

EPC-T

POULTRY AUTOMATION DEVICE

USER GUIDE

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Note: This user guide is prepared for EPCT_V_1_1_1

1. INTRODUCTION

1.1. General Features

EPC_T cihazı, at least one HMI (Human Machine Interface) and consists of one control card.

Control Card has following inputs-outputs :

19 Digital Outputs

11 Analog Inputs

8 Digital Inputs

2 Analog Outputs

1.2. Warranty

Two year warranty against materials and workmanship. This warranty will remain in effect if the warranty document accompanying the contract and the obligations and responsibilities of the customer as written in the manual are fulfilled.

Emko Elektronik warns the user that the structure of the device is complex and may not be completely error-free. Although the EPC_T device has been manufactured and tested according to the relevant standards, it is necessary to take measures by establishing a separate alarm system from the EPC_T device against external conditions (electrical noise, lightning, humidity, temperature, etc.) exceeding the standards and problems arising from possible production and design errors of the device, is the responsibility of the user. Emko Elektronik does not accept any liability for losses that may arise in probable circumstances.

It is highly recommended to install a system that will alert the user and alert the user to the survival of the intervention, given that the device may malfunction or even stop its functions altogether.

Emko Elektronik does not accept any liability resulting from improper use of the device.

Warranty coverage is limited only to the replacement or repair of the defective product.

1.3. Maintenance

The repair of the device should be done by trained personnel.

To access the internal parts of the device, first disconnect the device.

Do not clean the device with hydrocarbon-containing solutions (such as Petroleum, Trichlorethylene). Cleaning the device with these solutions may reduce the mechanical reliability of the device.

Use a cloth moistened with ethyl alcohol or water to clean the outer plastic part of the device.
The device has an average life of 10 years.

1.4. Order Information

ORDER CODE	INFORMATION
EPC-N_HMI	EPC-N HMI module
EPC-N-I/O-IV-OC	Input / Output module <i>(For EPC-N and EPC-T)</i>
EPC-N_COM	Eth. + USB + RS-485 communication module + Flat Cable 47cm <i>(For EPC-N)</i>
EPC-N_GSM	GSM SMS module (Antenna + Com. Cable 3m) <i>(For EPC-N and EPC-T)</i> <i>(For EPC-N, works with EPC-N_COM)</i>
EPC-T7	EPC-T 7" Touch HMI module (Front Mount)
EPC-T7.R	EPC-T 7" Touch HMI module (Rear Mount)
EPC-T10	EPC-T 10" Touch HMI module (Front Mount)
EPC-T10.R	EPC-T 10" Touch HMI module (Rear Mount)

2. SETUP

Before the start of installation:

- Cut off all the electricity from the device.
- Make sure that the device does not work during installation.
- Follow the device manufacturer's safety instructions.
- Read and follow the installation instructions.

Damage that may occur during transportation must be checked with the eye before starting installation of the device.

Installation and commissioning must be done by mechanical and electrical technicians.

It is necessary to check the supply voltage range of the device and apply the appropriate supply voltage. This control will prevent the device from damaging the system and possible accidents by applying the wrong supply voltage.

To prevent electric shocks and similar accidents, the device and the system in which it is installed must not

be energized until all connections of the device have been completed.

Never use the appliance in the presence of flammable and explosive gases.

The necessary precautions must be taken with regard to all the components which may cause danger on the mechanical parts to be installed.

These measures are necessary for the safety of the installation personnel.

The device must be mounted on the system with its own fixing parts. Do not install the device with unsuitable fixing parts.

Assemble with fixing pieces to ensure that the device will not fall.

If the device is used outside of the intended use and purposes specified in this user manual, the user assumes full responsibility.

2.1. General Explanations

The EPC-T device basically consists of two parts:

- Control Card
- HMI*



Image 1: HMI

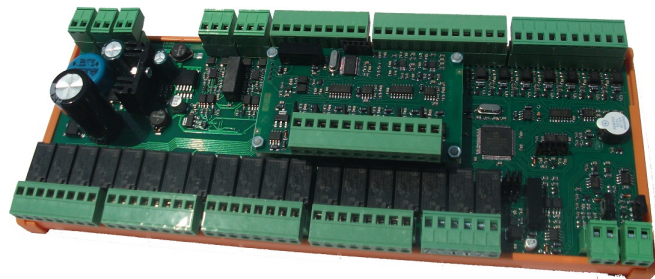


Image 2: Control Card

*HMI (Human Machine Interface)

When more input-output numbers are requested, one Control Card can be used as an expansion module. In this case, there are three basic parts of the device:

- HMI
- Master Control Card
- Expansion Module

The Master Control Card and the Expansion module are separated from each other by their device IDs. Device IDs are set with 3 jumper on Control Board. In the following photo, the location of the jumper used for the device ID is shown.

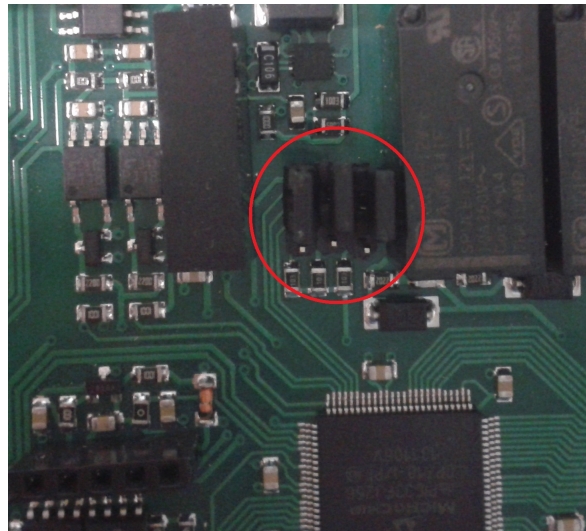
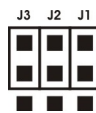


Image 3: Device ID Jumpers

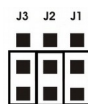
The 0.0.0 status displayed in the upper photo and expressed as below is the configuration to be made for the Main Control Card.



To use the control card as an expansion module, a different jumper configuration must be made.



Not: When the jumper positions are all 1.1.1 as follows, the control card always remains in the boot state.



2.2. Device Installation

HMI Installation

HMI is designed for panel mounting. Fixing is done with two clamping pieces.

- 1- Place HMI well in front of the panel.
- 2- After the crimp parts have been passed through the holes on both sides of the device, Do the installation.



The necessary precautions must be taken with regard to all the components which may cause danger to the mechanical parts of the user interface installation. These measures are necessary for the safety of the installation personnel.

There are 4 different types of EPC-T HMI device:

10 inch Front Mount:

...

10 inch Rear Mount:

...

7 inch Rear Mount:

...

7 inch Front Mount:

Outside Dimension (mm): 278 x 200 x 50

Mounting Depth (mm): 44

Panel Cutting (mm): 258 x 180

Control Card Assembly

The control cards are designed for rail mounting.

For each control card, 1 body, 2 covers and 3 feet are used.

The length of the control card, together with the body and the cover, is 280mm and the height is 100mm.

This metric must be taken into account when mounting to the rail.



The necessary precautions must be taken with regard to all the components which may cause danger on the mechanical parts of the control cards. These measures are necessary for the safety of the installation personnel.

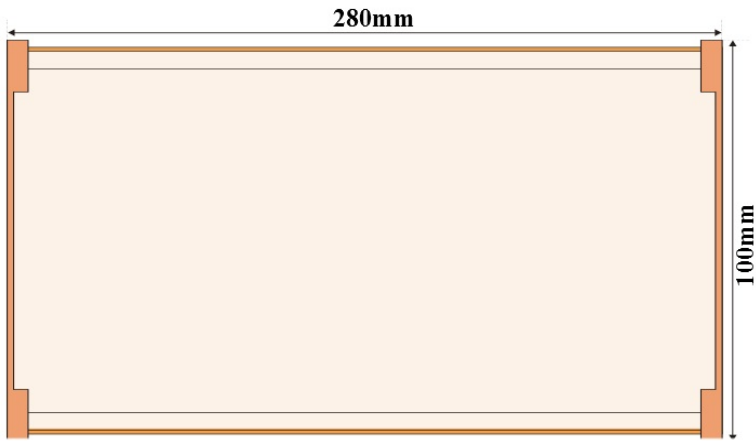


Image 4: Body and Covers

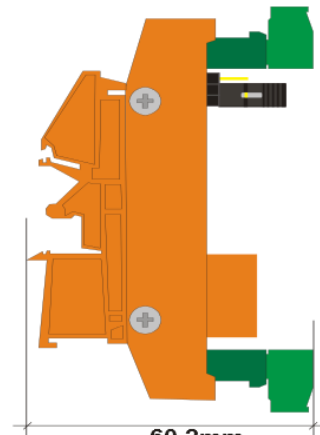


Image 5: .Foot

2.3 Power and Communication Connections

The power and communication connection diagram is given below. Power connections are shown with **RED**, communication connections are indicated with **BLUE**.

Communication connections must be made with a shielded cable.

Because of the voltage differences that may occur, the screen should be connected to one side so that current can flow through the screen and cause noise. The other tip is left idle.

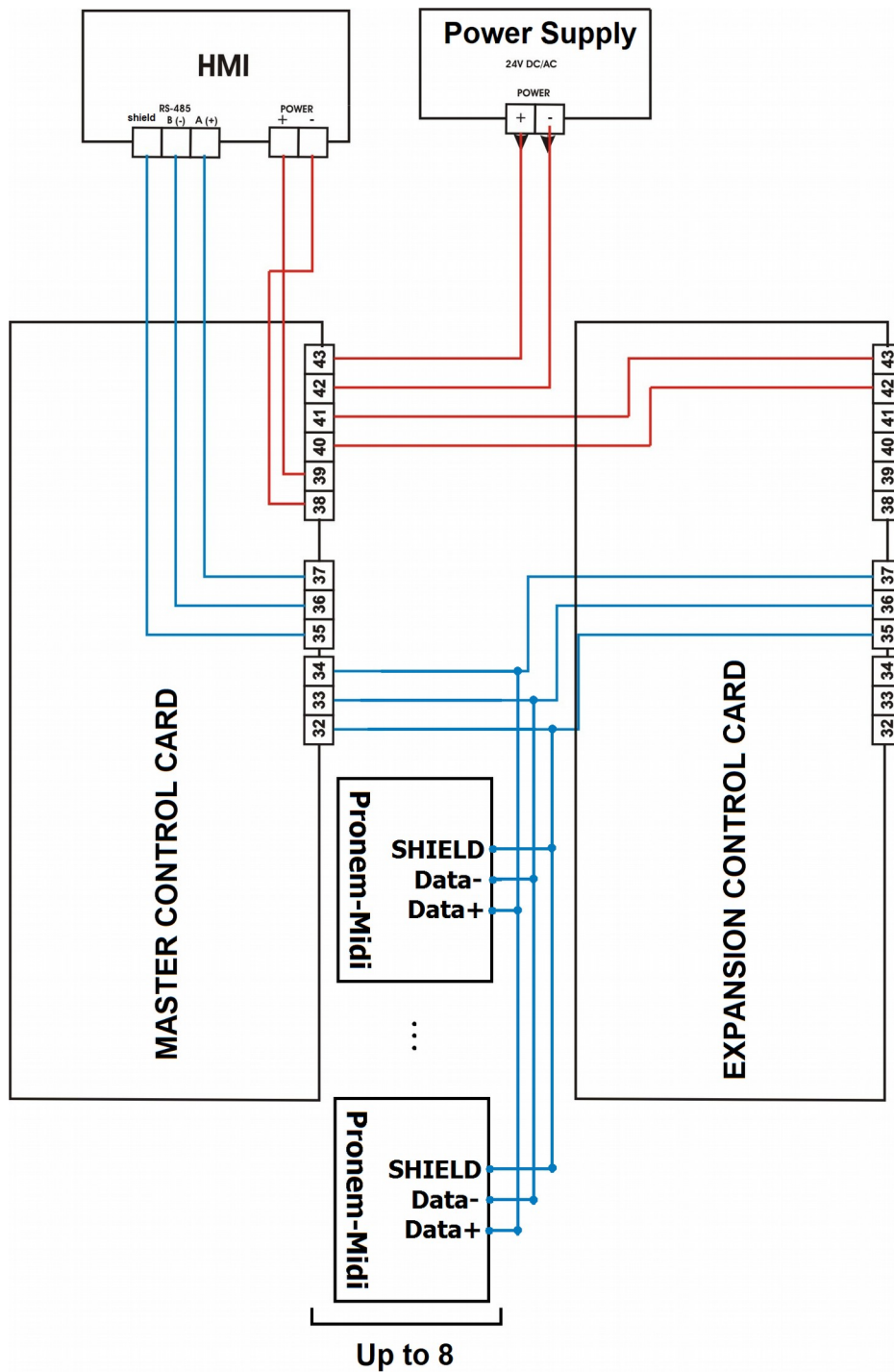


Image 6: Power and Communication Connections

2.4 Input / Output Connections

Note 1: For PT100 connections longer than 30 m, a shielded cable must be used.

Note 2: All Inputs and Outputs can be configured.

Connections are made according to this configuration.

see:

7.2. Analog Input Configurations

7.3. Relay Output Configurations

7.4. Digital Input Configurations

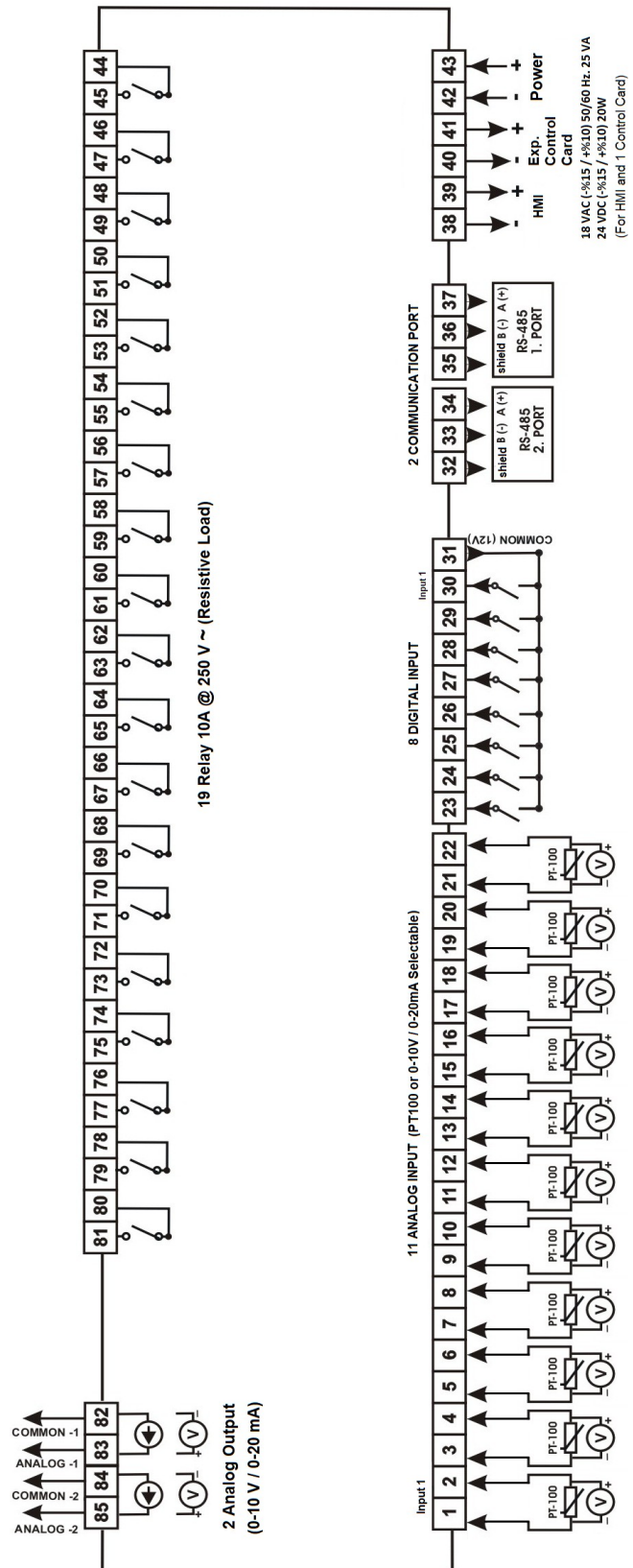
7.5. Analog Output Configurations

Note 3: Combinations for Analog Outputs are specified in the order code.

