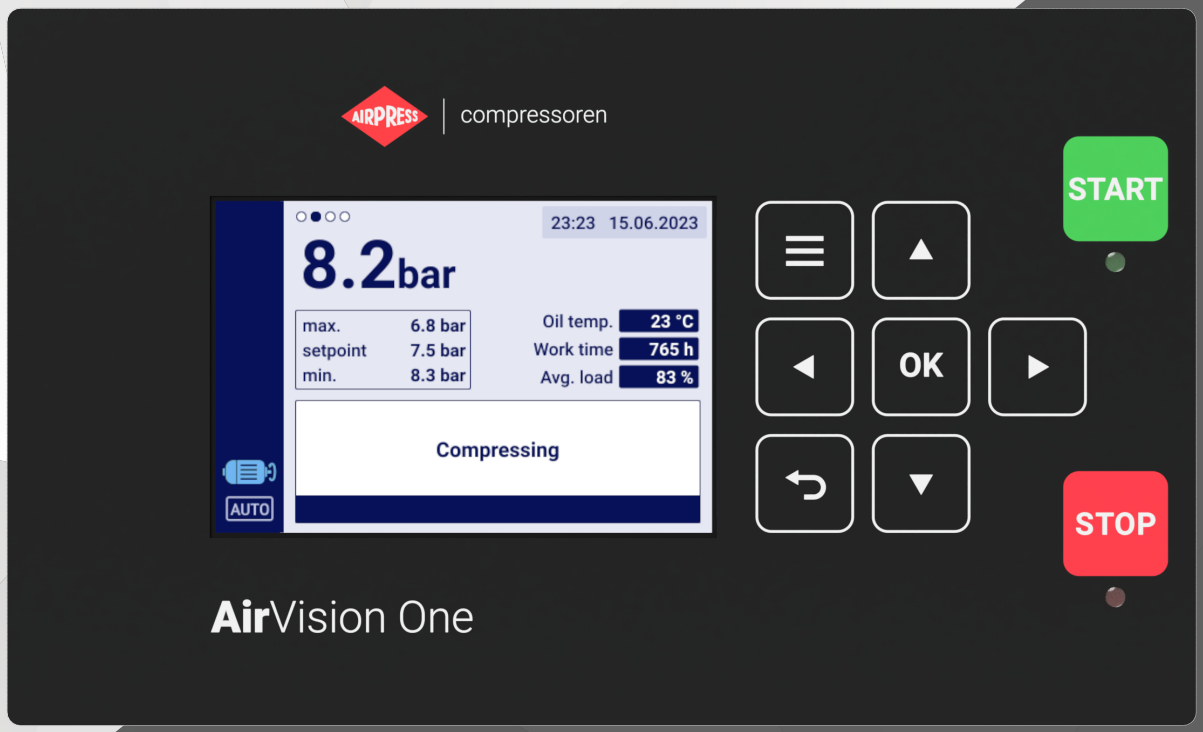
# User manual

EN User manual (Translation of the original document)




# AirVision One

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# 1. General information


Figure 1: Controller visualisation AirVision One

## 1.1. Controller description

AirVision One is a controller dedicated for compressors with a power of up to 22 kW. The controller can work with compressors operating in a star-delta configuration or equipped with an inverter.

Controller features:

- 3.5” color display
- Built-in web server
- Creating statistics
- Supervision function: network pressure, oil pressure, oil temperature, motor temperature and motor current
- Control of oil heaters, air dryer and condensate drain
- Freely configurable controller inputs and outputs
- Automatic restart function
- Inverter control using the Modbus RTU protocol (selection of standard Yaskawa, Danfoss, ABB , Inovance and Delta inverter)
- Star-delta or direct start-up (for compressors without inverter)
- Service parameters and user with access control menu
- Service counters and working time counters
- Network operation mode supporting up to 4 compressors
- Remote operation mode (using digital input)

- Operation scheduling with a division into cyclical and one time events, up to 5 events in total
- Software update via USB port

## 1.2. Input and output list

1. The controller is equipped with 2 RTD inputs to support resistive temperature sensors and has the possibility of independent configuration of each input to a selected sensor (PT100, PT1000, KTY84, PTC). Thanks to the RTD temperature inputs, the controller can control the following parameters:
    - Oil temperature
    - Motor temperature
2. The controller is equipped with 2 analog inputs to support 4-20 mA sensors. The measuring range can be configured from the controller. Supported parameters:
    - Network pressure
    - Oil pressure
3. The controller is equipped with 1 analog input to operate a 5 A standard current transformer. The primary winding current can be freely configured from the controller level.
4. The controller is equipped with 6 digital inputs to support sensors or binary signals with the possibility of configuring the default logic (normally open/normally closed) for each input independently. Supported sensors or signals:
    - Suction sensor
    - Dryer ready
    - Remote start-stop
    - Remote load-unload signal
    - Emergency stop
    - Power supply asymmetry
    - Phase sequence error signal
    - Overload relay error signal
    - Air filter error signal
    - Oil filter error signal
    - Separator error signal
    - AFOFSEP error signal (common error for air filter, oil filter and separator)
    - Fan error signal
5. The controller is equipped with 7 configurable digital (relay) outputs, including:

- 3 outputs with common potential
- 3 outputs with independent potential
- 1 NO/NC output with independent potential

Functions that can be configured on each of the outputs:

- Main power supply
- Star
- Delta
- Y valve
- Condensate drain
- Fan
- Dryer
- Heater 1
- Heater 2
- Warning
- Error
- Warning/error status
- Ready
- Running
- Compressing
- Service

6. The controller is equipped with 1 USB sockets and 1 Ethernet socket

## 1.3. Language versions

Controller AirVision One has 7 language versions:

- Polish
- English
- Dutch
- Spanish
- French
- German
- Russian

It is possible to develop other language versions in consultation with the controller manufacturer.

## 2. Safety information

**Before controller installation and start, refer to the user's manual and warranty terms and conditions. Incorrect installation and operation not in line with the manual will void the warranty.**

**All connection and assembly work must be carried out with the power supply disconnected.**

**Installation work should be carried out by an authorized service provider or authorized personnel.**

**To comply with safety standards, the PE terminal of the controller should be connected to the PE protective conductor.**

**Any use or operation of the controller without the housing installed is not allowed, as this poses a risk of electric shock.**

**Exposing the controller to water or operating in conditions of excessive humidity may cause damage.**

**Before starting, check that all connections are correct, according to the connection diagram in the user's manual.**

**Before starting the controller, check that the power supply meets the requirements specified in the user's manual.**

**Repairs must only be carried out by the manufacturer's service. Repairs carried out by an unauthorized person will make the warranty null and void.**

# 3. Description of connectors

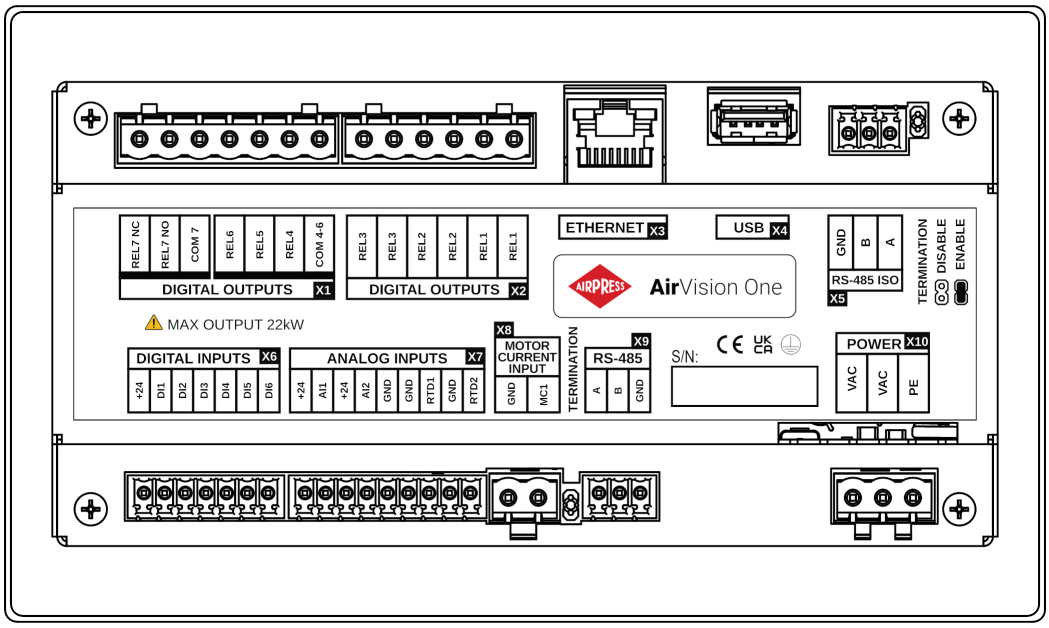


Figure 2: Electrical terminals of the controller

Table 1: Description of digital outputs (X1, X2 DIGITAL OUTPUTS)

| Name | Description |
|---|---|
| *REL1* | Two outputs of the configurable relay output 1 |
| *REL2* | Two outputs of the configurable relay output 2 |
| *REL3* | Two outputs of the configurable relay output 3 |
| *COM 4-6* | Common output of relay outputs from 4 to 6 |
| *REL4* | Configurable relay output 4 |
| *REL5* | Configurable relay output 5 |
| *REL6* | Configurable relay output 6 |
| *REL7 COM* | Common terminal of the relay output 7 |
| *REL7 NC* | N/C contact (normally closed) of relay 7 |
| *REL7 NO* | N/O contact (normally open) of relay 7 |

Table 2: Description of communication outputs (X3,X4)

| Name | Description |
|---|---|
| *ETHERNET* | Ethernet port (RJ45) |
| *USB* | USB port |

Table 3: Description of RS-485 ISO connector (X5)

| Name | Description |
|---|---|
| *GND* | Isolated RS-485 interface ground |
| *B* | Isolated RS-485 interface reversing line |
| *A* | Isolated RS-485 interface non-reversing line |

Table 4: Description of digital inputs (X6 DIGITAL INPUTS)

| Name | Description |
|---|---|
| *+24V* | Internal reference voltage output |
| *DI1* | Configurable digital input 1 |
| *DI2* | Configurable digital input 2 |
| *DI3* | Configurable digital input 3 |
| *DI4* | Configurable digital input 4 |
| *DI5* | Configurable digital input 5 |
| *DI6* | Configurable digital input 6 |

Table 5: Description of analog inputs (X7 ANALOG INPUTS)

| Name | Description |
|---|---|
| *+24V* | Analog input 1 power supply |
| *AI1* | Analog input 1 |
| *+24V* | Analog input 2 power supply |
| *AI2* | Analog input 2 |
| *GND* | Ground terminal |
| *GND* | Resistive temperature sensor 1 ground |
| *RTD1* | Resistive temperature sensor input 1 |
| *GND* | Resistive temperature sensor 2 ground |
| *RTD2* | Resistive temperature sensor input 2 |

Table 6: Description of 5A current transformer input (X8 MOTOR CURRENT INPUT)

| Name | Opis |
|---|---|
| *GND* | Ground terminal of MC1 input |
| *MC1* | Motor current measure input MC1 |

Table 7: Description of RS-485 connector (X9)

| Name | Description |
|---|---|
| *A* | RS-485 interface non-reversing line |
| *B* | RS-485 interface reversing line |
| *GND* | RS-485 interface ground |

Table 8: Description of power outlets (X10 POWER)

| Name | Description |
|---|---|
| *PE* | PE Connector |
| *VAC* | Controller supply voltage (24 VAC) |
| *VAC* | Controller supply voltage (24 VAC) |

The controller is equipped with a housing ground terminal, which is located next to X10 connector.

# 4. Technical specification

## 4.1. Electrical parameters

Table 9: List of electrical parameters

| Parameter | Value |
|---|---|
| Supply voltage | 24 VAC 50/60 Hz +/- 10% |
| Power consumption | Up to 10 W |
| Relays - maximum switching voltage | 250 VAC |
| Maximum load sum of REL4, 5, 6 relay group (resistive) | 4 A |
| Maximum load of each of the REL1, 2, 3 relays (resistive) | 3 A |
| REL7 relay maximum load (resistive) | 3 A |
| Maximum relays load (inductive) | 0,5 A |
| Maximum current in the current loop | 28 mA |
| Maximum power consumption from internal reference voltage | 250 mA |
| Digital inputs - minimum voltage | -0,5 VDC |
| Digital inputs - maximum voltage | 24,7 VDC |
| Analog inputs - minimum voltage | -0,5 VDC |
| Analog inputs - maximum voltage | 24,7 VDC |

## 4.2. Mechanical parameters

Table 10: Mechanical parameters

| Parameter | Value |
|---|---|
| Housing dimensions | 176 x 106 x 38 mm |
| Weight (without packaging) | 465 g |
| Assembly | Clips |

## 4.3. Operating conditions

Table 11: Permissible operating conditions

| Parameter | Value |
|---|---|
| Operating temperature | -15 ÷ 50°C |
| Storage temperature | -20 ÷ 70°C |
| Relative humidity | 10 ÷ 90%, no condensation |

# 5. User interface

## 5.1. Front panel

On the front panel, you will find:

- 9 buttons
- 2 LEDs indicating compressor status
- A display screen showing the graphical user interface


Figure 3: Controller front panel AirVision One

Table 12: Description of LED operation

| LED | Colour | LED behaviour |
|---|---|---|
| START | Green | **Constant** - compressor running (compression, idle mode)<br>**Pulse** - Motor startup |
| STOP | Red | **Constant** - compressor not running<br>**Pulse** - compressor shutting down or waiting for pressure drop |

Table 13: Button operation description

| Button | Function |
|---|---|
| START | Allow compressor to start working |
| STOP | Stop compressor operation |
| Up | Navigation arrow in the graphical user interface |
| Down | Navigation arrow in the graphical user interface |
| Right | Navigation arrow in the graphical user interface |

Table 13: Button operation description

| Button | Function |
|---|---|
| Left | Navigation arrow in the graphical user interface |
| OK | Confirm action |
| Back | Go return to previous level of graphical user interface |
| Menu | Switch to main menu |

# 6. Graphical user interface

## 6.1. Main view

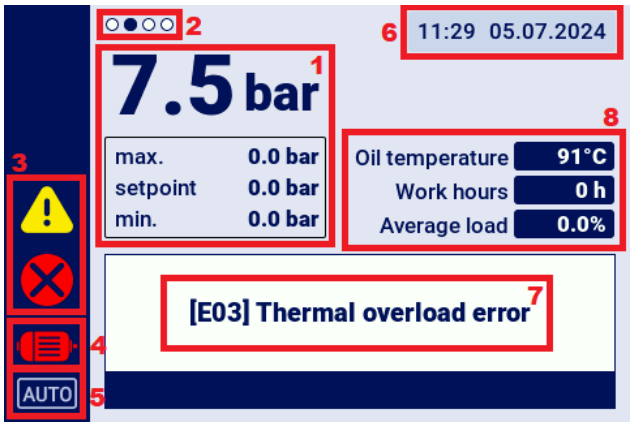


Figure 4: Main view with sections divided

**Description of individual sections:**

1. Pressure gauge in the network, pressure settings
2. Shortcut indicator available from the main view
3. Error icons and warnings
4. Icon indicating current compressor status
5. Operation mode icon
6. Current date and time
7. Text display showing text messages related to compressor status
8. Basic parameters display showing compressor operation

## 6.2. Main view shortcuts

The controller AirVision Onehas the ability to quickly switch from the main view to selected user interface tabs. This can be done using the left and right arrow buttons.
Dots in the top left corner of the display indicate which shortcut view is currently selected.

Table 14: List of main view shortcuts

| Tab name | Position relative to main view |
|---|---|
| Main view | - |
| Active events | < |

Table 14: List of main view shortcuts

| Tab name | Position relative to main view |
|---|---|
| Sensors | > |
| Network work view * | > > |

*-Shortcut only visible when the controller's main mode is enabled.

## 6.3. Compressor status icon

The icon on the side panel of the user interface informs about the current status of the compressor.

**Motor stopped**

**Compression**

**Idle**

**Motor startup or motor stop**

**Ready to start (waiting)**

## 6.4. Error and warning icon

Error and warning icons inform about errors and warnings that occur on the controller or occurred in the past, and may vary visually depending on the location on the graphical user interface.

