



Original operating instructions

VARIAIR

CONTROLLER+

Document number : VACON+ 1.01 EN



05/26



Contents

1	Introduction	5
1.1	Preface	5
1.2	Warranty	5
1.3	Customer service	5
1.4	Servicing	5
2	Safety notices	6
2.1	Explanation of symbols	6
2.2	Intended use	6
2.3	Inspection requirements	6
2.4	General safety information	6
2.5	Regulations and measures	7
2.6	Dangers of non-observance of the safety notices	7
2.7	Protection against electrostatic discharge	7
2.8	Transport and storage	7
2.9	Assembly	7
2.10	Operation	8
2.10.1	Protection against contact with electrical components	8
2.10.2	Ambient conditions - dust, moisture, aggressive gases	8
2.10.3	Programs, viruses and harmful programs	8
3	Operation of the VARIAIR CONTROLLER+	9
3.1	Notes	9
3.2	Value input	9
3.3	Basic user interface layout	10
3.4	System Stop	11
3.5	General status indications	11
3.5.1	Level status button	11
3.5.2	unit status	13
3.6	"Initialisation" window	13
3.7	"Main screen" window	14
3.7.1	Main window button status indication	14
3.7.2	Extended level information	15
3.7.3	Level area	15
3.7.4	Unit area	16
3.8	"Maintenance" window	17
3.8.1	Main window button status indication: Maintenance	17
3.8.2	Maintenance status	17
3.8.3	Operation	17
3.9	"Notifications" window	19
3.9.1	Main window button status indication: Notifications	20
3.9.2	Identification of various events	20
3.10	"Log" window	21
3.10.1	Main window button status indication: Log	21



3.10.2	Identification of various events	22
3.10.3	Operation	22
3.11	"IO card" window	22
3.11.1	Main window button status indication: IO card	23
3.11.2	Module status identification	23
3.11.3	Signal status identification	23
3.11.4	"Bus" control area	24
3.11.5	"Analogue input" control area	24
3.11.6	"Analogue output" control area	25
3.11.7	"Digital input" control area	25
3.11.8	"Digital output" control area	26
3.12	"Controller" window	27
3.12.1	Main window button status indication: Controller	28
3.12.2	Trend indication	28
3.12.3	"Digital output" control area	29
3.12.4	"Pressure limits" control area	29
3.12.5	"Frequency limits" control area	30
3.12.6	"Times" control area	30
3.12.7	"Basic load" control area	31
3.13	"Information" window	32
3.13.1	Main window button status indication: Information	32
3.14	"Setup" window	33
3.14.1	Main window button status indication: Setup	33
3.14.2	"Language selection" area	33
3.14.3	"Units" area	33
3.14.4	"Screensaver" area	34
3.14.5	"Touch configuration" area	34
3.14.6	"Time and date" area	34
3.14.7	Operation	34
3.15	Window „Network configuration“	35
3.15.1	Operation	36
3.16	Window "Timer"	36
3.16.1	Conditions	37
3.17	Window "Backup"	37
3.17.1	Operation	38
3.18	"Screenshot" function	38
3.18.1	Main window button status indication: Screenshot	38
3.19	"Password" function	38
3.19.1	Main window button and control status indication	39
4	Virtual Network Computing (VNC)	40
4.1	Sources for obtaining free VNC viewers	40
5	Hardware of the VARIAIR CONTROLLER+	41
5.1	VACON+ PowerPanel	42
5.1.1	Technical data	42



5.1.2	Conditions of use	43
5.1.3	Data and realtime clock buffering	43
5.1.4	Diagnosis LEDs	43
5.1.5	Maintenance and cleaning	45
5.2	VACON+ IO BLOCK	45
5.2.1	Conditions of use	45
5.2.2	Diagnosis	46
5.3	VACON+ MODULE ► Standard (bus receiver)	47
5.3.1	General	47
5.3.2	Status LEDs	47
5.4	VACON+ MODULE ► ANALOGUE IN	48
5.4.1	General	48
5.4.2	Status LEDs	48
5.5	VACON+ MODULE ► ANALOGUE OUT	49
5.5.1	General	49
5.5.2	Status LEDs	49
5.6	VACON+ MODULE ► DIGITAL IN	50
5.6.1	General	50
5.6.2	Status LEDs	50
5.7	VACON+ MODULE ► DIGITAL OUT	51
5.7.1	General	51
5.7.2	Status LEDs	51
5.8	Standards and approvals	52
5.8.1	Directives and declarations	52
5.8.2	International approvals	53
5.9	Spare parts list	54
5.10	Environmentally friendly disposal	55
6	Limitation of liability and copyright	56
6.1	Limitation of liability	56
6.2	Copyright	56
6.3	Decommissioning	56



1 Introduction

1.1 Preface

These operating instructions provide the user with useful guidance for the safe and correct operation of the VARAIR CONTROLLER+.

Every person tasked with transporting, installing, commissioning, operating, maintaining and repairing our products must have read and understood

- the operating instructions,
- the safety regulations
- and the safety notices in the individual chapters and sections.

1.2 Warranty

These operating instructions must be read carefully prior to commissioning.

No warranty is given for damage and malfunctions caused by non-observance of the operating instructions.

Wearing parts are not covered by the warranty; warranty claims must be notified without delay after detecting a defect specifying the order number.

The warranty is void in case of:

- improper handling,
- use other than intended
- impermissible operating equipment,
- incorrect installation,
- faulty or incorrect laying or connection of the connecting cables,
- use of other than original parts

1.3 Customer service

Our customer service is available for all technical queries about products and their system technology applications.

In case of difficulties with our products, please contact one of our customer service centres or the responsible agency or the manufacturing site to obtain help.

Please provide the data of the rating plate with any queries or spare part orders.

Providing these data guarantees that you will receive the correct information or the required spare parts.

1.4 Servicing

Upon request, our trained specialists will take care of this task for you.

Gebr. Becker GmbH	Service International
Hölker Feld 29-31 42279 Wuppertal, Germany Tel: +49 (0) 202 697 0 Fax: +49 (0) 202 660 855 Email: info@becker-international.com	24 hotline +49(0)151 40224302 Email: service-international@becker-international.com

In case of queries or problems please also contact your sales and service partners.



2 Safety notices

2.1 Explanation of symbols



Safety symbol

This symbol is found in the operating instructions with all health and safety notices indicating a risk to the life and limb of persons.

You should always observe these notices and proceed with attention and care.

Pass the safety notices to all persons commissioned to work on the blast station.

The generally applicable safety regulations must also be observed.



This symbol is found in the operating instructions with all notices where non-observance could cause damage to the blast station and other material assets.

2.2 Intended use

The central fan control VARI AIR CONTROLLER+ has been designed for the central air supply of individual or multiple production machines.

It has been manufactured in accordance with the latest state of the technical art and approved safety technology rules and tested for safety by the manufacturer.

The VARI AIR CONTROLLER+ must only be used in a sound technical condition by trained personnel taking account of the applicable safety and accident prevention regulations. This also includes adherence to the maintenance notices provided in the operating instructions.

Serious injury or material damage as well as substantial malfunctions may arise due to the:

- impermissible removal of covers,
- improper use,
- incorrect operation,
- decommissioning or bridging of safety apparatus,
- impermissible or improper alterations/conversions,
- manipulation of the software package supplied and installed by the factory.

2.3 Inspection requirements



Inspections during first commissioning:

The inspection consists mainly of a visual and functional check. It is intended to ensure that the components are in a safe state and any defects and damage, which might have been caused e.g. by transportation, are detected and rectified.



All inspections must be initiated by the operator and carried out by an authorised specialist.

2.4 General safety information

These operating instructions include general notices which must be observed during installation and operation. These operating instructions must, therefore, always be read by the installer and responsible specialist personnel/operator prior to assembly and commissioning and must always be available at the deployment site of the plant.



2.5 Regulations and measures

Electronic devices are not generally fail-safe. If the VARI AIR CONTROLLER+ fails, the user must ensure that connected devices, such as motors, are moved into a safe state.

When using the VARI AIR CONTROLLER+ the safety measures applicable to industrial controllers (safeguarding through protective equipment, such as emergency stop buttons etc.) must be observed in accordance with the applicable national or international regulations. This also applies to all additionally connected devices, such as drives.

All work, such as installation, commissioning and service, may only be carried out by qualified specialist personnel. Qualified specialist personnel means persons who are familiar with the transportation, installation, assembly, commissioning and operation of the product and have the appropriate qualifications to carry out their tasks (e.g. IEC 60364). The national accident prevention regulations must be observed.

The safety notices, information on connection conditions (rating plate and documentation) and the limit values specified in the technical data must be read carefully prior to installation and commissioning and must always be complied with.

2.6 Dangers of non-observance of the safety notices

Non-observance of the safety notices may put people at risk. The non-observance of the safety notices may lead to any compensation claims being void.

2.7 Protection against electrostatic discharge

The components of the VARI AIR CONTROLLER+ do not require any special ESD packaging but must still be handled correctly.

- Do not touch the contacts of plug-in connectors on the unit
- Do not touch the contacts of plug-in connectors on connected cables
- Do not touch the contact tabs of circuit boards

2.8 Transport and storage

During transport and storage the components of the VARI AIR CONTROLLER+ must be protected against impermissible stress (mechanical loads, temperature, moisture, aggressive atmosphere). The components include electrostatic sensitive elements which might be damaged if handled incorrectly. You should therefore take the necessary precautions against electrostatic discharge during the installation or removal of the units.

2.9 Assembly

- Assembly must take place in accordance with the documentation in suitable facilities and using suitable tools.
- The units may only be assembled in the de-energised state and by qualified specialist personnel.
- The general safety regulations and the applicable national accident prevention regulations must be complied with.
- The electrical installation must be carried out in accordance with the relevant regulations (e.g. conductor cross section, fuse protection, protective earth connection).
- Take the necessary precautions against electrostatic discharge.



2.10 Operation

2.10.1 Protection against contact with electrical components

Prior to switching the VARIAIR CONTROLLER+ on it must be ensured that the housing is connected correctly to an earth potential (PE rail).

Prior to activation live components must be securely covered. During operation all covers must remain closed.

2.10.2 Ambient conditions - dust, moisture, aggressive gases

When operating the VARIAIR CONTROLLER+ in rooms with dust and condensation potentially impairing its functions, it is protected at the front against the ingress of dust and moisture if installed correctly. At the rear all units must be protected against the ingress of dust and moisture or the dust deposits must be removed at suitable intervals.

2.10.3 Programs, viruses and harmful programs

Any data exchange or any installation of software via data carriers (USB memory stick) or via networks and the internet poses a potential risk for the system. The user is responsible for averting these dangers and protection through suitable measures, such as antivirus programs, firewalls etc., and to only use software from reliable sources.



3 Operation of the VARIAIR CONTROLLER+

In addition to its hardware the VARIAIR CONTROLLER+ also includes the software. The software is programmed and maintained at Gebr. Becker GmbH.

The software can be operated using the touch-screen of the VACON+ PowerPanel and provides information about the customer system.

The software consists of 2 parts:

- The Base Software forms the basic software for the VARIAIR CONTROLLER+. It provides system functions (e.g. adjustment, control, monitoring) for the customer system configuration.
- The customer system configuration defines the software-based implementation of the corresponding customer system. It defines e.g. how the customer system will be represented on the user interface and how the signals will be monitored and controlled.

The software permits the adjustment, control and monitoring of up to 8 levels. A level includes one to several units controlled and monitored via sensors as a group. If a level includes several units, the units are switched on or off dependent on the system load. Care is taken for all system having nearly identical loads.

3.1 Notes

The following notes apply generally to the software.

Additional notes are described in the individual windows.



All software configurations are accepted without restarting the VARIAIR CONTROLLER+ and affect the corresponding function directly.



All manual configurations via the user interface are reset to Automatic after a restart of the VARIAIR CONTROLLER+. This affects e.g.:

- Level is set to standard operation
- Level release via the user interface is set
- The digital signals are set to automatic



In general, it depends on the user group which parameters of the controller may be modified or viewed. In addition to the general control software area there are various other password levels. Changing a password level is described in the chapter "Password" window.



