PROGRAMMABLE DOT RECORDER KE8 TYPE

APPLICATION

The KE8 recorder is intended to be used for dot recording of slow-changing signals of voltage, current, temperature and resistance changes from six different measuring points. It can co-operate directly with voltage and current sources, thermocouples (TC), resistance thermometers (RTD), potentiometric and resistance transmitters.

This recorder is adapted to communicate with a host computer and can be a part of measuring or control systems.

Its mechanical design enables the fitting in control panels of a small building depth and ensures an optimal use of the panel front.

FUNCTIONAL PROPERTIES

- frontal dial with a digital display field with a keyboard,
- programmable measurement and recording of parameters,
- multicolour graph recording and chart descriptions,
- linearization of sensor characteristics,
- measurement protocol and recorder parameter printout on the chart,
- sensor break (burnout) signalling and recording of the message on the chart,
- alarm exceeding states signalled by relay contacts and chart printout,
- signalling of the recorder chart end by one of the alarm relay,
- detection of the chart end with the automatic description of the chart for archives purposes,
- recording cycle control and chart feed control by external binary signals,
- RS-232C or RS-485 standard interface co-operation with the host computer,
- MODBUS communication protocol,
- recording of measurement results in any values proportionally to measured quantities and the description of these values (when the protocol or the passport is printed out) in physical units according the customer's order,
- measurement data information storage during the time of the recording mode stoppage for the realization of recorder servicing operations,
- copying of measuring parameter settings between channels,
- printout of 24 hours' reports on the chart,
- linear and radical-processing function of the output signal conversion, or another, according the customer's order,
- 12 alarm relays assigned to optional channels,

TECHNICAL SPECIFICATIONS

Recording width	100 mm
Number of measuring points	1... 6 (electrically separated each other up to 100 V d.c.)
Recording mode	dot recording, by echangeable printing head in 6 colours
Printing head durability	750,000 dots/colour

Measuring ranges

Kind of signal	Range code number	Signal source	Measuring range	Minimal subrange
mV	01	voltage	- 9999...0...9999	5 mV
mA	02	current	- 20...0...20	1 mV
Ω	03	potentiometric transmitter	0...2000	50 Ω
Ω	04	resistive transmitter	0...2000	60 Ω
°C (TC)	05	**R** (PtRh13-Pt)	0...1760	540°C
	06	**S** (PtRh10-Pt)	0...1800	570°C
	07	**B** (PtRh30-PtRh6)	400...1820	1000°C
	08	**K** (NiCr-NiAl)	- 200...1370	130°C
	09	**J** (Fe-CuNi)	- 200...1200	100°C
	10	**T** (Cu-CuNi)	- 200...400	110°C
°C (RTD)	11	Ni-NiMo)	0...1400	110°C
	12	Pt100)	- 200...850	50°C
	13	Ni100)	- 60...180	50°C

Recording time:	
- of measurement results	0 or 4, 6, 12, 24, 30, 60, 120, 240 sec
- from 6 measurement points	for 0 setting, the recording time is proportional to the number of switched measuring channels (x 1 sec)
Paper feed speed	0 or 5, 10, 20, 30, 40, 60, 120, 240, 360 and 600 mm/h
Accuracy class	0.5
Chart advance accuracy error	0.05%
Additional error of the thermocouple automatic cold junction compensation	max 1°C
Input resistance for current ranges	100 Ω ± 0.05%
Recording chart	roll chart, 32 m long or Z-fold chart, 16 m long, according DIN 16230
Resolution of the carriage displacement	0.21 mm
Number of alarm relays	12, optionally assigned to channels
Load capacity of alarm outputs:	
- for resistive load	a.c. max: 125 V a.c., 0.5 A d.c. max: 30 V d.c., 0.5 A
- for inductive load	a.c. / d.c. max 30 V, 0.5 A

