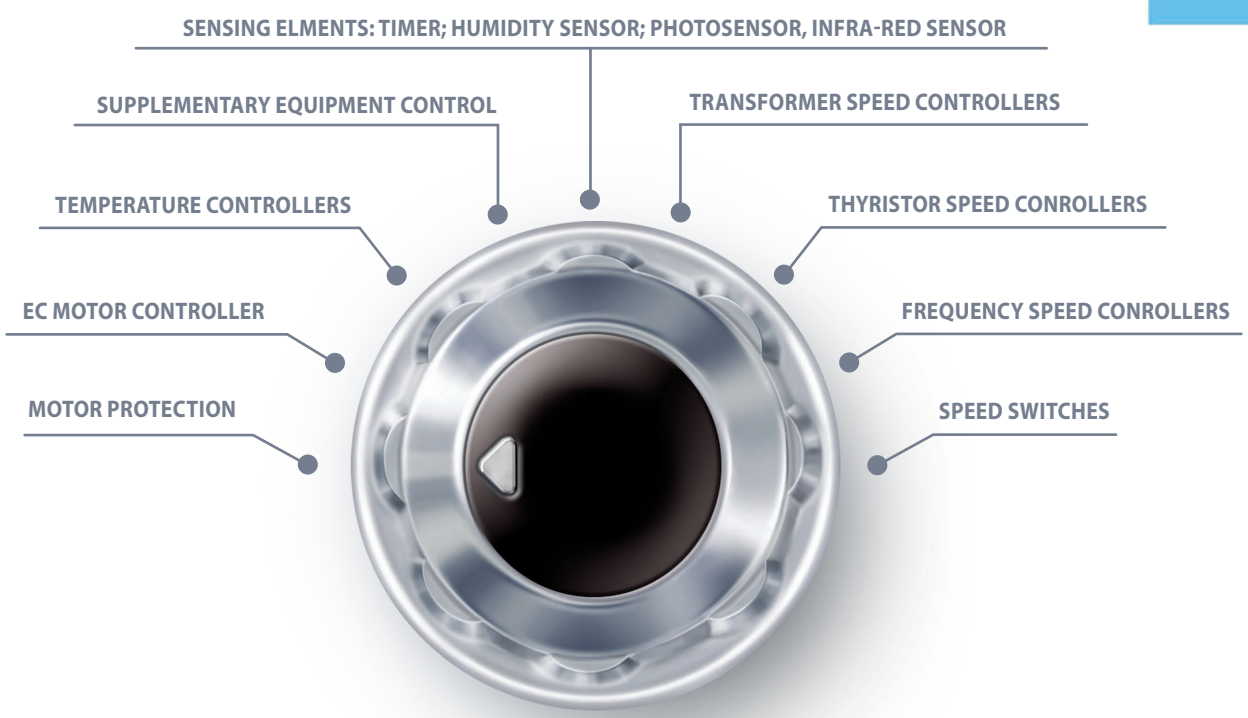
ELECTRICAL ACCESSORIES



Model		Phase	Current	Protection	Casing	Functions
Sensor speed controller						
SRS-1		single phase	up to 1 A	IP30	Plastic casing with fixing lugs for flush mounting	Smooth fan speed control, integrated switch
Thyristor speed controller						
RS-1-300		single phase	up to 1.5 A	IP40	Plastic casing for flush mounting	Smooth fan speed control with built-in switch.
RS-1-400			up to 1.8 A	IP40		
RS-1 N (V)		single phase	up to 1.0 A	IP44	Plastic casing for flush or surface mounting	Smooth fan speed control with built-in switch.
RS-1,5 N (V)			up to 1.5 A			
RS-2 N (V)			up to 2.0 A			
RS-2,5 N (V)			up to 2.5 A			
RS-0,5-PS		single phase	0.1 – 0.5 A	IP44	Plastic casing for flush or surface mounting	Smooth fan speed control with built-in switch, minimum speed setting.
RS-1,5-PS			0.15 – 1.5 A			
RS-2,5-PS			0.25 – 2.5 A			
RS-4,0-PS			0.4 – 4.0 A			
RS-3,0-T		single phase	0.3 – 3.0 A	IP54	Plastic casing for surface mounting	Smooth fan speed control with built-in switch, minimum speed setting.
RS-5,0-T			0.5 – 5.0 A			
RS-10,0-T			1.0 – 10.0 A			
RS-3,0-TA		single phase	0.3 – 3.0 A	IP54	Plastic casing for surface mounting	Smooth fan speed control. Control input 0-10 V or 4-20 mA, built-in switch, minimum speed setting.
RS-5,0-TA			0.5 – 5.0 A			
RS-10,0-TA			1.0 – 10.0 A			
Transformer speed controllers						
RSA5E-2-P		single phase	up to 2.0 A	IP54	Plastic casing for surface mounting	Step fan speed control. Overheating motor protection, thermostat and actuator driven air shutoff damper connections. Mechanical speed switching.
RSA5E-2-M		single phase	up to 2 A	IP21	Metal casing for surface mounting	Step fan speed control. Overheating motor protection, thermostat and actuator driven air shutoff damper connections. Mechanical speed switching.
RSA5E-3-M			up to 3 A			
RSA5E-4-M			up to 4 A			
RSA5E-12-M			up to 12 A	IP44		
RSA5E-1,5-T		single phase	up to 1.5 A	IP54	Plastic casing for surface mounting	Step fan speed control. Overheating motor protection, thermostat and actuator driven air shutoff damper connections. Mechanical speed switching.
RSA5E-3,5-T			up to 3.5 A			
RSA5E-5,0-T			up to 5 A			
RSA5E-8,0-T			up to 8 A			
RSA5E-10,0-T			up to 10 A			
RSA5D-1,5-T		three-phase	up to 1.5 A	IP44	Plastic casing for surface mounting	Step fan speed control. Overheating motor protection, thermostat and actuator driven air shutoff damper connections. Mechanical speed switching.
RSA5D-3,5-T			up to 3.5 A			
RSA5D-5-M		three-phase	up to 5 A	IP44	Metal casing for surface mounting	Step fan speed control. Overheating motor protection, thermostat and actuator driven air shutoff damper connections. Mechanical speed switching.
RSA5D-8-M			up to 8 A			
RSA5D-10-M			up to 10 A			
RSA5D-12-M			up to 12.0 A			

Model		Phase	Current	Protection	Casing	Functions
Frequency speed controllers						
VFED-200-TA		three-phase	200 W/1A	IP54	Plastic casing for surface mounting	Smooth speed control of three phase fan. Power supply 220V, motor overheating protection. Control input 0-10 V or 4-20 mA, series port RS232, remote LED display (ordered on request).
VFED-400-TA			400 W/2A			
VFED-750-TA			750 W/3.5 A			
VFED-1100-TA			1.1 kW/5.5A			
VFED-1500-TA			1.5 kW/7.5 A			
Room thermostats						
TST-1-300			up to 1 (0.6 A)	IP40	Plastic casing for wall surface mounting	Temperature control in ventilation, heating and air conditioning systems. Equipped with a highlighted sensor display. Automatic heating/cooling rate control.
TSTD-1-300						
Temperature controllers						
RTS -1-400		single phase	up to 2.0 A	IP40	Plastic casing for flush mounting	Temperature control in ventilation, air conditioning and heating systems. Equipped with digital LED display. Automatic heating/cooling rate control.
RTSD -1-400						
RT-10		single phase	up to 10 A	IP40	Plastic casing for surface mounting	Temperature regulation and control of ventilation, heating and air conditioning systems. Temperature control range from +10 up to +30°C.
Sensor speed switch						
SP3-1		single phase	up to 1 A	IP30	Plastic casing for flush mounting	Smooth fan speed control, integrated switch.
Speed control switches						
P2-1-300		single phase	up to 3 A	IP40	Plastic casing for flush mounting	2 speed step switching
P3-1-300						3 speed step switching
P2-5,0 N (V)		single phase	up to 5.0 A	IP40	Plastic casing for surface and flush mounting	2 speed step switching
P3-5,0 N (V)						3 speed step switching
P5-5,0 N (V)						5 speed step switching
EC motors regulators						
R-1/010		single phase	up to 1.1 mA	IP40	Plastic casing for flush mounting	Smooth control of speed, temperature and other characteristics. 0-10V output is equipped with max. 3A built-in switch.
Sensors						
T-1,5N		single phase	up to 1.5 A	IP54	Plastic casing for surface mounting	Fan operation with switch delay timer.
TH-1,5N						Fan humidity-dependent operation.
TF-1,5N						Fan operation with photo-sensor and running-out timer.
TP-1,5N						Fan operation with infra-red sensor and switch delay timer.

Sensor speed controller

SRS-1/SRS-2.5

Applications

Applied in ventilation systems for turning the fans on/off and speed control of single-phase voltage controlled fan motors. Several fans can be connected to one speed controller provided that the total current does not exceed the maximum controller current.

Design

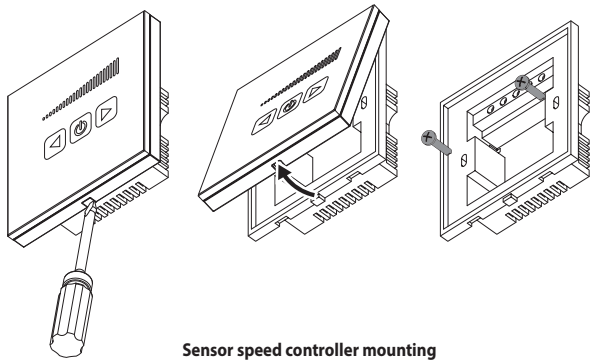
The casing is made of plastic and the sensor panel is made of hardened glass. The sensor panel has On/Off button for speed control from minimum to maximum. The set speed level is displayed on the LED display. The speed controller has high control accuracy.

Mounting

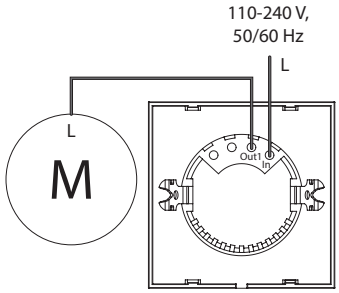
The controller is designed for indoor mounting into standard round electric junction boxes.

Technical data

	SRS-1	SRS-2.5
Voltage [V/50 (60) Hz]	230	
Maximum load current [A]	1	2.5
Cable cross section	0.35 up to 1 mm²	
Temperature range [°C]	from -10 up to +45	
Humidity range	5 % up to 80 % (no condensation)	
Service life	100 000 switching operations	
Protection rating	IP30	
Mass [kg]	0.138	

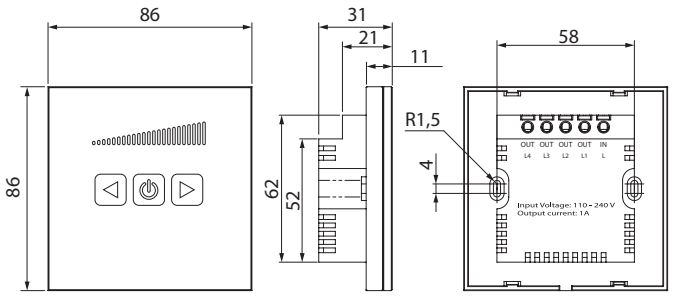


Sensor speed controller mounting



M – ventilation equipment motor

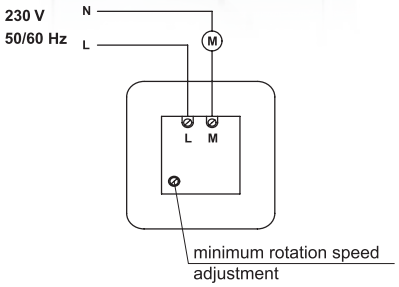
Wiring diagram



Overall dimensions

Speed controller

RS-1-300



Controller wiring diagram

Applications

Applied in ventilation systems for switching ON/OFF and speed controlling of single phase power-controlled motors. Several fans can be operated synchronously in case their total consumption current does not exceed the maximum permissible current value.

Design and control

The controller casing is made of plastic. The controller is featured with high efficiency and control accuracy. Switching to the maximum speed is effected by means of regulating the control knob. Regulating starts from the minimum to the maximum voltage value for the fan stable running. The minimum speed is set by means of the potentiometer at PCB.

Protection

The controller incorporates a thermal fuse for motor overload protection.

Mounting

The controller is designed for indoor mounting into special flush mounting junction box MKV-2 (under separate order) or into standard round electric junction boxes.

Technical data

	RS-1-300
Voltage [V/50 Hz]	1~230
Rated current [A]	1.5
Overall dimensions LxWxH [mm]	95x85x60
Maximum ambient temperature [°C]	40
Protection rating	IP40
Mass [kg]	0.11

FLUSH MOUNTING JUNCTION BOX

MKV-2

Speed controller

RS-1-400

Applications

Applied in ventilation systems for speed switching ON/OFF and speed control of the single phase power-controlled motors. Several fans can be controlled synchronously in case their total current does not exceed the maximum permissible values for the controller current.

Design and control

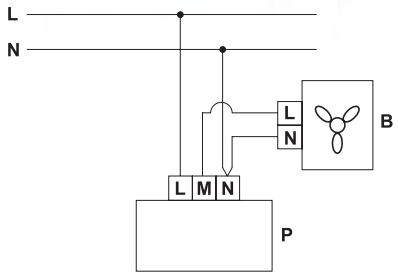
The controller casing is made of plastic. The controller is featured with high efficiency and control accuracy. Switching to the maximum speed is effected by means of regulating the control knob. Regulating starts from the minimum to the maximum voltage value for the fan stable running. The minimum speed is set by means of the potentiometer at PCB.

Protection

The controller contains a removable thermal fuse for motor overload protection and transient filter.

Mounting

The controller is designed for indoor mounting into special surface mounting (MKN-3) or flush mounting (MKV-4) junction box (under separate order) or into standard round electric junction boxes.

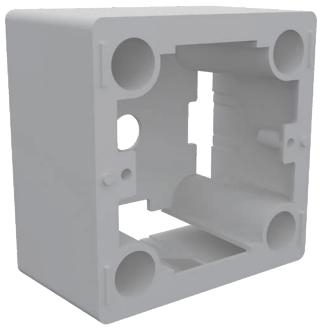


Controller wiring diagram

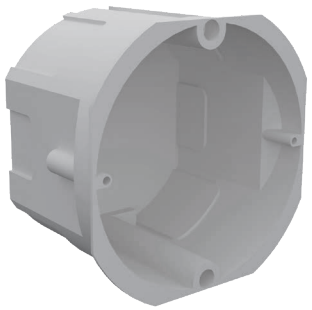
Technical data

	RS-1-400
Voltage [V/50 (60) Hz]	1~230
Rated current [A]	1.8
Overall dimensions LxWxH [mm]	78x78x63
Maximum ambient temperature [°C]	35
Protection rating	IP40
Mass [kg]	0.11

MOUNTING JUNCTION BOX



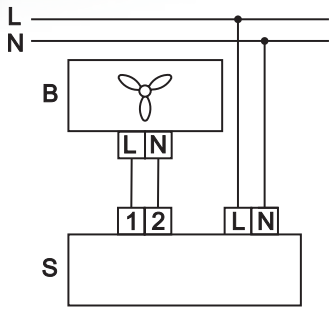
MKN-3 (for surface mounting)



MKV-4 (for flush mounting)

Speed controller

RS-...N (V)



Controller wiring diagram

Applications

Applied in ventilation systems for speed switching ON/OFF and speed control of the single phase power-controlled motors. Several fans can be controlled synchronously provided that the total current does not exceed the maximum controller current.

Design and control

Controller has the plastic casing with the control knob, ON/OFF button and pilot light. The controller is featured with high efficiency and control accuracy. Regulation starts from the minimum fan stable running voltage value to the maximum one. The minimum rotation speed is set by means of the potentiometer on the PCB.

Protection

Input circuit of the speed controller has a thermal fuse for overload protection. The controller is fitted with a transient filter.

Mounting

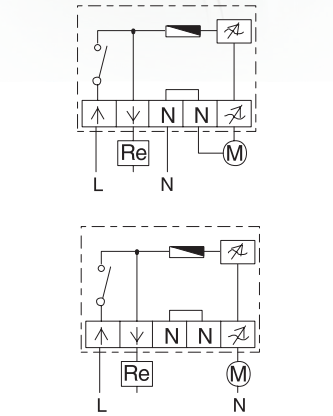
The controller is designed for indoor wall mounting either on the wall (H modification) or through the wall (V modification).

Technical data

	RS-1 N (V)	RS-1,5 N(V)	RS-2 N (V)	RS-2,5 N(V)
Voltage [V/50 Hz]	1~230	1~230	1~230	1~230
Rated current [A]	1.0	1.5	2.0	2.5
Overall dimensions LxWxH [mm]	162x80x70	162x80x70	162x80x70	162x80x70
Maximum ambient temperature [°C]	40	40	40	40
Protection rating	IP44	IP44	IP44	IP44
Mass [kg]	0.3	0.3	0.3	0.3

Speed controller

RS...PS



Controller wiring diagram

Applications

Applied in ventilation systems for speed switching ON/OFF and speed control of single phase power-controlled motors. Several fans can be controlled synchronously in case their total current does not exceed the maximum controller current.

Design and control

The controller casing is made of pastic. The control knob is equipped with the pilot light. The controller is featured with high efficiency and control accuracy. Switching is effected by means of pressing the control knob. Regulating starts from the minimum to the maximum voltage value for the fan stable running. The minimum speed is set by means of the potentiometer at the PCB. The controller is equipped with an extra 230 V terminal for connection and control of the external equipment.

Protection

Input circuit of the speed controller has a thermal fuse for overload protection. The controller is fitted with a transient filter.

