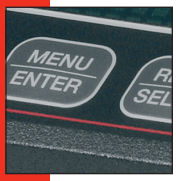
AMETEK®
SENSORS, TEST & CALIBRATION

# User manual

# CON050

## for Jofra DTI050 Handheld Thermometer, CTC series and RTC/PTC Calibrator series





# User Manual

# CON050

## for JOFRA DTI050 Handheld Thermometer, CTC series and RTC/PTC Calibrator series.

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# 1. INTRODUCTION

This manual contains installation and operating instructions for:

JOFRA windows probe configuration software

**CON050**

The program was developed by:

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## 1.1 General information

The CON050 program is designed to configure the JOFRA DTI050 handheld thermometer (RS–232 communications port), the RTC/PTC (USB & Ethernet) and the new CTC calibrators (USB port) with a range of AMETEK smart sensors.

The software is included in the JOFRACAL installation USB memory stick with update downloads available from the AMETEK home page.

Knowledge of the JOFRA equipment and system to be tested is essential in order to obtain the maximum benefit from this program. Knowledge of Windows® programs in general is an advantage.

- **Warranty**
  Use of the product remains the full responsibility of the user, and AMETEK Denmark A/S offers no warranty and is under no obligation in relation to this product. In addition, AMETEK Denmark A/S cannot be held responsible for any damage, which may occur in connection with the use of this product, including loss of earnings, loss of profit, loss of data or recovery of lost data, loss of goodwill and other similar incidental or consequential damage or loss.

- **Technical assistance**
  Please contact the distributor if you require technical assistance.

## 1.2 Hardware requirements

CON050 has the following requirements

### 1.2.1 PCs, minimum hardware requirements:

- Intel® Pentium® II 1.4 GHz processor.
- 128MB RAM (256MB recommended)
- 80MB free disk space on hard disk (120MB recommended) prior to installation
- Standard VGA (800x600, 256 colours). 1024x768 recommended.
- USB input device for installation of program
- Communication
  - RTC/PTC - 1 free USB or Ethernet connection.
  - CTC series - 1 free USB.
  - DTI050 - 1 free RS-232 serial port.

### 1.2.2 PCs, minimum software requirements:

- Microsoft Windows® XP(32bit), Vista(32bit), 7(32bit&64bit), 8 &10.
- System fonts: MS Sans Serif and Arial.

## 1.3 Installing CON050

Simply insert the Ametek JOFRACAL installation USB memory stick

1. Select the Software menu.

2. Select either the CON050 32 or 64bit version (depending on the computers processor) in the menu. Simply follow the installation instructions on screen.


Future upgrades available for download on www.jofra.com.

☞ By default, CON050 is installed in the directory:
***Default program folder***\CON050 (32bit)
***Root:****Ametek\CON050 (64bit)*
An icon will automatically appear on the Program's menu.
Be sure to select the correct OS version 32 or 64 bit.

### 1.3.1 DotNet Famework.

The CON050 software requires Microsoft .NET FRAMEWORK SP1 which is installed if not already found on the PC.

### 1.3.2 RTC/PTC and CTC series USB drivers

The RTC/PTC and CTC series calibrators required a driver to communicate with CON050. This driver is installed automatically during the installation of CON050

If you want to install the program manually, the USB also contains a CON050SETUP.EXE file.

☞ Note: when installing you may require Administrator's privileges. If not please contact your local System Administrator.

## 1.4 Reinstalling CON050

If you wish to reinstall, please use the Add/Remove programs option in the control panel of your PC, then reinstall. Your personal files will be maintained.

When upgrading the installation it is preferred that you uninstall the existing version prior to installing the new.

## 1.5 Connecting CON050 to a JOFRA device

CON050 can be connected to a JOFRA RTC/PTC or CTC calibrator using a USB cable or Ethernet using TCPIP protocol. A JOFRA DTI050 using a serial connection (RS232).

The device should be connected to a free USB or RS232 serial port on the PC - please refer to the PC manual for further information regarding the location and appearance of serial ports. Use the serial cable supplied with the device.

**IMPORTANT!**

- The JOFRA device must be switched off when connecting the cable from the PC.
- The JOFRA device and the PC must be earthed to avoid noise interference and damage to the equipment.
- You are advised not to switch the calibrator on until CON050 has been started.

