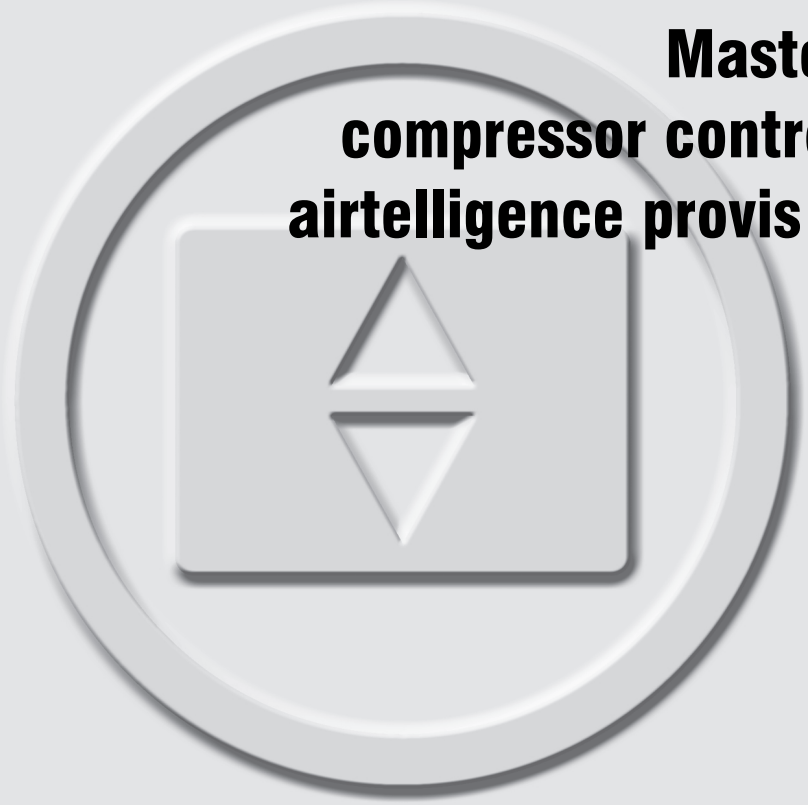
BOGE AIR. THE AIR TO WORK.

BOGE
COMPRESSED AIR SYSTEMS

Operating instructions

Master compressor control airtelligence provis 3



boge.com

Operating instructions for the master compressor control airtelligence provis 3

Software version V01.00.00.00

BOGE KOMPRESSOREN
Postfach 10 07 13
33507 Bielefeld

Otto-Boge-Straße 1-7
33739 Bielefeld

Fon: +49 5206 601-0
Fax: +49 5206 601-200
Mail: info@boge.com
Net: www.boge.com

Issue : 05 / 2020
No. 596.1551.01
Nominal price : € 5,00

Index

Part 1: General

1.1 Who are these operating instructions intended for? 1

1.2 Contents of these operating instructions 1

1.3 Additional important documents 2

1.4 Orientation aid for reading these instructions 2
Symbols and typographic features 3
Design of warning signs 4

Part 2: Safety

2.1 Basic information on safety 5
Prior to commissioning and operation 5
Intended use 5
Reasonably foreseeable misuse 5
Modifications to the product 5

2.2 Special safety notes 5
Transport 5
Switch cabinet 6
Touch panel 6
Network 6
Change of settings 7
Data backup 7

2.3 Owner and personnel 7
Personnel requirements 7
Obligations of the operator 8
Obligations of the personnel 8

Part 3: Assembly and connection

3.1 Installation of the control 9
Assembling the switch cabinet 9
Check assembly 10

3.2 Connecting the control 11
Establishing the electrical connection 11
Connect the cables for communication in the control cabinet 13
Using external interfaces 15

Part 4: Basic knowledge of control

4.1 Principle of the master control 17
Tasks of the master control in compressed airnets 17

4.2 User levels, rights and functions 18

4.3 Operation 19
Handling by finger or PC mouse 19
Operating elements and input functions 20

4.4 Symbols 23
General symbols for components 23
Special symbols for components - compressor 23
Special symbols for components - receiver 24
Special symbols for components - equipment 25
Special symbols for accessory values analog/digital inputs and outputs 25
Symbols for basic operating ability 26

4.5 Navigation through the views 28
Navigation structure 28

Part 5: Use of the control

5.1 Compressed airnet overview 35

5.2 Compressed airnet view 36
Status display: List representation 37
Status display: DIN representation 37
Status display: 2D representation 38
Status display: 3D representation 38
Change arrangement of components in DIN and 2D representation 39
Calendar display 41
Event display 50
Progress display 51
Settings for the compressed airnet 55

5.3 Component detail view 56
Component detail view - compressor 57
Component detail view - receiver 58
Component detail view- equipment 59

5.4 General system settings 61
User administration 62
System settings 64
Compressed airnet configuration 66

Part 6: Troubleshooting

6.1 Events / message types 69
Process events / messages 69

Part 7: Service, dismantling, disposal

7.1 Service 73
Cleaning the display 73
Software updates 73

7.2 Dismantling / Disassembly 73

7.3 Disposal 74

Part 8: Annex

8.1 Technical data 75

8.2 Housing dimensions and component overview 76

External dimensions and components 76

Internal components 77

Status LEDs of the control 78

1.1 Who are these operating instructions intended for?

These operating instructions are aimed at BOGE end customers who want to control the compressed air production of several compressors, organized in one or several compressed airnets, by means of the master compressor control **airtelligence provis 3**.

Apart from reading these operating instructions, the following prerequisites and previous technical knowledge on the part of the user are essential for the correct operation of the control:

– comprehensive technical knowledge of the connected compressors
– knowledge of the operating instructions of these compressors
– classification as qualified or appropriately trained personnel with technical background knowledge in compressed air technology (see also „Personnel requirements“, page 7)

1.2 Contents of these operating instructions

The operating instructions exclusively deal with installation, functioning, operation and setting of the **airtelligence provis 3**.

The following contents and descriptions of activities do not form part of these operating instructions:

– all safety-relevant information as to the individual compressors, they form part of the compressor operating instructions.
– any information as to controls which are directly installed on the individually connected compressors (slave controls).
– any work, e.g. repairs on the control or installation of updates.
– any work on compressors and equipment (e.g. installation, commissioning or service).
– description of the complete set-up/installation of compressed airnets or individual compressors within the master control (specially trained BOGE service personnel only).

Any of the above mentioned work may **only** be carried out by authorized and qualified personnel, qualified electricians or BOGE service personnel.

BOGE recommends to have control(s), compressors and equipment set up and commissioned by BOGE service personnel. Make sure that any servicing or repair work on the control is also performed by BOGE service personnel.



If you have any questions as to the product, please contact the Technical Support by calling:

Phone: +49 5206 601-140

If you require service personnel, please contact BOGE Service by calling:

Phone: +49 5206 601-100

1.3 Additional important documents

For any work not described in these operating instructions the following documents and specifications are required:

– operating instructions of the compressors,
– operating instructions of the connected equipment,
– operating instructions of the subordinate (slave) control(s).

Please observe the specific safety information provided in these documents!

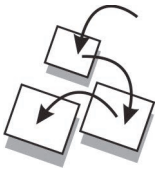
Below you will find directions how to read these instructions and information as to the design of the warning signs used in these operating instructions.

1.4 Orientation aid for reading these instructions

In order to easily familiarize with the compressor control, the layout of the operating instructions is intended to give you better orientation and support.

Symbols and typographic features

The following table provides an overview of all symbols and typographic features meant to facilitate the reading:

Symbol	Meaning
	Tips and further notes for optimum handling Particularly important tips and notes helping to optimally operate the control are marked with a frame and the illustrated symbol.
	The settings described in this section can only be made after login with user name and password, see also „User levels, rights and functions“, page 18.
– Information 1 – Information 2 – Information 3	Listing For a clear and understandable presentation some important information are listed up.
● Action step	Instructions I Instructions with one action step only are indicated with the symbol shown.
1. Action step 1 2. Action step 2 3. Action step 3	Instructions II Instructions with several action steps are numbered and must be carried out in the specified sequence.
⇨ Feedback for action step	Feedback The result to be expected after an action step is indicated with the arrow shown.
(1) (2) (3)	Figures and illustrations For a better understanding, illustrations of the user interface of the touch panel are possibly divided by frames into several image areas. The individual image areas are numbered.

Tab. 1.1: Overview of the means of design for easier reading of these operating instructions

Design of warning signs

The warning signs and notes in these instructions are to indicate dangers that may occur during execution of specific actions. Apart from this, they point out how a danger situation can be prevented. Warning signs are designed according to a fixed structure, described in the following.

Signal words

The following signal words are used:

Signal word	Meaning
WARNING	Warns of dangers that can possibly lead to serious or fatal injuries.
CAUTION	Warns of damage to property and loss of data.
NOTE	Warns of malfunctions within the operating process/communication.

General warning sign

The following general warning sign is used in this document:

Warning sign	Meaning
	Warns of a hazardous area.

Warning sign design

Warning signs are a combination of signal words, warning signs and information text and structured as follows:

⚠SIGNAL WORD

Kind of danger

Source of danger and consequences if the warning is not observed.

➔ How to avoid any danger.

2.1 Basic information on safety

Prior to commissioning and operation

Prior to commissioning and operation of the **airtelligence provis 3** control the following points must be observed:

- These operating instructions must be read completely prior to commissioning/operation of the control.
- These operating instructions must always be available at the place of operation of the control.
- Changes of settings on controls may only be carried out by authorized qualified personnel, see also „Personnel requirements“, page 7.
- The control is installed in a separate switch cabinet. Work on the control, for which the switch cabinet must be opened, may only be carried out by authorized and qualified electricians, see also „Personnel requirements “.
- Prior to first commissioning, check control for visible signs of transport damage.
- Damage to the control that could impair the safety of machine operation must be rectified immediately.

Intended use

The control serves solely for the correct operation of one or several compressed airnets, consisting of one or several BOGE compressors or compressors of other manufacturers and connected equipment, if applicable. It is designed for stationary indoor use in manufacturing and industrial areas.

BOGE controls, especially the focus control 2.0, are designed and developed for use in closed industrial networks (technical network).

Reasonably foreseeable misuse

Non-observance of the application limits (see „8.1 Technical data“, page 75) is considered unintended use, poses a risk to the operational safety of the control and can endanger the compressed air supply.
Furthermore, considerable material damage and personal injury may be the result.

Modifications to the product

Improper or unauthorized operation of the control can endanger the operational safety and damage connected devices or machines. It is not permitted to perform any modifications, extensions or conversions to the control, likewise no repairs may be carried out. If a component of the control is defective, contact BOGE service and coordinate any further proceedings.

2.2 Special safety notes

Transport

- During transport, removal, relocation or return shipments the switch cabinet must be secured against slipping or falling down by means of suitable measures. Internal transport is only permitted if the switch cabinet is adequately secured against tilting and falling over.
- The instructions for handling the packaged products as well as humidity, shock, tipping and temperature indicators on the packaging must be observed.
- The control must be transported in a horizontal position. The maximum permissible deviation from the horizontal is 15°.

- Only suitable and approved lifting and transport tools may be used for unloading and transport.
- Never climb onto control unit or packaging.
- Protect surfaces and frame from damage.
- During transport or intermediate storage, ensure that the surfaces are weather-protected, dry, clean and protected from external influences.
- The breaking load classes must be observed. Place insensitive parts at the bottom.
- Observe any information on humidity and temperature range during transport (see „8.1 Technical data“, page 75).

Switch cabinet

The control is installed in a separate switch cabinet.
The operating unit of the control, the touch panel, is installed in the front of the switch cabinet.

- The control may only be operated by means of the touch panel when the switch cabinet is closed
- Never open switch cabinet during operation.
- If necessary, switch cabinet to be opened by authorized and qualified electricians only.

Touch panel

- No pointed or sharp-edged objects may be used when operating the touch panel. They can damage the surface of the touch panel. Only operate the touch panel with your fingers or a suitable input pen with a plastic tip.

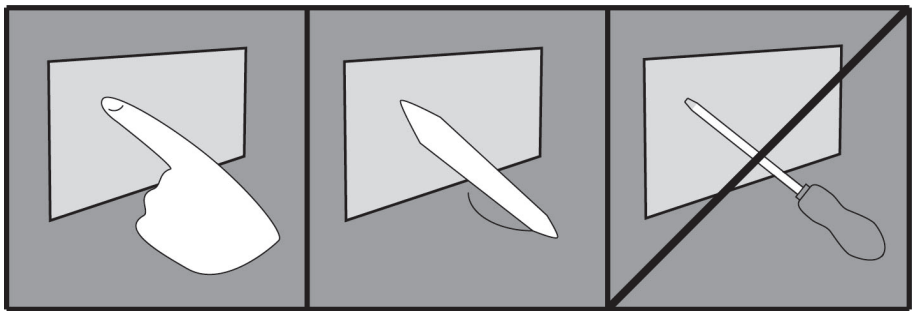


Fig. 2.1: Operate touch panel properly



Notes on cleaning the display on page 73.

Network

The control and configuration protocols do not provide authentication mechanisms. Furthermore, large amounts of network traffic can lead to an impairment of the control communication. BOGE therefore strongly recommends the use of the controls exclusively in closed networks (technical network).

The network configuration, e.g. the IP address assignment, must be carried out in coordination with the responsible IT department, which is also responsible for the network in which the control is to be operated. Incorrect settings (such as repeatedly assigned IP addresses, incorrect gateways, etc.) can also lead to interference with other network participants.

In addition, the specified minimum qualities of the network cables (CAT 6) must be observed.

Change of settings

The control regulates the individual compressed airnets by means of settings or parameters that can be defined individually. These adjustable values can therefore be used to change the control behavior of the compressors so that each net produces compressed air on demand. However, incorrect settings may also cause faults in the operating process or destruction of components.

– The change of settings / parameters may only be carried out by authorized specialist personnel with sound knowledge of compressed air technology.
– In cases of doubt please contact BOGE service prior to changing any settings.

Data backup

The control is equipped with a Solid State Drive (SSD). All changes made to adjustable values are automatically stored in this internal memory after being entered.

To ensure that an originally existing configuration is not lost after a possible defect of the SSD memory or a change of the settings, it can be transferred to an external memory for backup using the "Export configuration file" function (see „Configuration import and export“, page 65).

2.3 Owner and personnel

Personnel requirements

Basically only those persons may carry out activities on the control who perform their tasks duly and reliably and meet the following requirements:

Trained personnel

Trained personnel are persons who have been instructed in a verifiable and detailed manner by the owner about their assigned tasks and any potential risks in this conjunction.

Qualified personnel

Qualified personnel are persons who, due to their professional training, knowledge and experience as well as their awareness of the relevant regulations, are in a position to carry out the tasks assigned to them and be able to autonomously identify any potential hazards and to prevent personal injury or property damage.

Qualified electricians

Qualified electricians are persons who, due to their professional training, knowledge and experience as well as their awareness of the relevant standards and regulations, are in a position to properly carry out work on electrical installations, to autonomously identify any potential hazards and to prevent personal injury or property damage caused by electric current.



Prior to describing any work that requires special knowledge, it is clearly indicated in these operating instructions what qualifications profile a person must comply with to perform the described tasks.

Personal protective equipment (PPE)

During transport, assembly and maintenance/service work

– protective clothing,
– slip-resistant safety shoes,
– cut and puncture-resistant protective gloves
– protective helmet (for compressor transport and work inside the compressor)
– Safety goggles (when working on pressurized components / on the control pneumatics)

must be worn.

When operating the control in the compressor room, hearing protection must also be worn if necessary.

Obligations of the operator

The operator is subject to the statutory obligations for occupational safety and must be informed about the valid health and safety regulations.

The use of the master control implies that a suitable safety concept has been developed for the machines or plants. This includes a hazard and risk analysis in accordance with the relevant guidelines and standards (e.g. EMC and Low Voltage Directive) and a test report for the validity of the safety functions.

Furthermore:

– The operator must authorize qualified electricians for any work on the control cabinet.
– The owner must only provide the key for opening the control cabinet to qualified electricians who have been authorized by him to perform work on the control cabinet.
– The owner must authorize specialist staff performing changes to settings/ parameters of the control.

Obligations of the personnel

The personnel is subject to the statutory obligations for occupational safety and must be informed about the valid health and safety regulations.

Furthermore:

– The personnel must have completely read the operating instructions prior to commissioning/operation of the control.
– Personnel must have read the operating instructions for compressors, their integrated controls and the equipment in full prior to commissioning/operating these components.
– The staff must have been authorized based on these instructions for any work that they may perform depending on their qualification.

3.1 Installation of the control

The **airtelligence provis 3** is installed in a separate switch cabinet. The operating unit of the control, the touch panel (1), is located in the front of the switch cabinet (2).

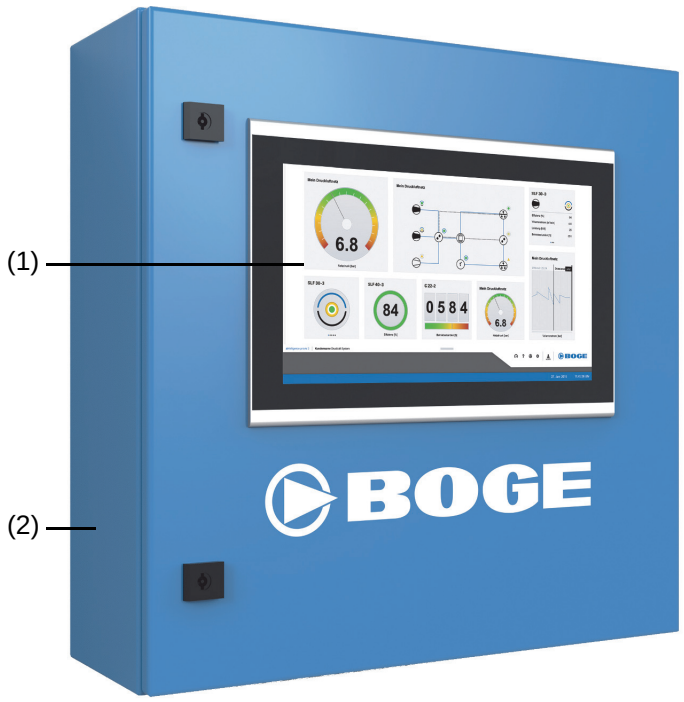


Fig. 3.1: Switch cabinet with touch panel

After delivery, the switch cabinet must be set up and installed at a suitable location before the necessary components can be connected and the control can be put into operation.