Mounting

The universal design of the controller enables its mounting either on the wall (H modification) or through the wall (V modification), suitable for installation into standard round electric junction boxes.

Technical data

	RS-0,5-PS	RS-1,5-PS	RS-2,5-PS	RS-4,0-PS
Voltage [V/50 Hz]	1~230	1~230	1~230	1~230
Minimum current [A]	0.1	0.15	0.25	0.4
Maximum current [A]	0.5	1.5	2.5	4.0
Overall dimensions LxWxH [mm]	82x82x65	82x82x65	82x82x65	82x82x65
Maximum ambient temperature [°C]	35	35	35	35
Protection rating	IP44	IP44	IP44	IP44
Mass [kg]	0.23	0.24	0.29	0.36

Speed controller

RS-...-T

Applications

Applied in ventilation systems for speed switching ON/OFF and speed control of single phase power-controlled motors. Several fans can be controlled synchronously in case their total consumption current does not exceed the maximum controller current.

Design and control

The controller casing is made of flame-retardant thermoplastic and fitted with ON/OFF knob with pilot light. The controller is featured with high efficiency and control accuracy. Output power is controlled from 25 to 100 % as a function of the control knob position. The minimum speed is set by means of the potentiometer at the PCB. The controller is equipped with an extra 230 V terminal for connection and controlling such external equipment as actuator-driven air dampers.

Protection

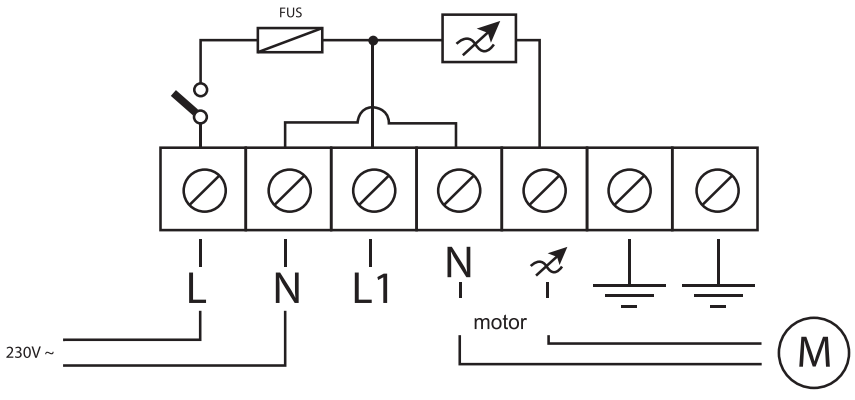
Input circuit of the speed controller has a thermal fuse for overload protection. The controller is fitted with a transient filter.

Mounting

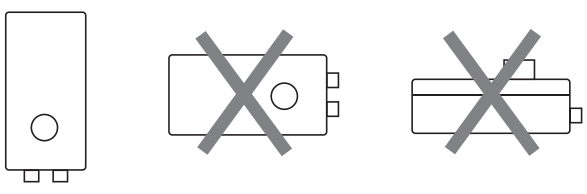
The controller is designed for indoor mounting. Installation shall be performed with respect to the free air circulation for inner circuit cooling. The controller is designed for vertical installation. Do not install the controller above the heaters and in bad air convection areas.

Technical data

	RS-3,0-T	RS-5,0-T	RS-10,0-T
Voltage [V/50 Hz]	1~230	1~230	1~230
Minimum current [A]	0.3	0.5	1.0
Maximum current [A]	3.0	5.0	10.0
Overall dimensions LxWxH [mm]	123x191x97	123x191x97	123x191x97
Maximum ambient temperature [°C]	+5…+40	+5…+40	+5…+40
Protection rating	IP54	IP54	IP54
Mass [kg]	0.3	0.3	0.3



Controller wiring diagram



Device operating position

Speed controller

RS-...-TA

Applications

Applied in ventilation systems for switching ON/OFF and speed controlling of single phase power-controlled motors. Several fans can be operated synchronously in case their total consumption current does not exceed the maximum controller current.

Design and control

The controller casing is made of flame-retardant thermoplastic and fitted with a ON/OFF knob. Output power is controlled from 25 to 100 % with the control signal 0…10V or 4-20mA over the range set during the controller adjustment. The control signal type 0...10V or 4-20mA is selected with SW2 control switch located in the controller casing. Control can be performed by means of remote control panel, i.e., R-1/010 controller. The minimum speed is set by means of the potentiometer at the PCB. The controller is equipped with an extra 230 V terminal for connection and control of such external equipment as actuator driven air dampers.

Protection

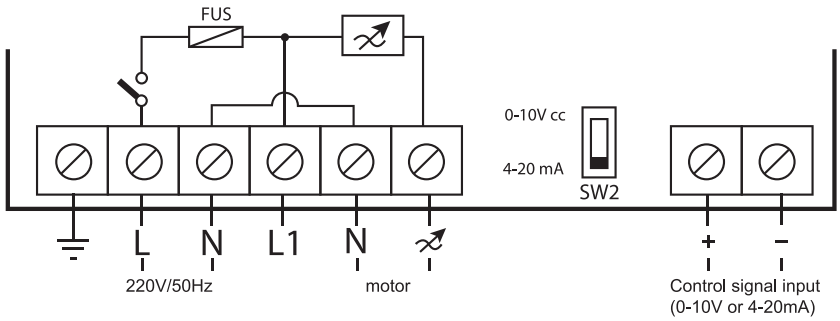
Input circuit of the speed controller has a thermal fuse for overload protection.

Mounting

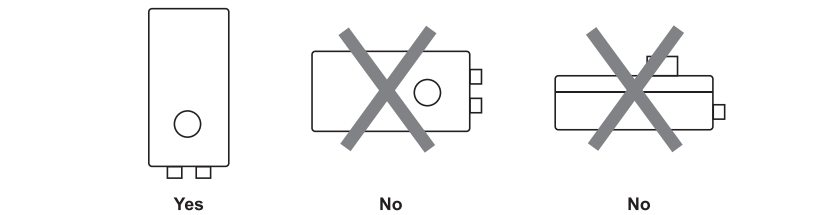
The controller is designed for indoor mounting. Installation shall be performed with respect to the free air circulation for inner circuit cooling. The controller is for vertical installation. Do not install the controller above the heaters and in bad air convection areas.

Technical data

	RS-3,0-TA	RS-5,0-TA	RS-10,0-TA
Voltage, [V/50 Hz]	1~230	1~230	1~230
Minimum current [A]	0.3	0.5	1.0
Maximum current [A]	3.0	5.0	10.0
Overall dimensions LxWxH [mm]	180x127x95	180x127x95	180x127x95
Maximum ambient temperature [°C]	+5…+40	+5…+40	+5…+40
Protection rating	IP54	IP54	IP54
Mass [kg]	0.3	0.3	0.3



Controller wiring diagram



Device operating position

Single phase speed controller

RSA5E-2-P

Speed control enables not only selecting the comfortable ventilation mode for the periodically visited premises but reducing the energy consumption for the ventilation.

Applications

RSA5E-2-P series speed controller is applied for air flow control of single phase fans by means of step control of motor speed. The controller has five speeds. Speed is set by means of rotating the control knob at the casing front panel. Several fans can be controlled synchronously in case their total consumption current does not exceed the maximum permissible value of the controller current.

Design

The controller casing is made of flame-retardant thermoplastic. The controller has five speeds with the output power 110V-130V-160V-190V-230V and incorporates ON/OFF button with pilot light, the control knob for speed switching and the emergency operation LED indicator. The integral motor protection device is included which cuts the supply voltage to the fan if the thermal contact in the fan motor is activated. After the temperature drops to the operating level the motor restarts.

The controller has the following supplementary functions:

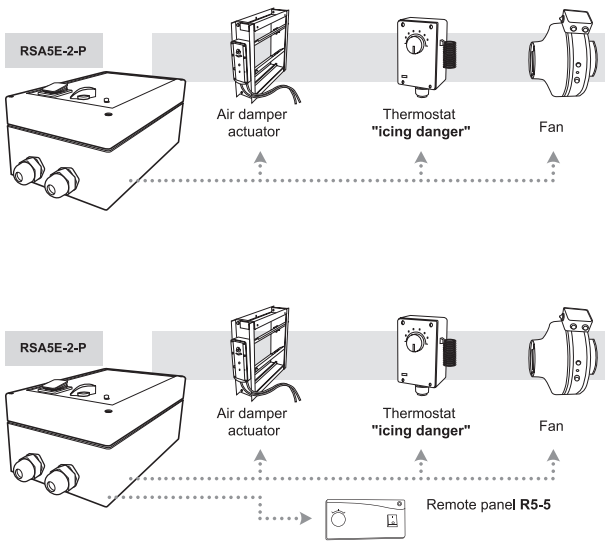
- terminals for connection to the room thermostat or to the thermostat for the icing protection. In case of the circuit breaking the power supply to the motor is disabled;
- terminals of 230 V, max. 2A for connection and controlling such external equipment actuator driven air damper;
- provision for remote speed control (refer the connection options).

Mounting

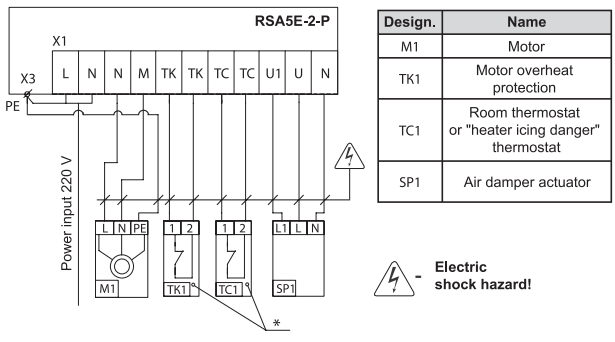
The controller is designed for indoor mounting. Installation shall be performed with respect to the free air recirculation for inner circuit cooling.

Technical data

	RSA5E-2-P
Voltage [V/50 Hz]	1~230
Rated current [A]	2.0
Overall dimensions LxWxH [mm]	222x120x100
Maximum ambient temperature [°C]	40
Protection rating	IP54
Mass [kg]	3.1



Controller connection options



Design.	Name
M1	Motor
TK1	Motor overheat protection
TC1	Room thermostat or "heater icing danger" thermostat
SP1	Air damper actuator

* - Controller operation without thermal motor protection (TK1) is effected with the jumper installed between TK terminals. Controller operation without thermostat TS1 is possible with the jumper installed between TS terminals.

Wiring diagram

Single phase speed controller

RSA5E-...-M

Speed controls enables not only selecting the comfortable ventilation mode for the periodically visited premises but reducing the energy consumption for the ventilation.

Applications

RSA5E-...-M series speed controllers are applied for air flow control of single phase fans by means of step speed control. The controller has five speeds. Speed is set by means of rotating the control knob at the casing front panel. Several fans can be controlled synchronously in case their total consumption current does not exceed the maximum permissible value of the controller current.

Design and control

Casing is made of steel with polymeric coating. The controller has five speeds with the output power 110V-130V-160V-190V-230V (for RSA5E-12-M modification-80V-105V-130V-160V-230V). The controller incorporates ON/OFF button with pilot light, control knob for speed switching and controller emergency operation LED indicator.

Protection

The integral motor protection device is included which cuts the supply voltage to the fan if the thermal contact in the fan motor is activated. After the temperature drops to the operating level the motor restarts.

The controller has the following supplementary functions:

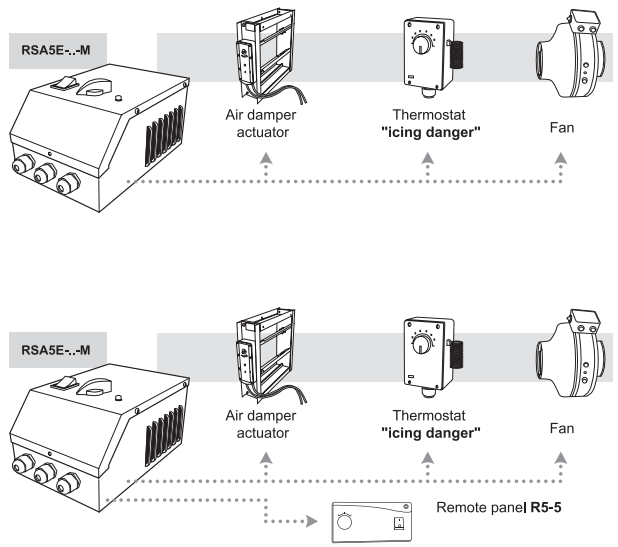
- terminals for connection to the room thermostat or to the icing protection thermostat. In case of the circuit breaking the power supply to the motor is cut.
- terminals of 230 V, max. 2A/3A/4A for connection and controlling such external equipment as actuator driven air damper.
- provision for remote speed control (refer the connection options).

Mounting

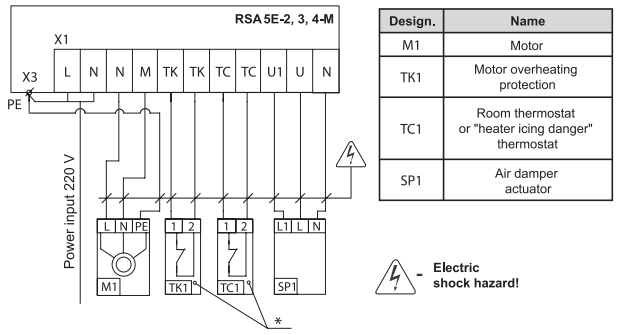
The controller is designed for indoor mounting. Installation shall be performed with respect to the free air circulation for inner circuit cooling.

Technical data

	RSA5E-2-M	RSA5E-3-M	RSA5E-4-M	RSA5E-12-M
Voltage, [V/50 Hz]	1~230	1~230	1~230	1~230
Rated current [A]	2.0	3.0	4.0	12.0
Overall dimensions LxWxH [mm]	226x144x120	241x164x138	241x184x132	325x250x245
Maximum ambient temperature [°C]	40	40	40	40
Protection rating	IP21	IP21	IP21	IP44
Mass [kg]	3.4	4.1	4.5	4.5



Controller connection options



Design.	Name
M1	Motor
TK1	Motor overheating protection
TC1	Room thermostat or "heater icing danger" thermostat
SP1	Air damper actuator

* - Controller operation without thermal motor protection (TK1) is possible with the jumper between TK terminals. Controller operation without thermostat TS1 is possible in case of jumper installation between TS terminals.

Wiring diagram

Single phase speed controller

RSA5E-...-T

Applications

RSA5E-…T series speed controllers are applied for air flow control of single phase fans by means of motor step speed control. The controllers have five speeds. Speed is set by means of rotating the control knob at the casing front panel to one of five available fixed positions. Several fans can be controlled synchronously in case their total consumption current does not exceed the maximum permissible value of the controller current.

Design and control

The controller casing is made of flame-retardant thermoplastic. The controller has five speeds with the output power 80V – 105V – 130V -160V – 230V and incorporates ON/OFF pilot light for operation indication, control knob for speed switching and controller emergency operation LED indicator. The integral motor protection device is included which cuts the supply voltage to the fan if the thermal contact in the fan motor is activated. After the temperature drops to the operating level the motor restarts.

The controller has the following supplementary functions:

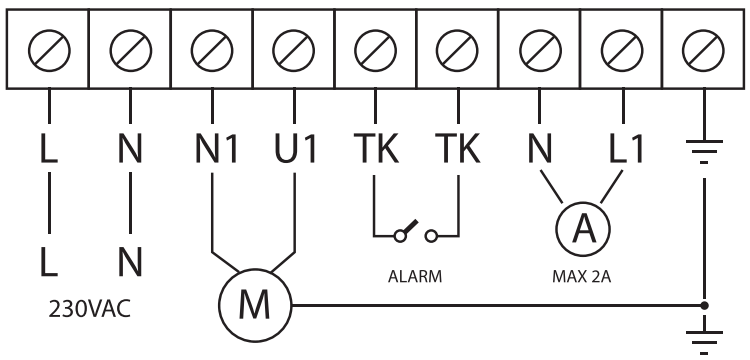
- terminals of 230 V, max. 2A for connection and controlling such external equipment as actuator driven air dampers.

Mounting

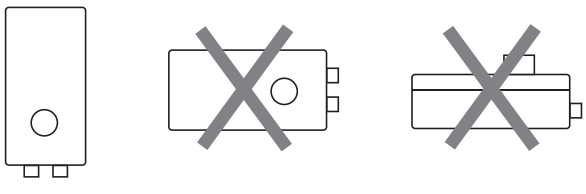
The controller is designed for indoor mounting. Installation shall be performed with respect to the free air recirculation for inner circuit cooling. The controller is for vertical installation. Do not install the controller above the heaters and in bad air convection areas.

Technical data

	RSA5E-1,5-T	RSA5E-3,5-T	RSA5E-5,0-T	RSA5E-8,0-T	RSA5E-10,0-T
Voltage [V/50 Hz]	1~230	1~230	1~230	1~230	1~230
Rated current [A]	1.5	3.5	5.0	8.0	10.0
Overall dimensions LxWxH [mm]	205x110x85	255x170x140	255x170x140	305x200x180	305x200x180
Maximum ambient temperature [°C]	+5…+35	+5…+35	+5…+35	+5…+35	+5…+35
Protection rating	IP44	IP44	IP44	IP44	IP44



Controller wiring diagram



Device operating position

Three phase speed controller

RSA5D-...-T

Applications

RSA5D-…T series speed controllers are applied for air flow control of three phase fans by means of step speed control. The controllers have five speeds. Speed is set by means of rotating the control knob at the casing front panel to one of five available fixed positions. Several fans can be controlled synchronously in case their total consumption current does not exceed the maximum permissible value of the controller current.

