



**PCD**

**System Operation Desk**  
**Instruction Manual**

## **License agreement for Software Embedded in Equipment**

### **ZIV APLICACIONES Y TECNOLOGIA,S.A. End-User Software License Agreement**

**THE EQUIPMENT YOU HAVE PURCHASED INCLUDES EMBEDDED SOFTWARE PROGRAM(S). THE PROGRAM IS COPYRIGHTED AND IS BEING LICENSED TO YOU (NOT SOLD) FOR USE WITH THE EQUIPMENT.**

**THIS IS A LEGAL AGREEMENT BETWEEN US ( AS “LICENSEE) AND ZIV APLICACIONES Y TECNOLOGIA, S.A. ( AS “LICENSOR”) FOR THE SOFTWARE PROGRAM INCLUDED WITH THE EQUIPMENT. PLEASE READ THE TERMS AND CONDITIONS OF THIS LICENSE AGREEMENT CAREFULLY BEFORE USING THE EQUIPMENT.**

**IF YOU INSTALL OR USE THE EQUIPMENT, YOU ARE ACCEPTING AND AGREEING TO THE TERMS OF THIS LICENSE AGREEMENT . IF YOU ARE NOT WILLING TO BE BOUND BY THE TERMS OF THIS LICENSE AGREEMENT, YOU SHOULD PROMPTLY RETURN THE EQUIPMENT UNUSED TO YOUR SELLER, AND YOU WILL RECEIVE A REFUND OF YOUR MONEY.**

#### **Terms and Conditions of License**

- 1. License Grant.** Licensor hereby grants to you, and your accept, a nonexclusive and non-transferable license to use the embedded programs and the accompanying documentation, if any (collectively referred to as the “Software”), only as authorized in this License Agreement.
- 2. Restrictions.** You may not (a) use, copy, modify or transfer the Software except as expressly provided in this or another Agreement with Licensor, (b) reverse engineer, decompile or disassemble or separate the components of the Software, or (c) rent, sell or lease the Software or make the Software available to others to do any of the foregoing.
- 3. No Assignment.** This License is intended for your exclusive use with the purchased equipment. You agree that you will not assign, sublicense, transfer, pledge, lease, rent or share your rights under this License Agreement.
- 4. Licensor’s Rights.** You acknowledge and agree that the Software is the proprietary product of Licensor protected under U.S. copyright law and international treaties.. You further acknowledge and agree that all right, title and interest in and to the Software, including associated intellectual property rights, are and shall remain with Licensor. This License Agreement does not convey to you an ownership interest in or to the Software, but only a limited right of use revocable in accordance with the terms of this License Agreement.

5. **Confidentiality.** The Software is confidential and no details or information relating to the same shall be disclosed to any third party without the prior written consent of Licensor. For the purposes of this clause, sub-contract staff, employed or retained by the Licensee to perform computer systems development work, shall not be deemed to be third parties provided such staff are subject to the disclosure restrictions set forth above. In no event, except with a prior written authorization duly signed by an officer of Licensor, may you disclose any such confidential information, even for subcontracted jobs, to persons or entities that may be considered to be direct competitors of Licensor.
6. **Term.** The License Agreement is effective upon delivery of the equipment to you and shall continue until terminated. You may terminate this License Agreement at any time by returning the equipment to Licensor, or by destroying the equipment. Licensor may terminate this License Agreement upon your breach of any term hereof. Upon such termination by Licensor, you agree to return the equipment to Licensor.
7. **Warranty and Disclaimer.** Licensor warrants, for your benefit only, that the Software, when and as delivered to you, will conform to the specifications described in the instruction manuals for the equipment purchased, or any specifications agreed to in writing by Licensor with a particular customer. This warranty does not cover any minor errors or deviations from the specifications that do not affect the proper functioning of the equipment. **EXCEPT FOR THE WARRANTIES SET FORTH ABOVE, THE SOFTWARE IS LICENSED "AS IS", AND LICENSOR DISCLAIMS ANY AND ALL OTHER WARRANTIES, WHETHER EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.**
8. **Licensee's Remedy.** Your sole and exclusive remedy for any breach of Licensor's warranty shall be the repair or replacement, at Licensor's sole option, of any Software that does not conform to stated specifications. Licensor shall not be responsible for any failure arising from inadequate or improper use of the Software.
9. **Limitation of Liability.** Licensor's cumulative liability to you or any other party for any loss or damages resulting from any claims, demands, or actions arising out of or relating to this Agreement shall not exceed the purchase price paid to Licensor for the equipment. In no event shall Licensor be liable for any indirect, incidental, consequential, special, or exemplary damages or lost profits, even if Licensor has been advised of the possibility of such damages.
10. **Trademark.** All ZIV trademarks (including ZIVERCOM, ZIVERLOG and ZIVERSYS) are common law trademarks of Licensor. No right, license or interest to such trademarks is granted hereunder, and you agree that no such right, license or interest shall be asserted by you with respect to such trademark.
11. **Licensee's Indemnity.** You shall defend, indemnify and hold Licensor harmless against any loss or damage of any kind arising from a breach by you of this License Agreement, or any use or misuse of the Software by you or your employees, agents or

representatives, and from any other of your conduct or from any claim or action by any of your customers in connection with the Software or this License Agreement.

12. **Governing Law.** This License Agreement shall be construed and governed in accordance with the internal laws of the State of Illinois, U.S.A.
13. **No Waiver.** The failure of either party to enforce any rights granted hereunder or to take action against the other party in the event of any breach hereunder shall not be deemed a waiver by that party as to subsequent enforcement of rights or subsequent actions in the event of future breaches.
14. **Entire Agreement.** This License Agreement is the entire agreement between you and Licensor with respect to the use of the software and supersedes all prior understandings or agreements between the parties. This License Agreement may be amended only by a writing signed by an officer of Licensor.

**ZIV Aplicaciones y Tecnología, S.A.**  
**Parque Tecnológico, 2089**  
**48016 Zamudio (Vizcaya)**  
**48080 Bilbao**  
**Spain**



# Table of Contents

|                                                                     |            |
|---------------------------------------------------------------------|------------|
| <b>CHAPTER 1. Introduction</b> .....                                | <b>1-1</b> |
| 1.1 General Overview.....                                           | 1-2        |
| 1.2 Functions.....                                                  | 1-2        |
| <b>CHAPTER 2. Technical Characteristics</b> .....                   | <b>2-1</b> |
| 2.1 Characteristics of the System Operation Desk (PCD).....         | 2-2        |
| 2.1.1 Desktop PC .....                                              | 2-2        |
| 2.1.2 19" Rack Mounted PC .....                                     | 2-2        |
| <b>CHAPTER 3. Installation and Start-Up</b> .....                   | <b>3-1</b> |
| 3.1 Installation of the Operating Desk .....                        | 3-2        |
| 3.1.1 Configuration of the Operating System .....                   | 3-2        |
| 3.1.2 Installation of the Local Operation Desk.....                 | 3-4        |
| 3.1.3 Installation of the Remote Operation Desk in Windows 98 ..... | 3-5        |
| 3.1.4 Installing the Remote Operation Desk in Windows XP.....       | 3-7        |
| <b>CHAPTER 4 User Interface. Basic Functions</b> .....              | <b>4-1</b> |
| 4.1 Starting the Application .....                                  | 4-2        |
| 4.2 General Screen Structure.....                                   | 4-3        |
| 4.2.1 Header.....                                                   | 4-4        |
| 4.2.2 Graphic Area .....                                            | 4-4        |
| 4.2.3 Function Keys.....                                            | 4-5        |
| 4.2.4 General Considerations.....                                   | 4-5        |
| 4.3 Single-line Diagram Page.....                                   | 4-6        |
| 4.3.1 Execution of Commands .....                                   | 4-9        |
| 4.4 General Menu Page .....                                         | 4-11       |
| 4.5 Signal Panel Page.....                                          | 4-13       |
| 4.6 Alarm Page.....                                                 | 4-16       |
| 4.7 Active Alarm Page.....                                          | 4-19       |
| 4.8 Events Page .....                                               | 4-19       |
| 4.8.1 Saving Events to Disk .....                                   | 4-20       |
| 4.9 SIPCO Status Page.....                                          | 4-21       |
| 4.10 Engineering Page.....                                          | 4-23       |

**CHAPTER 5. User Interface. Additional Functions..... 5-1**

5.1 Substation Selection Window..... 5-2

5.2 Window for Receiving Files from the Remote Operation Desk..... 5-3

5.3 Users and Passwords ..... 5-4

5.3.1 Without Users ..... 5-4

5.3.2 Users for Commands ..... 5-5

5.3.3 Users with Different Permissions..... 5-6

5.4 Report Page..... 5-10

5.5 Protection Page ..... 5-15

5.6 Automatic Control Configuration Page ..... 5-16

5.6.1 Automatic Control for Resistive Grounds..... 5-17

5.6.2 H and Y Automatic Controls ..... 5-19

5.6.3 ERAS Automatic Control ..... 5-21

5.6.4 Logic ..... 5-23

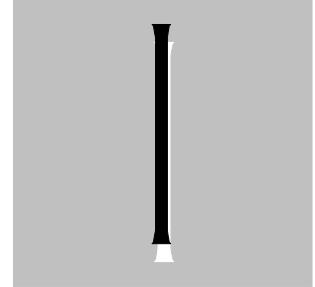
5.7 Automatic Control for Resistive Ground Page ..... 5-24

**CHAPTER 6. Settings ,Ranges..... 6-1**

**CHAPTER 7. Figures..... 7-1**

## CHAPTER 1

# Introduction



The **PCD** or **Operating Desk** belongs to the CPX and CPP families. It is part of the Integrated Protection and Control System (SIPCO) for electrical substations.

Some general functions of the **PCD** are:

- **Communication with the CPX and CPP IEDs.**
- **Intuitive display of substation information.**
- **Possibility of maneuvering on any element and of managing interlockings.**
- **Modification of programmable control function setting during time of execution.**
- **Event and alarm management with the possibility of acknowledging them individually or all at once.**

This Users Manual only refers to the PCD. Since the PCD must communicate with a CPX or CPP, however, it will use information referring to these units.

### 1.1 General Overview

The **Operating Desk** provides a simple way of monitoring the information coming from the CPX/ CPP. It uses a hierarchical level of menus with various displays of the updated status of the substation.

You can configure the entire system with **Zivergraph®** software. With this program, you can adapt the system to the substation's characteristics: units connected, signals associated with each unit, display of the information, substation-level logic functions, desired functions, etc.

### 1.2 Functions

The main functions of the Operating Desk are described next:

- **Communications**

The **PCD** or **Operating Desk** can communicate with the CPX/ CPP several ways. By an ethernet connection using a proprietary protocol on the TCP-IP stack. With this network interface, you can connect a second desk with the same function. This connection is permanent and automatic. The desk checks the communications channel to detect possible failures.

Using a telephone MODEM through an RTC line to implement the remote access service. This possibility allows remote connection from any point that has a telephone access point. You can also use a GSM modem.

Lastly, with the appropriate modems, you can connect through a dedicated telephone line.

- **Databases**

On start-up, the operating desk requests the entire database from the CPX/ CPP to update the screens. From then on, it is the CPX/ CPP that sends any change in these signals. The PCD only requests measurements and counters when the current screen needs to be updated.

- **Commands**

From the single-wire screens, you can request a command to be sent to a substation element. This request translates into a series of checks before sending it to the CPX/ CPP. These checks are configurable interlockings associated with the object representing the target element.

The end unit carries out the command. If this command is executed, some of the substation elements will change status. If the command is not executed because of a block, a screen will appear with all the signals that block the requested operation.

- **Event management**

From any of the screens, you can access a specific screen with a list sorted by date and time of all events collected by the CPX/ CPP. This list is circular and can store up to the last 500 events received.

- **Alarm management**

Two PCD screens, accessible from the rest of the screens, display a list of the alarms that have appeared in the installation. One of these, **Active Alarms**, only presents active alarms; the other, **Alarms**, presents all alarms -active or not, acknowledged or not- that have appeared in the installation.

This diagram shows the flow of information in the operating desk.

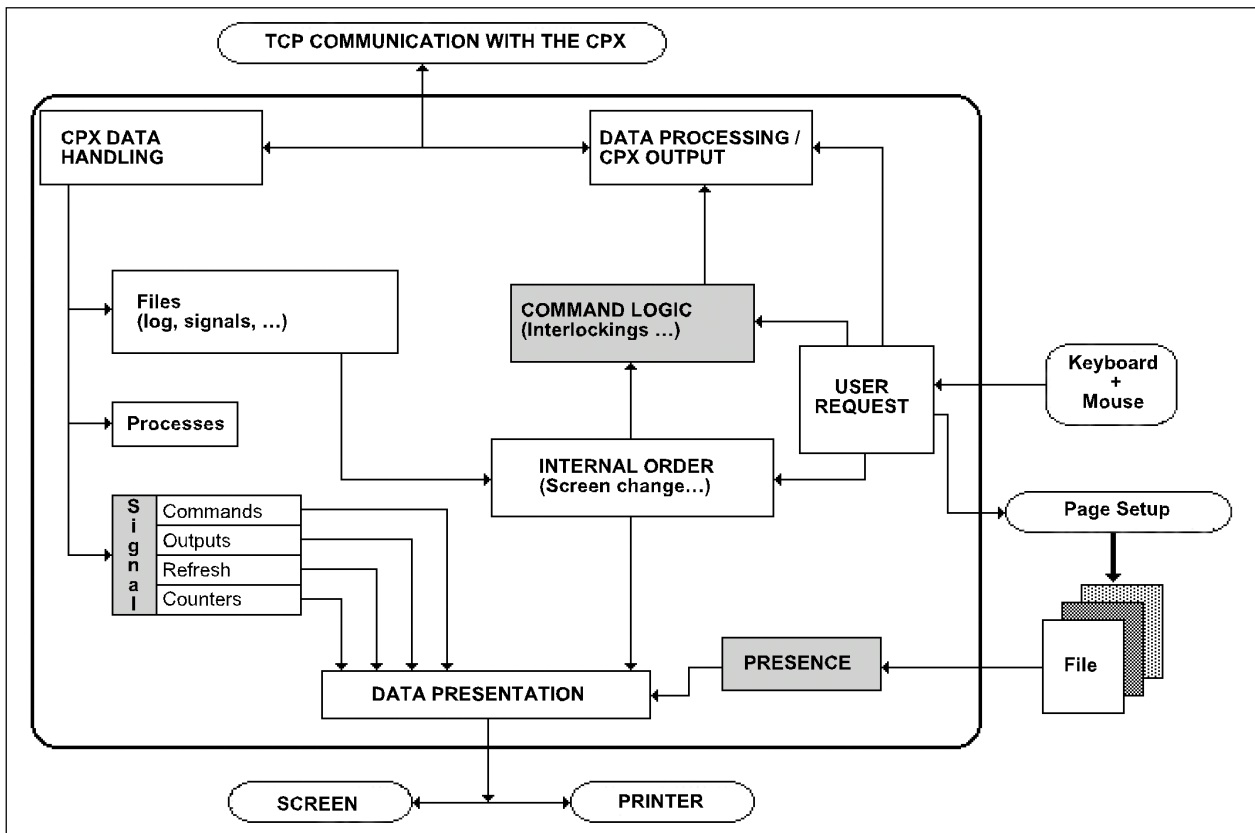
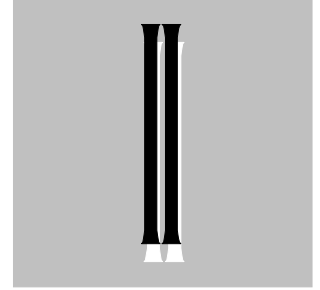


Figure 1.1: Information Flow in the Desk.

Notes:

CHAPTER 2

# Technical Characteristics



# 2.1 Characteristics of the System Operation Desk (PCD)

The System Operation Desk is made up of a PC (desktop or industrial) and specific software that includes the HMI functions of the installation. You can choose a tabletop PC or industrial PC in a 19" rack.

## 2.1.1 Desktop PC

The characteristics of the Operation Desk based on the desktop PC vary greatly due to changes in the computer market. The **minimum** characteristics that a PC must have to operate as an operating desk are:

### Processor

PENTIUM 100 MHz or higher

64 MB of RAM.

Super VGA controller with a resolution of 800 x 600 pixels.

A 1-Gb internal hard disk drive.

Disk drive.

CD-ROM drive.

10/100 network card.

### 102-key keyboard

### Mouse

### 15" Monitor

### Connectors

Mouse.

Keyboard.

25 pin parallel.

RS-232 Series 9 pin.

VGA 15 pin.

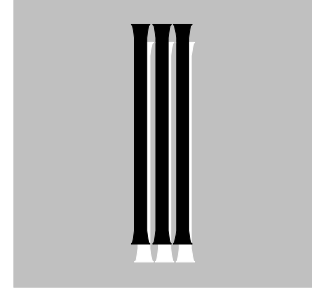
### Microsoft Windows 98 OSR2 Operating System.

## 2.1.2 19" Rack Mounted PC

The characteristics are the same as those for the desktop PC. The difference is that, here, the casing, keyboard and mouse all have industrial characteristics: protection against water, dust etc.

CHAPTER 3

# Installation and Start-Up



### 3.1 Installation of the Operating Desk

Install the Operating Desk program on a computer that has the Windows 98 or higher operating system installed. Before installing the operation desk application, adapt the configuration of the computer and operating system to operation desk requirements.

#### 3.1.1 Configuration of the Operating System

If the Operating System must be installed on the PCD, the procedure is explained in this section. The Windows version to install will depend on availability at the time of installing. Windows 98SE or higher is suitable. Install Windows from a CD-ROM. After installing Windows, enter the license number from the installation manual and then reboot.

This section is not intended to replace the installation instructions that came with the Operating System, but rather expand those particular aspects that need to be adapted to the installation of the ZIV computer. If you have any questions about any matter not dealt with in this section, please consult the Operating System documentation as well as any other information supplied by the Operating System manufacturer.

The PC onto which the operating desk is to be installed must have a network card to be able to connect to the CPX/PPP. During the operating system installation, also install the network card drivers and the software required for its proper operation. The following data will be requested during this procedure.

|                 |                |
|-----------------|----------------|
| PC NAME:        | OPERATION DESK |
| WORK GROUP:     | ENG            |
| PC DESCRIPTION: | Operating Desk |

If the operating system is already installed, verify these data with the following procedure:

- Select the **Network and Dial-up connections** icon from the **Settings**. In the **Settings** folder, verify that the following elements are installed:
  - An adaptor for the computer network card.
  - Client for Microsoft networks.
  - The NetBEUI protocol for the previous network adaptor. The option "File and Printer Sharing for Microsoft Networks" must be activated in the Properties window for this element.
  - The TCP/IP protocol for the previous network adaptor. Enter an IP address in the Properties window (this will usually be the same as the CPX/PPP but with a different third number: 128.127.61.xxx and 255.255.0.0 will be used as a subnet mask. Activate the Set option as predetermined protocol.
  - File and Printer Sharing for Microsoft networks.

If the network is not configured as detailed above, then do so now, selecting the desired element and clicking on the Properties button. If any of the elements are not installed, click on the button **Add – Protocol / Client / Adaptor / Service - Add** – and then select the desired element. If you cannot find it, select the **Have Disk** option and install it from the floppy disk.

In the **Configuration** folder, the TCP/IP protocol for the network card that was previously installed will be highlighted (for example, **TCP/IP -> 3Com Etherlink III**). Click on the **Properties** option. Select the **IP Address** folder, and click on the button. **Specify an IP address**. Enter a number for the IP address and the subnet mask as in the following example:

|              |                 |
|--------------|-----------------|
| IP ADDRESS:  | 128.127.061.xxx |
| SUBNET MASK: | 255.255.000.000 |

The last numbers of the IP address will vary with each installation. ZIV assigns a fixed IP address for each installation. Consult the documentation to find out the IP address assigned to your installation.

After verifying that the TCP/IP protocol is installed, go to the **Network** icon in the **Configuration Panel** and verify that the **NetBEUI** protocol is installed. If it is not installed, take the following steps:

In the **Configuration** folder, select **Add - Protocol - Add** – (Manufacturer:) **Microsoft** - (Protocol:) **NetBEUI** - **OK**. If you cannot find it, select the **Have Disk** option and install it from the floppy disk.

After the NetBeui protocol is installed, go the **NetBEUI Properties** folder and verify that the following fields are activated in the **links** file: **Client for Microsoft networks** and **File and Printer Sharing for Microsoft networks**.

The system should be allowed to share folders. To do this, in the **Properties** screen of the **Network Settings** inside the **Configuration** folder, select **File and Printer Sharing** and enable **I want to be able to give others access to my files** - **OK**.

Finally and also in the same **Configuration - Properties** folder, establish that a network session starts when Windows is started. To do this, click on the option **First start of session - Start of windows session**.

Accept the new configuration and then reboot the PCD.

The operation desk software is designed for a SVGA screen with a resolution of 800 x 600 pixels. If the resolution is not set to these requirements, follow these steps: right click on the desktop and select **Properties** and then the **Configuration** folder. Under Screen Size, select **800x600** and for Colors, select **256 colors**. Still in the **Configuration** folder, select the area **display** inside of **Advanced - General**, select **Small Font** for font size.

To configure the toolbar:

Right click on the toolbar, select **Properties** and then the folder **Toolbar options**. All fields must be inactive in this folder except for “**Display clock**”.

### 3.1.2 Installation of the Local Operation Desk

After verifying the perfect configuration of the operating system, you can install the Operating Desk program.

The installation program will guide you throughout the process. All you have to do is answer the questions that appear on the screen.

1. Make sure that the computer and monitor are turned on.
2. Wait for Windows to start running. If Windows is already running, first save all work in progress and then close all open applications, including MS-DOS sessions, before installing the operating desk program.
3. Click on **Start** on the toolbar and then select **Execute**.
4. In the **Execute** textbox on the command line for **Open**, write the *letter of the drive*:\setup. For example, if the installation disk for the operating desk is in the A drive, write **a:\setup**.
5. Click on **OK**.
6. Follow the instructions that appear on the screen. It will be installed in the default folder, although it is possible to select another folder by typing in its name.

When installation is complete, you will find direct access to the operating desk in the group of programs C: \ *WINDOWS* \ *Start Menu* \ *Programs* \ *Operating Desk*. Other direct accesses must be created on the desktop and in the folder C: \ *WINDOWS* \ *Start Menu* \ *Programs* \ *Start*. Use Windows Explorer to do this.

Finally, create a folder called *Central* inside the operation desk installation folder from *Windows Explorer*. C: \ *Operation desk* \ *Central*. Select File - New - Folder from the menu and name this new folder *Central*. Then right click on this *Central* folder. A menu of options will pop up. Now click on **Share...**

A dialog box will appear (figure 3.1) within the “Share” window. Select the access type option of “Complete” and click on “OK”.

When you have completed these steps, the operation desk will be installed.

