

User's Manual

HV/Collect*3.1



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This is a software manual for the Disturbance Collector software, HV/Collect*3.1

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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”

This chapter introduces you to the HV/Collect software

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Preface

Welcome to the Disturbance Collector User's Manual. The Disturbance Collector software is designed to provide a flexible tool for collection of disturbance files.

To be able to understand this document, you should be familiar with MicroSCADA and MicroLIBRARY.

The function is designed and created by ABB Automation Technology Products AB in Västerås, Sweden.

1

Abbreviations and definitions

Disturbance	An anomaly in the data of the supervised equipment. Disturbances are recorded by manual initiation or automatically if they meet pre-set triggering conditions.
Disturbance recorder	The built in disturbance recorder in REx 5xx
FTP	File Transfer Protocol
LIB520	High Voltage MicroLIBRARY
LAN	Local Area Network
LON	Local Operating Network
NFS	The Network File System (NFS) allows a client node to perform transparent file access over the network. By using NFS, a client node operates on files residing on a variety of servers and server architectures, and across a variety of operating systems.
OS	Operating System. Core software for a PC.
RAS	Remote Access Server
Recording	All the available information about a disturbance from one disturbance recorder
REVAL	Disturbance Evaluation Program. REVAL runs in Windows OS.
REVAL-format	The file format used by the REVAL evaluation program. The disturbance data is stored in two files, the header file and the data file.
REVAL log file	The log file contain file references to uploaded recordings during an auto poll for a unit.
SCS	Substation Control System. A system for monitoring and controlling a complete substation, i.e. the MicroSCADA in this document.
TCP/IP	Transmission Control Protocol/Internet Protocol.
Unit	Throughout this document the word "unit" refers to the REx5xx terminal in which the disturbance recorder is located.

1.1 Font conventions

Normal text is written with this font and size.

SCIL CODE, SCIL PROGRAMS AND FILE NAMES ARE WRITTEN WITH THIS FONT AND SIZE.

1.2 Product overview

Disturbance recording is a very effective tool for the operating and design personnel to analyze the performance of the power system and related equipment during and after a major disturbance. By promptly detecting any problems and initiating the corrective measures, maximum operating reliability and availability of the power system is achieved. Disturbance recording also improves the understanding of the behavior of the power system and the associated equipment, contributing to design improvements of future installations.

The complete disturbance recording and evaluation system consists of REVAL and Disturbance Collector programs together with hardware for interconnecting the disturbance recorders and protection terminals in a local network, in either a 'star' or a 'loop' configuration.

This document describes only the functions of the Disturbance Collector programs and the interface to REx5xx.

MicroSCADA software available for Disturbance Collector:

- HV/COLLECT - Software module for disturbance collector.

1.3

System overview

The “Disturbance Collector” function is a part of LIB520 in the MicroSCADA. In Figure 1 the “Disturbance Collector” function is shown as a part of a system. This user’s manual covers only the functionality of the “Disturbance Collector” function.

