EAGLEYE AGA®
PANEL OPERATIONS MANUAL

EAGLEYE AGA

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INTRODUCTION

The Eagleye AGA is an Atmosphere Gas Analyzer. It measures Carbon Monoxide (CO), Carbon Dioxide (CO2) and Natural Gas (CH4) typically found in an endothermic atmosphere. The measurement of these gases, combined with furnace temperature information, allows the Eagleye AGA to calculate the percent Carbon (%C) of the measured gas.

IMPORTANT!

If the Eagleye AGA is not configured for compatibility with gases other than the three gases listed above, do not use the Eagleye AGA for gas analysis with any gas other than the three gases listed above. Use of an Eagleye AGA with incompatible gas will void the product warranty.

SPECIFACITION

SPECIFACITION

The unit is designed and manufactured for the atmosphere heat treating industry.

CO range: 0 to 50 %
CO2 range: 0 to 5 %
CH4 range: 0 to 10 %

Sampling method: By internal pump (when necessary)
Measurement Method (CO, CO2, CH4): Non-Dispersive Infrared (NDIR)
Repeatability: ≤±1% FS
AC Power Requirements: 230VAC
Data Storage: From the moment recording starts
Data Retrieval: with USB from HMI Screen
Operating Temperature: +5 °C up to 45 °C
External Dimensions: Approximately
Weight: 400*300*200 mm

MECHANICAL INSTALLATION

MECHANICAL INSTALLATION

It is recommended that the Eagleye AGA be mounted as close to the sampling point as possible, since that will reduce the length of the plumbing lines that will need to be maintained. It is intended for use in a heat-treating environment, but care should be taken not to mount it too close to a furnace or other heat source. The operating temperature of the enclosure should be maintained below 122°F (50°C). If necessary, a heat shield can be mounted behind the enclosure to reduce the amount of radiant heat that the AGA is exposed to. In most cases, this will not be necessary. The enclosure is heavily vented to prevent the buildup of potentially harmful gases in the unlikely event of an internal leak. This venting will also reduce the internal temperature by allowing the free flow of ambient air around the internal components.
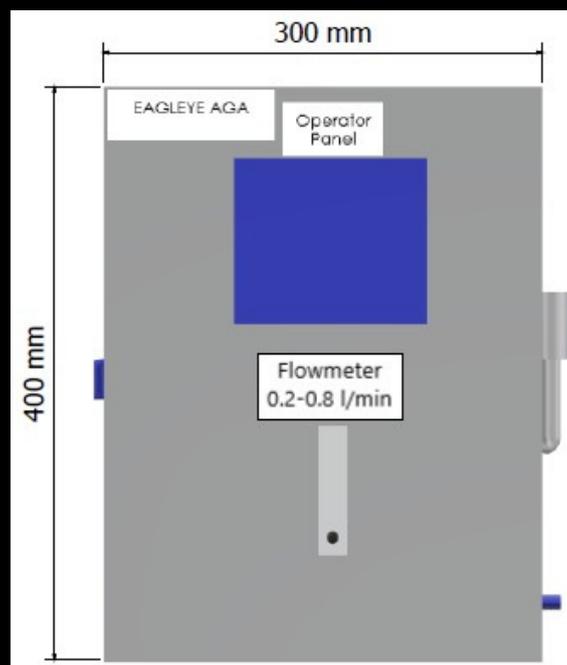
DEFAULT SCREEN

Once successfully turning on the Eagleye AGA switch, the default screen will be displayed.

F1: Eagleye®AGA (Main Screen)
F2: Calibration
F3: Trend F4: Pump Gauge

The default screen includes company information.

MAIN SCREEN
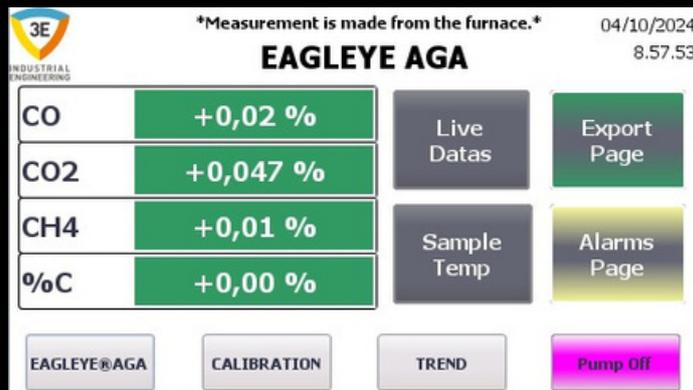
As we can see CO, CO2, CH4 and C actual values on this screen. We need to entry temperature value for the carbon value seen from Live Datas button. Then, we can follow the values from the image above. You can navigate to the relevant pages with the Live Datas, Export Page, Sample Temp and Alarms Page buttons on this page. There are descriptions at the top of the pages throughout the HMI. Here you will see system-related notifications during calibration and sample measurement. We can continue the explanation on the Live Datas page.

LIVE DATAS
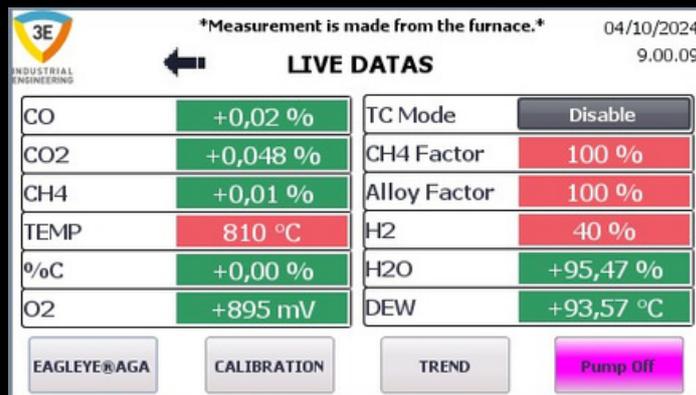
On the Live Datas page, we see the values that we can follow and that need to be entered. The background of the values that need to be entered is indicated in red. The background of the values we will follow is indicated in green. On the Live datas page, entry as CH4 factor value %100, Alloy factor %100 and H2 value %40. The entry as TEMP value is actual temperature. If TC Mode is active and the furnace temperature tag is connected to the DB14.DBD20/Real address, the temperature can be observed actual. You can go to the previous page with the arrow to the left above. Let's continue with the Export page.

