APPLICATION:

- measurements monitoring systems,
- inputs and outputs for PLC controllers,
- radio and serial transmission in automation systems,
- conversion between communication interfaces
- using Ethernet for industrial communication

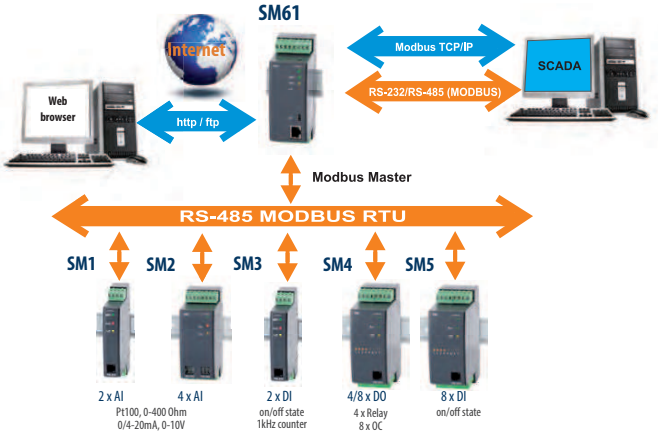
SELECTED FEATURES:

- integration of different transmission media (RS-232, RS-485, USB, Ethernet, radio)
- I/O modules configuration using LPConfig software

APPLICATION EXAMPLES

Radio transmission with MR03 radio modules.
Modules can realize transmission in a 1.5 km distance in open area.
The transmitted data are archived in KD7 recorder.

Visualization of production process.



I/O MODULES, COMMUNICATION MODULES

NEW!

Type






	Input/Output modules					
	SM1	SM2	SM3	SM5	SM4	S4A0
Number of channels	2	4	2	8	4 or 8	4
Inputs/outputs	fixed inputs: Pt100(-200...850°C) , 0...400 Ω or 0/4...20 mA or 0...10 V		programmable inputs: logic on/off or pulse counter up to 1 kHz 0...4 294 967 295 pulses	fixed inputs: logic on/off	fixed outputs: 4 x relay or 8 x OC	fixed outputs: 4 x 0/4...20 mA or 4 x 0..10 V or 2 x 0/4...20 mA + 2 x 0...10 V
Interface	RS-485 Modbus Slave, RS-232 for configuration					2 x RS-485 Modbus (Slave/ Master), USB for configuration
Baud rate	2400; 4800; 9600; 19.2 k; 38.4 k; 57.6 k; 115 k bit/s					1200; 2400; 4800; 960; 19.2 k, 38.4 k, 57.6 k, 115.2 kbit/s
Supply voltage	85...253 V a.c./d.c.; 20...50 V a.c./d.c.					85...253 V a.c./ 90...300 V d.c. 20...40 V a.c./ 20...60 V d.c.
Protection rating	IP40					
External dimensions	22.5 x 120 x 100 mm	45 x 120 x 100 mm	22.5 x 120 x 100 mm	45 x 120 x 100 mm	45 x 120 x 100 mm	53 x 110 x 60 mm

Type


	Data logger	
	PD22	SM61
Number of channels	up to 1000 digital channels	up 2500 digital channels
Input	Port I: Modbus RTU Master (50 groups 20 register each)	Port II: Modbus RTU Master (100 groups 25 registers each), 2 x logic
Output	Port II: Modbus RTU Slave	Port I: Modbus RTU/TCP Slave, 2 x relay
Interface	3 x RS-485 (Modbus Slave and Master) 1 x RS-232 (Modbus Slave) USB Device 1.1.	2 x RS-485 (Modbus Slave and Master) 1 x RS-232 (Modbus Slave) USB Device 1.1. Ethernet 10/100 Base-T
Memory	512 kB, 390.000 samples, 44.000 events	1 GB
Supply voltage	85...253 V a.c./d.c. or 20... 50 V a.c./d.c.	85...253 V a.c./ 90...300 V d.c. or 20...40 V a.c./ 20...60 V d.c. or 10...16 V a.c./ 10...20 V d.c.
Protection rating	IP40	
External dimensions	45 x 120 x 100 mm	
Additional functions	• RTC	• HTTP (web server - visualization in format of synoptic maps), • DHCP, • FTP server, • RTC

Type





	Interface/protocol converters				Radio transmission module
	PD51	**PD8**	**PD8W**	**PD10**	**MR03**
Interface 1	RS-232	RS-485, RS-232		RS-485	RS-232; RS-485
Interface 2	RS-485	**Ethernet** RJ45	**Ethernet** Wi-Fi	USB	radio frequency 869.4 – 869.65 MHz
Interface 3	-	USB		-	-
Power output	-	-		-	500 mW
Baud rate	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 [bit/s]	300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 56000 bit/s (RS-485) 10, 100 Mbit/s (Ethernet)		to 1 Mb/s	Port 1 - RS-232 1200...115200 bit/s Port 2 - RS-485 1200...115200 bit/s radio band 4800 bit/s
Distance	-	-		-	up to 1.5 km
Supply voltage	7...35 V d.c. or 20...24...40 V a.c./d.c. or 85...230...253 V a.c./d.c.	85..230..253 V a.c./d.c. 20..24..50 V a.c./d.c.		supplied from USB port	8..30 V a.c./d.c.
Protection rating frontal	IP40				IP54
Ambient temperature	0...23...55°C	-20...23....45°C		0...55°C	0...23...50°C
External dimensions	22.5 x 120 x 100 mm	45 x 120x 100 mm		52x44x24mm	115x65x40mm
Additional functions	• converter/repeater • galvanic isollation	• galvanic isolation • Digi RealPort®, TCP/IP, HTTP, ICMP, DHCP, ARP		• galvanic isolation	-

