

rain detector
RM 401/C

Technical Documentation

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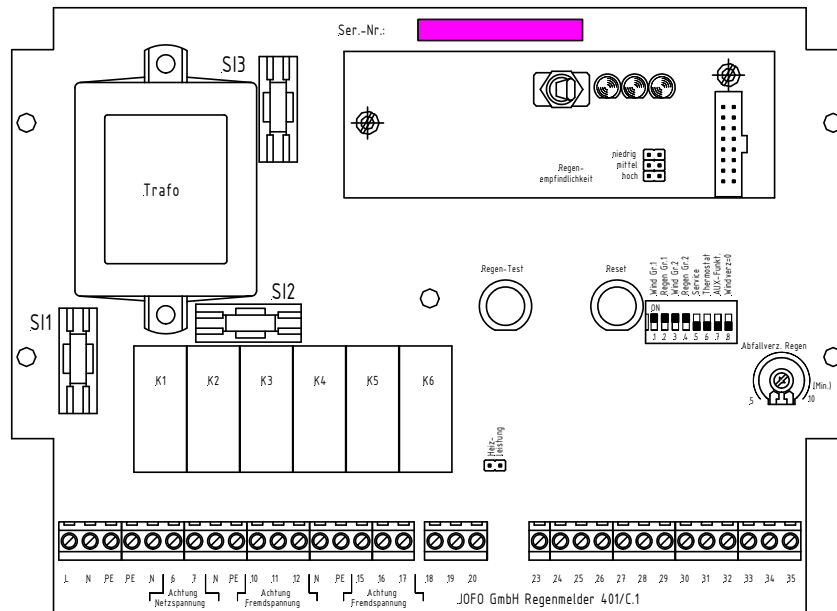
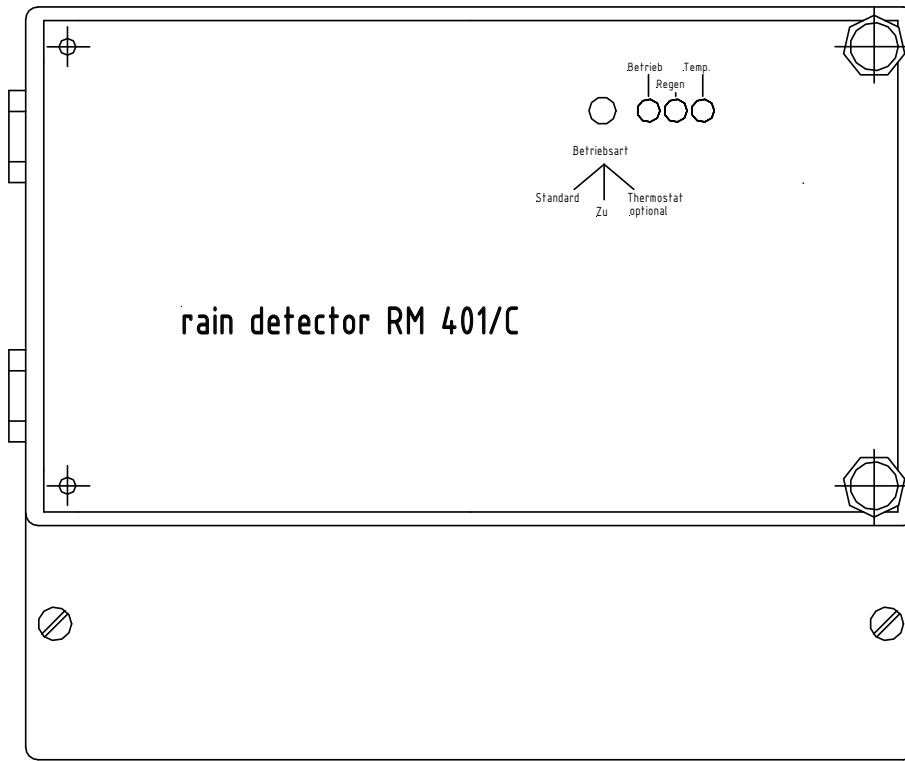


WINDOWDRIVES
BSC TECHNOLOGY

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2 Equipment diagram



3 Installation

3.1 General

Installation, commissioning, repair and maintenance of the rain detector RM 401/C may only be carried out by trained specialists.

3.2 Regulations and installation instructions

The following regulations and instructions must be observed during installation, cabling and commissioning work:

- national building regulations
- guideline ZH 1/494 for power-operated windows, doors and gates
- VDE 0100, VDE 0108
- the rules of the responsible power supply company
- the control unit should be installed in a location that allows unobstructed access to the control unit for subsequent maintenance and repair work
- the housing must be fastened to the wall

3.3 Accident prevention regulations

The general accident prevention regulations, the accident prevention regulations for power-operated windows, doors and gates, and the VDE installation regulations must be obeyed at all times.

Important warning

The system must be isolated from voltage before any components are removed.

- **first disconnect the 230 V mains voltage**

3.4 Design of the rain detector RM 401/C

The rain detector RM 401/C automatically closes electrically operated windows, blinds and ventilation units on the onset of rain or snow. The electrical drives / ventilation units (valves) to be connected can be looped into 3 ventilation lines. There are 3 ventilation lines available for this purpose:

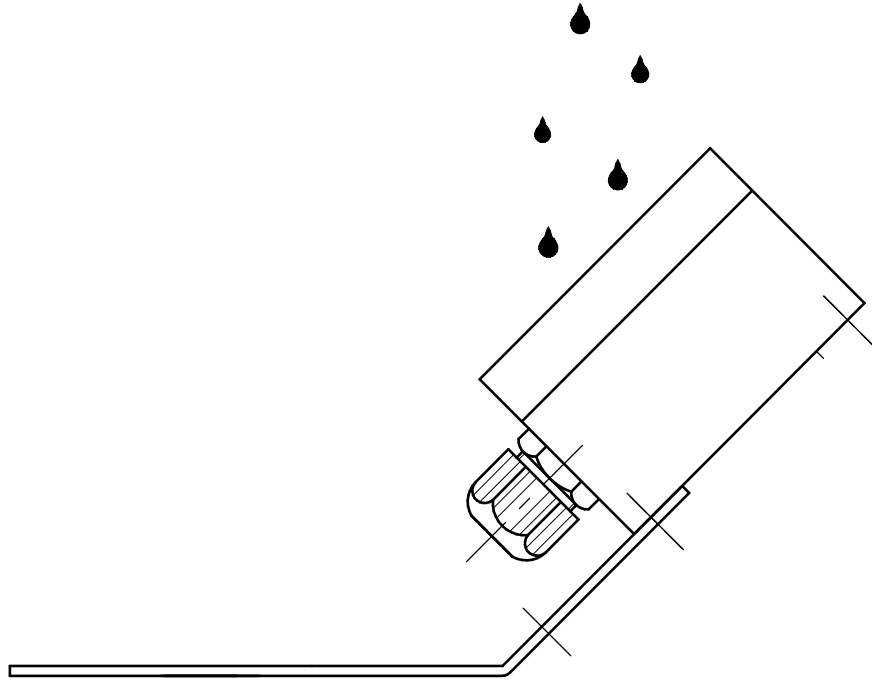
- Ventilation line 1: charged 230 V AC 50 Hz (breaking capacity 8A)
- Ventilation line 2: floating changeover contact (breaking capacity 8A)
- Ventilation line 3: floating changeover contact (breaking capacity 8A)

Its range of functional features make the rain detector RM 401/C suitable for use as a complete ventilation controller. For this purpose, the following components can be connected directly to the rain detector RM 401/C.

