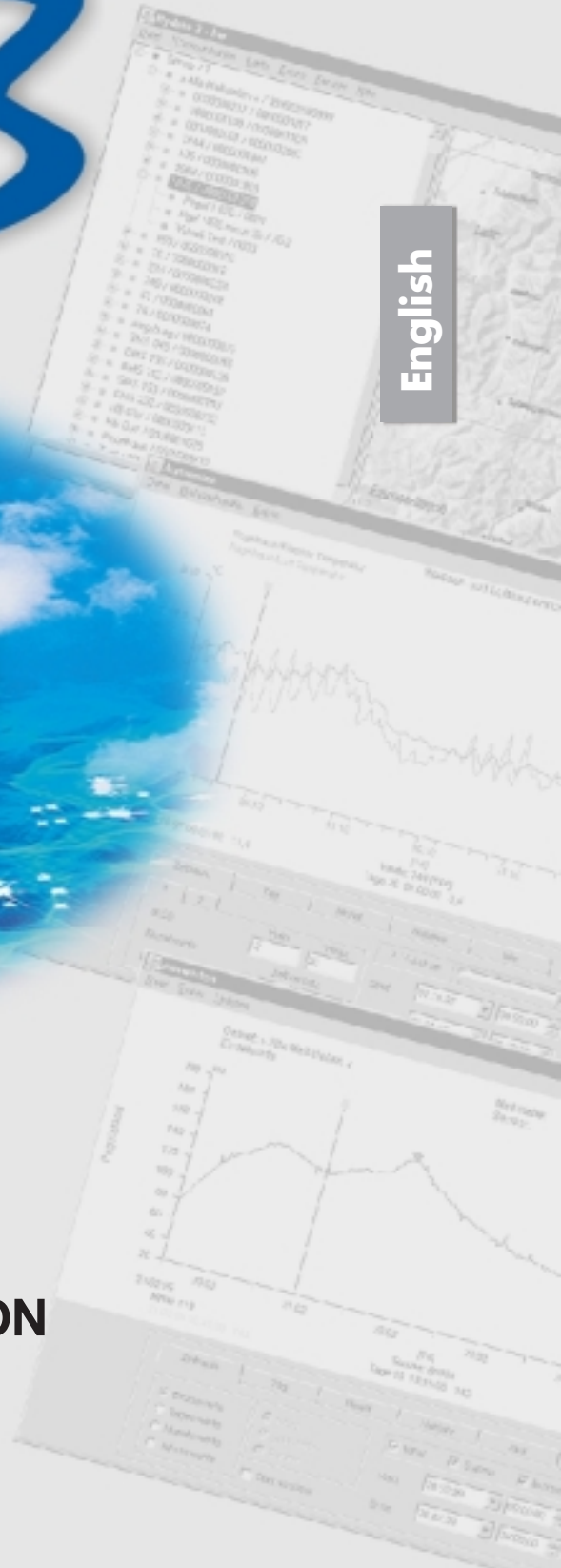**OTT**

HYDROMETRIE

Getting Started

HYDRAS 3

English

APPLICATION SOFTWARE FOR HYDROLOGY, METEOROLOGY AND ENVIRONMENTAL PROTECTION

Contents

1 What is HYDRAS 3 ?

HYDRAS 3 is a convenient solution for professional transfer, processing and management of measurement data in the areas of hydrometry, meteorology and environmental protection.

Fig. 1: Start-up logo of HYDRAS 3 application software
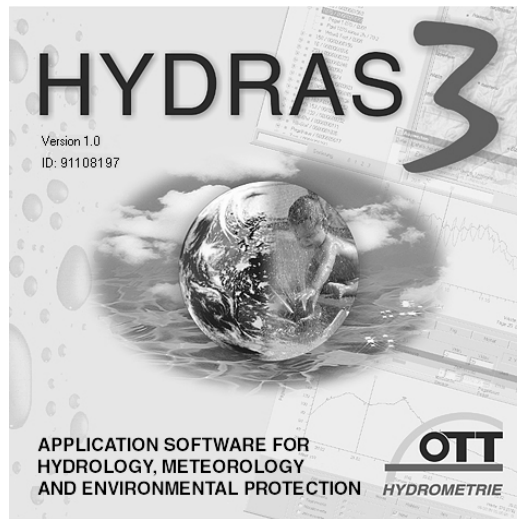
HYDRAS 3 is based on a high-performance database application which comes with a variety of functions:

▶ Communication with OTT devices (downloading data)
▶ Operating OTT devices (configuration)
▶ Station management (management of master data)
▶ Time sequence management
▶ Incorporating map or graphic material
▶ Graphical evaluation
▶ Multiple graphics
▶ Graphical editor
▶ Numerical display of measured data
▶ Virtual sensor
▶ Correlation analysis
▶ Isoline display
▶ Importing measurement data
▶ Exporting measurement data

One of the main applications of HYDRAS 3 is OTT device communication and operation (configuration). For example, measured values can be called up on location as well as per modem.

You can customise the software to your own requirements using the extensive range of options offered.

Thanks to import and export functions which can configured to individual requirements, HYDRAS 3 can easily be integrated into existing systems for time sequence management and evaluation.

It is particularly worth noting that HYDRAS 3 can manage any number of stations and sensors, plus their associated measured data. The size of the database is restricted only by the power and memory capacity of your PC system.

HYDRAS 3 application software is network-compatible. For network operation, HYDRAS 3 must be installed on each workstation. The shared HYDRAS 3 database is located in a central fileserver directory which can be accessed by all workstations. In this way, several users can simultaneously access the same data and evaluate data graphically, for example. If one of the users is currently editing measured data on his/her PC, a warning message is displayed to all other users with access to the same data; simultaneous editing of this data is then disabled.