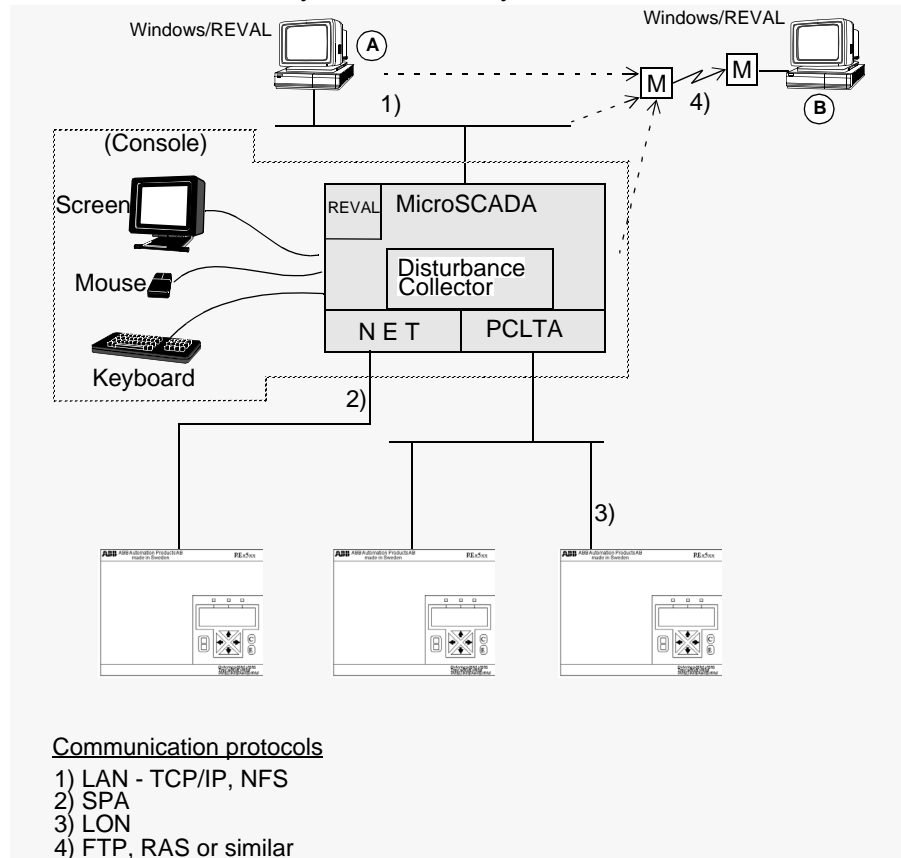


Fig. 1 Disturbance Collector system overview

- A) The MicroSCADA file system is mounted, using NFS, in the PC, i.e. the MicroSCADA file system will be accessed as just another disk in the PC.
- B) Remote communication, e.g. RAS. (not within the scope of this document to determine which technical solution to use).

The chapter “Instructions”

This chapter instructs you how to install the Disturbance Collector software and how to perform some typical tasks when to use the software.

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Installation

Before using Disturbance Collector, the software has to be installed on the hard disk of the MicroSCADA computer.

1 System requirements

In order to operate, the software module Disturbance Collector poses the following requirements on its environment.

At the protection terminal end:

Remote communication:

- The terminal with installed “remote communication’ and ‘disturbance recorder’ options.

Note. In order to run the disturbance collector, one HV/REx5xx software module for each terminal type used must be installed. All the HV/rex5xx software is included in LIB 520 as separate packages.

1.0.1

The MicroSCADA PC:

- MicroSYS revision 8.4.4 or later
- LIB500 revision 4.0.4 or later
- LIB510 revision 4.0.4 or later

The HV/collect package:

- 700 KB disk

2 Installation

Installation of the Disturbance Collector software module means copying files from the CD to the hard disk.

Important note!

In order to avoid problems, we recommend you not to have the MicroSCADA running during the installation.



2.1 Installing the MicroSCADA software

Before installing the Disturbance Collector, make sure the MicroSCADA software is already installed on the PC.

2.2 Installing the disturbance collector software

When installing from the installation disk to the hard disk, please follow the steps below:

- 1 **Start up the File Manager (Explorer)**
- 2 **Run [drive]:\L520_XXX.EXE found on the CD.**
- 3 **Follow the instructions on the screen**



The Disturbance Collector is now properly installed on the hard disk of the PC.

4 Start the MicroSCADA

The software is now installed in the following directories:

```
[drive]:\sc\lib4\smod\relays\rex5xx\hvcollect\inst
[drive]:\sc\lib4\smod\relays\rex5xx\hvcollect\lang0
[drive]:\sc\lib4\smod\relays\rex5xx\hvcollect\use
```

2.3

Installing the disturbance collector library function

The Disturbance Collector is not a stand-alone library function itself. It is an integrated part of the HV/REx 5xx library function.

When installing the HV/REx 5xx library function, make sure that you select the DISTURBANCE RECORDER option, to be able to use the Disturbance Collector, see HV/REx5xx User's Manual.

3

System setup

REVAL

The uploaded recordings can be analysed with tools like REVAL or other tools with the ability to read REVAL-form or COMTRADE.

