APLISENS®

AR662.B

UNIVERSAL CONTROLLER WITH TWO ROW DISPLAY

Single channel process controller with autotuning PID parameters functions

Input RTD, TC, mA V, mV, Ω, BIN

Output 3 x P/SSR 1 x mA/V

Control ON/OFF, PID Program, Servo

Alarms STB function LATCH

Access protection Password

RS485 MODBUS-RTU

USB port COM MODBUS-RTU

Ethernet MODBUS-TCP MQTT

Software ARSOFT-CFG

Bargraph 8-segment

- control and monitoring of temperature and other physical values (humidity, pressure, flow rate, level, speed, ect.) processed to a standard electrical signal
- configurable architecture enabling use in many fields and applications (industrial, heating, food, energy, etc.)
- **universal measuring input** (resistance thermometers, thermocouple, analogue 0/4÷20mA, 0÷10V, 0÷60mV, 0÷2,5kΩ)
- **2** function buttons (F i SET) and digital input (**BIN**) for quick selection operating mode of controller, separately programmable: start/stop of control, manual/ automatic mode for outputs, step change of the set point value SP (day / night, with separate control parameters), keyboard lock, resetting errors and alarms STB (LATCH)
- **3 control/alarm outputs** ON/OFF type (two-state P/SSR) with independent functionalities and control algorithms:
  - ON-OFF with hysteresis (characteristics for heating and cooling, band alarms in range, out of range and with deviation for 3-position control)
  - **PID** (selection of independent 3 sets of parameters), advanced functions of automatic tuning of PID parameters, **smart logic**
  - programmed control characteristic **(process controller with timer**, up to **6 sections**, including 3 ramping sections - inclination for heating/cooling or for cooling/defrosting, 3 setpoints SP with ON-OFF or PID control, selection of the auxiliary output and its status, displaying remaining time for the entire section or after exceeding SP, etc.)
  - thermostat/ safety controller **STB** (alarm state open or closed, can be used as **LATCH alarm memory** e.g. when exceeds a threshold or a band)
  - ability to control a three-way mixing valve with an actuator (**step control, Servo**) with two contact inputs (open - close)
  - **manual mode** (open control loop) with initial value of control signal (MV) taken from current automatic mode or programmed by user
  - direct or inverse copy of the output 1 state (applies to outputs 2 and 3, can be used e.g. to implement **DPDT** changeover relay or to take over the function of the damaged P1)
  - **limiting** maximum level of output signal **(power),** also includes associated mA/V analog output
- analog output **0/4÷20mA lub 0/2÷10V** for control or retransmission of measurements and set values:
  - getting control parameters from any associated two state output (1, 2, 3), both in automatic and manual mode
  - shockless (soft) switching of the output signal, e.g. after changing manual/automatic mode or control start/stop
  - correction (calibration) of range of changes of output signal (offset for end values to obtain non-standard ranges e.g. 2÷16mA or 1÷9V)
- **wide range of supply voltages** (**18÷265 Vac / 22÷350 Vdc**) and built-in power supply for supplying on-site transducers **24Vdc**/30mA
- **readable LED display with adjustable brightness**, typical **units of measurement** and signaling work status (messages, errors, etc.):
  - white color - measured value PV (upper row), units and symbols of status of outputs and serial transmissions (1, 2, 3, °C, %, %RH, mA, A, mV, V, m, **.** or none)
  - red, bottom row - selectable setpoints SP or 8-segment **bargraph** for MV (control signal), PV (measurement), output signal mA/V or none
- optional **RS485** serial interface, protocol **MODBUS-RTU** for reading measurements and parameter configuration
- optional **Ethernet** interface, protocol **MODBUS-TCP** i **MQTT** (for internet of things **IoT**/**M2M**, a cloud and mobile applications), possibility of data exchange via the **Internet**
- **USB interface** (micro USB port, standard equipment, for parameter programming, viewing measurements and updating firmware)
- automatic or fixed line resistance compensation for resistive sensors and thermocouple cold junction temperature compensation
- programmable type of input, indication range (for analog inputs), control options, alarms, display, communication, access, and other configuration parameters
- access to configuration parameters protected with a user password or without protection
- methods for configuring parameters:
  - via membrane keyboard IP65 located on the front panel
  - via USB, RS485 or Ethernet and freeware ARsoft-CFG (for Windows 7/10) or user application (using protocols MODBUS-RTU i TCP)
- free software ARSOFT-CFG (download from *www.apar.pl*) enabling the preview of measured value and quick configuration single or ready parameter sets previously saved on a computer for re-use, e.g. in other controllers of the same type (duplicate configuration)
- housing for mounting on a 35mm DIN rail, protection class IP40 (IP20 from the side of connectors)
- modern technical solutions, intuitive and clear operation, **high accuracy** and long-term stability as well as resistance to interference
- optional to choose from (in the way of ordering): control outputs for SSR, analog output 0/2÷10V (instead 0/4÷20mA) and RS485 and Ethernet interface (RJ45 conenctor)

