



Contact probing systems

Operating Instructions



Read this first!

- Please read these operating instructions before using the ZEISS product.
- For your own safety, keep all relevant accompanying documents always ready at hand.

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Preface

About this document

These operating instructions describe contact probes and their special features. To find out which probe can be used on your CMM, refer to the operating instructions for your CMM.

These operating instructions also contain information on stylus systems.

These operating instructions address operators and users of the coordinate measuring machine.

NOTE

In addition to the contact probes, there are also optical probes and roughness sensors. See separate documents.

- Optical probes are used on articulating systems.
- Roughness sensors are inserted in the adapter plate receptacle of a probe.
- Stylus systems, optical probes, and contact probes can be automatically changed on articulating systems and roughness sensors. There are changer racks for this purpose. Special holders in which a stylus system, a probe, or a roughness sensor can be deposited are mounted on the changer racks.

Separate documents

The following separate documents are available:

- Contact probing systems
- Optical Probing Systems
- Articulating systems
- Changer racks
- Roughness sensors

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 obtained.

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 probing system with a workpiece.

Markup elements

Text may be displayed differently in this document. Examples and the meaning of the representation type are described below:

Example	Meaning
<i>not</i>	Words to be emphasized are represented in <i>italics</i> . The italic print is sometimes used to mark a subheading, e.g. <i>Examples</i> :
<i>Main switch</i>	Any reference to control elements in the text is highlighted typographically.
Tolerance field	Designation of parts of software windows.
Cancel	Marking of buttons
RETURN	Keys of the keyboard are represented as small capitals.
"InstallShield Wizard completed"	Software messages
File → Open	Representation of menu items
Code	Source code
...\CALYPSO\protocol\protocol	File and directories
CALYPSO	Product name
ZEISS	Company name
CAUTION! The measuring table must be clean.	Safety instructions embedded in the text.
Note: Pay attention to the correct orientation of the qualification marks.	Note embedded in the text.
[1]	Representation of position numbers in texts

1

Introduction

This chapter contains:

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Delivery package

Probes and stylus system kits are supplied in a case. In this case, you will usually find a supplement sheet which lists the content of the case.

Warranty and standards

Operating instructions for the CMM

The probing system is part of the CMM, for which certain standards apply. Furthermore, to operate the CMM, the safety instructions must be observed. See the operating instructions for the respective CMM.

The operating instructions for the CMM include information on the following topics:

- System safety
- Standards, regulations, and directives
- Warranty
- Safety

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Safety

This chapter contains:

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Intended Use

Probing system

The probing system is a high-tech product which may be used for its intended purpose only.

Probing

CMM probing systems are designed for determining the *coordinates* of a workpiece. This is usually achieved via probing, during which the workpiece is probed by means of a stylus tip. In some cases optical measuring methods are used. The probing system comprises several components, such as the probe holder, probe, and stylus system.

Probes and probe holders

Two cases are distinguished:

- Normally, the probe is attached to the ram by means of an adapter. In this case, the probe is also the probe holder.
- On the other hand, there are probe holders which are not probes at the same time. In that case a probe is attached to a probe holder. Such a probe holder can be an articulating system, for example the RDS.

The stylus system used for probing is inserted into the probe. The probe and stylus system must be handled carefully.

Functions of the probe:

- Holding the stylus system.
- Exact positioning of the stylus system.
- Detecting the stylus system deflection and transmitting the signal to the computer.

The computer calculates the coordinates of the probed point.

Stylus system

The stylus system consists of several components: adapter plate, stylus, stylus system components. One or more styli can be mounted on a stylus system. The stylus tip is located at the end of the stylus.

Functions of the stylus system:

- The adapter plate holds and positions the stylus system exactly in the probe.
- The stylus tip probes the workpiece.

Reasonably foreseeable misuse

The probe, the probe holder, and the stylus system must not be used for purposes other than their intended use.

Examples:

- The probe must not be used as a support.
- The stylus system must not be used as a lever arm, e.g. to loosen a ring bolt.
- The stylus system must not be used as a hammer.

Basic safety instructions

Travel movements

There is a risk of injuries during all travel movements of the CMM. The speed of the travel movements and the travel direction are irrelevant. Travel movements take place in the three CMM axes X, Y, Z and during rotation of a rotary table. Sharp-edged workpieces increase the risk.



▲ WARNING

Risk of injury due to axis movements at high speed and the rotation of the rotary table axis.

Crushing and severing body parts.

Risk to the eyes caused by the styli. Styli can hurt the eyes during travel movements if you approach your head close to the workpiece during probing.

- ✓ Make sure that no travel movements are possible when installing the probing system on the CMM.
- Switch the drives off before setting up the probing system on the CMM.
- Please read and observe the safety information in the operating instructions for the CMM.

Stylus tips



▲ WARNING

Risk of eye injury due to stylus tip fragments.

Stylus tips are generally made of ruby. Falling onto a hard surface, the stylus tips may splinter and cause injuries. The eyes are particularly vulnerable to injury from the fragments.

- Treat styli and other stylus system components carefully.
 - Do not drop the stylus.
-

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Description

This chapter contains:

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Overview

Contact probing systems

For the tactile probing systems, a distinction is made between trigger and measuring probing systems. For the measuring probing systems, a distinction is made between passive and active measuring.

ZEISS contact probes:

Probe	Triggering	Measuring	
		Passive	Active
RST-P	×		
XDT TL3		×	
VAST XXT		×	
VAST XT gold			×
VAST XTR gold			×
VAST gold			×

Renishaw contact probes:

Probe	Triggering	Measuring	
		Passive	Active
TP6	×		
TP20	×		

Supplementary components for VAST gold:

Component	Description
ZAS	ZEISS articulating stylus
RST-T	Temperature sensor
ROTOS, ROTOS light	Roughness sensors. See operating instructions for roughness sensors.

Components and function

Contact probing systems consist of a probe and a stylus system. The stylus system is mounted rigidly to the probe or connected in a movable manner by means of an adapter plate. Probes equipped with an adapter plate receptacle can automatically change the adapter plate. A changer rack is required for the automatic change of stylus systems. See operating instructions for changer racks.

Big probes are fastened directly on the ram. The fastening may be rigid or flexible. Flexible means that the user can replace a probe with another probe or an articulating system.

Fastening of contact probes:

Probe	Ram		Articulating system
	Rigid	Flexible	
RST-P			×
XDT TL3	×		×
VAST XXT	×		×
VAST XT gold	×	×	
VAST XTR gold	×	×	
VAST gold	×	×	
TP6			×
TP20			×

Components

Contact probes on the articulating system of bridge-type CMMs:

Articulating system	RDS	
Probe	RST-P	XDT TL3 and VAST XXT ¹
RDS adapter plate ²	×	×
Probe	×	×
Probe extension	o ³	o
Adapter plate	–	×
Stylus / Stylus system	×	×

¹ In combination with RDS, only called XXT: RDS/XXT.

² The version of the RDS adapter plate depends on the probe.

³ o: Option

Contact probes on the articulating system of horizontal-arm CMMs:

Articulating system	RDS, CSC, or DSC.	
Probe	TP6	TP20
Adapter plate (RDS, CSC, or DSC)	×	×
Probe	×	×
Probe extension	o ¹	o

Articulating system	RDS, CSC, or DSC.	
	TP6	TP20
Adapter plate ²	–	–
Probe module	–	×
Stylus / Stylus system	×	×

¹ o: Option
²: Stylus or stylus system are screwed onto the probe.

Function

Probing

The *stylus* is used for probing the workpiece. The combination of several styli comprises a stylus system. The stylus system is mounted on an adapter plate. Afterwards, the adapter plate and the stylus system form a single unit.

Holding + securing

The *adapter plate* is used to hold one or more styli and to fasten them to the probe. Proper fastening is ensured by means of a *three-point bearing*. The adapter plate is held by a *magnet* integrated in the adapter plate receptacle of the probe.

There are different solutions for the correct orientation of the adapter plate.

Orientation of the adapter plate:

Probe	Solution
VAST gold VAST XT gold	Pin located in the adapter plate receptacle and recess on the edge of the adapter plate. The adapter plate must be inserted in the adapter plate receptacle so that the pin fits into this recess.
VAST XTR gold	Label
VAST XXT XDT TL3	Punctiform markings on the probe and on the adapter plate. At a distance of 120°, there are one, two or three dots. When inserting an adapter plate in the adapter plate receptacle, make sure that the markings on the adapter plate and on the probe coincide.

The RDS adapter plate is used to hold the probe. The RDS adapter plate is inserted in the articulating system and held by a magnet. The groove in the adapter plate enables correct positioning. The pin in the adapter plate receptacle of the RDS articulating probe holder must engage in this groove.

NOTE

There are RDS adapter plates with different probe connections.

Registration + transmission

The *probe* holds the adapter plate and the mounted styli. Furthermore, the probe registers the deflection of the adapter plate and the stylus during probing. A signal is sent to the computer after each deflection.

NOTE

Only measuring probes are provided with a stylus deflection. The contact of touch-trigger probes with the workpiece are registered via a switch.

RST-P

Product photo



RST-P probe with single stylus

Application

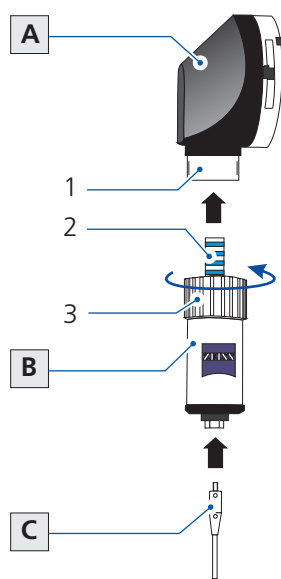
The RST-P is a touch-trigger probe.

- Discrete points
- Probing of hard-to-access locations on the workpiece
- Fast probing

NOTE

The RST-P probe is used on the RDS articulating system. See operating instructions for articulating systems.

Components



- A Adapter plate
- B RST-P probe
- C Stylus with extension or without extension
- 1 Connecting thread for probe or probe extension
- 2 Plug
- 3 Knurled ring with internal thread

NOTE

You may put a probe extension between the probe and the adapter plate.

Limit values



A maximum weight of 10 g can be suspended from the RST-P probe. The length of the stylus system including extension must not exceed 90 mm.

Extensions

There are extensions in different lengths for the RST-P probe. ➤ See [⇒ Appendix-4]

Material	Length
CFRP	60 mm
CFRP	100 mm

Material	Length
CFRP	200 mm
CFRP	300 mm

XDT TL3

Product photo



XDT TL3 probe

Application

The XDT TL3 probe can be used universally. Measurements performed with this system provide information on the dimensions, location, and form of a workpiece.

- Discrete points
- Automatic stylus system change

NOTE

The XDT TL3 probe can be used in two ways:

- On the RDS articulating system. See operating instructions for articulating systems.
- On a rigid adapter.

System requirements

To perform measurements using the XDT TL3 probe, the following requirements must be met:

Measuring software:	from CALYPSO 4.10.02
Firmware:	from C99 22.09

Version

Standard

The XDT TL3 probing system comprises:

- XDT TL3 probe for stylus lengths from 30 to 150 mm
- Two adapter plates:
 - ZSH-28-B-0-M3
 - ZSH-28-B-REF-TL3-M3 (for master stylus)
- Master stylus (ThermoFit):
 - Length: 30 mm.
 - Diameter of the stylus tip: 5 mm.
- Stylus (ThermoFit):
 - Length: 50 mm.
 - Diameter of the stylus tip: 3 mm.
- Installation kit
 - The installation kit consists of a pin wrench 5 × 1.2 and a probe key to screw on styli.

Option

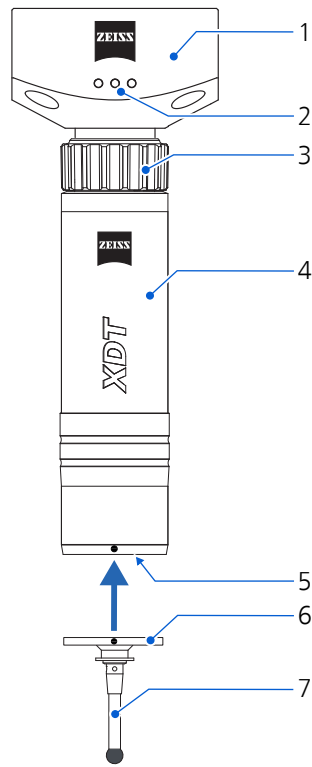
Further optional components are:

RDS-XXT adapter plate	Only in combination with the RDS articulating system
VAST XXT changer rack	One unit with three holders for adapter plates. There are also individual stylus system holders: ZCR-28-1-1W The unit with three holders and the individual holder are mounted to the profile rail of a changer rack.
Stylus system kit	There are three different stylus system kits.

NOTE

For conversions of a CMM, you may require additional conversion parts. Moreover, the system requirements must be met.

Components



- 1 Adapter; attached to ram
- 2 LED; 3 pieces
Left: LED for probe. The LED is permanently on if the probe is connected to the adapter.
Center: System clock pulse LED.
Right: Power LED. The LED is permanently on.
- 3 Knurled nut for screwing to adapter
- 4 Probe
- 5 Adapter plate receptacle
- 6 Adapter plate
- 7 Stylus

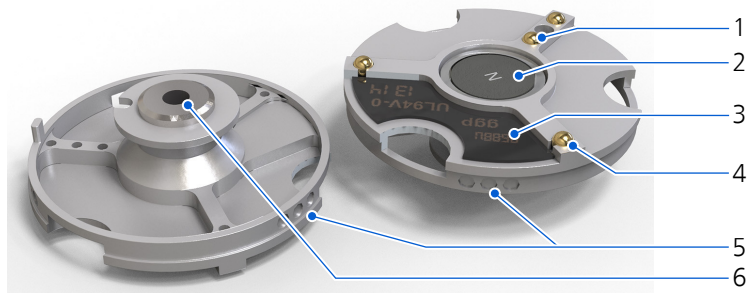
Adapter plate

The adapter plate is held magnetically and can be installed manually or automatically. The three outer spheres on the adapter plate serve for adjustment of the correct position in the adapter plate receptacle. The correct fit of these spheres is monitored electronically. The fourth sphere serves for mechanical coding of the adapter plate type.

Markers

Laterally on the adapter plate, there are punctiform markings. At a distance of 120°, there are one, two or three dots. The different markings serve for better orientation when installing the adapter plate. In the area of the adapter plate receptacle on the probe, there are also punctiform

markings. When inserting an adapter plate in the adapter plate receptacle, make sure that the markings on the adapter plate and on the probe coincide.



Adapter plate

- 1 The inner sphere serves for mechanically coding the various adapter plates.
- 2 Magnet
- 3 Chip for identification of the adapter plate
- 4 The outer spheres support the adapter plate in the adapter plate receptacle.
- 5 Lateral mark on the adapter plate; for orientation
- 6 Connecting thread for stylus

NOTE

Only adapter plates of the »ZSH-28-B« type may be used on the probe.

NOTE

Proper fit of the adapter plate must be checked.

- Carefully try to rotate the adapter plate.
If you feel a slight resistance, then the adapter plate fits correctly in the adapter plate receptacle of the probe.

Designation of the »ZSH-28-B« adapter plate

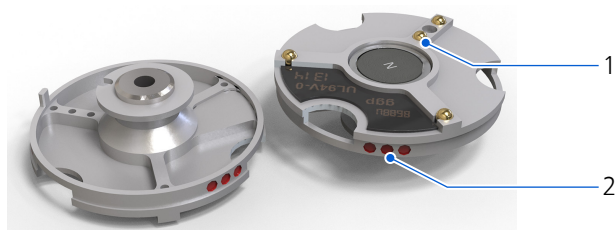
Component	Designation
Adapter plate without extension	ZSH-28-B-0-M3
Adapter plate with extension:	ZSH-28-B-75-M3
Adapter plate for master stylus:	ZSH-28-B-REF-TL3-M3

Adapter plate for master stylus

NOTE

The adapter plate for the master stylus is provided with red markings. Master styli are marked with a red dot.

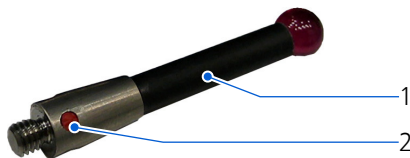
- Use this adapter plate exclusively for the master stylus.
- Use both the adapter plate and the master stylus only for qualification of the reference sphere (reference measurement).



