

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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Safety and guarantee 4

Rosenberg system control 5

Technical room air installations 5

Classification of technical room air installations 5

The catalogue 5

Procedure for the design of a control system 6

What is included in the delivery package 6

Switch box and housing dimensions 7

Description of the controller / TR devices 8

Description of the controller / Airtronic Basic 10

Controller description / Airtronic D 12

Block circuit diagram 1: Air inlet device heating PWW 14

Block circuit diagram 2: Air inlet device heating PWW; Cooling PKW 16

Block circuit diagram 3: Inlet and outlet air device heating PWW 18

Block circuit diagram 4: Inlet and outlet air device heating PWW; cooling PKW 20

Block circuit diagram 5: Inlet and outlet air device heating PWW; WRG (plate heat exchanger) 22

Block circuit diagram 6: Inlet and outlet air device heating PWW; cooling PKW; WRG (plate heat exchanger) 24

Block circuit diagram 7: Inlet and outlet air device heating PWW; WRG (circulation loop system (KVS)) 26

Block circuit diagram 8: Inlet and outlet air device heating PWW; cooling PKW; WRG (circulation loop system (KVS)) 28

Block circuit diagram 9: Inlet and outlet air device heating PWW; WRG (rotary heat exchanger) 30

Block circuit diagram 10: Inlet and outlet air device heating PWW; cooling PKW; WRG 32

Three-way valve manufacturer's series HVRG 3 34

Damper actuators 36

Accessories 38

Description of the technical ventilation functions 50

Description of the symbols (block circuit diagrams 1 - 10) 54

Key to abbreviations 56

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.

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.

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.

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.

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.

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 controller 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.

- 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 \pm 10% 50/60 Hz, Output 3VA

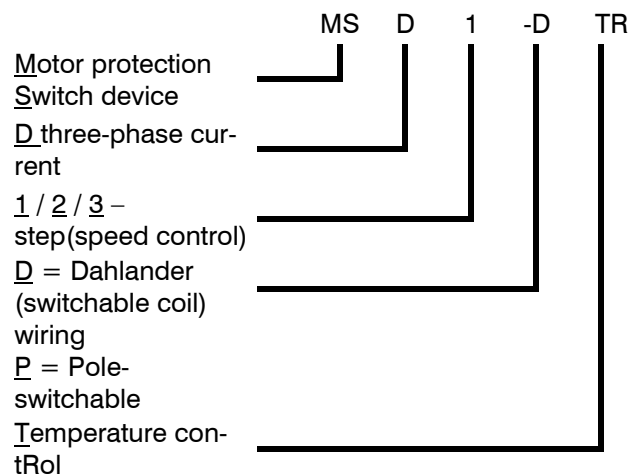
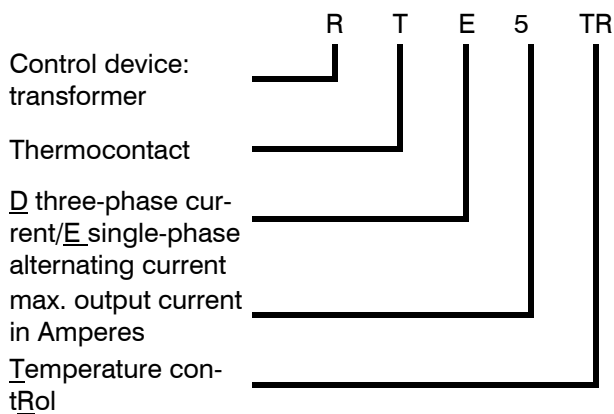
If two temperature sensors are connected to the control circuit board, the temperature indication can be switched between the two actual temperature values. Adjustments to the closed loop controlled systems can be made at the module controller.

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.

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

<p>Temperature control</p> <ul style="list-style-type: none"> ▪ 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)
<p>Timer switch (optional)</p> <ul style="list-style-type: none"> ▪ with weekly/annual program can be set: ON/OFF
<p>Monitoring functions</p> <ul style="list-style-type: none"> ▪ 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

<p>Cascade control</p> <ul style="list-style-type: none"> ▪ 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
<p>Fan control</p> <p>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</p>
<p>Operation</p> <p>User-friendly operation with written display.</p>
<p>Ventilation functions</p>

Rosenberg – service package

<p>Switch box</p> <p>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.</p>
<p>Control circuit board</p> <p>preset, sensors, control valves and other peripherals are delivered loose with it.</p>

In manufacture

<p>Services in manufacturing</p> <p>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</p>

Description of the controllers / Airtronic Basic

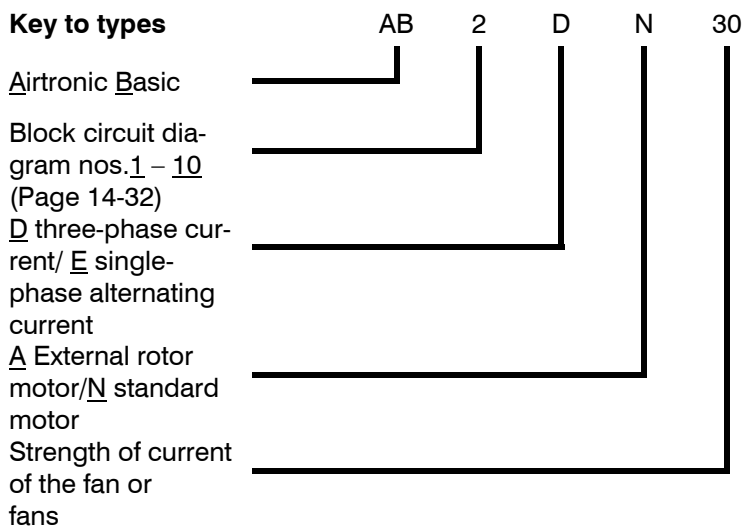
Airtronic Basic controllers have been specially designed for the control of Rosenberg housed instruments and they represent optimum comfort and safety in operation, monitoring and service of the system. The most up-to-date DDC technology is used. Amongst the advantages of this technology, the option 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
<ul style="list-style-type: none"> ▪ 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
<ul style="list-style-type: none"> ▪ 4 switch times per day can be set: temperature and fan level
Monitoring functions
<ul style="list-style-type: none"> ▪ 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
<ul style="list-style-type: none"> ▪ 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
<ul style="list-style-type: none"> ▪ 3-step speed control with direct drive (external rotor motor) ▪ Single speed with belt drive
Operation
<p>User-friendly operation with 4-line LCD display LCD operator console as a remote display</p>
Ventilation functions
<ul style="list-style-type: none"> ▪ Supported heating operation ▪ Supported cooling operation ▪ Night ventilation function ▪ Through ventilation function

Rosenberg service package

Switch box
<p>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.</p>
DDC compact regulator
<p>Wired and preset in accordance with block circuit diagram (pp.14 - 34), assembled. Sensors, control valves and other peripherals are supplied loose with them.</p>

In manufacture

Manufacturing services
<p>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</p>

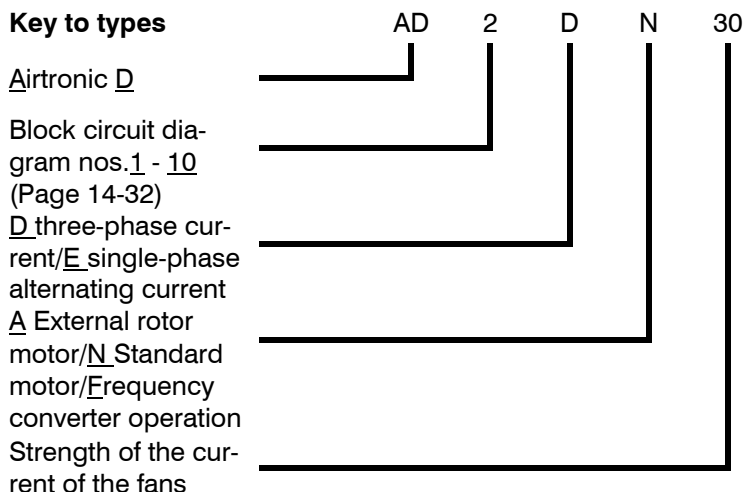
Controller description / Airtronic D

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



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 speed: 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 <ul style="list-style-type: none"> ▪ 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 <ul style="list-style-type: none"> ▪ 4 switch times per day can be input: Temperature and air level
Monitoring functions <ul style="list-style-type: none"> ▪ 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

Rosenberg service-package

Switch box <p>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.</p>
DDC compact controller <p>Wired and preset in accordance with block circuit diagram (pp.14 - 34) assembled. Sensors, control valves and other peripherals are supplied loose.</p>

