LUMEL
EVERYTHING COUNTS

RE92 CHECKMATE

Dual loop controller for demanding industrial applications

- Control / logging / visualisation –all in one
- Two independent channels
- 60 control programs (30 per each channel)
- WEB and FTP servers
- Parameters logging on SD card
- Intuitive and user-friendly software

Modern control functions

- **independent dual loop control**
- **PID control, on/off, three-step control of heating-cooling, and step-by--step control**
- **additional Modbus Master input for reading measurements from two external devices via RS-485 (up to 10 registers per device)**
- **innovative SMART PID algorithm with auto-tuning function (automatic selection of PID parameters)**
- the source of control signal is one of the two inputs or the sum/difference of the signal from two inputs combined
- 4 sets of PID parameters and additional set for cooling (for each loop)
- 6 types of alarm with programmable hysteresis and memory (latch function)
- digital communication - RS-485 (standard), Ethernet (option)
- Gain Scheduling feature - automatic PID set switching, depending on the set temperature (when the object behaves decidedly differently in various temperatures)

Intuitive and user-friendly interface

- **3.5" full-colour graphic screen with luminosity control**
- **menu available in English**
- **password-protected regulator access (4 users, 3 access levels)**
- signaling a state of binary inputs and two-state outputs

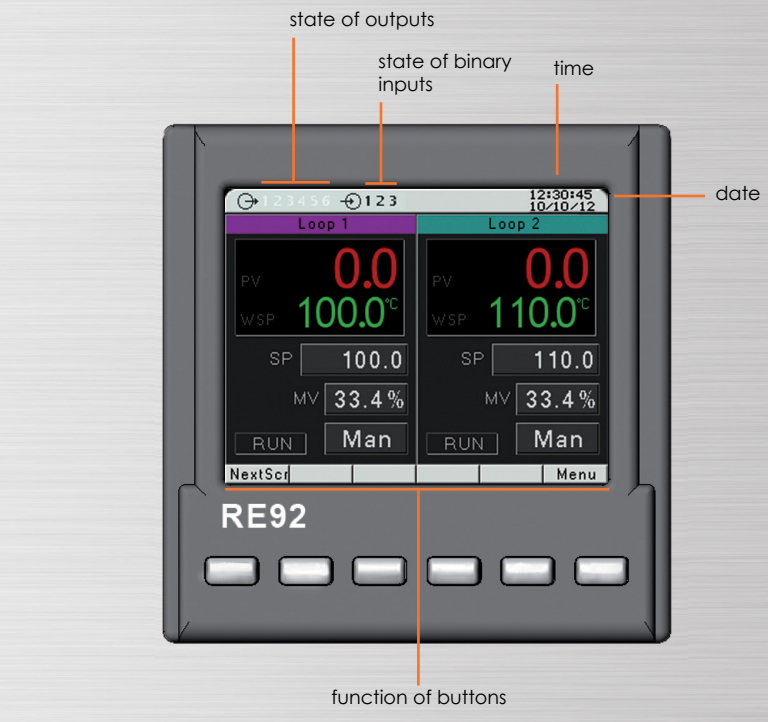
Reliable control with fixed set-point

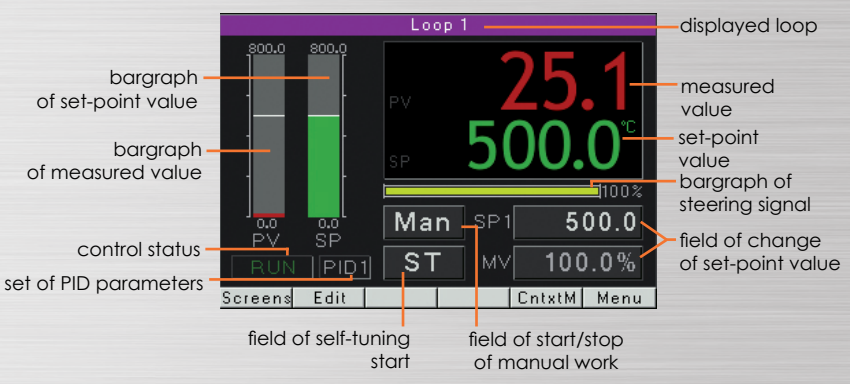
- **4 set point values switchable by the binary inputs (for each loop)**
- **soft-start function for set point values change, programmable increase/decrease**
- also an additional input may serve as the source of set point value (input 3)

