

# **DIGISTANT® Model 4420**

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05.07.2006 edition  
  
Software version

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## EG-Konformitätserklärung

*Certificate of Conformity*

### Gemäß ISO/IEC Leitfaden 22 und EN 45014 erklärt

*According to ISO/IEC guidelines 22 and EN 45014 standard*

**Name des Herstellers:** burster präzisionsmeßtechnik gmbh & co kg  
*Manufacturer*

**Adresse des Herstellers:** Talstr. 1-7.  
*Address of the manufacturer* 76593 Gernsbach

**daß das Produkt**  
**Produktname:** Universal-Kalibrator  
*Declares that the product with name* DIGISTANT®

**Modellnummer(n) (Typ):** 4420  
*Model / Type*

**Produktoptionen:** --  
*Options*

### mit den folgenden Produktspezifikationen übereinstimmt

*is conform with following specifications of product*

<b>Sicherheit:</b> <i>Safety requirements</i>	VDE 0100 Teil 410 Abs. 4.1+A2 (IEC 64) IEC 1010-1 EN 61010-03/94 VDE 0411 Teil 1	Schutzmaßnahmen; Schutz gegen gefährliche Körperströme <i>Protection against electric shock</i> Sicherheitsbestimmungen für elektrische Meß-, Steuer-, Regel- und Laborgeräte. <i>Safety requirements for electrical equipment for measurement control and laboratory used</i>
<b>EMC:</b> <i>Electromagnetic compatibility</i>	DIN EN 50081-2 VDE 0839 Teil 81-2 pr EN 50082-2 VDE 0839 Teil 82-2  CISPR 11 DIN EN 55011 1991 VDE 0875 Teil 11 07/92 VDE 0875 Teil 211 06/93	Elektromagnetische Verträglichkeit Fachgrundnorm Störaus- sendung <i>Generic emission standard Part 2: Industrial environment</i> Elektromagnetische Verträglichkeit Fachgrundnorm Störfestigkeit <i>Generic immunity standard Part 2: Industrial environment</i> EMC 3 V/m  Grenzwerte und Meßverfahren für Funkstörungen von industri- ellen, wissenschaftlichen und medizinischen Hochfrequenzgeräten (ISM-Geräten) <i>Limits and methods of measurement of radio disturbance characteristics of industrial, scientific and medical (ISM) radio-frequency equipment.</i>

### Ergänzende Informationen :

*Additional Information*

Um optimale Störfestigkeit zu erreichen ist das Gerät über geschirmte Leitungen anzuschließen.  
*In order to reach optimal electromagnetic immunity the device has to be conducted with shielded line.*

Gernsbach den 19.12.1996

*Place / Date*

Unterschrift des Herstellers  
oder Einführers  
*Signature of manufacturer  
or importer*



Alfred Großmann  
(Leitung Qualitätswesen)  
*Quality Manager*



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# 1. General information

## 1.1 Applications

The DIGISTANT® model 4420 universal calibrator is ideal for testing and calibrating temperature measurement and control devices as well as documenting the measurement results. Due to its versatile functions, this portable device can not only be used on-site but also as a stationary unit the test shop or laboratory.

The device can measure and simulate voltage, current, temperature and resistance.

Simultaneous transmission and measurement allow, for example, controllers to be tested precisely. The automatic ramp function allows processes to be controlled.

The universal calibrator measures and simulates 14 types of thermocouples, Pt 100. It can also measure resistances of 10 mΩ to 2 kΩ and simulate resistances of 10 Ω to 2 kΩ.

The reference-junction temperature can be entered manually from the keyboard; if required, however, automatic reference to an internal or external junction is also possible.

10 freely programmable memories can be used in each case for storing the basic values and corresponding Δ-values of voltages, current, thermocouples and resistance sensors. Operate the Δ+ or Δ-key to add or subtract the corresponding values.

## 1.2 Description

The microprocessing-controlled universal calibrator is operated by means of a clearly arranged membrane keyboard. The value-entry keys are coloured differently to the function and memory keys, thus allowing a clear distinction between measurement and transmission variables.

The measurement and transmission values are displayed on a high-contrast alphanumeric supertwist-LCD in two rows of 20 characters each. Transmission values are displayed with the corresponding units.

In the "Simulate Thermocouples" mode, the thermocouples data is displayed together with the standard abbreviation and the type of reference junction. On switch-off, the values entered last are stored.

In the "Measure Thermocouple" Mode, the selected thermocouple, type of reference-junction compensation and measurement value are displayed. An internal reference junction allowing the compensation of even large fluctuations in ambient temperature has been integrated specially for the measurement and simulation of thermocouples.

The integrated Ni-MH accumulator is protected against overload and deep discharge. The accompanying plug-in power supply allows the device to be charged even during floating operation.

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# 2. Preparation for use

## 2.1 Unpacking the device

The device weighs 2.5 kg and is enclosed in appropriate shock-proof packaging.

Unpack the device carefully and check whether the scope of delivery is complete.

The standard scope of delivery includes:

- 1 Universal Calibrator DIGISTANT® Type 4420
- 1 Plug-in power supply Type 4495-V001
- 1 Pair measuring cables Type 4490
- 1 Calibration Certificate

Carefully check the device for any signs of damage. If any damage seems to have occurred during transportation, inform the supplier within 72 hours.

Store the packaging so that it can be examined by a representative of the manufacturer and/or supplier.

The DIGISTANT® must only be transported in its original or an equivalent packaging.

## 2.2 Supply voltage

The required voltage is supplied by the integrated accumulator or the accompanying power unit (to be connected to the "Charge" socket).

Do not use a power supply unit other than the one supplied !

During the charging process, the DIGISTANT® can be operated without any restrictions.

Operational period per accumulator charge: 7 - 10 hours (depending in the power load).

Supply voltage for the  
type 4495-V 001 plug-in power supply: 230 V AC + 6 %, - 10 %, 50 - 60 Hz.

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## 2.2.1 How to correctly charge/discharge the Ni-MH-accumulator

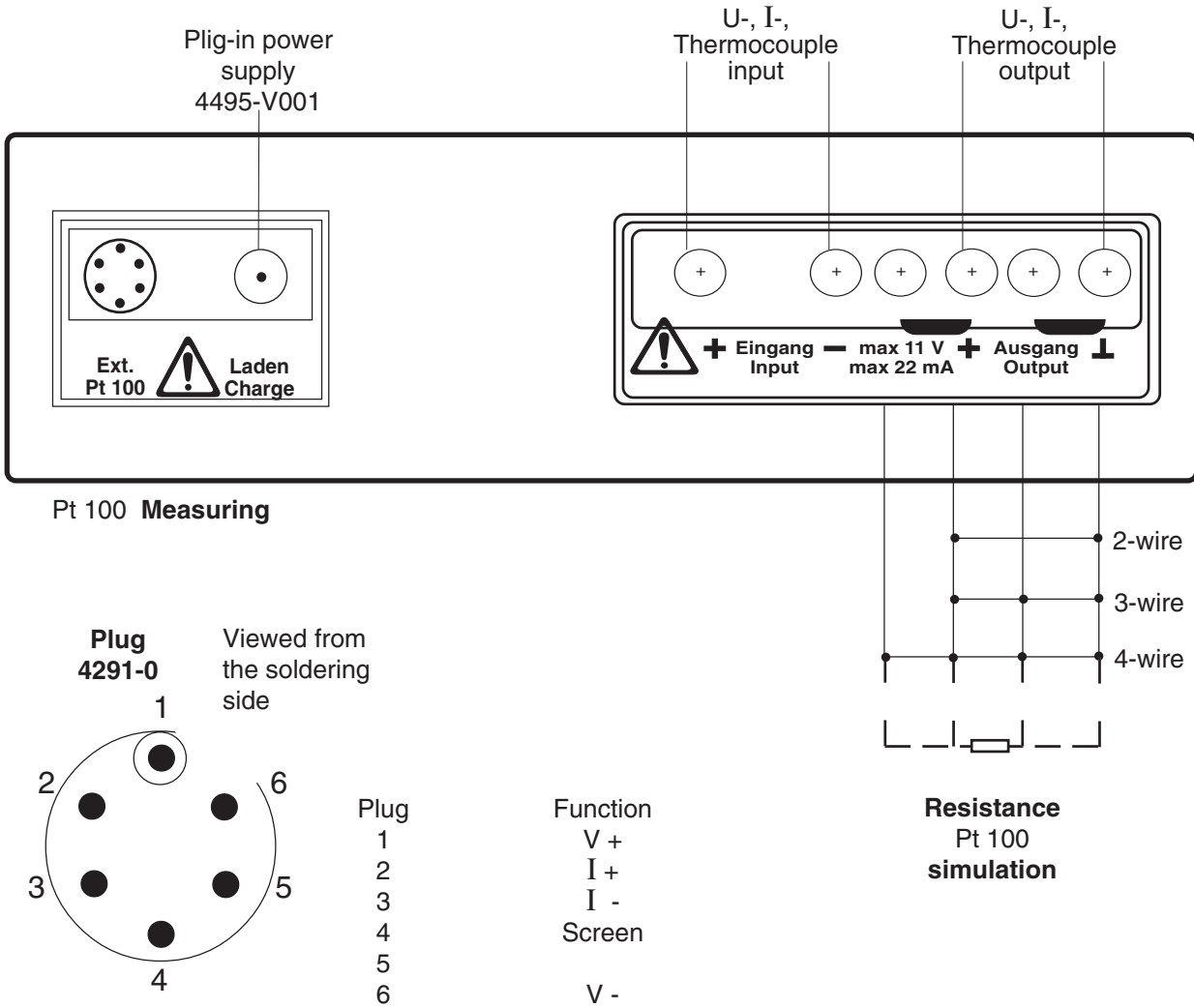
- It is advisable to discharge the accumulator completely at regular intervals (from twice a week to once a month, depending on the degree of use) and then recharge it. This has a relaxing effect on the accumulator, making it more reliable and durable.
- Long storage periods result in different charging levels in a multi-cell block, due to the different rates of self-discharges.  
In the worst case, this could lead to a pole reversal of the weakest cell during discharge.

If it is at all possible for the charging unit to reverse the polarity of this cell again, it will be further damaged.  
Its rate of self-discharge will increase as a result.

*Remedy:* After long periods of storage (or power supply operation without discharging) discharging the accumulator by just 25 % and then recharge it completely.  
After that, discharge the accumulator completely and recharge it again.

- High temperatures during storage and operation should be avoided as far as possible. Temperatures of around 20 °C are favorable.  
Avoid temperatures of less than 10 °C during charging.  
This will increase the service life on the accumulator and reduce the rate of self-discharge.
- Frequent recharging after partial discharging leads to a memory effect.  
In this process, an internal change occurs in the accumulator, causing the available capacitance to adapt itself to the regular discharge quantity. This effect can be reversed through several complete discharging cycles.
- Loss of capacitance is a normal phenomenon occurring in all accumulators. A loss of roughly 40 % after several years of use is normal. Operation at around 20 °C and regular discharging/charging minimize such losses.

## 2.3 Connection



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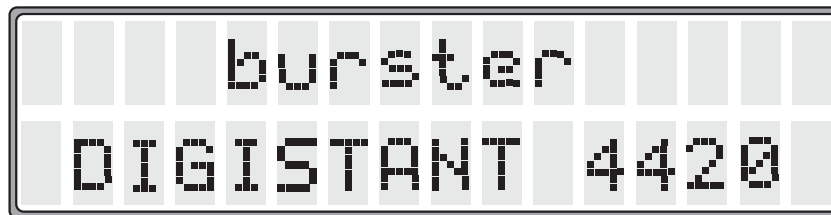
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## 2.4 Operation a test

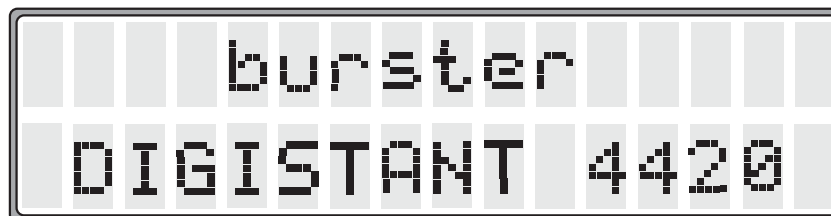
After the device is switched on, the following text appears on the display for approx. 5 seconds:



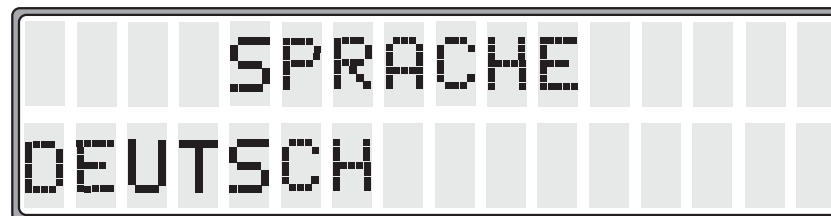
This is automatically followed by a display for the value set last.

## 2.5 Selecting the menu language

Different languages can be selected in this menu. After the device is switched on, the following identification message appears for approx. 5 seconds.



Pressing the  key during this display calls up the language selection menu:



The current selected language is shown in the 2nd line of the LCD.

Use the  and  keys to select GERMAN, FRENCH or ENGLISH as the menu language.

Press ENTER to return to the initial state. The currently displayed language is now standard.

## 2.6 Calibration

The device was calibrated before delivery. The measurement devices used for this comply with the German standards specified by DIN ISO 9000ff.

The device should be recalibrated after approximately one years.

Calibration is carried out via one of the interfaces and must only be performed by the manufacturer.

## 2.7 Storage

Storage is permitted at temperature between -10 °C and 60 °C. If the device has been exposed to moisture, ensure that it is dried before switching it on. Other start-up measure following storage are not necessary.

