User’s Manual rel. 1.35
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Prode will provide the licensee with limited technical support by telephone, or by electronic media for a period of 60 days after delivery of the produc

http://www.prode.com
Prode, via Spalato 2 Milano 20124 Italia

How to obtain technical support

we welcome your comments or suggestions about our program. On request we will also provide information on the internal methods used. While the program has been tested carefully to ensure proper operation, it still may be possible for an unusual situation to result in an error. We will have a much greater chance of fixing or assisting with errors and problems if they are provided to us in a form that is repeatable.

In reporting a problem to us, the following information should be given:

- customer reference
- the version of the software
- a copy of the procedure you are running and if possible the input data
- a detailed description of what you were doing (sequence of operations) when the problem occurred
- any additional information you think may describe the problem
Introduction

OPC
OPC stands for OLE for Process Controls, it is an industry wide standard that allows connectivity between different devices, software applications, control systems. In OPC the servers provide methods which other software packages, the clients, can access to exchange data, each control device, such as a PLC or DCS and instruments can exchange data.

MODBUS
MODBUS is an application-layer messaging protocol, it provides client-server communication between devices connected on different types of buses or networks, an industrial serial standard since 1979 MODBUS enables millions of automation devices to communicate.

PRODE PROPERTIES
Prode Properties is the thermodynamic framework created by Prode, it solves problems such as physical properties data, process simulation, optimization and realtime control.

PRODE INDUSTRIAL PROCESS INTERFACE
Available in different versions since 1995 Prode industrial interface works as a bridge between the world of industrial applications and the specialized software required for calculating thermodynamic properties. Many industrial applications need access to rigorous thermodynamic calculations and Prode interface in union with Prode Properties allows this at effective cost and in a very simple way.
Prode Interface includes an OPC server, an OPC client and a MODBUS device, it can receive data from inline devices or DCS systems and returns in realtime a series of calculated values, standard version has more than 30 predefined properties (see the list below), custom versions are available for expanding the list of properties (see below).

| CricondenBar pressure |
| CricondenBar temperature |
| CricondenTherm pressure |
| CricondenTherm temperature |
| Critical pressure |
| Critical temperature |
| Flash points |
| Hydrate formation pressure |
| Hydrate formation temperature |
| Liquid Fraction |
| Dew point temperature |
| Bubble point temperature |
| Gas heating value |
| Gas Joule Thomson coefficient |
| Gas Wobbe index |
| Gas specific entropy |
| Gas specific enthalpy |
| Gas specific heat at constant pressure (cp) |
| Gas specific heat at constant volume (cv) |
| Gas speed of sound |
| Gas compressibility |
| Gas specific gravity |
| Gas compressibility |
| Gas specific gravity |
| Gas density |
| Gas viscosity |
| Gas thermal conductivity |
| Liquid specific entropy |
| Liquid specific enthalpy |
| Liquid specific heat at constant pressure (cp) |
| Liquid specific heat at constant volume (cv) |
| Liquid speed of sound |
| Liquid viscosity |
| Liquid thermal conductivity |
| Liquid surface tension |

ADDITIONAL PROPERTIES
Custom versions can extend the features by including additional properties such as wax formation / cloud points / Reid vapor pressure etc.
in addition there are versions which allow real time simulation of equipments as distillation columns to optimize operating parameters
How Prode Industrial Process Interface Works

Introduction
A generic plant can include one or more equipments and each equipment can have one (or more) lines entering (influents) and lines exiting (effluents). For purposes of process simulation each line constitutes a stream, defined in terms of mixture composition and operating conditions (pressure, temperature). Different properties can require different specifications, for example the calculation of gas density requires as specifications composition plus operating temperature and pressure while gas heating value requires only composition. Prode interface permits to set each specification (composition, pressure, temperature) directly from external providers as in-line instruments, DCS systems or other devices and get immediately the calculated values, with Prode Interface it becomes very easy to add sophisticated process calculations to your applications.

How it works
Once the data provider (OPC or MODBUS) is connected at regular intervals (set by time cycle) the software detects changes in inputs (specifications) and calls Prode Properties to calculate output values (or, in case of errors, generate reports), the outputs are then available as external connection.