Cascade control <ul style="list-style-type: none"> ▪ 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 <ul style="list-style-type: none"> ▪ 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 <ul style="list-style-type: none"> ▪ User-friendly operation with 4-line LCD display ▪ LCD operator console as a remote display or switch box insertion
Ventilation functions <ul style="list-style-type: none"> ▪ Supported heating operation ▪ Supported cooling operation ▪ Night ventilation function ▪ Through ventilation function

In manufacturing

Manufacturing services <p>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</p>
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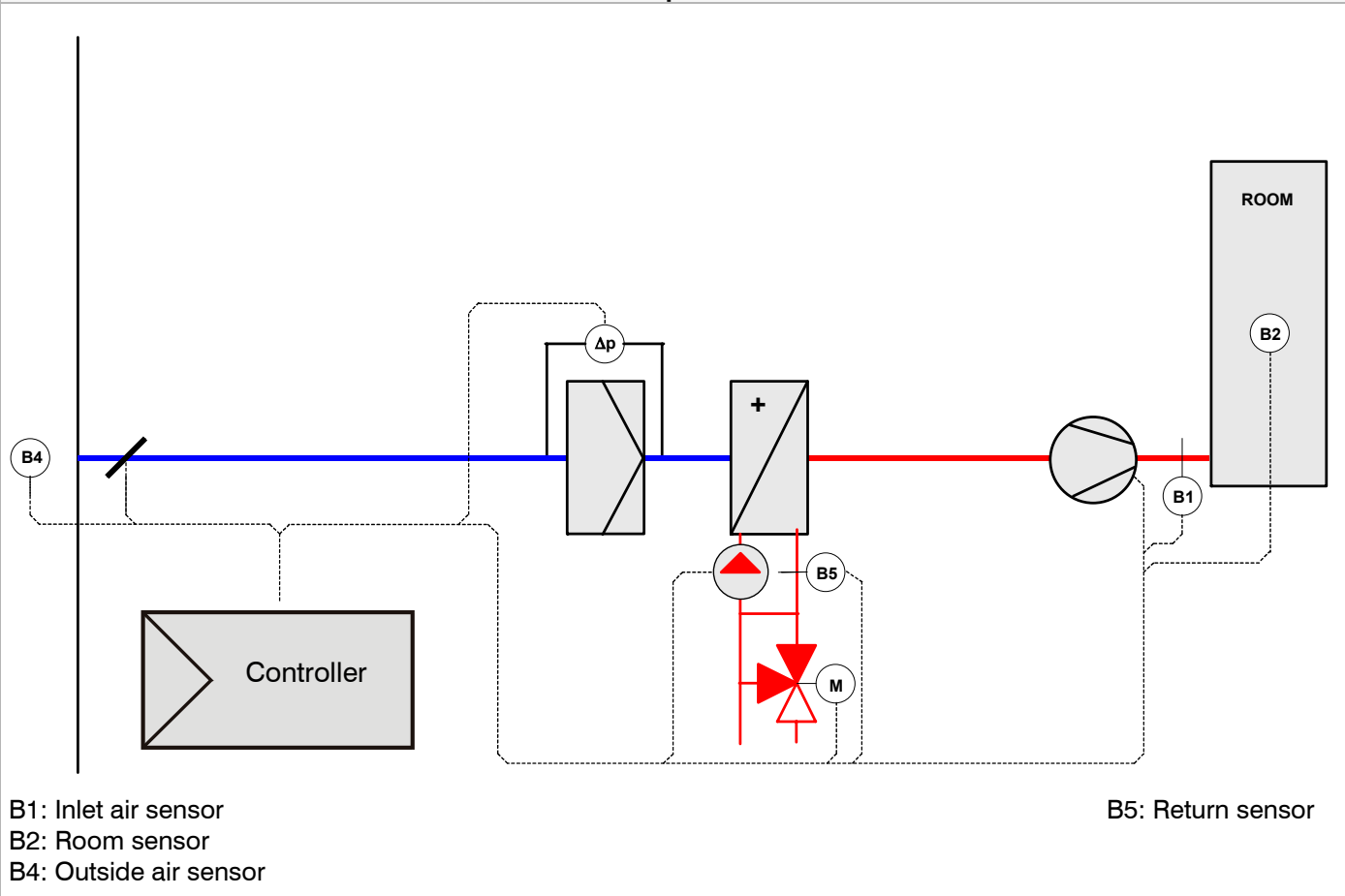
Inlet air device

Heating, with hot water pump

1

switch box, options:

- Inlet air temperature control
- Room temperature control



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:

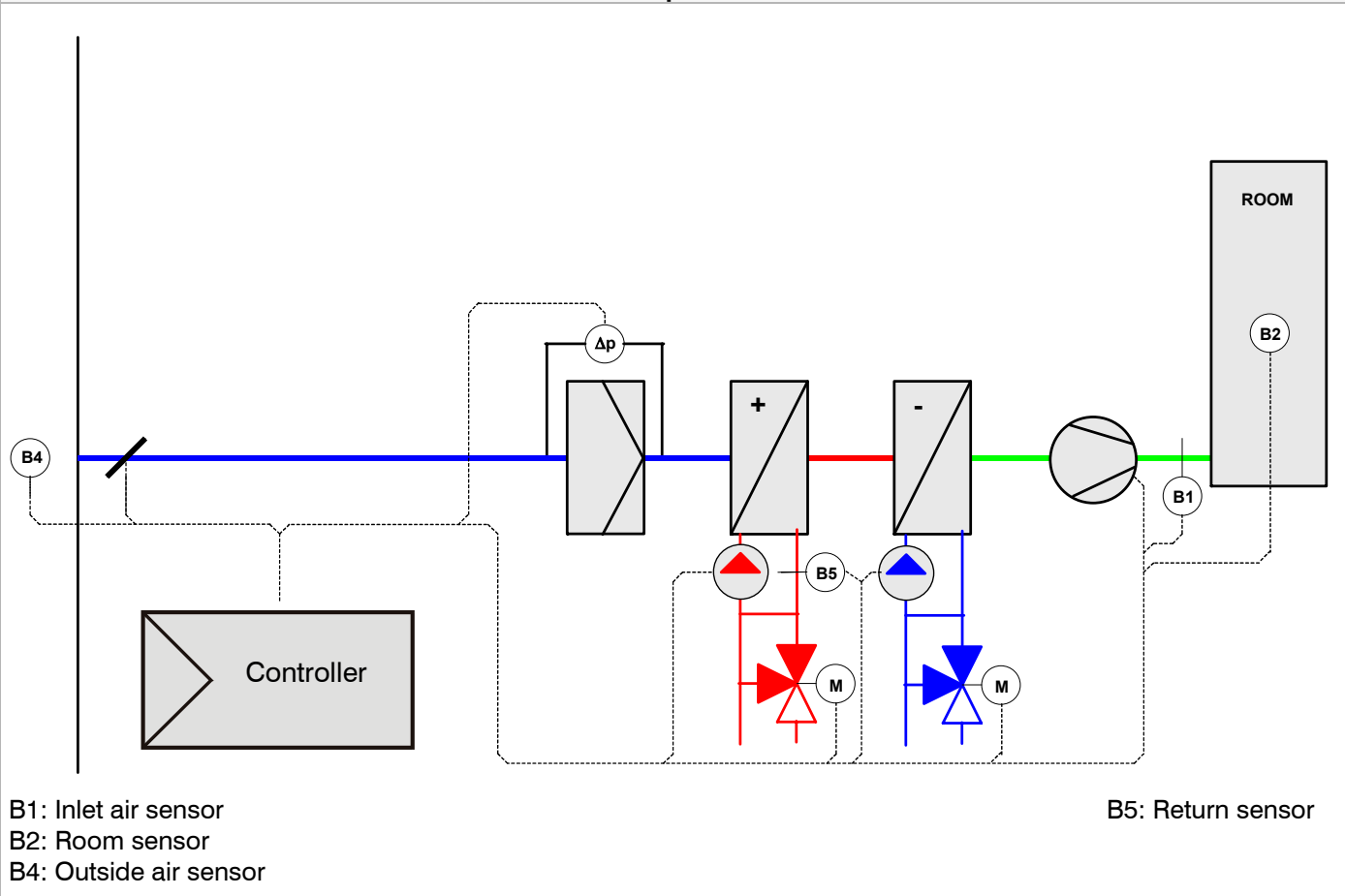
The temperature measured by the inlet air sensor B1, room sensor B2 or outlet air sensor B3 is compared by the controller with the adjusted set point. In the event of a deviation, the controller displaces the heating valve.

Function	description	TR	A B	A D
1.	Switch box for inlet air device			
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.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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

Inlet air device
Heating with hot water pump; cooling with cold water pump **2**

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



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.

