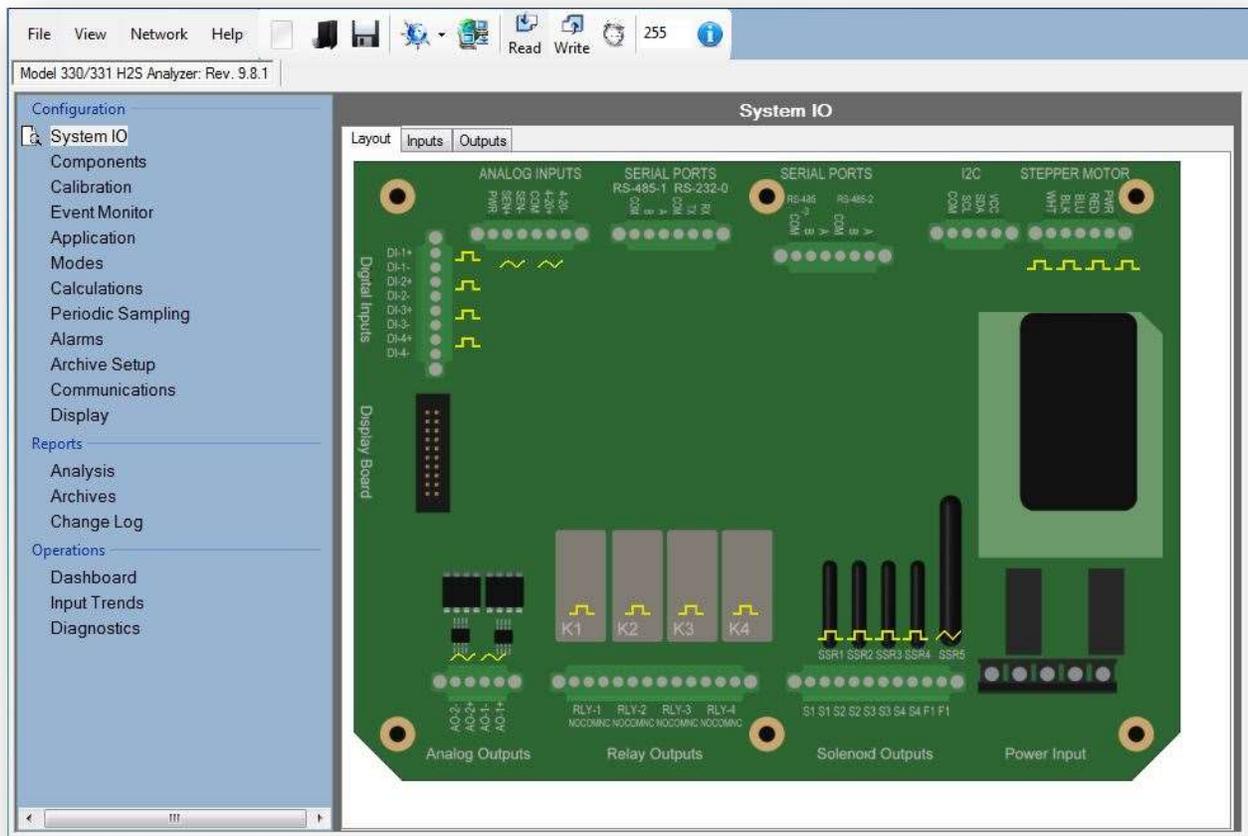


# Hydrogen Sulfide Analyzer Model 330S & 331S Model 330SDS & 331SDS <sup>(Patented)</sup>

Software Manual  
(Software Version Rev 8.3.2.2)





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# INTRODUCTION

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## Introduction to the 330S/331S ICE Software

The 330S/331S H<sub>2</sub>S analyzer has a software application for more advanced changes on the analyzer's configuration. To install the ICE Software, refer to the installer which comes in a USB flash drive with the analyzer (Check Start-up kit box). It is also available at [www.envent-eng.com](http://www.envent-eng.com).

The analyzer is configured at the factory according to the information provided by the customer at the time of purchase. If no information is provided by the customer, Envent Engineering Ltd will assign a standard configuration.

This manual covers only information that will help the user update/change the analyzer's configuration file. The features in the ICE Software that are not covered on this manual are not to be changed from its factory configuration. If advanced changes are necessary involving features not cover on this manual, contact Envent Engineering Ltd for assistance.

## Safety Guidelines

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Read this manual section before operating the ICE software to change the default configuration to ensure correct operation of the analyzer.



Envent Engineering Ltd configures analyzer in conformance to the customer specifications (if applicable). Any modifications on the factory configuration by the user may impair the proper functionality of the analyzer if not performed properly. Contact Envent Engineering Ltd for more information on how to modify the configuration of the analyzer.

For Class I, Division 1 Model 330S Analyzers, the glass window must remain installed in order to maintain area classification. However, to communicate to the 330S analyzer via RS-232 or RS-485 the glass window must be removed. Ensure area is known to be a non-hazardous before removing the explosion proof window.

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## USING THE ICE SOFTWARE

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This section covers an overview on the 330S/331S ICE Software application. It shows how to connect, configure and change the factory configuration to accommodate for different applications.

The H<sub>2</sub>S analyzer's controller board has a USB port for local user interface and three RS-485 connections. The RS-485 connections are identified with numbers from 1 to 3 on the controller board. Connections RS-232, RS-485-1 and RS-485-2 are used to communicate with the analyzer to check or modify the current analyzer's configuration; these connections have Modbus communication capabilities. RS-485-3 is only used for remote display option. The proper Mini USB to USB cable is provided in the analyzer spare parts.

### Connecting the Analyzer to a Computer Using the ICE Software

Install the ICE software on your computer using the software installer provided in the USB flash drive or on the Envent Engineering's website.

Once the ICE software is installed, physically connect the analyzer to the computer using the Mini USB to USB cable provided.

Open the ICE software. Select the USB port the analyzer is physically connected to. Do not select "Enable Hi-Speed". Click on "Read" and wait until the green bar has completed at the bottom of the screen, refer to Figure 1.

Once communication has been established successfully, the user will be able to modify the analyzer's configuration and write it to the analyzer.

