

Microprocessor climate controller belonging to the SPEED CONTROL family. The device versatility is guaranteed by the variety of its inputs/outputs and the intuitive software that is available in two languages: Polish and English. Apart from some basic functions such as: adjusting the temperature, heating, min/max fan speed and the alarms, the device also allows to test and maintain calibration records of the actuators cooperating with the controller.

Parameters and features:

1. Ventilation 1st stage:
 - output current smooth regulation up to the maximum of 12A
 - thermal overload protection
 - soft start function
 - bypass relay full calibration
 - minimal fan speed calibration
 - energy saving programme with inlet flaps opened in advance
2. Ventilation 2nd stage, separated relay up to 6A:
3. Heating, separated relay up to 6A
4. NO/NC alarm outputs:
 - power outage signalisation
 - max/min temperature threshold exceedance signalisation
 - built-in acoustic alarm
5. Three independent 0-10V outputs:
 - cooperation with the extension modules
 - inlet flaps and chimney damper control
 - variable-capacity heating control
6. Two analog inputs for the temperature measurement
7. Digital port for the temperature measurement (up to four sensors)
8. Two function-relay outputs (to choose):
 - cooperation with linear actuators
 - stage 3 and stage 4 ventilations
9. Two analog 0-10V inputs
10. Potentiometer DC10V power supply
11. Additional DC12V power supply
12. PC cooperation up to 1200 m
13. Power consumption of <10W
14. IP65 hermetic enclosure
15. Power supply voltage 230VAC 50Hz



**Climate controller with output
current permissible up to 12A**

ELETOR SC-12

2019.08.16

Controller installation



Warning! While installing the device it must be cut off from any power supply, because the voltage on some of the components is highly hazardous to your health and life. It is advised to entrust a qualified and skilled personnel to carry out this installation.

Choosing a place for the installation

The place for the installation have to be chosen rationally, taking into account easy access to such device for the persons concerned, and at the same time having a spot inaccessible for children or animals. Climate conditions should be also concerned, which means that the device ought to work within the temperature range from -10°C to 40 °C, in a place not exposed to direct sunlight. Free air flow around the device is also essential. The temperature sensor is an integral part of the device. There are a few rules to be followed in order to install such sensor:

- the sensor should not be installed in a place with no free air flow, or in a spot directly exposed to sunlight
- the sensor should not be installed on the load-bearing wall of the building
- presence of nearby heat-emitting devices such as radiators or lamps should be avoided
- the sensor should not be placed directly by the door or ventilation holes
- the sensor should not be placed in spots accessible for animals
- it is advised to arrange the wire connected to the sensor away from the power cords

The installation

The device works in rough climate conditions. If properly installed, the controller and the sensor are both resistant to the harmful influence of the environment.

Bear in mind the following comments while installing the device:

- the cover gasket should be checked before screwing
- the cover should be fully tightened by all the screws
- the wires used to connect the sensor should be round
- after connecting a wire, the cable gland should be tightened up in such a way to seal and immobilize the wire, the use of silicone is advised
- unused cable glands should be closed (sealed)
- the controller (from its bottom part) should be attached on a flat wall using four rawplugs

Plugging in



Warning! Be sure that the power supply is cut off before you plug in the device!

Before connecting the controller for the first time, the front panel should be unscrewed and then removed. Depending on the work mode, the adequate number of holes for the cable glands should be made (cut out from the bottom part). The wires should be inserted into the rubber cable glands and then connected. The illustration below presents the arrangement of the connectors of this device.

L N PE			PE N L			NO C NO C NO C			L N PE																																	
AC 230V			FAN			FAN 2			HOT			FUNC 1			FUNC 2			ALARM			12V		V1		V2		V3		10V		SENS1		SENS2		WIRERS		485		IN 0-1		DIN 0-1	

Connector labelled as AC 230V should be connected to the power supply (switching station). Using the circuit breaker 1P-B6 and overvoltage limiters of T1 and T2 type is obligatory. It is worth grouping the controllers on different phases (L1,L2,L3) while connecting multiple devices, in order to equally load the power line.

