LÜFTUNGS-REGELGERÄTE
CONTROLLER FOR AIR HANDLING UNITS

MSD...TR ; RTE...TR ; RTD...TR ; AIRTRONIC BASIC
AIRTRONIC D + ZUBEHÖR

ECOFIT
ETRI
rosenberg
THE AIR MOVEMENT GROUP

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Issue 2004 / 6th edition

Please observe the following instructions during installation and operation of Rosenberg system regulators:

Assembly and electrical work only by trained and authorised technical staff and according to the current relevant and local regulations or standards.

The currently applicable operating instructions must be observed!

We reserve the right to make alterations to construction and design in the direction of technical progress.

Quality management system DIN EN ISO 9001

Rosenberg products are produced with the most up-to-date manufacturing methods. Consistent inspection of manufacturing by our quality management system allows a constantly high quality standard.

Thanks to our extraordinarily high level of know-how in the most varied sectors of ventilation and air conditioning technology and to our motor production, our products undergo constant development to keep them technologically right up to date. By this means we can react quickly and flexibly to every requirement. The customer's wishes are always our main focus here.

Guarantee conditions

The purchaser is responsible for the selection, layout and installation of the Rosenberg system regulation.

The supplier is responsible for physical and legal defects of the delivery but with the exclusion of further claims – subject to Paragraph VII. of the applicable Standard Terms and Conditions (STC's) - guarantee.

No guarantee is given specifically in the following cases:

Inappropriate or incorrect use, faulty installation or operation by the customer or a third party, normal wear, faulty or careless handling, maintenance not as stipulated, unsuitable consumable materials, defective assembly work, unsuitable construction base, chemical, electrochemical or electrical effects – in so far as they are not the responsibility of the supplier.

If the product supplied by the manufacturer shows defects, the buyer has the right to receive a replacement of the product or of its parts up to a max. of the value of the purchase price.

In addition the supplier has the right to upgrades for a suitable period of time.

In the case of damage, the supplier must be immediately and fully informed.

The duty to make good further defects is excluded.

For all further terms such as e.g. control of the period, right to exchange etc. our generally applicable STC's apply.

You can find the STC's on our homepage: **www.rosenberg-gmbh.com** or directly from one of our branches.

Rosenberg system regulation

Rosenberg is the contact for project management, system identification, delivery, setup and agreement of technical regulation installations. These installations embody the concept of "everything from one source" and make us good at solving problems in ventilation technology. In this way any interface problems in the planning process are avoided by planning the technical ventilation installation in-house and in the layout of the tailored technical regulation installation by close contact with our project team. With the use and combination of high-quality components, a functionally correct total installation is delivered. With this concept, the aim of maximum comfort of the installation and greatest comfort for minimised energy consumption is reached with certainty and economically.

Technical room air installations

RLT installations have the task of maintaining the condition of the room air regarding cleanliness, temperature and humidity within specific limits. The requirements made of the condition of room air can be very different depending on the type of room. In rooms in homes one is often content in the simplest case with window ventilation whereas for many industrial businesses, air conditioning systems are demanded that maintain any desired air quality constant with great accuracy. Between the two extremes there are countless stages with more or less comprehensive air treatment.

Classification of technical room air systems

Technical room air systems are mechanical ventilation systems that are constructed in such a way as to relieve rooms of the following problems:

- Air pollution (smelly, harmful or dirt particles)
- Excess heat/excessive cold
- Unwanted substances

Technical room air systems definitions

- **Inlet air**
  is the air fed into the room
- **Outlet air**
  is the air going out of the room
- **Outside air**
  Is the air drawn in from the outside environment
- **Recirculated air**
  is the part of the outlet air that is fed back into the room. Recirculated air should only be used if the quality of the recirculated air corresponds to that of the intake air.
- **Exhaust air**
  is the air blown back out into the environment
- **Mixed air**
  is the mixture of outside air and recirculated air

Air removal systems

Air removal systems draw the air out of a room by means of fans and release it to the outside environment, whilst air flows in through openings from neighbouring rooms or the outside environment. Since the installations cause low pressure in the rooms where air is removed, they are particularly suitable for the prevention of spread of polluted air. They are therefore chiefly used in rooms with a high level of air pollution by gases, vapours, smells or high temperature such as e.g. kitchens, sanitary installations.

Air inlet systems

Air inlet systems, in contrast to air removal systems, draw in air from the outside environment and supply it to the rooms to be ventilated, with the effect that the excess air can escape to the environment or to the neighbouring rooms through doors, windows, other openings and unsealed gaps. Thus these systems cause a slightly high pressure in the room so the inward flow of unwanted air is prevented. In the winter it is necessary to heat the air to approximately room temperature by means of air heaters. This should prevent the cooling down of the room.
The use of air intake systems is mainly limited to rooms in which there is no heavy air pollution present and where the air drawn in through windows and doors can easily escape into surrounding areas or the environment e.g. offices, some factories, sales areas, exhibition halls.

Air intake and removal systems

In general it is useful to operate air intake and removal systems at the same time. By suitable measurement of the volume of air flow of outside air and exhaust air, suitable low or high pressure can be created as required in the rooms. Here the air intake and removal system represents the most suitable arrangement for almost all technical ventilation conditions e.g. halls of all kinds, theatres, cinemas, restaurants and bars, factory floors etc.
In particular, only with the controlled flow of inlet and outlet air will the effective use of heat recycling be possible.

The catalogue

This catalogue presents the Rosenberg control devices one after the other. There are three different concepts available from which you can select according to the requirements of the technical ventilation installation. The appliances shown in the following list are listed with the corresponding technical ventilation functions that are applicable. Here three different concepts are presented that differ in their layout.

- **MSD / RTE / RTD**
- **Airtronic Basic**
- **Airtronic D**

Layout of the catalogue details:

The catalogue is divided into four sections. In the first section, the three control concepts are each presented on three double pages.
In the second section, with the help of ten block circuit diagrams the design of a technical ventilation installation is presented in the form of standardised symbols as described in DIN EN 12792 Part 1. An explanation of the symbols used can be found in the appendix.

The third section is dedicated to accessories. The components supplied by Rosenberg are described here. The accessories shown in this section are not intended to be a complete listing of all technical control options. Here customer requirements are always of prime importance.

Procedure for the layout of a control system

1. Select a block circuit diagram according to the desired technical ventilation functions
2. Determine the motor type or the type of drive for the currents
3. Determine the fans of the inlet and outlet air fans.
4. Select the nearest current level
5. Put in the complete type designation in the place reserved for this
6. Tick required special functions
7. Determine the type of controller
   - MSD ... - TR, RTE ... -TR / RTD ... -TR
   - Airtronic B
   - Airtronic D
8. Setting up the three-way mixing valve

What is included in the delivery package of the control system?

- Switch box completely wired with master switch, fuse, protection, terminal block and DDC controller.
- comprehensive operation manual
- CAD switch diagram with wiring and terminal diagram.
- Distributed devices: duct sensors, room sensors, outside sensors, pressure difference monitors etc. depending on the arrangement.
- Frequency converter or EC controller for the specific type of fan operation. The frequency converter arrangement is always related to standard motors (400V output voltage). Frequency converters can also be selected that are not located in the Airtronic's switch box. The same also applies to the EC controllers.
- Continuous damper motor for the bypass damper with plate exchangers.
- 1 damper actuator for the outside damper i.e. if the connection of the outside air and exhaust air dampers is not possible, a further drive is required. For mixed air control a continuous drive should be used.
- The control setup and wiring are carried out during manufacture.

Switch box and housing dimensions

Plastic-coated grey steel housing (RAL 7032) with protection type IP 54.
The measurements given in the following table apply only to the combinations of control devices described in the catalogue. Depending on customer-specific design of the devices, the housing dimensions/weights can be varied from those given.

Information on devices in the AD.. DF manufacturer's series
With Airtronic D devices for frequency change drive, the housing dimensions/weights given for the required frequency converters are **not** taken into account. The size and weight of the assembled switch box will be given to you on request.

Type:	Weight approx. [kg]	Width [mm]	Height [mm]	Depth [mm]
MSD 1 TR / MSD 2 TR / MSD 2- D TR / MSD 2 -P TR / MSD 3 TR	14	380	380	210
RTE 7.5 TR	18	380	380	210
RTE 15 TR	26	400	500	210
RTD 5 TR	31	400	500	210
RTD 10 TR	42	400	500	210
RTD 14 TR	51	400	500	210
..EA 7.5 / AB..EA 10 / AB..EA 15	32 / 35 / 40	600	600	210
AB..DA 05 / AB..DA 10 / AB..DA 14	42 / 53 / 62	600		210
AB..DN 05 / AB..DN 10 / AB..DN 16 AB..DN 25 / AB..DN 30 / AB..DN 43	29 / 30 / 31 33 / 34 / 35	600	600	210
..EA 10 / AD..EA 15 / AD..EA 20	35 / 40 / 45	600	600	210
..DA 05 / AD..DA 10 AD..DA 14 / AD..DA 19	42 / 53 62 / 63	600	600	210
AD..DF 2.5 / AD..DF 4.5 / AD..DF 5.5 AD..DF 9.5 / AD..DF 12 / AD..DF 16 AD..DF 22 / AD..DF 29 / AD..DF 36 AD..DF 41	29 / 30 / 31 33 / 34 / 35 35 / 36 / 37 39	600	600	210
AD..DN05 / AD..DN10 / AD..DN16 AD..DN25 / AD..DN30 / AD..DN43	29 / 30 / 31 33 / 34 / 35	600	600	600
..DD05 / AD..DD10 / AD..DD16 AD..DD25 / AD..DD30 / AD..DD43	29 / 30 / 31 33 / 34 / 35	600	600	600
AD..DP05 / AD..DP10 / AD..DP16 AD..DP25 / AD..DP30 / AD..DP43	29 / 30 / 31 33 / 34 / 35	600	600	600

Assembled switch box dimensions/empty weight	Weight [kg]	Width [mm]	Height [mm]	Depth [mm]
	10	380	380	210
	13	400	500	210
	17	500	500	210
	23	600	600	210
	36	600	760	350

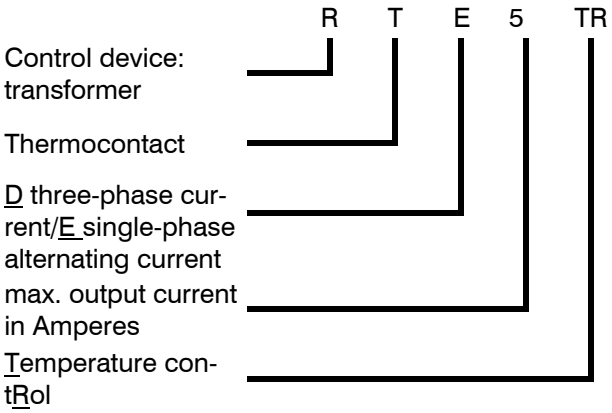
Description of the controller/TR devices

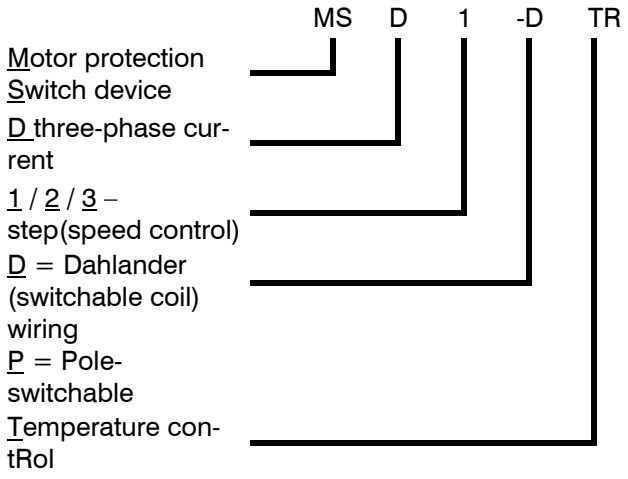
The Rosenberg Compact controller series MSD...TR (for standard motors) or RTE/D...TR (for external rotor motors) is especially suitable for the control of room temperature or inlet air temperature in technical ventilation systems.
The control circuit board contained in the compact untroller series is to set the room or inlet air temperature in conjunction with a room sensor and intake air sensor. The control takes place on a water heat register by the continuous control of the three-way mixing valve. If on the other hand an electric heat register is used, this is controlled at up to four levels by the module controller i.e. the temperature is controlled by switching on and off the individual heating levels.

If two temperature sensors are connected to the control circuit board, the temperature indication can be switched between the two actual temperature values. Adjustments to the closed loop controlled systems can be made at the module controller.
Every piece of equipment has a motor protection device. This guarantees optimum motor protection for motors with thermocontacts or PTC resistor. If the maximum permissible coil temperature is exceeded, the motor will be disconnected from the mains supply. After the removal of the cause of the fault and with the voltage restored after disconnection from the mains, the control device can only be switched on again if the system is reset.
The equipment contains a master switch so that the entire system can be switched on.

- Programmable controller with microprocessor
- Operator unit with three displayed places, decimal point and automatic mathematical signs, 4 operator keys
- IP 65 with front installation
- 1 digital input (used for frost protection)
- Operating voltage 12/24 VAC ± 10% 50/60 Hz, Output 3VA

Key to types of controllers external for rotor motors
Key to types of controllers external for standard motors





Possible variants (without taking into account the various block circuit diagrams)
External rotor motor/single-phase alternating current:
RTE 7.5 TR ; RTE 15 TR
External rotor motor/three-phase current:
RTD 5 TR ; RTD 10 TR ; RTD 14 TR
Standard motor/three-phase current / 1/2/3-step: speed control.
MSD 1 TR ; MSD 2 TR ; MSD 2-D TR ; MSD 2-P TR ; MSD 3 TR

Control functions

Temperature control

- Control of the heating pump by use of a hot water unit
- Control of the cooling pump by use of a cold water unit
- Control of inlet and outlet air dampers
- Manual continuous control of the mixed air damper
- Inlet/outlet air dampers shut on frost alarm
- Three-way valve on frost alarm to maximum flow (heating pump on/fan off)

Timer switch (optional)

- with weekly/annual program
  can be set: ON/OFF

Monitoring functions

- Overload of inlet and outlet fan
- Filter monitoring in the inlet and outlet air
- Frost alarm
- Overload/overheating monitoring when operating with electric air heater
- Fire message input for switching open the fire protection damper or fire and smoke detector

Cascade control

- Inlet air temperature control
- Room/inlet air or outlet air/intake air cascade control
- Minimal limiting of the inlet air temperature
- Heating sequence: hot water heat register or electric air heater (up to 4 levels)
- Cooling sequence: water air cooler or cooling machine

Fan control

In the use of RTE/RTD..TR equipment
- 5-step speed control with direct drive
In the use of MSD..TR equipment
- 1/2/3 step speed control

Operation

User-friendly operation with written display.

Ventilation functions

Rosenberg – service package

Switch box

All control devices are manufactured in accordance with VDE
(Association of German Electricians) guidelines and meet EMV (electromagnetic compatibility) guidelines 89/336 EWG and
low voltage guidelines 73/023 EWG, type of protection IP55, plastic cable sheath plate for simple electrical installation, completely wired and checked.

Control circuit board

preset, sensors, control valves
and other peripherals are delivered loose with it.

In manufacture

Services in manufacturing

Taking down and installing the switch box
Electrical master connection (feeding in)
Electrical installation of the externally located distributed devices (e.g. temperature sensors, serwmotors)
Connection of the heat/cold register with the insertion of control valves enclosed loose in each closed loop controlled system, as well as assembly of the serwmotors delivered with them

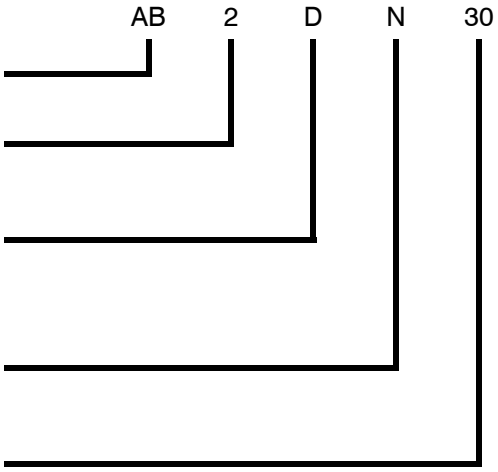
Description of the controllers / Airtronic Basic

Airtronic Basic controllers have been specially designed for the control of Rosenberg housed instruments and they represent optimum comfort and safety in operation, monitoring and service of the system. The most up-to-date DDC technology is used. Amongst the advantages of this technology, the option of customer-specific adjustment should be emphasised for very many applications.

Complete operation is carried out remotely via a remote control display on which all fault reports and conditions of the service are shown in writing.
The *Airtronic Basic* series is manufactured in accordance with VDE (Association of German Electricians) guidelines. It is available for control of fans with belt drive by standard motors and fans with direct drive by controllable external rotor motors.

- Freely programmable controller with microprocessor, which allows customers' special requirements to be met
- Operator unit with 4-line LCD display for messages in writing, 20 characters each
- Suitable for front installation or wall mounting
- 8 digital message inputs (fault messages)
- Can be expanded (e.g. subsequent insertion of a cooling sequence or of heat recycling possible)
- Operating voltage 24V AC, max 10 VA
- Recyclable housing

Key to types



Possible variants (without taking into account the various block circuit diagrams)
External rotor motor/single phase alternating current:
AB..EA7.5 ; AB..EA10 ; AB..EA15
External rotor motor/three-phase current:
AB..DA05 ; AB..DA10 ; AB..DA14
Standard motor/three-phase current/single speed:
AB..DN05 ; AB..DN10 ; AB..DN16 ; AB..DN25 ; AB..DN30 ; AB..DN43

Control functions

Control

- Circulation pumps dependent on load and outside temperature
- Control of inlet/outlet air dampers
- Smooth start mixed air damper
- Mixed air damper control manual/automatic
- Preheat function of the hot water air heater

Timer switch program

- 4 switch times per day
  can be set: temperature and fan level

Monitoring functions

- Fire/smoke message
- Alarm memory in which the last 10 alarm messages may be queried
- Air flow monitoring in the inlet and outlet air
- Programmable frost monitoring
- Overload of inlet and outlet air fan
- Filter monitoring in the inlet and outlet air

Cascade control

- Inlet air temperature control
- Room/inlet air or outlet/inlet air cascade control
- Minimal or maximum limiting of the inlet air temperature
- PI controller with 3 sequences: heating, cooling, heat recycling
- Heating sequence: hot water heat register
- Cooling sequence: water air cooler or cooling machine
- Heat recycling sequence: plate heat exchanger, glycol circulation or rotary heat exchanger
- Set point control according to the outside temperature
- Summer/winter compensation

Fan control

- 3-step speed control with direct drive (external rotor motor)
- Single speed with belt drive

Operation

User-friendly operation with 4-line LCD display
LCD operator console as a remote display

Ventilation functions

- Supported heating operation
- Supported cooling operation
- Night ventilation function
- Through ventilation function

Rosenberg service package

Switch box

All control devices are manufactured in accordance with VDE (Association of German Electricians) guidelines and in accordance with EMV (electromagnetic compatibility) guidelines 89/336 EWG and
low voltage guidelines 73/023 EWG, type of protection IP55, plastic cable sheath plate for simple electrical installation, completely wired and checked.

