

User Manual
CON050
for JOFRA DTI050 Handheld Thermometer
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:

AMETEK Denmark A/S

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Denmark

Tel.: +45 48 16 80 00
Fax: +45 48 16 80 80

1.1 General information

The CON050 program is designed to configure the JOFRA DTI050 handheld thermometer (RS-232 communications port) and the RTC/PTC calibrators (USB communications 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:

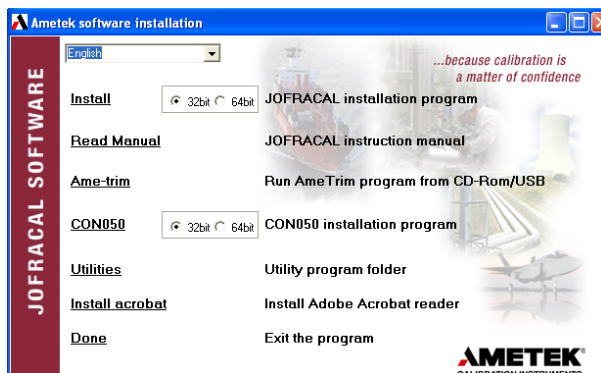
- Intel® Pentium® II 1.4 GHz processor.
- 128MB RAM (256MB recommended)
- 80MB free disk space on hard disk (120MB recommended) prior to installation
- Standard VGA (800x600, 256 colours). 1024x768 recommended.
- USB input device for installation of program
- 1 free USB and 1 free RS-232 serial port

1.2.2 PCs, minimum software requirements:

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

1.3 Installing CON050

Simply insert the Ametek JOFRACAL installation USB memory stick and select CON050 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* and 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 Framework.

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

1.3.2 RTC/PTC USB driver

The RTC/PTC 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 calibrator using a USB cable or 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(32bit)[®]

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

1.7 Uninstalling CON050

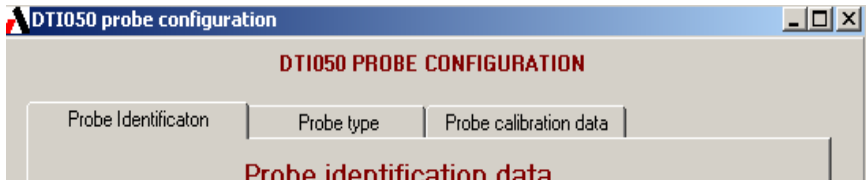
CON050 is removed from the PC as follows:

- 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

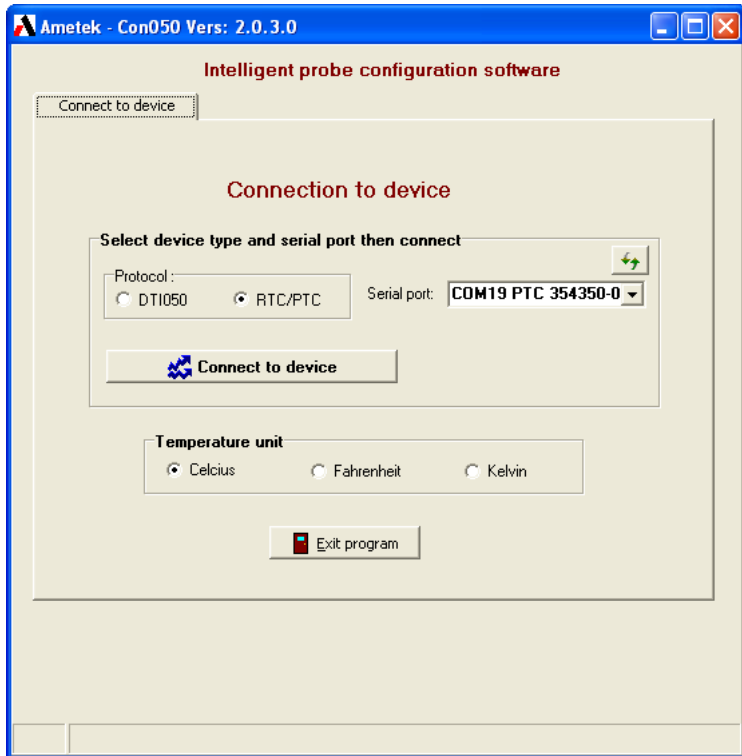
Under installation a number of Probe configuration template files are placed in the CON050 folder, containing all the default values for each of the know Ametek probe types. These can be loaded into CON050, edited and then saved again under the particular probes' serial number.

