

EAGLEYE AGA[®] ATMOSPHERE GAS ANALYZER USER MANUAL / V 0.1

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Don't worry about it !



EAGLEYE AGA Eagleye AGA Pages: <u>Safety</u> 3 Equipment Reviews 4 <u>Theory</u> 5 **Operation** 16 Live Data 23 Data Record 28 Menu Configuration 38 <u>Graphic</u> 44 Calibration 47 **Restoring Factory Calibration** 55 <u>Settings</u> 56 <u> About Battery Charge</u> 65 Remote access 66 **Information** 67



Before operating the device, be sure to read the user manual. The device complies with accepted industrial safety standards. EQUIPMENT REVIEWS

Eagleye

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Operating voltage	220V.AC
Charge Frequency	50/60 Hz
Power consumption	3.2A / 1.8A

Interval	Repeatability	Linear Error
CO 0-50%	≤±1% FS(Full Scale)	≤±1% FS
CO2 0-5%	≤±1% FS	≤±1% FS
CH4 0-10%	≤±1% FS	≤±1% FS

Operation Temperature Relative humidity -10**°C**--50**°C** 0%——95%RH (Non-condensing)

Suitable Atmospheres:

CARBONATION CARBONITRATION CARBON CORRECTION NEUTRAL HARDENING OSTEMPING MARTEMPERING RAIN HARDENING ANNEALING NORMALIZATION STRESS RELIEF 6] =

INDUSTRIAL Engineering

Call 3E Industrial Engineering if your transaction is not listed *Ammonia should never be used in applications*



THEORY

Why Non-Dispersive Infrared (NDIR)?

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Eagleye

By purchasing your new Eagleye AGA, you have decided that your current process measurement methods require some improvements. This is because of customer requirements for backup process verification for your existing oxygen probe-based system, or simply "does this probe really work?" may be due to the question being answered. You may be looking for more complete information on what is going on with your furnace atmosphere.

Whatever your reasons, the use of I/R analysis and Eagleye AGA will meet these requirements.

As most Eagleye AGA owners apply gas carburization or neutral hardening in an endothermic atmosphere, the following discussion will help to understand the meaning of the measured values:



The endothermic atmospheres used for these applications have the following basic composition has:

CO %20	(carbon monoxide)
H2 %40	(hydrogen)
CO2 İzi	(carbon dioxide)
CH4 İzi	(methane, usually from natural gas)
O2 İzi	(oxygen)
H2O İzi	(water vapor)
N2 Denge	(nitrogen)

These ratios are typical, whether you are producing gas via an endothermic generator or using prepared gases such as nitrogen and methanol. The rates are slightly different if propane is used instead of methane for the production of carrier gas.

Obviously, any increase in the volume of one of the gases means a decrease in one or more of the other gases. We are often asked: "Why does my generator produce 20% CO, but I only measure 17% in my furnace?" "When I add ammonia it drops even more!" Part of the answer to this question is simple volumetric displacement. The oven only has room for 100% of the atmosphere!



How can Eagleye AGA help me with my generator?

The basic chemical reaction that occurs in an endothermic generator is as follows:

2CH4 + O2 2 CO + 4 H2

Ignoring nitrogen

Note that you mix and heat the gas and air to get the gas composition described above. The reaction takes place in two stages: First, some of the methane burns with the air and produces heat. The byproducts of this combustion are H2O (water vapor) and CO2. In the second stage, the remaining methane reacts with CO2 and H2O. It becomes obvious that we want this reaction to be as complete as possible!

This is the reason for the nickel catalyst in the generator.

The main air gas ratio is 2.7 and 2.85 parts air to 1 part gas, there are two considerations:

1. The catalyst must be clean and free of soot. If soot is present, the effectiveness of the above reactions is reduced.

2. You must have enough temperature to keep the reaction rate high enough.



How can Eagleye AGA help?



First, you can determine whether the catalyst is working efficiently by measuring the methane content of the generator. 0.8% CH4 is approximately the upper limit. Above this level, it is possible that the catalyst is filled with soot or that the catalyst has simply been used up. Another indicator of this condition would be a high CO2 or dew point. Eagleye AGA; The dew point provides a convenient way to obtain CO, CO2 and CH4. Check that the base gas composition is as expected. The CO should be about 20%. Check the CH4 level and make sure it is less than 0.8%, observe the CO2 and dew point readings. Note the relationship between the dew point and CO2.

Make adjustments to either your oxygen probe control system or the generator carburetor to achieve the desired dew point.



How will Eagleye AGA help me with my Furnace?

If you are using oxygen probes, Eagleye AGA can provide independent, traceable verification of the accuracy of your probes. It will also give you a much more complete picture of what is going on in your furnace atmosphere.

The primary reactions involved in carbon transfer are well understood as:

2CO C + CO2 H2 + CO C + H2O

These reactions are assumed to be near equilibrium. The theory behind this is that a reaction sometimes called a water-gas reaction is busy keeping H2 and O2 in balance:

Measurement of % carbon in its atmosphere with an oxygen probe is based on the assumption that the above is true:

CO
$$C + \frac{1}{2}O2$$



Note that the primary mechanism of carbon transfer is assumed to be dependent on CO. What really happens is that the ratio of CO to CO2 is a much more accurate way of determining the equilibrium carbon.

One problem is that we use CH4 as the enriching gas. What happens to CH4 after it goes into the furnace? It mostly decomposes near the hot catalytic surfaces in your oven.

