# PRODUCTS & SERVICES CATALOG

# GUARANTEE OF THE HIGHEST QUALITY OF PRODUCTION AND SERVICES

To meet the expectations of our customers **we continuously improve 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 materials from suppliers, who meet the highest global standards.

**We work in accordance with:**
- Certificate **ISO 9001:2015**,
- Certificate **ISO 14001:2015**.

We fulfill all requirements of 2002/95/EC Directive **RoHS II 2011/65/UE** and **RoHS III 2015/863/UE** about limiting Hazardous Substances in our products.

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:** EN 61010.
- **Category III instalation acc. to:** safety requirements for electrical equipment for measurement, control and laboratory use EN 61010.

We declare with full responsibility that all products manufactured by LUMEL S.A. fulfil all requirements of Regulation (WE) of the European Parliament and the European Council no 1907/2006 dated December 18, 2006 regarding registration, rating, permits and limitations regarding chemicals (**REACH**).

# CONTENTS

# METERS AND ANALYZERS OF POWER NETWORK PARAMETERS

SCAN THE CODE
Product Code CONFIGURATOR



| | | N43 | NR30 | NR30PNET | NR30BAC | NR30IoT | ND03 | ND04 | ND08 | N14 | ND10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Measured parameters (detailed information in user's manuals) | $U_{LN}$ / $U_{LL}$ | | | | | ✔/✔ | | | | | |
| | average $U_{LN}$ / $U_{LL}$ | | | | | ✔/✔ | | | | | |
| | $I_L$ / average $I_L$ / $I_N$ | ✔/✔/ @ | ✔/✔/ ✔ | | | | ✔/✔/ - | ✔/✔/ - | ✔/✔/@ | ✔/✔/ - | ✔/✔/✔ |
| | P / Q / S | | ✔/✔/✔ | | | | - | - | | ✔/✔/✔ | |
| | $E_P$ / $E_Q$ / $E_S$ | ✔/✔/✔ | ✔/✔/✔ | | | | - | - | ✔/✔/✔ | ✔/✔/ - | |
| | 4-quadrant measurement | @ | ✔ | | | | - | - | ✔ | ✔ | |
| | PF / tgφ / cosφ / φ | | ✔/✔/ - / - | | | | - | - | ✔/✔/ - / - | | ✔/✔/ @ / @ |
| | f / THD U / THD I | ✔/✔/✔ | ✔/✔/✔ | | | | ✔/ - / - | ✔/ - / - | ✔/✔/✔ | ✔/ - / - | ✔/✔/✔ |
| | Harmonics | - | 51 | | | | - | - | - | - | |
| | P (15/30/60 min.) | ✔/✔/✔ | ✔/✔/✔ | | | | - | - | ✔/✔/ - | ✔/ - / - | ✔/✔/✔ |
| | S (15/30/60 min.) | ✔/✔/✔ | ✔/✔/✔ | | | | - | - | ✔/✔/ - | - | |
| | I (15/30/60 min.) | ✔/✔/✔ | ✔/✔/✔ | | | | - | - | ✔/✔/ - | - | |
| | Time / Date / Temp. | ✔/@/ - | ✔/✔/ - | | | | - | - | - | - | ✔/✔/ - |
| | Memory of min. and max. values | - | ✔ | | | | - | - | @ | ✔ | |
| Inputs | | 1 A/ 5 A or 63 A 57.7/100 V or 230/ 400 V or 290/ 500 V | 1 A/ 5 A or 63 A 57.7/100 V and 100/ 170 V or 230/ 400 V and 400/ 690 V | | | | 1 A/ 5 A 57.7...290 V / 100... 500 V | | 1 A or 5 A 63.5 / 110 V or 133 / 230 V or 239.6 / 415 V or 254 / 440 V or 220 / 380 V | 1 A or 5 A 57.7/100 V or 230/400 V or 400/690 V | 1 A or 5 A 57.7/100 V or 230/400 V or 290/500 V |
| Outputs | | 3 x relay 1 x pulse | 2 x relay | | | | 1 x relay - option | | | 1 x relay 1 x pulse | 2 x relays 1 x pulse |
| Interface | | RS-485 Modbus Slave | Ethernet 10/100 Baste T; RS-485 Modbus Slave | Ethernet ICMP (Ping) / Profinet ver. 2.2 | BACnet IP | MQTT | - | - | RS-485 Modbus Slave - option | RS-485 Modbus Slave | RS-485 Modbus Slave - option |
| Display | | LCD 4 x 3 digits + 1 x 7 digits | LCD 20 x 4 rows | | | | LED 3 x 3 digits | LED 3 x 4 digits | LCD 3 x 4 digits | LED 3 x 3 digits (14 mm) | 3.5" LCD 3 x 4 digits (16 mm) |
| Supply voltage | | 85...253 V a.c./ 90...300 V d.c. or 20...40 V a.c./ 20...60 V d.c. | | | | | 40...300 V a.c./d.c. | 40...300 V a.c./d.c. or 12...48 V d.c. or from measuring circuit | 60...300 V a.c./d.c. | 85..253 V a.c./d.c. | 50...64 V a.c. or 195...253 V a.c. or 246...300 V a.c. from measu-ring circuit |
| Protection IP | | IP50 | | | | | | | IP54 | IP40 | IP65 |
| Ext.dimensions | | 105 x 110 x 60 mm | | | | | 96 x 96 x 66 mm | | 96 x 96 x 61 mm | 96 x 96x 70.5 mm | 96 x 96 x 77 mm |
| Programming | | free eCon software (using miniUSB) or using buttons | | | | | - | - | - | free eCon software (using RS-485) or using buttons | |
| Additional fun-ctions | | • connection with S4AO module (module of 4 analog outputs) | | | | | - | - | - | - | |
| | | - | • data archiving up to 32 parameters | - | - | • data archi-ving up to 32 parameters | | | | • galvanic isolation of current inputs | |

@ - parameter available only through digital interface RS-485 and/or Ethernet

# METERS AND ANALYZERS OF POWER NETWORK PARAMETERS

| | | ND20LITE | ND20CT | ND20 | ND22 | ND25 | ND30 | ND30PNET | ND30BAC | ND30IoT |
|---|---|---|---|---|---|---|---|---|---|---|
| Measured parameters (detailed information in user's manuals) | $U_{LN}$ / $U_{LL}$ | ✔/✔ | | | | | | | | |
| | average $U_{LN}$ / $U_{LL}$ | @/@ | | | ✔/ - | | ✔/✔ | | | |
| | $I_L$ / average $I_L$ / $I_N$ | ✔/✔/✔ | | | | | | | | |
| | P / Q / S | ✔/✔/✔ | | | | | | | | |
| | $E_P$ / $E_Q$ / $E_S$ | ✔/✔/ - | | | ✔/✔/✔ | | ✔/✔/✔ | | | |
| | 4-quadrant measurement | ✔ | | | | | | | | |
| | PF / tgφ / cosφ / φ | ✔/✔/✔/ @ | | | ✔/ - / - /✔ | | ✔/✔/ - / - | | | |
| | f / THD U / THD I | ✔/✔/✔ | | | | | | | | |
| | Harmonics | - | | ✔ 21 | - | ✔ 31 | ✔ 63 | ✔ 51 | | ✔ 63 |
| | P (15/30/60 min.) | ✔/✔/✔ | | | ✔/✔/ - | | ✔/✔/✔ | | | |
| | S (15/30/60 min.) | - | | | ✔/✔/ - | | ✔/✔/✔ | | | |
| | I (15/30/60 min.) | - | | | ✔/✔/ - | | ✔/✔/✔ | | | |
| | Time / Date / Temp. | ✔/-/ - | | ✔/✔/ - | ✔/✔/ - | | ✔/✔/✔ | | | |
| | Memory of min. and max. values | ✔ | | | | | | | | |
| **Inputs** | | 1 A or 5 A 57.7/100 V or 230/400 V | **0.1 A and 0.25 A** 57.7/100 V or 230/400 V | 1 A or 5 A 57.7/100 V or 230/400 V or 290/500 V or 63.5/110 V or 69.3/ 120 V | 1 A/ 5 A 63.5/ 110 V or 127/ 220 V or 133/ 230 V or 220/ 380 V or 230/ 400 V or 239.6/ 415 V or 254/ 440 V | programmable 1 A/ 5 A 57.5...346.42 V/ 100...600 V | 1 A / 5 A 57.7/ 100 V 230/ 400 V or 110/190 V 400/690 V | | | |
| | | | | | | | 2 x Pt100 - option | - | | 2 x Pt100 - option |
| **Outputs** | | 1 x relay 1 x pulse | 1 x 0/4...20 mA (option) 1 x relay 1 x pulse | | 1/2 x relay (option) 2 x 4...20 mA (option) or 2 x 0...10 mA (option) | 2 x relay (option) | 1 x 0/4...20 mA (option) | | - | 1 x 0/4...20 mA (option) |
| | | | | | | | 2 x relay | | | |
| **Interface** | | RS-485 Modbus Slave | | | RS-485 Modbus Slave (option) | RS-485 Modbus Slave (option) or **Ethernet** Modbus TCP (option) | RS-485 Modbus Slave | | | |
| | | | | | | | **Ethernet** 10/100 Base-T Modbus TCP, www, FTP - option | **Ethernet** ICMP (Ping) / **Profinet** ver. 2.2 | **BACnet IP** | **MQTT** |
| **Display** | | 3.5" LCD 3 x 4 (11 mm) + 1 x 5 digits (9 mm) | | | 3.5" colour touch screen 320x240 pixel | 3.5" LCD 4 x 4 digits + 1 x 9 digits | 3.5" colour TFT LCD 320x240 pixel | | | |
| **Supply voltage** | | 85...253 V a.c./ 90...300 V d.c. or 20...40 V a.c./ 20...60 V d.c. | | | 100...250 V a.c./d.c. or 12...48 V d.c. | 100...550 V a.c./d.c. | 85...253 V a.c./ 90...300 V d.c. or 20...40 V a.c./ 20...60 V d.c. | | | |
| **Protection IP** | | IP65 | | | IP54 | | IP65 | | | |
| **Ext.dimensions** | | 96 x 96 x 77 mm | | | 96 x 96 x 80 mm | 96 x 96 x 70 mm | 96 x 96 x 77 mm | | | |
| **Programming** | | free eCon software (using RS-485 or Ethernet) or using buttons | | | - | | free eCon software (using RS-485 or Ethernet) or using buttons | | | |
| **Additional functions** | | - | • easy installation of meter and current transformer • **only to cooparation with dedicated current transformers L3XX and LJXX** | • memory 9000 samples samples for mean power | • phase reversal indication | • up to 28 programmable pages • data archiving in the internal memory 8 GB | • selection of displayed quantities on each of the 12 programmable pages • galvanic isolation between input,output, supply and interface | | | |
| | | | | | | | • temperature measurement - 2 x input Pt100 | - | | • temperature measurement - 2 x input Pt100 |
| | | • galvanic isolation of current inputs | | | | | • data archiving in the internal memory 8 GB | - | | • data archiving in the internal memory 8 GB |

@ - parameter available only through digital interface RS-485 and/or Ethernet

# METERS AND ANALYZERS OF POWER NETWORK PARAMETERS

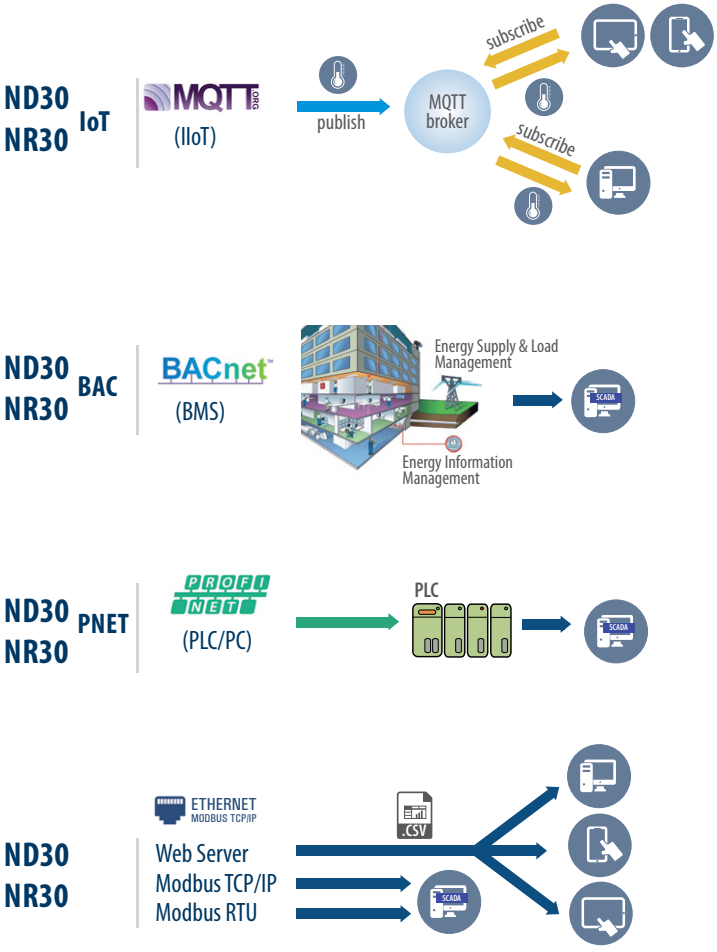
SCAN THE CODE
Product Code CONFIGURATOR


| | | N100 | ND40 | ND45 |
|---|---|---|---|---|
| Measured parameters (detailed information in user's manuals) | $U_{LN}$ / $U_{LL}$ | ✔/✔ | | |
| | average $U_{LN}$ / $U_{LL}$ | @/✔ | ✔/✔ | |
| | $I_L$ / average $I_L$ / $I_N$ | ✔/✔/✔ | | |
| | P / Q / S | ✔/✔/✔ | | |
| | $E_P$ / $E_Q$ / $E_S$ | ✔/✔/✔ | | |
| | 4-quadrant measurement | ✔ | | |
| | PF / tgφ / cosφ / φ | ✔/✔/ - / - | ✔/✔/ - /✔ | |
| | f / THD U / THD I | ✔/✔/✔ | | |
| | Harmonics/ interharmonics | ✔ 51/ - | | ✔ 51/ ✔ 51 |
| | P(15/30/60 min.) | ✔/✔/✔ | | |
| | Q(15/30/60 min.) | - | ✔/✔/✔ | |
| | S(15/30/60 min.) | ✔/✔/✔ | | |
| | I(15/30/60 min.) | ✔/✔/✔ | | |
| | Time/Date/Temp. | ✔/✔/ - | ✔/✔/✔ | |
| | Dips / Swells/ Overvoltages | - | ✔/✔/✔ | |
| | Tarrifs / Voltage asymmetry | - | - /✔ | ✔ 4 / ✔ |
| | Memory of min. and max. values | ✔ | - | |
| Inputs | | 1 A/5 A 57.7/100 V or 230/400 V or 400/690 V | 1 A /5 A 57.7/100 V or 230/400 V | 1 A /5 A 57.7/100 V or 230/400 V or 69.3/ 120 V |
| | | pulse 0/12...36 V | 2 x Pt100/Pt1000/5k Ω 6 x logic - option | 2 x Pt100/Pt1000/5k Ω 4 or 6 x logic - option |
| Outputs | | 1 x pulse, 1 x 0/4...20 mA + 3 x relay or 3 x -20...0...20 mA + 1 x relay | optionally: 3 x 0/4...20 mA; or 8 x relay | optionally: 3 or 6 x 0/4...20 mA; 4 or 8 x relay |
| Interface | | RS-485 Modbus Slave | RS-485 Modbus Slave, USB Device & Host | |
| | | Ethernet 10/100 Base-T Modbus TCP, www, FTP - option | Ethernet 10/100 Base-T Modbus TCP, www, FTP, NTP | |
| Display | | LED 4 x 4 ½ digit, backlight unit, 2-colour display (red, green) (14 mm) | 5.6" LCD TFT colour touch screen 640 x 480 pixel | |
| Supply voltage | | 85...253 V a.c. / 90...300 V d.c. | 85 V..253 V a.c. / 90 V..300 V d.c. | |
| Protection IP | | IP40 | IP65 | |
| Ext.dimensions | | 144 x 144 x 77 mm | 144 x 144 x 104 mm | |
| Programming | | free eCon software (using RS-485 or Ethernet) or using buttons | dedicated software or using touch screen | |
| Additional functions | | • selection of displayed quantities on each of the 20 programmable pages<br>• galvanic isolation of current and voltage inputs<br>• data archiving in the internal memory 8 GB<br>• **available special version with input frequency up to 500 Hz** | • **measurement class A/S**<br>• measurement and logging of energy quality acc. to EN 50160, EN 61000-4-30, EN 6100-4-7<br>• oscilloscope<br>• galvanic isolation of measuring current and voltage inputs<br>• data archiving on SD card | - |
| | | | | • programmable counter inputs<br>• dips and swells stored in registers<br>• flicker |

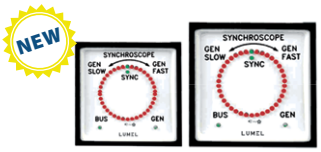

| | Current transformers dedicated to ND20CT | | |
|---|---|---|---|
| | LJ12 | LJ25, LJ35, LJ45 | L306, L307, L308 |
| Version | 1-phase | 3-phase | |
| Range | 50-250 A* | 60-600 A* | 63-250 A* |
| Class | 1 or 0.5* | | |
| Connection way to ND20CT | RJ12 connector | | screw terminals |

* - more detailed informations in data sheet

## APPLICATION EXAMPLE



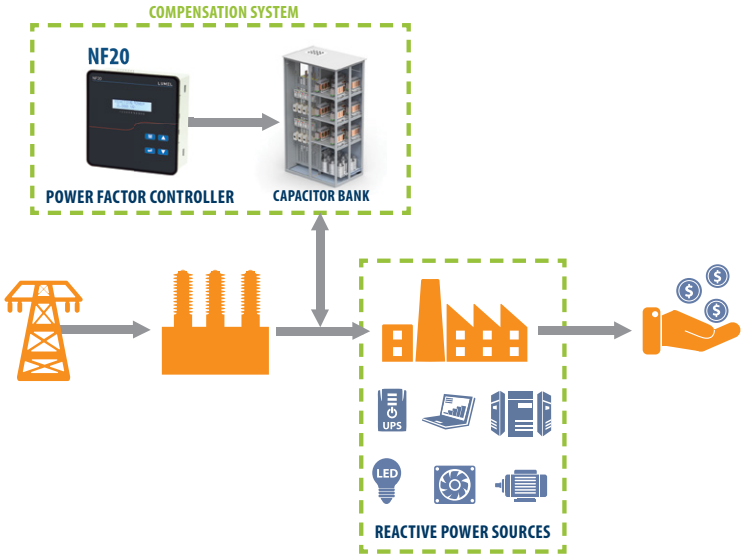
# SYNCHRONIZATION METERS & PF CONTROLLERS