**Active error icon (Sidebar)**

**Active warning icon (Sidebar)**

**Active error icon (Screen saver)**

**Active warning icon (Screen saver)**

**Error icon (Events)**

**Warning icon (Events)**

**Emergency kill switch icon**

## 6.5. Navigating the graphic user interface

The user graphic interface is operated using a set of buttons located on the front panel of the controller.
The arrow buttons allow you to move between the available fields in the menu data, the cursor in the form of a blue frame indicates which field is currently selected.
To select a specific field move the cursor over a field and confirm your selection with the “OK” button.
The button with a 180-degree curved arrow symbol is the “Undo” button. It allows you to go back to the previous view of the graphic interface, pressing it repeatedly (the number of presses depends on the level of nesting of the specified menu) will always move you to the main view.
The button with the symbol of three horizontal dashes is the “Menu” button, pressing it takes you directly to the main menu.
More detailed descriptions are included in the sections dedicated to each function.

### 6.5.1. Navigating the main view

The main view of the controller allows you to quickly navigate to tabs such as ”Active events”, ”Sensors” and ”Network operation view” by using the left and right arrow buttons.
”Network operation view” is only visible if the controller is configured as a master.

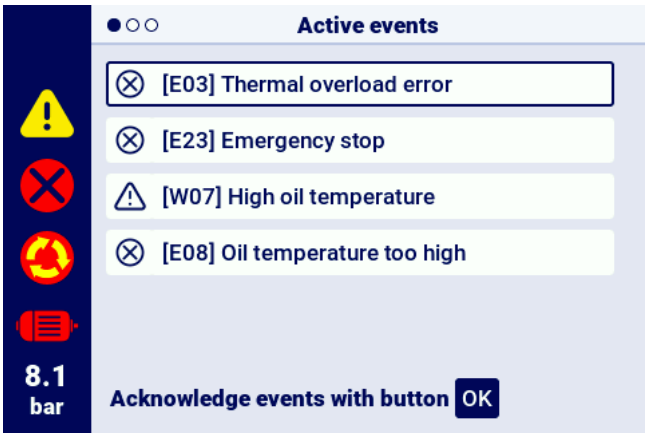


Figure 5: The active events tab is accessible via a quick transition between pages


Figure 6: Controller main menu AirVision One

### 6.5.2. Basic menu types

The user interface is divided into 2 basic menu types (tabs), which differ in the way they are navigated. The first type is a matrix menu, navigation in this case is done using the left, right, top and down buttons.

The second type is a menu in the form of a list, in which navigation is possible using the up and down buttons. If there are more parameters in the list than can fit on the display at the same time, the numbering of the subpages on which the parameters are located is displayed in the upper left corner. The left and right buttons allow you to quickly move to the next page.


Figure 7: Example matrix menu


Figure 8: Example list type menu

### 6.5.3. Sidebar

The rectangular bar on the left side of the screen is visible anywhere on the user's graphic interface, it allows you to continuously view the most important parameters of the compressor.

**List of information that is displayed on the sidebar:**

- Current network pressure
- Motor status
- Active error icon
- Active warning icon
- Safety button icon
- page numbering in the list

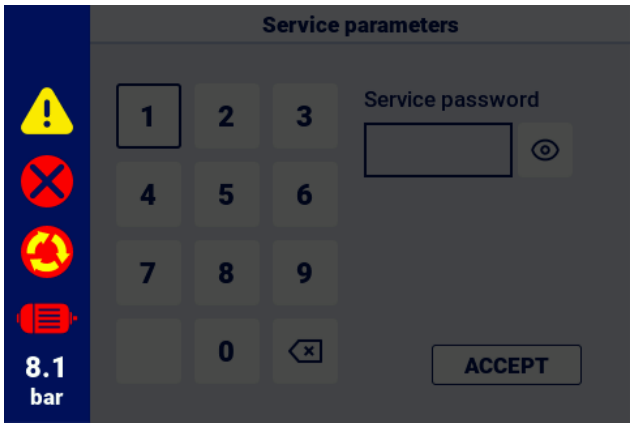


Figure 9: Side bar with visible indication of network pressure and icons for error, warning and emergency button

### 6.5.4. Log in screen

Some interface functionalities require user or service authorization. To do this, select the appropriate access level icon, enter the password, and confirm with the ”LOGIN” button. The entered password is encoded in the form of dots, and the eye icon on the right-hand side allows you to view the entered password. The preview is visible as long as the user presses the ”OK” button.

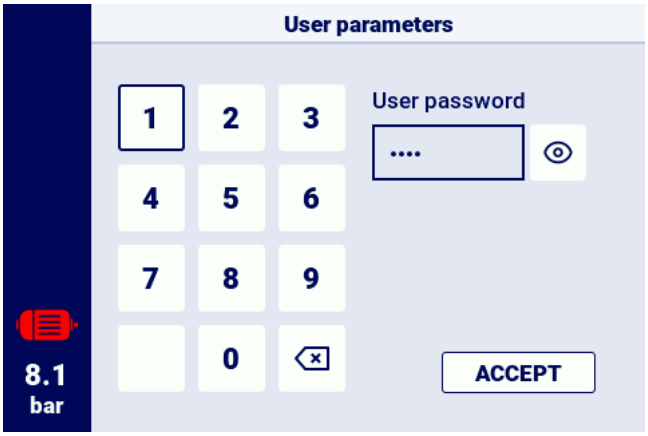


Figure 10: Authorization screen

### 6.5.5. Configuring parameters

The user’s graphic interface stores parameters in subgroups, which are displayed as tiles with descriptions. To go to the desired subgroup, select the tile area with the cursor, and then press the ”OK” button.

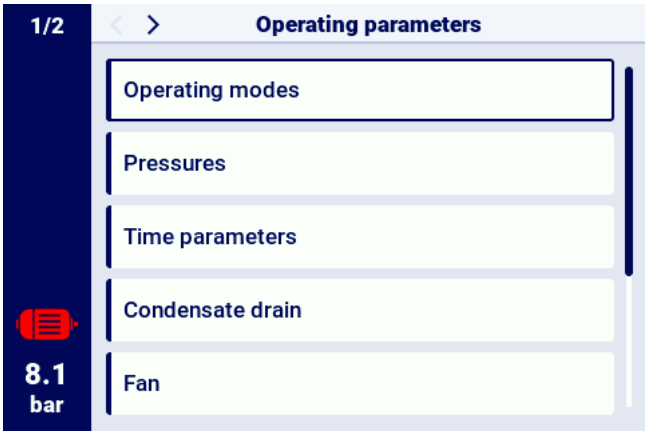


Figure 11: Parameter subgroup tiles showing work parameters

After navigating to the selected subgroup, the parameters will be displayed in the form of tiles displaying the name of the parameter and its current value. To modify the value of a parameter, press the ”OK” button when the cursor is on the specified parameter.
The pencil symbol indicates that the specified parameter can be modified. Parameters with a switch symbol are an exception. There is no pencil symbol next to them, but they can be modified.

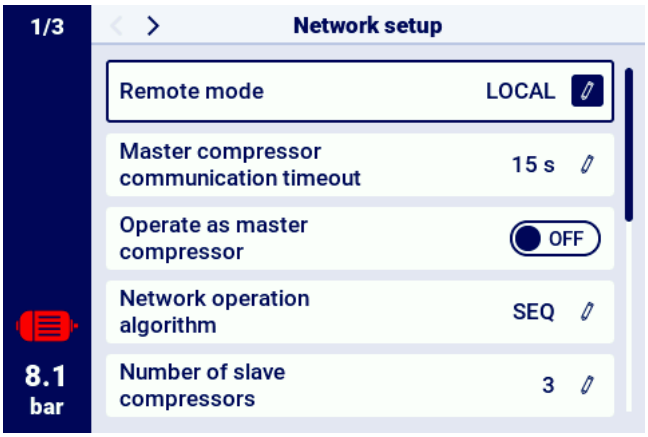


Figure 12: Parameter tiles showing a subgroup of network operation configuration parameters

A selected parameter, depending on its type, can be configured by entering values from the on-screen keyboard or by selecting an item from a predefined list. The on-screen keyboard may vary depending on the parameter being edited, allowing negative values to be entered (by using the symbol for changing the sign to negative). After entering a new parameter value, the operation must be approved with the ”SAVE” button. The permissible range of the parameter is displayed. Under the field where the entered value is displayed. To cancel the change, press the ”Undo” button instead of saving the new value.

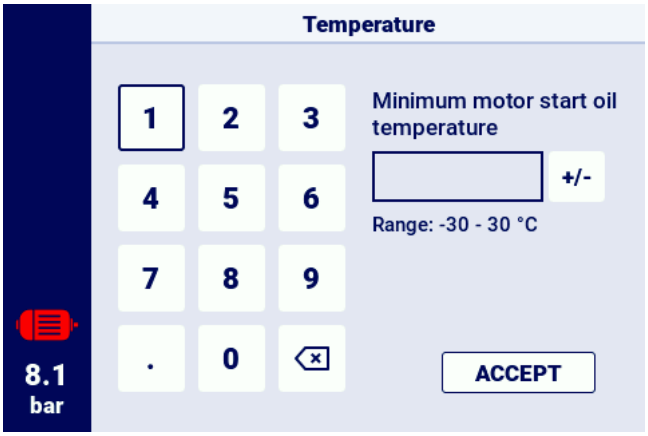


Figure 13: The on-screen keypad showing start minimum oil temperature

Parameters which require selecting a value from a predefined list for configuration are another type of parameters.
The ”On”, ”Off” parameters are a special type of such parameters. They are marked with a slider symbol and allow you to change the value without opening the selection list. Just selecting such a parameter changes its value to the opposite of the current one.

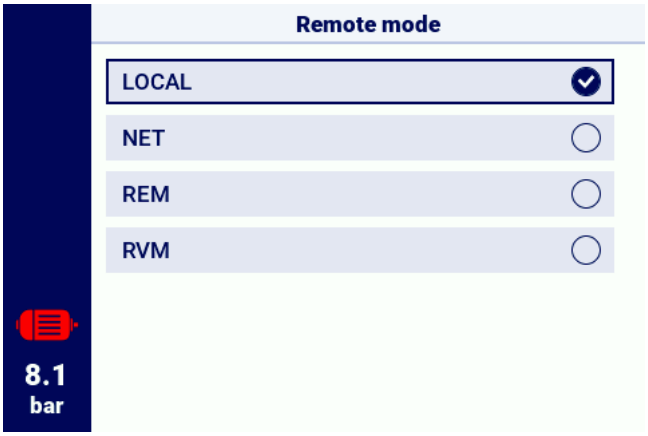


Figure 14: List example

### 6.5.6. Screen messages

The controller displays messages addressed to the user in the upper right corner of the screen, in the form of a message window. To close the message window, press any of the buttons on the controller except the ”On” and ”Off” buttons. These messages inform, for example, that an invalid password has been entered or that the update is in progress. They are not archived in the controller’s memory.

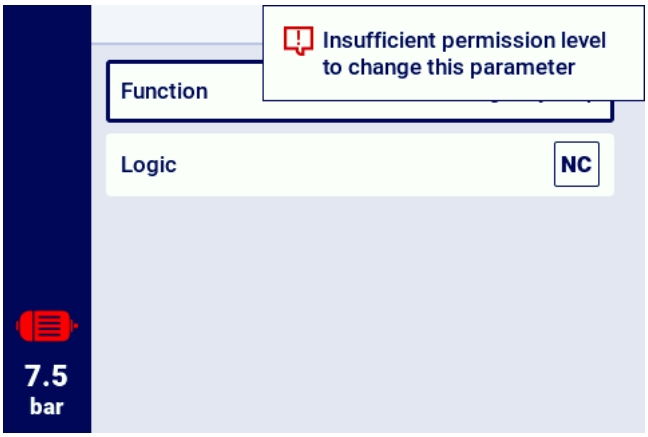


Figure 15: On-screen message example

## 6.6. Main menu

To access the main menu, press the menu button (3 horizontal dashes). From this level, it is possible to select available sub-tabs.

**List of sub-tabs:**

- User parameters
- Service parameters

- Sensors
- Active events
- Counters
- Statistics
- Operation planning
- Event history
- Information
- Search parameter


Figure 16: Main menu

### 6.6.1. Search parameter

The ”Search parameter” tab allows you to navigate to a specific parameter or group of parameters by entering its number in the search bar.
For a complete list of parameters with their numbers, see the section on parameters.

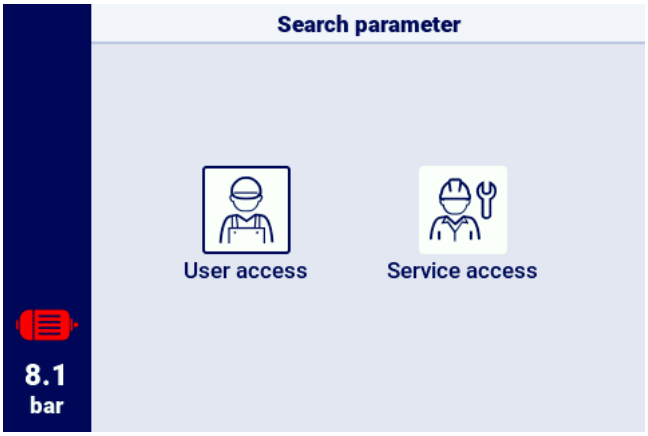


Figure 17: Access level selection

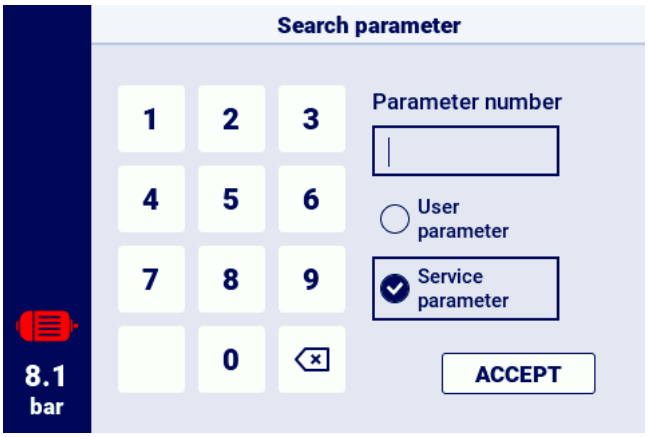


Figure 18: Parameter search menu

### 6.6.2. Information

The ”Information” tab contains basic data about the compressor and the controller. You will also see a button used to start the controller software update procedure.

**List of data stored in the information tab:**

- Software version
- Compressor serial number
- Controller serial number
- Manufacturer information
- Compressor startup method

- Controller IP address
- Controller MAC address


Figure 19: “Information” tab

### 6.6.3. Sensors

In the ”Sensors” tab, a preview of the current values of measurements taken by the controller and read from the inverter is available. The preview is available only for active sensors, configured in the input and output parameters. Each value has a unit in which it is displayed, except for the motor temperature for the PTC sensor (in this case, the user can read the correct temperature marked with ”✓”, or incorrect marked with ”**X**”).

**List of values in the sensors tab:**

- Network pressure
- Oil pressure
- Oil temperature
- Motor temperature
- Motor current
- Motor power
- Output frequency

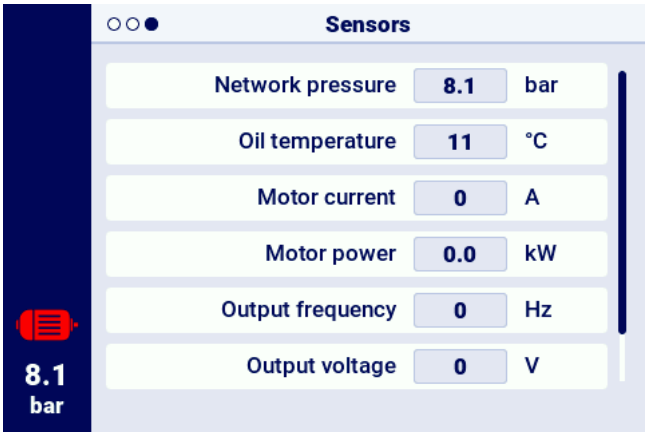


Figure 20: Sensors view

### 6.6.4. Counters

The “Counters” tab allows you to view the current values of service counters and modify them. Each counter is presented in the form of a tile containing information about the date of the next service and the remaining number of operating hours. The service counter can be configured for both of the previously mentioned values or only for one of them. In this case, only the configured value is displayed. If the counter is inactive, its tile shows an ”OFF” icon.

To reset the counter, select its tile, and then select the ”RESTART” parameter. The counter will be restarted to the values defined by the compressor manufacturer. The list of counters may vary depending on the compressor configuration.

**List of supported counters:**

- General inspection counter
- Oil change counter
- Oil filter counter
- Air filter counter
- Separator counter
- Belt tensioner counter
- Motor bearing lubrication counter
- General purpose counter 1
- General purpose counter 2


Figure 21: ”Service counters” tab

### 6.6.5. Events

The ”Events” tab allows you to check the history of errors and warnings that occurred on the controller. Each event has the following parameters assigned: date and time occurrence, content and symbol. The list archives 50 events, and when this number is exceeded, the oldest events are deleted.