## 1.6 Starting the CON050 program

### 1.6.1 WindowsXP/Vista/7/10®

- Click *Start*.
- Select *Programs*.
- Select *CON050*.
- Select *CON050 configuration*

## 1.7 Uninstalling CON050

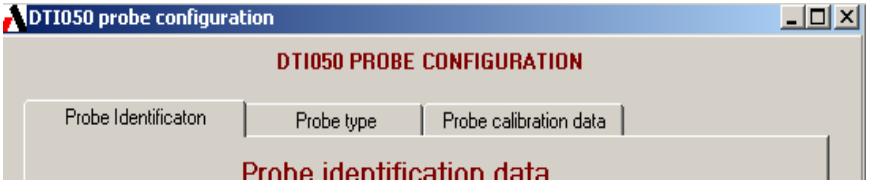
CON050 is removed from the PC as follows:

- Open Control Panel
- Open Add/Remove Programs
- Select CON050
- Press Add/Remove button and follow instructions on screens

All personal files (probe definition files) will be retained in the CON050 folder during the uninstall process. These can be used for subsequent installations of CON050.

## 1.8 Program structure for CON050

Like other Windows® programs, CON050 uses buttons, dialog boxes, lists etc. CON050 uses paging controls to navigate through the main areas of the program.




After initial Probe data is divided into 3 areas:

- Probe identification data (Probe identification data)
- Probe identification data (Probe type data)
- Probe calibration data (Probe calibration data)

All of which are displayed in their own page.

## 1.9 Probe configuration data files

Under installation a number of Probe configuration template files are placed in the CON050 folder, containing all the default values for each of the know Ametek probe types. These can be loaded into CON050, edited and then saved again under the particular probes' serial number.

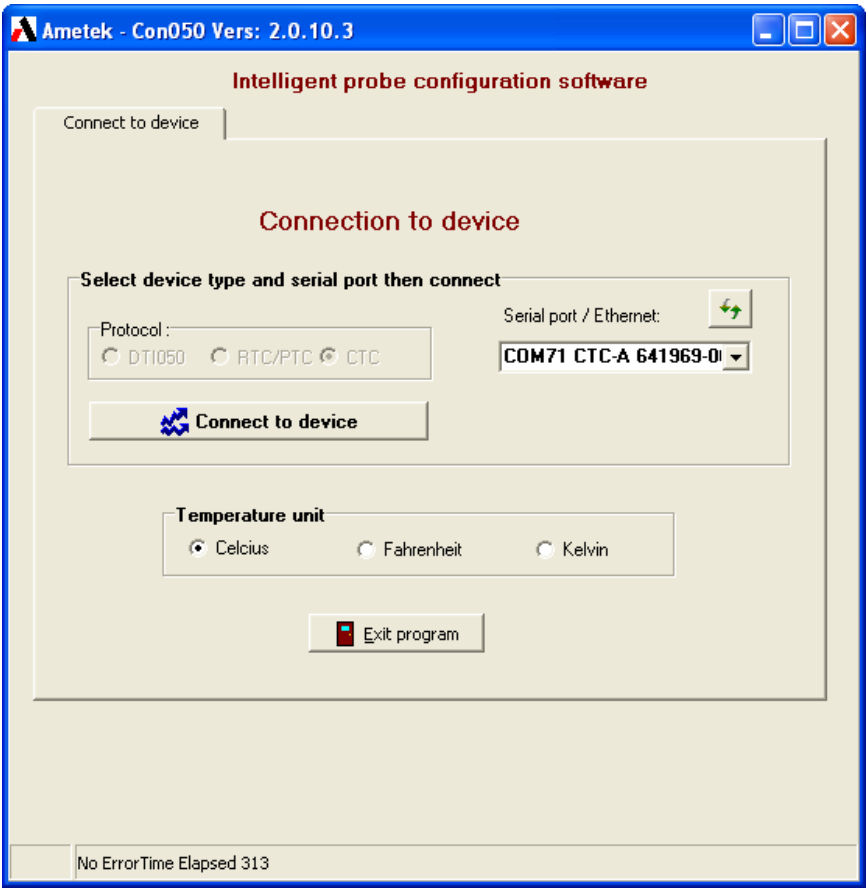
- DLC-ZERO
- DLC-155
- DLC-158
- DLC-159
- DLC-187
- DLC-250
- DLC-700
- STS-050 A 250
- STS-050 A 350
- STS-050 A 500
- STS-050 B 901

