

MODEL 331 HYDROGEN SULFIDE ANALYZER OPERATION AND INSTALLATION MANUAL

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Envent Engineering Ltd.

Bay E 7060 Farrell Road S.E.
Calgary, Alberta, Canada
T2H 0T2

Phone: (403) 253-4012

Fax: (403) 253-4016

www.envent-eng.com

info@envent-eng.com



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System Drawings

*Copies of the Manual are available at <http://www.envent-eng.com/manuals.php>
The latest version of the software can be found at <http://www.envent-eng.com/EnventH2S.zip>*

Introduction

The Model 331 hydrogen sulfide analyzer can be configured via software and hardware to measure a wide range of hydrogen sulfide concentrations in gases and liquids. With the addition of a hydrogen reaction furnace, the analyzer is also capable of total sulfur measurement. This manual describes the operation of the hydrogen sulfide analyzer. Additional sections will describe the operation of any optional equipment.

Specifications

Measurement method	ASTM D4084 - 07 : Standard Test Method for Analysis of Hydrogen Sulfide in Gaseous Fuels (Lead Acetate Reaction Rate Method)
Ambient	0-50 Deg C° (std) consult factory for other requirements
Power	12-24 vdc @ less than 3 watts, optionally 100-240 VAC50/60 Hz, 5 watts Class I Division 2 Groups A,B,C,D Certified to CSA standards
Output Ranges	0-50 parts per billion to 0-100 ppm are standard. Higher ranges require the dilution option
Response time	20 sec to 90% of full scale
Accuracy	1.5% of reading
Outputs	Two 4-20 mA outputs (Loop Powered) Optional 4-20 mA powered output boards available. Serial (1) RS-232 Modbus protocol (1) RS-485 Modbus protocol Four alarm relays (SPDT, 120 VAC 5 Amp maximum) Four solid state solenoid drivers
Displays	2x16 character LCD with back lighting Menu is scrolled using an internal button
Optional Equipment	
Total Sulfur	Total sulfur furnace converts all sulfur compounds to hydrogen sulfide which allows analyzer to measure total sulfur.
Auto Calibration	Allows automatic calibration of the analyzer on a timed schedule or operator initiated basis.

Stream Switching Allows switching of two input streams or from hydrogen sulfide to Total Sulfur measurement

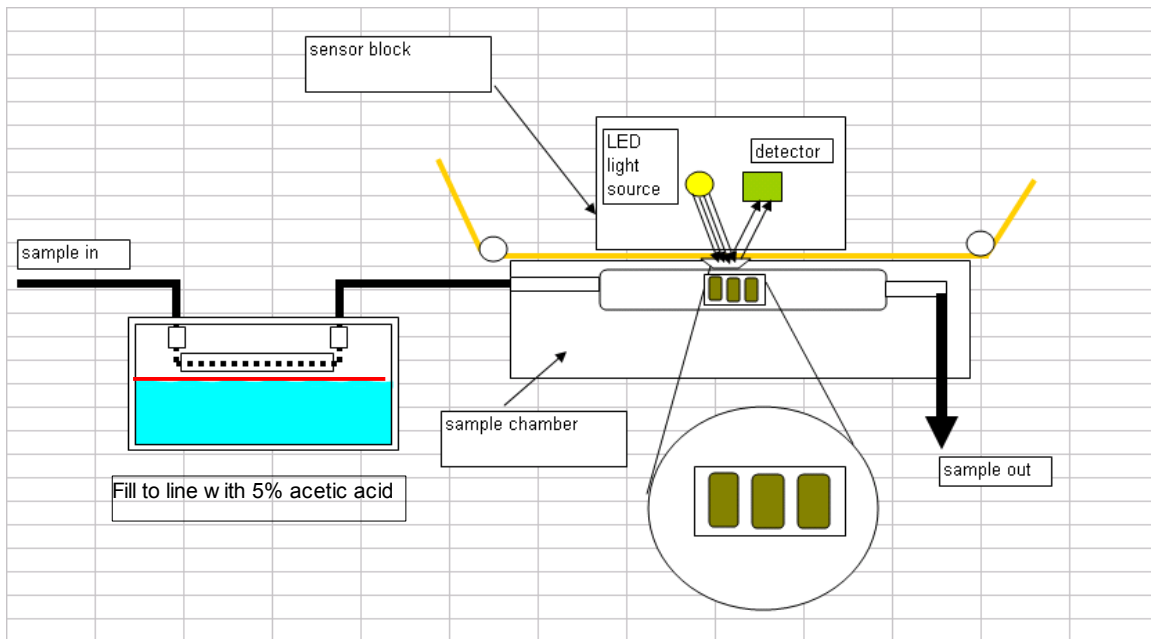
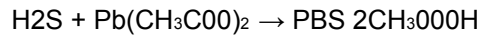
Dilution Permeable membrane technology allows measurements above 100 ppm hydrogen sulfide

Liquid sampling Liquid sample system to measure hydrogen sulfide in liquids

Principle of Operation

The Envent Engineering Ltd. Model 331 uses ASTM D4084 - 07 : Standard Test Method for Analysis of Hydrogen Sulfide in Gaseous Fuels (Lead Acetate Reaction Rate Method).