Adapter plate for master stylus

- 1 Sphere for coding, inside
- 2 Marking, red

Master stylus



- 1 Master stylus for XDT TL3, 30 mm long
- 2 Red dot for identification of the master stylus

Limit values

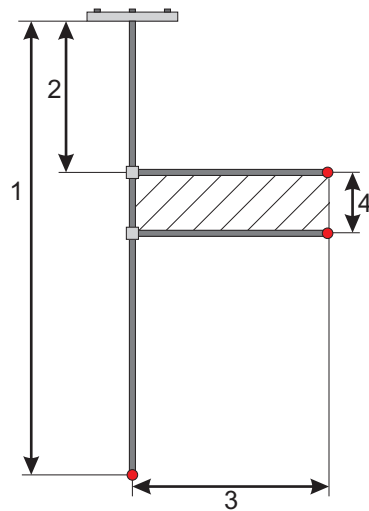
The following values must not be exceeded:

Limit values for XDT TL3:

Probe extension between RDS adapter plate and XDT TL3 probe	100 mm
---	--------

Stylus system weight, max. (incl. adapter plate)	15 g
--	------

Total length of the stylus	30 mm - 150 mm
----------------------------	----------------



Conditions for lateral styli with the TL3

- 1 Stylus length: max. 150 mm
- 2 Distance from the adapter plate: at least 50 mm
- 3 Projection: max. 65 mm
- 4 Recommended range for lateral styli: 50 - 70 mm

Maximum deflection at the stylus tip

The maximum deflections depend on the length and weight of the stylus system as well as on the probe orientation. If the stylus sags in the Z direction at lateral orientation, the deflection in the -Z direction is reduced and increases in the +Z direction. Additionally, the maximum deflections in the other directions change.

Deflection with a stylus length of 150 mm:

X, Y axis:	±3 mm
Z axis:	±3 mm

NOTE

Only the styli belonging to the respective stylus kit may be used. If longer or heavier styli are used, measurement errors may occur. Or probing is not possible because the stylus system slips from the work-piece.

Extensions

There are extensions in different lengths for the XDT TL3.

Material	Length
CFRP	60 mm

Material	Length
CFRP	100 mm

VAST XXT

Product photo



VAST XXT probe

Application

The VAST XXT probe can be used universally. Measurements performed with this system provide information on the dimensions, location, and form of a workpiece.

- Discrete points and scanning
- Automatic stylus system change
- Different probe variants are available
- Measurement of soft workpieces

Due to the low measuring force, deformations on the workpiece and thus incorrect measurements are avoided.

NOTE

The VAST XXT probe can be used in two ways:

- In combination with the RDS articulating system. See operating instructions for articulating systems.
- As a probe on a rigid adapter

The adapter is attached to the ram. This is not possible for all CMMs.

System requirements

To perform measurements using the VAST XXT probe, the following requirements must be met:

	TL1	TL3	TL4
Measuring software:	from CALYPSO 4.4	from CALYPSO 4.8.06	from CALYPSO 5.8.0
Firmware:	from C99 19.03	from C99 20.12	from C99 30.1

Version

The VAST XXT probe is available in three design versions. Each version is supplied with specific accessories:

Design versions:

TL1, for stylus lengths from 30 to 125 mm:	<ul style="list-style-type: none"> – VAST XXT TL1 probe – »ZSH-28-A« adapter plate – Master stylus (ThermoFit): Length: 30 mm; diameter of the stylus tip: 5 mm
TL3, for stylus lengths from 30 to 150 mm:	<ul style="list-style-type: none"> – VAST XXT TL3 probe – »ZSH-28-B« adapter plate – Master stylus (ThermoFit): Length: 30 mm; diameter of the stylus tip: 5 mm
TL4, for stylus lengths from 125 to 250 mm:	<ul style="list-style-type: none"> – VAST XXT TL4 probe – »ZSH-28-B« adapter plate (with fixed extension of 75 mm) – Master stylus (ThermoFit): Length: 50 mm; diameter of the stylus tip: 5 mm

All versions are supplied with an additional adapter plate, an additional stylus and an installation kit. The installation kit consists of a pin wrench 5 × 1.2 and a probe key to screw on styli. See instruction leaflet in the packaging of the probe.

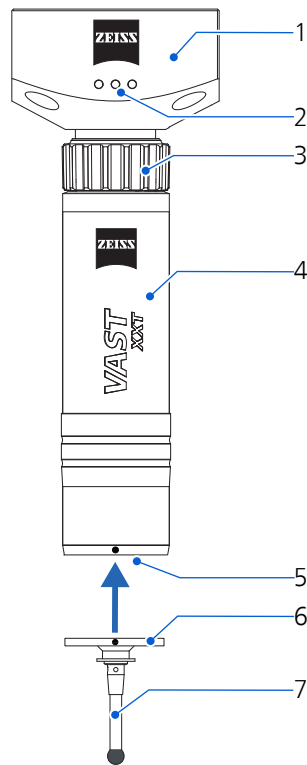
Further components are:

RDS-XXT adapter plate	Only in combination with the RDS articulating system.
VAST XXT changer rack	One unit with three holders for adapter plates. There are also individual stylus system holders: ZCR-28-1-1W The unit with three holders and the individual holder are mounted to the profile rail of a changer rack.
Stylus system kit	There are three different stylus system kits.

NOTE

For conversions of a CMM, you may require additional conversion parts. Moreover, the system requirements must be met.

Components



1 Adapter; attached to ram

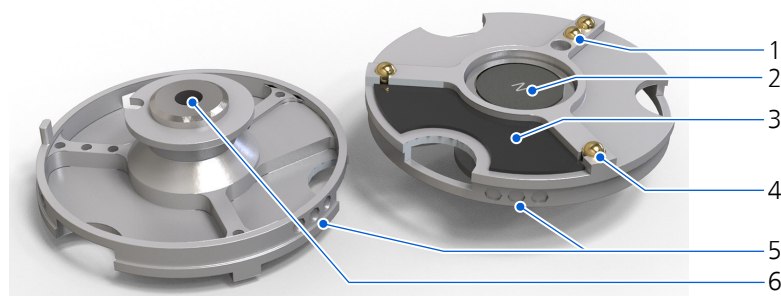
- 2 LED; 3 pieces
Left: LED for probe. The LED is permanently on if the probe is connected to the adapter.
Center: System clock pulse LED
Right: Power LED. The LED is permanently on.
- 3 Knurled nut for screwing to adapter
- 4 VAST XXT probe
- 5 Adapter plate receptacle
- 6 Adapter plate
- 7 Stylus

Adapter plate

The adapter plate is held magnetically and can be installed manually or automatically. The three outer spheres on the adapter plate serve for adjustment of the correct position in the adapter plate receptacle. The correct fit of these spheres is monitored electronically. A fourth sphere in one of the two inner boreholes is used as coding.

Markers

Laterally on the adapter plate, there are punctiform markings. At a distance of 120° , there are one, two or three dots. The different markings serve for better orientation when installing the adapter plate. In the area of the adapter plate receptacle on the probe, there are also punctiform markings. When inserting an adapter plate in the adapter plate receptacle, make sure that the markings on the adapter plate correspond to those on the probe.



Adapter plate TL1

- 1 The inner sphere serves for mechanically coding the various adapter plates. The illustration shows a TL1 adapter plate.
 On the TL3 and TL4 adapter plate, the inner sphere is even closer to the magnet.
- 2 Magnet
- 3 Chip for identification of the adapter plate
- 4 The outer spheres support the adapter plate in the adapter plate receptacle.
- 5 Lateral mark on the adapter plate; for orientation
- 6 Connecting thread for stylus

NOTE

For each probe variant, only the permitted adapter plate is allowed to be inserted. See »Version«.

NOTE

Proper fit of the adapter plate must be checked. Carefully try to rotate the adapter plate. If you feel a slight resistance, the adapter plate fits properly in the receptacle of the probe.

NOTE

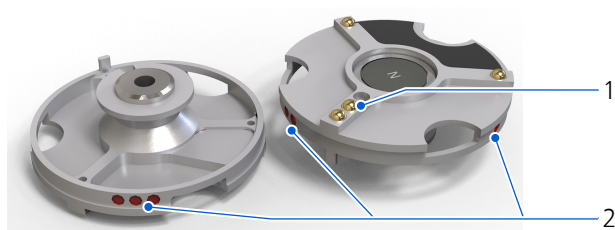
The 18-pole VAST XXT probe requires an adapter plate with ID chip. Adapter plates without ID chip are no longer supported.

Adapter plate for master stylus

NOTE

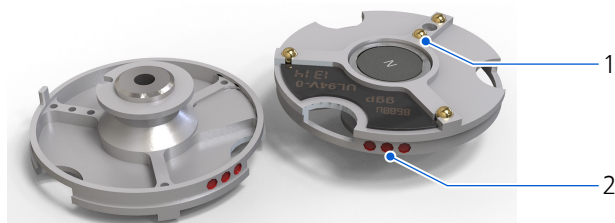
The adapter plate for the master stylus is provided with red markings. Master styli are marked with a red dot.

- Use this adapter plate exclusively for the master stylus.
- Use both the adapter plate and the master stylus only for qualification of the reference sphere (reference measurement).



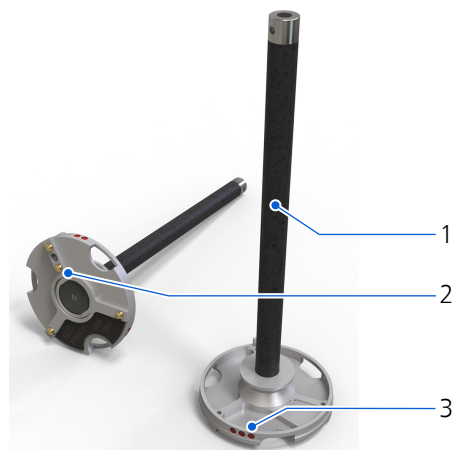
TL1 adapter plate for master stylus

- 1 Sphere for coding, center
- 2 Marking, red



TL3 adapter plate for master stylus

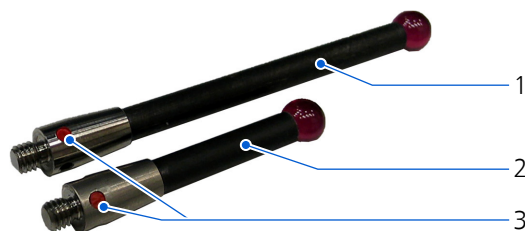
- 1 Sphere for coding, inside
- 2 Marking, red



TL4 adapter plate for master stylus

- 1 Integrated extension
- 2 Sphere for coding, center
- 3 Marking, red

Master stylus



Master stylus for VAST XXT

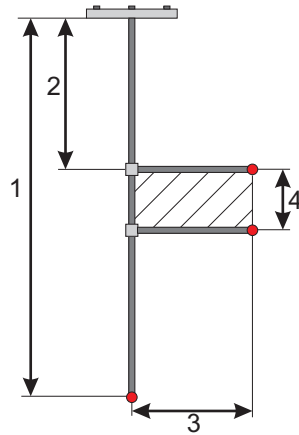
- 1 Master stylus for TL4, 50 mm long
- 2 Master stylus for TL1 and TL3, 30 mm long
- 3 Red dot for identification of the master stylus

Limit values

The following values must not be exceeded:

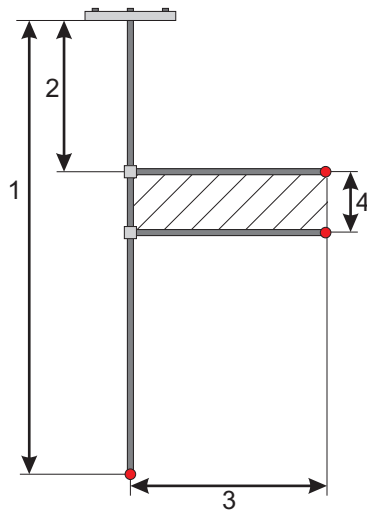
Probe extension (between RDS-XXT adapter plate and VAST XXT probe)	TL1, TL3, and TL4	100 mm
Stylus system weight, max. (incl. adapter plate)	TL1 and TL4	10 g
	TL3	15 g
Total length of the stylus	TL1	30 - 125 mm
	TL3	30 - 150 mm
	TL4	125 - 250 mm

Conditions for lateral styli



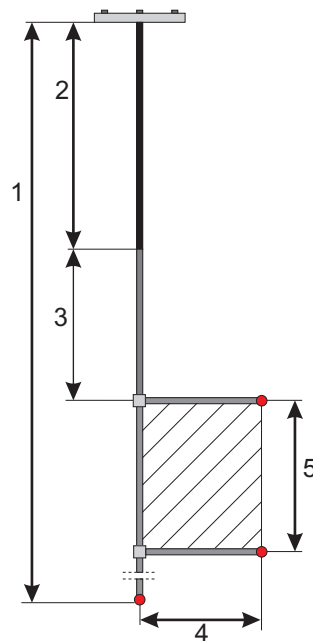
Conditions for lateral styli with the TL1

- 1 Stylus length: max. 125 mm
- 2 Distance from the adapter plate: at least 50 mm
- 3 Projection: max. 40 mm
- 4 Recommended range for lateral stylus: 50 - 70 mm



Conditions for lateral styli with the TL3

- 1 Stylus length: max. 150 mm
- 2 Distance from the adapter plate: at least 50 mm
- 3 Projection: max. 65 mm
- 4 Recommended range for lateral stylus: 50 - 70 mm



Conditions for lateral styli with the TL4

- 1 Stylus length: max. 250 mm
- 2 Fixed extension: 75 mm
- 3 Distance from the adapter plate extension: at least 50 mm
- 4 Projection: max. 40 mm
- 5 Recommended range for lateral stylus: 125 - 175 mm

Maximum deflection at the stylus tip

The maximum deflections depend on the length and weight of the stylus system as well as on the probe orientation. If the stylus sags in the Z direction at lateral orientation, the deflection in the -Z direction is reduced and increases in the +Z direction. Additionally, the maximum deflections in the other directions change.

TL1	Deflection with a stylus length of 125 mm:	
	X,Y axis:	± 3.5 mm
	Z axis:	± 2.8 mm
TL3	Deflection with a stylus length of 150 mm:	
	X, Y axis:	± 3 mm
	Z axis:	± 3 mm
TL4	Deflection with a stylus length of 250 mm:	
	X, Y axis:	± 3 mm

Z axis: ± 3 mm

NOTE

Only the styli belonging to the respective stylus kit may be used. If longer or heavier styli are used, measurement errors may occur. Or probing is not possible because the probe slips from the workpiece.

Extensions

There are extensions in different lengths for the VAST XXT probe:

Material	Length
CFRP	60 mm
CFRP	100 mm

VAST XT gold

Product photo



VAST XT gold probe

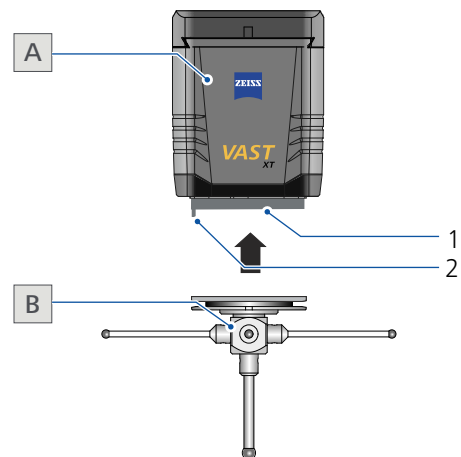
Application

The VAST XT gold probe is an actively measuring scanning probe. The probe can be used universally. Measurements performed with this system provide information on the dimensions, location, and form of a workpiece.

- Discrete points and scanning
- High accuracy
- Long and heavy stylus systems are possible
- Automatic stylus system change

The VAST XT gold probe supports the options VAST navigator and VAST performance.