CONNECTION DIAGRAMS

SM1

Fig. 118 Electrical connections of SM1

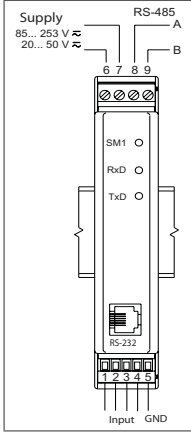


Fig. 119 Connection of input signals

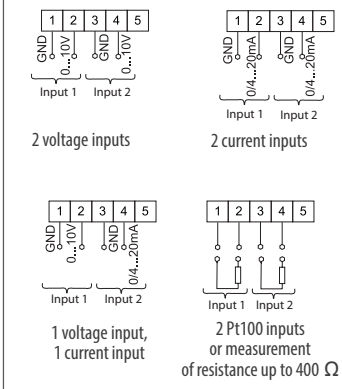


Fig. 120 Connection of RS-485 interface

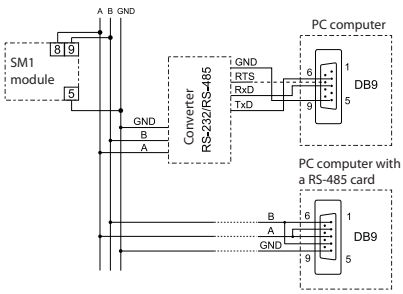
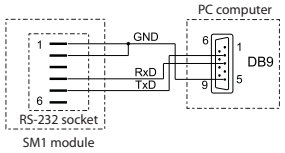


Fig. 121 Connection of RS-232 interface



SM2

Fig. 122 Electrical connections of SM2

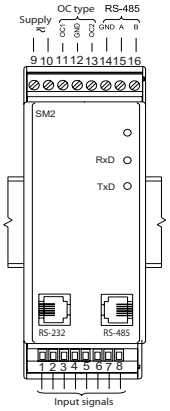


Fig. 123 Connection of input signals

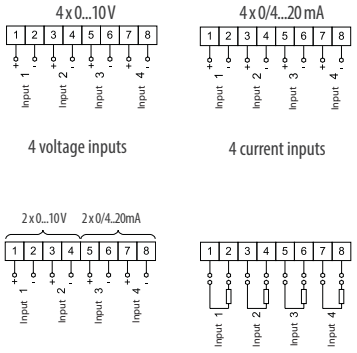


Fig. 124 Connection of RS-485 interface

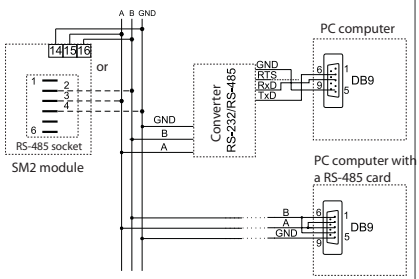
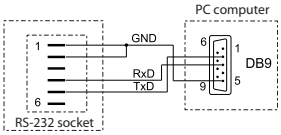
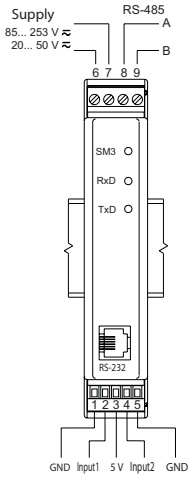


Fig. 125 Connection of RS-232 interface



SM3

Fig. 126 Electrical connections of SM3



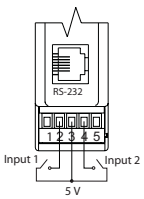


Fig. 127 Connection of RS-485 interface

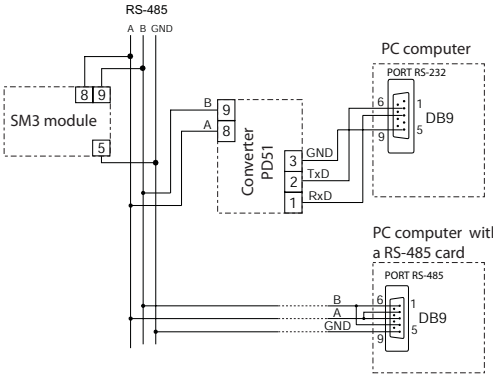
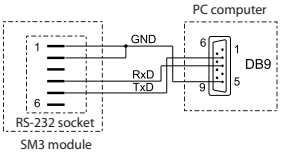