Assembling the switch cabinet

Safety instructions prior to assembly

- Ensure that the installation site is free from dirt and moisture.
- Physically separate the switch cabinet from frequency converters and high-voltage appliances.
- Avoid functional failures that can be caused by heat generation and interference with adjacent components, by meeting the requirements of EN 61439:
  - Ensure that the temperature limits at the place of operation are observed (see „8.1 Technical data“, page 75).
  - Do not place the switch cabinet directly next to heat sources.
  - The components are designed for cooling by convection: therefore avoid heat accumulation and ensure that no openings are covered (e.g. by surface-mounted cables).
- During assembly, ensure that the bottom side of the control cabinet housing points downwards (see also „Housing dimensions and component overview“, page 76). The specified ambient conditions, especially the ambient temperatures, apply to this alignment only.

To assemble the switch cabinet:

⚠WARNING

Risk of injury due to improper assembly!

The switch cabinet can fall down if not mounted properly. Injuries and damage to property can be the result.

➔ Assembly work may only be carried out by trained personnel.

➔ Carry out assembly with at least two persons.

➔ Follow the instructions in section „ Intended use“, page 5.

➔ Use the fixing material included in the scope of delivery.

➔ Always wear PPE during assembly work.

⚠CAUTION

Risk of property damage due to improper assembly!

If the switch cabinet is exposed to vibrations at its installation location, the product may be damaged.

➔ Do not install the switch cabinet on vibrating or oscillating supports, machines and equipment parts.



Ensure that there is sufficient freedom of movement for installation, operation and service work on the switch cabinet.

BOGE recommends that a circumferential distance of 1 meter to surrounding components is maintained.

1. Mark boreholes on the wall.
2. Drill holes at the marked positions.
3. Insert suitable dowels into the drill holes.
4. Fasten the switch cabinet with suitable screws and washers if necessary.
5. Protect all bores and bare machining points from corrosion.

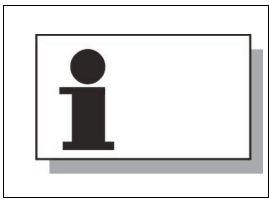
   ⇨ The switch cabinet is assembled.

Check assembly

1. Check to ensure that the switch cabinet is firmly tightened.
2. Check switch cabinet and components for damages.
3. Ensure that the required assembly clearances have been maintained.

3.2 Connecting the control

Once the installation of the switch cabinet has been completed, the power supply must be established in the switch cabinet. The lines for communication with the components to be acquired by the control must also be connected.



For proper connection and commissioning of the control you need the supplied wiring diagram. The circuit diagram must be kept in a safe place for later use.

Safety instructions prior to establishing the connections

– All work on and in the switch cabinet, including establishing of the connections and subsequent commissioning, may only be carried out by authorized electricians.
– When connecting to the power supply, observe the valid national and international regulations (e.g. VDE regulations, DIN-EN standards) and the local safety regulations.
– The electrical equipment of the installation must be designed in accordance with the Low Voltage Directive and the EMC Directive.

Establishing the electrical connection

To establish the electrical connection:

⚠WARNING

Risk of injury from live parts!

When establishing the electrical connection, there is a risk of life-threatening electric shock when the power supply is connected.

➔ The electrical connection may only be established in a de-energized state.

➔ Work may only be carried out by authorized qualified electricians.

1. Ensure that the customer has installed the back-up fuse recommended in the Technical Data on page 75.
2. Open switch cabinet.
3. Check that all components are securely seated on the top-hat rails and that the retaining clips of the components are firmly engaged.
4. Check whether all installed conductive connections are firmly tightened.
5. If necessary, tighten loose connections with a torque screwdriver. Observe the following torques:

BMK	Designation/Type	Torque
-14K1	Panel-PC - airtelligence provis 3	0.89 Nm
-20K1	Industrial Ethernet Switch - FL Switch SFNB 8TX	0,5 Nm ... 0,6 Nm

Tab. 3.1: Torques of switch cabinet components

6. Insert the cable into the switch cabinet through the threaded cable gland.
   CAUTION Risk of property damages. Insufficient cross-section of the cable wires can lead to malfunctions and overheating of the cable.
   Use wires with a minimum cross section of 1.5 mm².
7. Strip the cable and the cable cores according to the required length.
8. Strip wire ends.
9. Fit the individual wires with suitable wire ferrules.
   ⇨ The wires are ready for connection to the terminal strip -12X0.

Necessary specifications of the cable wires for connection to terminal strip -12X0:

BMK	fixed conductor	flexible conductor		Stripping length
		without ferrule	with ferrule	
-12X0	0.14 mm² ... 4 mm²	0.14 mm² ... 2.5 mm²	without plastic sleeve 0.14 mm² ... 2.5 mm² with plastic sleeve 0.14 mm² ... 2.5 mm²	8 mm ... 10 mm

Tab. 3.2: Specifications of conducting wires for power supply

In order to connect the wires correctly, the numbers on the terminals of the terminal block must be observed so that the external conductor, neutral conductor and protective earth can be assigned to the correct connections of the -12X0 terminal block.

Number on terminal block	Designation	Explanation
1	L1	Connection for external conductor
2	N	Connection for neutral conductor
3	PE	Connection for protective earth conductor

Tab. 3.3: Assignment of terminal block to cable wire

To connect a cable wire to the terminal strip -12X0:

10. Press and hold the orange push button with a special screwdriver for electrical installation.
11. Insert the cable wire into the round opening of the push-in terminal block.
12. Release the push button to fix the wire in the terminal compartment.
    ⇨ The cable wire is connected.
13. Perform the procedure with all 3 wires of the cable according to the assignment in table 4.3.
14. Check all cable wires for tight fitting.
    ⇨ The electrical connection is established.

Connect the cables for communication in the control cabinet

After the electrical connection has been established, cables must be connected in the control cabinet for communication with the components to be acquired by the control.



Compressors with the subordinate (slave) focus control 2.0 are connected directly to the Ethernet switch in the switch cabinet of the **airtelligence provis 3**.

Compressors that do not have a control with a suitable Ethernet interface (e.g. base control) or compressors from third-party manufacturers are connected via Modbus Interface Module 2.0 and the Ethernet switch in the switch cabinet of the **airtelligence provis 3**. The same applies to equipment or the necessary pressure sensor for the system pressure.

airtelligence provis 3 communicates via two Ethernet interfaces LAN 1 BOGE recommends connecting the local network to LAN 1, while LAN 2 should be reserved for the customer network. **airtelligence provis 3** can then be operated directly via the customer network using a PC with a suitable Internet browser (only Chrome from version 81.0 or Firefox from version 68.0).

⚠CAUTION

Danger of disturbances in the control behavior and damage to components due to incorrect configuration!

Incorrect or unqualified configurations of Modbus interface modules 2.0 can lead to disturbances in the control behavior and damages to network components.

➔ The configuration of Modbus interface modules 2.0 should only be carried out by BOGE service personnel or qualified persons who have received BOGE training on configuration.

Safety instructions prior to connecting the communication/data lines:

– The cables may only be connected in a de-energized state.
– Only use shielded data cables.
– Ensure that the cable shields are properly attached in the Ethernet connectors.
– Use only metallic or metallized connector housings for shielded data lines.
– When connecting network segments, avoid ground loops, potential carryover and potential equalization currents via the braided shield.



Please refer to the circuit diagram supplied and also section „Internal components“, page 77!

To connect the communication/data lines:

1. Connect the data lines of Ethernet-suitable network devices/components to the Ethernet Switch **-20K1**.



Each switch is equipped with Ethernet ports in RJ45 format.

Only connect twisted pair cables (CAT 6) to the Ethernet switch.

2. Connect pressure sensor for system pressure to the Modbus interface module (reservoir module) **-16K1**.

If the switch cabinet is equipped with an optional second Ethernet switch:

3. Connect further suitable components to optional switch **-22K1**.



When retrofitting an Ethernet switch, it must be connected to a switch that was already present when the control was delivered, so that communication via LAN 1 can be guaranteed.

If additional optional Modbus interface modules are installed in the switch cabinet for equipment or compressors without a suitable Ethernet interface:

4. Connect each of these components to a Modbus interface module in the switch cabinet.
5. If necessary and not yet available, connect the optional Modbus interface modules with free ports of the Ethernet switches.
6. Check that all components are securely seated on the top-hat rails and that the retaining clips of the components are firmly engaged.
7. Check again if all installed cable connections are firmly tightened.
8. Switch on power supply.
   WARNING Risk of injury from live parts. When switching on the power supply, there is a danger of life-threatening electric shock. Make sure that switching on the power supply does not lead to unexpected dangerous situations.
9. Check the functional status of the control by means of the LEDs on the back of the touch panel, see also „Status LEDs of the control“, page 78)
10. Check the communication status of the connected devices on the Ethernet Switch **-20K1** (and **-22K1**, if necessary).
11. Enter the connected components into the circuit diagram if necessary.
12. Seal unused openings on the switch cabinet with suitable dummy plugs (unsealed openings lead to a reduction of the protection class)
13. Close switch cabinet.
    - ⇨ All necessary connections to the control for local network and communication are established.
    - ⇨ The control is ready for operation.

Using external interfaces

At the bottom of the operating unit inside the switch cabinet there are connections that serve as external interfaces with the exception of LAN 1. These connections allow further processing of the data collected by the control, such as saving the configuration settings of the control using a USB stick or connecting to the customer network via LAN 2. The following connections are available:

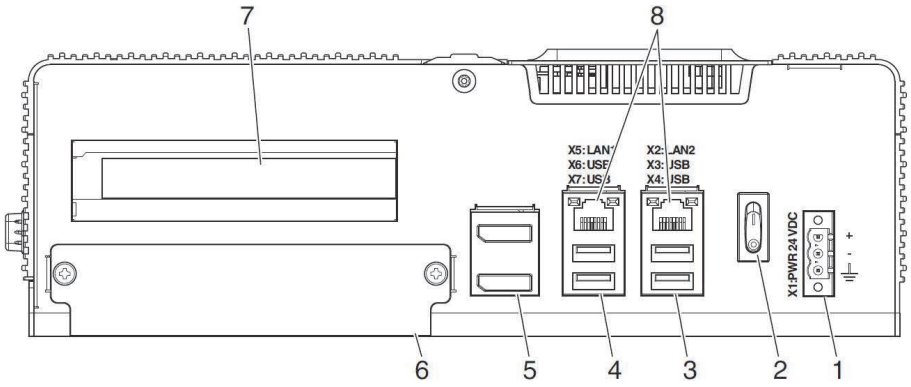


Fig. 3.2: Connections and ports at the bottom of the control unit

Position	Designation
1	Supply connector
2	Main switch
3	Connections for USB 3.0 X3:USB X4:USB
4	Connections for USB 2.0 X6:USB X7:USB
5	Display port connections (remain free)
6	Connection plate for extended functions (remains unused)
7	Slot for PCI/PCIe (remains unused)
8	Ethernet ports, RJ45 X5:LAN 1 X2:LAN 2 (necessary for data transfer to customer LAN)

Fig. 3.3: Connections and ports

LAN connections (8)

The Ethernet port for connecting the local network should already be occupied at position 8 with the designation X5:LAN1.

For applications via the customer network (operation of the control by a PC with a suitable Internet browser Chrome or Firefox) the Ethernet port at position 8 with the designation X2:LAN2 is provided. Control and PC can communicate in a 10/100/1000Base-T Ethernet network.

USB connections (3,4)

USB devices are connected with type A connectors. The **airtelligence provis 3** features two USB 3.0 ports (position 3) and two USB 2.0 ports (position 4).

USB 3.0 ports have a blue colour. USB 2.0 ports have a black colour.

Additional connections (5,6,7)

– Display port (DP) (position 5): It is not intended to use these ports to connect **airtelligence provis 3** to external digital monitors. These connections therefore remain unused.
– Connection plate for extended functions (position 6): The use of a connection plate for advanced functions is not required and not intended. This place therefore remains unused.
– PCI/PCIe (position 7): The use of a PCI or PCIe card is not necessary and not intended. This slot therefore remains unoccupied.

4.1 Principle of the master control

The **airtelligence provis 3** is a master compressor control with its own switch cabinet.

It controls one or more compressed airnets, each consisting of several interlinked compressors, the multiple compressor system. It coordinates the compressed air production of the individual multiple compressor systems or compressed airnets.

Each compressor (e.g. BOGE S 111-4 LF, C 22-2) in a compressed airnet usually possesses its own control, which is subordinated to **airtelligence provis 3** (e.g. BOGE focus control 2.0, base control). It exclusively manages, monitors and controls the settings and operation of the individual compressor. The subordinate control must be set up in such a way that it follows the specifications of the master control so that, e.g., the master control can request the corresponding compressor output via the subordinate control, when compressed air is required. Therefore, the corresponding instructions in the operating instructions of the subordinate compressor controls should also be observed.

In addition to compressors, compressed air treatment components (e.g. dryers, filters), separate compressed air receivers and other equipment (e.g. temperature sensors) can be connected and monitored by the control.

Tasks of the master control in compressed airnets

The primary task of the control is the **monitoring** of the functionality of one or several compressed airnets. Using the touch panel, important information about each net that has been set up, including detailed data on all the compressors contained therein, can be called up or controlled.

The second essential task of the control is the efficient **regulation** of the operation of several interlinked compressors within a multiple compressor system, i.e. the demand-based control of the compressed air production of a compressed airnet.

For this purpose, superordinate control settings can be set up via the control. These are necessary so that each net can produce compressed air by using its compressors according to individual requirements. This includes, for example, setting of the pressure range that is to be generated in the compressed airnet, as well as the definition of the time period in which compressors are to produce compressed air (see „Part 5: Use of the control“, page 35 onwards).

The subordinate (slave) controls monitor and control exclusively the settings and operation of their own compressor and must be set up according to the specifications of the superordinate **airtelligence provis 3**, so that no conflicts with the master control can arise.

The coordinated interaction of the compressors in the compressed airnet and the high efficiency of compressed air production are regulated exclusively by the master **control airtelligence provis 3**.

4.2 User levels, rights and functions

There are different levels that determine the scope of activities that a user can perform at the control. That means, depending on the level, the options for operating and setting the control differ. The group of persons as well as the user level that certain persons have are defined by the administrator (with user level *Admin*) via the user management. A login to be able to use the control within the scope of the corresponding rights always requires the defined user name and a password. The following table shows the user levels and the associated basic rights:

Level	Description
Without login	This level always applies when no user is logged in. Operators cannot edit configurations. They can adjust the visualization in some places (non-permanent changes), as well as language, formattings and units in the general system settings. Since this is the normal state, no user accounts are associated with this level.
User	This level is intended for persons who manage compressed airnets. They have access to all areas of application (exception: user administration) and can edit/change non-critical configurations.
Service	This level is intended for technical personnel who set up the compressed airnets and carry out service work. They have access to all areas of application (exception: user administration) and can edit/change non-critical and also critical configurations.
Admin	This level is intended for customer administrative staff / supervisors. They have access to all areas of application and are authorized to edit all configurations (especially the user administration).

Tab. 4.1: User level and scope of the associated rights

Excursus: Login / logout with username and password

To log-in to the controller:

1. In area (2), see „Fig. 4.2: Compressed airnet overview - Other navigation paths“, page 30 tap / click on user login/login .
2. Enter user name and password in the login window.
3. Tap / click on the check button .
   - ⇨ The login window closes.
   - ⇨ In area (2) the symbol with the corresponding user level appears under user login/login, in this case Admin .

To log out of the control:

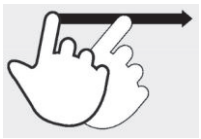
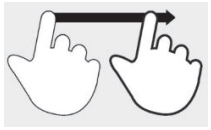
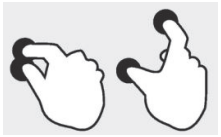
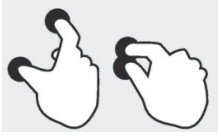
1. In area (2) under user login/login, tap / click on the symbol with the logged in user level, in this case Admin .
2. Tap / click the button in the window that opens.
3. Confirm logout with "Yes".
   - ⇨ The login window closes.
   - ⇨ In area (2) the symbol without the corresponding user level appears under user login/login.

4.3 Operation

The touch panel is operated by finger gestures. If the operation via a PC, which is connected to the control through the customer network, is carried out by means of an Internet browser, the mouse and keyboard serve as operating and input tools.

Handling by finger or PC mouse

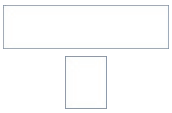
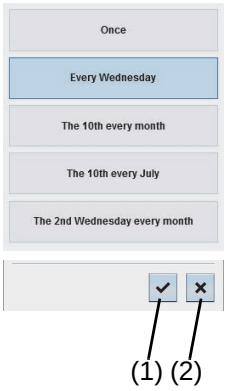
The basic finger gestures for operation including the analog mouse actions are listed below.

