LUMEL

60 years of Know-How

CATALOG 1

OFFER

of measuring instruments and Electronics Manufacturing Services

WWW.LUMEL.COM.PL

GUARANTEE

- OF THE HIGHEST QUALITY OF PRODUCTION AND SERVICES

To meet the expectation of our customers **we continuously take care of improving the quality management system.** It takes place at every activity level, from the identification of the customer's needs, through the production process, to the research of the recipients satisfaction.

To guarantee the highest quality we continuously supervise the production processes, we aim at the permanent parameter improving and we use the materials from the suppliers, who meet the highest global standards.

MEASUREMENT

CONTROL

RECORDING

STEERING

We work in accordance with:
- Certificate **ISO 9001:2008,**
- Certificate **ISO 14001:2004,**
- Technical specification **ISO/TS 16949:2009.**

We fulfill all requirements of 2002/95/EC Directive about limiting Hazardous Substances in our products.

All our products fulfill requirements
- **Electromagnetic compatibility acc. to:**
  - immunity against electromagnetic interference EN 61000-6-2
  - emission of electromagnetic interference EN 61000-6-4
- **Safety acc. to:** EN61010-1.

CE

WELCOME TO CO-OPERATION!

ICON'S LEGEND:

- TC and RTD input
- resistance signal measurement
- DC signal input
- AC signal input (1- or 3-phase network parameters)
- 0...10 V analog input/output
- 4...20 mA analog input/output
- analog output (0...10 V, 0/4...20 mA)
- voltage-free transistor output (OC)
- thermoresistance input
- relay output
- temperature and humidity measurement
- temperature input
- pulse counting input
- relative humidity measurement
- logic input
- Real Time Clock
- internal memory
- USB port
- RS-485 interface
- RS-232 interface
- Modbus protocol

CONTENTS

DIGITAL METERS

APPLICATION:

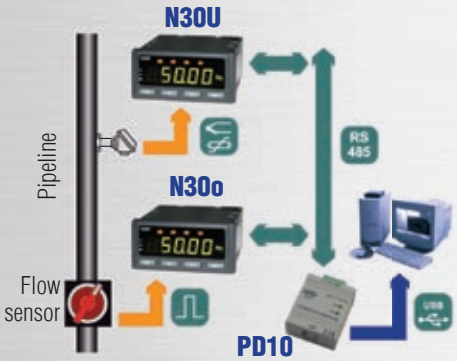
- power industry (substations, generators, turbines)
- heat engineering (heat and power plants, boiler plants)
- food industry (dairies, bakeries, food storage)
- pharmaceutical industry (drug storage)
- plastics processing industry
- wood industry (furnaces, drying plants)
- chemical industry
- pumping stations and sewage plants (visualization of flow, pressure and level in tanks)
- breweries, distilleries
- mimic panels

SELECTED FEATURES:

- **programmable measuring inputs** – simple service and universality
- **IP65 Protection rating frontal side** – dustproof and waterproof front panel, ensuring reliable operation and safe service under severe conditions
- **wide supplying voltage range** – applied in both dc and ac supplying systems
- **supplying output** – for external object transducers
- **3-colour display** – intuitive readings, display color programmable separately for three subranges of measured value
- **retransmission outputs** – analog signal for recording and further processing of measured values
- **alarm outputs** – two-state outputs operating in several modes for diagnostics and alarming
- **digital output** – RS-485 interface for communication with HMI panels, PLC controllers and SCADA software

APPLICATION EXAMPLES

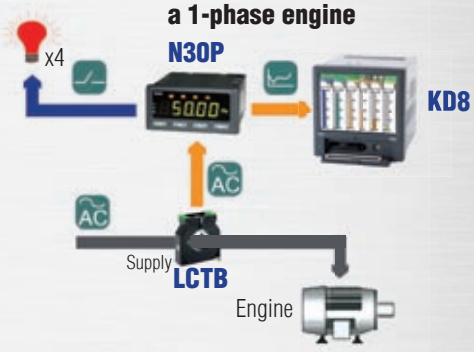
Temperature and flow measurement in a pipeline



Air temperature and humidity measurement

Current measurement in an electroplating plant

Measurement, alarming ang logging of load current for a 1-phase engine



Type / Parameters	N24	N25	N20Z	N20	N17Z
Input	fixed N24T, N25T: Pt100, J, K N24S, N25S: 0/4...20 mA, ±60 mV d.c., ±10 V d.c. N24H, N25H: ±10, ±100, ±250, ±400 V d.c., ±1/5 A d.c. N24Z, N25Z:100, 250, 400 V a.c., 1/5 A a.c., 20...500 Hz		fixed 1 A, 5 A a.c. 100 V, 250 V, 400 V a.c. 20...500 Hz	fixed Pt100, J, K 0/4...20 mA, ± 20 mA 0...60 mV, 0...10 V, ± 10 V	fixed 1 A, 5 A, 10 A, 40 A a.c. 100 V, 300 V, 500 V a.c. 20...200 Hz
Output	supplying output (24 V/ 30 mA) for S and T versions (option)		2 x OC	· 2 x OC · supplying output (24 V/ 30 mA)	-
Galvanic isolation	supply/input		supply/input/output		supply/input
Display	red LED 4 digits (20 mm)	red LED 5 digits (14 mm)	3-colour programmable LED 5 digits (14 mm)		red, green LED 3 digits (14 mm) 4 digits (10 mm)
Supply voltage	24 V a.c., 110 V a.c., 230 V a.c., 85...253 V a.c./d.c., 20...40 V a.c./d.c. (option)		85...253 V or 20...40 V a.c./d.c.		24 V a.c., 230 V a.c., 24 V d.c.
Protecion rating frontal/rear side	IP65/IP20		IP65/IP10		IP20
Ambient temp.	-10...23...55 °C				-10...23...50 °C
External dimensions	96 x 48 x 64 mm				52.5 x 90 x 64.5 mm
Panel cut-out	$92^{+0.6}$ x $45^{+0.6}$ mm				-
Programming	free LPCon software (using PD14 programmer)				PD15 programmer
Additional functions	rescaling				

N24

N25

N20 AND N20Z

N17Z

Type / Parameters	N30 series			
	N30U	N30H	N30o	N30P
Input	programmable: Pt100/500/1000 J, K, N, E, R, S ± 20 mA 0...10 V, -10...60 mV 400, 4000 Ω	programmable: 1/5 A d.c., 100/500 V d.c.	pulse input (pulses, frequency, rotational speed, period, operating time counter, encoder)	1-phase power network parameters, programmable: 0...1/5A 0...100/400V a.c.
Output	4 x relay (2 NO + 2 NOC (optionally)), 1 x analog (option), 1 x pulse (option) in N30P meter, supplying output (24 V/ 30 mA) in N30U (option) and N30O (for supply 85...253 V)			
Interface	1 x RS-485 with MODBUS slave (option)			
Galvanic isolation	supply/input/output/RS-485			
Display	3-colour programmable LED 5 digits (14 mm)			
Supply voltage	85...253 V a.c./d.c. or 20...40 V a.c./d.c.			
Protecion rating frontal/rear side	IP65/IP10			
Ambient temp.	-25...23...55 °C			
External dimensions	96 x 48 x 93 mm			
Panel cut-out	$92^{+0.6}$ x $45^{+0.6}$ mm			
Programming	free LPCon software (using RS-485) or using buttons			
Additional functions	· Conversion of any measured value into a current or voltage analog signal. · Storage of minimal and maximal values for all measured quantites. · 21-point rescaling for the measured value (does not apply to N30P) · Password protection.			

N30 SERIES

NA3

NA5 AND NA6

Type / Parameters	NA meters with bargraph indicators		
	NA3	NA5	NA6
Input	programmable: Pt100/500/1000, J, K, N, E, R, S 0...5/20 mA d.c., 0...2/5 A d.c., 0...60 mV d.c., 0...10/600 V d.c., 0...4 kΩ (NA3)	programmable: Pt100/500/1000, J, K, N, E, R, S ± 40 mA d.c., ± 5 A d.c., ± 300 mV d.c., ±0...600 V d.c., 0...10 kΩ	
Output	1 x relay or 2 x OC (option) 1 x analog (option)	4 x relay or 8 x OC (option) 1 x analog (option)	
Interface	1 x RS-485 MODBUS slave (option)		
Bargraph	3 or 7-colour programmable horizontal	3 or 7-colour programmable vertical	2 x 3 or 7-colour programmable vertical
Galvanic isolation	supply/input/output/RS-485		
Display	LED 4 digits (7 mm)	LED 4 digits (7 mm)	2 x LED 4 digits (7 mm)
Supply voltage	95...253 V a.c./d.c., 20....40 V a.c./d.c.		
Protection rating frontal/rear side	IP40/IP20	IP50/IP20	
Ambient temperature	-10...23...55 °C		
External dimensions	96 x 24 x 125 mm	48 x 144 x 100 mm	
Panel cut-out	$92^{+0.5}$ x $22.2^{+0.5}$ mm	$44^{+0.5}$ x $137.5^{+0.5}$ mm	
Programming	free LPCon software (using RS-485) or using buttons		
Additional functions	· 2-point rescaling · arithmetical functions x2, √x, (+, -, *, / - only in NA6) · logging of the measured signal in programmed time intervals (750 samples) · memory of minimal and maximal values for all measured quanstites · password protection · conversion of any measured value into a current or voltage analog signal		

N24

Fig. 1. Electrical connections of N24S meters

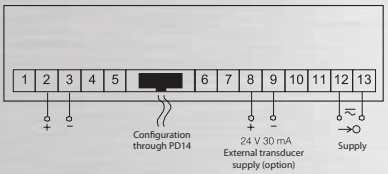
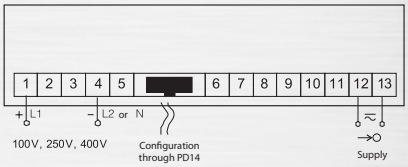


Fig. 2. Electrical connections of N24Z and N24H meters for the measurement of voltage (and frequency only in N24Z)



N24T

Fig. 3. Electrical connections of N24T meters

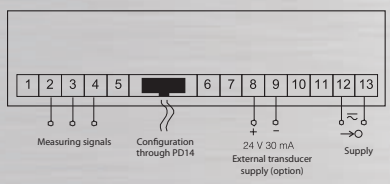


Fig. 4. Connections of N24Tmeasuring inputs

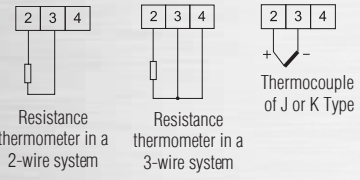
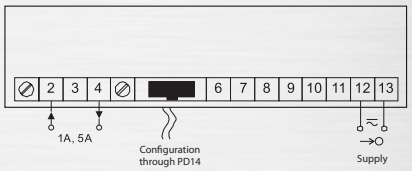


Fig. 5. Electrical connections of N24Z and N24H meters for the current measurement



N25

Fig. 6. Electrical connections of N25S meters

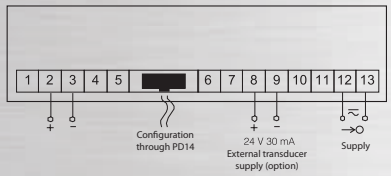
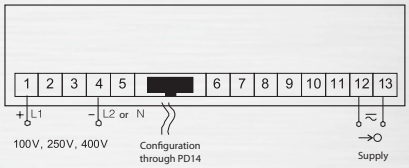


Fig. 7. Electrical connections of N25Z and N25H meters for the measurement of voltage (and frequency only in N25Z)



N25T

Fig. 8. Electrical connections of N25T meters

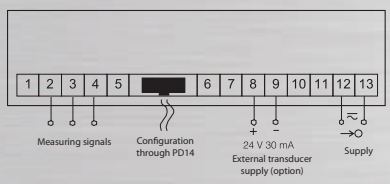


Fig. 9. Connections of N25T measuring inputs

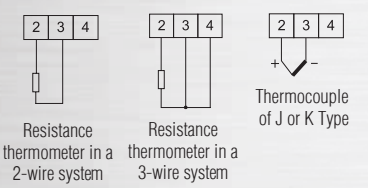
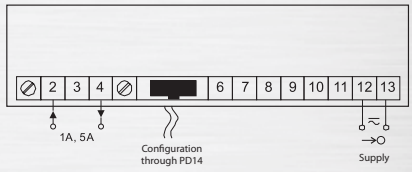


Fig. 10. Electrical connections of N25Z and N25H meters for the current measurement



N20

Fig. 11 Electrical connections of N20 meters

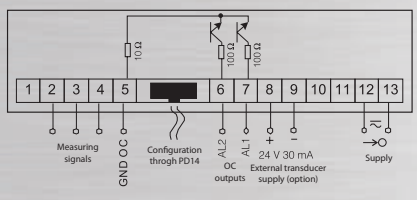
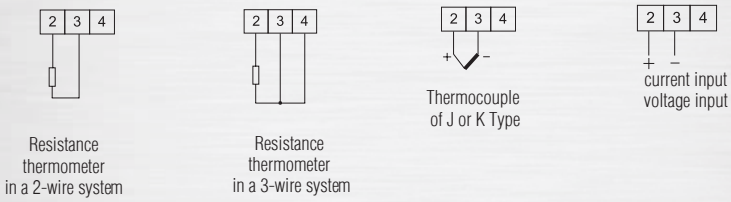


Fig. 12 Connections of measuring inputs



N20Z

Fig. 13 Electrical connections of N20Z meters

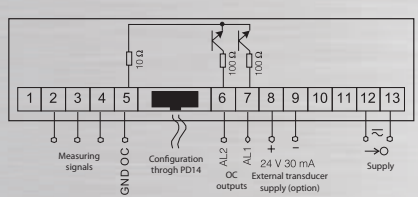


Fig. 14 Electrical connections of N20Z meter for the measurement of voltage and frequency

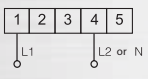
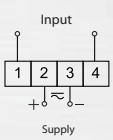


Fig. 15 Electrical connections of N20Z meter for the current measurement

N17Z

Fig. 16 Electrical connections of N17Z meter



N30U

Fig. 17. Electrical connections of N30U meter

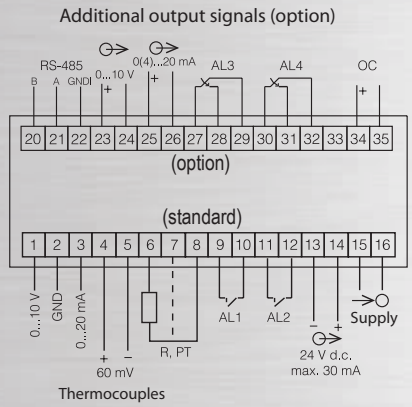
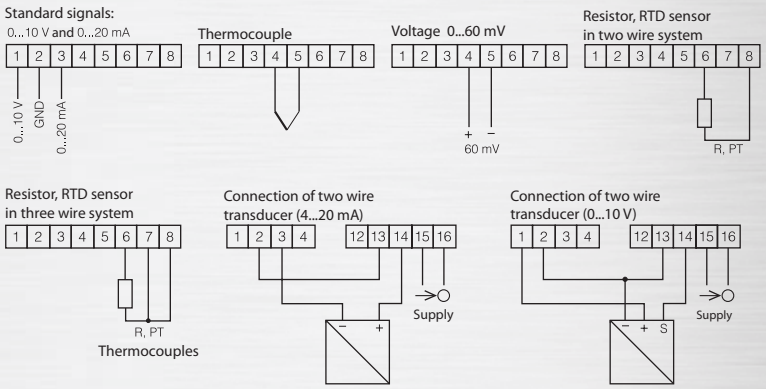


Fig. 18. Connections of measuring input



N30H

Fig. 19. Electrical connections of N30H meter

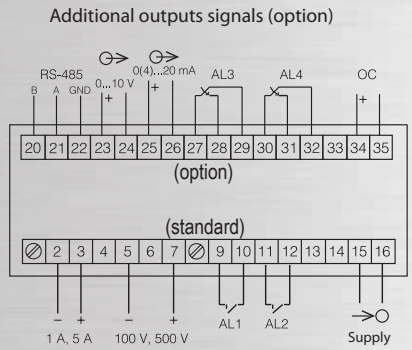


Fig. 20. Electrical connection for the current measurement

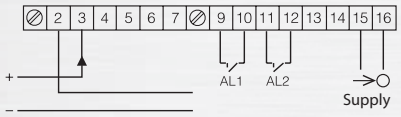
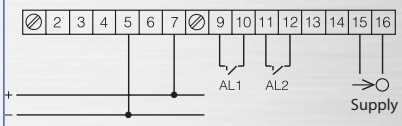


Fig. 21. Electrical connection for the voltage measurement



N30o

Fig. 22 Electrical connections N30o.

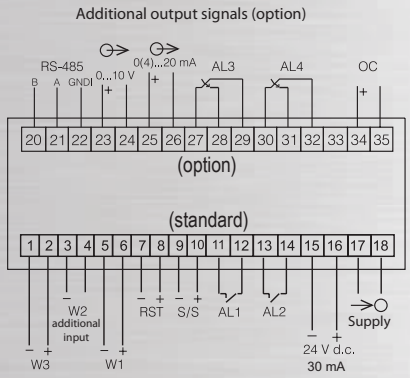


Fig. 23 Connections of the transducer with the OC output of NPN type

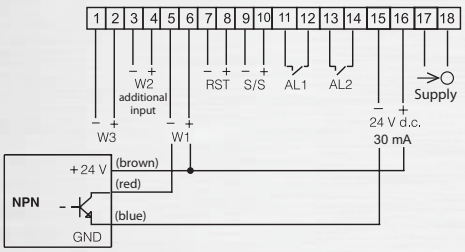
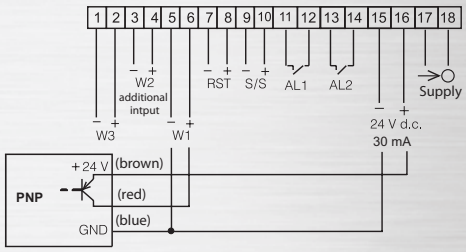


Fig.24 Connections of the transducer with the OC output of PNP type



N30P

Fig. 25 Electrical connections of N30P meter

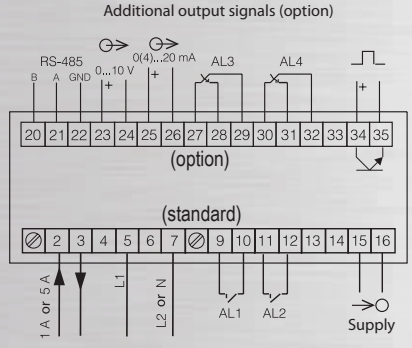


Fig. 26 Electrical connections of N30P meter for direct measurement

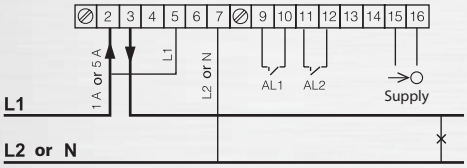
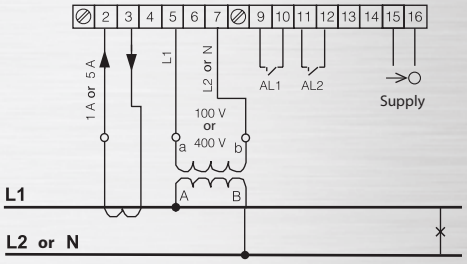
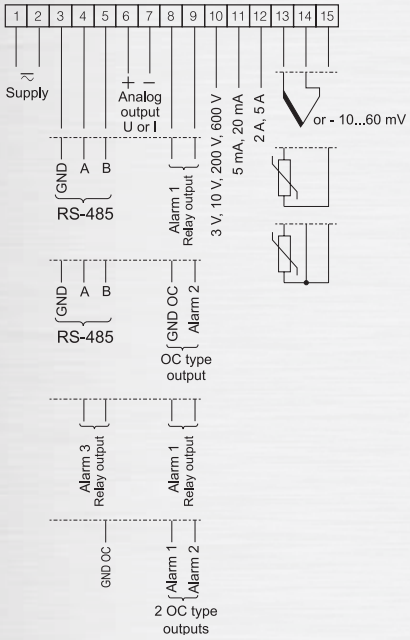


Fig. 27 Electrical connections of N30P meter for indirect measurement



NA3

Fig. 28 Electrical connections of NA3 meter



NA5

Fig. 29 Electrical connections of NA5 meter

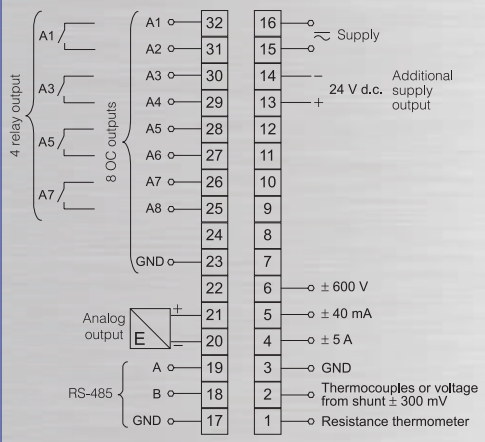
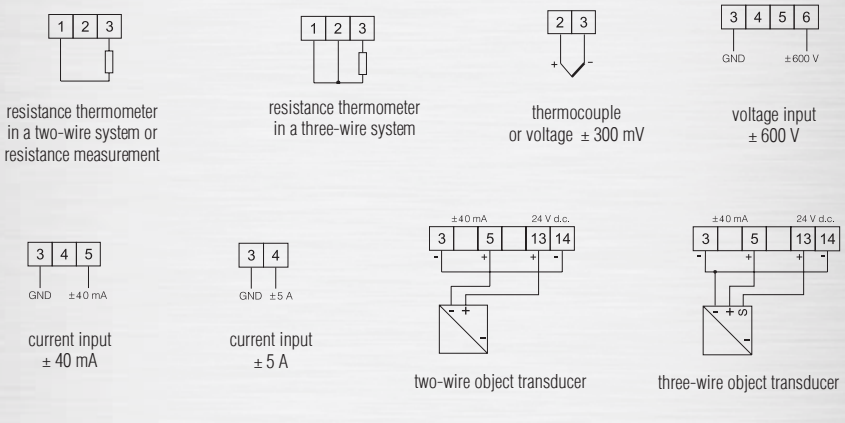


Fig. 30 Connections of measuring inputs



NA6

Fig. 31 Electrical connections of NA6 meter

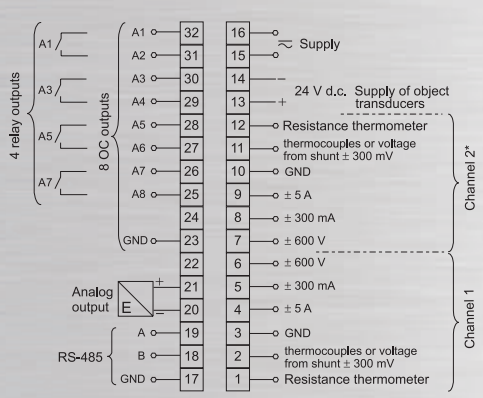
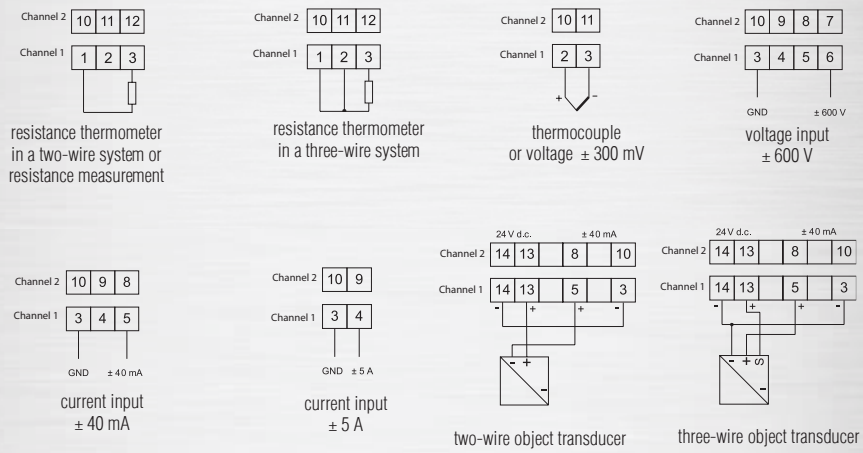


Fig. 32 Connections of measuring inputs



N24 AND N25 METERS

TABLE 1. N24 ORDERING CODE:

N24 -	X	X	X	XX	XX	X	X
Kind of input signal:							
standard: voltage, current	S						
temperature: thermocouples, resistance thermometers	T						
a.c. signals	Z						
d.c. signals: high voltage/current	H						
Input signal:							
see table 3		X					
Supply voltage:							
230 V a.c.			1				
110 V a.c.			2				
24 V a.c.			3				
85...253 V a.c./d.c. with supply output 24 V/30 mA**			4				
20...40 V a.c./d.c. with supply output 24 V/30 mA**			5				
Unit:							
see table 4				XX			
Version:							
standard					00		
non-standard settings					NS		
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 2. N25 ORDERING CODE:

N25 -	X	X	X	XX	XX	X	X
Kind of input signal:							
standard: voltage, current	S						
temperature: thermocouples, resistance thermometers	T						
a.c. signals	Z						
d.c. signals: high voltage/current	H						
Input signal:							
see table 3		X					
Supply voltage:							
230 V a.c.			1				
110 V a.c.			2				
24 V a.c.			3				
85...253 V a.c./d.c. with supply output 24 V/30 mA**			4				
20...40 V a.c./d.c. with supply output 24 V/30 mA**			5				
Unit:							
see table 4				XX			
Version:							
standard					00		
non-standard settings					NS		
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 3. METER TYPE

Nr	N24S/N25S	N24T/N25T
1	0...20 mA	Pt100: -50...150°C
2	4...20 mA	Pt100: -50...400°C
3	0...60 mV	thermocouple J
4	0...10 V	thermocouple K
5	± 60 mV	
6	± 10 V	
7		
Nr	**N24Z/N25Z**	**N24H/N25H**
1	100 V a.c.	±100 V d.c.
2	250 V a.c.	±250 V d.c.
3	400 V a.c.	±400 V d.c.
4	1 A a.c.	±1 A d.c.
5	5 A a.c.	±5 A d.c.
6	20...500 Hz	0...100 V d.c.
7		0...250 V d.c.

TABLE 4. CODES OF PRINTED UNITS:

Code	Unit	Code	Unit
00	without unit	08	kV
01	°C	09	Hz
02	%	10	turns
03	A	11	rpm
04	V	12	bar
05	mV	13	kPa
06	mA	14	MPa
07	kA	XX	on order*

* - after agreeing with the manufacturer
** - the output is only in N24S/N25S and N24T/N25T meters

N30 METER SERIES

TABLE 5. N30U ORDERING CODE:

N30U -	X	X	XX	XX	X	X
Supply voltage:						
85...253 V a.c./d.c.	1					
20...40 V a.c., 20...60 V d.c.	2					
Additional outputs:						
lack		0				
OC output, RS-485, analog outputs		1				
OC output, RS-485, analog outputs and change-over relay outputs		2				
Unit:						
unit code acc. to the table 9			XX			
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 6. N30H ORDERING CODE:

N30H -	X	X	XX	XX	X	X
Supply voltage:						
85...253 V a.c./d.c.	1					
20...40 V a.c./d.c.	2					
Additional outputs:						
lack		0				
OC output, RS-485, analog outputs		1				
OC output, RS-485, analog outputs and change-over relay outputs		2				
Unit:						
unit code acc. to the table 9			XX			
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 7. N30P ORDERING CODE:

N30P -	X	X	XX	XX	X	X
Supply voltage:						
85...253 V a.c./d.c.	1					
20...40 V a.c./d.c.	2					
Additional outputs:						
lack		0				
OC output, RS-485, analog outputs		1				
OC output, RS-485, analog outputs and change-over relay outputs		2				
Unit:						
unit code acc. to the table 9			XX			
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 8. N30o ORDERING CODE:

N30o -	X	X	XX	XX	X	X
Supply voltage:						
85...253 V a.c. (40...400 Hz) or d.c.	1					
20...40 V a.c. (40...400 Hz) or d.c.	2					
Additional outputs:						
lack		0				
OC output, RS-485, analog outputs		1				
OC output, RS-485, analog outputs and change-over relay outputs		2				
Unit:						
unit code acc. to the table 9			XX			
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

TABLE 9. CODES OF HIGHLIGHTED UNIT:

Code	Unit	Code	Unit
00	without unit	29	%
01	V	30	%RH
02	A	31	pH
03	mV	32	kg
04	kV	33	bar
05	mA	34	m
06	kA	35	l
07	W	36	s
08	kW	37	h
09	MW	38	m^3
10	var	39	obr
11	kvar	40	pcs
12	Mvar	41	imp
13	VA	42	rps
14	kVA	43	m/s
15	MVA	44	l/s
16	kWh	45	obr/min
17	MWh	46	rpm
18	kvarh	47	mm/min
19	Mvarh	48	m/min
20	kVAh	49	l/min
21	MVAh	50	m^3/min
22	Hz	51	szt./h
23	kHz	52	m/h
24	Ω	53	km/h
25	kΩ	54	m^3/h
26	°C	55	kg/h
27	°F	56	l/h
28	K	XX	on order*

* - after agreeing with the manufacturer

N20 AND N20Z METERS

TABLE 10. N20 ORDERING CODE:

N20 -	X	X	XX	XX	X
Input:					
Pt100: -50...400°C	1				
Thermocouple J: -50...1200°C	2				
Thermocouple K: -50...1370°C	3				
0...20 mA	4				
4...20 mA	5				
± 20 mA	6				
0...60 mV	7				
0...10 V	8				
± 10 V	9				
Supply voltage:					
85...253 V a.c./d.c.		1			
20...40 V a.c./d.c		2			
Unit:					
unit code acc. to the table 12			XX		
Version:					
standard				00	
custom-made*				XX	
non-standard settings				99	
Acceptance tests:					
without extra requirements					0
with an extra quality inspection certificate					1
acc. to customer's request*					X

TABLE 11. N20Z ORDERING CODE:

N20Z -	X	X	XX	XX	X
Input:					
100 V	1				
250 V	2				
400 V	3				
1 A	4				
5 A	5				
frequency: 20...500 Hz	6				
Supply voltage:					
85...253 V a.c./d.c.		1			
20...40 V a.c./d.c		2			
Unit:					
unit code acc. to the table 12			XX		
Version:					
standard				00	
custom-made*				XX	
non-standard settings				99	
Acceptance tests:					
without extra requirements					0
with an extra quality inspection certificate					1
acc. to customer's request*					X

TABLE 12. CODES OF HIGHLIGHTED UNIT:

Code	Unit	Code	Unit
00	without unit	24	l/h
01	V	25	ms
02	A	26	s
03	mV	27	h
04	kV	28	N
05	MV	29	kN
06	mA	30	Pa
07	kA	31	hPa
08	MA	32	kPa
09	°C	33	MPa
10	°F	34	bar
11	K	35	rad
12	Hz	36	Ω
13	kHz	37	kΩ
14	Ah	38	%
15	kAh	39	°
16	m/s	40	obr
17	µm	41	rps
18	mm	42	rpm
19	cm	43	rph
20	m	44	m/h
21	km	45	km/h
22	l	46	imp
23	l/s	XX	on roder*

* - after agreeing with the manufacturer

NA3, NA5 AND NA6 METERS

TABLE 13. NA3 ORDERING CODE:

NA3 -	X	X	X	X	X	X	X	X	XX	X
Meter version:										
with a bargraph and digital display	F									
with a bargraph*	B									
with a digital display	D									
Bargraph colour:										
without bargraph (NA3D)		0								
3-colour (R, G, R+G)		T								
7-colour (R, G, B, R+G, R+B, G+B, R+G+B)		M								
Display colour:										
without display			0							
red			R							
green			G							
blue			B							
Input signal:										
universal input				U						
Analog output:										
lack					0					
current programmable 0/4...20 mA					1					
voltage programmable 0...10 V					2					
Additional output:										
lack*						0				
RS-485 digital output + 1 relay						1				
RS-485 digital output + 1 output of OC type						2				
2 relays*						3				
2 outputs of OC type*						4				
Supply voltage:										
95...253 V a.c./d.c.							1			
20...40 V a.c./d.c.							2			
on order**							X			
Kind of terminals:										
screwed plug-in sockets								0		
Version:										
standard									00	
custom-made**									XX	
Acceptance tests:										
without extra requirements										0
with an extra quality inspection certificate										1
acc. to customer's request**										X

* - in case of a NA3-B X X X X (0, 3 or 4), one must fill the table 2 in the NA3 data sheet available on our website www.lumel.com.pl
** - after agreeing with the manufacturer

TABLE 14. NA5 ORDERING CODE:

NA5 -	X	X	X	X	X	X	X	X	XX	X
Bargraph colour:										
3-colour (R, G, R+G)	T									
7-colour(R, G, B, R+G, R+B, G+B, R+G+B)	M									
Display colour:										
without display*		0								
red		R								
green		G								
blue		B								
Input signal:										
universal input			U							
Analog output:										
lack				0						
current programmable 0/4...20mA				1						
voltage programmable 0...10 V				2						
Digital output:										
lack					0					
RS-485 digital output					1					
Additional output:										
lack*						0				
4 relays						4				
8 outputs of OC type						8				
Supply voltage:										
95...253 V a.c./d.c.							1			
20...40 V a.c./d.c.							2			
Kind of terminals:										
screwed plug-in sockets								0		
Version:										
standard									00	
custom-made**									XX	
Acceptance tests:										
without extra requirements										0
with an extra quality inspection certificate										1
acc. to customer's request**										X

* - in case of meters without displays, one must order an RS 485 digital output
** - after agreeing with the manufacturer

TABLE 15. NA6 ORDERING CODE:

NA6 -	X	XX	X	X	X	X	X	X	XX	X
Bargraph colour:										
3-colour(R, G, R+G)	T									
7-colour (R, G, B, R+G, R+B, G+B, R+G+B)	M									
Display colour on channels 1 and 2:										
without display*		00								
red-red		RR								
red-green		RG								
red-blue		RB								
green-red		GR								
green-green		GG								
green-blue		GB								
blue-red		BR								
blue-green		BG								
blue-blue		BB								
Input signal:										
universal input			U							
Analog output:										
lack				0						
current programmable 0/4...20mA				1						
voltage programmable 0...10 V				2						
Digital output:										
lack					0					
RS-485 output signal					1					
Additional output:										
lack*						0				
4 relays						4				
8 outputs of OC type						8				
Supply voltage:										
95...253 V a.c./d.c.							1			
20...40 V a.c./d.c.							2			
Kind of terminals:										
screwed plug-in sockets								0		
Version:										
standard									00	
custom-made**									XX	
Acceptance tests:										
without extra requirements										0
with an extra quality inspection certificate										1
acc. to customer's request**										X

* - in case of meters without displays, one must order an RS-485 digital output
** - after agreeing with the manufacturer

MEASURING TRANSDUCERS, SEPARATORS

APPLICATION:

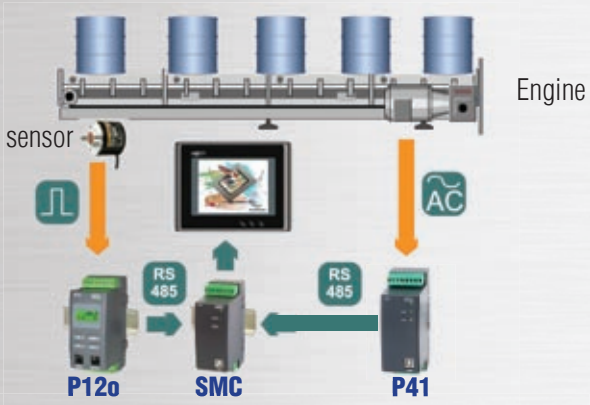
- power engineering (substation telemechanics)
- power plants
- food industry
- storage of food, drugs, etc.
- mines
- automotive industry
- drying plants
- boiler plants, heat plants
- monitoring systems (SCADA)
- object data gathering