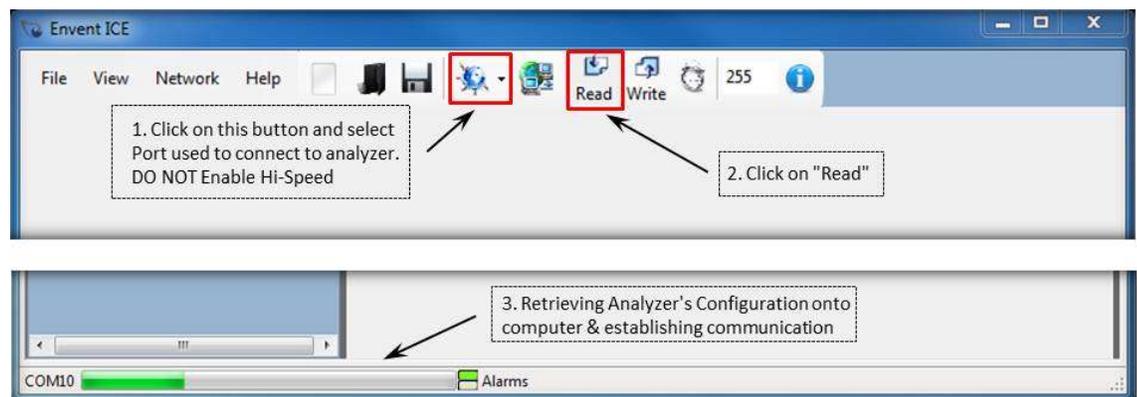


Figure 1. ICE Software: Enable Communication

If there are communication problems, check for the following:

1. Check that the analyzer is ON.
2. Check that the communication cable is properly connected.
3. If the ICE software application was open before physically connecting the analyzer to the computer, close the ICE software and re-open it. Try again and enable communication.

## Modify analyzer's Configuration



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Before modifying the factory configuration file, make sure to save it on your computer first for future retrieval. If the factory configuration file is lost or modified without saving it, a copy is kept in the USB flash drive given with the analyzer. Envent Engineering Ltd can also provide a copy. To save the configuration file, go to File > Save or Save as.

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Make the appropriate changes on the factory configuration file through the ICE software. When changes are made, they need to be uploaded to the analyzer in order to overwrite what is currently on it. Click on the "Write button" (located beside the Read button; refer to Figure 1) and wait until the new configuration is uploaded successfully.

## Discrete Input Configuration

In this section of the ICE software, discrete inputs (and virtual inputs) are configured. Go to System IO>Inputs>Discrete Inputs. Refer to Figure 2.



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Analog Inputs are not covered in this manual since they must not be changed from their factory values.

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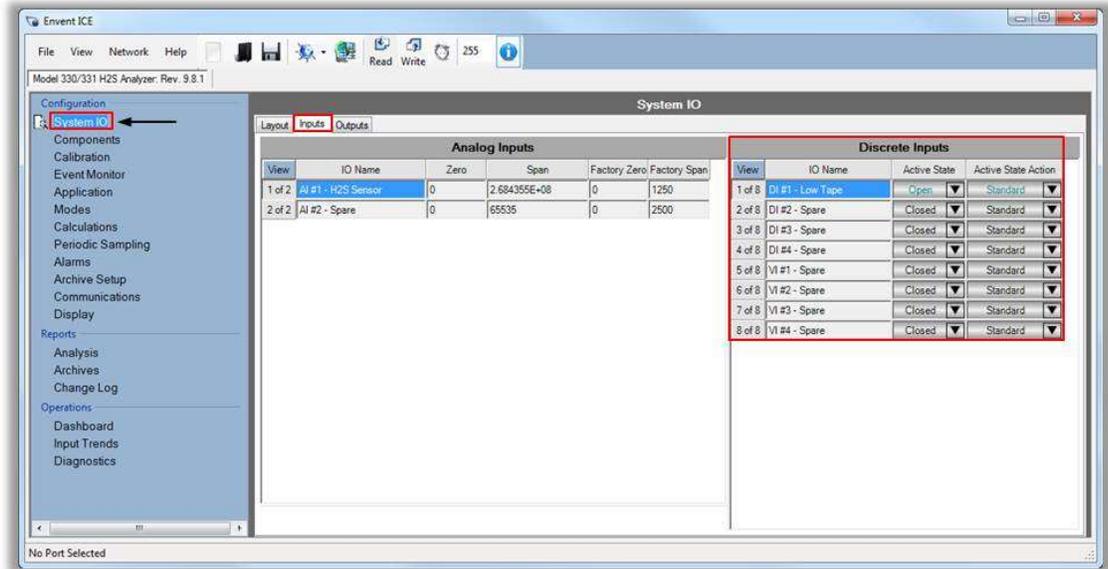


Figure 2. ICE Software: Configuration: System IO Tab: Inputs Tab

### IO Name

IO names are names assigned to the discrete and virtual inputs. The name is up to the user's discretion. Figure 2 shows DI#1 to be for Low H<sub>2</sub>S Tape Sensor. Once a discrete or virtual input is configured, an alarm can be added based on the discrete or virtual input status.

### Active State Action

Active state action is the response or output the discrete or virtual input will have when changing states. "Standard" is selected when the discrete or virtual input is used to output an alarm condition. "Bypass and halt" will place the analyzer into these states when the discrete or virtual input changes state. "Acknowledge" is used when an latched alarm needs to be acknowledged remotely (by means of a switch).

### Analog & Discrete Output Configuration

In this section of the ICE software, analog and discrete outputs are configured. To access the analog and discrete outputs, go to System IO>Output Tab. Refer to Figure 3.

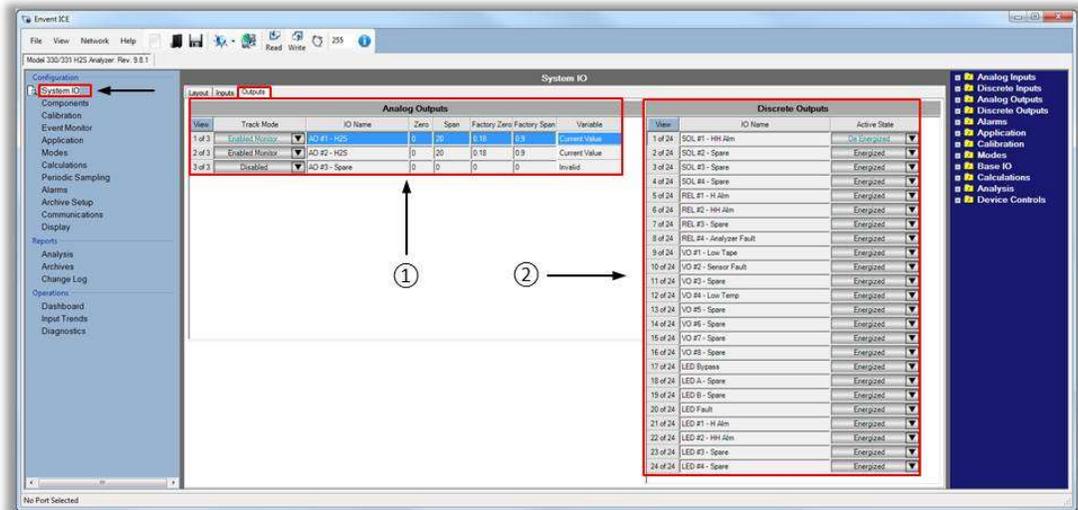


Figure 3. ICE Software: Configuration: System IO Tab: Outputs Tab

### Analog Outputs

Analog outputs are used when a device must be monitored or controlled remotely over a pair of conductors. Two 4-20 mA loop-powered analog output connections are available on the controller board (or looped-powered if AO Boards were requested by the customer). This section will refer to the configuration of the analog outputs through the ICE software.

