DATA RECORDER
MODBUS DATA ACQUISITION AND RECORDING SOFTWARE

www.seneca.it

100% Made & Designed in Italy
Data Recorder is an open, scalable and inexpensive Windows PC-based software recorder, ideal for professionals, maintenance engineers, students, researchers, designers and technical department managers working in the test, measurement and simulation sessions, in test benches, in electronics laboratories and for teaching, in test rooms, climatic chambers, engine rooms, industrial ovens, environmental measures, energy and plant monitoring.

Physical data acquisition takes place through distributed I/O modules of the SENECA Z-PC Series (with or without CPU), and in general from 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.

The normalized graphic representation can be set with nibs or display (digits). The real-time display offers multiple selection options: channel groups, representation range, on-screen scrolling direction. It is also guaranteed the consultation of the historical archive (data and alarms) with a specific display software tool (Trend Viewer).

The export and exchange of data as well as in .csv format (manageable with Microsoft Excel) can take place with standard SQLite and OPC Server technologies suitable for integration with Scada, management systems, automation devices, databases and Cloud platforms.

Data Recorder also provides advanced alarm management functions (with intervention on digital outputs), report management (with trigger events) and mathematical processing with algebraic, linear, trigonometric functions, boolean (digital channels), average calculation, compensation and deviations on measures.
### BENEFITS

- Plug & Play solution for data acquisition and real-time measurement
- DAQ system realization in 3 steps
- Data storage and export in standard format
- Full use of PC computing power - Use without specialist training
- Environment suitable for both industrial and educational laboratories
- Flexible and multi-format historical data and trend display
- Alarm management functions, reports and integrated mathematical processing

### TOOLS / OPTIONS

<table>
<thead>
<tr>
<th>Hardware requirements</th>
<th>Data acquisition and measurements via system SENECA Remote I/O Z-PC-series</th>
<th>Windows &amp; OPC tested &amp; supported</th>
<th>Ready to use portable measuring kits</th>
</tr>
</thead>
<tbody>
<tr>
<td>O.S. Windows 8 or later</td>
<td>ModBUS TCP: depending on the application</td>
<td>Windows &amp; OPC tested &amp; supported</td>
<td>Ready to use portable measuring kits</td>
</tr>
<tr>
<td>RAM 128 MB</td>
<td>ModBUS RTU: More than 40 with SENECA I/O modules Z-PC Series</td>
<td></td>
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<tr>
<td>HD 3G</td>
<td>Third party ModBUS devices: Up to 32 before amplifying the RS485 signal</td>
<td></td>
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<tr>
<td>SVGA 800x600</td>
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</tbody>
</table>

### TECHNICAL DATA

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Value</th>
</tr>
</thead>
</table>
| Max. Nr. of devices connected simultaneously | ModBUS TCP: depending on the application  
ModBUS RTU: More than 40 with SENECA I/O modules Z-PC Series  
Third party ModBUS devices: Up to 32 before amplifying the RS485 signal |
| Max. Nr. of simultaneously recordable I/O systems | Depending on the application |
| Max. Nr. of recordable channels | From a minimum of two channels to unlimited channels depending on license size |
| Data logging sampling time | From a minimum of 1s to a maximum of 24h |
| Max. Nr. of manageable display pages simultaneously | 64 |
| Max. Nr. display per page | 48 |
| Max. Nr. of pens per chart | 8 |
| Max. Nr. of alarms associated to each channel | 4 thresholds (high alarm, high alarm, low alarm, low alarm) in display and storage on database  
1 writing alarm threshold on an output channel |
| Manual Recording | Start and stop button |
| Automatic Recording | Three different scheduling methods:  
At fixed times and days  
Continuous and periodic with settable departure time and duration  
Start and stop on digital input status  
Recording option also with PC in stand-by mode |
| Dat export | CSV, OPC SERVER UA/DA, SQLITE (database format) |
| Math functions | Arithmetic operators (+, -, *, /, ^)  
Boolean operators (AND, OR, XOR, NOT)  
 Analog functions (Sin(), Cos(), Tan(), Sqrt(), exp(), ln(), log(), int(), sgn()) |
| Calibration | On different groups of channels associated with thermocouples or thermoresistances by linear interpolation  
From 1 to 5 points per channel |
| Interface language | Italian, English |
BASIC FUNCTIONS

CHANNEL MANAGEMENT
From Z-NET4 environment are edited display pages containing groups of channels that show the instantaneous values acquired from the system.