SELECTED FEATURES:

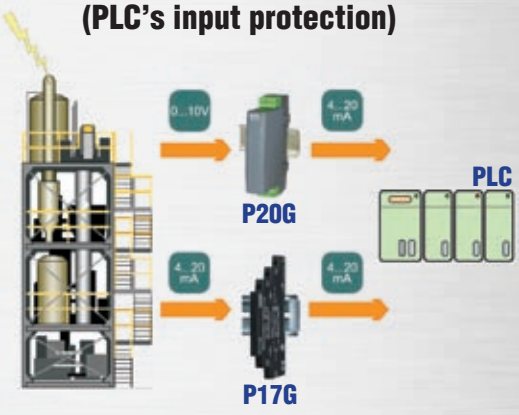
- signals standardization in automation systems
- galvanic isolation between input and output
- signal conversion with rescaling – linear (2-point) or multi-point
- programmability
- alarming (relay outputs)
- RS-485 Modbus communication, **Ethernet**
- measured values logging
- 15 minute power logging

APPLICATION EXAMPLES

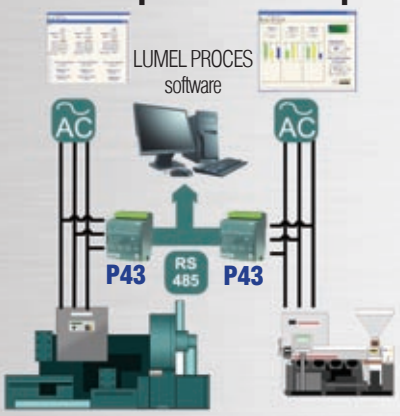
Measurement of conveyor belt speed and engine load



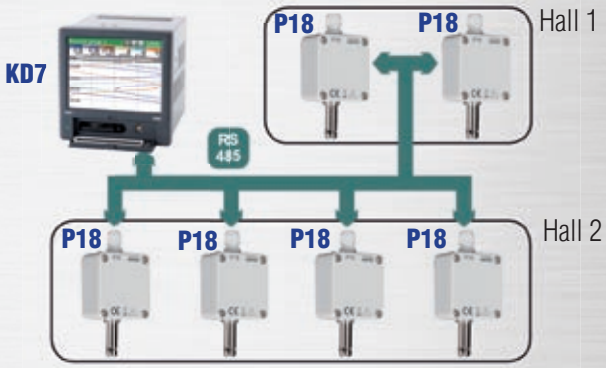
Galvanic insulation (PLC's input protection)



Measurement of 3-phase network parameters



Measurement and logging of temperature and humidity



LUMEL

Type / Parameters	P20 and P17 transducers				Separators	
	P20	P20Z	P20H	P17	P20G	P17G
Input	programmable Pt100/250/500/1000, J, K, S, N 0/4...20, ±20 mA 0...5/10, ±5, ±10 V ±60, ±150 mV 0...400/4000 Ω	fixed 0..60/100/150 /250/400/500/ /600 V a.c. 0..1/5 A a.c.	fixed 100, 250, 400 V d.c. ±100, ±250, ±400 V d.c. ±1, ±5 A d.c.	fixed Pt100 J, K, N, E, 0...10 V 0...60 mV 0...150/250 Ω	programmable 0/4...20 mA ±20 mA 0...5/10 V ±5V, ±10 V ±60 mV	0/4...20mA
Output	0/4...20 mA or 0...10 V		0/4...20 mA or 0...10 V	0/4...20 mA	programmable -20...20 mA -10...10 V	active output 0/4...20 mA
Galvanic isolation	supply/output/input			input/output	supply/output/input	input/output
Interface	-	-	RS485 Modbus Slave	-	-	–
Supply voltage	85...253 V a.c./d.c. or 20...85 V d.c., 20...65 V a.c.			supplied from a current loop	85...253 V a.c./d.c. or 20...85 V d.c., 20...65 V a.c.	supply not required
Protection rating frontal/rear side	IP40/IP20			IP50/IP20	IP40/IP20	IP50/IP20
Ambient temp.	-20...23...55 °C					
External dim.	22.5 x 120 x 100 mm			6.2 x 77.5 x 100 mm		
Additional functions	free LPCon software (using PD14 programmer)	-	free LPCon software (using PD14 programmer)	-	free LPCon software (using PD14 programmer)	-

P20Z

P20, P20H AND P20G

P17, P17G

Type / Parameters	P30 and P12 transducers				
	P30U	P30o New!	P12H	P12O	P12P
Input	programmable Pt100/250/500/1000, Cu100, Ni100, Ni1000 J, K, N, E, R, S, T, B 0...4/20, ±20 mA -5...20, , ±75, ±200 mV, 400, 2000, 5500 Ω, RS485 Master or Slave	2 programmable inputs: pulse counter, frequency, rotational speed, period, operating time counter, pulse differantial counter on inputs or encoder	programmable ±1 A ±5 A ±100 V ±600 V	programmable pulse input (pulses, frequency, rotational speed, period, operating time counter)	1-phase power network parameters fixed 1A (X/1A) 5A (X/5A) 100 V(x/100 V) 400 V
Output	2 x relays (1 x NO + 1 x NO) 0/4...20 mA, 0...10 V		2 x relays NO 0/4...20 mA, 0...10 V		
	supplying output (24 V/ 30 mA – optionally) - P30U, P12O				
Interface	RS-485 Modbus Ethernet 10/100 Base-T (option)		RS-485 Modbus		
Galvanic isolation	supply/output/input/RS-485				
Display	display LCD 2x8 characters backlighted		version without display or display LCD 2x8 characters		
Supply voltage	85...253 V a.c./d.c., 20...40 V a.c., 20...50 V d.c.		85...253 V a.c./d.c. or 20...40 V a.c./d.c.		
Protection rating frontal/rear side	IP40/IP10				
Ambient temp.	-20...23...55 °C				
External dim.	45 x 120 x 100 mm (on a rail)				
Programming	using buttons or RS485 Modbus, HTTP (option)		using buttons or RS485		
Additional functions	• rescaling (up to 21 points) (P30o - independent for both inputs) (P12P – 2-points linear) • alarms indicated on the display • internal memory 534336 samples (P30U, P30o), 750 samples (P12)				
	• mathemetic functions (P30o-independent for both inputs) • WWW server, FTP, Modbus TCP/IP Slave • memory of min. and max. values (P30o - for both inputs) • filtration of periodic signals • data logging in internal memory in SD card (P30U, P30o optionally)		-		

P30U

P30o

P12 SERIES


P41


P12 SERIES


P43

Type / Parameters	Transducers of network parameters		
	P41	**P12P**	**P43**
Input	1-phase power network parameters programmable 1, 5 A 100, 400 V	1-phase power network parameters fixed 1A (X/1A) 5A (X/5A) 100 V(x/100 V) 400 V	3-phase power network parameters fixed 1 A or 5 A, 3 x 57,7/100 V or 3 x 230/400 V
Output	±20 mA (analog programmable)	2 x relays NO analog 0/4...20 mA, 0...10 V	4 relays or 2 relays + 2 analog programmable ±20mA or 4 analog programmable ±20mA
Interface	RS-485 Modbus		
Galvanic isolation	supply/output/input/RS-485		
Display	-	version without display or display LCD 2x8 characters	-
Supply voltage	85...253 V a.c. 40...400 Hz; 90...300 V d.c. or 20...40 V a.c. 40...400 Hz; 20...60 V d.c.	85...253 V a.c./d.c. or 20...40 V a.c./d.c.	85...253 V a.c. 40...400 Hz; 90...300 V d.c. or 20...40 V a.c. 40...400 Hz; 20...60 V d.c.
Protection rating frontal/rear side	IP40/IP10		
Ambient temperature	-10...23...55 °C		
External dimensions	45 x 120 x 100 mm (on a rail)		90 x 120 x 100 mm (on a rail)
Programming	free LPCon software	using buttons or RS485	free LPCon software
Additional functions	· memory for selected measured value - 9 000 samples · memory of minimal and maximal values · programmable current and voltage transformer ratios	· 2-points linear rescaling · alarms indicated on the display · internal memory 750 samples	· memory for average power – 9 000 samples · memory of minimal and maximal values · programmable current and voltage transformer ratios · pulse output


P18 AND P18L


P18D

Type / Parameters	P18 and P18L temperature and humidity transducers		
	P18	**P18D** *New!*	**P18L**
Input	-30 ... -20 ... 60 ... 85°C 0...100% RH		-30 ... -20 ... 60 ... 85°C or 0...100% RH
Output	2 x 4...20 mA or 0...10 V (option)		4...20 mA
Interface	RS-485 Modbus		-
Supply voltage	9 ... 24 V d.c./a.c		19...30 V d.c. (supplied by a current loop)
Protection rating frontal/rear side	IP65		
Ambient temperature	-20...23...60 °C		
External dimensions	38 x 58 x 118 mm		
Additional functions	· calculation of other quantities (dew-point temp.; absolute humidity) · memory of measured and calculated min. and max. values	· data presentation on a LCD display	-

P20

Fig. 33. Electrical connections of P20

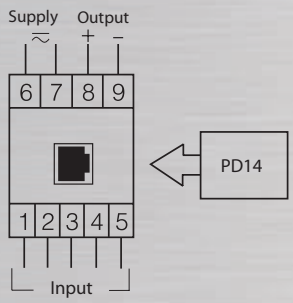
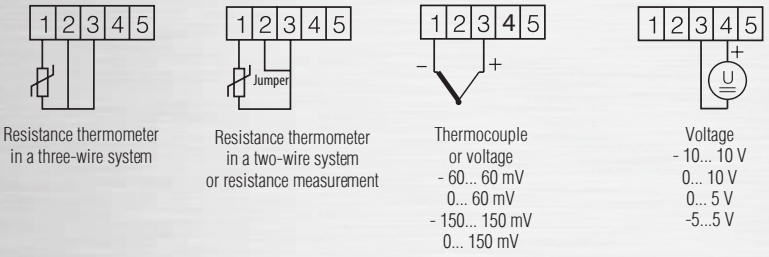


Fig. 34 Connections of measuring inputs



P20Z

Fig. 35. Electrical connections of P20Z

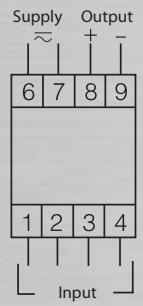


Fig. 36 Connections of measuring inputs

P20H

Fig. 37. Electrical connections of P20H - current measurement

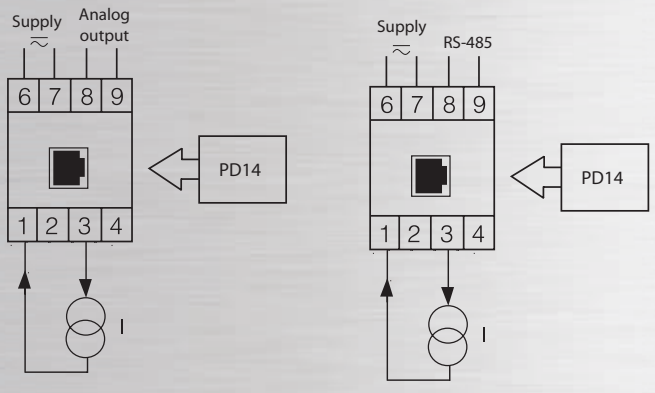
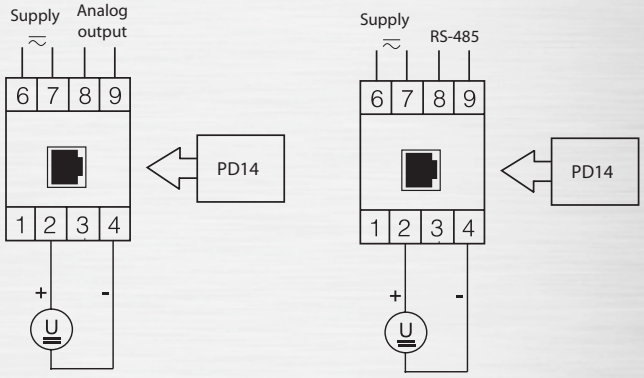
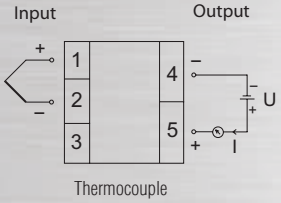


Fig. 38. Electrical connections of P20H - voltage measurement

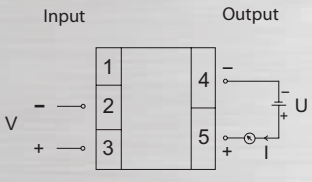


P17

Fig. 39. Electrical connections of P17

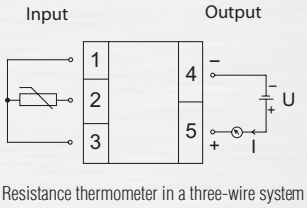


Thermocouple

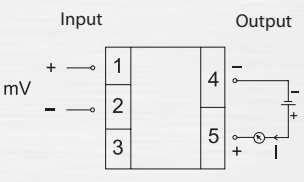


Voltage 0 .. 10 mV

Fig. 40. Electrical connections of P17



Resistance thermometer in a three-wire system



Voltage 0 .. 60 mV

P20G

Fig. 41. Electrical connections of P20G - voltage measurement: -10...10 V

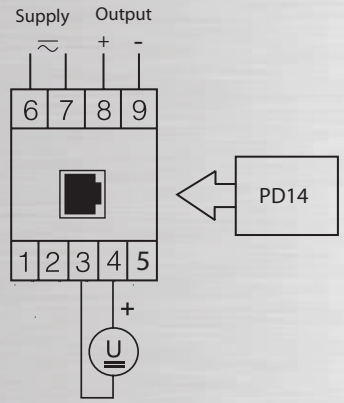
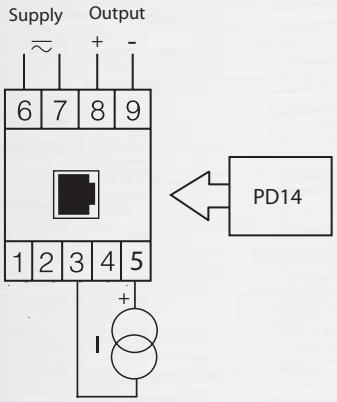
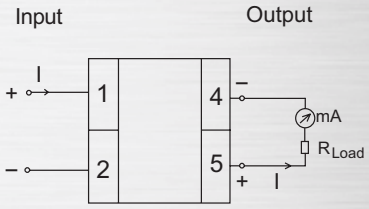


Fig.42. Electrical connections P20G - current measurement: -20...20 mA



P17G

Fig. 43. Electrical connections of P17G



P30U

Fig. 44. Electrical connection of P30U

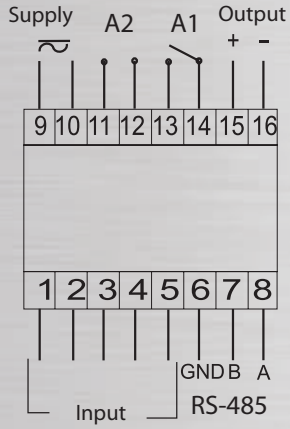
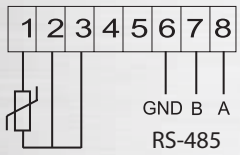
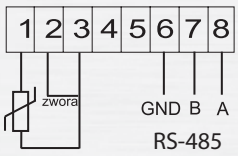


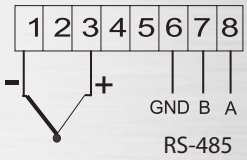
Fig. 45 Connections of measuring inputs



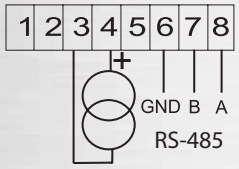
Resistance thermometer or resistance measurement in a three-wire system



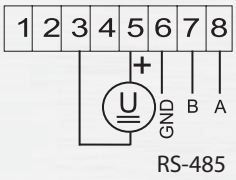
Resistance thermometer or resistance measurement in a two-wire system



Thermocouple or voltage
-5...20 mV
-75...75 mV
-200...200 mV



Voltage
-24...24 V
-10...10 V

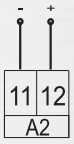


Current
-20...20 mA

P30U-XX1XXXXX

A2 - NO relay output no. 2

P30U-XX2XXXXX



A2 - auxiliary supply
24 V d.c. 30 mA

P30o

Fig. 46 Electrical connections of P30o

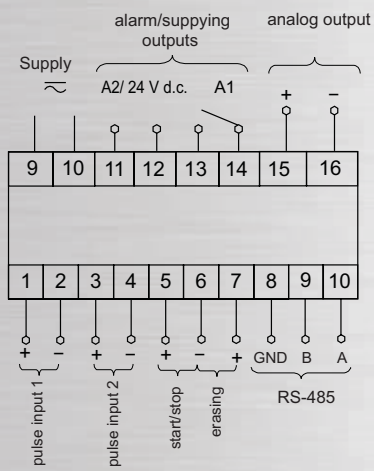


Fig. 47 Connections of measuring inputs

P30o -XX1XXXXX

A2 - NO relay output no.2

P30o -XX1XXXXX

A2 - NO relay output no.2

P12H

Fig. 48 Electrical connections of P12H

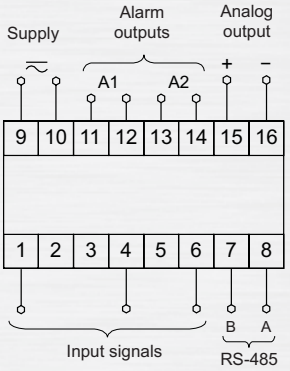
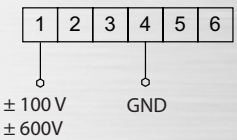
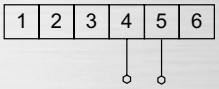


Fig. 49 Connections of measuring inputs



voltage input 100 V and 600 V

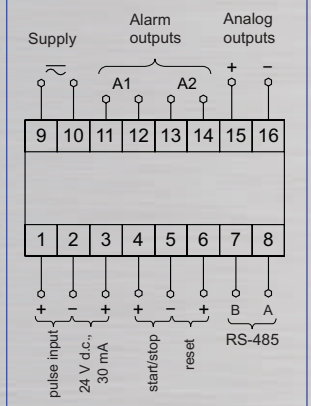


GND ± 1 A
± 5 A

current input 1 A and 5 A

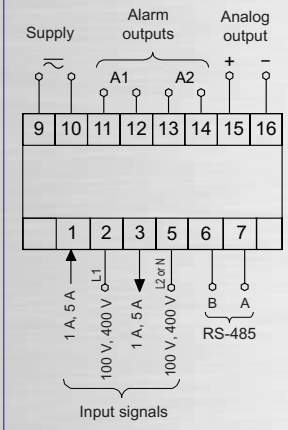
P12o

Fig. 50. Electrical connections of P12o



P12P

Fig. 51 Electrical connections of P12P



P41

Fig. 52 Electrical connections of P41 - direct measurement

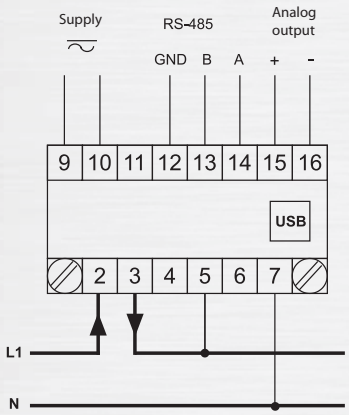
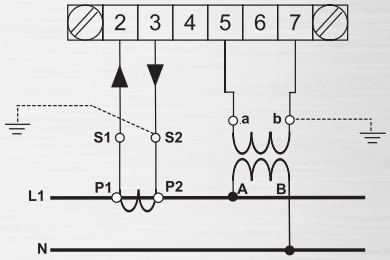


Fig. 53 Electrical connections of P41 - indirect measurement



P43

Fig. 54 Electrical connections of P43 for 3-wire network

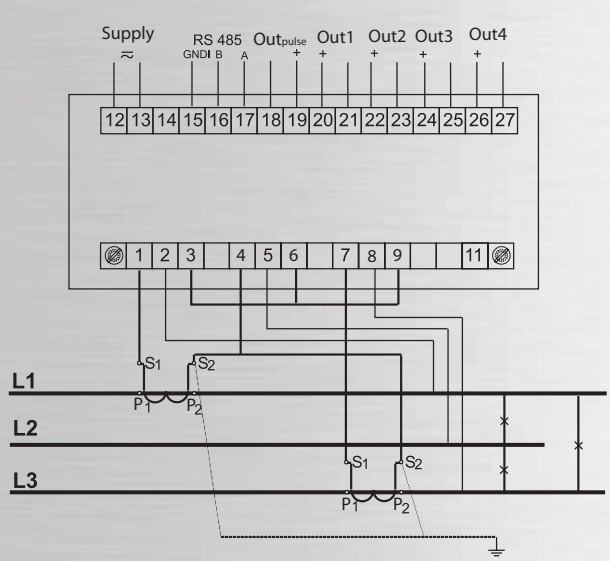
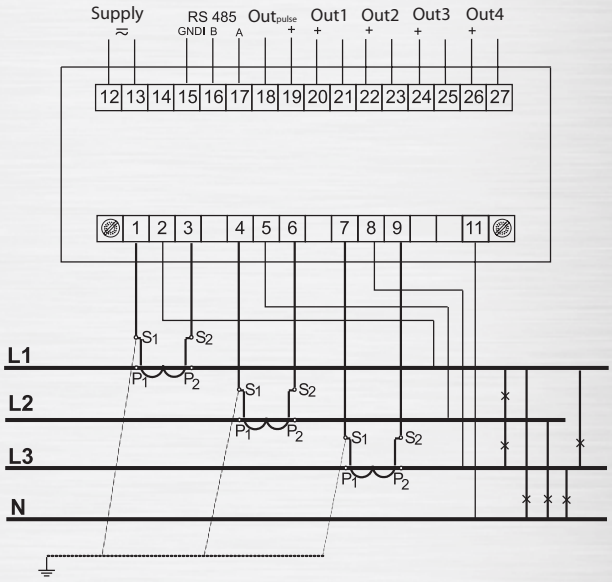


Fig. 55 Electrical connections of P43 for 4-wire network



P18, P18D AND P18L

Fig. 56 Electrical connections of P18 and P18D

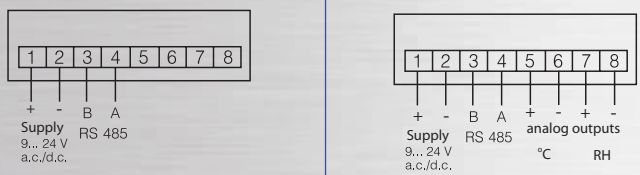
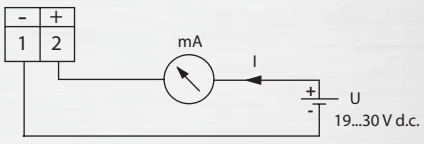


Fig. 57 Electrical connections of P18L



P20 AND P17 TRANSDUCER SERIES

TABLE 16. P20 ORDERING CODE:

P20 -	X	X	XX	XX	X
Analog output:					
current 0...20 mA	1				
current 4...20 mA	2				
voltage 0...10 V	3				
Supply:					
85...253 V a.c./d.c.		1			
20...85 V d.c., 20...65 V a.c.		2			
Kind of input:					
write the code from table 17			XX		
Version:					
standard				00	
custom-made*				XX	
Acceptance tests:					
without extra requirements					0
with an extra quality inspection certificate					1
acc. to customer's request*					X

TABLE 17. INPUT SIGNALS P20

Type of sensor/input [Unit]	Range	Code	Type of sensor/input [Unit]	Range	Code
Pt100 [°C]	-200..850	01	TC of K type [°C]	-200..1370	36
	0..850	02		0..1200	37
	0..600	03		0..1000	38
	0..400	04		0..800	39
	0..200	05		0..600	40
	-200..200	06		0..400[1]	41
	-100..100[1]	07		-200..200[1]	42
Pt250 [°C]	-200..850	08	TC of S type [°C]	0..1760	43
	0..850	09		0..1600	44
	0..600	10		0..1400[1]	45
	0..400	11		0..1200[1]	46
	0..200	12		0..1000[1]	47
	-200..200	13	TC of N type [°C]	-200..1200	48
	-100..100	14		0..1200	49
Pt500 [°C]	-200..850	15		0..1000	50
	0..850	16		0..800	51
	0..600	17		0..600[1]	52
	0..400	18		0..400[1]	53
	0..200	19		-200..200[1]	54
	-200..200	20	Voltage d.c. [V]	0..10	55
	-100..100	21		0..5	56
Pt1000 [°C]	-200..850	22		-10..10	57
	0..850	23		-5..5	58
	0..600	24	Voltage d.c. [mV]	0..60	59
	0..400	25		-60..60	60
	0..200	26		0..150	61
	-200..200	27		-150..150	62
	-100..100	28	Current d.c. [mA]	0..20	63
TC of J type [°C]	-200..1200	29		4..20	64
	0..1200	30		0..5	65
	0..1000	31		-20..20	66
	0..800	32	Res [Ω]	0..400	67
	0..600	33		0..4000	68
	0..400[1]	34	Custom-made		XX
	-200..200[1]	35	[1] Accuracy class 0.5		

TABLE 18. P20Z ORDERING CODE:

P20Z -	XX	X	X	X	XX	X
Input range:						
0...60 V	01					
0...100 V	02					
0...150 V	03					
0...250 V	04					
0...400 V	05					
0...500 V	06					
0...600 V	07					
0...1 A	08					
0...5 A	09					
Output range:						
0...5 mA		1				
0...20 mA		2				
4...20 mA		3				
0...10 V		4				
Supply voltage:						
85...253 V a.c./d.c.			1			
20...40 V a.c./d.c.			2			
Kind of terminals:						
inseparable screws				1		
screwed plug-in sockets				2		
Version:						
standard					00	
custom-made*					XX	
Acceptance tests:						
without extra requirements						0
with an extra quality inspection certificate						1
acc. to customer's request*						X

TABLE 19. P20H ORDERING CODE:

P20H -	X	X	X	XX	X
Input signal:					
+/- 100 V	1				
+/- 250 V	2				
+/- 400 V	3				
+/- 1 A	4				
+/- 5 A	5				
0..100 V	6				
0...250 V	7				
0...400 V	8				
Output:					
0...20 mA		1			
4...20 mA		2			
0...10 V		3			
RS-485		4			
Supply voltage:					
85...253 V a.c./d.c.			1		
20...85 V d.c., 20...65 V a.c.			2		
Version:					
standard				00	
non-standard settings				NS	
custom-made*				XX	
Acceptance tests:					
without extra requirements					0
with an extra quality inspection certificate					1
acc. to customer's request*					X

TABLE 20. P17 ORDERING CODE:

P17 -	XX	XX	X
Input signal:			
voltage (0...10 V)	00		
thermocouple J (-100...1200°C)	01		
thermocouple K (-100...1370°C)	02		
thermocouple N (-100...1300°C)	03		
thermocouple E (-100...900°C)	04		
Pt100 (-50...100°C)	05		
Pt100 (-50...400°C)	06		
voltage (0...60 mV)	09		
Version:			
standard		00	
on order*		XX	
Acceptance tests:			
without extra requirements			0
with an extra quality inspection certificate			1
acc. to customer's request*			X

* - after agreeing with the manufacturer

P20G AND P17G TRANSDUCER SERIES

TABLE 21. P20G ORDERING CODE:

P20G -	XX	XX	X	XX	X	X
Input:						
input code acc. to the table 22	XX					
Output:						
output code acc. to the table 22		XX				
Supply voltage:						
85...253 V a.c./d.c.			1			
20...40 V a.c./d.c.			2			
Version:						
standard				00		
non-standard settings				NS		
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 22. CODING OF THE P20G SEPARATOR KIND OF INPUT AND OUTPUT

Range	Input code	Output code
0...1 V	01	01**
0...5 V	02	02
0...10 V	03	03
±1 V	04	04**
±5 V	05	05
±10 V	06	06
0...5 mA	07	07**
0...20 mA	08	08
±5 mA	09	09**
±20 mA	10	10
4...20 mA	11	11
custom-made version*	XX	XX

* - after agreeing with the manufacturer

** - conversion class > 0.2

TABLE 23. P17G ORDERING CODE:

P17G -	XX	X
Version:		
standard	00	
on order*	XX	
Acceptance tests:		
without extra requirements		0
with an extra quality inspection certificate		1
acc. to customer's request*		X

P30 AND P12 TRANSDUCER SERIES

TABLE 24. P30U ORDERING CODE:

P30U -	X	XX	X	X	XX	X	X
Analog output:							
current (range 0...4...20 mA)	1						
voltage (0...10 V)	2						
SD/SDHC card:							
without slot for SC card		0					
with external SD/SDHC slot		1					
Additional output:							
NO relay, 5 A 30 V d.c., 250 V a.c.			1				
supply 24 V d.c. / 30 mA			2				
Supply:							
85...253 V a.c./d.c.				1			
20...40 V a.c., 20...50 d.c.				2			
Version:							
standard					00		
custom-made*					XX		
Language:							
Polish						P	
English						E	
Acceptance tests:							
without extra requirements							0
with an extra quality inspection certificate							1
acc. to customer's request*							X

TABELE 25. P30o ORDERING CODE:

P30o -	X	XX	X	X	XX	X	X
Analog output:							
current (range 0/4...20 mA)	1						
voltage (0...10 V)	2						
Additional equipment:							
without		0					
with external SD/SDHC slot		1					
with Ethernet interface and archive file system memory		2					
Additional output:							
relay (NO), 5 A 30 V d.c., 250 V a.c.			1				
supply 24 V d.c. / 30 mA			2				
Supply:							
85...253 V a.c./d.c.				1			
20...40 V a.c., 20...50 d.c.				2			
Version:							
standard					00		
custom-made[2]					XX		
Language:							
Polish						P	
English						E	
other[2]						X	
Acceptance tests:							
without extra requirements							0
with an extra quality inspection certificate							1
acc. to customer's request[2]							X

TABLE 26. P12P ORDERING CODE:

P12P -	X	X	XX	X	X	X	XX	X
Kind of transducer:								
without display	1							
with a display	2							
Input:								
100V 1A		1						
100V 5A		2						
400V 1A		3						
400V 5A		4						
custom version[2]		X						
Programmed converted parameter*:								
voltage			00					
current			01					
frequency			02					
active power			03					
reactive power			04					
apparent power			05					
3-phase active power			06					
3-phase reactive power			07					
3-phase apparent power			08					
cos ϕ			09					
tg ϕ			10					
ϕ			11					
active energy			12					
reactive energy			13					
apparent energy			14					
3-phase active energy			15					
3-phase reactive energy			16					
3-phase apparent energy			17					
custom version[2]			XX					
Output:								
voltage 0...10 V				1				
current 0...20 mA				2				
current 4...20 mA				3				
current 0...5 mA				4				
custom version[2]								
Supply voltage:								
85...253 V d.c./a.c.					1			
20...50 V d.c./a.c.					2			
Kind of terminals:								
screwed plug-in sockets						0		
Version:								
standard							00	
custom-made[2]							XX	
Acceptance tests:								
without extra requirements								0
with an extra quality inspection certificate								1
acc. to customer's request[2]								X

* - The change of the converted parameters is possible from the keyboard (P12P-2) through PD14 or RS-485. One must give in the order, the code of converted parameter which has to be programmed.