Changing the analog outputs' ranges (span values) should be done in consultation with Envent Engineering Ltd. If the intention is to change the analyzer's H<sub>2</sub>S range, previous steps must be followed in order for this change to work properly. The aperture strip must be changed, alarm setpoint values, gain, H<sub>2</sub>S range, etc.



Do not change the "Factory Zero" and "Factory Span" values.

The Third analog output is only used for Total Sulfur options. Do not modify factory settings.

### Track Mode

This option allows activating or deactivating the analog output. Refer to Figure 3 area ①

### IO Name

IO Names are names assigned to the analog outputs. The name is up to the user's discretion. Figure 3 area ① shows the analog output names as "H<sub>2</sub>S" as default for standard configurations.

## Zero & Span

These columns refer to the range being measured. Since the variables used for the analog outputs are the analyzer H<sub>2</sub>S readings, the zero and span values are 0 to 20 ppm of H<sub>2</sub>S (for standard configurations). Refer to Refer to Figure 3 area ①



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For the standard factory configuration on 330S/331S, both 1 and 2 analog output variables are based on the analyzer H<sub>2</sub>S readings of sample 1.

For the standard factory configuration on the 330SDS/331SDS models, analog output 1 variable is based on H<sub>2</sub>S reading of sample 1 and analog output 2 variable is based on H<sub>2</sub>S reading of sample 2.

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## Factory Zero & Factory Span

These values are set at factory. They compensate for the differences on the resistors and capacitors in the controller board. Do not modify these values.

## Variable

Items used by the analog output to signal their current statuses. To select a new variable, go to the right hand menu on dark blue background and find the new variable. Click and drag the variable to the variable column and proceed to change the specification on the analog output row according to the new variable.

## Discrete Outputs

In this section of the ICE software, discrete outputs are named and their status states are set-up. Refer to Refer to Figure 3 area ②.

## IO Name

IO Names are names assigned to the discrete outputs. The name is up to the user's discretion. Names are set-up according to the analyzer standard factory configuration file. These names are based on what alarm variable they are used for. These discrete output names will appear in the Output Controls column in the Alarm tab section. Refer to Figure 3 area ②.

## Active State

Active state is the condition the discrete output will have when in alarm. If selected as "De-energized", the discrete output will be fail-safe. Refer to Figure 3 area ②.

# Alarm Configuration

In this section of the ICE software, alarms and alarm setpoint are configured. Refer to this section to learn how to add, modify, or delete an alarm.

## Adding an Alarm

Go into the "Alarm" tag, refer to Figure 4. This section will show the current alarm configuration on the analyzer.

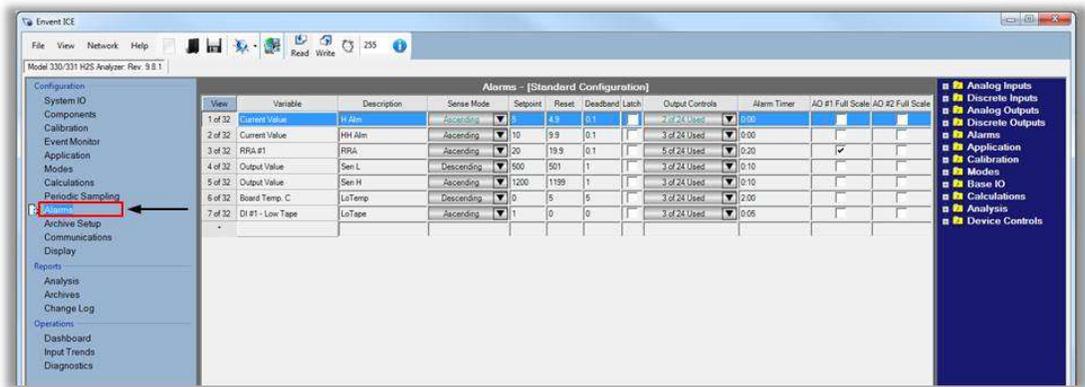


Figure 4. ICE Software: Configuration: Alarms Tab

To add an alarm, use the right hand menu on dark blue background to locate the appropriate variable as shown in Figure 4. On the right hand menu is where all analyzer variables can be found. In this example, we will add an Emergency System-Shutdown (ESD) using 15 ppm of H<sub>2</sub>S concentration readings as the setpoint. To add the appropriate variable for this example, click on Modes>Sample> H<sub>2</sub>S >Current Value. Refer to Figure 5.

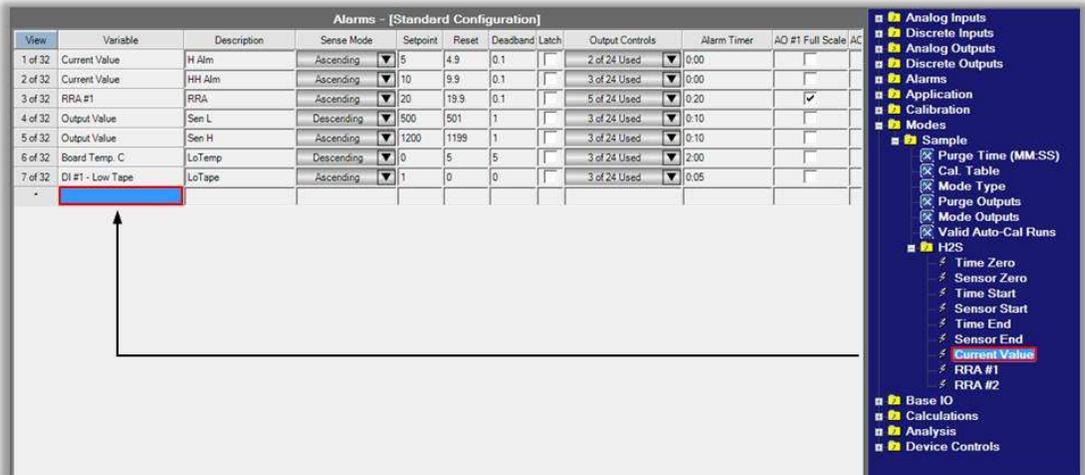


Figure 5. ICE Software: Adding Variable as an Alarm

Click on the appropriate variable, in this case "Current Value", and drag it all the way to the empty variable box, refer to Figure 5. Once the variable has been added to the list, you can proceed and change the alarm parameters on the variable. These parameters are:

#### **Description**

It will label the variable. This will identify the alarm on the display.