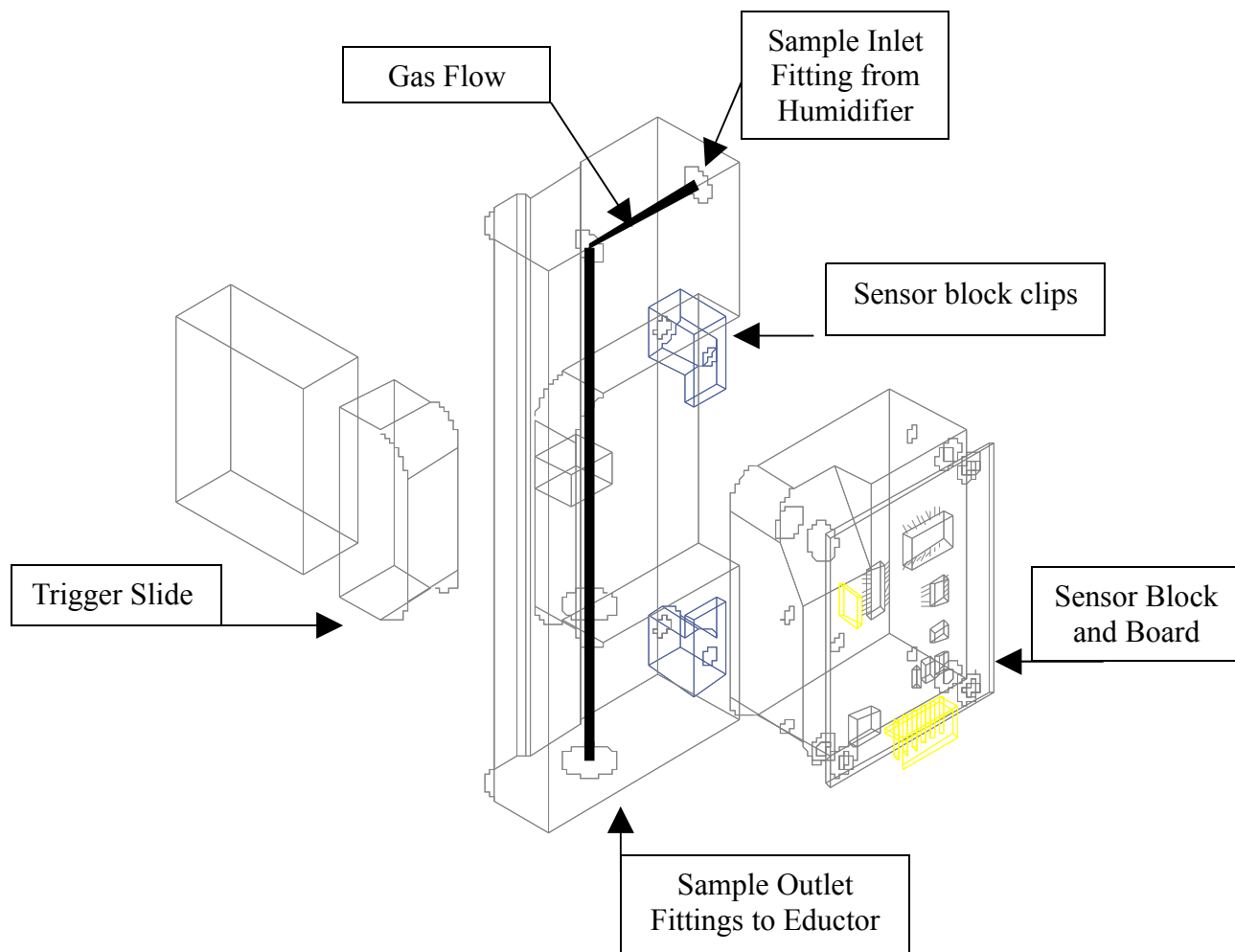
When hydrogen sulfide contacts the sensing tape a brown stain appears. The Model 331 electronics measure the rate of darkening over time and calculates the hydrogen sulfide concentration.



Sample Flow Schematic

In the above diagram a flow and pressure regulated filtered sample passes through a membrane humidifier and into the sample chamber. A window in the sample chamber allows the sample gas to come in contact with the tape creating a concentration dependent stain when hydrogen sulfide is present. In high concentration applications (over 20 ppm), there may be a restricting aperture behind the window.

Measurement range	Aperture	PN
100 ppb to 10 ppm	No aperture	
10 ppm to 20 ppm	1/16"	330103
20 ppm to 50 ppm	1/32"	330102
50 ppm to 100 ppm	1/64"	330101
>100 ppm	Consult factory	



Sample Chamber and Parts

Installation and Start-up

Your 331 analyzer was configured, functionally tested and calibrated at the factory. All test and calibration data is documented in the Factory Calibration Report at the end of this manual.

The analyzer should be mounted in an area in which it is not exposed to vibration and excessive pressure and temperature variations. The 331 is designed for Class I Division 2 areas.

Ensure that the analyzer received is suitable for the hazardous area classification.

Sample Point Selection

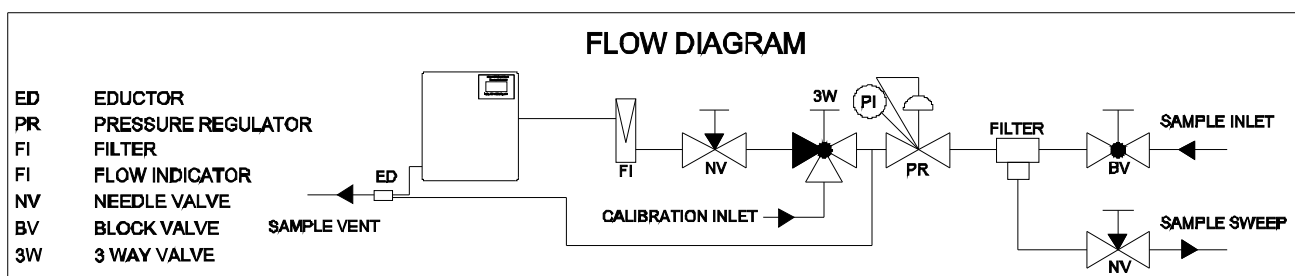
The sample sent to the analyzer must be representative of the stream and should be taken from a point as close as possible to the analyzer to avoid lag time and sample degradation in the lines. The sample should be taken from the middle 1/3 of the pipe diameter.

Sample Volume and Flow Rate

The sample should be supplied to the analyzer at 10-15 psig and the flowmeter set to 2.0 (100-200 cm³/min.) A bypass sweep is recommended to reduce sample lag time in the sample line if it is at high pressure or longer than 15 feet. It is best to reduce the pressure to 10 or 15 psig as close to the sample point as possible.

Sample Conditioning

The function of the optional sample system is to regulate and remove particulate or free liquids in the sample. Consideration must be taken for upset conditions as well as normal conditions when designing the sample system.



Typical Sample System with Coalescing Filter

The sample system consists of a 5000 psig inlet filter coupled to a 3000 psig inlet regulator. A three-way valve allows the user to switch from sample gas to calibration gas. The drain valve on the filter is left slightly open to drain any liquids that may collect and to increase the sample velocity to reduce lag time in the sample tubing piping.

Installation Procedure

1. Unpack the analyzer and Check for Damage.
2. Ensure that the analyzer power supply and range are suitable for the application.
3. Check that the hazardous location rating is suitable for the installation location.
4. Select an installation location that is close to the sample point. Ensure that the selected installation site provides adequate room for maintenance and repair.
5. Bolt the analyzer to the wall with the display window at approximately eye level.
6. Wire power, analog outputs and relay outputs to the analyzer.
7. Tube the sample inlet, sweep and vent lines to the analyzer. 1/4" 316 stainless steel tubing is recommended for the sample tubing. 1/8" 316 stainless steel tubing can also be used if the response time of the analyzer is of particular concern. All fittings in the sample and vent lines must be 316 stainless steel (Swagelock or equivalent). The vent line should be tubed in 3/8" stainless steel tubing to a maximum of 6 feet. 1/2" 316 stainless steel tubing should be used for vent lines exceeding 6 feet.