1) - the transducer has an universal input. In ordering code one must give the code of input signal, that has to be programmed
2) - after agreeing with the manufacturer
3) - possible version with screwed plug-in sockets

TABLE 27. P12o ORDERING CODE:

P12o -	X	XX	X	X	X	XX	X
Kind of transducer:							
without display	1						
with a display	2						
Input signal[1]:							
number of pulses: 0...99999		00					
frequency: 0.1...3000 Hz		01					
number of turns: 0...99999 t		02					
rotation speed: 0.99999 t/min		03					
period: 0.3...9999 ms		04					
long period >10s: 0...99999 s		05					
worktime counter: 0...99999 h		06					
on order[2]		XX					
Output:							
voltage 0...10V			1				
current 0...20mA			2				
current 4...20mA			3				
current 0...5 mA			4				
on order[2]			X				
Supply:							
85...253 V d.c./a.c.				1			
20...50 V d.c./a.c.				2			
Kind of terminals:							
screwed plug-in sockets					0		
on order[3]					1		
Version:							
standard						00	
custom-made[2]						XX	
Acceptance tests:							
without extra requirements							0
with an extra quality inspection certificate							1
acc. to customer's request[2]							X

TABLE 28. P12H ORDERING CODE:

P12H -	X	XX	X	X	X	XX	X
Kind of transducer:							
without display	1						
with a display	2						
Input signal[1]:							
voltage -100...100 V		00					
voltage -600...600 V		01					
current -1...1 A		02					
current -5...5 A		03					
custom version[2]		XX					
Output:							
voltage 0...10V			1				
current 0...20mA			2				
current 4...20mA			3				
current 0...5 mA			4				
on order[2]			X				
Supply:							
85...253 V d.c./a.c.				1			
20...50 V d.c./a.c.				2			
Kind of terminals:							
screwed plug-in sockets					0		
custom version[3]					X		
Version:							
standard						00	
custom-made[2]						XX	
Acceptance tests:							
without extra requirements							0
with an extra quality inspection certificate							1
acc. to customer's request[2]							X

P18, P18D AND P18L TEMPERATURE AND HUMIDITY TRANSDUCERS

TABLE 29. P18 ORDERING CODE:

P18 -	X	XX	X
Analog output:			
without analog outputs	0		
current 4...20 mA	1		
voltage 0...10 V	2		
Version:			
standard		00	
custom-made*		XX	
Acceptance tests:			
without extra requirements			0
with an extra quality inspection certificate			1
acc. to customer's request*			X

TABELE 30. P18D ORDERING CODE:

P18D-	X	XX	X
Analog output:			
without analog outputs	0		
current 4...20 mA	1		
voltage 0...10 V	2		
Version:			
standard		00	
custom-made*		XX	
Acceptance tests:			
without extra requirements			0
with an extra quality inspection certificate			1
acc. to customer's request*			X

TABLE 31. P18L ORDERING CODE:

P18L -	XX	X
Version:		
standard	00	
custom-made*	XX	
Acceptance tests:		
without extra requirements		0
with an extra quality inspection certificate		1
acc. to customer's request*		X

* - after agreeing with the manufacturer

P41 AND P43 POWER TRANSDUCERS

TABLE 32. P43 ORDERING CODE:

P43 -	X	X	X	X	XX	X	X
Current input In:							
1 A (X/1)	1						
5 A (X/5)	2						
Voltage input (phase/phase-to-phase) Un:							
3 x 57.7/100 V		1					
3 x 230/400 V		2					
Supply voltage:							
85...253 V a.c.; 90...320 V d.c.			1				
20..40 V a.c.; 20...60 V d.c.			2				
Kind of outputs:							
without analog outputs, 4 relays				1			
2 analog outputs, 2 relays				2			
4 analog outputs, without relay				3			
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 33. P41 ORDERING CODE:

P41 -	X	XX	X	X
Supply:				
85...253 V a.c. 40...400 Hz; / 90...300 V d.c.	1			
20...40 V a.c. 40...400 Hz; / 20...60 V d.c.	2			
Version:				
standard		00		
custom-made		XX		
Language:				
Polish			P	
English			E	
Acceptance tests:				
without extra requirements				0
with an extra quality inspection certificate				1

* - after agreeing with the manufacturer

METERS AND ANALYZERS OF POWER NETWORK PARAMETERS

APPLICATION:

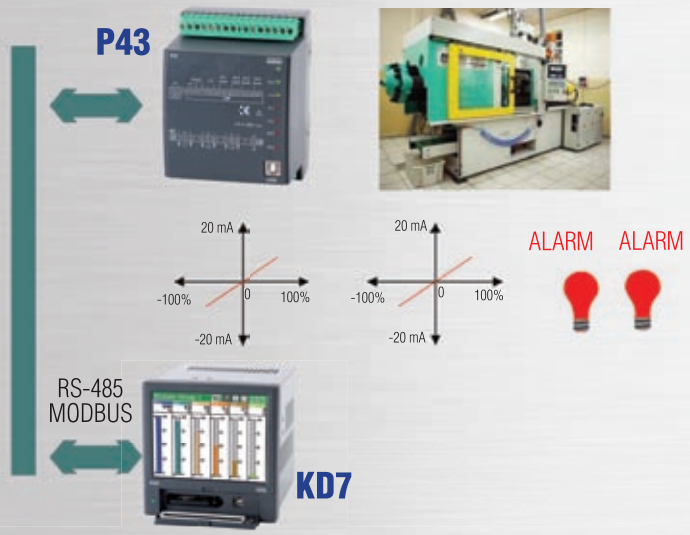
- supply systems in industry
- power industry (substations, generators, turbines)
- heat engineering (heat and power plants, boiler plants)
- monitoring of power network parameters
- monitoring of power quality and consumption

SELECTED FEATURES:

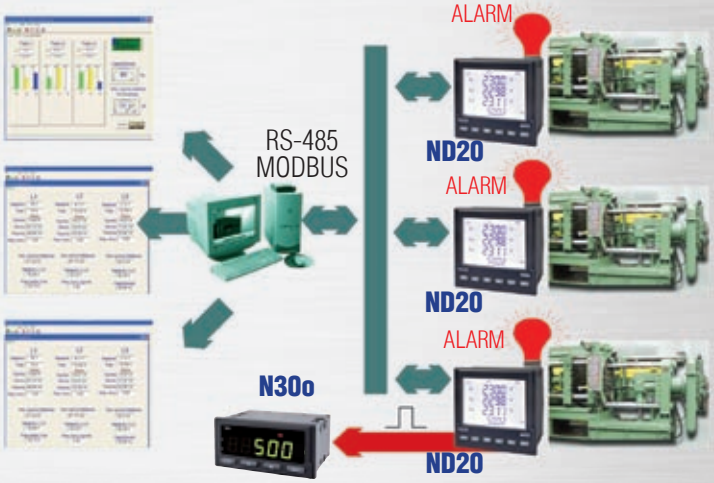
- 4-quadrant power and energy measurement
- measurement of THD and harmonics
- software for configuration of meters for free - LPConfig
- LCD or LED displays
- configurable sequence of displayed measurements
- RS-485 Modbus communication, **Ethernet**
- co-operation with current transformers (CT) and voltage transformers (VT)
- alarming based on selected parameters
- pulse output for energy retransmission

APPLICATION EXAMPLES

Measurement and monitoring of the power consumption of the machine and archiving by KD7 paperless recorder



Measurement and displaying of the network parameters and energy of the 3-phase machines



Type / Parameters	N14	ND10	ND20	N10/N10A	ND1
Measurement	voltage: phase , mean 3-phase, phase-to-phase, mean phase-to-phase current: phase, mean 3-phase, in neutral wire power: active, reactive, apparent 3-phase power, power factor, angle, tg φ, frequency, 15-min. active power **4-quandrats power and energy measurement**				
	3-phase active and reactive energy			3-phase active, reactive and apparent energy	
	-	-	-	-	energy tarrifs (4)
	-	THD U, I	THD U, I	THD U, I	THD U, I
	-	-	harmonics up to 21st	harmonics up to 25th	harmonics up to 51st
	-	-	-	-	voltage dips and swells
	-	-	-	-	voltage asymmetry
Input	1 A or 5 A 57,7/100 V, 230/400 V or 400/690 V	1 A or 5 A 57,7/100 V or 230/400 V 290/500 V	1 A or 5 A 57,7/100 V or 230/400 V	1 A or 5 A 57,7/100 V or 230/400 V pulse (N10)	1 A or 5 A 57,7/100 V, 230/400 V or 400/690 V 12 x logic
Output	1 x relay 1 x pulse	2 x relays 1 x pulse	1 x 0/4...20 mA (option) 1 x relay 1 x pulse	N10: 1 x 0/4..20 mA 3 x relay 1 x pulse N10A: 3 x -5...+5 mA 1 x relay	4 x 0/4...20 mA 6 x relay 2 x supplying outputs
Interface	RS-485 Modbus Slave - standard	RS-485 Modbus Slave option	RS-485 Modbus Slave - standard	RS-485 Modbus Slave - option	RS-485 Modbus 1 x Master, 1 x Slave **Ethernet** (HTTP, NTP, FTP, Modbus TCP), USB
Galvanic isolation	input/output/supply/RS-485				
Display	LED 3 x 3 digits (14 mm)	3.5" LCD 3 x 4 digits (16 mm)	3.5" LCD 3 x 4 (11 mm) + 1 x 5 digits (9 mm)	LED 4 x 5 digits (14 mm)	5.7" TFT touch screen, 320x240 pixel 256 colours, backlighted
Supply voltage	85..253 V a.c./d.c.	supplied from measuring circuit	85.. 253 V a.c/d.c. or 20..40 V a.c/d.c.	85..253 V a.c./d.c.	
Protection rating frontal/rear side	IP40/IP10	IP65/IP20		IP40/IP10	IP65/IP20
Ambient temperature	-20...23...55 °C			0...23...55 °C	
External dimensions	96 x 96x 70,5 mm	96 x 96 x 77 mm		144 x 144 x 77 mm	144 x 144 x 155 mm
Panel cut-out	$91^{+0.5}$ x $91^{+0.5}$ mm	$92^{+0.6}$ x $92^{+0.6}$ mm		$138^{+0.5}$ x $138^{+0.5}$ mm	$138^{+0.1}$ x $138^{+0.1}$ mm
Programming	free LPCon software (using RS-485) or using buttons				NDSetup program (using USB or CF card) or using touch screen
Additional functions	· galvanic isolation of current inputs	· memory 9000 samples for mean power · galvanic isolation of current inputs		· selection of displayed quantities on each of the 20 programmable pages · galvanic isolation of current and voltage inputs	· measurement and logging of energy quality acc. to EN50160 · memory - CF card 4GB · oscilloscope · galvanic isolation of current and voltage inputs


N14


ND10


ND20


N10/N10A


ND1

TECHNICAL DATA

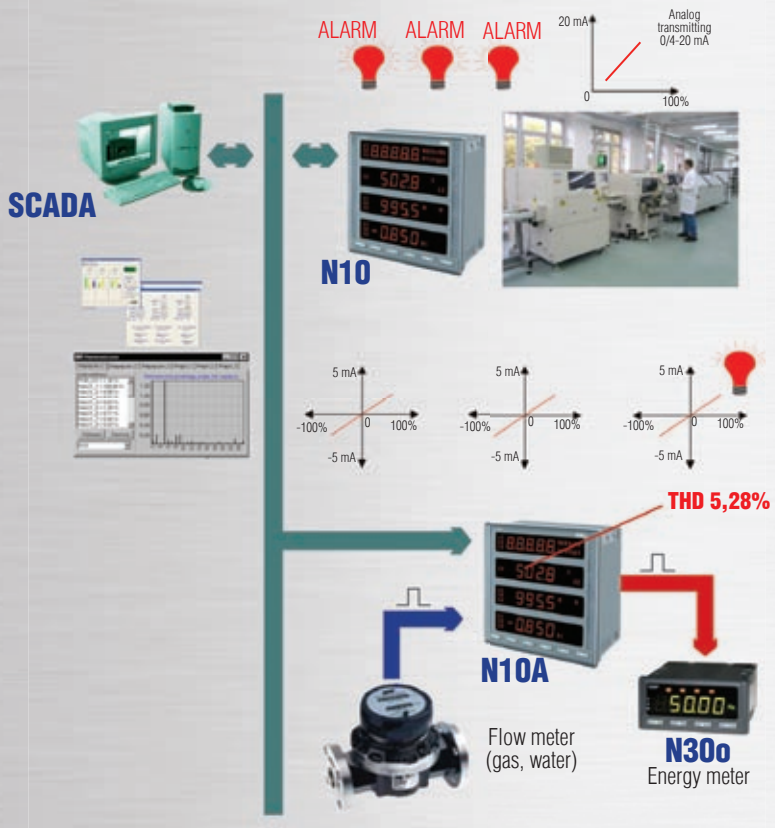
KS3.1

KS3.2

Parameters \ Type	KS3 synchronizing units	
	KS3.1	KS3.2
Input	100.0 V (Ku=1) 110.0 V (Ku=1) 240.0 V (Ku=1) 400.0 V (Ku=1)	
Output	2 x relays	
Interface	RS-485 Modbus - option	
Galvanic isolation	input/output/supply/RS-485	
Display	4 x 5 digits LED (14 mm), red colour	synchronoscope: circle with 72 diodes; differential voltage and frequency: bargraph with zero in the middle (68 diodes)
Supply voltage	85...253 V AC/DC or 20...40 V AC/DC	
Protection rating frontal/rear side	IP40/IP20	
Ambient temperature	0...23...55 °C	
External dimensions	144 x 144 x 77 mm	
Panel cut-out	$138^{+0.5}$ x $138^{+0.5}$ mm	
Additional functions	· signalling of synchronizing condition (AL1) · programmable parameters · signalling of any network voltage range exceeding beyond 80-120% of the rated value (AL2) · measurement of min. and max. values of voltage and frequency	

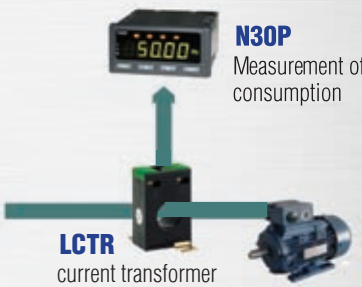
APPLICATION EXAMPLES

Measurement and displaying of the network parameters and energy of the 3-phase machines



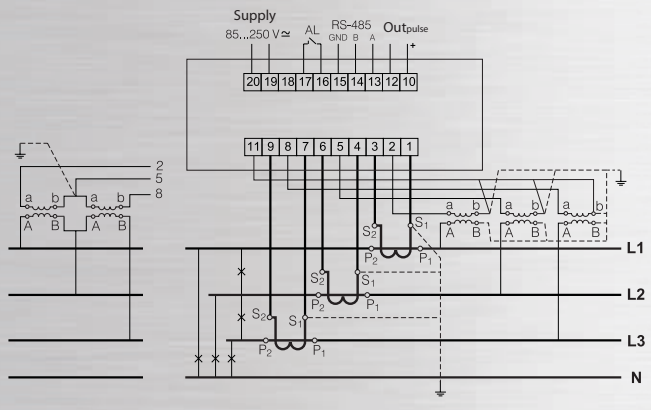
Automatic synchronization, while connecting a generator to the main power network

Measurement of a.c. current of 1-phase engine



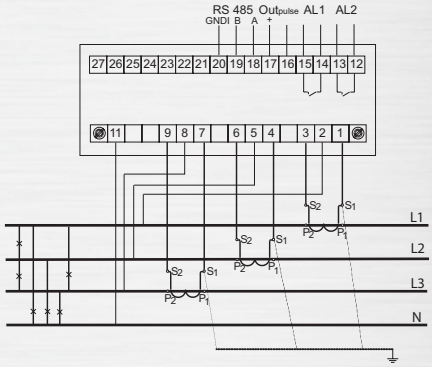
N14

Fig. 58 Electrical connections of N14



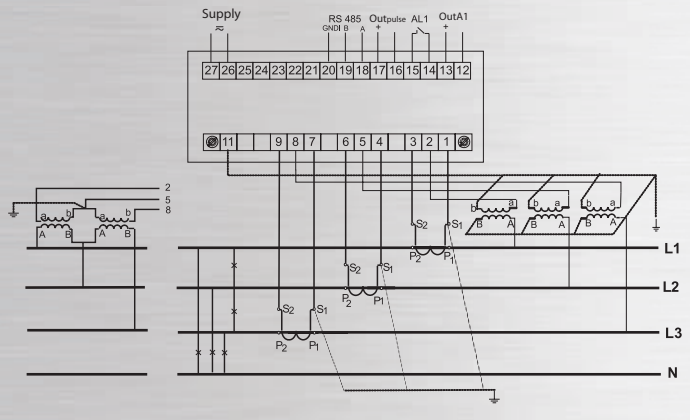
ND10

Fig. 59 Electrical connections of ND10



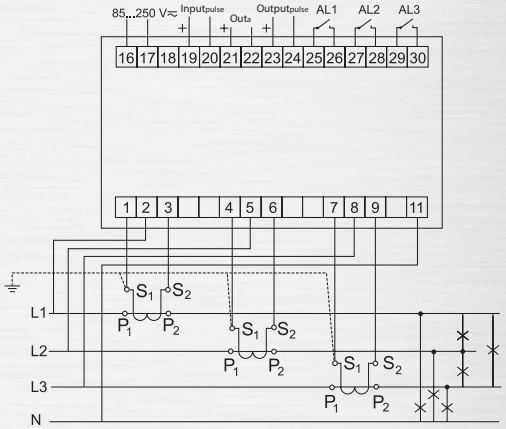
ND20

Fig. 60 Electrical connections of ND20



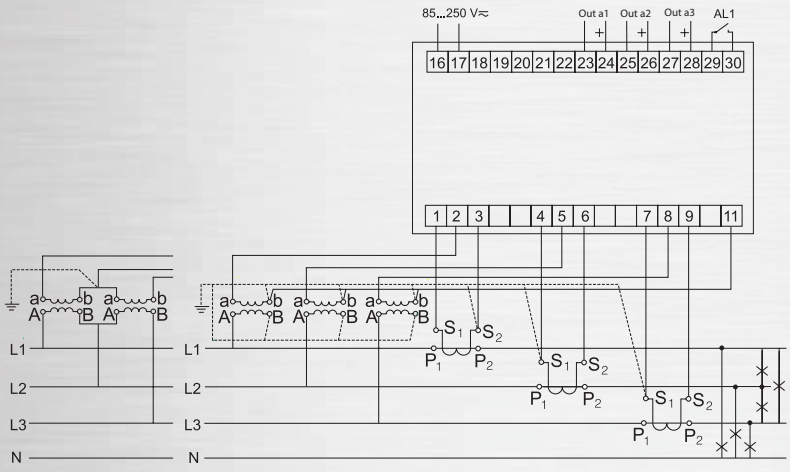
N10

Fig. 61 Electrical connections of N10



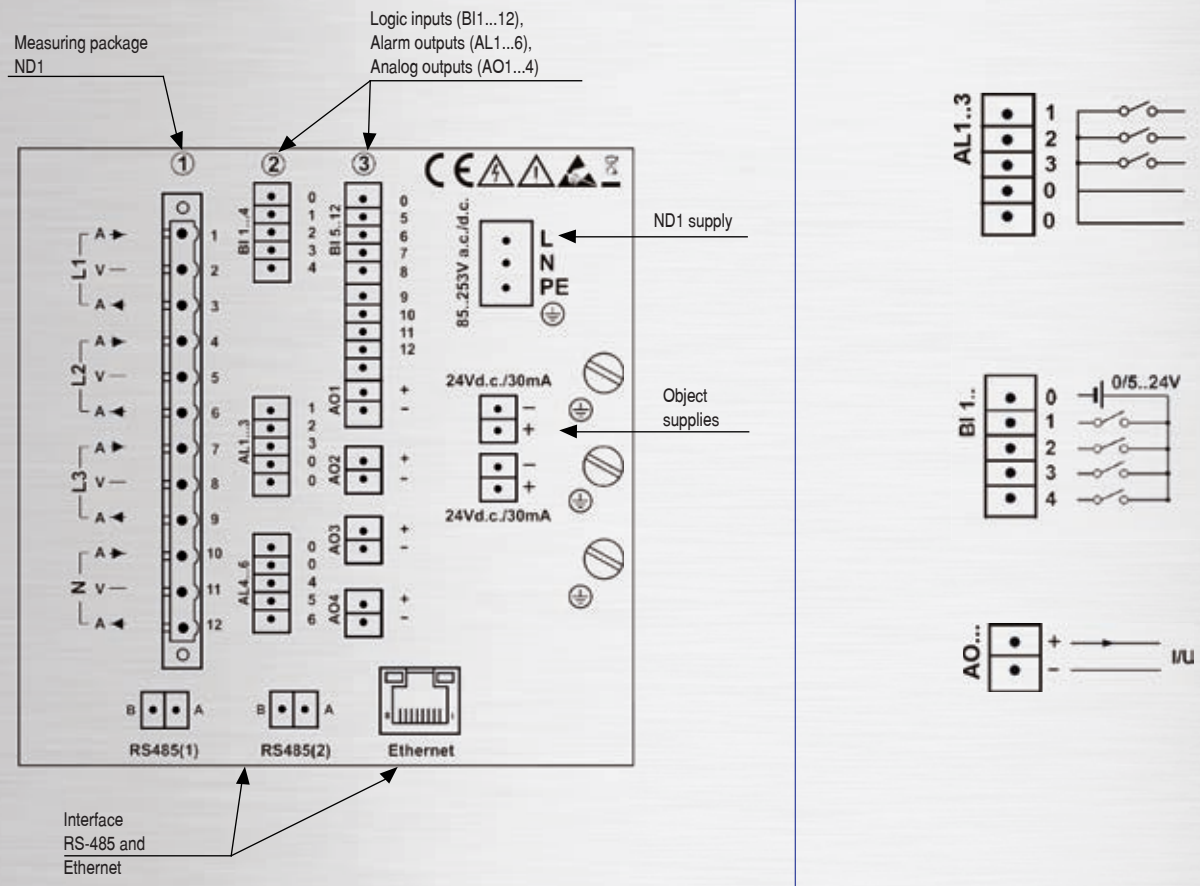
N10A

Fig. 62 Electrical connections of N10A



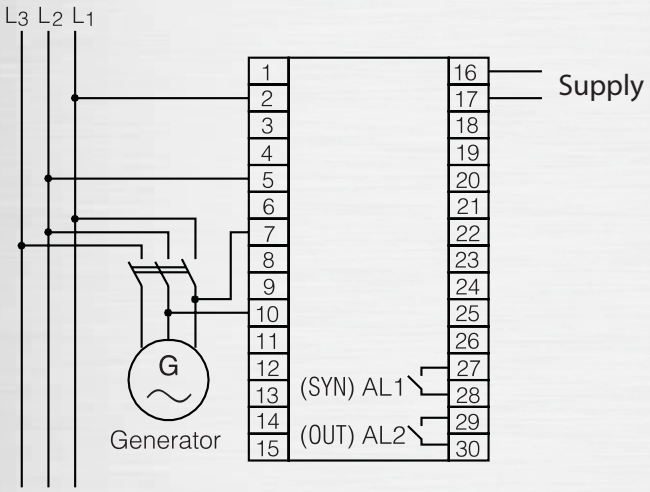
ND1

Fig. 63 Electrical connections of ND1



KS3.1 AND KS3.2

Fig.64 Electrical connections of KS3



METERS AND ANALYSERS OF POWER NETWORK PARAMETERS

TABLE 34. N14 ORDERING CODE:

N14 -	X	X	XX	X
Current input In:				
1 A (X/1)	1			
5 A (X/5)	2			
Voltage input (phase/phase-to-phase) Un:				
3 x 57.7/100 V		1		
3 x 230/400 V		2		
3 x 400/690 V**		3		
Version:				
standard			00	
input voltage 3 x 110/ 190 V			01	
custom-made*			XX	
Acceptance tests:				
without extra requirements				0
with an extra quality inspection certificate				1
acc. to customer's request*				X

** - version only for direct measurement

* - after agreeing with the manufacturer

TABLE 35. ND10 ORDERING CODE:

ND10 -	X	X	X	XX	X	X
Current input In:						
1 A (X/1)	1					
5 A (X/5)	2					
Voltage input (phase/phase-to-phase) Un:						
3 x 57.7/100 V		1				
3 x 230/400 V		2				
3 x 290/500 V		3				
Digital output:						
without RS-485 interface			0			
with RS-485 interface			1			
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 36. ND20 ORDERING CODE:

ND20 -	X	X	X	X	XX	X	X
Current input In:							
1 A	1						
5 A	2						
Voltage input (phase/phase-to-phase) Un:							
3 x 57.7/100 V		1					
3 x 230/400 V		2					
Analog current output:							
without analog output			0				
with programmable output 0(4)..20 mA			1				
Supply voltage:							
85..253 V a.c./d.c. (40...400 Hz)				1			
20..40 V a.c./d.c. (40...400 Hz)				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 37. N10/N10A ORDERING CODE:

N10/N10A -	X	X	X	X	X	XX	X
Current input In:							
1 A (X/1)	1						
5 A (X/5)	2						
on order*	X						
Input phase voltage Un:							
100 V		1					
400 V		2					
custom-made*		X					
Digital output:							
without interface			0				
with RS-485 interface			1				
Display:							
red				1			
green				2			
Supply voltage:							
85..250 V d.c., a.c. 40..400 Hz					0		
custom-made*					X		
Version:							
standard						00	
custom-made*						XX	
Acceptance tests:							
without extra requirements							0
with an extra quality inspection certificate							1
acc. to customer's request*							X

TABLE 38. ND1 ORDERING CODE:

ND1 -	X	X	XX	X	X
Input current:					
1 A	1				
5 A	2				
Input voltage:					
57,7/100 V		1			
230/400 V		2			
400/690 V		3			
Version:					
standard			00		
in a portable case, without RJ45 socket			PO		
in a portable case, witht RJ45 socket			PE		
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

Note!

Each ND1 analyser is equipped with 6 alarms (electro-mecanic relays), 4 analog outputs, 12 logic inputs and Ethernet interface.

SYNCHRONIZING UNITS

TABLE 39. KS3 ORDERING CODE:

KS3	X	XX	X	X	XX	X
Kind of display:						
digital display	1					
bargraphs (diode lines)	2					
Voltage input:						
100 V		01				
110 V		02				
240 V		03				
400 V		04				
Digital output:						
without interface			0			
with RS-485 interface			1			
Supply voltage:						
85 ... 250 V d.c./a.c.				0		
24 V d.c./a.c.				1		
Version:						
standard					00	
custom-made					XX	
Acceptance tests:						
without extra requirements						0
with an extra quality inspection certificate						1
acc. to customer's request*						X

* - after agreeing with the manufacturer

CONTROLLERS

APPLICATION:

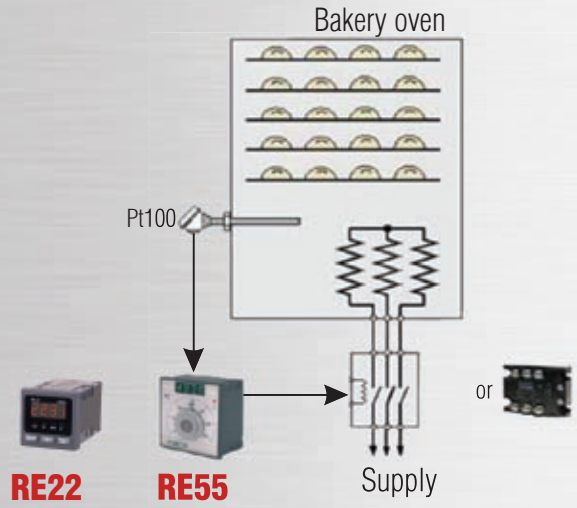
- plastics processing industry (injection moulding machines)
- food industry
- bakery ovens
- drying chambers
- industrial ovens (blast furnaces, kilns, etc.)
- packaging appliances
- to control other measuring quantities converted into standard signals

SELECTED FEATURES:

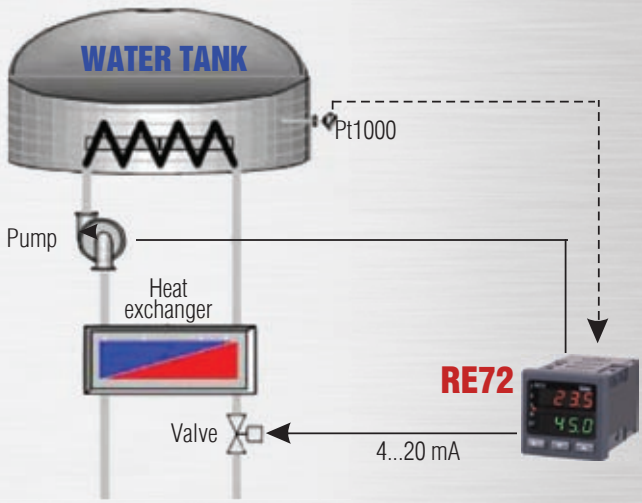
- universal/programmable measuring inputs allow implementing in diverse applications
- easy installation thanks to the function of automatic selection of PID parameters
- smaller overshoot thanks to the setpoint soft start function
- program following control option useful for instance in drying chambers, hardening furnaces and kilns
- bumpless transfer between manual and automatic control
- an installation is protected through the function of switching off the control output in case of measuring sensor damage
- remote control using RS-485 Modbus digital interface, **Ethernet**

APPLICATION EXAMPLES

Bakery oven control



Temperature measurement and control in a water tank



LUMEL

Type / Parameters	RE22	RE70 New!	RE71	RE81	RE72	RE82	RE92 New!	RE19
	Industrial process controllers							
Number of channels	1	1	1	1	1	1	2	2
Input	programmable Pt100/1000 J, T, K, S, R, B, E, N, L 0(4)...20 mA 0...5/10 V	programmable Pt100/1000 J, T, K, S, R, B, N	fixed Pt100 J, K, S		programmable Pt100/1000 J, T, K, S, R, B, E, N, L 0(4)...20 mA 0...5/10 V		programmable: 2x Pt100/500/1000, Ni100, Cu100 J, T, K, S, R, B, E, N, L 0(4)...20 mA 0...(5)10 V	programmable: 2x Pt100/500/ /1000, Ni100, Cu100 J, T, K, S, R, B, E, N, 0(4)...20 mA 0...(5)10 V
Additional input	-	-	-	-	logic/ current transformer input/ 0(4)... 20 mA (option)	2 x logic/ current transformer input/ 0(4)...20 mA	3x logic and 0(4)...20 mA / 0...(5)10 V / potentiometer (100)1000 Ω (option)	2x logic and 0...(5)10 V / 0(4)...20 mA / potentiometer (100)1000 Ω (option)
Output	relay or OC 0/5 V	relay	relays or 0/6 V	max. 2x relays / 1x OC 0/6 V (option)	2 x relays / OC 0/5 V / analog 0(4)...20mA / 0...10 V / supplying output 24 V d.c. 30 mA (option)	2x relays and 2x relays / OC 0/5V / analog 0(4)...20 mA / 0...10 V (option) supplying output 24 V d.c. 30 mA (option)	max. 6x relays / 2x OC 0/5 V / 2x analog 0(4)... 20 mA / 0...10 V (option) supplying output 24 V d.c. 30 mA (option)	max. 4x relays / 4x OC / 2x binary 0/15 V / 2x analog 0(4)...20 mA, 0...10 V (option)
Interface	-	RS-485 Modbus (for configuration only)	-		RS-485 Modbus		RS-485 Modbus, Ethernet (optionally)	RS-485 Modbus (optionally)
Galvanic isolation	input/output/supply		input/output/ supply/PD14		input/output/supply/RS-485			
Alarm	-	-	-	1	max. 2	max. 3	max. 6	max. 3
Control	on/off or PID heating or cooling	on/off or SMART PID, heating or cooling	on/off / SMART PID heating or cooling	on/off or SMART PID, heating/ cooling/ step-by-step	programmed on/off SMART PID heating/cooling/step-by-step		programmed on/off SMART PID heating/cooling/ step-by-step	programmed on/off, PID heating/ cooling/ ste-by-step
Display	red LED 4 digits (9,2 mm)		red LED 4 digits (7,6 mm)	red and green LED 2 x 4 digits (7,6 mm)		red and green LED 2 x 4 digits (7,6 mm) + 2 bargraphs	LCD 3.5" TFT 320 x 240 pixels colour	red and green LED 2 x 5 digits (10mm) + LCD 2 x 16 characters
Supply voltage	230; 110; 24 V a.c.	230 V a.c.			85...253 V a.c./ d.c. 20...40 V a.c./d.c.		85...253 V a.c./d.c.	85..253 V a.c./d.c. 18...23 V d.c.
Protect. rating front-tal/rear side	IP65/IP20							IP40/IP20
Ambient temp.	0...23...50 °C						0...23...40 °C	
External dimensions	48 x 48 x 93 mm			48 x 96 x 93 mm	48 x 48 x 93 mm	48 x 96 x 93 mm	96 x 96 x 99 mm	96 x 96 x 81 mm
Panel cut-out	$45^{+0.6}$ x $45^{+0.6}$ mm			$45^{+0.6}$ x $92^{+0.6}$ mm	$45^{+0.6}$ x $45^{+0.6}$ mm	$45^{+0.6}$ x $92^{+0.6}$ mm	$92^{+0.5}$ x $92^{+0.5}$ mm	
Additional functions	• soft start	-	-	-	• soft start • 6 types of alarms • alarm LATCH function • programmed control (15 programs with 15 segments in each)		• programmed control (20 programs with 15 segments in each)	• programmed control (15 programs with 15 segments in each)


RE22


RE70


RE71


RE72


RE81


RE82


RE92


RE19

TECHNICAL DATA

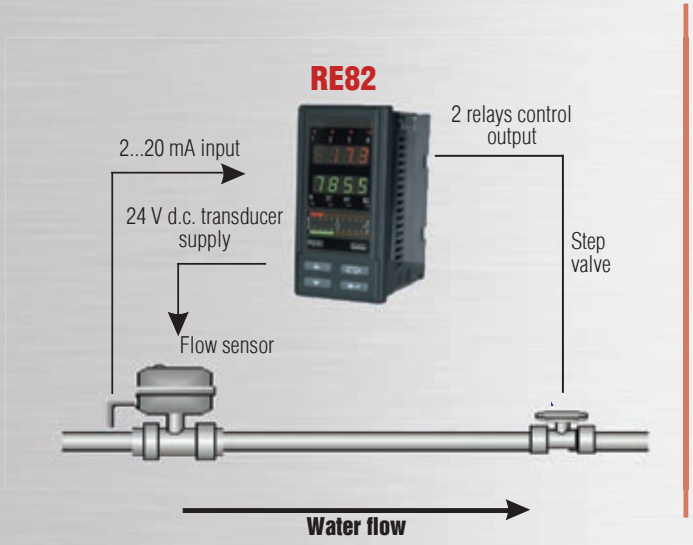
RE55

RE60

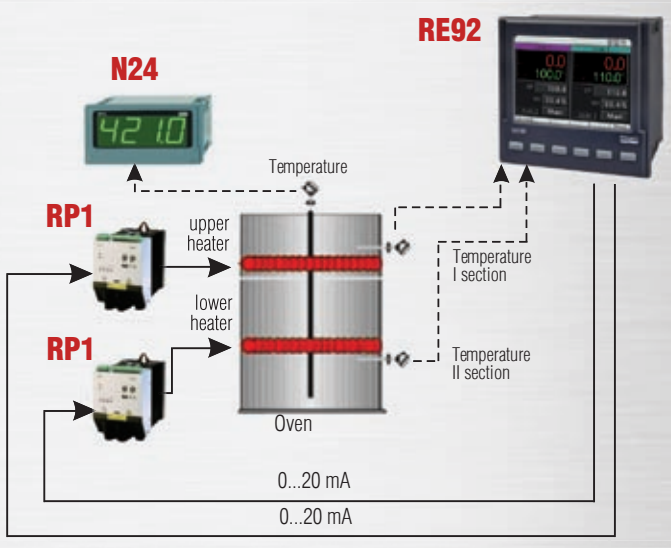
Type / Parameters	Industrial process controllers	
	RE55	RE60
Number of channels	1	1
Input	fixed: Pt100 J, K, S	
Additional input	-	
Output	max. 2x relays / 1x logic 0/5 V (option)	max. 3x relays / 1x logic 0/5 V (option)
Alarm	1	max 2
Control	on/off, PID, heating or cooling	
Galvanic isolation	input/output/supply	
Display	green LED 4 digits (10 mm)	LCD (2 x 8 characters)
Supply voltage	85 .. 253 V a.c./d.c.	24, 110, 230 V a.c. 18...72 V d.c.
Protection rating frontal/rear side	IP40/IP20	IP40/IP20
Ambient temperature	0...23...50 °C	
External dimensions	96 x 96 x 65 mm	45 x 100 x 120 mm
Panel cut-out	$91^{+0.6}$ x $91^{+0.6}$ mm	assembly on a rail

APPLICATION EXAMPLES

Water flow measurement and 3-stage valve control



Batch temperature measurement with stepless control of heaters power in a hardening furnace



RE22

Fig. 65 View of RE22 controller connection strips

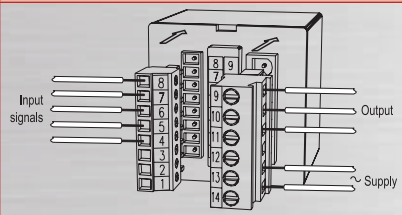
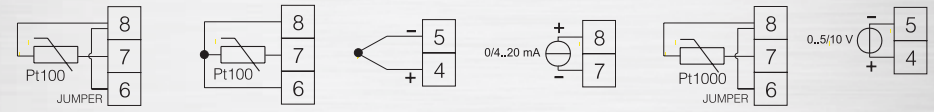


Fig.66 Connection of input signals



resistance thermometer Pt100 in a two-wire system

resistance thermometer Pt100 in a three-wire system

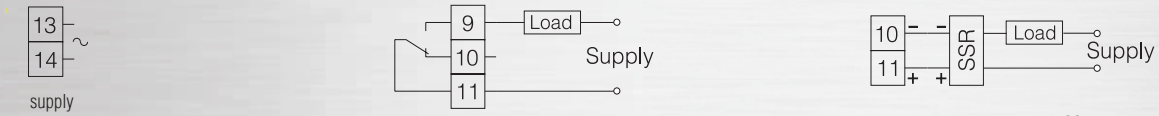
thermocouple

current input 0/4..20 mA

resistance thermometer Pt1000

voltage input 0..5/10 V

Fig. 67 Connection of supply and load circuit



supply

output - relay

output - logic voltage or SSR control

RE70

Fig. 68 View of RE70 controller connection strips

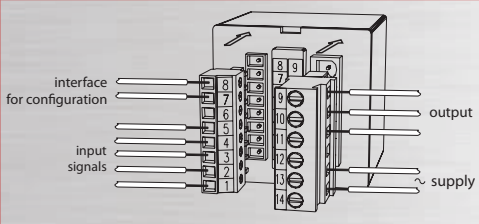


Fig.69 Connection of input signals

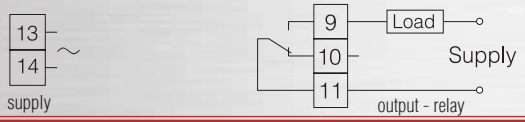
resistance thermometer Pt100 in a two-wire system

resistance thermometer Pt100 in a three-wire system

resistance thermometer Pt1000

thermocouple

Fig. 70 Connection of supply and load circuit



supply

output - relay

Fig. 71 Interface RS-485 (only for configuration)

RE71

Fig. 72 View of RE71 controller connection strips

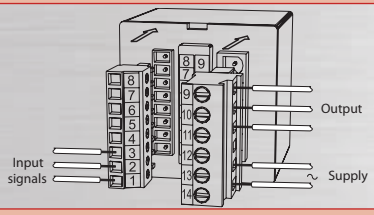
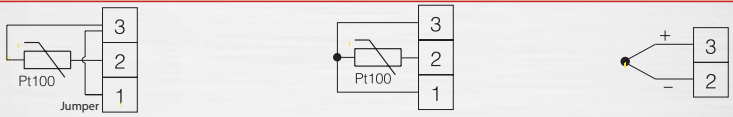