Fig. 128 Connection of RS-232 interface



SM5

Fig. 129 Electrical connections of SM5

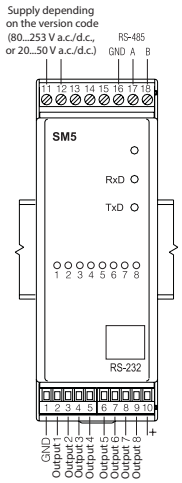


Fig. 130 Connection of RS-485 interface

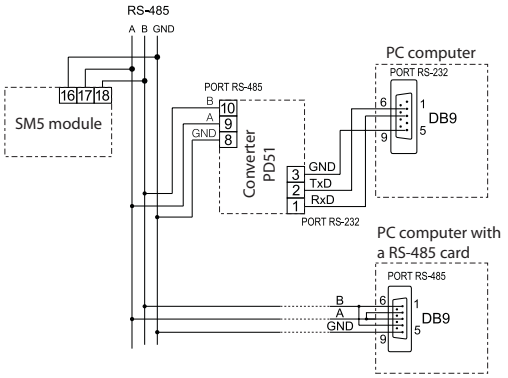
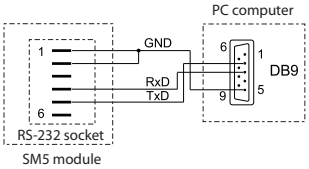
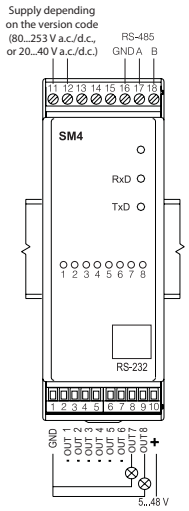


Fig. 131 Connection of RS-232 interface



SM4

Fig. 132 Electrical connections of SM4



Description of logic output module leads - version with 4 relay outputs

Terminal No	Terminal description
1	GND line
2,3	Relay output no 1
4,5	Relay output no 2
6,7	Relay output no 3
8,9	Relay output no 4
10	5 V d.c. line
11,12	Module supply lines
13...15	Not used
16	GND line of RS-485 interface with optoisolation
17	Line A of RS-485 interface with optoisolation
18	Line B of RS-485 interface with optoisolation

Description of logic output module leads - version with 8 OC output types

Terminal No	Terminal description
1	GND line of logic outputs
2	Output 1 line - output no 1
3	Output 2 line - output no 2
4	Output 3 line - output no 3
5	Output 4 line - output no 4
6	Output 5 line - output no 5
7	Output 6 line - output no 6
8	Output 7 line - output no 7
9	Output 8 line - output no 8
10	+ line - supply voltage of outputs
11,12	Lines of module supply
13...15	Not used
16	Mass of RS-485 interface with optoisolation
17	Line A of RS-485 interface with optoisolation
18	Line B of RS-485 interface with optoisolation

Fig. 133 Connection of RS-485 interface

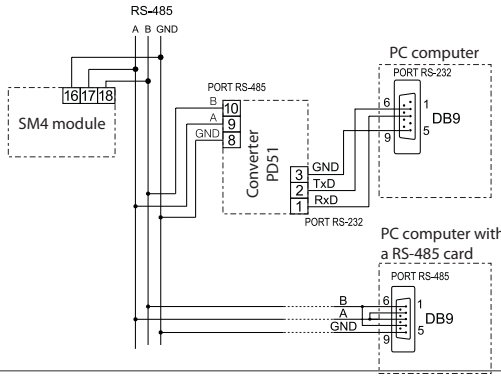
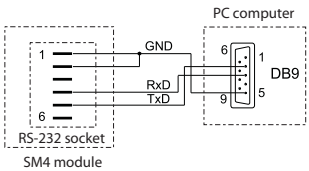


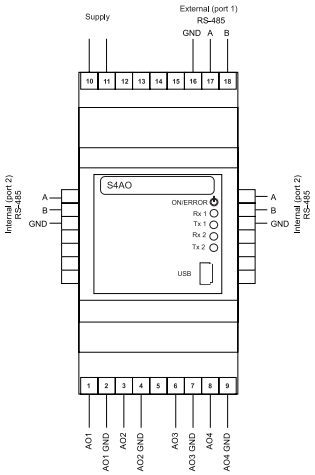
Fig. 134 Connection of RS-232 interface



CONNECTION DIAGRAMS

S4A0

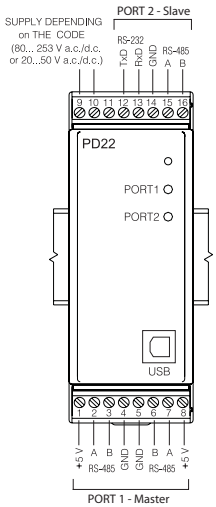
Fig. 135 Electrical connections of S4A0



PD22

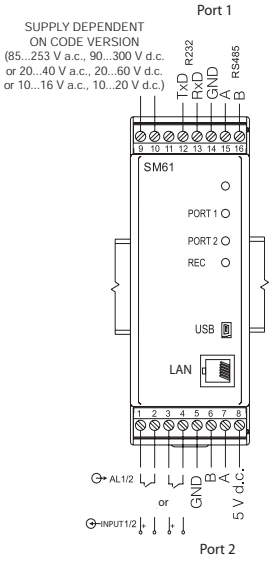
Fig. 136 Electrical connections of PD22

Terminal	Terminal description
1	Input +5 V (for bus polarisation)
2	Line A of the first RS-485 interface of Port 1
3	Line B of the first RS-485 interface of Port 1
4	Line GND of RS-485 interface of Port 1
5	Line GND of RS-485 interface of Port 1
6	Line B second RS-485 interface of Port 1
7	Line A second RS-485 interface of Port 1
8	Input +5 V (for bus polarisation)
9, 10	Concentrator supply lines
11	Not used
12	Output TxD of the RS-232 interface of Port 2
13	Input RxD of the RS-232 interface of Port 2
14	Line GND of the RS-232 and RS-485 interface of Port 2
15	Line A of the RS-485 interface of Port 2
16	Line B of the RS-485 interface of Port 2