Previous users of HYDRAS II can continue to use their existing configurations and measured data.

Finally: HYDRAS 3 is improving all the time. The following program expansions are currently being developed:

▶ Automatic selection of measured values and
  cyclical selection of measured values (high water tracking)
▶ Alarm management
▶ Internet interface
▶ Simultaneous management of extra information, such as level measurement
  entries, for example
▶ Graphical and tabular display of raw data
▶ OTT View: Transfer of digital status images.

2 HYDRAS 3: Documentation

Various sources of information are available to help make your introduction to HYDRAS 3 application software as easy as possible:

▶ This user's guide "Introduction to HYDRAS 3"

This user's guide provides you with detailed information on system requirements and installation of HYDRAS 3. It also introduces you to the first steps with the application software. Divided into sections, the guide gives you a thorough overview of the different application software functions.

▶ Context-sensitive online help

Call up information specifically related to your current task by pressing the function key "F1". Alternatively, you can call up the online help via the menu Help | Contents.

In this case, HYDRAS 3 displays a window with the help topics contents, which allows you to carry out a specific search for the topics required.

▶ File "README.txt" on the installation CD-ROM of HYDRAS 3

This file contains additional information on the installation or use of HYDRAS 3 which is too recent to have been included in the present guide or online help.

It is therefore very important that you read this file carefully. It is an ASCII file and can be opened and printed out using any text editor.

▶ Other "….txt" files also included on the installation CD-ROM for HYDRAS 3

e. g. W95_DLLs.txt
    W98_DLLs.txt
    NT4_DLLs.txt

These files contain special instructions which are useful in unusual or problem cases.

▶ OTT's Internet homepage "http://www.ott-hydrometry.de"

You can download free updates for HYDRAS 3 from the "service" pages (depending on availability).
These pages also include a file with FAQs (frequently asked questions) currently being compiled. The file contains our answers to typical questions often asked by HYDRAS 3 users.

▶ Individual support by e-mail

Do you have a specific problem or question which is not adequately covered by the sources of information above? Send a short e-mail with the keyword HYDRAS 3 to the following address: info@ott-hydrometry.de.

When describing the problem, please do not forget to include your PC configuration, series number and software version of HYDRAS 3 together with any error messages.

3 Installing HYDRAS 3

3.1 System requirements

The following minimum system requirements are necessary for installing HYDRAS 3:

▶ IBM-compatible PC with 60 MHz-processor and CD-ROM drive
▶ 15 MB free hard drive memory for the HYDRAS 3 program +
   additional memory for measured data
▶ 16 MB memory
▶ 15" monitor (resolution 800 x 600 pixels; 256 colours)
▶ Microsoft Windows 95/98 or Windows NT as of Version 4.0

However, for maximum convenience and optimal operation of the application software, we recommend the following hardware:

▶ IBM-compatible PC with 200 MHz processor or faster
▶ Minimum 32 MB memory
▶ 17" monitor (resolution 1024 x 768 pixels; true colour, 24-bit) or larger

If you wish to use the communication function "Download data/Operate" for HYDRAS 3, the following equipment is required, depending on your application

▶ Modem (analog, GSM, ISDN)
▶ OTT-DuoLink data readout device or standard OTT data readout device
▶ Integrated infrared interface (IrDA) or LinkIt infrared-interface adapter
▶ VOTA/PC data transfer cable

If you also require measured data evaluations as print-outs, you will also need an ink-jet or laser printer (ideally colour).

3.2 Special precondition when installing Hydras 3 under Windows NT

To be able to install HYDRAS 3 properly on a PC with the Windows NT operating system (as of version 4.0), you must log on to your PC with administrator access rights.

3.3 Installing HYDRAS 3

Follow the steps below to install HYDRAS 3:
- Exit all applications before running the setup program.
- Insert the HYDRAS 3 CD-ROM into the CD drive on your PC.
- Please read the README.txt file on the CD carefully. This file contains supplementary information on installing and operating the HYDRAS 3 which is not documented elsewhere.
- Run the setup.exe program on the CD. (For example, the command "Run" in the Windows start menu: d:\setup.exe; where "d" represents your CD-ROM drive. The setup.exe program starts the installation assistant which guides you through the installation procedure.
- Please note all messages from the installation assistant and enter the relevant information requested:
  - Select the target directory for installation
  - Select program folder
  - Enter user information.

Fig. 2: Installing HYDRAS 3 –
Setup program installation assistant

- Now check all entries and click on "Next>"
  The setup program copies all of the necessary files to your PC hard drive (usually "C:").
- Exit the setup program.

If problems occur during installation or when installing HYDRAS 3 for the first time, refer to the README.txt file under point 6 "Troubleshooting". Suggested solutions to various problems are given here.

During the installation procedure, the setup program usually adds the subdirectories "...\Borland\Common Files\BDE" and "...\Hydras3" to the "C:\Program Files\" directory. In addition, the setup program also installs various ... .DLL files. You can find more information on this subject in the README.txt. if necessary.

3.4 Using HYDRAS 3 in a network environment

You need to install the HYDRAS 3 application software on each of these workstations if you wish to access a shared HYDRAS 3 database within the network from several locations.

A directory within a fileserver which can be accessed by each HYDRAS 3 workstation is used as a workspace.

You must create a control file for these workstations for coordination of several users accessing the shared database:

■ Start up the administration program
"bdeadmin.exe" on each workstation.
This program is located in path C:\Program Files\Borland\Common Files\BDE (the details under drive "C:" may vary in your installation)

■ In the "NET DIR" field under Configuration | Drivers | Native | Paradox, enter a directory on your file server to which all HYDRAS 3 workstations have read/write access.
Please note that this entry is the same for each HYDRAS 3 workstation. If you use drive letter designations in the path specification, these drive letters must refer to the same network path on all of the PCs. There is no need to worry about this if you use a UNC path name (Universal Naming Convention) instead, i.e. "\\PC name\path name".

