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## CALYPSO

Option 20

CALYPSO VAST performance

## Operating Instructions



The design and delivered components of the CMM, its options, the program packages, and the relevant documentation are subject to change.

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Although utmost care has been taken in preparing the information given in this manual, we cannot assume any liability for its completeness and correctness, except in case of willful intent.

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# Preface

## Information about these operating instructions

The CALYPSO program consists of a base module and additional options for special purposes. You can customize the scope of program to fit your requirements.

These operating instructions describe an option of CALYPSO and are based on the assumption that the user is familiar with the operating instructions for the base module of CALYPSO.

### NOTE

The additional CALYPSO options are described in separate manuals.

Reference information about the windows and dialogs can be found in the dialog reference in the CALYPSO Online Help.

*Simply Measure – And what you should know to do it right, A metrology primer*

Carl Zeiss, Industrial Metrology Division,

Order no.: 612302-9002

### Text conventions

The following text conventions are used in these instructions.

Example	Description
<b>Features</b>	Text element of the graphics screen display.
<b>Comment</b>	The <b>Comment</b> button on the screen.
<machine name>	Variable text or dummy for a name.
C:\windows\w.ini	The w.ini file in the windows directory on the C:\ drive.
<i>For this section...</i>	A passage containing important information.

### Example

➤ *Preface* [⇒ *Preface-1*]

### Description

This is a cross reference. When viewing this manual on the screen, you will be guided to the indicated text passage by clicking the reference.

**Plan** → **CNC-Start** → **Run**

The **Run** command in the **CNC-Start** submenu of the **Plan** menu.

CTRL+A

Press the CTRL key and the letter A at the same time.

### Icons

Three special symbols containing important information are used in this manual. The icons appear in the marginal column next to the respective text.

You will find a detailed explanation of the safety instructions under Configuration of safety instructions.

## Configuration of safety instructions

Safety instructions indicate a personal health hazard. We distinguish three different levels: Danger, warning and caution. All three safety instructions are marked with the same warning symbol. The designation of the safety instruction is shown beside the symbol. The safety instructions used are described below.

### Configuration of a safety instruction

A safety instruction may have the following components:

- Warning symbol and designation of the safety instruction (signal word): Danger, warning or caution.
- Source and cause of the danger
- Consequences for the user due to non-observance of the safety instruction
- Required measures to be taken by the user to avoid possible consequences
- A measure may cause an intermediate result.
- At the end of all measures, a final result may be caused.

### Personal health hazard



#### **⚠ DANGER**

**A »danger« indicates an imminent risk to life and limb.**

Non-observance of this safety instruction when the described risk occurs causes death or serious injuries.

*Example:* Electric shock due to high electric voltage.



#### **⚠ WARNING**

**A »warning« indicates a possible risk to life and limb.**

Non-observance of this safety instruction when the described risk occurs may cause death or serious injuries.

*Example:* Risk of severe crushing of the body caused by heavy loads.



#### **⚠ CAUTION**

**A »caution« indicates a personal health hazard.**

Non-observance of this safety instruction when the described risk occurs may cause slight to moderate injuries.

*Example:* Risk of minor crushing of the limbs caused by small loads.

### Risk of material damage

If there is no personal health hazard, but the CMM or components may get damaged, this is pointed out by the following notice.



**This symbol refers to possible damage to the CMM.**

Non-observance of this safety instruction when the event occurs may cause damage to the CMM or one of its components.

*Example:* Collision of the ram with a workpiece.



# 1

## CALYPSO VAST performance (Option)

### **This chapter contains:**

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## Introduction: CALYPSO VAST performance (option)

The CALYPSO VAST performance option makes it possible to use the Fly-Scan and quick stylus system change-out functions.

- FlyScan allows you to measure scanning paths which are interrupted by grooves in one pass without lifting off the stylus.
- For quick stylus system change, CALYPSO uses the maximum travel speed when changing the stylus system. This shortens the measuring time, especially for measurement plans with frequent stylus system changes.

