

CLASSIC

## Cascade controllers

with one or two proportional outputs

## RKN8-L RKN88-L



### Electronic cascade controller

- Control of temperature, humidity, air quality, pressure etc.
- Use with LS-Ni1000 temperature sensors or active DC 0...10 V sensors
- Operating voltage AC 24 V
- One or two DC 0...10 V proportional outputs

### Use

The RKN8-L and RKN88-L electronic cascade controllers are designed specifically for control of the supply air, and intended for stand-alone operation in small (H)VAC systems. They are suitable for the control of variables such as temperature, humidity, air quality and pressure.

The proportional DC 0...10 V output (two outputs, in the case of the RKN88-L) can be used for control of valves, damper actuators etc.

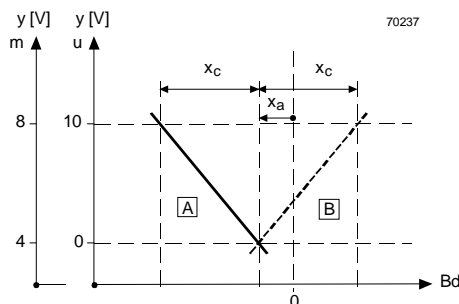
### Functions

On the input side, the controllers are designed for use with passive LS-Ni1000 sensors, active sensors with a DC 0...10 V signal, and active and passive setpoint adjusters (such as the BSGN-TC or BSGN-TZ) or the RKN-S setpoint reset module.

Either one or two proportional output signals are available on the output side (one with the RKN8-L and two with the RKN88-L).

The controller and parameter settings are accessed at three programming levels. Programming switches and potentiometers are provided directly on the controller to select the controller function (heating or cooling) and set the control parameters.

### Proportional output sequences



### Key :

- y Output signal
- Bd Demand signal
- $x_a$  Offset between heating/cooling cut-in point and setpoint
- $x_c$   $\Delta t$  of heating/cooling coil
- A Heating sequence
- B Cooling sequence
- u 'universal' for DC 0 ...10 V controlled devices (e.g. damper actuators, valves)
- m 'magnetic' for modulating magnetic valves

## Type summary

The two controller types differ only in the number of outputs available:

**RKN8-L** Cascade controller with one proportional output

**RKN88-L** Cascade controller with two proportional outputs

### Accessories

A digital indicator, type **BA-RK**, designed to fit into the controller, is also available for order. See data sheet CA2N3397.

### Ordering

When ordering, please indicate the quantity, product name and type code.

*Example: 2 cascade controllers, type RKN88-L and 2 digital indicators, type BA-RK*

## Peripheral devices

### Input side

On the input side, the RKN...-L can be used in conjunction with virtually any LS-Ni1000 temperature sensor or (DC 0...10 V) humidity sensor. Suitable temperature setpoint adjusters are the BSGN-TC or BSGN-TZ; the BSGN-100 is suitable for adjustment of the humidity setpoint. The BSGN-U1 or room unit type QAA27 or the RKN-S setpoint reset module can be used for setpoint resets.

### Output side

See the range overview (CA2N3390E) for details of compatible equipment.