Analog Outputs :

- 0-10V
- 0-20 mA

Image 7: Input / Output Connections

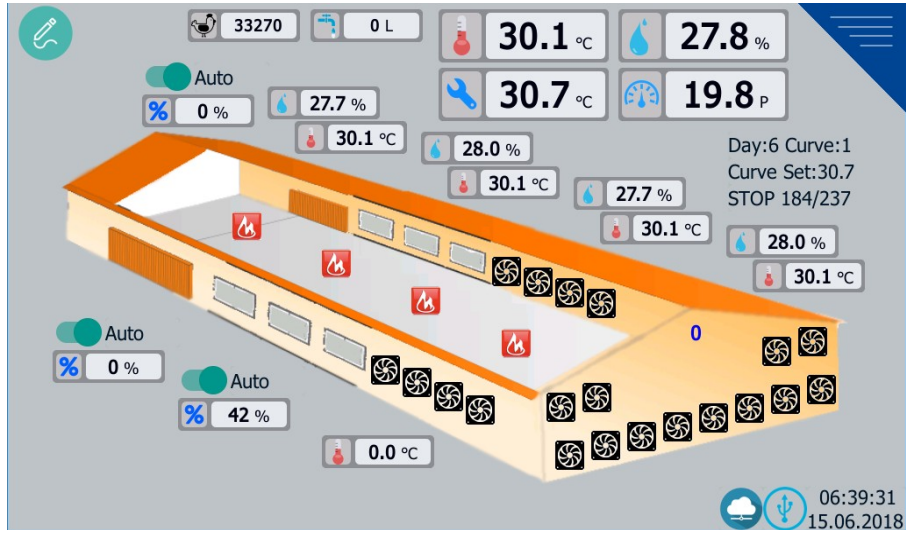


3. MAIN SCREEN AND GENERAL INTRODUCTION

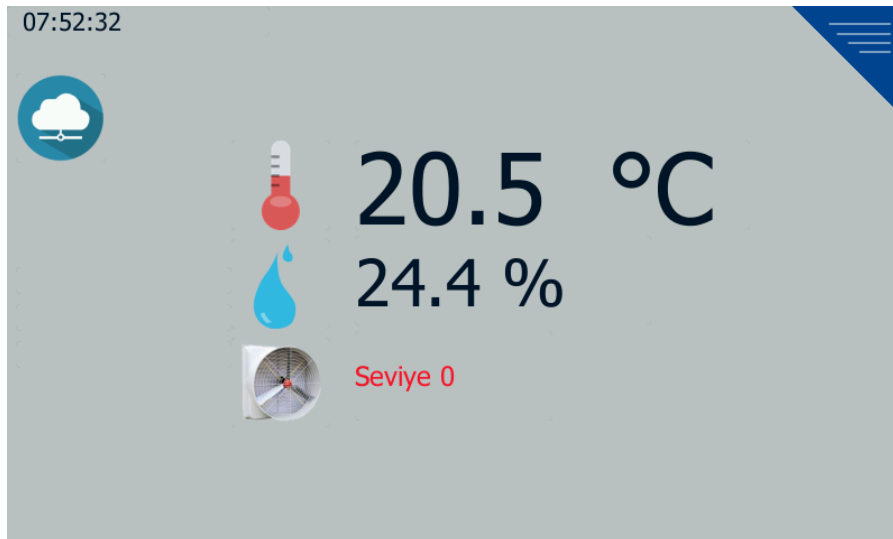
3.1. MAIN SCREEN

The main screen varies depending on the screen size:

EPCT10 Main Screen Screenshot:



EPCT7 Main Screen Screenshot:

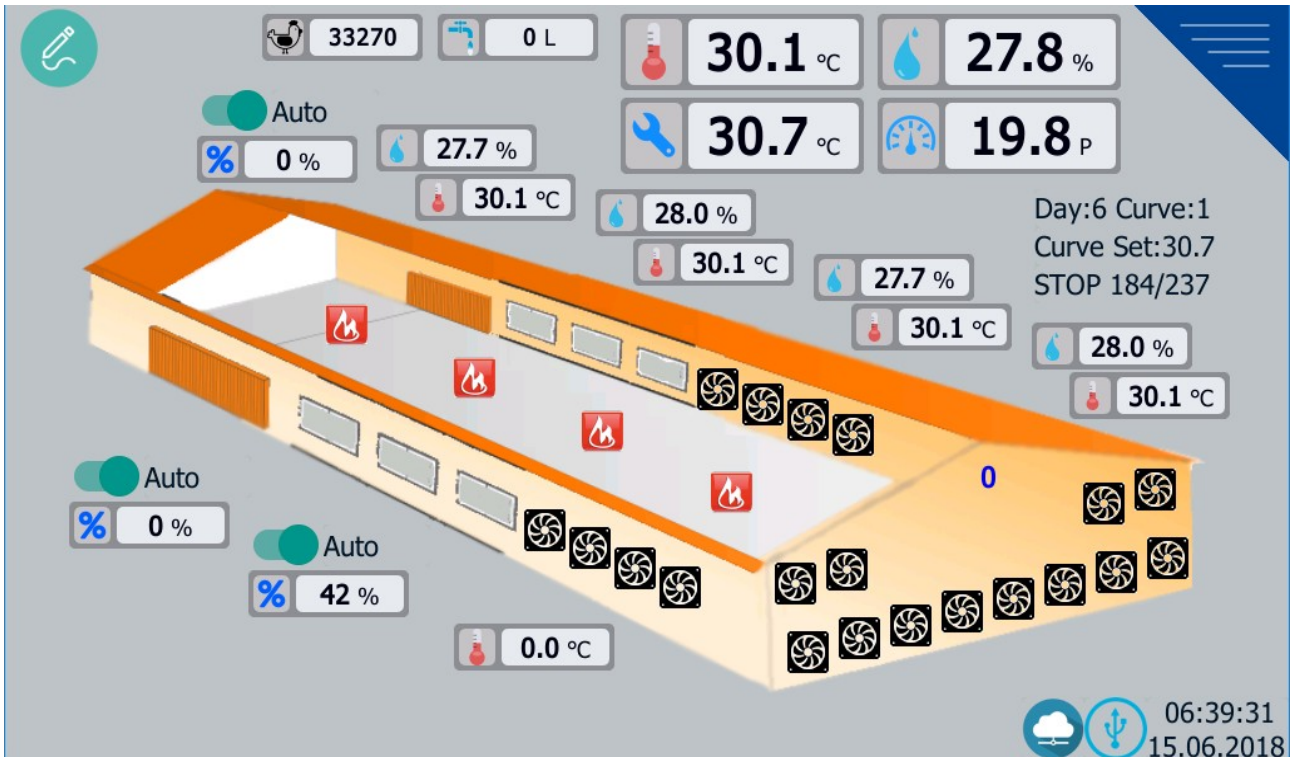


EPCT10 Main Screen Display Modes

There are two display modes:


- Observation Mode
- Design Mode

The screen example in the observation mode can be seen below.



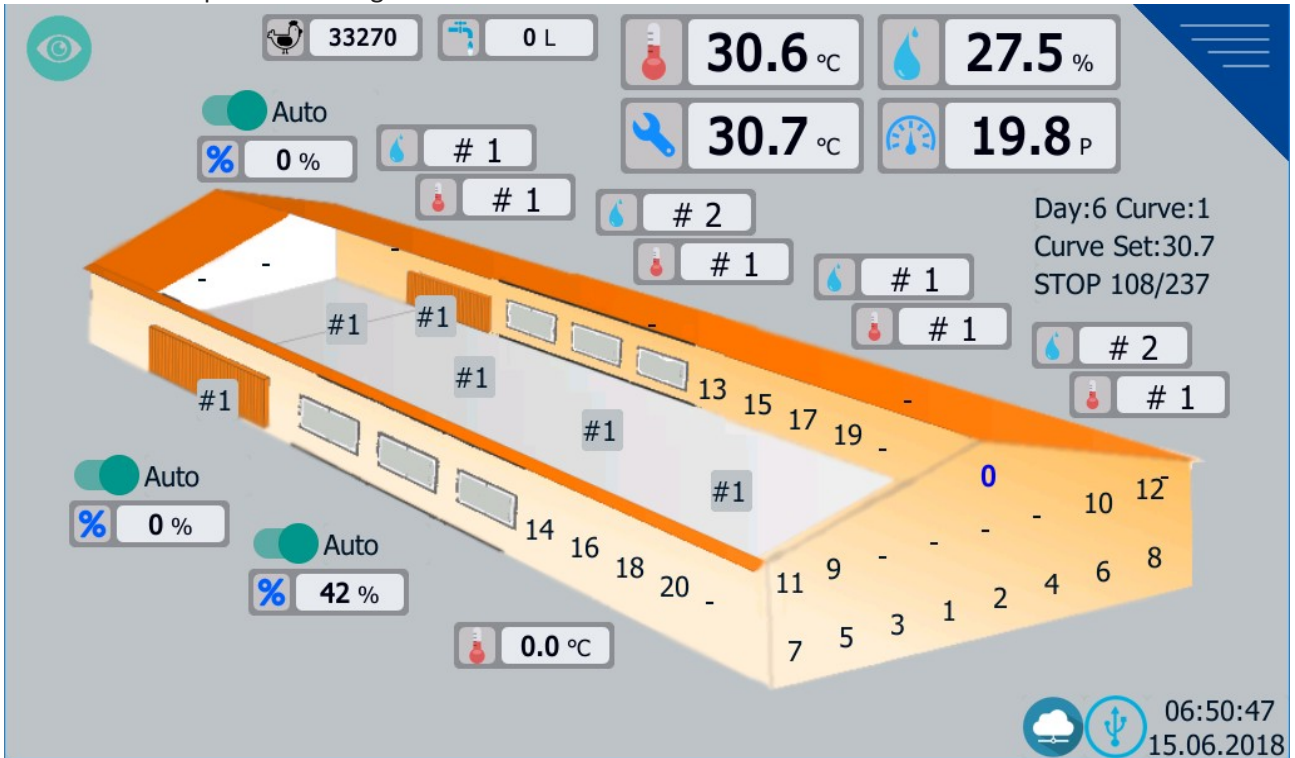
The device switches on in observation mode.
In this mode, you can see the values read from the IO cards.



With the icon in the upper left corner of the screen


 you can get the screen into design mode.

You can choose which values to display and where to see them in design mode.

The screen example in the design mode can be seen below.



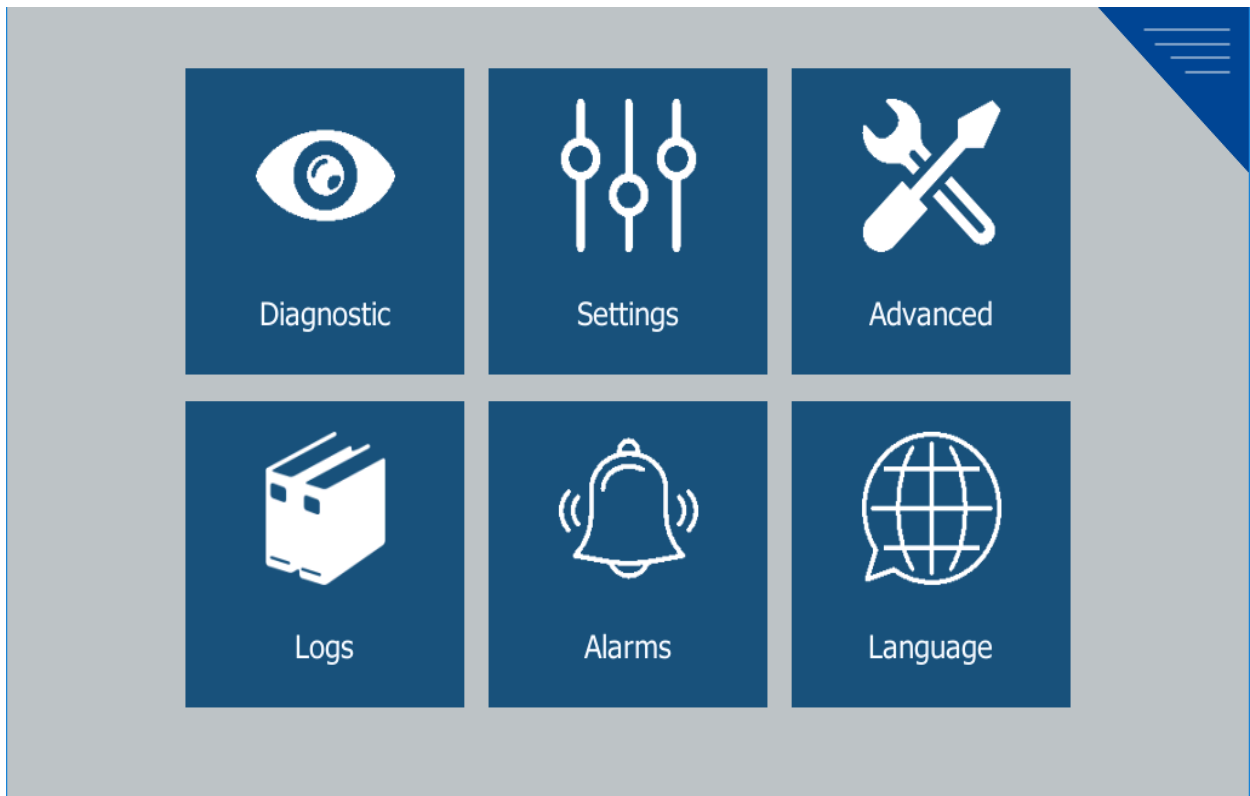
 The icon represents the temperature sensors and  the icon represents the humidity sensors. Numbers on the wall indicate fan numbers.

you can return to observation mode by clicking on the icon  again after you have made the desired design settings.

Note: Predefined User and Technician passwords are '2'

3.2. Menus

When the triangle on the upper right hand side of the main screen is clicked, the main menu comes out.



4. INPUTS

Inputs	Module/Input	Function	Value
	Sensor ID / 201	HOUSE TEMP TRANS	31.2
	Sensor ID / 201	HUMIDITY	26.9
Controls	Main Card / 1	OUTSIDE TEMP TRANS	0.0
	Main Card / 2	STATIC PRESSURE	19.8
	Main Card / 3	HUMIDITY	27.7
	Main Card / 4	CO2	0
	Main Card / 5	-	-

SET: 30.0°C HOUSE: 31.2°C RUN 46/200 LEVEL: 2

- Input: Analog Input Number
- Module: Module Name
- Function: Input function
- Value: Value read from the sensor

5. OUTPUTS

Inputs	Output Name	Value
	Baffle Position	42 %
	Baffle Target	42 %
Controls	Pad Curtain 1 Position	0 %
	Pad Curtain 1 Target	0 %
	Heater 1	OFF
	Pad Motor 1	OFF
	Humidity 1	OFF
	Humidity 2	ON

SET: 30.0°C HOUSE: 31.2°C RUN 33/200 LEVEL: 2

To observe the outputs in the system; Click the Controls button on the left. Table on the left; Output Name and Output Value; In the right column, the status of the fans is shown. The fans shown on the gray floor are **PASSIVE** and the fans shown on the green floor are **ACTIVE**.

Shown Outputs:

Baffle Position: 'Baffle's current active position in%.

Baffle Target: Gives the targeted baffle openness in%.

Pad Curtain 1 Position: Gives the current position of the1. Pad Curtain in%.

Pad Curtain 1 Target: Gives the target Pad Curtain openness in%.

Pad Curtain 2 Position: Gives the current position of Pad Curtain in%.