- STS-050 B 250
- STS-050 B 350
- STS-050 B 500
- STS-100 A 901
- STS-100 A 250
- STS-100 A 350
- STS-100 A 500
- STS-100 B 901
- STS-100 B 250
- STS-100 B 350
- STS-100 B 500
- STS-102 A 030
- STS-102 B 030
- STS-103 B 150
- STS-120 A 915
- STS-120 A 935
- STS-120 A 966
- STS-120 A 967
- STS-150 A 915
- STS-150 A 935
- STS-150 A 966
- STS-150 A 912
- STS-200 B 902
- STS-200 A 915
- STS-200 B 915
- STS-200 A 916
- STS-200 B 916
- STS-200 A 925
- STS-200 B 925
- STS-200 A 917
- STS-200 B 917

- STS-200 B 970
- STS-200 A 970
- STS-200 A 918
- STS-200 B 918
- STS-TC-N-A-1205

## 2. PROGRAM START UP

**Program menu – connecting to the device**




Select the device (DTI050, RTC/PTC or CTC series) then the serial port number. The serial port list contains the Ethernet (TCPIP) option plus the available ports on the PC.

## 2.1 Temperature unit

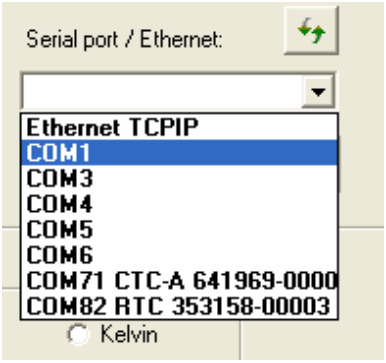
The preferred temperature unit can only be selected prior to opening communications.

**Select temperature unit**


## 2.2 Connecting to the JOFRA device

On start up the user must connect to the JOFRA device before probe configuration can begin.

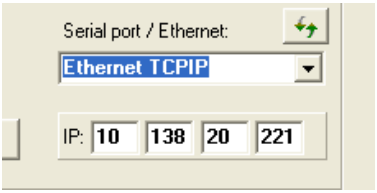
**Selecting serial port and connect**




To open communications simply select the Ethernet protocol (RTC only) or the serial port connecting the JOFRA device and click the “Connect to device.


## 2.3 TCP/IP protocol (RTC only)

If the Ethernet option is selected the IP address interface appears and the user can enter the IP address allocated to the connected RTC.




☞ Note. Please refer to the **RTC user manual** regarding setting the IP address on the calibrator.

 **Reload available comports list.**

If an RTC/PTC is connected and turned on but does not appear in the list, then select the refresh  button. This may be the case if you switched on the RTC/PTC after starting the program.

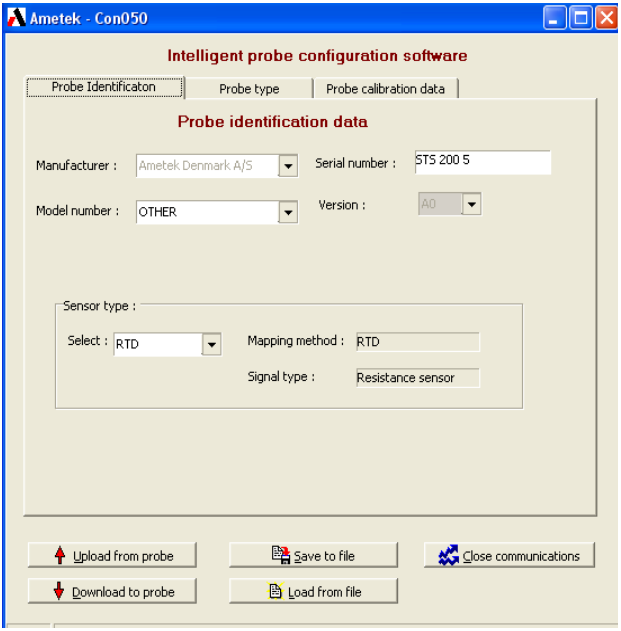
### 2.3.1 No connection to JOFRA device

If connection to the JOFRA device was unsuccessful the following message appears. Check that the device is on and the USB/RS232 cable is correctly connected.


**Communication error**

### 2.3.2 Successful connection to JOFRA device

When connected to the JOFRA device, CON050 displays the Probe configuration pages and the functionality to down/Upload and saving configuration data to files.




**CON050 after successful connection to JOFRA device**

## 2.4 Upload/download functions

Several buttons appear at the bottom when communications are open allowing the user to store probe data in files and to send/retrieve data from the JOFRA device itself.