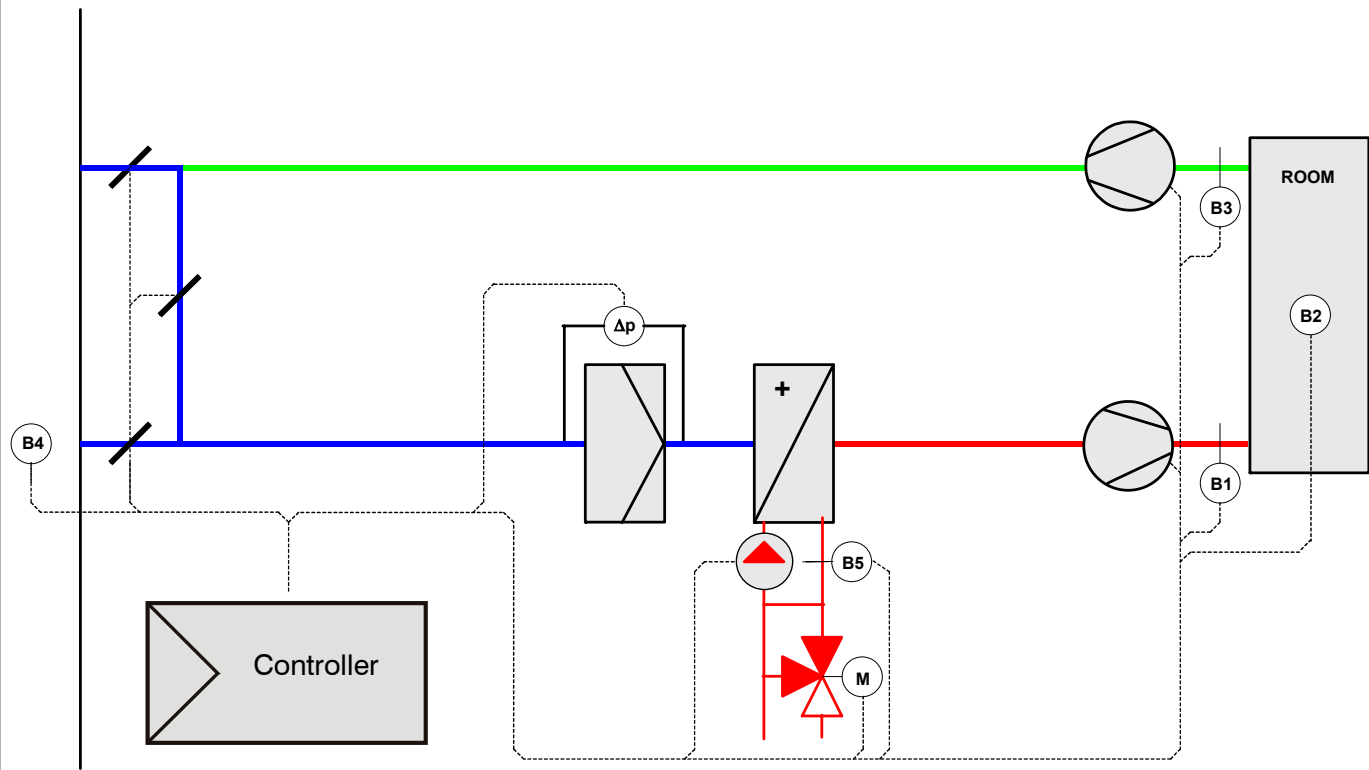
Function	description	TR	A B	A D
1.	Switch box for the inlet air device			
1.1	Switch box for the operation of an inlet air device, sheet steel housing, type of protection IP54, powder coating RAL 7032 (pebble grey), protection, fuses etc. on mounting plate with wiring channels, compact DDC controller,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

**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	TR	A B	A D
1.	Switch box for inlet and outlet air device			
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.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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

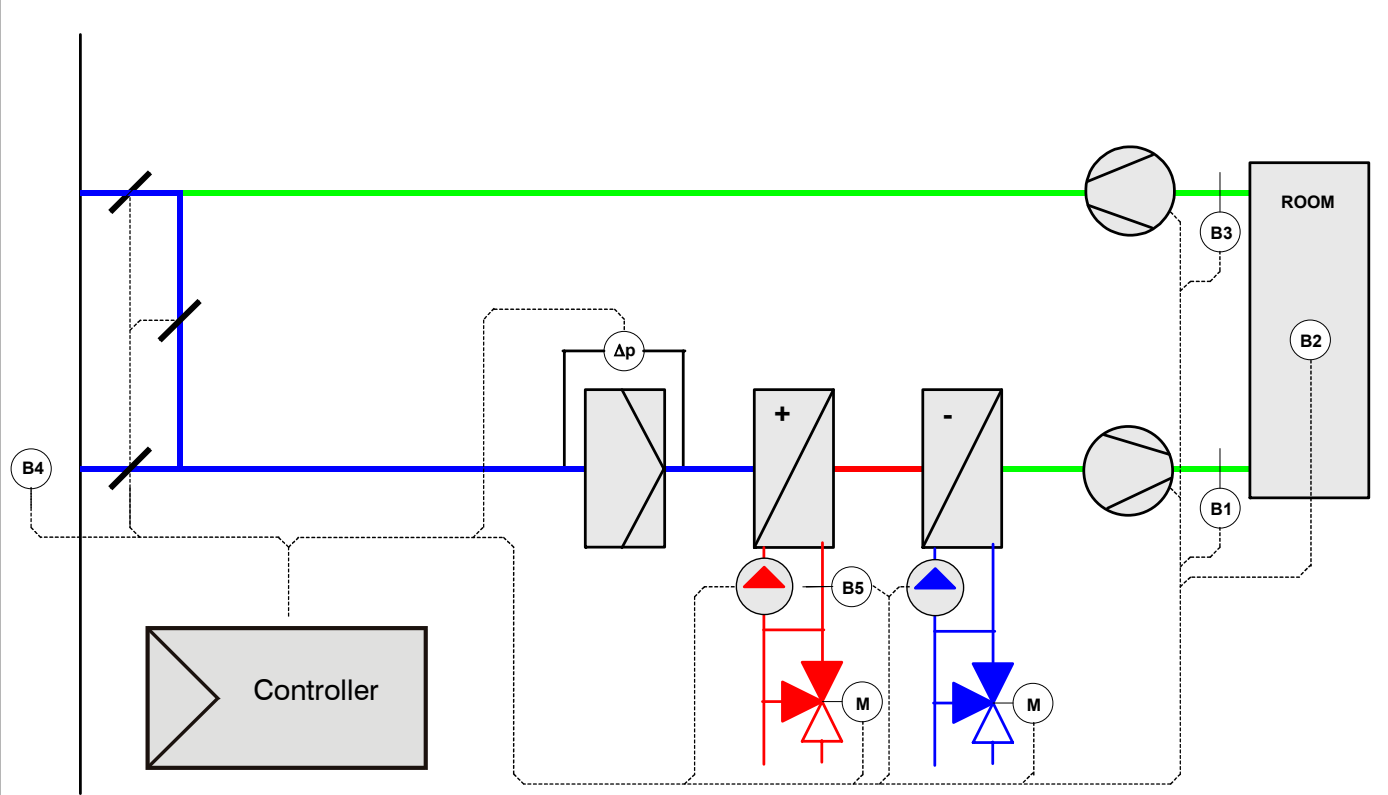
Inlet and outlet air device

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	TR	A B	A D
1.	Switch box for inlet and outlet air device			
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.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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