### NOTE

You can only use the CALYPSO VAST performance option if the **Navigator** and **VAST-PERFORMANCE** licenses have been installed and enabled on your system.

## Basics about FlyScan

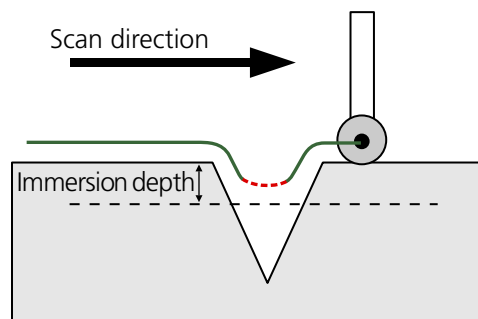
### Advantages of FlyScan

If you use the CALYPSO VAST performance option in addition to the CALYPSO VAST navigator option, you can measure scanning paths which are interrupted by grooves in one pass without lifting off the stylus. To do so, use the *FlyScan* function.

The interruptions of the scanning path must not be entered separately. CALYPSO identifies these interruptions automatically by means of FlyScan. FlyScan thus facilitates the creation of measurement plans and shortens the measuring times.

### How does FlyScan function?

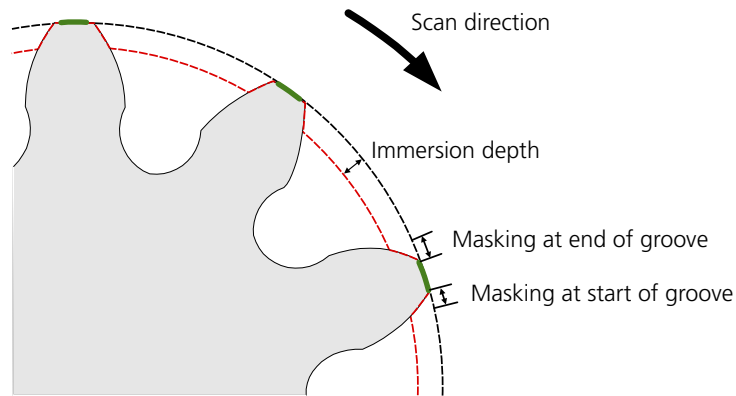
CALYPSO defines a "virtual plane" for the measurement of an interrupted scanning path. Once the scanning path is interrupted, the stylus lowers itself to the height of the virtual plane (immersion depth) and remains in this position until it gets again into contact with material. The measured "air points" are masked automatically and excluded from the evaluation.



#### Example

A practical example is the scanning of the circumference of a gear: One single scanning path at the height of the tip circle is sufficient for FlyScan.

Only the measuring points on the tooth tips are used for the evaluation (shown in green in the graphic). The other points are masked automatically (shown in red in the graphic).



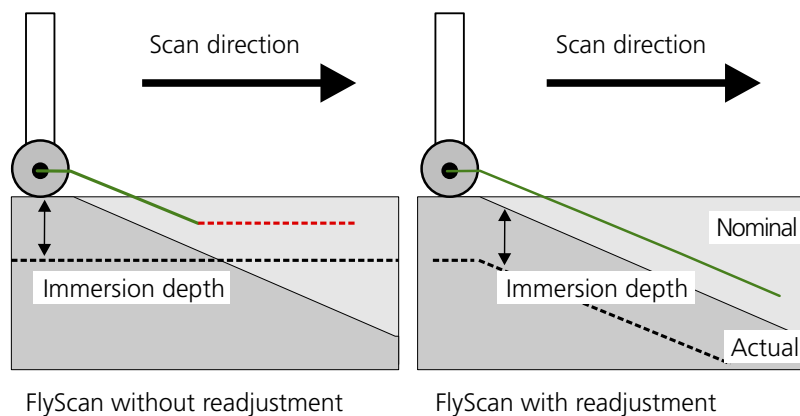
Both the air points at the height of the immersion depth as well as the involute components and points at the start and end of the groove, which would falsify the measuring result due to the approach and retraction movement of the stylus, are masked here.