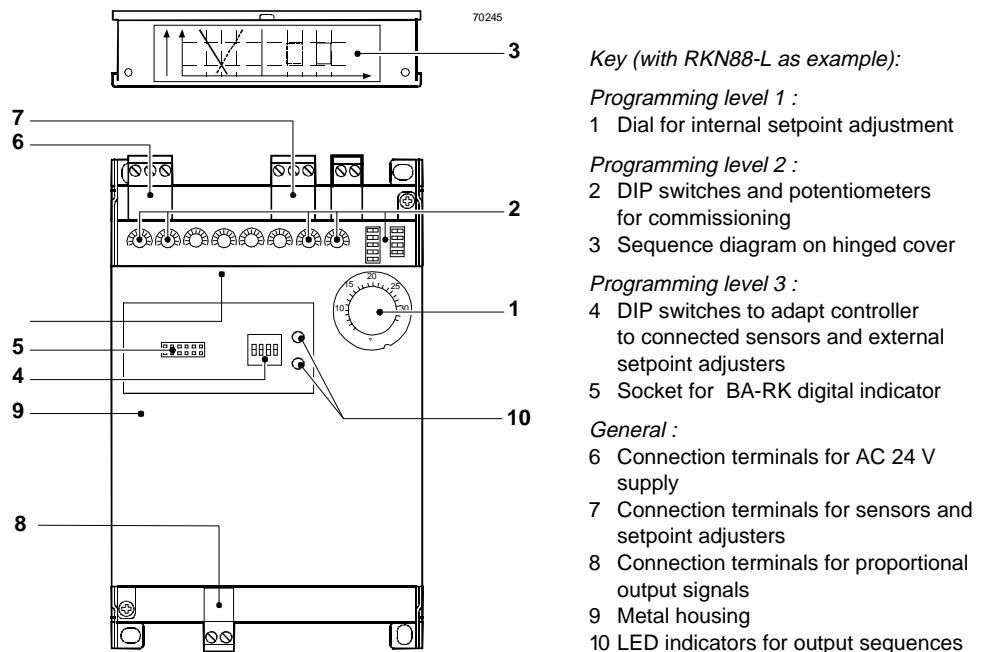
The proportional (DC 0...10 V) output(s) can be used to drive modulating valves and damper actuators either directly, or indirectly via step controllers.

## Mechanical design

The RKN... controllers have a metal housing which accommodates all the electronics, operator controls and plug-in connection terminals.

To limit the risk of incorrect wiring, the terminals to which the peripheral devices may be connected are physically segregated from the other terminals.

The controller incorporates a socket for the (optional) BA-RK digital indicator.



### Elements for display and control

- Users have direct access to the potentiometer at programming level 1.
- The DIP switches and potentiometers at programming level 2 are protected by a hinged metal cover.
- The DIP switches at programming level 3 and the socket for the digital indicator are under the transparent plastic cover.

## Mounting

The following mounting instructions must be observed:

- All controller connection terminals must be freely accessible
- Ensure adequate air circulation to dissipate the heat generated during operation.
- Local installation regulations must be observed.

See "Dimensions" for mounting options.

Detailed information will be found in the "Engineering and installation guide" (CA2N3398E).

A separate commissioning guide (CA2G3399E) is also available. In addition to detailed information on parameter setting, etc. this contains the check-lists required for commissioning.