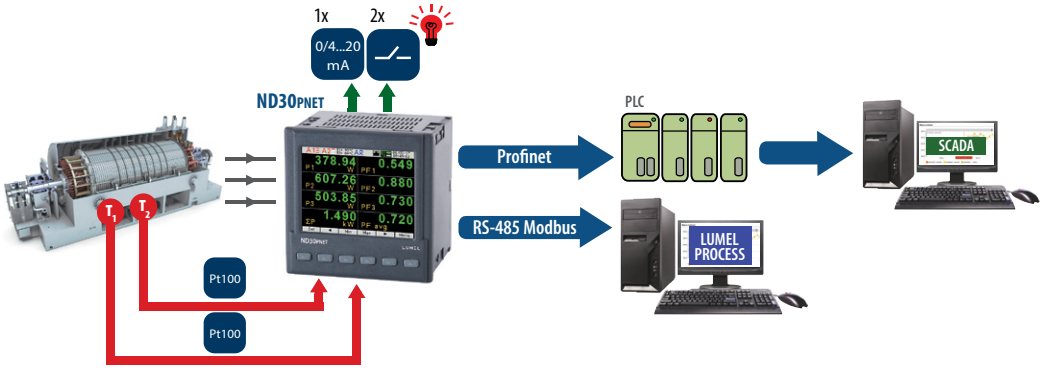


| | Synchronization Meters | | PF Controllers |
|---|---|---|---|
| | KS5 | SA12/SA19 | NF20 |
| **Input** | 50...150 V<br>150...400 V | 57.8...500 V | 1 A/ 5 A programmable<br>30...550 V |
| **Output** | 2 x relays | - | 4/6/8 or 6/8/12 switching outputs,<br>1 alarm relay |
| **Interface** | RS-485 Modbus<br>**Ethernet** 10/100 Base-T Modbus TCP, www - option | - | RS-485 Modbus - option |
| **Display** | 3.5" colour TFT LCD<br>320x240 pixel | LED indicator | graphic display LCD, 2 x 16 characters |
| **Supply voltage** | 85..253 V a.c. , 90..300 V d.c.<br>or 20..40 V a.c. , 20..60 V d.c. | - | 110...550 V a.c. |
| **Protection rating** | IP65 | IP52 | IP54 |
| **External dimensions** | 96 x 96 x 77 mm | 96 x 96 x 111.5 mm (SA19),<br>144 x 144 x 111.5 (SA12) | 96 x 96 x 51 (without extension modules)<br>96 x 96 x 75 (with extension modules)<br>144 x 144 x 56 |
| **Programming** | free eCon software, (using RS-485 or Ethernet) or using buttons | - | - |
| **Additional functions** | • memory of min. and max. values<br>• many forms of data presentation bargraph, digital<br>• additional control inputs | • one or two ranges of input voltage | • RTC - option |

## NF20 APPLICATION EXAMPLE




## ND30PNET APPLICATION EXAMPLE



# DIGITAL METERS

SCAN THE CODE
Product Code CONFIGURATOR

| | N24 | N25 | N19Z | N20 | N20PLUS | N20Z | N20ZPLUS | N21 | N27D | LLM3 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Input** | fixed<br>N24T, N25T: Pt100, J, K<br>N24S, N25S: 0/4...20 mA, ±60 mV d.c., ±10 V d.c.<br>N24H, N25H: ±100, ±250, ±400 V d.c., ±1/5 A d.c.<br>N24Z, N25Z:100, 250, 400 V a.c., 1/5 A a.c., 20...500 Hz | | fixed<br>1 A, 5 A a.c.<br>64 V, 110 V<br>240 V, 600 V a.c.<br>64/110 V,<br>133/ 230 V,<br>239.6/ 415 V a.c. | fixed<br>Pt100, J, K<br>0/4...20 mA, ± 20 mA<br>0...60 mV,<br>0...10 V,<br>± 10 V | | fixed<br>1 A, 5 A a.c.<br>100 V, 250 V, 400 V a.c.<br>20...500 Hz | | programmable<br>Pt100<br>J, K<br>± 20 mA,<br>± 10 V,<br>±60 mV | fixed<br>0...500 V a.c.<br>0...63 A a.c.<br>-31.5...31.5 kW<br>45...500 Hz | 3 x<br>230...400 V a.c. |
| **Output** | supplying output (24 V/ 30 mA) for S and T versions (option) | | - | • 2 x OC<br>• supplying output (24 V/ 30 mA) | | 2 x OC | | • 1 x relay NO, 250 V~/0.5 A~,<br>• supplying output 24 V d.c. ± 5%, 30 mA | - | - |
| **Display** | red<br>LED 4 digits<br>(20 mm) | red<br>LED 5 digits<br>(14 mm) | red<br>LED 4 digits<br>(14 mm) | 3-colour programmable<br>LED 5 digits<br>(14 mm) | | | | OLED 128 x 32 pixels<br>in amber colour | yellow<br>LED 4 digits<br>(8.5 mm) | 3 x dual red<br>LEDs |
| **Supply voltage** | 24 V a.c., 110 V a.c., 230 V a.c.,<br>85...253 V a.c./d.c., 20...40 V a.c./d.c. (option) | | 80...300 V a.c.,<br>40...300 V<br>a.c./d.c.<br>20...60 V a.c./d.c. | 85...253 V or 20...40 V a.c./d.c. (for N20, N20Z, N20ZPLUS)<br>85...253 V or 20...40 V a.c./ 20...60 V d.c. (N20PLUS) | | | | universal<br>22..60 V a.c. / 20..60 V d.c.<br>(terminals 12-13)<br>60..253 V a.c. /<br>60..300 V d.c.<br>(terminals 13-14) | 230 V a.c. | 230 V a.c. |
| **Protection rating** | IP65 | | IP50 or<br>IP65-option | IP65 | | | | | IP00 | IP50 |
| **External dimensions** | 96 x 48 x 64 mm | | 96 x 96 x 41 mm<br>or<br>96 x 48 x 73 mm | 96 x 48 x 64 mm | | | | | 110 x 53 x 60 mm | 57 x 110 x 60 mm |
| **Programming** | free eCon software (using PD14 programmer) | | - | free eCon software (using PD14 programmer - N20, N20Z or through RS-485 - N20(Z)Plus) | | | | free eCon software (using miniUSB) | - | - |
| **Additional functions** | • rescaling | | | | | | | • rescaling<br>• **vertical display** | selection of displayed quantities (kW, V, A, Hz) | external live line indicator LLI3 |
| | - | | | • **interface RS-485 Modbus Slave - only for N20PLUS and N20ZPLUS** | | | | | | |

| | N30U | N30H | N30o | N30P | N27P |
|---|---|---|---|---|---|
| **Input** | programmable<br>Pt100/500/1000<br>J, K, N, E, R, S<br>± 20 mA<br>0...10 V, -10...60 mV<br>400, 4000 Ω | programmable<br>1/5 A d.c.,<br>100/500 V d.c. | programmable<br>pulse input<br>(pulses, frequency, rotational speed, period, operating time counter, encoder) | programmable<br>1/5 A<br>100/400 V<br>1-phase power network parameters | programmable<br>1/5 A<br>or direct measurement 32/63 A<br>100 V/400 V a.c.<br>1-phase power network parameters |
| **Output** | 4 x relays (2 NO + optional 2 NOC),<br>1 x analog 0/4...20 mA or 0...10 V - option,<br>1 x pulse in N30P meter - option,<br>supplying output (24 V/ 30 mA) in N30U and N30O (for supply 85...253 V) | | | | 2 relays (2 NO)<br>or 1 x relay (NO) +<br>1 x output 0/4...20 mA |
| **Interface** | RS-485 Modbus Slave - option | | | | RS-485 Modbus Slave |
| **Display** | 3-colour programmable LED 5 digits (14 mm) | | | | OLED 0.96" yellow |
| **Supply voltage** | 85...253 V a.c./d.c.<br>or 20...40 V a.c., 20...60 V d.c. | | 85...253 V a.c./d.c.<br>or 20...40 V a.c./d.c. | | 85..253 V a.c.<br>90...300 V d.c. |
| **Protection rating** | IP65 | | | | IP50 (1/5 A) or IP00 (32/63 A) |
| **External dimensions** | 96 x 48 x 93 mm | | | | 110 x 53 x 60 mm |
| **Programming** | free eCon software (using RS-485) or using buttons | | | | free eCon software (using miniUSB, RS-485 or buttons) |
| **Additional functions** | • Conversion of any measured value into a current or voltage analog signal.<br>• Storage of minimal and maximal values for all measured quantites.<br>• 21-point rescaling for the measured value (does not apply to N30P and N27P) | | | • Password protection.<br>• Programmable current and voltage transformer ratio (applies to N27P and N30P). | |

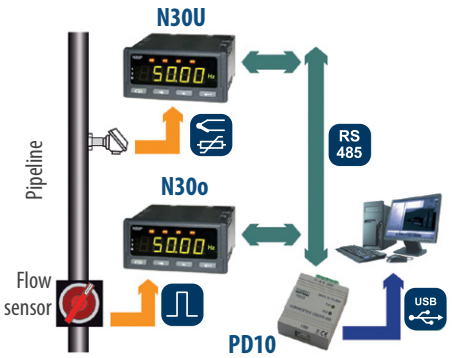
# DIGITAL METERS



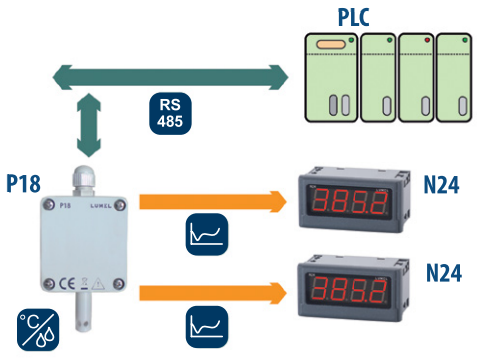
| | NA3 | NA5PLUS | NA6PLUS |
|---|---|---|---|
| **Input** | programmable<br>Pt100/500/1000,<br>J, K, N, E, R, S, T<br>0...5/20 mA d.c.,<br>0...2/5 A d.c.,<br>0...60 mV d.c.,<br>0...10/600 V d.c., 0...3/10/600 V d.c.<br>0...4 kΩ | programmable<br>Pt100/500/1000,<br>J, K, N, E, R, S, T<br>± 40 mA d.c.,<br>± 5 A d.c.,<br>± 75 mV d.c., ± 300 mV d.c.,<br>±10 V d.c., ±0...600 V d.c.,<br>0...5 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** | RS-485 Modbus Slave | | |
| **Bargraph** | 3- or 7-colour programmable horizontal | 3- or 7-colour programmable vertical | 2 x 3- or 2 x 7-colour programmable vertical |
| **Display** | LED 4 digits (7 mm) or 4 digits (14 mm) | LED 4 digits (7 mm) | 2 x LED 4 digits (7 mm) |
| **Supply voltage** | 95...253 V a.c./d.c. or 20....40 V a.c./ 20....60 V d.c. | | |
| **Protection rating** | IP40 | IP50 | |
| **External dimensions** | 96 x 24 x 125 mm | 48 x 144 x 100 mm | |
| **Programming** | free eCon software (using RS-485) or using buttons | | |
| **Additional functions** | • 21-point rescaling (NA5PLUS and NA6PLUS)<br>• arithmetical functions $x^2$, $\sqrt{x}$, (+, -, *, / - only in NA6PLUS)<br>• logging of the measured signal in programmed time intervals (800 samples) | • memory of minimal and maximal values for all measured parameters<br>• password protection<br>• conversion of any measured value into a current or voltage analog signal | |

## APPLICATION EXAMPLES

### Temperature and flow measurement in a pipeline

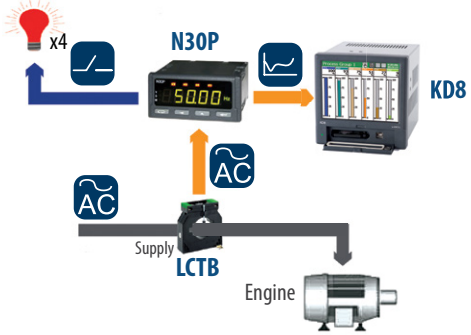



### Air temperature and humidity measurement




### Current measurement in an electroplating plant


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



# TRANSDUCERS, SEPARATORS

SCAN THE CODE
Product Code CONFIGURATOR


## Basic transducers

| | P10 | P10Z | P20 | P20Z | T23CT | P21Z | P20H | P15 | P17 |
|---|---|---|---|---|---|---|---|---|---|
| **Input** | fixed 4...20 mA d.c. 0...1/5/20/ 100 mA d.c. 0...60/75/100/ 500 mV d.c. 0...1/5/10/150 V d.c. | fixed 1/5 A a.c. 0...100/250/ 300 V a.c. | 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 50,100,150, 200,300 A a.c./d.c. | fixed 0...100/250/ /400 V a.c. 0...1/5 A a.c. 20...500 Hz | fixed 100, 250, 400 V d.c. ±100, ±250, ±400 V d.c. ±1, ±5 A d.c. | fixed 0/4...20 mA 1...5 mA | fixed Pt100 J, K, N, E, 0...10 V 0...60 mV |
| **Output** | 0/4...20 mA or 0/2...10 V | 0/2...10 mA or 0/4...20 mA or 0...10 V or 0...5 V | 0/4...20 mA or 0...10 V | | 4...20 mA | 0/4...20 mA or 0...10 V or RS-485 Modbus Slave | | 2 x 0/4...20 mA | passive 0/4...20 mA |
| **Supply voltage** | 24...60 V a.c./d.c. 60...300 V a.c./d.c. | 24...60 V a.c./d.c. 40...300 V a.c./d.c. | 85...253 V a.c./d.c. or 20...85 V d.c./ 20...65 V a.c. | 85...253 V a.c./d.c. or 20...40 V a.c./d.c. | 24 V d.c. | 85..253 V a.c. / 90..300 V d.c. or 20..40 V a.c. / 20..60 V d.c. | | 20...40 V a.c. 20...60 V d.c. 60...300 V a.c./d.c. | supplied from output current loop |
| **Protection rating** | IP40 | | | | IP65 | IP40 | | | IP50 |
| **External dimensions** | 22.5 x 65.5 x 106.5 mm | | 22.5 x 120 x 100 mm | | 70 x 92 x 47 mm | 22.5 x 120 x 100 mm | | 22.5 x 65.5 x 106.5 mm | 6.2 x 77.5 x 100 mm |
| **Additional functions** | - | - | free eCon software (using PD14 programmer) | - | hole diameter: 28 mm busbar: 30 x 10 mm | free eCon software (using PD14 programmer) | | - | - |


| | Separators | | Advanced transducers | | | |
|---|---|---|---|---|---|---|
| | P20G | P17G | P30U | P30O | P30H | P30P |
| **Input** | programmable 0/4...20 mA ±20 mA 0...5/10 V ±5V, ±10 V | 0/4...20 mA | 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, ±10 V, ±24 V 400, 2000, 5500 Ω , RS-485 Master or Slave | 2 programmable inputs: pulse counter, frequency, rotational speed, period, operating time counter, pulse differantial counter on inputs or encoder | d.c. network parameters programmable current using shunt ± 200 mV voltage 0...12/48/100/250 V voltage 0...600/1000V in set with additional D5 resistor | 1-phase power network parameters fixed 1A (X/1A), 5A (X/5A) 100 V(x/100 V) or 250 V |
| **Output** | programmable -20...20 mA -10...10 V | active output 0/4...20 mA | 1 x analog 0/4...20 mA or 0...10 V 1 x relay NO 1 x additional NO relay optionally exchangable with 24 V, 30 mA supplying output | | 1 x analog 0/4...20 mA or 0...10 V 1 x relay NO optionally exchangable with additional analog output 0/4...20 mA or 0...10 V 1 x additonal NO relay optionally exchangable with 24 V, 30 mA supplying output | |
| **Interface** | - | - | RS-485 Modbus (Slave or Master) - standard \| **Ethernet** 10/100 Base-T - option | | | |
| **Display** | - | - | LCD 2x8 characters with LED backlight | | | |
| **Supply voltage** | 85...253 V a.c./d.c. or 20...85 V d.c., 20...65 V a.c. | supplied from input current loop | 85...253 V a.c./d.c. or 20...40 V a.c./20...60 V d.c. | | 85...253 V a.c. , 85...300 V d.c. or 20...40 V a.c., 20...60 V d.c. | |
| **Protection rating** | IP40 | IP50 | IP40 | | | |
| **External dimensions** | 22.5 x 120 x 100 mm | 6.2 x 77.5 x 100 mm | 45 x 120 x 100 mm | | | |
| **Programming** | - | - | using buttons or free eCon software using RS-485 Modbus, **Ethernet (option)** | | | |
| **Additional functions** | free eCon software (using PD14 programmer) | - | • alarms indicated on the display • internal memory 534336 samples • WWW server, FTP, Modbus TCP/IP Slave (optionally) • data logging in internal memory or on SD card (optionally) | | | |
| | | | • rescaling (up to 21 points) • memory of min. and max. values (with time stamp) • mathematic functions independent for both inputs • filtration of periodic signals (only P30O) | | • memory of min. and max. values | |

# TRANSDUCERS, SEPARATORS



| | Power transducers | | |
|---|---|---|---|
| | **P41** | **P30P** | **P43** |
| **Input** | programmable<br>1/ 5 A , 100/ 400 V<br>1-phase power network parameters | fixed<br>1/5 A , 100 or 250 V<br>1-phase power network parameters | fixed<br>1 or 5 A, 100 or 400 V<br>3-phase power network parameters |
| **Output** | 1 x analog programmable ±20 mA | 1 x analog 0/4...20 mA or 0...10 V<br>1 x NO relay optionally exchangable with additional analog output 0/4...20 mA or 0...10 V<br>1 x additional NO relay optionally exchangable with 24 V, 30 mA supplying output | 4 x relays<br>or 2 x relay + 2 x analog programmable ±20 mA<br>or 4 x analog programmable ±20 mA |
| **Interface** | RS-485 Modbus Slave | RS-485 Modbus (Slave or Master) - standard<br>**Ethernet** 10/100 Base-T - option | RS-485 Modbus Slave |
| **Display** | - | LCD 2x8 characters with LED backlight | - |
| **Supply voltage** | 85...253 V a.c./90...300 V d.c.<br>or 20...40 V a.c. /20...60 V d.c. | 85...253 V a.c. , 85...300 V d.c.<br>or 20...40 V a.c., 20...60 V d.c. | 85...253 V a.c./90...300 V d.c.<br>or 20...40 V a.c. /20...60 V d.c. |
| **Protection rating** | IP40 | | |
| **External dimensions** | 45 x 120 x 100mm | | 90 x 120 x 100 mm |
| **Programming** | free eCon software using USB or RS-485 | using buttons or free eCon software<br>using RS-485 Modbus, **HTTP (option)** | free eCon software using USB or RS-485 |
| **Additional functions** | • memory for selected measured value – 9 000 samples<br>• memory of minimal and maximal values<br>• programmable current and voltage transformer ratios | • alarms indicated on the display<br>• internal memory 534336 samples<br>• programmable current and voltage transformer ratios<br>• WWW server, FTP, Modbus TCP/IP Slave (optionally)<br>• data logging in internal memory or on SD card (optionally) | • memory for average power – 9 000 samples<br>• memory of minimal and maximal values<br>• programmable current and voltage transformer ratios<br>• pulse output |