EXPORT PAGE
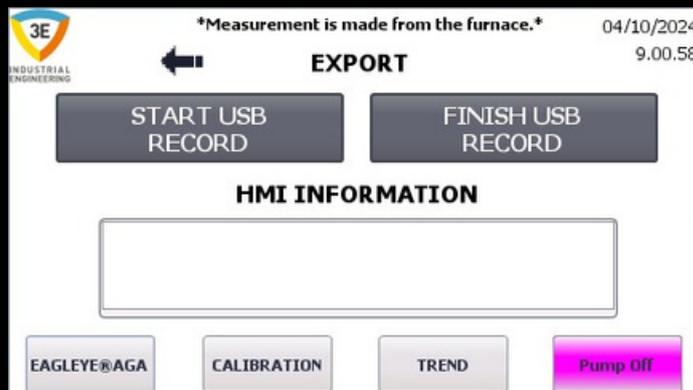
If you want to get a record, you should plug in usb to hmi panel.Then, press the START USB RECORD button. When you finish recording, press the FINISH USB RECORD button, and plug out usb. Your record is completed. As .txt formatted that the datas exported from HMI screen. In the HMI Information area, you can see information about the situations that occur during start and finish. Let's continue with the Alarms page.

ALARMS PAGE
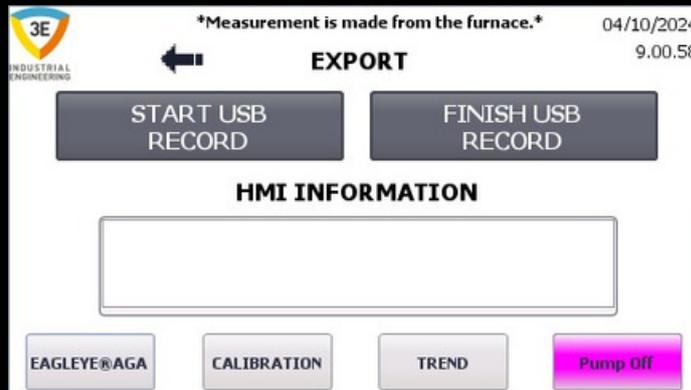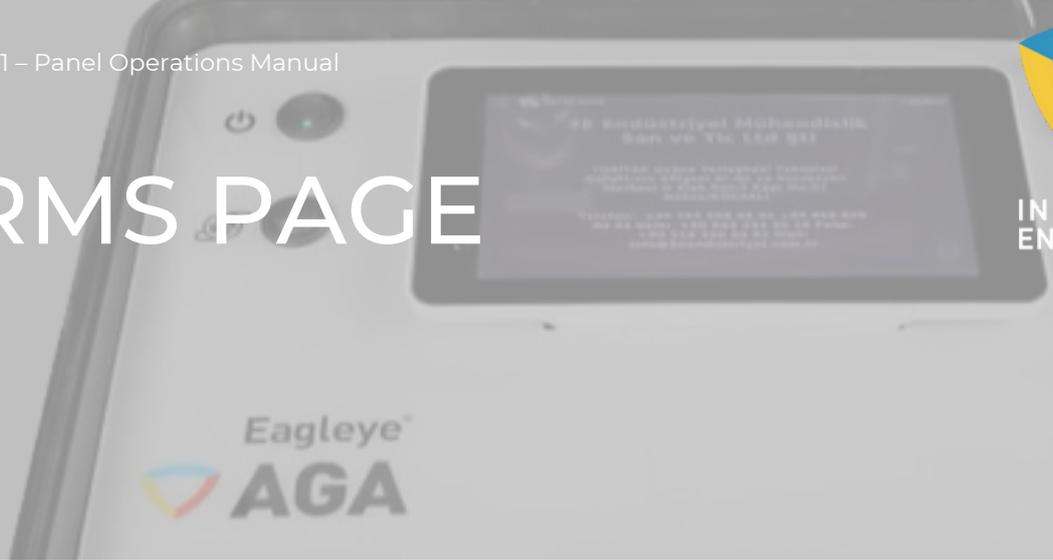
You can see the alarms in the Eagleye AGA system from this screen. When the alarm happened the system, you should follow these ways:

Alarms & Notifications	Solutions
CO Alarm Status Warning *Explanations: The CO reading is not within ±10% to ±20% of the CO target value or zero. The sensor couldn't be calibrate.*	Edit the target value again OR, you can make manually calibration then continue auto calibration. After then, press the ALARM RESET button.

ALARMS PAGE

CO Alarm Status Fault Explanations: While in auto calibration, the CO reading is ±20% off the CO target value or zero. The sensor cannot be calibrated.	Edit the target, value again OR, you can make manually calibration then continue auto calibration. After then, press the ALARM RESET button.
CO2 Alarm Status Warning Explanations: The CO2 reading is not within ±10% to ±20% of the CO2 target value or zero. The sensor couldn't be calibrate.	Edit the target value again OR, you can make manually calibration then continue auto calibration. After then, press the ALARM RESET button.
CO2 Alarm Status Fault Explanations: While in auto calibration, the CO2 reading is ±20% off the CO2 target value or zero. The sensor cannot be calibrated.	Edit the target value again OR, you can make manually calibration then continue auto calibration. After then, press the ALARM RESET button.
CH4 Alarm Status Warning Explanations: The CH4 reading is not within ±10% to ±20% of the CH4 target value or zero. The sensor couldn't be calibrate.	Edit the target value again OR, you can make manually calibration then continue auto calibration. After then, press the ALARM RESET button.