Without FlyScan, you would have to measure an individual scanning path for each tooth tip or measure using the discrete-point probing method.

### Readjustment

*Readjustment* is activated by default for scanning with FlyScan.

- Without readjustment, the immersion depth is also reached without any groove in the case of large nominal/actual deviation. The stylus lifts off the material and FlyScan creates undesired "air points" which cannot be evaluated.
- The readjustment function makes it possible to adapt the immersion depth automatically to the measured surface.



*Restrictions:* Scanning with readjustment only functions up to a deviation or inclination of the surface of 3 %. In the case of deviations > 3 %, you must use an individually adapted alignment.

For example, it is not possible to use readjustment for scanning hobs and workpieces during the measurement of which more air points than material points are measured (e.g. if groove > material). You must deactivate the readjustment function for such measuring jobs.

## Own settings for FlyScan

FlyScan offers the following setting and modification options:

### Immersion depth

CALYPSO automatically adapts the immersion depth to the measuring force. With a measuring force of 200 mN, the immersion depth is for example 0.15 mm. If necessary, you can increase the *immersion depth* in addition to the minimum immersion depth by an additional value in percent of the stylus tip radius.

You can change this setting for the entire measurement plan or for an individual feature in the **Measurement Plan Editor Features**. In the strategy window, you can overwrite the predefined value in the FlyScan settings.

### Readjustment

You can switch *Readjustment* on and off. This setting can be made in the strategy window of the corresponding feature.

### Masking outliers

In addition, those measuring points that would falsify the result due to approach and retraction movements can be *masked as outliers* at the start and end of a groove.

You have two independent options:

- Definition of fixed lengths at the start and end of the groove (in the evaluation of the corresponding feature).
- Manual masking of the unfavorable points in the CAD window. In the CAD window, you can mask further points in addition to the points masked in red.

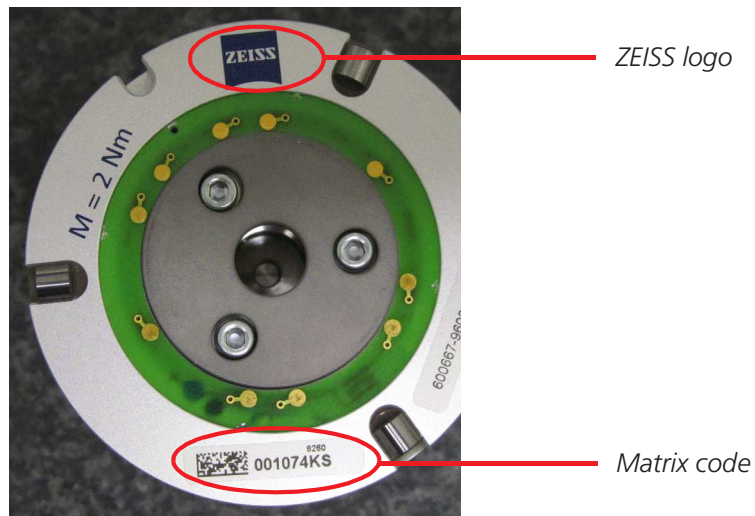
## Prerequisites for FlyScan

Certain preconditions must be satisfied before you can measure with FlyScan.

### CMM

- The probe is of the VAST gold, VAST XT gold or VAST XTR gold type.
- CMM control type C99, firmware version 24.0 or higher, is used.

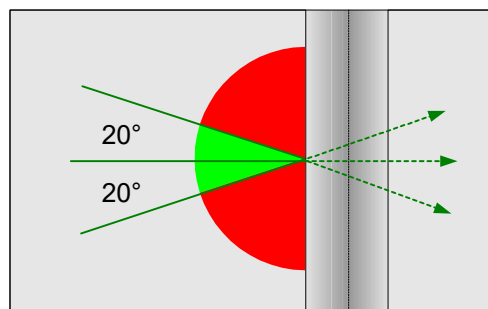
- Only original ZEISS adapter plates with matrix code (see photo) are used.