# 3. Control elements and terminals

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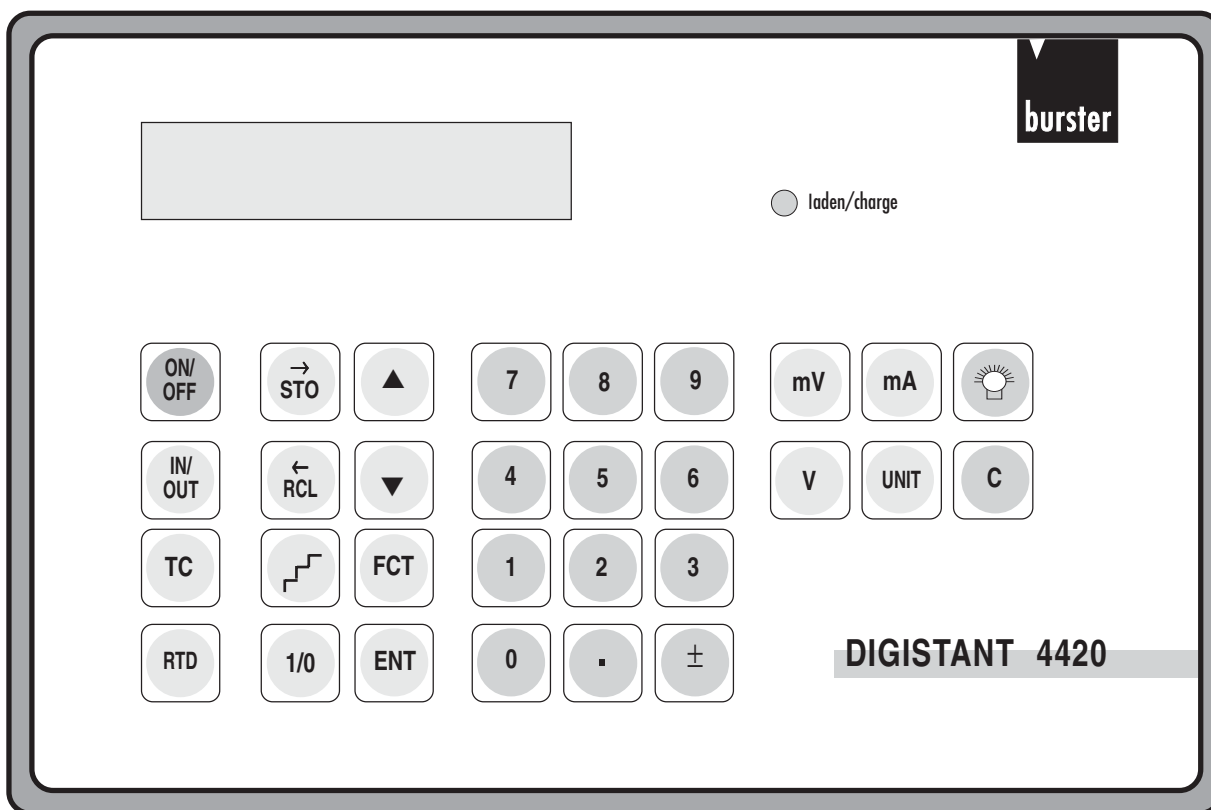
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## 3.1 Front panel



### 3.1.1 Display

The device has an LCD display with two rows of 20 characters each.




### 3.1.2 Description of each key

	Number keys	For entering numerals.
	Point key	For entering the decimal point.
	Sign key	For entering the sign.
	Cancel key	For cancelling a current entry.
	Milliamperere key	- For acknowledging an entered current value. - In the measuring mode, this effects a switchover to current measurement.
	Millivolt key	
	Volt key	- For acknowledging an entered voltage value. - In the measuring mode, this effects a switchover to voltage measurement.
	Store key or cursor right key	- For storing the currently entered value and the currently set delta-X value in the transmission mode. - In the measurement mode, this activates/deactivates the data logger. - As the cursor right key, it is meant for scrolling the various parameter in the function menus.
	Recall key or cursor left key	- For retrieving a stored value-pair (transmission and delta-X values) in the transmission mode. - As the cursor left key, it is meant for scrolling through the various parameters in the function menus.
	Cursor Up key	
	Cursor Down key	- If the delta-X function is being used, the set delta-X value is added to or subtracted from the value just entered. - If the ramp function is being used, the set ramp can be processed step-by-step in both directions. - If the menu function is being used, this key allows cursor control.
	Function key	For menu selection of the functions.
	ENTER key	- For indirect menu selection of a special function. - For exiting the menus of the special functions. - Serves as the LOCAL key during operation via an external interface.
	Ramp key	Toggle function: For activating/Deactivating the ramp function.
	Start/Stop key	Toggle function: For starting/stopping the ramp function.
	ON/OFF key	For switching the device on/off.
	Lamp key	For switching the LED background illumination on/off.
	TC Taste	For selecting thermocouples transmission/measurement.
	RTD key	For selecting RTD transmission/measurement.
	IN/OUT key	For switching over between transmission and measurement.
	Unit key	In the transmission mode, this key acknowledges the entry of a value for TC or RTD transmission. In the measurement mode, TC or RTD measurement is selected.

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### 3.1.3 Measurement mode

Prerequisite: The device must be in the measurement mode; if not, operate the  key.

The LCD might provide the following display, for example:

			I	N					1	0	.	2	3	5			m	A	

Measurements are carried out whenever the device is in the measurement mode. They are not started explicitly.

Measured values are displayed in the first row of the LCD.

The following entries are possible in the measurement mode:

Keys



Switches the device to voltage measurement.



Switches the device to current measurement.



Switches the device to thermocouples measurement.



Switches the device to Pt 100 measurement, depending on the setting in the function menu.



Switches the device to RTD or TC measurement, depending on the option selected last.



Switches the device to transmission mode.



Selects a function.



Switches the device to data logger mode.



If the min./max. function has been selected, the minimum and maximum values are reset to the current measured value.

# 4. Manual operation of the device

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The device can be operated from the keyboard or via the RS232 interface. Keyboard operation is described in the following.

## 4.1 Measurement function

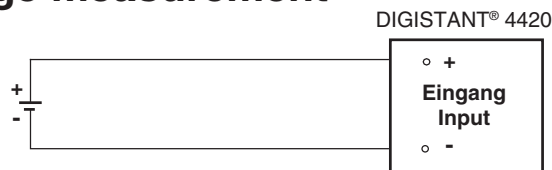
**Voltage Current Thermocouple**

(TYP: R,S,B,J,T,E,K,L)

**RTD**

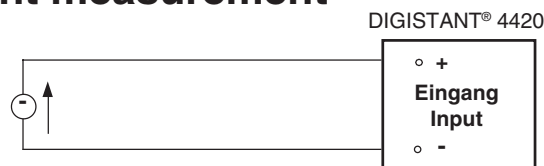
(TYP: Pt 100)

### 4.1.1 Voltage measurement



- Switch on the device and connect it as shown above.
- Switch the device with  $\text{IN/OUT}$  to "Measurement function" and
- with  $\text{mV}$  or  $\text{V}$  to voltage measurement.

### 4.1.2 Current measurement



- Switch on the device and connect it as shown above.
- Switch the device with  $\text{IN/OUT}$  to "Measurement function" and
- with  $\text{mA}$  to current measurement.

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## 4.1.3 Temperature measurement with a thermocouple

The DIGISTANT® Model4420 allows measurement with the following models of thermocouples:

No.	Thermocouple model		Standard	Temperature range [°C]
0	TC Type R	PtRh13-Pt	NIST 175	- 50.0 ... + 1766.9
1	TC Type S	PtRh10-Pt	NIST 175	- 50.0 ... + 1766.9
2	TC Type B	PtRh30-Pt-PtRh6	NIST 175	+ 99.5 ... + 1820.0
3	TC Type J	Fe-CuNi	NIST 175	- 209.9 ... + 1200.0
4	TC Type T	Cu-CuNi	NIST 175	- 269.9 ... + 399.9
5	TC Type E	NiCr-CuNi	NIST 175	- 269.9 ... + 999.9
6	TC Type K	Ni Cr-NiAl	NIST 175	- 269.9 ... + 1371.9
8	TC Type L	Fe-CuNi	DIN 43710	- 199.9 ... + 899.9

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Five types of measurement are possible, depending on the type of reference junction (abbreviated "RJ"):

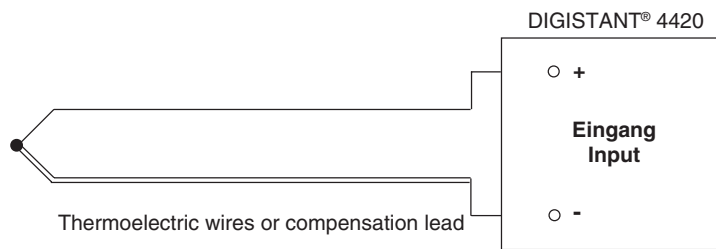
1. Direct measurement of a thermocouples. The reference junction is formed electronically in the DIGISTANT®. The thermocouples can be connected with thermoelectric wires or compensation leads.
2. Measurement after the reference junction. The temperature of the reference junction is constant and known. The unit is connected with copper leads.
3. Measurement after the reference junction. The temperature of the reference junction is constant and known. It is therefore measured with a Pt 100.
4. The thermoelectric voltage is converted into current by a linear-response transducer. Rated current range: 4 ... 20 mA. Connections are looped into the electric circuit.
5. As in 4. but with a rated current range of 0 ... 20 mA.

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### 4.1.3.1 RJ-INT: Measurement of a thermocouples



The reference junction is located inside the device (internal). It is simulated electronically by a built-in Pt 100 sensor.

- Switch on the device and connect it as shown above.

#### Selection of the thermocouples

- Press the **FCT** and **TC** keys. The "TC selection" display appears.
- Using the **→** or **←** key, select the desired thermocouples.

#### Selection of the reference junction

- After that, press the **▲** or **▼** key and select "Measure:.....".
- Then use the **→** or **←** key to select "Measure: RJ-INT".
- Bestätigen Sie mit **ENT**.

#### Selection of the unit

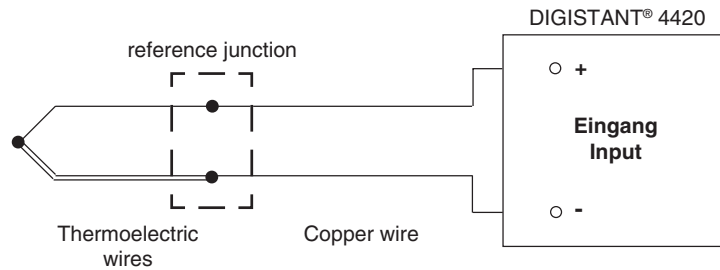
- After pressing the **FCT** and **UNIT** keys, set the correction cursor using the **▲** or **▼** key to TC.  
Using the **→** or **←** key, select °C, °F or K.
- Acknowledge with **ENT**.

#### Selection "RJ:INT" measurement function

- If the device is in the "OUT" transmission mode, first switch it to the "IN" measurement mode by pressing the **IN/OUT** key.
- By pressing **TC** you can then invoke the set measurement mode "RJ:INT".

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### 4.1.3.2 RJ-Man: Measurement after the reference junction; the reference-junction temperature is constant and known



- Switch on the device and connect it as shown above.

#### Selection of the thermocouples

- Press the **FCT** and **TC** keys. The "TC selection" display appears.
- Using the **→** or **←** key, select the desired thermocouples.

#### Selection of the reference junction

- After that, press the **▲** or **▼** key and select "Measure:.....".
- Then use the **→** or **←** key to select "Measure: RJ-MAN".
- Acknowledge with **ENT**.

The following display appears:

>	S	E	T	T	I	N	G				R	J	-	M	A	N
	R	J	:													

- You can now select the displayed temperature value with **ENT**, or enter the new reference junction temperature, press the **UNIT** key and acknowledge the new value with **ENT**.

### Selection of the unit

- After pressing the **FCT** and **UNIT** keys, set the correction cursor using the **▲** or **▼** key to TC.  
Using the **→** or **←** key, select °C, °F or K.
- Acknowledge with **ENT** .

### Selection of the "RJ:MAN" measurement function

- If the device is in the "OUT" transmission mode, first switch it to the "IN" measurement mode by pressing the **IN/OUT** key.
- By pressing **TC** you can then invoke the set measurement mode "RJ:MAN".

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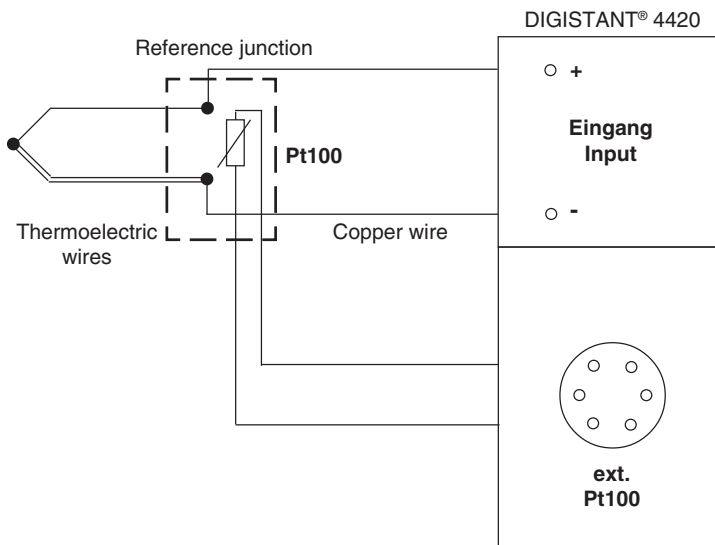
Control elements

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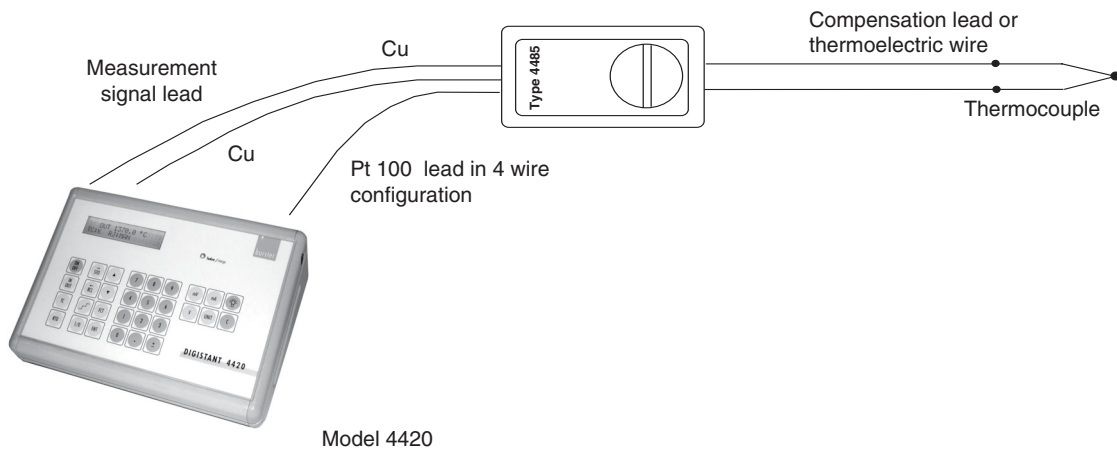
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### 4.1.3.3 RJ-Ext Pt100: Measurement after the reference junction; reference junction temperature using a Pt 100 or precision measurement using the Model 4485 external reference junction.