Figure 22: Event history tab

### 6.6.6. Statistics

The AirVision One controller aggregates sensor measurements and information on compressor operation and presents them in the form of statistics. The ”Statistics” tab stores information about the time and cycles of compressor operation. The types of load data are different for star-delta start and inverter compressors.

Table 17: Parameters from the ”Consumption” tab

| Parameter name | Parameter description |
|---|---|
| Total operating time | Total motor operating time |
| Operating time under load | Total compression time |
| Average load | Ratio of running time under load to total running time |
| Number of motor starts | Total number of motor starts |
| Average number of motor starts | Average number of motor starts per hour |
| Number of Y-valve engagements | Total number of Y-valve engagements |
| Load 80% - 100% [F] | Total operating time per load range |
| Load 60% - 80% [F] | Total operating time per load range |
| Load 40% - 60% [F] | Total operating time per load range |
| Load 20% - 40% [F] | Total operating time per load range |

[F]-Parameter available only for compressors equipped with an inverter

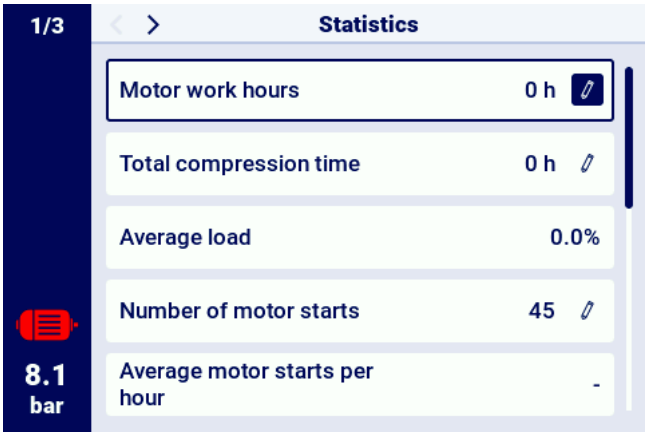


Figure 23: Statistics tab

## 7. User Preferences

UThe user can configure his preferences in the ”User preferences” tab:
**User parameters -> User preferences**. There you will find a set of settings that do not directly affect the operation of the compressor, but have an impact on the user’s comfort in operating the controller.

**List of sub-tabs:**

- Display

- Units
- Language
- Date and time
- Compressor name

## 7.1. Adjusting the display brightness

The controller display brightness can be adjusted in the tab:
**User parameters -> User preferences -> Display**.
The minimum brightness level available is 10%, the maximum is 100%

## 7.2. Screen saver configuration

You can enable or disable the screen saver by going to the tab:
**User parameters -> User preferences -> Display**.
Setting the ”Screen saver” switch to ”On” or ”Off”. The ”Screen saver delay” parameter defines the number of seconds after which the screen saver will turn on in case of inactivity.

## 7.3. Units

The controller allows you to configure the units in which the values read from each sensor are displayed, the configuration is available in the tab:
**User parameters -> User preferences -> Units**.

**List of temperature units:**

- °C
- °F

**List of pressure units:**

- bar
- psi

## 7.4. Controller language

To select a different language version of the user interface, go to the tab:
**User parameters -> User preferences -> Language**.

**List of language versions:**

- Polish
- English

- Dutch
- Spanish
- French
- German
- Russian

## 7.5. Date and time settings

To set the correct date and time on the controller, go to the tab:
**User parameters -> User preferences -> Date and time**.
The controller also allows you to change the time display format to 12 hours.

## 7.6. Compressor name

The controller allows you to give a name to your own compressor. This allows quick identification of the compressor from the Web server. To enter a compressor name, go to the tab:
**User parameters -> User preferences -> Compressor name**.
Then enter the name using the on-screen keyboard.

# 8. User parameters

**Default user password: 1234**

User parameters are available in the ”Parameters menu” tab. Access requires a user password, default password is ”0000”. Parameters are grouped into several submenus. Some parameters are only available in preview mode. The value of parameters in the preview mode can only be viewed. When attempting to modify a parameter that is available for preview only, the controller will display a screen message saying “Too low permission level to change this parameter”. The visibility and range of individual parameters may depend on the values of other interdependent parameters.

Table 18: List of user parameters

| Name | Modification | Range | Location |
|---|---|---|---|
| Display brightness | Yes | 10-100 % | User preferences -> Display |
| Screensaver | Yes | On; Off | User preferences -> Display |
| Screensaver delay | Yes | ≥ 0 s | User preferences -> Display |
| Temperature unit | Yes | °C; °F | User preferences -> Units |
| Pressure unit | Yes | bar; psi | User preferences -> Units |
| Language | U | Polish; English; German; Russian; French; Dutch; Spanish | User preferences -> Language |
| Time | Yes | hh:mm | User preferences -> Date and time |
| Date | Yes | dd-mm-rrrr | User preferences -> Date and time |
| Time format | Yes | 24h; 12h | User preferences -> Date and time |
| Automatic change to daylight saving time | Yes | On; Off | User preferences -> Date and time |
| Compressor name | Yes | | User preferences -> Compressor name |
| Operation mode | Yes | AUTO; CONST | Operation parameters -> Operation modes |
| Remote mode | Yes | LOCAL; NET; REM; RVM | Operation parameters -> Operation modes |
| Network pressure high warning | Yes | | Operation parameters -> Network pressure |
| Unload pressure | Yes | | Operation parameters -> Network pressure |
| Set pressure[F] | Yes | | Operation parameters -> Network pressure |
| Load pressure | Yes | | Operation parameters -> Network pressure |
| Low network pressure warning | Yes | | Operation parameters -> Network pressure |
| Restart delay | No | | Operation parameters -> Time parameters |

Table 18: List of user parameters

| Name | Modification | Range | Location |
|---|---|---|---|
| Main contactor delay | No | | Operation parameters -> Time parameters |
| Motor acceleration time | No | | Operation parameters -> Time parameters |
| Y valve on delay | No | | Operation parameters -> Time parameters |
| Idle time | Yes | 10-32767 s | Operation parameters -> Time parameters |
| Adaptive idle (AutoTIse) | Yes | On;<br>Off | Operation parameters -> Time parameters |
| Motor deceleration time | No | ≥ 0 s | Operation parameters -> Time parameters |
| Star-delta changeover time | No | | Operation parameters -> Time parameters |
| Condensate drain function | Yes | On;<br>Off | Operation parameters -> Condensate drain |
| Drain open time period | Yes | 0-720 min | Operation parameters -> Condensate drain |
| Drain open time | Yes | 0-600 s | Operation parameters -> Condensate drain |
| Fan function | No | | Operation parameters -> Fan |
| Fan on | No | | Operation parameters -> Fan |
| Fan off | No | | Operation parameters -> Fan |
| Dryer function | No | | Operation parameters -> Dryer |
| Drying time before compressor start | No | | Operation parameters -> Dryer |
| Drying time after compressor stop | No | | Operation parameters -> Dryer |
| Duration of pulse mode after compressor stop | No | | Operation parameters -> Dryer |
| Pulsation period time | No | | Operation parameters -> Dryer |
| Enable time in pulse mode | No | | Operation parameters -> Dryer |
| Waiting time in pulse mode | No | | Operation parameters -> Dryer |
| Dryer waiting time | S* | 0-720 min | Operating parameters -> Dryer |
| Heater 1 | No | | Operation parameters -> Heater |
| Heater 1 hysteresis | No | | Operation parameters -> Heater |
| Heater 2 | No | | Operation parameters -> Heater |
| Heater 2 temperature offset | No | | Operation parameters -> Heater |
| Heater 2 hysteresis | No | | Operation parameters -> Heater |
| Idle reheating | No | | Operation parameters -> Heater |
| Idle reheating on temperature | No | | Operation parameters -> Heater |
| Idle reheating off temperature | No | | Operation parameters -> Heater |
| Restart after power failure | Yes | On;<br>Off | Operation parameters -> Auto restart |
| Restart after error | Yes | On;<br>Off | Operation parameters -> Auto restart |
| Reboot delay | Yes | ≥ 0 s | Operation parameters -> Auto restart |

Table 18: List of user parameters

| Name | Modification | Range | Location |
|---|---|---|---|
| Maximum number of restart attempts | Yes | ≥ 1 | Operation parameters -> Auto restart |
| Restore user settings from local copy | Yes | | Service and Diagnostics -> Restore and save settings |
| Restore user settings from external media | Yes | | Service and Diagnostics -> Restore and save settings |
| User password | Yes | 1-10 digits | Factory settings -> Passwords |
| Function and logic of each digital input | No | | Input/output configuration -> Digital inputs |
| Function and logic of each digital output | No | | Input/output configuration -> Digital outputs |
| Function and range of each analog input | No | | Input/output configuration -> Analog inputs |
| Baud rate | Yes | 2400; 4800; 9600; 19200; 38400; 57600; 115200; 230400 | I/O configuration -> RS-485/RS-485 ISO |
| Parity | Yes | None; Even; Odd; | I/O configuration -> RS-485/RS-485 ISO |
| Stop bits | Yes | 1; 1.5; 2 | I/O configuration -> RS-485/RS-485 ISO |
| RS-485/RS-485 ISO function | Yes | None; Superior; Subordinate | I/O configuration -> RS-485/RS-485 ISO |
| Modbus address | Yes | 1-255 | I/O configuration -> RS-485/RS-485 ISO |
| IP address assignment | Yes | Auto(DHCP); Static(no DHCP) | I/O configuration -> IP settings |
| IP address | Yes | | I/O configuration -> IP settings |
| Subnet Mask | Yes | | I/O configuration -> IP settings |
| Gateway | Yes | | I/O configuration -> IP settingsP |
| Safety valve test [O] | Yes | < 15.5 bar | Diagnostics -> Safety valve test |
| Remote mode | Yes | LOCAL; NET; REM; RVM; | Network operation -> Configuration |
| Communication time limit with master compressor | Yes | ≥ 0 s | Network operation -> Configuration |
| Operation as master compressor | Yes | Enable; Disable | Network operation -> Configuration |
| Network operation algorithm | Yes | SEQ; CAS | Network operation -> Configuration |
| Number of slave compressors | Yes | 0-3 | Network operation -> Configuration |
| Switch-on delay between slave compressors | Yes | 0-60 s | Network operation -> Configuration |

Table 18: List of user parameters

| Name | Modification | Range | Location |
|---|---|---|---|
| Rotation time | Yes | ≥ 1 min | Network operation -> Configuration |
| Relief pressure for master compressor | Yes | | Network operation -> Configuration |
| Load pressure for master compressor | Yes | | Network operation -> Configuration |
| Automatic reconfiguration of pressure limits | Yes | Enable; Disable | Network operation -> Configuration |
| Network operation point | Yes | | Network operation -> Configuration |
| Pressure relief (slave compressor) | Yes | | Network operation -> Compressor 1/2/3 |
| Load pressure (slave compressor) | Yes | | Network operation -> Compressor 1/2/3 |
| Interface (slave compressor) | Yes | RS-485; RS-485 ISO | Network operation -> Compressor 1/2/3 |
| Modbus address (slave compressor) | Yes | 1-255 | Network operation -> Compressor 1/2/3 |
| Scheduled operation | Yes | Activate; Deactivate | Scheduling operation |
| Add event | Yes | | Job scheduling -> One-time events/cyclic events |

[F]-Parameter available only for compressors equipped with an inverter
[O]-Optional parameter

## 8.1. Change user password

To change the default user password, go to **User parameters->Factory settings->Passwords„** and then enter a value in the “User password” parameter. The password can be from 1 to 10 digits in length.
If you forget the user password, please contact the service.

## 8.2. User parameter search

The ”Search parameter” tab allows you to navigate to a specific parameter or group of parameters by entering its number in the search bar.

Table 19: List of user parameters

| Parameter number | Parameter description |
|---|---|
| 1 | Scheduling operation |
| 2 | Service counters |
| 3 | Change language |

Table 19: List of user parameters

| Parameter number | Parameter description |
|---|---|
| 4 \| 5 \| 26 | Configuring network operation |
| 6 | Information screen |
| 7 \| 18 | Event history |
| 8 \| 25 | Input/output configuration |
| 11 \| 12 | Date and time settings |
| 15 \| 61 | Time parameters |
| 27 \| 28 | Network operation settings |
| 30 | Dryer parameters |
| 40 | Condensate drain parameters |
| 51 \| 52 | Display settings |
| 90 | Auto restart settings |
| 111 | Reset menu |
| 423 | Changing user password |

# 9. Operating algorithm

The controller AirVision One is equipped with several motor control algorithms depending on the type of compressor. The control algorithm is configured according to the compressor's specifications during the production stage. The controller allows for determining the following starting methods:

- Star-Delta
- Modbus inverter
- Direct

The above methods of electric motor control and their operating principles are described in the subsections below.

## 9.1. Operating algorithm diagram in Star-Delta configuration

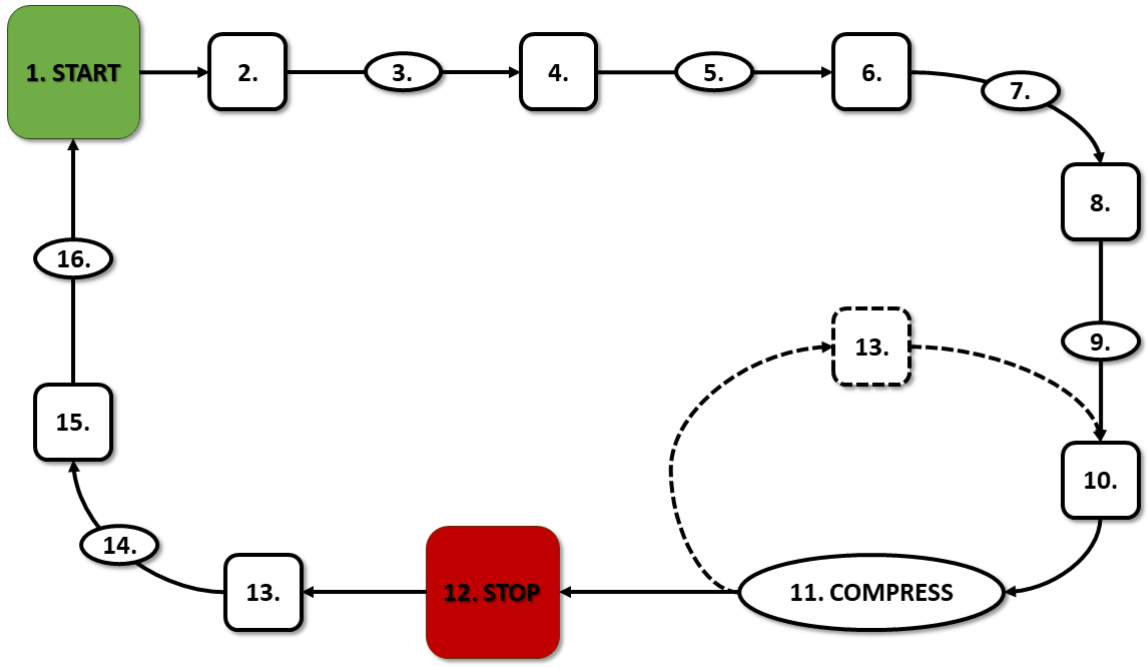


Figure 24: Motor control algorithm

The basic operating algorithm of a compressor in a star-delta configuration:

1. Start (e.g., pressing the **START** button)
2. Activate the star contactor (start the motor in star configuration)
3. Main contactor delay
4. Activate the main contactor

5. Startup - motor acceleration time
6. Deactivate the star contactor
7. Star-delta switching time
8. Activate the delta contactor (start the motor in delta configuration), and start the actual operation
9. Compression delay - delay in opening the Y valve
10. Open the Y valve - and then start the compression
11. Compression - The Y valve is controlled by the operating algorithm according to the required upper and lower pressure settings. Deactivating the Y solenoid valve relieves the compressor, and the motor enters an idle state
12. Stop operation (e.g., pressing the **STOP** button)
13. Close the Y valve, and go to an idle state
14. Stopping - motor stopping time
15. Deactivate the delta and main contactors
16. Restart delay

### 9.1.1. Compressor operating time parameters

Settings for all times and delays used in the control algorithm can be found in:
**User parameters -> Operating parameters -> Time parameters**.

