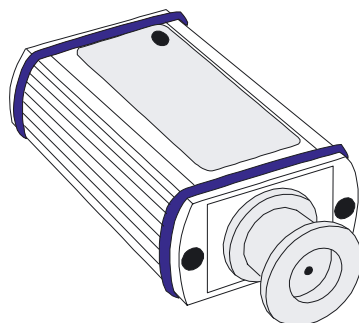


***Operating Instructions***

# ***CPT 100***

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***Compact Ceramic Transmitter***



# Contents

	Page
<b>1. Safety Instructions .....</b>	<b>3</b>
<b>2. Understanding The CPT 100 .....</b>	<b>4</b>
2.1. For Your Orientation .....	4
2.2. Product Identification .....	4
2.3. Package Contents .....	4
2.3. Product Description .....	5
Connection Options .....	5
Proper Use .....	5
Improper Use .....	5
<b>3. Installation .....</b>	<b>6</b>
3.1. Preparation For Installation .....	6
3.2. Vacuum Connection .....	6
3.3. Electrical Connection .....	7
3.4. Connections Plan .....	8
3.5. Disassembly .....	9
<b>4. Operation .....</b>	<b>10</b>
4.1. General.....	10
4.2. Communication.....	11
4.3. Transmitter Equalization .....	13
<b>5. Error Signals .....</b>	<b>13</b>
<b>6. Maintenance, Service .....</b>	<b>14</b>
<b>7. Technical Data .....</b>	<b>15</b>
7.1. Data List .....	15
7.2. Dimensions .....	16
<b>8. Accessories .....</b>	<b>16</b>
<b>9. Supplementary Information .....</b>	<b>17</b>

## Please note

Current operating instructions are available at [www.Lesker.com](http://www.Lesker.com)

# 1. Safety Instructions

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- ☞ Read and follow all the instructions in this manual.
- ☞ Inform yourself regarding:
  - Hazards which can be caused by the unit
  - Hazards which can arise in your system
- ☞ Comply with all safety and accident prevention regulations.
- ☞ Check regularly that all safety requirements are being complied with.
- ☞ Take account of the ambient conditions when installing the CPT 100. The protection type is IP40/IP 54. The unit is protected against the ingress of foreign bodies.
- ☞ Adhere to the applicable regulations and take the necessary precautions for the process media used.
- ☞ Consider possible reactions between the materials and the process media.
- ☞ Consider possible reactions of the process media due to the heat generated by the product.
- ☞ Do not carry out any unauthorised conversions or modifications on the unit.
- ☞ When returning the unit to us please note the shipping instructions.
- ☞ Before you begin to work, find out whether any vacuum components are contaminated.
- ☞ Adhere to the relevant regulations and take the necessary precautions when handling contaminated parts.
- ☞ Communicate the safety instructions to other users.

## Pictogram Definition



Danger of an electric shock.



Danger of personal injury.



Danger of damage to the unit or system.

## 2. Understanding The CPT 100

### 2.1. For Your Orientation

#### Abbreviations used

CPT = Compact Ceramic Transmitter  
RPT = Resistive Piezo Pirani Transmitter  
PPT = Pirani Pressure Transmitter  
HPT = Hot Cathode Pirani Transmitter  
DPG = Digital Pressure Gauge  
DPS = Digital Power Supply

#### Operating Instruction In The Text

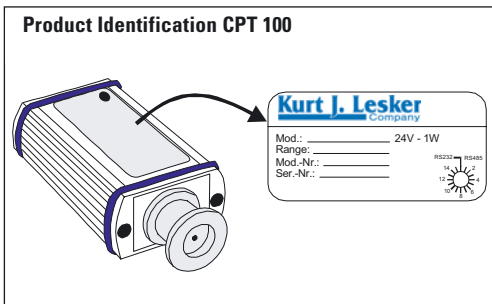
➔ Here, you have to do something.

#### Validity

These operating instructions describe the installation and operation of the Digital Rough Vacuum Transmitter CPT 100 with the part number KTR31130. The part number is shown on the rating plate. Technical modifications are reserved without prior notification.

### 2.2. Product Identification

Please state the information contained on the rating plate when corresponding with the Kurt J. Lesker Company.



