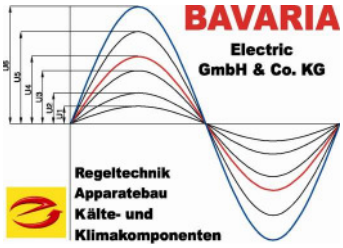

Operating Instructions for Control Adilog 602

Manual

for activation of speed controls with a 0 – 10 V signal

with and without sprinkling system

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CE

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1.0 General remarks

1.1 Copyright

Bavaria Electric GmbH & Co. KG

holds the copyright for this instruction manual.

This manual may not be copied, distributed, used for competitive purposes without prior authorization or disclosed to third parties in whole or in part.

In case of non-compliance, we are entitled to damages

All rights reserved, particularly in case of patent grant or other registrations.
Technical changes reserved.

Please note that this instruction manual refers to the unit only and is not applicable for the complete system!

1.2 Basis for unit construction

The unit has been constructed according to the state of the art and the accepted safety standards.

However, its use may still result in danger to life and limb of the user or third parties as well as in impairments of the system and other material assets.
The unit is only designed for the functions specified in the confirmation of order. Unless otherwise specified in the contract, any use for different purposes or beyond the specification is considered improper, and the manufacturer will not be liable for any resultant defects.

The user company will bear all risks.

Appropriate use also includes adherence to the installation, operating, and maintenance procedures described in this instruction manual.

1.3 Instructions for use

For the benefit of further developments, we reserve the right to modify design and technical data.

Therefore, no claims may be derived from any data, pictures, drawings and descriptions provided. Errors excepted!

Please read up on the measures for installation, adjustment, operation and maintenance before startup.

In addition to the instruction manual and the mandatory regulations for accident prevention in the user's country, the accepted technical rules are to be observed (safe and professional work according to UVV, VBG, VDE, etc.).

In addition to this instruction manual, please also observe the instructions of the component manufacturers (e.g. sensors). The units may pose dangers if used improperly by untrained staff.

Work at/with the units may only be accomplished by trained and qualified personnel authorized by the operating company!

1.4 Transport, storage

Bavaria Electric control units leave our factory packed appropriately for the mode of transportation agreed upon. Please only transport the control unit in the original packaging.
When hand carrying the unit, please observe reasonable human lifting and carrying capabilities. Avoid blows and crushes.

Pay attention to damages to the package or the control unit. Store the control unit dry and weather-proof in the original packaging. Avoid extreme heat and cold.

1.5 Duties of the operating company

The operating company is bound to use the units only in proper condition. Hazard areas between Bavaria units and customer equipment are to be protected by the operating company!

2. Safety Measures

2.1 Explanation of symbols and notes

The symbols and notes listed below warn of dangers and advise you of particular precautions.

Please observe these notes and also impart them to other users!

Attention! General Hazard Area!
Danger: Electric Current or Voltage!
Important Advice!

2.2 Electrical/Electronic Devices

Work at electrical components strictly is to be accomplished by an electrical specialist in accordance with the electrotechnical standards (e.g. EN 60204, DIN VDE 0100/0113/0160). Furthermore, the contractor or operating company has to make sure that the electrical equipment is operated and maintenanced according to electrotechnical standards.

It is strictly forbidden to accomplish work on energized parts. The protection class of the open unit is IP00! Direct contact with dangerous voltage is possible! During operation, the unit has to be closed or installed in the control cabinet. Fuses must not be repaired or bridged but replaced. Only use the fuses specified in the circuit diagram. Use a two-pole voltage tester for ensuring the parts are free of voltage.

Detected defects in electrical equipment/units/components are to be eliminated immediately. If in the meantime there is acute danger, the equipment/unit may not be operated in the defective condition.

2.3 Safety instructions

With reference to safety, we would like to draw your attention to the following details:

The cover may only be removed after disconnection of the feeder and after a three-minute waiting period. If measurements or adjustments at the energized open unit are inevitable, they may only be made by a specialist familiar with the associated dangers.

2.4 Employment of external personnel

Maintenance work is often accomplished by external personnel unfamiliar with the special conditions and associated dangers.
Please inform these people thoroughly about the dangers in their field of work. Supervise their work and interfere in time.

As supervisor, you are responsible for the safety of external personnel!