## Technical data

Supply voltage	Supply voltage	Extra-low voltage (SELV)	
	Nominal voltage	AC 24 V; 50 ... 60 Hz	
	– Max. voltage tolerance	+15/ –10 %	
	Power consumption	4 VA (without output peripheral devices)	
Signal inputs	Control sensor $x_1$	LS-Ni1000 sensor	
	– Temperature	DC 0 ...10 V, $R_i > 10 \text{ MOhm}$	
	– Humidity etc.		
	External setpoint adjuster $w_1$		
	– Temperature	10 ... 30 °C (with BSGN-TC setpoint adjuster)	
		20 ... 60 °C (with BSGN-TZ setpoint adjuster)	
	– Humidity, etc.	0 ...100 %rh (with BSGN-100 setpoint adjuster)	
	– Setpoint reset unit)	$\pm 3 \text{ K}$ (with BSGN-U1 setpoint reset unit or QAA27 room unit)	
	– RKN-S setpoint reset module	LS-Ni1000 or DC 0...10 V signal	
Outputs	Proportional outputs		
	Y1	DC 0 ...10 V, max. 1.5 mA (source)	
	Y3 (RKN88-L only)	DC 0 ...10 V, max. 1.5 mA (source)	<i>Factory setting:</i>
	– Cut-in point $x_a$	– 20 ... 20 K	<i>0 K</i>
	– $\Delta t$ of heating / cooling coil $x_c$	5 ... 50 K	<i>18 K</i>
	– Adaptation to peripheral devices	Can be selected: universal / magnetic	<i>magnetic</i>
	– Mode of operation	Can be selected: heating / cooling	<i>Y1 heating / Y3 cooling</i>
Controller data	Control algorithm	PI / PDPI (cascade)	
	– D- and I-components	Can be enabled/disabled	<i>On</i>
	– I-component	Integral action time 1 ...15 mins	<i>5 mins</i>
	– Zero-energy zone $\Delta w_1$	$\pm 2 \text{ K}$	<i>0 K</i>
	Supply air limit control		
	– $w_3$ min.	5 ... 30 °C	<i>5 °C</i>
	– $w_3$ max.	20 ... 60 °C	<i>60 °C</i>
	Internal setpoint		
– Temperature	5 ... 32 °C		
– Humidity etc.	10 ... 90 %rh		
General	Connection terminals	Plug-in screw terminals, 2 x 1.5 mm <sup>2</sup>	
	Weight	0.55 kg	
	Dimensions (W x H x D)	108 x 174 x 52 mm	
	Mounting	Snap-mounted on DIN rail (EN50022-35 x 7.5) or screwed to any flat surface	
General ambient conditions	Conditions of use	For control panel installation	
	Temperature range		
	– Operation	5 ... 45 °C	
	– Transport / storage	– 25 ... 70 °C	
Ambient humidity	10 ... 90 %rh, non-condensing		
Safety	Product safety	EN60730	
	– Overvoltage category	II; transient overvoltages up to 2500 V	
	– Contamination level	2 ; normal non-conductive contamination	
	Electrical safety	SELV-E (PELV to IEC364-4-41)	
Conformity	Meets the requirements for <b>CE</b> marking		

## Connection terminals

40331A
0
1
2
11
12
13
15
16
61
62

TE	Functional earth
GN	Secondary neutral conductor
GL	Secondary phase conductor AC 24 V
x1	Room sensor (LS-Ni1000 / DC 0...10 V)
M	LS-Ni1000 sensor ground
w1	External setpoint adjuster
M	LS-Ni1000 sensor ground
x3	Supply air sensor (LS-Ni1000 / DC 0...10 V)
Y1	Proportional output signal, DC 0...10 V
Y3	Proportional output signal, DC 0...10 V (RKN88-L only)

GN = System ground (Common)

## Connection diagrams

Various connection diagrams covering a wide range of applications and numerous options for connection to the peripheral devices will be found in the "Engineering and installation guide" (CA2N3398E).

## Dimensions

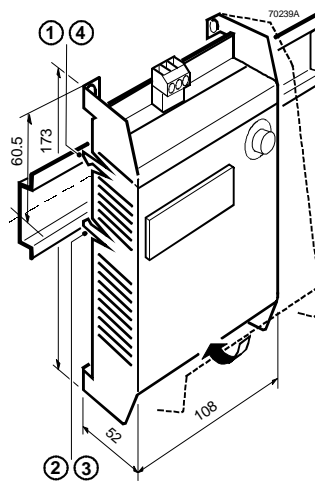
All dimensions in mm

### Mounting :

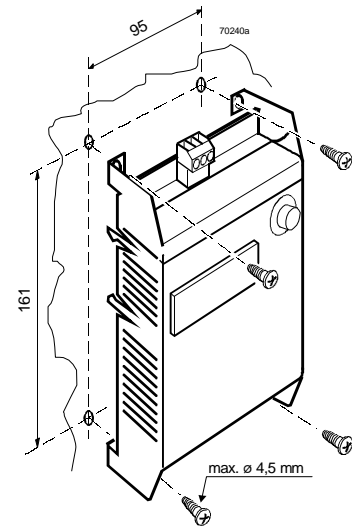
- 1 Fix to top rail
- 2 Snap-mount on bottom rail

### Removal :

- 3 Release at bottom
- 4 Remove from top rail



**Rail mounting**  
(Rail type EN50022-35 x 7.5)



**Surface mounting**