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- Switch on the device and connect it as shown above.

### Selection of the thermocouple

- Press the **FCT** and **TC** keys. The "TC selection" display appears.
- Using the **→** or **←** key, select the desired thermocouple.

### Selection of the reference junction

- After that, press the **▲** or **▼** key and select "Measure:.....".
- Then use the **→** or **←** key to select "Measure: RJ-EXT".
- Acknowledge with **ENT**.

### Selection of the unit

- After pressing the **FCT** and **UNIT** keys, set the correction cursor using the **▲** or **▼** key to TC.  
Using the **→** or **←** key, select °C, °F or K.
- Acknowledge with **ENT**.

### Selection of the "RJ:EXT" measurement function

- If the device is in the "OUT" transmission mode, first switch it to the "N" measurement mode by pressing the **IN/OUT** key.
- By pressing **TC** you can then invoke the set measurement mode "RJ:EXT".



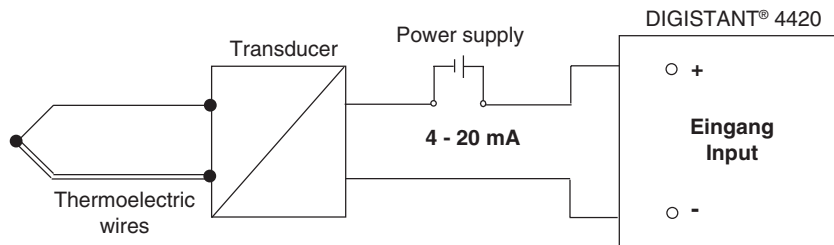
**4.1.3.4 4-20mA: Measurement after the thermocouples and a linear-response voltage transducer. Rated output-current range: 4 ... 20 mA**

In this mode, a thermocouples with a reference junction based on 0 °C is exposed to the temperature to be registered at the measurement point.

The thermocouples is connected in series to a U-/I transducer which converts the output voltage of the therm couple linearly into a current and supplies it to the DIGISTANT®.

The be able to calculate the temperatur at the measurement point from the measured current, The DIGISTANT® requires.

- the temperature corresponding to the lowest current value (4 mA) and
- the temperature corresponding the highest current value (20 mA).



- Switch on the device and connect it as shown above.

**Selection of the thermocouples**

- Press the **FCT** and **TC** keys. The "TC selection" display appears.
- Using the **→** or **←** key, select the desired thermocouple.

**Selection of the reference junction**

- After that, press the **▲** or **▼** key and select "Measure: .....".
- Then use the **→** or **←** key to select "Measure:4-20 mA".
- Acknowledge with **ENT** .
- The temperature values last allocated to the current values of 4 mA and 20 mA are then displayed.
- Modify the temperature limits or acknowledge the present entry with **ENT** .

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### Modifikation of the temperature limits

- The correction cursor indicates the temperature limit which can be modified. You can move the correction cursor up with ▲ and down with ▼.
- Enter the new temperature values and acknowledge the entry with UNIT.
- Complete your modification of the temperature limits with ENT.

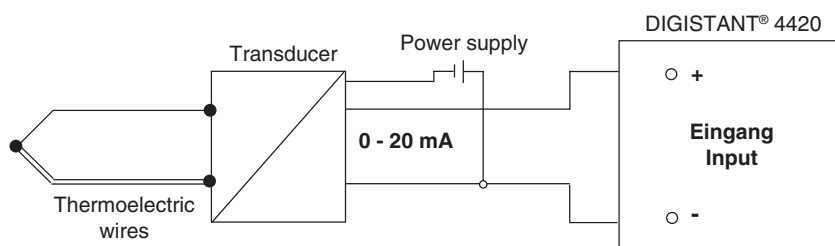
### Selection of the unit

- After press the FCT and UNIT keys, set the correction cursor using the ▲ or ▼ key to TC. Using the → or ← key, select °C, °F or K. Acknowledge with ENT.

### Selection of the "RJ:4-20mA" measurement function

- If the device is in the "OUT" transmission mode, first switch it to the "IN" measurement mode by pressing the IN/OUT key.
- By pressing TC you can then invoke the set measurement mode "RJ:4-20mA".

#### 4.1.3.5 0-20mA: Measurement after the thermocouples and a linear-response voltage transducer. Rated output-current range: 0-20mA



- Switch on the device and connect it as shown above.

### Selection of the thermocouple

- Press the **FCT** and **TC** keys. The "TC selection" display appears.
- Using the **→** or **←** key, select the desired thermocouple.

### Selection of the reference junction

- After that, press the **▲** or **▼** key and select "Measure:.....".
- Then use the **→** or **←** key to select "Measure:0-20mA".
- Acknowledge with **ENT**.
- The temperature values last allocated to the current values of 0 mA and 20 mA are then displayed.
- Modify the temperature limits or acknowledge the present entry with **ENT**.

### Modification of the temperature limits

- The correction cursor indicates the temperature limit which can be modified. You can move the correction cursor up with **▲** and down with **▼**.
- Enter the new temperature values and acknowledge the entry with **UNIT**.
- Complete your modification of the temperature limits with **ENT**.

### Selection of the unit

- After pressing the **FCT** and **UNIT** keys, set the correction cursor using the **▲** or **▼** key to TC. Using the **→** or **←** key, select °C, °F or K. Acknowledge with **ENT**.

### Selection of the "RJ:0-20mA" measurement function

- If the device is in the "OUT" transmission mode, first switch it to the "IN" measurement mode by pressing the **IN/OUT** key.
- By pressing **TC** you can then invoke the set measurement mode "RJ:0-20mA".

General information

Preparation for use

Control elements

Manual operation

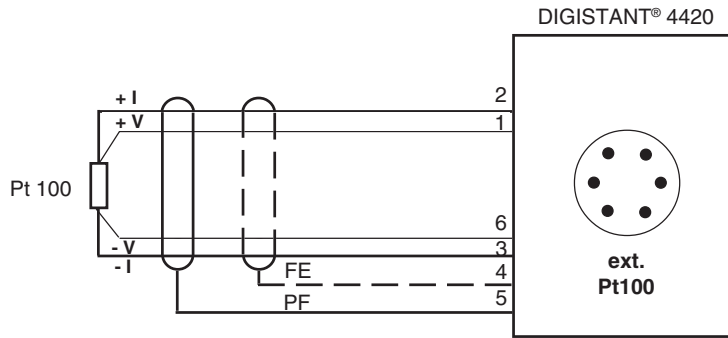
Maintenance and customer service

Technical data

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### 4.1.4 Temperature measurement with a Pt100

Connect the resistance sensor in 4-wire configuration to a 6-pin Lemo-plug (size 1).



- Switch on the device and connect it as shown above.

#### Rtd setting

- This menu is obtained by selecting the [FCT] and [RTD] functions. The following display appears on the LCD:

		R	L		S	E	L	E	C	T	I	O	N				
		R	L	-	O	U	T	:			O	F	F				

- Various parameters for RTD measurement and transmission are set in this menu.
- The different parameters are selected with the ▲ and ▼ cursor keys.

#### RTD selection

- PT 100 (Pt 100 is selected)

#### RL-OUT setting

- No setting is required for measurement.

**RL-IN setting**

- Here, you can specify whether or not lead resistance RL should be considered for the RTD measurement.

The  $\rightarrow$  and  $\leftarrow$  keys can be used to toggle between the following options:

ON	RL is subtracted from the RTD measurement value
OFF	RL is not considered.

**RL-entry**

- The lead resistance (for RTD transmission and measurement) can be adjusted over a value range of 1  $\Omega$  to 99  $\Omega$  with the  $\text{\textcircled{0}}$ – $\text{\textcircled{9}}$  number keys.

**Selection of the unit**

- After pressing the  $\text{\textcircled{FCT}}$  and  $\text{\textcircled{UNIT}}$  keys, set the correction cursor using the  $\blacktriangle$  or  $\blacktriangledown$  key to RTD.  
Using the  $\rightarrow$  or  $\leftarrow$  key, select  $^{\circ}\text{C}$ ,  $^{\circ}\text{F}$  or K.

Acknowledge with  $\text{\textcircled{ENT}}$ .

**Selection of the "RTD:XXXX" measurement function**

- If the device is in the "OUT" transmission mode, first it to the "IN" measurement mode by pressing the  $\text{\textcircled{IN/OUT}}$  key.
- By pressing  $\text{\textcircled{RTD}}$  you can then invoke the set measurement mode "RTD:XXXX".

**4.1.4.1 Resistance measurement**

- After pressing the  $\text{\textcircled{FCT}}$  and  $\text{\textcircled{UNIT}}$  keys, set the correction cursor using the  $\blacktriangle$  and  $\blacktriangledown$  key to "RTD".
- Using the  $\rightarrow$  or  $\leftarrow$  key, select the " $\Omega$ " unit.
- Acknowledge with  $\text{\textcircled{ENT}}$ .

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**Rtd setting**

This menu is obtained by selecting the [FCT] and [RTD] functions. The following display appears on the LCD:

			R	L		S	E	L	E	C	T	I	O	N				
			R	L	-	O	U	T	:					O	F	F		

Various parameters for RTD measurement and transmission are set in this menu.

The different parameters are select with the ▲ and ▼ cursor keys.

**RL-OUT setting** - No setting is required for measurement.

**RL-IN setting**

- Here, you can specify whether or not the lead resistance RL should be considered for RTD measurement.

The → and ← keys can be used to toggle between the following options:

ON	RL is subtracted from the RTD measurement value
OFF	RL is not considered.

**RL entry**

- the lead resistance (for RTD transmission and measurement) can be adjusted over range of 1 Ω to 99 Ω with the 1-9 number keys.

Press the ENT key to save the newly selected values.

**Selection of resistance measurement**

- If the device is in the "OUT" transmission mode, first switch it to the "IN" measurement mode by pressing the IN/OUT key.

- By pressing RTD you can then invoke the set measurement mode "RTD:XXXX".

## 4.2 Transmission function

**Voltage Current Thermocouples**

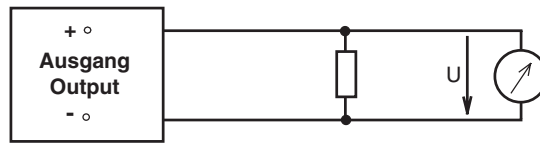
(TYPE: R,S,B,J,T,E,K)

**Rtd**

(TYPE: Pt 100)

### 4.2.1 Voltage transmission

DIGISTANT® 4420



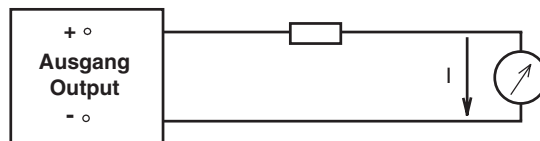
- Switch on the device and connect it as shown above.
- Switch the device using  $\text{IN/OUT}$  to "Output mode" and enter the setpoint voltage:
- Restriction on the setpoint voltage:
  - It must lie in a range of  $\pm 11$  V.
  - The entry must be mathematically correct.
  - It must not be longer than 5 digits.
- Complete your entry with  $\text{V}$  oder  $\text{mV}$ .

If automatic ranging is inactive, the device indicates "M" (manual ranging) in addition to the setpoint value.

If automatic ranging is active, the device selects the ideal range, indicates the setpoint value with a resolution matching that of the range, and supplies the voltage at the output.

### 4.2.2 Current transmission

DIGISTANT® 4420



- Switch on the device and connect it as shown above.
- Switch the device using  $\text{IN/OUT}$  to "Output mode" and enter the setpoint current:
- Restriction on the setpoint current:
  - It must lie in a range of  $\pm 22$  mA.
  - The entry must be mathematically correct.
  - It must not be longer than 5 digits.
  - Complete your entry with  $\text{mA}$ .

If you simply press the  $\text{mA}$  key without entering a value, the device supplies 0 mA.

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## 4.2.3 Simulating a thermocouple

The DIGISTANT® Model 4420 allows the following types of thermocouples to be simulated:

Preparation for use

No.	Thermocouple model		Standard	Temperatur range [°C]
0	TC Model R	PtRh13-Pt	NIST 175	- 50,0 ... + 1766,9
1	TC Model S	PtRh10-Pt	NIST 175	- 50,0 ... + 1766,9
2	TC Model B	PtRh30-Pt-PtRh6	NIST 175	+ 99,5 ... + 1820,0
3	TC Model J	Fe-CuNi	NIST 175	- 209,9 ... + 1200,0
4	TC Model T	Cu-CuNi	NIST 175	- 269,9 ... + 399,9
5	TC Model E	NiCr-CuNi	NIST 175	- 269,9 ... + 999,9
6	TC Model K	Ni Cr-NiAl	NIST 175	- 269,9 ... + 1371,9
8	TC Model L	Fe-CuNi	DIN 43710	- 199,9 ... + 899,9

Control elements

Five types of thermocouple simulation are possible (depending on the position of the reference junction RJ):

- Simulation of a thermocouple without a reference junction. The DIGISTANT® is connected to the test device by means of thermoelectric wires or compensation leads.
- Simulation of a thermocouple and a connected reference junction. The temperature of the reference junction is constant and know. The test device is connected by means of copper leads. The DIGISTANT® must be set to the same reference-junction temperature as the measurement device under test.
- Simulation of a thermocouples and a connected reference junction. The temperature of the reference junction is unknown and therefore registered with a Pt 100 which is connected to the measurement device under test. The thermocouple and the Pt 100 are to be brought into close thermal contact. The measurement device is connected to the DIGISTANT® with copper leads.
- Simulation of a thermocouple with a connected linear-response voltage transducer. Rated range of the measurement transducer: 4-20 mA. Note that the DIGISTANT® has active output. Therefore, disconnect the voltage supply and short-circuit the feed before switching over from measurement to transmission!
- As in 4. but with a rated current range of 0-20 mA.

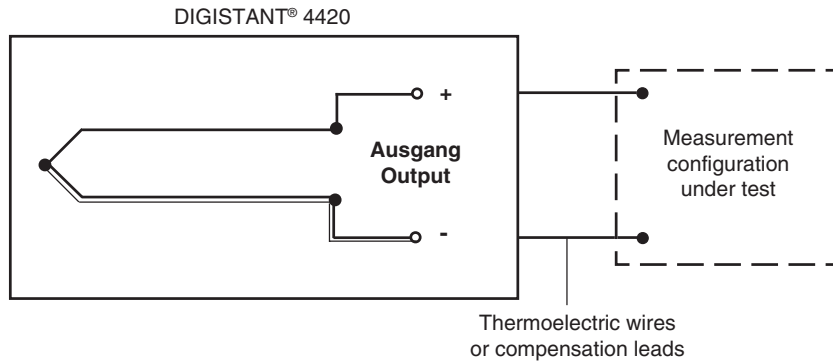
Manual operation

Maintenance and customer service

Technical data



### 4.2.3.1 TC: Simulating a thermocouple



- Switch on the device and connect it as shown above.