There are a number of ways to access the uploaded recordings from such a tool. One way is to have REVAL running on a separate PC and then mount, using NFS, the disk, in the MicroSCADA PC, where the recording files are stored.

File -> Open... In the Open dialogue you just select the NFS mounted disk from the "Unit:" list (not to be confused with the definition of unit in this document). Navigate through the directories to the terminal unit directory of your interest, then select the REVAL header file that you want to analyse.

In REVAL an automatic printout function is available. Before this is properly working together with HV/COLLECT the default path, where REVAL finds necessary files, must be changed from [drive]:\SMS\..\RECOM to [drive]:\SC\LIB4\SMOD\RELAYS\REX5XX\HVCOLLECT. This modification is made in [drive]:\REVAL\REVAL.INI tag RECOM_DIR and must match the PATH_REVAL_LOG_FILES tag in HVCOLLECT.INI described below.

HVCOLLECT

When HV/Collect is started the first time an ini file [drive]:\SC\APL\

```
[Parameters]
Path_Reval_Log_Files=[drive]:\SC\LIB4\SMOD\RELAYS\REX5XX\HVCOLLECT
Path_Reval=C:\SMS\REVAL
Prog_Reval=REVAL_NT.EXE
Print_Command_Reval=REVAL_NT.EXE -P
Print_Command="C:\Program Files\Windows NT\Accessories\wordpad.exe" /p
Recorder_Path=RECORDER
```

Tag description:

- `PATH_REVAL_LOG_FILES` defines the path where HV/Collect stores reference files used by REVAL.
- `PATH_REVAL` defines the path where REVAL has been installed.
- `PROG_REVAL` defines name of the REVAL executable.
- `PRINT_COMMAND_REVAL` defines name of the REVAL print executable.
- `PRINT_COMMAND` defines the printer command to be used by HV/Collect when printing the disturbance recordings list.
- `RECORDER_PATH` defines the path where to store the uploaded disturbance files.

Note!

Important notes concerning automatic printout from REVAL:



To get this function working properly it is very important that the necessary printers are defined for the MICROSCADA user. Otherwise REVAL is not able to detect default printer definitions which is a must.

4 Performing certain operations

4.1 Start the HV/Collect tool

- 1 **The HV/Collect tool is started from the main menu.**

On the **Options** menu, click **HV/Collect**.

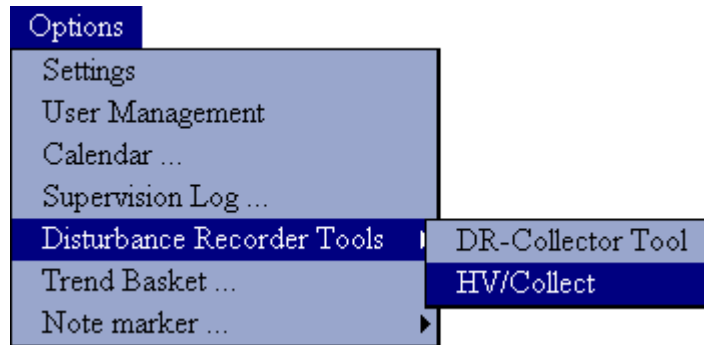


Fig. 1 Options menu

4.2 HV/Collect settings

- 1 **Enable/Disable showing grid lines in all lists**

On the **Settings** menu of the HV/Collect dialog, click **Show List Grid**.

- 2 **Enable/Disable the automatic updating of the recordings list when selecting a node in the navigator.**

On the **Settings** menu of the HV/Collect dialog, click **Update Recordings List When Node Is Selected**.

- 3 **Enable/Disable the automatic updating of the recordings list when selecting a leaf in the navigator.**

On the **Settings** menu of the HV/Collect dialog, click **Update Recordings List When Leaf Is Selected**.

4.3 Change of password

The Disturbance Collector has no password handling of its own. Instead, activities are depending on the user's authority level in the MicroSCADA. All users with authority level 1 or higher have access to the Disturbance Collector activities.

New MicroSCADA users can only be added by the MicroSCADA system manager.

