SIEMENS

3883

RXA

Air quality controller ACR14.22/UTK

Special software version in RXA unit for UTEK Mazzo di Valtellina

This document describes the special version of the RXA controllers for UTEK. All general details of the RXA controllers are described in the data sheet CA2N3881. Please consult the data sheet of the RXA controllers for additional technical information and security instructions.

Hardware

The UTEK solution is based on a special RXA hardware, with the following I/O features:

- 1 Analogue input X2: 0-10V, resolution 8 bits, for the air quality sensor
- 2 Digital input lines D1, D2, to control the dynamic operation modes
- 8 DIL switches SW1 – SW8, to set up the configuration
- 3 Relay outputs Q24, Q34, Q44, for the fan stages
- Potentiometer, for the test mode

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Modes

Basic modes:

- smoking places (for restaurants and places where smoking is allowed)
- non-smoking places (for places where the number of persons is important)
- base load ventilation (1st fan stage always active)
- demand-controlled ventilation (fan off if no demand)

Operating modes are:

- fan control active (default mode)
- standby mode (all fan stages off)
- boost ventilation (highest fan stage on)
- start-up (boost ventilation, can be inhibited by DIL)
- test mode (activated by position of on-board potentiometer)

Functions

Air Renewal Demand

This is the default operating mode. The sensor value determines the fan stage. It is a 0-10V signal, so the sensor values will be indicated in volts. A low voltage means good air quality. The fan stages are determined by adjacent switching hystereses. The position of the switching points of the fan stages depends on the smoker/non-smoker mode. These can be adjusted by DIL switches 6-8 (Q+,Q-, Qdbl). Q+ shifts the switching points one step towards a lower voltage, Q- shifts them towards a higher voltage. Qdbl shifts by two steps in either direction. If Q+ and Q- are configured together, the resulting shift is zero (no shifting).

Changing the basic settings for the switching points will require a different software version.

Smoker Mode

The sensor value comes from a VOC or mixed gas sensor. The adjustment step is +/- 1.0V (200 ppm).

The switching points are as follows (the ppm values indicated are for comparison with a CO_2 signal):

Description	Q—setting	Q- setting	Default setting	Q+ setting	Q++ setting
stage 1 off	8.0 V 1600 ppm	7.0 V 1400 ppm	**6.0 V 1200 ppm**	5.0 V 1000 ppm	4.0 V 800 ppm
stage 1 on, stage 2 off	8.5 V 1700 ppm	7.5 V 1500 ppm	**6.5 V 1300 ppm**	5.5 V 1100 ppm	4.5 V 900 ppm
stage 2 on, stage 3 off	9.0 V 1800 ppm	8.0 V 1600 ppm	**7.0 V 1400 ppm**	6.0 V 1200 ppm	5.0 V 1000 ppm
stage 3 on	9.5 V 1900 ppm	8.5 V 1700 ppm	**7.5 V 1500 ppm**	6.5 V 1300 ppm	5.5 V 1100 ppm

Non-Smoker Mode

The sensor value comes from a CO_2 sensor. The adjustment step is +/-0.5V (100 ppm). The switching points are as follows (the ppm values indicated are the corresponding CO_2 values):

Description	Q—setting	Q- setting	Default setting	Q+ setting	Q++ setting
stage 1 off	7.0 V 1400 ppm	6.5 V 1300 ppm	**6.0 V 1200 ppm**	5.5 V 1100 ppm	5.0 V 1000 ppm
stage 1 on, stage 2 off	7.5 V 1500 ppm	7.0 V 1400 ppm	**6.5 V 1300 ppm**	6.0 V 1200 ppm	5.5 V 1100 ppm
stage 2 on, stage 3 off	8.0 V 1600 ppm	7.5 V 1500 ppm	**7.0 V 1400 ppm**	6.5 V 1300 ppm	6.0 V 1200 ppm
stage 3 on	8.5 V 1700 ppm	8.0 V 1600 ppm	**7.5 V 1500 ppm**	7.0 V 1400 ppm	6.5 V 1300 ppm

Standby Mode

In this mode, all fan stages are off. This mode is active as long as digital input line D1 is connected to GND. It can be manually overridden by the boost ventilation mode. However, the controller will return to standby mode, if the standby input is still active at the end of the boost ventilation. After the standby mode, the fan will assume the lower stage between the switching points.