Fig.73 Connections of input signals



resistance thermometer Pt100 in a two-wire system

resistance thermometer Pt100 in a three-wire system

thermocouple

Fig.74 Connection of supply and load circuit

supply

output - relay

output - logic voltage or SSR control

RE81

Fig. 75 View of RE81 controller connection strips

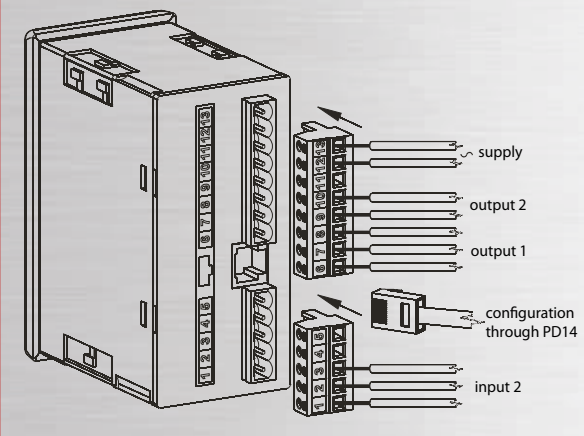
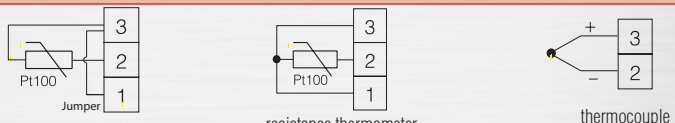


Fig.76 Connections of input signals



resistance thermometer Pt100 in a two-wire system

resistance thermometer Pt100 in a three-wire system

thermocouple

Fig.77 Connection of supply and load circuit

output 1 - relay

output 2 - relay

output 1 - logic voltage or SSR control

supply

RE72

Fig. 78 View of RE72 controller connection strips

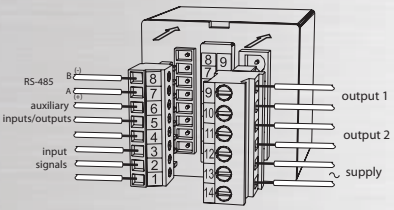
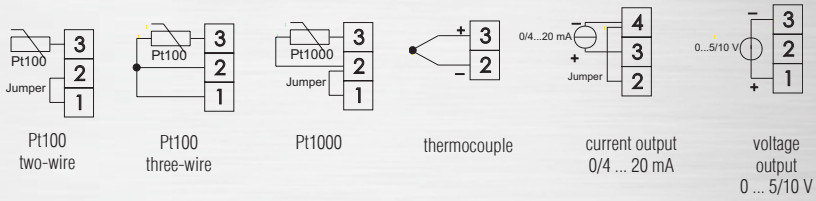


Fig.79 Connection of input signals



Pt100 two-wire | Pt100 three-wire | Pt1000 | thermocouple | current output 0/4 ... 20 mA | voltage output 0 ... 5/10 V

Fig.80 Optional connections

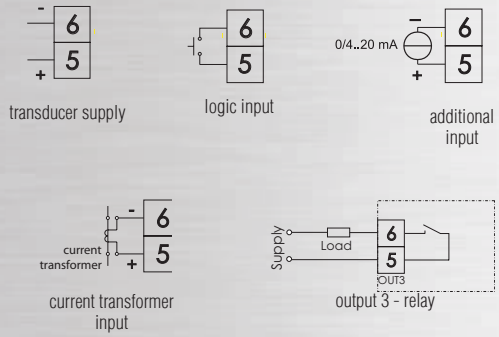
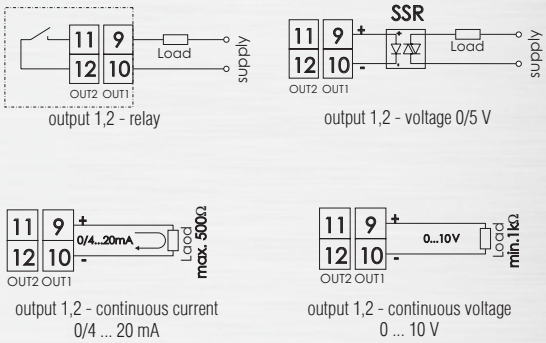


Fig.81 Connection of load circuit



RE82

Fig. 82 View of RE82 controller connection strips

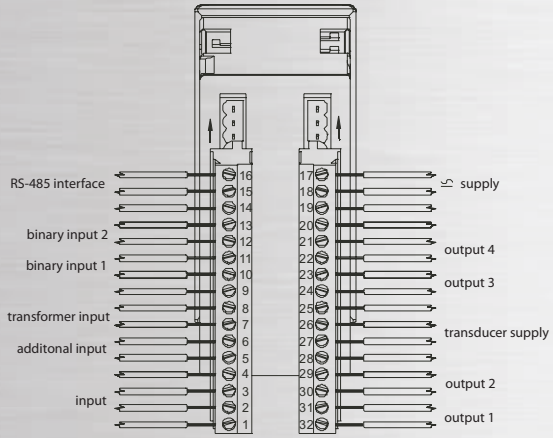


Fig.83 Connection of input signals

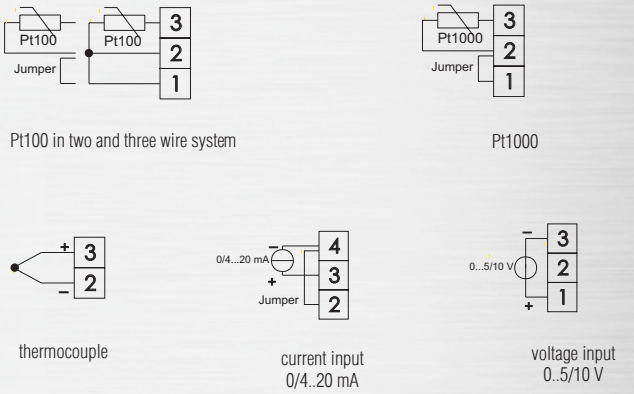


Fig.84 Remaining connections

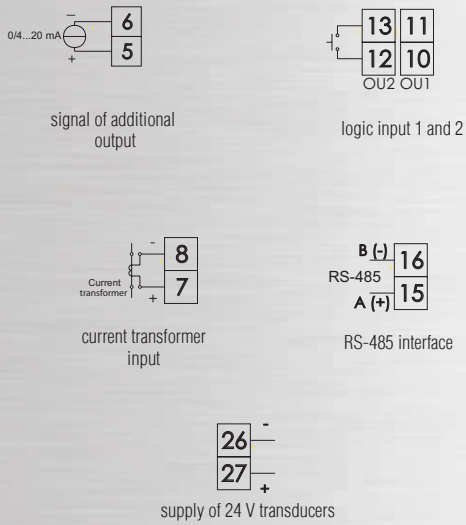
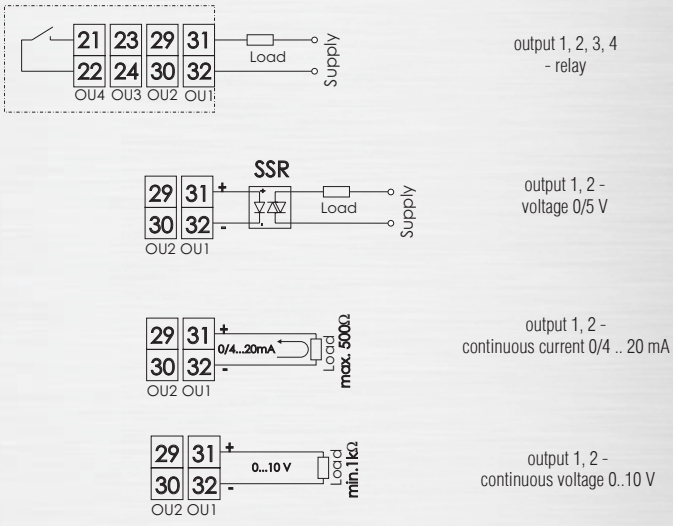
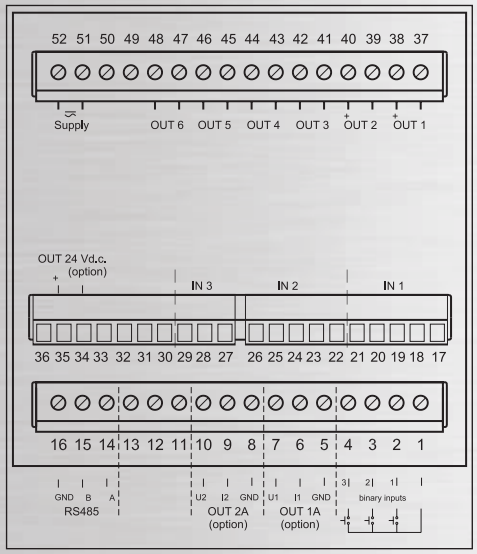


Fig.85 Connection of load circuit



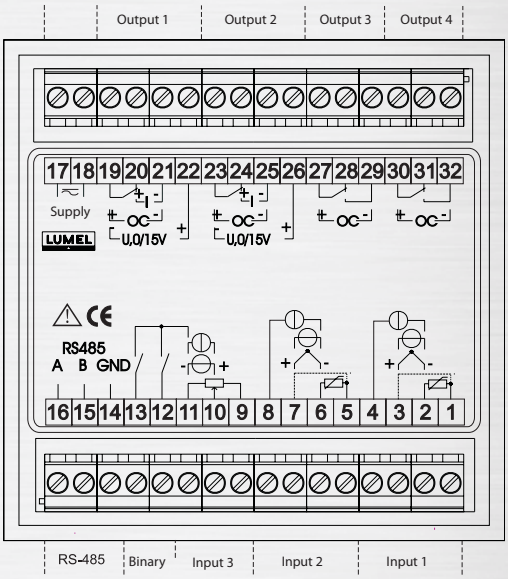
RE92

Fig. 86 View of RE92 controller connection strips



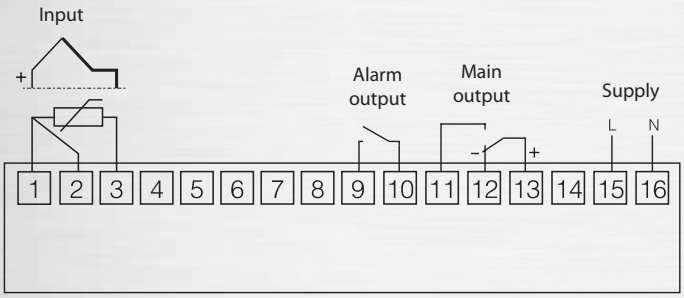
RE19

Fig. 87 View of RE19 controller connection strips



RE55

Fig. 88 View of RE55 controller connection strips



RE60

Fig. 89 View of RE60 controller connection strips

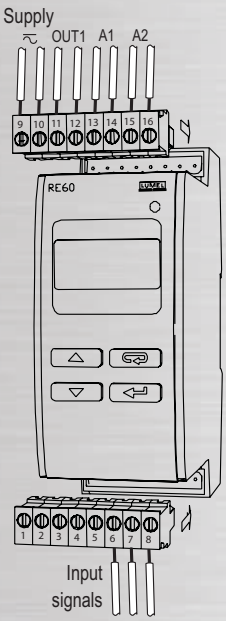


Fig.90 Connection of input signals

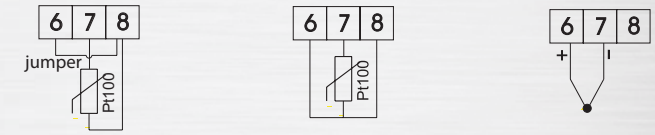
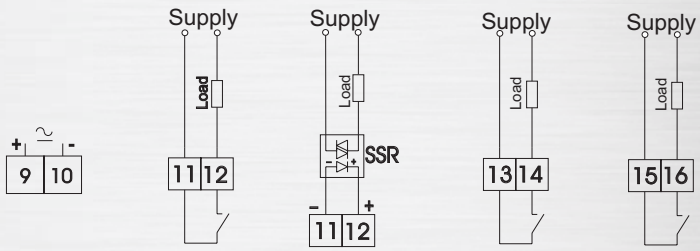


Fig.91 Connection of supply and load circuit



INDUSTRIAL PROCESS CONTROLLERS

TABLE 40. RE22 ORDERING CODE:

RE22 -	X	X	X	XX	X
Input:					
universal for RTD and TC sensors	1				
universal linear: - current: 0/4..20 mA - voltage: 0..5/10V	2				
on order*	X				
Output:					
relay		1			
logic 0/5 V for SSR control		2			
on order*		X			
Supply:					
230 V 50/60 Hz			1		
110 V 50/60 Hz			2		
24 V 50/60 Hz			3		
on order*			X		
Version:					
standard				00	
custom-made*				XX	
Acceptance tests:					
without extra requirements					0
with an extra quality inspection certificate					1
acc. to customer's request*					X

TABLE 41. RE71 ORDERING CODE:

RE71 -	XX	X	X	X	X
Input:					
Pt100 (-50..100 °C)	01				
Pt100 (0..250 °C)	02				
Pt100 (0..600 °C)	03				
thermocouple J (Fe-CuNi)(0...250°C)	04				
thermocouple J (Fe-CuNi)(0...600°C)	05				
thermocouple J (Fe-CuNi)(0...900°C)	06				
thermocouple K (NiCr-NiAl)(0...600°C)	07				
thermocouple K (NiCr-NiAl)(0...900°C)	08				
thermocouple K (NiCr-NiAl)(0...1300°C)	09				
thermocouple S (PtRh10-Pt)(0...1600°C)	10				
Output:					
relay		1			
logic 0/6 V to SSR control		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 42. RE81 ORDERING CODE:

RE81 -	XX	X	X	X	X
Input:					
Pt100 (-50..100 °C)	01				
Pt100 (0..250 °C)	02				
Pt100 (0..600 °C)	03				
thermocouple J (Fe-CuNi)(0...250°C)	04				
thermocouple J (Fe-CuNi)(0...600°C)	05				
thermocouple J (Fe-CuNi)(0...900°C)	06				
thermocouple K (NiCr-NiAl)(0...600°C)	07				
thermocouple K (NiCr-NiAl)(0...900°C)	08				
thermocouple K (NiCr-NiAl)(0...1300°C)	09				
thermocouple S (PtRh10-Pt)(0...1600°C)	10				
Output 1:**					
relay		1			
logic 0/6 V to SSR control		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

** - output 2: relay

TABLE 43. RE70 ORDERING CODE:

RE70 -	X	X
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 44. RE72 ORDERING CODE:

RE72 -	X	X	X	X	X	X	X
Output 1:							
relay	1						
voltage 0/5 V	2						
continuous current 0/4 ... 20 mA	3						
continuous voltage 0 ... 10 V	4						
Output 2:							
relay[1)]		1					
voltage 0/5 V		2					
continuous current 0/4 ... 20 mA		3					
continuous voltage 0 ... 10 V		4					
Options:							
none			0				
output 3 - relay			1				
logic input			2				
current transformer input[1)]			3				
additional current input 0/4 .. 20 mA			4				
transducer supply 24 V d.c. 1 W			5				
Supply:							
85 ... 253 V a.c./ d.c.				1			
20 ... 40 V a.c./ d.c.				2			
Version:							
standard					00		
custom-made[2)]					XX		
Language:							
Polish						P	
English						E	
other[2)]						X	
Acceptance tests:							
without extra requirements							0
with an extra quality inspection certificate							1
acc. to customer's request[2)]							X

1) - only, when a relay or voltage output 0/5 V is also selecteds
2) - after agreeing with the manufacturer

TABLE 45. RE82 ORDERING CODE:

RE82 -	X	X	X	X	X	X	X
Output 1:							
relay	1						
voltage 0/5 V	2						
continuous current 0/4 .. 20 mA	3						
continuous voltage 0 .. 10 V	4						
Output 2:							
relay[1)]		1					
voltage 0/5 V		2					
continuous current 0/4 ... 20 mA		3					
continuous voltage 0 ... 10 V		4					
Tansducer supply:							
none			0				
supply of relays 24 V d.c. 1 W			1				
Supply:							
85 .. 253 V a.c./ d.c.				1			
20 .. 40 V a.c./ d.c.				2			
Version:							
standard					00		
custom-made[2)]					XX		
Language:							
Polish						P	
English						E	
other[2)]						X	
Acceptance tests:							
without extra requirements							0
with an extra quality inspection certificate							1
acc. to customer's request[2)]							X

1) only, when on the output 1, a relay or voltage 0/5 V is also selected
2) after agreeing with the manufacturer

Table 46. RE92 ordering code:

RE92 -	X	X	X	X	X	XX	X	X
Additional input:								
lack	0							
current: 0/4..20 mA	1							
voltage: 0..10 V	2							
potentiometric transmitter: 1000 Ω	3							
Output 1 and 2:								
2 relays		1						
2 logic outputs 0/5 V		2						
Analog output:								
lack			0					
2 continuous 0/4...20 mA and 0...10 V			1					
Ethernet/SD card:								
lack				0				
with Ethernet/SD card				1				
Transducer supply:								
lack					0			
24 V d.c.					1			
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

in standard version: 2 universal inputs, 3 logic inputs, 6 relay outputs, RS-485 Modbus Slave

Table 47. RE19 ordering code:

RE19 -	X	X	X	X	X	X
Version:						
constant-valued control	S					
step-by-step control	V					
programmable control	P					
on order*	X					
Additional input:						
without input		0				
current: 0/4..20 mA		1				
voltage: 0..10 V, 0..5 V, 1..5 V potentiometric transmitter:: 100 Ω potentiometric transmitter:: 1000 Ω		2				
on order*		X				
Outputs:						
4 relays			1			
4 OC transistors			2			
1 transistor 0/15 V + 3 relays			3			
2 transistors 0/15 V + 2 relays			4			
1 continuous + 3 relays			5			
1 continuous + 3 OC transistors			6			
2 continuous + 2 relays			7			
2 continuous + 2 OC transistors			8			
1 continuous + 1 transistor 0/15 V + 2 relays			9			
on order*			X			
Interface RS-485:						
without Interface				0		
with MODBUS protocol				1		
Supply voltage:						
85..253 V a.c./d.c.					1	
18..30 V d.c.					2	
Acceptance tests:						
without extra requirements						0
with an extra quality inspection certificate						1
acc. to customer's request*						X

Table 48. RE55 ordering code:

RE55 -	XX	X	X	XX	X
Input:					
Pt100 (-50..100 °C)	01				
Pt100 (0..100 °C)	02				
Pt100 (0..150 °C)	03				
Pt100 (0..250 °C)	04				
Pt100 (0..400 °C)	05				
Pt100 (0..600 °C)	06				
thermocouple J - Fe-CuNi (0..250 °C)	07				
thermocouple J - Fe-CuNi (0..400 °C)	08				
thermocouple J - Fe-CuNi (0..600 °C)	09				
thermocouple J - Fe-CuNi (0..900 °C)	10				
thermocouple K - NiCr-NiAl (0..600 °C)	11				
thermocouple K - NiCr-NiAl (0..900 °C)	12				
thermocouple K - NiCr-NiAl (0..1300 °C)	13				
thermocouple S - PtRh10-Pr (0..1600 °C)	14				
on order*	99				
Version:					
on-off controller		1			
PID controller		2			
PID controller configurable by buttons and with alarm output		3			
Control output:					
relay			1		
voltage 0/5 V			2		
Version:					
standard				00	
custom-made*				XX	
Acceptance tests:					
without extra requirements					0
with an extra quality inspection certificate					1
acc. to customer's request*					X

Table 49. RE60 ordering code:

RE60 -	XX	X	X	X	X
Input:					
Pt100 (-50..100 °C)	01				
Pt100 (0..250 °C)	02				
Pt100 (0..600 °C)	03				
thermocouple J - Fe-CuNi (0..250 °C)	04				
thermocouple J - Fe-CuNi (0..600 °C)	05				
thermocouple J - Fe-CuNi (0..900 °C)	06				
thermocouple K - NiCr-NiAl (0..600 °C)	07				
thermocouple K - NiCr-NiAl (0..900 °C)	08				
thermocouple K - NiCr-NiAl (0..1300 °C)	09				
thermocouple S - PtRh10-Pr (0..1600 °C)	10				
on order	XX				
Main output:					
relay		1			
logic 0/5 V to SSR control		2			
on order		X			
Alarm outputs:					
without outputs			0		
1 relay			1		
2 relays			2		
on order			X		
Supply:					
230 V a.c. 50/60 Hz				1	
110 V a.c. 50/60 Hz				2	
24 V a.c. 50/60 Hz				3	
18..27 V d.c.				4	
on order				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

CONTROLLER FOR INJECTION MOULDS

APPLICATION:

- temperature control in injection mould with heated channels (SR11)

SELECTED FEATURES

- Fuzzy Logic algorythm ensures a high accuracy temperature control and optimal energy consumption
- soft-start function and leakage current monitoring ensure prolonged heaters reliability and operation safety for users
- during a break in system operation, a decreased temperature is maintained, what ensures a fast restart of the system
- damage detection:
  - too high heater leakage current,
  - damage of the load circuit,
  - short-circuit, break or inverse polarization in the sensor circuit.

APPLICATION EXAMPLES

Temperature control in a injection mould

SR11 system

Injection machine

TECHNICAL DATA

Type / Parameters	System for injection moulds with heated channels SR11
Number of channels	1...8
Input	fixed Fe-CuNi (J) logic 24 V d.c.
Output	1 output per control zone (15 A)
Control	Fuzzy Logic, PID with self-tuning
Interface	RS-485 with MODBUS protocol (option)
Display	LED 14 mm 2 x 3 digits
Supply voltage	230 V a.c. (for system with 1 control zone) 3 x 230/ 400 V a.c. (for system with 2...8 control zones)
Protection rating	IP30
Ambient temperature	0...40 °C
External dimensions	77.5 x 200 x 355mm (1 control zone) 215 x 197 x 355mm (2 or 3 control zones) 365 x 197 x 355mm (4, 5 or 6 control zones) 465 x 197 x 355 (7 or 8 control zones)
Additional functions	· Fuzzy Logic algorythm ensures a high accuracy temperature control and optimal energy consumption · soft-start function and leakage current monitoring ensure prolonged heaters reliability and operation safety for users · during a break in system operation, a decreased temperature is maintained, what ensures a fast restart of the system · damage detection: - too high heater leakage current, - damage of the load circuit, - short-circuit, break or inverse polarization in the sensor circuit.

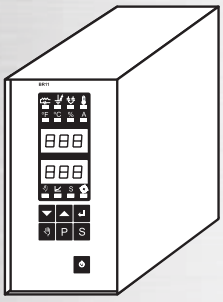
SR11

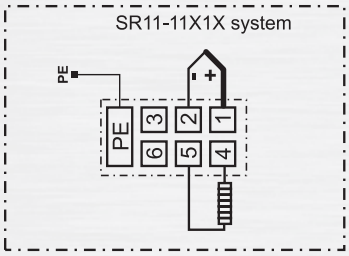
CONNECTION DIAGRAMS

SR11

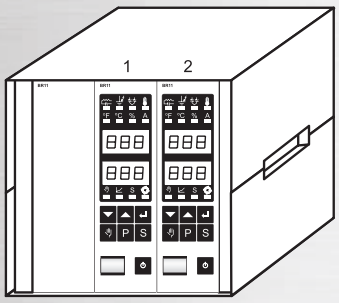
Fig. 85 View of individual versions of the SR11 system

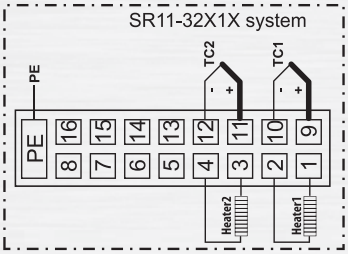
SR11-11X1X





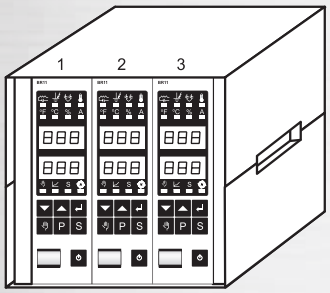
SR11-32X1X

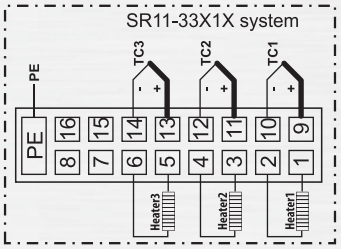




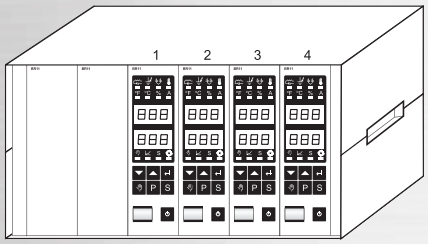
SR11

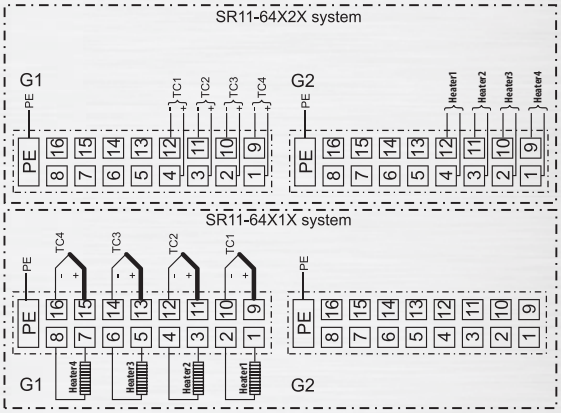
SR11-33X1X



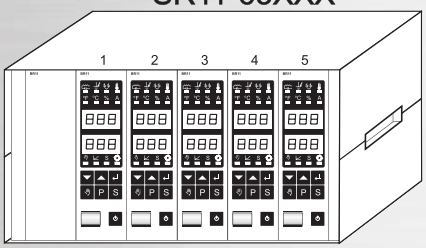


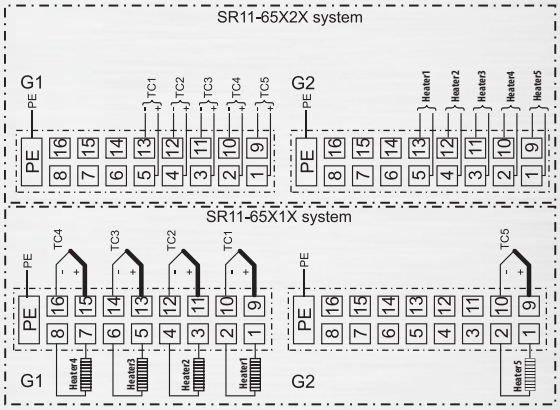
SR11-64XXX



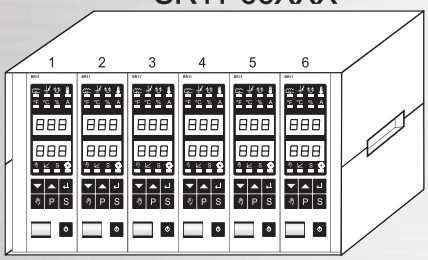


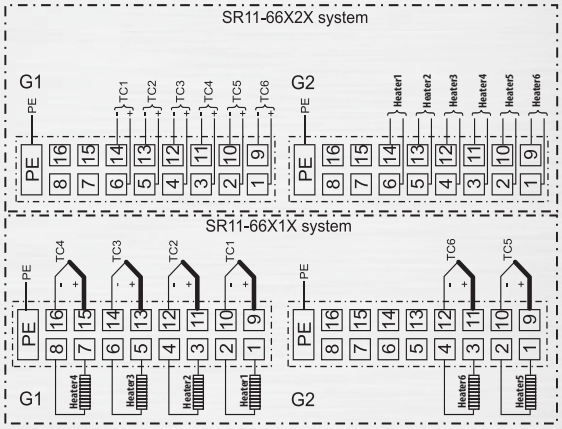
SR11-65XXX





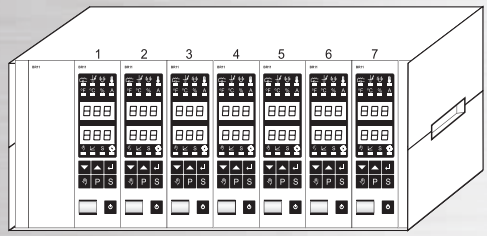
SR11-66XXX

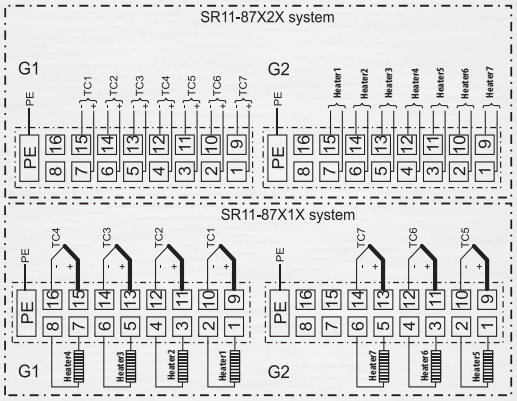




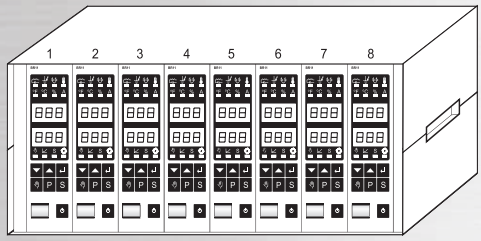
SR11

SR11-87XXX





SR11-88XXX



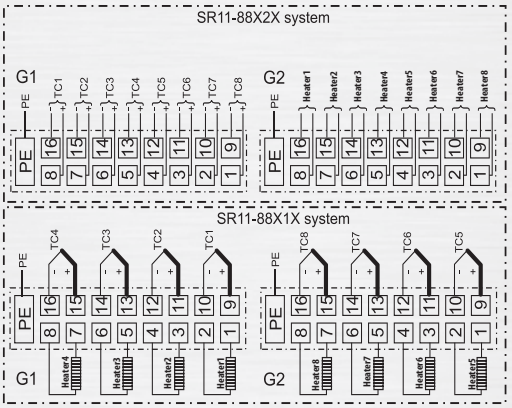
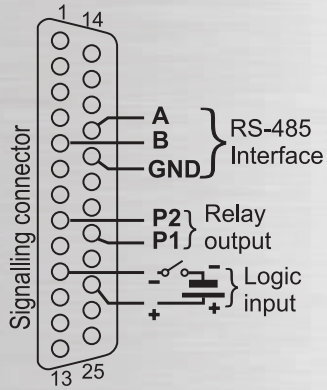


Fig. 92 Way of SR11 system external connections



ORDERING CODES

SYSTEM FOR INJECTION MOULDS WITH HEATED CHANNELS

TABLE 50. SR11 ORDERING CODE:

SR11 -	X	X	X	X	X
Housing dimensions:					
housing width: 77.5 mm number of controllers: 1	1				
housing width: 215 mm number of controllers: 2, 3	3				
housing width: 365 mm number of controllers: 4, 5, 6	6				
housing width: 465 mm number of controllers: 7, 8	8				
Number of controllers:					
1 controller		1			
2 controllers		2			
3 controllers		3			
4 controllers		4			
5 controllers		5			
6 controllers		6			
7 controllers		7			
8 controllers		8			
Interface RS-485:					
without interface			0		
with interface			1		
Mould connectors:					
common connectors for thermocouples and heaters				1	
separate connectors for thermocouples and heaters[1)]				2	
Acceptance tests:					
without extra requirements					0
with an extra quality inspection certificate					1
acc. to customer's request[2)]					X

1) concerns only versions with 365 mm and 465 mm housing width

2) after agreeing with the manufacturer

POWER CONTROLLERS

APPLICATION:

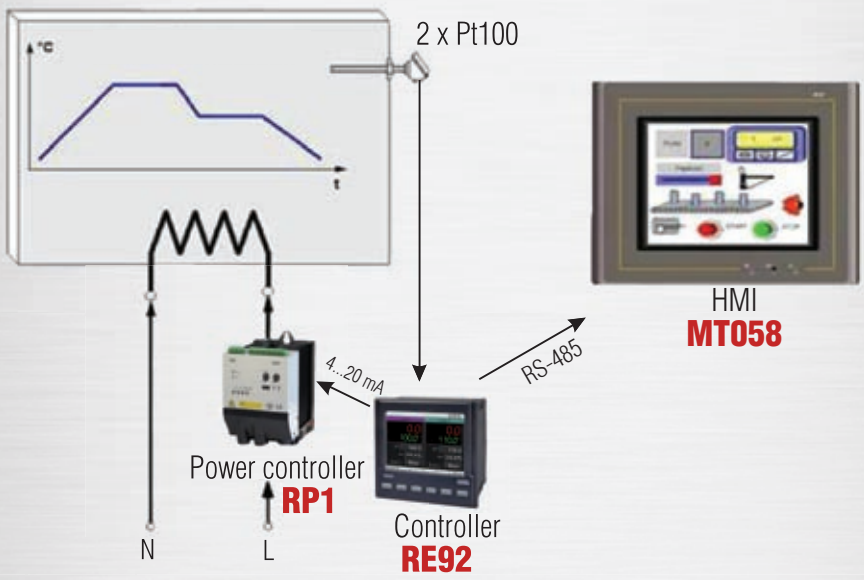
- smooth power control in single-phase networks
- destined for three-phase actuators in control systems and for automatic temperature control of electrothermal devices

SELECTED FEATURES:

- on-off or pulse control
- phase control
- switching on at zero voltage or in any time
- many additional functions:
  - limitation of the load current,
  - release time-lag of soft-start type,
  - control of the input circuit amplification,
  - stoppage of the triggering by an external signal,
  - checking and signalling of the current in the circuit,
  - checking of the radiator temperature,
  - signalling of the fuse damage,
  - signalling of overload,
  - relay outputs.