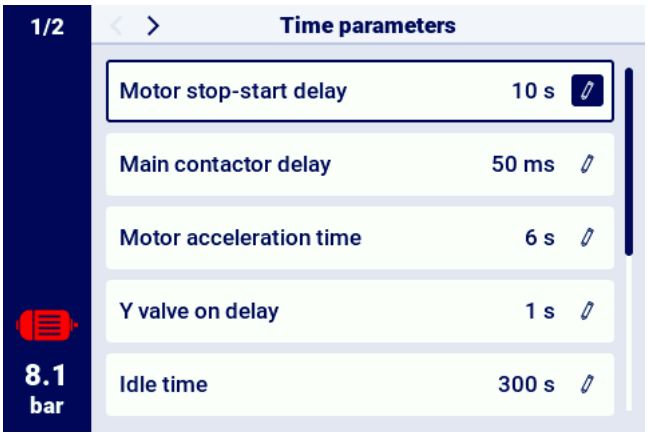


Figure 25: View of the menu with time parameter settings for the Star-Delta configuration

Table 20: List of compressor operating time parameters

| Name | Unit | Description |
|---|---|---|
| Restart delay | s | The minimum time between compressor shut-down and the next start. If the compressor is re-started before this time elapses, the motor will start with an appropriate delay |
| Main contactor delay | ms | The time between turning on the main contactor and turning on the star configuration contactor |
| Motor ramp-up time | s | The time it takes for the electric motor to ramp up. The time it takes to switch from the star configur-ation to the delta configuration |
| Y-Valve activation delay | s | The waiting time for pressurization, during which the motor is idling |
| Idle running time | s | The time the motor is idling after exceeding the up-per pressure limit |
| Motor stop time | s | The time the motor is idling after pressing the **STOP** button |
| Star-Delta switching Time | ms | The time between turning off the star configura-tion contactor and turning on the delta configura-tion contactor. |
| Adaptive idle run (AutoTIse) | | Described in the chapter **9.4.1. Adaptive idle run (AutoTIse)** |

## 9.2. Scheme of the control algorithm in the inverter configuration

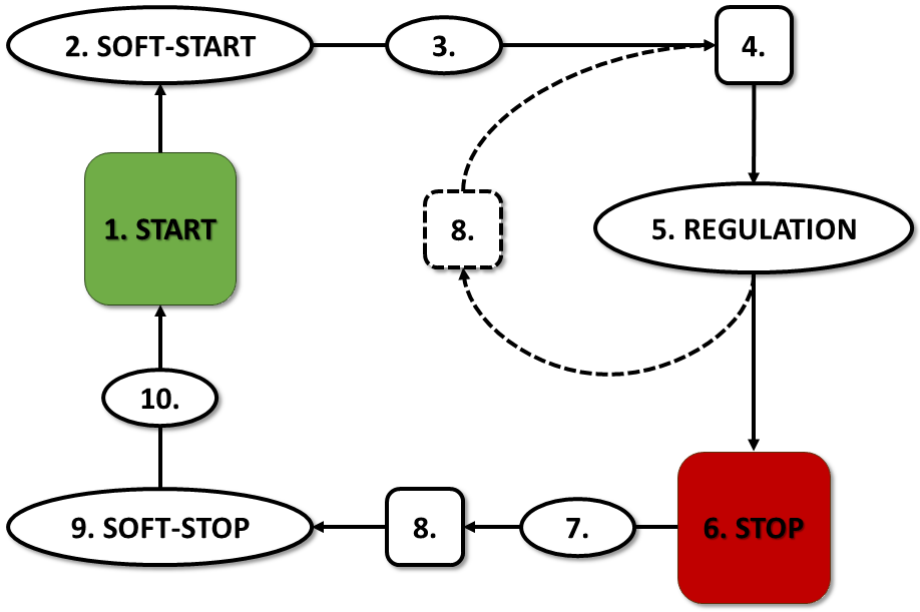


Figure 26: Motor control algorithm

The primary algorithm for compressor operation in the Inverter configuration:

1. Starting the operation (e.g., pressing the **START** button)
2. Startup - motor acceleration time
3. Compression delay - delay in turning on valve Y
4. Valve Y activation - and then start of compression
5. Compression - during compression, pressure is controlled by turning valve Y on and off, and motor speed is controlled by the PID algorithm. Turning off solenoid valve Y releases the compressor and puts the motor in idle mode.
6. Stopping the operation (e.g., pressing the **STOP** button)
7. Delay in deactivating valve Y
8. Deactivation of valve Y, transition to idle mode
9. Stopping - motor stopping time
10. Restart delay

### 9.2.1. Compressor operating time parameters

Settings for all times and delays used in the control algorithm can be found in:
**User parameters -> Operating parameters -> Time parameters**.


Figure 27: Menu view with time parameter settings for the Inverter configuration

Table 21: List of compressor operating time parameters

| Name | Unit | Description |
|---|---|---|
| Restart delay | s | The minimum time between compressor shut-down and the next start. If the compressor is re-started before this time elapses, the motor will start with an appropriate delay. |
| Motor acceleration time | s | The time it takes for the electric motor to accel-erate. A gradual motor startup procedure (**SOFT-START**) to the minimum speed. |
| Y-Valve activation delay | s | The waiting time for pressurization, during which the motor is idling. |
| Y valve deactivation delay | s | The delay in deactivating Valve Y after pressing the button **STOP** |
| Idle running time | s | The time the motor is idling after exceeding the up-per pressure limit. |
| Motor stop time | s | The time it takes for the electric motor to stop. Gradual engine stop procedure (**SOFT-STOP**) |
| Adaptive idle run (AutoTlse) | | Described in the chapter **9.4.1. Adaptive idle run (AutoTlse)** |

### 9.2.2. PID Controller

The output frequency of the drive motor is controlled by a PID algorithm based on the current and desired pressure values. The controller will aim to maintain the appropriate rotational speed of the compressor shaft to optimize the compression process and reduce electrical energy consumption.

### 9.2.3. Set pressure

For configurations with a drive motor in the control algorithm, in addition to the lower and upper-pressure limits, the set pressure value is also taken into account. This is the so-called PID algorithm control point, which is the desired pressure value in the network, and the algorithm strives to continuously maintain this pressure value through smooth compressor output adjustment.

Its value can be set, along with the other pressure settings, in the section:
**User parameters -> Operating parameters -> Network pressure**.
The value of this parameter is also displayed on the main screen of the controller. For other control algorithms, such as Star-Delta, this parameter is not visible.

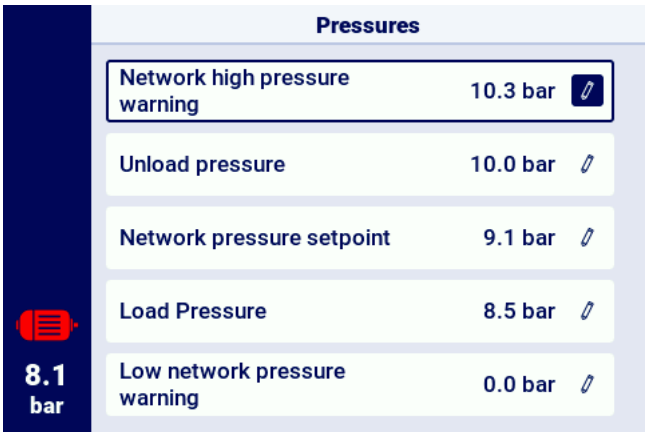


Figure 28: Network pressure settings

## 9.3. Primary operation algorithm in Direct Start configuration

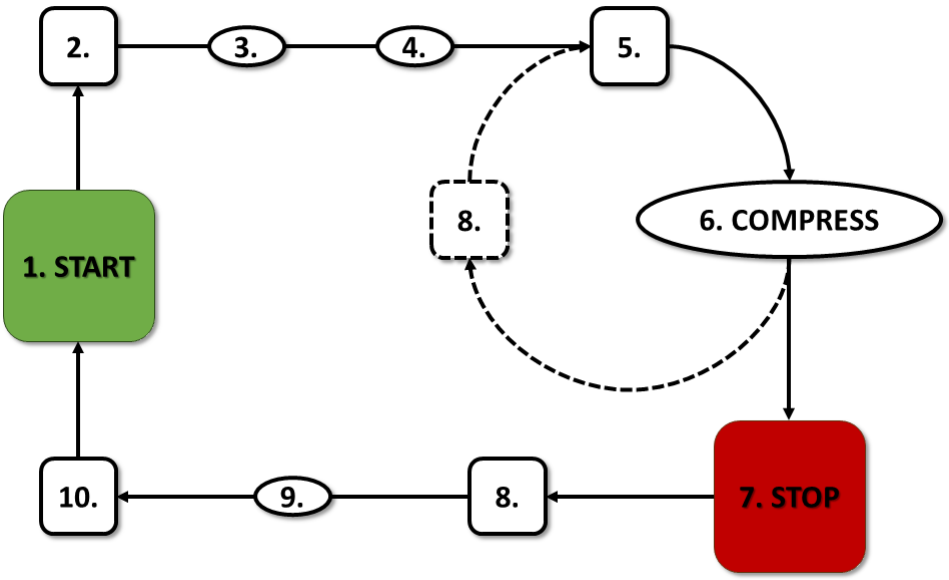


Figure 29: Motor control algorithm

Primary operation algorithm in Direct Start configuration:

1. Starting work (e.g., pressing the **START** button)
2. Main contactor activation
3. Motor startup - motor ramp-up time
4. Compression delay - delay in turning on valve Y
5. Valve Y activation - and the start of compression
6. Compression. Valve Y is switched on/off by the operation algorithm according to the required upper and lower pressure limits
7. Stopping work (e.g., pressing the **STOP** button)
8. Turning off valve Y, transition to idle mode
9. Stopping - motor stopping time
10. Main contactor deactivation

### 9.3.1. Compressor operating time parameters

The settings for all times and delays used in the control algorithm can be found in:
**User parameters -> Operation parameters -> Time parameters**.

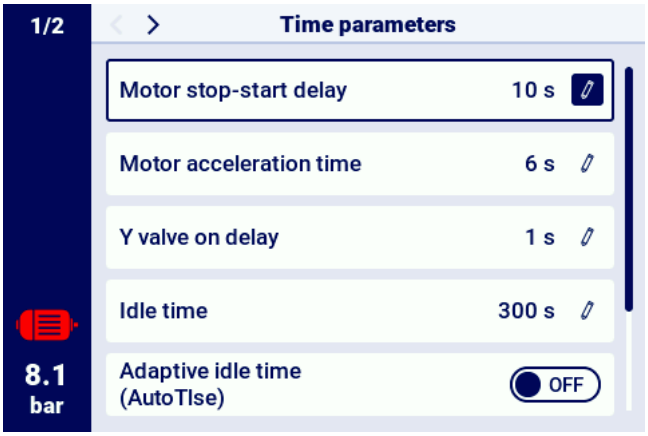


Figure 30: View of the menu with time parameter settings for Direct Start configuration

Table 22: List of time parameters for compressor operation

| Name | Unit | Description |
|---|---|---|
| Restart delay | s | The minimum time between compressor shut-down and the next start. If compressor operation resumes before this time elapses, the motor will start with the appropriate delay |
| Motor ramp-up time | s | Time it takes for the electric motor to reach full speed |
| Y-valve activation delay | s | Waiting time for pressurization, during which the motor is idling |
| Idle run time | s | Time of free operation after exceeding the upper pressure limit |
| Motor stopping time | s | Time of free operation after pressing the **STOP**button |
| Adaptive idle run (AutoTIse) | | Described in the chapter **9.4.1. Adaptive idle run (AutoTIse)** |

## 9.4. Idle run

The idle run of the compressor is a part of every operating mode provided in the controller. It is accomplished by closing the Y-valve and keeping the motor running. This allows the machine to quickly return to the air compression state in case of pressure drop, without the need for a full motor restart.

The idle run time can be defined by going to the tab:

**User parameters -> Operating parameters -> Time parameters -> Idle run time**.

The available range for idle run time setting depends on the specific compressor model. When the idle run time ends the motor is stopped.

### 9.4.1. Adaptive idle run (AutoTIse)

Optimally setting the idle run time is crucial for economic reasons. A time set too long results in unnecessary idle running of the engine, leading to increased electrical energy consumption. Conversely, setting a short idle run time can lead to frequent compressor start and stop cycles, causing an increase in electrical energy consumption and reducing the mechanical components' lifespan.
Utilizing the algorithm allows for automatic control of the engine's idle run time in the automatic compressor operation mode. The system continuously analyzes the historical and current tank pressure value, taking into account the following parameters:

- pressure monotonicity,
- pressure rise/fall rate,
- reference pressure values to upper and lower limits,
- pressure rise/fall times in previous compressor start/stop cycles,
- set idle run time,
- estimated number of compressors starts per hour.

Based on the gathered information, the function **AutoTIse** scontrols the idle run time mainly by reducing it, ensuring that it is never shorter than the minimum idle run time set in the time parameters in the controller's factory settings. If there is little demand for pressure in the network during idle operation and the pressure decreases slowly or not at all, the algorithm accelerates the compressor's shutdown. If there is an anticipated need to restart the compressor shortly after the motor is turned off, the compressor remains in idle run mode.
The Adaptive idle run function can be used both on standalone compressors and compressors in a network.
To enable this function **AutoTIse** go to the **User parameters screen -> Work parameters -> Time parameters** and set the "Adaptive idle run" parameter to "Enable."

## 9.5. Decompression control method

The controller AirVision One can control decompression using several methods, including a suction sensor, time delay, or oil pressure sensor.

# 10. Compressor and controller operation settings

Compressor operation mode settings can be found in the **User Parameters -> Operation Parameters -> Operating Modes** tab. The operation mode settings are divided into 2 independent groups: Operation mode and Remote mode. The first one defines the compressor's operation algorithm, the second one defines the way the compressor is controlled.

## 10.1. Operation modes

Available operation modes:

- AUTO
- CONST

### 10.1.1. Automatic mode (AUTO)

The automatic operating mode involves the compressor starting and stopping automatically when predefined load and unload pressure values are reached. To initiate automatic operation, press the green START button.
When the network pressure reaches the maximum set value, the compressor will enter an idle state. If the network pressure falls below the minimum set value before the idle time elapses, the compressor will resume loading. If the idle time ends, and the network pressure falls within the set pressure range, the engine will be stopped. The compressor will automatically restart when the pressure drops below the minimum pressure value. To disable automatic operation, press the red STOP button.
During automatic operation, it is possible to force the transition from the idle state to the loading state before the load pressure is reached by pressing the START button, provided the current network pressure is lower than the unload pressure.

### 10.1.2. Continuous mode (CONST)

The continuous operation mode keeps the compressor motor in a continuous state of operation. This is done through infinite idling time. To start the continuous mode, press the green START button.
When the network pressure reaches the setpoint (max.), the compressor will idle until the network pressure falls below the setpoint (min.), after which it will start compressing again. When the compressor is started with the START button and the network pressure is within the set pressure, the motor will not start. The motor will be started for the first time when the pressure drops below the minimum value. Press the red stop button to deactivate the continuous operation mode. During continuous operation, it is possible to force the transition from idle run to the compression state before the load pressure is reached by pressing the START button, provided that the current network pressure is lower than the offload pressure.

## 10.2. Remote modes

Available remote modes:

- LOCAL
- NET
- REM
- RVM

### 10.2.1. Local control mode (LOCAL)

In local control mode, the compressor operates according to pressures set on the controller (minimum and maximum). The compressor is controlled by the START and STOP buttons, and its operation is governed by internal algorithms of the controller, depending on the selected operation mode.

### 10.2.2. Network mode NET

In network operation mode, the compressor operates according to the pressure settings provided by the master controller via Modbus RTU. The NET mode is dedicated to the operation of the compressor as a slave. The master controller is responsible for starting the operation of the compressor, you do not have to press the START button.

### 10.2.3. Remote control mode REM

In REM remote control mode, the compressor does not control the network pressure setting. It is done through a digital input configured as ”Remote load - unload signal”. Pressure control is carried out externally, e.g. via the master controller.
When the load signal appears on the controller’s digital input, the compressor will behave in the same way as if the pressure dropped below the setpoint (min.). When the signal on the digital input is changed to unload, the compressor will behave as if the upper limit of the set pressure (max.) was exceeded.
Apart from the above mentioned differences, the operation of the compressor control algorithm is carried out according to the selected operating mode. When the REM remote control mode is selected in the main interface view, pressure ranges will be replaced by an ”External pressure control” message. Despite the lack of supervision over the set pressure in the network, the controller continuously controls the pressure limits set by the compressor manufacturer. If the measured pressure in the network exceeds the maximum pressure value, the compressor will be stopped.
**Note!**
To start the compressor in the REM remote control mode, press the START button on the controller.

