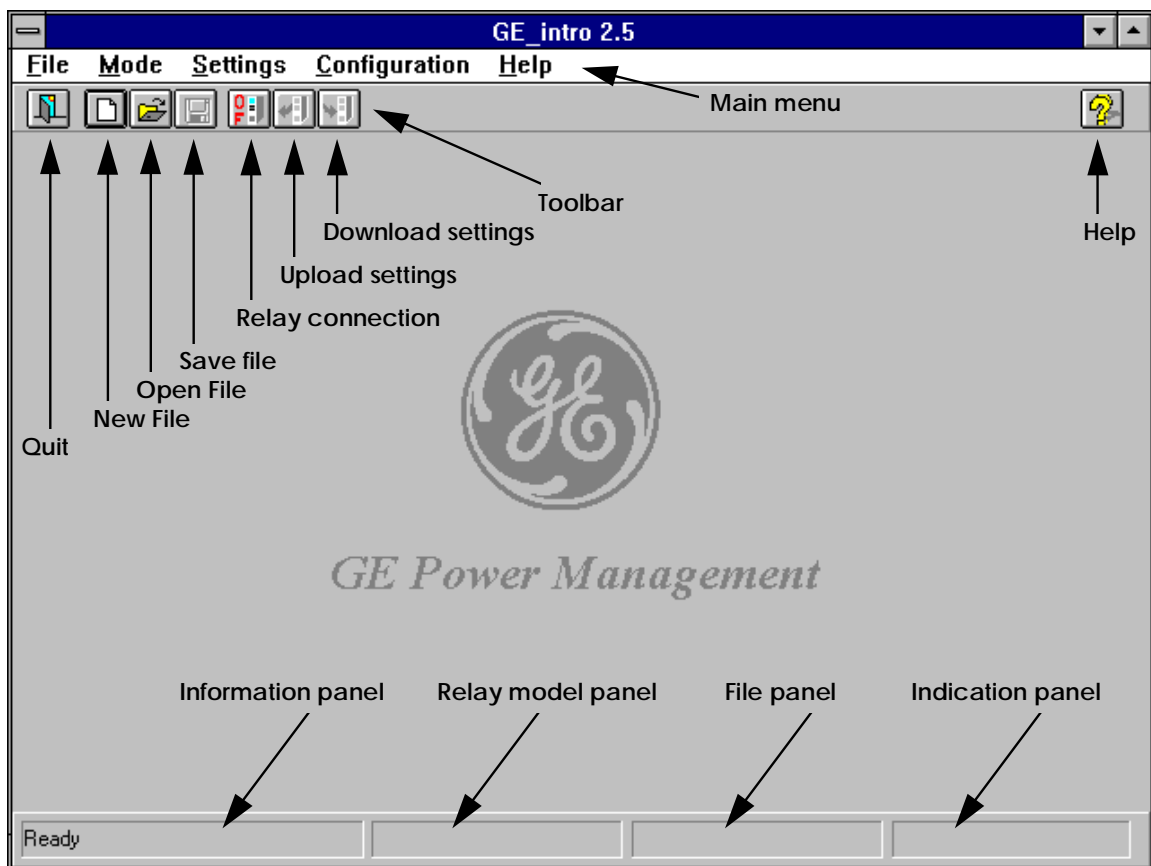


Figure 1. Main window



The items you will find in the main window are (see figure 1):

1. Main Menu: gathers all the different options and program capabilities.
2. Toolbar: where you can find push-buttons to perform the main functions, also accessible from the Main Menu.
3. Push-buttons: The main functions you can perform by pushing buttons are:
  - \* Open New File: 'File '+ 'New '
  - \* Open File: 'File '+ 'Open '
  - \* Save File: 'File '+ 'Save '
  - \* Download Settings: 'File '+ 'Send Settings '
  - \* Upload Settings: 'File '+ 'Receive Settings '
  - \* Help: 'Help '+ 'About '
  - \* Quit: 'File '+ 'Quit '
  - \* Relay Connection: This button has two assigned functions, depending on the text it shows:

OF: 'Working Mode '+ 'Emulation '

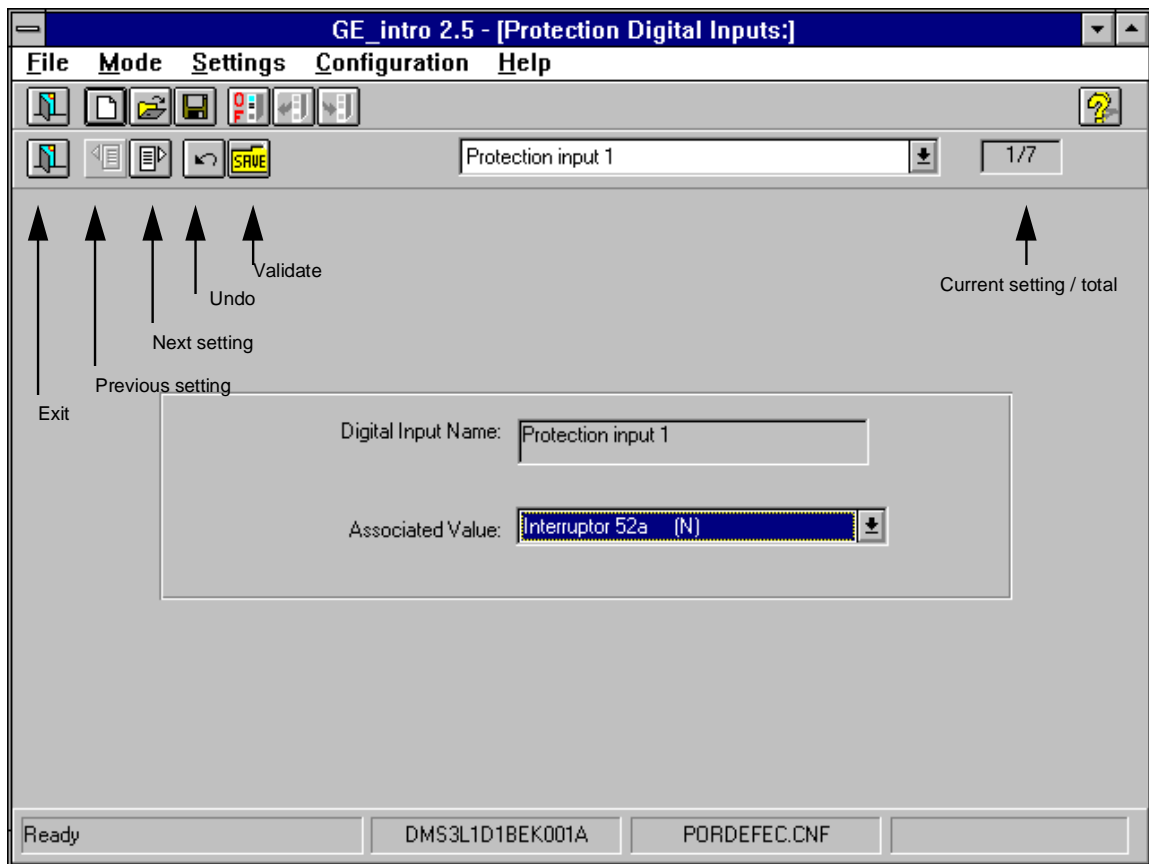
ON: 'Working Mode '+ 'Relay Connection '

4. Small Windows:

- \* Information window: shows program status or actions.
- \* Relay Model window: shows the model of the relay you are working with.
- \* File window : shows the name of the file you are working with.
- \* Indication window: shows the percentage done of the command selected using a dynamic bar.

### ***3. 2. Settings Window.***

The settings to define the configuration of the relay are grouped together according to functional characteristics. A different window has been designed for each different group of settings. All these windows have common points which are shown in figure 2. (To refer to a particular window see chapter 6)



**Figure 2. Settings window.**

In the upper bar of the window, above the main menu, the user has the information about the group of settings he is working in.

Under the toolbar, there is a bar with the following buttons: (these buttons are not related to any option in the menu). The meaning of these buttons is the following:

1. Exit: Quit the settings window and return to the main window.
2. Previous setting: go to the previous setting.
3. Next setting: go to the next setting.
4. Undo: disregard the change done to a particular setting.
5. Validate: push this button to validate the value entered for a particular setting. This button only validates the entered value, but does not save it into a file. To save the values use the 'save' option. Once you have validated all the desired settings, they must be saved into the corresponding file. Each setting must be validated before being saved into a file.
6. Current setting/ total: It shows the present setting number which is been modified and also the total number of settings of that group.

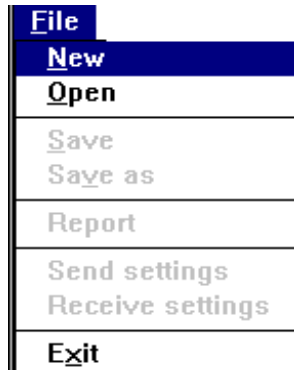


# 4.

# MAIN MENU

---

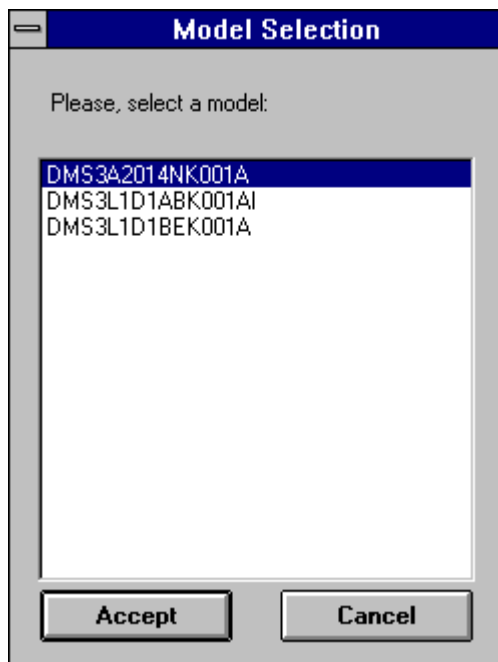
## 4. 1. FILE.



**Figure 3. File menu**

### 4. 1. 1. New.

This option allows the user to create a new file, which will have 'pordefec.cnf' as default name. There is a button in the toolbar associated to this function.



**Figure 4. Models**

If you are in the Emulation Mode, a complete list of all installed relay models will be displayed, and you will have to select the model you want to work with.

If you are in the Relay Connection Mode, GE-INTRO will take the model information from the relay and use the appropriate model description file from the database in your computer.

#### ***4. 1. 2. Open***

This option allows to open an existing file. There is a button associated to this function at the toolbar. (see 3. 1. ).

If you are working in the Relay Connection Mode, only the files associated with the relay you are working with can be opened.

#### ***4. 1. 3. Save.***

This option allows to save the file you are working with. If this file is the default one, 'pordefec.cnf', the program will ask for a new file name. There is a button associated with this function in the toolbar. (see 3. 1.)

#### ***4. 1. 4. Save As.***

This option allows to save your work into a file, using your own file name.

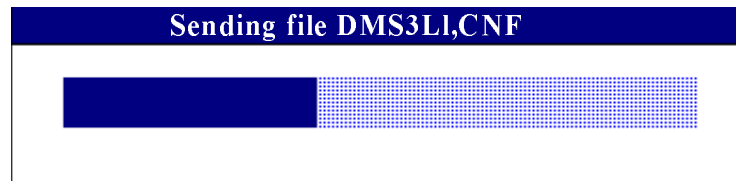
#### ***4. 1. 5. Report.***

This option allows you to create a report from the working file you have opened. This report can be automatically printed. The complete description of the report (format, options, etc.) can be found in chapter 7.

#### ***4. 1. 6. Send Settings.***

By using this option you can download into the relay the settings stored in a file. The file you can download into the relay can be the file you are working with, or a different one. In this case, you will be prompted to select the file, and then the GE-INTRO will check if the file model matches the relay model you are working with.

There is a button in the toolbar associated with this function. (see 3. 1.). You will see the following information window during the downloading process:



*Figure 5. Sending settings*

**NOTE:** GE-INTRO will disable the relay before downloading the settings. Then, it will download the settings, and return the relay to the original status. A warning message will be displayed asking the user to restart the relay in order to put in service the new relay configuration that has just been downloaded.

If there is any problem during the downloading of the settings, the GE-INTRO program will display a warning message and the relay will be disabled.

#### **4. 1. 7. Receive Settings.**

Using this option you can read the settings from a relay and write the information into a file in your computer. The file can be the working file (if it exists) or a different file. In this case, you will be prompted to enter a file name. If the file already exists the program will check if the model of the relay and the one of the file are the same.

There is a button in the tool bar associated to this function. (see 3. 1. ). The following window will appear while uploading settings.



*Figure 6. Receiving settings*

#### **4. 1. 8. Exit.**

This option is intended to exit the program. If you select this option while working, and the program detects you have done changes which have not already been saved to a file, a warning message will appear and will allow you to save the latest changes entered.

There is a button at the tool bar associated to this function. (see 3. 1. )

## 4. 2. Working Modes.



*Figure 7. Working Modes Menu.*

### 4. 2. 1. Emulation.

You can use this option when the relay is not available or the link between the relay and the computer is not established.

There is a button associated to this function at the tool bar (see 3. 1. ). This button will show an 'OF 'text while using this working mode.

### 4. 2. 2. Relay Connection.

This option allows you to work directly with the relay. Each time GE-INTRO connects with the relay it uploads the settings and then allows you to modify them. When you change a setting, this information is not automatically sent to the relay, but is stored in your computer. Then, when the settings are completed, you will have to download the complete information into the relay. GE-INTRO always sends complete settings files to the relay.

There is a button associated with this function on the tool bar (see 3. 1. ). This button will show an 'ON ' text while using this working mode.

The program will request the relay number and password if it does not have this information.

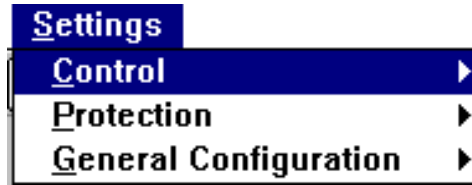
When trying to establish the connection link with the relay if a communication problem occurs, the program will automatically return to emulation mode.

## 4. 3. Settings.

Clicking on this option, the program will show you the settings of the relay, classified on three main groups: Control Settings, Protection Settings and General Settings. Each group is divided into smaller groups, following functional rules.

When a file is open, the program will allow you to select only those setting groups related to the relay model you are working with.

There are relays with only protection functions (SMOR-B), only control functions (some DMS relays) and relays with both, protection and control functions (DRS).



*Figure 8. Settings Menu.*

### 4.3.1. Control

See chapter 6. 1.

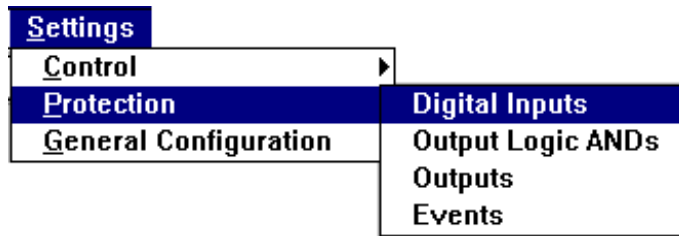
Settings	
Control	Switchgear Configuration
Protection	Operation Timers
General Configuration	Digital Inputs Pulse Inputs RTU Inputs Switchgear Inputs
	Outputs Events Operation Confirmation Timeout Command Status List
	Operation Conditions Failure Conditions Success Conditions

*Figure 9. Control settings menu*



### 4.3.2. Protection.

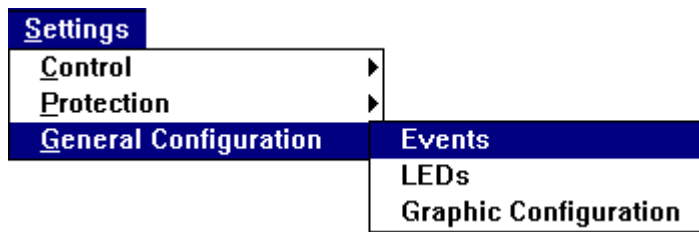
See chapter 6. 2.



