

20. Manual Characteristics

20.1 Introduction

Besides the characteristics coming from your part program (known as Machine Characteristics), you can add characteristics requiring keyboard entry known as **Manual Characteristics**. Most times, these values are collected using a hand-held gage or another source and they will need to be stored with CMM data to complete the part run. Examples of these types of measurements may include hardness value, a chemical reading, or color value.

QC-CALC can also include characteristics that are calculated as described in the [Calculated Characteristics](#) section on page 117. This means QC-CALC has a total of 3 different measurement types plotted in Real-Time.

- **Machine Characteristic** Received from your CMM part program
- **Calculated Characteristic** Extra characteristic calculated by QC-CALC
- **Manual Characteristic** Extra characteristic entered via keyboard

Adding a **Manual Characteristic** gives you the unique capability to add separate characteristics in your existing QC-CALC part file that cannot be measured on your CMM. There are a couple of ways to add manual characteristics while you are inspecting your parts. These are listed below in order of recommended use, in order of recommended usage:

- **QC-Gage via MultiSource** > This is the best way to enter manual measurements as it allows you the most flexibility when it comes to validating measurements. QC-Gage will introduce a level of automation by collecting data from small measurement devices and specialized machines (such as hardness, roundness, surface finish gages, etc) via RS-232, TCP/IP, and file-based outputs.

[MultiSource](#) (more details on page 155) allows multiple sources of data to be collected to a common QC-CALC part file. For example, a part file with 10 characteristics could have 3 coming from a CMM, 5 coming from a video measurement system and the last 2 coming from QC-Gage (via manually entered values or a wireless micrometer).

- **Manual Input Screen** > This screen is primarily used to enter Trace Fields or Manual Characteristics for your parts when your inspection equipment does not have the ability to provide them. For instance, your inspection equipment can output the measurements directly into QC-CALC but may not have the ability to allow your inspectors to enter the lot number, fixture, machine or other traceability info.

[Manual Input Screen](#) (more details on page 126) allows you combine Trace Fields and manual characteristics into the same screen, choose values from a list for better consistency, and it can be launched at regular measurement intervals (such as every 5 parts) to further automate the process.

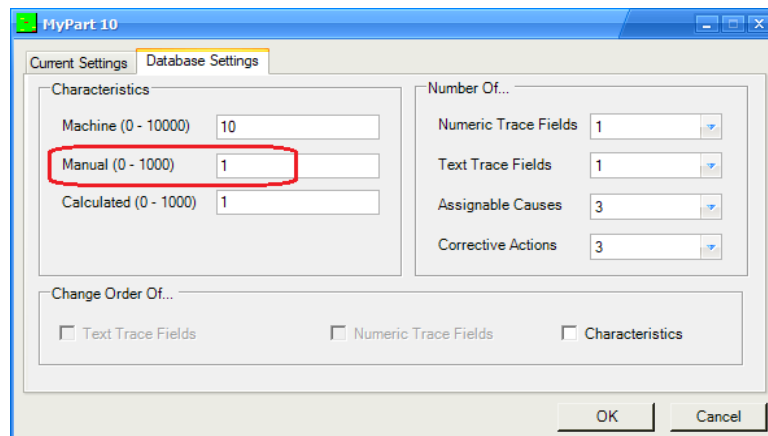
- **Manual Characteristics panel** > This screen is the original way of entering manual data and is the simplest of the manual data entry options. It gives you a column of cells for each manual characteristic. You can then type the values directly into the cells. There is no validation on the data, and the values are plotted immediately upon pressing the Enter key on your keyboard.

In this section, the first of the manual options will not be discussed since it involves QC-Gage as a separate product. You can read more about this product by visiting www.prolinksoftware.com/products.