#### **Sense Mode**

Alarm will activate when variable values are ascending or descending.

#### **Setpoint**

The setpoint is the value at which the alarm will activate.

#### **Reset**

Value at which the alarm resets back to a no alarm condition. The reset value is calculated automatically from the setpoint minus the dead-band value assigned.

#### **Dead-band**

Area of a measured variable that must be compensated before the alarm condition goes to a non-alarm condition. The dead-band is use to avoid ON-OFF repeatedly if the variable value is close to the alarm setpoint.

#### **Latch**

Latching an alarm will keep its alarm condition even after the variable values are no longer in alarm condition. When an alarm is latched, it will need to be acknowledged through the display (ACK) or by remote acknowledge (through a Digital Input) for the control outputs to go back into normal state.

#### **Output Controls**

Output control or discrete outputs, when selected, will change states when the alarm is triggered. To select the active state of the discrete outputs, go to System IO>Outputs Tab>Discrete Outputs.

#### **Alarm Timer**

It is a timer delay for the alarm to activate once it has hit the setpoint and kept that alarm condition during the timer countdown. The analyzer recognizes the alarm condition but it will not go into an alarm state or activate any discrete outputs until the timer countdown has completed. (E.g. the temperature is set to 120 seconds and the setpoint is 0 Degrees Celsius - descending). The analyzer will go into alarm after the

analyzer reaches 0 Degrees Celsius or lower and stays at or below the setpoint during the full countdown.

### AO1 & AO2 Full Scale

It forces the analog outputs to full scale when a condition is met. For instance, if the RRA alarm setpoint is set to 20 ppm with a Full scale AO1 option checked (Checkbox), AO1 will immediately go to 20 mA or Full scale when the analyzer reads 20 ppm or more. This would happen before the actual analysis time is done (2-3 mins) which makes it ideal for immediate shutdown.

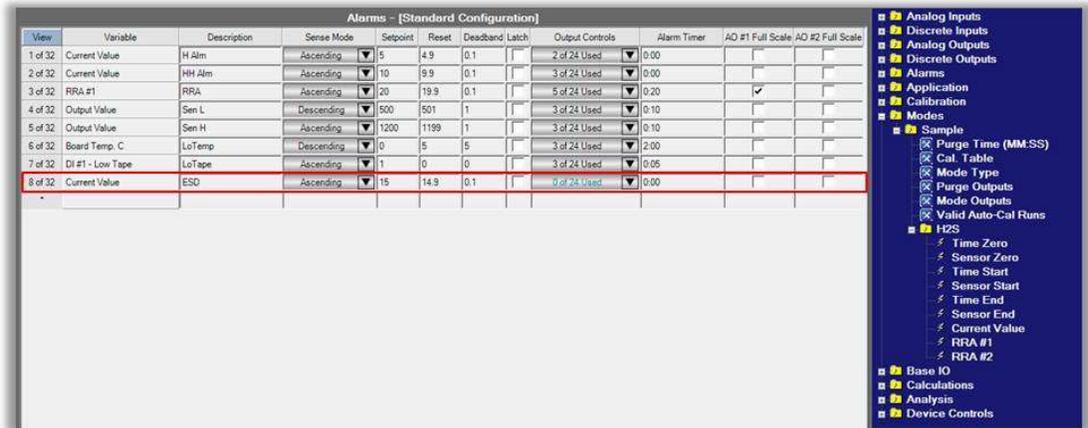


Figure 6. ICE Software: New Alarm Set-up

Figure 6, shows a new alarm non-latching, ascending, setpoint of 15 ppm, dead-band of 0.1, description as ESD, no output controls and no alarm timer.

To move the alarm up or down on the list, click on the "View" column for that specific alarm. In our example, click on the "8 of 32" box which highlights the entire alarm row. Then press control + up or down arrow keys.

### Removing an Alarm

Click on the "View" column for that specific alarm. Once the alarm row is highlighted, press "Delete" on the keyboard.

## Archive Setup Configuration

In this section of the ICE software, archiving is configured. To set up the archiving to record information on certain variables, go to the Configuration > Archive Setup Tab in the left side menu.

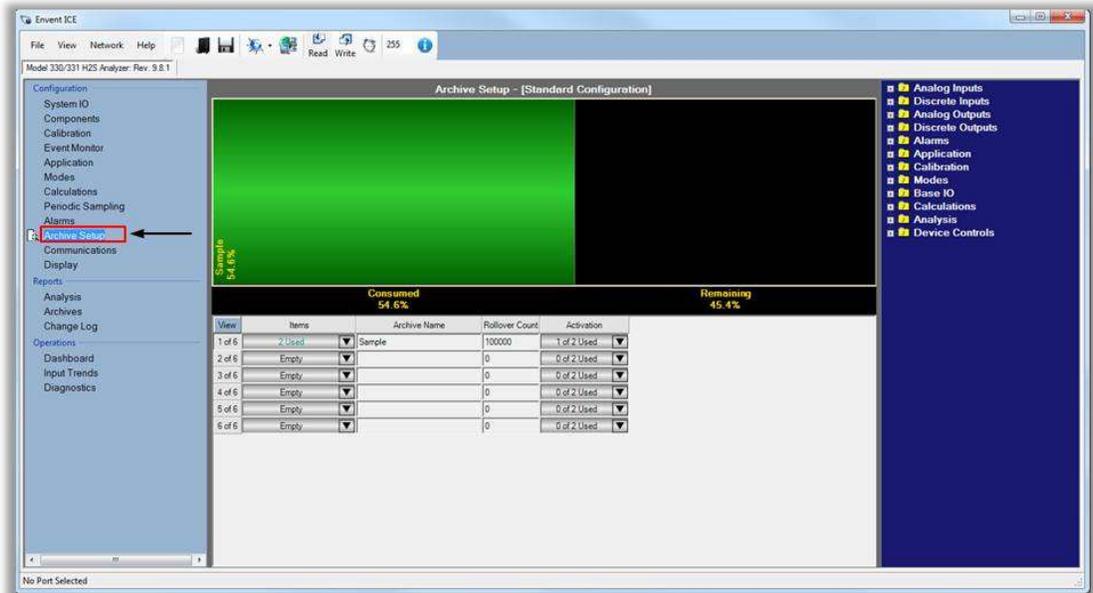


Figure 7. ICE Software: Configuration: Archive Setup Tab

The green-black box shown in Figure 7 is a representation of the memory capacity of the controller board for archiving information. The green area represents the memory that will be consumed or used by the items already selected and the amount (in this case 100,000 records). The black area represents the memory availability. Figure 7 shows that the two items or variable selected (in this case Current Value and Sensor Zero) with 100,000 records (per item) would use 54.6% of the total memory capacity.