Boost Ventilation Mode

When this mode is active, the highest fan stage is activated for a time selectable by SW5. The mode is inverted (start <-> stop) by each falling edge between the digital input line D2 and GND. This allows the attachment of a push-button rather than a clock timer. This mode stops automatically after the specified time (SW5) or when the controller changes to the standby mode (D1). This mode overrides the standby mode, but will return to it when finished. It can be configured to be entered automatically at the end of standby mode and after power reset. After the boost mode, the fan will assume the higher stage between the switching points.

Start-up Mode

At the end of standby mode and after power reset the device automatically enters the boost ventilation mode for the specified time. This behaviour can be disabled by DIL switch 4. If the device starts with the standby line active, no boosting will occur.

Base Load vs. Demand-Controlled Ventilation

In base load ventilation stage 1 is always active. In demand-controlled ventilation the fan is turned off completely when no demand has been calculated. The switching points for stage 2 and 3 are the same. This mode is configured by DIL switch 3.

Fan Stages, Boosting

The number of fan stages (2 or 3) can be configured by DIL switch 2. The highest fan stage will be switched by the relay with the highest breaking capacity (Q44). Stage 1 is output on Q24 (SW2 OFF) or Q34 (SW2 ON). The highest stage is a booster stage, which will be on for 3.0 s when the fan starts. When the fan stage switches from one active stage to another, there is a powerless interval of 0.5 s between the stages.

Test mode

If the on-board potentiometer is turned to the left or right limit stop, the device enters a test mode.

Position	SW2 off	SW2 on	LED
clockwise stop	Q24 on	Q34 on	0.9s on, 0.1s off
counterclockwise stop	Q44 on	Q44 on	0.1s on, 0.9s off
intermediate position	normal operation	normal operation	1.0s on, 4.0s off

If the potentiometer is in an intermediate position, the device is in the normal operating mode. Its position is used to adjust the analogue reading counterclockwise from +0.5 to –0.5V (equivalent to +99 to -99 ppm).

- Analogue input X2: 0-10V, corresponding to 0-2000 ppm CO_2. Resolution 8 bits, yielding 8 ppm/bit or 39 mV/bit. The signal is taken from a QPA63.1, AQP63.1, QPA2000, QPA2002 or equivalent sensor. Good air quality is indicated by a low voltage.

- On-board potentiometer: used for signal adjusting and function testing. It adjusts the input value by –99 to +99 ppm. At the clockwise stop, either Q24 (SW2 off) or Q34 (SW2 on) are turned on. At the counterclockwise stop, Q44 is turned on.

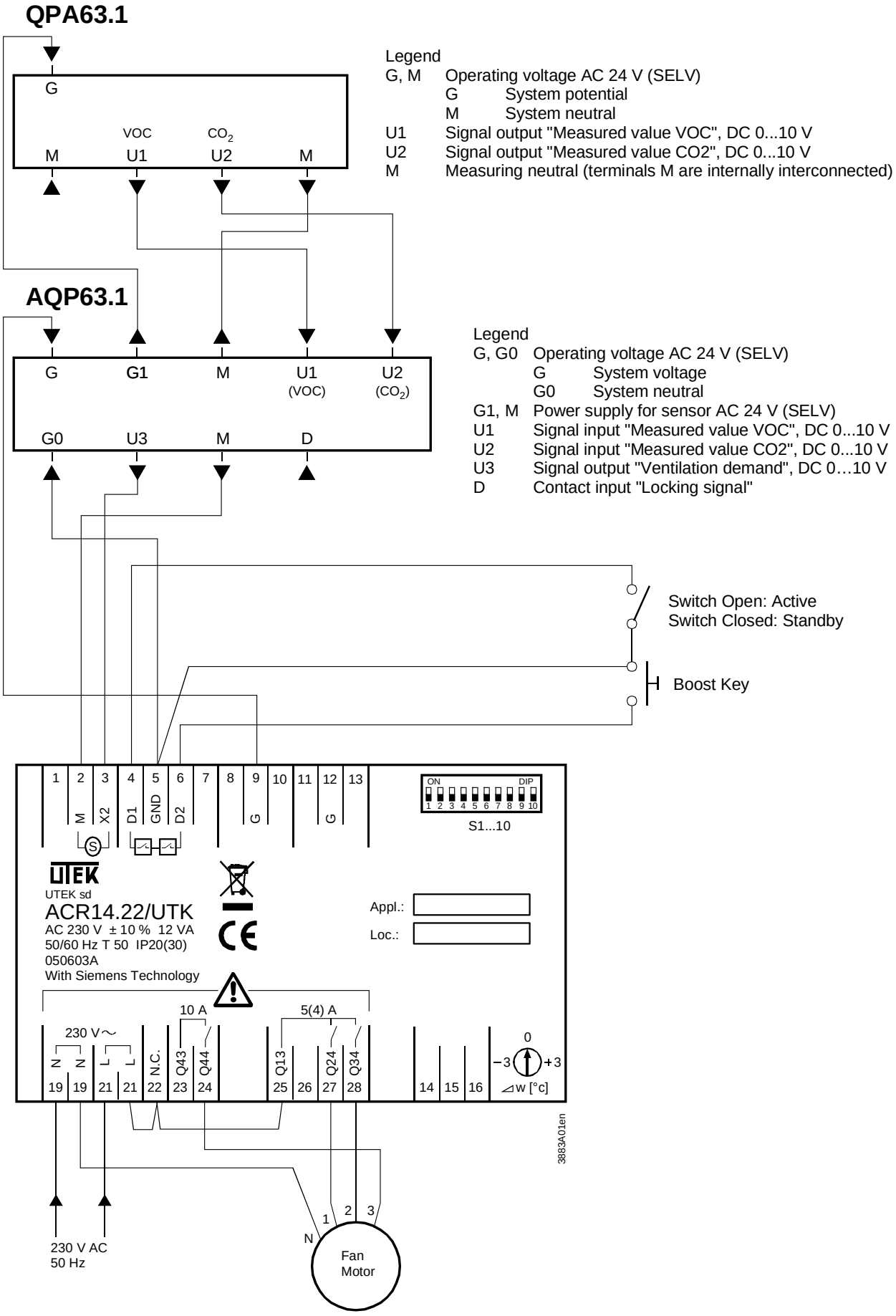
- 2 Digital input lines
  - D1: open: active closed: standby
  - D2: open to closed: start/stop boost ventilation