DDC compact regulator

Wired and preset in accordance with block circuit diagram (pp.14 - 34), assembled. Sensors, control valves
and other peripherals are supplied loose with them.

In manufacture

Manufacturing services

Taking down and installing the switch box
Main electrical connection (feeding in)
Electrical installation of the externally located distributed devices (e.g. temperature sensors, servo-motors)
Connection of the heat/cold register with insertion of the control valves enclosed loose into each closed loop controlled system, as well as assembly of the servo-motors supplied with them

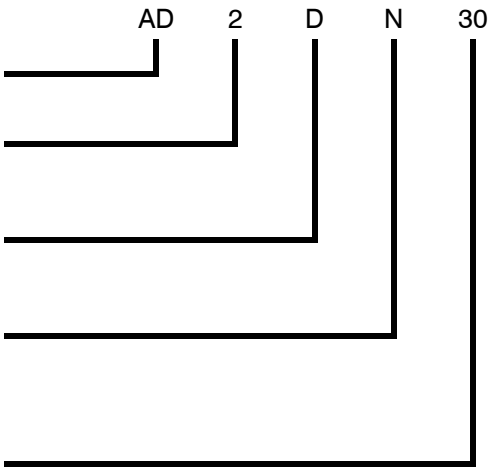
Controller description / Airtronic D

Airtronic D control devices represent the highest level of development of the Airtronic series and are based on the Airtronic Basic. In addition, operation is also possible with frequency converters as drive units for the fans, pressure, humidity and flow volume control and air quality measurement.

Control may also be linked to building control systems via a visualisation program. Remote interrogation and intervention are possible over a modem.
Airtronic D control devices cover the entire spectrum of control and drive control of air and air conditioning technology.

- Freely programmable controller with microprocessor, which allows special customer requirements to be met
- Operator unit with 4-line LCD display for messages in writing, 20 characters each
- Suitable for front installation or wall mounting
- 14 digital message inputs (fault messages)
- (e.g. subsequent insertion of a cooling sequence or heat recycling possible)
- Operating voltage 24V AC, max 10 VA
- Recyclable housing
- Connection option for a local printer for regular monitoring

Key to types



Airtronic D

Block circuit diagram nos.1 - 10 (Page 14-32)

D three-phase current/E single-phase alternating current

A External rotor motor/N Standard motor/Frequency converter operation

Strength of the current of the fans

Possible variants (without taking into account the various block circuit diagrams)
External rotor motor/single-phase alternating current:
AD..EA10, AD..EA15, AD..EA20
External rotor motor/three-phase current:
AD..DA05, AD..DA10, AD..DA14, AD..DA19
Frequency converter operation/three-phase current:
AD..DF2.5, AD..DF4.5, AD..DF5.5, AD..DF9.5, AD..DF12, AD..DF16, AD..DF22, AD..DF29, AD..DF36, AD..DF41
Standard motor/three-phase current /1 single sped:
AD..DN05, AD..DN10, AD..DN16, AD..DN25, AD..DN30, AD..DN43
Standard motor/three-phase current/2-step speed control ("Dahlander" switchable coils):
AD..DD05, AD..DD10, AD..DD16, AD..DD25, AD..DD30, AD..DD43
Standard motor/three-phase current/2-step speed control (separate coils):
AD..DP05, AD..DP10, AD..DP16, AD..DP25, AD..DP30, AD..DP43

Control functions

Control

- Circulation pumps dependent on load and outside temperature
- Control of inlet/outlet air shutters
- Smooth start mixed air shutter
- Mixed air shutter control manual/automatic
- Preheat function of the hot water air heater
- Outside temperature-dependent blocking of fan speed control

Timer switch program

- 4 switch times per day can be input: Temperature and air level

Monitoring functions

- Fire/smoke message
- Alarm memory in which the last 10 alarm messages can be queried
- Air flow monitoring in the inlet and outlet air
- Programmable frost monitoring
- Electric heating register monitoring
- Overload of hot water pump- circulation pump
- Overload of cold water pump- circulation pump
- Overload of circulation loop system- circulation pump
- Overload of cooling machine
- Overload of inlet and outlet air fan
- Filter monitoring in the inlet and outlet air
- Icing up monitoring, heat recycling sequence
- Full motor protection with thermocontact or PTC resistor
- Full motor protection with overload relay
- Const. pressure control
- Common alarm volt-free contact
- Operation hours counter

Cascade control

- Inlet air temperature control
- Room/inlet air or outlet/inlet air cascade control
- Minimal or maximum limiting of inlet air temperature
- PI controller with 3 sequences: heating, cooling, heat recycling
- Heating sequence: hot water heat register or electric air heater (up to 4 levels)
- Cooling sequence: water air cooler or cooling machine
- Heat recycling sequence: plate heat exchanger, glycol circulation or rotary heat exchanger
- Set point control according to the outside temperature
- Summer/winter compensation

Fan control

- 5-step speed control with direct drive (external rotor motor)
- 2-step speed control with belt drive ("Dahlander" switchable or separate coils)
- Continuous rotation speed control via frequency converter or EC motor
- single speed with belt drive

Operation

- User-friendly operation with 4-line LCD display
- LCD operator console as a remote display or switch box insertion

Ventilation functions

- Supported heating operation
- Supported cooling operation
- Night ventilation function
- Through ventilation function

Rosenberg service-package

Switch box

All control devices are manufactured in accordance with VDE
(Association of German Electricians) guidelines and meet EMV (electromagnetic compatibility) guidelines 89/336 EWG and
low voltage guidelines 73/023 EWG, type of protection IP55, plastic cable sheath plate for simple electrical installation, completely wired and checked.

DDC compact controller

Wired and preset in accordance with block circuit diagram (pp.14 - 34) assembled. Sensors, control valves
and other peripherals are supplied loose.

In manufacturing

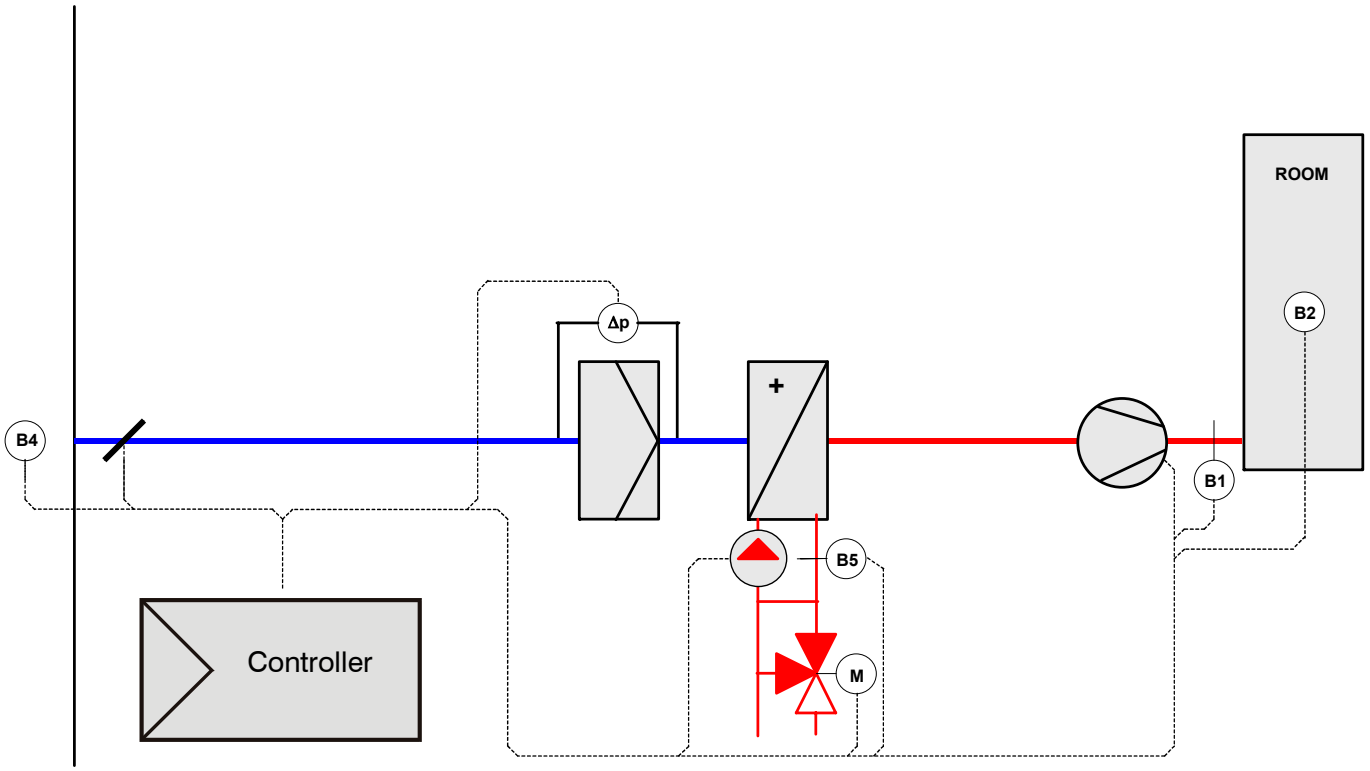
Manufacturing services

Taking down and installing the switch box
Main electrical connection (feeding in)
Electrical installation of the externally located distributed devices (e.g. temperature sensors, servo-motors)
Connection of the heat/cold register with insertion of the control valves enclosed loose in each closed loop control system, as well as assembly of the servo-motor supplied with them

Inlet air device
Heating, with hot water pump

1

switch box, options:
- **Inlet air temperature control**
- **Room temperature control**



B1: Inlet air sensor
B2: Room sensor
B4: Outside air sensor
B5: Return sensor

Application:
Ventilation system for rooms in which the inlet air temperature or room temperature should be held constant by warming or cooling the inlet air.

Function:
The temperature measured by the inlet air sensor B1, room sensor B2 or outlet air sensor B3 is compared by the controller with the adjusted set point. In the event of a deviation, the controller displaces the heating valve.

Function	**description**

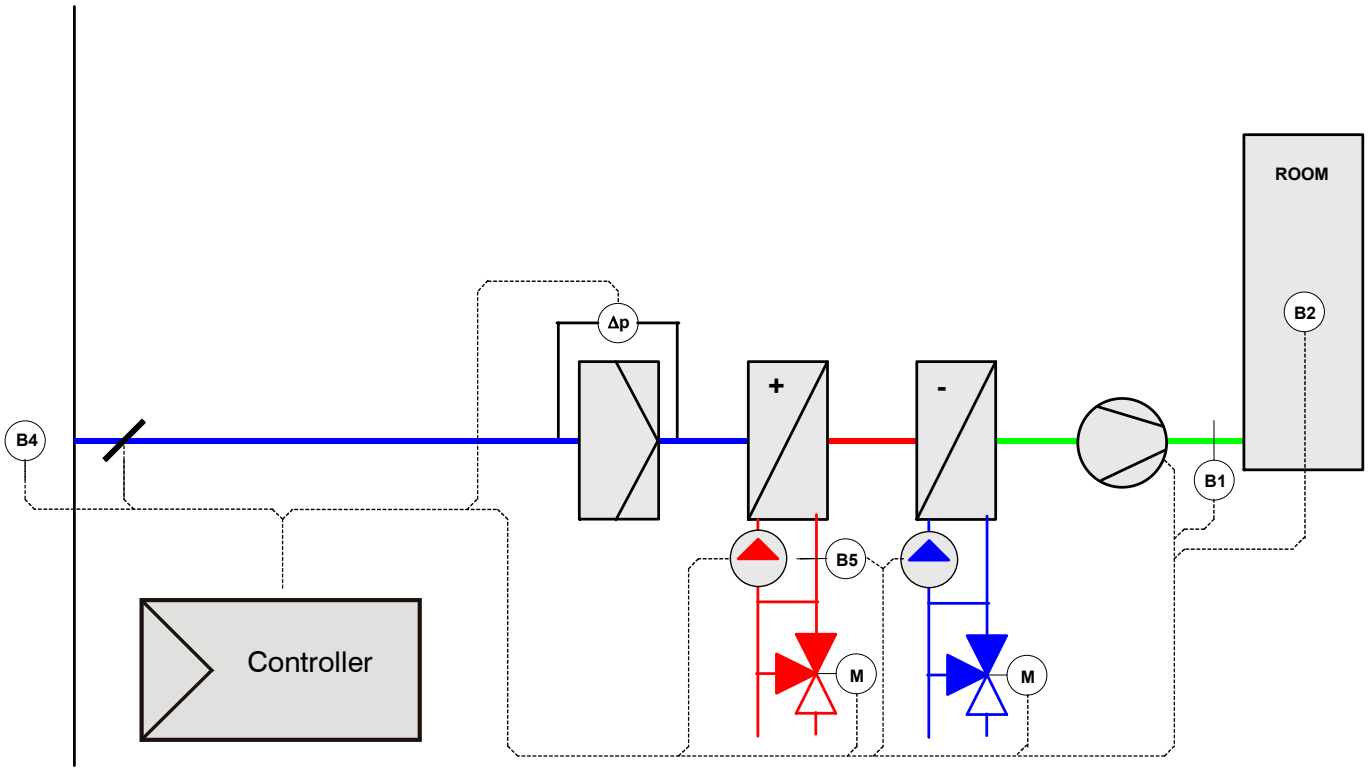
1.	**Switch box for inlet air device**	**TR**	**A B**	**A D**
1.1	Switch box for the operation of an inlet air device, sheet steel housing, type of protection IP54, powder coating RAL 7032 (pebble grey), protection, fuses etc. on mounting plate with wiring channels, compact DDC controller, with flexible wiring, completely assembled, wired and checked, including wiring diagram.	☐	☐	☐

2.	Fan & motor					TR	A B	A D
2.1	- External rotor 5-step speed control	☐ 230 V alternating current ☐ 400 V three-phase current Motor capacity Inlet air: Pmo_t = kW Motor current (only frequency converters) Inlet air: I_{mot} = A (With EC setup only 400 V three-phase current may be selected)				☐		☐
2.2	- External rotor 3-step speed control						☐	☐
2.3	- Standard motor speed					☐	☐	☐
2.4	- Standard motor 2-step speed control					☐	☐	☐
2.5	- Standard motor 3-step speed control					☐	☐	☐
2.6	- Standard motor continuous						☐	☐
2.7	- EC external rotor motor						☐	☐
2.8	- Smooth start for single speed standard motors from 5.5kW to 30.0kW					☐	☐	☐
2.9	- Motor protection with PTC resistor					☐	☐	☐
2.10	- Motor protection with thermocontact (max. up to 2.2 kW)					☐	☐	☐
2.12	- Air flow monitoring inlet and outlet air							☐
2.13	- Volume of flow display -> special function							☐
3.	**Control**							
3.1	- Inlet air temperature control with minimal limiting incl. temperature sensor					☐	☐	☐
3.2	- Room temperature control with inlet air minimal limiting incl. temperature sensor					☐	☐	☐
3.4	- humidifier control -> special function							☐
3.5	- dew point control -> special function							☐
3.6	- Constant pressure control	☐ - Inlet air	(only with frequency converters)				☐	☐
3.7	- Constant volume of flow control						☐	☐
3.8	- Summer/winter compensation (outside sensor is supplied)					☐	☐	☐
4.	**Heat register**							
4.1	- Heater control 0 - 10 V continuous					☐	☐	☐
4.3	- Reheater control 0 - 10 V continuous							☐
4.4	- Control 230 Volt pump heating ON- OFF					☐	☐	☐
4.8	- Frost protection mon. with frost protection thermostat ☐ or attached thermostat ☐					☐	☐	☐
4.9	- Frost protection monitoring with return sensor (return sensor is supplied)					☐	☐	☐
4.10	- Electric air heater up to 4-step with temperature safety limiter and air flow monitoring	☐ 2-step speed control	☐ 3-step speed control	☐ 4-step speed control		☐		☐
4.11	- Heating pump fault							☐
6.	**Filter and dampers**							
6.1	- Filter monitoring	☐ Inlet air				☐	☐	☐
6.2	- Inlet air shutter Open – Closed					☐	☐	☐
7.	**Miscellaneous**							
7.1	- Timer switch with weekly program (On/Off with different rotation speed & set point)						☐	☐
7.3	- Timer switch with weekly program (only On/Off)					☐	☐	☐
7.4	- Operator console with 4-line LCD display for control and monitoring	☐ into switch box doors ☐ as remote display incl. 20m. of cable					☐	☐
7.5	- Common alarm						☐	☐
7.6	- Fire and flame alarm (fire protection dampers)					☐	☐	☐
7.7	- Alarm memory of the last 10 alarm messages						☐	☐
7.9	- External On – Off for control					☐		☐
8.	**Special functions**							
8.0						☐		
8.1							☐	☐

Inlet air device
Heating with hot water pump; cooling with cold water pump

2

Switch box, options:
- **Inlet air temperature control**
- **Room temperature control**



B1: Inlet air sensor
B2: Room sensor
B4: Outside air sensor
B5: Return sensor

Application:
Ventilation system for rooms in which the inlet air temperature or the room temperature should be held constant by the heating or cooling of the inlet air.

Function:
The temperature measured by the inlet air sensor B1, room sensor B2 or the outlet air sensor B3 is compared by the controller with the adjusted set point. In the event of a deviation, the controller displaces the heating/cooling valves.