Otherwise, no readjustment is possible. In this case, the CNC run will be canceled.

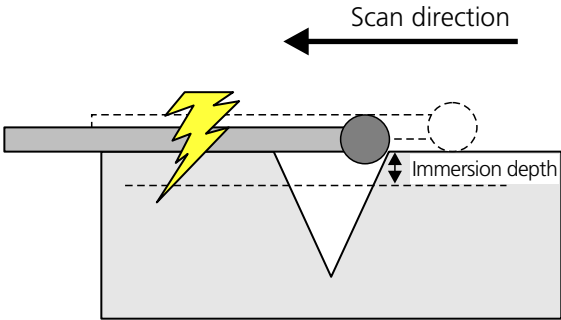
### Workpiece

- The grooves have a maximum flatness of 0.3 mm.
- The width of the groove exceeds the diameter of the stylus tip. Otherwise, no groove can be recognized.
- The angle between travel path and groove edge is  $90^\circ \pm 20^\circ$ . If the angle between the travel path and the edge is too small, the stylus tip radius will make automatic data validation impossible until the immersion depth has been reached.



**Scanning path**

- The measurement starts on material and not in a groove.
- When measuring in shaft direction, there is an increased risk of unapparent shaft probing due to the immersion depth. In this case, you must use a stylus with larger stylus tip radius for the measurement.



**Features and strategies** The "FlyScan" function can be used for the following features and strategies:

<b>Feature</b>	<b>Strategy</b>	<b>Rotary table</b>
Circle	Circle path (not with rotary table)	Not possible
	Helix	Only with pitch = 0
Plane	Grid	
	Polyline	
	Circle path on plane	
2D Line	Line	
Cylinder	Circle path	
	Surface line	
	Helix	
	VAST Helix (variable Helix)	
Cone	Circle path	
	Helix	

# Measuring with FlyScan

## Procedure for the measurement with FlyScan

FlyScan is an individual probing method. You can measure with FlyScan only if the following settings are made:

- Self-centering scanning is deactivated.
- Tangential probing is deactivated.

### Procedure

To measure with FlyScan, activate FlyScan in the the corresponding strategy window. If necessary, change the predefined FlyScan settings, such as immersion depth and readjustment.

In the **Evaluation** window, you must enter additional distances for the start and end of the groove for the masking of additional points.

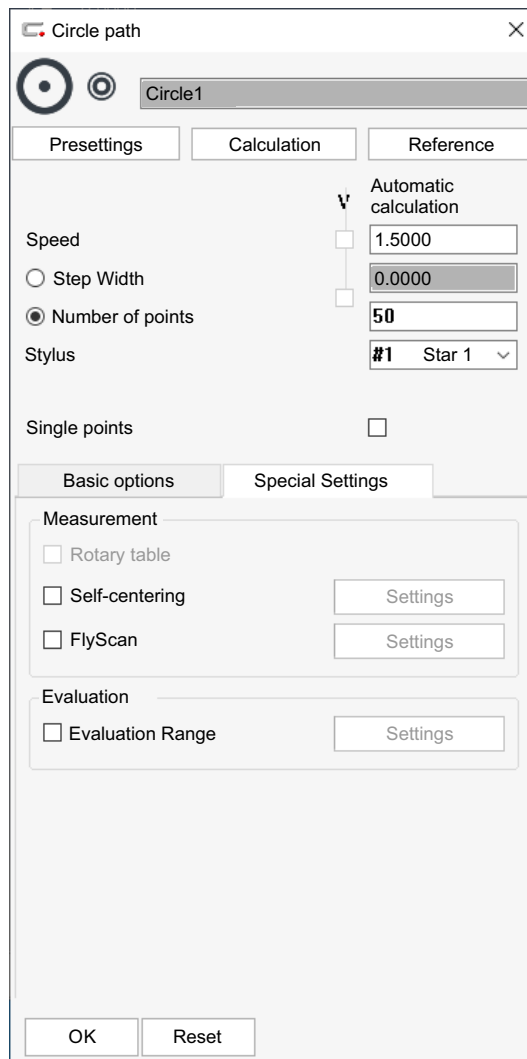
After the CNC run, check the measured and masked points in the CAD window and mask additional points if needed.

