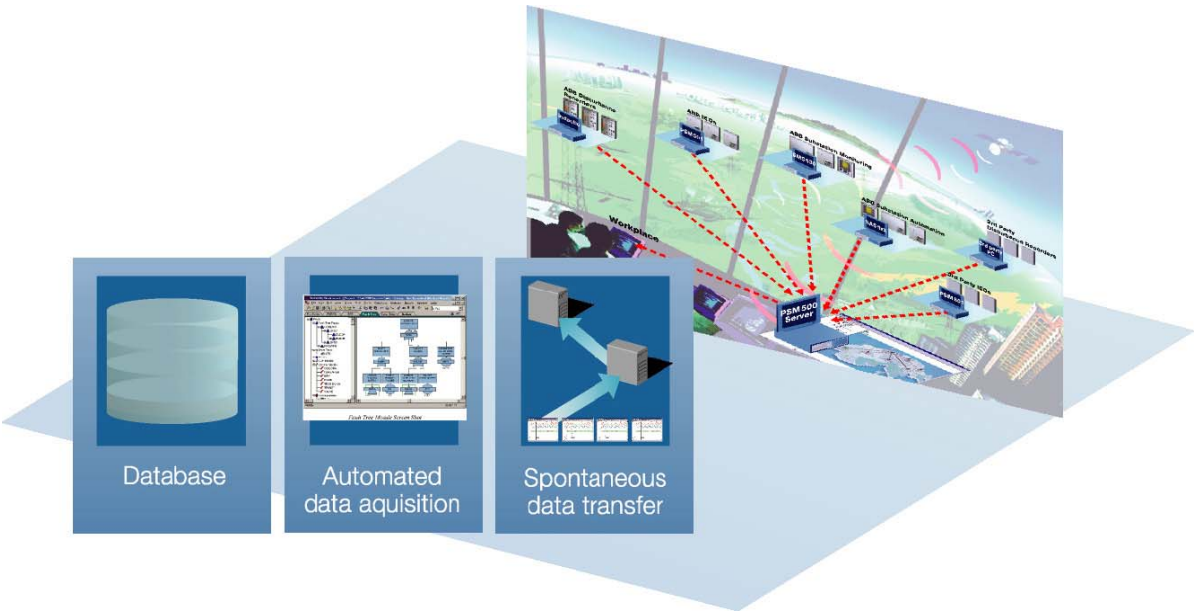
Power System Monitoring

1MRB520373-Uen
Edition June 2003

E_database, E_navigate and E_com System Configuration, Navigation and Disturbance Recorder Data Transfer

Software Manual



1st Edition

Applicable for Software Version V1.5.0

This document has been carefully prepared and reviewed. Should in spite of this the reader find an error, he is requested to inform us at his earliest convenience.

The data contained herein purport solely to describe the product and are not a warranty of performance or characteristic. It is with the best interest of our customers in mind that we constantly strive to improve our products and keep them abreast of advances in technology. This may, however, lead to discrepancies between a product or software and its "Software Instructions".

Contents

1. Introduction to PSM E_com documentation

This section gives an overview of PSM modules E_com, E_navigate, E_database and of this documentation.

- Knowledge of Microsoft Windows® is helpful for installing PSM E_com. The installation is automated to a large extent. All required user actions are described in the installation part of this document.
- Knowledge of user management, Windows security, shared directories and communication protocols on Microsoft Windows® 2000 is an advantage.

1.1. Overview of PSM system modules

E_com, E_navigate and E_database form the base modules of the software system PSM, Power System Monitoring.

Note: The three base modules are referred to as E_com throughout this manual.

Additional modules e.g. E_wineve depend on these base modules as shown in the figure below.

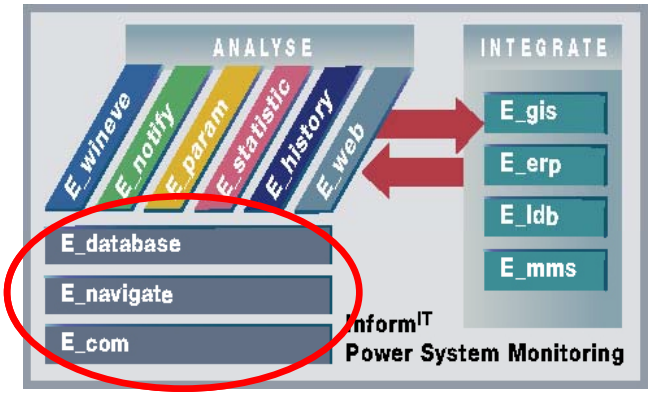


Fig. 1.1 PSM system modules

1.2. Functionality

PSM E_com is a Microsoft Windows® application with the following functionality:

- PSM Transmission network model creation and configuration
- Transmission network model navigation
- Automatic and manual transfer of disturbance recorder data from substation bay unit level to regional control center level.

PSM E_com can be installed on substation level as well as on regional control centre level:

- E_com installed on substation level transfers disturbance recorder data from the bay units to station level control within one substation.
- E_com installed in a power system control centre transfer disturbance recorder data from multiple substations or from regional control centres to the supervising control centre. Communication is typically via WAN (modems) or via LAN.
- Disturbance recorder data can be evaluated whenever the E_wineve evaluation module is installed.

The following diagram shows a typical configuration for a power system with PSM E_com on the power system control centre level and on substation level.

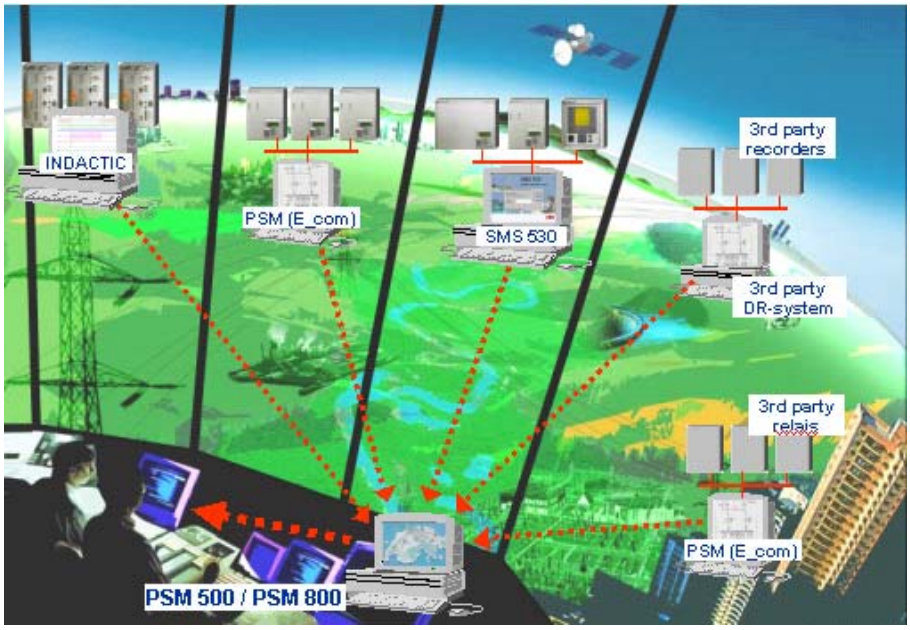


Fig. 1.2 PSM E_com installed at the power system control level

Larger systems with many substations can be broken down into regions to reduce the complexity.

E_com supports direct disturbance record data transfer from the following disturbance recorders:

RE.216/RE.316, REL300 (MDAR), REL301/302, REL350/352, REL512, GEC Optimho LFZP11x,12x,15x, SEL321

PSM E_com also supports disturbance recorder data transfer from computers in substations that acquire disturbance recorder data from the bay units.

Example: a substation equipped with a computer running the ABB WinCom program that periodically transfers disturbance recorder data generated by Indactic units. PSM E_com transfers the disturbance recorder data to the power system control centre via remote access.

1.3. Scope of this documentation

This document instructs user on how to install and use the functionality of the PSM system modules E_database, E_com and E_navigate. This document also forms the base for the on-line help.

1.4. Structure of this documentation

Chapter 1: Introduction to PSM E_com documentation contains general information about the PSM E_com and this documentation.

Chapter 2: Installation explains all necessary tasks that have to be carried out before PSM and PSM E_com can be used for the first time.

Chapter 3: Licensing explains how to order the correct license for your PSM system.

Chapter 4: General user information gives an introduction of the most important parts of the PSM E_com user interface.

Chapter 5: Engineering a PSM system with E_com describes the configuration steps necessary to collect, evaluate and analyze disturbance data with PSM.

Chapter 6: Creating and Configuring a PSM transmission network describes the different types of building blocks available to PSM Configurators.

Chapter 7: Importing Configuration Data describes how you can speed up the engineering of your PSM system by importing substation descriptions from existing PSM systems and by importing disturbance recorder configuration data.

Chapter 8: Manual disturbance data collection explains how to configure and use the interactive disturbance data collection functionality of PSM E_com. This chapter also contains information about remote access to PSM systems and computers using modems.

Chapter 9: Automatic disturbance data collection contains information about the PSM E_com Automatic Mode that automatically collects disturbance data from substations in your PSM system.

Chapter 10: Database handling explains PSM database maintenance tasks and necessary configuration steps for remote database access.

Chapter 11: Troubleshooting provides solutions and advice to common problems. This chapter contains explanations to PSM E_com system log error messages.

1.5. Conventions used in this documentation

Product names and literal texts being part of dialogs, menu bars, etc. are written in *italic font.*

If the user has to select a menu item or press a button, check box, etc., such items are written in **bold font**.

Shortcut keys are written as in the following example: CTRL + C, meaning that the user shall press the keys CTRL and C simultaneously, starting with the CTRL key.

1.6. List of abbreviations

COMTRADE	**COM**mon format for **TRA**nsient **D**ata **E**xchange (IEEE standard for DR file formats)
DR	**D**isturbance **R**ecord (file, data in memory), or **D**isturbance **R**ecorder (physical device)
IEEE	**I**nstitute of **E**lectrical and **E**lectronics **E**ngineers, New York (international standardisation gremium)
MSDE	**M**icrosoft **S**QL Server **D**esktop **E**ngine (royalty-free version of the Microsoft SQL Server® product)
PSM	**P**ower **S**ystem **M**onitoring (Software system of ABB Switzerland, containing the main applications E_com and E_wineve)
RAS	**R**emote **A**ccess **S**ervice by Microsoft provides remote access to computers via modems
REVAL	Proprietary DR file format for REx5xx relays of ABB Sweden and ABB Finland
SQL	**S**tructured **Q**uery **L**anguage (international standard for DB query language)

2. Installation

This chapter includes important preparation steps that must be executed once before PSM E_com can be run properly. It contains information about installation, operating system and database configuration actions.

2.1. Computer requirements

The following conditions must be fulfilled on the computer before E_com can be successfully installed and run:

- Operating system: The following operating systems are supported by PSM:
  - Windows 2000 Professional with Service Pack 3 or higher.
  - Windows XP Professional.
    Note: Windows XP Home Edition is not supported.
- Microsoft Internet Explorer 5.0 or higher installed.
- Minimum 100 MByte of free hard disk space.
- For PSM systems collecting disturbance data from remote computers:
  - Modem installed.
  - Remote access service installed.
  - Required communication protocols installed.
- A CD drive for installation. A CD read / write (R/W) device is recommended if you want to do backup of your data on the local PC.
- Screen resolution: min. 1024 x 768 pixels
- It is recommended to purchase a full licence of the Microsoft SQL Server® product and to install it either on the local computer or on a remote computer that grants network access to the computer where PSM E_com will be installed. The installation includes the royalty-free version Microsoft SQL Server® Desktop Engine (MSDE) may be used, which is included in the PSM installation kit.

  Note: If you have installed a full licence of the Microsoft SQL Server® product, we strongly recommend you to obtain and install the latest Service Pack available to avoid devastating viruses e.g. SQL Slammer. Service Pack 3 is distributed on the installation CD. Run the file **setup.bat**

from the *MS (full) SQL Server SP 3* subdirectory of the PSM installation CD to install Service Pack 3. For the latest information about Service Packs, see Microsoft's home page www.microsoft.com for more information.

2.2. Installation of PSM E_com

Note: You must have administrator rights on your computer to install PSM E_com.

PSM E_com is installed as part of the PSM installation. It is recommended to close all other Windows programs before installing PSM E_com.

Note: Any previous version (smaller than V1.5.0) of PSM E_com already installed on your computer shall be deinstalled first (see Section "Deinstallation of E_com " on Page 15) to ensure proper installation and operation of the new version.

The installation procedure for PSM E_com is otherwise straightforward. Simply insert the PSM CD in the drive and run the program *setup.exe* and follow the instructions that appear on the screen.

The following installation steps that are of special interest are explained in the following sections.

2.2.1. Installation dialog: Choose destination location

The installation directory for the PSM product can be freely selected. The default value is the subdirectory *PSM* of the program files folder. The location of the E_com software is on a predefined location within the PSM installation directory tree (see Section 2.4: Directories created during installation).

2.2.2. Installation dialog: Select PSM Components

The PSM installation CD always comes with all components of PSM. You can select, which components of PSM you want to install. See the following figure:

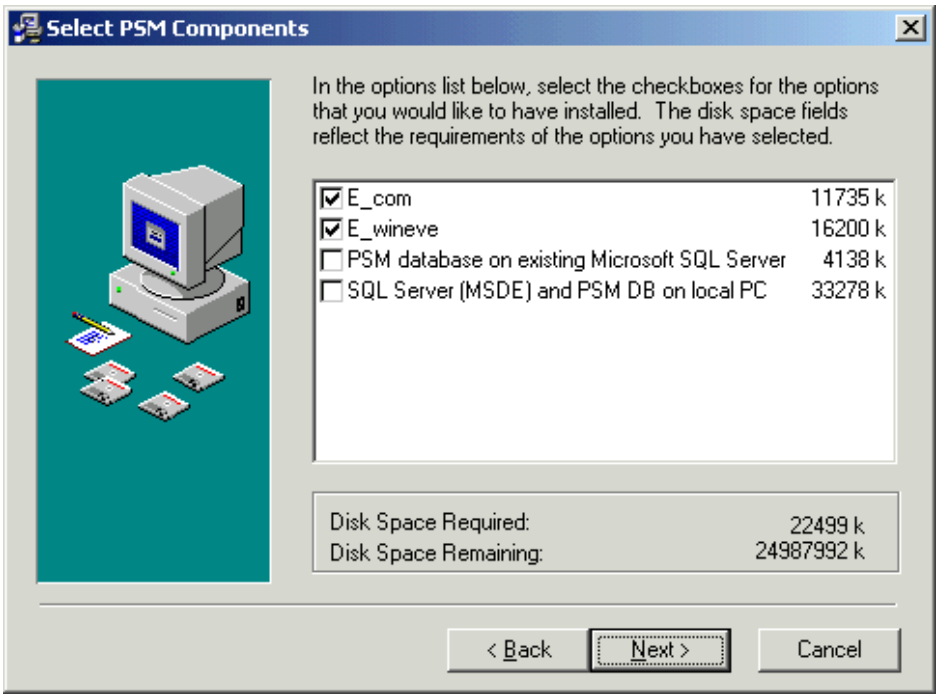


Fig. 2.1 Installation Dialog: *Select PSM Components*

The check boxes for *E_com* and *E_wineve* are selected by default.

The last two check boxes installs PSM E_database and are explained in the following two subsections.

2.2.2.1. Installation of PSM E_database

All PSM applications uses E_database, a common Microsoft SQL Server® database customized for PSM. PSM is a distributed system allowing PSM applications and PSM E_database to execute on different computers, e.g. in an office LAN environment.

- If you already have the Microsoft SQL Server® product installed, use the option *PSM database on existing Microsoft SQL Server* to install PSM E_database.
- You can use an existing remote installation of PSM E_database by unchecking all database installation options. You will be asked for the name of the database and the name of the remote computer.
- Verify that the remote PSM E_database access rights are correctly set up on the remote computer, see Section 9.2, Database access.

- You can install several PSM databases on the same SQL Server installation, each of them having a different database name.

2.2.2.2. Installation of Microsoft SQL Server 2000 Desktop Engine

Select the option *SQL Server (MSDE) and PSM Database on local PC* if you want to install the royalty-free version of Microsoft SQL Server® to host a PSM database on your computer.

Note: Microsoft SQL Server® Desktop Engine (MSDE) is a royalty-free variant of the Microsoft SQL Server® installation with restrictions in concurrency and tools. See www.microsoft.com for complete MSDE product information.

MSDE can be installed together with an existing installation of Microsoft SQL Server 2000®, e.g. Microsoft SQL Server® Enterprise Edition on your local computer. However, we recommend using the full version of SQL server.

The standard MSDE installation takes about one to three minutes.

This is followed by the Service Pack 3 installation, which takes about seven to ten minutes.

Note: Let the service pack installation finish completely. When you see the message "Time remaining: 0 seconds", wait another five minutes until the service pack installation is finished. **Do not** restart the computer when prompted by the Service Pack installation. Answer the question with *No* and let PSM installation finish and restart the computer later.

After MSDE installation, the PSM database is installed in the same way as described in the preceding subsection under the option *PSM database on existing Microsoft SQL Server* (i.e. database server = *<computer name>\PSM*, database name = *PSM*).

Troubleshooting:

The installation program for MSDE and its Service Pack 3 originate from Microsoft Corporation. In case of problems with the MSDE installation, examine the generated installation log files *Install_MSDE.log* or *Install_MSDE_SP3.log* that are created in the PSM installation directory. Use the *Find* function in your text editor to search for the string "*return value 3"* to locate the reason of the installation error, or send the log files to ABB for further examination. If you get the warning *Unable to run the script files* after restarting your computer, an additional restart is required.

2.2.3. Installation Dialog: Select Program Manager Group

Allows you to define the name of the PSM System program group. Default name is *PSM <PSM version>*, e.g. *PSM 1.5.0*. The program group is visible in the *Programs* item of the Windows *Start* menu.

This manual assumes from this point in all example that the default name *PSM <PSM version>* of the program group has not been changed.

2.2.4. Completing the PSM installation

Two new user groups are created during the installation:

- PSM Operators
- PSM Configurators

Each user that shall be authorised to work with PSM E_com or other PSM applications must have group membership of one of these groups after installation. See Section 2.5, User management.

Note: A PSM user does not need administrator rights on your computer. It is not recommended to give administrator rights to standard users.

At the end of the E_com installation procedure, you are advised to restart your computer to complete the installation.

After completing the installation procedure, all necessary files needed by E_com have been copied to the specified program directory. New directories has been created, see Section "Directories created during installation" below.

Start PSM E_com by selecting **Programs/PSM/E_com** from the *Start menu*.

2.3. Deinstallation of E_com

PSM is deinstalled by opening the **Control Panel** and double-clicking on **Add/Remove Programs**.

2.4. Directories created during installation

During the installation procedure of PSM the following directories are created:

Directory	Description
\bin	This directory contains all PSM executables.
\bitmaps	This directory contains bitmap files for demonstration purposes.
\evaluation	This directory contains PSM E_wineve demonstration files.
\examples	This directory contains example modem settings.
\language	This directory contains help text translations.
\license	This directory contains PSM system wide licensing files.
\logs	This directory contains log files generated by PSM E_com.
\readme	This directory contains the specific readme files for E_com and E_wineve.

2.4.1. License files

File	Description
PSMLicense.key	This license key file contains the licensing information concerning the current version. E_com (as well as E_wineve) starts in the Demo mode, if it cannot find this file, which has to be provided by ABB.
PSMLicense.req	This license request file is created when ordering an E_com licence ABB needs this file to generate a valid licence key.

2.5. User management

PSM system user management is entirely based on Windows security and Windows user management to help you control who is using your PSM system.

Note: You must have administrator rights on your computer to perform user management.

The user accounts for the PSM system users are created and configured by an Administrator. Users are granted rights to use PSM by simply adding the respective account to the required user group.

The following local user groups are created during installation:

- PSM Operators – contains all users who can operate the PSM system installed on your local computer.

- PSM Configurators – contains all users who can configure a PSM system installed on your local computer.

Two default users are created:

User	Default Password
PSMOperator	PSMOperator
PSMConfigurator	PSMConfigurato

2.5.1. PSM Operators

Members of the PSM Operators group have the permissions for the following actions in the PSM system using PSM E_com:

- Navigating in the PSM system topology.
- Manually upload and delete disturbance record data from disturbance data producers.
- Start and stop the automatic upload of disturbance record data.
- View but not change configuration parameters of system objects.

2.5.2. PSM Configurators

Members of the PSM Configurators group have full access to all E_com functionality and are allowed to configure the PSM system using PSM E_com after switching to Configuration Mode, see Section 4.6.2, "Configuration Mode".

- Create, delete and modify system objects and data in the PSM database.
- Configuration of manual and automatic file transfer with PSM E_com.
- Configuration of disturbance data evaluation with PSM E_wineve.

2.5.3. Enabling PSM to existing user accounts

Open the **Control Panel**. Click **Users and Passwords**. Go to the tab **Advanced** and click on the button **Advanced**. A dialog with the two folders *Users* and *Groups* appears.

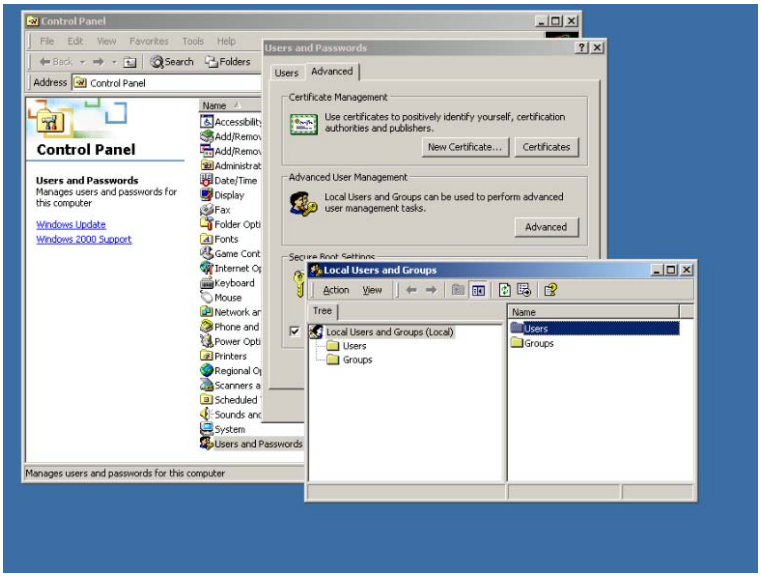


Fig. 2.2 Local Users and Groups dialog in the Control Panel

Click on *Groups* folder in the left pane, double-click on the group name (PSM Configurators or PSM Operators) you want the user to become a member of and click on **Add…** in the dialog that appears. Select the users, which shall be included in this group, press **OK** and close the dialog.

Note: the SQL Server database uses the information in the two PSM groups. After changing any of the groups it is recommended to stop the SQL Server and then restart it to make sure that the correct user information is used in the complete system. Restarting the computer where you have installed PSM and changed the groups has the same effect.

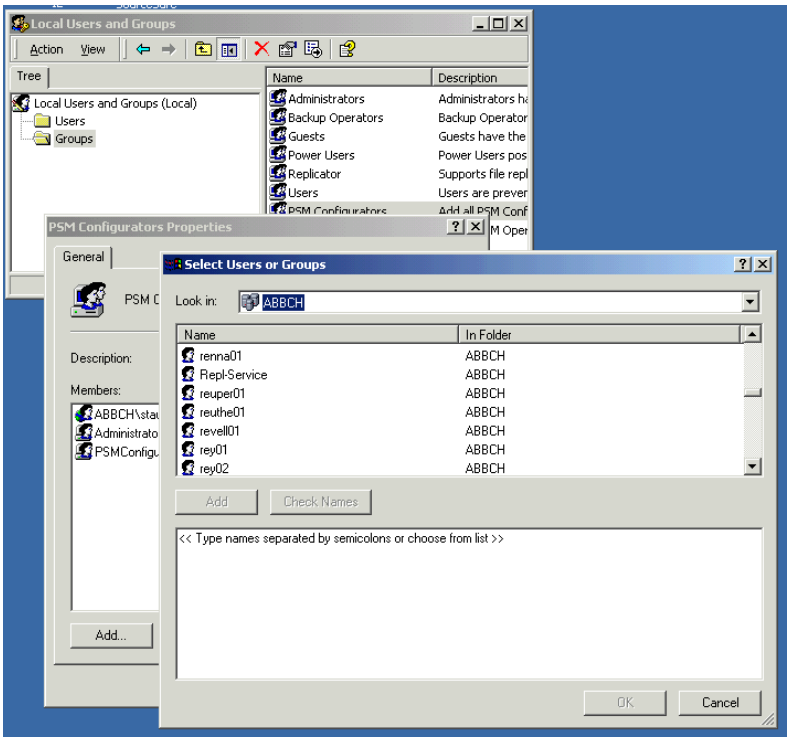


Fig. 2.3 Adding users to groups

2.5.4. *Disabling PSM users*

Simply remove the account from corresponding PSM group by pressing by selecting a user and press **Remove**. The user is now removed from the group. Press **OK** to confirm and close the dialog.

Note: the SQL Server database uses the information in the two PSM groups. After changing any of the groups it is recommended to stop the SQL Server and then restart it to make sure that the correct user information is used in the complete system. Restarting the computer where you have installed PSM and changed the groups has the same effect.

2.5.5. *Creating new PSM users*

Creating a PSM user is analogue to creating a new windows user. This section describes how to create a new local user.

Contact your network domain administrator for creating new domain users.