Fig. 3: Creating a control file for shared use of HYDRAS 3 data
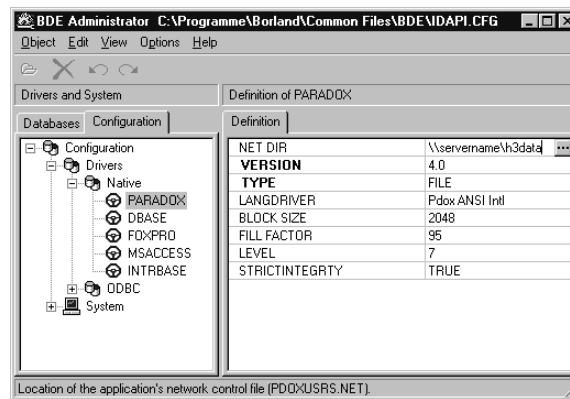
HYDRAS 3 creates the control file "PDOXUSRS.NET" in the directory specified by "NET DIR". This file handles synchronization of access between several different users. Therefore, two users trying to edit the same measured data simultaneously will receive a warning message.
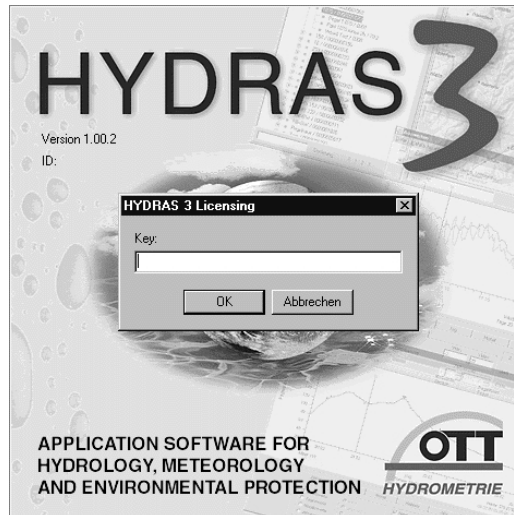
4 Starting HYDRAS 3 for the first time

4.1 Entering the licence code
You must enter a licence code before starting HYDRAS 3 for the first time.

■ Start HYDRAS 3 (e. g. Windows start menu: Programs| Hydras3 |Hydras3). The HYDRAS 3 logo is displayed initially, followed by the "HYDRAS 3 Licensing" window.
■ Enter the series number of your application program HYDRAS 3 as a code. The series number is located on the inside of the CD cover on the bottom left. This code query will not appear the next time you start HYDRAS 3.

Fig. 4: Entering the licence code

Now the HYDRAS 3 main window opens:

Fig. 5: The HYDRAS 3 main window when first started
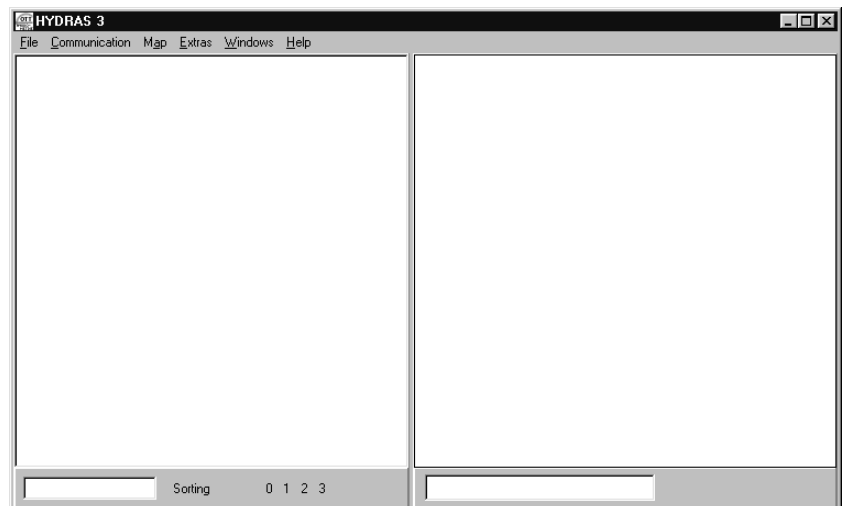
There are no entries in the HYDRAS 3 main window when the software is started for the first time. You must therefore first create a "workspace" in which the individual stations and sensors can be grouped at a later stage. A HYDRAS 3 workspace is defined as a directory in which the configurations for stations and sensors plus the associated measured value database are saved. Up to nine workspaces can be created: these are independent of each other. A workspace therefore represents a complete configuration so that it can be recognized by HYDRAS II.

The logical structure of HYDRAS 3 is divided into workspaces, regions, stations and sensors.

4.2 Creating a workspace

Now create a new workspace:
■ Select the menu: File | New workspace (or use the right mouse button to click on the left-hand side of the HYDRAS 3 main window and then select the function "Create workspace".)