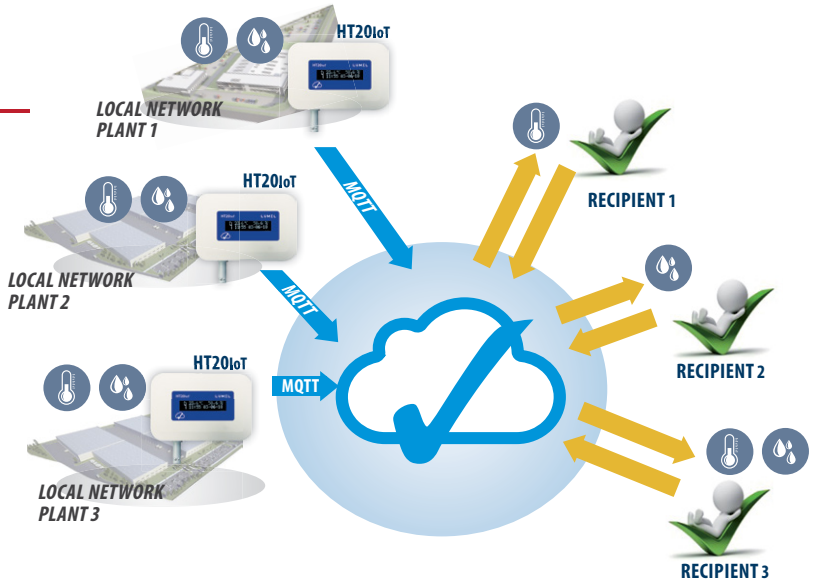

| | P18 and P19 temperature and humidity transducers | | | | |
|---|---|---|---|---|---|
| | **P18L** | **P18** | **P18D** | **P18S** | **P19** |
| **Measurement range** | -30 ... -20 ... 60 ... 85°C<br>or 0...100% RH | -30 ... -20 ... 60 ... 85°C, 0...100% RH | | | -20 ... 60 °C, 0...100% RH |
| **Output** | passive 4...20 mA | 2 x 4...20 mA or 0...10 V (option) | | - | |
| **Interface** | - | RS-485 Modbus | | | |
| **Galvanic isolation** | - | supply/ RS-485 (for version without analog outputs) | | supply/ RS-485 | |
| **Supply voltage** | 19...30 V d.c.<br>(supplied by a current loop) | 9 ... 24 V d.c./a.c | | 9 ... 28 V d.c./a.c | 9 ... 24 V d.c./a.c |
| **Protection rating** | IP65 | | | | IP20 |
| **External dimensions** | 38 x 58 x 118 mm | | | (sensor case) 86 x 12.5 mm | 120 x 80 x 25 mm |
| **Additional functions** | - | • calculation of other quantities (dew-point temp.; absolute humidity) | | • memory of measured and calculated min. and max. values | |
| | | • available version with sensor mounted on the wire 0.5 m | | • wire to cnonnect RS-485 and supply | - |
| | | - | • data presentation on a LCD display<br>• configuration of transmis-sion parameters using the capacitive button | - | |

# MONITORS, DATA LOGGERS

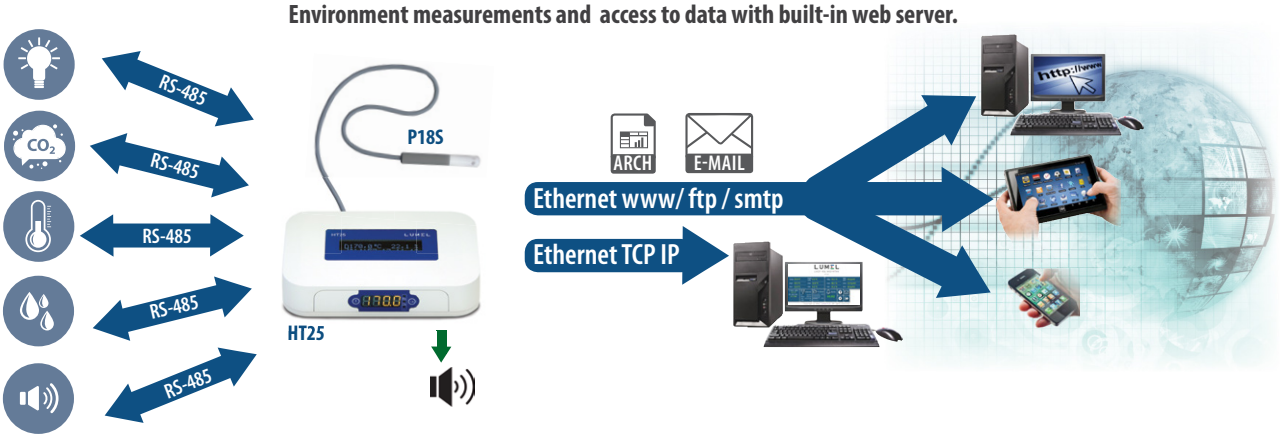
SCAN THE CODE
Product Code CONFIGURATOR


| | Humidity and temperature monitor | | Data logger |
|---|---|---|---|
| | HT20 | HT20IoT | HT25 |
| Number of channels | up to 4 channels ( T [°C], RH [%], a [g/m³], Td [°C] ) | | up to 16 channels (4 channels reserved for data logging from P18S/P18/P18D) |
| Input | built-in temperature and humidity sensor | | Modbus RTU Master |
| Output | Modbus TCP/IP | | |
| Measurement range | -20...60 °C, 0...100% RH | | - |
| Interface | Ethernet (WWW, FTP, SMTP, DHCP) | | 1 x RS-485 (Modbus Slave or Master)<br>Ethernet (WWW, FTP, SMTP, DHCP) |
| | - | MQTT | |
| Memory | internal - 8GB | | |
| Display | LCD, 2 x 16 characters | | LCD, 2 x 16 characters and LED, 4 characters |
| Supply voltage | 6 V d.c. or PoE IEEE 802.3af - option | | 12 V d.c. or PoE IEEE 802.3af - option |
| Protecting rating | IP20 | | |
| External dimensions | 150 x 100 x 30 mm | | |
| Additional functions | • data presentation on a LCD display and on website<br>• parameter configuration through a web browser<br>• email messages in case of alarm occurs<br>• acustic signaling of alarm events | | |
| | - | | • up to 90 monitored parameters (10 groups 9 register each) via web browser<br>• up to 100 monitored parameters (10 group 10 register each) via Modbus TCP/IP<br>• logging of 16 parameters (4 parameters reserved for P18S/P18/P18D) |

## HT20IoT & HT25 APPLICATION EXAMPLES




**Environment measurements and access to data with built-in web server.**




... max. 10

# ULTRASONIC LEVEL METER


| | Ultrasonic level meter<br>ULT20 |
|---|---|
| **Range of distance measurement** | 0.5...8 m<br>(The measuring range is strongly dependent on the environment in which the measurements are made and the surface from which the ultrasonic wave is reflected. Typical damping for a given environment (reflective medium) is summarized in the table next. |
| **Measurement resolution** | 0.001 m |
| **Output** | 1x analog 0/4...20 mA<br>1 x relay (2 NO outputs)<br>1 x pulse |
| **Interface** | RS-485 Modbus Slave<br>USB Device, v.2.0. |
| **Supply voltage** | 12...24...40 V d.c. |
| **Protection rating** | IP65 |
| **Programming** | free eCon software |
| **Additional functions** | • two 32-points individual characteristic (recalculate functions)<br>• memory of min. and max. values (with time stamp)<br>• internal data and setup memory |

**Typical damping for a given environment (reflective medium)**

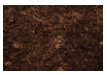
**FLUID**

| | Typical attenuation [dB] |
|---|---|
| **Calm surface**  | 0 |
| **Wavy surface**  | from 5 up to 10 |
| **Strong turbulence (agitators, etc.)**  | from 10 up to 20 |

**DUST**

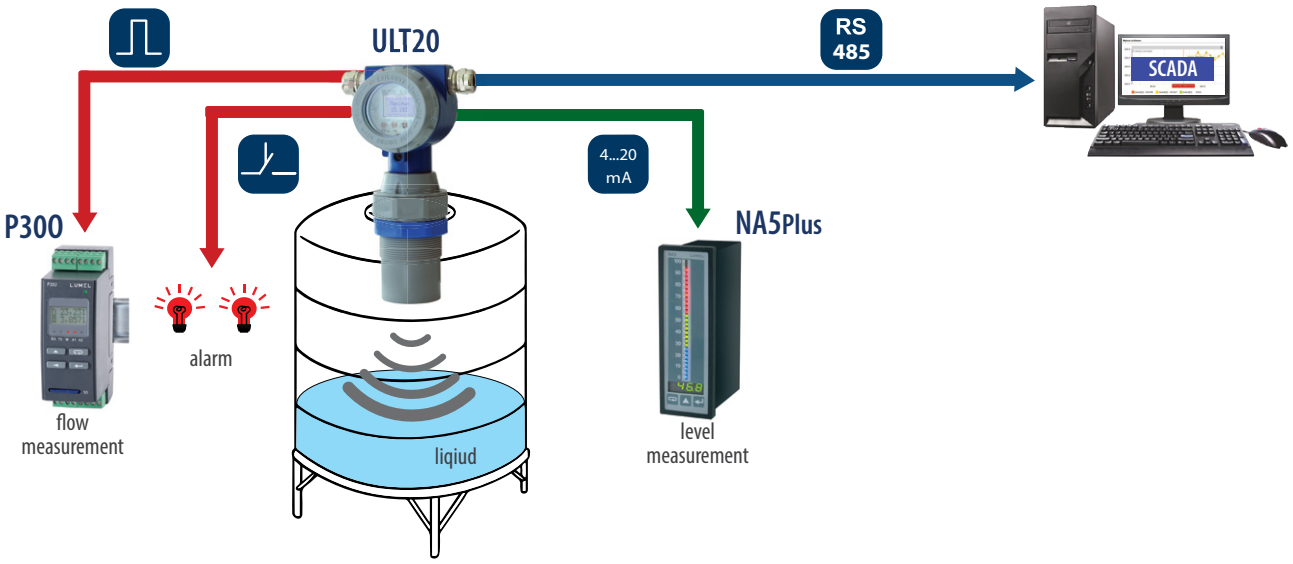
| | Typical attenuation [dB] |
|---|---|
| **Low dust**  | about 5 |
| **Large dust**  | from 5 up to 20 |

**GRANULAR**

| | Typical attenuation [dB] |
|---|---|
| **Hard, porous**  | 40 |
| **Soft with strong damping (e.g. peat)**  | from 40 up to 60 |

## ULT20 APPLICATION EXAMPLE

**Level measurement with visualisation and recording.**



# TEMPERATURE CONTROLLERS

SCAN THE CODE
Product Code CONFIGURATOR







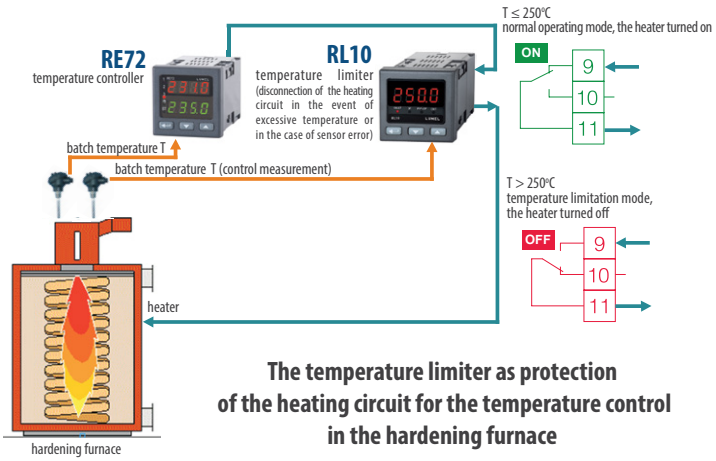

| | Industrial process controllers | | | | | | |
|---|---|---|---|---|---|---|---|
| | **RE22** | **RE70** | **RE71** | **RE81** | **RE72** | **RE82** | **RE92** |
| **Number of channels** | 1 | 1 | 1 | 1 | 1 | 1 | 2 |
| **Input** | programmable Pt100/1000 J, T, K, S, R, B, E, N, L or 0/4...20 mA, 0...5/10 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 2 x Pt100/500/1000, Ni100, Cu100 J, T, K, S, R, B, E, N, L 0/4...20 mA 0...5/10 V **2 x digital input (RS-485 Modbus Master)** |
| **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) **3 x binary input interface** |
| **Output** | relay or logic 0/5 V | relay | relays or logic 0/6 V | 2 x relays or 1 x relay + 1 x logic 0/6 V | 2 x relays / logic 0/5 V / analog 0/4...20mA / 0...10 V / supplying output 24 V d.c. 30 mA - option | 2 x relays and 2 x relays / logic 0/5V / analog 0/4...20 mA / 0...10 V (option) supplying output 24 V d.c. 30 mA - option | max. 6 x relays / 2 x logic / 2 x analog 0(4)... 20 mA / 0...10 V (option) supplying output 24 V d.c. 30 mA - option |
| **Interface** | - | RS-485 Modbus (only for configuration) | - | | RS-485 Modbus | | **2 x RS-485 (Modbus Slave & Master)**, **Ethernet** - option |
| **Alarm** | - | - | - | 1 | max. 2 | max. 3 | max. 6 |
| **Control** | on/ off or PID with self-tuning, heating or cooling | | | | | | |
| | - | - | - | step-by-step | | | |
| | - | - | - | - | programmed | | |
| **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 | colour LCD 3.5" TFT 320 x 240 pixels |
| **Supply voltage** | 230 or 110 or 24 V a.c. | 230 V a.c. | | | 85...253 V a.c./ d.c. or 20...40 V a.c./d.c. | | 85...253 V a.c./d.c. |
| **Protection rating** | IP65 | | | | | | |
| **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 |
| **Additional functions** | • soft start | - | | | • soft start<br>• profile control (15 programs with 15 segments in each) | • 6 types of alarms | • alarm LATCH function<br>• **parameter logging on SD card**<br>• **FTP and WEB server - option**<br>• profile control (20 programs with 15 segments in each) |

# TEMPERATURE CONTROLLERS & LIMITERS



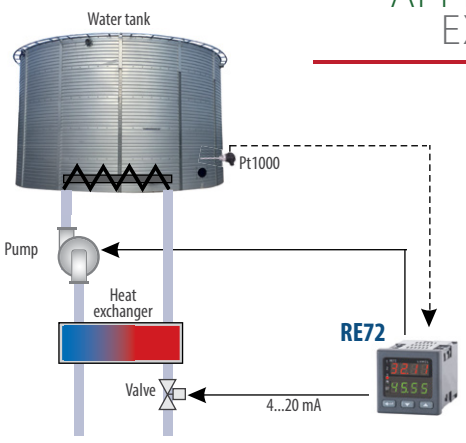



| | Industrial process controllers | | | | Temperature limiter |
|---|---|---|---|---|---|
| | **RE55** | **RE60** | **RE62** | **RE01** | **RL10** |
| **Number of channels** | 1 | 1 | 1 | 1 | 1 |
| **Input** | fixed<br>Pt100<br>J, K, S | | programmable<br>Pt100<br>J, K<br>± 20 mA, ± 10 V, ± 60 mV | fixed<br>Pt100, Pt1000<br>NTC | programmable<br>Pt100/1000<br>J, T, K, S, R,<br>B, N |
| **Additional input** | - | | - | logic | - |
| **Output** | 2 x relay or 1 x logic 0/5 V<br>+ 1 x relay | 1 x relay or 1 x logic 0/5 V<br>1 or 2 x relay - option | max 3 x relay or<br>2 x relay and 1 x analog<br>supply 24 V d.c. - option | 2 x relay (1 x NOC 10 A/230 V,<br>1 x NO 5 A/230 V) | relay |
| **Interface** | - | - | RS-485 (option) | - | RS-485 |
| **Alarm** | 1 | max 2 - option | max 3 | max 2 | - |
| **Control** | on/off, PID, heating or cooling | | | | on/off |
| **Display** | green LED 4 digits (10 mm) | LCD (2 x 8 characters) | OLED 128 x 64 pixel, amber color | red LED 4 digits (14 mm) | red LED 4 digits (9.2 mm) |
| **Supply voltage** | 85... 253 V d.c./a.c. | 24 or 110 or 230 V a.c.<br>or 18...72 V d.c. | 22...60 V a.c. / 20...60 V d.c.<br>(terminals 11-12)<br>or 60...253 V a.c. / 60...300 V d.c.<br>(terminals 10-11) | 230 V a.c. | 230 V a.c. |
| **Protection rating** | IP40 | | IP30 | IP65 | |
| **External dimensions** | 96 x 96 x 65 mm | 45 x 100 x 120 mm | 53 x 110 x 60.5 mm | 76 x 34 x 80 mm | 48 x 48 x 93 mm |
| **Remarks** | - | | | **defrost function with programmable automatic or manual mode** | meets the requirements of **EN 60519-2** for class 2 (Safety in electroheat installations) |



