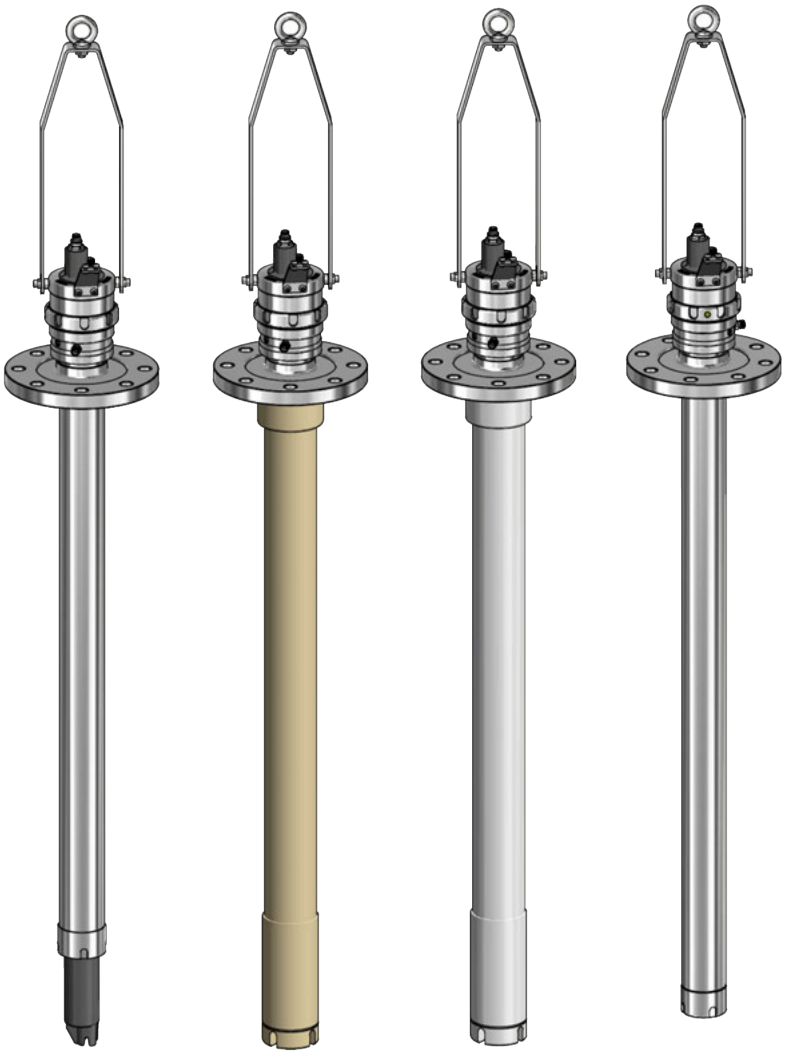
Knick

User Manual

Ceramat WA160

Retractable Fitting



Read before installation.
Keep for future use.

www.knick-international.com

Supplemental Directives

READ AND SAVE THIS DOCUMENT FOR FUTURE REFERENCE. BEFORE ATTEMPTING TO ASSEMBLE, INSTALL, OPERATE OR MAINTAIN THE PRODUCT, PLEASE ENSURE A COMPLETE UNDERSTANDING OF THE INSTRUCTIONS AND RISKS DESCRIBED HEREIN. ALWAYS OBSERVE ALL SAFETY INFORMATION. FAILURE TO COMPLY WITH INSTRUCTIONS IN THIS DOCUMENT COULD RESULT IN SERIOUS INJURY AND/OR PROPERTY DAMAGE. THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE.

These supplemental directives explain how safety information is laid out in this document and what content it covers.

Safety Chapter

This document's safety chapter is designed to give the reader a basic understanding of safety. It illustrates general hazards and gives strategies on how to avoid them.

Warnings

This document uses the following warnings to indicate hazardous situations:

Symbol	Category	Meaning	Remark
⚠	**WARNING**	Designates a situation that can lead to death or serious (irreversible) injury.	The warnings contain information on how to avoid the hazard.
⚠	**CAUTION**	Designates a situation that can lead to slight or moderate (reversible) injury.	
None	**NOTICE**	Designates a situation that can lead to property or environmental damage.	

Symbols Used in this Document

Symbol	Meaning
→	Reference to additional information
✓	Interim or final result in instructions for action
▶	Sequence of figures attached to an instruction for action
①	Item number in a figure
(1)	Item number in text

Table of Contents

1 Safety

This document contains important instructions for the use of the product. Always follow all instructions and operate the product with caution. If you have any questions, please contact Knick Elektronische Messgeräte GmbH & Co. KG (hereinafter sometimes referred to as "Knick") using the information provided on the back page of this document.

1.1 Intended Use

The Ceramat WA160 (hereafter also called "product") is a retractable fitting for installation in boilers and tanks. The product holds a sensor for measuring process parameters. The Ceramat WA160 moves the sensor into the process medium. The Ceramat WA160 is driven pneumatically.

Cleaning, calibration, or sensor replacement under process conditions by the customer (hereinafter sometimes referred to as the "operating company") may be conducted, subject to the requirements set forth herein, by placing the product into the service position (SERVICE limit position).

If the product is used with any product or part not authorized by Knick, the operating company assumes all risks and liabilities related thereto.

The Ceramat WA160 is suitable for the following sensor types:

Solid-electrolyte sensors	External diameter 12 mm, length 225 mm, sensor head thread PG 13.5

For further information, refer to the applicable documentation of the sensor manufacturer.

The defined operating conditions must be observed when using this product. → *Specifications, p. 49*

USE CAUTION AT ALL TIMES WHEN INSTALLING, USING, MAINTAINING OR OTHERWISE INTERACTING WITH THE PRODUCT. ANY USE OF THE PRODUCT EXCEPT AS SET FORTH HEREIN IS PROHIBITED, AND MAY RESULT IN SERIOUS INJURY OR DEATH, AS WELL AS DAMAGE TO PROPERTY. THE OPERATING COMPANY SHALL BE SOLELY RESPONSIBLE FOR ANY DAMAGES RESULTING FROM OR ARISING OUT OF AN UNINTENDED USE OF THE PRODUCT.

The Ceramat WA160-X version is certified for operation in hazardous locations.
→ *Operation in Explosive Atmospheres, p. 6*

1.2 Personnel Requirements

The operating company shall ensure that any personnel using or otherwise interacting with the product is adequately trained and has been properly instructed.

The operating company shall comply and cause its personnel to comply with all applicable laws, regulations, codes, ordinances, and relevant industry qualification standards related to product. Failure to comply with the foregoing shall constitute a violation of operating company's obligations concerning the product, including but not limited to an unintended use as described in this document.

1.3 Residual Risks

The product has been developed and manufactured in accordance with generally accepted safety rules and regulations, as well as an internal risk assessment. Despite the foregoing, the product may among others bear the following risks:

Environmental Influences

The effects of moisture, ambient temperature, chemicals, and corrosion can negatively impact the safe operation of the product.

Please observe the following instructions:

- Ceramat WA160 may only be operated in compliance with the specified operating conditions. → *Specifications, p. 49*
- Install the product inside a protected area of the plant. Alternatively, take appropriate action to protect the Ceramat WA160.
- If using aggressive chemical process media, adjust the inspection and maintenance intervals accordingly. → *Inspection and Maintenance Intervals, p. 35*
- Adhering and sticky process media can impact the functionality of the Ceramat WA160 (e.g., by causing components to stick together). Adjust the inspection and maintenance intervals accordingly. → *Inspection and Maintenance Intervals, p. 35*

1.4 Hazardous Substances

IN THE EVENT OF ANY CONTACT WITH HAZARDOUS SUBSTANCES OR OTHER INJURY HEREUNDER, SEEK IMMEDIATE MEDICAL ATTENTION OR FOLLOW APPLICABLE PROCEDURES TO ADDRESS HEALTH AND SAFETY OF PERSONNEL. FAILURE TO SEEK IMMEDIATE MEDICAL ATTENTION MAY RESULT IN SERIOUS INJURY OR DEATH.

In certain situations (e.g., sensor replacement or corrective maintenance), personnel may come into contact with the following hazardous substances:

- Process medium
- Calibration or cleaning medium
- Lubricant

The operating company is responsible for conducting a risk assessment.

See the relevant manufacturers' safety datasheets for hazard and safety instructions on handling hazardous substances.

1.5 Operation in Explosive Atmospheres

Ceramat WA160-X is certified for operation in hazardous locations.

- EU Type Examination Certificate KEMA 04ATEX4035X
- IECEx CoC IECEx DEK 23.0051X

The conditions for installation and operation in hazardous locations can be found on the corresponding certificates.

Exceeding the standardized atmospheric conditions within the manufacturer's specifications, e.g., with regard to the ambient temperature and pressure, does not endanger the retractable fitting's durability. → *Specifications, p. 49*

Related certificates are included in the product's scope of delivery and are available at www.knick-international.com in the current version.

Observe all applicable local and national codes and standards for the installation of equipment in hazardous locations. For further guidance, consult the following:

- IEC 60079-14
- EU directives 2014/34/EU and 1999/92/EC (ATEX)

1.5.1 Possible Ignition Hazards During Installation and Maintenance

To avoid mechanically generated sparks, handle the Ceramat WA160-X with care and take suitable protective action, e.g., use covers and pads.

The metallic parts of the Ceramat WA160-X must be connected to the plant's equipotential bonding system using the metallic process connection or the grounding connection provided for this purpose.

When components are replaced with genuine Knick spare parts made of other materials (e.g., O-rings), the information on the nameplate may then deviate from the actual version of the Ceramat WA160-X. The operating company must assess and document the changes.
→ *Nameplates, p. 12*

Mechanically Generated Sparks

Single impacts on metal parts or collisions between metal parts of the Ceramat WA160-X are not a potential ignition source if the following conditions are met:

- Possible impact velocity is less than 1 m/s.
- Possible impact energy is less than 500 J.

If these conditions cannot be ensured, the operating company must reassess single impacts on metal parts or collisions between metal parts as potential sources of ignition. The operating company must implement suitable risk minimization measures, e.g., by ensuring a non-explosive atmosphere.