- any number of ventilation pushbuttons (double rocker without mutual interlock) on each motor line
- 1 x rain sensor RS 401
- 1 x room thermostat (see 4.6)
- 1 x external mode selector switch (see 4.6)
- 1 x timer (see 4.6)
- 1 x "Close control unit" switch (see 4.6)
- the system can be expanded by connecting the additional relay 301/8 (contact duplication)

3.5 The rain detector RS 401/C

The following illustration shows the rain detector RS 401/C. The rain measurement process makes use of a resistivity measurement between two electrodes (rendered weather-proof by gold-plating). To prevent the rain sensor from freezing and accelerate the drying process, a heat resistor (470 Ω) is fitted below the electrodes.



3.6 Power connection

Power is supplied by connecting a 3-strand cable (L1, N, PE) to a 230V AC mains. It is imperative that the rain detector RM 401/C is afforded external fuse protection, as Phase L1 is transferred unprotected to motor group 1.

The connection diagram and wiring arrangement can be found in the wiring diagrams at the Annex.

It should be noted that the first motor group is charged. The other 2 motor groups have zero-potential and can be used for connecting to the control units of external rain systems and to building control systems. Each motor group has an input for an external ventilation pushbutton [operating voltage 24V DC]. The rain detector RM 401/C also has a thermostat input and/or an input for an external mode selector switch or a 'Close control unit' switch.

4 Functional description

The rain detection process makes use of the rain sensor of the RS 401 designed for external connection. Alternatively, ventilation can be controlled through a thermostat or ventilation pushbutton, both designed for external connection.

In the case of motor groups 2 and 3, dip switches on the board provide an indication as to whether the respective motor group is to actuate in dependence of rain or not. Motor group 3 has in principle a rain priority. This rain priority applies in all operating modes.

3 different operating modes can be selected using the '**Standard / Closed / Thermostat optional**' mode selector switch.

4.1 "Standard" operating mode

In "Standard" mode, the connected motor openers / ventilation units can be opened only with the aid of the ventilation pushbuttons connected to the ventilation pushbutton input. In the absence of actuation by rain, the motor groups are opened, closed and stopped when the ventilation pushbutton is pressed.

Switching function of double rocker switch without mutual interlock:

- "open" switch pressed once only → moves to 'open' end position
- "closed" switch pressed once only → moves to "closed" end position
- "open" and "closed" switch pressed simultaneously → stop
- several connected ventilation pushbuttons pressed simultaneously (to locking) → stop

When the rain detector is idle, the relay contacts are in the "closed" position. If there are no ventilation pushbuttons connected (ventilation pushbuttons – input not assigned), the motors cannot be opened.

If there are no external ventilation pushbuttons connected directly to the rain detector (ventilation pushbuttons – input not assigned), a jumper must be inserted between terminals 23 / 24, 26 / 27 and 29 / 30 to ensure the actuation process. This situation occurs when pneumatic switching cabinets or control units for 24V rain systems are connected. If the ventilation pushbuttons are integrated directly into the motor group, the jumper must again be inserted between terminals 23 / 24, 26 / 27 and 29 / 30.

In addition, a switch for the "Close control unit" function can be connected to terminals 34 / 35. This function must be set using the dip switches and ensures on actuation that all motor groups have priority closing.

4.2 "Closed" operating mode

In "Closed" mode, all motor groups (switching contacts) are in the closed position. In this operating mode, the system cannot be actuated through the ventilation switch or a room thermostat.

4.3 "Thermostat optional" operating mode

In "Thermostat optional" mode, all 3 motor groups are opened and closed by means of an externally connected room thermostat, timed thermostat or a timer. An external manual/automatic switch can also be connected to terminals 34 / 35. The switch is selected by means of a dip switch and deselects the mode selector switch integrated into the cover of the rain detector RM 401/C.

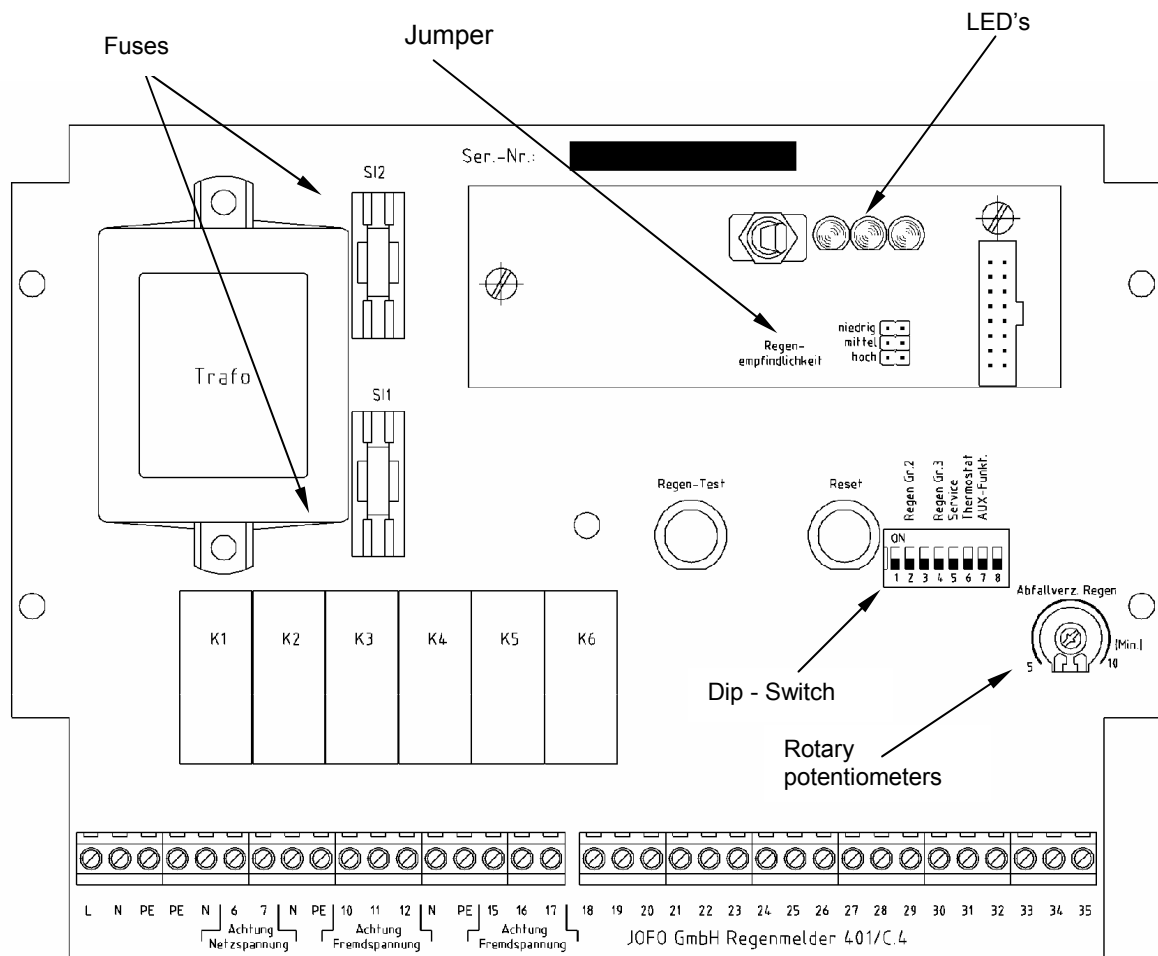
As with "Standard" mode, a "Close control unit" switch can also be connected to terminals 34 / 35. The function ("Standard – Thermostat optional" or "Close control unit") is selected by means of the dip switch on the board.