It may be regenerating depleted CO, it may be making soot in your furnace according to the "rules" of equilibrium, or it may be reacting directly with the surface of the material:

CH4 C+2H2

How much of the above reaction occurs depends on how much methane you have in your furnace. The reaction also happens faster at higher temperatures, but is still slow compared to equilibrium reactions.

For example, with an equilibrium carbon potential of 0.4% and a methane content of 0.5, the theoretical carbon potential at 1600 is actually 0.44%. In reality, the effect is usually about 6/10 of what theoretical calculations provide, bringing the carbon potential closer to 42%. In contrast, if we increase the methane content to 5%, the actual carbon potential could be close to 0.6%, which is a significant difference!

Whether the study will actually see this depends on a number of issues, such as temperature, which governs the reaction rate, the surface area of the work and the level of saturation at the surface, atmospheric circulation, etc.



Using the Eagleye AGA to analyze the furnace atmosphere:

Probe status:

Carbon is calculated using actual gas values, so it is more accurate than assumptions made by the probe. Compare the %C calculated by Eagleye AGA with the %C displayed on the carbon controller.

Your carbon controller is set up with some assumptions about the content of the furnace atmosphere. Most controllers assume that the CO is 20% "out of the box", you can use the Eagleye AGA to fix this by setting this "factor" to the correct %CO.

Observe the probe millivolts calculated by the Eagleye AGA and displayed by the carbon controller. These should be between 1-2% of each other. If not, and you entered the process temperature correctly into the Eagleye AGA, you probably have a problem with the probe or controller. To eliminate possible instrument problems, first check the millivolt value on the back of the probe with a meter.



Next, make sure that the probe does not contain soot by burning the probe. If the numbers still do not match, perform an impedance test on the probe to help determine the electrode status. You'll also want to check after this test to see how quickly the probe is healing. Recovery time should be in seconds, not minutes.

Finally, disconnect the reference air hose of the probes and see if the millivolt reading on the controller has changed, if there is, there is a leak in the probe substrate.

If you replace the probe or are sure the probe is good, be sure to get a good sample with the Eagleye AGA. Most of the time, example ports are the cause of the problem. A good non-metallic sample probe helps solve this problem. One trick is to use the probe burn off port to obtain a sample. This has several problems associated with this in furnaces with high methane content. The methane will crack near the alloy surface of the probe, creating a local reaction that is not representative of the general furnace atmosphere.



Interpretation of gas value readings:

CO:

For most atmospheres in use, this number should be around 18-20%. If it is less than 18%, observe the following:

Check if the generator is working properly.

If you are using nitrogen-methanol, check the nitrogen to methanol ratio. Also make sure the atmosphere sprayer is in good condition. If you are using nitrogen to "push" the methanol into the furnace, make sure that no nitrogen bubbles form in the methanol.

If you are using ammonia, additions of ammonia will dilute the %CO in the furnace. Note that there is only room for 100% of the gas in the oven. Check for leaks. This can be confirmed by a high CO2. If you want high carbon potential, high methane content can also dilute the atmosphere mix.

Check for leaks. Air leaks typically cause the control system to add more natural gas to the furnace.

High surface area charges will be able to extract more carbon from the atmosphere. Typically the methane content will therefore increase.



CO2:

This number can range from 0.05% to 1% and is dependent on temperature and gas composition. It tracks in the opposite direction to the carbon potential. At 1600F, 0.4%C will be approximately 0.62% CO2 (assuming 20% CO). It will be around 0.25 to get 0.4% carbon at 1750 CO2. If the carbon potential is lower than expected, the CO2 should be higher than expected. Check for air leaks.

Check for leaks in the burner pipe.

Check for oven fan water jacket leaks.

Check generator or nitrogen methanol system.

If the probe system is compatible with Eagleye AGA, ensure there is adequate carrier gas flow and adequate enrichment gas flow. Does the carbon controller turn on natural gas when it should?



CH4:

Most batch based furnaces will operate with a CH4 content ranging from 0.1% to 4-5%. At the beginning of the cycle this number is higher than when the atmosphere and work are approaching equilibrium with each other. Carburizing continuous furnaces generally operate at higher methane levels. In fact, in some belt oven applications this is required for the process to work! The high free methane content is usually a product of the control system requiring a lot of natural gas due to an air leak, there are unusually high surfaces in the load. Check for air leaks.

Check for leaks in the burner pipe.

Check for oven fan water jacket leaks.

Check generator or nitrogen methanol system.

Make sure the probe control system is working properly.

OPERATION



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Pre-operative precautions:

1) The dew point of the sampling gas must be lower than the ambient temperature to prevent discharge in the gas analyzer. If there is steam in the sampling gas, the dew point should be lowered to 0°C using a desiccant.

2) The temperature of the sampling gas should be between 10 and 50°C. Provide a means of preventing hot gas from entering the appliance directly.

3) Atmospheric pressure of the sampling gas should be 1020 hPa. Avoid fluctuations in flow (300mL/min) and pressure during measurement. Observe the flow reading with a supplied flow meter as shown

4) Avoid installing this tool near an electrical unit (high frequency furnace or electric welding machine) that generates a lot of electrical noise.

5) Allow 30 minutes to warm up for stabilized readings.



Example Gas

Sample Gas: The condition of the sample must comply with the following requirements to ensure that the performance of the product meets the specified specifications. Contamination in the sample cell, especially windows, will cause an error in the output reading.