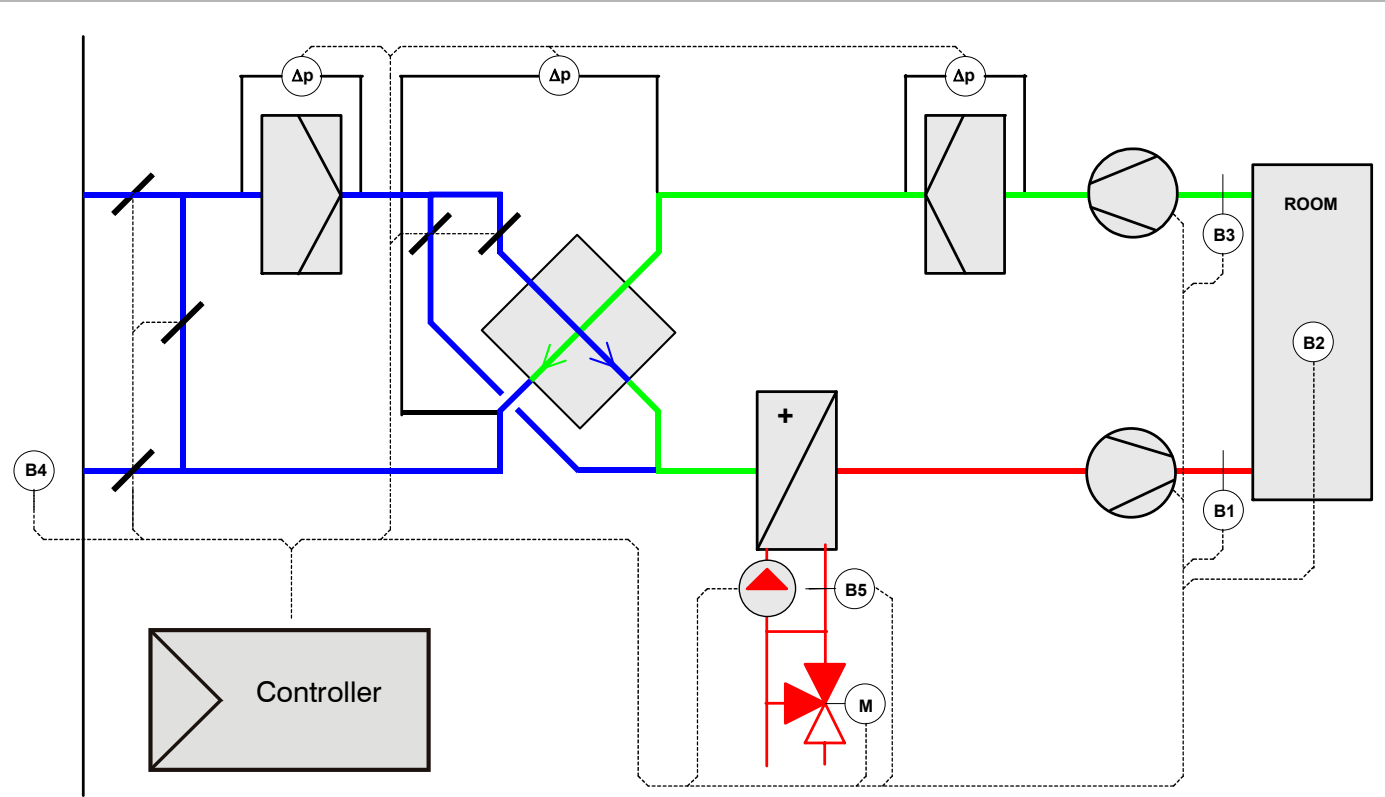
Inlet and outlet air device

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	TR	A B	A D
1.	Switch box for inlet and outlet air device			
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.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

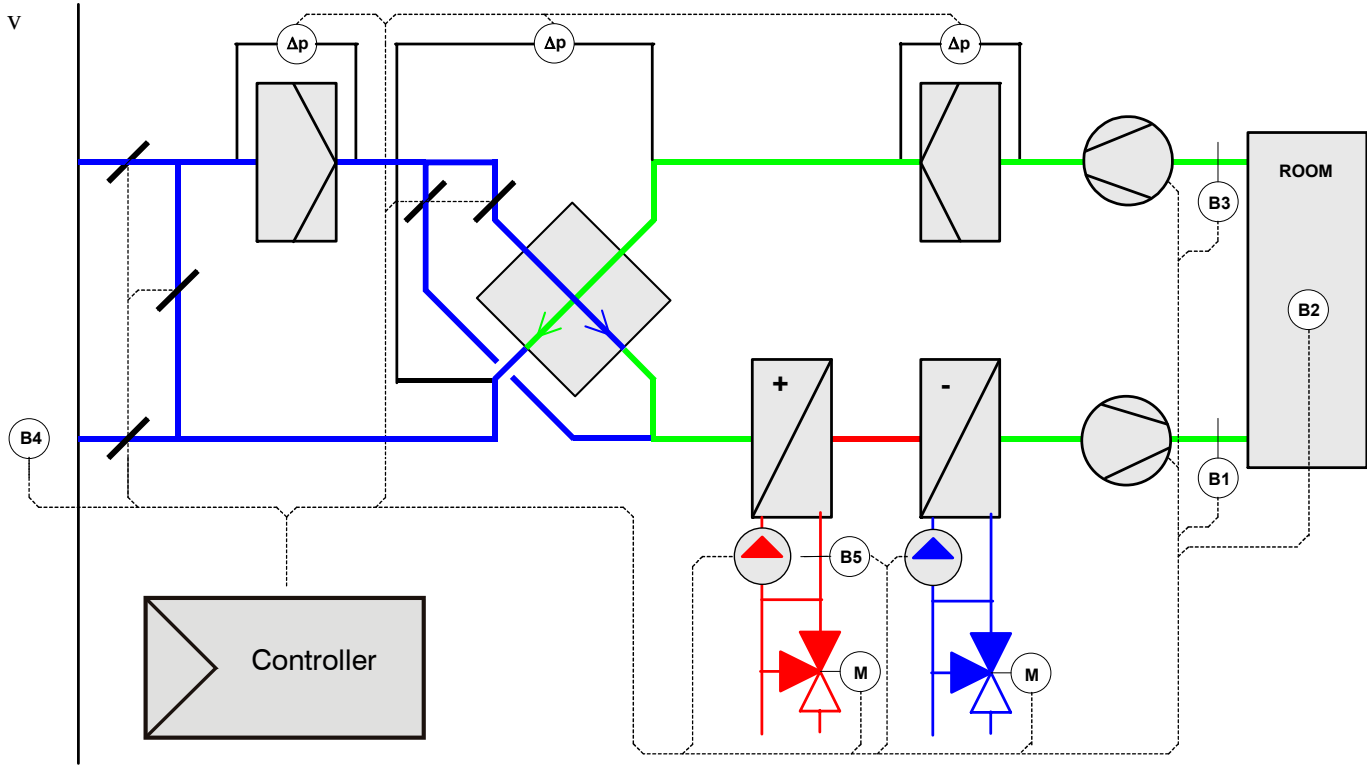
2.	Fan & motor				TR	A B	A D
2.1	- External rotor 5-step speed control				<input type="checkbox"/>		<input type="checkbox"/>
2.2	- External rotor 3-step speed control					<input type="checkbox"/>	<input type="checkbox"/>
2.3	- Standard motor single step	<input type="checkbox"/> 230 V alternating current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

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	TR	A B	A D
1.	Switch box for inlet and outlet air device			
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.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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

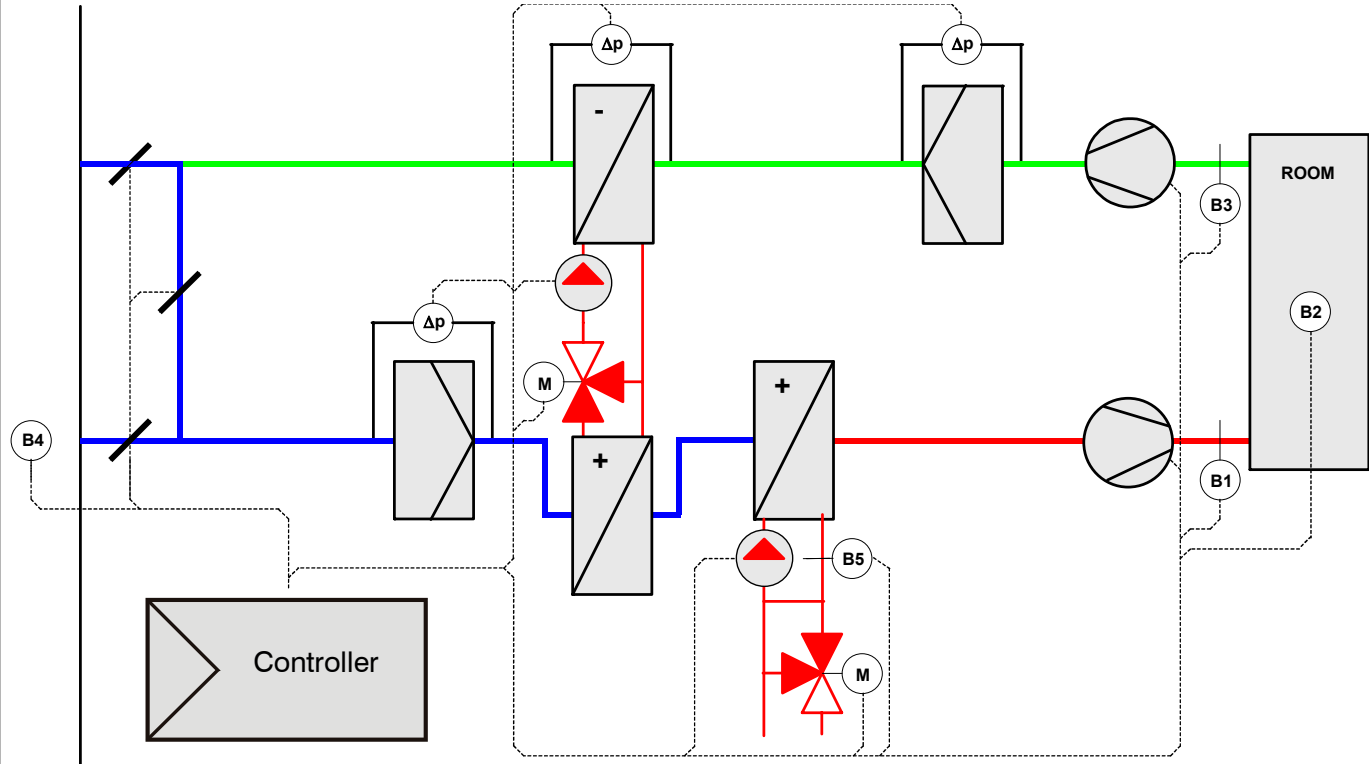
Inlet and outlet air device

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.

