AR653

Universal two-channel controller

Two-channel universal regulator with mathematical functions and elements fuzzy logic PID

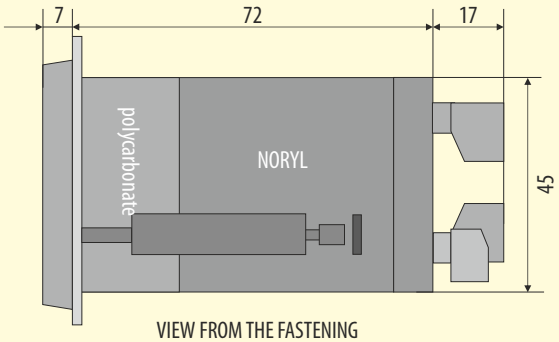
- control and monitoring of temperature and other physical values (humidity, pressure, level, speed, etc.) processed to a standard electrical signal (0/4÷20mA, 0÷10V, 0÷60mV, 0÷2,5kΩ)
- 2 universal measurement inputs (thermoresistant, thermocouple, and analog) with mathematical functions (subtraction, addition and average of measurements from two inputs)
- programmable functional button to change the operating mode of the controller: start/stop of control, manual mode for outputs, step change of the set value (day/night), keyboard lock, view of measured values
- 3 independent ON/Off type outputs (2- and 3-way adjustment) with the following control characteristics:
  - output 1 (main): ON-OFF with hysteresis, PID, AUTOTUNING PID
  - output 2, 3 (auxiliary/alarm): ON-OFF with hysteresis
- analogue output 0/4÷20mA or 0/2÷10V (constant-control, retransmission)
- selection of the value controlling the operation of each output (any input, subtraction, addition, average of measurements)
- advanced PID parameter selection function with fuzzy logic elements
- manual mode (open control loop) available for binary outputs and the analog output, which makes it possible to set the value of the output signal in the range of 0-100%; possibility of self-activation in the event of sensor failure
- programmable operating characteristics (process controller, ramping)
- an integrated 24 V DC power supply supplying the field transducers
- two-line LED digital readout with adjustable brightness:
  - Upper dispaly- measured value1 (e.g. input 1, difference between measured values, etc.)
  - Bottom dispaly measured value 2 or set value of output 1
- RS485 serial interface, galvanically isolated, MODBUS-RTU
- compensation of line resistance for resistance sensors
- temperature compensation of thermocouple cold ends
- programmable values to be displayed (measurements or mathematical functions), types of inputs, indication ranges (for analog inputs), control, alarms, communication, and access options, and other configuration parameters;
- access to configuration parameters protected with a user password
- parameter configuration methods:
  - via membrane keyboard (IP65) located on the front panel of the device
  - via RS485 or PRG AR955/GP programmer and freeware: ARsoft-LOG (Windows 7/8/10)
- software and the AR956 (or AR955) programmer that enables viewing the measured value and quick configuration of single or ready sets of parameters that were saved earlier on the computer for future use, e.g. in other controllers of the same type (copying of configuration)
- universal power supply 15-350 Vdc, 20-250 Vac / 50-60Hz
- panel enclosure, IP65 on the front
- high accuracy, long-term stability and immunity to interference
- optional to choose (in the ordering method): power supply 24Vac/dc, output SSR, analog output 0/2÷10V, digital input BIN and interface RS485

Contents of set:
- regulator with handles mounting in the window
- user manual
- warranty card

Available accessories:
- programmer AR955/GP (with optional adapter)
- RS485 to USB converter

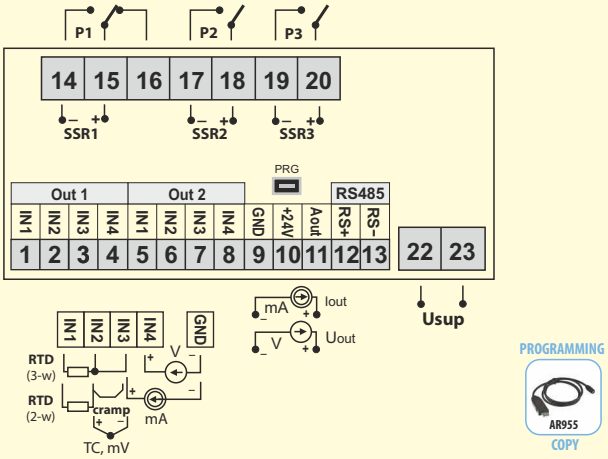
DIMENSIONS, INSTALATTION DATA

Enclosure dimensions	96x48x79 mm
Panel window	92x46mm
Fixing methods	panel, grips on the side of the enclosure
Material	self-extinguishing polycarbonate NORYL 94V-0