Avoid degradation of the sample gas between the sample point and the sensor by introducing unnecessary volumes or restrictions.

Eliminate transients that can cause pressure changes.

Maintain constant flow conditions (Flow 200-400 mL/min).

Avoid using rubber compounds for the sample tube (adsorption effects).

Moisture

Before entering Eagleye AGA, the moisture in the gas must be sufficiently reduced. This means that the dew point of the gas has to be somehow lowered below the operating temperature of Eagleye AGA.



Liquids:

The sample gas must not contain any liquid.

Entrained Oil:

The sample gas must not contain any contamination.

Particle:

The gas to be measured must be well filtered. 100% of the 3 micron particles should be retained.

Eagleye AGA®-V 0.1 – User Manual





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Connect one end of the sample tube to the gas inlet hose inlet. Connect the other end to the furnace sample port. Be sure to properly ventilate the exhaust!



We strongly recommend a small diameter (½" ID or less), non-metallic sample tube that can be placed at least 5cm beyond the refractory wall hot face to ensure an accurate sample.





Make sure the waterstop filter with an accuracy of 5µm and a rated flow rate of 750L/min is clean and free of moisture! Soot buildup or discoloration on the waterstop filter element requires replacement.



Make sure the vacuum filter with a filtration degree of 50μ m and a rated flow rate of 70L/min is clean and free of moisture.



Turn on the power switch. Press the Pump button to start sampling.





After pressing the power switch, the touch screen will illuminate and the login screen will appear shortly after.

🦁 Eagleye AGA	12.04.2023 14:41:43	₹ 5
	Username	
	Select user V	
	Password	
	Password	
	Login	
		0
		0

After entering the username and password and pressing the "Login" button, the menu page will open.





On the menu page, there is the page where you can follow the data live in the button marked in the picture.



After logging in to the page, in general, the fields marked with an orange box cannot be entered, and the fields marked with a blue box are indicated as allowable.

🦁 Eagleye AGA	12	.04.2023 14:53:56	₹ 5
Live Data			
со	0,1	COF	200
CO2	0,042	CH4 Factor (%)	100
CH4	0	Alloy Factor (%)	100
C Celcius	880	%H2	40
C (%)	0.00	H2O (%)	20.97
O2 (mV)	945.12	Dew (°C)	59.44



This area; It allows the measurement of CO, CO2 and CH4 gas values, entering the appropriate parameters of COF, CH4 Factor(%), Alloy Factor(%), %H2 and temperature values, and as a result of these parameters, the device provides C(%), O2(mV), H2O(%) to the user.) and Dew(°C) allows it to calculate and present parameters.

After 30 seconds, gas values will begin to be measured and displayed.

Make sure the sampling flow is sufficient. The flow range in which the device can make healthy measurements is indicated in the picture below (0.2—0.4 L/min)





A note about sample ports:

We have found that in a large percentage of heat treatment environments, the furnace sample ports are either clogged or leaking. Even if you can look at the inlet and it looks unobstructed, the port may leak somewhere behind the hot side of the refractory. This can cause the sample to be pulled between the brick and the kiln shell or even from the outside of the kiln. It is also necessary to keep the sample rate high to quickly stabilize the CO2.

Therefore, we strongly recommend the use of a non-metallic sample probe that will penetrate the furnace wall at least 5cm from the hot face of the refractory.

If you can't use a non-metallic probe and you're getting numbers that don't make sense (Extremely low CO values or high CO2), then try taking a sample (not a reference) from the oxygen probe scavenge(burn) port. Use this method only if there are no other ports working. This method will affect the probe reading.



When the unit is powered, the measured and calculated values on the touch screen will appear as zero.

The measurement starts approximately 1 minute after the device starts operating and the values will start to appear after the process temperature is entered. The unit will not correctly display the O2 mV, C(%), H2O or Dew Point until the temperature is entered.

You must enter the process temperature to calculate the correct %C associated with the measured CO, CO2 and CH4 gases.

			. 2
_IV€ Tap here	to change		
to °F and	back to °C	Enter Process Temperature	200
:02		Here	100
CH4	0	Alloy Factor (%)	100
°C Celcius	880	%H2	40
C (%)	0.00	H2O (%)	20.97
02 (mV)	945.12	Dew (°C)	59.44



Tap the temperature field and a numeric keypad will appear. Enter the process temperature and press the green button.



The instrument carbon displays the dew point and the entered probe temperature for the measured CO, CO2, CH4 gases. Additionally, it displays the calculated probe millivolts.

It will take at least 60 seconds before a cold start for the instrument to display any meaningful information. Make sure the sample flow is sufficient! It's always a good idea to allow at least 30 minutes of running to get a meaningful reading.

Eagleye AGA, the temperature for °F / °C can be changed between fahrenheit and celcius by touching the toggle button.



DATA RECORD

Your Eagleye AGA is equipped with a built-in USB port system. Data on all gas values are stored at 20 second intervals and can be viewed in our PC Standalone graphic viewer.