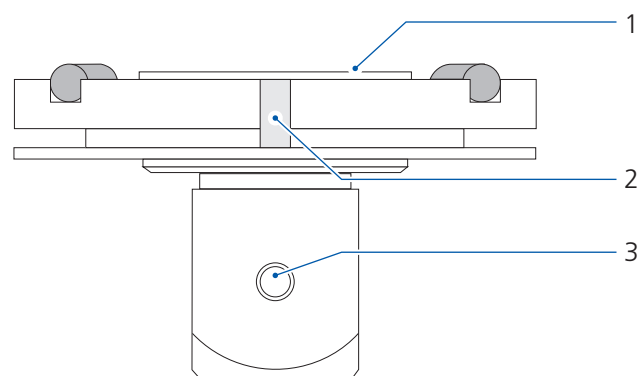
Components



- A Probe
- B Stylus system (adapter plate, extension and stylus)
- 1 Adapter plate receptacle
- 2 Pin for positioning the stylus system

adapter plate

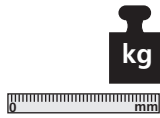
The VAST adapter plate is provided with a distributor with five threaded holes used for mounting stylus system components. The size of the connection thread is M5.



VAST adapter plate

- 1 Anchor plate
 - 2 Groove for the pin located in the adapter plate receptacle of the probe
- Note:** The pin ensures proper positioning of the adapter plate.
- 3 M5 threaded hole for stylus system components, e.g. styli.

Limit values



A maximum weight of 500 g can be suspended from the adapter plate receptacle including the adapter plate. The length of the stylus system including extension must not exceed 500 mm.

Tilting moment

The maximum tilting moment of the stylus system allowed is 0.3 Nm. Calculation of the tilting moment: ➤ See [⇨ 5-32]

VAST XTR gold

Product photo



VAST XTR gold probe

Application

The VAST XTR gold probe is an actively measuring scanning probe. The probe can be used universally. Measurements performed with this system provide information on the dimensions, location, and form of a workpiece.

- Discrete points and scanning
- High accuracy
- Long and heavy stylus systems are possible
- Automatic stylus system change
- Rotational axis

The stylus system can be rotated in angular steps of 15° in the Z axis. This enables positioning a stylus at the correct angle to the workpiece. In some cases, the rotary table is therefore not required.

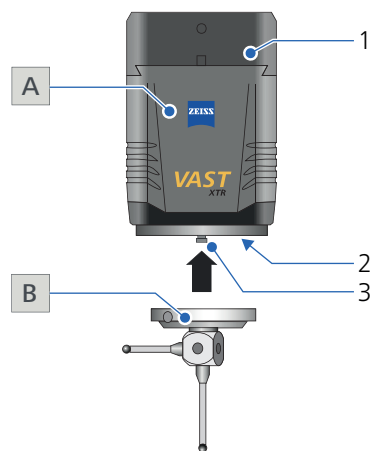
The VAST XTR gold probe supports the options VAST navigator and VAST performance.

System requirements

To perform measurements using the probe, the following requirements must be met:

Measuring software:	from CALYPSO 5.2.14
Firmware:	from C99 26.12

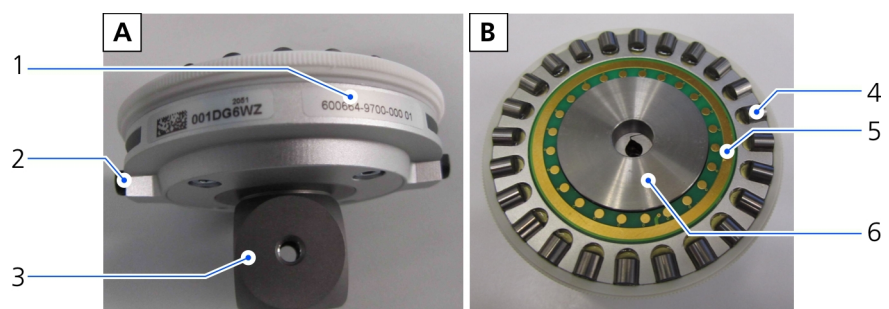
Components



- A Probe
- B Stylus system (adapter plate, extension and stylus)
- 1 Probe adapter on the ram
- 2 Adapter plate receptacle
- 3 Rotational axis with pin for securing the adapter plate

adapter plate

To use the rotation function on the VAST XTR gold probe, a special adapter plate is needed. The designation is: »ZSH-70-R-24« (order number: 600664-9700-000).



- A Front view

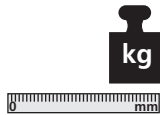
B Top view

- 1 Order number
- 2 Push-buttons for installing and removing the adapter plate (2 buttons)
- 3 Cube for mounting styli
- 4 Anchor plate for fastening to the adapter plate receptacle of the probe
- 5 Contacts for identifying the adapter plate
- 6 Cylinder rollers

NOTE

The »ZCR 70« holder is required for storage in the changer rack. The VAST holder is not allowed.

Limit values



A maximum weight of 500 g can be suspended from the adapter plate receptacle including the adapter plate. The length of the stylus system including extension must not exceed 350 mm.

Tilting moment and rotational torque

The maximum tilting moment of the stylus system allowed is 0.3 Nm. Calculation of the tilting moment: ➤ See [⇒ 5-32]

The maximum permitted rotational torque of the stylus system is 0.15 Nm around the axis of rotation.

To achieve better reproducibility during stylus change, the stylus system should be balanced precisely so that the torques are significantly smaller than the indicated values.

VAST gold

Product photo



VAST gold probe with stylus system

Application

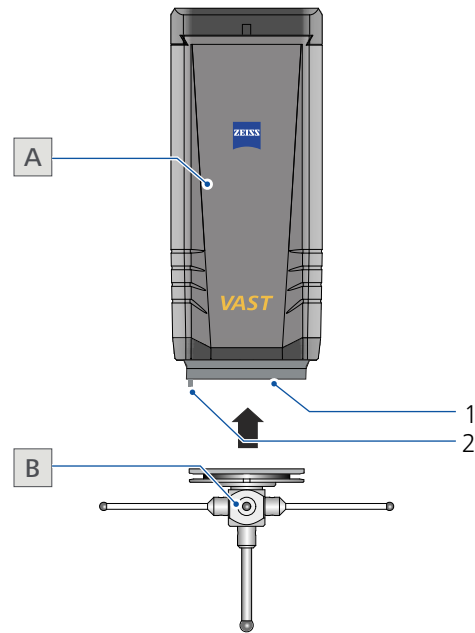
The VAST gold probe is an actively measuring scanning probe. The probe can be used universally. Measurements performed with this system provide information on the dimensions, location, and form of a workpiece.

- Scanning
- High accuracy
- Use in case of adverse ambient conditions: e.g. vibrations (floor vibrations and sound).
- Long and heavy stylus systems are possible
- Automatic stylus system change
- Use of roughness sensors

- Use of the RST-T temperature sensor
- Use of the ZASarticulating stylus

The VAST gold probe supports the options VAST navigator and VAST performance.

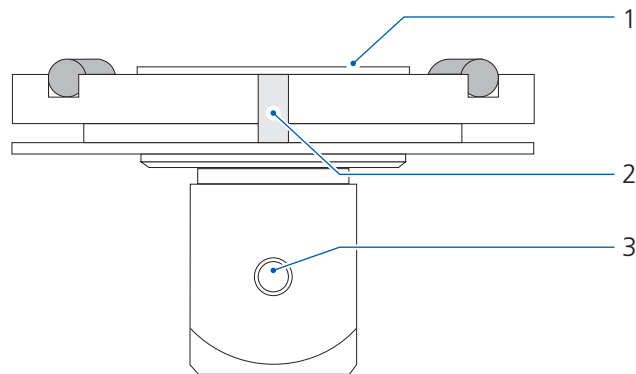
Components



- A VAST gold Probe
- B Stylus system with adapter plate
- 1 Adapter plate receptacle
- 2 Pin for positioning the adapter plate

Adapter plate

The VAST adapter plate is provided with a distributor with five threaded holes used for mounting stylus system components. The size of the connection thread is M5.



VAST Adapter plate

- 1 Anchor plate
- 2 Groove for the pin located in the adapter plate receptacle of the probe. The pin ensures proper positioning of the adapter plate.
- 3 M5 threaded hole for stylus system components, e.g. styli

Limit values

The limit values for weight, length and tilting moment of a stylus system must be considered when assembling or mounting the stylus system.



A maximum weight of 800 g can be suspended from the adapter plate receptacle including the adapter plate. The length of a stylus system must not exceed 800 mm.

Tilting moment

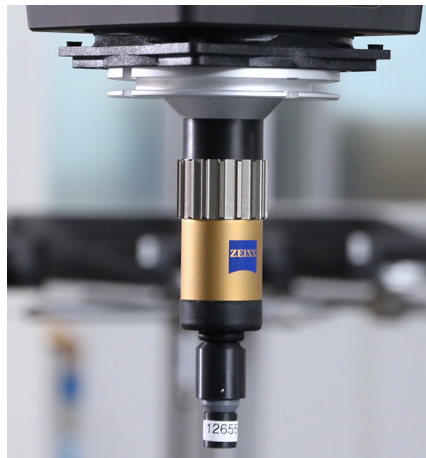
In general, the tilting moment depends on the weight and the position of the center of gravity of the stylus system. In addition, the tilting moment depends on the total weight of the stylus system:

Tilting moment in case of a different total weight:

Total weight of the stylus system	K_M
800 g	0.1 Nm
450 g	0.3 Nm

Calculation of the tilting moment: ➤ See [⇨ 5-32].

Temperature sensor RST-T (option)



Application

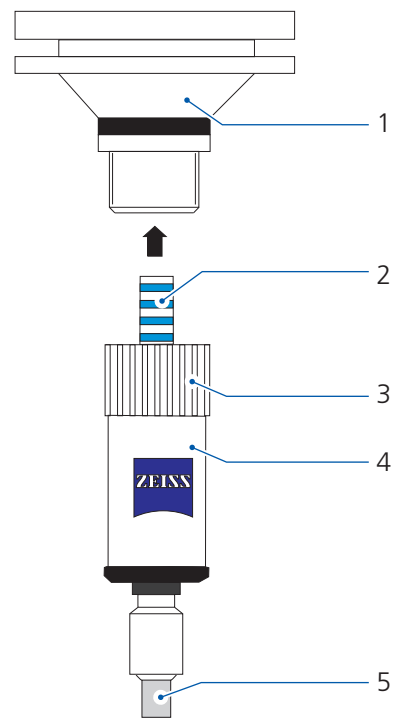
The RST-T is used to measure the temperature of the workpiece surface and the surrounding air. Both measurements can be carried out in an automatic measurement run. Temperature monitoring is thus possible throughout the entire measurement.

NOTE

The VAST probe is a prerequisite for operating the RST-T. The RST-T is inserted into the adapter plate receptacle.

Further information is given elsewhere. ➤ See [⇨ 5-15] and ➤ see [⇨ 5-16].

Components



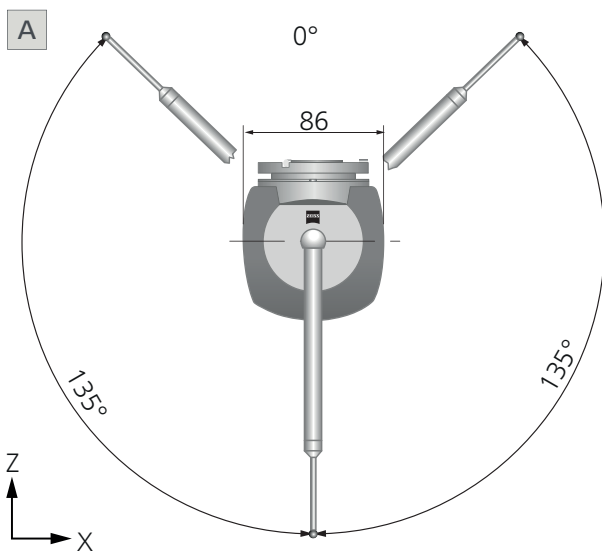
- 1 VAST adapter plate for RST-T
- 2 Plug
- 3 Knurled nut for screwing to adapter plate
- 4 Temperature sensor
- 5 Exchangeable sensor

Articulating stylus (option)

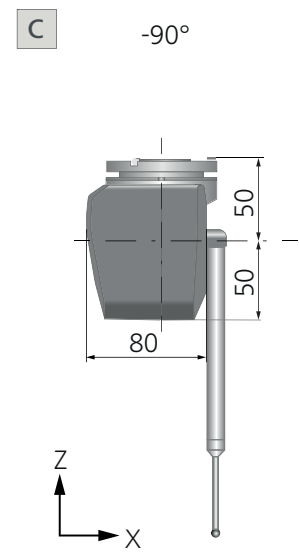
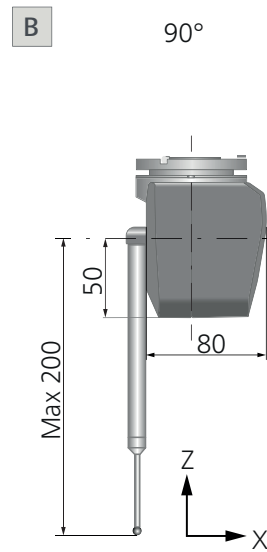


Articulating stylus for 0° orientation

The articulating stylus is inserted into the VAST gold adapter plate receptacle. An articulating stylus can only be inserted in a specific orientation into the adapter plate receptacle. There are three articulating stylus for three different orientations: 0°, 90°, -90°. The stylus can be articulated continuously.



Orientations of the articulating stylus



- A 0° orientation and swivel range $\pm 135^\circ$
- B 90° orientation, stylus on the left side of the ram
- C -90° orientation, stylus on the right side of the ram

Limit values

Probe length, max.	200 mm
Stylus tip diameter, min.	1 mm

The articulating stylus is supplied in a case. Contents of the case:

- Stylus, 50 mm
- Stylus extension 50 mm
- Tool

System requirements

CMM	CALYPSO version	C99 firmware
PRISMO	6.8.08 (2019)	40.06
PRISMO ultra, CenterMax, MMZ G, MMZ M, MMZ T	7.0 (2020)	40.06

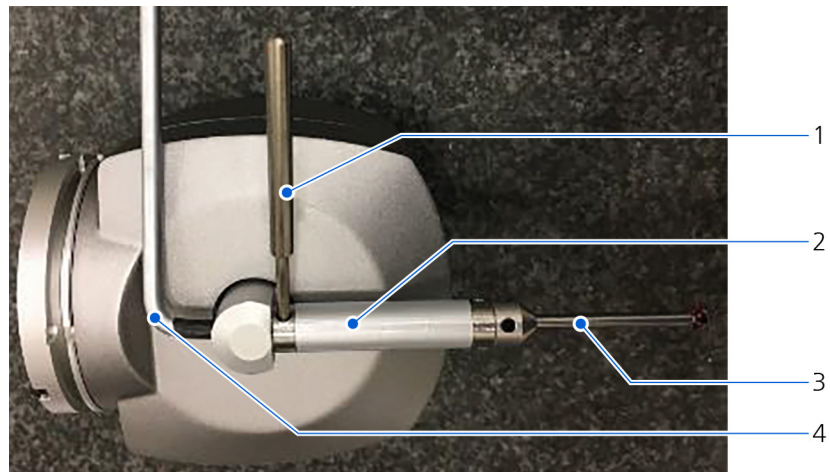
Notes on the operation



Damage to the probe due to the application of force during work on the articulating stylus.

- Remove the articulating stylus from the adapter plate receptacle before performing work on the articulating stylus.

To replace a stylus or a stylus extension, use the tool included in the delivery; the Torx wrench and the pin wrench. As an alternative, use the hook wrench included in the delivery instead of the pin wrench.



- 1 Pin wrench
- 2 Stylus extension REACH CFX 3
- 3 Stylus
- 4 Torx key

NOTE

The Torx key is used to absorb the forces in order to avoid damaging the bearing of the swivel axis.

NOTE

The stylus system holder ZCR 70 is used for an automatic change of the articulating stylus.

TP6

Product photo



Renishaw TP6 probe

Application

The TP6 is a touch-trigger probe.

- Discrete points
- Probing of hard-to-access locations on the workpiece
- Fast probing

NOTE

The TP6 probe is used on articulating systems. See operating instructions for articulating systems.

NOTE

The probing force can be adjusted. See operating instructions Renishaw for the TP6 probe.

