

Calibration Toolbox ADO

Quick Start Guide – How to Create and Use Calibration Data Templates

This set of quick start guides is designed to help you to discover the main features of Calibration Toolbox ADO as quickly as possible. Like all sophisticated tools, it will take time and practice for you to become totally proficient, but you can begin to use some of its powerful features almost straight away.

Introduction

Many of the devices that you have will all be of a particular kind, for example, you might have ten or twenty identical pressure gauges or thermometers. All of these will require calibrating in pretty much the same way, in other words, you will have the same number of calibration points, tolerances, and they will all use the same calibration procedure.

Calibration Toolbox ADO simplifies this task by enabling you to produce a set of re-usable calibration data templates. Basically, you allocate to each device a particular calibration data template and this is used each time you perform a calibration.

Some devices, such as digital multi-meters, have several channels, voltage, current, resistance, etc. Calibration Toolbox ADO allows you to create calibration templates that will accommodate instruments and devices having up to forty channels. Each channel can have a maximum of twenty calibration points.

Creating a new template

The Calibration Template Editor is accessed from the Tools main menu item. Click the 'New Template' button as shown in fig 2 below and then proceed as directed below, working down the left-hand side of the window.

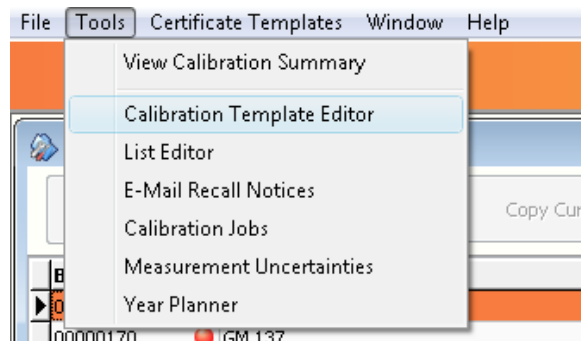


Fig 1: Opening the Calibration Template Editor

- **Enter a name for your template.** The user will use this to select the template to be used for any given device.
- **Select a procedure file.** This can either be any file, such as a Word document, spreadsheet or PDF selected from the file dialogue box that appears to the right. Or should you require, you can type in a web site address. When this is done make sure that you enter the full URL of the page. For example: <http://www.calisouk.com>. Click the button on the extreme right to preview this entry.

- **Select a template parent.** There are three basic parents for you to use:
 - Basic As Found – As Left
 - Extended as Found – As Left
 - Basic Comparison

These are explained in greater detail below.

- **Number of Channels.** This can be between one and forty inclusive.
- **Standard, Standard Time and Special Instructions.** Enter values here to pass this information on to the person performing the calibrations.