Eagleye

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Qeri Al	Asso (G	van Tip	6	Hitelana	6 tay		1	Sile			Hireler		Darrie	me		~
9	* I × ~	fa														w
	A	8	c	D	1	F	G	н	1	1	к	L	M	N	0	1
	SENSOR TYPE	DATA	SENSOR ADDRESS	SENSOR UNIT	DATE											
	CO	0,2	01	NVOL	13/03/2023, 10:47:42											
	CHI	0	02	NVOL	13/03/2023, 10:47:42											
	C02	0,056	03	90400	13/03/2023, 10:47:42											
	CO	0,3	01	NVOL	13/03/2023, 10:47:43											
	CH4	0	02	90406	13/03/2023, 10:47:43											
	C02	0,056	03	90406	13/03/2023, 10:47:43											
	0	0,3	01	NVOL.	13/03/2023, 10:47:44											
	CH4	0	02	9V/OL	13/03/2023, 10:47:44											
s	C02	0,056	03	NVOL	13/03/2023, 10:47:44											
1	CO	0,3	01	NVOL.	13/03/2023, 10:47:45											
2	CH4	0	02	90406	13/03/2023, 10:47:45											
1	C02	0,056	03	NVOL	13/03/2023, 10:47:45											
8	co	0,4	01	NVOL.	13/03/2023, 10:47:46											
5	CH4	0	02	90406	13/03/2023, 10:47:46											
£	C02	0,056	03	NVOL	13/03/2023, 10:47:46											
3	CO	0,4	01	NVOL.	13/03/2023, 10:47:47											
8	CH4	0	02	NVOL.	13/03/2023, 10:47:47											
9	C02	0,056	03	NVOL	13/03/2023, 10:47:47											
0	CO	0,4	01	NVOL	13/03/2023, 10:47:48											
1	CH4	0	02	NVOL	13/03/2023, 10:47:48											
2	C02	0,057	03	90406	13/03/2023, 10:47:48											
1	CO	0,5	01	NVOL	13/03/2023, 10:47:49											
4	CHI	0	02	90VOL	13/03/2023, 10:47:49											
5	C02	0,057	03	NVOL	13/03/2023, 10:47:49											
	Sheet1	+					1		_	_	_	_	_	_	_	

Data logs store data internally in a standard sd memory module and you can monitor the memory capacity of the device from the screen below.

te://	Time::		Delete History		
isk Space	Disk Total	Disk Used	Disk Percent		
IG	296	5.5G	20%		
otal Live Data : 51301	2	Total Operatio	on Data : 7		
Totak 9.81 M8 First: 04,01/2000 03:00:06 Last: 12/04/2023 14:39:06		Total: 0.07 M8 First: 13/02/2023 15:1 Last: 28/02/2023 10:0	Tetak 0.07 MB First: 13/02/2023 15:16:31 Lest: 28/02/2023 10:07:49		
erial Number	Model		Uptime		
AGA/2303/0008 Raspberry Pi 3 Mo		el B Plus Rev 1.3	up 26 minutes		



The recorded data includes time, date, sensor type, data, sensor address and sensor unit. The expected O2mV, Dew(°C), C (%), will appear on the "Live Data" screen.

Starting the Data Logger:

First of all, you must click on the selected button in the picture shown below from the menu page.



After clicking the button, a list of previous operations will appear on the page that will open. If we want to start a new registration from this page, you must click on the selected button in the picture below.



3	Eagley	ye AGA		12.04.202	3 14:55:25		÷ 5
Ор	erati	on List		Œ			
Id	Name	Company	Furnace	Operator	Start date	Stop date	Actions
7	sad	safa	dfs	Engineer	12/04/2023 14:28:13	-	ē 2
6	ЗE	3E	Vqm	admin	28/02/2023 08:58:16	28/02/2023 10:07:49	ô Z
5	3e	Vqm	s	admin	24/02/2023 14:31:50	24/02/2023 14:33:03	ē 2
4	3e	3e	D	admin	23/02/2023 15:34:11	23/02/2023 15:36:44	ē 2
3	dfsa	dsad	cfsafas	admin	13/02/2023 16:18:02	-	ĕ∠

Our registration page that opens is shown in the picture below. With the button we pressed above, the registration page always appears in the format in which a new registration can be opened.

Deserved			
Record			
Operation Name			
		U	
Start Date	Start Time	Stop Date	Stop Time
//			E
Company	Furnace		Operator
			Engineer



In the registration page, when we are going to start the registration of a new process, we need to enter the operation name, company and furnace information. Otherwise, recording cannot be started. After filling the required fields, you should press the registration start button marked in orange on the page below.

🦁 Eagleye AGA		13.04.2023 08:19:33		₹ 5
Record				
Operation Name				
x		\odot		
Start Date	Start Time	Stop Date		Stop Time
//				
C	Furnace		Oper	ator
Company				

After pressing the registration start button, our screen will appear as follows and our registration will begin.

🦁 Eagleye AGA	12	2.04.2023 14:57:23	₹ 5
Record Operation Name		• • •	10
X Start Date	Start Time	Stop Date	Ston Time
2023-04-12	14:57:16 (3)	// E	
Company	Furnace	c	perator
3E	TQ1		Engineer



Data Logger Stopping, Fix Update, Graph and Excel:

To stop recording, press the button selected in orange in the picture below, or press the button selected in blue in the picture below when you want to edit the recording and update your edit, or press the button selected in yellow when you stop (complete) the recording and want to see the trend of your recording, and Finally, when you finish your recording and want to print it out as excel, you should press the black button.

🦁 Eagleye AGA		12.04.2023 14:57:23	₹ 5
Record			
Operation Name		\bigcirc	\bigcirc
x		▣ ∠	
Start Date	Start Time	Stop Date	Stop Time
2023-04-12	14:57:16 ③	//	
Company	Furnace	Opera	tor
	TO1	Engi	neer



After stopping the recording, the notification will appear on the top right of the screen as below.