ALARMS PAGE

CH4 Alarm Status Fault *Explanations: While in auto calibration, the CH4 reading is ±20% off the CH4 target value or zero. The sensor cannot be calibrated.*	Edit the target, value again OR, you can make manually calibration then continue auto calibration. After then, press the ALARM RESET button.
CO System Fault	Firsly, reset the alarm. Check the sensor LED. If it is red, contact 3E Industrial Engineering.
CO2 System Fault	Firsly, reset the alarm. Check the sensor LED. If it is red, contact 3E Industrial Engineering.
CH4 System Fault	Edit the target value again OR, you can make manually calibration then continue auto calibration. After then, press the ALARM RESET button.
CO EEPROM Error	Reset the alarm, if the alarm is not reset, contact 3E Industrial Engineering.
CO2 EEPROM Error	Reset the alarm, if the alarm is not reset, contact 3E Industrial Engineering.
CH4 EEPROM Error	Reset the alarm, if the alarm is not reset, contact 3E Industrial Engineering.

ALARMS PAGE

CO Communication Error	Check the cable connection, whether the T/RA and T/RB LEDs on the communication module on the CPU are flashing together, whether there is 2.5V at the T/RA input, and the sensor LED status.
CO2 Communication Error	Check the cable connection, whether the T/RA and T/RB LEDs on the communication module on the CPU are flashing together, whether there is 2.5V at the T/RA input, and the sensor LED status.
CH4 Communication Error	Check the cable connection, whether the T/RA and T/RB LEDs on the communication module on the CPU are flashing together, whether there is 2.5V at the T/RA input, and the sensor LED status.
CO Factory Calibration Must Be Done	Check the factory calibration page. If the values are not between 5000 and 15000, perform a reset. Then reset the alarm.
CO2 Factory Calibration Must Be Done	Check the factory calibration page. If the values are not between 5000 and 15000, perform a reset. Then reset the alarm.
CH4 Factory Calibration Must Be Done	Check the factory calibration page. If the values are not between 5000 and 15000, perform a reset. Then reset the alarm.

ALARMS PAGE
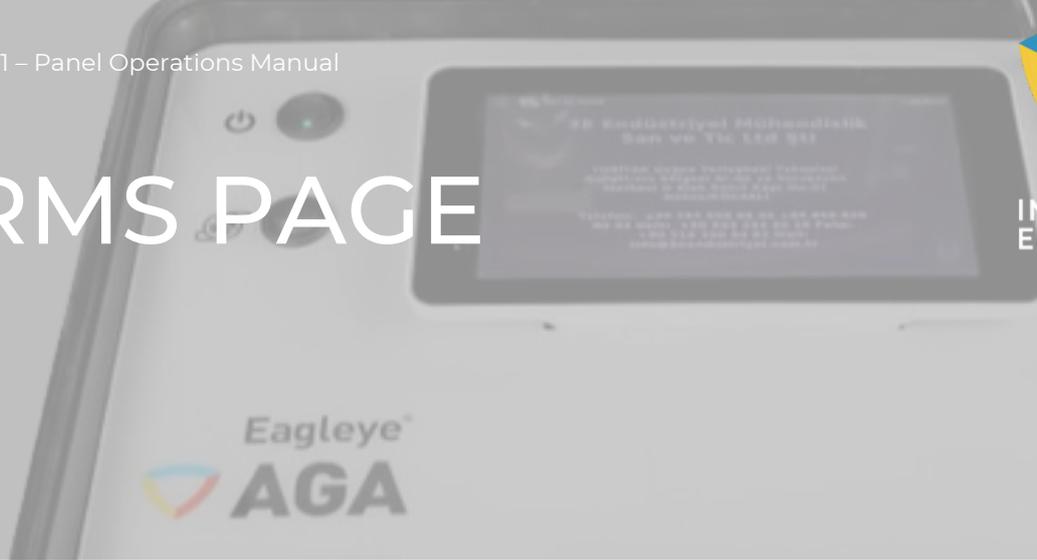
Span Conditions NOT Met For CO	If the expression in the Status column is not OK in automatic calibration, it does not perform calibration. You can perform manual calibration. Then you can switch to automatic.
Span Conditions NOT Met For CO2	If the expression in the Status column is not OK in automatic calibration, it does not perform calibration. You can perform manual calibration. Then you can switch to automatic.
Span Conditions NOT Met For CH4	If the expression in the Status column is not OK in automatic calibration, it does not perform calibration. You can perform manual calibration. Then you can switch to automatic.

DATE & TIME SETTING

Let's continue on the page where we will set the system time, and to access this page, simply click on the date and time displayed on the HMI.

Date & Tıme Setting
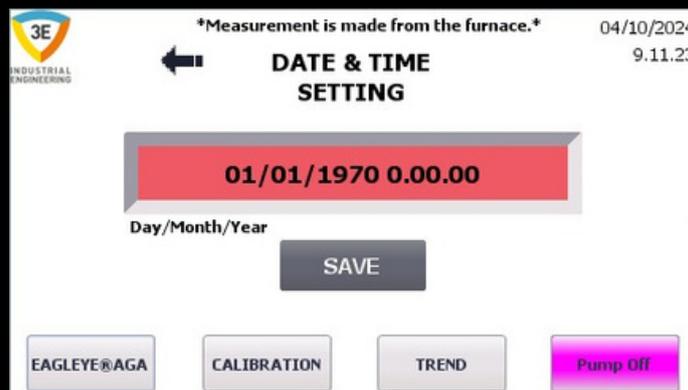
You can set the system time from this page. If your system is up to date, it will show the correct times in your log records. Therefore, it is important that the time is up to date. Let's continue from the calibration page.