NOTE

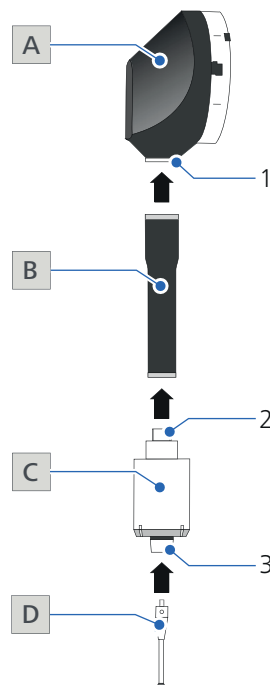
With the TP6 probe, 5-axis probing is possible. Probing in +Z direction is not possible.

System requirements

To perform measurements using the TP6 probe, the following requirements must be met:

Controller	C99
CMM	Horizontal-arm CMM, e.g. CARMET 2, PRO 2, CALENO
Probe holder	Articulating system: RDS, CSC, and DSC

Components



TP6 probe with RDS adapter plate

- A RDS adapter plate for Renishaw probe or Renishaw extension
- B Renishaw extension for probe
- C TP6 probe
- D Stylus with M3 thread
- 1 Connection for probe or extension
- 2 Connection thread M8
- 3 Connection thread M3 for probe

NOTE

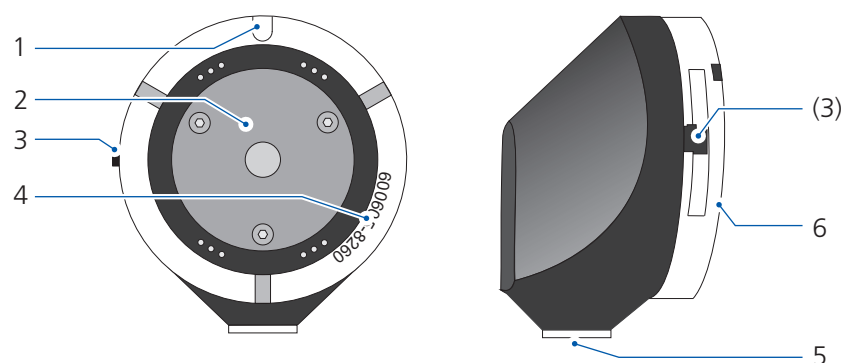
The supplied Renishaw documents contain information on the assembly.

NOTE

The TP6 probe can also be used on other articulating systems.

adapter plate

The Renishaw probe or an extension is attached to the RDS adapter plate. In the second case, the probe is attached to the extension.



RDS adapter plates for Renishaw probes with M8 thread

- 1 Groove for positioning the adapter plate in the adapter plate receptacle of the RDS articulating system
- 2 Anchor plate
- 3 Push-button for releasing the adapter plate from the RDS articulating system
- 4 Order number of adapter plate
- 5 Connection of the Renishaw probe or Renishaw extension (M8 thread)
- 6 Connection to the RDS articulating system

Limit values

The limit values for Renishaw probes can be found in the accompanying Renishaw brochures.



Use only the delivered stylus in order to reach the maximum probe accuracy possible.

Extensions

There are extensions in different lengths for the TP6 probe:

Extensions with connection thread M8:

Designation	Length	Order number
PEL1	50 mm	626120-0039-000
PEL2	100 mm	612030-8801-000
PEL3	200 mm	639090-5329-000

TP20

Product photo



TP20 probe with single stylus

Application

The TP20 is a touch-trigger probe.

- Discrete points
- Probing of hard-to-access locations on the workpiece
- Fast probing
- Automatic stylus system change possible
- Different probe modules for different probing forces

NOTE

The TP20 probe is used on articulating systems. See operating instructions for articulating systems.

NOTE

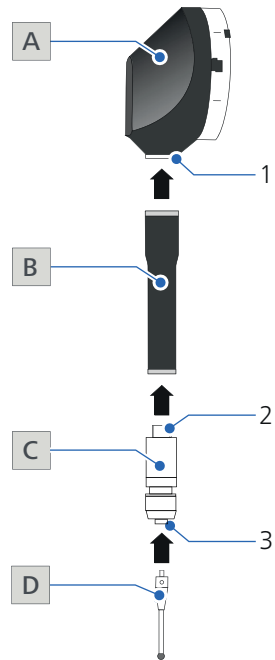
With the TP20 probe, 5-axis probing is possible. Probing in +Z direction is not possible.

System requirements

To perform measurements using the TP20 probe, the following requirements must be met:

Controller	C99
CMM	Horizontal-arm CMM, e.g. CARMET 2, PRO 2, CALENO
Probe holder	Articulating system: RDS, CSC, and DSC

Components



TP20 probe with RDS adapter plate

- A RDS adapter plate for Renishaw probe or Renishaw extension
- B Renishaw extension for probe
- C TP20 probe
- D Stylus with M2 thread
- 1 Connection for probe or extension
- 2 Connection thread M8
- 3 Connection thread M2 for probe

NOTE

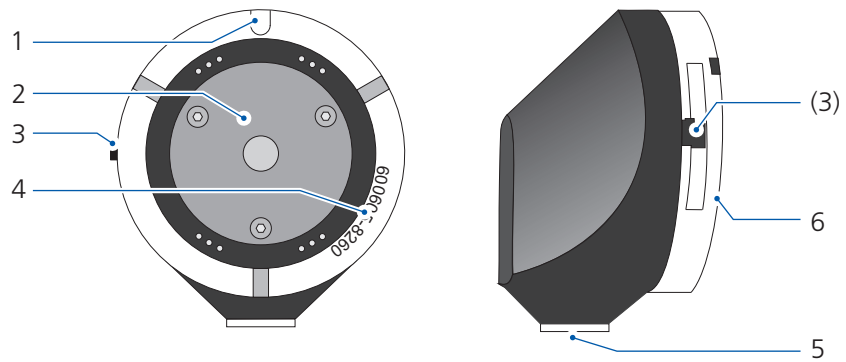
The supplied Renishaw documents contain information on the assembly.

NOTE

The TP20 probe can also be used on other articulating systems.

adapter plate

The Renishaw probe or an extension is attached to the RDS adapter plate. In the second case, the probe is attached to the extension.



RDS adapter plates for Renishaw probes with M8 thread

- 1 Groove for positioning the adapter plate in the adapter plate receptacle of the RDS articulating system
- 2 Anchor plate
- 3 Push-button for releasing the adapter plate from the RDS articulating system
- 4 Order number of adapter plate
- 5 Connection of the Renishaw probe or Renishaw extension (M8 thread)
- 6 Connection to the RDS articulating system

Limit values

The limit values for Renishaw probes can be found in the accompanying Renishaw brochures.



Use only the delivered stylus in order to reach the maximum probe accuracy possible.

Extensions

There are extensions in different lengths for the TP20 probe:

Extensions with connection thread M8:

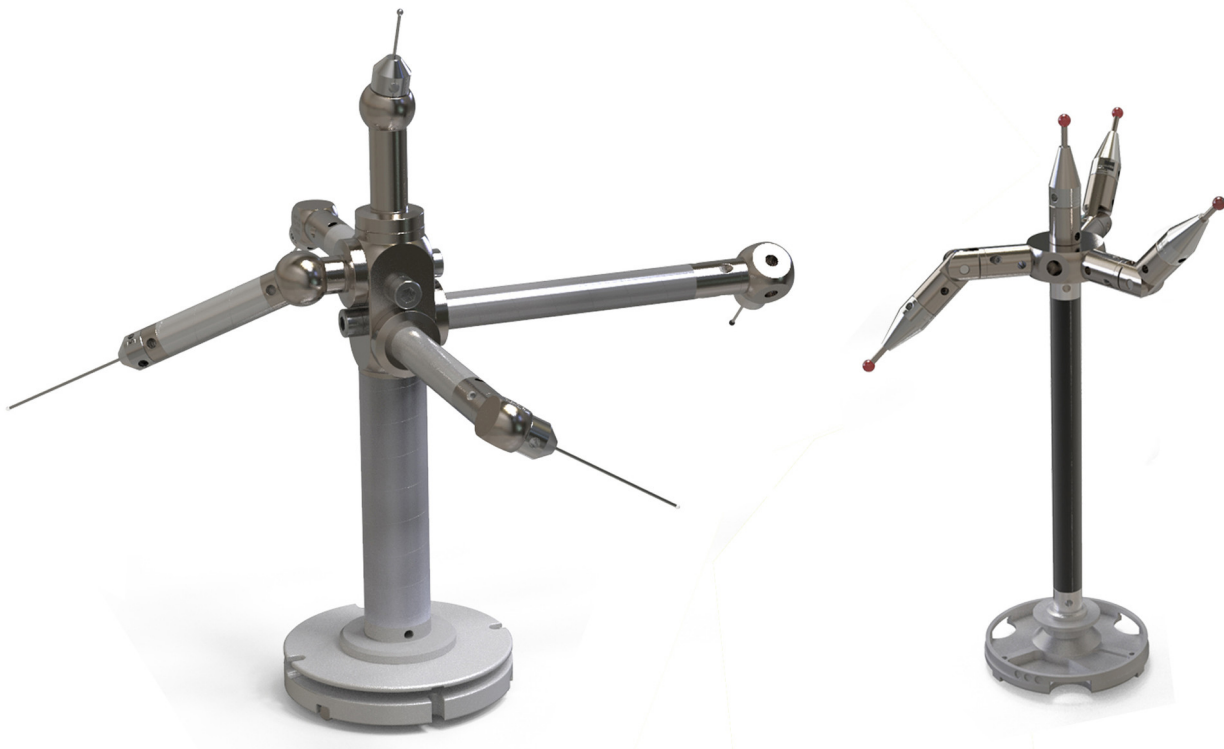
Designation	Length	Order number
PEL1	50 mm	626120-0039-000
PEL2	100 mm	612030-8801-000
PEL3	200 mm	639090-5329-000
PECF4	350 mm	639044-0529-000

Stylus systems

Stylus system components

A simple stylus system consists of an adapter plate and a probe.

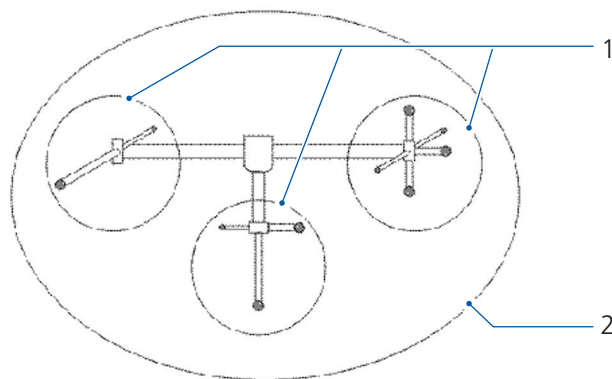
A complex stylus system may consist of several probes, joining elements and extensions.



Example for complex stylus systems

Stylus combination

A distinction is made between stylus system and stylus combination. The stylus system can consist of several stylus combinations. A stylus combination consists of several styli.



1 Stylus combinations

2 Stylus system

NOTE

It is basically possible to create a stylus system with several stylus combinations. However, certain assembly criteria must be observed to ensure exact measurement.

Stylus



A stylus consists of a shaft and a stylus tip. Shafts differ with regard to size and material. Stylus tips differ in terms of size, material and form. ➤
See [↔ 3-47]

Extensions

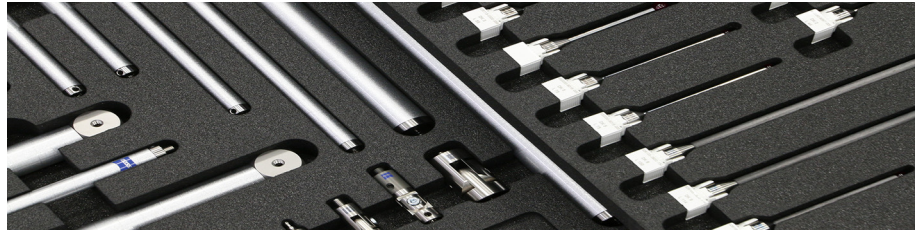


There are extensions in different diameters and lengths and for different accuracy requirements.

REACH extensions:

Designation	Use
REACH CFX 1	Recommended for CONTURA, SPECTRUM plus, and comparable CMMs.
REACH CFX 3	Recommended for ACCURA II, PRISMO, PRISMO fortis, and comparable CMMs.
REACH CFX 5	Recommended for PRISMO ultra, PRISMO verity, XENOS, MICURA, and comparable CMMs.

Probe kits



The stylus system kits contain styli of different sizes and components that can be used to create stylus systems, e.g. connecting elements.

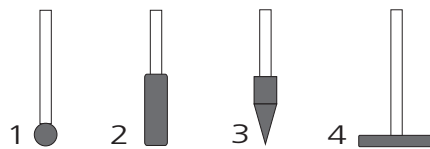
There are many different designs of stylus kits. There are small and big stylus kits.

Webshop

Stylus components are available in the webshop. ➤ See [⇒ Appendix-2]

Stylus tips

Stylus tips may have various forms. Examples of stylus tips: sphere, cylinder.



Types of stylus tips

- 1 Sphere
- 2 Cylinder
- 3 Cone
- 4 Disk

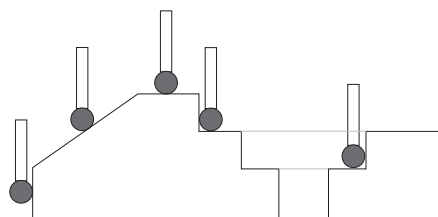
Use of the stylus tips:

Stylus tip

Description

Sphere

The sphere is the standard stylus tip suitable for most measuring jobs.

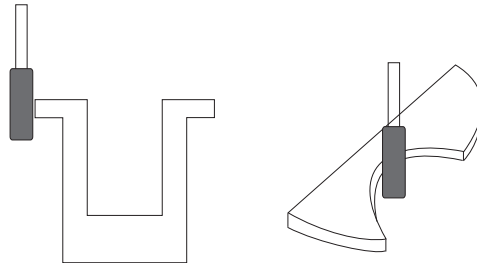


Stylus tip

Description

Cylinder

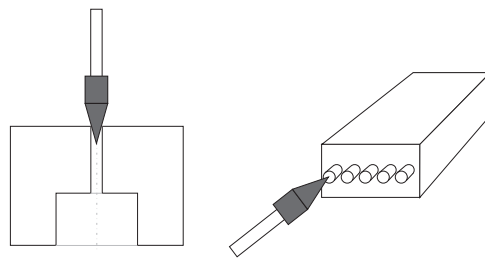
Cylinders are preferably used for probing thin sheet-metal parts and narrow workpiece edges.



Cone

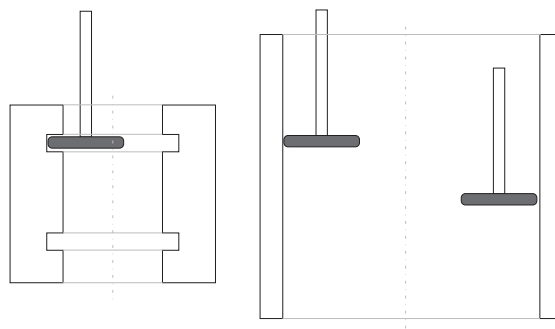
Cones are required for two applications:

1. Self-centering probing
2. High-precision probing of specified positions



Disk

A disk is used for probing deep grooves and large holes. For large holes, a disk offers the advantage of shorter travel paths.



Storage of stylus systems

Once the stylus system has been assembled, it can be used as long as required. It does not need to be disassembled. Careful handling is necessary. This applies particularly to the adapter plate and stylus tips.

Stylus system protection

The stylus system must be protected against the following influences:

- Force of impact and other external mechanical influences.
- Dust and dirt.

A changer rack is recommended for storage if you measure every day with the CMM. When no measurements are carried out with the CMM over a longer period, the stylus systems should be stored in a place protected against environmental influences.

Storage options:

Separate packing materials	E.g. box made of cardboard, styrofoam, wood When using a metal box, wrap the stylus system in a cloth. This is necessary to protect the adapter plate and stylus tips against being scratched.
Drawer	Wrap the stylus system in a cloth or lay it on a soft support. This is necessary to protect the adapter plate and stylus tips against being scratched.
Special cabinet	The stylus systems are hooked into special fixtures. Such a cabinet is available from ZEISS.