LUMEL S.A., ul. Sulechowska 1, 65-022 Zielona Góra, Poland / fax: (48-68) 325 40 91, tel.: 329 53 02, 329 53 04 / e-mail:export@lumel.com.pl / www.lumel.com.pl

Binary input control	short-circuited or opened inputs or signal at the TTL level
Communication interface	RS-232C or RS-485
Data transmission protocol	MODBUS
Operating temperature range	0...23...50°C
Duration of the preliminary heating	0.5 h
Data storage	RAM memory with battery support for a period of min. 4 years
Data buffer capacity	1.5...30 h
Supply voltage	90...230...253 V a.c. /15 VA or 18...24...30 V d.c./a.c./18 W
Supply voltage frequency	45...50...65 Hz
Housing protection degree	IP 65, acc. to EN 60529
Terminal protection degree	IP 00, acc. to EN 60529
Recorder front dimensions	144 x 144 mm
Depth behind panel face	260 mm
Panel cutout	138 x 138 mm
Weight	4.3 kg
Servicing safety	acc. to EN 61010-1
- installation cathegory	II
- pollution degree	2

Electromagnetic compatibility:

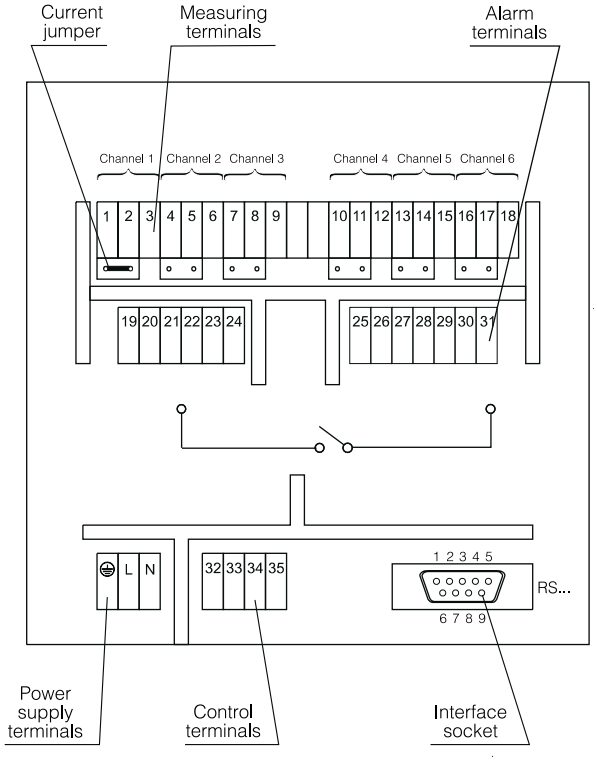
- emission	acc. to EN 61000-6-4
- immunity	acc. to EN 61000-6-2
- additional error from electromagnetic stress	≤ 1%

EXTERNAL CONTROL, RECORDER SUPPLY

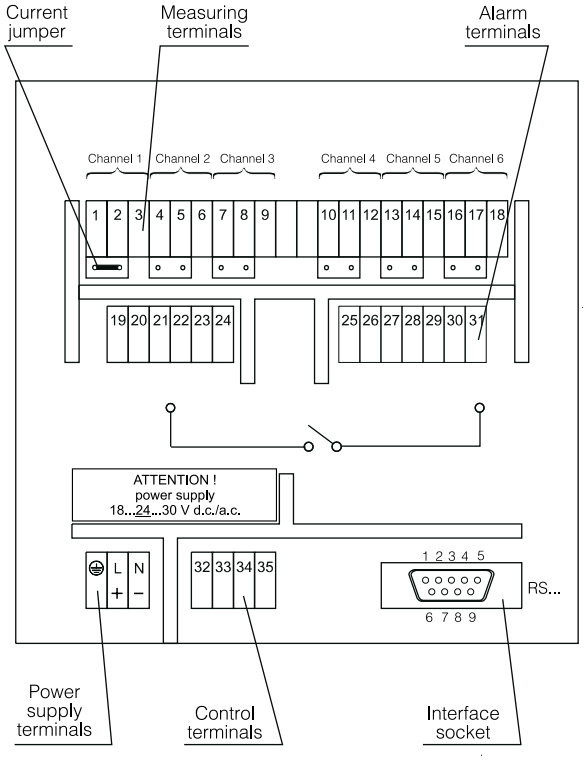
Kind of control	Terminal number	Terminal marking
External (remote) control of binary signals at the TTL level or by short-circuiting and opening the inputs	32	Mass
	33	INT - EXT, switching of the chart advance
	34	START - IMPULS, release of single recorder measuring cycles
	35	START - STOP, switching on/off the chart advance
Network supply	L +	Phase conductor
	N -	Neutral conductor
	⏚	Ground wire
Junction temperature sensor	B	Connection of the external reference cold junction temperature sensor placed in the ACJC attachment
	E	

