



D/A converter

DA2RS

16bit D/A converter with two
voltage or current outputs
(0 - 10 V, 0 - 5 V, ± 10 V, ± 5 V, 4 - 20 mA, 0 - 20 mA, 0 - 24 mA)

RS232 or RS485 communication



DA2RS

Datasheet

Created: 9.10.2012

Last update: 29.06.2020 14:55

Number of pages: 12

© 2020 Papouch s.r.o.

Papouch s.r.o.

Address:

**Strasnicka 3164/1a
102 00 Praha 10**

Phone:

+420 267 314 267

Fax:

+420 267 314 269

Internet:

www.papouch.com

E-mail:

papouch@papouch.com



CONTENTS

Basic information	4
Application	4
Features	4
Block diagram	4
Connections	5
Output terminals	5
Power	5
RS232.....	5
RS485.....	7
Technical specifications	8
Available makes.....	9
Indications.....	10
Complete protocol description.....	10

BASIC INFORMATION

DA2RS is a universal converter with two analog outputs. These two outputs are independent and can be either voltage or current outputs. Available ranges are: 0 - 10 V, 0 - 5 V, ±10 V, ±5 V, 4 - 20 mA, 0 - 20 mA, 0 - 24 mA. Values for the outputs are sent from a control system using RS232 or RS485 line.



fig. 1 - Device function principle

Application

- Regulation and process automation.
- Controlling units that require analog.

Features

- Two analog outputs (independent settings for voltage or current). Available ranges: **0 – 10 V, 0 – 5 V, ±10 V, ±5 V, 4 – 20 mA, 0 – 20 mA, 0 – 24 mA**
- Output range divided to 10.000 divisions.
- Active current outputs.
- Each output with own galvanic isolation.
- **16 bit** D/A converter.
- **RS232** or **RS485** communication using **Spinel** or **Modbus RTU**.
- Wide power voltage range (8 to 30 V).

BLOCK DIAGRAM

The device is divided to 4 entirely galvanically isolated parts: (1) Power and processor, (2) communication lines, (3) output 1 and (4) output 2.

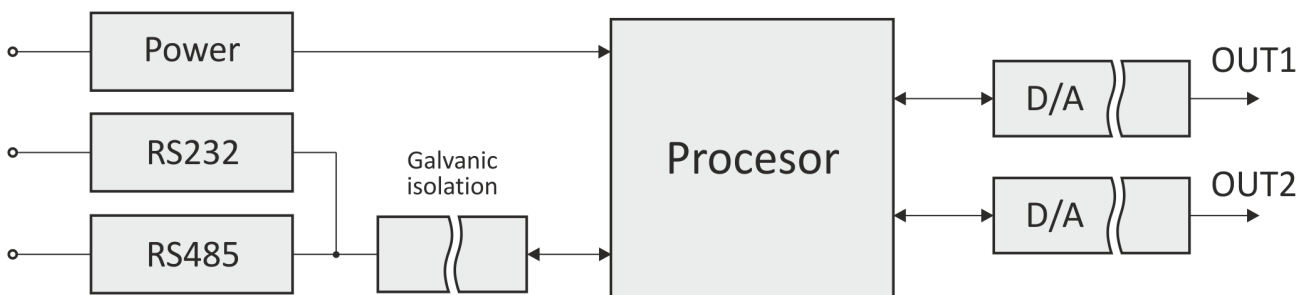


fig. 2 – DA2RS block diagram

CONNECTIONS

Output terminals

Output terminal is a 6-pin terminal - see fig. 3. It consists of two analog outputs. Each with its own galvanic isolation. If there is no specific reason, DO NOT interconnect grounding terminals (GND) between DA2RS and your device.

Wires are connected separately and fixed by tightening the screw (flat screw for 2.5mm screwdriver).

The picture below shows output 1 connected as a voltage and output 2 as a current output. (each output can be connected either way.) Current outputs are active.