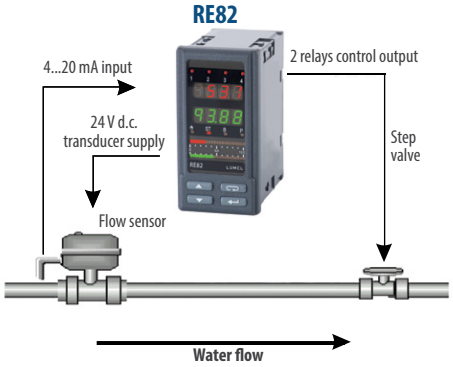

**The temperature limiter as protection of the heating circuit for the temperature control in the hardening furnace**

## APPLICATION EXAMPLES

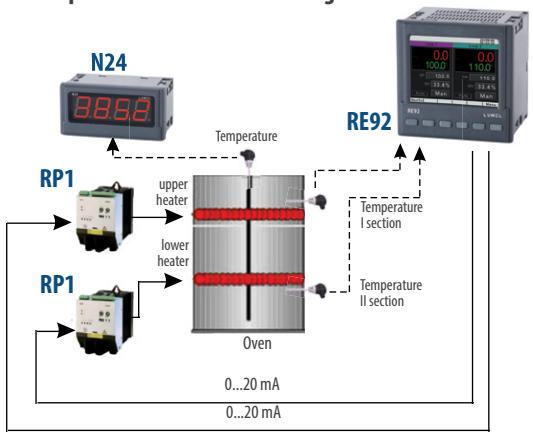



**Temperature measurement and control in a water tank**

**Water flow measurement and 3-stage valve control**




**Batch temperature measurement with a smooth heater power control in a hardening furnace**



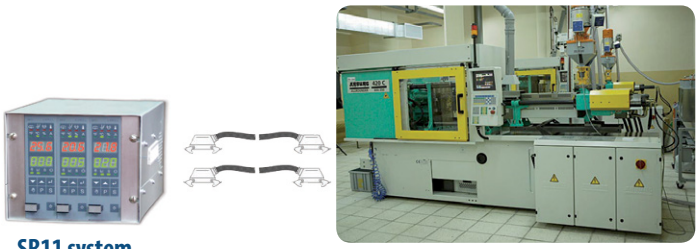
# CONTROLLER FOR INJECTION MOULDS

SCAN THE CODE
Product Code CONFIGURATOR

| | System for injection moulds with heated channels |
|---|---|
| | **SR11** |
| **Number of channels** | 1...8 |
| **Input** | fixed Fe-CuNi (J)<br>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)<br>3 x 230/ 400 V a.c. (for system with 2...8 control zones) |
| **Protection rating** | IP30 |
| **External dimensions** | 77.5 x 200 x 355 mm (1 control zone)<br>215 x 197 x 355 mm (2 or 3 control zones)<br>365 x 197 x 355 mm (4, 5 or 6 control zones)<br>465 x 197 x 355 mm (7 or 8 control zones) |
| **Additional functions** | • Fuzzy Logic algorythm ensures a high accuracy temperature control and optimal energy consumption<br>• soft-start function and leakage current monitoring ensure prolonged heaters reliability and operation safety for users<br>• during a break in system operation, a decreased temperature is maintained, what ensures a fast restart of the system<br>• damage detection:<br>- too high heater leakage current,<br>- damage of the load circuit,<br>- short-circuit, break or inverse polarization in the sensor circuit. |

## SR11 APPLICATION EXAMPLE

**Temperature control in an injection mould**



**SR11 system**

Injection mould

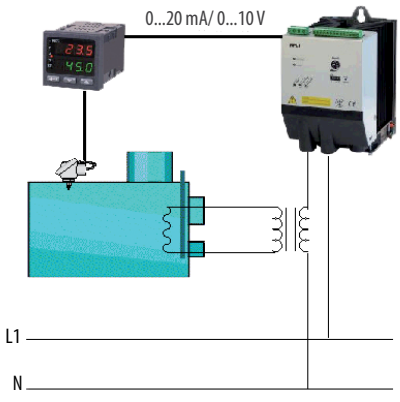
# POWER CONTROLLERS



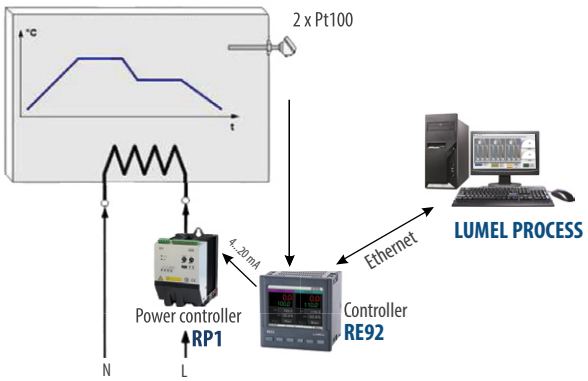

| | RP7 | RP1 | RPL1 | RP3 |
|---|---|---|---|---|
| **Version** | 1-phase | | | 3-phase |
| **Control** | phase | phase, pulse, on/off | | |
| **Input signal** | 0..5/10V, 0/4..20mA potentiometer | | | |
| **Output** | - | 2 x relays | | |
| **Output current** | 5-15 A | 25-125 A | | 3 x 40-450 A |
| **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 |
| **External dimensions** | 50 x 105 x 105 mm | 135 x 201 x 199 mm<br>135 x 231 x 199 mm | 135 x 201 x 199 mm<br>135 x 231 x 199 mm - RPL1-x4xx (version with fan) | 212 x 318 x 177 mm (40, 70, 125 A versions)<br>383 x 433 x 281 mm (200, 300, 450 A versions) |

## APPLICATION EXAMPLES

**Continuous temperature control in furnace**




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



# RECORDERS

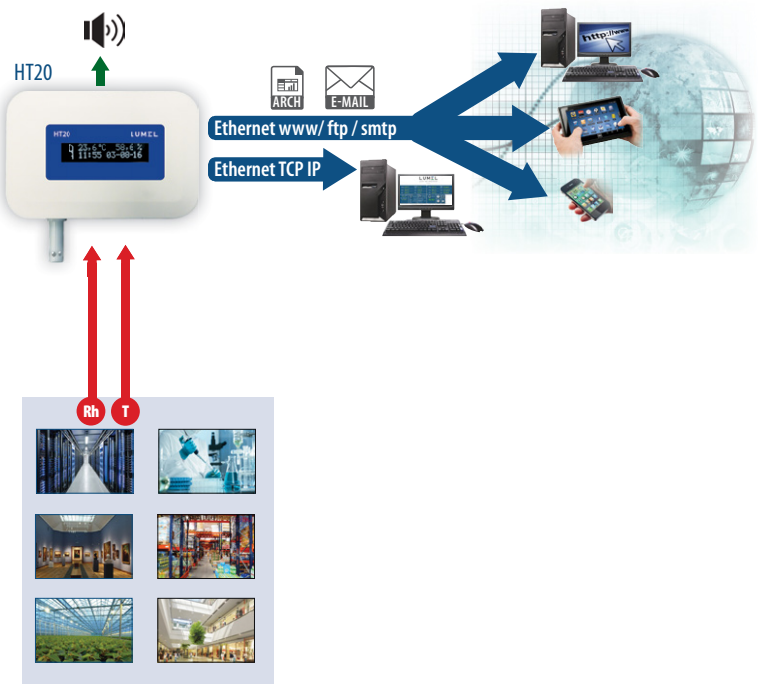
SCAN THE CODE
Product Code CONFIGURATOR



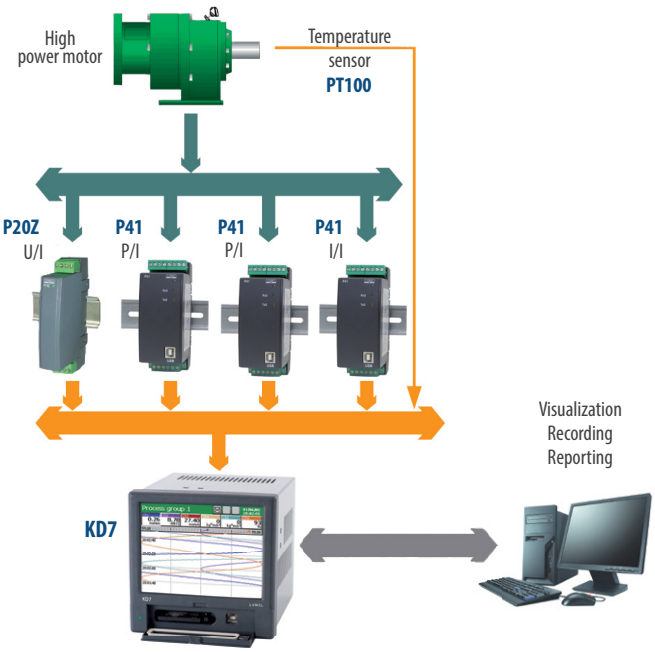

| | HT20<br>HT20IoT | HT25 | KD7 | KD8 | SM61IoT |
|---|---|---|---|---|---|
| **Number of channels** | up to 4 channels<br>( T [°C], RH [%],<br>a [g/m³], Td [°C] ) | up to 16 channels<br>(4 channels reserved for data logging from P18S/P18/P18D) | up to 24 channels<br>(max. 12 analog channels<br>and/or max. 24 digital channels) | up to 6 | up to 2500 |
| **Input** | built-in temperature<br>and humidity sensor | Modbus RTU Master | programmable<br>(3, 6, 9 or 12 inputs)<br>Pt100/500/1000,<br>Ni100, Cu100, J, K, N, E, R, S, T, B, L,<br>± 20mA<br>± 9999mV<br>50...2000 Ω<br>0...2000 Ω<br>logic input 0/5...24 V d.c.<br>(8 or 16 pcs.)<br>Modbus RTU Master<br>(24 registers) | programmable<br>(3 or 6 inputs)<br>Pt100/500/1000<br>Ni100, Cu100, J, K, N, E, R, S, T, B, L,<br>± 20mA<br>± 9999mV<br>50...2000 Ω<br>0...2000 Ω<br>logic 0/5...24 V d.c.<br>(4 or 8 pcs.) | Port II:<br>Modbus RTU Master,<br>(100 groups 25 registers each)<br>2 x logic<br>(option) |
| **Output** | Modbus TCP/IP Slave | | relays (8 or 16)<br>relays OptoMOS<br>(8 or 16)<br>analog (4 or 8)<br>0...5, 0/4...20 mA<br>0... 5 V, 1...5 V, 0...10 V<br>supplying output<br>(2 x 24 V d.c. 30 mA) | relays (6 or 12) | Port I: Modbus RTU/TCP Slave,<br>2 x relays<br>(option) |
| **Measurement range** | -20...60 °C, 0...100% RH | - | - | - | - |
| **Interface** | **Ethernet**<br>(WWW, FTP, SMTP, DHCP)<br>**MQTT**<br>(applies to HT20IoT) | 1 x RS-485<br>(Modbus Slave or Master)<br>**Ethernet**<br>(WWW, FTP, SMTP, DHCP) | 2 x RS-485<br>(Modbus Slave and Master)<br>1 x RS-232 (Modbus Slave)<br>USB Device 1.1.<br>**Ethernet** 10 Base-T | RS-485 (Modbus Slave)<br>USB Device 1.1. | 2 x RS-485<br>(Modbus Slave and Master)<br>1 x RS-232 (Modbus Slave)<br>USB Device 1.1.<br>**Ethernet** 10/100 Base-T<br>Modbus TCP/IP,<br>**MQTT** |
| **Memory** | internal - 8GB | | internal – up to 6 MB<br>external – CF card up to 4 GB | | 8 GB |
| **Display** | LCD, 2 x 16 characters | LCD, 2 x 16 characters<br>LED, 4 characters | LCD 5,7"TFT type<br>320 x 240 pixels<br>with touch panel | | - |
| **Supply voltage** | 6 V d.c. or PoE IEEE 802.3af<br>- option | 12 V d.c. or PoE IEEE 802.3af<br>- option | 90...253 V a.c., 90...300 V d.c.<br>or 18...30 V d.c. | | 85...253 V a.c., 90...300 V d.c.<br>or 20...40 V a.c., 20...60 V d.c.<br>or 10...16 V a.c., 10...20 V d.c. |
| **Protecting rating** | IP20 | | IP65 | | IP40/IP20 |
| **External dimensions** | 150 x 100 x 30 mm | | 144 x 144 x 171 mm | 144 x 144 x 171 mm | 45 x 120 x 100 mm |
| **Additional functions** | • data presentation on a LCD display and on website<br>• email messages in case of alarm occurs<br>• parameter configuration through a web browser<br>• acustic signaling of alarm events | | • many forms of data presentation: linear, bargraph, chart,<br>• digital and analog indicators,<br>• WWW and FTP Server (KD7)<br>• Windows® CE operating system<br>• PC software: KD SETUP, KD CHECK, KD CONNECT, KD ARCHIVE<br>• user access levels<br>• menu available in 8 language versions | | • HTTP<br>(WEB server -visualization in format of synoptic maps),<br>• DHCP<br>• FTP Server,<br>• RTC |
| | - | • up to 90 monitored parameters (10 groups 9 register each) via web browser<br>• up to 100 monitored parameters (10 group 10 register each) via Modbus TCP/IP<br>• logging of 16 parameters (4 parameters reserved for P18S/P18/P18D) | | | |

# APPLICATION EXAMPLES

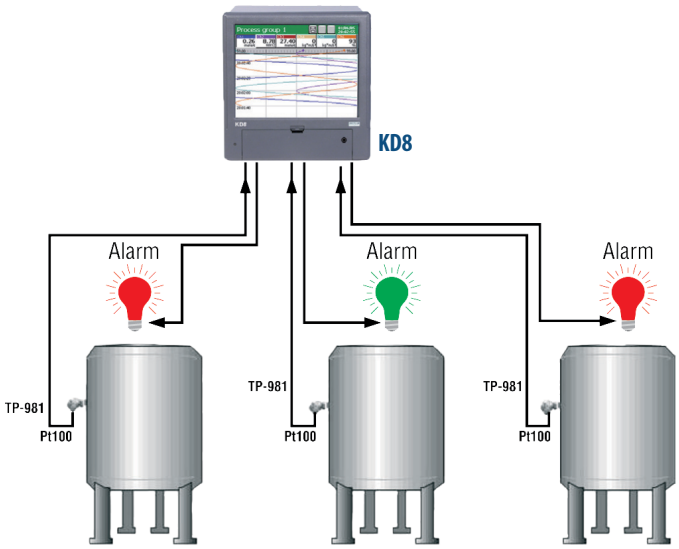
**Access to the device from anywhere in the world thanks to the built-in web server.**

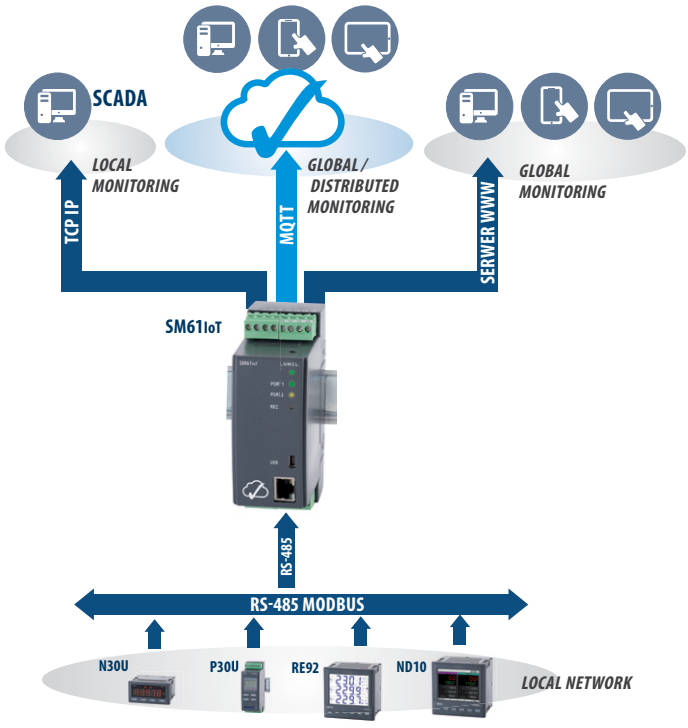



**Measurement and visualization of motor working parameters (temperature and motor load)**




**Temperature measurement, logging and alarming**



# I/O MODULES, COMMUNICATION MODULES

SCAN THE CODE
Product Code CONFIGURATOR

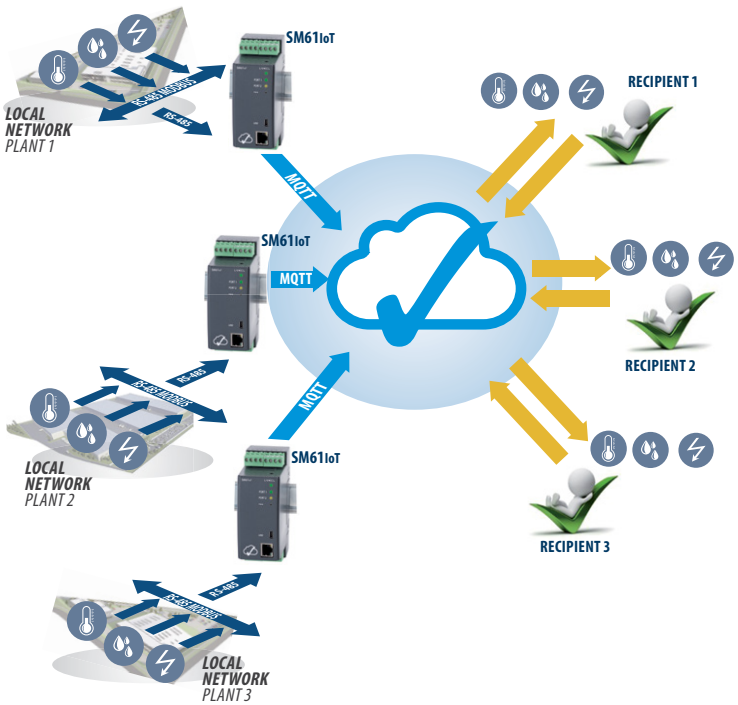
| | Input/Output modules | | | | | | |
|---|---|---|---|---|---|---|---|
| | SM1 | SM2 | SM3 | SM5 | SM4 | S4AI | S4AO |
| Number of channels | 2 | 4 | 2 | 8 | 4 or 8 | 4 | 4 |
| Inputs/outputs | fixed inputs: Pt100(-200...850°C) , 0...400 Ω or 0/4...20 mA or 0...10 V | | programmable inputs: logic on/off or pulse counter up to 1 kHz 0...4 294 967 295 pulses | fixed inputs: logic on/off | fixed outputs: 4 x relay or 8 x OC | programmable inputs: 4 x ± 10 V, ± 20mA or 4 x Pt100, Pt500, Pt1000 J, k, S, ± 150 mV | fixed outputs: 4 x 0/4...20 mA or 4 x 0..10 V or 2 x 0/4...20 mA + 2 x 0...10 V |
| Interface | RS-485 Modbus Slave, RS-232 for configuration | | | | | RS-485 Modbus (Slave), USB for configuration | 2 x RS-485 Modbus (Slave, Master) USB for configuration |
| Baud rate | 2400; 4800; 9600; 19.2 k; 38.4 k; 57.6 k; 115 k bit/s | | | | | 1200; 2400; 4800; 9600; 19.2 k, 38.4 k, 57.6 k, 115.2 k bit/s | |
| Supply voltage | 85...253 V a.c./d.c.; 20...50 V a.c./d.c. | | | | | 85...253 V a.c./ 90...300 V d.c. 20...40 V a.c./ 20...60 V d.c. | |
| Protection rating | IP40 | | | | | | |
| External dimensions | 22.5 x 120 x 100 mm | 45 x 120 x 100 mm | 22.5 x 120 x 100 mm | 45 x 120 x 100 mm | 45 x 120 x 100 mm | 53 x 110 x 60 mm | |