Design and control

The controller casing is made of flame-retardant thermoplastic. The controller has five speeds with the output power 90V – 150V – 200V -280V – 400V and incorporates control speed knob, pilot light and controller emergency operatrion LED indicator.

The integral motor protection device is included which cuts the supply voltage to the fan if the thermal contact in the fan motor is activated. After the temperature drops to the operating level the motor restarts.

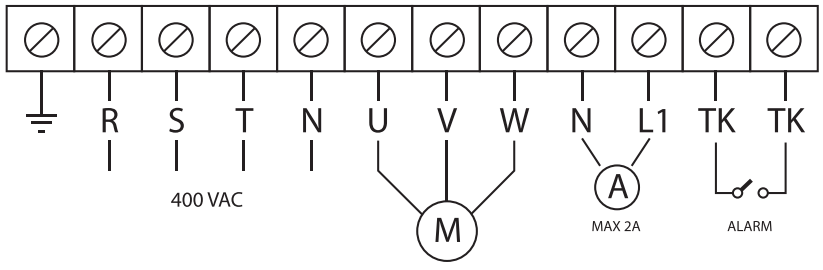
As supplementary functions the controller is fitted with terminals of 230 V, max. 2A for connection and controlling such external equipment as actuator driven air damper.

Mounting

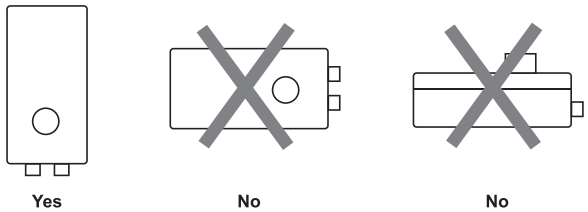
The controller is designed for indoor mounting. Installation shall be performed with respect to the free air recirculation for inner circuit cooling. The controller is for vertical installation. Do not install the controller above the heaters and in bad air convection areas.

Technical data

	RSA5D-1,5-T	RSA5D-3,5-T
Voltage, [V/ 50 Hz]	3~400	3~400
Rated current [A]	1.5	3.5
Overall dimensions LxWxH [mm]	305x200x180	305x200x180
Maximum ambient temperature [°C]	+5…+35	+5…+35
Protection rating	IP44	IP44



Controller wiring diagram



Device operating position

Three phase speed controller

RSA5D-...-M

Applications

RSA5D-…M series speed controllers are applied for air flow control of three phase fans by means of step control of motor speed. The controllers have five speeds. Speed is set by means of rotating the control knob at the casing front panel to one of five available fixed positions. Several fans can be controlled synchronously in case their total consumption current does not exceed the maximum permissible value of the controller current.

Design and control

The controller casing is made of flame-retardant thermoplastic. The controller has five speeds with the output power 90 V – 150 V – 200 V -280 V – 400 V and incorporates control speed knob, light indication for operation and pilot lamp to indicate the emergency operation of the controller. The controller has built-in motor overheating protection which cuts power supply in case of exceeding the set temperature threshold. After the temperature drops to the operating level the motor restarts.

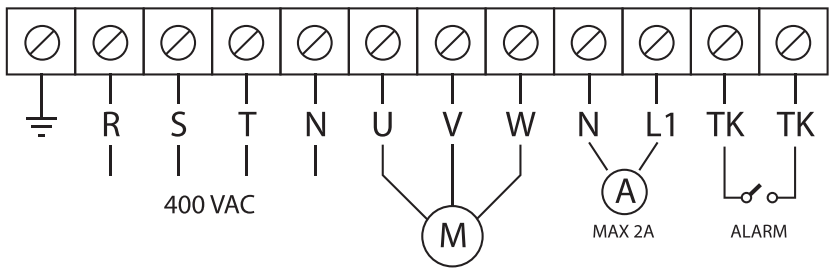
The controller is fitted with 230 V terminals, max. 2 A for connection and controlling such external equipment as actuator driven air damper.

Mounting

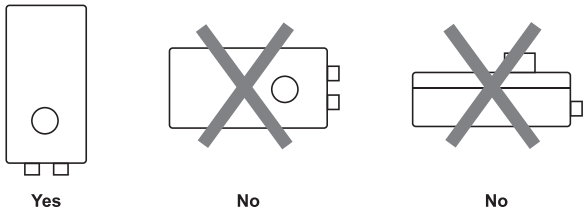
The controller is designed for indoor mounting. Installation shall be performed with respect to the free air recirculation for inner circuit cooling. The controller is for vertical installation. Do not install the controller above the heaters and in bad air convection areas.

Technical data

	RSA5D-5,0-M	RSA5D-8,0-M	RSA5D-10,0-M	RSA5D-12,0-M
Voltage [V/ 50 Hz]	3~400	3~400	3~400	3~400
Rated current [A]	5.0	8.0	10.0	12.0
Overall dimensions LxWxH [mm]	325x250x245	325x250x245	425x300x250	425x300x250
Maximum ambient temperature [°C]	+5…+35	+5…+35	+5…+35	+5…+35
Protection rating	IP44	IP44	IP44	IP44



Controller wiring diagram



Device operating position

Frequency speed controller

VFED-...-TA

Frequency speed controllers are the energy saving devices which ensure maximum utilization of actuator power with minimum energy consumption.

Applications

VFED-…-TA series controllers or inverters are designed for frequency control of three phase asynchronous AC motors. Speed control is effected by means of variation of supplied voltage frequency. Applied for air flow control of three phase motors.

Design and control

The controller casing is made of flame-retardant thermoplastic. The assembly transforms voltage of 220 V, 50 Hz supply mains into output impulse voltage with the frequency 3 Hz to 400 Hz. Motor rotor is powered with simple sinusoidal current and has the rotation speed as a function of the supplied voltage frequency. Single phase 220 V, 50 Hz power is supplied to the frequency controller inlet. Three-phase voltage with the frequency up to 400 Hz for asynchronous motor supply is generated at the controller outlet.

Control by means of external device

Power output variation as a function of the external control signal 0…10 V or 4-20 mA over the range set during the controller adjustment. The external device is connected through RS-232 serial port.

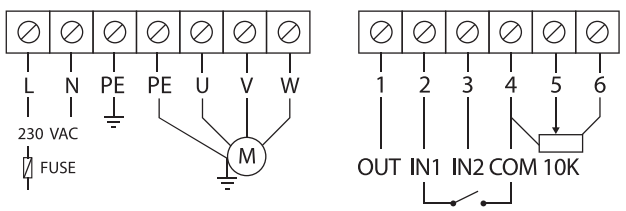
Mounting

The controller is designed for indoor mounting. Installation shall be performed with respect to the free air circulation for inner circuit cooling. The controller is for vertical installation. Do not install the controller above the heaters and in bad air convection areas.

Technical data

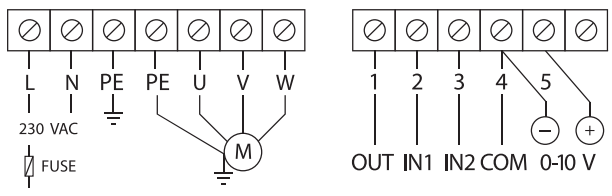
	VFED-200-TA	VFED-400-TA	VFED-750-TA	VFED-1100-TA	VFED-1500-TA
Voltage supplied to the controller [V/50 Hz]	1~230	1~230	1~230	1~230	1~230
Voltage supplied from the controller to the electric motor, [V]	3~230	3~230	3~230	3~230	3~230
Frequency output supplied to the motor, [Hz]	from 3 to 400	from 3 to 400	from 3 to 400	from 3 to 400	from 3 to 400
Maximum load current [A]	1.0	2.0	3.5	5.5	7.5
Maximum electric motor power [W]	200	400	750	1100	1500
Maximum ambient temperature [°C]	+5…+40	+5…+40	+5…+40	+5…+40	+5…+40
Protection rating	IP54	IP54	IP54	IP54	IP54

Control by means of a potentiometer

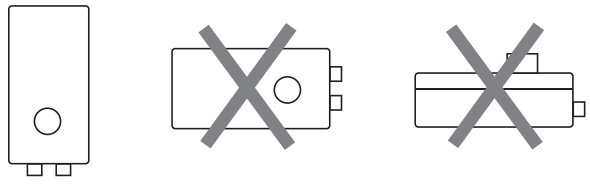


Controller wiring diagram

Control by means of external signal 0-10 V



Controller wiring diagram



Device operating position

Temperature controller

RT-10

Applications

Applied for control of the set indoor temperature as well as ventilation and air conditioning systems control.

Design and control

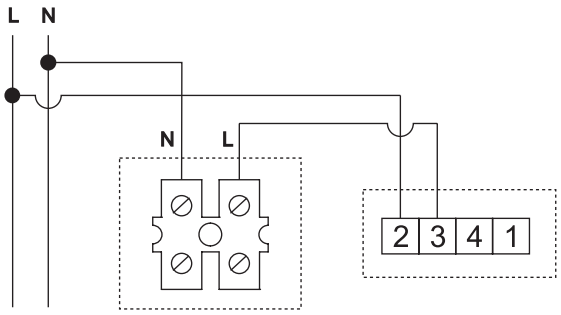
The casing is made of high-quality durable plastic. During the temperature increase or decrease with respect to the set value the thermostat opens or closes the contacts (the pattern is selected during the connection. The temperarture adjustment range is +10 up to +30 °C.

Mounting

The temperature controller is designed for indoor surface mounting. The recommended installation height is 1.5 m. Do not install the temperature controller close to windows, doors, heating or cooling devices.

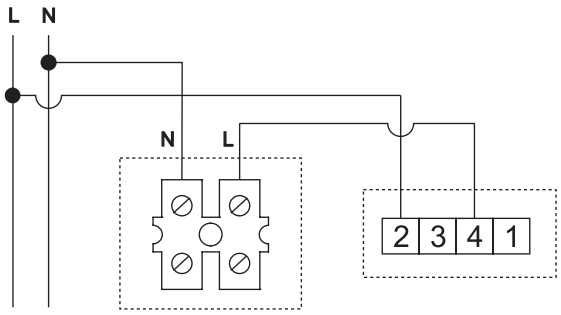
Technical data

	RT-10
Voltage [V/50 (60) Hz]	1~230
Overall dimensions LxWxH [mm]	84x84x35
Maximum ambient temperature [°C]	40
Protection rating	IP40



The fan operates till reaching the temperature threshold level set in the temperature controller

fig. 1



The fan starts operation after reaching the temperature threshold set in the temperature controller

fig. 2

Temperature controller connection options

Wiring diagram, fig. 1

- maximum current of active load no more 10A
- maximum current of inductive load no more 3A

Wiring diagram, fig. 2

- maximum current of active load no more 6A
- maximum current of inductive load no more 2A

Temperature controller

TST-1-300
TSTD-1-300

Applications

Applied for temperature control in HVAC systems. Applicable for fan control as well as actuating of fan coils and air heating units driven by 230 V three-speed fans. Provides automatic air heating/cooling rate.

Design and control

The temperature sensor is built into the plastic control panel casing. A digital light-up LCD display and control knobs are located at the control face panel. The display shows the current and set indoor air temperature, selected mode for cooling, heating or automatic mode as well as set motor speed. The rotation speed can be adjusted manually by means of control knob rotation. Provision is made for automatic control of rotation speed (quick/medium/low) depending on the indoor temperature.

- LCD highlighting allows to use the room thermostat in low light conditions.
- Temperature control with accuracy up to 1 °C.
- The user setup saving during power cut-off.
- The model TSTD-1-300 is equipped with a remote controller.

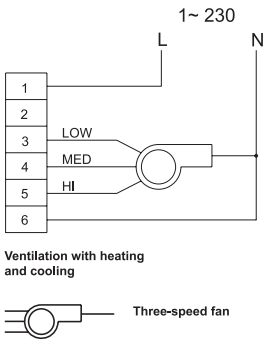
Mounting

The room thermostat is designed for indoor flush mounting. The recommended installation height is 1.5 m above floor level. The room thermostat is not designed for installation close to windows, doors, heating or cooling devices.

Technical data

	TST-1-300	TSTD-1-300
Voltage [V/50 Hz]	1~230	1~230
Rated current [A]	1 (0.6A)	1 (0.6A)
Number of selected speeds	3	3
Temperature adjustment range [°C]	+10…+30	+10…+30
Maximum ambient temperature [°C]	40	40
Protection rating	IP40	IP40
Remote control panel	no	yes

Controller connection options



Ventilation with heating and cooling

Three-speed fan

Temperature controller

RTS-1-400
RTSD-1-400

Application

- Temperature control in ventilation, heating and air conditioning systems.
- Compatible with fans and fan coil valves, air heating units equipped with three-speed 230 V fans.
- Automatic control of heating/cooling capacity.

Design and control

- Plastic casing with a built-in temperature sensor.
- The front panel incorporates an integrated LCD display and control buttons.
- The display shows current and set indoor air temperature, set speed and a selected operation mode. The temperature controller may be set for cooling, heating or auto mode.
- The fan speed is set manually by pressing the control buttons.
- Automatic control of low/medium/high speed, depending on indoor air temperature.
- Due to illuminated LCD display the temperature controller is suitable for use in bad light conditions.
- Temperature control accuracy up to 1 °C.
- Saving of user setting saving in case of power outage.
- RTSD -1- 400 is available with a remote control.
- Night operation mode. For details, refer to the night operation mode diagram.

Mounting

- The temperature controller is designed for indoor wall flush mounting.
- The recommended installation height is 1.5 m above the floor level.
- The installation place must not be close to windows, doors and heating or cooling equipment.
- Wall flush mounting in the junction box MKV-1 (available upon separate order).

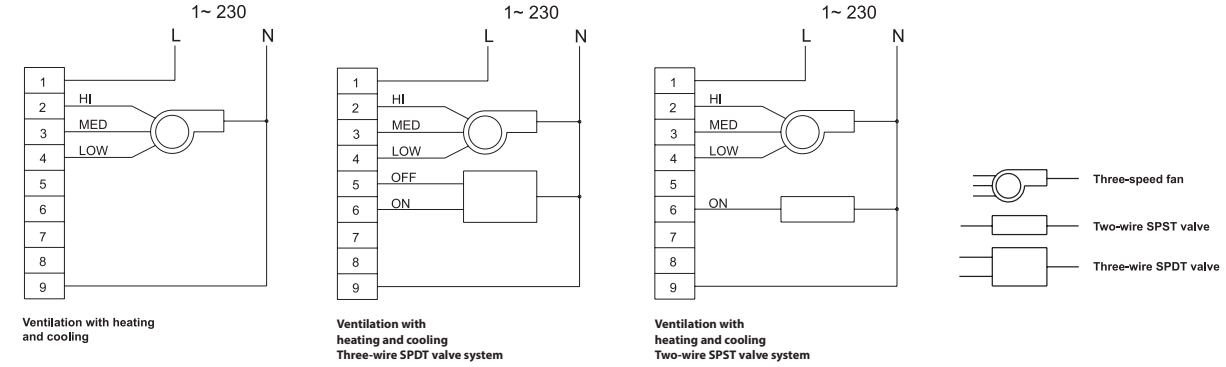
Technical data

	RTS-1-400	RTSD-1-400
Voltage [V] at 50 Hz	1~230	1~230
Rated current [A]	2,0	2,0
Number of speeds	3	3
Temperature range °C	+10…+30	+10…+30
Overall dimensions LxBxH [mm]	88x88x51	88x88x51
Maximum ambient temperature [°C]	40	40
Protection	IP40	IP40
Remote control	no	yes

Night mode operation

- **Operation in heating mode:** 30 minutes after activation of the night mode the indoor air temperature drops by 1 °C and by one more 1 °C in the next hour. In the next hour the air temperature drops by 1 °C more and remains constant for the next 5 hours. After turning the timer off the air temperature reaches the initial value.
- **Operation in cooling mode:** 30 minutes after activation of the night mode the indoor air temperature increases by 1 °C and by one more 1 °C in the next hour and remains constant for the next 6 hours. After turning the timer off the air temperature drops down to the initial value.

Temperature controller wiring options

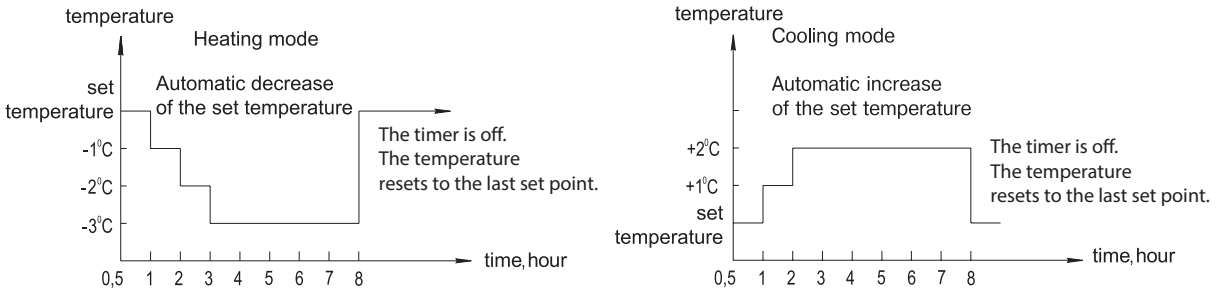


Ventilation with heating and cooling

Ventilation with heating and cooling Three-wire SPDT valve system

Ventilation with heating and cooling Two-wire SPST valve system

Operation in night mode



JUNCTION BOX FOR WALL FLUSH MOUNTING

MKV-1

Sensor speed switch

SP3-1

Application

Applied in ventilation systems for turning the fans on/off and speed switch of multi-speed fan motors.