VIEW FROM THE FASTENING HOLDER SIDE

TERMINAL STRIPS, ELECTRICAL CONNECTIONS



How to order

AR653 / □ / □ / □ / □ / □

Output 3	Code
relay	P
SSR	S

Analog output	Code
0/4÷20mA	WA
0/2÷10 V	WU

Outputs 1, 2	code
relay	P
SSR	S

Interface RS*	Code
interface RS485	RS485

* option for an extra fee

For example:
AR653 / S / P / RS485 / P
AR653, main output (1) SSR, auxiliary output (2 i 3) relays, interface RS485

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Technical Data

Universal inputs (programmable)			**measurement ranges**
- Pt100 (RTD, 3- or 2-wire)			-200 ÷ 850 °C
- Ni100 (RTD, 3- or 2-wire)			-50 ÷ 170 °C
- Pt500 (RTD, 3- or 2-wire)			-200 ÷ 620 °C
- Pt1000 (RTD, 3- or 2-wire)			-200 ÷ 520 °C
- thermocouple J (TC, Fe-CuNi)			-40 ÷ 800 °C
- thermocouple K (TC, NiCr-NiAl)			-40 ÷ 1200 °C
- thermocouple S (TC, PtRh 10-Pt)			-40 ÷ 1600 °C
- thermocouple B (TC, PtRh30PtRh6)			300 ÷ 1800 °C
- thermocouple R (TC, PtRh13-Pt)			-40 ÷ 1600 °C
- thermocouple T (TC, Cu-CuNi)			-25 ÷ 350 °C
- thermocouple E (TC, NiCr-CuNi)			-25 ÷ 820 °C
- thermocouple N (TC, NiCrSi-NiSi)			-35 ÷ 1300 °C
- current (R_{we} = 50 Ω)			0/4 ÷ 20 mA
- voltage (R_{we} = 33 kΩ)			0 ÷ 10 V
- voltage (R_{we} > 2 MΩ)			0 ÷ 60 mV
- resistance (3- or 2-wire)			0 ÷ 2500 Ω
Number of measurement inputs			2
Response time for measurements (10 ÷ 90%)			0,5 ÷ 4 s (prgrammable)
Resistance of leads (RTD, Ω)			R_d < 25 Ω (for each line)
Resistance current (RTD, Ω)			400 µA (Pt100, Ni100), 200 µA (remaning), pulse for WE1, continuous for WE2
Processing errors (at 25°C ambient temperature):			
- basic	- for RTD, mA, V,mV, Ω		0,1 % of measuring range ±1 digit
	- for thermocouples		0,2 % of measuring range ±1 digit
- additional for thermocouples			<2 °C (cold ends temperature)
- additional caused by ambient temperature changes			< 0,003 % of input range /°C
Resolution of measured temperature			0,1 °C or 1 °C, programmable

Communication interface (RS485 i PRG, do not use at the same time)	- RS485 (galvanically separated), option		- bitrate 2,4 ÷ 115,2 kb/s, - format 8N1 (8 data bit, 1 bit stop, no parity bit), - MODBUS-RTU protocol (SLAVE)
	- PRG programming link (no separation), standard		
Outputs (3 relays or SSR)	- relay (P1, P2, P3), standard		8A / 250Vac (for resistive loads), 1 main (SPDT), 2 additional (SPST-NO)
	- SSR (SSR1, SSR2, SSR3), option		transistor type NPN OC, 11V, internal resistance 440 Ω
Analogue outputs (1 current or voltage)	- current 0/4÷20 mA (standard)		maximum resolution 1,4 µA (14 bit)
			output load Ro < 350 Ω
	- voltage 0/2÷10 V (option)		maximum resolution 0,7 mV (14 bit)
			output load Io < 3,7 mA (Ro > 2,7 kΩ)
	- output basic error		< 0,1 % of output range
7-segment LCD display with brightness control		- top	red 4 digits, height 14 mm
		- bottom	green 4 digits, height 9 mm
Signalling	- relays active		LED's red
	- messages and errors		LED dispaly
Power supply (Usup)	universal, compatible to standard 24Vdc and 230Vac		15-350 Vdc / 3VA
			20-250 Vac / 3VA / 50-60Hz
Power supply to filed transmitters			24Vdc / 50mA
Rated operating conditions			0 ÷ 50°C, <100 %RH (non-condesing)
Working environment			air and neutral gases
Protection rating			IP65 front, IP20 of the connections side
Weight			~200g
Electromagnetic compatibility (EMC)			- immunity: acc. to PN-EN 61000-6-2
			- emission: acc. to PN-EN 61000-6-4

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