



# **Setup measurement**

## **Configuration options**



Q-DAS

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# Document History

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# 1 Setup measurement - functionality

To ensure constant measuring accuracy, the measuring equipment such as probes and other measuring devices must be adjusted at regular periods. The "Setup measurement" provides the possibility to guarantee the measuring accuracy directly at the production line. For this purpose, the "master part", "reference" or "standard", referred to as "reference part" in this document, serves as an aid.

After inserting a measurement part, if the measurement shows a difference between the dimension of the reference part and the measured value, an adjustment can be made with the "Setup measurement" so that the probe value corresponds to the expected dimension. With a set-up measurement, the relative probe value is returned to the desired absolute value.

If, for example, a reference part (e.g., 10.0000 mm) is inserted into the measuring device and a measurement is carried out, then in an ideal world the measuring device would display exactly the reference value 10.000 mm. However, it is quite possible that the measuring device is misaligned, and, for example, the value 10.002 mm is displayed. Since the reference part is trusted more than the measuring device, a correction must be made, and the value set to 10.000 mm.

There are thus two reasons for using the setup measurement. Firstly, to correct the mounting of the measuring device by mechanically adjusting the align probe. Secondly, to determine a correction value which is used to convert the measured value to the zero position.

## 2 Handling the Setup Measurement

To carry out a setup measurement, the data set must be configured accordingly in the Q-DAS applications. The configurations made are saved per data set at data set level.

### Communication between measuring devices and Q-DAS software

A setup measurement can only be carried out if a corresponding measuring device is correctly connected to the computer and can communicate with the Q-DAS software. For this purpose, the corresponding measuring device, an RS232 interface, and the corresponding recording channel must be selected in the characteristics mask under recording type. The basic configuration of the measuring device interface must also be defined in the characteristics mask.



Setup measurement is not available with dynamic recording Types "Deviation/shock", "Deviation measurement" and "Number of values".

### Calling up the dialogue for carrying out a setup measurement

The dialogue for carrying out a setup measurement can be called up automatically or manually.

### Carrying out a setup measurement

To carry out a setup measurement, i.e., to adjust the measuring device, the "Setup measurement" dialogue is available. This shows the current measured values of the reference part and offers the possibility to carry out a correction. Basically, a difference is made between the following types of "Setup measurement".

- Setup measurements for the mechanical adjustment of a measuring device, so to speak, to correct the setup of the measuring device with respect to the optimum measuring range.
- Setup measurements to determine the correction values. The reference values are compared with the current measured values. The determined difference values (offset) are used as correction values to "convert" the measured value to the zero setting.



# 3 Dialogue call

The dialogue call can be triggered manually or automatically.

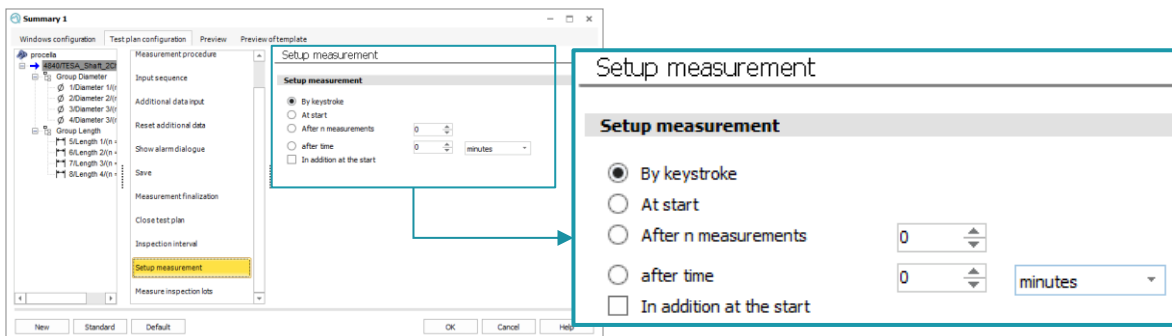
## Manual call-up

Manual call-up is done by selecting the "Setup measurement" function in the "Part/Characteristic" tab in the ribbon (1) or by selecting the "Setup measurement" button in the application bar of the "Summary/input" window (2).



## Automatic call

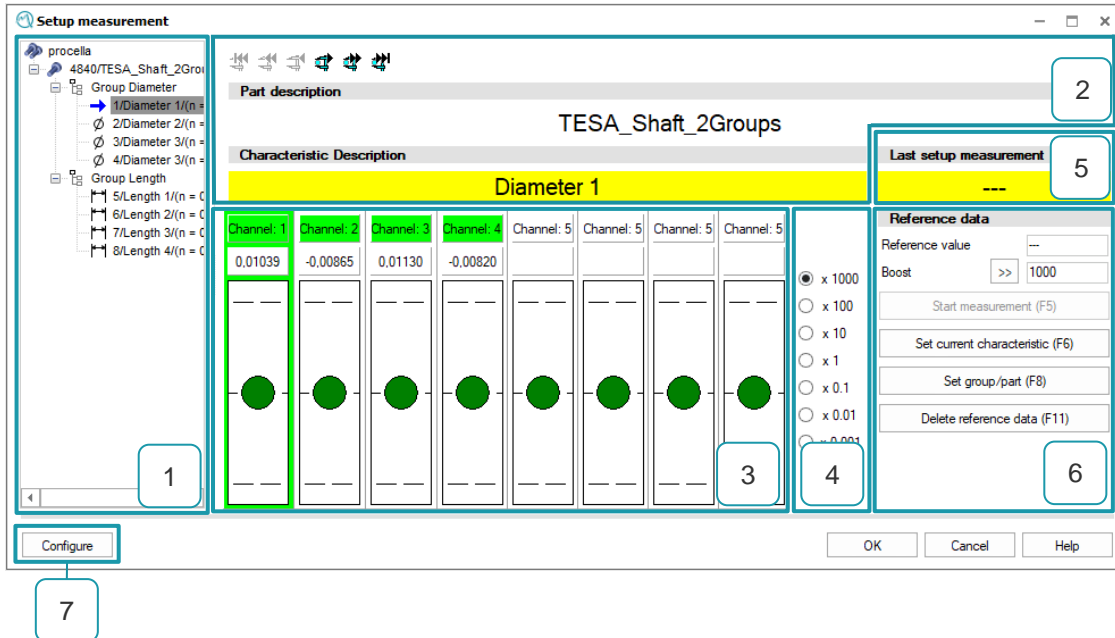
If the setup measurement is a part of the test procedure, it can be called up automatically. For example, a setup measurement can be performed after loading a data set or before the actual measurement.



The "Setup measurement" menu group is only available in the "Setup data recording" dialogue at the part configuration level (data set). Detailed information on the configuration of the automatically executed setup measurement can be found in the separate document "Setup data recording".



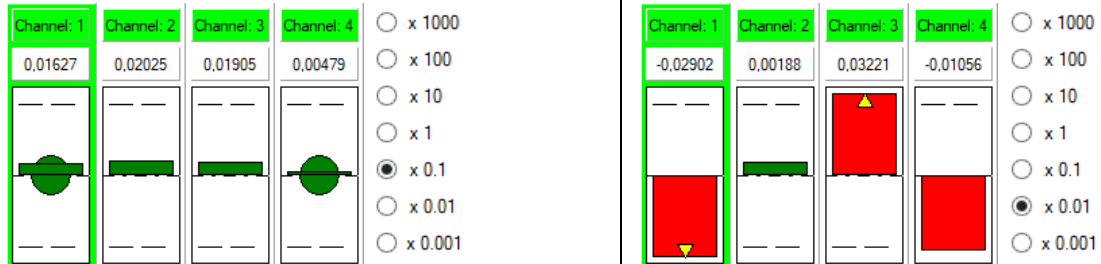
## 4 “Setup measurement” dialogue



1	<p><b>“Characteristics selection” window area</b> The parts/characteristics list represents the data set structure and shows all characteristics present in the data set. It allows a manual change of characteristics.</p>
2	<p><b>“Characteristics selection” window area</b> The buttons, as well as the corresponding keyboard shortcuts, enable the change of characteristics as well as the change of trigger channels.</p> <p>Data set information is displayed here as an operating note. The content of the characteristic field corresponds to the currently selected characteristic.</p>
1+2	<p>Regardless of how a characteristic is selected, the currently selected characteristic can be recognised by the content of the characteristic field in the window area "Characteristic selection" (2) as well as by the green marked bars in the window area "Bar display" (3).</p>
3	<p><b>“Bar display” window area (measured values)</b> The bar display is used to show the measured values that the measuring device sends. Basically, the characteristics with a configured RS232 interface are listed here. If configured accordingly, the listing of calculated characteristics is also possible. Which part of the data set is actually displayed in this window area depends on the configuration of the dialogue display and the currently selected characteristic.</p>



- 4 **“Zoom within bars” window area**  
Starting from the centre of a bar, the measured values (online values) currently received from the measuring device are displayed in the bars. The options here define the start and end range within the bars. By immediately applying the selected level, zooming in and out of the range of measured values is made possible.