For the purpose of these operating instructions a generally applicable system has been selected as an example to allow the individual functions to be explained better. The functions are identical for customer systems. The customer systems mainly differ in the number of levels, the number of units and the representation of the customer system on the user interface.

3.2 Value input

Dependent on the approved user level, values/texts may also be entered in the various windows in addition to the operation of buttons. When selecting a value/text field, a corresponding keyboard or numerical block is displayed on the user interface.

The keyboard and the numerical block feature a text field at the top which displays the entry.

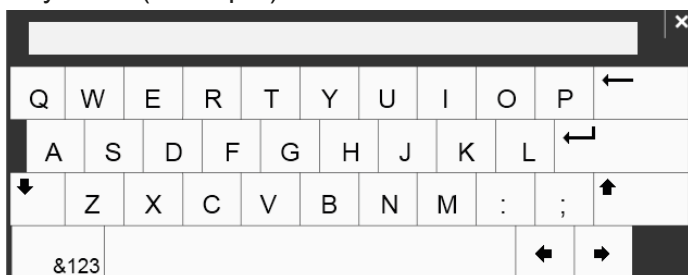




For numerical entries, there is a minimum and a maximum value. These values are displayed below the text field in the numerical block. To be accepted, the values entered must be between these two values.

After pressing the  button the new entry is accepted. To close the window without accepting a value/text, the  button must be pressed.

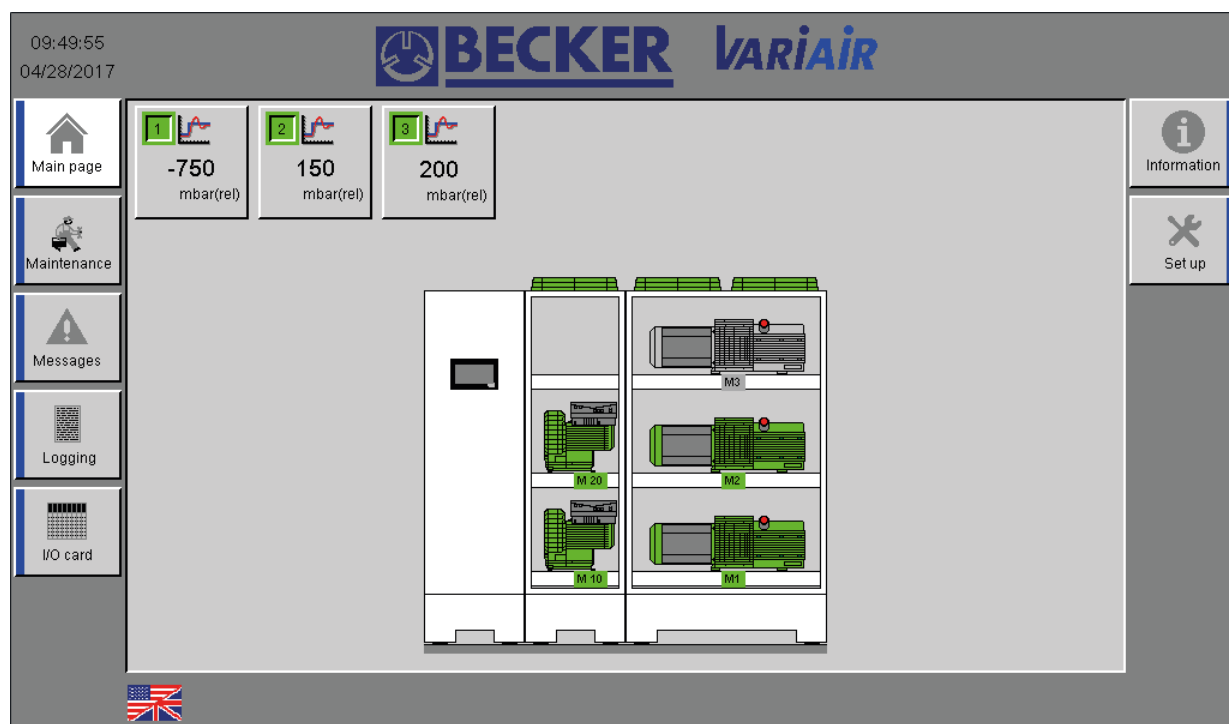
Keyboard (text input)



Numerical block (numerical input)



3.3 Basic user interface layout



The basic layout of the user interface consists of two areas. These two areas are a frame (large grey area) and an information area (light grey area).

The frame has 4 areas providing various information:

- In the top area the triggering of the safe stop is shown, dependent on the system configuration, in addition to the company logo and the time/date. (For more information see chapter "Safe stop")
- In the left area main window buttons are shown indicating a direct link (e.g. maintenance indication) to the customer system.
- In the right area main window buttons are shown providing extended functions (e.g. language selection) for the VARIair CONTROLLER+



- In the bottom area general information is shown. This includes, for example, the configured language. With user levels above "observer" the current user level and the remaining login type is displayed there.

Dependent on the status of the individual functions, the main window buttons may assume different background colours. These colour options are described in more detail in the individual chapters of the corresponding windows.

In the information area, corresponding windows are shown depending on the selection of the main window buttons. These windows are described in the following chapters.

3.4 System Stop



The system stop function is an option which can be implemented for the system dependent on the customer requirements.

When triggering the system stop, warning signs are shown next to the company logo and a corresponding message is displayed in the message window.

The system stop is defined as an overriding reset of the controller release for all units by default.



Dependent on the controlled unit type, an after-running of the unit is possible after the release has been withdrawn.

3.5 General status indications

In various windows, sometimes the level status and the unit status are shown to provide a better overview. It has been ensured that an identical indication is always shown in the respective windows.

3.5.1 Level status button

Level status buttons are user interfaces (buttons) for selecting the corresponding level. At the same time, the level status is displayed in these user interfaces.



The current actual pressure is always shown in the level status button.

The following display options apply to the level status:



Some status indications can be displayed simultaneously on the level button.



Status	Description
 -749 mbar(rel)	Normal operation: - level release is available - the level is in standard operation - the level is free from faults and required maintenance
 -749 mbar(rel)	The level has been selected: The values and states displayed in the window relate to this level
 0 mbar(rel)	No manual release: The level has been switched off on the user interface
 0 mbar(rel)	No external release: The level does not have an external release from the customer system
 -749 mbar(rel)	Direct start: All error-free units in the level run at maximum frequency
 -749 mbar(rel)	 Maintenance: A maintenance event is present in the level (more detailed information is displayed in the window "Notifications")
 -749 mbar(rel)	Warning: A warning is present in the level (more detailed information is displayed in the window "Notifications")
 0 mbar(rel)	Fault: A fault is present in the level (more detailed information is displayed in the window "Notifications")
 -749 mbar(rel)	Speed-controlled operation: The level is not controlled and the units are controlled manually via the user interface



3.5.2 unit status

The unit status is shown on the user interface in various colours. The following display options apply to the unit status:

Unit	Description
Ready	Unit is ready
Active	Unit is active
Fault	Unit has a fault
FC fault	The frequency converter of the unit has a fault
No FC connection	No communication to the frequency converter of the unit could be established
Unit switched off manually	The unit has been switched off on the user interface

3.6 "Initialisation" window

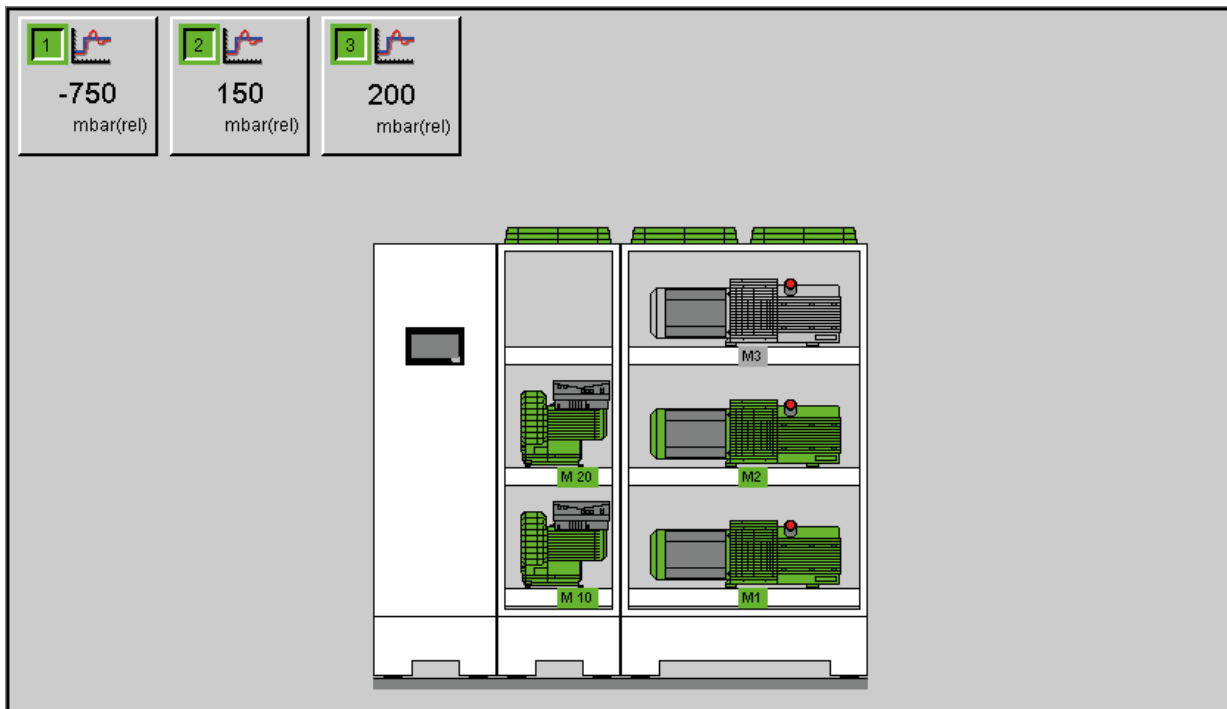


If the supply voltage of the VARIair CONTROLLER+ is activated, the software is initialised until the "Main screen" window is shown.

During the initialisation the communication to the VACON+ IO block is established and the customer-specific data are loaded to the software.



3.7 "Main screen" window



After software initialisation the "Main screen" window is shown. This window consists of 2 areas. In the top area the configured levels are displayed via level status buttons.

In the bottom area the customer system layout is shown. The displayed units can be shown in different colours dependent on the unit status. In addition, the units belonging to a level are highlighted in colour if a level is selected via the level status button.