*Figure 10. Protection Settings Menu*

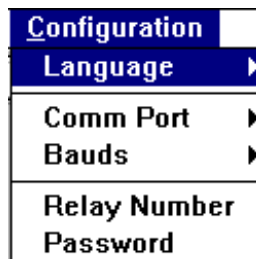
### 4.3.3. General Configuration.

See chapter 6. 3.



*Figure 11. General Settings Menu*

### 4.4. Configuration.



*Figure 12. Configuration Menu*

#### 4. 4. 1. Language.

This option allows you to select the language in which you want the messages on your or the computer and on the report to be shown. You can select English or Spanish.

<b>Configuration</b>	
<b>Language</b>	<b>Spanish</b>
	✓ <b>English</b>
<b>Comm Port</b>	
<b>Bauds</b>	▶
<b>Relay Number</b>	
<b>Password</b>	

*Figure 13. Language Menu*

#### 4. 4. 2. Communication Port.

This option allows you to select the communication port you want to use to communicate with the relay. The program will use COM2 by default.

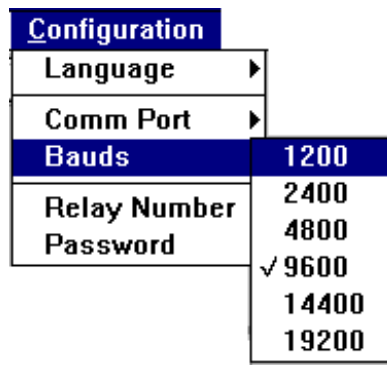
<b>Configuration</b>	
<b>Language</b>	▶
<b>Comm Port</b>	✓ <b>Port1</b>
<b>Bauds</b>	<b>Port2</b>
	<b>Port3</b>
<b>Relay Number</b>	<b>Port4</b>
<b>Password</b>	

*Figure 14. Communication Port Menu*

#### 4. 4. 3. Baud Rate.

This option allows you to select the communication baud rate (speed). The program will use 9600 Baud by default. Besides this parameter, the program will use:

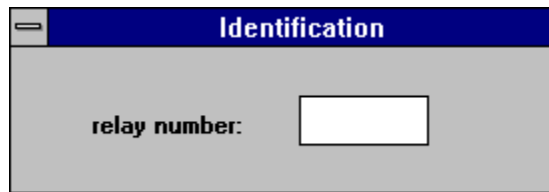
Parity: No parity.  
 Data bits: 8  
 Stop bits: 1



**Figure 15. Baud Rate Menu**

**4. 4. 4. Relay Number.**

This option allows you to enter the relay number. This number must match the number stored in the relay you want to communicate with.



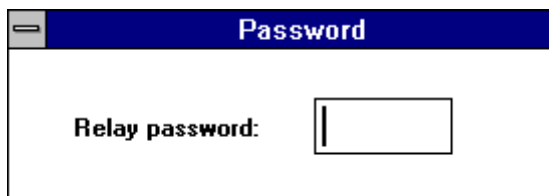
**Figure 16. Relay Number**

(Read the instruction book of the relay you have to see how to get the relay number setting).

**4. 4. 5. Password.**

This option asks you to enter the password needed to change settings.

**If the password entered does not match the one stored in the relay, you will be able to communicate with the relay, upload relay settings, but you will not be able to change any of them.**



**Figure 17. Password**

## 4. 5. Help



Figure 18. Help Menu

### 4. 5. 1. About



Figure 19. About Window.

The text entered will be validated when you press the 'Accept 'button, **but it will be saved into a file when you select 'File '+ 'Save ',** or the associated button at the tool bar.

This window shows you two types of information:

1. Miscellaneous: Version/ Revision of the program and system information.
2. Text for the report: Text entered in the fields 'Substation ', 'Position 'and 'Comments ' will be shown on the report (see chapter 7 for more information. )



## **5. WORKING MODES**

---

There are two possible working modes, as mentioned previously.

The Emulation Mode allows you to create a configuration file and/or modify an existing one.

The Relay Connection Mode allows you to work directly with your relay, sending/ receiving settings to/ from the relay.

### **5.1. Emulation Mode.**

While using this option, the 'Relay Connection ' button ( see figure 1 ) shows ' OF ' and the menu option ' Working Mode ' - ' Emulation ' is marked.

You can create a new configuration file and/or modify an existing one using this working mode at any time, without having to have a relay with you.

If you want to create a new configuration file, the program needs to know for which relay model you want to create the file. GE-INTRO will show you the list of all the relay model description files installed in your computer, to select the one you want to use. The file name assigned by the program to the initial working file is 'pordefec.cnf '. You cannot save your work using this file name, so the program will ask you to assign a file name when you try to save it.

If you want to modify an existing file, GE-INTRO will check if the associated relay model description file is already installed. The program needs to have this information (model description file) to open an existing configuration file. (see 2. 3). If any error is detected, the program will show you the appropriate warning message.

It is important to note that all the changes entered to the program must be validated using the 'validate ' or 'accept ' button ( see figure 2), but these changes will not be saved until you press the ' save ' button ( see figure 1 ) or the ' File ' - ' Save ' options at the main menu.

### **5.2. Relay Connection**

You can enter this working mode by pressing the ' Relay Connection ' button (see figure 1) when this button shows the text ' OF ' or by selecting the options ' Working Mode ' - ' Relay Connection ' at the main menu.

It is advisable to check the communication parameters before trying to establish connection with the relay. The default communication parameters assigned when installing the GE-INTRO program are:

PORT2, 9600, N, 8, 1

this is, communication port number 2, 9600 Baud rate, no parity, 8 Data bits and 1 Stop bit. You can change the communication port or the baud rate. (see 4 . 4)

When establishing communication with the relay, the program will load into your computer memory the appropriate communication driver, which will manage the physical link between your computer serial port and the relay serial port.

This driver has two minimized icons associated to it, called ' Communications DDS Driver ' and ' Communication Errors '. The first one is the real communication manager, and the second one is an Error Viewer.



**Figure 20.** Driver Icons.

Connection begins when the loaded communication driver asks the relay for its model. If communication is successful, you will see at the model window (see figure 1) the read relay model. You will also see that the ' Relay Connection ' button ( see figure 1 ) shows ' ON ' and the ' Working Mode ' - ' Relay Connection ' option is marked at the menu. If any communication error is detected the GE-INTRO will remain in Emulation Mode.

**As soon as the connection with the relay is made, the relay model read by the program from your relay has priority over any other relay model of any configuration file you could be working with before communicating with the relay.**

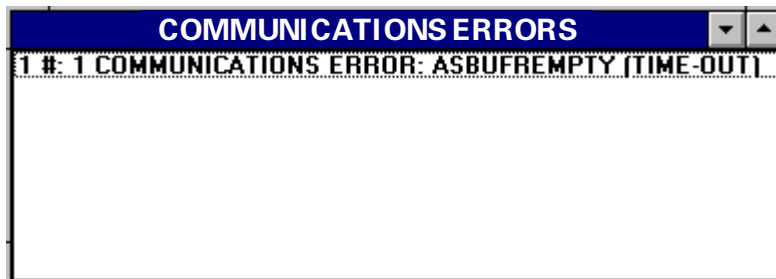
That is, if you are working in Emulation Mode in a particular file corresponding to a relay model which does not match the model of the relay you are just connecting to, the GE-INTRO will change the relay model to the one got from the relay. The program will allow you to save your work before changing model.

While communicating with your relay, two types of communication error may appear:

1. Fatal Communication Error: The program will show the error message at the ' Communication Errors ' window. Maximize this window to read this message.



**Figure 21. Fatal Communication Error**



**Figure 22. Communcication Errors**

2. **Communication error # 0x--** : This is not a communication error but an error at the relay. The error number is a code sent by the relay to help identifying the error.



**Figure 23. Communication Error**

By using this working mode, you can basically do the same operations that you can in Emulation mode, plus send and receive information to/from your relay. As it has been mentioned before, this operations can be done over the working file or over a different file.

While sending or receiving settings, the program will show a process information window to allow you to know how much of the process has been already done. (see 4 . 1. 6 y 4 . 1. 7)



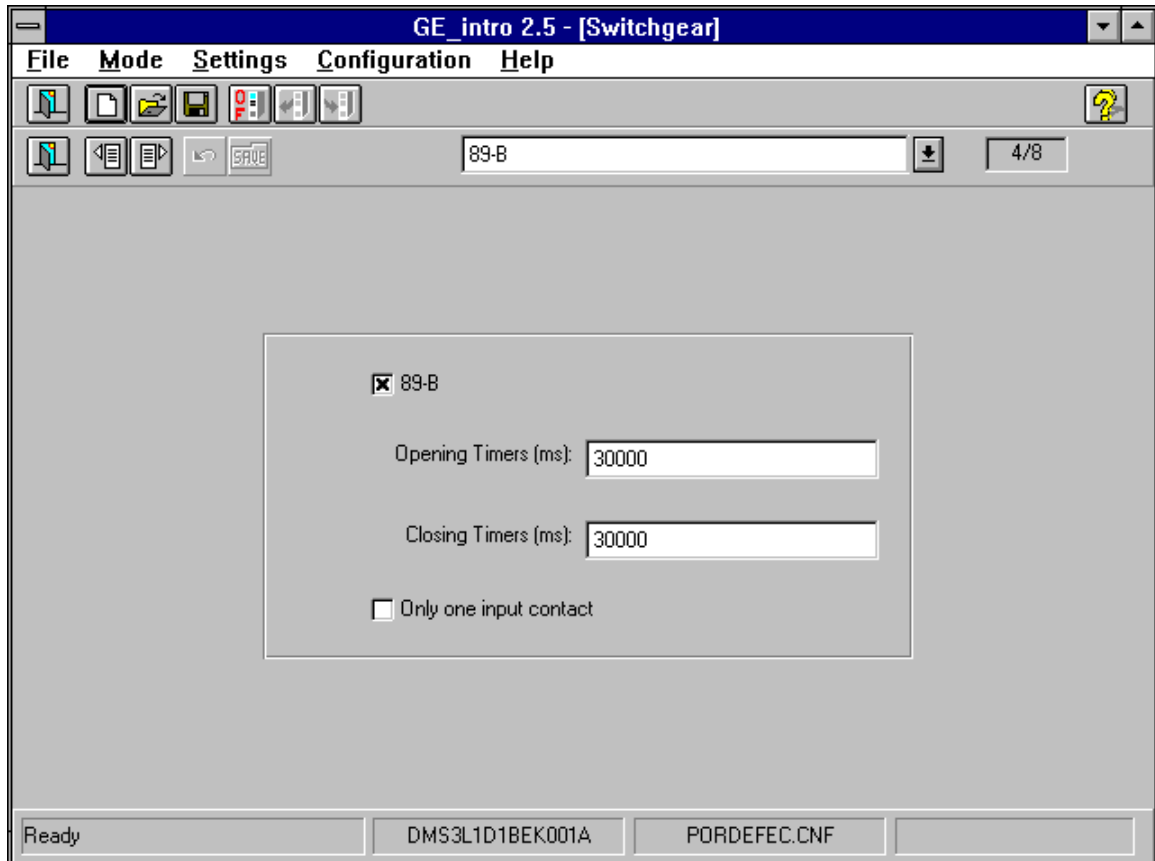


## 6. **SETTINGS DESCRIPTION**

---

### 6. 1. Control

#### 6. 1. 1. Switchgear Configuration.



**Figure 24.** Switchgear configuration.

Control functions allow seven switchgear items to be defined ( circuit breakers, line switches, grounding switches, etc. ) and configured. Besides this, there is an additional item called ' Control ' which cannot be configured.

The word ' switchgear ' has a wider meaning than just high voltage switchgear. It also refers to any other item that the Control functions of the relay can manage, like an external recloser, a lock out relay, etc.

The program will ask for two time variables for each switchgear item, called ' Opening Time ' and ' Closing Time '. These variables refer to the time a particular item takes to change from open status to closed status and vice versa. Using these times, the relay will be able to determine a ' Failure to Close ' or a ' Failure to Open ', if the switchgear takes more time than the defined one to

change status. These functions use the ' a ' and ' b ' type of auxiliary contacts from each switchgear item.

You can also define switchgear items that only have one auxiliary contact. In this case these time variables are not used, and the relay cannot perform these monitoring functions.

Figure 24 shows how to configure these settings:

- Figure shows Switchgear item number 3. (The first one is number 0).
- The text identifier is entered by the user, in this case ' 89-B '. This text will appear:
  1. As part of the text message the program shows at the ' Switchgear Inputs ' group of settings ( see 6 . 1. 5 ), for each type of contact. The text will be ' 89-B-a ' and ' 89-B-b '.
  2. As part of the text message at the Switchgear ' Signal Group ' ( see 6 . 1. 6 ); the program will then show messages at the Switchgear Signal Group like ' A3 :ClosedActive 89-B ', ' A3 :Undefined 89-B ', ' A3 :Failure to Open 89-B ', ' A3 :Failure to Close 89-B '.
- The ' x ' at the check-box shows that the relay does have to handle this particular switchgear item. If it is not selected, the relay will not handle the item.
- '30000' are the numbers entered by the user to define the ' Opening Time ' and ' Closing Time '. Units are milliseconds.
- The last check-box is to assign 1 or 2 auxiliary contact inputs.

### **6. 1. 2. Operation Timers.**

The Control Module of the relay allows up to 16 different operations to be defined, 2 of them are fixed ( ' Block Control ' and ' Unblock Control ' ) and 14 can be configured. These operation commands can get to the relay from local communications (local keypad and display), from remote communications or from a digital input (pulse, traditional RTU).

For each operation it can be configured :

- The operation ' Identification '.
- The operation interlocking, ' Operation Conditions ', to check before starting a maneuver ( up to 4 conditions )
- The ' Failure Conditions ', to abort a maneuver that is being performed ( up to 3 conditions ).

- The ' Success Condition ', to decide if a maneuver has been performed successfully ( 1 condition ).

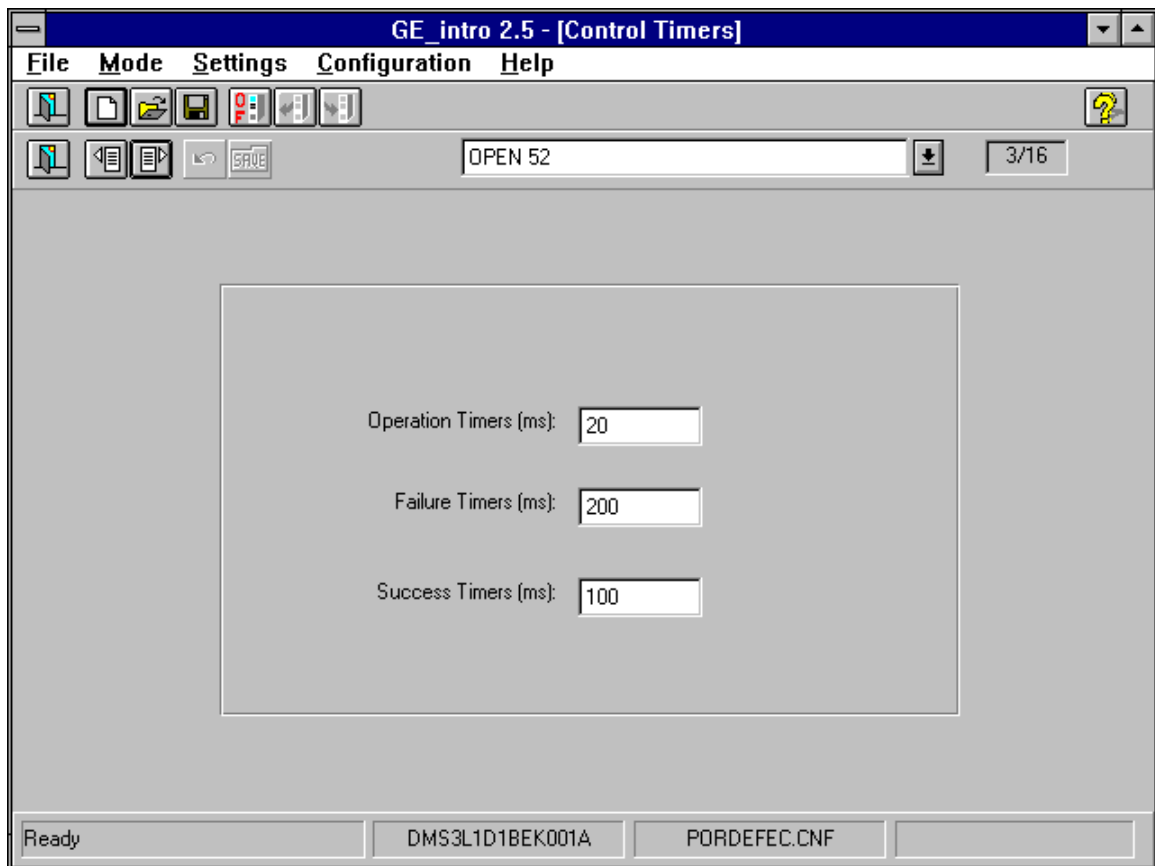
- The ' Holding Time ', which define the time the program waits for any of the operation conditions to become true.