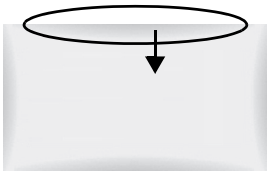
Symbol	Finger gesture	analog mouse action
	Tapping	Left click
	Double-tapping	Left double click
	lengthy tapping	Keep left key pressed
	Wiping	Click and move
	Moving	Keep left key pressed and move mouse
	Two-finger zooming 1 zooming in	Mouse wheel
	2 zooming out	

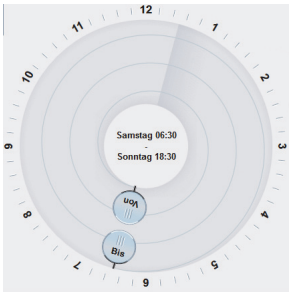
Tab. 4.2: Finger gestures for operating the touch panel

Operating elements and input functions

The following is an overview of the most important operating elements that can be used to perform inputs and operate the control:

Operating element		Function	Operation
	Input field (white background)	Enter text using the on-screen keyboard or numbers using the numeric keypad. Examples: – Naming a profile – Input of numerical values, e.g. pressure range	– Type into the input field. Depending on the input content, the on-screen keyboard or the numeric keypad appears, see below.
	Buttons Confirm / Reject	Standard function for confirming / rejecting an input	– Press the "Check" button to confirm an entry. – Press the "x" button to reject an input.
	Keyboard	Input of freely selectable text Example: Enter names, e.g. for compressors or profiles	Enter the text by tapping the letters. – Confirm with green check mark. – Correct with blue arrow to the left. – Cancel process with red "x".
	Numeric keypad	Input of freely selectable numbers Example: Values and quantities	Input of values by tapping the numbers. – Confirm with green check mark. – Correct with blue arrow to the left.
	Selection field	Selection from predetermined selection list. Example: Pre-set times for repetition cycle of a profile	Selection of the desired value by tapping the corresponding list entry. If a shadow is visible above or below the list, the list goes beyond the visible area. Then place your finger on the touch panel and swipe lightly across the surface to move the list up or down. – Tap selection. – Confirm with (1) – Cancel process with (2)
	Arrow buttons	Unfolding and folding of lists. Example: View of compressed airnet - list display	– Press the "Down Arrow" button to unfold the lists. – Press the "Up Arrow" button to fold in the lists.

Operating element		Function	Operation
	Line symbol I (horizontal) – in header white background – in footer blue background	Scroll up or down the header or footer to display further information Example: Overview of the last warnings or faults in the footer. (In the case of unconfirmed messages, the footer bar also flashes yellow or red at intervals, depending on the type of message)	– Tap on the line symbol of the header or footer bar or drag it with your finger / input device into the view area, if visible (depending on the type of view). The contents of the bar slide over the original view. – If the contents are to be minimised again: Tap once more on the line symbol in the footer to minimize the contents again.
	Line symbol II (vertical)	Opens contextual menu or information Example: – Activation / deactivation of a compressor profile – Context menu for processing options of a compressor profile	– Tap on the line symbol. The contents of the bar slide into the view. If the contents are to be minimized again: – Tap on the line symbol once more to minimise the contents again.
	Scroll field	Shift to the superordinate display level Example: Shift from compressed airnet view to the higher-level compressed airnet overview	– Move your finger / input device across the scroll field from top to bottom to get to the superordinate level.
	bellied shadows (possible on top, bottom, left, right edges of views)	Indicate that there is more content available than currently displayed in the visible area. Example: Component detail view (right and after shifting right and left)	– Drag the shadow with your finger / input device away from the edge towards the current view to display the content next to the current view.
	3-point symbol	Calling up a selection list Example: – Call up the selection list for the operating modes	– Tap on the 3-point symbol to open the selection list.
	Slider control	Definition of a priority level Example: Setting the priority of a compressor in the profile configuration	– Tap the controller, keep it pressed and slide it to the desired position

Operating element		Function	Operation
	Calendar	Time specification Example: Time limitation of the validity of a profile (approximate timing)	– Tap on date. – Tap the single arrow buttons in the first line to jump between months. – Tap the double arrow buttons in the first line to jump between years.
	Time selector	Time specification Example: Time limitation of the validity of a profile (fine timing)	– Tap and hold blue circles. – Then move circularly around the centre to set the desired period. – The time period is displayed with start time (upper indication) and end time (lower indication) in the centre of the time selector.
	Numerical time input	Time setting, alternative to the time selector Example: Time limitation of the validity of a profile (fine timing)	– Enter the numerical value for the period into the boxes.

Tab. 4.3: Operating elements and input functions

4.4 Symbols

A recurring symbolism is used on the user interface of the control to facilitate orientation. On the one hand, connected components can be quickly identified. On the other hand, it helps to quickly determine the status of the connected components.

General symbols for components

The connected components, which are registered by the control, are shown in 3 main product groups:

Symbol	Meaning
	Compressor
	Receiver
	Equipment

Tab. 4.4: General symbols

Special symbols for components - compressor

The symbols in the following table provide special information on the activity or operating status of a compressor. The symbols are dynamic, i.e. they change depending on their state. The master control receives this information from the subordinate (slave) compressor controls.

The normal state is, that the connected compressors are controlled according to the specifications of **airtelligence provis 3.** In this case the symbols for the activity state appear fully saturated black and white (see column 1 of the following table).

However, it is also possible that the compressors have been enabled by **airtelligence provis 3** (see operating mode "All released") or are inactive for them and therefore assume a passive status (Activation and deactivation via the "Manipulation: Force / forbid release" in „Component detail view - compressor“, see also page 57). In these cases, the slave compressor controls take over the regulation of their compressors again. The master control no lon-

ger has any influence on their control. If there is still a connection to the compressors, the operating status is still displayed via the symbols, but these are now grayed out (see column 3 of the following table).

Symbol	State of activity	Symbol	State of activity
	Compressor is switched off		Compressor is switched off and released or disabled by airtelligence provis 3.
	Compressor in load-run (is used as a static symbol in the top right of the compressed airnet view)		Compressor in load run and released or disabled by airtelligence provis 3.
	Compressor in idle-run		Compressor in idle-run and released or disabled by airtelligence provis 3.
	Compressor ready for operation		Compressor ready for operation and released or disabled by airtelligence provis 3.
	Compressor fault		Compressor fault and released or disabled by airtelligence provis 3.
	Communication error		Communication error and released or disabled by airtelligence provis 3.

Tab. 4.5: Dynamic symbols - compressor activity state

Special symbols for components - receiver

The symbol in the following table stands for a receiver and is assigned to the component during setup. The symbol is static, i.e. it does not change. **airtelligence provis 3** receives the displayed status of the component through the connection via the Modbus Interface Module 2.0.

Symbol	Meaning
	Receiver

Tab. 4.6: Static symbol - receiver

Special symbols for components - equipment

The symbols in the following table represent different equipment. The symbols are static, i.e. they do not change.

Symbol	Meaning
	Dryer
	Filter
	Separator
	MBI 2.0

Tab. 4.7: Static symbols - equipment

Special symbols for accessory values analog/digital inputs and outputs

For the analog / digital inputs and outputs the value of the connected equipment is displayed. The symbols are static, i.e. they do not change:

Symbol	Meaning
	Amperage, sensor for compressor power consumption
	Dew point, e.g. sensor for refrigeration dryer
	Free air delivery
	Frequency, e.g. feedback from frequency converters
	Humidity, e.g. sensor for room humidity
	Other equipment, e.g. measuring point heat recovery
	Percentage value, e.g. sensor for valve opening angle („Percentage“)
	Power, e.g. sensor for power consumption of a compressor

Symbol	Meaning
	Pressure, e.g. sensor for boiler pressure
	Temperature, e.g. sensor for room temperature
	Electrical voltage, e.g. sensor for supply mains voltage

Tab. 4.8: Static symbols accessory values analog / digital inputs and outputs

Symbols for basic operating ability

The symbols described so far serve to clearly identify connected components on the user interface of **airtelligence provis 3**. Combined with these symbols, further indicators appear on the user interface, which provide information about the basic operating ability of the displayed components.

The following dynamic symbols can indicate the basic operating ability of a compressed airnet (see e.g. compressed airnet overview):

Status - Operating ability compressed airnet		
Symbol	Designation	Meaning
	Green dot	There are no events (faults, warnings or communication errors).
	Green dot, orange outline	a One or more compressors in the compressed airnet show a warning or servicing message. b A fault has occurred in one of the equipments. In all cases: The compressed air supply is not at risk.
	Orange triangle	a A compressor fault massage has occurred. b The system utilization rate is 100%. In all cases: The compressed air supply is not yet endangered; however, further events / problems can lead to it.
	Red triangle, orange filling	The system utilization rate is 100%, the pressure drops and no further compressor can be started. The compressed air supply is at risk.
	Red x / cross	a There is a critical error of airtelligence provis 3, the control can no longer fulfill its task (e.g. after a cable breakage at the sensor). b All compressors show a fault or communication error. c The system utilization rate is 100%, the pressure is below the pressure range and continues to fall. In all cases: The compressed air supply is no longer guaranteed.

Tab. 4.9: Symbols - Operating ability compressed airnet

	Since compressed airnets do not have an independent symbol, a network is represented by the dynamic symbol for basic operating ability, which is supplemented by a surrounding gray circle: 

The following dynamic symbols can appear next to the compressor symbols and indicate the basic operating ability of a compressor (see e.g. compressed airnet view):

Status - Operating ability compressor		
Symbol	Designation	Meaning
●	Green dot	No events (faults, warnings, servicing messages) are indicated for the compressor.
▲	Orange triangle	The compressor indicates a warning or servicing message. The compressor can still be operated, the compressed air supply is not endangered.
✖	Red x / cross	The compressor indicates a fault / communication error. The compressor is not capable of supplying compressed air and is switched off.

Tab. 4.10: Symbols - Operating ability compressor

In addition to the equipment symbols, the following dynamic symbols can indicate the basic operating ability of a compressed airnet (see e.g. compressed airnet overview).

Status - Operating ability equipment / receiver		
Symbol	Designation	Meaning
●	Green dot	There are no faults or malfunctions present.
▲	Orange triangle	The equipment indicates a warning or servicing message. The equipment is still functional.
✖	Red x / cross	The equipment indicates a fault / communication error. The equipment is no longer functional.

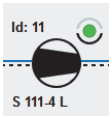
Tab. 4.11: Operating ability equipment / receiver

As far as compressors are concerned symbols for basic operating ability are always enclosed by 2 semicircles. They provide information on whether or not **airtelligence provis 3** is currently requesting the respective component:

Compressor (with unlimited operating ability)	
	requested (black semicircle below)
	not requested (gray semicircle below)

Tab. 4.12: Visualization of the request of a compressor

A sample image from the DIN view of a compressed airnet as a summary of the user interface symbols described:



- It is a compressor.
- The compressor is in the activity/operating state "Load run" (not released or inactive).
- The compressor is fully operational, there are no events such as warnings or faults.
- The compressor is requested by **airtelligence provis 3**.

The ring symbols do **not** appear in the symbolic representation of:

- receivers (the control does not request them individually),
- compressors and equipment in the top right-hand side of the compressed airnet view, as the compressor and equipment symbol collectively refers to the operating ability of all compressors and, equally collectively, of all equipment in the network. However, it only makes sense to specify the request status using the circle symbol if the request is for a single component.

An unchanging gray ring symbol appears when displaying other equipment.

4.5 Navigation through the views

The user interface of **airtelligence provis 3** is designed very intuitively and follows a logical structure. Due to the regular operation of the control unit, the user will quickly find his way through the views. Furthermore, many menus are self-explanatory.

The description of the contents in this chapter assumes that the control has already been completely configured. Compressed airnet and their components have been installed or are being identified.

Navigation structure

In order to provide a basis for orientation, the structure of the views is briefly described.

The initial view (after switching on the already set up control) is the **compressed airnet overview.** As the name suggests, this view provides an overview of all compressed airnets identified by the control (see Fig. 4.1: 1st level). For a large number of compressed airnets (> 4), it is possible to call them up one after the other by moving them from right to left in the top and middle area (not in the header bar).

By tapping a net on the compressed airnet overview, you can access the corresponding **compressed airnet view** (see Fig. 4.1: 2nd level). In the compressed airnet view, all compressors and components belonging to this compressed airnet are listed with their corresponding current data. By moving it to the right or left in the header area (not in the header bar), you can view another compressed airnet, if available. To get back to the compressed airnet overview, drag it back into the image area across the scroll field from top to bottom (see „Scroll field“, page 21).

By tapping on a compressor, an equipment or a receiver, you can access the corresponding **component detail view** (see Fig. 4.1: 3rd level). This level contains all necessary information about the status and settings for this particular component. By moving it to the right or left in the header area (not in the header bar), you get to a detailed view of the next component of the compressed airnet. To get back to the compressed airnet view, drag it across the scroll field back into the image area (see „Scroll field“, page 21).

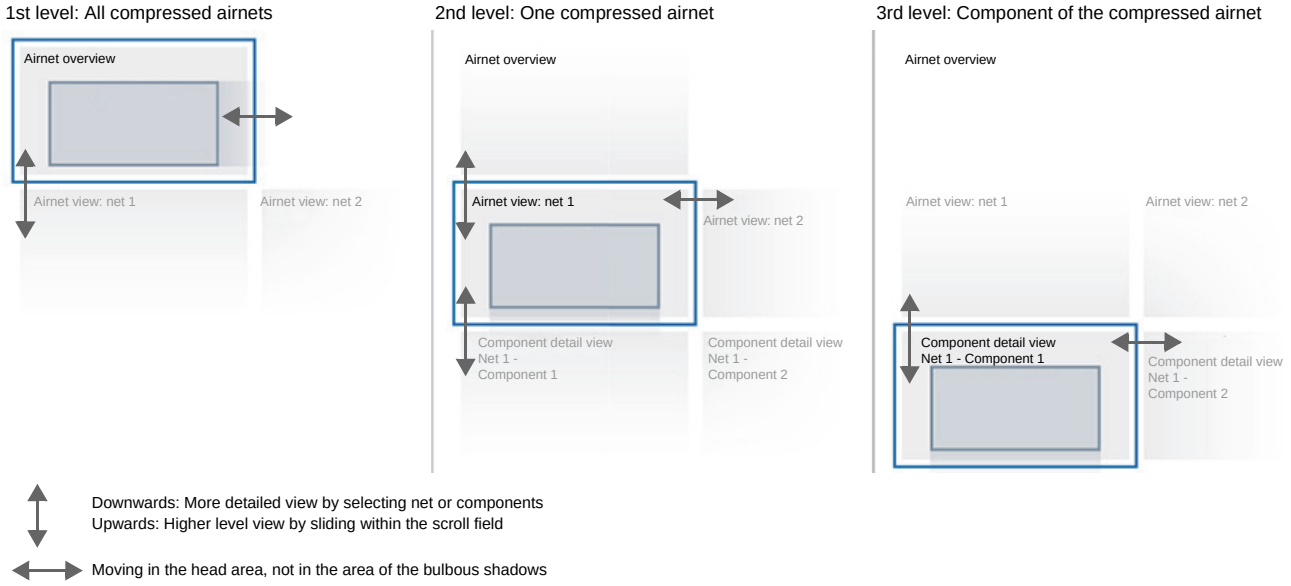


Fig. 4.1: Navigation through the main views

Further options for navigation on level 1

Navigating from the compressed airnet overview to the lower levels was already described in the previous section. However, there are further navigation paths, e.g. to essential control features, which are explained in figures and tables below.



Fig. 4.2: Compressed airnet overview - Other navigation paths

Area	Action	Description
(1)	Moving the head or middle section from right to left	With more than 4 compressed airnets: Calling up further networks (also in the opposite direction)
(2) available in all view levels	Tap symbols	Calling up: – Dashboard (not yet implemented) – airtelligence provis 3-help – Compressed airnet configuration – General system settings – User Login/Login
(3) available in all view levels	Wipe line symbol from top to bottom	Same content as under the setting symbol in area (2)
(4) available in all view levels	Wipe line symbol from bottom to top	Recalling the last 10 unconfirmed events of all compressed airnets (Warnings/servicing messages/faults) If there are no more unconfirmed events, the line symbol is no longer visible.

Tab. 4.13: Compressed airnet overview - Description of navigation paths

Further options for navigation on level 2

By selecting a compressed airnet on the compressed airnet overview, you can access the compressed airnet view. In this view, it is also possible to take various navigation paths that have not yet been explained in „Fig. 4.1:“, page 29.

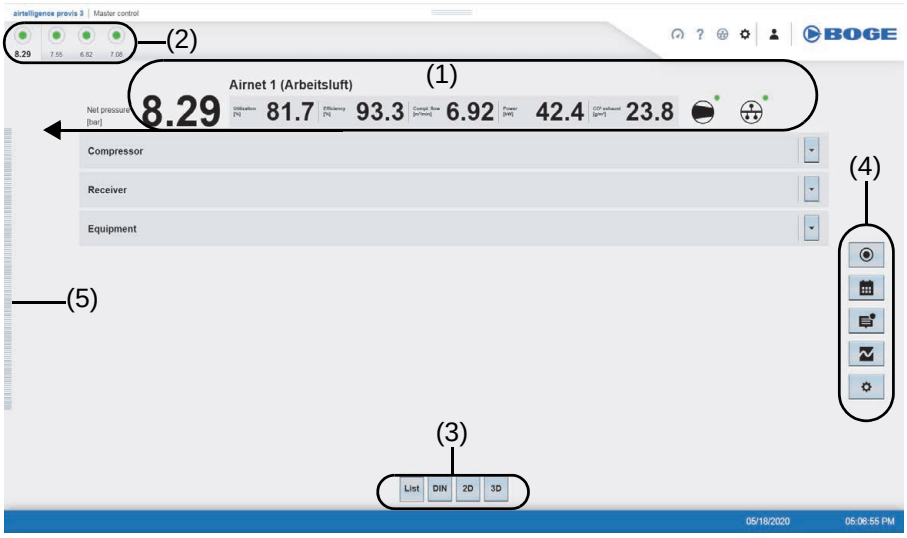


Fig. 4.3: Compressed airnet view - Other navigation paths

Area	Action	Description
(1)	Moving the head or middle section from right to left	1x: Calling up the compressed airnet view 2 2x: Calling up the compressed airnet view 3 ...etc. (also in the opposite direction)
(2)	Tap symbols	Analog result as in segment (1) Calling up a specific compressed airnet view (Each symbol represents a compressed air network)
(3)	Tap buttons	Changing the display format of the current compressed airnet view: – List display of the network components Arrow buttons for unfolding and refolding the lists – DIN representation of the net components – 2D representation of the net components – 3D representation of the net components
(4)	Tap buttons	Calling up the monitoring and setting functions of the compressed airnet: – Status display – Calendar display – Event display – Progress display – Settings for the compressed airnet
(5)	Moving within the scroll field	Return to the higher-level view

Tab. 4.14: Compressed airnet view - Description of navigation paths

Further options for navigation on level 3

By selecting a compressor, an equipment or a receiver in the compressed airnet view, you can access the component detail view. In this view, it is also possible to take various navigation paths that have not yet been explained in „Fig. 4.1:“, page 29.