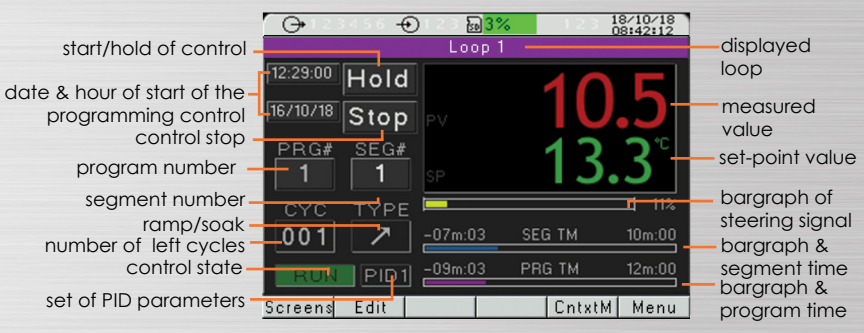
Advanced programming control

- **60 internal programs (30 programs per loop)**
- **15 units per program**
- signaling up to 6 events per unit (two-state outputs)
- selection of PID parameters for any unit
- iterations number setting (up to 9999 repetitions)

RE92 is an advanced dual loop controller for industrial use. It was designed for demanding industrial applications. RE92 can control two controlled objects independently or control two physical values in one object (e.g. in the two-zone furnaces). Thanks to the universal measuring inputs, it can be used for controlling of temperature and other physical values (e.g. pressure, humidity). Every user can update controller's software individually, thus getting access to the additional features added by the LUMEL development team.







Connections description

Universal supply

- 85…253 V a.c./d.c
- installation category III

Multi-functions outputs

- 6 relay outputs or 2 binary and 4 relay outputs
- outputs features: control, alarm, signaling events and binary output state in programming control
- **the ability to directly control outputs via the digital interface**

Mini USB port

- designed for future uses

Ethernet interface (option)

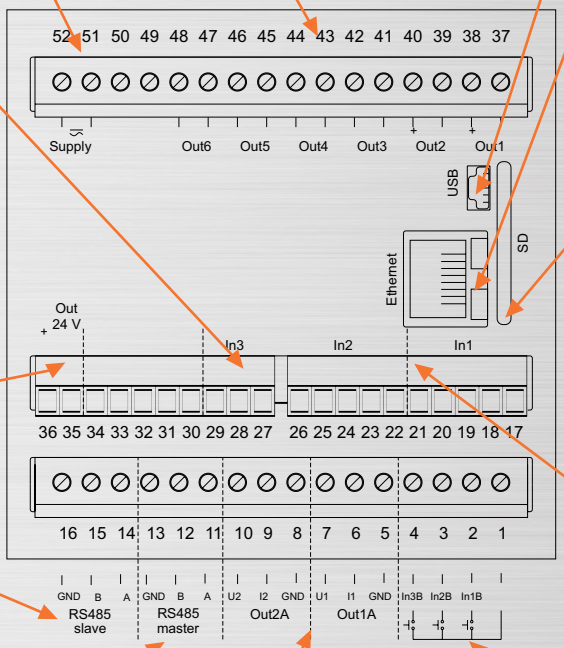
- Modbus TCP protocol
- for the monitoring of the controller and programming
- FTP Server
- **web server (to download the .csv archive files remotely)**

Additional input (option)

- input 0/4...20 mA, 0...5/10 V or 0...100/1000 Ω
- programmable indication range
- averaging of the measurements with programmable time filter
- functions: measurement of controled signal and set point value

Free updates & parameter logging

- software self-update using SD memory card
- process parameter logging on SD card (.csv files)



Object transducers supply (option)

- 24 V d.c., max. 30 mA
- for external transducers and sensors

Universal inputs

- 2 programmable measuring inputs (temperature sensor, 0/4...20 mA i 0...5/10 V)
- programmable indication range
- averaging of the measurements with programmable time filter

RS-485 interface slave

- Modbus RTU protocol
- for the monitoring of the regulator programming

RS-485 interface master

- **protocoll Modbus RTU**
- **for reading measurements from two external devices (up to 10 registers per device)**
- **the read register can be used as a measuring input for the control channel**