4.4 Diagnosing errors

When errors occur, the system produces error messages which are shown in a message box. The error messages are composed of a status code and short descriptive text.

The meaning of these codes are described in the MicroSCADA manuals.

The error messages in the example below have the following meaning:

```
16303 - RMTP_NET_NOT_RUNNING
```

In other words:

You have tried to read settings from a terminal but the NET is not running. Start the NET and try again.

A probable cause for these errors can be:

- The NET-program is not running.
- The terminal is not defined in the base system (SPANET, LON).
- The terminal is not defined in the DATA list (SRIO).
- The terminal has an other SPA address than defined in the Micro SCADA (SPANET, LON and SRIO).
- The fibre optic bus is broken.
- The terminal is faulty.

4.5 Communication problem

Errors have, in most cases, something to do with the communication. When the program does not get an answer from the unit within the system defined time limit it does twenty attempts to re-send the message. If the terminal still does not respond to any of these attempts there is a communication problem in the system.

A probable cause for these communication problems can be:

- The NET is running but the line that is used for this purpose is not in use.
- The terminal (slave) does not respond (SPANET, LON and SRIO)

The chapter “Technical instructions”

This chapter describes the Disturbance Collector software and its functionality.

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1 Overview

The purpose of the Disturbance Collector is to collect disturbances from disturbance recorders and save them as files on a hard drive for evaluation and long time storage.

Two files for each uploaded recording will be created, one header file `yymmddss.reh` and one data file `yymmddss.rev` where `yymmddss` = year, month, day and sequence number of the recording.

Both upload processes (manual and automatic) stores disturbances under the MicroSCADA directory structure in `\apl\application_name\recorder`, which is the main storage directory for recording files. Subdirectories for each unit are created at run time and are named according to the unit name. E.g. `\apl\apl_1\recorder\unit_2\95113001.reh` and `95113001.rev`.

2 Functions

- Recordings saved in REVAL format
- Automatic printout using REVAL
- Manual or Automatic uploading of recorder
- Automatic polling of recorder is time driven
- Station wide list of uploaded recordings
- Unit recordings list
- Manual trig of recording
- Clear recordings stored in the recorder
- Conversion to COMTRADE and EVE format
- View indications for a specific disturbance
- View and recalculate fault location data
- View internal terminal events.