- 5 **“Timestamp of the setup measurement” window area**  
The background colour and the time stamp indicate that a setup measurement has been carried out.

Setup measurement not yet performed or not possible (e.g., for dynamic recording types such as "Deviation measurement")

Last setup measurement

---

Current setup measurement

Last setup measurement

15.12.2022 14:40:29

Last Setup Measurement

Last setup measurement

15.12.2022 14:40:29

- 5 **“Reference data” window area**  
Control elements for carrying out the “Setup measurements”. An individual selection of the control elements can be made via the configuration of the dialogue display. The execution of a function in the window area "Reference data" is in principle independent of the display in the window area "Bar display".

- 6 **Configuration of the dialogue display**

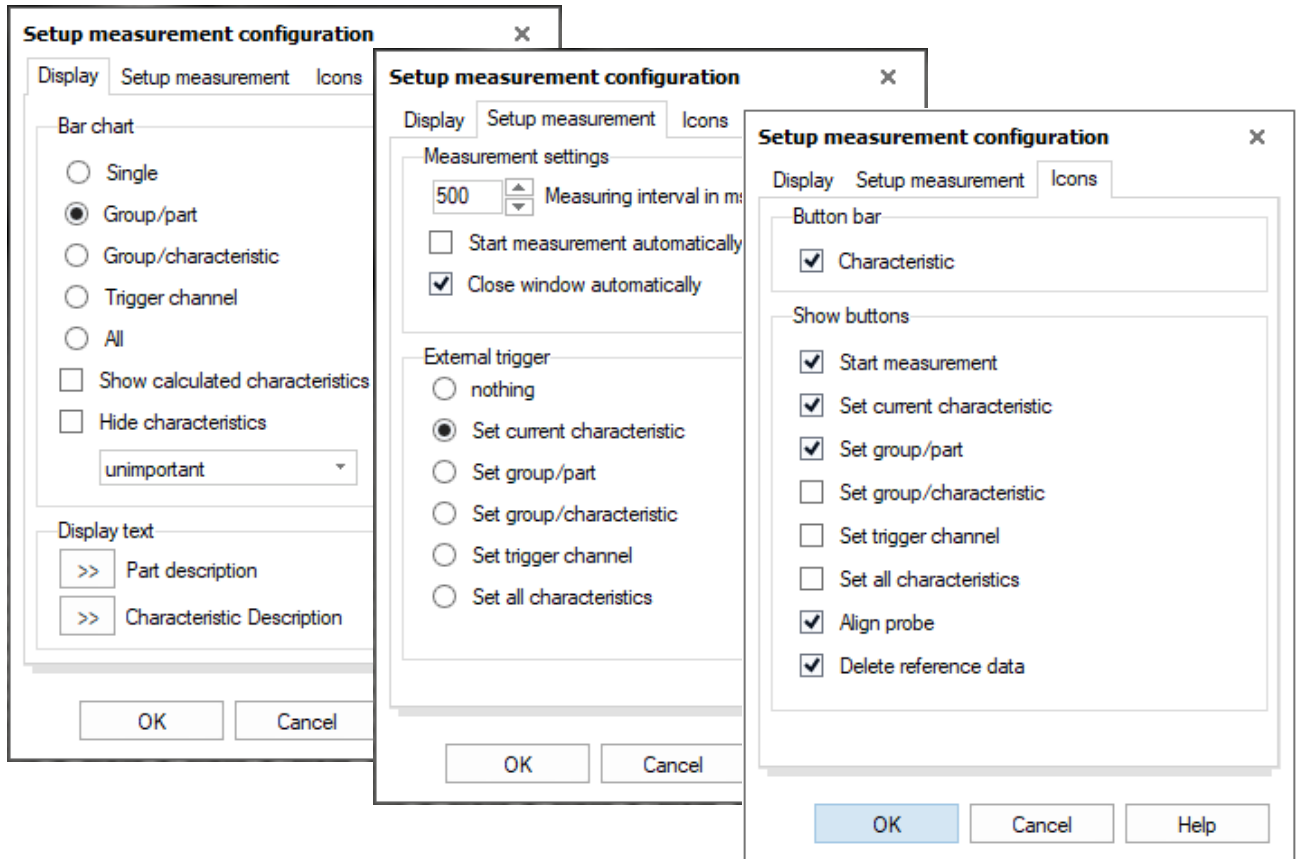
The display and the available operating elements in the "Setup measurement" dialogue can be individually adapted. The separate "Setup measurement configuration" dialogue is available for this purpose.





## 4.1 Configuration of the dialogue display

The appearance of the dialogue and the available operating elements for performing a setup measurement are defined via the "Setup measurement configuration" dialogue. The dialogue is called up via the "Configure" button in the "Setup measurement" dialogue.



1	<b>“Display” tab</b> Extended settings for the display in the window area "Bar display".
2	<b>“Setup measurement” tab</b> The settings here are divided into different task areas. <ul style="list-style-type: none"><li>• Behaviour of the "Setup measurement" dialogue after performing a setup measurement.</li><li>• Extended configuration for triggering the measurements for measuring devices that only provide measured values on requirement.</li><li>• Trigger setup measurement via external triggers.</li></ul>
3	<b>“Buttons” tab</b> Selection of the operating elements in the "Reference data" window area.

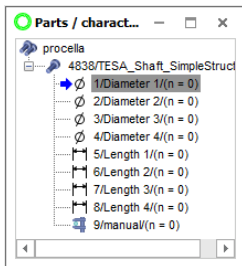


### 4.1.1 "Display" tab

In principle, the characteristics of a data set for which a measuring device is stored under "Recording Type" and the characteristics that are recorded via a logical operation formula can be displayed in the window area "Bar display". A bar represents the measured values of a characteristic that are sent via its recording channel or the result of the calculated characteristics. The use of different data set structures and also the possibility of recording several characteristics together (trigger channels) can be helpful in customising the view. The options here serve to customise the view in the "bar display" window area.

Two data sets are used below to explain the individual options.

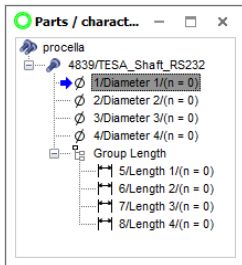
#### Flat data set structure



An RS232 interface with the corresponding recording channel is stored for characteristics one to eight. The ninth characteristic is configured for manual recording.

Characteristics one to four form a virtual characteristics group that are recorded together. The first characteristic is configured as the start of the recording group. For characteristics two, three and four, the "trigger channel" option is deactivated. The characteristics five to eight are recorded individually.

#### Data set structure with grouped characteristics



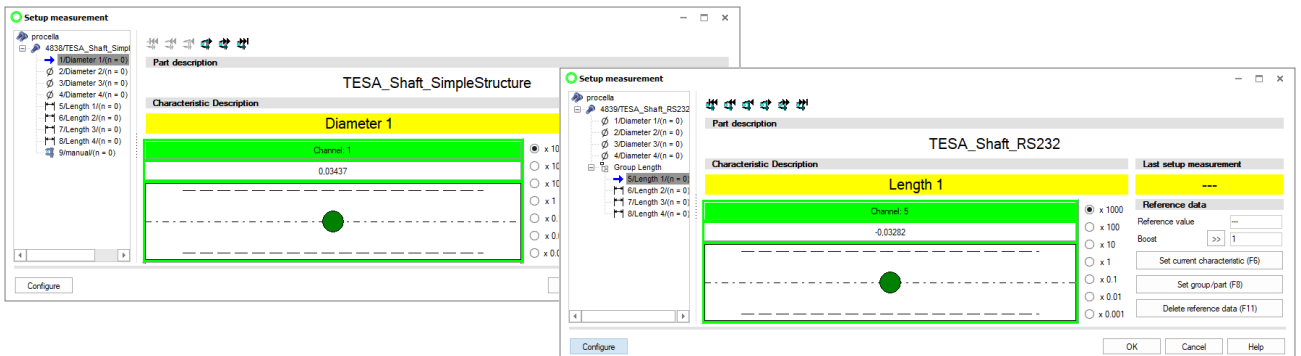
An RS232 interface with the corresponding recording channel is stored for each characteristic.