Record		Record stop	ped successfully	
Operation Name				
Х		<u> </u>	<u>n</u> ×≣	
Start Date	Start Time	Stop Date	Stop Time	
2023-04-13	08:51:52 ③	2023-04-13	08:52:12 ③	
Company	Furnace	OF	erator	
3E	TQ1	F	ingineer	



After completing the registration, after clicking the trend button for the registration trend, the following screen will appear first. You should wait until the "Loading" text in the box marked with orange on the screen is "Get".

🦁 Eagleye AGA	13.04.2023 09:08:10	₹ ±)
Graphic	Start Date: 2023-03-13 10:47:4 🗎 Hours Range: 3	Loadin	9
50	%CO 600 %CO2 600 %CH4	5.0	10
45		4,5	9
40		4,0	8
35		3,5	7
30		3,0	6
25		2,5	5
20		2,0	4
15		1,5	3
10		1,0	2
0		0,5	

Below is the trend of your completed (completed) record. On this screen, the trend of the user recorded interval is shown.

Graphic	Start Date:	2023-03-13 10:47:4	2 🗇	Hours Range: 3	G	et
		KCO - 84002 -	_	ichu .		
50					5,0	1
45					4,5	9
40					4,0	8
35					3,5	7
30					3,0	ŧ
25					2,5	ŧ
20					2,0	4
15					1,5	3
10					1,0	2
5					0,5	1
0					0	0
5 th at all	\$ \$ 5 5 3	33332	\$ 8	2 8 8 5 5 8	\$	
"Q" "Q" "Q" "L"	R. R. R. R.	12 12 13 15 15 12	2 2	リンンヤヤヤヤ	2	



In order to make the examination easier and clearer in the recording graph, the display of the gases can be adjusted according to the user's request as shown in the picture below. You can set the display of the gas you do not want to see as active or passive by clicking on the area marked with orange in the picture below.



When the user reaches this stage, he has successfully completed the recording and can export the record as excel from the usb port on the device.





First of all, the USB memory that will be recorded must be properly inserted into the box marked in the photo on the previous page. Afterwards, the completed record should be opened from the operation list with the edit button. After these steps, you should reach the screen shown in the picture at the top of the next page. When you click on the button marked with orange on this screen, the export took place within seconds and the notification screen shown in the picture will appear.

You have successfully exported the recording.





Operation List:

The record you have completed will now be added to the operation list and will appear marked in orange in the image below.

Op	eratio	on List			Ð		
Id.	Name	Company	Furnace	Operator	Start date	Stop date	Actions
10	х	3E	TQ1	Engineer	13/04/2023 08:51:54	13/04/2023 08:52:14	ē 🖉
9	х	3E	TQ1	Engineer	13/04/2023 08:25:34		8 ∠
8	Endo	Ornek	Qqq	Engineer	06/04/2023 09:55:18	06/04/2023 10:37:55	8 ∠
7	3enew	3e	Vqm	Engineer	13/03/2023 10:47:42	13/03/2023 10:57:51	8 Z

Regarding the record added to the operation list in the photo above, it is possible to delete the record with the button marked with yellow in the picture, and to correct the record with the button marked with blue. Parameters you can edit; Company, Furnace, Start Date, Start Time, Stop Date and Stop Time parameters.



Live Data

Record



Information

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When you press the button marked in orange on the menu page, you will be directed to the main page no matter what page you are on, and the button marked in blue will enable you to switch from the page you are on to the previous page. Indicator marked with yellow shows internet connection and network power status. You can understand that there is no internet when you see an exclamation mark on the indicator.

Settings



The following options are available in the main menu:

Live Data:

The data includes the parameters CO, CO2 and CH4. It includes calculated O2mV, Dew(°C), C (%) and H2O values and expected COF, CH4 Factor(%), Alloy Factor(%), %H2 and temperature parameters on this screen.

🮯 Eagleye AGA	12	2.04.2023 14:53:56	⊽ 5
Live Data			
со	0,1	COF	200
CO2	0,042	CH4 Factor (%)	100
CH4	0	Alloy Factor (%)	100
Celcius	880	%H2	40
C (%)	0.00	H2O (%)	20.97
O2 (mV)	945.12	Dew (°C)	59.44



Graphic:

It is the screen where the user's instantaneously read data is displayed on a graph.





Calibration:

This page allows you to calibrate the device to certified and rated gases. At the same time, you will be able to see the log records of the last calibrations when the "Show Calibration Logs" button is pressed.

Calibrat	ion			
GAS	OFFSET	READING	VALUE	ACTIONS
%CO	0	0,1	0,1	Span
%CO2	0	0,042	0,042	Span
%CH4	0	0	0	Span
Last Factory (7580		



Record:

It is the screen where the operation records are processed. On this screen, the user can both take records and see the list of records he has received.

F	Eagley	ye AGA		12.04.202	3 14:55:25		÷ 5
Ор	eratio	on List		Œ)		
Id	Name	Company	Furnace	Operator	Start date	Stop date	Actions
7	sad	safa	dfs	Engineer	12/04/2023 14:28:13	-	ôŻ
6	ЗE	ЗE	Vqm	admin	28/02/2023 08:58:16	28/02/2023 10:07:49	ō 2
5	3e	Vqm	S	admin	24/02/2023 14:31:50	24/02/2023 14:33:03	ō∠
4	3e	3e	D	admin	23/02/2023 15:34:11	23/02/2023 15:36:44	ō 2
3	dfsa	dsad	cfsafas	admin	13/02/2023 16:18:02	-	ōŻ



Settings:

On this page, it allows you to set the date and time, set up internet connection, set user logins, view system information, restart device, power off device and log out user.



