

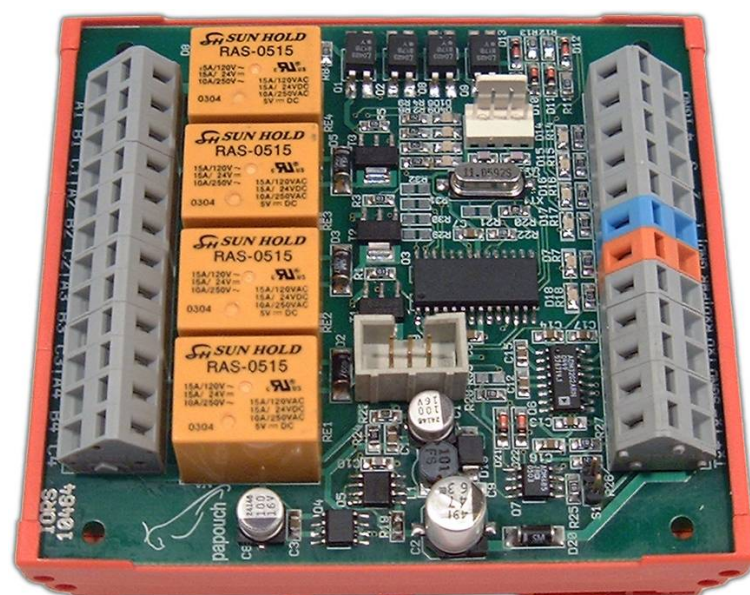
I/O module

IORS

4 optically isolated logical inputs

4× output: relay switch contact

RS232/RS485 communication



IORS

Data Sheet

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BASIC INFORMATION

Description

The IORS universal interface is a module with four two-status inputs and four outputs. The outputs are controlled and the inputs' status is read with the aid of instructions transmitted via an RS232 or RS485 line. The inputs are separated using optocouplers; the outputs go to a relay switch contact. A simple protocol, Spinel (described below), is used for communication. Upon a change of status, a report can be sent automatically. The status of all inputs and outputs is signalled by LED indicators. The range of power-supply voltage is wide. The inputs and outputs are conductively separated; the power supply' grounding is connected to the communication line's grounding.

Applications

- Simple control of any devices from a PC
- Auxiliary control if the required inputs and outputs are not available
- Monitoring status of simple sensors
- The device is easily switched on/off from a PC

Features

- 4 conductively separated logical inputs
- 4 outputs, relay NO/NC switch
- LED indicators Power, and the status of the inputs and outputs
- Signalling of current communication
- Automatic response to an input's status
- A "watchdog" circuit controls the processor
- A simple communication protocol
- Small footprint, low energy consumption
- A wide range of power supply voltage

Technical Parameters

Number of logical inputs	4
Input voltage for State 1.....	8 – 20 V
Input voltage for State 0.....	0 – 4 V
Max. input voltage	24 V
Conductive separation.....	Using an opto-element
Input current	Max. 4 mA at 12 V
Delay of response to change of level.	Shorter than 1 ms
Number of two-state outputs.....	4
Type.....	Relay NO switch
Switched voltage	AC 100 V, DC 50 V
Switched current.....	3 A
Communication line	RS232 or RS485
Baudrate	Option able from 110 Bd up to 115,2 kBd
Number of data bits	8
Parity	None
Number of stop-bits	1
Isolation	± 300 V
Communication protocol	Described
Minimum delay of response.....	2 ms ¹
Maximum delay of response.....	3 ms ²
Power supply voltage	DC 5 to 35 V (with protection from reversal of polarity)
Power consumption	Max. 300 mA
Connectors	Wago 236 terminal
Operational temperature.....	0 °C to 50 °C
Dimensions.....	100 mm 86 mm × 20 mm (depth × width × height)



Fig. 1 – Wago 236

Comment: The power supply and the RS232 line have a common grounding contact.