Characteristics one to four form a virtual characteristics group that are recorded together. The first characteristic is configured as the start of the recording group. For characteristics two, three and four, the option "trigger channel" (recording channel) is deactivated.

The characteristics five to eight are recorded individually. These are combined into one characteristics group.

#### 4.1.1.1 Single

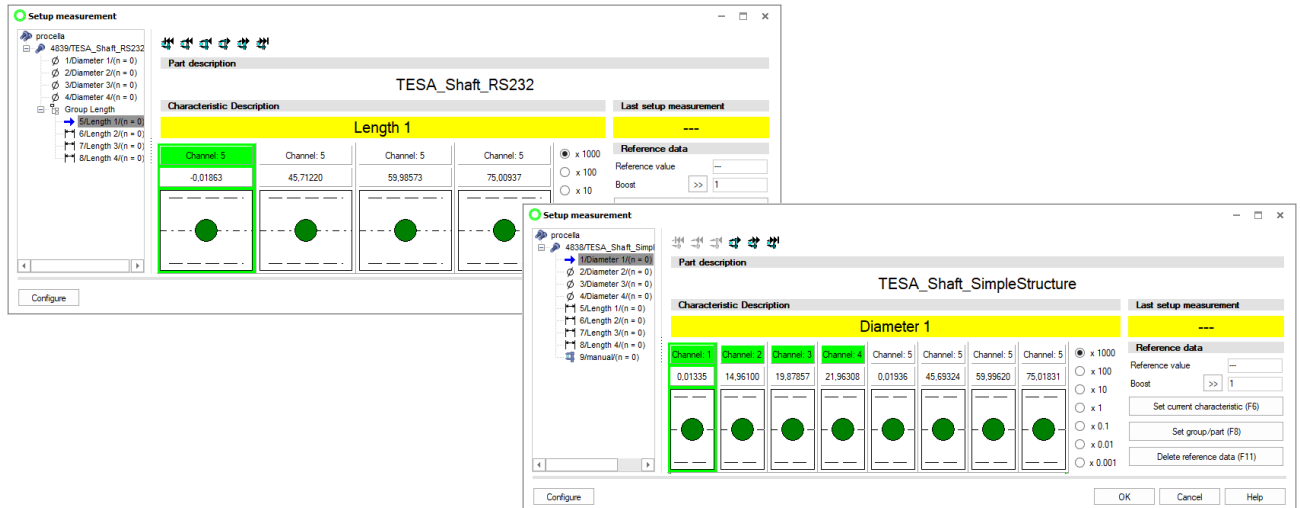
Regardless of the record structure, only the currently selected characteristic is displayed in the window area "Bar display". The last characteristic in the example with the flat data record structure cannot be selected because it is configured for manual recording.





### 4.1.1.2 Group/part

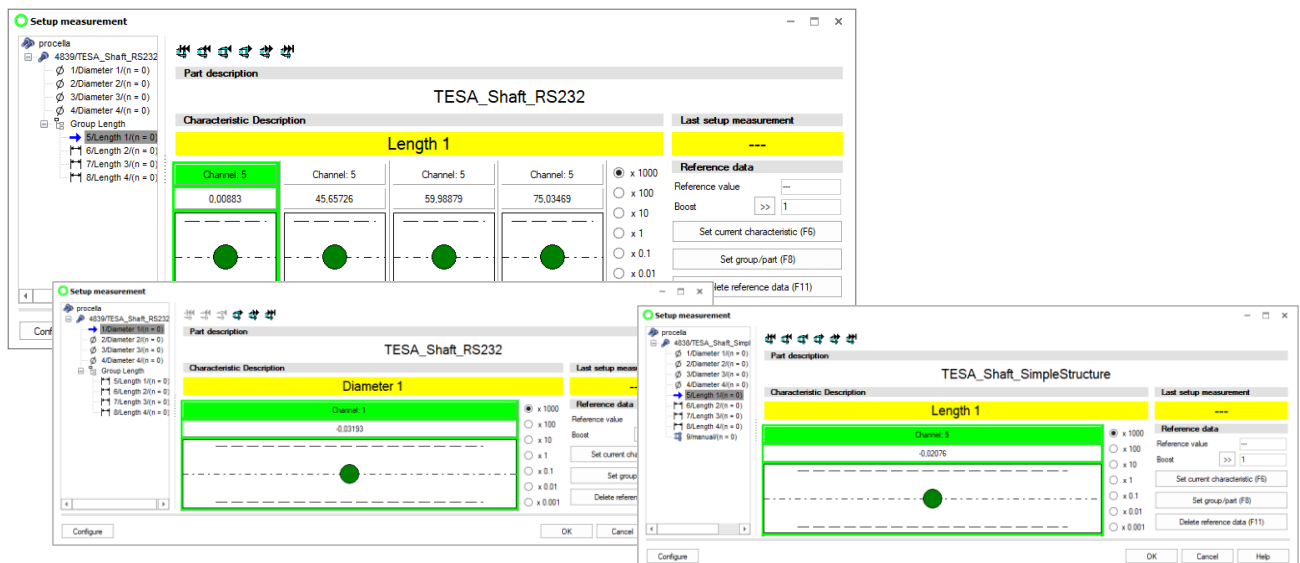
If there is a data set structure with grouped characteristics, the characteristics of the group are displayed together in the window area "Bar display". The fallback level is the part level. If there are no characteristics groups in the data set or if a non-grouped characteristic is active, the bar display shows all characteristics.



### 4.1.1.3 Group/characteristic

With this option, depending on the data set structure, the current characteristic or the current characteristics group is displayed in the window area "Bar display". The grouped characteristics are displayed together as one recording group. The characteristics without grouping are displayed as single record groups.

Provided that there are no grouped characteristics in the data set structure, or a non-grouped characteristic is active, the fallback level is the characteristic level.