Now copy the particular substation configuration files to the appropriate directories: \*.cfg copied to C:\Operation desk\Bin and \*.bmp to C:\Operation desk\bmp.

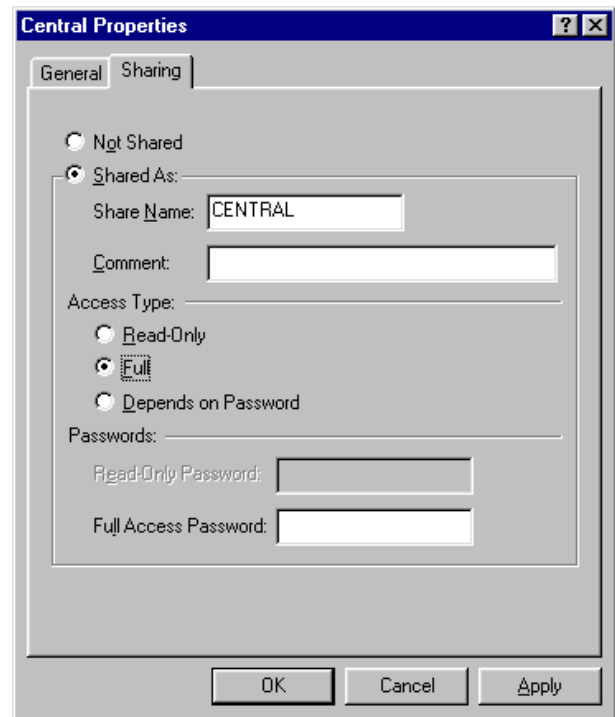


Figure 3.1: Share Directory.

### 3.1.3 Installation of the Remote Operation Desk in Windows 98

A Remote Operation desk is basically a operation desk that can be connected to a multitude of substations to remotely monitor their status.

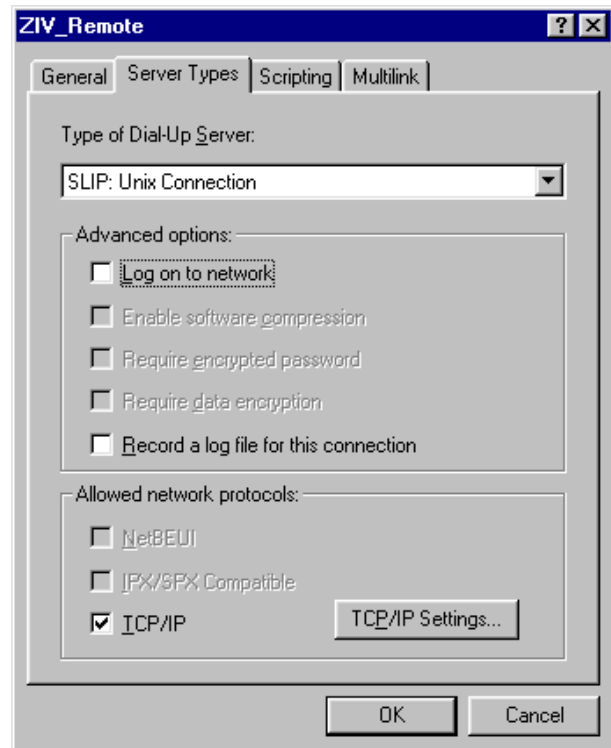
If the operation desk you are installing is a remote operation desk, first configure the computer as detailed in section 3.1.1 and install the operation desk application as detailed in section 3.1.2. Then follow these steps.

1. In the *C:\Operation desk* folder, create a file with the name *subest.cfg* where you will configure the remote operation desk type. Consult appendix A for the format of this file in order to fill it in with the correct data and formats.
2. If the connection with the CPX/ CPP is by modem, the configurations for the different substations go in different folders. Thus, a folder must be created for each of the substations within the folder *C:\Operation desk\bin*. **IMPORTANT:** The name of this folder may not exceed 8 characters.
3. If the CPX/ CPP connection is via modem, a file *name\_substation.sub* file must be created for each substation with the data for this substation in the *C:\Operation desk* folder. Consult appendix A for the format of this file in order to enter the correct data and formats.
4. If the CPX/ CPP connection is via modem, you must create a Dial-Up Networking connection. Click on the *Dial-Up Networking* option in Windows Explorer and select *Make New Connection*. Windows will guide you in making this connection. Call it ZivRemote and enter any telephone number (during the connection procedure, the operation desk uses the phone number configured in the *name\_substation.sub* file. In addition, select the modem with which you want to connect.

## Chapter 3

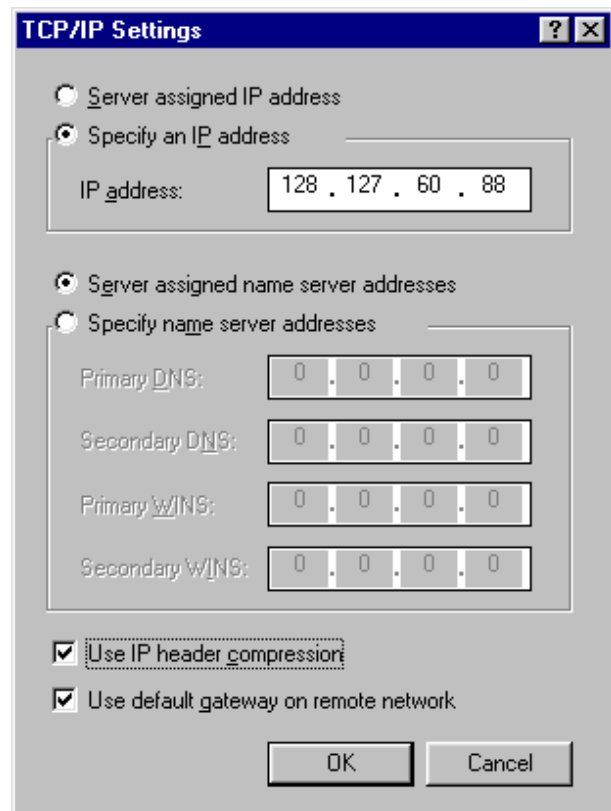
These operations create a ZivRemote icon. Right click on it and select **Properties**. A screen with several tabs will appear for you to fill in a series of data.

Select the *Server Type* tab and configure the available parameters as depicted in the image. In the *Server type for Dial-Up Networking*, select *SLIP: Unix connection*. Verify that only the TCP/IP option is active for the remaining options in the window. Deactivate the rest of the options if necessary.



Click on TCP/IP Settings to access the TCP/IP options. Assign a fixed IP address. Leave the rest of the options as shown in the screen shot. The IP address cannot be the same as any other computer on the network. Since you are configuring remote access, in order to access multiple substations with different IP addresses, use one that is not from the CPX/CPX family but within the addresses permitted for the subnet mask in the properties of the TCP/IP protocol under network properties.

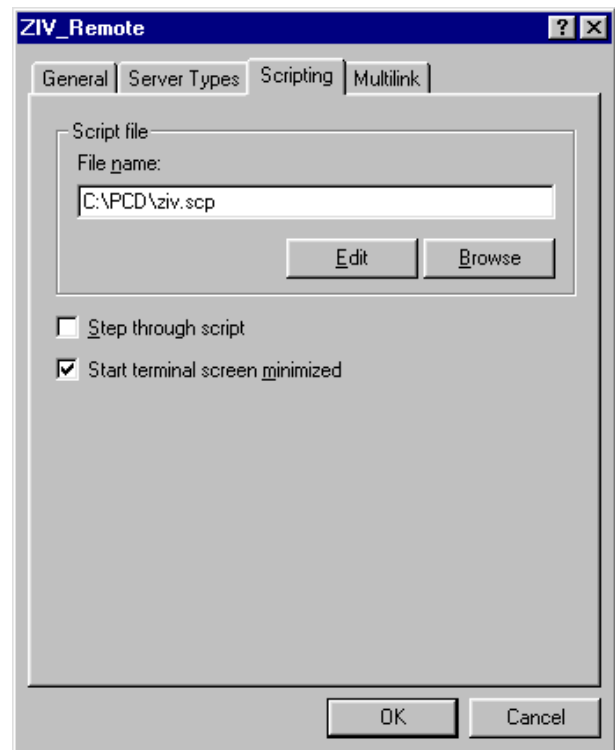
For example, you can use the following: 128.127.62.XX.



Finally, select the *Scripting* tab and configure the parameters as in the image. In the *Script* parameter, select the Ziv.scp file found in the operation desk installation directory. To do this, click on the **Browse** button and in the **Open** window, go to the *C:\Operation desk* folder and select the file, Ziv.scp.

Take special care to not activate the option *Step by step through the script*.

These steps complete your configuration of the ZivRemote connection necessary to access the CPX/ CPP by modem.



### 3.1.4 Installing the Remote Operation Desk in Windows XP

A remote operation desk is basically a operation desk that can be connected to a multitude of substations in order to remotely monitor their status.

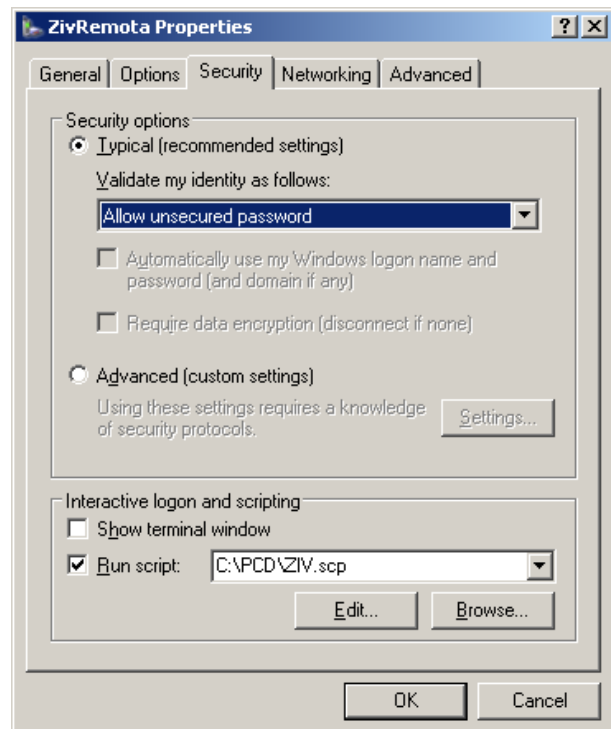
If the operation desk you are installing is a remote operation desk, first configure the computer as in section 3.1.1 and install the operation desk application as in section 3.1.2. Then proceed as follows.

1. In the *C:\Operation desk* folder, create a file with the name *subest.cfg* where you will configure the remote operation desk type. Consult appendix A for the format of this file in order to fill it in with the correct data and formats.
2. If the connection with the CPX/ CPP is via modem, the configurations for the different substations go into different folders. So create a folder for each of the substations within the *C:\Operation desk\bin* folder. **IMPORTANT:** The name of this folder cannot exceed 8 characters.
3. If the CPX/ CPP connection is via modem, create a file *name\_substation.sub* for each substation with the data for this substation in the *C:\Operation desk* folder. Consult appendix A for the format of this file in order to fill it in with the correct data and formats.

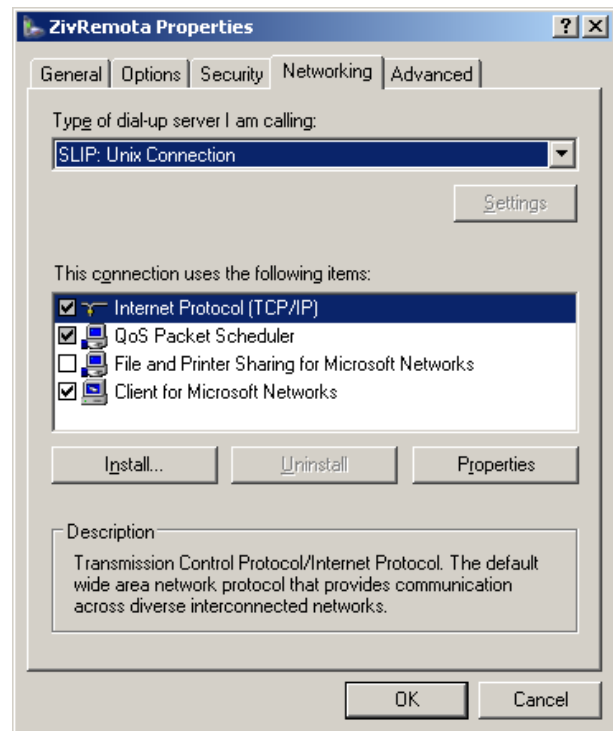
4. If the CPX/PPP connection is via modem, you must create a Dial-Up Networking connection. **Start - Control Panel - Internet and Network connections - Network connections - Create a new connection.** This option launches an assistant to guide you through the procedure. To move from one option to the next, click on the *Next* button. In the **Type of Network Connection** option, select the option **Connect to the network at my work place.** In the option **Network connection**, select **Dial-Up Networking connection.** Under **Connection name**, enter **ZivRemote.** Enter any number under telephone number (during the connection procedure, the operation desk uses the telephone number configured in the *name\_substation.sub* file). Under the **Connection availability** option, select **Use by any person.**

By clicking on Finish, a **ZivRemote** icon will appear. Right click on this icon and select Properties. A screen with several tabs will appear for you to fill in a series of data.

Select the *Security* tab and configure the available parameters as depicted in the image. In the field, *Run command file*, click on the Browse button and select the **Ziv.scp** file from the *C:\Operation desk* folder. Leave the rest of the options as they are.

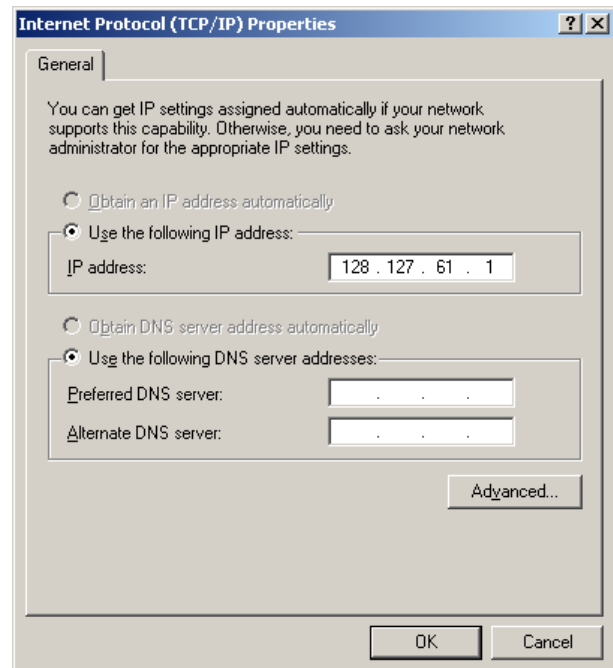


Select the *Network functions* tab and configure the options as in this screen shot. For *Telephone access server type*, select *SLIP: Unix Connection*. Leave the rest of the options as they are.



In this window, use the mouse to select the line, Internet Properties (TCP/IP), and click on the properties button. A window will appear like the one depicted here. Assign a fixed IP address and leave the rest of the options blank. The IP address may not be the same as any other computer on the network. Since you are configuring remote access, to access multiple substations with different IP addresses, use one that is not from the CPX/CPD family, but within the addresses permitted for the subnet mask in the properties of the TCP/IP protocol under network properties.

For example, you can use: 128.127.61.XX.



These steps complete the configuration of the ZivRemote connection needed to access the CPX/CPD by modem for a computer with the Windows XP operating system.

Notes:

CHAPTER 4

# User Interface. Basic Functions



## 4.1 Starting the Application

Normally, the Operation Desk computer is configured so that the Operation Desk application starts immediately after the Operating System does. If not, click on the PCD icon on the Windows desktop.

The process for starting the Operation Desk consists in reading the various configuration files and using the data read to create the various screens. During this process, a screen appears as shown in Figure 4.1:

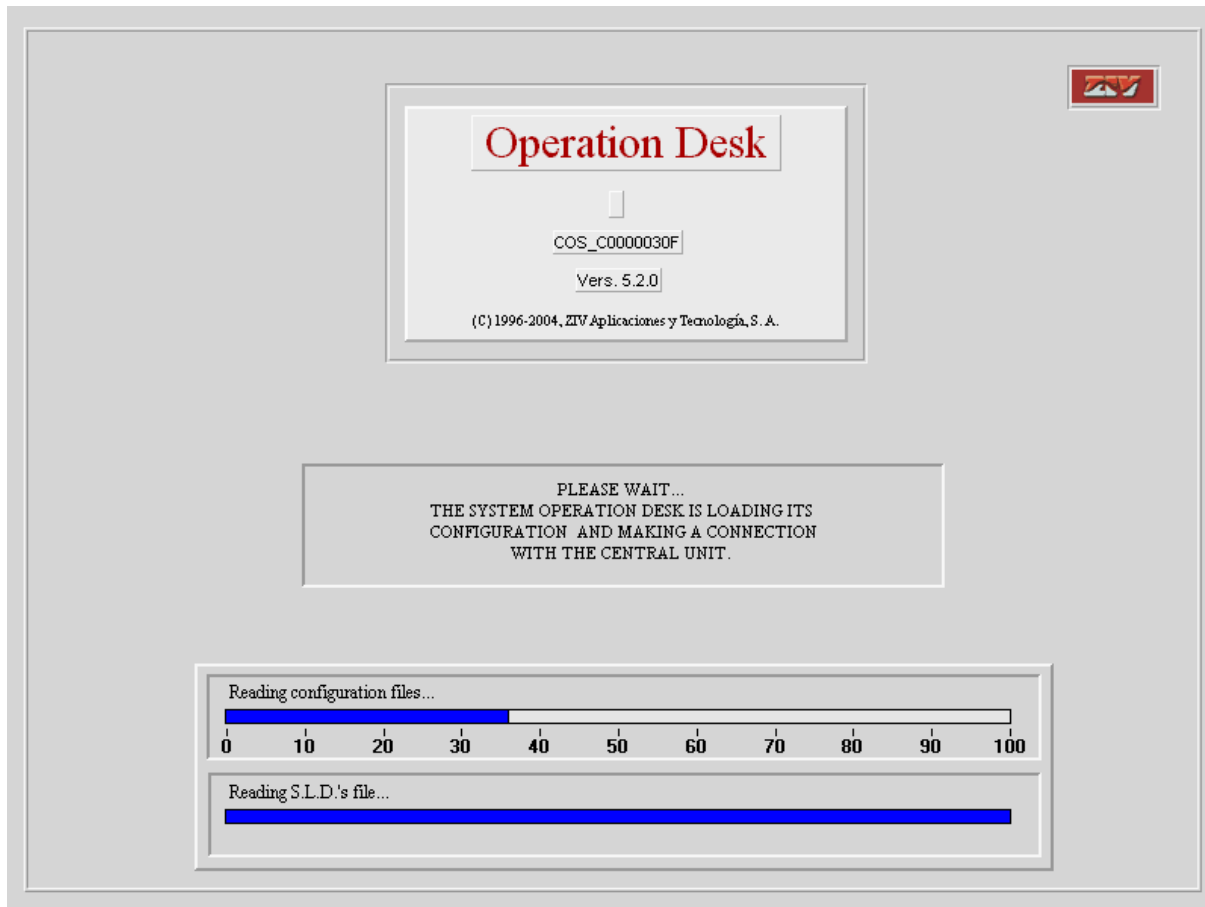


Figure 4.1: Screen for Reading Configuration.

A box identifying the Operation Desk appears at the top of the screen: model and version. Two progress bars appear at the bottom of the screen. The upper one indicates the percentage of the configuration reading completed. The lower one indicates the steps it is taking (what files are being read) and the percentage of the current step completed.

This initialization verifies that the configuration files do not contain any errors and are coherent. If there is an error in any of the files, a window will appear stating the file and line containing the error.

After the entire configuration is read and the screens created, the default single-line diagram appears. At this time, the Operation Desk tries to establish a connection with the CPX/CP. If a connection is not made, all diagram elements will be drawn in the color symbolizing *not updated* and will remain so until communication is established.

When the PCD and the CPX/CP connect, the PCD requests the configuration of the CPX. Subsequently, the PCD compares the configuration of the CPX/CP received with its configuration and if these do not match, draws a black screen with two buttons: the button for engineering and the one shown here. They indicate that there is an error and the single-line diagram screens can not be presented because the data could be false.



PCD and CPX configuration is different

The parameters compared in this process are: **numbers of bays configured, addresses of each bay, number of signals of each bay, CPX/CP model**. To find out exactly where the error is, click on the button shown above to open a window with the configuration data that indicates -with an asterisk- where the difference is.

If everything is correct, the PCD requests the status of all substations from the CPX/CP, and when it receives them, draws the single-line screen with all diagram elements and their current status. From this point on, the various diagram elements are updated as changes in their status or values are detected.

## 4.2 General Screen Structure

As mentioned, the principal function of the Operation Desk is to present the data received from the CPX graphically so that the user knows the updated status of the substation. The Operation Desk provides screens for manipulating certain substation elements.

To navigate the screens, use the button-based *general menu* or the menu called *button toolbar* located at the bottom of the screen. To change from one screen to another, simply place the mouse (or the touchpad) over the selected option and click.

The page format will be the same for all screens (see figure 4.2). Each page will be divided into three clearly differentiated areas: a *header*, a *graphic area* and some *function keys* (which we call the *button toolbar*).

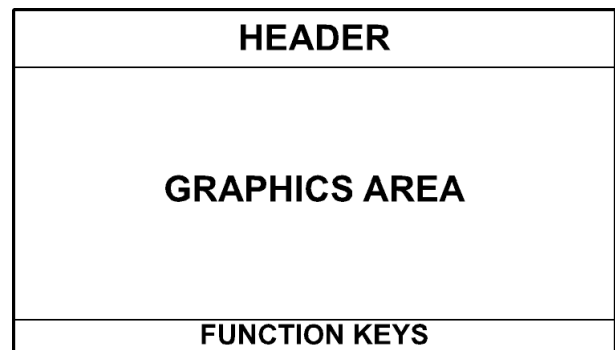


Figure 4.2: Page Format.

### 4.2.1 Header

Its three lines (see figure 4.3) contain the following information:


|                                                                                   |      |                    |      |       |
|-----------------------------------------------------------------------------------|------|--------------------|------|-------|
|  | USER | SUBSTATION NAME    | DATE | TIME  |
| Pg 1/2                                                                            |      | NAME OF THE SCREEN |      | ALARM |
| LAST SYSTEM EVENT OR ALARM                                                        |      |                    |      |       |

Figure 4.3: Page Header.

- **First line: general information**

This line has four fields:

- The supplier (ZIV).
- The user.
- Substation name.
- Time and date in *dd/mm/yy* and *hh/mm/ss* formats respectively.