The "Create workspace" window is opened:

Fig. 6: Creating a workspace
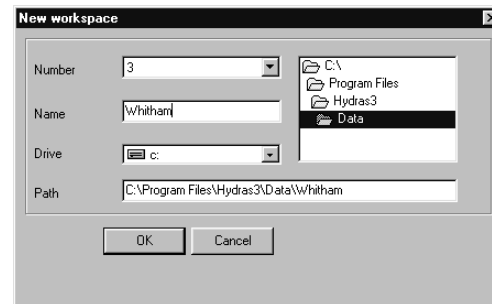
■ Select a number (1-9) for the workspace.
■ Enter your desired name for the workspace.
■ Choose a drive under which HYDRAS 3 should create a subdirectory for the workspace.
■ Enter the path including the subdirectory. The workspace and the subdirectory do not have to have the same name, although identical names make organizing them easier. Create a separate subdirectory for each workspace. If you are not using HYDRAS 3 in a network environment, we recommend that you use the path (standard installation) C:\Program Files\Hydras3\Data\… .
As this is a new workspace, HYDRAS 3 requests a confirmation for creating the configuration files.
■ Click OK.
HYDRAS 3 now creates new empty configuration files in the specified sub-directory. The tree display shows an entry for the workspace and the region "All stations".

Note: The "All stations" region contains every station in a workspace, regardless of its usual region classification.

4.3 The next steps

The following different procedures can be used, depending on your individual requirements:

▶ HYDRAS II users can now convert their existing databases.In this process, HYDRAS 3 automatically includes all stations and sensors in the application program.

▶ Download measured values from an OTT data logger using the Communication | Download data function and then transfer these to the measured value database via the Communication | Raw data. Using this information from the data loggers, HYDRAS 3 then automatically sets up the stations and the sensors. You can add more master data via the configuration window.

▶ Manually create new regions, stations and sensors via the configuration window.

▶ Set the operating parameters of a OTT data logger (configuration). In this case, it is usually advisable to create a new station in advance using the configuration window in case configuration takes place via modem.

5 Converting existing HYDRAS II databases

Naturally, you can continue to use your existing HYDRAS II configurations and measured data under HYDRAS 3.
HYDRAS 3 has a different database format and different configuration files for stations and sensors to HYDRAS II. An existing HYDRAS II configuration therefore needs to be converted.
This is done using the program "Convert.exe" located in the main directory of the HYDRAS 3 installation CD-ROM.

To convert a HYDRAS II configuration including database:
- Create an empty HYDRAS 3 workspace.
  (e. g. Menu: File | New workspace)
- Run the "Convert.exe" program on the CD-ROM.
- Under "Source", enter the data path for your HYDRAS II configuration.
- Under "Target", enter the path for the empty HYDRAS 3 workspace.
- Click on START Conversion.

Fig. 7: Converting existing HYDRAS II configurations and measured data for HYDRAS 3
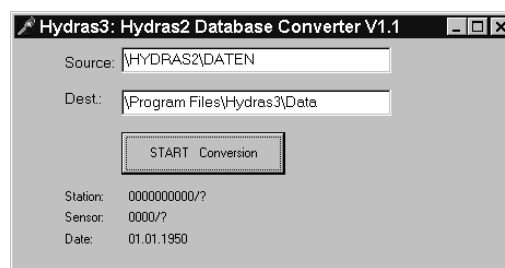
The "Convert.exe" program automatically converts and transfers the configuration files and measured data to the empty workspace. Conversion progress is recorded simultaneously under station, sensor and date.

Note on virtual sensors
If your HYDRAS II database includes virtual sensors which use the variable "YTIME" in the IF conditions, these must be adjusted manually. Under HYDRAS II, YTIME reports the time in full seconds, compared to 1/10 seconds under HYDRAS 3.

- For this reason, you should take factor 10 into account in the IF conditions which use "YTIME".

Note on "Convert.exe" program crashes
If the "Convert.exe" program ends unexpectedly during the conversion procedure, follow the steps below:

- Restart "Convert.exe".

During the second conversion process, the program generates the following message for each conversion step already completed: "The station/sensor is already present. Do you wish to continue?"

- For each message, click "No".

This allows you to skip all of the stations and sensors which have already been successfully converted, including the last station/sensor which is probably faulty.

6 The HYDRAS 3 main window

The starting point for operating the HYDRAS 3 is the main window. This window opens automatically as soon as the application software is started; it is divided into two sections. The left side of the window contains a tree display which is hierarchically organized into workspaces, regions, stations and sensors. The layout of this tree display is similar to Windows Explorer.

A map can be saved on the right-hand side of the screen for each workspace. This allows you to geographically display the selected stations and sensors (as a shape file or in bmp. file format). Alternatively, instead of maps, you can incorporate any diagrams you wish in bmp file format. HYDRAS 3 uses symbols to display the individual stations and sensors in the map.

Fig. 8: The HYDRAS 3 main window
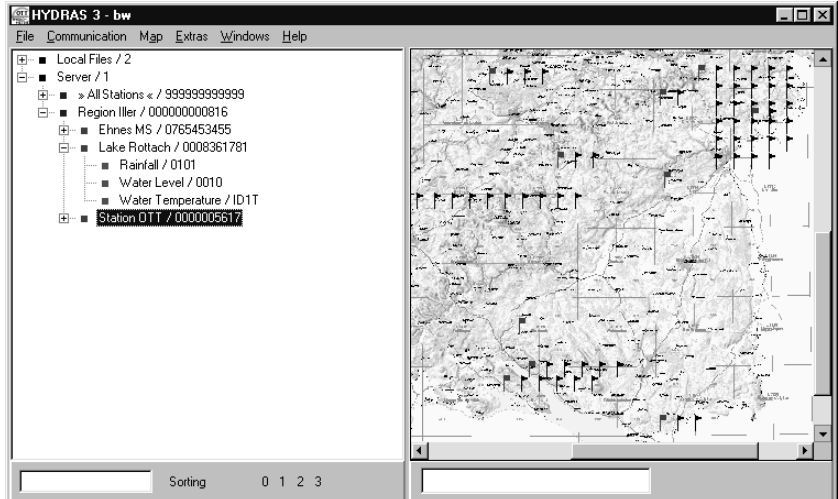
You can operate the HYDRAS 3 application program using either the menu bar at the top of the main window – or with the more convenient context menus (pop-up menus).