3 Design

3.1 Main dialog

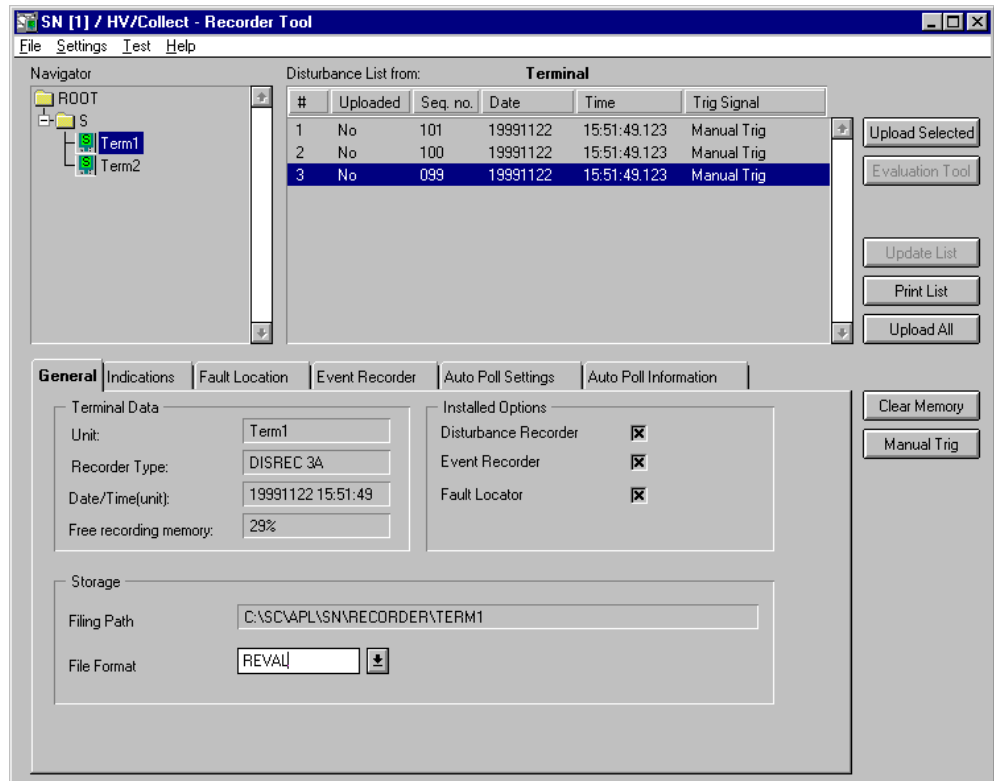


Fig. 1 HV/Collect Main Dialog

3.2

Buttons

Table 1: HV/Collect main dialog functions

Button	Condition	Functionality
Upload Selected	Disturbance(s) selected, not already uploaded	Upload disturbance(s) from the terminal for harddisk storage.
Evaluation Tool	Disturbance selected	Start the evaluation tool, REVAL, on the selected disturbance.
Update List	Automatic update disabled in the Settings menu	Update the disturbance list depending on the selection in the navigator.
Print List	Disturbance list not empty	Print out the terminal disturbance list on the default Windows printer.
Upload All	-	Upload all new disturbances from terminal(s), one or hierarchy, selected in the navigator
Clear Memory	Leaf selected	Clear all disturbance data in the selected terminal.
Manual Trig	Leaf Selected	Manual trig of disturbance recording in the terminal.

Table 2: Tabbed page function

Page	Condition	Automatic function
General	-	-
Indications	Terminal selected (leaf) and a disturbance within that terminal selected	Fetch data, from the terminal, about the 48 indications in the selected disturbance recording.
Fault Location	Terminal, that supports fault location, selected (leaf) and a disturbance within that terminal selected	Fetch data, from the terminal, about fault location in the selected disturbance recording
Event Recorder	Terminal, that supports event recording, selected (leaf) and a disturbance within that terminal selected	Fetch event recorder data for the selected disturbance recording from the terminal
Auto Poll Settings	-	-
Auto Poll Information	-	-

3.3

Navigator

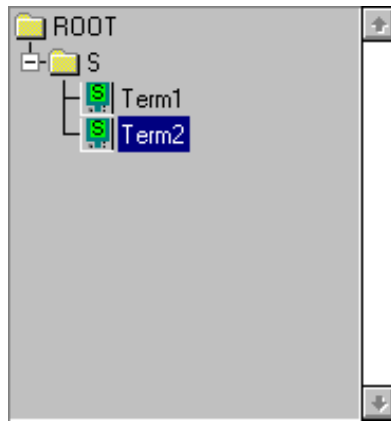


Fig. 2 Navigator

The navigator shows the project structure where each leaf represents a terminal with disturbance recorder function installed. When selecting a node all terminals that hierarchally reside below that node are considered to be selected.

3.4 Terminal disturbance list

#	Uploaded	Seq. no.	Date	Time	Trig Signal
1	No	02	19991006	10:43:53.123	Manual Trig
2	No	01	19991006	10:43:53.123	Manual Trig
3	No	00	19991006	10:43:53.123	Manual Trig

Fig. 3 Terminal disturbance list

When a **node** is selected in the navigator, the terminal disturbance list shows all the disturbances that have been uploaded for all terminals that reside hierarchally below the selected node.

When a **terminal** (leaf) is selected in the navigator, the terminal is asked for information about all disturbances currently available in the terminal. The result is displayed in the terminal disturbance list.

Sorting is provided and it is accessed through the column header. Clicking on a column header toggles ascending/descending sorting of the list.

The list supports multiple discontinuous selection, which means, you can select any disturbance in the list, for example 1, 3 and 8.