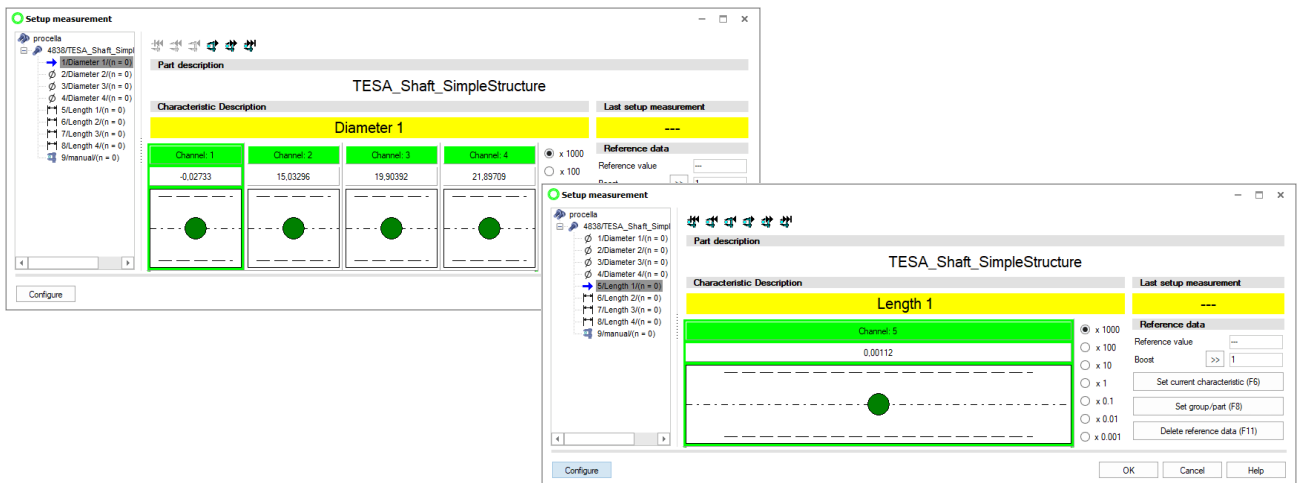


#### 4.1.1.4 Trigger channel

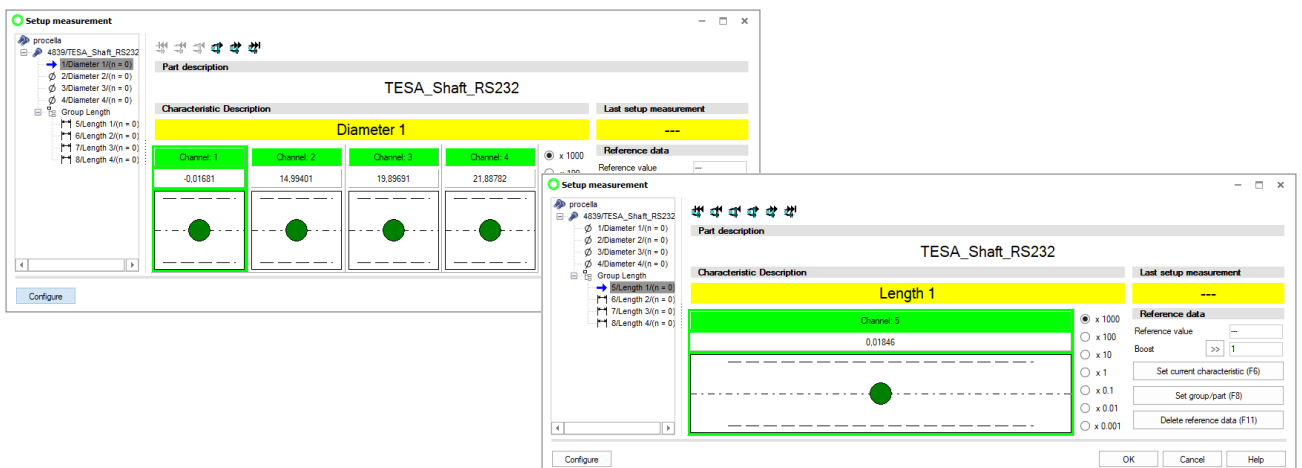
Depending on the configuration of the RS232 interface of individual characteristics, this option displays the current characteristic or the virtual characteristics group in the window area "Bar display".

In both data sets, characteristics one to four are recorded together. These have an RS232 Interface as the recording type. The option "Trigger channel" is deactivated for characteristics two, three and four.

#### Data set with flat structure



#### Data set structure with grouped characteristics



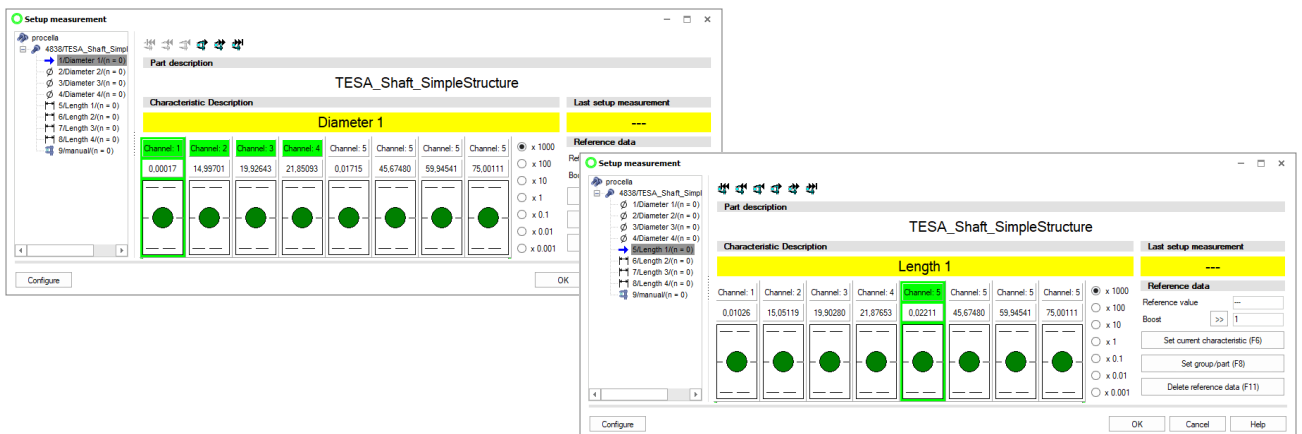


### 4.1.1.5 All

Regardless of the structure of the data set, all characteristics with an RS232 interface are displayed in the window area "Bar display". If the option "Display calculated characteristics" is active, the characteristics that are recorded via a logical operation formula are also displayed.

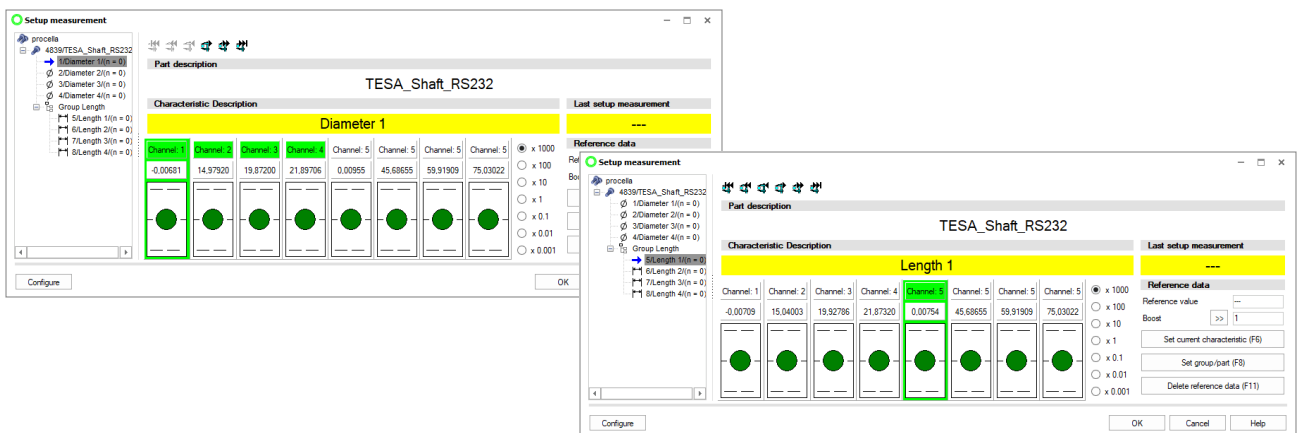
#### Data set with flat structure

The last characteristic in this example is not shown as a bar because it is a characteristic for manual recording. The bar for the selected characteristic is highlighted in green as an active characteristic. Characteristics one to four are a virtual characteristics group. Since the option "trigger channel" is deactivated for characteristics two, three and four, the entire virtual characteristics group is highlighted in green when characteristic one is selected.



#### Data set structure with grouped characteristics

When listing the characteristics in the window area "Bar display", the existing grouping of the characteristics is ignored. The graphic displays all characteristics with a connected measuring device. The bar for the active characteristic is highlighted in green. If the active characteristic is the beginning of a virtual group, i.e., several characteristics with a common trigger channel, the entire characteristics group is highlighted.

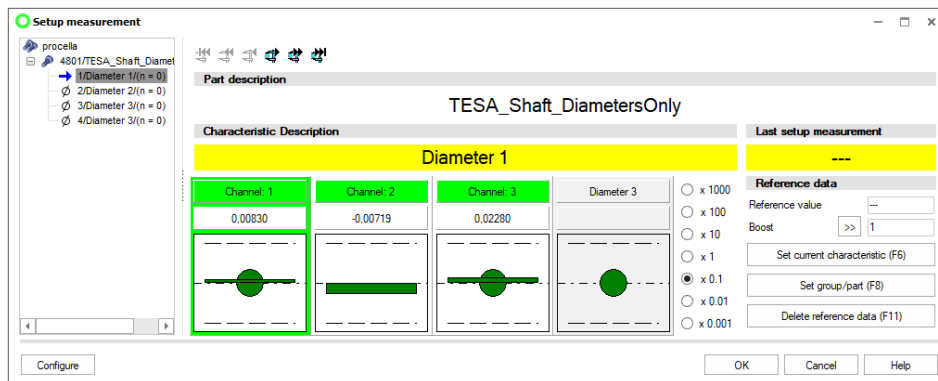


### 4.1.1.6 Additional display options

The following options are additional options for the display in the "Setup measurement" dialogue.

#### “Show calculated characteristics” option

If characteristics are recorded in a data set via a logical operation formula, these can be displayed during the setup measurement. Since the setup measurement cannot be carried out for the calculated characteristics, the bars of these are displayed greyed out.