- **Second line: information about the screen type**

This line has five fields:

- Page number and total pages (Page 1/2 means that the current page is 1 and the total number of pages is 2).
- The word COMMANDS appears on the remote Operation Desk if there is permission to carry out commands.
- Name of the information screen.
- If users have been defined, the name of the active user. If the field is blank, there are no active users.
- The existence of alarms. The ALARM text will appear in this field and flash if there are unacknowledged active alarms. After all the alarms have been acknowledged, the ALARM text will still be red, but no longer flashing. If there are no active alarms, this text does not appear. You can configure all the colors as well as the flashing.

- **Third line: last system event or alarm**

The last event or alarm the system has received is displayed on this line. Its format is described below. When a new event arrives, the previous one disappears from the line and the latest is displayed.

### 4.2.2 Graphic Area

The content of this area varies depending on the active screen. It may display a single-line drawing, the list of alarms, panels, the status of the SIPCO, control function settings, etc. We will describe these screens later.

### 4.2.3 Function Keys

This area has eight buttons for rapid access to the various screens. Options in the general menu provide more convenient access to the various screens. There are fixed function buttons and others that change depending on the active screen.



Figure 4.4: Function Keys.

The fixed buttons are:

- **Panels.** For accessing the panel screen.
- **Alarms.** For accessing the alarm screen.
- **Active Al.** For accessing the active alarm screen.
- **Events.** For accessing the event screen.
- **Menu.** For accessing the main menu.

### 4.2.4 General Considerations

By default, the Operation Desk starts up with the main single-line screen, which is defined in the configuration when all the single-line diagrams are drawn. The rest of the screens can be accessed by clicking on any of the function keys to access the corresponding screen, or clicking on the subset buttons of the various single-line diagrams.

When you reach a specific screen, it will remain active until you change it with the function keys.

The various display screens are:

- **Menu screen.**
- **Single-line screen.**
- **Digital signal screen.**
- **Alarm screen.**
- **Active alarm screen.**
- **Event screen.**
- **SIPCO (Integrated Protection and Control System) status screen.**
- **Access password change screen.**
- **Engineering screen.**
- **Control function configuration screen.**
- **Grounding control function screen.**
- **Report screen.**

### 4.3 Single-line Diagram Page

After the Operation Desk start-up process has finished, the first screen displayed is the first single-line diagram defined in the configuration file “*unifilar.cfg*”.

The single-line screens present a very clear, easy-to-understand graphic presentation of the status and topology of a given substation. They are composed of a series of dynamic and static objects laid out in a specific way to depict the substation topology and the status of the various substation elements. You can configure as many single-line diagrams as your installation needs. Generally, a substation has as many single-line diagrams as voltage levels. Thus, you can have one single-line diagram for the high-voltage system and one or several for the medium voltage system.

A single-line diagram can be made up of several IED bays. You can access the IED bay screens to obtain further information not seen in the single-line diagram. The IED bay screens show the specific status and greater detail about the IED bays that make up the single-line diagrams.

Furthermore, they let you maneuver within the system. An interlocking logic has been configured internally so that after a command is made, if there is an active signal blocking it, a window will pop up with the list of all signals defined as blocking the command next to a LED. Those signals that are active will have a red LED and the rest will be green. If there is no block, the command will be executed.

Figures 4.5 and 4.6 show an example of a single-line diagram and its specific IED bay.

The appearance of a single-line diagram depends exclusively on its configuration. The elements and their layout on the screens are configured with the **Zivergraph®** Single-line Diagram Editor program. It will generally report on the following items:

- The local / remote status of the substation and the single-line diagram.
- Topological representation of the status of the breakers, disconnect switches, reclosers and all elements that guide the substation.
- Representation of the voltage and current measurements. If there is not enough space, this datum can be given only by IED bay.
- Representation of the status of the control functions in the system.
- Representation of the energy counters at the substation.

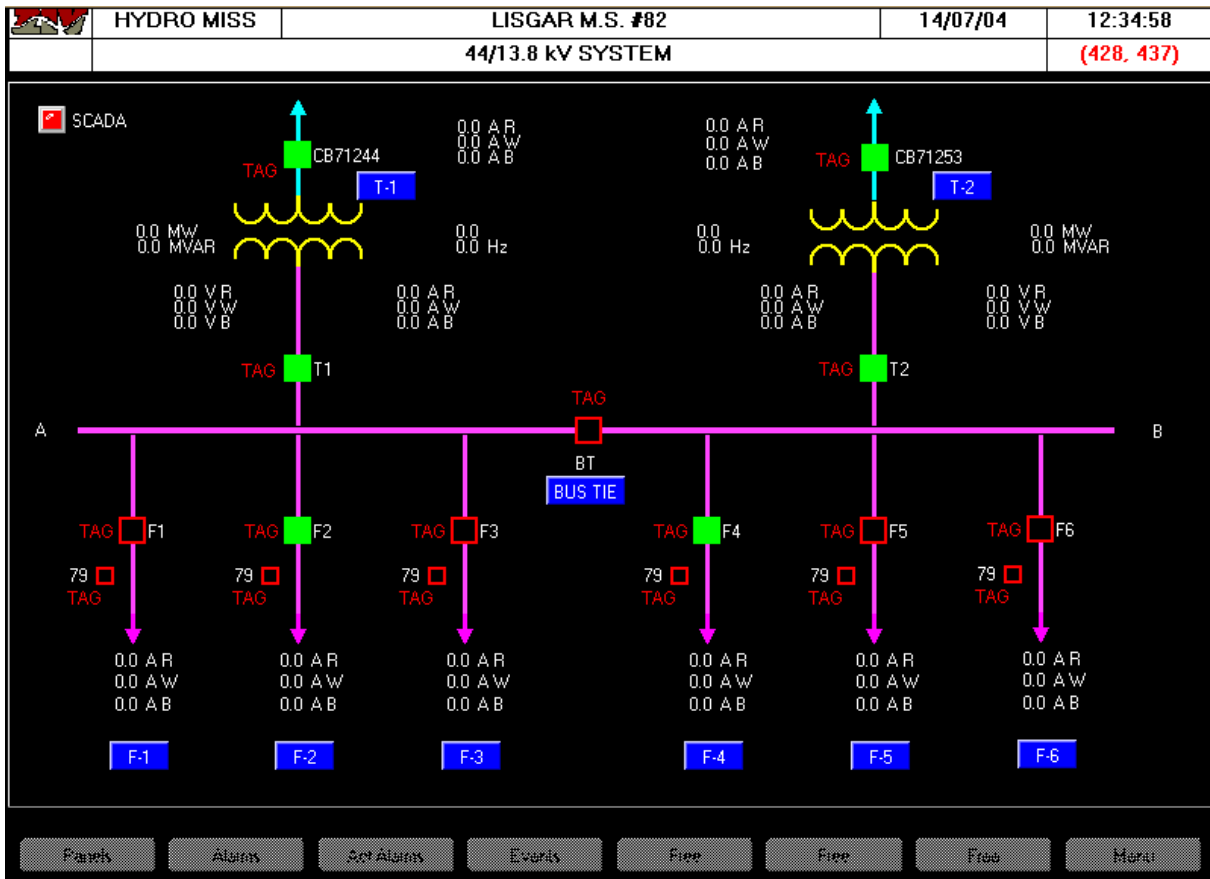


Figure 4.5: Single-line Diagram.

Figure 4.5 shows a single-line screen configured with a series of diagram elements at specific coordinates to represent the high-voltage part of a substation, consisting of two input lines, two transformers and two medium voltage buses. The breakers have been represented by boxes. You can also see the measurement values and additional information such as the transformer collection, element tags, etc. This shows that there is no voltage in the T1, that the breaker for the F2 is closed (filled green box), while the F1 is open (empty red box). The blue buttons with text inside allow you to move from the positions of this single-line diagram to other single-line diagrams.

The diagram elements can be divided into two broad groups: static and dynamic.

- **Static:** objects whose representation is fixed and does not vary (such as buttons for changing to IED bays or single-line diagrams, tags, etc).
- **Dynamic:** objects whose representation differs depending on the status of the associated signals (measurements, breakers, disconnect switches, etc.). The specific representation of each one depends on the type of object. Table X.X contains more information about this.

## Chapter 4

When they are in an *unknown* state, dynamic objects have a special associated representation (for example, because connection with the IED that the object belongs to has been lost): this representation shows the object drawn in *gray*. Specific objects can appear in both general single-line diagrams and IED bays that are dependent on some signal(s) with an alarm category (reclosers, LEDs that indicate if there is an alarm at the IED, etc). Depending on the status and/or acknowledgment of the alarm(s), the latter will *blink* or not.

The IED screens show the specific status and greater detail about the IED bays that make up the single-line diagrams. To see an IED, click on the button for changing to the IED (blue button with text identifying the IED). There are also buttons for changing from one single-line diagram to another without needing to go to the general menu page. If the substation has many single-line diagrams, not all of them are accessible from the general menu, and you access them with these buttons.

Spare IEDs are represented in a general single-line diagram but their representation as a detailed IED bay has not yet been implemented. In this case the IED on the single-line diagram is faded, and the button for changing IEDs is dark, indicating that clicking on the button will not have any effect.

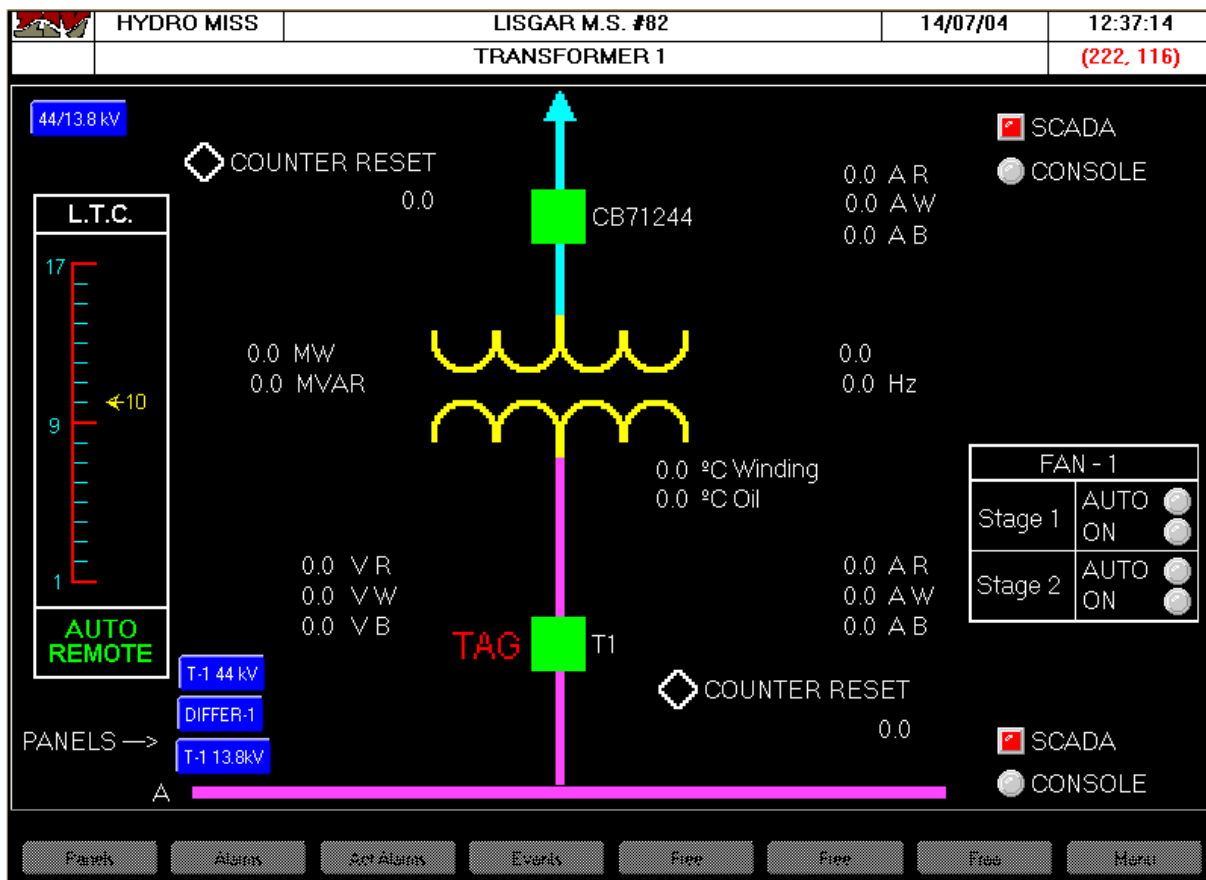


Figure 4.6: Single-line Diagram of a Transformer Position

The IED bay screens can also have buttons that let you go directly to the signal panel corresponding to this position. In all cases, you can always navigate from any single-line diagram or IED to the screens with signal panels, alarms, active alarms, events or the general menu by clicking on the appropriate button among the function buttons (button toolbar) that are available on all single-line and IED diagrams.

### 4.3.1 Execution of Commands

There are specific objects, both in the general single-line and IED diagrams, on which you can execute commands. Click on the item that you want to maneuver. If you can make commands on this element, a command panel will appear with all the available operations. This panel is placed on the screen so that it does not cover the element you are going to close or open. Thus, you can see the status of this element at all times.

The command panel includes all orders that you can send to the selected element. The title of the command screen contains the element you wish to maneuver. If no action is taken on the panel for 30 seconds, it disappears and you are returned to the previous single-line or IED diagram.

Figure 4.7 is an example of a command panel. The window title tells you that it is a 13.8kV breaker from the T1 bay. The panel content tells you that you can perform four operations on this breaker.

You can only select one command. If, for example, you select **CLOSE** and click on **OK**, before sending the order to the CPX/ CPP, the program verifies the *interlockings* (signals that impede the execution of a command depending on their status) associated with the **CLOSE** command for this breaker and configured with the **Single-line Editor** by **Zivergraph®**.

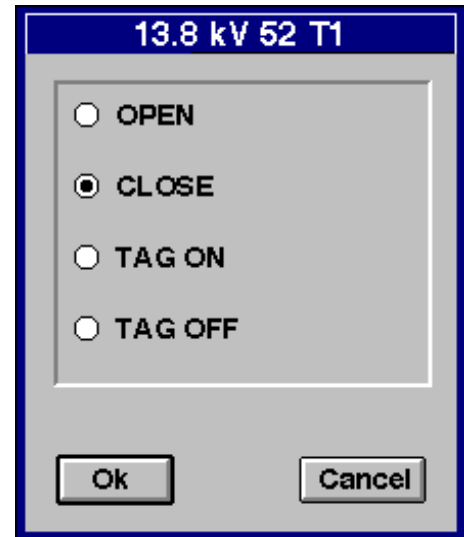


Figure 4.7: Command Panel for a Breaker.

The interlockings are configurable for each element and each order. Suppose that this order has three interlockings that block the command, which may be the case if the unit is on remote, if the Operation Desk is disconnected or if the breaker is tagged. If the command does not have any active interlockings, the command is sent to the CPX/ CPP, which is then responsible for sending it to the appropriate IED. If any interlockings are active, the command is not sent and a message informs you of the active interlock. Figure 4.8 diagrams the operation of the commands from the Operation Desk to the final IED.

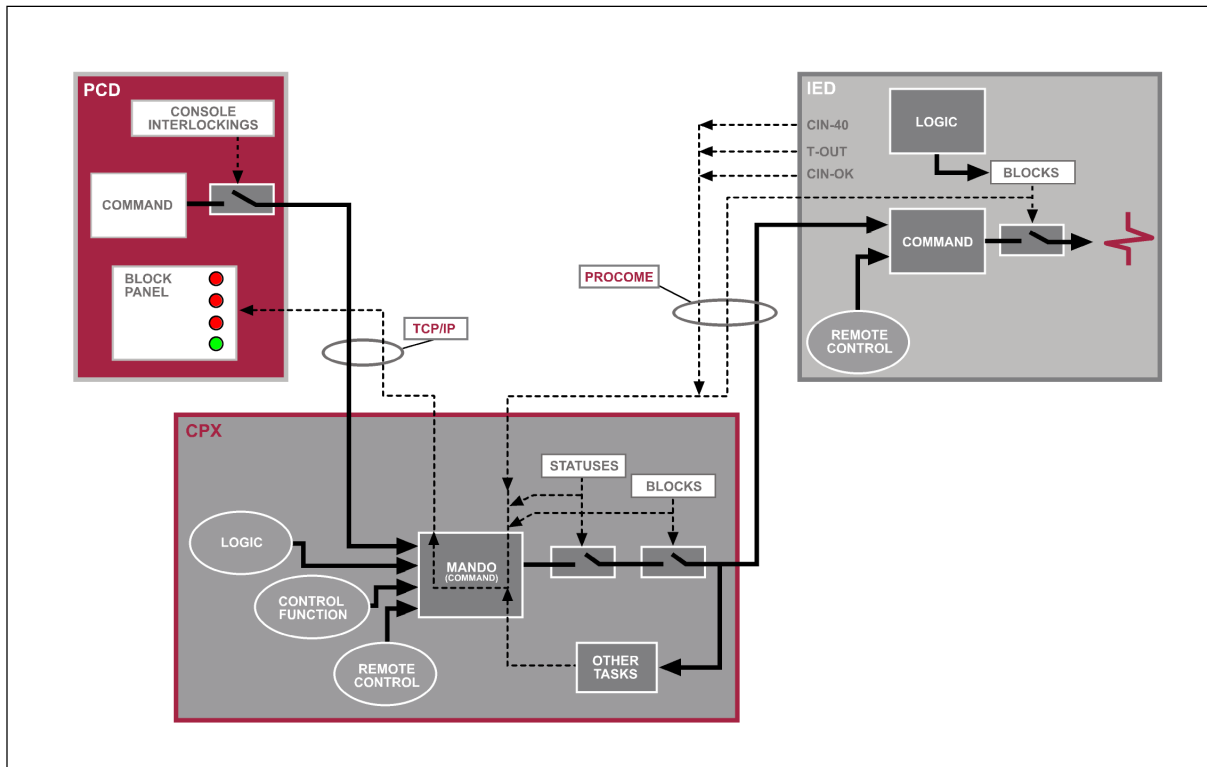


Figure 4.8: SIPCO Command Logic.

The CPX/CPD also checks whether this command can be carried out by studying its configured associated signals. If it detects no block on the command, it sends the order to the appropriate IED for the command to be executed.

Furthermore, the IED can have internal logic that can block a command depending on the status of certain signals. After the order is sent to the CPX/CPD, it verifies that the IED has no active block that could stop the order. If there is an active block, the CPX responds to the command sent from the Operation Desk with a message. This message makes a panel appear with the status of the blocks of the command sent. Those signals that are active have a red LED and the rest are green.

The block panel will be unique for each element and each order. This panel is configurable, since it collects the signals implicit in the internal logic of the IED.

## 4.4 General Menu Page

The screen called General Menu provides centralized access to the rest of the screens. This screen has *twenty buttons* in four rows and five columns (as in figure 4.9). Each button is associated with the name of the page that it accesses.

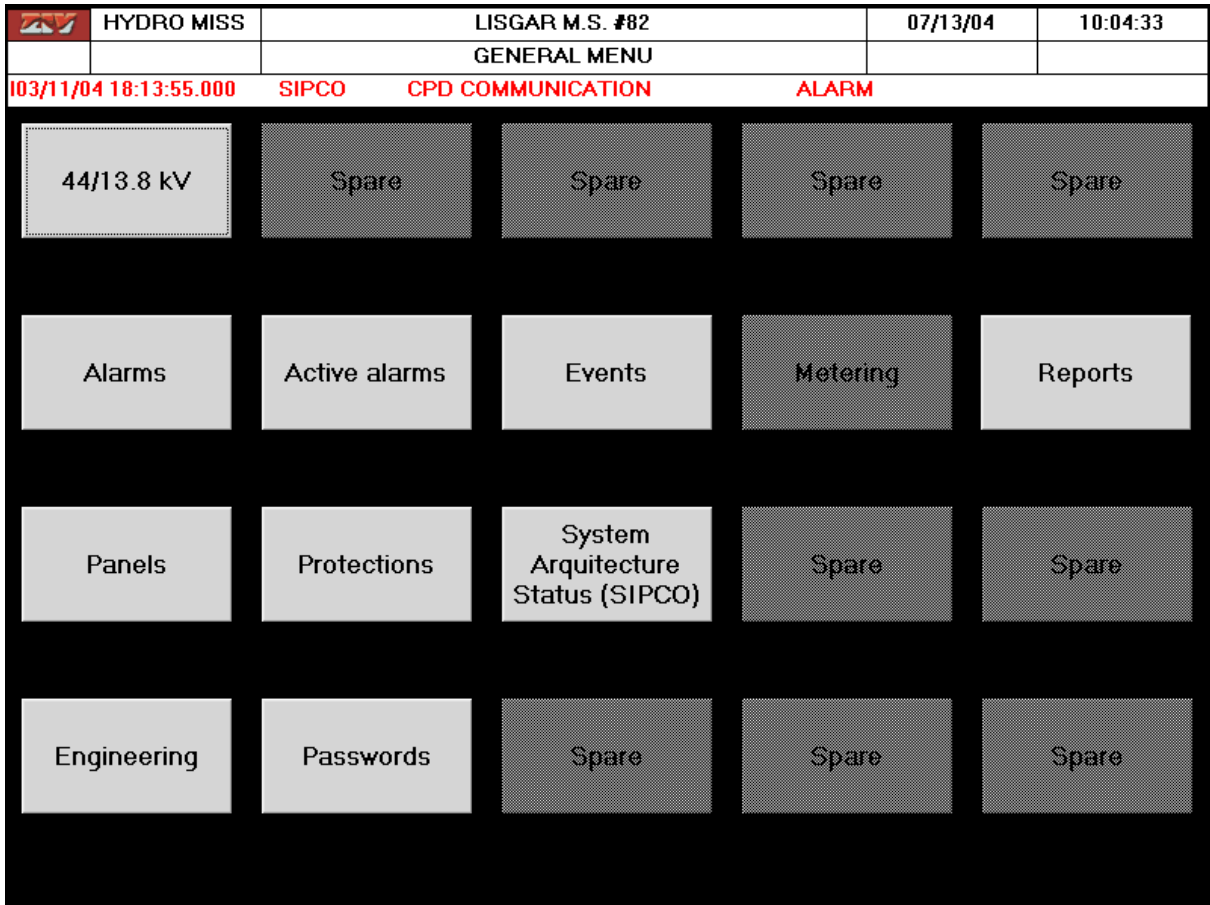


Figure 4.9: System General Menu Page.

The five buttons in the first row and the three last ones in the fourth row are associated with the possible single-line diagrams for the substation in the order they were defined in the configuration. If they have less than eight single-line diagrams, the unused buttons will not be operative (they will stay in reserve) and when the number of single-line diagrams for the substation exceeds eight, only the first eight will be presented on this menu.

In addition to the substation single-line diagrams, the screens you can access from these buttons are the following:

- Alarm Screen.
- Active Alarm Screen.
- Event Screen.
- Report screen.
- Digital signal panel screen.
- Protection Screen.
- SIPCO (Integrated Protection and Control System) screen.
- Engineering screen.
- Change Access Password and User Screen.