- The ' Failure Time ', which define the time the program waits for the success condition to become true.

- The ' Dwell Time ', define the time the output contacts of the relay are closed for that particular maneuver.

Each maneuver generates 2 signals: a switchgear item selection signal and an output signal. These signals can be assigned to any of the relay output contacts. The selection signal gets active when the maneuver is confirmed and stays active until the maneuver is finished successfully or the ' Failure Time ' times out. The output signal gets active when any of the ' Operation Conditions ' become true and it stays on until the ' Dwell Time ' times out.

At this point of the program, each maneuver must be set as well as the corresponding time variables.



**Figure 25. Maneuver Timers**

Example at figure 25 shows how to configure this group of settings :

- It is maneuver number 3.
- Text ' OPEN 52 ' is entered by the user to define the maneuver. This text will automatically appear at :
  1. At the ' RTU Inputs ' group of settings.
  2. As part of the text messages at the Commands ' Signal Group ' (see 6.1.6); the program will then show messages at the Commands ' Signal Group ' like 'O-3 : OPEN 52', 'SELEC. O-3 : OPEN 52', 'OUTPUT O-3 OPEN 52'.
  3. As part of the text messages at the windows corresponding to ' Operation Conditions ', ' Failure Conditions ' and ' Success Conditions ', then the program will show messages like ' 1st Operation Condition - OPEN 52 ', ' 3rd Failure Condition - OPEN 52 ' and ' Success Condition - OPEN 52 '.
- '20', '200' and '100' are time values entered by the user to define the Operation, Failure and Success Times respectively. (Units are milliseconds.)

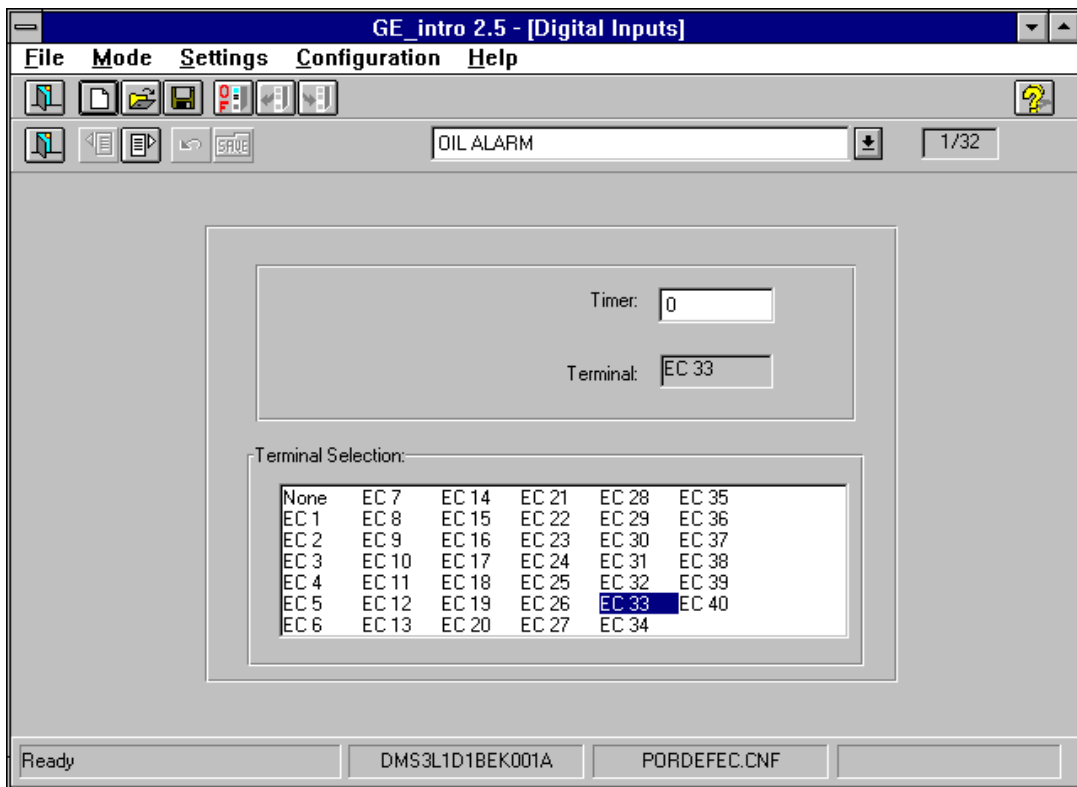
### **6. 1. 3. Digital Inputs Configuration.**

The Control module of the relay can handle up to 42 physical contacts. You can configure up to 32 logical inputs (they will appear at the Internal Status of the Control Module) at this point. You can select any of the inputs of the relay as the actual input associated to each of your logical input.

The relay can also assign an additional timer to 8 of your inputs. These must be the first 8 inputs, and time can be set between 0 to 60,000 ms. All the inputs are active while the voltage applied to the input is on, and as soon as it disappears, the input gets deactivated.

Figure 26 shows how to configure this group of settings:

- It shows input number 1, (1/ 32). Being assigned to physical input number 33.
- Input Timer is being set to 0 ms.
- Identification text ' OIL LEVEL ALARM ' is entered by the user. The text entered at this window will appear as part of the text messages at the Digital Inputs ' Signal Group ' ( see 6 . 1. 6 ); the program will show the text message ' E1 : OIL LEVEL ALARM ' anywhere Input #1 is mentioned.



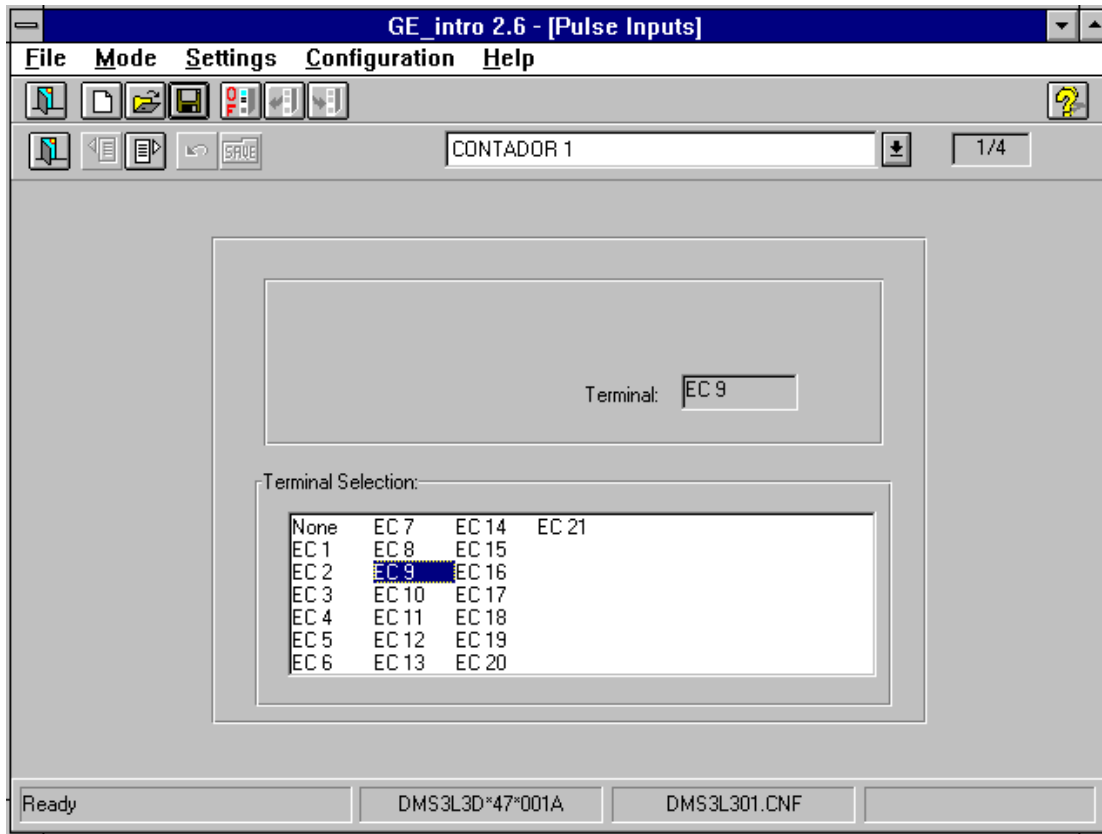
**Figure 26. Digital Inputs Definition.**

### **6.1.4. Pulse Inputs Configuration**

Control can deal with up to 42 physical inputs (terminals). In this section, up to 4 pulse inputs can be defined, and the user can give them meaning and use. Concrete physical inputs can be assigned to these pulse inputs.

Figure 27 gives us an example on how to configure this setting group.

- This is the pulse input 1, and the terminal 9 has been assigned to it..
- The text "CONTADOR 1" is entered by the user in order to define the input.



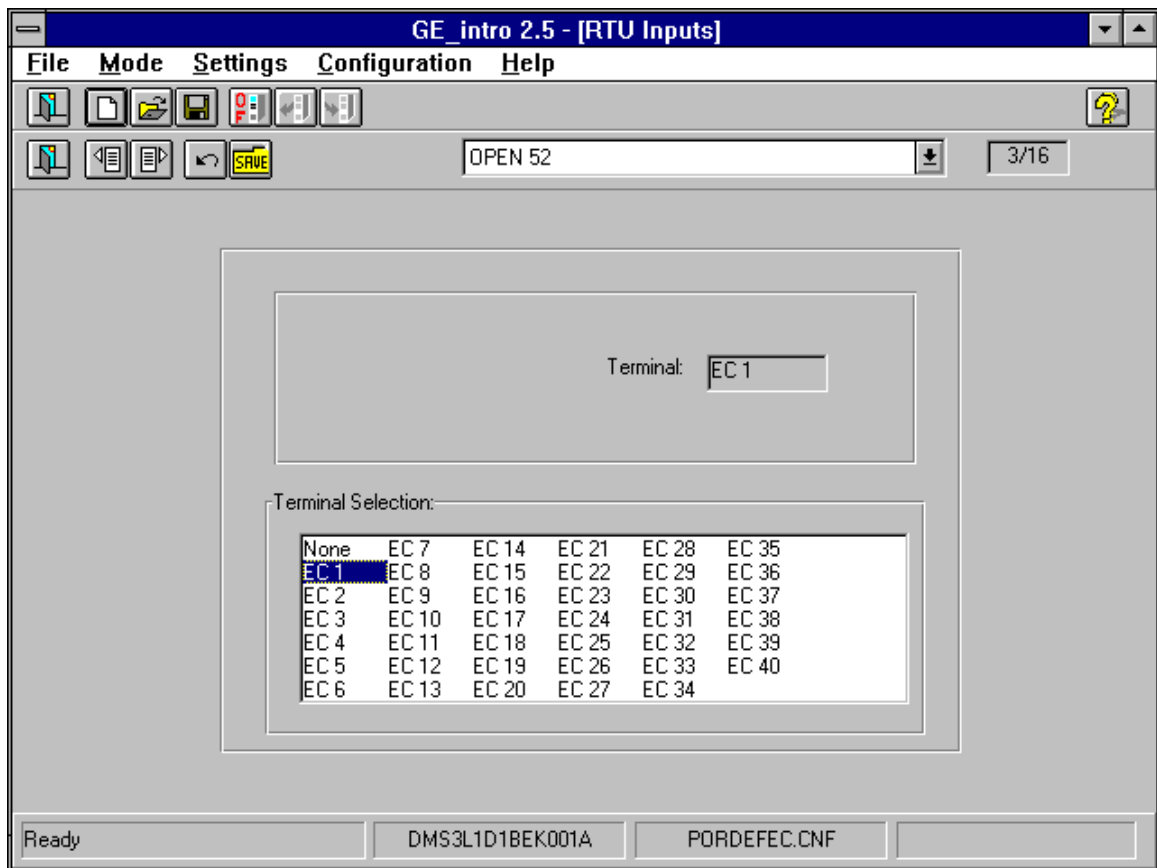
**Figure 27. Pulse Inputs Configuration.**

### **6. 1. 5. RTU Inputs Configuration.**

These inputs must be configured when RTU conventional maneuvers are desired. The maneuver is activated using pulses. These pulses must be 15 ms. minimum and the maximum is equal to the ' Confirmation Time-out '.

Figure 28 shows how to configure this group of settings:

- RTU maneuver input number 3 .
- The text ' OPEN 52 ' was entered by the user at the window 'Operation Timers', associated to maneuver number 3 . (see 6 . 1. 2)
- Physical input number 1 has been selected as RTU input to perform this maneuver.



**Figure 28. RTU Inputs Configuration.**

### **6. 1. 6. Switchgear Status Inputs Configuration.**

This group of settings is intended to assign physical inputs to the auxiliary contacts of all the switchgear items defined at ' Switchgear Configuration ' ( see 6.1.1). Auxiliary contacts are called ' a ' and ' b ', and these inputs are level type of inputs.