2.5 Accessories, spare parts

PLEASE NOTE:
For your own safety, please only use parts, sensors, and accessories approved or recommended by Bavaria Electric. We are not able to judge on possible safety risks resulting from the use of non-approved or non-recommended third-party products or other modifications not made by Bavaria Electric. Original Bavaria Electric parts and accessories as well as other products approved or recommended by Bavaria Electric and the relevant qualified advice are available from the Bavaria-Electric service department under +49 (0) 8105-778190. In our mutual interest, we ask you to observe the above advice, as

SAFETY OF OPERATION IS OUR ULTIMATE CONCERN!

2.6 Manufacturer's address, service address

If you have any questions regarding the use of our products or if you are planning special applications, please do not hesitate to contact us:

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3.0 Functional Description ADILOG 602:

The unit is controlled by a temperature sensor type PT 100 located in the medium outlet. There are two nominal values. The nominal temperature 1 (e.g. 27°C) is set at the control and stored. A second nominal value may be set and stored in the same way. The nominal values may also be provided by a superordinate control through a 0-10V or 0-20mA signal.
Issuing a 0-10V signal, the controller is able to control any frequency converter or phase control. The ventilator motors accelerate to top speed as required. For this purpose, there is an adjustable spectrum of about 0.8 kelvin. When the peak ventilator capacity is reached, at the seventh and eighth level, the different recooling units' sprinkling (or also called adiabatic) effect will be triggered independently, sprinkling the cooling units with (pre-treated) water.
The ball valves will be connected at a further increase of the return temperature by +0.3 kelvin.
One to six ball valves at the max. may be activated directly by the controller.
The final positions of all ball valves are monitored. In case of malfunctions, a fault message is generated.

When the medium outlet temperature has dropped, the individual adiabatic ball valves close automatically, and a further temperature drop will lead to a motor speed reduction. If the temperature rises again, first the motor speed will be increased, then the adiabatic effect will be triggered as before.

The adiabatic effect is only enabled at adjustable ambient temperatures exceeding 27°C.
We are working with a P-band control, i.e. the ventilator output increases proportionally to the temperature rise.

For avoiding damage due to freezing, at an ambient temperature of about 23°C, the main inlet valve for the adiabatic water will be closed. At an ambient temperature of about 10°C, first the waste valve and a little delayed all ball valves at the recooling units will be opened as well.
The spray nozzles will draw air, automatically emptying the pipe system. If the ambient temperature rises, this process takes place in reverse order.

Phases L1 L2 L3 may be monitored, and a fault message will be generated in case of malfunctions.
The activated ball valves are indicated by LEDs.

The nighttime limit may be activated by a potential-free contact, and the ventilators will only operate at a pre-set max. speed.

4.0 General description

4.1 Field of application

Adilog 602 is designed for the control of ventilators through an external load controller.
Automatic control of the adiabatic system with 6 ball valves at the max. and automatic filling and emptying.

Supply voltage at 3~ 400 V (-15 % to +10 %), 50/60 Hz

Input resistance for sensor or speed preset signal:
- input of 0-10 V: Ri 100 k
- input of 0-20 mA: Ri = 100

Voltage feed e.g. for sensors +24 V ±20 %, Imax 120 mA
Max. tolerable ambient temperature: 40° C
Tolerable relative humidity 85 %, non-condensing
Emitted interference according to EN 50081-1
Interference resistance according to EN 61000-6-2

4.2 Models of the EC-LOG series

or IP 55 steel-sheet housing.

5.0 Installation

5.1 Wall fastening, installation in control cabinet

Please observe the following details:

Install the unit on clean, sustainable surface with adequate fasteners; do not twist! Installation on vibrating surface is not allowed!

Use adequate fasteners.

If the casing has interior fixing holes, the bolt heads are to be underlayed with the enclosed plastic rings!
Install the unit outside the traffic area, yet ensuring good accessibility! Cable ducts have to be easily accessible!

Protect the unit from direct insolation!

If several units are installed, please keep a distance of 5 cm between the units and to the walls! In order to avoid mutual heat up, superposed installation of several control units is not allowed.

Please ensure proper heat dissipation (General Description: Technical Data, „Dissipation Loss“).
Max. tolerable ambient temperature 40° C,
(Installation: Output reduction with ambient temperatures exceeding 40° C (Derating)).
Installation site (for farming applications):
For avoiding damages due to ammonia (NH3) fumes, if possible the control unit should not be installed directly in the barn but in the anteroom.

5.2 Outdoor installation

of units with IP 54 casings

Outdoor installation is possible under the following conditions:

With outside temperatures below 0°C, a control cabinet heating system should be provided for avoiding bedewing.