### Item & Archive Name

There are up to 6 groups with a maximum of 6 items (variables) that can be added to each group. Group 1 name assigned for Figure 7 is "Sample".

### Rollover Count

It is the number of records per item that the analyzer will archive.

**Activation: End of Analysis**

The analyzer obtains a new H<sub>2</sub>S reading after the analysis cycle is completed (360 sec max). That is when the analyzer will record the values of each item selected. The average analysis time is 140 sec to 220 sec; depends on the application and the H<sub>2</sub>S range.

**Activation: Continuous (Always Set)**

When data needs to be recorded at a certain time interval regardless of the analysis cycle, this option is used. The time interval options vary from every 1 sec to every 30 min. The End of Analysis and the Continuous (Always Set) options can also be selected at the same time.

**Selecting More Items (Variables) Inside a Group**

To select items inside a group, locate the variables in the right hand menu on dark blue background and drag them into the "Item" column.

**Creating another Group**

To create a new group, simply select an item in the right hand menu on dark blue background and drag it into an empty row in the "Item" column. Assign a name, the maximum amount of records and the activation method.

## Retrieve Archives from the Analyzer

Go to the "Archive" tab under the report section in the left hand menu. Refer to Figure 8.

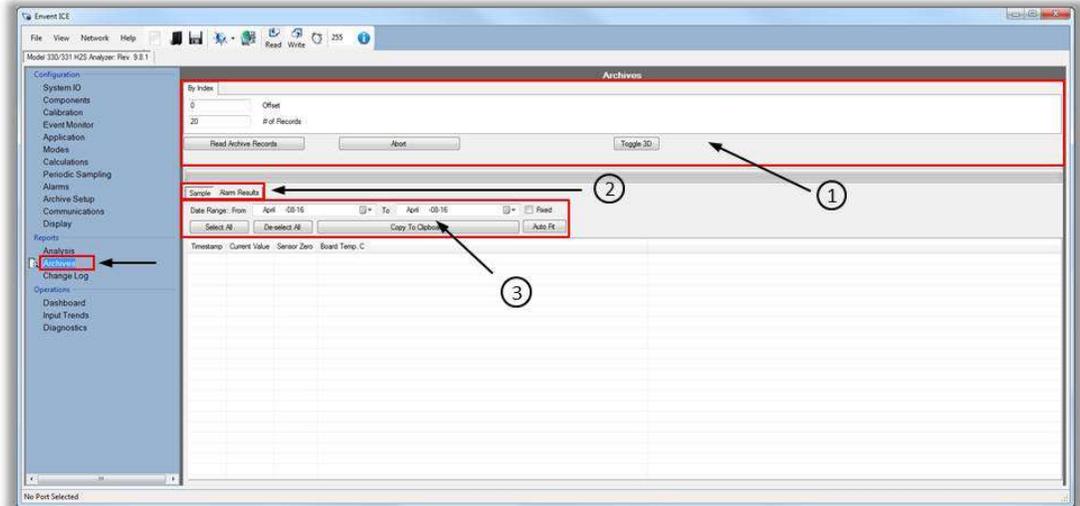


Figure 8. ICE Software: Reports: Archives Tab

### Read Archive Records

Retrieve the records from the analyzer by clicking on this button. The amount of records retrieved will depend on the offset and # of records. Refer to Figure 8 area ①

### # of Records

The number of records retrieved from the analyzer. By default the analyzer always retrieves from newest to oldest records. Figure 8 area ①.

### Offset

The records are always retrieved from newest to oldest. Use the offset to see the oldest records and skip the newest ones. E.g. the analyzer has recorded 1000 records, and only the first 100 records (Oldest) need to be retrieved, type in 900 in the offset box and this will skip the latest 900 records. Refer to Figure 8 area ①.

### Sample

On Figure 8 area ② shows "Sample" and "Alarm Result" buttons. "Sample" was the name giving to group 1 on the Configuration>Archives Tab.

### Alarm Result

The "Alarm Result" group is a fixed section that shows all the alarms state changes, bypass action, discrete input state change, etc. Refer to Figure 8 area ②. The

analyzer stores up to 1024 records from this fixed archive group. Recognize that these records are only saved when there is a state change. It is not based on a time frame or analysis time.

### Date Range

The Date Range is the option of retrieving data from specific calendar days. By default, the analyzer will always retrieve data from the current date. To always retrieve records from a specific Date Range, check the “Fixed” box to retrieve records from a specific time. Refer to Figure 8 area ③.

### Select/De-select All, Copy to Clipboard, & Auto Fit

Once archives have been retrieved from the analyzer, click on Select all and then click on Copy to clipboard. This data can then be used in a spreadsheet document.

The auto fit option is used to increase the column's width for when the variable's name being recorded is too long. Refer to Figure 8 area ③.

## Display Configuration

To configure or change the factory configuration on the display, go to the "Display" tab on the left hand menu. Figure 9 area ① shows the current variables that appear in the analyzer display. Area ② shows different options for the LED's, display options, and button options. Area ③ is used for adding special characters into the caption and units areas.

