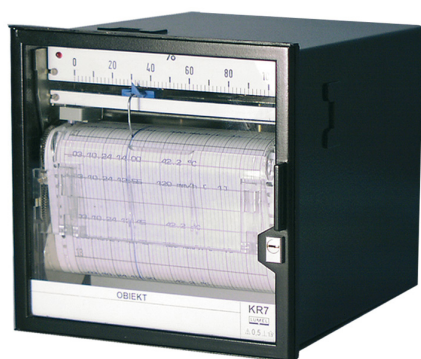


ONE-CHANNEL PANEL PEN RECORDER KR7 TYPE



- One measuring channel, continuous recording
- Printing of text descriptions on the recording tape
- Recording of voltage, current, temperature or resistance
- Programmable measurement and recording parameters
- Roll and Z-fold chart paper tape
- IP65 front panel protection degree
- Supply: 90...230...253 V a.c. or 18...24...30 V c.d.

APPLICATION

The KR7 one-channel pen recorder with a built-in printer is intended for the continuous recording of voltage, current, temperature, resistance or other quantities converted into an electric signal on a paper tape.

Measurement, recording and printing parameters are directly programmed from the recorder keyboard or from PC through the RS-485 interface.

RECORDER FUNCTIONS

- continuous recording of the measured quantities on roll or Z-fold paper tape,
- printing of date, time, value of measured signal, tape feed speed, recorder parameter settings, description of binary signals and alarms,
- signalling of alarm state overruns by means of relay contacts and LED diodes on the analog scale,
- signalling of the sensor break,
- retransmission signal galvanically isolated from the recorder system,
- locking of the parameter change by means of a password.

RECORDER PROPERTIES

- all recorder functions are controlled by a microprocessor-based system,
- linearization of sensor characteristics,
- parameters programming from the recorder keyboard with an LCD display and from a PC through the RS-485 interface connector with MODBUS protocol, following parameters are programmed:
 - measuring parameters (selection of sensors, measuring ranges, TC compensation, conduits resistance for RTD),
 - parameters of alarms (value of MIN/MAX alarm states, hysteresis, activity),
 - recording tape feed speed,
 - the range of descriptions on the recording tape,
 - output signals (retransmitting),
 - parameters of the communication interface.
- binary inputs to control the recording tape feed,
- possibility of archiving and converting measuring data in a computer through the RS-485 interface connection,
- universal power supply from the network or by d.c. voltage,
- housing protection degree from the frontal side: IP65,
- conformity to standard requirements concerning servicing safety and electromagnetic compatibility (CE mark).
- Possibility to build in a power pack for measuring transducers or a power pack for the binary input control (after agreeing the execution with the manufacturer).

TECHNICAL DATA

Recording width	100 mm
Number of channels	1
Recording of the measuring signal	continuous
Writing elements:	
- measuring system	a blue felt-tip pen (for 1000 running m)
- printer	a blue felt-tip pen
- offset between felt-tip pens	3 mm
Response time	≤ 2 s
Measurement, recording and output signal accuracy class	0.5
Recording support	paper recording tape roll or Z-fold tape -16 m, acc. to DIN 16230
Recording tape feed	0, 5, 10, 20, 60, 120, 300, 600, 1200 and 3600 mm/h
Printing of texts	for recording tape feed 5...300 mm/h
Output signal:	
- current	0...5 mA, 0...20 mA or 4...20 mA load resistance < 250 Ω
- voltage	0...5 V, 1...5 V or 0...10 V load resistance > 500 Ω
Binary input	2, switching over of the tape feed: START/STOP and INT/EXT
- control signal	0 or 5...24 V/0.02 A