SM61

Fig. 137 Electrical connections of SM61



PD51

Fig. 138 Electrical connections of PD51 **version A1 and A2**

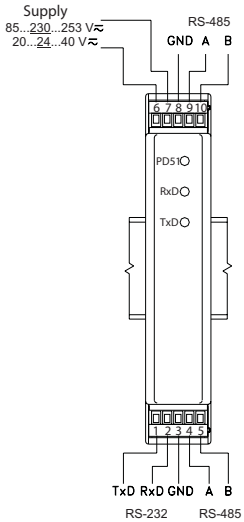


Fig. 139 Electrical connections of PD51 **version A3**

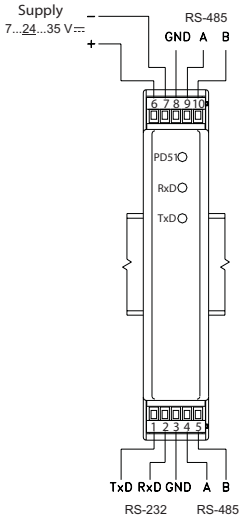
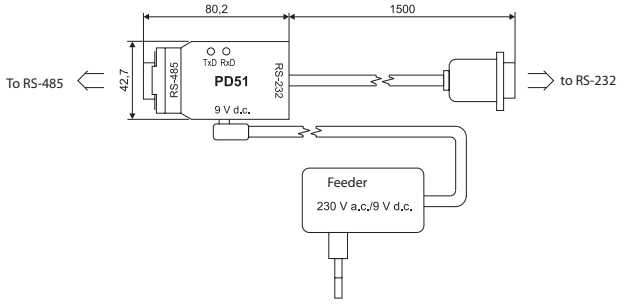


Fig. 140 Electrical connections of PD51 **version B1**



PD8

Fig. 141 External connections PD8

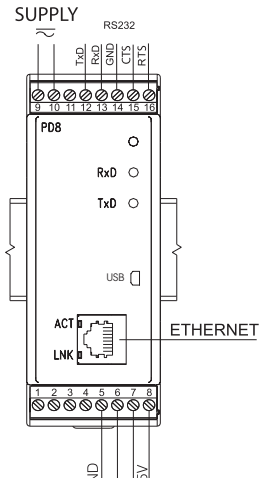
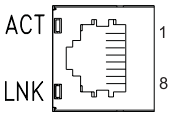


Fig. 142 Frontal view of the Ethernet interface RJ-45 socket

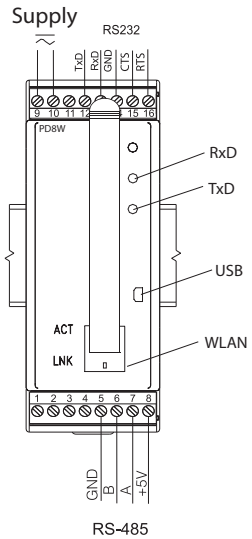


Description of RJ-45 socket signals

No	Signal	Description
1	TX+	Transmission +
2	TX-	Transmission -
3	RX+	Reception +
4	EPWR+	(not used)
5	EPWR+	(not used)
6	RX-	Reception -
7	EPWR-	(not used)
8	EPWR-	(not used)

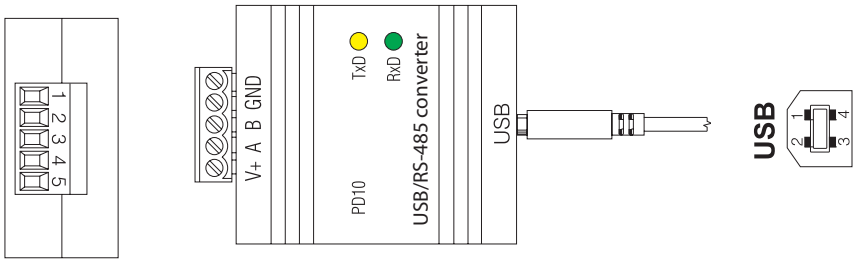
PD8W

Fig. 143 External connections PD8W



PD10

Fig. 144 Connection of PD10



MR03

Fig. 146 Electrical connections of MR03

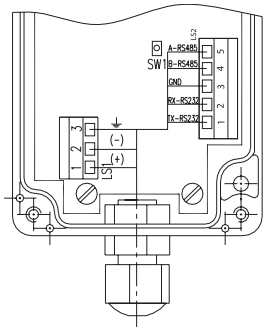


Fig. 147 Connection of RS-485 interface

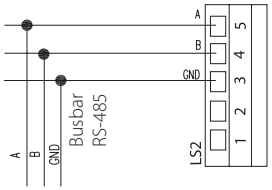
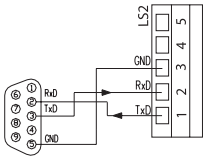