Status	Description
	Unit is active
	Unit is active and belongs to the selected level
	Unit is ready
	Unit is ready and belongs to the selected level
	Unit has a fault
	Unit has a fault and belongs to the selected level

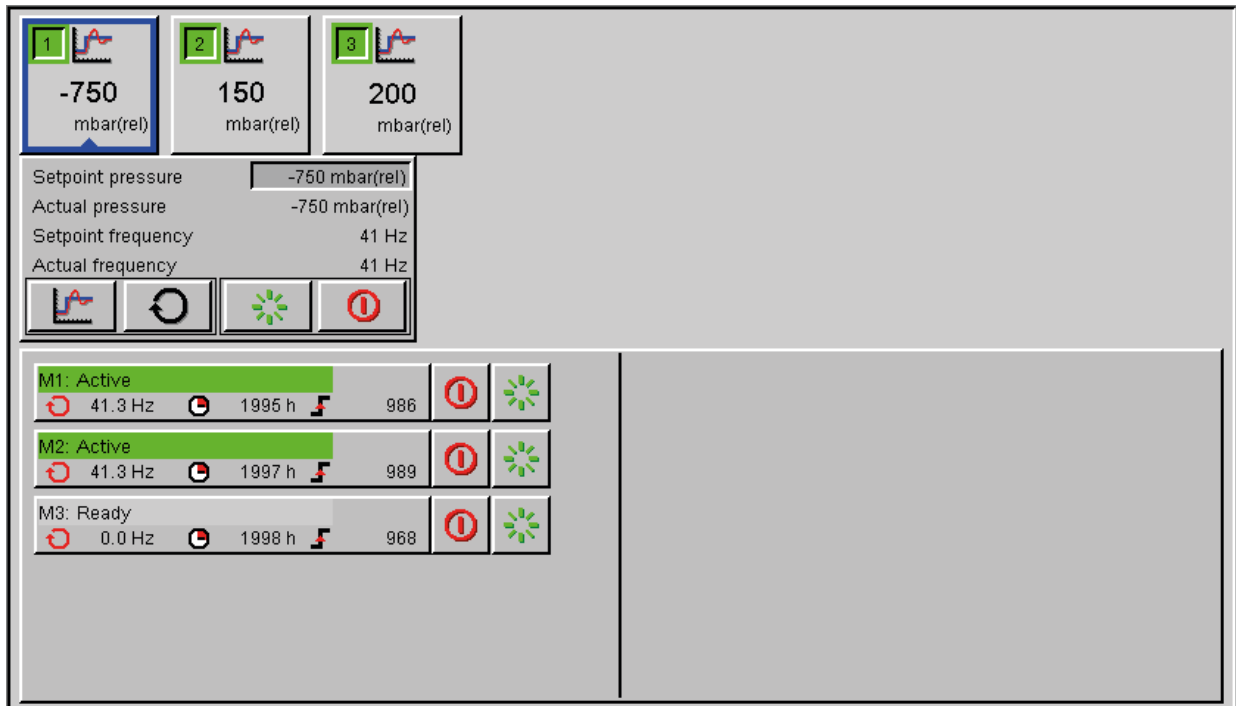
3.7.1 Main window button status indication

Status	Description
	The window is not selected
	The window is selected and shown on the user interface



3.7.2 Extended level information

After selecting a level via the level status button and pressing the button  extended information on the level and the corresponding units is shown in the window.



2 further areas are displayed.

- In the top area values and configurations for the level are displayed
- In the bottom area the units belonging to the level are displayed.

3.7.3 Level area

In the level area the following information is available:

- Target pressure: this value corresponds to the desired target pressure of the system
- Actual pressure: this value corresponds to the current sensor signal
- Target frequency: this value corresponds to the calculated setpoint from the controller for the units
- Actual frequency: this value corresponds to the average actual frequency of all active units in the level

From the corresponding user level the user has additional control options available.



The target pressure of the level can by default be modified from the user level "Operator" on the user interface.



Operation is by default only available from the user level "Operator".



	Description
	This switches the level on manually
	This switches the level off manually

	Operation is by default only available from the user level "Installer".
---	---

	Description
	This moves the level into the operating mode Control
	This moves the level into the speed-controlled operating mode. It is also possible to set a target frequency via the user interface.

3.7.4 Unit area

In the unit area further information is displayed for each unit in addition to the current unit status.

M1: Active					
 41.3 Hz	 1995 h		986		

Status	Description
	Current frequency
	Current operating hours
	Current number of activations
	A maintenance event is present for the unit
	A warning is present for the unit
	The unit can be changed between 2 levels

From the corresponding user level the user has additional control functions available.

	Operation is by default only available from the user level "Installer".
---	---

	Description
	This switches the unit on manually
	This switches the unit off manually



3.8 "Maintenance" window

M1: Active 1995 h 986	M 10: Active 3129 h 578	M 20: Active 3081 h 568
M2: Active 1997 h 989		
M3: Ready 2001 h 968		

The "Maintenance" window displays the units, the unit status and the current maintenance status. In addition to the colour-coded display of the maintenance status, the operating hours of the unit and the number of activations are displayed.

After selecting a unit the exact maintenance data for the unit are displayed (see sub-chapter "Operation").

3.8.1 Main window button status indication: Maintenance

Status	Description
 Maintenance	The window is not selected
 Maintenance	The window is selected and shown on the user interface
 Maintenance	A maintenance event is present in the "Maintenance" area

3.8.2 Maintenance status

Status	Description
	No maintenance event is present
	A maintenance event is present

3.8.3 Operation



M3: Ready

Operating hours 2001 h

Starting 968

Wear of the vanes

Maintenance in 999 h

Interval 7500 h

Shift schedule 500 h

Lubricate device

Maintenance in 0 h

Interval 2000 h

Shift schedule 500 h

In addition to the unit status, this window displays the operating hours, number of activations and the maintenance objects configured for the unit.

Every maintenance object provides the following information:

- Maintenance type
- Maintenance in: Describes the time until the next maintenance
- Interval: Describes the maintenance interval
- Move: This is a defined time by which the maintenance can be moved



Operation is by default only available from the user level "Operator".



Only confirm the maintenance if it was carried out. The date of acknowledgement is logged.

Status	Description
	Move a maintenance appointment. The maintenance appointment is carried out at a later time
	Maintenance has been completed
	Back to previous screen



3.9 "Notifications" window

05/02/2017 12:56:55	Maintenance device 1 (M1)	  
05/02/2017 12:54:21	Maintenance device 2 (M2)	  
05/02/2017 12:53:56	Login 2	  
05/02/2017 12:53:41	Error Digital Input: Module 3 Channel 3: M3: Automatic operation	  
05/02/2017 12:53:31	Warning Digital Input: Module 2 Channel 2: SYS: Top-fan	  



If a notification or event occurs during the operation of the system controller, this is displayed in the "Notifications" window with a text message and a corresponding time stamp (date and time).



Dependent on the customer system configuration it might be necessary to acknowledge defined notifications or events.



All notifications and events displayed in the notification window are logged in a file and available for subsequent analysis!



3.9.1 Main window button status indication: Notifications

Status	Description
	The window is not selected
	The window is selected and shown on the user interface
	A maintenance event is present
	A warning event is present
	A fault event is present

3.9.2 Identification of various events

Dependent on the event, the corresponding notifications are highlighted in colour. The following colour definition applies:

Status	Description
	General notifications
	Maintenance events
	Warnings
	Faults
	The notification or event was acknowledged in the user interface

Status	Description
	Using the buttons the file can be navigated
	Acknowledge the selected notification or event



3.10 "Log" window

05/02/2017 12:56:54	Maintenance device 1 (M1)	✓
05/02/2017 12:56:10	Create Backup "Backup-02052017_125453"	✓
05/02/2017 12:55:23	Saving Database "Database.usr"	✓
05/02/2017 12:55:20	Saving Database "Database.dbrun"	✓
05/02/2017 12:55:18	Saving Database "Database.dbset"	✓
05/02/2017 12:54:59	Saving Database "L000000 VACS0130.0230.conf"	✓
05/02/2017 12:54:58	Create Backup "Backup-02052017_125453"	✓
05/02/2017 12:54:21	Maintenance device 2 (M2)	✓
05/02/2017 12:53:56	Login 2	✓
05/02/2017 12:53:41	Error Digital Input Module 3 Channel 3: M3: Automatic operation	✓
05/02/2017 12:53:31	Warning Digital Input Module 2 Channel 2: SYS: Top-fan	✓
05/02/2017 12:52:22	Error Digital Input Module 2 Channel 1: SYS: System stop	✓
05/02/2017 12:51:21	Logout	✓

All events and notifications occurring during the runtime of the VARI AIR CONTROLLER+ are provided with a time stamp (date and time) and logged in a file. This permits the chronological logging and retention of configuration changes, warnings, faults and other events.

These log files can be viewed in the "Log" window.



These data continue to be available after a restart of the controller.

3.10.1 Main window button status indication: Log

Status	Description
 Logging	The window is not selected
 Logging	The window is selected and shown on the user interface



3.10.2 Identification of various events

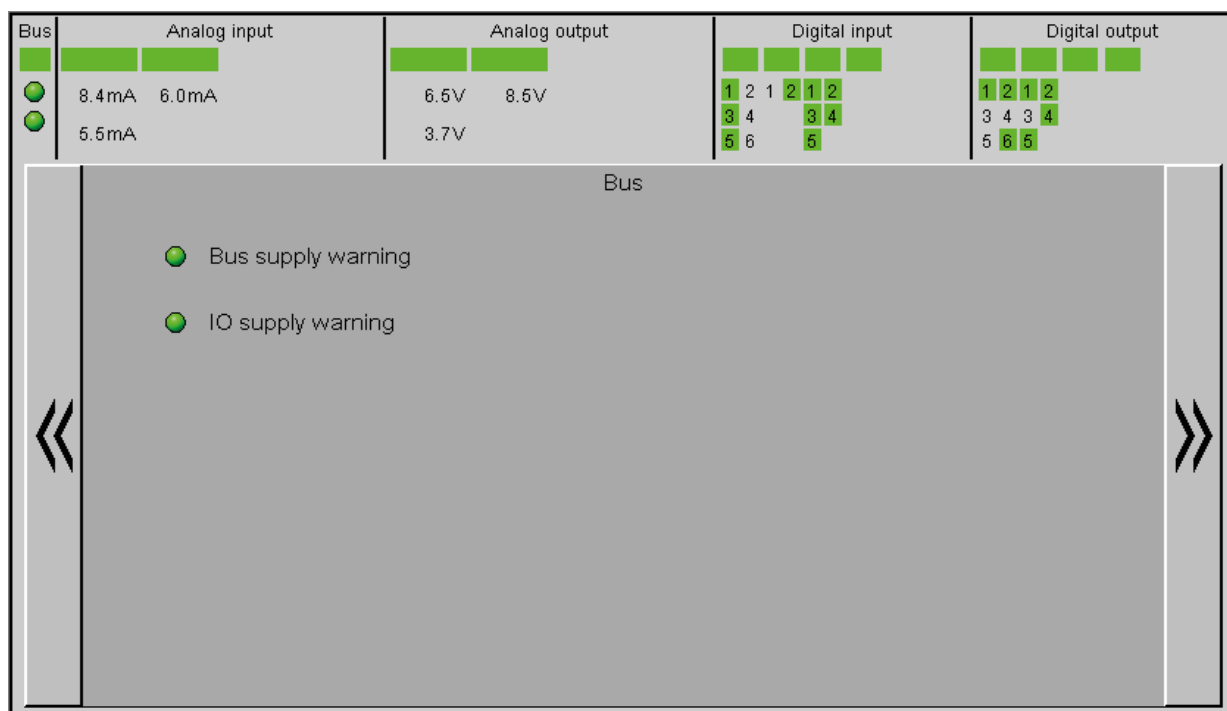
Dependent on the event, the corresponding notifications are highlighted in colour. The following colour definition applies:

Status	Description
	General notifications
	Maintenance events
	Warnings
	Faults
	Fault was acknowledged in the user interface

3.10.3 Operation

Status	Description
	Using the buttons the file can be navigated

3.11 "IO card" window



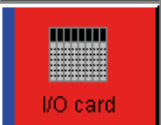
The "IO card" window displays all digital and analogue signals and their states.

The window consists of 2 areas:

- In the top area the current VACON+ IO block layout and the status of the modules and individual channels is displayed
- In the bottom area (control area) more detailed information on the function of the channels is displayed. In addition, the digital signals can be set manually here dependent on the user level.



3.11.1 Main window button status indication: IO card

Status	Description
 I/O card	The window is not selected
 I/O card	The window is selected and shown on the user interface
 I/O card	In the area "IO card" at least one channel has been adjusted manually

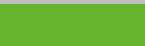
3.11.2 Module status identification

On the operating screens and in the top field the module status of each module is displayed in colour.