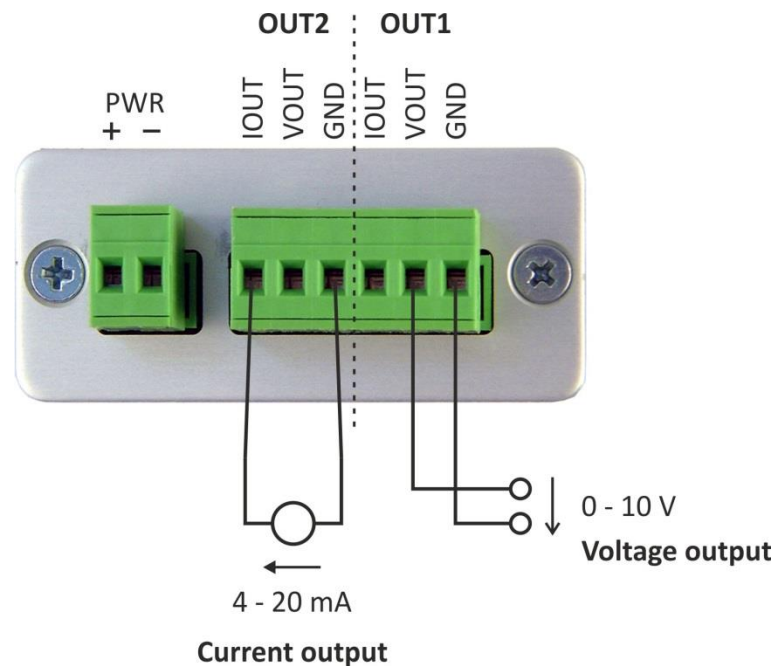


fig. 3 – output terminals and two ways to connect different output types

Power

DC power ranging from 8 to 30 V is connected to 2-pin terminal shown on fig. 3. Input is reverse polarity protected.

Wires are connected separately and fixed by tightening the screw (flat screw for 2.5mm screwdriver).

RS232

RS232 serial line is connected using CAN9F connector (D-Sub 9 female). Regular RS232 cable is to be used. RS232 connector is shown in fig. 4, pinout is shown on a different page in fig. 5.

RS232 and RS485 can both be used to communicate with the unit. DA2RS can only receive commands from one of the lines at any given time. It is necessary to make sure DA2RS does not get a command from both lines at the same time.

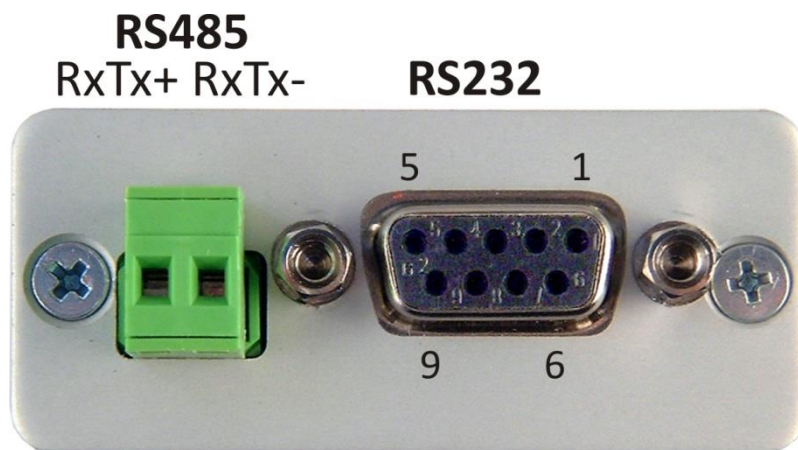


fig. 4 – terminal and connector to connect RS485 and RS232 respectively¹

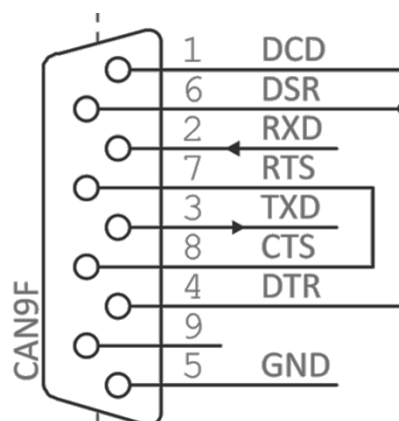


fig. 5 – RS232 connector pinout

¹ RS485 line wires can be labeled as **A** (RxTx+) and **B** (RxTx-).

RS485

To connect RS485 line a 2-pin slip-on terminal is to be used. Terminal pinout is shown in fig. 4. RS232 and RS485 can both be used to communicate with the unit. DA2RS can only receive commands from one of the lines at any given time. It is necessary to make sure DA2RS does not get a command from both lines at the same time.

RS485 line termination connections

Most cases do not require RS485 termination. If the line goes through a noisy environment however, it is recommended to connect it. There can be only two devices with RS485 termination connected on one RS485 line at both ends of the line.

Use the internal jumper to connect the RS485 termination (see fig. 6). The enclosure can be opened using a Philips screwdriver by unscrewing screws on both sides of the device.