Table 3: Terminal disturbance list

Column	Description
#	List item number
Unit	Terminal unit name. This column is only shown when a node is selected in the navigator
Uploaded	Indicates if the disturbance recording has been uploaded to the harddisk (Yes) or not (No).
Seq. no.	The disturbance recording sequence number, 0..99.
Date	The disturbance recording date, in format YYYYMMDD.
Time	The disturbance recording time, in format hh:mm:ss.sss.
Trig Signal	The disturbance recording trig reason

3.5

General page

Fig. 4 Main dialog, General page

Table 4: General page items

Item	Description
Terminal Data	Group of data for the selected terminal
Unit	Unit name
Recorder Type	Recorder Type (DISREC 0A - DISREC 4A)
Date/Time(Unit)	The current date and time in the unit.
Free recording memory	Indication of the amount of free recording memory in percent of the total recording memory.
Storage	Group of information regarding storage on the hard disk.
Filing Path	Common root path where all uploaded disturbance recordings are filed away. Note: The path is defined in the HVCOLLECT.INI file.
File Format	The desired file format when storing the disturbance recordings on the hard disk. Available formats are REVAL, COMTRADE and EVE where REVAL (no conversion) is default.
Installed Options	Group of information regarding installed options. If the box is checked then the option is installed in the Terminal.
Disturbance Recorder	Disturbance Recorder option.
Event Recorder	Event Recorder option.
Fault Location	Fault Location option.

3.6

Indications page

Channel	Id	Activated
1	bi 1	Activated
2	bi 2	
3	bi 3	
4	bi 4	
5	bi 5	
6	bi 6	Activated
7	bi 7	
8	bi 8	
9	bi 9	Activated
10	bi 10	Activated
11	bi 11	Activated
12	bi 12	
13	bi 13	Activated
14	bi 14	
15	bi 15	

Fig. 5 Main dialog, indications page

Table 5: Indications page items

Column	Description
Channel	Indication channel number, 1..48
Id	Indication ID (name)
Activated	Indicates if the indication was active when the fault occurred (Activated, blank).

3.7

Fault location page

The screenshot shows a software interface with a tabbed header. The 'Fault Location' tab is active. The interface is split into two panels. The left panel, titled 'Automatically Phase Selected Loop', displays: Fault Loop = L3-N, Distance = 100 Mile, and Distance = 100 %. The right panel, titled 'Manually Selected Loop', displays: Fault Loop = L3-N, Distance = 100 Mile, and Distance = 100 %. Below these, there is a 'New Fault Loop' field with a dropdown menu showing 'L3-N' and a downward arrow button.

Fig. 6 Main dialog, fault location page

Table 6: Fault location page items

Item	Description
Automatically Phase Selected Loop	Group of fault location data that has been automatically calculated in the terminal.
Manually Selected Loop	Group of fault location data that has been recalculated, in the terminal, using the New Fault Loop selected by the operator.
Fault Loop	Fault Loop that has been used for the calculations (L1-N, L2-N, L3-N, L1-L2, L2-L3, L3-L1, PhSel).
Distance	Distance to fault in km or mile and percent.

3.8

Event recorder page

General						Indications						Fault Location						Event Recorder						Auto Poll Settings						Auto Poll Information					
Nr		Time		Event		Value																													
01	12.37,34.377	Event 1	off																																
02	12.37,34.377	Event 2	off																																
03	12.37,34.377	Event 3	on																																
04	12.37,34.377	Event 4	off																																
05	12.37,34.377	Event 5	off																																
06	12.37,34.377	Event 6	on																																
07	12.37,34.377	Event 7	on																																
08	12.37,34.377	Event 8	on																																
09	12.37,34.377	Event 9	off																																
10	12.37,34.377	Event 10	off																																
11	12.37,34.377	Event 11	off																																
12	12.37,34.377	Event 12	on																																
13	12.37,34.377	Event 13	on																																
14	12.37,34.377	Event 14	off																																
15	12.37,34.377	Event 15	off																																

Fig. 7 Main dialog, event recorder page

Table 7: Event recorder page items

Column	Description
No	Event number, 1..150.
Time	Time when event occurred.
Event	Event text.
Value	Event value, on or off.

