High Precision Calibration Source
For voltage, current and thermocouples
DIGISTANT®
Model 4462

Application
The precision calibration unit combines high accuracy, low drift, low noise and superior long-term stability with multiple functionality and simple operation. Ramps, Δ+/Δ-, and multiple setpoint storage make the operation of the device easier for the user. For that reason the application possibilities are many:

► Calibration of current and DC-voltage meters
► Precise testing of thermocouple temperature measuring instruments
► Calibration of controllers, sensors, detection devices and other devices used in process control
► Open-loop process control with the aid of integrated ramp function

DIGISTANT® model 4462 can be used both as a stand-alone table-top device, as well as in automatic, computer-assisted manufacturing and testing systems.

Description
It is possible to set current of ± 200 nA ... ± 52 mA, voltage of ± 1 µV ... ± 30 V and, optionally temperature setpoint value of 14 thermocouples types.

The output value is fed back via the sense line to eliminate voltage drops across the measuring leads.

The device has an adjustable current/voltage limitation. An external voltage divider of 1 up to 1:1000 can be considered internally.

With the thermovoltage sourcing option you can enter °C, °F and K, the temperature scales ITS 90 or IPTS 68 and the comparison point mode constant/external. Furthermore, when sourcing thermocouples a calibrated external comparison point can be used, whereby the data for calibration in the device can be taken into consideration.

Indication of the source value is carried out in large 12 mm figures on an illuminated graphics-LCD.

The device can be operated both via the keyboard as well as the interface.

- High precision current and voltage source
  ± 52 mA, ± 30 V
  Option: ± 22 mA, ± 60 V
- Precision simulation for all conventional thermocouple types (optional)
- Error limit 0.003 % Rdg.
- Standard with RS232 and IEEE488 interface, USB and Ethernet (optional)
- Current "SINK"

Code: 4462 EN
Delivery: upon request
Warranty: 24 months
**Source main menu**

- **External sense**
- **Manual range selection**
- **Current limitation**
- **Divider factor of the external divider. The voltage value is fed with the value which should appear on the output.**
- **Currently set delta value**
- **Source value**
- **Source value will be positive**
- **Source value will be negative**
- **0 are edited. The last source value remains stored**

**Ramp 1 Configuration menu**

**SEQUENZ: TRIANGEL**

**REPETITIONS:** 17

**START-VAL:** 0.0 mV

**END-VAL:** 250.0 mV

**DELTA-VAL:** 25.0 mV

**DELTA-TIME.hh:mm:ss.s**

**SOURCE:**

**MAN**

**T1:** 100.01

**GR:** 52 mA

**dx 101.346 mV**

**-123.456 mV**

**POL+ STBY POL-**

**A new delta value can be entered**

**Operating Examples**

**Ramp function:**
- Ramp 1 with constant delta values and delta time
- Ramp 2 with variable delta values and internal time.

The ramp function allows single or repeated outputs in sawtooth or triangular form. The number of steps can set from 0 to 99 (0 is continuous). The START, END and DELTA values can be entered in µV, mV, V, mA and temperature values. DELTA time is displayed as shown in the menu.

**Current/voltage limit:**
If a voltage or temperature value is given, the current limit is automatically active. If current is sourced the voltage limit is active. The voltage limit ranges from 1 V to 32 V and the current limit ranges from 1 mA to 55 mA.

**TC/Temperature menu**

**TC-TYPE:** K

**IPTS68**

**RJ-TYPE:** EXTERN

**RJ-TEMP:** 300.00 K

**TEMP.DIMENSION:** K

**SCALE:** IPTS68

**Pt100 scale (measurement with external RJ)**

<table>
<thead>
<tr>
<th>A =</th>
<th>0.0039083</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ro =</td>
<td>100</td>
</tr>
<tr>
<td>B =</td>
<td>-5.775E-07</td>
</tr>
<tr>
<td>C =</td>
<td>-4.183E-12</td>
</tr>
<tr>
<td>D =</td>
<td>0.0039083</td>
</tr>
<tr>
<td>0.003 &lt; - - &gt; 0.006</td>
<td></td>
</tr>
</tbody>
</table>

Optionally the thermocouples types R, S, B, J ,T, E, K, U, L, N, M, C, D and G2 can be simulated. For the “manual” reference junction at 0 °C the accuracy depends on the thermocouple model starting at 0.1 K.