The tubing should be installed with a slight downward slope and should be as short as possible. The vent line must be tubed to atmospheric pressure and **cannot** be connected to a flare line. Avoid connecting multiple vents to the same line. Please refer to the venting recommendation drawing at the end of this manual.

8. Ensure the analyzer has a sufficient quantity of sensing tape and acetic acid. A sensing tape and one liter of acetic acid were provided with the analyzer.
9. With the sample pressure turned off. Apply power to the analyzer. The display will illuminate and the sensing tape will advance.
10. Press the menu button until mv is displayed. Check that the mv reading is 1000 mv +/- 100 mv.
11. The sample gas pressure can be applied.
12. Open the sweep valve slightly and adjust pressure regulator to 15 psig and the valve on the flowmeter to 2.0.
13. Allow twenty minutes for the analyzer to stabilize. The analyzer calibration can be verified if calibration gas is available (refer to the calibration section). If no calibration gas is available, the analyzer may be operated using the factory calibration settings until calibration gas is available.

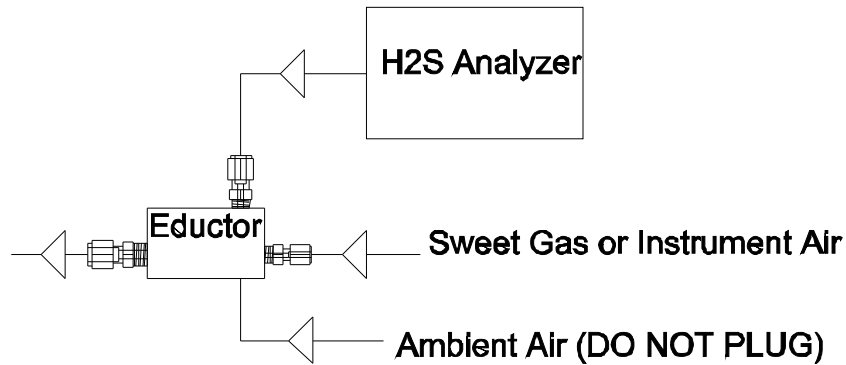
Sample Lag Time vs Tubing Size

<u>Tube size</u>	<u>Tube Gauge</u>	<u>ID inches</u>	<u>ID cm</u>	<u>Flow SCFH</u>	<u>Flow Std. cc/ min</u>	<u>Pressure PSIA</u>	<u>Time Lag per 100ft Minutes</u>	<u>Time Lag per 100ft Seconds</u>
3/8	20	0.319	0.8103	5	2359	800	36.3	2178
3/8	20	0.319	0.81	5	2359	200	9.07	544
3/8	20	0.319	0.81	5	2359	50	2.27	136
1/4	20	0.18	0.459	5	2359	800	11.69	701
1/4	20	0.18	0.46	5	2359	200	2.92	175
1/4	20	0.181	0.46	5	2359	50	0.73	44
1/8	24	0.08	0.205	5	2359	800	2.34	140
1/8	24	0.08	0.21	5	2359	200	0.59	35
1/8	24	0.081	0.21	5	2359	50	0.15	9

Note: using the internal menu button, the second line of the display on the default configuration can be cycled to display sensor millivolts, alarm 1 High & High High status and Alarm 2 status.

Eductor Vent Assembly

An eductor is provided with the 331 analyzer. It's function is to eliminate any effect on the analyzer reading from ambient pressure and to minimize the possibility of the vent line freezing in cold weather. The eductor uses the sample pressure to create a slight vacuum on the vent line.

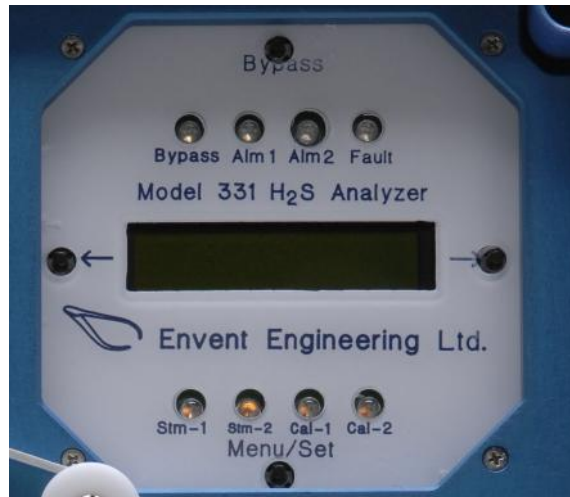


Eductor Assembly

The eductor is required to comply with the electrical certification in division 2 areas.

Operator Interface

The 331 is configured from the front panel. A computer interface is also available and described in a separate section.



Calibration & Alarms

The calibration and alarm settings on the 331 were set at the factory. The calibration factor or gain adjustment can be found on the "Factory Calibration Sheet" of the manual. The factory calibration sheet also specifies the alarm settings. Alarm settings can be read and adjusted using the push buttons on the 331 face plate.

Calibration Procedure for the Envent Model 331 hydrogen sulfide analyzer

Ensure a suitable calibration gas and a stainless steel regulator with the correct CGA fitting is available. Ensure the regulator is rated for the calibration cylinder pressure.

The recommended calibration gas is certified and analyzed hydrogen sulfide in a balance of Nitrogen

The calibration gas concentration should be approximately 2/3 of the full scale range of the analyzer. Or should be specified at the shut-in alarm point

The recommended supplier is AirGas

Note: The menu can be navigated with the pushbuttons on the model 331 analyzer. The top line of the display will show the hydrogen sulfide concentration; the lower line can be set to a number of diagnostic values.

Calibration:

Turn off the sample flow

Press the bypass button and verify the Bypass led illuminates

Ensure an adequate supply of sensing tape and acetic acid

Press the Menu/Set button until mV is displayed

Verify that the mV reading is 1000 mV +/- 100 mV with white sensing tape in front of the sample chamber

If the mV reading is less than 900 mV or greater than 1200 mV, ensure the sample chamber is clean and the sensing tape is free from brown stain.

Remove the cover over the sensor block. Press the small pushbutton located on the lower side next to the wire connector. The sensor block will enter a "re-zero" procedure indicated by a red led.

When the "re-zero" procedure is complete the green led should illuminate.

Initiate a motor run (MTR RUN) using the display interface and re-check the mV value of the sensor while reading on white tape.

Turn on the calibration gas flow, set the flow meter to 2.0 and the calibration gas pressure to 15 psig.

Allow the analyzer to stabilize for 10 to 15 minutes.