3.9

Auto poll settings page

Fig. 8 Main dialog, auto poll settings page

Table 8: Auto poll settings page items

Item	Description
General Settings	Settings that are general for all terminals.
Auto Poll Activated	Check box for activating the Auto Poll function.
Automatic Printout	Check box for activating the automatic printout function. The function will create REVAL information files, RCM-REV.nnn where nnn is an index number, and activate a printout. The path where the files are stored is defined in the HVCollect.ini file.
Poll Cycle Interval	Time between Auto Poll activations. This formula can be used as a guideline for evaluating the time between auto polls for your specific system: $\text{Auto poll time} \Rightarrow 15 + (15 * \text{terminal units}) \text{ [minutes]}$ Minimum value is 30 minutes. Note: The starting time can not be defined. The start time reference is defined as 01:00:00, e.g. if you specify the cycle interval to be 1 hour, at 15:47:23, then the next poll cycle will start at 16:00:00 (multiple of 1 hour since 01:00:00) not 16:47:23 and the next after that will start 17:00:00 etc.
Terminal Setting	Setting that is terminal specific
Selection For Polling	Check box for adding the terminal to the list of terminals that are to be automatically polled for disturbance recordings.

3.10

Auto poll information page

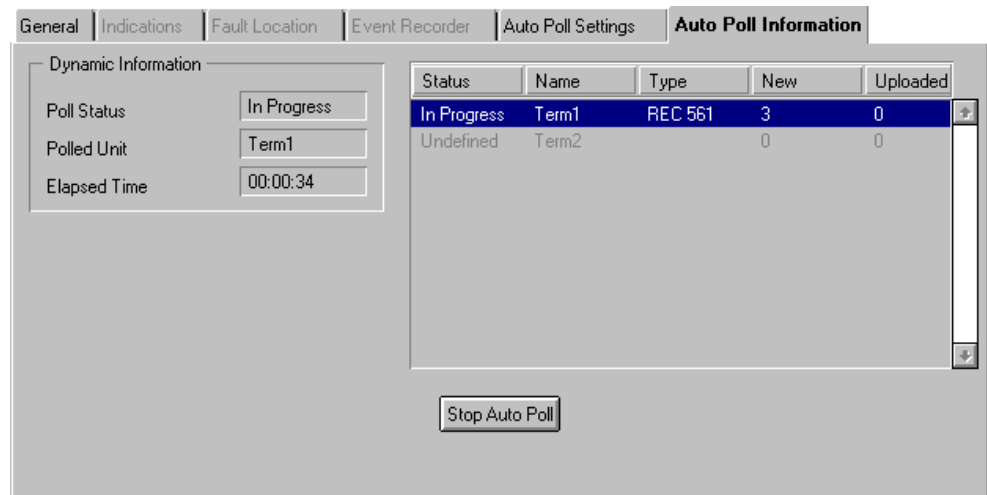


Fig. 9 Main dialog, auto poll information page

Table 9: Auto poll information page items

Item	Description
Dynamic Information	Information about the Auto Poll function that are updated every 10 seconds
Poll Status	Indicates the current status of the Auto Poll function, Idle or In Progress.
Polled Unit	Name of the terminal unit that is currently being polled for disturbance recordings.
Elapsed Time	The time elapsed since the current poll cycle started.
Status	Poll status for a individual terminal, OK, In Progress, Failed or Interrupted.
Name	Name of the terminal unit that has been added to the list of terminals to be automatically polled for disturbance recordings.
Type	Terminal type.
New	Number of new disturbance recordings that has been recorded by the terminal since the previous poll cycle.
Uploaded	Number of disturbance recordings that has been uploaded during the current poll cycle.
Stop Auto Poll	Button for immediate stop of the automatic polling sequence. The automatic polling will resume at the next poll cycle interval, to stop further poll cycle activations then the automatic polling must be disabled, please refer to Auto Poll Settings page.

4 Tutorial

4.1 Manual uploading

Upload disturbance recordings that has not already been uploaded and stored on the hard disk.