Some menu options require a code or password, so three levels of operation are set up. This is explained in the section dealing with changing access codes.

There are spare buttons for special screens unique to each installation. In the graph, two of these spare buttons have been used to configure *Control Functions* and *Ground Control Functions*. If there are no control functions, or there is no ground control function, these buttons will appear like the other spare options.

You can configure the appearance of the spare buttons. They can be invisible, disabled with their defined text, or inactive with their defined text.



## Chapter 4

This summary screen presents *45 buttons* (9 rows and 5 columns). The (free or spare) ones are faded. Color coding allows you to see the active, alarm or without-communication status of the signals at a glance. Then each button presents more detail.

- If the general panel screen has a button drawn in *solid gray*, this means that, at this time, there is no communication with the IED that the panel refers to or that some of the signals it includes have an invalid status. If all the buttons are this color, it means there is no communication with the CPX/CP.
- If, however, the button for changing to the signal panel for the position is *green*, this means that all the digital signals it includes are deactivated or set to *zero*.
- If the button for changing is *red*, this means that some digital signal for the outline panel is active or set to *one*.
- Lastly, the digital signals making up the panel can have the category of alarm or not. If a signal was configured as an alarm and has not been acknowledged in the alarm list, the button for moving to this panel will be *blinking*. Alarms cannot be acknowledged from this general panel page. They can only be acknowledged from inside each panel.

Clicking on a button on the *general panel* screen takes you to the particular screen corresponding to the signal panel associated with the IED stated on this button. This screen is shown in figure 4.11.

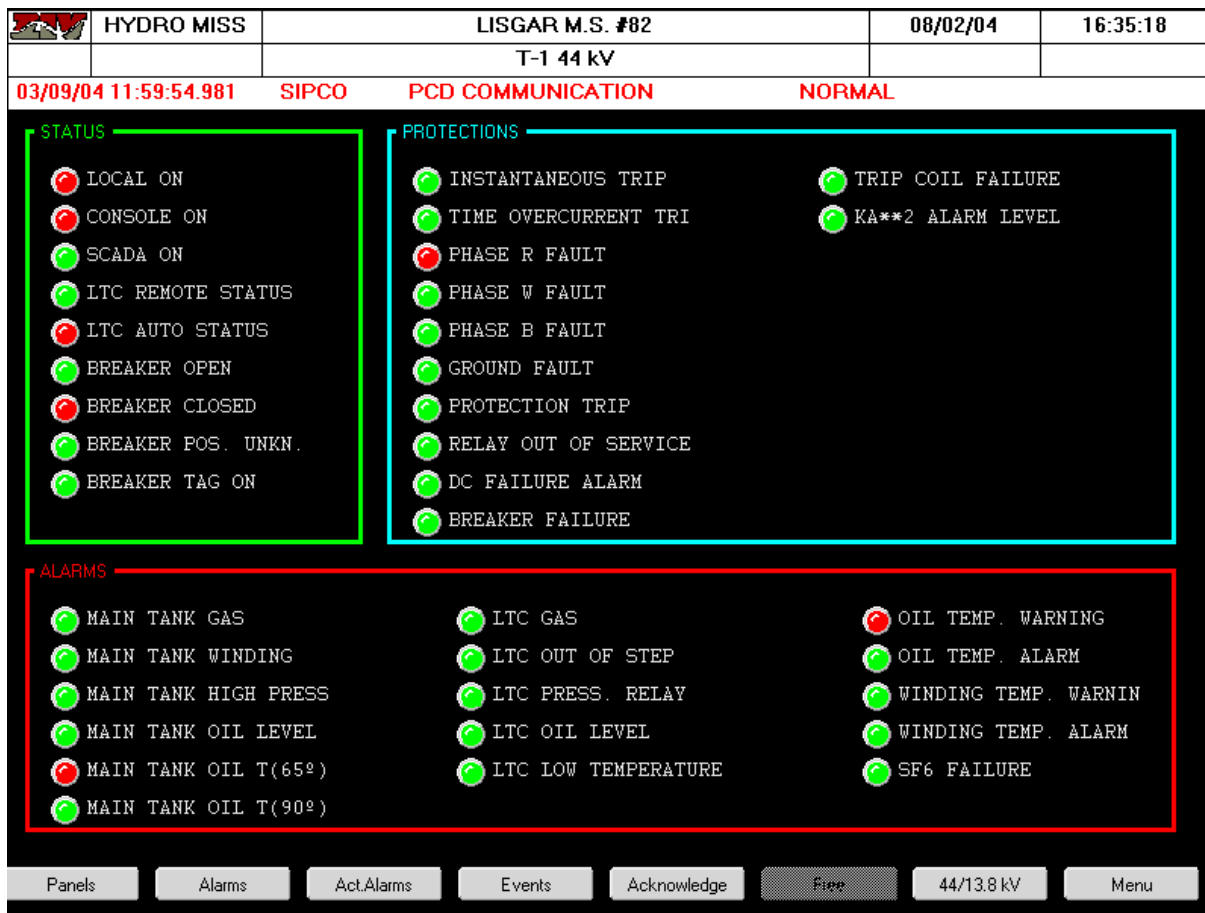


Figure 4.11: Digital Signal Panel for an IED.

The panel contains a list of LEDs that show the status of the associated digital signal, which is identified with a text to the right of the indicator.

Each digital signal panel will be different and will have as many indicators as you have configured. There are three *categories* of LEDs:

- Statuses:** This category contains all signals corresponding to the digital inputs of the field associated with the IED topology, device status, etc. The activation of a signal in this group could turn out to be an alarm. If so desired, this attribute can be highlighted so that the LED blinks when the signal appears. To do this, give the panel an alarm category when you create it. (Example: the unknown status of the breaker is an alarm inside the Statuses).
- Protections:** This category contains those digital signals collected directly from the field via digital inputs or internal device statuses that are associated with the tripping of the protections. They are classified in this group for greater clarity of the panel representation.
- Alarms:** This category contains all individual signals assigned to the system with an alarm category. Thus, besides representing the status of the signal, it must also indicate whether or not you have acknowledged the alarm.

A signal can be in any category. The criteria for grouping signals into different categories are simply for clarity when the signals are presented.

One of the function keys (button toolbar) for this screen is a button for *acknowledging* the signals that are blinking, independently of the group they are in. Activating this button will cause the alarm to be acknowledged in both the signal panel and the system alarm list.

As with the IED summary signal panel, this screen also uses a color code to show the status of the signals represented. The criteria used are the following:

- If the LED is *green* and the signal represented is not an alarm, the signal is deactivated. If it is *red*, the signal is activated.
- If the signal represented has an alarm category, the red and green colors have the same meaning as above, but the LED will be either *blinking* or not, depending on whether or not the alarm is acknowledged in the alarm list.
- When the associated IED does not have communication with the CPX/CPD or the signal is not valid, the panel LEDs will be *gray*. This criterion is global throughout the application.

**Note:** the screen topology is modified when there are no statuses, protections or alarms and the frame corresponding to the group of non-existent elements is eliminated.

## 4.6 Alarm Page

The alarm screen consists of a series of text lines that show changes in those signals configured as alarms. The text format on the pages for alarms, active alarms and events is the same. Each text line is either an alarm and/or an event. The format of the *line* is:

| 1 | 2        | 3            | 4           | 5                | 6      |
|---|----------|--------------|-------------|------------------|--------|
| * | 17/05/96 | 15:52:38.000 | 15 52-4 L-4 | RELEASED SPRINGS | NORMAL |

**Field 1:** a user-configurable alphanumeric character indicating the alarm type. Its default values:

‘ ‘: a *normal* alarm whose date and time are valid.

‘\*’: a *normal* alarm whose date and time could be incorrect because there is a desynchronization in the IED or the CPX/CPG is not synchronized by the GPS.

‘R’: an alarm generated through *redundancy* tasks whose date and time are valid.

‘r’: an alarm generated through *redundancy* tasks whose date and time could be incorrect because there is a desynchronization in the IED or the CPX/CPG is not synchronized by the GPS.

‘I’: an *internal* alarm (not arising from any IED, but generated internally in the CPX/CPG by simulation or by the information coherence mechanism), the date and time of which are valid.

‘i’: an *internal* alarm that does not come from any IED, whose date and time could be incorrect because there is a desynchronization in the IED or the CPX/CPG is not synchronized by the GPS.

‘?’: an *unidentified* alarm whose date and time are correct.

‘¿’: an *unidentified* alarm whose date and time could be incorrect because there is a desynchronization in the IED or the CPX/CPG is not synchronized by the GPS.

**Field 2:** the date the alarm was generated. The format is day / month / year.

**Field 3:** the time the alarm was generated. It is accurate to one one-thousandth.

**Field 4:** text describing the IED detecting the alarm. For example, this field could contain: first the bay voltage, then the description of the field element the alarm is associated with and lastly the bay name (15 52-4 L-4).

**Field 5:** a description of the signal produced (for example, released springs).

**Field 6:** the status of the signal (normal, activated, alarm, etc.).

You can configure the text in these fields with the **Zivergraph®** program. If so, the appearance may be different, although the meaning remains the same.


Three types of alarms can appear on this screen. These are the default colors:

| TYPE   | ALARMS                | TEXT  | BACKGROUND |
|--------|-----------------------|-------|------------|
| Type 1 | Unacknowledged active | white | red        |
| Type 2 | Acknowledged active   | red   | black      |
| Type 3 | Inactive              | white | black      |

The colors of alarm records are also user-configurable. So they could be different if they are modified.

The alarm screen has 10 pages with 25 alarms per page. The system saves the last 250 alarms. By default, the alarms are sorted chronologically. However, you can have them presented in the order in which they reach the Operation Desk if you indicate this in a configuration parameter as you will see in the document. When the list contains 250 alarms, the last alarm on the list (the oldest chronologically) is lost when a new alarm is added. When you turn off the Operation Desk, you do not lose new alarms that may appear, because the CPX/ CPP stores them from this point onward.

There are function buttons (button toolbar) on the alarm page for acknowledging alarms and for advancing or going back pages. The left-hand central line of the page header indicates the current alarm page in relation to the total number of alarm pages.

|  HYDRO MISS |                     | LISGAR M.S. #82                  |  | 07/14/04 | 12:42:53 |
|----------------------------------------------------------------------------------------------|---------------------|----------------------------------|--|----------|----------|
| Pg 1/2                                                                                       |                     | ALARMS PAGE                      |  |          | ALARM    |
| 03/09/04 11:59:54.981                                                                        | SIPCO               | PCD COMMUNICATION                |  | NORMAL   |          |
| 03/09/04 11:59:54.981                                                                        | SIPCO               | PCD COMMUNICATION                |  | NORMAL   |          |
| 03/09/04 11:59:54.000                                                                        | SIPCO               | CPD COMMUNICATION                |  | NORMAL   |          |
| 03/09/04 11:52:21.012                                                                        | 15 kV FEEDER-1      | BATTERY CHARGER AC FAILURE ALARM |  | NORMAL   |          |
| 03/09/04 11:52:19.921                                                                        | 15 kV TRANSFORMER-1 | FAN FAILURE ALARM                |  | NORMAL   |          |
| 03/09/04 11:52:19.880                                                                        | 15 kV TRANSFORMER-2 | FAN FAILURE ALARM                |  | NORMAL   |          |
| 03/09/04 11:52:12.585                                                                        | 15 kV BUS-TIE       | BUS VOLTAGE FAILURE              |  | NORMAL   |          |
| 03/09/04 11:52:12.159                                                                        | 15 kV BUS-TIE       | BUS VOLTAGE A                    |  | PRESENCE |          |
| 03/09/04 11:50:34.341                                                                        | 45 kV TRANSFORMER-1 | PROTECTION TRIP OUTPUT           |  | NORMAL   |          |
| 03/09/04 11:50:34.280                                                                        | 45 kV TRANSFORMER-1 | TRANSFORMER PROTECTIONS TRIP     |  | NORMAL   |          |
| 03/09/04 11:50:34.217                                                                        | 45 kV TRANSFORMER-1 | DIFFERENTIAL UNIT TRIP           |  | NORMAL   |          |
| 03/09/04 11:50:34.217                                                                        | 45 kV TRANSFORMER-1 | PHASE B TRIP                     |  | NORMAL   |          |
| 03/09/04 11:50:34.217                                                                        | 45 kV TRANSFORMER-1 | PHASE W TRIP                     |  | NORMAL   |          |
| 03/09/04 11:50:34.217                                                                        | 45 kV TRANSFORMER-1 | PHASE R TRIP                     |  | NORMAL   |          |
| 03/09/04 11:02:09.873                                                                        | SIPCO               | 15 kV T-2 COMMUNICATION FAILURE  |  | NORMAL   |          |
| *03/09/04 11:02:09.229                                                                       | 15 kV TRANSFORMER-2 | TRIP COIL FAILURE                |  | ALARM    |          |
| *03/09/04 11:02:05.429                                                                       | 15 kV TRANSFORMER-2 | DC FAILURE ALARM                 |  | NORMAL   |          |
| 03/09/04 10:11:20.010                                                                        | SIPCO               | REMOTE CONSOLE COMMUNICATION     |  | NORMAL   |          |
| 02/23/04 09:46:15.740                                                                        | 15 kV BUS-TIE       | BUS VOLTAGE B                    |  | ABSENCE  |          |
| 02/16/04 14:40:25.967                                                                        | 15 kV FEEDER-1      | TIME OVERCURRENT TRIP            |  | NORMAL   |          |
| 02/16/04 14:31:12.987                                                                        | 15 kV TRANSFORMER-1 | PROTECTION TRIP OUTPUT           |  | NORMAL   |          |
| 02/16/04 14:31:12.987                                                                        | 15 kV TRANSFORMER-1 | TIME OVERCURRENT TRIP            |  | NORMAL   |          |
| 02/16/04 14:31:12.987                                                                        | 15 kV TRANSFORMER-1 | PHASE R FAULT                    |  | NORMAL   |          |
| 02/16/04 14:28:33.078                                                                        | 15 kV FEEDER-3      | TIME OVERCURRENT TRIP            |  | NORMAL   |          |
| 02/16/04 14:10:36.031                                                                        | 15 kV FEEDER-3      | RECLOSE SEQUENCE IN PROGRESS     |  | NORMAL   |          |
| 02/16/04 14:09:35.170                                                                        | 15 kV FEEDER-3      | PHASE R FAULT                    |  | NORMAL   |          |

Panels Alarms Act.Alarms Events Acknowledge Previous page Following page Menu

Figure 4.12: Alarm Page.

## Chapter 4

When an alarm is generated, it is added to the alarm list as an unacknowledged active alarm. At this time, two things can happen: either you acknowledge it or the cause of the alarm disappears. If you acknowledge the alarm, it is added to the alarm list as an acknowledged active alarm and when the cause for the alarm disappears, it is added as an inactive alarm. If however, the cause for the alarm disappears before it is acknowledged, it is listed as an inactive alarm. Acknowledging alarms does not modify their time tags.

For an alarm to disappear from the alarm list, it must be acknowledged and have been deactivated. When you acknowledge alarms, their status changes (to *active acknowledged*) if they are active. If they are not active, they are deleted from the list. This means that you must acknowledge the activation as well as the deactivation of alarms.

There are two modes for acknowledging alarms: by page or by group. If you click on the button for acknowledging alarms, all alarms displayed at this time are acknowledged. A group of alarms must first be selected to be acknowledged. Right click on the alarm to select it. The alarm then changes color in accordance with the following default criteria:

| TYPE   | ALARMS SELECTED       | TEXT  | BACKGROUND |
|--------|-----------------------|-------|------------|
| Type 1 | Unacknowledged active | white | blue       |
| Type 3 | Inactive              | white | green      |

**Note:** type 2 alarms can not be selected.

Repeat the same process to individually deselect alarms. To cancel the selection of all the alarms, press ESCAPE. When one or more alarms are selected, clicking on the acknowledge button only acknowledges the marked alarms. The selection of alarms is automatically cancelled when you change alarm page or window.

You can also selectively delete alarms. A group of alarms must first be selected in order to be deleted. Right-click on the alarm while simultaneously pressing the CONTROL and SHIFT keys on the keyboard to select it. The alarm then changes color in accordance with the following default criteria:

| TYPE   | ALARMS SELECTED       | TEXT  | BACKGROUND   |
|--------|-----------------------|-------|--------------|
| Type 1 | Unacknowledged active | white | purple       |
| Type 2 | Acknowledged active   | red   | bright green |
| Type 3 | Inactive              | white | orange       |

The button text changes from *acknowledge* to *delete*. Repeat the same process to individually deselect alarms. Press ESCAPE to cancel the selection of all the alarms. When you press the delete button, a window will ask for confirmation: *Delete selected alarms?* Choosing *Yes* eliminates the selected alarms from the alarm list. If you choose *No*, you will be taken back to the screen with the previous status.

The selection of alarms is automatically cancelled when you change alarm page or window.

## 4.7 Active Alarm Page

The active alarm pages are almost exactly the same as the alarm pages. The difference is that these pages only display *active alarms* in the system, whether or not you have acknowledged them. Unconfirmed deactivated alarms do not appear.

The colors and the mode for managing the alarms are the same as in the previous section.

## 4.8 Events Page

The event screens contain a chronological record of all signal changes (called events) that occur at the substation.

The text format for the event is the same as for alarms. However, the storage capacity for events is double. It can store 500 events, divided into 20 pages with 25 events per page. These signal changes can be sorted chronologically or not, like alarms.

If the list already contains 500 events, the oldest event will disappear from the list when the new event arrives. The event with the oldest time tag is not deleted, but rather the first event that arrived out of the 500 stored. Figure 4.13 shows an Events page:

| HYDRO MISS             |                     | LISGAR M.S. #82                      |                 | 08/02/04 | 16:55:54 |
|------------------------|---------------------|--------------------------------------|-----------------|----------|----------|
| Pg 19/20               | EVENTS PAGE         |                                      |                 | ALARM    |          |
| 108/02/04 16:54:23.000 | SIPCO               | CPD COMMUNICATION                    | ALARM           |          |          |
| 03/11/04 16:37:34.664  | 15 kV FEEDER-2      | "LOCAL ON".                          | CONSOLE COMMAND | ACTIVATE |          |
| 03/11/04 16:37:31.047  | 15 kV TRANSFORMER-2 | LOCAL                                |                 | ON       |          |
| 03/11/04 16:37:31.007  | 15 kV TRANSFORMER-2 | "LOCAL ON".                          | CONSOLE COMMAND | ACTIVATE |          |
| 03/11/04 16:37:26.955  | 45 kV TRANSFORMER-2 | LOCAL                                |                 | ON       |          |
| 03/11/04 16:37:26.915  | 45 kV TRANSFORMER-2 | "LOCAL ON".                          | CONSOLE COMMAND | ACTIVATE |          |
| 03/11/04 16:37:22.594  | CPD                 | SYSTEM CONTROL                       |                 | SCADA    |          |
| 03/11/04 16:37:19.573  | 15 kV BUS TIE       | LOCAL                                |                 | ON       |          |
| 03/11/04 16:37:19.533  | 15 kV BUS TIE       | "LOCAL ON".                          | CONSOLE COMMAND | ACTIVATE |          |
| I03/11/04 16:34:22.559 | 15 kV FEEDER-3      | RECLOSER BLOCKED                     |                 | NORMAL   |          |
| I03/11/04 16:34:14.284 | 15 kV FEEDER-3      | RECLOSER BLOCKED                     |                 | ALARM    |          |
| I03/11/04 16:33:56.925 | 15 kV FEEDER-3      | RECLOSER BLOCKED                     |                 | NORMAL   |          |
| I03/11/04 16:33:07.890 | 15 kV FEEDER-3      | BREAKER 52 OPEN                      |                 | ACTIVATE |          |
| I03/11/04 16:32:24.631 | SIPCO               | 15 kV FEEDER-3 COMMUNICATION FAILURE |                 | NORMAL   |          |
| 03/11/04 16:32:00.742  | 15 kV FEEDER-2      | RECLOSER INTERNAL LOCKOUT            |                 | ALARM    |          |
| 03/11/04 16:31:45.676  | 15 kV FEEDER-2      | RECLOSER BLOCKED                     |                 | NORMAL   |          |
| 03/11/04 16:31:45.627  | 15 kV FEEDER-2      | "79 UNBLOCKED".                      | SCADA COMMAND   | ACTIVATE |          |
| 03/11/04 16:31:36.105  | 15 kV FEEDER-2      | RECLOSER INTERNAL LOCKOUT            |                 | NORMAL   |          |
| 03/11/04 16:31:36.105  | 15 kV FEEDER-2      | RECLOSER BLOCKED                     |                 | ALARM    |          |
| 03/11/04 16:31:36.064  | 15 kV FEEDER-2      | "79 BLOCKED".                        | SCADA COMMAND   | ACTIVATE |          |
| 03/11/04 16:31:27.856  | 15 kV FEEDER-2      | RECLOSER INTERNAL LOCKOUT            |                 | ALARM    |          |
| 03/11/04 16:31:26.834  | 15 kV FEEDER-2      | BREAKER 52 OPEN                      |                 | ACTIVATE |          |
| 03/11/04 16:31:26.754  | 15 kV FEEDER-2      | "OPEN 52".                           | SCADA COMMAND   | ACTIVATE |          |
| 03/11/04 16:31:12.770  | 15 kV FEEDER-2      | BREAKER 52 CLOSED                    |                 | ACTIVATE |          |
| 03/11/04 16:31:12.757  | 15 kV FEEDER-2      | RECLOSER INTERNAL LOCKOUT            |                 | NORMAL   |          |
| 03/11/04 16:31:12.663  | 15 kV FEEDER-2      | "CLOSE 52".                          | SCADA COMMAND   | ACTIVATE |          |

Panels
Alarms
Act.Alarms
Save Disk
44/13.8 kV
Previous page.
Following page
Menu

Figure 4.13: Events Page.

The configuration of the substation signals determines whether a signal goes to the alarm list and/or the events list. You can also define whether the rising edge and/or the falling edge of the signal is recorded.

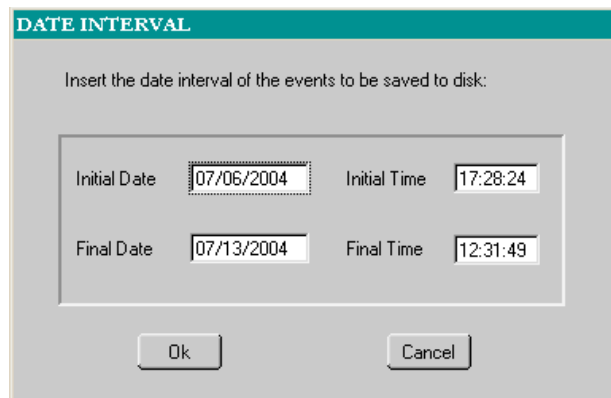
The default colors for recording events are:

- *Positive edge* events (activation): no background color and green text.
- *Negative edge* events (deactivation): no background color and yellow text.