Fig. 4.4: Component detail view - other navigation paths

Area	Action	Description
(1)	Moving the head or middle section from right to left	1x: Calling the component detail view - Component 2 2x: Calling the component detail view - Component 3 ...etc (also in the opposite direction)
(2)	Drag the shadow with your finger / input device away from the edge towards the current view to display the content next to the current view.	Calling up additional information and data on another view for the currently selected component
(3)	Tap buttons	Calling up the detailed views of all components of the compressed airnet (see further explanation in the following figure)
(4)	Moving within the scroll field	Return to the higher-level view

Tab. 4.15: Component detail view - Description of navigation paths

A closer look at area (3) in the upper left of the component detail view follows:

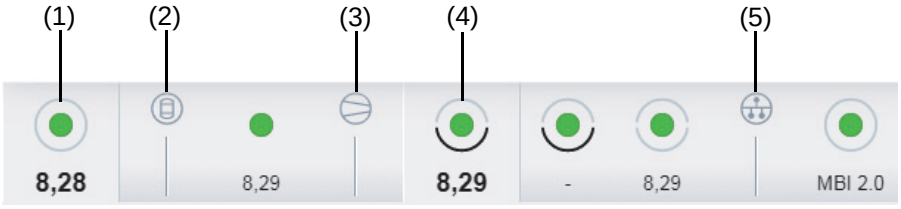


Fig. 4.5: Detailed description area (3) - Quick access to the components

In this area, you can quickly switch between the detailed views of **all components** that make up the compressed airnet by simple tapping. The compressed airnet is displayed with (1), so tapping the area (1) would take you back to the higher-level compressed airnet view.

The symbol (2) stands for **receiver,** the area is grayed out and cannot be tapped. On the right, all receivers in the network are listed with the symbols for operational availability, in this case there is one receiver in the network. Tapping the green symbol would take you to the component detail view of the receiver..

The symbol (3) stands for **compressors**, the area is grayed out and cannot be tapped. On the right, all compressors in the network are listed with the symbols for operational availability, in this case there are 3 compressors in the network. Currently, the user is in the component detail view of the first compressor (4), as this area is highlighted. By tapping on the 2 symbols to the right of it, you would get to the detailed views of the other two compressors of the net.

The symbol (5) stands for **equipment**, the area is grayed out and cannot be tapped. On the right, all equipment components in the network are listed with the symbols for operational availability, in this case there is one equipment MBI 2,0 in the network. Tapping the green symbol would take you to the component detail view of this equipment.

5.1 Compressed airnet overview

The initial view of airtelligence provis 3 is the compressed airnet overview. It is designed to provide a quick overview of the status of all compressed airnets that are registered by the control. Therefore, only values for control and monitoring are displayed in the view, no settings can be made.



The description of the contents in the entire chapter 5 assumes that the controller has already been completely configured. Compressed airnets and their components have been established or are being registered.



Fig. 5.1: Compressed airnet overview

In addition to the dynamic symbols for the basic operational ability of the compressed airnet (see page 26), the following current values are displayed for each network:

Value	Unit	Meaning
Net pressure	bar, psi*	Current net pressure of the compressed airnet
Utilization	%	The current delivery capacity of running compressors depending on the maximum possible total flow rate of the net. Example: If with 3 compressors of the same size in the net only one is running at full load, then the percentage value would be approx. 33 %.
Efficiency	%	This values specifies the ratio of energy consumption for load-runs compared to the overall energy consumption in %. Example: At a value of 90 %, 90 % of the energy is used for load runs and 10 % for idle runs of the compressors within the net. The higher the percentage value, the more efficiently the compressed airnet works.

Value	Unit	Meaning
Compl. flow	m³/min, cfm*	The current volume flow (compressed air consumption) of the compressed airnet
Power	kW	Current power of the entire system
CO2 -exhaust (emissions)	g/m³	Calculated value on the basis of the current power output

* When changing the unit in general system settings or in a user profile from metric to imperial

Tab. 5.1: Compressed airnet overview - values and meaning

The values in the table, which are visualized for each net on the compressed airnet overview, are also displayed horizontally next to each other in the header area in each version of the compressed airnet view (2nd level) of the corresponding net.

The compressor symbol and the accessory symbol on the right show the current operating ability of all compressors and also collectively of any equipment in the net.

5.2 Compressed airnet view

After selecting a compressed airnet on the compressed airnet overview, the desired compressed airnet view is displayed. On the one hand, this view is intended to provide a detailed overview of the status and the most important values of all components of the compressed airnet. For this purpose, the status button must be selected for the status display in the right-hand selection area. Here you can view the status and values of the components as a list, DIN, 2D or 3D representation.

On the other hand, this view enables the user to make essential settings in the compressed airnet, which allow the compressed air to be supplied according to the requested time and requirements. This is achieved via the calendar display . The activities of the net can be monitored via the event display and via the progress display . The basic setup of the compressed airnet is carried out via the compressed airnet settings .



Fig. 5.2: Compressed airnet view - list view unfolded

Status display: List representation

In the list representation (see figure above) all components of the net are sorted according to compressors, receivers and equipment, including their essential values.

For each compressor (with ID number and designation/name) these are, in addition to the status (symbol for operational ability), its current utilization, its current volume flow, the net pressure, its current temperature and the total motor running time.

For each receiver (with ID number and designation/name), in addition to the status (symbol for operational ability) these are, the load cycles until the next service, the receiver volume, the current net pressure and the maximum operating pressure.

The values for the equipment (with ID number and designation/name) can be calculated individually on the basis of the difference and depending on the sensor technology.



If not all components can be displayed in the window, e.g. if all component lists are unfolded, the list can be viewed by tapping / clicking and moving it upwards.

Status display: DIN representation

The DIN representation can be called up by tapping the DIN button. In this display mode, the compressed airnet is shown schematically and in the correct arrangement according to an P&I flow chart. The individual components (with ID number and designation/name) are represented by the symbols according to page 23 onwards, which also indicate the operating status. In addition, the symbols for basic operational ability are shown for each component. In the case of controlled compressors, the status of their current utilization is indicated by a bar graph with percentage reading. By tapping the component symbols one or more times, their most important current data is displayed instead of the symbols:



Fig. 5.3: Compressed airnet view - DIN representation

The connections of compressed air and signal lines are also shown and are supposed to simulate the real conditions. Therefore, it is also possible in this form of representation to change the connection and arrangement of the com-

ponents at the beginning of the installation of a network and at any time afterwards, so that they always correspond to the real conditions, see also „Change arrangement of components in DIN and 2D representation“.

Status display: 2D representation

The 2D representation can be called up by tapping the 2D button. This form of representation corresponds to the DIN representation, but more pictorial two-dimensional symbols are used instead of the operating status symbols for the components:

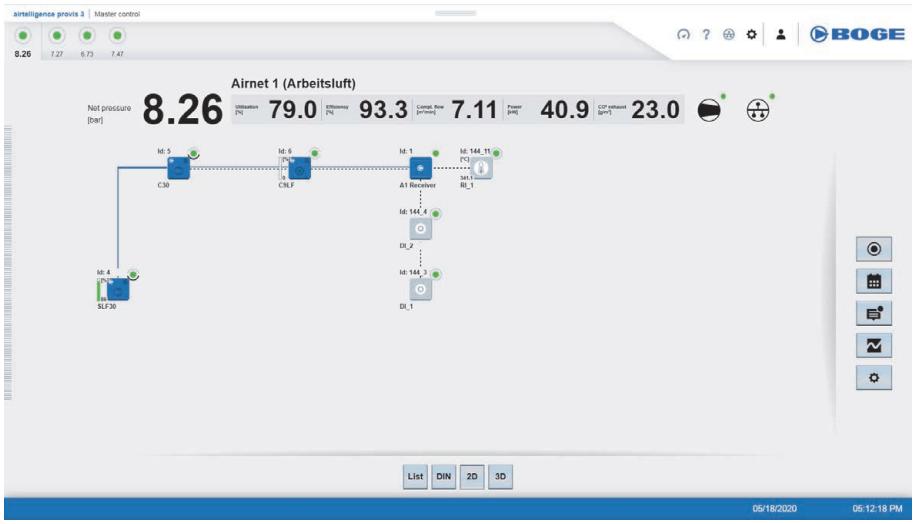


Fig. 5.4: Compressed airnet view: 2D representation

In this form of representation it is also possible to change the connection and arrangement of the components at the beginning of the installation of a network and at any time afterwards, so that they always correspond to the real conditions, see also „Change arrangement of components in DIN and 2D representation“.

Status display: 3D representation

The 3D representation can be called up by tapping the 3D button. In this representation form, the compressed airnet is displayed three-dimensionally and according to the arrangement as set up in the DIN or 2D representation:

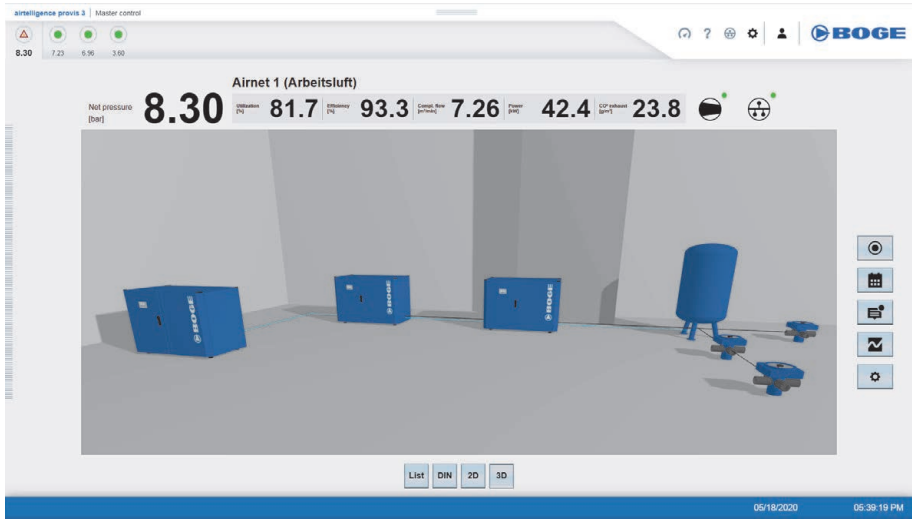


Fig. 5.5: Compressed airnet view: 3D representation

To change the perspective in this view on the **touch panel**:

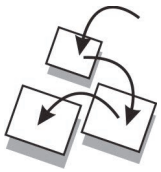
1. Keep the touch panel pressed and move your finger in any direction - *move in the room in the direction the finger is guided.*
2. Keep the touch panel pressed and move your finger horizontally to the left or right - *rotate in the room*.

To change the perspective in this view on a **PC** with a suitable Internet browser:

1. Click with the mouse into the picture and press the cursor keys " upwards " or " downwards " on the keyboard - *move forwards or backwards in the room.*
2. Click with the mouse into the picture and press the cursor keys " to the left " or " to the right " on the keyboard - *move to the right or to the left in the room*.
3. Keep mouse pressed in the picture and drag left or right - *rotate in the room.*

Change arrangement of components in DIN and 2D representation

Change the connection and arrangement of these two views at the beginning of the installation of a network and at any time afterwards, so that they always correspond to the real conditions. The positions of the components in the net, the connection paths of the compressed air lines (blue) and the connection paths of the signal lines (black dotted) can be changed.





The redesign or modification of the arrangement of connections and components can only be carried out after login (at least "User" level).

To enter the edit mode to modify the arrangement:

1. Call up the DIN or 2D representation in the compressed airnet view.
2. Tap / click with the finger or mouse into the middle area of the picture.
3. Keep finger or left mouse button pressed for 2 seconds.
   ⇨ The view is divided into a number of square tiles.
   ⇨ The editing mode is started, see „Fig. 5.6:“, page 40.

To change the position of a component:

1. Tap / click on the "Components" button.
2. Tap/click and hold the desired component.
3. Drag component to any other tile.
4. Release finger / mouse.
   ⇨ The component is in its new position.

In the editing mode for components:
Tap / click on the symbol to change the direction of a connection line from left to right and vice versa.

To route a new compressed air line between two components:

1. Tap / click on the " Pipes " button.
2. Tap / click on first component.
   ⇨ The component is highlighted in red.
3. Tap / click on second component.
   ⇨ A compressed air line is shown between the two components.

If a compressed air line already exists between 2 components, no second compressed air line can be routed between these components.

To delete a compressed air line between two components:

1. Tap / click on the " Pipes " button.
2. Tap / click on the garbage can symbol of the corresponding line.
   ⇨ The line disappears and is deleted.



Fig. 5.6: Changing the arrangement of components in DIN view

Routing a new and deleting an existing signal line between 2 components is performed in the same way as for compressed air lines, but the "Control" button must be tapped / clicked first.

To leave the editing mode again:

- Tap / click the button.
  ⇨ The normal view mode of the DIN or 2D representation is active again.

Calendar display

In the calendar display the main control settings of the compressed airnet can be made to enable the compressed air to be supplied according to the desired time and demand specifications.

This is done in this display by creating profiles. A profile allows the configuration of the compressed air production for a certain period of time, which can be one-time or regularly recurring.

At least one profile must always be set up. This would then be active during the entire period in which a compressed air system or airnet is in operation and determine the compressed air supply by the system. Theoretically, an infinite number of profiles are also possible. In the example shown below, two profiles have been set up for the compressed air network "airnet 1 (Arbeitsluft)" *(working air)*. The profiles „Volumenstrom“ (1) *("Volume flow")* and „Wochenende“ (2) *("Weekend").* These two profiles cover the entire period of compressed air production of "airnet 1 (Arbeitsluft)" *(working air)* with their set specifications.



Fig. 5.7: Compressed airnet view - calendar display

The time periods, when which profile is active, are visualized via the continuous time bar display (3). Colors can be assigned to each profile. These colors are transferred to the time bar display depending on the validity period of a profile. The current time is indicated by a thick black line (4). In this case, the "Volume flow" profile (orange) is currently active. The time bar display can be scaled individually so that the displayed period can be increased or decreased. At the same time, the time bar can also be drawn to a specific time.

Excursus: Adjust time bar display

To scale the time frame of the time bar display directly:

1. Touch the time bar with 2 fingers.
2. Zoom in or out with two-finger zoom (see „Tab. 4.2:“, page 19.)

To move the time bar to a desired time:

- Touch the time bar with one finger and move your finger left or right.

To display the current time on the time bar:

- Tap on the "Now" button to the right of the bar display.

Or via PC and browser:

1. Place the mouse pointer on the time bar.

2. Use the mouse scroll wheel to zoom in or out.

To move the time bar to a desired time:

- Click on the time bar and move the mouse left or right.

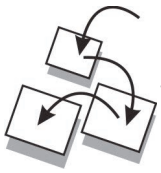
To display the current time on the time bar:

- Tap on the "Now" button to the right of the bar display.

The time frame can also be set using the symbol to the right of the bar display::

1. Tap / click on symbol .
   ⇨ The "Select time frame" input window opens.
2. Enter the day/month/year and, if necessary, the time of the starting point of the time frame into the input field.
3. Enter the day/month/year and, if necessary, the time of the end time of the time frame into the input field.
4. Tap / click the check button to confirm.
   ⇨ The entered time frame is shown in the time bar display.

Profiles



In order for a profile to regulate the compressed air production of the compressors in the net, the necessary criteria must be defined in it:

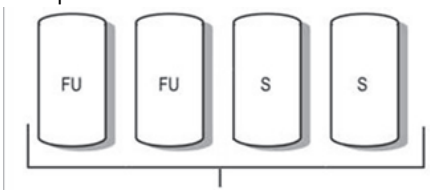
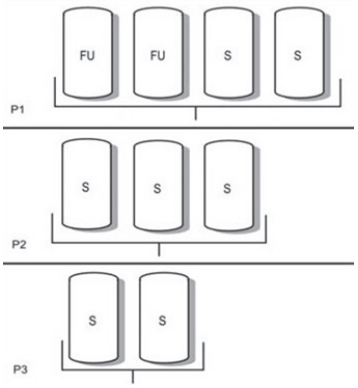
– How the compressors of a network regulate and produce compressed air in a coordinated manner.
  ➔By setting an **operating mode** and, if necessary, assigning **priorities** to the compressors of the network.
– When, or in what period of time, they produce compressed air in this coordination/configuration of the profile.
  ➔ By setting a **time range**.

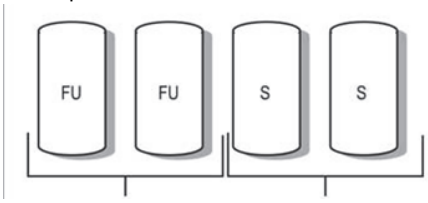


The creating/modifying of a profile can only be performed after login (at least level "User").