Function	**description**

1.	**Switch box for the inlet air device**	**TR**	**A B**	**A D**
1.1	Switch box for the operation of an inlet air device, sheet steel housing, type of protection IP54, powder coating RAL 7032 (pebble grey), protection, fuses etc. on mounting plate with wiring channels, compact DDC controller, with flexible wiring, completely assembled, wired and checked, including wiring diagram.	☐	☐	☐

2.	Fan & motor					TR	A B	A D
2.1	- External rotor 5-step speed control	☐ 230 V alternating current ☐ 400 V three-phase current Motor capacity Inlet air: Pmo_t = kW Motor current (only frequency converters) Inlet air: I_{mot} = A (With EC setup only 400 V three-phase current can be selected)				☐		☐
2.2	- External rotor 3-step speed control						☐	☐
2.3	- Standard motor single speed					☐	☐	☐
2.4	- Standard motor 2-step speed control					☐	☐	☐
2.5	- Standard motor 3-step speed control					☐	☐	☐
2.6	- Standard motor continuous						☐	☐
2.7	- EC external rotor motor						☐	☐
2.8	- Smooth start for single speed standard motors from 5.5kW to 30.0kW					☐	☐	☐
2.9	- Motor protection with PTC resistor					☐	☐	☐
2.10	- Motor protection with thermocontact (max. up to 2.2 kW)					☐	☐	☐
2.12	- Air flow monitoring inlet and outlet air							☐
2.13	- Volume flow display indicator -> special function							☐
3.	**Control**							
3.1	- Inlet air temperature control with minimal limiting incl. temperature sensor					☐	☐	☐
3.2	- Room temperature control with intake air minimum limitation incl. temperature sensor					☐	☐	☐
3.4	- humidifier control -> special function							☐
3.5	- Dew point control -> special function							☐
3.6	- Constant pressure control	☐ Inlet air	(only with frequency converters)				☐	☐
3.7	- Constant volume flow control						☐	☐
3.8	- Summer/winter compensation (outside sensor is supplied)					☐	☐	☐
4.	**Heat and cold register**							
4.1	- Heater control 0 - 10 V continuous					☐	☐	☐
4.2	- Cooler control 0 - 10 V continuous					☐	☐	☐
4.3	- Reheater control 0 - 10 V continuous							☐
4.4	- Control 230 Volt heating pump ON- OFF					☐	☐	☐
4.5	- Control 230 Volt cooling pump ON- OFF					☐	☐	☐
4.6	- Control of cooling machine 0-10V continuous					☐	☐	☐
4.7	- Release of cooling machine On-Off					☐	☐	☐
4.8	- Frost protection mon. with frost protection thermostat ☐ or attached thermostat ☐					☐	☐	☐
4.9	- Frost protection monitoring with return sensor (return sensor is supplied)					☐	☐	☐
4.10	- Electric air heater up to 4-step with temperature safety limiter and air flow monitoring	☐ 2-step speed control	☐ 3-step speed control	☐ 4-step speed control		☐		☐
4.11	- Heating pump fault							☐
4.12	- Cooling pump fault							☐
6	**Filter and damper**							
6.1	- Filter monitoring	☐ Inlet air				☐	☐	☐
6.2	- Inlet air damper Open – Closed					☐	☐	☐
7.	**Miscellaneous**							
7.1	- Timer switch with weekly program (On/Off with different rotation speed & set point)						☐	☐
7.3	- Timer switch with weekly program (only On/Off)					☐	☐	☐
7.4	- Operator console with 4-line LCD display for control and monitoring	☐ into switch box doors ☐ as remote display incl. 20m. of cable					☐	☐
7.5	- Common alarm						☐	☐
7.6	- Fire and flame alarm (fire protection shutters)					☐	☐	☐
7.7	- Alarm memory of the last 10 alarm messages						☐	☐
7.9	- External On – Off for control					☐		☐

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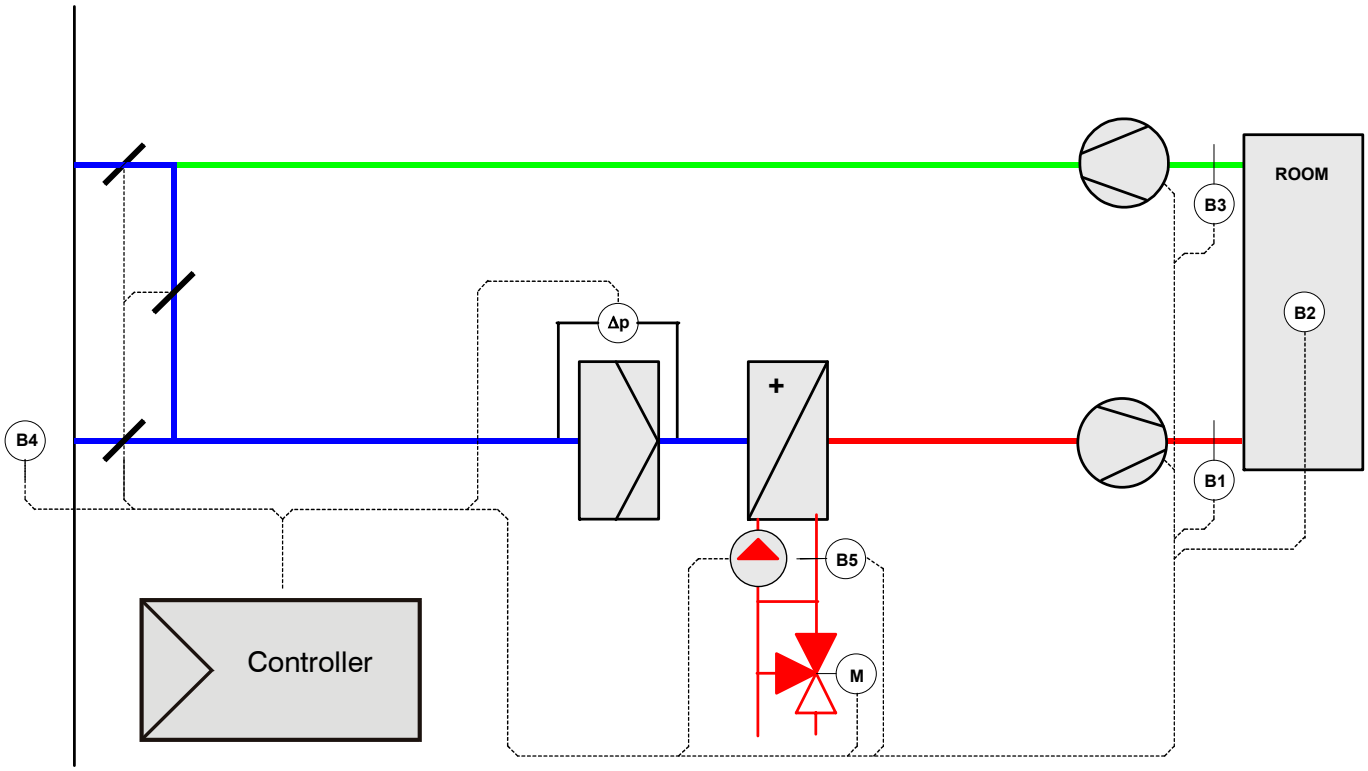
Inlet and outlet air device
Hot water pump heating

3

Switch box, options:

- **Inlet air temperature control**
- **Room temperature control**
- **Outlet air temperature control**



B1: Inlet air sensor
B2: Room sensor
B3: Outlet air sensor
B4: Outside air sensor
B5: Return air sensor

Application:
Ventilation system for rooms in which the inlet air temperature or the room temperature should be held constant by heating or cooling of the inlet air. The room sensor is placed in the outlet air if no representative measurement value can be located in the room.

Function:
The temperature measured by the inlet air sensor B1, the room sensor B2 or the outlet air B3 is compared by the deviation control with the adjusted set point. In the event of a variation, the controller displaces the heating valve.

Function	**description**

1.	**Switch box for inlet and outlet air device**	**TR**	**A B**	**A D**
1.1	Switch box for the operation of an inlet and outlet air device, sheet steel housing, protection type IP54, powder coating RAL 7032 (pebble grey), protection, fuses etc. on mounting plate with wiring channels, compact DDC controller, with flexible wiring, completely assembled, wired and checked, including wiring diagram.	☐	☐	☐

2.	Fan & motor					TR	A B	A D
2.1	- External rotor 5-step speed control	☐ 230 V alternating current ☐ 400 V three-phase current Motor capacity Inlet air: Pmo_t = kW outlet air: P_{mot} = kW Motor current (only frequency converters) Inlet air: I_{mot} = A Outlet air: I_{mot} = A (With EC setup only 400 V three-phase current can be selected)				☐		☐
2.2	- External rotor 3-step speed control						☐	☐
2.3	- Standard motor single speed					☐	☐	☐
2.4	- Standard motor 2-step speed control					☐	☐	☐
2.5	- Standard motor 3-step speed control					☐	☐	☐
2.6	- Standard motor continuous						☐	☐
2.7	- EC External rotor motor						☐	☐
2.8	- Smooth start for single speed standard motors from 5.5kW to 30.0kW					☐	☐	☐
2.9	- Motor protection with PTC resistor					☐	☐	☐
2.10	- Motor protection with thermocontact (max. up to 2.2 kW)					☐	☐	☐
2.11	- Outlet air fan can be separately switchable (only TR)					☐		
2.12	- Air flow monitoring inlet and outlet air							☐
2.13	- Volume flow display-> special function							☐
3.	**Control**							
3.1	- Inlet air temperature control with minimal limiting incl. temperature sensor					☐	☐	☐
3.2	- Room temperature sensor with inlet air minimal limiting dew incl. temperature sensor					☐	☐	☐
3.3	- Outlet air temperature control with inlet air minimal limiting incl. temperature sensor					☐	☐	☐
3.4	- Humidifier control -> special function							☐
3.5	- Dew point control -> special function							☐
3.6	- Constant pressure control	☐ Inlet air	☐ Outlet air	(only with frequency converters)			☐	☐
3.7	- Constant volume of flow control						☐	☐
3.8	- Summer/winter compensation (outside sensor is supplied)					☐	☐	☐
4.	**Heat register**							
4.1	- Heater control 0 - 10 V continuous					☐	☐	☐
4.3	- Reheater control 0 - 10 V continuous							☐
4.4	- Control of 230 Volt heating pump ON- OFF					☐	☐	☐
4.8	- Frost protection mon. with frost protection thermostat ☐ or attached thermostat ☐					☐	☐	☐
4.9	- Frost protection monitoring with return sensor (return sensor is supplied)					☐	☐	☐
4.10	- Electric air heater up to 4-step with temperature safety limiter and air flow monitoring	☐ 2-step speed control	☐ 3-step speed control	☐ 4-step speed control		☐		☐
4.11	- Heating pump fault							☐
6.	**Filter and dampers**							
6.1	- Filter monitoring	☐ Inlet air	☐ Outlet air			☐	☐	☐
6.2	- Inlet and outlet air damper Open – Closed					☐	☐	☐
6.3	- Mixed air damper manual					☐	☐	☐
6.4	- Mixed air damper automatic					☐	☐	☐
7.	**Miscellaneous**							
7.1	- Timer switch with weekly program (On/Off with different rotation speed & set point)						☐	☐
7.3	- Timer switch with weekly program (only On/Off)					☐	☐	☐
7.4	- Operator console with 4-line LCD display for control and monitoring	☐ into switch box doors ☐ as remote display incl. 20m. of cable					☐	☐
7.5	- Common alarm						☐	☐
7.6	- Fire and flame alarm (fire protection damper)					☐	☐	☐
7.7	- Alarm memory of the last 10 alarm messages						☐	☐
7.9	- External On – Off for control					☐		☐

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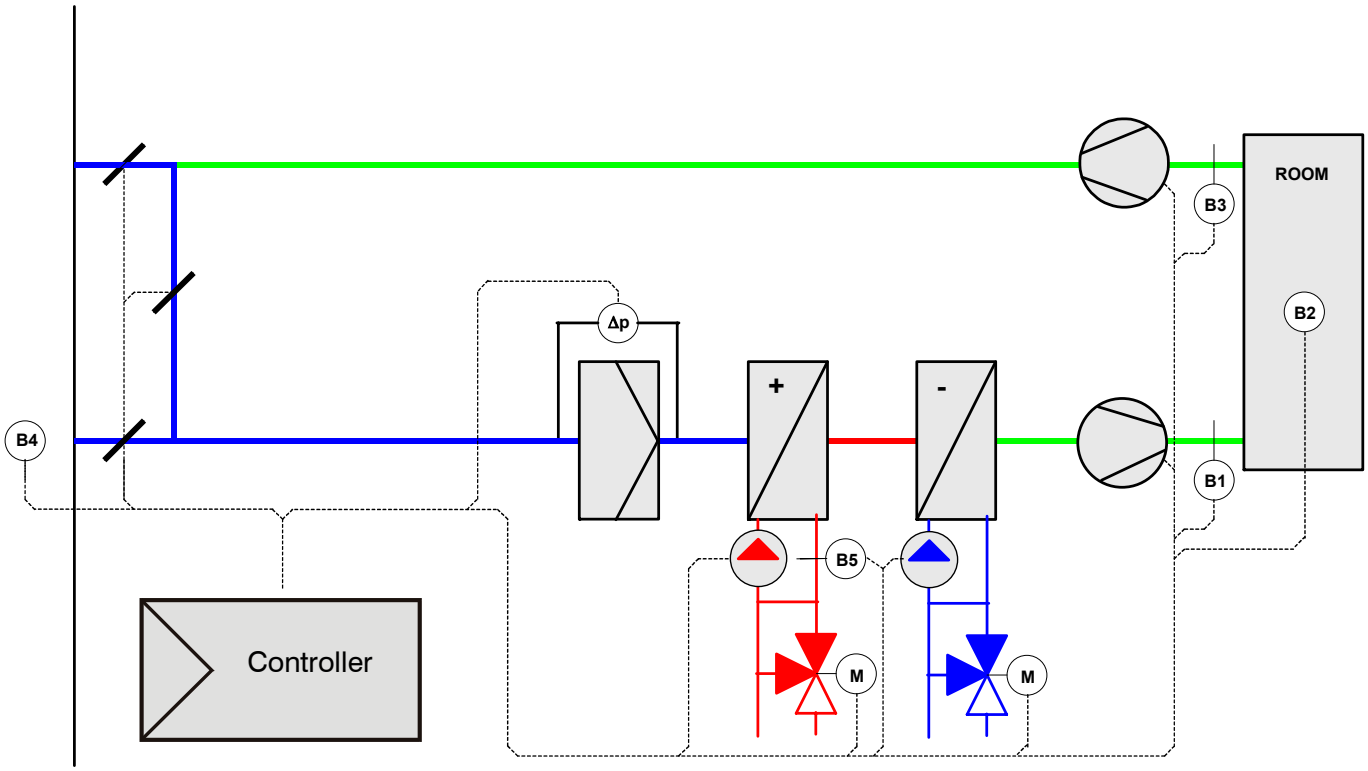
Inlet and outlet air device
Hot water pump heating & cold water pump cooling

4

Switch box, options:

- **Inlet air temperature control**
- **Room temperature control**
- **Outlet air temperature control**



B1: Inlet air sensor
B2: Room sensor
B3: Outlet air sensor
B4: Outside air sensor
B5: Return sensor

Application:
Ventilation system for rooms in which the inlet air temperature or the room temperature should be held constant by heating or cooling the inlet air. The room sensor is placed in the outlet air if no representative measurement value can be located in the room.

Function:
The temperature measured by the inlet air sensor B1, the room sensor B2 or the outlet air sensor B3 is compared by the control with the set value input. In the event of a deviation the controller displaces the heating valves/cooling valves.

Function	**description**

1.	**Switch box for inlet and outlet air device**	**TR**	**A B**	**A D**
1.1	Switch box for the operation of an inlet and outlet air device, sheet steel housing, type of protection IP54, powder coating RAL 7032 (pebble grey), protection, fuses, etc. on mounting plate with wiring channels, compact DDC controller, with flexible wiring, completely assembled, wired and checked, including wiring diagram.	☐	☐	☐

2.	Fan & motor					TR	A B	A D
2.1	- External rotor 5-step speed control	☐ 230 V alternating current ☐ 400 V three-phase current Motor output Inlet air: P_{mot} = kW Outlet air: P_{mot} = kW Motor current (only frequency converters) Inlet air: I_{mot} = A Outlet air: I_{mot} = A (With EC setup only 400 V three-phase current can be selected)				☐		☐
2.2	- External rotor 3-step speed control						☐	☐
2.3	- Standard motor single speed					☐	☐	☐
2.4	- Standard motor 2-step speed control					☐	☐	☐
2.5	- Standard motor 3 step speed control					☐	☐	☐
2.6	- Standard motor continuous						☐	☐
2.7	- EC external rotor motor						☐	☐
2.8	- Smooth start for single speed standard motors from 5.5kW to 30.0kW					☐	☐	☐
2.9	- Motor protection with PTC resistor					☐	☐	☐
2.10	- Motor protection with thermocontact (max. up to 2.2 kW)					☐	☐	☐
2.11	- Outlet air fan separately switchable (only TR)					☐		
2.12	- Air flow monitoring inlet and outlet air							☐
2.13	- Volume of flow display -> special function							☐
3.	**Control**							
3.1	- Inlet air temperature control with minimal limiting incl. temperature sensor					☐	☐	☐
3.2	- Room temperature control with inlet air minimal limiting incl. temperature sensor					☐	☐	☐
3.3	- Outlet air temperature control with inlet air minimal limiting incl. temperature sensor					☐	☐	☐
3.4	- Humidifier control -> special function							☐
3.5	- Dew point control-> special function							☐
3.6	- Constant pressure control	☐ Inlet air	☐ Outlet air	(only with frequency converters)			☐	☐
3.7	- Constant volume flow control						☐	☐
3.8	- Summer/winter compensation (outside sensor is supplied)					☐	☐	☐
4.	**Heat and cold register**							
4.1	- Heater control 0 - 10 V continuous					☐	☐	☐
4.2	- Cooler control 0 - 10 V continuous					☐	☐	☐
4.3	- Reheater control 0 - 10 V continuous							☐
4.4	- Control of 230 Volt heating pump ON- OFF					☐	☐	☐
4.5	- Control of 230 Volt cooling pump ON- OFF					☐	☐	☐
4.6	- Control of cooling machine 0 - 10V continuous					☐	☐	☐
4.7	- Release of cooling machine On-Off					☐	☐	☐
4.8	- Frost protection monit. with frost protection thermostat ☐ or attached thermostat ☐					☐	☐	☐
4.9	- Frost protection monitoring with return sensor (return sensor is supplied)					☐	☐	☐
4.10	- Electric air heater up to 4-step speed control with temperature safety limiter and air flow monitoring	☐ 2-step speed control	☐ 3-step speed control	☐ 4-step speed control		☐		☐
4.11	- Heating pump fault							☐
4.12	- Cooling pump fault							☐
6.	**Filter and dampers**							
6.1	- Filter monitoring	☐ Inlet air	☐ Outlet air			☐	☐	☐
6.2	- Inlet and outlet air damper Open – Closed					☐	☐	☐
6.3	- Mixed air damper manual					☐	☐	☐
6.4	- Mixed air damper automatic					☐	☐	☐
7.	**Miscellaneous**							
7.1	- Timer switch with weekly program (On/Off with different rotation speed & set point)						☐	☐
7.3	- Timer switch with weekly program (only On/Off)					☐	☐	☐
7.4	- Operator console with 4-line LCD display for control and monitoring	☐ into switch box doors ☐ as remote display incl. 20m. of cable					☐	☐
7.5	- Common alarm						☐	☐
7.6	- Fire & flame alarm (fire protection dampers)					☐	☐	☐
7.7	- Alarm memory of the last 10 alarm messages						☐	☐
7.9	- External On – Off for control					☐		☐