Contents of set:

- controler with handles mounting
- user manual

Available accessories:

- USB cable (A - micro B) for connection with a computer, length 1.5 m
- USB to RS485 converter (with galvanic separation)

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TECHNICAL DATA

Number of measuring inputs	1 universal (resistance thermometer RTD, thermocouple, analog mA/V/Ω)		
Universal input (programmable, 17 types, conversion A/C 18 bits), measuring ranges			
- Pt100 (RTD, 3- or 2-wire)	-200 ÷ 850 °C	- thermocouple R (TC, PtRh13-Pt)	-40 ÷ 1600 °C
- Pt500 (RTD, 3- or 2-wire)	-200 ÷ 620 °C	- thermocouple T (TC, Cu-CuNi)	-25 ÷ 350 °C
- Pt1000 (RTD, 3- or 2-wire)	-200 ÷ 520 °C	- thermocouple E (TC, NiCr-CuNi)	-25 ÷ 820 °C
- Ni100 (RTD, 3- or 2-wire)	-50 ÷ 170 °C	- thermocouple N (TC, NiCrSi-NiSi)	-35 ÷ 1300 °C
- thermocouple J (TC, Fe-CuNi)	-40 ÷ 800 °C	- current (mA, Rwe = 50 Ω)	0/4 ÷ 20 mA
- thermocouple K (TC, NiCr-NiAl)	-40 ÷ 1200 °C	- voltage (V, Rwe = 110 kΩ)	0 ÷ 10 V
- thermocouple S (TC, PtRh 10-Pt)	-40 ÷ 1600 °C	- voltage (mV, Rwe > 2 M Ω)	0 ÷ 60 mV
- thermocouple B (TC, PtRh30PtRh6)	300 ÷ 1800 °C	- resistance (R, 3- or 2-wire)	0 ÷ 2500 Ω
Response time for measurements (10÷90%)	0,2 ÷ 3,5 s (programmable, default ~0,5 s)		
Resistance of leads (RTD, R)	Rd < 25 Ω (for each line), compensation of line resistance		
Resistive input current (RTD, R)	400 µA (Pt100, Ni100), 200 µA (Pt500, Pt1000, 2500 Ω)		
Processing errors (at 25°C ambient temperature):			
- basic	- for RTD, mA, V,mV, R	0,1 % of the measurement range ±1 digit	
	- for thermocoupels	0,2 % of the measurement range ±1 digit	
- additional for thermocouples	< 2 °C (thermocouple cold junction temperature compensation)		
- additional from ambient temp. changes	< 0,004 % of the input range /°C		
Indication range (programmable)	total -1999÷9999 (maximum range of indications for analog inputs)		
Display resolution / dot position	programmable, 0 ÷ 0.000 , for thermometric inputs 0,1 °C or 1 °C		
Outputs P/SSR (3 separate)	- relay P1÷P3	5A/250Vac (for resistance load), SPST-NO, standard for outputs 1,2	
	- SSR1÷SSR3 (option)	transistor type NPN OC, 11V, current < 23mA, standard for output 3	
Analogue output (mA or V, without separation from input)	- current (standard)	0/4 ÷ 20 mA, load Ro<1 kΩ, max resolution 1,4 µA, 14 bit, active	
	- voltage (option)	0/2 ÷ 10 V, load Io < 3,7mA (Ro > 2,7 kΩ), max resolution 0,7mV, 14 bit	
	- errors (at 25°C)	basic< 0,1 % output range, additional< 0,004 % /°C	
Digital input BIN (2-state)	contact or voltage <24V, active leve: short circuit or < 0,8V		
Power (Usup, universal, comply with the standards 24Vac/dc and 230Vac)	18 ÷ 265 Vac, <3VA (alternating voltage, 50/60Hz)		
	22 ÷ 350 Vdc, <4W (direct voltage)		
Power supply of field transducers	24Vdc/30mA		
Communication interfaces (independent, they can be used simultaneously)	- **USB** (mirco type B, standard)	drivers for the Windows 7/8/10 (virtual serial port COM, communication with computer, MODBUS-RTU protocol, Slave)	
	- **RS485** (option)	MODBUS-RTU protocol (Slave), bitrate 2,4÷115,2 kbit/s, programmable sign format (8N1, 8E1, 8o1, 8N2), galvanic separation	
	- **Ethernet** (option)	RJ45 connector, 10base-T, protocols TCP/IP: MODBUS-TCP (Server), MQTT (client, v.3.1.1), DHCP (client, ICMP (ping), galvanic separation	
Display (LED with brightness adjustment, signaling status of outputs and measuring units)	top row: white color, 7-segment, height digit 9 mm		
	bottom row: red color, 7-segment, height digit 7 mm		
Rated operating conditions	0 ÷ 50°C, <90 %RH (no condensation) air and neutral gases, no dust		
Protection rating	enclosure IP40, connection side IP20		
Electromagnetic compatibility	immunity:according to the PN-EN 61000-6-2, emission:PN-EN 61000-6-4		
Safety requirements according to PN-EN 61010-1	overvoltage category: II	pollution degree: 2	
	voltage to the ground (earth): 300 V for power supply and output relay circuits 50 V for other inputs/outputs circuits and communication interfaces		
	insulation resistance > 20 MΩ	height above sea leve < 2000 m	