In addition

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 insufficient to achieve the desired temperature, the heating valve is opened 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.		<input type="checkbox"/>	<input type="checkbox"/>

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

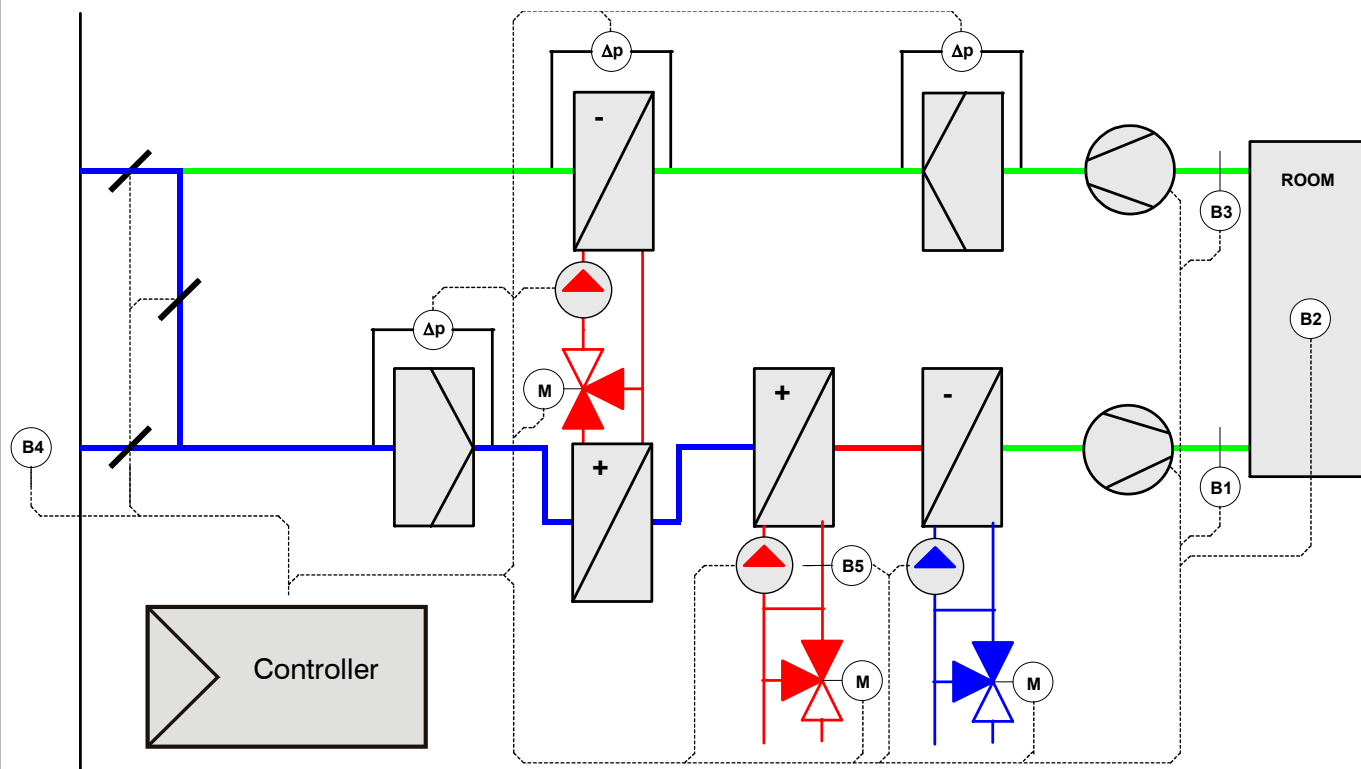
Inlet and outlet air device

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.		<input type="checkbox"/>	<input type="checkbox"/>

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

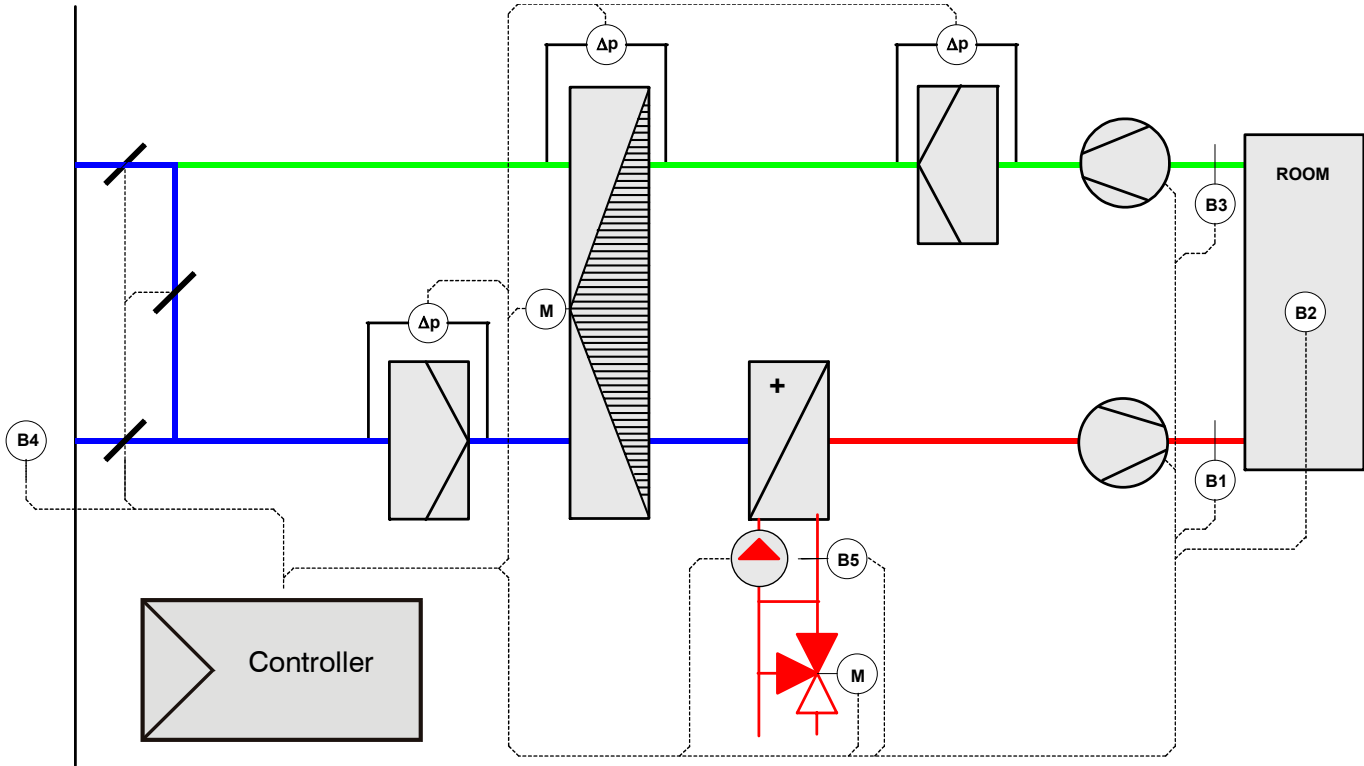
Inlet and outlet air device

9

Hot water pump heating & heat recycling (rotary heat exchanger)

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	TR	A B	A D
1.	Switch box for inlet and outlet air device			
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.		<input type="checkbox"/>	<input type="checkbox"/>