REAL-TIME VISUALIZATION
At each display page corresponds to a time chart real-time containing a maximum of eight contemporary pens or customizable displays, with time axis settable.

DATA STORAGE AND EXPORT
Each registration generates a database where for each sample is written the instantaneous, maximum, minimum value and medium. Data storage and export is available in csv, opc server formats UA/DA, Sqlite.

ADVANCED FUNCTIONS

RECORDING SCHEDULING
Flexible scheduling allows the manual recording mode or the automatic recording up to 8 hours prefixed, continuous and with start from digital input.

ALARM FUNCTIONS
For each analog channel you can enable a set of threshold alarms (high alarm, high alarm, alarm low and low alarm) displayed in real-time with the possibility of activate an output channel.

TEMPERATURE SENSORS CALIBRATION
Possibility to perform calibrations of different groups of channels associated with TC or RTD by linear interpolation from a minimum of one point to a maximum of five points per channel.

LICENSING
Licensing is managed with USB key and covers a display range from 2 to unlimited channels, be they analog, digital, impulsive or calculated. In the Package PLUS you can find the multi-client functionality.

HISTORICAL DATA VISUALIZATION
The integrated tool “Trend Viewer” allows to display graphs, filter, process and print the data recorded on the database both in graphic format and tabular.

DATA STORAGE AND EXPORT
It is guaranteed the acquisition of measures from MODBUS RTU and TCP devices, in particular through distributed I/O modules SENECA Z-PC Series, with interfaces serial, Ethernet and wireless.

MATH FUNCTIONS
In addition to the physical channels you can create of channels calculated from combination of imported channels and mathematical operators, with insertion of a possible scaling for each channel.

REPORTS
Automatic reports generation at the end of each registration with pages of project visualization that may include graphs, charts, tables of values and tables of recorded alarms.

MULTICLIENT OPTIONAL PACKAGE
The PLUS package - Multi-Client allows you to manage multiple independent sessions and simultaneous measurement (and recording) on the same PC where they come created and managed separate databases.
START-UP STEPS

1. CONFIGURATION

- Hardware configuration and general settings
- Communication parameters configuration
- Channel configuration (I/O, variables, tags, name, description, start/bottom scale)
- Configuration of each channel by range, description, tag
- Algebraic, linear mathematical functions, trigonometric, boolean, mean values, compensations, deviances on the measures
- Processing channels calculated in real time with formulas and combinations of acquired variables
- Alarm setting for single channel (L, LL, H, HH)
- Online test configuration

2. RECORDING

- Data acquisition from 2 to unlimited channels (period of minimum sampling 1 second)
- MIN, MAX and AVG recording for each channel in the sampling period
- Simultaneous acquisition of channels from different ModBUS RTU/TCP nodes
- Setting the display pages
- Real-time measured value display
- Display in nib or display mode
- Alarm display
- Start / stop / pause recording commands
- Scroll selection, range, channel groups
- Automatic report generation
- Scheduling of recordings
- Thermocouple calibration
- Independent multi-client recording sessions

3. VISUALIZATION AND ARCHIVING

- Historical archive consultation (data logs, events and alarms) with special display tool
- Configurable display of the current database of recording even from PCs other than acquisition.
- Independent display for groups of different signals
- Display, filtering (on channels and times) and printing of the historical data recorded via Data Recorder
- Historical data storage and access
- Statistical processing
- Print and convert data into graphical, tabular formats, csv and Excel compatible
- SQLite database management
DATA RECORDER