Pad Curtain 2 Target: Gives the targeted Pad Curtain openness in%.

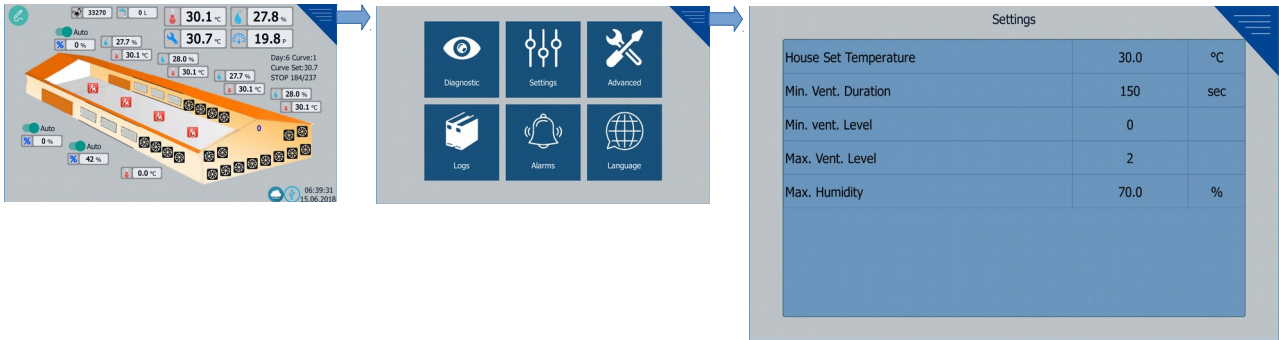
Heater n: n. The proportional operating value of the heater.

Cooler n: n. Indicates the status of the cooler.

Humidity n: n. The proportional operating value of the humidity relay.

Lighting n: n. Indicates the status of the lighting relay.

6. SETTINGS



House Set Temperature (° C): The desired temperature value of the poultry environment.

Min Vent. Duration (s): At minimum ventilation level (Level-0), when the operating mode is proportionally selected, the duration of the fans.

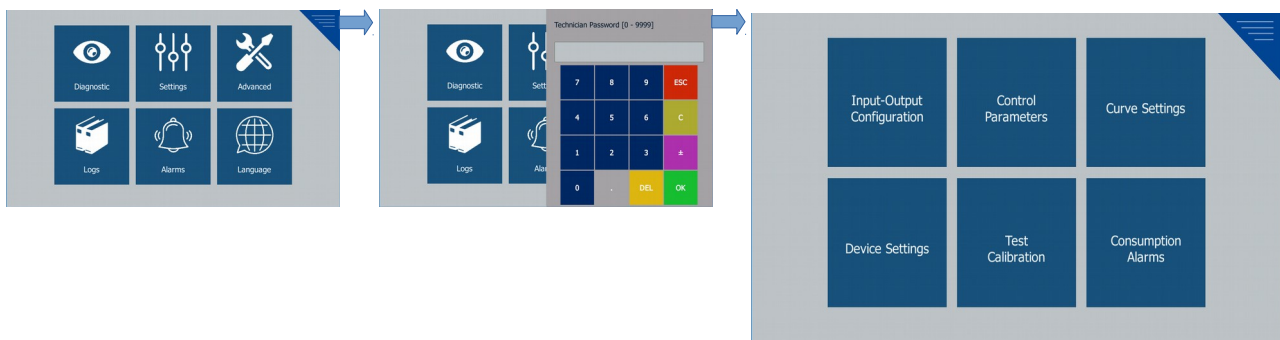
Min. Vent. Level: Minimum ventilation level.

Max. Vent. Level: Maximum ventilation level.

Max. Humidity (%): Acceptable maximum humidity value. When the humidity level exceeds this value:

- 1- No high humidity alarm is given.
- 2- If the humidity level does not fall to normal within a certain time, the ventilation level is increased by 1 level. (See 7.1.7 Humidity Control Parameters) (if "VENTILATION EFFECT" is selected "YES")
- 3- If the humidity level does not return to normal after a certain period of time, the Heater will run. (See 7.1.7 Heater Parameters) (if "HEATED DRY" is selected "YES")

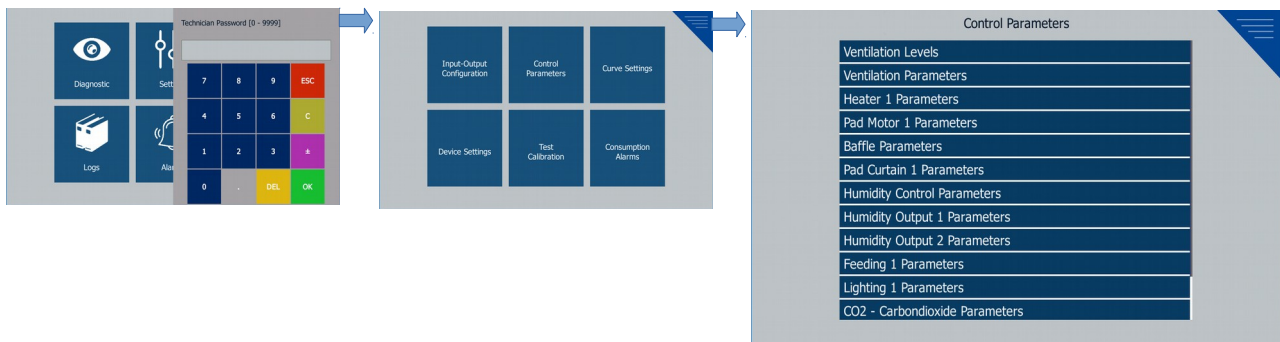
7. ADVANCED SETTINGS



From the Advanced Settings Menu, you can access the following pages:

- 7.1. Control Parameters
- 7.2. Input Output Configuration
- 7.3. Curve Settings
- 7.4. Device Settings
- 7.5. Test Calibration
- 7.6. Consumption Alarms

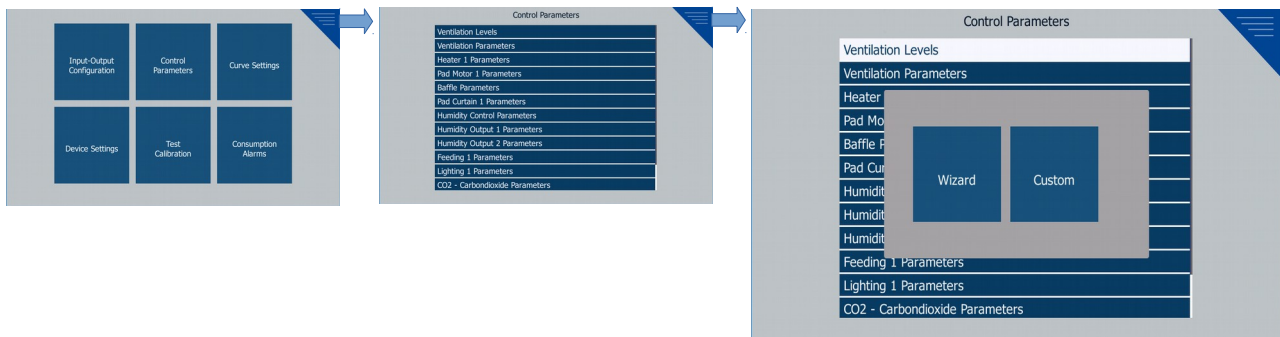
7.1. CONTROL PARAMETERS



This menu contains a list of parameters related to the control functions of the device. In this list, there are always rows of "Ventilation Levels", "Ventilation Parameters" and "Minimum Maximum Values". The other rows in the list are automatically added or removed according to the input - output configuration.

7.1.1 VENTILATION LEVELS

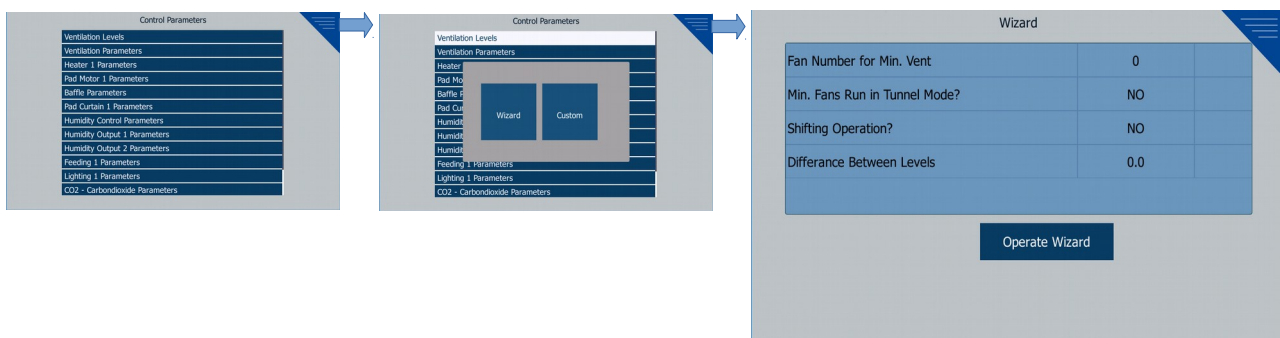
The page contains the offset values for the ventilation levels, the proportional fan's duration and the fan's operating modes.



When the page opens, you see 2 options :

- **Wizard**
- **Custom**

Wizard:



It is used to make ventilation level adjustments in a simple way.

Fan Number for Min. Vent. : It is used to determine the number of fans to operate at minimum ventilation level (Level-0).

Min. Fans Run in Tunnel Mode? : When the tunnel mode (Level-1 ... n) is passed, it is selected whether the fans that are set aside for minimum ventilation will work.

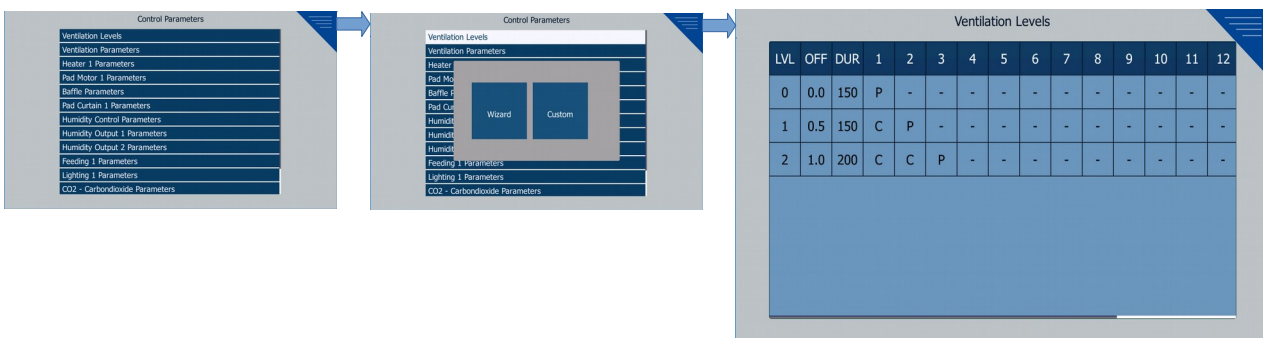
Shifting Operation? : Whether or not to shift operation is selected.

Difference Between Levels (° C): When ventilation levels are adjusted, the offset is increased at each level. This increment value is entered here.

The wizard will ask you whether to recreate the ventilation parameters when you exit the wizard. When the yes answer is given, the ventilation parameters are recreated with the selected values in the wizard, deleting the old parameters. By changing to 'Custom Settings', the settings that the wizard creates are observed.

After entering these parameters, one fan will be added at each level sets created.

Custom Settings:



LVL: The number of ventilation level

OFF: Offset value of the ventilation level according to the set of poultry.

DUR: Operating time of the selected fans in operating mode P (proportional) at the relevant ventilation level.

1, 2, ..., 32: At the relevant ventilation level, the operating mode of the fan concerned. There are 4 fan operating modes:

- **C:** The fan runs continuously in the relevant level.
- **P:** The fan operates proportionally at the relevant level.
- **K:** The fan works by shifting at the relevant level.
- **A:** Shift work area for fans in the shifting mode.

Example:

We selected the fan operating modes for level 3 as follows.

Level	Duration	1. Fan	2. Fan	3. Fan	4. Fan	5. Fan
...						
3. Level	30	P	P	C	-	-
...						

3. Ventilation level 1 and 2 fans are Proportional, and fan 3 is Steady / Continuous. Proportional fans are ON for 30 seconds and OFF for the remainder of the period.

If we take the period as 100 seconds, the operation diagram of the fans becomes as follows in the 3rd level.

	1. Fan	2. Fan	3. Fan	4. Fan	5. Fan
<u>Period 1</u> first 30 seconds	✓	✓	✓	x	x
<u>Period 1</u> the next 70 seconds	x	x	✓	x	x
<u>Period 2</u> first 30 seconds	✓	✓	✓	x	x
<u>Period 2</u> the next 70 seconds	x	x	✓	x	x
<u>Period 3</u> first 30 seconds	✓	✓	✓	x	x
<u>Period 3</u> the next 70 seconds	x	x	✓	x	x

Example:

We selected the fan operating modes for level 4 as follows.

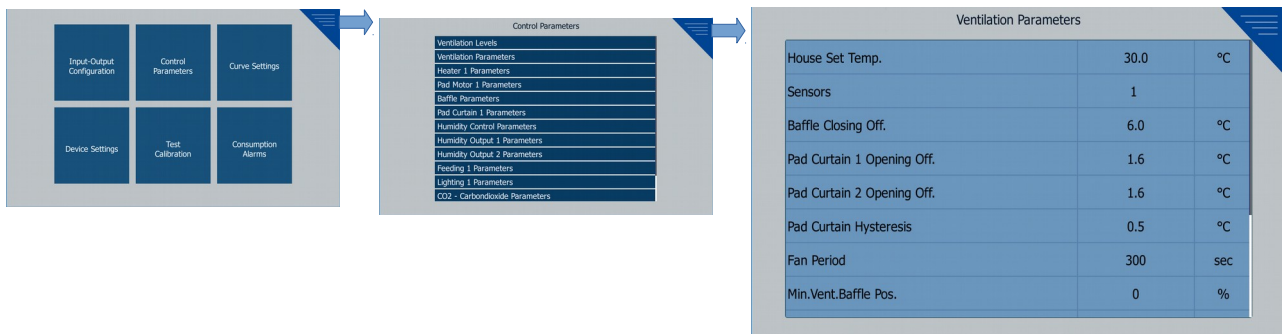
Level	Duration	1. Fan	2. Fan	3. Fan	4. Fan	5. Fan
...						
4. Level	30	-	S	S	A	A
...						

At ventilation level 4, 2nd and 3rd fans operate in Shifting mode.

If we take the period as 100 seconds, the operation diagram of the fans becomes as follows in the 4th level.

	1. Fan	2. Fan	3. Fan	4. Fan	5. Fan
<u>Period 1</u> first 30 seconds	x	✓	✓	x	x
<u>Period 1</u> the next 70 seconds	x	✓	✓	x	x
<u>Period 2</u> first 30 seconds	x	x	✓	✓	x
<u>Period 2</u> the next 70 seconds	x	x	✓	✓	x
<u>Period 3</u> first 30 seconds	x	x	x	✓	✓
<u>Period 3</u> the next 70 seconds	x	x	x	✓	✓
<u>Period 4</u> first 30 seconds	x	✓	✓	x	x
<u>Period 4</u> the next 70 seconds	x	✓	✓	x	x

7.1.2 VENTILATION PARAMETERS



House Set Temp. (°C): Set value from Tunnel Ventilation to Minimum Ventilation (Level 0).

Sensors: Selection of sensors to participate in the average for calculating poultry temperature. The ventilation works according to this average temperature.

Baffle Closing Off. (°C): If "Use Own Sensors" is selected "YES"; When the poultry temperature reaches "House Set Temperature + Baffle Closing Offset" value, the baffle closes.

If "Use Own Sensors" is selected "NO"; If the "Baffle Closing Offset" corresponds to the ventilation level, then the baffle closes. It works according to the ventilation level, not according to its sensors.