### Package Contents

The following items are included in the package:

- CPT 100
- Protective cover
- Operating instructions

## **2.3. Product Description**

The Digital Transmitter CPT 100 enables absolute pressure measurements in the range 1 - 1500 Torr (1 - 2000 mbar).

The transmitter can be operated in conjunction with the Kurt J. Lesker Company DigilLine Measuring and Control Units, with the DigilLine Power Pack and the Windows Measuring Software DokuStar (please see "Accessories") on a PC or with customer-supplied, digital signal evaluation.

The transmitter communicates optionally via a Serial Interface RS 232 or RS 485. The individual functions are described in more detail in the section "Communication".

The transmitter CPT 100 has been tested and accepted in compliance with EN 61010/VDE 0411 "Safety Equipment For Electrical Components".

## **Connection Options**

The CPT 100 provides connection options for:

- RS 232/485 (for communication with the display unit), or
- Voltage supply

## **Proper Use**

The Digital Transmitter CPT 100 serves exclusively to provide total pressure measurements in the range 1 - 1500 Torr (1 - 2000 mbar). It may only be connected to components specifically provided for this purpose.

## **Improper Use**

The following is regarded as improper:

- The use for purposes not covered above and, in particular,
  - The connection to components not allowed for in their operating instructions;
  - The connection to components containing touchable, voltage carrying parts.

No liability will be accepted for claims arising from improper use.

The user bears the responsibility with respect to the process media.

## 3. Installation

### 3.1. Preparation For Installation



Unauthorized modifications or alterations to the unit are not allowed and will void the warranty.

**Installation location:** Indoor; max. 2000 m above mean sea level.

The following is applicable for open buildings and operations rooms which are not fully air conditioned:

**Temperature:** +5°C ... +40°C (+ 41°F ... +100 °F)

**Relative humidity:** 5 - 85%, non-condensing.

**Air pressure:** 86 kPa - 106 kPa (12.5 psi - 15.4 psi)

### 3.2. Vacuum Connection



Dirt and damage have an adverse effect on the function of these vacuum components.

Please take account of the instructions with regard to cleanliness and damage prevention when using vacuum components.

#### Set-Up Configuration

The gauge may be mounted in any orientation. A horizontal to upright orientation is preferred to keep condensates and particles from getting into the measuring chamber.

#### Connection

- ➔ Remove the protective cover. Do not discard the protective cover as it is required during maintenance work.
- ➔ Make vacuum connection via a QF16 (DN 16KF) flange with version KTR31130.



Where excess pressure is involved in the vacuum system > 750 Torr (1 bar):  
Inadvertent opening of elements under stress can lead to injuries because of parts flying around.

- ➔ Only use stressed elements which can be opened and closed (for example QF16 (DN 16KF) clamp).



With excess pressure in the vacuum system of 1125 to 3000 Torr (1.5 to 4 bar):  
With QF (KF) flange connections elastomer washers (for example O-rings) cannot withstand the pressure and this can lead to personal injury resulting from the emission of process media.

- ➔ Use centering rings with an outer over pressure ring (such as the QF16-075-OPR).

### 3.3. Electrical Connection



Only connect/disconnect the cable to/from the gauge when the power is disconnected.

#### **Kurt J. Lesker Company model DPG 101 controller:**

- ➔ First make the connection to the Kurt J. Lesker Company DPG 101 controller by means of Data Cable, part number KT348203T (please see "Accessories") on the RS 232 Serial Interface of the controller.
- ➔ Rotate the transmitter address switch to RS232 operation (factory default setting). The transmitter address switch can be found on the rating plate side of the unit.

#### **Kurt J. Lesker Company model DPS 101 power pack:**

- ➔ To connect a transmitter to a PC, use the Kurt J. Lesker Company Power Pack Model DPS 101 and set the transmitter to RS 232.

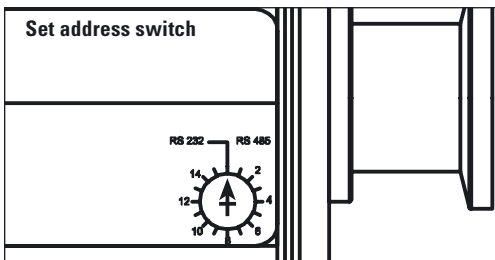
#### **Kurt J. Lesker Company model DPG 109 controller:**

Up to nine transmitters in series can be connected to this controller.