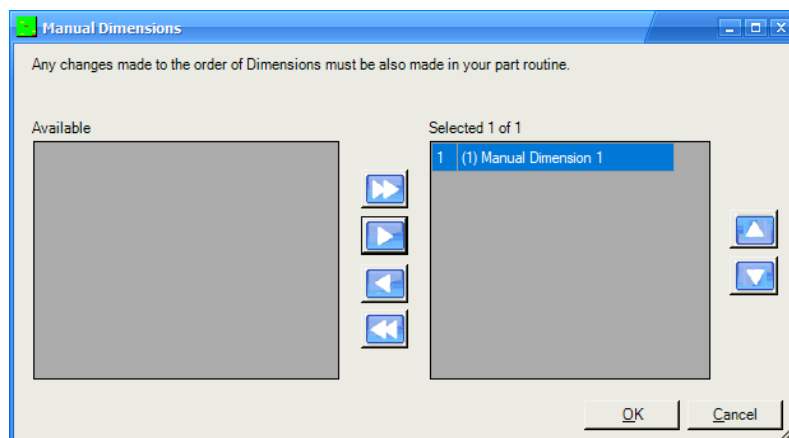
Whether you decide to use QC-Gage, the Manual Input screen, or the Trace Field Values panel, the first thing you need to do is modify the database and create the characteristics that will be manually entered and ready them for the data to come. The next three sections cover this task and are followed by the two options so you can determine the best method for manually entering data based on your needs.

20.2 Adding the Extra Characteristics

We discussed adding an extra characteristic in the [Calculated Characteristics](#) section on page 117 which will be a very similar process to adding Manual characteristics. To add a **Manual Characteristic**, select **File > Properties > Modify Database Structure** and then select the **Database Settings** tab. Change the **Characteristics > Manual** to add one new characteristic to the database. Click **OK** after you've increased this value.

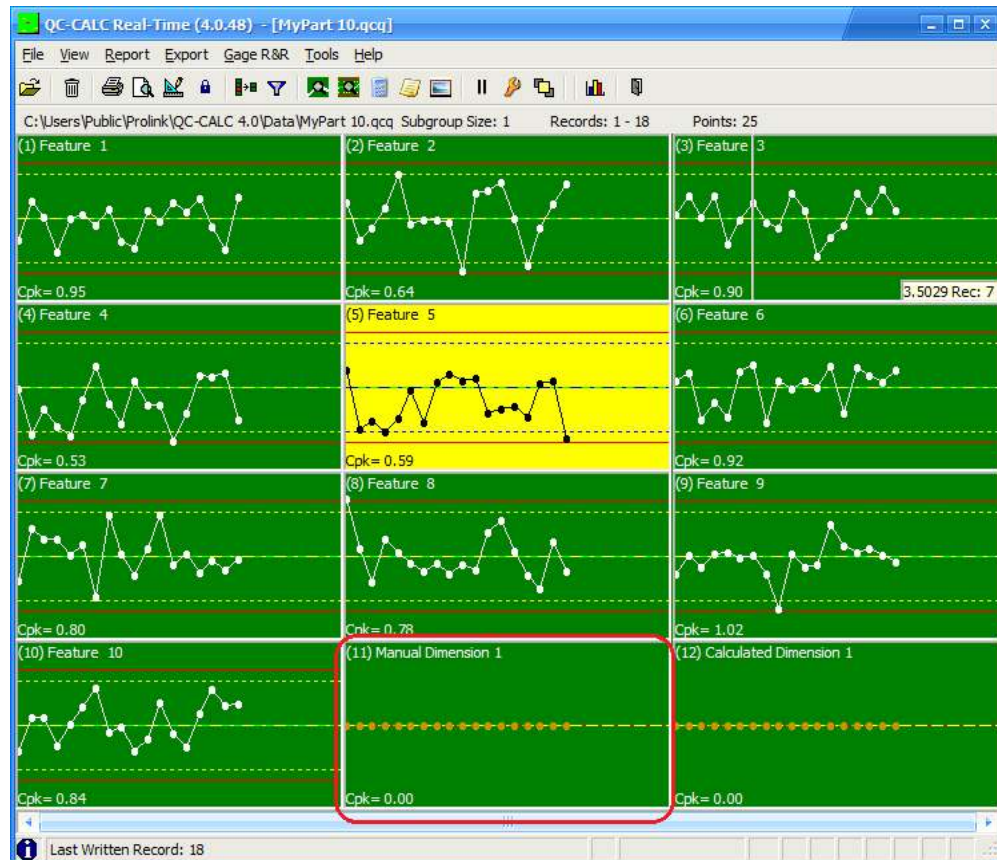


Select the "Manual Dimension 1" (meaning **Manual Characteristic**) and click the **Right Arrow** to move it to the right side and click **OK**.