1.5.2 Possible Ignition Hazards During Operation

When using non-water-based cleaning, rinsing, or calibration media with a low conductivity of less than 1 nS/m, electrostatic charging of internal, conductive components may occur. The operating company must assess the associated risks and take appropriate action.

The sensors that are used must be approved for operation in hazardous locations. Further information can be found in the sensor manufacturer's documentation.

Electrostatic Charging

The immersion tube of specific versions of the Ceramat WA160-X is sheathed with non-conductive plastic (e.g., PP, PVDF). The plastic can build up an electrostatic charge. To prevent this charge from becoming an effective ignition source, ensure that the following conditions are met:

- Efficient charge generating mechanisms are excluded
- Process media are grounded and have a minimum conductivity of 10 nS/cm

If these conditions cannot be ensured, operation in Zone 0 and Zone 1 is not permitted.

1.6 Safety Training

Upon request, Knick Elektronische Messgeräte GmbH & Co. KG will provide safety briefings and product training during initial commissioning of the product. More information is available from the relevant local contacts.

1.7 Maintenance and Spare Parts

Preventive Maintenance

Preventive maintenance can keep the product in good condition and minimize downtimes. Knick provides recommended inspection and maintenance intervals. → *Maintenance, p. 35*

Lubricants

Only use lubricants approved by Knick. Special applications or upgrades to special lubricants are available on request. Usage of any other lubricants shall constitute an unintended use of the product.
→ *Maintenance, p. 35*

Tools and Mounting Aids

Special and accessory tools help maintenance personnel to replace components and wear parts safely and professionally. → *Tools, p. 47*

Spare Parts

For professional corrective maintenance of the product, only use Knick genuine spare parts. Usage of any other spare parts shall constitute an unintended use of the product.
→ *Spare Parts, p. 44*

Repair Service

The Knick Repair Service offers professional corrective maintenance for the product to the original quality. Upon request, a replacement unit can be obtained for the period of the repair.

Further information can be found at www.knick-international.com.

2 Product

2.1 Package Contents

- Ceramat WA160 in the version ordered
- User Manual
- As applicable, supplementary datasheet for special versions[1)]
- EU Declaration of Conformity[2)]
- EU Type Examination Certificate[2)]

2.2 Product Identification

The various versions of the Ceramat WA160 product are coded in a model designation.

The model designation is stated on the nameplate, the delivery note, and the product packaging.
→ *Nameplates, p. 12*

2.2.1 Model Designation Example

Model designation		**WA160**	**–**	**X**	**3**	**A**	**R**	**D**	**3**	**B**	**1**	**–**	**0**	**0**	**0**
Explosion protection	ATEX Zone 0			**X**								**–**			
Plug-in sensor connection	Memosens				**3**							**–**			
Seal material	FKM					**A**						**–**			
Probe housing and sensor socket material	PVDF without integrated sensor protector, sensor socket full sensor protection C22						**R**					**–**			
Process connections	Flange, loose, ANSI 316, 150 lbs, 3″							**D**	**3**			**–**			
Immersion depth	1000 mm									**B**		**–**			
Immersion tube material	Stainless steel 1.4571										**1**	**–**			
Special version	Without											**–**	**0**	**0**	**0**

1) Supplied depending on the ordered version of the Ceramat WA160. → *Product Code, p. 10*

2) Only for versions certified for operation in hazardous locations.

2.2.2 Product Code

Basic unit with pneum. drive unit, stainless steel version		**WA160**	**–**	_	_	_	_	_	_	_	_	**–**	_	_	_
Explosion protection	ATEX Zone 0			**X**								**–**			
	Without			**N**								**–**			
Plug-in sensor connection	VP				**1**							**–**			
	InduCon				**2**							**–**			
	Memosens				**3**							**–**			
Seal material	FKM					**A**						**–**			
	EPDM					**B**						**–**			
	FFKM/FKM[1)]					**C**						**–**			
	EPDM-FDA					**E**						**–**			
	FFKM-FDA					**H**						**–**			
	FFKM					**K**						**–**			
Probe housing and sensor socket material	PEEK with integrated sensor protector						**A**					**–**			
	PVDF with integrated sensor protector						**B**					**–**			
	PEEK without integrated sensor protector						**C**					**–**			
	PVDF without integrated sensor protector						**D**					**–**			
	1.4435 without integrated sensor protector, sensor socket PEEK						**E**					**–**			
	PEEK without integrated sensor protector, sensor socket long 1.4404						**H**					**–**			
	PEEK without integrated sensor protector, sensor socket long C22						**J**					**–**			
	PVDF without integrated sensor protector, sensor socket long 1.4404						**K**					**–**			
	PVDF without integrated sensor protector, sensor socket long C22						**L**					**–**			
	PEEK without integrated sensor protector, sensor socket PEEK with PEEK scraper						**M**					**–**			
	PEEK without integrated sensor protector, sensor socket full sensor protection 1.4404						**N**					**–**			
	PVDF without integrated sensor protector, sensor socket full sensor protection 1.4404						**O**					**–**			
	PEEK without integrated sensor protector, sensor socket full sensor protection C22						**P**					**–**			
	PVDF without integrated sensor protector, sensor socket full sensor protection C22						**R**					**–**			
Process connections	Flange, loose, PN10/16, DN 80							**B**	**3**			**–**			
	Flange, loose, PN10/16, DN 100							**B**	**4**			**–**			
	Flange, loose, PN10/16, DN 125							**B**	**5**			**–**			
	Flange, loose, PN10/16, DN 150							**B**	**6**			**–**			
	Flange, loose, PN16, DN 200							**B**	**7**			**–**			
	Flange, loose, PN40, DN 80							**E**	**3**			**–**			
	Flange, loose, PN40, DN 100							**E**	**4**			**–**			
	Flange, loose, PN40, DN 125							**E**	**5**			**–**			
	Flange, loose, PN40, DN 150							**E**	**6**			**–**			
	Flange, loose, PN40, DN 200							**E**	**7**			**–**			

[1)] Process-wetted seals/rinse-wetted seals

Basic unit with pneum. drive unit, stainless steel version		WA160 – _ _ _ _ _ _ _ _ – _ _ _
	Dairy pipe DN 80	C 3 –
	Dairy pipe DN 100	C 4 –
	Flange, loose, ANSI 316, 150 lbs, 3″	D 3 –
	Flange, loose, ANSI 316, 150 lbs, 3.5″	D 4 –
	Flange, loose, ANSI 316, 150 lbs, 4″	D 5 –
	Flange, loose, ANSI 316, 150 lbs, 5″	D 6 –
	Flange, loose, ANSI 316, 150 lbs, 6″	D 7 –
	Flange, loose, ANSI 316, 300 lbs, 3″	P 3 –
	Flange, loose, ANSI 316, 300 lbs, 3.5″	P 4 –
	Flange, loose, ANSI 316, 300 lbs, 4″	P 5 –
	Flange, loose, ANSI 316, 300 lbs, 5″	P 6 –
	Flange, loose, ANSI 316, 300 lbs, 6″	P 7 –
Immersion depth[1)]	600 mm	A –
	1000 mm	B –
	1500 mm	C –
	2000 mm	D –
Immersion tube material	Stainless steel 1.4571	1 –
	Stainless steel 1.4435, polished	2 –
	Stainless steel, PP coated	3 –
	Stainless steel, PVDF coated	4 –
Special version	Without	– 0 0 0
	Equipment with special grease (provided by customer)	– 0 0 1
	Fixation ring (process unit) made of Hastelloy C22 Driving pin (rotary drive) made of Hastelloy C22	– 0 0 A
	Customer-specific special datasheet	– 0 0 F

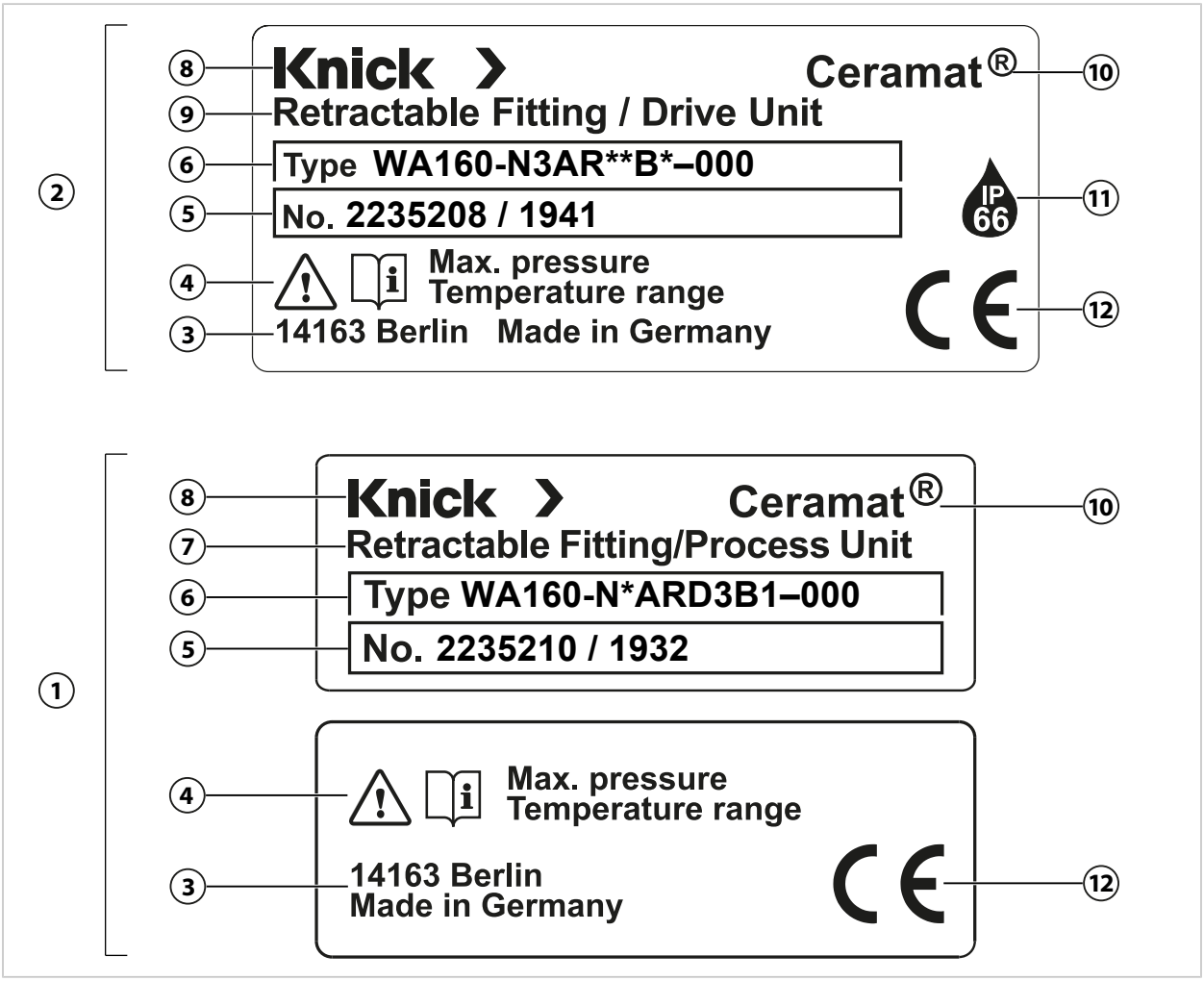
1) Additional immersion lengths on request.