Features
- Fully customizable list for inputs (specifications) and outputs (properties to be calculated)
- Support for up to 20 components per stream and up to 10 streams (up to 100 streams in custom versions) each stream supports a different list of components, pseudo components, thermodynamic models etc.
- Capability to relay each input to OPC and MODBUS ports
- Customizable parameters for OPC and MODBUS ports
- Automatic diagnostic and error reporting

Operating
Once started the program shows two windows which have different purposes:
- on the first window the program shows errors and warnings which occurred during operations
- on the second window the program creates the list of ports, connections states, values etc.

Diagnostics
During the operations different events may occur and Prode interface includes procedures for validating data by utilizing filters and generating error / warning messages when the program detects a possible problem. When the problem is related to one (or more) ports the program can use different colors to emphasize the row (in the list of ports) which is related with the detected problem.
Installing Prode Industrial Process Interface

32 and 64 bit versions of Prode Interface are included in Windows distribution file which installs automatically in your computer, install Prode Properties before Prode Interface, once installed both applications follow a few steps to manually configure the system.

**IMPORTANT**
To register the OPC Server service you need to run proind.exe as administrator (you may use the “run as administrator” command)

To access OPC Server and Client services you may need to install separately the 32 or 64 bit version of OPC Core Components freely distributed by OPC Software Foundation (if these are not installed on your computer)

**Configuring the Interface**

Configuring Prode Industrial Process Interface is easy, only a few steps are required

- defining the inputs
- define and set up connection devices (OPC Server, OPC Client, MODBUS)
- define and set up connecting ports

**IMPORTANT**
Once you have completed each step you can save the configuration with the command File->Save config

The program automatically loads the configuration file at startup, if required it can autoconnect all OPC / MODBUS devices

**First step, define the Inputs**

To execute the calculations the procedure needs for each property a suitable set of specifications, these inputs (usually provided by external devices via MODBUS or OPC protocols) can be the operating conditions (temperature, pressure) at which the process takes place and/or the composition of the mixture (the molar percentage of each component in the stream), the table below shows the list of required specifications per each property.

The user is allowed to force fixed values for compositions, temperatures and pressures (from Prode Properties Editor) as alternative to obtain these value at regular intervals from a data provider, in any case the procedure does require a consistent set of inputs (specifications) to solve the calculations.

<table>
<thead>
<tr>
<th>Property</th>
<th>Main specifications</th>
<th>Additional specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>CricrondenBar pressure</td>
<td>Composition</td>
<td></td>
</tr>
<tr>
<td>CricrondenBar temperature</td>
<td>Composition</td>
<td></td>
</tr>
<tr>
<td>CricrondenTherm pressure</td>
<td>Composition</td>
<td></td>
</tr>
<tr>
<td>CricrondenTherm temperature</td>
<td>Composition</td>
<td></td>
</tr>
<tr>
<td>Critical pressure</td>
<td>Composition</td>
<td></td>
</tr>
<tr>
<td>Critical temperature</td>
<td>Composition</td>
<td></td>
</tr>
<tr>
<td>Flash point</td>
<td>Composition</td>
<td></td>
</tr>
<tr>
<td>Hydrate Formation pressure</td>
<td>Operating temperature</td>
<td>Composition</td>
</tr>
<tr>
<td>Hydrate Formation temperature</td>
<td>Operating pressure</td>
<td>Composition</td>
</tr>
<tr>
<td>Liquid Fraction</td>
<td>Operating temperature, pressure</td>
<td>Composition</td>
</tr>
<tr>
<td>Dew point temperature</td>
<td>Operating pressure</td>
<td>Composition</td>
</tr>
<tr>
<td>Bubble point temperature</td>
<td>Operating pressure</td>
<td>Composition</td>
</tr>
<tr>
<td>Gas heating value</td>
<td>Composition</td>
<td></td>
</tr>
<tr>
<td>Gas Joule Thomson coefficient</td>
<td>Operating temperature, pressure</td>
<td>Composition</td>
</tr>
<tr>
<td>Gas Wobbe index</td>
<td>Composition</td>
<td></td>
</tr>
<tr>
<td>Gas specific entropy</td>
<td>Operating temperature, pressure</td>
<td>Composition</td>
</tr>
<tr>
<td>Gas specific enthalpy</td>
<td>Operating temperature, pressure</td>
<td>Composition</td>
</tr>
<tr>
<td>Gas specific heat (cp)</td>
<td>Operating temperature, pressure</td>
<td>Composition</td>
</tr>
<tr>
<td>Gas specific heat (cv)</td>
<td>Operating temperature, pressure</td>
<td>Composition</td>
</tr>
<tr>
<td>Gas speed of sound</td>
<td>Operating temperature, pressure</td>
<td>Composition</td>
</tr>
<tr>
<td>Gas compressibility</td>
<td>Operating temperature, pressure</td>
<td>Composition</td>
</tr>
<tr>
<td>Gas specific gravity</td>
<td>Composition</td>
<td></td>
</tr>
<tr>
<td>Gas compressibility</td>
<td>Operating temperature, pressure</td>
<td>Composition</td>
</tr>
<tr>
<td>Gas specific gravity</td>
<td>Composition</td>
<td></td>
</tr>
<tr>
<td>Gas density</td>
<td>Operating temperature, pressure</td>
<td>Composition</td>
</tr>
<tr>
<td>Gas viscosity</td>
<td>Operating temperature, pressure</td>
<td>Composition</td>
</tr>
<tr>
<td>Gas thermal conductivity</td>
<td>Operating temperature, pressure</td>
<td>Composition</td>
</tr>
<tr>
<td>Liquid specific entropy</td>
<td>Operating temperature, pressure</td>
<td>Composition</td>
</tr>
<tr>
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<td>Operating temperature, pressure</td>
<td>Composition</td>
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<td>Composition</td>
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<tr>
<td>Liquid specific heat (cv)</td>
<td>Operating temperature, pressure</td>
<td>Composition</td>
</tr>
<tr>
<td>Liquid speed of sound</td>
<td>Operating temperature, pressure</td>
<td>Composition</td>
</tr>
<tr>
<td>Liquid viscosity</td>
<td>Operating temperature, pressure</td>
<td>Composition</td>
</tr>
<tr>
<td>Liquid thermal conductivity</td>
<td>Operating temperature, pressure</td>
<td>Composition</td>
</tr>
<tr>
<td>Liquid surface tension</td>
<td>Operating temperature, pressure</td>
<td>Composition</td>
</tr>
</tbody>
</table>
From Prode Interface application, menu Process->General to activate the dialog where to define the required properties and input specifications.