Open the **Local Users and Groups** dialog, right click on the Users folder and select **New user…** The following dialog appears:

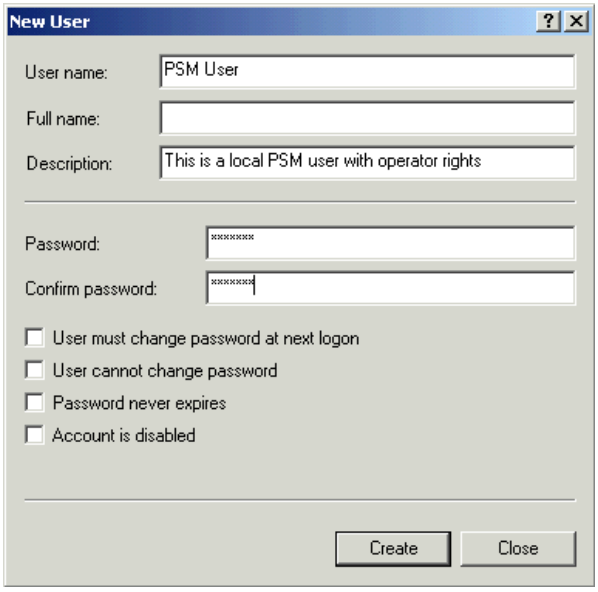


Fig. 2.4 Creating a new local user in Windows 2000

Enter and confirm a password for the new user.

Press **Create**. The local account is now created as you have specified it. Press **Close** to get back to the Users and Groups folders. Add the new user to the corresponding PSM user group as described above.

3. Licensing of PSM E_com

Each PSM E_com installation requires a valid license key file. The license key file is of multi-user, node locked type, meaning that multiple users may use PSM E_com on the computer where PSM E_com has been installed. The license key file is not valid on other computers.

- The PSM E_com license file defines which functionality is available to the user.
- The PSM E_com license defines the maximum PSM system size in terms of disturbance data sources. The size is based on counting disturbance data sources located in substations.

The license key file is obtained by filling in a license request, containing customer information, the requested system size in terms of disturbance data source and the desired functionality.

After receiving the license request file, ABB delivers the specified license key to the customer.

Note: PSM E_com allows full system configuration without a valid license. However, disturbance data transfer and functionality will not be available.

The PSM E_com license is valid under the following conditions:

1. A license key file exists in the \license directory.
2. The computer information in the license key file identifies the computer where PSM E_com is installed.
3. The PSM system database contains a number of disturbance data sources less than or equal to the amount specified in the license key file.

The Spontaneous Data Transfer functionality between separate PSM E_com installations is explicitly licensed. Each PSM E_com installation using this functionality must have a valid license for spontaneous data transfer.

3.1. Demonstration license

E_com is installed with a floating demonstration licence, limited disturbance data collection from one file server, one PSM system and two disturbance recorders. This license is not coupled to the computer where PSM E_com is installed.

3.2. Ordering a license key

Select *Order a New License*… from the Options menu:

Fig 3.1 Order new license from the Options menu

The dialog below appears:

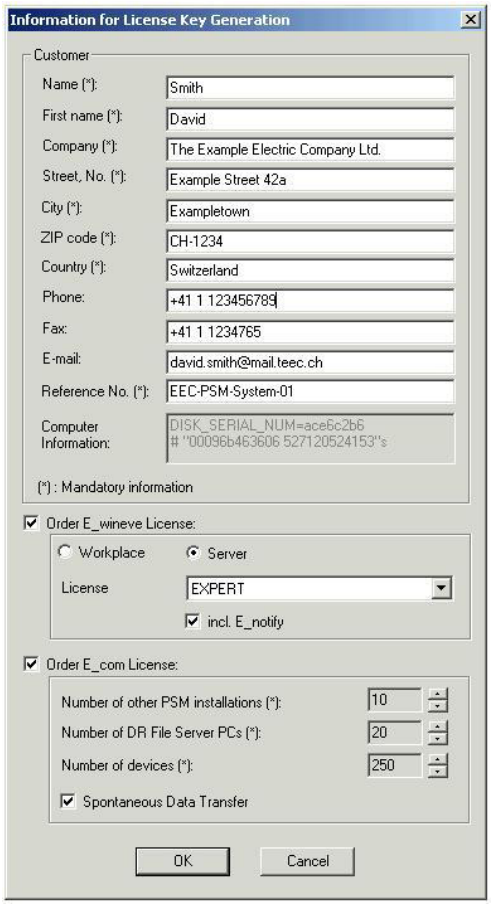


Fig. 3.1 Filling out the license form

3.3. Filling out the license request form

Enter the requested information in the *Customer* area.

Reference No.

This field is identifies your PSM System installation. It can be a name or a number. Each license request shall have a unique Reference No.

Computer Information

This field is read-only and displays computer information used to generate the license request file.

Order E_com License

Check the box Order E_com license and enter the desired number of disturbance data sources.

Note: The same request file can be used to order a license key for PSM E_wineve. See the PSM E_wineve documentation for a detailed description of the PSM E_wineve license types.

Number of other PSM Installations

The number of PSM systems located in substations.

Note: The main PSM E_com system is not counted.

Number of DR File Server PCs

The number of File Servers located in substations.

Number of devices

The total number of disturbance recorders.

Spontaneous Data Transfer

Check this box to order the Spontaneous Data Transfer functionality in your license request. Spontaneous Data Transfer allows fast and economical transfer of disturbance data between PSM systems in a Wide Area Network environment. For more information about the benefits of using Spontaneous Data Transfer see Section 8, Automatic disturbance data collection.

3.4. Licence ordering example

This section describes how to order a PSM E_com license for an example PSM system.

Our pre-engineered example system includes three substations as shown in the tree view below:

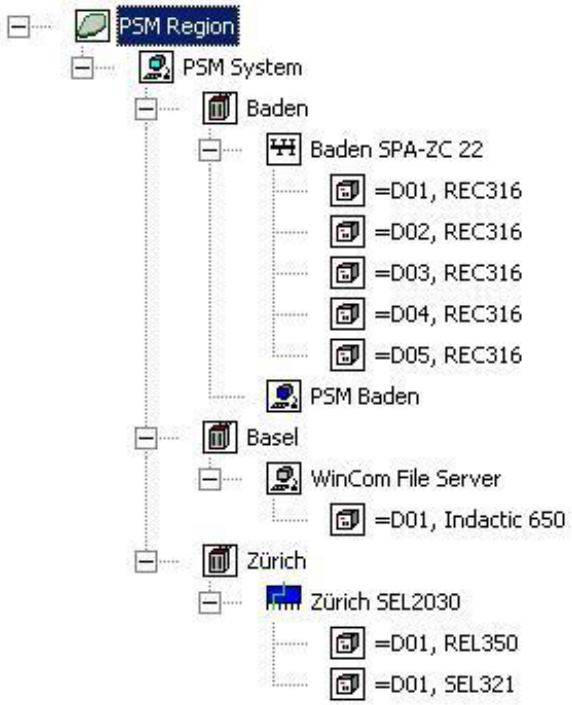


Fig. 3.2 Tree view of the example system

- Substation Baden contains five RE..16 recorders from a remote PSM system, imported using the Substation Import functionality. For more information about Substation Import see Section 6.1.
- Substation Basel contains one File Server and one Indactic 650 disturbance recorder.
- Substation Zürich contains one REL350 and one SEL321 disturbance recorder.

The information above is the basic input for the license request and is easily determined by viewing the About box in the Help menu (see Section 4.9) after completing the engineering of your PSM system.

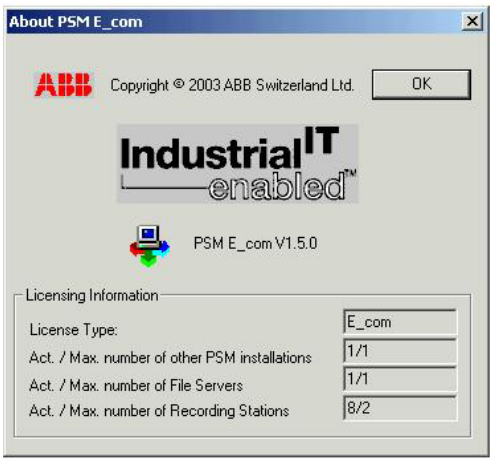


Fig. 3.3 Licensing information in the About box

- Close the About box.
- Open the License Request dialog and request one PSM installation, one File Server and eight Recording Stations
- Check the box Spontaneous Data Transfer.
- Close the license request dialog with **OK**. A file named PSMLicense.req is now generated containing the details of your computer (serial number) and the information you have provided.
- Send the generated file to ABB via e-mail: sa-lec-support@ch.abb.com for license key generation. The generated license key file is sent back to you via email if an email address was provided.
- Copy the key file to the license directory and restart PSM E_com. The new license key is now activated.

3.5. Summary

This section shows how to:

- Obtain a license key for PSM E_com from ABB.
- Find the required input for a license request by using the About box after completed engineering.

4. General user information

4.1. Starting E_com

Start E_com by using the start menu item created during installation.

4.2. User interface layout

The E_com main window is divided into two parts similar to Windows Explorer with the directory tree to the left and the contents to the right (see picture below).

- The tree view to the left displays the structure of the currently opened PSM system in a clear way.
- The scroll view to the right shows the geographic locations of substations and the associated equipment they contain.

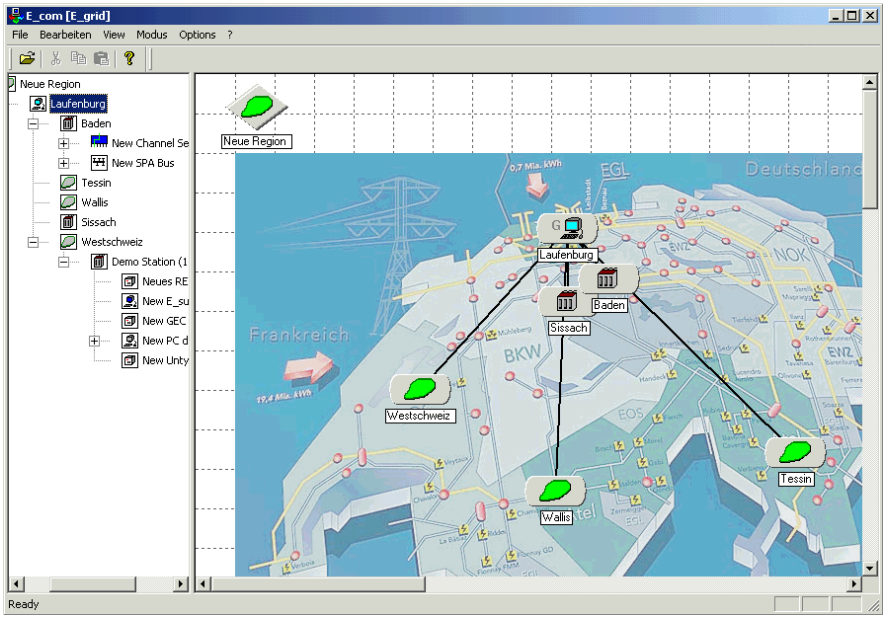


Fig. 4.1 E_com window layout

The main window size is saved according to the current user.

4.3. Status bar

The PSM E_com status bar displays information supporting the user when working with the program.

- Short description of menu commands
- Current operation mode
- Current PSM E_database instance

Fig. 4.2 E_com Status bar

4.4. E_com User interface symbols

This section describes the symbols in the PSM E_com user interface and their meaning.

4.4.1. Power network structure

The network structure symbols are describing the topology of the power network.

Symbol	Description
	Represents a logical or geographical region of the power network. A region may contain other regions.
	Represents a substation. A substation is located in a region and contains communication equipment and disturbance recorders.

4.4.2. Communication equipment

The communication equipment is located in substations except for the PSM installation located in the top region of the network.

Symbol	Description
	Represents a PC with PSM E_com installed. A PC with PSM installed exists in a region
	Represents a PC that contains disturbance data.
	Represents an ABB SPA ZC-22 optical bus.
	Represents a SEL 2030 (Channel Selector).

4.4.3. Disturbance recorders

Disturbance recorders are located in substations and produces disturbance files that is the main input to the PSM system.

Symbol	Description
	Represents an ABB RE..16 disturbance recorder.
	Represents an ABB Indactic (I65, I650) disturbance recorder.
	Represents one of the disturbance recorders REL300 (MDAR), REL301, REL302. REL350, REL352, REL512.
	Represents an GEC Optimho LFZP11x,12x,15x disturbance recorder.
	Represents a SEL321 disturbance recorder.
	Represents an unspecified disturbance recorder.

4.5. Navigation

PSM E_com follows the usual conventions when using Windows programs. The PSM E_com application window is divided into a left side with a tree structure of objects similar to a directory tree (called Tree view) and a right side (called Scroll view). The size of both is variable.

In both views the user navigates upwards and downwards by clicking on the respective objects. Right clicking on an object displays its context menu with the available functions.

4.5.1. Navigating in the scroll view

The user navigates in the scroll view by double-clicking appropriately on regions and substations. In both cases the user gains access to the respective region or substation.

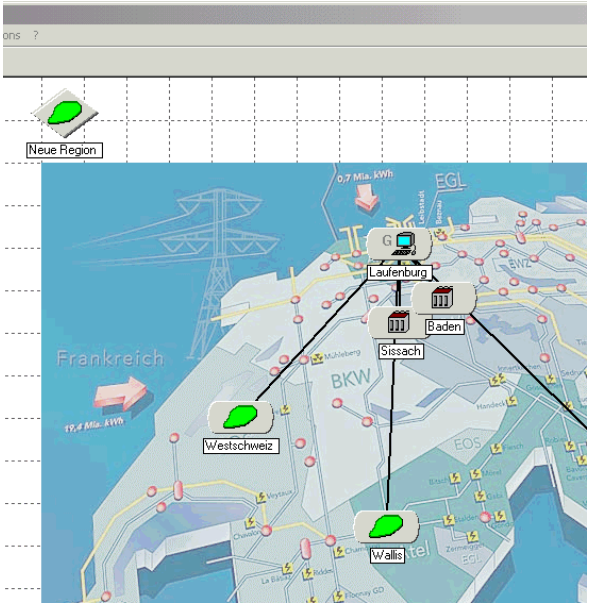


Fig. 4.3 Navigating in scroll view

Move up to the next region by double-clicking on the Substation button.

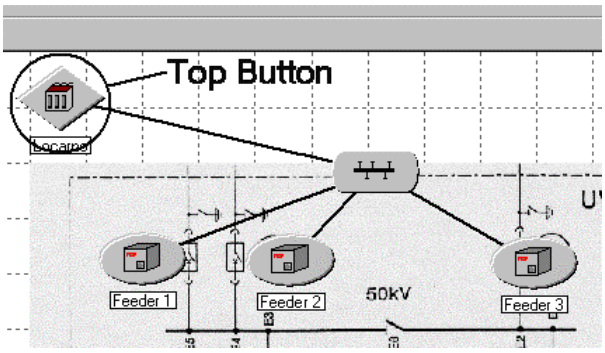


Fig. 4.4 Top button

A double-click on the other objects has no effect.

4.5.2. Navigating in the tree view

Navigating in the tree view is similar to navigating in Windows Explorer. Clicking on the plus and minus signs opens regions and substations. Double-clicking on a unit or device displays the corresponding substation in the scroll view.

4.6. Modes of operation

PSM E_com operates in one of three modes

- Control Mode
- Configuration Mode
- Automatic Mode

as described in the next three sections. The Control Mode and the Automatic Mode are accessible for PSM Operators while the Configuration Mode is exclusively accessible for PSM Configurators. See Section 2.5, User management for more information about user handling.

4.6.1. Control Mode

The Control Mode is used by PSM Operators to supervise the transfer of disturbance data from substations in the PSM transmission network model.

Fig. 4.5 Control Mode menu

The following operations are available in the Control Mode:

- Navigation through the PSM transmission network model
- Transfer of disturbance recorder data
- Starting evaluation of disturbance recorder data
- Deletion of disturbance recorder data
- Starting and stopping the Automatic Mode
- View log records, see Section “Viewing the system log”.
- Change the language; see Section “Changing the application language”.
- Ordering a license key for PSM E_com, see Section “Ordering a license key”.

The program is in the Control mode when started as a member of PSM Operator group.

4.6.2. Configuration Mode

The Configuration Mode is used by PSM Configurators and gives access to all functions necessary to configure the PSM system.

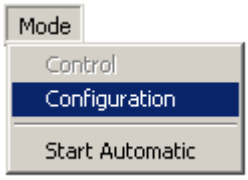


Fig. 4.6 Configuration Mode menu

The Configuration Mode includes all functions of the control mode plus the following:

- Creating, deleting and editing system objects in the PSM database.
- Arranging system objects in the scroll view.
- Modifying E_com configuration parameters.
- Importing disturbance recorder configuration information.
- Importing substation descriptions from existing PSM databases.
- Configure the Automatic Mode.

The user switches between Control Mode and Configuration Mode by using the Mode menu or by pressing the shortcut key combination

CTRL + TAB

A grid is superimposed on the scroll view to indicate that the configuration mode is active. Return to the Control Mode by using the Mode menu or CTRL + TAB.

4.6.3. Automatic mode

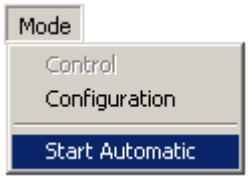


Fig. 4.7 Automatic mode menu

The Automatic Mode collects disturbance data from selected substations by polling cyclically or by listening to disturbance data notifications.

Substations equipped with a PSM E_com installation can benefit from efficient disturbance data transfer by using the Spontaneous Data Transfer functionality. For more information see Section 8.

The PSM E_com installation on the remote computer is configured to send notifications to the local E_com installation when new disturbance data are available on the remote computer.

The local computer reacts on the notification and transfers the new disturbance data from the remote computer to the local computer.

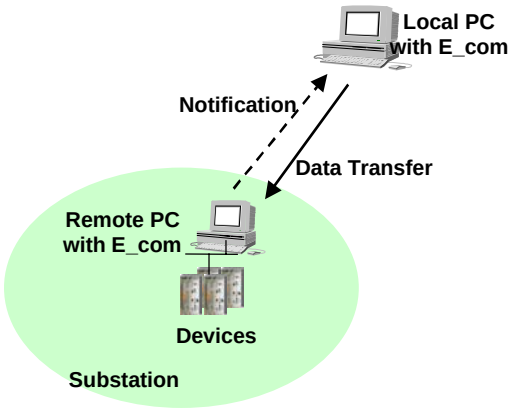


Fig. 4.8 Spontaneous Data Transfer

This functionality saves costs and communication time when two computers are connected via modems by avoiding unnecessary communication using shared resources, e.g. phone lines.

4.7. E_com system log

E_com logs information about system operations in a system log. The user can view the system log at any time during system operation.

The maximum size of the system log file is set to 1 Mbyte and a copy is generated if this limit is reached.

The log files contain important information for both the user and in the event of a failure, also for our support services. If you contact our customer support for assistance we strongly recommend sending your latest log files with your support request.

Log files are simple text files that can be printed without difficulty.

4.7.1. Viewing the system log

To inform the user of system status and the result of system operations, E_com includes a log function and a system log window, which can be viewed by selecting Log window in the View menu:

Fig. 4.9 View the Log Window

All system operations, e.g. transferring files are logged. All error messages from system operations are logged

It is recommended to have the system log window open when working with E_com so as to notice new messages without delay.

4.7.2. *Log message categories*

Error messages are divided into three categories as follows:

Category	Description
WARNING	A warning message indicates a temporary fault and does not impair the system operation, E.g. a temporary interruption of communication.
ERROR	An error message causes a system function to fail, E.g. no communication can be established with a relay.
FATAL	A fatal message indicates that the system has encountered an internal error. Further operation of E_com is impossible. The system must be restarted.

4.7.3. *Advanced logging information*

E_com generates additional log files when communication with relays or computers is established, depending on which type of communication is used in the system.

All log files are plain text files and generated in the \logs directory. Below is a short description of the additional log files:

File	Description
UserLog.txt	This file is displayed in the log window.
DebugLog.txt	This file contains detailed information about E_com operation for tracing purpose in case of errors. The information in this file is in English.
E_StreamConnection DebugLogFile.txt	Relay communication log file for tracing purpose in case of errors. The information in this file is in English.
E_RASConnectionDebugLogFile.txt	RAS communication log file for tracing purpose in case of errors. The information in this file is in English.

4.8. *Security*

E_com includes user authentication based on Windows security. You can explicitly control which logged on Windows users who are authorized to use the system and which tasks the user can perform. The PSM system defines two groups with users authorized to use PSM:

- PSM Operators
- PSM Configurators

A windows user which not member of one of these groups will not be authorized to use PSM.

This also applies to users dialling up from remote. A user attempting to establish a connection with another PC via RAS must also be registered and authorised on the other PC as well as the local one

To add users to the PSM user groups, see section "Enabling PSM to existing user"

4.9. Help

Help is obtained on-line by selecting the Help menu or by pressing F1.

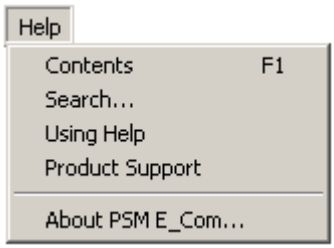


Fig. 4.10 Help Menu

This provides access to the contents of this document on-line. The on-line help is the first place to look when encountering problems with E_com.

Menu item	**Description**
Contents	Displays the contents of the E_com help file.
Search…	Displays the search tab for typing in a help topic to search for.
Using Help	Displays instructions on how to use this help system (HTML help).
About PSM E_com	Displays software version and licensing information.

4.10. Changing the application language

To change the language used by the system, select Change Language… in the Options menu:

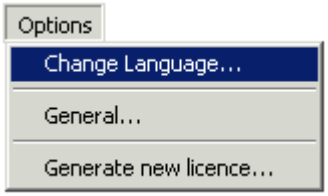


Fig. 4.11 Change Language in the Option menu

This opens a dialog that allows you to select a language from the list of available languages:

Fig. 4.12 Rapid Translation dialog

The selected language becomes effective immediately after pressing OK.

4.11. Product support

This section describes how to contact the technical support for PSM E_com.

4.11.1. Contact address

If you have questions about PSM E_com, contact our SA-LEC support via the following address:

ABB Switzerland Ltd, Utility Automation Systems

SA LEC Support

Bruggerstr. 72

CH-5400 Baden

Switzerland

Email: sa-lec-support@ch.abb.com

Phone: +41 (0)844 845 845

FAX: +1 425 928 1513

4.11.2. Technical questions

If you have technical question concerning PSM E_com, please refer to the printed user documentation or the on-line help, which can be accessed via the Help menu. You may also find README files on the PSM installation CD that contain additional information.

4.11.3. Updates

As a licensee of PSM E_com, you will be kept informed of product updates (e.g. new versions of E_com), training courses and other events.

4.11.4. Improvement suggestions

If you have suggestions on how E_com can be improved, please let us know.

Your suggestions are very helpful to us in our efforts to improve the product.

4.11.5. Reporting software errors

In case of a software error, we need the most precise description possible to be able to reproduce the error.

- Exact E_com program designation including the version number. This information can be obtained using the command Help/About E_com.
- Language used in E_com.
- Installed operating system with version number and service pack number (if installed).
- Version number of installed Microsoft Internet Explorer.
- Version number of installed Microsoft SQL Server database.
- Type designation of the computer on which the software is installed.
- CPU, main memory available, free space on hard disk.
- Communication equipment information; type of modems if installed.
- The exact wording of error messages that are shown on screen (include screen shots if possible).
- A description of what happened, and what you did when the problem occurred. Include screen shots if possible.
- Can the behaviour be reproduced? Only on your computer?
- If applicable, a description of what you did to remedy or circumvent the problem.
- Copies of all log files produced.

4.12. Terminating PSM E_com

To stop PSM E_com select Exit from the File menu.

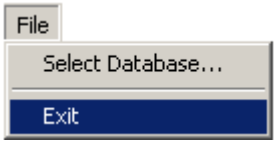


Fig. 4.13 Exit E_com

5. Engineering a PSM system with E_com

5.1. Overview

E_com is the PSM system configuration tool. E_com handles the complete engineering of a PSM system. All configuration data used in a PSM system is created by E_com and saved in the PSM system component E_database.

The PSM System Configuration process is simple and object oriented.

Advantages:

- The PSM system engineering process is controlled at one single place.
- Access to system configuration data in E_database is protected with PSM security based on the Microsoft Windows 2000 security model.
- All PSM components work on the same system configuration

E_com contains the PSM component E_navigate that together with E_database forms the base of PSM.

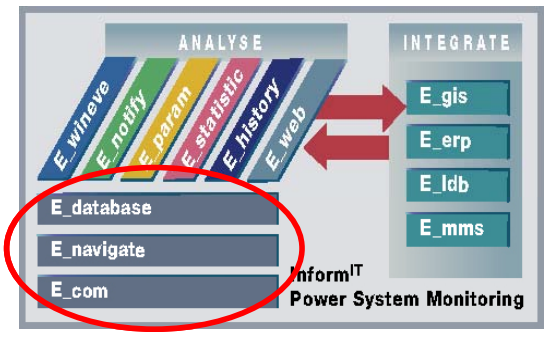


Fig. 5.1 PSM component overview

This base package must be installed and used before you can work with additional PSM components e.g.

- E_wineve
- E_notify
- E_statistic
- E_web

5.2. Engineering fundamentals

The complete engineering of a PSM system is done with PSM E_com in Configuration Mode (see section 4.6). All engineering operations are available to the user through context menus accessible on all visible objects or through dialogs called from toolbar menus.

Note: Engineering must be done in Configuration Mode (see section 4.6.2).

The following sections describe the fundamental engineering operations in PSM E_com.

5.2.1. Creating objects

Clicking the right mouse button on an object displays a context menu opens with the menu item Create.

Selecting the menu item Create opens a submenu with a list of creatable objects. Select the object type you want to create.

Note: The available selection of creatable objects is context dependent, e.g. a recording station must be created in a substation.

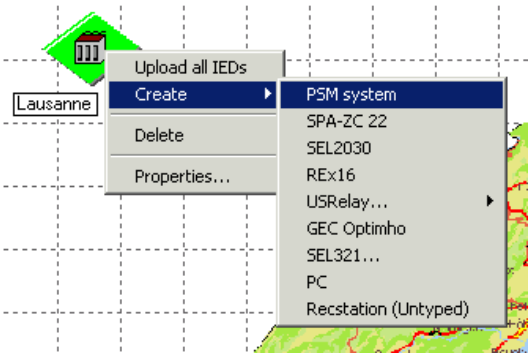


Fig. 5.2 Creating a PSM system in substation Lausanne

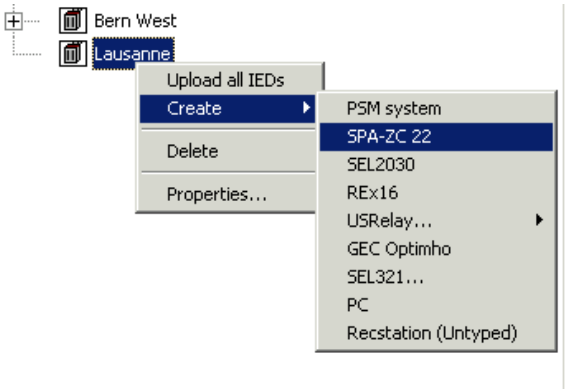


Fig. 5.3 Creating a SPA-ZC-22 in substation Lausanne

The new object now appears in the tree view and the scroll view.