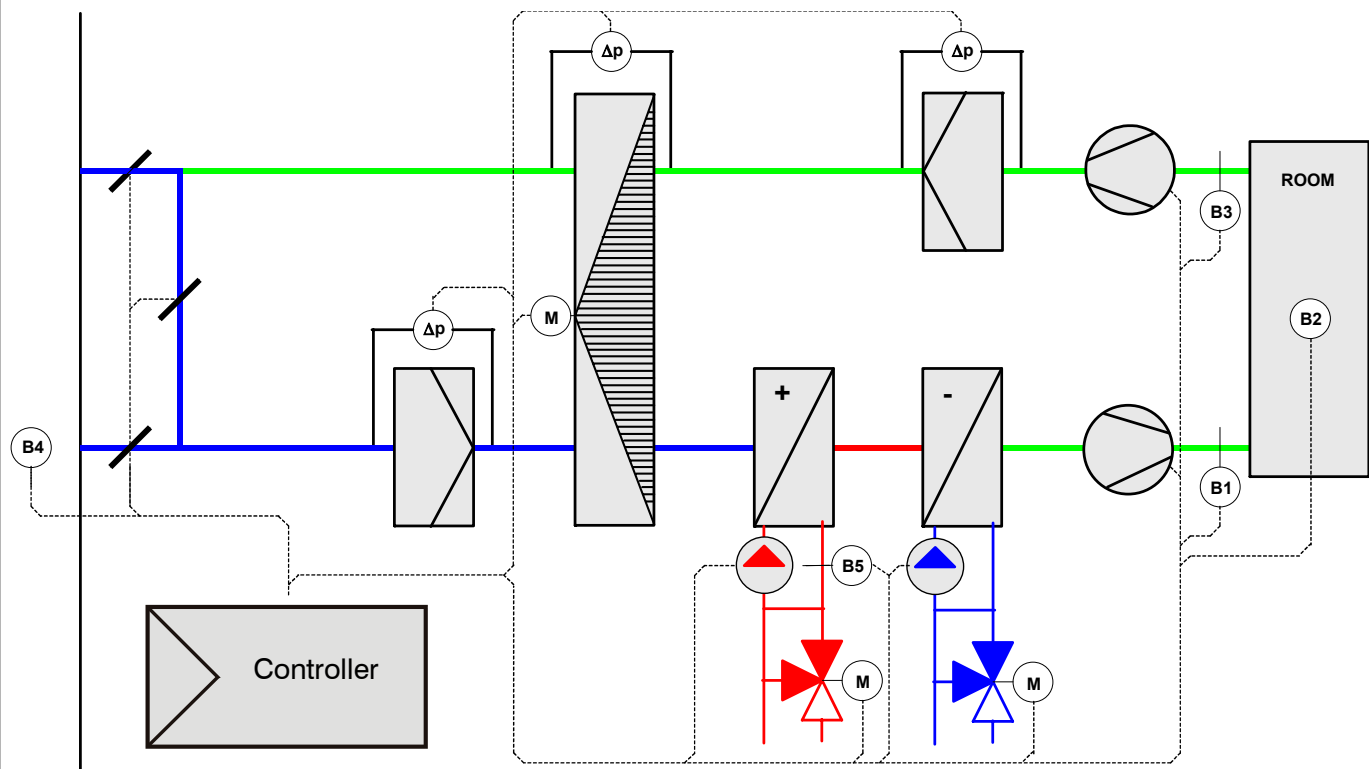
2.	Fan & motor				TR	A B	A D	
2.1	- External rotor 5-step speed control	<input type="checkbox"/> 230 V alternating current <input type="checkbox"/> 400 V three-phase current Motor capacity Inlet air: P _{mot} = kW Outlet air: P _{mot} = kW Motor current (only frequency converters) Inlet air: I _{mot}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

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.

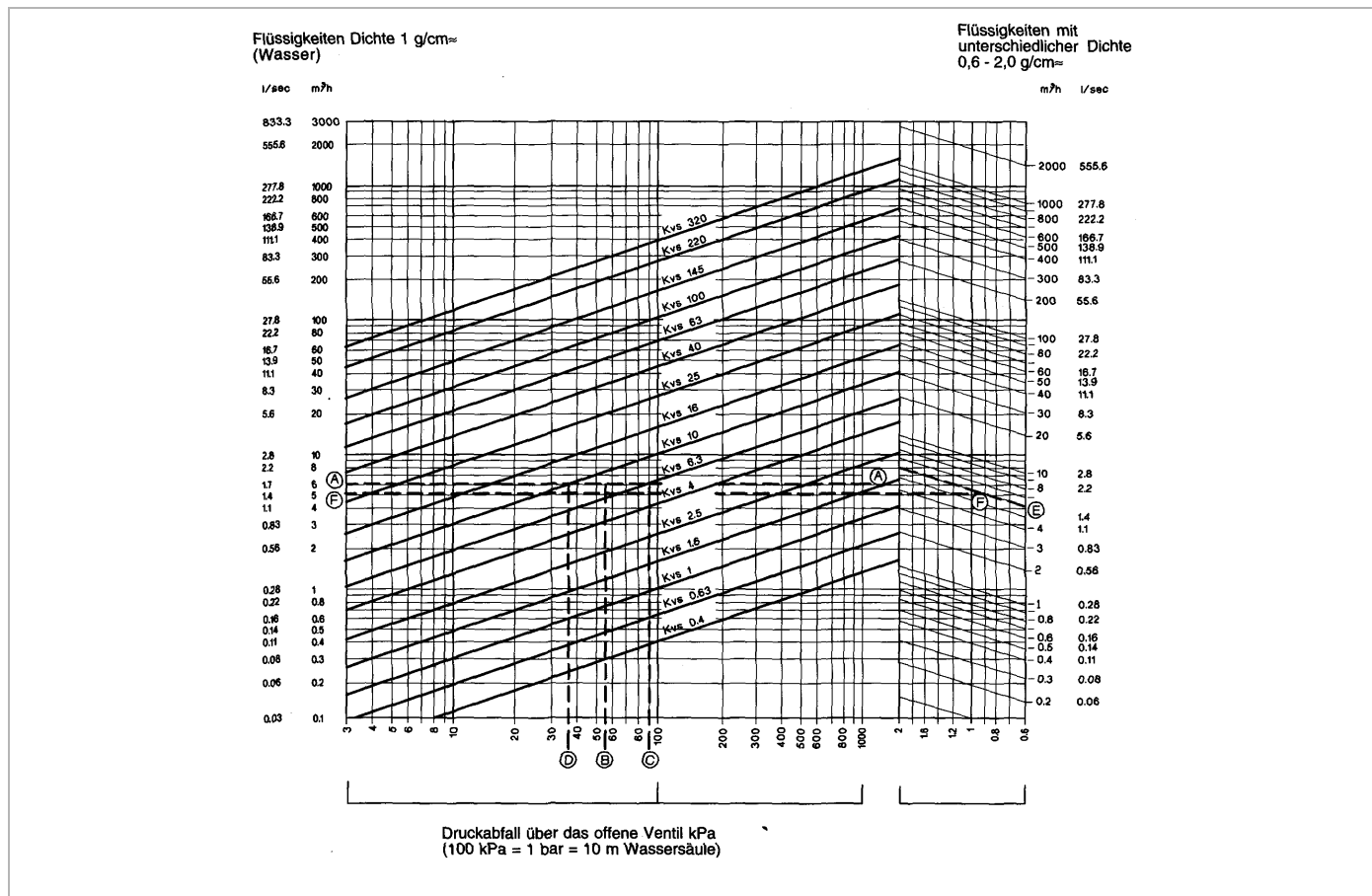
Function	description	TR	A B	A D
1.	Switch box for inlet and outlet air device			
1.1	Switch box for the operation of an inlet and outlet air device, sheet steel housing, type of protection IP54, powder coating RAL 7032 (pebble grey), protection, fuses etc. on mounting plate with wiring channels, compact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

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

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.
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 /	20/6.3	
60	A20-10R / S40-10R		
70	K40-13F	25/10	
80			
90	S40-10Q, ECP-10Q, A20-10Q		
100	A20-13R, S40-13R	32/16	
110			
120	A20-13Q		
130			
140	S40-13Q	40/25	
150			
170	S40-16R		
190			
210	S40-16Q		50/40
230			
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

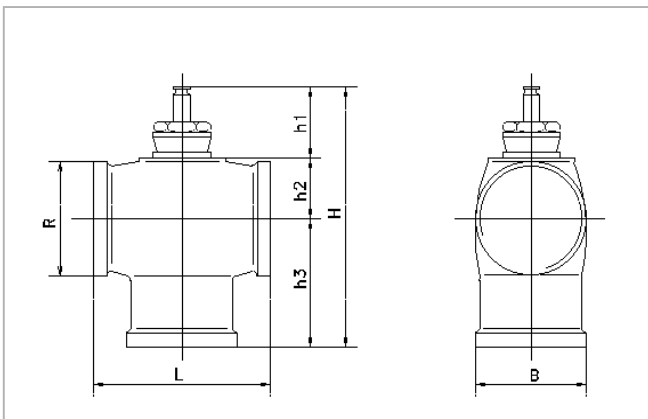
The 1st value in the valve reference gives the size of the outer thread collar in accordance with ISO 228/1. The 2nd number represents the kvs value. The kvs value is defined as the

volume flow of a fluid with the density $\rho_0 = 1,000 \text{ kg/m}^3$ (density of water) with a pressure loss of $\Delta p_0 = 1 \text{ bar (100 kPa)}$ at the valve.