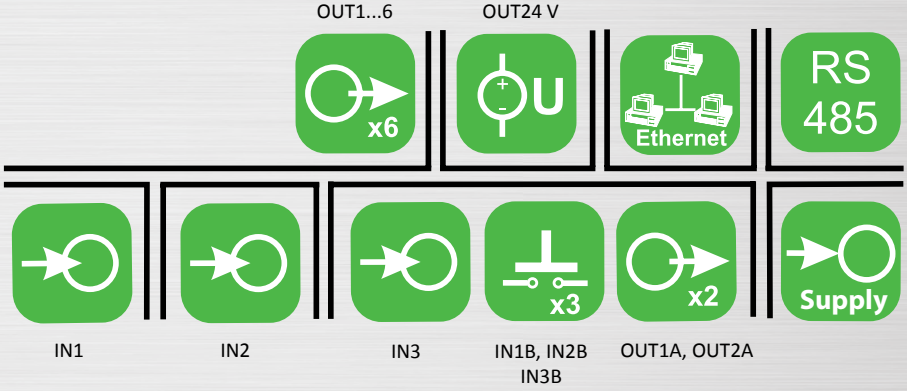
Analog outputs (option)

- two programmable analog output 0/4...20 mA and 0...10 V
- outputs features: control, retransmission

Binary/logic inputs

- 3 voltageless binary inputs
- inputs features: stop control, manual /automatic control, program control, relay outputs control
- **3 additional binary inputs controlled with digital interface**

Galvanic isolation



TECHNICAL DATA

INPUTS			
Input type	**Range**	**Error**	**Additional error**
Universal main inputs 1 and 2			
Pt100	-200 ... 850°C	0.2%	Compensation of wire resistance changes in 3-wire connection: < 0.1% Compensation of thermocouple reference cold junction: < 2°C Ambient temperature change: ≤ 0.1% / 10 K
Pt500	-200 ... 850°C	0.2%	
Pt1000	-200 ... 850°C	0.2%	
Ni100	-60 ... 180°C	0.2%	
Ni1000	-60 ... 150°C	0.2%	
Cu100	-50 ... 180°C	0.2%	
Fe-CuNi (J)	-100 ... 1200°C	0.3%	
Cu-CuNi (T)	-100 ... 400°C	0.3%	
NiCr-NiAl (K)	-100 ... 1372°C	0.3%	
PtRh10-Pt (S)	0 ... 1767°C	0.5%	
PtRh13-Pt (R)	0 ... 1767°C	0.5%	
PtRh30-PtRh6 (B)	0 ... 1767°C	0.5%*	
NiCr-CuNi (E)	-100 ... 1000°C	0.3%	
NiCrSi-NiSi (N)	-100 ... 1300°C	0.3%	
Current (I)	0/4 ... 20 mA	0.2% +/- 1 digit	
Voltage (U)	0 ... 5/10 V	0.2% +/- 1 digit	
Additional input			
Current (I)	0/4 ... 20 mA	0.2% +/- 1 digit	Ambient temperature change: ≤ 0.1% / 10 K
Voltage (U)	0 ... 5/10 V	0.2% +/- 1 digit	
Resistance (R)	0 ... 100/1000 Ω	0.2% +/- 1 digit	
Logic input	3 x voltageless		

* error concerns the range: 200...1767 °C (392 ... 3212.6 °F)

OUTPUTS		
Output type	**Properties**	**Remarks**
Relay	6/4 outputs	switching contacts, 2 A/ 230 V
Voltage transistor	0/2 outputs	0/5 V (I_{max}=20 mA)
Continuous voltage	0...2 outputs	0...10 V, R_{load} ≥ 1 kΩ
Continuous current	0...2 outputs	0/4...20 mA, R_{load} ≤ 500 Ω

DIGITAL INTERFACE		
Interface type, protocol	**Mode**	**Baud rate**
RS-485, MODBUS RTU Slave	8N2, 8E1, 8O1, 8N1	2400, 4800,9600, 19200, 38400, 57600, 115200 bit/s
RS-485, MODBUS RTU Master	8N2, 8E1, 8O1, 8N1	2400, 4800,9600, 19200, 38400, 57600, 115200 bit/s
Ethernet, MODBUS TCP Slave, FTP server, web server		