4.4 Setting the rain detector system

The rain detector system RM 401/C is fitted with a number of functions. This Section describes the different configurations: Settings can be configured at the following positions:

- “Rain deceleration delay” potentiometer
- Dip switch 8 times
- Jumpers – “rain sensitivity” series
- Jumper – “Heat output”
- Jumper – “Reed / Hall”

All potential configurations are present on the board of the rain detector system RM – WM/A. The following illustration shows the different positions at which the settings can be configured.



4.5 Setting rain sensitivity

The jumper series (vertical series) for setting rain sensitivity are accommodated below the large LED displays. Rain sensitivity can be set to 3 stages (low / medium / high) using a jumper. If there is no jumper inserted, the “rain LED” flashes and the rain detector RM 401/C will detect a fault. In this case, all motor groups will switch over to “CLOSED”.

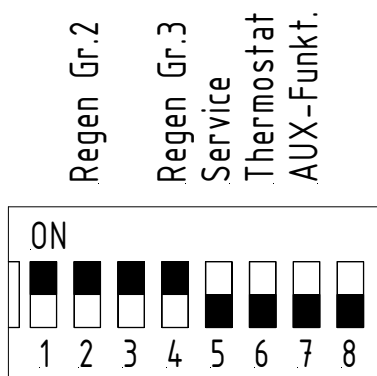
The rain sensitivity setting can only be modified locally in line with local conditions.

4.5.1 Setting delay times for rain

The board has one rotary potentiometers for setting the rain deceleration delay. The deceleration delay can be set infinitely from 5 min to 10 min. The rain acceleration delay is equal to zero.

4.6 Special functions (dip switch)

Various special functions can be set on the rain detector RM 401/C using a dip switch series (8 dip switches). The following illustration shows the dip switches:



Function:	Dip switch no.:	ON	OFF
Motor group 2 switches to “closed” in rain.	2	x	
Motor group 2 does not switch to “closed” in rain.	2		x
Motor group 3 switches to “closed” in rain.	4	x	
Motor group 3 does not switch to “closed” in rain.	4		x
Service switch “ON”: No motor group responds to detection of rain → green LED – operation flashing.	5	x	
Service switch “OFF”: All motor groups respond again to detection of rain	5		x
The connected thermostat, timed thermostat or timer has an opener contact.	6		x
The connected thermostat, timed thermostat or timer has a closer contact.	6	x	
A “Close control unit” switch is connected to terminals 34 / 35	7		x
A mode selector switch is connected to terminals 34 / 35 The internal mode selector switch is deselected.	7	x	

5 Operator action

The rain detector RM 401/C has several control and display elements. The display elements serve to indicate the operating status of the RM 401/C. The different control elements can be used to select the operating mode and rain can be simulated.

The arrangement and/or positions of the control and display elements can be found in the diagram of the board in section 2.

5.1 Control elements

The following table shows an overview of the various functions accommodated by the different control elements.

Operator action:	Function:
Mode selector switch in "Standard" position	<ul style="list-style-type: none"> The commands to open and close the motor groups are given by the ventilation pushbuttons.
Mode selector switch in "Closed" position	<ul style="list-style-type: none"> All motor groups reverse into closed direction Cannot be opened by the ventilation pushbuttons or thermostat.
Mode selector switch in "Thermostat optional" position	<ul style="list-style-type: none"> The open and close commands are given by a room thermostat, timed thermostat or timer. Cannot be opened by the ventilation pushbuttons.
"Rain test" pushbutton	<ul style="list-style-type: none"> Simulates rain when pressed. All participating groups move to CLOSED position. The rain LED comes on. The set rain deceleration delay is active → the rain test is ended after a preset time.
"Reset" pushbutton	<ul style="list-style-type: none"> When pressed, ends the rain test and resets the rain deceleration delay.

5.2 Display elements

The following table shows an overview of the various display states of the different display elements:

Display:	State:
"Operation" LED (green)	<ul style="list-style-type: none"> Lights up permanently in mains operation. Extinguishes on mains failure of faulty SI1 or SI3 fuse. Flashes when dip switch no. 5 is in "ON" position → service switch.
"Rain" LED (yellow)	<ul style="list-style-type: none"> Lights up permanently on rain actuation. Flashes on malfunction (no jumper inserted for setting rain sensitivity and/or rain sensor fuse faulty).
"Temperature" LED (yellow)	<ul style="list-style-type: none"> Lights up permanently when thermostat is triggered (set temperature exceeded). Responds only in "Thermostat optional" mode.

