Entis Pro for Windows 7
OPC Server
PREFACE

This manual describes the Entis Pro OPC Server communication with an OPC Client system. It has been written for application engineers to provide them with all information to establish the communication with the OPC Client system.

Safety and prevention of damage

‘Cautions’ and ‘Notes’ have been used throughout this manual to bring special matters to the immediate attention of the reader.

A Caution draws attention to an action which may damage the equipment.

A Note points out a statement deserving more emphasis than the general text, but does not deserve a “Warning” or a “Caution”

Additional information

Please do not hesitate to contact Honeywell Enraf or its representative if you require additional information. Refer also to the list of related documents in Appendix C.

Legal aspects

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Enraf BV disclaims any responsibility for personal injury or damage to equipment caused by:

- Deviation from any of the prescribed procedures
- Execution of activities that are not prescribed
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INTRODUCTION

The Entis Pro OPC Server acts as a transmission interface between the Enraf field instruments and Host computer system having an OPC interface. The ‘OPC-Server’ will provide information to an OPC-Client (e.g. a DCS, Scada or other system).

It supports OPC Data Access 1.0a and 2.0
SYSTEM REQUIREMENTS

Hardware

The minimum requirements are described in the Installation Guide Entis Pro.
For the OPC option the PC should have:
- Connection to a 10/100Mbit Ethernet LAN

Interface

The OPC-Server is able to communicate with one or more OPC-Clients.
During configuration the user must decide on which station(s) the OPC Server(s) will be running. This can be done in CIU Plus Links.
For details see “Configuration manual Entis Pro”.


FUNCTIONAL REQUIREMENTS

The Entis Pro OPC-Server offers the OPC-Client to:

- Create OPC-Groups containing various items (e.g. Tank-entities)
- Subscribe on one or more data items (e.g. Tanks)
- Perform a ‘Manual-overwrite’ on an Item (entity)
- Enable/disable PAL and GAL alarms
- Acknowledge of alarms
- Handle (Entis Pro) alarms as data items
- Get requested information (by the OPC-Client) using the defined system dimensions
- Provide the OPC-Client the (unique) names of the selectable entities
- In the language as is used by Entis Pro
- Perform gauge commands
**DATA**

**Introduction**

The OPC-Server provides information regarding the OPC-Items in a dynamic fashion. Data Items are created when they become accessible from Entis Pro.

The OPC-Server provides the OPC-Client data in a hierarchical way; e.g. like ‘explorer’ does with directories and files. Entries on the same hierarchy level appear in the order defined by the corresponding Entis Pro list.

**Available data**

The OPC-Server provides the OPC-Client, data which is available in the ‘Define View’ task of ‘Entis Pro’, except:

- CIU+ details
- CIU2 details
- CIU addresses (Primary and secondary)
- Signatures
- CRC
- Background and Foreground Timestamp;

**Manual overwrite**

The OPC-Server is able to receive ‘Manual Overwrite’ commands from the OPC-Client in a value. The ‘Kill’ command can only be performed using Entis Pro. If an entity can be measured automatically the OPC server checks if the entity is killed or manual.

In addition the OPC Server provides the OPC-Client, data which is available in the ‘Manual Overwrite’ task of ‘Entis Pro’, except:

- Observed Density
- Observed Temperature
- Hydrometer Correction
- DCF & TCF
- Flow rate & Moving detection settings
Gauge commands

The OPC-Server provides a ‘Gauge Command’ item for each tank. The ‘Gauge command’ exists of a Command-number (See appendix A) and Parameter_1.

The various ‘Gauge commands’ are:

- Dipping;
- Displacer
- Profile
- Test Gauge alarm;

An extra ‘Start’ field shall be used to actually start the Gauge command. The ‘Start code’ is 1.

Events

The OPC-Server generates an event for the following events:

- Performing a ‘Gauge Command’;
- Performing a ‘Manual Overwrite’
- Acknowledging of an Alarm;
- Enable / Disable Pal / Gal Alarm;
- Start-up / shutdown of the OPC-Server;
- Connecting / disconnecting of an OPC-Client
Data Structure

In the figure below you will find the structure in which the OPC Server will show the data from Entis Pro.