### 10.2.4. REM remote control mode configuration

To configure remote control in REM mode, set the ”Remote mode” parameter to ”REM” (**User parameters-> Operation parameters-> Operation modes -> Remote mode**). In order to enable remote control in REM mode, one of the digital inputs of the controller should be assigned the function ”Load-relief remote signal”. To verify, go to the digital input configuration parameters (**User parameters-> Configure inputs/outputs -> Digital inputs**). If none of the digital inputs is configured as “Remote load - relief signal”, please contact the

### 10.2.5. RVM remote control mode

In REM remote control mode, the compressor does not control the network pressure setting. It is done through a digital input configured as ”Remote load - unload signal”. Pressure control is carried out externally, e.g. via the master controller.
When the load signal appears on the controller’s digital input, the compressor will behave in the same way as if the pressure dropped below the setpoint (min.). When the signal on the digital input is changed to unload, the compressor will behave as if the upper limit of the set pressure (max.) was exceeded.
Apart from the above mentioned differences, the operation of the compressor control algorithm is carried out according to the selected operating mode. When the REM remote control mode is selected in the main interface view, pressure ranges will be replaced by an ”External pressure control” message. Despite the lack of supervision over the set pressure in the network, the controller continuously controls the pressure limits set by the compressor manufacturer. If the measured pressure in the network exceeds the maximum pressure value, the compressor will be stopped.
**Note!**
To start the compressor in the REM remote control mode, press the START button on the controller.

### 10.2.6. RVM remote control mode configuration

To configure remote control in RVM mode, set the ”Remote mode” parameter to ”RVM” (**User parameters-> Operation parameters-> Operation modes -> Remote mode**).

### 10.2.7. Remote start function

The remote compressor start function allows the user to control the compressor using digital input. Remote control operates to pressing the START or STOP button was pressed on the controller.
**Note!**
The START and STOP buttons override the remote start function, which means that pressing the START button is necessary to grant permission to remote start. If all remote start conditions are met the compressor will start. Whereas, if there are any issues with input signal, the message ”Waiting for remote start signal” will be displayed in the text message. Pressing the stop button cancels the start permission until the START button is pressed again.

### 10.2.8. Remote start configuration

The configuration of remote start is done by assigning the ”Remote start-stop” function to one of the digital inputs of the controller. In order to verify which input is assigned to above mentioned function, go to the digital input configuration parameters (**User parameters-> Input/output configuration ->Digital inputs**). If none of the digital inputs is configured as “Remote start-stop”, please contact the

### 10.2.9. Differences between REM and RVM remote modes and the remote start function

Remote REM/RVM is a special controller mode which controls network pressure externally. In REM/RVM mode, the controller operates based on an external load and relief signal that replaces pressure settings. This mode is dedicated to master control, in which the master controller is responsible for controlling network pressure.
The remote start function as opposed to the remote REM/RVM mode is only a signal that can be assigned to one of the digital controller inputs. It does not affect the control algorithm. The compressor will operate according to the selected operating modes. The remote start function is an additional condition that must be met for the compressor to start. This function allows, for example, to assign an a compressor start-stop switch to an external operator panel. It can also be used to run simple algorithms in master operation.

# 11. Other functions

## 11.1. Fan function (compressor cooling)

The fan function is dependant on the oil temperature measurement and allows the oil temperature to be kept in the optimum range. The fan turns on and off at specified oil temperature levels. This function is only active when the START button is pressed.
The parameters of the fan function can be found in the **User parameters tab -> Operation parameters -> Fan**. Modification of these parameters requires service level authorization.
The fan will stop when the motor is stopped using the stop button or an error occurs when the fan is on. However, if the motor stops during a standard work cycle, the fan will not be turned off, until the oil temperature drops below the fan shutdown temperature. **Note!**
In order for the fan function to work correctly, one of the digital outputs must be assigned the ”Fan” function

## 11.2. Dryer function

The dryer function allows you to control the dryer using one of the digital (relay) controller outputs. There are 2 independent dryer modes: Standard and pulsating.
In standard mode, the dryer is switched on during motor operation, and it is also possible to configure the drying time before starting and after finishing operation.
It is also possible to configure the dryer’s operation so that the dryer runs all the time when the compressor is in standby or running condition. This configuration allows the dryer to run continuously even when the set pressure is reached.
The pulse mode consists in switching the dryer on and off cyclically in order to maintain the relevant parameters. The pulse mode starts only when the machine motor is stopped when idling time elapses after the set pressure is reached. The dryer will go into pulsed mode (if configured) when the standard operation mode is complete.
When the dryer function is enabled, the user is informed about the remaining time of the dryer operation in the main view of the controller.

The dryer configuration requires service authorization, to view the current configuration go to the tab **User parameters -> Operation parameters -> Dryer**.

**Note!**
In order for the dryer function to work correctly, one of the digital outputs must be assigned the ”Dryer” function

## 11.3. Condensate drain function

The controller has a built-in condensate drain valve operation function. The valve is opened using one of the digital (relay) outputs of the controller, the time interval and the operating time are defined by the user.

### 11.3.1. Condensate drain function configuration

In order to configure the condensate drain function, go to the **User parameters tab -> Operation parameters -> Condensate drain**. The ”Condensate drain function” parameter allows the user to enable or disable the function.
The ”Valve open period” parameter specifies the time interval in minutes between successive valve openings. The maximum value that can be set is 720 minutes.
The ”Valve open time” parameter determines the time in seconds during which the drain valve will be opened. The maximum value that can be set is 600 seconds.

**Note!**
In order for the Condensate drain function to work correctly, one of the digital outputs must be assigned the ”Condensate drain” function

## 11.4. Auto restart function

The auto restart function allows the compressor to resume automatically when a power failure or error occurs. Not all errors allow auto restart. The full list of errors divided into those allowing and preventing auto restart, can be found in the ”Warnings and errors” section.
The automatic compressor restart function in the event of an error that allows for an auto restart requires the user to confirm the error and to start the compressor. In the event of failure (if it is not possible to confirm the error), the controller will make further attempts at auto restart (the number of attempts and the time interval between attempts are defined by the user).
The procedure for automatic compressor restart in the event of a power failure works in the same way as described above, with the difference that it initiates only after a power failure.
The user is informed about the ongoing auto restart procedure by through a message displayed in the main controller view in the message field.
If the auto restart fails, the function will be reset after the compressor is started manually.

### 11.4.1. Auto restart function configuration

To configure the auto restart function, go to the **User parameters tab -> Operation parameters -> Auto restart**. The ”Restart after power failure” and ”Restart after error” parameters allow the user to select the function range. One or both can be enabled at the same time.
The ”Restart delay” parameter allows the user to determine the time in seconds the controller will wait before proceeding to the automatic restart procedure. At the same time, it is also the time interval that the controller will wait between subsequent auto restart attempts.
The ”Maximum number of restart attempts” parameter determines the number of auto restart attempts that the controller will make.

## 11.5. Heater function

The heater function allows the user to start the oil heater using one of the digital (relay) controller outputs. It is also possible to prevent excessive oil cooling by using idle. The controller provides the possibility of oil heating in 3 independent modes.
The user can view the settings of the heater parameters in the **User parameter tabs -> Operation parameters -> Heater**. Their modification requires service authorizations.

### 11.5.1. Heater 1

The function of heater 1 starts when the motor starts and the oil temperature is lower than the minimum starting oil temperature foreseen by the compressor manufacturer. A message informing about the operation of the heater will be visible in the main view of the controller. The start-up will take place when the oil temperature reaches the minimum value for start-up + heater 1 hysteresis value.
**Note!**
In order for the heater 1 function to work correctly, the ”Heater 1” function must be assigned to one of the digital outputs

### 11.5.2. Heater 2

The function of heater 2 allows the oil temperature to be maintained in a range that allows the motor to start immediately, regardless of the compressor operation algorithm. This means that the heater will start when the compressor is stopped in order to maintain the oil temperature within the specified temperature range.
**Note!**
In order for the heater 2 function to work correctly, the ”Heater 2” function must be assigned to one of the digital outputs

### 11.5.3. Idle heating

The idle heating function consists in using the idle speed of the compressor in order to prevent the oil temperature from falling below the minimum temperature for start-up. Idle heating starts only when the compressor is able to reach the set pressure. This means that this function will not work if the compressor is stopped.
The user is informed about the activation of the idle heating function through a message in the main view of the controller.

## 11.6. Restoring and saving settings

The controller AirVision Onecan save and restore settings from a local copy or an external data carrier. From the user access level, it is only possible to restore user settings in the controller. Service authorizations are required to save or restore the settings of service parameters.

The option of restoring and saving settings on external data carriers allows you to copy settings between AirVision One controllers.

To restore or save the settings, go to the tab:
**User parameters -> Diagnostics and service -> Restore and save settings**.
The user can restore the settings from a local copy saved in the controller's memory or from an external data carrier connected to one of the controller's USB ports. The scope of restored settings includes only user parameters. To restore the service settings, logging in from the service technician level is required. Restoring compressor settings overwrites the data and will not be able to be restored. After selecting the recovery source, you must confirm the warning.

# 12. Diagnostic Functions

To use the diagnostic functions of the controller, go to the **Service parameters -> Diagnostics and service** tab.

## 12.1. Input/output diagnostics

The ”Input/output diagnostics” tab shows the status of each input and digital and analog outputs, as well as several additional parameters.
At the top of the tab you will find a list of inputs and digital outputs.
**List of diagnostic parameters:**

- Logical state of digital inputs (high/low)
- Digital output staus (closed/open)
- Measured value of RTD inputs
- Measured value of AI inputs
- Measured value of MC1 input (transformer secondary winding current)
- Controller battery voltage
- Controller power supply voltage
- Controller 24VDC internal voltage

# 13. Service counters

Service counters are designed to remind you of the need to carry out specific service activities. Each meter has 2 operating modes, counting down the remaining operating hours of the compressor or counting down the time to a specific date. Both modes are independent, only one or two of them can be active simultaneously. The remaining operating hours are counted only during motor operation, the hours are not counted when the compressor is switched off or is in an idle mode. The countdown to a specific date takes place independently of the compressor operation.
The controller AirVision One has 9 independent service counters:

- General service counter
- Oil change counter
- Oil filter counter
- Air filter counter
- Separator counter
- Drive belt counter
- Motor bearing lubrication counter
- General purpose counter 1
- General purpose counter 2

In the case of direct drive compressors, the drive belt counter is not available. It is replaced by general purpose counter 3.


Figure 31: The ”Service counters” tab”

Each counter is displayed in the form of a tile with the name of the counter. The counter status is visible to the right of its name. If the counter is active, depending on the operating mode of the counter, the date of the next inspection or the number of operating hours remaining to the inspection

or both are displayed at the same time. If the counter is inactive, the information ”off” is displayed next to it.
If any of the active counters counts down the hours to 0, or reaches the service due date, a warning will appear on the controller with information referring to the meter that needs attention, e.g., ”Change oil”

### 13.1. Restarting service counters

O restart service counters select the tile of one of the counters and then select ”Reset” in the ”Reset Service” parameter. Before the restart occurs, a confirmation will be displayed showing the with values to which the counter will be restarted. Service intervals are assigned by the service or compressor manufacturer.
Resetting the service counter requires the user or service password.

## 14. Statistics

The controller AirVision One records sensor measurements and information on compressor operation and presents them in the form of statistics related to the time and compressor cycles. The types of load data are different for star-delta start and inverter compressors.

In the ”Statistics” tab, which is located in the main menu, data is presented in the form of rows with parameter descriptions and values. The pencil symbol next to the selected line means that it is possible to manually enter the values of the selected parameters, authorization from the manufacturer is required in this case The pencil symbol next to the selected line means that it is possible to manually enter the values of the selected parameters, authorization from the service level is required in this case.

Table 23: Parameters from the ”Statistics” tab

| Parameter name | Parameter description |
|---|---|
| Total operating time | Total motor operating time. |
| Operating time under load | Total compression time. |
| Average load | Ratio of running time under load to total running time |
| Number of motor starts | Total number of motor starts |
| Average number of motor starts | Average number of motor starts per hour |
| Number of Y-valve engagements | Total number of Y-valve engagements |
| Load 80% - 100% [F] | Total operating time per load interval |
| Load 60% - 80% [F] | Total operating time per load interval |
| Load 40% - 60% [F] | Total operating time per load interval |
| Load 20% - 40% [F] | Total operating time per load interval |

Table 23: Parameters from the ”Statistics” tab

| Parameter name | Parameter description |
|---|---|

[F]-Parameter available only for compressors equipped with an inverter

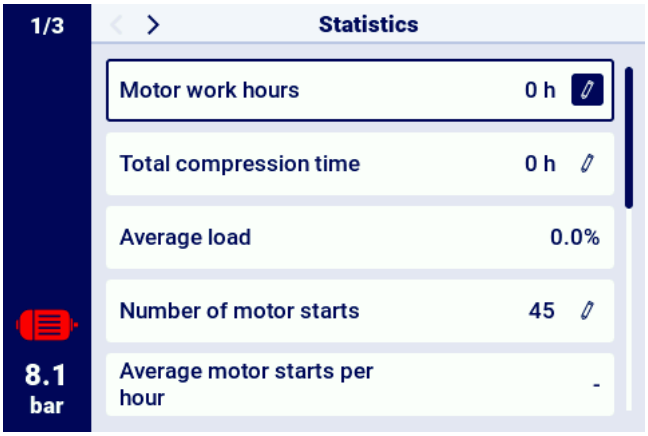


Figure 32: Statistics tab

# 15. Operation scheduling

The controller AirVision One is equipped with a compressor scheduling function. This allows the machine to automatically turn on and off according to a pre-planned schedule. It is possible to save a total of up to 5 independent one-time or cyclic events.
One-time events are defined by specific dates and times, while recurring events are set up by hours for each day of the week.
The operation scheduling menu is located in the main menu and in the user parameters, under the name ”Operation scheduling”. The user or service password is required when entering the menu through the main menu.
When you enter the work scheduling menu, the first position is the parameter ”ON”, ”OFF” allowing you to enable or disable the operation of the controller according to the active events, which are shown below in the menu.
Each of the configured events is presented in the form of a field from which you can read basic information about the event, such as the time interval of the event, operation mode, and the status of the event (activated or deactivated). If the field displays the message ”Create event”, this means that no event has yet been assigned to the field.


Figure 33: The main view of the ”Operation scheduling” menu.

## 15.1. Event Configuration

Each event is configured with the following parameters:

- Event status
- Event type
- Operation mode
- Activity date of the event


Figure 34: Example of configuration of scheduled operation event

The ”Event status” parameter allows you to activate or deactivate the event. If an event is deactivated, It will not affect scheduled work, but will remain in the event list.
The ”Event type” parameter defines whether the event is cyclic or one-time.
The ”Operation mode” parameter defines the operation mode in which the compressor will operate during the event. In addition to the standard operating modes (AUTO and CONST), you can also select the ”STOP - compressor stopped” operating mode.
The last parameter of the event configuration is the ”Event activity term” parameter, which defines the period, during which the event is to be active.
Depending on the selected type of event, its activity period is defined through a different set of parameters.
Cyclic events are parameterized by the ”Days of the week”, ”Start time” and ”End time” parameters, while for one-time events these are ”Start date”, ”Start time”, ”End date”, ”End time”.


Figure 35: Example of event activity date configuration

After entering all the parameters of the event, switch to the ”Save Event” field and save the parameters with the OK button.
The ”Delete event” field allows you to remove the event from the list.

## 15.2. Work scheduling algorithm

In order for the compressor to operate according to the configured events, the scheduled operation must be activated in the ”Operation scheduling” menu. When the scheduled operation is active, the screen will display the message ”Scheduled operation is active”.
In addition, in order for the operation scheduling algorithm to control the compressor, it is necessary to allow the compressor to start in advance by pressing the ”START” button on the controller. If, according to the scheduled events, the compressor is not work at the moment, after allowing the start, the main view of the graphic interface will display the message ”Stopped by scheduled operation”.
The scheduled operation algorithm only takes into account events that are activated.

**NOTE!**

One-time events have a higher priority than cyclic events. This allows you to make ”exceptions” for cyclic events, such as for public holidays.. At the same time, events that are at a higher position on the list have a higher priority than those at lower positions on the list. This means that when two or more scheduled events overlap in time, the compressor will run according to the event with higher priority.

# 16. Network operation

The controller AirVision One can manage a group of up to 4 compressors (including itself) as the master controller, using one of two available algorithms: Sequential (**SEQ**) or cascading (**CAS**).
All controllers in the network must be connected to each other via RS-485 or RS-485 ISO ports. The communication protocol used for network operation is Modbus RTU.