Move the new object icon to its desired position in the scroll view by using drag-and-drop.

5.2.2. Viewing object properties

Configuration data for an object is entered through its property page. View the properties by right clicking the icon and select Properties… as shown in the example below.

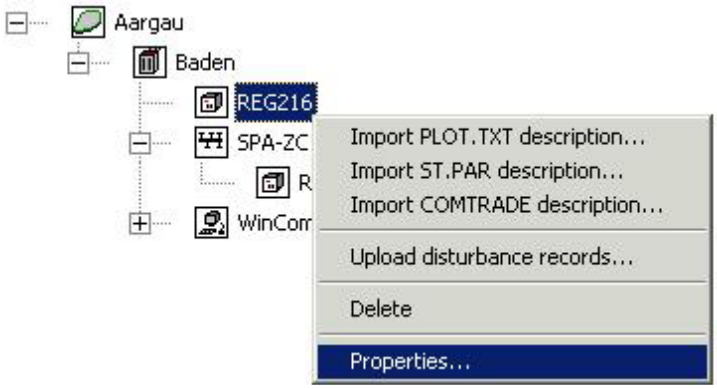


Fig. 5.4 Viewing the properties of a REG216

The property page below appears:

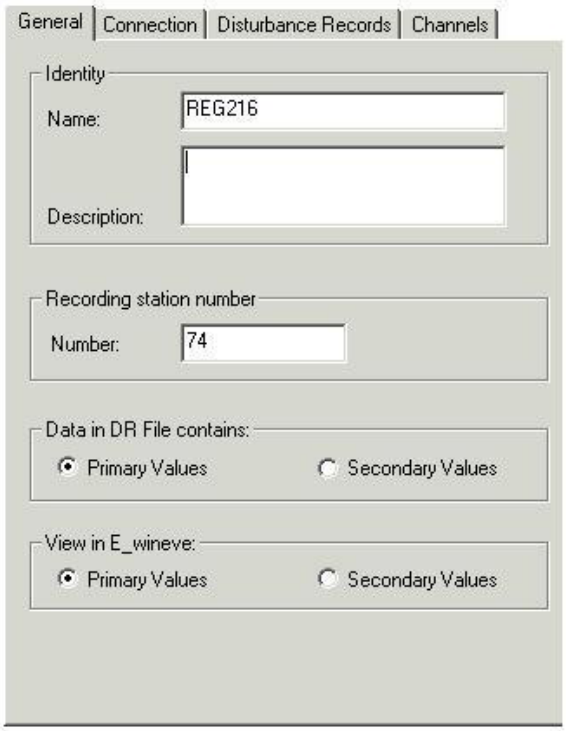


Fig. 5.5 Object properties

Note: PSM Configurators can edit object properties in Configuration Mode. PSM Operators can view but not edit object properties.

5.2.3. Deleting objects

All objects except the topmost region and its PSM system can be deleted in the tree or scroll view. Delete an object by right clicking the icon and select Delete. The object disappears from the scroll view and the tree view.

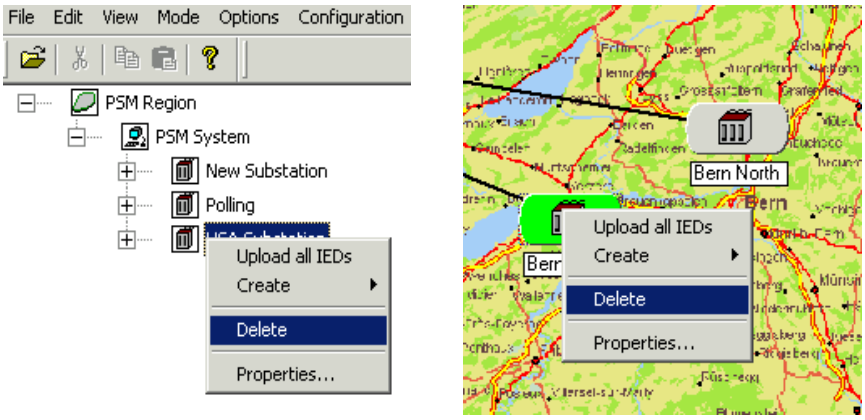


Fig. 5.6 Deleting a substation

Note: All objects below will be automatically deleted, e.g. deleting a region containing three substations will delete the region and the three substations.

5.2.4. Undoing an operation

Selecting Edit=>Undo or pressing CTRL+Z can restore an object that has been deleted by mistake

Fig. 5.7 Undoing a create command

The Undo command reverses the last operation.

5.2.5. Redoing an operation

After undoing an operation you can redo the operation by selecting **Edit=>Redo** or by pressing CTRL+Y.

Fig. 5.8 Redoing a create command

The redo command reverses the last undo command.

5.3. PSM Engineering Tasks

The engineering tasks in PSM consists of one standard procedure and customized procedures depending on what you want to model. Here are some common engineering tasks:

- Transmission Network Modelling – Create and populate a new PSM system database with primary and secondary equipment.
- Disturbance data collection – The PSM system is configured to collect disturbance data in manual or automatic mode with PSM E_com.
- Disturbance data collection and evaluation on Substation level - The PSM system is configured for automatic disturbance data collection, evaluation and fault location. PSM E_com and PSM E_wineve can be used in Automatic Mode.
- Disturbance Data Analysis and Evaluation on control center level – The PSM system is configured for analysis and evaluation of disturbance record files with PSM E_wineve. PSM E_com and PSM E_wineve can be used in Automatic Mode.

5.3.1. Transmission Network Modelling

Prerequisites: transmission network size, region and substation naming convention. The network's regional structure, the number of substations, names of all substations and regions.

1. Create your system database using the installation CD, See Chapter "Installation of PSM E_com".
2. Design the regional structure of your network by creating regions and/or sub regions. Assign name and description to each region by editing the corresponding properties.
3. Create the required number of substations in each region. Assign a name and a description to each substation by editing its properties. See Chapter "Creating and Configuring a PSM transmission network".

5.3.2. Disturbance data collection

This section describes how you create and configure the different disturbance data transfer mechanisms.

Follow the steps below to configure if you want to use PSM exclusively for transfer of disturbance data.

Prerequisites: Completed Transmission Network Modelling.

1. Configure the Connection and Disturbance Record properties of the root PSM system object.
2. Create an PSM system object in each substation where PSM is installed to allow subscription to disturbance data.
3. Configure the remote PSM systems Connection and Disturbance Record properties.
4. Create an File Server object in all substations where 3rd party software is installed for local collection of disturbance data. This enables remote disturbance data collection with PSM E_com from remote substations equipped with a PC accessible via remote access.
5. Configure the File Server Connection and Disturbance Record properties.
6. Create additional communication equipment in the substations and disturbance recorders in the respective substations. Configure the Connection and Disturbance Record properties of the communication objects.
7. Verify that all communication channels works by performing a manual upload from each disturbance data source, See section Manual disturbance data collection.
8. Configure the Automatic Mode properties. See section Automatic disturbance data collection.

5.3.3. Disturbance data collection and evaluation on Substation Level

Follow the configuration steps below when you intend to use PSM to automatically collect, analyze and evaluate disturbance data on substation level:

Prerequisites: Transmission Network Modelling.

1. Create a File Server object in your substation if it has 3rd party disturbance data upload software installed. Edit the Connection and File upload properties.
2. Create disturbance recorders and additional communication equipment in the substation. Edit the Connection and Disturbance records properties.
3. Import existing configuration information (STnnn.PAR, PLOT.TXT or .CFG file).
4. Create transmission lines and configure the transmission line properties.
5. Create feeders in your substation for each incoming transmission line.
6. Connect the transmission lines to the substation.
7. Map the Edit the Channels properties for each disturbance recorder.
8. Configure the automatic mode of E_com and E_wineve.

The PSM system now ready to operate in manual or in automatic mode.

5.3.4. Disturbance Data Analysis and Evaluation on Network Level

Follow the steps below if you want to use PSM for analysis and evaluation of disturbance data on central network level.

The following configuration steps describe the minimal configuration for evaluating disturbance data with PSM E_wineve. For more information see the PSM E_wineve manual.

E_wineve requires configuration information from the PSM database, E_database. This configuration data is produced with E_com.

Prerequisites: Transmission Network Modelling.

1. Create an PSM system object in each substation where PSM is already installed.
2. Edit the Connection, File Upload and Database properties of each PSM System object.
3. Import existing substation descriptions from the remote PSM Systems. See Section Substation Import.
4. Verify all properties the imported substation and all system objects it contains. Including Transmission Lines, Feeders and
5. Verify the Signal Engineering by viewing the Channels properties on all disturbance recorders. For more information on Signal Engineering, see Signal engineering.
6. Create the required disturbance recorders in the remaining substations.
7. Import existing configuration data for all disturbance recorders. See Disturbance recorder import.
8. Complete the line and feeder configuration, see Attaching transmission lines.
9. Complete the Signal Engineering per Substation for each Disturbance Recorder. See Channels properties.
10. Configure the Automatic Mode of E_com and E_wineve.

The PSM system now ready to operate in manual or in automatic mode.Creating and Configuring a PSM transmission network.

5.4. PSM model description

The PSM transmission network is based on a hierarchical model of substations located in geographical regions. Transmission lines connect substations and forms a power network grid.

The transmission network consists of primary and secondary equipment.

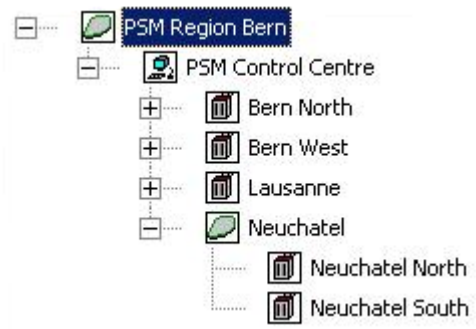


Fig. 5.9 PSM transmission network

- A region can be nested within other regions
- A substation is always located in a region
- Transmission lines connect substations through feeders.

Note: A new PSM database always contains a predefined starting point for creating a PSM transmission network:

- The topmost region for the transmission network
- The E_com system, monitoring the transmission network.

The topmost region in the tree view corresponds to the location where your PSM system is installed, which can be in a power system control centre or in a substation.

A region can include:

- Regions
- Substations.

Three types of substations are distinguished in PSM depending on their contents as shown below:

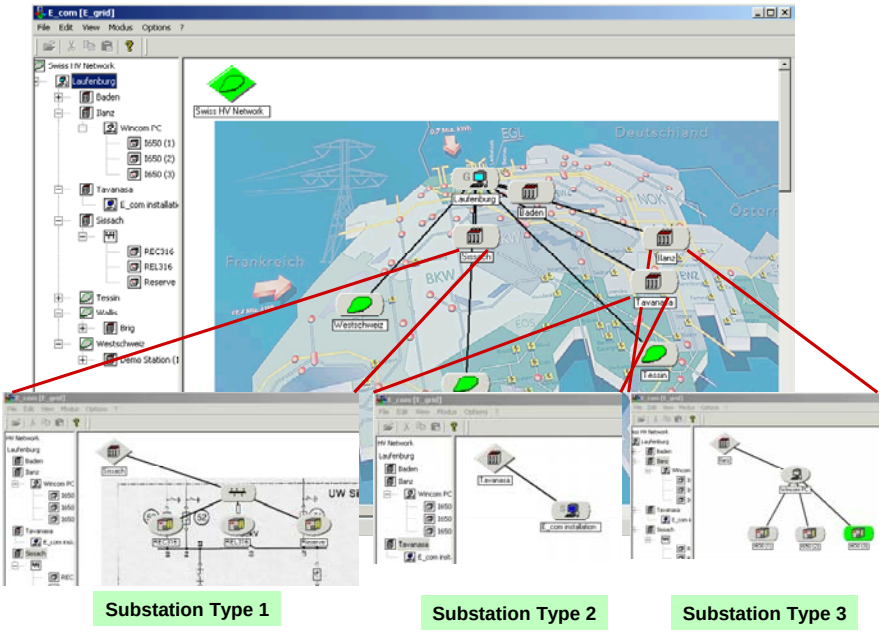


Fig. 5.10 PSM substation types

PSM Substation Type 1:

This substation type does not have a computer installed. All communication is done directly with the disturbance recorders or via communication equipment like modems directly attached to buses. A PSM Substation Type 1 can contain the following disturbance recorder types:

- RE..16, REL300 (MDAR), REL301/302, REL350/352, REL512, SEL321, GEC Optimho

RE..16 disturbance recorders can be connected via a ZC-22 bus. Any disturbance recorder can be connected via a SEL2030.

PSM Substation Type 2:

This substation type has a computer with PSM installed. The PSM installation is responsible for transferring disturbance records from the recorders inside the substation. The PSM Substation Type 2 contains:

- PSM System installation
- Imported disturbance recorders and communication equipment.

PSM Substation Type 3:

The third substation type has a computer installed but without a PSM system. Third party software for disturbance data collection is installed. The PSM Substation Type 3 contains:

- A computer accessible via LAN or WAN providing disturbance data produced by installed 3rd party disturbance data collection software.
- Indactic disturbance recorders.
- General disturbance recorders.

This substation type is used if 3rd party disturbance recording systems are used to transfer the disturbance data from the disturbance recorder to the computer.

5.5. Primary equipment

This section describes the various primary equipment types in the PSM system.

5.5.1. Region

The Region is a browseable geographical area containing substations and sub regions. Regions are helpful for structuring larger amounts of substations.

Regions may be nested, meaning that a region can contain other regions.

5.5.1.1. Properties

Configure the properties of the region by right clicking the icon and select **Properties** from the context menu.

Name

A human-readable name of the region.

Description

A human readable description of the region. This text appears as tool tip when the mouse is moved over the icon in the scroll view.

Background

Allow you to select a bitmap background for this region. Press the change button to select a bitmap file. PSM E_com can use bitmaps for the backgrounds of displays, their size being limited to 950 x 950 Pixels or 25 x 25 cm. Larger bitmaps are cut off at the bottom and right-hand edges.

Transfer

Check this box to include this region in automatic disturbance recorder upload.

5.5.2. Substation

Substations contain feeders, disturbance recorders and communication equipment.

5.5.2.1. Properties

Configure the properties of the new substation right-clicking the icon and select **Properties** from the context menu.

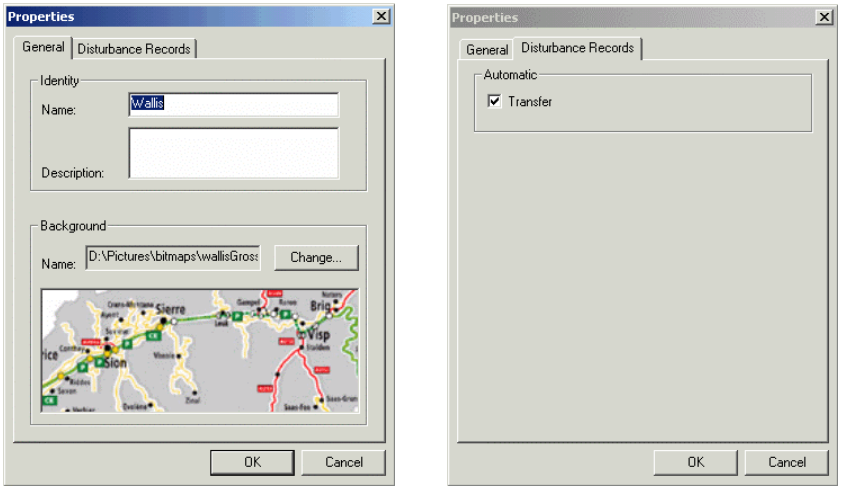


Fig. 5.11 Substation properties

Name

A human-readable name of the substation.

Description

A human readable description of the substation. This text appears as tool tip when the mouse is moved over the icon in the scroll view.

Background

Allow you to select a bitmap background for this substation. Press the change button to select a bitmap file. PSM E_com can use bitmaps for the backgrounds of displays, their size being limited to 950 x 950 Pixels or 25 x 25 cm. Larger bitmaps are cut off at the bottom and right-hand edges.

Transfer

Check this box to include this substation in automatic disturbance recorder upload.

5.5.3. Feeder

A feeder defines a transmission line connection point. A substation can contain any number of feeders.

Use the Line and Feeder configuration dialog to create and configure feeders. Select Line and Feeder Configuration… from the Configuration menu:

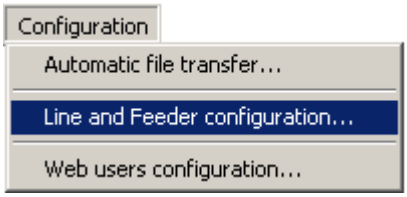


Fig. 5.12 Line and Feeder configuration

Select a substation in the drop down box. The list box below contains the names of all existing feeders for the selected substation.

Note: Feeders are not visualized in the scroll view.

To connect a power line to a substation, a feeder must be created or available.

Create a new feeder by selecting your substation in the drop down list of the Feeder Management dialog and pressing the button **Add Feeder…**

Delete a specific feeder from your substation by selecting the feeder name in the list and pressing **Delete Feeder**.

Feeders may be already defined, if existing configuration data for devices in the substation are imported, see “Importing Configuration Data”.

Assigning feeders to the device signals is described in ”Channel configuration”.

5.5.3.1. Properties

Name

The feeder name, e.g. D01. The name must be unique within the substation.

5.5.4. Transmission lines

This section describes how to create and configure transmission lines. A transmission line connects any pair of two substations via feeders.

Note: Transmission lines are not visualized in the scroll view.

Select Line and Feeder Configuration… from the Configuration menu to create and configure transmission lines:

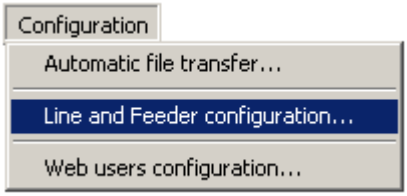


Fig. 5.13 Line and Feeder configuration

The complete configuration of a transmission line connecting consist of the following steps:

1. Select the substation
2. Create the required amount of feeders in the selected substation.
3. Create and configure the name and the properties of the new transmission line.
4. Attach the line to substations and feeders.

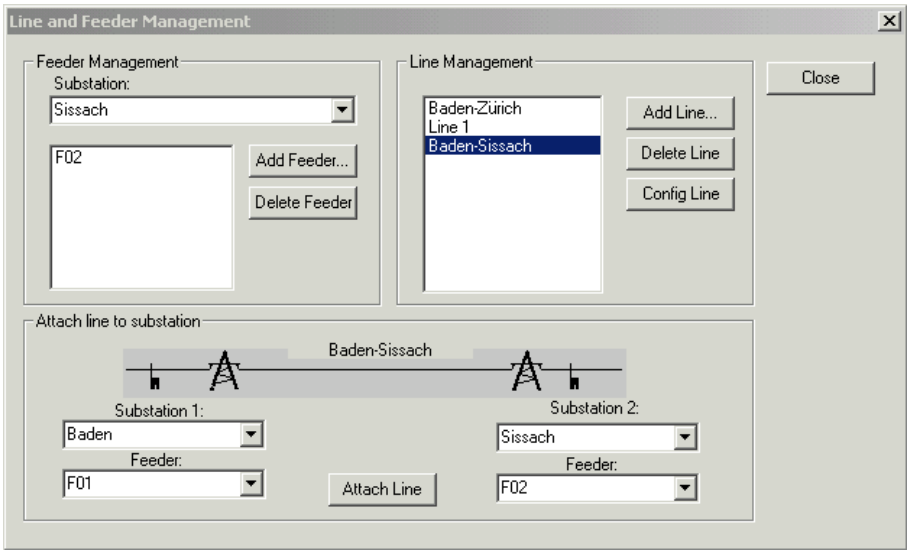


Fig. 5.14 Attaching a line to a substation

The list box in the line management part contains a list of all defined lines in the system. Create a new line by pressing **Add Line…** In the following dialogue, enter the name for the new line.

To delete a line from the list, select the line and press **Delete**.

Lines may be already defined, if existing configuration data for devices in the substation are imported, see Section 6.1, ”Substation Import”.

5.5.4.1. Properties

Select a line in the Line Management list box. The button **Config Line** becomes available. Pressing Config Line displays the following dialog:

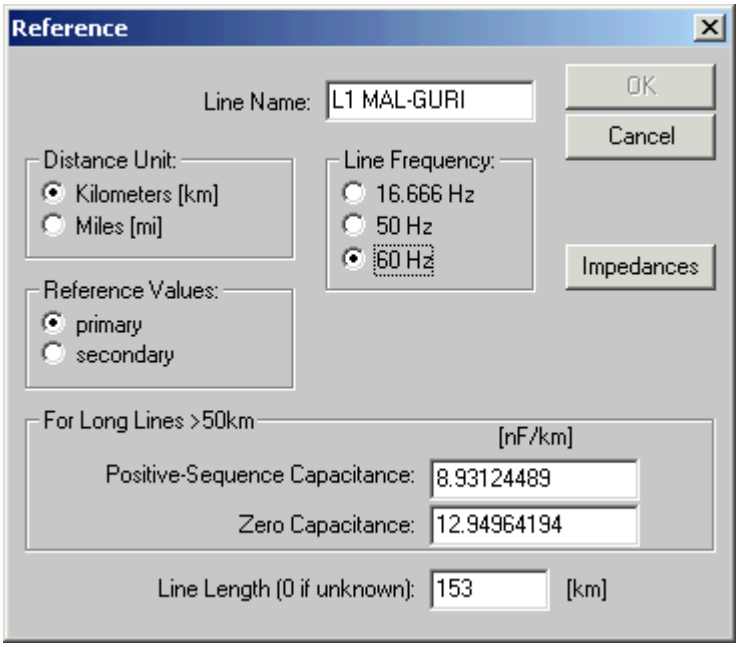


Fig. 5.15 Line *Reference* dialog

The *Reference* sub-dialog shows the following parameters:

Line Name

The line name can be any name with 1 to a maximum of 32 letters.

Distance Unit

Specifies the unit (km or miles) that is used together with the *Line Length:* field and that is used in the fault result files that are produced by an execution of the PSM E_wineve **Fault Location** or **Expert Evaluation** functions.

Line Frequency

The frequency of the transmission line (usually 50 Hz or 60 Hz) 16.7 Hz is only used by the electrical grids of some railway companies. **Note**: This is a very important configuration parameter to obtain correct results of the PSM E_wineve **Fault Location, Expert Evaluation** and **Phasor and Impedance Display** functions.

Reference Values

If *primary* was chosen, the values that are recorded in the disturbance file are the real values (voltages, currents) from the high-voltage part of transmission line. If *secondary* was chosen, the values from the disturbance file are the ones that are output from the instrument transformer that is installed between the high voltage equipment and the measurement equipment of the disturbance-recording device. Secondary values are much smaller than primary values, because the measurement equipment cannot measure such big values from the high-voltage part. This parameter is important for the PSM E_wineve **Fault Location** or **Expert Evaluation** functions to correctly interpret the measurements from the disturbance file.

Positive-Sequence Capacitance, Zero Capacitance

The parameters for the line capacitance may be defined here for use of the PSM E_wineve **Fault Location** algorithm. The influence of capacitance can be ignored if the line is less than 50 km in length. The following value range is usually meaningful:

- Positive sequence capacitance: 9 to 14.5 nF/km
- Zero sequence capacitance: 5 to 25 nF/km

Line Length

This parameter specifies the length of the line, measured in the unit that has been selected in the *Distance Unit:* section.

Impedances button

Displays the **Line Impedances** dialog:

The *Reference* sub-dialog of *Parameters => Line* dialog shows some line impedance parameters of the transmission line that influence the results of the PSM E_wineve functions **Fault Location** and **Expert Evaluation**. It is important that you should have the most accurate information possible concerning your line data. The more precise the line data are, the better the results of the fault location will be. The line data are principally determined by the geometry of the line or the positioning of the line on the

high-voltage pylon and the arrangement of the line wires beneath one another.

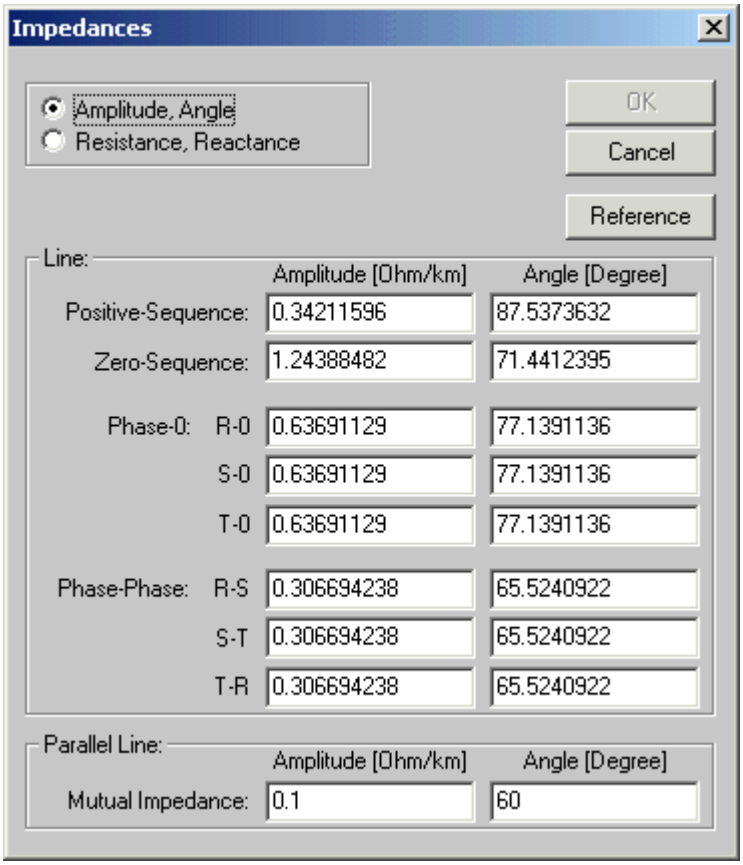


Fig. 5.16 *Impedances* sub-dialog of *Parameters => Line* dialog

The *Impedances* sub-dialog shows the following parameters:

Amplitude, Angle* and *Resistance, Reactance

The actual setting of this switch influences the representation of all other fields of this *Impedances* dialog. If *Amplitude, Angle* is selected, the first column shows all values as an amplitude (Ohm/km or Ohm/mile, depending on the *Distance Unit:* setting of the Line dialog) and the second column shows the angles of such impedance vectors in the complex algebra.