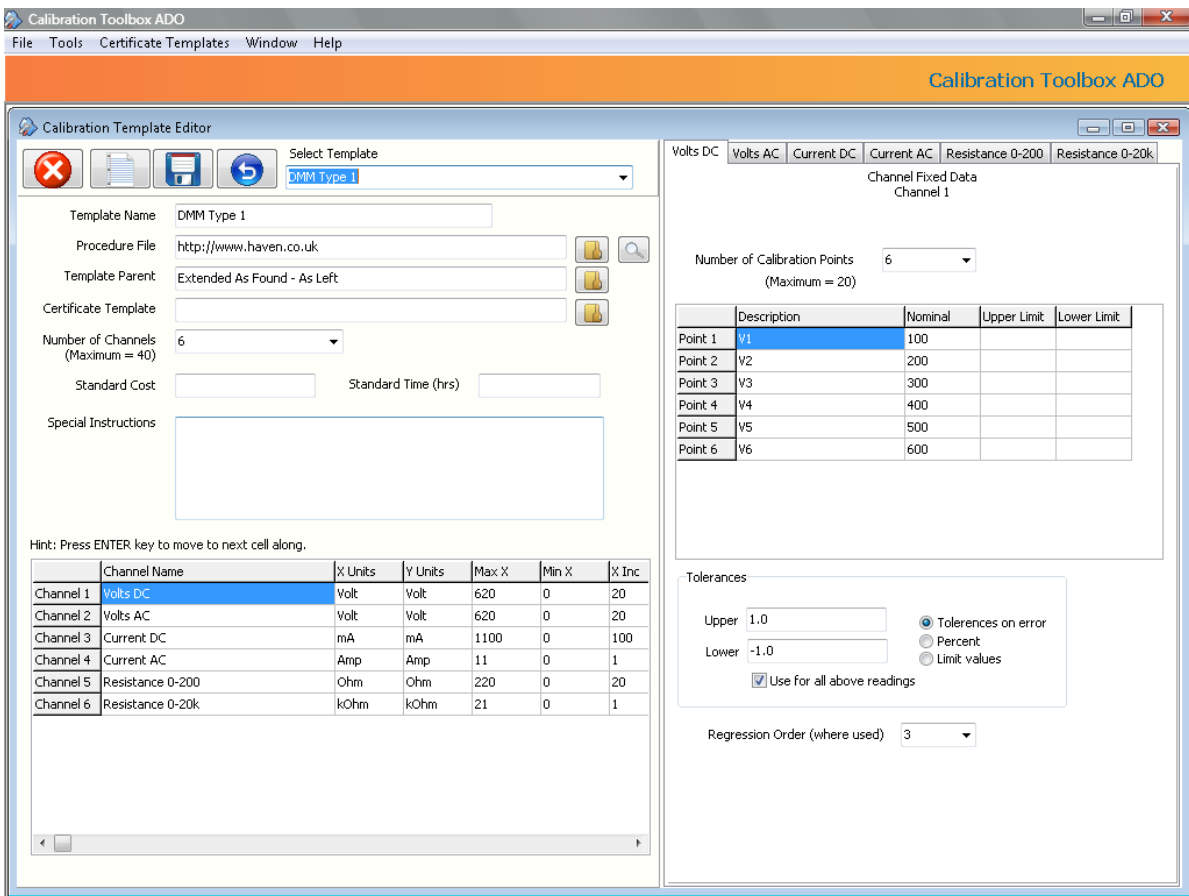


Fig 2: Creating or Editing a Calibration Data Template

When you change the number of channels you will notice that the data grids at the bottom left of the window and the right hand side of the page were updated to reflect your selection. Now, again referring to fig 2, using the grid to the bottom of the page we will enter some of the basic parameters required for each channel.

Note: To move horizontally along the rows of the grid press the 'Enter' key. The values to be entered are:

- Channel Name:** The name by which you refer to the channel
- X Units:** The units for the reference channel
- Y units:** Units for the channel under test.
- Max X:** The maximum value for the X-axis of the calibration graph
- Min X:** The minimum value for the X-axis of the calibration graph
- X Inc:** The main increment for the X axis graticule
- Max Y:** The maximum value for the X-axis of the calibration graph
- Min Y:** The minimum value for the X-axis of the calibration graph
- Y Inc:** The main graticule increment for the X axis

Figure 3 below shows how you enter the calibration points for each of your channels. The first thing is to select the number of calibration points you require up to a maximum of twenty. You then enter a brief description of each channel [maximum sixteen characters] and a nominal value for each. You then enter the measurement tolerances which are used to perform a pass/fail indication for your calibration.

Channel Fixed Data
Channel 1

Number of Calibration Points: 6 (Maximum = 20)

	Description	Nominal	Upper Limit	Lower Limit
Point 1	V1	100		
Point 2	V2	200		
Point 3	V3	300		
Point 4	V4	400		
Point 5	V5	500		
Point 6	V6	600		

Tolerances

Upper: 1.0
Lower: -1.0

Tolerances on error
 Percent
 Limit values

Use for all above readings

Regression Order (where used): 3

Fig 3: Entering Calibration Information into a Template

The first choice you need to make is the way in which tolerances are applied. You have three choices:

- Apply tolerances to the error i.e. the difference between the measured and reference values
- Percent tolerance. The tolerance will be the entered percentage of the nominal value
- Limit values. Used mainly for dimensional measurements, this enables you to enter the tolerance for the upper and lower dimensional limits.

You can choose to enter values for each calibration point or to enter a single pair of tolerances and apply them to each calibration point of the channel.

Calibration Toolbox ADO

Quick Start Guide – Introducing Template Parents

Every day, all over the world, many thousands of calibrations are carried-out. The vast majority of these will fall into one of three basic types:

- Simple Comparison:** Where the measured value is compared to a traceable set of references and no adjustments are possible (for example, a glass thermometer or steel rule)
- As Found - As Left:** Comparisons performed as the device is received from the user, and after adjustment. The nominal value is the same as the value of the traceable reference (for example, a set of slip gauges)
- Extended As Found - As Left:** Comparisons performed as the device is received from the user, and after adjustment. The nominal value need not be same as the value indicated by the traceable reference (for example, a pressure gauge or resistance thermometer)

For this very reason, Calibration Toolbox provides you with template parents that match these calibration types. With reference to fig 4 below, select the required template parent by clicking the button to the right.