#### Selection of the thermocouples

- Press the **FCT** and **TC** keys. The "TC selection" display appears.
- Using the **→** or **←** key, select the desired thermocouples.

#### Selection of the reference junction

- After that, press the **▲** or **▼** key and select "Transmit:XXXX".
- Then use the **→** or **←** key to select "Transmit:TC".
- Acknowledge with **ENT**.

#### Selection of the unit

- After pressing the **FCT** and **UNIT** keys, set the correction cursor using the **▲** or **▼** key to TC. Using the **→** or **←** key, select °C, °F or K.
- Acknowledge with **ENT**.

#### Selection of the "TC:Simulation eines Thermopaares" mode

- If the device is in the "IN" measurement mode, first switch it to the "OUT" transmission mode by pressing the **IN/OUT** key.
- By pressing **TC** you can then invoke the set transmission mode "TC: Thermocouple simulation"

General information

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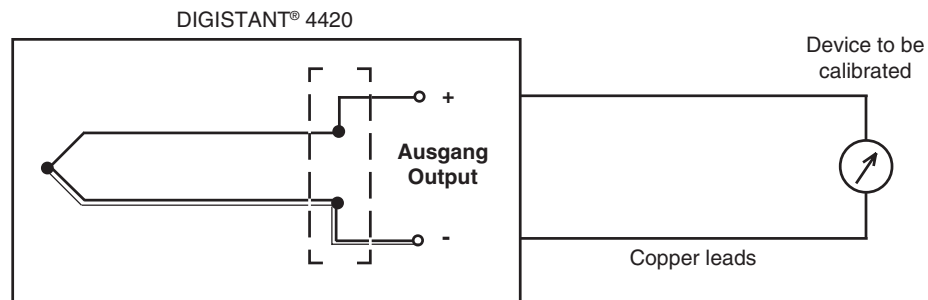
Maintenance and customer service

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### 4.2.3.2 TC+RJ-Man: Simulating a thermocouple and an external reference junction

The reference-junction temperature set on the measurement device under test must also be entered on the DIGISTANT®.



- Switch on the device and connect it as shown above.

#### Selection of the thermocouple

- Press the **FCT** and **TC** keys. The "TC selection" display appears.
- Using the **→** or **←** key, select the desired thermocouple.

#### Selection of the reference junction

- After that, press the **▲** or **▼** key and select "Transmit:XXXX".
- Then use the **→** or **←** key to select "Transmit:TC+RJ-MAN".
- Acknowledge with **ENT**.
- The following display appears:

		E	I	N	S	T	E	L	L	U	N	G		R	J	-	M	A	N	
		R	J	:	X	X	.	X	°	C										

- Now you can select the displayed value with **ENT** or enter a new reference-junction temperature and complete this entry with the **UNIT** key.
- Acknowledge with **ENT** .

### Selection of the unit

- After pressing the **FCT** and **UNIT** keys, set the correction cursor using the **▲** or **▼** key to TC. Using the **→** or **←** key, select °C, °F oder K.
- Acknowledge with **ENT** .

### Selection of the "TC:X RJ:MAN" transmission mode

- If the device is in the "IN" measurement mode, first switch it to the "OUT" transmission mode by pressing the **IN/OUT** key.
- By pressing **TC** you can then invoke the set transmission mode "TC:X RJ:MAN".

General information

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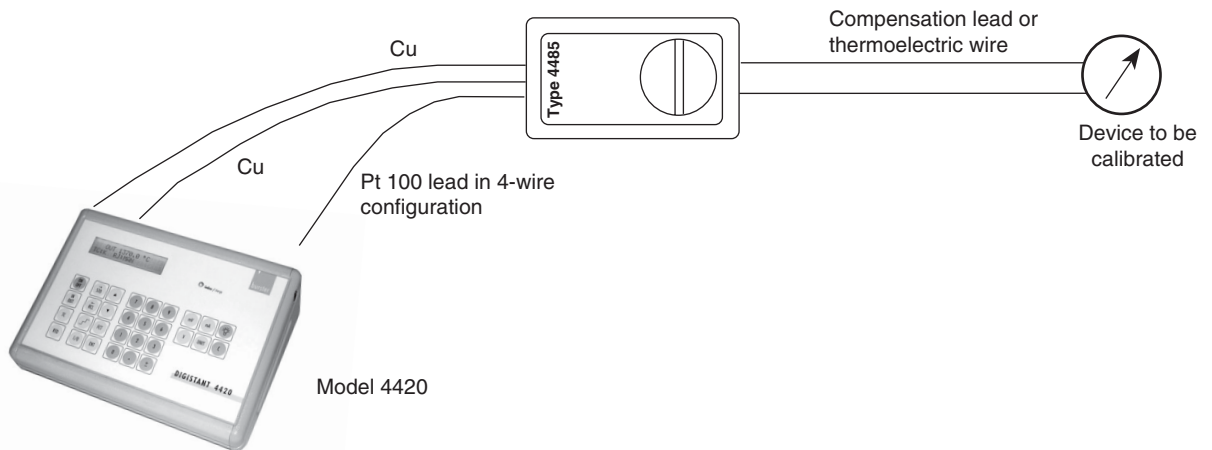
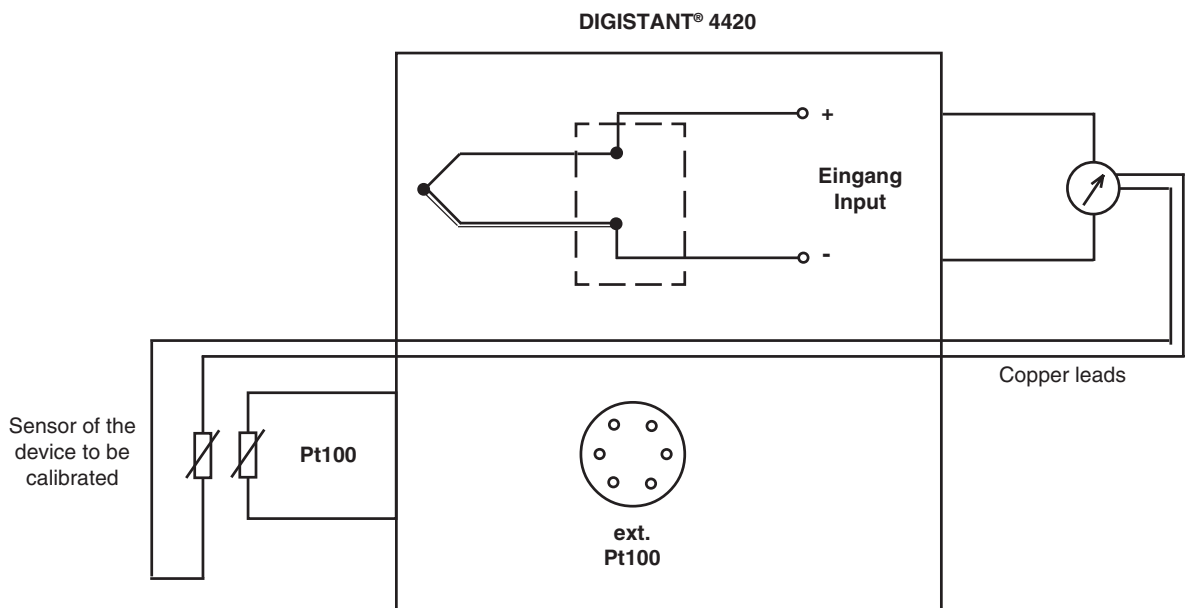
Maintenance and customer service

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**4.2.3.3 TC+RJ-Aut: Simulating a thermocouple and a reference junction to calibrate a device which records the temperature of the reference junction with a measurement sensor, or simulating with a Model 4485 external reference junction**

The DIGISTANT® 4420 records the temperature of the external sensor or the sensor of the reference junction model 4485 continuously it during output in the automatic mode.



- Switch on the device and connect it as shown on the neighbouring page.
- The Pt 100 sensor which you connect to the "Ext. Pt 100" socket must comply to a sufficient degree with the DIN (German Industrial Standard). Bring it into close thermal contact with the sensor of the test device (this need not be considered in the case of the reference junction model 4485).

### Selection of the thermocouple

- Press the **FCT** and **TC** keys. The "TC selection" display appears.
- Using the **→** or **←** key, select the desired thermocouple.

### Selection of the reference junction

- After that, press the **▲** or **▼** key and select "Transmit:XXXX".
- Then use the **→** or **←** key to select "Transmit:TC+RJ-AUT".
- Acknowledge with **ENT**.

### Selection of the unit

- After pressing the **FCT** and **UNIT** keys, set the correction cursor using the **▲** or **▼** key to TC. Using the **→** or **←** key, select °C, °F or K.
- Acknowledge with **ENT**.

### Selection of the "TC:Simulation eines Thermopaars" mode

- If the device is in the "IN" measurement mode, first switch it to the "OUT" transmission mode by pressing the **IN/OUT** key.
- By pressing **TC** you can then invoke the set transmission mode "RJ-AUT".

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### 4.2.3.4 TC+4-20mA: Simulating a thermocouple with a linear-response voltage transducer. Rated output-current range: 4-20 mA.

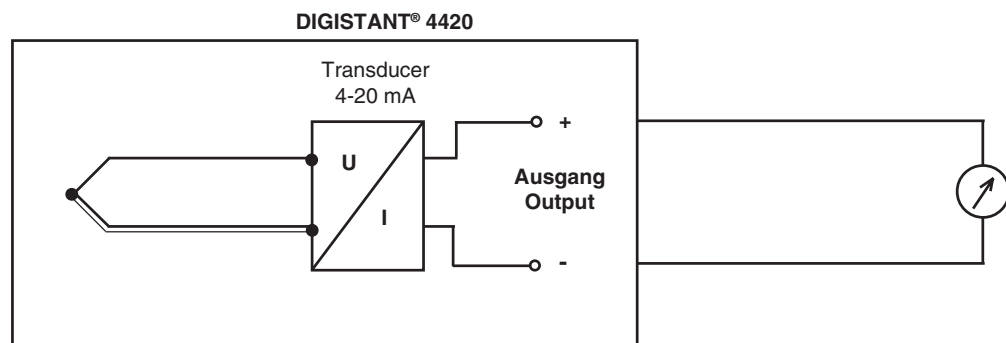
Preparation for use

The DIGISTANT® simulates at thermocouples with a series-connected U/I transducer. This transducer converts the output voltage of the simulated thermocouple linearly into a current, which the DIGISTANT® supplies at its output socket.

To be able to calculate the output current from the simulated temperatures, the DIGISTANT® requires

- the temperature corresponding to the lowest current value (4 mA) and
- the temperature corresponding to the current value (20 mA).

Control elements



Manual operation

- Switch on the device and connect it as shown above.

Maintenance and customer service

#### Selection of the thermocouple

- Press the **FCT** and **TC** keys. The "TC selection" display appears.
- Using **→** or **←** key, select the desired thermocouple.

Technical data

### Selection of the reference junction

- After that, press the ▲ or ▼ key and select "Transmit:XXXX".
- Then use the → or ← key to select "Transmit:TC+4-20mA".
- Acknowledge with ENT .
- The temperature values last allocated to the current values of 4 mA and 20 mA are then displayed.  
Modify the temperature limits or acknowledge the present entry with ENT .

### Modification of the temperature limits

- The correction cursor indicates the temperature limit which can be modified. You can move the correction cursor up with ▲ and down with ▼ .
- Enter the new temperature values and acknowledge the entry with UNIT .
- Complete your modification of the temperature limits with ENT .
- Values can be entered and allocated in the "OUT" and "IN" modes. However, these values are stored only once and used jointly for both operating modes. In other words, the entered temperature limits are applicable to "OUT-TC" as well as "IN-TC".

### Selection of the unit

- After pressing the FCT and UNIT key, set the correction cursor using the ▲ or ▼ key, select TC.  
Using the → or ← key, select °C, °F or K.
- Acknowledge with ENT .

### Selection of the "RJ:4-20mA" transmission mode

- If the device is in the "IN" measurement mode, first switch it to the "OUT" transmission mode by pressing the IN/OUT key.
- By pressing TC you can then invoke the set transmission mode "TC:X RJ4-20mA".

General information

Preparation for use

Control elements

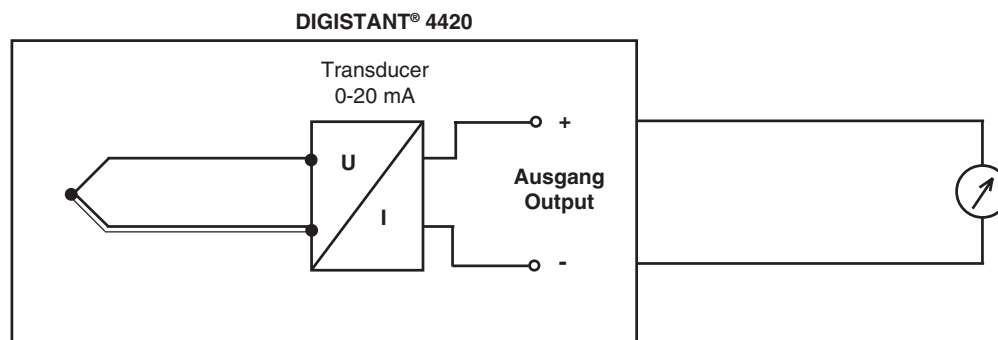
Manual operation

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### 4.2.3.5 TC+0-20mA: Simulating a thermocouple with a linear-response voltage transducer. Rated output-current range: 0-20 mA.

- Switch on the device and connect it as shown below.



#### Selection of the thermocouple





- Press the **FCT** and **TC**. The "TC selection" display appears.
- Using the **→** or **←** key, select the desired thermocouple.

#### Selection of the reference junction








- After that, press the **▲** or **▼** key and select "Transmit:XXXX".
- Then use the **→** or **←** key to select "Transmit:TC+0-20mA".
- Acknowledge with **ENT**.
- The temperature values last allocated to the current values of 0 mA and 20 mA are then displayed.
- Modify the temperature limits or acknowledge the present entry with **ENT**.





### Modification of the temperature limits

- The correction cursor indicates the temperature limit which can be modified. You can move the correction cursor up with  and down with .
- Enter the new temperature values and acknowledge the entry with .
- Complete your modification of the temperature limits with .
- Values can be entered and allocated in the "OUT" and "IN" modes. However, these values are stored only once and used jointly for both operating modes. In other words, the entered temperature limits are applicable to "OUT-TC" as well as "IN-TC".