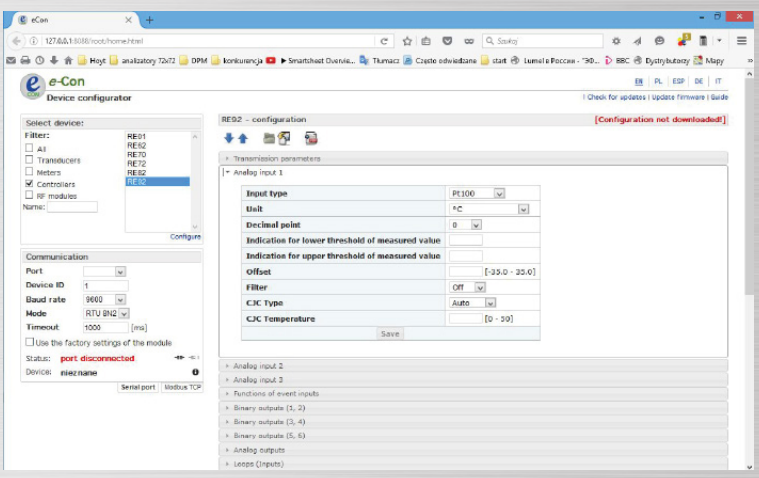
EXTERNAL FEATURES		
Readout field	colorful display TFT 3,5''	320 x 240 pixels
Overall dimensions	external: 96 x 96 x 100 mm	panel cut-out: 92.5 x 92.5 mm
Weight	< 0.5 kg	
Protection grade	from the frontal side: IP65	from the terminal side: IP20

RATED OPERATING CONDITIONS		
Supply voltage	85...253 V a.c./d.c.	frequency: 40...50...440 Hz
Temperature	ambient: 0...23...50°C	storage: -20...70°C
Humidity	< 85%	without condensation
Operating position	any	

SAFETY AND COMPATIBILITY REQUIREMENTS		
Electromagnetic compatibility	noise immunity	acc. to EN 61000-6-2
	noise emissions	acc. to EN 61000-6-4
Pollution level	2	
Installation category	III	
Maximal phase-to-erth operating voltage	for supply circuit, relay outputs: 300 V	for input circuits, interface, continuous and voltage 0/5 V outputs: 50 V
Altitude above sea level	up to 2000 m	

SOFTWARE

For easy programming and devices configuration LUMEL offers one common eCon software. It is developed with expansion of the products offer.



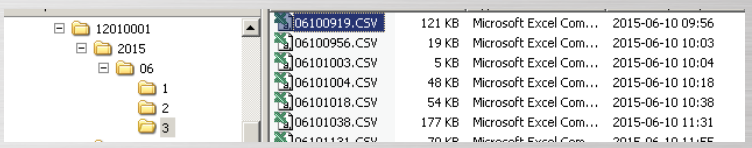
eCON - FREE CONFIGURATION TOOL

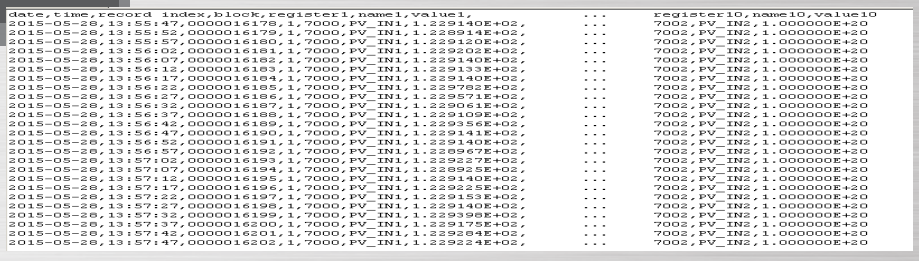
- program for remote service of RE92 configuration (by RS-485 interface)
- user-friendly saving of the configuration to file and fast copying the settings to other RE92s
- the most current version is always available on www.lumel.com.pl

PARAMETER LOGGING

- **archiving on the SD card (three independent groups of data archiving of 10 values in the group)**
- **archival data are available in the CSV files**
- **archival data could be downloaded directly from SD card, remotely via FTP server * or any web browser (web server)***