The following controllers can be additionally connected AirVision Oneto network operation:

- AirVision Touch

## 16.1. Network operation view

The network operation view is only available in a master controller. To enable the network operation view, go to the tab **Network operation** in the main menu or the main view shortcuts. From the master controller, the user gains access to a preview of the status of all controllers in the network.
The network operation view shows all connected slave controllers (marked with numbers from 1 to 3) and the master controller (marked with the letter ”M”).
The number of visible slave compressors depends on the number of compressors configured in the master controller. Each of the tiles in the network operation view allows the user to read the current pressure settings on each of the compressors and the status of each of the compressors in the form of a short message. In the event of an error or warning on any of the compressors in the network, an error or warning icon will be displayed in its tile field.

It is not possible to display the network operation view from the level of the slave controller.

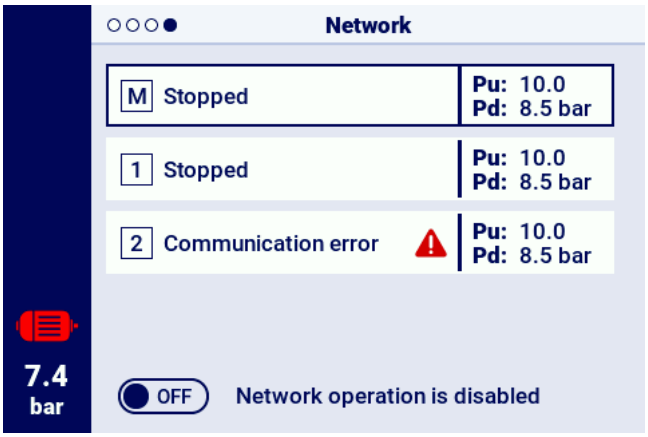


Figure 36: Network operation view

## 16.2. Starting network operation and changing the settings of the slave controllers

To enable the network operation algorithm, go to the network operation view on the master controller, and then enable it with the button ON/OFF next to the text ”Network operation is: OFF”. When the algorithm is turned on, the inscription will change to ”Network operation is: ON”. In order for the master controller to properly manage the compressor unit the START button on each of the slave compressors must be pressed before starting network operation on the master compressor (This does not apply to previous generations of MS series controllers. These will turn on automatically)..
Disabling the network operation algorithm will stop all slave compressors if the STOP button has not been pressed on the slave compressors in the meantime, restarting slave compressors only requires re-activating the start button of the network operation algorithm in the network operation view on the master controller.
To configure the pressure on any of the controllers in the network, select its tile and then enter the appropriate pressure values.

## 16.3. Errors and events in network operation

If an error occurs in the compressor or in one of the slave compressors, it will be automatically disabled from operation in the master control algorithm. Restoring such a compressor to operation in the algorithm will be only possible when the fault is removed and the error is confirmed on its controller.
If an error occurs in the master controller, it will be excluded from the master operation algorithm, however, it will still control the operation of slave compressors.
If the connection to one or more of the slave controllers is interrupted, the status window of the slave compressor will display the message ”Communication error”. Such a compressor will be excluded from the master operation algorithm, however, if there are no additional errors in the slave compressor, this compressor will operate according to the last pressure settings received from the master controller.
This also means that in the event of a loss of communication with the master controller network, the remaining compressors will not shut down, but will operate in accordance with the last pressure settings received.

## 16.4. Sequential operation algorithm (SEQ)

The sequential algorithm is designed for network operation of a group of compressors of similar power. The assumption of the algorithm is to evenly distribute the run time between all compressors in the network. This is done by rotating the load pressure (Pd) and relief pressure (Pu) settings by a specified rotation time, which can be configured by going to the **User Parameters tab -> Network operation -> Configuration**.
During the rotation phase, individual compressors do not stop. The compressor may be stopped/started only as a result of the reference of the current pressure in relation to its newly set Pu - Pd limits. Only active compressors are involved in the pressure rotation procedure.
Exclusionary, step intervals are an example, recommended setting of Pu - Pd pressure limits in the

sequential algorithm. With such a distribution, the compressor with the highest limit range will be switched off at the last (when the required network pressure is reached) and switched on as the first, because it has the highest lower Pd pressure limit.
The second example of Pu - Pd limit settings in the sequential algorithm is to give the compressors identical upper Pu limits and lower step limits. In this situation, all compressors will be switched off at the same time, and switched on at pressure drops below the subsequent lower Pd limits.

| **Before rotation** | | | **After first rotation** | | | **After second rotation** | | | **cd.** |
|---|---|---|---|---|---|---|---|---|---|
| ID | *Pd* | *Pu* | ID | *Pd* | *Pu* | ID | *Pd* | *Pu* | |
| 1 | 6.0 | 7.0 | 1 | 3.0 | 7.0 | 1 | 4.0 | 7.0 | |
| 2 | 5.0 | 7.0 | 2 | 6.0 | 7.0 | 2 | 3.0 | 7.0 | ... |
| 3 | 4.0 | 7.0 | 3 | 5.0 | 7.0 | 3 | 6.0 | 7.0 | |
| 4 | 3.0 | 7.0 | 4 | 4.0 | 7.0 | 4 | 5.0 | 7.0 | |

Compressors stopped manually or as a result of a critical error are automatically given the lowest pressure limits (with the automatic reconfiguration function turned on), and their limits are transferred to active compressors with the lowest Pu - Pd limits. For example, if in the first instance the compressor with ID 2 is stopped manually, then after reconfiguration, the distribution of boundaries will look like in the second instance. If the compressor with ID 2 is still inactive during the rotation procedure, the pressure distribution will look like in the third instance.

## 16.5. Cascading algorithm (CAS)

The cascade operation algorithm is designed for network operation of a group of compressors of different power capacities. This algorithm assumes that the compressor with the lowest power will be switched on and off most often. The compressor with the highest power will be started only in cases of high demand for air in the network.
An example, recommended setting of Pu - Pd limits in the cascade algorithm is to give the compressors identical upper Pu limits and lower step limits (instance 1). In this situation, all machines will compress air until the required network pressure is reached, and then they will be switched off at the same time. With a low pressure demand, the compressor with the lowest power (ID=4) will be switched on. If, despite its operation, the pressure falls below the lower limit of the compressor with ID=3, this compressor will also be switched on.

| **1. All active** | | | | **2. Compressor ID=2 not active** | | | |
|---|---|---|---|---|---|---|---|
| ID | *Pd* | *Pu* | Power | ID | *Pd* | *Pu* | Moc |
| 1 | 3.0 | 7.0 | 120kW | 1 | 4.0 | 7.0 | 120kW |
| 2 | 4.0 | 7.0 | 100kW | 2 | 3.0 | 7.0 | 100kW |
| 3 | 5.0 | 7.0 | 50kW | 3 | 5.0 | 7.0 | 50kW |
| 4 | 6.0 | 7.0 | 20kW | 4 | 6.0 | 7.0 | 20kW |

In the cascade algorithm, the Pu - Pd pressure limits are permanently assigned to a given compressor identifier. There is no rotation procedure (the rotation time parameter is not taken into ac-

count). Thus, when setting pressure limits, their order relative to ID is important. With the automatic reconfiguration function enabled, compressors stopped manually or as a result of an error are automatically assigned the lowest Pu - Pd pressure limits in the network. This shifts the lower limits up one position. For example, if in instance 1 a critical error occurs in the compressor with ID=2, then after automatic reconfiguration, the distribution of Pu - Pd pressure limits will look like in instance 2. When the compressor with ID=2 is restored to operation, the boundary distribution will return to instance 1.

## 16.6. Master controller configuration

In order to configure the master controller for network operation, the communication parameters of the RS-485 port must first be configured. There are 2 independent RS-485 ports available in the AirVision One controller, one of them is isolated (RS-485 ISO). Any of the ports can be used for controller network operation.
To configure the parameters of the selected RS-485 port, go to the **User parameters tab -> Configuration of inputs/outputs -> RS-485/RS-485 ISO**.
Communication parameters: The band rate, parity, and stop bits should be configured the same for all devices in the network.
For long distances between controllers, it is recommended to set lower band rates.
The ”RS-485 function” parameter must be set to ”Master”.


Figure 37: The RS-485 port configuration menu

In the next step, configure the network operation parameters. To do this, go to the User parameters tab -> Network operation -> Configuration. The ”Operate as master compressor” parameter should be set to ”Enable”, this will automatically set the ”Remote mode” parameter to ”NET”.
In the remaining parameters, select the number of slave compressors (excluding the master compressor), the operation algorithm of the master control (sequential or cascading).
The parameter ”Switching delay between slave compressors” determines the delay of starting subsequent compressors in the network and aims to protect the power network from overloading as a result of starting too many compressors at once.
The parameter ”Rotation time” applies only to the sequential mode and determines the interval in

which the pressure settings will be changed between successive compressors.
The ”Master compressor load/relief pressure” parameters determine the pressure settings for the master compressor.
The ”Automatic reconfiguration of pressure limits” parameter, if enabled, is responsible for transferring the pressure settings from the compressor in which the failure occurred to the compressor that is operating correctly.
In the case of network operation involving compressors equipped with an inverter, the operating point is common to all compressors in the network, it is configured in the ”Network operation point” parameter. This setting is sent to all slave compressors equipped with an inverter.

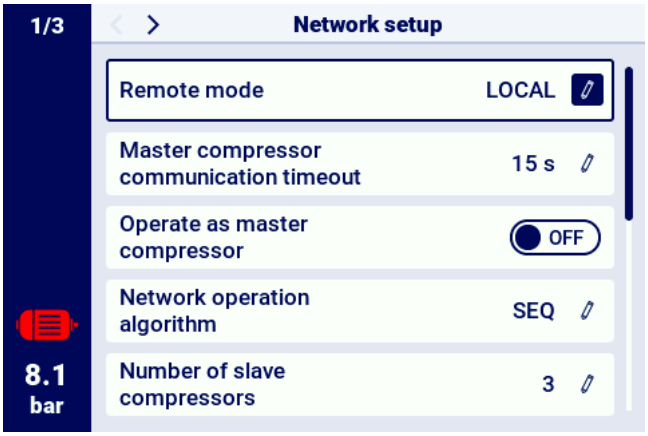


Figure 38: Network operation configuration menu 1/3

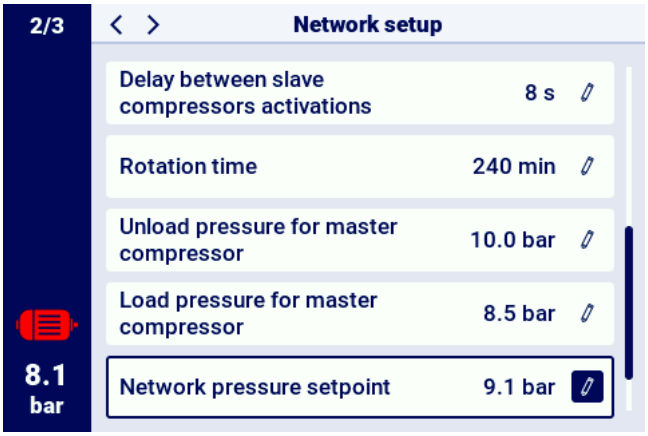


Figure 39: Network operation configuration menu 2/3

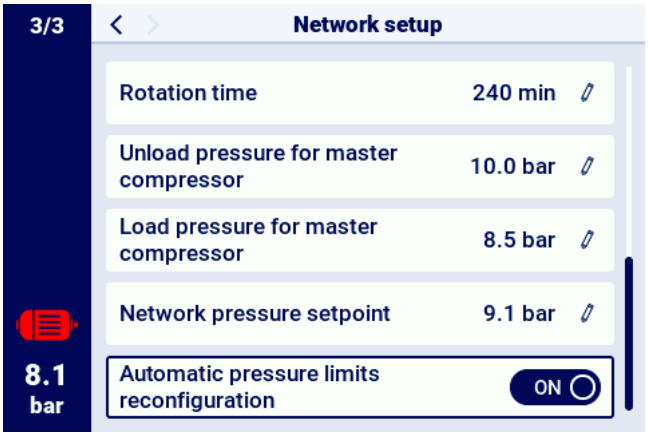


Figure 40: Network operation configuration menu 3/3

The last step in the parameterization of the master controller is the configuration of each of the slave compressors. The sub-compressor configuration tabs are available in **User parameters -> Network operation -> Compressor**. The number of compressors that can be configured depends on the number of slave compressors entered. Each of the slave compressors is configured in the same way by entering the pressure settings of the selected compressor in the ”Relief pressure” and ”Load pressure” parameters.
In the ”Interface” parameter, select which RS-485 port of the master controller the slave compressor is connected to (”RS-485” or ”RS-485 ISO”)..
The ”Modbus address” parameter specifies the modbus address that was assigned to a given slave compressor, it should be rewritten from the slave compressor controller after its configuration.
**Note!**
Controller addresses within a single network may not be duplicated. Each of the slave compressors should have a different address.

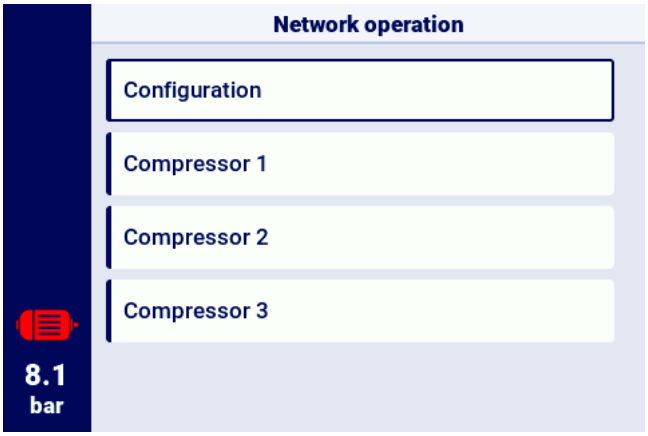


Figure 41: Network operation menu

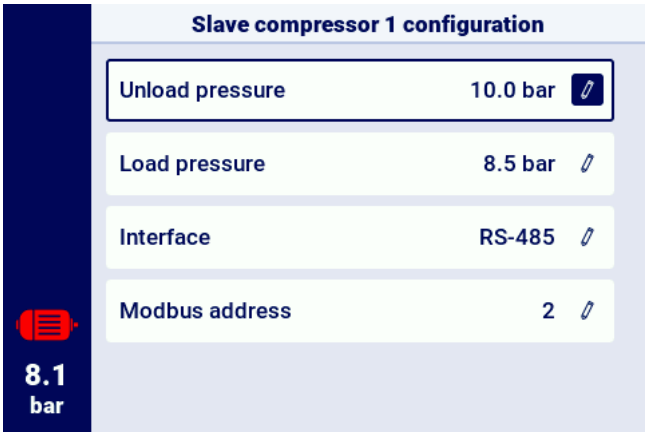


Figure 42: Slave compressor 1 configuration menu

## 16.7. Slave controller configuration

In order to configure each of the slave controllers, AirVision One first configure the RS-485 port to which the network is connected. Go to the **User parameters tab -> Configuration of inputs/outputs -> RS-485/RS-485 ISO.**

The communication parameters of the selected RS-485 port, i.e. ”Bitrate”, ”Parity” and ”Stop bits”, must be configured in the same way as on the master controller.

Select ”Slave” in the ”RS-485/RS-485 ISO function” parameter

Enter any address that will coincide with the selected slave compressor configured in the master controller in the ”Modbus address” parameter.

**Note!**

Controller addresses within a single network may not be duplicated. Each of the slave compressors should have a different address.

The whole process must be repeated on each of the slave compressors.


Figure 43: The RS-485 port configuration menu

The last step in the configuration of the slave compressor is to change the remote mode to ”NET”.

To make a change, go to the **User parameters tab -> Operation parameters -> Operation modes**.

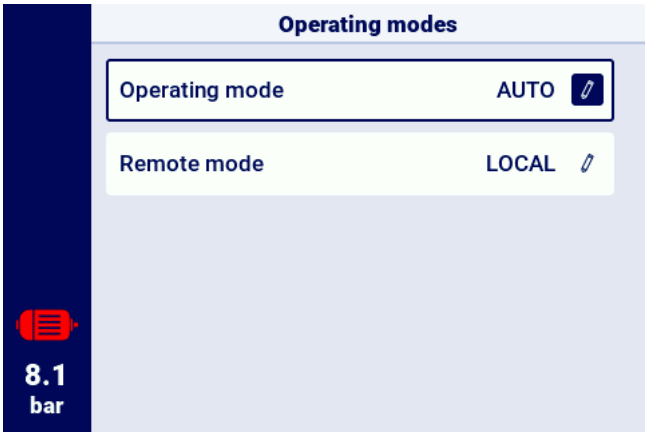


Figure 44: Remote mode setup menu

# 17. Web server (Visualization system)

The controller AirVision One is equipped as standard with a visualization system (web server), enabling real-time monitoring of the compressor via the local LAN.
The web server is presented in the form of a website. The website is hosted directly from the controller on the local network, which does not require the installation of any software. For correct operation a web browser on a computer with access to the LAN to which the controller is connected will suffice It is possible to browse the web server page by several users at the same time, on several computers.