### Selection of the unit

- After pressing the  and  keys, set the correction cursor using the  or  key to TC. Using the  or  key, select °C, °F or K.
- Acknowledge with .

### Selection of the "RJ:0-20mA" transmission mode

- If the device is in the "IN" measurement mode, first switch it to the "OUT" transmission mode by pressing the  key.
- By pressing  you can then invoke the set transmission mode "TC:X RJ:0-20 mA".

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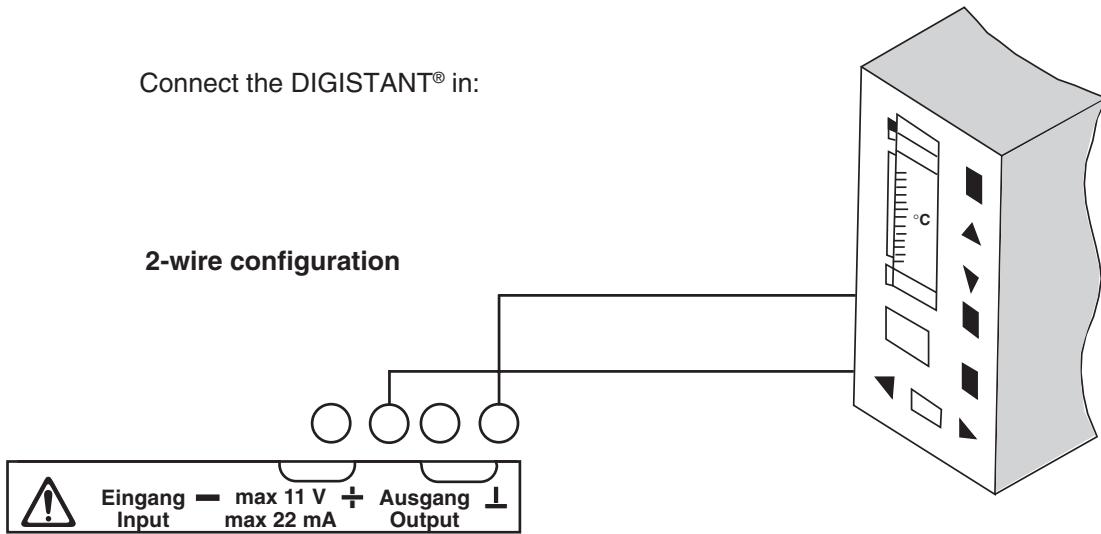
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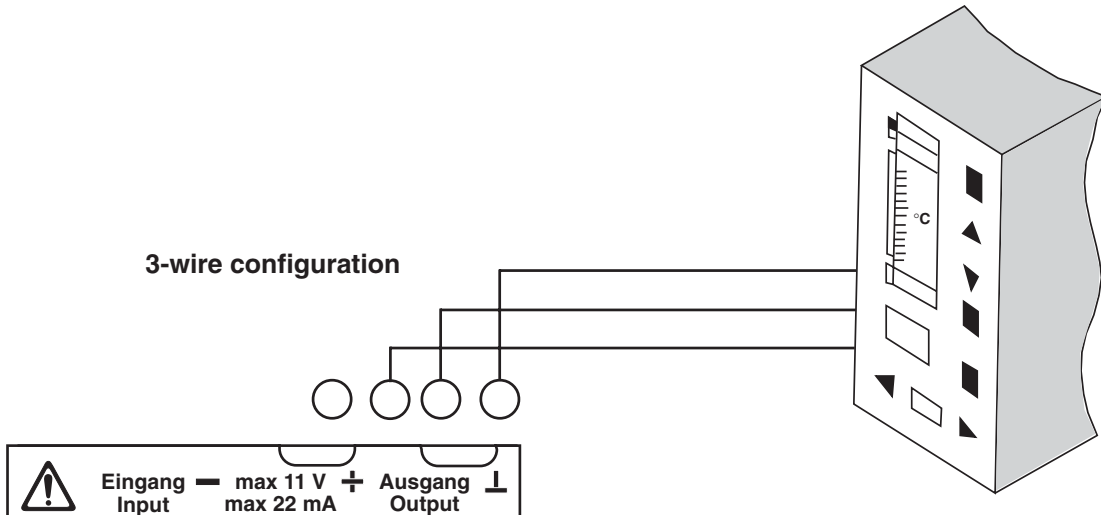
### 4.2.4 Temperature simulation with a Pt 100

Connect the DIGISTANT® in:

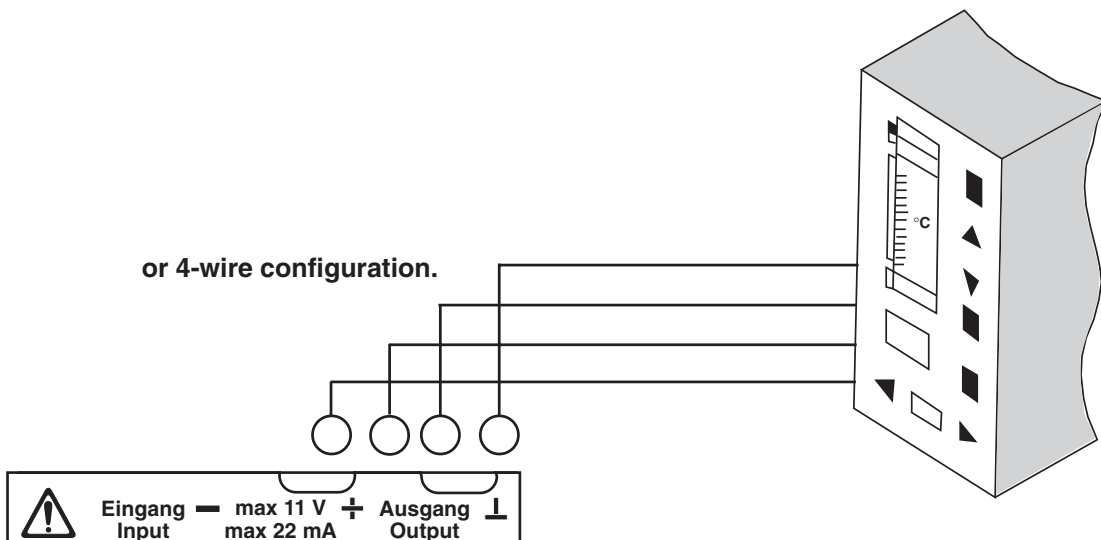
2-wire configuration



3-wire configuration



or 4-wire configuration.



Switch on the device and connect it as shown above.

### 4.2.4.1 Settings for resistance-thermometer simulation

This menu is obtained by selecting the [FCT] and [RTD] functions.

The following display appears on the LCD:

			R	L		S	E	L	E	C	T	I	O	N					
	R	L	-	O	U	T	:					O	F	F					

Various parameters for RTD measurement and transmission are set in this menu.

The different parameters are selected with the and cursor keys.

#### RL-OUT setting

- Here, you can specify whether or not the lead resistance RL should be considered for RTD transmission.
- The and keys can be used to toggle between the following options:
  - ON RL is added to the RTD transmission value
  - OFF RL is not considered.

**RL-IN setting** - No setting is required for simulation.

#### RL-entry

- The lead resistance (for RTD transmission and measurement) can be adjusted over a value range of 1  $\Omega$  to 99  $\Omega$  with the - number keys.
- Press the key to save the new RTD setting and return to the measurement or transmission mode.

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**Selection of the unit**

- After pressing the (FCT) and (UNIT) keys, set the correction cursor using the (▲) or (▼) key to RTD.  
Using the (→) or (←) key, select °C, °F, Ω or K.  
  
Acknowledge with (ENT) .

**Selection of the "RTD:XXXX" transmission function**

- If the device is in the "IN" measurement mode, first switch it to the "OUT" transmission mode by pressing the (IN/OUT) key.
- By pressing (RTD) you can then invoke the set transmission mode "RTD:XXXX".
- Using the (0)-(9) number keys, you can now enter the desired value.
- Complete your entry with (UNIT) .

**4.2.4.2 Resistance simulation**

After pressing the (FCT) and (UNIT) keys, set the correction cursor using the (▲) or (▼) key to "RTD".  
  
Using the (→) or (←) key, select the "Ω" unit.  
  
Acknowledge with (ENT) .

**RTD - Setting**

- This menu is obtained by pressing the (FCT) and (RTD) keys.  
The following display appears on the LCD:

			R	L	-	S	E	L	E	C	T	I	O	N				
			R	L	-	O	U	T	:					O	F	F		

- Various parameters for RTD measurement and transmission are set in this menu.
- the different parameters are selected with the ▲ and ▼ cursor keys.

### RL-OUT setting

- Here, you can specify whether or not the lead resistance RL should be considered for RTD or resistance simulation.
- The → and ← keys can be used to toggle between the following options:
  - ON RL is added to the RTD transmission value
  - OFF RL is not considered.

**RL-IN setting** - This setting is not required for simulation.

### RL-entry

- The lead resistance (For RTD transmission and measurement) can be adjusted over a value range of 1 Ω to 99 Ω with the 0-9 number keys.
- Press the ENT key to save the new settings.

### Selection of resistance simulation

- If the device is in the "IN" measurement mode, first switch it to the "OUT" transmission mode by pressing the IN/OUT key.
- By pressing RTD you can then invoke the set transmission mode "Resistance simulation".
- Using the 0-9 number keys, you can now enter the desired value.
- Complete your entry with UNIT .

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## 4.3 Power-on/power-off

- The 4420 is switched on and off with the  key.
- This key has a toggle function.

Pressing the key effects power-off immediately, as it not controlled by the built-in microcontroller.


- When switched on, the device assumes the state it was in immediately before being switched off.

## 4.4 Changeover between measurement and transmission


- Changeover between measurement and transmission is effected with the  key.

- In the measurement mode, the 4420 invokes the function which was last performed in the transmission mode, and vice versa.





Example:

If the  key is operated while a current value is being output, the 4420 switches over to current measurement.






## 4.5 Transmission mode


- Prerequisite: The device must be in the transmission mode; if not, press the  key.
- The LCD might show the following display, for example:

			O	U	T			-	1	0	.	2	3	5			m	A	

- A new transmission value is entered with the - number keys, the  sign key and the  decimal-point key.
- A maximum of 5 digits can be entered.
- When a new entry is made, the display of the previous transmission value in the 1st row of the LCD extinguishes and is replaced by a display of the present entry:

			O	U	T				5	.	3	4							














- The present entry can be cancelled with the  cancel key.
- The previous transmission value is displayed again in the 1st row of the LCD.
- Entries are completed with the unit keys:
  1.  key: A current value is output.
  2.   keys: A voltage value is output.
  3.  key: A TC or an RTD is simulated, depending on the setting.

The  key can be assigned to different units.

for TC: K, °C, °F;

for Rtd: K, °C, °F and Ω.

These assignments are carried out in a function menu.

General information	<ul style="list-style-type: none"> <li>- If the entered transmission value is valid, it is output and displayed in the 1st row of the LCD.</li> <li>- Invalid transmission values generate an error message.</li> </ul>
Preparation for use	<ol style="list-style-type: none"> <li>1. Press the  key. The previous transmission value is output and displayed again.</li> <li>2. Commence a new entry.</li> </ol> <ul style="list-style-type: none"> <li>- Pressing a unit key once causes a value of 0 to be output in the applicable transmission mode.</li> <li>- Key combination  and  : The sign of the present transmission value is inverted. This function is only available for I and U transmission.</li> </ul>
Control elements	<ul style="list-style-type: none"> <li>-  Key: The device assumes the TC transmission mode. The value output last in this mode is output here again.</li> <li>-  Key: The device assumes the RTD transmission mode. The value output last in this mode is output here again.</li> <li>-  Key: A dX-value entered in a function menu is added to the present transmission value. If the result is valid, it is output.</li> <li>-  Key: A dX-value entered in a function menu is subtracted from the present transmission value. If the result is valid, it is output.</li> </ul>
Manual operation	<ul style="list-style-type: none"> <li>-  Key: The device assumes the applicable measurement mode.</li> <li>-  Key: A function is selected.</li> <li>-  Key: A value-pair (transmission and dX values) is stored.</li> <li>-  Key: A value-pair (transmission and dX values) is retrieved. The value fetched from the memory is output.</li> <li>-  Key: The ramp function is invoked.</li> <li>-  Key: The background illumination is switched on/off.</li> </ul>
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## 4.6 Selecting a function

Functions are selected by pressing the key in the measurement or transmission mode.

- Key: This key effects a return to the measurement or transmission mode without a function having been selected.
- Key: This key turns the background illumination on and off.

There are two possibilities of invoking special functions:

<b>a) Direct selection</b>	<u>Function selected</u>	(after the  key is pressed)
	Key	dX-setting
	Key	Min./Max. function
	Key	Display of software version and calibration status
	Key	Range selection for RTD transmission (automatic or manual)
	Key	Storage and retrieval of device settings
	Key	Setting of the LCD displayed contrast
	Key	Setting of the ground connection
	Key	Setting of the date and time
	Key	Display of the date and time
	Key	Setting of the units for TC and RTD
	Key	Rtd (Pt100)
	Key	Selection of the TC type and RJ
	Key	Range selection for U transmission (automatic or manual)
	Key	Data-logger setting
	Key	Data-logger evaluation
	Key	Ramp setting
	Key	Setting of transmission or measurement
	Key	Setting the duration of the background illumination
	Key	Range selection for I transmission (automatic or manual)

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a) **Indirect selection**      Function selected:      (after the  key is pressed)





The functions can also be selected indirectly by operating the  or  key.

This invokes the menu for indirect selection.

The following display appears on the LCD:

>		d	X	-	I	N	P	U	T										
		M	I	N	/	M	A	X		F	U	N	C	T	I	O	N		

The function can be scrolled through with the  and  cursor key.

-  Key:      The function marked with the  cursor symbol in the first column can be selected by pressing the ENTER key.  
The corresponding menu is displayed on the LCD.
  
-  Key:      This key can be used to cancel an entry without a function having been selected.  
A return is effected to the transmission or measurement menu, depending on on where the function was invoked from.
  
-  Key:      The background illumination is turned on or off.

## 4.7 dX-setting

The menu is obtained by pressing the **FCT** and **0**.  
The LCD provides the following display, for example:

	d	X	-	I	N	P	U	T											
>	U	:				5	.	2	3	4		m	V						

The **▲** and **▼** cursor keys can be used to scroll through the various dX-values belonging to the respective transmission mode if no current entry is active.

The currently selected dX-value is identified with a mark in the 2nd row of the LCD.