Entis Pro - OPC tag names tree

Rev. 3.0
Mapping Data Status and OPC Quality Flags

An OPC-item contains three fields:

- Value,
- Timestamp,
- Quality

The OPC Server maps the Data status of an entity on the OPC Quality Flags as described in the table below.

### Entis Pro

<table>
<thead>
<tr>
<th>Description</th>
<th>Entis Pro Display</th>
<th>OPC Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uncalibrated</td>
<td>Data + “#” + …</td>
<td>GOOD_ NON _SPECIFIC</td>
</tr>
<tr>
<td>Manual</td>
<td>… “&amp;”</td>
<td>GOOD_ LOCAL_OVERRIDE</td>
</tr>
<tr>
<td>Stored</td>
<td>… “S”</td>
<td>GOOD_ NON _SPECIFIC</td>
</tr>
<tr>
<td>Reduced Accuracy</td>
<td>… “?”</td>
<td>UNCERTAIN_ SENSOR_NOT ACCURATE</td>
</tr>
<tr>
<td>Calibrated</td>
<td></td>
<td>GOOD_ NON _SPECIFIC</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Entis Pro Display</th>
<th>OPC Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Data available</td>
<td>Blanks</td>
<td>BAD_ NOT CONNECTED</td>
</tr>
<tr>
<td>Killed</td>
<td>Blanks + “K”</td>
<td>BAD_OUT_OF_SERVICE</td>
</tr>
<tr>
<td>Over Range</td>
<td>Data + “^”</td>
<td>UNCERTAIN_ENGINEERING_ UNITS EXCEEDED. (High Limited.)</td>
</tr>
<tr>
<td>Under Range</td>
<td>Data + “v”</td>
<td>UNCERTAIN_ENGINEERING_ UNITS EXCEEDED. (Low Limited.)</td>
</tr>
<tr>
<td>Un-initialised</td>
<td>Blanks + “U”</td>
<td>BAD_ NON SPECIFIC</td>
</tr>
</tbody>
</table>
Alarms

The OPC-Server provides information for alarm items in a hierarchical way. Entries on the same hierarchy level appear in the order defined by the corresponding ‘Entis Pro list’.

The OPC-Server provides the OPC-Client only Entis Pro Alarms.

In case OPC is enabled certain Pal’s can get an extra attribute, named OPC Extension. When creating a “High”, “Low” or “No valid data” PAL, the user must enter a PAL Extension, this extension identifies the PAL and must be unique.

(For each tank-type-entity combination).

**Example:** In the OPC tree a PAL can be addressed as follows:

```
Entis Pro.OPCServer\Tk.<tankname>.ALPAL.<entity name>.<PAL type>.<OPC extension>.Act or Setpoint or ……
E.G. EntisPro.OPCServer\Tk34.ALPAL.Product level.
Hi.Op1,…..
```

The maximum number of Pal’s of the same type and entity of a tank is limited only by the maximum number of Pal’s in an Entis Pro system.

When a PAL is set on a group of tanks, then the software shall check that the specified extension is unique for all involved tanks. If not a warning will be generated.

Only when the extension is unique for all involved tanks then the command will be executed.

The OPC-Server can only get alarms that are passed by the ‘Alarm-type profile’ filter. The user should activate this filter using an Entis Pro station.

The following alarms are also supported by the OPC-Server:

- AAL
- SAL
- CAL
- NAL
- HAL
- GAL
All ‘Entis Pro’ CAL, NAL, SAL or AAL alarms, shall be recognised as a communication Failure in an items quality-field. See table below.