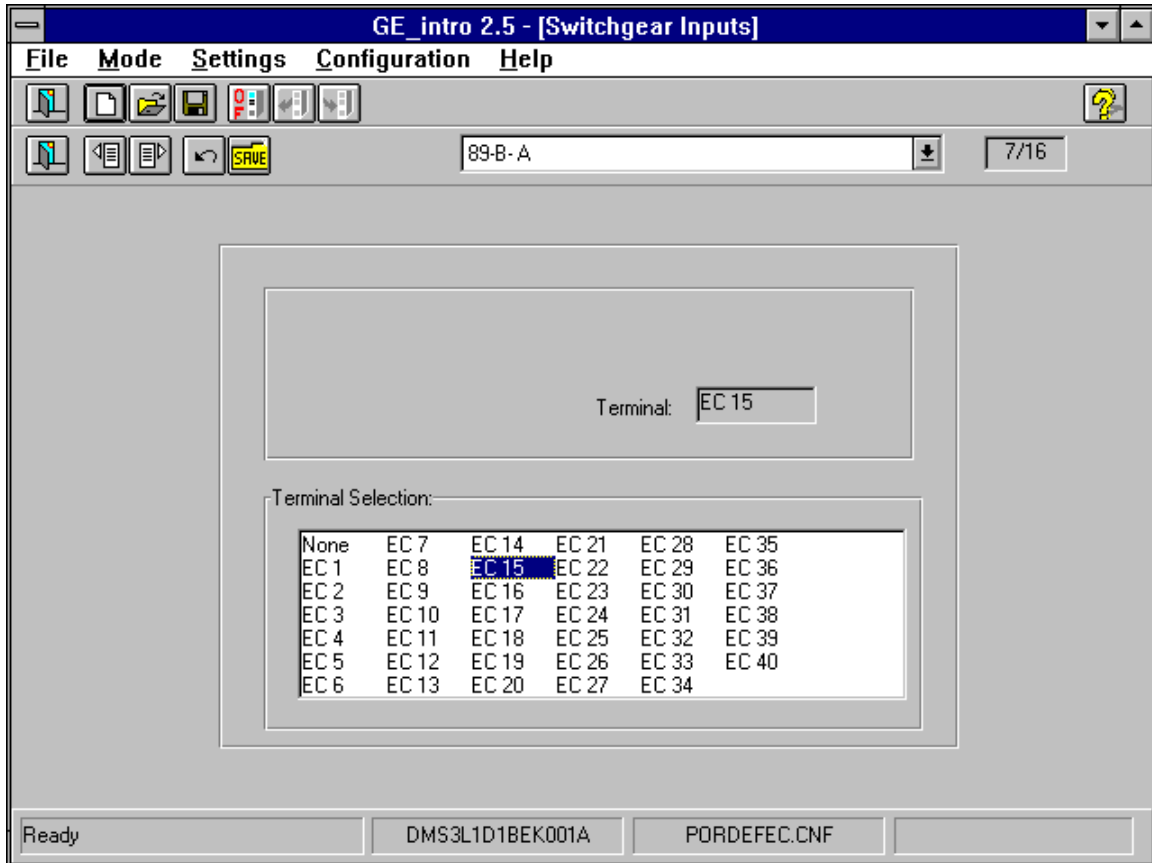
You can configure up to 16 switchgear status inputs, as there can be up to 8 switchgear items, each one with up to 2 auxiliary contacts.

Figure 29 shows how to configure this group of settings:

- ' 89-B-a ' message correspond to the ' 89-B ' text entered by the user at the ' Switchgear Configuration ' window; ' a ' indicates it is a ' a ' type of auxiliary contact. In the same way, the program will show the ' 89-B-b ' message for the ' b ' type of auxiliary contact. If the switchgear item is a one contact type of item, then ' 89-B-b ' has no meaning.
- In this example, physical input number 15 has been selected for the ' 89-B-a ' auxiliary contact.



**NOTE:** You can select one physical input to be assigned to two different groups of input settings. For example, it is possible to configure one physical input as a ' Switchgear Status Input ' and also as a ' Digital Input ' to be able to have this information available to address its status to an output, etc. (configurable logic) (see 6 . 1. 6).



**Figure 29. Switchgear Status Inputs Configuration.**

### 6. 1. 7. Outputs Configuration.

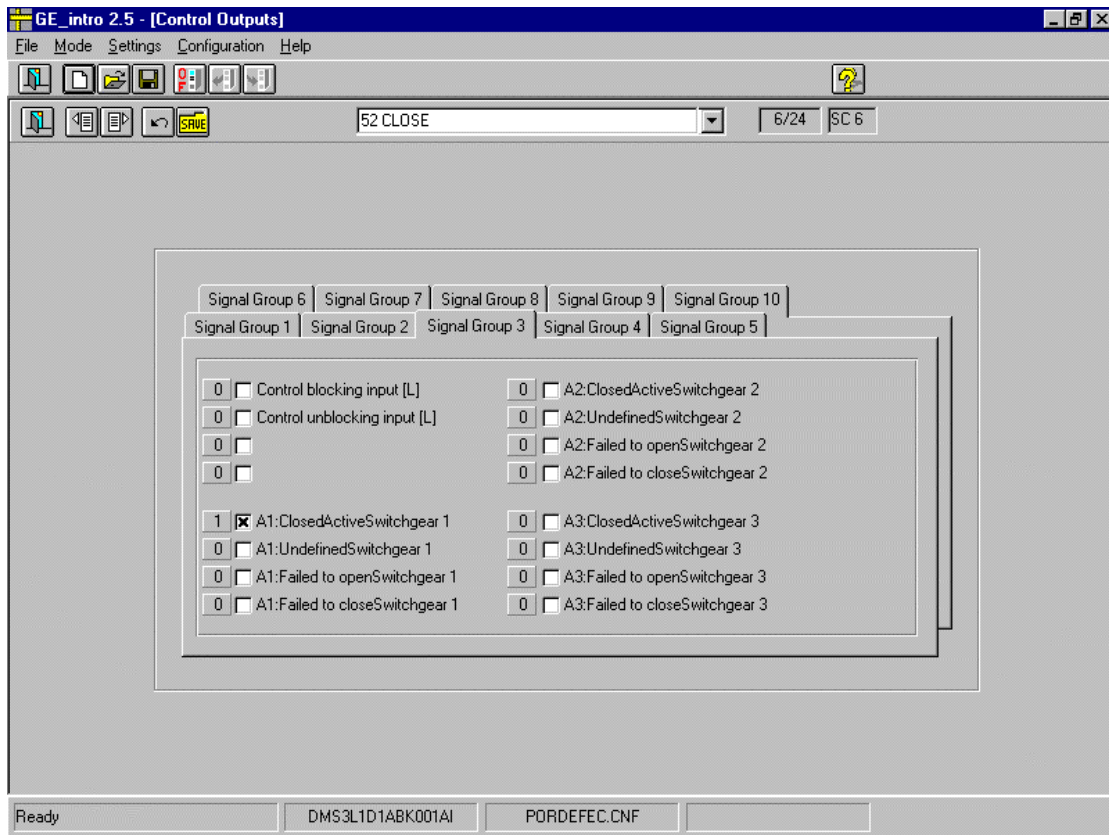
First of all the definition of ' Control Signals ' and ' Signals Groups ' will be explained.

Control Signals are composed by 160 signals, grouped in 10 ' Signals Group ', which contain ALL the information related with Control functions. These are:

- Switchgear items status, (see 6 . 1. 1. 'Switchgear Configuration ')
- Switchgear Selection Signals and Operation Output Signals (see 6. 1. 2. 'Operations Timers ')
- RTU Inputs Status (see 6. 1. 4. 'RTU Inputs Configuration ')

- Digital Inputs (see 6 . 1. 3. 'Digital Inputs Configuration ')

It is possible to define OR logical gates and assign their output to a physical output of the relay. These OR gates have 16 inputs taken from the ' Control Signals '. These 16 inputs must belong to the same ' Signal Group '. The output of an OR gate becomes active when any of the 16 inputs become active.



**Figure 30. Output Configuration.**

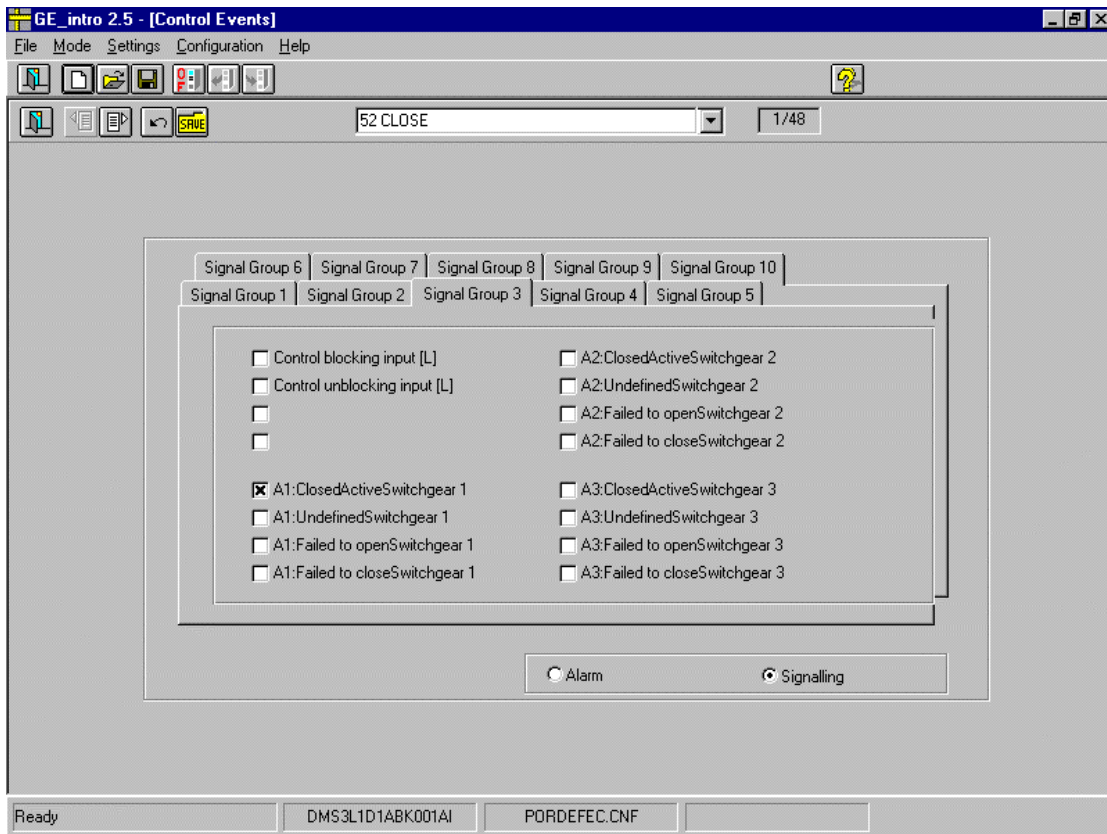
Figure 30 shows how to configure this group of settings. In this example the output will become active when the circuit breaker is closed :

- The physical output will be output number 6 .
- ' 52 CLOSED ' text message is entered by the user in order to identify this output.
- The ' A1 :ClosedActive 52 ' text message is referring to the ' Control Signal ' chosen. This logical signal is associated with the Closed-Active status of the switchgear item number 1, which the user defined as the circuit breaker.
- The indication ' 1 ' means that the user wants the physical output active ( closed ) when the Control Signal is active, ( circuit breaker closed ). If the user select ' 0 ' instead of ' 1 ', then the output will become active when the Control Signal is not active, ( circuit breaker open ).

### 6. 1. 8. Events Configuration.

The user can define which events he wants the relay to generate. It is possible to use 16 inputs OR gates to define one event. These 16 input signals must belong to the same ' Signal Group '. An Event will be generated when :

- Being all the 16 signals deactivated, one of them becomes activated.
- Being one of the 16 signals activated, all of them become deactivated.



**Figure 31. Events Configuration.**

Figure 31 shows how to configure this group of settings. In this example the relay will generate an event when:

- Being the circuit breaker open, it is suddenly closed.
- Being the circuit breaker closed, it is suddenly open.

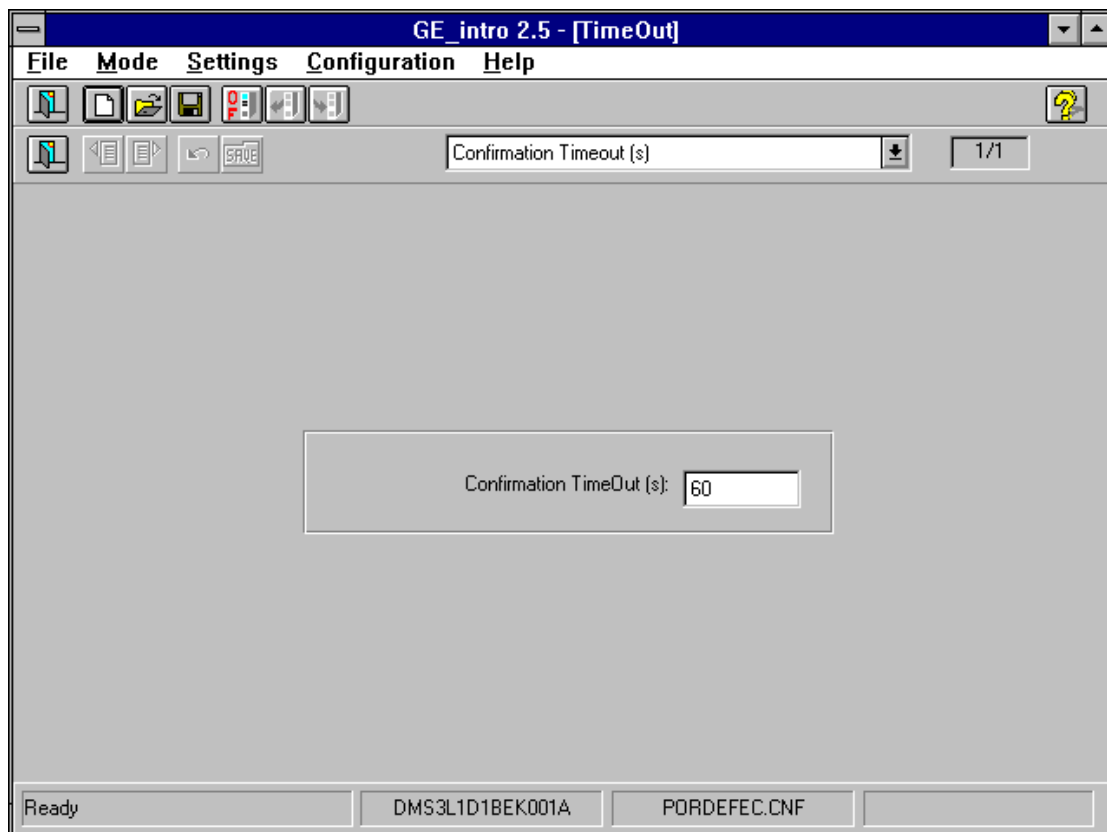
Besides this, it can be said that :

- It is event number 1.

- ' 52 CLOSED ' text message is entered by the user, and it will be shown at the ' LEDs Configuration ' ( see 6 . 3. 2 ), if this option is chosen, instead of the default text message.
- The Control Signal selected to generate the event is the status of the circuit breaker.
- 'Signaling' has been selected instead of ' Alarm ', so the text message will not be sent to the relay to be shown at the graphical display when the event becomes active. If the user wants this text to appear at the graphical interface of the relay, ' Alarm ' must be chosen.

### **6. 1. 9. Maneuver Confirmation Timer.**

In order to perform a control, there are two steps to follow: select the command, and confirm it. When the user selects a maneuver to be done, the control module of the relay checks if it is possible to perform the command ( interlocking ), and if it is, waits until the user confirm he wants the maneuver to be done. The maneuver confirmation must be done before the ' Maneuver Confirmation Timer ' times out.



**Figure 32. Maneuver confirmation timer.**

Figure 32 shows how to configure this group of settings:

- ' Maneuver Confirmation Timer ( sec. ) ' text message is fixed.

- 60 sec. is the time value entered by the user for the program to wait for confirmation.

