

## Regulator AP 21



**3**-coloured display



- professional performance
- modern construction
- universal application
- low price
- 3-year warranty



### Application

Technologic processes  
 Industrial and laboratory ovens  
 3-states or continuous management of regulatory valves  
 Equithermal regulation of heating systems

### Preference

3-coloured display immediate optical signalization  
 Vertical bargraph  
 PID regulation  
 Program regulation 4 programs with 8 steps  
 Real time  
 External settings of required value  
 Operating software PAP  
 Communication with protocol MODBUS



### Description

AP 21 is professional PID regulator with 3-coloured display for universal application. Change the color of the upper display (green-yellow-red) give immediate optical signal to operator, settings is independent of other parameters. Another auxiliary visual element is a vertical bargraph. Input part of apparatus is equipped with 16-bit transducer with galvanic separation. The regulator has two analogue inputs. Input 1 is universal for resistance sensors Pt100, Pt1000, Ni1000, thermocouples J, K, E, T, R, S, B; unified signals 0/4-20 mA or 0-10 V. Input 2 can be used as feedback in the management of regulating valves or as remote (external) settings of required value. The apparatus has operated regulating algorithms ON/OFF and PID. The next appliance can be controlled by outputs relay (2x relay for regulation and

2x relay for alarms) or by continuous analogue output. For data communication with regulator can be used communication line RS232 or RS485 with protocol MODBUS. An operating software PAP is included in standard delivery, which serve to fast configuration of parameters auxiliary via PC or to monitoring and archiving of measured data.

**Technical data**

<b>POWER SUPPLY</b>	80-253 VAC, 50 Hz 18-36 VDC / 18-36 VAC, 50 Hz	<b>DISPLAY</b>	Display	-999 ~ 0 ~ 9999
<b>Incoming power</b>	max. 12 VA	<b>Display color</b>	top display: green, yellow, red (colour change is possible) bottom display: green	
		<b>Height of digits</b>	top display: 14 mm bottom display: 10 mm	
		<b>Decimal point</b>	adjustable in program	
		<b>Resolution</b>	according to position of decimal point	
		<b>Bargraph</b>	16 LED lights	

**INPUT SIGNAL, ACCURACY**

Type	Input signal	Range of measurements	Measurement accuracy (% range)	Standard
<b>Input 1: universal with galvanic separation</b>	Pt100	-100 ~ 800 °C	± 0,1 %	IEC 751
	Pt1000	-100 ~ 600 °C	± 0,1 %	IEC 751
	Ni1000/6180 ppm	-50 ~ 200 °C	± 0,1 %	DIN 43760
	Ni1000/5000 ppm	-50 ~ 200 °C	± 0,1 %	DIN 43760
	thermocouple J	-200 ~ 1200 °C	± 0,1 %	IEC 584
	thermocouple K	-200 ~ 1300 °C	± 0,1 %	IEC 584
	thermocouple E	-200 ~ 950 °C	± 0,1 %	IEC 584
	thermocouple T	-200 ~ 400 °C	± 0,1 %	IEC 584
	thermocouple R	-50 ~ 1550 °C	± 0,15 %	IEC 584
	thermocouple S	-50 ~ 1700 °C	± 0,15 %	IEC 584
thermocouple B	250 ~ 1800 °C with linearization by 400 °C	± 0,15 %	IEC 584	
	current signal	4-20 mA, 0-20 mA	± 0,1 %	
	voltage signal	0-10 V	± 0,1 %	
Compensation of comparative ends of thermocouples inside - accuracy 0,5 °C at temperature 20 °C, temperature coefficient 50 ppm / °C outside - regulable 20 °C, 50 °C, 70 °C or without compensation				
<b>Input 2: feedback, external settings of required value</b>	potentiometer 1 (resistance transmitter)	to 250 Ω	± 0,2 %	
	potentiometer 2 (resistance transmitter)	to 1,3 kΩ	± 0,2 %	
	potentiometer 3 (resistance transmitter)	to 10 kΩ	± 0,2 %	
	current signal	4-20 mA, 0-20 mA	± 0,1 %	
	voltage signal	0-10 V	± 0,1 %	