CONNECTION OF EXTERNAL CIRCUITS TO THE TERMINAL PLATE

Supply: 90...230...253 V a.c.



Supply: 18...24...30 V d.c.



CAUTION:
The recorder must be earthed or zeroed.

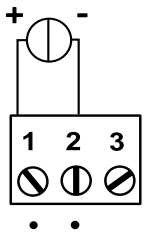
LUMEL S.A., ul. Sulechowska 1, 65-022 Zielona Góra, Poland / fax: (48-68) 325 40 91, tel.: 329 53 02, 329 53 04 / e-mail:export@lumel.com.pl / www.lumel.com.pl

Measuring signal terminals

Table 3

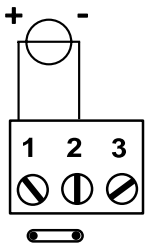
	Measuring channels					
	1	**2**	**3**	**4**	**5**	**6**
Terminal number	1	4	7	10	13	16
	2	5	8	11	14	17
	3	6	9	12	15	18

Voltage source connection



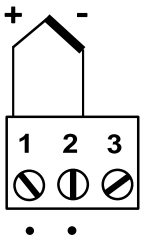
Signal source resistance < 1k Ω

Current source connection

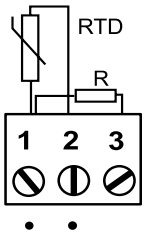


Jumper from recorder accessories

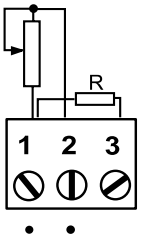
Thermocouple connection - TC



Two-wire connection of resistance thermometer

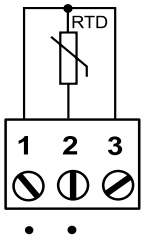


Two-wire connection of resistance transmitter



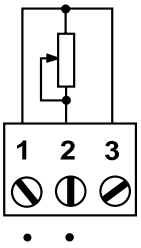
The balancing resistance R should have a resistance equal to the resistance sum of both leads connecting RTD with terminals

Three-wire connection of resistance thermometer

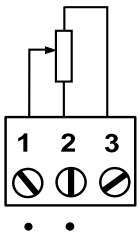


Leads connecting RTD to terminals 2 and 3 should have the same resistance

Three-wire resistance transmitter



Three-wire petentiometric transmitter



Alarm terminals

Relay No	1	2	3	4	5	6	7	8	9	10	11	12	Common terminal
Terminal No.	19	20	21	22	23	24	25	26	27	28	29	30	No. 31