2.3 Nameplates

The Ceramat WA160 is identified by nameplates on the drive unit and the process unit. The information provided on the nameplates varies according to the version of the Ceramat WA160.

Nameplate, Version Without ATEX Approval

Note: The figure shows a nameplate for the Ceramat WA160-N version by way of example.

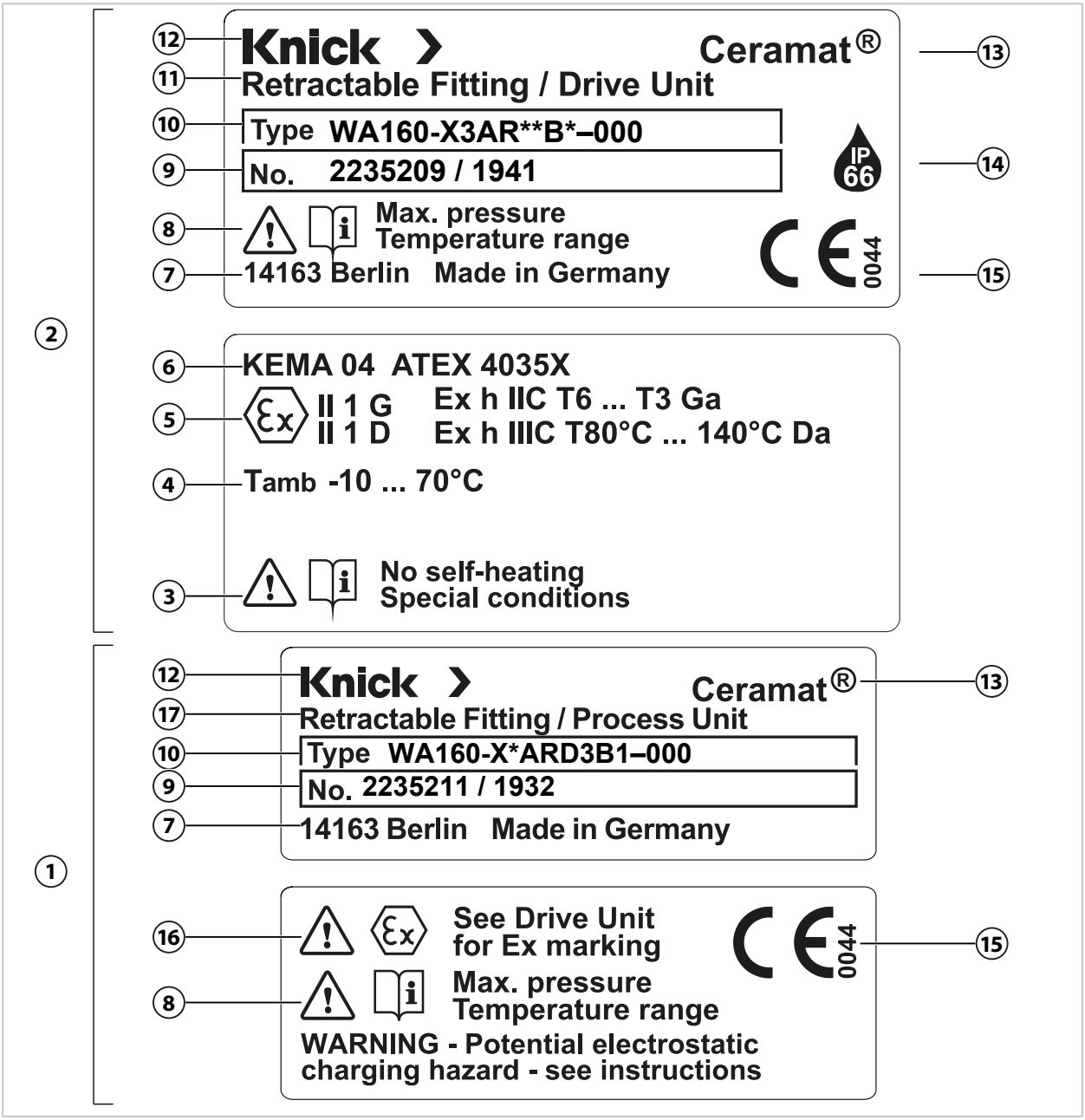


1	Nameplate, process unit	7	Product line: Retractable fitting Assembly group: Process unit
2	Nameplates, drive unit	8	Manufacturer
3	Manufacturer address with designation of origin	9	Product line: Retractable fitting Assembly group: Drive unit
4	Max. operating pressure and temperature range[1)]	10	Product family
5	Serial number/production year and week YYWW	11	IP protection class
6	Model designation	12	CE mark

[1)] Further information is available in the related EU Type Examination Certificate and in the → *Safety, p. 5* and → *Specifications, p. 49* chapters.

Nameplate, Version with ATEX Approval

Note: The figure shows a nameplate for the Ceramat WA160-X version by way of example.



1	Nameplate, process unit	10	Model designation
2	Nameplate, drive unit	11	Product line: Retractable fitting Assembly group: Drive unit
3	No self heating/special conditions[1)]	12	Manufacturer
4	Permitted ambient temperature	13	Product family
5	ATEX marking/information on explosion protection	14	IP protection class
6	EU Type Examination Certificate test number	15	CE mark with identification number
7	Manufacturer address with designation of origin	16	Reference to ATEX information on the drive unit
8	Max. operating pressure and temperature range[1)]	17	Product line: Retractable fitting Assembly group: Process unit
9	Serial number/production year and week YYWW		

[1)] Further information is available in the related EU Type Examination Certificate and in the → *Safety, p. 5* and → *Specifications, p. 49* chapters.

2.4 Symbols and Markings

	Special conditions and danger points! Observe the safety information and instructions on safe use of the product as outlined in the product documentation.
	Reminder to read the documentation
	CE mark with identification number[1] of the notified body involved in the production control.
	ATEX marking[1] of the European Union for operation in hazardous locations → *Operation in Explosive Atmospheres, p. 6*
	IP66 protection: The product is dust-tight and offers complete protection against contact as well as protection against strong water jets.
	Display indicating process position (PROCESS limit position). → *Moving into the Process Position (PROCESS Limit Position), p. 28*
	Display indicating service position (SERVICE limit position). → *Moving into the Service Position (SERVICE Limit Position), p. 28*

2.5 Design and Function

The Ceramat WA160 consists of two main assembly groups:

- Drive unit
- Process unit

The drive unit is connected to the process unit by a coupling nut. The drive and process units can be disconnected under process conditions. → *Drive Unit: Disassembly, p. 37*

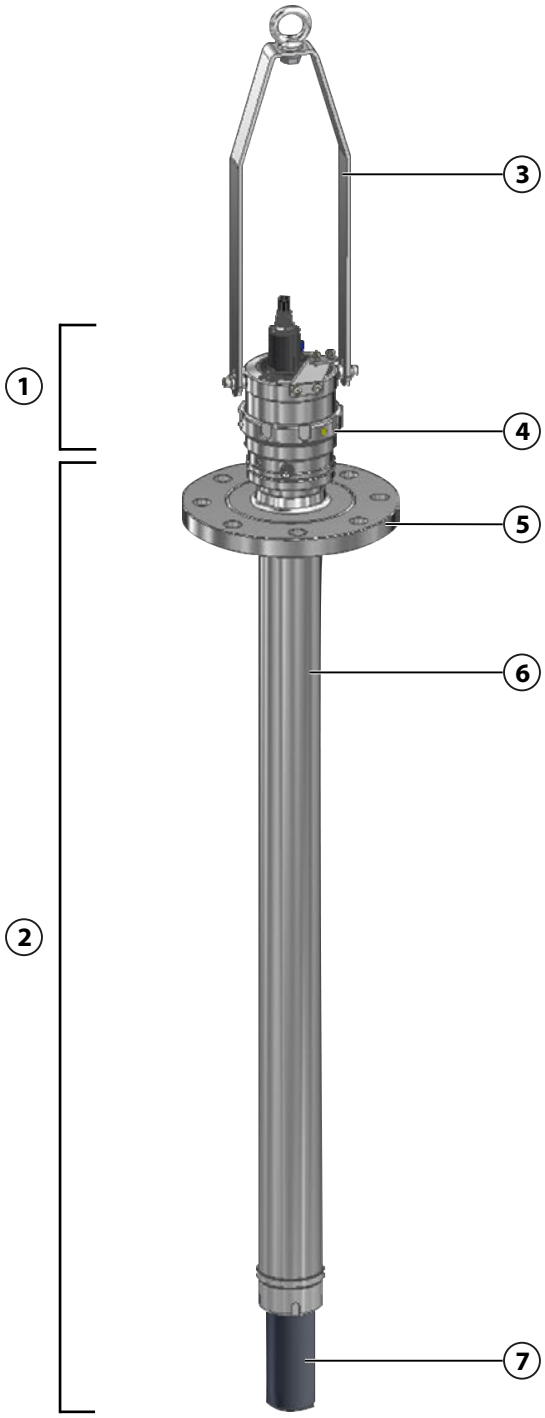
The process connection is use to fasten the Ceramat WA160 at the process port of the measuring point.