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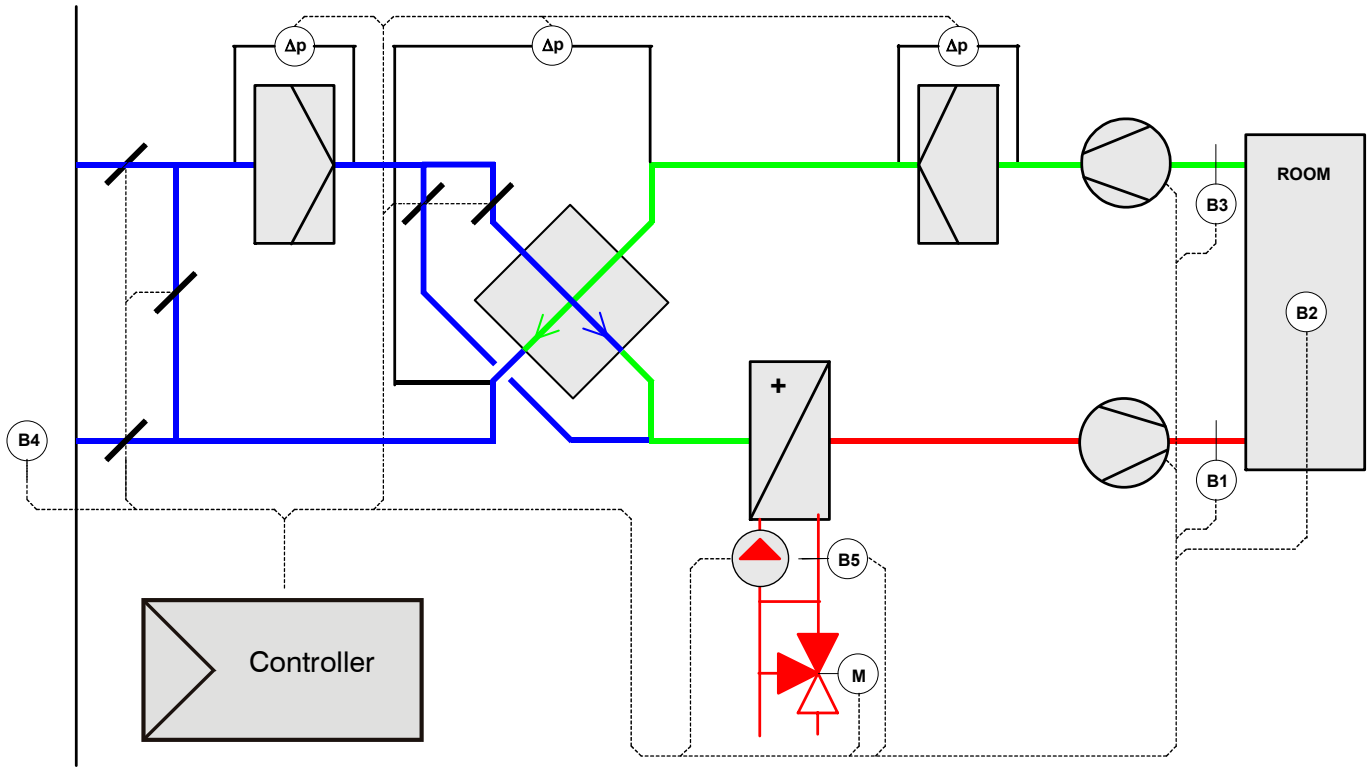
Inlet and outlet air device
Hot water pump heating & heat recycling (plate heat exchanger)

5

Switch box, options:

- **Inlet air temperature control**
- **Room temperature control**
- **Outlet air temperature control**



B1: Inlet air sensor
B2: Room sensor
B3: Outlet air sensor
B4: Outside air sensor
B5: Return sensor

Application:

Ventilation system for rooms in which the air inlet temperature or the room temperature should be held constant by heating or cooling the inlet air. The room sensor is placed in the outlet air if no representative measurement value can be located in the room.

Function:

The temperature measured by the inlet air sensor B1, the room sensor B2 or the outlet air sensor B3 is compared by the control with the adjusted set point. In the event of a deviation, the controller first displaces the bypass shutter. If this is insufficient to achieve the desired temperature, the heating valve is additionally opened.

Function	description

1.	Switch box for inlet and outlet air device	TR	A B	A D
1.1	Switch box for the operation of an inlet and outlet air device, sheet steel housing, type of protection IP54, powder coating RAL 7032 (pebble grey), protection, fuses etc. on mounting plate with wiring channels, compact DDC controller, with flexible wiring, completely assembled, wired and checked, including wiring diagram.	☐	☐	☐

2.	Fan & motor					TR	A B	A D
2.1	- External rotor 5-step speed control	☐ 230 V alternating current ☐ 400 V three-phase current Motor capacity Inlet air: P_{mot} = kW Outlet air: P_{mot} = kW Motor current (only frequency converters) Inlet air: I_{mot} = A Outlet air: I_{mot} = A				☐		☐
2.2	- External rotor 3-step speed control						☐	☐
2.3	- Standard motor single step					☐	☐	☐
2.4	- Standard motor 2-step speed control					☐	☐	☐
2.5	- Standard motor 3-step speed control					☐	☐	☐
2.6	- Standard motor continuous						☐	☐
2.7	- EC external rotor motor	(EC setup only 400 V three-phase current can be selected)					☐	☐
2.8	- Smooth start for single speed standard motors from 5.5kW to 30.0kW					☐	☐	☐
2.9	- Motor protection with PTC resistor					☐	☐	☐
2.10	- Motor protection with thermocontact (max. up to 2.2 kW)					☐	☐	☐
2.11	- Outlet air fan separately switchable (only TR)					☐		
2.12	- Air flow monitoring inlet and outlet air							☐
2.13	- Volume flow display -> special function							☐
3.	**Control**							
3.1	- Inlet air temperature control with minimal limiting incl. temperature sensor					☐	☐	☐
3.2	- Room temperature control with intake air minimal limiting incl. temperature sensor					☐	☐	☐
3.3	- Outlet air temperature control with inlet air minimal limiting incl. temperature sensor					☐	☐	☐
3.4	- Humidifier control -> special function							☐
3.5	- Dew point control -> special function							☐
3.6	- Constant pressure control	☐ Inlet air	☐ Outlet air	(only with frequency converters)			☐	☐
3.7	- Constant volume of flow control						☐	☐
3.8	- Summer/winter compensation (outside sensor is supplied)					☐	☐	☐
4.	**Heating register**							
4.1	- Heater control 0 - 10 V continuous					☐	☐	☐
4.3	- Reheater control 0 - 10 V continuous							☐
4.4	- Control of 230 Volt heating pump ON- OFF					☐	☐	☐
4.8	- Frost protection monit. with frost protection thermostat ☐ or attached thermostat ☐					☐	☐	☐
4.9	- Frost protection monitoring with return sensor (return sensor is supplied)					☐	☐	☐
4.10	- Electric air heater up to 4-step with temperature safety limiter and air flow monitoring	☐ 2-step	☐ 3-step	☐ 4-step		☐		☐
4.11	- Heating pump fault							☐
5.	**Heat recycling**							
5.1	- Bypass valve heat recycling manual summer/winter operation (plate heat exchanger) only with electric heating					☐		
5.2	- Bypass valve heat recycling automatic (plate heat exchanger)					☐	☐	☐
5.3	- Icing up monitoring, heat recycling						☐	☐
6.	**Filter and dampers**							
6.1	- Filter monitoring	☐ Inlet air	☐ Outlet air			☐	☐	☐
6.2	- Inlet and outlet air damper Open – Closed					☐	☐	☐
6.3	- Mixed air damper manual					☐	☐	☐
6.4	- Mixed air damper automatic					☐	☐	☐
7.	**Miscellaneous**							
7.1	- Timer switch with weekly program (On/Off with different rotation speed & set point)						☐	☐
7.3	- Timer switch with weekly program (only On/Off)					☐	☐	☐
7.4	- Operator console with 4-line LCD display for control and monitoring	☐ into switch box doors ☐ as remote display incl. 20m. of cable					☐	☐
7.5	- Common alarm						☐	☐
7.6	- Fire and flame alarm (fire protection dampers)					☐	☐	☐
7.7	- Alarm memory of the last 10 alarm messages						☐	☐
7.9	- External On – Off for control					☐		☐

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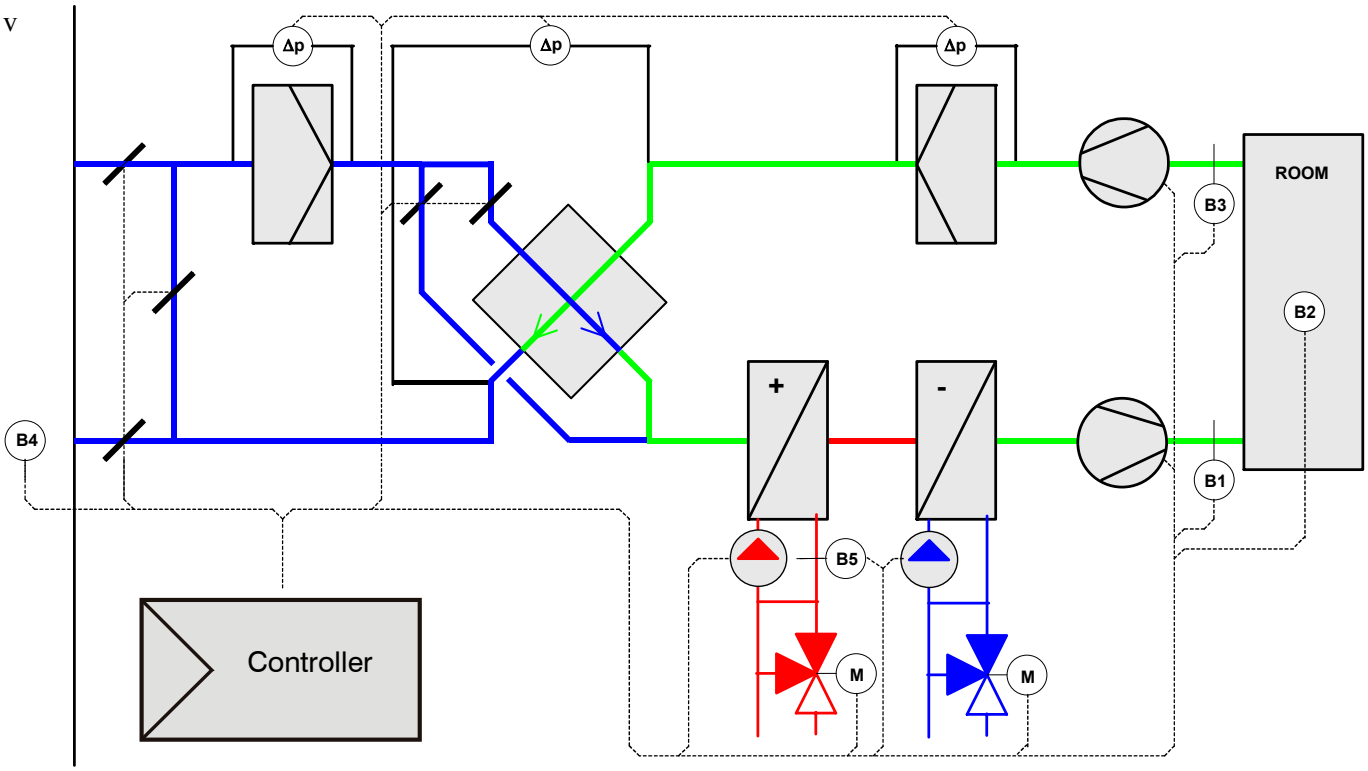
Inlet and outlet air device
Hot water pump heating, cold water pump cooling, heat recycling (plate heat exchanger)

6

- **Switch box, options:**
  - **Inlet air temperature control**
  - **Room temperature control**
  - **Outlet air temperature control**



B1: Inlet air sensor
B2: Room sensor
B3: Outlet air sensor
B4: Outside air sensor
B5: Return sensor

Application:
Ventilation system for rooms in which the inlet air temperature or the room temperature should be held constant by heating or cooling the inlet air. The room sensor is placed in the outlet air if no representative measurement value can be located in the room.

Function:
The temperature measured by the inlet air sensor B1, the room sensor B2 or the outlet air sensor B3 is compared by the control with the adjusted set point. In the event of a deviation the controller displaces of the bypass damper. If this is insufficient, the heating or cooling valve will also be displaced.

Function	**description**

1.	Switch box for inlet and outlet air device	**TR**	**A B**	**A D**
1.1	Switch box for the operation of an inlet and outlet air device, sheet steel housing, type of protection IP54, powder coating RAL 7032 (pebble grey), protection, fuses etc. on mounting plate with wiring channels, compact DDC controller, with flexible wiring, completely assembled, wired and checked, including circuit diagram.	☐	☐	☐

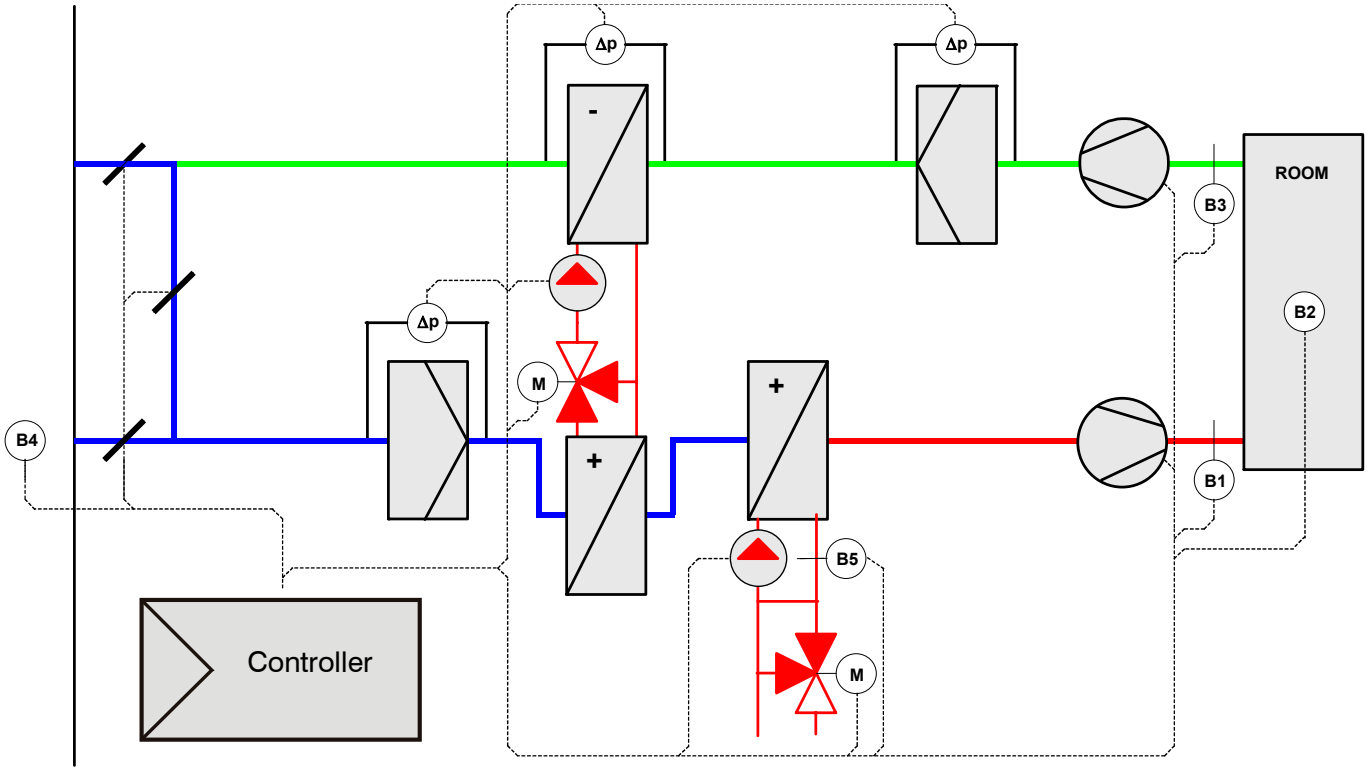
2.	Fan & motor					TR	A B	A D
2.1	- External rotor 5-step speed control	☐ 230 V alternating current ☐ 400 V three-phase current Motor capacity Inlet air P_{mot} = kW Outlet air: P_{mot} = kW Motor current (only frequency converters) Inlet air: I_{mot} = A Outlet air: I_{mot} = A (EC setup only 400 V three-phase current can be selected)				☐		☐
2.2	- External rotor 3-step speed control						☐	☐
2.3	- Standard motor single speed					☐	☐	☐
2.4	- Standard motor 2-step speed control					☐	☐	☐
2.5	- Standard motor 3-step speed control					☐	☐	☐
2.6	- Standard motor continuous						☐	☐
2.7	- EC external rotor motor						☐	☐
2.8	- Smooth start for single speed standard motors from 5.5kW to 30.0kW					☐	☐	☐
2.9	- Motor protection with PTC resistor					☐	☐	☐
2.10	- Motor protection with thermocontact (max. up to 2.2 kW)					☐	☐	☐
2.11	- Outlet air fan separately switchable (only TR)					☐		
2.12	- Air flow monitoring intake and outlet air							☐
2.13	- Volume flow display -> special function							☐
3.	**Control**							
3.1	- Inlet air temperature control with minimal limiting incl. temperature sensor					☐	☐	☐
3.2	- Room temperature control with inlet air minimal limiting incl. temperature sensor					☐	☐	☐
3.3	- Outlet air temperature control with inlet air minimal limiting incl. temperature sensor					☐	☐	☐
3.4	- Humidifier control -> special function							☐
3.5	- Dew point control -> special function							☐
3.6	- Constant pressure control	☐ Inlet air	☐ Outlet air	(only with frequ. conv.)			☐	☐
3.7	- Constant volume flow control						☐	☐
3.8	- Summer/winter compensation (outside sensor is supplied)					☐	☐	☐
4.	**Heat and cold register**							
4.1	- Heater control 0-10 V continuous					☐	☐	☐
4.2	- Cooler control 0-10 V continuous					☐	☐	☐
4.3	- Reheater control 0 - 10 V continuous							☐
4.4	- Control of 230 Volt heating pump ON- OFF					☐	☐	☐
4.5	- Control of 230 Volt cooling pump ON- OFF					☐	☐	☐
4.6	- Control cooling machine 0 - 10V continuous					☐	☐	☐
4.7	- Release of cooling machine On-Off					☐	☐	☐
4.8	- Frost protection mon. with frost protection thermostat ☐ or attached thermostat ☐					☐	☐	☐
4.9	- Frost protection monitoring with return sensor (return sensor is supplied)					☐	☐	☐
4.10	- Electric air heater up to 4-step speed control with temperature safety limiter and air flow mon.	☐ 2-step speed control	☐ 3-step speed control	☐ 4-step speed control		☐		☐
4.11	- Heating pump fault							☐
4.12	- Cooling pump fault							☐
5.	**Heat recycling**							
5.1	- Bypass damper heat recycling manual summer/winter operation (plate heat exchanger) only with electric heating					☐		
5.2	- Bypass damper heat recycling automatic (plate heat exchanger)					☐	☐	☐
5.3	- Icing up monitoring, heat recycling						☐	☐
6.	**Filter and damper**							
6.1	- Filter monitoring	☐ Inlet air	☐ Outlet air			☐	☐	☐
6.2	- Inlet and outlet air damper Open – Closed					☐	☐	☐
6.3	- Mixed air damper manual					☐	☐	☐
6.4	- Mixed air damper automatic					☐	☐	☐
7.	**Miscellaneous**							
7.1	- Timer switch with weekly program (On/Off with different rotation speed & set point)						☐	☐
7.3	- Timer switch with weekly program (only On/Off)					☐	☐	☐
7.4	- Operator console with 4-line LCD display for control and monitoring	☐ into switch box doors ☐ as remote display incl. 20m. of cable					☐	☐
7.5	- Common alarm						☐	☐
7.6	- Fire and flame alarm (fire protection dampers)					☐	☐	☐
7.7	- Alarm memory of the last 10 alarm messages						☐	☐
7.9	- External On – Off for control					☐		☐

Inlet and outlet air device
Hot water pump heating, heat recycling (circulation loop system (KVS))

7

Switch box, options:

- **Inlet air temperature control**
- **Room temperature control**
- **Outlet air temperature control**



B1: Inlet air sensor
B2: Room sensor
B3: Outlet air sensor
B4: Outside air sensor
B5: Return sensor

Application:
Ventilation system for rooms in which the inlet air temperature or the room temperature should be held constant by heating or cooling the inlet air. The room sensor is placed in the outlet air when no representative measurement value can be located in the room.