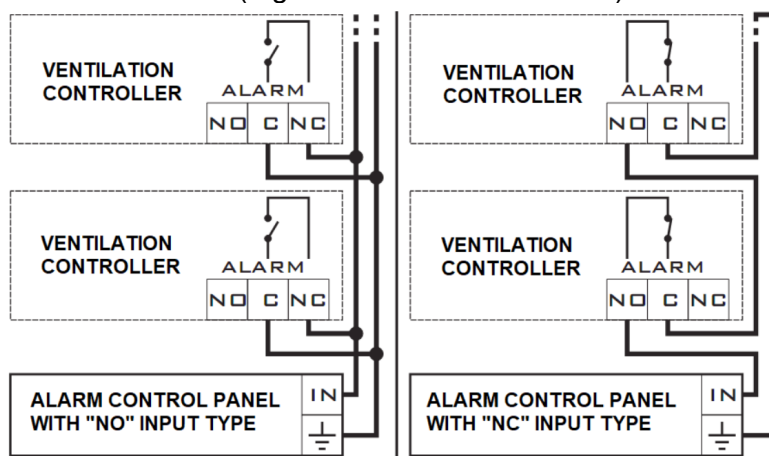
Connector labelled as FAN should be directly connected to the ventilator. In case of controlling multiple ventilators the aggregated load cannot be higher than 12A. Every ventilator should be separately secured. PE and N outputs should not be guided from the power supply (the switching station). Instead, they ought to be connected to the connectors of the controller.

Connector labelled as FAN 2 may be used for connecting 2nd stage ventilators or the spraying systems. The output is separated with max relay current of 6A (the circuit breaker 1P-B6 is required, when controlling the load directly). The relay activates when the measured temperature is higher than the total amount of value set previously by the user and the band ventilation value.

Connector labelled as HOT may be used to connect the heater. The output is separated with max relay current of 6A (the circuit breaker 1P-B6 is required, when controlling the load directly). The relay activates when the temperature drops below the value set by the user.

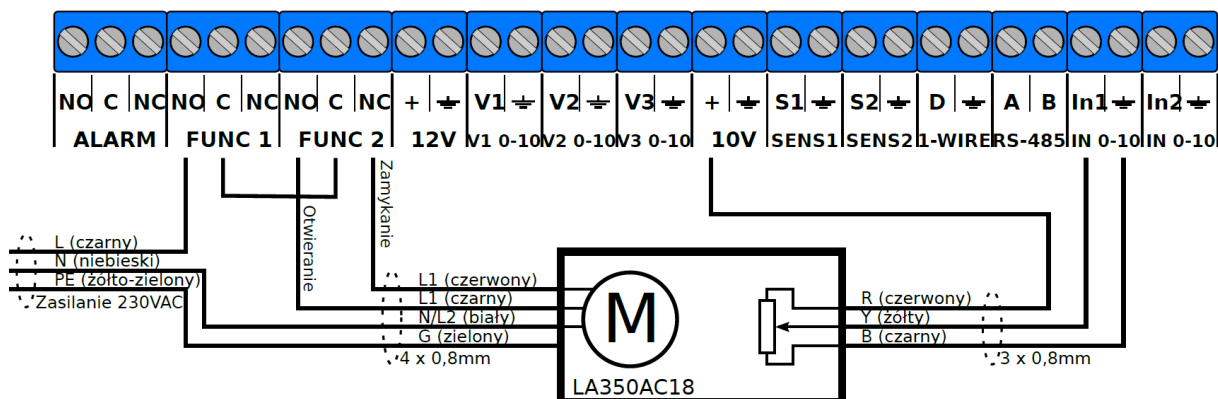
Connector labelled as ALARM – NC,C and NO outputs that should be connected to the alarm control panel. The alarm activates automatically when:

- the temperature is too low or too high,
- the controller or the temperature sensor is damaged,
- the power blackout occurs,
- the controller malfunction occurs (e.g the device is overheated)



Connectors labelled as FUNC1 and FUNC2 help to connect the elevator to opening the air inlets using the left/right motor. FUNC1 relay provides current for the servo motor, while FUNC2 relay switches the direction of the motor rotation. The exemplary scheme of connecting the elevator is presented below - (the circuit breaker 1P-B6 is required).

By deactivating the elevator function, FUNC1 and FUNC2 outputs work respectively as the relays of the 3rd and 4th stage ventilation.



Connector labelled as 12V is intended to provide power for the external sensors.

Connector labelled as V1 0-10V is intended to connect the expansion modules. The voltage on this connector is proportional to the level of ventilation.

Connector labelled as V2 0-10V is intended to connect the servo motor that opens the inlet flaps.

Connector labelled as V3 0-10V is intended to connect the smooth speed heating system. The voltage of this output increases proportionally to the decrease in the temperature, starting from the heating temp. value.

Connector labelled as 10V is intended to power the potentiometer of the elevator, or other 0-10V type components.