CALIBRATION

We can see the gas values read and the status of the calibration action on the calibration screen. From this calibration page, the operator or engineer must enter the values from the span tube certificate in the target values column. Just a little warning; If the tube is changed or refilled, new tube values must be entered again. You will see variables "OK", "Warning", "Fault" and "Unselect" from STATUS column. These will tell us the following: "OK": The sensor is suitabled to calibrate.

CALIBRATION

"Warning": The sensor is not suitabled to calibrate. In other words, the value is not within a ±10-20% tolerance. "Fault": The sensor is not suitabled to calibrate. In other words, the value is not within a ±20% tolerance. "Unselect": If any of the target values is zero, it means that the value in the span tube has not been entered and the sensor with zero will not be calibrated. While the sensor status is "OK", it can calibrate but cannot calibrate in "Warning", "Fault" and "Unselect" states. These are valid while Eagleye AGA in auto calibration. These situations can be evaluated by the user in manual calibration and can calibrate. When the offset values are zero, the Value and Reading values are the same. If an offset value is entered for any sensor, the Value value will be the sum of the Offset value and the Reading value. The value in the Reading column is the raw value read from the sensor. The value in the Value column is the value displayed in the entire program and is the sum of the Offset with Reading values. We can continue to review buttons to this page. Let's continue with the Calibration Logs button.

** Important: If calibration is not to be applied to any cell, it is sufficient to enter ZERO for the value of that cell in the TARGET column.

CALIBRATION LOGS
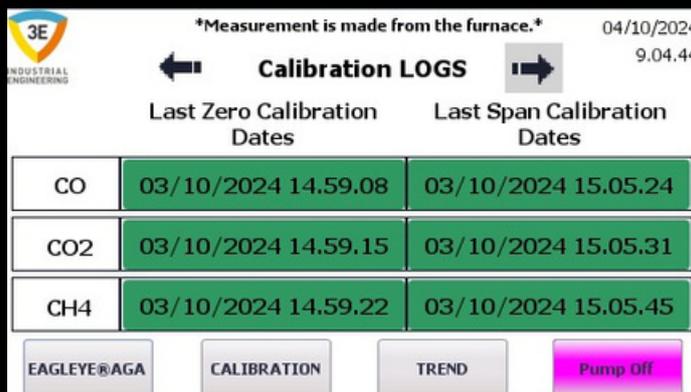
The deadlines for calibrations to cells are shown independently for each cell. If the calibration is completed successfully, the date of the completed calibration process is shown on this page. Let's check the value states in the calibration with the right arrow with a gray background.
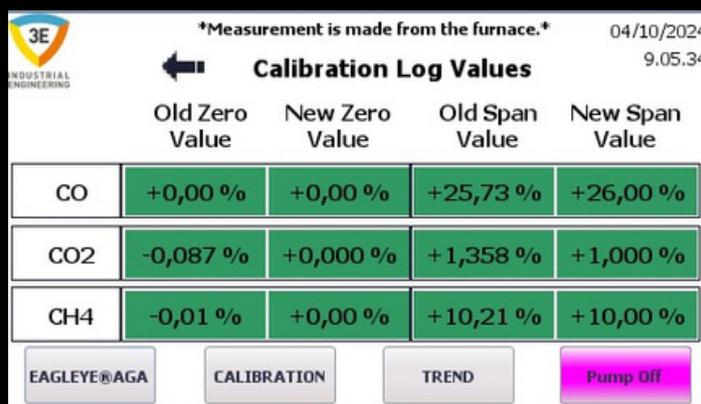
This page shows the new value at which the cell was calibrated with the old value immediately prior to calibration. If a wrong calibration has been made, control can be provided here. Let's continue with the Factory Calibration button on the calibration page.

FACTORY PAGE
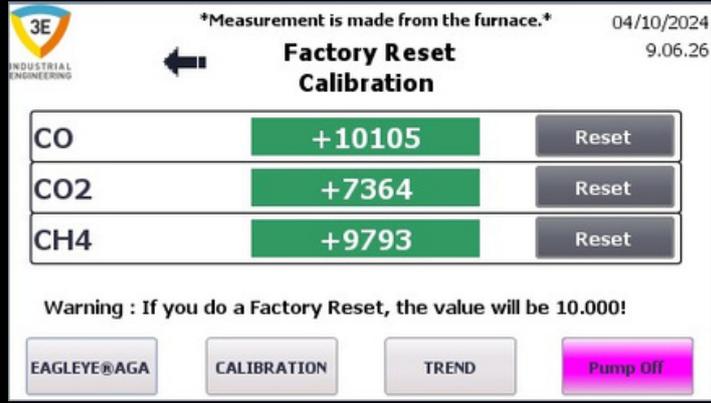
When you want to bring it to factory calibration, you can reset it for the desired cell from this page. The reset result should be the new value on this page of 10.000! Let's continue with the Calibration Selection button on the Calibration page.

