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TABLE OF CONTENTS

1.INTRODUCTION
2.MAIN FEATURES
3.MINIMUM HARDWARE REQUIREMENTS
4.SPECIFICATIONS
5.(Z-NET) CONFIGURATION
6.RECORDING (DATA RECORDER)
7.VIEWING AND STORAGE (TREND VIEWER)
8.LICENSING

1. INTRODUCTION



Data Recorder is an open, scalable and economical software recorder based on PC Windows, ideal for test sessions, laboratories, test rooms, process measurement monitoring.
The physical data acquisition takes place via distributed I/O modules of the Seneca Z-PC Series (with or without CPU) or via any standard Modbus RTU slave device.
The communication between hardware and PC can be serial (RS232/RS485/ModBUS RTU) or Ethernet/Modbus TCP, on wired or wireless physical medium (using Z-Link for the serial connection and a WiFi network for Ethernet connections).
Licensing is managed with a USB key and covers a display range from 2 to 1000 channels, be they analogue, digital, impulsive or calculated. The normalized graphic representation can be set with pens or displays (digits). The real-time display offers multiple selection possibilities: groups of channels, representation interval, scrolling direction on the screen. Consultation of the historical log (data and alarms) is also guaranteed using the Trend Viewer application.
The basic package includes alarm management, the creation of channels calculated through mathematical functions (algebraic, linear, trigonometric and boolean operations) and the management of automatic reports.

An optional **Plus** package is available which extends the ability to have multiple simultaneous recording sessions on the same PC.

2. MAIN FEATURES

CONFIGURATION AND ACQUISITION

- Creation of projects and sub-projects.
- Import of multiple Z-NET4 projects within the same Data Recorder project.
- Import of channels from Z-NET4 projects
- Channel multi-point calibration;
- Creation of calculated channels from imported channels;
- Configuration of display pages;
- Customization of pages with different displayed channel groups (DR)
- Selection of channel groups divided among the configured pages
- Password protection of the project configuration
- Data acquisition from 2 to 1000 channels (minimum sampling period 1 second).

RECORDING

- Recording of the channel values in .sqlite database
- Programmed start of recordings (scheduling);
- Independent multi-client recording sessions.
- Start / stop recording commands (manual or automatic from digital input);

VIEWING AND EXPORTING DATA

- view the instantaneous values of the groups of channels through displays divided into different pages(DR)
- view through charts the instantaneous values of the groups of channels associated with the different pages
- view in real time the alarms defined on the channels
- view and record alarm events.
- viewing in graphic or display mode;
- real time viewing of measurement values and alarms defined on the channels
- automatic report generation

3. MINIMUM HARDWARE REQUIREMENTS

O.S. Windows 8 or later

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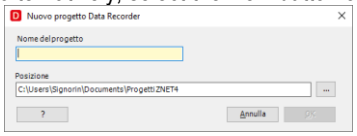
4. SPECIFICATIONS

Item	Description
Max No. of devices connected at the same time	ModBUS TCP: max 15 ModBUS RTU: 40 Seneca I/O modules, 32 third parties' (without RS485 repeaters)
Max number of simultaneously recordable I/O systems	Dependent on the application
Max number of recordable channels	Dependent on the application
Minimum sampling period	1 s
Recording period	Minimum 1 second Maximum 30 minutes (With 1000 channels minimum recording time 10 s)
Max No. of displays per page	48
Max number of pens per chart	8
Maximum number of alarms that can be associated with each channel	Four thresholds (high high alarm, high alarm, low alarm, low low alarm) displayed and stored on database A write alarm threshold on an output channel
Manual recording	Start and stop button
Automatic recording	At fixed times and days Continuous and periodic with settable start time and duration Start and stop on digital input status
Writings	Max 20 channels
Calibration	Possibility to carry out various calibrations of different groups of channels associated with TC or PT-100 through linear interpolation. Each calibration can be performed on a minimum of one point up to a maximum of five points per channel
Languages	Italian and English

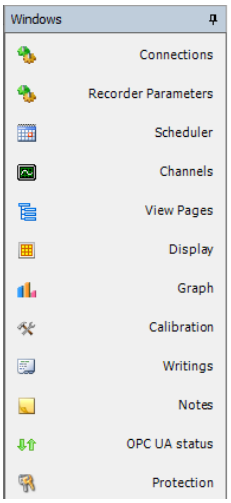
5. CONFIGURATION IN 3 STEPS

5.1 New Project

To create a new project, you can select the New item from the File menu or, alternatively, select the New button on the toolbar.