5.3 Fuses on the board

Fuse:	Function:	Rating:
SI 1	Rain sensor protection	250 mA neutral
SI 2	Secondary transformer protection	250 mA neutral

5.4 State at time of delivery

Rain sensitivity	set to high
Rain deceleration delay	set to 5 min
Heat output jumper	jumper inserted → full heat output
Dip switch no. 1	ON
Dip switch no. 2	ON
Dip switch no. 3	ON
Dip switch no. 4	ON
Dip switch no. 5	OFF
Dip switch no. 6	OFF
Dip switch no. 7	OFF
Dip switch no. 8	OFF
0 Ω Resistance on terminal 23-24, 26-27 and 29-30	
Mode selector switch in STANDARD position	

6 Technical data

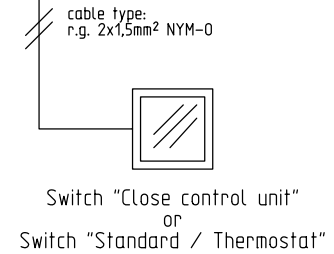
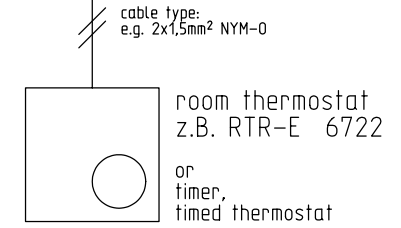
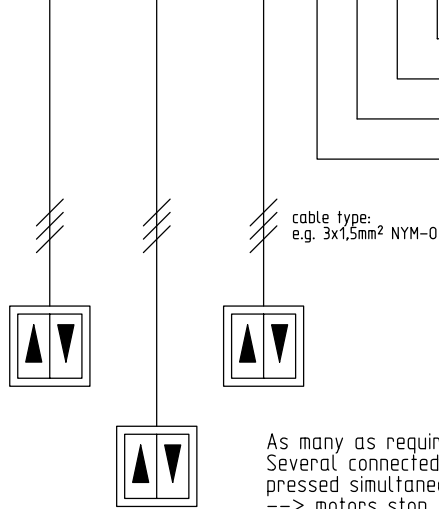
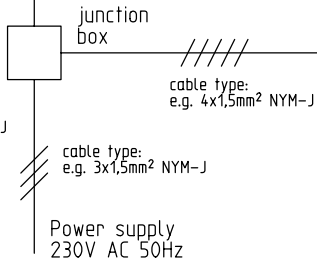
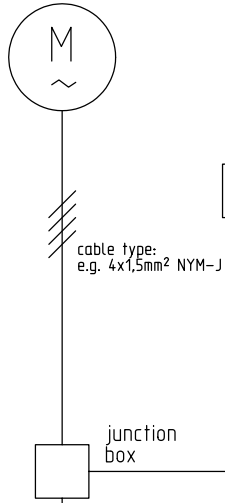
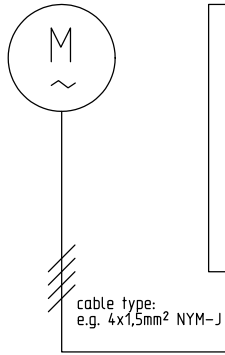
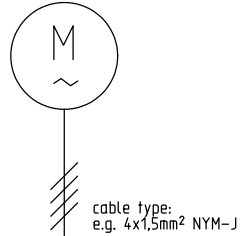
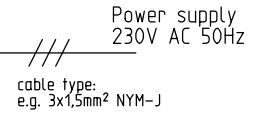
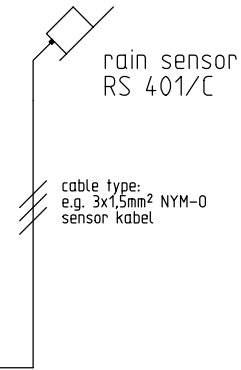
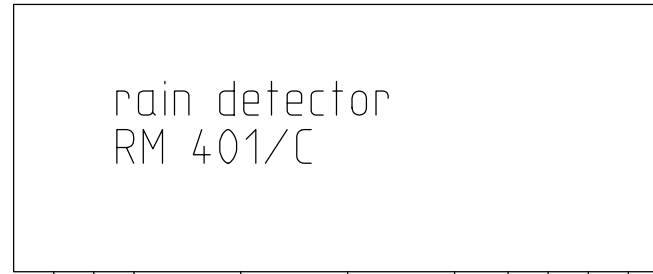
Model:	Rain detector RM 401/C
Housing:	Plastic housing Dimensions W/H/D: 213/180/98 [mm] Colour: grey, similar to RAL 7035 with transparent cover
Protection classification:	IP 54
Temperature range:	- 5°C to + 40°C
Rated voltage:	230 V AC / 50 Hz
Rated power:	≤ 8 W
Vent line breaking capacity:	Max. 8 A rated current e.g. : Max. of 8 230 V / AC / 0.9 A motor openers
Number of vent lines:	3 can be altered if additional relay 301/8 is connected
No. of ventilation pushbuttons	any number double rocker without mutual interlock
Number of sensors:	1 x rain sensor RS 401/C 1 x additional rain sensor RS 401 <u>Measuring principle for rain:</u> Resistivity measurement between the electrodes
<u>Terminals:</u>	
Motor terminals:	1.5 mm ² (fine-wire), 2.5 mm ² (solid)
Mains connection terminals:	1.5 mm ² (fine-wire), 2.5 mm ² (solid)
Other terminals:	1.5 mm ² (fine-wire), 2.5 mm ² (solid)

Connection diagram RM 401/C --> Ventilation central

Group 1
Remark !
main voltage
max. 8A / 230V AC

Group 2
Remark !
external Voltage
max. 8A / 230V AC

Group 3
Remark !
external Voltage
max. 8A / 230V AC



Cable types are only proposals !!
Please notice the installation instructions !!
Technical modifications reserved !!

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rain detector RM 401/C

Connection diagram
Ventilation central

Auftrag:

Kommission:

Rev.:
28.02.2006

erstellt von:
Krause

Datum:

10.01.2003

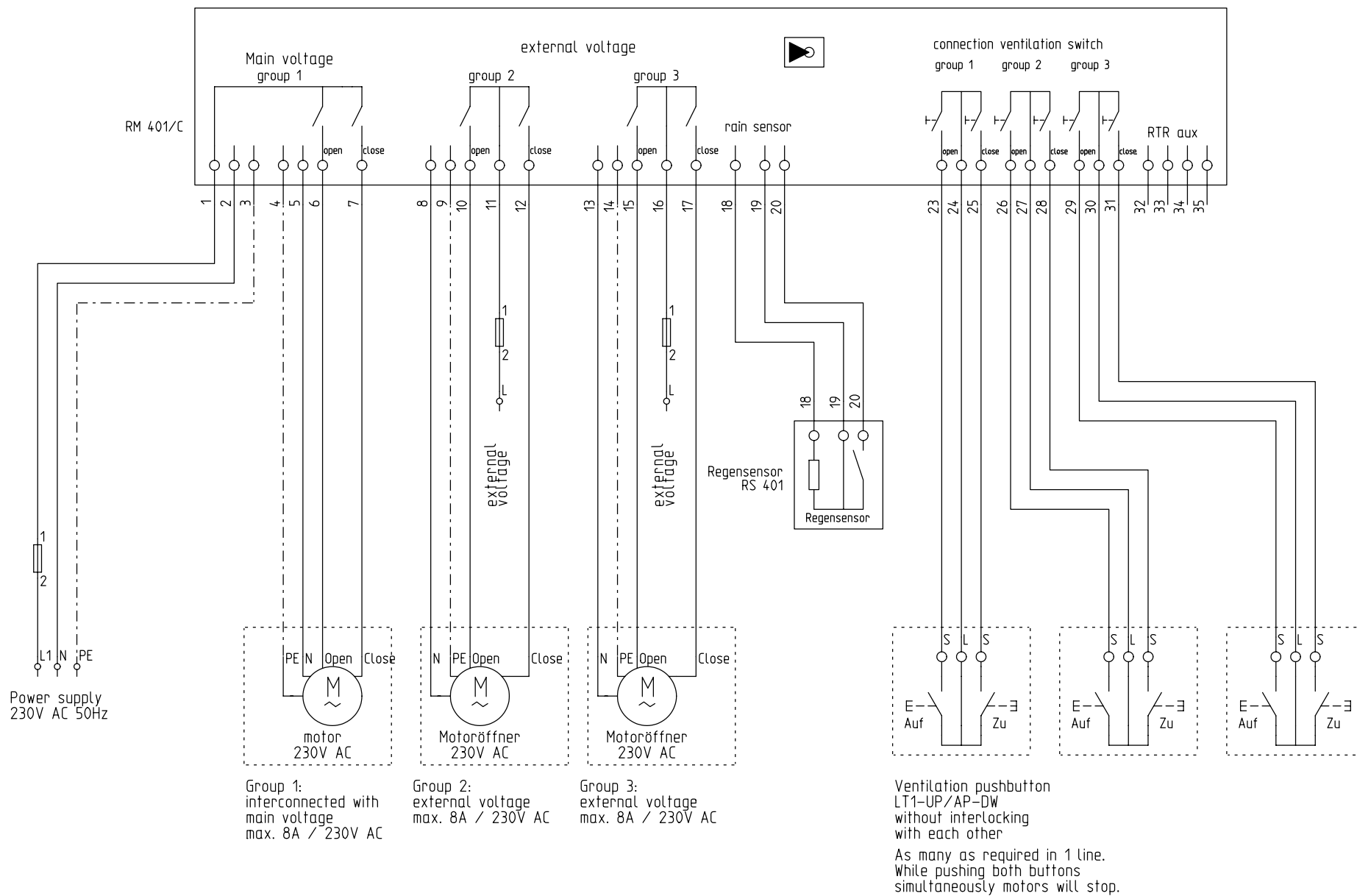
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Connection of 230V motors (Ventilation switches are directly connected)



--24_0202010401_E034_--

rain detector RM 401/C

Connection motors
switches directly connected

Auftrag:

Kommission:

Rev.: 28.02.2006

erstellt von:
Krause

Datum:

10.01.2003

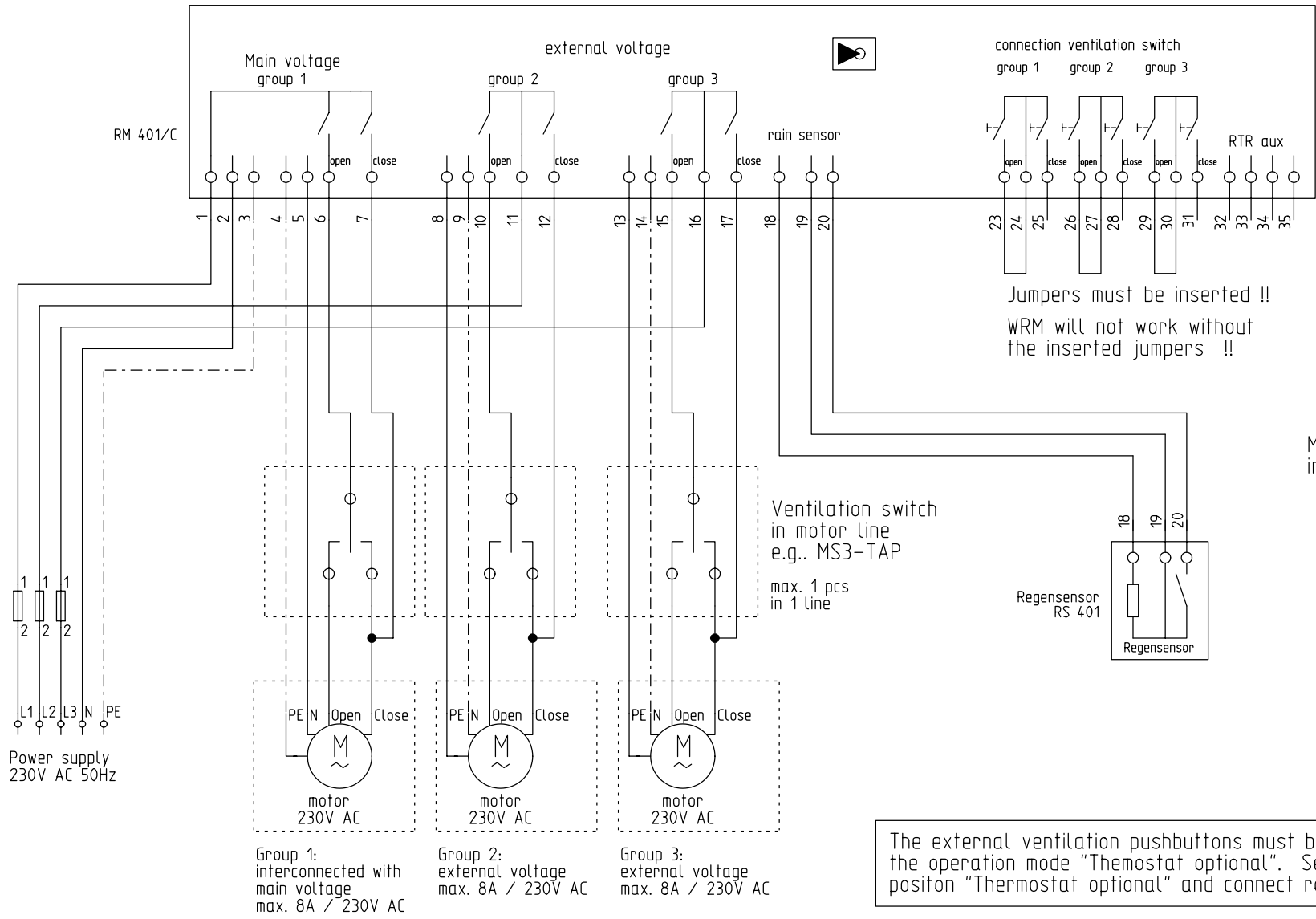
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Connection of 230V motors (Ventilation switches in the motor line)