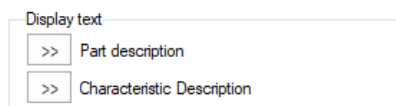
#### Hide characteristics

By activating the option "Hide characteristics" and selecting a characteristic class, the characteristics with an RS232 interface and corresponding characteristic class as well as all lower characteristic classes are not displayed as bars.

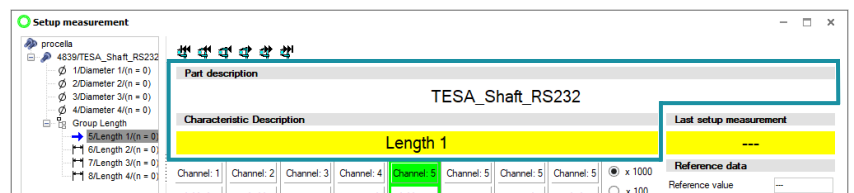
#### Display text

The options here offer the possibility to individually configure the data set information displayed in the "Characteristic selection" window area. One field each is available at part and characteristic level. The corresponding configuration dialogue can be called up via the ">>" button.

Configuration of the dialogue display



Display in the "Setup measurement" dialogue





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### 4.1.2 “Setup measurement” tab

The settings available here are divided into different task areas.

#### Measurement settings

##### Close dialogue

If the option "Close window automatically" is activated, the "Setup measurement" dialogue is closed after a setup measurement has been performed. The option is active in the standard delivery. When adjusting individual characteristics, it is generally recommended to deactivate this option.

##### Request measured values from the measuring device

If measuring device is used that sends measured values automatically, the received measured values are displayed in the bars of the "Setup measurement" dialogue. The update is done according to the transmission frequency of the measuring device. The measuring devices that do not send automatically require the request to send the measured values.

##### *“Measuring interval in ms” option*

The time intervals in which the request is to take place are configured under "Measuring interval in ms". In the standard delivery, the polling frequency of 500 milliseconds is pre-set.

##### *“Start measurement automatically” option*

With the additionally activated option "Start measurement automatically", the request is automatically executed after calling up the "Setup measurement" dialogue. Alternatively, the request can be started manually.

#### Perform setup measurement via external trigger

If external triggers are available for the measuring device, e.g., a foot switch, the setup measurement can be triggered via this. Detailed information on the effect of the individual options is described under [“Reference data” window area](#).

### 4.1.3 “Icons” Tab

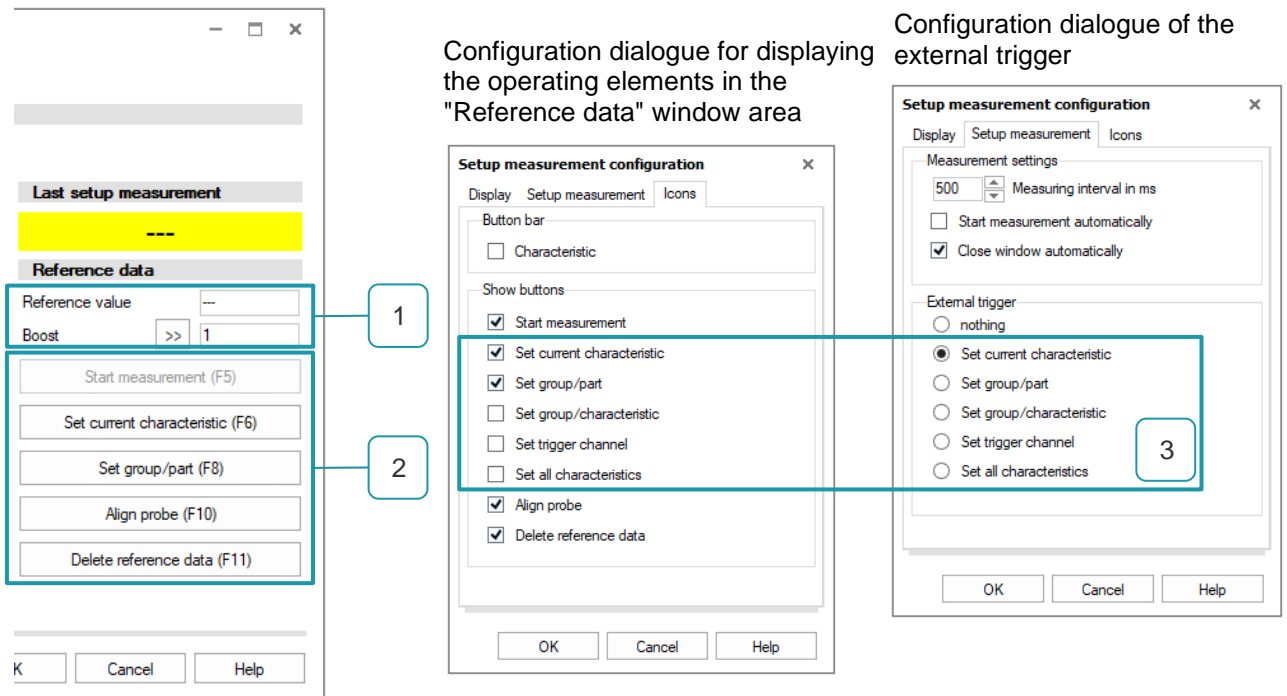
The options available here are used to show or hide the active operating elements in the "Setup measurement" dialogue.

The keyboard shortcuts assigned to the navigation bar can also be used when the navigation bar is not shown. With the option "Characteristics" in the window area "Button bar" deactivated, the navigation bar is hidden.



### 4.2 "Reference data" window area

To determine the target values, the reference values (1) must be specified. The operating elements can be displayed individually (2). A "Setup measurement" is triggered via the operating elements (2) or via external triggers. According to the selected operating elements or option for external triggers (3), the determined offset values are also transferred to the data set. Detailed information on calculating the measured values is described at [Appendix: How is a measured value generated?](#).



#### Reference values (1)

1	<b>"Reference value"</b> : This is the certified value of the reference part.
1	<p><b>"Boost"</b>: Various factors, such as the specification or the mounting (deflection) of the measuring device, can affect the measured values sent by the probe or measuring device. The "Boost" setting is used in the following cases:</p> <p><b>To convert the real measured values</b> If, for example, the measuring probe or measuring device sends the measured values in inches but these are required in millimetres, the corresponding conversion factor is specified in the "Boost" field.</p> <p><b>To correct the measuring direction (inside/outside dimensions)</b> To take the measuring geometry into account in the sense that increasing probe deflection can lead to smaller measured values, depending on the measuring geometry. Here, for example, a reversal of the probe direction can be affected e.g., by specifying "-1".</p> <p><b>Without influence</b> To carry out a Setup measurement, the "Boost" must be set. If none of the above-mentioned influences are present, the setting "1" is required for the correct calculation of the measured values. Detailed information on calculating the measured values is described at under <a href="#">Appendix: How is a measured value generated?</a></p>





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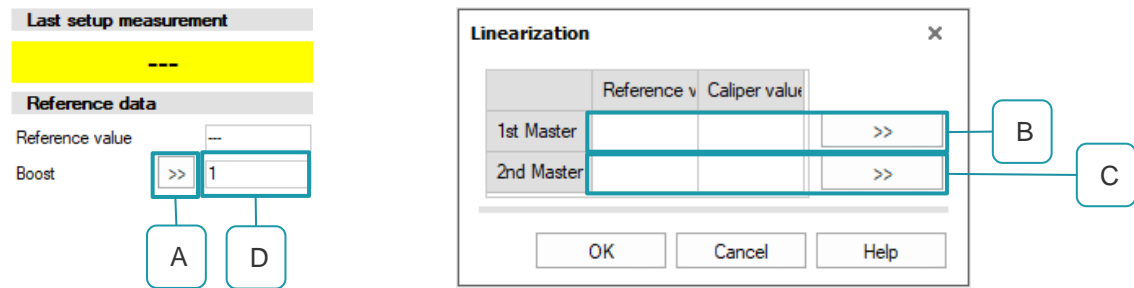
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- 1 **Determining the "Boost" by linearisation:** The dialogue "Linearisation" enables the calculation of the "Boost" using two reference parts.

**Procedure for determining the "Boost" through linearisation**

Dialogue is called up via the ">>" button (A). The first reference part is inserted into the measuring device. Use the ">>" button (B) to enter the corresponding reference value and request the current measured value. The second reference part is inserted into the measuring device. The corresponding reference value is entered via the ">>" button (C) and the current measured value is requested.