Status	Description
	Module is OK
	Module reports a fault

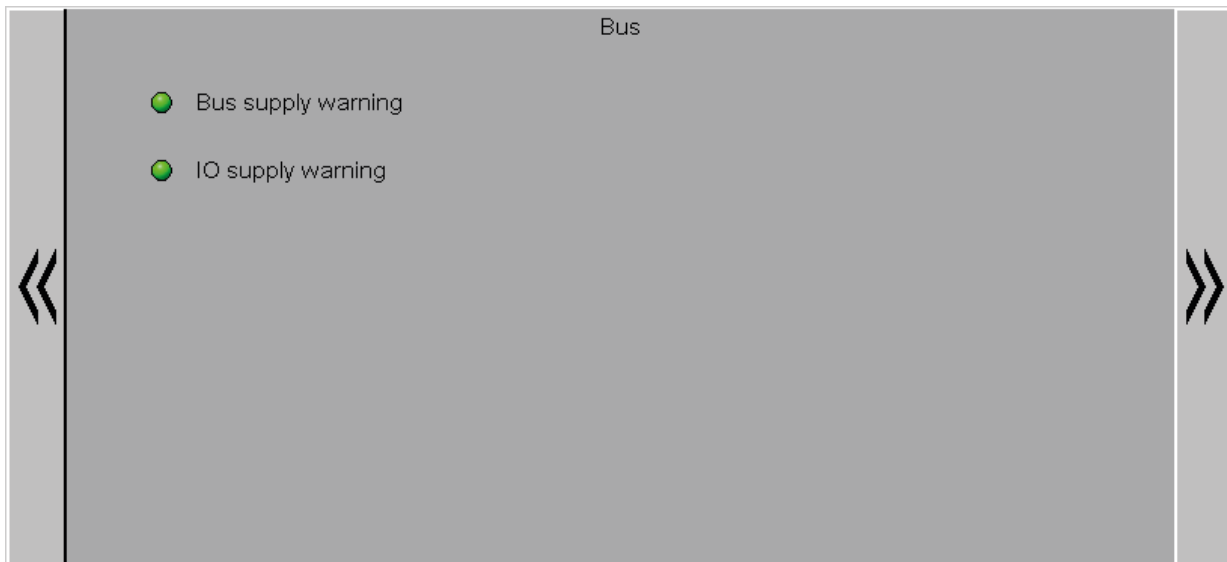
3.11.3 Signal status identification

On the operating screens and in the top field the signal status of each channel is displayed in colour.

Status	Description
	The signal corresponds to a low signal.
	The signal corresponds to a high signal.
	Channel reports a fault



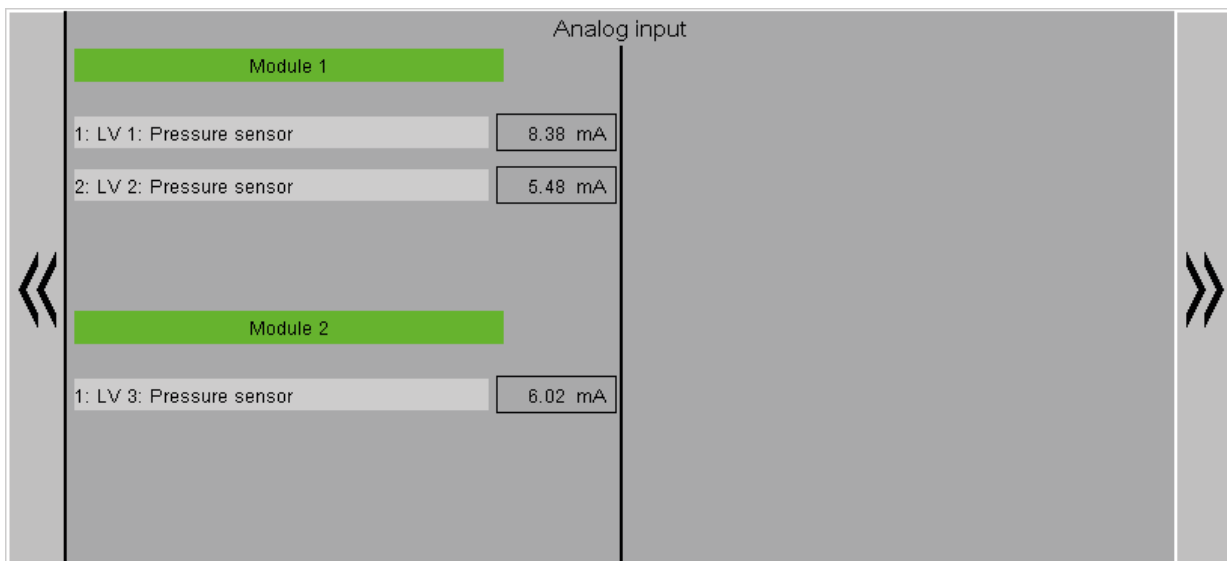
3.11.4 "Bus" control area



In the "Bus" area the status of the bus module and any available "Bus supply" and "IO supply" warnings are displayed.

Status	Description
	Supply OK
	Supply fault

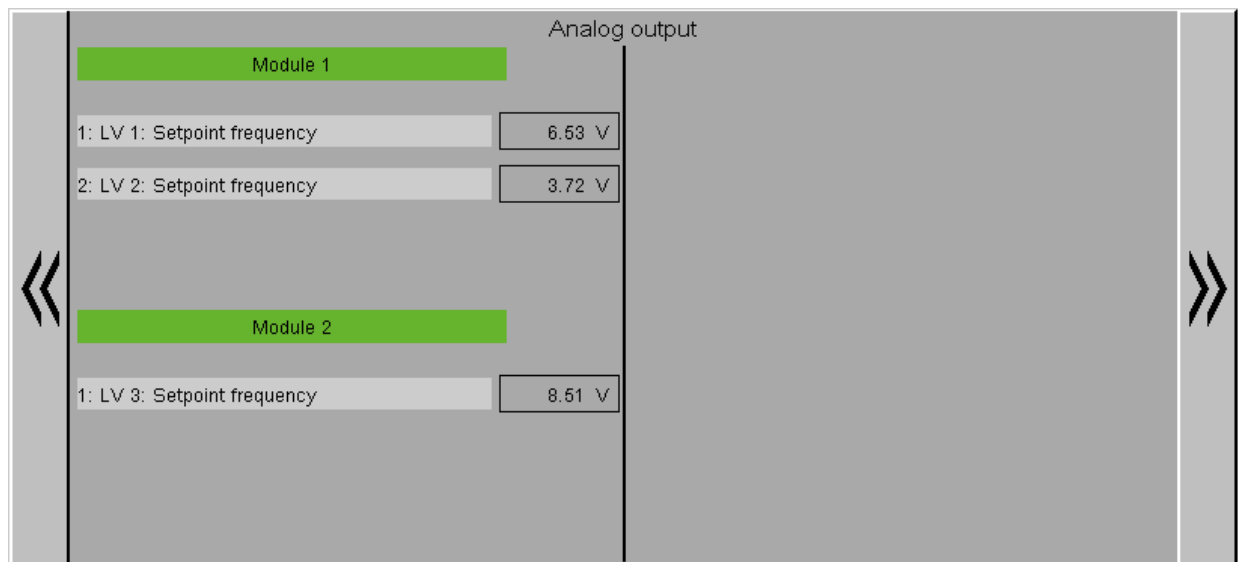
3.11.5 "Analogue input" control area



In the "Analogue input" area the standard signals present and their functions (e.g. pressure sensor) are displayed.

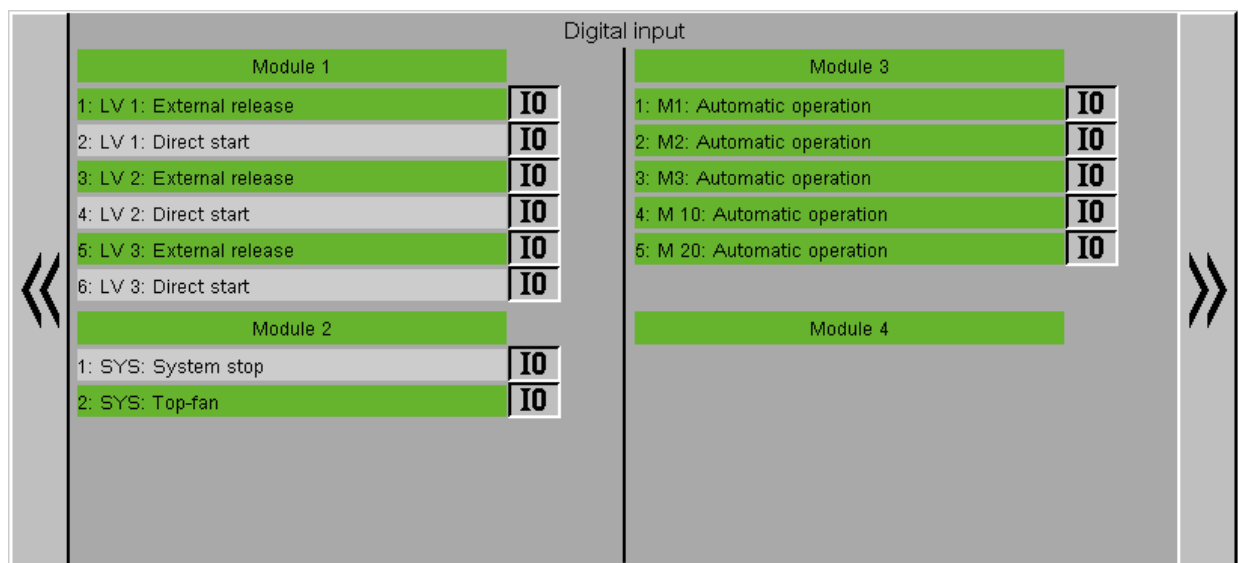


3.11.6 "Analogue output" control area



In the "Analogue output" area the outgoing standard signals and their functions (e.g. target frequency) are displayed.

3.11.7 "Digital input" control area



In the "Digital input" area the digital signals and their functions (e.g. external release) are displayed. To test the functions the digital signals can be manually altered from the user interface.

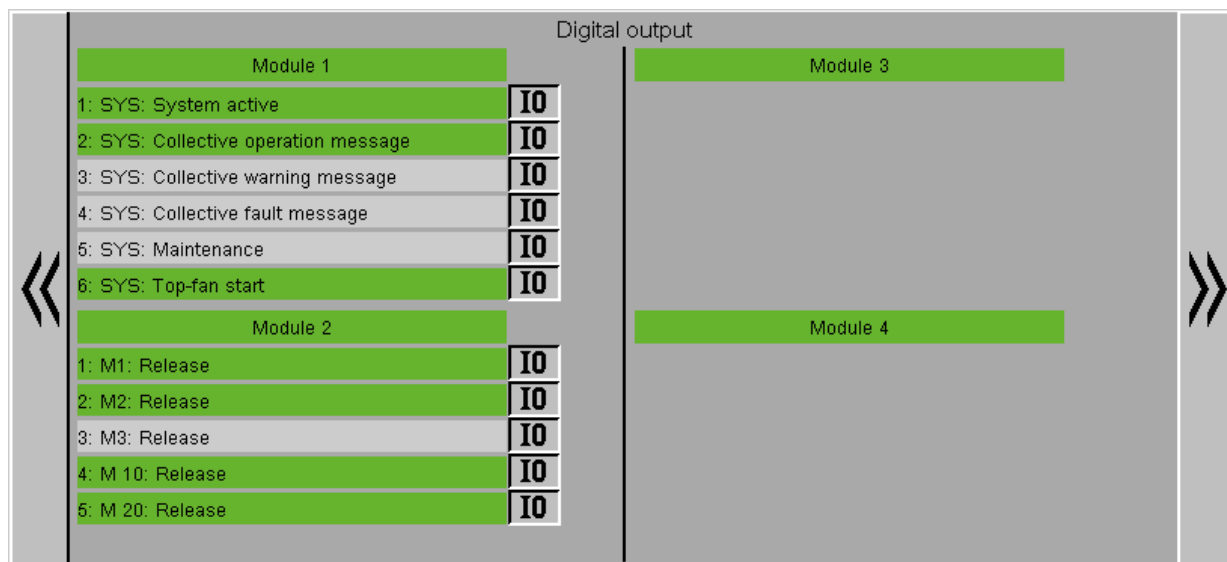


The control of the digital channels is by default only available from the user level "Installer".