Installing options

Installation:

- Without a DIN rail mount (*standard*)
- With a DIN rail mount

Please do not hesitate to contact us if you have specific requirements for the IORS module's workmanship and functionality.



Fig. 2 – With a DIN strip holder

¹ The delay is a necessary waiting time for the reversing of the communication direction on RS485.

² If user data is written, the delay may be up to 40 ms.

CONNECTIONS

The 4-input and 4-output interface uses relay contacts as an isolated output. The inputs are isolated by optocouplers. The input diagram is shown below.

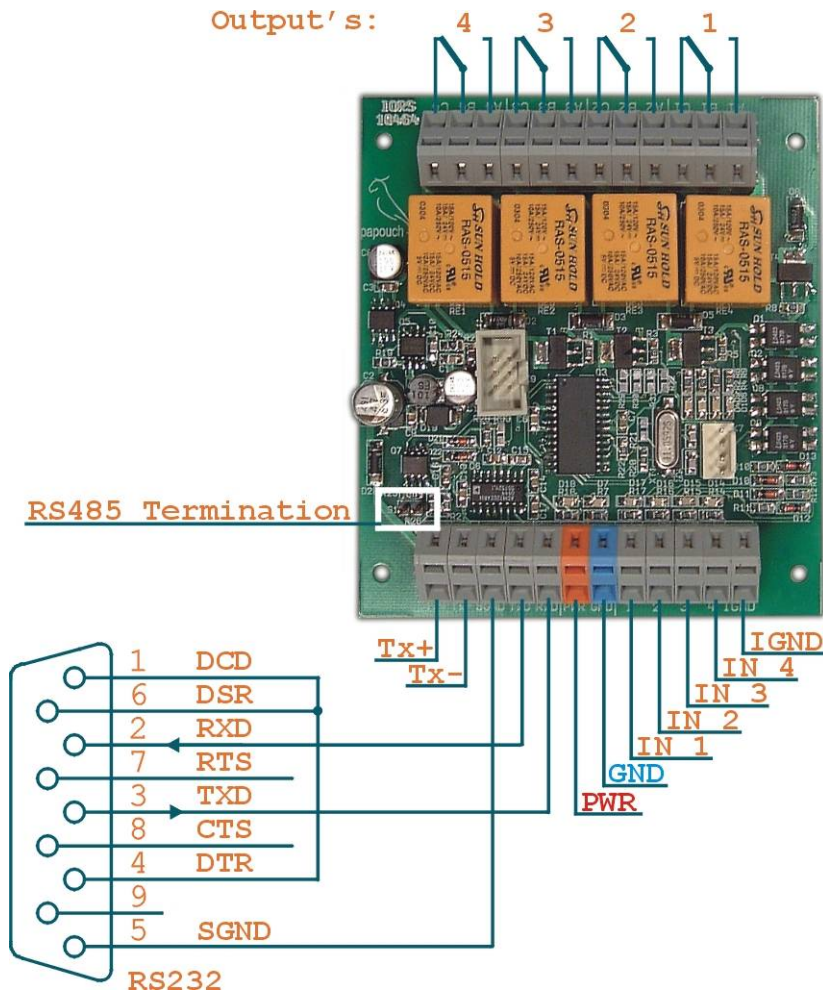


Fig. 3 – Connections

The connections of the inputs and outputs are shown in the Figure 3. The Figure also shows the RS232-line cable connection. (The connector is described from the PC view.)

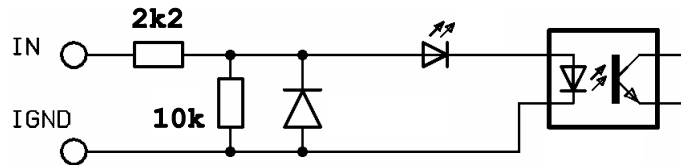
The module enables communication via an RS485 line, connected to Tx+ a Tx-³contacts.

An RS232 line does not require any settings. A jumper shown in the Figure 3 can be used for termination of an RS485 line.