The selectable **operating modes** are a central tool for the coordinated control of compressors within a compressed airnet, as they use the individual compressors for compressed air production according to completely different criteria. A different operating mode can be assigned to each profile. The following table gives an overview of all possible operating modes:

Operating mode	Characteristics	Select this operating mode,
„All released“	This operating mode releases all compressors; no more live bits are sent. The compressors behave according to their settings for internal pressure control and display a servicing message if necessary. The mode is functionally similar to deactivating a compressor, but valid for all compressors. If a bus connection still exists, the compressor data are read out and their running time data are displayed. The compressors are displayed grayed out. NOTE: This operating mode can be forced by digital input 6 on the receiver module of the compressed airnet, even if the currently active profile requires a different operating mode. Further details on the connection of the digital input can be found in the circuit diagram supplied with the control.	– if the compressors are to follow the specifications of their own (subordinate) controls.
„All off“ *	This operating mode withdraws the output release from all compressors, so that none of the compressors produces compressed air. However, the compressors are not released, live bits are still sent. NOTE: Make sure that the settings on the compressors do not switch to internal pressure control even at low pressure. Therefore, please observe the operating instructions of the subordinate compressor controls and the compressors! This is not a safe shutdown, e.g. for servicing work! If, for example, a communication error or cable damage occurs, the compressor could still start up due to internal pressure control. In such a case, always operate the power disconnecting device on the compressor itself. NOTE: This operating mode can be forced by digital input 5 on the receiver module of the compressed airnet, even if the currently active profile requires a different operating mode. Further details on the connection of the digital input can be found in the circuit diagram supplied with the control.	– if it is to be specified that compressed air production is to be subject to certain pause periods (e.g. on weekends).
„(Volume)flow“	The (Volume)"flow" operating mode is the standard operating mode. The control always selects the most suitable compressors in terms of air delivery and switches them on. Accordingly, in case of a reduced air requirement, the most suitable compressor in terms of air delivery is always switched off to cover the current volume flow requirement. If regulated compressors are present and the utilization is at the lower or upper edge of the current air delivery range, compressors are switched on or off in advance in order to remain as exactly in the middle of the pressure band as possible. At the same time it is ensured that regulated compressors are prevented from running close to their set minimum frequency as long as the compressor constellation allows this. NOTE: The air delivery of the compressors and their minimum permitted frequency (utilization) must be parameterized correctly. For machines of the same size, the selection is made either by operating hours or servicing hours, depending on the setting under compressed airnet parameter "Same-size machine selection".	– if energy-efficient compressed air production with the most stable pressure possible is desired. – if a narrow pressure band is required for compressors of different sizes.
„Flow and prio“	This operating mode corresponds to the '(Volume) flow' mode with the difference that only the compressors of the currently appropriate priority level are taken into account in the selection. If, for example, all compressors with priority 1 are running (and with priority 2 not yet), only compressors with priority 2 are selected, even if there is a more suitable compressor in priority 3 in terms of air delivery. In the same way, only priority 2 compressors would be switched off in this case, even if a more suitable compressor was available for switching off in priority 1.	– if energy-efficient compressed air production with the most stable pressure possible is desired, depending on specified priority groups.

Operating mode	Characteristics	Select this operating mode,
„Service“	This operating mode is very similar to the "Operating hours" mode (see below), but here the compressors are used according to the time remaining until the next servicing.	– if the servicing of all machines is to be carried out at the same time, so that maintenance and service costs are reduced, at the expense of the fact that vsd systems will not run at all times.
„Service and prio“	This operating mode corresponds to the "Service" mode, but the compressors within a priority group are synchronized after the remaining time until the next servicing.	– if groups of compressors are to be serviced at the same time.
„Operating hours“	The aim of the "Operating hours" operating mode is to compensate for or keep the operating hours of the compressors the same. Compressors with fewer operating hours, for example, are switched on earlier than compressors with more operating hours. Example:  Operating mode Operating hours (FU= vsd compressors / S= fixed speed compressors)	– if a uniform aging of the compressors is desired, at the expense of the fact that vsd units will not run at all times
„Operating hours and prio“	The operating mode "Operating hours and prio" corresponds to the operating mode "Operating hours", but here the operating hours of a certain priority group are adjusted, not the operating hours of all compressors. Example:  Operating mode Operating hours and prio (FU= vsd compressors / S= fixed speed compressors)	– if a uniform aging of the compressors of a priority group is desired, e.g. one group of old and one group of new compressors.
„Service vsd“	Like service, but vsd compressors and fixed speed compressors form a separate run-time group	– if the servicing of several machines is to be carried out at the same time, but the vsd systems should still be able to run at any time.

Operating mode	Characteristics	Select this operating mode,
„Service and prio vsd“	Like service vsd, but with priority groups.	– if the servicing of several machines of a priority group is to be carried out at the same time, but the vsd systems should still be able to run at any time.
„Operating hours vsd“	Like operating hours, but vsd compressors and fixed speed compressors form a separate runtime group. Example:  Operating mode Operating hours vsd (FU= vsd compressors / S= fixed speed compressors)	– if a uniform aging of the compressors is desired, but the vsd systems should still be able to run at any time.
„Operating hours and prio vsd“	Like operating hours vsd, but with priority groups.	– if a uniform aging of the compressors of a priority group is desired, e.g. one group of old and one group of new compressors

Tab. 5.2: Overview operating modes

*

WARNING

Risk of injury due to unplanned start-up!

In operating mode "All off", there is a risk of injury and material damage due to unplanned, automatic start-up of compressors when the power supply is connected.

➔ To switch off the compressors (e.g. for servicing work), always open the power disconnecting devices of the compressors.

In addition to setting the operating mode, the control of the compressors can also be determined by assigning **priorities**. Different priorities can be assigned to all compressors in the compressed airnet. For **airtelligence provis 3**, these priorities range from 1 (highest) to 10 (lowest). During operation, the control will always switch on the compressors of the highest priority level/ group first. If, for example, all compressors with priority 1 are running, only compressors with priority 2 are switched on if the compressed air requirement continues to increase, even if there is a more suitable compressor in priority 3. Analogously, priority 2 compressors are switched off first, even if a more suitable compressor is available in priority group 1.
The priority of the compressors only needs to be set if the previously selected operating mode functions according to priorities.

As a summary of the descriptions of operating modes and profiles, the profile "flow"of "airnet 1 (Arbeitsluft)" (working air) is given as an example:

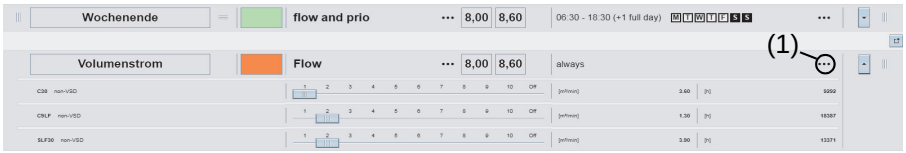


Fig. 5.8: Example profile " flow" - unfolded

In the "flow" profile, all compressors of the compressed airnet named "airnet 1" (working air) are automatically registered. The selected operating mode is the "flow" mode according to the name of the profile (visible to the right of the orange rectangle, which represents the freely selectable profile color). The pressure range of the profile from 8 to 8.6 bar is set directly in the profile. The performance data of the individual compressors must be taken into account. Below are the priority sliding controls for each compressor, so that the priority level could be set individually. In the "flow rate" operating mode, the sliding controls have no function, as in this mode no priorities are taken into account. The requirement for the most suitable compressor is based exclusively on the optimum air delivery for the situation. If this mode were to take account of priorities, this would mean for the specific example: The fixed speed compressor C 30 has the highest priority 1, it would always be requested first. The vsd compressors SLF 30 and C 9 LF are sensibly classified in the same priority level 2, they are requested later than the C 30 and are more likely to be removed from a load run if the compressed air requirement should decrease. To the right of the sliding controls, the air delivery quantities of the compressors, which have been specified in advance in the settings for each compressor, are listed. The current operating hours of the compressors are displayed to the right.

This means that all important settings have been specified in the "flow" profile by the operating mode, such as **how** the compressors, coordinated with each other in a network, control and produce compressed air.Another important criterion that completes the profile must also be determined: **When** this profile is valid or in which period of time in the coordination/ configuration of the profile compressed air is produced.

For this purpose, the **time range** for the validity of the profile must be determined via the 3-point symbol (1), see figure above. After tapping / clicking the symbol, the "Choose time range" window opens:

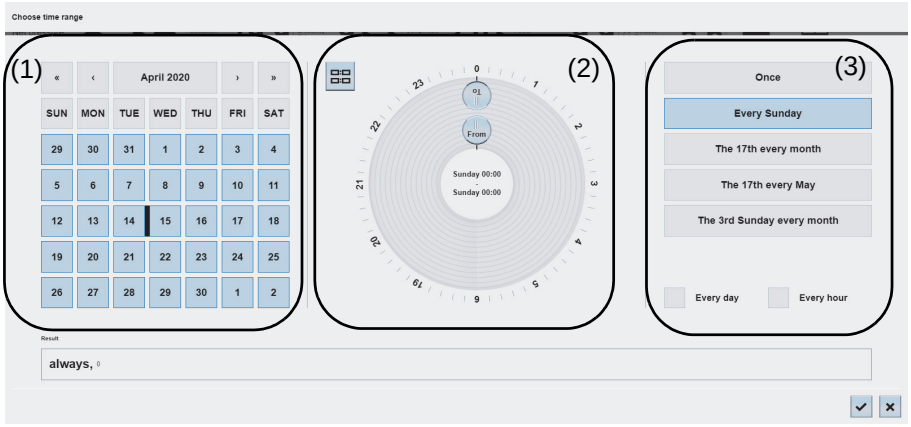


Fig. 5.9: Calendar display - Select time range for profile

The time range of the profile can be defined via 3 complementary selection ranges.

In the calendar (1) the days for the profile validity can be selected. The current day is indicated by a black bar in front of the day.

For example, to select only Saturdays and Sundays:

1. Tap / click on April 4th.
2. Tap / click on April 5th.
   - ⇨ Only all Saturdays and Sundays have a blue highlighted background. On these days the profile is valid.
   - ⇨ The result is displayed in the lower part of the screen in the "Result" line. In this case it is 00:00 - 00:00 (+1 full day), with the black marked abbreviations for Saturday (S) and Sunday (S) behind.
   - ⇨ The profile is now valid for all Saturdays and Sundays.

However, it is also possible to apply the profile only for the weekend of 18 and 19 April 2020. The control selection range (3) can be used for this purpose. This can be used to set regularly recurring or one-off time ranges:

1. Tap / click on "Once" in the control selection range.
2. Tap / click on the April 18th and 19th until only these two days are highlighted in blue.
   - ⇨ The result is displayed in the lower part of the screen in the "Result" line. In this case it is 00:00 - 00:00 (+1 full day), Saturday 18.04.2020.
   - ⇨ The profile is only valid for April 18 - 19, 2020

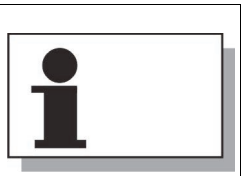
A more precise time range for the validity of the profile can be set using the time selector (2) in the middle of the display. By turning the circular hands "From" and "To" clockwise or counterclockwise, start and end time can be set to the minute. It is also possible to jump within the days. For this purpose the circle pointer "To" must be turned 2x completely in a circle for +1 day. The time selector disc can also be displayed in the form of a pure numerical view. To do this, the appropriate symbol must be selected in the selection area of the time selector (2). The validity "From" and "To" is then entered via the control element of the numeric keypads, as is the number of days. Via a PC the input is done by mouse and keyboard.

To save all settings for the time range and close the "Choose time range" window:

- Tap / click the check button ✔.
  - ⇨ The window closes and the settings are adopted for the profile.
  - ⇨ The result of the time range setting is also displayed in the calendar display in the right-hand line area of the profile.

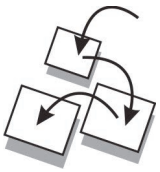
To discard all settings for the time range and close the "Choose time range" window:

1. Tap / click the ✖ button.
2. Confirm again with "Yes" in the pop-up window.
   - ⇨ The window closes and the settings were not adopted for the profile.



There are several options for setting the desired time range for the profile using the selection ranges. It is recommended to simulate various scenarios in order to refine the handling. The result of a setting is always displayed in the lower part of the display, so even a faulty setting can be quickly detected and corrected.

Profile hierarchy



The visual arrangement of profiles in the calendar display is extremely important for their prioritization:

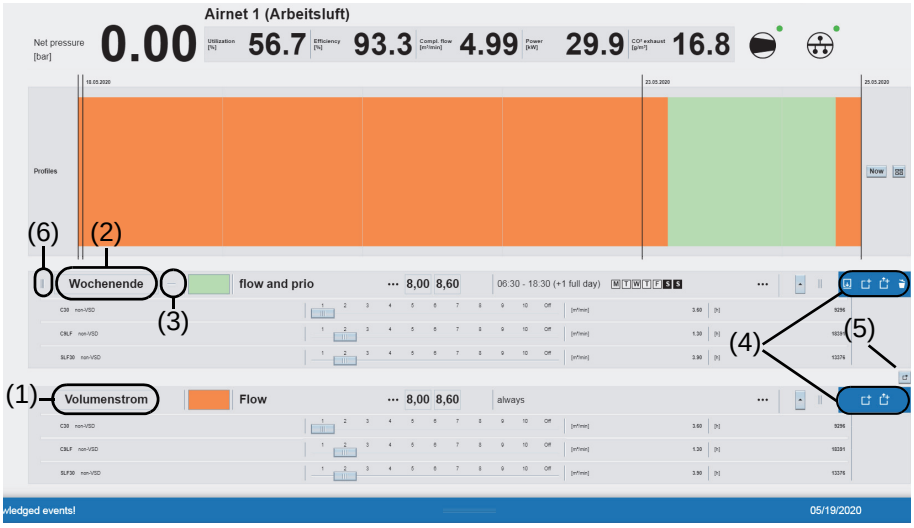


Fig. 5.10: Profile arrangement

There is always a basic profile. In the figure above, this is the profile "flow" (1). This profile is always valid, so the time range for the validity is also set to "always". Furthermore, there is an additional profile "Wochenende" (weekend) (2). This is limited in its validity according to its name to a time range on Saturday and Sunday. The basic profile is displayed below the "Weekend" profile in the calendar display. The "Wochenende" (weekend) profile positioned

above it, cancels the validity of the basic profile for the period Saturday and Sunday. Volume "flow" as the basic profile is therefore not "always" valid, but only from Monday to Friday.

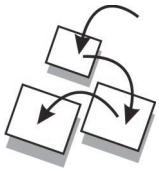
	The profile at the top cancels all profiles positioned below for the set time range.

If, for example, another profile is to be set up that is only valid for several hours on Sunday, then it would have to be placed at the top of the "Wochenende" (weekend) profile to override all other profiles for the Sunday period.

To move a profile to another position and change the hierarchy of the profiles:

- Tap / click into area (3), press and hold and drag the profile to the desired position with your finger or mouse.

Create / delete / deactivate profiles



To facilitate the creation of profiles, profiles can be created very intuitively and quickly. Any profile, including the basic profile, which is always available, can serve as a basis for this. The profiles can simply be copied and then modified, if necessary. It is also possible to copy a profile from one compressed airnet, e.g. from "airnet 1 (Arbeitsluft)" (working air) into another compressed airnet. Profiles can also be deleted or deactivated just as quickly. The action buttons for editing profiles in this way are marked with the numbers (4), (5) and (6) in the figure „Profile arrangement“, page 48. The contents of these buttons have the following functions:

Button	Symbol	Action by selection
(4)		The profile becomes the basic profile of the net (it then also shifts downwards in the visual arrangement).
		A copy of the profile is created in the same compressed airnet (for example, to process it further and develop a new profile).
		A copy of the profile is copied into any available compressed airnet (after selecting the symbol, a list of all compressed airnets registered by airtelligence provis 3 appears, from which the desired net can be selected).
		The profile is deleted (this function is not available for the basic profile).
(5)		A new profile is created.
(6)		Deactivate profile -> Profile is grayed out and no longer considered. Activate profile -> Profile is saturated in black and considered. (This button / function is not available for the basic profile).

Tab. 5.3: Buttons (4), (5) and (6) in calendar display

Event display

The event display shows all important events or messages that are available for the compressed airnet. In addition to information about which events occurred when, the event display also offers the possibility to edit the events / messages, i.e. to confirm or acknowledge them.

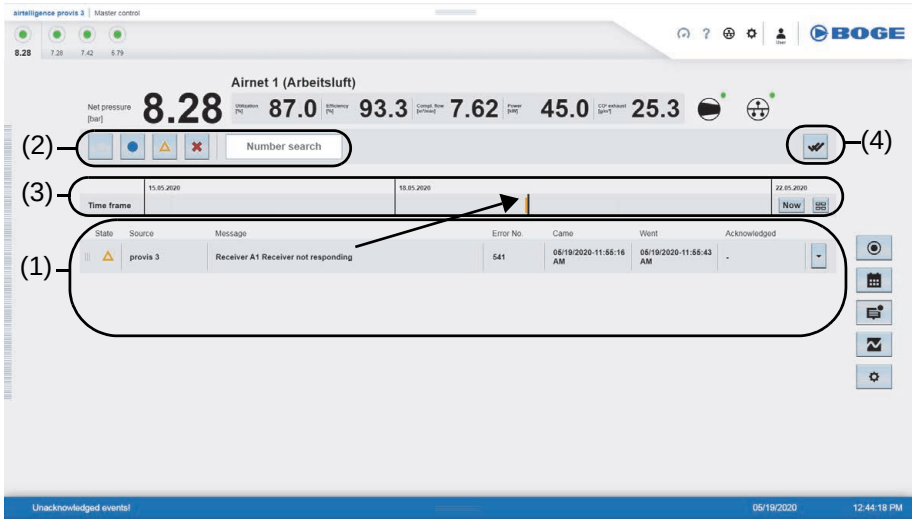


Fig. 5.11: Compressed airnet view - event display

There are four types of events:

No.	Symbol	Event	Meaning
1		Internal system message	Concerns the airtelligence provis 3 control itself.
2		Information message	Important information (about the compressed airnet) is available.
3		Warning/Servicing message	There is a warning or servicing message on the control or in the compressed airnet, or on a component of the compressed airnet. All components are still operational and the compressed air supply is guaranteed.
4		Fault	There is a fault in the control or in the compressed airnet, or in a component of the compressed airnet. The compressed air supply is at risk. In the event of critical faults that no longer guarantee the function of the control system or the compressed airnet, the compressors are released (analogous to the operating mode „All released“). If a component is faulty, the component is switched off.