20.3 View the Extra Characteristic

The Real-Time Plots screen now shows the extra plot we added. Note the data line is flat since we had collected data from parts before adding this characteristic. QC-CALC back fills the new characteristics with nominal values as a placeholder.



20.4 Scale the Plot

At this point you need to decide on the characteristic's Nominal and Tolerance values. This new characteristic has a default nominal of 0 and the upper and lower tolerance default to +/- 0. Use the **File > Properties > Edit Nominals and Tolerances** screen to change these values, click OK when you're done, and your plot is now ready for data entry.

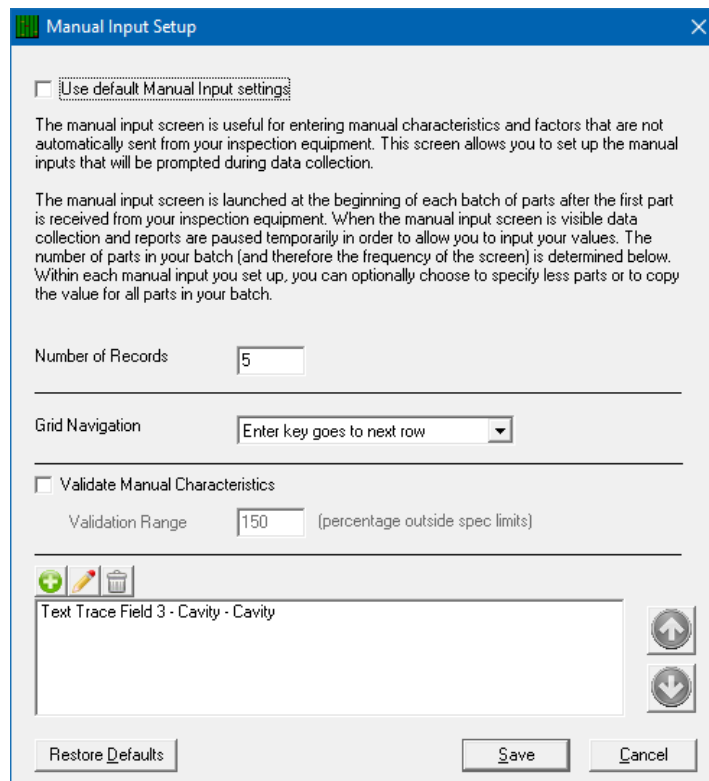
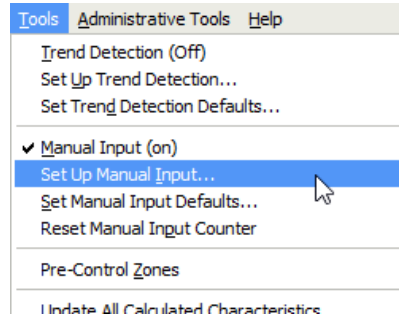
20.5 Manual Input Screen

The **Manual Input** screen gives you an interface to enter extra data into a part file that already contains the data from the CMM machine. This screen gives you the ability to enter additional values into the same file as the CMM data. This needs to be set up, so it launches at the right time and for the right number of records.

20.5.1 Setup Manual Input

If just setting up a manual characteristic for one specific part, we'll want to use the **Tools > Set Up Manual Input** menu. There are two sections to this screen: **Settings** and **Input Values**.

At the top of the screen, a checkbox labeled **Use default Manual Input settings** allows you to either use the defaults set in the **Tools > Set Manual Input Defaults** area or override the settings for this specific part file. Using the **Defaults** screen, you can set up the Manual Input defaults for *all* parts. This screen will display the same options but will automatically be applied to all new part files. For this section, however, we will focus on setting up Manual Input for a single part file, so **Uncheck** the **Use default Manual Input settings** option.



First, set the **Number of Records** options to tell QC-CALC how often to launch this screen. In the picture above, this has been set to 5. This means the screen will launch every 5 parts to ask for manual values to be entered. It is important to understand that it will launch at the beginning of each group of 5 parts. When the data is entered, the values will then be applied to the next 5 parts as they arrive.