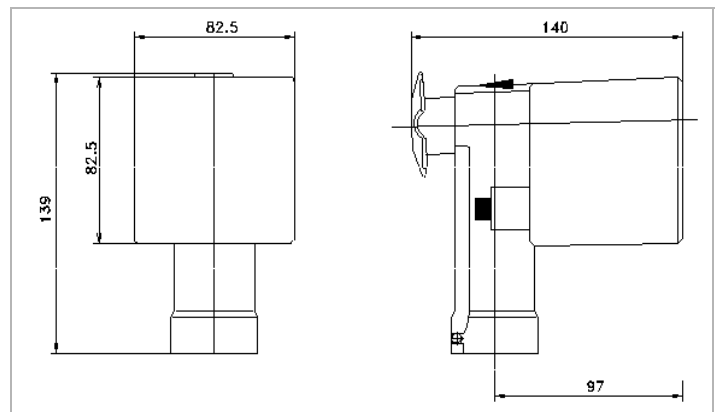
Dimensions

Valve type	DN	R	L [mm]	H [mm]	W [mm]	h1 [mm]	h2 [mm]	h3 [mm]	$\Delta p \text{ max. total [bar]}$
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; 6m²)

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

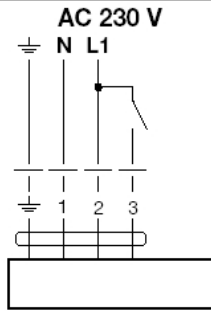
Mixed air damper = continuous actuator

Bypass damper = continuous actuator

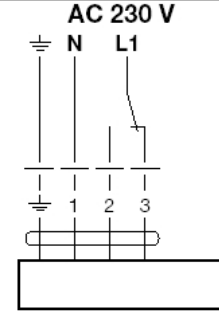
Type	Part no.	Power	Torque	Function	Damper	Circuit diagram
LM24	SMB024-0403N	24 V AC/DC	4 Nm	Open/Closed	0.8 m ²	1
LM230	SMB230-0402N	230 V AC	4 Nm	Open/Closed	0.8 m ²	1
LM24SR	SMB024-0401N	24 V AC/DC	4 Nm	Continuous	0.8 m ²	4
LF24	SMB024-0402F	24 V AC/DC	4 Nm	Open/Closed (spring return)	0.8 m ²	3
LF230	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
Antriebsleistung	4 Nm	8 Nm	15 Nm	18 Nm	30 Nm	4 Nm	15 Nm
Sicherheitsfunktion	—	—	—	—	—		
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

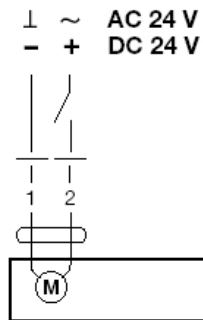
Circuit diagram 1



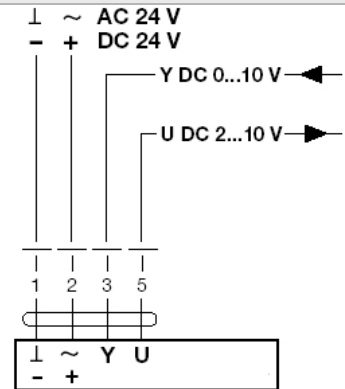
Circuit diagram 2



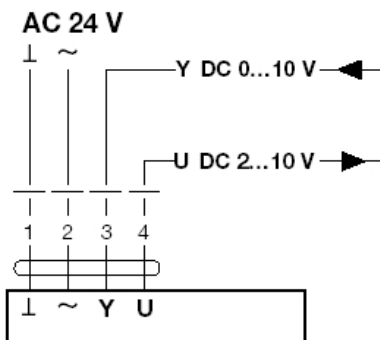
Circuit diagram 3



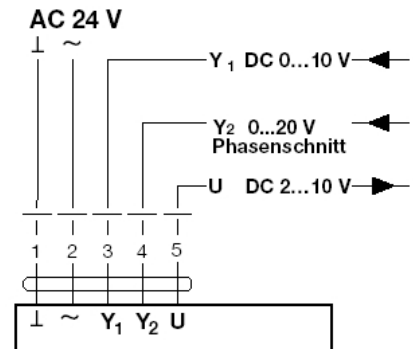
Circuit diagram 4



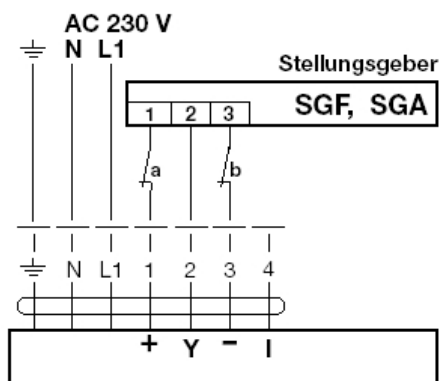
Circuit diagram 5

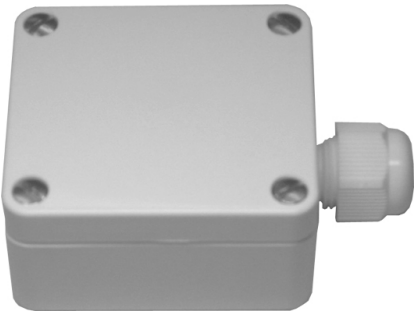



Circuit diagram 6





Circuit diagram 7




Outside temperature sensor	Part no.	H42-09914
Used for the control of: Airtronic D/Basic		
Sensor:	NTC measured resistance 10 k Ω at 25 °C in 2-wire configuration	
Measurement range:	-50 - +90 °C	
Tolerance:	\pm 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 k Ω at 25 °C in 2-wire configuration	
Measurement range:	-50 - +120 °C	
Tolerance:	\pm 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)	
		

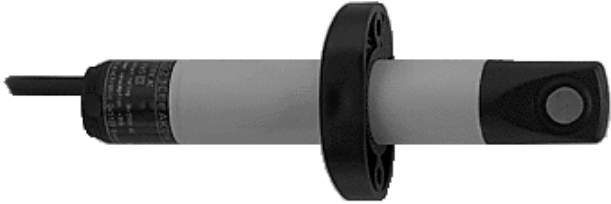
Living room temperature sensor	Part no.	H42-09902
Used with controller: RTE/D ... TR, MSD ... TR and Airtronic D/Basic		
Sensor:	NTC measured resistance 10 k Ω at 25 °C in 2-wire configuration	
Measurement range:	-50 - +90 °C	
Tolerance:	\pm 0.2 °C from 0 - 70 °C	
Type of protection:	IP 20	
Housing:	WRF02, material ABS. Colour white. Connection with 2-pole terminal	
		