Press the Menu/Set pushbutton until *Gain* is displayed.

The gain is adjusted by pressing the right and left arrows until the cursor is under the number you wish to change. Use the menu/set pushbutton to scroll numerically. After the desired gain value is obtained press the right (arrow) "scroll" button until the display screen reads "saved".

Adjust the gain setting until the analyzer reads the correct concentration.

The new calibration gain should be compared to the factory gain as noted in the factory calibration sheet. If the new gain is substantially different than the factory calibration value, the sample chamber may require cleaning or the sample system may be contaminated.

It is a good practice to record the date and results of the calibration in a maintenance log located at the analyzer.

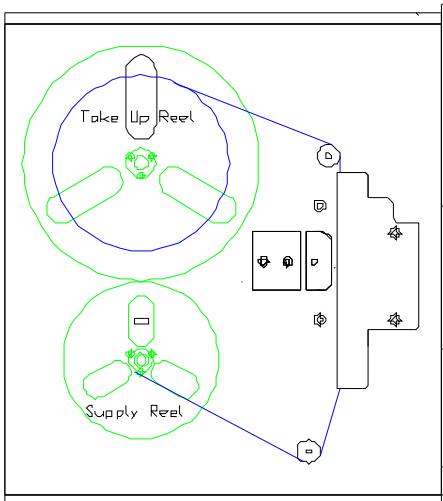
Remove the calibration gas.

Re-connect the sample gas.

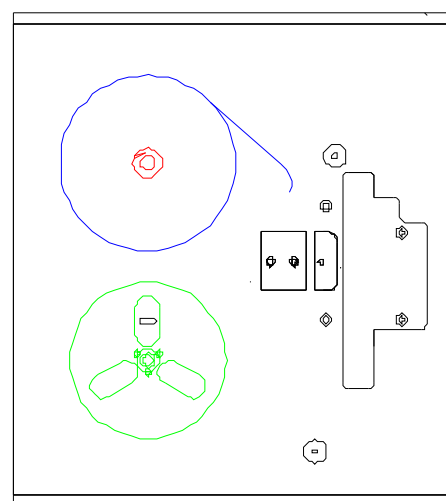
Allow the analyzer to return to a no-alarm condition

Remove the analyzer from bypass

Tape Change Procedure

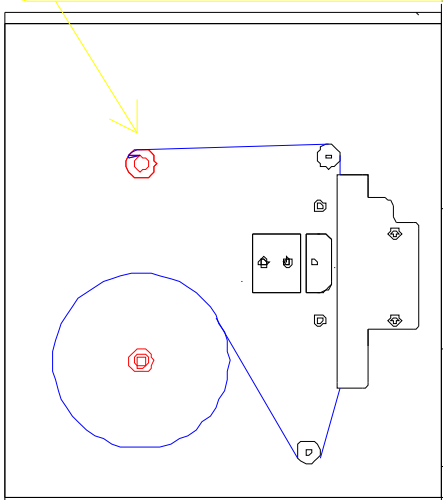
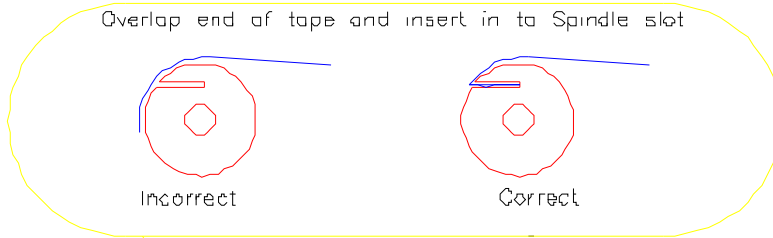


Step 1: Place analyzer in BYPASS

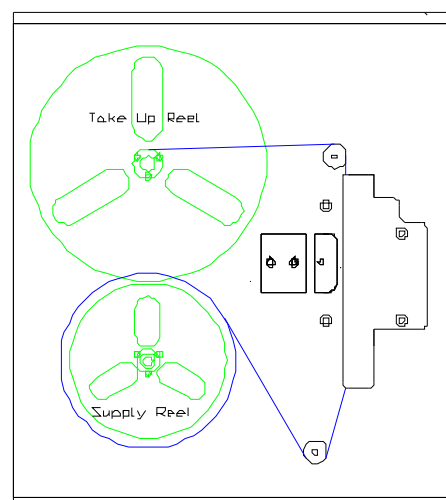


Step 2: Remove Reel covers
Step 3: Discard old Tape

Overlap end of tape and insert in to Spindle slot

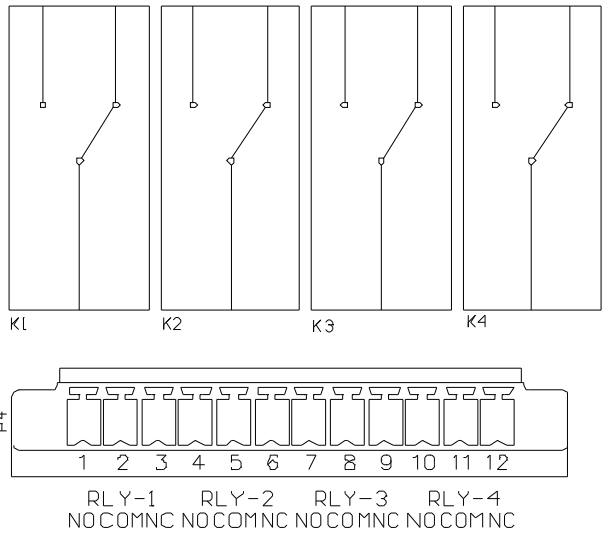
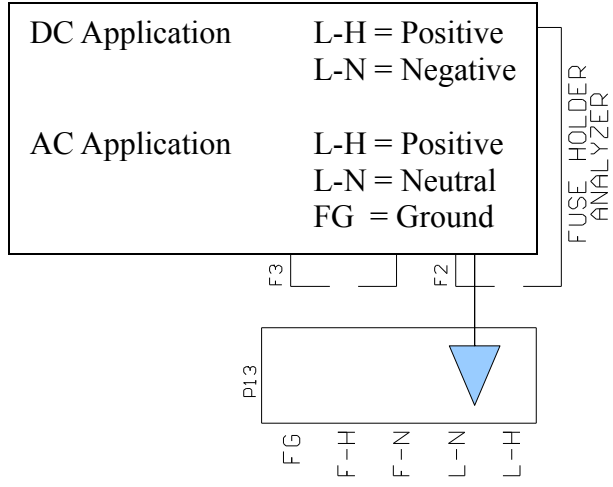
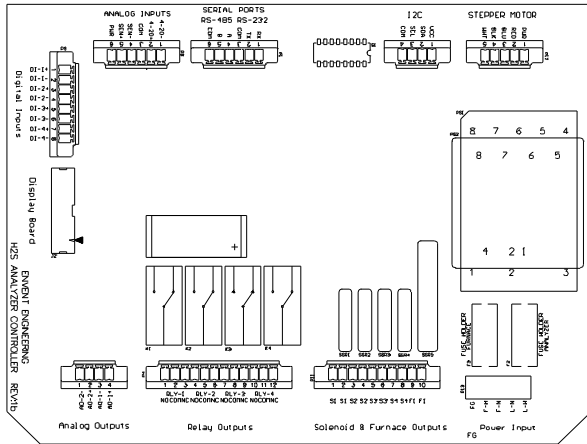


