

# ALMEMO® multi-point adjustment

## Usage

In case reference or correction values are available, the user can carry out the multi-point adjustment by himself. By means of the free software ALMEMO® CONTROL a correction table is converted to an interpolation table containing over 30 basic values and saved to the ALMEMO® plug. Using the function “consider correction value zero and gradient” the readouts of a pre-scaled sensor are corrected. This procedure requires an ALMEMO® device (e.g. ALMEMO® 2690-8) featuring the option “KL” (multi-point adjustment and special measuring ranges).



Sensor with multi-point adjustment

ALMEMO® plug with 4K EEPROM. Characteristic curve and sensor characteristics are saved to the plug



ALMEMO® 1030-2

The correction table programmed on the ALMEMO® plug can be saved as a file to the PC and additionally as an Excel table for archiving purposes. Of course, it is possible to load the correction table again from the archived file as well as from the ALMEMO® plug. Consequently, the user is able to access his multi-point adjustments at all times.

Hand units from series ALMEMO® 2450, 2470, 2490 as well as 2590 are already able to process ALMEMO® plugs with a programmed multi-point adjustment as standard. For sensors that have special linearizations saved on the ALMEMO® plug, a multi-point adjustment is not possible.

| Interpolation point | Setpoint | Actual value | SP  | IP  | M     |
|---------------------|----------|--------------|-----|-----|-------|
| Start of range      | -5.00    | -5.00        | 0   | 0   | 34614 |
| 1.                  | -3.50    | -3.58        | 150 | 142 | 30341 |
| 2.                  | -1.50    | -1.42        | 350 | 358 | 40289 |
| 3.                  | 0.00     | -0.20        | 500 | 480 | 27927 |
| 4.                  | 1.50     | 1.56         | 650 | 656 | 31508 |
| 5.                  | 3.50     | 3.64         | 850 | 864 | 36141 |
| End of range        | 5.00     | 5.00         |     |     |       |



Measuring instrument ALMEMO® 710 a precision measuring instrument with touchscreen

## Calibration

During the calibration of the ALMEMO® measuring technology, the sensor deviation is determined in every calibration point and saved as correction value to the ALMEMO® plug. The measured values for such multi-point adjusted sensors are then listed in the calibration certificate. Compared to the reference values, the identified sensor deviations are close to zero. Measurements within the calibrated interval can then be carried out with minor deviations. The measured value displayed on the ALMEMO® measuring instrument is the already corrected value and can be used directly. It is not necessary anymore to correct the displayed measured value on the basis of the calibration certificate.

We are an accredited calibration laboratory in terms of the parameters relative humidity, pressure, temperature, flow velocity and electrical quantities according to the standard DIN EN ISO/IEC 17025.



# ALMEMO® multi-point adjustment

## For precisely correcting measuring chains

- Increased options due to additional memory in the ALMEMO® plug
- Maximum flexibility with special linearization of non-linear sensors
- Maximum precision due to multi-point adjustment in the ALMEMO® plug

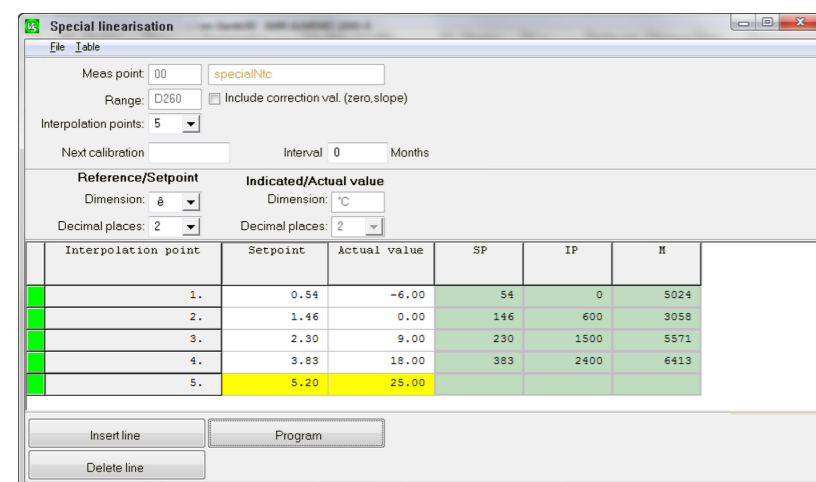


## 1. Individual sensor linearization

In addition to the sensor characteristics (e.g. range, dimension, scaling- and limit values, comments) it is now possible to save complete characteristic curves of a sensor in the ALMEMO® plug. This offers the great opportunity to connect also non-linear sensors to the ALMEMO® system whose linearizations (measuring ranges) are not saved to the device itself. Consequently, the variety of sensors compatible with ALMEMO® devices is immensely increased.