Status	Description
	The channel is in automatic mode
 	The channel is in manual mode and the signal has been set
 	The channel is in manual mode and the signal has not been set

3.11.8 "Digital output" control area



In the "Digital output" area the digital signals and their functions (e.g. external release) are displayed. To test the functions the digital signals can be manually altered from the user interface.



The control of the digital channels is by default only available from the user level "Installer".

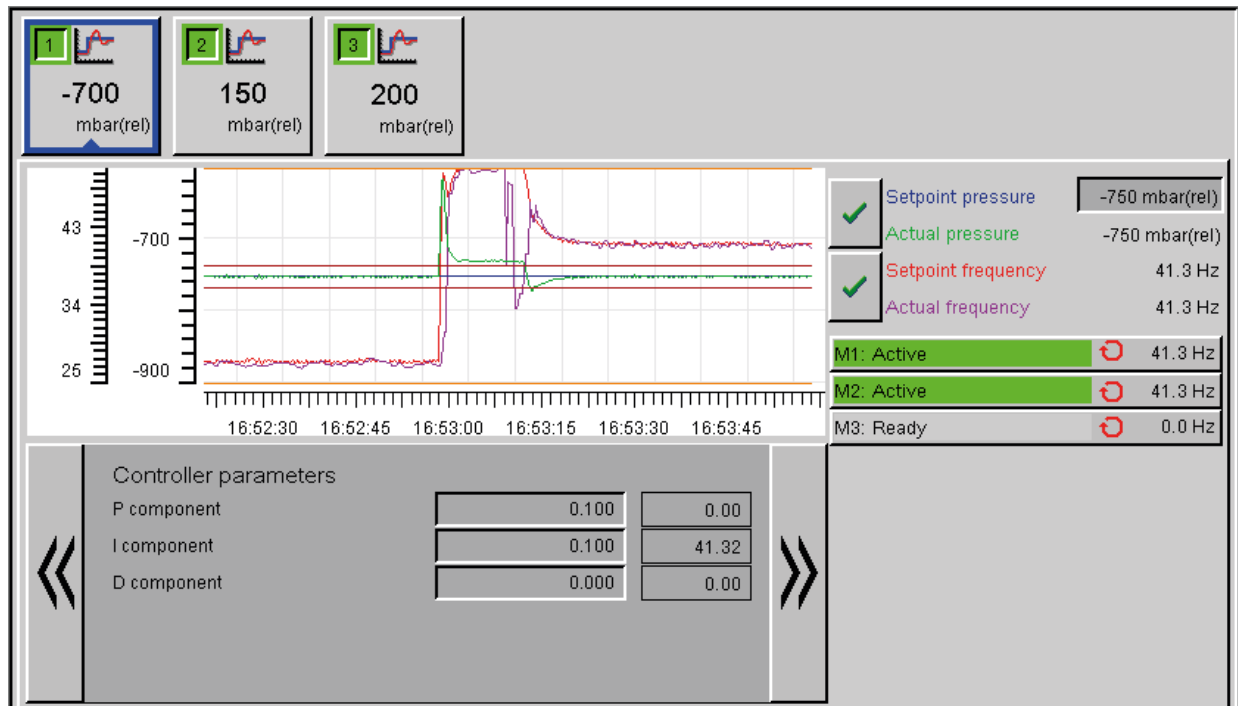
Status	Description
	The channel is in automatic mode
 	The channel is in manual mode and the signal has been set
 	The channel is in manual mode and the signal has not been set



3.12 "Controller" window



The "Controller" window is by default only available from the user level "Installer"!



Various configurations to enable an optimized air supply can be made in the "Controller" window. In addition to the PID controller configurations, the configurations for activating and deactivating the units are also set in this window.

The windows is divided into different areas:

- Level status button: after selecting a level status button the corresponding values and information is displayed
- Trend indication: this displays the time progression of the control behaviour
- Control area: here various optimizations of the system behaviour are set
- Unit status: here the units and their unit status are displayed. In addition, the current actual frequency is displayed for units with frequency converter.
- Target/actual values
 - Target pressure: this value corresponds to the desired target pressure of the system and can be modified in the window
 - Actual pressure: this value corresponds to the current sensor signal
 - Target frequency: this value corresponds to the calculated setpoint from the controller for the units
 - Actual frequency: this value corresponds to the average actual frequency of all active units in the level



In addition to some input fields, information fields are displayed to indicate the current status of the values during runtime.



3.12.1 Main window button status indication: Controller

Status	Description
 Controller	The window is not selected
 Controller	The window is selected and shown on the user interface

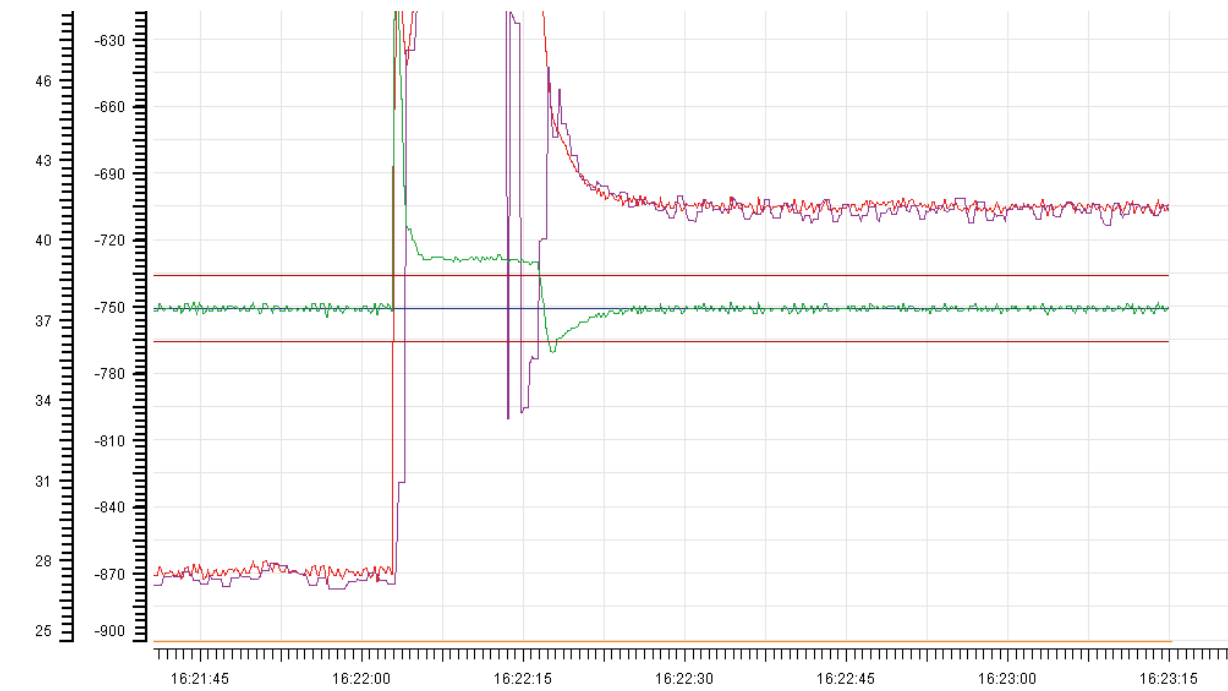
3.12.2 Trend indication

During the operation of the VARIAR CONTROLLER+ the trend indication is always active and displays the control behaviour of the selected level over time.

In the trend indication the individual colours of the characteristics lines have the following meaning:

Status	Description
	Target pressure
	Actual pressure
	Pressure limits
	Target frequency
	Actual frequency (average frequency of all active units in the level)
	Frequency limits

To allow for a better evaluation of the control behaviour, the trend indication can be enlarged. The trend indication is then displayed across the entire display diagonal. To enlarge and reduce the trend indication, the trend indication must be touched.



3.12.3 "Digital output" control area

Controller parameters			
P component	0.100	0.00	
I component	0.100	41.32	
D component	0.000	0.00	

In the "PID controller" area the control behaviour of the system can be optimized.

The control behaviour is defined by the following control parameters:

	Description
P share	The P share (amplification K_p) acts proportional to the control deviation on the output signal
I share	The I share (adjustment time T_n) acts through time integration of the control deviation on the output signal
D share	The D share (hold-off time T_v) acts through the speed of change of the control deviation differentially on the output signal

3.12.4 "Pressure limits" control area

Pressure limits			
Activation pressure offset	15		
Activate waiting time	10 sec	0 sec	
Deactivation pressure offset	15		
Deactivate waiting time	10 sec	0 sec	

In the "Pressure limits" area the pressure limits for the activation and deactivation of units are defined. The pressure limits are set relatively to the target pressure.

	Description
Activation pressure connection	If the actual pressure continuously exceeds this limit, another unit is connected after expiry of the waiting period
Activation pressure waiting period	This time defines how long the limit "Activation pressure connection" limit must be exceeded
Deactivation pressure connection	If the actual pressure continuously falls below this limit, another unit is disconnected after expiry of the waiting period



	Description
Deactivation pressure waiting period	This time defines how long the limit "Activation pressure connection" limit must be fallen below

3.12.5 "Frequency limits" control area

Frequency limits			
Activation frequency	60 Hz		
Activate waiting time	60 sec	0 sec	
Deactivation frequency	30 Hz		
Deactivate waiting time	60 sec	0 sec	

In the "Frequency limits" area the frequency limits for the activation and deactivation of units are defined. Activation and deactivation of the units using these limits provides an influence on the dynamics and energy consumption of the system.

	Description
Activation frequency	If the actual frequency continuously exceeds this limit, another unit is connected after expiry of the waiting period
Activation frequency waiting period	This time defines how long the limit "Activation frequency" limit must be exceeded
Deactivation frequency	If the actual frequency continuously falls below this limit, another unit is disconnected after expiry of the waiting period
Deactivation frequency waiting period	This time defines how long the limit "Deactivation frequency" limit must be fallen below

3.12.6 "Times" control area

Times			
Start delay	10 sec	0 sec	
Activation delay	0 sec	0 sec	
Deactivation delay	0 sec	0 sec	
Minimum running time	0 sec		
Min. running time without FI	0 sec		



To further optimize the time sequences of the customer system, additional configuration options are available:

	Description
Start delay	This time describes the time period from the activation of the units during the start-up process until the target value has been reached
Activation delay	This time describes the time period for the activation of the units during running operation. During this time it will be ensured that between the activation of units a specific min. time must have elapsed.
Deactivation delay	This time describes the time period for the deactivation of the units during running operation. During this time it will be ensured that between the deactivation of units a specific min. time must have elapsed.
Minimum running time	This time describes the min. time period a unit with frequency converter must run after release before it can be switched off again. This time is used to minimise the activation frequency of units
Minimum running time without FC	This time describes the min. time period a unit without frequency converter must run after release before it can be switched off again. This time is used to minimise the activation frequency of units (e.g. overheating of motors)

3.12.7 "Basic load" control area

Basic load

Number of devices 1 2

Number of devices without FI 1 0

In the "Basic load" area the min. number of units is defined which must permanently remain in operation when the level is released. These are also not shut down during low consumption levels in production but only reduced to the lowest possible speed.