Connector labelled as SENS1 (SENS2) should be connected to one TS-3 or TS-5 temperature sensor, the polarity is not relevant. If connecting two sensors at the same time, the temperature measured values are averaged. It is advised to arrange the test leads away from the power cords.

Connector labelled as 1-WIRE may be used to connect higher number of the digital temperature sensors to the maximum of 4, connected in parallel (with the appropriate polarisation maintained). The maximum length of the wire connecting the sensors is 150 m (the length of the wire has no influence on the temperature measurement). Using the screened cable is advised.

Connector labelled as RS-485 may be used to build ventilation systems and for the PC communication.

Connector labelled as IN1 0-10 is intended to implement the feedback signal to the air inlets - determining current inlets position.

Connector labelled as IN2 0-10 is intended to connect the controller with other sensors, e.g. the humidity or CO2 sensors or the sensor working as the power extending module.

Working principle

The primary function of the controller is to maintain the temperature in the breeding room at the level set by the breeder. Please note that the controller is only a tool that helps to provide the optimal climate conditions in the room. The breeder plays the main role in the whole process by adjusting the settings on the device based on current weather conditions outside the building, as well as (and most importantly) based on the observation of the behaviour of all animals. The user should also monitor the device work status using the alarm control panel.

First controller start-up



Caution! While starting the sensor up for the first time the settings of the minimal fan speed must be adjusted immediately.

The sensor cooperates with the ventilators equipped with the single-phase induction motor, capacitor start-up and the maximum current consumption of 12A. After the attachment of a given ventilator, the user has to adapt it to the cooperation with the controller. In other words, it is necessary to set the minimal fan speed. Such function is similarly called "Minimal speed" and it can be set after entering

“Advanced setup” option. To perform such action properly, it is advised to cooperate with another person, who can set the value of “Minimal speed” (the default value is 0µs). Not having this setting adjusted, the device may not work properly.

The value of “Minimal speed” may be considered as valid ,as soon as the flaps of the ventilation stack start to lift slightly.

If a new ventilator is being attached to the controller, the whole activity of setting the “Minimal speed” has to be repeated.

Periodical airing

Airing is one of the functions performed by the controller, which activates when the temperature in the room drops below the temperature value set by the user. Such function guarantees a constant air circulation inside the breeding room to provide a regular air supply for the animals, at the same time extracting already used air. There are three parameters available in the airing mode:

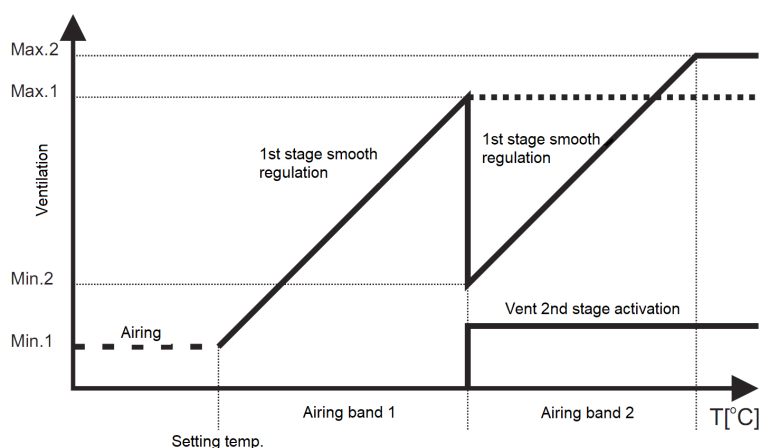
- “Time airing” - indicates the time duration of the activated ventilator (in minutes)
- “Break time” - determines the amount of time during which the ventilator is not working
- “Airing level” - indicates the power value of the ventilator in “Time airing”

All of the parameters above can be set by the user. However, there are some rules to be remembered while adjusting the values in the airing process:

- airing is turned on only when the temperature in the piggery drops below the value previously set by the user,
- the primary function of airing is to provide a constant fresh air supply for the animals, and not maintaining the temperature that had been set in the room,
- airing the room frequently for short periods is strongly recommended,
- longer airing periods should be avoided, because they can lead to major temperature variations,
- the parameters must be adjusted properly according to the behaviour of animals in the breeding room and all the conditions that occur not only inside, but also outside of the building.