| | Data loggers | | |
|---|---|---|---|
| | PD22 | SM61IoT | HT25 |
| Number of channels | up to 1000 digital channels | up 2500 digital channels | up to 16 channels (4 channels reserved for data logging from P18S/P18/P18D) |
| Input | Port I: Modbus RTU Master (50 groups 20 register each) | Port II: Modbus RTU Master (100 groups 25 registers each), 2 x logic | Modbus RTU Master |
| Output | Port II: Modbus RTU Slave | Port I: Modbus RTU/TCP Slave, 2 x relay | Modbus TCP/IP |
| Interface | 3 x RS-485 (Modbus Slave and Master) 1 x RS-232 (Modbus Slave) USB Device 1.1. | 2 x RS-485 (Modbus Slave and Master) 1 x RS-232 (Modbus Slave) USB Device 1.1. Ethernet 10/100 Base-T Modbus TCP/IP, MQTT | 1 x RS-485 (Modbus Slave or Master) Ethernet (WWW, FTP, SMTP, DHCP) |
| Memory | 512 kB, 390.000 samples, 44.000 events | 8 GB | 8 GB |
| Supply voltage | 85...253 V a.c./d.c. or 20... 50 V a.c./d.c. | 85...253 V a.c./ 90...300 V d.c. or 20...40 V a.c./ 20...60 V d.c. or 10...16 V a.c./ 10...20 V d.c. | 12 V d.c. or PoE IEEE 802.3af - option |
| Protection rating | IP40 | | IP20 |
| External dimensions | 45 x 120 x 100 mm | | 150 x 100 x 30 mm |
| Additional functions | • RTC | • HTTP (web server - visualization in format of synoptic maps), • DHCP, • FTP server, • RTC | • data presentation on a LCD display and on website • email messages in case of alarm occurs • acustic signaling of alarm events • parameter configuration through a web browser • up to 90 monitored parameters (10 groups 9 register each) via web browser • up to 100 monitored parameters (10 group 10 register each) via Modbus TCP/IP • logging of 16 parameters (4 parameters reserved for P18S/P18/P18D) |




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

## SM61IoT APPLICATION EXAMPLE

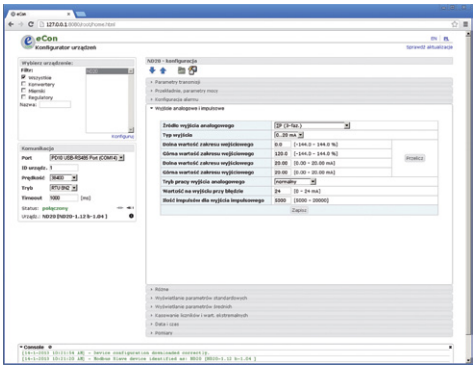


# SOFTWARE TOOLS

## eCon - Free Software for Configuration of Lumel Products

- Easy configuration of Lumel products
- Upload / download full configuration of a device connected to a PC computer using RS-485, Ethernet, USB or PD14 programmer (USB)
- Full device configuration can be saved to a file and stored on a PC computer for later use
- Firmware update for Lumel products
- Work over the web browser

eCon



**PD10** – RS-485 to USB converter that can be used to configure using eCon a device equipped with RS-485

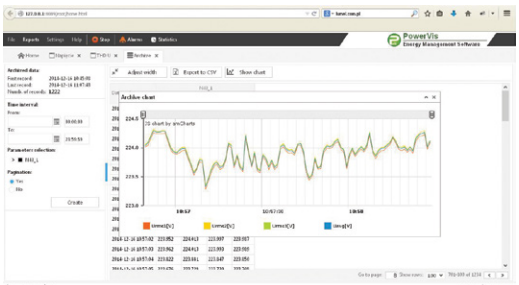
**PD14** – programmer to configure non RS-485 devices using eCon

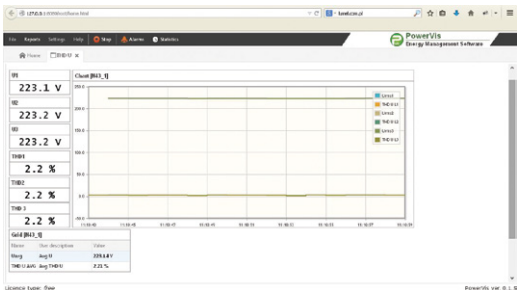
SCAN THE CODE
Product Code CONFIGURATOR

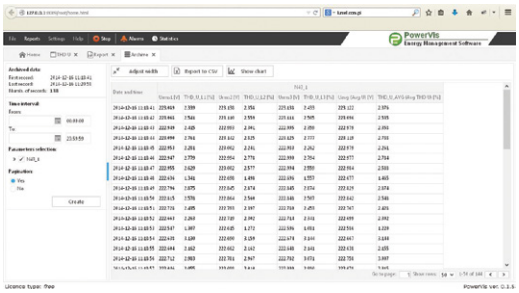
# PROCESS VISUALIZATION SOFTWARE

## PowerVis Software (**OP40**)

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





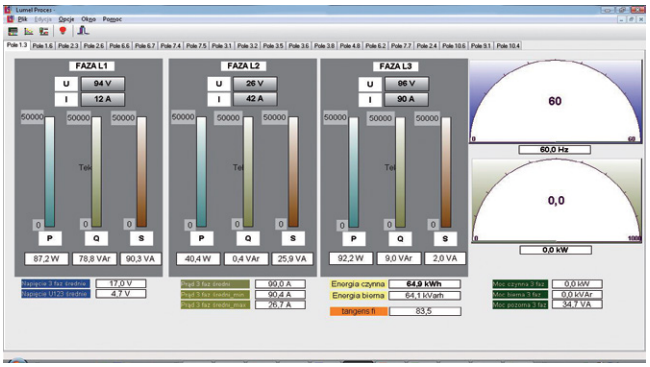
SCAN THE CODE
Product Code CONFIGURATOR

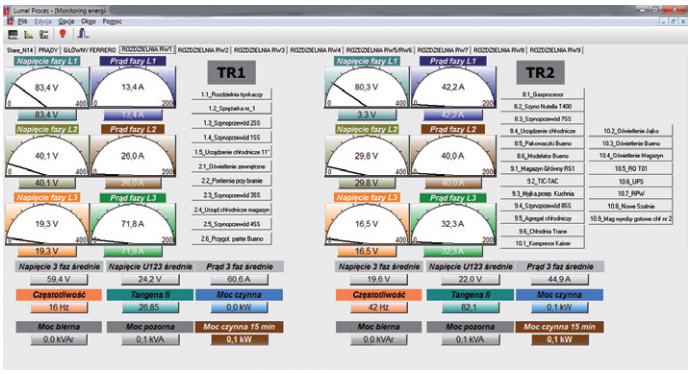
# LUMEL-PROCESS Software (**OP38**)

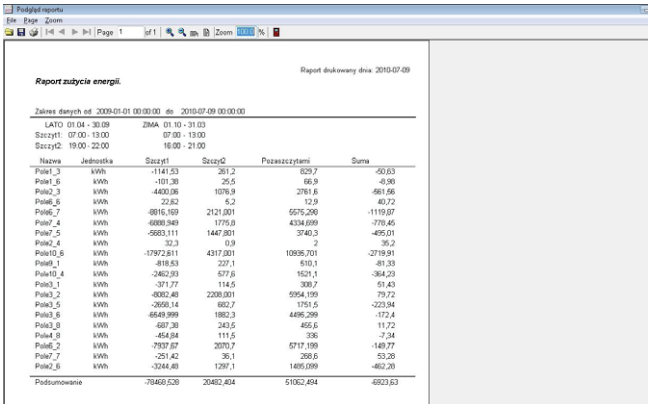
- modern integration and data presentation system,
- control and measurement applications for industrial installations, intelligent buildings, heat engineering, gas engineering, power engineering and laboratories,
- for systems built with the application of LUMEL's instruments, compatible with devices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

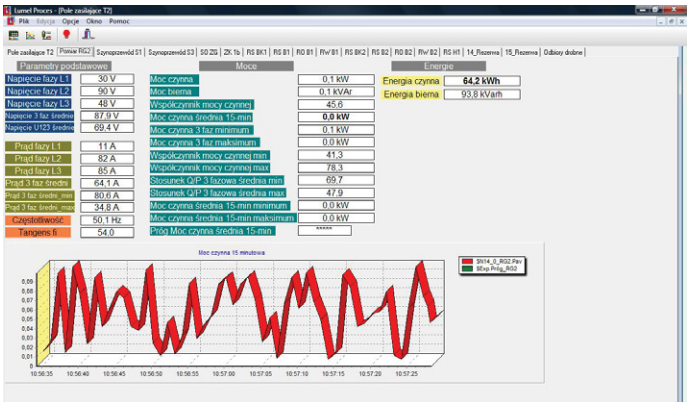
process visualization

LUMEL-PROCESS software



# ANALOG PANEL METERS / SCALE: 90°

SCAN THE CODE
Product Code CONFIGURATOR

NEW WIDER RANGE OF METERS





| | Moving-iron meters | | | | |
|---|---|---|---|---|---|
| | **EB16** | **EA16** | **EA17** | **EA19** | **EA12** |
| **Type of scale** | 90° | | | | |
| **External dimensions** | 45 x 85 mm | 48 x 48 mm | 72 x 72 mm | 96 x 96 mm | 144 x 144 mm |
| **Interchangeable scale** | - | ✔* | ✔* | ✔* | - |
| **Measuring ranges:** | | | | | |
| - current: · direct | 100 mA ... 25 A | | 100 mA ... 100 A | | |
| · through a transformer* | xA x/5 A; xA/1 A | | xA x/5 A; xA x/1A | | |
| (on request, with twice or six-times overload) | | | | | |
| - voltage: · direct | 6 V ... 600 V | | 6 V ... 1000 V | | |
| · through a transformer | xV/100 V; xV/110 V | | xV/ 100 V; xV/110 V | | |
| **Proof voltage** | 3 kV | 2 kV | 3 kV | | |
| **Frequency of measured value** | 40...45..65...72 Hz | | | | |
| **Protection rating** | IP52 | | IP52 (on request IP65) | | IP52 |
| **Climate version** | normal or tropical | | normal, tropical or similar to marine | | |
| **Class** | 1.5 | | | | |

* for current mesurement up to ranges: 1 A, 1/2 A, 5 A, 5/10A), for voltage measurement - all ranges ** see our current transformers (page 28)



| | Moving-iron meters | | |
|---|---|---|---|
| | **MA17(P)** | **MA19(P)** | **MA12(P)** |
| **Type of scale** | 90° | | |
| **External dimensions** | 72 x 72 mm | 96 x 96 mm | 144 x 144 mm |
| **Interchangeable scale** | ✔ | ✔ | ✔ |
| **Measuring ranges (direct):** | | | |
| - current: | 400 µA...1 A (30...1000...10 000 Hz)<br>1 A...6 A (49...50...51 Hz) | | 400 µA...1 A (30...1000...10 000 Hz) |
| - voltage: | 60 mV...1.5 V (49..50...51 Hz)<br>2.5 V...600 V (30...1000...10 000 Hz) | | 2.5 V...600 V (30...1000...10 000 Hz) |
| **Proof voltage** | 2 kV | | 2 kV |
| **Protection rating** | IP52 (on request IP65) | | IP52 |
| **Climate version** | normal, tropical or similar to marine | | |
| **Class** | 1.5 | | |



| | 3-phase voltmeters | |
|---|---|---|
| | **EP27** | **EP29** |
| **Type of scale** | 90° | |
| **External dimensions** | 72 x 72 mm | 96 x 96 mm |
| **Interchangeable scale** | ✔ | ✔ |
| **Voltage measuring ranges:** | | |
| - direct phase-to-phase: | 500 V | |
| - through a transformer: | xV/100 V; xV/110 V | |
| **Frequency** | 40...45...65...72 Hz | |
| **Proof voltage** | 3 kV | |
| **Protection rating** | IP52 | |
| **Climate version** | normal | |
| **Class** | 1.5 | |

| | Power meter |
|---|---|
| | **PA39** |
| **Type of scale** | 90° |
| **External dimensions** | 96 x 96 mm |
| **Interchangeable scale** | ✔ |
| **Power measuring ranges** | 50W...1000 MW<br>or 50 var...1000 Mvar |
| **Frequency** | 50 Hz, 60 Hz or 400 Hz |
| **Proof voltage** | 2 kV |
| **Protection rating** | IP52 (on request IP65) |
| **Climate version** | normal, tropical or similar to marine |
| **Class** | 1.5 |

# ANALOG PANEL METERS / SCALE: 90°

NEW WIDER RANGE OF METERS





## Moving-coil meters

| | MB16 | MA16 | MA17 | MA19 | MA12 |
|---|---|---|---|---|---|
| **Type of scale** | 90° | | | | |
| **External dimensions** | 45 x 85 mm | 48 x 48 mm | 72 x 72 mm | 96 x 96 mm | 144 x 144 mm |
| **Interchangeable scale** | - | ✔ | ✔ | ✔ | - |
| **Measuring ranges:**<br>- current:<br>· direct measurement<br>· indirect measurement (through the shunt*)<br>- voltage:<br>· direct measurement | <br><br>1 µA....6 A (MB16);<br>40 µA...25 A (MA16)<br>1 A...15 kA<br><br>60 mV...600 V | | <br><br>100 µA...25 A<br>1 A...15 kA<br><br>60 mV...1000 V | | |
| **Proof voltage** | 3 kV | | 2 kV | | |
| **Protection rating** | IP52 | | IP52 (on request IP65) | | IP52 |
| **Climate version** | normal or tropical | | normal, tropical or similar to marine | | |
| **Rated operational conditions:**<br>- ambient temperature<br>- relative air humidity | <br>5...23...55°C<br>25...85% | | | | |
| **Class** | 1.5 | | | | |

* see our shunts (page 31)




## Max demand ammeters - Bimetalic or Bimetalic and moving-iron

| | BA27 | BA39 | BE27 | BE39 |
|---|---|---|---|---|
| **Type of scale** | 90° | | | |
| **External dimensions** | 72 x 72 mm | 96 x 96 mm | 72 x 72 mm | 96 x 96 mm |
| **Interchangeable scale** | ✔ | ✔ | ✔ | ✔ |
| **Measuring ranges:**<br>- bimetalic element:<br>· direct measurement<br>· indirect measurement (through a transformers*)<br>- moving-iron element:<br>· direct measurement<br>· indirect (through a transformer*) | <br><br>0...1.2 A or 0...6 A<br>0...1.2(x) A x/1 A or 0...1.2(x) A x/5 A<br><br><br>-<br>- | | <br><br>0...1.2 A or 0...6 A<br>1.2(x) A x/1 A or 1.2(x) A x/5 A<br><br><br>0...1/2 A or 0...5/10 A<br>0...2(x) A x/1 A or 0...2(x) A x/5A | |
| **Proof voltage** | 3 kV | | | |
| **Protection rating** | IP40 (on request IP65) | | | |
| **Climate version** | normal or tropical | | | |
| **Class** | 3 | | 3 (1.5) | |

* see our current transformers (page 28)






## Power factor and frequency meters

| | FA39 | FA32 | CA36 | CA37 | CA39 | CA32 |
|---|---|---|---|---|---|---|
| **Type of scale** | 90° | | | | | |
| **External dimensions** | 96 x 96 mm | 144 x 144 mm | 48 x 48 mm | 72 x 72 mm | 96 x 96 mm | 144 x 144 mm |
| **Interchangeable scale** | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ |
| **Measuring ranges** | $0.5_{Cap}$....1...$0.5_{IND.}$<br>$0.8_{Cap}$....1...$0.2_{IND.}$<br>$0.85_{Cap}$....1...$0.85_{IND.}$<br>$0_{IND.}$ ...1 | | 45...55 Hz; 45...65 Hz; 48...52 Hz; 55...65 Hz; 360...440 Hz; 380...420 Hz | | | |
| **Frequency** | 45...50...60...65 Hz | | - | | | |
| **Proof voltage** | 2 kV | | | | | |
| **Protection rating** | IP52 (IP65 on request) | IP52 | IP52 | IP52 (IP65 on request) | | IP52 |
| **Climate version** | normal, tropical or similar to marine | | | | | |
| **Class** | 1.5 | | 0.5 | | | |

# ANALOG PANEL METERS / SCALE: **240°**

SCAN THE CODE
Product Code CONFIGURATOR

NEW WIDER RANGE OF METERS




| | Moving-coil meters | | | |
|---|---|---|---|---|
| | **MA16L** | **MA17L** | **MA19L** | **MA12L** |
| **Type of scale** | 240° | | | |
| **External dimensions** | 48 x 48 mm | 72 x 72 mm | 96 x 96 mm | 144 x 144 mm |
| **Interchangeable scale** | ✔ | ✔ | ✔ | ✔ |
| **Measuring ranges:**<br>- current:<br><br>- voltage: | 40 µA...60 A<br><br>60 mV...600 V | | | |
| **Proof voltage** | 2 kV | 3 kV | | |
| **Protection rating** | IP52 (IP65 on request) | | | IP52 |
| **Climate version** | normal | | | |
| **Rated operational conditions:**<br>- ambient temperature<br>- relative air humidity | <br>5...23...55°C<br>25...85% | | | |
| **Class** | 1.5 | | | |




| | Moving-iron meters | | | |
|---|---|---|---|---|
| | **MA16L(P)** | **MA17L(P)** | **MA19L(P)** | **MA12L(P)** |
| **Type of scale** | 240° | | | |
| **External dimensions** | 48 x 48 mm | 72 x 72 mm | 96 x 96 mm | 144 x 144 mm |
| **Interchangeable scale** | - | - | - | - |
| **Measuring ranges**<br>- current:<br><br>- voltage: | <br>100 mA, 1 A<br>5 A, 10 A<br><br>40 V...600 V | | | |
| **Proof voltage** | 2 kV | | | |
| **Protection rating** | IP52 (IP65 on request) | | | IP52 |
| **Climate version** | normal | | | |
| **Class** | 1.5 | | | |