Tab. 5.4: Event types

The events are listed in the list area (1) according to their chronological order. In case of the Fig. 5.11: there is an event at the top, it is a warning because it is indicated in the "Status" column with an orange triangle. Further information

on the event can be found to the right. Under "Source" the origin of the event is mentioned, the warning was causally generated by **airtelligence provis 3**. It would also be possible that components or Modbus interface modules are displayed in the "Source" column. This directly restricts the search for the cause of the error and enables faster rectification. Each event has a unique number and a fixed message text and is therefore assigned to a specific cause, see in the columns "Error no." and "Message". In this case, it is error number 541 and the cause according to the message text *„Receiver HDL Equip not responding“*.
In the "Came" column, the time at which the event occurred is displayed. If the cause of the event, in this case for the warning, has been automatically rectified or has been eliminated by manual intervention, the time at which this was registered is displayed under "Went". Under "Acknowledged" the time is indicated when the message was acknowledged via **airtelligence provis 3**. If "Coming" and "Going" of an event occur several times without acknowledgment, the number is counted in the message.

The events can be listed by event type in the list area by pressing the desired button under (2). You can also search events by their error number under (2).

Above the list area, the events that have occurred are displayed in a continuous time bar display (3), which has the same structure as the calendar display. Event 541 from the list display is therefore to be found in the time bar display (see arrow).



The time bar display can be scaled as desired. The scaling is done as in the calendar display. To perform scaling, see „Excursus: Adjust time bar display“, page 41.

The events can be confirmed or acknowledged via area (4) in the event display. This is described in more detail in chapter „Troubleshooting“, page 69.

Progress display

With the progress display the activities of the compressed airnet can be monitored. It visualizes the development of important operating values of the net components during a freely configurable period of time as a diagram and in tabular form. The display can also be used to generate reports and evaluations of the compressed airnet, e.g. for energy and cost efficiency calculations.



Due to the large amount of information in this display and the finite display options on the touch panel or PC screen, the contents can be called up one after the other by shifting from bottom to top. To do so:

- Tap / click with finger or mouse into the image area, hold down and drag upwards.

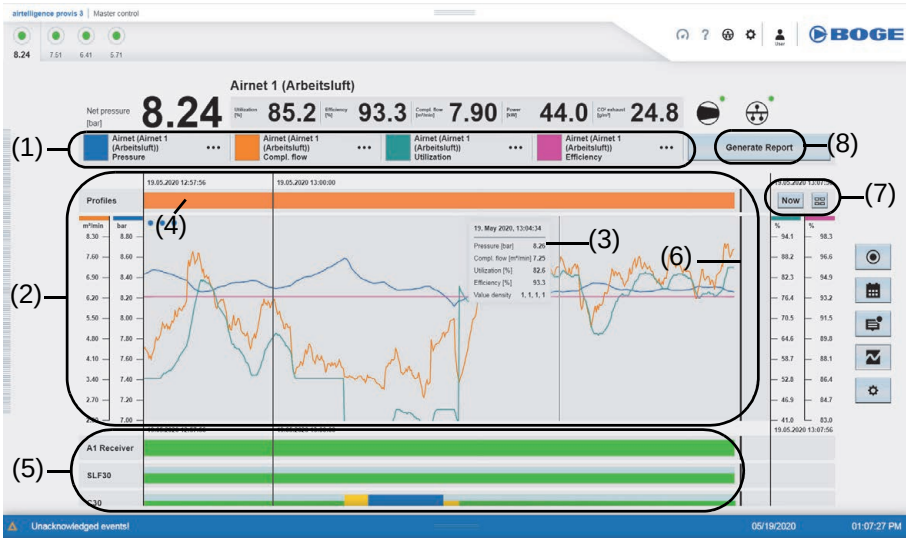


Fig. 5.12: Compressed airnet view - Progress display

In area (1) a total of 4 operating values can be defined which are to be displayed in diagram (2). Each value can be set individually using the 3-point symbol. The unit scales to the left and right of the diagram are automatically changed to the correct unit when an operating value is changed. The 3-point symbol can also be used to determine whether a value of the entire compressed airnet is to be displayed or only that of a single component (e.g. flow of the entire net or flow of a compressor). The corresponding color of the value graph in the diagram can be selected individually using the colored rectangles..

The diagram in area (2) shows the development of the defined operating values (y-axis) as a function of time (x-axis). As soon as you touch any part of the diagram with your finger or mouse, a line (3) appears in the diagram, which can be moved horizontally on the time axis. Simultaneously, the operating values recorded at this time are displayed in a window next to it. In the upper area of the diagram, the profile that was valid or is currently valid in the selected period is also indicated (4).

Below the diagram (2) are the progress bars showing the operating status of all components of the compressed airnet (5). They run on the same time axis as the diagram. There is an individual progress bar for each compressor and compressed air receiver. All equipment is grouped under a progress bar, in this case "HDL Equip" for the name of the equipment module:

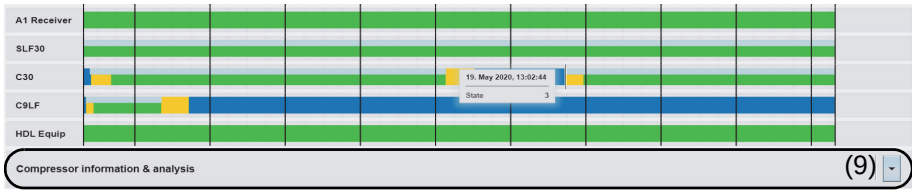


Fig. 5.13: Progress bar for the operating status of all components

The color of the bars has the following meaning:
If the narrow upper part of the bar for compressors is light blue, the compressor was requested by **airtelligence provis 3**. The wide lower area shows the

operating states of compressors (green = load run, blue = "Ready", red = Fault, orange = Restart lock, yellow = Start up/Idle run/Follow-up, gray = no data).

It is possible that the upper part of the bar may not be light blue for a long time when the compressor is in load run (green) (i.e. not requested).

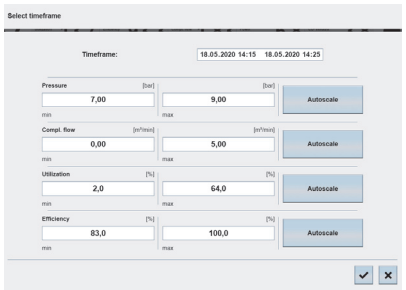
It is also possible that with a compressor in the "Ready" (blue) state, the upper part of the bar is light blue for a long time (i.e. requested).

Both cases are irregularities and are not intended. They always indicate errors or incorrect settings in the slave controls, but not errors in **airtelligence provis 3**.

For receivers and equipment there is only one wide progress bar and four possible operating states (green = OK, yellow = Warning / Service, red = Fault, gray = no data).

As soon as you touch a point in a progress bar with your finger or mouse where a color change took place, a line appears in the diagram. At the same time, the operating status recorded at that time is displayed in a window next to it (0 = Off, 1 = Ready, 2+3 = Start-up, 4 = Load run, 5+6 = Follow-up, 7 = Fault).

Diagram (2) and progress bars for the operating status of the components (5) can be scaled together as required. The scaling is done as in the calendar display. To perform scaling, see „Excursus: Adjust time bar display“, page 41. The "Now" button in area (7) also has the function of displaying the current time (6) in the diagram and progress bar. Only the setting options via the symbol in the area (7) are supplemented by additional scaling options in addition to the time frame adjustment already described, which also works analogously to the calendar display. It is thus possible to manually increase or decrease the widths of each scale displayed to the left and right of the diagram (2). Automatic default by the control is also possible:



Below the progress bar for the operating status of all components, further collected and calculated data on the compressors in the compressed airnet is given under the item "Compressor Information & Analysis", see „Fig. 5.13:“, page 52, area (9). In unfolded view:



Fig. 5.14: Progress display - Compressor information & analysis

The data always refer to the displayed / selected time period of the time axis of diagram and progress bar. If this data is to be further processed for internal energy or cost calculations or further analyses by departments of your company, this can be done using the "Generate report" function, see „Fig. 5.12:“, page 52, area (8).

Generate report

	The function "Generate report" can only be executed after login (at least level "User"). The function can only be used via a PC with a suitable Internet browser, not directly via the touch panel. The report always refers to the selected compressed airnet only.

To generate a report:

1. Click on the button "Generate report" (8).
   ⇨ A new window opens:

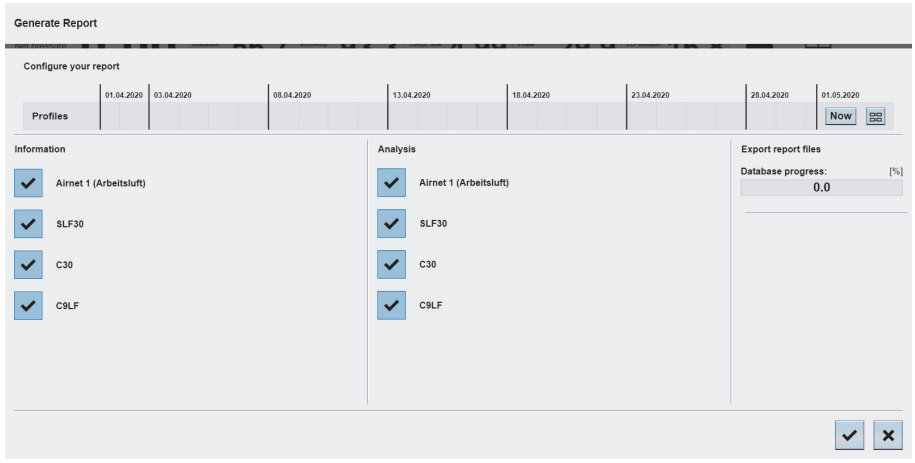


Fig. 5.15: Function „Generate report“

In this window it is possible to set individually which contents the report (information and/or analysis) for the compressed airnet should contain, for example, whether only the entire compressed airnet, individual compressors or

everything should be integrated. In addition, you can use this window to define the period the report should cover. This can be selected independently of the selected period of the time axis in the progress display.

2. Select the desired period for the report in the upper area of the window, according to „Excursus: Adjust time bar display“, page 41.
   ⇨ The creation of a report can take 30 - 60 seconds for a longer period of time (e.g. 1 month).
3. Click on check buttons ✔ to consider or not consider network and components.
4. Click the check button ✔ at the bottom right of the window to generate the report.
   ⇨ The browser indicates that an Excel file has been created.
   ⇨ The file name ends with "Name of the airnet"_report.csv.
   ⇨ The report can be used as an Excel file for further processing.
5. Click the ✖ button to close the window.

Settings for the compressed airnet

In the settings for the compressed airnet, you can configure all the specifications from **airtelligence provis 3** that are necessary for the proper functioning of the compressed airnet.

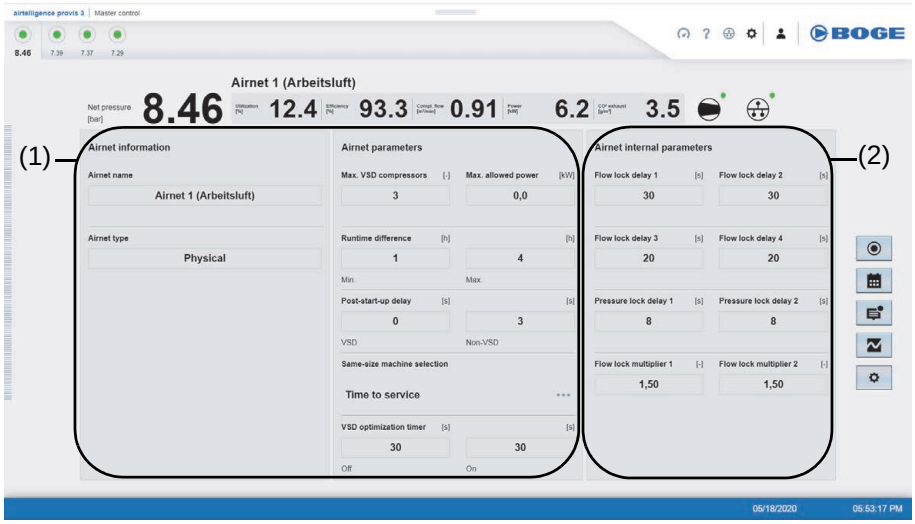


Fig. 5.16: Compressed airnet view - settings for the compressed airnet

This basic setup of the compressed airnet is usually carried out during commissioning of the control, but subsequent adjustments are also possible, for example if new components are added to the net or basic adjustments are to be made.

	The settings for the compressed airnet can only be changed after login (at least "Service" level).

The settings in area (1) have a particular effect on the control behavior of the compressors in relation to each other, the settings in area (2) are development parameters which as a rule should not be changed.

⚠CAUTION

Danger of faults or malfunctions in control behavior and damage to components due to incorrect settings!

Incorrect or unqualified settings for the compressed airnet can lead to disturbances in the control behavior and damage to network components

➔ The settings in this display may only be carried out by BOGE service personnel or qualified persons who have received BOGE training on this control.

The detailed description of the setting options is therefore not part of these operating instructions. Details of possible settings in this display can be obtained by contacting Technical Support or in the BOGE training courses.

5.3 Component detail view

Tapping a component in the list view of the status display at the level of the compressed airnet view (see page 37) takes you to the corresponding component detail view. In this view, current information values calculated by airtelligence provis 3 are displayed on the basis of the data from the slave controls. On the other hand, set values which are necessary for the configuration of the component in the compressed airnet of airtelligence provis 3 are also displayed. The view that exists for each component of the compressed airnet is structured differently depending on whether it is a compressor, a receiver or equipment. All component detail views always consist of several tiles (1,2,3,...), see the following figure. Each tile encloses related contents.

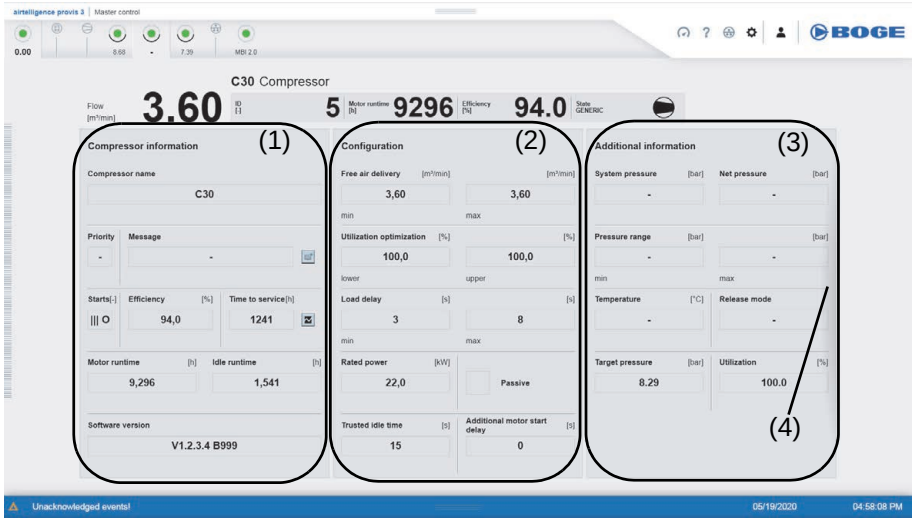


Fig. 5.17: Component detail view - compressor

The shadow (4) can be used to call further tiles with information and data about this component, see also „Further options for navigation on level 3“, page 31.



The change of settings in the component detail view can only be done after login (at least level "Service").

Component detail view - compressor

Except for the name of the compressor, which can be changed, only display values are output on the first tile "Compressor information" (1). These values (depending on the operational behavior of the compressor) are communicated by the compressor control to the master **airtelligence provis 3**, including the software version of the slave control or the Modbus Interface Module 2.0. However, the value under Priority refers to the profiles that were set up in **airtelligence provis 3**. If a profile is currently active in which priorities are taken into account and the compressor has been assigned a priority, its priority is displayed here. In the current case the profile "flow" is valid. No priorities are considered, therefore no value is displayed.

The following tiles of the component detail view contain the basic setup of the compressor regarding its functionality in the compressed air network so that it can be generated and controlled by **airtelligence provis 3**. The setup is usually carried out during commissioning of the control, but subsequent adjustments are also possible, for example, if a new compressor is added to the network or basic adjustments are to be made.

⚠CAUTION

Danger of malfunctions in control behavior and damage to components due to incorrect settings!

Incorrect or unqualified settings for the compressor can lead to faults or malfunctions in the control behavior and damage to network components.

➔ The settings in the component detail view may only be carried out by BOGE service personnel or qualified persons who have received BOGE training on this control.

The following is a brief description of the contents of the individual tiles, in which setup settings for the compressor can be made:

Configuration (2)

Machine-dependent setup settings according to type plate and compressor data. Utilization optimization is a fixed value that only needs to be adjusted in exceptional cases and as required by the system.

Additional information (3)

Similar to the first tile, these are also values that are initially displayed on the slave compressor control. An exception is the target pressure, which is calculated and specified by airtelligence provis 3.

Communication settings

IP settings of the component for internal technical network or external customer network.

Manipulation

Service parameters that should normally not be changed or only changed by service personnel.

