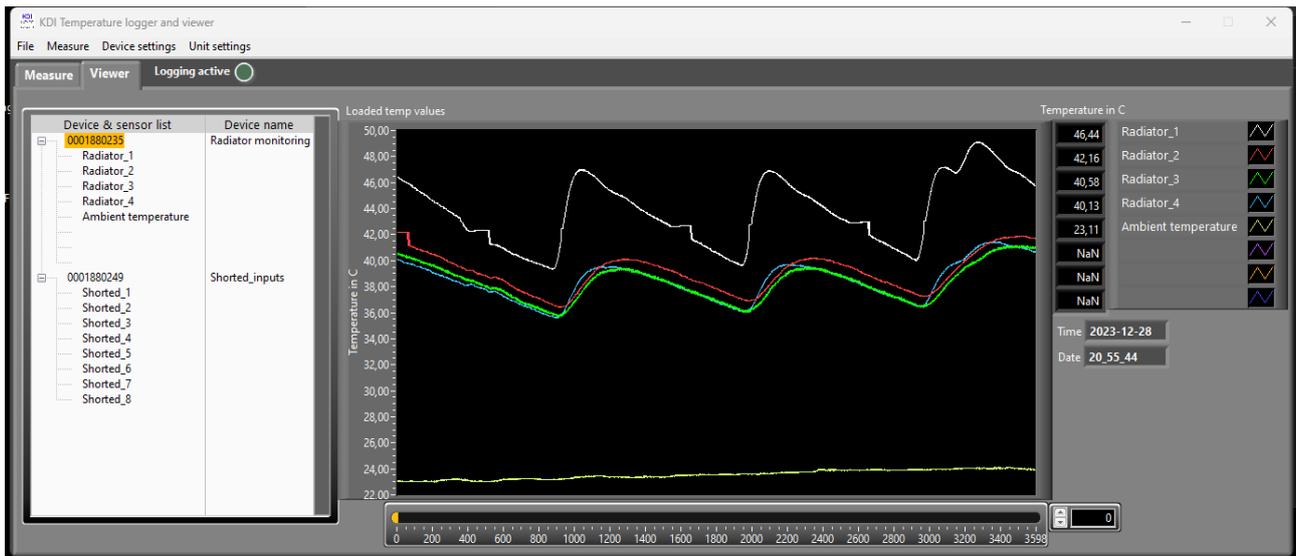


Eight channel K-Type temperature logger ready to run software by KDI Kunze Digital Instrumentation



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PURPOSE AND SCOPE

Description of eight channel K-Type temperature measurement device and software to measure, log and view temperatures.

The document describes scalability of device and software.

LICENSE CONSTRAINTS

Copyright of device and software belongs to KDI Kunze Digital Instrumentation. Software is within scope of supply and can be used on different PCs without additional license fee. Hardware copyright 2023..

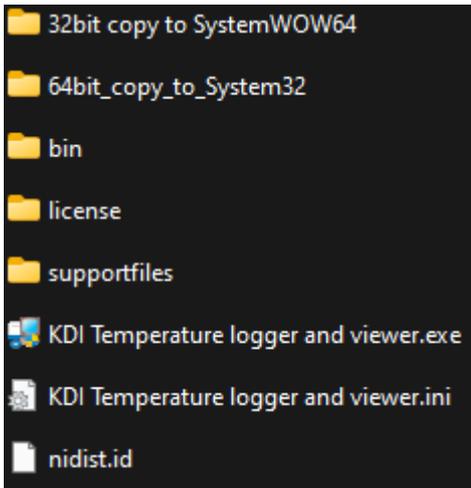
FEATURES

- Eight K-Type (NiCrNi) channels per device
- Measurement range -200°C to 1200°C or -328°F to 2192°F
- Accuracy $\pm 0,25^{\circ}\text{C}$ over temperature range
- Sensitivity 16bit for K-Type temperature and cold junction temperature measurement
- Update rate per device 0,5s for eight channels
- Up to 128 devices total can be handled by software
- Data will be logged in ,csv files with timestamp for each measurement
- Each measurement file contains 3600 measurements
- Measurement line contains all cold junction and k-Type temperatures of all devices
- Load and view of measurement files while logging is possible
- Device calibration can be performed by user
- Two years warranty
- Scope of applications: test bench, laboratories, engine test bench, temperature control, electronic load tests, total power dissipation tests

SOFTWARE INSTALLATION

The software package includes installer named: KDI Temperature logger and viewer.exe

This file must be started in order to install software. Furthermore two DLLs must be copied to SystemWOW64 and System32 folder. Therefore you need administration rights on your computer. Start Windows Explorer with administrator rights.