CALIBRATION SELECTION
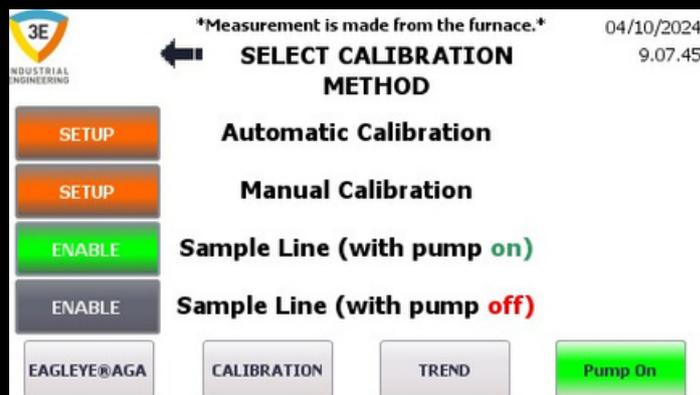
You can select and set the Calibration Method from this page. You can also use the device with or without a pump from the Sample Line. You can see the pump usage image in the picture above. When you don't calibrate the Eagleye AGA, Eagleye AGA works in sample line. If the sample line is pressurized, you must press the ENABLE button next to Sample Line (with pump off). If the sample line is not pressurized, you must press the ENABLE button next to Sample Line (with pump on). In the picture below, you can see the Sample Line without a pump. I would like to state that we checked the pump on this page.

Just a little warning: when you turn on the Eagleye AGA you need to choose how you want to use it on the oven line from the calibration selection page.

CALIBRATION SELECTION
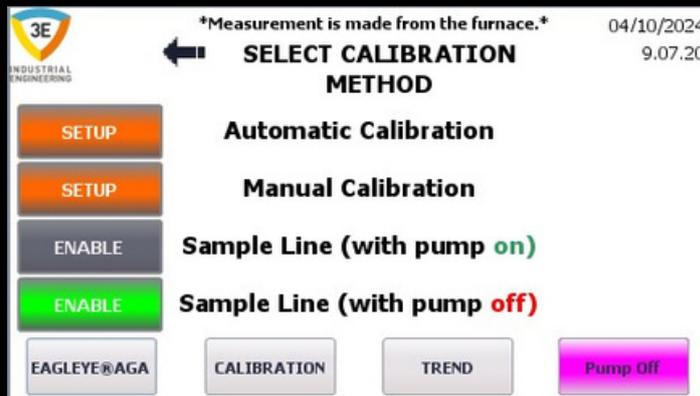
Let's continue with the Automatic Calibration method.

AUTOMATIC CALIBRATION
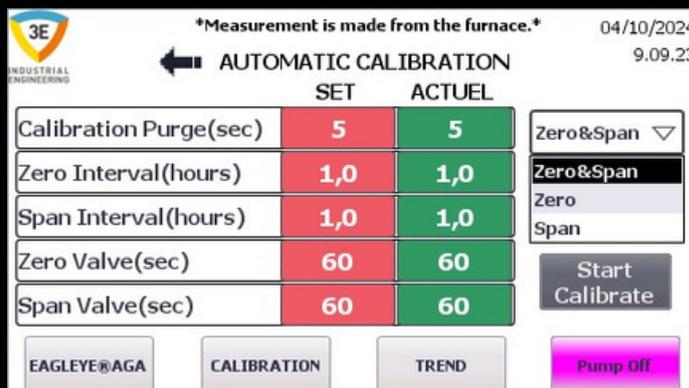
When you wanted to make the auto calibration, must enter purge time to clear the analyzer. This timing varies depending on the line length. For example, while normal line length 90 seconds, long length line need more timing. We can then enter the calibration timing. For example, calibrate every 96 hours with span tube. When entering the time for span calibration is completed before the analyzer will make to purge and then the span tube will open.

Just a little warning; For the SPAN gas to arrive, the 8R2 relay on the analyzer panel must be opened and the valve connected to the relay must work. When the span tube opens, a countdown begins for the previously entered valve open time (Span Valve(sec)). When the time is finished, the countdown begins 96 hours again. This situation continues every time. When we give the example for span calibration, the same situation applies to zero and zero&span calibration.
Generally, for the automatic calibration:

1- Must enter the timing
2- Must select the calibration type
3- Must press the Start Calibrate button

MANUAL CALIBRATION

You can calibrate each cell individually on the manual calibration page. Let's perform a zero calibration for the CO cell as an example.
Steps for zero calibration;

1-You must enter the Purge time from the Automatic Calibration page, then return to Manual Calibration,
2-Click on the button with the label of the cell you want to calibrate from the buttons under the Zero heading,
3-When the button is pressed, the background color will be green,
4-After clicking the button, the Purge time counts down and the time is completed,
5-After the Purge is finished, the Zero valve is opened and Nitrogen flow is provided to the cells,
6-The flow from the Zero tube should be observed from the flow meter as an average of 0.8 lt/min,
7-The value of the relevant cell is checked from the Actual Values column and it is expected to reach the stability that we can calibrate,
8- During the waiting period, EagleyeAGA will continue to draw nitrogen from the valve,

MANUAL CALIBRATION

9-When the values reach the desired stability and we want to calibrate, we must click on our green button again,

10-Our manual calibration process is complete and let's check,

11-In this example, since we made Zero calibration to the CO cell, the CO value will be 0 and we will be able to see the calibration date and the old and new value from the Calibration Logs, Generally, in Manual Calibration, Zero calibration of a cell is performed with the above steps.

MANUAL CALIBRATION

Now let's talk about the Span calibration steps for the same cell:

1-You must enter the Purge time from the Automatic Calibration page, then return to Manual Calibration

2-You must enter the value of the cell to be calibrated in the tube in the relevant field in the Tube Values column,

3-Click on the button with the label of the cell you want to calibrate from the buttons under the Span heading,

4-When the button is pressed, the background color becomes green,

5-After clicking the button, the Purge time starts to count down and the time is completed,

6-After Purge is finished, the Span valve is opened and mixed gas flow is provided to the cells,

7-The flow from the Span tube should be observed as an average of 0.8 lt/min from the flow meter,

8-The value of the relevant cell is checked from the Actual Values column and it is waited to approach the tube value, which is the value we want to calibrate, and to stabilize,

9-During the waiting period, EagleyeAGA continues to draw mixed gas from the valve,

10-When the values reach the desired stability and approach the value we want to calibrate, click on the button of the relevant cell with a green background again to calibrate you should click,

MANUAL CALIBRATION

11-In this example, since we made Span calibration to the CO cell, the CO value will be the value you entered in the tube values column and we will be able to see the calibration date and old and new value from the Calibration Logs,

Generally, in Manual Calibration, Span calibration of a cell is performed with the above steps.