APPLICATION EXAMPLES

Program following temperature control in a high power oven with electrical heaters



Type / Parameters	RP7	RP1	RPL1	RP3
Version	1-phase			3-phase
Control	phase	phase, pulse, on/off		
Input signal	0..5/10V, 0/4..20mA potentiometer			
Output	-	voltage (1) – Master/Slave (for co-operation with second power controller) relays (2)		
Galvanic isolation	input/output/supply			
Max. output current	15A	125A		3 x 450A
Load supply voltage	230 V	230 V, 400 V a.c.	230, 400, 500 V a.c.	400 V a.c.
Load configuration	2-wire	2 or 3-wire		3, 4 or 6-wire
Protection rating frontal/rear side	IP20/IP10			IP20/IP00
Ambient temperature	-5...20...50 °C	0...40 °C		
External dimensions	50 x 105 x 105 mm	135 x 201 x 199 mm 135 x 231 x 199 mm	135 x 201 x 199 mm 135 x 231 x 199 mm - RPL1-x4xx (version with fan)	212 x 318 x 177 mm (40, 70, 125 A versions) 383 x 433 x 281 mm (200, 300, 450 A versions)


RP7


RP1

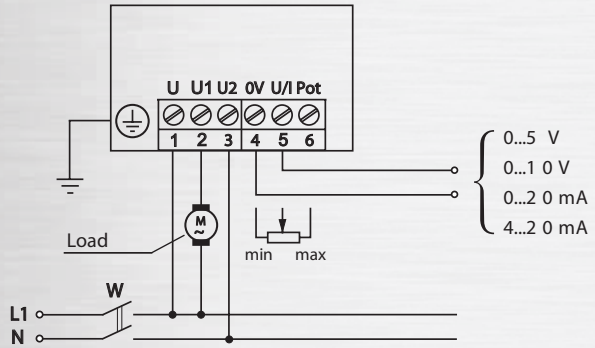

RPL1


RP3

CONNECTION DIAGRAMS

RP7

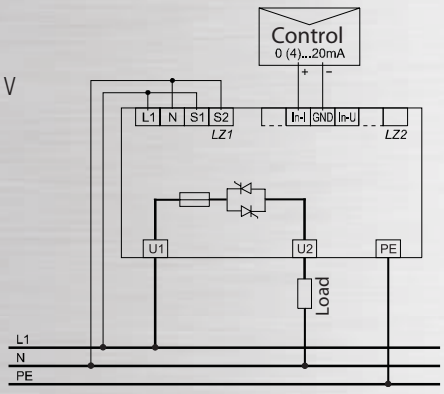
Fig. 93 Electrical connections of RP7



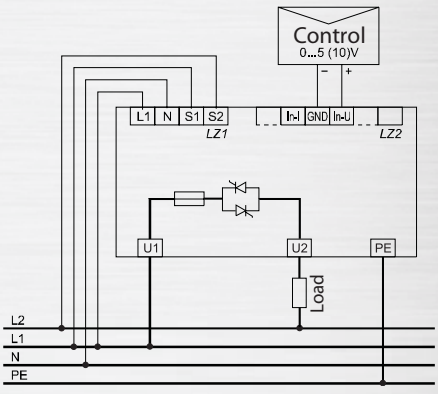
RP1

Fig.94 Connection of load in a single-phase system

a) load supply
U_{LOAD} = 230 V,
supply U_{GTS} = 230 V



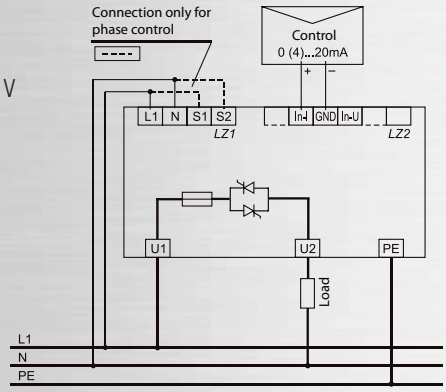
b) load supply
U_{LOAD} = 400 V,
Supply U_{GTS} = 230 V



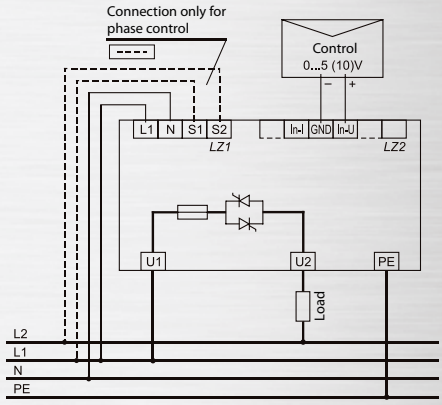
RPL1

Fig.95 Connection of load in a single-phase system

a) load supply
U_{LOAD} = 230 V,
supply U_{GTS} = 230 V



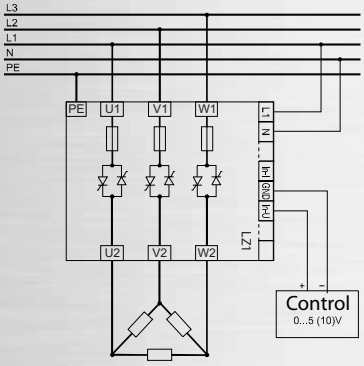
b) load supply
U_{LOAD} = 400 V,
supply U_{GTS} = 230 V



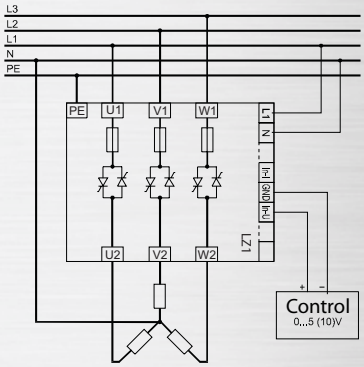
RP3

Fig. 96 Connection of load in a 3- and 4-wire system

a) three-wire load



b) four-wire load



ORDERING CODES

Power controllers

Table 55. RP7 ordering code:

RP7 -	X	X
Maximal current output:		
5 A	1	
10 A	2	
15 A	3	
Acceptance tests:		
without extra requirements	0	
with an extra quality inspection certificate	1	
acc. to customer's request*	X	

Table 56. RP1 ordering code:

RP1 -	X	X	X
Maximal current output:			
25 A	1		
40 A	2		
70 A	3		
125 A	4		
load voltage: 24...400 V a.c. 50/60 Hz			
Gate triggering system (GTS):			
supply voltage 85...115...135 V a.c.	1		
supply voltage 195...230...253 V a.c.	2		
Acceptance tests:			
without extra requirements	0		
with an extra quality inspection certificate	1		
acc. to customer's request	X		

Table 57. RPL1 ordering code:

RPL1 -	X	X	X	XX	X	X
Control:						
phase	1					
pulse/ on/off	2					
Current range:						
maximal current output **25 A**	1					
maximal current output **40 A**	2					
maximal current output **70 A**	3					
maximal current output **125 A***	4					
Load voltage:						
supply voltage **- 195...230...253 V a.c.**	1					
supply voltage **- 340...400...440 V a.c.**	2					
supply voltage **- 425...500...550 V a.c.**	3					
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 58. RP3 ordering code:

RP3 -	X	X
Maximal current output:		
40 A	1	
70 A	2	
125 A	3	
200 A	4	
300 A	5	
450 A	6	
load voltage: 3 - 400 V a.c. 50 Hz		
Acceptance tests:		
without extra requirements	0	
with an extra quality inspection certificate	1	
acc. to customer's request*	X	

* the version RPL1- x4xx has a fixed fan
** after agreeing with the manufacturer

APPLICATION:

Measuring, visualization, logging and control of technological processes in different industries, like:

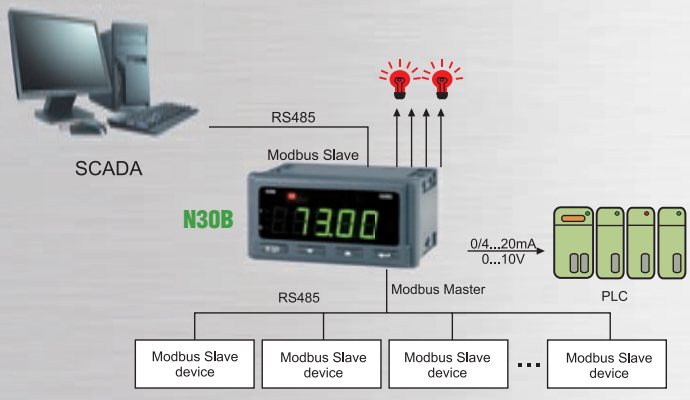
- pharmaceutical,
- food,
- chemical,
- paper.

SELECTED FEATURES:

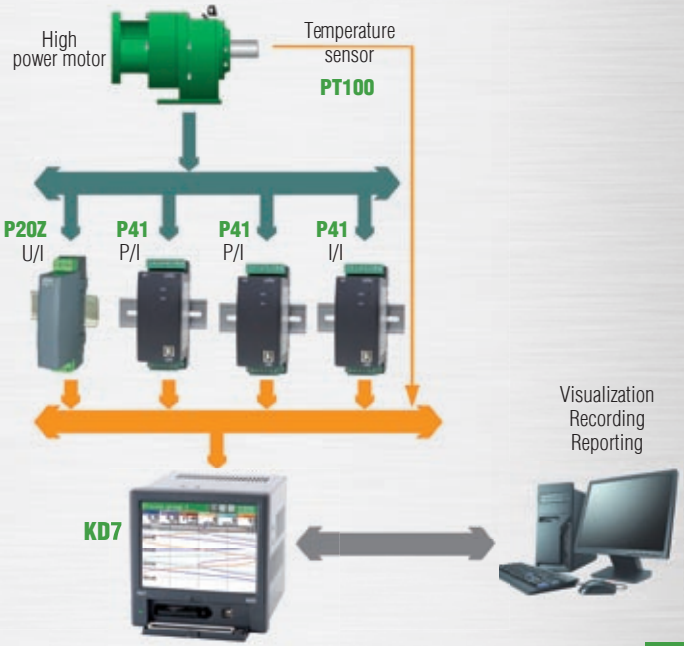
- data visualization on a touchscreen 5.7", 320 x 240 pixels
- data logging on a Compact Flash card, capacity up to 4GB
- universal measuring inputs (option)
- interfaces: USB, RS-485 Modbus Slave, USB Modbus Master (KD7), **Ethernet** (KD7)
- intuitive user interface based on Windows CE (available in 8 languages)
- operator messages functionality
- compatible with FDA CFR21 standard, part 11 (for electronic recordes)
- mathematical functions on measuring data (KD7)
- **Ethernet**: WWW server, FTP server, NTP client (time synchronization), Modbus TCP/IP (only KD7)

APPLICATION EXAMPLES

Data presentation and logging from automation devices



Measurement and visualization of motor working parameters (temperature and motor load)




N30B


KD7


KD8


PD22


SM61

Type / Parameters	N30B	KD7	KD8	PD22	SM61 New!
Number of channels	up to 100 digital channels	up to 12 analog channels 24 digital channels	up to 6 analog channels	up to 1000 digital channels	up to 2500 digital channels
Input	Modbus RTU Master 10 groups 10 registers each	programmable (3, 6, 9 or 12 inputs) Pt100/500/1000, Ni100, Cu100, J, K, N, E, R, S, T, B, L, ± 20mA ± 9999mV 50...2000 Ω 0...2000 Ω logic input 0/5...24 V d.c. (8 or 16 pcs.) Modbus RTU Master (24 registers)	programmable (3 or 6 inputs) Pt100/500/1000 Ni100, Cu100, J, K, N, E, R, S, T, B, L, ± 20mA ± 9999mV 50...2000 Ω 0...2000 Ω logic 0/5...24 V d.c. (4 or 8 pcs.)	Port I: Modbus RTU Master (50 groups 20 registers each)	Port II: Modbus RTU Master, (100 groups 25 registers each) 2 x logic (option)
Output	4 x relays (2 NO + optionally 2 changeover), 1 x analog (option)	relays (8 or 16) relays OptoMOS (8 or 16) analog (4 or 8) 0...5, 0/4...20 mA 0... 5 V, 1...5 V, 0...10 V supplying output (2 x 24 V d.c. 30 mA)	relays (6 or 12)	Port II: Modbus RTU Slave	Port I: Modbus RTU/TCP Slave, 2 x relays (option)
Interface	max 2 x RS-485 Modbus Master and Slave (option)	2 x RS-485 (Modbus Slave and Master) 1 x RS232 (Modbus Slave) USB Device 1.1. Ethernet 10 Base-T	RS-485 (Modbus Slave) USB Device 1.1.	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	internal - 308000 samples external – MMC/SD card up to 4 GB	internal – up to 6 MB external – CF card up to 4 GB		512 kB, 390.000 samples 44.000 events	1 GB
Galvanic isolation	input/output/supply/RS-485				input/output/supply
Display	3-colour LED 5 digits (14 mm)	LCD 5,7" TFT type 320 x 240 pixels with touch panel		-	
Supply voltage	85...253 V a.c. (40...400 Hz); 90...320 V d.c., 20...40 V a.c. (40...400 Hz); 20 ...60 V d.c.	90...253 V a.c. or 18...30 V d.c.		20...50 V a.c./d.c. 85...230...253 V a.c./d.c.	20...24...50 V a.c./d.c. 85...230...253 V a.c./d.c.
Protection rating frontal/rear side	IP65/IP10	IP65/IP20		IP40/IP20	
Ambient temperature	-25...23...55 °C	0...23...55 °C			
External dimensions	96 x 48 x 93 mm	144 x 144 x 171 mm	144 x 144 x 171 mm	45 x 120 x 100 mm	
Panel cut-out	$92^{+0.6}$ x $45^{+0.6}$ mm	$138^{+0.1}$ x $138^{+0.1}$ mm		assembly on a rail	
Additional functions	· 21-point rescaling · free software for data analysis · data logging on PC in MySQL database	· many forms of data presentation: linear, bargraph, chart, digital and analog indicators, · WWW and FTP Server (KD7) · Windows® CE operating system · PC software KD SETUP, KD CHECK, KD CONNECT, KD ARCHIVE · user access rights · menu available in 8 language versions.		· RTC	· HTTP (WEB server -visualization in format of synoptic maps), · DHCP · ftp server, · RTC

KD7

Fig. 97 Electrical connections of KD7

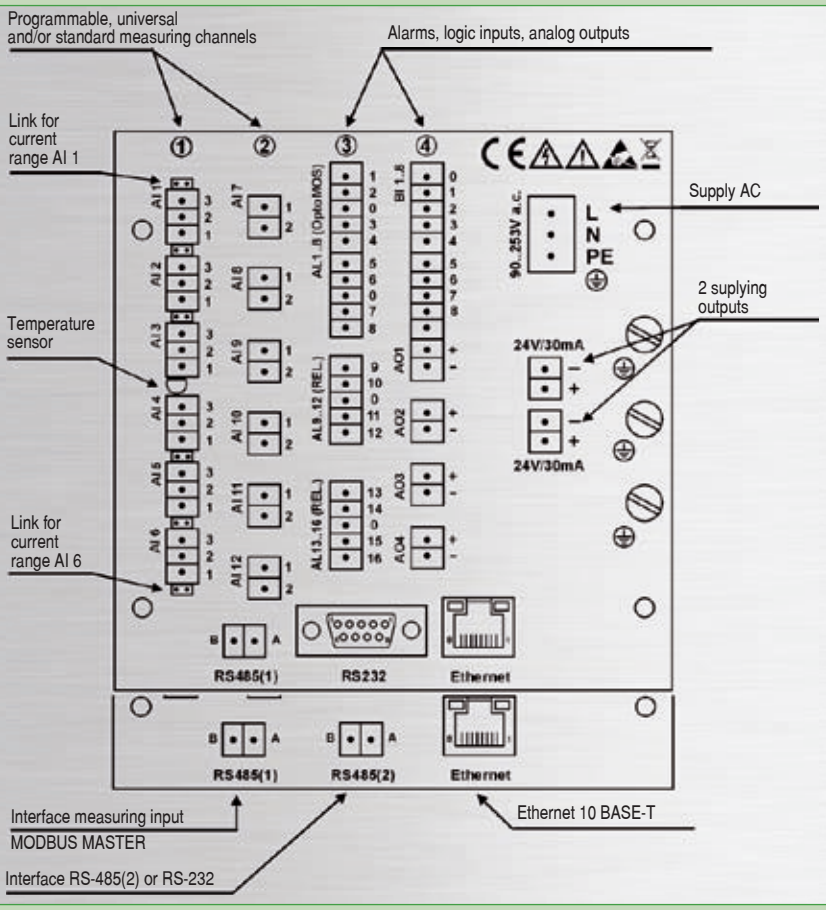
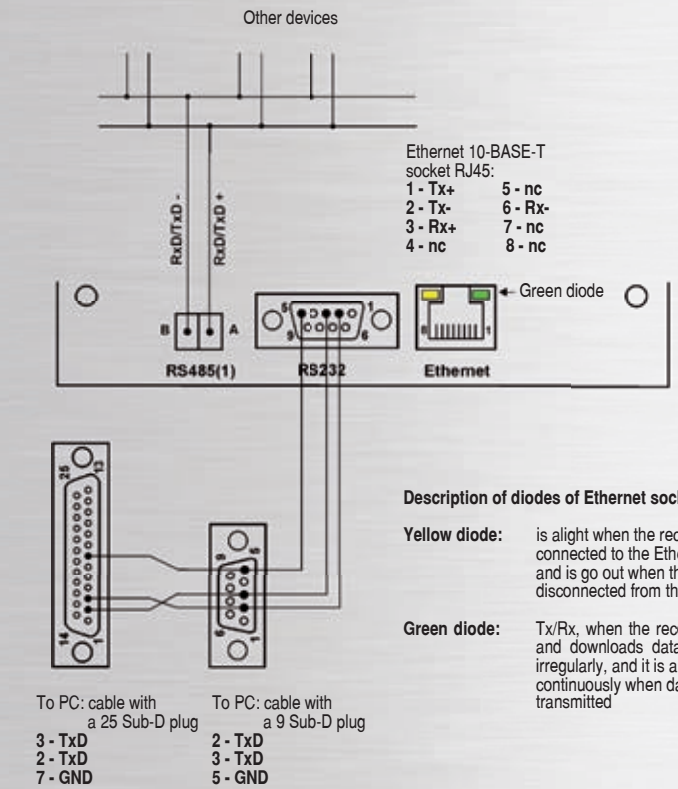


Fig. 102 Interface RS-485(1), RS-485(2), RS-232, Ethernet 10-BASE-T



Description of diodes of Ethernet socket:

Yellow diode: is alight when the recorder is connected to the Ethernet network and is go out when the recorder is disconnected from the network

Green diode: Tx/Rx, when the recorder uploads and downloads data, it is alight irregularly, and it is a light continuously when data are not transmitted

Fig. 98 Standard measuring inputs AI 1...2

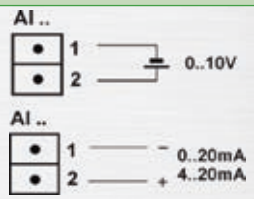


Fig. 99 Programmable measuring inputs AI 1...12

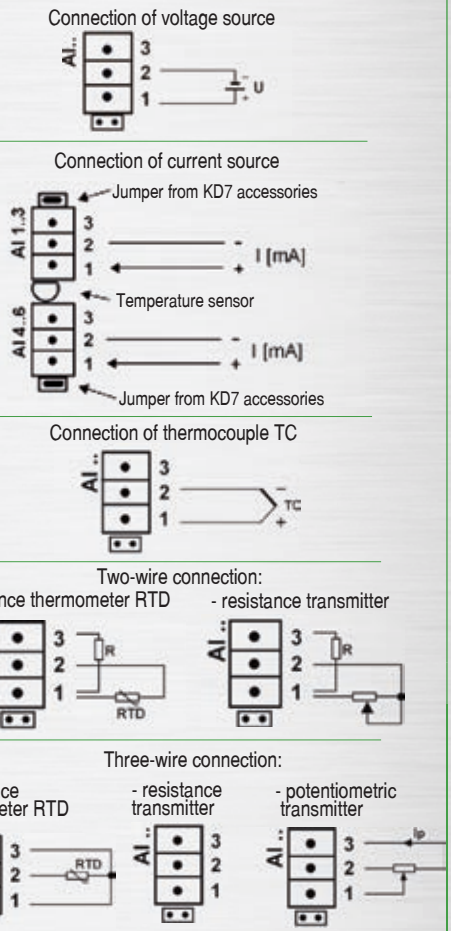


Fig. 100 Analog output systems AO 1...8

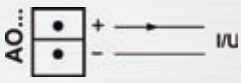
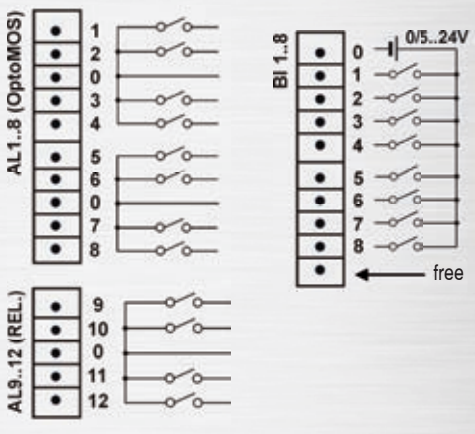


Fig. 101 Alarm systems AL 1...32 and logic inputs BI 1...16



KD8

Fig. 103 Electrical connections of KD8

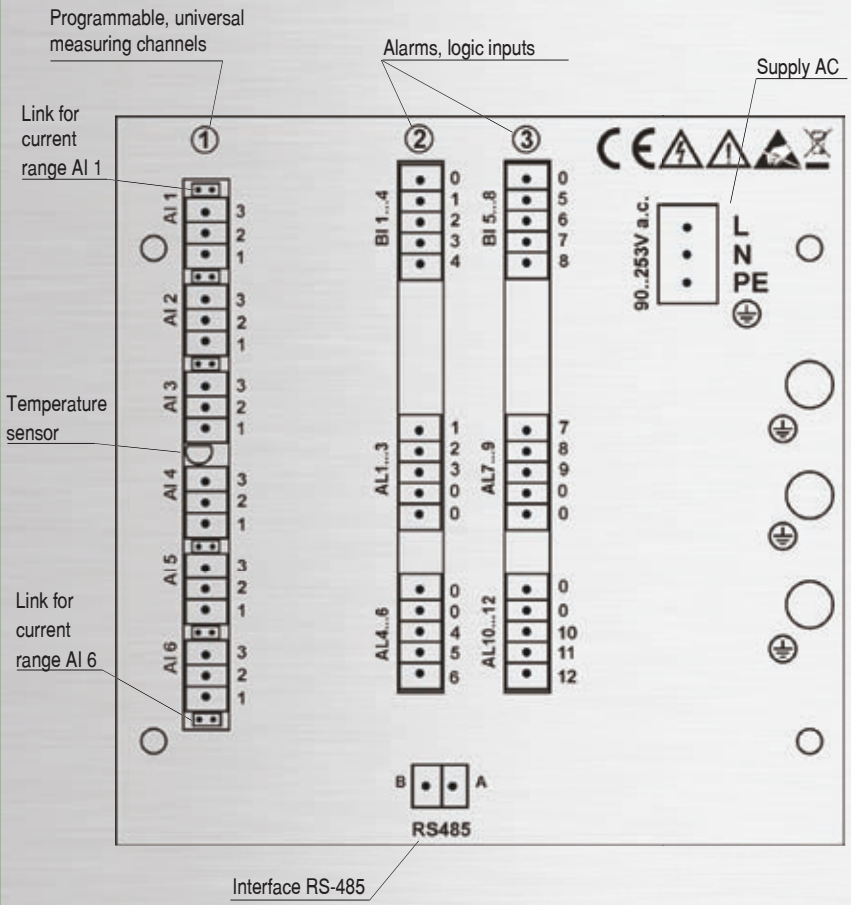
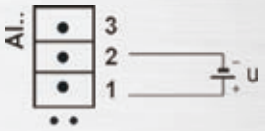
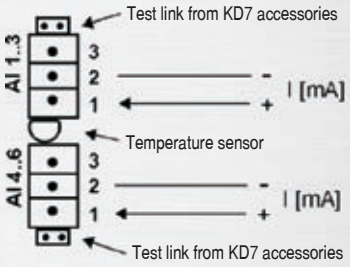


Fig. 104 Programmable measuring inputs AI1...AI2

Connection of voltage source



Connection of current source



Connection of thermocouple TC

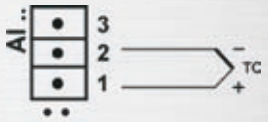
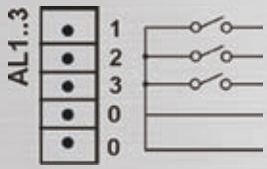
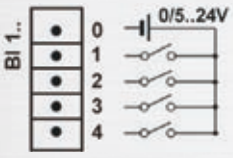


Fig. 105 Alarms AL 1... 12 and logic inputs BI 1... 8

- connection to terminals of the alarm system with electromechanical relays AL1...12

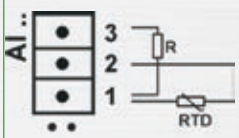


- connection to the control signalm to terminals of the logic input system BI 1...8

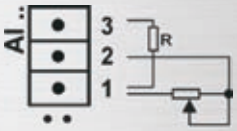


Two-wire connection:

- resistance thermometer RTD

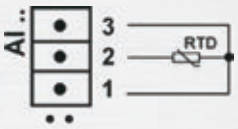


- resistance transmitter

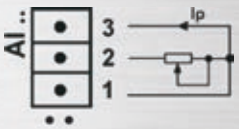


Three-wire connection:

- resistance thermometer RTD



- resistance transmitter



- potentiometric transmitter

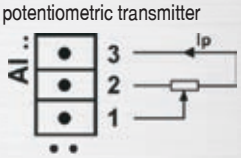
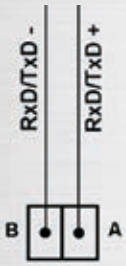
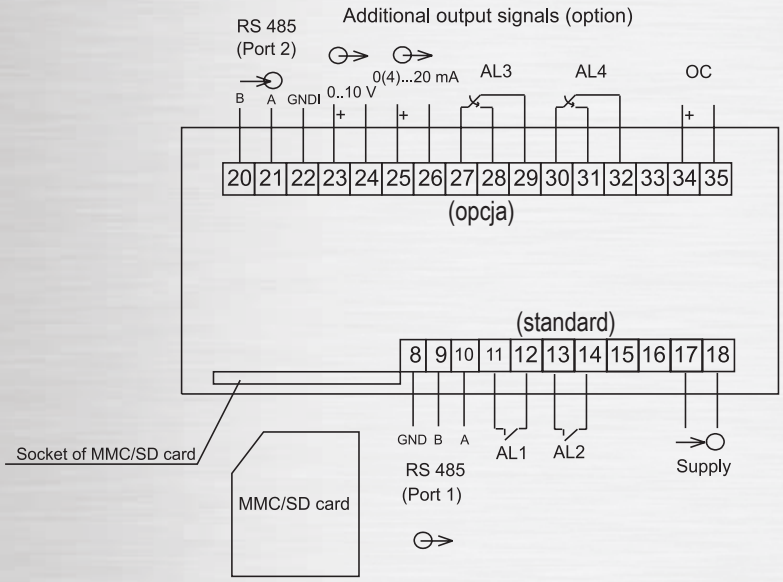


Fig. 106 Interface RS-485 (Modbus Slave)



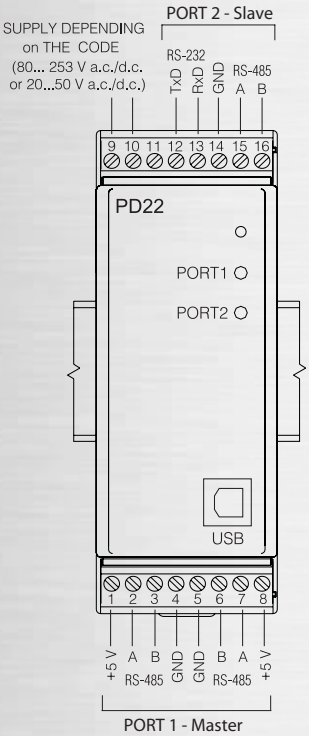
N30B

Fig. 107 Electrical connections of N30B



PD22

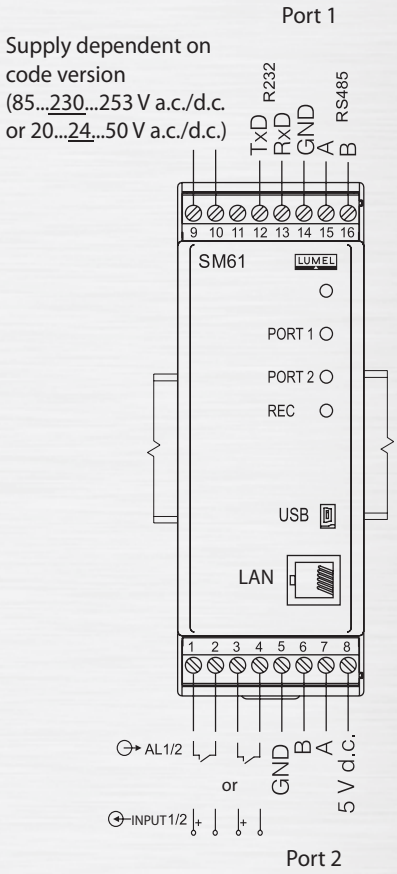
Fig. 108 Electrical connections of PD22



Terminal	Terminal description
1	Output +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	Output +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. 109 Electrical connections of SM61



RECORDERS

TABLE 59. N30B ORDERING CODE:

	N30B -	X	X	XX	XX	X	X
Supply voltage:							
85...253 V a.c. (40 ... 400 Hz); 90 ... 320 V d.c.		1					
20...40 V a.c. (40 ... 400 Hz); 20 ... 60 V d.c.		2					
Additional outputs:							
lack			0				
OC output, RS-485 (port 2), analog output			1				
OC output, RS-485 (port 2), analog output switched-over relay outputs			2				
Unit:							
unit code acc. to the table 61				XX			
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

TABLE 61. CODES OF HIGHLIGHTED UNIT:

Code	Unit	Code	Unit	Code	Unit
00	without unit	20	kVAh	40	szt
01	V	21	MVAh	41	imp
02	A	22	Hz	42	rps
03	mV	23	kHz	43	m/s
04	kV	24	Ω	44	l/s
05	mA	25	kΩ	45	obr/min
06	kA	26	°C	46	rpm
07	W	27	°F	47	mm/min
08	kW	28	K	48	m/min
09	MW	29	%	49	l/min
10	var	30	%RH	50	m^3/min
11	kvar	31	pH	51	szt/h
12	Mvar	32	kg	52	m/h
13	VA	33	bar	53	km/h
14	kVA	34	m	54	m^3/h
15	MVA	35	l	55	kg/h
16	kWh	36	s	56	l/h
17	MWh	37	h	XX	on order*
18	kvarh	38	m^3		
19	Mvarh	39	obr		

* after agreeing with the manufacturer

TABLE 62. KD8 ORDERING CODE:

	KD8 -	X	X	X	X	XX	X
Measuring inputs:							
3 programmable measuring inputs		1					
6 programmable measuring inputs		2					
Alarms and logic inputs:							
without alarms and logic inputs			0				
alarms (NO relays) + logic inputs 1)			1				
Supply:							
90..253 V a.c.				1			
Softwares servicing the recorder from PC:							
KD Connect, KD Check					1		
KD Connect, KD Check, KD Archive, KD8 Setup					2		
Version:							
standard						00	
custom-made 2)						XX	
Acceptance tests:							
without extra quality inspection requirements							0
with an extra quality inspection certificate							1
acc. to customer's request							X

1) for each 3 measuring inputs a package with 6 alarms and 4 logic inputs is installed

2) after agreeing with the manufacturer

TABLE 60. KD7 ORDERING CODE:

	KD7 -	X	X	X	X	X	X	X	X	X	X	X
Measuring input (slot 1):												
without mesuring inputs		0										
6 programmable measuring inputs		1										
6 standard measuring inputs: 0...10 V		2										
6 standard measuring inputs: 0...20 mA		3										
6 standard measuring inputs: 4...20 mA		4										
6 standard measuring inputs: 3 x 0..10 V + 3 x 0..20 mA		5										
6 standard measuring inputs: 3 x 0..10 V + 3 x 4..20 mA		6										
3 programmable measuring inputs		7										
Measuring inputs (slot 2):												
without measuring inputs			0									
6 programmable measuring inputs			1									
6 standard measuring inputs 1)			2..6									
3 programmable measuring inputs			7									
Interface input:												
RS-485 for measuring inputs				1								
Digital signals/analog outputs (slot 3):												
without digital signals and analog outputs					0							
8 alarms (NO relays) + 8 alarms (OptoMos)					1							
8 alarms (NC relays) + 8 alarms (OptoMos)					2							
8 digital inputs + 4 analog outputs: 0...5 mA					3							
8 digital inputs + 4 analog outputs: 0...20 mA					4							
8 digital inputs + 4 analog outputs: 4...20 mA					5							
8 digital inputs + 4 analog outputs: 0...5 V					6							
8 digital inputs + 4 analog outputs: 0...10 V					7							
Digital signals/analog outputs (slot 4):												
without digital signals and analog outputs						0						
8 alarms (NO relays) + 8 alarms (OptoMos)						1						
8 alarms (NC relays) + 8 alarms (OptoMos)						2						
8 digital inputs + 4 analog output 2)						3..7						
Interface:												
USB							1					
USB + Ethernet + RS-485 (2)							2					
USB + Ethernet + RS-232							3					
Memory for measuring data:												
with a 4 GB CF card 3)								1				
as per order 4)								X				
Supply:												
90...253 V a.c.									1			
Recorder firmware:												
without mathematical functions 5)										0		
with mathematical functions										1		
Softwares servicing the recorder from PC:												
KD Connect, KD Check											1	
KD Connect, KD Check, KD Archive, KD7 Setup											2	
Acceptance tests:												
without extra quality inspection requirements												0
with an extra quality inspection certificate												1
acc. to customer's request 6)												X

1) - write the range code from the item 2...6 as above: (Slot 1)
2) - write the range code from the item 3...7 as above: (Slot 3)
3) - CF card with the lowest capacity from currently accessible cards on the market
4) - after agreeing with the manufacturer (it is recommended to use a 4 GB CompactFlash card from ScanDisk company)
5) - a key for the activation of mathematical functions can be ordered separately
6) - after agreeing with the manufacturer

Table 63. PD22 ordering code:		
PD22 -	XX	X
Version:		
standard	00	
custom-made*	XX	
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 64. SM61 ordering code:					
SM61 -	X	X	XX	X	X
Supply voltage:					
85...253 V a.c./d.c.	1				
20...50 V a.c./d.c.	2				
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

* - after agreeing with the manufacturer

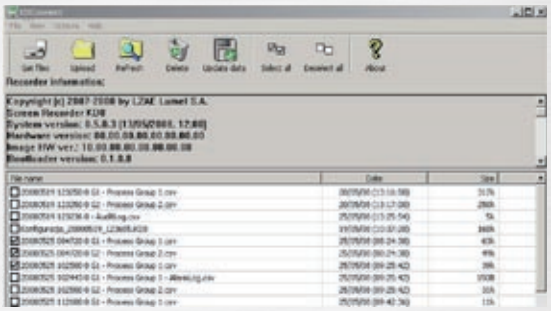
KD7 AND KD8 ASSISTING SOFTWARE

KD CONNECT

Software destined for the communication between the recorder and the PC computer through the USB interface in order to download archive data and record/erase on the CF card.

The KD Connect program enables to carry out following operations:

- copying of files from the CompactFlash card, directly from the recorder into the PC computer (e.g. data files, screen dumps),
- uploading of files from the PC computer into the CompactFlash card in the recorder (e.g. file with the updated KD7 software)
- delation of stored files in the recorder CompactFlash,
- sampling of current systemic information of the KD7 recorder (among others, system version, current configuration, degree of the Compact Flash filling).



Downloading and erasing of archive data by means of the PC computer - KD CONNECT.

KD7 SETUP

Software destined to configure recorder settings by means of a PC computer. After recopying the configuration on the CF memory card, it can be used for reprogramming of settings in the given KD7 recorder.

Backlighting of the selected measuring channel diagram.

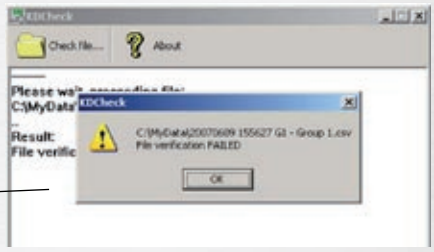
KD7 configuration through the PC computer -KD SETUP.

KD ARCHIVE

Sofware destined to review and analyse archive data from the recorder on a PC computer, stored in a logic format with digital signature. The software installation is typical for application destined for the MS Windows environment (MS Windows XP or a newest one).

KD CHECK

Software destined to verify the digital signature in archive data stored in text format. The program installation is typical for application destined for the MS Windows environment.



Checking result:
incorrect file verification

Verification of the digital signature of text data - KD CHECK.

I/O MODULES
COMMUNICATION MODULES

APPLICATION:

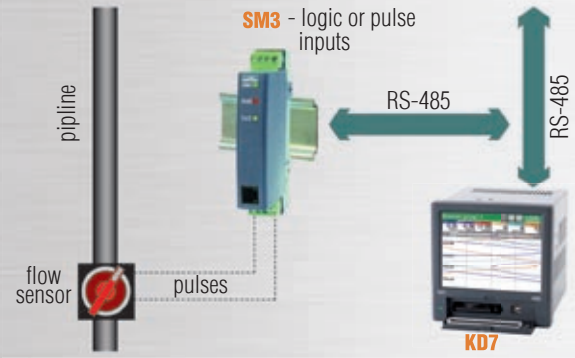
- measurements monitoring systems,
- inputs and outputs for PLC controllers,
- radio and serial transmission in automation systems,
- conversion between communication interfaces
- using Ethernet for industrial communication

SELECTED FEATURES:

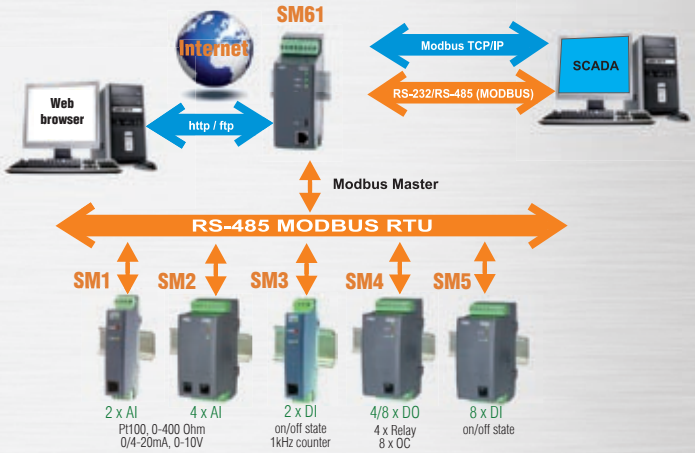
- integration of different transmission media (RS-232, RS-485, USB, **Ethernet**, radio)
- I/O modules configuration using LPConfig software

APPLICATION EXAMPLES

Measurement and visualization flow in a pipeline



Visualization of production process



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 the KD7 recorder.