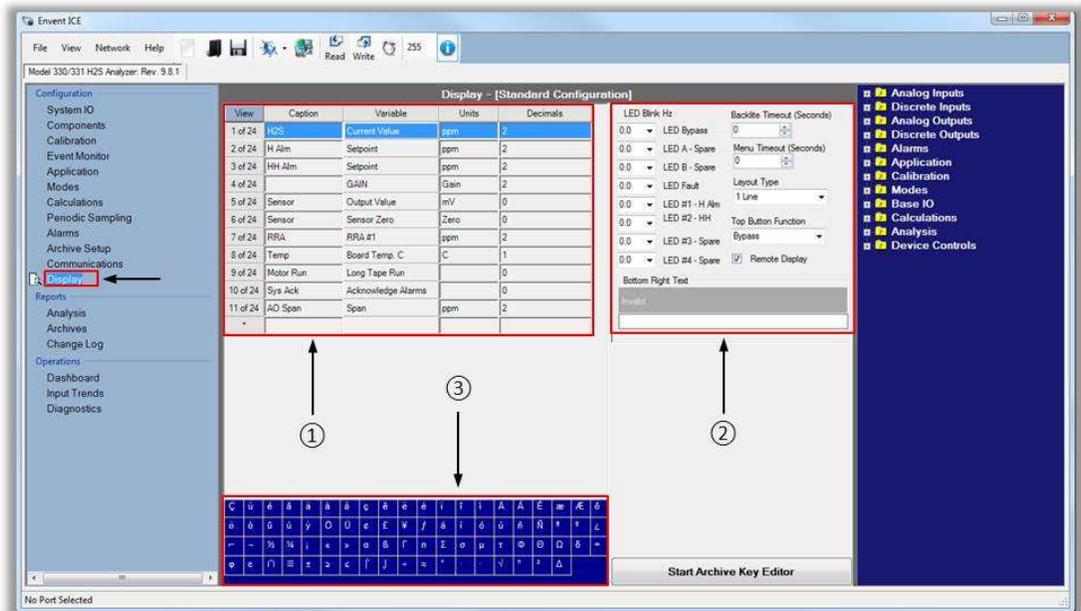


Figure 9. ICE Software: Configuration: Display Tab

### **Caption**

Names assigned to the selected variables to be shown in the display. The name is up to the user's discretion

### **Variable**

Item that will be shown in the analyzer's display. To select a new variable, go to the right hand menu on dark blue background and find the new variable. Click and drag variable to the variable box and proceed to change the specification on the analog output row according to the new variable.

### **Units**

Units are a simple multiple of the unit of measurement that describes the variable selected. Refer to Figure 9 area ①.

### **Decimals**

This is where the amount of decimals per variable are decided. Refer to Figure 9 area ①. For lower range H<sub>2</sub>S analyzers (e.g. 0-20 ppm) it is recommended to use 1 to 2 decimal points, but for high range (e.g. 0-10,000 ppm) it is recommended to not use decimal points as they are not significant enough for these ranges.

### **LED Blink Hz**

This option is used to make the LED blink when activated. The lower the value, the fastest it will blink. Zero value means no blinking. Refer to Figure 9 area ②.

### **Backlit Timeout (Seconds)**

Amount of seconds the display backlit will stay ON after pressing a display button. Zero means the backlit stays always ON. Refer to Figure 9 area ②.

### **Menu Timeout (Seconds)**

The amount of seconds the display will wait until it automatically returns to the main menu. Zero means the display will not return to the main menu automatically. The user will need to complete the menu cycle (by pressing the menu button – lower button) until it goes back to the main menu. Refer to Figure 9 area ②.

### **Layout Type**

This applies to the main menu in the analyzer display. The user can select from 1 to 4 items. These items refer to the variables selected in Figure 9 area ①. If "2 lines" is selected, the 1<sup>st</sup> and 2<sup>nd</sup> variables will appear in the main menu.



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The display text size will change accordingly to the number of lines displayed in the main menu.

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### Top Button Function

This feature allows the user to change the function of the top button in the analyzer display. By default, this button is set to be the bypass manual option. The other options are: Halt, Acknowledge, and Disable.

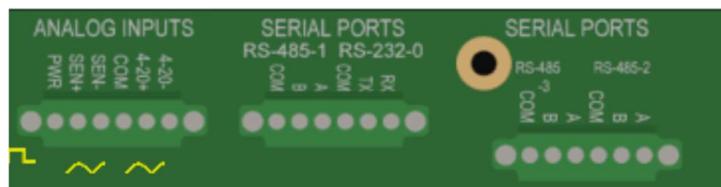
Keep in mind that the acknowledge option is already included in the display variables.

### Remote Display

This option allows having a remote display which it would be connected to the RS-485-3 on the controller board.

## Modbus Configuration

The Envent model 330S & 331S H2S analyzer come standard with modbus communication capabilities. The communication ports available are RS-232 and RS-485 connections. These ports operate at 9600 N 8 1 (no parity, 1 stop bit) using RTU protocol. (ASCII protocol is not supported). Modicon 16, Modicon 32 and Modicon Enron (Daniel) variants of the Modbus protocol are selected from a drop down menu in the Communications tab in the H2S ICE software.



Unless otherwise configured the default Unit address for the Envent H2S analyzer is set to 8. The communication protocol is Modicon 32. These values can be adjusted in the using the Envent ICE software. The modbus list in the H2S analyzer can be customized via the software, to make changes to the modbus list first connect to the analyzer.