Sample displayed:

>	U	:				5	.	2	3	4		m	V						
---	---	---	--	--	--	---	---	---	---	---	--	---	---	--	--	--	--	--	--

dX-value for U transmission

>	I	:				1	2	.	4	8	6		m	A					
---	---	---	--	--	--	---	---	---	---	---	---	--	---	---	--	--	--	--	--

dX-value for I transmission

>	T	C	:			1	2	3	.	8		°	C						
---	---	---	---	--	--	---	---	---	---	---	--	---	---	--	--	--	--	--	--

dX-value for TC transmission

>	R	T	D	:		2	0	0	.	4	3		Ω						
---	---	---	---	---	--	---	---	---	---	---	---	--	---	--	--	--	--	--	--

dX-value for Rtd transmission

Using the **0**–**9** number keys and the **.** decimal-point key, the selected dX-value can be newly entered.

Current entries are completed with the corresponding units key:

- mV** or **V** Key: dX-values for U transmission.
- mA** Key: dX-values for I transmission.
- UNIT** Key: dX-values for TC and Rtd transmission.

The meaning of the key depends on its assignment which can be made in a function menu.  
K, °C or °F for TC and K, °C, °F or Ω for Rtd transmission.

Current entries can be cancelled with the **C** key.

- ENT** Key: If no current entry is active, the **ENT** key can be pressed to return to the transmission or measurement menu.

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### 4.7.1 Storing a value-pair

This menu is obtained by pressing the  $\text{STO} \rightarrow$  key in the transmission mode.  
 In addition to the present transmission value in the 1st row, the dX-value is displayed in the 2nd row of the LCD:

			O	U	T		-	1	0	.	2	3	5			m	A	
S	T	O		d	X					1	.	5	6	4			m	A

By pressing one of the  $\text{0}$ – $\text{9}$  number keys, the value-pair (transmission value and dX-value) can be stored under one of the 10 memory numbers 0 to 9.  
 After that, a return is effected to the transmission mode.

Pressing the  $\text{C}$  key effects a return to the transmission mode without prior storage of the value-pair.

### 4.7.2 Retrieving a value-pair

This menu is obtained by pressing the  $\text{RCL} \leftarrow$  key in the transmission mode.  
 In addition to the present transmission value in the 1st row, the RCL mode is displayed in the 2nd row of the LCD:

			O	U	T		-	1	0	.	2	3	5			m	A	
R	C	L																

Pressing the  $\text{C}$  key effects a return to the transmission mode without retrieval of a value-pair from the memory.  
 Memory location can be selected directly or indirectly.

**a) Direct selection**

By pressing one of the  $\text{0}$ – $\text{9}$  number keys, the value-pair (transmission value and dX-value) stored at the corresponding memory location can be retrieved.  
 After that, a return is effected to the transmission mode.

**b) Indirect selection**

One of the two cursor keys must be pressed for indirect selection.  
 The transmission and delta-X values at memory location 0 are displayed.



0			O	U	T		1	.	2	3	4	5		V				
R	C	L		d	X		1	2	.	2	1	8		m	V			

By operating the two cursor keys, the value-pairs at the 10 memory locations (0 to 9) can be scrolled through. They are displayed with their respective location numbers on the LCD.

Press the  $\text{C}$  key to cancel your entry. No value-pair is fetched from the memory.  
 The original, currently selected values are displayed again on the LCD.



Press the  $\text{ENT}$  key to acknowledge the currently selected value-pair.


## 4.8 Ramp function



This menu is obtained by pressing the  and  keys. The LCD provides the following display, for example:

			R	A	M	P			F	U	N	C	T	I	O	N				
	R	A	M	P		1														

The currently selected ramp type is shown in the 2nd row.

The  and  keys can be used to toggle between RAMP 1 and RAMP 2.

 Key: This key effects a return to the measurement or transmission menu.

 and  Keys: By pressing the cursor keys, various setting parameters can be scrolled through, depending on the ramp type. The different parameters are displayed in the 2nd row together with their present settings. (Exception: dWi and dti, see below)

### Difference RAMP 1 and RAMP 2

	RAMP 1	RAMP 2
Number of stages:	Depending on resolution	max. 30
dt for each stage	Constant for all stages	Variable for each stage
Delta transmission value	Constant for all stages	Variable for each stage
Physical variable for each stage	Voltage or current	Voltage/current combinations permissible
Type of ramp sequence	Triangle or sawtooth	Triangle or sawtooth
Number of passes	1 to 99 or continuous	1 to 99 or continuous

Due to their different characteristics, the two ramp types need to be described with two different parameter entries.

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### 4.8.1 Use of the ramp function

The ramp function can be activated by pressing the  key in the normal transmission mode. Only then is it possible to execute a ramp sequence (automatic or single-step).

			O	U	T		-	2	.	3	4	5		m	V				
																		R	O

Display when a ramp has stopped.

Indication of a stopped ramp. RO in the 2nd row of the LCD.


The ramp is started with the  key.


			O	U	T		1	0	.	4	5		m	V					
d	t	:					1	2	.	4		s						R	1


Display when a ramp has started



Indication of a started ramp: R1 in the 2nd row of the LCD.

At time intervals of  $\geq 3$  s, the current transmission value is displayed in the 1st row. The time remaining for the current stage is counted down in 1/10 seconds and displayed in the 2nd row of the LCD. At time intervals of  $< 3$  s, only the transmission value is displayed without the remaining time on the LCD.


On the "continuous" setting, the ramp can be stopped by pressing the  key again.

Even if a limited number of passes has been set, the ramp can be cancelled prematurely by pressing the  key.

If the ramp is cancelled with the  key, the last value supplied by the ramp is retained. The ramp is that restarted with the current transmission value instead of beginning automatically with the initial value.

In the stopped state, the ramp sequence can be executed in single step in both directions using the  and  cursor keys.

During single-step execution of the ramp sequence, the current transmission value is displayed in the 1st row of the LCD.

By pressing the  key once more, the ramp function can be deactivated again.

The current transmission value is retained.

## Entry for selecting ramp 1

Parameter list :	RAMP 1
	SEQUENCE
N	Number of passes
AW	Initial value
EW	Final value
dW	Delta transmission value
dt	Delta time

Using the  $\leftarrow$  and  $\rightarrow$  keys, sequence can be toggled between the following values:  
SAWTOOTH  
TRIANGLE

The number of passes (N) can be entered using the number keys over a value range of 0 to 99.0 implies continuous operation. After pressing the  $\text{C}$  key, a new entry can be made.

*The initial value (AW)* is entered with the  $0-9$  number keys, the  $\cdot$  decimal-point key and the  $\pm$  sign key.

*The final value (EW)* is entered with the  $0-9$  number keys, the  $\cdot$  decimal-point key and the  $\pm$  sign key.

*The delta transmission value (dW)* is entered with the  $0-9$  number keys and the  $\cdot$  decimal-point key. Only positive values can be entered.

*The delta time (dt)* is entered in seconds using the  $0-9$  number keys and the  $\cdot$  decimal-point key.

(resolution: 100 ms; value range: 0.1 s to 99999.9 s). After pressing the  $\text{C}$  key, a new entry can be made.

A current entry can be cancelled with the  $\text{C}$  key. The previous value then appears on the display.

An entry is completed with the corresponding units key, causing the value to be saved. Invalid entries generate an error message (invalid value range). The error message must be acknowledged by pressing the  $\text{C}$  key (the previous value is then displayed) or by a new entry.

$\text{ENT}$  Key: On exiting the  $\text{ENT}$  key, a check is made as to whether the initial, final and delta values were entered with the same unit. If an error has occurred, it is displayed.  
Wrong entries must be corrected, otherwise it is not possible to exit the function with this key.

### Entry for selecting ramp 2

Parameter list : RAMP 2  
 SEQUENCE  
 N number of passes  
 S number of stages  
 Wi, ti value and time of the i-th stage for  $1 \leq i \leq 30$

On the selection of SEQUENCE, N and S, the respective parameter is displayed in the 2nd row. The SEQUENCE end the number of passes (N) are entered as for RAMP 1. The number of stages (S) can be set with the number keys in a value range between 2 and 30. New entries can be made after pressing the **(C)** key. On the selection of Wi and ti, the value of Wi is displayed in the 1st row and the value of ti is displayed in the 2nd row.

>	W	1	4	:	1	8	.	3	6	3	m	V						
	t	1	4	:	8	.	4											s

**(▲)** and **(▼)** - Keys: The cursor keys are used to change between the parameters. If the cursor is on Wi, the cursor-down key selects ti (cursor on ti) and the cursor-up key selects the S parameter:

			R	A	M	P		F	U	N	C	T	I	O	N				
	S	2	:				2	4											

If the cursor is on ti, the cursor-down key is used to select RAMP 2.

			R	A	M	P		F	U	N	C	T	I	O	N				
	R	A	M	P		2													

Again, if the cursor is on ti, the cursor-up key is used to select Wi (cursor on Wi).

The current Wi and ti parameters are marked with the "->" cursor symbol. In the case of Wi as well as ti, the i-value can be set over a range of  $1 \leq i \leq 30$  using the [→]- and [←]- keys.

The Wi-value is entered with the **(0)** - **(9)** number keys, the **(.)** decimal-point key and the **(±)** sign key.

A current entry can be cancelled with the **(C)** key. The previous value then appears on the display.

An entry is completed with the corresponding units key, causing the value to be saved. Invalid entries generate an error message (invalid value range). The error message must be acknowledged by pressing the **(C)** key (the previous value is then displayed) or by a new entry.

The time (ti) is entered seconds with the **(0)** - **(9)** number keys and the **(.)** decimal-point key (resolution: 100 ms; value range 0.1 s to 99999.9 s).

A new entry can be made after pressing the **(C)** key.

**(ENT)** Key: This key effects a return to the measurement or transmission mode.

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## 4.9 Setting simultaneous transmission and measurement

This menu is obtained by pressing the and keys.  
The following display appears on the LCD:

>	T	R	A	N	S.	+	M	E	A	S.	:	O	F	F			
	M	E	A	S.		M	O	D	E	:		U					

In this menu, you can specify whether measurement should be carried out simultaneously in the transmission mode. The variable to be measured can also be specified here.

The 1st row indicates whether the function is active or inactive.

The 2nd row indicates the selected measurement mode.

Key: This key effects a return to the measurement or transmission mode.

and Key: These keys are used to jump between the 1st and 2nd rows. The selected row is marked with the cursor symbol.

The parameter in the selected row can be changed.

### Setting TRANSMISSION + MEASUREMENT

Press the and keys to toggle between the following options:

ON (transmission + measurement function is active)  
OFF (transmission + measurement function is inactive)

### Setting the MEASUREMENT MODE

Press the and keys to toggle between the following options:

MEAS. MODE: I (current measurement)  
MEAS. MODE: U (voltage measurement)  
MEAS. MODE: RTD (Pt100 measurement) \*\*  
MEAS. MODE: TC (thermocouple measurement)

**\*\*Warning:** Simultaneous transmission and measurement of RTD with a direct connection (between the RTD input and output in the case of the DIGISTANT® 4420) leads to measurement errors and should be **avoided**.

External applications without an electrical connection, e.g. Pt 100 simulation for a controller and simultaneous temperature measurement with an integrated, electrically isolated Pt 100 sensor do not pose any problems in this respect.

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### 4.9.1 Simultaneous transmission and measurement

Here, the measurement mode is a fixed selection in the function menu. The transmission value can be changes. The LCD provides the following display, for example:

			O	U	T		-	2	.	3	4	5		m	V					
																	R	O		

The entry corresponds to that in the transmission mode, except that the key cannot invoke the ramp function and the key cannot be used to switch to the measurement mode.

## 4.10 Setting the data logger

This menu is obtained by pressing the and keys. The following display appears on the LCD:


### 4.10.1 Setting the storage time

D	A	T	A	L	O	G													
	T	I	M	E	:					1	2	0	0		s				

The menu for entering the time interval at which measurement data should be written in the data logger's memory appears first.


- = Keys: A new time value can be entered with the number keys 0 to 9. Value range: 0 to 3600 s
- Key: The current entry can be cancelled with this key.
- Key: By pressing this key, the newly entered time value is saved and a return is effected to the measurement or transmission menu.
- Key: By pressing this key, the newly entered time value is saved and the menu for erasing the data logger's entire memory appears.
- Key: By pressing this key, the newly entered time value is saved and the menu for erasing individual blocks of the data logger's memory appears.

### 4.10.2 Data logger mode

The data logger mode is invoked by pressing the  key in the measurement mode. The data logger mode is indicated in the 2nd row of the LCD. The stopped state is indicated by a 0 and the started state by a 1. In addition, the number of free memory locations (e.g. 214) and the current block number (e.g. 101) are displayed.

			I	N					1	0	.	2	3	5			m	A	
D	A	T	A	L	O	G			1	0	1			0			2	1	4


Data logger in the stopped state


 Key: Pressing this key starts automatic data recording. The following display appears:


			I	N					1	0	.	2	3	5			m	A	
D	A	T	A	L	O	G			1	0	1			1			2	1	4

Data logger in the started state

Pressing this key again stops automatic data recording.

The  key thus a toggle function


 key: If automatic data recording has not been started, this key can be pressed to record single values.

 key: If automatic data recording has not been started, this key can be pressed to delete the measurement value recorded last by the data logger.

The datalogger's memory has a capacity of 256 values. When the memory becomes full, any data recording still in progress is stopped and the following message appears on the LCD:

			I	N					1	0	.	2	3	5			m	A
	D	A	T	A	L	O	G	G	E	R				V	O	L	L	

This indicates that the data logger's memory is full.

 Key: If automatic data recording has not been started, pressing this key effects a return to the normal measurement mode.

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### 4.10.3 Erasing the data logger's memory

**a. Erasing the memory completely**

This menu is obtained by pressing the **FCT** and **STO** keys.  
 After that, press the **▼** key.  
 The following display appears.

D	A	T	A	L	O	G													
E	R	A	S	E	:			N	O										

In this menu, the data logger's memory can be erased completely

To be able to erase the memory, enter the number -2609- in the above display.  
 The following display then appears:

D	A	T	A	L	O	G													
E	R	A	S	E	:			Y	E	S									

YES (erase memory) -2609-  
 NO (do not erase memory) -continue on p. 4-41\*

**b. Erasing the memory in blocks**

This menu is obtained by pressing the **FCT** and **STO** keys.  
 After that, press the **▲** key.

The following display appears, for example:

	B	L	O	C	K	:			1	0									
>	E	R	A	S	E	:			N	O									

In this menu, the data logger's memory can be erased in blocks.