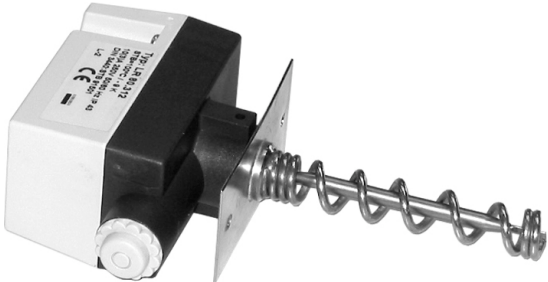
Attachable return sensor	Part no.	H42-09917
<p>Used with controller: Airtronic D/Basic</p>		
Sensor:	NTC measured resistance 10 kΩ at 25 °C in 2- wire configuration	
Measurement range:	-30 - +105 °C	
Tolerance:	± 0.2 °C from 0 - 70 °C	
Type of protection:	IP 54	
Housing:	ALF4, material PA 6.6 reinforced 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
<p>Used with controller: RTE/D ... TR, MSD ... TR and Airtronic D/Basic</p>		
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																		
<p>Used with controller: RTE/D..TR, MSD..TR and Airtronic D/Basic</p>																				
<p>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.)</p>																				
<table border="0"> <tr> <td data-bbox="65 510 762 577">Electrical connection:</td> <td data-bbox="331 510 762 577">changeover contact (15 A / 250V)</td> </tr> <tr> <td data-bbox="65 577 762 611">Type of protection:</td> <td data-bbox="331 577 762 611">IP 40</td> </tr> <tr> <td data-bbox="65 611 762 645">Setup range:</td> <td data-bbox="331 611 762 645">- 10 to +15°C</td> </tr> <tr> <td data-bbox="65 645 762 712">Max. sensor temperature:</td> <td data-bbox="331 645 762 712">+200°C</td> </tr> <tr> <td data-bbox="65 712 762 779">Ambient temperature:</td> <td data-bbox="331 712 762 779">-15...+55°C</td> </tr> <tr> <td data-bbox="65 779 762 869">Sensor:</td> <td data-bbox="331 779 762 869">gas-filled capillary tube made of Cu (active over the whole length of the tube)</td> </tr> <tr> <td data-bbox="65 869 762 936">Capillary tube length:</td> <td data-bbox="331 869 762 936">1.8; 3 or 6m</td> </tr> <tr> <td data-bbox="65 936 762 1003">Housing:</td> <td data-bbox="331 936 762 1003">Sheet steel galvanised, cover ABS</td> </tr> <tr> <td data-bbox="65 1003 762 1055">Accessory:</td> <td data-bbox="331 1003 762 1055">1 set of mounting clamps (6 pieces)</td> </tr> </table>			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)
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)																			
		<p>Design approved by TÜV in accordance with DIN 3440!</p>																		

Differential pressure monitor	Part no.	DDW050-0500N								
<p>Used with controller: RTE/D..TR, MSD..TR and Airtronic D/Basic.</p>										
<p>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.</p>										
<table border="0"> <tr> <td data-bbox="65 1429 762 1496">Electrical connection:</td> <td data-bbox="363 1429 762 1496">changeover contact (1.5 A / 250 V)</td> </tr> <tr> <td data-bbox="65 1496 762 1529">Pneumatic connection.:</td> <td data-bbox="363 1496 762 1529">+ (P1) and -(P2)</td> </tr> <tr> <td data-bbox="65 1529 762 1641">Setup range:</td> <td data-bbox="363 1529 762 1641">50 - 500 Pa (0.5 - 5.0 mbar) max. operating excess pressure 5,000 Pa (50 mbar)</td> </tr> <tr> <td data-bbox="65 1641 762 1776">Delivery package:</td> <td data-bbox="363 1641 762 1776">mounting bracket, 2m PVC hose, rubber grommets, connection pipes and screw terminals</td> </tr> </table>			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 pressure 5,000 Pa (50 mbar)	Delivery package:	mounting bracket, 2m PVC hose, rubber grommets, connection pipes and screw terminals
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 pressure 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		
<p>Used in controller: RTE/D..TR, MSD..TR and Airtronic D/Basic.</p> <p>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</p> <p>Feed voltage: 24 V AC (2m PUR cable ×0.5mm²)</p> <p>Power consumption: 3 VA</p> <p>Setup range: 1 - 10 m/s</p> <p>Medium temperature: - 10 - +50 °C</p> <p>Visual display: light-emitting diodes LED (start up, operation, fault)</p> <p>Type of protection: IP 54</p> <p>Switch adjustment: with potentiometer</p> <p>Output: relay (opener contact) 3A / 250 V</p> <p>Delivery package: mounting clamp, fixing material</p>			<p>a belt drive monitor and also as an air flow monitor with electric air heater (absolutely essential).</p> 	

Temperature safety limiter	Part no.:	H40-00015		
<p>Used with controller: RTE/D..TR, MSD..TR and Airtronic D/Basic</p> <p>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.</p> <p>Electrical connection.: changeover contact (10 A/ 250V)</p> <p>Setup range: +75 to +100°C</p> <p>Max. sensor temp.: +135°C</p> <p>Immersion sheath length: 120mm</p> <p>Type of protection: IP 43</p>			<p>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.</p> 	
			<p>Design approved by TÜV in accordance with DIN 3440!</p>	

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.

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

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



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

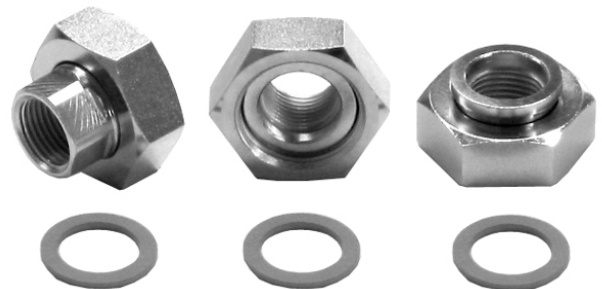
Part no.	H81-24040 HVRG3 15/4
Part no.	H81-24063 HVRG3 20/6.3
Part no.	H81-24100 HVRG3 25/10
Part no.	H81-24160 HVRG3 32/16
Part no.	H81-24250 HVRG3 40/25
Part no.	H81-24400 HVRG3 50/40



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.

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

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

**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.

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.

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: 315x110x60 (LxWxH) mm



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: 227.5x110x60 (LxWxH) 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.**

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

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

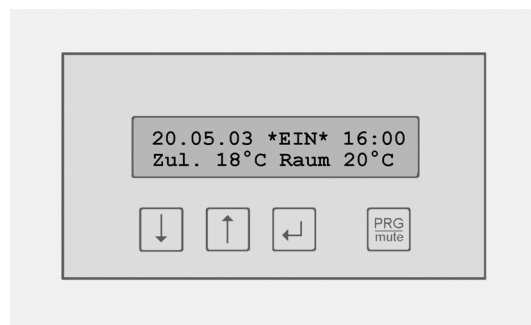


Control circuit board**Part no.:****H42-00011**

**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

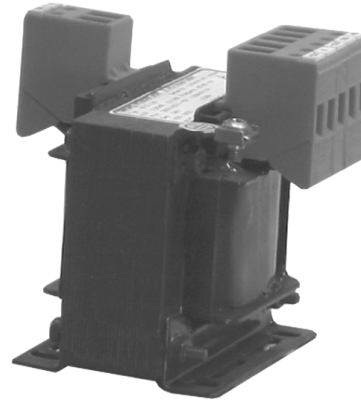
Part no.:

W51-23024

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

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

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



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	<p>Fan drive by single-turn IEC standard motor.</p> <ul style="list-style-type: none"> ▪ 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	<p>Fan drive with two-turn IEC standard motor.</p> <ul style="list-style-type: none"> ▪ 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	<p>Fan drive with three-turn IEC standard motor.</p> <ul style="list-style-type: none"> ▪ 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 ≥ 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	<p>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.</p> <p>With fans with belt drive, this function can be used to monitor the belt drive</p>

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.
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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 <ul style="list-style-type: none"> ▪ Implementation of the function with AB and AD devices <i>Written indication on the remote control display and recording of the fault report in the fault memory.</i>
4.12	Cooling pump fault	Fault report indication, cooling pump <ul style="list-style-type: none"> ▪ Implementation of the function with AB and AD devices <i>Written indication on the remote control display and recording of the fault report in the fault memory.</i>
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.

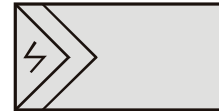
Filter and dampers/valves		
6.1	Filter monitoring	Fault report indication filter monitoring <ul style="list-style-type: none"> ▪ Implementation of the function with TR devices Signal light on the switch box housing of the control device ▪ Implementation of the function with AB and AD devices Written 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 auto-matic	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: <ul style="list-style-type: none"> - 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

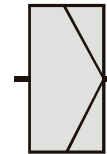
- Module controller (see Page 8)
- Airtronic B (see Page 10)
- Airtronic C (see Page 12)

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



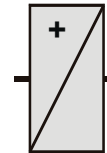
Filter

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.

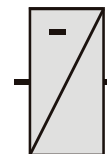
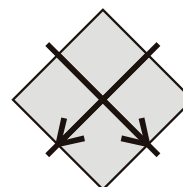

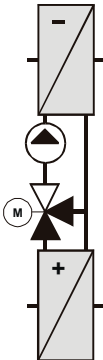
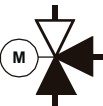





Plate heat exchanger

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	
<p>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.</p>	
Circulation loop system (KVS)	
<p>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.</p>	
Three-way valve	
<p>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.</p>	
Circulation pump	
<p>Supply of the heat-carrying medium by pumps running forwards or backwards.</p>	
Temperature sensor	
<p>For measurement of inlet, outlet and room temperature.</p>	
Pressure differential sensor	
<p>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.</p>	

		<i>Explanation:</i>
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	