Fig. 148 Connection of RS-232 interface

Terminal	Terminal description
LS1_1	Tightening line (+ to supply by d.c. current)
LS1_2	Tightening line (+ to supply by d.c. current)
LS1_3	Functional earthing line (supply by d.c. current)
LS2_1	TxD line for RS-232 interface
LS2_2	RxD line for RS-232 interface
LS2_3	GND line of RS-232/RS-485 interface
LS2_4	B line of RS-485 interface
LS2_5	A line of RS-485 interface



ORDERING CODES

Input/output modules

Table 66. SM1 ordering code:

SM1 -	XX	X	X
Input:			
2 voltage inputs: 0..10V	00		
2 current inputs: 0/4..20mA	01		
1 voltage input + 1 current input: 0...10 V + 0/4...20 mA	02		
2 resistance 0...400 Ω or Pt100 inputs	03		
custom-made *	XX		
Supply:			
85..253 V a.c./d.c.		1	
20..50 V a.c./d.c.		2	
Acceptance tests:			
without extra requirements			0
with an extra quality inspection certificate			1
acc. to customer's request*			X

Table 67. SM2 ordering code:

SM2 -	XX	X	X
Input:			
4 voltage inputs: 0..10V	00		
4 current inputs: 0/4..20mA	01		
2 voltage inputs + 2 current inputs: 0..10 V + 0/4..20 mA	02		
4 resistance 0..400 Ω or Pt100 inputs	03		
custom-made*	XX		
Supply:			
85..253 V a.c./d.c.		1	
20..50 V a.c./d.c.		2	
Acceptance tests:			
without extra requirements			8
with an extra quality inspection certificate			7
acc. to customer's request*			X

Table 68. SM3 ordering code:

SM3 -	X	XX	X
Supply voltage:			
85..253 V a.c./d.c.	1		
20..50 V a.c./d.c.	2		
Version:			
standard		00	
custom-made*		XX	
Acceptance tests:			
without extra requirements			8
with an extra quality inspection certificate			7
acc. to customer's request*			X

Table 69. SM4 ordering code:

SM4 -	X	X	XX	X
Supply:				
85..253 V a.c./d.c.	1			
20..50 V a.c./d.c.	2			
Outputs:				
8 outputs of OC type		1		
4 relays		2		
Version:				
standard			00	
custom-made*			XX	
Acceptance tests:				
without extra requirements				8
with an extra quality inspection certificate				7
acc. to customer's request*				X

Table 70. SM5 ordering code:

SM5 -	X	XX	X
Supply:			
85...230...253 V a.c./d.c.	1		
20...24...50 V a.c./d.c.	2		
Version:			
standard		00	
custom-made*		XX	
Acceptance tests:			
without extra requirements			8
with an extra quality inspection certificate			7
acc. to customer's request*			X

Table 71. S4A0 ordering code:

S4A0 -	X	X	XX	X	X
Outputs:					
4 current outputs, 0...20 mA	1				
4 voltage outputs, 0...10 V	2				
2 sets of 1 voltage + 1 current outputs: 0...10 V / 0...20 mA	3				
acc. to customer's requirements*	X				
Supply voltage:					
85...253 V a.c., 90...300 d.c.		1			
20...40 V a.c., 20...60 V d.c.		2			
Version:					
standard			00		
custom-made*			XX		
Language:					
Polish				P	
English				E	
other*				X	
Acceptance tests:					
without extra requirements					0
with an extra quality inspection certificate					1
acc. to customer's requirements*					X

* - after agreeing with the manufacturer

Data logger

Table 72. SM61 ordering code:

SM61 -	X	X	XX	X	X
Supply:					
85...253 V a.c., 90...300 V d.c.	1				
20...40 V a.c., 20...60 V d.c.	2				
10...16 V a.c., 10...20 V d.c.	3				
Input/output:					
2 relays		1			
2 logic inputs		2			
Version:					
standard			00		
custom-made*			XX		
Language:					
Polish				P	
English				E	
other*				X	
Acceptance tests:					
without extra requirements					0
with an extra quality inspection certificate					1
acc. to customer's request*					X

Table 73. PD22 ordering code:

PD22 -	XX	X
Version:		
standard	00	
custom-made*	XX	
Acceptance tests:		
without extra requirements		8
with an extra quality inspection certificate		7
acc. to customer's request*		X

* - after agreeing with the manufacturer

Interface/protocol converters

Table 74. PD51 ordering code:

PD51 -	XX	XX	X
Supply voltage:			
on-rail version: 85...230...253 V a.c/d.c.	A1		
20...24...40 V a.c./d.c.	A2		
7...24...35 V d.c.	A3		
portable version 9 V d.c.	B1		
Version:			
standard		00	
custom-made *		XX	
Acceptance tests:			
without extra requirements			8
with an extra quality inspection certificate			7
acc. to customer's request *			X

Table 75. PD8 ordering code:

PD8 -	X	XX	X
Supply voltage:			
85...230...253 V a.c./d.c.	1		
20...24...50 V a.c./d.c.	2		
Version:			
standard		00	
Acceptance tests:			
without extra requirements			8
with an extra quality inspection certificate			7
acc. to customer's request*			X

Table 76. PD8W ordering code:

PD8W -	X	XX	X	X
Supply voltage:				
85...253 V a.c./d.c.	1			
20...50 V a.c./d.c.	2			
Version:				
standard		00		
custom-made		XX		
Language:				
Polish			P	
English			E	
other*			X	
Acceptance tests:				
without extra requirements				0
with an extra quality inspection certificate				1
acc. to customer's request*				X

* - after agreeing with the manufacturer

Table 77. PD10 ordering code:

PD10 -	X	XX	X
Galvanic isolation:			
with isolation	1		
Version:			
standard		00	
custom-made*		XX	
Acceptance tests:			
without extra requirements			8
with an extra quality inspection certificate			7
acc. to customer's request*			X

Radio transmission modules

Table 79. MR03 ordering code:

MR03 -	XX	X
Version:		
standard	00	
custom-made*	XX	
Acceptance tests:		
without extra requirements		8
with an extra quality inspection certificate		7
acc. to customer's request*		X

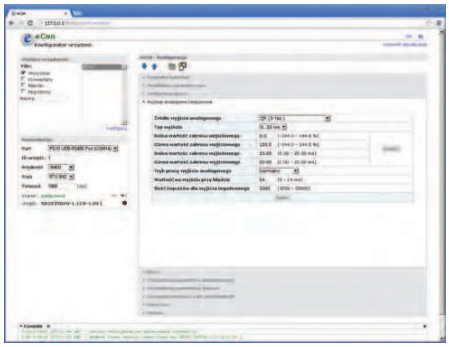
* - after agreeing with the manufacturer

LPCon and eCon - Free Software for Configuration of Lumel Products

PD14 – programmer to configure non RS-485 devices using LPCon and eCon
PD10 – RS-485 to USB converter that can be used to configure using LPCon and eCon a device equipped with RS-485

- Easy configuration of Lumel products
- Upload / download full configuration of a device connected to a PC using RS-485, Ethernet, USB or PD14 programmer (USB)
- Full device configuration can be saved to a file and stored on a PC later use
- A device template can be created for a RS-485 Modbus device not listed in LPCon
- Firmware update for Lumel products
- Work over the web browser (only for eCon)

LPCon



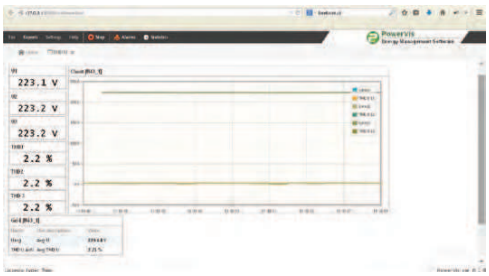
eCon

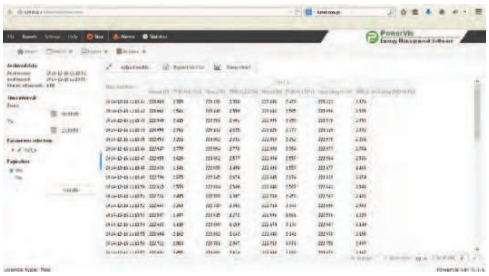
programmer **PD14**

PROCESS VISUALIZATION SOFTWARE

PowerVis Software

- dedicated to monitoring of power network parameters
- works on all web browsers
- simple and user-friendly configuration (specialist knowledge is not required)
- user-friendly interface
- dedicated for LUMEL meters and transducers
- dedicated for other producers devices with Modbus or Modbus TCP protocols
- visualization of parameters through: digital indicatons, trends and tables
- data archiving
- presentation of archived data through: tables and trends
- export of archived data to CSV files
- signalling of alarm events
- remote access to PowerVis software through a web browser