- 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 250
- STS-100 B 350
- STS-100 B 500
- STS-100 B 901
- STS-102 A 030
- STS-102 B 030
- STS-103 B 150
- STS-150 A 912
- STS-150 A 915
- STS-150 A 935
- STS-150 A 966
- STS-200 A 915
- STS-200 B 915
- STS-200 B 970
- STS-200 A 970
- STS-200 A 916
- STS-200 B 916
- STS-200 A 917

- STS-200 B 917
- STS-200 A 925
- STS-200 B 925
- DLC-155
- DLC-158
- DLC-159
- DLC-250
- DLC-700

2. PROGRAM START UP

Program menu – connecting to the device




Select the device (DTI050 or RTC/PTC) then the serial port number. The serial port list contains the available ports on the PC and can also display the USB port the RTC/PTC is connected to.

2.1 Temperature unit

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

Select temperature unit



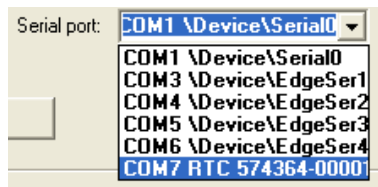
Temperature unit

Celcius Fahrenheit Kelvin

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




Serial port: **COM1 \Device\Serial0**

- COM1 \Device\Serial0
- COM3 \Device\EdgeSer1
- COM4 \Device\EdgeSer2
- COM5 \Device\EdgeSer3
- COM6 \Device\EdgeSer4
- COM7 RTC 574364-00001

To open communications simply select the serial port connecting the JOFRA device and click the “Connect to device.”



Reload available comports list.

If an RTC/PTC is connected and turned on but doesn't 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.

2.2.1 No connection to JOFRA device

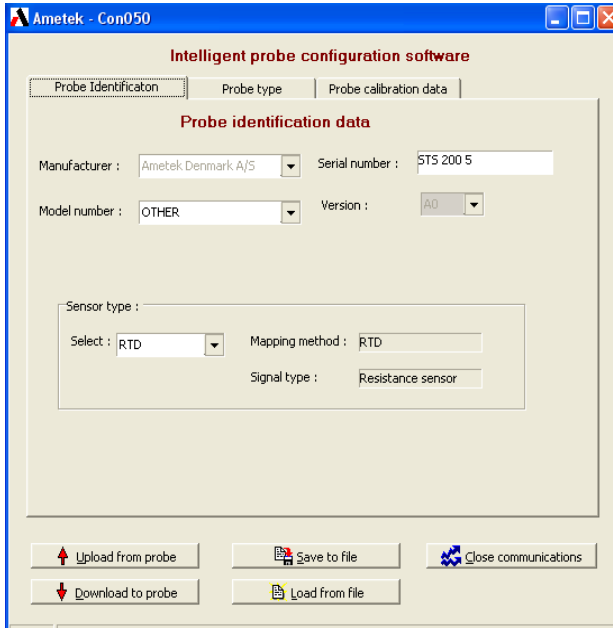
If connection to the JOFRA device was unsuccessful the following message appears. Check that the device is on and the USB/RS232 cable is correctly connected.



Communication error

2.2.2 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.

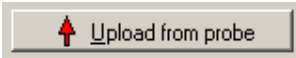


CON050 after successful connection to JOFRA device

2.3 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:



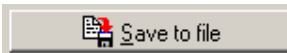
Upload probe data to device

Uploads the current probes data from the device into CON050.



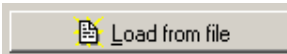
Download probe data to device

Download the probes data from CON050 to the device.



Save probe data to file

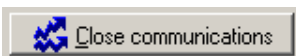
Save the current probe definition data to a file.



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

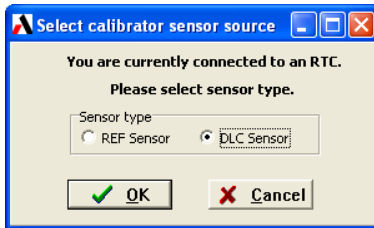
Close down communications and return to start up screen.

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.

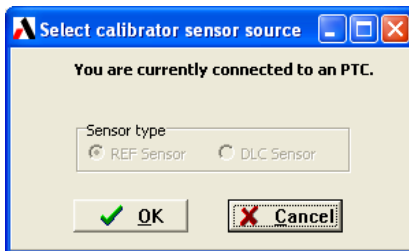
RTC Calibrator.