Note: Shutting down QC-CALC or changing part files by inspecting different parts will cause the software to forget the manual values entered. It is critical to enter the data and measure the parts together before switching parts.

The **Grid Navigation** choice controls how the screen behaves when asking for values. When pressing **Enter** after entering values for your manual characteristics, the focus will either go down (“next row”) or to the right (“next column”).

The **Validate Manual Characteristics** option instructs QC-CALC to validate the characteristics being entered. This is set as a percent of tolerance; therefore, if you set it at 150%, then it will warn you if a number that is typed is outside 150% on either side of tolerance. This is meant to prevent wildly out of tolerance values such as a misplaced decimal point (typing 11 instead of 1.1). With manual characteristics there is more opportunity for human error via keyboard entry; using this option will help prevent errors of this nature.

The bottom section of the screen is where you set up the actual data items (characteristics and trace fields) that will be manually entered. To add entries, click the green plus icon and the **Manual Input Editor** screen will be displayed.

Details

Manual Input Type

This screen allows you to choose either Manual Characteristics or Trace Fields (Numeric or Text) as the type of data to be entered. Some of the remaining settings on this screen will change depending on the choice made here.

Available Locations

This is the location where the entered data will be placed. It can either be a Trace Field or a Manual Characteristic. Be sure to not use a location for data that may already be automatically received by another source by adding additional characteristics and trace fields in the **File > Modify Database Structure > Database Settings** menu.

User Prompt

This is the message the operator will see when the **Number of Records** to prompt the Manual Input is fulfilled. Enter clear instructions such as “Please type the serial number of the part” or “Please bar code scan your badge” to lead the operator through the process.

Required

With this option checked the operator will not be able to close the Manual Input Screen unless this value has been entered.

Entry Options

Enter one value for entire batch

This choice is only available when Text or Numeric Trace Fields is set as the **Manual Input Type**. With this option chosen the value entered into the Manual Input Screen will be used for all records in the session, or **Number of Records** set on previous menu. This is useful for things like “Operator Name” and “Lot Number” where the same value applies to everything in this session.

Enter individual values

This is available for both Trace Fields and Manual Characteristics. When this option is chosen, you will need to set the **Number of Entries** (records) - that will be required on the Manual Input Screen. This number may be less than the total **Number of Records** entered into the previous screen.

For example, you may want to launch the screen every 5 parts, but only want to manually measure the first 3 of those parts for a particular Manual Characteristic. In this case, the **Number of Records** on the main **Manual Input Setup** screen would be 5 and the **Number of Entries** for this Manual Characteristic would be 3. If you want to have the operator fill in data for all parts in the session, make sure the **Number of Entries** number matches the **Number of Records**.

The entries are always at the beginning of the sample set. Therefore, if the frequency is 5 and a characteristic has the Entries set as 3, it is always the *first* three parts that will have a value for the characteristic and the remaining 2 will not be used (a *Null* value for Text Trace Fields, 0 for Numeric Trace Fields, or set to Nominal and Marked as *Excluded* in the plots for Manual Characteristics).



Note: Each different type of data entry point can have its own value for Entries. This allows you to set up some of your trace fields for all parts, but other characteristics for only some of your parts.

Remember last value for next batch

This choice is only available for Text or Numeric Trace Fields. With this option chosen the value entered into the **Manual Input Screen** during the last session will automatically populate the fresh screen during the next session. This value can be changed if necessary, but in many cases, it is a good starting point making it quicker to input data.

Manual Characteristic Options

Characteristic Entry

There are 3 choices for this option:

- **Normal Numeric Entry** > With this option the operator will type in the numeric value for this characteristic.
- **Enter as Pass or Fail** > With this option the operator will be given a choice of “Pass” or “Fail” only.
- **Enter as Pass or Fail with N/A option** > With this option the operator will be given a choice of “Pass” or “Fail” or “N/A”.

Default Value

This is simply the default value of the characteristic. When the screen launches, cells with default values are pre-populated allowing the operator to change if needed.

Trace Field Options**Manual Entry**

This options just gives the operator a box to type into and does not do any validation on what is entered.