Stylus cabinet

4

Technical specifications

This chapter contains:

RST-P	4-2
XDT TL3	4-3
VAST XXT	4-4
VAST XT gold	4-5
VAST XTR gold	4-6
VAST gold	4-7
Renishaw probes	4-8

RST-P

Dimensions

Diameter	24 mm
Length	56 mm
Weight	44 g
Probe extension, max.	300 mm
Probing direction	Direction-independent
Min. diameter of the stylus tip	0.5 mm
Stylus system weight, max.	10 g
Stylus system length, max.	90 mm
Connecting thread for stylus	M3

Ambient conditions:

Environmental operating temperature	5-40°C
Permissible sound pressure level	75 dBA with sinusoidal excitation 80 dBA noise

XDT TL3

Dimensions

Length	126 mm
Diameter	33 mm
Weight	162 g
Diameter of adapter plate	28 mm
Probe extension, max.	100 mm
Probing direction	Direction-independent
Diameter of the stylus tip	0.3 - 8 mm
Stylus system weight, max.	15 g (TL3)
Stylus system length	30 - 150 mm (TL3)

Ambient conditions:

Environmental operating temperature	5-40°C
Permissible sound pressure level	75 dBA with sinusoidal excitation 80 dBA noise

VAST XXT

Dimensions

Length	126 mm
Diameter, max.	33 mm

Weight

TL1	147 g
TL3	162 g
TL4	172 g

Diameter of adapter plate	28 mm
---------------------------	-------

Probe extension, max.	100 mm
-----------------------	--------

Probing direction	Direction-independent
-------------------	-----------------------

Diameter of the stylus tip	0.3 - 8 mm
----------------------------	------------

Stylus system weight, max.

TL1,	10 g
TL3	15 g
TL4	10 g

Stylus system length, max.

TL1	30 - 125 mm
TL3	30 - 150 mm
TL4	125 - 250 mm

Ambient conditions:

Environmental operating temperature	5-40°C
-------------------------------------	--------

Permissible sound pressure level	75 dBA
	80 dBA with sinusoidal excitation
	100 dBA noise

VAST XT gold

Dimensions

Length	91 mm
Width	91 mm
Height	100 mm
Probing directions	6; $\pm X$, $\pm Y$, $\pm Z$
Measuring force	0.05 to 1 N / continuous
Diameter of adapter plate	70 mm
Probe deflection	max. ± 2 mm
Stylus system weight, max.	500 g/ incl. adapter plate
Stylus system length, max.	500 mm / stylus + extension
Max. tilting moment of the adapter plate	0.3 Nm
Min. diameter of the stylus tip	0.3 mm (on some CMMs 0.5 mm)

Ambient conditions:

Environmental operating temperature	5-40°C
Permissible sound pressure level	100 dBA with sinusoidal excitation 100 dBA noise

VAST XTR gold

Dimensions

Length	91 mm
Width	91 mm
Height	100 mm
Probing directions	6; $\pm X$, $\pm Y$, $\pm Z$
Measuring force	0.05 to 1 N / continuous
Diameter of adapter plate	70 mm
Probe deflection	max. ± 2 mm
Stylus system weight, max.	500 g/ incl. adapter plate
Stylus system length, max.	350 mm / stylus + extension
Max. tilting moment of the adapter plate	0.15 Nm
Min. diameter of the stylus tip	0.3 mm (on some CMMs 0.5 mm)

Ambient conditions:

Environmental operating temperature	5-40°C
Permissible sound pressure level	100 dBA with sinusoidal excitation 100 dBA noise

VAST gold

Dimensions

Length	91 mm
Width	91 mm
Height	200 mm
Probing directions	6; $\pm X$, $\pm Y$, $\pm Z$
Measuring force	0.05 to 1 N / continuous
Diameter of adapter plate	70 mm
Probe deflection	max. ± 5 mm
Stylus system weight, max.	800 g/ incl. adapter plate
Stylus system length,max.	800 mm / stylus + extension
Max. tilting moment of the adapter plate	0.1 Nm
Min. diameter of the stylus tip	0.3 mm

Ambient conditions:

Environmental operating temperature	5-40°C
Permissible sound pressure level	100 dBA with sinusoidal excitation 100 dBA noise

Renishaw probes

Type		TP6	TP20
Dimensions			
Diameter	[mm]	25	13.2
Length	[mm]	41	38 ¹
Weight	[g]	56	22
Extensions, max.	[mm]	200	300
Probing direction		±X, ±Y, -Z	±X, ±Y, -Z
Connection thread for probe		M8	M8
Connecting thread for stylus		M3	M2
¹ including module for probing force. There are several modules for different probing forces.			

Ambient conditions:

Environmental operating temperature	5-40°C
Permissible sound pressure level	75 dBA with sinusoidal excitation 80 dBA noise

5

Handling

This chapter contains:

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What you should know!

Types of measurement

Overview

Discrete-point probing, multipoint measurements, and scanning are possible using the corresponding probing system. When scanning, it is differentiated between passive and active measuring probing systems:

	Single point	Multiple point	Scanning	
			Passive	Active
RST-P	×			
XDT TL3	×	×		
VAST XXT	×	×	×	
VAST XT gold	×	×		×
VAST XTR gold	×	×		×
VAST gold	×	×		×
TP6	×			
TP20	×			

Discrete-point probing

Discrete-point probing means that only one point is probed. Then the probe moves away from the workpiece. This procedure must be repeated if additional points are to be probed.

Complete measurement

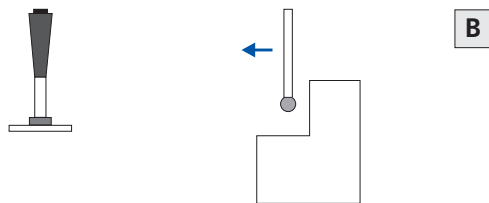
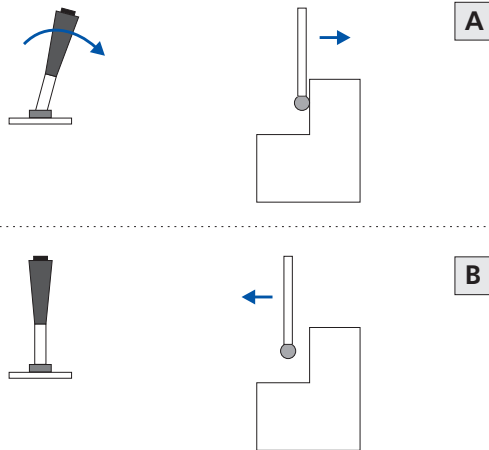
With discrete-point probing, a workpiece can be measured completely. All dimensions of the workpiece are calculated by means of the probed discrete points. No information can be obtained regarding form. For this, scanning and a special software are required.

Probing used for trigger probing systems

Acknowledgement by signal sound

A signal is sounded as soon as the measuring point probed is successfully transmitted to the measuring system. The joystick can then be released. The stylus automatically retracts in the direction opposite to the probing direction.

An essential feature of the touch-trigger probe system is the automatic retraction of the probe. For all systems, it is possible to switch the beep on or off.



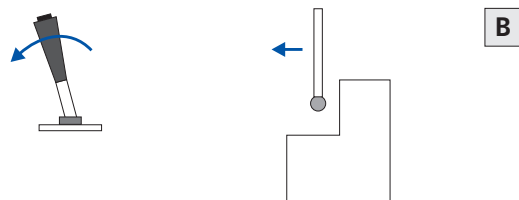
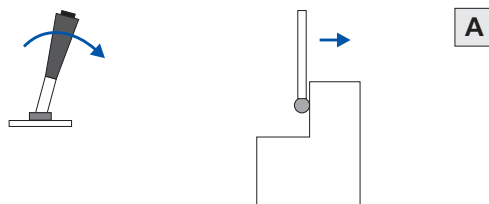
- A Before probing
- B After probing

NOTE

In case of a fault, the joysticks are re-enabled after about two seconds. The stylus can be moved back via joystick control. The stylus can be moved in all directions at low speed. The collision protection is *not* active.

Probing used for measuring probing systems

The stylus must be moved back contrary to the probing direction after each discrete-point probing.



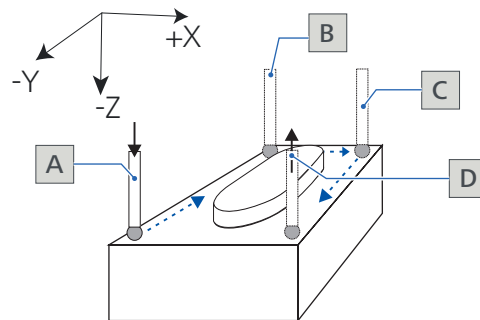
- A Before probing
- B After probing

Exact measured values With measuring probing systems, many measured values are recorded in each probing. Using these values, the control calculates the exact measured value. This guarantees a low deviation and a high reproducibility, even in case of high travel speeds and disturbance variables from outside, e.g. floor vibrations.

Multipoint measurement

Multipoint measurement is only possible with a measuring probing system. During multipoint measurement, the stylus, in the probing status, is moved perpendicular to the probing direction.

The probing axis runs parallel to the workpiece surface. During the entire measurement, the stylus tip constantly remains in contact with the workpiece surface. A pre-selectable measuring force provides a defined force between stylus tip and workpiece.



Example for probing in Z direction

- A Probing of a workpiece (-Z)
- B-D Moving over the workpiece (+Y, +X, -Y)
- D Moving away from the workpiece (+Z)

Applying the measured value You can influence the transfer of measured values individually. The measured value can be transferred either dynamically or statically.

- *Dynamic transfer of measured values* (not possible with the C99 control unit and the CALYPSO measuring software):
The measured value is immediately transferred by pressing the push-button of the right joystick. The stylus movement is not stopped.
- *Static measured value transfer*:
Each time the CMM stops traveling a measured value is created, but not transferred immediately. Measured value transfer occurs after a damping period of approx. one second (1 s).

Terminating the multipoint measurement To terminate the measurement, deflect the joystick counter to the probing direction.

Active scanning

During active scanning, the surface of a workpiece is continuously probed. The measuring points make it possible to calculate surfaces or provide information on the form of a surface.

NOTE

By selecting the scanning mode, it is possible to influence the stylus deflection and the measuring accuracy.

NOTE

The axes of the probe are generally not clamped during scanning. This means that measurement takes place with freely movable axes.

Scanning modes:

VAST circle scanning:	For measuring shafts and bores; the CMM automatically differentiates between inside and outside bores.
VAST surface scanning:	For measuring surface-like workpiece areas.
VAST line scanning	For flatness measurements or acquisition of curved shapes in predefined section planes. In this case, it is advisable to clamp one axis.

Special features of the VAST gold

Different measuring routines are available for each scanning mode:

Four VAST stages:

VAST stage 1:	Exact measurement of dimensions, position, and form. Scanning with maximum precision for measurement of dimensions, form, and position.
VAST stage 2:	Fast measurement of dimensions, position, and form. High dynamic scanning for measurement of dimensions, form, and position ($2 \times V_2$).
VAST stage 3:	Exact measurement of dimensions and position. Scanning with maximum precision for measuring dimensions and position.
VAST stage 4:	Rapid acquisition of the position. Scanning with maximum dynamics for measuring the position.

For more information, please refer to the operating instructions for the measuring software.

Passive scanning

During probing by means of the stylus tip, a spring element in the probe is deflected which generates the measuring force.

Special features of the measuring probing system

Notes on measuring probing systems

The results of manual probings and automatic measuring runs may slightly differ from each other. In general, automatic measurement runs provide the highest accuracy.

Precision positioning during probing

With measuring probing systems, the joysticks are temporarily deactivated as soon as the probe touches the workpiece. The CMM control takes over the precision positioning of the stylus. The measured value is accepted.

Setting the measuring force

The measuring force has to be set for the measuring probing systems. The value of the measuring force must be entered in the measuring software. Please see the user guide for the measuring software.

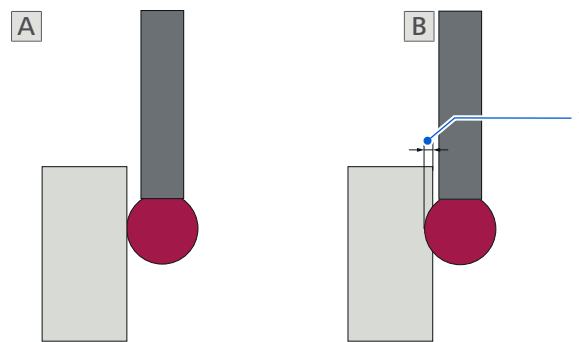
NOTE

The measuring force can be set individually for each stylus, if required.

Why does the measuring force have to be set?

During probing, the stylus tip can cause changes in the form and the surface of the workpiece. The extent of these changes influences the precision of the calculated values. In order to avoid falsified measuring data, the measuring force should be adapted to the characteristics of the workpiece material.

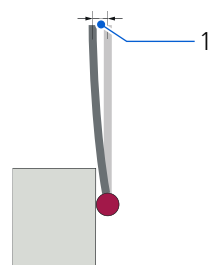
Example: Greater changes in form can be expected with soft workpiece materials and high measuring force than with hard workpiece materials and low measuring forces. In this case, the measured value is falsified by the extent of the form change.



Deformation of the workpiece

- A Nominal condition: no workpiece deformation.
- B Falsified measurement due to deformation of the workpiece. Reason: soft material and high measuring force.
- 1 Extent of falsification

Measurement values can also be falsified by the stylus bend, especially when long and thin probes are used. The measuring force must be reduced. For the compensation of the probe bend, the tensor qualification is performed. Please see the user guide for the measuring software.



Probe bend

- 1 Extent of falsification

Info for VAST probes

This includes VAST XT gold, VAST XTR gold, and VAST gold.

The measuring force can be set continuously. Normally, a measuring force of 0.2 N is used for measurement.

NOTE

The measuring force should be as low as possible, e.g. 0.1 N. The measuring force, however, must be high enough so that a reliable contact between the workpiece and the stylus tip is guaranteed at any time.

0.2 N –normal

NOTE

With *self-centering probing*, a higher measuring force in the MAN operating mode might be useful in order to improve centering. See

- Increase the measuring force if necessary.

Probe-specific information

Adjustments of the measuring force and further particularities for the measuring operation of specific probes are treated elsewhere.

- Please pay attention to the chapters dealing with the special features of the respective probing system.

Notes on scanning

Scanning speed

The possible scanning speed depends on the measuring force, the surface condition of the workpiece, the radius of the stylus tip and the required tolerance.

NOTE

Too high scanning speeds can lead to incorrect measuring results. The »navigator« software option offers you assistance for the choice of the optimum scanning speed.

Measuring force

The measuring force depends on the probe and can be adjusted within certain limits with many probes.

Abrasion or material deposits

NOTE

During scanning, the stylus remains continuously in contact with the workpiece. The stylus tip practically glides along the surface of the workpiece. This may cause abrasion and material deposits.

Abrasion: Material may rub off the workpiece or the stylus tip (e.g. in case of sintered material) as the stylus glides along the surface of the workpiece during probing.

Material deposits: With certain materials (such as aluminum), material may remove itself from the workpiece and deposit itself on the stylus tip.

For this reason, stylus tips should be checked regularly following all scanning operations and be replaced, if necessary.

- 1 Check the condition of the stylus tips and clean them.

For information on how to remove aluminum deposits, please refer to the operating instructions for the CMM.

- 2** If the stylus tip is damaged, you must replace the stylus.

Notes on measuring operation

Checking the styli



Regular inspection of the stylus systems is required to ensure correct workpiece measurement.

- Check the styli, the stylus system components and the adapter plate regularly.
- Remove any particles or grease film from the stylus tips and the adapter plate.
- Replace a damaged stylus.

NOTE

Especially styli made of CFK must be handled very carefully. A fall even from a low height can destroy the inner structure of the stylus without being visible from the outside.

Effect of magnetic fields

NOTE

Probes are sensitive to magnetic fields. The presence of magnetic fields may lead to stylus deflections and thus to measuring errors. Possible causes of a magnetic field: e.g. magnetic workpieces, clamping tool.