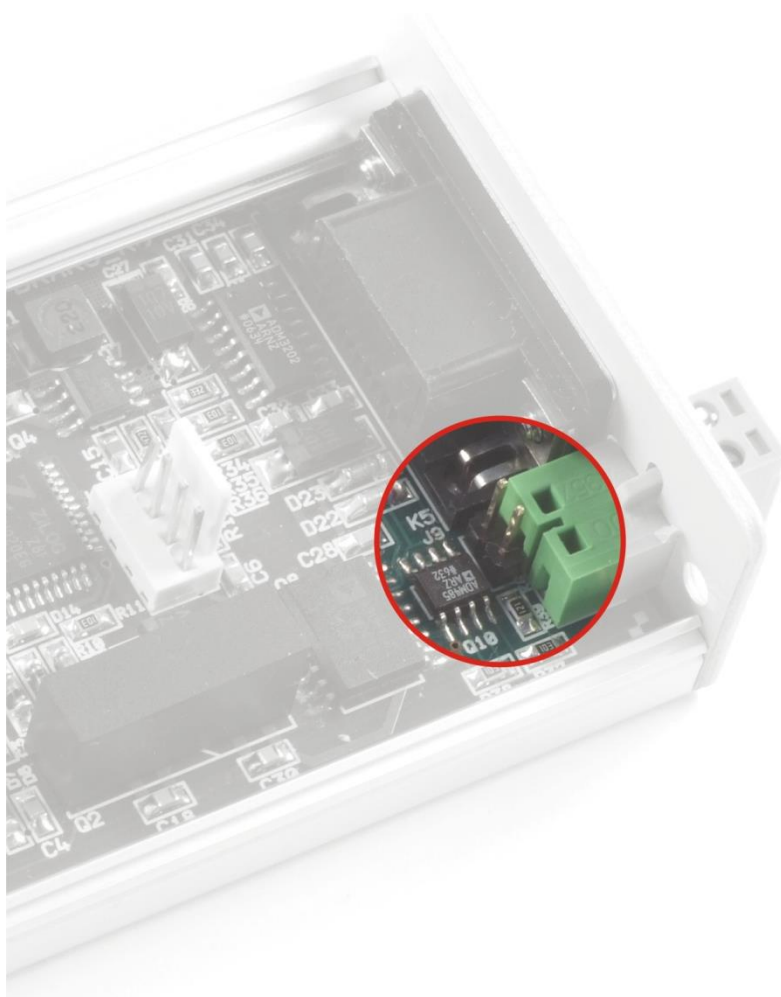


fig. 6 – RS485 termination jumper

TECHNICAL SPECIFICATIONS**Analog outputs:**

Number of outputs	2
Output types.....	voltage or current (active)
D/A converter resolution.....	16 bit
Nonlinearity	max. $\pm 0,032\%$ from range
Settle time	25 μ s
Range divisions.....	10 000

Voltage output:

Output ranges	0 – 10 V, 0 – 5 V, ± 10 V, ± 5 V
Minimal load.....	> 1 k Ω
Conversion accuracy	typ. 0,05 % from range at 25 °C

Current output:

Output ranges	4 – 20 mA, 0 – 20 mA, 0 – 24 mA
Maximum load (0 – 24 mA).....	< 400 Ω
Maximum load (other).....	< 500 Ω
Conversion accuracy	typ. 0,15 % from range at 25 °C

Communication interface:

Type	RS232 a RS485
Connector	slip-on terminal / D-Sub 9
Communication speed	selectable 300 Bd to 230,4 kBd (default: 9,6 kBd)
Data bits.....	8
Parity.....	no parity
Stop bits	1
Isolation.....	500 V DC
Communication protocol	Spinel a Modbus RTU
Minimum delay before response is sent.....	2 ms ²

Power:

Power voltage	DC 8 to 30 V (reverse polarity protected)
Current consumption.....	normally 90 mA at 12 V

² Delay is necessary due to switching the RS485 communication direction.

Other:

Operation temperature.....	-20 °C to +70 °C
Dimensions.....	104 mm × 55 mm × 24 mm
Dimensions including connectors	121 mm × 55 mm × 24 mm
Dimensions with DIN holder	104 mm × 55 mm × 33 mm
Weight	140 g

Available makes**Mounts:**

- No holder (standard make)
- With DIN rail holder



fig. 7 - DA2RS with DIN rail holder

- With wall mount



fig. 8 – Wall mount (bottom view)

Output ranges:

- 0 – 10 V, 0 – 5 V, ± 10 V, ± 5 V, 4 – 20 mA, 0 – 20 mA, 0 – 24 mA
- Other voltage and current ranges can be delivered upon request. Please feel free to contact us should you require a different range; a combination of output ranges is possible as well.

Please feel free to contact us on any DA2RS modifications and / or makes.

INDICATIONS

There are three indicators on the device indicating operation states:

ON

Green LED indicator. It is lit once a power supply is connected.

COM

Yellow LED indicator. It flashes after the device is fully powered up and also flashes during the RS232 or RS485 communication.

OVR

Red LED indicator. It is lit when any one of the two outputs are overloaded.

COMPLETE PROTOCOL DESCRIPTION

Complete protocol description of Spinel and ModBus RTU used for communications is available in a separate document on DA2RS WEB page.

Papouch s.r.o.

Data transmission in industry, line and protocol conversions, RS232/485/422/USB/Ethernet/GPRS/WiFi, measurement modules, intelligent temperature sensors, I/O modules, and custom-made electronic applications.

Address:

**Strasnicka 3164/1a
102 00 Praha 10**

Phone:

+420 267 314 267

Fax:

+420 267 314 269

Internet:

www.papouch.com

E-mail:

papouch@papouch.com