Design and control

The casing is made of plastic and is equipped with a sensor panel made of hardened glass. The sensor panel has three speed switch buttons. Press a respective speed button to activate a required speed of a connected ventilation unit.

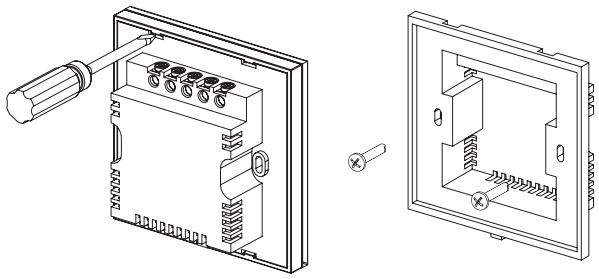
Press an activated speed button to turn the ventilation unit off. The activated speed button glows blue.

Mounting

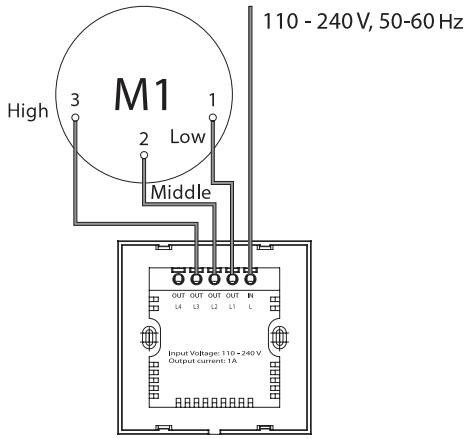
The speed switch is designed for indoor mounting into special surface mounting box MKN-5 (upon special order) or flush mounting junction box MKV-1 (included).

Technical data

	SP3-1
Voltage [V/50 (60) Hz]	110-240
Maximum load current [A]	1
Cable cross section	0.35 up to 1 mm^2
Temperature range [°C]	from -10 up to +45
Humidity range	5 % up to 80 % (no condensation)
Service life	100 000 switching operations
Protection rating	IP30
Mass [kg]	0.138

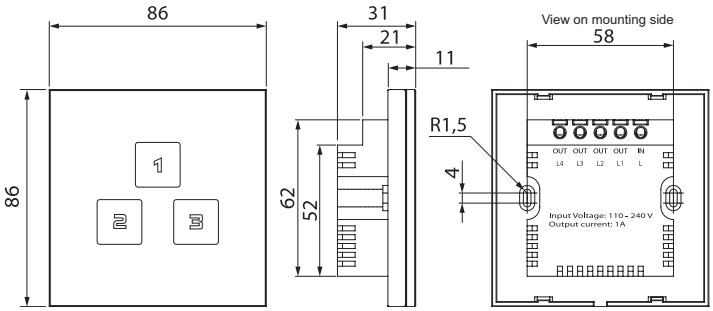


Sensor speed switch mounting



Sensor speed switch mounting

Overall dimensions:



SURFACE MOUNTING JUNCTION BOX

MKN-5

Switch

P2-1-300
P3-1-300

Applications

Applied for speed ON/OFF switching and speed select switching in the fans with multi-speed motors.

Design and control

The casing is made of plastic. Provision is made for the direct switching of the motor speeds (wiring diagram 1 and 3) as well as fan switching ON and control synchronically with lightening in the room (wiring diagram 2 and 4).

Mounting

Speed switch is designed for indoor wall mounting inside a flush mounting box MKV-2 (under separate order). It can be installed into standard round electric junction boxes.

Technical data

	P2-1-300	P3-1-300
Voltage [V/ 50 Hz]	1~230	1~230
Rated current [A]	3.0	3.0
Number of selected speeds	2	3
Overall dimensions LxWxH [mm]	88x88x51	88x88x51
Maximum ambient temperature [°C]	40	40
Protection rating	IP40	IP40
Mass [kg]	0.13	0.13

SWITCH CONNECTION OPTIONS

diagram 1

The fan can be manually switched ON to one of the three required speeds or switched OFF by means of external speed switch as P3-1-300.

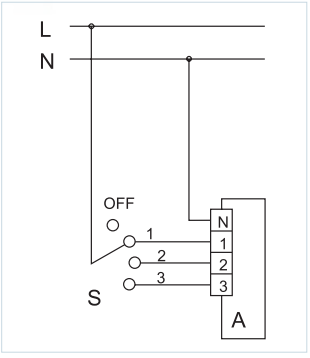


diagram 2

The fan can be manually switched ON to one of three speeds by means of such external S speed switch as P3-1-300. When switching the fan ON the light is switched in parallel ON. The fan can be switched OFF with parallel switching the light OFF. The fan operates both with light or without it.

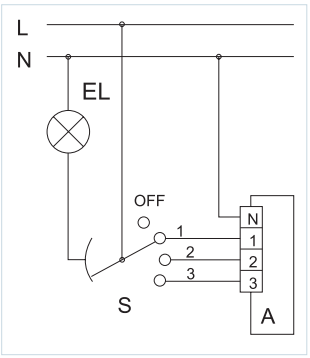


diagram 3

The fan can be manually switched ON to one of the two required speeds or switched OFF by means of the external speed switch as P2-1-300.

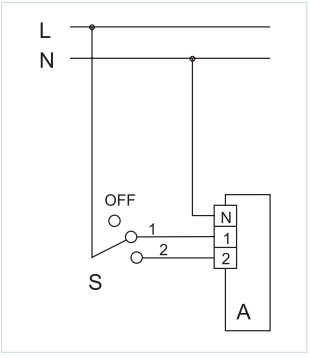
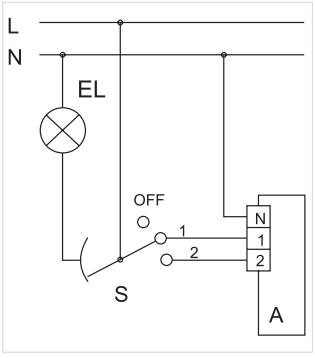


diagram 4

The fan can be manually switched ON to one of three speeds by means of the external S speed switch as P2-1-300. When switching the fan ON the light is switched in parallel ON. The fan can be switched OFF with parallel switching the light OFF. The fan operates both with light or without it.



FLUSH MOUNTING JUNCTION BOX

MKV-2

Switch

P2-5,0 N(V)
P3-5,0 N(V)
P5-5,0 N(V)

Applications

Applied for speed ON/OFF switching and speed selection in the fans with multi-speed motors.

Design and control

The switch casing is made of plastic and fitted with ON/OFF knob with operating mode indicator light. The fan speeds can be switched directly or by means of the remote panel for speed switching for multistage transformer speed controller as P5-5,0 for five-stage transformer speed controller.

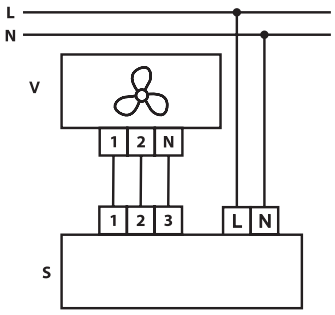
Mounting

The universal design of the controller enables its indoor wall mounting either on the wall (H modification) or through the wall (V modification).

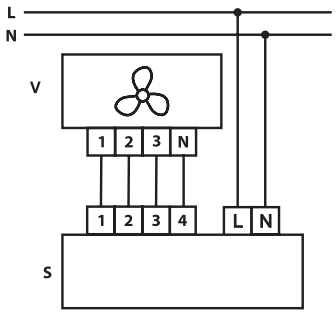
Technical data

	P2-5,0	P3-5,0	P5-5,0
Voltage, [V/ 50 Hz]	1~230	1~230	1~230
Rated current [A]	5.0	5.0	5.0
Number of selected speeds	2	3	5
Overall dimensions LxWxH [mm]	162x80x70	162x80x70	162x80x70
Maximum ambient temperature [°C]	40	40	40
Protection rating	IP40	IP40	IP40
Mass [kg]	0.25	0.25	0.25

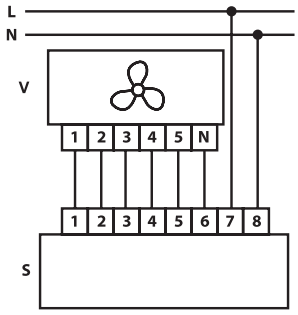
V – fan;
S – switch



P2-5,0 N(V)



P3-5,0 N(V)



P5-5,0 N(V)

Switch connection options

Speed switch

P2-10

Application

Turning fan on/off and speed switching for multi-speed fans.

Design and control

The speed switch casing is made of non-combustible and impact-resistant ABS plastic. The switch has an integrated on/off button and a speed switch button.

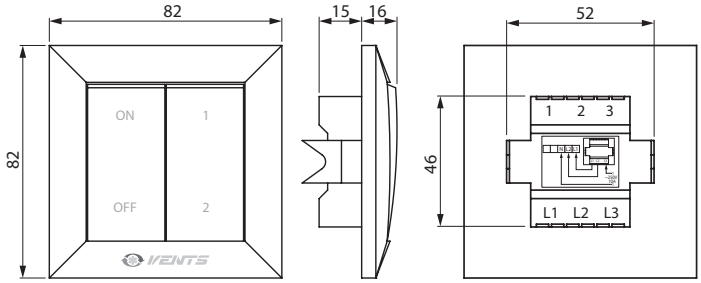
Mounting

The speed switch is designed for indoor installation and flush wall mounting inside a junction box and its fixation with screws or fixing lugs. A junction box and fasteners are not included in the delivery set.

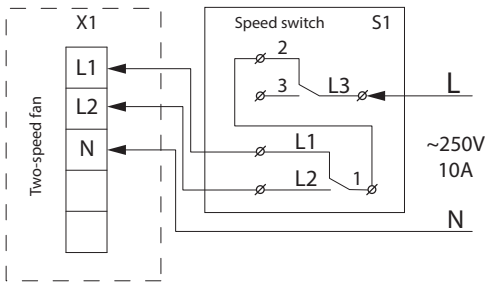
Technical data

Max. power voltage [V]	250
Max. load current [A]	10
Cable cross section [mm²]	from 0.35 up to 0.75
Temperature range [°C]	from -10 up to +45
Humidity range [%]	5 – 80 (no condensation)
Service life	1 000 000 switching operations
Protection rating	IP40
Mass [kg]	0.098

Overall dimensions [mm]:

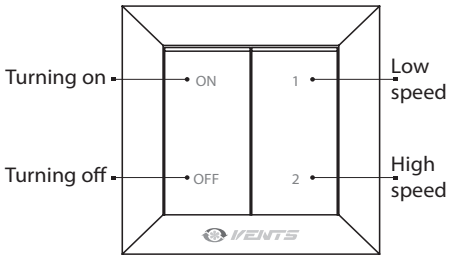


Wiring diagram:

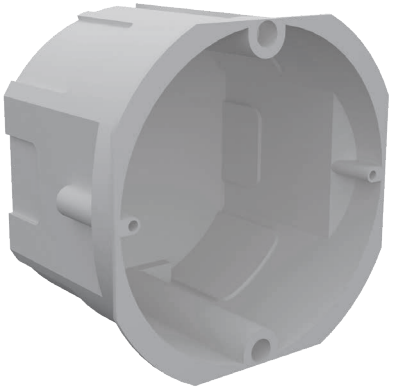


Speed switch control:

Control: switch buttons for turning on/off and speed changeover.



JUNCTION BOX



MKV-4 (flush mounting)

Speed controller

R-1/010

Applications

Applied for smooth speed control of EC motors with the control input 0-10 V.

Design and control

The controller casing is made of plastic. Switching ON/OFF is effected by means of control knob rotation. The control range starts from the minimum possible value and includes the maximum possible values.

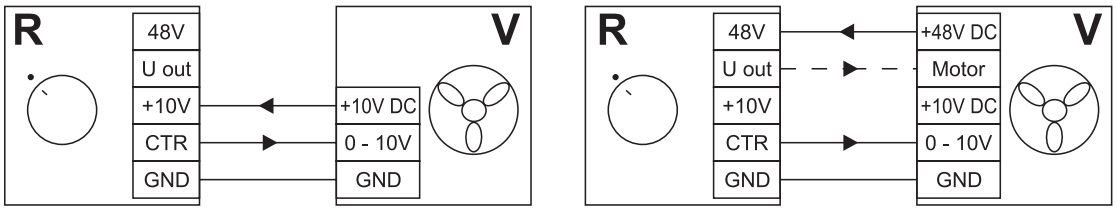
Mounting

The controller is designed for indoor mounting into special surface mounting (MKN-3) or flush mounting (MKV-4) junction box (under separate order) or into standard round electric junction boxes.

Technical data

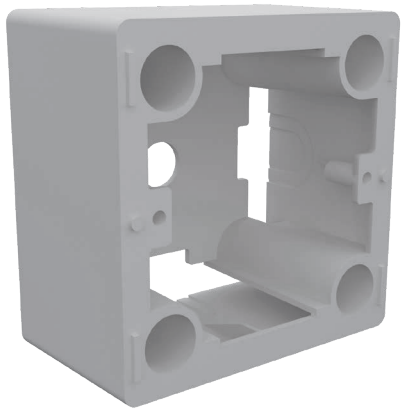
	R-1/010
Voltage [V]	10-48VDC
Control signal [V]	0-10
Maximum current [mA]	5mA
Overall dimensions LxWxH [mm]	78x78x63
Maximum ambient temperature [°C]	35
Protection rating	IP40
Mass [kg]	0.12

Designation key
V – fan;
R – controller R-1/010

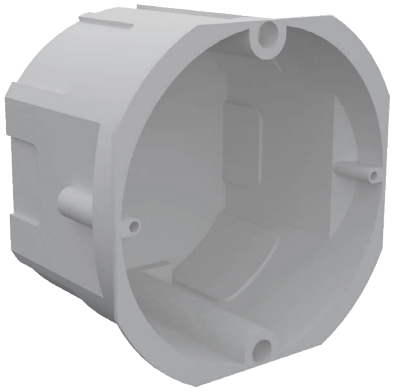


Controller wiring diagram

MOUNTING JUNCTION BOX



MKN-3 (for surface mounting)



MKV-4 (for flush mounting)

Electro-mechanical humidistats

HR-S

Purpose

The humidistat is designed for controlling humidification and/or dehumidification in ventilation, air conditioning and heating systems. Can also be used to alarm when the humidity exceeds or falls below a pre-set level.

Design

The single-stage humidistat HR-S uses a synthetic element as sensor medium. The synthetic element stretches as the humidity increases and shrinks as the humidity decreases.

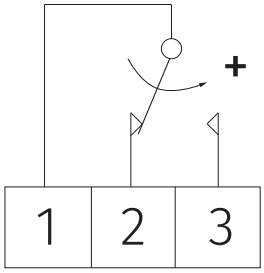
Mounting

The humidistat is designed for indoor mounting on the wall surface.

Technical data

Switch contact	250 V AC, 5 A
Moisture [%]	20-90 %
Casing material	Polycarbonate
Temperature range [°C]	0-40
Mounting	Wall surface mounting
Ingress protection	IP30
Dimensions [mm]	86x86x30

Humidistat wiring diagram



Humidification	Closing contact between terminals 1 and 2
Dehumidification	Closing contact between terminals 1 and 3

Series
DPWC11200

Features
The DPWC humidity sensor is intended for humidification control in air ventilation, air conditioning and heating systems.

Design
The DPWC11200 humidity and temperature sensor has 2 analogue outputs: 0-10 V and 4-20 mA. An analogue output provides for stepless fan speed control (requires an EC-motor fan or an extra speed controller with an output 0…10 V, for example, VFED). With stepless control the fan speed is changed in proportion to the humidity level.

Mounting
The sensor is mounted onto a wall in the serviced space. The unit is powered from a 24 V AC/DC low-current electric mains.

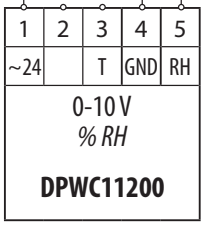
Technical data

Parameters	Values
Power source	8-30 V DC/12-24 V AC
Analogue outputs	0-10 V and 4-20 mA
Temperature measurement precision	±1,2 °C
Humidity measurement precision	±3 % RH
Operating conditions	-10-60 °C; 10-90 % humidity without condensate
Protection class	IP30
Dimensions [mm]	127x80x30

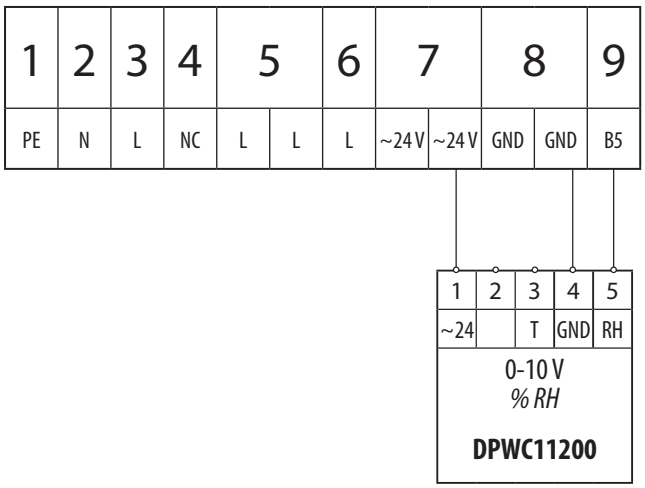
Connection diagram

VUTR P/V EC

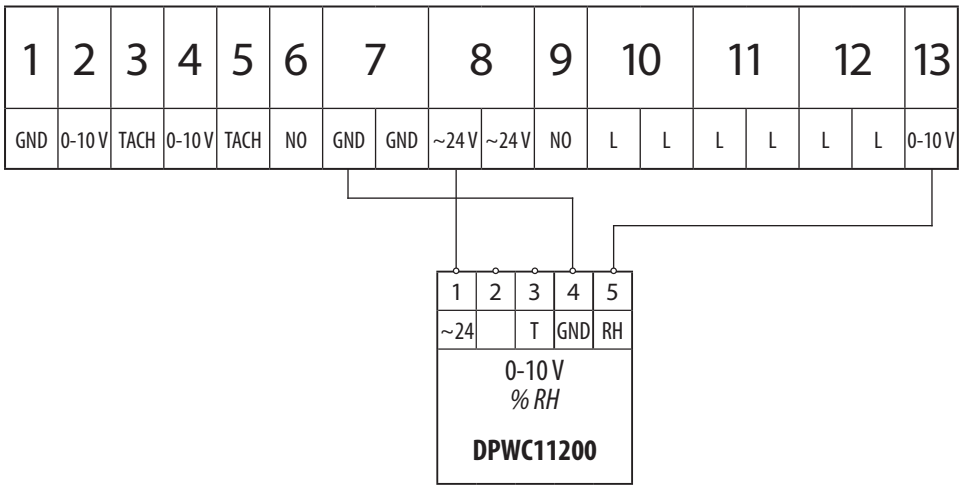
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
GND	R+	R-	GND~	~24 V	0-10 V	GND	~24 V	NO	NO	NO	NO	2	1	2	1	TS1	TS1	PE	N	L	N	L1



DVUT HB EC



DVUT PB EC



Sensor

T-1,5 N
TH-1,5 N
TF-1,5 N
TP-1,5 N

T-1,5 N – run out timer

Enables the fan operation within the set time period after pressing the knob for switching the fan OFF. After the set time from 2 to 30 minutes the fan switches automatically OFF. The run-out timer is generally applicable for the fans installed in bathrooms, WC or kitchens.