³ Notation A (for Tx+) and B (for Tx-) is sometimes used.

LOGICAL INPUTS

There are four logical inputs and the **IGND** conductively-separated grounding contact, all connected to the terminal board as shown in the Figure. Their status is indicated by a LED indicator. The ON status is defined by an input voltage between 8 V and 20 V. The **IGND** pole is separated from the device's grounding GND and is shared among all inputs. The inputs' status does not affect other functions of the device and is only transmitted to a PC.



INDICATORS

Indicators on the front panel show the status of the inputs, outputs, power supply and communication.

The input and output contacts and indicators are shown in the Figure 4.

Next to the power-supply connector, there is a green LED (power supply) and a Yellow LED (communication with the module).

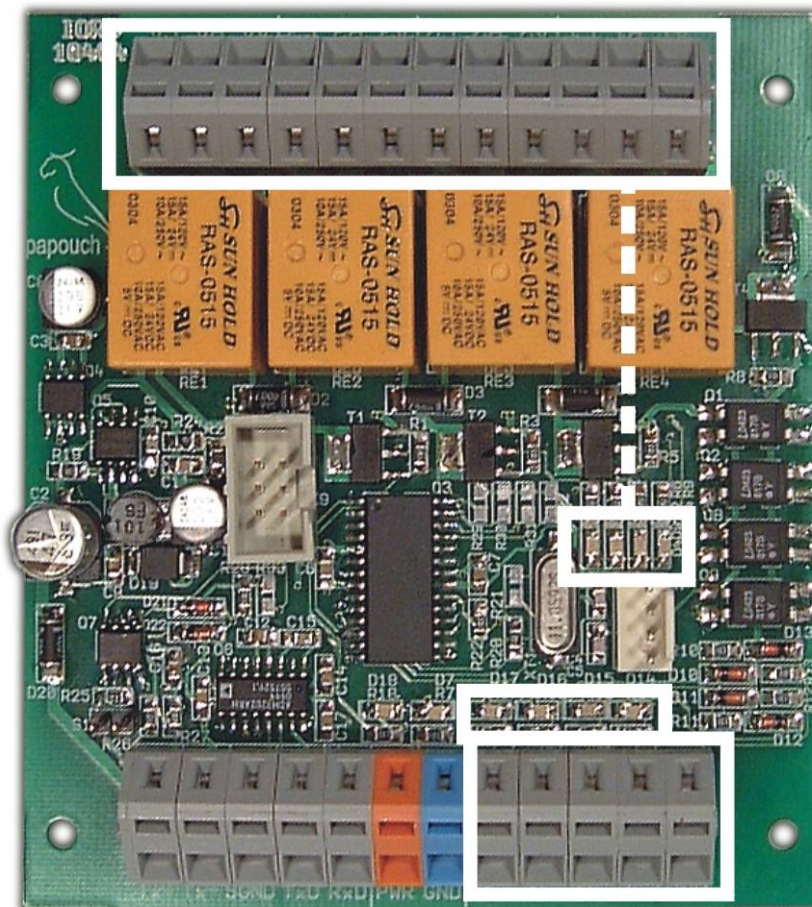


Fig. 4 – Indicators

BLOCK DIAGRAM

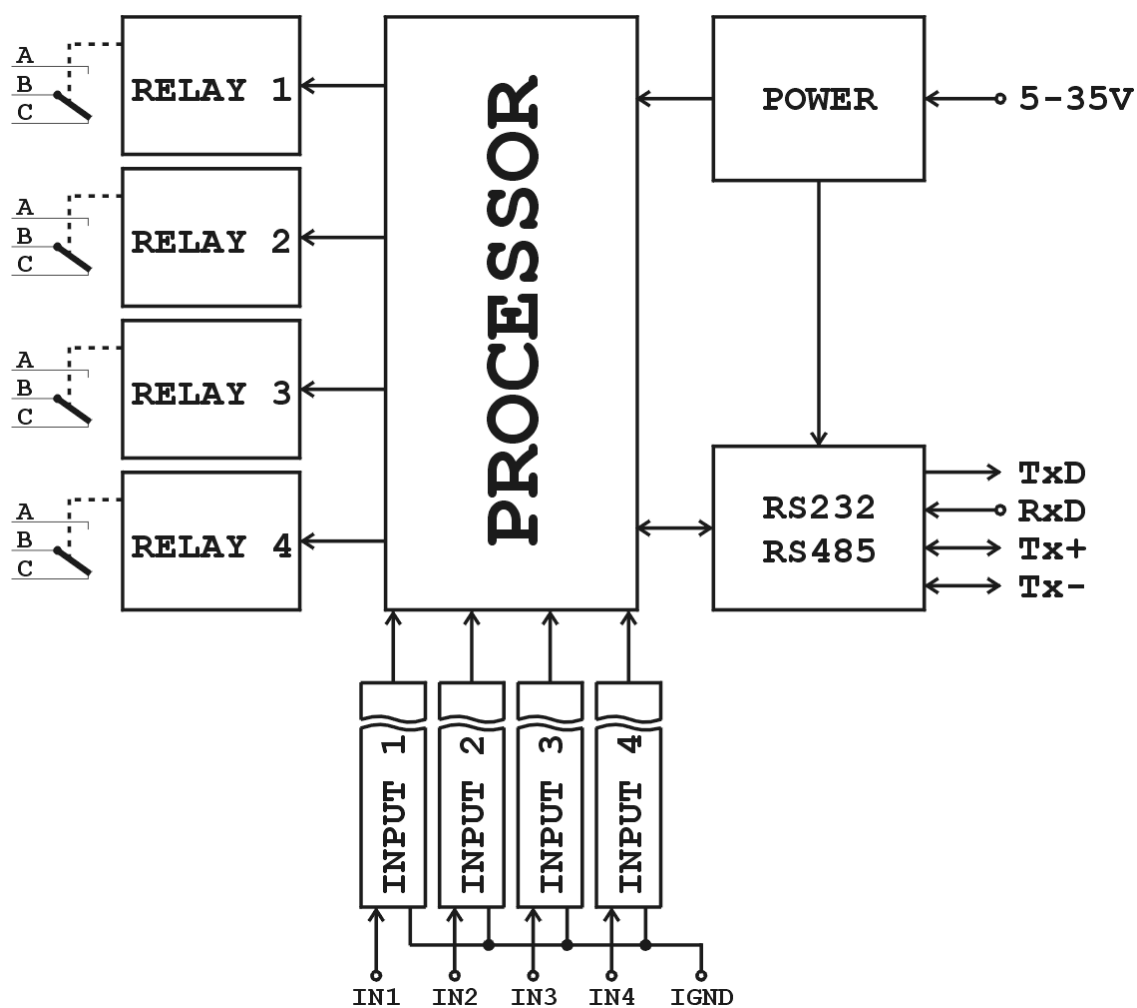


Fig. 5 – Block Diagram

EXAMPLES OF CONTROL

The examples below are based on an assumption that the communication with the module makes use of the default settings. Send an Enquiry string (delays between individual characters of an enquiry must not be longer than 5 seconds). The module should response as shown in the Response column.

The default settings of the communication line are:

Datarate.....9600 Baud
 Number of data bits8
 Paritynone
 Number of stop-bits1

For the sake of simplicity, the examples are written in a simple 66 format, which is suitable for first information, debugging and communications with the aid of a terminal.

Switch Relay ON

The following example shows switching of Relay 2 in Module 1:

Enquiry	Response	Explanation
*B1OS21 ↵	*B	Prefix
		Module address
	1	\$ can be used as an address entry. It is a "universal address" character and is only allowed if there is only one module on the line.
	OS	Instruction code
	2	Output number
	1	Switching code
	↵	Carriage return ("Enter")
*B10 ↵	*B	Prefix
	1	Module address
	0	Acknowledge
	↵	Carriage return ("Enter")

Switch relay off

The following example shows switching OF relay 4 in module.