The pneumatically operated drive unit moves the Ceramat WA160 into the service position (SERVICE limit position) or the process position (PROCESS limit position). → *Service and Process Position, p. 18*

[1] Dependent on the ordered version → *Product Code, p. 10*

2.5.1 Retractable Fitting

Note: The figure shows an example version of the Ceramat. → *Product Code, p. 10*



1	Drive unit	5	Process connection (e.g., flange)
2	Process unit	6	Immersion tube
3	ZU0651 bail handle[1] → *Accessories, p. 46*	7	Sensor housing with ceramic rotary slides
4	Coupling nut		

[1] Not included in the package contents of the Ceramat WA160.

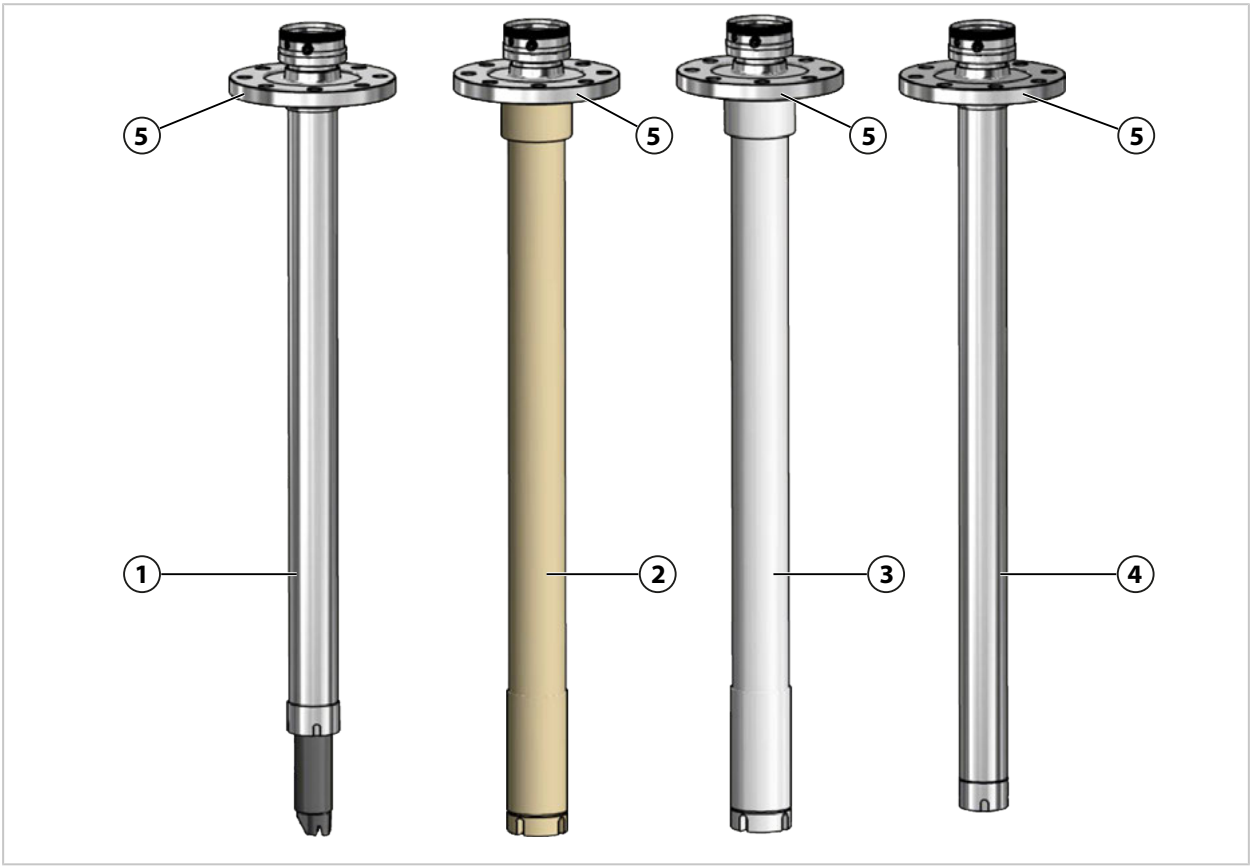
2.5.2 Drive unit

Note: The figure shows a selection from the product line. → *Product Code, p. 10*

1 Drive unit

2.5.3 Process Connections and Immersion Tubes

Note: The figure shows a selection from the product line. → *Product Code, p. 10*



1	Immersion tube, stainless steel 1.4571	4	Immersion tube, stainless steel 1.4435
2	Immersion tube, stainless steel, PP coated	5	Process connection, flange, loose
3	Immersion tube, stainless steel, PVDF coated		

2.6 Service and Process Position

The Ceramat WA160 can assume two limit positions (service or process position).

Note: The Ceramat WA160 is only disconnected from the process in the service position (position indicator points to SERVICE). This is *not* the case in any other position, i.e., there remains contact with the process.

Service position (SERVICE limit position)

- The ceramic rotary slide is closed (sensor is retracted in the sensor housing).
- The sensor is not in contact with the process medium.
- The position indicator points to SERVICE.
- The sensor can be installed, removed, and, as necessary, cleaned under process conditions.
- The drive unit can be removed under process conditions.

Process position (PROCESS limit position)

- The ceramic rotary slide is open (sensor is extended out of the sensor housing).
- The sensor is in contact with the process medium.
- The position indicator points to PROCESS.
- The desired process parameters can be measured.

On reaching one of the limit positions, a contact is closed in the limit switch. The electrical signal can be processed further, for example in the electro-pneumatic controller, the process analyzer, or the process control system (PCS).

See also
→ *Moving into the Process Position (PROCESS Limit Position), p. 28*
→ *Moving into the Service Position (SERVICE Limit Position), p. 28*

3 Installation

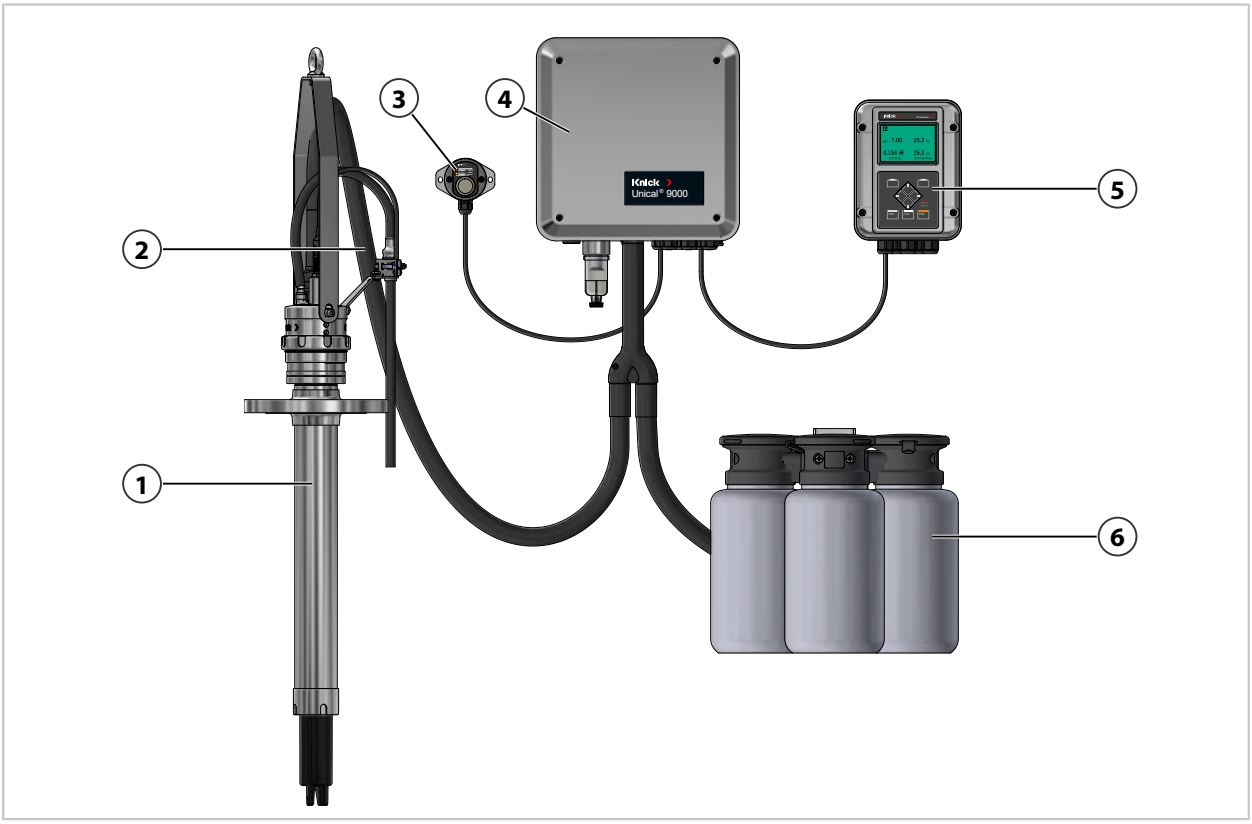
3.1 General Installation Instructions

Process Analysis System: Installation Example

The Ceramat WA160 is designed for operation within a fully automatic Knick process analysis system. The process analysis system may typically comprise the following products:

- Protos industrial transmitter
- Unical 9000 electro-pneumatic controller
- Ceramat WA160 retractable fitting

Note: The figure shows an installation example of a process analysis system from Knick. More information is available on www.knick-international.com.



1	Retractable fitting WA160	4	Unical 9000 controller
2	Media connection	5	Protos industrial transmitter
3	Service switch	6	Media adapter with metering pumps

Note: Alternatively, it is possible to operate the Ceramat WA160 without a process analysis system. To do this, accessory ZU0631 "standard media connection" is required. In that case, the Ceramat WA160 is automatically controlled by a process control system (PCS) or manually using accessory ZU0646 "manually operated pneumatic valve". → *Accessories, p. 46*

3.2 Retractable Fitting: Installation

⚠ WARNING! Risk of explosion from mechanically generated sparks when used in explosive atmospheres. Take appropriate action to prevent mechanically generated sparks. Follow the safety instructions. → *Operation in Explosive Atmospheres, p. 6*

NOTICE! Product damage from impermissible load from approaching process medium. In case of high loads on the retractable fitting at the bottom end, brace or protect using a protection sleeve installed in the boiler. Observe the recommendations of Knick.
→ *Permitted Loads from Approaching Process Medium, p. 21*

Note: Ceramat WA160 is intended for vertical installation. With sufficient bracing, lateral installation is possible. To access your specific application, contact → *support@knick.de*.