Step 4: Install new tape on Supply Reel
Step 5: Run tape through to a Take Up spindle

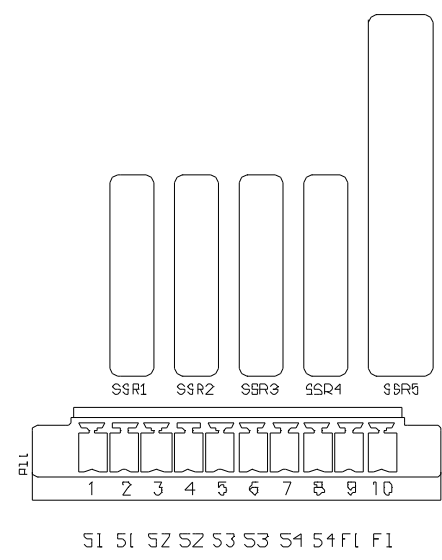


Step 6: Re-attach Reel Covers
Step 7: From Display do a MTR Run.
Step 8: Take analyzer out of BYPASS

Customer Connections



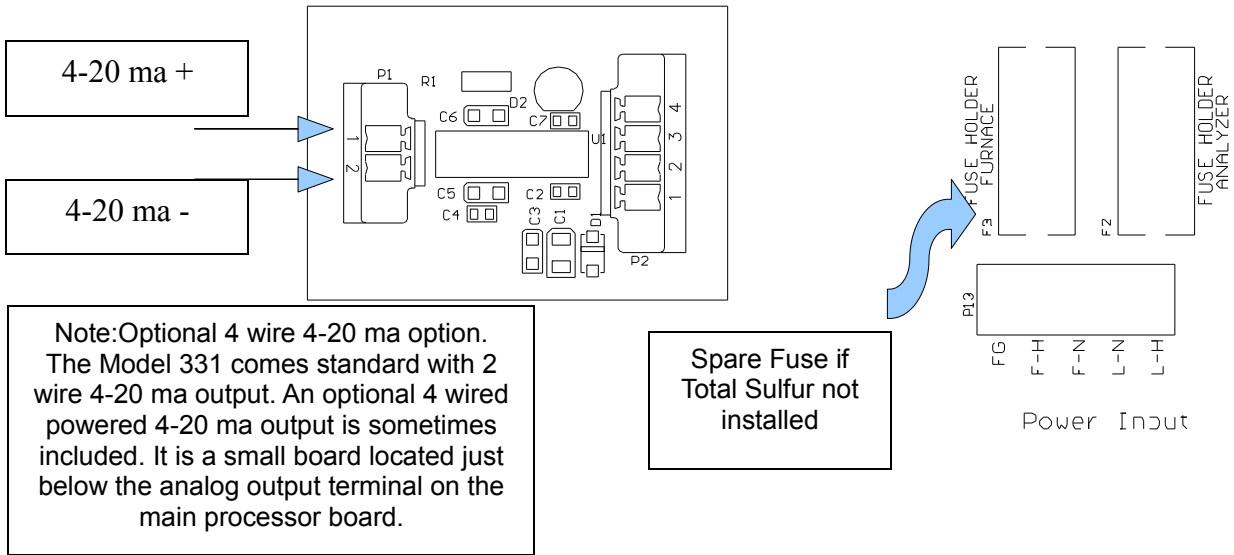
Relay Outputs



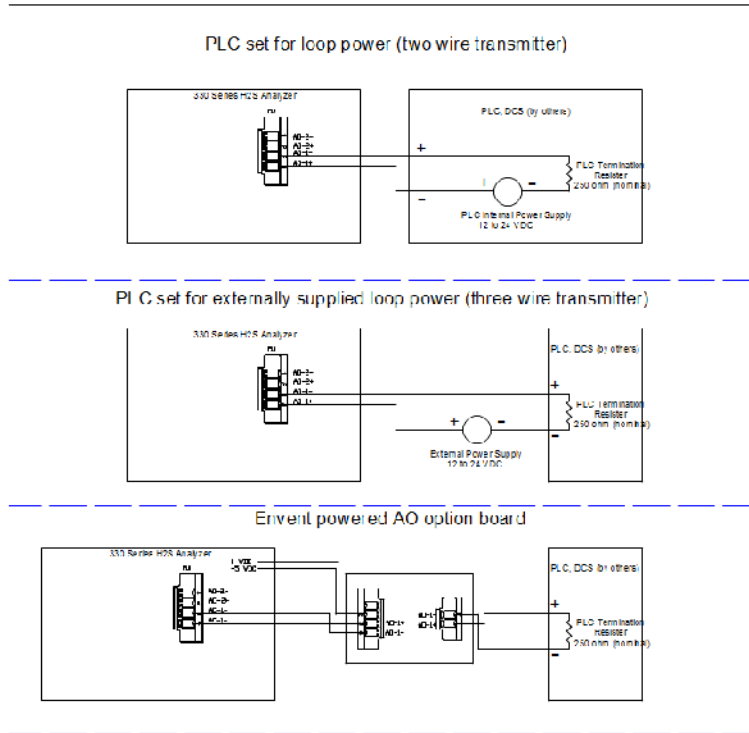
Solenoid & Furnace Outputs

Controller Board Layout Relay Outputs and Solenoid Drivers

Four relays are provided as status outputs, to drive external relays or solenoids. Envent recommends use of solenoid drivers for external loads. DO NOT supply external power to solenoid drivers. Four solenoid drivers are provide to directly drive solenoids for shutdown, auto-calibration or stream switching.



Powered 4-20 mA Option



4-20 ma output wiring options

Maintenance & Trouble Shooting

Monthly Check-up

Your analyzer will provide reliable service with very little attention. If the analyzer is kept clean there should be no reason to recalibrate from factory gain settings. However, a weekly check-up will ensure that the analyzer is operating to specifications. Check that the tape take-up and feed reels are tight and flow meters are free of liquid or solids contamination. Replace inlet filters as required.