Information:

Contains company information about 3E Industrial Engineering.



Graphical representation of CO, CO2 and CH4 gases is made.

Graphic	Start Date: Select date	Hours Range:	3	Get
	%CO	%CO2 %CH4		
50			5	0 1
45			4	,5 9
40			4	,0 8
35			3	,5 7
30			3	,0 6
25			2	,5 5
20			2	.0 4
15			1	,5 3
10			1	,0 2
5			0	,5 1
0			- 0	0
10040001 4502 45020 45020 45020 45020 45020 45020 45020 45020 45020 45020 45020 45020 45020 45020 45020 45020 4	2 ²⁰ 152 ²⁰ 152 ²⁰ 152 ²⁰ 152 ¹⁰	50 - 55 ⁵ - 5	4000 1000 1000 1000 1000 1000 1000 1000	

In the picture below, the date entered in the "Start Date" section in the box marked in orange and the parameter entered in the "Hours Range" section in the box marked in blue (for example, if the hourly data is to be displayed, 1 must be written for 1 hour data), the graph of the parameter is shown after pressing the "Get" button. The display will appear in a few seconds.

🦁 Eagleye AG	A 13.04.2023 09:08:51	Ð	
Graphic	Start Date 2023-03-13 10:47:42 📄 Hours Range 3	Get	
50 45 40 35 30 25 20 15 10 5 0	\$ 400 \$ 9602 \$ 9604	5,0 10 4,5 9 4,0 8 3,5 7 3,0 6 2,5 5 2,0 4 1,5 3 1,0 2 0,5 1 0 0	
350 ²⁰⁰ -350 ²⁰⁰ -350 ²⁰⁰ -350 ²⁰⁰ -350 ²⁰ -35			



In order to understand the representation in the graph, the color of the colored boxes next to the gases represents the gas. Pink represents CO, green CO2 and blue CH4. To provide more clarity while observing the graph, the hiding option will be active when you press the button in the box marked below.





The current data read in the last 1 minute is shown on the graphic screen. Therefore, when the user wants to see the previous data, he should use the "Start Date" and "Hours Range" parts. In order to see the value of the data in the graph more clearly, as shown in the picture below, the user will be able to see the values more easily by touching the point they want to see.



CALIBRATION

You can calibrate your device with certified and graded span gas and nitrogen. Span gas must have an on-tube regulator capable of regulating or regulating at 1 PSI. Make sure your gas supplier provides you with a certified analysis of the gas in the bottle!

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You can purchase span gas cylinders (bottles) from suitable gas filling facilities.

Span gas values should be 20-25.0% CO .7 -1.0% CO2 and 8-15.0% CH4 and 40% H2 with nitrogen balance. It is recommended that you choose the emission gas with values approximately 20% higher than the typical observed process value. The emission gas values may be higher or lower, but must not exceed the ranges of the measuring cells 35% CO, 5% CO2 and 10% CH4.

Make sure to keep the second stage regulator pressure around 1-2 PSI.

It is important to understand that I/R cells are very pressure sensitive by nature. Notice that for a particular type of gas, there are more molecules of that gas in a cell with 1.5 PSI pressure than in a cell with 0.5 PSI cell pressure. This will result in measurement error if the unit is calibrated at high pressure and then applied to low pressure measurements.

You can observe this phenomenon by turning off the exhaust of the instrument when measuring an oven. Note the rapid increase in the CO value.

INDUSTRIAL Engineering



Calibration:

Connect the spring-loaded bottle to the tool and measure weekly. Calibration of the instrument is not necessary if the instrument measures the span flask within 2% of the values analyzed on the flask. If calibration is required, perform it in the environment in which the instrument will be used.

To start the calibration:

Tap the "Calibration" button from the menu to go to the calibration page.

After connecting the device to the span cylinder, make sure that the "READING" values match the certified gas values supplied with the span gas cylinder.

Calibrati	on			
GAS	OFFSET	READING	VALUE	ACTIONS
%CO	0	0,1	0,1	Span
%CO2	0	0,042	0,042	Span
%CH4	0	0	0	Span
Last Factory C		7580		
Last Factory Ca	alibration RESET	ZERO		

The "READING" field shows the actual measured values.



If these values need to be changed, you should click on the "Span" button, which is located at the level of the gas you want to change the value of, and on the area marked with orange in the picture below.

Calibrati	on			
GAS	OFFSET	READING	VALUE	ACTIONS
%CO	0	0,1	0,1	Span
%CO2	0	0,042	0,042	Span
%CH4	0	0	0	Span
Last Factory C	alibration RESET	ZERO		

In the window that opens, you will be able to follow the change in the current live gas value. You should enter the value you need to calibrate in the tube and confirm that the value you entered is correct, and then press the "Save" button. After a few seconds you will have calibrated your sensor to the correct value.