To open a context menu, click the right mouse button on an object, e.g. a sensor. HYDRAS 3 now displays a menu with all functions available for this object. Now select the desired function with the mouse.

Fig. 9: Context menu for the station selected in Fig. 8
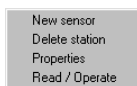
In the menu: File | Options | Colours tab, you can select the option "Display treenodes in colour". If this is selected, HYDRAS 3 allocates the following colours in the tree display:

– Workspaces   Black
– Regions   Blue
– Stations   Red
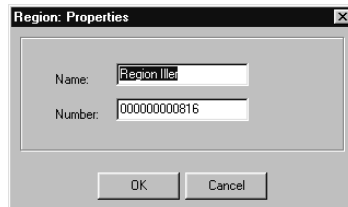– Sensors   Green.

7 Configuring regions, stations and sensors

All important information for the regions, stations and sensors are saved in the configuration windows of HYDRAS 3 (master data).

■ Use the right-hand mouse button to click on a region, station or sensor in the tree display and select "Configuration" in the context menu.
■ If the desired region (or station or sensor) has not yet been created, click with the right-hand mouse in the tree display on the workspace (region, station) and select the context menu "New (station, sensor) region".
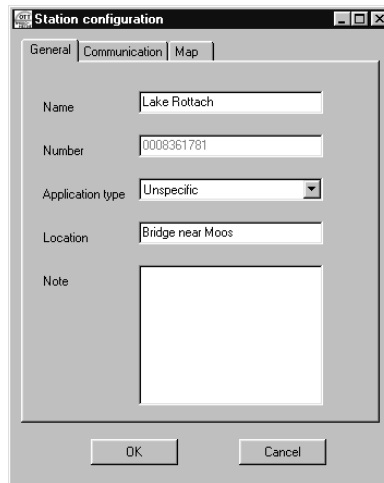
HYDRAS 3 displays the relevant configuration window:

Fig. 10: Region configuration window

Fig. 11: Station configuration window

Fig. 12: Sensor configuration window

The individual configuration windows are further subdivided into tabs. In the "Station configuration" window, the number of tabs displayed depends on the "Application type" setting and in the "Sensor configuration" window, the number depends on the "Application type" and "Virtual sensor" settings.
The tabs contain all configuration information which is logically related.
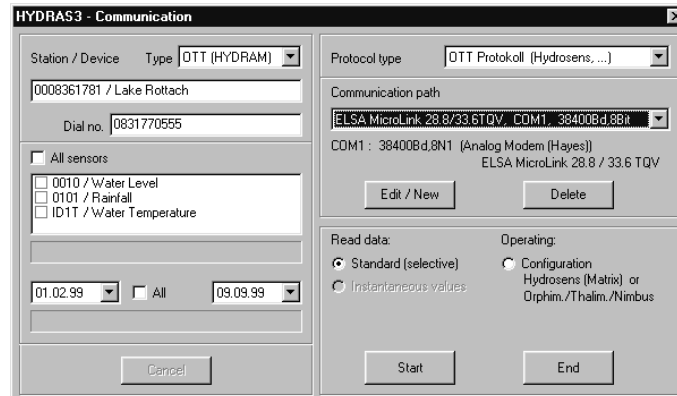
8 Communication

8.1 Downloading data/Operating the devices (configuration)

The core of HYDRAS 3 is its communication function. With the HYDRAS 3, you can operate an OTT device (configuration), download measured data from a data logger or transfer data from a multifunctional unit, the VOTA, for example.

To call up the communication function:

▨ Click with the right-hand mouse button in the tree display on a measuring station and select "Download data/Operate" in the context menu.
▨ If the desired station has not yet been created, select the function "Download data/Operate" in the communication menu.

Fig. 13: Communication

In theory, two means of communication are available:

▶ Download data
  – from an OTT data logger
  – from a VOTA multifunctional unit or PC (transfer data)

▶ Operation (configuration)
  – Orphimedes, Thalimedes, Nimbus data loggers
  – HYDROSENS devices with operating matrix

You must select an appropriate means of communication, depending on whether you wish to download data from a Thalimedes on-site or via modem. HYDRAS 3 automatically sets up the protocol type for data transfer.

Please note that all measurement data are in raw data format immediately following the function "download data". They must be accepted into the measured value database using the "Raw data transfer" function.

Fig. 14: Example of communication with an OTT data logger.

Configuring a Thalimedes
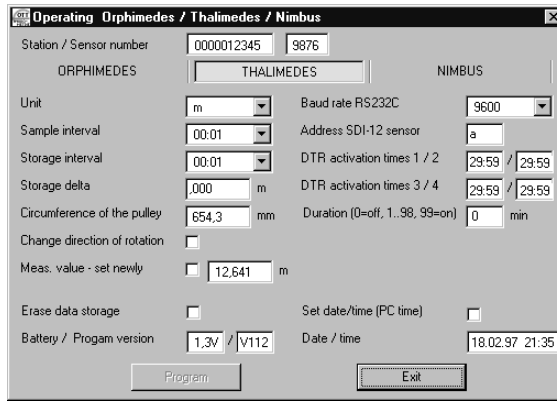
8.2 Raw data transfer

All measured data to be transferred from a measurement device to the HYDRAS 3 application software are initially in raw data format.

The function "Raw data transfer" in the communication menu converts these raw data into the specific HYDRAS 3 data format.