### 4.8.1 Saving Events to Disk

You can save events into a text file on a disk from this events screen. The following screen appears when you click on the **Save to Disk** button on the button toolbar.

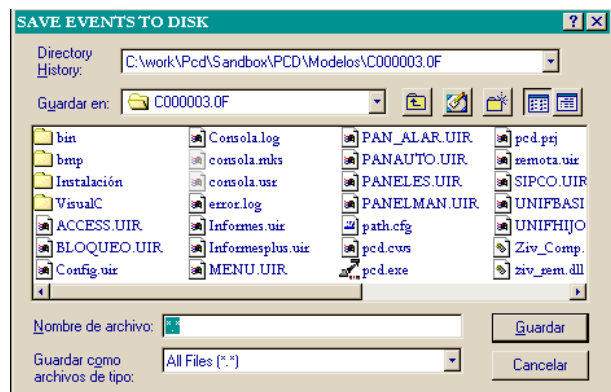
Here you can select the data interval for the events to be saved. The oldest event data appear in the Initial Date and Time fields when the window opens, while the data for the newest event appears in the Final Date and Time fields. You can modify any of the four fields. The date format is dd/mm/yyyy and the time format is hh:mm:ss. All events between the *Initial Date* and the *Final Date* are saved.



The DATE INTERVAL dialog box has a title bar with a question mark and a close button. The main text says "Insert the date interval of the events to be saved to disk:". Below this are four input fields: "Initial Date" (07/06/2004), "Initial Time" (17:28:24), "Final Date" (07/13/2004), and "Final Time" (12:31:49). At the bottom are "Ok" and "Cancel" buttons.

Clicking on the **OK** button verifies the dates and times entered. If they are correct, the following screen appears where you select or enter the filename and the folder where the selected events will be saved.

You will be asked if you want to replace them with the new events if the file already exists. If so, all previously saved events will be deleted and the new events saved.



The SAVE EVENTS TO DISK dialog box has a title bar with a question mark and a close button. It shows the "Directory" as "C:\work\Pcd\Sandbox\PCD\Modelos\C000003.0F" and "Guardar en:" as "C000003.0F". Below is a file list with columns for folders and files. At the bottom are fields for "Nombre de archivo:" and "Guardar como archivos de tipo:" (set to "All Files (\*.\*)"), along with "Guardar" and "Cancelar" buttons.

## 4.9 SIPCO Status Page

The objective of this screen is to display all IEDs in the Integrated Protection and Control System (SIPCO), indicating the operating status of each of the devices in the communications network in real time, which are:

- Status of all system UCPs.
- Status of the CPX/CPD communications with remote, local Operation Desk, remote Operation Desk, GPS clock (provided that these options were available) and printer.

As shown in figure 4.14, the Central Unit (CPX/CPD) and the local Operation Desk are connected by a local network with a 10baseT cable. If there is no communication between them, the bay that connects both IEDs is drawn in *red* and the rest of the system is drawn in *gray*, indicating the lack of information about the rest of the elements making up the system. Recall that the SIPCO status represents the status of communications with the IEDs seen from the PCD.

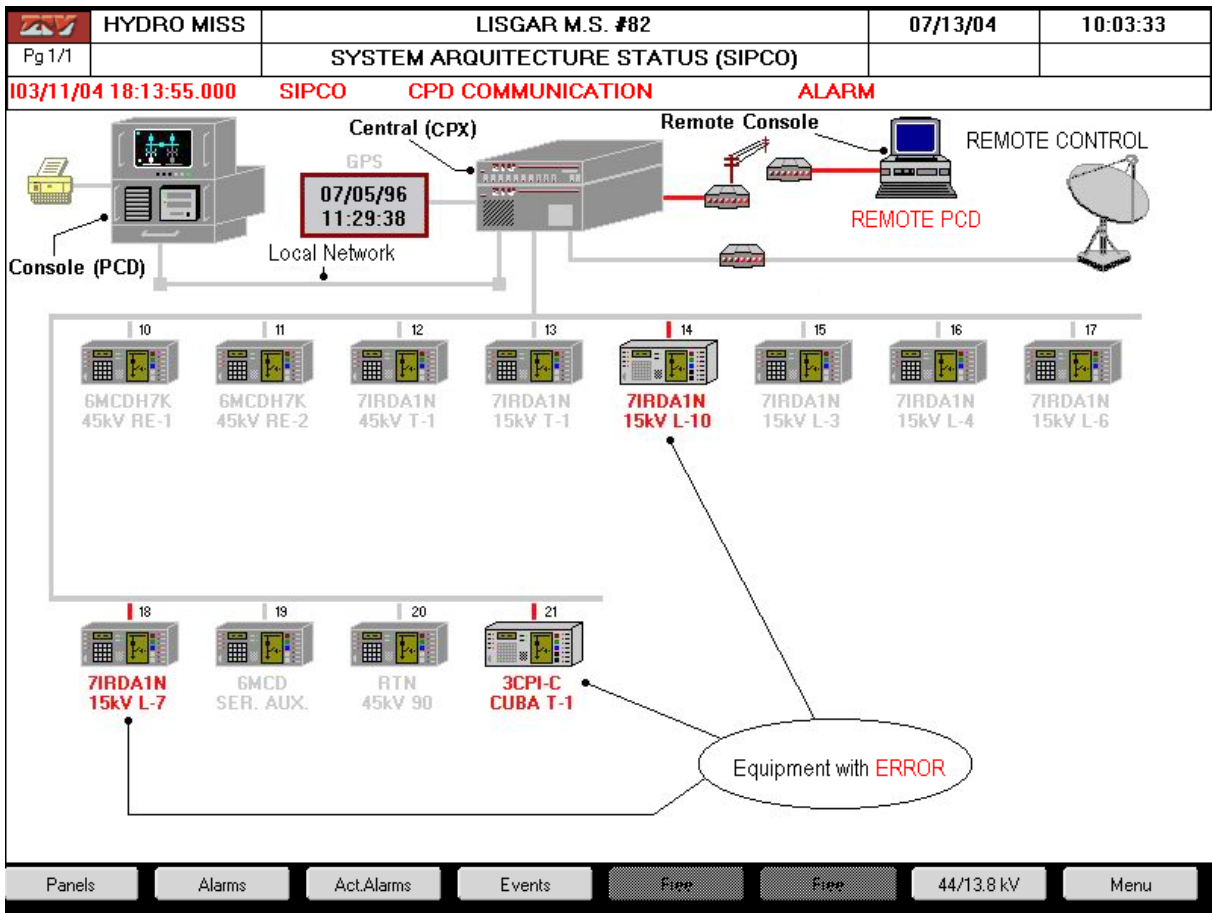


Figure 4.14: Integrated Protection and Control System

## Chapter 4

If communication between the Operation Desk and the central unit is correct, the bay connecting them is drawn in *white* and each system element is represented according to its communication status with respect to the central IED. Following the same criteria, if communication fails with any element, this element changes to *dark gray*. To highlight the error status, the tag and its connection with the communications system turn *red*. If there are no communication failures, the element is clearly represented in its original color and its connection to the communications system and its tag are *white*.

Meriting special note is the communication of the central unit (CPX/CP) with the remote Operation Desk (REMOTE PCD in the figure): The lines connecting the central unit with the modem, and the modem with the remote Operation Desk are *red* when no connection has been established between modems, *green* when the modems have connected but there is no communication between the central unit and the remote Operation Desk, and *white* when there is complete communication among all elements.

Communication with the GPS clock also presents additional information. When there is communication with the GPS and the CPX/CP is synchronized with it, both the line and the box are green. They are red if there is no communication. When there is communication with the GPS clock but it is not synchronized due to a synchronization error, they are blue.

The following information is given for each IED in the substation:

- IED *address*: the physical address of the IED.
- IED *description*: indicates the IED type (for example, the IED model).
- IED *position* at the substation: indicates the IED position (for example, the voltage and bay name the IED is associated with).

Figure 4.15 shows these fields, where the IED at address 10 is a 6MCDH7K, located at the 45 kV RE-1 bay.

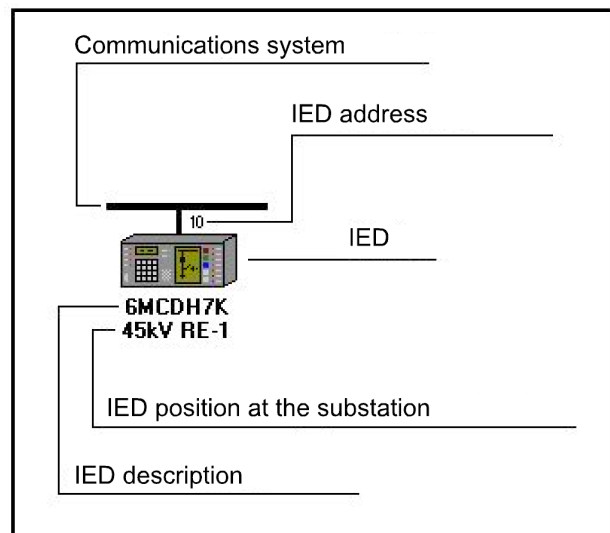


Figure 4.15: IED Description.

## 4.10 Engineering Page

Access to this screen requires a *level/ 3* password. If the password entered is incorrect, you can access the information but can not modify any system configuration parameters. Figure 4.16 is the screen that appears after entering the password.

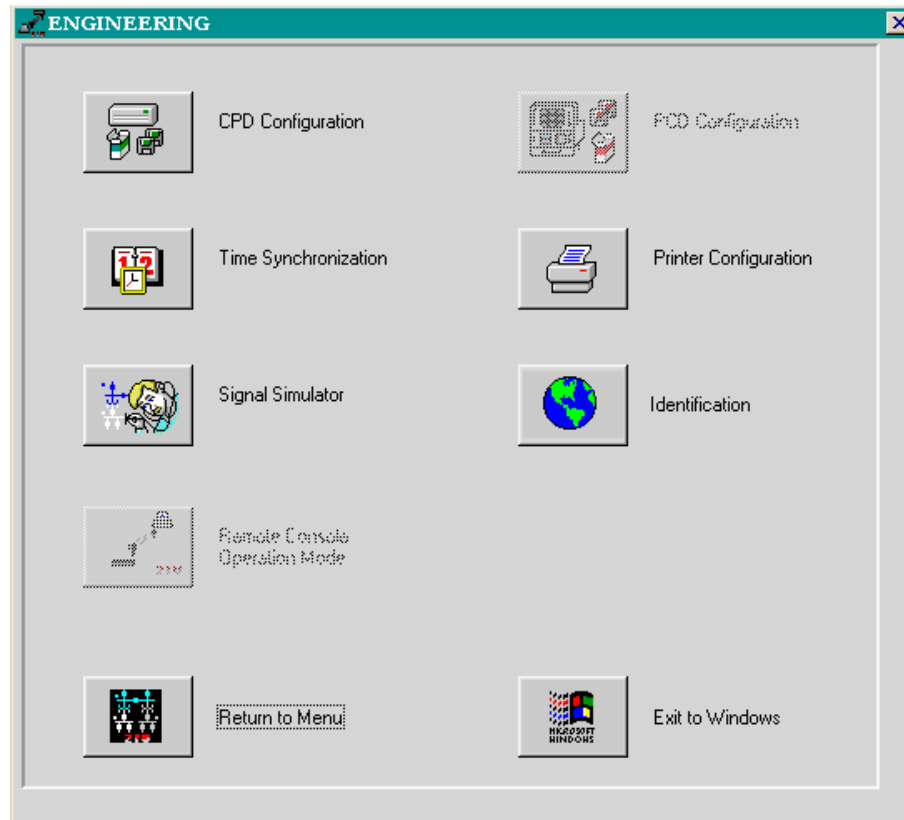


Figure 4.16: Engineering Screen.

If no action is taken in 30 seconds, this screen will disappear and revert to the general menu again. You can select the following options:

- **Central Unit configuration**

The configuration of the CPX/ CPP is updated from this menu.

**IMPORTANT: This button is always disabled on the remote Operation Desk, since you can configure the central unit only from the local Operation Desk.**

The CPX/ CPP configuration consists of a series of files that must be sent from the Operation Desk to the central unit (it is actually the CPX/ CPP that copies these files to its Flash disk from the PCD hard drive). These files must be in the shared folder, CENTRAL, in the Operation Desk, which is inside the folder where the Operation Desk application was installed. This folder must be shared (with total access and without passwords) when you install the Operation Desk software (see chapter 3). This directory must also contain the configuration files to be loaded to the CPX/ CPP.

## Chapter 4

The files to copy to the CPX/CPM should be in the shared CENTRAL folder of the Operation Desk or in another folder or disk drive. First, you are informed that the Central Unit configuration will be changed. Confirm the operation by clicking on the **OK** button or click on the **Cancel** button.

Next, you are asked if you want to update the CPX/CPM with a new configuration. If you click on the No button, it is understood that the files are already in the shared CENTRAL folder. If however, you click on the Yes button, steps are taken to move the configuration files to the shared CENTRAL folder from where they are currently located.

The following steps are followed: First, define the drive and directory that the new files will be taken from. The screen for making this selection is shown in figure 4.17.

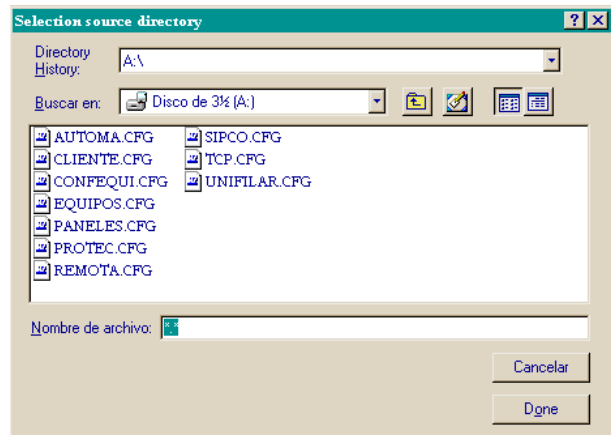


Figure 4.17: Selecting the Drive for Updating the CPX/CPM.

Following this, select the files for the new configuration. You do this from a screen like the one shown in figure 4.18.

To select a file, click on its name in the upper, left-hand window. If you click on an already selected file, it is deselected. When a file is selected, it is highlighted. If you want to select several files, hold down the Ctrl key while clicking on the file names. The list of selected files will appear in the bottom window. If you select a file by mistake and want to remove it, select it in the bottom window and then click on the *Remove* button. If you want to delete all selected files, simply click on *Remove All*.

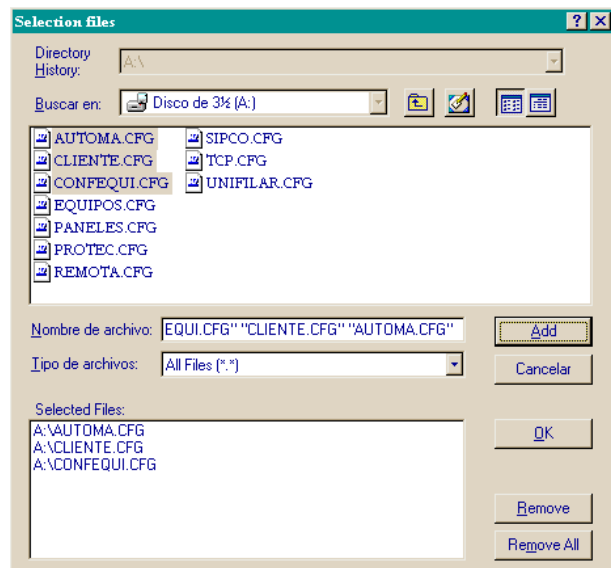


Figure 4.18: Selecting the CPX Configuration Files.

After selecting the CPX/ CPP configuration files, specify the shared directory they will be copied to. Normally, this folder will be C:\Operation Desk\Central, but this can vary from installation to installation. A window appears like the one in figure 4.19 to select the target folder:

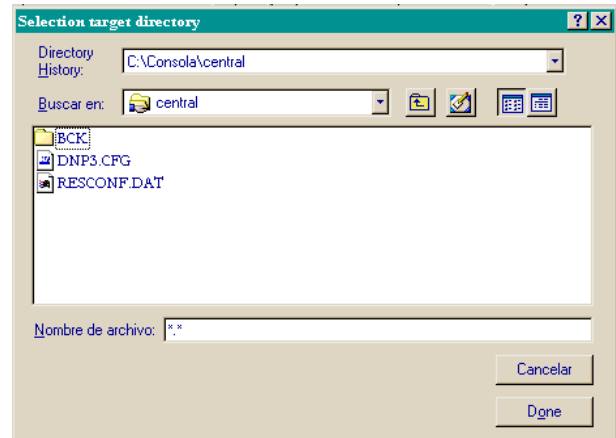


Figure 4.19: Specifying the Shared Directory.

After correctly specifying the folder to copy the selected files to, the process continues automatically without you having to do anything else. The selected files are copied from the source folder to the shared CENTRAL folder.

After the operation has finished, the PCD sends a message to the CPX/ CPP to restart and copy the files from the shared CENTRAL folder to its internal storage drive. Therefore, communication with the central unit will be lost during the configuration process. After about a minute, communication is reestablished with the CPX/ CPP and the system becomes operative again.

- **Time synchronization**

Central Units are usually synchronized by a GPS clock, so data sent by the GPS periodically updates the date and time. In this situation, the Central Unit rejects any modifications to the date and time not coming from the GPS. However, if there is no GPS clock or it is wrong, you have to set the CPX/ CPP clock. You can update it either from the control office or from the Operation Desk.

One of the engineering options is *time synchronization*, to change the date and time of the central unit. Figure 4.20 is the screen that displays this data.

Click on the *Send* button after correctly indicating the date and time. Changes to settings or parameters sent to the CPX/ CPP must always be confirmed, and then the system date and time will be modified.

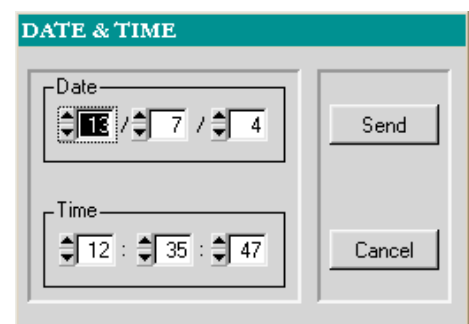


Figure 4.20: Time and Date Collection.

- **Printer configuration**

The Operation Desk can print in-coming events as well as send them to the events list, and at times, to the alarm list. You can activate or deactivate the system printer through this screen (figure 4.21).

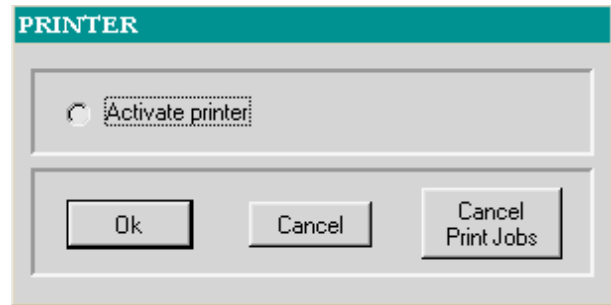


Figure 4.21: Activating / Deactivating the Printer.

By default, the first time a Operation Desk is started, the printer will be *deactivated*. Whether activated or deactivated, each time the Operation Desk is started up after this, the printer activation status will be maintained.

If there is a printer error, the events are saved in a temporary file until the printer recovers from the error. The **Delete Print Queue** button resets the print queue for the printer, deleting all events pending printing. This print queue can hold 500 events.

- **Signal simulator**

This application displays and/or changes the status and validation of all signals, measurements and counters of connected IEDs. If you click on the corresponding button, a movable panel appears that always remains in the foreground. After selecting a signal, measurement or counter from the PCD configuration database, you can display and/or change it status and validity.

- **Operation Desk identification**

Figure 4.22 is the window that displays Operation Desk information (Operation Desk model, software and software version). To return to the general menu, click anywhere in the window.

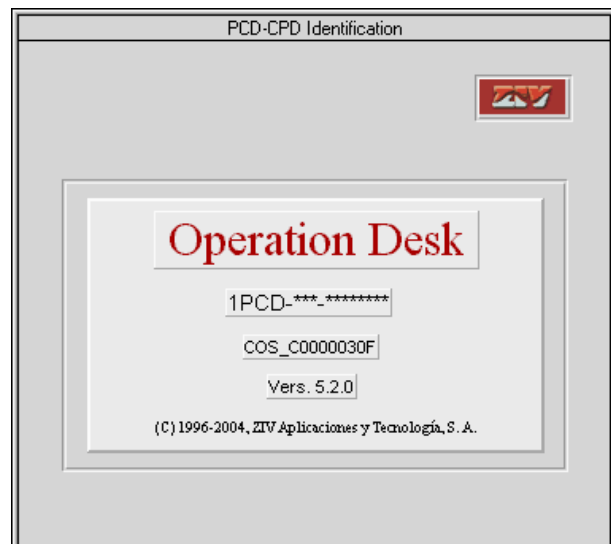


Figure 4.22: Operation Desk Identification Window.

- **Operating mode of the remote Operation Desk**

This option is only implemented for the remote Operation Desk (for the *local operation desk*, this button is always *disabled*). When there is a remote Operation Desk and it is not disabled by the local Operation Desk, use this button to modify online (without needing to leave the Operation Desk) the permissions for this remote Operation Desk to execute commands and/or acknowledge alarms.

Click the button and a window will appear for entering a password. After correctly entering the *Superuser* password (Level 4) the window in figure 4.23 will appear. You can configure the permissions of the remote Operation Desk to execute commands, acknowledge alarms in the Central Unit and/or acknowledge alarms locally at the Operation Desk. The alarm acknowledgement option in the Central Unit also involves local acknowledgement (selecting the first acknowledgement option, the second will also be selected automatically).

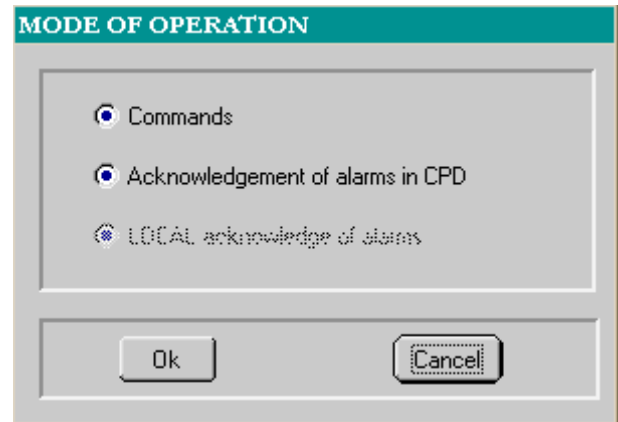


Figure 4.23: Operating Mode of the Remote Operation Desk.