**The web server does not have the ability to remotely change the controller parameters.**

## 17.1. Web server - description of the graphical user interface

The web server is divided into many subpages corresponding to individual tabs in the controller. Many of them are extended on the web server.
Regardless of the content of the subpage that the user is currently browsing, the navigation bar on the web server and the top bar are always visible.
The side navigation bar allows the user to go to any subpage of the visualization system, and indicates which subpage the user is currently viewing.
**List of subpages of the web server:**

- Desktop AirVision One
- Sensors
- Consumption
- Messages
- Service counters
- Scheduled operation
- Information

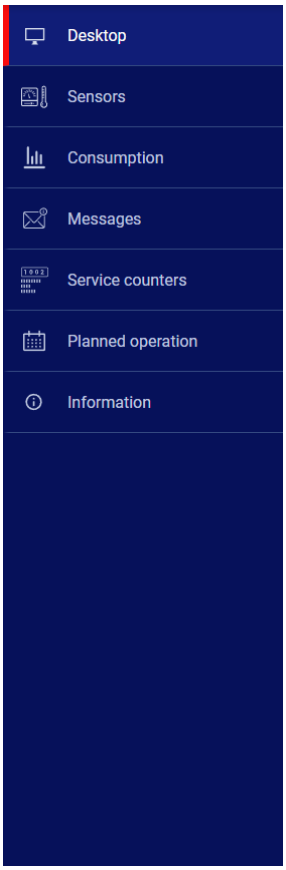


Figure 45: Web server navigation sidebar

The top bar allows the user to view the basic parameters of the compressor regardless of the subpage the user is viewing.

**List of parameters visible in the top bar:**

- Compressor name
- Current pressure
- Abbreviated compressor status
- Fan operation icon
- Motor icon that changes colours in the same way as on the controller
- Date and time from controller


Figure 46: Top web server info bar

## 17.2. Web server - Desktop AirVision One

The ”Desktop” subpage AirVision One” is the default view of the web server. It shows all the most important compressor parameters.

**List of parameters visible on the Dashboard subpage AirVision One**

- Pressure
- Current pressure settings
- Motor frequency
- Oil temperature
- Compressor status
- Motor status
- Operation mode
- List of active messages
- Network operation icon
- Scheduled operation icon
- Fan operation icon
- Dryer operation icon
- Heater operation icon
- Condensate drain icon
- Compressor and controller basic information

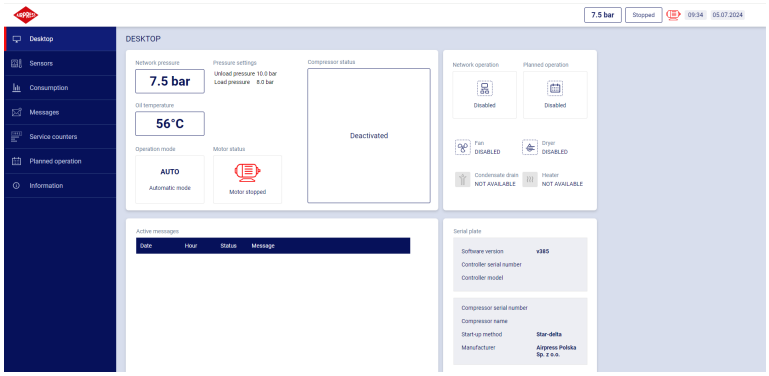


Figure 47: Web server dashboard view

## 17.3. Web server - Sensors

The ”Sensors” subpage corresponds to the ”Sensors” tab in the controller. Only values of the sensors configured in the controller are displayed in it.

**List of sensors available for viewing on the ”Sensors” subpage:**

- Network pressure
- Oil pressure
- Oil temperature
- Motor temperature
- Motor current
- Motor power
- Output frequency

## 17.4. Web server - Consumption

The ”Consumption” subpage presents time statistics from the controller, extending them with a circular diagram of the load and relief work distribution, or in the case of compressors equipped with an inverter, a bar graph showing the work distribution over individual load ranges.

## 17.5. Web server - Messages

The ”Messages” subpage allows the user to view the history of messages (Errors and Warnings) that have occurred in the controller in the past or are active at a given moment. Active messages are highlighted with a blue flag symbol. The web server allows the user to filter events in the list by type (error, warning, active, inactive) or by date. It is also possible to search for events by name.

## 17.6. Web server - Service counters

The ”Service counters” subpage shows the service counters active in the controller and their values. Additionally, the progress bar of each meter is also displayed. The progress bar shows 100% in the case of a reset counter, this value decreases with run time / when the date of the next inspection approaches.

## 17.7. Web server - Scheduled operation

The ”Scheduled operation” subpage presents all events configured in the controller with their parameters and status, divided into one-off and cyclic events.

## 17.8. Web server - Information

The ”Information” subpage duplicates the information from the ”Information” tab in the controller.

## 17.9. Initiating and configuring connection with the web server

In order to configure the web server, go to the **User parameters tab -> Configure inputs/outputs -> IP settings**. Next, select from the list how the IP address will be assigned to the controller in the local network. The avilable modes are auto (DHCP) and static.
In the automatic mode, the IP address will be assigned automatically via the DHCP server running on the network (this depends on the individual configuration of the local network).
In the static mode, the user can configure the standard parameters of the network device.
**List of parameters that can be configured in static mode:**

- IP address
- Subnet mask
- Gateway

**Note!**
After each change press the ”SAVE” button, otherwise the parameters will not be saved.


Figure 48: IP address configuration menu

To check the assigned IP address, go to the ”Information” tab available from the main menu of the controller. The MAC address of the device is also available there.


Figure 49: The ”Information” tab with the IP and MAC address.

# 18. Warnings and errors

The controller displays current errors and warnings in the form of icons on the sidebar of the user interface. The icons will remain visible on the screen until the user confirms the event in the ”Active warnings and errors” tab, only if the error or warning has been resolved. After confirmation, the message will disappear from the list. If the message is still visible, the root cause of the error or warning has not been resolved. Error information is also displayed in the form of a text message on the main interface view. This also applies to errors and warnings of internal inverters. The controller reads the inverter messages and displays them along with a description. The messages can be sorted by their impact on the compressor operation:

Warning - does not affect compressor operation
Critical error - emergency (immediate) motor stop
Non-critical error - standard motor stop

In the event of any error, it will not be possible to restart the motor as long as the error remains active.

## 18.1. Warnings

## 18.2. Warnings of the AirVision Onecontroller

Table 24: Warnings

| Error code | Warning Name | Type | Description |
|---|---|---|---|
| W01 | Inspection Necessary | Warning | The date set by the service technician on which the overhaul should be performed has arrived. |
| W02 | Service due soon | Warning | The service date set by the service technician is due soon. |
| W03 | Network pressure too high | Warning | The network pressure is close to the maximum value set by the service technician. |
| W04 | Low network pressure | Warning | The network pressure is close to the minimum value set by the service technician. |
| W05 | Received pressure values are invalid | Warning | Driver returns information that the pressure values are invalid. |
| W06 | Oil replacement due soon | Warning | The oil replacement date set by the service technician is due soon. |
| W07 | High motor oil temperature warning | Warning | The oil temperature is close to the maximum value set by the service technician. |

Table 24: Warnings

| Error code | Warning Name | Type | Description |
|---|---|---|---|
| W08 | Necessary oil change | Warning | The date set by the service technician on which the oil should be changed has arrived. |
| W09 | Oil filter replacement time due soon | Warning | The oil filter replacement date set by the service technician is due soon. |
| W10 | Necessary oil filter inspection | Warning | The date set by the service technician for the oil filter inspection has arrived. |
| W11 | Oil filter error [OF] | Warning | The oil filter sensor reports that an error has occurred. |
| W12 | Oil separator replacement due soon | Warning | The oil separator replacement date set by the service technician is due soon. |
| W13 | Necessary oil separator replacement | Warning | The date set by the service technician on which the oil separator filter inspection must be performed has arrived. |
| W14 | Separator error [SEP] | Warning | The separator sensor reports that an error has occurred. |
| W15 | Air filter replacement due soon | Warning | The air filter replacement date set by the service technician is due soon. |
| W16 | Necessary air filter replacement | Warning | The date set by the service technician for the air filter inspection has occurred. |
| W17 | Air filter error [AF] | Warning | The air filter sensor reports that an error has occurred. |
| W20 | Belt tension check time is due soon | Warning | Service technician set date to check belt tension is due soon. |
| W21 | Belt Tension Check Necessary | Warning | The date set by the service technician to check the belt tension has arrived. |
| W24 | Dryer not ready | Warning renewable | The dryer is not ready for operation. |
| W25 | Battery warning | Warning | Due to a battery issue, the controller does not save the date. |
| W26 | Controller battery low | Warning | The controller battery is low. |

Table 24: Warnings

| Error code | Warning Name | Type | Description |
|---|---|---|---|
| W27 | Controller battery critically low | Warning | The controller battery is critically low. |
| W28 | CT short circuit | Warning | Sensor has been misconnected or some part has been damaged. |
| W29 | No CT | Warning | Driver returns information that the compressor has no CT connected. |
| W34 | Network operation communication error | Warning | The controller informs that there was a network operation problem. |
| W35 | Slave compressor 1 communication error | Warning | Slave compressor 1 is not connected to the network, or there is a communication error. |
| W36 | Slave compressor 2 communication error | Warning | Slave compressor 2 is not connected to the network, or there is a communication error. |
| W37 | Slave compressor 3 communication error | Warning | Slave compressor 3 is not connected to the network, or there is a communication error. |
| W40 | Network operation has been disabled on master controller | Warning | Network operation has been disabled or lost connection on master controller. |
| W41 | User Counter 1 necessary inspection | Warning | The date set by the service technician on which to perform the inspection of the user counter 1. |
| W42 | User Counter 2 necessary inspection | Warning | The date set by the service technician on which to perform the inspection of the user counter 2. |
| W43 | User Counter 1 review date is due soon | Warning | Service technician set date approaching for general Inspection. |
| W44 | User Counter 2 Inspection is due soon | Warning | Service Technician set date approaching for general Inspection. |
| W45 | Inverter Warning | Warning | A warning occurred on the inverter. |
| W48 | Motor bearing lubrication required | Warning | Motor bearing lubrication service counter exceeded set value. |
| W49 | Motor Bearing Lubrication Time Approaching | Warning | Warning of Bearing Lubrication Service Counter Approaching Expiration. |

## 18.3. DANFOSS inverter warning information

Table 25: Inverter warnings

| Error code | Error description |
|---|---|
| W1 | Low 10V voltage |
| W2 | Live zero error (W2) |
| W3 | No motor |
| W4 | Power loss |
| W5 | High DC circuit voltage |
| W6 | Low DC circuit voltage |
| W7 | DC circuit overvoltage |
| W8 | DC circuit voltage below minimum |
| W9 | Inverter overload |
| W10 | ETR motor overheating |
| W11 | Motor overheating |
| W12 | Torque limitation |
| W13 | Overcurrent |
| W14 | Ground error |
| W17 | TO controller control |
| W22 | Hoist mechanical brake |
| W23 \| W24 | Internal/external fan fault |
| W25 | Brake resistor |
| W26 | Brake overload |
| W27 | IGBT brake |
| W28 | Brake check |
| W34 | Fieldbus error |
| W36 | Power failure |
| W47 | Low 24V power supply |
| W49 | Maximum speed limit |
| W59 | Current limit |
| W62 | Output frequency limit |
| W64 | Voltage limit |
| W65 | Control card temperature |
| W66 | Low temp. |
| W68 | Safe stop |
| W69 | Power card overheating |
| W74 | PTC Thermistor |
| W87 | DC automatic braking |
| W89 | Mechanical brake sliding |

Table 25: Inverter warnings

| Error code | Error description |
|---|---|
| W90 | Encoder signal loss |
| W93 | Pump idle |
| W94 | End of Curve function |
| W95 | Broken belt |
| W127 | EMF too high |
| W158 | Power limit reached |
| W219 | Reverse compressor lock |
| None | Delayed start |
| None | Delayed stop |
| None | High discharge level |
| None | Multi-motor underload |
| None | Multi-motor overload |
| None | Safety error |
| None | KTY warning |
| None | ECB warning |
| None | Motor power limit reached |

## 18.4. YASKAWA inverter warning information

Table 26: Inverter warnings

| Error code | Error description |
|---|---|
| dEv | Speed deviation |
| CALL | Communication error |
| oH2 | Inverter overheat warning |
| oH3 | Motor overheat warning |
| DC Uv | Supply voltage too low |

## 18.5. Delta inverter warning information

Table 27: Inverter warnings

| Error Code | Error Description |
|---|---|
| CE1 | Invalid Modbus RS-485 function code |
| CE2 | Invalid Modbus RS-485 data address |
| CE3 | Invalid Modbus RS-485 data value |

Table 27: Inverter warnings

| Error Code | Error Description |
|---|---|
| CE4 | Modbus RS-485 data writing is set to read-only |
| CE10 | Modbus RS-485 timeout |
| oH1 | AC motor detects IGBT overheating and above protection level warning oH1 |
| oH2 | The controller has detected capacitor overheating |
| uC | Low current |
| oSPD | Overspeed warning |
| dAvE | Overspeed deviation warning |
| PHL | Input Phase Loss Warning |
| ot1 | Excess torque warning 1 |
| ot2 | Over torque warning 2 |
| oH3 | Engine overheating warning. The AC motor drive detects that the temperature inside the motor is too high |
| OPHL | Output phase loss |

## 18.6. ABB inverter warning information

Table 28: ABB inverter warning information

| Error code | Error description |
|---|---|
| 0xA2B1 | Overcurrent |
| 0xA2B3 | Earth leakage |
| 0xA2B4 | Short circuit |
| 0xA2BA | IGBT overload |
| 0xA3A1 | DC link overvoltage |
| 0xA3A2 | DC link undervoltage |
| 0xA3A3 | DC not charged |
| 0xA490 | Incorrect temperature sensor setup |
| 0xA491 | External temperature 1 warning |
| 0xA4A0 | Control board temperature |
| 0xA4A1 | IGBT overtemperature |
| 0xA4A9 | Cooling |
| 0xA4B0 | Excess temperature |
| 0xA4B1 | Excess temperature difference |
| 0xA4B2 | IGBT temperature |
| 0xA581 | Fan error |

Table 28: ABB inverter warning information

| Error code | Error description |
|---|---|
| 0xA582 | Auxiliary fan missing |
| 0xA5A0 | Safe torque off |
| 0xA5F0 | Charging feedback error |
| 0xA6A4 | Wrong motor nominal values |
| 0xA6A5 | No motor nominal values |
| 0xA780 | Motor stall |
| 0xA792 | Brake resistor wiring error |
| 0xA793 | Brake resistor excess temperature |
| 0xA79C | Brake chopper IGBT excess temperature |
| 0xA7A2 | Mechanical brake opening failed |
| 0xA7CE | Communication loss |

## 18.7. Errors

Table 29: Errors

| Error code | Warning name | Type | Description |
|---|---|---|---|
| E01 | Power asymmetry error | Critical error (auto restart possible) | Power supply phase shift |
| E02 | Phase sequence error | Critical error | Incorrect phase sequence detected. |
| E03 | Thermal fault | Critical error | Motor temperature exceeded. |
| E04 | Network pressure too high | Critical error | The controller informs that the network pressure is too high. |
| E05 | No network pressure sensor | Critical error | The controller informs that there is a problem with the pressure sensor. |
| E06 | Network pressure sensor short-circuit | Critical error | The sensor has been connected incorrectly or it is faulty. |
| E07 | No pressure sensor selected | Critical error | Select a pressure sensor. |
| E08 | Oil temperature too high | Critical error | The controller informs that the oil temperature is too high. |
| E09 | Oil temperature too low | Recurring error | The compressor cannot operate correctly because the oil temperature is too low. |