Fig. 15: Raw data transfer
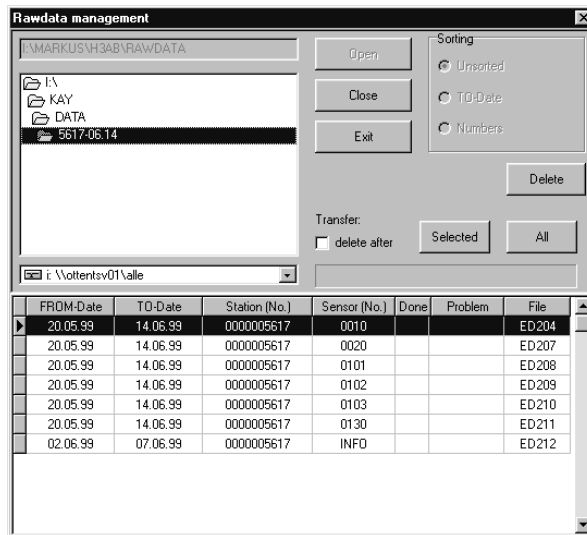
Once you have downloaded measured data to the application software via the "Download data" function, the raw data to be saved are located in the "RAWDATA" subdirectory of the selected workspace.

Please note that raw data transfer also depends on the settings in the configuration field "Sensor configuration", and the tab "Raw data".

9 Evaluating data

9.1 The HYDRAS 3 evaluate window

HYDRAS 3 can graphically display the measured values of a sensor by means of the function "Evaluate":

▪ Click the right-hand mouse button in the tab or in the tree display on a sensor and select "Evaluate" in the context menu.
   Alternatively, you can double-click on a sensor.

Fig. 16: Evaluate window

Several options are available in the evaluate window for more specific selection of the time range or the measured values displayed.
These allow you to highlight a single measured value or measured value range using two rulers within an evaluate window. If you select a range within the image while holding the mouse button pressed down, HYDRAS 3 provides a zoomed display of the range.

You can display a navigation bar in the evaluate window to guide you (Menu Extras | Navigation info). This navigation bar indicates the time range which applies to the measured values, plus the particular section of measured values currently displayed in the evaluate window.

From the evaluate window, it is possible to call up a numerical display and the graphical editor.
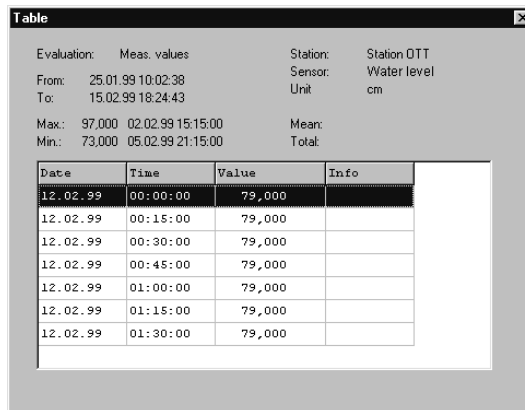
9.2 Numerical display of measured data

For accurate representation of several measured values, HYDRAS 3 offers a numerical display in the form of a table.

▣ First position a ruler in the HYDRAS 3 evaluate window on the measured value to be taken as the starting point for the numerical display.

▣ In the evaluate window, click on the "Table" function or click on the evaluate window using the right-hand mouse button and select "Table" in the context menu.

HYDRAS 3 displays an additional window showing a tabular display of the measured values:

Fig. 17: Numerical display of measured values

The window indicates the measured values surrounding the rulers. The highlighted table line corresponds exactly to the ruler position. You can move about the table using the cursor keys ↓↑ while HYDRAS 3 simultaneously moves the ruler in the evaluate window.
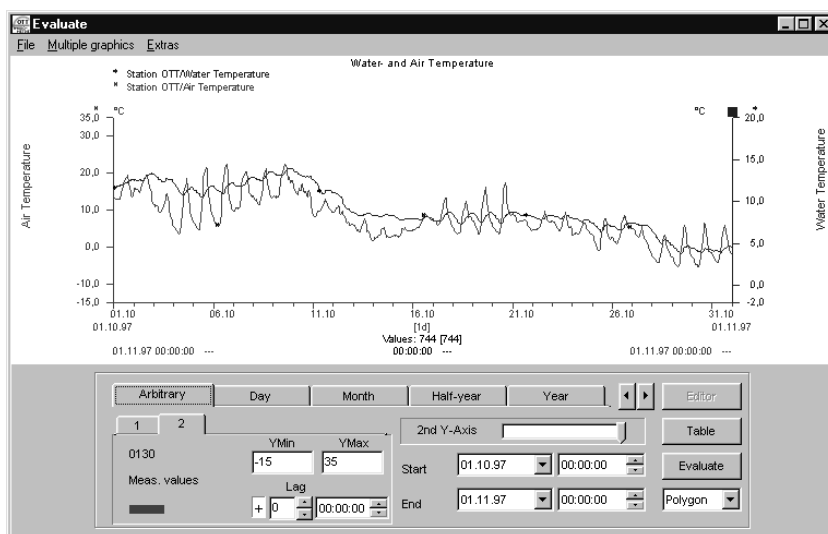
9.3 Multiple graphics

Hydras 3 allows you to display up to 6 overlapping measured value sequences within a single graph. This allows you to compare measured value sequences directly. One condition applies: sensors to be displayed in a multiple graphic must be related to the same workspace.

▪ First display the measured values for a sensor in the evaluate window (see chapter 9.1).

▪ Now move up to 5 other sensors into the evaluate window per drag & drop. (Mark the sensors in the tree display using the mouse and drag them onto the evaluate window holding the mouse button down.)
Alternatively, you can double-click on another sensor while the shift key is pressed.