Archiving of 3-phase network parameters from ND20 meter.

Type / Parameters	Input/Output modules				
	SM1	SM2	SM3	SM5	SM4
Number of channels	2	4	2	8	4 or 8
Inputs/outputs	inputs: Pt100(-200...850°C) 0/4...20 mA 0...10 V 0...400 Ω		inputs: logic on/off or pulse counter up to 1 kHz 0...4 294 967 295 pulses	inputs: logic on/off	outputs: 4 x relays or 8 x OC
Interface	RS-485 Modbus (ASCII i RTU), RS232 for configuration				
Galvanic isolation	input/output/supply/RS-485				
Baud rate	2400; 4800; 9600; 19.2 k; 38.4 k; 57.6 k; 115 k bit/s				
Supply voltage	85...253 V a.c./d.c.; 20...50 V a.c./d.c.				
Protection rating frontal/rear side	IP40/IP20				
Ambient temperature	-10...23...55 °C				
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

SM1 AND SM3

SM2

SM4 AND SM5

Typ / Parameters	Data logger	
	PD22	SM61 New!
Number of channels	up to 1000 digital channels	up 2500 digital channales
Input	Port I: Modbus RTU Master (50 groups 20 register rach)	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 RS232 (Modbus Slave) USB Device 1.1.	2 x RS-485 (Modbus Slave and Master) 1 x RS232 (Modbus Slave) USB Device 1.1. Ethernet 10/100 Base-T
Memory	512 kB, 390.000 samples, 44.000 events	1 GB
Galvanic isollation		input/output/supply
Supply voltage	20... 50 V a.c./d.c. 85...230...253 V a.c./d.c.	20...24...50 V a.c./d.c. 85...230...253 V a.c./d.c.
Protection rating frontal/rear side	IP40/ IP20	
External dimensions	45 x 120 x 100 mm	
Mounting	on a rail	
Additional functions	· RTC	· HTTP (web server - visualization in format of synoptic maps), · DHCP, · FTP server, · RTC

PD22

SM61

Typ / Parameters	Power supplier
	SM9
Galvanic isollation	input/output
Supply voltage	105...250 V a.c.
Protection rating frontal/ rear side	IP20/IP20
External dimensions	45 x 120 x 100 mm
Additional functions	· power supplier 24 V d.c., · max current output: 1 A d.c.

SM9

COMMUNICATION MODULES


PD51


PD8


PD8W


PD10


SM7


MR03

Typ	Interface/protocol converters				Radio transmission modules	
	PD51	PD8	PD8W New!	PD10	SM7	MR03
Interface 1	RS-232	RS-485, RS-232		RS-485	RS-232 or RS-485	RS-232 RS-485
Interface 2	RS-485	Ethernet RJ45	Ethernet Wi-Fi	USB	radio frequency 433/869 MHz	radio frequency 869.4 – 869.65 MHz
Interface 3	-	USB*		-	–	–
Galvanic isollation	supply/RS-485/RS-232	supply/RS-485/Ethernet		USB/RS-485	RS-485/RS-232/supply	
Power output	-	-		–	10 mW (-20 do 10 dBm)	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 (RS485) 10, 100 Mbit/s (Ethernet)		do 1 Mb/s	serial interface: 4800...115200 bit/s radio band: 4800, 9600, 19200, 38400, 76800 bit/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 300m	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	85..230..253 V a.c./d.c. or 20..24..50 V a.c./d.c. 7..35 V d.c.	8..30 V a.c./d.c.
Protection rating frontal/rear side	IP40/IP20				IP20/IP20	IP54/IP54
Ambient temperature	0...23...55°C	-23...23....45°C		0...55°C	0...23...45°C	0...23...50°C
External dimensions	22,5 x 120 x 100 mm	45 x 120x 100 mm		52 x 44 x 24 mm	45 x 120 x 100 mm	115 x 65 x 40 mm
Additional functions	· converter/repeater · galvanic isollation	· galvanic isollation · Digi RealPort®, TCP/IP, HTTP, ICMP, DHCP, ARP		· galvanic isollation	–	–

* for PD8 available from second mid-hear 2013

SM1

Fig. 110 Electrical connections of SM1

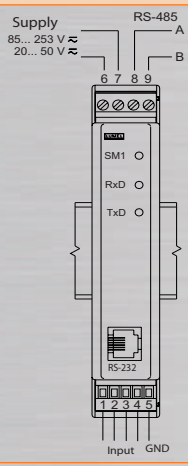


Fig. 111 Connection of input signals

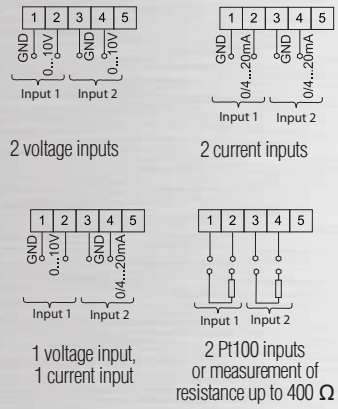


Fig. 112 Connection of RS-485 interface

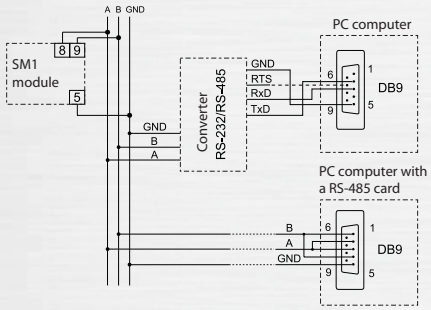
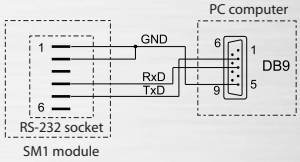


Fig. 113 Connection of RS-232 interface



SM2

Fig. 114 Electrical connections of SM2

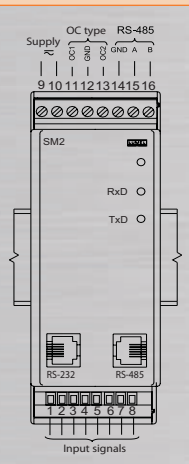


Fig. 115 Connection of input signals

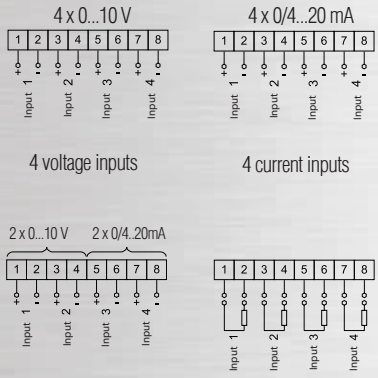


Fig. 116 Connection of RS-485 interface

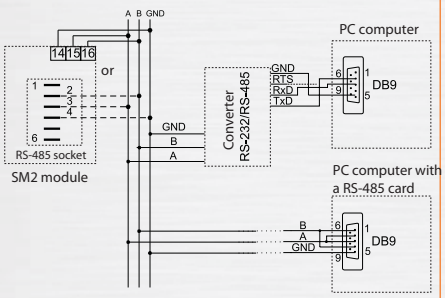
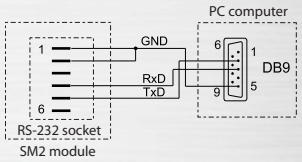
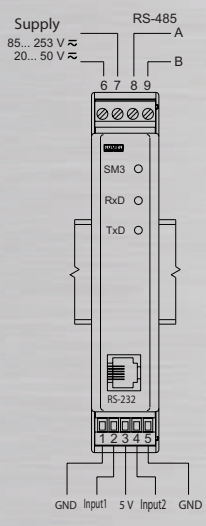


Fig. 117 Connection of RS-232 interface

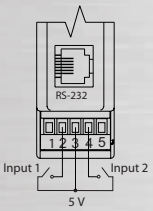


SM3

Fig. 118 Electrical connections of SM3



Electrical connection
of the logic input module



Connection way
of the logic inputs

Fig. 119 Connection of RS-485 interface

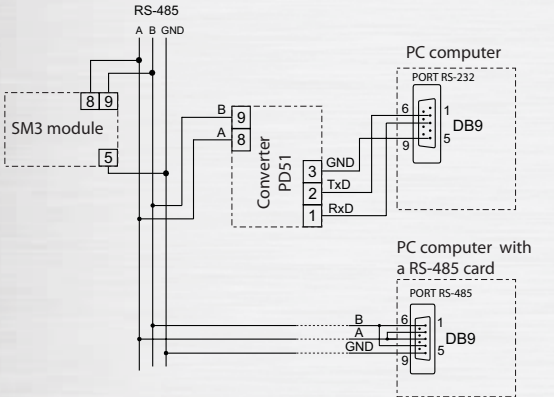
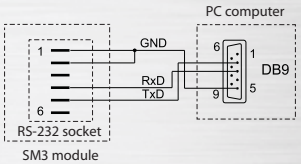


Fig. 120 Connection of RS-232 interface



SM5

Fig. 121 Electrical connections of SM5

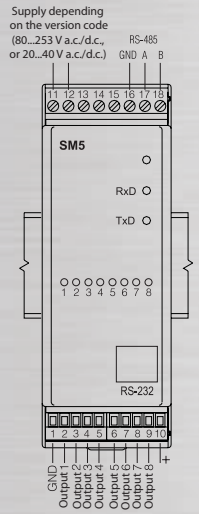


Fig. 122 Connection of RS-485 interface

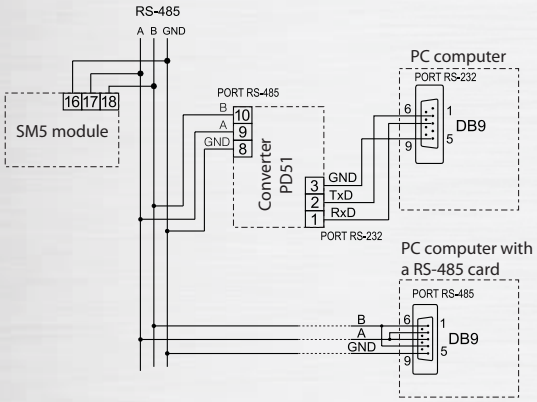
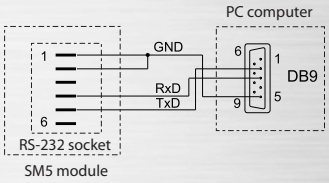
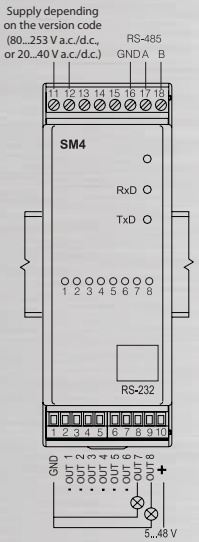


Fig. 123 Connection of RS-232 interface



SM4

Fig. 124 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	No 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. 125 Connection of RS-485 interface

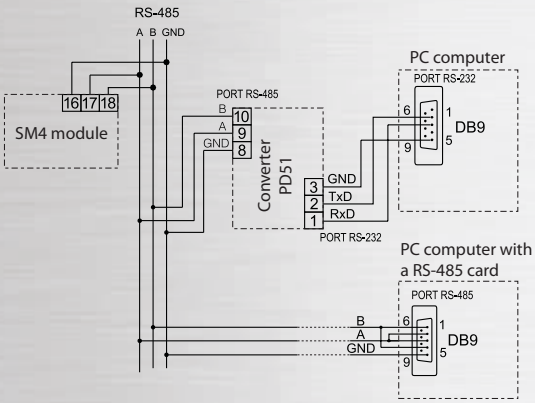
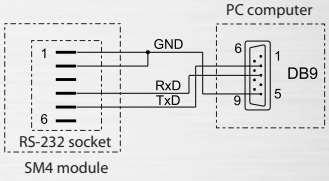
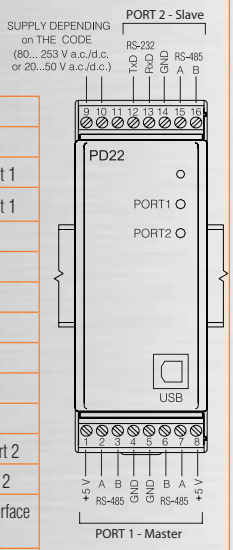


Fig. 126 Connection of RS-232 interface



PD22

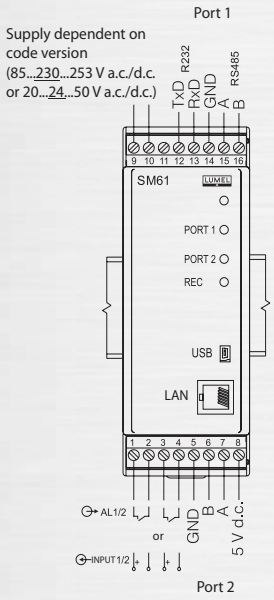
Fig. 127 Electrical connections of PD22



Terminal	Terminal description
1	Output +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	Output +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

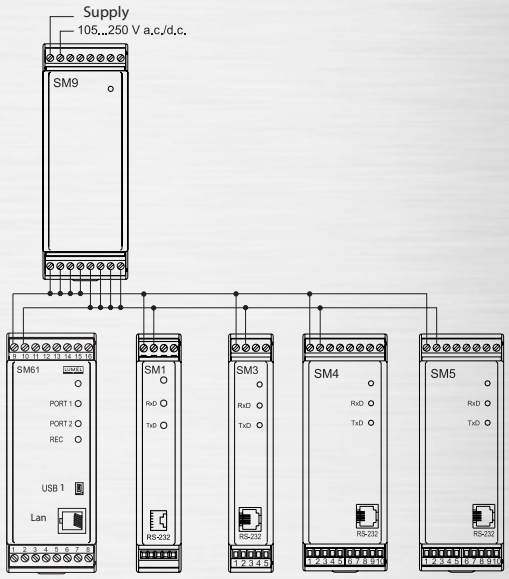
SM61

Fig. 128 Electrical connections of SM61



SM9

Fig. 129 Example of SM series module connection with the SM9 feeder module



PD51

Fig. 130 Electrical connections of PD51 **version A1 and A2**

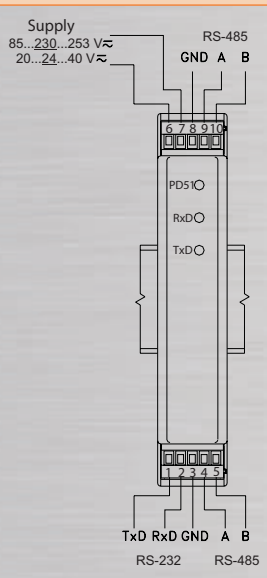


Fig. 131 Electrical connections of PD51 **version A3**

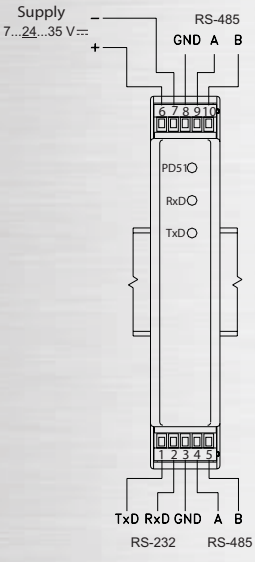
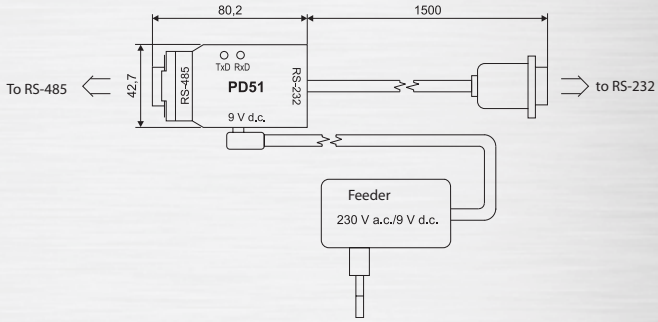


Fig. 132 Electrical connections of PD51 **version B1**



PD8

Fig. 133 External connections PD8

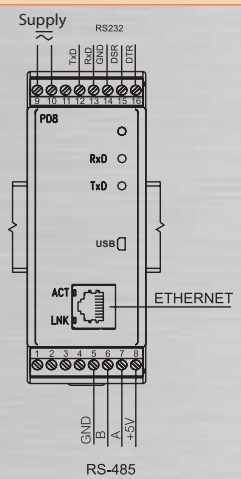
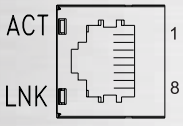


Fig. 134 Frontal view of the Ethernet interface RJ-45 socket

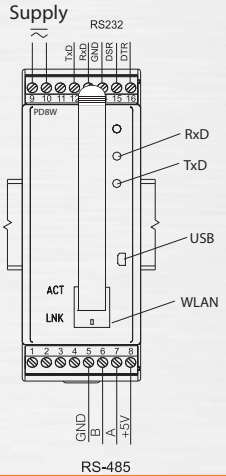


Description of RJ-45 socket signals

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)

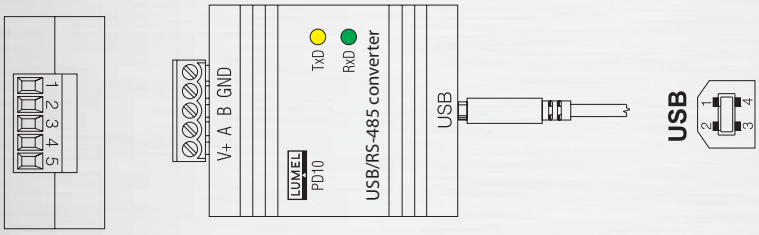
PD8W

Fig. 135 External connections PD8W



PD10

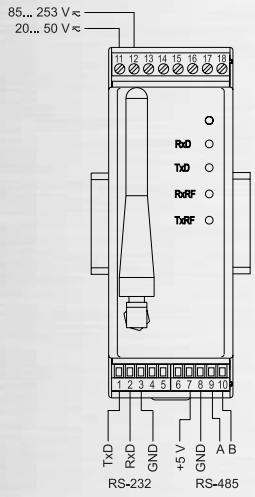
Fig. 136 Connection of PD10



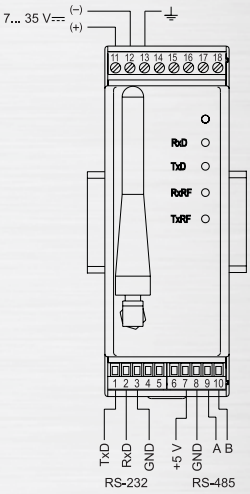
SM7

Fig. 137 Electrical connections of SM7

a) for supply 85...253 V a.c./d.c. and 20...50 V a.c./d.c.



b) for supply 7...35 V d.c.



MR03

Fig. 138 Electrical connections of MR03

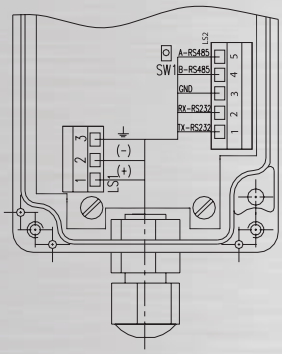


Fig. 139 Connection of RS-485 interface

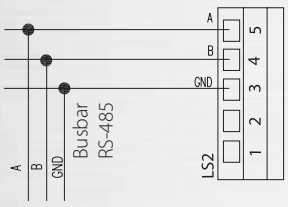
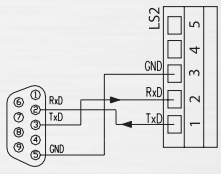


Fig. 140 Connection of RS-232 interface



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

Input/output modules

Table 65. 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 66. 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				0
with an extra quality inspection certificate				1
acc. to customer's request*				X

Table 67. 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				0
with an extra quality inspection certificate				1
acc. to customer's request*				X

Table 68. 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					0
with an extra quality inspection certificate					1
acc. to customer's request*					X

Table 69. 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				0
with an extra quality inspection certificate				1
acc. to customer's request*				X

* - after agreeing with the manufacturer

Data logger

Table 70. SM61 ordering code:

	SM61 -	X	X	XX	X	X
Supply:						
85...253 V a.c./d.c.		1				
20...50 V a.c./d.c.		2				
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 71. PD22 ordering code:

	PD22 -	XX	X
Version:			
standard		00	
custom-made*		XX	
Acceptance tests:			
without extra requirements			0
with an extra quality inspection certificate			1
acc. to customer's request*			X

* - after agreeing with the manufacturer

Interface/protocol converters

Table 72. 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				0
with an extra quality inspection certificate				1
acc. to customer's request *				X

Table 73. PD8 ordering code:

	PD8 -	X	X	X
Supply voltage:				
85...230...253 V a.c./d.c.		1		
20...24...50 V a.c./d.c.		2		
Version:				
standard			0	
Acceptance tests:				
without extra requirements				0
with an extra quality inspection certificate				1
acc. to customer's request*				X

Table 74. PD8W ordering code:

	PD8W -	X	X	X	X
Supply voltage:					
85...253 V a.c./d.c.		1			
20...50 V a.c./d.c.		2			
Version:					
standard			1		
custom-made			x		
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 75. PD10 ordering code:

	PD10 -	X	X	X
Galvanic isolation:				
with isolation		1		
Version:				
standard			0	
custom-made*			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

Power supplier

Table 76. SM9 ordering code:

	SM9 -	XX	X
Version:			
standard		00	
custom-made*		XX	
Acceptance tests:			
without extra requirements			0
with an extra quality inspection certificate			1
acc. to customer's request*			X

Radio transmission modules

Table 77. SM7 ordering code:

	SM7 -	X	X	X
Supply:				
85...230...253 V a.c./d.c.		1		
20...24...50 V a.c./d.c.		2		
7...35 V d.c.		3		
Radio carrier frequency:				
433 MHz			1	
868 MHz			2	
Acceptance tests:				
without extra requirements				0
with an extra quality inspection certificate				1
acc. to customer's request*				X

Table 78. MR03 ordering code:

	MR03 -	XX	X
Version:			
standard		00	
custom-made*		XX	
Acceptance tests:			
without extra requirements			0
with an extra quality inspection certificate			1
acc. to customer's request*			X

APPLICATION:

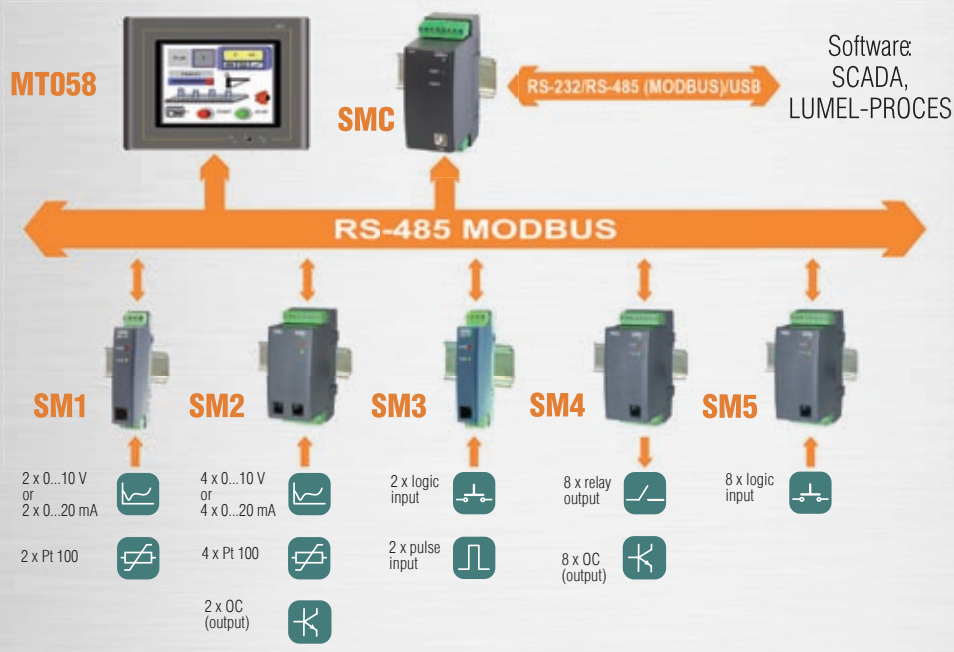
- automation of production process (SMC)
- preparing non-standard functionality for control systems

SELECTED FEATURES:

- programming in ST language acc. to the IEC61131-3 standard using CPDev package,
- libraries of functional blocks: standard (IEC61131) and dedicated (Basic Blocks, Complex Blocks)
- communication with I/O modules and other measuring and control instruments (like power network analyzers and other) through RS-485 interface with Modbus protocol
- applications for processes which use:
  - sequential logic control,
  - real time clock (RTC),
  - multi-channel PID control,
- easy algorithm creation using rich functional libraries, including user created libraries
- configurable functionality for any application

APPLICATION EXAMPLES

Control of production process



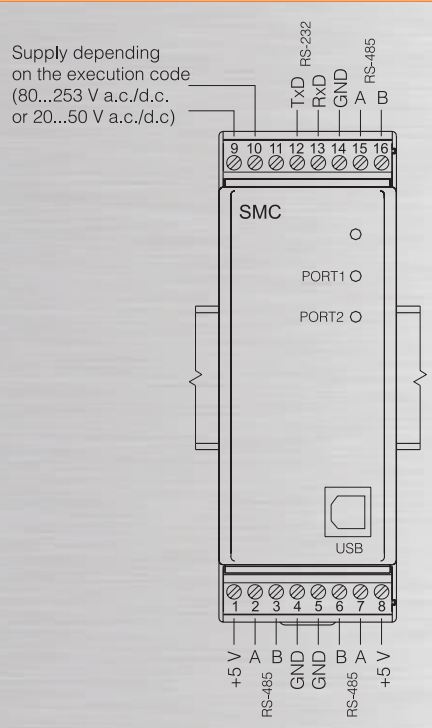
Type / Parameters	PLC controller SMC
Interface	Port 1: RS-485, RS-232, USB 1.1 Modbus Slave (for communication with PC or HMI); Port 2: 2 x RS-485 Modbus Master (for communication with I/O modules)
Baud rate	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bits/s
Supply voltage	20...24...50 V a.c./d.c. or 85...230...253 V a.c./d.c.
Protection rating frontal/ rear side	IP40
Ambient temperature	0...23...55 °C
External dimensions	45 x 120 x 100 mm
Additional functions	• programming in ST, FBD, LD, IL languages acc. to the IEC61131-3 (CPDev software) • on-line and off -line simulation of created algorithms (CPDev software) • communication with input / output modules and other control and measurement devices through RS-485 interface with MODBUS protocol • rich libraries of functional blocks (incl. PID) with possiblity to create a user's library • real time clock (RTC).


SMC

CONNECTION DIAGRAMS

SMC

Fig.141 Electrical connections of SMC



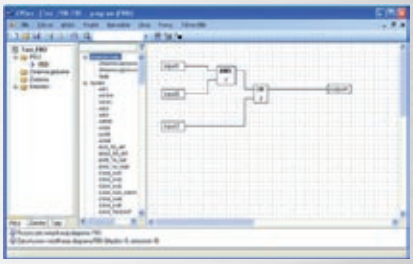
ORDERING CODES

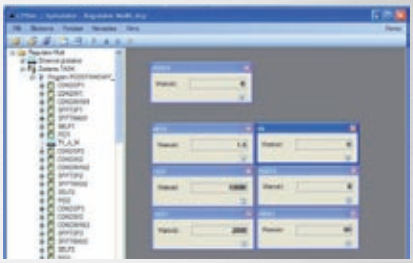
TABLE 79. SMC ORDERING CODE:

	SMC -	X	XX	X	X
Supply:					
85..253 V a.c./d.c.		1			
20..50 V a.c./d.c.		2			
Version:					
standard			00		
non-standard settings			NS		
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

SMC CONTROLLER SOFTWARE





CPDev Module:

- Programming of algorithmus in ST language (structured Text) in compliance with IEC 61131-3 standard.
- Available logic, comparative, arithmetical operators and mathematical functions.
- Constructions: IF...THEN, CASE...OF, FOR...DO, WHILE...DO, REPEAT...UNTIL.
- Access to the RTC clock of the SMC controller.
- Available libraries of IEC-61131 standard functional modules and Basic Blocs, and also specialized Complex Blocs.
- Possible creation of own functional libraries.

CPSim Module:

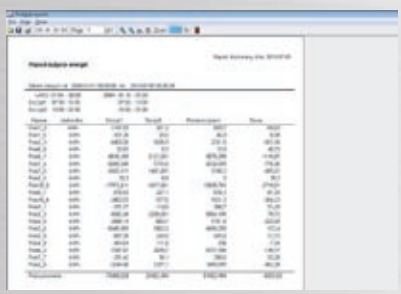
- Simulation of off-line algorithms (without a controller) and on-line (with a controller).
- Read-in of process data for simulation from a text file.
- Write of simulation results in the text file.

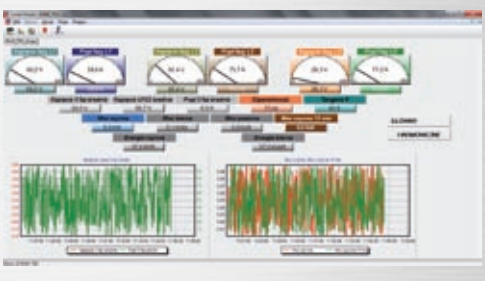
CPCon Module:

- Configuration of communication parameters of the controller and modules I/O of SM series.
- Configuration of communication tasks with modules I/O (by means of the creator or manually).
- Transmission of the project to the controller.

LUMEL-PROCES SOFTWARE

- 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 (client DDE),
- sharing data with other computers with a LUMEL Proces program 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 broser - NEW FUNCTION!**





APPLICATION:

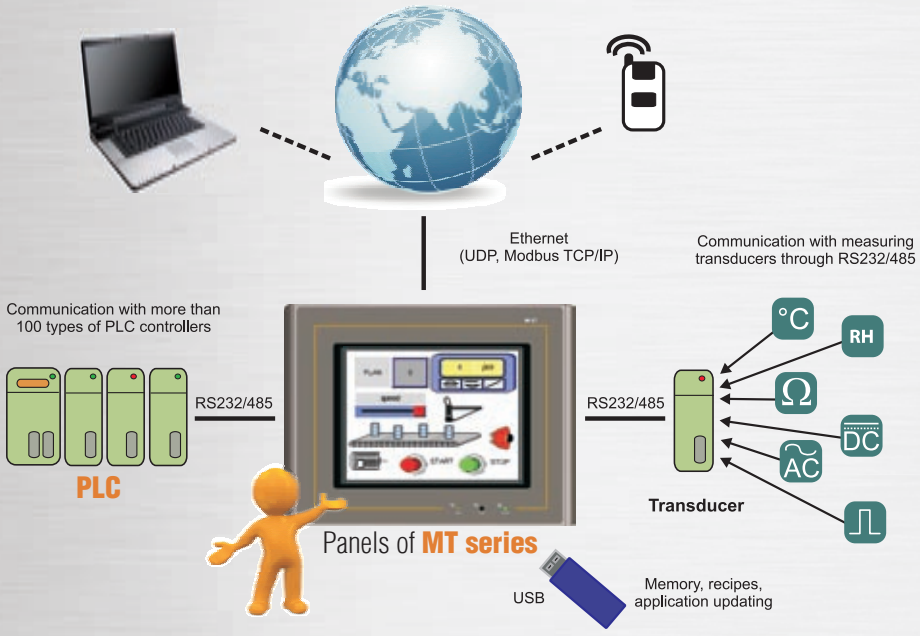
- technological process visualization
- remote control of many automation components from one place
- integration of automation devices working with different communication protocols
- data logging for technological processes

SELECTED FEATURES:

- rich library of graphic elements
- large communication possibilities (service of over 200 communication drivers, at least 2 serial ports, USB connectors and Ethernet)
- transparent communication (access to PLC from SCADA software through HMI)
- multi-language applications (up to 10 languages)
- 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 (8 access levels for applications)
- free Panel Master tool software

APPLICATION EXAMPLES

Communication possibilities of HMI panels




MT035


MT058


MT080


MT104

	Type / Parameters	HMI panels			
		MT035	MT058	MT080	MT104
External features	Screen	3.5" TFT	5.7" TFT	8.0" TFT	10.4" TFT
	Colour	256	256	65535	65535
	Resolution	320 x 240	320 x 240	800 x 600	640 x 480
	Net weight	0.3 kg	0.85 kg	0.9 kg	1.4 kg
	External dimensions l x h x d [mm]	130 x 106.2 x 36	186.5 x 145.4 x 42	232.5 x 175.8 x 49	315 x 241 x 60
	Panel cut-out l x h [mm]	118.5 x 92.5	174.5 x 132.5	221.5 x 164	303 x 226
Communication protocols	COM1	RS232/422/485			
	COM2	RS422/485	RS232/422/485		
	COM3	-		RS232/422/485	
	Ethernet	-	+		
	USB Host 2.0	-		2x	3x
Memory ressources	Flash memory	4 MB		16 MB	
	System memory	1 MB	2 MB	64 MB	
	Battery operated memory	128kB - 1MB			
	CPU	RISC ARM 32-bit			
	Supply voltage	20...24...28 V d.c.			
	Power consumption	6 W	10 W	20 W	
	Protection rating frontal/rear side	IP65/IP20			
	Ambient temperature	0....50°C			

MT

Fig. 142 Connectors of MT035 panel

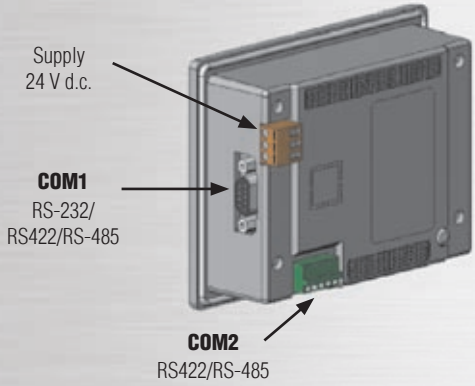


Fig. 144 Connectors of MT058 panel

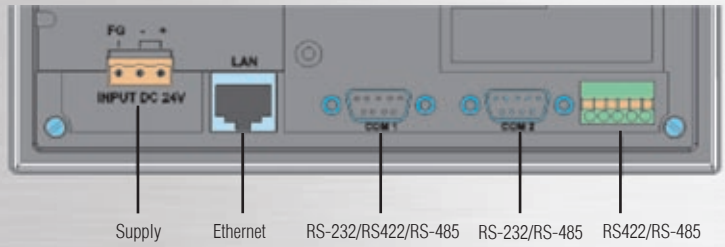


Fig. 145 Connectors of MT080 and MT104 panels

Fig. 143 Serial ports

COM1 serial port in the panel - DB9-9P female connector.
Pin definition:

Pin	Function	Pin	Function
1	RS422 TX+ and RS-485 +(A)	6	RS422 TX- and RS-485 –(B)
2	RS-232 RXD	7	RS-232 RTS
3	RS-232 TXD	8	RS-232 CTS
4	RS422 RX+	9	RS422 RX-
5	GND		

COM2 serial port in the panel – connector 5 pins (RS-422 and RS-485)

422	TX+	RX+	RX-	TX-	SG
485	+(A)			-(B)	

COM2 serial port in the panel - DB9-9P male connector
(MT058, MT080 and MT104)
Pin definition:

Pin	Function	Pin	Function
1	RS-485 +(A)	6	RS-485 –(B)
2	RS-232 RXD	7	RS-232 RTS
3	RS-232 TXD	8	RS-232 CTS
4		9	
5	GND		

COM3 serial port in the panel – connector 6 pins (RS-232) (only MT080 and MT104)

5V	CTS	RTS	TXD	RXD	SG

ORDERING CODES

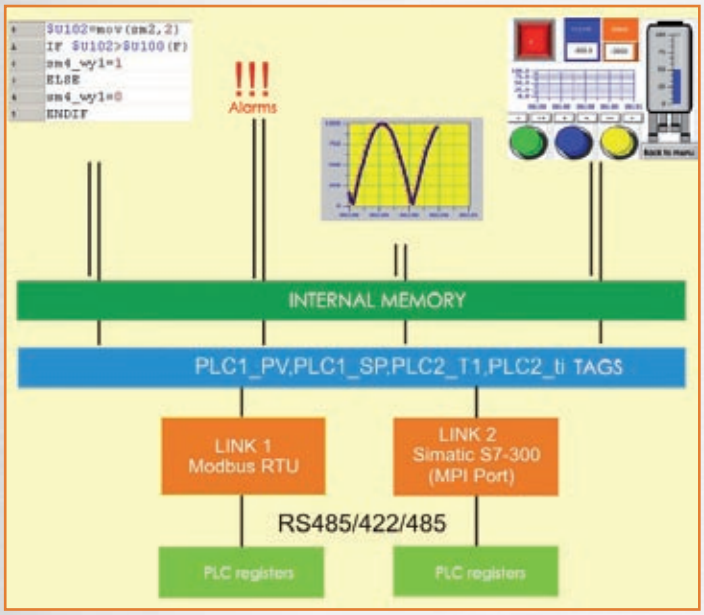
TABLE 80. MT ORDERING CODE:

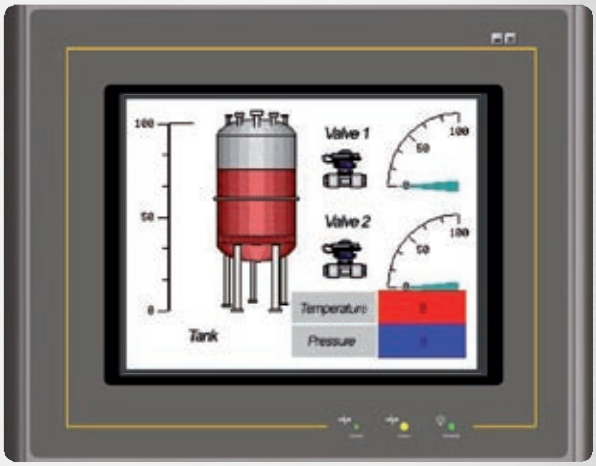
HMI panel MT -	XXX-XXX	XX	X
Type:			
3.5"	035-TST		
5.7"	058-TST		
5.7" Ethernet	058-TNT		
8.0" Ethernet	080-TNT		
10.4" Ethernet	104-TNT		
Version:			
standard		00	
Acceptance tests:			
without extra requirements			0
with an extra quality inspection certificate			1
acc. to customer's request*			X

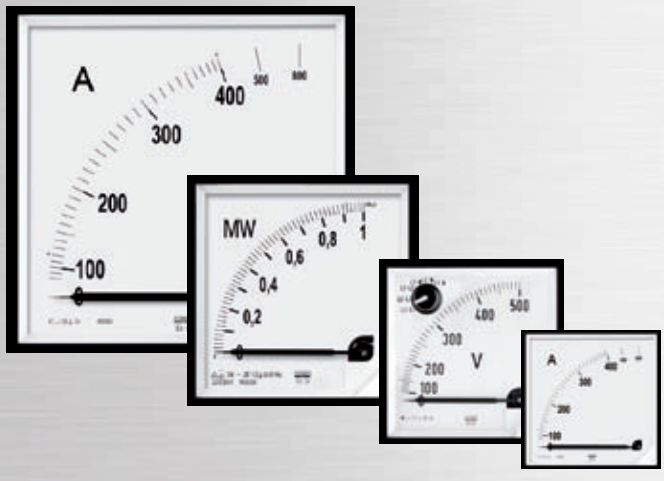
* after agreeing with the manufacturer

PANEL MASTER 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).
- Mode of transparent communication
  (access from SCADA application to registers of PLC controllers through the operator's panel).
- Multilanguage applications (up to 10 languages, Unicode coding).
- 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 PC computer ports.)