**The buttons have the following functions:**


Upload probe data to device

Uploads the current probes data from the device into CON050.


Download probe data to device

Download the probes data from CON050 to the device.


Save probe data to file

Save the current probe definition data to a file.


Retrieve probe data from file

Load probe definition data from a file.

☞ **Note!** Probe definition data files are saved under their serial number in the same folder as CON050.EXE

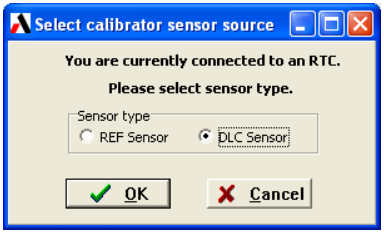

Close communications

Close down communications and return to start up screen.

**Note! Up/Downloading probe data to device with RTC/PTC.**
The RTC/PTC series have both Reference sensor and a Differential Load compensation (DLC) sensor and the actual sensor involved in the upload/download must be determined.

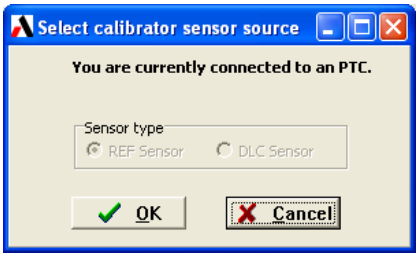
**RTC Calibrator.**

If working with an RTC you need to select the type of sensor.



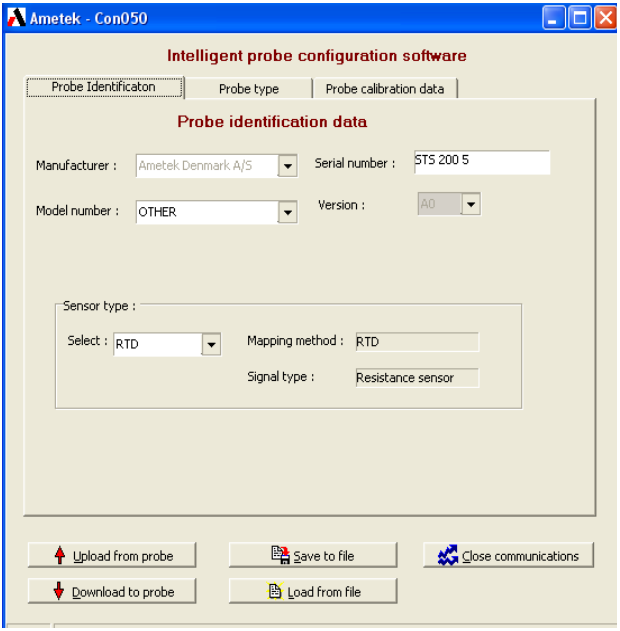

**PTC & CTC series Calibrator.**

The PTC series however only has the Reference sensor so the user simply selects the OK button.



# 3. PROBE IDENTIFICATION DATA

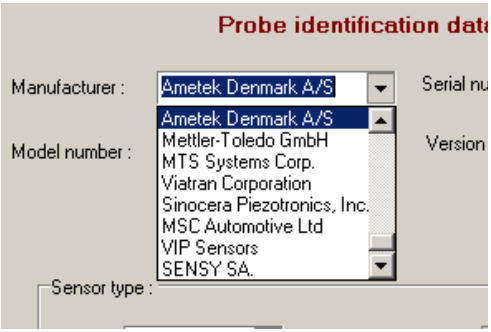
**Probe identification data page:**




The probe identification page contains a description of the probes type, model and maker.

### 3.1.1 Manufacturer

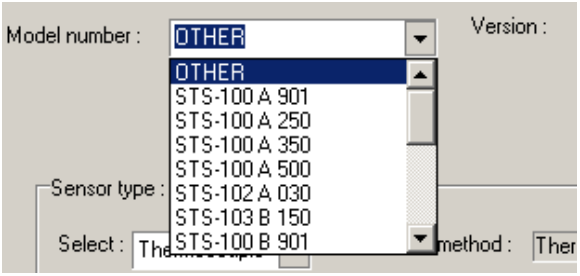
Select the probe manufacturer from the drop down list of recognised companies.




### 3.1.2 Model number

The sensor model number must be selected from the following drop down list.