HYDRAS 3 also displays the additional sensors in the evaluate window, although the operating field in the evaluate window is then changed:

Fig. 18: Multiple graphics

If necessary, you can store the particular multiple graphics configuration so that the desired measured value sequences are automatically displayed the next time the graphic is selected (Menu Extras I Multiple Graphics). This allows easy access to an already existing multiple graphic even immediately after downloading new measured values.
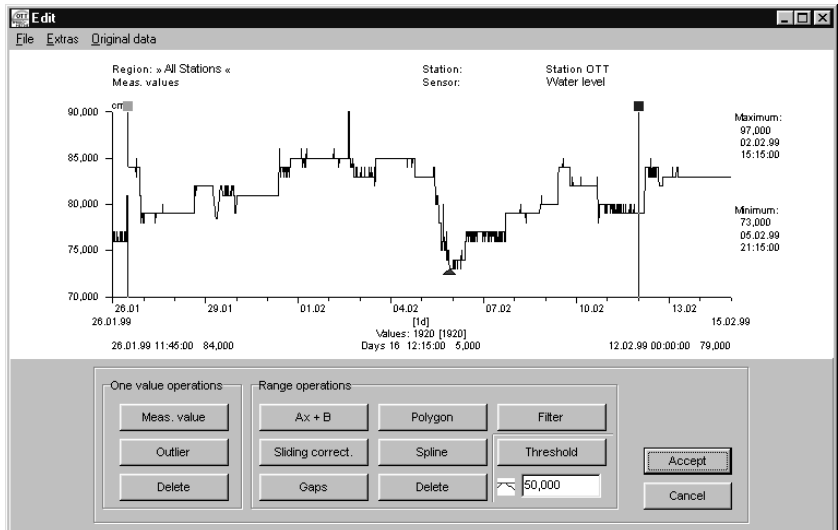
9.4 Graphical editor

The HYDRAS 3 includes a high-performance editor for post-editing operations.

▢ In the evaluate window, click on the "Editor" function or click on the evaluate window using the right-hand mouse button and select "Editor" in the context menu.
HYDRAS 3 displays the "Edit" window:

Fig. 19: Graphical editor

One value operations

The one value operations "Meas. value", "Outlier" and "Erase" only affect a single measured value. The "Meas. value" operation changes an existing measured value, while the "Outlier" operation calculates the arithmetic mean using two adjacent values. "Erase" is only possible for the non-periodic measured values which are present; otherwise this operation would result in data gaps.

Range operations

– Scaling and Translation (Ax+B)
This operation scales a range of measured values using a factor "A" and/or adjusts the range by an offset "B"

– Sliding correction
This operation is used to correct measured values which are subject to linear drift error.

– Gaps
This function fills all gaps within a range by generating an arithmetic mean value from two adjacent values (missing/invalid values).

– Polygon
This operation can be used to create new measured values for an entire range: individual values are specified by control points which are linearly interpolated by HYDRAS 3.

– Spline
This operation can be used to create new measured values for an entire range: individual values are specified by control points which are linearly interpolated by HYDRAS 3 using cubic splines.

– Filter
This operation can be used to select a particular area of the data using a filter. A filter consists either of a number (2 to 7) of freely-definable filter coefficients or of an arithmetic mean or median filter with adjustable length.

– Threshold
With the threshold function, you can adjust values which either exceed or fall below a specified threshold value in relation to their adjacent values by means of linear interpolation. This is a simple way of eliminating invalid values.

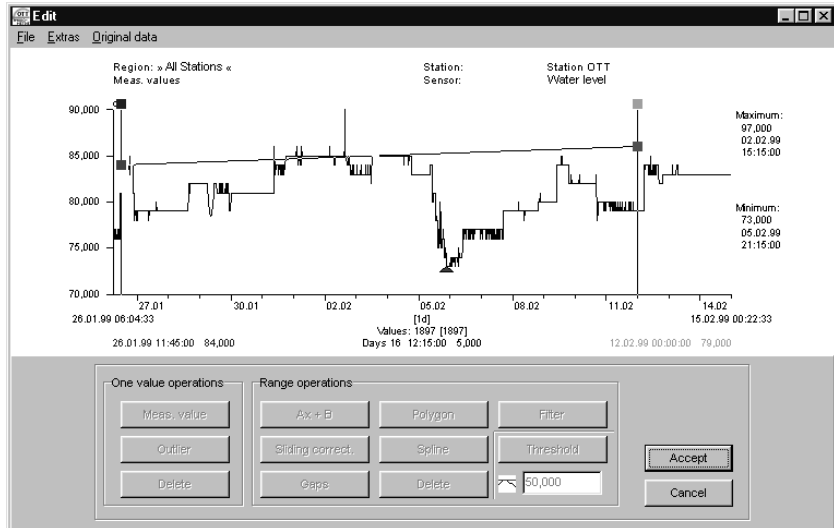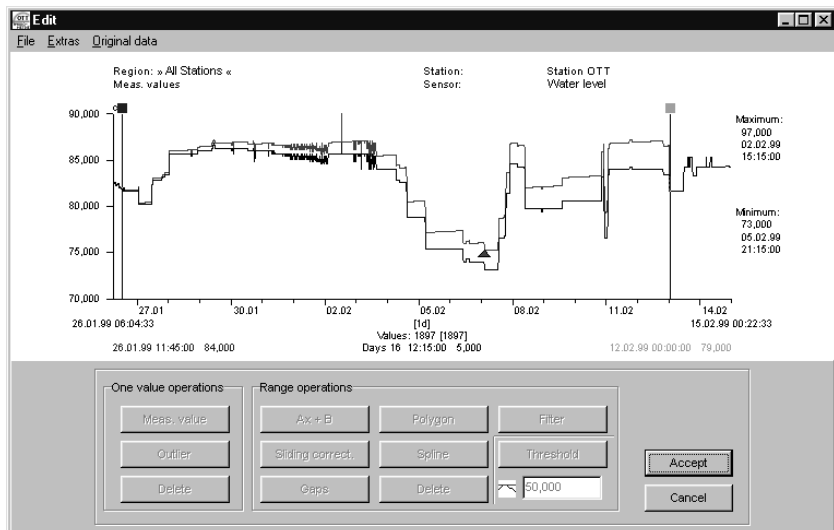Fig. 20: Editing: example of "Sliding correction"