These permissions changed on-line are valid until exiting the Operation Desk. The next time the remote Operation Desk is started up, the permissions used will be those configured in the remote Operation Desk configuration file "*remota.cfg*".

You can also *exit* the Operation Desk or return to the *main menu* from the engineering screen menu.

**Notes:**

CHAPTER 5

# **User Interface. Additional Functions**



## 5.1 Substation Selection Window

When the Operation Desk is remote using modems, you must indicate the substation you want to connect with. This option only exists for the remote operation desks that are connected by modem to the central unit, and is not applicable for remote operation desks through a TCP/IP network.

When starting the Operation Desk application, a screen appears with a list of substations (defined in the files, "NameSubstation.sub"<sup>1</sup>) you can connect to through the modem. The remote connection is made after you select the substation and click on the top button (drawing of a computer). An example of this window is shown in figure 5.1.

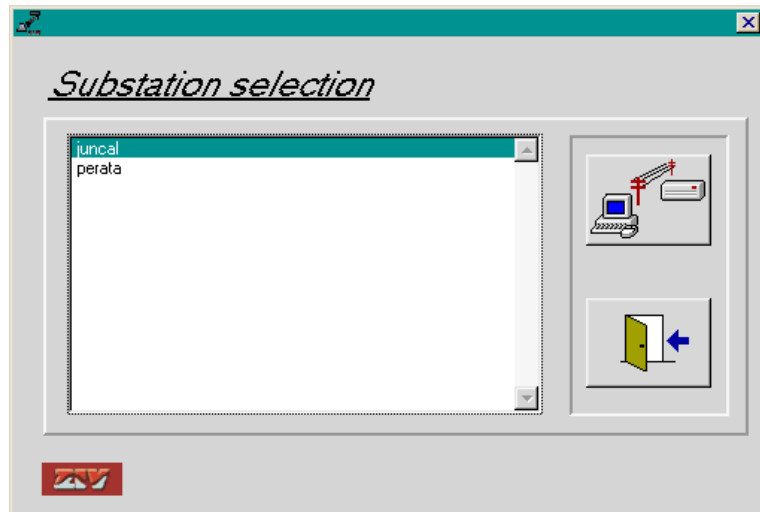


Figure 5.1: Substation Selection Window.

A new window appears (figure 5.2) indicating that it is trying to establish a remote connection. The Operation Desk application uses the remote access connection called **ZivRemote**, which was created during the installation and start-up (Chapter 3). If this connection does not exist or is configured incorrectly, it will not be able to connect with the CPX/CPD and an error will occur.

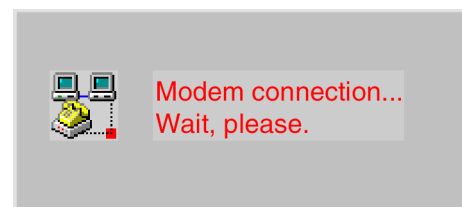


Figure 5.2: Window Waiting for Modem Connection.

If everything is connected and configured correctly, after a certain time (possibly more than a minute), the modem connection will be made and authenticated, and the Operation Desk will start to read the configuration and request event and alarm files (see section 5.2).

## 5.2 Window for Receiving Files from the Remote Operation Desk

The remote Operation Desk is similar to the local Operation Desk, and identical from a functional viewpoint. The main difference is that, by definition, a remote Operation Desk is not always connected to the CPX/ CPP and multiple remote Operation Desks -not simultaneous- are admitted. The initial updating of the available information at the central units depends on this fact. The status of the various installation elements consists of a snapshot of the digital signals and measurements, etc. However, alarms and events must be sent to the Operation Desk during the connection process because the CPX/ CPP does not know what information the connecting Operation Desk lacks. This problem has been resolved by sending the files with events and alarms from the CPX/ CPP to the Operation Desk during connection.

When the Operation Desk application is initiated (after the connection between modems has been established if this were necessary), and only if this is a **remote** Operation Desk, the event and alarm files that have occurred at the substation will be requested from the CPX/ CPP. The window in figure 5.3 will appear to show the status of this process.

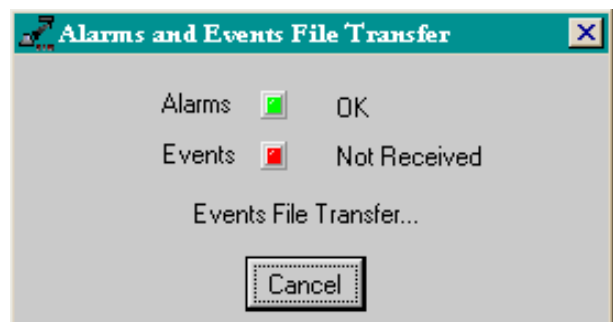


Figure 5.3: Retrieval of Events and Alarms from the CPX.

This window indicates the following:

- Process being carried out: configuration request to the CPX/ CPP, reception of alarm or event file, resetting of the connection with the CPX/ CPP, ... (e.g. *Receiving event file ...*).
- Status of the reception of the alarm or event file:
  - *Not received*: Is accompanied by a red LED and indicates that the alarm or event file reception has not finished.
  - *Error*: Is accompanied by a red LED and indicates that an error has occurred in the reception of this file or when processing it after it was received.
  - *OK*: Is accompanied by a green LED and indicates that the alarm or event file has been correctly received and processed.
- *Cancel* button, for canceling the reception of files and aborting communication with the CPX/ CPP.

After both the alarm and event files have been correctly received, the window disappears and the Operation Desk displays the first substation screen, which is the first single-line diagram.

At this time, the screens are updated with the changes received from the CPX/ CPP, as with the local Operation Desk. When a change arrives, the single-line diagram is updated (if it is so configured), and stored in the alarm and/or event list.

## 5.3 Users and Passwords

Some Operation Desk operations are controlled by a security system based on passwords and users. There are three configuration types:

- The first possibility is to operate **without users** and to use passwords only for accessing the various functions. This is the default operation.
- The second possibility is like the first one, but you can define **different users** to limit the possibility of specific users carrying out commands on certain elements.
- The third possibility is to **create users with their corresponding passwords**, which allows access to specific functions depending on the active user.

### 5.3.1 Without Users

With this default possibility, there are no users defined and security is managed through a *four-level* password system:

- Level 1** System operation and control. No password.
- Level 2** Configuration of programmable automatic controls and settings for the protection system: **Password 1**. The default code is **ziv**. Within this level, the existing protection or automatic control settings can be modified, such as bay priorities for the automatic control of resistant grounds and the values of the logic settings.
- Level 3** Complete configuration of the system and its peripherals: **Password 2**. The default code is **ziv**. This level is where you can configure the CPX, printer, launch the CPX / CPP signal emulator, exit the application, etc.
- Level 4** **Superuser password**: only used at the remote Operation Desk and for changing permissions of this remote Operation Desk on-line (without exiting the Operation Desk) so as to be able to carry out commands and/or acknowledge alarms (*Operating Mode of Remote Operation Desk* option in the general menu). The default password is **ziv**.

You can change the access password for level 2 *protections / automatic control configuration*, level 3 *engineering and system configuration* and level 4 or *superuser* by selecting the *change password* button from the general menu. A screen will appear like the one in figure 5.4.

The steps to follow are the same in all cases:

- Enter the password you want to change.
- Enter the new password.
- Repeat the new password.

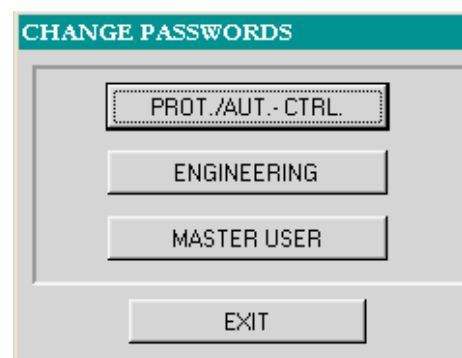
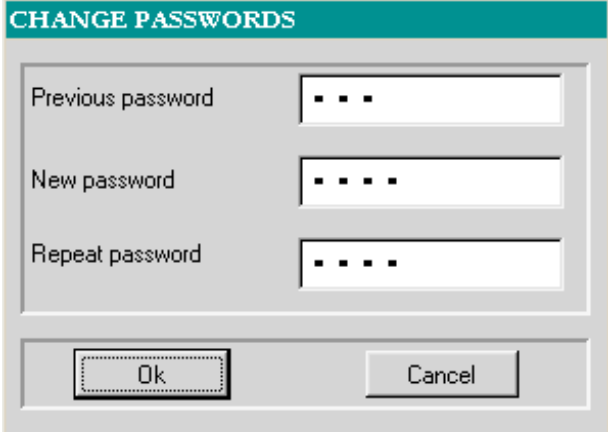


Figure 5.4: Level Selection to Change Access Passwords.

When you correctly complete these three steps, the new password is saved. The passwords are combinations of letters (case-dependent) and numbers, with a maximum of five characters. Figure 5.5 displays this sequence.



The image shows a dialog box titled "CHANGE PASSWORDS". It contains three text input fields. The first field is labeled "Previous password" and contains three dots. The second field is labeled "New password" and contains four dots. The third field is labeled "Repeat password" and contains four dots. At the bottom of the dialog box, there are two buttons: "Ok" and "Cancel".

Figure 5.5: Changing Access Passwords.

### 5.3.2 Users for Commands

This mode uses the figure of users with their corresponding passwords to restrict the commands that can be made. All users can perform all operations stated in the previous section and the passwords for engineering, protections and superuser are managed as usual. The difference is that, depending on the user, a signal is activated at the CPX that allows a series of commands to be executed or not. These users are configured in the *client.cfg* file.

Definitions are entered for each user specifying commands to open and close sessions and a status signal that indicates that the user has an open session. In the inactive state, there is no active user and, consequently, no commands can be made. When a user decides to open a session, the Operation Desk sends the command to the CPX/CPD stating that the specific user wants to open a session. The CPX/CPD executes this (logic) command and generates a change of status in the associated signal indicating that a session has been established with this user.

The status signal is used to block commands from other users and ask permission for commands from the user that opened the session. These blocks must be manually entered in the configuration of the commands that each user can execute. Each status signal will block the commands of other users, but not their own.

After a certain time has elapsed in an open session without any maneuvers, the session with the active user will automatically close and change to an inactive state.

These users, in the inactive situation and with an open session, have the same security controls for accessing the screens and functions described in section 5.3.1. The correct passwords must be entered to access protections, engineering and programmable automatic controls.

### 5.3.3 Users with Different Permissions

This type of user has restricted access to functions depending on the permissions granted. There are three types of permissions:

- **Commands:** Can carry out commands, acknowledge/delete alarms, store events to disk, access *Reports*, access *Engineering* (without being able to configure the Central Unit, or activate printers or change operating options at the remote Operation Desk).
- **Protections and automatic control configuration:** Can access *Protections* and *Configuration of Programmable Automatic control* buttons.
- **Administrator:** Has both previous permissions as well as being able to access all options from the Engineering menu and manage (add, modify and delete) users.

If the Operation Desk is started and the “*operation desk.usr*” file does not exist, the Operation Desk creates it with a DEFAULT USER (user = **zivPCD** and password = **ziv1996**). This user is created with **ADMINISTRATOR PERMISSION** (permission for everything) and will be used to add the rest of the users during the process of installing and starting-up the PCD.

**There will always be an active user** at the Operation Desk (the one selected as predetermined). If there are no users other than the default user, then this user will be the predetermined one. When more users are created, one of them will be predetermined (by default, the first created), and the ZIV internal user will disappear. When the Operation Desk is started up, it looks for the predetermined user and makes that user active. A good criterion is to select a user without permissions to be predetermined (read only), so that that user must log in to perform an action that requires permission.

The name of the active user will be displayed at all times at the **top, right-hand side of the screen** (in the header, to the left of the ALARM label) and will appear with the colors you configured in “*client.cfg*.”

Existen dos formas de poner activo (autenticar) un usuario:

a) In the main menu, under the **Users** button, select the option **OPEN session** (see figure 5.6). After entering the user name and password (figure 5.7), this user will be activated.

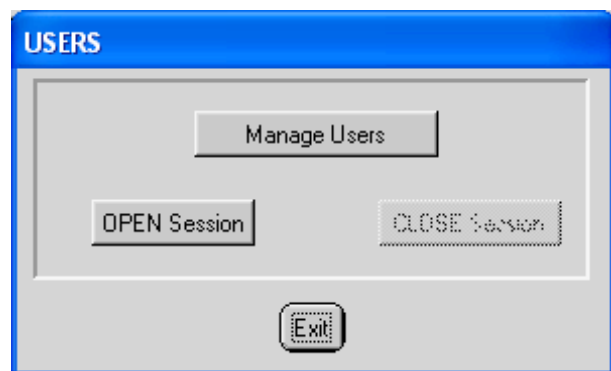


Figure 5.6: User Options.

b) When the current user tries to carry out an action without the corresponding permission, the user is asked to log-in (figure 5.7). If identification is positive, the authenticated user becomes active.

Here is a screen of the log-in dialog box (for entering user name and password) (figure 5.7). Remember that the user name and password are case-sensitive.

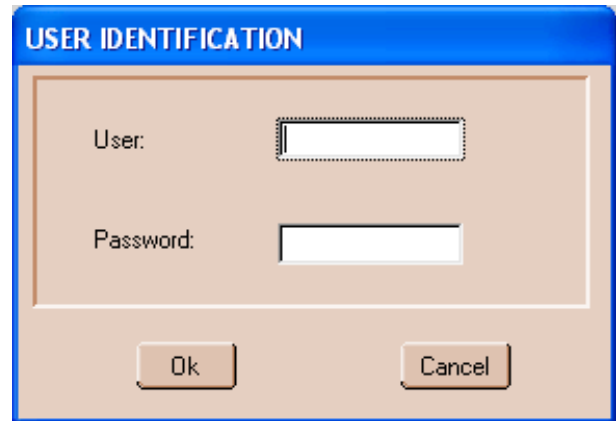


Figure 5.7: User Log in.

If a user does not have permission for the task they are logging in for (e.g. to execute a command), the following message appears (figure 5.8) and the active user will continue to be the one that initiated authentication.



Figure 5.8: User without Permission.

If the user does not exist or the password is incorrect, the following message will be displayed (figure 5.9):

When a user other than the predetermined one is activated, an **inactivity time** is started up (configured in "*client.cfg*"). This is the time that must elapse before the current user is deactivated and the predetermined user is activated.



Figure 5.9: Incorrect User / Password.

If you want to close your session before this inactivity time is up, go to the **Users** button on the principal menu and use the **CLOSE session** button (see figure 5.6). (The predetermined user will be automatically changed to the current user.) When the active user is the predetermined user, the session cannot be closed (the **CLOSE session** option will be disabled), since there must always be an active user. By default, this is the predetermined user.

User management is explained next. Access the **Users** button on the main menu, and then the **Manage Users** option (figure 5.6).

**IMPORTANT:** to be able to manage users, you must have administrator permission. Otherwise, the Operation Desk will request you to log in.

Once you reach the user management screen (see figure 5.10), a list of users will appear with their properties. This list will be empty initially, since the “zivPCD” user is internal to ZIV and can not be modified or deleted (“invisible” to the client). In this screen, you can add new users (**New**), modify the data for existing users (**Modify**) and delete users (**Delete**). The data for different users is faded, since you can not modify them from this screen.

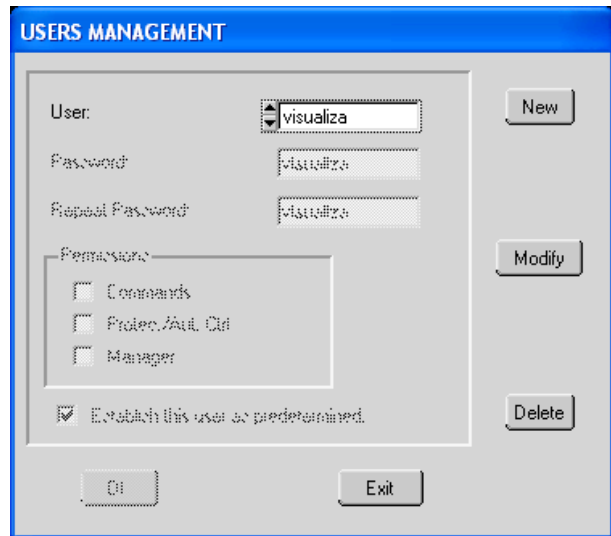


Figure5.10: User Management.

- **New user**

To add a user, click on the **New** button. A screen appears (see figure 5.11) for you to enter the user name, password, and then repeat the password. The rest of the options are not enabled until the password is successfully repeated. If the password is changed, the options will be disabled again until the password is repeated successfully.

When you add a user that you want to be the predetermined user, activate the appropriate check box.

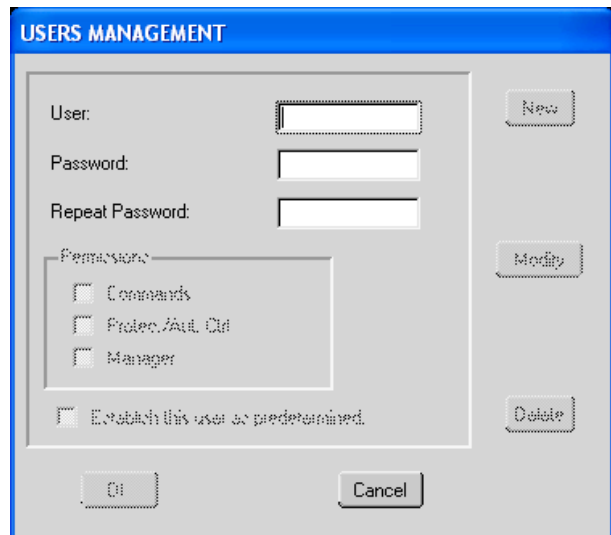


Figure 5.11: New User.

When the first user is created, if you do not activate the predetermined check box, the screen in figure 5.12 will appear. It indicates that, since there are no other users (there is the “zivPCD” user, this is for ZIV INTERNAL USE), the first user will be set as predetermined.

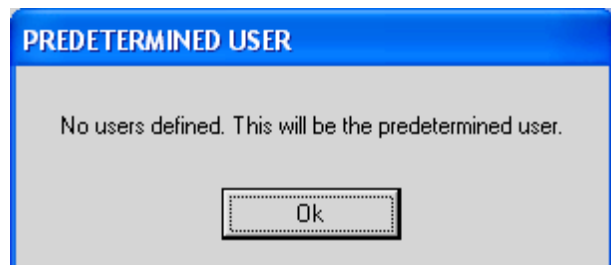


Figure 5.12: No Users Defined.

After you enter the user data, click on the **OK** button to add them to the user list. The Operation Desk returns to figure 5.10. You can abort the process of adding a user by clicking on the **Cancel** button.

• **Modify User**

To modify user data, select the **Modify** button in the dialog box shown in figure 5.10. This brings up a screen (see figure 5.13), where you can modify user data. If the password is changed, the rest of the user options will be disabled until the password is repeated successfully.

After the user data is entered, click on the **OK** button to modify the data in the user list. Then the Operation Desk returns to figure 5.10. You can abort the process of modifying user data by clicking on the **Cancel** button.

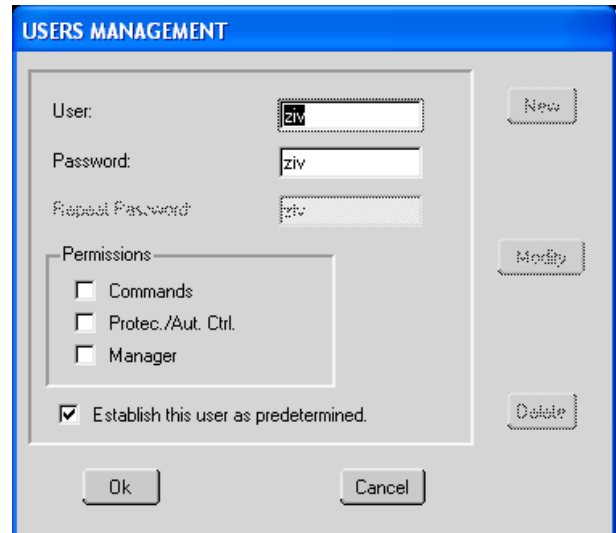


Figure 5.13: Modify User.

If you modify the predetermined user and the predetermined option is disabled, the Operation Desk warns that there is no predetermined user and you must select one from the user list.



Figure 5.14: No Predetermined User Defined.

After clicking **OK**, the user list appears (figure 5.15) and you can now select the user that will become the predetermined user.

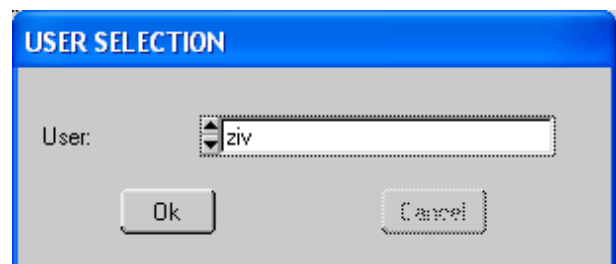


Figure 5.15.: Selection of Predetermined User.

### • Delete User

To remove a user, select **Delete** from the list on the screen shown in figure 5.10 and click on the **Delete** button. You will then be asked for confirmation to delete the user from the list (figure 5.16). Clicking on **Yes** deletes the user from the list. Clicking on **No** aborts the deletion process.

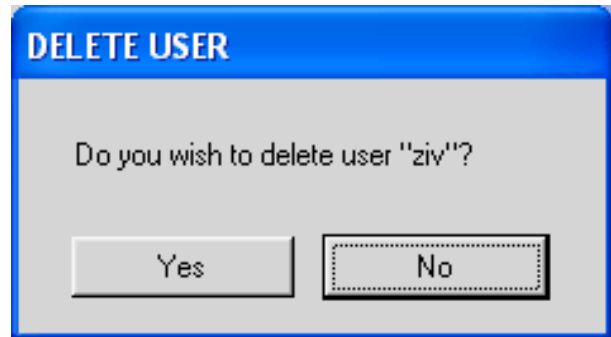


Figure 5.16: Confirmation to Delete User.

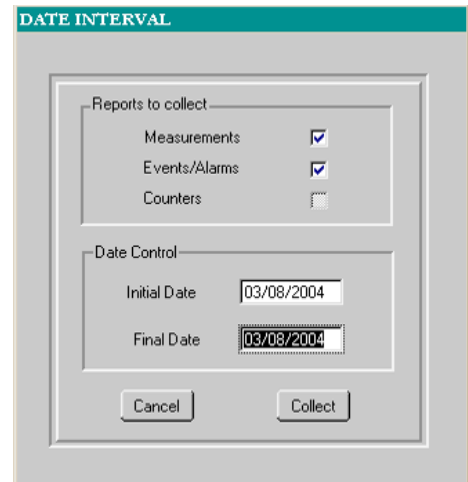
If you delete the predetermined user, the Operation Desk will warn you that there is no predetermined user and that you must select one from the user list, as explained in the point **Modify User** (figures 5.14 and 5.15). Then the Operation Desk will return to the screen shown in figure 5.10.