**Sensor model number selection**

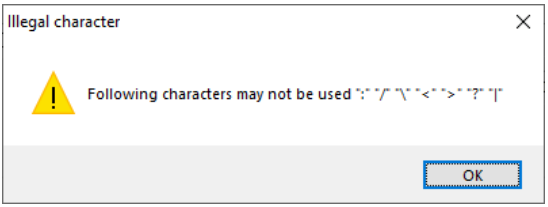


### 3.1.3 Sensor serial number

The serial number which identifies the  must be entered in this field.

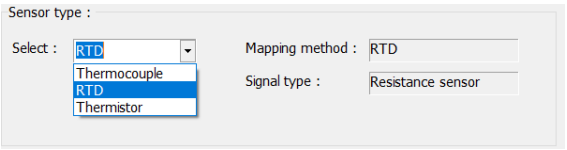

When saving the Probe data to a file, the serial number is used as the file name therefore certain characters are not permitted within the serial number itself.

Should the user key an illegal character the following warning is displayed.




### 3.1.4 Sensor type

There are 3 basic sensor types which are selected from the below drop down list.

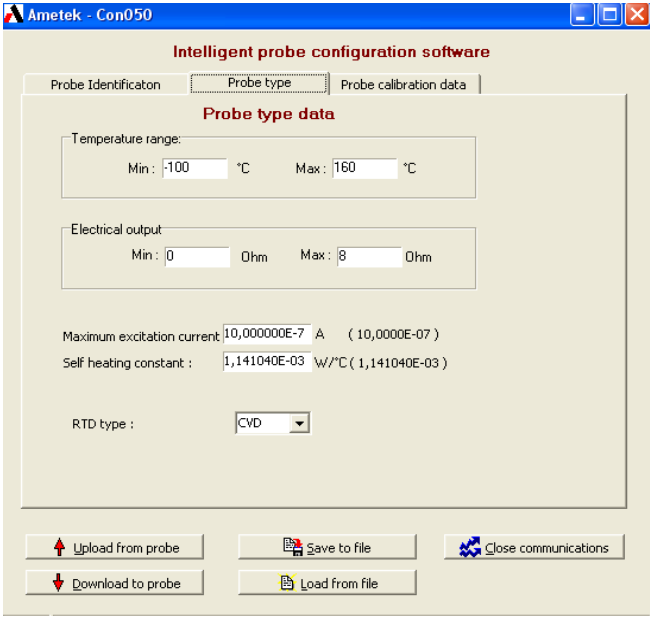



**Select the sensor type**

## 4. PROBE TYPE DATA

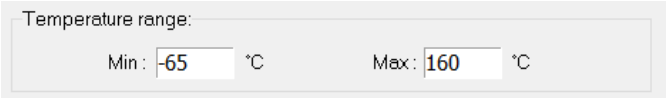
In the type data page the user can further define the characteristics of the probes properties. The displayed data depends upon the type of sensor defined in the Identification page (***Rtd, Thermocouple or Thermistor***).

**Probe type data page**

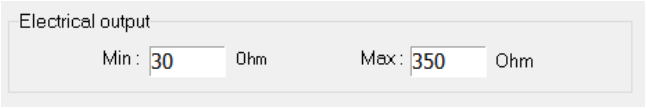


## 4.1 Temperature range

The valid range for the temperature parameters are between –273 and 1770 Celsius.




## 4.2 Electrical output




Valid ranges for the electrical output parameters are as follows :

***Thermocouple: Volts***

min = -25E-3
max=0.1

***Rtd: Ohms***

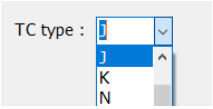
min = 0 to 2050
max:= 0 to 8200

***Thermistor: Ohms***

min:=0;
max:=524000;

## 4.3 Selection of the TC type ( TC type only )

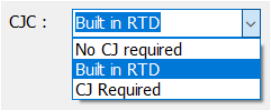
Select the type of thermocouple from the list of standard TC sensor types.




**Thermocouple type list**

## 4.4 CJ compensation ( TC type only )

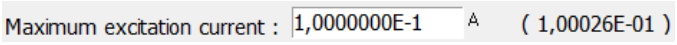
Determines if the probe has automatic CJ compensation or otherwise.




No CJ Req. - Compensation made by Calibrator.
Built in RTD - Probe with built in RTD/coefficients.
CJ Required - Compensation required by operator.

## 4.5 Maximum excitation current (RTD & THERMISTOR only)

Select the type of thermocouple from the list of standard TC sensor types.