	Description
Number of units	Defines the min. number of units with frequency converter which need to remain active
Number of units without FC	Defines the min. number of units without frequency converter which need to remain active



3.13 "Information" window

Software version		
4.1.4 - 24.04.2017		
System identification		
L000000 VACS0130.0230		
VARIAR CONTROLLER+ Hardware		
HW_1A22D44		
CPU:	VACON+ 10" Display with RS485	Serialnumber: E580 0168784
Module Bus Coupler:	VACON+ x2x-Module	Serialnumber: 7105 1585053
Module Analog Input 1:	VACON+ Analog Input Module	Serialnumber: 7070 0473534
Module Analog Input 2:	VACON+ Analog Input Module	Serialnumber: 7070 0473531
Module Analog Output 1:	VACON+ Analog Output Module	Serialnumber: 7074 0468815
Module Analog Output 2:	VACON+ Analog Output Module	Serialnumber: 7074 0485040
Module Digital Input 1:	VACON+ Digital Input Module	Serialnumber: 7059 0686190
Module Digital Input 2:	VACON+ Digital Input Module	Serialnumber: 7059 0686189
Module Digital Input 3:	VACON+ Digital Input Module	Serialnumber: 7059 0686406
Module Digital Input 4:	VACON+ Digital Input Module	Serialnumber: 7059 0686409
Module Digital Output 1:	VACON+ Digital Output Module	Serialnumber: 7064 0777293
Module Digital Output 2:	VACON+ Digital Output Module	Serialnumber: 7064 0590479
Module Digital Output 3:	VACON+ Digital Output Module	Serialnumber: 7064 0777294
Module Digital Output 4:	VACON+ Digital Output Module	Serialnumber: 7064 0776736

The "Information" displays information on the VARIAR CONTROLLER+.

In the "Software version" area the installed software version and its creation date are displayed.

In the "System designation" area the name of the installed customer system configuration is displayed.

In the area VARIAR CONTROLLER+ Hardware the hardware incl. the serial numbers of the installed modules is displayed.

3.13.1 Main window button status indication: Information

Status	Description
 Information	The window is not selected
 Information	The window is selected and shown on the user interface



3.14 "Setup" window

The 'Setup' window contains the following sections:

- Select Language:** A grid of 12 flags representing different languages: United Kingdom, Germany, Italy, France, Spain, Poland, Czech Republic, Japan, China, Denmark, Netherlands, South Korea, and Sweden.
- Units:** Three dropdown menus for 'Level 1 (LV 1)', 'Level 2 (LV 2)', and 'Level 3 (LV 3)', all currently set to 'mbar(rel)'.
- Touch Configuration:** A 'Brightness' slider and a 'Touch Calibration' button.
- Time and Date:**
 - Date: yyyy/mm/dd format with fields for 2017, 05, and 02.
 - Time: HH:MM format with fields for 11, 42, and 00.
 - Timezone: A dropdown menu showing '(UTC +01:00) Amsterdam, Berlin, Bern, Rome, Stockholm, Vienna'.
 - Automatic Summertime: A button with a red 'X' icon, indicating it is disabled.
- Bottom Navigation:** Three buttons: 'Network Settings' (gear icon), 'Timer' (clock icon), and 'Backup' (floppy disk icon).

In the "Setup" window various general configurations can be made for the VARI-AIR CONTROLLER+.

3.14.1 Main window button status indication: Setup

Status	Description
 Set up	The window is not selected
 Set up	The window is selected and shown on the user interface

3.14.2 "Language selection" area

In the "Language selection" area the language of the user interface can be changed during operation.

3.14.3 "Units" area

In the "Units" area the display of the pressure units on the user interface can be changed during operation.



3.14.4 "Screensaver" area



This function is by default only available from the user level "Installer".

In the "Screensaver" area a screensaver can be enabled and configured.



The screensaver is only interrupted when the user interface is touched.

3.14.5 "Touch configuration" area



This function is by default only available from the user level "Installer".

In the "Touch configuration" area the following display parameters can be changed

- Brightness: this changes the brightness of the background lighting
- Touch calibration: this starts the touch calibration

3.14.6 "Time and date" area



This function is by default only available from the user level "Installer".

In the "Time and date" area the system time can be adjusted. The following data can be changed:

- Date
- Time
- Time zone
- Daylight saving time (manual/automatic)

3.14.7 Operation

	Description
 Network Settings	Open window "Network configuration"
 Timer	Open window "Timer"
 Backup	Open window "Backup"



3.15 Window „Network configuration“



This function is only available from the user level „Installer“ by default.

To access the VARIAR CONTROLLER+ via a network, it is necessary to set the corresponding IP address and the subnet mask on the VARIAR CONTROLLER+ and to save them.

A gateway connects computer networks. The function “standard gateway” is optional (standard setting: 000.000.000.000) and is needed only when the VARIAR CONTROLLER+ shall be accessed from another computer network. In this case it is necessary to enter the gateway address into the fields and to save it.

The network echo request (“Ping”) is a diagnosis tool to check whether a certain device is available in a computer network. For this purpose, an existing IP address of another device in the network must be entered and the network echo request (“Ping”) must be started.

Status	Description
	Echo request (“Ping”) not yet performed
	Echo request (“Ping”) waiting for the reply of the entered device
	Device with the entered IP address found in the IP network
	Device with the entered IP address not found in the IP network



3.15.1 Operation

	Description
 Load	Here the current network configurations are loaded
 Save	Here the adjusted network configurations are saved. After saving they are adjusted directly in the VARI AIR CONTROLLER+
Ping	Execute network echo request ("Ping")
 General	Open window "General"
 Timer	Open window "Timer"
 Backup	Open window "Backup"

3.16 Window "Timer"



This function is only available from the user level „Installer“ by default.

Day	Start	Stop
Monday	06:00	18:00
Tuesday	06:00	18:00
Wednesday	06:00	18:00
Thursday	06:00	18:00
Friday	06:00	16:30
Saturday	00:00	00:00
Sunday	00:00	00:00

A timer has been integrated into the controller. This timer can be adjusted in the "Timer" window. Up to 21 time ranges can be defined and activated.



If signals overlap, the high signal always takes precedence!



The switching state is displayed in the window in color.

Status	Description
	The timer output has been set
	The timer output has not been set

If the timer is activated, the switching state of the timer is additionally displayed in the lower frame of the user interface.

Status	Description
	The timer output has been set
	The timer output has not been set

3.16.1 Conditions

	Description
	The time range set will be taken into account
	The time range set will not be taken into account
 General	Open window "General"
 Network Settings	Open window "Network configuration"
 Backup	Open window "Backup"

3.17 Window "Backup"



This function is only available from the user level „Installer“ by default.

Backup

➔ Connect USB stick (IF3)

Press button "Start backup"

Save file "L000000 VACS0130.0230.conf"

Save file "Database.dbset"

Save file "Database.dbrun"

Save file "Database.usr"

Create folder "Backup-02052017_11230" on USB stick

Copy folder "CONFIG" to folder "Backup-02052017_11230"

Copy folder "DATA" to folder "Backup-02052017_11230"

Backup finished

Remove USB stick

 General

 Network Settings

 Timer



The creation of a backup serves the purpose of data protection of important files from the VARIAIR CONTROLLER+.

To create a backup, the instructions on the display of the VARIAIR CONTROLLER+ must be taken into account. The current status of every work stage and the still missing work stages are shown on the display.



The creation of a backup takes some time as all data is created anew for the current point in time and copied to the USB stick afterwards.

3.17.1 Operation

	Description
 Start backup	Start backup creation
 General	Open window "General"
 Network Settings	Open window "Network configuration"
 Timer	Open window "Timer"

3.18 "Screenshot" function



This function is by default only available from the user level "Operator".

With the "Screenshot" function it is possible to take images of the user interface. These images are saved on the controller in the "Data" directory.

3.18.1 Main window button status indication: Screenshot

Status	Description
 Screenshot	The screenshot function is available
 Screenshot	A screenshot for the current user interface is being created

3.19 "Password" function



To display the "Password" window the bottom right button on the display must be pressed in the VACON+ PowerPanel.



Service password?

Installer ▼

Login

To access the extended password-protected software functions, the corresponding user level can be released in the "Password" window. To this end the desired user group can be selected from the popup field:

- Observer
- Operator
- Installer
- Technician
- Administrator

After entering the correct password for the user group the corresponding additional functions are available after login.

	Viewer	Operator	Commissi- oner	Technician
Switching individual devices on/off	☒	☒	☒	☒
Setpoint and enable	-	☒	☒	☒
Maintenance	-	☒	☒	☒
Taking screenshots	-	☒	☒	☒
Manual/Auto mode	-	-	☒	☒
Controller settings	-	-	☒	☒
Controlling the I/O card	-	-	☒	☒
Advanced settings (Network...)	-	-	☒	☒
Service and diagnostic functions	-	-	-	☒



The password check is case sensitive.





The the extended password-protected software functions are available for 60 minutes after and input which is reset to 60 minutes after each display operation. After timeout the user level "Observer" is automatically reset.



Login for the individual user groups is logged.

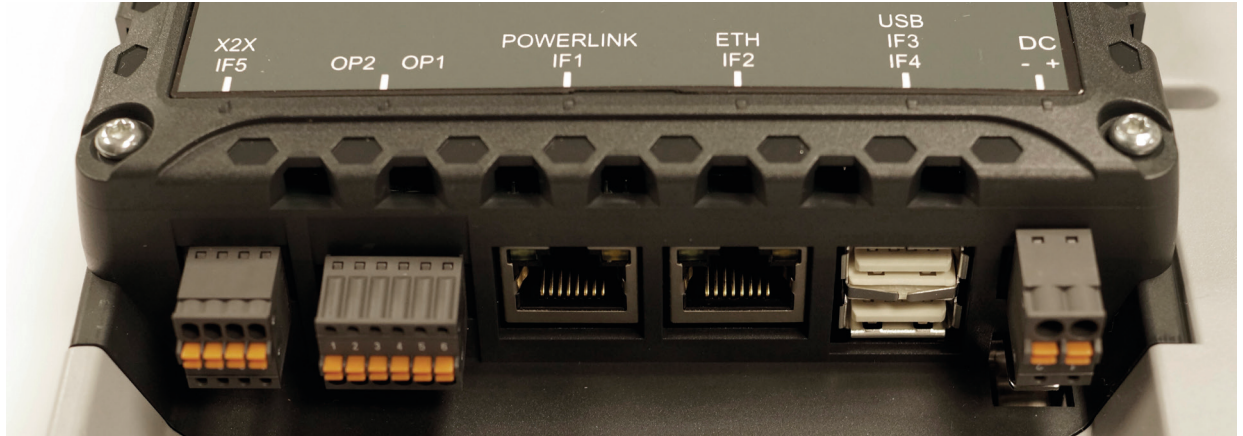
3.19.1 Main window button and control status indication

Status	Description
 Logout	Here the user level can be exited early



4 Virtual Network Computing (VNC)

In the VACON+ PowerPanel Virtual Network Computing Servers have been activated and can be used at any time. Virtual Network Computing is a software which displays the screen content of the remote VACON+ PowerPanel on a local computer and in turn sends the keyboard and mouse movements of the local computer to the remote computer of the VACON+ PowerPanel. The connection between the two computers may be established directly or via a corporate network.



To this end the VARI AIR CONTROLLER+ must be connected with an Ethernet cable at the "ETH IF2" interface to the network or directly to the computer. The network address and subnet mask can be configured in the "Setup" window. After saving the data these are transferred to the network configuration.

Using a VNC Client and the corresponding configurations of the VACON+ PowerPanel a connection is established with the VACON+ PowerPanel.