TH-1,5 N – humidity sensor

The fan with such sensor switches automatically ON in case of exceeding the set humidity level. A user can independently adjust the required humidity level based on personal preferences.The humidity sensor is generally applicable for the fans installed in the premises with increased humidity as bathrooms, kitchens, washing rooms or pools.

TF-1,5 N – timer + photo sensor

The built-in photo sensor responds to the indoor illumination rate fluctuations and has the provisions for automatic switching the fan ON accordingly. In case of light switching OFF the fan will be switched OFF with respect to the built-in run-out timer with the time period set between 2 to 30 minutes. In such a way the ventilation system fitted with a photo sensor is fully automated and requires no human control. The photo sensor is generally applicable for the fans installed in periodically visited premises.

TP-1,5 N – infra-red sensor

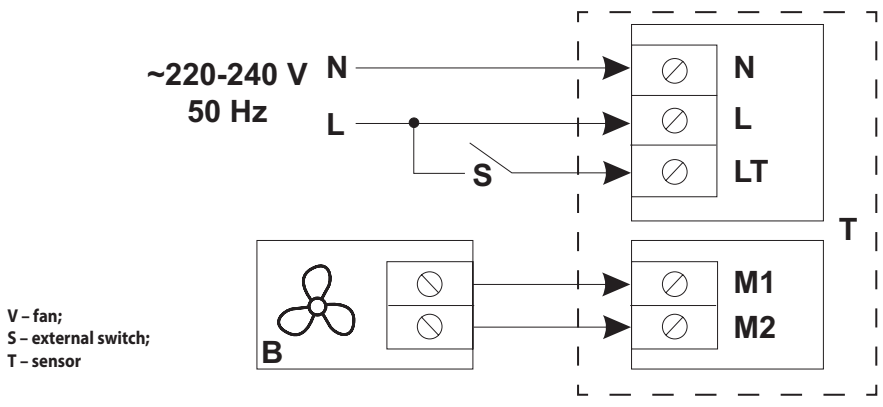
The built-in infra-red sensor responds to movement in a room and switches the fan automatically ON. If the room is empty the fan switches OFF with respect to the built-in run-out timer adjustable between 2 to 30 minutes. In such a way the ventilation system fitted with infra-red sensor is fully automated and requires no human control. The infra-red sensor is generally applicable for the fans installed in periodically occupied spaces.

Mounting

The sensors are designed for indoor wall surface installation (Modification N).

Technical data

	T-1,5 N/TH-1,5 N TF-1,5 N/TP-1,5 N
Voltage [V/50 Hz]	230
Max. power [VA]	330
Max. current [A]	1.5
Overall dimensions LxWxH [mm]	162x80x70
Timer operating conditions [°C]	from 1 up to +45
Protection rating	IP30
Mass [kg]	0.400

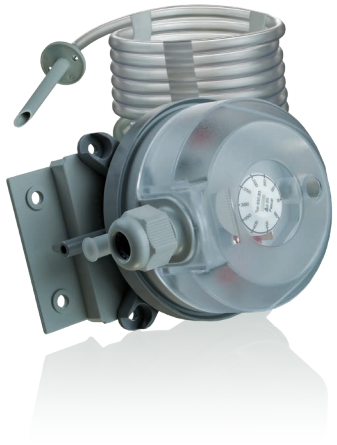


V – fan;
S – external switch;
T – sensor

Switch wiring diagram

Pressostat

DTV 500



Application

The pressure differential switch is used to determine air rarefaction or air (non-aggressive gases) pressure drop. It is used in ventilation systems to determine air filter clogging degree or belt breaking in centrifugal fans, etc.

Design and control

The pressostatt switch of made of plastic. The pressure differential for the pressure switch actuation is set by turning the disk in the casing. The delivery set includes 2 plastic pressure outlets for pressure tap-off, PVC tubes Ø 5 mm and 2 m long.

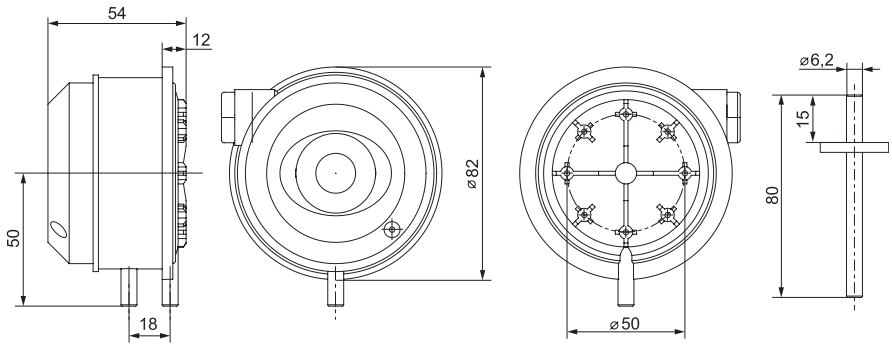
Mounting

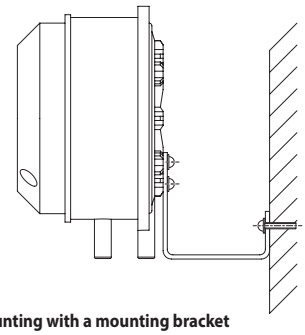
The pressure switch is designed for surface wall mounting or installation into air ducts on the mounting bracket with two Ø 5 mm openings located at 40 mm center-to-center distance. The switch is suitable both for vertical and horizontal installation. However vertical orientation is preferable because in case of horizontal orientation the switching point will be shifted for 11 Pa. The length of pressure outlet tubes is variable but the relay actuation time increases if the tube length is above 2 m. Install the differential pressure switch above the pressure tapping points. Connect the tubes in such a way as to avoid formation of tubular loops to prevent condensate accumulation inside the tubes.

Technical data

	DTV 500
Number of contacts	1
Contact data [A]	5 (0.8) 250 V AC
Reset mechanism	changeover
Pressure range [Pa]	50...500
Hysteresis loop	25 Pa +/- 8 Pa
Protection rating	IP54

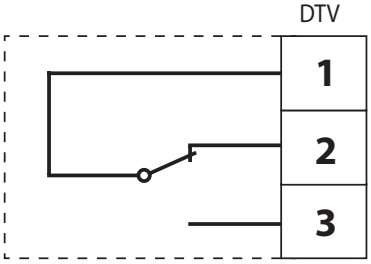
Overall dimensions





Mounting with a mounting bracket

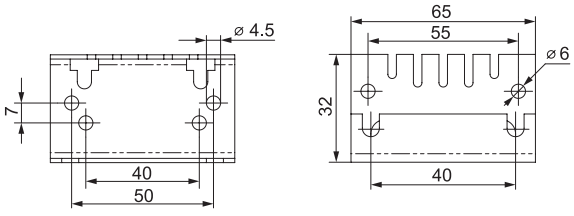
Pressostat wiring diagram



General

The switch closes the terminals 1-2 when the pressure is low

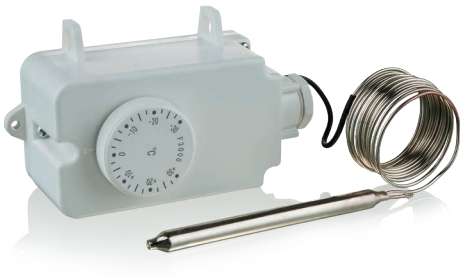
The switch closes the terminals 1-3 when the pressure is high



Metal mounting bracket

Thermostat

F-3000



Application

The thermostats with bridging contacts are designed for regulation of air temperature, temperature of liquids and gases and are widely used in electric water heaters, dishwashing and clothe washing machines, drying machines, electric furnaces, etc. The thermostat is used to prevent freezing of water heaters and heat exchangers according to exhaust air temperature readings.

Design and control

The operating logic is based on volumetric thermal extension. The thermostatic bulb is located in the copper sleeve. Liquid placed inside the thermostatic bulb is heated, expanded and its excessive volume is transferred through the capillary tube to the bellows. The bellows are elongated and transmit force to the relay contact. Thus the set temperature is maintained in the system. The thermostat casing is made of plastic. The temperature probe is made of copper. The response temperature is set by rotation of the disk in the casing.

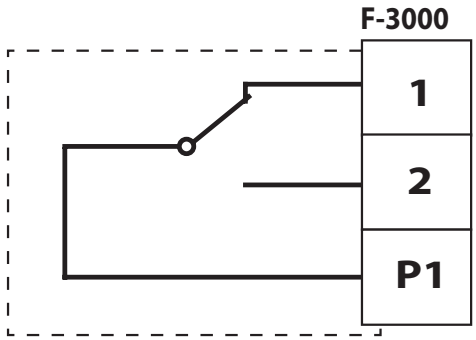
Mounting

The thermostat is suitable for wall surface mounting or installation in the duct in any position. The casing is fixed to the surface with screws on the front panel. The thermostatic bulb is designed for operation in tempersture-controlled environment. The thermostat is connected with the thermal bellows with 1.5 m long capillary tube.

Technical data

	F-3000
Relay switching capacity	16A 230 V (active load)
Length of the capillary tube [m]	1.5
Operating temperature range [°C]	-30 up to +30
Reset mechanism	changeover
Operating pressure range [Pa]	50...500
Number of contacts	1 per switch
Protection rating	IP54

Thermostat wiring diagram



If current temperature is below set value the contacts P1 and 1 are closed

If current temperature is above set value the contacts P1 and 2 are closed

General

Electric triac temperature controllers for single and two-phase electric heaters

PULSER-M

Application

The triac controller **PULSER-M** is designed for control of electric heaters power output. The controller design allows connecting to single or two phase heater.

Design and control

PULSER-M is equipped with a built-in temperature controller for indoor temperature control and external main sensor as well as input terminals for connection of the built-in temperature sensor that can be used as a main sensor and the sensor for minimum and maximum limitations. The temperature controller selects required voltage automatically depending on 230 or 400 V operation. P or PI control law is selected automatically. Temperature setting range depends on the used temperature sensor, refer temperature sensors TG-K.

Mounting

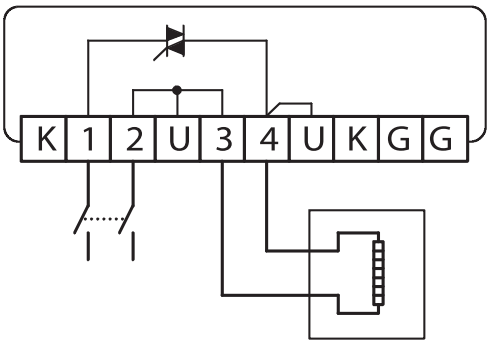
The controller is designed for mounting on the vertical level surface between power supply and the electric heater.

Technical data

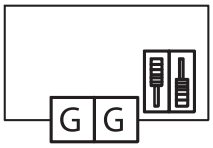
	PULSER-M
Maximum load current	16 A (3400/6000 W)
Voltage [V]	230/400
Pulse period	60 s
Overall dimensions [mm]	94x150x43
Mass [kg]	0.300
Protection rating	IP20

Wiring diagrams

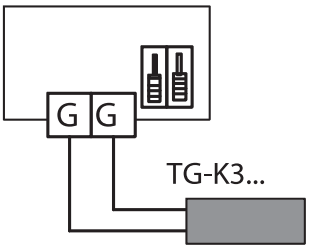
Connection to electric heater and power mains



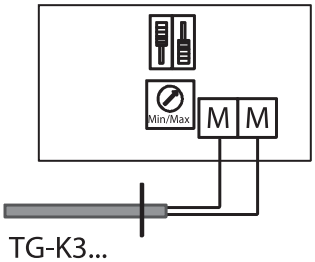
Built-in sensor and settings



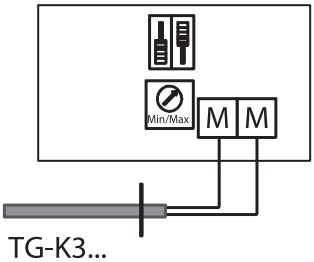
Connection of external sensors



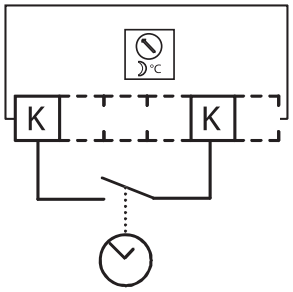
Connection of the sensor for minimum temperature



Connection of the sensor for maximum temperature



Connection for night set-back



TRIAC power controller for electric heaters

RNS

Applications

Applied in ventilation systems for regulating the power output of electric heaters with load current rating up to 120 A.

Design and control

The controller casing is made of flame-retardant thermoplastic. The controller is equipped with an ON/OFF button and a heating temperature control knob. Electric power output is regulated by proportional connection and disconnection of the full load depending on the pre-set heating temperature. The RNS-16 is capable of controlling only one heating stage. Unlike the smaller models, RNS-25 are capable of controlling one or three heating stages with the power output equal or exceeding that of the controlled stage. The power output of the first stage is controlled steplessly by switching the full load on and off. The second and third stages are controlled in steps. For overheating protection the electric heater must be equipped with two built-in thermal contacts: TK50 with intervention temperature of +50 °C and automatic restarting and TK90 with response temperature of +90 °C and manual restarting. The air temperature is set by means of the built-in potentiometer or the external control device generating a 0-10 V control input for increasing the duct temperature proportionally in the range from 0 to +40 °C. The duct temperature sensor must be installed downstream of the heater in the direction of the air stream at the minimum distance of 50 cm from the heater. If the controller runs in the heating power output mode in disregard of the temperature sensor feedback, no duct temperature sensor is necessary whereas the heating power output is regulated in the 0 to 100 % range by means of the 0-10 V control signal.

Protection

Input circuit of the power controller has a thermal fuse for overload protection.

Mounting

The controller is designed for indoor mounting. Installation shall be performed with respect to the free air circulation for inner circuit cooling. The controller is for vertical installation. Do not install the controller above the heaters and in bad air convection areas.

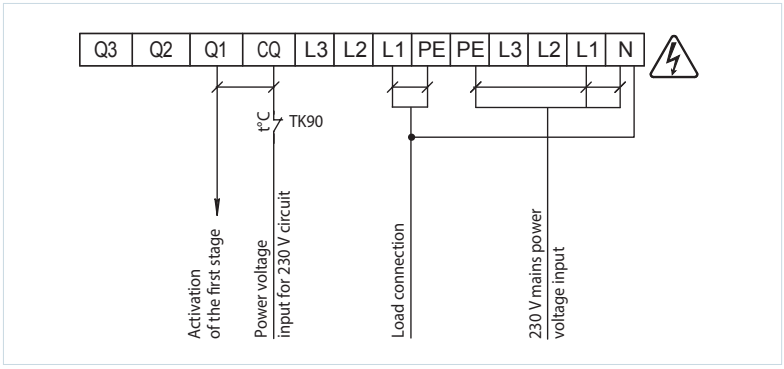
Technical data

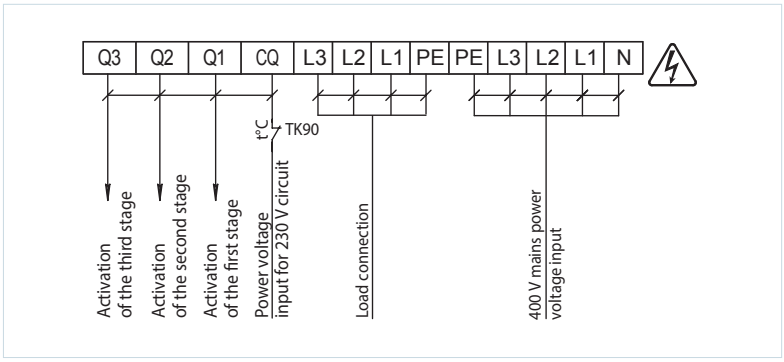
	RNS-16	RNS-25
Max. load current (single stage) [A]	25	40
Heater power (single stage) [kW]	16	25
Max. load current (three stages) [A]	–	120
Heater power (three stages) [kW]	–	75
Control circuit supply voltage	~230 V/50 Hz	
Nominal current of control circuit board fuse [A]	0.1	
Cross-section area of screw terminal block input pin [mm²]	4...10	
Protection rating	IP54	
Overall dimensions [mm]	170x255x140	
Weigh [kg]	1.2	
Mains parameters: • voltage [V] • frequency [Hz] • phases	 210-255, 380-415 50-60 1 or 3	
Operating temperature range [°C]	+5...+40	

Note: heat generated by the RNS-16 controller themselve is 50 W, by the RNS-25 controller – 80 W.