Outside temperatures must not drop below -20°C.
Weatherproof installation if possible, i.e. also prevent from direct insolation (max. tolerable ambient temperature 40° C).

5.3 Temperature influence during start-up

Avoid condensing humidity in the control unit and resulting malfunctions by storing the control unit at room temperature!

5.4 Systems with ground fault circuit interrupters

If using ground fault circuit interrupters, please ensure they are AC/DC sensitive. According to EN 50 178, para. 5.2., other ground fault circuit interrupters are not allowed. In order to avoid false activations, if a ground fault circuit interrupter is to be used, we would recommend a release current of 300 mA.

5.5 Potential of control voltage connections

The control voltage connections (<50 V) refer to the common GND potential (exception: relay contacts are voltage free). Between the control voltage connections and the electrical isolation, there is potential separation

Please make absolutely sure the max. external voltage at the control voltage connections does not exceed 50 V (between terminals „GND“ and ground wire „PE“).

6.0 Emitted interference and cable laying

6.1 Motor cable

With reference to the emitted interference, the applicable standard is EN 50081. It is complied with with unshielded motor feed cable.

6.2 Cables and PT 100

In order to avoid interspersions, the cables for the PT 100 sensors have to be shielded, if they are longer than 20 m or layed together with other cables (e.g. in a cable duct). If a shielded cable is used, the shield has to be connected with the ground wire unilaterally, i.e. only at the control unit (as shortly and with induction as low as possible!).

7.0 Electrical installation

The electrical installation is to be carried out by trained specialists observing the general and local provisions! When the control unit is open, dangerous voltage is exposed. Please be aware of the danger and behave accordingly; Keep employees of other departments away from the hazard area!

For the different connections, please refer to the connecting diagram attached to this manual (Attachment: Connecting Diagram)!

With „WAGO" terminal strips please only insert a connector of 2.5 mm² at the max. With flexible wires, no cable sleeves are required!

Prior to the final start of operation, the casing has to be duly bolted together, and non-required cable inserts (depending on the casing model) have to be closed with the plugs!

7.1 Output reduction

with ambient temperatures exceeding 40° C (Derating)

The max. tolerable ambient temperature of the unit is 40° C. Up to this temperature, loading (max. continuous current) with the specified rated current is possible. As evacuation of the dissipation loss originating from the unit (heat development) crucially depends on the ambient temperature, with ambient temperatures exceeding 40° C, the max. load absolutely has to be limited!

The average value measured within a period of 24 hours is to be 5° C below the max. ambient temperature.

If the unit is to be integrated in a control cabinet, the unit's dissipation loss and its possible effect on the ambient temperature has to be considered (General Description: Technical Data)!

8.0 Electrical connection

(Annex: Connection Diagram)

8.1 Power connection

Power connection at the terminals PE, L1, and N. Please make absolutely sure that the supply voltage is within the accepted tolerances (General Description: Technical Data and label attached laterally).

As the unit has a leakage current > 3.5 mA, permanent connection is required. According to EN 50178, item 5.2.11, up to a profile > 10 mm² double ground wire connection is required.

8.2 Voltage type requirements

The required supply voltage has to correspond to DIN EN 50160 (Voltage Characteristics in Public Power Supply Systems). If this is the case, unit malfunctions will only occur to the degree of supply voltage failures described in the standard.

Of course, in countries with a line frequency of 60 Hz, this value is considered the rated frequency.

Supply voltages not corresponding to DIN EN 50160 require a separate examination.

8.3 Motor protection

Upon activation of a connected thermostat relay or PTC thermistor (interruption between the two terminals TK), the controller will not cut off the unit. The programmed operating and fault relays will react, the internal red LED for motor malfunction will flash up, the green LED for operation will expire. After cooling of the drive, restart is possible either by switching off and on the supply voltage or by using the ON/OFF switches of the motor protection function. (See IO setup).

The display will show the message „Motor Protection Malfunction“ in turn with the actual value.

This control offers the following display or menu items with the corresponding sub-items:

- EC-LOG V1.03 (Indication of version, no adjustments possible)
- P controller and return **(Pure status indication, no adjustments** possible)
- Return (Pure status indication of return and outside temperature)
- Target Value (Parameterization and setting of values like 2nd target value, P level,…)
- Operating hour meter **(indication of operating hours at different** regulating steps)
- Language **(English – German, operational times)**

8.4 Ball Valve Connection

Max. 6 ball valves can be connected for the adiabatic system. They are connected as needed according to a rolling system.
The number of connected ball valves is programmed using a menu on the display.
The ball valves for automatic filling and emptying are controlled depending on the outside temperature. All ball valves are monitored with reference to end position. In case of malfunction, a fault report is generated.