Function:
The temperatures measured by the inlet air sensor B1, the room sensor B2 or the outlet air sensor B3 is compared by the control with the adjusted set point. In the event of a deviation, the controller first displaces the KVS valve. If this is in sufficient to achieve the desired temperature, the heating valve is opened in addition.

In addition

Function	**description**

1.	**Switch box for inlet and outlet air device**	**TR**	**A B**	**A D**
1.1	Switch box for the operation of an inlet and outlet air device, sheet steel housing, type of protection IP54, powder coating RAL 7032 (pebble grey), protection, fuses etc. on mounting plate with wiring channels, compact DDC controller, with flexible wiring, completely assembled, wired and checked, including circuit diagram.		☐	☐

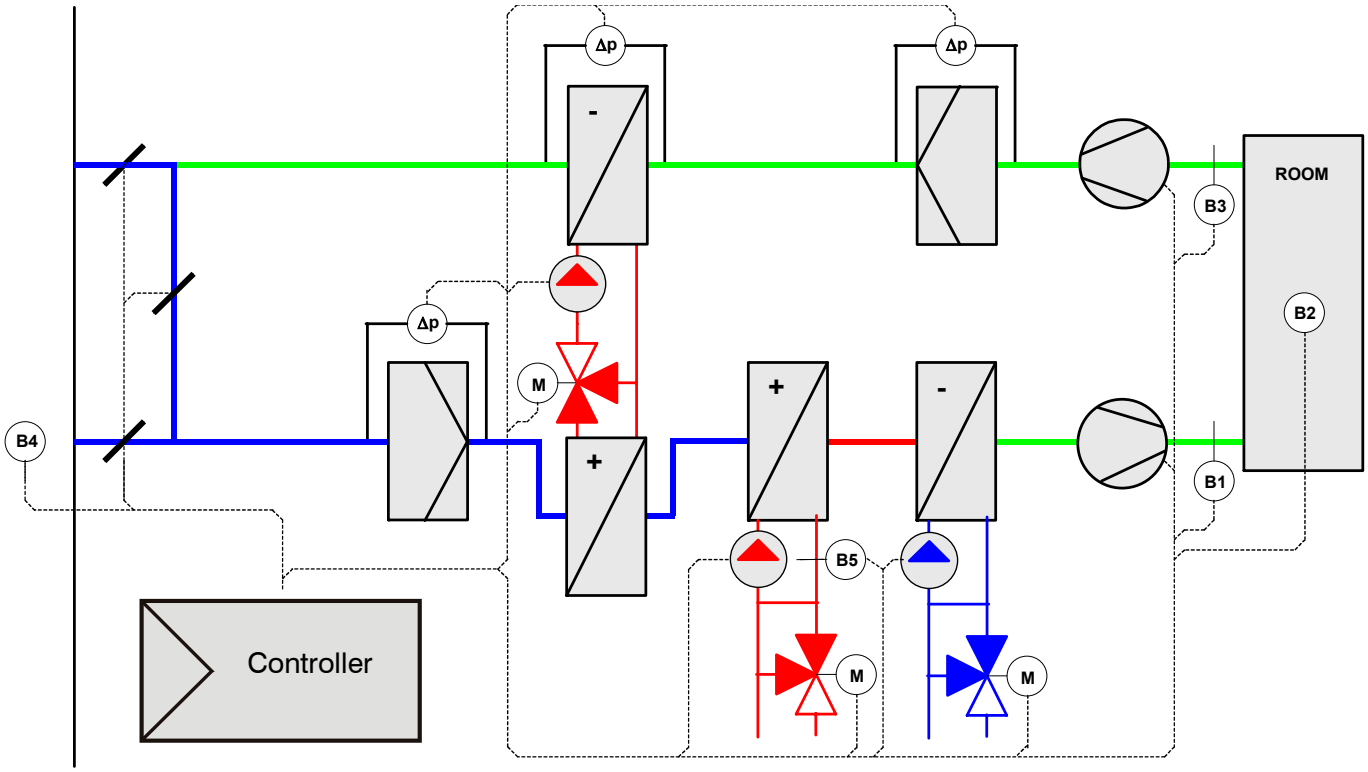
2.	Fan & motor					TR	A B	A D
2.1	- External rotor 5-step speed control	☐ 230 V alternating current ☐ 400 V three-phase current Motor capacity Inlet air: P_{mot} = kW Outlet air: P_{mot} = kW Motor current (only frequency converters) Inlet air: I_{mot} = A Outlet air: I_{mot} = A						☐
2.2	- External rotor 3-step speed control						☐	☐
2.3	- Standard motor single speed						☐	☐
2.4	- Standard motor 2-step speed control						☐	☐
2.5	- Standard motor 3-step speed control						☐	☐
2.6	- Standard motor continuous						☐	☐
2.7	- EC external rotor motor	(EC setup only 400 V three-phase current can be selected)					☐	☐
2.8	- Smooth start for single speed standard motors from 5.5kW to 30.0kW						☐	☐
2.9	- Motor protection with PTC resistor						☐	☐
2.10	- Motor protection with thermocontact (max. up to 2.2 kW)						☐	☐
2.12	- Air flow monitoring inlet and outlet air							☐
2.13	- Volume flow display -> special function							☐
3.	**Control**							
3.1	- Inlet air temperature control with minimal limiting incl. temperature sensor						☐	☐
3.2	- Room temperature control with inlet air minimal limiting incl. temperature sensor						☐	☐
3.3	- Outlet air temperature control with inlet air minimal limiting incl. temperature sensor						☐	☐
3.4	- Humidifier control -> special function							☐
3.5	- Dew point control -> special function							☐
3.6	- Constant pressure control	☐ Inlet air	☐ Outlet air	(only with frequ. conv.)			☐	☐
3.7	- Constant volume flow control						☐	☐
3.8	- Summer/winter compensation (outside sensor is supplied)						☐	☐
4.	**Heat register**							
4.1	- Heater control 0 - 10 V continuous						☐	☐
4.3	- Reheater control 0 - 10 V continuous							☐
4.4	- Control of 230 Volt heating pump ON- OFF						☐	☐
4.8	- Frost protection mon. with frost protection thermostat ☐ or attached thermostat ☐						☐	☐
4.9	- Frost protection monitoring with return sensor (return sensor is supplied)						☐	☐
4.10	- Electric air heater up to 4-step speed control with temperature safety limiter and air flow mon.	☐ 2-step speed control	☐ 3-step speed control	☐ 4-step speed control				☐
4.11	- Heating pump fault							☐
5.	**Heat recycling**							
5.2	- Control of heat recycling 0 - 10 V continuous, automatic (circulation loop system)						☐	☐
5.3	- Icing up monitoring						☐	☐
5.4	- Control of 230 V pump (circulation loop system) ON- OFF							☐
5.5	- Pump fault (circulation loop system)							☐
6.	**Filter and dampers**							
6.1	- Filter monitoring	☐ Inlet air	☐ Outlet air				☐	☐
6.2	- Inlet and outlet air damper Open – Closed						☐	☐
6.3	- Mixed air damper manual						☐	☐
6.4	- Mixed air damper automatic						☐	☐
7.	**Miscellaneous**							
7.1	- Timer switch with weekly program (On/Off with different rotation speed & set point)						☐	☐
7.3	- Timer switch with weekly program (only On/Off)						☐	☐
7.4	- Operator console with 4-line LCD display for control and monitoring	☐ into switch box doors ☐ as remote display incl. 20m. of cable					☐	☐
6.5	- Common alarm						☐	☐
7.6	- Fire and flame alarm (fire protection dampers)						☐	☐
7.7	- Alarm memory with the last 10 alarm messages						☐	☐
7.9	- External On – Off for control							☐

Inlet and outlet air device
Hot water pump heating, cold water pump cooling & heat recycling (circulation loop system (KVS))

8

Switch box, options:

- **Inlet air temperature control**
- **Room temperature control**
- **Outlet air temperature control**



B1: Inlet air sensor
B2: Room sensor
B3: Outlet air sensor
B4: Outside air sensor
B5: Return sensor

Application:
Ventilation system for rooms in which the inlet air temperature or the room temperature should be held constant by heating or cooling the inlet air. The room sensor is placed in the outlet air if no representative measurement value can be located in the room.

Function:
The temperature measured by the inlet air sensor B1, the room sensor B2 or the outlet air sensor B3 is compared by the control with the adjusted set point. In the event of a deviation the controller displaces the KVS valve. If this is insufficient then the heating valve is also moved.

Function	**description**

1.	**Switch box for inlet and outlet air device**	**TR**	**A B**	**A D**
1.1	Switch box for the operation of an inlet and outlet air device, sheet steel housing, type of protection IP54, powder coating RAL 7032 (pebble grey), protection, fuses etc. on mounting plate with wiring channels, compact DDC controller, with flexible wiring, completely assembled, wired and checked, including circuit diagram.		☐	☐

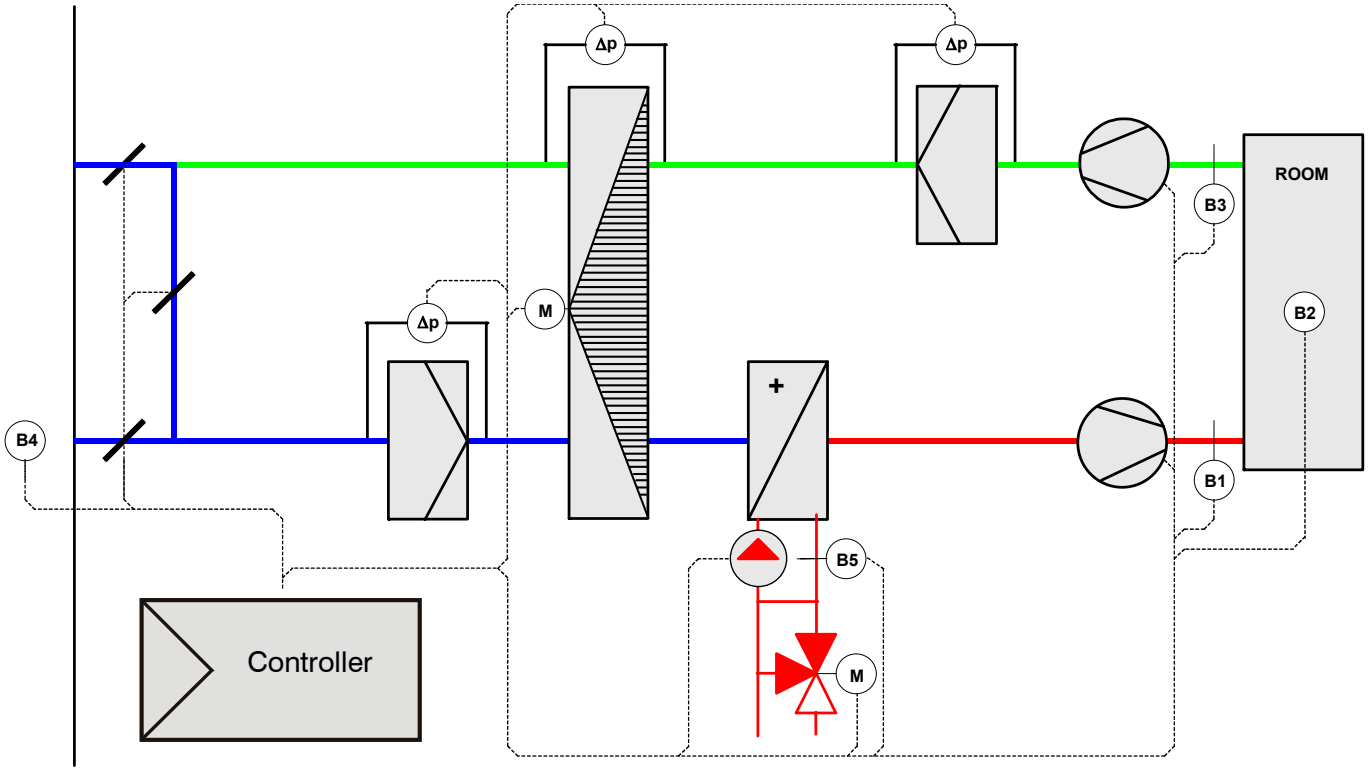
2.	Fan & motor				TR	A B	A D
2.1	- External rotor 5-step speed control	☐ 230 V alternating current ☐ 400 V three-phase current Motor capacity Inlet air: P_{mot} = kW Outlet air: P_{mot} = kW Motor current (only frequency converters) Inlet air: I_{mot} = A Outlet air: I_{mot} = A (EC setup only 400 V three-phase current can be selected)					☐
2.2	- External rotor 3-step speed control					☐	☐
2.3	- Standard motor single speed					☐	☐
2.4	- Standard motor 2-step speed control					☐	☐
2.5	- Standard motor 3-step speed control					☐	☐
2.6	- Standard motor continuous					☐	☐
2.7	- EC external rotor motor					☐	☐
2.8	- Smooth start for single speed standard motors from 5.5kW to 30.0kW					☐	☐
2.9	- Motor protection with PTC resistor					☐	☐
2.10	- Motor protection with thermocontact (max. up to 2.2 kW)					☐	☐
2.12	- Air flow monitoring intake and outlet air						☐
2.13	- Volume flow display -> special function						☐
3.	**Control**						
3.1	- Inlet air temperature control with minimal limiting incl. temperature sensor					☐	☐
3.2	- Room temperature control with inlet air minimal limiting incl. temperature sensor					☐	☐
3.3	- Outlet air temperature control with inlet air minimal limiting incl. temperature sensor					☐	☐
3.4	- Humidifier control -> special function						☐
3.5	- Dew point control -> special function						☐
3.6	- Constant pressure control	☐ Inlet air	☐ Outlet air	(only with frequ. conv.)		☐	☐
3.7	- Constant volume flow control					☐	☐
3.8	- Summer/winter compensation (outside sensor is supplied)					☐	☐
4.	**Heat and cold register**						
4.1	- Heater control 0 - 10 V continuous					☐	☐
4.2	- Cooler control 0 - 10 V continuous					☐	☐
4.3	- Reheater control 0 - 10 V continuous						☐
4.4	- Control of 230 Volt heating pump ON- OFF					☐	☐
4.5	- Control of 230 Volt cooling pump ON- OFF					☐	☐
4.6	- Control of cooling machine 0-10V continuous					☐	☐
4.7	- Release of cooling machine On-Off					☐	☐
4.8	- Frost protection mon. with frost protection thermostat ☐ or attached thermostat ☐					☐	☐
4.9	- Frost protection mon. with return sensor (return sensor is supplied)					☐	☐
4.10	- Electric air heater up to 4-step speed control with temperature safety limiter and air flow mon.	☐ 2-step speed control	☐ 3-step speed control	☐ 4-step speed control			☐
4.11	- Heating pump fault						☐
4.12	- Cooling pump fault						☐
5.	**Heat recycling**						
5.2	- Control heat recycling 0 - 10 V continuous, automatic (circulation loop system)					☐	☐
5.3	- Icing up monitoring					☐	☐
5.4	- Control 230 Volt pump (KVS, circulation loop system) ON- OFF						☐
5.5	- Pump fault (circulation loop system)						☐
6.	**Filter and dampers**						
6.1	- Filter monitoring	☐ Inlet air	☐ Outlet air			☐	☐
6.2	- Inlet & outlet air shutter Open – Closed					☐	☐
6.3	- Mixed air damper manual					☐	☐
6.4	- Mixed air damper automatic					☐	☐
7.	**Miscellaneous**						
7.1	- Timer switch with weekly program (On/Off with different rotation speed & set point)					☐	☐
7.3	- Timer switch with weekly program (only On/Off)					☐	☐
7.4	- Operator console with 4-line LCD display for control and monitoring	☐ into switch box doors ☐ as remote display incl. 20m. of cable				☐	☐
7.5	- Common alarm					☐	☐
7.6	- Fire and flame alarm (fire protection dampers)					☐	☐
7.7	- Alarm memory of the last 10 alarm messages					☐	☐
7.9	- External On – Off for control						☐

Inlet and outlet air device
Hot water pump heating & heat recycling (rotary heat exchanger)

9

Switch box, options:

- **Inlet air temperature control**
- **Room temperature control**
- **Outlet air temperature control**



B1: Inlet air sensor
B2: Room sensor
B3: Outlet air sensor
B4: Outside air sensor
B5: Return sensor

Application:

Ventilation system for rooms in which the inlet air temperature or the room temperature should be held constant by heating or cooling the inlet air. The room sensor is placed in the outlet air if no representative measurement value can be located in the room.

Function:

The temperature measured by the inlet air sensor B1, the room sensor B2 or the outlet air sensor B3 is compared by the control with the adjusted set point. In the event of a deviation, the controller first activates the rotary heat exchanger. If this is insufficient to achieve the desired temperature, the heating valve is also opened.