Number of Streams: The procedure calculates the properties per each stream in the list.

Timer Cycle: The procedure recalculates the properties at regular intervals of time.

Sum of Mol. Fractions: Acceptable range of values for the sum of molar fractions in compositions.

Inputs (Specifications): Inputs from external devices.

Outputs (Results): Required properties, outputs to external devices.

**Setting the correct timer cycle**

Once the data provider (OPC or MODBUS) is connected at regular intervals (set by timer cycle) the software detects changes in inputs (specifications) and calls Prode Properties to calculate output values (or, in case of errors, generate reports). The different timing cycles don’t affect the execution time of Prode Properties internal procedures but permits to reduce the number of calls when inputs are not updated frequently and, most important, setting the correct timer cycles reduces the risk to call the thermodynamic framework before the previous calc’s have been completed.

A typical value for timer cycle would be 60 seconds but in some cases as with gas-chromatographs the timer cycle could be set at 10 minutes or more.
From Prode Interface application, menu Process->Process Data to activate the Prode Properties Editor

Use this editor to define
- List of components for all streams
- Thermodynamic models and options
- Units of measurement

To define the list of components, thermodynamic models and options for a stream select the stream in the list then in components page define the list of components
IMPORTANT
in stream's editor make sure to save your edited stream's data (button save) before to select a different stream, differently all changes will be discharged

In Models page define the models and options for this stream
in BIPS page enter the relevant binary interaction pairs, see Prode Properties manual for additional informations on these parameters, then back to page Operating, Select Save for saving this stream before selecting a different stream or leaving the dialog.
To define a set of Units of Measurement go to the page Units

Once all process parameters have been defined select Ok to leave the dialog

Define calculated fractions (components not measured by analyzer)
Prode Interface allows to define fractions for heavy components not measured by in field analyzers, supposing we know (from laboratory analysis) the composition of a stream