Trouble Shooting

Problem	Possible reasons	Possible Solution
Erratic Readings	a. Trigger slide not seated properly	Ensure trigger slide is seated in groove of sample chamber
	b. Pressure in building moving up and down from fan, exhaust or wind.	Eductor may be plugged or vent plugged. Ensure vent tubing is 3/8" or larger and that tubing and fittings are 316 stainless steel
	c. Sample vent either blocked or frozen	Vent should be 3/8" or larger tubing on a downward slope. Possible heat trace required.
	d. Liquid carry over in sample system	Sample system requires cleaning. Refer to Cleaning procedures.
	e. Regulator not maintaining 15 psig	Pre-regulation to 50 psig of sample at sample point. Possible regulator requires repair or replacement Hydrocarbon liquid carry over through the sample regulator. Heated regulator may be required
	f. Analog Input 2 jumper removed.	Re-install jumper in Analog Input across (+4-20 & -4-20)
	g. Sensor block fault	Re-zero Sensor block. Refer to Sensor Re-zero procedure.
	h. Contaminants in sample chamber	Check and replace filter if required. Clean sample chamber. Replace apperature and window if required.
Tape does not advance	a. No tension on take up reel	Check setscrew in take up reel. Check to see if manual advance possible on tape.
Tape breaking	a. High liquid content in sample gas	Genie probe and additional filtration may be required.
	b. Feed wheel not spinning freely	Dust and refuse build up between feed wheel and chassis. Requires removal and cleaning of chassis.
	c. Tape cover wheels pressing against tape.	Tape cover wheel became warped. Needs to be flattened to not contact tape when on feed

		wheel bolt.
	d. Trigger slide not seated properly	Ensure trigger slide is seated in grove of sample chamber
Slow Response	a. Aperture in chamber not optimized for sample stream hydrogen sulfide reading.	Removal or change of aperture type required. Contact Envent tech support for ideal setting
	b. Liquid contamination in sample tubing	Sample system requires cleaning. Refer to Cleaning procedures.
	c. Sensor block in fault	Re-zero Sensor block. Refer to Sensor Re-zero procedure.
Higher or Lower than expecting reading	a. Liquid contamination in sample tubing	Sample system requires cleaning. Refer to Cleaning procedures.
	b. Sample vent either blocked or frozen	Vent should be 3/8" or larger tubing on a downward slope. Possible heat trace required.
	c. Contaminants in sample chamber	Sample system requires cleaning. Refer to Cleaning procedures.
Fault light indicated	a. Sensor Low fault	Re-zero Sensor block. Refer to Sensor Re-zero procedure.
	b. Sensor High fault	Re-zero Sensor block. Refer to Sensor Re-zero procedure.
	c. Low Tape	Sensing tape requires change. Possible low tape sensor failure. May require replacement.
	d. Low press	Pressure on outlet of regulator is lower then set point of pressure switch. (<i>factory set to 10 psi</i>)
Sensor Fault	a. Sensor didn't zero on white tape.	Re-zero Sensor block. Refer to Sensor Re-zero procedure.
	b. Sensor Wire failure	Wire or Sensor requires replacement.

Re-Zero Sensor Procedure

1. Put the Analyzer in bypass
2. Turn off the sample gas at the flow meter
3. Press the Menu/Set button until *Mtr Run* displayed
4. Press the Left or Right button on the display to move the tape
5. Remove the cover over the sensor block. Press the small pushbutton located on the lower left side next to the wire connector. The sensor block will enter a "re-zero" procedure indicated by a red led.
6. When the "re-zero" procedure is complete the green led should illuminate.
7. If the green led does not illuminate, ensure that the tape is clean and white and that the sample chamber is free of tape dust. Re-zero again
8. A sensor block that will not zero on clean white tape requires replacement. Contact Envent Engineering Ltd.

9. Initiate another motor run
10. Press the Menu/Set button until millivolts is displayed. The millivolt value should be between 900 & 1100 millivolts.
11. Turn on sample gas to flow of two.
12. Ensure the analyzer reading is below the alarm settings
13. Take analyzer out of bypass.

Cleaning the Sample System

During startup or plant upset situations, the hydrogen sulfide analyzer may become contaminated with hydrogen sulfide scavenger solution. This condition can be determined at calibration. The analyzer will read low and require incremental increases in the gain to maintain calibration. Please refer to the factory calibration sheet for the default gain factor. The scavenger solution is water soluble and therefore is relatively easy to clean.

Cleaning Material List.

Alconox Laboratory cleaner or equivalent residue free cleaning agent. Do not use solvents, soaps or detergents.
 Fresh water.
 100% Isopropyl Alcohol. Do not use rubbing alcohol
 Large bucket to mix cleaning solution
 Rinse bottle

Procedure:

Mix a 1% (2-1/2 tbsp per gal.) of Alconox in warm water.

Sample Tubing

Shut off flow at the sample point prior to sample system
 Flush the sample line and components with cleaning solution
 Rinse with fresh water
 Flush with isopropyl alcohol
 Dry with clean, dry instrument air or gas

Sample System

Note: Disassembly of the pressure regulator and solenoids in the field is not advised. Consult the factory if the regulator or solenoid appears contaminated

Remove filter elements from filter housings and discard
 Remove all sample system components and soak in cleaning solution
 Ensure valves are fully open when cleaning. 3-way valves should be cleaned with handle in all positions.
 Flush sample components with fresh water
 Rinse with isopropyl alcohol
 Blow dry with clean compressed air or fuel gas
 If the Tygon tubing appears discolored replace with new tubing
 Tubing on the humidifier should be replaced if it appears contaminated
 Install new filter elements into filter housings
 Re-assemble Stainless Steel Tubing to analyzer according to analyzer drawing (refer to back of manual)
 Once sample system has been re-assembled. Apply calibration gas to the analyzer.
 Adjust gain to indicate the value from the factory calibration sheet.
 Gains for streams should be +/- 2.00 from factory cal sheet or last calibration. If reading is not within range, then system may need further cleaning. Please consult the factory.