Set the cursor to the "BLOCK" parameter with the **▲** key.  
 The block to be erased can now be selected with the **→** or **←** key.

After that, set the cursor with the **▼** key back to "ERASE".

To be able to erase the memory block, you must enter the number -2609- in the above display.  
 The following display then appears:

	B	L	O	C	K	:			5										
>	E	R	A	S	E	:			Y	E	S								

- YES (erase memory) -2609-
- NO (do not erase memory)
- ⓔ Key: If YES was selected, pressing this key erases the data logger's memory and effects a return to the measurement or transmission menu.
- ⬆ Key: If YES was selected, pressing this key erases the data logger's memory and invokes the menu for erasing individual blocks of the data logger's memory.
- ⬇ Key: IF YES was selected, pressing this key erases the data logger's memory and invokes the menu for setting the storage time.

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### 4.10.4 Data logger evaluation

This menu is obtained by pressing the ⓔ and Ⓜ keys.  
 The following display appears on the LCD:

		D	A	T	A		L	O	G	G	E	R	V	A	L	U	E	S
		M	E	A	S.		V	A	L	U	E	S						

#### Setting the type of evaluation

In this menu, the type of data logger evaluation is selected and indicated in the 2nd row of the LCD.

- ⬅ and ➡ Keys: These keys can be used to toggle between the following values:  
 MEAS. VALUE (displays the individually recorded measurement values)  
 STATISTICS (statistical evaluation in blocks)
- ⓔ Key: This key effects a return to the measurement or transmission menu.
- ⬆ and ⬇ Keys: Depending on the selected type of evaluation, pressing this key invokes either the menu for displaying the recorded measurement values or the statistics menu.

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### 4.10.5 Statistical evaluation

>	B	L	O	C	K	:				1	4								
	M	I	N	:						1	1	.	2	5	7			m	V

In the 1st row: The selected block is displayed.  
 In the 2nd row: the type of statistical evaluation is displayed together with the corresponding calculated value.

Row 1 or 2 of this menu can be selected using the ▲ and ▼ keys. The selected row is marked by the → cursor symbol.

▼ Key: If the cursor symbol is in the BLOCK row, pressing this key moves the symbol to the 2nd row (type of statistic).  
 If the cursor symbol is in the 2nd row, pressing this key invokes the menu for selecting the type of evaluation.

▲ Key: If the cursor symbol is in the BLOCK row, pressing this key invokes the menu for selecting the types of evaluation.  
 If the cursor symbol is in the 2nd row, pressing this key moves the symbol to the BLOCK row.

The parameter selected and marked with the → cursor symbol can be changed.

### 4.10.6 Display of the recorded values

1	4	.	1	0	.	9	4			0	7	:	2	4	:	1	5		
1	2			1	3	4				-	1	4	.	2	3	4		m	V

The display is to be interpreted as follows:

In the 1st row: the data and time of recording of the relevant measurement value are displayed.

In the 2nd row: the block number (12), sequential number (134) and measurement value (-14.234 mV) are displayed.

← and → Keys: These keys can be used to scroll through the individually recorded values.

0-9 Keys: The number keys can be used to enter a measurement value number directly. During this entry, the display is cleared except for the sequential number.

ENT Key: 1. Completes the entry of a sequential number.  
 2. Otherwise effects a return to the transmission or measurement menu.

▲ and ▼ Keys: Pressing these keys invokes the menu for selecting the type of output.

## 4.11 Min./max. function

This menü is obtained by pressing the **FCT** and **2** keys.  
 Here you can specify whether or not the minimum and maximum values should be recorded while a measurement is in progress.  
 If the min./max. function is active, the min. and max. values in the measurement mode are displayed in the 2nd. row.

The following display appears on the LCD:

		M	I	N	/	M	A	X		F	U	N	C	T	I	O	N		
		M	I	N	/	M	A	X	:				O	F	F				

The **ENT** key effects a return to the measurement or transmission mode.

The MIN./MAX. function can be toggled with the **←** and **→** keys between the following options:

- OFF (MIN./MAX. recording is inactive)
- ON (MIN./MAX. recording is active)

## 4.12 Display of the version and calibration stage

This menü is obtained by pressing the **FCT** and **2** keys.  
 The LCD provides the following display, for example:

V	E	R	S	I	O	N	:	V	0	3	9	4							
C	A	L	:					C	0	0	1								



In the 1st row: the software version is indicated.

In the 2nd row: the number of calibration is indicated.  
 000 means that the device has not been calibrated yet.  
 This value is incremented after every calibration.


The **ENT** key effects a return to the measurement or transmission mode.


Calibration can only be controlled via one of the external interfaces.

## 4.13 Adjusting the background illumination


this menu is obtained by pressing the  and .  
The following display appears on the LCD:


	D	I	S	P	L	A	Y		L	I	G	H	T	I	N	G			
L	I	G	H	T	I	N	G		T	I	M	E		1	9		s		


In this menu, the duration of the background illumination can be set.  
The background illumination can be activated in every by pressing the  key.

The background illumination goes off when the  key is pressed again or when the lighting time set in this menu has elapsed.

The LIGHTING TIME can be set with the  -  number keys over a value range of 1 to 60 s.

Pressing the  key saves the newly entered value and effects a return to the measurement or transmission mode.

Pressing the  key deletes the newly entered value and restores a display of the previous value on the LCD.

 key:            Activates/deactivates the background illumination.



## 4.14 Rtd settings

This menu is obtained by pressing the **FCT** and **RTD**.  
The LCD provides the following display, for example:

			R	T	D	-	S	E	T	T	I	N	G						
	R	T	D	:						P	T	1	0	0					

Various parameters for RTD measurement and transmission are set in this menu.

The following parameters can be selected with the **▲** and **▼** cursor keys.

### RTD selection:

The **→** and **←** keys are used to toggle between the following RTD types:

PT 100 (Pt100 is selected)

### RL-OUT setting:

Here, you can specify whether or not the lead resistance RL should be considered for RTD transmission.

The **→** and **←** keys can be used to toggle between the following options:

ON RL is subtracted from the RTD measurement value

OFF RL is not considered

### RL entry:

The lead resistance (for RTD transmission and measurement) can be adjusted over a value range of 1 Ω to 99 Ω with the **0**-**9** number keys.

Press the **ENT** key to save the new RTD setting and return to the measurement or transmission mode.

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## 4.15 Setting the TC model and RJ

This menu is obtained by pressing the **FCT** and **TC** keys.

The following display appears on the LCD:

In this menu, the TC model, reference junction (RJ) for TC measurement and RJ for TC transmission are set.

### Setting the TC type

After the function has been selected, the menu for setting the TC type first appears:

				T	C	-	S	E	L	E	C	T	I	O	N		
	T	C	:							R							

Selection of the TC model

Press the **←** and **→** keys to choose between the following TC types:

R, S, B, J, T, E, K, L

Pressing the **ENT** key effects a return to measurement or transmission mode.

Pressing the **▲** key calls up the menu for setting the reference junction (RJ) for TC transmission.

Pressing the **▼** key calls up the menu for setting the reference junction (RJ) for TC transmission.

### 4.15.1 Setting the reference junction (RJ) for TC transmission

The following display appears on the LCD:

				R	J	-	S	E	L	E	C	T	I	O	N				
	T	R	A	N	S.	:				T	C	+		R	J	-	M	A	N

Press the **←** and **→** keys to choose one of the following reference junctions:

- TC
- TC + RJ-MAN
- TC + RJ-AUT
- TC + 4-20 mA
- TC + 0-20 mA

Keys: **ENT** If TC or TC+RJ-AUT is selected, a return is effected to measurement or transmission mode.  
 If TC+RJ-MAN is selected, the menu for entering the reference-junction temperature is called up.  
 If TC+4-20 mA is selected, the menu for entering the temperatures at 4 mA & 20 mA is called up.  
 If TC+0-20 mA is selected, the menu for entering the temperatures at 0 mA & 20 mA is called up.

Pressing the **▼** key calls up the menu for setting the reference junction (RJ) for TC measurement.

Pressing the **▲** key calls up the menu for setting the TC type.

### 4.15.2 Setting the reference junction (RJ) for TC measurement

The following display appears on the LCD:

				R	J	-	S	E	L	E	K	T	I	O	N			
M	E	A	S.			:			R	J	-	M	A	N				

Press the  $\leftarrow$  and  $\rightarrow$  keys to choose one of the following reference junctions:

- RJ-INT
- RJ-MAN
- RJ-AUT
- 4-20 mA
- 0-20 mA

Key:  $\textcircled{\text{ENT}}$  If RJ-INT or RJ-EXT is selected, a return is effected to the measurement or transmission mode. If RJ-MAN is selected, the menu for entering the reference-junction temperature is called up. If 4-20 mA is selected, the menu for entering the temperatures at 4 mA & 20 mA is called up. If 0-20 mA is selected, the menu for entering the temperatures at 0 mA & 20 mA is called up.

Press the  $\blacktriangledown$  key calls up the menu for setting the TC type.

Pressing the  $\blacktriangle$  key calls up the menu for setting the reference junction (RJ) for TC transmission.

### 4.15.3 Entering the reference-junction temperature

This menu is obtained by pressing the  $\textcircled{\text{ENT}}$  key in the RJ menus if TC+ RJ-MAN for transmission was selected.

The following display appears on the LCD:

	S	E	T	T	I	N	G		R	J	-	M	A	N				
R	J	:			1	2	3	.	4			°	C					

The currently set reference-junction temperature is displayed in the 2nd row.

Using the  $\textcircled{0}$ – $\textcircled{9}$  number keys, the  $\textcircled{\cdot}$  decimal-point key and the  $\textcircled{\pm}$  sign key, a new temperature value can be entered.

Complete your entry with the  $\textcircled{\text{TC}}$  or  $\textcircled{\text{UNIT}}$  key. This entry applies to the selected TC type.

A current entry can be cancelled with the  $\textcircled{\text{C}}$  key.

Pressing the  $\textcircled{\text{ENT}}$  key effects a return to the transmission or measurement menu.

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### 4.15.4 Entering temperatures with RJ = 4-20 mA

This menu is obtained by pressing the **ENT** key in the RJ menu if TC+4-20 mA for transmission or 4-20 mA for measurement was selected.

The following display appears on the LCD:

>	0		m	A	:		2	3	.	5		°	C					
	2	0	m	A	:		1	3	4	.	8		°	C				

Temperatures related to 4 mA or 20 mA can be entered in this menu.

Use the **▲** and **▼** keys to change between the two parameters. The selected parameter is marked with a **→** cursor symbol.

Using the **0**–**9** number keys, the **.** decimal-point key and the **±** sign key, a new temperature value can be entered.

Complete your entry with the **TC** or **UNIT** key.  
This entry applies to the selected TC type.

A current entry can be cancelled with the **C** key.

Pressing the **ENT** key effects a return to the transmission and measurement menu.

### 4.15.5 Entering temperatures with RJ = 0-20 mA

This menu is obtained by pressing the **ENT** key in the RJ menu if TC+0-20 mA for transmission or 0-20 mA for measurement was selected.

The following display appears on the LCD:

>	0		m	A	:		2	8	.	3		°	C					
	2	0	m	A	:		2	8	4	.	3		°	C				

Temperatures related to 0 mA or 20 mA can be entered in this menu.

Use the **▲** and **▼** keys to change between the two parameters. The selected parameter is marked with a **→** cursor symbol.

Using the **0**–**9** number keys, the **.** decimal-point key and the **±** sign key, a new temperature value can be entered.

Complete your entry with the **TC** or **UNIT** key.

A current entry can be cancelled with the **C** key.

Pressing the **ENT** key effects a return to the transmission or measurement menu.

### 4.15.6 Selecting units for TC and Rtd

This menu is obtained by pressing the **FCT** and **UNIT** keys.

The following display appears on the LCD:

>	T	C	:							°	C						
	R	T	D	:						Ω							

Row 1: Unit for TC  
 Row 2: Unit for Rtd

The units for TC and Rtd are set in this menu. These units are applicable to the measurement and transmission modes.

The **UNIT** key is assigned the selected units. These units are also applicable to the entry of parameters in the function menu.

Use the **▲** and **▼** cursor keys to toggle between the two parameters.

The selected parameter is marked by the **→** cursor symbol.

**Setting the TC unit:**

The TC unit can be toggled with the **→** and **←** keys between the following options:  
 K  
 °C  
 °F

**Setting the RTD unit:**

The RTD unit can be toggled with the **→** and **←** keys between the following options:  
 K  
 °C  
 °F  
 Ω

Pressing the **ENT** key saves the newly selected units and effects a return to the measurement or transmission mode.

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## 4.16 Range selection and zero offset with U transmission

This menu is obtained by pressing  $\text{FCT}$  and  $\text{mV}$  or  $\text{V}$ .  
The following display appears on the LCD:

>	U	:	M	A	N			1	0	.	0	0				V		
	Z	E	R	O				O	F	F	S	E	T					0

In this menu, manual or automatic range selection can be set for voltage transmission, and zero offset can be performed.

Use the  $\blacktriangle$  and  $\blacktriangledown$  cursor keys to toggle the two parameters.

The selected parameters is marked by the  $\rightarrow$  cursor symbol.

### Setting range selection:

Use the  $\leftarrow$  and  $\rightarrow$  cursor keys to toggle between the followig options:

U:AUTO (automatic range selection)

U:MAN "voltage value" (manual range selection)

On the selection of U: MAN, the maximum value is also displayed.

If manual range selection has been set, the  $0$ – $9$  number keys and the  $\cdot$  key can be used to enter a new value.

This value is considered absolute, i.e. the entry of a sogn is not possible.

Complete your entry with the  $\text{mV}$  or  $\text{V}$  key.

On the basis of the entered value, the device selects the corresponding transmission range to ensure the validity of this at all events, provided that it lies within the absolute transmission limits.

Permissible range for entered values:  $0 \text{ V} < 0 = \text{VALUE} \leq 11.0 \text{ V}$

A current entry can be cancelled with the  $\text{C}$  key.  
The previous value is displayed again.

### Performing zero offset:

Press the  $1/0$  key to commence zero offset. While the offset is in progress, a "1" is indicated instead of a "0" in the last column of the display.

0 V is output during zero offset. The output voltage is recorded internally by the measurement section. The transmission section is balanced in accordance with the measured zero error.

Pressing the  $\text{ENT}$  key effects a return to the transmission or measurement menu.

If manual range selection has been set, it is indicated in the transmission mode by an "M:" in the 1st row of the LCD.

## 4.17 Range selection with RTD transmission

This menu is obtained by pressing **FCT** and **1**.