<table>
<thead>
<tr>
<th>Component</th>
<th>Molecule</th>
<th>Fraction</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>CH4</td>
<td>0.7</td>
</tr>
<tr>
<td>C2</td>
<td>C2H6</td>
<td>0.11</td>
</tr>
<tr>
<td>C3</td>
<td>C3H8</td>
<td>0.05</td>
</tr>
<tr>
<td>C4</td>
<td>C4H10</td>
<td>0.03</td>
</tr>
<tr>
<td>C5</td>
<td>C5H12</td>
<td>0.02</td>
</tr>
<tr>
<td>C6</td>
<td>C6H14</td>
<td>0.03</td>
</tr>
<tr>
<td>C7</td>
<td>C8H14</td>
<td>0.02</td>
</tr>
<tr>
<td>C8</td>
<td>C9H20</td>
<td>0.02</td>
</tr>
<tr>
<td>C9</td>
<td>C10H22</td>
<td>0.02</td>
</tr>
</tbody>
</table>

when the in field analyzer is limited to C1-C5, we can configure the interface for calculating C6-C9 as fractions

- total (C6+C7+C8+C9) = 0.09
- relative fractions:
  - C6 = 0.3333
  - C7 = 0.2222
  - C8 = 0.2222
  - C9 = 0.2222

in that way we can obtain reasonable estimates from a limited set of values
From Prode Interface application, menu Process->Pseudo Components to activate the dialog.

In the dialog select “Do not split” if you do not require calculated fractions, differently define in each stream the input component from which the software calculates the components not provided as inputs. Note that the interface will show only the input values (in this case C1-C6 from analyzer).

To see the different fractions stop connection and access the Process Editor which shows the full composition (including estimated fractions for heavy components C6-C9 not measured by analyzer).
Second step, setting up connection devices

Prode interface can act as OPC client, OPC server and MODBUS device, each connection can get data from external providers (input port) or working as output port, in addition connections can relay data (expose a copy) from a different connection. From Prode Interface application, menu Services->Settings to activate the Connection Settings dialog.

**General**
In this section define
the required connections (OPC client, OPC server, MODBUS)
the service which provides the input data
automatic connection at application's startup, required when OPC server is activated

**OPC Connection**
In this section define
the extern OPC server in case of OPC client active, with OPC Client active select the button “Update” to see the list of OPC Servers available, then select one
OPC out data type, calculated values are of real types, COM provides two compatible types
OPC in data transfer, SYNC forces reading at each cycle
OPC delimiter, must be compatible with external OPC devices

**MODBUS Connection**
In this section define
Connector, TCP or computer’s COM port
Device ID, the address to access this MODBUS device
Baud Rate, port speed
Protocol, MODBUS protocol
Stop Bits, Parity, MODBUS connection settings
Third step, setting up connection ports

Each position in the list represents a port, select the connection to edit.

![Screenshot of connection settings dialog]

Then for activating the Connection Settings dialog use the right buttom in the mouse or the application menu Services->Edit Port.

The different sections of the dialog are editable when the related service (OPC client, OPC server, MODBUS) has been activated in Connection Settings dialog.

The external Server TAG List shows the connections exposed by the external OPC server (which connects with the OPC client in Prode interface).

The TAG names are those exposed by OPC ports.

MODBUS Scaling defines a multiplier (a real which defines the full scale) for extending the MODBUS range.

MODBUS address defines the address.

To activate a service set the related box.
Define Colors

Select Process->File in menu, then Set colors.

From this dialog you can set the different colors (text and background) associated to each operating condition:

- Normal condition, the connection is working as expected
- Warning condition, the connection doesn’t receive data
- Error condition, the port isn’t connected

Connect the Services

To connect the external services select Services->Connect

For disconnecting Services->Disconnect

Once connected at regular intervals the procedure reads the inputs ( specifications), calls Prode Properties to calculate output values and show the results (or, in case of errors, generate reports). Outputs are then available to external connections.
MODBUS configuration example

This example shows how to configure and connect via MODBUS TCP a MODBUS slave (Prode Interface) installed on computer with IP 10.0.0.1 with a MODBUS server installed on computer with IP 10.0.0.2.

This is a minimal example with just two inputs (temperature and pressure) and two outputs (compressibility and density) but one can easily add all inputs and outputs required by complex applications. We start to define inputs, outputs and process data.
for calculating compressibility and density of a natural gas mixture select as thermodynamic model Peng Robinson

To load BIPs required by Peng Robinson model from Prode Database click on Get BIPs from database button
IMPORTANT!
Do not forget to save the stream (button save on first tab) before to leave the dialog, this (saving stream) is a important step otherways data will be lost closing the dialog.