Template Name	<input type="text" value="DMM Type 1"/>		
Procedure File	<input type="text" value="http://www.haven.co.uk"/>		
Template Parent	<input type="text" value="Extended As Found - As Left"/>		
Certificate Template	<input type="text"/>		

Fig 4: Selecting a Template Parent

This will open the Template Parent Selector window as shown in fig 5. Click the entries in the list box to see the difference between the different types.

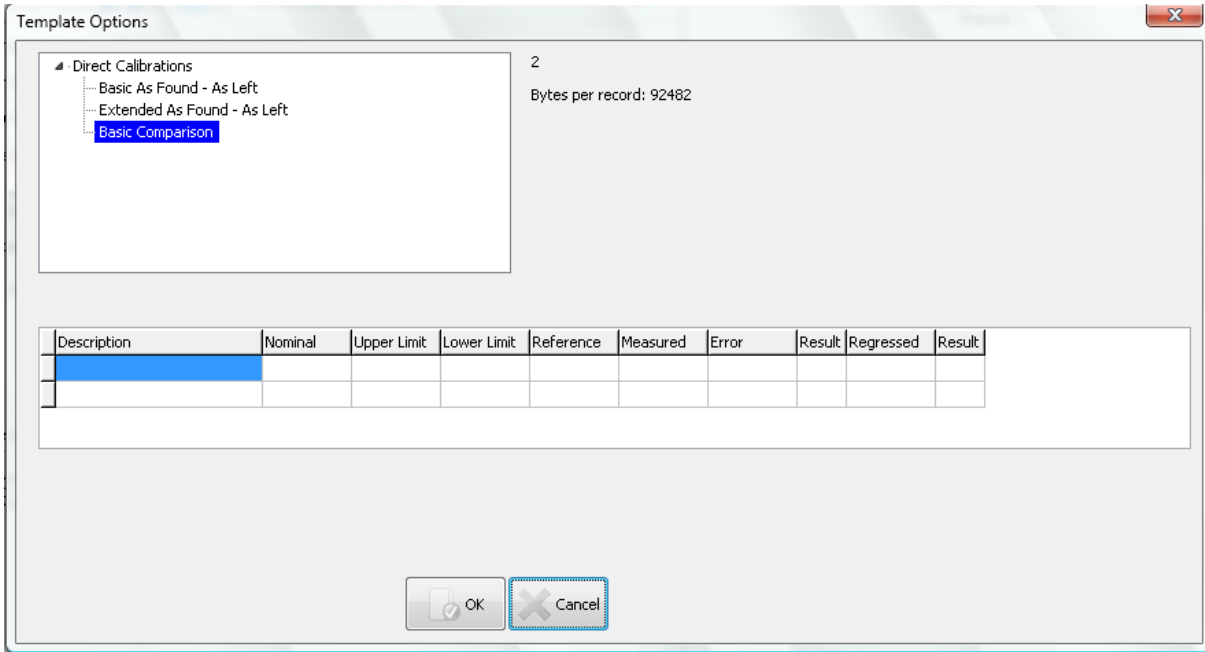


Fig 5: The Template Parent Selector Window

Once you have made your selection, click OK.

To illustrate further, by way of example, let us take a look at a device that uses a simple template designed for use with a glass thermometer over the range 0 to 100°C. From fig 6 below, we can note the following:

- The template's name is: Thermometer Glass 0-100°C
- It is based on the Basic Comparison parent
- We have chosen to obtain it's calibration procedure from a website (we could just have easily linked to a computer document such as a PDF)
- The device has only one channel