Pad Curtain 1 Opening Off. (°C): If "Use OwnSensors" is selected "YES"; When the poultry temperature reaches "Poultry Set Temperature + Pad Curtain 1 Opening Offset", Pad Curtain 1 opens.

If "Use Own Sensors" is selected "NO"; If the "Pad Curtain 1 Opening Offset" corresponds to the ventilation level, the Pad Curtain opens at that level. It works according to the ventilation level, not according to its sensors.

Pad Curtain 2 Opening Off. (°C): If "Use OwnSensors" is selected "YES"; When the poultry temperature reaches "Poultry Set Temperature + Pad Curtain 2 Opening Offset", Pad Curtain 2 opens.

If "Use Own Sensors" is selected "NO"; If the "Pad Curtain 2 Opening Offset" corresponds to the ventilation level, the Pad Curtain opens at that level. It works according to the ventilation level, not according to its sensors.

Pad Curtain Hysteresis (°C): This parameter is active if "Use Own Sensors" is selected "YES". The hysteresis value used to reopen / close Baffle and Pad Curtains.

Fan Period (s): The working period of the fans.

Min. Vent. Baffle Pos. (%): In minimum ventilation mode (Level-0), it indicates how long the Baffle will be turned on when the fans are running. If this parameter is not "0", it is the dominant parameter. At level 0 operation is performed according to this parameter, not fan effect.

Level Hysteresis (°C): The hysteresis value used to return to the lower ventilation level when it passes from the lower ventilation level to the upper ventilation level. This value should not be greater than the offset values in Ventilation levels.

Vent. Level Delay Time (s): Waiting time for ventilation level detection. At the beginning of this waiting time the ventilation level is determined and the level is not changed during this time.

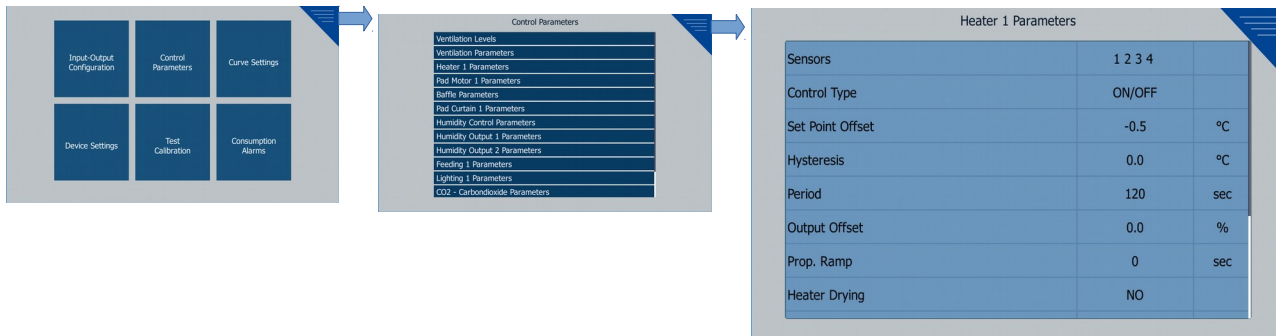
Synchronization Delay (s): After the device is turned on, it will start working as long as the time entered here. This parameter is used to prevent all devices from starting to work at the same time when multiple devices are fed from a single source.

Min. Vent. Dur. Inc./Dec. (%): Increase or decrease min ventilation time (level 0 Active time) in%.

Hysteresis for Min Vent (°C): Is the hysteresis value that transitions from level 1 to level 0.

7.1.3 HEATER PARAMETERS

Heating control can be performed up to the number of selected heating relay. (maximum 4 pieces)



Sensors : Selection of temperature sensors to be used for heating controls.

Control Type : The algorithm of the heating control is selected. There are two types of control:

- PROPORTIONAL
- ON/OFF

Set Point Offset (°C): It is the parameter that determines if the poultry temperature falls below the Poultry Set value and the heating control is active. For example; If the set value is set at 25 °C, set value offset is set at 2 °C; At 23 °C the heater starts to work.

Hysteresis (°C) : When Control Type "ON / OFF" is selected; determines how much the heated heater closes when the value of "Poul Set Temperature - Set Value Offset" is exceeded. For example; When hysteresis 1 °C is selected, the heater starts to operate at 23 °C and will stop at 24 °C.

When the Control Type "PROPORTION" is selected; determines the Proportional Band.

Period (s) : When the Control Type "PROPORTION" is selected; proportional output period.

Output Offset (%) : Offset value for heater output value.

Prop. Ramp (s) : The time at which the value of the heater output (%) reaches the calculated value. It is used for slow / soft increase of output.

Heater Drying : Selection of drying control by operating heaters in high humidity. There are two options:

- **YES**: Heating is on in case of high humidity
- **NO**: Heating is off in case of high humidity

Humidity Set Point (%) : If heater drying is selected "YES"; the humidity set value at which the heater will start.

Humidity Hysteresis (%) : If heater drying is selected "YES"; The hysteresis value is used to stop the heater.

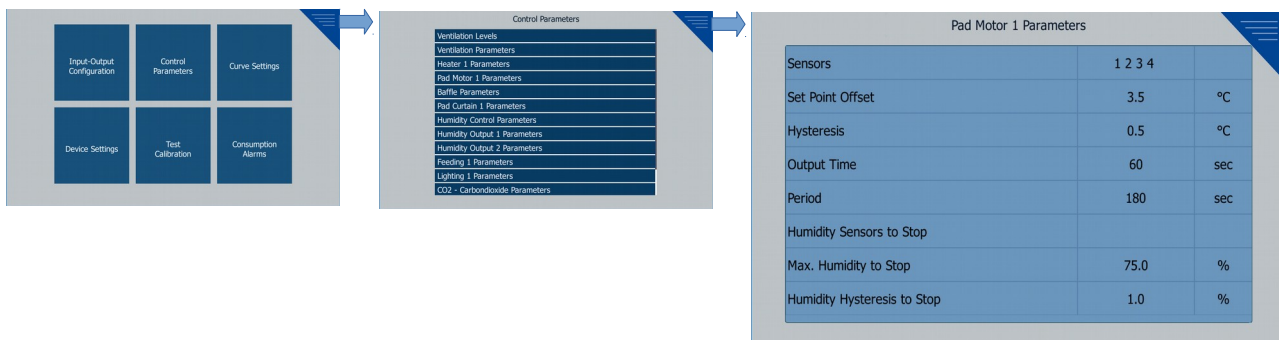
Humidity Sensors : If heater drying is selected "YES"; is the selection of the humidity sensors that the heater controls when deciding on the high humidity condition.

Humidity Inf. Band : When the Control Type "PROPORTION" is selected; as each Effect Band increases in humidity level, the heating proportional output increases by the Humidity Coefficient.

Humidity Inf. Coef. : When the Control Type "PROPORTION" is selected and If heater drying is selected "YES"; the coefficient to be added to the proportional output in case of high humidity.

7.1.5. COOLER PARAMETERS

Cooler control can be performed up to the number of selected cooler relay. (maximum 4 pieces)



Sensors : Selection of temperature sensors to be used for cooling controls.

Set Point Offset (°C) : It specifies how much cooling control will be active when the average value of the selected sensors rises from "Poultry Set Temperature".

Hysteresis (°C) : Parameter to determine how much the average temperature of the selected sensors should be lowered to "Poultry Set Temperature + Set Value Offset" after passive cooling control is enabled, to be inactive.

Output Time (s) : Determines how many seconds the cooler will run during a period.

Period (s) : It is the working period of the cooler.

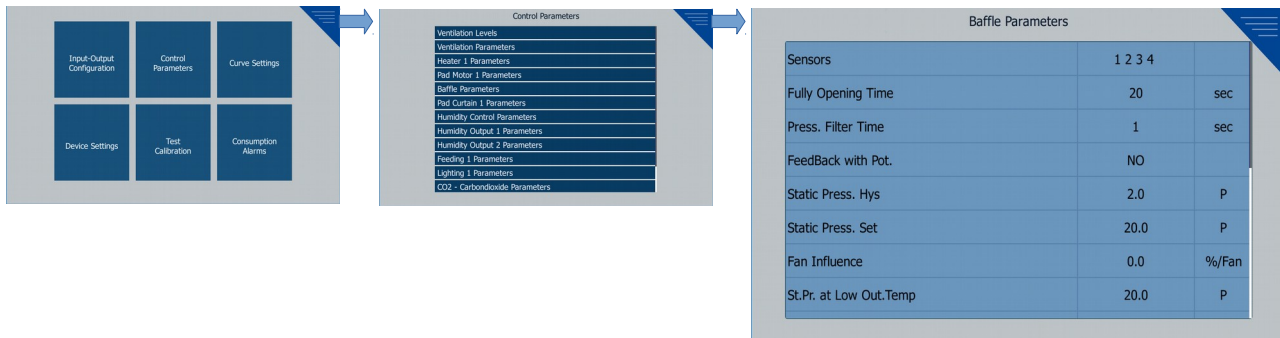
Humidity Sensors to Stop : Depending on the average of the selected humidity sensor values, it is decided whether to stop the cooler in case of high humidity. If no sensor is selected, cooling will not be stopped in high humidity.

Max. Humidity to Stop : The maximum humidity value at which the cooler will stop.

Humidity Hysteresis to Stop : The hysteresis value used for re-starting the cooler stopped at high humidity.

7.1.5. BAFFEL PARAMETERS

After the Baffle On-Off setting is assigned to the relay outputs, this page is added to the menu. 1 can be used.



Sensors : if "Use your own sensors" to "YES" is selected; selection of temperature sensors to be averaged for Baffle control.

Fully Opening Time (s): When continuous trip output is given, it is time to switch 'Baffle' from full closed position (0%) to full open position (100%).

Press. Filter Time (s): If the baffle is working with pressure, the value read from the pressure sensor is the filter time.

Feedback with Pot. : It is the choice of the potentiometer feedback or floating contact method with the baffle position specified.

- **YES**: Position is taken from feedback.
- **NO**: The position is calculated by the device.

Static Press. Hys. (P): Hysteresis value related to static pressure.

Static Press. Set (P): The desired static pressure (differential pressure) value in the poultry house. In the normal case (Low Outside Temperature, High Poultry Temperature, High Gas Conditions did not occur), it focuses on this set value. If this parameter is set to 0, the shutter opening is set according to the number of active fans.

Fan Influence : It is the active parameter if it works according to the numbers of active fans, not static pressures. An operating fan has an effect (%) on the shutter opening level. For example, if this parameter is set to 10.0, the shutter will open at 10.0% when 1 fan is running, 20.0% when 2 fans are running, when n fan is running, It opens at % n x 10.0. While the system is in normal condition; Static Pressure Set "0" must be selected in order to operate according to Fan Influence. If you want to work for level 0, "Min Air Baffle Position" in "Ventilation Parameters" should be "0".

In different situations (Low Outside Temperature, High Poultry Temperature, High Gas Conditions) you can enter different static pressure set. The Static Pressure Set Value (or Fan Influence Coefficient) is also entered for these cases.

St. Pr. at Low Out. Temp. (P) : Static Pressure Set Value - Low Outside Temperature. The desired pressure value at low outside temperature.

Fan In. at Low Out. Temp. (%/Fan) : Fan Influence - Low Outside Temperature. In case of low outside temperature; if "St. Pr. At Low Out. Temp." parameter set to 0, baffle per fan is the coefficient that determines the amount of opening.

St. Pr. at High House Temp. (P) : Static Pressure Set Value - High Inside Temperature

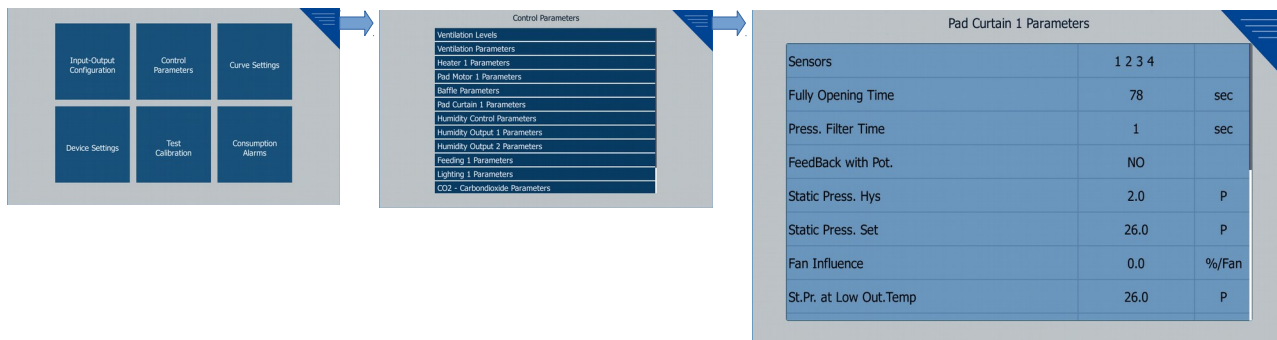
Fan In. at High House Temp. (%/Fan) : Fan Influence - High Inside Temperature. In case of high inside temperature; if “St. Pr. at High House Temp.” parameter set to 0, baffle per fan is the coefficient that determines the amount of opening.

St. Pr. at High Gas (P): Static Pressure Set Value - High Gas. In case of any of the values of Humidity, NH3, CO2 exceed its set value.

Fan In. at High Gas (%/Fan): Fan Influence - High Gas. In case of any of the values of Humidity, NH3, CO2 exceed its set value. In case of high gas; if “St. Pr. at High Gas” parameter set to 0, baffle per fan is the coefficient that determines the amount of opening.

7.1.6. PAD CURTAIN PARAMETERS

After the Pad Curtain On-Off setting is assigned to the relay outputs, this page is added to the menu. 2 can be used.



Sensors : if "Use your own sensors" to "YES" is selected; selection of temperature sensors to be averaged for Pad Curtain control.

Fully Opening Time (s): When continuous trip output is given, it is time to switch 'Pad Curtain' from full closed position (0%) to full open position (100%).

Press. Filter Time (s): If the Pad Curtain is working with pressure, the value read from the pressure sensor is the filter time.

Feedback with Pot. : It is the choice of the potentiometer feedback or floating contact method with the Pad Curtain position specified.

- **YES:** Position is taken from feedback.
- **NO:** The position is calculated by the device.

Static Press. Hys. (P): Hysteresis value related to static pressure.

Static Press. Set (P): The desired static pressure (differential pressure) value in the poultry house. In the normal case (Low Outside Temperature, High Poultry Temperature, High Gas Conditions did not occur), it focuses on this set value. If this parameter is set to 0, the Pad Curtain opening is set according to the number of active fans.

Fan Influence : It is the active parameter if it works according to the numbers of active fans, not static pressures. An operating fan has an effect (%) on the Pad Curtain opening level. For example, if this parameter is set to 10.0, the Pad Curtain will open at 10.0% when 1 fan is running, 20.0% when 2 fans are running, when n fan is running, It opens at% n x 10.0. While the system is in normal condition; Static Pressure Set "0" must be selected in order to operate according to Fan Influence.

In different situations (Low Outside Temperature, High Poultry Temperature, High Gas Conditions) you can enter different static pressure set. The Static Pressure Set Value (or Fan Influence Coefficient) is also entered for these cases.

St. Pr. at Low Out. Temp. (P) : Static Pressure Set Value - Low Outside Temperature. The desired pressure value at low outside temperature.

Fan In. at Low Out. Temp. (%/Fan) : Fan Influence - Low Outside Temperature. In case of low outside temperature; if "St. Pr. At Low Out. Temp." parameter set to 0, Pad Curtain per fan is the coefficient that determines the amount of opening.