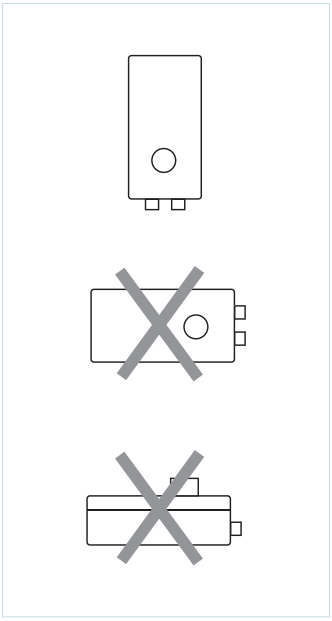
Control parameters	
Regulation time [s]	0.1 (fixed)
Cycle length [s]	1...10 (adjustable)
Indication	Power, operation and malfunction indicator
Type of temperature sensor used	LM 60
Input signal parameters [V]	0...10 (direct current)
Set temperature range [°C]	0...40 (adjustable)

External connections diagram

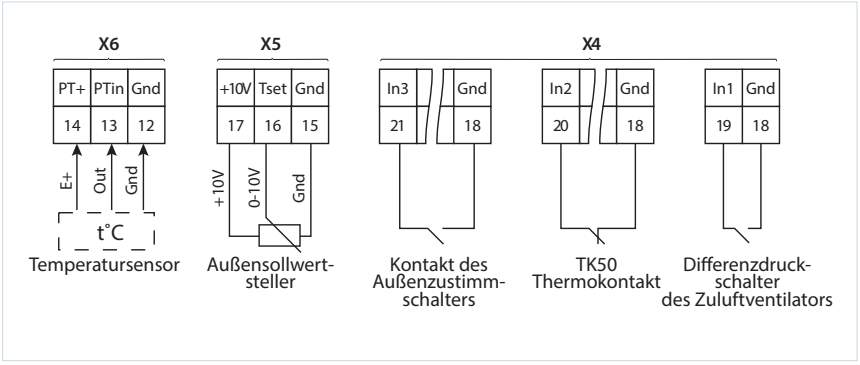




Attention!
THE CONTROLLER IS INTENDED FOR VERTICAL MOUNTING ONLY!



Control unit wiring diagrams



Duct temperature sensors

KDT-M/KDT-M1

Application

The duct temperature sensors are designed for installation in the air duct and temperature measurement of the air flow in the ventilation and air conditioning systems.

Design

The sensing element, NTC thermometer resistor, is enclosed in the aluminium sleeve. The thermometer resistor electric resistor depends on the temperature, the non-linear resistance. Connection of the sensor to the controller is double-wired, regardless of polarity.

The KDT-M sensor delivery set includes a mounting flange with a fixing screw for its fixation to the air duct wall. The sensors are supplied with a 2.5 m connecting cable. The immersion depth is adjusted for 100, 150, 200 or 400 mm.

Mounting

Fixation with screws to the air duct wall by means of the flange with the sensing element located the air stream.

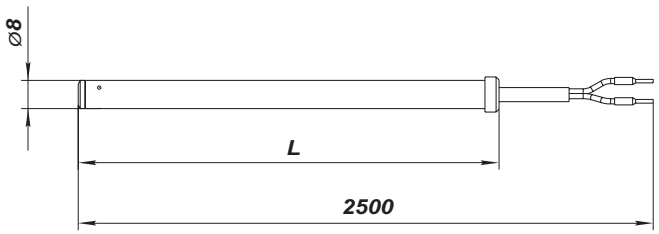
Technical data

	KDT-M/KDT-M1
Temperature measuring range [°C]	-30…+80
Voltage [V]	≤ 5 DC*
Output	resistance
Electric connection	double-wire, cross section 2x0.25 mm^2
Relative humidity	up to 90 %, no condensation
Protection rating	IP54
Electrical appliance class	III

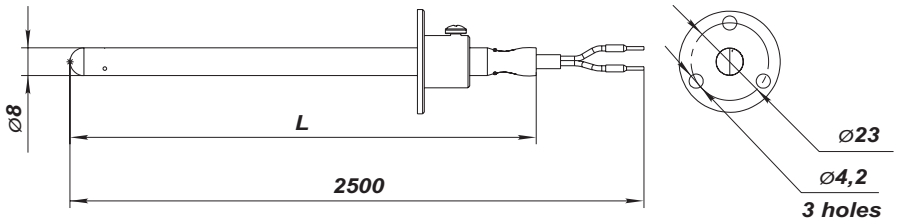
*Maximum current generated through the sensor by the applied voltage is 2 mA.

Overall dimensions:

Type	L [mm]
KDT-M 100/KDT-M1 100	100
KDT-M 150/KDT-M1 150	150
KDT-M 200/KDT-M1 200	200
KDT-M 400/KDT-M1 400	400



KDT-M1 duct temperature sensor



KDT-M duct temperature sensor

Duct temperature sensors

KDT2-M/KDT2-M1

Application

The duct temperature sensors are designed for installation in the air duct and temperature measurement of the air flow in the ventilation and air conditioning systems.

Design

The sensor consists of the integrated circuit chip located inside the plastic casing. This sensor type has a linear transfer characteristics of output voltage to temperature and a three-wire connection to power mains.

This sensor type is not compatible with resistance sensors. During electric connections the polarity of the outputs connected to the inputs of the air handling units must be considered.

The KDT-M sensor delivery set includes a mounting flange with a fixing screw for its fixation to the air duct wall.

The KDT-M sensor delivery set includes a mounting flange with a fixing screw for its fixation to the air duct wall. The sensors are supplied with a 2.5 m connecting cable. The immersion depth is adjusted for 100, 150, 200 or 400 mm.

Mounting

Fixation with screws to the air duct wall by means of the flange with the sensing element located the air stream.

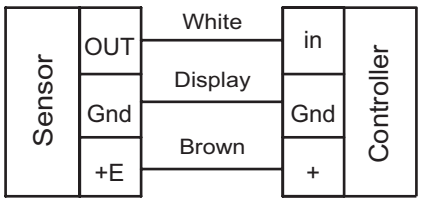
Technical data

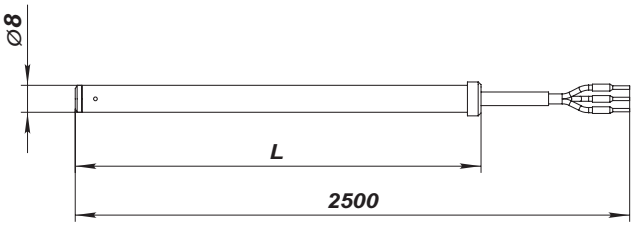
	KDT2-M/KDT2-M1
Temperature measuring range [°C]	-30…+80
Voltage [V]	2,7…10
Output resistance [Ohm]	800
Electric connection	three-wire, cross section 2x0.25 mm²
Relative humidity	up to 90 %, no condensation
Protection rating	IP54
Electrical appliance class	III

Overall dimensions

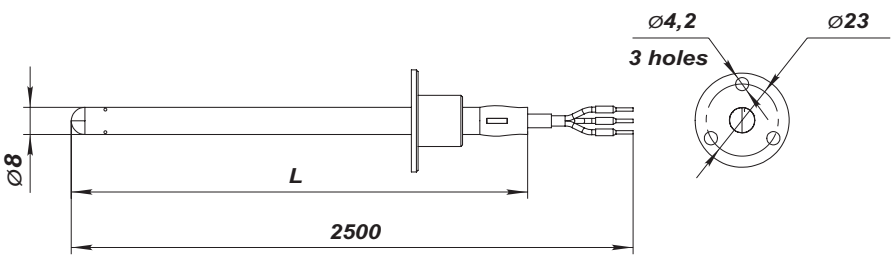
Type	L [mm]
KDT2-M 100/KDT2-M1 100	100
KDT2-M 150/KDT2-M1 150	150
KDT2-M 200/KDT2-M1 200	200
KDT2-M 400/KDT2-M1 400	400

Wiring diagram





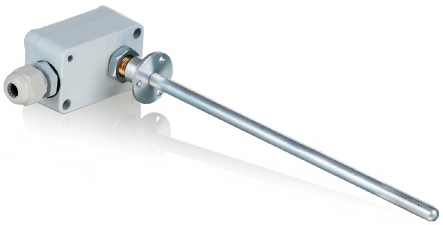
KDT2-M1 duct temperature sensor



KDT2-M duct temperature sensor

Duct temperature sensors with a terminal box

KDT-MK



Application

The duct temperature sensors are designed for installation in the air duct and temperature measurement of the air flow in the ventilation and air conditioning systems.

Design

The sensing element, NTC thermometer resistor, is enclosed in the aluminium sleeve. The thermometer resistor electric resistor depends on the temperature, the non-linear resistance. Connection of the sensor to the controller is double-wired, regardless of polarity.

The KDT-MK sensor delivery set includes a mounting flange with a fixing screw for its fixation to the air duct wall.

The sensors are supplied with a 2.5 m connecting cable. The immersion depth is adjusted for 100, 150, 200 or 400 mm.

Mounting

Fixation with screws to the air duct wall by means of the flange with the sensing element located the air stream.

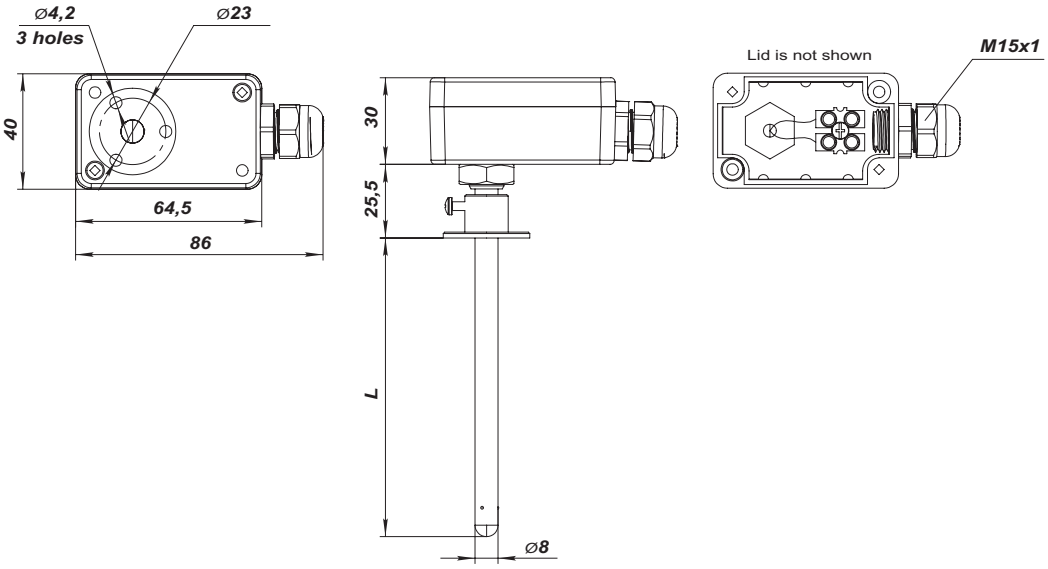
Technical data

	KDT-MK
Temperature measuring range [°C]	-30…+60
Voltage [V]	≤ 5 DC *
Output	resistance
Electric connection	double-wire, cross section 2x0.25 mm²
Relative humidity	up to 90 %, no condensation
Protection rating	IP54
Electrical appliance class	III

*Maximum current generated through the sensor by the applied voltage is 2 mA.

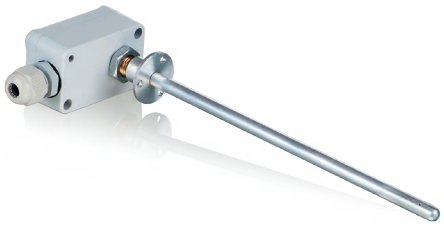
Overall dimensions:

Type	L [mm]
KDT-MK 100	100
KDT-MK 150	150
KDT-MK 200	200
KDT-MK 400	400



Duct temperature sensors with a terminal box

KDT2-MK



Application

The duct temperature sensors are designed for installation in the air duct and temperature measurement of the air flow in the ventilation and air conditioning systems.

Design

The sensor consists of the integrated circuit chip located inside the plastic casing. This sensor type has a linear transfer characteristics of output voltage to temperature and a three-wire connection to power mains.

This sensor type is not compatible with resistance sensors. During electric connections the polarity of the outputs connected to the inputs of the air handling units must be considered.

The KDT2-MK sensor delivery set includes a mounting flange with a fixing screw for its fixation to the air duct wall. The sensors are supplied with a 2.5 m connecting cable. The immersion depth is adjusted for 100, 150, 200 or 400 mm.

Mounting

Fixation with screws to the air duct wall by means of the flange with the sensing element located the air stream.

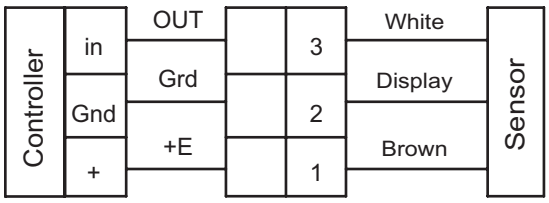
Technical data

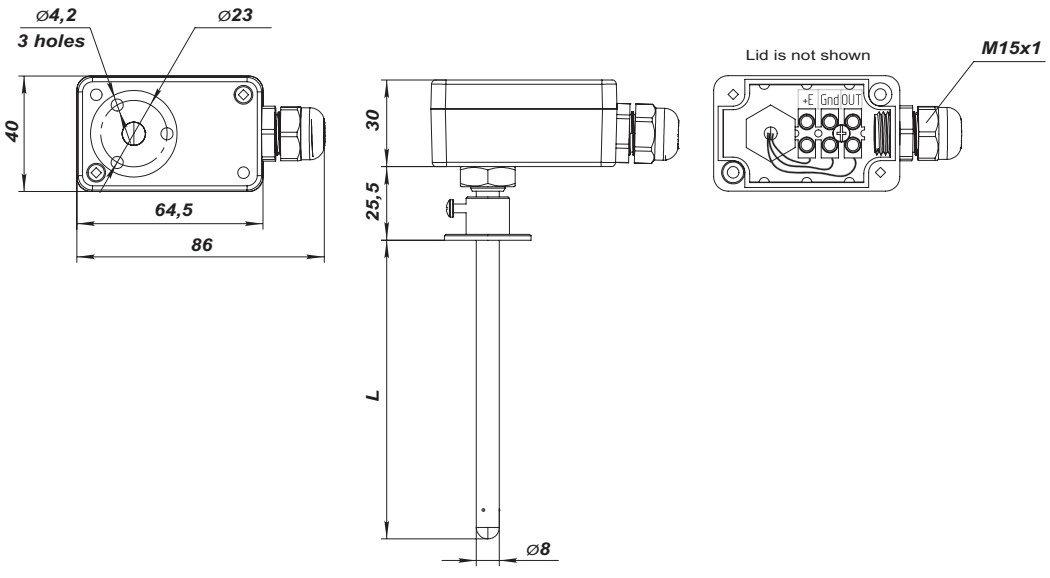
	KDT2-MK
Temperature measuring range [°C]	-30…+60
Voltage [V]	2,7…10
Output resistance [Ohm]	800
Electric connection	three-wire, cross section 3x0.25 mm^2
Relative humidity	up to 90 %, no condensation
Protection rating	IP54
Electrical appliance class	III

Overall dimensions:

Type	L [mm]
KDT2-MK 100	100
KDT2-MK 150	150
KDT2-MK 200	200
KDT2-MK 400	400

Wiring diagram





Outdoor temperature sensor

NDT

Application

The outdoor temperature sensor is designed for outdoor temperature measurement in ventilation and air conditioning systems.

Design

The sensing element, NTC thermometer resistor, is enclosed in the plastic housing. The plastic housing incorporates also a copper probe for higher sensing efficiency. The thermometer resistor electric resistor depends on the temperature, the non-linear resistance. Connection of the sensor to the controller is double-wired, regardless of polarity.

The sensor is connected to power mains through the terminal blocks of the circuit board located in the casing.

Mounting

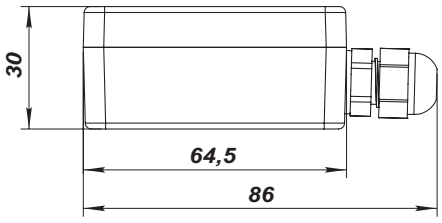
Outdoor mounting.

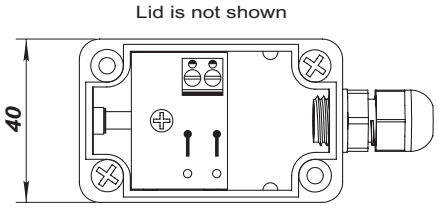
Technical data

	NDT
Temperature measuring range [°C]	-30…+60
Voltage [V]	≤ 5 DC *
Output	resistance
Electric connection	cross section 2x0.25 mm²
Relative humidity	up to 90 %, no condensation
Protection rating	IP54
Electrical appliance class	III

*Maximum current generated through the sensor by the applied voltage is 2 mA.