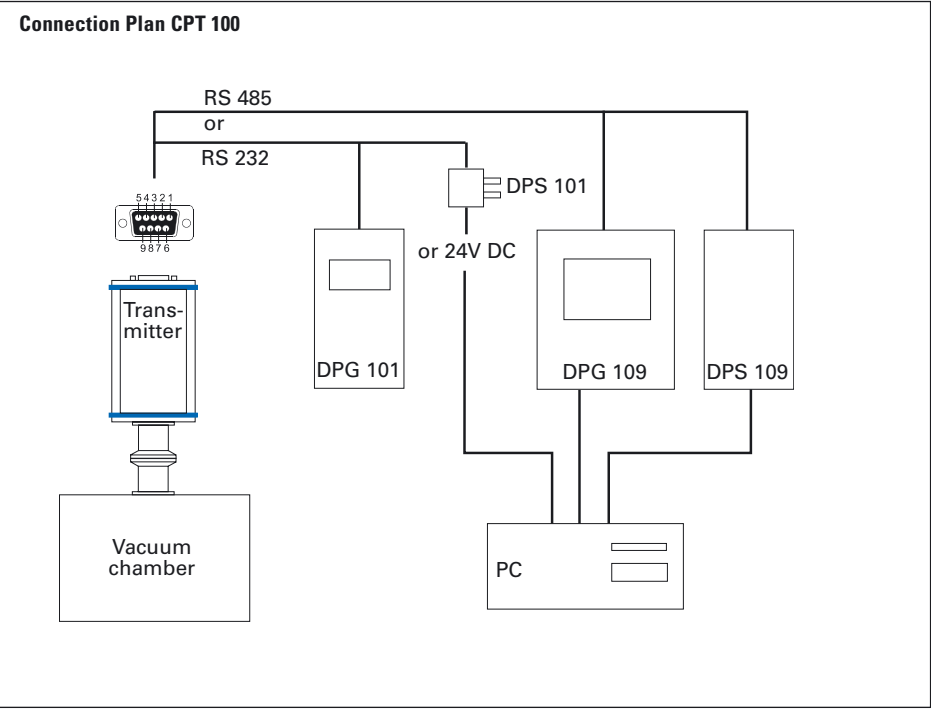
- ➔ Integrate the transmitter using Data Cable part number KT348403T (please see "Accessories") into the measuring chain.
- ➔ Rotate the Transmitter Address switch to RS485 operation with the appropriate address. The transmitter address switch can be found on the rotating plate side of the unit (please also refer to DPG 109 Operating Instructions).

#### **Kurt J. Lesker Company model DPS 109 power pack:**

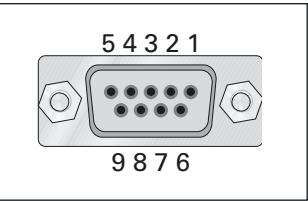
- ➔ To connect up to nine transmitter to a PC, use the Kurt J. Lesker Company Power Pack Model DPS 109 and set the transmitter to RS 485.



### 3.4. Connection Plan



#### Sub-D socket arrangement on the transmitter casing



PIN	Settings
Pin 1:	n.c.
Pin 2:	RS 232, RxD
Pin 3:	RS 232, TxD
Pin 4:	n.c.
Pin 5:	gnd
Pin 6:	VCC
Pin 7:	RS 485, D-
Pin 8:	RS 485, D+
Pin 9:	n.c.



### 3.5. Disassembly



Possible contaminated parts.  
Contaminated parts can cause personal injuries.

- ➔ Inform yourself regarding possible contamination before beginning work.
- ➔ When working with contaminated parts be sure to follow the relevant instructions and take the necessary protection measures.



Dirt and damage have an adverse effect on the function of these vacuum components.

- ➔ Please take account of the instructions with regard to cleanliness and damage prevention when using vacuum components.
- ➔ Shut down the gauge head.
- ➔ Disconnect the connecting cable.
- ➔ Detach the gauge heads from the vacuum apparatus.
- ➔ Place the protective cover in position.