APPLICATION:

- industrial supply systems
- power engineering
  (switching stations, generators, turbines)
- heat engineering
  (thermal-electric power stations, boiler rooms)
- shipyard industry
  (supply systems on ships)
- mimic panels
  (visualization of physical quantities
  converted into an analog signal)

SELECTED FEATURES:

protection grade IP65 (optional)	– dustproof and waterproof front frame ensuring the meter reliability and safety of service in rugged operation conditions
direct and indirect measurements	– co-operation with current and voltage transformers, and shunts
overload scales	– extension of ammeter indication ranges (twice or six-times)
interchangeable scales	– simple change of indication ranges in meters for indirect measurements
extra red pointer	– possible setting on the scale in any position, makes it easier to read measuring results (optional)
red division on the scale	– makes it easier to read measuring results (optional)
memory of maximal value	– the “memory” pointer remains in maximal position and enables the readout of the maximal load current without a continuous meter observation, possible return of the pointer to the value 0 (BA and BE meters)
various working positions	– meters are graduated considering individual working position (optional)
front window material	– glass

TECHNICAL DATA

EB16

EA12

Type	Moving-iron meters				
	EB16	EA16	EA17	EA19	EA12
Measuring ranges: - current: · direct · through a transformer (on request, with twice or six-times overload) - voltage: · direct · through a transformer	100 mA ... 25 A xA x/5 A; xA/1 A 6 V ... 600 V xV/100 V; xV/110 V		100 mA ... 100 A xA x/5 A; xA x/1A 6 V ... 1000 V xV/ 100 V; xV/110 V		
Frequency of measured value	40...45..65...72 Hz				
Protection rating frontal/rear side	IP52/IP20	IP50/IP20			
		on request: IP65/IP20			on request: IP54/IP20
Ambient temperature	5...23...50 °C				
Climate version	normal or tropical		normal, tropical or similar to marine		
External dimensions	53 x 90 mm	48 x 48 mm	72 x 72 mm	96 x 96 mm	144 x 144 mm
Panel cut-out [mm]	on a rail	$45^{+0.6}$ x $45^{+0.6}$	$68^{+0.7}$ x $68^{+0.7}$	$92^{+0.8}$ x $92^{+0.8}$	$138^{+1.0}$ x $138^{+1.0}$
Panel cut-out [mm] - for version with IP65	on a rail	$47^{+0.6}$ x $47^{+0.6}$	$70.2^{+0.7}$ x $70.2^{+0.7}$	$94.2^{+0.8}$ x $94.2^{+0.8}$	-

EV96

EV72

Type	Moving-iron meters	
	EV72	EV96
Measuring ranges: - current: · through a transformer (with twice times overload) - voltage: · direct	x/2x x/5 A 500 V	
Frequency of measured value	45...65 Hz	
Protection rating frontal/rear side	IP52	
External dimensions	72 x 72 mm	96 x 96 mm

MA12

Type	Moving-coil meters with rectifiers		
	MA17P	MA19P	MA12P
Measuring ranges (direct): - current: - voltage:	400 mA...1 A (30...1000...10000 Hz) 1 A...6 A (49...50...51 Hz) 6mV...1,5 V (49..50...51 Hz) 2,5 V...600 V (30...1000...10 000 Hz)		400 mA...1 A (30...1000...10 000 Hz) 2,5 V...600 V (30...1000...10 000 Hz)
Protection rating frontal/rear side	IP50/IP20 (on request: IP65/IP20)		IP50/IP20 (on request: IP54/IP20)
Ambient temperature	5...23...55 °C		
Climate version	normal, tropical or similar to marine		
External dimensions	72 x 72 mm	96 x 96 mm	144 x 144 mm
Panel cut-out [mm]	$68^{+0.7}$ x $68^{+0.7}$	$92^{+0.8}$ x $92^{+0.8}$	$138^{+1.0}$ x $138^{+1.0}$
Panel cut-out [mm] - for version with IP65	$70.2^{+0.7}$ x $70.2^{+0.7}$	$94.2^{+0.8}$ x $94.2^{+0.8}$	-

EP29

Type	3-phase voltmeters	
	EP27	EP29
Voltage measuring ranges: - direct phase-to-phase: - through a transformer:	500 V xV/100 V; xV/110 V	
Frequency	40...45...65...72 Hz	
Protection rating frontal/rear side	IP50/IP20	
Climate version	normal, tropical or similar to marine	
External dimensions	72 x 72 mm	96 x 96 mm
Panel cut-out [mm]	$68^{+0.7}$ x $68^{+0.7}$	$92^{+0.8}$ x $92^{+0.8}$

PA39

Type	Power meters
	PA39
Power measuring ranges:	50W...1000 MW or 50 var...1000 Mvar
Frequency	50 Hz, 60 Hz or 400 Hz
Protection rating frontal/ rear side	IP50/IP20 (on request: IP65/IP20)
Ambient temperature	5...23...40 °C
Climate version:	normal, tropical or similar to marine
External dimensions	96 x 96 mm
Panel cut-out [mm]	$94.2^{+0.6}$ x $94.2^{+0.6}$

Type	Moving-coil meters				
	MB16	MA16	MA17	MA19	MA12
Measuring ranges: - current: · direct measurement · indirect measurement (through the shunt) - voltage: · direct	40 mA...25 A 1 A...15 kA 60 mV...1000 V		100 mA...25 A 1 A...15 kA 60 mV...1000 V		
Protection rating frontal/rear side	IP52/IP20	IP50/IP20			
		on request: IP65/IP20			on request: IP54/IP20
Ambient temperature	5...23...55 °C				
Climate version:	normal or tropical		normal, tropical or similar to marine		
External dimensions [mm]	53 x 90	48 x 48	72 x 72	96 x 96	144 x 144
Panel cut-out [mm]	on a rail	$45^{+0.6}$ x $45^{+0.6}$	$68^{+0.7}$ x $68^{+0.7}$	$92^{+0.8}$ x $92^{+0.8}$	$138^{+1.0}$ x $138^{+1.0}$
Panel cut-out [mm] - in version with IP65	on a rail	$47.2^{+0.6}$ x $47.2^{+0.6}$	$70.2^{+0.7}$ x $70.2^{+0.7}$	$94.2^{+0.8}$ x $94.2^{+0.8}$	-

MA12

Type	Max demand ammeters - Bimetalic or Bimetalic and moving-iron			
	BA27	BA39	BE27	BE39
Measuring ranges: - bimetalic element: · direct measurement · indirect measurement (through a transformers) - moving-iron element: · direct measurement · indirect (through a transformer)	0...1,2 A or 0...6 A 0...1,2(x) A x/1 A or 0...1,2(x) A x/5 A - -		0...1,2 A or 0...6 A 1,2(x) A x/1 A or 1,2(x) A x/5 A 0...1/2 A or 0...5/10 A 0...2(x) A x/1 A or 0...2(x) A x/5 A	
Protection rating frontal/rear	IP50/IP20			
Ambient temperature	-25...40 °C			
Climate version:	normal, tropical or similar to marine			
External dimensions	72 x 72 mm	96 x 96 mm	72 x 72 mm	96 x 96 mm
Panel cut-out [mm]	$68^{+0.7}$ x $68^{+0.7}$	$92^{+0.8}$ x $92^{+0.8}$	$68^{+0.7}$ x $68^{+0.7}$	$92^{+0.8}$ x $92^{+0.8}$

BA27

BE27

Type	Power factor and frequency meters				
	FA39	FA32	CA37	CA39	CA32
Measuring ranges: **Frequency**	$0,5_{Cap}$....1...$0,5_{IND.}$ $0,8_{Cap}$....1...$0,2_{IND.}$ $0,85_{Cap}$....1...$0,85_{IND.}$ $0_{IND.}$ ...1 45...50...60...65 Hz		Class 0,5: 45...55 Hz; 45...65 Hz; 55...65 Hz; 360...440 Hz; Class 0,2: 48...52 Hz; 58...62 Hz; 140...160 Hz; 180...220 Hz; 380...420 Hz -		
Protection rating frontal/rear side	IP52/IP20 (on request IP65/IP20)	IP50/IP20 (on request IP54/IP20)	IP50/IP20 (on request IP65/IP20)		IP50/IP20 (on request IP54/IP20)
Ambient temperature	5...23...40 °C		5...23...40 °C 5...35...55 °C (tropical version)		
Climate version:	normal, tropical or similar to marine				
External dimensions	96 x 96 mm	144 x 144 mm	72 x 72 mm	96 x 96 mm	144 x 144 mm
Panel cut-out [mm]	$92^{+0.8}$ x $92^{+0.8}$	$138^{+1.0}$ x $138^{+1.0}$	$68^{+0.7}$ x $68^{+0.7}$	$92^{+0.8}$ x $92^{+0.8}$	$138^{+1.0}$ x $138^{+1.0}$
Panel cut-out [mm] - in version with IP65	$94.2^{+0.8}$ x $94.2^{+0.8}$	-	$70.2^{+0.7}$ x $70.2^{+0.7}$	$94.2^{+0.8}$ x $94.2^{+0.8}$	-

CA39

FA39

EV048, EV072, EV96 AND EV144

Fig. 146 Voltage AC

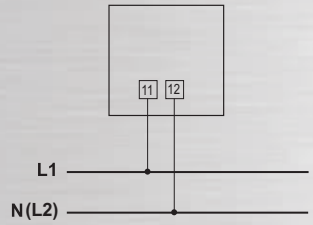


Fig. 147 Current AC, direct connection

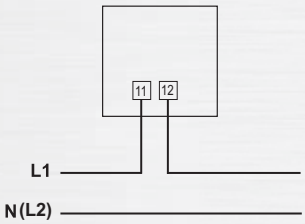
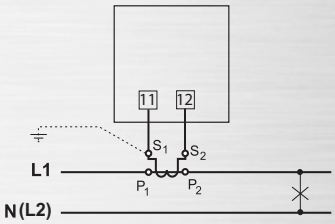


Fig. 148 Current AC, indircet connection



EP27

Fig. 149 Direct connection

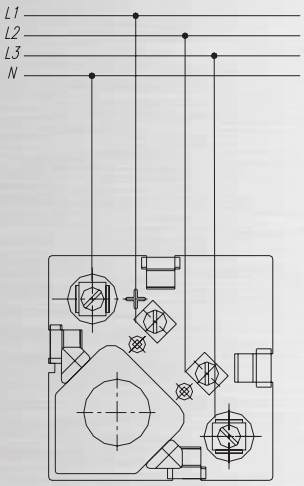
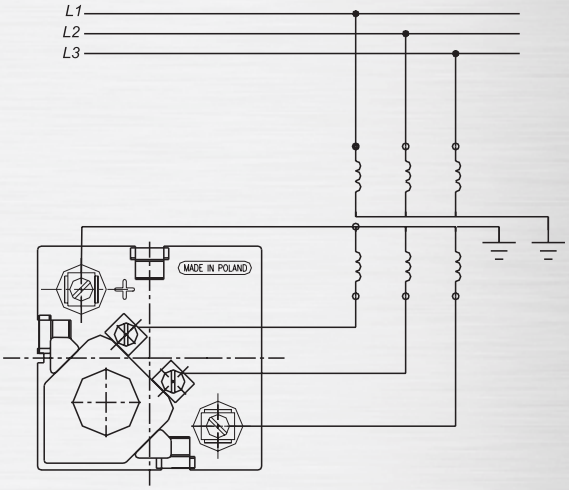


Fig. 150 Connection with voltage transformers



EP29

Fig. 151 Direct connection

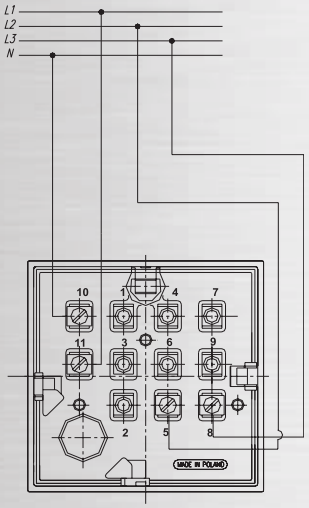
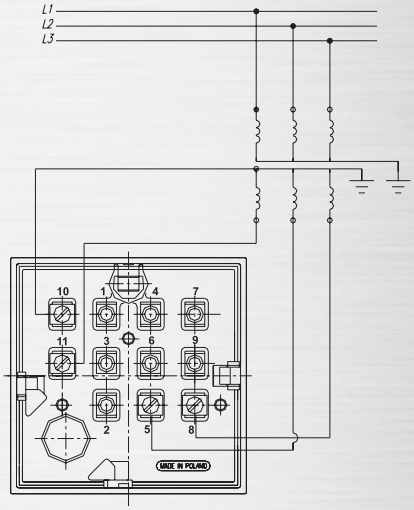


Fig. 152 Connection with voltage transformers



PA39

Fig.153 Measurement of active power in a single-phase network

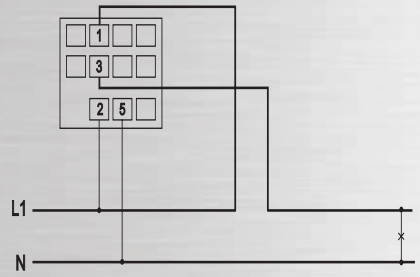


Fig. 154 Measurement of active power in a three-phase three-wire symmetrically loaded network

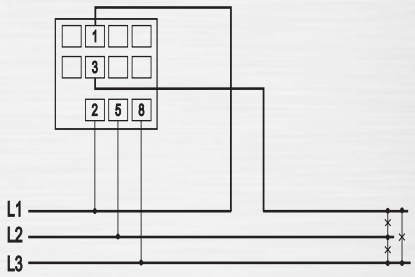


Fig. 155 Measurement of active power in a three-phase three-wire asymemrtically loaded network

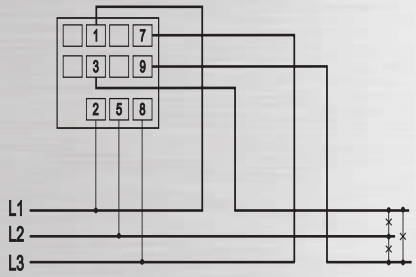


Fig. 156 Measurement of active power in a three-phase fout-wire symmetrically loaded network

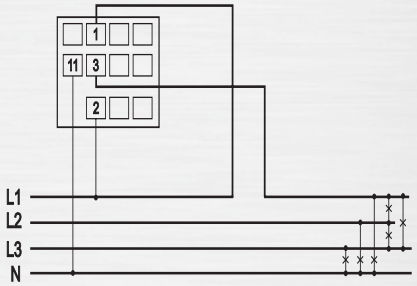


Fig. 157 Measurement of active power in a three-phase four-wire asymmetrically loaded network

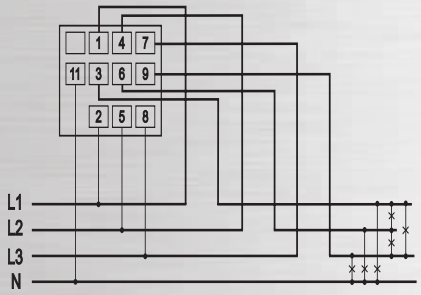


Fig. 158 Measurement of reactive power in a three-phase three-wire symmetrically loaded network

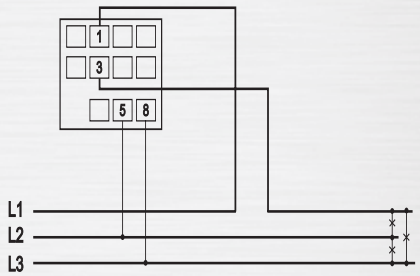


Fig. 159 Measurement of active power in a three-phase three-wire asymmetrically loaded network

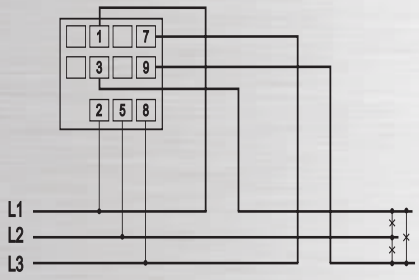


Fig. 160 Measurement of reactive power in a three-phase four-wire symmetrically loaded network

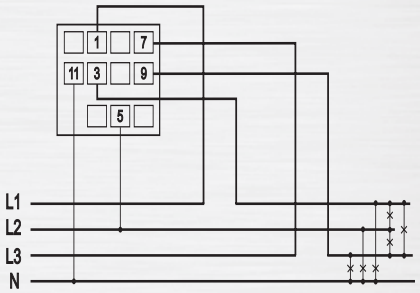
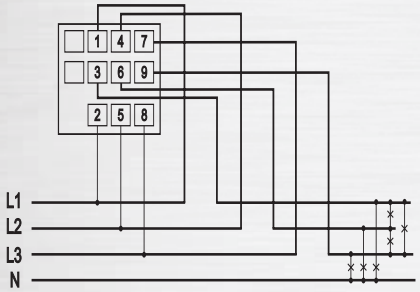


Fig. 161 Measurement of active power in a three-phase four-wire asymmetrically loaded network



FA39

Fig. 162 Power factor meter connected directly to a single-phase network.

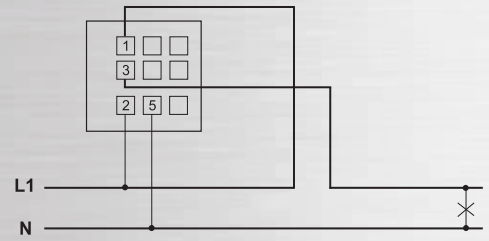


Fig. 163 Power factor meter connected directly to a three-phase symmetrically loaded network.

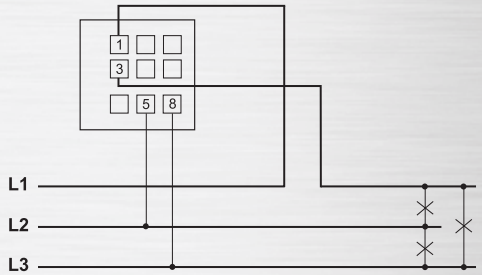


Fig. 164 Power factor meter connected through a current transformer to a single-phase network

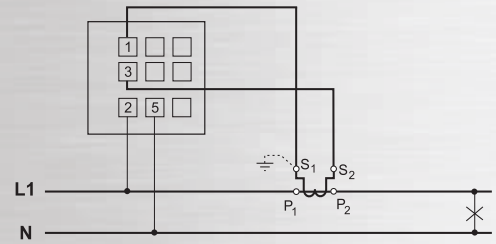


Fig. 165 Power factor meter connected through a current transformer to a three-phase symmetrically loaded network.

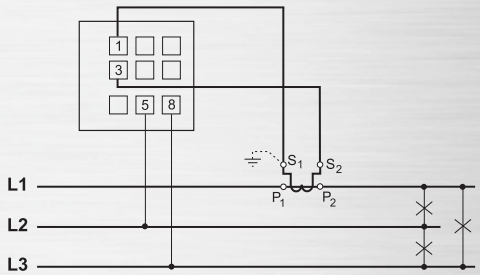


Fig. 166 Power factor meter connected through a current and voltage transformers to a single-phase network

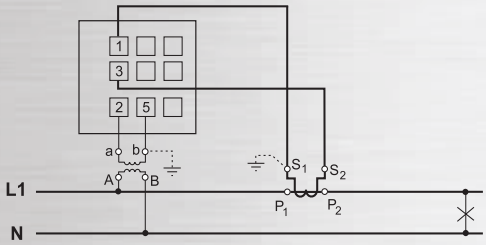
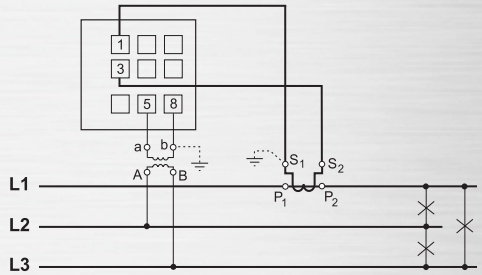


Fig. 167 Power factor meter connected through a current and voltage transformers to a three-phase symmetrically loaded network



FA32

Fig. 168 Power factor meter connected directly to a single-phase network

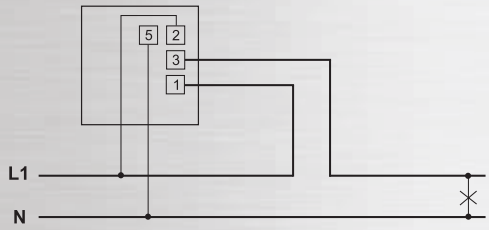


Fig. 169 Power factor meter connected directly to a three-phase symmetrically loaded network

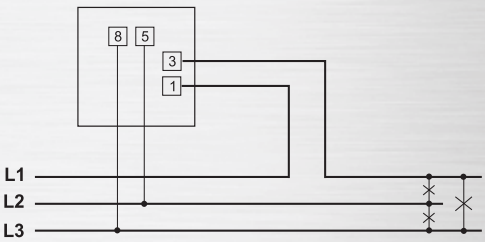


Fig. 170 Power factor meter connected through a current transformer to a single-phase network

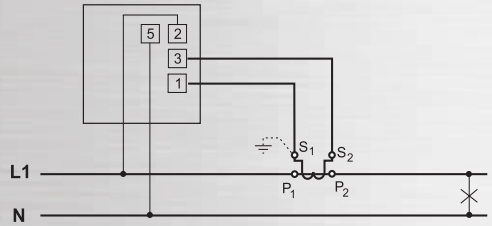


Fig. 171 Power factor meter connected through a current transformer to a three-phase symmetrically loaded network

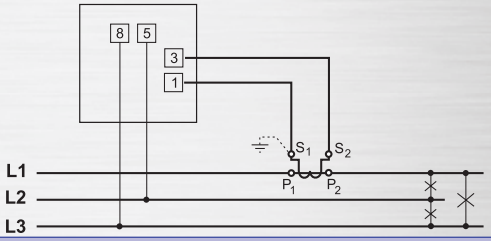


Fig. 172 Power factor meter connected through a current and voltage transformers to a single-phase network

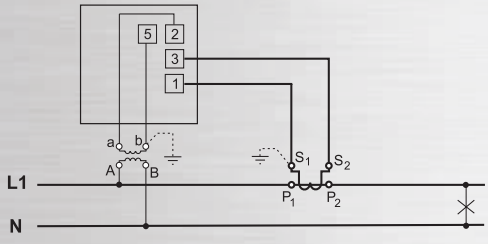
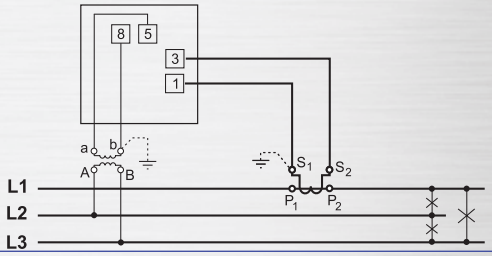


Fig. 173 Power factor meter connected through a current and voltage transformers to a three-phase symmetrically loaded network



D.C. Ammeters and D.C. Voltmeters EA and EB

Please, specify in the order:
- name and meter type
- measuring range
- overload value – only for current ranges
- data of measuring transformers – if the meter is foreseen to co-operate with transformers
- working position
- meter climate version - only for tropical versions or similar to marine
- extra requirements if necessary

Ordering example: voltmeter of EA17 type, 500 V range, direct measurement, vertical 90°working position, scale consistent to the range, without extra requirements.

D.C. and A.C. Ammeters and Voltmeters MA and MB

Please, specify in the order:
- name and meter type
- measuring range
- data of the shunt – if the meter is foreseen to co-operate with an interchangable shunt
- working position
- meter climate version - only for tropical versions or similar to marine
- extra requirements if necessary

One must order the shunt separately.
When ordering meters for a.c. current or voltage, add „with rectifier" to the meter name.

Ordering example: ammeter of MA16 type, 40 A range, to co-operate with shunt of B2 40 A/60 mV type, vertical 90° working position, scale consistent to the range, without extra requirements. If the shunt has to be delivered with the meter, one must place it in the order as a separate item, e.g. shunt B2 40 A/60 mV.

A.C. Voltmeters EP

Please, specify in the order:
- name and meter type
- measuring range
- data of measuring transformers – if the meter is foreseen to co-operate with transformers
- working position
- meter climate version - only for tropical versions or similar to marine
- extra requirements if necessary

Ordering example: voltmeter of EP27 type, 500 V range, direct measurement, vertical 90°working position, scale according to the range, without extra requirements.

DEFAULT PARAMETERS

- climate version: normal
- protection grade: IP50 (IP52 for EB16/MB16)
- working position: 90°
- scale according to the measuring range
- without an inspection certificate and extra requirements

A.C. AMMETERS AND I VOLTMETERS EV SERIES

TABLE 81. EV048, EV072, EV09, EV144

EV048, EV072, EV096, EV144 -	XXX	XXX	X	XX	X
Meters dimensions:					
48 x 48 mm	048				
72 x 72 mm	072				
96 x 96 mm	096				
144 x 144 mm	144				
Measuring range:					
acc. to table 83		XXX			
Scale:					
without scale			0		
scale equal to measuring range			1		
Version:					
standard				00	
custom-made				XX	
Acceptance tests:					
without extra requirements					0
with an extra quality inspection certificate					1

TABLICA 82 - ACCESSORIES: SCALE

Measuring range	Ordering codes for scale			
	EV048	EV072	EV096	EV144
75/150A 75/5A	0904-145-209	0904-145-009	0904-145-509	0904-145-709
80/160A 80/5A	0904-145-210	0904-145-010	0904-145-510	0904-145-710
100/200A 100/5A	0904-145-201	0904-145-001	0904-145-501	0904-145-701
150/300A 150/5A	0904-145-202	0904-145-002	0904-145-502	0904-145-702
200/400A 200/5A	0904-145-203	0904-145-003	0904-145-503	0904-145-703
250/500A 250/5A	0904-145-211	0904-145-011	0904-145-511	0904-145-711
300/600A 300/5A	0904-145-204	0904-145-004	0904-145-504	0904-145-704
400/800A 400/5A	0904-145-205	0904-145-005	0904-145-505	0904-145-705
500/1000A 500/5A	0904-145-212	0904-145-012	0904-145-512	0904-145-712
600/1200A 600/5A	0904-145-206	0904-145-006	0904-145-506	0904-145-706
750/1500A 750/5A	0904-145-213	0904-145-013	0904-145-513	0904-145-713
800/1600A 800/5A	0904-145-207	0904-145-007	0904-145-507	0904-145-707
1/2kA 1000/5A	0904-145-208	0904-145-008	0904-145-508	0904-145-708
4/8kA 4000/5A	0904-145-214	0904-145-014	0904-145-514	0904-145-714

TABLE 83

Range code:	Meassuring range	Range code:	Meassuring range
001	75/150A 75/5A	009	500/1000A 500/5A
002	80/160A 80/5A	010	600/1200A 600/5A
003	100/200A 100/5A	011	750/1500A 750/5A
004	150/300A 150/5A	012	800/1600A 800/5A
005	200/400A 200/5A	013	1/2kA 1000/5A
006	250/500A 250/5A	014	4/8kA 4000/5A
007	300/600A 300/5A	015	500V
008	400/800A 400/5A		

Additional accessories:

- IP65 cover:
  for EV048 - code: 1301-130-702
  for EV072 - code:1301-130-701
  for EV096 - code: 1301-130-700

POWER METERS PA39

TABLE 84. POWER METER PA39

PA39 -	X	X	X	X	X	X	XX	X
Kind of measured power and measuring element:								
measurement of active power in 1-phase network	A							
measurement of active power in a 3-phase network, 3-wire balanced network	B							
measurement of active power in a 3-phase network, 3-wire unbalanced network	C							
measurement of active power in a 3-phase network, 4-wire balanced network	D							
measurement of active power in a 3-phase network, 4-wire unbalanced network	E							
measurement of reactive power in a 3-phase network, 3-wire balanced network	F							
measurement of reactive power in a 3-phase network, 3-wire unbalanced network	G							
measurement of reactive power in a 3-phase network, 4-wire balanced network	H							
measurement of reactive power in a 3-phase network, 4-wire balanced network	K							
Input voltage:								
write in the range code Un from the table 85		X						
Frequency of the input voltage:								
50 Hz			0					
60 Hz			1					
400 Hz			2					
Input current:								
write in the range code In from the table 85				X				
Power flow direction:								
unidirectional, zero on the left side of the scale					0			
bidirectional, zero in the middle side of the scale					1			
Work position:								
write in the position code from the table 88						X		
Version:								
standard							00	
custom-made							XX	
Acceptance tests:								
without extra requirements								0
with an extra quality inspection certificate								1
other requirements								X

TABLE 85

Un [V]																								
Single phase active power	A	100/√3	100	230	280	400																		
3-phase 3-wire active power symmetrically loaded	B						230	400	500	690	3000/100	6000/100	10000/100	15000/100	20000/100	30000/100	40000/100	60000/100	110000/100	220000/100	400000/100			
3-phase 3-wire active power asymmetrically loaded	C																							
3-phase 4-wire active power symmetrically loaded	D						133/230	230/400	280/500	400/690	3000/100√3	6000/100√3	10000/100√3	15000/100√3	20000/100√3	30000/100√3	40000/100√3	60000/100√3	110000/100√3	220000/100√3	400000/100√3			
3-phase 4-wire active power asymmetrically loaded	E																							
3-phase 3-wire reactive power symmetrically loaded	F						230	400	500	690	3000/100	6000/100	10000/100	15000/100	20000/100	30000/100	40000/100	60000/100	110000/100	220000/100	400000/100			
3-phase 3-wire reactive power asymmetrically loaded	G																							
3-phase 4-wire reactive power symmetrically loaded	H						133/230	230/400	280/500	400/690	3000/100√3	6000/100√3	10000/100√3	15000/100√3	20000/100√3	30000/100√3	40000/100√3	60000/100√3	110000/100√3	220000/100√3	400000/100√3			
3-phase 4-wire reactive power, asymmetrically loaded	K																							

In/x	IN Code x=5	IN Code x=1	Power unit	Un Code T	U	A	V	W	B	C	D	E	F	G	H	I	K	L	M	N	P	R	S
1	–	A1	W	50	100	200	250	400	400	600	800	1,2	5	10	15	25	30	50	80	100	200	400	800
5; 5/x	B5	B1		250	500	1	1,2	2	2	3	4	6	25	50	60	120	150	250	400	500	1	2	4
10/x	C5	C1		500	1	2	2,5	4	4	6	8	12	50	100	150	250	300	500	800	1	2	4	8
15/x	D5	D1		800	1,5	3	4	6	8	10	12	15	80	150	250	400	500	800	1,2	1,5	2,5	5	12
20/x	E5	E1		1,2	2	4	6	8	8	12	15	20	100	200	300	500	600	1	1,5	2	4	8	15
30/x	F5	F1		1,5	3	6	8	12	12	20	25	30	150	300	500	800	1	1,5	2	3	5	10	20
50/x	G5	G1							20	30	40	50	250	500	800	1,2	1,5	2,5	4	5	10	20	40
75/x	H5	H1							30	50	60	80	400	800	1,2	2	2,5	4	5	8	15	25	50
100/x	I5	I1							40	60	80	100	500	1	1,5	2,5	3	5	8	10	20	40	80
150/x	J5	J1	kW; kvar						60	100	120	150	800	1,5	2,5	4	5	8	12	15	25	50	120
200/x	K5	K1							80	120	150	200	1	2	3	5	6	10	15	20	40	80	150
300/x	L5	L1							120	200	250	300	1,5	3	5	8	10	15	20	30	50	100	200
400/x	M5	M1							150	250	300	400	2	4	6	10	12	20	30	40	80	150	300
600/x	N5	N1							200	400	500	600	3	6	10	15	20	30	40	60	100	200	400
800/x	P5	P1							300	500	600	800	4	8	12	20	25	40	60	80	150	300	600
1000/x	R5	R1							400	600	800	1	5	10	15	25	30	50	80	100	200	400	800
1200/x	S5	S1							500	800	1	1,2	6	12	20	30	40	60	100	120	250	500	1000
1500/x	T5	T1							600	1	1,2	1,5	8	15	25	40	50	80	120	150	300	600	
2000/x	U5	U1							800	1,2	1,5	2	10	20	30	50	60	100	150	200	400	800	
3000/x	V5	V1	MW; Mvar						1,2	2	2,5	3	15	30	50	80	100	150	200	300	600	1000		
4000/x	W5	W1							1,5	2,5	3	20	20	40	60	100	120	200	300	400	800			
6000/x	X5	X1							2	4	5	6	30	60	100	150	200	300	400	600	1000			
10000/x	Y5	Y1							4	6	8	10	50	100	150	250	300	500	800	1000				
20000/x	Z5	Z1							8	12	15	20	100	200	300	500	600	1000						

Notes: the power range results from the given rated values of current and voltage transformers, acc. to the table 3 (e.g. for the given example, the power range is 1,5 Mvar).