By selecting the "OK" button, the linearisation is carried out. The "Boost" is calculated and entered in the "Boost" field (D).

**General operating elements (2)**

- 2 **Start measurement:** The measuring devices that do not send measured values automatically require a prompt to send the measured values. This button is used to start the request manually. When a measuring device is sending data, the button is greyed out.
- 2 **Align probe:** Serves to mechanically adjust the probe. After clicking on the button, the probe can be mechanically adjusted to the optimum measuring range, e.g., the middle of the measuring range. In other words, to mechanically move the probe in the holder or to adjust the test object holder.
- 2 **Delete reference value:** If a reference value was measured for the wrong characteristic, this function resets the reference value. To ensure that the setting is no longer used, the reference value for the current characteristic in the parts/characteristics list is set to "---".



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**Operating elements for performing a setup measurement to calculate the offset values (3)**

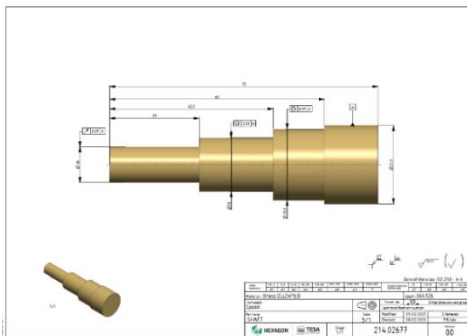
3	<b>Set current characteristic (Single):</b> The setup measurement is only carried out for the currently selected characteristic.
3	<b>Set group/part:</b> The range of the data set on which the operating element has an effect depends on the activated characteristic. The characteristics without groups are treated as single record groups. The fallback level is the part level. If the currently selected characteristic is a part of grouped characteristics, the setup measurement is performed for the active characteristics group. If the current characteristic is a single recorded characteristic or if there are no grouped characteristics in the data set, the setup measurement is performed for the entire data set.
3	<b>Set group/characteristic:</b> The range of the data set on which the operating element has an effect depends on the activated characteristic. The characteristics without groups are treated as single record groups. The fallback level is the characteristic level. If the currently selected characteristic is a part of grouped characteristics, the setup measurement is carried out for the active characteristics group. If the current characteristic is a single recorded characteristic or if there are no grouped characteristics in the data set, the setup measurement is only performed for the selected characteristic.
3	<b>Set trigger channel:</b> If the active characteristic is part of a virtual characteristics group, the setup measurement is carried out for all characteristics of the group, i.e., for all characteristics with the common trigger channel. Provided there are no virtual characteristics groups in the data set structure, each characteristic is treated as a single recording group.
3	<b>Set all characteristics:</b> Regardless of the data set structure or grouping, the setup measurement is carried out for all characteristics with an RS232 interface.
3	<b>Nothing:</b> The triggering of the external trigger is ignored when performing the setup measurement.



# 5 Performing a setup measurement - examples

In the following, the effect of various operating elements in the "Setup measurement" dialogue is explained using the "TESA shaft" as an example. As can be seen in the drawing, the test object consists of four diameters and four length measurements. These are recorded at different measuring stations.

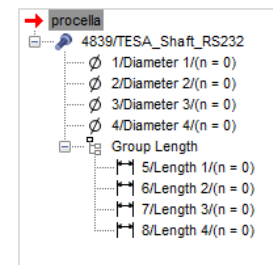
Drawing "TESA shaft"



Measuring stations with various measuring devices



The measurement procedure is organized as follows.



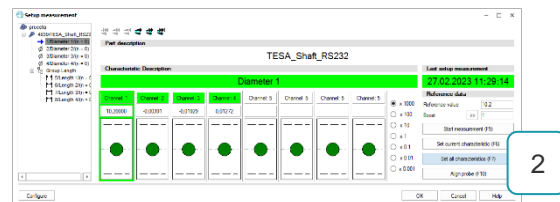
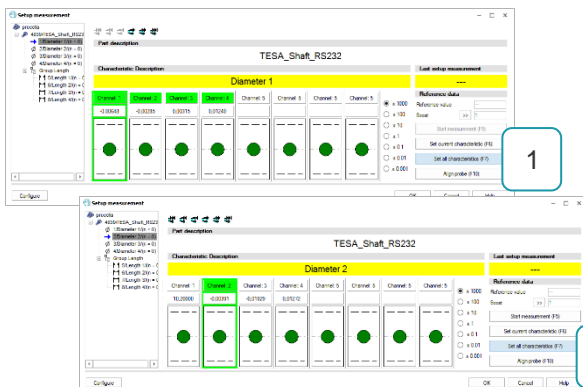
## Configuration of the data set

An RS232 interface with the corresponding recording channel is stored for each characteristic via the characteristics mask. Characteristics one to four form a virtual characteristics groups that are recorded together. The characteristic "Diameter 1" is configured as the beginning of the recording group, while the option "Trigger channel" (recording channel) is deactivated for the characteristics "Diameter 2" to "Diameter 4". Characteristics five to eight are recorded individually. These are combined into a characteristic group.

## Prepare data set for setup measurement

In order to carry out a setup measurement for calculating the offset values, the reference values "Reference value" and "Boost" are required in addition to the current measured values. If there is no influence, enter "1" under "Boost". These are assigned during the first "Setup measurement", so to say when setting up a characteristic. When using the operate elements to perform a setup measurement over several characteristics, the individual characteristics must be set up in advance.

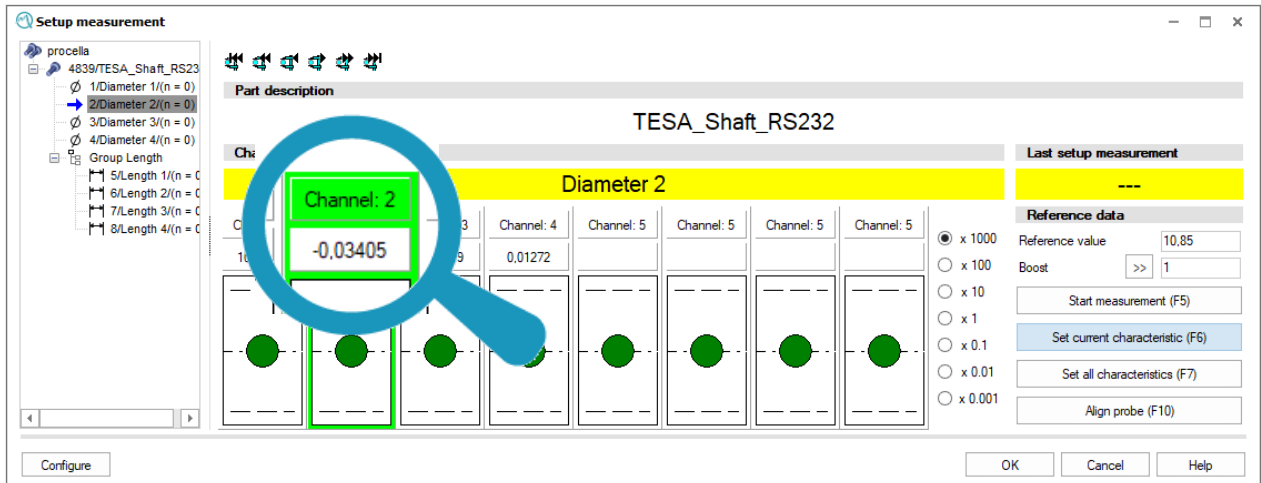
If, for example, the reference values are entered for the current characteristic (1), the "Setup all characteristics" operating element is used to carry out the setup measurement only for the current characteristic (2). For all other characteristics for which the reference values are missing, the setup measurement for the characteristic is skipped (3).





### 5.1 Set up single characteristic

The operating element "Set current characteristic" is used to set the individual characteristics. First, the corresponding characteristic must be activated in the window area "Parts/characteristics list". The active characteristic is highlighted in green in the window area "Bar display". The measured values received via the recording channel are shown in the bar display.



After entering the reference values "Reference value" and "Boost" and selecting the operating element "Set current characteristic", the first setup measurement for the active characteristic is carried out.

This means that an offset value is calculated from the measurement of the reference value and the actual measured value to determine the "real" measured value. The measured value determined in this way is shown in the bar display. Both the reference values and the calculated offset values are stored in the data set.

### 5.2 Carry out setup measurement for characteristics groups

Using the operating elements to perform a setup measurement across multiple characteristics requires that the corresponding characteristics be set up in advance (first setup measurement has been performed). By saving the reference values for the data set, they can be used again for a new offset calculation.