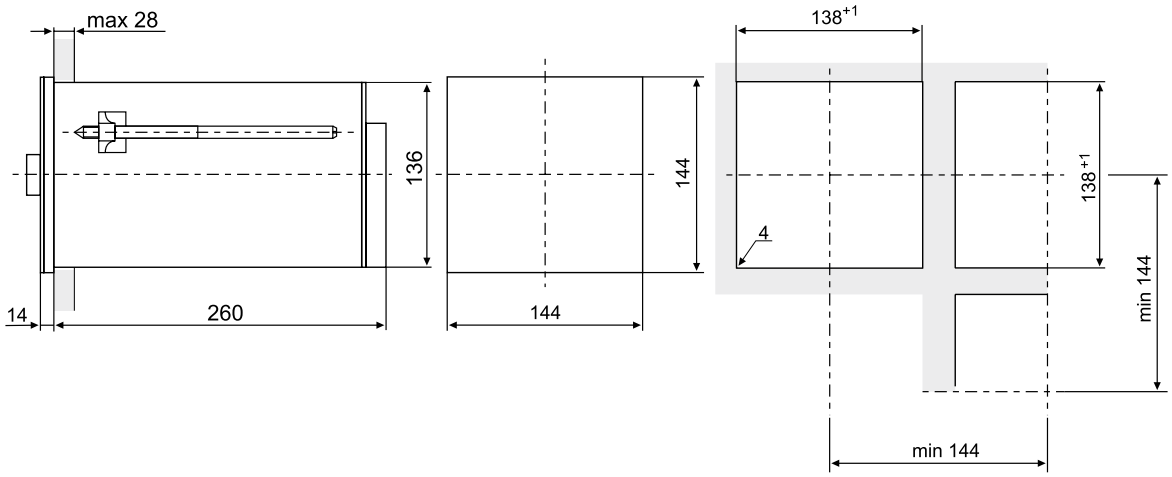
Notice:

Leads supplying signals to each measuring channel of the recorder should be twisted in pairs and for resistance sensors in a three-wire connection should be of the same length, sectionand resistance, and led in a screen.

Moreover, conductors supplying measuring signals to the same recorder can be led in the same screen (if it is possible).
All screens should be connected to the recorder housing and earthed unilaterally by the recorder.

RECORDER DIMENSIONS

Overall and cut-out dimensions of the KE8 recorder.



ORDERING CODES

KE8 TYPE RECORDER	X	X	X	X	X	X	X	X
Without alarms **0**								
With alarms **1**								
RS-232C interface **1**								
RS-485 interface **2**								
RS-232C interface + servicing program from the computer [1] **3**								
RS-485 interface + servicing program from the computer [1] **4**								
LUMBUS communication protocol **1**								
MODBUS communication protocol **2**								
Without compensation of the thermocouple cold junction **0**								
Compensation of the thermocouple cold junction sensor **1**								
Red colour of the read-out field **1**								
Green colour of the read-out field **2**								
Standard parameter settings **1**								
Custom-made parameter settings (acc. customers'order) **2**								
Supply 90...230...253 V a.c. **1**								
Supply 18...24...30 V d.c./a.c. **2**								
Without additional requirements **8**								
With a control quality certificate **7**								
Acc. agreements with the customer [2] ..... **X**								

[1] Concerns the recorder execution with the LUMBUS communication protocol.

[2] The code number willbe settle by the producer.

After choosing:

- ***Settings of standard parameters***. Manufacturer's standard settings given bellow will be programmed in the recorder.
- ***Settings of user's parameters:*** the user may give his proper set of parameters to program the ordered recorder.
- ***RS-232C (or RS-485) interfaces:*** for the recorder with the LUMBUS communication protocol, the current version of the ***Lumel-Leonardo*** demo program is delivered (without the possibility to change recorder settings and without the record of measuring data in the computer).
- ***RS-232C (or RS-485) interfaces + program to service the recorder from the computer:*** with the recorder, against an extra charge, the current commercial version of the ***Lumel-Leonardo*** program with the code key enabling a full service of the given recorder from the computer level, is delivered.

LUMEL S.A., ul. Sulechowska 1, 65-022 Zielona Góra, Poland / fax: (48-68) 325 40 91, tel.: 329 53 02, 329 53 04 / e-mail:export@lumel.com.pl / www.lumel.com.pl