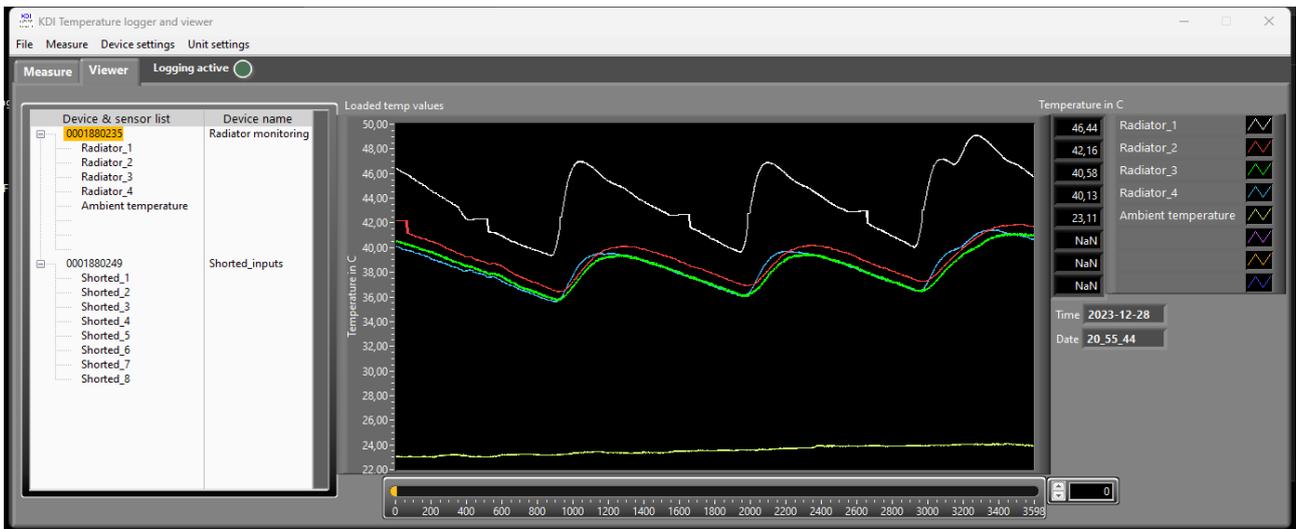


Copy content of folder **32bit copy to SystemWOW64** to C:\Windows\SystemWOW64
 Copy content of folder **64bit copy to System32** to C:\Windows\System32

Start installer **KDI temperature logger and installer.exe** and follow instructions.

Once software has been installed front panel appears.

Front panel is separated into five functional sections.



Menu bar, device tree, measurement value display of the cold junction temperature, measured temperature, temperature chart and register tab for measure and viewer.

Tree view shows that two of the **eight channel K-Type temperature logger devices** have been connected to the USB-Bus. Each device has a unique serial number. Software allows to specify a device name and up to eight sensor names per device.

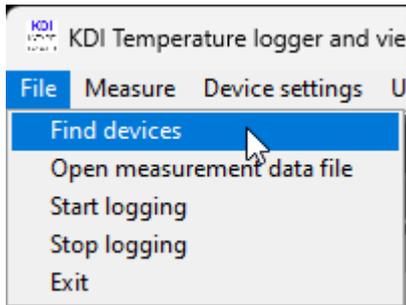
In the tree two devices are connected. The first one is named Wing_BB and the 2'nd device is named Wing_STB. Sensor names are defined and displayed under the device's serial number.

SOFTWARE USAGE

MENU BAR

The menu bar displays Files, Measurement, Device settings and Unit settings.