Set runtime

For third-party compressors or compressors without focus control 2.0, which are connected via Modbus interface module 2.0, the values must be specified here, for example to allow the maintenance counter to run down internally. With the button "Update runtime" the entered values are sent to the Modbus interface module

IO Scaling

For external vsd compressors or vsd compressors without focus control 2.0, which are connected with Modbus interface module 2.0: adaptation of the mA values according to the specifications of the installed frequency converter.

Display options

Specifications for the 3D representation in the compressed airnet view (see „Status display: 3D representation“, page 38), e.g. the color of the component and in which direction the component is positioned when rotated

Component detail view - receiver

When a receiver is selected in the list view of the status display at the compressed airnet view level, the component detail view of the receiver is displayed. The content of the tiles differs in several places from that of compressors:

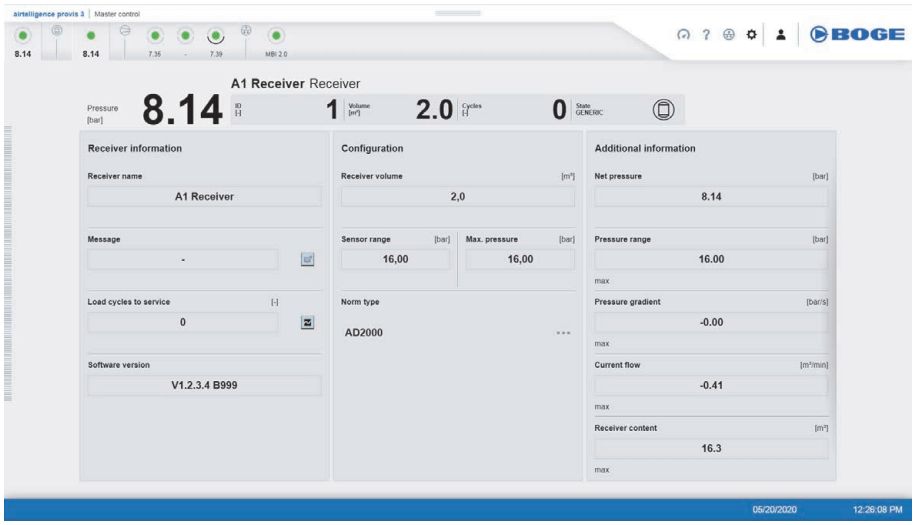


Fig. 5.18: Component detail - receiver view

Except for the name of the receiver, which can be changed, only display values are output on the first tile "Receiver information". These values (depending on the control behavior of the compressed airnet) are communicated by the Modbus Interface Module 2.0 to the master **airtelligence provis 3,** including the software version of the receiver module.

The following tile of the component detail view contains the basic setup of the receiver for its functionality in the compressed airnet. The setup is usually carried out during commissioning of the control, but subsequent adjustments are also possible, for example, if a new receiver is added to the network or basic adjustments are to be made.

⚠CAUTION

Danger of faults or malfunctions in control behavior and damage to components due to incorrect settings!

Incorrect or unqualified settings for the receiver can lead to faults or malfunctions in the control behavior and damage to components of the network.

➔ The settings in the component detail view may only be carried out by BOGE service personnel or qualified persons who have received BOGE training on this control.

The following is a brief description of the contents of each tile, in which setup settings for the container can be made.

Configuration

Receiver-specific setup settings according to receiver data/label. The size of the receiver, its permissible maximum pressure and the standard type of the receiver (AD 2000, EN 286-1 or neither of them) must be stated as well as the sensor measuring range which determines the pressure sensor installed in the receiver more precisely.

Additional information

Similar to the first tile, these are also pure display values.

Communication settings

IP settings of the component for internal technical network or external customer network, if applicable.

Set operating time

Due to the connection via the Modbus interface module 2.0, the values must be specified here, for example to allow the service counter to run down internally (load cycles to service). The values "Operation time over Pmin" and "Operation time under Pmin" can be entered according to standard specifications. With the button "Update operating time" the entered values are sent to the Modbus interface module.

Display options

Specifications for the 3D representation in the compressed airnet view (see „Status display: 3D representation“, page 38), e.g. the color of the component and in which direction the component is set up.

Component detail view-equipment

When an equipment is selected in the list view of the status display at the level of the compressed airnet view, the component detail view of the equipment is displayed. In contrast to the other detail views, this one shows each equipment on a single tile:

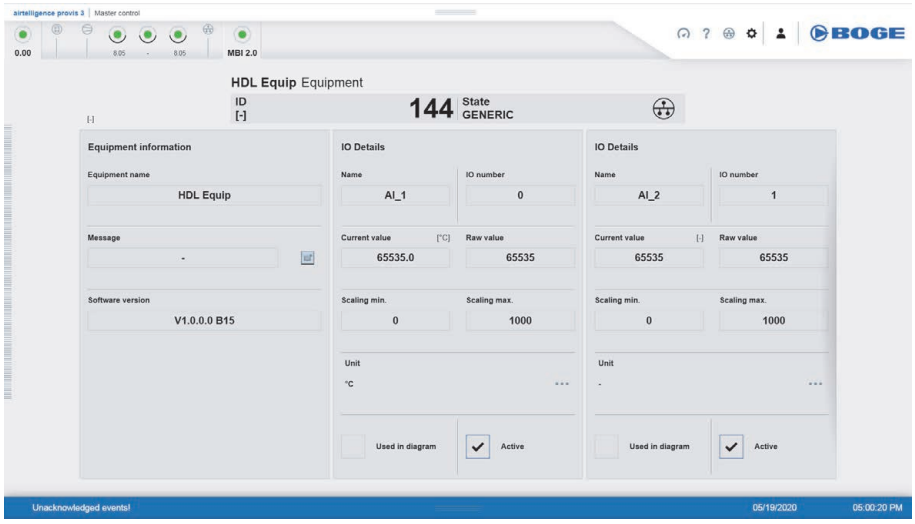


Fig. 5.19: Component detail view - equipment

The first tile " Equipment information " contains general information about the equipment module (Modbus Interface Module 2.0), to which all equipments on the tiles to the right are connected. These display values include the editable name of the equipment group, the software version of the mode and any messages that occur in the equipment group.

All other tiles in the component details view contain the basic setup of the individual components that are connected to the module and registered. The setup is usually carried out during commissioning of the control, but subsequent adjustments are also possible, for example, if a new equipment is added to the network or if basic adjustments are to be made.

NOTE

Risk of faults in the compressed airnet due to incorrect settings!

Incorrect or unqualified settings for equipment can lead to faults in the compressed airnet.

➔ The settings in the component detail view may only be carried out by BOGE service personnel or qualified persons who have received BOGE training on this control.

Here is a brief description of the contents of the equipment tiles that must be configured for accessory setup.

IO details

Each individual equipment tile is marked with the heading "IO details".

The name of the equipment can be freely defined, on the first equipment tile in the figure on page 60 it is "AI_1" (for analog input 1). The choice of the connection of the components on the equipment module already determines whether it is an analog or digital input or output.

For analog inputs and outputs, the type of sensor is then defined via the unit (e.g. room temperature sensor by defining the unit "Temperature" and "°C").

This is not possible with digital inputs and outputs. For these, however, information on the message link must be provided.

The raw value and, if necessary, the scaling (not for digital inputs and outputs) must also be entered based on the information on the sensor.

For the accessories to be recognized by **airtelligence provis 3**, the "Active" check mark must be set.

A check mark at "Used in diagram" means that the equipment is displayed in the DIN, 2D and 3D view.



The name of the equipment should be unique in order to quickly identify it. For example, if "AI_1" is a sensor that measures the room temperature, a possible name would be "Roomtemp_Airnet 1".

Communication settings

Definition of the communication settings for the Modbus Interface Module 2.0 of the equipments.

This includes the connection type according to the list specification, which can be called up via the 3-point symbol. In addition, the IP settings of the equipment module must be specified for an internal technology network or, if applicable, an external customer network.

5.4 General system settings

Using the general system settings, the basic configuration of the control can be adapted to the customer's compressed air supply. In addition to the user administration, which can be created and maintained by the administrator (with user level *Admin*), this area contains the basic settings of **airtelligence provis 3** ("System Settings") and the compressed airnet configuration, in which new components can be searched for and registered components can be assigned to the individual compressed airnets.



Settings in "System settings" and "Airnet configuration" can only be changed after login (at least "Service" level).

It is only possible to change the user administration after login with level "Admin".

The general system settings are called up via the ⚙ symbol in the upper right area (2) of the display (see „Fig. 4.2: Compressed airnet overview - Other navigation paths“, page 30):

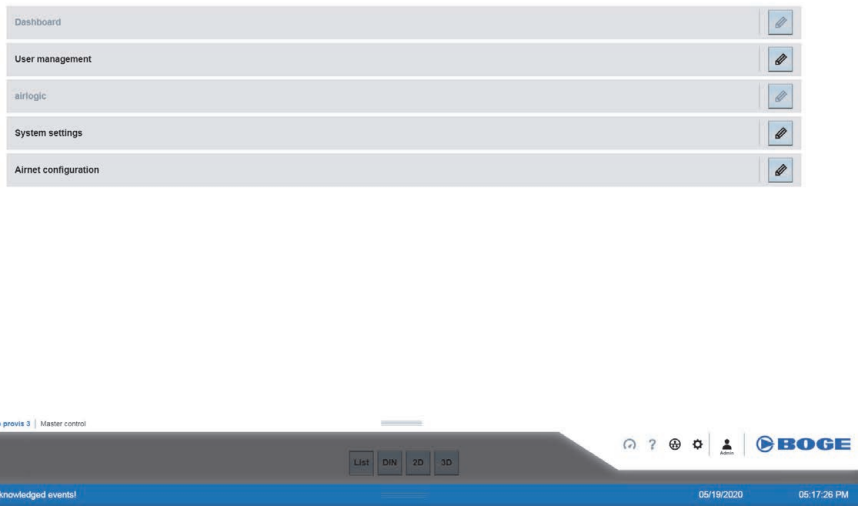
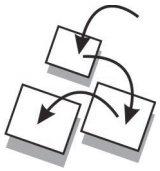


Fig. 5.20: General system settings

User administration



The group of persons and user level to which certain persons are assigned in order to carry out the various tasks on the control are defined by the administrator (with user level *Admin*) via the user administration.

It is possible to change or delete the profiles of existing users (1) and create profiles for new users (2).

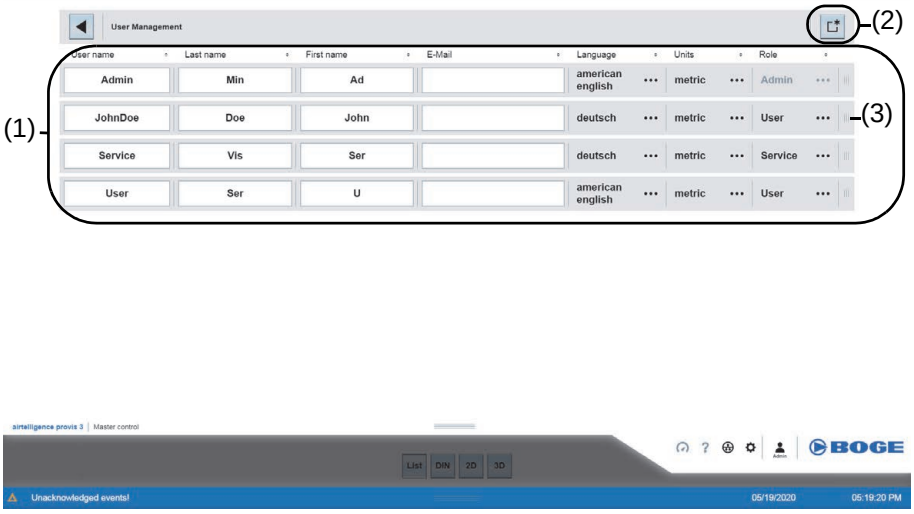


Fig. 5.21: User administration

The following settings and changes are possible with existing users (1):

Column	Meaning and setting options
User name	Freely selectable user name
Surname	Freely selectable surname of the user
First name	Freely selectable first name of the user
E-mail	E-mail address of the user for sending messages / notifications generated by the control. Sending is only possible if an SMTP server has also been configured.
Language	The control is displayed in the language set in the selection menu
Units	Selection between metric (EU) and imperial (e.g. USA)
Role	The user level according to the selection menu: – User – Service – Admin

Tab. 5.5: Changes for existing users

A user can be deleted by the administrator via the vertical line symbol (3) at the right edge of the profile and tapping / clicking the button.

To create a new user:

1. Click / tap the button under (2).
   ⇨ A window for the necessary information on the new user opens.
2. Enter user name.
3. Enter the surname.
4. Enter first name.
5. Enter e-mail address (optional).
6. Set the password.
7. Set language according to 3-point symbol and selection menu.
8. Set units according to 3-point symbol and selection menu.
9. Set user level according to 3-point symbol and selection menu.
10. To acknowledge and close the window, tap / click the hook button .
    ⇨ The new user has been created.

The password for the user is only created initially by the administrator.

Only the user himself is authorized to change his password after the administrator has set up his profile.

The immediate change of the password by the user is recommended.

To do so, the user must log in once with the password that was initially set by the administrator. For registration proceed according to „Excursus: Login / logout with username and password“, page 18.

Then click again on the Login symbol, which now shows the user level below. Enter the desired new password twice into the left area of the window that has opened.Finally, enter the old password. Acknowledge with check button ✔. Thus the new password was set.

System settings

The basic configuration of **airtelligence provis 3** is done in the system settings area.

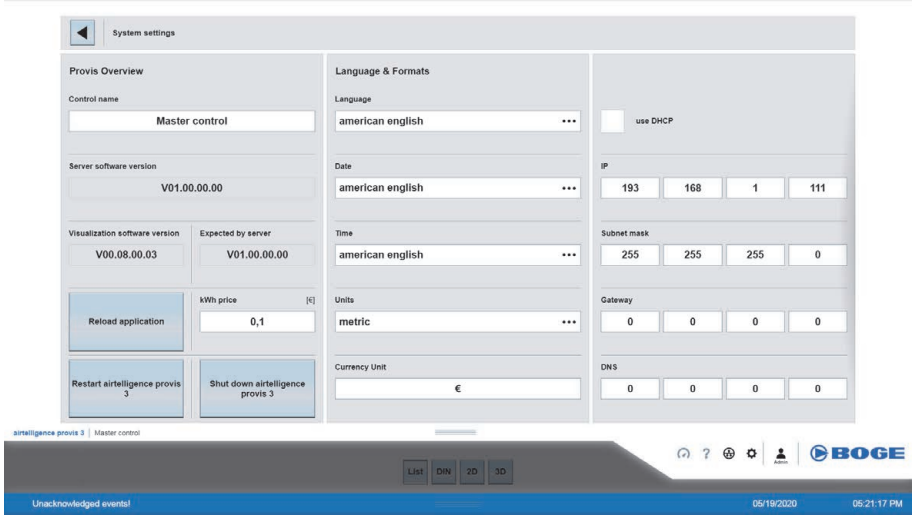


Fig. 5.22: System settings

All system-relevant and sensitive configuration options in this area can only be accessed after login (at least Level "Service").

NOTE

Risk of faults in the compressed airnet due to incorrect settings!

Incorrect or unqualified settings in this area can cause faults in the control behavior of the control.

➔ The settings in the system settings may only be carried out by BOGE service personnel or qualified persons who have received BOGE training on this control system.

A brief description of the contents and functions follows:

Provis overview

– Control name (changeable)
– Server and software versions (pure display value)
– Price per kWh (changeable)

The buttons "Reload application" (like Refresh), "Restart **airtelligence provis 3**" and "Shut down **airtelligence provis 3**" (switch off) can also be used without login.

Language & Formats

General output settings for the control that are always valid when no user is logged on:

– Language
– Date
– Time
– Units
– Currency unit (from "Service" level)

These values should be set country-specifically; apart from "Currency unit", no registration is required.

For a logged-in user, the language and unit settings defined in his user profile apply.

Network settings (2 tiles)

Definition of the address settings for the two network cards in the control (left "technical network" and right "customer network").

Date and time settings

– Automatic acquisition of time and date via time server, or ...
– Manual setting (then press the "Update time" button)

Adjustable from user level "User".

SMTP settings

To enable the control to send emails to the users' email addresses, the SMTP server data must be specified. The email address (sender **airtelligence provis 3**) is freely selectable and is usually specified by the customer's IT. By pressing the button "Test SMTP settings" a test message is sent to the recipient after selecting a recipient email address.

Configuration import and export

The configuration files created in the control, i.e. all settings and net configurations, can be backed up externally ("Export configuration file") or files can be reloaded externally ("Select/Browse" and then "Start import").

The functions can be used both via a PC with a suitable Internet browser and via USB stick via the switch cabinet.

The functions can be used from user level "User"

Software update

Uploading an update file from the data carrier to the control.

Software updates can only be made with a USB stick via the switch cabinet.

The execution of software updates is possible from user level "Service".

Export log files

The function of logging files (storage of operating data) is intended to facilitate troubleshooting by service personnel if, for example, the functionality of the control is not satisfactory. It can be defined from which period the operating data should be exported (current day, last week, last month or all).

The export of log files is only possible with a USB stick via the switch cabinet.

The function can be used from user level "User".

Compressed airnet configuration

In the compressed airnet configuration, the compressed airnets are generated and managed by the organized composition of the components that are detected by the control. In this area it is therefore determined for the control which component belongs to which compressed airnet.



Fig. 5.23: Compressed airnet configuration

⚠CAUTION

Danger of faults or malfunctions in control behavior and damage to components due to incorrect settings!

Incorrect or unqualified settings in the compressed airnet configuration can lead to faults or malfunctions in control behavior and damage to network components.

➔ The settings in the compressed airnet configuration may only be carried out by BOGE service personnel or qualified persons who have received BOGE training on this control system.