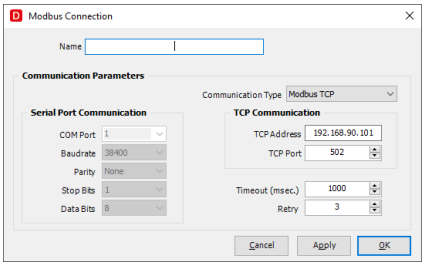


After entering the project name, the following menu appears on the left, summarizing the management and control options for the project.

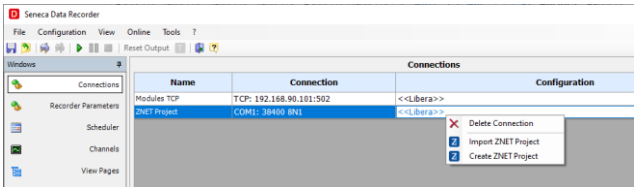


5.2 New Connection

The first step is setting the communication parameters. The software can manage Modbus RTU and Modbus TCP serial connections at the same time.
Selecting **Connections** from the options listed on the left, the window in which the connections will be listed opens in the centre. By clicking on the Add Connection button, a window appears in which it is possible to type the name of the connection and define the serial or TCP communication parameters. Multiple connections can be created within a project.



Configuration with Z-NET4
After creating a new connection, you can associate an existing Z-NET4 project with it or create a new one.



With the right mouse button, clicking on the connection you want to associate with the Z-NET4 project, the import and creation options will appear.
The advantage of having a connection to a Z-NET4 project consists in streamlining the creation of the channels, using the import tool.

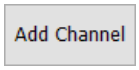
5.3 Channel configuration (I/O, variables, tags, name, description, scale start/full scale)

After creating the connections, proceed to add the channels that will be subject to the software recordings.

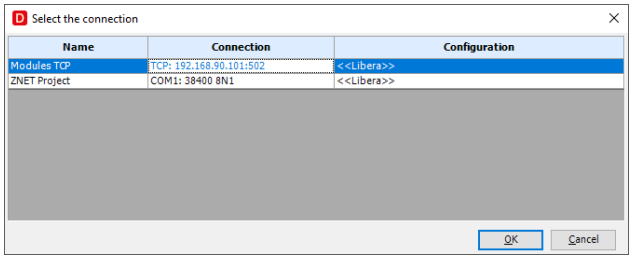
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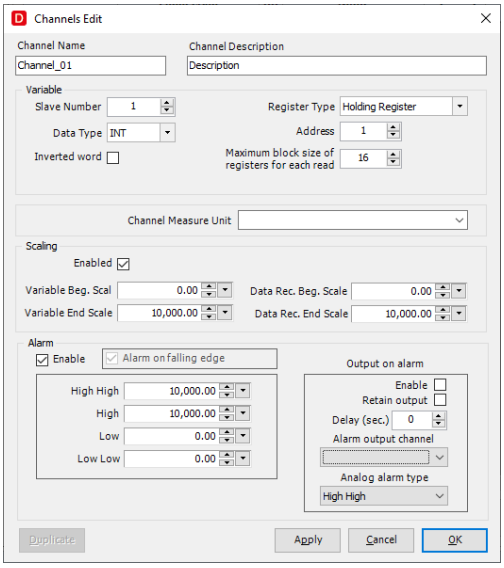
Selecting Channels from the options listed on the left, the dedicated window opens in the centre.
To add a channel, select the “Add Channel” button located at the bottom of the window.



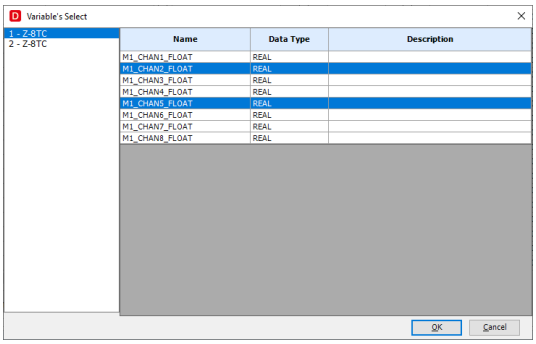
The following window appears in which it is necessary to select the reference connection where the channel will be acquired.