Now we proceed to configure connection's settings for MODBUS TCP.
then we configure the four ports (two inputs and two outputs). The information about how to define the values for MODBUS address and scaling factors is available in paragraph "MODBUS Interface".

Note: you should select Scaling Factors as the maximum possible values for that input or output taking into account the selected units (for temperatures, pressures, densities etc.)

In this example we assume that selected units are K for temperature, Pa for pressure and Kg/M3 for density (see previous paragraph about how to define a set of Units of Measurement).

Now we configure the inputs, for the first port we set 400 (K) as scaling factor (or full range) and position1 notice that MODBUS address for all input ports is in MODBUS Holding Registers range.

For the second port we set 10000000 (Pa) as scaling factor and position2 (in MODBUS Holding Register range).
we have two outputs, on first (compressibility) we set 2 as scaling factor and position 3 (in MODBUS Input Register) notice that MODBUS address for all output ports is in MODBUS Input Register range

now we save the configuration, from menu’ (File->Save Config) (do not forget this step !) and connect the client, from menu’ (Services->Connect) this operation makes the client visible from MODBUS Server and ready to start communication.
For purposes of testing any MODBUS server can be utilized, in this example we utilize ModScan32.
Before to test MODBUS communication it is important to verify settings on both computers, specifically you must verify:
- machine IP
- TCP settings
- firewalls settings etc.
and make sure that TCP services on both computers are active and exchanging data.

Once verified that the two computers are communicating, on second computer start the MODBUS server and connect to IP 10.0.0.1 (the IP of first computer, where Prode MODBUS client is running).
Once MODBUS server is connected with the client you may update the values of pressure and temperature and read the calculated values.

To set the temperature use the address 1 in Holding Register, the value which Prode Industrial Interface reads is

\[
400 \times \frac{50000}{65535}
\]

where 400 K is the scaling factor or full range for temperature (see the previous port’s configuration) and 65535 is the maximum integer value for MODBUS.

In the same way you can set a pressure.

After a few seconds the values calculated by Prode Properties will be visible in Input Register 3 and 4.

This confirms that communication is active and both client and server are working as expected.
To convert the value returned by MODBUS to the value calculated by Prode Properties we use the same procedure discussed before:

\[ \text{value} = \text{Scaling Factor} \times \text{MODBUS Value} / 65535 \]

For the compressibility (port 3) Scaling Factor is 2 and the value calculated by Prode Properties is:

\[ 2 \times 28815 / 65535 = 0.8793 \]

as shown in Prode Industrial Interface.

In the same way we can convert the value of density:

\[ 1000 \times 923 / 65535 = 14.084 \]

which shows a little difference due to improper Scaling Factor, a value of 100 as Scaling Factor for density (full range of 100 Kg/M^3) should have reduced the error by a factor of about 10.

This is an important point to consider when setting Scaling Factors!
MODBUS standard offers two types of analog registers, the Holding Register which permits read/write operations and the Input Register for read only operations. Each register has a size of 16 bits and can store unsigned integers with values between 0 and 65535, each register has an address, Input Registers in range 30000-30999 and Holding Registers in range 40000-49999.

Prode interface maps the inputs (compositions, temperature, pressure) in Holding Registers and the outputs (calculated values) in Input Registers, the interface accepts values for address in range 1-9999.

In this example the address 1 for calculated Cricondentherm will be translated by MODBUS to 30001 which is the first position in Input Registers area.

Standard MODBUS registers have 65536 possible values and a proper scaling is important, the MODBUS Scaling factor is the full range value, in the example for Cricondentherm the range is 0 to 500 Kelvins, a MODBUS register value of 0 means 0 K and a value of 65535 the value 500 K.

In the example there are 7 input values (the molar fractions of each component in mixture) and 3 output values (Cricondentherm, Gas Heating Value and Gas Wobbe Index).