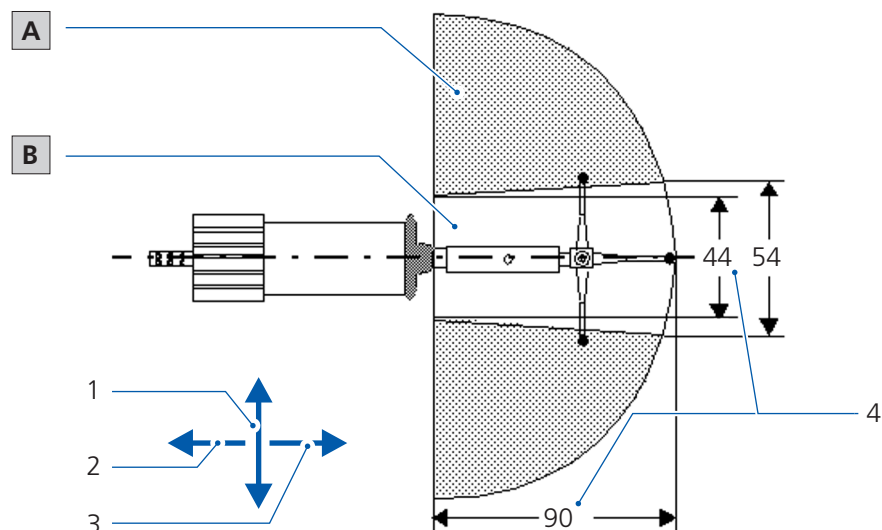
Temperature influence

NOTE

In order to carry out a temperature compensation between CMM and an inserted probe, an appropriate time period for this temperature compensation has to be considered. This period depends on the temperature difference between the probe and CMM.

RST-P

Admissible zone for the stylus



- A Admissible zone for the stylus
- B Limited central zone for reverse probings
- 1 Lateral
- 2 Reverse
- 3 Next
- 4 Data in mm

Admissible zone [A]

When probing forwards and sideways, all stylus systems are admissible, in which the styli are arranged within the drawn semicircular area.

Limited central zone [B]

If reverse probing is to be carried out, the styli arranged in the conical central zone must not be used for the probing.

NOTICE! When assembling a stylus system, make sure that the styli are arranged within the admissible zone. If a stylus is located outside the admissible zone, probing errors may be caused. Furthermore, the probe may become damaged, especially during reverse probings.

Critical probings

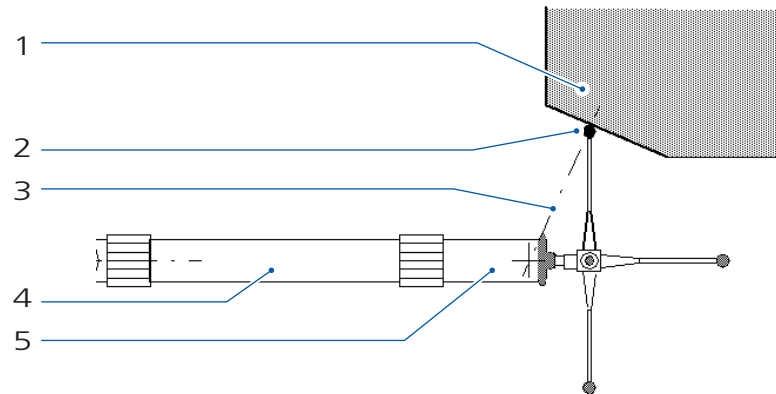
Condition for probing pulse

NOTE

A measured value is only valid if the probing pulse is confirmed by the mechanical contact in the probe within a certain period.

Unfavorable conditions

In certain cases it may happen that the mechanical contact is released too late. In this case, the measured value is not accepted.



- 1 Workpiece
- 2 Probing point with lateral stylus
- 3 Surface normal in the probing point
- 4 Extension of RST-P: > 200 mm
- 5 Probe

Probing may be critical if the following four criteria coincide:

- Use of an extension that is longer than 200 mm for the RST-P probe.
- Surface normal at the probing point points to the center of the bearing plane, in the range of $\pm 5^\circ$.
- Probing with a lateral stylus.
- the probing direction runs parallel to an axis of the stylus system.

NOTE

Critical probing can be avoided if you ensure that at least one of the above mentioned criteria does not apply during probing.

How to avoid critical probings

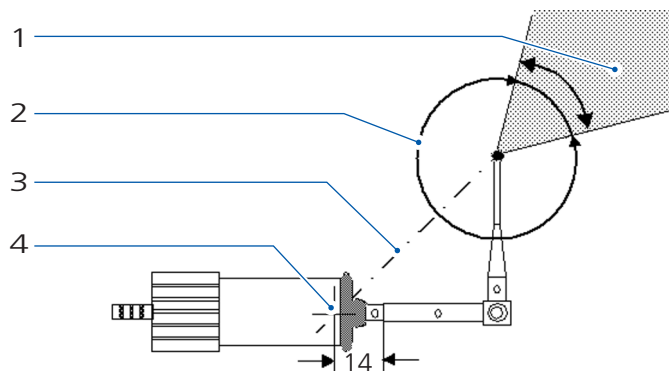
Critical probing can be avoided if the central stylus instead of the lateral stylus is used for the measuring point on the oblique surface.

Inadmissible zone for reverse probings

The stylus vector is different for each stylus. It determines the admissible and inadmissible zones for the probing.

NOTE

The stylus vector is a connecting line between the stylus tip and the bearing plane of the RST-P probe.



Stylus vector

- 1 Inadmissible zone for reverse probings; 60° angle
- 2 Admissible zone for all probing directions
- 3 Stylus vector
- 4 Center of the bearing plane for the RST-P probe

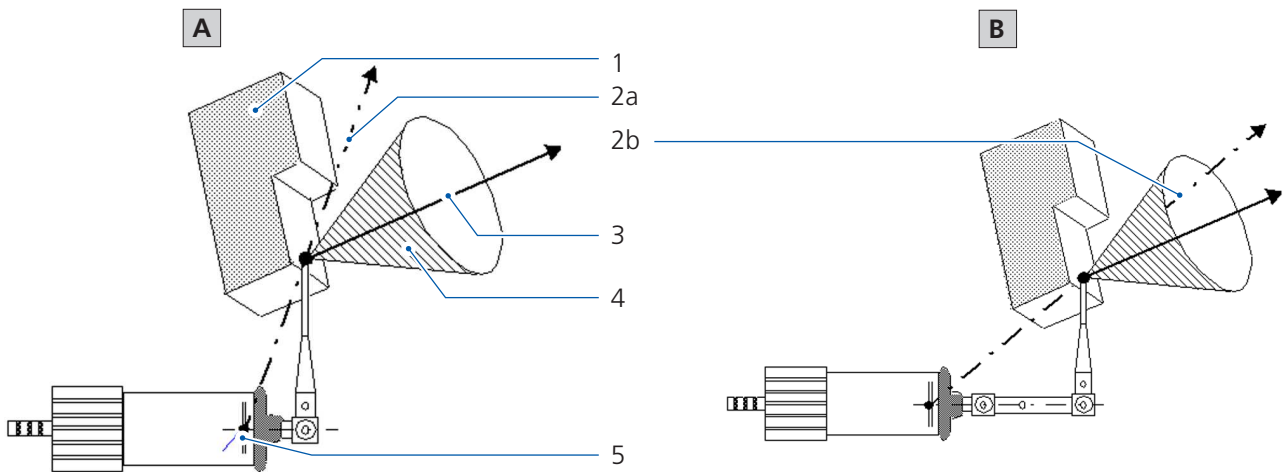
**Damage to the probe during reverse probing.**

The bearing plane for the RST-P probe must not be loaded in the direction of pull. This may happen during reverse probings if the surface normal of the workpiece to be probed is superimposed on the stylus vector. This may lead to measuring errors and cause damage to the RST-P probe.

- Do not perform any reverse probing if there is a risk of stylus deflection within the inadmissible 60° range. See examples.

NOTE

Avoid reverse probings. However, if reverse probing is necessary, the stylus with which the largest angle between the surface normal and the stylus vector can be achieved should be used. See diagram above.



Examples of admissible and inadmissible reverse probing

- A Admissible reverse probing: the stylus vector lies *outside* the inadmissible zone.
- B Inadmissible reverse probing; the stylus vector lies *within* the inadmissible vector range.
- 1 Workpiece
- 2a Stylus vector outside the inadmissible zone
- 2b Stylus vector within the inadmissible zone
- 3 Surface normal of the workpiece in the probing point
- 4 Inadmissible zone: 60° cone around the surface normal
- 5 Center of the bearing plane for the RST-P probe

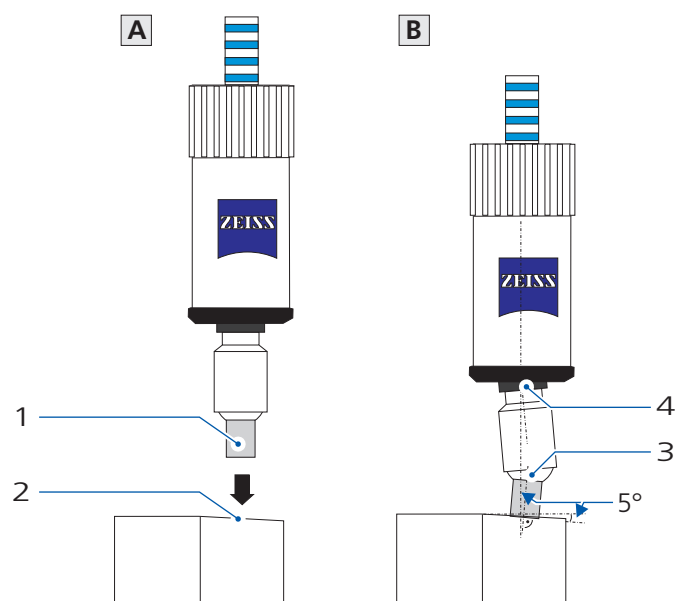
RST-T

Notes on temperature measurement

- The temperature measurement should be carried out on thick-walled workpieces.
- The workpiece surface must be clean and flat.
- The surface being probed should be larger than the contact surface of the sensor.
- Measuring force: 1 N
- The workpiece should be probed in the axis direction of the temperature sensor.

The maximum angle between the axis direction and the standards of the workpiece surface must not exceed $\pm 5^\circ$. Correct measurements cannot be guaranteed with larger angles.

The temperature sensor adapts itself automatically to the inclination of the workpiece surface.



A Approaching an oblique workpiece surface

B Probing: Deflection at two points

- 1 Probe
- 2 Workpiece
- 3 Deflection on the probe
- 4 Deflection of the sensor; maximum $\pm 5^\circ$

Field of application

With a RST-T, you have the following options:

- To carry out a temperature compensation.
- To use the temperature probe in an automatic measuring run.
- To monitor the temperature.
- To check the temperature.
- To record the temperature.

For more information, please refer to the table.

Possibility	Comment
Temperature compensation	When using the temperature sensor for temperature compensation, the measuring time after positioning the temperature sensor is approximately five seconds. During this time, the temperature is continuously measured, evaluated, and saved.
Using the temperature probe in an automatic measuring run	If the temperature sensor is to be included in a measuring run, the position of the temperature sensor must be known beforehand. <ul style="list-style-type: none"> – Determine the position of the temperature sensor.
Temperature monitoring	It is possible to define <i>limit values</i> for the temperature. Furthermore, you can define when to perform the temperature measurement. There are two possibilities if the limit value is exceeded: A warning appears in the report or the automatic measuring run is cancelled.
Temperature check	The ambient air temperature can be measured at any time. The temperature is compared with the limit values. There are two possibilities if the limit value is exceeded: A warning appears in the report or the automatic measuring run is cancelled.
Temperature recording	If the data from the last temperature measurement is required, the temperatures of the workpiece and the air can be recorded.

NOTE

The measuring software is required in order to use the possibilities offered by the RST-T. Please see the user guide for the measuring software.

VAST XXT

Dead-weight offset

Since the VAST XXT is not provided with the counterbalancing function, the stylus sags down, more or less, depending on the weight and orientation of the probe. The resulting display on the probe-internal path measurement system is called dead-weight offset (DWO). Any probing during measuring operation takes place relative to this DWO.

A DWO is determined after certain actions. These actions may *not* be carried out while probing.

These actions include:

- Cold start of the control unit
 - Switching the control unit on and off
- Swiveling of the stylus
- Stylus system change

NOTE

Make sure that the stylus does not come into contact with anything during these actions.

- Move the stylus free prior to carrying out one of these actions.

Notes on the operation

Probe deflection and measuring force

The measuring force depends on the probe type (TL1, TL3 or TL4), on the stylus length, and on the deflection at the stylus tip. The longer the stylus length, the higher the deflection of the stylus tip and the lower the measuring force.

NOTE

Very thin styli may break. Styli of the applicable stylus system kit are suitable.

»Standard« presetting

The recommended presetting for the deflection is »Standard«, selectable in the CALYPSO measuring software. With this setting, the probe deflection during measurement value recording is 0.15 mm, this value is independent of the stylus length.

Modes for critical application cases:

- | | |
|------------|---|
| Sensitive: | Small deflection, for example for soft workpieces or low scanning speed. |
| Robust: | High deflection, for example for rough workpieces or high scanning speed. |

The different modes can be selected in CALYPSO.

Qualification

NOTE

The shaft of the reference sphere may not be probed during the qualification.

- Position the reference standard in a way to prevent probing of the shaft.

Please note:

- The maximum deflection occurring during qualification is 0.4 mm. A maximum probing force results from the deflection of 0.4 mm. The resulting probing force depends on the stylus length.
Only use styli which will not show any inadmissible deformation at the maximum probing force.
- RDS CAA is only available for VAST XXT TL3.
For VAST XXT TL1 and VAST XXT TL4, each RDS position must be qualified separately.
- For requalification of already qualified styli, six probing points are sufficient.

Probing

- In the case of styli with a very thin stylus shaft, the probing dynamics may have to be reduced. Please refer to the operating instructions for the measuring software.
A reduction of the probing dynamics is normally not required for styli up to a shaft diameter of 1 mm and a stylus tip diameter of 1.5 mm. For smaller styli, a reduction of the probing dynamics can be useful. See below.
- Self-centering probing is not permitted.
The moments generated by frictional forces lead to inaccurate measurements.

Note: If special boundary conditions are complied with, a self-centering probing may be possible in particular cases.

- Disk styli may not be used since those cannot be qualified.

Requirements for very small styli

Styli with a stylus tip diameter of 0.1 mm can be used on the O-INSPECT. The following CALYPSO settings are recommended for styli diameters of less than 0.3 mm:

Requirements for qualification:

Probe	VAST XXT TL1
Stylus extensions	50 mm
Reference sphere	8 mm
Probing behavior	Sensitive
Probing dynamics	20 %

Requirements for measurements:

Probe	VAST XXT TL1
Stylus extensions	50 mm
Probing behavior	Sensitive
Probing dynamics	25 %

VAST XTR

Configuring the probe

Configuring probe and holder in the measuring software

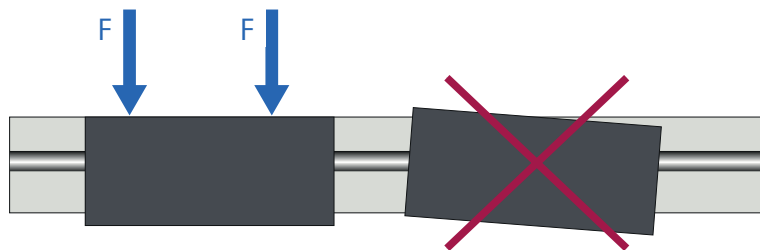
In the CALYPSO default settings, the probe must be set on the »Sensors« tab. To do so, select »VAST-XTR«. When creating a new stylus system holder, select the »ZCR« type. Please see the user guide for the measuring software.

Changing the position of a holder

To move a holder in the profile rail on the MSR changer rack, you must first slacken the two screws on the lower side of the holder.

1. Slacken the two screws on the lower side of the holder.
2. Move the holder to the desired position.
3. Retighten the screws.