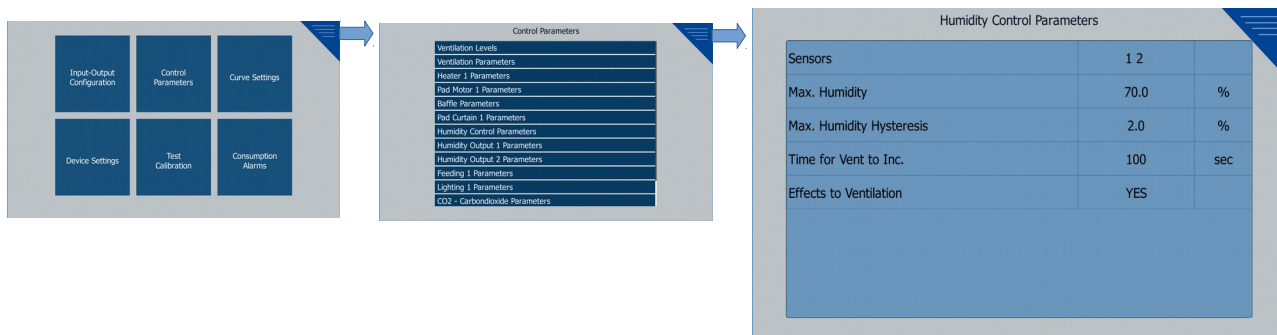
St. Pr. at High House Temp. (P) : Static Pressure Set Value - High Inside Temperature

Fan In. at High House Temp. (%/Fan) : Fan Influence - High Inside Temperature. In case of high inside temperature; if "St. Pr. at High House Temp." parameter set to 0, Pad Curtain per fan is the coefficient that determines the amount of opening.

St. Pr. at High Gas (P): Static Pressure Set Value - High Gas. In case of any of the values of Humidity, NH3, CO2 exceed its set value.

Fan In. at High Gas (%/Fan): Fan Influence - High Gas. In case of any of the values of Humidity, NH3, CO2 exceed its set value. In case of high gas; if "St. Pr. at High Gas" parameter set to 0, Pad Curtain per fan is the coefficient that determines the amount of opening.

7.1.7. HUMIDITY CONTROL PARAMETERS



Sensors : When humidity is controlled; is the choice of the humidity sensors to be averaged.

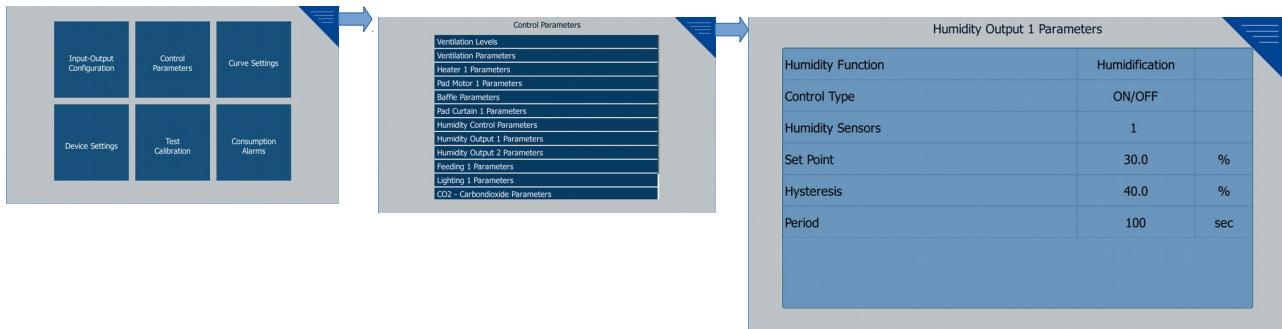
Max. Humidity (%) : Is the desired maximum humidity value. "High Gas Condition" occurs when the average value of the selected sensors exceeds this value.

Max. Humidity Hysteresis (%): When a "High Gas Condition" occurs with humidity; for this situation to disappear; the average value of the selected sensors must be reduced by the value of Max Humidity - Max Humidity Hysteresis.

Time for Vent. to Inc. (s): If "Effects to Ventilation" set to "YES" and "High Gas Condition" occurs with humidity; at first, the fans operating proportionally start to work continuously. At the end of this period, it goes to the upper ventilation level. If the "High Gas Condition" did not stop during this period, it goes to the upper ventilation level. This increment continues until the "High Gas Condition" stops.

7.1.8. HUMIDITY OUTPUT PARAMETERS

After the "HUMIDITY" setting is assigned to the relay outputs, this page is added to the menu. 2 can be used.



Humidity Function : (Humidification or Drying) Humidity relay output function selection.

Drying: The relay outputs when the average value of the selected humidity sensors is higher than the humidity set value.

Humidification: The relay outputs when the average value of the selected humidity sensors is lower than the humidity set value.

Contol Type : *PROPORTIONAL or ON/OFF*

Humidity Sensors : Selection of which humidity sensors to use for feedback control.

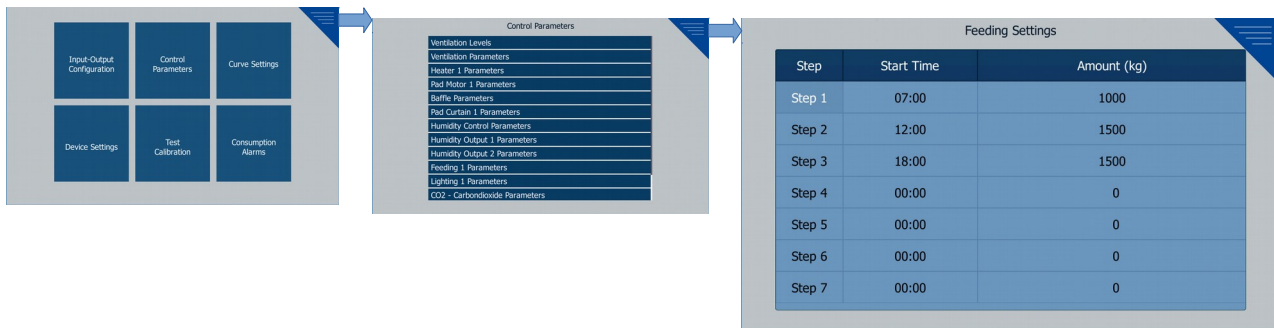
Set Point (%) : The humidity to be used in control is the set value.

Hysteresis (%) : If Control Type is set to "ON / OFF", hysteresis, If the Control Type is "PROPORTIONAL" selected; proportional band value for proportional control.

Period (s) : When the Control Type is "PROPORTIONAL", it becomes active. Control period.

7.1.9. FEEDING PARAMETERS

After the "FEEDING" setting is assigned to the relay outputs, this page is added to the menu. 2 can be used.



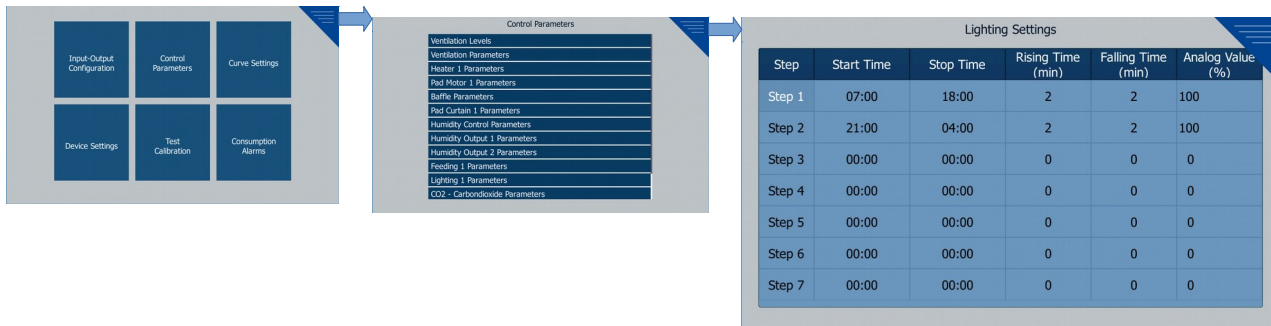
7 different feeding timers can be set during the day. When the start time arrives, the amount written in the Amount column is pulled to the feeding relay until completion. The information about how long the relay should remain open is calculated in two ways;

1: Within the Consumption Parameters menu, using the Feed Consumption parameter. If the amount of feed per minute is entered, the time is calculated according to this input.

2: Within the Consumption Parameters menu, when the Feed Consumption parameter 0 is selected; As feedback, the feed consumption input is used and the relay is pulled according to the amount of reduction in the silage.

7.1.10. LIGHTING PARAMETERS

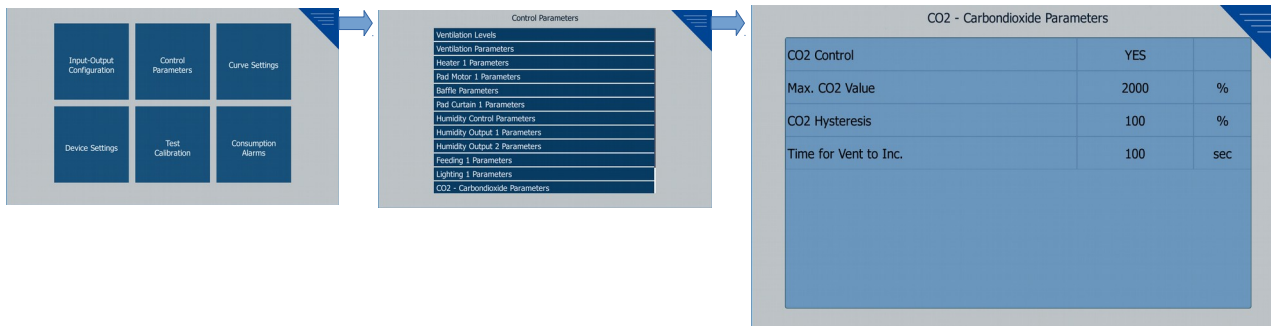
After the "LIGHTING" setting is assigned to the relay outputs, this page is added to the menu. 2 can be used.



7 different lighting timers can be set during the day. The time to start lighting and the time to stop lighting should be entered in hours: minutes and "analog value" should be entered different of 0. When the lighting is active, the lighting relay is activated and the analog output is activated at the same time. Analog output is given as "Analog Value" entered here.

7.1.11. CO2 - CARBONDIOXIDE PARAMETERS

After the "CO2" setting is assigned to the analog inputs, this page is added to the menu.



CO2 Control : When "YES" is selected, the effect of the CO2 value on the ventilation is activated. If "NO" is selected, the effect of CO2 on ventilation is passive.

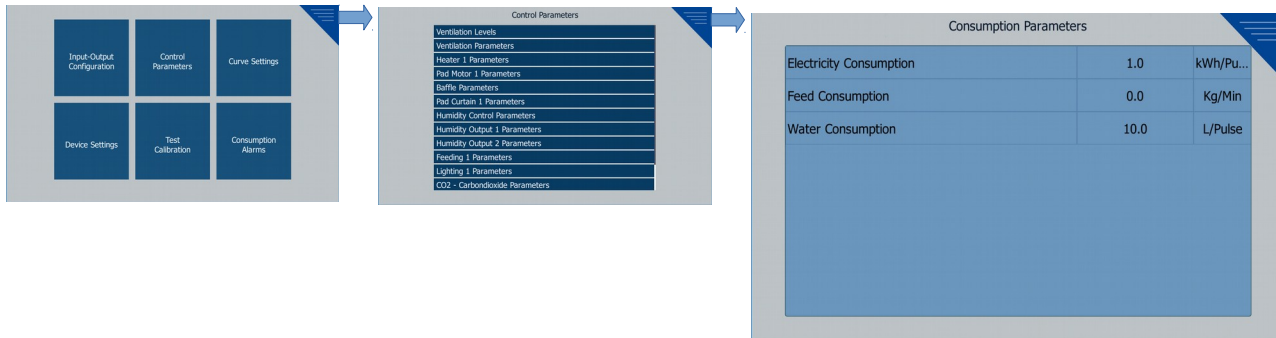
Max. CO2 Value (ppm): It is the CO2 value that will increase the level of ventilation. If the CO2 value exceeds this value, "High Gas Condition" occurs.

Max. CO2 Hysteresis (ppm): The parameter used to return the ventilation level to normal.

Time for Vent to Inc. (s): During this time, if the CO2 level in the poultry is higher than the "Max CO2 value", the ventilation level is increased by 1 level.

7.1.14. CONSUMPTION PARAMETERS

In the Digital Inputs section, this menu is activated if any of "ELECTRICITY CONSUMPTION", "WATER CONSUMPTION", "SILAGE CONSUMPTION" is selected.



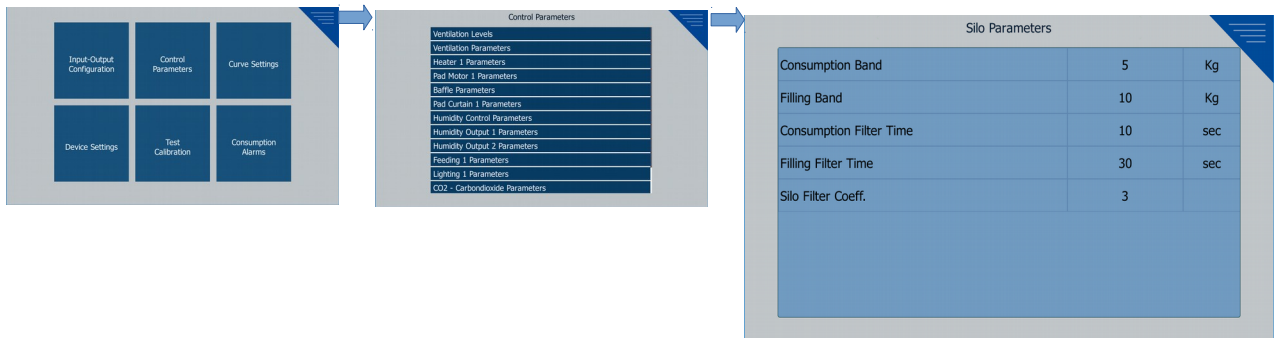
Electricity Consumption (kWh/Pulse) : is the amount of kWh of electricity consumed per pulse at the digital input.

Silage Consumption (Kg/Min) : The amount of silage consumed when the digital input is active for 1 min. If this parameter is set to 0, feed consumption information is calculated based on the reduction in the silage.

Water Consumption (L/Pulse) : The amount of water consumption per 1 pulse.

7.1.15. SILO PARAMETERS

This menu is activated if any of "SILO" is selected in the Analog Inputs section or if using LoadCell communication.



Consumption Band (Kg) : Reference value (accepted amount of silo feed); the minimum amount of change in consumption.

Filling Band (Kg) : Reference value (accepted amount of silo feed); the minimum amount of change in filling direction.

Consumption Filter Time (s) : In the direction of consumption; In order to update the reference value to the new value (Consumed decision), it is the minimum time that the Consumption Band should remain under.

Filling Filter Time (s) : In the direction of filling; In order to update the reference value to the new value (filling decision), it is the minimum time that the Filling Band should remain on.

Silo Filter Coeff. : It is the filter coefficient to be applied to silo feed information. 1 new value is read per second.

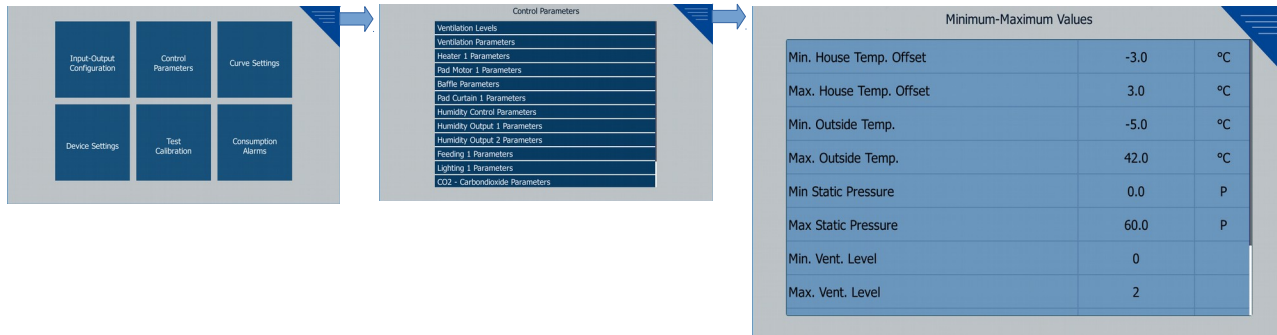
0: No filter

1: Silo value; the sum of 1 out 2 in the old filtered value and 1 out 2 of the new value.