APPLICATION SCHEMES

MONITORING WATER QUALITY PARAMETERS

TESTS, TRIALS AND DATA ACQUISITION FOR ELECTRIC MOTORS

TEMPERATURE AND HUMIDITY MONITORING

CLIMATIC CHAMBERS MONITORING

LEAKAGE TESTS IN TESTING ROOM

POWER CONSUMPTION MONITORING AND REPORTING

POLYMER PRODUCTION OVENS MONITORING

TEMPERATURE AND PRESSURE TESTS FOR INSULATING MATERIALS

Remote I/O modules SENECA Z-PC Series

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<thead>
<tr>
<th>Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>Z-10-D-IN</td>
<td>10-Ch digital inputs / RS485 - ModBUS RTU module</td>
</tr>
<tr>
<td>Z-10-D-OUT</td>
<td>10-Ch digital outputs / RS485 - ModBUS RTU module</td>
</tr>
<tr>
<td>Z-4DI</td>
<td>4-Ch analog inputs / RS485 - ModBUS RTU module</td>
</tr>
<tr>
<td>Z-4TA</td>
<td>4-Ch thermocouple inputs / RS485 - ModBUS RTU module</td>
</tr>
<tr>
<td>Z-5DI</td>
<td>5-Ch digital inputs / RS485 - ModBUS RTU module</td>
</tr>
<tr>
<td>Z-5AI</td>
<td>5-Ch, 5 single-ended or 4 differential analog inputs / RS485 - ModBUS RTU module</td>
</tr>
<tr>
<td>Z-6NTC</td>
<td>6-Ch, NTC inputs / RS485 - ModBUS RTU module</td>
</tr>
<tr>
<td>Z-8AI</td>
<td>8-Ch, 8 single-ended or 4 differential analog inputs / RS485 - ModBUS RTU module</td>
</tr>
<tr>
<td>Z-D-4</td>
<td>6-Ch, 6 digital inputs, 2 digital outputs / RS485 - ModBUS RTU control module</td>
</tr>
<tr>
<td>Z-D-8</td>
<td>8-Ch, 8 digital inputs, 2 digital outputs / RS485 - ModBUS RTU control module</td>
</tr>
<tr>
<td>Z-D-10</td>
<td>10-Ch relay outputs / RS485 - ModBUS RTU module</td>
</tr>
<tr>
<td>Z-2AI</td>
<td>2-Ch analog inputs, ModBUS RTU / ModBUS TCP/IP module</td>
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<tr>
<td>Z-3AI</td>
<td>3-Ch analog inputs, ModBUS RTU / ModBUS TCP/IP module</td>
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<tr>
<td>Z-4AI</td>
<td>4-Ch analog inputs / RS485 - ModBUS RTU module</td>
</tr>
<tr>
<td>Z-6AI</td>
<td>6-Ch analog inputs, ModBUS RTU / ModBUS TCP/IP module</td>
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<tr>
<td>Z-8AI</td>
<td>8-Ch analog inputs, ModBUS RTU / ModBUS TCP/IP module</td>
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<td>Z-10AI</td>
<td>10-Ch analog inputs, ModBUS RTU / ModBUS TCP/IP module</td>
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<td>Z-12AI</td>
<td>12-Ch analog inputs, ModBUS RTU / ModBUS TCP/IP module</td>
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<tr>
<td>Z-16AI</td>
<td>16-Ch analog inputs, ModBUS RTU / ModBUS TCP/IP module</td>
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<td>Z-8AO</td>
<td>8-Ch analog outputs / RS485 - ModBUS RTU module</td>
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<tr>
<td>Z-16AO</td>
<td>16-Ch analog outputs / RS485 - ModBUS RTU module</td>
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<td>Z-32AO</td>
<td>32-Ch analog outputs / RS485 - ModBUS RTU module</td>
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<tr>
<td>Z-64AO</td>
<td>64-Ch analog outputs / RS485 - ModBUS RTU module</td>
</tr>
<tr>
<td>Z-UN</td>
<td>Acquisition and management of unlimited recordable channels (video tracks)</td>
</tr>
<tr>
<td>-PLUS</td>
<td>Multi-client PLUS package</td>
</tr>
<tr>
<td>-UPGRADE</td>
<td>Data Recorder license upgrade service</td>
</tr>
</tbody>
</table>
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