Measuring ranges

Table 1

Input signal	Signal symbol in the menu	Measuring range	Minimal sub-range
1	2	3	4
Voltage < 10V	U mV	0...±9999 mV	5 mV
Voltage > 10V	U V	0...±50 V	5 V
Current	I mA	0...±50 mA	1 mA
Termocouples (TC): J(Fe -CuNi)	TC J	-200...1200°C (-328...2192°F)	100°C (212 °F)
K(NiCr -NiAl)	TC K	- 200...1370 °C (-328...2498°F)	130°C (266°F)
N(NiCrSi -Ni Si)	TC N	-200...1300°C (-328...2372°F)	200°C (392°F)
E(NiCr-CuNi)	TC E	-200...1000°C (-328...1832°F)	160°C (320°F)
R(PtRh13 -Pt)	TC R	0...1760°C (32...3200°F)	540°C ¹⁾ (1004°F)
S(PtRh10 -Pt)	TC S	0...1760°C (32...3200°F)	570°C ¹⁾ (1058°F)
T(Cu-CuNi)	TC T	-200...400°C (-328...752°F)	110°C (230°F)
B(PtRh30-PtRh6)	TC B	400...1820°C (752...3308°F)	1000°C (1832°F)
Resistance thermometers (RTD): Pt 100	Pt 100	- 200...850°C (-328...1562°F)	50°C (122°F)
Pt 500	Pt 500	- 200...850 °C (-328...1562°F)	
Pt 1000	Pt 1000	- 200...850°C (-328...1562°F)	
Ni 100	Ni 100	- 60...180°C (-76...356°F)	
Cu 100	Cu 100	-50... 180°C (-58...356°F)	
Potentiometer transmitter ²⁾	Potent	50...9999 Ω	50 Ω
Resistance transmitter	Resist.	0...9999 Ω	50 Ω

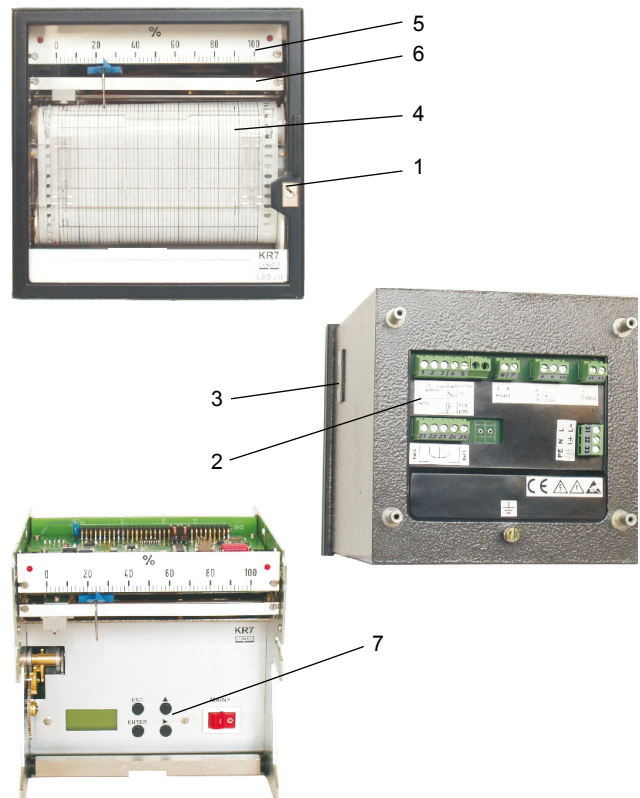
- 1) For signals measured up to 20°C the error can reach a 1% value, in connection with the characteristic non-linearity of the thermocouple.
- 2) The measurement accuracy is guaranteed for the sub-range equal to the nominal resistance of the transmitter (table 1, column

Input resistance for current ranges	50 Ω ± 0.05%
Input resistance for voltage ranges	≥ 250 kΩ - input for a voltage ≥ 10 V
Operational elements of alarms	2 relays (accessible as normally open and normally short-circuited)
- setting range of the alarm value	0...100% of the measuring range on the recorder scale
- setting range of the alarm hysteresis	0.5...1.5% of the measuring range on the recorder scale
Overload capacity of alarm relay contacts:	
- for resistance load	a.c. max: 125 V a.c., 0.5 A d.c. max: 30 V d.c., 0.5 A
- for inductance load	a.c./d.c. max: 30 V, 0.5 A
Supply voltage	90...230...253 V a.c., 45...50...65 Hz, ≤ 15 VA or 18...24...30 V d.c., ≤ 12 W
Communication interface:	RS-485, MODBUS
- baud rate	300...115200 baud
Working position	vertical ± 10°
Working temperature range	0...23...50°C