Recommended Spare Parts List

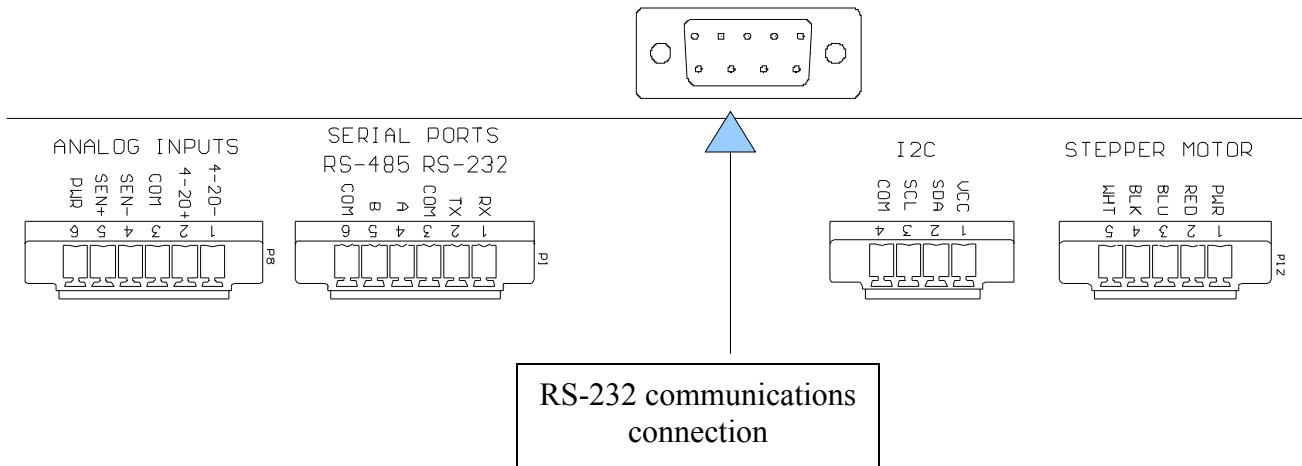
331 Recommended Spare Parts for 2 years service

2 yrs

330079	2	Rear Window & Gasket
330103	2	*1/16" Aperture Strip *(only one size used per measurement range)
330130	2	4 liter containers of Acetic Acid
330133	24	300' Lead Acetate Tape
330406	1	Box 10 coalescing filter elements

Computer Software

The software for the 331 allows the user to change the factory configuration. The software is available on the Envent website at www.envent-eng.com. Contact our technical support department for assistance. A separate instruction manual is available for the software.



Modbus Registry Commonly Used Addresses

(16 bit)

Stream 1 hydrogen sulfide Value - 40001 or 40002
 RRA Current Value - 40009 or 40010
 Sensor MV - 40005 or 40006

(32 bit)

Stream 1 hydrogen sulfide Value - 40029 or 40031
 RRA Current Value - 40045 or 40047
 Sensor MV - 40037 or 40039

(Float)

Stream 1 hydrogen sulfide Value - 40085 or 40087
 RRA Current Value - 40101 or 40103
 Sensor MV - 40093 or 40095

(Output Coils)

High hydrogen sulfide Alarm Status - 00016 or 00017
 High High hydrogen sulfide Alarm Status - 00018 or 00019
 Sensor Low Fault - 00032 or 00033
 Sensor High Fault - 00040 or 00041
 Relay 1 - 00008 or 00009
 Relay 2 - 00010 or 00011
 Relay 3 - 00012 or 00013
 Relay 4 (*Set as Fault Relay*) - 00014 or 00015
 Solenoid 1 - 00000 or 00001
 Solenoid 2 - 00002 or 00003
 Solenoid 3 - 00004 or 00005
 Solenoid 4 - 00006 or 00007

13. Conversion Factors

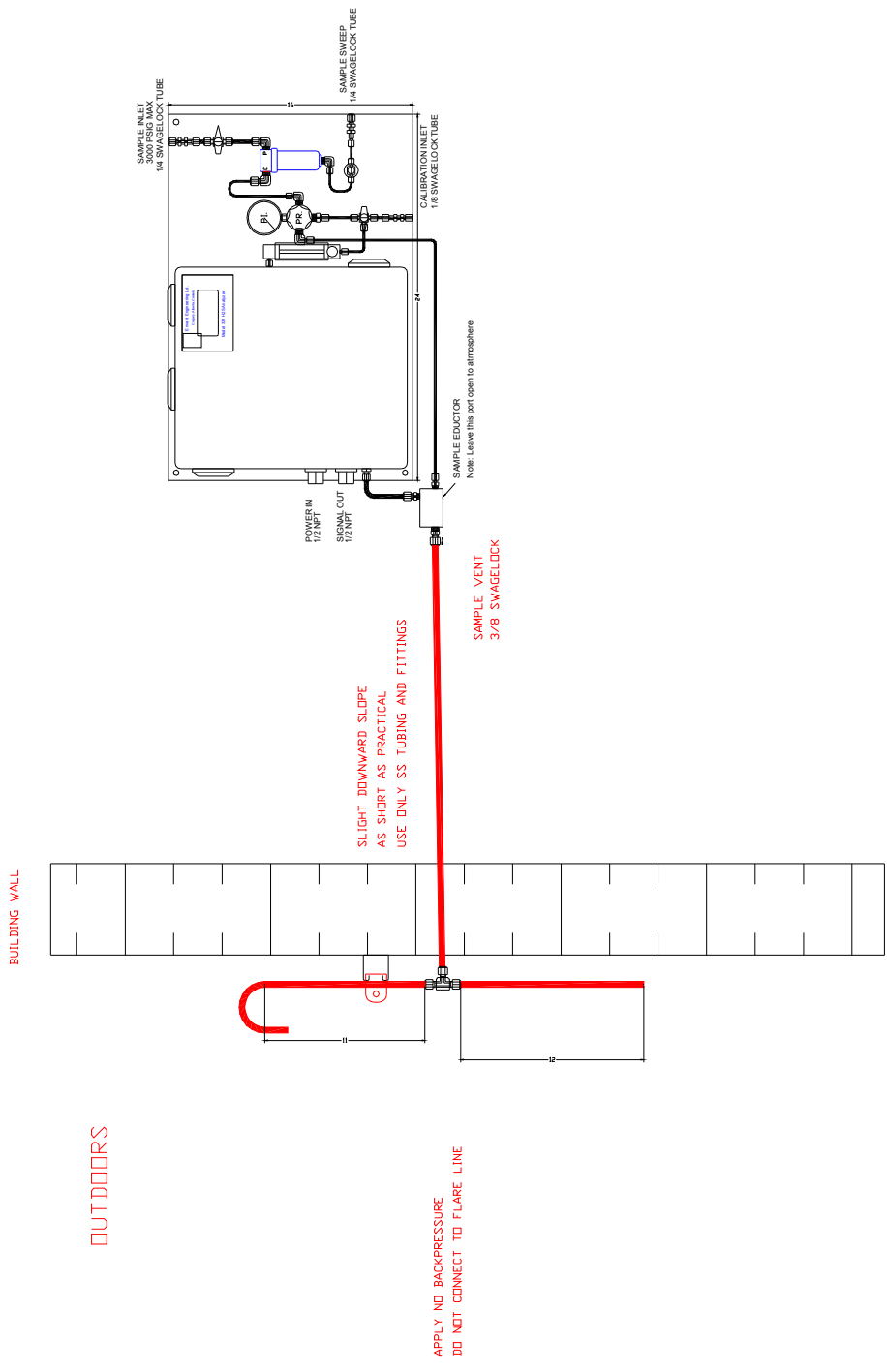
Conversion Factors Often Used In hydrogen sulfide Measurement