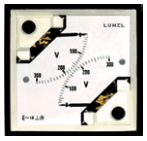

| | Power factor and frequency meters | | | |
|---|---|---|---|---|
| | **FA39L** | **FA32L** | **CA39L** | **CA32L** |
| **Type of scale** | 240° | | | |
| **External dimensions** | 96 x 96 mm | 144 x 144 mm | 96 x 96 mm | 144 x 144 mm |
| **Interchangeable scale** | ✔ | ✔ | ✔ | ✔ |
| **Measuring ranges**<br><br><br>**Frequency** | $0.5_{Cap}$....1...$0.5_{IND.}$<br>$0.8_{Cap}$....1...$0.3_{IND.}$<br>$0.8_{Cap}$....1...$0.8_{IND.}$<br>49...51 Hz (1-phase)<br>45...65 Hz (3-phase) | | 45.....50.....55Hz<br>45.....55.....65Hz<br>55.....60.....65Hz<br>360...400...440Hz<br>380...400...420Hz | |
| **Proof voltage** | 2 kV | | | |
| **Protection rating** | IP52 (IP65 on request) | IP52 | IP52 (IP65 on request) | IP52 |
| **Climate version** | normal | | | |
| **Class** | 0.5 | | | |

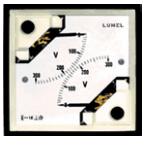
# ANALOG PANEL METERS / SCALE: **240°**



| | Power meter | |
|---|---|---|
| | **PA39L** | **PA32L** |
| **Type of scale** | 240° | |
| **External dimensions** | 96 x 96 mm | 144 x 144 mm |
| **Interchangeable scale** | ✔ | |
| **Power measuring ranges** | 50 W...1000 MW<br>or 50 var...1000 Mvar | |
| **Frequency** | 50 Hz, 60 Hz or 400 Hz | |
| **Proof voltage** | 2 kV | |
| **Protection rating** | IP52 (on request IP65) | IP52 |
| **Climate version** | normal | |
| **Class** | 1.5 | |

# **DUAL** ANALOG PANEL METERS / 2 IN 1 / SCALE: **90°**





| | Dual moving-iron meters | Dual frequency meters | | Dual moving-coil meters |
|---|---|---|---|---|
| | **EA19D** | **CA39D** | **CA32D** | **MA19D** |
| **Type of scale** | 90° | | | |
| **External dimensions** | 96 x 96 mm | 96 x 96 mm | 144 x 144 mm | 96 x 96 mm |
| **Interchangeable scale** | ✔ | ✔ | | ✔ |
| **Measuring ranges** | 150...600 V;<br>xV/100V ; xV/110V | 45.....50.....55 Hz<br>45.....55.....65 Hz<br>55.....60.....65 Hz<br>360...400...440 Hz<br>380...400...420 Hz | | 1000 µA...30 A<br>60 mV...600 V |
| | 4...60 A;<br>xA x/5A; xA/1A | | | 40 mV...1000 V |
| **Proof voltage** | 3 kV | 2 kV | | 3 kV |
| **Parameters of measured signal** | 45...65 Hz | - | | - |
| **Protection rating** | IP52 (on request IP65) | IP52 (on request IP65 - only for CA39D) | | IP52 (on request IP65) |
| **Climate version** | normal | | | |
| **Class** | 1.5 | 0.5 | | 1.5 |

# CURRENT TRANSFORMERS

SCAN THE CODE
Product Code CONFIGURATOR

LCTM series

| | LCTM current transformers with a primary winding | |
|---|---|---|
| | LCTM 62/W (40) | LCTM 74W (45) |
| Primary current [A] | 1...30 | 1...60 |
| External dimensions | 40 x 62 mm | 45 x 74 mm |
| Accuracy class | 0.2; 0.5; 1 | |

LCTR series

| | 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 | ∅14 | ∅14 | ∅14 | ∅22 |
| Accuracy class | 0.5; 1; 3 | | | 0.2; 0.5S;0.5; 1; 3 |

LCTB 45 LCTB 62

| | LCTB current transformers for a bar conductor | | | | | |
|---|---|---|---|---|---|---|
| | 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] | 50...400 | 50...400 | 50...400 | 50...400 | 30...400 | 75...600 |
| Hole diameter | ∅20 | ∅21 | ∅21 | - | ∅20 | ∅26 |
| Busbar (mm) | 20 x 10 | 20x10 | 20x10 | 20 x 12<br>2 x 15 x 6 | 20 x 10 | 30x10; 20x15<br>20x20<br>2x20x10 |
| Accuracy class | 0.5; 1; 3 | | | 0.2S; 0.2; 0.5S; 0.5; 1; 3 | | 0.5; 1; 3 |

LCTB 74 LCTB 86

| | LCTB current transformers for a bar conductor | | | | | |
|---|---|---|---|---|---|---|
| | 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 | ∅26 | ∅30 | ∅28 | ∅26 | ∅31 | ∅36 |
| Busbar (mm) | 30x10; 20x15;<br>20x20; 2x20x10 | 30x10<br>2x25x10 | 30x10<br>2x25x10 | 30x15<br>2x20x10 | 40x10<br>2x30x10 | 40x10<br>2x30x15 |
| Accuracy class | 0.5; 1; 3 | 0.2S; 0.2; 0.5S; 0.5; 1; 3 | | | | |

LCTB 104 LCTB 86

| | LCTB current transformers for a bar conductor | | | | | |
|---|---|---|---|---|---|---|
| | 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 | ∅35 | ∅41 | ∅46 | ∅51 | ∅54 | ∅65 |
| Busbar (mm) | 40x12<br>2x30x15 | 50x12<br>2x40x10 | 50x12<br>2x40x15 | 60x12<br>2x50x15 | 60x12<br>2x50x15<br>2x40x20 | 80x12<br>2x60x15<br>2x50x25 |
| Accuracy class | 0.2S; 0.2; 0.5S;0.5; 1; 3 | | | | | |

# CURRENT TRANSFORMERS

| | LCTB current transformers for a bar conductor | | | |
|---|---|---|---|---|
| | 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 | ∅72 | ∅86 | - | - |
| Busbar (mm) | 80x30<br>2x60x25 | 100x30<br>2x80x25<br>2x70x30 | 124x93 | 166x65 |
| Accuracy class | 0.2S; 0.2; 0.5S; 0.5; 1; 3 | | | |

LCTB 140

LCTB 225

| | LCTB current transformers for a bar conductor | | | |
|---|---|---|---|---|
| | 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<br>2x80x25<br>2x70x30 | 38 x 128 | 70 x 130 |
| Accuracy class | 0.2S; 0.2; 0.5S; 0.5; 1; 3 | | 0.2; 0.5; 1; 3 | |

LCTB 140

LCTB 100

| | 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) [mm] | 23 x 33 | 85 x 54 | 85 x 125 | 82 x 162 |
| Accuracy class | 0.5; 1 | | | |

LCTS series

| | LCTP 3-phase current transformers | | | | |
|---|---|---|---|---|---|
| | LCTP 75/15(60) | LCTP 105/21(40) | LCTP 140/31(40) | LCTP 185/27(45) | LCTP 185/37(45) |
| Primary current [A] | 100…160 | 100…250 | 250…630 | 100…500 | 300…800 |
| Hole diameter [mm] | - | - | - | ∅27 | ∅37 |
| Busbar (mm) | 14 x 24 | 20 x 24 | 31 x 36 | - | - |
| Accuracy class | 0.5; 1 | | | 1 | |

LCTP series

| | LRC - resin cast current transformers | | | |
|---|---|---|---|---|
| | LRC1 80/30(50) | LRC2 90/50(40) | LRC3 110/72(40) | LRC4 135/85(40) |
| Primary current [A] | 60 A...160 | 200 A...320 | 400 A...630 | 800 A...1250 |
| Hole diameter [mm] | ∅ 30 | ∅ 50 | ∅ 72 | ∅ 85 |
| Busbar (mm) | - | - | - | - |
| Accuracy class | 1 | | | |


LRC series

| | LRC - resin cast current transformers | | | |
|---|---|---|---|---|
| | LRC5 165/115(40) | LRC6 195/130(40) | LRC7 230/165(40) | LRC8 295/200(40) |
| Primary current [A] | 1500 A...2000 | 2500 A...3200 | 3000 A...3200 | 4000 A....5000 |
| Hole diameter [mm] | ∅ 115 | ∅ 130 | ∅ 165 | ∅ 200 |
| Busbar (mm) | - | - | - | - |
| Accuracy class | 1 | | | |


LRC series

# CURRENT TRANSFORMERS

SCAN THE CODE
Product Code CONFIGURATOR

| | LU01 - summation current transformers | |
|---|---|---|
| | LU01 (75) | LU01 (150) |
| Inputs [A] | 2 x 5A...4 x 5A | 5 x 5A...8 x 5A |
| Secondary current | 5 A | 5 A |
| Dimensions [mm] | 70 x 75 | 70 x 150 |
| Accuracy class | 0.5; 1 | |


LW05

| | LW - Round current transformers | | | | | |
|---|---|---|---|---|---|---|
| | LW01 | LW02 | LW03 | LW04 | LW05 | LW06 |
| Primary current [A] | 50...200 | 50...200 | 75...300 | 120...600 | 200...1000 | 600...3200 |
| Hole diameter [mm] | ∅30 | ∅30 | ∅43 | ∅58 | ∅72 | ∅113 |
| Outer diameter [mm] | ∅73 | ∅73 | ∅92 | ∅100 | ∅110 | ∅159 |
| Accuracy class | 0,5; 1 | 0.2; 0.5S; 0.5; 1 | | | | |


LE03

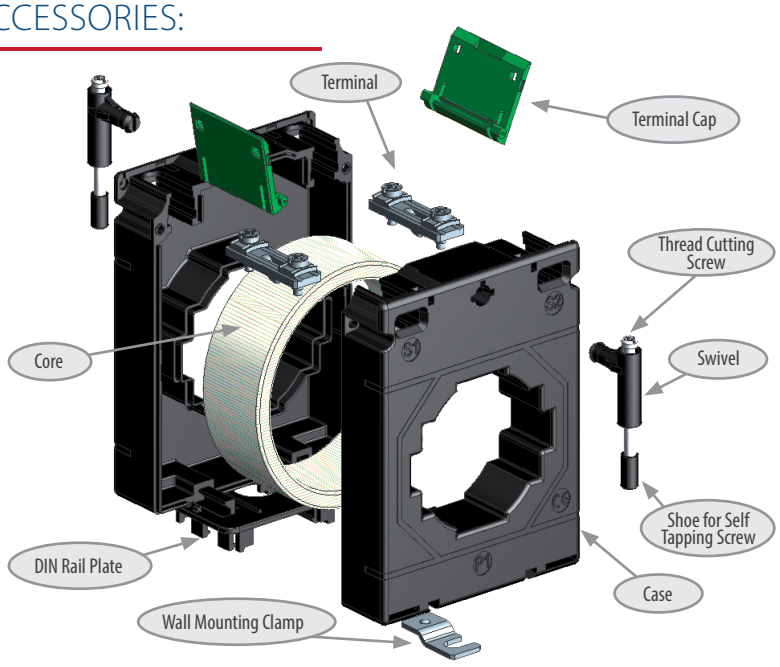
| | LE - Round current transformers | | | |
|---|---|---|---|---|
| | LE01 73/30 (50) | LE03 92/43 (41) | LE04 95/50 (40) | LE05 100/58 (41) |
| Primary current [A] | 50...200 | 200...400 | 200...300 | 400..600 |
| Hole diameter [mm] | ∅30 | ∅43 | ∅50 | ∅58 |
| Outer diameter [mm] | ∅73 | ∅92 | ∅95 | ∅100 |
| Accuracy class | 1; 5 | 1 | | |


LE06

| | LE - Round current transformers | | | |
|---|---|---|---|---|
| | LE06 110/72 (41) | LE07 135/85 (30) | LE08 159/113 (40) | LE09 165/130 (30) |
| Primary current [A] | 800...1000 | 800...1200 | 1200...2000 | 2400...3000 |
| Hole diameter [mm] | ∅72 | ∅85 | ∅113 | ∅130 |
| Outer diameter [mm] | ∅110 | ∅135 | ∅159 | ∅165 |
| Accuracy class | 1 | | | |

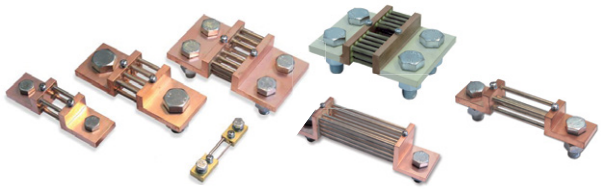
**We offer:** On customers request we offer transformer calibration certificates.

## ACCESSORIES:




## MORE INFORMATION IN OUR CATALOG:

# SHUNTS / **CLASS 0.2, 0.5**



| | B1 | B2 | B3 | B4 | B5 | B6 |
|---|---|---|---|---|---|---|
| **Voltage drop** | 30 mV | 60 mV | 150 mV | 50 mV | 75 mV | 100 mV |
| **Rated current** | 1 A...15 kA<br>(1; 1.5; 2.5; 4; 6 and their decimal multiples) | | | | | |
| **Accuracy class** | 0.2 or 0.5 | | | | | |

- shunts from 1...25 A are fixed on insulating basis with the possibility to be mounted on a DIN rail (except B1 type)
- shunts of other ranges are fixed directly on the DC rail or cable
- dimensions acc. DIN 43703
- shunts 40...150 A - insulating base as a option for B2, B4, B5 types
- on request additional chemical coating are available: lackering or silver

plate shunts

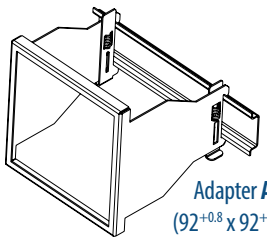
| | BP4 |
|---|---|
| **Voltage drop** | 50 mV |
| **Rated current** | 5 A...500 A |
| **Accuracy class** | 0.5 |

- Custom-made executions are available on request (voltage drop, current).

# ADAPTER FOR DIN RAIL TS35

- Designed for mounting of panel instruments on the DIN rail TS35.

| | Adapter ATS | | | | |
|---|---|---|---|---|---|
| | **ATS1** | **ATS2** | **ATS3** | **ATS4** | **ATS5** |
| **Hole dimensions (widht x hight) [mm]** | $92^{+0.8}$ x $92^{+0.8}$ | $92^{+0.8}$ x $45^{+0.6}$ | $68^{+0.7}$ x $68^{+0.7}$ | $45^{+0.6}$ x $92^{+0.8}$ | $45^{+0.6}$ x $45^{+0.6}$ |
| **Panel instruments dimensions (widht x hight) [mm]** | 96 x 96 | 96 x 48 | 72 x 72 | 48 x 96 | 48 x 48 |



Adapter **ATS1** ($92^{+0.8}$ x $92^{+0.8}$ mm)

# ENLARGING FRAME

- Designed to reduce the mounting hole from 96 x 96 mm to 48 x 96 mm or 96 x 48 mm.
  **Ordering code:** CZ/996-001

# CAM SWITCHES

SCAN THE CODE
Product Code CONFIGURATOR

**PKT1 / PKS1/ PKH1**
changeover

**PKT2 / PKS2/ PKH2**
multi-step

**PKT3 / PKS3/ PKH3**
isolator


**PKT4**
selector

| PKT1, PKT2, PKT3, PKT4 | | | | | | PKS1, PKS2, PKS3 | | | | PKH1, PKH2, PKH3 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **PARAMETERS** | **UNIT** | **6 A** | **10 A** | **16 A** | **20 A** | **25 A** | **32 A** | **40 A** | **63 A** | **100 A** | **200A** |
| **Rated operational voltage (Ue)** | V | 440 | 440 | 690 | 690 | 690 | 690 | 690 | 690 | 690 | 690 |
| **Rated Insulation voltage (Ui)** | V | 440 | 440 | 690 | 690 | 690 | 690 | 690 | 690 | 690 | 690 |
| **Rated uniterrupetd current (Ith)** | A | 8 | 12 | 20 | 25 | 32 | 40 | 50 | 80 | 125 | 225 |
| **Rated short time withstand current (Icw)** | A | 72 | 120 | 192* | 240* | 300 | 384 | 480 | 756 | 1200 | 2400 |
| **Rated Impulse withstand voltage (Uimp)** | kV | 4 | 4 | 4 | 4 | 6 | 6 | 6 | 6 | 6 | 6 |
| **Rated Fuse short circuit current** | kA | 3 | 3 | 5 | 5 | 10 | 10 | 10 | 10 | 15 | 15 |
| **Frontal frame dimensions** | mm | 48 x 48 | | | | 64 x 64 | | | | 88 x 88 | |

* Rated short time withstand current (0.5s- current)


**PKR1 / PKR5**
ON-OFF spring return switches


**PKR2/PKR6**
double throw with OFF


**PKR3 / PKR7**
spring return switches without OFF


**TKR1 / TKR2**
spring return cam switches 1xNO 1xNC / spring return cam switches 2xNO 2xNC

| PKR1, PKR2 PKR3, PKR5, PKR6, PKR7 | | | | TKR1, TKR2 | |
|---|---|---|---|---|---|
| **PARAMETERS** | **UNIT** | **16 A** | **20 A** | **25 A** | **32 A** |
| **Rated operational voltage (Ue)** | V | 690 | 690 | 690 | 690 |
| **Rated Insulation voltage (Ui)** | V | 690 | 690 | 690 | 690 |
| **Rated uniterrupetd current (Ith)** | A | 20 | 25 | 32 | 40 |
| **Rated short time withstand current (Icw)** | A | 192* | 300 | 300 | 384 |
| **Rated Impulse withstand voltage (Uimp)** | kV | 4 | 6 | 6 | 6 |
| **Rated Fuse short circuit current** | kA | 5 | 10 | 10 | 10 |
| **Frontal frame dimensions** | mm | 48 x 48 | 64 x 64 | 65 x 65 | |