2: Silo value; the sum of 2 out 3 in the old filtered value and 1 out 3 of the new value.

3: Silo value; the sum of 3 out 4 in the old filtered value and 1 out 4 of the new value.

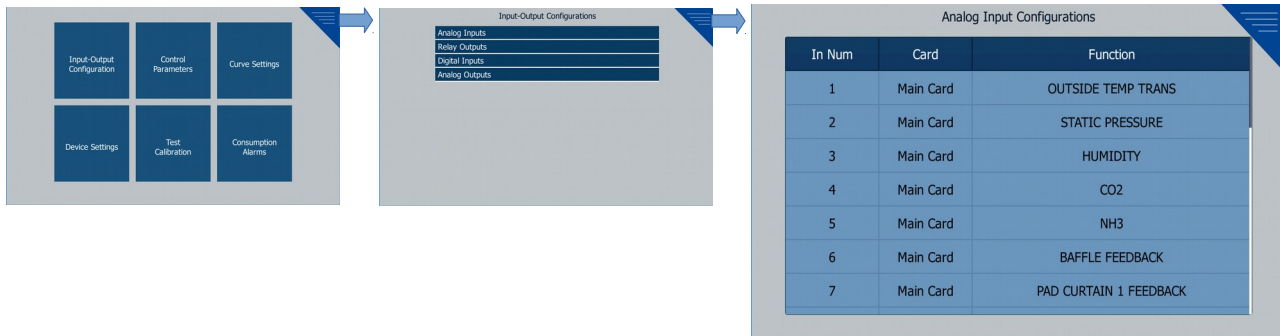
7.1.16. MINIMUM - MAXIMUM VALUES



The following parameters are edited in this page:

- **Min. House Temp. Offset:**
When the average temperature value of the poultry goes down by this value from the set value, an alarm is given.
- **Max. House Temp. Offset:**
When the average temperature value of the poultry goes up by this value from the set value, an alarm is given.
- **Min. Outside Temp. :**
When the outside temperature value is lower than this value, an alarm is given.
- **Max. Outside Temp. :**
When the outside temperature value is higher than this value, an alarm is given.
- **Min. Static Pressure :**
When the pressure value is lower than this value, an alarm is given.
- **Max. Static Pressure :**
When the pressure value is higher than this value, an alarm is given.
- **Min. Vent. Level :**
This is the choice which level the ventilation's lowest level.
- **Max. Vent. Level :**
This is the choice which level the ventilation's highest level.
- **Out. Temp. Eff. to Min. Vent.**
When the outside temperature value falls below the stability band, min ventilation time active duration is reduced by the value entered here.
- **Outside Temp. Stable Diff.**
When the outside temperature falls below "*Poultry Set Value - Outside Temperature Stable Diff.*", the effect of the outside temperature on minimum ventilation is activated.
- **Max. Humidity Alarm Value**
When the humidity value is higher than this value, an alarm is given. This value only affects the alarm status.

7.2. ANALOG INPUT CONFIGURATIONS

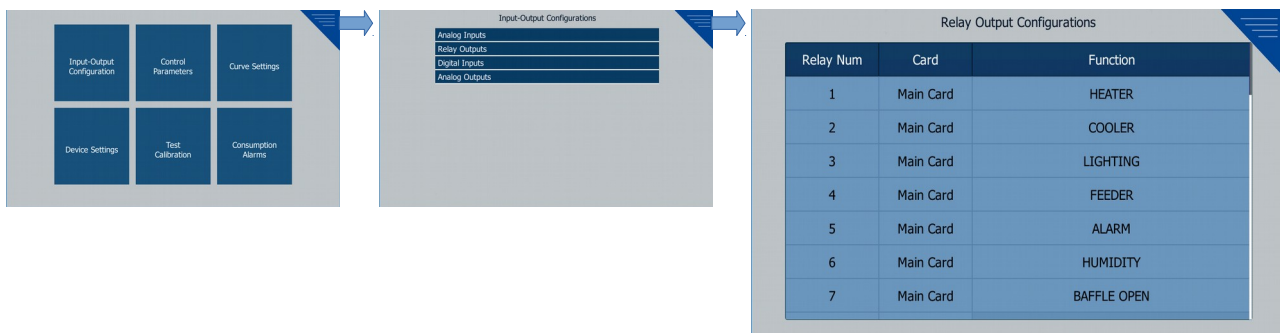


On a card, 11 analog inputs can be configured for the desired purpose. The number of analog inputs can be increased by installing an expansion card in the system. The functions that can be selected for analog inputs are:

- Poultry House Temperature (PT100)* (Up to 11 selectable)
- Static Pressure (Up to 11 selectable)
- Humidity (Up to 11 selectable)
- CO2 (Up to 1 selectable)
- NH3 (Up to 1 selectable)
- Outside Temperature (PT100)** (Up to 1 selectable)
- Silage Silos Measuring Sensor (Up to 3 selectable)
- Baffle Position Feedback Pot (Up to 1 selectable)
- Pad Curtain 1 Position Feedback Pot (Up to 1 selectable)
- Pad Curtain 2 Position Feedback Pot (Up to 1 selectable)

-
- *A temperature sensor with 0-10V / 0-20mA output can be connected by choosing **HOUSE TEMP TRANS** instead of **HOUSE PT100**.
 - **A temperature sensor with 0-10V / 0-20mA output can be connected by choosing **OUTSIDE TEMP TRANS** instead of **OUTSIDE PT100**.
-

7.3. RELAY OUTPUT CONFIGURATIONS

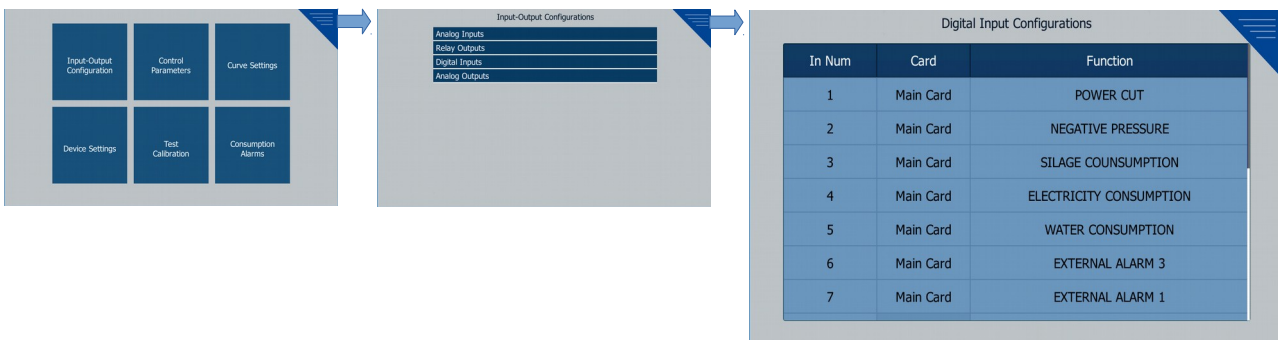


On a card, 19 relay outputs can be configured for the desired purpose. The number of relays can be increased by installing an expansion card in the system.

The functions that can be selected for the relays are:

- Fan (Up to 32 selectable)
- Heater (Up to 4 selectable)
- Cooler (Up to 4 selectable)
- Pad Curtain Open (Up to 2 selectable)
- Pad Curtain Close (Up to 2 selectable)
- Baffle Open (Up to 1 selectable)
- Baffle Close (Up to 1 selectable)
- Lighting (Up to 2 selectable)
- Feeder (Up to 1 selectable)
- Alarm (Up to 1 selectable)
- Humidity (Up to 2 selectable)

7.4. DIGITAL INPUT CONFIGURATIONS

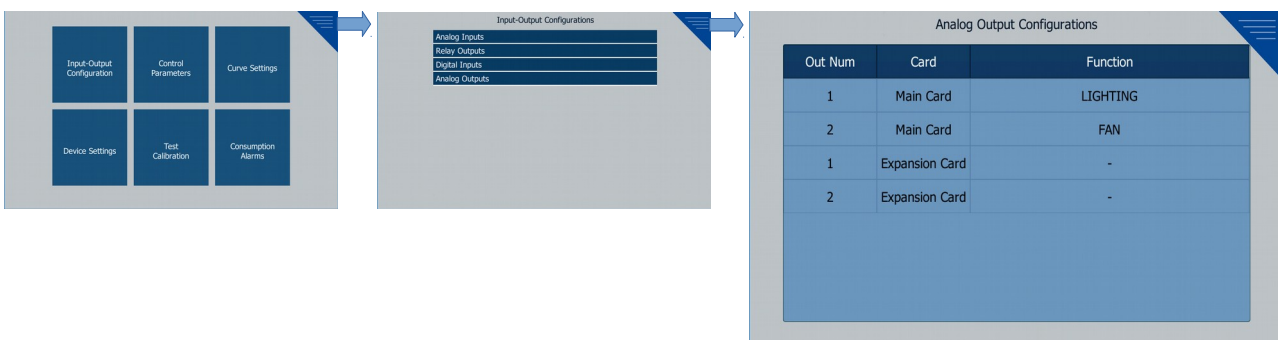


On a card, 8 digital inputs can be configured for the desired purpose. The number of digital inputs can be increased by installing an expansion card in the system.

The functions that can be selected for digital inputs are:

- POWER CUT (Up to 1 selectable)
- ELECTRICITY CONSUMPTION (Up to 1 selectable)
- WATER CONSUMPTION (Up to 1 selectable)
- SILAGE CONSUMPTION (Up to 1 selectable)
- NEGATIVE PRESSURE (Up to 1 selectable)
- EGG COUNTER (Up to 1 selectable)
- EXTERNAL ALARM (Up to 3 selectable)

7.5. ANALOG OUTPUT CONFIGURATIONS



On a card, 2 analog outputs can be configured for the desired purpose. The number of analog outputs can be increased by installing an expansion card in the system.

The functions that can be selected for analog outputs are:

- LIGHTING
- FAN

Analog output function When light is selected; the device gives the value entered in Analog Value in the Lighting Table as analog output.

Analog output function If Fan is selected, the analog output takes the following value:

$$\text{Analog Output \%} = 100 * \text{Current Ventilation Level} / \text{Maximum Ventilation Level}$$

7.6. SENSOR SETTINGS

Mod/In	Function	Bottom	Upper	Offset	SBR
1 / 1	OUTSIDE TEMP TRANS	0.0	100.0	0.0	0.0
1 / 2	STATIC PRESSURE	0.0	100.0	0.0	0.0
1 / 3	HUMIDITY	0.0	100.0	0.0	0.0
1 / 4	CO2	0	5000	0	0
1 / 5	NH3	0	5000	0	0
1 / 6	SILAGE	0	30000	0	0
1 / 7	SILAGE	0	30000	0	0

In this section, the analog sensors connected to the device can be adjusted.

Bottom: It is the value corresponding to 0 Volt. For example; If the sensor produces 0 V at -20 ° C, the bottom value -20 is entered.

Upper: It is the value corresponding to 10 Volt. For example; If the sensor produces 10 V at 80 ° C, the upper value 80 is entered.

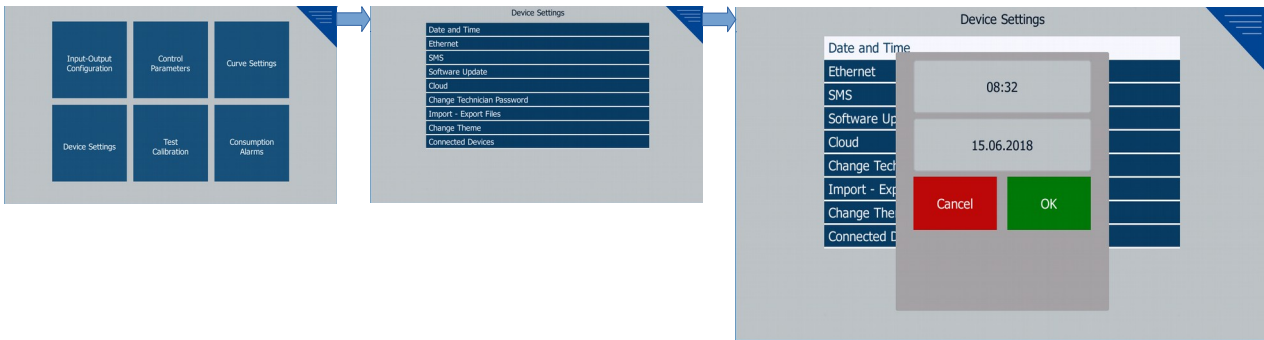
Offset: Used to add an offset to the read value.

SBR: The lower limit of the value of the sensor break.

7.8. DEVICE SETTINGS

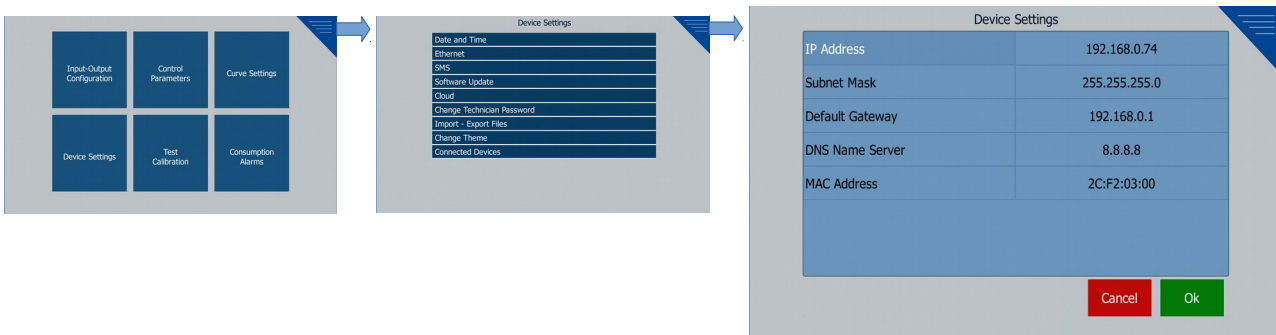
- Date and Time
- Ethernet
- SMS
- Software Update
- Cloud
- Change Technician Password
- Import - Export Files
- Change Theme
- Connected Devices

7.8.1 Date and Time Settings



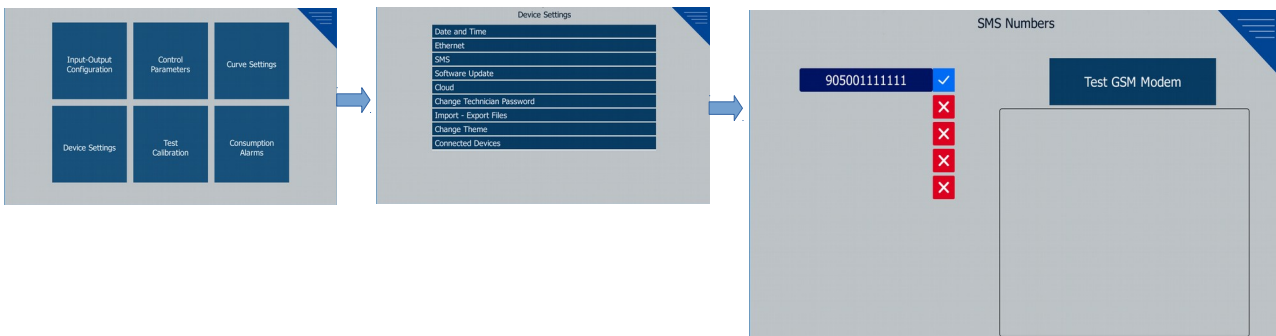
The time and date settings are made on this page.

7.8.1 Ethernet Settings



On this page, the ethernet settings are made.