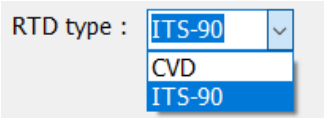



## 4.6 Self heating constant (RTD & THERMISTOR only)

Select the type of thermocouple from the list of standard TC sensor types.

## 4.7 Rtd coefficients ( Rtd only )

Select the type of coefficients stored in the probe. The user can choose between Callendar Van Dusen and ITS-90.

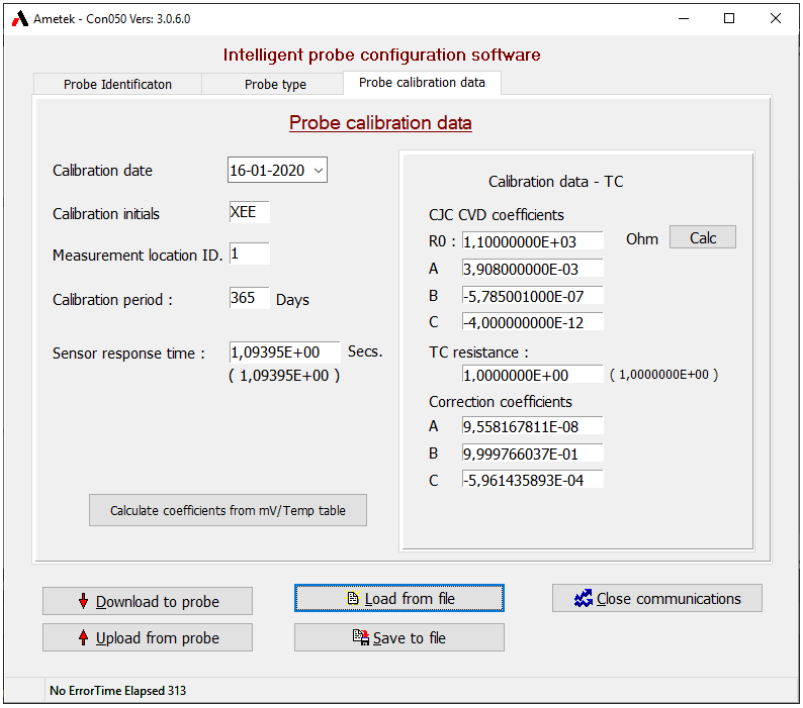


## 5. PROBE CALIBRATION DATA

In the calibration data page the user define the probe calibration related information.

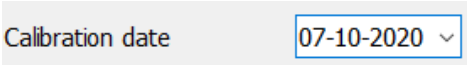
The displayed data depends upon the type of sensor defined in the Identification page (***Rtd, Thermocouple or Thermistor***).

**Probe type data page**



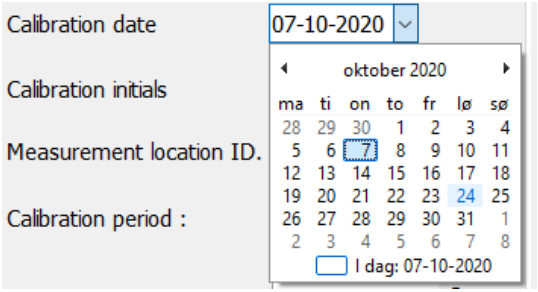
## 5.1 Calibration details

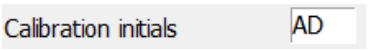
Set probe calibration date.




**Calibration date**

Click on the down arrow and an electronic calendar will assist in the date selection.