### Usage

The user is able to carry out the special linearization by himself. By means of the free software ALMEMO® CONTROL a linearization table is converted to an interpolation table containing over 30 basic values and saved onto the ALMEMO® plug. Using the function “consider correction value zero and gradient” the linearization with the already pre-scaled readouts is carried out for a pre-scaled measuring range. This procedure requires an ALMEMO® device (e.g. ALMEMO® 2690-8) featuring the option “KL” (multi-point adjustment and special measuring ranges).



Measuring instrument ALMEMO® 2690-8 with programming option KL



ALMEMO® 2470

The linearization table programmed on the ALMEMO® plug can be saved as a file to the PC and additionally as an Excel table for archiving purposes. Of course, it is possible to load the linearization table again from the archived file as well as from the ALMEMO® plug. Consequently, the user is able to access his special linearizations at all times. Hand units from series ALMEMO® 2470, 2490 as well as 2590 are already able to process ALMEMO® plugs with a programmed characteristic curve as standard. Individual linearizations are possible in all measuring ranges of the ALMEMO® measuring instruments.

**Upon request, pre-programmed plugs featuring several special linearizations are available as a factory-installed option. Please contact us for further detail.**

## 2. Maximum precision due to multi-point adjustment

Measurement deviations from a reference or a measurement standard, which were identified during the calibrating of the device, can be used to permanently correct a sensor or a measurement chain. In this case, we speak about adjustment.

To adjust a device, the readout of the measurement instrument (actual value) is as well as possible leveled to the reference value (setpoint) to obtain a correct readout. Measurement deviations concerning several measuring points are saved to the ALMEMO® plug as fine adjustment. In this way it is possible to significantly increase the measurement accuracy of e.g. inexpensive standard sensors.

### Two-point adjustment

#### Sample table Two-point adjustment at 0°C and 100°C

(using the parameters ZPC = zero-point correction / SC = slope correction)  
example given: ZPC = -0,20 / SC = 1.0010

| Measuring range PT100 204 (-200.00°C to 400.00 °C) |          |              |  |
|--|----------|--------------|--|
| basic value  | setpoint | actual value | corrected value (= readout on test device) |
| 1. Start of meas. range                            | -200     | -200         |  |
| 2.   | -20      | -20.25       | -20.07                                     |
| 3.   | 0.00     | -0.20        | 0.00                                       |
| 4.   | 50.00    | 49.80        | 50.05                                      |
| 5.   | 100.00   | 99.75        | 100.00                                     |
| 6.   | 150.00   | 149.60       | 149.95                                     |
| 7. End of meas. range                              | 400.00   | 400.00       |  |

Two-point adjustment

Readout values concerning zero point and slope are corrected.

### Multi-point adjustment

#### Sample table multi-point adjustment at all five meas. points

| Measuring range PT100 204 (-200.00°C to 400.00 °C) |          |              |  |
|--|----------|--------------|--|
| basic value  | setpoint | actual value | corrected value (= readout on test device) |
| 1. Start of meas. range                            | -200     | -200         |  |
| 2.   | -20      | -20.25       | -20.00                                     |
| 3.   | 0.00     | -0.20        | 0.00                                       |
| 4.   | 50.00    | 49.80        | 50.00                                      |
| 5.   | 100.00   | 99.75        | 100.00                                     |
| 6.   | 150.00   | 149.65       | 150.00                                     |
| 7. End of meas. range                              | 400.00   | 400.00       |  |

Multi-point adjustment allows to exactly correct the readout values to the reference values.

- By default, a linear interpolation between the endpoints of the adjusted range and the device-specific upper and lower measuring range limits is carried out.
- Optionally it is possible to disable any measurement outside the adjusted range (i.e. no incorrect measurements outside the adjusted range). The device will only signalize whether the result is exceeding or falling below the measurement range.