Let's talk about other situations;

When we want to cancel while in manual calibration, it is enough to press the ABORT button. When the ABORT button is pressed, it resets the button of the cell you pressed to calibrate, does not calibrate the cell and the ABORT button is also reset. In short, if you press the ABORT button while you are in the calibration process, the calibration process is canceled. The Status column on the Manual Calibration page is included in the design only to make the status in the cells more understandable and to facilitate the observation status. Whatever the situation, it does not constitute an obstacle to Manual Calibration.

TREND
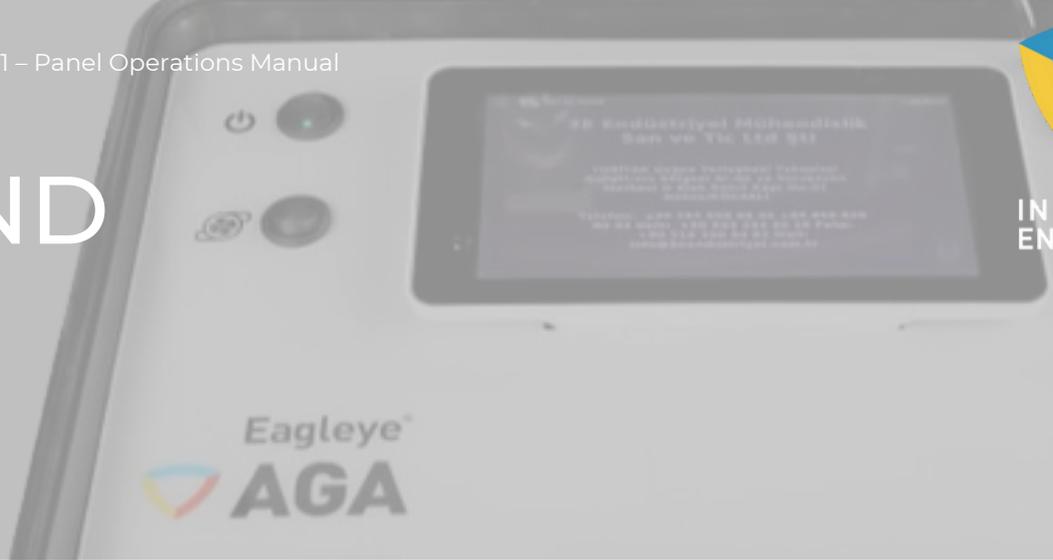
We can see the values CO, CO2 and CH4 on this page. Every gas visibility is colored differently. You can follow actual values from the trend table.

Just a little warning: If you want to turn back from this page, you can use buttons F1 and F2 below.

FILTER
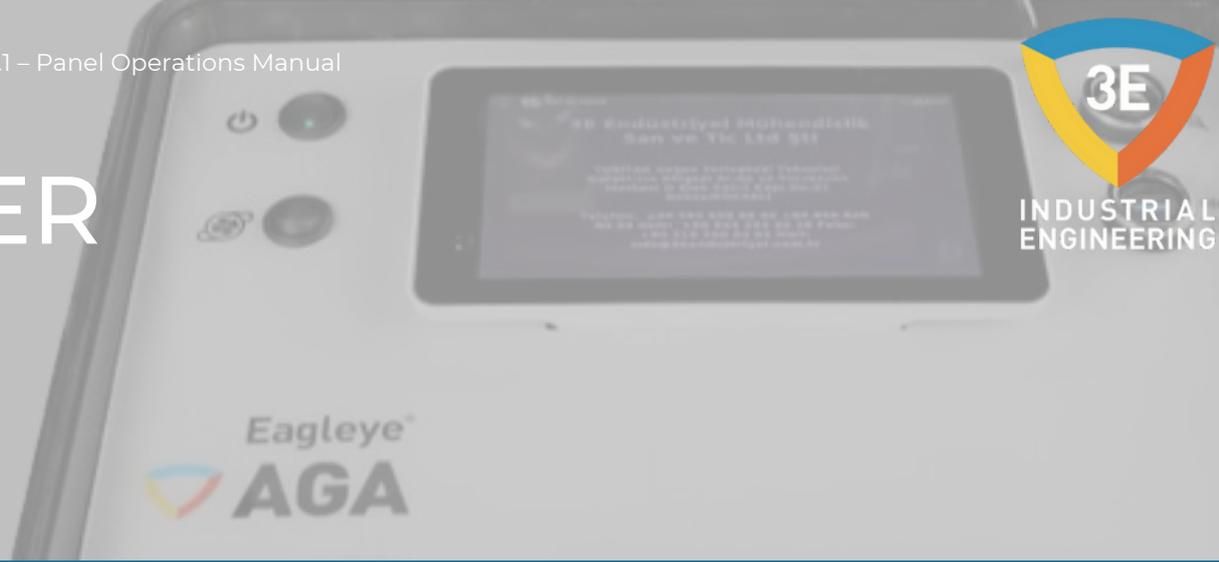
The filter has a manual unloading system. You must follow as periodically. Suggested, depending on processes once a week. The input pneumatic hose is 6mm in diameter.