File:

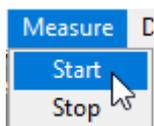


Find devices allows you seek for connected devices

- **Open measurement data file**
 - allows you to display a log file in the viewer tab
- **Start logging**
 - open a file name menu
- **Stop logging**
 - close the actual log file
- **Exit**
 - close and terminate the program

Due to access right restrictions the measurement path is restricted to your document folder. In this folder you'll find a directory called: K-Type_thermocouple. Within this folder a directory called: **Measurements**. This is the location for all log files you may create.

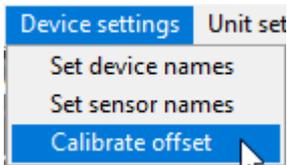
Measure:



- **Start**
 - will start the measurement
 - Measurement can be started with and without activated logging
 - To display the values of a connected device you must select the device in the tree by clicking on the serial or one of the sensors

- **Stop**
 - stop process

Device settings:



- **Set device names** to change the name of the device. This will open a dialogue window.



On the left hand side you see the serials of connected devices and on the right side the device names. You can change the names but it's limited to 30 characters.

- **Set sensor names** to specify sensor names for each connected device



In the upper region is a selector that displays the current serial number and the device name. Click selector to see the list of devices and select the one you want to change sensor names.

Table content under the selector may change regarding to previously set sensor names. Sensor names are limited to 30 characters. You can edit the names and click **Apply** once you are ready or cancel to leave without changes.

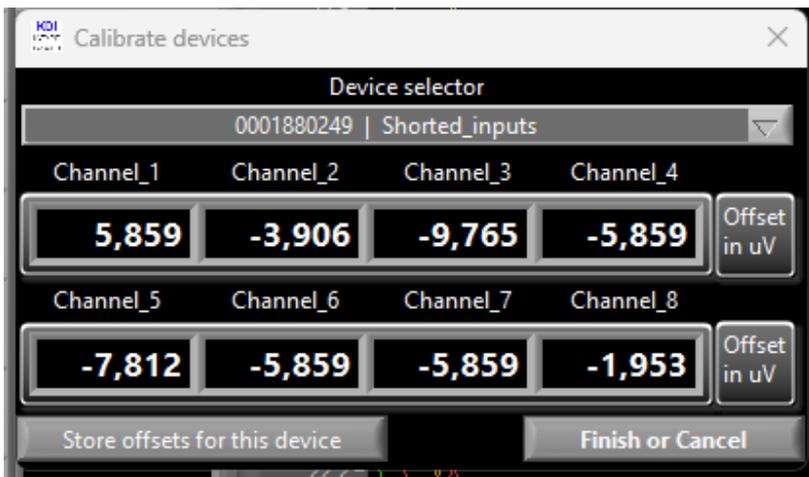
Please keep in mind that all sensor names can be changed for all devices before you click **Apply**. In other words: It is not necessary to apply each sensor name change per device.

- **Calibrate offset** to open a dialogue to correct the temperatures according to the corresponding channel offset. Offsets are displayed in uV. Offset calibration enhances accuracy.

Two calibration methods are available:

1) In case you have eight shorted plugs you can calibrate all channels at the same time. Short all channels to measure the offset. Once you are ready and all offsets are stable press the **Store offsets for this device** button. Now you can select another connected device using the **Device selector**. Then repeat the previously described procedure with the next device.

Values displayed as NaN represent not shorted input terminals.

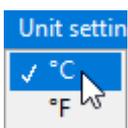


2) Perform calibration by using one shorted plug.

Calibrate a channel of your choice by plugging a shorted plug in the connector. Measured voltage is the device offset. Once the value is stable press **Store offsets for this device**. Then proceed with other channels or devices. Using this procedure will not lead to an overwrite of already stored calibration values.