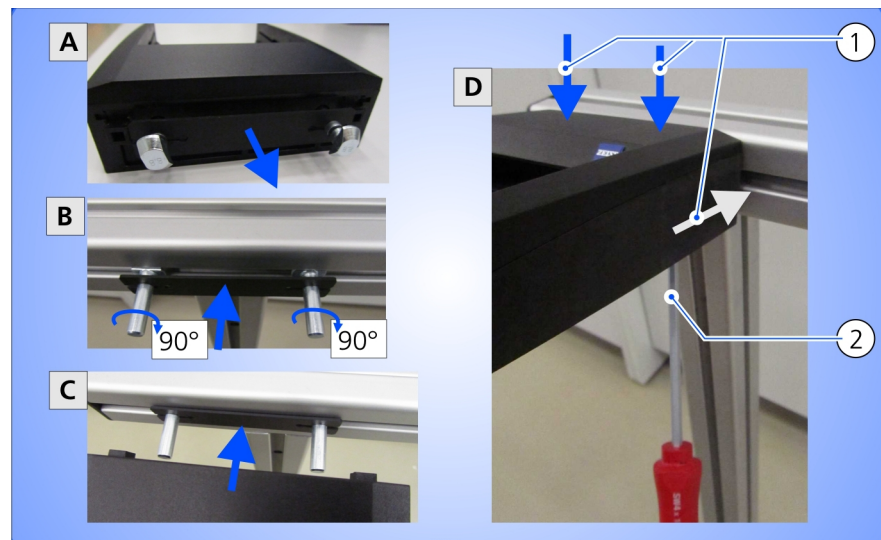
NOTICE! When tightening, the holder may tilt to the side. To avoid inclined mounting of the holder in the profile rail, you must push the holder downwards against the profile rail while tightening the screws.



Inclined holder due to incorrect mounting

Mounting a holder between two existing holders

1. Remove the metal plate located on the rear side of the holder and the two holding pins **[A]**.
2. Slide the holding pins into the groove of the profile rail and turn by 90° **[B]**.
3. Slide the metal plate and the holder onto the two holding pins and retighten the screws **[C, 1, 2]**. Also see information on item 3 shown above.



Mounting a holder between two existing holders

Qualification

The holder can be qualified using any qualified stylus. The only condition is that the max. diameter of the stylus tip is 8 mm.

Qualification is a two-step procedure:

1. The stylus length must be determined.

To do so, probe any plane surface with the stylus tip and with the lower edge of the adapter plate. **NOTICE! The smaller surface of the adapter plate must be used for probing as shown in the illustration. [1]**



- 1 Zone for probing
2. The sloped qualification surface on the holder must be probed with a stylus.

Then CALYPSO automatically recognizes the type of the holder and the direction of approaching the holder.



- 1 Sloped qualification surface

NOTE

The adapter plate can only be stored in one holder position. For this, the adapter plate is rotated automatically to the corresponding position. The holders can be arranged such that approach in the $\pm X$ and $\pm Y$ directions is possible.

Installing and removing the adapter plate



The adapter plate must be installed with the styli mounted. No styli must be mounted to the installed adapter plate. This could damage the probing system.

1. To insert the adapter plate into the probe, press *both* push-buttons of the adapter plate and keep them pressed.
2. Then slightly push the adapter plate in horizontal position upwards into the adapter plate receptacle of the probe and release the push-buttons.



ZSH-70-R-24 adapter plate

- 1 Push-button for locking the adapter plate

NOTE

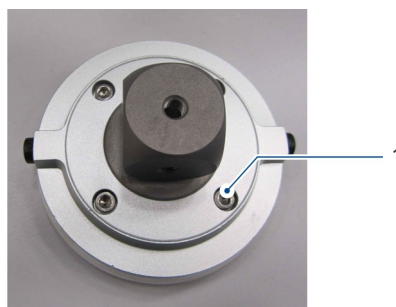
After manual change of the adapter plate, make sure that both push-buttons return to their initial position. Otherwise, the adapter plate may not be recognized correctly in the system. Neither rotation nor probing is possible in this position.

The current angular position of the adapter plates is automatically recognized after correct loading. The position in which the two type plates of the adapter plate point towards the front side of the probe defines the angular position «zero». See **[1]** below.



1 Home position of the adapter plate

The angular position can be changed in steps of 15°. Thus, a maximum of 24 positions is possible. By rotating the probe mounting cube you can adjust its position in smaller angular steps. To do so, the four screws on the lower side must be slightly loosened.



1 Screws for setting the angular position (4 pieces)

NOTE

You must retighten the four screws after setting the desired position. The torque is 1.5 Nm.

Removing the adapter plate

The procedure for manual removal of the adapter plate is initiated by a command via the control console or a software command. At the same time, the two push-buttons of the adapter plate must be pressed and kept pressed. After the audible release of the holding magnet, the adapter plate can be removed downwards.

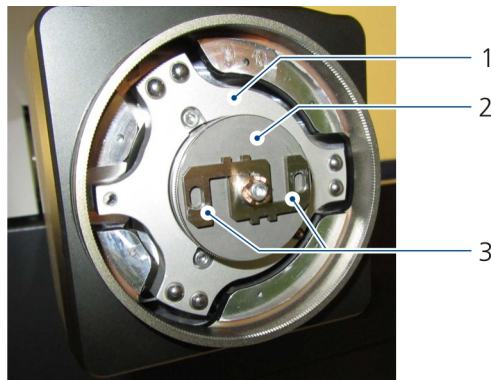
Collision protection

The collision protection of the probe is partly integrated in the adapter plate.

NOTE

If short styli are mounted directly to the adapter plate, only limited protection against collision is provided in case of maximum travel speed.

If, in case of collision, the adapter plate moves away from the probe, the body and the styli are pulled off the adapter plate. The anchor plate remains on the probe. Furthermore, the locking slides also remain on the anchor plate.



Adapter plate receptacle after a collision

- 1 Adapter plate receptacle
- 2 Anchor plate
- 3 Locking slides

The anchor plate can be removed from the probe by means of a software command. **NOTICE! The anchor plate can fall off automatically. Therefore, hold your hand under the anchor plate to prevent it from falling on the measuring table.**

NOTE

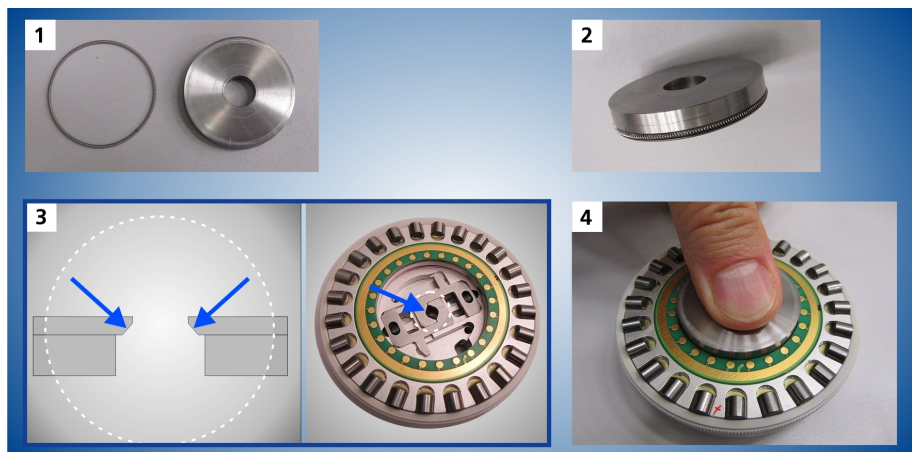
In individual cases, both locking slides need to be pushed manually outwards and the anchor plate must be removed by pulling downwards.

Subsequent measures:

1. After more than 3 collisions, insert new annular springs in the groove of the anchor plate [1, 2].
2. Reinsert the locking slides [3], making sure they are properly aligned.
NOTICE! The beveled surfaces of the locking slides must point downwards.
3. Press the anchor disc into the adapter plate with the groove pointing downwards [4].

NOTE

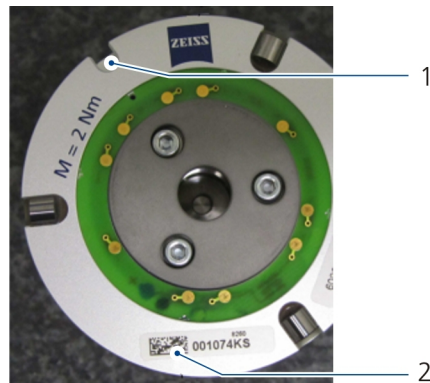
The replacement springs are included in the packaging of each adapter plate. Additional replacement springs can be ordered by specifying the order number »531-398«.



Use of other adapter plates

The adapter plate supplied for the master stylus and a recent type of the VAST adapter plate can also be installed in the adapter plate receptacle of the VAST XTR gold probe. These adapter plates can only be operated in the 0° position.

The usable VAST adapter plates can be recognized by a label with the DataMatrix code.

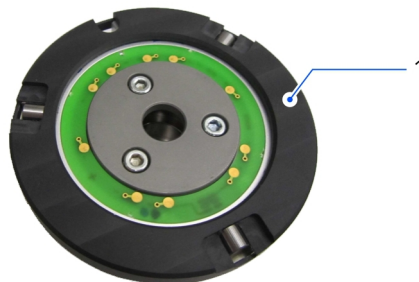


VAST adapter plate with DataMatrix code

- 1 Groove for proper positioning in the adapter plate receptacle
- 2 DataMatrix code

Collision protection

Before using VAST adapter plates, the collision protection ring must be pressed onto the adapter plate. **NOTICE! Otherwise, no collision protection is provided for the VAST XTR gold.**



- 1 Collision protection ring (order number: 600664-8410-000)

Installing adapter plates

The adapter plate supplied for the master stylus and the VAST adapter plate must only be installed in a specific position. The recess in the adapter plate must point in the -X direction of the CMM coordinate system. See first illustration.

NOTE

In contrast to other VAST probes, the adapter plate receptacle of the VAST XTR gold probe has no pin for proper positioning of the adapter plate.

- The adapter plate must therefore be inserted with care.

NOTE

If the adapter plate is accidentally inserted in the wrong position, it will not be recognized. In this case, the adapter plate must be released and installed again.

Stylus system assembly

Precautions

Probe holder



Damage to the probe holder due to forces exerted during installation of the styli.

Stylus systems must not be assembled on the probe.

- Do not attach any styli to the probe as long as probing system is inserted in the adapter plate receptacle.

Probe



Damage to the optical probe caused by forces applied to the adapter plate receptacle.

Damage to the mechanical system inside the probe.

Stylus systems must not be assembled on the probe.

- Do not attach any styli to the stylus system as long as the stylus system is located in the adapter plate receptacle.

Weight and length

Observe the limit values regarding weight and length when assembling the stylus system. The limit values depend on the probing system. ➤ See [⇨ 5-32]



Impairment of the accuracy of the CMM if limit values are exceeded.

The specified accuracy will not be reached.

The weight of all components and the length of the stylus, extensions and joining elements must be considered when assembling a stylus system.

- Observe also the *weights indicated* for the individual styli, joining elements and the adapter plate when assembling a stylus system.
- Observe the *length specifications* for the styli, extensions and other joining elements when assembling a stylus system.

Stylus system



Damage to the styli and stylus system components and reduced accuracy of measuring results due to incorrect assembly of the stylus system.

The stylus shafts may bend or break. Damage to threads.

Assemble the stylus systems carefully, especially very small styli with thin stylus shafts. Do not exert any force when screwing the components together.

- First screw the components carefully together by hand.
If necessary, use the tools and fixations included in the delivery.
Assemble them fully.
- Use the pin included in the kit to tighten the components.
- Observe the limit values regarding weight and length.
The limit values depend on the probing system.
- We recommend using only one-piece extensions.

Temperature influence



Linear expansion due to hand heat.

Falsification of measuring results.

- Please wear gloves.

RST-P probe



Damage to the probe due to the application of force to the joint.

Damage to the joint to which a stylus or a stylus system is mounted.

- When mounting styli, use the supplied auxiliary tool to fasten the joint.

Probe extensions

NOTE

Only one-piece ZEISS extensions may be used for probe extensions exceeding 300 mm. Multiple-piece extensions are not permitted.

Information on the assembly

There are two ways to assemble a stylus system:

1. Screwing technique; stylus with thread
2. Clamping technique; stylus without thread

Preference should be given to the screwing technique.

Advantages of the screwing technique:

- Easy assembly
- Complex stylus systems possible
- Stable construction

Stylus system kit

Stylus systems may be assembled individually. There are stylus system kits with different components. There are different stylus system kits for small and large workpieces.

NOTE

The limit values for probing systems must be observed when assembling.

Threaded-joint technology

Depending on the probing system, different thread sizes are used: M2, M3 and M5.

Thread sizes:

M5	VAST XT gold, VAST XTR gold, VAST gold
M3	RST-P, XDT TL3, VAST XXT
M2, M3	Renishaw probes

The stylus system components differ with regard to material and geometry, e.g. length of the stylus and diameter of the stylus tip.

Clamping technique

Laterally oriented styli are inserted in grooved discs and clamped by the vertically oriented end stylus. The end stylus is screwed into the stylus extension or directly into the adapter plate. In this way the laterally oriented styli are clamped.

The stylus system components for the clamping technique and assembly instructions are included in the stylus system kit.

Criteria and limit values

Criteria

An unfavorable stylus system configuration may impair the measuring accuracy. Therefore, it is necessary to observe the following criteria for assembly.

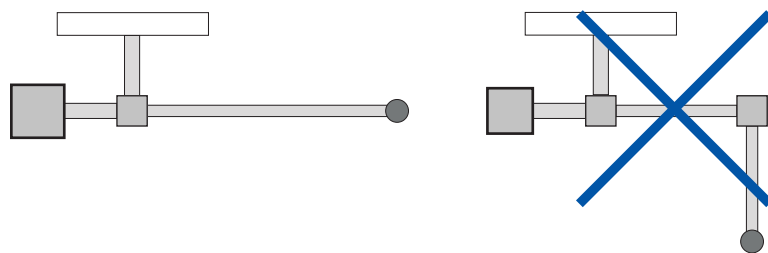
- Use only styli with a suitable thread (M3 or M5).
- Stable structure with as few components as possible.

- Symmetrical design with respect to weight; the center of gravity must be located in the physical center; use counterweights if necessary.

Stylus extensions may be used as counterweights.

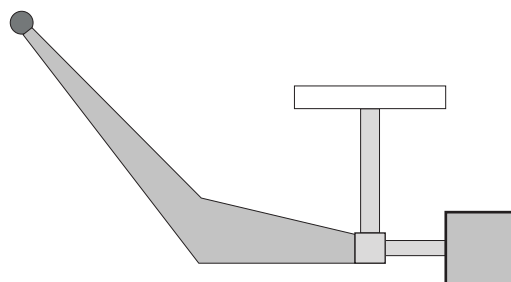
Note: Check the balance by holding the adapter plate between two fingers and letting the stylus system swing back and forth until it comes to a stop. The stylus system must point downward in a vertical direction.

- Create as few branchings as possible.



- If possible, never use joints when assembling oblique stylus configurations.

It is preferable to use components shaped according to your corresponding requirements. You can also make such components yourself, provided that you observe the permissible limit values for the stylus system.



- Use only components that are in perfect condition.

Component requirements:

- Not damaged
- Clean
- Grease-free.
- Observe the limiting values for the stylus system: length, weight and tilting moment.

The allowed styli are available in the webshop. ➤ See [[Appendix-2](#)]

Limit values

To ensure error-free measurement by the probing system, the maximum weight and length must not be exceeded. Furthermore, the maximum tilting moment may not be exceeded.

The limit values depend on the probing system used. The limit values of the available probing systems are listed below.

Overview:

Probing system	Length [mm]	Weight [g]	Tilting moment [Nm]
RST-P	90	10	–
XDT TL3	150	15	–
VAST XXT			
TL1	125	10	–
TL3	150	15	–
TL4	250	10	–
VAST XT gold	500	500	0.3
VAST XTR gold	350	500	0.15
VAST gold	800	800	0.1
TP6	See Renishaw user manual		
TP20	See Renishaw user manual		

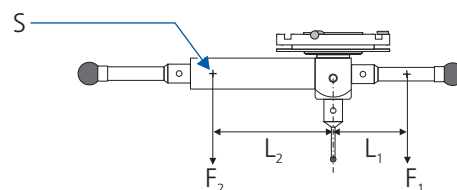
NOTE

The limit values for the maximum weight refer to the stylus system and adapter plate. For some probes, there is no adapter plate, for example for the RST-P.