7.8.4 Sms Settings



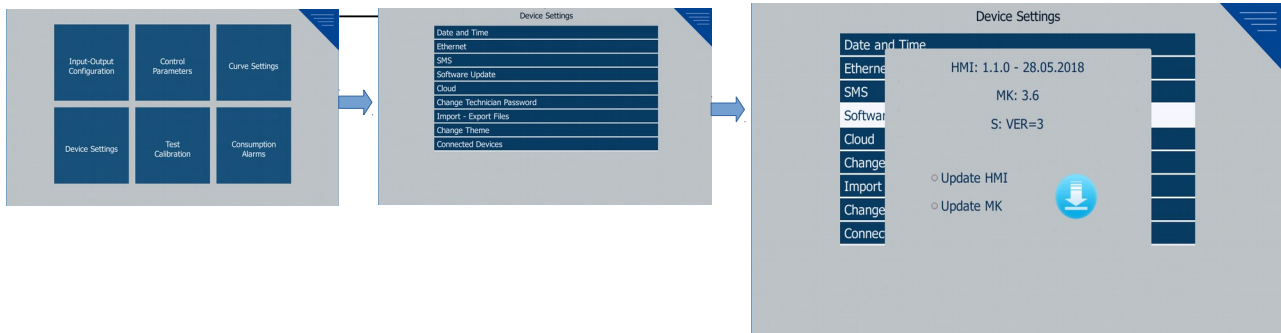
When at least one GSM number is activated, 13 digits are allowed to be entered. GSM numbers must be written in international format.

For example, a GSM number in Turkey should be entered as;



905XXXXXXXXXX

When any GSM number is entered, SMS is activated and any event that is described under 8.1 Events heading will be followed by SMS to all GSM numbers entered. Then if the sim card supports calling; a call is made.

7.8.5. Software Update



To update the software of any of the control cards,

1. All outputs are disconnected
2. Software to be updated control card
 - By changing the position of the jumper that determines the card ID, the card ID is set to 0 (See 2.1. General Explanations)
 - connect the communication port to the HMI's communication port becomes master control card.
3. The USB Flash Disk containing the file "EPCMK.txt" is inserted into the device.
4. Selecting Update MK option ,  Click on the Update button.

To update the HMI software,

1. The USB Flash Disk containing the file "update_EPC-Touch" is inserted into the device.
2. Selecting Update HMI option ,  Click on the Update button.

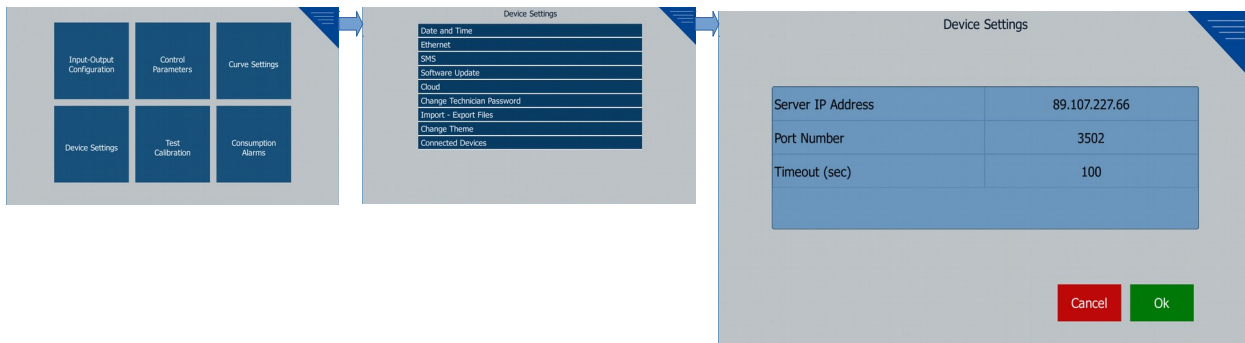
Note: The formatting options of the USB Flash Disk should be as follows:

*File System: **FAT 32***

*The allocation unit size is : **4096 bytes***

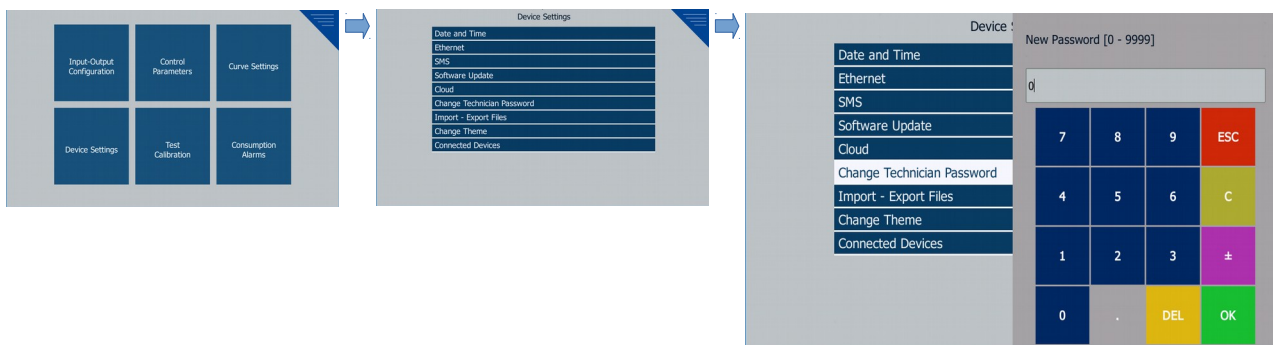
*Quickly format: **Passive***

7.8.6. Cloud



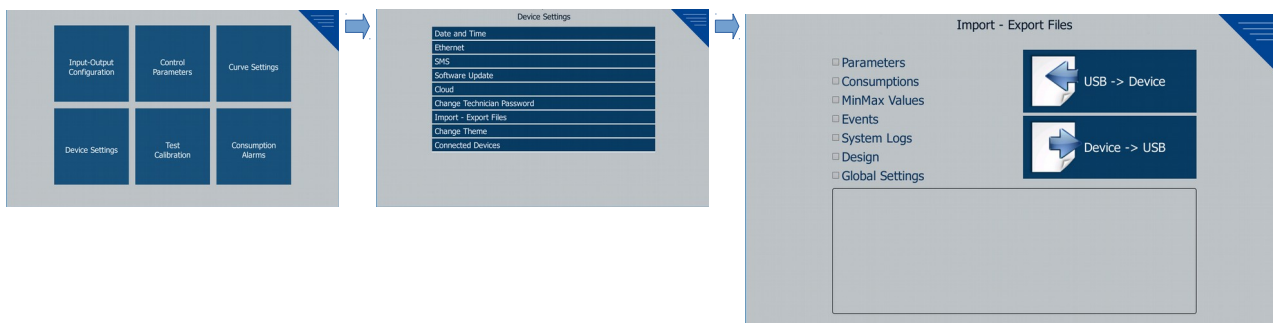
The settings needed to connect to Emko Web Management are changed here when needed.

7.8.7. Change Technician Password



This page is used to change 'Technician Password'.

7.8.8. Import – Export Files



This page is used to backup the desired settings of the device or to load backup settings into the device.

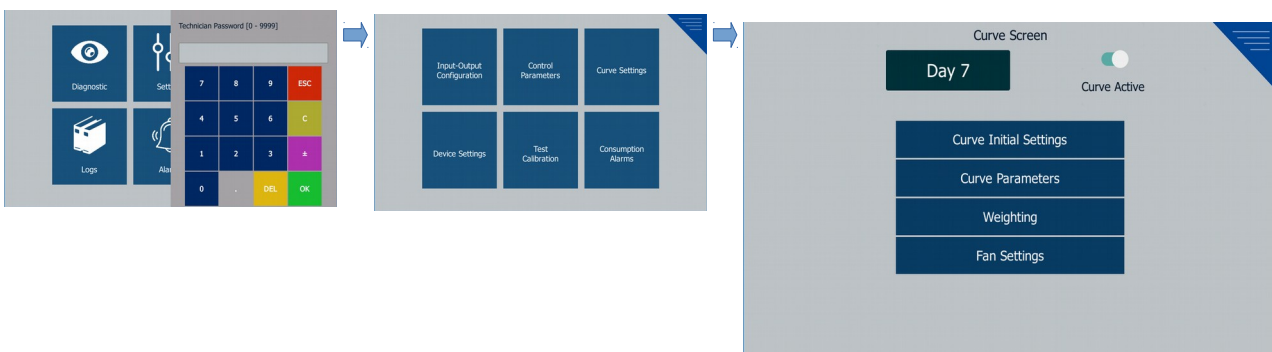
7.8.9. Connected Devices

Pronem Midi Slave ID assignment will be done differently for each sensor.

Switch no	1	2	3	4
Pronem 200	0	0	0	x
Pronem 201	1	0	0	x

Pronem 202	0	1	0	x
Pronem 203	1	1	0	x
Pronem 204	0	0	1	x
Pronem 205	1	0	1	x
Pronem 206	0	1	1	x
Pronem 207	1	1	1	x

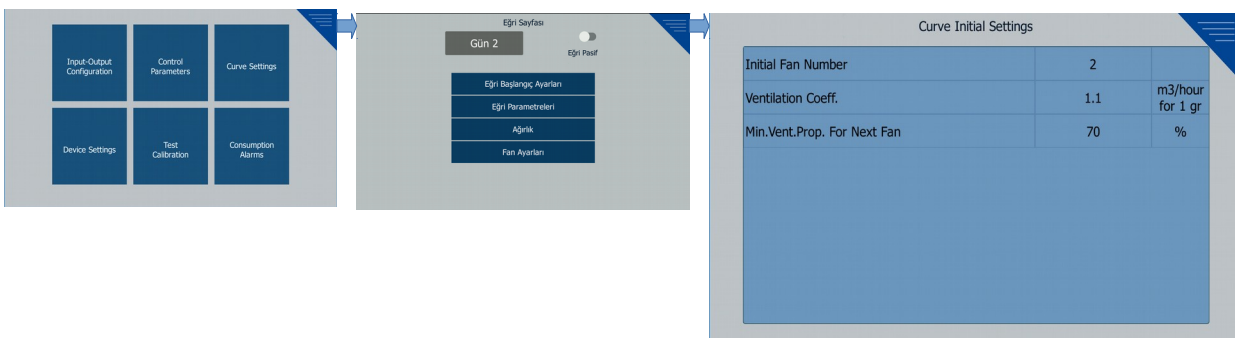
7.9 CURVE



When the curve function is activated, minimum ventilation (level 0) is calculated according to the following variables:

- * Birds Inventory
- * Depending on the day, the average animal weight
- * Fan capacities

7.9.1 Curve Initial Settings

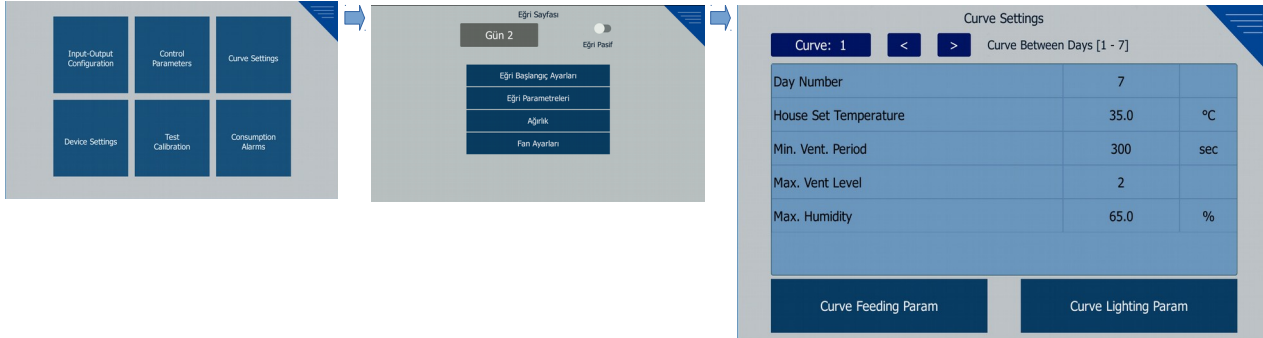


Initial Fan Number : At the beginning of the curve, the minimum number of fans to be operated.

Ventilation Coeff. : It is the amount of ventilation per hour per 1 gram of each animal.

Min. Vent. Prop. For Next Fan : The amount of ventilation is calculated by using the number of animals, animal weight, ventilation coefficient. But the capacities of existing fans are fixed. The fans are turned on and off to give the calculated desired ventilation fully. If The ratio of the open time of the fans to the period (%) reached this value, the next fan runs. The active duration is reduced.

7.9.2 Curve Parameters



Curve : The parameters are the curve step to be adjusted. From 1 to 50 different curve parameters can be defined.

Day Number : Determines how many days a curve step will take. In the example above, step 1 is selected for 7 days. If the number of days is set to 0, the curve does not start at all. On the right side you can see which days this step will take.

House Set Temperature (°C) : At the beginning of the selected curve, the desired house temperature value. The set value changes gradually every day according to the next curve set value.

Min. Vent. Period (s): Ventilation period, in the case of minimum ventilation (Level-0).

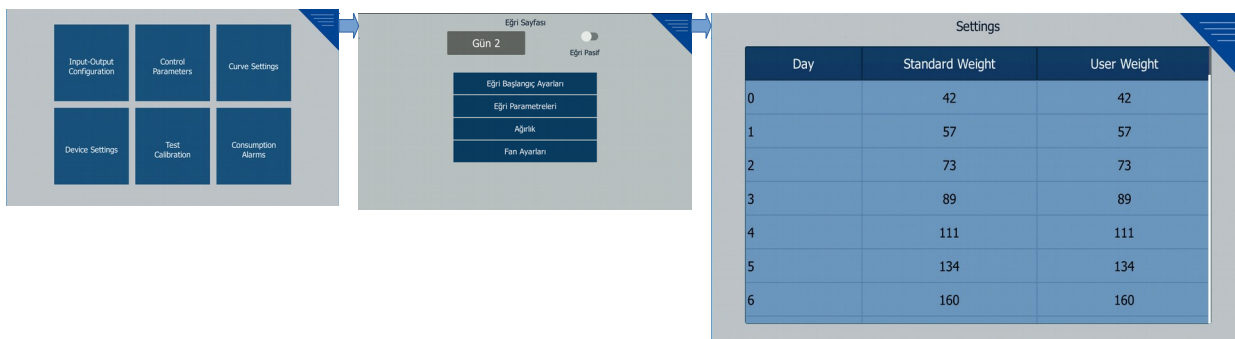
Max. Vent. Level : Maximum ventilation level that can be reached.

Max. Humidity (%) : Humidity set value. As the curves progress; value changes the following parameters: "Advanced"> "Control Parameters"> "Moisture Control Parameters" > "Max. Humidity " and " Settings "> " Max. Humidity ".

Curve Feeding Param. : Opens the timer setting page for feeding control.

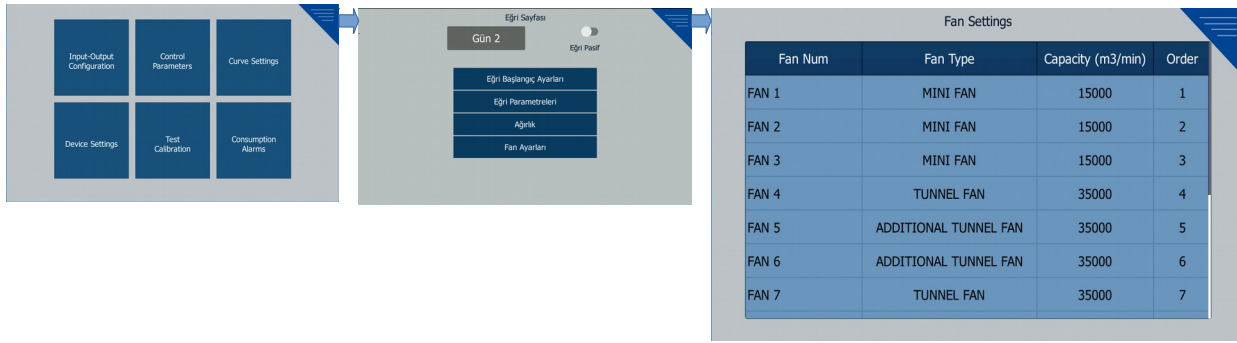
Curve Lighting Param. : Opens the timer setting page for lighting control.