4.1 Sources for obtaining free VNC viewers

For the following VNC viewers free versions are available to download for various operating systems (e.g. Windows, iOS, Android):

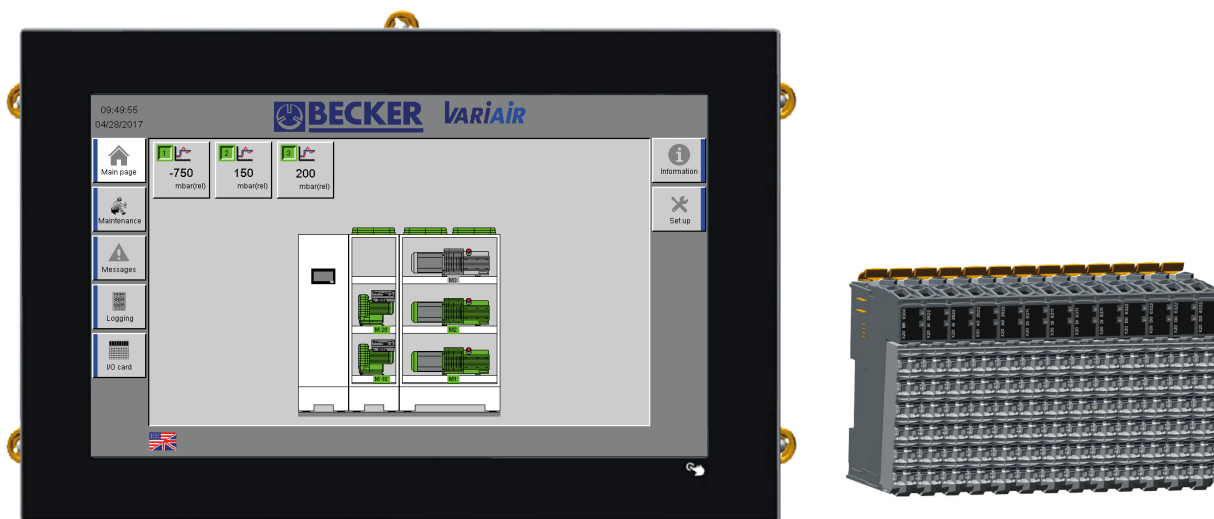
- RealVNC → URL: <http://www.realvnc.com/>
- UltraVNC → URL: <http://ultravnc.sourceforge.net/index.html>
- TightVNC → URL: <http://www.tightvnc.com/>



5 Hardware of the VARI AIR CONTROLLER+

The hardware consists of mainly 2 components communicating with each other via a BUS link.

VARI AIR CONTROLLER+ = VACON+ Powerpanel and VACON+ IO BLOCK



VACON+ PowerPanel

The VACON+ PowerPanel of the VARI AIR CONTROLLER+ is a terminal with integrated PLC. It does not contain any hard discs, fans or batteries and is thus maintenance-free. The front of the VACON+ PowerPanels has been designed with IP65 degree of protection which makes it also suitable to rough environments.

The VACON+ PowerPanels are available in 3 different versions.

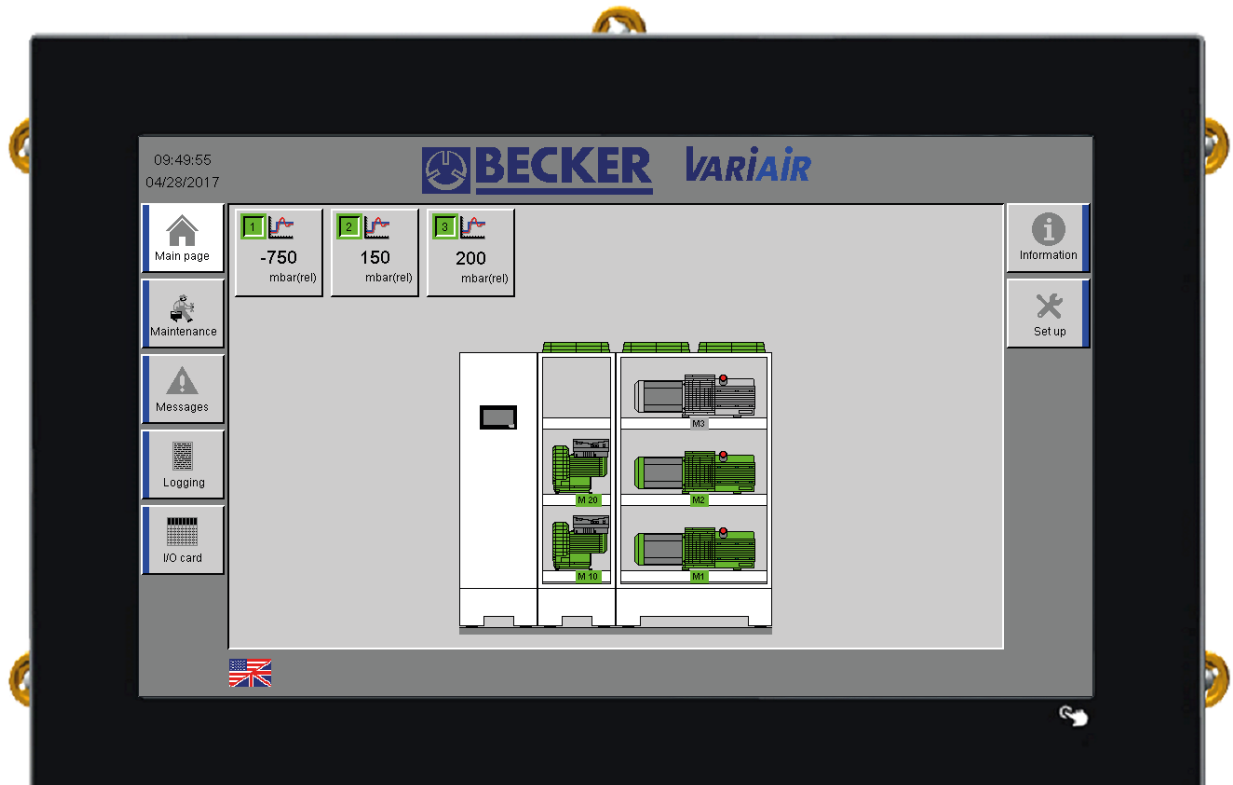
- VACON+ PowerPanel 7"
- VACON+ PowerPanel 7" with RS485 interface
- VACON+ PowerPanel 10.1" with RS485 interface

VACON+ IO BLOCK

The disc-based VACON+ IO block is a scalable solution for systems and plant. It consists of various interconnected VACON+ modules.



5.1 VACON+ PowerPanel



5.1.1 Technical data

Product name	VACON+ PowerPanel 7“ VACON+ PowerPanel 7“ 485	VACON+ PowerPanel 10“ 485
General		
Cooling	Without fan	
Temperature-controlled shut-down	Yes, at >88°C	
IF3 interface		
Type	USB 2.0	
Design	Type A	
Current load capability	0.49 A	
IF4 interface		
Type	USB 2.0	
Design	Type A	
Current load capability	0.10 A	
Display		
Diagonal	7"	10.1"
Touchscreen		
Technology	analogue resistive	



When using a USB stick it must be ensured that the USB stick has been formatted using the FAT16 or FAT32 file system.



5.1.2 Conditions of use

Product name	VACON+ PowerPanel 7“ VACON+ PowerPanel 7“ 485	VACON+ PowerPanel 10“ 485
Installation height above MSL (mean sea level)		
0 to 2000 m	No restriction	
>2000 m	Reduction of the ambient temperature by 0.5°C per 100 m	
Degree of protection according to EN 60529	IP20 rear	
	IP65 front	
Ambient conditions		
Temperature	USB 2.0	
Operation	0 to 50°C	
Storage	-20 to 60°C	
Transport	-20 to 60°C	
Relative humidity		
Operation	20 to 90%, non-condensing	10 to 85%, non-condensing
Storage	10 to 90%, non-condensing	10 to 95%, non-condensing
Transport	10 to 90%, non-condensing	10 to 95%, non-condensing

5.1.3 Data and realtime clock buffering

The VACON+ PowerPanel is designed without batteries and thus completely maintenance-free.

- Remanent data are stored in a FRAM
- The realtime clock is buffered for approx. 1000 hours using a gold foil capacitor. The gold foil capacitor is fully charged after a continuous operating period of 3 hours.

5.1.4 Diagnosis LEDs

At the rear of the VACON+ PowerPanel are LEDs for quick and easy diagnosis:



Diagnosis LEDs

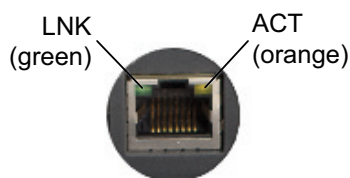
LED	Colour	Status	Description
R/E	Green	On	Application running
	Red	On	SERVICE or BOOT mode
		Double Flash	BOOT mode (during firmware update)
RDY/F	Orange	On	SERVICE or BOOT mode
S/E	Green/Red		Status/Error LED. The LED status has been described in the section LED "S/E".
PLK	Green	On	A link to the remote station has been established.
		Flashing	A link to the remote station has been established and Ethernet activity is present at the Bus.
OPS1	-	-	NC
OPS2	-	-	NC
OPS3	-	-	NC
OPS4	Green	On	RxD of the respective interface
OPS5	Orange	On	TxD of the respective interface

LED "S/E"

The Status/Error LED has been designed as dual LED in the colours green and red. Dependent on the operating mode, the LED status has different meanings.

Colour Green - Status	Description
Off	The module is in the mode NOT_ACTIVE or is: - switched off - starting up - faulty
On	The interface is operated as an Ethernet interface.
Flashing green (approx. 10 Hz)	The module is in the mode BASIC_ETHERNET. The interface is operated as an Ethernet TCP/IP interface.
Flashing (approx. 2.5 Hz) STOPPED	The module is in the mode STOPPED.

Ethernet and POWERLINK LEDs



LED	Colour	Status	Description
LNK	Green	On	A link to the remote station has been established.
ACT	Orange	Flashing	A link to the remote station has been established and Ethernet activity is present at the Bus.



5.1.5 Maintenance and cleaning



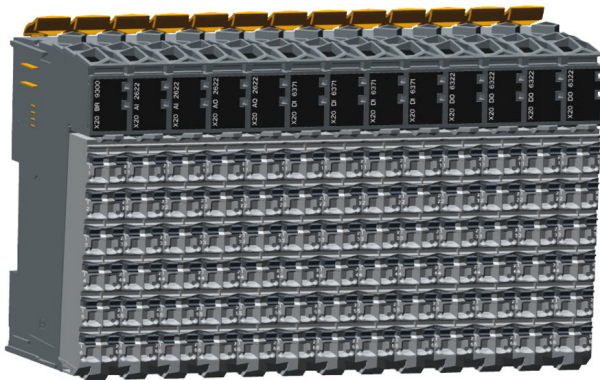
The PowerPanel must only be cleaned with the unit switched off to prevent from functions being triggered unintentionally when touching the touchscreen.

A moist cloth should be used to clean the VACON+ PowerPanel. Only use water and detergent, screen cleaning agent or alcohol (ethanol) to wet the cloth. Do not spray the cleaning agent directly onto the VACON+ PowerPanel but first on the cloth! Never use aggressive solvents, chemicals, abrasives, compressed air or a steam cleaner.



The display with the touchscreen should be cleaned at regular intervals.

5.2 VACON+ IO BLOCK



5.2.1 Conditions of use

Installation orientation	
horizontal	Yes
vertical	Yes
Installation height above MSL (mean sea level)	
0 to 2000 m	No restriction
>2000 m	Reduction of the ambient temperature by 0.5°C per 100 m
Degree of protection according to EN 60529	IP20
Ambient conditions	
Temperature	
Operation (horizontal installation orientation)	-25 to 60°C
Operation (vertical installation orientation)	-25 to 50°C
Storage	-40 to 85°C
Transport	-40 to 85°C
Relative humidity	
Operation	5 to 95%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing



5.2.2 Diagnosis



Every VACON+ MODULE has LEDs in the top area for easy and quick diagnosis.

The operating state of the modules is displayed on the top two LEDs r (green) and e (red).

Other LEDs are module-specific and mostly indicate the state of I/O channels. For inputs, green LEDs are usually used, for outputs yellow LEDs. In some modules these I/O status LEDs are only operated in the RUN mode.

The status of the LEDs is differentiated:

- Flashing: the LED is 50% of the time on and 50% off
- Single Flash: the LED only illuminates briefly, followed by a pause
- Single Flash: the LED briefly illuminates twice, followed by a pause

r (green)	e (red)	Description	Comment
Off	Off	Module not supplied	Module does not have a power supply
On	Off	RUN mode	Everything ok
Single Flash	On	Invalid firmware	Invalid firmware, occurs when firmware update has been interrupted.
Single Flash	Off	RESET mode	The firmware is reloaded as soon as the X2X Link Master is active again, but only if the module has also been entered in the configuration.
Double Flash	Off	BOOT mode	X2X Link Master (VACON+ PowerPanel) has not yet detected the module.
Flashing	Off	(RESET mode with communication)	Usually firmware transfer, some modules also remain in single flash during the firmware transfer. Dependent on the configuration the firmware transfer may also take several minutes.
On	Flashing	PREOPERATIONAL mode	Modules in whose slot no or a different module has been configured remain in the PREOPERATIONAL mode. Potentially: an incorrect module has been plugged in.
On	On	RUN mode with module fault	A fault is present at the module which affects all channels.