Overall dimensions [mm]





Outdoor temperature sensor

NDT2

Application

The outdoor temperature sensor is designed for outdoor temperature measurement in ventilation and air conditioning systems.

Design

The sensor consists of the integrated circuit chip located inside the plastic casing. This sensor type has a linear transfer characteristics of output voltage to temperature and a three-wire connection to power mains.

This sensor type is not compatible with resistance sensors. During electric connections the polarity of the outputs connected to the inputs of the air handling units must be considered.

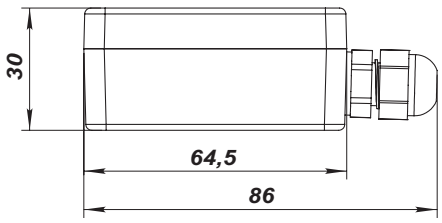
Mounting

Outdoor mounting.

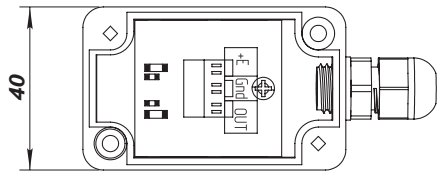
Technical data

	NDT2
Temperature measuring range [°C]	-40 …+60
Voltage [V]	4…10
Output resistance [Ohm]	800
Electric connection	cross section 3x0.25 mm²
Relative humidity	up to 90 %, no condensation
Protection rating	IP54
Electrical appliance class	III

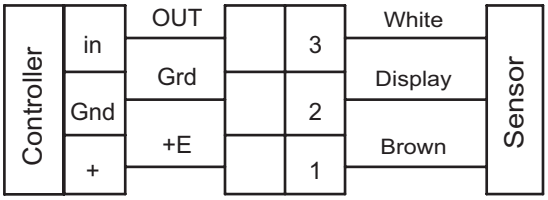
Overall dimensions [mm]



Lid is not shown



Wiring diagram



Duct temperature sensors

TG-K

Application

The duct sensors are used jointly with PULSER-M temperature controllers.

Design and control

The sensor is installed in the air duct. The sensors are supplied with connecting cable 1.5 m long and have adjustable length. The sensors differ in temperature sensitivity range.

Mounting

The sensor is installed in the air stream area. It is connected to the wall through a flange with two Ø 5 mm openings located at 40 mm center-to-center distance.

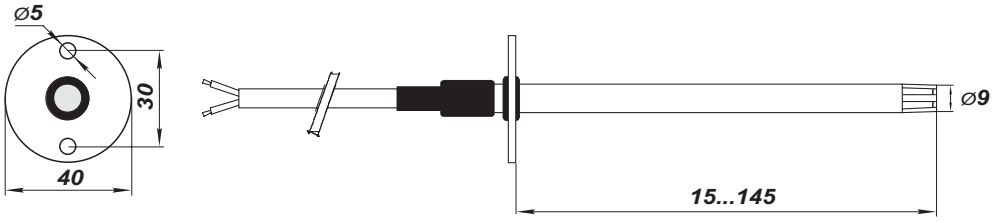
Technical data

	TG-K
Insertion length [mm]	15…145 (adjustable)
Length cable [m]	1.5
Sensitive element	linearized NTC sensor
Accuracy	above + /-1 °C
Pressure range [Pa]	50...500
Protection rating	IP54

Duct sensor model range:

Model	Temperature range
TG-K300	-30...+30 °C
TG-K330	0...30 °C
TG-K350	20...50 °C
TG-K360	0...60 °C

Overall dimensions [mm]



External
temperature controller
TS-1-90
for chimney fans

Applications

The temperature controller is designed for chimney fan control and applied for hot air distribution from chimney to the premises VENTS KAM T1, VENTS KAM Eco T1, VENTS KAM EcoDuo T1.

Design and control

The temperature controller casing is made of metal and equipped with the temperature control knob. The casing is connected with the temperature probe by means of a capillary tube of 1 m length. The temperature level is followed by the temperature probe which is installed directly inside the fireplace heat-exchanger. The appliance controls the fan operation and switches the chimney fan on or off depending on the set temperature increase or decrease.

Mounting

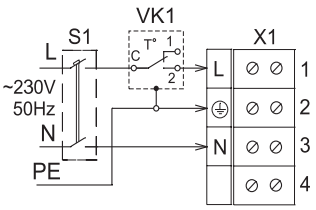
The temperature controller is mounted in the concealed or external mounting box. The temperature probe is installed inside the fireplace heat-exchanger. The temperature controller shall be installed away from the source of air heating.

Technical data

	TS-1-90
Voltage [V/50/60 Hz]	1~230
Maximum load current [A]	2.2
Maximum fan power [W]	500
Range of controllable temperatures [°C]	0…+90
Overall dimensions of the thermostat casing, [mm]	55 x 56 x 56
Capillary tube length [mm]	1000
Temperature probe [mm]	∅ 6.5 x 95
Maximum ambient temperarture for the casing [°C]	+80
Maximum temperature for the temperature probe and capillary tube [°C]	+150
Protection rating	IP40

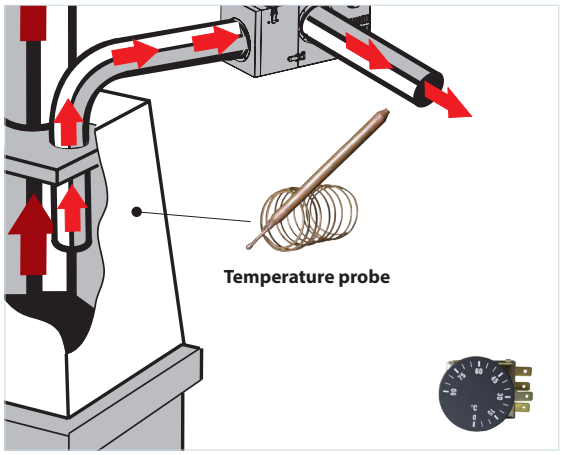
Wiring diagrams

Wiring diagram for KAM T1
single-phased motor fan to AC network

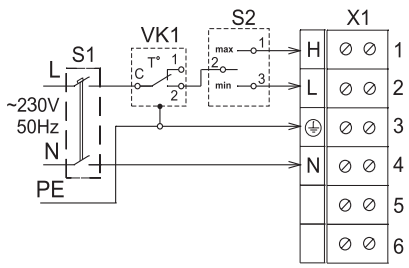


S1 - automatic switch
X1 - terminal block
VK1 - temperature regulator
S1 and VK1 available upon request

Applications



Wiring diagram for KAM EcoDuo T1
single-phased motor fan to AC network.



S1 - automatic switch
S2 - three-position switch
X1 - terminal block
VK1 - temperature regulator
S1, S2 and VK1 available upon request

Serie
DPWQ40200

Anwendung

Self-calibrating sensor with microprocessor control for measuring carbon dioxide contentration in the air within the range from 0 to 2,000 million^{-1} (parts per million).

Design

CO2 sensor has 2 analogue outputs: 0-10 V and 4-20 mA. An analogue output provides for stepless fan speed control (requires an EC motor fan or an additional fan speed controller with input 0 ... 10 V, for example, VFED). With stepless control the fan speed is changed in proportion to carbon dioxide concentration changes. The CO_2 dioxide concentration in the air is measured by means of a non-dispersive infrared analyser (NDIR).

Mounting

The sensor is mounted onto a wall or a mounting box inside the serviced space. The unit is powered from a 24 V AC/DC low-current electric mains.

Technical data

Parameters	Values
Power source	24 V AC/DC
Gas analyser	optical (NDIR)
CO_2 measurement range	0-2,000 million^{-1} (parts per million) of CO_2
CO_2 output signal	0-10 V
CO_2 measurement precision	± 30 million^{-1} (parts per million), ± 5 % of maximum value
Operating conditions	0-50 °C; 10-90 % relative humidity without condensate
Protection class	IP55
Dimensions [mm]	95x97x30

Connection diagram

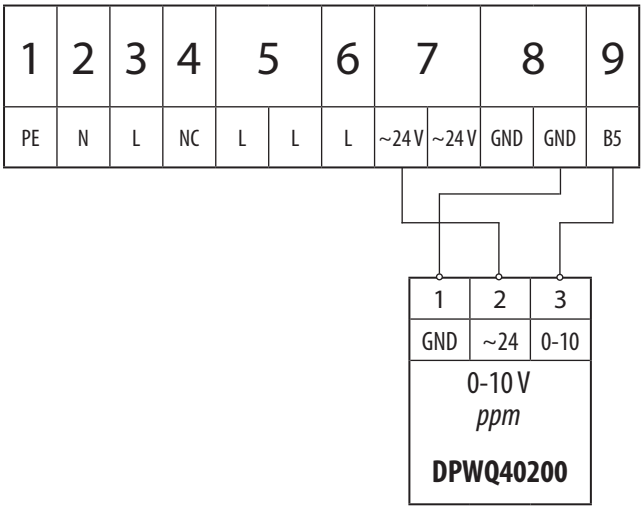
VUTR P/V EC

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
GND	R+	R-	GND~	~24 V	0-10 V	GND	~24 V	NO	NO	NO	NO	2	1	2	1	TS1	TS1	PE	N	L	N	L1

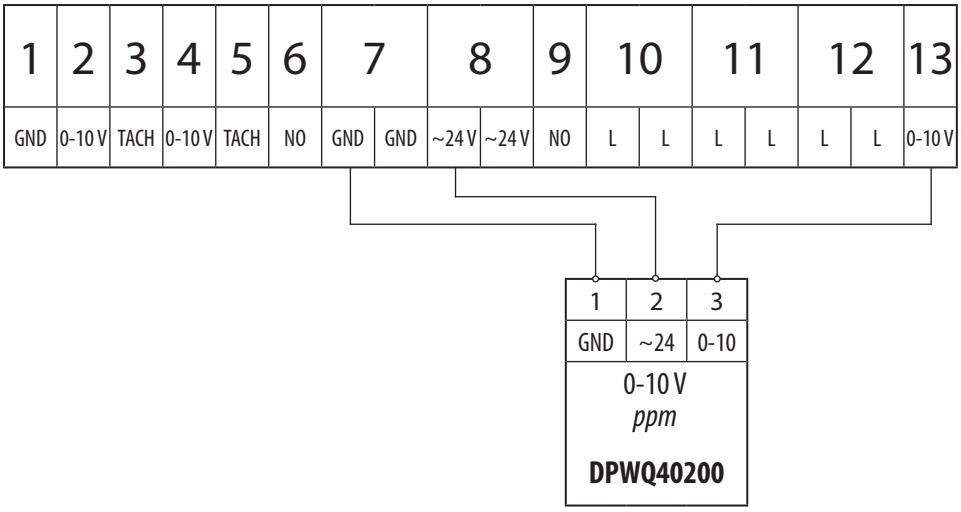
1	2	3
GND	~24	0-10

0-10 V
ppm
DPWQ40200

DVUT HB EC



DVUT PB EC



CO_2 sensor
CO2–1

CO_2 sensor
CO2–2

Application

The sensor is designed for indoor carbon dioxide concentration measurement and respective air flow regulation through the control output signal to the fan. Air flow control based on CO_2 concentration is an efficient energy saving solution.

Design and compatability

The sensor has two separate outputs: a normally opened dry relay contact and an analogue output 0…10 V (this output is adjustable for 2…10 V/0…20 mA/4…20 mA). The relay output is used to turn the fan on/off depending on indoor CO2-concentration and the analogue output is used for smooth fan speed control for a fan with EC-motor or a fan with extra speed controller with 0-10 V input, refer to RS...TA or VFED. In case of smooth fan speed control the fan speed varies proportionally to carbon dioxide emissions. The relay and analogue outputs make the sensor compatible with any ventilation system. The integrated self-calibration system ensures reliable sensor operation during the sensor service life.

Modifications

The sensor is available in two modifications: CO2-1 and CO2-2. The CO2-1 model incorporates LED lights for CO_2 concentration and operation buttons indicating the level of three operation modes: 1 – on, 2 – off, 3 – operation by CO_2 concentration. The button is used to switch the ventilation system on or off when CO_2-based ventilation control is not required. The CO2-2 model has no LED-lights and on/off button. The model is applied for premises requiring permanent ventilation, i.e. at school classes and other public premises.

Mounting and power supply

The sensor is designed for wall surface mounting. 24 VAC low current power supply.. If power supply 24 V is not available, connect the TRF plug that is offered as an accessory.

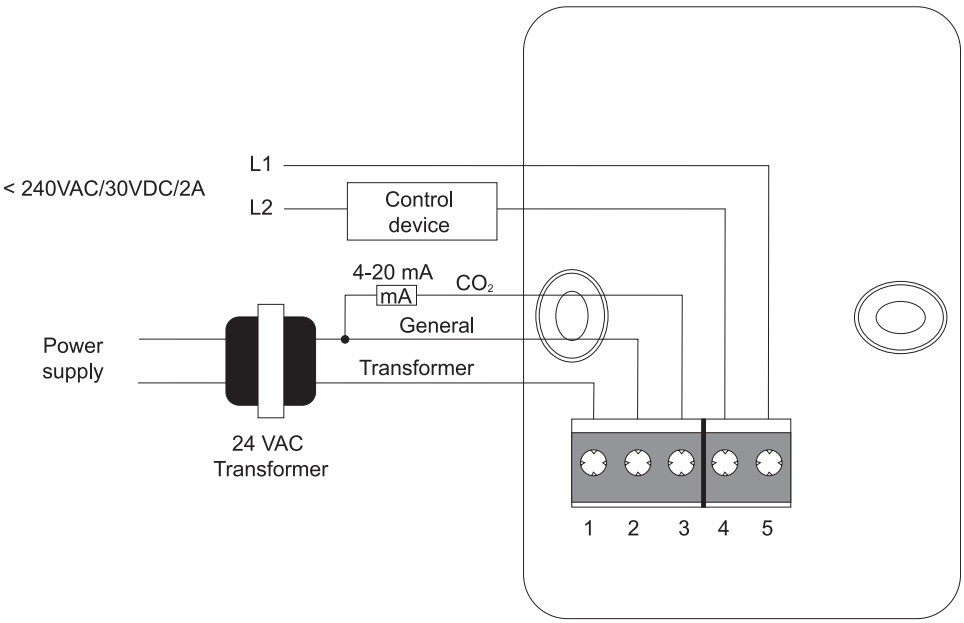
Accessories

Power supply unit is applied for connection of the sensor to 220 V (model **TRF-220/24-1,6**) or 120 V (**TRF-120/24-1,6**) AC power mains.

Technical data

Parameters	Value
Power supply/consumption	24 VAC (50/60 Hz ± 10 %), 24 VDC/1.6 W Max
Gas detection analyzer	Non-dispersive infrared detector (NDIR) with self-calibration system
CO_2 measuring range	0–2,000 ppm (parts per million)
Accuracy at 25 °C, 2,000 ppm	±30 ppm + 3 % of reading
Response time	max. 2 min
Warm up time for each turning-on	2 hours (first time), 2 minutes (operation)
Analogue output	0–10VDC (default), 4–20mA selectable by jumpers
On/Off output	1X2A switch load Four set points selectable by jumpers
6 LED lights for CO_2 concentration indication (for model CO2-1)	1st green indicator lights when CO_2 concentration is below 600 ppm; 1st and 2nd green indicators light when CO_2 concentration is 600–800 ppm; 1st yellow indicator lights when CO_2 concentration is 800–1200 ppm; 1st and 2nd yellow indicators light when CO_2 concentration is 1200–1400 ppm; 1st red indicator lights when CO_2 concentration is 1400–1600 ppm; 1st and 2nd red indicators light when CO_2 concentration is above 1600 ppm
Operating conditions/storage recommendations	0–50 °C; 0–95 % RH non condensing/0–50 °C
Mass/Dimensions	0.120 kg/100 mm x 80 mm x 30 mm

Sensor wiring diagram



Series

DPWQ30600

Use

Self-calibrating sensor DPWQ30600 VOC with a microprocessor control for air quality control. Qualitative assessment of air saturation with contaminants (cigarette smoke, exhaled air, solvent and detergent vapours). The sensor sensitivity can be adjusted with regards to the expected maximum level of air pollution. Enables on-demand ventilation which results in considerable energy savings as air is exchanged only upon reaching the pre-set level of pollution.

Design

VOC sensor has 2 analogue outputs: 0-10 V and 4-20 mA. An analogue output provides for stepless fan speed control (requires an EC-motor fan or an extra speed controller with an output 0…10 V, for example, VFED). With stepless control the fan speed is changed in proportion to air quality changes.

Mounting

The sensor is mounted onto a wall or a mounting box inside the serviced space.

The unit is powered from a 24 V AC/DC low-current electric mains.