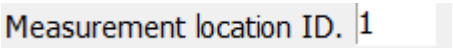


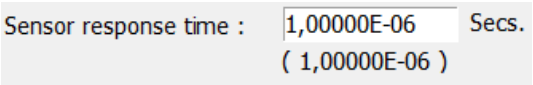

**Initials of operator**


**Calibration period**

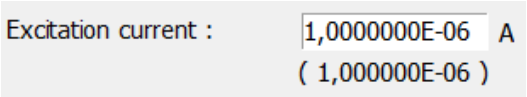
## 5.2 Measurement location ID



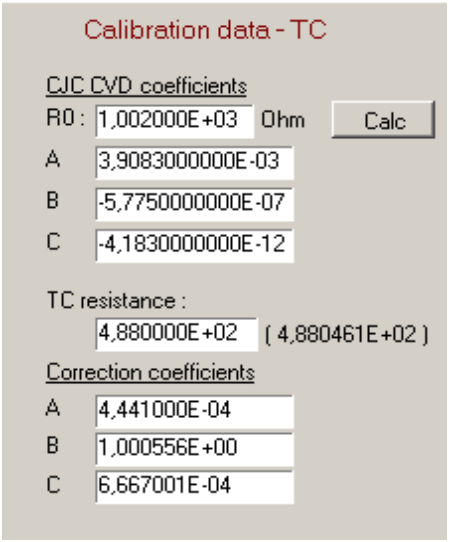

## 5.3 Probe response time




## 5.4 Probe excitation ( RTD & Thermistor only )



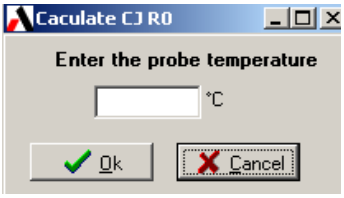
## 5.5 Thermocouple coefficients




**Calendar van dusen**

The Calc button 

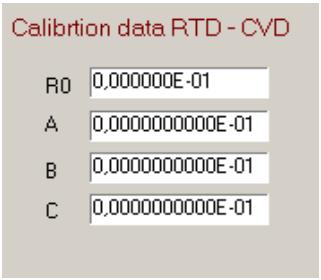
is used to calculate the CJ R0 value. The user will be prompted to key in the current temperature reading of the probe



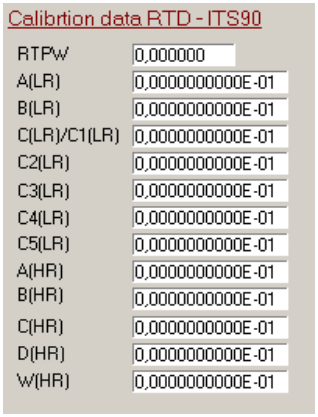

Enter the reading on the device then click OK.

## 5.6 RTD coefficients

There are two possible coefficient standard available, Calendar van dusen and ITS-90



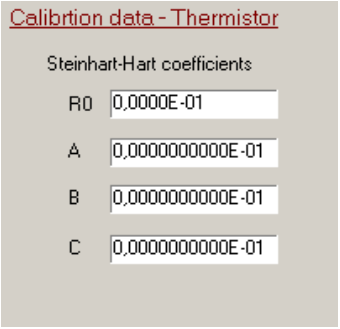

**Calendar van dusen**




**ITS-90**

## 5.7 Thermistor coefficients

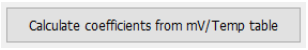
For thermistor type sensor Steinhart-Hart coefficients are used.




**Steinhart-Hart**

## 5.8 Coefficients calculation

Con050 software can be used to calculate coefficients based on table of Ohm/Temp (RTD) or mV/Temp (Thermocouple) values depending on the type of sensor.

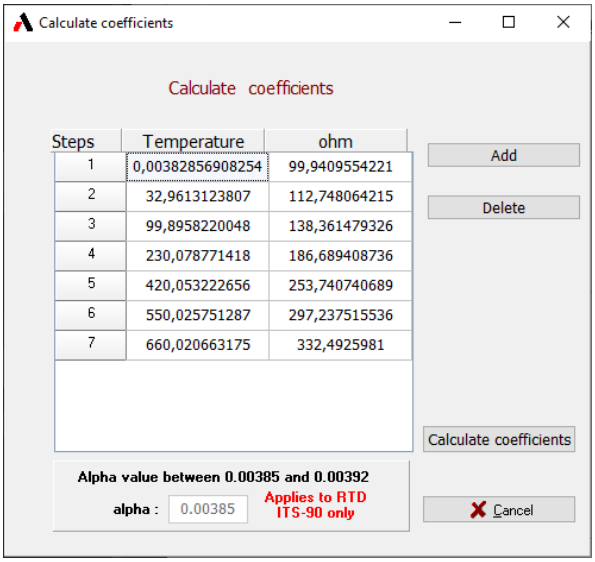
Select the calculation button 

to display the temperature table and enter the values used for the Coefficients calculation.

### 5.8.1 RTD sensors.

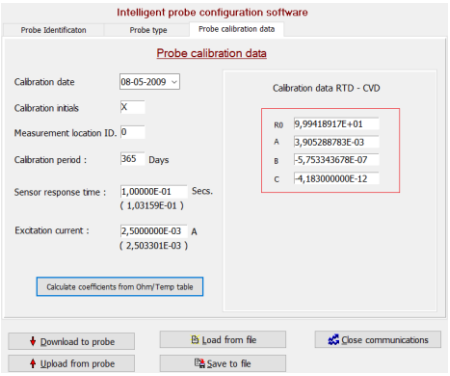
For Resistance type sensor it is possible to calculate both Callendar-Van Dusen (IEC-751) and ITS-90 coefficients.