If *Resistance, Reactance* was chosen instead, the first column shows the resistance part (i.e. real part of the complex impedance vector) and the second column shows reactance part (i.e. imaginary part). The unit for both columns is Ohm/km or Ohm/mile, depending on the *Distance Unit:* setting of the Line Dialog.

Positive-Sequence, Zero-Sequence

The algorithm of the Fault Location is designed for overhead power lines. The value ranges for meaningful line data are as follows (assuming that *Amplitude, Angle* is selected):

- Positive seq. impedance amplitude: 0.27 to 0.42 Ohms/km
- Positive sequence impedance angle: 75 to 87 degrees
- Zero sequence impedance amplitude: 0.6 to 1.2 Ohms/km
- Zero sequence impedance angle: 65 to 85 degrees

However, you can also define values outside of the above ranges. For lines whose characteristic varies from above ranges (e.g. underground cable lines), it is possible that the fault location results are not correct. An error message is only displayed if a fatal error such as division by zero has been occurred during fault location.

Phase-0, Phase-Phase

The impedance from phase-to-zero and phase-to-phase are automatically calculated from the impedance values of the *Positive-Sequence:* (z1) and *Zero-Sequence*: (z0) fields, by the following formulae using complex algebra:

- For all three phase-to-zero impedances (Zp0):

  Zp0 = (2 * z1 + z0) / 3

- For all three phase-to-phase impedances (Zpp):

  Zpp = (z0 - z1) / 3

These phase-to-zero and phase-to-phase impedances should only be corrected if line symmetries have to be compensated.

Note: These values must be re-entered after every new data entry into the *Positive-Sequence:* and *Zero-Sequence*: fields, because in this case all phase-to-zero and phase-to-phase impedance values are automatically recalculated, superseding any manually entered values.

Mutual Impedance

This parameter is only needed if the influence of parallel lines is also considered in the Fault Location calculation (see *Parallel Line:* section of the Line dialog). It specifies the mutual impedance between the two parallel lines.

Reference button

Displays the Reference dialog.

5.5.5. Attaching transmission lines

After creating and configuring feeders and transmission lines, the lines shall be attached to the feeders in the substations.

1. Select the line in the *Line Management* list box.
2. Select "Substation 1". (Selecting "Substation 2" is not mandatory) and the corresponding feeders.
3. To attach the line to the selected substations and feeders, press then **Attach line** button.

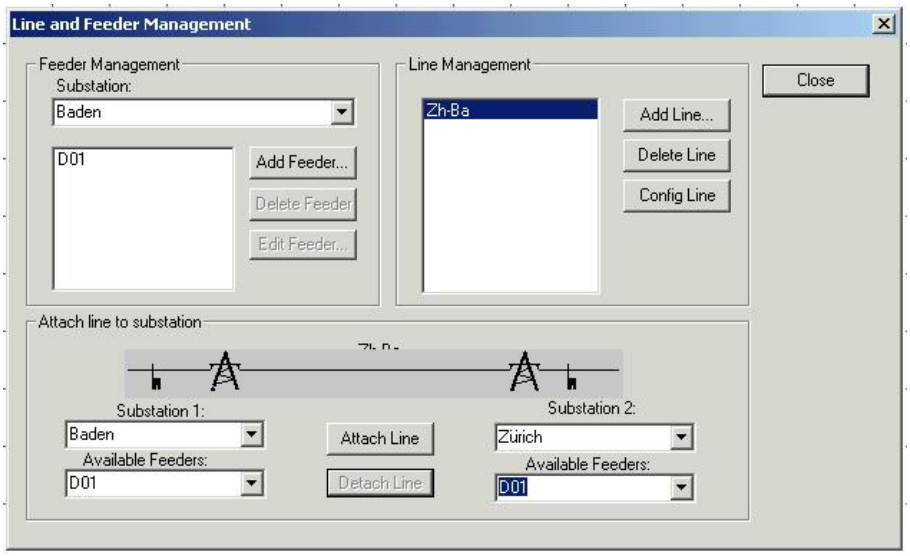


Fig. 5.17 Attaching the line Zh-Ba to substations Baden and Zürich

Check if a line is already attached to substations and feeders by selecting the line in the *Line Management* list box. The attached feeders and substations are automatically displayed.

When you want to update a binding, e.g. connect an open transmission line end to a second substation, pressing **Detach Line** is required. First select both substations and their feeders and then press **Attach Line**.

5.6. Secondary equipment

This section describes the different categories of communication equipment supported by PSM E_com.

5.6.1. Disturbance recorders

Disturbance recorders produce the fundamental input data to the PSM system in the form of disturbance data event files produced by the protection function of the disturbance recorder.

For information about communication and disturbance data upload, see Section 7, Manual disturbance data collection.

A disturbance recorder is always created inside a substation. See the figure below:

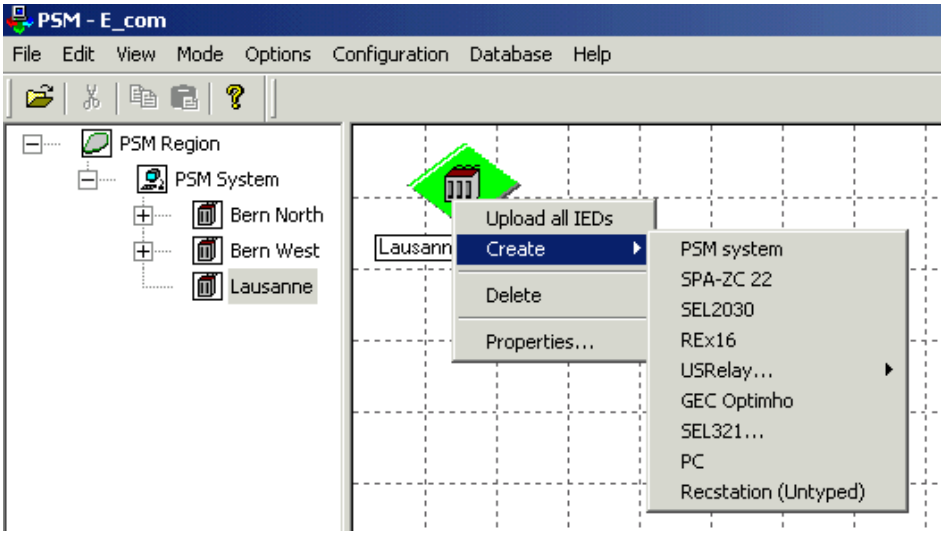


Fig. 5.18 Creating a disturbance recorder

5.6.2. General properties

This section describes the general properties of a disturbance recorder their meaning.

Fig. 5.19 General properties of a disturbance recorder

Name

Human-readable name of the disturbance recorder

Description

This field is a human-readable description of the disturbance recorder.

Number

Numerical identification in the range [1..999], unique within the substation where the disturbance recorder is located. PSM E_wineve uses this number when evaluating disturbance data produced by this disturbance recorder.

Disturbance Data Type

Indicates the type of values produced by this disturbance recorder.

View in PSM E_wineve

Indicates how the values produced by this disturbance recorder are visualized in PSM E_wineve.

5.7. Signal engineering

This section describes how PSM Configurators does signal engineering with PSM E_com.

Note: This configuration step is mandatory when using PSM E_wineve for fault location purposes or phasor impedance display.

5.7.1. Channels properties

Each recording station has a property page called Channels. This page defines which line signals are actually read by this recording station, that is, the connection between the primary and the secondary equipment.

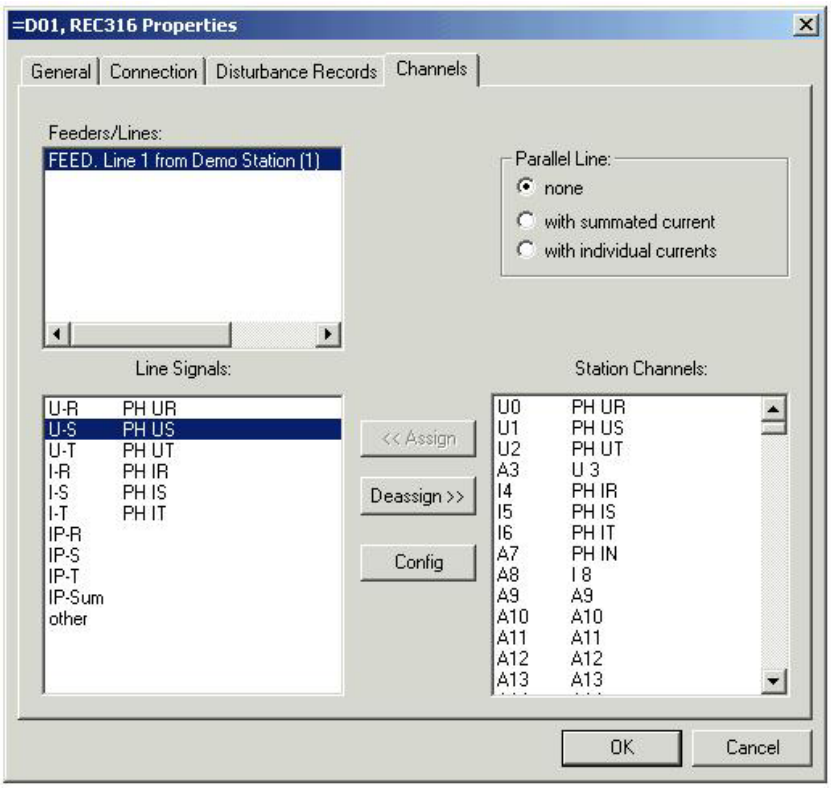


Fig. 5.20 Channels properties

Parallel Line

The setting of this section defines how the influence of a parallel line (which may give result deviations up to 20%) should be applied to a Fault Location or Expert Evaluation. A setting of *none* disregards this influence. If *with summated current* has been selected, the signal that has been assigned in the *IP-Sum* entry of the *Line Signals:* list is also handled in the fault location calculation. If *with individual currents* was chosen, the signals that have been assigned in the *IP-R, IP-S and IP-T* entries of the *Line Signals:* list is taken into account for the fault location calculation instead of the *IP-Sum* entry.

Feeders/Lines

The list Feeders/Lines contains all defined feeders and attached lines in this substation where the recording station is located. Select an assigned line and the corresponding line signals can be seen in the Line Signals list. See Section 5.5.5 Attaching transmission lines.

Station Channels

The Station Channels list contains the names of all physical channels defined for this disturbance recorder.

Line Signals

Station Channels need to be assigned to Line signals. To assign or deassign, select one signal in the Line Signal list and the corresponding Station Channel and press the appropriate button **<<Assign**, or **Deassign>>**.

To configure the line signals, select a signal in the list of Line Signals or Station Channels and press **Config**.

5.7.2. *Channel configuration*

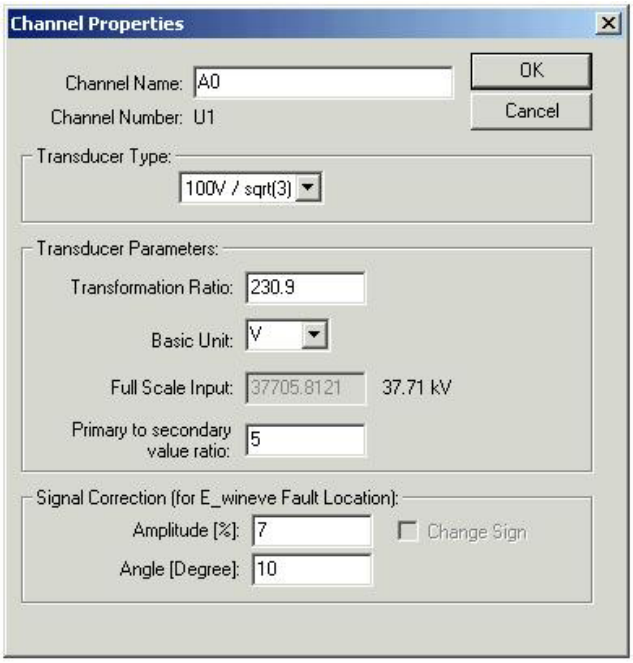


Fig. 5.21 Line signal configuration dialog

Channel Name

The signal name can be any name with 1 to a maximum of 32 letters. It must be unique within all analogue and digital channels of the same disturbance-recording device. This parameter can only be modified the configuration mode of E_com using the *Signal Config.* dialog of tab folder *Channels* of the *Properties* dialog of the recording station object.

Channel Number

This is an identification number that is used internally by PSM E_wineve.

Transducer Type

Shows a list of various current and voltage transformers that are used for Indactic® and some other types of disturbance recorders. If the actually used transformer of the corresponding disturbance recorder is not in this list, the value *other* may be selected (see also *Full Scale Input:* field). For Indactic® disturbance recorders the transformation ratios depend on the exact device type.

Transformation Ratio

This value defines the transformation ratio of the transformer, (Input/Output). The transformation ratio is directly influencing the Full Scale input.

Basic Unit

Defines the measuring unit of the analog signal, without any multiplication factors like e.g. k (kilo) or m (milli). E_wineve automatically calculates these multiplications wherever necessary.

Full Scale Input

Corresponds to the maximum input value (e.g. voltage or current) that can still be measured with the existing input and output values for the primary transformer and the source transducer used. This value is very important for E_wineve because it derives the physical values (like e.g. 220.3 kV, 1.5 A, etc.) from this input.

Primary to secondary value ratio

This value indicates the ratio between primary values (i.e. the original values on the high-voltage equipment) and secondary values (i.e. the values measured on the secondary side of a primary transformer or source transducer). A value of 1 indicates that this ratio is unknown. This ratio is taken into account in E_wineve depending on the settings of the *View in E_wineve:* section of the *Properties* dialog of the associated recording station object in E_com

Amplitude, Angle

The correction values for the amplitudes and the angles of the signals are mainly taken into account during Fault Location. The amplitude correction can be specified as a percentage value. A negative value means reducing the amplitudes. See the PSM E_wineve documentation for more information.

Change Sign

For current signals only (*Basic Unit* = A) the direction can be changed, which is equivalent as changing the sign of the current measurement. The direction of the current is dependent on the used conventions of an electrical power unit and has a significant influence on the results of a Fault Location and Expert Evaluation.

5.8. Communication Equipment

This section describes the communication equipment supported by PSM E_com. All communication equipment is created inside substations, by right-clicking the substation icon in Configuration Mode.

5.8.1. File Server

This object describes a computer providing disturbance data via one shared directory. The File Server has ABB or 3rd party software installed, collecting disturbance data from disturbance recorders, e.g. ABB WinCom collecting disturbance records from ABB Indactic 650 in batch mode.

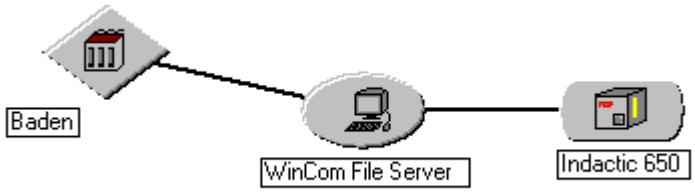


Fig. 5.22 File Server for an Indactic 650

PSM E_com does not control when files are produced on the file server and obtains disturbance data by polling the shared directory periodically.

5.8.2. PSM system

This object describes a computer within a substation with PSM E_com V1.5.0 or higher installed. The PSM system provides files via a shared directory, collected from its disturbance data sources as defined in the database of the PSM system.

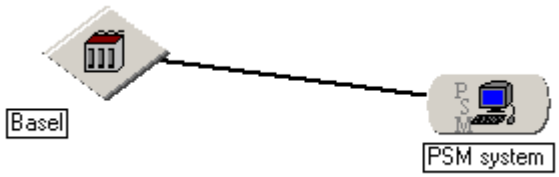


Fig. 5.23 PSM system

In addition to the file server, the PSM system allows:

- Substation import - importing disturbance recorder information from the remote PSM system database. This is

useful when evaluating disturbance data at grid level using PSM E_wineve.

- Spontaneous disturbance data upload, eliminating the periodical polling for disturbance data. The substation PSM system automatically notifies the supervising PSM system that disturbance data is available.

Note: When creating a PSM system in a substation, no additional equipment can be created except for using the Substation Import function. See Section 6.1, Substation Import for more information.

5.8.3. SPA ZC-22 Optical Bus

The SPA ZC-22 Optical Bus allows transfer of disturbance data from RE..16 disturbance recorders configured to use the SPA protocol. One ZC-22 can upload disturbance data from a total of 255 RE..16 disturbance recorders.

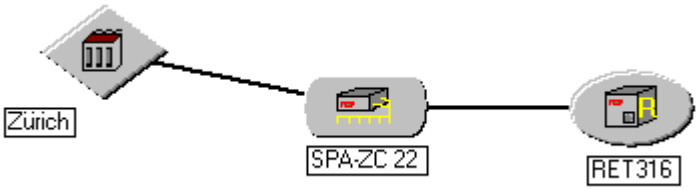


Fig. 5.24 SPA ZC-22 Optical Bus

For information about disturbance data upload using the SPA ZC-22 with RE..16, see Section 7.10, Communication properties.

5.8.4. SEL2030

The SEL2030 (Channel Selector) acts as a communication gateway to disturbance recorders. You can connect up to 16 disturbance recorders to the SEL2030.

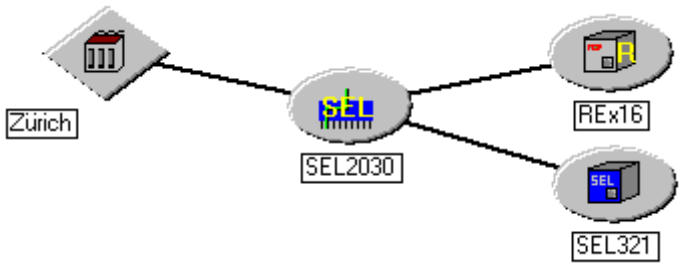


Fig. 5.25 SEL2030 with connected RE..16 and SEL321

For more information about uploading disturbance data using the SEL2030, see Section 7.19, SEL2030 Channel Selector.

6. Importing Configuration Data

PSM E_com allows you to import existing configuration data to speed up the signal engineering process when configuring PSM for disturbance data evaluation with PSM E_wineve. The PSM Configurator can do the following:

- Import a complete substation configuration from an existing PSM database.
- Import disturbance recorder information from a **COMTRADE** disturbance file. By importing an **STnnn.PAR** file you can easily migrate data from earlier wineve projects into PSM. The **PLOT.TXT** import allows you to import an RE..16 configuration generated by ABB's CAP2/316 tool and it predecessor DOS HMI.

6.1. Substation Import

Substations created in other PSM databases can be imported into your database by using the command "Import substation". The result is a new, fully browseable PSM substation in your database.

Note: Substation import requires correct configuration of database remote access, see Section 9.2, "Database access".

Note: Disturbance data file transfer from the imported substation is performed via polling the PSM installation or via Spontaneous Data Transfer. Manual disturbance data upload of imported disturbance recorders is not possible.

Create a substation containing a PSM System object and edit the Connection and Database properties. For more information about remote access to databases, see Section 9.2, "Database access".

Choose “Import PSM substation…” by right-clicking the substation:

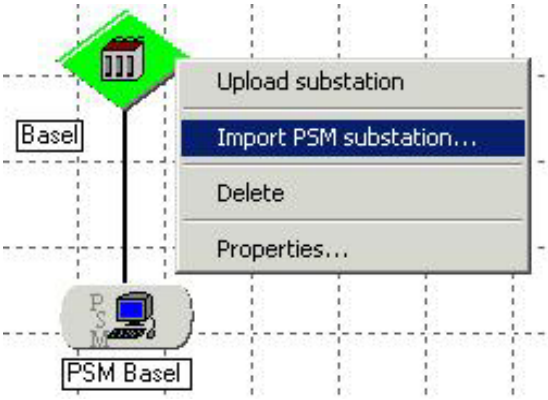


Fig. 6.1 Importing a PSM substation

Now select a substation to import from the list and press the “Import Substation” button. The imported substation and its contents are now browsable.

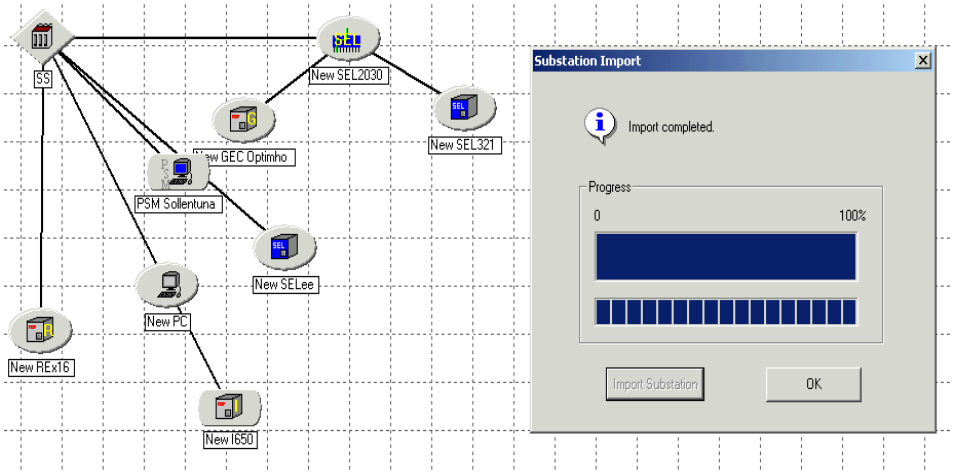


Fig. 6.2 Completed substation import

Importing a substation also imports transmission lines connected to the substation. If a transmission line already exists with the same name a dialog will ask if you want to overwrite the existing line. By pressing ‘No’, a line will be created with a unique name by adding an extra prefix to the name that already exists.

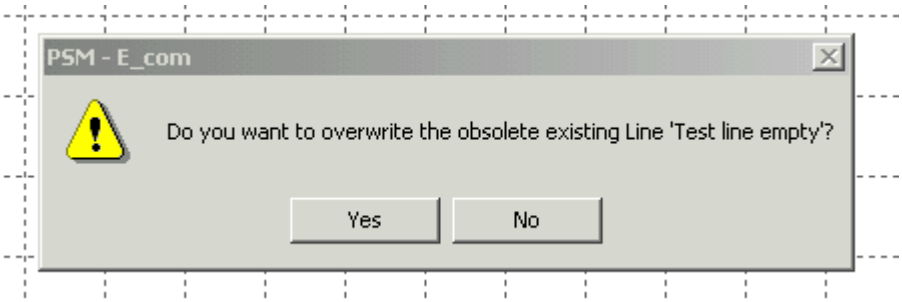


Fig. 6.3 Overwriting a line

An imported line can be renamed in the Line and feeder configuration dialog.

If a line with the same name as an imported line is in use in your database, substation import will ask if you want to connect the existing line to your substation:

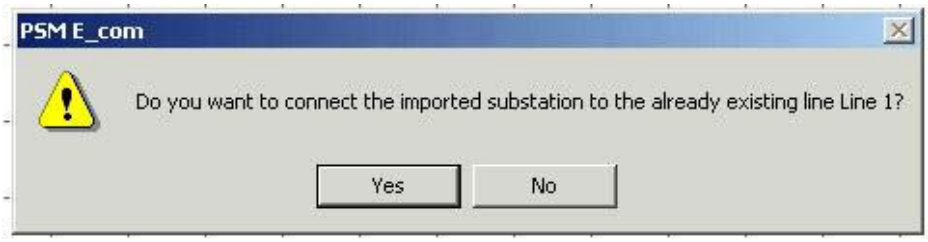


Fig. 6.4 Connect to existing line

All imported data is fully configurable through the Line and Feeder dialog.

6.2. Disturbance recorder import

PSM E_com can import existing configuration data for disturbance recorders in the following formats:

- STnnn.PAR files (from INDACTIC and RE..16 recorders)
- COMTRADE (standard format)

The disturbance recorder itself or the corresponding configuration software produces a configuration file that PSM E_com can import. The following list shows the devices and the corresponding configuration files:

Disturbance recordr	**File rormat**	**Configuration data file**
INDACTIC	EVE	STATION.PAR files (STxx.PAR)
RE..16	EVE	PLOT.TXT files
REF…	REVAL	COMTRADE configuration files (.CFG)
REB500	COMTRADE	COMTRADE configuration files (.CFG)
ABB US Relays	COMTRADE	COMTRADE configuration files (.CFG)
Others	COMTRADE	COMTRADE configuration files (.CFG)

These configuration files normally contains information about the signals recorded from the device, sometimes information about the line (e.g. STnnn.PAR files).

Import disturbance recorder configuration data by selecting the recorder. Click the right mouse button and select the format, you want to import:

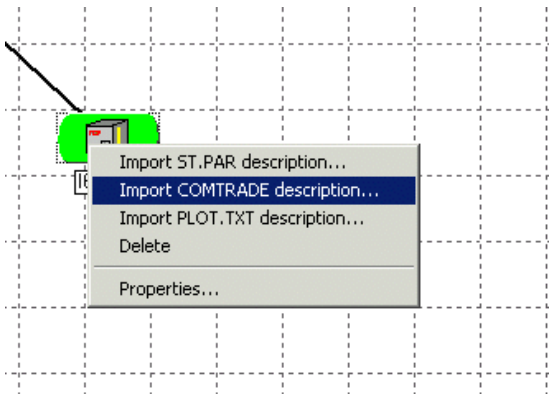


Fig. 6.5 Importing configuration data

This functionality enables easy import of STnnn.PAR files from disturbance recorders whose disturbance data was evaluated with earlier versions of PSM E_wineve.