If the connection is not associated with any Z-NET4 project, in the window that appears later it will be possible to parametrize the acquired channel according to the characteristics of the process being recorded.

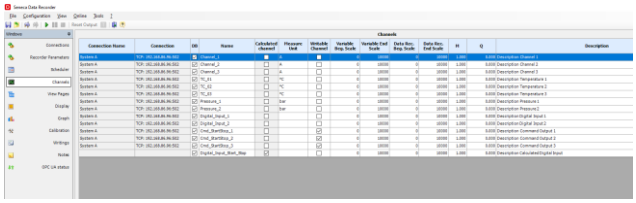


If the connection is associated with a Z-NET4 project, the window that appears later allows the user to identify the associated device and select the channel to be included in the project.



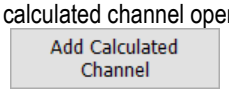
Channels page

The Channels page visually summarizes all configuration information. For each channel from left to right there is the "IP address or COM port" relating to the project from which the channel was imported, the tick "Save to database" enabled by default the "Name" assigned to the variable, which is the name that is then used within the software for that channel, the tick "Calculated channel", which cannot be changed, indicating whether the channel comes from a direct reading or if it is a channel created from a combination of other channels; the "unit of measurement", the "Start of Data Rec Scale.", the Data Rec. Full Scale " If set, the "M" and "Q" calculated during any channel calibration on the "Calibration page and any "Description" of the channel. Channel changes can only be made with the system disconnected (by clicking on the appropriate button in the global commands in the second line of the software or by using the appropriate buttons in the "Online" submenu in the global commands in the first line of the software.
It is possible to disable the saving on the database of the values of that channel in case of recording, select the unit of measurement to be assigned to the channel as well as set the start / end of the recording and description.
It is also possible to select whether the variable is available also for writing. If so, it will appear in the Writings window.

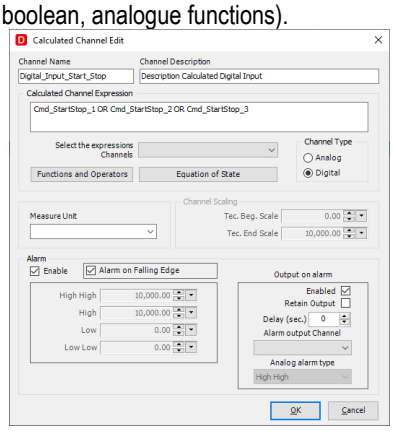


5.4 Mathematical functions

In addition to the physical channels, in which it is already possible to insert a different scaling for each, the software allows you to create calculated channels.
By clicking on the relative button, the window that enables the customization of the calculated channel opens.



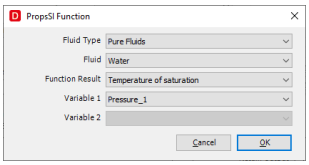
Through this tool it is possible to combine the channels acquired from the field exploiting the mathematical operators available (arithmetic, boolean, analogue functions).



The calculated channels can be parametrized like the physically acquired channels (recording enabling, scaling and events on threshold).

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In addition, advanced functions dedicated to the calculation of the properties of fluids are available.
A calculated channel must be considered as an acquisition channel for the purposes of sizing the license.

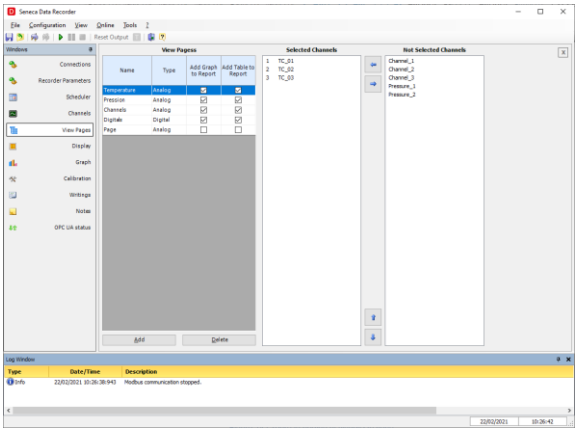
5.5 Setting the alarms

For each analogue channel it is also possible to enable a set of threshold alarms (high high alarm, high alarm, low alarm and low low alarm) which are then displayed in real-time in the display of the instantaneous values in the various display pages that can be generated. If you choose to enable alarms on a channel, you can also write one of the four alarms on an output channel chosen by the user. Each output channel on which an alarm writing is enabled must be considered as an acquisition channel for the purposes of sizing the license.