7.9.3 Weighting



1 animal weight table. Standard Weight is literature weight . For reference purposes. The system works according to the values in the "User Weight" column (In the case when the curve is active). The user can change these weights. On the days after the 70th day, the value entered on the 70th day is valid.

7.9.4 Fan Settings

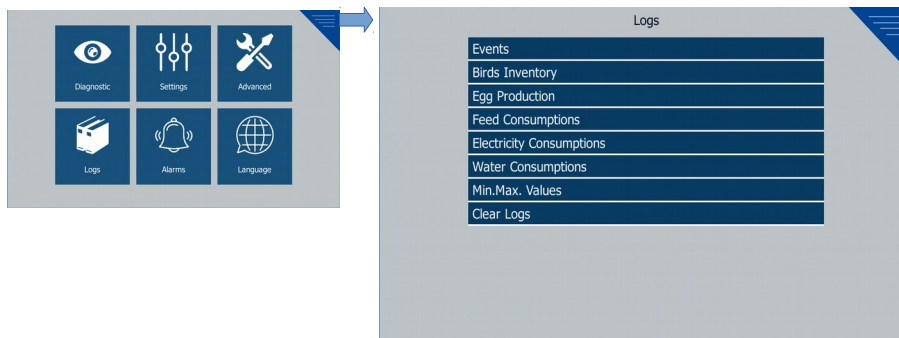


The curve uses the fan definitions there to calculate the fan on-time. The high priority is given to the fans which are defined as "MINI FAN". The next priority is "ADDITIONAL TUNNEL FAN". The next fan is activated according to the values in the "Order" column. If all "MINI FAN" fans are used and the next fan is running, the "ADDITIONAL TUNNEL FAN" with the lowest order number is run. If the "ADDITIONAL TUNNEL FAN" fans are also used but still require the next pass, the lowest "TUNNEL FAN" in the order number is automatically changed as "ADDITIONAL TUNNEL FAN".

In order to observe the need at the end of the period; by setting the last day of the period, it can be observed how many tunnel fans turn into additional tunnel fans. You can change the priority by changing the automatically modified "ADDITIONAL TUNNEL FAN" to "TUNNEL FAN" and assigning "ADDITIONAL TUNNEL FAN" to different tunnel fans.

For example; Let's look at the above image, If you select "Initial Fan Number" 2 on the "Curve Initial Settings" menu, first "FAN 1" and "FAN 2" work at startup. If the next fan is needed, "FAN 3" will work. If the mini fans are not enough (if the next fan is to be activated); "FAN 5" is engaged and then "FAN 6". If still not enough, the system will set "FAN 4" to "ADDITIONAL TUNNEL FAN" and start it.

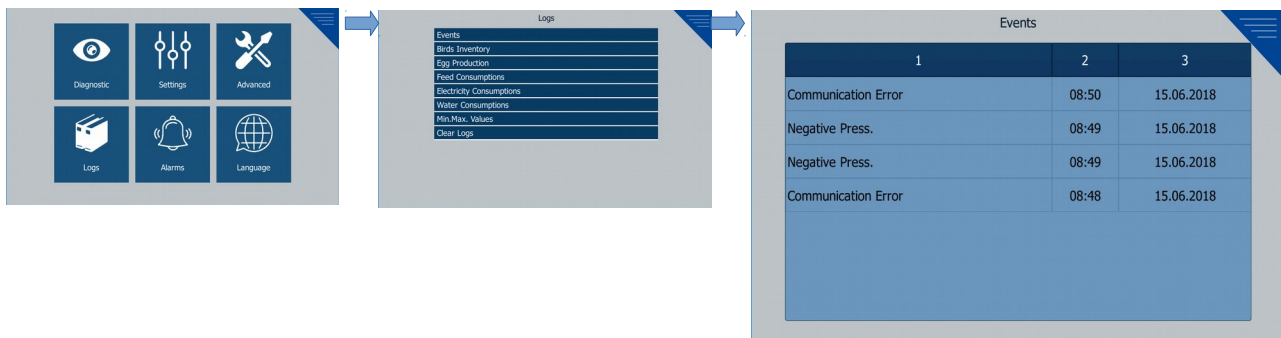
8. Logs



This menu contains;

- Events
- Birds Inventory
- Egg Production
- Feed Consumptions
- Electricity Consumptions
- Water Consumptions
- Min. Max. Values
- Clear Logs

8.1. Events



In this page, the records of the events are displayed.

Events caused by exceeding the Minimum Maximum Values (see 7.1.15 Minimum Maximum Values):

- Low Poultry Temperature
- High Poultry Temperature
- High Humidity
- Low Outside Temperature
- High Outside Temperature
- Low Static Pressure
- High Static Pressure

Events that occur when Digital Inputs are active:

- Power Cut
- Negative Pressure
- External Alarm 1/2/3
-

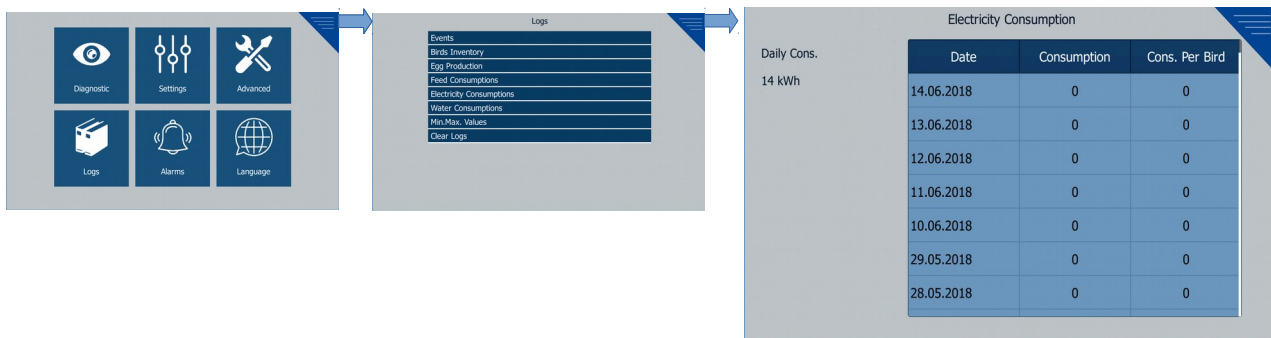
Events related to sensor break:

Pt100 1/2/ ... /11 Sensor Break

Communication Errors:

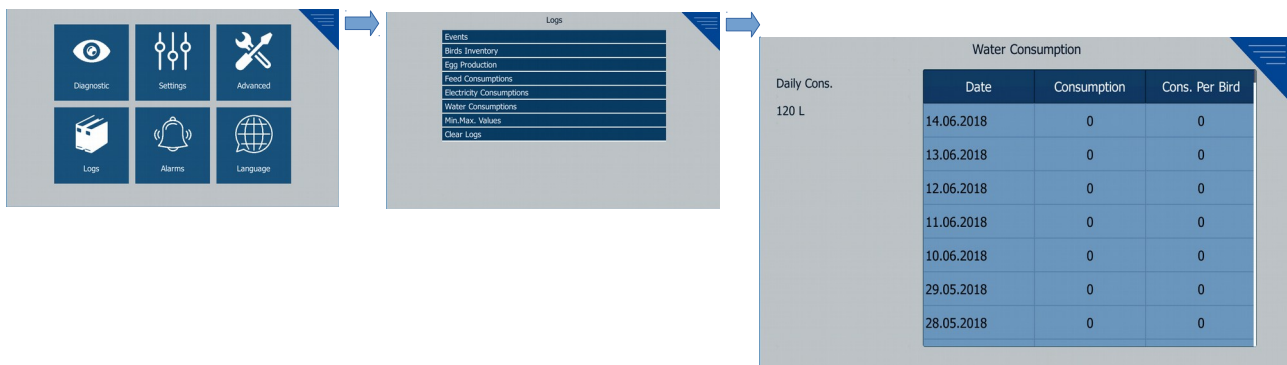
- Module 1 Communication Error: It occurs when there is no communication between the expansion control board and the main control board.
- Communication Error: It occurs when the communication between the main control card and the HMI is broken.

8.2 Electricity Consumption



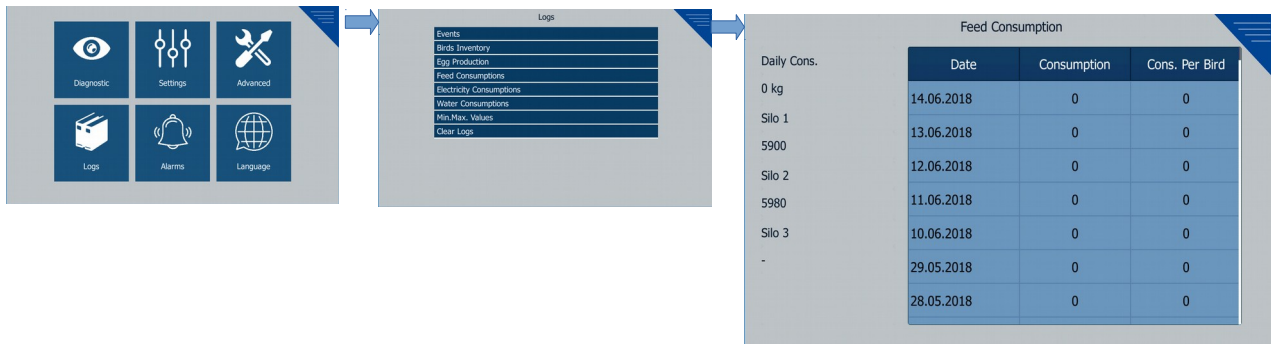
ELECTRICITY CONSUMPTION electricity consumption increases as Electricity Consumption (kWh / Pulse) is entered at every step of the digital input (as entered in "7.1.14 Consumption Parameters" section).

8.3 Water Consumption



WATER CONSUMPTION water consumption increases as Water Consumption (L / Pulse) is entered at every step of the digital input (as entered in "7.1.14 Consumption Parameters" section).

8.4 Feed Consumption



This menu contains;

- Total and daily feed consumption
- Available silage in silo

Feed consumption can be calculated in two ways:

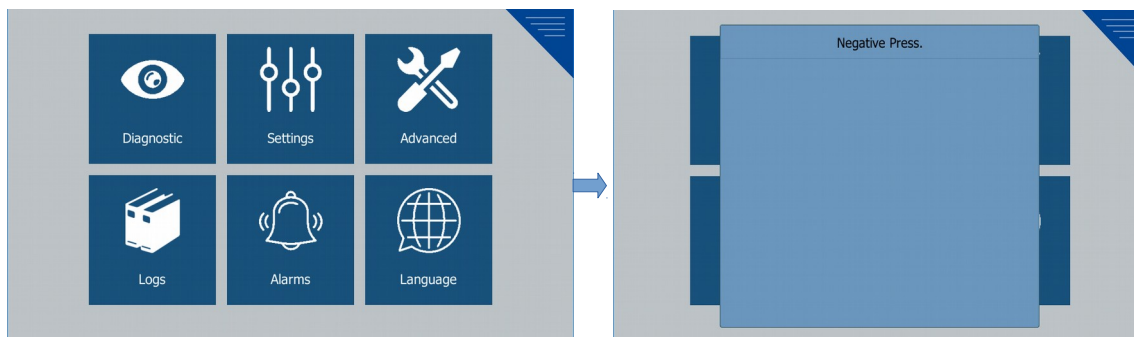
With Feed Consumption (Kg / Min) parameter :

if 7.1.14 Feed Consumption (Kg / Min) parameter is set to a number other than 0, when FEED CONSUMPTION digital input is active, feed consumption recording increases by "Feed Consumption" parameter.

With the reduction of silo weight :

if 7.1.14 Feed Consumption (Kg / Min) parameter is set to 0, feed consumption is calculated by the amount of reduction in silage.

10. ALARMS



Alarms caused by exceeding the Minimum Maximum Values (see 7.1.15 Minimum Maximum Values):

- Low Poultry Temperature
- High Poultry Temperature
- High Humidity
- Low Outside Temperature

- High Outside Temperature
- Low Static Pressure
- High Static Pressure

Alarms that occur when Digital Inputs are active:

- Power Cut
- Negative Pressure
- External Alarm 1/2/3

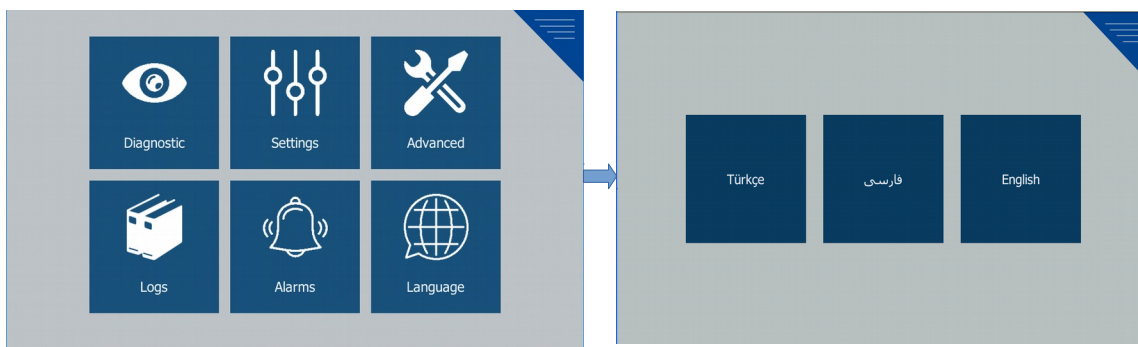
Alarms related to sensor break:

Pt100 1/2/ ... /11 Sensor Break

Communication Errors:

- Module 1 Communication Error: It occurs when there is no communication between the expansion control board and the main control board.
- Communication Error: It occurs when the communication between the main control card and the HMI is broken.

11. LANGUAGE



12. SPECIFICATIONS

Device Type : Poultry Controller

Physical Properties : Control Card: 280x100 mm

HMI: 168 x 117 mm

Protection Class : HMI: front IP65, behind IP20

Weight : HMI: 292 g, Control Card: 616 g.

Environmental Conditions : It operates from sea level up to 2000 meters high, without intense humidity.

Stocking Temperature / Operating Temperature : Between -20 °C and +70 °C / 0 °C and +50 °C.

Stocking Humidity Ratio / Operating Humidity Ratio : 90% max. (In a non-condensing environment)

Mounting Type : Fixed mounting category.

Over Voltage Category : II.

Electrical Pollution : II. In the office or workplace, non conductive pollution.

Working Period : Continuous.

Device Supply Voltage And Power :

18 VAC (-%15 / +%10) 50/60 Hz. 25 VA

24 VDC (-%15 / +%10) 20W

(For HMI and 1 Control Card)

Temperature Sensor Inputs : PT-100 (IEC751)(ITS90), 0-10 V, 0-20 mA

Accuracy : Full scale \pm % 0,25

Sensor Break Protection : Over Scale

Reading Frequency : 600 ms

Input Resistance : For Pt100 input type : 10M Ω

For input type 0-10 V : 17 k Ω

Outputs : Relay, 0-20mA or 0-10V Analog Output

Analog Output : 0-20mA, 0-10V (maximum 3mA)

Röle Çıkışı : Resistive load 10A @ 250VV

(Electrical Life: 50,000 Switches at Full Load)

Standard Communication : RS-232 (Modbus RTU)

Optional Communication : 10Mbits/s Ethernet (Modbus RTU Over TCP/IP -Modbus RTU TCP/IP Selectable)
"1500V insulated"

Indicator : 480x272 pixel TFT

Compatible Standards : CE, EAC

13. OTHER INFORMATIONS

Manufacturer Company Information:

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