FLOWMETER
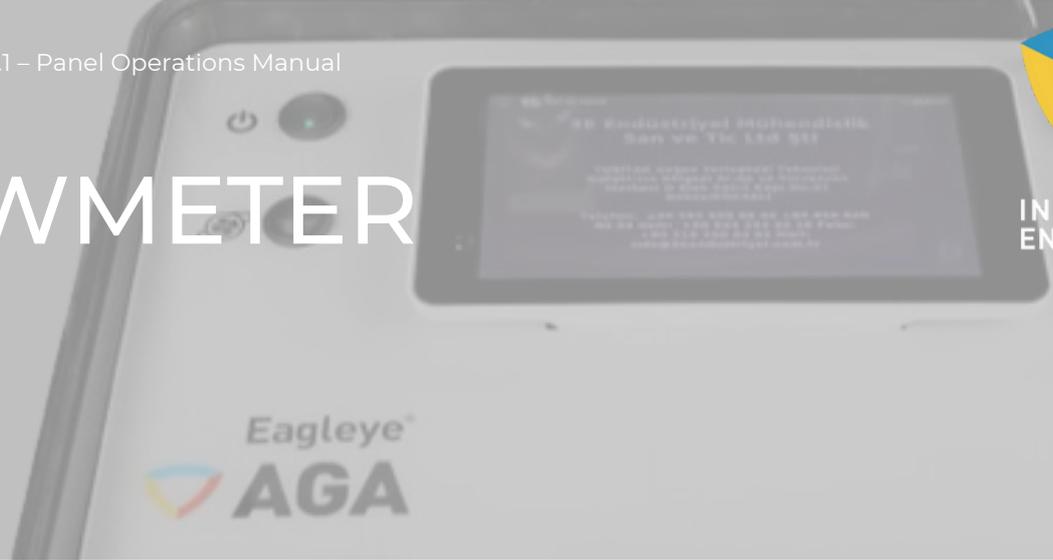
The flow must be within 0,2-0,8 lit/min. When the analyzer works, the calibration tubes, or sample line must be this flow range. The flow range is marked with a red arrow on the panel.

PART LIST AND INTERNAL COMPONENTS

5CPU3	6ES7212-1AE40-0XB0	CPU, DC/DC/DC, 24V DC
-	6ES7241-1CH30-1XB0	RS485, PTP COMMUNICATION
1F1	A9F74106	N AUTO CIRCUIT BREAKER 6A 1P
1G4	S8VK-C06024	POWER SUPPLY 24V DC 60W 2.5A
1G4	S8VK-G01505	POWER SUPPLY 5V DC 60W 3A
3GS3	SENSOR UNIT	5VDC
5OP6	6AV2123-2DB03-0AX0	KTP400 BASIC PN, 4" PROFINET
2PC6	FAN	24V DC 80*80mm
1Q1	CA10A200	CIRCUIT BREAKER
8R1-8R2-8R3-8R4	2966171	PLC-RSC-24V DC/21 SLIM RELAY
2VP2	VACUUM PUMP	24V DC / AIR
-	BLACK TERMINAL	WITH FUSE TERMINAL
-	GRAY TERMINAL	NO FUSE TERMINAL
-	YELLOW-GREEN TERMINAL	GROUND TERMINAL
KFIL-212-5-PC-B-AM	FILTER | BG2 KNOCKS	WATER TRAP FILTER
LZM-4T-H001	0.1-1.0 LT/MIN	FLOWMETER

PART LIST AND INTERNAL COMPONENTS
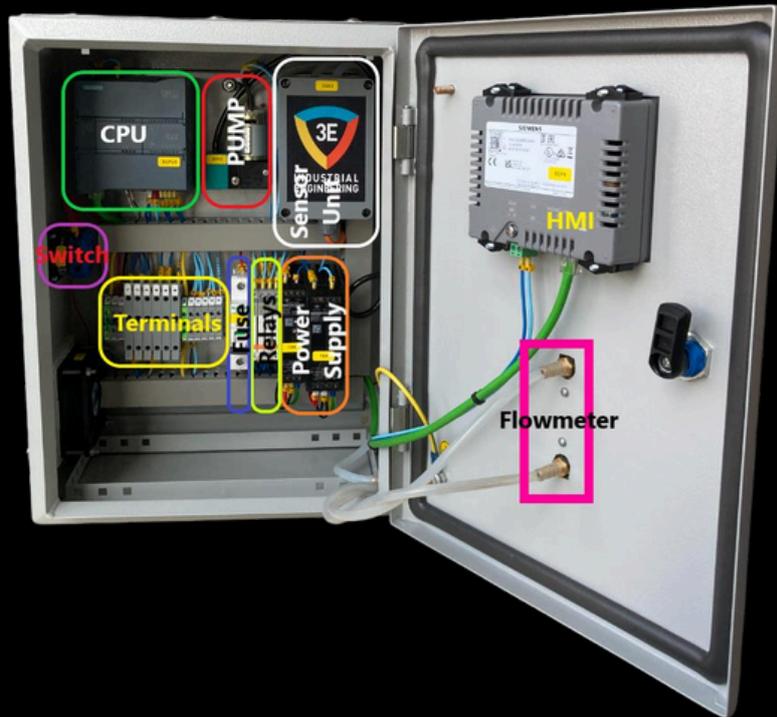
HMI KEYBOARD
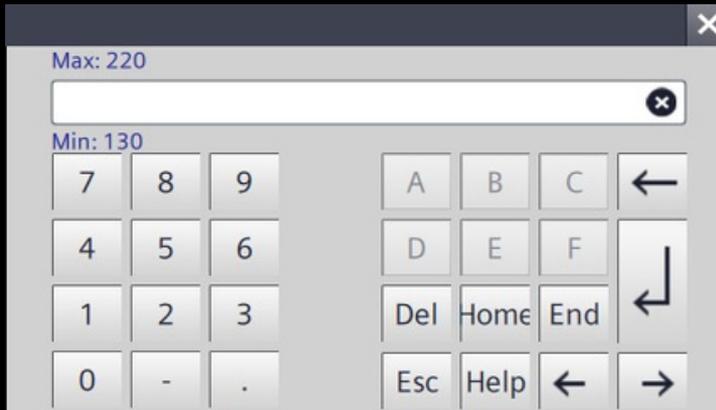
You will use this keyboard in the HMI panel. For example, when you press the green area on the live data page, the above screen will open. You can make to entry the value. If there is a value limitation in the field you entered, this limitation will appear on the keyboard screen. Like Max-Min. You must make to entry the value within the range that appears.