During the import, checks are made if the station number a station name is correct.

- The station name in the configuration file must correspond to the substation name.
- The station number in the configuration file must be the same as configured in the General Properties. See Section 5.6.2,“General properties”.

If the name or number is incorrect, a warning appears. Please correct the mismatch and import the configuration file again.

7. Manual disturbance data collection

This section describes the disturbance data collection functionality of PSM E_com, which allows automatic or manual transfer of disturbance data files from disturbance recorders to your PSM system.

7.1. Overview

Disturbance data stored as files is the key input to the PSM system and is collected by PSM E_com and stored in a hierarchical file tree structure corresponding to your network topology. The collection can be done interactively by a PSM system operator or automatically in the background by using the Automatic Mode.

PSM E_com provides visual feedback and logs the outcome of the disturbance data collection operations. The disturbance data is automatically stored as .EVE or COMTRADE files in a hierarchical file tree.

You can collect files by directly communicating with disturbance recorders or via 3rd party software.

PSM E_com supports different media (LAN, serial link, modem and RAS) to communicate with disturbance recorders and computers.

In all the cases, a timeout takes place, generally after about 20 – 30 sec, in the event of a failure (i.e. communication cannot be established or is interrupted during data transfer).

7.2. Functionality

Manual file transfer is available to PSM Configurators and PSM Operators by right-clicking the corresponding object in the scroll view or the tree view.

The user can transfer and delete files from single disturbance recorders and remote computers including other PSM installations as well as complete regions and substations.

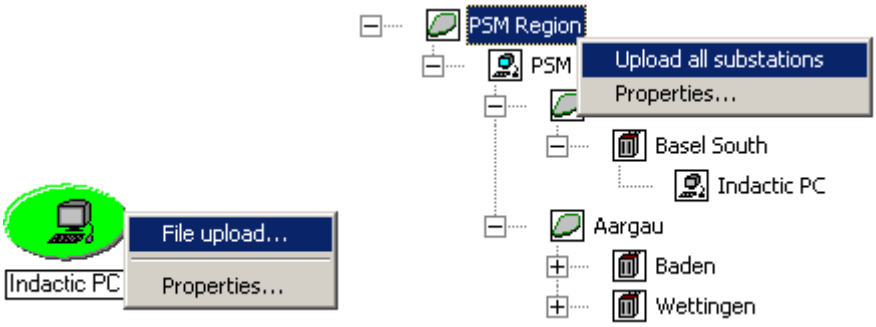


Fig. 7.1 Manual file upload

Note: the communication properties must be configured correctly and tested before disturbance data can be successfully collected.

7.3. Communication status

PSM E_com graphically displays the current status of the communication channels to all communication equipment. The status shows the result of the last communication attempt and is updated for each new attempt.

The communication status is continuously updated when the automatic mode is active.

If a connection to a particular device cannot be established or if the connection is malfunctioning, the device icon turns red in the scroll view.

The substation where the device is located and the associated region turn yellow.

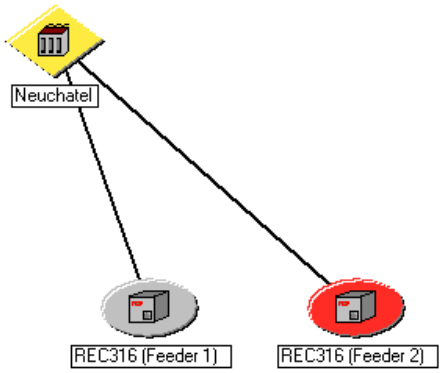


Fig. 7.2 Visual feedback of communication errors

The colour change is temporary and will revert to normal colour when the communication is successfully established. The tree view indicates communication errors with an exclamation mark.

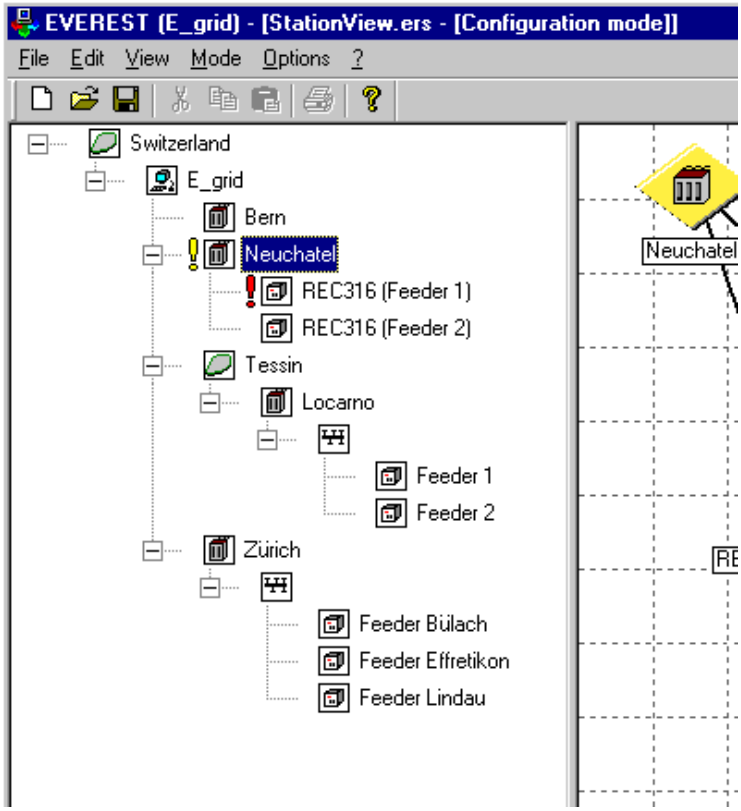


Fig. 7.3 Displaying communication status

7.4. Directory tree for disturbance data

All uploaded files are stored in a directory tree structure, automatically created by PSM E_com. The directory structure corresponds to the transmission network topology.

Note: Root directories for data and backup is configured on the Root PSM System's Disturbance Records properties.

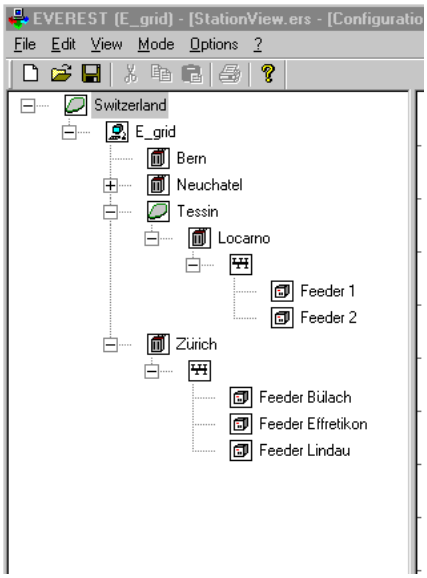


Fig 7.1 Tree view structure

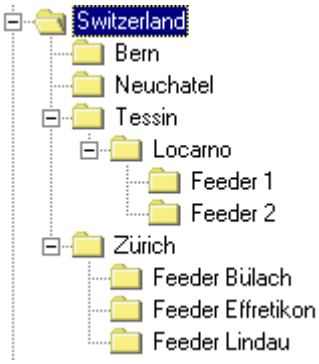


Fig. 7.4 Directory structure

7.5. RAS communication

To transfer files from a remote PC to a local PC using the Windows RAS Service the user management has to be configured properly. On both PC's, an equal user (same username, same password) is required. In the figure below, this is the user PSMOperator, which is pre-created during installation of PSM:

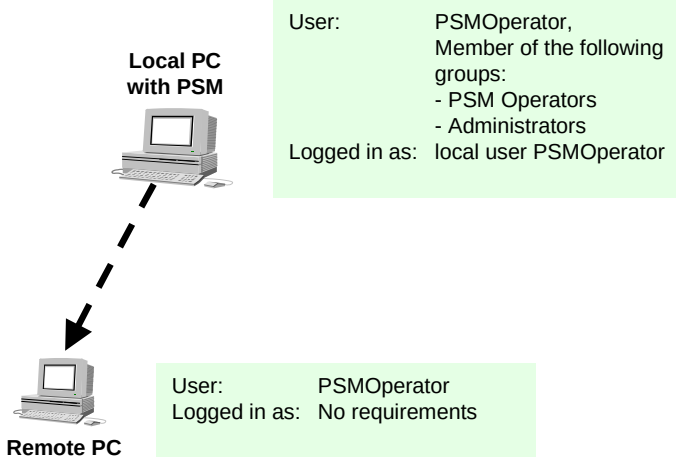


Fig. 7.5 User management for RAS communication

Note: the name / password of the local users are not restricted to PSMOperator but it is a must, that the same user with the same password exist on both computers. It is possible, to have a network user on the local computer and define an equal local user (same name and password) on the remote computer.

The time required to transfer disturbance recorder data via a RAS connection is determined by the following:

Connection Time and user validation: 25-40 seconds depending on the telephone system.

Data Transfer at a baud rate of 33 kBit: 30-35 seconds for 10 files of 3 kByte each, total 30 kByte.

Disconnection time: approx 10 seconds.

7.6. Remote Access Service (RAS) on Windows 2000

PSM/E_com uses Microsoft's Remote Access Service to access resources on remote computers via modems. Communication via RAS is based on Connection Object.

This section describes how to configure RAS on Windows 2000.

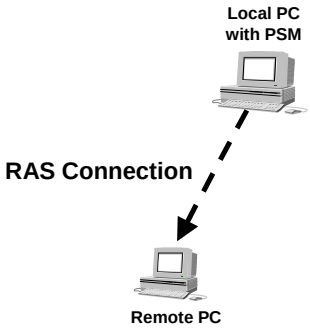


Fig. 7.6 RAS connection

7.6.1. Connection Objects

PSM E_com uses Connection Objects to communicate via RAS. A Connection Object represents an ingoing or outgoing connection to your local computer and is an integral part of Windows 2000.

Connection Objects are handled via Settings=>Control Panel or Settings=>Network and Dial-Up Connections. Creating new Connection Objects require administrator rights.

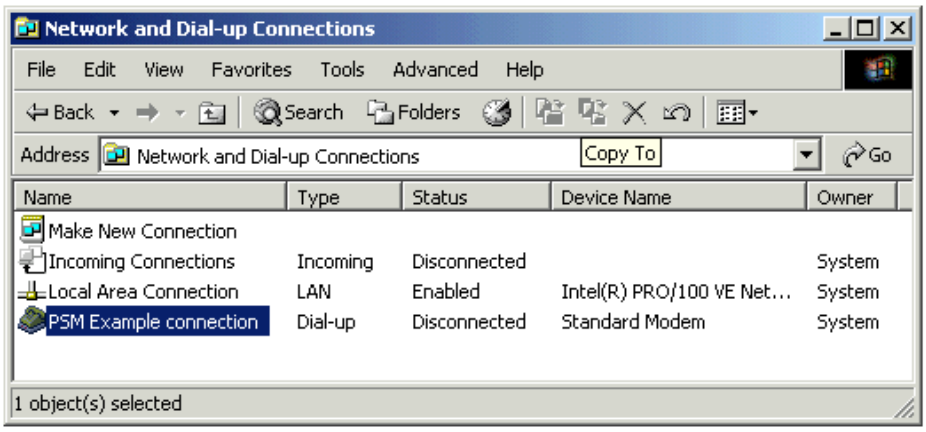


Fig. 7.7 Connection Objects

Each Connection Object represents an ingoing or outgoing connection to your local computer. All properties related to this connection, e.g. which protocol to use, are available by right clicking the connection object.

7.6.2. Creating an outgoing RAS connection

Establishing a remote access connection to a remote computer from the local computer (client) requires creation of a Windows

2000 dial-up connection object, which represents how to connect to the remote computer.

Create a new dial-up connection by opening the Control Panel and double click on **Network and Dial-up Connections**. Double click **Make New Connection** and follow the Network Connection Wizard:

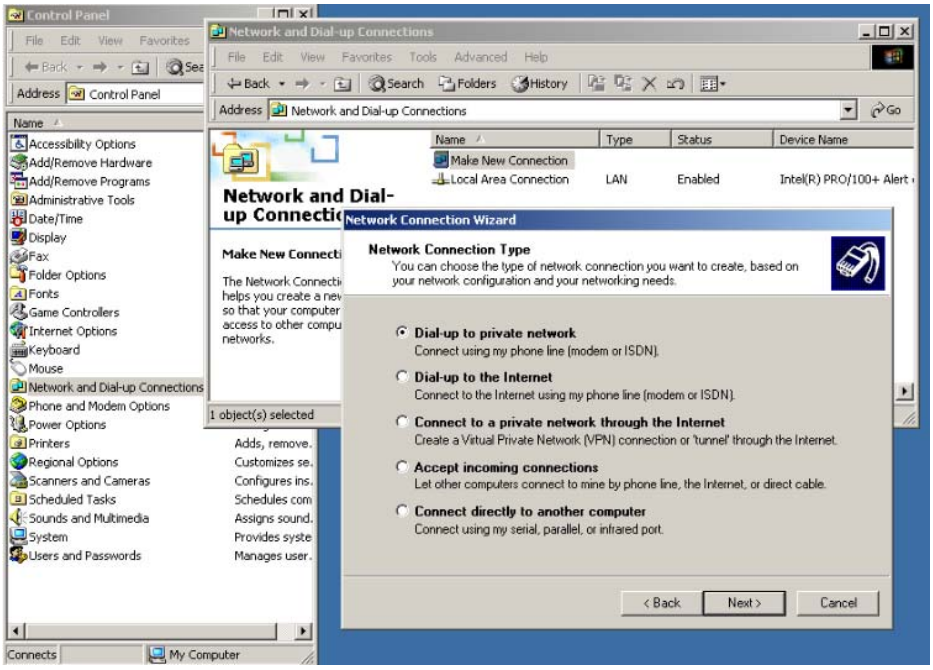


Fig. 7.8 New Dial-up connection

Select **Dial-up to private network** and press **Next**. Follow the network connection wizard and give the connection a useful name. After finishing the creation of the new connection, right-click the connection object and select Properties. Select the tab **Networking** and make sure that the following protocols and services are selected:

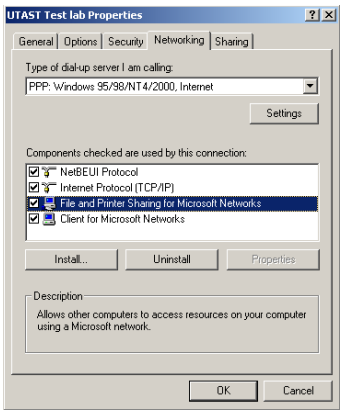


Fig. 7.9 Connection properties

If not, press **Install** and install the missing services / protocols

7.6.3. Creating an incoming RAS connection

An incoming connection object must be correctly configured to enable clients to log on to a computer via RAS.

Open Control Panel and double click on **Network and Dial-up Connections**. Double click **Make New Connection** and follow the Network Connection Wizard:

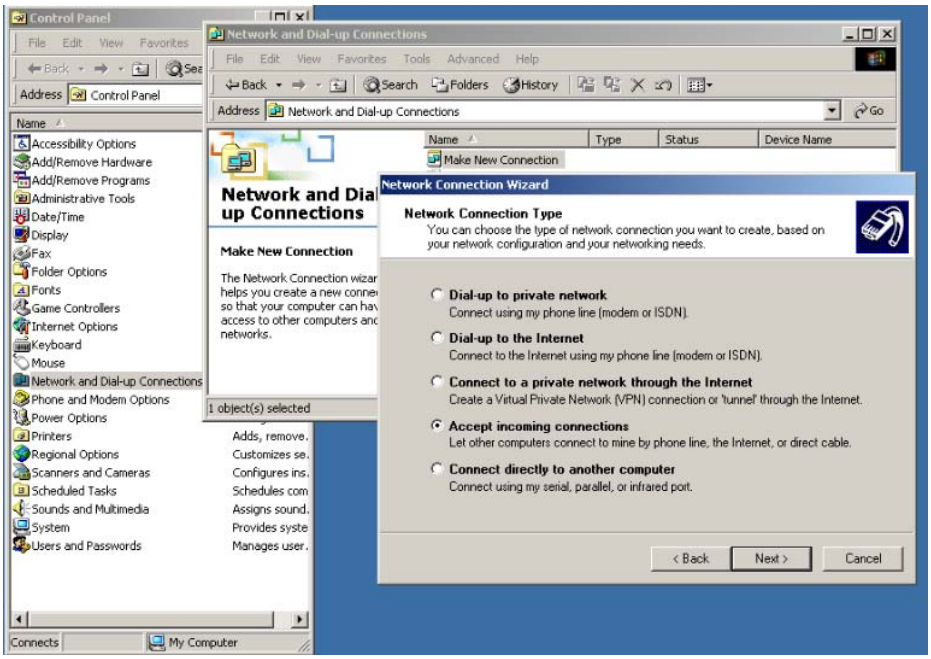


Fig. 7.10 Connection Wizard

Select **Accept incoming connections** and proceed with **Next**. Complete the wizard steps by filling in the dialogs as seen in the following sequence:

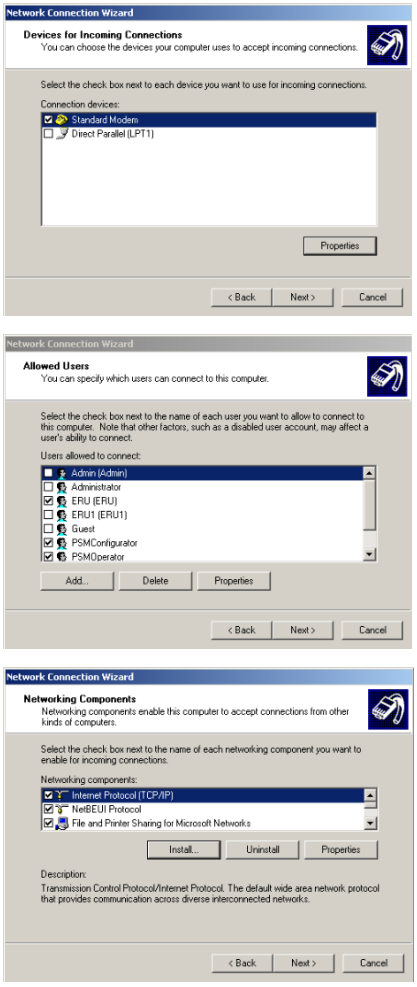


Fig. 7.11 Creating an incoming connection

- Grant rights to the users you have chosen.
- Check Allow virtual private networks.

On the Networking Component dialog, be aware to select the **File and Printer Sharing to Microsoft Networks** check box. Both Protocols (TCP/IP and NetBEUI) have to be selected. If one is missing (typically NetBEUI), press the **Install…** button, select Protocols and there the NetBEUI protocol.

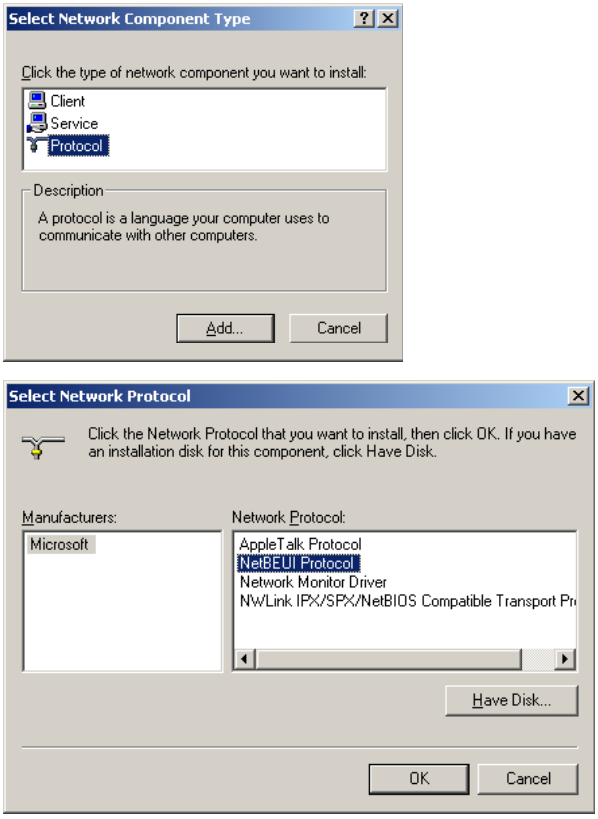


Fig. 7.12 Installing protocols

Finish the Network Connection Wizard. A new connection named “Incoming Connections” is created.

Right click on the Incoming Connections and select *Properties*. Verify again, that all desired users are allowed to connect, that the modem is used for the connection, that both protocols (TCP/IP and NetBEUI) are selected and that **File and Printer Sharing** is selected.

7.7. Root PSM System

The Root PSM System corresponds to the PSM system you are currently operating. This section describes how to configure the properties of the root PSM System.

7.7.1. Disturbance Records

This section describes how to configure the upload settings for the Root PSM object.

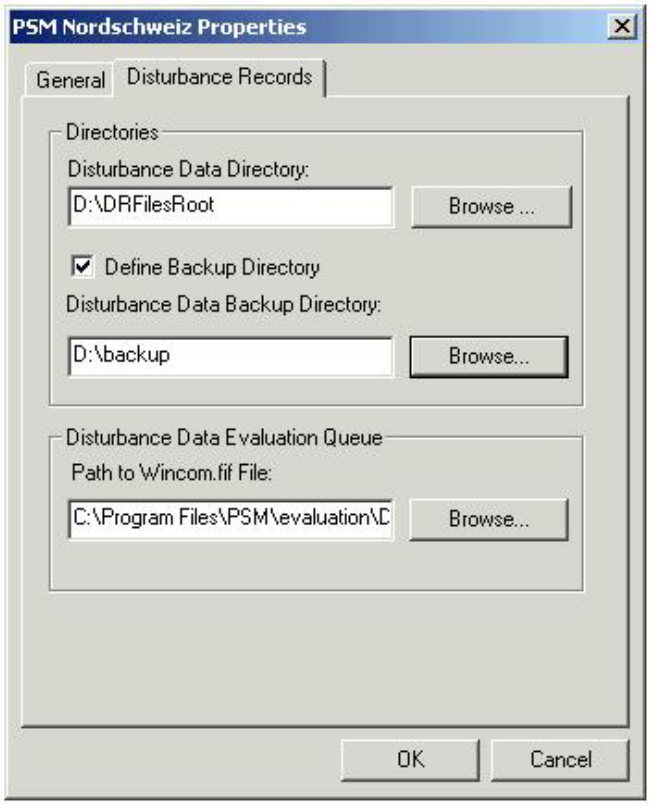


Fig. 7.13 Root PSM system settings

Disturbance Data Directory

This is the root of the PSM disturbance data directory structure.

Define Backup Directory

Check this box to enable browsing for a root backup directory.

Disturbance Data Backup Directory

This is the root of the PSM disturbance data backup directory structure. The structure is identical to the disturbance data directory.

Disturbance Data Evaluation Queue

PSM E_com in Automatic Mode can deliver newly arrived disturbance data to PSM E_wineve for automatic evaluation. This is controlled by text file-based queue called **WINCOM.FIF**. Enter the path to the **WINCOM.FIF**. File to make PSM E_com

write the full path to each new disturbance data file in WINCOM.FIF.

7.8. *PSM System*

This section describes how to configure the properties of a PSM System object.

7.8.1. *Connection*

This section describes how to configure the connection settings.

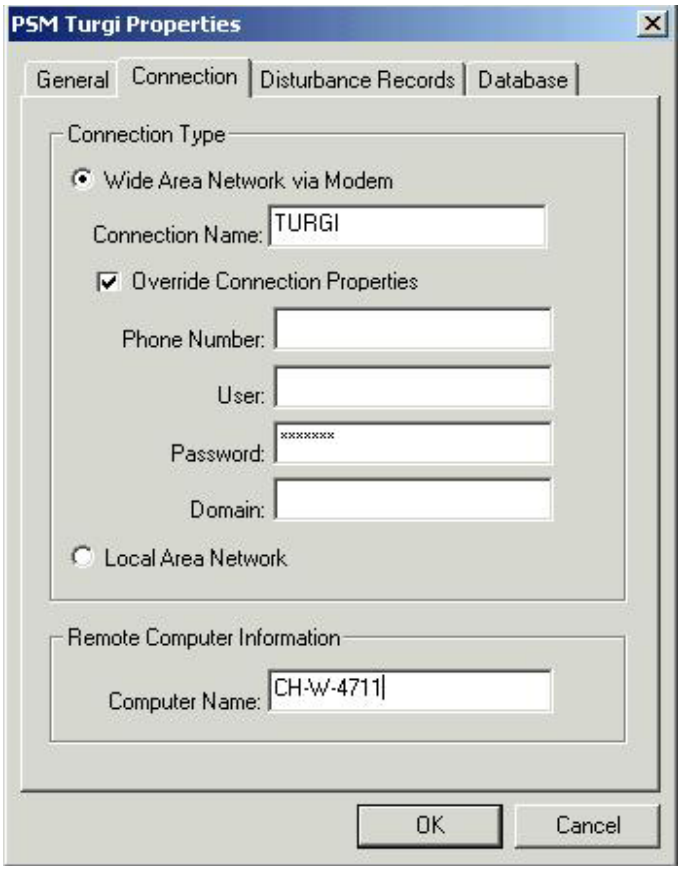


Fig. 7.14 PSM system Turgi's connection settings

Name

Name of the PSM installation.

Description

A description of the PSM system, appearing as tool tip.

Wide Area Network via Modem

Choose this connection type when you want a dial-up connection using Microsoft RAS to communicate with your PSM system.

Note: RAS must be correctly set up before this connection type can be used. See ”Setting up RAS” for more information.

Local Area Network

Choose this option if your PSM System is accessible via your local area network.

Connection Name

The name of a Microsoft Windows Connection object to use when connecting to the PSM System.

Override Connection Properties

Check this box if you want to override one or more of the connection object properties Phone Number, User, Password or Domain.

Phone Number

The phone number to the PSM System.

User

This user name is used by RAS to establish the connection with the remote computer.

Password

This password is used by RAS to establish the connection with the remote computer.