MAX DEMAND AMMETERS BA AND BE

TABLE 86. BIMETALLIC METERS BA27, BE27, BA39, BE39

BA27, BE27, BA39, BE39 -	X	X	XXXX	X	X	X	X
Version:							
standard, to fix in a panel	1						
direct fixing on the transformer (only BA27)	2						
custom-made version[1)]	X						
Climatic categories:							
standard version		N					
tropical version		T					
custom-made version[2)]		X					
Ranges:							
acc. to the table 87 (write the code, e.g.: F205)			XXXX				
Setting time of the bimetallic element:							
15 minutes				0			
8 minutes				2			
Working position:							
acc. to the table 88					X		
Signs on the dial and markings:							
dial with a standard scale (consistent to the range)						0	
dial with the scale in %						1	
dial execution acc. to the order [3)]						X	
Acceptance tests:							
without extra requirements							0
with an extra quality inspection certificate							1
other requirements [3)]							X

1) - the code number is established by the manufacturer
2), 3) - all extra requirements must be agreed with the manufacturer

TABLE 88

Work position	Code			
	EB16	MB16	MA16 EA16	other meters
c3, α = 90°	A	A	A	0
c1, α = 0°		B	B	A
c2, α = 15°			C	B
c2, α = 30°			D	C
c2, α = 45°			E	D
c2, α = 60°			F	E
c2, α = 75°			G	F
c4, α = 105°			H	H
c4, α = 120°			I	I

TABLE 87

Code Range	Range description (measuring range)	Code range	Range description (measuring range)
F201	1.2 A	F366	1920 A 1.6k/1
F205	6 A	F4	1.2 XA X/5
F3	1.2X A X/1	F405	6 A 5/5
F301	1.2 A 1/1	F406	7.2 A 6/5
F305	6 A 5/1	F407	12 A 10/5
F306	7.2 A 6/1	F408	18 A 15/5
F307	12 A 10/1	F409	24 A 20/5
F308	18 A 15/1	F411	36 A 30/5
F309	24 A 20/1	F412	48 A 40/5
F311	36 A 30/1	F413	60 A 50/5
F312	48 A 40/ 1	F414	72 A 60/5
F313	60 A 50/1	F415	96 A 80/5
F314	72 A 60/1	F416	120 A 100/5
F315	96 A 80/1	F417	180 A 150/5
F316	120 A 100/1	F418	240 A 200/5
F317	180 A 150/1	F420	360 A 300/5
F318	240 A 200/1	F421	480 A 400/5
F320	360 A 300/1	F422	600 A 500/5
F321	480 A 400/1	F423	720 A 600/5
F322	600 A 500/1	F424	960 A 800/5
F323	720 A 600/1	F450	1200 A 1k/5
F324	960 A 800/1	F451	1800 A 1.5k/5
F350	1200 A 1k/1	F452	2400 A 2k/5
F351	1800 A 1.5k/1	F454	3600 A 3k/5
F352	2400 A 2k/1	F455	4800 A 4k/5
F354	3600 A 3k/1	F456	6000 A 5k/5
F355	4800 A 4k/1	F457	7200 A 6k/5
F356	6000 A 5k/1	F459	12000 A 10k/5
F357	7200 A 6k/1	F465	1440 A 1.2k/5
F359	12000 A 10k/1	F466	1920 A 1.6k/5
F365	1440 A 1.2k/1		

POWER FACTOR METERS FA

TABLE 89. POWER FACTOR METERS FA39 AND FA32

FA39 and FA32 -	X	X	X	XX	X	XX	X
Measurement of power factor in:							
1-phase system	1						
3-phase system, in a 3-phase balanced network	3						
Measuring range:							
0.5 $_{cap}$...1...0.5 $_{ind}$		A					
0.8 $_{cap}$ ...1...0.2 $_{ind}$		B					
0.85 $_{cap}$ ...1...0.85 $_{ind}$		C					
0$_{cap}$ ...1		D					
Input current:							
1 A			1				
5 A			5				
Input voltage:							
60 V (only for measurement in a 1-phase system)				01			
100 V				02			
110 V				03			
230 V				04			
400 V				05			
415 V (only for measurement in a 3-phase system)				06			
440 V (only for measurement in a 3-phase system)				07			
500 V (only for measurement in a 3-phase system)				08			
on request - after agreeing with the manufacturer				XX			
Working position:							
acc. to the table 88					X		
Version:							
standard						00	
custom-made*						XX	
Acceptance tests:							
without extra requirements							0
with an extra quality inspection certificate							1
other requirements*							X

* - after agreeing with the manufacturer

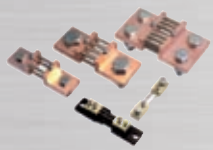
FREQUENCY METERS CA

TABLE 90. FREQUENCY METERS CA32, CA37, CA39

CA32, CA37, CA39 -	X	X	X	XX	X
Frequency range:					
45...55 Hz	1				
45...65 Hz	2				
48...52 Hz	3				
55...65 Hz	4				
58...62 Hz	5				
140...160 Hz	6				
180...220 Hz	7				
360...440 Hz	8				
380...420 Hz	9				
Range voltage:					
60 V		1			
100 V		2			
110 V		3			
230 V		4			
400 V		5			
415 V		6			
440 V		7			
500 V		8			
690 V		9			
Working position:					
acc. to the table 88			X		
Version:					
standard				00	
custom-made*				XX	
Acceptance tests:					
without extra requirements					0
with an extra quality inspection certificate					1
other requirements*					X

* - after agreeing with the manufacturer

SHUNTS



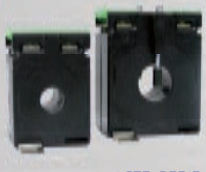
Type / Parameters	Shunts				
	B2	B3	B4	B5	B6
Voltage drop	60 mV	150 mV	50 mV	75 mV	100 mV
Rated current	1 A...15 kA (1; 1.5; 2.5; 4; 6 and their decimal multiples)				
Accuracy class	0.5				

- all shunts from 1...25 A are fixed on insulating basis with the possibility to be mounted on a DIN rail
- shunts of other ranges are fixed directly on the DC rail or cable
- dimensions acc. DIN 43703

CURRENT TRANSFORMERS

LCTM SERIE

Type / Parameters	LCTM current transformers with a primary winding	
	LCTM 62/W (40)	LCTM 74W (45)
Primary current [A]	1...25	1...60
External dimensions	40 x 62 mm	45 x 74 mm
Accuracy class	0.2; 0.5; 1	0.2; 0.5; 1



LCTR SERIE

Type / Parameters	LCTR current transformers for a round conductor			
	LCTR 45/14(40)	LCTR 50/14 (30)	LCTR 50/14 (50)	LCTR 62/R
Primary current[A]	30..300	40...300	30...300	50...600
Hole diameter	ϕ14	ϕ14	ϕ14	ϕ22
Accuracy class	0.5; 1	0.5; 1	0.5; 1	0.2; 0.5; 1

LCTB 45 LCTB 62

Type / Parameters	LCTB current transformers for a busbar					
	LCTB 45/21(40)	LCTB 50/21 (30)	LCTB 50/21 (50)	LCTB 62/20 (40)	LCTB 74/20 (45)	LCTB 50/30 (30)
Primary current [A]	5...400	50...400	50...400	50...400		75...600
Hole diameter	ϕ20	ϕ21	ϕ21	-	ϕ20	ϕ36
Busbar (mm)	20 x 10	20 x 10	30 x 10; 20 x 15 20 x 20; 2 x 20 x 10	20 x 12 2 x 15 x 6	20 x 10	30x10; 20x15 20x20 2x20x10
Accuracy class	0.5; 1	0.5; 1	0.5; 1	0.2S; 0.2; 0.5; 1	0.2S; 0.2; 0.5; 1	0.5; 1

LCTB 74 LCTB 86

Type / Parameters	LCTB current transformers for a busbar					
	LCTB 50/30 (50)	LCTB 62/30 (40)	LCTB 62/30 (50)	LCTB 74/30 (45)	LCTB 62/40 (40)	LCTB 86/40 (45)
Primary current [A]	75...600	50...800	40...800	30...800	100...800	50...1000
Hole diameter	ϕ26	ϕ30,5	ϕ28	ϕ26	ϕ31	ϕ36
Busbar [mm]	30x10; 20x15; 20x20; 2x20x10	30x10 2x25x10	30x10 2x25x10	30x15 2x20x10	40x10 2x30x10	40x10 2x30x15
Accuracy class	0.5; 1	0.2S; 0.2; 0.5; 1				

Type / Parameters	LCTB current transformers for a busbar					
	LCTB 74/40 (45)	LCTB 74/50 (45)	LCTB 86/50 (45)	LCTB 86/60 (45)	LCTB 104/60 (45)	LCTB 104/80 (45)
Primary current [A]	40...1000	100...1000	100...1250	100...1600	100...1600	200...2000
Hole diameter	ϕ35	ϕ41	ϕ45	ϕ51	ϕ54	ϕ65
Busbar [mm]	40x12 2x30x15	50x12 2x40x10	50x12 2x40x15	60x12 2x50x15	60x12 2x50x15 2x40x20	80x12 2x60x15 2x50x25
Accuracy class	0.2S; 0.2; 0.5; 1					

Type / Parameters	LCTB current transformers for a busbar			
	LCTB 140/80 (45)	LCTB 140/100H (45)	LCTB 225/125 (50)	LCTB 225/167 (50)
Primary current [A]	200...2000	200...4000	600...6000	1000...7500
Hole diameter	73	86	-	-
Busbar [mm]	80x30 2x60x25	100x30 2x80x25 2x70x30	124x92	166x65
Accuracy class	0.2S; 0.2; 0.5; 1	0.2S; 0.2; 0.5; 1	0.2S; 0.2; 0.5; 1	0.2S; 0.2; 0.5; 1

Type / Parameters	LCTB current transformers for a busbar			
	LCTB 100/100V (45)	LCTB 140/100V (45)	LCTB 100/130V (45)	LCTB 140/130V (45)
Primary current [A]	400...2500	200...3000	400...3200	400...5000
Hole diameter	-	-	-	-
Busbar [mm]	41 x 103	100x30 2x80x25 2x70x30	38 x 128	70 x 130
Accuracy class	0.2S; 0.2; 0.5; 1		0.2; 0.5; 1	0.2S; 0.2; 0.5; 1

Type / Parameters	LCTS split core current transformers			
	LCTS 93/30SC (40)	LCTS 125/50SC (40)	LCTS 155/80SC (40)	LCTS 195/80SC (64)
Primary current [A]	100...400	250...1000	250...3000	500...5000
Hole dimensions (depth x width)	23 x 33 mm	82 x 52 mm	82 x 122 mm	82 x 162 mm
Accuracy class	0.5; 1	0.5; 1	0.5; 1	0.5; 1

We offer: On customers request we offer transformer calibration certificates.

ORDERING

ORDERING WAY

Please, specify in the order: transformer type / primary current / secondary current / power / accuracy class

Order example: LCTM 62/W (40) 25/5A, 5VA, cl. 1

APPLICATION:

- visualization of essential technological process' parameters (DN, DL)
- displaying text messages (DA1)

SELECTED FEATURES:

- different digit sizes (100, 200 and 300 mm) for showing information from different distances
- analog input for direct connection with a measuring transducers (DNL)
- RS-485 interface with Modbus Master protocol to connect external information source
- RS-485 interface with Modbus Slave protocol for sharing displayed values with master systems (SCADA, PLC)

APPLICATION EXAMPLES

Type / Parameters	Outdoor or indoor displays
	DN1, DN2, DN3
Display	numerical
Digit height	100/200/300 mm
Number of rows	1 or 2
Characters per row	3,4 or 5
Display colour	red, yellow or green
Displayed values	value measured by external device, transmitted through RS-485 interface
Interface (Master)	RS-485 for value download
Programming	during the production process
Protection rating frontal/rear side	IP54 (IP65 option)
Additional functions	· good visibility in range up to 120m · brightness sensor installed (display brightnes changes depending on outside conditions)

Type / Parameters	Indoor displays				
	DL11, DL12, DL13	DL21	DLZ	DA1	DNL
Display	numerical			alphanumerical	numerical
Digit height	100 mm			60 mm	230 mm (DNL2), 305 mm (DNL3)
Number of rows	1, 2 or 3	1	1	2 or 3	1 or 2
Characters per row	3	3	7	20 or 24 for text version	4
Display colour	red, yellow or green	red/orange/green (programmable)	red	red, yellow or green	red, yellow
Displayed values	value measured by external device, transmitted through RS-485 interface		current time, humidity and temperature (version with P18 transducer)	value measured by external device, transmitted through RS-485 interface, programmed texts, current time	value measured by external device, transmitted through RS-485 interface
Interface (Master)	Modbus RTU RS-485 for value transmission				
Interface (Slave)	RS-485 for configuration			RS-485 or RS-232 for configuration	RS-485 for configuration
Programming	using dedicated software	using LPCon software		using dedicated software	using LPCon software
Additional functions	· unit field can be printed in each row · 15 V d.c. supply for P18 transducer	· 3-colour, display colour changes on value change. Ranges of colour changes can be programmed	· digits brightness can change depending on day time	-	· visibility up to 120m · brightness sensor (digital brightness changes depending on outside conditions) · analog input 4...20 mA

DN1, DN2, DN3

Fig.174 Electrical connections of DN1,DN2, DN3

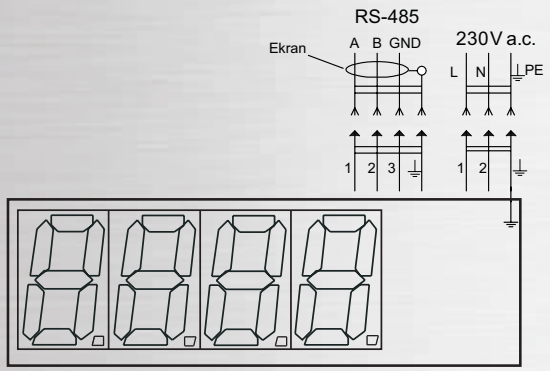
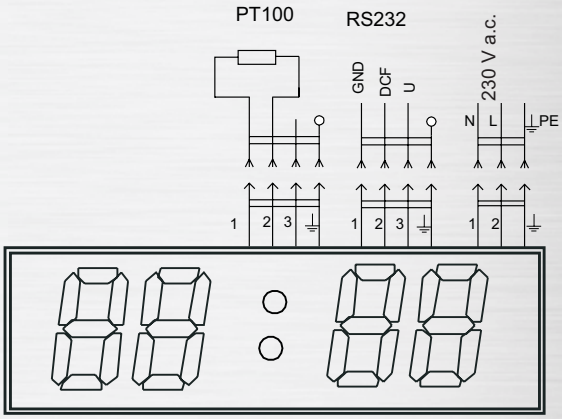
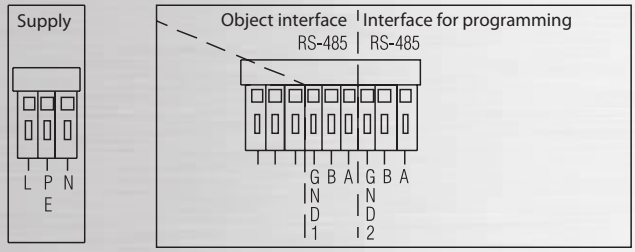


Fig.175 Electrical connections of DN3-8xxxxxxx (temperature + time)



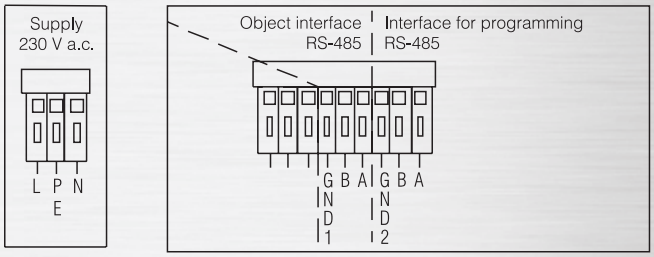
DL11, DL12, DL13

Fig. 176 Electrical connections of DL11, DL12, DL13



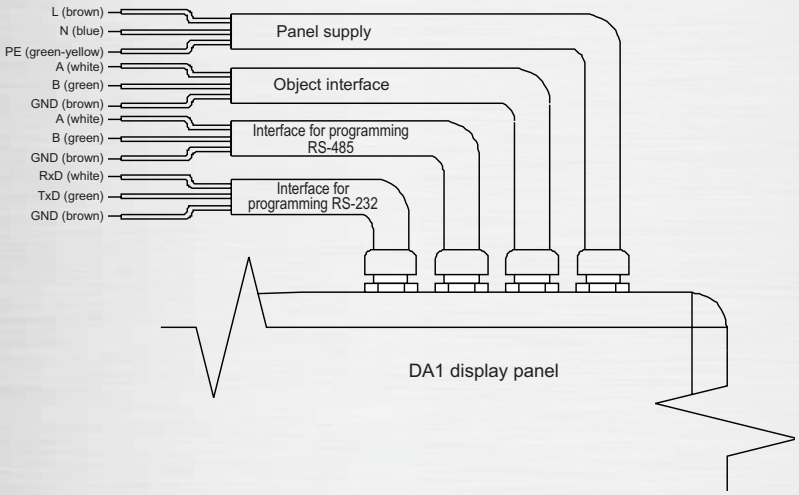
DL21

Fig. 177 Electrical connections of DL21



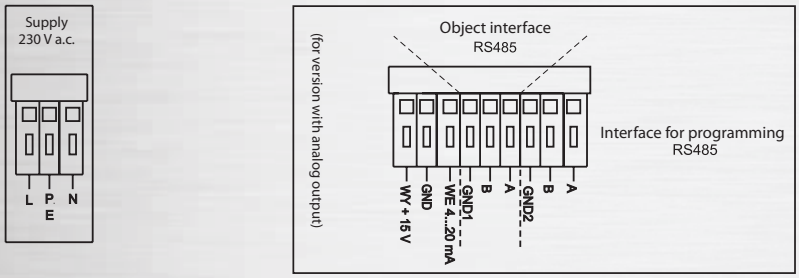
DA1

Fig. 178 Electrical connections of DA1



DNL

Fig.179 Electrical connections of DNL



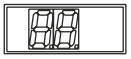
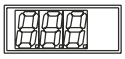
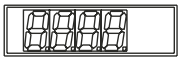
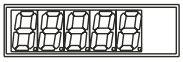
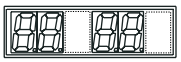
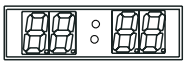
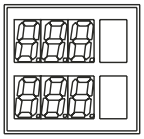
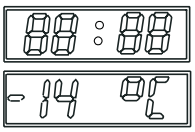
Outdoor display

Table 91. DN1, DN2, DN3 ordering code:

DN -	X	X	X	X	X	XX	XX	X	XX	X
Digit hight:										
100 mm	1									
200 mm	2									
300 mm	3									
Kind of display:										
Code acc to the table 92 (version 8 concerns DN3)		X								
on order*		9								
Digit colour of the first display field:										
red			R							
yellow			Y							
green			G							
blue** (concerns version 1...4 and 6 acc. to the tab.92)			B							
Digit colour of the second display field:										
lack of second field				0						
red				R						
yellow				Y						
green				G						
Way of fixing:										
on the wall					1					
suspended					2					
on order*					9					
Unit of the first display field:										
code number of the unit acc. to the table 93						XX				
on order*						99				
Unit of the second display field:										
code number of the unit acc. to the table 93							XX			
on order*							99			
Quantity displayed and measuring device:										
acc. to the table 94								X		
on order*								9		
Version:										
standard									00	
custom-made*									XX	
Acceptance tests:										
without extra quality requirements										0
with an extra quality inspection certificate										1
acc. to customer's request*										X

* after agreeing with the manufacturer
** concerns DN1

Table 92.

Code	Kind of display	Number of digits	Display overal dimensions [mm] DN1	DN2	DN3	Assembly dimensions [mm] DN1	DN2	DN3
1		2 digits	a = 415 b = 77 h = 160	a = 560 b = 77 h = 264	a = 820 b = 100 h = 370	c = 220 d = 50 L = 250	c = 320 d = 75 L = 350	c = 450 d = 80 L = 450
2		3 digits	a = 415 b = 77 h = 160	a = 560 b = 77 h = 264	a = 820 b = 100 h = 370	c = 220 d = 50 L = 250	c = 320 d = 75 L = 350	c = 450 d = 80 L = 450
3		4 digits	a = 593 b = 77 h = 160	a = 810 b = 77 h = 264	a = 1200 b = 100 h = 370	c = 320 d = 50 L = 420	c = 430 d = 75 L = 480	c = 850 d = 80 L = 710
4		5 digits	a = 593 b = 77 h = 160	a = 810 b = 77 h = 264	a = 1200 b = 100 h = 370	c = 320 d = 50 L = 420	c = 430 d = 75 L = 480	c = 850 d = 80 L = 710
5		2x 2 digits	a = 593 b = 77 h = 160	a = 810 b = 77 h = 264	a = 1200 b = 100 h = 370	c = 320 d = 50 L = 420	c = 430 d = 75 L = 480	c = 850 d = 80 L = 710
6		clock	a = 415 b = 77 h = 160	a = 810 b = 77 h = 264	a = 1200 b = 100 h = 370	c = 320 d = 50 L = 420	c = 430 d = 75 L = 480	c = 850 d = 80 L = 710
7		2x 3 digits 2 rows	a = 415 b = 77 h = 270	a = 560 b = 77 h = 478	a = 820 b = 100 h = 680	c = 320 d = 50 L = 250	c = 320 d = 75 L = 350	c = 450 d = 80 L = 450
8*	 **Uwaga:** Alternate display every 10 sec. Clock synchronized by DCF signal.	clock + temperature			A = 1200 B = 100 H = 370			C = 850 D = 80 L = 450

* concerns DN3

Table 93. Codes of highlighted unit:

Code	Unit	Code	Unit	Code	Unit
00	without unit	22	°F	44	m^3/h
01	mV	23	K	45	obr
02	V	24	% H_2O	46	obr/min
03	kV	25	mbar	47	rad
04	mA	26	Bar	48	szt.
05	A	27	mmH_2O	49	szt./h
06	kA	28	mmHg	50	O_2
07	kW	29	Pa	51	CO
08	MW	30	hPa	52	CO_2
09	var	31	kPa	53	l
10	kvar	32	MPa	54	l/min
11	Mvar	33	pH	55	l/h
12	kWh	34	s	56	mg
13	Ω	35	min	57	kg
14	kΩ	36	h	58	Mg
15	μ S	37	mm	59	k/h
16	mS	38	cm	60	Mg/h
17	Hz	39	m	61	N
18	kHz	40	m^3	62	kN
19	MHz	41	m/s	63	mg/l
20	%	42	m/h		
21	°C	43	km/h		

Table 94. Code of backlighted unit and measuring devices

Displayed quantities	Code
Without measuring quantity	0
Temperature measurement * Measuring range	1
Humidity measurement * Measuring range	2
Temperature and humidity measurement * Measuring range	3
Pressure measurement * Measuring range	4
Measurement of the real time * Measuring range	5
Measurement of pulses, revolutions, working time * Measuring range	6
Measurement of power network parameters * Measuring range	7
measurement of current and voltage standard signals * Measuring range	8

Indoor displays

Table 95. DL11 ordering code:

DL11 -	X	XX	X
Colour of display field:			
red	R		
yellow	Y		
green	G		
Version:			
standard		00	
custom-made*		XX	
Acceptance tests:			
without extra requirements			0
with an extra quality inspection certificate			1
acc. to customer's request*			X

Table 96. DL12 ordering code:

DL12 -	X	X	XX	X
Colour of first display field:				
200 mm	2			
300 mm	3			
Colour of second display field:				
red		R		
yellow		Y		
green		G		
Version:				
standard			00	
custom-made*			XX	
Acceptance tests:				
without extra requirements				0
with an extra quality inspection certificate				1
acc. to customer's request*				X

Table 97. DL13 ordering code:

DL12 -	X	X	X	XX	X
Colour of first display field:					
200 mm	2				
300 mm	3				
Colour of second display field:					
red		R			
yellow		Y			
green		G			
Colour of third display field:					
red			R		
yellow			Y		
green			G		
Version:					
standard				00	
custom-made*				XX	
Acceptance tests:					
without extra requirements					0
with an extra quality inspection certificate					1
acc. to customer's request*					X

Table 98. DL21 ordering code:

DL21 -	XX	X
Version:		
standard	00	
custom-made*	XX	
Acceptance tests:		
without extra requirements		0
with an extra quality inspection certificate		1
acc. to customer's request*		X

Table 99. DA1 ordering code:

DA1 -	XX	X	X	X
Display type:				
with text 2x20 characters (character hight h=60 mm)	01			
with text 3x24 characters (character hight h=60 mm)	02			
graphical 16x120 points	03			
graphical 32x144 points	04			
on order	XX			
Colour:				
red		R		
yellow		Y		
green		G		
Interface for programming:				
RS-232			0	
RS-485			1	
RS-232 + RS-485			2	
Ethernet			3	
Profibus DP			4	
CAN			5	
Acceptance tests:				
without extra requirements				0
with an extra quality inspection certificate				1
acc. to customer's request*				X

Table 100. DNL ordering code:

DNL -	X	X	XX	X	XX	XX	X	X
Digit hight:								
230 mm (9")	2							
305 mm (12")	3							
Colour of digits in first row:								
red		R						
yellow		Y						
Unit of the first row:								
lack			00					
acc. to the table 101			XX					
Colour of digits in the second row:								
lack of row				0				
red				R				
yellow				Y				
Unit of the second row:								
lack					00			
acc. to the table 101					XX			
Version:								
standard						00		
first row with input 4...20 mA and output +15 V						01		
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

Table 101. Codes of highlighted unit:

Code	Unit
00	lack
01	%
02	°C
03	szt.
04	imp.
05	kg
06	m/s
07	szt./h
08	m^3
09	obr
XX	on order

* after agreeing with the manufacturer

Clamp meters NC10 NEW!

- Unique design of rotating clamp jaws facilitate the measurement at positions difficult to access.
- Large Jaw Opening:
  - Clamp meter NC10 1000A: Jaw opening of 55 mm for standard wire diameter of 50 mm
  - Clamp meter NC10 300A: Jaw opening of 44 mm for standard wire diameter of 40 mm
- Current measurement up to 300 and 1000 A.
- Temperature measurement from -200 to 800 °C using Pt 100 and Pt 1000 sensors.
- Backlit digital display with analog indicator.
- Auto Power Off - battery saving function.
- DATA Hold Function.
- MIN, MAX function - recording function of min. and max. values.
- NULL ZERO Correction for Resistance - for low ohm measurement, the lead resistance can be compensated by pressing the shift key (Yellow Key).
- NULL ZERO Correction for Capacitance. For nF range, stray capacitance can be compensated by shift key (Yellow Key).
- AUTO and MANUAL ranging modes.
- Diode Measurement - for testing diode and transistors, diode measurement function is available.
- Protection rate IP20.
- Applicable International Safety standards - 600 V CAT IV/1000V CAT III as per International Safety standard IEC 61010-1- 2001.

NC10 300 A

NC10 1000 A

TABLE 102. NC10 ORDERING CODE:

NC10 -	X	XX	X	X
Maximum current measuring range AC:				
300 A	1			
1000 A	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

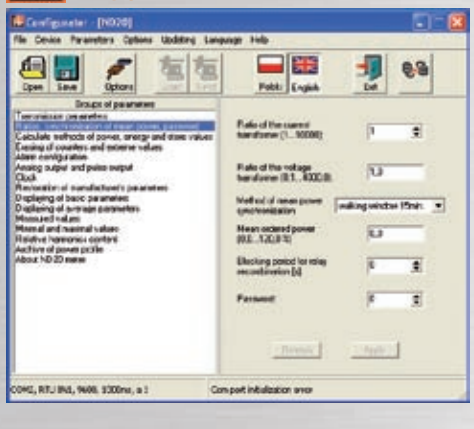
* after agreeing with the manufacturer

LPCON FREE SOFTWARE FOR CONFIGURATION OF LUMEL S.A. PRODUCTS

PD14 – PROGRAMMER TO CONFIGURE NON RS-485 DEVICES USING LPCON
PD10 – RS-485 TO USB CONVERTER THAT CAN BE USED TO CONFIGURE USING LPCON A DEVICE EQUIPPED WITH RS485

- Easy configuration of Lumel products
- Upload / download full configuration of a device connected to a PC computer using RS485 or PD14 programmer (USB)
- Full device configuration can be saved to a file and stored on a PC computer for later use
- A device template can be created for a RS485 Modbus device not listed in LPCon
- Firmware update for Lumel products

LPCon



programmer **PD14**

PRODUCTION OF PLASTIC PARTS

In the scope of plastic parts production, we offer complex services, from the design of moulds and tools, through the production, machining and assembling, to the delivery of ready products.
We can execute any large-series of parts using entrusted tools or ordered with us. We specialize in the production of plastics moulded pieces for electronics, automotive industries and also for household equipment.
In the scope od production and machining of plastic parts **we offer:**

- designing and manufacturing of moulds,
- execution of parts in all shapes,
- ultrasonic welding,
- gluing,
- silk-screen printing,
- varnish processing,
- anti-electrostatic protection.

We are currently using following plastics: ABS, PA, PC, PE, PMMA, POM, PPE, PPS, PVC, SAN, SB, TPU, in 30 grades and colours.

Machine park:

- injection moulding press Arburg 470C
- injection weight: 210 g,
- closing force: 1500 kN,
- overall mould dimensions: up to 470 x 470 mm

- injection moulding press Arburg 420C
- injection weight: 166 g,
- closing force: 800 kN,
- overall mould dimensions: up to 420 x 420 mm

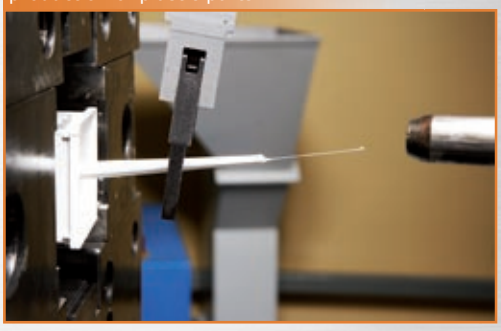
- injection moulding press Arburg 170U
- injection weight: 21 g,
- closing force: 150 kN,
- overall mould dimensions: up to 170 x 170 mm

- driers, feeding devices, slow-speed mills - from MOTAN company.

All injection moulding presses are equipped with a robot collecting gating systems.

production of
plastic parts

production of plastic parts



mould for plastic parts

Arburg - mould for plastic parts

We offer:

- one-sided and double-sided assembling of SMD elements in the technology of reflow soldering, in accordance with European Directive for RoHS,
- assembly of THT elements by flow soldering,
- complementary assembly of THT elements and mechanical parts,
- mixed assembly,
- optical inspection of assembled PCB.

Assembly can be carried out on the base of own or committed elements.

Taking advantage of the acquired experience in design and testing of our apparatus we also offer:

- design of PCB;
- completion of elements to assembly, ensuring PCB and templates for coating with soldering paste or glue in compliance with the transmitted documentation
- testing of assembled systems acc. to the customer's instructions,
- testing in the climatic chamber;
- testing of vibration resistance.

Our machine park

The assembly line is composed of:

- automatic silkscreen printer JUKI Type KS-1710
- placement machine JUKI KE-2060
- reflow oven ERSA Hotflow 2/14
- magazine loader and line unloader JOT
- soldering aggregate Kirsten
- optical control stand
- stand for thread assembly with Weller soldering stations.

Electronic Manufacturing Services

All stands and devices are equipped with the protection against static electricity in compliance with EN 61340 5-1 and 5-2 standards.

SMT line

wave soldering line

quality controll

quality controll

tester

OFFER OF HIGH PRESSURE DIE-CASTING AND CNC MACHINING

LUMEL S.A. We are one of the european leading manufacturers of high pressure aluminium die-castings.

Our offer includes:

- technical consulting,
- design of moulds and appropriate tools,
- execution of moulds and tools,
- precise die casting,
- CNC machining,
- precise surface treatment,
- varnishing and powdering process, assembly.

We fulfill all requirements of 2002/95/EC Directive about limiting Hazardous Substances in our products.

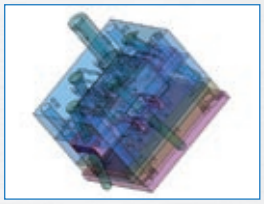
More technical details you can find in our web in our catalog CUSTOMIZED SOLUTIONS and in our web **www.odlewy.lumel.com.pl**.

high pressure
die - casting

Quality **precision!**

DESIGN
OF MOULDS AND TOOLS

on the basis of drawing and 3D documentation
CAD/CAM software: SolidWorks, EdgeCAM, AlphaCAM, MAGMA (for simulation of filling the mould chamber)



EXECUTION
OF MOULDS AND TOOLS

forming elements (mould cavities, punches, sliders)
trimming devices, CNC fixtures
gauges, measurement fixtures
tools for plastic working, bending dies, punching dies

PRECISE
DIE - CASTING

aluminium alloys 43400, 44200, 46000, 46100 47000 acc. to EN 1706
castings up to 4 kg
closing force of die-casting machines up 750 tones
vacuum systems and injection cooling
quality inspection: spectrometer, rotostative, X-ray

CNC
MACHINING

more than 42 CNC machines
milling and lathe CNC machines
machining in 4 programmables axes
turned parts - by using bar feeder ⌀ 77 mm, by using fixture ⌀ 280 mm

SURFACE
TREATMENT

shot blasting and tumbling
washing
chromate (trivalent chromium)
powder coating, coating by epoxy and varnishes
screen printing process

ASSEMBLY
SMT & THT

assembling of standardized and customized elements as well as elements executed in our factory
SMT & THT assembly
acc. to EX requirements

march 2013

LUMEL S.A. – we are one of leading European manufacturers of electrical devices for automation and high pressure aluminium castings. We have been on the market since 1953. We have achieved our high position on the market due to continuous development policy, competence of our employees and modern equipment for research, design and production.

The activity of LUMEL S.A. is focused on 4 main branches:

- production of automatic devices for measurement, conversion, control and recording, transmission and visualization of various industrial processes;
- production and machining of high pressure castings and manufacturing of moulds and tools;
- design and manufacturing of control and measuring systems,
- SMT assembly, precision engineering and production of plastics parts.

We provide comprehensive solutions for various branches of industry: power industry, chemical industry, metallurgy, food industry,light industry, automotive industry, white industry and mining.
We have been working according to: ISO 9001:2008, ISO 14001:2004 and ISO/TS 16949.

Welcome to co-operation!

LUMEL

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