Fig. 21: Editing: example of "Sliding correction"

Result of sliding correction: When the function "Show Original Data" is selected, the window displays the graphs before and after editing

HYDRAS 3 executes all graphical editor operations on a copy of the measured value sequences. Calling up the editor can therefore take a little longer, depending on the measured values to be copied. Once you have exited the editor, HYDRAS 3 includes the changes made in the graphical editor in the original data. However, it is still possible to call up the original measured values at any stage using the functions "Original Data | Show" and "Original Data | Restore".
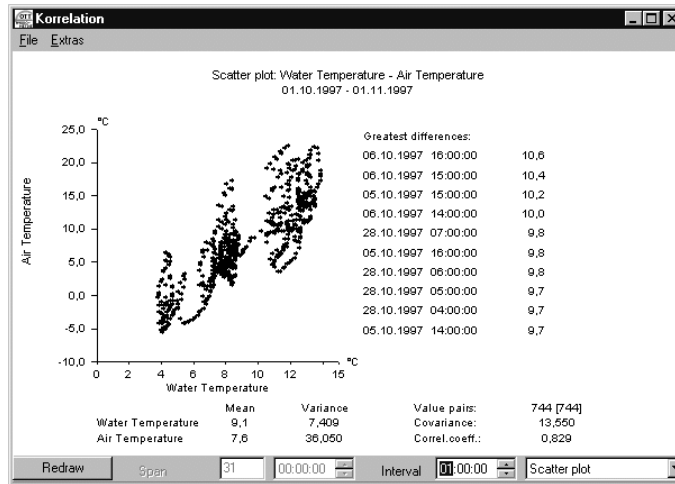
9.5 Correlation analysis

With HYDRAS 3, it is possible to check the correlation of two separate sensors by means of the functions "Cross correlation" and "Scatter plot". HYDRAS 3 can also display autocorrelograms.

(A correlation analysis is a mathematical procedure used to examine the correspondence between two (or more) random sizes; in the case of HYDRAS 3 application software, two measured value sequences are analysed).

It is only possible to perform a correlation analysis if a multiple graphic already exists.

■ In the "Multiple graphics" window, select the menu item Extras | Correlation. HYDRAS 3 calculates the correlation and then displays the "Correlation" window with a scatter plot:

Fig. 22: Correlation analysis – Example of a scatter plot

If required, you can now select the type of display from a selection list (in the bottom right-hand corner of the correlation window).

Fig. 23: Correlation analysis – Example of a crosscorrelogram
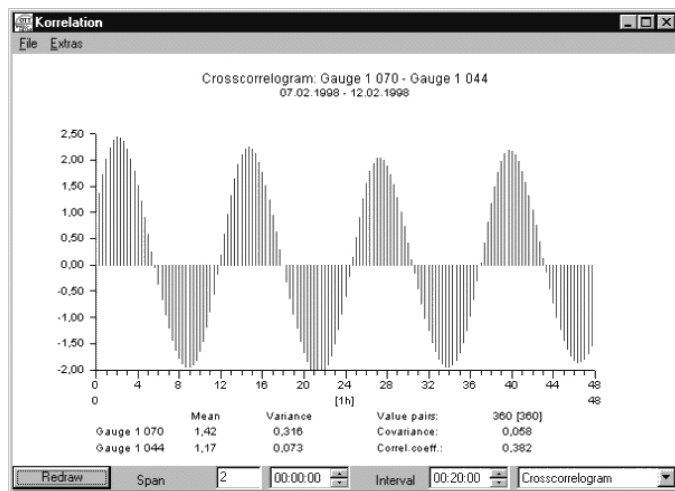
9.6 Isoline display

The creation of isolines is another HYDRAS 3 tool for representing measured values graphically. Unlike the other HYDRAS 3 graphical tools, which display the measured value sequences for one or more sensors over a period of time, the isoline display allows you to graphically evaluate several sensors at the same time, together with their geographical location.

(Isolines = Lines on geographical or other maps linking points with the same rating or appearance as each other, e. g. locations with the same level of ground water)

■ Start the creation of isolines in the menu Extras | Isolines.
   HYDRAS 3 displays the empty "isoline" window

Fig. 24: Example of an isoline display
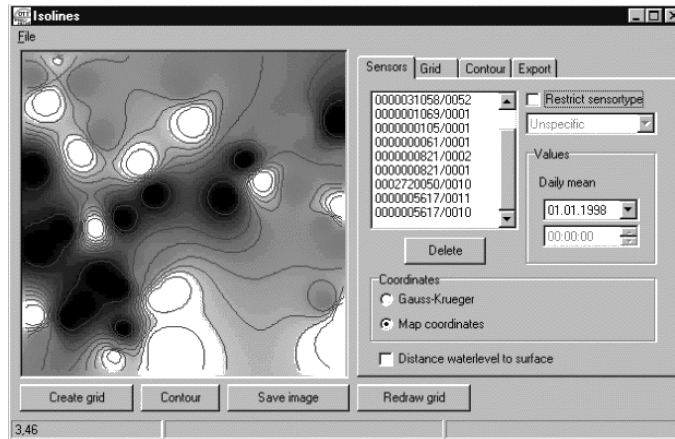
Refer to the online help of HYDRAS 3 (context-sensitive selection via function key "F1") for a step-by-step introduction to creating isolines.