This control offers the following display or menu items with the corresponding sub-items:

Adilog 602 (Indication of version, no adjustments possible)
P controller and return (Pure status indication, no adjustments possible)
Return (Pure status indication of return and inside temperature)
Target Value (Parameterization and setting of values like 2nd target value, P level,…)
Operating hour meter (indication of operating hours at different regulating steps)
Language (English – German, operational times)

9.0 Functions: according to table

1.0 Adilog 602

Adilog 602

Indication of the version (e.g. Adilog 602), no adjustments possible.

Press the „M“ key for reaching the next menu item „P control – return temperature“.

2.0 P control - return temperature

P control – return temperature

This menu item displays the values of the P control and the return temperature in turn. Here, no settings or adjustments are possible either.

Press the „M“ key for reaching the next menu item „return temperature“.

3.0 Return temperature

Return

Using the enter key, from this display you can read return and temperature.

Press the „M“ key for reaching the next menu item „target value“.

4.0 Target value

Target value

The item „target value“ allows parameterization and setting of the different values like

- Target value
- 2nd target value
- P Level
- P Level 2
- nighttime limit

according to your requirements.

Press the „M“ key for reaching the next menu item „operating hours“.

5.0 Operating hours

Using the Enter key, you will be able to read the different operating hours counters. There are separate counters for all regulating steps and for standby: S-FU-A1-A2-A3-A4-A5-A6

Operating hours

Press the „M“ key for reaching the next menu item „Language German“.

6.0 Language German

Language German

You can change the language to English by pressing the „+“ key. Under this item, you will also find the times, offsets, factors, Aditemperature, A levels, and F code to be programmed user-specifically.

Press the „M“ key for reaching the start „Adilog 602“.

Attention: Values changed incorrectly may have an impact on the controller function!!

10.0 Operating elements according to structure:

10.1 Target value

Setting of the controller target temperature. The setting range is 0.0 – 60.0° C.

10.2 Target value 2

Alternative target value which can be activated by a signal at the logic entry. The setting range also is 0.0 – 60.0° C.

10.3 + 10.4 P-Control x

The controller works in automatic operation. The current level is displayed.

10.5 Nighttime limit

The nighttime limit can be activated by a signal at the logic entry.

Display

On the LC display, all messages and parameters necessary for operation are indicated.
The display is double-spaced with 8 characters each, and for better legibility in the control cabinet, it features a green backlight.

Below the LC display, you will find four keys for menu control and parameter entry.

„M“ (Modus) and „E“ (Enter) keys

You can use the „M“ (Modus) key for proceeding to the next menu items. With the „E“ (Enter) key, you can read and set individual values for each item.