👿 Eagleyr		¢
Calibrati	%CO Enter span value	
GAS	%CO Live Span Value: 0.1	TIONS
%CO	0	san
%CO2	Close Save	san
%CH4		pan
Last Factory Ca	libration RESET ZERO	
	Show Calibration Logs	



Span calibration is performed in the same situation for other gases. Also on the calibration page, as shown in the picture below, the orange marked part is the inputable field, the blue marked part is the non-enterable field.

🦁 Eagley	ve AGA	12.04.2023 14:51:24		₹ 5
Calibrati	OFFSET	READING	VALUE	ACTIONS
%CO	0	0,1	0,1	Span
%CO2	0	0,042	0,042	Span
%CH4	0	0	0	Span
Last Factory C	Calibration RESET	ZERO		
		Show Calibration	Logs	

Span calibration of the device is as in the above explanation. Now let's explain the zero calibration of our device. First of all, you must connect the nitrogen tube to the device in order to perform zero calibration. In the meantime, you will be able to see in the "READING" field that the values decrease within a few minutes while only the nitrogen tube is being gassed. After connecting our tube, you must click on the orange marked area in the picture below.

🦁 Eagleye AGA		12.04.2023 14:51:24		÷ 5
Calibration GAS	OFFSET	READING	VALUE	ACTIONS
%CO	0	0,1	0,1	Span
%CO2	0	0,042	0,042	Span
%СН4	0	0		



The screen that opens will look like the image below. On the screen that opens, it says to check that the nitrogen tube is connected. Let's press the "Next" button and continue.





The screen that will open will be as follows. You will be able to see the actual live values of the gases on the screen that opens. At the same time, this screen will make you wait for 1 minute. But if the values continue to decrease to zero, you should continue to wait after the time expires. When the values are fixed now, you can complete the zero calibration by pressing the "Reset" button. Zero calibration of your device is now complete.

Calibrati	Nitrogen Reset Pro	ocess	×
GAS		00:54	TIONS
%CO	Parameter	Value	ban
%CO2	%со	0.1	ban
%CH4	%CO2	0.042	ban
Last Factory C	%CH4	0	
		Close	Reset



While the span and zero calibrations are being performed, the notification screen will appear. From this screen, you can follow up that the calibration has been completed correctly.

They are the structures assigned to increase and decrease the values in the "OFFSET" column on the calibration page from the area marked with orange in the picture below, and in the area marked with blue in the "VALUE" column in the picture below.





You can follow the calibration logs from the image below. To switch to the image below, you must press the "Show Calibration Logs" button on the calibration page.

Calibrati	Calibrat	ion L	ogs		×
5AS	Username	Action	Info	Date	TIONS
6CO	Engineer	span	Type: CH4, Value: 5	07/03/2023 09:53:46	ban
6CO2	Engineer	span	Type: CH4, Value: 5.1	07/03/2023 09:53:14	ban
ast Factory C	Engineer	span	Type: CH4, Value: 5.1	07/03/2023 09:51:15	
,	Engineer	span	Type: CH4, Value: 5.1	07/03/2023	
					Close



RESTORING FACTORY CALIBRATION

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If you want to restore the calibration performed at the factory, touch the "RESET" button.

🦁 Eagleye	AGA	12.04.2023 14:51:24		₹ 5
Calibratio GAS	n OFFSET	READING	VALUE	ACTIONS
%CO	0	0,1	0,1	Span
%CO2	0	0,042	0,042	Span
%CH4	0	0	0	Span
Last Factory Cali	bration RESET	ZERO		
		Show Calibration	Logs	

Are you sure you want to restore the factory calibration? Tap the "Yes" button in the dialog and the last factory calibration data will be restored.

Eagley Calibrati	Reset to fa	ctory setting	5	÷ 5
GAS	Are you sure yo	ou want to reset to f	actory settings?	TIONS
%CO				
%CO2			Close	Jan
%CH4	o	0	0	Span
Last Factory C	alibration RESET	ZERO		
		Show Calibra	tion Logs	

When you send your analyzer to 3E Industrial Engineering for calibration, the last calibration data and factory calibration date are entered.



Time:

When you click the "Setting" button on the menu for the time setting on the settings screen, you need to click the "Set Time" button on the screen you encounter. When you encounter the screen below, you can set the time manually and automatically. After setting the times, you should press the "Save" button.

Set Time			
Manuel Auto			
	Set Manuel Timezone		
	Set Manuel Timezone		
	Select Current Date		
	2023-04-12		
	Select Current Time		
	14:36:05 ③		
	Save		
			(Manuel)
🦁 Eagleye AGA	12.04.2023 14:36:30	÷ 5	
Teagleye AGA	12.04.2023 14:36:30	د د	
Eagleye AGA Set Time Manuel Auto	12.04.2023 14:36:30	ک ک	
Eagleye AGA Set Time Manuel Auto	12.04.2023 14:36:30	₹ 5	
Eagleye AGA Set Time Manuel Auto	12.04.2023 14:36:30 Set Auto Timezone	د د	
Eagleye AGA Set Time Manuel Auto	12.04.2023 14:36:30 Set Auto Timezone Timezone	₹ 5	
Eagleye AGA Set Time Manuel Auto	12.04.2023 14:36:30 Set Auto Timezone Timezone Europe/Istanbul	₽ 5	
Eagleye AGA Set Time Manuel Auto	12.04.2023 14:36:30 Set Auto Timezone Timezone Europe/Istanbul Select Current Date	₽ 5	
Eagleye AGA Set Time Manuel Auto	12.04.2023 14:36:30 Set Auto Timezone Timezone Europe/Istanbul Select Current Date 2023.04-12	₽ 5	
Eagleye AGA Set Time Manuel Auto	12.04.2023 14:36:30 Set Auto Timezone Timezone Europe/Istanbul Select Current Date 2023-04-12	₹ 5	
Eagleye AGA Set Time Manuel Auto	12.04.2023 14:36:30 Set Auto Timezone Timezone Europe/Istanbul Select Current Date 2023-04-12 Save	⊽ 5	



Ethernet / Wifi:

On the Settings page, you must press the "Ethernet/Wifi" button to set the device's internet. On the screen that will open, you will see two separate tabs as "Wifi" and "Ethernet" as shown in the picture below.



