

SPA7-EXP Expansion board

1. Introduction

The SPA7 has 9 logical inputs, 4 logical outputs, 2 analog inputs. It's possible to use the SPA7 with an expansion board called SPA7-EXP. Due to necessity of analog inputs calibration the completion of SPA7-EXP can be done by the manufacturer only.

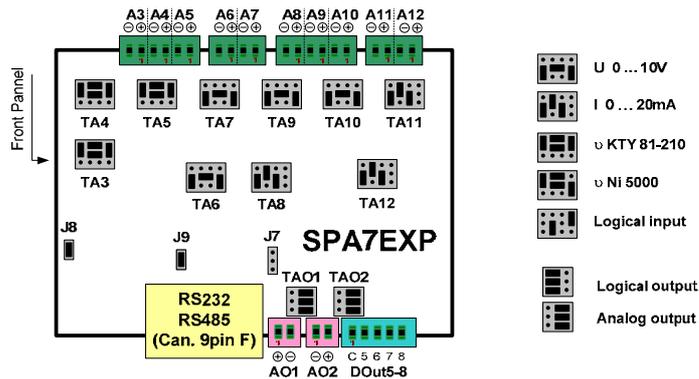


Expansion board contains

- 6 analog inputs, resolution 12 bit, common GND
- 4 analog inputs, resolution 8 bit, common GND
- 2 analog outputs, common GND
- 4 logical outputs (isolated)

1 port RS232 + RS485 common GND
(serial port option RS485 isolated – on special order)

2. Hardware



Warning

Use external power supply for external logical inputs and logical outputs circuits. Do not use SPA7 power (PWR terminal).

2.1 DOut – Logical outputs

Internal circuitry of 4 logical outputs no. 4, 5, 7, 8 are the same as the one on an SPA7 basic board.

2.2 Analog inputs

Internal circuitry of 6 analog inputs no. 3, 4, 5, 6, 7, 8 are the same as the one on SPA7 basic board (12 bits A/D converter).

Internal circuitry of 4 logical inputs no. 9, 10, 11, 12 are the same as the one on an SPA7 basic board except A/D converter which has only 8bit resolution. It's recommended not to use these 4 inputs for temperature measuring (low A/D resolution).

The mode of analog inputs (voltage, current, temperature sensor) can be selected by jumper field TAX (the same number like Ax). Connector layout is the same as the one on SPA7 basic board. 2 pin for each input grouped together only from limited space reason. Any analog inputs can be modified into galvanically isolated logical input (after jumper setting - see SPA7 manual).

2.3 Analog outputs

Output voltage can be set via SMS message in form:
<PASSWORD> <OUTPUT NAME> <VALUE>

Example of an SMS message for an analog output, which is set as an analog output:
"1234 FAN=80"

After receiving of this SMS message SPA7 sets analog output called FAN to 4V. 4V is 80% of 5V which is a maximum for this output.

Any analog output can be used as galvanically isolated logical output (after jumper setting).

Example of an SMS message for an analog output, which is set as a logical output:
"1234 OUTPUT 0" ... output not active (switched off) state
"1234 OUTPUT 1" ... output active (switched on) state

Function of logical outputs is setup using jumpers TAO1, TAO2. See picture.



Warning

When changing jumpers setting it's necessary to copy the change into configuration program SPInit, otherwise SPA7 will not work correctly.

2.4 SPA7-EXP – factory setup

Input Name	Resolution	Input Mode	Factory setup	Jumpers
Aln3	12 bits	Temperature sensor	Temperature KTY 81-210	
Aln4	12 bits	Temperature sensor	Temperature KTY 81-210	
Aln5	12 bits	Temperature sensor	Temperature KTY 81-210	
Aln6	12 bits	Voltage	0 ... +10 V	
Aln7	12 bits	Voltage	0 ... +10 V	
Aln8	12 bits	Current	0 ... 20 mA	
Aln9	8 bits	Voltage	0 ... +10 V	
Aln10	8 bits	Voltage	0 ... +10 V	
Aln11	8 bits	Current	0 ... 20 mA	
Aln12	8 bits	Current	0 ... 20 mA	
Output Name	Resolution	Output Mode	Factory setup	Jumpers
AO1	12 bits	Voltage	0 ... +5 V	
AO2	12 bits	Voltage	0 ... +5 V	

2.5 Serial port RS232/RS485

Serial channel RS232/RS485 is designed in a way that incoming signals RxD are "wired OR". That's why just one serial can be fully used (either RS232 or RS485) because simultaneously incoming RxD data from both ports would collide. It's possible to communicate with two devices of the "slave" type which has a different communication address. One device can be connected to the RS232 port and group of devices of the "slave" type can be connected to the RS485 port. The only condition is that no more than one device will communicate to SPA7 at the same time. And it is ensured by different addresses in the connected devices of "slave" type because they communicate only on request.

Typical usage of this serial channel is GSM data call which can be directed to a device (like e. g. PLC) which is connected to RS232/RS485 channel. This enables direct "transparent" connection from remote PC over GSM network and SPA7 to a connected PLC just by a data call to a phone (data) number of SPA7. This enables to control PLC remotely via GSM network in the same way like locally over serial channel.

Pin	RS232	RS485
1		RS485 D+
2	RS232 Data Out	
3	RS232 Data In	
4	NC	NC
5	GND(RS232, RS485)	GND (RS232, RS485)
6	NC	NC
7	RS232 RTS In	
8	RS232 CTS Out	
9		RS485 D-

Jumpers J8, J9 connects internal power supply +5V to supply input of active RS485 terminators (in case of galvanically not separated RS485 are these jumpers closed) Jumper J7 selects RS232 converter's supply. As a standard pin 1-2 are closed (+5V). Selection 1-3 is supply 3.3V (ready for non standard possibility of supply – LiON battery)

3. Technical specification

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Logical inputs DC any polarity	Count	-		8		-
	Voltage log. H	VIN	8	12	30	V
	Voltage log. L	VIN		<4	4	V
Logical outputs DC, AC	Count	-		4		-
	Voltage	VOUT			50	V
	Current	IOUT			100	mA
Analog inputs	Count	-		6 + 4		-
	Modes	-	voltage, current, temperature, logical input (user selectable)			
Aln3 ... Aln8 Resolution 12 bits	Voltage	-	0		10	V
	Input resistance	RIN	Voltage	18		kΩ
	Current measuring	-		0	20	mA
Aln9 ... Aln12 Resolution 8 bits	Input resistance	RIN	Voltage	100		Ω
	Temperature measuring 1	sensor		KTY 81-210		
	Temperature measuring 2	sensor		Ni 5000		
Analog outputs AO1 ... AO2	Logical input	limit			8	V
	Count	-		2		-
	Modes	-	analog voltage output or logical output (user selectable)			
RS485 RS232	Output voltage	UDAC			5	V
	Output current	IDAC			5	mA
RS485	Baud rate				115200	baud
Temperature	Operational	tA	-20		+65	°C