Storage temperature	-20°C...+70°C (without the pen)
Preliminary heating	30 minutes
Recorder frontal dimensions	144 x 144 mm
Length behind the panel (depth)	202 mm
Connection terminals	screws, wires with cross-section within 0.2...2.5 mm ²
Housing protection degree:	
- from the frontal side	IP65, acc. EN 60529
- from terminal side	IP00, acc. EN 60529
Weight	3.5 kg
Servicing safety:	acc. IEC 61010-1
- installation category	II
- pollution level	2
Electromagnetic compatibility:	
- electromagnetic noise emission	EN 61000-6-4
- electromagnetic interference immunity	EN 61000-6-2
- additional error from electromagnetic hazards	< 1%

RECORDER DESIGN

The recorder housing is made of steel sheet and is closed from the front side by a transparent door with a lock (1).



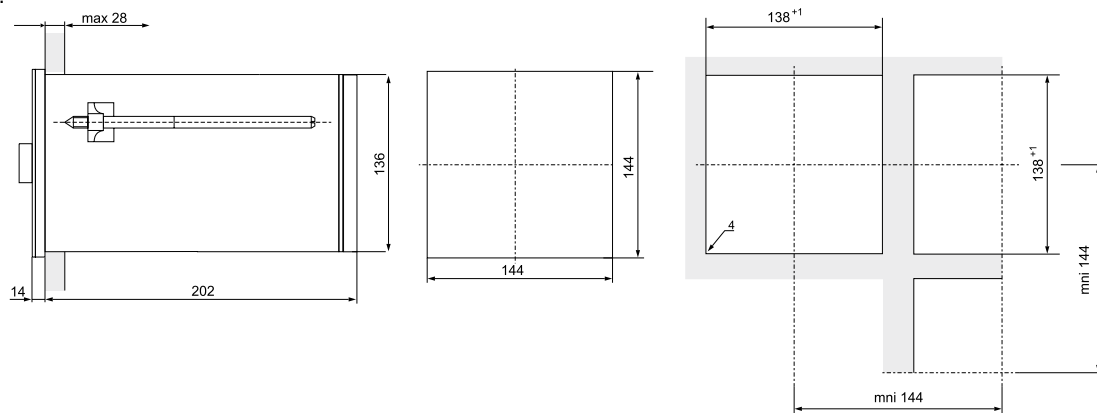
Two catches (2) are placed on the housing walls to fix the recorder into the panel by means of assembly screw holders included in the delivered recorder accessory set. At the housing rear part a terminal plate (3) is placed.

A universal tape rewriter for the recording roll and Z-fold tape (4) has been applied in the recorder.

Above the rewriter there are the measuring system (5) and the printer (6). The keyboard with the LCD display and the supply switch (7) are accessible after removing the rewriter.

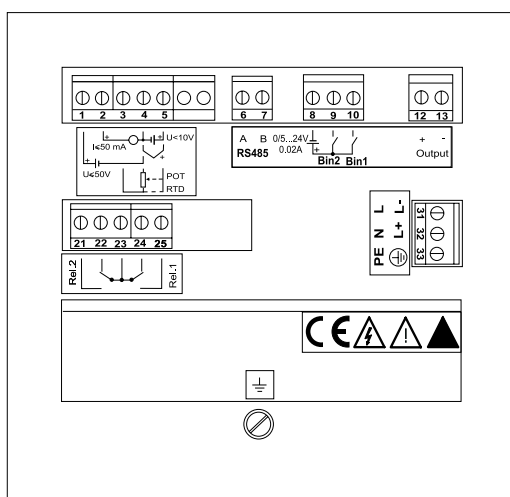
RECORDER DIMENSIONS

The recorder is fixed into the panel by means of two assembly screw holders included in the recorder accessory set, which are installed in the housing catches. The arrangement of catches on the four housing walls and the door design enable to assembly recorders in contiguity on the over-panel part.