**6. 1. 10. Command Status Configuration.**

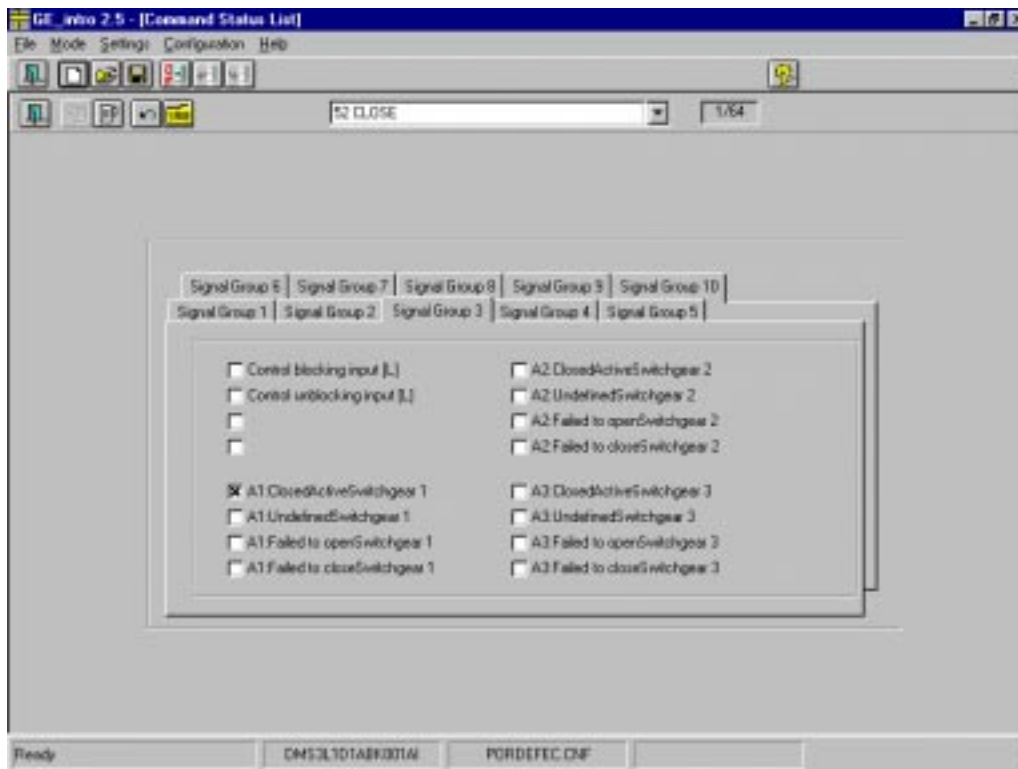
The Control Module of the relay is designed to check if a configurable set of conditions are false or true, in order to determine the possibility of performing a maneuver, ' Operation Conditions ', the success of a maneuver, ' Success Condition ' and the failure of a maneuver ' Failure Conditions '.

These sets of conditions are configured taken signals from two groups of signals, the 'External Status' and the 'Command Status'.

The 'External Status' is fixed in the relay and it is determined by signals external to the control module, which gets into the relay using communications.

The 'Command Status' must be defined by the user from the signals in the 'Signals Groups' which are included in the Control Module.

At this point, the 'Command Status' is defined, by selecting the 'Command Bits' needed to define later on the 'Operation Conditions', 'Failure Conditions' and 'Success Conditions'.



**Figure 33. Command Status Configuration**

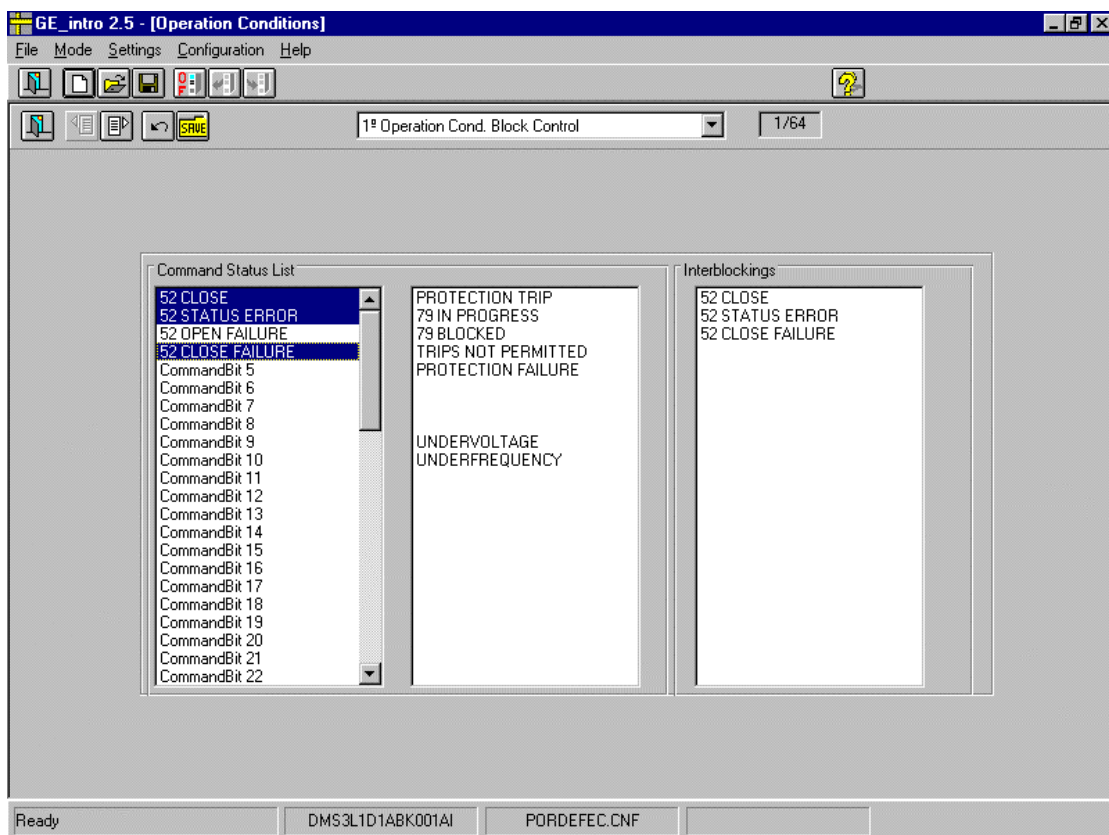
Figure 33 shows how to configure this group of settings:

- 'Command Bit' number one is being configured.
- '52 CLOSED' text message is entered by the user to identify the 'Command Bit'.
- The closed status of the circuit breaker is assigned to this 'Command Bit'. When the circuit breaker is closed, this Command Bit will be activated. 16 input OR gates can be used to define one Command Bit. In this case, when any of those 16 signals is active, the Command Bit will be active as well.

### 6. 1. 11. Operation Conditions.

Each maneuver can be supervised by up to 4 different Operation Conditions. At least one of those conditions must be true for the maneuver to take place.

The program shows three windows. The one on the left is the 'Command Status', defined by the user. The one in the middle of the main window is the 'External Status' and the last one, on the right is where the Operation Conditions must be defined. This Operation Conditions are also called Interlockings.



**Figure 34.** Operation Conditions.

To define the operation conditions for a particular maneuver, you only have to select the signals, from the ' Command Status ' and from the ' External Status ', that affect the maneuver, and also the status each one must be ( activated or deactivated ) for the maneuver to be allowed to take place. To define the status, click on the selected signal in the right window. Inverse video means ' activated ', normal video means ' no activated '.

An Operation Condition is defined by the logical AND of the selected signals.

All the signals that do not appear at the right window are not considered in the interlocking of the maneuver.

Figure 34 shows how to configure this group of settings:

- The first operation condition for the open maneuver of the circuit breaker is being defined. (see example 6 . 1. 2)
- ' 1st Operation Condition for OPEN 52 ' text message is composed by a fixed part ' 1st Operation Condition ' and a variable part ' OPEN 52 ' that correspond to the text entered by the user at the ' Operations Timers ' window.
- This first Operation Condition is:

52 must be closed AND without any error status AND no failure to close error.

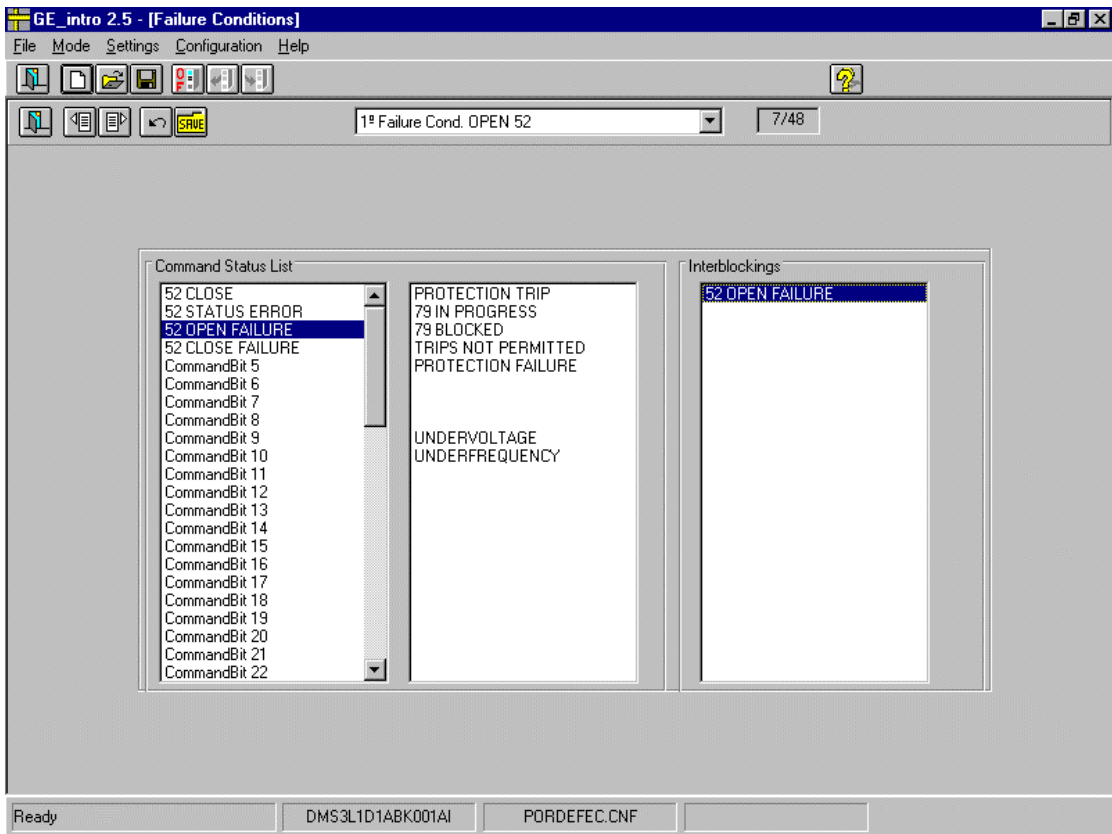
### **6. 1. 12. Failure Conditions.**

Each maneuver is supervised by up to 3 different Failure Conditions. If one of these conditions becomes true, the maneuver that was being performed will be aborted.

The configuration procedure for this group of settings is similar to the previously described for Operation Conditions (see 6. 1. 10). All the steps described before can be applied to this chapter.

Figure 35 shows how to configure this group of settings:

- The first failure condition for the ' Open Circuit Breaker ' command is being configured.
- '1st Failure Condition OPEN 52' text message is composed by a fixed part ' 1st Failure Condition ' and a variable part ' OPEN 52 ' that correspond to the text entered by the user at the ' Operations Timers ' window.
- This first failure condition correspond to the failure to open 52 error signal.



**Figure 35. Failure Conditions**



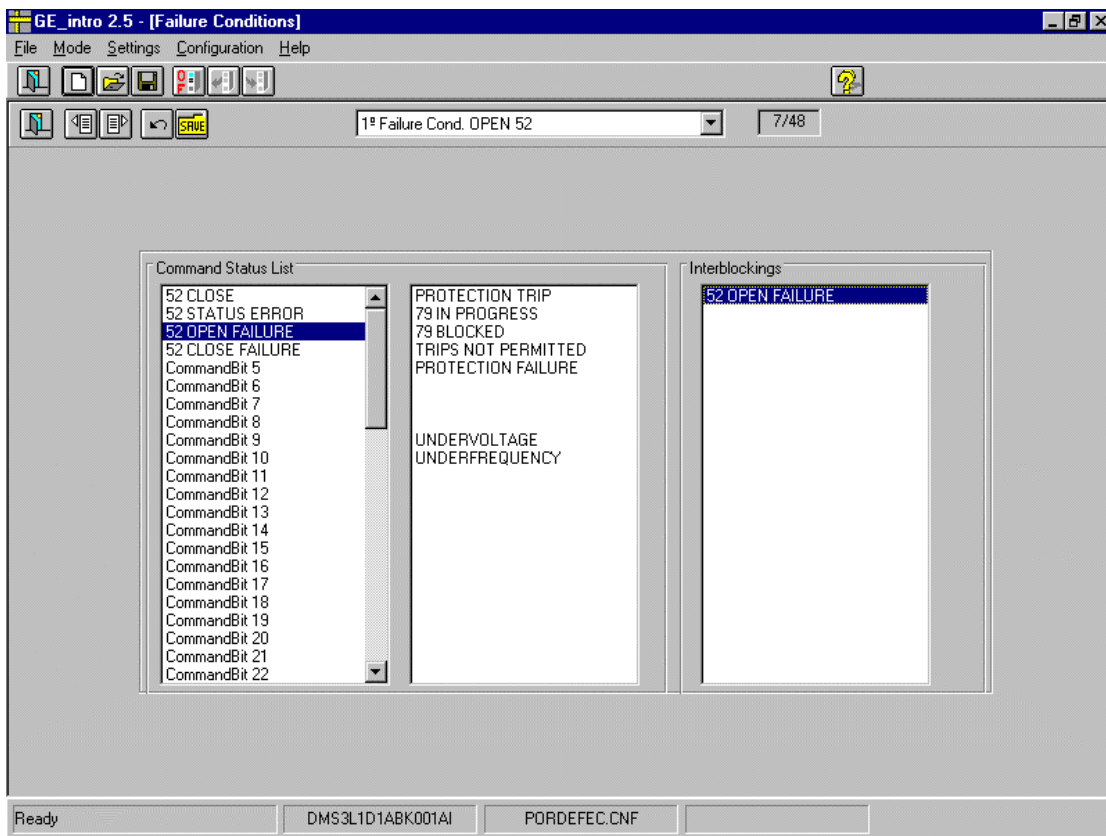
### 6. 1. 13. Success Conditions.

Each maneuver has one success condition to determine if the maneuver has been performed successfully. This condition must be detected before the corresponding failure timer times out ( see Operations Timers, 6 . 1. 2)

The configuration procedure for this group of settings is similar to the previously described for Operation Conditions (see 6 . 1. 10). All the steps described before can be applied to this chapter.

Figure 36 shows how to configure this group of settings:

- The success condition for the opening of the circuit breaker is being defined. (see example 6 . 1. 12. )
- 'Success Condition OPEN 52 'text message is composed by a fixed part ' Success Condition ' and a variable part ' OPEN 52 ' that correspond to the text entered by the user at the ' Operations Timers ' window.
- The success condition for this maneuver is to detect that the circuit breaker is open.



**Figure 36. Success Condition.**

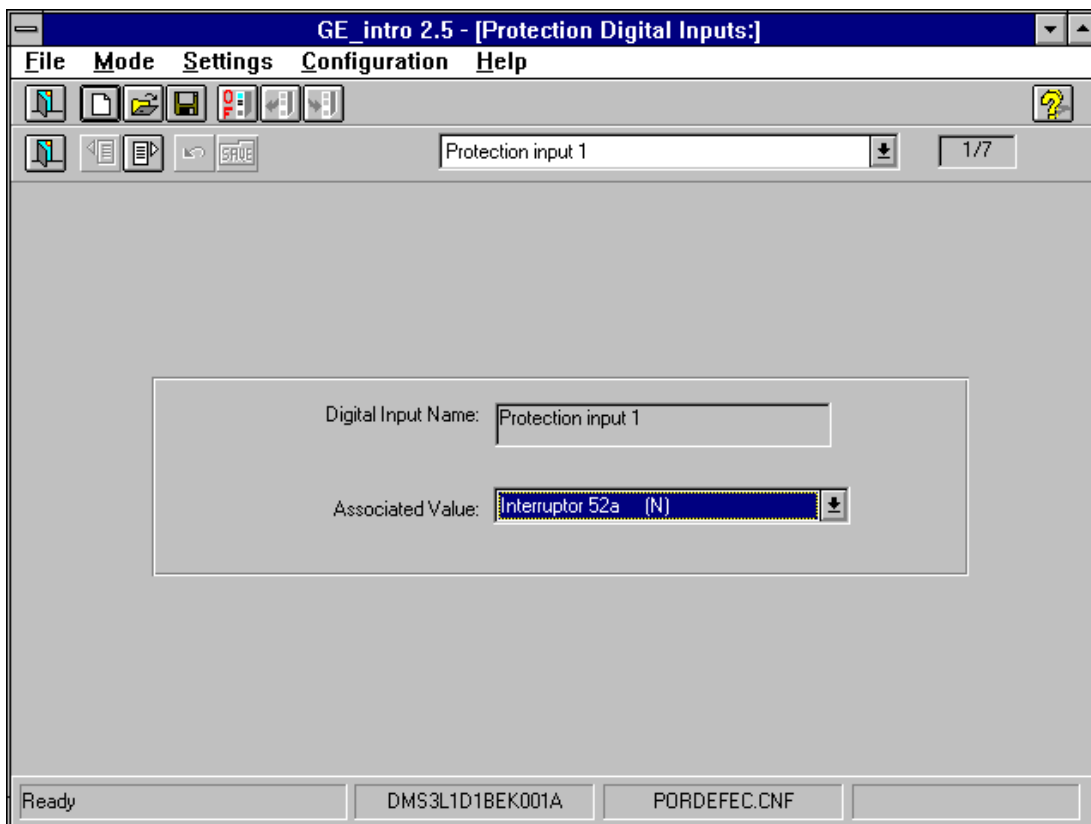
## 6. 2. Protection.