Technical data

Parameters	Values
Power source	24 V AC/DC
Gas analyser	VOC sensor
Measurement range	0-100 % air quality
Output signal	0-10 V
Measurement precision	±20 %
Operating conditions	0-50 °C; 10-90 % relative humidity without condensate
Protection class	IP30
Dimensions [mm]	79x81x26

Connection diagram

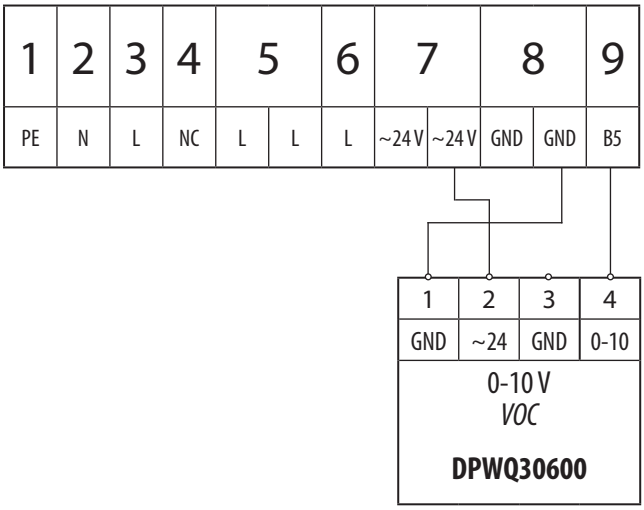
VUTR P/V EC

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
GND	R+	R-	GND~	~24 V	0-10 V	GND	~24 V	NO	NO	NO	NO	2	1	2	1	TS1	TS1	PE	N	L	N	L1

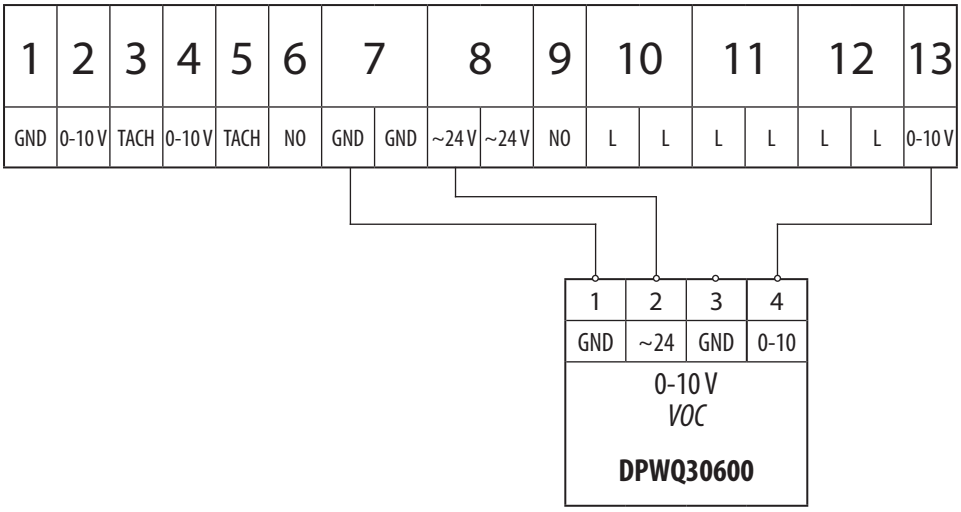
1	2	3	4
GND	~24	GND	0-10

0-10 V
VOC
DPWQ30600

DVUT HB EC



DVUT PB EC



Series

BELIMO CM230/CM24

Application

The SM series actuators with actuating torque 2 Nm are designed for controlling air dampers with cross section up to 0.4 m² installed in various ventilation and air conditioning systems.

Design

The actuator is installed directly on the damper axis and locked with a special spindle clamp to prevent its turning-through. The actuator overload protection stops the actuator once it reaches the end positions. In case of installation of a magnet on the actuator housing the gear is disengaged and the damper changes into manual operation mode. The turning angle is adjusted by mechanical end stops.

Control

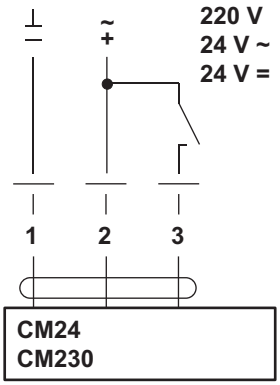
The **CM24A**, **CM230** models are controlled by the three-point control system. The damper is opened or closed by the single-circuit control.

Technical data

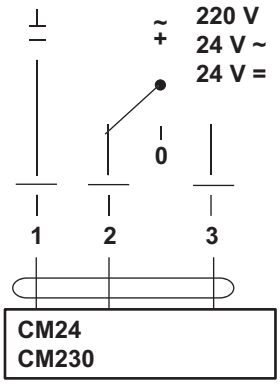
	CM24	CM230
Voltage	24 AC 50/60 Hz, 24 DC	230 AC 50/60 Hz
Nominal voltage range [V]	19.2...28.8 AC 19.2...28.8 DC	85...265 AC
Rated power [VA]	1	2
Power consumption in operation/at rest [W]	0.5/0.5	1/1
Connecting cable	1 m long, 3 x 0.75 mm²	
Positioning accuracy	± 5 %	
Rotation direction	determined by terminal connection	
Torque [Nm]	2, nominal voltage	
Rotation angle: – no end stop – with end stop	 endless fixed 315°/adjustable 0...287.5° with 2.5° increment	
Running time	75 s/90°	
Position indicator	mechanical	
Ingress protection	IP54 at any mounting position	
Electrical protection class	III low voltage II totally insulated	
Operation temperature [°C]	-30…+50	
Storage temperature [°C]	-40…+80	
Ambient humidity	95 %, no condensation	
Noise level [dBA]	35	
Maintenance	not required	
Mass [kg]	0.13	

Wiring diagram

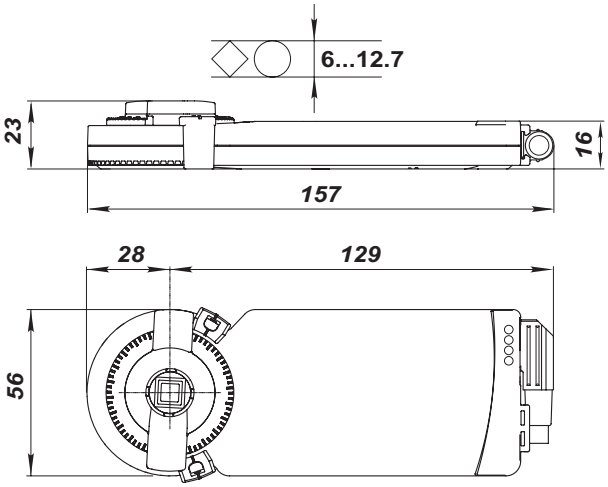
Single-wire control



Two-wire control



Overall dimensions [mm]



Series

BELIMO LM230A/LM24A

Application

The SM series actuators with actuating torque 5 Nm are designed for controlling air dampers with cross section up to 1 m² installed in various ventilation and air conditioning systems.

Design

The actuator is installed directly on the damper axis and locked with a special spindle clamp to prevent its turning-through. The actuator overload protection stops the actuator once it reaches the end positions. In case of pressing the button on the actuator housing the gear is disengaged and the damper changes into manual operation mode. The turning angle is adjusted by mechanical end stops.

Control

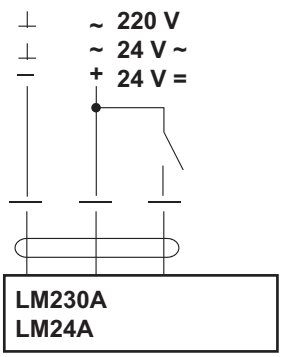
The **LM24A**, **LM230A** models are controlled by the three-point control system. The damper is opened or closed by the single-circuit control.

Technical data

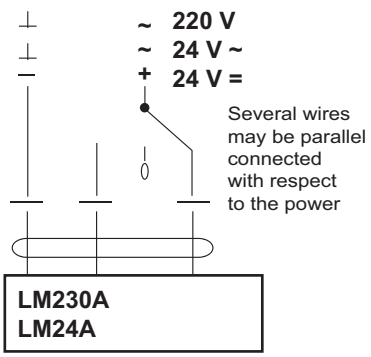
	LM24A	LM230A
Voltage	24 AC 50/60 Hz, 24 DC~	230 AC 50/60 Hz
Nominal voltage range [V]	19.2...28.8 AC 19.2...28.8 DC	85...265 AC
Rated power [VA]	2	4
Power consumption [W]	1	1.5
Feedback potentiometer	integrated 5 kOhm ± 5 %	
Connecting cable	1 m long, 3 x 0.75 mm²	
Rotation direction	selected by 0/1 switch positioning	
Mechanical control	self-resetting button	
Torque [Nm]	5 (at nominal voltage)	
Rotation angle:	max. 95°, adjustable with mechanical end stops	
Running time	150 s	
Position indicator	mechanical	
Ingress protection	IP54 at any mounting position	
Electrical protection class	III low voltage II totally insulated	
Operation temperature [°C]	-30…+50	
Storage temperature [°C]	-40…+80	
Ambient humidity	95 %, no condensation	
Noise level [dBA]	35	
Maintenance	not required	
Mass [kg]	0.6	

Wiring diagram

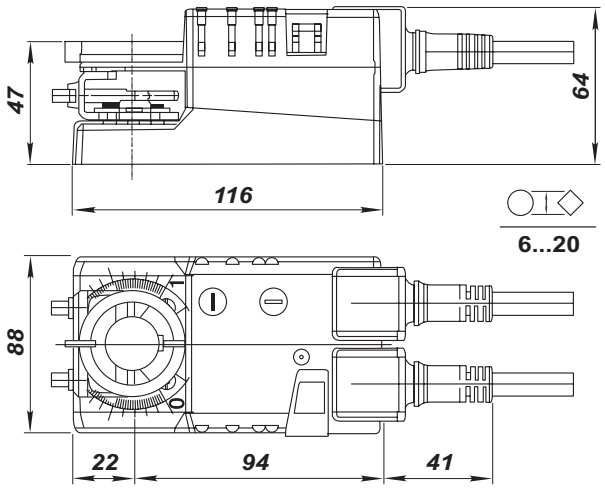
Single-wire control



Two-wire control



Overall dimensions [mm]



Series

BELIMO TF24/TF230

Application

The TF series actuators with actuating torque 2 Nm are designed for controlling air dampers with cross section up to 0.4 m² installed in various ventilation and air conditioning systems and performing protection functions, as freezing protection, smoke detection, etc.

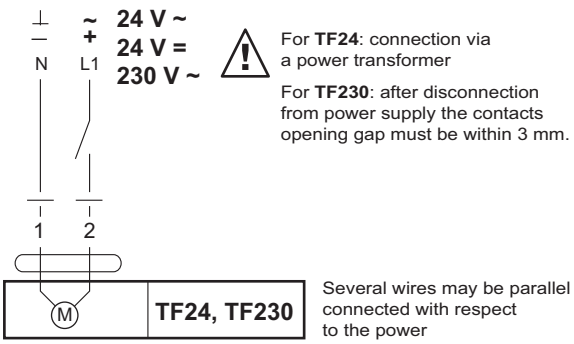
Design

The actuator moves the damper to its operating position while tensioning the return spring at the same time. In case of power supply cut-off, the damper moves back to its safe position by the spring energy. The actuator is installed directly on the damper axis and locked with a special spindle clamp to prevent its turning-through. The actuator overload protection stops the actuator once it reaches the end positions. The turning angle may be adjusted by a mechanical end stop.

Technical data

	TF24	TF230
Voltage	24 AC 50/60 Hz, 24 DC	230 V~50/60 Hz
Nominal voltage range [V]	19.2...28.8 AC 21.6…28.8 DC	85...265 AC
Rated power [VA]	4 (max. I 5.8 A at t = 5 ms)	4 (max. I 150 mA at t = 10 ms)
Power consumption in operation/at rest [W]	2/1.3	2/ 1.3
Connecting cable	1 m long, 2 x 0.75 mm²	
Rotation direction	determined by L/R positioning	
Torque (motor/spring) [Nm]	2, nominal voltage/2	
Rotation angle:	max. 95°, adjustable 37…100 % with a mechanical end stop	
Running time (motor/spring) [s]	40…75 (0…2 Nm)/< 25 at -20…50 °C	
Service life	60 000 switching operations	
Ingress protection	IP42	
Electrical protection class	III low voltage II totally insulated	
Operation temperature [°C]	-30…+50	
Storage temperature [°C]	-40…+80	
Ambient humidity	95 %, no condensation	
Noise level (motor/ spring) [dBA]	50 /~62	
Maintenance	not required	
Mass [kg]	0.6	

Wiring diagram

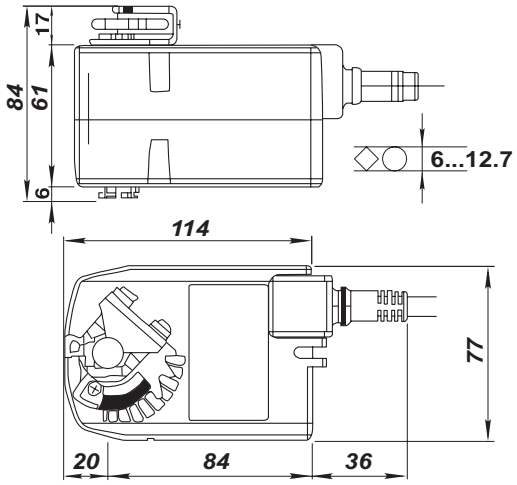


For **TF24**: connection via a power transformer

For **TF230**: after disconnection from power supply the contacts opening gap must be within 3 mm.

Several wires may be parallel connected with respect to the power

Overall dimensions [mm]



Series

BELIMO LF24/LF230

Application

The LF series actuators with actuating torque 4 Nm are designed for controlling air dampers with cross section up to 0.8 m² installed in various ventilation and air conditioning systems and performing protection functions, as freezing protection, smoke detection, etc.

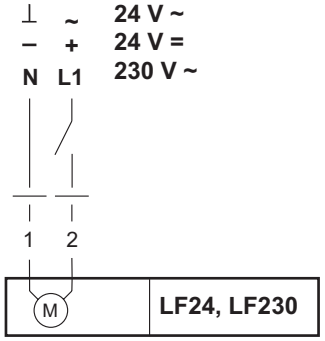
Design

The actuator moves the damper to its operating position while tensioning the return spring at the same time. In case of power supply cut-off, the damper moves back to its safe position by the spring energy.
The actuator is installed directly on the damper axis and locked with a special spindle clamp to prevent its turning-through. The actuator overload protection stops the actuator once it reaches the end positions. The turning angle may be adjusted by a mechanical end stop.

Technical data

	LF24	LF230
Voltage	24 AC 50/60 Hz, 24 DC	230 AC 50/60 Hz
Nominal voltage range [V]	19.2...28.8 AC 21.6…28.8 DC	198...264 AC
Rated power [VA]	7 (max. I 5.8 A at t = 5 ms)	7 (max. I 150 mA at t = 10 ms)
Power consumption in operation/at rest [W]	5/2.5	5/ 3
Connecting cable	1 m long, 2 x 0.75 mm²	
Rotation direction	determined by L/R positioning	
Torque (motor/spring) [Nm]	4 (at nominal voltage)/4	
Rotation angle:	max. 95°, adjustable 37…100 % with a mechanical end stop	
Running time (motor/spring) [s]	40…75 (0…4 Nm) /~20 at -20…50 °C	
Service life	60 000 switching operations	
Ingress protection	IP54 (installation with cable downwards)	
Electrical protection class	III low voltage II totally insulated	
Operation temperature [°C]	-30…+50	
Storage temperature [°C]	-40…+80	
Ambient humidity	95 %, no condensation	
Noise level (motor/ spring) [dBA]	50 /~62	
Maintenance	not required	
Mass [kg]	1.4	1.55

Wiring diagram



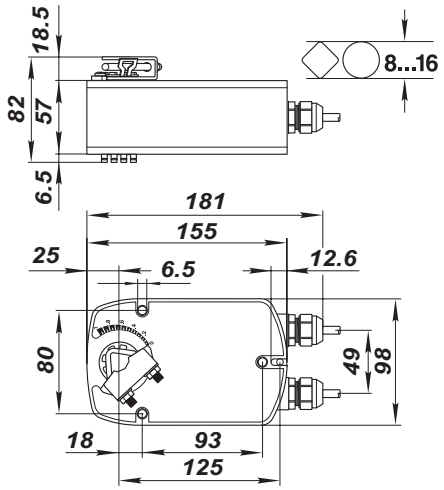
Warning!

For **LF24**: connection via a power transformer

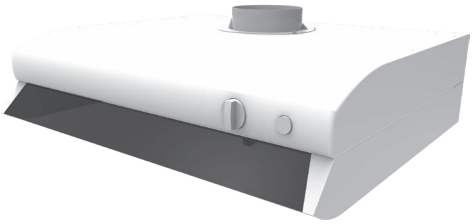
For **LF230**: after disconnection from power supply the contacts opening gap must be within 3 mm.

Several wires may be parallel connected with respect to the power

Overall dimensions [mm]



KH-1



Application

The kitchen exhaust hood is designed to clean air from combustion products, fumes, odors that form during cooking in the kitchen.

Operating logic

When the kitchen hood is turned on, the valve is opened, the signal is sent to the unit and it boosts to the high speed.

Design

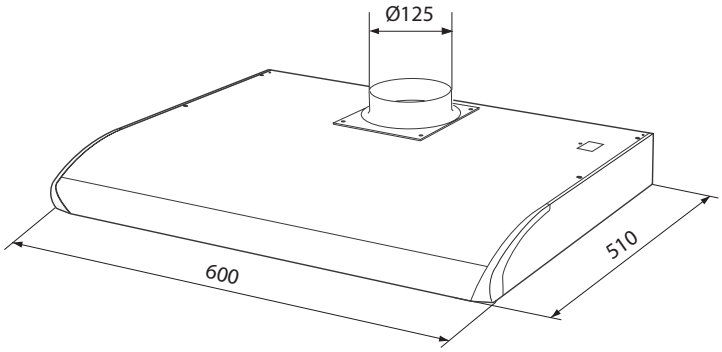
The kitchen exhaust hood is equipped with a lightning and a polyester filter.

Installation

The mounting accessories and screws are included with the unit. The kitchen exhaust hood is supplied with a cable and a grounded power connector. Installation is carried out according to the unit manual.

Technical Data

Width, mm	600
Electrical connection, V	230
Lighting, V	11



Application examples

The KH-1 kitchen hood can be connected directly to the VUTR 200 V(E) EC A17/A18 unit.

Application options