Function	description

1.	Switch box for inlet and outlet air device	TR	A B	A D
1.1	Switch box for the operation of an inlet and outlet air device, sheet steel housing, type of protection IP54, powder coating RAL 7032 (pebble grey), protection, fuses etc. on mounting plate with wiring channels, compact DDC controller, with flexible wiring, completely assembled, wired and checked, including circuit diagram.		☐	☐

2.	Fan & motor					TR	A B	A D
2.1	- External rotor 5-step speed control	☐ 230 V alternating current ☐ 400 V three-phase current Motor capacity Inlet air: P_{mot} = kW Outlet air: P_{mot} = kW Motor current (only frequency converters) Inlet air: I_{mot} = A Outlet air: I_{mot} = A						☐
2.2	- External rotor 3-step speed control						☐	☐
2.3	- Standard motor single speed						☐	☐
2.4	- Standard motor 2-step speed control						☐	☐
2.5	- Standard motor 3-step speed control						☐	☐
2.6	- Standard motor continuous						☐	☐
2.7	- EC external rotor motor	(EC setup only 400 V three-phase current can be selected)					☐	☐
2.8	- Smooth start for single speed standard motors from 5.5kW to 30.0kW						☐	☐
2.9	- Motor protection with PTC resistor						☐	☐
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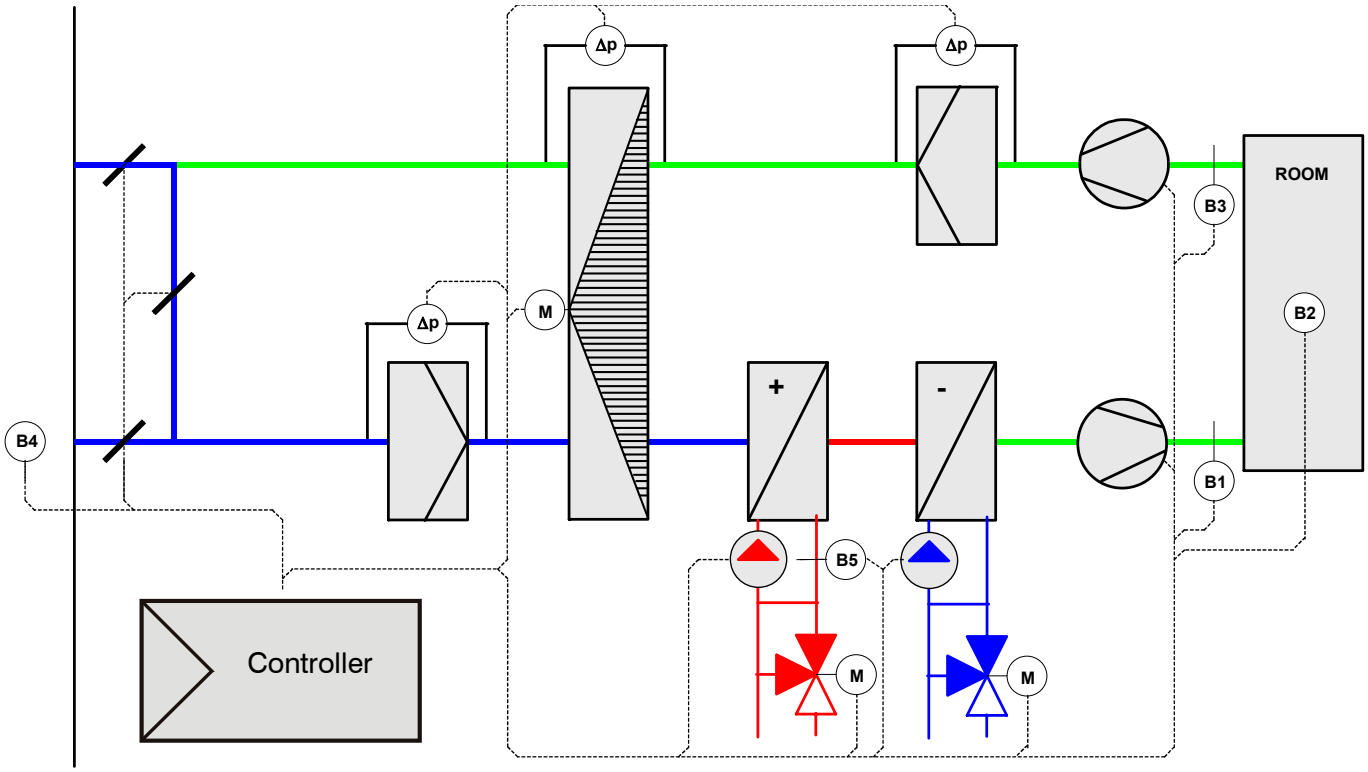
2.12	- Air flow monitoring intake and outlet air							☐
2.13	- Volume flow display -> special function							☐
3.	**Control**							
3.1	- Inlet air temperature control with minimal limiting incl. temperature sensor						☐	☐
3.2	- Room temperature control with inlet air minimal limiting incl. temperature sensor						☐	☐
3.3	- Outlet air temperature control with inlet air minimal limiting incl. temperature sensor						☐	☐
3.4	- Humidifier control -> special function							☐
3.5	- Dew point control -> special function							☐
3.6	- Constant pressure control	☐ Inlet air	☐ Outlet air	(only with frequ. conv.)			☐	☐
3.7	- Constant volume flow control						☐	☐
3.8	- Summer/winter compensation (outside sensor is supplied)						☐	☐
4.	**Heat register**							
4.1	- Heater control 0 - 10 V continuous						☐	☐
4.3	- Reheater control 0 - 10 V continuous							☐
4.4	- Control of 230 Volt heating pump ON- OFF						☐	☐
4.8	- Frost protection mon. with frost protection thermostat ☐ or attached thermostat ☐						☐	☐
4.9	- Frost protection monitoring with return sensor (return sensor is supplied)						☐	☐
4.10	- Electric air heater up to 4-step speed control with temperature safety limiter and air flow mon.	☐ 2-step speed control	☐ 3-step speed control	☐ 4-step speed control				☐
4.11	- Heating pump fault							☐
5.	**Heat recycling**							
5.2	- Control of heat recycling 0 - 10 V continuous, automatic (rotor)						☐	☐
5.3	- Icing up monitoring						☐	☐
6.	**Filter and dampers**							
6.1	- Filter monitoring	☐ Inlet air	☐ Outlet air				☐	☐
6.2	- Inlet and outlet air shutter Open – Closed						☐	☐
6.3	- Mixed air damper manual						☐	☐
6.4	- Mixed air damper automatic						☐	☐
7.	**Miscellaneous**							
7.1	- Timer switch with weekly program (On/Off with different rotation speed & set point)						☐	☐
7.3	- Timer switch with weekly program (only On/Off)						☐	☐
7.4	- Operator console with 4-line LCD display for control and monitoring	☐ into switch box doors ☐ as remote display incl. 20m. of cable					☐	☐
7.5	- Common alarm						☐	☐
7.6	- Fire & flame alarm (fire protection dampers)						☐	☐
7.7	- Alarm memory of the last 10 alarm messages						☐	☐
7.9	- External On – Off for control							☐

Inlet and outlet air device
Hot water pump heating; cold water pump cooling; heat recycling (rotary heat exchanger)

10

- **Switch box, options:**
  - **Inlet air temperature control**
  - **Room temperature control**
  - **Outlet air temperature control**



B1: Inlet air sensor
B2: Room sensor
B3: Outlet air sensor
B4: Outside air sensor
B5: Return sensor

Application:
Ventilation system for rooms in which the inlet air temperature or the room temperature should be held constant by heating or cooling the inlet air. The room sensor is placed in the outlet air if no representative measurement value can be located in the room.

Function:
The temperature measured by the inlet air sensor B1, the room sensor B2 or the outlet air sensor B3 is compared by the control with the adjusted set point. In the event of a deviation, the controller activates the rotary heat exchanger. If this is insufficient, the heating or cooling valve is also moved.

Function	**description**

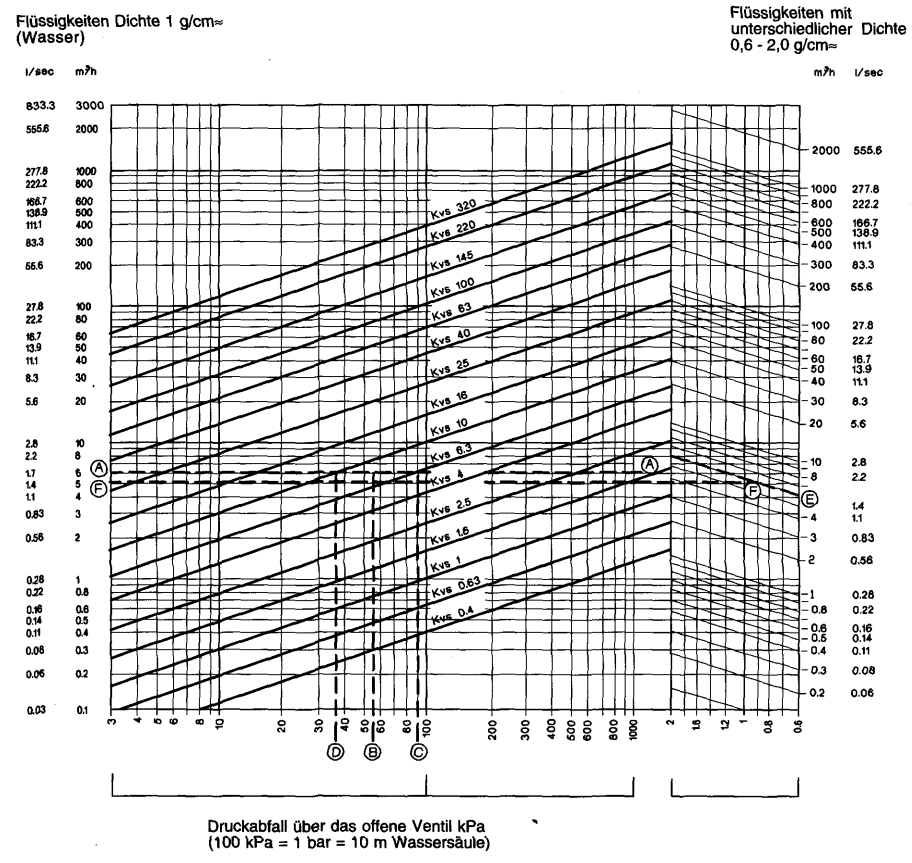
1.	**Switch box for inlet and outlet air device**	**TR**	**A B**	**A D**
1.1	Switch box for the operation of an inlet and outlet air device, sheet steel housing, type of protection IP54, powder coating RAL 7032 (pebble grey), protection, fuses etc. on mounting plate with wiring channels, compact DDC controller, with flexible wiring, completely assembled, wired and checked, including circuit diagram.		☐	☐

					TR	A B	A D
2.	**Fan & motor**						
2.1	- External rotor 5-step speed control	☐ 230 V alternating current ☐ 400 V three-phase current Motor capacity Inlet air: P_{mot} = kW Outlet air: P_{mot} = kW Motor current (only frequency converters) Inlet air: I_{mot} = A Outlet air: I_{mot} = A (EC setup only 400 V three-phase current can be selected)					☐
2.2	- External rotor 3-step speed control					☐	☐
2.3	- Standard motor single speed					☐	☐
2.4	- Standard motor 2-step speed control					☐	☐
2.5	- Standard motor 3-step speed control					☐	☐
2.6	- Standard motor continuous					☐	☐
2.7	- EC external rotor motor					☐	☐
2.8	- Smooth start for single speed standard motors from 5.5kW to 30.0kW					☐	☐
2.9	- Motor protection with PTC resistor					☐	☐
2.10	- Motor protection with thermocontact (max. up to 2.2 kW)					☐	☐
2.12	- Air flow monitoring inlet and outlet air						☐
2.13	- Volume flow display -> special function						☐
3.	**Control**						
3.1	- Inlet air temperature control with minimal limiting incl. temperature sensor					☐	☐
3.2	- Room temperature control with intake air minimal limiting incl. temperature sensor					☐	☐
3.3	- Outlet air temperature control with inlet air minimal limiting incl. temperature sensor					☐	☐
3.4	- Humidifier control -> special function						☐
3.5	- Dew point control -> special function						☐
3.6	- Constant pressure control	☐ Inlet air	☐ Outlet air	(only with frequ. conv.)		☐	☐
3.7	- Constant volume flow control					☐	☐
3.8	- Summer/winter compensation (outside sensor is supplied)					☐	☐
4.	**Heat and cold register**						
4.1	- Heater control 0 - 10 V continuous					☐	☐
4.2	- Cooler control 0 - 10 V continuous					☐	☐
4.3	- Reheater control 0 - 10 V continuous						☐
4.4	- Control of 230 Volt heating pump ON- OFF					☐	☐
4.5	- Control of 230 Volt cooling pump ON- OFF					☐	☐
4.6	- Control of cooling machine 0 - 10V continuous					☐	☐
4.7	- Release of cooling machine On-Off					☐	☐
4.8	- Frost protection mon. with frost protection thermostat ☐ or attached thermostat ☐					☐	☐
4.9	- Frost protection monitoring with return sensor (return sensor is supplied)					☐	☐
4.10	- Electric air heater up to 4-speed speed control with temperature safety limiter and air current mon.	☐ 2-speed speed control	☐ 3-speed speed control	☐ 4-speed speed control			☐
4.11	- Heating pump fault						☐
4.12	- Cooling pump fault						☐
5.	**Heat recycling**						
5.2	- Control of heat recycling 0-10 V continuous, automatic (rotor)					☐	☐
5.3	- Icing up monitoring					☐	☐
6.	**Filter and dampers**						
6.1	- Filter monitoring	☐ Inlet air	☐ Outlet air			☐	☐
6.2	- Inlet and outlet air shutter Open – Closed					☐	☐
6.3	- Mixed air damper manual					☐	☐
6.4	- Mixed air damper automatic					☐	☐
7.	**Miscellaneous**						
7.1	- Timer switch with weekly program (On/Off with different. rotation speed & set point)					☐	☐
7.3	- Timer switch with weekly program (only On/Off)					☐	☐
7.4	- Operator console with 4-line LCD display for control and monitoring	☐ into switch box doors ☐ as remote display incl. 20m. of cable				☐	☐
7.5	- Common alarm					☐	☐
7.6	- Fire and flame alarm (fire protection dampers)					☐	☐
7.7	- Alarm memory of the last 10 alarm messages					☐	☐
7.9	- External On – Off for control						☐

Three-way valves series VRG 3

Required heat output of the ventilation appliance in [kW]	*AIRBOX*- Unit size for heating up from -10°C to +20°C with hot water pump 80/60	Recommended valve size	
10	A20-07F / A20-05Q	15/0.63 – 1.6	This list gives only indicative values for rough preplanning. The precise setup is always dependent on the order and installation. For greater heat output levels a different series of valve must be chosen. The fall in pressure through the valve should be at least equal but preferably greater than the fall in pressure through the heat exchanger built into the ventilation device.
15			
20	S40-07F / K40-07F / A20-08F	15/2.5	
30	S40-08F / K40-08F / A20-10F / S40-10F	15/4	
40	A20-07Q / S40-07Q, / ECP-07Q / K40-10F		
50	A20-08Q / S40-08Q / ECP-08Q / A20-10R / S40-10R	20/6.3	
60			
70	K40-13F	25/10	
80			
90	S40-10Q, ECP-10Q, A20-10Q		
100			
110	A20-13R, S40-13R		
120			
130	A20-13Q	32/16	
140			
150	S40-13Q		
170		40/25	
190	S40-16R		
210			
230	S40-16Q	50/40	
250			

Design diagram for three-way valve series RVR



Three-way valve VRG

Used as a control valve to control:
RTE/D ... TR, MSD ... TR and Airtronic D/Basic

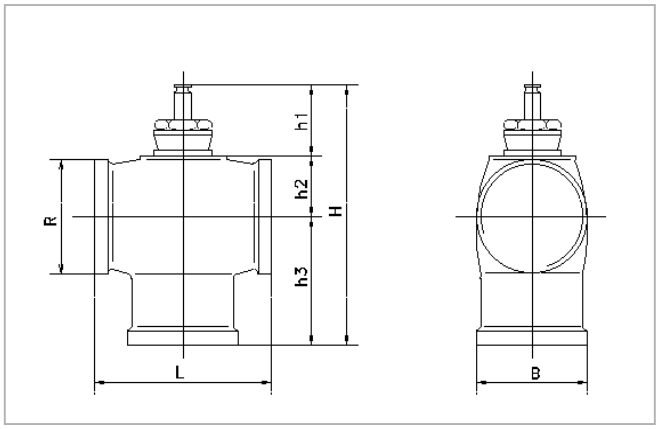
- Three-way valve loose, with electrical servo-motor for continuous control of cold and hot water systems, with manual movement and position indicator.
- Technical data:
- Water temperature 2 - 120°C
- Nominal pressure PN16
- Housing made from GG-25
- Flow characteristic line same percentage (log), kvs/kvo = 320
- kvs/kvo = 320
- Mixing characteristic line linear
- Leakage losses in direction of flow 0.1 % kvs
- Leakage losses in direction of mixing 1 % kvs
- Valve rod made of stainless steel
- Cone made of brass
- Seals EPDM

The 1st value in the valve reference gives the size of the outer thread collar in accordance with ISO 228/1. The 2nd number represents the kvs value. The kvs value is defined as the volume flow of a fluid with the density $\rho 0 = 1{,}000$ kg/m3 (density of water) with a pressure loss of $\Delta p0 = 1$ bar (100 kPa) at the valve.

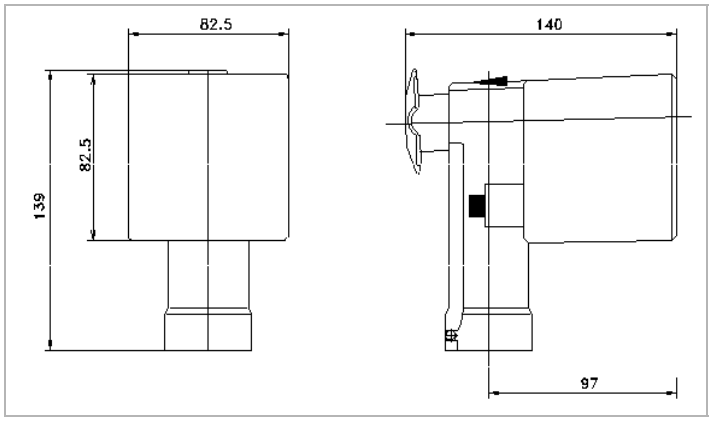
Dimensions

Valve type	DN	R	L [mm]	H [mm]	W [mm]	h1 [mm]	h2 [mm]	h3 [mm]	Δ p max. total [bar]
15/1.6									
15/2.5									
15/4.0	15	3/4"	80	110	40	49	21	40	16
20/6.3	20	1 1/4"	80	130	55	49	26	55	8
25/10	25	1 1/2"	95	135	60	49	26	60	4.5
32/16	32	2"	112	147	65	49	32	66	2.5
40/25	40	2 1/4"	132	160	71	49	36	75	1
50/40	50	2 3/4"	160	176	80	49	42	85	0.5

Valves:



Drive motor:



Damper actuators

Damper actuators are used for the opening and lowred of dampers. In the selection of motors the following features should be considered.
24 V AC/DC or 230 V AC
Damper size (0.8; 1.5; 3; 3.6; 6m^2)
Function (Open/Closed; continuous switch; spring return)
Simple direct mounting on damper shaft with universal clamp. Secured against twisting with supplied twist lock. Manual positioning with self-resetting push button possible (drive idle as long as button is depressed).
High level of operational safety since the drive cannot be overloaded. It needs no stop switch and stops automatically on impact. The direction of rotation can be manually changed by a switch.

Attention:
With the use of controllers (RTE/D TR, MSD TR and Airtronic) the following arrangement should be observed!