Domain

This is the domain on the remote computer where the user name shall be verified.

Computer Name

The network address of the computer. This can be a string or the computers TCP/IP address.

7.8.1.1. Automatically mapping a drive

To enable communication, the computer may be mapped as network drive with a script, automatically executed when the computer is started. The script must look similar to the following:

```
set IP_ADR=255.255.255.255
set DR_SHR=COMPUTER_NAME
set DR_DRV=X:
```

```
set DR_USR=user
set DR_PW=password

net use %DR_DRV% \\%IP_ADR%\%DR_SHR% /DELETE
net use %DR_DRV% \\%IP_ADR%\%DR_SHR% %DR_PW% /USER:%DR_USR%
```

7.8.1.2. Setting up RAS

The Microsoft Remote Access Service (RAS) is installed by default on Windows XP Professional and Windows 2000 Professional. If it is not available on your computer it must be installed or PSM E_com will not be able to access remote computers using RAS.

Using RAS requires the following actions that are performed using the Control Panel (Start=>Settings=>Control Panel):

- Installing a modem
- Configuring incoming connections
- Configuring outgoing connections.

7.8.2. Disturbance Records

This tab contains the file transfer settings.

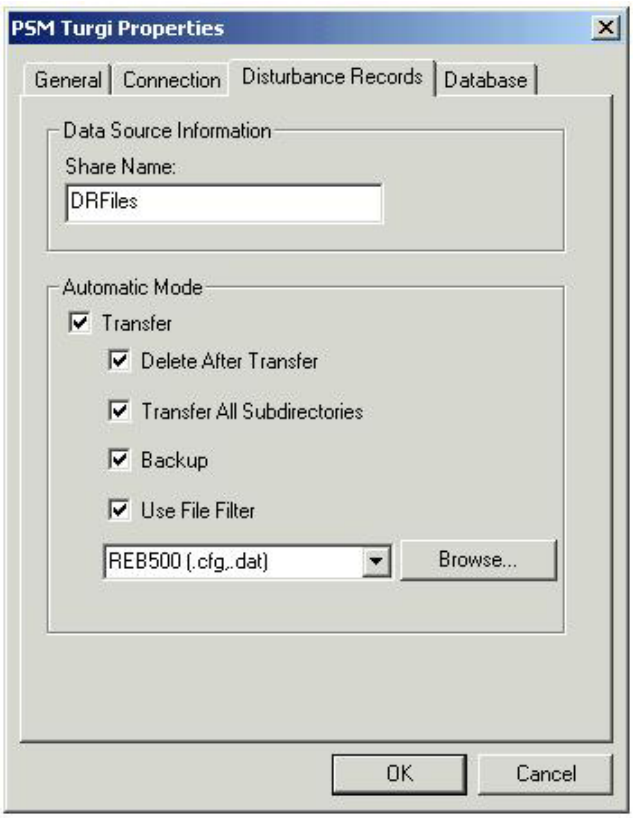


Fig. 7.15 PSM system Turgi's file transfer settings

Share Name

The name of the shared directory on the computer where the files that shall be transferred are located.

Note: The directory must be correctly shared. See "Configuring a shared directory" for more information.

Transfer

When checked, the Automatic Mode transfers files from this computer. The following file transfer rules applies in Automatic Mode:

- A file with the same name, size and creation time will not be transferred twice.
- A file with an existing name but different size or creation time is transferred and saved as a new file.

Delete After Transfer

When checked, PSM E_com deletes all files in the shared directory after successfully transferring them.

Transfer All Subdirectories

Check this box to transfer all subdirectories of the shared directory.

Use File Filter

Check this box to specify a file filter. A file filter allows you to define which file types that shall be transferred. See ”File Filter Editor”.

- If you do not specify a file filter, all files (*.*) are transferred.

7.8.2.1. File Filter Editor

This section describes how to create File Filters.

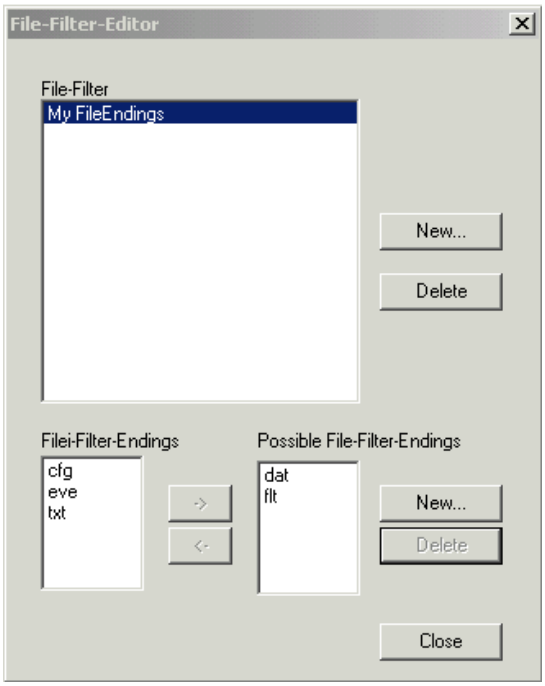


Fig. 7.16 File filter editor

Create a new name for the file filter by pressing **New…** in the upper part of the dialog. Enter a name and close with **OK**. Select the file filter and assign or deassign the endings. Additional endings can also be added by pressing **New...** in the lower part of the dialog.

7.8.2.2. Configuring a shared directory

The directory with the files to be transferred has to be configured as a shared directory with a share name. The procedure is as follows:

Select the respective directory in the tree on the left of Windows Explorer and click on the properties button to open the **Properties** dialog. Click on the **Sharing** tab, select the **Shared As** radio button and enter a name in the **Share Name** field. The **Permission** button provides facility for defining which users are permitted to access the shared directory. This is generally necessary when communication is via a LAN to avoid any risk of unauthorised access.

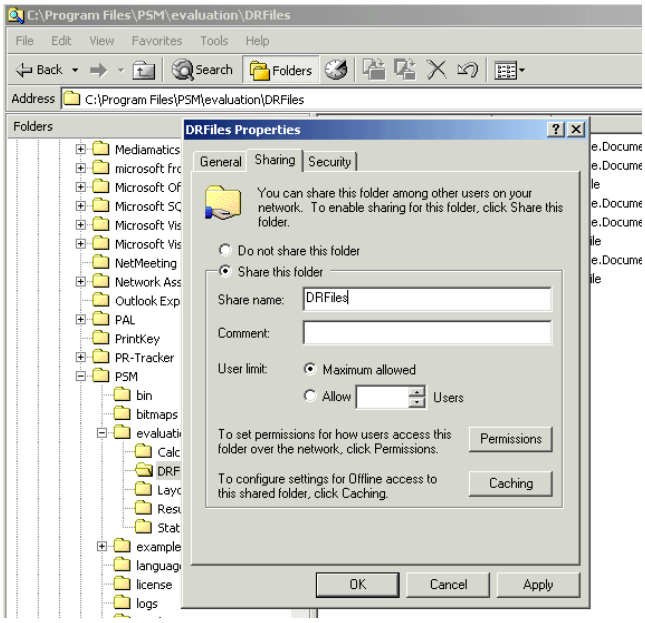


Fig. 7.17 Shared directory properties

These settings are also necessary on the computer running PSM E_com when the communication is done via RAS.

7.8.3. Database

This tab defines the address of the PSM System database.

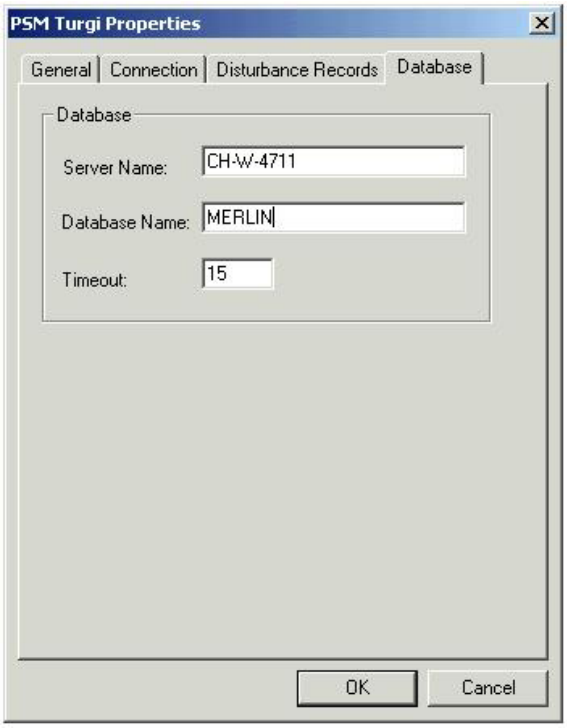


Fig. 7.18 PSM system Database properties

Server Name

The name of the database server computer and optionally the database instance name, Example: CH-W-2215\PSM

Database Name

The name of the database. Example: PSM

Timeout

The connection timeout in seconds. Over LAN connections the connection takes a non-significant time but over slower RAS connections this timeout may need adjustments.

7.8.4. Functionality

The program functions on a PSM System are accessed via the context menu upon clicking the right mouse button.

File Upload

Opens a dialogue giving access to information on the disturbance recorder data available for transfer on the PC. The data can be transferred and also deleted.

Delete

Available to PSM Configurators in Configuration Mode. Deletes the PSM system object.

Properties

Displays PSM system object settings. Can be viewed by PSM Operators, but can only be changed in the Configuration Mode.

Regardless of whether a computer has PSM installed or not, files are transferred from it manually by selecting **File Upload...**. A connection to the PC selected is then established. If the PC is connected to a LAN, the transfer normally only takes a short time. It takes about 15 seconds (Windows network timeout), however, for an error message to be displayed, should the PC not exist or not be switched on.

If communication between E_com and the remote PSM system, is via a modem, a RAS connection is established and takes about the same time as a modem connection with any device (approx. 30 – 60 sec.).

If a RAS connection cannot be established, an error message and an entry in the log file are generated. In this event, first check the settings you are using and that RAS is correctly installed.

Pay special attention to the settings on the computer you want to communicate with.

An error message is displayed first should it prove impossible to establish a connection and then the dialogue appear with the current directory on the user’s computer. Close the dialog by clicking on **Cancel** so that the appropriate changes to the configuration can be made.

7.8.5. Manual file transfer

After establishing a connection with the other computer, the following dialog appears:

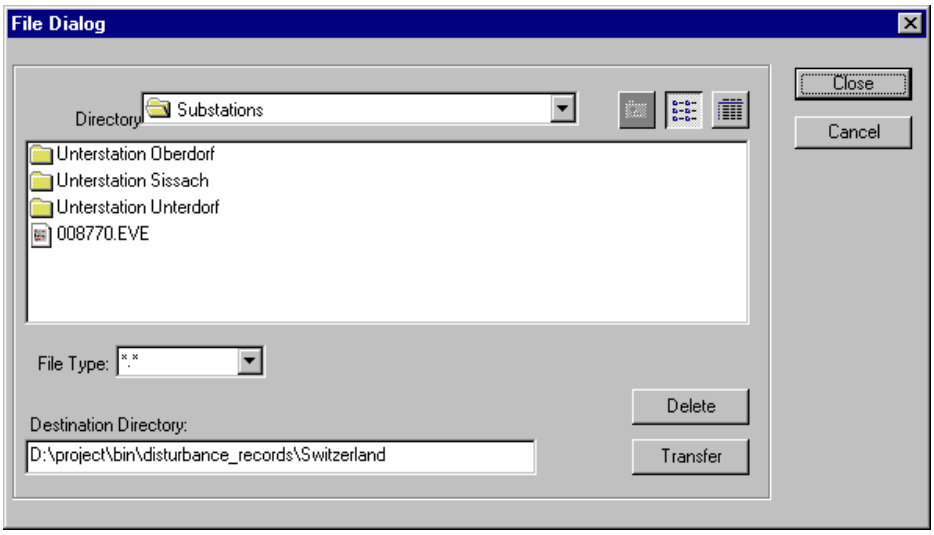


Fig. 7.19 File transfer dialog

The share name entered during configuration appears in the directory field. The conventions for navigating in the list are the same as those for Windows Explorer. To prevent accidentally accessing other data, it is impossible to move to a higher level than the share name.

The directory on the computer in the central office is given in the destination directory field and is the one configured on the computer running PSM in the substation. The user can change the directory.

As with Windows Explorer, one or several files can be selected. Click on the **Transfer** button to copy them to the destination directory.

Files can be transferred in the manual mode, but not complete directories. If the destination directory does not exist, it is created by E_com. Files can be transferred several times. An error message will only be generated and a file not transferred if the file of the same name in the destination directory is write-protected.

The automatic mode, on the other hand, only transfers each file once, but it is possible to transfer a complete tree structure.

Files that are transferred are recorded in the log file.

Backups of the files transferred are created if this possibility was set in Properties.

Window build-up and file transfer take a little longer in the case of a RAS connection.

7.8.6. Deleting Files

A PSM Configurator user can delete files from the PC directory by selecting them and then clicking on the **Delete** button. Files that are write-protected cannot be deleted and are noted accordingly in the log file (Access denied).

Deleted files are also noted in the log file.

7.8.7. Changing the view

Clicking on the following button can change the format of the list of files.

This view is not recommended, however, for RAS connections to another PC, because much data has to be exchanged to change the view, which can last some considerable time via RAS.

7.9. File Server

The settings are similar to the settings of a PSM system.

Note: The File Server does not have a Database tab.

7.10. RE..16

This section describes the properties and available functions for disturbance data upload of an RE..16.

Note: PSM E_com does not parameterize the RE..16. This shall be done with the ABB CAP2/316 software.

7.10.1. Communication properties

This section describes how to configure the communication properties for an RE..16.

PSM E_com communicates with RE..16 disturbance recorders using the SPA protocol. The communication medium is direct serial link (RS232) or via modem.

- A modem connected to the SPA ZC-22 or the RE..16 requires special configuration. See ”Configuring a RE..16”.

An RE..16 can be directly connected with the PSM installation or via a ”SPA ZC-22 Optical Bus”.

Note: When using a SPA ZC-22 Optical Bus, enter the communication properties once on the SPA ZC-22 bus Connection tab. When using a direct connection to the RE..16, enter the communication properties directly on the RE..16.

The SPA ZC-22 has identical default communication port settings as the RE..16 disturbance recorder and identical connection properties except for the SPA Address.

For each connected RE..16, enter the SPA Address on the Connection property page tab. For more information about the SPA ZC-22 optical bus see Section 5.8.3, SPA ZC-22 Optical Bus.

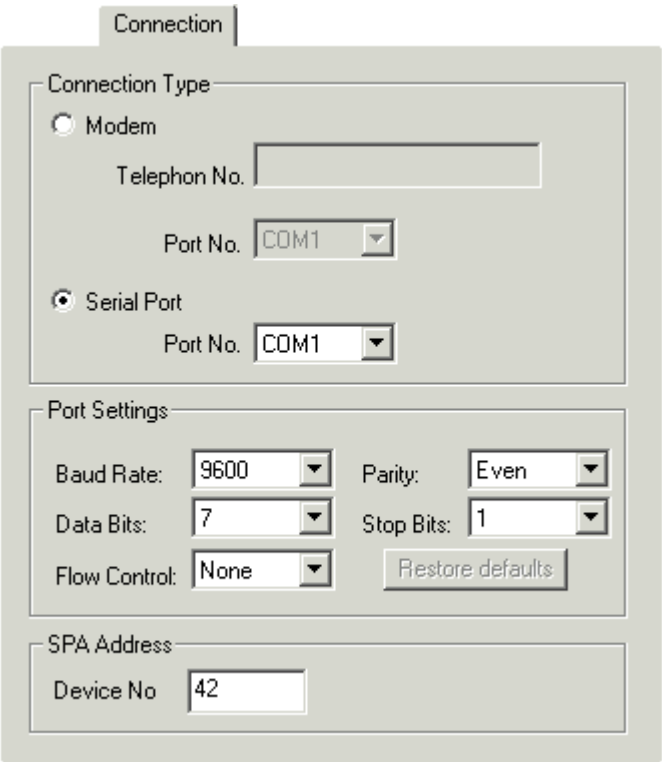


Fig. 7.20 Direct serial connection with a RE..16

Connection Type

Defines if you are using a direct serial RS232 link or a modem. When using a modem, enter the telephone number to the RE..16 and select the COM port where the modem is installed. When using a direct serial link, select the COM port where the RE..16 are connected.

Port Settings

Defines your outgoing serial port settings. RE..16 requires the following settings which are default: Baud rate=9600, Data bits=7, Flow control=None, Parity=Even, Stop bits=1.

SPA Address

The configured SPA address of the RE..16 disturbance recorder.

7.10.2. Disturbance record properties

This tab defines the upload behaviour of PSM E_com for this specific disturbance recorder.

Transfer

Uncheck this box if you want to exclude the disturbance recorder from automatic uploads.

Delete after transfer

Default value for RE..16 are *Delete after transfer*. PSM E_com deletes the record in the RE..16 after successfully transferring the file.

Disabling *Delete after Transfer* this box will cause the same file to be transferred multiple times when using the Automatic Mode.

It is recommended to delete the disturbance data in the RE..16 after transfer.

Backup

Check this box if you want PSM E_com to generate a backup for each file transferred from the disturbance recorder in Automatic Mode.

Note: the root backup directory on the PSM root installation must be defined. See Section 7.7, Root PSM System.

7.10.3. Verifying the communication settings

Verify that the communication to the RE..16 works by right-clicking the RE..16 object and select "**Upload disturbance records…**".

When the dialog appears, select the tab Test Operations. See Section 7.10.10,Testing the communication for sending test SPA telegrams.

Fig. 7.21 Verifying communication settings

7.10.4. Information about available disturbance recorder data

Initially the list of the tab Disturbance records is empty. Click on the **Update** button to view information about the disturbance records currently available in the RE..16.

The list is now updated with the details of all currently available disturbance records as shown below:

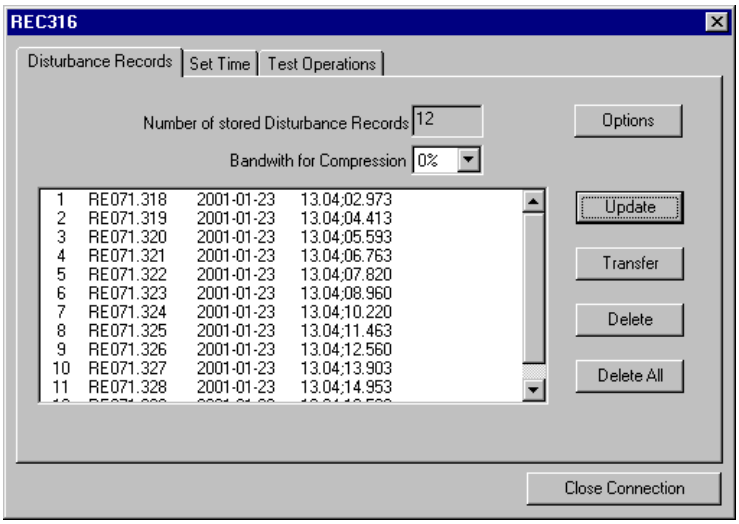


Fig. 7.22 Available disturbance records in a RE..16

The list of disturbance records is in chronological order and includes in each case the date recorded and the number of the dataset that was generated.

7.10.5. Transferring the disturbance recorder data

Select an entry in the list by clicking it. Select several consecutive entries by holding the **Shift** key depressed and selecting the last wanted entry. Select several non-consecutive entries by holding the **Ctrl** key depressed while clicking on the entries.

Transfer the selected records by clicking on the **Transfer** button. The progress of data transfer is indicated with progress bars.

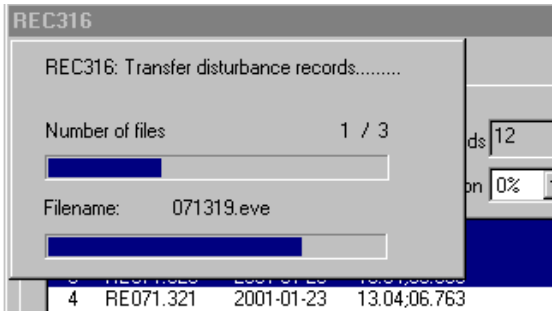


Fig. 7.23 File transfer progress bars

The transfer of disturbance recorder data file with a size of 5 Kbytes from an RE..16 using SPA takes about t 15 seconds.

The integrity of the data transferred is continuously supervised. Should an error be detected (e.g. because of a poor telephone connection), just the faulty block of data is retransmitted and not the whole file. This keeps the total transmission time to a minimum.

The data are saved in a file in the automatically created directory structure as described in section 7.4, Directory tree for disturbance data. The file name is shown on the data transfer progress indicator. It comprises the SPA address and the number of the data set, i.e. xxxyyy.eve, where xxx is the SPA address and yyy the number of the data set. The file extension denotes the format of the disturbance recorder file, i.e. EVE format.

Any existing file with the same name that is not write-protected is overwritten with the new data; an existing file that is write-protected gives rise to an error message in the log file. Since the transfer failed, the original file in the RE..16 disturbance recorder is not deleted.

A message also appears to confirm that all the files have been successfully transferred and corresponding entries are made in the log file. If the creation of a backup was specified in the

properties, backups of the files transferred are also saved. This procedure also generates an error message and an entry in the log file if unsuccessful.

7.10.6. Deleting disturbance recorder data

Configurators and Operators can delete disturbance data in the recorders.

Note that the oldest disturbance record must be deleted first by RE..16 design.

Several records can be selected and deleted at the same time.

Press the Delete All button to delete all the disturbance records in the disturbance recorder.

A message is displayed and an entry made in the log file for each file deleted.

7.10.7. Initiating evaluation

Once the files have been transferred successfully, their evaluation by E_wineve can be automatically started, providing E_wineve was appropriately configured. See the PSM E_wineve documentation.

Clicking on the Options button and selecting the desired data transfer mode in the dialogue that appears accomplish this. If **Start Evaluation** is selected, E_wineve is automatically started after the last file has been successfully transferred. A selected option is saved when the dialogue is closed and is active the next time data are transferred.

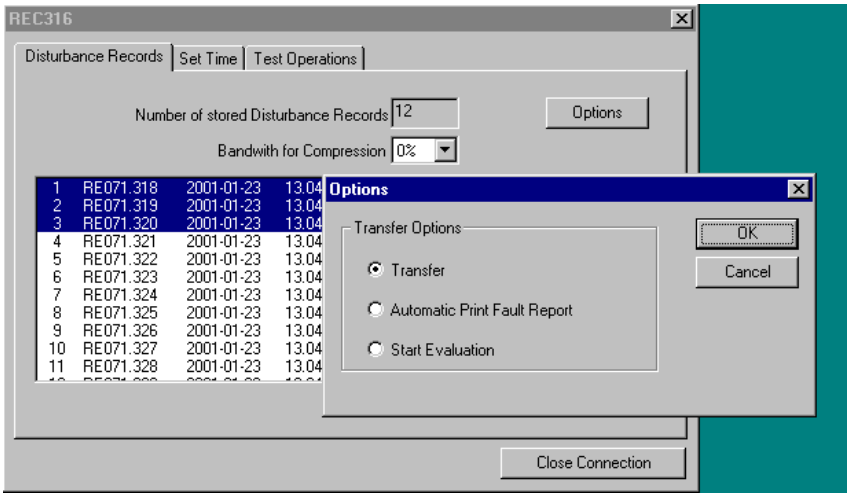


Fig. 7.24 Data transfer modes

7.10.8. Printing a report

To automatically print a report after the files have been transferred, select the option **Automatically Print Fault Report** in the **Options** dialog. This also requires that E_wineve be running in the background in the batch mode and polls the same WINCOM.FIF file for new records as configured for PSM E_com, see Section 8.8, WINCOM.FIF. PSM E_wineve then automatically starts its evaluation after data transfer has finished and prints a report on the printer configured for it.

7.10.9. Setting the system time

When necessary, PSM Configurators can set the disturbance recorder time manually. The **Set Time** tab provides a choice of entering the time manually or copying the local computer's time to the device.

Since time telegrams on the SPA bus are a broadcast command, all the devices connected to the same SPA bus receive the telegram and are set to the same time. This is then the valid time for subsequent disturbance records.

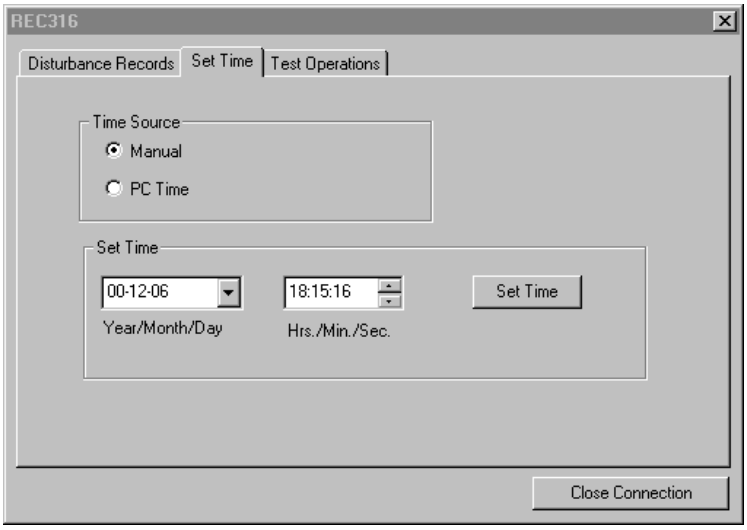


Fig. 7.25 Setting the system time

Note: E_com does not perform the periodic synchronisation of the RE..16 disturbance recorders.

Note: No error message is displayed if the RE..16 recorders are not configured to permit the time to be set (e.g. in the case of synchronisation via LON). The time telegram is a broadcast command that does not trigger a response.

7.10.10. Testing the communication

PSM Configurators sees a further tab marked **Test Operations**. This permits two important tests to be carried out.

Test telegrams can be sent directly to RE..16 disturbance recorders via SPA. An example of a typical SPA command is one in the following figure, the response to which is the disturbance recorder type.

Note: If you are using modem communication, the modem connection must be correctly established before test telegrams can be sent.

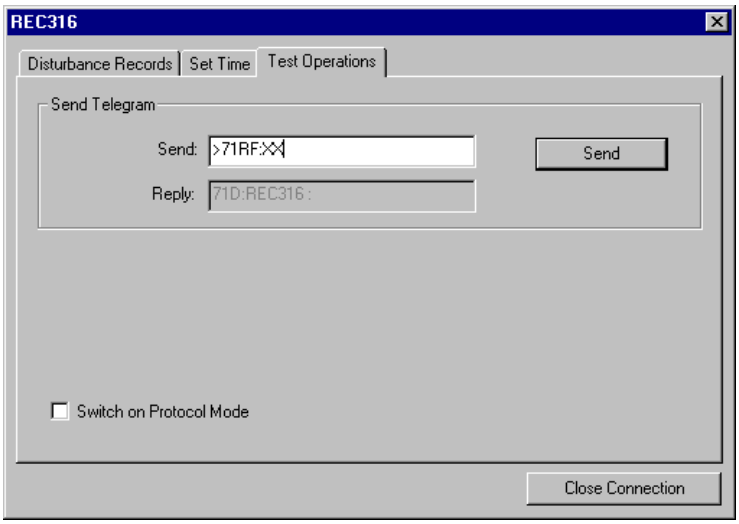


Fig. 7.26 Test commands

If the Report Mode checkbox is active, all subsequent communication telegrams are recorded in the debug log file. Thus all stages of communication during the transfer of disturbance recorder data can be recorded.

Note: These options are not saved when the disturbance recorder dialog is closed.

7.11. Indactic 650

PSM E_com supports indirect automatic disturbance data upload from the Indactic family of disturbance recorders. The ABB WinCom software must be configured to produce disturbance data in the shared directory of a File Server object, polled periodically by PSM E_com.

7.12. REB500

PSM E_com supports indirect automatic disturbance data upload from the REB500 system. The ABB HMI500 RebWin software must be configured to produce disturbance data in the shared directory of a File Server object, polled periodically by PSM E_com. Creating an untyped recording station object below the File Server object represents the REB500 system object.

For information about configuring a connection to the REB500 and additional system information, please see the REB500 documentation:

REB500 User Manual, 1MRB520292

7.13. REL300 (MDAR)

PSM E_com supports manual and automatic disturbance data upload from the REL300 (also known as MDAR) disturbance recorders. The disturbance data is saved in COMTRADE99 format as <filename>.CFG and <filename>.DAT.

The file name is automatically generated and based on the trigger time as follows: <MonthDayHourMinSecMilliseconds>.

Example: 0303104903804.dat

The interactive user can do the following:

- Refresh and display the list of currently available disturbance records.
- Upload selected disturbance records as COMTRADE99 files.
- Delete all disturbance records in the relay.

7.13.1. Communication properties

When creating a REL300 the following default serial parameters are used:

Baud rate=1200, Data bits=8, Flow control=None, Parity=None, Stop bits =2.

For information about configuring a direct modem connection to the REL300 and additional relay information, please see the REL300 documentation:

Instruction Manual 40-385.5 Numerical Distance Protection MDAR (REL300) Relaying Systems.

7.13.2. Disturbance record properties

This tab defines the upload behaviour of PSM E_com for this specific disturbance recorder.

Transfer: uncheck this box if you want to exclude the disturbance recorder from automatic uploads.

Delete after transfer: uncheck this box if you don't want to delete the file in the disturbance recorder after transferring it to your PSM system.

Backup: check this box if you want PSM E_com to generate a backup for each file transferred from the disturbance recorder in Automatic mode.

7.14. REL301/302

PSM E_com supports manual and automatic disturbance data upload from the REL301/302 disturbance recorders. The disturbance data is saved in COMTRADE99 format as <filename>.CFG and <filename>.DAT.

The file name is automatically generated and based on the trigger time as follows: <MonthDayHourMinSecMilliseconds>.

Example: 0303104903804.dat

The interactive user can do the following:

- Refresh and display the list of currently available disturbance records.
- Upload selected disturbance records as COMTRADE99 files.
- Delete all disturbance records in the relay.

7.14.1. Communication properties

When creating a REL301/302 the following default serial parameters are used:

Baud rate=1200, Data bits=8, Flow control=None, Parity=None, Stop bits =2.

For information about configuring a direct modem connection to the REL301/302 and additional relay information, please see the REL301/302 documentation:

Instruction Manual I.L.40-386.1C: "REL301/302 Numerical Distance Relay"

7.14.2. Disturbance record properties

This tab defines the upload behaviour of PSM E_com for this specific disturbance recorder.

Transfer: uncheck this box if you want to exclude the disturbance recorder from automatic uploads.

Delete after transfer: uncheck this box if you don't want to delete the file in the disturbance recorder after transferring it to your PSM system.

Backup: check this box if you want PSM E_com to generate a backup for each file transferred from the disturbance recorder in Automatic mode.

7.15. REL350/352

PSM E_com supports manual and automatic disturbance data upload from the REL350/352 disturbance recorders. The disturbance data is saved in COMTRADE99 format as <filename>.CFG and <filename>.DAT.

The file name is automatically generated and based on the trigger time as follows: <MonthDayHourMinSecMilliseconds>.

Example: 0303104903804.dat

The interactive user can do the following:

- Refresh and display the list of currently available disturbance records.
- Upload selected disturbance records as COMTRADE99 files.
- Delete all disturbance records in the relay.

7.15.1. Communication properties

When creating a REL350/352 the following default serial parameters are used:

Baud rate=9600, Data bits=8, Flow control=None, Parity=None, Stop bits =2.

For information about configuring a direct modem connection to the REL350/352 and additional relay information, please see the REL350/352 documentation:

Instruction Manual 40-201.81 "REL350 Numerical Segregated Phase Comparison Transmission Line Protection System"

Instruction Manual 40-201.9 “REL352 Numerical Segregated Phase Comparison Transmission Line Protection System”.

7.15.2. Disturbance record properties

This tab defines the upload behaviour of PSM E_com for this specific disturbance recorder.

Transfer: uncheck this box if you want to exclude the disturbance recorder from automatic uploads.

Delete after transfer: uncheck this box if you don’t want to delete the file in the disturbance recorder after transferring it to your PSM system.

Backup: check this box if you want PSM E_com to generate a backup for each file transferred from the disturbance recorder in Automatic mode.

7.16. REL512

PSM E_com supports manual and automatic disturbance data upload from the REL512 disturbance recorder. The disturbance data is saved in COMTRADE99 format as <filename>.CFG and <filename>.DAT.

The file name is automatically generated and based on the trigger time as follows: <MonthDayHourMinSecMilliseconds>.

Example: 0303104903804.dat

The interactive user can do the following:

- Refresh and display the list of currently available disturbance records.
- Upload selected disturbance records as COMTRADE99 files.

Note: the REL512 does not allow deletion of disturbance data by design. To avoid unnecessary uploading of disturbance records from the REL512, PSM E_com verifies if a corresponding file name exists for each disturbance record before uploading it. Uploading only takes place if no file exists for the disturbance record.

7.16.1. Communication properties

When creating a REL512 the following default serial parameters are used:

Baud rate=9600, Data bits=8, Flow control=None, Parity=None, Stop bits =2.

For more information about configuring a direct modem connection to the REL512 and additional relay information, please see the REL512 documentation:

REL512 Line Distance Protection Terminal Instruction Book 1MRW512029-MEN.

7.16.2. Disturbance record properties

This tab defines the upload behaviour of PSM E_com for this specific disturbance recorder.

Transfer: uncheck this box if you want to exclude the disturbance recorder from automatic uploads.

Delete after transfer: uncheck this box if you don't want to delete the file in the disturbance recorder after transferring it to your PSM system.

Backup: check this box if you want PSM E_com to generate a backup for each file transferred from the disturbance recorder in Automatic mode.

7.17. SEL321

PSM E_com supports manual and automatic disturbance data upload from the SEL321 disturbance recorder. The disturbance data is saved in COMTRADE99 format as <filename>.CFG and <filename>.DAT.

The file name is automatically generated and based on the trigger time as follows: <MonthDayHourMinSecMilliseconds>.

Example: 0303104903804.dat

The interactive user can do the following:

- Refresh and display the list of currently available disturbance records.
- Upload selected disturbance records as COMTRADE99 files.
- Delete all disturbance records in the relay.

7.17.1. Communication properties

When creating a SEL321 the following default serial parameters are used:

Baud rate=9600, Data bits=8, Flow control=None, Parity=None, Stop bits =1.

Accessing the SEL321 requires entering a password in the Connection tab below the Port settings.

For information about configuring a direct modem connection to the SEL321 and additional relay information, please see the SEL321 documentation:

“SEL321 Phase and Ground Distance Relay Instruction Manual”.

7.17.2. Disturbance record properties

This tab defines the upload behaviour of PSM E_com for this specific disturbance recorder.

Transfer: uncheck this box if you want to exclude the disturbance recorder from automatic uploads.

Delete after transfer: uncheck this box if you don’t want to delete the file in the disturbance recorder after transferring it to your PSM system.

Backup: check this box if you want PSM E_com to generate a backup for each file transferred from the disturbance recorder in Automatic mode.

7.18. GEC Optimho

PSM E_com supports manual and automatic disturbance data upload from the GEC Optimho disturbance recorder. The disturbance data is saved in COMTRADE99 format as <filename>.CFG and <filename>.DAT.

The file name is automatically generated and based on the trigger time as follows: <MonthDayHourMinSecMilliseconds>.

Example: 0303104903804.dat

The interactive user can do the following:

- Refresh and display the list of currently available disturbance records.
- Upload selected disturbance records as COMTRADE99 files.

Note: the GEC Optimho does not allow deletion of disturbance data by design. To avoid unnecessary uploading of disturbance records from the GEC Optimho, PSM E_com verifies if a corresponding file name exists for each disturbance record before uploading it. Uploading only takes place if no file exists for the disturbance record.

7.18.1. Communication properties

When creating a GEC Optimho the following default serial parameters are used:

Baud rate=4800, Data bits=7, Flow control=None, Parity=Even, Stop bits =1.

Accessing the GEC Optimho requires entering a password in the Connection tab below the Port settings.

For information about configuring a direct modem connection to the GEC Optimho as well as for additional information, please consult the GEC Optimho documentation.

7.18.2. Disturbance record properties

This tab defines the upload behaviour of PSM E_com for this specific disturbance recorder.

Transfer: uncheck this box if you want to exclude the disturbance recorder from automatic uploads.

Delete after transfer: uncheck this box if you don't want to delete the file in the disturbance recorder after transferring it to your PSM system.

Backup: check this box if you want PSM E_com to generate a backup for each file transferred from the disturbance recorder in Automatic mode.

7.19. SEL2030 Channel Selector

A SEL2030 acts as a gateway to disturbance recorders of various types. PSM E_com typically connects to the SEL2030 via a modem connection and communicates with the connected disturbance recorders.

Note: The SEL2030 must be correctly configured with type specific communication parameters for each disturbance recorder connected to it. PSM E_com does not support configuration of the SEL2030. Please see the SEL2030 documentation for more information.

7.19.1. Connecting disturbance recorders

Create all disturbance recorders that shall be connected below the SEL2030.

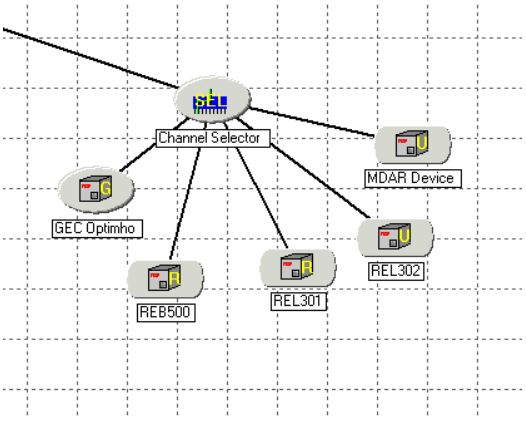


Fig. 7.27 Connecting disturbance recorders to a SEL2030

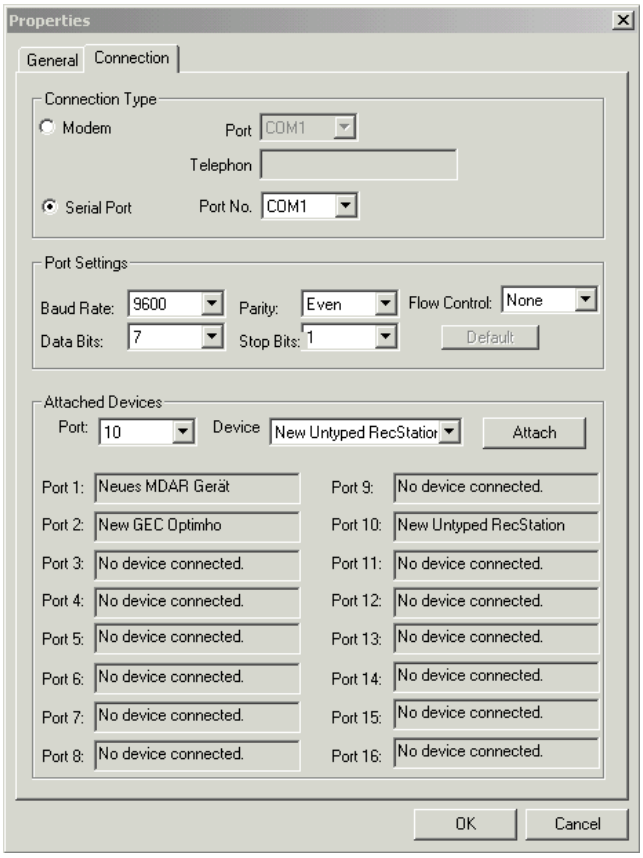


Fig. 7.28 Communication settings for a SEL2030

Afterwards, configure which disturbance recorder is connected to which port of the SEL2030.

First, select port number and the corresponding recorder and then press **Attach**. The attached recorder appears in the corresponding port dialog.

7.19.2. Communication properties

The connection type and port settings are the same as for a SPA ZC-22 bus. See Section 7.10, RE..16 for a detailed description.

The connection properties of the SEL2030 defines:

- How PSM E_com communicates with the SEL2030
- Which SEL2030 backplane ports are in use by disturbance recorders.

7.20. Substation and region functions

The program functions for a substation or a region are accessed via the context menu upon clicking the right mouse button.

Import PSM substation

Allows substation import from a remote PSM installation provided that a PSM System object has been created in this substation.

Upload substation

This function transfers all disturbance recorder data from the substation or region. All disturbance data producers with the transfer option set are polled for new disturbance recorder data. The data are transferred according to the Automatic mode configuration.

This simple command permits the disturbance recorder data from entire regions and substations to be transferred in a minimum of time.

Create

Shows a list of objects that can be created. This command is only available in Configuration Mode.

Delete

This command is only available in the configuration mode. The region or substation is deleted together with all its contents.

Properties…

Shows the properties of the region or substation. The properties can only be edited in Configuration Mode.

7.21. Modems

Note: Please make sure that you have the latest version of your modem driver(s) installed. Contact the modem manufacturer to obtain the latest modem driver version.

There are no special requirements to be fulfilled by the local modem for use with E_com. All commercially available modems are suitable including internal modem. They are configured differently, however, depending on whether they communicate with another computer or with disturbance recorders in the substation.

For communicating with a computer in a substation, any commercially available modem can be used and its configuration is described below.

Special requirements have to be fulfilled, however, by modems intended for communicating with RE..16 disturbance recorders and the modems and their configuration are described below.

All modems have to be installed on the PC first according to the Windows instructions.

7.21.1. Configuring a RE..16 modem

This section describes how to configure a modem directly connected to a RE..16 or a SPA ZC-22 optical bus.

See also the RE..16 documentation for more information:

- REL316*4, Digital Line Protection, 1MRB520050
- REC316*4, Digital Control Unit, 1MRB520044.

Note: The modem must support asynchronous operation. It must be possible to fix the baud rate independently of the line baud rate. The modem must also be able to answer an incoming call automatically (auto-answer mode). The table below contains the AT commands settings. These settings may not correspond completely to your modem. Consult your modem documentation.

Save the following settings in your modem: Fixed DTE rate, DTE asynchronous speed = 9600 baud, DTR ignored, RTS ignored, DSR answer on, Auto answer on, Handshake off, no result code

The following modem types can be used with an RE..16 disturbance recorder. The corresponding settings are available in the installation directory \examples\modem settings\.

ZyXEL U-1496E

3COM USRobotics 56K FAX

Multitech-MT-2834BL

The time required to transfer disturbance recorder data via a modem is determined by the following:

Connecting time: 25-40 seconds, depending on the telephone system

Data transfer: approx. 20 seconds for a 5Kbyte-sized file excluding transmission errors.

Displaying file list: approx. 20 seconds for 10 files.

Disconnection time: approx. 10 seconds

7.21.2. Configuring a modem for RAS

A modem which enables E_com to communicate with another computer requires the Windows service RAS and has to be configured accordingly.

8. Automatic disturbance data collection

This section describes the PSM E_com automatic disturbance data collection functionality.

8.1. Overview

The Automatic Mode is based on configurable cyclical polling of disturbance recorders and shared directories.

The collection of disturbance data in a large utility grid with WAN-based communication is further accelerated by using the spontaneous data upload feature of E_com, allowing PSM E_com installations to exchange information about files in a fast and cost efficient way.

- The PSM E_com Automatic Mode periodically collects disturbance data from selected disturbance data producers and stores the disturbance data as files in a directory structure corresponding to the PSM network topology.
- The PSM E_com Automatic Mode delivers disturbance data input to Automatic Fault Location with PSM .E_wineve via the WINCOM.FIF interface.

PSM Operators can

- Start the Automatic Mode
- Stop the Automatic Mode.

PSM Configurators can in addition:

- Configure the root directory where disturbance data shall be stored.
- Select which disturbance data sources that shall be polled for new disturbance data.
- Configure when the disturbance data sources shall be polled for new disturbance data.
- Configure the backup and deletion strategy for each disturbance data source in the Automatic Mode properties.
- Configure Spontaneous Data Transfer of disturbance data from remote PSM systems.
  Note: this functionality is licensed.

When the PSM E_com executes in Automatic Mode, all actions are logged.

- During the polling cycle, all selected disturbance data producers are checked sequentially for new disturbance records.

Spontaneous Data Transfer requests from remote PSM systems are processed by the Automatic Mode between polling cycles as described below:

- If a polling cycle is in progress, the cycle is finished before the request will be processed. The request will then be acknowledged. A communication channel to the remote PSM System is created and new disturbance data are transferred.
- If the Automatic Mode is idle, PSM E_com acknowledges the request and connects to the remote PSM system and transfers the new disturbance recorder data.
- A remote PSM system can both be part on the polling list and send spontaneous data upload requests.

8.2. Prerequisites

Make sure that your system has correctly configured communication channels to all communication equipment.

It is recommended to verify all communication channels by performing a manual file upload for each device.

Using the spontaneous data upload feature requires a valid license.

8.3. Configuring the polling cycle

To use the simplest form of the automatic mode you must select the devices that shall be uploaded and how often they shall be uploaded. Selecting the menu does this

Configuration -> Automatic file transfer…

A dialog with tabs appears.

8.3.1. Setting the polling interval

The Interval tab defines how often the automatic disturbance data transfer shall be done.

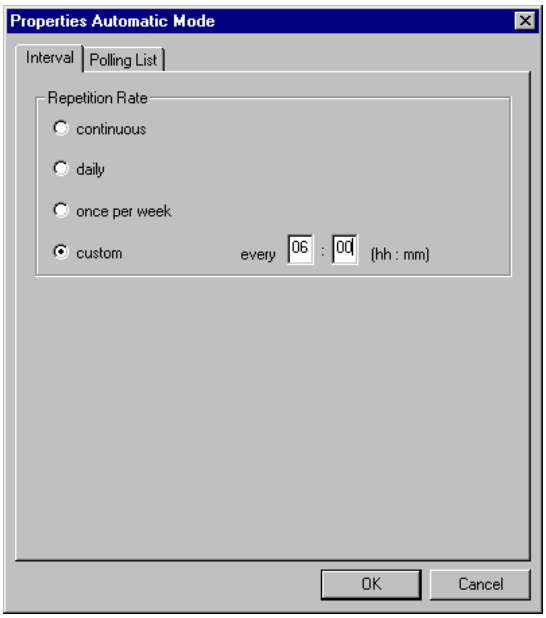


Fig. 8.1 Polling cycle interval in the automatic mode

The repetition rate has the following parameters:

Continuous

The automatic mode continuously polls all devices for new disturbance data. This mode is not recommended, as it is very communication intensive. Example: if you have a RAS connection to a remote PC that is used for both dial out and dial-in, the automatic mode will use your modem for continuously dialling the remote PC. This generates extra communication costs and also prohibits clients to dial in.

Daily

After selecting the Daily option two fields appear for the time of day when the communication equipment shall be polled, e.g. 12:00.

Weekly

After selecting the Weekly option, fields appear for entering the time of day and day of the week when the communication equipment shall be polled, e.g. every Sunday at 17:42.

User defined

Allow you to enter the interval between two consecutive polling cycles, e.g. every 6 hours. If the polling cycle takes longer than the configured interval the next polling cycle starts immediately after finishing the first.

8.3.2. Defining the polling list

The tab Polling List lets you define which communication equipment that shall be included in the polling cycle on regional and on substation level.

Select the regions and the substations you want to include in the polling list by checking the box next to it.

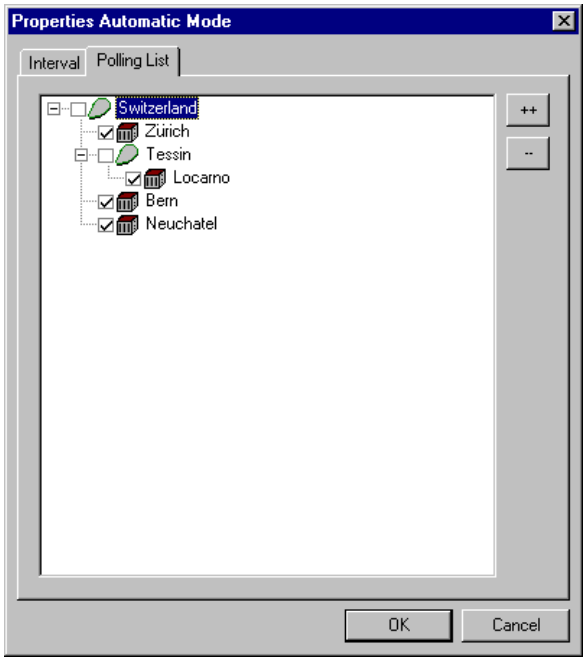


Fig. 8.2 Polling list

All the devices in the substations and regions that have been selected (☑) are polled for new disturbance records.

If you want to exclude a certain device from the automatic polling, uncheck the Transfer checkbox in the properties for the respective device.

The two buttons

++ and --

enable the entire polling list to be opened and closed.

8.4. Spontaneous data transfer

The configuration of spontaneous data transfer is done on the tabs SD Transfer and SD Callback.

To enable spontaneous data upload, your PSM system must subscribe to spontaneous data upload from other PSM systems.

To disable spontaneous data upload, your PSM system must unsubscribed.

8.4.1. Prerequisites

Fill in the database information for the PSM installations you want to subscribe to on the tab Database:

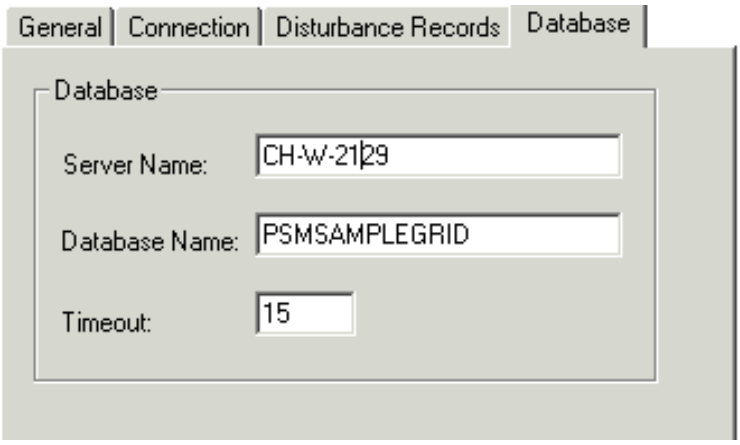


Fig. 8.3 Database information

Import the substation descriptions.

8.4.2. Callback information

This account information is used by the remote PSM installation to contact your PSM system during spontaneous data upload.

This user must have dial-in rights in your WAN environment.

Note: All PSM E_com installations supporting Spontaneous Data Transfer must have the outgoing Connection Object **PSMCALLBACK** defined. This connection object allows Spontaneous Data Transfer to use a well-defined outgoing connection using a specific designated modem and protocols. Create and configure this connection object. See Section 7.6.2, Creating an outgoing RAS connection for more information.

Note: You do not have to define a real user and password for the **PSMCALLBACK** connection. This information is handled by PSM E_com.

8.4.3. Subscription handling

Select the PSM installation in the tree from which you want to subscribe to notifications. Click Subscribe.

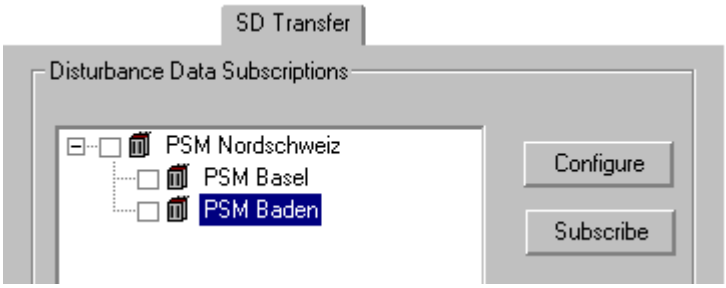


Fig. 8.4 Subscribing to spontaneous data transfer

A dialog displays the result:

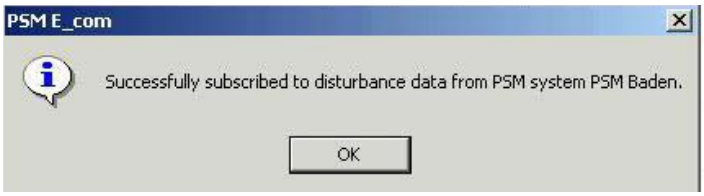


Fig. 8.5 Subscription dialog

Unsubscribing is done analogue subscribing to spontaneous data transfers.