As can be seen from the parts protocol, the setup measurement is set up for all characteristics of the data set.

The range of the data set on which the operating element has an effect depends on the activated characteristic and the selected operating element.

The characteristics displayed in the window area "Bar display" are for display purposes only and have no effect on the execution of a setup measurement.

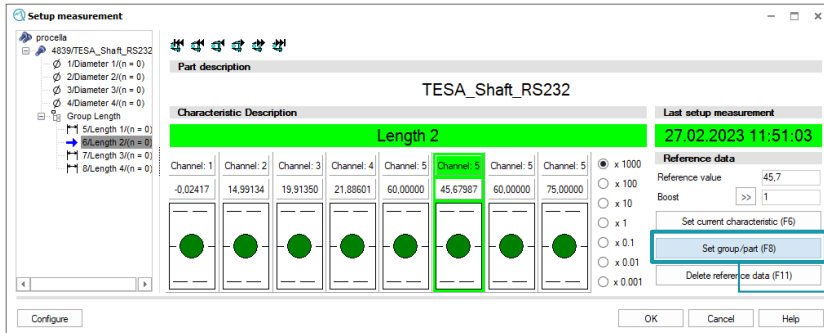
**Complete parts protocol 1**

Part no.		4839
Char.No.	Char.Descr.	Setup meas. date
1	Diameter 1	27.02.23 11:35:24
2	Diameter 2	27.02.23 11:36:03
3	Diameter 3	27.02.23 11:36:06
4	Diameter 4	27.02.23 11:36:13
5	Length 1	27.02.23 11:36:43
6	Length 2	27.02.23 11:36:51
7	Length 3	27.02.23 11:36:54
8	Length 4	27.02.23 11:36:56



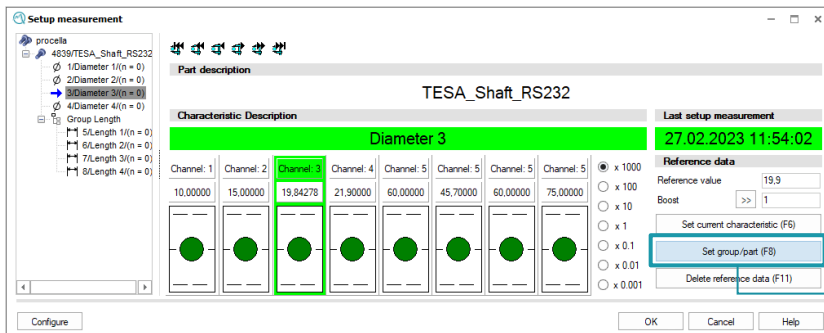
### 5.2.1 Operating element "Set group/part (F8)".

When the characteristic with the designation "Length 2" is activated, the operating element "Set group/part" is selected. The "Setup measurement" is carried out for all characteristics belonging to the characteristics group.



Complete parts protocol 1		
Part no.	4839	
Char.No.	Char.Descr.	Setup meas. date
1	Diameter 1	27.02.23 11:35:24
2	Diameter 2	27.02.23 11:36:03
3	Diameter 3	27.02.23 11:36:06
4	Diameter 4	27.02.23 11:36:13
5	Length 1	27.02.23 11:51:03
6	Length 2	27.02.23 11:51:03
7	Length 3	27.02.23 11:51:03
8	Length 4	27.02.23 11:51:03

When the characteristic with the characteristic designation "Diameter 3" is activated, the operating element "Set group/part" is selected. The fallback level is the part level. The setup measurement is carried out for all characteristics, including the characteristics of the virtual characteristics group. This means for all single record groups (characteristics without grouping) belonging to the data set (part level) and the grouped characteristics (groups).

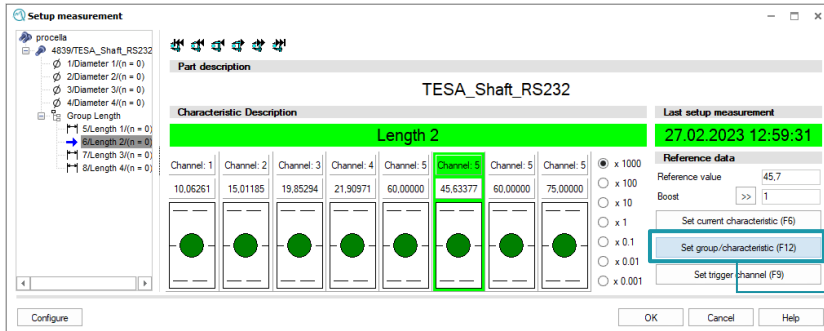


Complete parts protocol 1		
Part no.	4839	
Char.No.	Char.Descr.	Setup meas. date
1	Diameter 1	27.02.23 11:54:02
2	Diameter 2	27.02.23 11:54:02
3	Diameter 3	27.02.23 11:54:02
4	Diameter 4	27.02.23 11:54:02
5	Length 1	27.02.23 11:54:02
6	Length 2	27.02.23 11:54:02
7	Length 3	27.02.23 11:54:02
8	Length 4	27.02.23 11:54:02



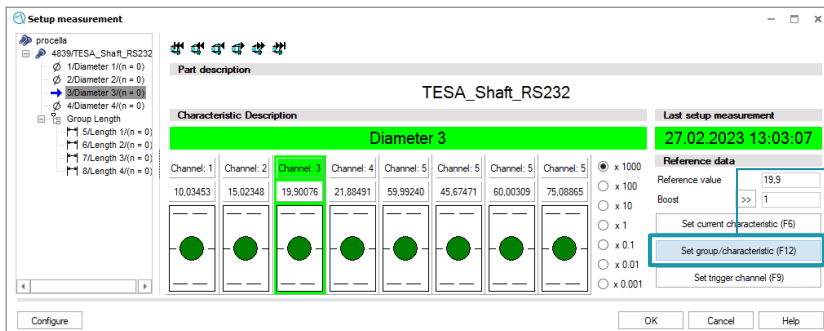
### 5.2.2 Operating element "Set group/characteristic (F12)

When the characteristic with the characteristic designation "Length 2" is activated, the operating element "Set group/characteristic" is selected. The "Setup measurement" is carried out for all characteristics belonging to the characteristics group.



Complete parts protocol 1		
Part no.	4839	
Char.No.	Char.Descr.	Setup meas. date
1	Diameter 1	27.02.23 11:54:02
2	Diameter 2	27.02.23 11:54:02
3	Diameter 3	27.02.23 11:54:02
4	Diameter 4	27.02.23 11:54:02
5	Length 1	27.02.23 12:59:31
6	Length 2	27.02.23 12:59:31
7	Length 3	27.02.23 12:59:31
8	Length 4	27.02.23 12:59:31

When the characteristic with the characteristic designation "Diameter 3" is activated, the operating element "Set group/characteristic" is selected. The fallback level is the characteristic level. This means that the operating element has no influence on the virtual characteristics group. The setup measurement is only carried out for the currently active characteristic.

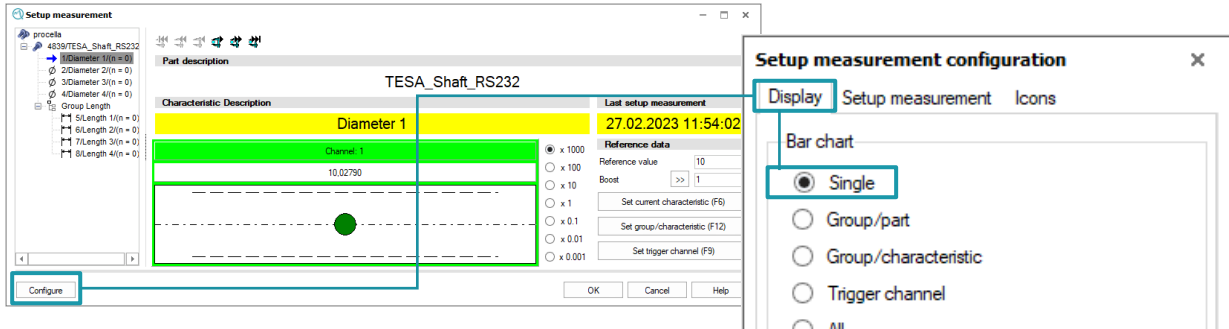


Complete parts protocol 1		
Part no.	4839	
Char.No.	Char.Descr.	Setup meas. date
1	Diameter 1	27.02.23 11:54:02
2	Diameter 2	27.02.23 11:54:02
3	Diameter 3	27.02.23 13:03:07
4	Diameter 4	27.02.23 11:54:02
5	Length 1	27.02.23 12:59:31
6	Length 2	27.02.23 12:59:31
7	Length 3	27.02.23 12:59:31
8	Length 4	27.02.23 12:59:31