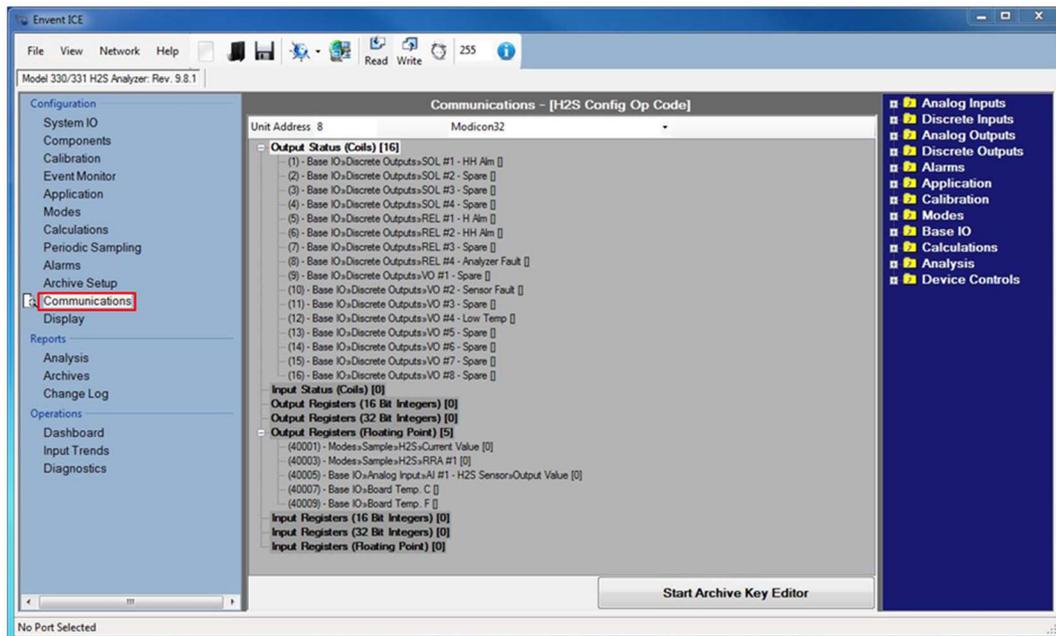


Figure 10. Communication's Tab

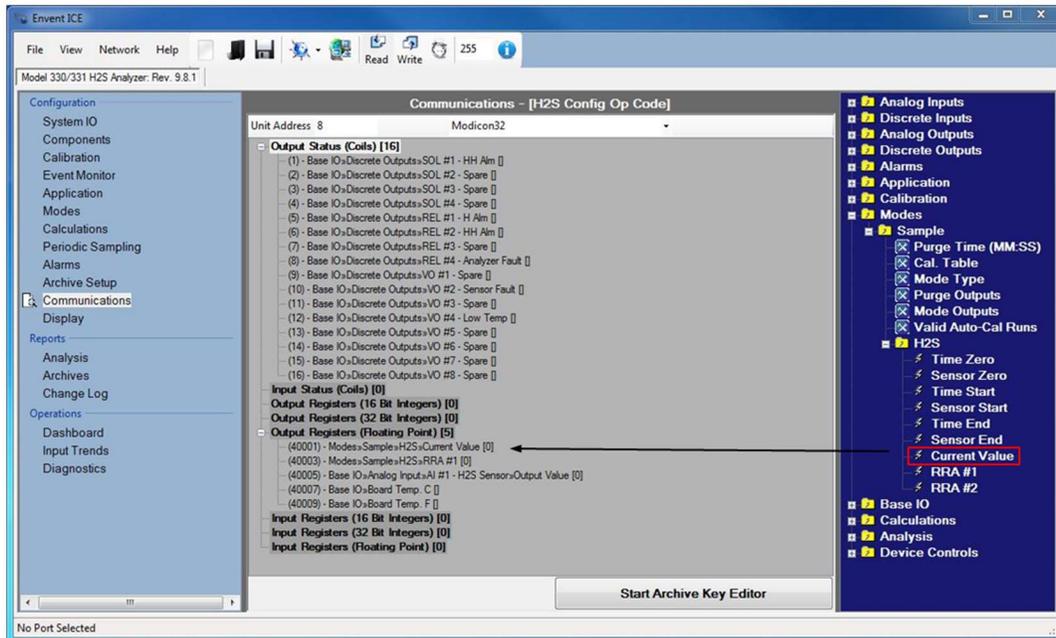


Figure 11. Adding a variable to a registry

Click and drag the variable in to the correct register area. Binary data ie. switch or relay status are normally configured as coils. Stream data such as the current analyzer reading are normally configured as Floats To move a register item, highlight it then press Ctrl and the up arrow. To delete an item, highlight it and press delete.

Save the changes to the analyzer by pressing the **Write** icon at the top of the screen.

### Modbus Registry



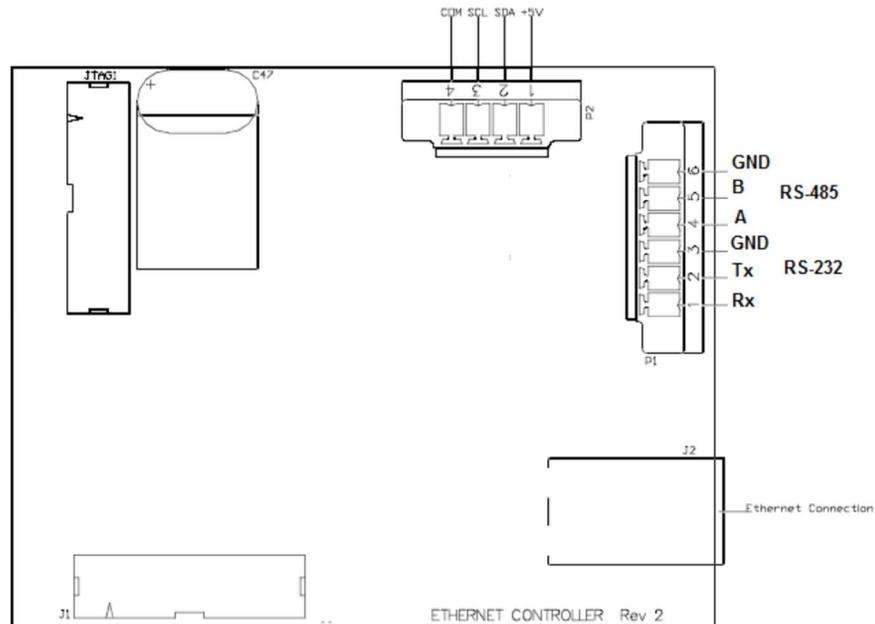
Please note that due to differences in PLC's, these registries may be shifted by one value. These can be modified if necessary using the H<sub>2</sub>S software.

These Modbus Registries may vary depending on the pre-configured application on the analyzer. These Modbus Registries are a sample for a 330S or 331S standard unit only.

Coils		MODICON 32-bit Standard protocol	Enron Protocol
Discrete Output 1	Solenoid 1	0000	1001
Discrete Output 2	Solenoid 2	0001	1002
Discrete Output 3	Solenoid 3	0002	1003
Discrete Output 4	Solenoid 4	0003	1004
Discrete Output 5	Relay 1	0004	1005
Discrete Output 6	Relay 2	0005	1006
Discrete Output 7	Relay 3	0006	1007
Discrete Output 8	Relay 4	0007	1008
Discrete Output 9	Virtual Output 1	0008	1009
Discrete Output 10	Virtual Output 2	0009	1010
Discrete Output 11	Virtual Output 3	0010	1011
Discrete Output 12	Virtual Output 4	0011	1012
Discrete Output 13	Virtual Output 5	0012	1013
Discrete Output 14	Virtual Output 6	0013	1014
Discrete Output 15	Virtual Output 7	0014	1015
Discrete Output 16	Virtual Output 8	0015	1016
FloodingPoint		MODICON 32-bit Standard protocol	Enron Protocol
Sample Current Value (H <sub>2</sub> S)		40001	7001
Sample RRA (H <sub>2</sub> S)		40003	7002
Analog Input Sensor		40005	7003
Board Temperature (°C)		40007	7004
Board Temperature (°F)		40009	7005