### 6. 2. 1. Digital Inputs Configuration.

The protection digital inputs are physical inputs that the user can assign to a particular Status or Command. By doing this configuration, the protection module of the relay can take the information of the status of the circuit breaker (Status), or it can change the active table of settings (Command).

Figure 37 shows how to configure this group of settings.

- Protection digital input number one is being configured.
- 'Digital input # 1 ' text message is fixed in the program.
- By doing this assignment, the protection module of the relay can take the status of the circuit breaker. According to the text chosen 'Circuit Breaker 52-a ( L )', this input is a ' level ' type of input ( not pulse ). The Status and Commands that the user can configure are fixed, and the GE-INTRO will show the list of the available signals.



**Figure 37. Digital Inputs Configuration.**

### 6. 2. 2. Output ANDs Configuration.

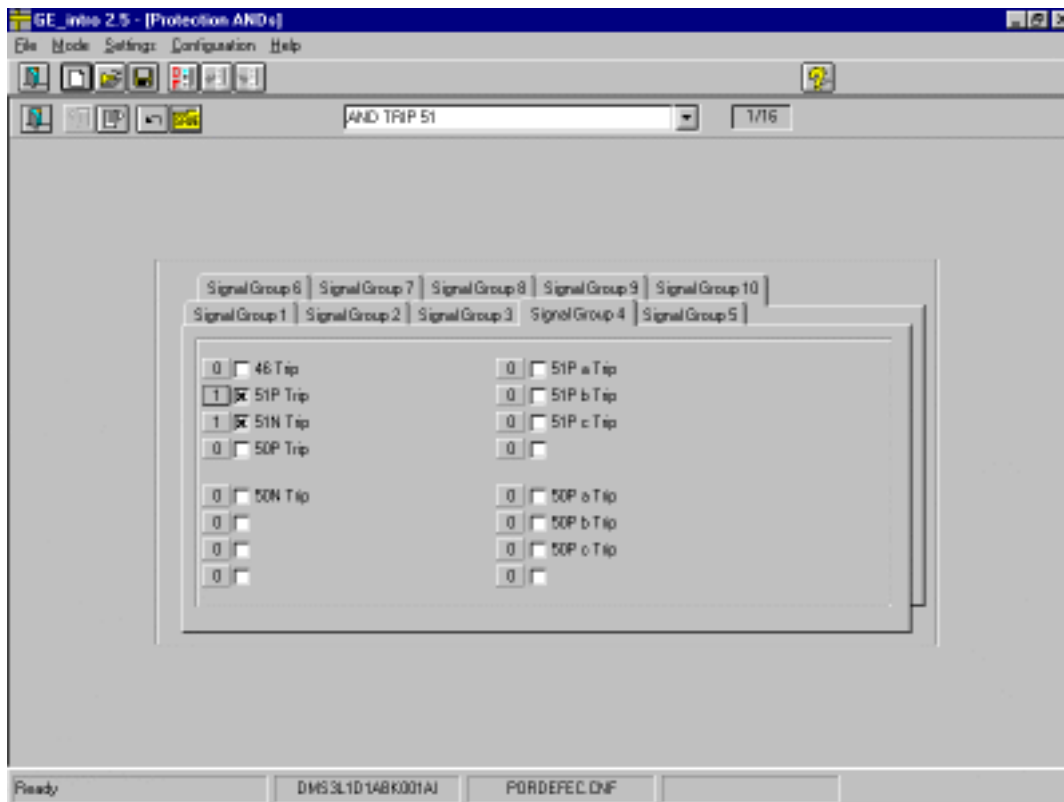
Similar to the described Control configuration procedure, the Protection module of the relay has 160 'Protection Signals', grouped in 10 different 'Signal Groups', which contain ALL the information possible about this protection module. In this case, there are some ANDs logical gates available as part of the 'Protection Signals'.

This ANDs gates are Status variables, to which the user can assign a logic composed by NOTs and ANDs gates, with inputs chosen from the 'Protection Signals'. All the protection signals assigned to an AND gate must belong to the same 'Group of Signals'.

Figure 38 shows how to configure this group of settings:

- AND number one is being configured.
- 'AND 51 TRIPS' text message is entered by the user to identify the AND# 1.
- The assigned logic is: AND#1 = ' 51P Trip ' AND ' 51N Trip '.

This means that AND#1 will become active when the relay issues a 51P and 51N trip. If you want to choose a NOT operator, select ' 0 ' instead of ' 1 ' for the signal you want.



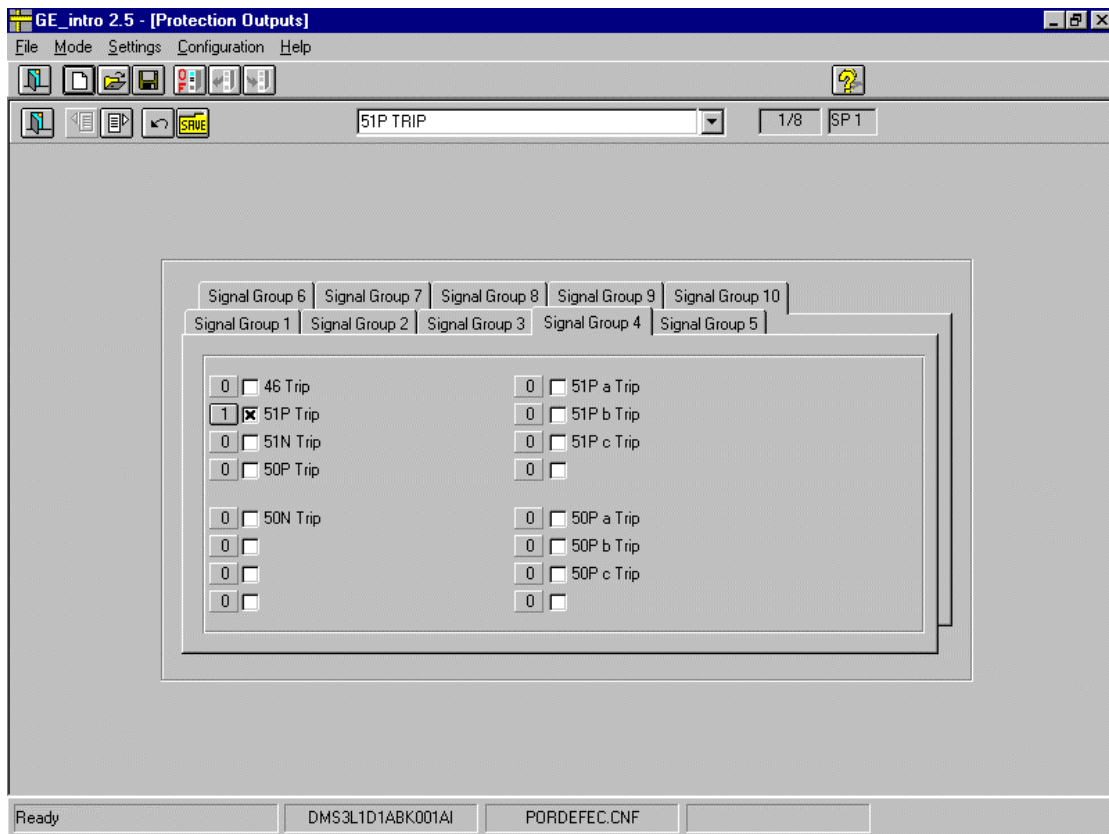
**Figure 38. Output ANDs Configuration.**

### 6. 2. 3. Outputs Configuration.

The protection outputs are physical outputs which can be assigned by the user to any ' Protection Signal '. 16 OR gates can be used, and assign the output of the OR gate to a physical output. All the 16 inputs to the OR gate must belong to the same ' Group of Signals '. The physical output will be activated when any of the 16 signals become active.

Figure 39 shows how to configure this group of settings:

- Protection output number 1 is being configured.
- ' 51 PHASES TRIP ' text message is entered by the user to identify the output.
- The physical output will be activated when the relay issues a 51P trip, because the selection shows a ' 1 ' indication. If you select ' 0 ' instead of ' 1 ', the physical output would be activated when there is not a 51P trip.



**Figure 39. Outputs Configuration.**

### **6. 2. 4. Events Configuration.**

You can configure which protection events you want your relay to generate. You can define this events from the ' Protection Signals ' of the relay. 16 inputs OR gates can be used to define one event. All of these 16 inputs to the OR gates must belong to the same ' Signal Group '. An event will be generated when :

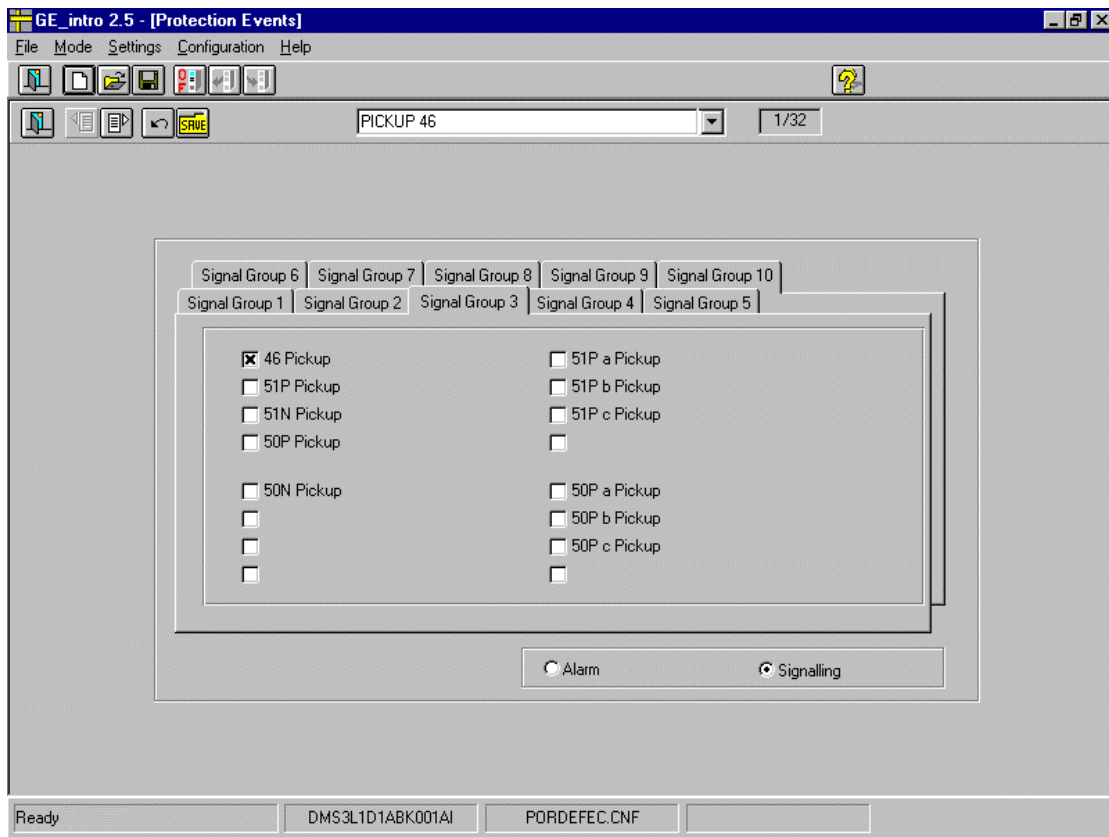
- Being all the signals deactivated, at least one become active.
- Being at least one signal active, all of them become deactivated.

Figure 40 shows how to configure this group of settings. In this example, an event will be generated when :

- 46 function picks up.
- having picked up, the fault disappears.

Besides that it can be said that :

- It is event number one.
- ' 46 PICK UP ' text message is entered by the user and will appear at the ' LEDs Assignment ' ( see 6 . 3. 2. ) if exists, instead of the default text.
- ' 46 Pick up ' has been selected to generate the event.
- It has been selected as ' Signaling ', so the ' 46 PICK UP ' text will not be sent to the relay to be shown at the graphical display when the event becomes active. If the user wants this text to appear at the graphical interface of the relay, ' Alarm ' must be chosen.



**Figure 40. Events Configuration**

### **6.3. General.**

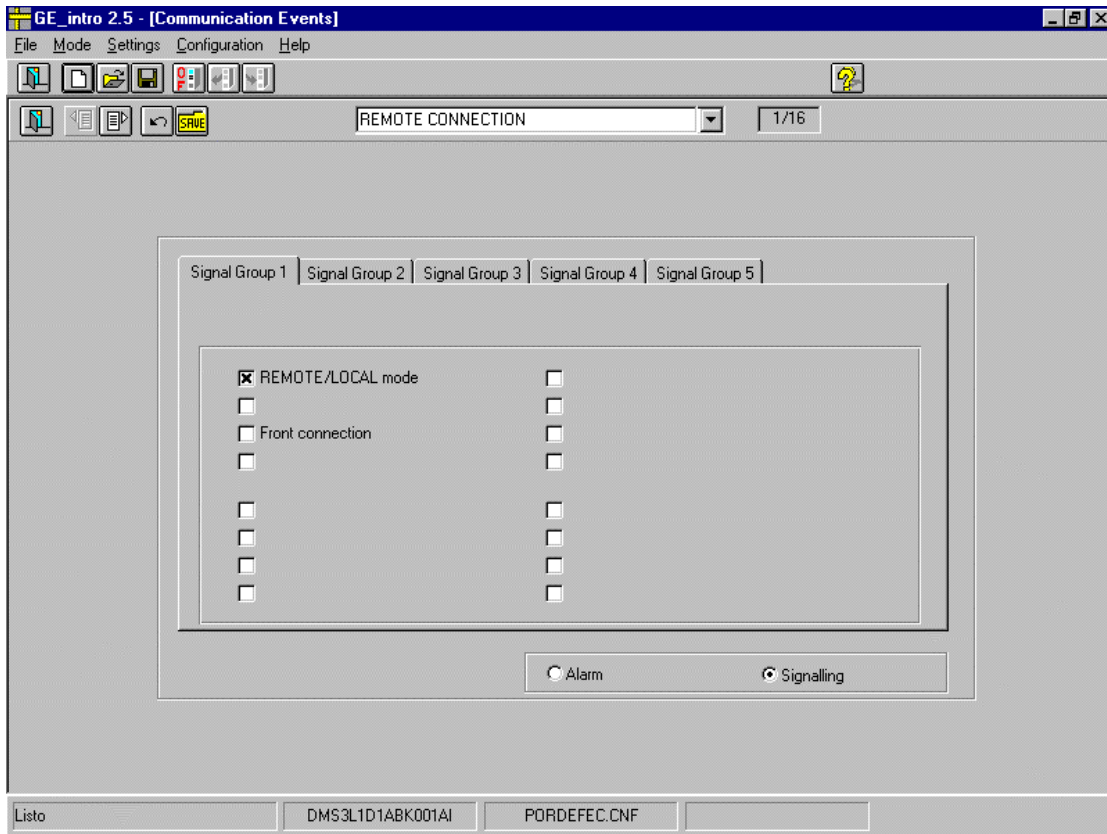
Under the term ' General ' settings the GE-INTRO refers to the Communication Module Settings. This term has been selected because it is a more general module, not so specific as the Control or Protection part, though from the relay point of view, it is as important as the two others, managed by a different microprocessor, etc. We can also refer to this section as the ' Communication Settings '.