To convert from	To	Perform This Operation
mg/m ³	ppm	Multiply by .698
ppm	grain/100cf	Multiply by .0626
%hydrogen sulfide	ppm	Multiply by 10000
Mole/Kmole hydrogen sulfide	ppm	Multiply by 1000

Complete Modbus Registry

Input Coils		Output Register (16 bit)		Output Registry(32 bit)		Output Registry(Floats)	
RegistryNumber	Data Field	RegistryNumber	Data Field	RegistryNumber	Data Field	RegistryNumber	Data Field
10001	Discrete Input 1	40001	Process Stream 1 Current Value	40029	Process Stream 1 Current Value	40085	Process Stream 1 Current Value
10002	Discrete Input 1	40002	Process Stream 1 Current Value	40031	Process Stream 1 Current Value	40087	Process Stream 1 Current Value
10003	Discrete Input 2	40003	Process Stream 2 Current Value	40033	Process Stream 2 Current Value	40089	Process Stream 2 Current Value
10004	Discrete Input 2	40004	Process Stream 2 Current Value	40035	Process Stream 2 Current Value	40091	Process Stream 2 Current Value
10005	Discrete Input 3	40005	Analog Input Current # 1	40037	Analog Input Current # 1	40093	Analog Input Current # 1
10006	Discrete Input 3	40006	Analog Input Current # 1	40039	Analog Input Current # 1	40095	Analog Input Current # 1
10007	Discrete Input 4	40007	Analog Input Current # 2	40041	Analog Input Current # 2	40097	Analog Input Current # 2
10008	Discrete Input 4	40008	Analog Input Current # 2	40043	Analog Input Current # 2	40099	Analog Input Current # 2
		40009	RRA Current Value	40045	RRA Current Value	40101	RRA Current Value
		40010	RRA Current Value	40047	RRA Current Value	40103	RRA Current Value
		40011	Analysis Time	40049	Analysis Time	40105	Analysis Time
		40012	Analysis Time	40051	Analysis Time	40107	Analysis Time
		40013	mv at Sample Start	40053	mv at Sample Start	40109	mv at Sample Start
		40014	mv at Sample Start	40055	mv at Sample Start	40111	mv at Sample Start
		40015	mv at Sample End	40057	mv at Sample End	40113	mv at Sample End
		40016	mv at Sample End	40059	mv at Sample End	40115	mv at Sample End
		40017	Time at Sample Start	40061	Time at Sample Start	40117	Time at Sample Start
		40018	Time at Sample Start	40063	Time at Sample Start	40119	Time at Sample Start
		40019	Time at Sample End	40065	Time at Sample End	40121	Time at Sample End
		40020	Time at Sample End	40067	Time at Sample End	40123	Time at Sample End
		40021	System Date	40069	System Date	40125	System Date
		40022	System Date	40071	System Date	40127	System Date
		40023	Board Temperature	40073	Board Temperature	40129	Board Temperature
		40024	Board Temperature	40075	Board Temperature	40131	Board Temperature
		40025	Cal Gain 1	40077	Cal Gain 1	40133	Cal Gain 1
		40026	Cal Gain 1	40079	Cal Gain 1	40135	Cal Gain 1
		40027	Cal Gain 2	40081	Cal Gain 2	40137	Cal Gain 2
		40028	Cal Gain 2	40083	Cal Gain 2	40139	Cal Gain 2

Output Coils			
RegistryNumber	Data Field	RegistryNumber	Data Field
00000	Discrete Output 1	00036	User Alarm 3 State 3
00001	Discrete Output 1	00037	User Alarm 3 State 3
00002	Discrete Output 2	00038	User Alarm 3 State 4
00003	Discrete Output 2	00039	User Alarm 3 State 4
00004	Discrete Output 3	00040	User Alarm 4 State 1
00005	Discrete Output 3	00041	User Alarm 4 State 1
00006	Discrete Output 4	00042	User Alarm 4 State 2
00007	Discrete Output 4	00043	User Alarm 4 State 2
00008	Discrete Output 5	00044	User Alarm 4 State 3
00009	Discrete Output 5	00045	User Alarm 4 State 3
00010	Discrete Output 6	00046	User Alarm 4 State 4
00011	Discrete Output 6	00047	User Alarm 4 State 4
00012	Discrete Output 7	00048	User Alarm 5 State 1
00013	Discrete Output 7	00049	User Alarm 5 State 1
00014	Discrete Output 8	00050	User Alarm 5 State 2
00015	Discrete Output 8	00051	User Alarm 5 State 2
00016	User Alarm 1 State 1	00052	User Alarm 5 State 3
00017	User Alarm 1 State 1	00053	User Alarm 5 State 3
00018	User Alarm 1 State 2	00054	User Alarm 5 State 4
00019	User Alarm 1 State 2	00055	User Alarm 5 State 4
00020	User Alarm 1 State 3	00056	User Alarm 6 State 1
00021	User Alarm 1 State 3	00057	User Alarm 6 State 1
00022	User Alarm 1 State 4	00058	User Alarm 6 State 2
00023	User Alarm 1 State 4	00059	User Alarm 6 State 2
00024	User Alarm 2 State 1	00060	User Alarm 6 State 3
00025	User Alarm 2 State 1	00061	User Alarm 6 State 3
00026	User Alarm 2 State 2	00062	User Alarm 6 State 4
00027	User Alarm 2 State 2	00063	User Alarm 6 State 4
00028	User Alarm 2 State 3	00064	User Alarm 7 State 1
00029	User Alarm 2 State 3	00065	User Alarm 7 State 1
00030	User Alarm 2 State 4	00066	User Alarm 7 State 2
00031	User Alarm 2 State 4	00067	User Alarm 7 State 2
00032	User Alarm 3 State 1	00068	User Alarm 7 State 3
00033	User Alarm 3 State 1	00069	User Alarm 7 State 3
00034	User Alarm 3 State 2	00070	User Alarm 7 State 4
00035	User Alarm 3 State 2	00071	User Alarm 7 State 4



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