The connection occurs directly at the standard terminals or "externally" via an external, attachable reference junction model 4485-V001, at which the temperature is detected with a Pt100 sensor (see application 1).
Technical Data

Voltage source

<table>
<thead>
<tr>
<th>Range (±)</th>
<th>Resolution</th>
<th>Error limits at 23 °C ± of reading</th>
<th>TC with resp. to 23 °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 V</td>
<td>0.1 mV</td>
<td>0.003 % (bis ± 4.5 V) + 200 µV (&gt; ± 4.5 V) + 1.1 µV</td>
<td>8 ppm/K + 10 µV/K</td>
</tr>
<tr>
<td>3 V</td>
<td>10 µV</td>
<td>0.003 % (bis ± 450 mV) + 20 µV (&gt; ± 450 mV) + 110 µV</td>
<td>8 ppm/K + 1 µV/K</td>
</tr>
<tr>
<td>300 mV</td>
<td>1 µV</td>
<td>0.003 % (bis ± 45 mV) + 3 µV (&gt; ± 45 mV) + 11 µ</td>
<td>8 ppm/K + 0.35 µV/K</td>
</tr>
</tbody>
</table>

Option: 60 V (Range 30 V will be dropped)

<table>
<thead>
<tr>
<th>Range (±)</th>
<th>Resolution</th>
<th>Error limits at 23 °C ± of reading</th>
<th>TC with resp. to 23 °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 V</td>
<td>0.2 mV</td>
<td>0.003 % (bis ± 9 V) + 500 µV (&gt; ± 9 V) + 2.2 µV</td>
<td>8 ppm/K + 10 µV/K</td>
</tr>
</tbody>
</table>

Output current: max. 52 mA at 30 V, source resistance < 10 mΩ (max. 22 mA at 60 V, model VXX1)

Current source

<table>
<thead>
<tr>
<th>Range (±)</th>
<th>Resolution</th>
<th>Error limits at 23 °C ± of reading</th>
<th>TC with resp. to 23 °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>52 mA (22 mA)</td>
<td>200 nA</td>
<td>0.007 % (bis ± 7.5 mV) + 0.6 µA (&gt; ± 7.5 mV) + 3 µA</td>
<td>10 ppm/K + 10 nA/K</td>
</tr>
</tbody>
</table>

Burden voltage: max 30 V at 52 mA, source resistance > 500 MΩ (max. 22 mA at 60 V, model VXX1)

Option: Thermocouple simulation

<table>
<thead>
<tr>
<th>Model</th>
<th>Range</th>
<th>Error (K)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>-50.0 °C … 1768 °C</td>
<td>0.4 (+ 250 ... 1768 °C)</td>
</tr>
<tr>
<td>S</td>
<td>-50.0 °C ... 1768 °C</td>
<td>0.4 (+ 350 ... 1768 °C)</td>
</tr>
<tr>
<td>B</td>
<td>0.0 °C ... 1820 °C</td>
<td>0.5 (+ 800 ... 1820 °C)</td>
</tr>
<tr>
<td>J</td>
<td>-210 °C … 1200 °C</td>
<td>0.2 (- 210 ... 900 °C)</td>
</tr>
<tr>
<td>T</td>
<td>-270 °C … 400 °C</td>
<td>0.2 (- 170 ... 400 °C)</td>
</tr>
<tr>
<td>E</td>
<td>-270 °C … 1000 °C</td>
<td>0.2 (- 220 ... 1000 °C)</td>
</tr>
<tr>
<td>K</td>
<td>-270 °C … 1372 °C</td>
<td>0.1 (- 50 ... 800 °C)</td>
</tr>
<tr>
<td>U</td>
<td>-200 °C … 600 °C</td>
<td>0.3 (- 100 ... 600 °C)</td>
</tr>
<tr>
<td>L</td>
<td>-200 °C … 900 °C</td>
<td>0.2 (- 100 ... 750 °C)</td>
</tr>
<tr>
<td>N</td>
<td>-270 °C … 1300 °C</td>
<td>0.2 (- 120 ... 1200 °C)</td>
</tr>
<tr>
<td>M</td>
<td>-50 °C … 1410 °C</td>
<td>0.1 (- 50 ... 900 °C)</td>
</tr>
<tr>
<td>C</td>
<td>0.0 °C … 2315 °C</td>
<td>0.2 (+ 100 ... 900 °C)</td>
</tr>
<tr>
<td>D</td>
<td>0.0 °C … 2315 °C</td>
<td>0.2 (300 ... 1100 °C)</td>
</tr>
<tr>
<td>G2</td>
<td>0.0 °C … 2315 °C</td>
<td>0.3 (300 ... 2100 °C)</td>
</tr>
</tbody>
</table>