VACUUM PUMP OPERATION

The pump button on the HMI screen is designed for both monitoring and control of the vacuum pump. If not auto and manual calibration the pump can control from calibration select page. In addition, in manual or automatic calibration, the pump is operated until the system purging time and then the pump can be controlled by the operator. While the pump works, the flowmeter must become between 0.2-0.8 lit/min. Flow adjustment is made manually. According to the above conditions, the pump can be controlled. Regardless of the above conditions, the pump cannot be controlled.

PNUMATIC LINE DIAGRAM

PNEUMATIC LINE DIAGRAM
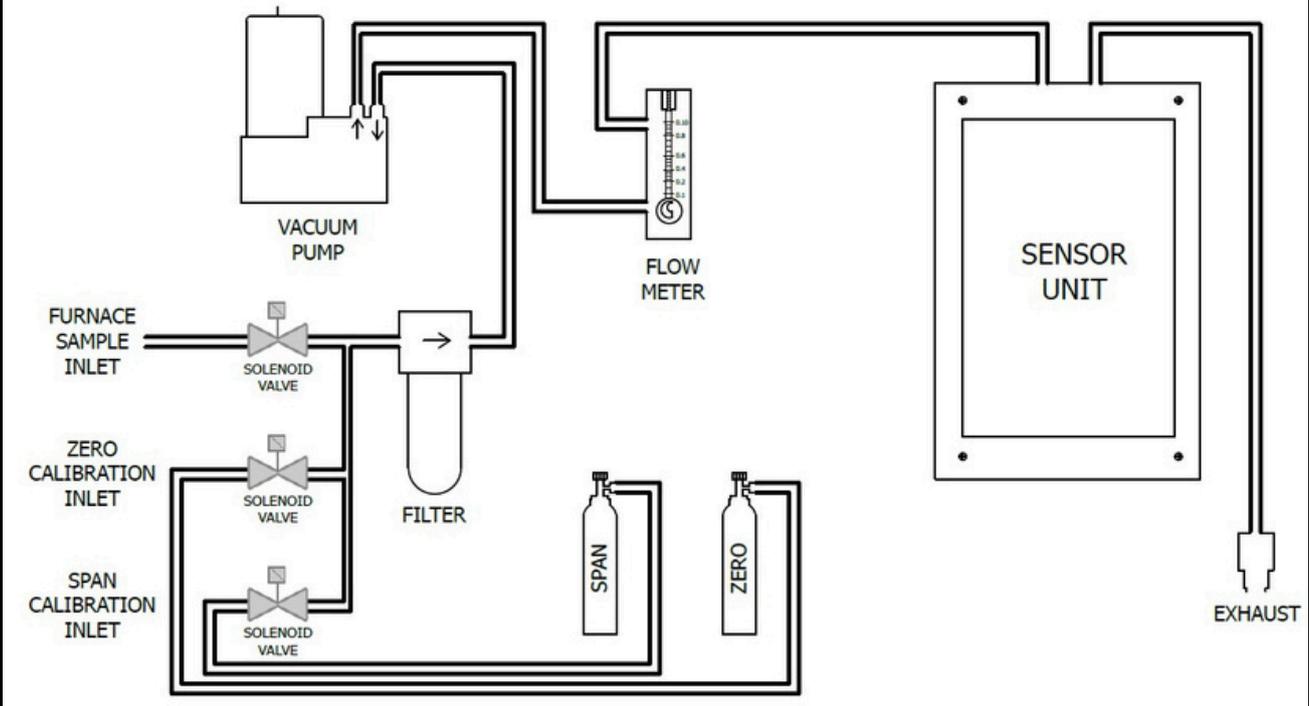
BASIC WORKING DESCRIPTION

Eagleye AGA is designed to simultaneously analyze CO, CO2 and CH4 from furnace atmospheric gases during heat treatment. Uses color touch screen/operator interface for data entries and displays. You can control the screen using your finger or pen. Avoid using sharp objects as they may cause permanent damage to the screen and will void the device's warranty. Once the power switch is turned on, it will take approximately 30 seconds for the Eagleye AGA software to activate. Once the software is properly installed, the device is ready for use. The system can be de-energized by turning the switch next to the panel to the 0 position. A controlled shutdown of the system is important for the health of the analyzer.

CONFIGURATION PARAMETERS

Sensor ID		
1	CO	43
2	CO2	02
3	CH4	79
Sampling Parameters		
1	Minimum COF Value	130
2	Maximum COF Value	220
3	COF Adjustment Mode	HMI
4	Minimum Temperature for sampling	810 °C
5	Recommended Alloy Factor%	100
6	Recommended CH4 Factor%	100
7	Recommended H2%	40
8	Recommended COF	200
9	Operation Temperature	-10°C - 50°C
10	Relative Humidity	0% - 95%RH (Non-Condensing)
Communication IP Address		
1	PLC IP Address	192.168.1.101
2	HMI IP Address	192.168.1.102
Communication Board / Properties		
1	CB 1241	RS485
2	Baud Rate	9.6 kbps
3	Parity	Even
4	Data Bits	8 bits per character
5	Stop Bits	1
6	Communication Pins	Tx / Rx
General Setup		
1	Temperatures Unit	°C
***WARNING		
AMMONIA should never be used in applications.		

EAGLEYE AGA

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