The masked points that have not been evaluated can be displayed in the plot if necessary.

## Activating and setting FlyScan

- 1 Open the definition template of the feature.
- 2 Tick the **FlyScan** check box on the **Special Settings** index card.





3 To define additional settings, click the **Settings** button.

- If needed, enter the **Additional immersion depth to minimum immersion depth in % from probe feature radius**.

In the case of larger nominal/actual deviation, a better result can be obtained with a larger immersion depth.

- Untick the **Readjustment** check box if readjustment is not suitable for your measuring job. This is, for example, the case if the number of air points with respect to the material is very high (groove > material).

4 Press **OK** to confirm.

You can exclude other areas from the evaluation in addition to the automatically masked "air points" at the start and end of the groove (➤ *Defining evaluation for FlyScan [⇒ 1-10]*).

During the CNC run, CALYPSO moves with FlyScan over the grooves and interruptions and ignores the "air points" and excluded measuring points.

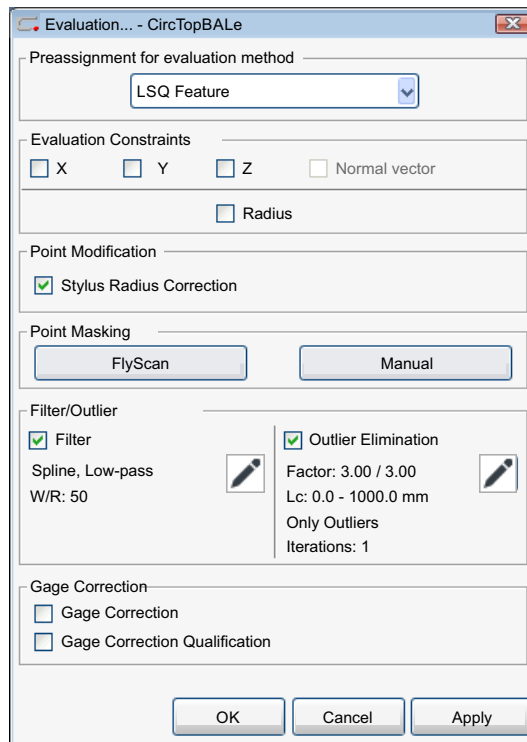
If necessary, it is possible to exclude additional points from the evaluation even after scanning (Manual Point Masking).

## Defining evaluation for FlyScan

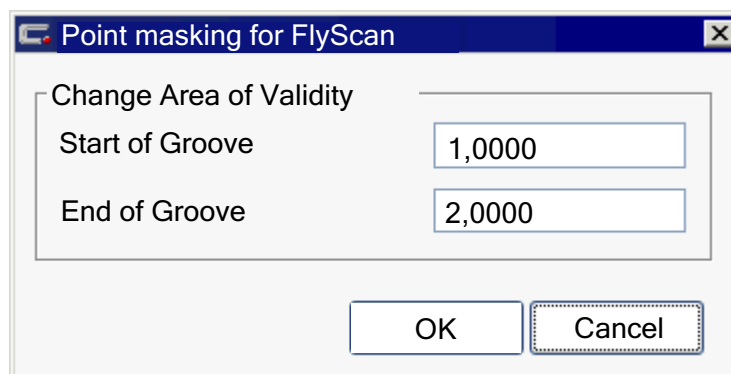
You can exclude other areas from the evaluation in addition to the automatically masked "air points" at the start and end of the groove.

### To exclude areas at the start and end of the groove from the evaluation:

- 1 Click **Evaluation** in the definition template of the feature.