4.1.1 Upload selected disturbance(s)

- 1 Select a terminal in the navigator
- 2 Select one or more disturbance recording(s) in the Terminal Recordings List
- 3 Click on Upload Selected
A confirmation box is displayed
- 4 Click Ok in the confirmation box
A progress box is displayed

4.1.2 Upload all disturbances from a terminal

- 1 Select a terminal in the navigator
- 2 Click on Upload All
A confirmation box is displayed
- 3 Click Ok in the confirmation box
A progress box is displayed

4.1.3 Upload all disturbances from all selected terminals

- 1 Select a node in the navigator
- 2 Click on Upload All
A confirmation box is displayed
- 3 Click Ok in the confirmation box
A progress box is displayed

4.2 Fetch indications

- 1 Select a terminal in the navigator
- 2 Select a disturbance recording in the Terminal Recordings List
- 3 Click on the Indications page tab
A progress box is displayed

4.3 Fetch fault location

- 1 Select a terminal in the navigator
- 2 Select a disturbance recording in the Terminal Recordings List
- 3 Click on the Fault Location page tab
A progress box is displayed

4.4 Fetch internal events

- 1 Select a terminal in the navigator
- 2 Click on the Event Recorder page tab
- 3 Click on fetch Page
A progress box is displayed

4.5 Evaluate disturbance recording

- 1 Select a disturbance recording in the Terminal Disturbance List
- 2 Click on Evaluation Tool
A confirmation box is displayed
- 3 Click Ok in the confirmation box
The evaluation tool is displayed

4.6 Print out a list of disturbance recordings

- 1 Select a node or terminal in the navigator
- 2 Click on Print List
A confirmation box is displayed
- 3 Click Ok in the confirmation box

4.7 Clear terminal recording memory

- 1 Select a terminal in the navigator
- 2 Click on Clear Memory
A confirmation box is displayed
- 3 Click Ok in the confirmation box
A progress box is displayed

4.8 Trig a recording in the terminal

The triggering will be ignored if a progressing disturbance recording exists in fault-time recording state

- 1 Select a terminal in the navigator**
- 2 Click on Manual Trig**
A confirmation box is displayed
- 3 Click Ok in the confirmation box**
A progress box is displayed

4.9 Deletion of uploaded disturbance recordings

The maintenance of the files, i.e. deletion of old disturbance recording files, that are no longer needed has to be done through the Windows file manager.

4.10 Automatic uploading

The automatic polling of terminals for disturbance recordings is scheduled by a Time Channel in the MicroSCADA.

4.10.1 Activate automatic polling of terminals

- 1 Click on the Auto Poll Settings Page tab**
- 2 Click on Auto Poll Activated**
The check box is now checked and the automatic polling function is activated

4.10.2 Activate automatic printout

- 1 Click on the Auto Poll Settings Page tab**
- 2 Click on Automatic Printout**
The check box is now checked and the function is activated when the Automatic Polling is activated

4.10.3 Set new poll cycle interval

- 1 Click on the Auto Poll Settings Page tab**
- 2 Click on the spinners to change the interval**

4.10.4 Select terminal for automatic polling

- 1 Click on the Auto Poll Settings Page tab**
- 2 Select a terminal in the navigator**
- 3 Click on Selection For Polling**
The check box is now checked
- 4 Click on the Auto Poll Information Page tab**
The terminal is now present in the list

4.10.5**Immediate stop of automatic polling****1 Click on the Auto Poll Information Page tab****2 Click on Stop Auto Poll**

The current automatic polling cycle is stopped and the status for the current terminal in the list is changed to Interrupted.

The chapter “Appendix”

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Appendix

1 Application engineering information

1.1 Text files

File location: SMOD/RELAYS/REX5XX/COLLECTOR/LANG'L'

Filename	Description
SRU_ADCOL.TXT	Automatic Uploading dialogue and status texts

Customer feedback report

Product:

ABB Automation Technologies AB would appreciate your comments on this product. Please grade the following questions by selecting one alternative per category. Your answer will enable us to improve our products.

How do you grade the quality of the product?

	Excellent				Poor
Total impression	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Useability	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Functionality	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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