## **4. Operation**

---

### **4.1. General**

Once voltage has been supplied the transmitter is ready to operate. The pressure measured is independent of the type of gas.

The transmitter has been factory adjusted. Re-adjustment may be necessary in the event of extreme temperatures or ageing etc. and is carried out with a connected vacuum controller via the PC-Software "DokuStar" or customer specific in accordance with the communication instructions.

Communication is done, depending on the position of the address switch on the rating plate side, via Serial Interface RS 232 or via the RS 485 with one of the transmitter addresses settable from 1-15.

The transmitter responds to measurement value queries, type queries and setting commands.

## 4.2. Communication

The transmitter communicates via the serial interface with the respective display units (please see "Accessories"), but alternatively can also be controlled directly via the RS 232 or RS 485 by means of the interface protocol.

The Interface protocol is in ASCII format which means that all data bytes are representable symbols with an ASCII code  $\geq 32$  with the exception of the telegram final symbol carriage return (C<sub>R</sub>, 13).

For example the character string and the ASCII code corresponds as follows:

0	1	2	0	0	7	4	0	0	2	=	?	1	0	8	C <sub>R</sub>
48	49	50	48	48	55	52	48	48	50	61	63	49	48	56	13

The following possible telegrams are transferred with 9600 baud, 8 data bits, no parity and 1 stop bit.

### Write request to transmitter

a1	a2	a3	1	0	p1	p2	p3	l1	l2	data	c1	c2	c3	C <sub>R</sub>
----	----	----	---	---	----	----	----	----	----	------	----	----	----	----------------

### Read request to transmitter

a1	a2	a3	0	0	p1	p2	p3	0	2	=	?	c1	c2	c3	C <sub>R</sub>
----	----	----	---	---	----	----	----	---	---	---	---	----	----	----	----------------

### Answer of transmitter

a1	a2	a3	1	0	p1	p2	p3	l1	l2	data	c1	c2	c3	C <sub>R</sub>
----	----	----	---	---	----	----	----	----	----	------	----	----	----	----------------

a1, a2, a3: Unit address ("001" ... "015", also see chapter 3.3)

p1, p2, p3: number (see table)

l1, l2: data length (see table)

data: see table or "NO\_DEF": wrong parameter number, "\_LOGIC": Access fault, "\_RANGE": Out of range

c1, c2, c3: checksum, sum of all ASCII up to checksum modulo (remainder) 256, for example "0120074002=?" => 48+49+50+ ... +61+63=620, 620 modulo 256 = 108 => "108"

C<sub>R</sub>: Carriage return (ASCII code 13)

#	Name	writable	readable	I1, I2	Date
040 <sup>1)</sup>	DeGas	•	•	"01"	"0": abort respectively is not active "1": activate respectively is active
303	Error code		•	"06"	"000000": no error "Err001": transmitter defective "Err002": memory defective
312	Software version		•	"06"	character string; six characters long
349	Transmitter type		•	"06"	".... A1" (32 32 32 32 65 49): CPT 100 ".... A2" (32 32 32 32 65 50): RPT 100 ".... A3" (32 32 32 32 65 51): PPT 100 ".... A4" (32 32 32 32 65 52): HPT 100
740	Current pressure value in mbar (Torr)	• <sup>2)</sup>	•	"06"	"aaaabb" for a.aaa · 10 <sup>-(bb-20)</sup> z.B. "123423" => 1.234 · 10 <sup>-(23-20)</sup> => 1.234 · 10 <sup>3</sup> => 1234 mbar
741	Adjustment low/high pressure	•		"03"	"000": low pressure "001": high pressure
742	Correction factor (Pirani)	•	•	"06"	"abcdef" for abcd,ef z.B. "000123" => 1.23
743 <sup>1)</sup>	Correction factor (Bayard-Alpert)	•	•	"06"	"abcdef" for abcd,ef z.B. "000123" => 1.23

1) only HPT 100

2) see transmitter adjustment

### DeGas (only for HPT 100)

The degassing mode can be activated/canceled with a write request and the status be queried with a read request as well.

While the transmitter is in the degassing mode, no valid measuring values are transmitted.

### Transmitter adjustment

To equalize a transmitter there must first be set a pressure adjustment point and then the actual pressure value. If the setting for the pressure adjustment point is missing or if another telegram is inserted between the two steps, an error signal is generated when writing the pressure value.