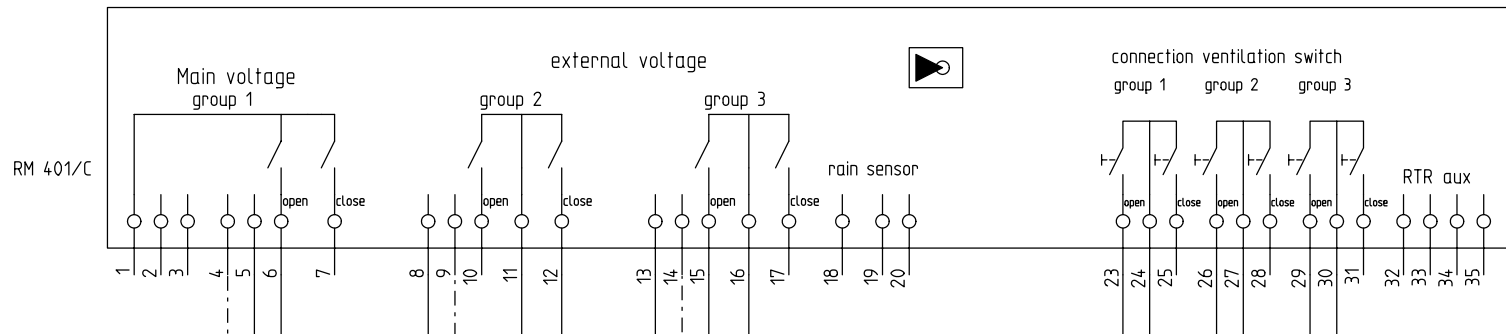
Mode selector switch must be in position "STANDARD"

The external ventilation pushbuttons must be in position "open" at the operation mode "Thermostat optional". Set mode selector switch in position "Thermostat optional" and connect room thermostat.

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rain detector RM 401/C	Connection 230V motors switches in motor line	Auftrag:	Kommission:	Rev.: 28.02.2006	erstellt von: Krause
		Datum: 10.01.2003	Blatt: 4		von 10

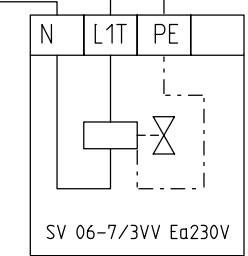
Connection of pneumatic switching cabinets



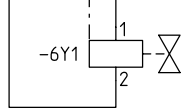
external Voltage !!
L

Jumpers must be inserted !!
WRM will not work without the inserted jumpers !!

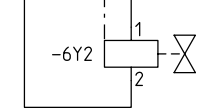
Mode selector switch must be in position "STANDARD"



model: P-RF-1-2
switch valve
example:
valve control electric open !!



TV 06-... Ez 230V~
pushbutton valve
example:
valve control electric closed !!



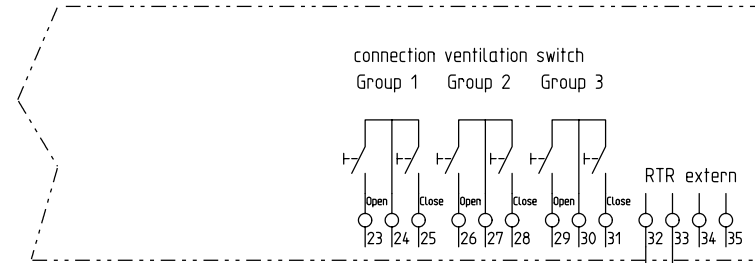
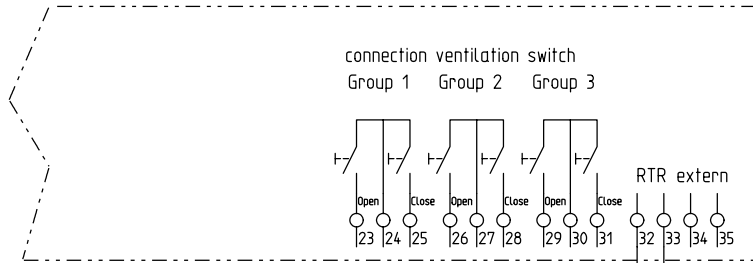
MV 06-... Ea 230V~
magnetic valve
example:
valve control electric open !!

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rain detector RM 401/C	Connection of pneumatic switching cabinets	Auftrag:	Kommission:	Rev.: 28.02.2006	erstellt von: Krause
		Datum: 10.01.2003		Blatt: 5	von 10

room thermostat (opening contact)

room thermostat (closing contact)

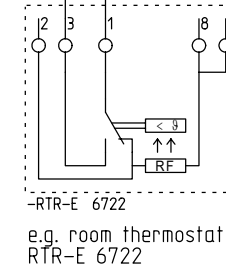
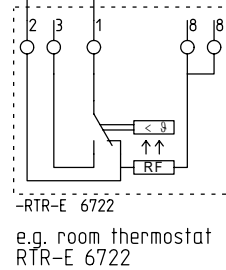


Attention:

Dip switch no. 6 must be in position "OFF".
See also "Technical Documentation" chapter 4.9 "Special functions".

Attention:

Dip switch no. 6 must be in position "ON".
See also "Technical Documentation" chapter 4.9 "Special functions".



Mode selector switch must be in position "Thermostat optional"

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rain detector RM 401/C

room thermostat (opener)
room thermostat (closing contact)

Auftrag:

Kommission:

Rev.: 28.02.2006

erstellt von:
Krause

Datum:

10.01.2003

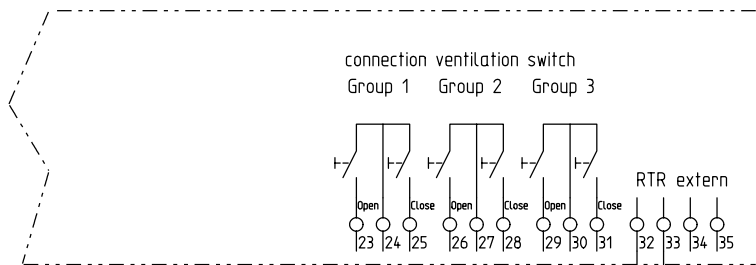
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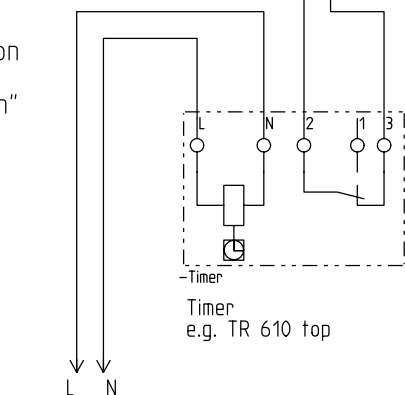
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Timer (opening contact)



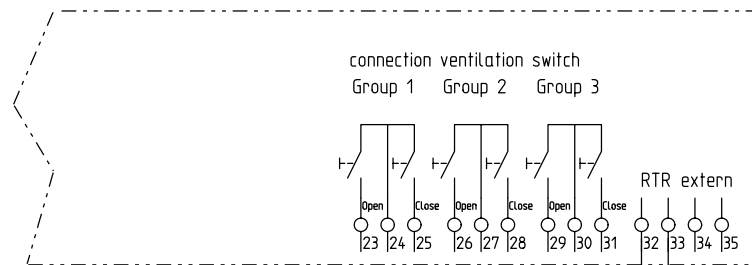
Attention:

Dip switch no. 6 must be in position "OFF".
See also "Technical Documentation" chapter 4.9 "Special functions".