#### **6.3.1. Events Configuration.**

Similar to the described Control and Protection configuration procedure, the Communication module of the relay has ' Communication Signals ', grouped in 10 different ' Signal Groups ', which contain ALL the information possible about this communication module.

The user can define which events he wants the relay to generate. It is possible to use 16 inputs OR gates to define one event. These 16 input signals must belong to the same ' Signal Group '. An Event will be generated when :

- Being all the 16 signals deactivated, one of them becomes active.
- Being one of the 16 signals activated, all of them become deactivated.



**Figure 41. Events Configuration**

Figure 41 shows how to configure this group of settings. In this example the relay will generate an event when:

- Being the relay in Local Mode user changes to Remote Mode.
- Being the relay in Remote Mode user changes to Local Mode.

Besides this, it can be said that :

- It is event number one.
- ' REMOTE CONNECTION MODE ' text message is entered by the user and will appear at the ' LEDs Assignment ' ( see 6 . 3. 2. ) if exists, instead of the default text.
- ' LOCAL/REMOTE MODE ' has been selected to generate the event.
- It has been selected as ' Signaling ', so the ' LOCAL/REMOTE MODE ' text will not be sent to the relay to be shown at the graphical display when the event becomes active. If the user wants this text to appear at the graphical interface of the relay, ' Alarm ' must be chosen.

### **6.3.2. LEDs Assignment.**

In this chapter, you can configure the working behavior of the LEDs indications and the causes that can turn on each LED.

LEDs can only be turned on by the defined events ( Control, Protection and Communication events ), and because of this, the ' Signal Groups ' handled at this chapter are not the same than the ones of the previous chapters. In this case, the ' Signals Groups ' are composed by 16 signals each, and group all the events that can be configured in the relay, in the Protection, Control and Communication Module.

As it was explained at the ' Events Configuration ' chapter of each group of settings, an event can be generated when :

- Being all the 16 signals deactivated, one of them become active.
- Being one of the 16 signals activated, all of them become deactivated.

In this case, only the first case will produce the activation of the LED indicator.

1. The working behavior can be:

- a. ' Blinking ' : when it gets active the LED blinks.
- b. ' Steady ' : when it gets active the LED is ON permanently.

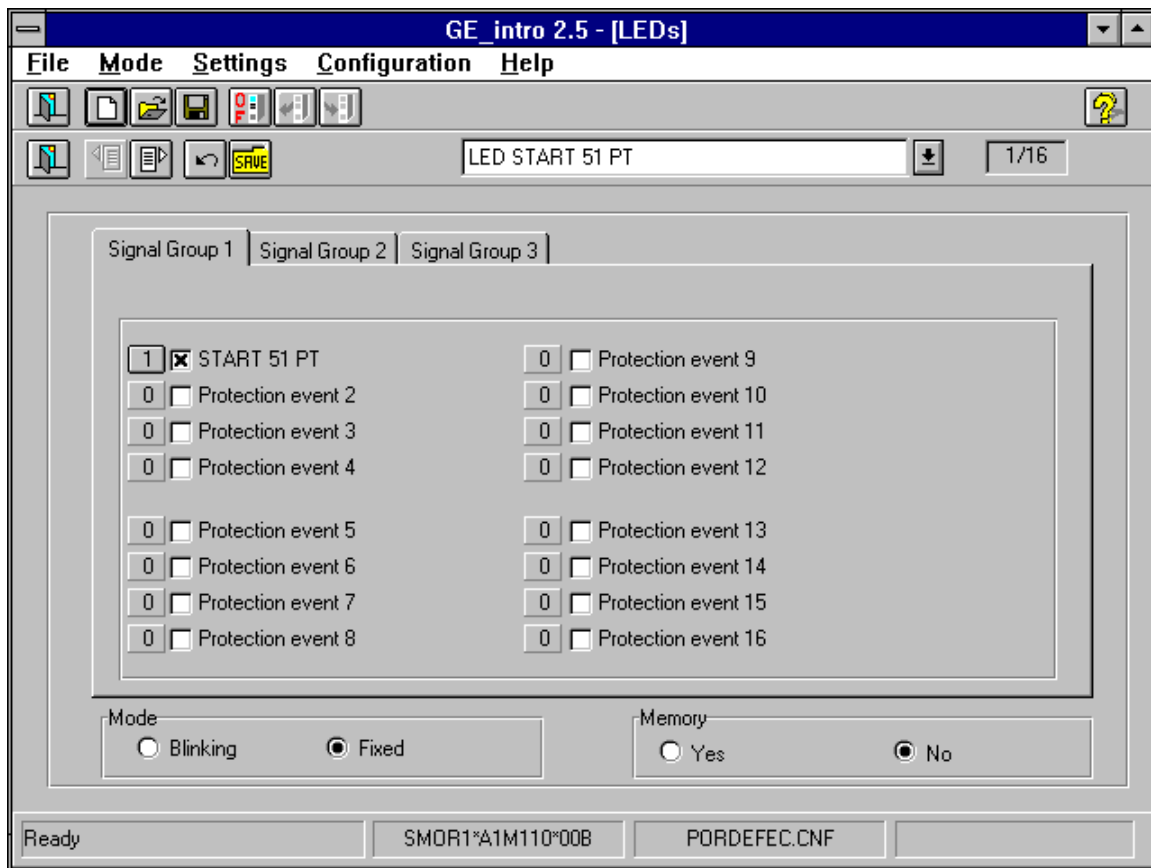
2. The ' Memory ' indicates if the LED keeps lighting or not when the causes that activated it disappear.

- a. ' YES ' : The LED will keep lighting.
- b. ' NO ' : It will not.

Figure 42 shows how to configure this group of settings.

- LED number one is being configured.
- ' 51PT PICK UP LED ' text message is entered by the user to identify the LED indicator..
- ' 51PT PICK UP LED ' text message is a text entered by the user at the Protection ' Events Configuration ' for event number one. All the other texts of the ' Signals Group ' are the default ones. In general, the text messages entered by the user when configuring the Events ( Control, Protection and Communication ) will appear as they are, at their corresponding ' Signals Groups '.
- LED will light blinking and without memory when it gets active.





**Figure 42. LEDs Configuration**

### 6.3.3. Graphical Configuration

The Graphical display of the relay can show different screens, 2 of which can be configured by the user: the switchgear screen and the measurements screen. For the user, this configuration has two main elements:

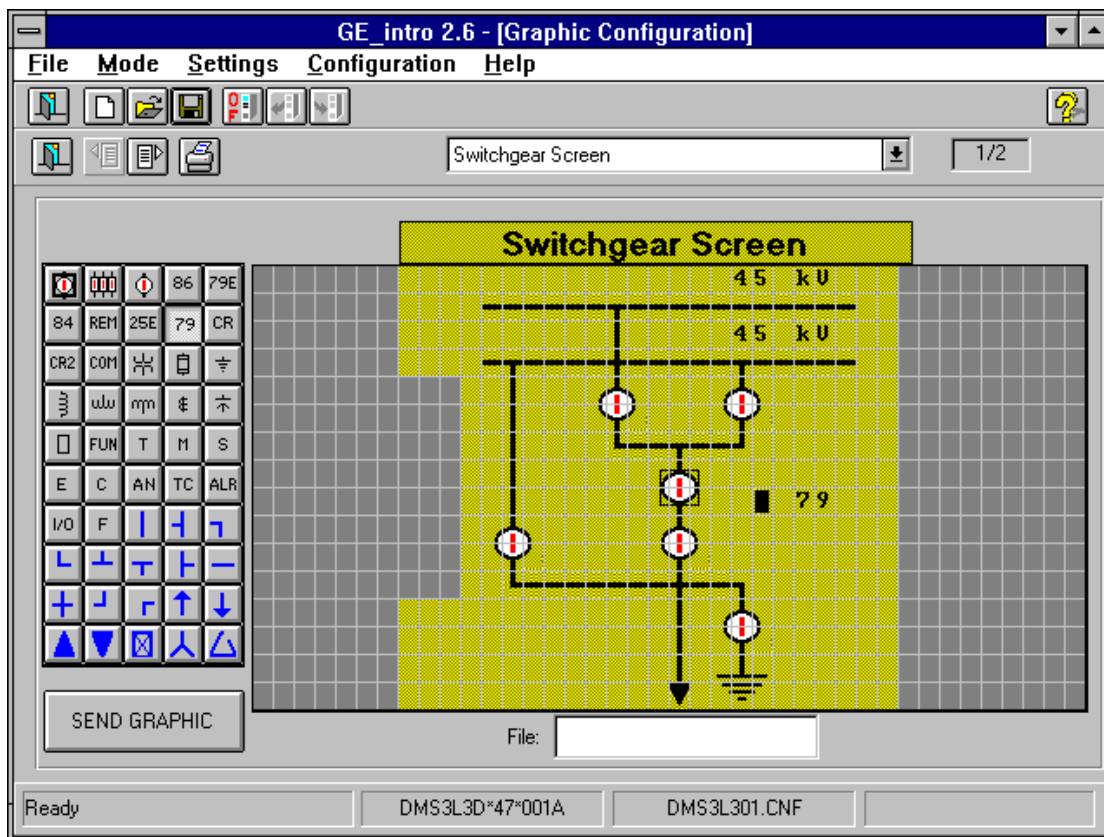
- active screen
- configurable objects.

The active screen refers to the screen to be configured, and can be either the switchgear screen (figure 43) or the measurements screen (figure 44). For moving from one screen to another, you must simply click the “next setting” or “previous setting” button, being very easy to identify the screen on which you want to work. This screen, as the relay display, consists of a matrix of 16\*40 characters. The gray sections are forbidden sections where you cannot place the graphical objects.

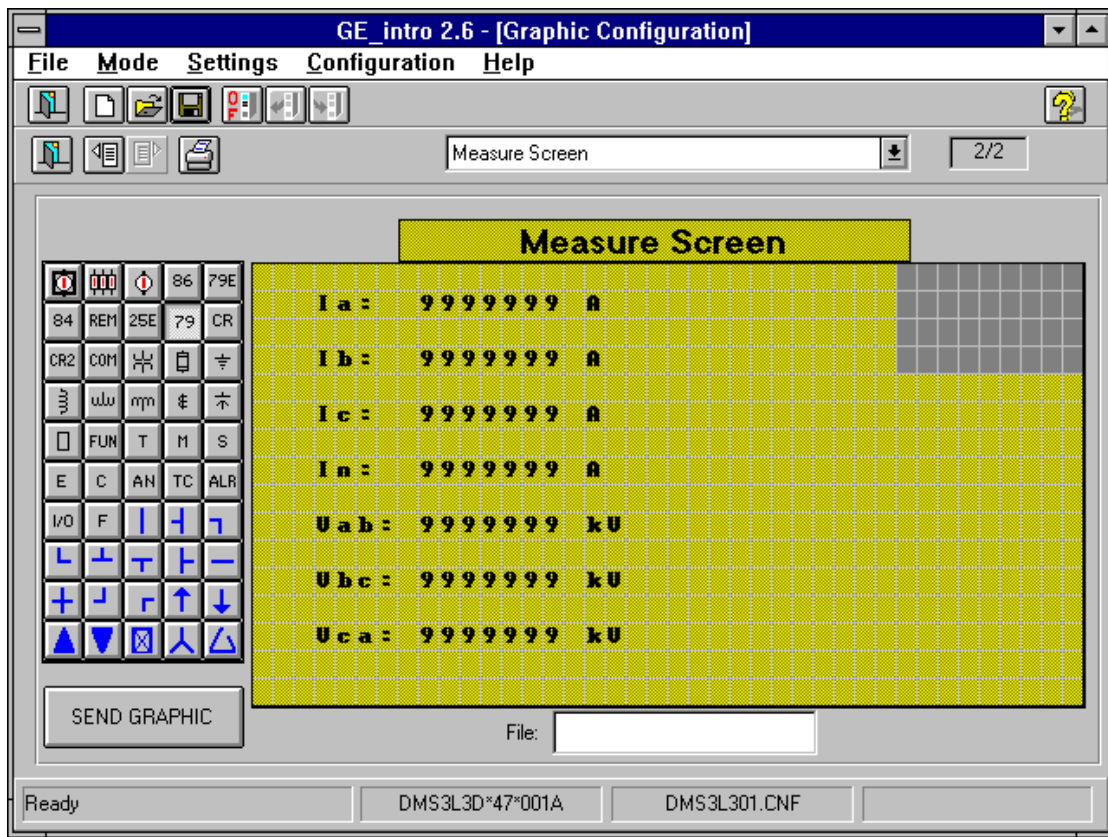
Otherwise, on the left side of the screen there is a group of buttons placed in rows and columns which represent the configurable objects, which can be accessed by the user.

The operating procedure is the same for both screens:

1. The user chooses the object he/she wants to see on the screen by clicking on the button that represents that object.
2. After the object is chosen, you must click on the side of the screen where you want to place that object. Depending on which kind of object it is, the program might ask the user for more information about it before placing it.
3. The characteristics of an object can be modified by double-clicking on it.
4. For deleting an object you must select it with the mouse and then press "Supr" or "Del" key.



**Figure 43. Graphical Configuration (Switchgear).**



**Figure 44.** Graphical configuration (Measurements)

Before continuing, we must make 2 important comments about the graphical configuration:

1. Some relays might not have a graphical display, but will admit graphical configuration. The reason for this is that the configured screen will be shown by the GE-LOCAL program when working on "relay connection" mode. In this case, the relay itself will inform GE-LOCAL of its graphical configuration.
2. The objects configured as operable, will only be able to make operations from the relay or from the Switchgear screen of the GE\_LOCAL.

From this screen, you can also make 2 more operations:

1. Send the configured graphic to the relay; clicking the "SEND GRAPHIC" button.
2. Print graphic. For printing, click on the printer button on the toolbar. The program will ask for a graphic number, so that the user can keep a record on them.

We have already explained that the left-side buttons represent those objects which can be accessed by the user. Placing the mouse on one of these buttons, a text on yellow background will appear indicating the name of the object. For example, on figure 44 we have placed the mouse on the "MEASURES" object. Each object has its own characteristics, so we will explain them one by one:



**Breaker:** (2 rows x 3 columns) gives information about the breaker status (open, closed, failure, non-defined). Depending on the type of relay, this object can be already configured or must be configured by the user. In this case, the user will have to assign:

- switchgear
- allow or not operation from the relay:
  - 1.- OPENING order
  - 2.- CLOSING order



**Three-pole breaker:** (2 x 11) gives information about the three-pole breaker status. This object is exactly the same as the breaker, except for that if the user assigns a switchgear, the two following switchgears will be selected automatically.



**Selector switch:** (2 x 3) gives information about the selector switch status. This object is configured exactly like the breaker.



**Latching:** (1 x 8) gives information about the latching status (open, closed). This object is configured like the breaker, but it only admits the RESET operation.



**External recloser:** (1 x 8) gives information about the status of an external recloser (in service, blocked-out of service). This object is configured like the breaker. The allowed operations are::

- BLOCK
- UNBLOCK



**Tap changer stop:** (1 x 4) gives information about the tap changer status (working, stopped). This object is configured like the breaker, but the only operation allowed is the Tap changer STOP.