## 5.4 Report Page

This page allows you to launch the report application as configured in the configuration file, *“protecc.cfg”*. Access this option with the *Reports* button from the general menu. There can be three cases:

- If there is no report application, nothing will happen.
- If the application to be executed is defined and it is the *Report Application*, it will be directly executed. For further information, please consult the Report Application manual.
- If the Internal Reports are defined, after the button is selected, the process for generating internal reports starts. This consists in collecting signal logs, measurements and counters stored in the CPX (defined in the file, *“historic.cfg”*), and text files containing this information will be generated.

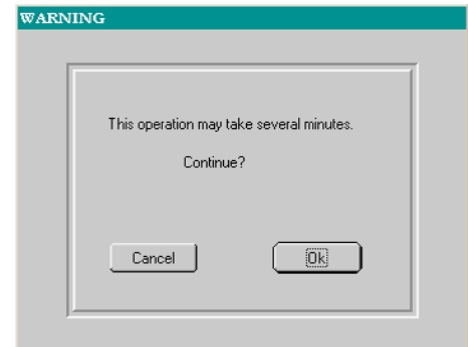
The dialog box in figure 5.17 will appear first. Here you can specify if you wish to receive reports concerning signals (events/alarms), measurements and/or counters and set the start and end date for the period you want to receive the reports.



The dialog box titled "DATE INTERVAL" has a teal header. It contains two sections: "Reports to collect" and "Date Control". The "Reports to collect" section has three items: "Measurements" with a checked checkbox, "Events/Alarms" with a checked checkbox, and "Counters" with an unchecked checkbox. The "Date Control" section has two date input fields: "Initial Date" with the value "03/08/2004" and "Final Date" with the value "03/08/2004". At the bottom are "Cancel" and "Collect" buttons.

Figure 5.17: Report Request.

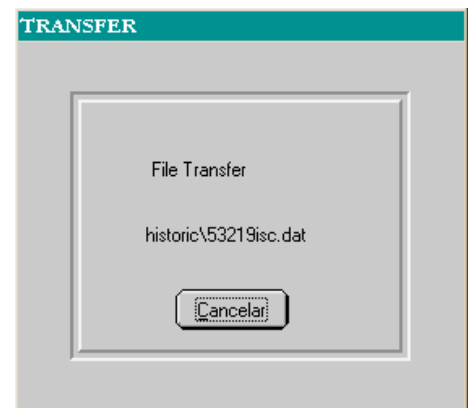
The *Retrieve* button will collect the CPX logs. Retrieving logs can be a slow process. If it is going to be long, the dialog box in figure 5.18 will indicate that the process could take several minutes.



The dialog box titled "WARNING" has a teal header. The main text reads "This operation may take several minutes." followed by "Continue?". At the bottom are "Cancel" and "OK" buttons.

Figure 5.18: Report Warning.

Clicking on the **OK** button will start the operation for collecting logs. Then a dialog box like the one in figure 5.19 will appear, showing the log filename that is being transferred from the CPX to the Operation Desk (\*.dat).



The dialog box titled "TRANSFER" has a teal header. The main text reads "File Transfer" followed by the filename "historic\53219isc.dat". At the bottom is a "Cancelar" button.

Figure 5.19: Report Transfer.

After the log transfer has finished, the Operation Desk will generate the internal reports. When they have been generated, a dialog box like the one in figure 5.20 will ask if you want to launch Windows Explorer to copy the internal reports to disk. Clicking Yes will launch Explorer (if you close Explorer after copying the files, you will go back to the general Operation Desk menu). If you click on **Finish**, you will go directly back to the general menu of the Operation Desk.

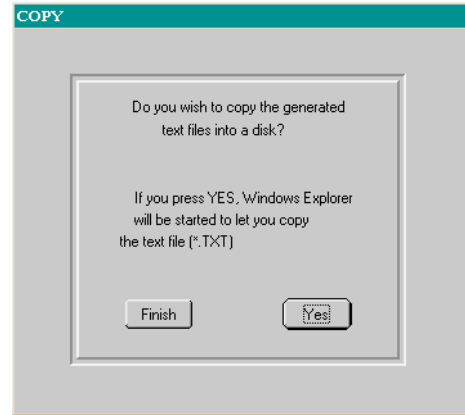


Figure 5.20: Windows Explorer for Copying Reports.

Internal reports are stored in the Operation Desk in the directory, **c:\Operation Desk\log\**. The file names will contain the last five figures of the Julian day plus three identifying letters of the data type. MEA=Measurement, ISC=Signals, CON=Counters. The extension will be **.TXT**. For example, if the date is November 17, 1997 (Julian day = 2450768), the corresponding data files will be called "50768mea.txt", "50768isc.txt" and "50768con.txt."

• **Signal file (events / alarms)**

It includes the changes that occurred in the signals configured in the "historic.cfg" file of the Central Unit on a specific day with the format:

|           |   |      |   |         |   |        |   |        |
|-----------|---|------|---|---------|---|--------|---|--------|
| JulianDay | , | Date | , | NumISCs | , | NumReg | , |        |
| Date      | , | Time | , | Elem    | , | Signal | , | Status |
|           |   |      |   |         |   |        |   | Alarm  |

(\*)

(\*) Repeated for each change. There will be as many as *NumReg* indicates.

- *JulianDay*: Day in Julian format where the file data is taken from.
- *Date*: Date the file data is taken. The format is the following: YYYYMMDD (e.g. 20011001).
- *NumISCs*: Number of digital signals configured in the "historic.cfg" file in the Central Unit.
- *NumReg*: Number of records taken in the file.
- *Date*: Date the change takes place. The format is the following: **yyyy/mm/dd** (e.g. 2001/10/01).
- *Time*: Time the change takes place. The format is the following: **hh:mm:ss.mmm** (e.g. 16:13:08:877).
- *Elem*: Description of the IED that detected the change (e.g. 13 T-2).
- *Signal*: Description of the signal where the change occurred (e.g. L/T STATUS).
- *Status*: Is the status of the signal (e.g. IN REMOTE).
- *Alarm*: Indicates whether the signal has an alarm category or not (for ex. FALSE).

These four fields *Elem*, *Signal*, *Status* and *Alarm* are contained in the Operation Desk configuration ("units.cfg").

E.g.

```
2452182, 20011001, 8, 6,
2001/10/01, 16:13:08:877, 13 T-2, STATUS L/T IN REMOTE, FALSE,
2001/10/01, 16:13:09:578, 13 T-2, STATUS L/T, IN LOCAL, FALSE,
2001/10/01, 17:35:33:969, 13 T-2, STATUS L/T IN REMOTE, FALSE,
2001/10/01, 17:35:34:654, 13 T-2, STATUS L/T, IN LOCAL, FALSE,
2001/10/01, 18:08:25:332, 13 T-2, STATUS L/T IN REMOTE, FALSE,
2001/10/01, 18:08:26:141, 13 T-2, STATUS L/T, IN LOCAL, FALSE,
```

• **Measurement file**

Includes the values of the measurements configured in the “*historic.cfg*” file of the Central Unit on a specific day, sampled with the interval configured in the file, “*informes.cfg*” (each minute in this case). The file format is as follows:

|           |   |        |   |         |   |       |   |        |   |      |
|-----------|---|--------|---|---------|---|-------|---|--------|---|------|
| JulianDay | , | Date   | , | NumMEAs | , |       |   |        |   |      |
| Add       | , | MEA    | , | Descr   | , | (*)   |   |        |   |      |
| SampleNum | , | Value1 | , | Value2  | , | ..... | , | ValueN | , | (**) |

- (\*) Repeated for each measurement configured. The number indicated in *NumMEAs*.
- (\*\*) Repeated for each of the day’s samples. For measurements this will be 1440 samples (the sample interval is 1 minute => 1440 samples/day).

- *JulianDay*: Day in Julian format where the file data is taken from.
- *Date*: Date the file data is taken. The format is the following: YYYYMMDD (e.g. 20011017).
- *NumMEAs*: Number of measurements configured in the “*historic.cfg*” file in the Central Unit.
- *Add*: PROCOME address of the IED the measurement belongs to.
- *MEA*: PROCOME label of the measurement.
- *Descr*: Descriptive text about the measurement.

These three fields: *Add*, *MEA* and *Descr* are contained in the Operation Desk configuration (“*units.cfg*”).

- *SampleNum*: Correlative number of the day’s sample (from 0 to 1439).
- *Value1*: Value of measurement 1.
- *ValueN*: Value of measurement N (with N = *NumMEAs*)

E.g.

```
2452198,20011017,4,
11, 0, CURRENT MEASUREMENT,
11, 1, VOLTAGE MEASUREMENT,
10, 0, CURRENT MEASUREMENT,
10, 1, VOLTAGE MEASUREMENT,
0, 5.156, 10.000, 5.132, 10.012,
1, 5.198, 10.034, 5.054, 10.232,
2, 4.923, 10.134, 4.980, 10.123,
3, 5.080, 10.098, 4.998, 10.108,
...
1439, 4.980, 10.007, 5.008, 10.089,
```

### • Counter file

It includes the values of the counters configured in the “*historic.cfg*” file in the Central Unit on a specific day, sampled with the interval set in the file, “*informes.cfg*”. The file format is the following:

|           |   |        |   |         |   |            |   |               |
|-----------|---|--------|---|---------|---|------------|---|---------------|
| JulianDay | , | Date   | , | NumCONs | , | NumSamples | , |               |
| Add       | , | CON    | , | Descr   | , | (*)        |   |               |
| SampleNum | , | Value1 | , | Value2  | , | .....      | , | ValueN , (**) |

(\*) Repeated for each counter configured. The number indicated in *NumCONs*.

(\*\*) Repeated for each of the day's samples. There will be a maximum of 1440 samples (depending on the interval set in “*reports.cfg*”). In the example, there are 96 samples, as the set sampling interval is 15 minutes.

- *JulianDay*: Day in Julian format where the file data is taken from.
- *Date*: Date the file data is taken. The format is the following: YYYYMMDD (e.g. 20011017).
- *NumCONs*: Number of counters configured in the “*historic.cfg*” file in the Central Unit.
- *Add*: PROCOME address of the IED the counter belongs to.
- *CON*: PROCOME label of the counter.
- *Descr*: Descriptive text about the counter.

These three fields: *Add*, *CON* and *Descr* are contained in the Operation Desk configuration (“*units.cfg*”).

- *SampleNum*: Correlative number of the day's sample (from 0 to a maximum of 1439). In the example, from 0 to 95, there will be 96 samples.
- *Value1*: Value of counter 1.
- *ValueN*: Value of counter N (with N = *NumXONs*)

E.g.

```
2452198,20011017,4,96,
11, 0, COUNTER 1,
11, 1, COUNTER 2,
10, 0, COUNTER 3,
10, 1, COUNTER 4,
0, 5.000, 10.000, 5.000, 10.000,
1, 9.000, 17.000, 15.000, 15.000,
2, 14.000, 23.000, 24.000, 19.000,
3, 15.000, 28.000, 26.000, 31.000,
...
95, 98.000, 103.000, 115.000, 110.000,
```

## 5.5 Protection Page

You can execute the **Zivercom**© application from this page. Select the **Protections** button from the general menu. If there is no application defined, nothing will happen. If the application is defined, a dialog box like the one in figure 5.21 will appear.

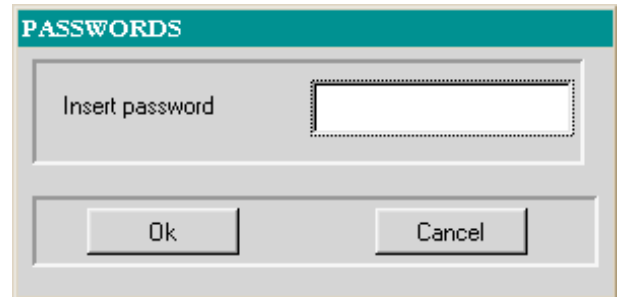


Figure 5.21: Entering the Protection Password.

You can do either of two things:

- Enter the *level 2* password and click *OK*.
- Click *Cancel* and return to the general menu.

The screen will return to the general menu if you enter an incorrect password. If the password is *correct*, the defined application (**Zivercom**©) will initiate. For further information, please consult the **Zivercom**© application.

## 5.6 Automatic Control Configuration Page

This is the screen that allows you to configure the various programmable automatic controls and their settings. Access this option by selecting the **Automatic control Configuration** button from the general menu. Clicking on this button brings up a menu to select the various automatic controls, as in figure 5.22.

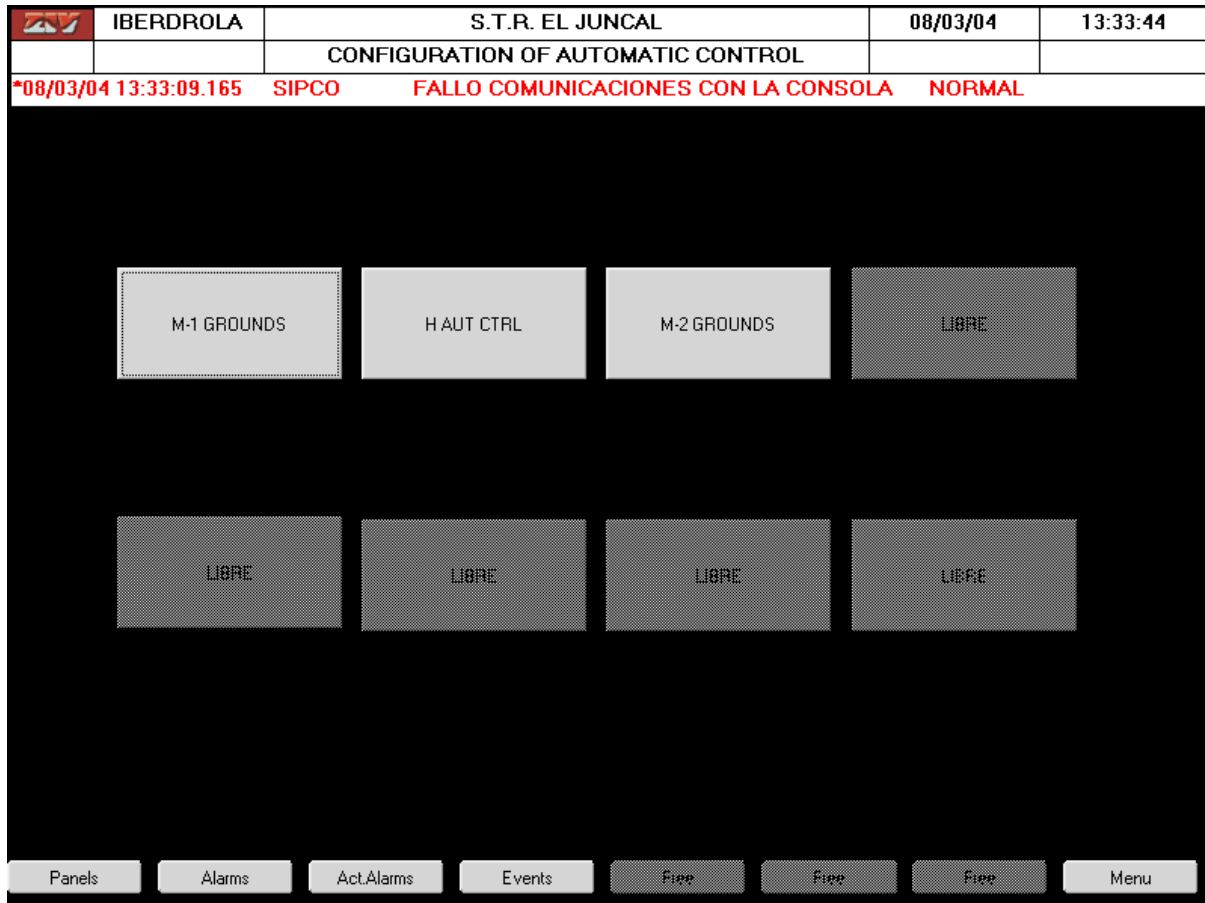


Figure 5.22: Automatic Control Selection Screen.

When you click on a automatic control button, the corresponding settings are read. During this process, you see the wait message in figure 5.23.

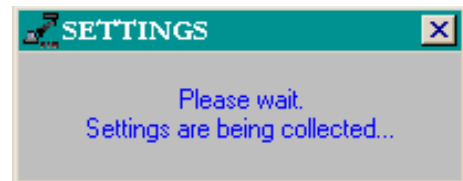


Figure 5.23: Notice of Setting Request.

If there is an error reading the settings, you will see the message in figure 5.24 and you will be returned to the general menu.

This menu can have four types of automatic controls: **Resistive Grounds**, **H/Y Automatic controls**, **ERAS** and **Logic**.



Figure 5.24: Setting Request Failure Warning.

### 5.6.1 Automatic Control for Resistive Grounds

Clicking on any of the buttons with the text **M-X GROUNDS**, and after reading the settings, a screen is displayed (figure 5.25) for you to configure the automatic controls for the corresponding grounds. You can perform the following operations on this screen:

- Put the automatic control into or out of service. The default value is **in service**.
- Modify the delay time for starting up after the Resistive Ground alarm has been triggered. The range of valid values is from 0 - 600 seconds, with *60 seconds* being the default value. The step is 1 second.
- Modify the verification time (in seconds). This is the time the breaker is open while waiting for the ground alarm to be deactivated. The range of valid values is from 0 - 10 seconds, with *5 seconds* being the default value. The step is 1 second.
- Set the *priority* for the IED. Double click on the IED you want in the list or select that IED from the list (click once) and then click on the **Edit** button.

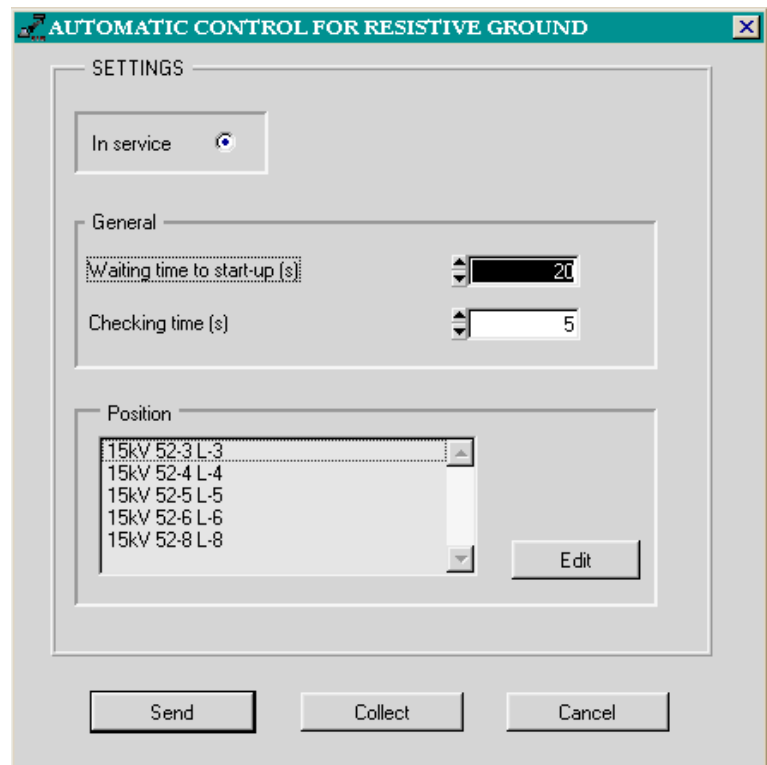


Figure 5.25: Automatic Control Settings for Resistive Grounds.

## Chapter 5

This will bring up a dialog box like the one in figure 5.26. Select the priority you want to assign to the IED (1 - 50) and the participation (in service) or not of the IED in the automatic control.

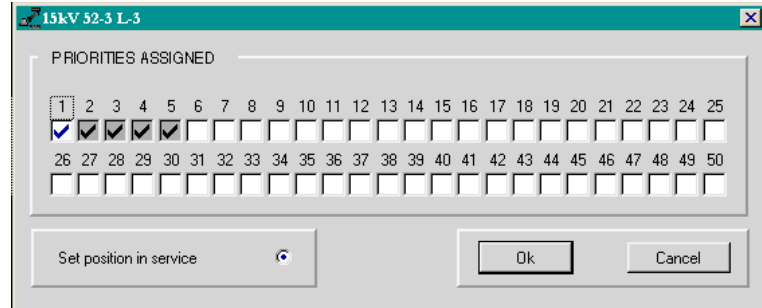


Figure 5.26: Assigning a Priority to a Specific IED.

Priorities already assigned to other IEDs will be checked and faded. To select a specific priority, click on the corresponding box. Click on **OK** to confirm the choice. You can abort the operation at any time by clicking on **Cancel**.

- Clicking on **Send** prompts a message like the one in figure 5.27 for you to confirm that you want to send the settings to the Central Unit. Then you are returned to the general menu.
- Clicking on the **Retrieve** button gets the automatic control settings for the grounds in the Central Unit.
- Clicking on **Cancel** returns you to the general menu.

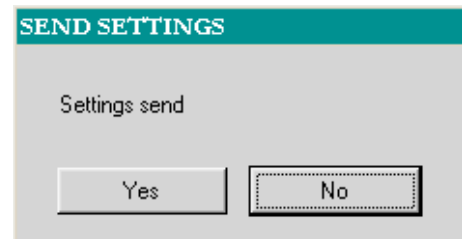


Figure 5.27: Confirmation for Sending Settings.

### 5.6.2 H and Y Automatic Controls

In this case, the settings are also read after you click on the button corresponding to either of the automatic controls: **H Automatic Control** or **Y Automatic Control**. The process is the same as for the ground automatic control.

After the settings are read, the following screen appears (figure 5.28) so you can set the H automatic control.

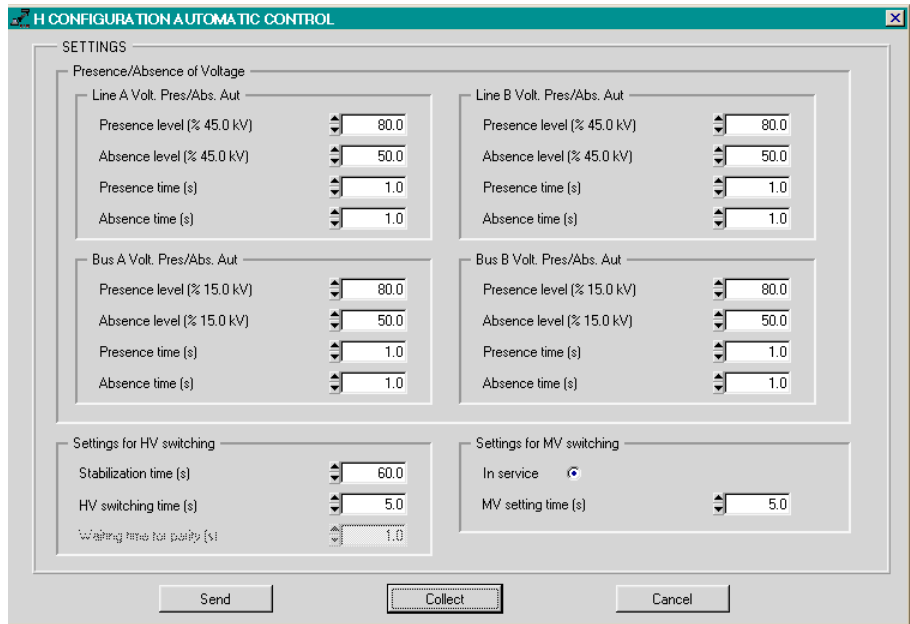


Figure 5.28: H Automatic control Settings with Two Busses.