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



PTC 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 screenshot shows a software window titled "Ametek - Con050" with a blue title bar. The main content area is titled "Intelligent probe configuration software" and has three tabs: "Probe Identification" (selected), "Probe type", and "Probe calibration data". Under the "Probe Identification" tab, the heading "Probe identification data" is displayed. The form contains the following fields:

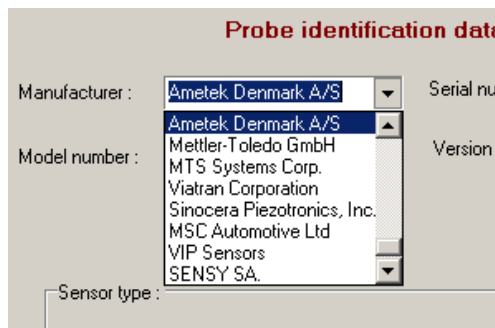
- Manufacturer: Ametek Denmark A/S (dropdown menu)
- Serial number: STS 200 5 (text input)
- Model number: OTHER (dropdown menu)
- Version: A0 (dropdown menu)
- Sensor type section:
 - Select: RTD (dropdown menu)
 - Mapping method: RTD (text input)
 - Signal type: Resistance sensor (text input)

At the bottom of the window, there are five buttons: "Upload from probe" (with an upward arrow icon), "Download to probe" (with a downward arrow icon), "Save to file" (with a floppy disk icon), "Load from file" (with a document icon), and "Close communications" (with a network icon).

The probe identification page contains a description of the probes major and maker.

3.1.1 Manufacturer

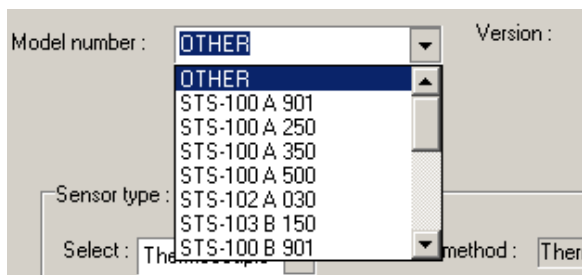
Select the probe manufacturer from the drop down list of recognised companies.



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.



Serial number : SERIALNO

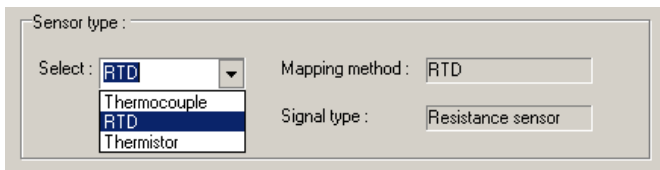
When saving the Probe data to a file, the serial number is used as the file name therefore certain characters are not permitted within the serial number itself.

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.



Sensor type :

Select : **RTD** [v]
Thermocouple
RTD
Thermistor

Mapping method : RTD

Signal type : Resistance sensor

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

Intelligent probe configuration software

Probe Identification | **Probe type** | Probe calibration data

Probe type data

Temperature range:
Min : -100 °C Max : 160 °C

Electrical output
Min : 0 Ohm Max : 8 Ohm

Maximum excitation current : 10,000000E-7 A (10,0000E-07)
Self heating constant : 1,141040E-03 W/°C (1,141040E-03)

RTD type : CVD

Upload from probe Save to file Close communications
Download to probe Load from file

4.1 Temperature range

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

Temperature range:
Min: °C Max: °C

4.2 Electrical output

Electrical output
Min: Ohm Max: Ohm

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

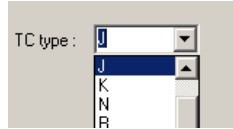
Thermistor: Ohms

min:=0;

max:=524000;

4.3 Selection of the TC type (TC type only)

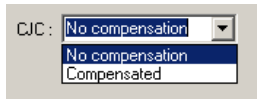
Select the type of thermocouple from the list of standard TC sensor types.



Thermocouple type list

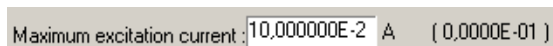
4.4 CJ compensation (TC type only)

Determines if the probe has automatic CJ compensation or otherwise.



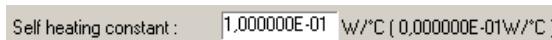
4.5 Maximum excitation current (RTD & THERMISTOR only)

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.



The image shows a software interface for selecting the RTD type. It features a label "RTD type :" followed by a dropdown menu. The dropdown menu is currently set to "ITS-90" and is open, showing two options: "CVD" and "ITS-90". The "ITS-90" option is highlighted in blue.