## Optional Ethernet Board Set-up

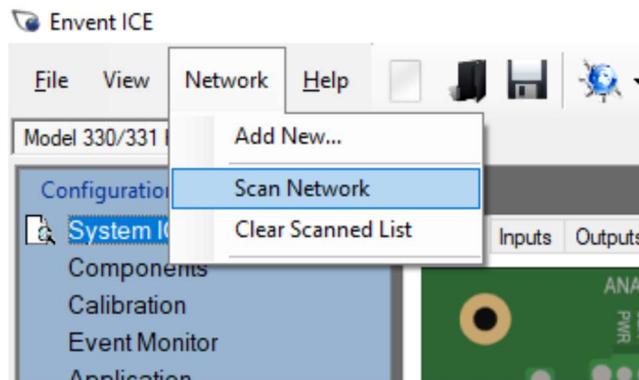
A communications board is available as an option for both the model 330S and 331S analyzers. This board adds an additional RS232 and an additional RS485 communications port (a total of two each). An Ethernet port is also provided that will support both configuration and Modbus communications (simultaneously if desired). The Ethernet port supports Modbus/TCP as well as standard Modbus.



Step 1) Ensure there is an Ethernet cable plugged into the networking card RJ45 connector with the other end connected directly to the laptop.

Step 2) Apply power to the analyzer and wait for the Green LED on the networking card to start blinking. (Indicates connection to the network)

Step 3) Select the menu item Network. Clear Scanned List.

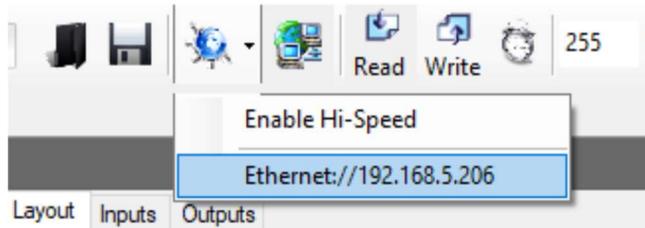


Step 4) Select the 'Scan Network' from the Network menu option and wait for approximately 10 seconds while the software detects the analyzers connected to the network.



If the current unit address does not appear the unit this may be due the wireless setting on the laptop. The wireless adapter needs to be disabled or turned off to force the scan through the wired connection.

Step 5) Select the globe icon and select the IP address.

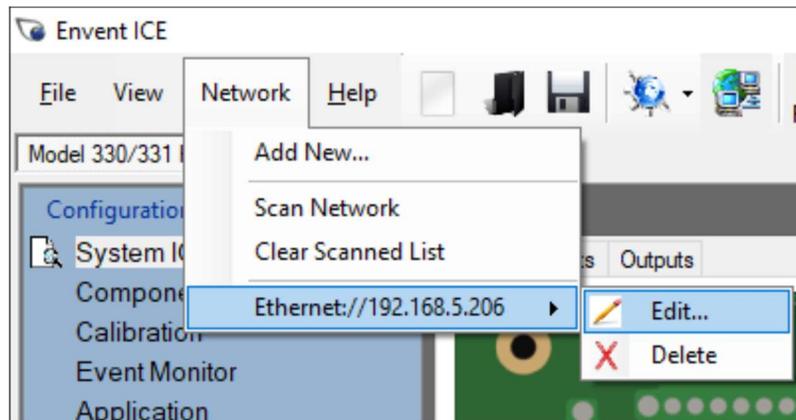


Step 6) Select Read to connect to the H2S analyzer.



[If the subnet or gateway of the PC is outside of range of the ip of the analyzer it may be required to adjust the IP address of the PC.]

Step 7) Once able to communicate to the analyzer the ip can be adjusted. By selecting Network → The Ethernet card → Edit.



Step 8) Make the changes required in the Device Configuration page and press Send Changes to the apply the changes to the card.

### Manually assigning a fixed IP address to the Communications Card

The communications card is shipped from the factory with the IP address left as all zeros (000.000.000.000). The network card assumes there is no fixed address and will look for a DHCP server on the network from which to acquire an address.

If the analyzer cannot be connected to a router supporting DHCP the IP address can be configured to a fixed address with a laptop by performing the following procedure.

1. Disable your wireless card
2. Connect a standard network cable from the laptop to the communication card
3. Check that the led indicator next to the RJ45 network connector on the laptop illuminates. Any recent laptop will support network communication using a standard networking cable. Very old laptops may require a "crossover network cable" which is available from any office supply store.
4. From the Windows Start Icon, select run, type cmd. This will bring up a DOS box.
5. Type ipconfig, and confirm a valid IP address has been assigned.

```
C:\Windows\system32\cmd.exe
Windows IP Configuration

Ethernet adapter Local Area Connection:

    Connection-specific DNS Suffix  . : 
    Link-local IPv6 Address . . . . . : fe80::b414:58b3:e07:db69%11
    IPv4 Address. . . . . : 192.168.5.16
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 192.168.5.1

Tunnel adapter Local Area Connection* 11:

    Connection-specific DNS Suffix  . : 
    IPv6 Address. . . . . : 2001:0:4137:9e50:8b4:3d20:3f57:faef
    Link-local IPv6 Address . . . . . : fe80::8b4:3d20:3f57:faef%12
    Default Gateway . . . . . : 

Tunnel adapter isatap.{BA5CB7A1-6AFD-4191-87D3-75BE9A46E957}:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . : 

C:\>
```

6. If a valid IP has not been assigned Media State.....Media disconnected will be displayed. In this case restart the computer. This indicates that you are required to have a crossover cable.
7. Note the IP address assigned to the analyzer from the Envent ICE software.
8. From the Control Panel, select Local Area Connection
9. Right click, then select Properties
10. Select Internet Protocol (TCP/IP)
11. Select Properties
12. Select Use the following IP Address
13. Enter an IP address one of two address above the analyzer.

This document has been continuously improved and revised over time; see the table below for revision (rev) information.

Revision No.	Revision Date	Revision Description
2.4	Jan 2019	The software section will no longer be on the User's manual. The software section will now be its own separate manual (addendum). To keep consistency, the starting revision on this manual is 2.4 as it is the User's manual at the time of the split.
2.5	30 May 2019	Manual's Content Improvements

Decimal increases on revision numbers (E.g. Rev 1.0 to Rev 1.1) on this user manual means that content changes will not affect or contradict Intertek certification documentation, thus the notified body does not need to be informed of the changes; for instance, improving writing or layout. A full unit change (E.g. Rev 1.0 to Rev 2.0) will mean that the content changes must be communicated and updated to the notified body.

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