Handling	Telegram to Transmitter	Telegram from Transmitter
Set correction factor to 4.2 of transmitter 2	Write request to transmitter Answer (O.K)	"0021074206000420028 <sup>C</sup> R" "0021074206000420028 <sup>C</sup> R"
Read current pressure value of transmitter 12	Read request to transmitter Answer represents 4.234 · 10 <sup>-5</sup> mbar	"0120074002=?108 <sup>C</sup> R" "0120074006423415040 <sup>C</sup> R"
Adjust transmitter 1 at atmosphere (high pressure)	Write request to transmitter Answer (O.K) Write request to transmitter Answer (O.K)	"0011074103001130 <sup>C</sup> R" "0011074103001130 <sup>C</sup> R" "0011074006100023025 <sup>C</sup> R" "0011074006100023025 <sup>C</sup> R"

### 4.3. Transmitter Equalization

#### Operations via DPG 101 or DPG 109:

- ➔ Equalization of the transmitter as described in section 4.4. or 4.5. of the DPG instructions.

#### Communication via RS 232 or RS 485:

- ➔ Evacuate the vacuum system to the pressure of  $p < 1 \times 10^{-1}$  mbar.
- ➔ Set the adjusting pressure point [P:741] to «000» for low pressure and transmit.
- ➔ Transmit the actual pressure value ([P:740] with «000000» ) for low pressure (represents  $p < 1,0 \cdot 10^{-1}$ ); ==> "ur" (under Range).  
Is the low pressure exactly known, e. g. 4 mbar; send [P:740] with value «400020».
- ➔ Vent to atmospheric pressure; afterwards wait about 10 minutes.
- ➔ Set the adjusting pressure point [P:741] to «001» for high pressure and transmit.
- ➔ Set the actual pressure value to the atmospheric pressure (e.g. «100023» for 1000 mbar).  
Is the atmospheric pressure actually present, e. g. 980 mbar; send [P:740] with value «980022».

## 5. Error Signals

Error	Possible Cause	Elimination
Transmitter does not respond	No supply voltage	Connect data cable or power pack
	Incorrect serial interface type or incorrect address set	Remove rubber stoppers on rating plate side and set address switch to the serial interface to be used and/or set the correct address (see Section 3.3.).
	Transmitter defective	Replace transmitter
Measurement value shows ur / or, although the pressure is between 1...1500 Torr (1...2000 mbar)	Adjustment necessary	Re-adjust (see Section 4.1.)
	Transmitter defective	Replace transmitter

## 6. Maintenance, Service

---

The unit requires no maintenance. A damp cloth can be used to wipe away any dirt. Ensure that the unit is first disconnected from the mains power supply.

### Do Make Use Of Our Service Facilities

- ➔ "Should a defect occur on the CPT 100 contrary to expectations, please send the transmitter to the authorized service center for repair and for replacement with a new exchange unit."



The unit cannot be field serviced.

### Please note:

Units returned to us for repair or maintenance are covered by our general conditions of sale and supply.

Products returned to the Kurt J. Lesker Company for service or repair should, if possible, be free of harmful substances (e.g. radioactive, toxic, caustic or microbiological).

- ➔ Adhere to the forwarding regulations of all involved countries and forwarding companies.
- ➔ Enclose a completed contamination declaration.

Products that are not clearly declared as "free of harmful substances" are decontaminated at the expense of the customer.