* function available in version with Ethernet





```
date,time,record index,block,register1,name1,value1,   ...   register10,name10,value10
2015-05-28,13:55:47,0000016178,1,7000,PV_IN1,1.2291402E+02,   ...   7002,PV_IN2,1.0000000E+20
2015-05-28,13:55:52,0000016179,1,7000,PV_IN1,1.2289142E+02,   ...   7002,PV_IN2,1.0000000E+20
2015-05-28,13:55:57,0000016180,1,7000,PV_IN1,1.2291202E+02,   ...   7002,PV_IN2,1.0000000E+20
2015-05-28,13:56:02,0000016181,1,7000,PV_IN1,1.2292022E+02,   ...   7002,PV_IN2,1.0000000E+20
2015-05-28,13:56:07,0000016182,1,7000,PV_IN1,1.2291402E+02,   ...   7002,PV_IN2,1.0000000E+20
2015-05-28,13:56:12,0000016183,1,7000,PV_IN1,1.2291332E+02,   ...   7002,PV_IN2,1.0000000E+20
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2015-05-28,13:56:22,0000016185,1,7000,PV_IN1,1.2297922E+02,   ...   7002,PV_IN2,1.0000000E+20
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2015-05-28,13:57:07,0000016194,1,7000,PV_IN1,1.2289252E+02,   ...   7002,PV_IN2,1.0000000E+20
2015-05-28,13:57:12,0000016195,1,7000,PV_IN1,1.2291402E+02,   ...   7002,PV_IN2,1.0000000E+20
2015-05-28,13:57:17,0000016196,1,7000,PV_IN1,1.2292252E+02,   ...   7002,PV_IN2,1.0000000E+20
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2015-05-28,13:57:27,0000016198,1,7000,PV_IN1,1.2291402E+02,   ...   7002,PV_IN2,1.0000000E+20
2015-05-28,13:57:32,0000016199,1,7000,PV_IN1,1.2293982E+02,   ...   7002,PV_IN2,1.0000000E+20
2015-05-28,13:57:37,0000016200,1,7000,PV_IN1,1.2291752E+02,   ...   7002,PV_IN2,1.0000000E+20
2015-05-28,13:57:42,0000016201,1,7000,PV_IN1,1.2292842E+02,   ...   7002,PV_IN2,1.0000000E+20
2015-05-28,13:57:47,0000016202,1,7000,PV_IN1,1.2292242E+02,   ...   7002,PV_IN2,1.0000000E+20
```
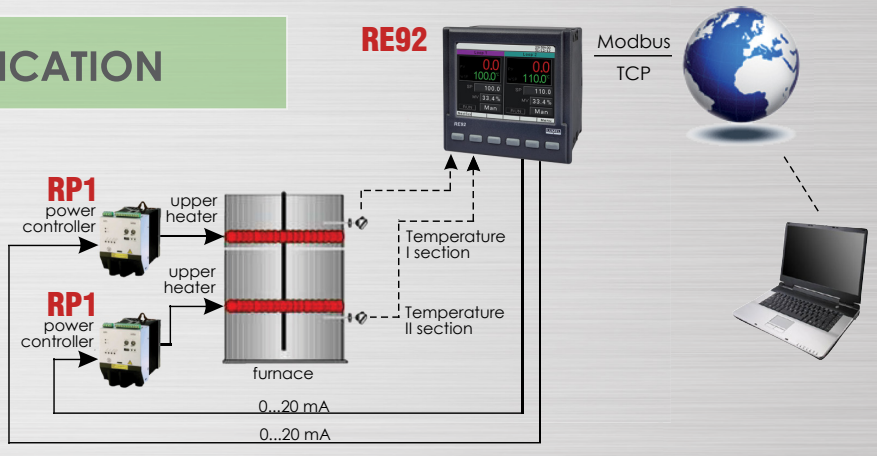

EXAMPLE OF APPLICATION



Temperature control in two-section furnace.

ORDERING CODE

	RE92	X	X	X	X	XX	X	X
Input 3:								
none		0						
current: 0/4...20 mA		1						
voltage: 0...5/10 V		2						
potentiometric transmitter: 100 Ω / 1000 Ω		3						
Output 1 and 2:								
2 relays			1					
2 binary outputs 0/5 V			2					
Analog outputs:								
none				0				
2 continuous 0/4...20 mA and 0...10 V				1				
Ethernet:								
none					0			
with Ethernet					1			
Transducer supply:								
none						0		
24 V d.c.						1		
Version:								
standard						00		
custom-made[1)]						XX		
Language:								
Polish- English							M	
other[2)]							X	
Additional quality requirements:								
without additional quality requirements								0
with an extra inspection quality certificate								1
with calibration certificate								2
acc. to customer's request[2)]								X

IN STANDARD VERSION

(RE92 0100000M0):
2 universal inputs
3 binary inputs
6 relay outputs
RS-485 Modbus Slave
RS-485 Modbus Master
supply 85...253 V a.c./d.c

[1)] - the code will be established by the manufacturer
[2)] - after agreeing with the manufacturer

Order example:
The code **RE92 1101000M0** means: controller RE92, with additional input: current 0/4...20 mA, output 1 and 2: 2 relays, analog outputs: none, with Ethernet, transducer supply: none, standard version, Polish-English language version, without additional quality requirements.

SEE OTHER CONTROLLERS WITH SMART PID ALGORITHM:

BASIC

RE71 RE81

ADVANCED

RE72 RE82

LUMEL
EVERYTHING COUNTS

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