Enquiry	Response	Explanation
*BDOS40 ↵	*B	Prefix
		Module address
	D	\$ can be used as an address entry. It is a "universal address" character and is only allowed if there is only one module on the line.
	OS	Instruction code
	4	Output number
	0	Switching code
	↵	Carriage return ("Enter")
*BD0 ↵	*B	Prefix
	D	Module address
	0	Acknowledge
	↵	Carriage return ("Enter")

Read input state

The following example shows reading of inputs 3 in only module the line (universal address character is used).

Enquiry	Response	Explanation
*B\$IR3 ↵	*B	Prefix
	\$	"universal address"
	IR	Instruction code
	3	Input number
	↵	Carriage return ("Enter")
*B101 ↵	*B	Prefix
	1	Module address
	0	Acknowledge
	1	Input is in state 1
	↵	Carriage return ("Enter")

Change module address

Instruction changes module address "f" to "5".

Enquiry	Response	Explanation
At first is necessary to allow configuration by a special instruction. This instruction allows configuration only for next instruction.		
*BfE ↵	*B	Prefix
	f	Module address
	E	Instruction code
	↵	Carriage return ("Enter")
*Bf0 ↵	*B	Prefix
	f	Module address
	0	Acknowledge
	↵	Carriage return ("Enter")
Now configuration is allowed, address can be changed.		
*BfAS5 ↵	*B	Prefix
	f	Old module address
	AS	Instruction code
	5	New module address
	↵	Carriage return ("Enter")
*Bf0 ↵	*B	Prefix
	f	Old module address
	0	Acknowledge
	↵	Carriage return ("Enter")

LIST OF BASIC INSTRUCTIONS

Description	Code [Enquiry] [Response]	Example (always for address = 1)
Reading input	*B[address]IR[input] ⁴ ↓	*B1IR2↓
	*B[address]0[status] ⁵ ↓	*B101↓
Reading output	*B[address]OR[output] ⁴ ↓	*B1OR4↓
	*B[address]0[status] ⁶ ↓	*B100↓
Setting output	*B[address]OS[output] ⁴ [status] ⁶ ↓	*B1OS31↓
	*B[address]0↓	*B10↓
Setting output with delay	*B[address]OT[output] ⁴ [status] ⁶ [delay] ⁷ ↓	*B1OT1120↓ ⁸
	*B[address]0↓	*B10↓
Request device's name and firmware version	*B[address]?↓	
	*B[address]0IORS; v.209.00; F66 97↓	
Allow configuration ⁹	*B[address]E↓	*B1E↓
	*B[address]0↓	*B10↓
Address setting ¹⁰	*B[old address]AS[new address]↓	*B1AS5↓
	*B[old address]0↓	*B10↓
Setting communication speed ¹⁰	*B[address]SS[code]↓	*B1SS5↓
	*B[address]0↓	*B10↓

Notes:

[address] ... A universal address character \$ can be used. It can be used if there is only one module on the line. Character % is broadcast address. All modules on the line are addressed and carry out the command, but do not respond so as to prevent conflict on the line.

Baudrate Bd	code
110	0
300	1
600	2
1200	3
2400	4
4800	5
9600	6
19200	7
38400	8
57600	9
115200	A

⁴ Numbers 1 through 4.

⁵ 0 – inactive input; 1 – active input

⁶ 0 – disconnected; 1 – connected

⁷ Time of the selected output's connection / disconnection; a number from 1 to 255 can be set, where 0.5 s is the unit. I.e., the time can be set from 0.5 s to 127.5 s.

⁸ Output 1 connected for 10 s (10 s = 20 × 0.5).

⁹ The universal address \$ cannot be used within this instruction.

¹⁰ "Allow configuration" must precede before this instruction.

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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.

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