<table>
<thead>
<tr>
<th>Stream</th>
<th>Property</th>
<th>Connection</th>
<th>Value</th>
<th>U.M.</th>
<th>Quality</th>
<th>TimeStamp</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Stream.1.Composition.C1</td>
<td>Active</td>
<td>0.663500</td>
<td>DATA QUALITY G.</td>
<td>08:49:02</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Stream.1.Composition.C2</td>
<td>Active</td>
<td>0.0325628</td>
<td>DATA QUALITY G.</td>
<td>08:49:02</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Stream.1.Composition.C3</td>
<td>Active</td>
<td>0.120405</td>
<td>DATA QUALITY G.</td>
<td>08:49:02</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Stream.1.Composition.C4</td>
<td>Active</td>
<td>0.059144</td>
<td>DATA QUALITY G.</td>
<td>08:49:02</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Stream.1.Composition.C5</td>
<td>Active</td>
<td>0.0357524</td>
<td>DATA QUALITY G.</td>
<td>08:49:02</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Stream.1.Composition.C6</td>
<td>Active</td>
<td>0.0527832</td>
<td>DATA QUALITY G.</td>
<td>08:49:02</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Stream.1.Composition.C7</td>
<td>Active</td>
<td>0.0357524</td>
<td>DATA QUALITY G.</td>
<td>08:49:02</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Stream.1.Cricondentherm</td>
<td>Active</td>
<td>362.399</td>
<td>K</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Stream.1.GasHeatingValue</td>
<td>Active</td>
<td>44760.6</td>
<td>UJ/kg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Stream.1.GasWobbeIndex</td>
<td>Active</td>
<td>29423.2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

To obtain the value in Kelvins for Cricondentherm from MODBUS internal value of 47499 (address 30001) use the formulation

\[
\text{Value} = \text{Scaling factor} \times \text{MODBUS value} / 65535
\]

or \[500 \times 47499 / 65535\]
OPC Interface

The standard OPC interface, based on Microsoft Variant objects, supports several data types including:

- VT_R432-bit floating-point value
- VT_R864-bit floating-point value

Prode interface recognizes automatically the different types and the user can define the format for outputs.

Unregister OPC Server, delete registration keys in Windows Registry

When deinstalling (removing) the application or installing different versions or moving the application to different folders, you need to delete all the information stored in Windows Registry (to register the OPC Server), this information includes registration keys, the name of the application, the installation folder, etc.

To clear Windows Registry, you can simply select the command in menu Services->Unregister Server Service or you may delete manually:

1) run regedit.exe
2) find and delete all the strings 94b7f321-c03c-abd2-80b8-0060975858be

Data files folder

When running Prode Interface requires to access several files, these are placed in a directory \Prode\ in user space to avoid possible conflicts with code reserved areas, the exact path depends on Windows version and settings, for example in Windows XP they could be placed in C:\Documents and Settings\All Users\Application Data, the list of files includes:

- proind.lan
- proind.ppp
- proind.cfg

Do not remove or rename these files.

Translate resources to different languages

A large part of the resources are stored in the file proind.lan, this is a text file, easily editable by the user.

Example

- in English language
  PID_LABEL_14 = "Automatic connection";
- in French language
  PID_LABEL_14 = "Connecter automatiquement";
- in Italian language
  PID_LABEL_14 = "Connessione automatica";

IMPORTANT

When editing a string take care to modify only the parts enclosed within the braces "" and do not alter/modify the data structures composed by special characters.
Application Examples

A inline instrument includes an OPC Server to export compositions, the OPC Client in Prode Interface reads data, the package calculates properties and exports compositions and calculated properties via MODBUS.

Inline Instrument: Prode Interface: Remote DCS

OPC SERVER ------------------------> OPC CLIENT
Compositions
MODBUS ------------------------> MODBUS MASTER
Compositions
Calculated Values

A inline instrument includes an OPC Client to export compositions, the OPC Server in Prode Interface reads data, the package calculates properties and exports compositions and calculated properties via OPC Client.

Inline Instrument: Prode Interface: Local Application

OPC CLIENT ------------------------> OPC SERVER
Compositions
OPC CLIENT ------------------------> OPC SERVER
Compositions
Calculated Values

A inline instrument includes an OPC Client to export values such as pressure or temperature, the OPC Server in Prode Interface reads data and exports calculated values to another OPC client.

Inline Instrument: Prode Interface: Local Application

OPC CLIENT ------------------------> OPC SERVER
Compositions
OPC SERVER ------------------------> OPC CLIENT
Calculated Values

A DCS provides via MODBUS compositions plus operating conditions to Prode Interface, calculated values are then exported via MODBUS interface.

DCS: Prode Interface

MODBUS MASTER ------------------------> MODBUS
Compositions
MODBUS MASTER <----------------------> MODBUS
Calculated Values

Custom solutions

On request Prode software is available preinstalled and tested in different types of industrial grade computers, these can be very small with rugged metal case, splash/dust resistant.