*The errors are defined at manual reference junction 0 °C

Reference junction:
EXTERNAL: The temperature is measured with an external Pt100 sensor.
MANUAL: The reference junction temperature is entered manually.

Temperature recording in an external reference junction or temperature measurement with Pt100

<table>
<thead>
<tr>
<th>Range</th>
<th>Resolution</th>
<th>Current (mA)</th>
<th>Tolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td>-200 ... 850 °C</td>
<td>0.01 °C</td>
<td>approx. 0.6</td>
<td>0.00006 °C + 0.045 °C</td>
</tr>
</tbody>
</table>

General Technical Data

Long-term stability: U-Drift < 20 ppm / year + 2 µV / year (300 mV)
U-Drift < 20 ppm / year + 6 µV / year (3 V)
U-Drift < 20 µV / year + 10 µV / year (300 V)
I-Drift < 70 ppm / year + 0.5 µA / year

Warm-up time: 30 minutes, until specified error limit

External divider: 1 to 1010

An external voltage divider can be connected. In this case the divider function is activated and the division factor of the external divider is entered. Then the source value is entered as the value that should be present at the divider's output.

Display: graphics LCD display with LED illumination
Visual field: 56.3 mm x 38 mm, resolution 128 x 64 dots
Sockets: + output, - output, + sensor, - sensor, gold-plated 4 mm terminals and 6 pin LEMO socket 1B for the optional Model 1100 connection.

Potential to ground: ≤ 50 V between analog ground and ground
Temperature range: 5 °C ... 23 °C ... 40 °C

Technical changes reserved - Latest updates of data sheet always under www.burster.com
External reference junction model 4485-V001 for thermocouples
► For an accurate simulation of thermocouples
► A built-in Pt100 for cold junction compensation
► Thermally stable and isolated construction
► Plug type: Miniature TC connector

Technical Data
► Limits: ± 0.3 K
► Long term stability: typical 0.05 K/year
► Insulation resistance between pins in disconnected status: ≥ 20 MΩ
► Operating temperature range: 0 °C ... 23 °C ... 40 °C
► Storage temperature range: -10 °C ... 60 °C

Note: Thermo cable and connector cause an additional error. We recommend to use the class 1.

Application Example
1. Calibration of a PC card with a thermocouple measurement input
   Instead of the thermocouple the calibration source DIGISTANT® model 4462 is connected. Using an external DAkkS calibrated reference junction the PC card is retraceable calibrated with the optimum accuracy. Up to 14 thermocouples can be selected.

   ![Diagram of PC card with thermocouple measurement input](image1)

2. Calibration of measuring system in medicine engineering
   In the sweep function you set different current and voltage values with individual steps. The output happens once or repeatedly in triangular or sawtooth wave.

   ![Diagram of calibration setup](image2)

Synthesis processes in the production of medicine require a careful check. A highly secured production process is life saving.