<b>OUTPUTS</b>	
<b>Contact</b>	2x relay (switching contact 250 VAC, 2 A) or 4x relay (switching contact 250 VAC, 2 A)
<b>Analogue</b>	13,5 bit D/A transducer without galvanic separation or with galvanic separation current 0(4)-20 mA, loading resistance max. 400 Ω voltage 0-10 V, loading resistance min. 10 kΩ
<b>COMMUNICATION</b>	RS232 without galvanic separation (protocol MODBUS), RS485 with galvanic separation (protocol MODBUS), two-way communication

<b>MECHANICAL PROPERTIES</b>	
<b>Type</b>	panel
<b>Dimensions</b>	96 x 48 x 119 mm for power supply 80-253 VAC, 50 Hz 96 x 48 x 125 mm for power supply 18-36 VDC / 18-36 VAC, 50 Hz
<b>Opening in panel</b>	90,5 x 43,5 mm (openings in corners ø 3 mm with pitch 89,5 x 42,5 mm)
<b>Keyboard</b>	foil, 4 keys
<b>Weight</b>	0,4 kg

**AUXILIARY POWER SUPPLY U<sub>i</sub>**  
>18 VDC @25 mA for power supply sensor

<b>OPERATING CONDITIONS</b>	
<b>Working temperature</b>	0-60 °C
<b>Stabilizing time</b>	to 10 min. after switching
<b>Shielding</b>	IP 54 (front panel) IP 20 (terminal board)
<b>Temperature coefficient</b>	25 ppm/°C
<b>Calibration</b>	25°C and 40 % r.v.
<b>Data back-up</b>	electrically (EEPROM)

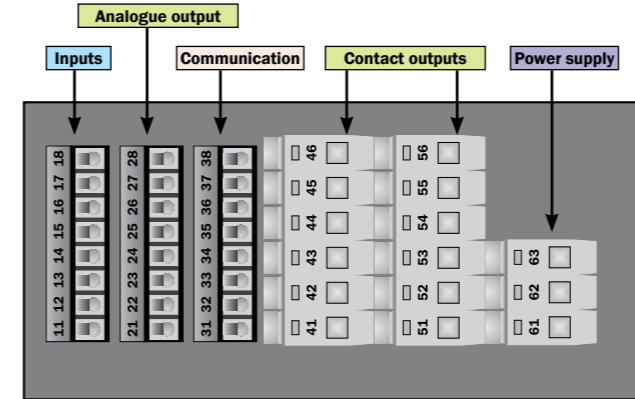
<b>CONNECTION</b>	
<b>Connector terminal board</b>	
<b>Max. section of conductor</b>	2,5 mm <sup>2</sup> for power supply and contact outputs 1 mm <sup>2</sup> for other connectors
<b>Safety class</b>	I

**ELECTRIC SAFETY**  
CSN EN 61010-1: 2003 including changes

**ELECTROMAGNETIC COMPATIBILITY**  
CSN EN 61326

**SEISMIC RESISTIBILITY**  
CSN IEC 980:1993, art. 6

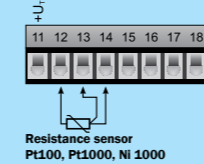
**Terminal board connection**



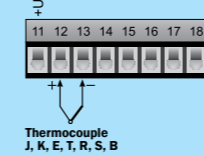
**INPUTS**

**Input 1**

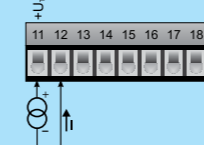
Resistance sensor  
Pt100, Pt1000, Ni1000



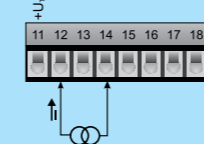
Thermocouple  
J, K, E, T, R, S, B



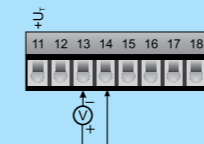
Current signal 4-20 mA  
(passive double-conductor transducer)



Current signal 0/4-20 mA  
(active current signal)