<table>
<thead>
<tr>
<th>Entis Pro</th>
<th>OPC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Validity</td>
<td>OPC Quality flags</td>
</tr>
<tr>
<td>Hex</td>
<td>Communication Failure (striked out)</td>
</tr>
<tr>
<td>Description</td>
<td>00011011</td>
</tr>
<tr>
<td>≥ 80</td>
<td>CAL / NAL</td>
</tr>
<tr>
<td></td>
<td>OPC_QUALITY_COMMUNICATION_FAILURE</td>
</tr>
<tr>
<td></td>
<td>SAL</td>
</tr>
<tr>
<td></td>
<td>OPC_QUALITY_CONFIG_ERROR</td>
</tr>
<tr>
<td></td>
<td>AAL</td>
</tr>
<tr>
<td></td>
<td>OPC_QUALITY_LAST_USABLE</td>
</tr>
<tr>
<td></td>
<td>HAL</td>
</tr>
<tr>
<td></td>
<td>GOOD_NON SPECIFIC</td>
</tr>
</tbody>
</table>

**Restrictions**

The OPC-Client cannot define alarms (e.g. limits like high, low). Start/stop a ‘logging-action’ is not supported.

**Result codes**

When performing a Manual Overwrite or Gauge Commands, the OPC Server will set the Result Tag according to the following table:

### Manual Overwrite

<table>
<thead>
<tr>
<th>Result</th>
<th>Result code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>OK</td>
<td>1000</td>
<td>OK</td>
</tr>
<tr>
<td>NOK</td>
<td>1001</td>
<td>Error occurred</td>
</tr>
<tr>
<td>EMPTY</td>
<td>1002</td>
<td>Clear result code</td>
</tr>
<tr>
<td>NOT KILLED</td>
<td>1003</td>
<td>Entity not killed</td>
</tr>
</tbody>
</table>

### Gauge Command

<table>
<thead>
<tr>
<th>Result</th>
<th>Result code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>OK</td>
<td>2000</td>
<td>Action completed successful</td>
</tr>
<tr>
<td>NOK</td>
<td>2001</td>
<td>Error occurred</td>
</tr>
<tr>
<td>INVALID NUMBER</td>
<td>2002</td>
<td>Invalid gauge command number</td>
</tr>
<tr>
<td>EMPTY</td>
<td>2003</td>
<td>Clear result code</td>
</tr>
</tbody>
</table>
Available entities

- Air density
- Ambient temperature
- Automatic measured values
- Available room
- Available DOV
- Correction for expansion of shell
- Communication status
- Configuration status
- Density Correction Factor
- Displacement
- FlowRateInterval
- FlowRateMultiplicationFactor
- FlowTV
- Gauge error
- Gauge commands
- Gauge Command timestamp
- Gauge type
- Gauge status
- General alarm
- GOV
- GV
- GSV category
- High TVV
- Hot standby status
- Insulation factor
- Liquid in vapour
- Liquid volume ratio
- Low TVV
- Mass calculation type
- Mass in vapour
- Mass of liquid
- Maximum level
- Minimum level
- Multiple weight of the gas composition
- MovingInterval Time
- Moving status
- Moving Trip Value
- NiGs zone 0 (high)
- NiGs zone 0 (low)
- NiGs zone 1 (high)
- NiGs zone 1 (low)
- NiGs zone 2 (high)
- NiGs zone 2 (low)
- NSV
- Observed density
- Oven Calibration Temperature
- Original Displacement position
- Product code
- Product level
- Product name
- Product Source
- Product Temperature
- Product TREF
- Range Checking
- Reference density
- Floor weight
- SSVV percentage
- Shell capsule
- Tank name
- Tank shear
- Tank status
- Tank Trip
- Tank TG
- Tank type
- Temperature Correction Factor
- Temp element type
- TGTV
- Time to fail
- Total mass
- TVV
- Vapour pressure
- Vapour temperature
- VCF
- Volume connections
- Water level
- Water volume
### APPENDIX A