Device working scheme

The controller smoothly regulates the ventilation from “Min 1” to “Max1” within the range of “Setting temp.” and “Airing band 1”. “Vent 2nd stage” will be active above that range and “Level min. 1” will immediately change to “Level min. 2”. As the temperature continues to grow, it will change to “Level max. 2” at the end of “Airing band 2” range. If “Airing band 2: equals “0”, but “Level max.1” is enabled, “Vent. 2nd stage” will be activated, causing further increases in the temperature to have no effect on changes in the ventilation process (dotted part of the graph). In the case of the temperature in the room dropping below the “Setting temp.”, the controller turns on the airing process periodically and if it continues to drop, heating is additionally activated. Every action is based on the adjustments that the user had implemented before. When the temperature in the piggery has different parameters than those set by the user, the programme of the controller may connect with the alarm control panel and activate the alarm.



Controller programming

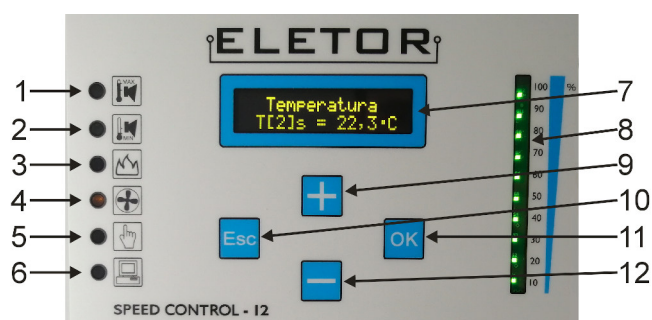
The controller has a built-in set of default settings entered to the non-volatile device memory in two cases:

- during the first device start-up
- when the memory data error occurs

In case of the power outage, the controller is not losing any of the settings that had been adjusted earlier by the user.

Front panel – indicator lights, buttons and the display

1. Red indicator light signalling that the maximal permitted temperature threshold had been exceeded.
2. Red indicator light signalling that the minimal permitted temperature threshold had been exceeded.
3. Yellow indicator light signalling the process of heating.
4. Yellow indicator light signalling “Vent. 2nd stage”.
5. Green indicator light signalling manual ventilation level adjustment.
6. Green indicator light signalling the work of RS485 communication.
7. Display menu in normal work mode showing the temperature on the screen
8. Bargraph signalling the level of the Ventilation
9. “up” menu button or the value change button
10. ESC button – exiting the menu or the given parameter without saving its value
11. OK button – entering the menu or confirming (saving) the given parameter value
12. “down” Menu button or the value change button



Using the menu (setup)

Rich in a wide range of functions, the controller allows to adjust the settings to the specific circumstances. After entering the menu (by pressing one of those buttons “+”, “-” or “OK”), access to the grouped functions section is granted. Pressing “+” or “-” button allow to choose one of the functions, editing, saving or entering further function options may be triggered by pressing “OK” button. To go back to the main menu or cancel the adjustment of the given value “Esc” button should be pressed.

Main menu (setup) functions

MENU	PARAMETR	OPIS
Setting temp	Setting temp. 20.0°C	Displays the temperature value from which the smooth ventilation process will start. This parameter should be based on the type of animals inside the breeding room.
Airing time	Active time 0 min	Indicates the length of the airing process (in minutes).
	Break time 5 min	Indicates the length of the breaks between the airing process work cycles (in minutes).
	Airing level 30 %	Indicates the power of the ventilation during the airing process (in percentage).

Alarm	Active alarm YES	The Alarm relay activation/deactivation. Press "NO" to block the connector from transmitting the alarm input signal (to the alarm control panel).
	Min. alarm 15.0°C	Indicates the minimal absolute temperature value signalling the alarm activation.
	Max. alarm 25.0°C	Indicates the maximal absolute temperature value signalling the alarm activation.
	Alarm signal YES	Activation/deactivation of the acoustic signal inside the controller.
Airing	Airing Band 1 5.0°C	Indicates the reaction time of the controller (the change of the ventilation level from min 1 to max 1) on the growing temperature.
	Level min. 1 1 %	Indicates the ventilation level corresponding to the setting temperature.
	Level max. 1 100 %	Indicates the constant ventilation level for the temperature exceeding the range of smooth regulation, when "Airing Band 2" = 0. Otherwise the maximum regulated ventilation level for the temperature will be the sum of the Setting temperature and the Airing Band 1.
	Airing Band 2 0.0°C	Indicates the reaction time of the controller (the change of the ventilation level from min 2 to max 2) on the growing temperature of the 2 nd stage. The function is not active when the band value equals 0.
	Level min. 2 1 %	Indicates the minimal level of the 1 st ventilation stage, at the moment when the ventilation 2 nd stage relays are activated.
	Level max. 2 100 %	Indicates the constant ventilation level for the temperature exceeding the smooth regulation range when the ventilation 2 nd stage is active.
	Stage 3 5.0°C	Indicates the current temperature of the stage 3 based on the setting temp. (the elevator function must be deactivated).
	Stage 4 7.0°C	Indicates the current temperature of the stage 4 based on the setting temp. (the elevator function must be deactivated).
Heating	Heating temp. 15.0°C	Indicates the temperature threshold at which the heating process is activated.
	Heating Band 5.0°C	Indicates the proportion of the heating systems (on 0-10V V3 output) in accordance to the current temperature.