01. Check the package contents of the Ceramat WA160 for completeness. → *Package Contents, p. 9*
02. Check the Ceramat WA160 for damage.
03. Ensure the required installation clearances for sensor installation and the movement of hoses and cables. → *Dimension Drawings, p. 48*
04. Install the sensor. → *Installing and Dismounting Sensors, p. 29*
05. Position the Ceramat WA160 at the customer-side process port.
    Note: For versions with immersion depths greater than 600 mm, Knick recommends using ZU0651, the bail handle accessory. → *Accessories, p. 46*
06. Optional: Align the sensor housing with integrated sensor protector in the flow direction of the process medium. → *Optional: Aligning the Sensor Housing with Integrated Sensor Protector, p. 26*
07. Fasten the Ceramat WA160 to the process port with the process connection.
08. Optional: For use in potentially explosive atmospheres, connect the metallic parts of the Ceramat WA160 with the equipotential bonding of the system.

See also

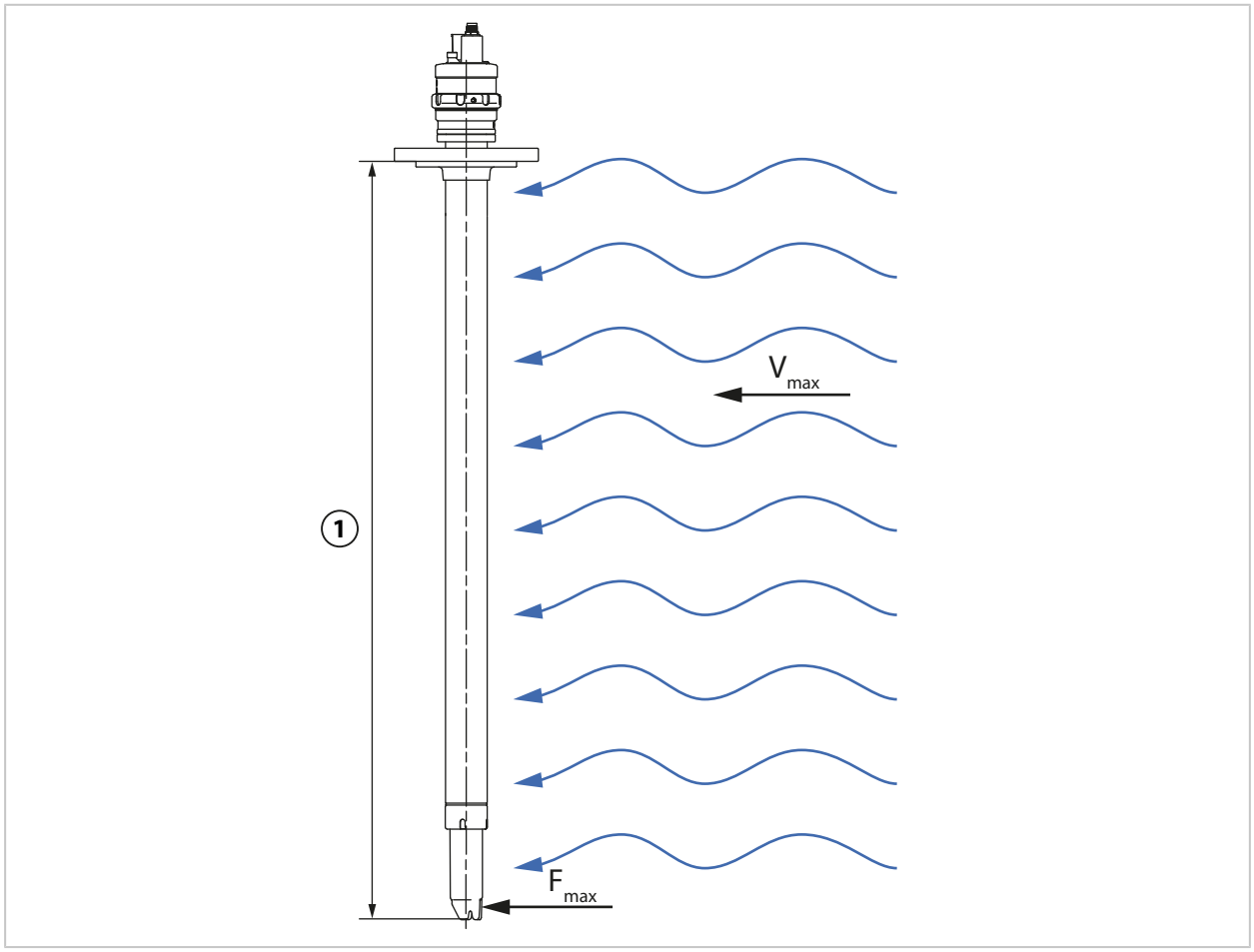
→ *Operation in Explosive Atmospheres, p. 6*
→ *Commissioning, p. 27*

Permitted Loads from Approaching Process Medium

The permitted loads from an approaching process medium depend on various factors:

- Flow speed
- Process medium viscosity and temperature
- Pressure fluctuations, e.g., from pumps

Use the following information for orientation when using the retractable fitting in low-viscosity process media and without relevant pressure fluctuations. Further, they are only valid for versions with an immersion tube made of stainless steel 1.4571. → *Product Code, p. 10*

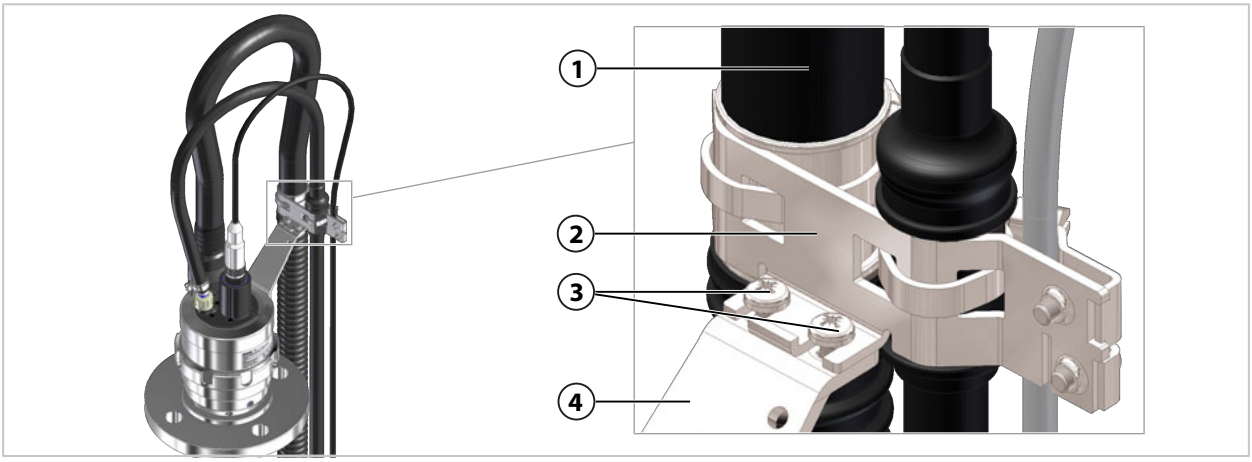


Immersion Depth (1)	F_{max}	V_{max}
1500 mm (59.05″)	400 N	4 m/s
2000 mm (78.74″)	300 N	3 m/s

Note: Ceramat WA160 is intended for vertical installation. With sufficient bracing, lateral installation is possible. To access your specific application, contact → *support@knick.de*.

3.3 Media Connection: Installation at Strain Relief Bracket

Note: The figure shows installation on the Ceramat WA160 strain relief bracket when using the media connection. The steps involved are the same when using accessory ZU0631, "Standard media connection". → *Process Analysis System: Installation Example, p. 19*



01. Position the bracket **(2)** of the media connection **(1)** on the strain relief bracket **(4)** of the Ceramat WA160. If necessary, loosen the screws **(3)** a few rotations.
02. Tighten the screws **(3)** using a screwdriver.

3.4 Outlet

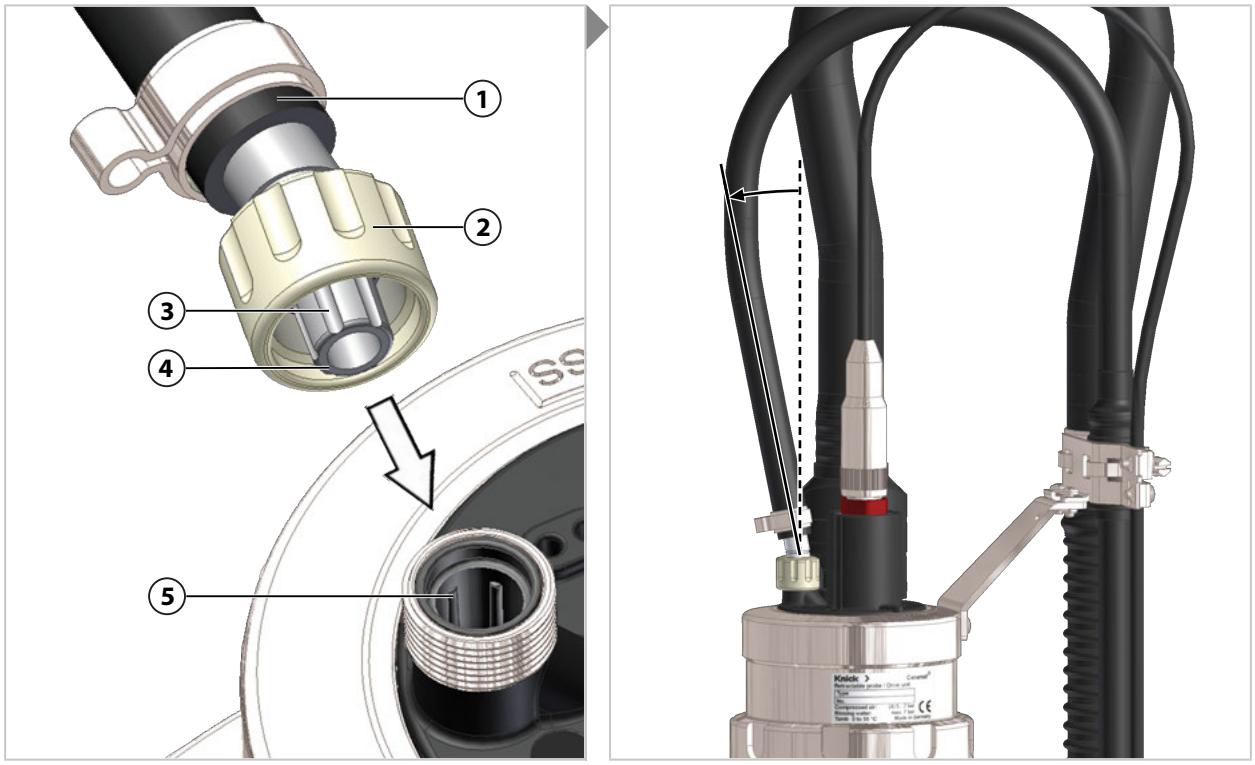
3.4.1 Outlet Hose: Installation Instructions

Bend the outlet hose in an arc and fasten it to the strain relief bracket of the retractable fitting. For vertical installation, this prevents calibration chamber leakage due to gravity.