**Internal Local/Remote:** (1 x 8) is configured like the breaker but it does not allow any operation. It gives information about the relay

mode (local, remote).The local/remote switch on the front of the relay is disabled by this object.

25E

**Synchronizer:** (1 x 8) gives information about the synchronizer status (lack of synchronism, synchronism). It is configured like the breaker, and the allowed operations are :

- BLOCK
- UNBLOCK

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**Recloser:** (1 x 4) gives information about the recloser status (working, blocked-out of service). It is configured like the breaker, and the allowed operations are:

- BLOCK
- UNBLOCK

CR

**Control:** (1 x 4) gives information about the control status (in service, blocked). It is configured like the breaker, and the only allowed operation is UNBLOCK.

CR2

**Control2:** is exactly like Control but it allows also the BLOCK operation..

COM

**Operation:** (1 x 6) This object allows to carry out an operation from the graphic display of the relay. One of the available operations will be assigned, as well as a text of maximum 6 characters. This text will appear on the display of the relay, and will turn to inverse when the operation is about to be made.



**Transformer:** (2 x 3) does not need any configuration and it only shows a transformer on the display.



**Fuse:** (2 x 1) does not need any configuration and it only shows a fuse on the display.



**Ground:** (2 x 3) does not need any configuration and it only shows a Ground symbol on the display.



**Induction:** (3 x 1) does not need any configuration and it only shows an induction on the display.



**High voltage transformer:** (1 x 5) does not need any configuration and it only shows a winding on the display.



**Low voltage transformer:** (1 x 5) does not need any configuration and it only shows a winding on the display.



**Current Transformer:** (2 x 1) does not need any configuration and it only shows a Current Transformer on the display.



**Capacitor:** (1 x 1) does not need any configuration and it only shows a capacitor on the display.



**There is Breaker:** (1 x 1) does not need any configuration and it only shows an empty box on the display.



**Function signal:** shows a circle (3 x 4) with two characters inside, and a text with a maximum of 4 characters starting from the bottom-right side of the box containing the circle. These characters can be configured by the user.



**Text:** (1 x 7) shows a text configured by the user with a maximum of 7 characters.



**Measures:** allows to show on the relay display one of its measures. The format shown by this object is as follows: a text of 4 characters maximum, entered by the user, 7 free spaces for the measures. and a text for the measure units. This last text is not entered by the user, but appears automatically depending on the measure.



**Status:** (1 x 3) gives information about an internal status of the relay. The user can choose a status, protection, control or

communications, that he/she wants to see; assigns a text with a maximum of 3 characters that will appear when that status is active, and another text (of 3 characters as well) for the non-active status.



**Events:** (1 x 3) gives information about an event in the relay. The user chooses an event, of protection, control or communications, that he/she wants to see, assigns a text of 3 characters that will appear when that event is active, and another text for when that event is not active.



**Counter:** (1 x 6 or 9) allows to see a power measure coming from a pulse counter. The user can choose the pulse counter, the power (active or reactive) and the power units (Kilo or Mega)



**Analog measures:** (1 x 9) allows to see a measure from an analog inputs board. The user configures the measure scale and the number of decimals that he/she wants to see for that measure. The scale is established by defining the maximum and minimum value for that measure.



**Tap changer:** (1 x 9) gives information about the tap changer value. The user can configure the input format for that value: BCD, GRAY or BINARY.



**There are alarms:** (1 x 3) informs whether there are alarms on the alarms panel..



**Inputs/Outputs:** (1 x 3) gives information about the status of an input/output terminal. The user configures the terminal he/she wants to check, and assigns a text (3 characters maximum) that will appear when that terminal is active, and a different text for when it is not active.



**File:** the user enters a filename, that will not appear on the graphical display, but in the text box below the display.

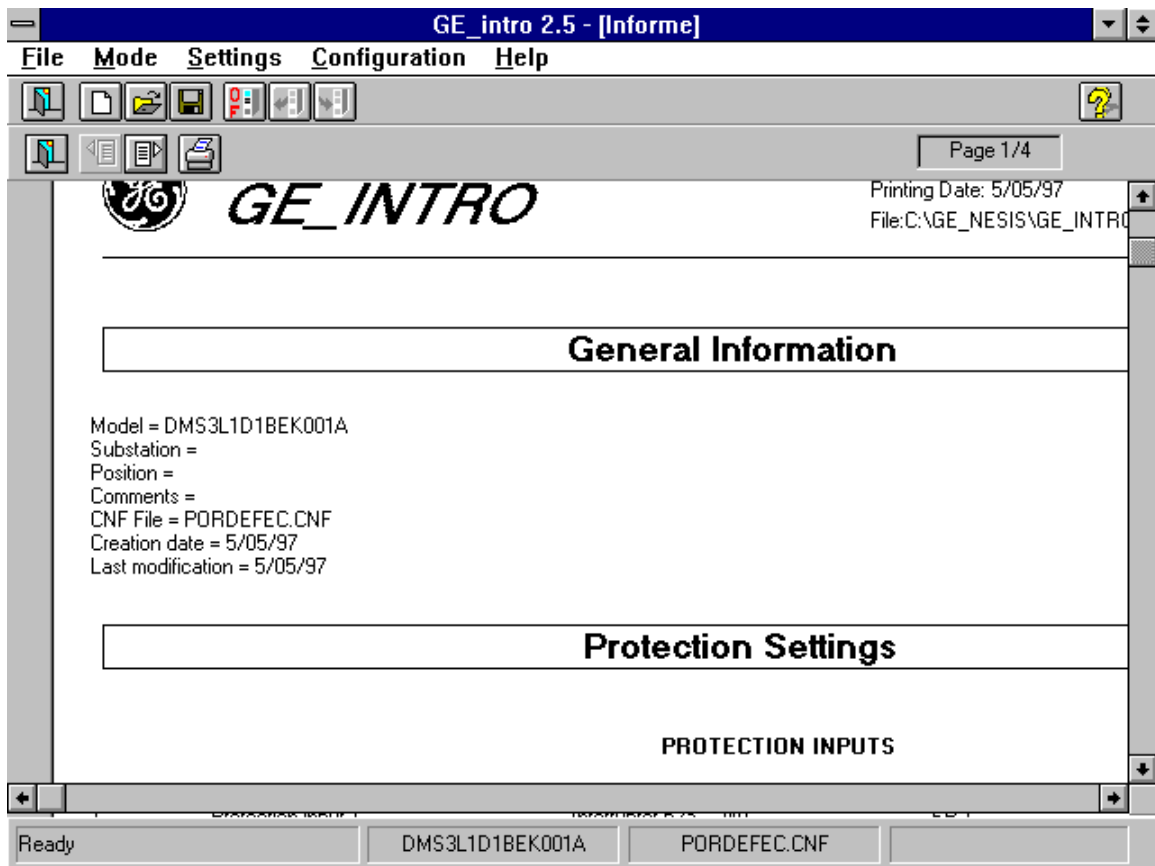


**Drawings:** (1x1) shows on the display the character that appears on each button. It allows to draw simple geometrical figures.

# 7. **REPORT GENERATION**

## 7.1. **Report Window.**

The GE-INTRO can generate a report and send it to your monitor or to your printer, corresponding to a configuration file. To generate a report you have to select the ' File ' - ' Report ' option at the main menu. When you select this option, the program read all the settings from the file and show a new window with all the settings ordered by groups. This window is a What-You-Get-Is-What-You-See type, this means that the printed report is identical to the window shown at your monitor.



**Figure 45. Report Window.**



The report window has the following items (see figure 45):

1. Report window: where the pages of the report are shown.
2. Page box: where the total number of pages is shown, as well as the present page number.
3. Next page button : to go to the next page of the report.
4. Previous page button : to go to the previous page of the report.
5. Print button: to send to the printer the complete report.
6. Quit button: to quit from the report function to the main window.

## **7. 2. Report Format.**

The GE-INTRO program tries to follow the same structure followed to generate the configuration file to generate the report. The program shows the settings at the report following the same order and grouped as they are at the ' Settings ' menu.

The report will be generated in the language selected at the ' Configuration ' - ' Language ' option ( English - Spanish ).

There are three different groups within the report (see figure 45):

1. Header.
2. General Information.
3. Settings.

The report will be printed by the printer selected by Windows. Please refer to the Windows Manual in order to select a printer.

**NOTE:** The report will be generated from the validated settings of the working file, not from the working file. For these two to match, save the settings before generating the report.

### **7. 2. 1. Header**

Header is composed by the logo of the GE-INTRO program and by some additional information, referring to :

- Program version.
- Printing date.
- File name, including complete path.

### **7.2.2. General Information.**

This group contains additional information to be filled by the user. It consists of:

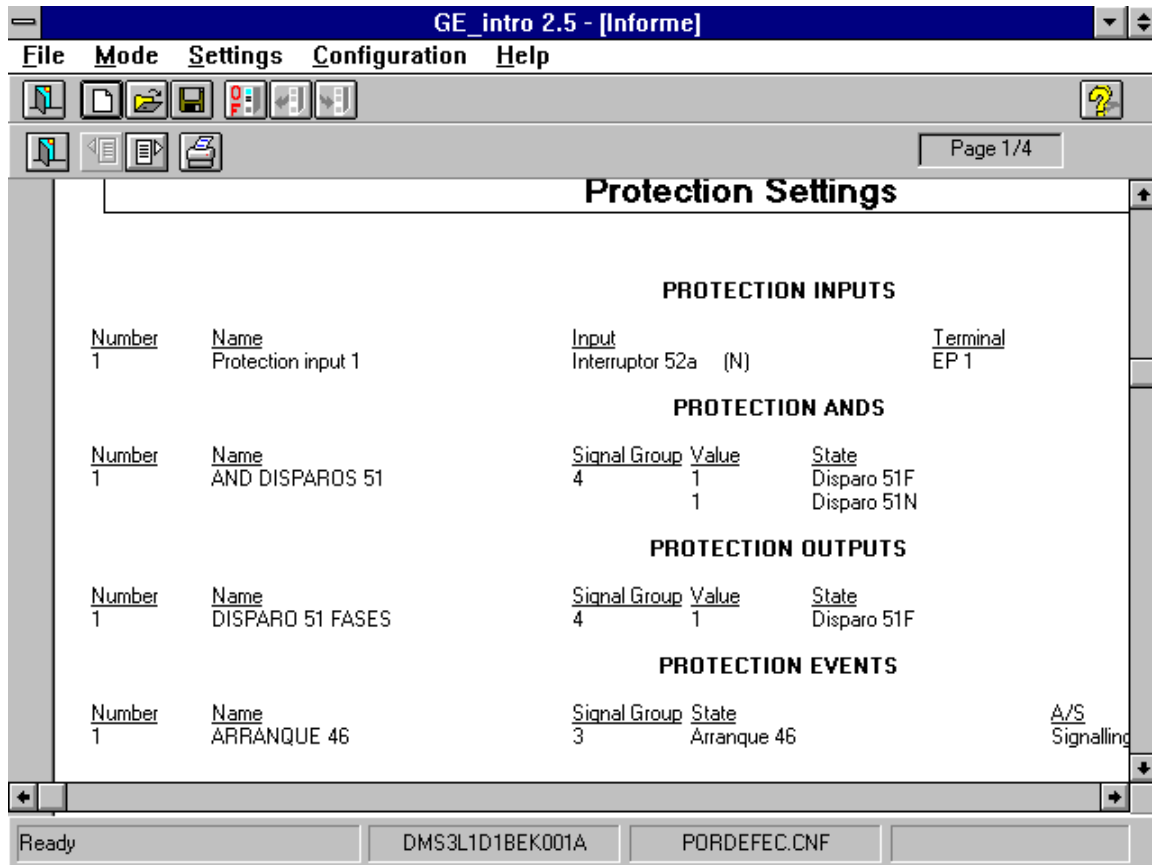
- Model: Relay model.
- Substation: this text corresponds to the text entered at the ' substation ' field at the help window. (see 4 . 5. 1. ).
- Position: this text corresponds to the text entered at the ' Position ' field at the help window ( see 4 . 5. 1. )
- Comments: this text corresponds to the ' comments ' field at the help window ( see 4 . 5. 1)
- CNF file name : Name of the configuration file, without including the path.
- Creation date: Date when the file was created. This field can be empty if the file was created using version 2 . 0 of the GE-INTRO program.
- Last Modification: Date when the last modification was done. this field can be empty if the file was created using version 2 . 0 of the GE-INTRO program.

### **7.2.3. Settings.**

At the report, settings are grouped in the same way they are at the program, so it is convenient for the user to know all the different concepts handled at the chapter number 6 of this manual.

1. Protection Settings: They correspond to the settings shown in the ' Settings ' - ' Protection ' option in the menu. These are: Inputs, ANDs, Outputs and Events.
2. Control Settings: They correspond to the settings shown in the ' Settings ' - ' Control ' option in the menu. These are: Switchgear Items, Operation Timers, Inputs, Outputs, Events, Confirmation Timer, Command Status, Operation Conditions, Failure Conditions and Success Condition. there are some exceptions :
  - The ' Switchgear Status Inputs ' of the menu has been included in the ' Switchgear ' Group of the report.
  - The ' RTU Inputs ' of the menu has been included at the ' Operations Timers ' of the report.
  - The ' Digital Inputs ' group of the menu has been included at the ' Control Inputs ' group of the report.

3. Communication Settings: They correspond to the settings shown at the 'Settings' - 'General Configuration' option of the menu. They are: Events, LEDs and Graphical Configuration.



**Figure 46. Report Format**

Each setting has been positioned in different columns. Each column has an underlined header indicating the type of information it represents:

- Number: Setting number within the setting group.
- Name: Setting name.
- Signal Group: Signal Group to whom the settings belongs.
- Value: Value assigned to the setting, (0 or 1).
- Status: Status assigned to the setting within the signal group.
- Contact: Physical Input assigned to the setting.
- Input: Relay function assigned to a protection input.
- A/ S: Alarm or Signaling.

- Opening Time: Opening Time for the switchgear item, in milliseconds.
- Closing Time: Closing Time for the switchgear item, in milliseconds.
- Holding Time: Holding Time for each maneuver, in milliseconds.
- Failure Time: Failure Time for each maneuver, in milliseconds.
- Dwell Time: Time the output is closed for each maneuver, in milliseconds.
- Timer: Control inputs timers, in milliseconds, or Confirmation Timer, in seconds.
- Interlocking : Interlocking assigned to the different Operations Conditions, Failure Conditions and Success Conditions.
- Mode: Blinking or Steady for the LEDs setting.
- Memory: With or without memory for the LEDs settings.

For those cases for which the ' Number ' column is empty, they refer to the setting above, and in this case it has more than one value.



## 8. **TROUBLESHOOTING**

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Some of the most common problems that may appear and their possible solutions are the following:

1. Trying to open a new file the program does not show any relay in the list.  
**Solution:** there are no relay model description file installed. Install the relay model description file you want to work with. (see 2 . 3)
2. Trying to open an existing file, the program says there is no model installed.  
**Solution:** Install the required relay model description file ( see 2 . 3)
3. Communication Fatal Error. The relay does not communicate.  
**Solutions:**
  - Check if communication parameters are right, comm. port and baud rate.
  - Check relay number entered match the one at the relay.
  - Check physical connection: wire and connectors.
4. Communication Error number 0x28 . Relay can read settings but it does not change settings.  
**Solution:** Check password entered match password at the relay.
5. Communication Error number 0x23 . Relay can read settings but does not change settings.  
**Solution:** Change relay connection mode, this means, if it is in local mode change to remote or vice versa.
6. Program cannot print report.  
**Solution:**
  - Check printer is on-line.
  - Check if the printer you want to use is the active one in Windows.
7. A modification has been done, but the relay ignores it.  
**Solution:** Check your changes have been validated before saving the file.