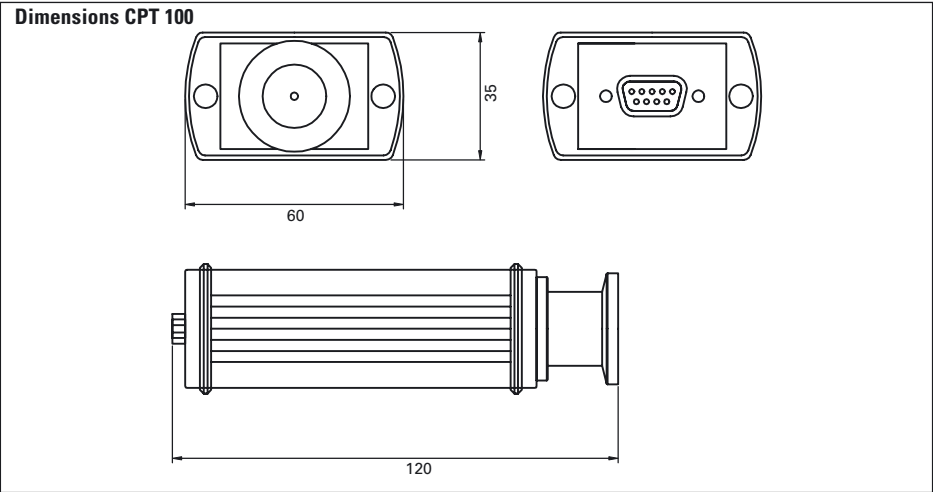
## 7. Technical Data

### 7.1. Data List

Description	Unit	Value	Comments
Measurement method		Piezo	
Mat. in contact with media		Ceramics, Stainless Steel, Viton	
Seal		Viton	
Feedthrough		Glass	
Measuring range	Torr (mbar)	1 - 1500 (1 - 2000)	
Pressure	Torr (bar)	max. 3000 (4)	
Accuracy		1 - 900 Torr (1 - 1200 mbar) +/- 0.5 % F.S.* > 900 Torr (1200 mbar) +/- 2 % F.S.*	
Measuring cycles	ms	40	
Temperature: Operating	C°(°F)	+5 ... +50 (+40 ... +120)	
Temperature: Storage	C°(°F)	-40 ... +60 (-40 ... +140)	
Temperature: Bake-out	C°(°F)	70 (160)	
Supply: Voltage	VDC	24	
Supply: Power consumption max.	W	0.5	
Output		digital RS 232 / RS 485	
Serial Interface		9600 baud, 8 databits, no parity, 1 Stopbit	
Electrical connection		9 poles Sub-D socket, screwable	
Adjustment		with display unit or software to atmosphere and zero and/ or ref. pressure 1 - 75 Torr (1 - 100 mbar)	
Protection type		IP 40/IP 54	
Weight	kg (lbs)	0.2 (0.44)	
Internal volume, approximately	cm <sup>3</sup>	0.35	
Dimensions KTR31130 Flange KTR31130	mm (inch)	120 x 60 x 35 (4.72 x 2.36 x 1.38) QF16 (DN 16KF)	incl. flange
Measuring cable length	m (ft)	max. 1000 (3280), only for RS 485	

\*F.S. = Full Scale

## 7.2. Dimensions



## 8. Accessories

Description	Unit	Pieces	Number	Comments
DPS 101, plug power pack with PC connecting cable for one transmitter		1	KTG20011	US version
DPS 109, switching power pack with integrated PC adapter for up to 9 transmitters		1	KTG25010	
DPG 101, Gauge		1	KTG10010	
DPG 109, Gauge		1	KTG15010	
Data cable for connection to DPG 101 Controller (RS 232)	10 ft	1	KT348203T	
Data cable for connection to DPG 109 Controller or Switching Power Pack DPS 109 (RS 485)	10 ft	1	KT348403T	
Bus termination RS 485		1	KT348100T	
TIC 002 Level converter		1	KT051519AT	
Software "Dokustar "		1	KT882500	
Software "Dokustar Plus"		1	KT882501	



## 9. Supplementary Informations

Depending on the configuration of your components further operating instructions are included in the package (please see the table). If, despite every effort by us, information on your products is missing please get in touch with your local Kurt J. Lesker Company representative or contact us using the information shown on the back cover page.

The following operating instructions are available for digital transmitters and accessories:

Product	Definition	No. Operating Instructions
CPT 100	Rough vacuum transmitter	KG0001KJL
PPT 100	Medium vacuum transmitter	KG0002KJL
RPT 100	Combination vacuum transmitter	KG0003KJL
HPT 100	High vacuum transmitter	KG0004KJL
DPG 101	Display unit	KG0006KJL
DPS 101	Switching power pack	KG0007KJL
DPG 109	Display unit	KG0005KJL
DPS 109	Switching power pack	KG0008KJL
TIC 002	Level Converter	KT0076KJL
Software "DokuStar Plus"	Software for PC data evaluation	KG0012KJL







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