Default Value

This is simply the default value of the trace field. When the screen launches, cells with default values are pre-populated allowing the operator to enter the data only if it changes.

The screenshot shows the 'Trace Field Options' dialog box. It has two main sections. The left section is titled 'Entry Type' and contains a dropdown menu with 'Manual Entry' selected. The right section is titled 'Default Value' and contains an empty text input field.

Choose from list

This option allows you to force the operator to choose the value from a list. This is useful for repeating values such as operator names or machine numbers where there is a finite list of items from which to choose. It helps to provide consistency in your data making filtering easier later. Choose the list to use to the right of the **Entry Type** setting and you can optionally choose the **Default Value** from that list to display to the operator.

The screenshot shows the 'Trace Field Options' dialog box. The 'Entry Type' dropdown menu is set to 'Choose From List'. To the right of this dropdown is a text input field containing 'Operators' and a small button with three dots. Below this, the 'Default Value' section contains a dropdown menu with 'Laura' selected.

Auto Increment

This option will use the **Start Value** setting and add one to it for each record collected. This will just continue incrementing through time and the operator will not be prompted to enter any values or even see that this is happening.

The screenshot shows the 'Trace Field Options' dialog box. The 'Entry Type' dropdown menu is set to 'Auto Increment'. Below this, the 'Start Value' section contains a text input field with the number '1' entered.

Auto Increment Daily

This option is like the **Auto Increment** option above, but the counting resets at midnight and uses the **Start Value** again for the first record collected each day. The user will not see this value or be prompted for any information.

The screenshot shows the 'Trace Field Options' dialog box. The 'Entry Type' dropdown is set to 'Auto Increment Daily'. The 'Start Value' text box contains the number '1'.

Enter List

The **Enter List** option allows you to paste in a list of values to be used for each record as it is received. If you have a list of Cavity values (1/3/5/7/9) for example, you can choose the "/" delimiter on this screen, then paste that list of numbers into the Manual Input Screen when it appears. The "1" value will be saved for the first record that is received, then "3" for the second record and "5" for the third...

The screenshot shows the 'Trace Field Options' dialog box. The 'Entry Type' dropdown is set to 'Enter List'. The 'Delimiter' dropdown is set to '/'.

Auto Increment with Date

Text Trace Field Only – This option combines saving the current date (and optionally the time) with an incrementing number. The picture below shows that the Date and Time will be saved, followed by the incrementing number that will have a maximum of 2 leading zeros. With a Start Value of "1" the "001" is the first value for that incrementing number. This will not be shown to the operator at all and will just be added to the records as data is collected.

The screenshot shows the 'Trace Field Options' dialog box. The 'Entry Type' dropdown is set to 'Auto Increment With Date'. Below it, there are three fields: 'Date Format' set to 'MM/dd/yyyy:hh:mm', 'Separator' set to '-', and 'Max Leading' set to '2'. The 'Start Value' text box contains the number '1'. At the bottom, there is a 'Sample Entry' text box showing '03/01/2022:12:58-001'.

Auto Increment From Start Point

With this option, the operator will be prompted to enter the starting point for each batch. From that starting point the value for each record will be incremented from the previous value.

The screenshot shows the 'Trace Field Options' dialog box. The 'Entry Type' dropdown is set to 'Auto Increment From Start Point'.

20.5.2 Turning Manual Input On/Off

The Manual Input functionality is turned on and off by selecting **Tools > Manual Input**. Simply click it in the **Tools** menu to activate or deactivate the Manual Input. This then immediately employs either the **Set Up Manual Input** configuration or the **Defaults** depending on what was chosen in those screens.

20.6 Manual Characteristic Panel

Prior to the **Manual Input Screen** feature being added to the software, the simplest method to add data to your database was by inputting it into the **Manual Characteristic Panel**. It should be noted that this screen does not support input for Text or Numeric Trace Fields.

To add data into a Manual characteristic using this method, select **View > Manual Characteristic Values**, and a spreadsheet-like grid is displayed at the bottom of the plotting area. The grid contains the same number of values as displayed records, but you can use the bottom scroll bar to update older records that are out of view. As you type the number into the grid and press enter, you will see the plot updating. Should you make a mistake, select the cell and change your entry.

