

RCP 30, 31: P+PI cascade controller

How energy efficiency is improved

Enables the implementation of individually optimised controls for maximum efficiency in pneumatic installations.

Areas of application

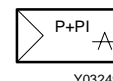
Room-temperature control (P) with supply-air temperature as auxiliary control loop (PI) in ventilation and air-conditioning equipment. Pneumatic control of temperature, pressure, differential pressure, humidity and flow rate in combination with appropriate transducers.

Features

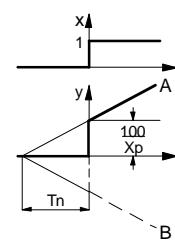
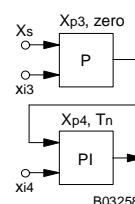
- P+PI cascade controller
- P+PI cascade schedule controller
- Controllers can be used universally for the most varied of applications
- Housing, rack and front doors made of thermoplastic
- Suitable for wall or panel mounting
- Functional description and commissioning help inserted in front door
- Front panel with adjusters and 3 covered recesses for plug-in pressure gauge (XMP) making commissioning easier
- Setpoint adjuster X_S adjustable manually with scales for all Centair measuring ranges
- All settings very easy to make with a coin and % scale
- M4 measuring connections, control action adjustable (delivered with control action B)
- Compressed-air connections R_p 1/8" female thread
- Complies with directive 97/23/EC Art. 3.3 on pressure equipment

Technical description

- Supply pressure 1.3 bar \pm 0.1
- Easily accessible adjusters for X_S (setpoint), X_{P4} (P range), T_n (reset time), E (influence) and FF (schedule start point)
- Inputs for:
 - remote setpoint adjustment
 - main controlled variable
 - auxiliary controlled variable
 - command variable
- Outputs for:
 - output pressure for dampers or actuator



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Type	Description	Air capacity l_n/h	Air consumption ¹⁾ l_n/h	Weight kg
RCP 30 F001	fixed-value controller, P+PI	400	70	0,7
RCP 31 F001	fixed-value + schedule controller, P+PI	400	90	0,7
RCP 30:		RCP 31:		
Setpoint X_S	0...100%	Setpoint X_S	0...100%	
Remote adjust. of setpoint	0...100%	Remote adjustment of setpoint	0...100%	
P-band X_{P3} , X_{P4}	0...100%	P-band X_{P3} , X_{P4}	0...100%	
Reset time T_n	1...15 min	Reset time T_n	1...15 min	
Zero point	0...100%	Zero point	0...100%	
Limiter B	0...100%	Limiter B	0...100%	
		Shift starting point FF	0...100%	
		Influence E	0,25...3	
Supply pressure ²⁾	1,3 bar \pm 0,1	Connection diagram, RCP 30	A02688	
Input pressures	0,2...1,0 bar	Connection diagram, RCP 31	A02689	
Output pressures	0,2...1,0 bar	Dimension drawing	M297100	
Permissible amb. temp.	0...55 °C	Fitting instructions	MV 3246	

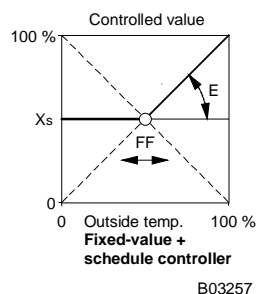
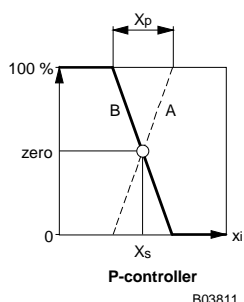
Accessories

0297103 000 Additional bag of scales with 8 different scales according to the transducer used.

0297133 000 Universal scales for setpoint adjuster X_S ; gradation 120, 80/160, 50/100, 30/60

1) Without transducer; air consumption for transducer connections 3 and 4 is 33 l_n/h more in each case.

2) See Section 60 on regulations concerning the quality of supply air, especially at low ambient temperatures.



Operation

RCP 30 and RCP 31

The transducer at connection 3 converts the control variable into the pneumatic standard signal 0,2...1,0 bar (equivalent to 0...100%) within its measuring range. This actual-value signal x_{i3} is compared with the fixed setpoint X_s .

Depending on the P-band X_{P3} , the control deviation is amplified by a P-controller (master), limited by limiter B to a (variable) minimum value, and then fed as the command variable to a PI-controller (slave). When the actual value is equal to the setpoint ($x_{i3} = X_s$), the PI-controller controls to the value zero = 50%, i.e. to a value that is 50% of the transducer range at connection 4.

With a pressure of 0,2...1,0 bar at input 6, the setpoint can be set remotely from 0...100%. The internal setpoint setting then functions as a minimum limitation.

A restrictor ($\varnothing 0,2$ mm) for supplying the transducer is fitted at connections 3 and 4. The signals from the transducer and the output pressure can be checked via the M4 measuring connection or shown via the manometer.