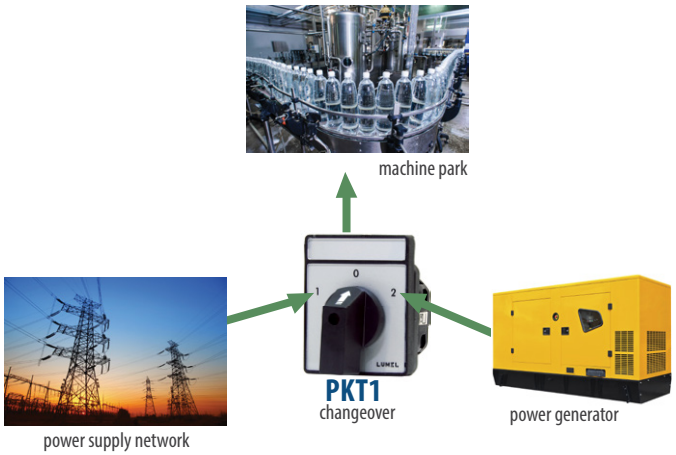
* Rated short time withstand current (0.5s- current)

| RATED OPERATING CONDITIONS | | |
|---|---|---|
| **Frequency** | 50/60 Hz | |
| **Operating temperature** | -25°C...60°C | |
| **Installation category** | III | |
| **Protection grade** | IP50 from frontal side | IP20 from terminal side |
| **Standards** | IEC 60947-1, IEC 60947-3, IEC 60947-5 | |
| **SWITCH LIFE** | | |
| **Mechanical Life** | 100 000 operations at 300 cycles/hr | |
| **Electrical Life** | 10 000 operations at 100% rated duty at 120 cycles/hr | |

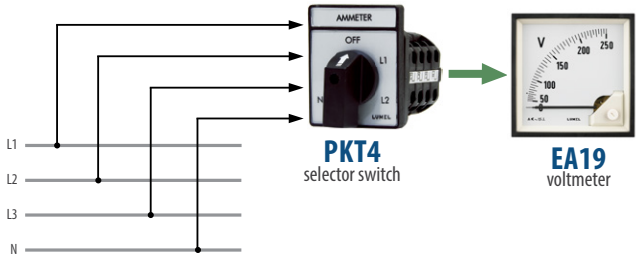
- all cam switches available in yellow-red version
(colour of background and knob can be selected in the ordering code and additional one can order separately the background-knob-combinination as accessories- see data sheet)

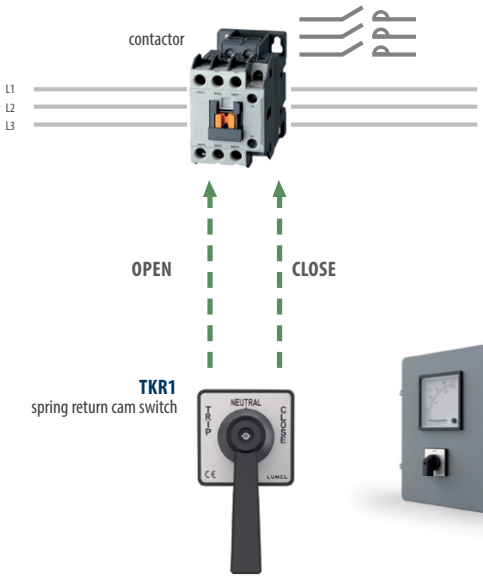
## APPLICATION EXAMPLES

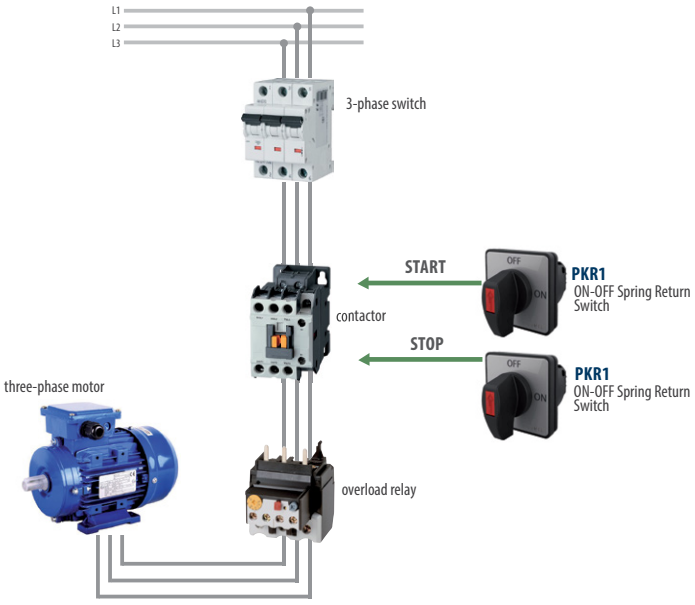
**Switching on the (emergency) power supply.**




**Mesurement of phase-to-phase voltage using only one voltmeter.**



# PORTABLE MULTIMETERS

SCAN THE CODE
Product Code CONFIGURATOR

NEW

## NP45
### Portable power quality analyzer

- 5.6" TFT color screen. 640 x 480 pixel,
- waveform real-time display (4 voltages/4 currents),
- half cycle RMS measurement (voltage and current),
- measurement of TRMS currents up tp 6000 A (with additional probes mode),
- measurement in 1-phase and 3-phase systems (3 - and 4-wire),
- measurement of voltage, current, harmonics, power, energy, inrush current, flicker and other,
- graphical presentation of data in a waveform and vector diagram,
- record of events: dips,swells, overvoltages,
- power quality according to EN-50160 standard or user-defined limit,
- registration of user-defined parameters in the 32GB internal memory (registration time from 2 h up to 1 year),
- Ethernet and WiFi interfaces for remote operation of the analyzer,
- USB Host to move archive data and screenshots to an external USB memory,
- safety standards: EN 61010-1. CAT III 1000V / CAT IV 600V

## NP40
### Portable power quality analyzer

- half cycle RMS measurement (voltage and current);
- measurement of TRMS currents up to 3000 A (with standard sensor);
- measurement in 1-phase and 3-phase systems (3 - and 4-wire);
- measurement of voltage, current, harmonics, power, energy, inrush current, flicker and other;
- graphical presentation of data in a waveform and vector diagram;
- record of events: dips, swells, over voltages;
- power quality according to EN-50160 standard or user-defined limit;
- internal memory for data logging needs (continuous registration from 2 hours to 7 days), the registration frequency from 1 second up to 60 minutes;
- built-in 8G memory card;
- Ethernet interface for remote operation of the analyzer;
- USB Host to move archive data and screenshots to an external USB memory;
- safety standards: EN 61010-1, CAT III 1000V / CAT IV 600V;
- 5,6" TFT color screen, 320 x 240 pixel;
- waveform real-time display (4 voltages/4 currents).

## NP15
### TRUE RMS digital multimeter with data logger & view function

- voltage measurement of AC, DC and AC / DC up to 1000V;
- current measurement of AC, DC and AC / DC up to 10A;
- low input impedance;
- measurement of TRMS effective;
- data logging & view function (up to 32000 readings);
- 100 kHz bandwidth for voltage measurement;
- resistance measurement;
- frequency and duty cycle measurement;
- temperature measurement with J, K, Pt100 & Pt1000 sensors;
- capacitance measurement;
- automatic / Manual measuring range selection;
- low-pass filter mode with a cutoff frequency of 1kHz;
- voltage noise measurement and suppression (dB);
- square wave signal generator;
- continuity test and diode test;
- function: Backlight, Relative / Zero, Auto Hold, Min / Max / Avg;
- acoustic signal indicating the overrange (Go / NoGo);
- information on dangerous voltage at the terminals;
- external power supply;
- fuse 16 A for all current measurement ranges to protect the device.

NEW

Bluetooth

## NP15B
### TRUE RMS digital multimeter with data logger & view function

- voltage measurement of AC, DC and AC / DC up to 1000V;
- current measurement of AC, DC and AC / DC up to 10A;
- low input impedance;
- measurement of TRMS effective;
- data logging & view function (up to 32000 readings);
- 100 kHz bandwidth for voltage measurement;
- resistance measurement;
- frequency and duty cycle measurement;
- temperature measurement with J, K, Pt100 & Pt1000 sensors;
- capacitance measurement;
- automatic / Manual measuring range selection;
- low-pass filter mode with a cutoff frequency of 1kHz;
- voltage noise measurement and suppression (dB);
- square wave signal generator;
- continuity test and diode test;
- function: Backlight, Relative / Zero, Auto Hold, Min / Max / Avg;
- acoustic signal indicating the overrange (Go / NoGo);
- information on dangerous voltage at the terminals;
- external power supply;
- fuse 16 A for all current measurement ranges to protect the device.

## NP10
### Digital multimeter

- capacitance from 1pF...40.00 mF with zero correction;
- direct and alternating voltages from 100 µV ... 1000 V;
- direct and alternating currents from 10 µA ... 10.00 A;
- resistance from 100 mΩ... 60.00 MΩ;
- frequencies from 10.00 Hz ... 10 MHz;
- diode measurement and continuity testing;
- hold measurement- the value can be held and display simultaneously;
- relative measurement by pressing and holding PEAK and then pressing AUTO/MAN key;
- duty cycle (%) measurement;
- temperature measurement with 'K' type Thermocouple (NiCr – Ni) in the range from 0°C to 1300°C acc. to EN 60584;
- peak value measurement.

Electrical Safety 1000 V CAT III

Electrical Safety 600 V CAT IV


## NP06
### Digital multimeter

- direct and alternating voltages from 100µV ... 1000V,
- direct and alternating currents from 10µA ... 10.00A,
- resistance from 1Ω... 40.00MΩ with zero correction,
- resistance from 1pF... 200.00µA with zero correction,
- frequencies from 10.00 Hz ... 10MHz,
- diode measurement and continuity testing,
- duty cycle (%) measurement,
- hold measurement,
- relative measurement,
- non contact voltage detection.


## NP08
### Digital multimeter

- direct and alternating voltages from 100µV ... 1000V,
- direct and alternating currents from 10µA ... 10.00A,
- resistance from 1Ω... 40.00MΩ with zero correction,
- resistance from 1pF... 200.00µA with zero correction,
- frequencies from 10.00 Hz ... 10MHz,
- diode measurement and continuity testing,
- hold measurement
- relative measurement
- duty cycle (%) measurement,
- temperature measurement with 'K' type Thermocouple,
- backlit facility.

## NC14
### Power clamp-on meter

- AC & DC voltage measurement up to 1000 V;
- AC & DC current measurement in the range of 1000 A / 400 A;
- inrush/peak value measurement;
- active, reactive and apparent power measurement;
- power measurement in KM;
- energy consumption measurement in kWh;
- measurement up to 49th harmonics;
- phase angle measurement;
- THD measurement;
- DF measurement;
- crest factor /CF/ measurement;
- power factor /PF/ measurement;
- LPF mode.

## NC12
### Clamp-on meter

- current measurement up to 300 and 1000 A AC;
- measuring voltage up to 1000 V AC / DC;
- measuring temperature from -200°C to 800°C (Pt100 and Pt1000);
- the diameter of measured cable 50 mm (the meter up to 1000A);
- the diameter of measured cable 40 mm (the meter to 300A);
- illuminated digital display with analog indicator;
- a number of features:
  - HOLD - Stop function currently displayed measured value,
  - MIN, MAX - recording the minimum and maximum values measured;
- auto power off;
- an adjustment of the resistance or capacitance - for low measuring low resistance or capacitance, resistance wire or stray capacitance for a range of nF can be compensated by pressing the Shift;
- automatic and manual mode;
- available measuring function diodes and transistors;
- degree of protection IP20.


## NC11
### Clamp-on meter

- the diameter of measured cable 50 mm (the meter up to 1000A)
- the diameter of measured cable 40 mm (the meter to 400A)
- current measurement up to 400 and 1000 A AC
- measuring voltage up to 1000 V AC
- measuring temperature from 0 to 1300°C (K type termocouple)
- illuminated digital display with analog indicator,
- a number of features:
  - HOLD - Stop function currently displayed measured value,
  - Auto power off,
- for low ohm measurement, the lead resistance can be compensated by presssing the REL key,
- automatic and manual mode,
- available measuring function diodes and transistors,
- degree of protection IP20.
- an adjustment of the resistance - for low measuring low resistance or can be compensated by pressing the Shift button

## NT10
### Insulation meter

- insulation resistance measurement up to 3 GΩ;
- measurement of DC and AC voltage in the range of 30 mV...1000 V;
- measurement of DC and AC current in the range of 300 µA...300 mA;
- resistance measurement 30 Ω...30 MΩ;
- capacity measurement 30 nF...30 µF;
- frequency measurement 300 Hz...100 kHz;
- measuring the fill factor (%);
- HOLD Function;
- temperature measurement in the range of -200...800°C / Pt100/ Pt1000;
- analog scale.


SCAN THE CODE
Product Code CONFIGURATOR



| | Digital Multimeter | |
|---|---|---|
| | **HA-DMA512** | **HA-DMA612** |
| **Resolution** | true digits 5½ | true digits 6½ |
| **Sampling** | 800 samples/s | 1000 samples/s |
| **Measuring quantity** | d.c. voltage and current, a.c. voltage and current, resistance, capacity, frequency, temperature | |
| **Additional measuring functions** | auto range, diode test, continuity, null, tigger, save/read, math | |
| **Safety** | IEC61010-1: 2010, CAT I 1000V/CAT II 600V, Pollution level: 2 | |
| **Interface** | USB, RS-232 | |
| **Power supply** | 115 V/230 V (1±10%), 50 Hz/60 Hz, 15 VA | |
| **Dimensions & weight** | 260 × 106 × 375 mm, 3.0 kg | |
| **Additional functions** | • VFD display with high-brightness<br>• Reading rates up to 1000 readings per second.<br>• True RMS measurement of AC voltage and current.<br>• Built-in math operations.<br>• Full measuring functions to meet user's test need. | |


| | Programmable DC power supply |
|---|---|
| | **HA-PSA3515** |
| **Output range** | 35 V / 15 A |
| **Output power** | 500 W |
| **Resolution** | 1 mV/ 1 mA |
| **Accuracy** | voltage: ≤± (0.05% + 10 mV)<br>current: ≤± (0.2% + 50 mA)<br>OVP: ≤± (0.5% + 0.5 V) |
| **Interface** | RS-232 |
| **Power supply** | AC 115-230 V (1±10%)V, 50 (1±5%) Hz |
| **Dimensions & weight** | 425 × 150 × 465 mm, 20 kg |
| **Additional functions** | • All digital controlled, output 1mV/1mA step.<br>• High stability, low drift.<br>• LED display the voltage/current and working status visually.<br>• Intelligent temperature controlled fun with low noise.<br>• Storage and recall function.<br>• OVP (Over Voltage Protecion) function.<br>• Keypad locked function to avoid the misoperation. |


| | Synthesized Signal Generator HA-GFA005 | |
|---|---|---|
| **CHA** | | |
| **Frequency range** | sine: 1 µHz ... 500 MHz<br>square: 1 µHz ... 80 MHz | |
| **Sine output level** | ≤ 500 MHz | -127 dBm ... +13 dBm(-127 dBm ... -117 dBm typ.) |
| | ≤ 1000 MHz | -110 dBm ... +13 dBm(-100 dBm ... -110 dBm typ.) |
| | ≤ 1500 MHz | -105 Bm ... +10 dBm(-100 dBm ... -105 dBm typ.) |
| **Modulation type** | AM,FM, FSK, PSK | |
| **CHB** | | |
| **Frequency range** | 1 µHz ... 10 MHz | |
| **Waveform type** | Sine, Square, Ramp, Pulse, Sinc, Exp, Noise, DC | |
| **Output amplitude** | 1 mVpp ... 10 Vpp(50 Ω), 2 mVpp ... 20 Vpp (High Z) | |
| **GENERAL CHARACTERISTICS** | | |
| **Interface** | USB, RS-232 | |
| **Power supply** | 100 V a.c. ... 240 V, 50(1±10%)Hz, <40 VA | |
| **Dimensions & weight** | 254 × 103 × 374 mm; 4.2 kg | |
| **Additional functions** | • Perfect combination of DDS and PLL techniques.<br>• Frequency upper limits to 500 MHz.<br>• Higher level of frequency accuracy, up to 1 ppm.<br>• Communication interfaces: USB, RS-232.<br>• 4 built-in fixed arbitrary waveforms: Exp, Sinc, Noise, DC.<br>• Sweep and Burst function. | |

# PHOTOVOLTAIC STRING INVERTERS

SCAN THE CODE
Product Code CONFIGURATOR

7 YEAR WARRANTY

NEW

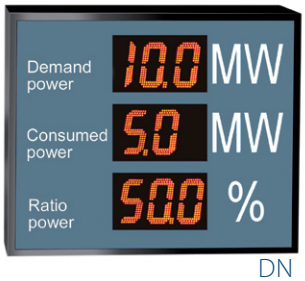
## PVSA
Photovoltaic string inverter


- Designed for use in photovoltaic installations connected to the grid (On-grid).
- Available in power classes from 10 to 34 kW.
- Maximum efficiency up to 98.5%
- IP -65 structure suitable for both indoor & outdoor installation
- Full power without derating up to 50°C ambient temperature.
- Natural ventilation minimizes breakdown & maintenance.
- Robust design and latest-generation power components with SiC technology.
- Maximum power point tracking, up to 3 MPPT trackers.
- Wide MPPT voltage range 350 to 800V.
- Large graphical display provides a easy, user-friendly operator interface.
- „Transformerless" versions for enhanced efficiency.
- String fault detection & DC fuses on both poles of string.
- Integrated DC circuit breaker under load.
- Tool free & maintenance free terminals on both DC & AC side.
- Integrated datalogger for operation and fault data logging.
- USB port for quick & handy saving of production and operation data.
- Integrated protections against overcurrent, overtemperature, reverse dc polarity, AC & DC overvoltage.
- Wire Box to allow separate access for easy and quick installation.
- 2 RS-485 ports for communication interface
- Integerated inputs/outputs: 3 anlog inputs, 2 digital inputs, 2 digital outputs.
- Auxiliary 24 V out (500mA max) for connection of environmental sensors.