Advanced menu (setup) functions

Menu intended mainly for the installers, that allows to adapt the controller to the ventilator and the installation process, test the circuits or choose the menu language.

MENU	PARAMETER	DESCRIPTION
Testing		This function allows to check the specific controller circuits. All of the settings in this mode are temporary, until cancelling the menu. After pressing the OK or ESC button, every parameter will change back to its previously set value.
	Airing 0 %	Allows to adjust the ventilation level manually, in order to check the ventilation system. After confirming the function, the green indicator light (hand shape) should light up.
	Alarm No	The activation lights up two red indicator lights, activates the sound signal and the alarm circuit.
	Heating No	The activation lights up the yellow indicator light (the flame shape) and activates the heating circuit.
	Stage 2 No	The activation lights up the yellow indicator light (the ventilator) and activates the 2 nd stage circuit.
	Output V1 0.0 V	Testing the 0-10V outputs. By pressing "+" and "-" buttons it is possible to adjust the voltage value on: the expansion modules, inlet flaps and smooth heating. This function is especially useful during the calibration of inlet flaps

	Output V2 0.0 V	V2 output.
	Output V8 0.0 V	
	Elevator 0	Allows to check the inlet flaps system "+" button opens the inlets, while "-" button closes them. The display shows a current actuator position measured by the potentiometer.
	Stage 3 No	The activation enables the Stage 3 ventilation circuit to start (the elevator function must be deactivated).
	Stage 4 No	The activation enables the Stage 4 ventilation circuit to start (the elevator function must be deactivated).
Language	English	Choosing the language of the menu. Currently there are two options available: Polish or English.
Fan	Minimal speed 0	The calibration of the minimal fan speed directly attached to the controller. The parameter determines the level of ventilation of "1%". The positive value of this parameter increases the fan speed, while the negative value decreases that speed.
	Min. extend 1.9 V	Minimal voltage supplied to the power extending module (0-10V V1 output).
	Max. extend 10.0 V	Maximum voltage supplied to the power extending module (0-10V V1 output).
	Cut extend No	Cutting off the power extending module. When selecting "Yes", the (V1 0-10V) output voltage of the control extending modules will drop to 0V and not to the minimal set value - when the ventilation level reaches 0%.
	Inversion No	The activation triggers the inversion of the V1 output characteristics. The voltage value will be dropping, as the ventilation level in min-max range increases. The signal on the V1 output during the inversion is 10-0V.
Flaps	Offset 0.0°C	Early inlet flaps opening. The adjusted value determines the temperature before the "Setting temp, at which the inlet flaps will open.
	Closure No	The activation results in the (V2 0-10V) output voltage value of the inlet flaps dropping to level of 0V and not to the minimal set value - in case of no ventilation = ventilation level 0%.
	Flaps min. 1.9 V	Minimal voltage supplied to the inlet flaps (0-10V V2 output).
	Flaps max. 10.0 V	Maximum voltage supplied to the inlet flaps (0-10V V2 output).
	Inversion No	The activation triggers the inversion of the V2 output characteristics. The voltage value will be dropping, as the ventilation level in min-max range increases. The signal on the V2 output during the inversion is 0-10V.
Measurements T	Calibration S1 23.0°C -> 23.5°C	The calibration for the the analog inputs, allowing to rescale the temperature measured from S1 and S2 sensors.
	Calibration S2 23.0°C -> 23.2°C	
	Averaging time 60 s	
Elevator	Calibration Ope 1024 -> 853	The calibration of the elevator is vital for the proper inlet flaps system work. The "+" button opens the inlets, the "-" button closes the inlets. While opening the inlets, the position parameter should grow and drop while closing them – if not, verify the connection of the actuator (power supply and the potentiometer). In "Calibration Ope" the inlets should be opened to the maximum and then the parameter should be confirmed by pressing the "OK" button. In "Calibration Clo" the inlets should be closed and then the
	Calibration Clo 0 -> 324	