If either of the two busses does not exist (Y automatic control), the screen in figure 5.29 will appear.

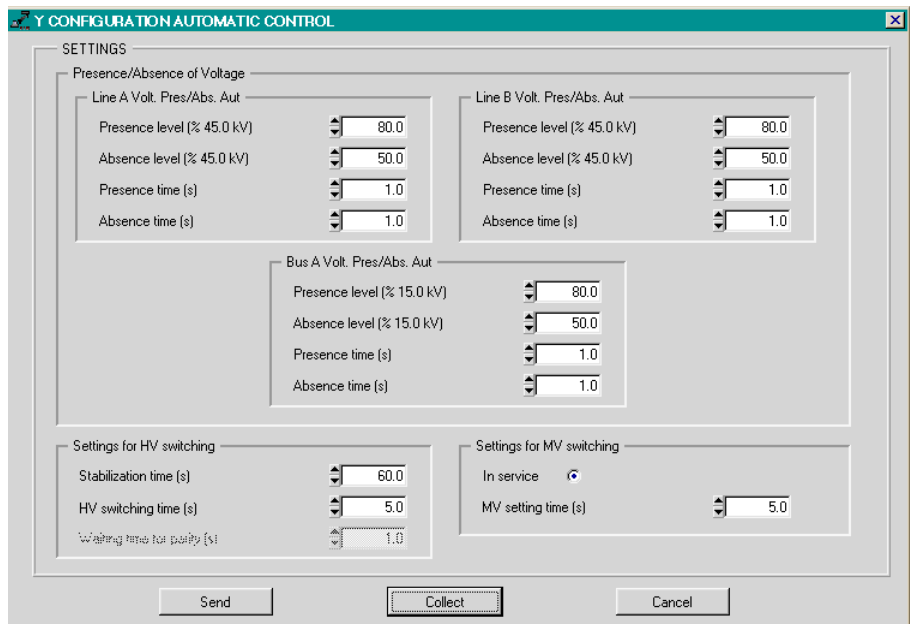


Figure 5.29: H Automatic control Settings with One Bus.

You can perform the following operations on this screen:

- Put the automatic control for medium voltage into or out of service. The default value is *in service*.
- Modify the stability time (in seconds) for the high voltage automatic control. The range of valid values is from 0 – 300 seconds, with *60 seconds* being the default value. The step is 0.1 second.
- Modify the switch time (in seconds) for the high voltage (HV) automatic control. The range of valid values is from 0 – 10 seconds, with *5 seconds* being the default value. The step is 0.1 second.
- The equality delay time for the high-voltage automatic control appears faded because it is fixed and equals *1 second*.
- Modify the switch time for the medium voltage (MV) automatic control. The range of valid values is from 0 - 10 seconds, with *5 seconds* being the default value. The step is 0.1 second.
- Edit the automatic control settings for the presence / absence of voltage. You can modify the following parameters:
  - Voltage presence level (in % of Vnominal). The range of valid values is from 50 – 100, with *80%* being the default value. The step is 0.1%.
  - Voltage absence level (in % of Vnominal). The range of valid values is from 0 – 70, with *50%* being the default value. The step is 0.1%.
  - Voltage presence time (in seconds). The range of valid values is from 0.5 – 5, with *1 second* being the default value. The step is 0.1 second.
  - Voltage absence time (in seconds). The range of valid values is from 0.5 – 5, with *1 second* being the default value. The step is 0.1 second.
- After the necessary settings have been made to the H/Y automatic control, click on the *Send* button. This brings up a confirmation message like the one in figure 5.27. Clicking on Yes will send the settings to the Central Unit.
- If you select the *Retrieve* button, the automatic control settings will be collected for the H/Y in the Central Unit.
- The *Cancel* option returns you to the general menu.

### 5.6.3 ERAS Automatic Control

In this case also, the settings are read when you click on the ERAS automatic control button: The procedure is the same as for the two preceding automatic controls.

After the settings are read, the following screen appears (figure 5.30) for you to set the ERAS automatic control.

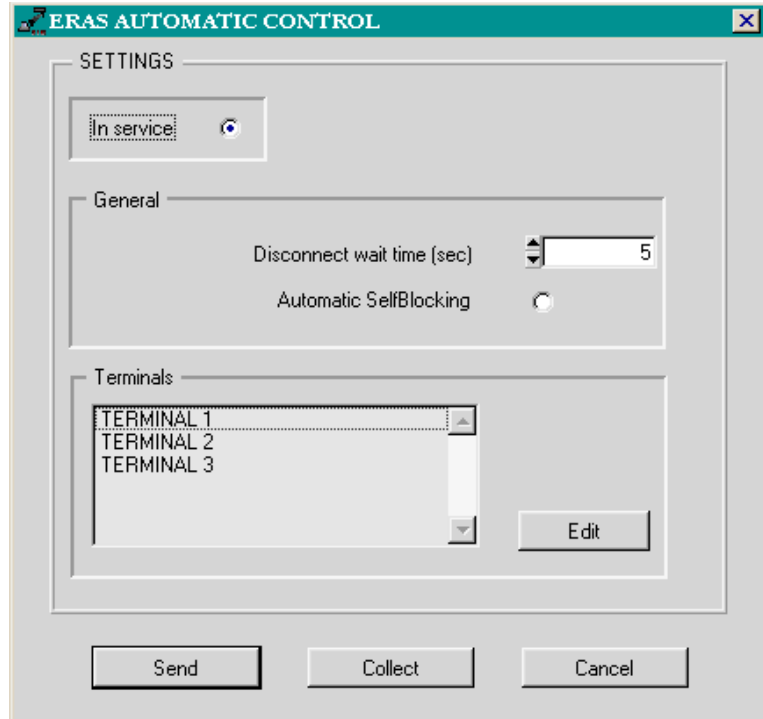


Figure 5.30: ERAS Automatic Control Settings.

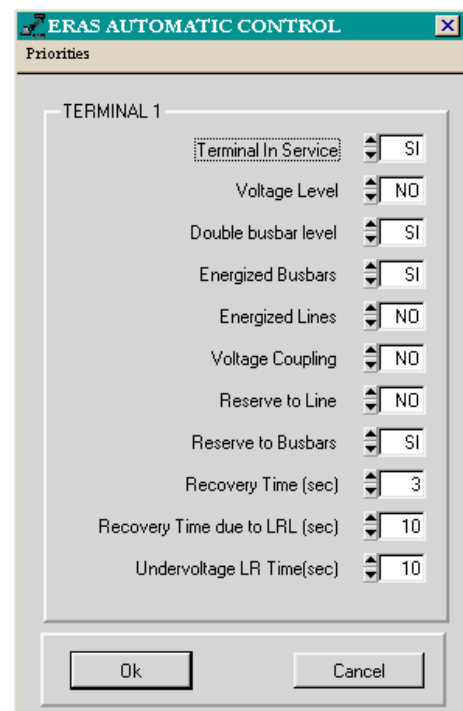
You can perform the following operations on this screen:

- Put the automatic control into or out of service. The default value is *in service*.
- Delay time for the disconnection (in seconds). The range of valid values is from 0 - 10 seconds, with 5 seconds being the default value. The step is 1 second.
- Put auto-block option after the disconnection or not. The default value is *auto-block*.
- Edit settings for a specific IED. Double click on the IED or select the IED and click on the *Edit* button. A dialog box like the one in figure 5.31 will appear. You can modify several parameters.

## Chapter 5

You can modify the following parameters on this screen:

- IED in-service or out-of-service flag. The default value is *Yes* (in service).
- Voltage level. The default value is *NO*.
- Two busses on this level. The default value is *NO*.
- Voltage conditions of busses. The default value is *NO*.
- Voltage conditions of bays. The default value is *NO*.
- Voltage coupling. The default value is *NO*.
- Reserve to bay. The default value is *NO*.
- Reserve to busses. The default value is *NO*.
- IED reset time (in seconds). The range of valid values is from 3 – 30 seconds, with 3 *seconds* being the default value. The step is 1 second.
- Reset time by LRL (in seconds). The range of valid values is from 3 – 60 seconds, with 3 *seconds* being the default value. The step is 1 second.
- LR sub-voltage time (in seconds). The range of valid values is from 0 – 10 seconds, with 5 *seconds* being the default value. The step is 1 second.
- You can also modify the IED priority. Click on the *Priorities* label and a menu will pop up displaying the priorities (1 – 20) that you can assign to the IED. The priorities already assigned to other IEDs are checked and faded. To check a specific priority, click on it (the symbol ✓ will be displayed).

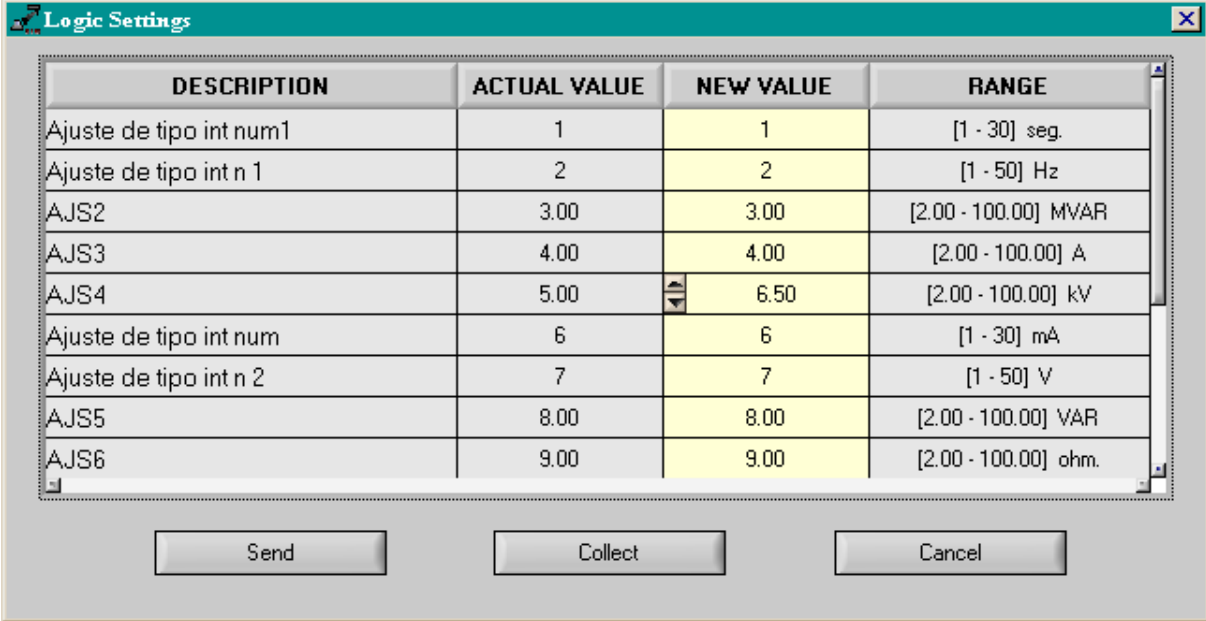


When you have modified the parameters you want, confirm by clicking on **OK** or undo them with **Cancel**.

- When you have made the necessary settings for the ERAS automatic control, click on the *Send* button. This brings up a confirmation message like the one in figure 5.36. Click on *Yes* to send the settings to the Central Unit.
- If the *Retrieve* button is selected, the automatic control settings will be collected for the ERAS in the Central Unit.
- The *Cancel* option returns you to the general menu.

## 5.6.4 Logic

The Central Unit logic program can use settings in some of its OPCODES. You can modify these settings at any time from this screen in the Operation Desk. See an example in figure 5.32.



The screenshot shows a window titled "Logic Settings" with a table containing the following data:

| DESCRIPTION             | ACTUAL VALUE | NEW VALUE | RANGE                |
|-------------------------|--------------|-----------|----------------------|
| Ajuste de tipo int num1 | 1            | 1         | [1 - 30] seg.        |
| Ajuste de tipo int n 1  | 2            | 2         | [1 - 50] Hz          |
| AJS2                    | 3.00         | 3.00      | [2.00 - 100.00] MVAR |
| AJS3                    | 4.00         | 4.00      | [2.00 - 100.00] A    |
| AJS4                    | 5.00         | 6.50      | [2.00 - 100.00] kV   |
| Ajuste de tipo int num  | 6            | 6         | [1 - 30] mA          |
| Ajuste de tipo int n 2  | 7            | 7         | [1 - 50] V           |
| AJS5                    | 8.00         | 8.00      | [2.00 - 100.00] VAR  |
| AJS6                    | 9.00         | 9.00      | [2.00 - 100.00] ohm. |

Below the table are three buttons: "Send", "Collect", and "Cancel".

Figure 5.32: Logic Settings.

As you can see, this screen consists of a table with the settings configured in the CPX/CP. The table contains a description, the current value, the new value and the range and unit. The only values you can modify from this screen are the ones in the **New Value** column.

Double clicking on one of these cells elicits two arrows for increasing/decreasing its setting value. The value used is the one configured in the CPX/CP. However, you can enter any value directly from the keyboard.

The **Current Value** column shows the setting's present value in the CPX/CP. This value is only modified if the settings are sent by clicking on the **Send** button. You can return to the set values at any time by clicking on the **Retrieve** button.

The vertical scroll bar on the right of the table lets you scroll through the various settings, if more than 9 settings are defined.

When settings are changed and sent to the CPX/CP, the logic times are restarted and the system starts to work with the new values. If any of the timers were counting, they stop and start over from zero. That is, after settings are changed, the timers could go longer than the configured time in the first operation after the change of settings.

## 5.7 Automatic Control for Resistive Ground Page

This screen provides information about the status of resistive ground automatic controls. They are represented by LEDs, with the color indicating the status of the associated signal. There is text identifying the signal next to each LED. This screen is divided into two boxes.

- The signals providing general information about the automatic control status (maximum three) with the corresponding LEDs are in the top box.
- The signals providing information about the medium-voltage bays for the automatic control (one signal for each bay) with the corresponding LEDs are in the bottom box.

The representation of the LEDs is the same as the previous description for LEDs in IED signal panels (see section 4.6). This screen can not, however, acknowledge signals with an alarm category (see figure 5.33).

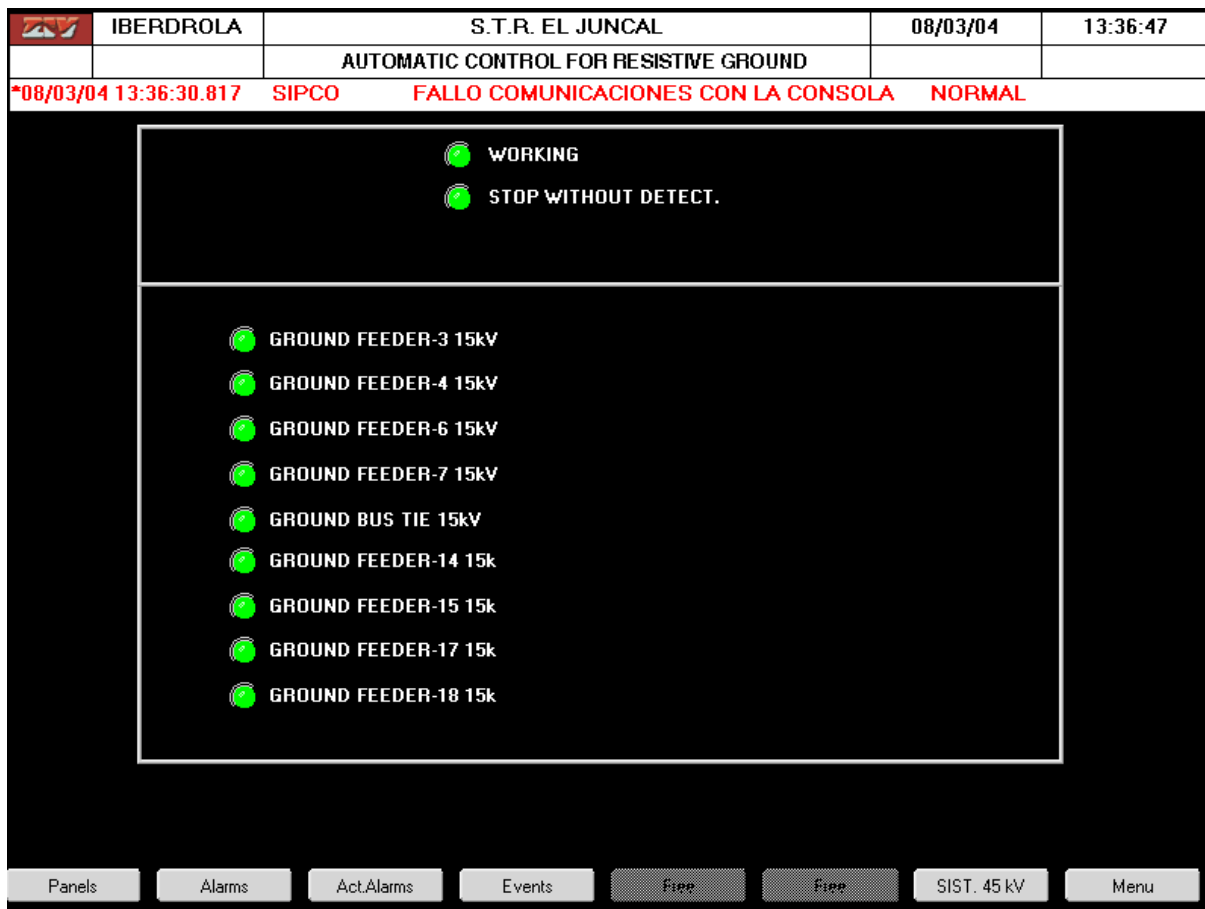


Figure 5.33: Automatic Control for Resistive Ground Screen.

CHAPTER 6

# Settings Ranges



## Chapter 6

The PCD is configured with the **Zivergraph**® program. This program customizes an Operation Desk for a specific installation. As this is a complex operation, the ranges of parameter and setting variations will not be discussed here; they will be indicated in the program manual and in the appendices describing the configuration files.

CHAPTER 7

# Figures



| Figure |                                                     | page |
|--------|-----------------------------------------------------|------|
| 1.1    | Information Flow in the Desk.....                   | 1-3  |
| 3.1    | Share Directory .....                               | 3-5  |
| 4.1    | Screen for Reading Configuration .....              | 4-2  |
| 4.2    | Page Format .....                                   | 4-3  |
| 4.3    | Page Header .....                                   | 4-4  |
| 4.4    | Function Keys .....                                 | 4-5  |
| 4.5    | Single-line Diagram .....                           | 4-7  |
| 4.6    | Single-line Diagram of a Transformer Position ..... | 4-8  |
| 4.7    | Command Panel for a Breaker.....                    | 4-9  |
| 4.8    | SIPCO Command Logic.....                            | 4-10 |
| 4.9    | System General Menu Page .....                      | 4-11 |
| 4.10   | Summary Screen of the Signal Panels .....           | 4-13 |
| 4.11   | Digital Signal Panel for an IED .....               | 4-14 |
| 4.12   | Alarm Page .....                                    | 4-17 |
| 4.13   | Events Page.....                                    | 4-19 |
| 4.14   | Integrated Protection and Control System.....       | 4-21 |
| 4.15   | IED Description .....                               | 4-22 |
| 4.16   | Engineering Screen.....                             | 4-23 |
| 4.17   | Selecting the Drive for Updating the CPX/ CPP ..... | 4-24 |
| 4.18   | Selecting the CPX Configuration Files .....         | 4-24 |
| 4.19   | Specifying the Shared Directory .....               | 4-25 |
| 4.20   | Time and Date Collection .....                      | 4-25 |
| 4.21   | Activating / Deactivating the Printer.....          | 4-26 |
| 4.22   | Operation Desk Identification Window.....           | 4-26 |
| 4.23   | Operating Mode of the Remote Operation Desk .....   | 4-27 |
| 5.1    | Substation Selection Window.....                    | 5-2  |
| 5.2    | Window Waiting for Modem Connection .....           | 5-2  |
| 5.3    | Retrieval of Events and Alarms from the CPX.....    | 5-3  |
| 5.4    | Level Selection to Change Access Passwords.....     | 5-4  |
| 5.5    | Changing Access Passwords.....                      | 5-5  |
| 5.6    | User Options .....                                  | 5-6  |
| 5.7    | User Log in.....                                    | 5-7  |
| 5.8    | User without Permission.....                        | 5-7  |
| 5.9    | Incorrect User / Password.....                      | 5-7  |
| 5.10   | User Management.....                                | 5-8  |
| 5.11   | New User .....                                      | 5-8  |
| 5.12   | No Users Defined.....                               | 5-8  |
| 5.13   | Modify User .....                                   | 5-9  |
| 5.14   | No Predetermined User Defined .....                 | 5-9  |
| 5.15   | Selection of Predetermined User.....                | 5-9  |
| 5.16   | Confirmation to Delete User .....                   | 5-10 |
| 5.17   | Report Request.....                                 | 5-11 |
| 5.18   | Report Warning.....                                 | 5-11 |
| 5.19   | Report Transfer.....                                | 5-11 |
| 5.20   | Windows Explorer for Copying Reports.....           | 5-12 |
| 5.21   | Entering the Protection Password .....              | 5-15 |

|      |                                                        |      |
|------|--------------------------------------------------------|------|
| 5.22 | Automatic Control Selection Screen .....               | 5-16 |
| 5.23 | Notice of Setting Request .....                        | 5-16 |
| 5.24 | Setting Request Failure Warning .....                  | 5-17 |
| 5.25 | Automatic Control Settings for Resistive Grounds ..... | 5-17 |
| 5.26 | Assigning a Priority to a Specific IED .....           | 5-18 |
| 5.27 | Confirmation for Sending Settings .....                | 5-18 |
| 5.28 | H Automatic control Settings with Two Busses .....     | 5-19 |
| 5.29 | H Automatic control Settings with One Bus .....        | 5-19 |
| 5.30 | ERAS Automatic Control Settings.....                   | 5-21 |
| 5.31 | Ajustes de un terminal determinado .....               | 5-21 |
| 5.32 | Logic Settings.....                                    | 5-23 |
| 5.33 | Automatic Control for Resistive Ground Screen.....     | 5-24 |

Notes: