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As a result, it is possible that there may be some differences between the HW/SW product and this information product.

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## **The chapter "Introduction"**

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## Introduction

Welcome to the SM/REx 500 version 2.0-00 User's manual.

SM/REx 500, version 2.0, is intended for parameter setting and supervision of the corresponding terminals:

- REx 500 multi functional terminal
- REL 501 line distance protection terminal
- REL 511 line distance protection terminal
- REL 521 line distance protection terminal
- REL 531 line high speed distance protection terminal
- REL 551 line differential protection terminal
- REL 561 line differential and distance protection terminal
- REB 551 breaker protection terminal
- REC 561 control terminal

version 2.0. The software runs on a PC system using the DOS operating system.

### Note!



*The SM/REx 500, version 2.0 can not be used with previous versions than 2.0 of the terminals in the previous list.*

When REx 5xx terminal is mentioned in this User's manual, it is understood as the terminal type that were mentioned in the previous list.

Once a terminal is installed, the user can change the text to the type of terminal, for example, after installing SM/REx 500, the text can be changed to REL 531, using the edit function. For more details, see Ref.2 in chapter 4: "References".

The SM/REx 500 software module is part of SMS 010, hereafter simply denoted SMS.

The Station Monitoring System (SMS) consists of four functional parts:

- Parameter setting and supervision
- Disturbance recording evaluation
- Event handling
- Time synchronisation

Before SM/REx 500 can be used, the platform program SMS-BASE must be installed on the PC system.

The SMS-BASE is the platform program always required to run SM/REx 500 and other SM/... software modules. When SM/REx 500 is installed, it will be integrated in the SMS-BASE software structure. The product can be considered as the library files required for SMS-BASE to communicate with REx 5xx. The REPORT program must also be installed if SMS is to be used for event and alarm handling of the REx 5xx terminal.

To be able to make use of this document the user should be familiar with SMS-BASE. For more information regarding SMS-BASE functions, please refer to the SMS-BASE User's Guide (see Ref. 2 in chapter 4: "References").

This software module is developed and manufactured by ABB Network Partner AB, Västerås, Sweden.

# 1 Terminal parameter setting and supervision

Terminal parameter setting and supervision, sometimes also called protection/control monitoring, is a means for getting the same information on a PC as that available on the built-in HMI (Human-Machine-Interface) on the front of the terminal. In this case, even more information is available through the PC. This means that the SM/REx 500 program is a way to access information stored in the terminal that is not available on the built-in HMI of the terminal, e.g. time tagged disturbance reports and event functions settings.

## 1.1 Product overview

The ABB Network Partner PANORAMA concept contains a full range of flexible and functional systems for monitoring, protection, and control of all parts in the power system.

The terminals in the REx 5xx-series consist of several numerical high-performance terminals for medium and high voltage applications. Almost all information and settings available in the terminals can also be made available in a PC equipped with SMS programs. For the REx 5xx, the CAP 531 configuration tool is also required for configuration of the function blocks. Since SMS also supports communication via telephone modems this makes SMS a way to travel to the station by communication link, making physical presence in the station unnecessary.

Besides the SM/REx 500 software module, there are other programs available for efficient use of the information stored in the terminals.

**SMS software available for REx 5xx terminal**

- SMS-BASE - Platform program for all SMS applications.
- REPORT - Event and alarm handling program. The program is integrated with SMS-BASE.
- SM/REx 500- Software module for setting and monitoring of the REx 5xx terminal. The included FrontRECOM, which contains a part of RECOM, makes manual collection of disturbance recordings via the front port of the terminal possible.
- RECOM - Program for manual or automatic collection of disturbance recordings.
- REVAL - Program for manual evaluation of disturbances.



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# Instructions

## 1 Installation

Before using SM/REx 500, the software must be installed on the local hard disk on a PC.

### 1.1 About the product

SM/REx 500 is used for parameter setting and supervision of one of the corresponding REx 5xx terminals. It is delivered on two diskettes. One diskette contains the software module for SM/REx 500, which includes specific description files for communication with REx 5xx, and the second diskette contains FrontRECOM, for manual disturbance collection via the front port.

#### Note!

*The SM/REx 500 can only be used to communicate with the corresponding \* 2.0 of REx 5xx terminals. Previous versions require SM-products corresponding to the terminal name, i.e. SM/REL 521 for terminal REL 521. The FrontRECOM program, however, can communicate with all existing REx 5xx terminals.*



The SM/REx 500 diskette contains the following files:

INSTALL.EXE	Installation program
INSTALL.LAN	Language file for the installation
PKUNZIP.EXE	Expansion software for MODULES.ZIP
DEVICES	Additional file section to DEVICES already installed
MODULES	Empty file required by the installation program
MODULES.ZIP	Compressed configuration files
FUNCTION.ZIP	Compressed files for auxiliary functions
README.TXT	Latest information

The FrontRECOM diskette contains the following files:

INSTALL.EXE	Installation program
FRONTINS.EXE	Compressed program files
README.TXT	Latest information

## 1.2 System requirements

The following requirements must be fulfilled for the SM/REx 500 software module to operate (see also Ref. 2: SMS-BASE User's Guide in chapter 4: "References"):

### 1.2.1 At the REx 5xx terminal end:

Alternative 1; Remote and/or local SPA-bus communication:

- Terminal REx 5xx with installed 'Remote communication SPA/IEC' option.
- Optical fibre SPA-bus with opto/electrical converter.

#### Note!

*The settings for the SPA/IEC communication is made via local HMI.*



Alternative 2; Front communication:

- Terminal REx 5xx.
- Front connection cable for the REx 5xx-series.

The software module SM/REx 500 enables the reading and setting of individual parameters, or switching between preset groups of parameters in one or several REx 5xx terminals. The authorization for remote setting are set on the local HMI of the terminal.

### 1.2.2 At the PC end:

- Computer; 100% IBM compatible PC
- Local disk space; 10 Mbyte + 8 Mbyte/terminal
- One serial port (RS232); COM1 or COM2
- Parallel port; 1 port for the printer, LPT1, LPT2, or LPT3
- Disk drive; 1 drive, 3.5" of type HD (1.44 Mbyte)
- Work memory; 500 kbyte unused
- Operating system; DOS 6.0 or higher
- Base program; SMS-BASE, version 2.1 or higher.
- If the REPORT program is used; version 2.0 or higher (used for event and alarm handling in SMS).
- If the RECOM program is used; version 1.4 or higher.

A PC equipped with a 386 processor is sufficient for this type of SMS application. However, for better performance a more powerful PC is recommended.

### 1.2.3

#### **For communication via telephone modems:**

(see Ref 2. in chapter 4: “References”, SMS-BASE User’s Guide, Appendix C)

- Public telephone network according to CCITT.
- Hayes compatible telephone modems that understand AT commands.

For more details on building up the hardware, see Ref. 1 in chapter 4: “References”).

SMS communication with a REx 5xx terminal does not delay the protection/control function. The communication only affect the protection functions when new parameter settings are transmitted to the terminal. When new parameter settings (Settings, Configuration, Test, Event Masks) are downloaded, or when the active parameter setting group is changed, the terminal is blocked for typically 45 seconds. This will occur each time a data part containing settable parameters is transmitted to the terminal.

## 1.3

### **The README file**

The SM/REx 500 diskette and the FrontRECOM diskette both includes a README.TXT file. This file contains last minute news to be added to the User’s manual, i.e. improvements made after the User’s manual was printed. The README files are delivered in uncompressed format and should be read prior to installation.

## 1.4

### **Installation procedures**

Installation of the SM/REx 500 and the FrontRECOM programs is made by decompressing and copying files from the diskettes to the hard disk. This is normally designated ‘C’, but other disks can also be used. From here on, it is assumed that the installation procedure is carried out from disk drive ‘A:’. However, any other drive will of course be possible.

In order to avoid problems, installation of the DOS-based programs is to be made **directly in DOS**, and not via MS Windows. It is also recommended not to have shell programs, like Norton Commander, active during the installation.

When starting the SMS-BASE and SM/REx 500 for the first time after installation, follow the instructions in chapter “Overview” on page 29 and in chapter “Handling SM/REx 500” on page 30.

### 1.4.1

#### **Installation of SMS-BASE**

SMS-BASE must be installed on the PC before installation of SM/REx 500 can take place. SMS-BASE is delivered as a separate program and the installation is described in Ref. 2.

### 1.4.2

#### **Installation of SM/REx 500**

Follow the steps described in the following to install from drive A to hard disk (C):

**1 Insert the SM/REx 500 diskette into drive A.**

Change the command line directory to drive A by typing a: and press <Enter>.

**2 At the command line, type install and press <Enter>.**

Generally <F1> can be pressed in order to present a help text, and <Esc> to exit the installation procedure.

The path of the SMS-BASE system is presented. This path can be edited. Note that the path is the location of the SMS-BASE system and not the position of the modules within the system. If the default path is to be used, press <Enter>.

**3 Press <Enter> once more to confirm the path when the cursor is placed on Yes.**

The next screen displays the available unit on the diskette, i.e. "REX500A V2.0". This unit is selected by pressing <Space> or <Enter> and is then marked with an X. Press <F2> to continue the installation procedure.

**4 Press <Enter> once more to confirm the selected unit when the cursor is placed on Yes.****5 When the installation is completed (and the next diskette is to be asked for), press <Esc> to exit the installation procedure.**

The SM/REx 500 is now properly installed on the hard disk of the PC.

If the default path is used, the hard disk should have the following directory structure after the installation:

```
C:\SMS\BASE\ Home directory of the system
      SUPPORT\ Support programs for SMS
      MODULES\ Descriptions
              REX500A\ Description of the REx 5xx parts
```

**1.4.2.1****The SMS directory structure**

SM/REx 500 is a part of the SMS software structure. The SM/REx 500 module consists of a number of files and directories which are added to the SMS structure. The following file types are added into the directory

C:\SMS\BASE\MODULES\REX500A:

- **.SUP** - Support files defining the programs to be called for a certain action.
- **.CNF** - Configuration files defining all terminal parameters and data types.
- **.DEF** - Initial values for terminal parameters.
- **.EXE** - General product support file.
- **.CHN** - Support file for the REPORT program.
- **.EVN** - Support file for the REPORT program.
- **.LOG** - Support file for the REPORT program.
- **.SUB** - General product support file.

## 1.5

### Installation of FrontRECOM

A diskette called FrontRECOM is included in the SM/REx 500 package. It contains a part of RECOM, which enables manual collection of disturbance recordings via the front port of the terminal.

#### Note!

*FrontRECOM is to be installed before SM/REx 500 is used to add application elements in the SMS-BASE application structure.*



#### Note!

*Installing FrontRECOM is only required if RECOM is not installed on the PC. If RECOM is to be installed on the PC, it must always be installed as the last diskette. This means that the installation must take place in the following order:*



- 1 SM/REx 500
- 2 FrontRECOM. Not necessary if RECOM is to be installed.
- 3 RECOM

### 1.5.1

#### Installation procedures

Follow the steps described in the following to install from drive A to hard disk (C):

##### 1 Insert the FrontRECOM diskette into drive A.

Change the command line directory to drive A by typing **a:** and press **<Enter>**.

**2 At the command line, type install and press <Enter>.**

If the SMS path is selected, C:\SMS is the default path. If another path is used, type **install C:\realpath** and press <Enter>.

If a previous version of the FrontRECOM exists, the installation program will show the message 'An old installation of RECOM has been found on directory C:....' and abort. To be able to install the new version of FrontRECOM, the previous version must be uninstalled. See below. The same is valid if RECOM is already installed on the PC.

**3 Press <Any key> to confirm that the installation is to continue, or press <Ctrl> and <Break> to quit.****4 When the installation is completed, press <Any key> to continue.**

The temporary directory \recomtmp created during the installation, will now be deleted.

FrontRECOM is now properly installed on the hard disk of the PC.

**Uninstallation of a previously installed version of the FrontRECOM program**

A previously installed version of the FrontRECOM program can be uninstalled using the 'uninstall' command. All RECOM files are removed and the initialisation files in SMS-BASE are reset to original.

To uninstall the program, do as follows:

**1 Position to the RECOM directory by typing c: and press <Enter>, then type cd \sms\recom and press <Enter>.****2 Type uninstall and press <Enter>.**

The FrontRECOM program is now uninstalled.

**Note!**

*Follow the same procedure as described above if FrontRECOM version 1.4 is to be installed. This is also necessary if RECOM is to be installed on the PC.*

**1.6****Installation of REPORT**

The REPORT program is delivered as a separate program package with diskettes and a User's guide. For installation information, please refer to the REPORT User's Guide (Ref. 4).

## 1.7

### Communicating via the REx 5xx front port

The following steps must be followed to communicate via the front port of the REx 5xx terminal:

- 1 **Connect a communication cable between the PC and the REx 5xx front port.**
- 2 **Start the PC.**

Now SMS-BASE can be started and run (see section 1.8 below), provided that the communication settings are correct. The settings for communication are made by selecting '**Alter application structure**' under the '**UTILITIES**' menu and then selecting '**Organisation**', '**Station**' and '**Object**'. When the '**Object**' screen is shown, press '**C**' to open the screen for editing communication parameters. The important setting to check in this menu is '**Handshake**', which has to be set to **RTS-idle**. This setting also works for remote communication with the terminal over modems via the rear ports.

- 3 **Set the 'Baud rate' for the front port communication correctly.**

Check the terminal baud rate setting using the local HMI, and set the PC to the same value. This setting is to be found under the local HMI menu:

*Configuration/SPA Comm/Front/...*

- 4 **Check that the 'Slave number' is correct in all the data parts.**

Check the terminal slave number setting using the local HMI, and set the PC to the same value. This setting is also to be found under the local HMI menu:

*Configuration/SPA Comm/Front/...*

```

===== Edit communication parameters =====
Phone no: 000000                               000000
Connection: Direct                             Direct
Serial port: COM2                              COM2
Protocol: SPA                                  SPA
Baud rate: 9600                                9600
Parity: EUEN                                  EUEN
Data bits: 7                                  7
Echo: NONE                                    NONE
Handshake: RTS-IDLE                            RTS-IDLE
Stop bits: 1                                  1
=====
| E=Edit          ESC=quit          ENTER=save

```

The list shown above is an example on how to set the communication parameters. All setting restrictions are set to OPEN on the front port, as described in chapter 3, paragraph "Setting restrictions" on page 31.

## 1.8

### Starting the SM/REx 500 program

SMS-BASE and SM/REx 500 is started from DOS in the following way:

- 1 **Change the command line directory to C:\SMS\BASE by typing c: and then press <Enter>, type cd\sms\base and then press <Enter>.**
- 2 **Type smsbase and press <Enter> to start the program.**

---

To start the SMS-BASE program from an MS Windows icon, please refer to paragraph “Handling SMS under MS Windows” on page 69.

**Note!**

*Once a terminal object is installed into the SMS-BASE application structure, the user may change the presented text. The type designation of the used control/protection terminal can be added. However, the module definition in the beginning of the text must not be changed. This part is used as reference by the SW*

*Example:*

**REX500A V2.0 C REL 511 Protection and Control terminal**

*Bold: Not to be changed.*

*Underlined: User defined text.*

*For more details see Ref.2 in chapter 4: References.*

## 2 Basic operation

In this chapter the work flow for some typical tasks when using SM/REx 500, are described.

### 2.1 Changing settings in a terminal

**Note!**

*When changing parameter settings (Settings, Configuration, Test and Event Masks) or when changing active parameter setting group, the terminal will be blocked for typically 45 seconds.*

#### 2.1.1 Presenting options

The terminals consist of many different functions, of which some are basic and some are options. After having installed a new REx 5xx terminal in the ‘Application structure’ in SMS-BASE, it will be shown as if all options available for the terminal type are installed. But after having communicated with the terminal once (twice is needed in some cases), the screens will automatically be corrected to show only the functions that are currently installed. If you have prepared settings in advance, you must write them to the terminal first.

Some parts of the SM/REx 500 only contain information belonging to one specific option. The first screen on such part will give information whether the option is installed or not. If not, it is recommended to remove the whole part, as described in paragraph “Removing Parts of Unit from an installation” on page 68, since it does not contain any relevant information.

### 2.1.2

#### **Read or Write multiple parameters to or from a terminal**

All parameters for a Group (Disturbance Report, Service Report, Settings, Configuration and Event Masks) can be read or written to the terminal in one step. This will allow for monitoring or setting multiple parameters in several parts of SM/REx 500, by means of viewing and saving changes on the PC, instead of reading or writing data to or from the terminal each time a new part of SM/REx 500 is selected. This feature is especially valuable when setting a REx 5xx terminal for the first time, since the multiple write command will confirm to the user that all settings prepared in advance are downloaded to the terminal.

The multiple read or write function is available for:

- **DRP--OVER** Reads all disturbance data (in parts **DRP-INDC**, **DRP-EVEL**, **DRP-TRIP**) from the terminal to the PC.
- **SRV--ALL** Reads all service values from the terminal to the PC.
- **SET--ALL** Reads or writes all settings from/to the terminal to/from the PC.
- **CNF--ALL** Reads or writes all configurations from/to the terminal to/from the PC.
- **MSK--ALL** Reads or writes all event masks from/to the terminal to/from the PC.

### Example of reading all settings from/to the terminal

- 1 **Select the SET--ALL part under the group 'Settings'.**
- 2 **Select 'Read ALL settings' and press <Enter>**

The terminal data is now read to all SET-xxxx parts in the PC, in the same order as the parts are listed. The part currently executed is shown in the bottom left corner of the SMS-BASE screen.

When the communication information box in the middle of the screen has disappeared and no current part is shown in the bottom left corner, all settings have been read and stored on the PC. All settings in each SET-xxxx part can be viewed by selecting '**Monitor PC-file information**' for each data part.

- 1 **Select the SET-xxxx part containing the settings to be viewed.**
- 2 **Select 'Monitor PC-file information' and press <Enter>.**

#### 2.1.2.1

### Example of writing all settings to the terminal

As the command 'Write ALL settings' writes all settings from the PC to the terminal, all settings in each SET-xxxx part should first be changed to the desired value. If the settings stored in the terminal are to be modified, read first all settings to the PC as described in the previous section.

- 1 **Select the SET-xxxx part containing the settings to be modified.**

Select '**Monitor PC-file information**' and press <Enter>. Change the settings, press <Esc> to leave the SET-xxxx part and press <Enter> twice to save the new settings. As all changes will be written to the terminal from the SET--ALL, it is not necessary to write the settings to the terminal, press <Esc>

- 2 Repeat the previous step for all SET-xxxx parts in which the settings should be modified.
- 3 Select the SET--ALL part.
- 4 Select the 'Write ALL settings'

You will now be asked if you want to write the selected group to the terminal. Press <Y> and then <Enter>.

The PC-file information for all SET-xxxx parts is now written to the terminal in the same order as the parts are listed. The part currently executed is shown in the bottom left corner of the SMS-BASE screen. When the communication information box in the middle of the screen has disappeared and no current part is shown in the bottom left corner, all settings have been written to and stored in the terminal.

The settings will be automatically read back to the PC for each SET-xxxx part, after the settings have been stored in the terminal. You can now verify the downloaded settings by selecting 'Monitoring PC-file information' for each SET-xxxx part and check that the 'Present values' stored in the terminal are the same as the 'New values' that was entered in the PC.

### Note!



*The write command that downloads ALL data parts is NOT password protected. Delete the xxx--ALL parts from the application structure if the ability to write ALL data parts without password is to be omitted. To uninstall the parts, see paragraph "Removing Parts of Unit from an installation" on page 68.*

## 2.2

### Alternating between setting groups

- 1 Select the 'SET-ACTI Change Active SetGroup' part.
- 2 Select 'Read present group No. to PC-file' to check which setting group is currently active.
- 3 Select 'Enter new group No.' to monitor the active setting group and to enter the new one.

On the top, the 'Remote change' shows 'OPEN' if change of active group is possible from SMS.

- 4 Select 'New group - Active setting group' by pressing <Enter>, selecting the new group and the press <Enter> again.

When the new group is entered, leave the editor with <Esc> and answer yes <Y> to the following questions by pressing <Enter> twice.

- 5 **Select 'Write new group No. to terminal' and press <Enter>.**
- 6 **Enter the correct password and press <Enter>.**
- 7 **Press <Enter> again to proceed.**

When the active setting group is changed, the terminal will be blocked for typically 45 seconds.

## 2.3

### Setting REx 5xx terminal time

The terminal has an internal real time clock including full-time, i.e., date and time. The clock can be checked, and set from SM/REx 500 on a minute basis. The setting of the terminal time is not affected by the setting restrictions ('OPEN'/'BLOCKED') in the terminal, i.e., it can always be changed. The format of the time is YY-MM-DD HH.MM:SS.

Use the following work flow to check and, if necessary, set the REx 5xx terminal time:

- 1 **Check and set the date and time of the PC (if necessary).**
- 2 **Read the internal time of the terminal by means of 'SET-TIME'.**  
Select 'Read terminal time to PC-file' followed by 'Enter new time setting'.
- 3 **Compare the 'Terminal Time' on screen 1 with the 'PC-file Time' to check if the terminal time should be corrected.**
- 4 **Enter the full date and time.**  
Add a few minutes to the time entry, e.g., if the time is 10.44 when the string is entered, set the 'Terminal Time' to 10.46.
- 5 **When the new time is entered, leave the monitor mode immediately by pressing <Esc> and answer yes (Y) to the following questions by pressing <Enter> twice.**
- 6 **Select 'Write new time setting to terminal'.**
- 7 **Enter the correct password and press <Enter>.**  
Wait until 10.45.58.
- 8 **Press <Enter> to leave the password function and to start the communication process.**
- 9 **Check the new REx 5xx terminal time by means of 'SET-TIME'.**  
Select 'Read terminal time to PC-file' followed by 'Enter new time setting'. Compare the read Terminal Time with the PC-file Time.

For accurate setting of the terminal time it is recommended to utilise the local HMI, since the communication procedure in SMS makes accurate setting of the time difficult.



### Note!

*It is only possible to change terminal time when no synchronisation source is configured. If a synchronisation source is configured, the time setting will be rejected by the REx 5xx terminal.*

## 2.4

### Archive disturbance data

The easiest way to store disturbance data is to use the report facility and store the screens either on paper or in a text file. This facility is useful since only one disturbance at a time can be selected in the DRP-OVER part for detailed information in the other DRP-... parts.

When storing information in a file the following procedure is to be followed:

- 1 Select one of the 10 disturbances in the DRP-OVER part for more detailed information.**

See also paragraph “DRP-OVER Disturbance Overview” on page 50.

- 2 Select, for example, the DRP-INDC part for information regarding the indications during the selected disturbance.**
- 3 Select ‘Read terminal data to PC-file’ and then ‘Monitor PC-file information’.**
- 4 The selection ‘F7 REPORT’ is given at the bottom of the screen.**

When pressing <F7> a selection list is presented as shown in the following figure.

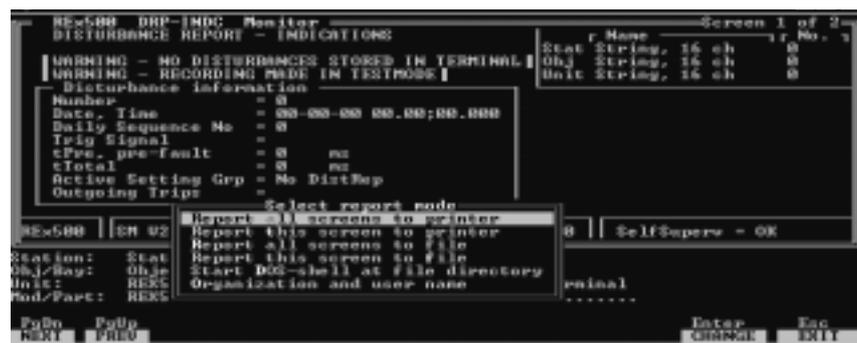


Fig. 1 Selection list obtained by pressing <F7>.

**5 Select 'Report all screens to file'.**

All the information on the screens in the current Part of Unit will now be stored in a file given a name set by the date of the PC, and the extension SRP.

**6 By selecting 'Start DOS-shell at file directory', the path to the directory where the file is stored is given.**

Information on the file can be accessed using, for example, the 'DOS-Edit' editor, i.e. by typing '**edit 990604\_0.SRP**' at the DOS-prompt.

For more information regarding these facilities, refer to the SMS-BASE User's Guide (see Ref. 2 in chapter 4: "References").

**2.5****Using REPORT with SM/REx 500**

The REPORT program is used for event, alarm and log reporting in the Station Monitoring System (SMS). The REPORT program is integrated with SMS-BASE and polls up to 16 defined stations in the application structure for events, alarms and log values. The result is presented to the user in form of logging files and screens.

A complete REPORT system for an application comprises protection relays/terminals, a SRIO 500/1000 M or SACO 100M data communicator, a PC with SMS-BASE installed, REPORT and SM/... product/-s. REPORT communicates with the relays/terminals via the SRIO/SACO data communicator unit using the SACO 100M protocol. REPORT synchronises the operation of the entire system.

To use REPORT for a REx 5xx terminal, the corresponding software module SM/REx 500 and SMS-BASE must be installed. SM/REx 500 contains the event, alarm and logging parameter tables for the REx 5xx terminal, necessary for handling REPORT data in the REPORT station.

Only the parts that are specific for using SM/REx 500 together with REPORT is described in this User's manual. For installation, configuration and general use of the REPORT program, refer to Report User's Guide (see Ref. 4 in chapter 4: References).

**2.5.1****Configuration of Event and Alarm tables**

To configure the event, alarm and log handling for SM/REx 500, select '**Alter additional configurations**' in the '**UTILITIES**' menu.

- 1 Select 'Organization', 'Station', 'Object' and then the 'Unit' to configure. Press <Enter>.
- 2 Select 'Event/Alarm Tables', and press <Enter>.



Fig. 2 Selection of Event/Alarm Tables.

- 3 Select the first Part of Unit, 'TRM-OVER Terminal Overview', and press <Enter>. The following screen will appear:

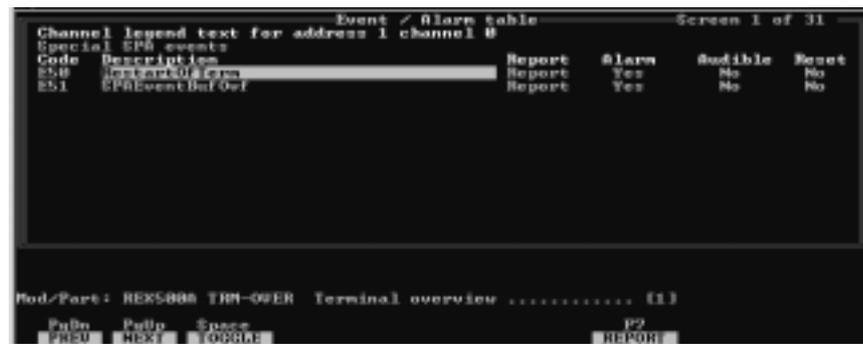


Fig. 3 Event/Alarm Tables for REx 5xx.

The following events and alarms for the REx 5xx terminal can be configured in these 31 screens:

- Special SPA Events.
- All single events and double indications for Event Functions 01-06 (i.e. Event Functions 07-44 cannot be used together with the REPORT program).

The settings in the event/alarm parameter table determine which events should be reported, which events that are defined as alarms, if audible alarms should be given and if SACO annunciators should be reset. Also event/alarm texts and the channel description can be edited.

Please refer to the 'REPORT User's Guide' (see Ref. 4 in chapter 4: "References") for further information.

### 2.5.2 Configuring logging tables

To configure the logging handling, enter the 'Logging Tables' for the selected unit.

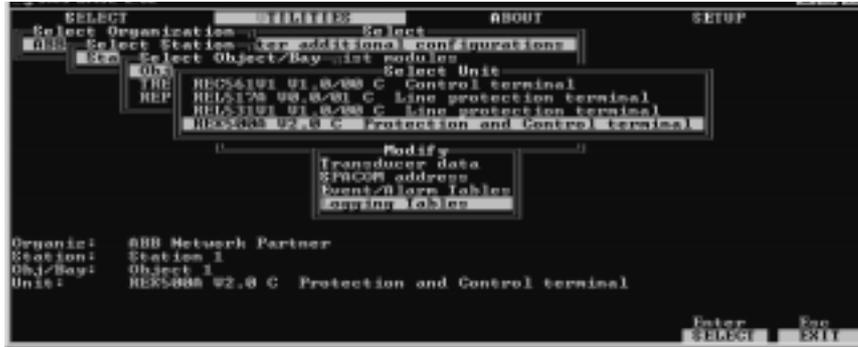


Fig. 4 Selection of Logging Tables.

1 Select the first Part of Unit, 'TRM-OVER Terminal Overview', and press <Enter>. The following screen will appear:

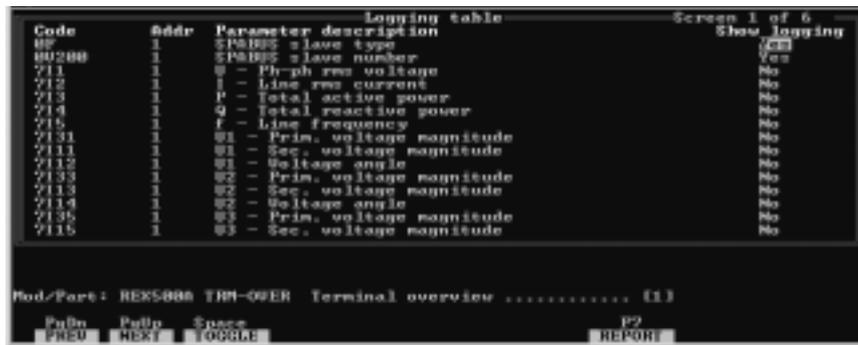


Fig. 5 Logging Tables.

The following logging values for the REX 5xx terminal can be selected to be logged on these 6 screens. (Note that the logging parameter description cannot be edited.)

- SPABUS slave type and number.
- Primary mean values.
- Analog input phasors.
- Synchrocheck values.
- mA input values.

Please refer to the 'REPORT User's Guide' (see Ref. 4 in chapter 4: "References") for further information.

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# 1 Extensive operation

This chapter describes SM/REx 500 functions. The menus in the SM/REx 500 program are presented with explanations of the contents and how to use them.

## 1.1 Overview

The following flow of activities is typical when using SM/REx 500:

The user:

- Creates and maintains an application structure.
- Establish communication via telephone modems or direct connection.
- Selects from the application structure the terminal to work with.
- Orders data to be sent from the terminal to the PC, by selecting '**Read terminal data to PC-file**'.
- Observes the presented data by selecting '**Monitor PC-file information**'.
- Reads the information sent from the terminal.
- Orders new data to be sent from the PC to the terminal by selecting '**Write PC-file settings to terminal**'. A 'write' procedure is automatically followed by a verification procedure, to ensure that the settings are changed correctly.

The SMS-BASE program is a standard application run in DOS, consisting of the following parts:

### 1 Function keys:

- <Esc> EXIT from current menu.
- <F7> REPORT generation, i.e., printing of screens.
- <F8> Start DOS window.
- <PgDn> Display NEXT screen.
- <PgUp> Display PREVIOUS screen.
- <Enter> CHANGE value.

### 2 Menu items:

The menus offer a number of functions which are explained in the SMS-BASE User's Guide (see Ref. 2 in chapter 4: References).

When a terminal is selected on the unit level, a list of functional groups is shown. Each group contains the different parts of the terminal. The user selects a group by pressing <Enter>. The parts within the group are then shown. The user can select any of the parts by pressing <Enter>, and perform actions to display or modify information related to the selected part.

The user can:

- Read settings and information from the terminal.
- Monitor settings and information stored in the PC.
- Write settings to the terminal.
- Generate and print reports.

When data is written to the terminal, a password has to be entered by the user. The password check assumes one password common to all the units in one station.

Communication to the terminals is performed through the SPA-bus protocol.

### 1.1.1 Navigating through the SMS structure

The **'SELECT'** menu includes the application structure, either built with the 'Alter application structure' function, or installed from a diskette. The application structure fulfils its task by means of mapping the real world hierarchy of 'Organization', 'Station', 'Object', 'Unit', 'Groups' and 'Part of Unit' into the directory structure. The user navigates through the structure using the <Arrow>, <Home>, <End>, <PgUp>, and <PgDn> keys. Press <Enter> to select an item in the structure. Press <Esc> to return from a selected item in the structure.

### 1.1.2 Changing application structure

To change the application structure, select the **'Application structure path'** function in the **'SETUP'** menu. The path to the application structure is by default C:\SMS\DATA-EX.

### 1.1.3 Altering application structure

To work with the application structure, select the **'Alter application structure'** function in the **'UTILITIES'** menu. A new application structure must be built when SMS-BASE is started for the first time,

## 1.2 Handling SM/REx 500

In this section the general handling of SM/REx 500 is described.

### 1.2.1 Setting restrictions

Remote setting restrictions can be set on the REx 5xx local HMI, which disables the possibility to set parameters in the REx 5xx terminal from SMS. However, parameters and information can always be read.

The access rights have the following alternatives:

#### Access rights on remote communication ports (rear)

Switching between setting groups	<b>Open or Blocked</b> Setting made under <i>Configuration/SPA/IEC Comm/Rear</i> menu node
Setting of individual parameters	<b>Open or Blocked</b> Setting made under <i>Configuration/SPAComm/Rear</i> menu node

The setting of the access rights can only be done via the local HMI.

For communication on the front port of the terminal, no setting restrictions exist. For instructions on how to communicate via the front port, see paragraph “Communicating via the REx 5xx front port” on page 17.

#### Access rights on front communication port

Switching between setting groups	Open
Setting of individual parameters	Open

### 1.2.2

#### Password handling

A password must be entered as an introduction to each activity that can change the settings of the protection terminal. The password is the same for all terminals in one station. This means that if the password is changed during communication with one terminal, the new password is valid for all terminals in that station. Remote setting activities are allowed according to the setting restrictions set via the local HMI on the REx 5xx terminal.

The default password for a new station is 000.

#### Note!



*The SET--ALL, CNF--ALL and MSK--ALL parts have no password handling. This means that these parts can write data to the terminal without entering any password. To inhibit this function, the SET--ALL, CNF--ALL and MSK--ALL parts should be removed from the structure as described in paragraph “Removing Parts of Unit from an installation” on page 68*

### 1.2.3 **Configuring functions and logical elements**

The terminal configuration of all application functions and logical elements is performed using the CAP 531 Configuration Tool (CAP/REx 500). No configuration of the application functions and logical elements is available in the SM/REx 500.

## 1.3 **Parts of Unit in SM/REx 500**

In this section an overview of all SM/REx 500 parts is given. Some data parts are described more thoroughly in the following chapters.

Prior to the first communication session with the terminal, the information is presented as if all options were installed. The reason is that it must be possible to prepare all settings in advance. But after having communicated once with the terminal, the data entry fields belonging to options not installed will disappear.

In the table below all parts of unit in SM/REx 500 are listed. For each data part a description together with the screen contents is presented.

### **References:**

Technical reference manual for corresponding terminal REx 5xx \* 2.0.

## 1.3.1

**Terminal Overview**

This section contains basic information on the terminal. It gives the same overview of the terminal front panel as a visitor gets when visiting the station.

Screen contents	Description
<b>TRM-OVER</b> <ul style="list-style-type: none"> <li>• Terminal overview - HMI LEDs, Module</li> <li>• Analogue Inputs, Communication</li> <li>• Function Selectors</li> </ul>	<p>This part gives the same overview of the terminal front panel that a visitor would have when visiting the station.</p> <p>See chapter "Terminal Overview" on page 46 in the chapter "Technical description".</p>

## 1.3.2

**Disturbance Report**

The disturbance report menu gives the user all information recorded by the terminal for the last ten disturbances since the last clearing of the disturbance recorder memory.

Screen contents	Description
<b>DRP-OVER</b> <ul style="list-style-type: none"> <li>• Disturbance overview</li> <li>• Reporting Conditions</li> </ul>	<p>This part contains information about the last 10 disturbances stored in the terminal.</p> <p>See paragraph "DRP-OVER Disturbance Overview" on page 50 in the chapter "Technical description".</p>
<b>DRP-INDC</b> <ul style="list-style-type: none"> <li>• Indications</li> </ul>	<p>Indications that appeared during the recorded disturbances, for each disturbance record separately. Indications recorded by the disturbance reporting unit are selectable during the configuration procedure.</p> <p>See paragraph "DRP-INDC Indications" on page 55 in the chapter "Technical description" for detailed information.</p>
<b>DRP-EVEL</b> <ul style="list-style-type: none"> <li>• 150 Event list</li> <li>• Event 1-150</li> </ul>	<p>Contains information on events during the disturbance selected in DRP-OVER.</p> <p>See paragraph "DRP-EVEL 150 Events List" on page 56 in the chapter "Technical description" for detailed information.</p>
<b>DRP-TRIP</b> <ul style="list-style-type: none"> <li>• Trip values</li> <li>• Distance to fault</li> </ul>	<p>The user gets information on the distance to the fault together with the fault loop that was used for calculation. Trip values are presented as phasors, value and phase angle of the currents and voltages, before and during the fault.</p> <p>See "DRP-TRIP Trip values" on page 58 in the chapter "Technical description" for detailed information.</p>

<p><b>DRP-CLRS</b></p> <ul style="list-style-type: none"> <li>• Clears and Manual trig</li> </ul>	<p>Manual triggering of a disturbance report is possible in this data part. Clears all the disturbances in the terminal and LEDs.</p> <p>See paragraph “DRP-CLRS Clears and Manual trig” on page 61 in the chapter “Technical description” for detailed information.</p>
<p><b>RECOM REX5XXV1</b></p> <ul style="list-style-type: none"> <li>• Unit disturbance summary</li> </ul>	<p>This program makes it possible to collect the disturbance recordings stored in the terminal, to the PC. Contains the disturbance date and sequence number, the triggering signal, and if it is stored in the PC, or only in the terminal.</p> <p>See paragraph “RECOM REx5xxV1 Unit disturbance summary” on page 62 in chapter Technical description for detailed information.</p>

1.3.3

**Service Report**

Information on the operating conditions in question, for protected objects in the power system, as well as information on the terminal itself is available in this data part. All the service values are the currently measured values in the protection terminal at the time of communication with the terminal.

Screen contents	Description
<p><b>SRV--ALL</b></p> <ul style="list-style-type: none"> <li>• Read ALL Service Values</li> <li>• Upload routine.</li> </ul>	<p>This part allows reading of all service reports data sequentially from the terminal. This does not include the SRV-CLRS part.</p>
<p><b>SRV-ALOG</b></p> <ul style="list-style-type: none"> <li>• Primary values</li> <li>• Synchrocheck values</li> <li>• Secondary values</li> <li>• Impedance values</li> <li>• Directions</li> <li>• Diff Values</li> <li>• Diff Communication</li> <li>• Analogue Inputs</li> <li>• Trig Status</li> <li>• Autorecloser Counters</li> </ul>	<p>Contains the service values for the analogue inputs and protection functions. All signals that are active will be marked with a square. Only the functions installed in the terminal will be shown.</p>

<b>SRV-CLRS</b> <ul style="list-style-type: none"> <li>• Clear Counters</li> </ul>	<p>In this data part it is possible to clear the Autore-closer Counters presented in the SRV-ALOG part.</p>
<b>SRV-FUN1</b> <ul style="list-style-type: none"> <li>• Additional Functions</li> </ul>	<p>Contains the service values for the logical signals and protection functions. All signals that are active will be marked with a square. Only the functions installed in the terminal will be shown.</p> <p>Additional Functions:</p> <ul style="list-style-type: none"> <li>- Internal Signals</li> <li>- IO Error</li> <li>- Test</li> <li>- Differential</li> <li>- Time delayed overcurrent</li> <li>- Fuse failure</li> <li>- Stub</li> <li>- Time delayed overvolt.</li> <li>- Current transf. circuit supervision</li> <li>- Over load</li> <li>- Loss off voltage</li> <li>- Earth fault comm.</li> <li>- Time Delayed Earth fault</li> <li>- Active Group</li> <li>- Time</li> <li>- MIM Error</li> <li>- Instant. over current</li> <li>- Breaker failure</li> <li>- Broken conductor</li> <li>- Time delayed undervolt.</li> <li>- Trip</li> <li>- Dead line detection</li> <li>- Earth fault 4-step</li> <li>- Earth fault ComIRevWei</li> </ul>
<b>SRV-FUN2</b> <ul style="list-style-type: none"> <li>• Impedance</li> </ul>	<p>Contains the service values for the logical signals and protection functions. All signals that are active will be marked with a square. Only the functions installed in the terminal will be shown.</p>
<b>SRV-FUN3</b> <ul style="list-style-type: none"> <li>• Synchrocheck 1..4</li> <li>• Autorecloser 1..6</li> </ul>	<p>Contains the service values for the logical signals and protection functions. All signals that are active will be marked with a square. Only the functions installed in the terminal will be shown.</p>
<b>SRV-LOG</b> <ul style="list-style-type: none"> <li>• Logical Gate Outputs</li> </ul>	<p>Contains the service values for the logical elements. All signals that are active will be marked with a square. Only the functions installed in the terminal will be shown.</p>
<b>SRV-MIMV</b> <ul style="list-style-type: none"> <li>• mA Input Values</li> </ul>	<p>Contains the service values for the “mA Input Module” installed in the terminal. If the module is not installed, the fields for the module will be empty. For each module the slot position for where the module is installed is shown.</p>
<b>SRV-IO<math>n</math> (1..13)</b> <ul style="list-style-type: none"> <li>• IO<math>n</math> Binary Inputs and Outputs</li> </ul>	<p>This part contains the service values for the input and output signals of the I/O modules, maximum 13 modules, including MIM. The modules must be first installed in the terminal.</p>

<p><b>SRV--RTC</b></p> <ul style="list-style-type: none"> <li>• I/O Remote Terminal Communication</li> </ul>	<p>Contains the service values for the input and output signals of the remote terminal communication.</p>
--	---

1.3.4

**Settings**

This data part is for the setting of different parameters within the built-in protection and automation functions, as well as for those in the disturbance reporting unit.

**Note!**

*If remote change of settings is blocked in the terminal, it will not be possible to change any parameter from SMS, even if new settings are sent to the terminal. The terminal will not accept them.*



Screen contents	Description
<p><b>SET--ALL</b></p> <ul style="list-style-type: none"> <li>• Write-Read ALL Settings</li> </ul>	<p>This part allows reading or writing of all settings to or from the terminal. The 'Read ALL settings' and 'Write ALL settings' do not include the SET-ACTI and SET-TIME parts.</p>
<p><b>SET-ACTI</b></p> <ul style="list-style-type: none"> <li>• Change Active Set-Group</li> </ul>	<p>The 'Active Setting Group' shows which setting group is currently active in the terminal and when it was activated. An identification string for each of the 4 setting groups is shown along with the data when the setting group was stored in the terminal. The identification string is set in SET-GRnA Screen 1. If a new string is set in SET-GRnA, it cannot be read in the SET-ACTI until it is transmitted to the terminal and read back with SET-ACTI.</p>
<p><b>SET-COPY</b></p> <ul style="list-style-type: none"> <li>• Copy setting groups</li> </ul>	<p>Copies all the defined settings from one group to the other. When several data parts exist for each setting group, all will be copied. This process does not include communication with the terminal, which means that to save these settings in the terminal, a "write" operation has to be performed. This can be done from the "SET--ALL" data part or from the "SET-GRnX" data part to which the settings were copied.</p>

<p><b>SET-GRnA</b></p> <ul style="list-style-type: none"> <li>• Line Reference</li> <li>• Differential</li> <li>• Earth Fault</li> <li>• Additional Functions</li> </ul>	<p>All settings regarding the protective functions in the terminal are done in the SET-GRnX part.</p> <p>There are 3 different setting groups with the same contents.</p> <p>(X={A, B, C})</p>
<p><b>SET-GRnB</b></p> <ul style="list-style-type: none"> <li>• Impedance</li> </ul>	
<p><b>SET-GRnC</b></p> <ul style="list-style-type: none"> <li>• Synchrocheck 1..4</li> <li>• Autorecloser 1..6</li> </ul>	
<p><b>SET-DREP</b></p> <ul style="list-style-type: none"> <li>• Recording Times, Fault Locator</li> <li>• Binary Signals - Input 1..12</li> <li>• Binary Signals - Input 13..24</li> <li>• Binary Signals - Input 25..36</li> <li>• Binary Signals - Input 37..48</li> </ul>	<p>Settings of the basic disturbance reporting functions in the terminal are done in this part.</p> <p>The user can determine whether the disturbance reporting unit is to be active or not, by setting operation On or Off.</p> <p>Different recording times, e.g. pre-fault, post-fault and limit time, are settable in this submenu.</p> <p>The programming of the triggering functionality and the masking of the binary signals are to allow local man-machine communication.</p> <p>For the fault locator function, the user must define the unit in which a distance to fault will be presented.</p>
<p><b>SET-ASIG</b></p> <p><b>Analogue signals -Trig</b></p> <ul style="list-style-type: none"> <li>• Name and Transformer ratios</li> <li>• Recording and Triggers</li> </ul>	<p>All settings of the analogue signals in the Disturbance recorder function in the terminal are done in this part. This means that if the 'Disturbance recorder' function is not installed, the entire part can be removed.</p> <p>It is feasible to select the triggering mode (overfunction, underfunction and Off-mode) and the recording mode of up to ten analogue signals when necessary.</p>

<p><b>SET-DAIn</b></p> <ul style="list-style-type: none"> <li>• DA01..05 - Voltage U1..U5</li> <li>• DA06..10 - Current I1..I5</li> <li>• DA11 - Voltage U phase-phase</li> <li>• DA12 - Current I, phase</li> <li>• DA13 - Active Power, P</li> <li>• DA14 - Reactive Power, Q</li> <li>• DA15 - Frequency, f</li> </ul>	<p>The settings of the analogue inputs in the “Direct Analogue Input” function in the terminal is done in this part. The ‘Monitoring A/C Measurements’ function must be installed in the terminal. If not, the entire part can be removed as shown in paragraph “Removing Parts of Unit from an installation” on page 68 in the chapter “Technical description”.</p>
<p><b>SET-MIMn</b></p> <p><b>mA Input Module n</b></p> <ul style="list-style-type: none"> <li>• Operation, Sampling Rate</li> <li>• Input 1</li> <li>• Input 2</li> <li>• Input 3</li> <li>• Input 4</li> <li>• Input 5</li> <li>• Input 6</li> </ul>	<p>The settings of the ‘mA Input Modules’ are done in this part. The mA Input Module must be installed in the terminal. If not, the entire part can be removed as shown in paragraph “Removing Parts of Unit from an installation” on page 68 in the chapter “Technical description”.</p>
<p><b>SET-PLSC</b></p> <ul style="list-style-type: none"> <li>• Pulse Counter 1..12</li> </ul>	<p>The settings of the ‘Pulse Counter’ 1 to 12 is done in this part. The function must be installed in the terminal. If not, the entire part can be removed as shown in paragraph “Removing Parts of Unit from an installation” on page 68 in the chapter “Technical description”.</p>
<p><b>SET-TIME</b></p>	<p>The terminal has an internal real time clock including full-time, i.e., date and time. The clock can be checked, and set from SMS on a minute basis. The settings of the Terminal Time are not affected by the setting restrictions (‘OPEN/BLOCKED’) in the terminal, and can always be changed.</p>

## 1.3.5

**Terminal Report**

This menu gives the user information on the terminal itself.

Screen contents	Description
<p><b>TRM--REP</b></p> <p><b>InternalEvents - SelfSuperv</b></p> <ul style="list-style-type: none"> <li>• Internal events - 1..40</li> <li>• Self supervision information</li> <li>• Observed modules - Article number, revision</li> <li>• Noted modules - Article number, revision</li> <li>• Users Notes</li> <li>• Analogue Input</li> </ul>	<p>The self supervision facilities informs the user about faults detected in the terminal itself or within any of the built-in protection functions.</p> <p>The identity of the terminal consists of information on the terminal's serial number, ordering number and software and hardware versions of different software functions and hardware modules.</p> <p>See chapter "TRM--REP InternalEvents - SelfSuperv" on page 64 in the chapter "Technical description" for detailed information.</p>
<p><b>TRM--INST</b></p> <ul style="list-style-type: none"> <li>• Installed software functions</li> <li>• Installed hardware units</li> </ul>	<p>All software functions and hardware units installed in the terminal are listed, with ordering numbers as they appear in the ordering forms.</p>

1.3.6

**Configuration**

This menu serves for the user-specific configuration of a terminal.

**Note!**



*The write command that downloads ALL configuration data parts is NOT password protected. Delete the CNF-ALL part from the application structure if the ability to write or read ALL data parts without password is to be omitted. To remove the part from the application structure see paragraph “Removing Parts of Unit from an installation” on page 68 in the chapter “Technical description”.*

Screen contents	Description
<p><b>CNF-ALL</b>  <b>Write-Read ALL Configurations</b>                      Up/download routine.</p>	<p>This part allows reading or writing of all configuration data from or to the terminal.</p>
<p><b>CNF-ALOG</b>  <b>Analogue - I/O - Comm</b></p> <ul style="list-style-type: none"> <li>• Identifiers- Analogue Input U, I, P, Q, f</li> <li>• Analogue Input U1..U5, I1..I5,</li> <li>• CTEarth</li> <li>• I/O-Modules</li> <li>• Time Synchronisation Source, SPABUS communication</li> <li>• LON communication</li> <li>• IEC-Com, Remote Terminal Communication</li> </ul>	<p>The configuration regarding the analogue inputs and I/O-modules is done in this part. Information about the communication and time synchronisation is also presented.</p> <p>The LON communication configuration and setting restrictions are shown in this data part.</p>
<p><b>CNF-BHMI</b></p> <p><b>Local HMI menus</b></p> <ul style="list-style-type: none"> <li>• Disturbance Report and Service Report menus</li> <li>• Settings and Terminal Informations</li> <li>• Configuration, Test and Command menus</li> </ul>	<p>The configuration of the menus of the local HMI of the terminal is done in the CNF-BHMI part.</p>

## 1.3.7

**Test**

This menu serves for testing purposes. The user can block the sending of alarm signals to the control centre during the testing activities. It is possible to block the operation of the disturbance reporting unit so as not to overload the memory with operations caused by the secondary injection testing.

Screen contents	Description
<b>TST-MODE</b>  <b>Test - Block functions</b> <ul style="list-style-type: none"> <li>• Test</li> <li>• Block Functions</li> <li>• Configuration Mode</li> </ul>	All settings regarding the Test function are done in the TST-MODE part: <ul style="list-style-type: none"> <li>• Set the terminal in test mode</li> <li>• Block selected functions during test mode</li> <li>• Set the Disturbance report and the Disturbance summary to On or Off during test mode.</li> <li>• Set the terminal in configuration mode. It can only be done from the terminal. <b>This disables the logic tasks in the terminal.</b></li> </ul>

## 1.3.8

**Event Masks****Note !**

*The write command that downloads ALL event mask data parts is NOT password protected. Delete the MSK--ALL part from the application structure if the ability to write or read ALL data parts without password is to be omitted. To remove the part from the application structure, see paragraph “Removing Parts of Unit from an installation” on page 68 in the chapter “Technical description”.*

Screen contents	Description
<b>MSK--ALL</b>  <b>Write-Read ALL Event Masks</b> <ul style="list-style-type: none"> <li>• Up/download routine.</li> </ul>	The part MSK--ALL allows reading or writing all 'Events Masks' from or to the terminal.

<p><b>MSK-EV03</b></p> <p><b>Event function 1..3 - Report</b></p> <ul style="list-style-type: none"> <li>• Set Event Functions reporting</li> <li>• Event Function 1</li> <li>• Event Function 2</li> <li>• Event Function 3</li> </ul>	<p>The 'Event function reporting' and the masking of 'Event functions' for the SPA events polled by SCS and REPORT in SMS are done in the MSK-EV<math>nn</math> part</p> <p>The setting in the MSK-EV<math>nn</math> part is only valid for the SPA events and will therefore not affect the events in disturbance recording presented in the DRP-EVEL part.</p>
<p><b>MSK-EV<math>nn</math></b></p> <p><b>Event function <math>nn..nn</math></b></p> <ul style="list-style-type: none"> <li>• Event Function <math>n</math></li> </ul>	
<p><b>MSK-ANEV</b></p> <p><b>Event Mask for Analogue Events</b></p> <ul style="list-style-type: none"> <li>• mA Input Module 1..6</li> <li>• Direct Analogue Input 1..15</li> <li>• Pulse Counter 1..12</li> </ul>	<p>The masking of 'Analogue Events' for the SPA events used by SCS, is done in the MSK-ANEV part.</p>

## 1.4 General Display Layout

### 1.4.1 Screen layout for settable quantities

All the layouts of screens with settable quantities are designed similarly. They have four columns; Parameter name, Present values, New values and Unit.

The 'Present values' column shows the actual settings of the REX 5xx terminal at the time of the last reading from the terminal. The date and time stamp shows when the 'Present values' were transmitted to the PC.

The 'New values' are the modifiable values. The user can change the values and send them to the terminal. The 'PC-file' date and time stamp shows when the settings were last stored in the PC.

The representation of time and date, i.e., 'PC-file time', depends on the specified country code in the CONFIG.SYS file in the PC.

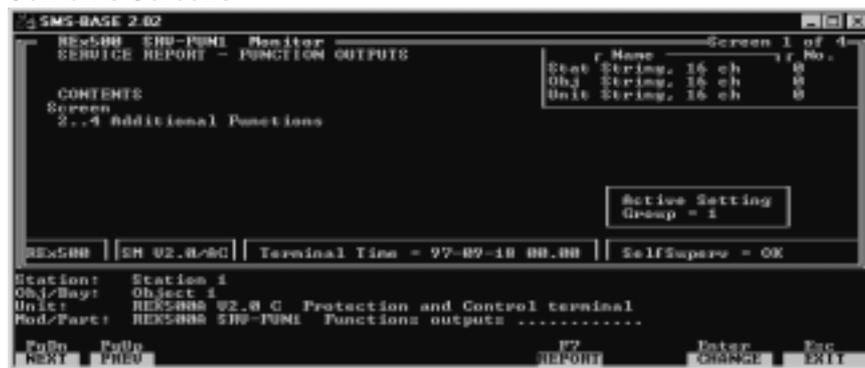
For most settable parameters, an explanatory text is displayed at the bottom line of the screen. The help text gives the user a more detailed description of the parameter along with the setting range, if applicable. (The text is displayed when the user positions the cursor to the parameter field which has a defined text). The help text follows the cursor position.

For some data parts, an alarm text can be displayed in the first screen, i.e. the contents screen. A warning text appears at the top left area of the screen giving information about errors and actual conditions in the terminal.

If the 'Remote setting restrictions' is 'blocked' in the terminal, it will only be possible to monitor the settings from SMS. If the user tries to transfer new parameters to the terminal when remote settings are blocked, the terminal will not accept them. In each part where settings can be made, it is shown whether remote setting is 'OPEN' or 'BLOCKED'. Commands like 'Clear Disturbance Reports' and 'Clear Counters' are not affected by the 'Remote setting restrictions', i.e. they can always be executed.

## 1.4.2

### Contents Screens



#### The following applies to all the contents screens for the data parts:

- A list of contents is presented to inform about the contents on the following screens:
- 'Stat', 'Obj' and 'Unit' shows the station, object and unit numbers and associated label texts.
- 'Terminal Time' shows the real time clock value of the terminal at the end of the last terminal reading of this data part. The format of the time is YY-MM-DD HH.MM.
- 'SelfSuperv' presents a summarised status of the terminal. Normally it should indicate 'OK', but if the self supervision has detected any fault, 'WARNING' or 'FAIL' is shown.

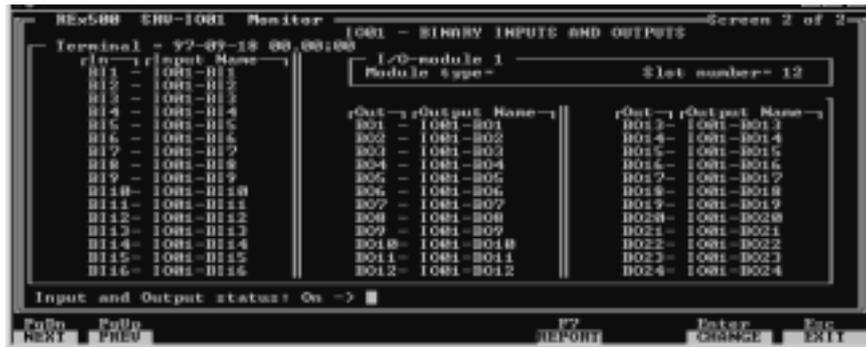


- In the upper part of the screen 'Remote setting' indicates whether remote change of the parameters is allowed ('OPEN') or not ('BLOCKED') on the connected channel. The restriction is set with the local HMI on the terminal and cannot be changed from the SMS.
- 'SM' shows the SM-product version number.

- In the first line the name of the terminal, the name of the data part and the performed function (read, monitor) are shown.
- Terminal identity.

1.4.3

Other examples



- Only the functions installed in the terminal will be shown.
- Additional information, like Module type and Slot number are shown in another box.
- 'Terminal Time' shows the real time clock value of the terminal at the end of the last terminal reading of this data part. The format of the time is YY-MM-DD HH.MM:SS.



- The information is grouped in different functions.
- The information presented is the values that were valid at the moment of reading from the terminal.



- ‘Stored Time’ is the time of last change when saving information in the terminal.
- ‘PC file time’ is the time of the last saving of new values in the PC.
- Positioning the cursor in ‘New values’ of a parameter shows a help line related with that parameter.

## 1.5

### Terminal Overview

#### 1.5.1

#### TRM-OVER

The TRM-OVER part contains basic information of the terminal. This part gives the same overview of the terminal front panel as a visitor would get when visiting the station. Since the amount of information being transferred from the terminal is limited, reading the terminal overview can be used as a fast check to verify that the communication with the terminal is working correctly. Note that it is not possible to set any parameter in the TRM-OVER part.

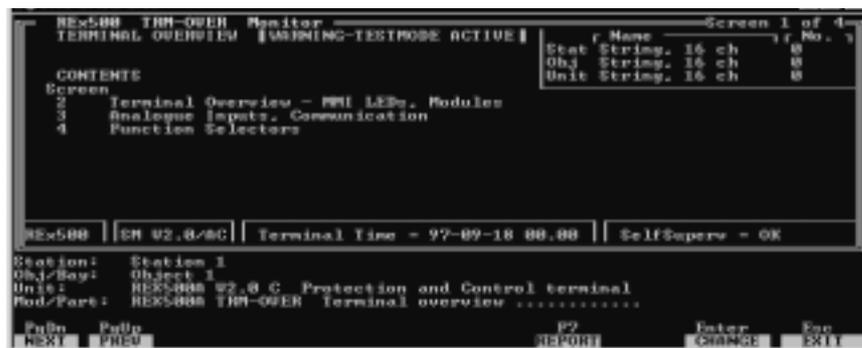


Fig. 1 TRM-OVER Screen 1

## Screen 2 - Information presented



Fig. 2 TRM-OVER Screen 2

- The product name 'REX 500' and the version number 'Version 2.0' are displayed together with the information on which setting group is active in the terminal.
- 'local HMI LEDs' shows the status of the three LEDs on the local HMI of the terminal.
- The 'Green' LED signifies:
  - 'Ready' which means that the terminal is in operation, or
  - 'Fail' if the internal fail signal is activated.
- The 'Yellow' LED signifies:
  - 'Start' Disturbance Report triggered, or
  - 'Test' if the terminal is put in test mode, or
  - '-' otherwise.
- The 'Red' LED signifies:
  - 'Trip' Trip command issued from a protection function, or
  - 'Conf' if the terminal is in configuration mode, or
  - '-' otherwise.
- If the terminal is in test mode, this will be indicated with the text 'WARNING TESTMODE ACTIVE'.
- 'I/O-Modules' shows a list of hardware slots and the installed I/O-module in each slot.

Screen 3 - Information presented

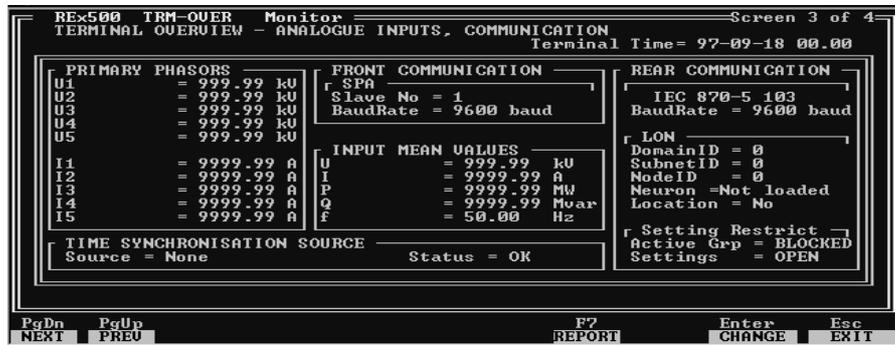


Fig. 3 TRM-OVER Screen 3

- ‘Terminal Time’ shows the real time clock value of the terminal at the end of the last terminal reading of this data part. The format of the time is YY-MM-DD HH.MM.
- ‘FRONT COMMUNICATION’ shows the ‘SPA’ configuration, i.e., slave number and baud rate of the front port on the terminal.
- ‘REAR COMMUNICATION’ shows the ‘SPA’ configuration, i.e., slave number and baud rate of the rear SPA port on the terminal or the IEC communication and the baud rate. The ‘LON’ configuration is also shown, i.e. domain Id, subnet Id, node Id, neuron load status and location configuration. ‘Setting Restrict’ ‘OPEN’ = remote setting allowed, and ‘BLOCKED’ = remote setting not allowed. These setting restrictions can only be set on the local HMI and are valid for both rear ports of the terminal.
- ‘TIME SYNCHRONISATION SOURCE’ shows if ‘LON’ or ‘SPA’ is selected for synchronisation of the internal real time clock. Alternatively, the time synchronisation can be performed via a minute-pulse to a binary input of the terminal. The status of the time synchronisation source is shown and should indicate ‘OK’.

**Note!**

*If any function is not installed in the terminal, the corresponding part of the screen will be empty or show ‘Not installed’.*



## Screen 4 - Information presented



Fig. 4 TRM-OVER Screen 4

- 'Function Selectors and Optional Functions' shows a list of functions that can be installed in the terminal. Installed functions are marked with a square to the left of the text.

## 1.6 Disturbance Report

### 1.6.1 DRP-OVER Disturbance Overview

The part DRP-OVER contains information about the 10 last disturbances stored in the terminal. In this part, the user also selects which disturbance to activate for more information in the other DRP-xxxx parts (DRP-INDC, DRP-EVEL and DRP-TRIP).

#### Screen 1 - Information presented



Fig. 5 DRP-OVER Screen 1

- The ‘No.’ of the recorded disturbance is a number running from 0 to 200, and then starting from 0 again. This is the primary disturbance identifier in the terminal, not to be mixed with the daily sequence number that is reset to zero each new date. This is also the number to be entered by the user in order to select a new disturbance to be loaded into the disturbance report memory in the terminal. By selecting a disturbance, the detailed information about the disturbance will be available for SMS.
- An overview of the stored disturbances is shown with information regarding the ‘Date’ and ‘Time’ of the recording, ‘Outgoing TRIP’, and ‘Trig Signal’ causing the start of the recording.

### Screen 1 - Select a new disturbance number

The SMS and the terminal present detailed information about one disturbance at a time. This means that a disturbance must be selected before any detailed information about the disturbance can be accessed from the SMS. In order to get more detailed information on each of the recorded disturbances the user must select one of the listed disturbances by entering a disturbance number in the 'New No.' field.

**1 To select a disturbance, press <Enter>.**

**2 Enter the number of one of the disturbances listed to the left on the screen, and press <Enter>**

**3 Press <Esc> to leave the part and select 'Activate selected DistRep No.'**

This action will make the terminal load the selected disturbance into an active memory area accessible from SMS. When detailed presentation of data is selected from the SMS, the terminal will, on request, upload the data to the PC.

**4 Finally select 'Monitor PC-file information' in order to verify that the selected number is now presented in the 'Present No.' field.**

**5 The selection of a new disturbance will make more information regarding the selected disturbance available to the SMS.**

The additional information is shown in the three parts DRP-INDC, DRP-EVEL, and DRP-TRIP provided that the required functions are installed in the terminal.

It is also possible to select a disturbance and upload the data of the disturbance to the PC in one step. This will allow presentation of the data in the DRP-INDC, DRP-EVEL and DRP-TRIP parts by '**Monitoring PC-file information**'. To select a disturbance and upload the data:

**6 Press <Enter> in DRP-OVER Screen 1.**

**7 Enter the number of one of the disturbances listed to the left on the screen, and press <Enter>.**

**8 Press <Esc> to leave the part and select 'Upload DistRep DPR-INDC-EVEL-TRIP'.**

This action will make the terminal load the selected disturbance into an active memory area accessible from SMS and upload the disturbance data for DRP-INDC, DRP-EVEL and DRP-TRIP parts to the PC.

**9 Select 'Monitor PC-file information' in order to verify that the selected number is now presented in the 'Present No.' field.**

The selection of a new disturbance and upload of data will make the information regarding the selected disturbance available to the SMS. As the information is already uploaded to the PC, the detailed information is available in the DRP-INDC, DRP-EVEL, and DRP-TRIP by selecting '**Monitoring PC-file information**' when opening these parts, provided that the required functions are installed in the terminal.

### Screen 1 - Disturbance numbering

The terminal has a storage capacity of 10 disturbances, equivalent to approximately 1,5 Mb. On the local HMI these are numbered 1-10, while in SMS the index number 0-200 is used. The reason for this is that after the user has read the DRP-OVER, and selected, for example, the last disturbance designated Disturbance 1, a new disturbance might occur in the terminal. This means that Disturbance 1 has changed contents. Instead, by using the index number 0-200, the number of the selected disturbance will be unique, and the situation described will never occur.

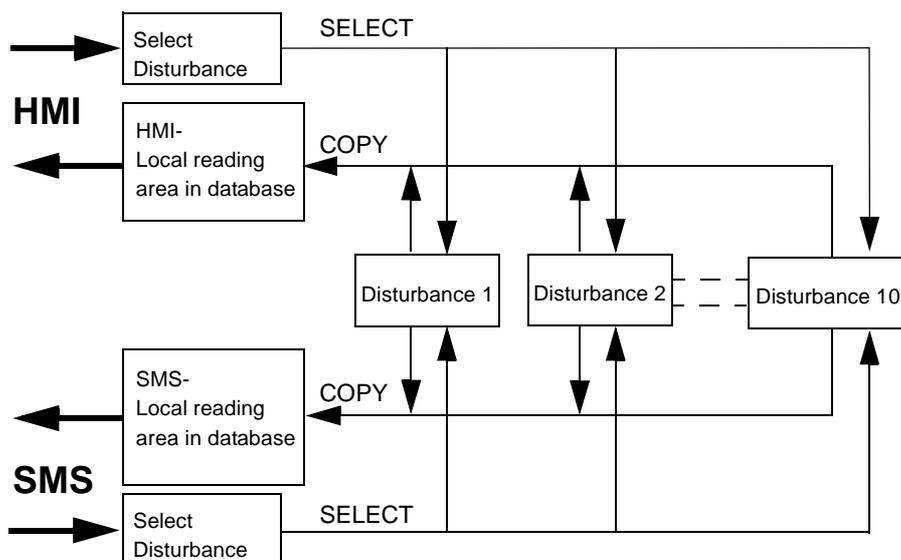


Fig. 6 SMS and local HMI reading areas for disturbances.

### Screen 1 - Information structure of disturbance functions

Depending on the functions installed in the terminal, the information available for a disturbance varies. The indications event list, fault locator values, trip values and disturbance recording header are always available for the last 10 disturbances. The number of disturbance recordings containing oscillographic information depends on the recording times set in the terminal, and the harmonic contents of the signals. All information is accessed via SM/REx 500 and the disturbance recordings, which are available via FrontRECOM (or RECOM) and can be evaluated with REVAL.

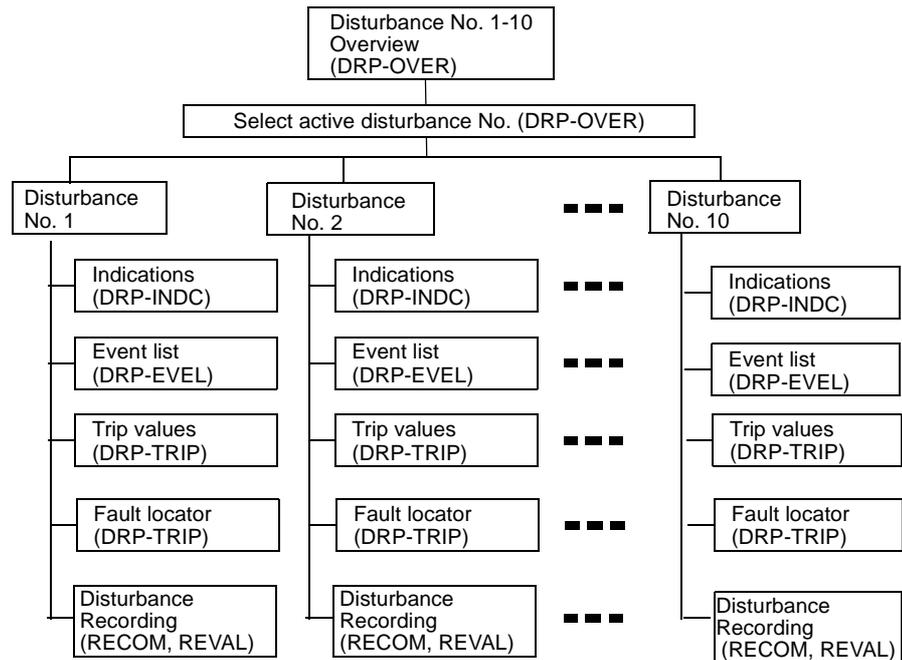


Fig. 7 Information structure of disturbance reporting functions.

## Screen 2 - Information presented



Fig. 8 DRP-OVER Screen 2

- ‘Disturbance report Operation’ shows if the disturbance reporting functions are active or not in normal mode and in test mode. These settings can be changed in the parts ‘SET-DREP Disturbance Report Contents’ and ‘TST-MODE Test - block functions’.
- At the lower left part of the screen, the user is informed if the terminal is in ‘Test-Mode’ or in ‘NormalMode’ at the moment of communication.
- The ‘Recorder’ shows if the ‘Event Recorder’ function is installed in the terminal and if the ‘Disturbance Recorder’ function is installed along with the amount of disturbance memory used by the Disturbance Recorder at the moment.
- The ‘Daily Sequence No’ shows the status of the sequence number counter, i.e. the number the next recorded disturbance during the present day will get. The number is reset to 0 when a new day begins. The first report that day gets the number 0, the second number 1, etc.

## 1.6.2

## DRP-INDC Indications

The part DRP-INDC contains information on indications during the disturbance that was selected in the part DRP-OVER. Note that it is not possible to set any parameters in the DRP-INDC part.

## Screen 1 - Information presented

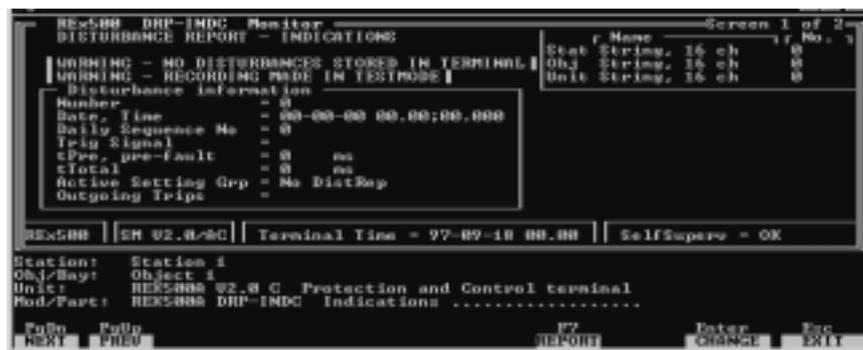


Fig. 9 DRP-INDC Screen 1

- If no disturbances are stored in the terminal this will be indicated with the text 'WARNING - NO DISTURBANCES STORED IN TERMINAL'.
- If the disturbances were stored while the terminal was in test mode, this will be indicated with the text 'WARNING - RECORDING MADE IN TESTMODE'.
- 'Disturbance information' shows some basic information regarding the selected disturbance.
- 'Number' is the same number as was selected in the part DRP-OVER.
- 'Date, Time' is the time of the triggering of the disturbance report.
- 'Daily Sequence No' shows the terminal sequence number of this specific disturbance report. The number is reset to 0 when a new day begins and the first report that day gets the number 0, the second number 1, etc.
- 'Trig Signal' shows which signal triggered the disturbance reporting function.
- 'tPre, pre-fault' shows the pre-fault time of the recording, i.e., the time recorded before the triggering signal was activated.
- 'tTotal' shows the total recording time, i.e., pre-fault, fault, and post-fault times.
- 'Active Setting Grp' shows which setting group was active during the disturbance.

Screen 2 - Information presented



Fig. 10 DRP-INDC Screen 2

- At the top of the screen the No. of the disturbance, 'Date, Time' and 'Trig Signal' are shown.
- The 48 binary signals configured by the user are shown. The signals are presented with the user-defined names. All signals that were active during the disturbance, i.e. the signals that have changed state once or several times, are indicated with a square in front of the name.

1.6.3

DRP-EVEL 150 Events List

The part DRP-EVEL contains information on events during the disturbance that was selected in the part DRP-OVER. Note that it is not possible to set any parameters in the DRP-EVEL part. The 'Event recorder' function must be installed in the terminal in order to get an event list. If not, the event list will always be empty. In this case the whole part can be removed as shown in paragraph "Removing Parts of Unit from an installation" on page 68 in this chapter.

## Screen 1 - Information presented



Fig. 11 DRP-EVEL Screen 1

- If no disturbances are stored in the terminal, this will be indicated with the text 'WARNING - NO DISTURBANCES STORED IN TERMINAL'.
- If the disturbances were stored while the terminal was in test mode, this will be indicated with the text 'WARNING - RECORDING MADE IN TESTMODE'.
- 'Disturbance information' shows some basic information regarding the selected disturbance.
- 'Number' is the same number as was selected in the part DRP-OVER.
- 'Date, Time' is the time of the triggering of the disturbance report.
- 'Daily Sequence No' shows the terminal sequence number of this specific disturbance report. The number is reset to 0 when a new day begins and the first report that day gets the number 0, the second number 1, etc.
- 'Trig Signal' shows which signal triggered the disturbance reporting function.
- 'tPre, pre-fault' shows the pre-fault time of the recording, i.e. the time recorded before the triggering signal was activated.
- 'tTotal' shows the total recording time, i.e. pre-fault, fault, and post-fault time.
- 'Active Setting Grp' shows which setting group was active during the disturbance.
- 'Stat', 'Obj' and 'Unit' shows the station, object and unit numbers and associated label texts.
- 'Event Recorder required' shows if the Event recorder function is installed in the terminal or not. If not, it is recommended to remove the DRP-EVEL part as mentioned earlier.

## Screen 2 to 5 - Information presented



Fig. 12 DRP-EVEL Screen 2

- The events among the 48 binary signals selected by the user are shown along with the time tag. The events are presented with the user-defined signal names. The event list for each disturbance contains a maximum of 150 events presented on four screens. The first event on the first screen is the first event that occurred within the disturbance, and the following events are presented in chronological order.

### 1.6.4

#### DRP-TRIP Trip values

The part DRP-TRIP contains information on trip values related to the disturbance that was selected in the part DRP-OVER. The 'Measurement 1A/5A' function must be installed in the terminal in order to get any values. If not, all values always show 0. In this case, the whole part can be removed as shown in paragraph "Removing Parts of Unit from an installation" on page 68 in this chapter.

## Screen 1 - Information presented

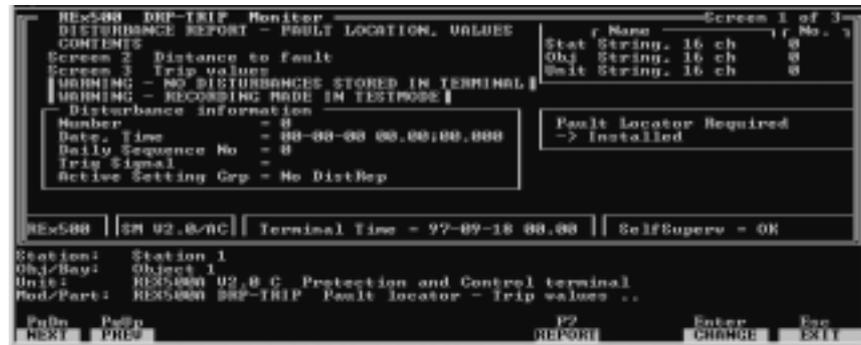


Fig. 13 DRP-TRIP Screen 1

- If no disturbances are stored in the terminal this will be indicated with the text 'WARNING - NO DISTURBANCES STORED IN TERMINAL'.
- If the disturbances were stored while the terminal was in test mode, this will be indicated with the text 'WARNING - RECORDING MADE IN TESTMODE'.
- 'Disturbance information' shows some basic information regarding the selected disturbance.
- 'Number' is the same number as was selected in the part DRP-OVER.
- 'Date, Time' is the time of the triggering of the disturbance report.
- 'Daily Sequence No' shows the terminal sequence number of this specific disturbance report. The number is reset to 0 when a new day begins and the first report that day gets the number 0, the second number 1, etc.
- 'Trig Signal' shows which signal triggered the disturbance reporting function.
- 'Active Setting Grp' shows which setting group was active during the disturbance.

**Screen 2 - Information presented**



*Fig. 14 DRP-TRIP Screen 2*

- On the top of the screen No. of the disturbance, 'Date, Time' and 'Trig Signal' are shown.
- The phasors for the prefault conditions are shown on the left part of the screen along with the frequency. To the right, the phasors for the fault conditions are shown.

## 1.6.5

**DRP-CLRS Clears and Manual trig**

In the part DRP-CLRS it is possible to clear LED indications and disturbances stored in the terminal. It is also possible to activate a manual trig that generates a disturbance report.

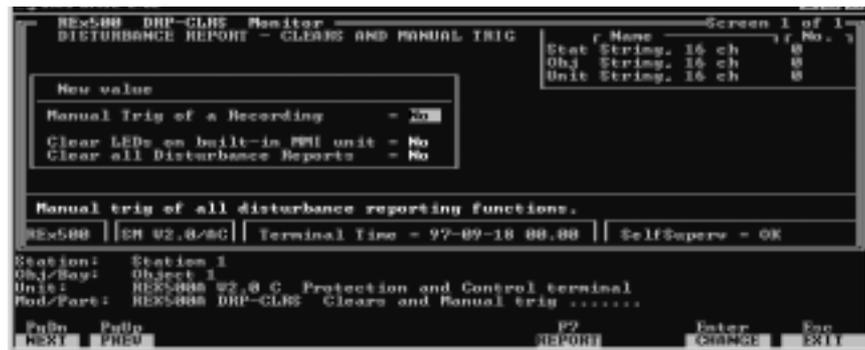
**Screen 1 - Performing a manual trig**

Fig. 15 DRP-CLRS Screen 1

- By selecting 'Yes' on the 'Manual Trig of a Recording' all disturbance reporting functions available in the terminal is activated when the command is sent to the terminal. If 10 disturbances are stored in the terminal or if the disturbance memory is full, this action will overwrite the oldest disturbance.

**Screen 1 - Clearing information**

- The HMI LEDs will be cleared if selecting 'Yes'. This corresponds to pressing the 'C' button on the local HMI.
- All disturbance reports, i.e. the information available in the different DRP-... parts and RECOM will be erased if selecting 'Yes'. After this action the disturbance memory will be empty.

**Screen 1 - Note**

- All desired settings have to be made each time since all actions set to 'Yes' will be performed when selecting '**Write settings to terminal**'. For this reason, always start with the command '**Read terminal data to PC-file**', as this action will set all answers to 'No'.

All actions in the DPR-CLRS part can be carried out even if remote setting is blocked in the terminal. However, a password is requested before any clearing activity can take place.



- The third and fourth columns indicate where the disturbance is stored. 'R' stands for disturbance file, and 'H' stands for header file. If the disturbance memory is full due to long recording times, the oldest disturbances might consist of the header only. There might also be disturbances that are only stored in the PC, because the whole recording has been deleted or overwritten in the terminal.
- 'Time' shows when the trigger of the disturbance recorder was activated. 'Trig' is the triggering signal, analogue or binary, or manual triggering.

### Screen 1 - Uploading a disturbance to the PC

- To upload a disturbance to the PC, the disturbance of interest has to be highlighted by positioning the cursor with the <up arrow> and <down arrow> keys.
- Press <U> to upload all information, i.e. the header (H) and the disturbance file (R) from the terminal to the PC. This action will not delete the recording in the terminal. It will still be available for other users until it is manually deleted or overwritten by new disturbances. The uploaded disturbance will be stored in the same directory structure as the terminal settings, e.g.

c:\sms\data\o001\s001\o001\u001. The name of the disturbance file will be, for example, 98061700.RE\*, where the first six digits are the date, YYMMDD, and the last two the sequence number. The file name extension is REV for the disturbance file and REH for the header file. When opening the file with the REVAL disturbance evaluation program, the same station and unit names as entered in SMS-BASE will be shown in order to simplify the handling.

### Screen 1 - Refreshing information on screen

- The refresh selection <R> updates the information on the screen, e.g. if a new disturbance has occurred.

### Screen 1 - Deleting a disturbance from the PC

- The delete selection <D> deletes the current highlighted disturbance file in the PC.

### Note!

*It is only the PC-file containing the disturbance information that is deleted. Disturbances stored in the terminal are not affected.*



### Screen 1 - Getting Help

- The help selection <E> presents a short help text for the handling of FrontRECOM.

### Screen 1 - Exiting FrontRECOM

- To exit the FrontRECOM Unit disturbance summary, press <Esc> or <X>.



**Note!**

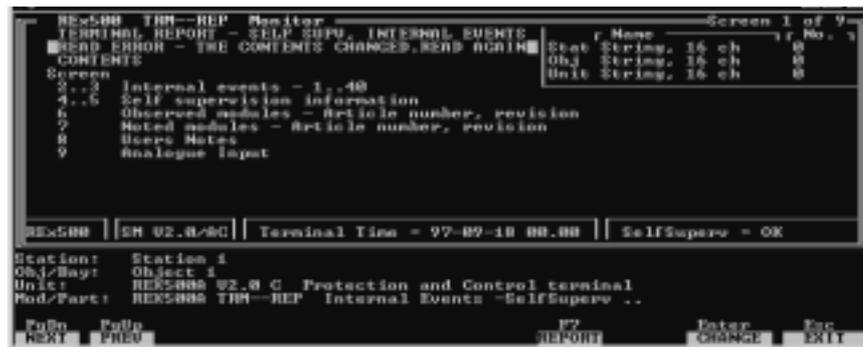
*If the disturbance memory is full, and the oldest disturbance is uploaded at the same time as a new disturbance occurs, the information in the oldest disturbance will be lost. This will result in a disturbance that is only partly stored on the PC, and will not be possible to open by the REVAL disturbance evaluation program. The REVAL program then gives the indication 'Not readable'.*

**1.7**

**TRM--REP InternalEvents - SelfSuperv**

The part TRM--REP consists of the status of the terminal, coming from the self supervision functions, and article numbers of the terminal and the included hardware modules.

**Screen 1 - Information presented**



*Fig. 17 TRM--REP Screen 1*

- ‘READ ERROR - THE CONTENTS CHANGED. READ AGAIN’  
This warning is displayed if ‘Internal Events’ shown on screen 2-3 has changed during the communication. To access an updated list, the data part must be read again by selecting ‘**Read terminal data to PC-file**’.

Screen 2 to 3 - Information presented

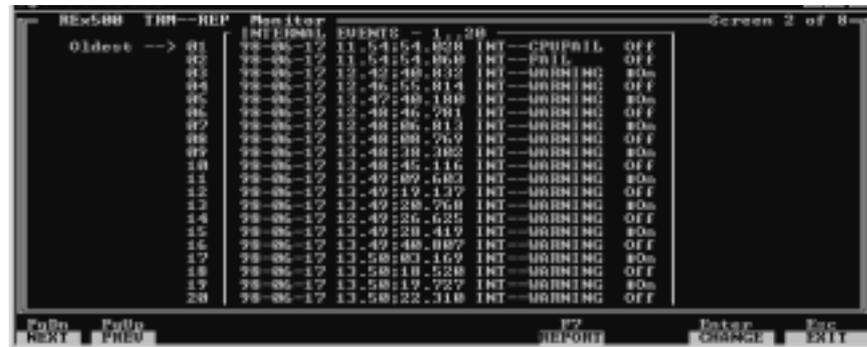


Fig. 18 TRM--REP Screen 2

- On these screens the internal events of the terminal are presented. The list mainly contains events from the internal self supervision signals. The list is a first-in-first-out list. All the events are presented with date and time. The latest event is always presented as the last event in the list. The events are presented in chronological order.

Screen 4 - Information presented



Fig. 19 TRM--REP Screen 4

- On these screens, the current status of all self supervision signals, at the time of communication with the terminal, is presented along with a brief explanation. All activated self supervision signals in this list are also included in the internal event list on screen 2.

Screen 5 to 6 - Information presented

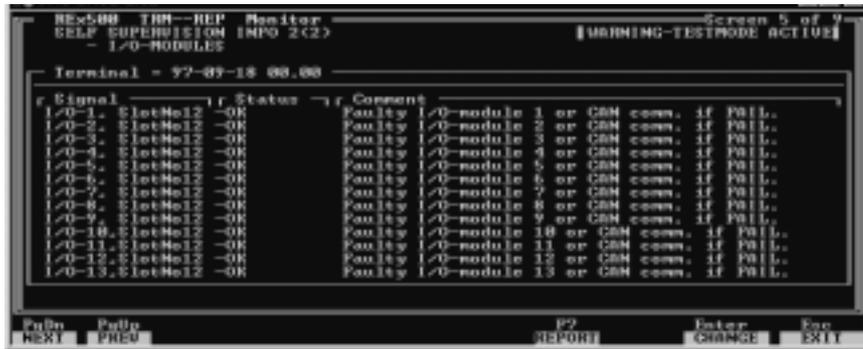


Fig. 20 TRM--REP Screen 5



Fig. 21 TRM--REP Screen 6

- On this screen the article numbers of the included hardware modules are presented. The reason for this information is to give the user the correct identification number if a module is faulty and has to be replaced. The article numbers of all I/O-modules and the CPU-module are stored as a code on the module itself and will automatically be updated if the module is replaced.
- The terminal type and version number are presented together with a unique serial number of the terminal. The 'Ordering No.' of the terminal is also presented.

### Screen 7 - Settable parameters



Fig. 22 TRM--REP screen 7

- On this screen the notes made by the user are shown. After downloading, these notes are stored in the terminal and can be read by other users from other locations using the SMS. The user notes are intended to store information regarding, for example, additional hardware co-operating with the terminal, or the date of the last test or maintenance. This information can only be read from SMS. It is not available on the local HMI. The possibility to change the user notes is not affected by the setting restrictions ('OPEN'/'BLOCKED') in the terminal, i.e. they can always be changed. The notes are changed when selecting 'Write User's Notes to terminal'

### Screen 9 - Information presented



Fig. 23 TRM--REP Screen 8

On this screen, the nominal values for the transformer inputs are shown.

---

## 2 Appendix

### 2.1 Diagnosing errors

- Check the technical requirements according to paragraph “System requirements” on page 12 in the chapter Instructions.
- Check the installation with reference to paragraph “Installation procedures” on page 13 in the chapter Instructions.

The correct use of SM/REx 500 is presented in chapters 2 and 3. When errors occur, their type as well as a probable cause are shown in the lower part of the screen. Error messages normally have to be confirmed with <Enter>. The user is then brought back to the activity prior to the one that caused the error.

See SMS-BASE User’s Guide Ref. 2 in chapter 4: References for more information regarding error messages.

### 2.2 Error messages during communication

When communication is bad using a telephone line, data is not transferred. After a number of unsuccessful attempts to transfer a quantity, the program asks the user to press <R> for a ‘Retry’ or <Q> for ‘Quit’.

Normally, select <Q> and terminate the call. Try to call again to get a better line.

Both rear port channels on the terminal are normally served in parallel. However, during busy terminal situations, the service may be delayed and a ‘busy’ signal (NAK 1) is sent by the terminal during read conditions and another ‘busy’ signal (NAK 7) during write conditions. It is very important that the SMS user does not ‘Skip’ any NAK messages. Either press ‘Retry’ <R> or ‘Quit’ <Q>. Otherwise, most likely the transmitted data is faulty or incomplete.

### 2.3 Adopting PC to SMS programs

Sometimes when selecting ‘**Monitor PC-file information**’ the text ‘Not enough memory’ is shown on the screen. This means that less than the required 450 kb of work memory are available on the PC. One common problem is that other applications are resident in the same memory area in the PC. By removing these from the PC, memory is released and the requirement of 500 kb is fulfilled.

### 2.4 Removing Parts of Unit from an installation

If any ‘Part of Unit’ is not relevant for a terminal, for example SET-ASIG if the ‘Disturbance recorder’ function is not installed, this part can be removed from the installation:

- 1 **Select the 'Alter application structure' in the 'UTILITIES' menu.**
- 2 **Go down the structure and select the terminal in question.**
- 3 **Select the part 'SET-ASIG' and press <D>.**
- 4 **Answer yes <Y> to the question.**

This procedure can be repeated for any 'Part of Unit'.

The removal of parts due to the fact that some functions are not installed in a terminal is highly recommended in order to get a better overview. Also the removal of parts like 'SET--ALL' or 'DRP-CLRS' is highly recommended, if the philosophy of the user is that this action should not be possible from SMS.

So, for each new instance of unit, the following work flow is recommended:

- 1 **For each part select 'Read terminal data to PC-file'.**
- 2 **Then select the 'Monitor PC-file information' in order to check that the required function is installed, and if the part contains functionality that is of interest for the user. If not, the part should be removed according to the procedure above.**

## 2.5

### Handling SMS under MS Windows

The SMS-BASE can be started as an icon in MS Windows as described in the SMS-BASE User's Guide Ref. 2. When starting SMS-BASE from Windows the PC will automatically open a DOS-Window in which SMS-BASE is run. It will then be possible to switch between different applications in Windows by pressing <Alt>+<Tab>.

It will also be possible to reduce the DOS application to a smaller window, by pressing <Alt>+<Enter>. This means that the information in SMS can be overviewed at the same time as for example REVAL, as shown below. For more information regarding this facility refer to the MS Windows User's Guide.

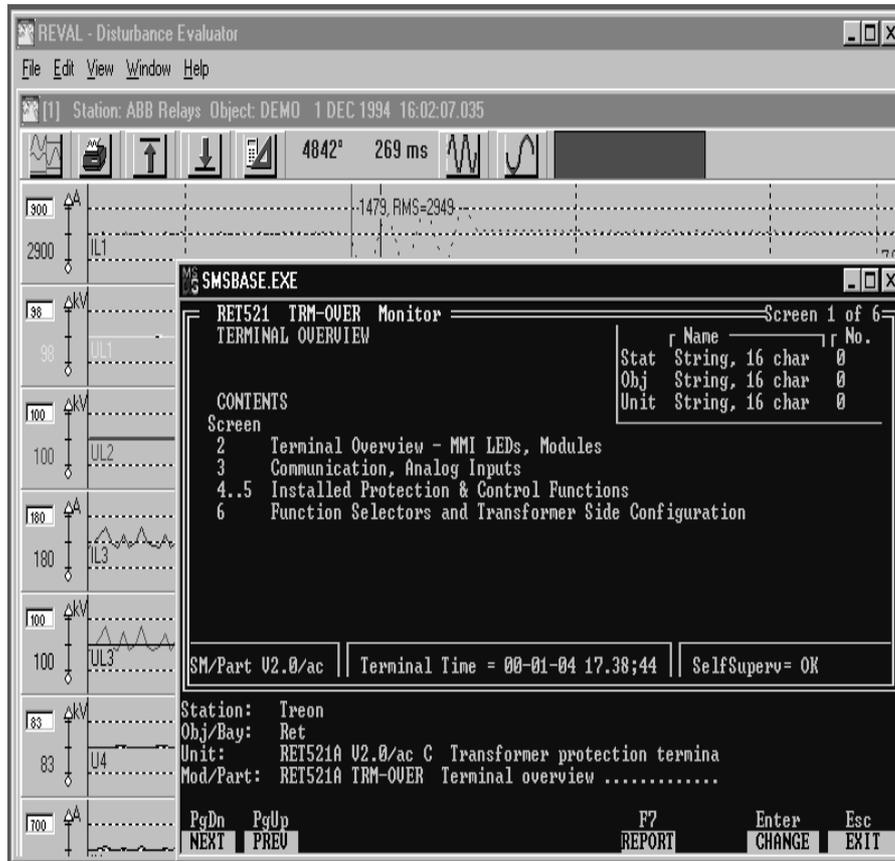


Fig. 24 SMS-BASE run as a small DOS window under MS Windows.

## 2.6 Error Messages

### Terminal blocked

Internal fault:

- The internal supervision software of the terminal has detected an error, e.g. component malfunction.

The input "block" of the trip function element is activated:

- By an activated input signal via I/O, internally connected/configured to the element.
- By another input signal e.g. "FIXED-ON" internally connected/configured to the element.

By local HMI:

- In menu "Test" the alternative "Block Terminal" is On. The blocking must be released from the same menu by changing setting to Off.

**Warning - testmode active**

Function element "Test" activated:

- By an activated input signal via I/O, internally connected to the function element.

Local HMI:

- In menu "Test" the alternative "Mode/Operation" is set to On.

**Warning - recording made in testmode**

Indicates that presented data fields do not contain relevant information, since the terminal will not record data in this mode. The mode may have been modified.

- On local HMI in menu "Test" with alternative "TestMode/Operation".
- By an activated input signal (e.g. via I/O) connected to the function element "Test".

**Warning - no data**

Indicates that the presented data fields in the DRP-TRIP data part do not contain relevant information.

The information is not available since:

- Fault locator is not included.
- Recording is made for fault outside the protected range.
- The recorder is running in test mode, i.e. no analog data used to calculate data has been recorded.
- All analogue channels are deactivated, which can be done in data part SET-ASIG or from local HMI:

"/Settings/DisturbReport/Operation"

"/Settings/DisturbReport/AnalogSignals/'channel name, e.g.UL1'/Operation"

**2.7****List of References**

HMI	Monitor SM/REx 500
Configuration Identifiers	Configuration/CNF-ALOG/ screen 2
Configuration LON Comm	Configuration/CNF-ALOG/ screen 6
Configuration Time	Configuration/CNF-ALOG/ screen 5
Configuration I/O	Configuration/CNF-ALOG/ screen 4
Configuration RemTermCom	Configuration/CNF-ALOG/ screen 7
Configuration DisturbReport	Configuration/CNF-BHMI/ screen 2

HMI	Monitor SM/REx 500
Configuration Local HMI	Configuration/CNF-BHMI
Configuration SPA Comm	Configuration/CNF-ALOG/ screen 6
Service Report- ServiceValues	Service Report/SRV-ALOG/ screen 2
Service Report- Phasors	Service Report/SRV-ALOG/ screens 2,4
Service Report- Functions Impedance Settings-Functions-Impedance	Service Report/SRV-FUN2 Settings/SET-GR1B
Service Report- Functions Differential Settings-Functions-GRP1-Differential	Service Report/SRV-FUN1/ screen 2 Settings/SET-GR1A screen 2
Service Report- Functions Instant OC Settings-Functions-GRP1-Instant OC	Service Report/SRV-FUN1/ screen 2 Settings/SET-GR1A screen 5
Service Report- Functions TimeDelayOC Settings-Functions-GRP1-TimeDelayOC	Service Report/SRV-FUN1/ screen 2 Settings/SET-GR1A screen 5
Service Report- Functions Overload Settings-Functions-GRP1-Overload	Service Report/SRV-FUN1/ screen 3 Settings/SET-GR1A screen 5
Service Report- Functions Stub Settings-Functions-GRP1-TimeDelayOC	Service Report/SRV-FUN1/ screen 3 Settings/SET-GR1A screen 5
Service Report- Functions BreakerFailure Settings-Functions-GRP1- BreakerFailure	Service Report/SRV-FUN1/ screen 3 Settings/SET-GR1A screen 6
Service Report- Functions Earth Fault Settings-Functions-GRP1-Earth Fault	Service Report/SRV-FUN1/ screen 3 Settings/SET-GR1A screen 3..5
Service Report- Functions TimeDelayUV Settings-Functions-Grp1-TimeDelayUV	Service Report/SRV-FUN1/ screen 3 Settings/SET-GR1A screen 6
Service Report- Functions TimeDelayOV Settings-Functions-Grp1-TimeDelayOV	Service Report/SRV-FUN1/ screen 3 Settings/SET-GR1A screen 6
Service Report- Functions LossOfVoltage Settings-Functions-Grp1- LossOfVoltage	Service Report/SRV-FUN1/ screen 4 Settings/SET-GR1A screen 5
Service Report- Functions DeadLineDet Settings-Functions-Grp1-DeadLineDet	Service Report/SRV-FUN1/ screen 4 Settings/SET-GR1A screen 6
Service Report- Functions BrokenConduct Settings-Functions-Grp1-BrokenConduct	Service Report/SRV-FUN1 screen 3 Settings/SET-GR1A/ screen 7
Service Report- Functions CTSupervision Settings-Functions-Grp1-CTSupervision	Service Report/SRV-FUN1 screen 3 Settings/SET-GR1A/ screen 7
Service Report- Functions FuseFailure Settings-Functions-Grp1-FuseFailure	Service Report/SRV-FUN1 screen 3 Settings/SET-GR1A/ screen 7
Service Report- Functions AutoRecloser Settings-Functions-Grp1-AutoRecloser	Service Report/SRV-FUN3 screen 3..4 Settings/SET-GR1C/ screen 6..10
Service Report- Functions Trip Settings-Functions-Grp1-Trip	Service Report/SRV-FUN1 screen 3 Settings/SET-GR1A/ screen 7
Service Report- Functions Settings-Functions-Grp1-Trip	Service Report/SRV-FUN1 screen 3 Settings/SET-GR1A/ screen 7
Service Report- Functions SynchroCheck Settings-Functions-Grp1-SynchroCheck	Service Report/SRV-FUN3 screen 2 Settings/SET-GR1C/ screen 2..5
Service Report/MIM	Service Report/SRV-MIMV
Service Report/IOM	Service Report/SRV-IO01, SRV-IO02, SRV-IO03, SRV-IO04...SRV-IO13
Service Report/BOM	Service Report/SRV-IO01, SRV-IO02, SRV-IO03, SRV-IO04...SRV-IO13
Service Report/RemTermCom	Service Report/SRV--RTC

---

<b>HMI</b>	<b>Monitor SM/REx 500</b>
Settings-Disturbance Report-Operation/Fault Locator /Sequence No/Sampling Rate/Recording Times	Settings/SET-DREP/ screen 2
Settings-Disturbance Report-Binary Signals	Settings/SET-DREP/ screen 3..6
Settings-Disturbance Report- AnalogSignals	Settings/SET-ASIG/ screen 2,3
Settings-ChangeActGrp	Settings/SET-ACTI
Setting-Time	Settings/SET-TIME
TerminalReport-Self Super/Identity No	Terminal ReportTRM--REP
Test-TestMode/ConfigMode	Test/TST-MODE



## Reference Publications:

Ref. 1: SMS 010 Buyer's Guide - 1MRK 511 014-BEN

Ref. 2: SMS-BASE User's Guide - 1MRS 750 146-ESD

Ref. 3: RECOM User's Manual - 1MRK 511 052-UEN

Ref. 4: REPORT User's Guide - 1MRS 750 335-ESD

Ref. 5: CAP 531 User's Guide - 1MRK 511 034-UEN



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This card registers your program and makes you eligible to receive information about future updates.

---

Name:

---

Title:

---

Company:

Dept.

---

Address:

---

City:

State:

Zip:

---

Phone:

---

Fax:

---

Program supplied by:

---

Adress:

---

City:

State:

Zip:

---

Phone:

---

Date of receival of the program:

---

Program serial Nr:

**Fascimile:**

Please send this registration card to ABB Network Partner AB, Sweden department PS  
(+46 21 32 17 36)

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Postage  
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**ABB Network Partner AB**  
**Department: PS**  
**S-721-71 Västerås**  
**Sweden**

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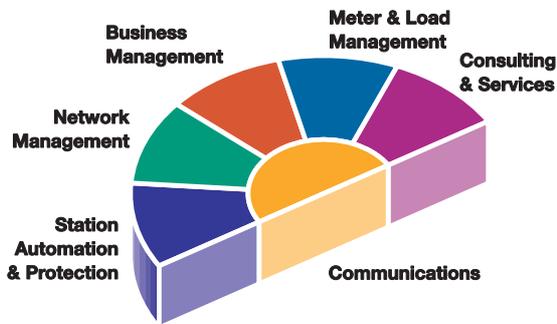
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