Calculation of the tilting moment:

The tilting moment K_M can be calculated as follows:

$$K_M = |F_2 \times L_2 - F_1 \times L_1|$$



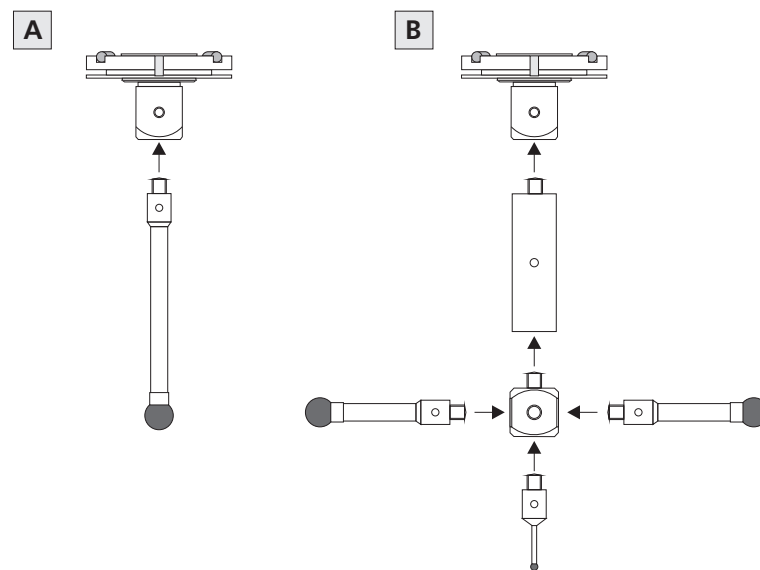
- S Center of gravity of a probe
- F Force in the center of gravity

L Distance between the center of gravity and the bisecting line

Example

Connecting parts are normally needed to assemble the required stylus systems. It is also possible to screw the stylus directly into the adapter plate.

Assembly example, applying the threaded-joint technology with the VAST adapter plate:



A Stylus in the adapter plate

B Extension in adapter plate

Aligning the stylus system

It is still possible to align the stylus system after it has been assembled. This may be necessary if some points on the workpiece cannot be probed.

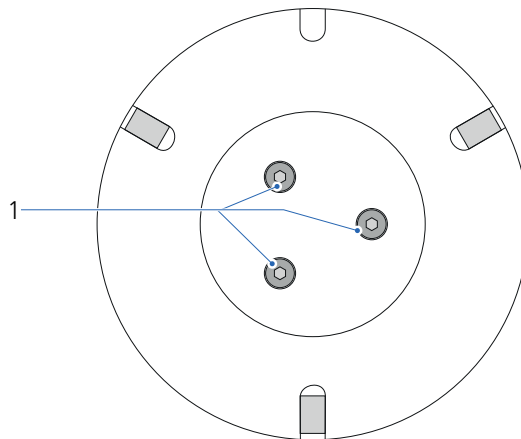


Stylus systems for the RDS articulating system must not be aligned.

NOTE

During the alignment, make sure that shaft probing is prevented during probing.

- 1 Loosen the three screws in the adapter plate so that the stylus system can be turned. **NOTICE! Do not completely unscrew the screws.**



VAST adapter plate

- 1 Screws
- 2 Insert the stylus system in the adapter plate receptacle.
- 3 Rotate the stylus system to the required position.
- 4 Hold the stylus system and take it out of the adapter plate receptacle.
- 5 Tighten the screws until you feel resistance.

Torque for tightening the screws:

VAST adapter plate:

2 Nm

Installing the stylus system

Precautions

The stylus system is held in place by an magnetic spring system. If the measuring software calls for an insertion or change of the stylus system, the magnetic force is adapted electrically. After insertion of the stylus system, the full holding force becomes effective after a short delay.

The measuring software is required for inserting and changing a stylus system. Please see the user guide for the measuring software.



Damage to the probe due to the application of force to the adapter plate receptacle.

Stylus systems must not be assembled on the probe. This could damage the probe.

- Install only complete stylus systems, equipped with all necessary styli.
- Do not attach any styli to the stylus system as long as the stylus system is located in the adapter plate receptacle.



Damage to the adapter plate caused by falling from the adapter plate receptacle.

A VAST probe automatically falls off of the adapter plate receptacle after a specified period of time following the initiation of the stylus system change.

- Hold onto the stylus system immediately after activating the change in order to avoid damaging the stylus system, the workpiece, or the measuring table.

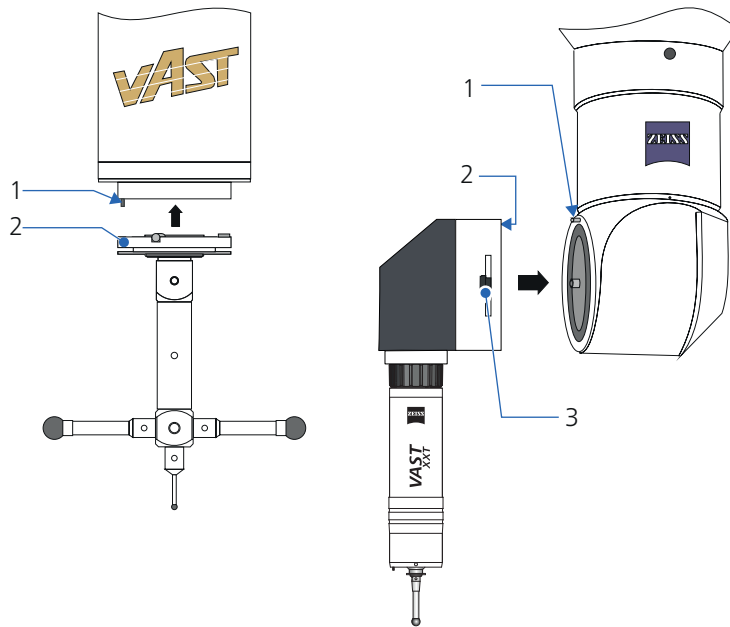
The period of time after which the stylus system falls off is set in the measuring software.

Installing the stylus system

The procedure for installing a stylus system is basically the same as for the individual probing systems. This procedure must be initiated by the measuring software. Please see the user guide for the measuring software.

- 1 Initiate the procedure via the measuring software.
Then install the stylus system within 20 seconds. If the stylus system is not installed within this time, you have to repeat this procedure.
- 2 Insert the stylus system in the adapter plate receptacle.

The pin must engage in the notch. See drawing. The stylus system is attracted by the magnet. The stylus system installation is complete, if there has been an audible click.



- 1 Pin in the adapter plate receptacle of the probe
- 2 Groove in the adapter plate
- 3 Push-button for releasing the safety catch.

Note: Press the push-button only when removing the RDS adapter plate.

Pin position:

VAST gold	Pin on the left side
RDS with VAST XXT	Pin in any position. The position depends on the setting of the tilting axis. The angle of the tilting axis is set in the measuring software.

Removing the stylus system (manually)

The procedure for removing a stylus system is basically the same as for the individual probing systems. However, several special points must be observed. This procedure must be initiated by the measuring software. Please see the user guide for the measuring software.

- 1 Initiate the procedure via the measuring software.

For the VAST probing systems, the delay required before the stylus system is released from the adapter plate receptacle must be specified in the measuring software.

Set the delay so that enough time always remains to grasp the stylus system after initiating the stylus system removal. This is essential to prevent damage to the stylus system, workpiece, or the measuring table.

- 2 Remove the stylus system.

Special aspects to be considered for probing systems:

VAST XT gold and VAST gold	Hold the stylus system. It drops down automatically.
VAST XTR gold	Two push-buttons on the adapter plate need to be pressed at the same time and kept pressed.
XDT TL3 and VAST XXT	<ul style="list-style-type: none"> – The stylus system is held magnetically and can be removed manually. – Hold the stylus system below the adapter plate and tilt it to the side.
RST-P	The stylus system must be deflected manually. This releases the magnet in the RDS adapter plate receptacle.
Adapter plate of articulating systems	The adapter plate is locked. To remove it, press the push-button on the adapter plate.

6

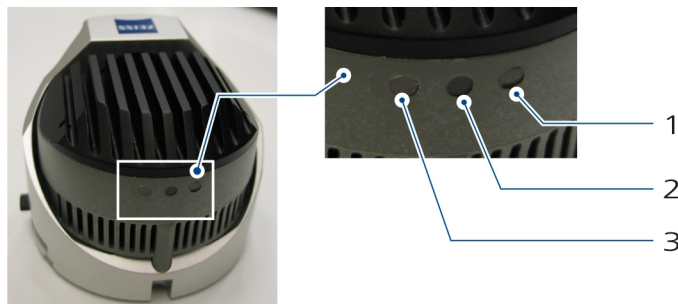
Errors and Malfunctions

This chapter contains:

Faults during operation	6-2
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Faults during operation

Error	Cause	Remedy
The power LED on the RDS adapter plate does not light up.	The contacts of the adapter plate are defective or soiled.	<ul style="list-style-type: none"> – Check and, if necessary, clean the contacts.
The system clock pulse LED on the RDS adapter plate does not flash.	CAN bus error	<ul style="list-style-type: none"> – Check and, if necessary, clean the contacts on the RDS adapter plate.
Error message: The adapter plate does not fit correctly in the adapter plate receptacle.	Stylus contacts are not closed.	<ul style="list-style-type: none"> – Remove the adapter plate and insert it again.
	Contacts on the adapter plate or on the adapter plate receptacle are soiled.	<ul style="list-style-type: none"> – Clean the contacts: <ul style="list-style-type: none"> with a dry or damp cloth. – Use a mild cleaning agent. – Dry the contacts to prevent oxidation. <p>Make sure that the contacts are free from cleaning agent residues.</p>
Error message during qualification: "No result"	The shaft of the reference standard has been probed unintentionally during the automatic qualification.	<ul style="list-style-type: none"> – Change the position of the reference standard so that the shaft will not be touched during qualification.
	Stylus or reference standard is loose.	<ul style="list-style-type: none"> – Fasten the stylus and reference standard firmly.
	Stylus tip or reference sphere is extremely soiled.	<ul style="list-style-type: none"> – Clean the stylus tip and reference sphere.
Measured value not accepted during probing.	Contacts are soiled. Contacts are on the adapter plate and its receptacle.	<ul style="list-style-type: none"> – Clean the contacts. <p>Further information See above.</p>



LED on the RDS-XXT adapter plate

- 1 LED for probe: The LED is permanently on if the probe has been installed in the adapter plate and if the adapter plate is fitted in the RDS adapter plate receptacle.
- 2 System clock pulse LED
- 3 Power LED: The LED is permanently on.

7

Care and inspection

This chapter contains:

What you should know!	7-2
Inspection measures	7-3
Care and cleaning	7-4

What you should know!

The sensitive measuring system of the CMM requires a certain degree of cleanliness. Even the smallest dust particles on the stylus tip or the reference sphere may cause inaccurate measurements.

Cleaning agent:

Material	Purpose
Mild cleaning agent	
Lint-free cloth, for example made of linen	
Note: The use of inappropriate cloths may lead to electrostatic charging of the stylus tip and attract dust particles.	
Solvent	To remove aluminum deposits from the stylus tip

Inspection measures

Checking the stylus system

Regular inspection of the stylus systems is required to ensure correct workpiece measurement.

- 1** Check the styli at regular intervals.
- 2** Remove any particles or grease film from stylus tips.
- 3** Replace a damaged stylus.

Care and cleaning

Stylus tips

Stylus tips may be contaminated, e.g. by dust particles. Furthermore, material from the probed workpiece may accumulate on the stylus tip, especially during scanning.

NOTE

The styli must be handled carefully. If force is applied, the bond between the stylus tip and the stylus shaft may break and the stylus shaft may bend or even break.

- Do not apply any force when cleaning.

NOTE

When styli are not in use, they should be stored in a safe place, ideally in the intended packaging.

- Clean the stylus tips with a lint-free cloth.
- Use a cleaning agent if necessary.

Ensure that there is no cleaning agent residue on the stylus tip.

If material from the workpiece settles on the stylus tip, it can be removed with a suitable solvent.

Aluminum deposits can be removed with a solvent. However, the solution should not be allowed to act too long because it can corrode the bond between the stylus tip and stylus shaft. When cleaning, proceed as follows:

1. Wear rubber gloves and safety eyewear.
2. Immerse a cloth (e.g. cotton cloth) in a solvent and clean the stylus tip with the cloth.
3. Rinse the stylus tips immediately with water and dry them.

Adapter plate

The adapter plate must be protected against contamination.

- If an adapter plate is not being used, store it in a clean, dust-free place, e.g. in a cabinet or drawer.

Cleaning:

Wipe off the adapter plate with a dry or damp cloth.

- Clean it with a mild cleaning agent.
- Dry it to prevent oxidation of its contacts.

Removing aluminum deposits

NOTE

Ensure that there is no cleaning agent residue. This could impair the function of the adapter plate.

Probe

The adapter plate and the adapter plate receptacle of the probe must be protected against dirt.

- Place a protective cap on the adapter plate receptacle of the probe when there is no stylus system in the adapter plate receptacle or the probe is not in use.
- Store the probe in a clean, dust-free place, e.g. in a cabinet or drawer.

Cleaning:

Wipe the probe with a dry or damp cloth.

If the *adapter plate receptacle* is dirty:

1. Clean the adapter plate receptacle with a mild cleaning agent.
2. Dry the adapter plate receptacle.

NOTE

Make sure that the adapter plate receptacle is free from cleaning agent residues. This could impair the function of the adapter plate receptacle.

8

Disposal

This chapter contains:

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Disposal of probing systems	8-3

Package

The regulations of the country in which the CMM is installed apply to the disposal of the packaging material.

Disposal of probing systems

Some parts of the probing system contain electronic components and must not be disposed of with domestic waste. Make sure to dispose of the components in question in accordance with the WEEE directive 2012/19/EU or the respective country-specific legislation applicable within the EU states. This also applies to probes and adapter plates.



For more information on the disposal, please refer to the operating instructions for the CMM.

Glossary

Term	Explanation
CAN bus	Asynchronous, serial bus system (CAN: acronym for »Local Area Network«)
CFRP	Acronym for »Carbon Fiber Reinforced Polymer«

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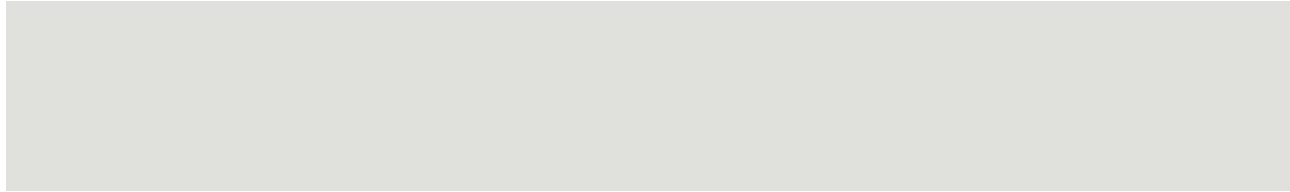
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Appendix

This chapter contains:

Webshop Appendix 2
Order numbers Appendix 3

Webshop

In the webshop, you will find:

- Probe accessories

Examples: styli, extensions, adapter plates.

- CMM accessories

Examples: changer racks, clamping devices, reference spheres.

- Training material

Examples: books, learning videos.

If the desired component is not available in the webshop, please contact the support.

See <https://shop.metrology.zeiss.de>

Order numbers

Below you will find some order numbers of components. Version: 2020-12.

Supplementary components for VAST gold:

Component	Order number
RST-T temperature sensor	600661-9675-000
Replacement sensor for RST-T	600661-8600-000
RST-T adapter plate	600667-9603-000

Order numbers for VAST XTR gold:

Component	Order number
VAST XTR gold adapter plate	600664-9700-000
ZCR 70 holder	600664-8600-000

Articulating stylus

Order number for the articulating stylus:

Orientation of the swivel axis	Order number
Articulating stylus for 0° orientation	601683-9110-000
Articulating stylus for 90° orientation	601683-9111-000
Articulating stylus for -90° orientation	601683-9112-000

Order number for stylus system holder:

Stylus system holder	Order number
ZCR 70	600664-8600-000

Order number for the contents of the case:

Tool	Order number
Stylus, 50 mm	626105-0584-050
Stylus extension REACH CFX 3, 50 mm	626107-1050-100
Torx wrench TX25	000000-0626-870
Pin wrench 2.9	602030-0222-000
Hook wrench DG11	626109-0012-000

Extensions**Extensions for RST-P and VAST XXT:**

Material	Length	Order number	Note
CFRP	60 mm	600661-8420-000	
CFRP	100 mm	600661-8421-000	
CFRP	200 mm	600661-8422-000	Only for RST-P
CFRP	300 mm	600661-8423-000	Only for RST-P