6. DATA RECORDER

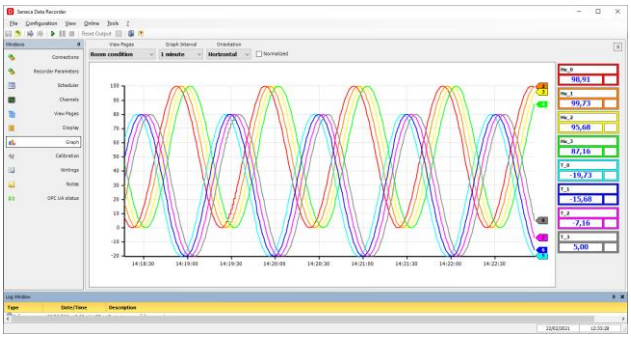
6.1 Setting the display pages

The real-time display offers multiple selection possibilities: groups of channels, representation interval, scrolling direction on the screen. The consultation of the historical archive (data and alarms) is guaranteed with the appropriate viewing tool (Trend Viewer software).

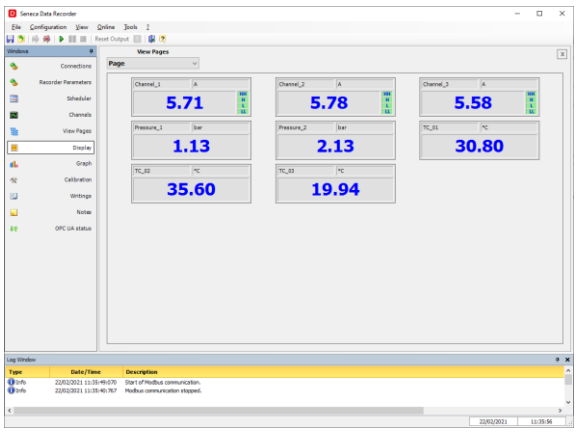


6.2 Viewing in graphic or display mode

In **graphic (pen)** mode, each display page corresponds to a real-time time chart containing a maximum of eight contemporary pens that can be customized in colours, with a time axis that can be set from a minimum of thirty seconds up to a maximum of twenty-four hours.



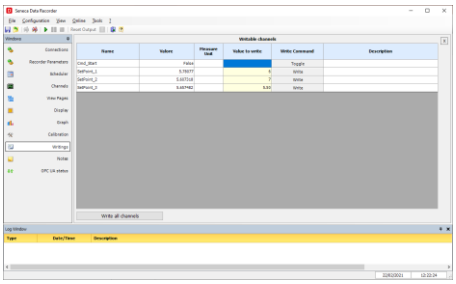
In **display** mode it is possible to create various display pages containing groups of different channels which show the instantaneous values acquired by the system in the form of a display. In addition to the name and the instantaneous value of the acquired channel, each display on each page also shows the status of any alarms set.



For both pages (Display and Chart), by double clicking anywhere in the box relating to a channel, a small pop-up opens in which it is possible to change the decimal digits displayed (from 1 to 5) and the associated pen colour. Changing the number of decimals has no effect on recording the value in the database, but only affects the display of the instantaneous value in the "Display" and "Chart" pages.

6.3 Writings page

An interface is available that allows you to write some variables, both analogue and digital, previously selected in the channel configuration page.



From this interface it is possible to set the analogue value or the status change and choose whether to send the writing individually (using the Write key for the analogue and the Toggle key for the digital), or whether to write all the set parameters.

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6.4 Automatic report generation

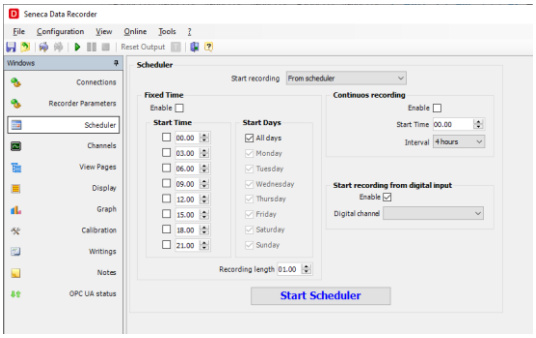
At the end of each recording, the software can be configured to generate automatic reports of all the project display pages or only some which may include charts, tables of values and tables of recorded alarms.
The print report can be customized inserting an image.