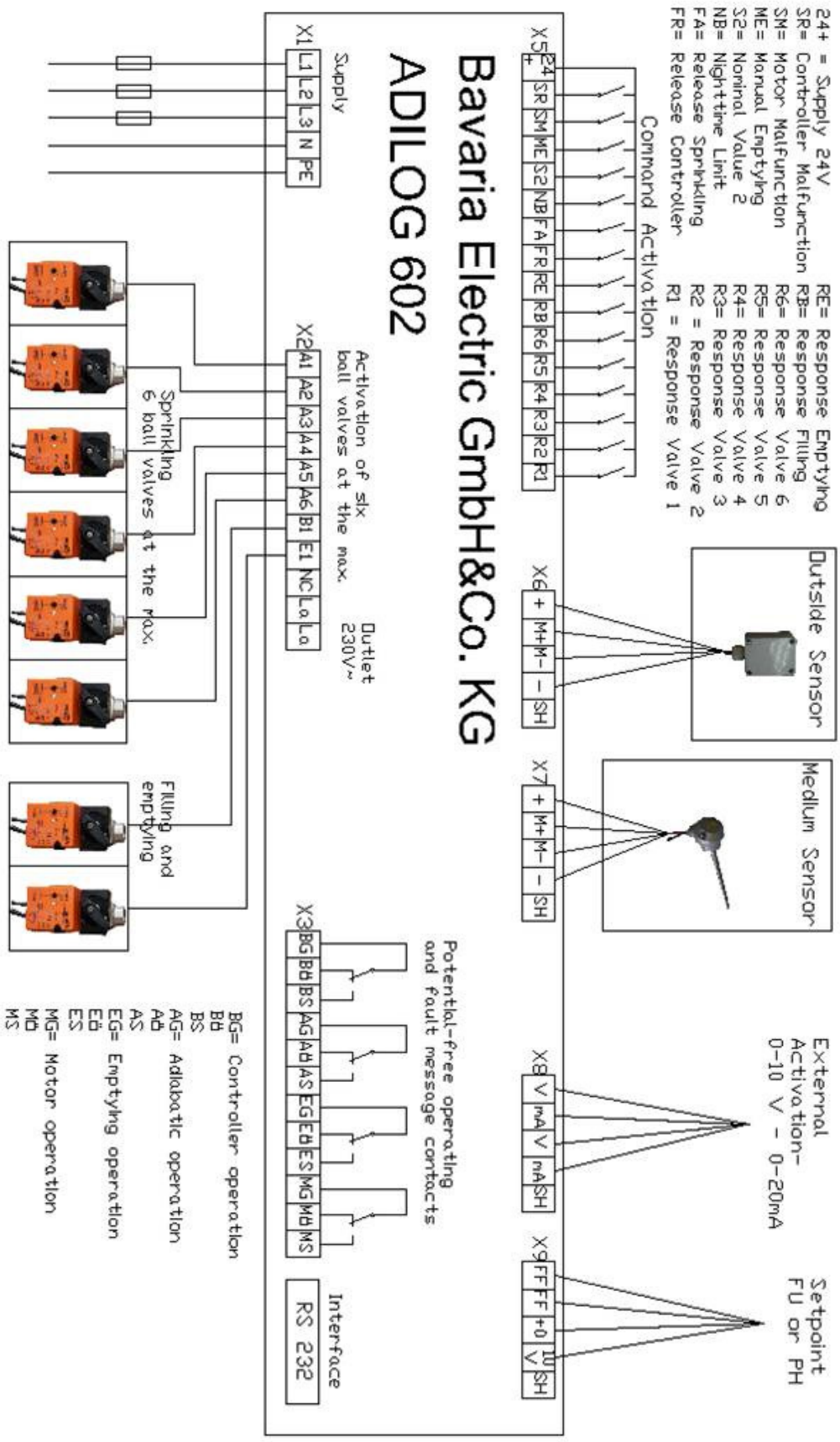
+/- key

for setting the parameters. The values can be increased or reduced by touching.

10.6 – 10.11 Time, Offset, Factor, Adi Temp., A Levels, F Code

Time 1 =	Delay time control „up – down“ (factory setting 200ms)
Time 2 =	Delay time end position evaluation ball valves 1-6 (factory setting 180s), no end position evaluation with 0 s
Time 3 =	Delay time end position evaluation ball valve filling (factory setting 180s), no end posi tion evaluation with 0 s
Time 4 =	Delay time end position evaluation ball valve emptying (factory setting 180s), no end position evaluation with 0 s
Offset 1 =	Readjustment return (adaptation) of PT 100 sensor (factory 2600)
Offset 2 =	Readjustment outside temperature (adaptation) of PT 100 sensor (factory 2600)
Factor 1 =	Fine adjustment 0-10V (factory 1,200)
Factor 2 =	Vacant
Adi Temp =	Presetting of outside temperature (e.g. 27°C) allowing connection of the adiabatic system
A Levels =	Setting of actual number of ball valves 1 – 6 (With 2 ball valves enter 2, filling and emptying do not have to be considered.)
F Code =	The activation code for the board. Without code, the activation is canceled after 1500 h (protection measure)

11.0 Example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ADILOG 602
24+ = Supply 24V
SR= Controller Malfunction
SM= Motor Malfunction
ME= Manual Emptying
S2= Nominal Value 2
NB= Night-time Limit
FA= Release Sprinkling
FR= Release Controller
RE= Response Emptying
RB= Response Filling
R6= Response Valve 6
R5= Response Valve 5
R4= Response Valve 4
R3= Response Valve 3
R2 = Response Valve 2
R1 = Response Valve 1
Command Activation
Supply
Activation of six ball valves at the max.
Outlet 230V~
Sprinkling 6 ball valves at the max.
Filling and emptying
Outside Sensor
Medium Sensor
External Activation- 0-10 V - 0-20mA
Setpoint FU or PH
Potential-free operating and fault message contacts
Interface RS 232
BG= Controller operation
BB
BS
AG= Adiabatic operation
AB
AS
EG= Emptying operation
EB
ES
MG= Motor operation
MB
MS

12.0 Menu Structure