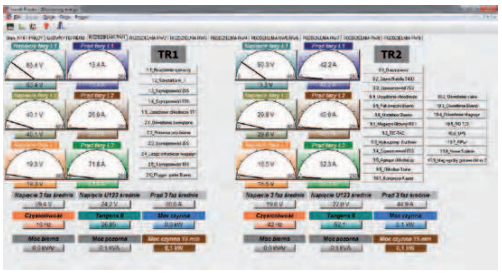


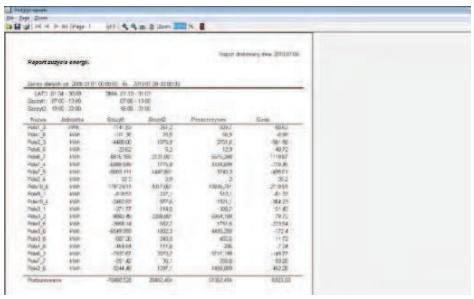
LUMEL-PROCESS Software

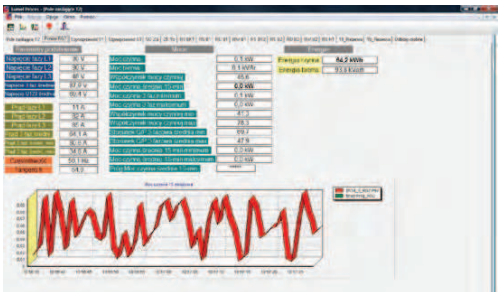
process visualization

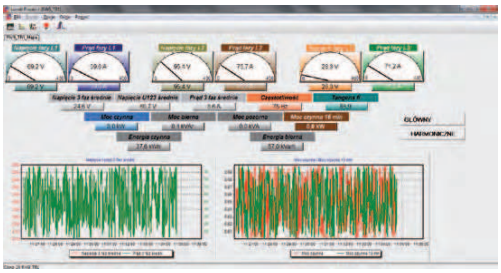
- modern integration and data presentation system,
- control and measurement applications for industrial installations, intelligent buildings, heat engineering, gas engineering, power engineering and laboratories,
- for systems built with the application of LUMEL's instruments, compatible with devices from other manufacturers,
- data exchange using Modbus transmission protocol,
- visualization of process parameters in form of mimic maps, tables, bargraphs and trends,
- remote configuration and control of devices,
- data logging,
- recording of alarm events in the system,
- data sharing with other applications using DDE data exchange protocol (DDE client),
- sharing data with other computers with a LUMEL Process software in the local computer network with the TCP/IP protocol,
- report templates,
- report monitoring on the base of archived data,
- report printing and export to pdf, txt, html formats,
- **view of synoptic map via web browser!**

LUMEL-PROCESS software









APPLICATION:

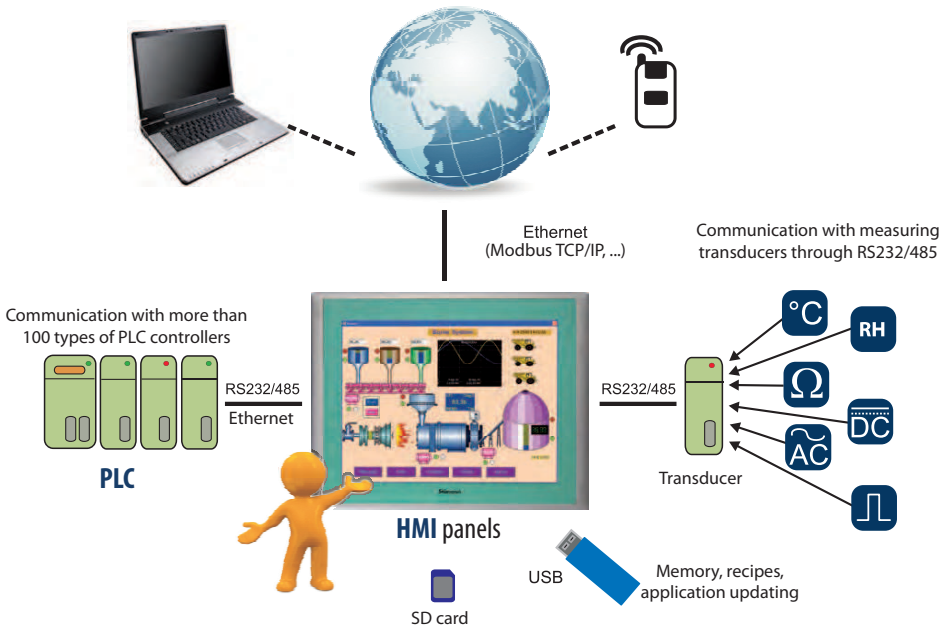
- technological process visualization
- remote control of many automation components from one place
- integration of automation devices working with different communication protocols
- data logging for technological processes

SELECTED FEATURES:

- rich library of graphic elements
- large communication possibilities (service of over 200 communication drivers, at least 2 serial ports, USB Host, optionally Ethernet)
- storage of data, alarms and events (battery operated memory)
- alarms, recipes, reports, macros (simple control)
- operation in though conditions (IP65 from front side)
- high security level
- free Panel Studio tool software

APPLICATION EXAMPLES

Communication possibilities of HMI panels



HMI PANELS

Type



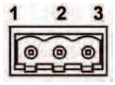


		HMI 450	HMI 730	HMI 750	HMI 1050	HMI 1550
Display	Size	4,3"TFT	7"TFT	7"TFT	10"TFT	15"TFT
	Colors	65 536				
	Resolution (W x H in pixels)	480 x 272	800 x 480	800 x 480	1024 x 768	1024 x 768
	Touch screen type	resistive analog				
	Active Display Area (W x H)	95 x 54	152 x 91	152 x 91	203 x 152	304 x 228
	Display position	both horizontal and vertical				
	MTBF backlight at 25°C	30 000 hrs	50 000 hrs			
	Backlight	LED				CCFL
	Brightness Adjustment	yes				
	Screen Saver	yes				
	Language Fonts	yes				
Main Hardware	Processor, CPU speed	ARM11, 533 MHz	ARM11, 533 MHz	ARM Cortex-A8, 667 MHz	ARM Cortex-A8, 667 MHz	ARM Cortex-A8, 667 MHz
	Flash Memory (ROM)	128 MB				
	SDRAM (RAM)	128 MB		256 MB		
	Operation System	WinCE 6.0				
	Real Time Clock	yes				
	Buzzer	yes				
	Sound output	-		option		
	SD card slot	yes	-	yes		
Interfaces	RS-232C, DB9 Male	yes				
	RS-232C/ RS422/ RS-485, DB25 Female	yes				
	USB Host	yes				
	Ethernet 10/100 Mbps, RJ45	option		yes	yes, 2 ports	

HMI

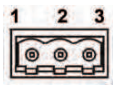
POWER SUPPLY

Fig. 149 AC power supply, 90-250 V AC, 47-63 Hz



Terminal	Description
1 ⏚	Grounding
2	N
3	L

Fig. 150 DC power supply, 11-36 V DC



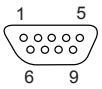
Terminal	Description
1 ⏚	Grounding
2	DC-
3	DC+