## APPLICATION EXAMPLES

# LARGE DISPLAYS

DL21



DN

DL

| | Outdoor or indoor large 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 |
| **Protection rating** | IP54 (IP65 option) |
| **Additional functions** | • good visibility in range up to 120 m<br>• brightness sensor installed (display brightness changes depending on outside conditions) |

| | Indoor large displays | | |
|---|---|---|---|
| | **DL11, DL12, DL13** | **DL21** | **DNL** |
| **Display** | numerical | | |
| **Digit height** | 100 mm | | 230 mm (DNL2), 305 mm (DNL3) |
| **Number of rows** | 1, 2 or 3 | 1 | 1 or 2 |
| **Characters per row** | 3 | 3 | 4 |
| **Display colour** | red, yellow or green | red/orange/green (programmable) | red, yellow |
| **Displayed values** | value measured by external device, transmitted through RS-485 interface | | value measured by external device, transmitted through RS-485 interface |
| **Interface (Master)** | Modbus RTU<br>RS-485 for value transmission | | |
| **Interface (Slave)** | RS-485 for configuration | | RS-485 for configuration |
| **Programming** | using dedicated software | using LPCon software | |
| **Additional functions** | • unit field can be printed in each row<br>• 15 V d.c. supply for P18 transducer | • 3-colour, display colour changes on value change. Ranges of colour changes can be programmed | • visibility up to 120 m<br>• brightness sensor (digital brightness changes depending on outside conditions)<br>• analog input 4...20 mA |

## DL12 APPLICATION EXAMPLES


PC

Slave

RS-485

DL12

Master

RS-485

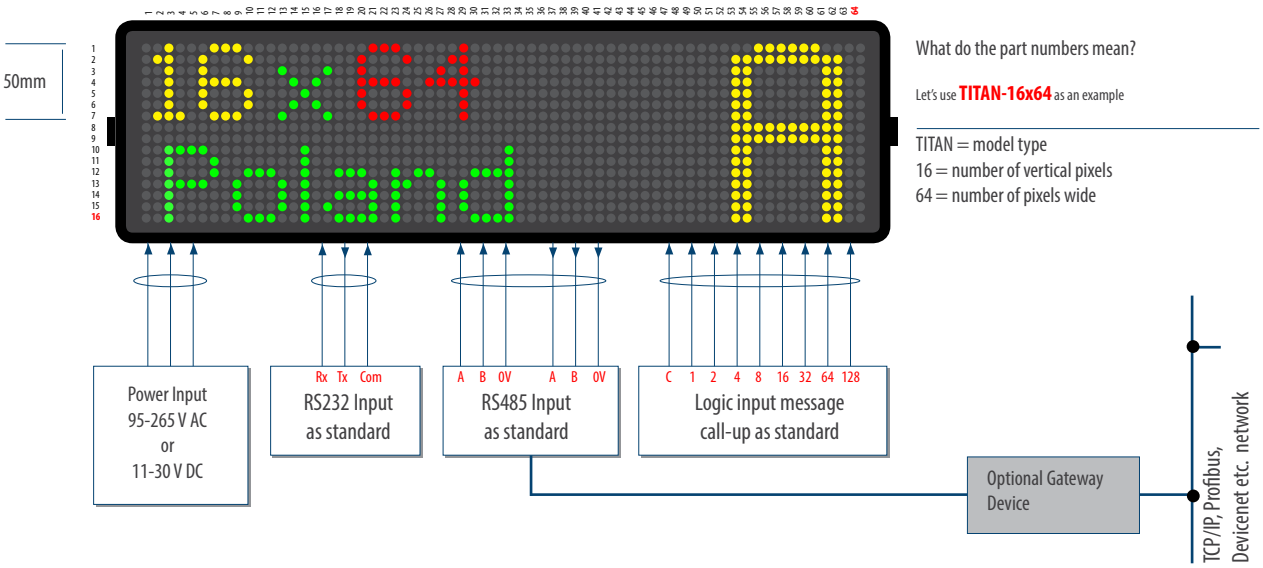

P18

# TITAN SERIES
message display


| Model number | Characters per line | Number of lines |
|---|---|---|
| **8 pixels high** | | |
| (One line 50mm high) | | |
| Titan 64x8 | 10 char.s, | single line |
| Titan 96x8 | 15 char.s, | single line |
| Titan 128x8 | 21 char.s, | single line |
| Titan 160x8 | 26 char.s, | single line |
| Titan 192x8 | 31 char.s, | single line |
| **16 pixels high** | | |
| (Two lines each 50mm high, or 1 line 120mm high) | | |
| Titan 64x16 | 10 char.s, 2 line/8 char.s, 1 line | single and dual line |
| Titan 96x16 | 15 char.s, 2 line/12 char.s, 1 line | single and dual line |
| Titan 128x16 | 21 char.s, 2 line/16 char.s, 1 line | single and dual line |
| Titan 160x16 | 26 char.s, 2 line/20 char.s, 1 line | single and dual line |
| Titan 192x16 | 31 char.s, 2 line/24 char.s, 1 line | single and dual line |
| Titan 256x16 | 42 char.s, 2 line/24 char.s, 1 line | single and dual line |

Suspension mounting

Wall mounting




What do the part numbers mean?

Let's use **TITAN-16x64** as an example

TITAN = model type
16 = number of vertical pixels
64 = number of pixels wide

**All cables enter the sealed enclosure through compression glands.**

# FUSION SERIES
numerical display ( indoor & outdoor)

**Model numbers:-**

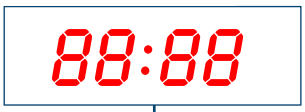
| | |
|---|---|
| Fusion-C | Counter/Rate |
| Fusion-H | Elapsed timer |
| Fusion-L | Weight/load |
| Fusion-P | 4-20mA/0-10V |
| Fusion-S | Serial data |

**Model numbers:-**

| | |
|---|---|
| Fusion-H | Clock / Timer |
| Fusion-S | Serial data |

**Model numbers:-**

| | |
|---|---|
| Fusion-C | Counter/Rate |
| Fusion-H | Elapsed timer |
| Fusion-L | Weight/Load |
| Fusion-P | 4-20mA/0-10V |
| Fusion-S | Serial data |
| Fusion-T | Temperature |



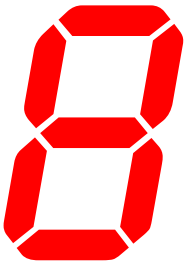
**Model numbers:-**

| | |
|---|---|
| Fusion-H | Clock |
| Fusion-S | Serial data |
| Fusion TT | Time/Temp |

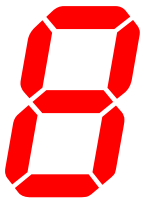
## Digit sizes available as standard

**A 'Rule of Thumb' about digit height and viewing distance:-** For every 10 metres of viewing distance, you need digits 1" high (The typical width of a thumb). so, if you will be up to 65 metres away, you will need digits at least 7 inches high - round up to the nearest inch.

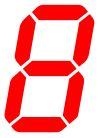
400 mm, 16"
200m viewing



300 mm, 12"
150m viewing



200 mm, 8"
100m viewing



150 mm, 6"
75m viewing

102 mm, 4"
50m viewing

57mm,
2.25"
25m viewing

## Digit colour options

We offer indoor and outdoor brightness versions.

# ERXX SERIES EASY-READER

economy large display

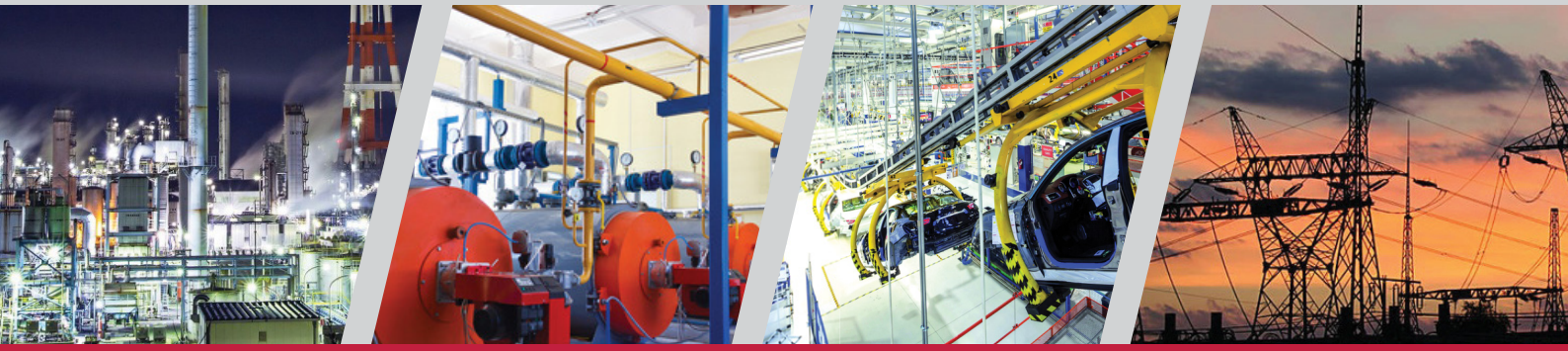
### 5 Input Signal types

- 4-20mA, 0-10V, 1-5V etc
- Pulses PNP, NPN, Contact etc
- Serial Data RS232, 485, 422 etc.
- BCD data, via model PSC1
- Thermocouple/PT100 Sensors


| | 57mm digit height gives **25 metres viewing max.** | | 102mm digit height gives **50 metres viewing max.** | |
|---|---|---|---|---|
| **Model numbers:** | | Format | | Format |
| Process input | **ER2P** | 8.8.8.8 | **ER4P** | 8.8.8.8 |
| Rate / Total | **ER2C** | 8.8.8.8 | **ER4C** | 8.8.8.8 |
| Serial data input | **ER2S** | 8.8.8.8 | **ER4S** | 8.8.8.8 |
| Temperature | **ER2T** | 8.8.8.8 | **ER4T** | 8.8.8.8 |
| Clock Slave * | **ER2H** | 88:88 | **ER4H** | 88:88 |
| **Mechanical:** | | | | |
| Case size | 260mmW x 140mmH | | 415mmW* x 195mmH | |
| Depth front-back | 75 mm | | 75 mm | |
| Weight | 2kg | | 3kg *425mm for ER4H | |

## Only **BENEFITS !**

For many years we have known that automation users appreciate a comprehensive offer.
Therefore, in addition to the supply of equipment, we offer design and implementation of automation systems, which:
- will be time and cost effective,
- will raise productivity,
- will improve work quality and safety.



## Who ARE WE?

- A team of engineers (designers, constructors, developers, integrators)
- We have over 50 years of experience in project implementation in Poland and abroad.
- We have modern development laboratory facilities where we test our solutions.

## How DO WE WORK?

We offer a comprehensive approach to the project, starting with a thorough analysis of the needs, providing custom made solutions for system implementation in facilities, throughout training and warranty and after-warranty service.

PROJECT ANALYSIS AND IDENTIFICATION OF THE CUSTOMER'S NEEDS → OFFER / SIGNING THE CONTRACT → ASSEMBLY IN THE FACILITY → PROJECT COMMISSIONING AND PERSONNEL TRAINING → SERVICE

## WE CAN DO THIS FOR YOU:

- Design and implement a dedicated control system for industrial processes.
- Design and implement a control and transmission system in industrial environments.
- Create applications to visualize and control in SCADA programs.
- Design and manufacture power and control cabinets and laboratory work stations.

And everything:
- at competitive prices,
- based on certified and modern product and communication solutions,
- with guarantee of reliability and post-implementation service.

# LUMEL AUTOMATION SYSTEMS

## Energy Monitoring Systems - OUR SPECIALTY!

Because of the possibility of large savings and environmental protection, the systems which currently are the most popular ones are our systems for energy consumption monitoring and for the control of power supply network parameters. These systems can be easily extended with additional measuring points or other utilities. What is important, the license for the software to manage these utilities is indefinite and unlimited in terms of the number of parameters read out from the devices.

## Facts and figures LIGHTING MONITORING IN LUMEL S.A.

- power bills are lower by 18%
- monitoring of costs in many departments at the same time
- effective sector management of lighting
- a thorough analysis of the most costly places

**18%** of savings

## COMPLEXITY OUR RANGE OF DEVICES AND SOFTWARE

We have a comprehensive offer of hardware and software to implement monitoring and control systems:

- devices to measure object signals (sensors, current transformers, shunts, transducers)
- devices for measurement and control such as meters, analyzers, controllers
- devices to ensure adequate communication (converters, I/O modules, hubs)
- our own software of Scada type to visualize, archive and process control

## APPLICATION EXAMPLES

FURNITURE INDUSTRY — TEMPERATURE AND HUMIDITY MONITORING

FOOD INDUSTRY — ENERGY MANAGEMENT

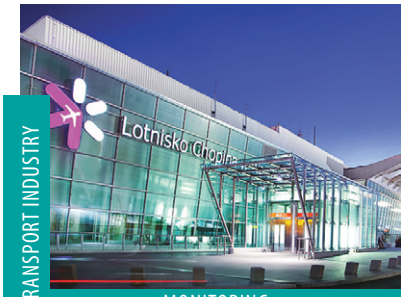
POWER STATIONS — SYNCHRONIZATION OF GENERATORS

AIR INDUSTRY — ENGINE TEMPERATURE MONITORING

TELECOMMUNICATION — MONITORING OF ENERGY CONSUMPTION IN GSM SYSTEMS

PUMPING STATION — ENERGY MONITORING

TRANSPORT INDUSTRY — CONTROL STATION OF BRAKE SYSTEMS




TRANSPORT INDUSTRY — MONITORING OF ENERGY CONSUMPTION

SHOPPING CENTERS — TEMPERATURE AND HUMIDITY VISUALIZATION SYSTEM

**CONTACT:**
address: LUMEL S.A., ul.Sulechowska 1, 65-022 Zielona Góra, Poland
tel. +48 68 45 75 276 or +48 68 45 75 353
**e-mail:** automatyka@lumel.com.pl

# ***CHECK*** YOUR INSTRUMENTS AT OUR ***LABORATORY***

/ Checking should be carried out regularly in all places where precise measurments significantly influence human life and health. /

**Our services for you**

If you want to have a **GUARANTEE,** that your instruments work properly - **USE OUR LABORATORY**!

We provide services related to calibration of analogue and digital devices, including:

- 3-phase power network meters,
- multi-channel controllers and recorders,
- ammeters, voltmeters, wattmeters,
- multimeters,
- shunts and current transformers,
- temperature meters and sensors (thermoresistive, semiconductor, thermocouples),
- humidity meters and transducers.



The laboratory also performs tests of devises in the scope of:

- electromagnetic compatibility,
  - electromagnetic noise immunity according to EN 61000-6-2,
  - emission of electromagnetic interference according to EN 61000-6-4,
  - safety (including safety according to EN 61010-1)
- ambient and environmental conditions,
- vibrations and impacts ( among others transport conditions),
- measurement accuracy.

**We guarantee competitive prices and delivery dates!**

**We are looking forward to doing business with you and working together!**

Electrical quantities

Temperature

Temperature and relative air humidity

**CONTACT:**

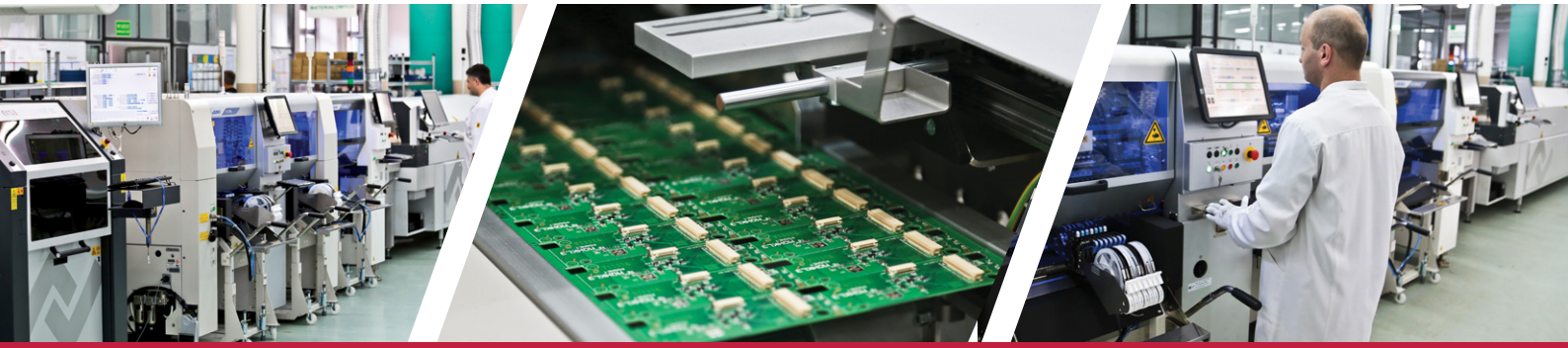
address: LUMEL S.A., ul.Sulechowska 1, 65-022 Zielona Góra, Poland
tel. +48 68 45 75 290
e-mail: **laboratorium@lumel.com.pl**

# ELECTRONIC MANUFACTURING SERVICES

**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 wave 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:

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

**Our machine park**

Our machine park consists of 2 complete assembly lines.

- silk screen printer ERSA (equipped in stencils cleaning system, inspection of bridging, clogging of the openings, inspection of smearing and paste level on the stencil. Additionally it is equipped in complete record of statistical data of the processes)
- two automatic machines JUKI (flexible KE-3020VA and high-speed chip shooter: FX-3RA).
- 7- zones reflow soldering oven ERSA HOTFLOW 3/14E.
- The whole line is completed by handling system, loader, conveyors and unloader of the circuit boards manufactured by ASYS - Germany.

The second assembly line is composed of:

- silks creen printer JUKI K1760,
- placement machine JUKI KE-2060,
- reflow oven ERSA HOTFLOW 2/14,
- magazine loader and line unloader – JOT,
- conveyors and in-line workstation – JOT.

ELECTRONIC MANUFACTURING SERVICES

Additionally our machine park is equipped with:

- two soldering aggregates of KIERSTEN company,
- optical control stands,
- stand for thread assembly with Weller soldering stations,
- tester Flying Probe Takaya.

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

**CONTACT:**

address: LUMEL S.A., ul.Sulechowska 1, 65-022 Zielona Góra, Poland
tel.: (+48 68) 45 75 139, 45 75 233, 45 75 321, 45 75 386
e-mail: **export@lumel.com.pl**

# NOTES

# NOTES

LUMEL
EVERYTHING COUNTS

Since 1954 Lumel brand has been known as a producer of top quality measuring devices and high-pressure die-castings all over the world. Our high position in the market has been achieved thanks to continuous development policy, competence of our employees and modern technology in the areas of research, design and production. We deliver complex solutions for power and industrial automation sector as well as for automobile, chemical, steel or HVAC industries.

Our activitity is focused on the following business areas:

- Production of automation devices meant for measurement, control, registration, transmission and visualization of various industrial processes;
- Services of designing and manufacturing of automation systems;
- Electronic manufacturing services;
- Technical consulting services.

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 9001:2015 and ISO 14001:2015.

**LUMEL S.A.**
ul. Sulechowska 1, 65-022 Zielona Góra, POLAND
tel.: +48 68 45 75 100, fax +48 68 45 75 508
www.lumel.com.pl

**Export department:**
tel.: (+48 68) 45 75 139, 45 75 233, 45 75 321, 45 75 386
fax.: (+48 68) 32 54 091
e-mail: export@lumel.com.pl

January 2020