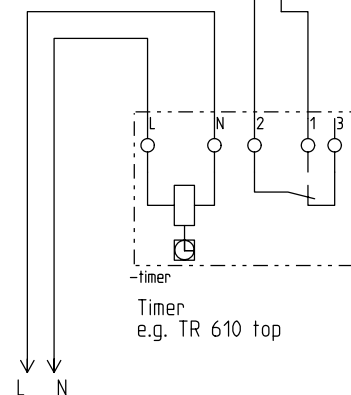
Power supply
230V AC 50Hz

Timer (closing contact)



Attention:

Dip switch no. 6 must be in position "ON".
See also "Technical Documentation" chapter 4.9 "Special functions".



Power supply
230V AC 50Hz

Mode selector switch must be in position "Thermostat optional"

--24_0202010401_E034_--

rain detector RM 401/C

timer (opener)
timer (closing contact)

Auftrag:

Kommission:

Rev.: 28.02.2006

erstellt von:
Krause

Datum:

10.01.2003

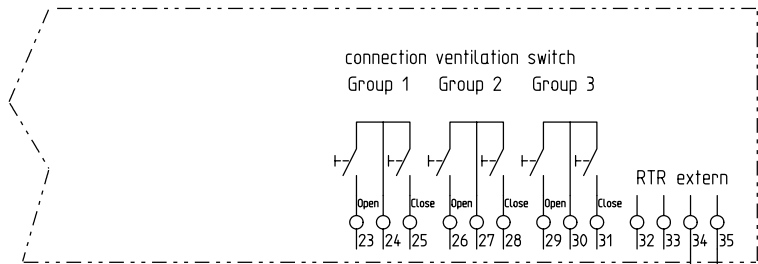
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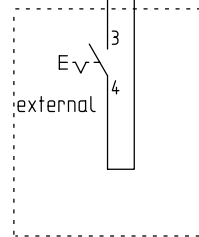
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Connection "Close control unit" switch



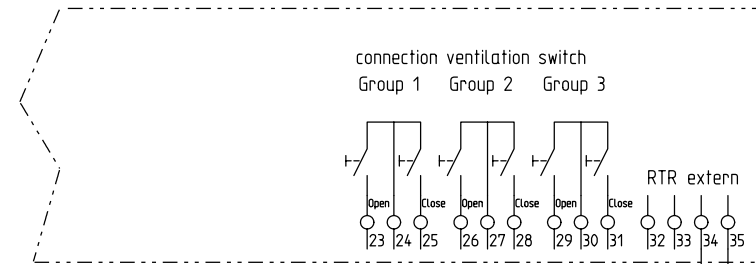
Attention:

Dip switch no. 7 must be in position "OFF".
See also "Technical Documentation" chapter 4.9 "Special functions".



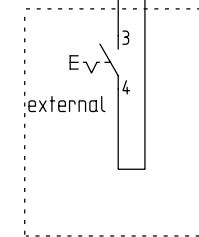
If the contact is closed, all 3 motor groups are opened and closed by means of an externally connected room thermostat, timed thermostat or a timer.

Connection external mode selector switch



Attention:

Dip switch no. 7 must be in position "ON".
See also "Technical Documentation" chapter 4.9 "Special functions".



If dip switch no. 7 is in position "ON", the internal mode selector switch is deselected. A closed contact means operation mode "Thermostat optional".

--24_0202010401_E034_---

rain detector RM 401/C

Close control unit
externally mode selector switch

Auftrag:

Kommission:

Rev.: 28.02.2006

erstellt von:
Krause

Datum:

10.01.2003

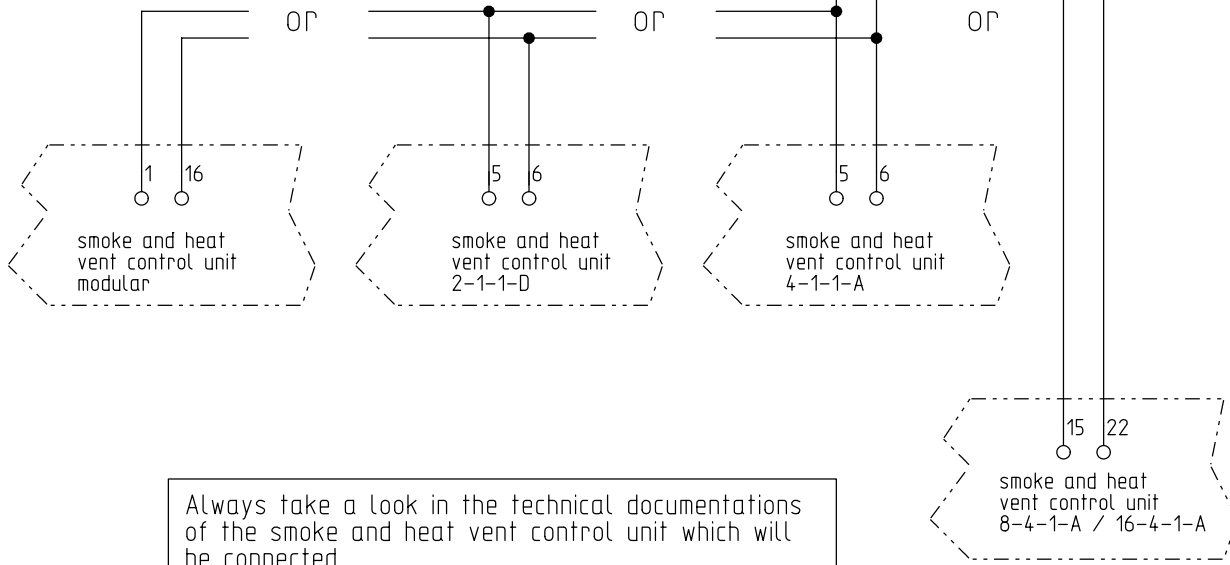
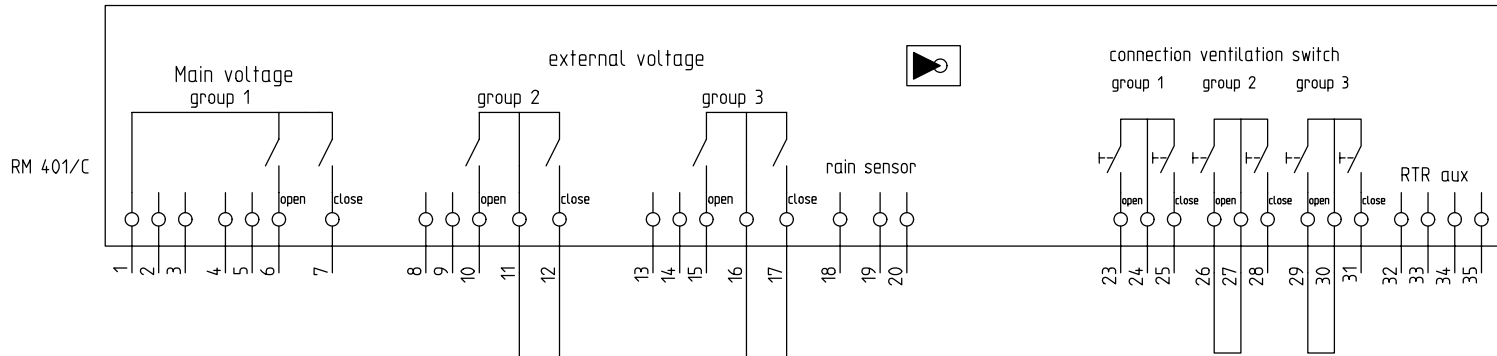
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Connection of smoke and heat vent control units



Jumpers must be inserted !!