Ordering procedure

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Interface Ethernet *	Code
Ethernet (10base-T)	**RJ45**

Output 1, 2, 3	Code
relay	**P**
SSR ***	**S**

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

Interface RS *	Code
interface RS485	**RS485**

* option for an extra fee

** output 0/2÷10 V it is mounted **instead** of the output 0/4÷20 mA (standard)

*** order with only one SSR output is only available for output 3 (fully functional)

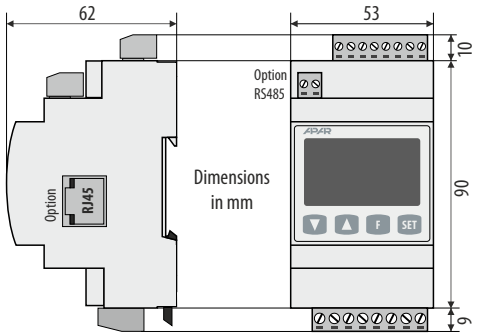
Order examples (standard execution):

AR662.B / P / P / S / WA

AR662.B, 1 and 2 relay outputs, output 3 for control SSR (NPN-OC),
analog output 0/4÷20 mA (active), without RS485 and Ethernet interfaces

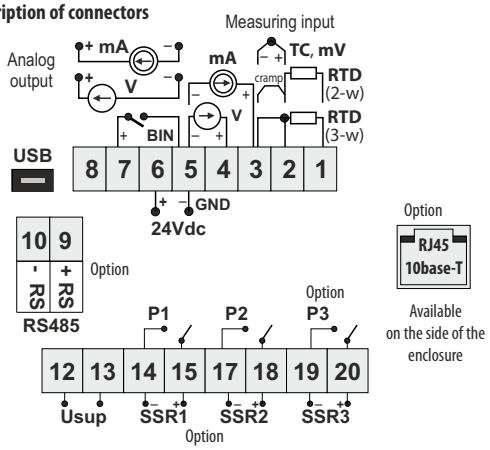
INSTALATION DATA

Enclosure and material	on rail, Modulbox 3MH53, PC/ABS self-extinguishing
Dimensions and weight	53 x 90 x 62 mm (without connectors), ~160 g
Fixing methods	on rail TS35 (DIN EN 60715)
Conductor cross-sections (separable connectors)	2.5mm2 (supply and outputs P/SSR), 1.5mm2 (othrers)



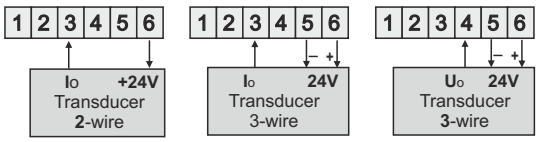
TERMINAL STRIPS, ELECTRICAL CONNECTIONS

1. Description of connectors

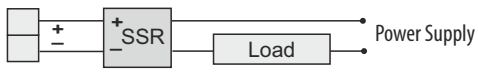


2. Connection of a 2- and 3-wire transducer

(Io - current, Uo - voltage output)

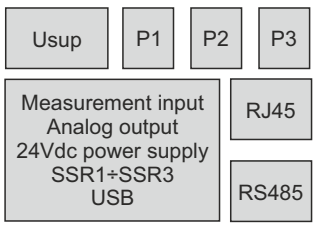


3. Connection of a SSR type relay to regulator's control output



Output
SSR1÷SSR3

4. Galvanic separation of circuits



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