6.5 Recording scheduling

Recordings can be manually controlled by the user through the Start, Stop and Pause buttons.
Furthermore, automatic management is available in three different ways:

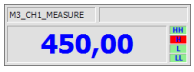
- recording at fixed times and days of the week;
- continuous recording;
- recording with start from a digital input.

Timed recording allows you to set up to eight daily recording starts for all days of the week or choosing the recording days with the recording duration which also determines the size of the databases created; continuous recording allows you to choose the recording start time and the size in which to break the various registered databases to avoid generating excessively heavy databases; finally, recording from digital input allows you to set a digital channel that controls the recording start and stop.



6.6 Alarm display

If enabled in the channel configuration, in the “Display” page the high high (HH), high (H), low (L) and low low (LL) alarms appear in green if not active and in red if active.

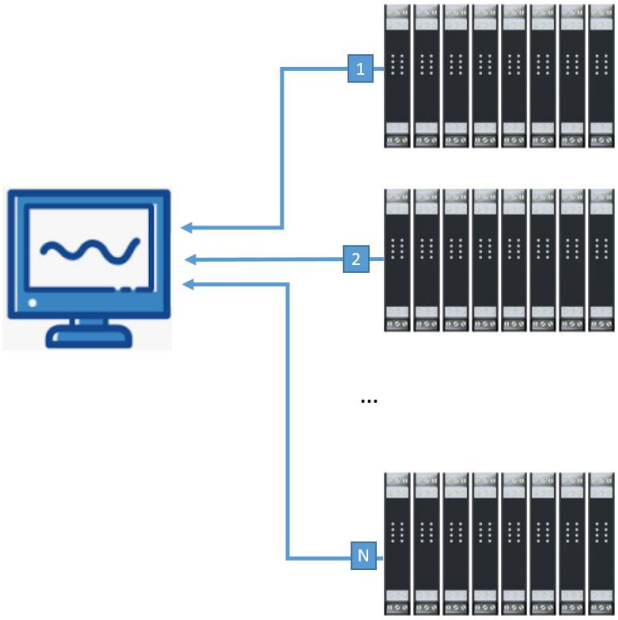


6.7 Calibration

Where it is necessary to proceed with the calibration of the tools, the software allows the calibration of one or groups of channels (for example measurements from TC and/or PT-100) using a linear interpolation calculated on a variable number of points, between one and five, chosen by the user with the aim of eliminating any possible errors.
Calibrations are shared between sub-projects belonging to the same project and, in addition, can be saved, imported and exported between different projects.

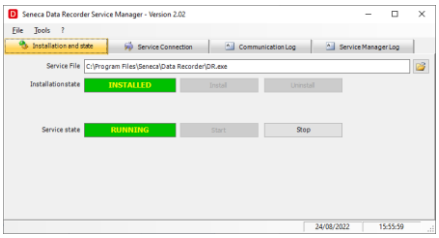
6.8 PLUS Option - Independent recording sessions

Option that allows you to start multiple independent Data Recorder requests on the same PC. This option allows you to control several specific measurement sessions for each use case from a single workstation.

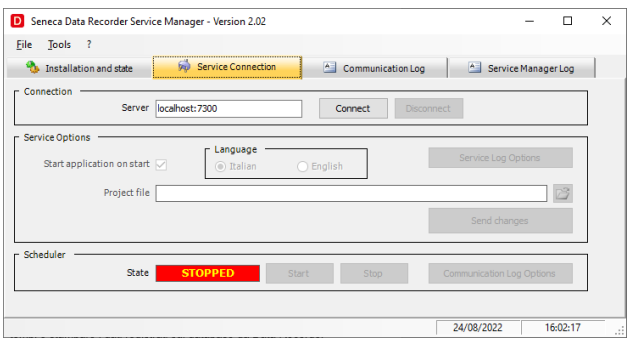


7. DATA RECORDER SERVICE MANAGER

The Data Recorder Service Manager enables the installation and activation of the Data Recorder as a service, and it monitors its operating status.
With this option, the Data Recorder can be started in the background when the PC is turned on.