			R	A	N	G	E		S	E	L	E	C	T	I	O	N		
R	T	D	:	M	A	N		1	4	5	.	2	3			°	C		

In this menu, manual or automatic range selection can be set for Rtd transmission. The current setting is displayed in the 2nd row of the LCD.

Use the **←** and **→** keys to toggle between the following options:

Rtd:AUTO (automatic range selection)  
 U:MAN "value" (manual range selection)

On the selection of Rtd: MAN, the maximum value is also displayed.

If manual range selection has been set, the **0**–**9** number keys and the **.** key can be used to enter a new value.

This value is considered absolute, i.e. the entry of a sign is not possible.

Complete your entry with the **RTD** or **UNIT** key.

On the basis of the entered value, the device selects the corresponding transmission range to ensure the validity of this value at all events, provided that it lies within the absolute transmission limits.

A current entry can be cancelled with the **C** key. The previous value is displayed again.

Pressing the **ENT** key effects a return to the transmission or measurement menu.

If manual range selection has been set, it is indicated in the transmission mode by an "M:" in the 1st row of the LCD.

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## 4.18 Storage and retrieval of device settings

This menu is obtained by pressing **FCT** and **5**.

The following display appears on the LCD:

>	S	P	E	I	C	H	E	R	N	:		2							
	L	A	D	E	N	:						4							

This menu is meant for STORING and LOADING device settings.

**▲** and **▼** keys: Use these keys to change over between row 1 (STORE) and row 2 (LOAD).

The selected row is marked by a **→** cursor symbol.

**ENT** key: This key effects a return to the measurement or transmission mode without a function having been activated.

A new entry can be made for the selected parameter.

### STORE selection:

Use the **←** and **→** keys to toggle the memory number between values of 1 to 4.

Press the **FCT** key to store the device setting under the selected number.

### LOAD selection:

Use the **←** and **→** keys to toggle the memory number between values of 1 to 4 and the DEFAULT value.

Pressing the **FCT** key retrieves the device setting stored under the selected number.

On the selection of DEFAULT, the device is configured with factory settings.



# 4.19 LCD contrast setting

This menu is obtained by pressing **FCT** and **6**.

The following display appears on the LCD:

C	O	N	T	R	A	S	T		S	E	T	T	I	N	G				
>					5														

The contrast can be adjusted with the **0**–**9** number keys between a value of 0 (minimum contrast) and 9 (maximum contrast).

**ENT** key: This key effects a return to the measurement or transmission mode.

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## 4.20 Range selection with I transmission

This menu is obtained by pressing **FCT** and **mA** .

			R	A	N	G	E		S	E	L	E	C	T	I	O	N		
I	:	M	A	N					1	4	.	2	3				m	A	

In this menu, manual or automatic range selection can be set for current transmission. The present setting is displayed in the 2nd row of the LCD.

Use the **←** and **→** keys to toggle between the following options:

- I:AUTO (automatic range selection)
- I:MAN "current value" (manual range selection)

On the selection of I:MAN, the maximum value is also displayed.

If manual range selection has been set, the **0**–**9** number keys and the **.** key can be used to enter a new value.

This value is considered absolute, i.e. the entry of a sign is not possible.

Complete your entry with the **mA** key.

On the basis of the entered value, the device selects the corresponding transmission range to ensure the validity at all events, provided that it lies within the absolute transmission limits.

Permissible range of entered values:  
 0 V <= VALUE <= 22.0 mA

A current entry can be cancelled with the **C** key. The previous value is displayed again.

Pressing the **ENT** key effects a return to the transmission or measurement menu.

If manual range selection has been set, it is indicated in the transmission mode by an "M": in the 1st row of the LCD.

## 4.21 Setting the ground connection

This menu is obtained by pressing **FCT** and **7**.  
The following display appears on the LCD:

		G	R	O	U	N	D		C	O	N	N	E	C	T	I	O	N	
M	E	A	S.	S	E	C	T	I	O	N		I	N	T	E	R	N	A	L

In this menu, the ground connection of the measurement section can be set.

Use the **←** and **→** keys to select one of the following options for the ground connection: INTERN, EXTERN, AUTO

On the INTERN setting, the measurement section is internally grounded in the measurement mode.

On the EXTERN setting, the measurement section must be externally grounded in the measurement mode.

On the AUTO setting, the measurement section is internally grounded only in the measurement mode; in the simultaneous measurement and transmission mode, the measurement section be externally grounded.

Pressing the **ENT** key effects a return to the transmission or measurement menu.

## 4.22 Displaying the data and time

This menu is obtained by pressing **FCT** and **9**.  
The following display appears on the LCD:

	D	A	T	E	:					1	4	.	1	0	.	9	4	
	T	I	M	E	:			1	5	:	2	3	:	4	6			

The date and time are displayed on the LCD.

Pressing the **ENT** key effects a return to the transmission or measurement menu.

## 4.23 Setting the date and time

This menu is obtained by pressing **FCT** and **8**.  
The following display appears on the LCD:

>	D	A	T	E	:					1	4	.	1	0	.	9	4	
	T	I	M	E	:				1	5	:	2	3	:	4	6		

The date and time can be reset here.

**▲** and **▼** keys: Use these keys to change over between row 1 (DATE) and row 2 (TIME).  
The selected row is marked with a **→** cursor symbol.  
A new entry can be made for theselected parameter.

### Setting the DATE:

Use the **←** and **→** keys to select a digit within the date display.  
rings angefahren werden.

Use the **0**–**9** number keys to reset the date digit.

### Setting the TIME:

Use the **←** and **→** keys to select a digit within the time display.

Use the **0**–**9** number keys to reset the time digit.

Pressing the **ENT** key saves the set date and time, and effects a return to the transmission or measurement menu.

# 5. Maintenance and customer service

## 5.1 Maintenance

In principle, the DIGISTANT® does not require any maintenance by the user. Any necessary repairs must only be performed by the manufacturer.

## 5.2 Customer service

### Inquiries

We strongly recommend that technical inquiries to the manufacturer be accompanied by the serial number of the device in question, as this will allow a determination of the technological version (including the software release) so that rapid assistance can be provided. The serial number is inscribed on the type plate.

### Shipping instructions

When sending the DIGISTANT® in for repairs, please observe the following packaging and shipping guidelines:

Complaints regarding the device should be described using keywords on a slip of paper which is to be attached to the housing of the device.

We will be able to process your complaints faster if you add your name, department, fax number and telephone number in case we need to make any checks with you.

### **burster präzisionsmeßtechnik gmbh & co kg**

Talstr. 1-5                      76593 Gernsbach  
 P.O.Box 1432                76587 Gernsbach  
 Tel.: +49-7224-645-0      Fax: +49-7224-645-88

## 5.3 Manufacturer's guarantee

burster guarantees reliable operation of the device for a period of 12 months following delivery.

All repairs required within this period will be performed free-of-charge.

Damage caused through improper handling of the device is not covered by the guarantee.

The technical data is subject to alterations without notice at any time.

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## 5.4 Cleaning

Clean the front panel and housing with water-soluble detergents; do not use benzols.

## 5.5 Handling batteries

Auxiliary power is supplied by an integrated Ni-MH accumulator.

This accumulator is fully protected against overload and deep discharge.

However, should it become necessary to replace the accumulator, send the DIGISTANT® in for repair !

In this case, the device will also be given a complete checkover and recalibrated, if required.

The replacement will consist of a 6 V/4.4 Ah accumulator block bearing a recycling symbol (ISO 7000 Reg No. 1135) which characterizes environmentally batteries.

If you want to replace the accumulator yourself and cannot dispose of it correctly, please send it back to us.

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## 6.1 Measure and simulation

Voltage Measuring Instrument				
Range	Resolution	Zero Error	Tolerance	
± 9,999 mV	1 μV	≤ 7 μV	0,040 % of range	
± 99,99 mV	10 μV	≤ 15 μV	0,035 % of range	
± 999,9 mV	100 μV	≤ 150 μV	0,03 % of range	
± 12,000 V	1 mV	≤ 1,5 mV	0,03 % of range	
Voltage Source				
Range	Resolution	Zero Error	Tolerance	
± 9,999 mV	1 μV	≤ 7 μV	0,03 % of range	
± 99,99 mV	10 μV	≤ 15 μV	0,03 % of range	
± 999,9 mV	100 μV	≤ 150 μV	0,03 % of range	
± 11,000 V	1 mV	≤ 1,5 mV	0,03 % of range	
Current Measuring Instrument				
Range	Resolution	Zero Error	Tolerance	
± 30,000 mA	1 μV	≤ 5 μA	0,03 % of range	
Current Source				
Range	Resolution	Zero Error	Tolerance	
± 1,9999 mA	200 nA	≤ 500 nA	0,03 % of range	
± 22,000 mA	2 μV	≤ 2 μA	0,02 % of range	
Resistance Measuring Instrument				
Range	Resolution	Source	Accuracy	
0,00 Ω to 200,00 Ω	0,01 Ω	0,6 mA	< 0,04 Ω	
200,0 Ω to 2000,0 Ω	0,1 Ω	0,6 mA	< 0,4 Ω	
Resistance Simulator				
Range	Resolution	Zero Error	Tolerance	
10,00 Ω to 200,00 Ω	0,02 Ω	< 40 mΩ	0,05 % of range	
200,0 Ω to 2000,0 Ω	0,2 Ω	< 400 mΩ	0,05 % of range	
Temperature Measuring/Thermocouples/Thermocouples Simulator				
Model	Thermocouples	Accuracy		
		Simulating	Measuring	
R	PtRh 13-Pt	1,5 K	1,5 K	(+150 ... 953 °C)
S	PtRh 10-Pt	1,5 K	1,5 K	(+200 ... 1027 °C)
B	PtRh 30-PtRh 6	1,5 K	1,5 K	(+850 ... 1482 °C)
J	Fe-CuNi	0,9 K	1 K	(- 210 ... 1200 °C)
T	Cu-CuNi	0,9 K	1 K	(- 220 ... + 400 °C)
E	NiCr-CuNi	0,9 K	0,9 K	(- 240 ... 1000 °C)
K	NiCr-NiAl	0,7 K	0,7 K	(- 200 ... + 243 °C)
L	Fe-CuNi	0,5 K	0,5 K	(- 100 ... + 181 °C)
Accuracy without deviation. Accuracy is referred to definition of characteristic curve (Valid for RJ-Man 0 °C).				
Temperature Measuring/RTD-Simulator PT 100 DIN EN 60751, ITS90				
Range	Tolerance			
- 200 ... 266,3°C	Simulating: 0,3 K		Measuring: 0,08 K	
267 ... 849°C	Simulating: 3,5 K		Measuring: 0,8 K	

General information	<h2>6.2 Interference-suppression</h2> <p>The interference-suppression class B specified by the VDE (Association of German Electrical Engineers) standard 0871 is only adhered to in conjunction with the burster type 4495-V001 power supply unit.</p>
Preparation for use	<h2>6.3 Long-term stability</h2> <p>Long-term stability: &lt; 25 ppm/month</p>
Control elements	<h2>6.4 Influencing variables</h2> <p>Operating temperature range: 0 ... <u>23</u> ... 50 °C, 0 ... 70 % humidity non-condensing</p> <p>Storage temperature: 10 ... 60 °C</p> <p>Charging temperature: 10 ... <u>23</u> ... 35 °C</p>
Manual operation	<p>Auxiliary power: a. Ni-MH-accumulator, built-in b. 230 V AC + 6 %, -10 %, 50 - 60 Hz</p> <p>Operating time: 7 - 10 Std. (115 V on request)</p>
Maintenance and customer service	<h2>6.5 Housing</h2> <p>Aluminium housing, desk-type design, with plastic edges</p> <p>Dimensions [W x H x D]: 235 x 85 x 155 [mm]</p> <p>Weight: 2,5 kg</p>
Technical data	

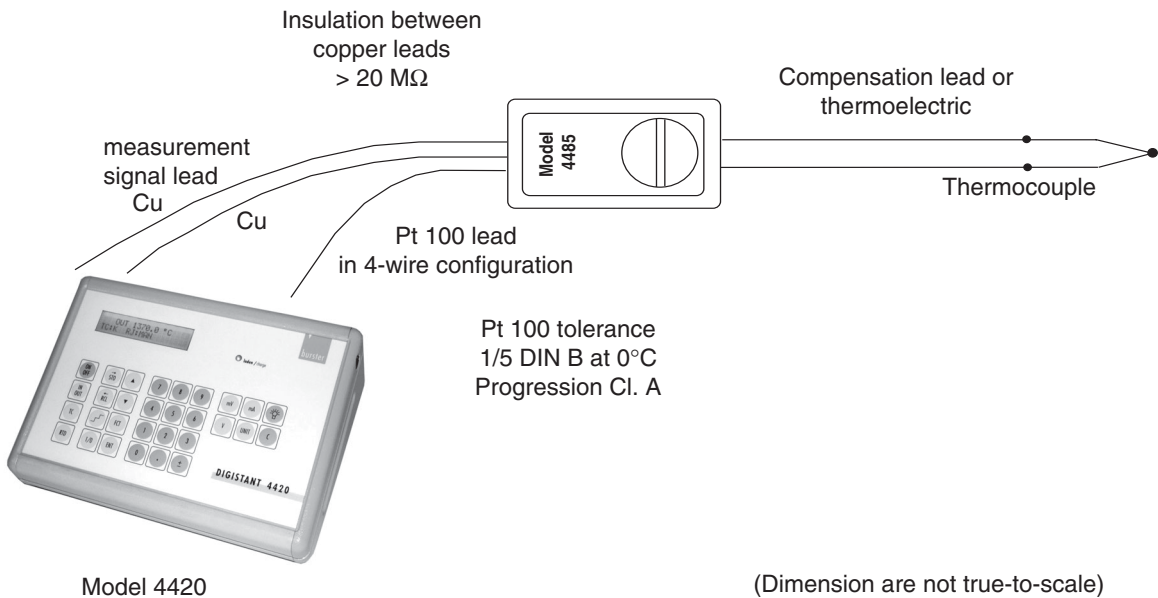


## 6.6 Accessories

### 6.6.1 Model 4485 external reference junction

**Application:** The model 4485 external reference junction was developed for precision measurement and simulation with thermocouples. It can be connected by means of thermoelectric wires or compensation leads having a diameter of less than 1.5 mm. The model 4485 external reference junction is connected to the type 4420 DIGISTANT®, routing the lead to plus and the black lead to minus. The third lead with the 6-pin plug is connected to a Pt 100 input.

**Description:** The reference junction consists of two pieces cut from the solid. It contains a copper terminal block whose temperature is registered with a Pt 100 sensor. The unit has been designed to provide an even distribution of temperature throughout the copper block. This makes it possible to compensate the existing thermoelectric voltages.



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