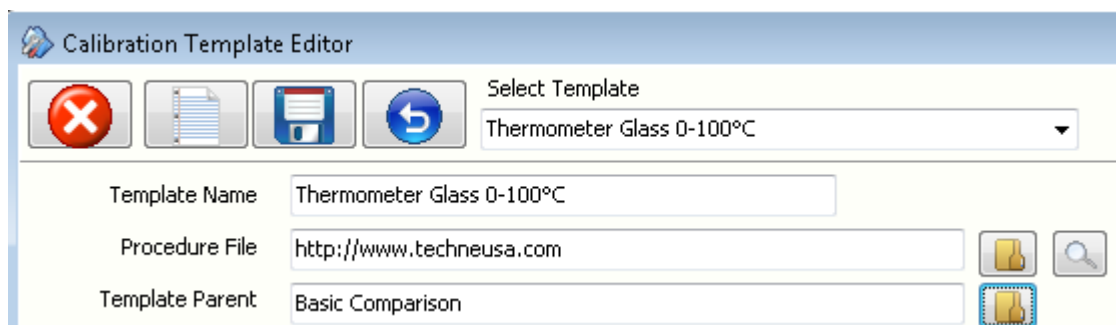


Fig 6: Template Basics

Furthermore, by looking at fig 7, we can see that:

- The channel name is 'Temperature'
- We have 6 calibration points (temperature setpoints)
- We have named the setpoints: T1, T2, T3, T4, T5 and T6
- The setpoint values are: 0, 20, 40, 60, 80, and 100°C
- A tolerance of $\pm 0.2^\circ\text{C}$ will be applied to the error on all readings to give a pass/fail indication

Temperature

Channel Fixed Data
Channel 1

Number of Calibration Points: 6 (Maximum = 20)

	Description	Nominal	Upper Limit	Lower Limit
Point 1	T1	0		
Point 2	T2	20		
Point 3	T3	40		
Point 4	T4	60		
Point 5	T5	80		
Point 6	T6	100		

Tolerances

Upper: 0.2
Lower: -0.2

Tolerances on error
 Percent
 Limit values

Use for all above readings

Fig 7: Calibration Data Points

All devices that use this template will have calibrations performed using the data that we have just described. We will illustrate this by looking at an example from the demonstration database that ships with calibration Toolbox ADO.

In fig 8 we see part of the listing of devices whose calibrations expire within 28 days. There are at least 2 devices whose Calibration Data Type is 'Thermometer Glass 0 - 100°C'.

Barcode Number	Device Number	Calibration Data Type
00000260	PM 1052	DMM Type 1
00120307	9419.003	Torque Type 1
00000141	TS 437	Thermometer Glass 0-100°C
00000054	PS 18	Pressure Gauge
00000064	SCA 121	Pressure Gauge
00000275	TS 490	pH Meter
00000051	FGA 517	Temp Indicator x2
00000143	TS 463	Temp Indicator x2
00000218	EGM 1	Micrometer V1
00000084	T 1300	Temp Indicator x2
00000008	STI 33	Pipette x8
00000280	TS 109-2	Thermometer Glass 0-100°C

Fig 8: Main Table Display

If we open the first of these device's Core Data - Device in Detail window and select the 'Current Calibration Data' and then the 'Measurements' tabs we see how the calibration data is saved, and how it conforms to the template that we have just examined above (see fig 9).

Description	Nominal	Upper Limit	Lower Limit	Reference	Measured	Error	Result	Regressed	Result
T1	0	0.4	0.0	0.2	0.1	-0.1	●	0.2	●
T2	20	20.3	19.9	20.1	19.9	-0.2	●	20.0	●
T3	40	40.3	39.9	40.1	40.3	0.2	●	40.2	●
T4	60	60.1	59.7	59.9	60.1	0.2	●	59.8	●
T5	80	80.1	79.7	79.9	80.2	0.3	●	79.9	●
T6	100	100.3	99.9	100.1	100.0	-0.1	●	100.1	●

Fig 9: Current Calibration Data Using our Sample Template

The only data that needs to be entered by the user are the reference values indicated and the values as measured by our unit under test. The rest is either taken from the template or calculated by Calibration Toolbox ADO.

Fig 10 shows that the historical calibration data is also stored in a similar way.

Description	Nominal	Upper Limit	Lower Limit	Reference	Measured	Error	Result	Regressed	Result
T1	0	0.4	0.0	0.2	0.1	-0.1	●	0.2	●
T2	20	20.3	19.9	20.1	19.9	-0.2	●	20.0	●
T3	40	40.3	39.9	40.1	40.3	0.2	●	40.2	●
T4	60	60.1	59.7	59.9	60.1	0.2	●	59.8	●
T5	80	80.1	79.7	79.9	80.2	0.3	●	79.9	●
T6	100	100.3	99.9	100.1	100.0	-0.1	●	100.1	●

Fig 10: Historical Calibration Data