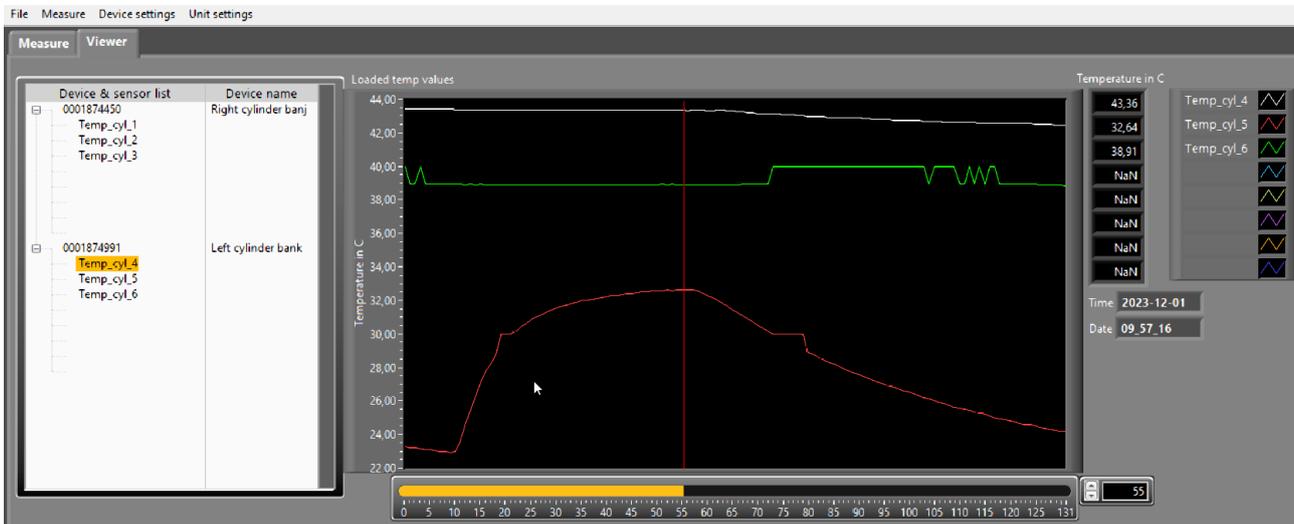
Finish or cancel will close the calibration window.

Unit settings:



You can select whether the chart and values are presented in metric or imperial units. Once you have changed the unit, the chart will be deleted and starts again. This has no effect on data logging. The Log file content will always be in metric units.

VIEWER TAB



Viewer tab shows the device tree according to the information from the log file. On the right hand side of the tree shows the log file chart. The chart displays the entire log file. The right hand side of the chart displays values and the sensor legend. Underneath measurement the timestamp will be displayed. As described before the chart displays the selected device content.

Underneath the chart is a slider. You can click and hold the left mouse button to drag the slider. While doing so a red cursor line is displayed in the chart. The values and timestamp content change according to the slider position. For fine adjustments you can click in the value field of the slider and change the value with the up and down cursor keys on your keyboard or use the arrows on the left of the value display by clicking on it with the mouse.

On the left side of the chart is the y-axis. Y-axis can be changed from auto scaling to manual scaling by deactivation autoscaling. To perform this you should hover over the y-axis and click the right mouse button. A menu will pop up and you can do the adjustment there.

MEASUREMENT FILE FORMAT

All measurements are stored in a .csv table. The values in the .csv table are separated by tabulators.

The first row contains the serial numbers and names of the device. In the next row you'll see the sensor names. Under each line the measurement entries are located. Starting with date, time, cold junction temperature, temperature for all channels.

		1874991 Left cylinder bank															
Date	Time	Cold junction	Temp_cyl_4	Cold junction	Temp_cyl_5	Cold junction	Temp_cyl_6	Cold junction		Cold junction		Cold junction		Cold junction			
2023-11-30	09_18_28	18,59	48,61	18,56	50,88	18,66	20	18,56	NaN	18,56	NaN	18,53	NaN	18,53	NaN	18,44	NaN

The example above shows the first lines of the measurement file.

Date format is: YYYY-MM-DD

Time format is: hh_mm_ss

Temperatures are stored in °C

Temperature values with NaN (Not a Number) describe not connected or defective sensors.

The cold junction temperature is always followed by the corresponding temperature.

HARDWARE



Hardware will be delivered with a mini-USB cable. The device is a PnP device and will be powered by the USB-interface.

All K-Type connectors can be green or orange depending on the country. Both versions are usable.

The hardware is trimmed to extreme low emissions and protected against ESD (8KV HBM).

Measurement failure can happen if the device is too far away from the DUT (Device Under Test). Especially if the environment temperature of the device location is different from the environment temperature where the DUT is located. In this case cold junction temperature can be wrong. Therefore the measurement result will be wrong too.

Update rate is 0,5s per device. With four devices the update rate will be 2s.

Usually devices should be connected to the PC prior starting the program

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