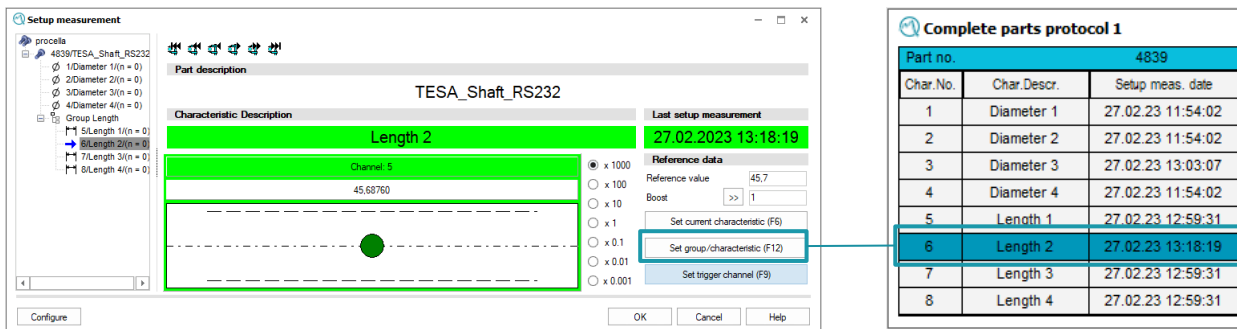
### 5.2.3 Operating element "Set trigger channel (F9)".

In the following example, the dialogue display is configured for viewing single characteristics. For this purpose, the option "Single" is activated on the tab "Display" in the dialogue "Setup measurement configuration".

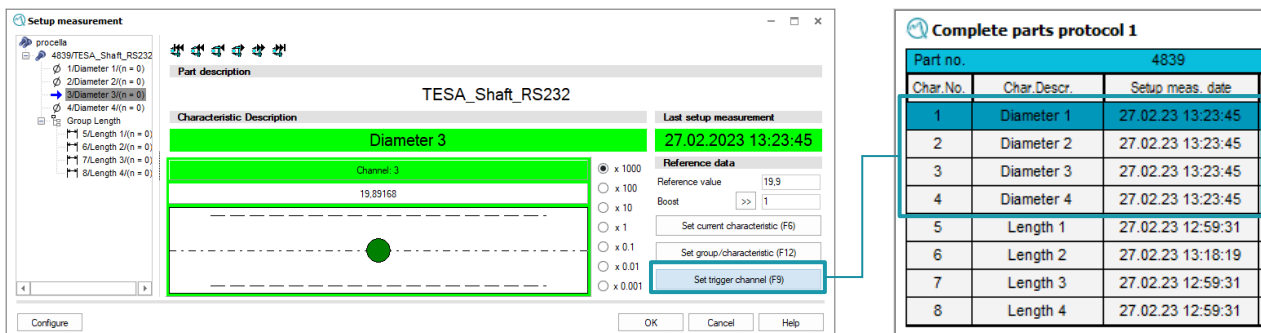


With this option, only the currently selected characteristic is displayed in the window area "Bar display", regardless of the data set structure. The display in the window area "Bar display" has no influence on the setup measurement. The part of the data set for which the setup measurement is performed is determined only by the selection of the operating element.

The selection of the operating element "Set trigger channel" with activated characteristic with the characteristic designation "Length 2". Although the characteristic "Length 2" belongs to a characteristics group, it is recorded individually. Due to the individual recording, it forms its own virtual characteristics group.



The selection of the control element "Set trigger channel" with activated characteristic with the characteristic designation "Diameter 3". This characteristic is a part of a virtual characteristics group. The setup measurement is carried out for all characteristics of the virtual group.





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## 6 Appendix: How is a measured value generated?

An explanation that is often necessary in this context is how the actual measured value that is effectively stored in the data set is composed.

For a setup measurement, the difference value "Setup measurement offset" (K2074) is determined from the "Certified Value of Reference Part" (K2073) and the "Amplification factor for setup measurement" (K2075).

### Measured value:

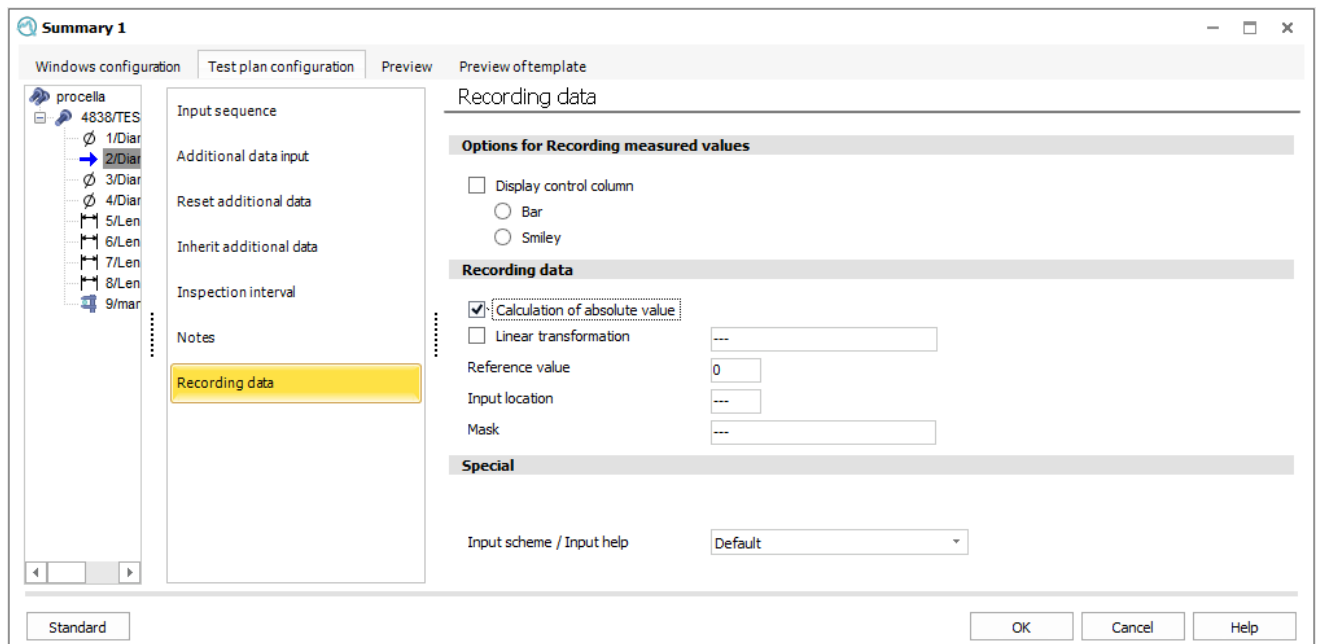
During measurement value recording, the measured value is calculated from the real measured value sent by the probe, the "Boost" ("Amplification factor for setup measurement") and the determined offset according to the following formula.

Measured value = ( Transmitted value \* "Amplification factor for setup measurement" ) + ( "Offset for setup measurement" )

Measured value = ( transmitted value \* K2075 ) + K2074

### Measured value with calculation of absolute value:

By activating the option "Calculation of absolute value" on the characteristic level, the sign information is ignored and thus only the positive measured values are recorded.



Measured value<sub>ABS</sub> = ( absolute transmitted value ) \* "Amplification factor for setup measurement" + ( "Offset for setup measurement" )





## 7 Appendix: K-fields used for Setup measurement:

The following K-fields are used for the setup measurement in the Q-DAS application:

(without guarantee for completeness)

K2071	Accumulating Constant
K2072	Multiplication factor
K2073	Certified Value of Reference Part
K2074	(current) Setup measurement offset
K2075	Amplification factor for setup measurement
K2076	Setup measurement date

Additional fields for the measuring device (general):

K2043	Recording Device Name
K2044	Recording Device Index
K2045	Recording Channel
K2046	Recording Subchannel
K2047	Software Requirement Index
K2048	Trigger channel
K2049	Channel initialization
K2051	Interface
K2052	Baud rate
K2054	Parity
K2055	Data bits
K2056	Stop bits