	Settings in the compressed air network configuration can only be changed after login (at least "User" level).

The basis for all functions in this area are the components that **airtelligence provis 3** can detect. For this purpose, a Modbus scan (1) should be performed during commissioning or when new components are connected to the control.

If a component was not found via the scan, it is also possible to manually set it up again (1), so that it is then displayed on the left side (2). On the left side of the view all single components are collected.

These can then be distributed to existing compressed airnets or to new compressed airnets. To do this, the desired compressed airnet must be called up on the right-hand side (3) via the 3-point symbol (4).

The + button moves a component from the left to the right side (and thus into a compressed airnet), with the button - from the right to the left side (and thus out of a compressed air network), e.g. to be reassigned afterwards.

It is possible to delete individual components from compressed airnets or from the scan page using the vertical line symbols (they no longer appear in the entire compressed airnet configuration). Entire compressed airnet can also be created or deleted (5).



A manual setup of components is not only necessary if they are not found in the scan. It can also be useful if pre-configuration is required for time reasons, e.g. if the installation of lines or components has not yet been completed.

6.1 Events / message types

All important events or messages that exist for a compressed airnet are shown in the event display (see „Event display“, page 50). Likewise, the last 10 unacknowledged events from all compressed airnets can be called up for quick information via the line symbol (4), which is available in all view levels (see „Fig. 4.2:“, page 30). However, it is only possible to edit, i.e. acknowledge, the events / messages for this or all compressed airnets in the event display of a compressed airnet.

A distinction was made between the 4 event types, see also page 50:

– Internal system message
– Information message
– Warning / Service message
– Fault



The necessity to acknowledge warnings / maintenance messages and faults, i.e. to confirm the proper status after a problem has been solved, is **necessary** and much more important than acknowledging system-internal messages or information messages, since these message types are not based on events causing the problem.

In addition to these event types, it is also important to distinguish where the event occurs. This is illustrated on the one hand by the indication of the "Source" in the event display, on the other hand by the unique "Error No.". Depending on the range of numbers, you can limit where exactly the message was generated:

– Numbers **< 500**: The message originates from a lower-level controller or a Modbus interface module.
– Numbers from **500 to 699**: The message comes directly from **airtelligence provis 3**.

Depending on where the message comes from, the procedure for processing the messages differs.

Process events / messages

The following procedure is recommended when an event occurs that causes one of the message types to occur **in slave controls or modules** (Error No. < 500):

1. Call up event information using the line symbol (on all view levels) or directly in the affected compressed airnet with the event display.
2. Locate and rectify the cause of the message on the affected component (compressor / receiver / equipment), if necessary also by BOGE service personnel.

⚠CAUTION

Danger of material damage!

Troubleshooting (including service and repair work) by unauthorized or unqualified personnel can damage or destroy components of a compressed airnet.

➔ Faults and problems may only be rectified by authorized specialist personnel or BOGE service personnel.

➔ In cases of doubt please contact BOGE service beforehand.

3. Only for compressors: Acknowledge event/message at the slave control (see separate operating instructions of the compressor control).
   ⇨ In the event display on page 50, the "Went" column shows the date and time of the fault rectification.
4. Acknowledge event / message on **airtelligence provis 3** via the event display with button , which appears after tapping / clicking on the line symbol to the left of the event.



The acknowledgment of one or more events can only be carried out after login (at least "User" level).

Several events / messages can be acknowledged simultaneously via the area (4) with the button in the event display.

Particularly in the case of warnings / maintenance messages and faults, it is recommended, to acknowledge events individually.

⇨ The date and time of the acknowledgment is shown in the " Acknowledged " column in the event display.

⇨ Event / message disappears from the list of the last 10 unacknowledged events, which is present in all view levels.

The following procedure is recommended when an event occurs which causes one of the message types at **airtelligence provis 3** (error number 500 to 699):

1. Call up event information using the line symbol (on all view levels) or directly in the affected compressed airnet with the event display.
2. Find and eliminate the cause of the message (by checking communication settings / settings on **airtelligence provis 3** or controls and modules), if necessary also by BOGE service personnel.

⚠CAUTION

Danger of material damage!

Troubleshooting (including service and repair work) by unauthorized or unqualified personnel can damage or destroy components of a compressed airnet.

➔ Faults and problems may only be rectified by authorized specialist personnel or BOGE service personnel.

➔ In case of doubt contact the BOGE service in advance.

⇨ In the event display on page 50, the "Went" column shows the date and time of the error correction.

3. Acknowledge event / message on airtelligence provis 3 via the event display with button , which appears after tapping / clicking on the line symbol to the left of the event.



The acknowledgment of one or more events can only be carried out after login (at least "User" level).

Several events / messages can be acknowledged simultaneously via the area (4) with the button in the event display.

Particularly in the case of warnings / service messages and faults, it is recommended that events be acknowledged individually.

⇨ In the event display, the " Acknowledged " column shows the date and time of the acknowledgment.

⇨ Event / message disappears from the list of the last 10 unacknowledged events, which is present in all view levels.

7.1 Service

Cleaning the display

To clean the display, use a damp but not wet cloth. If the display is soiled with oil, add a small amount of commercial household cleaner to the cleaning cloth. Do not use caustic cleaning agents, thinners or scouring agents!



Before the display is cleaned, logged-in users should log out so that settings cannot be accidentally changed when wiping the display.

Software updates

Updating of the control software is usually carried out by BOGE service personnel and is therefore possible from user level "Service" (see Software update on page 65).

When operating the control via a PC with a suitable Internet browser, the browser cache should be cleared regularly and especially after an update.

If the control is updated, the BOGE service personnel will inform you if the update will result in changes to the functions of the control system.

7.2 Dismantling / Disassembly

⚠WARNING

Danger to life from electric current!

Touching live parts, defective insulations or components can cause danger to life.

➔ All work on the electrical system may only be carried out by authorized electrical specialists.

➔ Before starting work, the connecting cable from the operator's network to the switch cabinet must be disconnected from the power supply and secured against being switched on again.

⚠CAUTION

Risk of injury in case of improper dismantling!

Dismantling by unauthorized or unqualified personnel can lead to serious accidents due to lack of expertise.

➔ Dismantling may only be carried out by authorized and qualified personnel.

➔ Always wear your personal protective equipment during dismantling.

➔ Carry out the dismantling with at least two persons.

➔ Protect the switch cabinet from falling down during dismantling by taking appropriate measures.

Procedure:

1. Switch off voltage.
2. Open switch cabinet.
3. Disconnect wires.
4. Loosen cable screw connections.
5. Pull out cables.
6. Secure switch cabinet against falling down.
7. Loosen the fastening screws from inside the switch cabinet.
8. Remove switch cabinet.
9. Close removed switch cabinet.
   ⇨ The dismantling is completed.

7.3 Disposal

When disposing of the switch cabinet or parts thereof, ensure that the used components are disposed of in accordance with the applicable environmental regulations . Under no circumstances it is allowed to re-enter them into circulation.

Dispose of all parts of the **airtelligence provis 3** control in such a way that damage to health and environment is avoided!

The following electronic components must be disposed of separately in any case:

– Monitors, display devices
– Electrical supply components
– PCBs with electronic components



The WEEE requirements shall be based on the valid General Terms and Conditions of BOGE in the respective valid version.

If you have any questions, you can reach the Technical Support at:

Phone: +49 5206 601-140

8.1 Technical data

airtelligence provis 3	
Rated power	272 W
Voltage (U_N)	1/N/PE AC 100 ... 240 V
Nominal current (I_N)	max. 2,2 A
Recommended back-up fuse	10 A, B characteristic, 1 pole
Fine-wire fuse	2,5 A mt
Control voltage	DC 24 V
Nominal current (control voltage)	1,94 A (with one switch) 2,08 A (with two switches)
Housing	Sheet steel, powder coating
Door	Sheet steel, powder-coated, foamed-in PU seal, twist lock 3 mm double bit
Dimensions housing (W x H x D)	without attachments: 600 mm x 600 mm x 211 mm with attachments: 600 mm x 644 mm x 211 mm
Display size	15,6“ (344 mm x 194 mm)
Maximum screen resolution	3200 x 3200
Color (RAL)	RAL 5012
Weight	35 kg
Protection type (IP, NEMA)	IP55, TYPE 12
Protection class (0, I, II, III) according to EN 61140	I
Type of cable entry	Cable screw connection, 20 x M25
Torques	see „Tab. 3.1:“, page 11
Installation site	Interior (see section „Intended use“, page 5)
Ambient temperature (operation)	0 °C ... 45 °C
Ambient temperature (storage/transport)	0 °C ... 45 °C

Tab. 8.1: Technical data

8.2 Housing dimensions and component overview

External dimensions and components

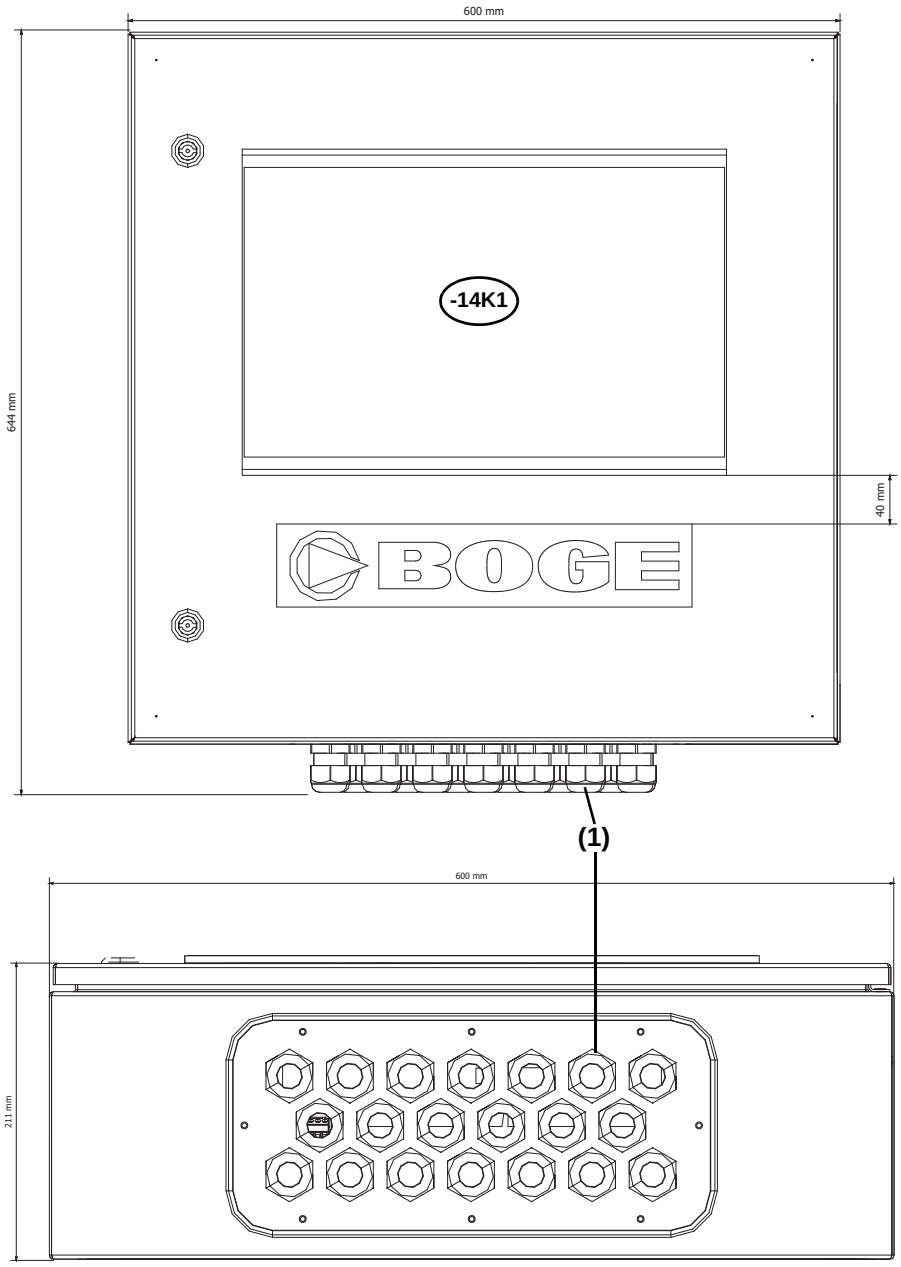


Fig. 8.1: Housing dimensions front and bottom, external part positions

No.	BMK	Designation/Type
-	-14K1	Panel-PC - airtelligence provis 3
1	-	Cable screw connections M25

Tab. 8.2: External components

Internal components

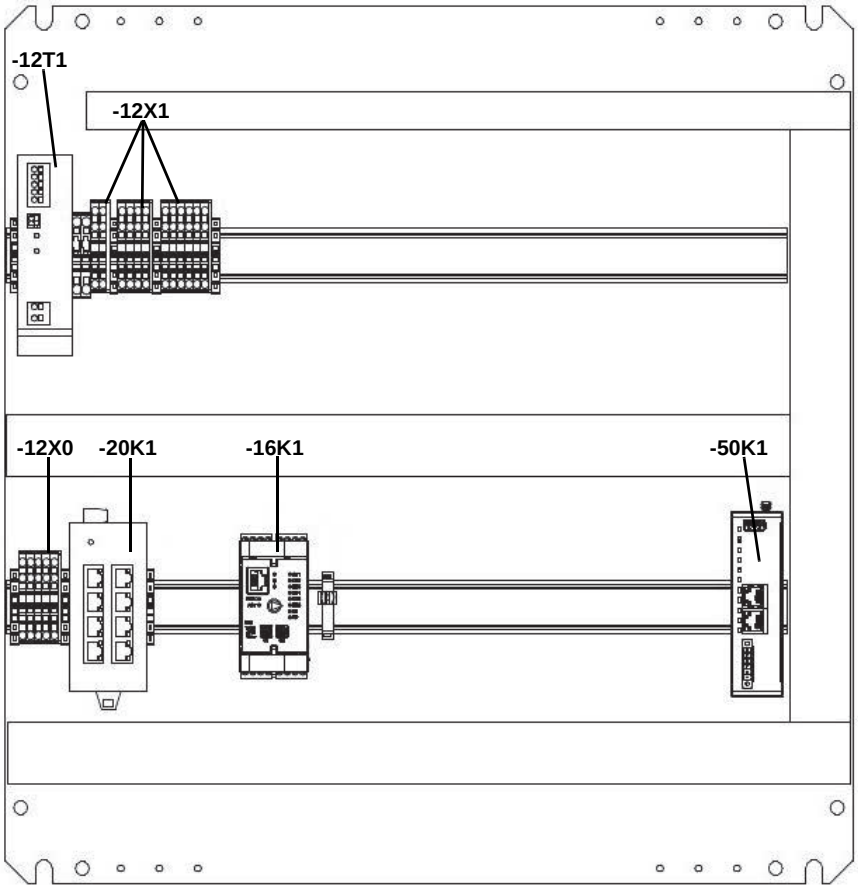


Fig. 8.2: Internal part positions

BMK	Designation/Type
-12T1	Power supply - TRIO-PS-2G/1AC/24DC/5
-12F1	Isolation terminal - PT 4-TG Fuse connector - P-FU 5X20 Fine-wire fuse 2,5A MT
-12F2	Isolation terminal - PT 4-TG Fuse connector - P-FU 5X20 Fine-wire fuse 2,5A MT
-12X1	Feed-through terminal - PT 2,5-TWIN Feed-through terminal - PT 2,5-TWIN BU
-16K1	Modbus-Interface module (BOGE)
-12X0	Feed-through terminal - PT 2,5-TWIN Feed-through terminal - PT 2,5-TWIN BU Protective earth terminal - PT 2,5-TWIN-PE
-20K1	Industrial Ethernet Switch - FL Switch SFNB 8TX
-50K1	BOGE connect

Tab. 8.3: Internal components

Status LEDs of the control

There are four LEDs on the back of the touch panel. These LEDs provide information about the operating status of the control.

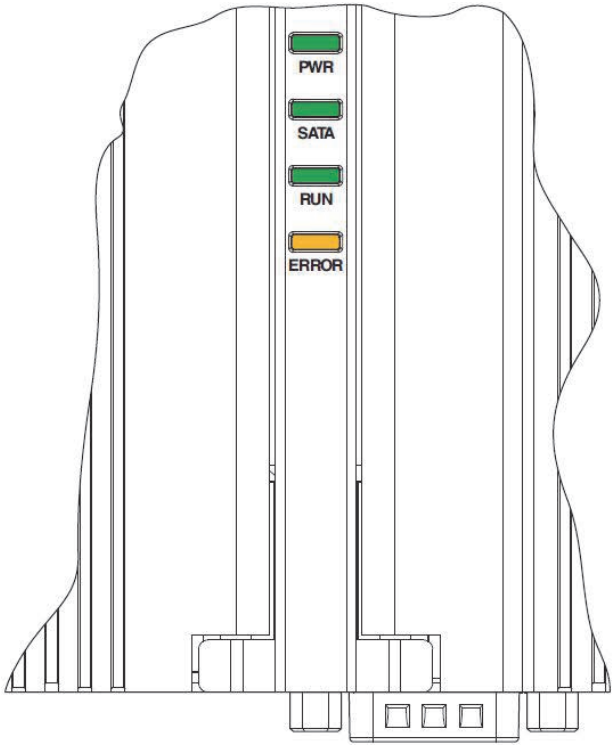


Fig. 8.3: Position of the LEDs

LED	Display feature	Meaning
PWR	Green	24 V DC are present and the main switch is switched on.
SATA	Green blinking	Indicates activity during data storage (HDD or SSD).
RUN		Intended for future use.
ERROR	Orange	Indicates active thermal choking of the processor.
	Red	Indicates processor shutdown due to overheating.

Tab. 8.4: Meaning LED indications