#### Commands

<table>
<thead>
<tr>
<th>Command number</th>
<th>Command Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Unlock</td>
</tr>
<tr>
<td>1</td>
<td>Test the gauge</td>
</tr>
<tr>
<td>10</td>
<td>Lock test the gauge</td>
</tr>
<tr>
<td>11</td>
<td>Lock test the gauge to a defined level and unlock</td>
</tr>
<tr>
<td>21</td>
<td>Lock the gauge to a specified level and block</td>
</tr>
<tr>
<td>30</td>
<td>Send the verify calibration command to the gauge</td>
</tr>
<tr>
<td>40</td>
<td>Check the HH alarm</td>
</tr>
<tr>
<td>41</td>
<td>Check the HA alarm</td>
</tr>
<tr>
<td>42</td>
<td>Check the LA alarm</td>
</tr>
<tr>
<td>43</td>
<td>Check the LL alarm</td>
</tr>
<tr>
<td>50</td>
<td>Start a water interface dip</td>
</tr>
<tr>
<td>51</td>
<td>Start a density dip upwards</td>
</tr>
<tr>
<td>52</td>
<td>Start a density dip downwards</td>
</tr>
<tr>
<td>53</td>
<td>Start a combined upwards (water interface first, then density upwards)</td>
</tr>
<tr>
<td>54</td>
<td>Start a combined downwards (density first downwards, then water interface)</td>
</tr>
</tbody>
</table>
APPENDIX B

Setup an OPC connection

Prerequisites for Entis Pro OPC integration.

- The Entis Pro and the OPC client PC’s must be in the same workgroup (or domain).
- The Entis Pro and the OPC client PC’s should not be isolated by a firewall.
- The Entis Pro and OPC client PC’s OS is Windows 7 Professional.
- The OPC Client party and Local IT support must be available because OPC integration is a mutual job.

Network

- Make sure that PC’s have IP addresses in the same range.

Windows Firewall

- Disable the Windows Firewall on both PC’s.

User Accounts

- **Workgroup**: Create mutual (Local) Users on both PC’s and Logon as this user. (User Accounts must be recognized on both the OPC Client and Server PC.). First it can help if these users are a member of the local Administrators group. Make sure that user names and passwords are identical on both PC’s. By typing \ followed by the other computer name in the Run As dialog it can be tested if the other computer can be accessed without logon dialog. This must be checked on both PC’s.

- **Domain**: First, the OPC Server PC must recognize the User Account of the OPC Client PC. Therefore the User Account of the OPC Client must exist in the Active Directory (located on the Domain Controller) of the OPC Server PC. Alternatively, the OPC Server PC must have a local User Account setup for the OPC Client application. Second, the OPC Client PC must recognize the User Account of the OPC Server PC. Therefore the User Account of the OPC Server must exist in the Active Directory (located on the Domain Controller) of the OPC Client PC. Alternatively, the OPC Client PC must have a local User Account setup for the OPC Server application.
DCOM configuration


OPC Connection test

- Use an OPC Client to check the local OPC Server.
- Use an OPC Client to check the remote connection.

Security

- If the OPC connection is ok, the OPC Client user does not have to be an Administrator on the Entis Pro OPC Server PC and does not have to be logged on as the interactive user either. (The user must only be available in the ACL with the proper permissions to launch OPCenum on the Entis Pro PC. On the Client PC this user can logon remotely for launching OPCenum.)
- An Entis Pro user must be a member of the Power Users. This is necessary because Entis Pro must be able to modify the registry for making the OPC Server known for clients. (If required this can be done more secure by setting permissions on some parts of the registry). (In these settings, launching the server by a client is deliberately prohibited.)
- The Windows Firewall can be switched on when the proper settings are configured. (See the “Entis Pro OPC on Windows 7.pdf” on the Entis Pro CD)
- Some clients are not able to use OPCenum for detecting servers remotely. In that case a registry file can be imported to make the Entis Pro OPC Server known on the client PC. This .reg file is available on the Entis Pro CD. The computer name from the Entis Pro PC must be configured in this file before importing it on the OPC client PC.

APPENDIX C

Related documents

Instruction manual Entis Pro
Configuration manual Entis Pro
Instruction manual Ensite Pro Configuration tool
For More Information
To learn more about Honeywell Enraf’s solutions, contact your Honeywell Enraf account manager or visit www.honeywellenraf.com.

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