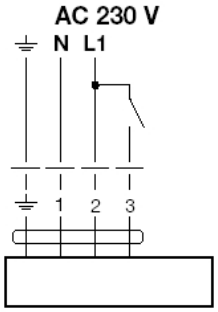
Airtronic D/Basic:
Intake/outlet air damper =Open/Closed actuator
Mixed air damper =continuous actuator
Bypass damper =continuous actuator

TR control:
Inlet/outlet air damper =Open/Closed actuator
Mixed air damper =continuous actuator
Bypass damper =continuous actuator

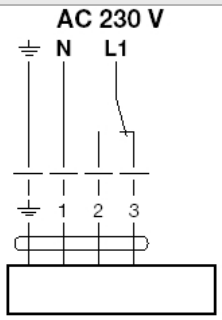
Type	Part no.	Power	Torque	Function	Damper	Circuit diagram
LM24	SMB024-0403N	24 V AC/DC	4 Nm	Open/Closed	0.8 m^2	1
LM230	SMB230-0402N	230 V AC	4 Nm	Open/Closed	0.8 m^2	1
LM24SR	SMB024-0401N	24 V AC/DC	4 Nm	Continuous	0.8 m^2	4
LF24	SMB024-0402F	24 V AC/DC	4 Nm	Open/Closed (spring return)	0.8 m^2	3
LF230	SMB230-0402F	230 V AC	4 Nm	Open/Closed (spring return)	0.8 m^2	3
LF24-SR	SMB024-0401F	24 V AC/DC	4 Nm	Continuous with spring return	0.8 m^2	4
NM24	SMB024-0803F	24 V AC/DC	8 Nm	Open/Closed	1.5 m^2	1
NM230	SMB230-0802N	230 V AC	8 Nm	Open/Closed	1.5 m^2	1
NM24SR	SMB024-0801N	24 V AC/DC	8 Nm	Continuous	1.5 m^2	5
SM24	SMB024-1503N	24 V AC/DC	15 Nm	Open/Closed	3 m^2	2
SM220	SMB230-1503N	230 V AC	15 Nm	Open/Closed	3 m^2	2
SM230	SMB230-1513N	230 V AC	15 Nm	Open/Closed	3 m^2	1
SM24SR	SMB024-1501N	24 V AC/DC	15 Nm	Continuous	3 m^2	6
SM220SR	SMB230-1501N	230 V AC	15 Nm	Continuous	3 m^2	7
AF24	SMB024-1502F	24 V AC/DC	15 Nm	Open/Closed (spring return)	3 m^2	3
AF230	SMB230-1502F	230 V AC	15 Nm	Open/Closed (spring return)	3 m^2	3
AF24SR	SMB024-1501F	24 V AC/DC	15 Nm	Continuous with spring return	3 m^2	6
AM24	SMB024-1803N	24 V AC/DC	18 Nm	Open/Closed	3.6 m^2	1
AM24SR	SMB024-1801N	24 V AC/DC	18 Nm	Continuous	3.6 m^2	4
AM230	SMB230-1802N	230 V AC	18 Nm	Open/Closed	3.6 m^2	1
GM24	SMB024-3003N	24 V AC/DC	30 Nm	Open/Closed	6 m^2	1
GM220	SMB230-3002N	230 V AC	30 Nm	Open/Closed	6 m^2	2
GM24SR	SMB024-3001N	24 V AC/DC	30 Nm	Continuous	6 m^2	6

Typ	LM	NM	SM	AM	GM	LF	AF
							
Antriebs-leistung	4 Nm	8 Nm	15 Nm	18 Nm	30 Nm	4 Nm	15 Nm
Sicherheits-funktion	–	–	–	–	–		
für Klappen bis ca.	0,8 m^2	1,5 m^2	3 m^2	3,6 m^2	6 m^2	0,8 m^2	3 m^2

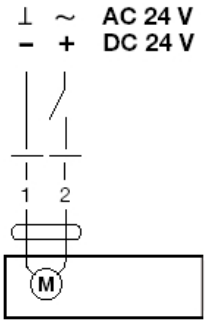
Circuit diagram 1



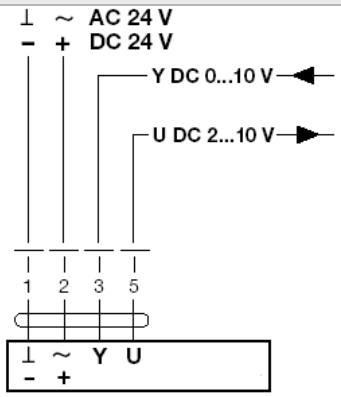
Circuit diagram 2



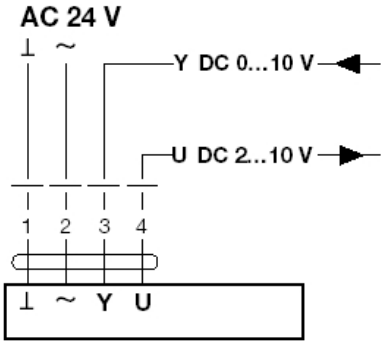
Circuit diagram 3



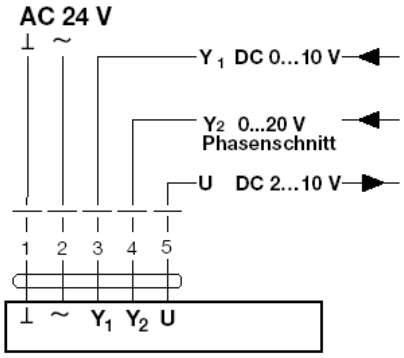
Circuit diagram 4



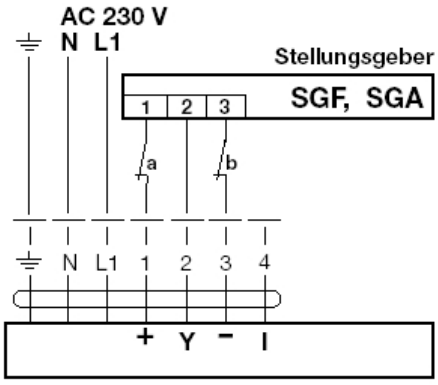
Circuit diagram 5



Circuit diagram 6



Circuit diagram 7

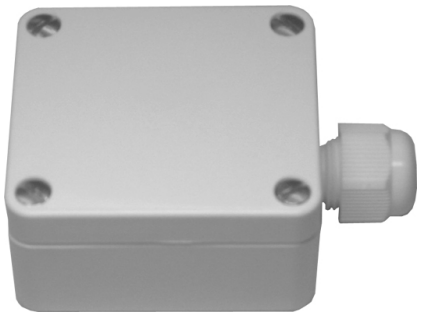


Outside temperature sensor

Part no. H42-09914

Used for the control of:
Airtronic D/Basic

Sensor:	NTC measured resistance 10 kΩ at 25 °C in 2- wire configuration
Measurement range:	-50 - +90 °C
Tolerance:	± 0.2 °C from 0 - 70 °C
Type of protection:	IP 54
Housing:	AGS54, material PA 6.6 reinforced with glass beads. Colour white. Connection with 2-pole terminal, cable in feed PG9
Dimensions:	65×50×37.5 mm



Channel temperature sensor

Part no. H42-09901

Used as an inlet or outlet air duct sensor with controller: RTE/D ... TR, MSD ... TR and Airtronic D/Basic

Sensor:	NTC measured resistance 10 kΩ at 25 °C in 2-wire configuration
Measurement range:	-50 - +120 °C
Tolerance:	± 0.2 °C from 0 - 70 °C
Type of protection:	IP 54
Housing:	AKF10, material PA 6.6 reinforced with glass beads. Colour white. Connection with 2-pole terminal, cable in feed PG9
Dimensions:	
Housing:	65×50×37.5 m
Sheath:	7×192×0.4 mm (material stainless steel 1.4571)

Living room temperature sensor

Part no. H42-09902

Used with controller:
RTE/D ... TR, MSD ... TR and Airtronic D/Basic

Sensor:	NTC measured resistance 10 kΩ at 25 °C in 2-wire configuration
Measurement range:	-50 - +90 °C
Tolerance:	± 0.2 °C from 0 - 70 °C
Type of protection:	IP 20
Housing:	WRF02, material ABS. Colour white. Connection with 2-pole terminal

Attachable return sensor	Part no.	H42-09917

Used with controller:
Airtronic D/Basic

Sensor:	NTC measured resistance 10 kΩ at 25 °C in 2- wire configuration
Measurement range:	-30 - +105 °C
Tolerance:	± 0.2 °C from 0 - 70 °C
Type of protection:	IP 54
Housing:	ALF4, material PA 6.6 reinforced with glass beads. Colour white. Connection with 2-pole terminal, cable infeed PG9
Dimensions:	65×50×37.5 mm

Attachable thermostat	Part no.	H40-00016

Used with controller:
RTE/D ... TR, MSD ... TR and Airtronic D/Basic

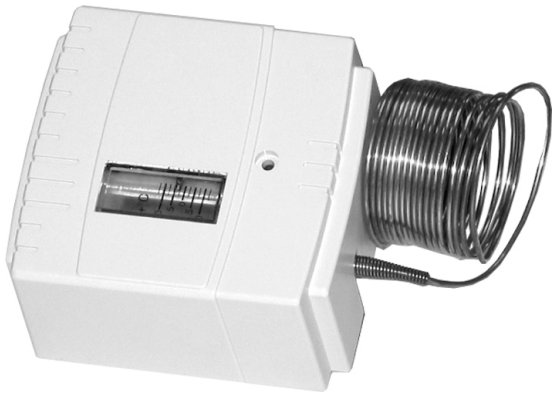
Sensor. Fluid temperature sensor of	CU
Measurement range:	-30 - +105 °C
Type of protection:	IP54
Protection:	8A (230 V~)

Frost protection thermostat — Part no. FST000-0212N

Used with controller:
RTE/D..TR, MSD..TR and Airtronic D/Basic

The frost protection thermostat serves to safeguard hot water heat registers against freezing.
If the adjusted value falls short (+5°C), the contact opens and the corresponding message appears on the controller. (The system's outside air dampers are closed, the circulation pump switched on and the heating valve fully opened.)

Electrical connection:	changeover contact (15 A / 250V)
Type of protection:	IP 40
Setup range:	- 10 to +15°C
Max. sensor temperature:	+200°C
Ambient temperature:	-15...+55°C
Sensor:	gas-filled capillary tube made of Cu (active over the whole length of the tube)
Capillary tube length:	1.8; 3 or 6m
Housing:	Sheet steel galvanised, cover ABS
Accessory:	1 set of mounting clamps (6 pieces)



Design approved by TÜV in accordance with DIN 3440!

Differential pressure monitor — Part no. DDW050-0500N

Used with controller:
RTE/D..TR, MSD..TR and Airtronic D/Basic.

By means of the differential pressure, dirt will be detected in the filter and icing up on the outlet air duct. If the input value is exceeded, a changeover contact will be activated and the corresponding message will appear on the controller.

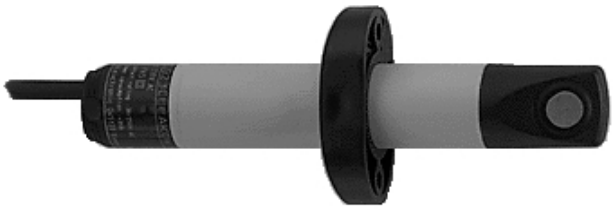
Electrical connection:	changeover contact (1.5 A / 250 V)
Pneumatic connection.:	+(P1) and -(P2)
Setup range:	50 - 500 Pa (0.5 - 5.0 mbar) max. operating excess pres sure 5,000 Pa (50 mbar)
Delivery package:	mounting bracket, 2m PVC hose, rubber grommets, connection pipes and screw terminals

Electronic flow monitor **Part no.** **H42-09905**

Used in controller:
RTE/D..TR, MSD..TR and Airtronic D/Basic.

The electronic air flow monitor serves for the monitoring of the air flow within an air duct system. The air flow monitor is used as a belt drive monitor and also as an air flow monitor with electric air heater (absolutely essential).

Feed voltage:	24 V AC (2m PUR cable ×0.5mm^2)
Power consumption:	3 VA
Setup range:	1 - 10 m/s
Medium temperature:	- 10 - +50 °C
Visual display:	light-emitting diodes LED (start up, operation, fault)
Type of protection:	IP 54
Switch adjustment:	with potentiometer
Output:	relay (opener contact) 3A / 250 V
Delivery package:	mounting clamp, fixing material



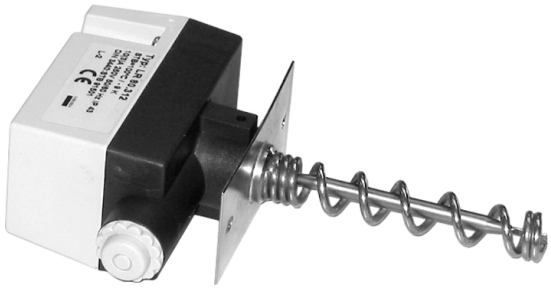
Temperature safety limiter **Part no..:** **H40-00015**

Used with controller:
RTE/D..TR, MSD..TR and Airtronic D/Basic

The safety temperature limiter serves as a temperature monitor/temperature limiter in air duct. Systems that are equipped with an electric heat register and it is absolutely essential in this case.

If the adjusted value is exceeded, the contact opens and the corresponding message appears on the controller. Restart operation is only possible after cooling down by about 20 K by pressing the reset key.

Electrical connection.:	changeover contact (10 A/ 250V)
Setup range:	+75 to +100°C
Max. sensor temp.:	+135°C
Immersion sheath length:	120mm
Type of protection:	IP 43



Design approved by TÜV in accordance with DIN 3440!

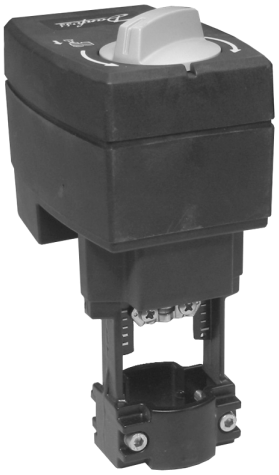
Servo-motor HAME 15 for control valve	Part no.	H81-24010

Used with controller:
RTE/D..TR, MSD..TR, Airtronic D/Basic

The HAME 15 servo motor is used for the HVRG 3-way valves series. It converts feed.

voltage:	24 V AC 50 Hz
Power consumption:	4 VA
Control:	0 - 10 V
Temp. range:	- 10 - +50 °C
Nominal power:	500 N
Nominal stroke:	15 mm
Type of protection:	IP 54
Ambient temperature:	0 - 55 °C
Type of protection:	IP 54

an electrical signal into a stroke motion which operates the 3-way valve rod via a lever mechanism.



Three-way valve HVRG3 in nominal widths of DN15 ...DN50

Used with controller:
RTE/D..TR, MSD..TR and Airtronic D /Basic

The three-way valve is used as a control valve in heating, ventilation and air conditioning systems. Preferably for the following applications:

- Cold water – minimum temperature of 1°C
- Hot water – maximum temperature of 120°C
  Other media (on request)

Nominal pressure: PN 16
Nominal size: DN 15 ... DN 50
Flow characteristic: same percentage (log) kvs/Kvo = 30 (VDI/VDE 2173)
Mixing characteristic: linear
Temperature range: 1 ... 120 °C
Leakage losses: Direction of flow 0.1% Kvs
Mixing direction 1% Kvs
max. operating pressure: 160 kPa (16 bar)

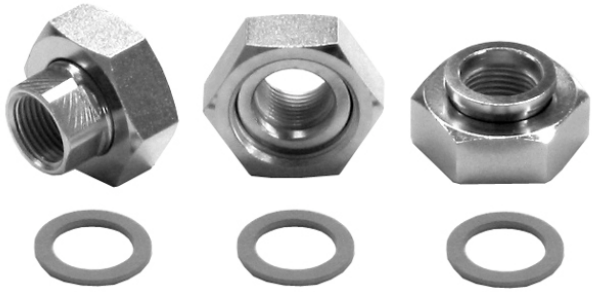
Nominal stroke: 15 mm
Type of protection: IP 54
Ambient temperature: 0 - 55 °C
Type of protection: IP 54

Part no.	**H81-24040 HVRG3 15/4**
Part no.	**H81-24063 HVRG3 20/6.3**
Part no.	**H81-24100 HVRG3 25/10**
Part no.	**H81-24160 HVRG3 32/16**
Part no.	**H81-24250 HVRG3 40/25**
Part no.	**H81-24400 HVRG3 50/40**

Set of nuts for three-way valve HVRG3

The set of nuts consists of 3 specific nuts for a valve.

Part no..:	**Y02-24000 DN15**
Part no.:	**Y02-24001 DN20**
Part no.:	**Y02-24100 DN25**
Part no.:	**Y02-24101 DN32**
Part no.:	**Y02-24200 DN40**
Part no.:	**Y02-24400 DN50**



LCD operator unit — Part no.: H42-00001

Used on controller:
Airtronic D/Basic

The LCD operator unit permits reading off and altering of the functional parameters of the controller. It consists of a keyboard and a display in an enclosure.

Display:	4x20mm (height of characters 5mm) backlit
Keyboard:	5 transparent, lit silicon rubber keys
Colour:	Grey
Dimensions:	297.5 x 107 mm

and is connected with a 6-line telephone cable to the base circuit board via an RJ45 plug.

Base circuit board pCO² medium — Part no.: H42-00007

Used on controller:
Airtronic D

The base circuit board is the core of the Airtronic D controller. It is a freely programmable controller with a double microprocessor that is suitable for numerous applications in the area of air conditioning. The design of the base circuit board allows for an operator unit with a keyboard that is connected via a telephone cable.

Operating voltage:	24V AC 50/60 Hz
Power consumption:	50 VA (base circuit board+operator unit)
Analogue inputs:	9
Digital inputs:	14
Analogue outputs:	6
Digital outputs:	13
Dimensions:	315×110×60 (L×W×H) mm

The connection to the controlling units is made with screw terminals and screw connectors. The base circuit board can operate the controller even without an operator unit being plugged in.

Base circuit board pCO² small **Part no.: H42-00008**

Used with controller:
Airtronic Basic

The base circuit board is the core of the Airtronic Basic regulator. It is a freely programmable controller with a double microprocessor that is suitable for numerous applications in the area of air conditioning. The design of the base circuit board allows for an operator unit with a keyboard that is connected via a telephone cable.

Operating voltage:	24V AC 50/60 Hz
Power consumption:	50 VA (base circuit board+operator unit)
Analogue inputs:	5
Digital inputs:	8
Analogue outputs:	4
Digital outputs:	8
Dimensions:	227.5×110×60 (L×W×H) mm

The connection to the controlling units is made with screw terminals and screw plug connectors. The base circuit board can operate the controller even without an operator unit being connected.

Module controller IR 32 Z **Part no.: H42-00006**

Used with controller:
RTE/D..TR and MSD..TR in combination with electric heat registers.

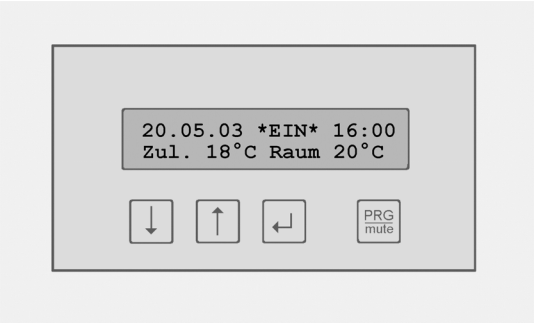
The module controller IR32Z is an electronic temperature controller. It is the core of the control.