5.3 VACON+ MODULE ► Standard (bus receiver)



5.3.1 General

With the bus receiver VACON+ MODULE Standard the VACON+ IO Block is connected to the X2X Link interface of the PowerPanel. The VACON+ IO-BLOCK is supplied with voltage through the module.

Properties

- X2X Link bus receiver
- Feed for the X2X Link and internal I/O supply
- Electrical separation of feed and X2X Link supply
- Operation only at the far left slot

5.3.2 Status LEDs

For a description of the various operating modes see section r + e LEDs

Figure	LED	Colour	Status	Description
	r	Green	Off	Module not supplied
			Single Flash	RESET mode
			Flashing	PREOPERATIONAL mode
			On	RUN mode
	e	Red	Off	Module not supplied or everything OK
			Double Flash	LED indicates one of the following states: The X2X Link supply of the power supply is overloaded I/O supply too low Input voltage for X2X Link supply too low
	r + e	green	Single Flash/Red on	Firmware is invalid
	X	Orange	Off	No communication at the X2X Link
			On	Communication at the X2X Link is in process
	I	Red	Off	The X2X Link supply is within the valid range
			On	The X2X Link supply of the power supply is overloaded



5.4 VACON+ MODULE ► ANALOGUE IN



5.4.1 General

The VACON+ MODULE ANALOGUE IN is equipped with 2 inputs. Using various connection terminal points it is possible to select between the current and voltage signal.

Properties

- 2 analogue inputs
- Selectable current or voltage signal
- 13 bit digital converter resolution

5.4.2 Status LEDs

For a description of the various operating modes see section r + e LEDs

Figure	LED	Colour	Status	Description
	r	Green	Off	Module not supplied
			Single Flash	RESET mode
			Flashing	PREOPERATIONAL mode
			On	RUN mode
	e	Red	Off	Module not supplied or everything OK
			On	Fault or reset state
	r + e	green Single Flash/Red on		Firmware is invalid
	1 - 2	Green	Off	Wire break or sensor is not connected
			Flashing	Overflow or underflow of the input signal
			On	The analogue/digital converter is running, the value is OK



5.5 VACON+ MODULE ► ANALOGUE OUT



5.5.1 General

The VACON+ MODULE ANALOGUE OUT is equipped with two outputs. Using various connection terminal points it is possible4 to select between the current and voltage signal.

Properties

- 2 analogue outputs
- Selectable current or voltage signal
- 13 bit digital converter resolution

5.5.2 Status LEDs

For a description of the various operating modes see section r + e LEDs

Figure	LED	Colour	Status	Description
	r	Green	Off	Module not supplied
			Single Flash	RESET mode
			Flashing	BOOT mode (during firmware update)
			On	PREOPERATIONAL mode
	e	Red	Off	RUN mode
			On	Module not supplied or everything OK
	r + e	green Single Flash/Red on		Firmware is invalid
	1 - 2	Orange	Off	Value = 0
			On	Value ≠ 0



5.6 VACON+ MODULE ► DIGITAL IN



5.6.1 General

The VACON+ MODULE DIGITAL IN is equipped with 6 inputs IN 1 or 2 conductor technology. The inputs of the module are designed for sink wiring.

Properties

- 6 digital inputs
- Sink wiring
- 1 or 2 conductor technology
- 24 VDC for sensor supply

5.6.2 Status LEDs

For a description of the various operating modes see section r + e LEDs

Figure	LED	Colour	Status	Description
	r	Green	Off	Module not supplied
			Single Flash	RESET mode
			Flashing	PREOPERATIONAL mode
			On	RUN mode
	e	Red	Off	Module not supplied or everything OK
	r + e	green Single Flash/Red on		Firmware is invalid
	1 - 6	Green		Input state of the corresponding digital input



5.7 VACON+ MODULE ► DIGITAL OUT



5.7.1 General

The VACON+ MODULE DIGITAL OUT is equipped with 6 outputs IN 1 or 2 conductor technology. The outputs of the modules are designed for source wiring.

Properties

- 6 digital outputs
- Source wiring
- 1 or 2 conductor technology
- GND for signal supply
- Integrated output protection

5.7.2 Status LEDs

For a description of the various operating modes see section r + e LEDs

Figure	LED	Colour	Status	Description
	r	Green	Off	Module not supplied
			Single Flash	RESET mode
			Flashing	PREOPERATIONAL mode
			On	RUN mode
			Flashing (approx. 10 Hz)	Module is in the OSP state
	e	Red	Off	Module not supplied or everything OK
			Single Flash	Warning/fault of an I/O channel. Level monitoring of the digital outputs has triggered.
	r + e	green Single Flash/Red on		Firmware is invalid
	1 - 6	Orange		Output state of the corresponding digital output



5.8 Standards and approvals

All components of the VARAIR CONTROLLER+ comply with the following directives, declarations and approvals.

5.8.1 Directives and declarations

CE marking



All directives and their harmonised EN standards applicable to the4 respective product are complied with.

EMC Directive

The units meet the requirements of the EC Directive "Electromagnetic Compatibility 2004/108/EC" and are designed for industrial environments.

EN 61131-2

Programmable controllers - part 2: Equipment requirements and tests

EN 61000-6-2

Electromagnetic Compatibility (EMC) - part 6-2: Generic standards - Immunity for industrial environments

EN 61000-6-4

Electromagnetic Compatibility (EMC) - part 6-4: Generic standards, emission standard for industrial environments

Low Voltage Directive

The units meet the requirements of the EC Directive "Low Voltage Directive 2006/95/EC" and are designed for industrial environments.

EN 61131-2

Programmable controllers - part 2: Equipment requirements and tests

Machinery Directive

The units for functional safety meet the requirements of the EC Directive "Machinery Directive 2006/42/EC". The products have been certified in this regard by authorised bodies (TÜV Rheinland, TÜV Süd, Underwriters Laboratories).



All standards always relate to the currently applicable year.



5.8.2 International approvals

The components of the VARIAIR CONTROLLER+ comply with the applicable standards. These are the international standards of organisations such as ISO, IEC and CENELEC, as well as national standards of organisations such as UL, CSA, VDE, ÖVE etc. We pay particular attention to the reliability of our products in industrial environments.

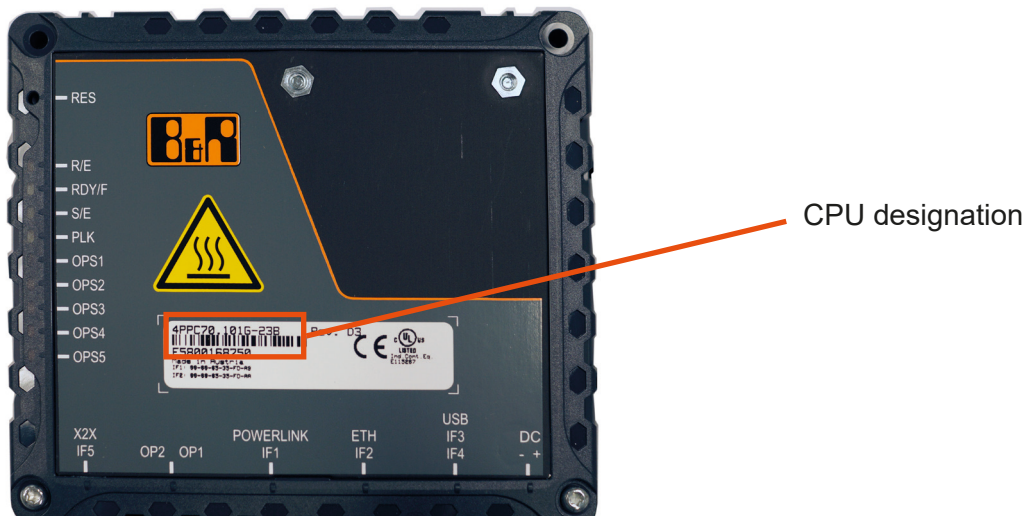
Status	
	UL approval Products with this mark have been tested by Underwriter Laboratories and listed as "Industrial Control Equipment". The test mark applies to the USA and Canada and facilitates the approval of machines and plant in this economic area. Underwriters Laboratories (UL) according to Standard UL508 - 17th Edition Canadian (CSA) Standard according to C22.2 No. 142-M1987
	GOST-R Products with this mark have been tested by an accredited test laboratory and may be imported to the Russian Federation (based on their EU conformity).



5.9 Spare parts list

The enclosed allocation table facilitates the ordering of the correct component for spare parts requirements.

VACON+ PowerPanel



CPU designation	Order designation	Order number
4PPC70.0702-20B	VACON+ PowerPanel 7"	56360350117
4PPC70.0702-23B	VACON+ PowerPanel 7" 485	56360350108
4PPC70.101G-23B	VACON+ PowerPanel 10" 485	56360350105

VACON+ MODULE



CPU designation	Order designation	Order number
X20BR9300	VACON+ MODULE Standard	56360350104
X20AI2622	VACON+ MODULE ANALOGUE IN	56360350100
X20AO2622	VACON+ MODULE ANALOGUE OUT	56360350101
X20DI6371	VACON+ MODULE DIGITAL IN	56360350102
X20DO6322	VACON+ MODULE DIGITAL OUT	56360350103

5.10 Environmentally friendly disposal

All components of the VARIAIR CONTROLLER+ are of a low environmental impact design. To allow for the components to be disposed of in an environmentally friendly recycling process, various materials must be separated.

Component	Disposal
Components of the VARIAIR CONTROLLER+	Electronic recycling
Cardboard/paper packaging	Paper/cardboard recycling
Plastic packaging	Plastics recycling

Disposal must be in accordance with the respective applicable statutory regulations.



6 Limitation of liability and copyright

6.1 Limitation of liability

Any technical information, data and notices included in these operating instructions concerning the operation and maintenance of our products correspond to the latest status at the date of printing and are based on our best knowledge, taking into account our existing experience and insights.

We reserve the right to technical modifications in the interest of the further development of the products described in these operating instructions. Hence, no claims may be asserted from the information, figures and descriptions in these operating instructions.

We are not liable for damage or malfunctions caused by operating errors, non-observance of these operating instructions or improper repairs. We point out explicitly that any spare parts and accessory parts not supplied by us will also not have been tested and approved by us.

Therefore, the installation and use of third party products might negatively affect design features and impair the safety of people or material property.

Any liability for damage resulting from the use of other than original spare parts and accessories is excluded.

For reasons of safety no unauthorised conversions and alterations are permitted and liability for resulting damage is excluded.

We are liable for any errors and omissions, with the exclusion of any additional claims, within the scope of the warranty obligations granted in the main contract. Compensation claims, whatever the legal basis for such claims, are excluded.

Translations are produced to the best of our knowledge. We can therefore not accept liability for translation errors even if the translation is produced or commissioned by us. Only the German text remains authoritative and we can send you a copy upon request.

The textual and figurative representations do not necessarily match the scope of delivery or any spare part order. The drawings and diagrams are not to scale.

6.2 Copyright

These operating instructions must be treated as confidential. They are exclusively intended for use by authorised persons within your organisation. Disclosure to third parties is prohibited. All documentation is protected under copyright laws.

The disclosure and duplication of documents, even in parts, utilisation and communication of its contents is not permitted unless explicitly granted. Violations are punishable by law and may give rise to compensation claims. We reserve all rights for exercising commercial protection rights.

6.3 Decommissioning

Decommissioning takes place in accordance with the national regulations of the respective country. In Germany VDI guidelines VDI 2343 sheet 3 may be consulted.





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