Install the outlet hose a maximum of 1 meter down (measured from the level of the calibration chamber). The resulting negative pressure creates a risk of the calibration chamber being drained if the outlet hose is not ventilated.

3.4.2 Outlet Hose: Installation

Note: The outlet is used to discharge rinse medium and trapped process medium and must not be closed. By moving the sensor to the respective limit positions, pressurized process medium can enter the calibration chamber and be compressed when the outlet is closed. This process medium may splash out during sensor replacement.



01. Push the outflow nozzle **(4)** into the mount on the Ceramat WA160. In the process, correctly position the coding ribs **(5)** in the coding recesses **(3)** (locking device).
02. Turn the outflow nozzle **(4)** so that the outlet hose **(1)** points outward.
03. Fasten the coupling nut **(2)** finger tight.

3.5 Media Connection

3.5.1 Media Connection: Installation Instructions

To connect the media to the Ceramat WA160, the following options are available:

- "Media connection" of the electropneumatic controller (operation with process analysis system)
- Accessory ZU0631 "standard media connection" (operation without process analysis system)

"Media connection" for operation with process analysis system

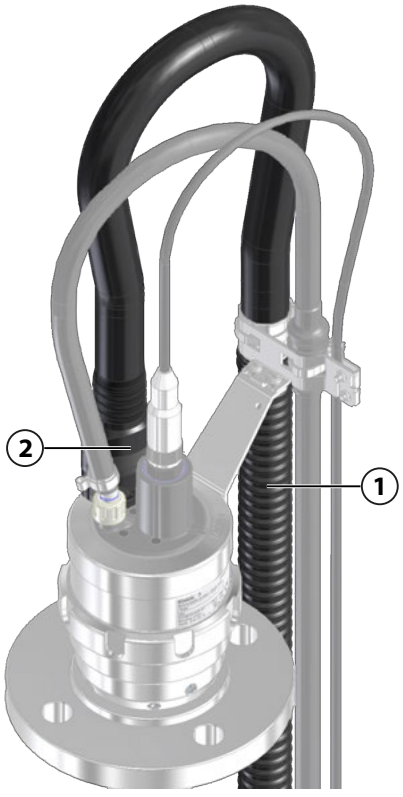
When using a process analysis system from Knick, all supply lines and the connecting cable for the limit signal are joined in one hose: the media connection **(1)**. The connection to the Ceramat WA160 is established via a common plug-in connection, the multiplug **(2)**.

The supply lines of the different media are connected to the electropneumatic controller of the process analysis system. More information is available in the documentation of the electropneumatic controller.

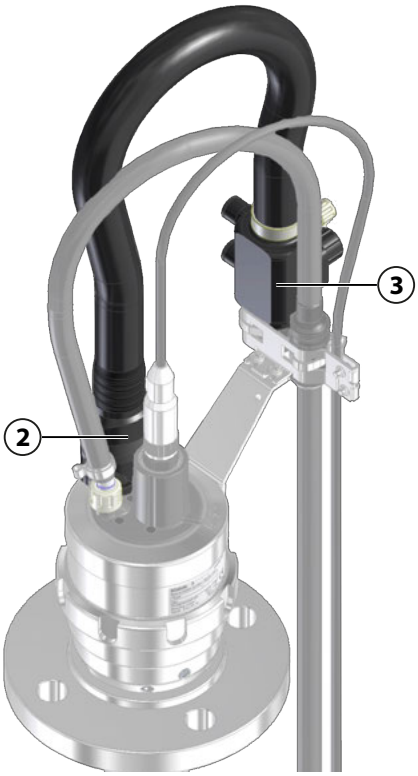
"Standard media connection" for operation without the process analysis system

To control the Ceramat WA160 using accessory ZU0646 "manually operated pneumatic valve" or the process control system (PCS), accessory ZU0631 "standard media connection" **(3)** is required. The Ceramat WA160 is connected using a common plug-in connection, the multiplug **(2)**.

The supply lines of the different media are connected using any position to accessory ZU0631 "standard media connection" **(3)** or accessory ZU0646 "manually operated pneumatic valve". More information is available in the associated accessory documentation. → *Accessories, p. 46*



"Media connection" for operation with process analysis system

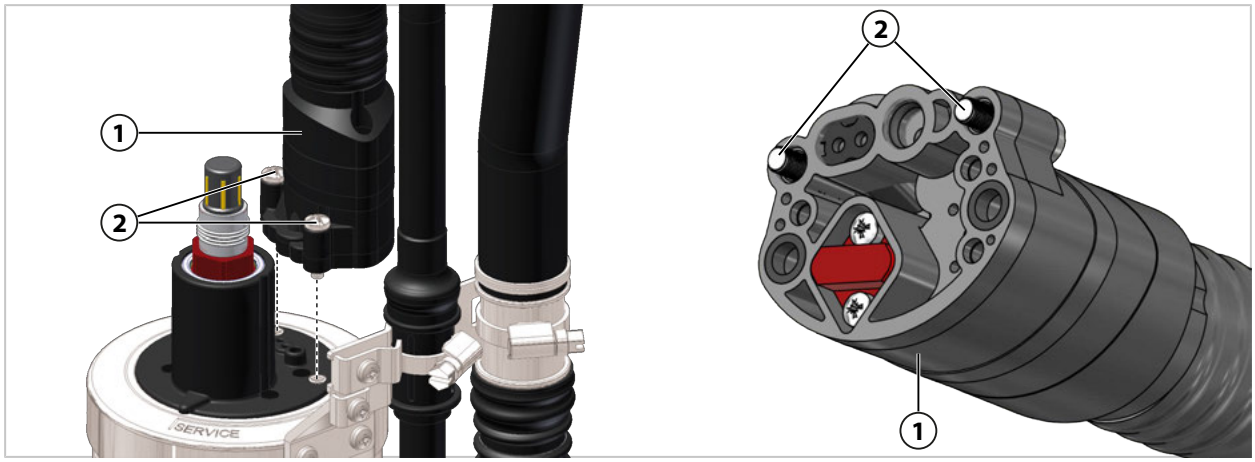


Accessory ZU0631 "standard media connection" for operation without process analysis system

See also

→ *Process Analysis System: Installation Example, p. 19*

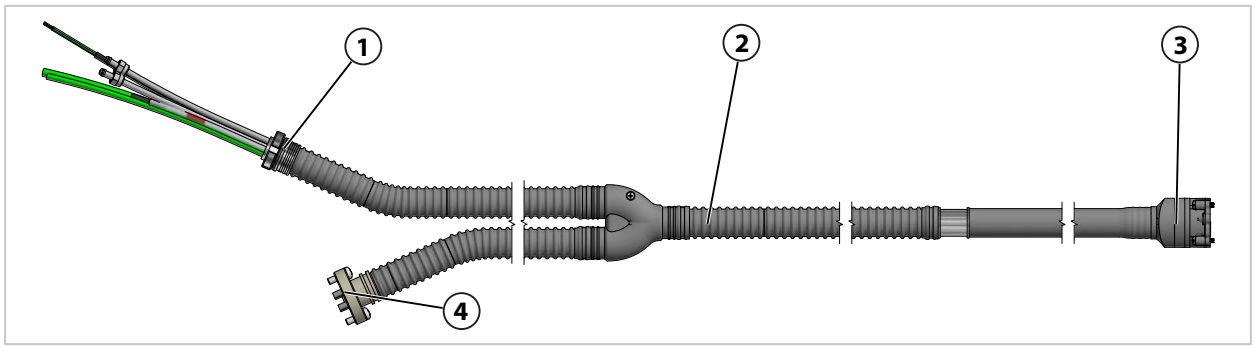
3.5.2 Multiplug: Installation



01. Check the gaskets and O-rings of the multiplug **(1)** for correct positioning and damage, and replace them if necessary. → *Troubleshooting, p. 40*
02. Position and connect the multiplug **(1)** to the Ceramat WA160.
03. Fasten the multiplug **(1)** with two screws **(2)**.

3.5.3 Electro-Pneumatic Controller: Connection

The associated documentation contains a description of how to connect the Ceramat WA160 to the electropneumatic controller with the media connection.