Table 29: Errors

| Error code | Warning name | Type | Description |
|---|---|---|---|
| E10 | Oil temperature rise too slow | Critical error | Oil temperature is increasing too slowly for the compressor to work correctly. |
| E11 | Oil temperature sensor short-circuit | Critical error | The sensor has been connected incorrectly or it is faulty. |
| E12 | No oil temperature sensor | Critical error | The controller informs that there is a problem with the oil temperature sensor. |
| E13 | Motor undercurrent after start-up | Critical error | The current to the motor is too low after start-up to maintain correct compressor operation. |
| E14 | Motor overcurrent | Critical error | The current to the motor is too high. |
| E15 | Power failure | Recurring error | Power supply received inadequate voltage level. |
| E16 | Motor temperature too high | Critical error | The controller informs that the motor temperature is too high. |
| E17 | No motor temperature sensor | Critical error | The controller informs that there is a problem with the fan. |
| E18 | Motor temperature sensor short circuit | Critical error | The sensor has been connected incorrectly or it is faulty. |
| E21 | Fan error | Non-critical error (auto restart possible) | The controller informs that there is a problem with the fan. |
| E22 | Dryer not ready | Recurring error | The dryer is not ready for operation. |
| E23 | Emergency stop | Critical error | C The controller informs that some factor caused an emergency stop of the compressor. |
| E24 | Controller memory has been cleared | Critical error | The controller has been restored to factory settings. |
| E25 | Inverter error | Critical error | An error occurs on the inverter. |
| E26 | Communication error with inverter | Critical error | Incorrect communication with inverter. |
| E31 | 24 V circuit voltage too low | Critical error | 24 V circuit voltage below minimum level. |
| E32 | Oil injection pressure drop error | Critical error | Oil injection pressure drop too high. |
| E33 | Oil injection pressure too low | Critical error | Oil injection pressure too low. |

Table 29: Errors

| Error code | Warning name | Type | Description |
|---|---|---|---|
| E34 | Short-circuit of the oil injection pressure sensor | Critical error | Short-circuit at the input of the oil injection pressure sensor. |
| E35 | Oil injection pressure sensor not connected | Critical error | No oil injection pressure sensor connected. |
| E32 | Oil injection pressure drop error | Critical error | Oil injection pressure drop too high. |
| E33 | Oil injection pressure too low | Critical error | Oil injection pressure too low. |
| E34 | Short-circuit of the oil injection pressure sensor | Critical error | Short-circuit at the input of the oil injection pressure sensor. |
| E35 | Oil injection pressure sensor not connected | Critical error | No oil injection pressure sensor connected. |
| E36 | Short-circuit of oil pressure sensor | Critical error | Short-circuit at oil pressure sensor input. |
| E37 | Oil pressure sensor not connected | Critical error | No oil pressure sensor connected. |

## 18.8. DANFOSS inverter errors

Table 30: Inverter errors

| Error code | Error type | Error description |
|---|---|---|
| A2 | Critical error | Live zero error |
| A4 | Critical error | Phase loss |
| A7 | Critical error | DC circuit overvoltage |
| A8 | Critical error | DC circuit voltage below minimum |
| A9 | Critical error | Inverter overload |
| A10 | Critical error | ETR motor overheating |
| A11 | Critical error | Motor overheating |
| A12 | Critical error | Torque limitation |
| A13 | Critical error | Overcurrent |
| A14 | Critical error | Ground error |
| A16 | Critical error | Short circuit |
| A17 | Critical error | TO controller control |
| A22 | Critical error | Hoist mechanical brake |
| A23 | Critical error | Fan fault |
| A25 | Critical error | Brake resistor |
| A26 | Critical error | Brake overload |

Table 30: Inverter errors

| Error code | Error type | Error description |
|---|---|---|
| A27 | Critical error | GBT brake |
| A28 | Critical error | Brake check |
| A30 | Critical error | U phase loss |
| A31 | Critical error | V phase loss |
| A32 | Critical error | W phase loss |
| A33 | Critical error | Pre-charging system error in start-up phase |
| A34 | Critical error | Communication bus error |
| A36 | Critical error | Power failure |
| A38 | Critical error | Internal error |
| A46 | Critical error | Power card supply |
| A47 | Critical error | Low 24V power supply |
| A48 | Critical error | Low 1.8V power supply |
| A49 | Critical error | Speed limit |
| A57 | Critical error | AMA internal fault |
| A59 | Critical error | Current limit |
| A60 | Critical error | External interlock |
| A63 | Critical error | Brake error |
| A65 | Critical error | Control card temperature |
| A67 | Critical error | Option change |
| A68 | Critical error | Safe stop |
| A69 | Critical error | Power card temperature |
| A70 | Critical error | Illegal FC configuration |
| A72 | Critical error | Dangerous failure |
| A74 | Critical error | PTC Thermistor |
| A80 | Critical error | Inverter running |
| A83 | Critical error | Illegal option combination |
| A84 | Critical error | No safety option |
| A90 | Critical error | Feedback monitor |
| A94 | Critical error | End of curve |
| A95 | Critical error | Engine belt damaged |
| A99 | Critical error | Locked rotor |
| None | Critical error | KTY error |
| None | Critical error | ECB error |
| None | Critical error | No flow or pressure information |
| None | Critical error | Start error |
| None | Critical error | No flow |

## 18.9. YASKAWA inverter errors

Table 31: Inverter errors

| Error code | Error type | Error description |
|---|---|---|
| Uv1 | Critical error | DC supply voltage too low |
| SC | Critical error | Output short circuit or IGBT error |
| GF | Critical error | Ground error |
| oC | Critical error | Overcurrent |
| ov | Critical error | DC supply overvoltage |
| oH | Critical error | Heat sink overheat |
| oH1 | Critical error | Heat sink overheat |
| oL1 | Critical error | Motor overloaded |
| oL2 | Critical error | Inverter overload |
| PF | Critical error | Input phase loss |
| LF | Critical error | Output phase loss |
| oH4 | Critical error | Motor overheating |
| CE | Critical error | Modbus communication error |
| EF1 | Critical error | External error - S1 terminal |
| SCF | Critical error | Safety system fault |
| oH3 | Critical error | Motor overheating |

## 18.10. Delta inverter errors

Table 32: Inverter errors

| Error code | Error description |
|---|---|
| ocA | The output current exceeds 2.4 times the rated current during acceleration. When ocA occurs, the drive closes the output gate immediately. The engine is idling and the display shows the ocA error |
| ocd | The output current exceeds 2.4 times the rated current during deceleration. When ocd occurs, the drive closes the output gate immediately. The engine is idling and the display shows ocd error |
| ocn | The output current exceeds 2.4 times the rated current during deceleration. When ocn occurs, the drive closes the output gate immediately. The engine is idling and the display shows an ocn error |
| GFF | When one of the output terminals is grounded, the short circuit current is greater than the Pr setting value |
| occ | A short circuit has been detected between the upper bridge and the lower bridge of the IGBT module |

Table 32: Inverter errors

| Error code | Error description |
|---|---|
| ocS | Excessive current or hardware error in stopping current detection. After ocS occurs, turn on the power. If a hardware failure occurs, cd1, cd2, or cd3 will appear on the display. |
| ovA | DC bus overvoltage during acceleration, when ovA occurs, the drive closes the output gate, the motor idling and the display shows ovA error. |
| ovd | Excess DC bus voltage during deceleration. When overvoltage occurs, the drive immediately closes the output gate, the motor is idling, and the display shows ovd error |
| ovn | Excessive DC bus voltage during deceleration. When an overvoltage occurs, the drive immediately closes the output gate, the motor is idling, and the display shows the ovn error |
| ovS | Power surge when stopping |
| LvA | The DC bus voltage is lower than the Pr setting value. 06-00 during acceleration |
| Lvd | The DC bus voltage is lower than the Pr setting value. 06-00 during acceleration |
| Lvn | The DC bus voltage is lower than the Pr setting value. 06-00 at constant speed |
| LvS | The DC bus voltage is lower than the Pr value. 06-00 value at stop. Voltage detection hardware failure |
| Orp | Input power phase loss |
| oH1 | The IGBT temperature exceeds the protection level |
| oH2 | The capacity temperature exceeds the protection level |
| tH1o | IGBT hardware error in temperature detection |
| tH2o | Hardware error in capacitor temperature detection |
| oL | The AC motor drive detects excessive current. The overload capacity persists for 1 minute when the drive is outputting 120% of the drive's rated output current. |
| oH3 | Engine overheating |
| ot1 | When the output current exceeds the over-torque detection level |
| ot2 | When the output current exceeds the over-torque detection level |
| uC | Low current detection |
| cd1 | U phase current detection error when power on |
| cd2 | Phase V current detection error when power on |
| cd3 | W phase current detection error when power on |
| Hd0 | cc (current terminal) hardware protection error when power is on |
| Hd1 | Oc hardware protection error with power on |
| Hd2 | Hardware protection error after power-up |
| Hd3 | occ IGBT short circuit detection protection error when power on |
| EF | External error. When the drive decelerates based on the Pr setting. 07-20, EF error is displayed on the keypad |

Table 32: Inverter errors

| Error code | Error description |
|---|---|
| EF1 | When the MIx=EF1 contact is turned on, the output stops immediately and displays EF1 on the keypad. The engine is idling |
| CE1 | The communication command is invalid |
| CE2 | Data address is invalid |
| CE3 | The data value is invalid |
| CE4 | Data is written to a read-only address |
| CE10 | MODBUS transmission timeout occurred |
| bF | Motor drive brake transistor is abnormal (for models with built-in brake transistor) |
| S1 | Emergency stop for external safety |
| Brk | External mechanical brake error The MO terminal is active when MOx=12, 42, 47 or 63, but MIx=55 does not receive a signal for mechanical brake operation during the time set in Pr. 02-56. |
| OPLH | Output phase loss |
| oL3 | Low frequency and high current protection |

## 18.11. Inovance inverter errors

Table 33: Inovance inverter errors

| Error code | Error description |
|---|---|
| Err02 | Acceleration over-current |
| Err03 | Deceleration over-current |
| Err04 | Overcurrent at constant speed |
| Err05 | Acceleration over-voltage |
| Err06 | Deceleration Over-voltage |
| Err07 | Overvoltage at constant speed |
| Err08 | Control power supply fault |
| Err09 | Undervoltage |
| Err10 | AC drive overload |
| Err11 | Motor overloaded |
| Err12 | Power input phase loss |
| Err13 | Power output phase loss |
| Err14 | Module overheat (IGBT) |
| Err15 | External fault (digital input) |
| Err16 | Communication fault |
| Err17 | Encoder fault |
| Err18 | Current detection fault |

Table 33: Inovance inverter errors

| Error code | Error description |
|---|---|
| Err19 | Motor auto-tuning fault |
| Err20 | Pulse wheel encoder fault |
| Err21 | EEPROM read-write fault |
| Err22 | AC drive hardware fault |
| Err23 | Short circuit to ground |
| Err26 | Accumulative running time reached |
| Err29 | Accumulative power-on time reached |
| Err30 | Load lost |
| Err31 | Software overcurrent (PID LOST) |
| Err40 | Pulse-by-pulse current limit |
| Err41 | Motor switchover fault during running |
| Err42 | Speed feedback error too large speed deviation |
| Err43 | Motor over-speed |
| Err45 | Motor overheat |

## 18.12. ABB Inverter errors

Table 34: ABB Inverter errors

| Error code | Error description |
|---|---|
| 0x2310 | Overcurrent |
| 0x2330 | Earth leakage |
| 0x2340 | Short circuit |
| 0x2381 | IGBT overload |
| 0x3130 | Input phase loss |
| 0x3181 | Wiring or earth fault |
| 0x3210 | DC link overvoltage |
| 0x3220 | DC link undervoltage |
| 0x3381 | Output phase loss |
| 0x4110 | Control board excess temperature |
| 0x4210 | IGBT overtemperature |
| 0x4290 | Drive module excess temperature |
| 0x42F1 | IGBT overtemperature |
| 0x4310 | Power unit module temperature is excessive |
| 0x4380 | Excess temperature difference |
| 0x4981 | Excess external temperature 1 |

Table 34: ABB Inverter errors

| Error code | Error description |
|---|---|
| 0x4982 | Excess external temperature 2 |
| 0x5080 | Colling fan missing |
| 0x5081 | Auxiliary fan broken |
| 0x5090 | STO hardware failure |
| 0x5091 | Safe torque off |
| 0x5094 | Measurement circuit error |
| 0x5089 | SMT circuit malfunction |
| 0x5098 | I/O communication loss |
| 0x50A0 | Cooling fan stuck or disconnected |
| 0x5682 | Power unit lost |
| 0x5691 | Measurement circuit ADC fault |
| 0x5692 | Power unit power supply failure |
| 0x5693 | Measurement circuit DFF fault |
| 0x5696 | PU state feedback error |
| 0x5697 | Charging feedback |
| 0x5698 | Unknown PU fault |
| 0x64B1 | Internal SSW fault |
| 0x6681 | Communication loss |
| 0x7121 | Motor stall |
| 0x7181 | Brake resistor error |
| 0x7183 | Brake resistor excess temperature |
| 0x7184 | Brake resistor wiring error |
| 0x7191 | Brake chopper short circuit |
| 0x7192 | Brake chopper IGBT excess temperature |
| 0x7310 | Overspeed |
| 0x73F0 | Overfrequency |
| 0x9081 | External fault 1 |
| 0xFA81 | STO 1 |
| 0xFA82 | STO 2 |

# 19. Controller dimensions

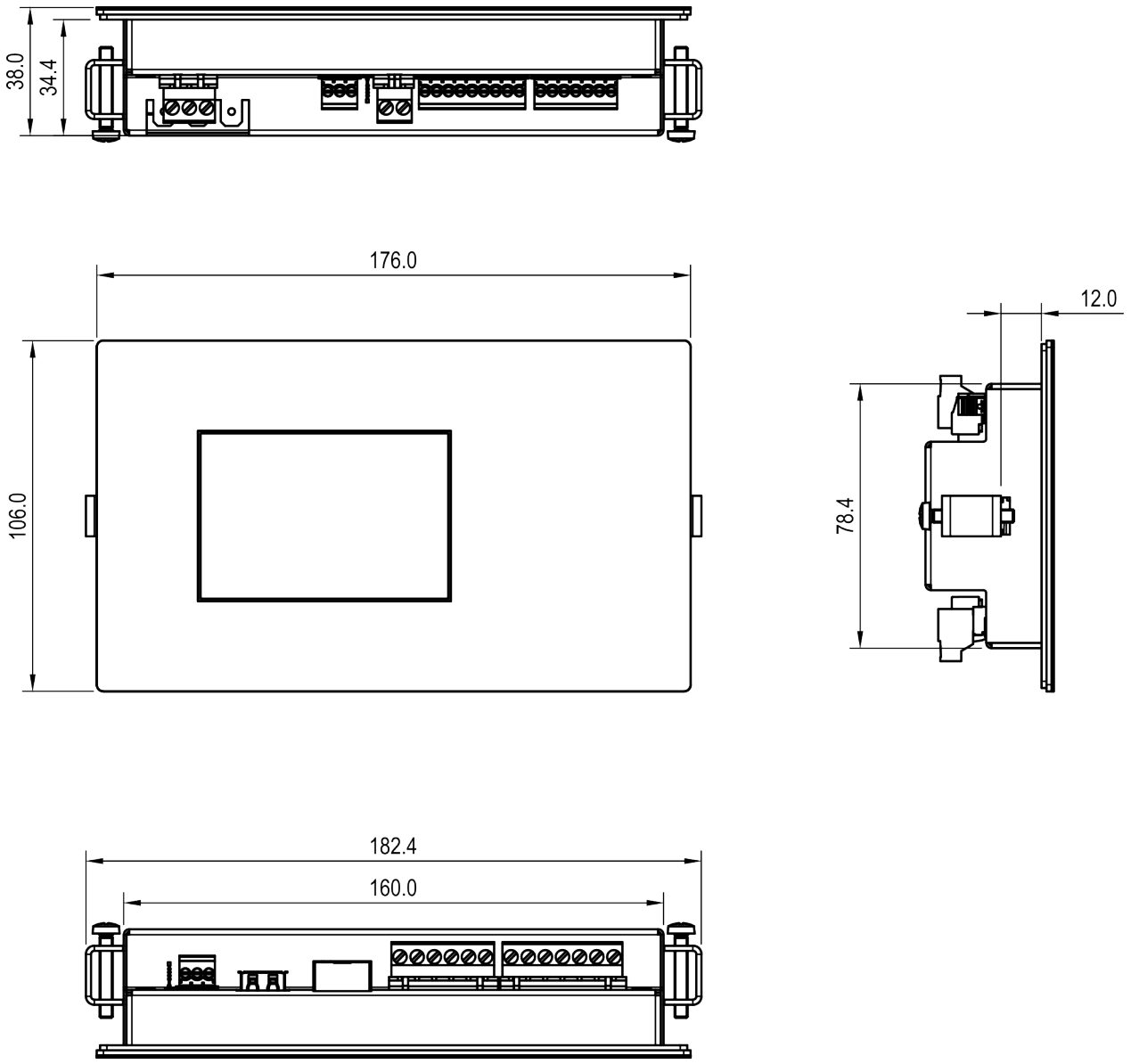


Figure 50: Controller housing drawing