		parameter should be confirmed by pressing the “OK” button. The “ESC” button allows to cancel the function mode without saving. Różnica między The difference between the values of these two positions should be of at least 100 units.
	Deactivation No	The deactivation option cuts off the elevator from the FUNC1 and FUNC2 relays, at the same time changing their functions to the ventilation of Stage 3 and 4.
Soft Start		All the parameters on this group are responsible for the ventilation start-up. The start of the ventilation in the smooth group is always preceded by the smooth fan movement up to 100%, working on that level for some time and then dropping to the ventilation level that had been previously set. Such action creates the blow while this process begins, allowing the butterfly valves to open. The values are presented in the power supply voltage periods on the ventilation of 1%.
	Start time 5	A parameter indicating the speed of the ventilation level changes from zero to maximum – smooth fans start-up. Setting the value to 0, turns the smooth start-up off.
	100% time 100	A parameter indicating the starting work time of the ventilation level on 100%. Adjusting the start-time and changing the value from 100 to 0, turns off the blows completely during the ventilation start.
	Stop time 5	A parameter indicating the speed of the ventilation level changes.
Heating	Inversion relay No	The activation triggers the inversion of HOT output characteristics. The relay will be opened wider, as the measured temperature value drops.
	Hysteresis 0.5°C	Indicates the level of the temperature hysteresis for the heating relay.
	Relative work No	The activation triggers the relative heating temperature adjustment against the temperature set previously. Basic heating menu is changed, showing the differences from the setting temp.
	Heating min. 1.9 V	Minimum voltage of the smooth heating system – the heater with variable fan efficiency (V3 0-10V output).
	Heating max. 10.0 V	Maximum voltage of the smooth heating system – the heater with variable fan efficiency (V3 0-10V input).
Software	ver. 2.4 Apr 13 2018	Information about the software version and the date of its compilation.

Error messages and warnings

Error messages inform the user about the potential malfunctions of the device. Possible error messages that may appear on the screen are listed below:

ERROR	DESCRIPTION
Out of power	The overload alarm, activating at 75°C. The device stops working until it cools down.
Sensor failure	Signals that the sensor is not connected to the device or that the sensor/connecting cable is damaged.

Comments and warnings



Caution! While installing the device it must be cut off from any power supply, because the voltage on some of the components is highly hazardous to health and life. It is advised to entrust a qualified and skilled personnel to carry out this installation.

To avoid problems with the utilisation of the device it is necessary to familiarise with the Instruction Manual before installation and further usage. The user should not interfere with the device construction or perform any repairs. This applies in particular to modifying various elements or components. Maintenance and service works should be only performed by the authorised staff (the installer or the authorised service). The controller requires proper adjustments of the parameters in accordance with the conditions that occur inside the breeding room. Such adjustments are the matter of breeder's choice. The alarm system is required in rooms with artificial ventilation. The producer of this product is not responsible for the damage/losses caused by the abnormal installation, improper programming of the functions, repercussions of random events, or other external factors.

The producer reserves all the rights to modification of the construction, or software of the device.



The product should not be thrown away with unsorted municipal waste after being used for the last time. Instead, it should be reprocessed in accordance with current requirements (EU Commission WEEE directive 2012/19/EU).

The product was manufactured in compliance with RoHS EU directive (also known as Directive 2011/65/EU).

Technical data

Power supply voltage	230VAC 50Hz
Max FAN power output	12A
Range of operating output voltage	70V ÷ 230V
Max FAN 2 (relay) output current	6A
Max HOT (relay) output current	6A
Max ALARM (relay) output current	4A
Max FUNC1 and FUNC2 (relay) outputs current	4A
Operating temperature range	-10 +40°C
Temperature measurement range	0 +50°C
Temperature measurement resolution	0,1°C
Temperature sensor damage detection	YES
Maximum number of analog sensors	2
Temperature measurement accuracy – analog input	1°C
Dependence of wire resistance on the measurement – analog input	15.8Ω/°C
Maximum number of digital sensors	4
Temperature measurement accuracy – digital input	0.5°C
Dependence of wire resistance on the measurement – digital input	none
Max wire length connecting digital sensors	150m
Surge protection (max E)	210J
Overload protection	75°C
Dimensions	34x29x12 [cm]
Enclosure class	IP65

The controller SPEED CONTROL-12 v2 comes with:

- one temperature sensor
- four rawlplugs
- two PG13.5 cable glands
- three PG11 cable glands
- four PG9 cable glands