WRM will not work without the inserted jumpers !!

Mode selector switch must be in position "STANDARD"

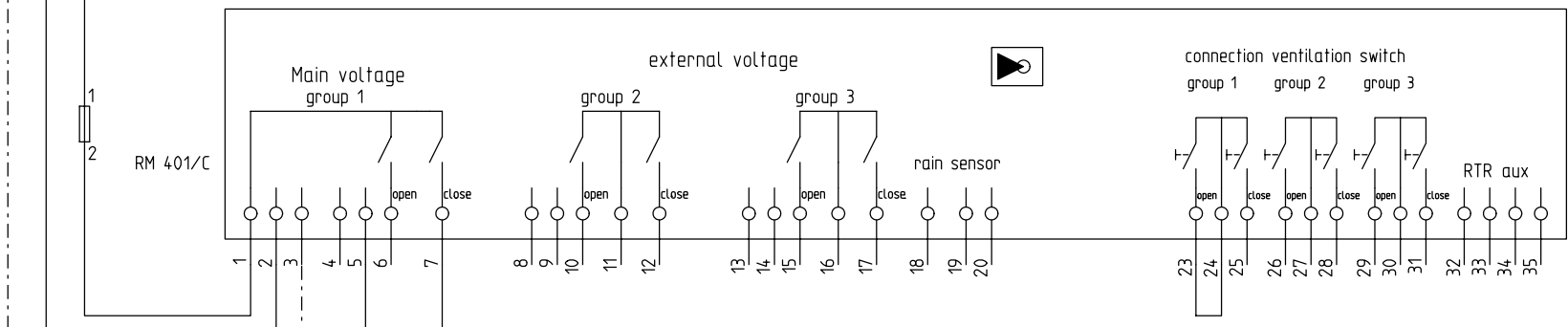
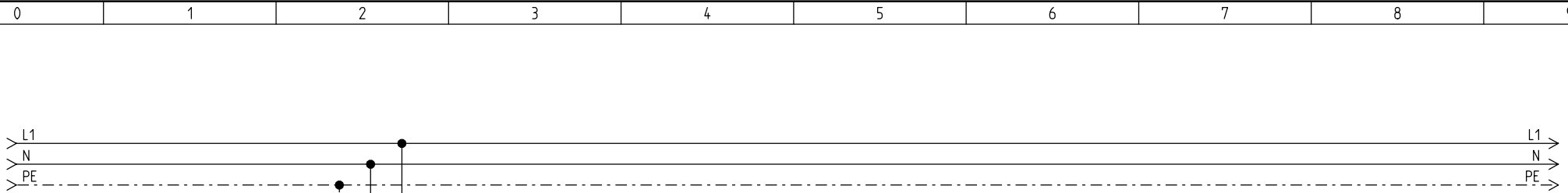
Attention:
Please take note about the position of the internal dip switches.
See "Technical Documentation" chapter 4.9 "special functions".

Always take a look in the technical documentations of the smoke and heat vent control unit which will be connected.

The connection of a smoke and heat vent control unit must be potential free. In this case only the contacts from group 2 and 3 can be used. Each smoke and heat vent control unit needs an own contact. So only 2 units are connectable at 1 RM 401/C. If more than 2 units will be connected a additional relay ZR 401 is required.

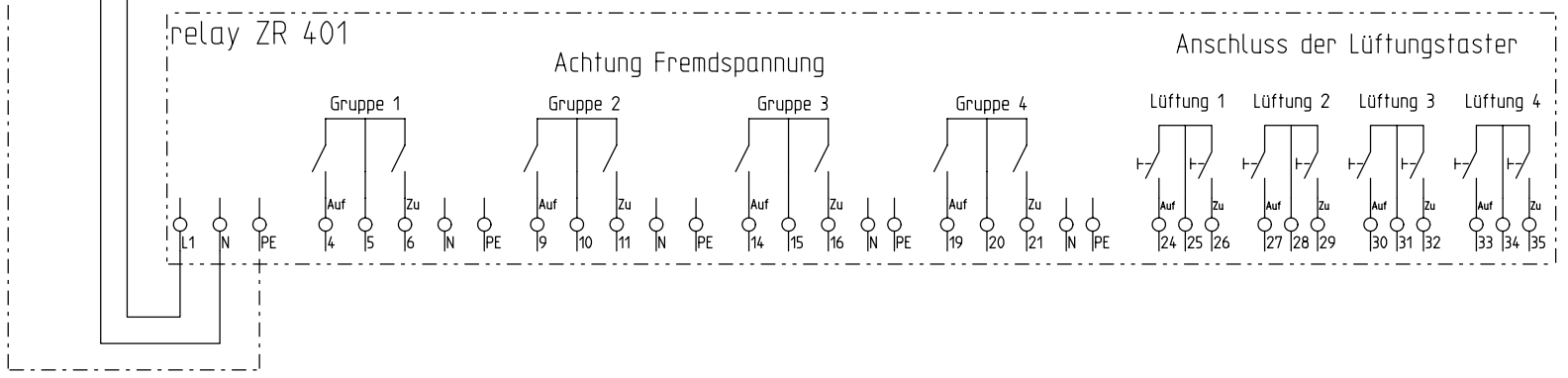
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rain detector RM 401/C	smoke and heat vent control units	Auftrag:	Kommission:	Rev.: 28.02.2006	erstellt von: Krause
		Datum: 10.01.2003		Blatt: 9	von 10



Attention:
Please take note of
the position of the internal
dip switches.
See "Technical Documentation"
chapter 4.9 "special functions".

Jumpers must be inserted !!
WRM will not work without
the inserted jumpers !!
Mode selector switch must be
in position "STANDARD"



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rain detector RM 401/C	relay ZR 401	Auftrag:	Kommission:	Rev.: 28.02.2006	erstellt von: Krause
		Datum: 10.01.2003		Blatt: 10	von 10