Select the PSM installation in the tree from which you want to cancel an existing subscription. Click Unsubscribe. A dialog displays the result analogue to subscription

8.5. Starting the Automatic Mode

The Automatic Mode can be activated from either the Control or Configuration Mode by selecting

Fig. 8.6 Starting Automatic Mode

The Automatic Mode dialog now appears. When the polling cycle is in progress, the dialog indicates how many disturbance data sources there is to upload, using a progress bar (see figure below). When disturbance records are transferred from a disturbance recorder, the actual file transfer progress is displayed. The system log is updated as the automatic upload proceeds with information about transferred deleted and backed up files as well as communication errors.

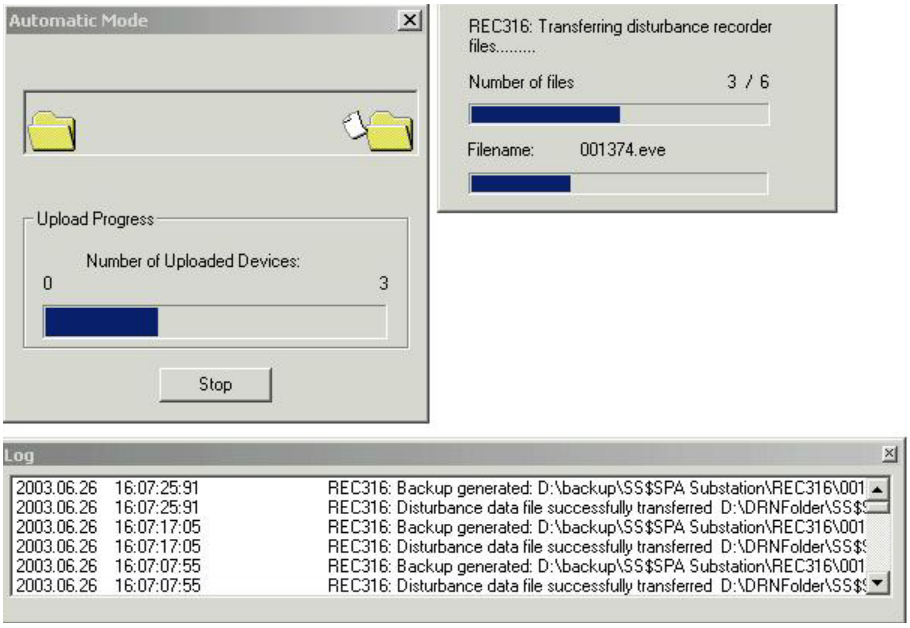


Fig. 8.7 Progress indications in the Automatic Mode

If an automatic polling cycle is not in progress, the time remaining until the next polling cycle is displayed.

Fig. 8.8 Time remaining until next polling cycle

All automatic mode operations are recorded in the system log.

In the event that a connection to a substation or a device be interrupted or cannot be correctly established, the communication status is displayed and appropriate entries are made in the log file. The polling cycle then continues to the next device and a new attempt is made to establish communication with the respective device during the next polling cycle.

The user cannot perform any other E_com operations as long as the automatic mode is running; the automatic mode has to be deactivated first.

The automatic mode can also be started automatically, when the computer starts. See Section 8.7, Starting PSM E_com in automatic mode.

8.6. Stopping the automatic mode

Clicking on the Stop button terminates the Automatic Mode. See figure in "Starting the Automatic Mode".

If data are being transferred when an attempt is made to terminate the automatic mode, the transfer operation is completed before the function closes. This may take a few minutes depending on how much data has to be transferred.

8.7. Starting PSM E_com in automatic mode

PSM E_com can be configured to start in automatic mode when you log on to your computer is started by placing a shortcut in the Startup menu. Add the **/B** option to the Target property of the shortcut as shown below:

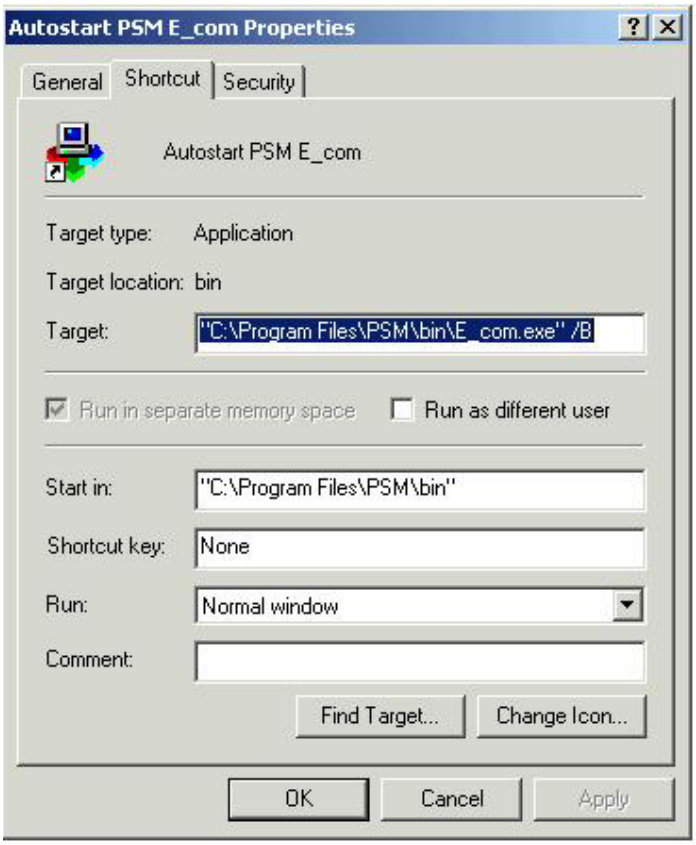


Fig. 8.9 Startup menu shortcut

8.8. WINCOM.FIF

E_com and E_wineve in batch mode communicate via an event file queue. This queue is a file called WINCOM.FIF. See the topmost E_com installations properties. The PSM installation script initially creates the path to this file.

In the automatic mode, E_com enters the name and path of each of the files transferred in the WinCom.FIF file. E_wineve supervises WinCom.FIF and re-evaluates the disturbance records every time it detects a new entry. E_wineve then deletes the entries in WinCom.FIF.

The path is also needed when evaluation is initiated in the manual mode. (See ”Initiating evaluation”) or a report has to be printed (see ”Printing a report”).

Refer to the manual “Software for fault analysis, E_wineve”, 1MRB520260, for further details of E_wineve.

Note: Do not store a WINCOM.FIF file in a shared directory to avoid transferring the file to remote PSM Systems.

8.9. Troubleshooting

This section provides help on how to solve problems with the automatic mode.

8.9.1. General information

It is recommended to verify that all communication channels are working correctly in Control mode before activating the automatic mode of PSM E_com.

8.9.2. Setting the polling cycle

Pay attention to the fact that setting a too short polling interval for a large amount of communication equipment can cause the modem communication performance to degenerate heavily when one single modem is used for both incoming and outgoing connections.

Example: PSM system A is polling remote disturbance recorders connected to a SEL 2030 or a SPA ZC-22 via modem with the interval set to Continuous.

PSM system B subscribes to disturbance data notifications from PSM system A via modem but will not succeed in connecting to PSM system A, as the modem is constantly busy.

Solution: Neither PSM system A or B shall use the Continuous interval in this example. Verify manually how long time the completion of a polling cycle takes and set the polling time according to this time plus an idle time slot, enough for recovering from internal timeouts (SEL2030) allowing PSM system B to connect via RAS.

9. Database handling

9.1. Database management

E_com includes support for backing up and restoring databases via two user-configurable policies, running automatically as background jobs in the PSM database.

The database management functionality is exclusively available to members of the user group PSM Configurators.

Note: the backup files are produced on the local PC where the database is installed.

The backup policies are not activated by default and must be configured by the user.

A PSM database backup consists of two parts; a complete backup and a transaction log file backup. The transaction log file contains all transactions performed on the database since the last complete backup.

When restoring a database, the complete backup is restored. Finally the transactions from the log file are performed on the restored database.

The maintenance functionality allows you to do the following:

- Specify a policy when a complete database backup shall be done, e.g. 21:15 on Monday each week.
- Specify a policy when a transaction log file backup shall be done, e.g. 23:00 every day.
- Do a manual backup of the complete database.
- Do a manual backup of the transaction log file.
- Restore a complete database including the transaction log files.

It is recommended to configure a policy that does transaction log file backups more frequently than a full backup as a full backup takes more computational effort.

9.1.1. Configuring the database backup

Selecting Maintenance from the Database menu configures the database maintenance policy.

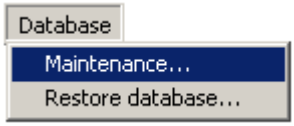


Fig. 9.1 Database Maintenance Menu

Configure the Database Maintenance as follows:

1. Select the Database backup tab.
2. Select the backup directory where the backup files shall be stored by pressing Browse… . Note that the selected directory is a local directory on the PC where the database is installed.
3. Configure the schedule by clicking the Change… button. The schedule dialog appears. Configure the when the database backup shall be done and press OK. The configured schedule now appears in the dialog as written text.
4. Check the box named “Remove files older than” and select the desired criteria for deleting old backup and report files from the backup directory.

Configure the Transaction Log Backup as follows:

1. Select the Transaction Log Backup tab.
2. Select the transaction log directory where the log files shall be stored by pressing Browse… . Note that the selected directory is a local directory on the PC where the database is installed.
3. Configure the schedule by clicking the Change… button. The schedule dialog appears. Configure when the log backup shall be done and press OK. The configured schedule now appears in the dialog as written text.
4. Check the box named “Remove files older than” and select the desired criteria for deleting old transaction log and report files from the backup directory.
5. Test the backup by checking start Backup now and entering a backup name. Press OK. Verify that a backup was produced in the backup directory you configured.

Finally, test the backup by selecting the Database Backup tab, check start Backup now and enter a backup name. Press OK.

Verify that a backup was produced in the backup directory you have configured.

9.1.2. Database Backup properties

This section describes the properties of the database backup tab.

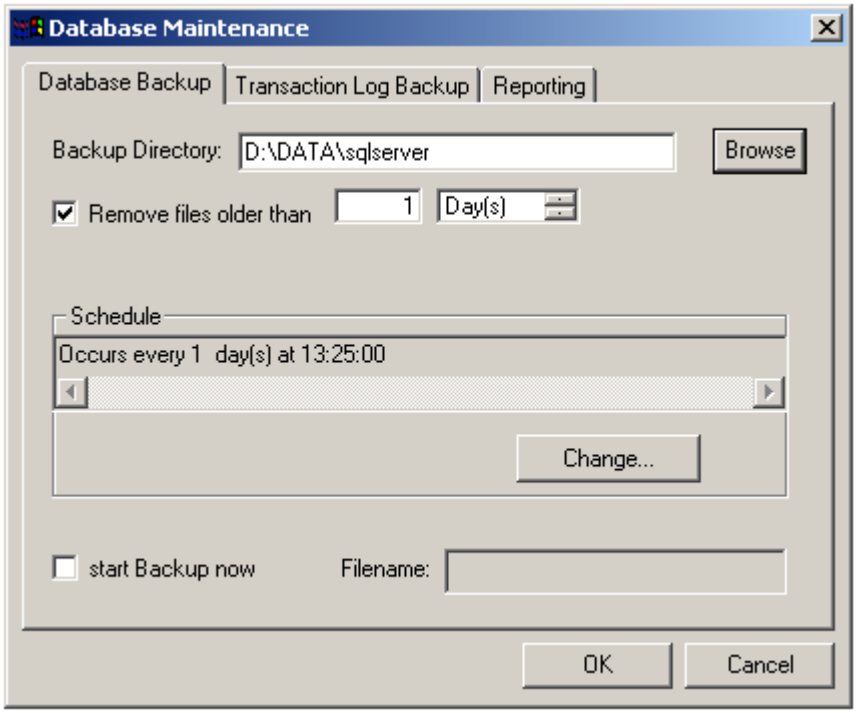


Fig. 9.2 Database Backup properties

Property	Description
Backup directory	A local directory on the PC where the PSM database is installed that shall contain the database backup files. Press Browse to select the directory.
Remove files older than	Check this property to automatically delete backups according to their selected age.
Schedule	Press the change.. button to define when a database backup shall be done.
Start backup now	Manually starts a backup. When selecting this property a filename for the backup is required.

9.1.3. Transaction Log Backup properties

This section describes the properties of the transaction log backup tab.

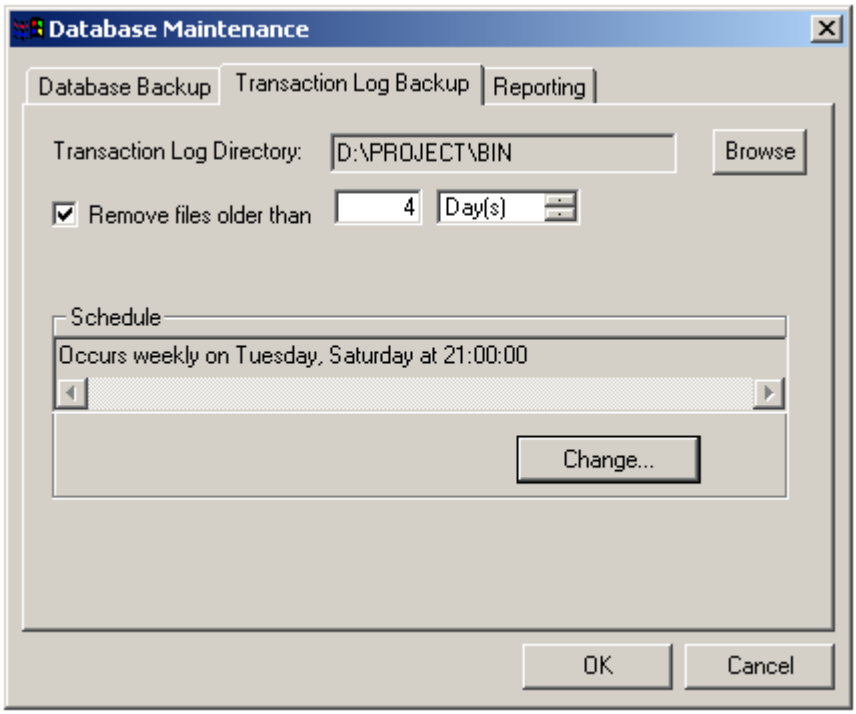


Fig. 9.3 Transaction log properties

Property	**Description**
Transaction log directory	A local directory on the PC where the PSM database is installed that shall contain the transaction log backup files. Press Browse to select the directory.
Remove files older than	Check this property to automatically delete backups according to their selected age.
Schedule	Press the change.. button to define when a transaction log backup shall be done.

9.1.4. Reporting properties

This section describes the properties of the reporting tab. Reporting files are text files generated during the backup operation to describe the outcome of the backup operation.

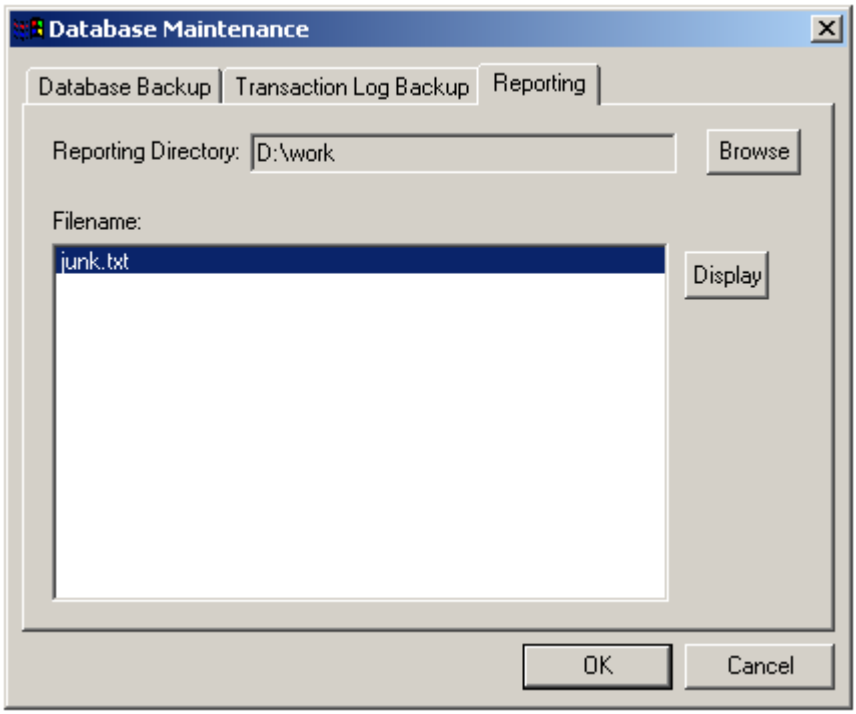


Fig. 9.4 Reporting tab

Property	Description
Reporting directory	A local directory on the PC where the PSM database is installed that contains generated report files describing the outcome of the backup operation. Press Browse to select the directory.
Filename	This is a list of the report files. Press Display to view the report file contents.

9.1.5. Restoring a database

Selecting Restore Database from the Database menu does restoring a database.

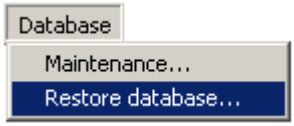


Fig. 9.5 Restore Database menu

The following dialog appears:

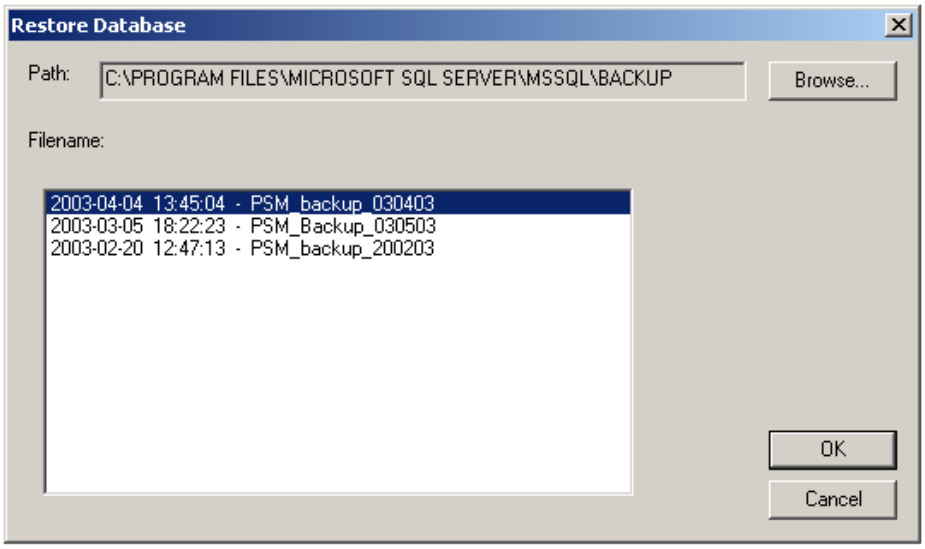


Fig. 9.6 Restore Database dialog

Note: the database you are restoring must not be in use by another application.

A complete restore of a backed up PSM database is done as follows:

1. Restore the PSM database backup.
2. Restore all of the subsequently produced transaction log files of the backup, starting with the oldest log file and finishing with the youngest log file.

Restore a backup or a transaction log file by selecting the file you want to restore in the list and press OK.

9.2. Database access

This section describes how to access the PSM system database over LAN and via WAN through modem connection.

9.2.1. *Local access via LAN*

To access a PSM database on your LAN, your user account must be added to the local group on the computer where the database is installed.

An Administrator can add your account to the local group PSM Configurators or PSM Operators. Note that the database must be stopped and restarted after the account has been added to the respective group.

9.2.2. *Remote access via WAN*

Accessing a remote PSM system database via modem requires

- A correctly set up RAS connection to the remote PSM system
- Granted dial-in rights for the specified RAS user on the remote computer.
- Granted access in the remote PSM database for your user account.

It is recommended to test the remote access to a PSM database by doing a substation import.

Note: The RAS user account is used to build a RAS connection to the remote computer. When accessing the database or a shared directory on the remote computer, your user account (the account you have logged on with) is used to determine if you are authorized to access or not.

9.3. *Troubleshooting*

This section describes common issues that can appear with the database and how to resolve the issues.

Opening a PSM database via LAN does not work

- Verify that the database is running on the remote computer.
- Verify that the account you are logged on with on the client computer is member of PSM Configurators and/or PSM Operators on the server computer where PSM E_database is installed.
- If you use a local account on your client computer, make sure the corresponding local account on the server computer has the same password.
- After manipulating user rights and user group membership it is recommended to restart the computer. The database

must be stopped and restarted to register changes to the user groups.

WAN access to the database does not work.

- Verify that you can successfully build a RAS connection from your client computer using a connection object.
- Verify that all computers have unique names. All computers accessed by PSM via RAS must have names that are unique. If a computer in your LAN has the same name as the remote computer, either disable the cached IP address by commenting out the host cache in the file *\WINNT\system32\drivers\hosts* or rename the remote computer.

10. Troubleshooting

10.1. Error messages

COM could not be initialised when starting the application.

This error indicates initialization problems. Reinstall PSM.

COM security could not be initialised when starting the application.

This error indicates initialization problems. Reinstall PSM.

Data transfer terminated because of an error

This is a general error message which is displayed when communication with the desired device cannot be established or a fault occurs during data transfer. Additional entries in the log file give further details as to where the problem could be.

It was impossible to start the communication server on the local PC.

The communication function did not start. A possible cause is that the user is not registered in the correct PSM user group, see section 2.5, User management.

The database cannot be opened with the software licence installed.

An attempt was made to open an E_com system file that was created with a different E_com software licence. E_com system files created with a software licence having a smaller scope can be opened, but not those created with a software licence having a larger scope.

An entry could not be made in the DRList file.

The DRList file is either being used by another user or is write-protected.

Error while creating a file

A file could not be created. Either a file with the same name exists already that cannot be accessed, or the directory does not permit files to be created in it.

Error while deleting a file

A file could not be deleted because the user was not authorised to do so, the file is write-protected or another user is using it.

Error while transferring a file

The complete File could not be transferred. The most probable cause is an instable or interrupted connection.

A device does not respond

No communication with the device can be established. Either the connection settings are incorrect, or the particular device is switched off.

The specified directory cannot be accessed.

The share name cannot be found on the computer. Either the computer does not exist or the settings are incorrect. The settings on both computers must also agree.

Communication error

This error message is displayed when anything at all is not in order with the communication. A detailed description of the problem is to be found in the log file.

Serial link via COM XX could not be opened.

The specified COM port cannot be accessed (e.g. it is being used by another application), does not exist or is incorrectly configured.

Data transfer error

An error occurred while transferring data. The cause can be a poor connection (e.g. poor telephone line).

10.2. Corrective actions

The most frequent problems concern the communication with other devices. Some procedures for tracing the cause of a particular problem are suggested below. They are grouped according to type of connection.

10.2.1. Modem speed

If the same modem is used for connections with different speed, it may happen that the modem always tries to connect with the highest speed available. For slower data sources the effect is that PSM E_com fail to transfer the data.

Resolve this by configuring the maximum modem speed to the slowest disturbance data source transmission speed or consider using an additional modem and phone line.

10.2.2. Serial link to RE..16 device

- Check the COM port and its settings in the Control Panel.
- Check the respective E_com settings (SPA address, connection settings and telephone number).
- Check that the device switched on.
- Check that the cable is a proper serial cable.
- Check that the COM port is not being used by another application.
- Check that the user is properly registered in the corresponding PSM user group

10.2.3. Modem connection to RE..16

- Check that the modem is correctly connected (see suggestions for a serial link above).

10.2.4. LAN connection with computer

- Check that the remote computer is switched on.
- Check that the shared directory has been correctly created and configured.
- Check that the user has authority to use the share directory.
- Check that the user is registered in the corresponding PSM user group and the PC was restarted afterwards.

10.2.5. RAS connection with computer

- Check that the modem is switched on, correctly configured and the connecting cable inserted.
- Check that the modem in the substation at the other end is also switched on, correctly configured and the connecting cable inserted.

- Check that RAS is installed on the Windows system.
- Check that the communication protocol NetBEUI is installed on the Windows system.
- Check that the user is registered in the corresponding PSM user group.
- Check that the properties have been correctly configured (domain, user name and telephone number).
- Check, that the user is registered on the remote machine also.
- Refer also to the suggestions for a LAN connection above.

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Notification Form for Errors in this Document

Dear User,

We constantly endeavour to improve the quality of our **technical publications** and would like to hear your suggestions and comments. Would you therefore please fill in this questionnaire and return it to the address given below.

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Have you discovered any mistakes in this publication? If so, please note here the pages, sections etc.

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Is the information sufficient for the purpose of the publication? If not, what is missing and where should it be included?

Name: Date:

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Notification Form for Software Errors and Problems

Dear User,

As we all know from practice, software does not always function as expected for all applications. A precise description of the problem and your observations will help us to improve and maintain the software. Please complete this form and send it together with any supporting information or documents to the address below.

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Software Support Group / Dept. PTUSX
Bruggerstrasse 72
CH-5401 Baden

Telefax: +41 56 205 02 53
e-mail: SA-LEC-Support@ch.abb.com

Unit/ System: PSM Version:

Problem: ❑ Program error (unit/system) ❑ Program error (HMI /PC)
❑ Error in manual ❑ Suggestion for improvement
❑ other:

Can the error be reproduced at will? ❑ yes ❑ no

Particulars of hardware and software (unit/system configuration including jumper positions, type of PC etc.):

Problem located? ❑ yes ❑ no
Suggested changes enclosed? ❑ yes ❑ no

The following are enclosed (floppy with settings etc.):

❑ Floppy ❑ Unit/system settings, file name:
❑ other:

Description of problem:

Customer: Date:

Address:

Please contact: Phone: Fax:

DESCRIPTION OF PROBLEM: (continuation)

ACTION (internal use of ABB Switzerland Ltd, Dept. PTUSX)

Received by: Date:
Answered by: Date:

Problem solved? ❑ yes ❑ no

Week: Name: Position: Consequence:

-

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