Operating voltage:	24V AC 50/60 Hz
Power consumption:	3 VA
Display:	3 indicator places, decimal point and automatic mathematical signs
Digital inputs:	1 pot. free contact, programmable
Digital outputs:	4 pot. free changeover contacts (load 250V / 8A)
Protection:	IP 65 (front part)
Dimensions:	91.5 x 33 x 72mm (WxHxD) Designed for mounting on front of switch box

Control circuit board	Part no.:	H42-00011

Used with controller:
RTE/D..TR and MSD..TR

Operating voltage: 24V AC 50/60 Hz
Power consumption: 3 VA
Display: backlit clear transparent display
Digital inputs:
Digital outputs:
Type of protection: IP 65 (front part)
Dimensions:



Operator station RTE/D..TR; MSD..TR	Part no.:	H42-09916

Used with controller:
RTE/D..TR and MSD..TR

Suitable as a remote operator station for adjusting set points in living rooms, offices etc.
- Changing the room temperature set point with potentiometer
- Changing the operating status (ON/OFF) by switch

No temperature measurement can be taken, so only inlet air control possible
Type of protection: IP 20
Enclosure: WRF02, material ABS,
Dimensions: 84x84x22mm colour white; connection via 4-pole terminal

Master switch

Used with controller:
RTE/D..TR, MSD..TR and Airtronic D/Basic as master switch

- Designed for fitting into switch box

Part no.: **H80-00055** **(5.5kW)**
Part no.: **H80-00110** **(11kW)**
Part no.: **H80-00220** **(22kW)**
Part no.: **H80-00300** **(30kW)**

5-step speed control switch 230 V — Part no..: W11-30000

Used on controller:
RTE/D..TR, MSD..TR
with 230V single-phase setup

- On/Off switching of the system
- Switching the fan's 5 voltage steps
- Designed for fitting into switch box

5-step speed control switch 400 V — Part no.: W11-30001

Used with controller:
RTD..TR, MSD..TR
with 400V three-phase current setup

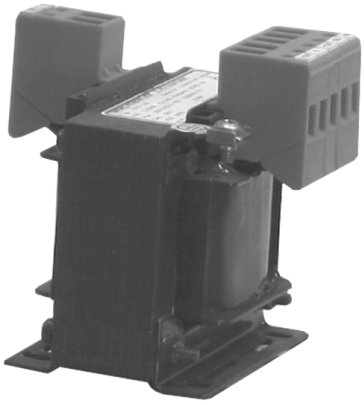
- On/Off switching of the system
- Switching the fan's 5 voltage steps
- Designed for fitting into switch box

Control transformer 24V	Part no.:	W51-23024

Used with controller:
RTE/D..TR, MSD..TR and Airtronic D/Basic

Primary: 230V / 400V AC 50/60 Hz 0.28 / 0.16A
Secondary: 24V , 2.08A

The control transformer is used with all controllers as a transformer for the 24V control voltage



PTC resistor activation device TÜS 100a	Part no..:	H80-10001

Used with controller:
RTE/D..TR, MSD..TR and Airtronic D/Basic as PTC resistor activation device for fitting into the switch box for motors with PTC resistor protection.

- max connection of 6 PTC resistors in series
- Mounting rail assembly

Timer switch **Part no..:** **H42-09900**

Used with controller:
RTE/D..TR, MSD..TR

The electronic timer switch is used for automatic turning on/off of the system.

Measurements (HxWxD)	45 x 36 x 60
Connection:	230 V AC 50/60 Hz
Breaking capacity:	16A/250V AC (load, ohms) 2.5A/250V AC (inductive load)
Switch output:	potential free
Switch contacts:	1 changeover contact (option: 2 changeover contacts)
Running accuracy:	+/- 2.5 sec/day at +20°C
Reserve power type:	Lithium battery
Power reserve:	3 years from leaving factory
Shortest switch time:	1 minute
Programmable:	Every minute
Memory locations:	20
Manual switch:	Automatic/fixed pre-selection On/Off
Switch status indicator:	yes
Summer/ winter time settings:	automatic/freely selectable
Protection class/ type of protection:	IP 20
Assembly:	DIN mounting rail

No.	Function:	Description:
	Fan and motor	
2.1	External rotor 5-step	Fan drive by Rosenberg external rotor motor mounted directly on to the impeller. Manual rotation speed control by transformer in five steps via the step speed control built into the switch box housing.
2.2	External rotor 3-step	Fan drive by Rosenberg external rotor motor mounted directly on to the impeller. Manual rotation speed control by transformer in three steps via the keys of the remote control display of the AB and AD series of appliances.
2.3	Standard motor single speed	Fan drive by single-turn IEC standard motor. ▪ ***Implementation of the function with TR devices*** *Manual switching of the rotation speed 0 /1 with the switch built into the switch box housing.* ▪ ***Implementation of the function with AB and AD devices*** *Manual switching of the rotation speed 0 /1 with the keys of the remote control display, timer switch programs*
2.4	Standard motor 2-step	Fan drive with two-turn IEC standard motor. ▪ ***Implementation of the function with TR devices*** *Manual switching of the rotation speed 0 / 1 / 2 with the switch built into the switch box housing.* ▪ ***Implementation of the function with AB and AD devices*** *Manual switching of the rotation speed 0 / 1/ 2 with the keys of the remote control display, timer switch programs*
2.5	Standard motor 3-step	Fan drive with three-turn IEC standard motor. ▪ ***Implementation of the function with TR devices*** *Manual switching of rotation speed 0 / 1 / 2 / 3 with the switch built into the switch box housing.* ▪ ***Implementation of the function with AB and AD devices*** *Manual switching of rotation speed 0 / 1 / 2 / 3 with the keys of the remote control display, timer switch programs*
2.6	Standard motor continuous	Fan drive by IEC standard motor in combination with a frequency converter. Continuous manual or automatic rotation speed control of the fan with the keys of the remote control display with respectively control functions.
2.7	EC external rotor motor	EC external rotor motor in the setup as a freely rotating wheel or in the single inlet spiral housing. Continuous change of rotation speed with external EC controller in protection type IP 20.
2.8	Smooth start	Smooth start for single speed standard motors from 5.5 kW to 30.0 kW. This function is absolutely essential for motors with greater power of 5.5 kW upwards. The Technischen Anschlußbedingungen (TAB, technical connection conditions) of the responsible energy supplier are to be observed.
2.9	Motor protection with PTC resistor	This series of devices is equipped with a PTC resistor activation device and it thereby permits temperature monitoring of the drive motor with PTC resistors built into the coil.
2.10	Motor protection with thermocontact	This series of devices is designed for motors with thermocontacts built into the coil. With drives using standard motors one should ensure that with a capacity of $\geq$ 2.2 kW upwards, they are not operated with a thermocontact.
2.11	Outlet air fan separately switchable	In this device setup, two five-step switches are mounted in the switch box housing. Thanks to this measure the inlet and outlet air fan can be run at different rotation speeds.
2.12	Air flow monitoring inlet and outlet air	With the help of an electronic flow sensor the air flow is monitored and when it falls below the adjusted limit, an error message is displayed. With fans with belt drive, this function can be used to monitor the belt drive

2.13	Volume of flow display	The current volume flow of the inlet or outlet air fan is shown in the display of the remote control panel. This function is however only possible if the respective fan is equipped with a ring measurement circuit.

	Control	
3.1	Inlet air temperature control incl. temperature sensor	With this type of control the air transported in the inlet air duct is maintained at constant values. If this function is selected, the duct temperature sensor H42-09902 (see accessories) is also supplied.
3.2	Room temperature control with inlet air minimal limiting incl. temperature sensor	With this type of control the room air will be maintained at constant values. If however the outside air introduced falls below the minimum inlet air temperature, this is automatically heated to the preset temperature. This function prevents the creation of unwanted draughts in rooms with additional heating. A requirement of this function is however an installed inlet air temperature sensor. If this function is selected, the room temperature sensor H42-09902 (see appendix) will also be supplied.
3.3	Outlet air temperature control with inlet air minimal limiting incl. temperature sensor	With this type of control the outlet air is maintained at constant values. This type of control is to be used if there is no suitable place for the room thermostat because of the characteristics of the room. If however the introduced outside air falls below the minimum temperature, it will automatically be heated to the preset value. This function prevents the creation of unwanted draughts in rooms with additional heating. A requirement for this function is however an installed inlet air temperature sensor. If this function is selected, the duct temperature sensor H42-09902 (see appendix) will also be supplied.
3.4	Humidification	The Airtronic controller provides a potential-free contact with Start installations. An external humidifier can be controlled with this contact.
3.5	Dew point control	Dehumidification of the outside air drawn in
3.6	Constant pressure control	Control of the pressure of the system at constant values. This function is only possible in combination with a controlled drive (frequency converter/EC controller)
3.7	Constant volume flow control	Constant control of the volume flow of the system. This function is only possible in combination with a controlled drive (frequency converter/EC controller)
3.8	Summer/winter compensation	Raising of the temperature set point on outside temperatures from 25°C. This function reduces the drop in temperature in air conditioned rooms when there are high outside temperatures in the summer and at the same time has a positive effect on people's wellbeing. Outside sensor H42-09914 is also supplied.
	Heat and cold register	
4.1	Heater control 0-10V continuous	Depending on the heating required, the controller sends a 0-10 Volt position signal to the three-way mixing valve or to the rotation speed-controlled pump.
4.2	Cooler control 0-10V continuous	Depending on the cooling required, the controller sends a 0- 10 Volt position signal to the three-way mixing valve or to the rotation speed-controlled pump.
4.3	Reheater control 0-10 V continuous	Depending on the heating required, the controller sends a second 0-10 Volt position signal to the three-way mixing valve or to the rotation speed-controlled pump.
4.4	Heating pump supply (1~230 Volt)	1~230 Volt signal for control of the heating pump circulation
4.5	Cooling pump supply (1~230 Volt)	1~230 Volt signal for control of the cooling pump circulation
4.6	Control of the cooling machine 0-10V continuous	Depending on the cooling required, the controller sends a 0- 10 Volt signal to the cooling machine.
4.7	Release of cooling machine On-Off	Release of cooling machine, potential-free contact

4.8	Frost protection monitoring with frost protection thermostat or attached thermostat	The thermostat attached to the hot water heat register opens if the temperature falls below the frost protection temperature. The controller then sets off a chain of events that should prevent the freezing of the hot water heat register. This safety function is also active if controllers are switched off.
4.9	Frost protection monitoring with outside sensor	Frost protection monitoring with a return sensor, if the frost protection temperature is reached, the three-way mixing valve is activated so as to prevent the icing up of the hot water register. Hence a frost protection alarm. Return sensor part no.: H42-09917
4.10	Electric air heater up to 4-step with temperature protection limitation and air flow monitoring	Electric air heater up to 4-step with temperature safety limiter and electronic air flow monitoring. With the use of electric air heaters the relevant applicable technical connection conditions of the energy supplier should be observed.
4.11	Heating pump fault	Fault report indication, heating pump ▪ ***Implementation of the function with AB and AD devices*** *Written indication on the remote control display and recording of the fault report in the fault memory.*
4.12	Cooling pump fault	Fault report indication, cooling pump ▪ ***Implementation of the function with AB and AD devices*** *Written indication on the remote control display and recording of the fault report in the fault memory.*
	Heat recycling	
5.1	Bypass damper heat recycling manual summer/winter operation (plate heat exchanger)	Manual switching of the bypass damper (Open/Closed) by a toggle switch on the switch box housing of the control appliance. Only in combination with a plate heat exchanger.
5.2	Bypass damper heat recycling automatic (plate heat exchanger)	Continuous control of the bypass damper by a 0-10 Volt signal at the controller output. Only in combination with a plate heat exchanger.
5.3	Control heat recycling 0-10 Volt continuous, automatic (circulation loop system)	Continuous control of the three-way mixing valve in the cooling medium circuit of the circulation loop system (recovery heat recycling)
5.4	Control heat recycling 0-10 Volt continuous, automatic (rotor)	Continuous control of the rotary heat exchanger by a 0-10 Volt signal.
5.5	Icing up monitoring	Icing up is indicated by a signal light on the switch box housing of the controller. With the icing up monitoring function, no other routines specific to the system are carried out.
5.6	KVS Pump supply (1~230 Volt)	1~230 Volt signal for the control of the pump circulation in the KVS system.
5.7	Pump fault (KVS)	Written indication on the remote control display and registration of the fault report in the fault memory.

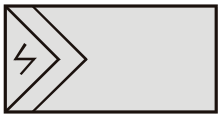
	Filter and dampers/valves	
6.1	Filter monitoring	Fault report indication filter monitoring ▪ ***Implementation of the function with TR devices*** *Signal light on the switch box housing of the control device* ▪ ***Implementation of the function with AB and AD devices*** *Written indication on the remote control display.*
6.2	Inlet and outlet air damper Open – Closed	Control of the inlet and outlet air damper (Open - Closed).
6.3	Mixed air damper manual	Control of the mixed air shutter Open /Closed. Manual continuous control of the outlet air damper with a potentiometer on the switch box housing of the control instrument.
6.4	Mixed air damper automatic	Continuous control of the mixed air damper (requirement is a continuous servo- motor)
	Miscellaneous	
7.1	Timer switch with weekly program (On/Off with different rotation speed & set point)	Time-controlled set point default by the timer switch contained in the Airtronic. The following set points can be input: - Inlet temperature/room temperature - Fan speeds - Four different daily programs - On the interlocking of a corresponding
7.2	Timer switch with annual program	The controller can be switched On and Off by the appropriate timer switch.
7.3	Timer switch with weekly program (only On/Off)	On the interlocking of a corresponding timer switch the controller can be switched On and Off .
7.4	Operator console with 4-line LCD display for control and monitoring	Operator console on the front plate of the switch box Operator console supplied loose incl. cable
7.5	Common alarm	If a fault appears, switching is done by a potential-free changeover contact.
7.6	Fire and flame alarm (fire protection dampers)	Input 24 V; if a 24 Volt signal is switched off, the system is switched off. Servo-motors are stopped, the lawred dampers..
7.7	Alarm memory of the last 10 alarm messages	The last 10 fault messages can be called up in writing on the remote control display.
7.8	Connection for standard printer for regular monitoring	
7.9	External On – Off for control	External systems release by a 24 Volt signal
	Remote control On/Off + set point alteration via potentiometer	
8.0	Remote control On/Off + set point alteration via potentiometer	With the operator station H42-09916, the RTE/D or MSD...TR controller can be switched On or Off. At the same time it is possible to adjust the set point temperature with this operator station. This function is not necessary with the Airtronic D and Basic devices since these functions are covered by the LCD operator unit.
8.1	MOD bus	Connection of the Airtronic D and Basic devices via a MOD bus. With this setup several installations can be interconnected.
8.2	LON bus	Connection of the Airtronic D and Basic devices via a LON bus. With this setup several installations can be interconnected.

Electronic controllers

This symbol represents the electronic controllers of the Rosenberg manufacturing series

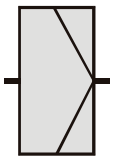
- Module controller (see Page 8)
- Airtronic B (see Page 10)
- Airtronic C (see Page 12)

Depending on the type of controller selected, the above-mentioned control components are built into the switch box.



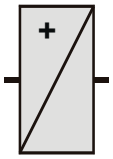
Filter

Air filters are devices and components for air treatment with which dirt can be filtered out of the air. The grouping is made by class of filter.



Heater (air heater)

Air heaters consist of ribbed pipes placed beside and in front of each other that are welded at both ends to common collection chambers. The air flows across the pipes between the ribs. Water is used as the heating medium. A heater that consists of only one row of pipes located beside each other is called a single-row heater. If the heat output of a single-row heater is insufficient, then two or three or more rows of heater are placed one behind the other.



Coolers (air coolers)

The air coolers correspond exactly to the same design as the air heaters for water pump operation. In principle one can also use a heat exchanger intended for air heating in a hot water pump heater for the cooling of the air by passing cold water instead of hot water through the pipes.

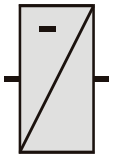
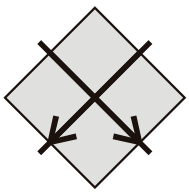


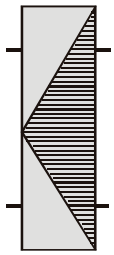
Plate heat exchanger

In a plate heat exchanger, the air flows are passed through thin plates e.g. of aluminium, plastic etc. that are separated from each other. The two air flows are passed between the plates crossing to each other. There is no mixing of air and no transfer of humidity.



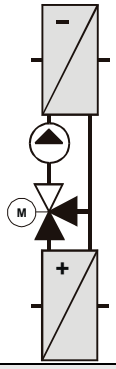
Rotary heat exchanger

Exhaust air flows through a slowly-rotating store in one direction and outlet air flows through in the other. A warm air current and a cold one flow in alternating fashion through the storage body. Tangible heat and humidity are both exchanged.



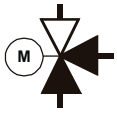
Circulation loop system (KVS)

In the outlet air duct is a built-in heat exchanger that transfers the heat of the outlet air to a circulating water/glycol mixture. This heat is then used to heat outside air. Especially suitable for the improvement of existing installations the connection of spatially separated air as well as ducts.



Three-way valve

The three-way valve is the actuator between the heat generator and the heating devices of hydraulic systems. It is used to control the mass flow of the heat-carrying medium.



Circulation pump

Supply of the heat-carrying medium by pumps running forwards or backwards.

Temperature sensor

For measurement of inlet, outlet and room temperature.

Pressure differential sensor

The dirtiness of a filter is monitored by a differential pressure switch. If the pressure differential is exceeded, the "Filter dirty" warning light adjusted in the switch device lights up . There are no other control functions.

		Explanation:
RLT	**Technical room air systems**	RLT's have the task of keeping the condition of the room air within certain limits with regard to purity, temperature and humidity.
DDC	**Direct Digital Control**	With DDC control the control parameters can be freely programmed. In contrast to conventional switch box wiring, these systems can be altered or adjusted without the use of additional cabling.
GLT	**Building management systems**	DDC driving or control of RLT systems enables direct digital connection with central control systems. If several such systems are centrally combined in one building one speaks of building management systems.
WRG	**Heat recycling**	
PWT	**Plate heat exchanger**	Here we are dealing with an exchanger in which the air flows are passed through thin plates separated from each other. The two flows are passed between the plates across each other. No mixing of air and no transfer of humidity takes place.
RWT	**Rotary heat exchanger**	Exhaust air flows through a slowly-rotating store in one direction and outlet air flows in the other. A warm air current and a cold one flow in alternating fashion through the storage body. Tangible heat and humidity are both exchanged
KVS	**Circulation loop system**	Heat recycling with circulating fluid heat carrying medium. The outlet air heat is transferred to circulating water by a heat exchanger in the outlet air duct. This heat is then used to heat the outside air. Particularly suitable for improving existing systems.
LWT	**Blade heat exchanger**	Blade heat exchangers consist of ribbed pipes placed beside and in front of each other. The air flows across the pipes between the ribs, the most commonly used heating medium in the pipes being water. A radiator that consists of only one row of pipes next to each other is known as a single heat exchanger (radiator).
PWW	**Hot water pump**	
PKW	**Cold water pump**	
DV	**Direct vaporiser**	
STB	**Temperature safety limiter**	
BSK	**Fire protection shutter**	
EVU	**Energy supplier**	
TAB	**Technical connection conditions**	
TK	**Thermocontact**	
KL	**PTC resistor**	