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

Intelligent probe configuration software

Probe Identification | Probe type | **Probe calibration data**

Probe calibration data

Calibration date: 06-01-2010

Calibration initials: TMH

Measurement location ID: 1

Calibration period: 365 Days

Sensor response time: 1,031591E-01 Secs.
(1,031591E-01)

Excitation current: 10,000000E-07 A
(10,000000E-07)

Calibration data RTD - CVD

R0	1,000557E+02
A	3,9125587791E-03
B	-5,8624186750E-07
C	-4,3129818293E-12

Upload from probe | Save to file | Close communications
Download to probe | Load from file

5.1 Calibration details

Set probe calibration date.

Calibration date

Calibration date

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

Calibration date Calib

Calibration initials

Measurement location ID.

Calibration period :

Sensor response time :

juni 2006						
ma	ti	on	to	fr	lø	so
29	30	31	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	1	2
3	4	5	6	7	8	9

Calibration initials

Initials of operator

Calibration initials

Calibration period

5.2 Measurement location ID

Measurement location ID.

5.3 Probe response time

Sensor response time : Secs.
(2,619996E-03)

5.4 Probe excitation (RTD & Thermistor only)

Excitation current : A
(1,000256E-01)

5.5 Thermocouple coefficients

Calibration data - TC

CJC CVD coefficients

R0 : Ohm

A

B

C

TC resistance :

(4,880461E+02)

Correction coefficients

A

B

C

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

Calculate CJ R0

Enter the probe temperature

°C

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

Calibration data RTD - CVD

R0	<input type="text" value="0,000000E-01"/>
A	<input type="text" value="0,0000000000E-01"/>
B	<input type="text" value="0,0000000000E-01"/>
C	<input type="text" value="0,0000000000E-01"/>

Calendar van dusen

Calibration data RTD - ITS90

RTPW	<input type="text" value="0,000000"/>
A(LR)	<input type="text" value="0,0000000000E-01"/>
B(LR)	<input type="text" value="0,0000000000E-01"/>
C(LR)/C1(LR)	<input type="text" value="0,0000000000E-01"/>
C2(LR)	<input type="text" value="0,0000000000E-01"/>
C3(LR)	<input type="text" value="0,0000000000E-01"/>
C4(LR)	<input type="text" value="0,0000000000E-01"/>
C5(LR)	<input type="text" value="0,0000000000E-01"/>
A(HR)	<input type="text" value="0,0000000000E-01"/>
B(HR)	<input type="text" value="0,0000000000E-01"/>
C(HR)	<input type="text" value="0,0000000000E-01"/>
D(HR)	<input type="text" value="0,0000000000E-01"/>
W(HR)	<input type="text" value="0,0000000000E-01"/>

ITS-90

5.7 Thermistor coefficients

For thermistor type sensor steinhart-Hart coefficients are used.

Calibration data - Thermistor

Steinhart-Hart coefficients

R0	<input type="text" value="0,0000E-01"/>
A	<input type="text" value="0,0000000000E-01"/>
B	<input type="text" value="0,0000000000E-01"/>
C	<input type="text" value="0,0000000000E-01"/>

Steinhart-Hart

AMETEK Calibration Instruments

is one of the world's leading manufacturers and developers of calibration instruments for temperature, pressure and process signals as well as for temperature sensors both from a commercial and a technological point of view.

JOFRA Temperature Instruments

Portable precision thermometers. Dry-block and liquid bath calibrators: 5 series, with more than 25 models and temperature ranges from -90° to 1205°C / -130° to 2200°F. All featuring speed, portability, accuracy and advanced documenting functions with JOFRACAL calibration software.

JOFRA Pressure Instruments

Convenient electronic systems ranging from -25 mbar to 1000 bar (0.4 to 15,000 psi) - multiple choices of pressure ranges, pumps and accuracies, fully temperature-compensated for problem-free and accurate field use.

JOFRA Signal Instruments

Process signal measurement and simulation for easy control loop calibration and measurement tasks - from handheld field instruments to laboratory reference level bench top instruments.

JOFRA / JF Marine Instruments

A complete range of calibration equipment for temperature, pressure and signal, approved for marine use.

FP Temperature Sensors

A complete range of temperature sensors for industrial and marine use.

M&G Pressure Testers

Pneumatic floating-ball or hydraulic piston dead weight testers with accuracies to 0.015% of reading.

M&G Pumps

Pressure generators from small pneumatic "bicycle" style pumps to hydraulic pumps generating up to 1,000 bar (15,000 psi).

AMETEK[®]
TEST & CALIBRATION INSTRUMENTS

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