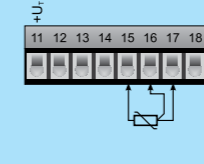


Voltage signal 0-10 V

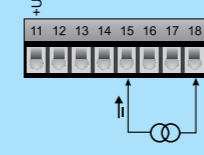


**Input 2**

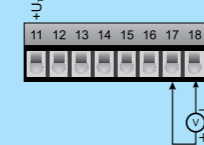
Potentiometer



Current signal 0/4-20 mA  
(active current signal)

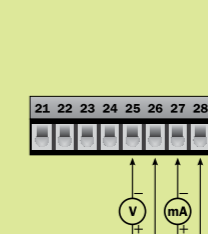


Voltage signal 0-10 V

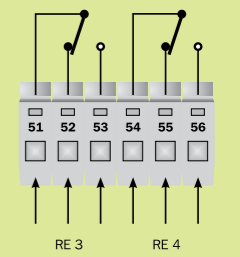
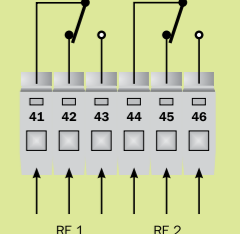


**OUTPUTS**

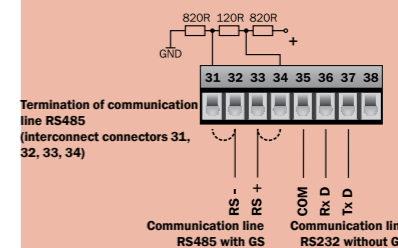
**Analogue output**



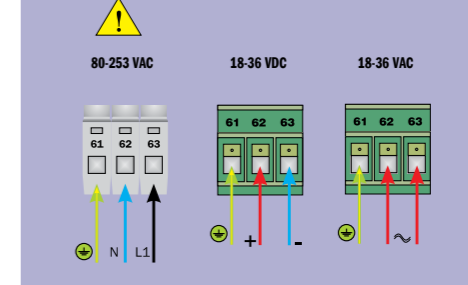
**Contact output**



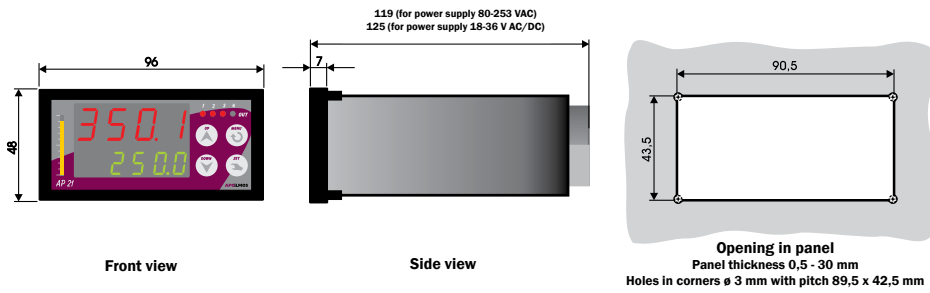
**COMMUNICATION**



**POWER SUPPLY**



**Dimensions**



**Ordering code**

AP 21 - XX - X - X - X - X - X - XXX		
41		<b>Input</b>
		input 1: universal with galvanic separation
		input 2: feedback, external settings of required value
		<b>Contact output</b>
1		2 x relay (switching contacts 250 VAC, 2A)
2		4 x relay (switching contacts 250 VAC, 2A)
		<b>Analogue output</b>
0		empty
1		current/voltage without GS
2		current/voltage with GS
		<b>Communication</b>
0		empty
1		RS232 (protocol MODBUS)
3		RS485 with GS (protocol MODBUS)
6		RS485 with GS + RS232 (protocol MODBUS)
		<b>Power supply</b>
1		80-253 VAC
2		18-36 V AC/DC
		<b>Display</b>
4		coloured
		<b>Software</b>
001		standard
002		program regulation
003		equithermal regulation
XXX		atypical software on special request

**Example of order**

AP 21 - 41 - 2 - 0 - 6 - 1 - 4 - 001
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