- 2 Click **FlyScan** under **Point Masking** and enter the desired distances for **Start of Groove** and **End of Groove** in mm.



### 3 Close by clicking **OK**.

During the CNC run, CALYPSO moves with FlyScan over the grooves and interruptions and ignores the "air points" and excluded measuring points.

If necessary, it is still possible to exclude additional points from the evaluation in the CAD window after scanning.

# Quick stylus system change (QuickChange)

## Advantages of the quick stylus system change

The CALYPSO VAST performance option allows you to activate and use the quick stylus system change in CALYPSO. For quick stylus system change, CALYPSO uses the maximum travel speed when changing the stylus system. This shortens the measuring time, especially for measurement plans with frequent stylus system changes.

For the VAST XTR gold, the CALYPSO VAST performance option is not required for quick stylus system change.

### NOTE

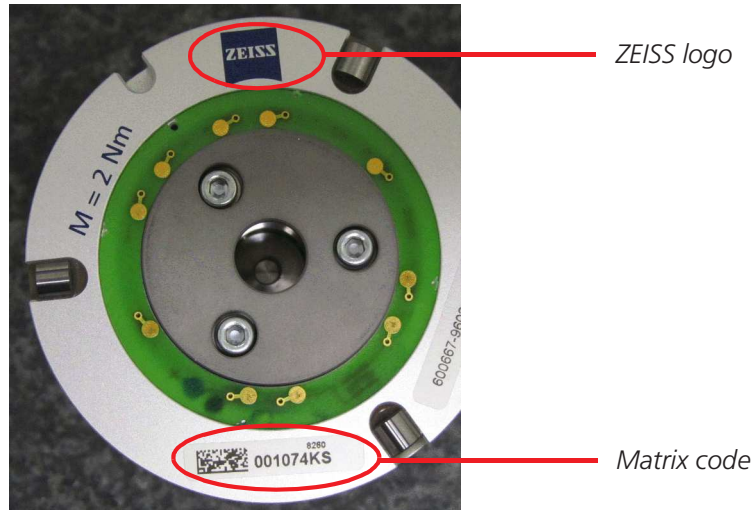
Use can use the quick stylus system change if the specifications valid for all your stylus systems and changers are complied with (see ► *Requirements for the quick stylus system change* [⇒ 1-12]).

In case of extra long or heavy stylus configurations, stylus system change at reduced speed may be useful. For such a case, you may deactivate the quick stylus system change function for the corresponding holder (see ► *Deactivating quick stylus system change for individual holders* [⇒ 1-14]).

## Requirements for the quick stylus system change

The following conditions must be fulfilled for the quick stylus system change:

- The probe is of the VAST, VAST gold, VAST XXT, VAST XT gold or VAST XTR gold type.
- Only original ZEISS adapter plates with matrix code (see photo) are used.