Fig. 151 DC power supply, 11-36 V DC (only for HMI 450)

Terminal	Description
1	DC +
2	DC -

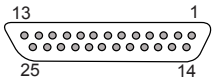
INTERFACES

Fig. 152 COM1 port, DB9 male (RS232C)



Pin	Signal	Input/Output
1	DCD	Output
2	RD	Input
3	TD	Output
4	DTR	Output
5	SG	
6	DSR	Input
7	RTS	Output
8	CTS	Input
9	RI	Input

Fig.153 COM2 port, DB25 female (RS232C/RS422/RS485)



Pin	Signal	Input/ Output	Type	Pin	Signal	Input/ Output	Type
1	FG	-	-	14	RTSA	Output	RS422
2	TD	Output	RS232C	15	RTSB	Output	RS422
3	RD	Input	RS232C	16	-	-	-
4	RTS	Output	RS232C	17	-	-	-
5	CTS	Input	RS232C	18	CTSA	Input	RS422
6	DSR	Input	RS232C	19	CTSB	Input	RS422
7	SG	-	5V-/RS232C	20	DTR	Output	RS232C
8	DCD	Output	RS232C	21	5 V +	Output	
9	-	-	-	22	RI	Input	RS232C
10	-	-	-	23	-	-	-
11	-	-	-	24	RXDA	Input	RS422
12	TXDA	Output	RS422/RS485	25	RXDB	Input	RS422
13	TXDB	Wyjście	RS422/RS485				

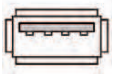
ETHERNET

Fig. 154 RJ45 connection, Ethernet 10/100 Mbps

Pin	Description
1	Transmission (TX+)
2	Transmission (TX-)
3	Reception (RX+)
4	Not connected
5	Not connected
6	Reception (RX-)
7	Not connected
8	Not connected

USB

Fig. 155 USB



Pin	Description
1	+ 5V DC (max 100mA)
2	USB-DN
3	USB-DP
4	GND

AUDIO INPUT /OUTPUT

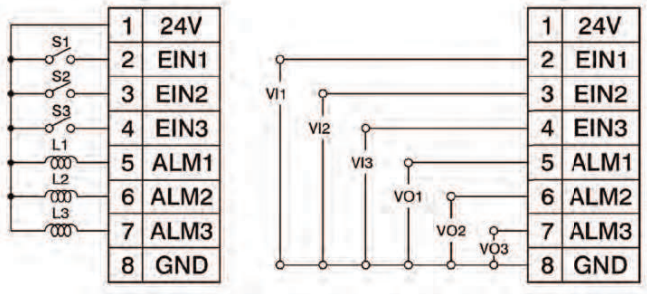
Rys.156 Input / output socket

Audio input for connecting a microphone (for future use)
Audio output. Used for playing sound files related to an Event / Alarm

For connection use a headphone jack: ø3.5 mm and length 14 mm.

DIGITAL INPUTS / OUTPUTS

Fig. 157 inputs / outputs



Pin	Signal	Description	Label in Panel Studio
1	24V +	+ 24V DC power supply	
2	EIN1	Digital input 1	SystemDI_1
3	EIN2	Digital input 2	SystemDI_2
4	EIN3	Digital input 3	SystemDI_3
5	ALM1	Digital output 1	SystemDO_1
6	ALM2	Digital output 2	SystemDO_2
7	ALM3	Digital output 3	SystemDO_3
8	GND	Neutral (ground) 0V DC	

ORDERING CODE

Table 80. HMI ordering code:

	HMI	XXXX	X	X	X	X	XX	X	X
Type:									
4.5" HMI 450		0450	1	0	1				
7" HMI 730		0730		0	0				
7' HMI 750		0750			1	1			
10" HMI 1050		1050			1	1			
15" HMI 1550		1550			1	1			
Supply voltage:									
11...36 V d.c.			1						
90...250 V a.c.			2						
Input/output Audio 3 DI, 3 DO:									
lack				0					
yes				1					
SD card:									
lack					0				
yes					1				
Ethernet:									
lack						0			
yes						1			
Version:									
standard							00		
cutom-made*							XX		
Language:									
Polish								P	
English								E	
other*								X	
Acceptance tests:									
without extra requirements									0
with an extra quality inspection certificate									1
acc. to customer's request*									X

* after agreeing with the manufacturer

HMI panels

Panel Studio Software

- Graphical visualization of processes (available rich library of graphical elements), possible import of own graphics in gif, bmp, jpg formats.
- Communication with devices of over 100 manufacturers (among others: Modbus ASCII/RTU Master and Slave, Siemens: S5, S7-200, S7-300, Profibus DP, GE: 90 Series CCM, 90 Series SNP, Allen Bradley: Micrologix 1000/1500, DH-485, SLC 5/03, 5/04, Saia, Omron and others).
- Data storage in internal memory.
- Alarm storage.
- Event log.
- Review of archived data on trends and tables.
- Recipes.
- Macros (set of instructions for algorithm realization).
- Simulation in off-line (without panel and controllers) and on-line mode (with controllers connected to computer ports.)

process control

Panel Studio software