Temperature/ohm values are entered into the displayed table with a maximum of 10 rows. Use the Add & Delete buttons to regulate the number of rows.

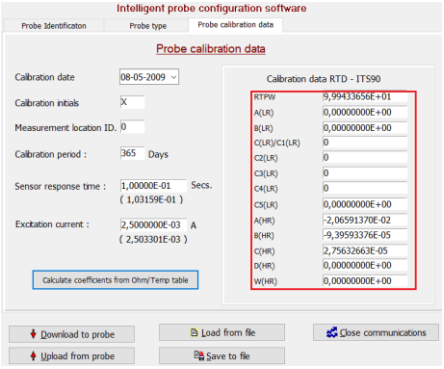



Note! Alpha value field is inactive and only applicable to ITS-90

When all values are entered select the Calculate coefficients to calculate the coefficients. The program returns to the main screen displaying the new coefficients.




Results – Cvd



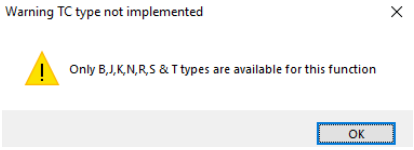

Results – ITS-90

Saving to the probe file will also preserve the Temp/Ohm values and are available next time the probe is loaded again.

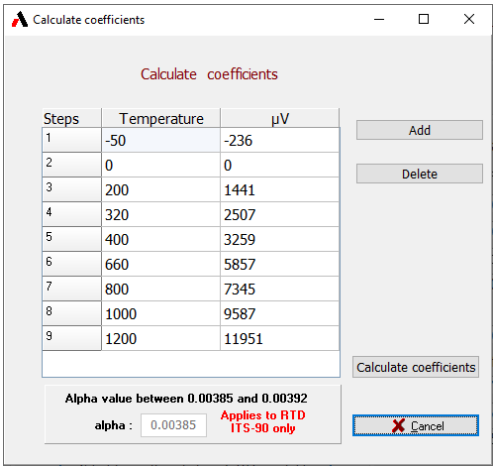
### 5.8.2 Thermocouple sensors.

It is also possible to calculate coefficients for certain Thermocouple types by entering the temperature / microvolt (µV) values in the table.

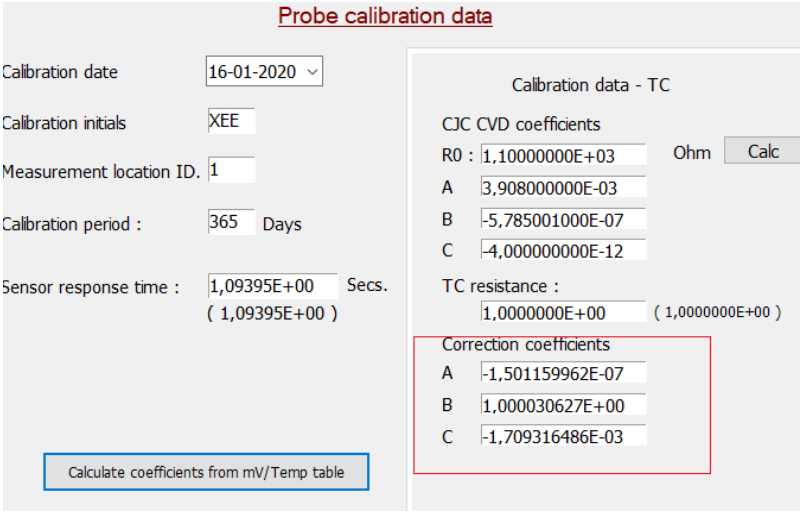
Not all Thermocouple type are implemented. Con050 will display a warning should a user try to calculate coefficients for a type not yet implemented.




Temperature/ microvolt values are entered into the displayed table with a maximum of 10 rows. Use the Add & Delete buttons to regulate the number of rows.



When all values are entered select the Calculate coefficients to calculate the coefficients. The program returns to the main screen displaying the new coefficients.




Saving to the probe file will also preserve the Temp/Microvolt values and are available next time the probe is loaded again.

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