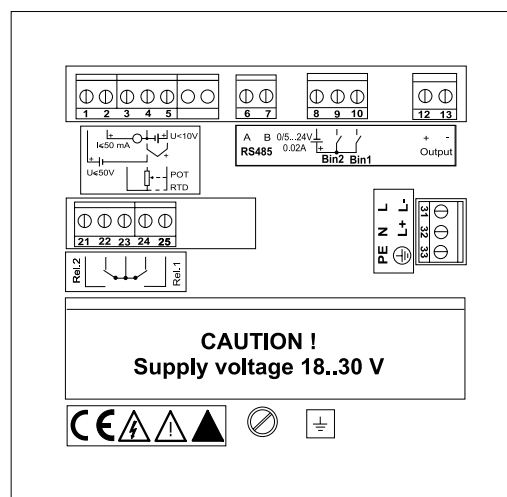


CONNECTION OF SIGNALS TO THE TERMINAL PLATE

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



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



Supply	Connection diagram
	<p>L+ N- ⊕</p> <p>L N PE</p> <p>31 32 33</p> <p>○ ○ ○</p>
Input signal:	Connection diagram
Voltage $U < 10\text{ V}$ ($0 \dots \pm 9999\text{ mV}$)	<p>$U < 10\text{ V}$</p>
Voltage $U \leq 50\text{ V}$ ($0 \dots \pm 50\text{ V}$)	<p>$U \leq 50\text{ V}$</p>
Current $I \leq 50\text{ mA}$ $0 \dots \pm 50\text{ mA}$	<p>$I \leq 50\text{ mA}$</p>
Thermocouples (TC) * See table 1	<p>TC</p>

CAUTION:
The recorder must be earthed or zeroed.

Input signal:	Connection diagram
Resistance thermometer (RTD) - three-wire connection	
Resistance thermometer (RTD) -two-wire connection with a balance resistance R where: $R = R_L$ (the total resistance of both leads connecting RTD with terminals)	
Resistance thermometer (RTD) -two-wire connection, with the programmed resistance of the linking leads (one must program the R_L line resistance of both leads connecting RTD with terminals).	

Input signal:	Connection diagram
Potentiometric transmitter	
Resistance transmitter - three-wire connection	
Binary inputs	
RS-485 (MODBUS) Inter- face	
Output signal (retransmission)	
Alarms Rel.1: 24 -23 normally shorted 25 -23 normally open Rel.2: 22 -23 normally shorted 21 -23 normally open	

EXECUTION CODES OF THE KR7 RECORDER

RECORDER	KR7 -	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Printer:																		
without printer ³⁾0																		
with printer1																		
Supply:																		
90...230...253 Va.c., 50/60 Hz1																		
18...24...30 V d.c.2																		
Parameter settings:																		
setting of standard parameters ¹⁾1																		
parameter settings as per order9																		
Ranges and input signals:																		
acc. table 11																		
version on order ²⁾9																		
Output signals:																		
without output signal0																		
current 0...5 mA1																		
current 0...20 mA2																		
current 4...20 mA3																		
voltage 0...5 V4																		
voltage 1...5 V5																		
voltage 0...10 V6																		
version on order ²⁾9																		
Alarms:																		
without alarms0																		
with alarms1																		
Binary inputs:																		
without binary inputs0																		
with binary inputs1																		
Setup configuration program:																		
without a configuration program0																		
with a configuration program1																		
Program for data archiving in PC:																		
without Lumel-Leonardo program0																		
with Lumel-Leonardo program ³⁾1																		
Scale graduation:																		
version with a blank scale1																		
version with description: 0...100%2																		
version on order ²⁾9																		
Recorder execution:																		
standard1																		
custom-made ²⁾9																		
Acceptance tests:																		
without an extra quality inspection certificate8																		
with an extra quality inspection certificate7																		
acc. user's agreement ²⁾X																		

¹⁾ Standard settings defined by the manufacturer are programmed in the recorder.

²⁾ The manufacturer establishes the code number.

³⁾ The KR7 recorder in the version without the printer is not serviced by the Lumel-Leonardo program.

NOTE:

One can build into the recorder a power pack for measuring transducers or to the binary output control. These options must be agreed with the manufacturer.