1	Electropneumatic controller connection	**3**	Multiplug for connection of the Ceramat WA160
2	Media connection	**4**	Media adapter connection[1)]

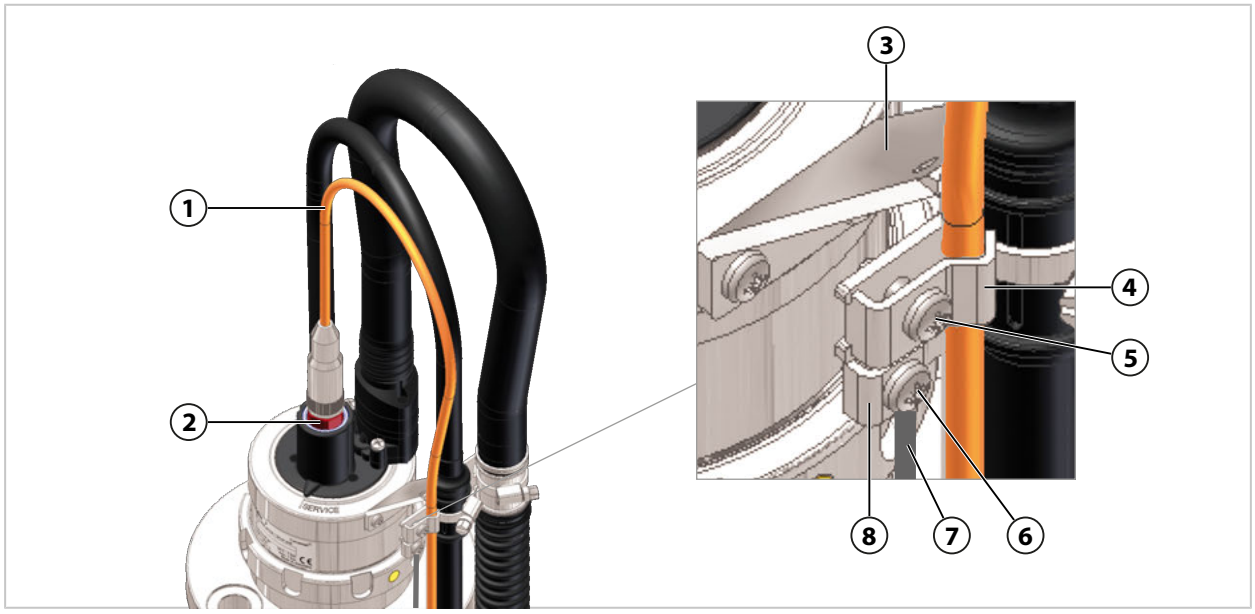
3.5.4 ZU0631 Standard Media Connection: Installation

Note: Accessory ZU0631, "Standard media connection", is only required for operation of the Ceramat WA160 without a process analysis system. → *Process Analysis System: Installation Example, p. 19*

The method of installing accessory ZU0631, "Standard media connection", is set out in the accessory documentation. → *Accessories, p. 46*

1) Availability depends on the version of the process analysis system.

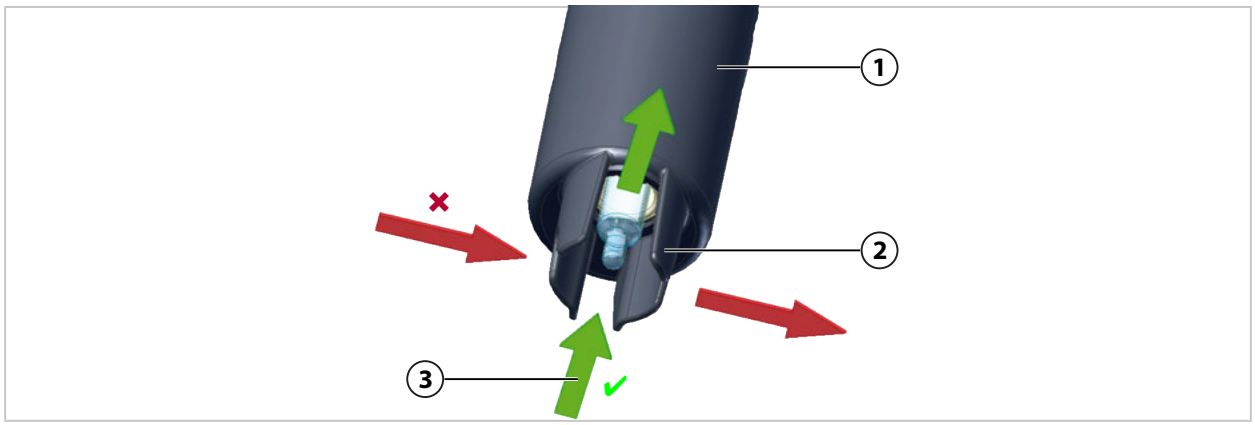
3.6 Sensor Cable: Installation



01. Install the sensor. → *Installing and Dismounting Sensors, p. 29*
02. Connect the cable connector of the sensor cable **(1)** to the sensor adapter **(2)**.
    Note: Loosely fasten the sensor cable with the clamp, but do not constrict it. If you do, rotary movement of the Ceramat WA160 may damage the sensor cable. The sensor cable arc must be long enough so that the sensor cable does not impede the stroke movement of the Ceramat WA160.
03. Guide the sensor cable **(1)** to the strain relief bracket **(3)** in a curve, fasten it with a clip **(4)** and tighten the screw **(5)**.
04. Optional: Fasten the equipotential bonding conductor **(7)** with a terminal **(8)** and tighten the screw **(6)**. → *Operation in Explosive Atmospheres, p. 6*

3.7 Optional: Aligning the Sensor Housing with Integrated Sensor Protector

Note: The following information only applies to versions with a sensor housing with integrated sensor protector. → *Product Code, p. 10*



01. Align the sensor housing **(1)** with the integrated sensor protector **(2)** in the direction of flow **(3)** of the process medium. Position the retractable fitting accordingly and fasten it to the process port.
    → *Retractable Fitting: Installation, p. 20*

4 Commissioning

⚠ WARNING! If the Ceramat WA160 fitting is damaged or improperly installed, process medium, potentially containing hazardous substances, may escape. Follow the safety instructions.
→ *Safety, p. 5*

Note: Upon request, Knick will provide safety briefings and product training during initial commissioning of the product. More information is available from the relevant local contacts.

01. Install the Ceramat WA160. → *Retractable Fitting: Installation, p. 20*
02. Install the media connection or ZU0631 "standard media connection" at the strain relief bracket.
    → *Media Connection: Installation at Strain Relief Bracket, p. 22*
03. Install the outlet hose. → *Outlet, p. 22*
04. Install the multiplug. → *Multiplug: Installation, p. 25*
05. Install the sensor cable. → *Sensor Cable: Installation, p. 26*
06. Check that the process connection is securely fastened to the process port.
07. Optional: Check that the Ceramat WA160-X is correctly connected to the equipotential bonding of the system. → *Operation in Explosive Atmospheres, p. 6*
08. Move the Ceramat WA160 into the process position (PROCESS limit position).
    → *Moving into the Process Position (PROCESS Limit Position), p. 28*
    ✓ The position indicator points to PROCESS.
09. Move the Ceramat WA160 into the service position (SERVICE limit position).
    → *Moving into the Service Position (SERVICE Limit Position), p. 28*.
    ✓ The position indicator points to SERVICE.
10. Check that the Ceramat WA160 is tight under process conditions.[1)]
    ✓ Ceramat WA160 and connections do not leak.

See also
→ *Troubleshooting, p. 40*

[1)] If using a fully automatic Knick process analysis system, a range of functions can be tested via the process analyzer.
→ *Process Analysis System: Installation Example, p. 19*

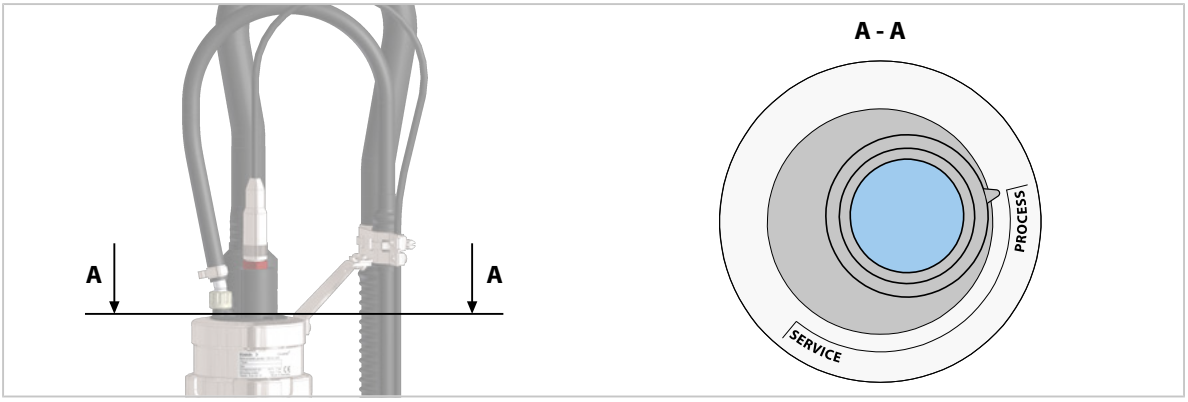
5 Operation

5.1 Moving into the Process Position (PROCESS Limit Position)

⚠ WARNING! Process, rinse, or additional media, potentially containing hazardous substances, may escape from the Ceramat WA160. Only move the Ceramat WA160 into the process position (PROCESS limit position) if a sensor is installed. → *Installing and Dismounting Sensors, p. 29*

⚠ CAUTION! Risk of crushing injuries to hands and fingers. When moving to the limit positions, the Ceramat WA160 performs a rotary movement (approx. 140°) and a stroke movement (approx. 43 mm). Do not touch the Ceramat WA160 while it is moving to the limit positions.

Note: Movement to the limit positions is triggered differently depending on the installation of the Ceramat WA160: (a) process analyzer, (b) service switch of the electro-pneumatic controller, (c) process control system (PCS), or (d) ZU0604 "Pneumatically Operated Manual Control Valve".
→ *Process Analysis System: Installation Example, p. 19*



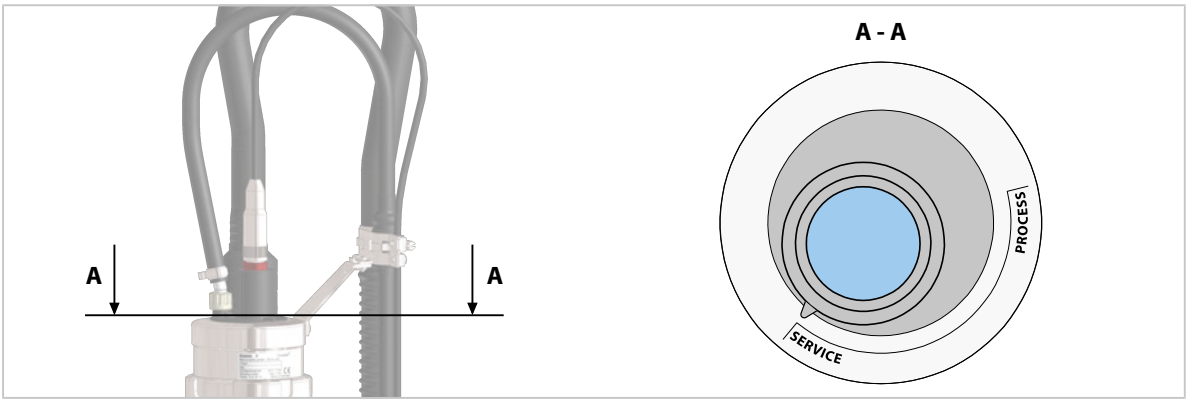
01. Install the sensor. → *Installing and Dismounting Sensors, p. 29*
02. Move the Ceramat WA160 into the process position (PROCESS limit position).
    ✓ The position indicator points to PROCESS.