RCP 31: additional functions

The transducer at connection 5 converts the command variable (e.g. outside temperature) into the pneumatic standard signal 0,2...1,0 bar (equivalent to 0...100%). This signal (x_{i5}) is fed to the command circuit which, together with the setting parameters FF and E, creates a program for the setpoint shift of the following P-controller (master). The characteristic for the influence E can be placed in any of the four quadrants.

Because the outside temperature is often fed to more than one controller, the transducer at connection 5 must be supplied by a separate ($\varnothing 0,2$ mm) restrictor.

Additional details

RCP 30: Front plate with adjusters for setpoint (X_s), P-bands (X_{P3} , X_{P4}), zero, reset time (T_n) and minimum limitation (B).

RCP 31: Front plate with adjusters for setpoint, P-bands, (X_{P3} , X_{P4}), zero, reset time, minimum limitation, influence (E) and shift starting point (FF).

Additional information on accessories

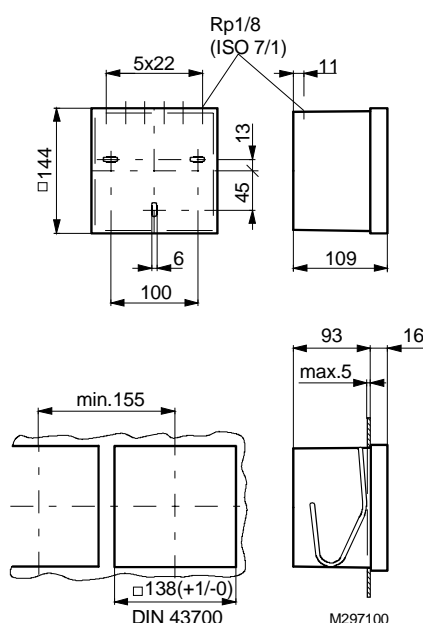
0297103 000 Additional bag of eight alternative scales

5...35 °C	20...90 %rh
-20...40 °C	0...5 mbar
0...120 °C	5...10 mbar
80...200 °C	10...15 mbar

Technical information

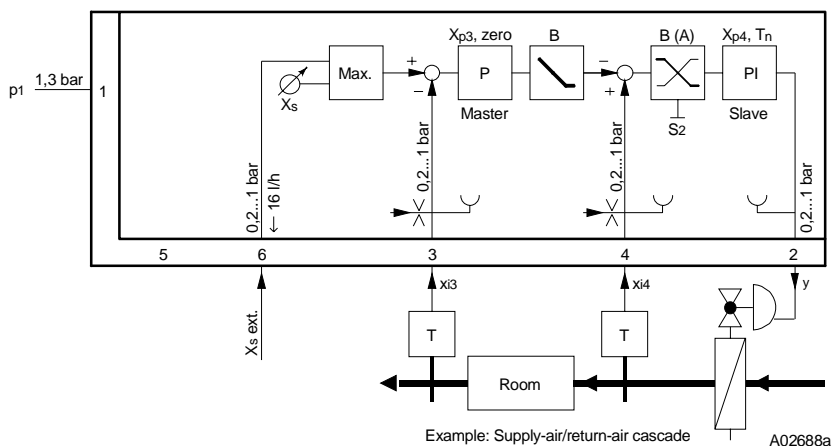
Technical manual: *centair* system 304991 003

Dimension drawing

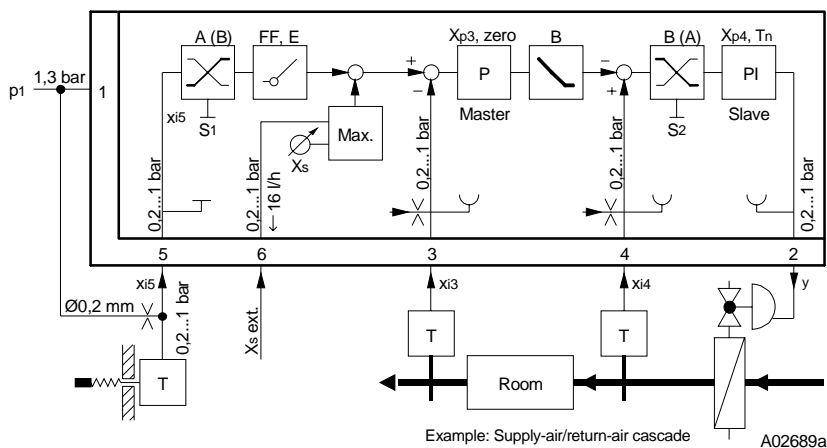


Connection diagrams

RCP 30



RCP 31



1	Supply pressure	T_n	Reset time	B	Limiter
2	Output pressure	X_S	Variable setpoint	x_{i3}	Main control variable
3	Actual value for P-controller	X_{p3}	P-band for P-controller	x_{i4}	Secondary control variable
4	Actual value for PI-controller	X_{p4}	P-band for PI-controller	x_{i5}	Command variable
5	Command variable for fixed-value + schedule	zero	zero point	y	Output pressure
6	Remote setpoint adjustment	FF	Shift starting point for fixed-value + schedule	S1	Control action for fixed-value + schedule
		E	Influence	S2	Control action for controller