You can connect your network with the "Change Wifi" button on the Wifi tab on the screen, you can disconnect from the network you are connected to with the "Disconnect" button and forget the network. When you connect to a network, your device's IP address, mask address and gateway address will appear on the right side of the screen.



What you need to do in the Ethernet tab of the screen is to connect the ethernet cable of the internet that you will connect to the ethernet port of the device. The device will automatically start using the internet coming from the ethernet cable connected to the port of the device. At the same time, IP address, mask address and gateway address will be displayed in the picture on the next page in the Ethernet tab on the screen.



In this way, we will know the addresses of the network to which the device is connected.

🦁 Eagleye	GA 12.04.2023 14:37	r:19 🔻 🕏
Connection T	/pe	
Wifi Ethernet		
	Set Ethernet	
	lp	
	Mask	
	Gateway	



Admin:

It is possible to set user logins on the settings page. We can make this adjustment on the page that will open by clicking the "Admin" button. The picture below shows the page where we can set the previously created users with the marked button.

3	Zegleye AGA	12.04.2023 14:37:53	₹ 5
Add N	lew User		
#	Username	Role	Action
1	Engineer	admin	Edit
2	Operator	user	Edit
3	admin	admin	Edit



On the page that opens, the page with the parameters of the user named Engineer that we want to change is indicated by the picture below. On this page, "username", "password" and "role" can be changed and updated.

🦁 Eagleye AGA	12.04.2023 14:38:34	⊽ •5
Edit User		
Username		
Engineer		
Password		
Password		
Role		
Admin		
	Update	
	Delete	
	Delete	

To register a new user, after clicking the "Admin" button, you must press the button marked in the picture below.

			. 2
Add N	lew User		
#	Username	Role	Action
1	Engineer	admin	Edit
2	Operator	user	Edit
3	admin	admin	Edit



On the page that opens, you must fill in the "username", "password" and "role" sections and press the "Save" button. You have successfully completed creating the new user.

🦁 Eagleye AGA	12.04.2023 14:42:58	÷ 5
Username		
Username		
Password		
Password		
Password must be between 8 and 22 charac	ters	
Password must be between 8 and 22 charac	ters	

The feature of the "Role" parameter in these settings is that it presents some features of the device to the user in 2 different ways, active and passive. If the user selects the "Role" parameter as "Admin";



The device will open so that it can use all the features of the device.



If the user selects the "Role" parameter as "User";

😵 Eagleye AGA	13.04.2023 17:56:50	÷ 5
Live Data		Graphic
ि ि ि Record	င်မြာ န် Settings	Information

The "Calibration" page does not appear in the menu section and in addition,



On the settings page, only the features that appear on the screen above remain open.



This feature actually offers two different usage possibilities as the user and the manager of the device.

System Information:

It contains the device's disk status, total live data, total operation data, device serial number and model information. You can delete the past with the "Date" and "Time" parameters.

S Lagleye Ad	~	12.04.2023 14:39:14		* 5	
ate://	🗄 Tin	ne: 0	Dele	te History	
Disk Space	Disk Tota	Disk	Used	Disk Percent	
23G	29G	5.5G		20%	
Total Live Data : 513012		Total	Total Operation Data : 7		
Total: 9.81 M8 Finit: 04/01/2000 03:00:06 Last: 12/04/2023 14:39:06		Totak 0. First: 13, Lest: 28,	Total: 0.07 M8 First: 13/02/2023 15:16:31 Last: 28/02/2023 10:07:49		
Serial Number	1	Model	Upti	me	
AGA/2303/0003	,	aspberry Pi 3 Model B Plus Rev 1.	3 10 2	up 26 minutes	

Restart:

You can restart the device with the "Restart" button.



Closure:

You can turn off the device in a healthy way with the "Shutdown" button.

User Output:

While the device is on, you must press the "Logout" button to log out due to user change or any other reason.

ABOUT BATTERY CHARGING



Your Eagleye AGA has a universal cable and a power converter (source) that converts 220V.ac to 13.8V.

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When the battery of the device runs out, it needs to be charged for about 8 hours for a full charge.

After the user connects the cable to the device as follows, plugging the cable into the socket will start charging the device.

There is a 2A glass fuse in the socket where the cable enters the device.

The fused socket, which is designed to take precautions, is designed as a precaution against high current situations.





REMOTE ACCESS

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All screens can be watched by connecting to the network (wire, tablet, etc.), without the need for additional software or settings, via the device's remote access feature and any other device in the system.





Eagleye AGA®-V 0.1 – User Manual

INFORMATION

General information of 3E Industrial Engineering company is included. You can use the information in the picture below to get information about the device.

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INDUSTRIAL Engineering



EAGLEYE AGA

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