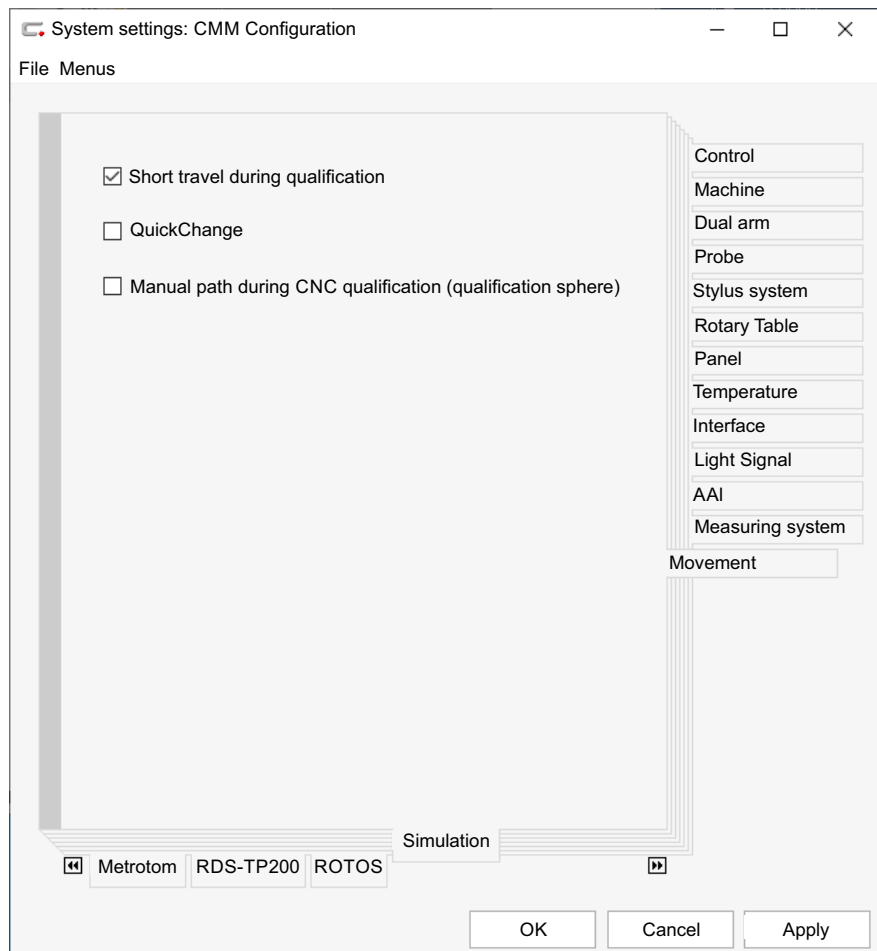
- CMM control type C99, firmware version 24.0 or higher, is used.
- The control system is configured for quick stylus system change according to your CMM type.
- You have a valid license for the CALYPSO VAST performance option (not necessary for VAST XTR gold).
- The automatic stylus recognition is enabled and the ID of the stylus is known to CALYPSO.

### NOTE

If you also use other stylus systems, you must deactivate the quick stylus system change function for the holders of these stylus systems in the configuration of your stylus system changer (see ► *Deactivating quick stylus system change for individual holders* [⇒ 1-14]).

## Activating the quick stylus system change

- 1 Select **Extras** → **Settings** → **CMM** and open the **Movement** notebook page.



### 2 Activate **QuickChange**.

This is only possible if the control is configured for quick stylus system change according to your CMM type.

### 3 Confirm the following prompt if you are sure that all stylus systems should be changed using the quick stylus system change function.

The quick stylus system change is thus activated.

You can deactivate the quick stylus system change for individual holders of your stylus system changer. For more information, please refer to [► Deactivating quick stylus system change for individual holders \[⇒ 1-14\]](#).

## Deactivating quick stylus system change for individual holders

You can use the quick stylus system change if the specifications valid for all your stylus systems and changers are complied with (see [► Requirements for the quick stylus system change \[⇒ 1-12\]](#)).

To make sure that the quick stylus system change is available for a holder, the quick stylus system change must be activated in the system setup. For more information, please see ➤ *Activating the quick stylus system change* [⇒ 1-13].

In case of extra long or heavy stylus configurations, stylus system change at reduced speed may be useful. For such a case, you may deactivate the quick stylus system change function for the corresponding holder.

- 1 Select **Resources** → **Stylus system** → **Automatic stylus system change**.

- or -



Click **Automatic stylus system change** in the toolbar.

The **Automatic stylus system change** dialog box is opened.

- 2 Select the holder for which you want to deactivate the quick stylus system change function.

The selected holder is highlighted in color. For information on the color coding, please see *Color coding of holders*.

- 3 In the **Changer** selection list, select **Approach Parameters**.

The **Approach Parameters [cmm\_name] [changer\_name]** dialog box opens.

- 4 Click **Advanced Options**.

The **Advanced Options** dialog box opens.

- 5 Untick the **Fast stylus change for this holder (depending on assignment)** check box in the **Movement** section.





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