- 8 DIL switches
  - SW1: OFF: smoker (VOC/mixed gas sensor) ON: non smoker (CO_2 sensor)
  - SW2: OFF: 3 fan stages ON: 2 fan stages
  - SW3: OFF: base load (fan stage 1 always on) ON: demand-controlled ventilation (fan stage 1 switched)
  - SW4: OFF: initial boost ventilation allowed ON: inhibit initial boost ventilation
  - Quality standard: Q-,Q+, Qdbl)
  - SW5: OFF: short boosting time (10 min) ON: long boosting time (20 min)
  - SW6: OFF: Q+ inactive ON: setpoint for higher air quality
  - SW7: OFF: Q- inactive ON: setpoint for lower air quality
  - SW8: OFF: Qdbl inactive ON: highest/lowest air quality

- 3 Relay outputs
  - Q24 fan stage 1 (in case of 3 stages, otherwise unused)
  - Q34 fan stage 2 (in case of 3 stages, otherwise stage 1)
  - Q44 highest fan stage

The factory setting of all DIL switches is OFF, which means smoker mode, 3 fan stages, base load ventilation, initial boost ventilation allowed and air quality setpoint in middle position.

Wiring diagram



For the detailed technical data see the datasheet of the room controllers RXA (CA2N3881) which describes the controllers in general.

Measured value inputs

B1	1	not used
M	2	Measured value input ground
X2	3	0…10 V signal from APQ63.1

Signal inputs

D1	4	Mode switch Active – Standby
GND	5	Signal ground
D2	6	Boost key
D3	7	not used

Triac outputs

Y1	8	not used
G	9	AC 24 V actuator supply
Y2	10	not used

Device bus

M/S	14	not used
CP–	15	not used
CP+	16	not used

Power supply

N	19	Neutral conductor
L	21	Phase conductor AC 230 V +/- 10 %
		Power consumption (without fan motor) max. 12VA
		Fuse or circuit breaker in supply lines max. 10 A

Relay outputs

Q13	25	Input for Q14, Q24 and Q34
Q14	26	not used
Q24	27	Normally-open contact, max. AC 250 V, 5 (4) A (Stage 1)
Q34	28	Normally-open contact, max. AC 250 V, 5 (4) A (Stage 2)
Q43	22, 23	Input for Q44
Q44	21	Normally-open contact, max. AC 250 V, 10 (8) A (Stage 3)

Operator controls

S1...8	DIP switch for configuring the room controller.
S9, S10	DIP switch not used

Caution

- **Observe the technical data for the relay outputs: max. AC 250 V, 5 (4) A or 10 A**
- **Local installation regulations must be observed.**
- **Ensure safety distances between 230V lines and low voltage (SELV) lines by separating and fastening the cables properly.**
- **Do not connect anything to the unused input and output terminals of any of the units**
- **Do not change the settings of the potentiometers on ACR14 and AQP63.1**