The user interface also allows you to configure, control and interact with the project that you want to manage as a service, thanks to activation and deactivation of automated functions defined in "scheduler" page.



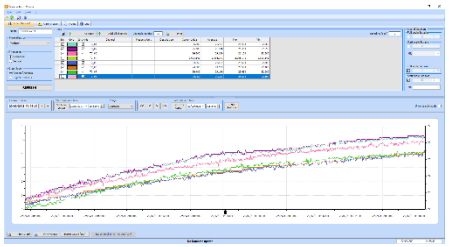
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8. TREND VIEWER - VIEWING AND STORAGE

Using the Trend Viewer software, you can view charts of current sessions and completed sessions, filtering by channel and selecting time intervals.
It is also possible to print the data recorded on the Data Recorder created database, both in graphic and table form, and exporting in .csv format is available.

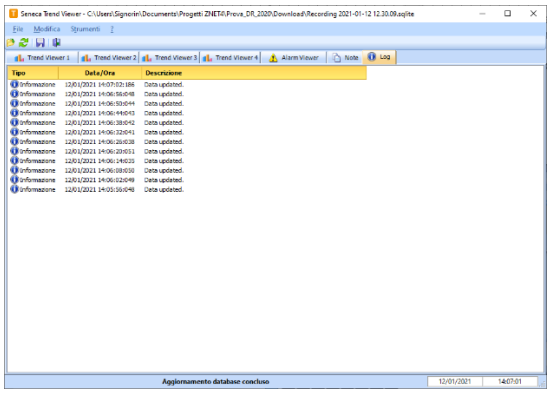
7.1 Trend viewing



Trend Viewer is the software that complements Data Recorder and allows you to consult the databases with the recorded data and display them in charts that can be customized in colours, filtering the data by channel and by time intervals.
You can add more trend display tabs, customizing and saving the generated configuration. The section relating to the Alarms displays any events that occurred during the recording, while the Notes section displays the notes entered by an operator during the recording session.

7.2 Event / Alarm Log

The log window shows all the events recorded by the software during execution. In particular, four groups of events are displayed: error messages, information (result of operations performed), data (messages sent by modules), trace (additional more specific information).



7.3 Printing and exporting in Excel (csv format)

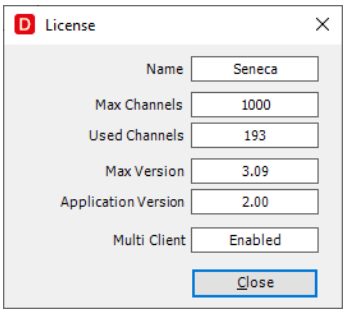
Once the databases have been recorded, using the Trend Viewer software, it is possible to view in graphs, filter by channels and times and print the data recorded on the database by Data Recorder both in graphical and tabular CSV format.
In order to facilitate the creation of complex reports, an option allows the export the displayed data to an excel file (template).

7.4 SQLite database

Each recording session generates a database in which the instantaneous value taken by the variable at the time of sampling, maximum, minimum and average values calculated in the time interval elapsed is written for each sample.
The sampling time can be set and can vary from a minimum of one second to a maximum of half an hour. For each recording, it is possible to insert descriptive notes which are also shown on a column of the relevant database.

9. LICENSING

The licensing (USB dongle or software key) covers a display range from 2 to 1000 channels, whether analogue, digital, impulsive or calculated, alarms or digital outputs.
You can check your license by selecting License from the Tools menu.



The following features are included in the basic package:

- alarm management (with activation of digital outputs);
- automatic report management;
- mathematical package with algebraic, linear, trigonometric, boolean functions for the creation of calculated channels, calculation of averages,
- advanced calculation functions (integral) and calculation of fluid properties (equations of state).

Acquiring the **Plus** license you can use the multi-client functionality to deal with multiple software requests simultaneously on the same PC.

Code	Description	
DR-	Data Recorder, data acquisition and viewing software for Modbus I/O modules (writings, alarms, mathematics, reports)	
	02	2-channel management (free)
	04	4-channel management
	08	8-channel management
	16	16-channel management
	32	32-channel management
	64	64-channel management
	UN	Management of unlimited channels (1000)
	-PLUS	Multi-client PLUS package
	-UPGRADE	Data Recorder license upgrade service

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