5.2 Moving into the Service Position (SERVICE Limit Position)

⚠ CAUTION! Risk of crushing injuries to hands and fingers. When moving to the limit positions, the Ceramat WA160 performs a rotary movement (approx. 140°) and a stroke movement (approx. 43 mm). Do not touch the Ceramat WA160 while it is moving to the limit positions.

Note: The Ceramat WA160 is only disconnected from the process in the service position (position indicator points to SERVICE). This is *not* the case in any other position, i.e., there remains contact with the process.

Note: Movement to the limit positions is triggered differently depending on the installation of the Ceramat WA160: (a) process analyzer, (b) service switch of the electro-pneumatic controller, (c) process control system (PCS), or (d) ZU0604 "Pneumatically Operated Manual Control Valve".
→ *Process Analysis System: Installation Example, p. 19*



01. Move the Ceramat WA160 into the service position (SERVICE limit position).
    ✓ The position indicator points to SERVICE.

5.3 Installing and Dismounting Sensors

5.3.1 Safety Instructions when Installing and Removing Sensors

⚠ WARNING! Process medium, potentially containing hazardous substances, may escape from the Ceramat WA160. Only replace the sensor in the service position (SERVICE limit position). Secure the Ceramat WA160 from unintentional movement out of the service position (SERVICE limit position). Follow the safety instructions. → *Safety, p. 5*

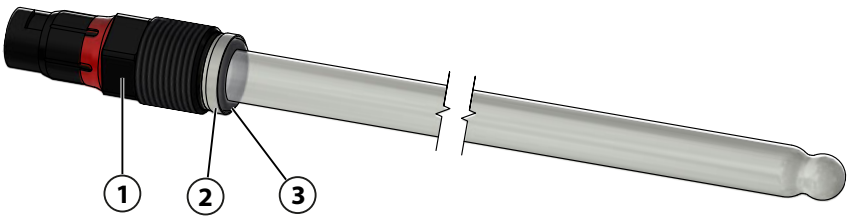
⚠ CAUTION! Risk of cutting injuries from broken sensor glass. Handle the sensor with care. Follow the safety instructions in the sensor manufacturer's documentation.

Note: The Ceramat WA160 is only disconnected from the process in the service position (position indicator points to SERVICE). This is *not* the case in any other position, i.e., there remains contact with the process.

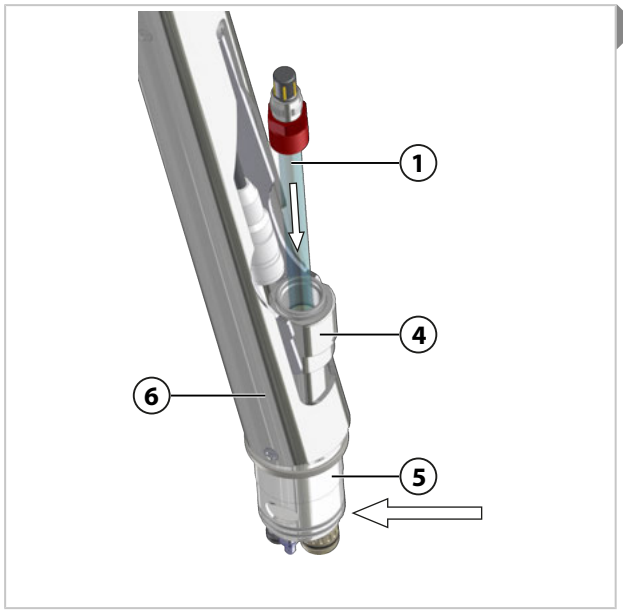
Note: The outlet is used to discharge trapped rinse medium and must not be closed. By moving the Ceramat WA160 to the limit positions, pressurized process medium may enter the calibration chamber. When the outlet is closed, this process medium may be compressed and splash out during a sensor replacement. → *Design and Function, p. 14*

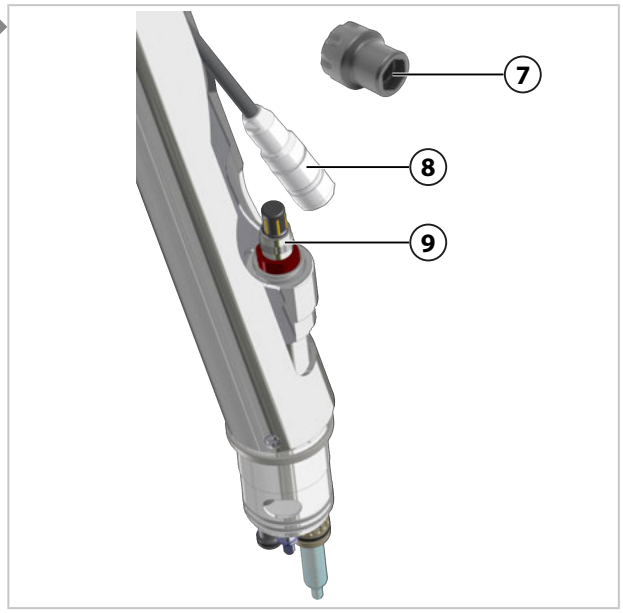
5.3.2 Solid-Electrolyte Sensor: Installation

01. Move the Ceramat WA160 into the service position (SERVICE limit position).
    → *Moving into the Service Position (SERVICE Limit Position), p. 28*.
02. Check the outlet for escaping process medium. If process medium escapes, stop the process (depressurize or drain off the process medium if necessary) and perform troubleshooting.
    → *Troubleshooting, p. 40*
03. Remove the drive unit. → *Drive Unit: Disassembly, p. 37*
    Note: For sensor installation and dismounting, the drive unit must be disconnected from the process unit.
04. Check that the sensor is permitted. → *Intended Use, p. 5*
    ✓ Diameter 12.0 to 0.5 mm
    ✓ Length 225 mm
    ✓ Pressure resistance permissible for process

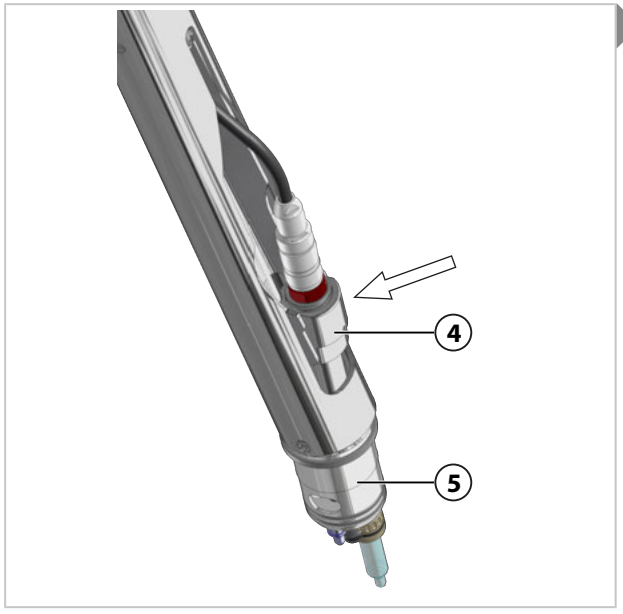


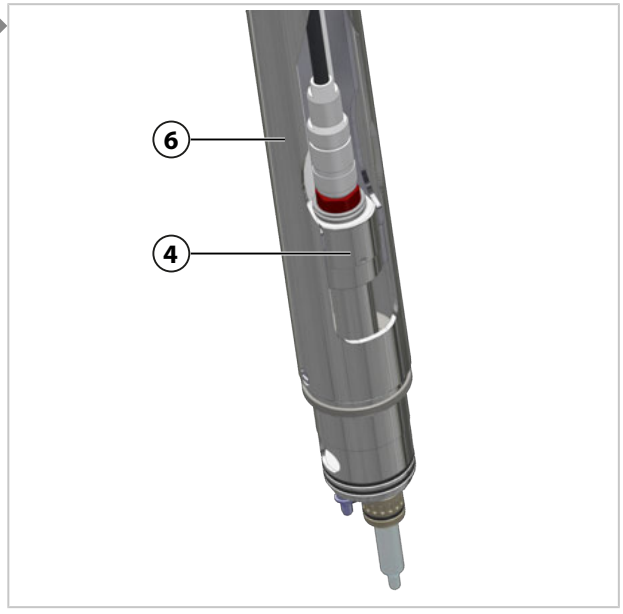
05. Check that the compression ring **(2)** and O-ring **(3)** of the sensor **(1)** are correctly positioned.
06. Check the sensor **(1)**, compression ring **(2)**, and O-ring **(3)** for damage.
    Note: Do not install or commission damaged sensors, thrust rings, or O-rings.
07. Remove the watering cap from the sensor tip and rinse the sensor **(1)** with water (see documentation of the sensor manufacturer).





08. Bend the sensor endpiece **(5)**.
    ✓ Sensor endpiece perceptibly snaps in **(5)**.
    ✓ Sensor holder **(4)** protrudes from the inner tube **(6)**.
09. Check interior of sensor holder **(4)** for foreign bodies (e.g., compression ring, O-ring). Remove any foreign bodies.
10. Push the sensor **(1)** into the sensor holder **(4)**.
11. Tighten the sensor **(1)** using a spanning wrench **(7)** to max. 3 Nm (A/F 19). Recommended tool: ZU0647 sensor spanning wrench → *Tools, p. 47*
12. Connect the cable connector **(8)** of the sensor cable to the sensor head **(9)**.



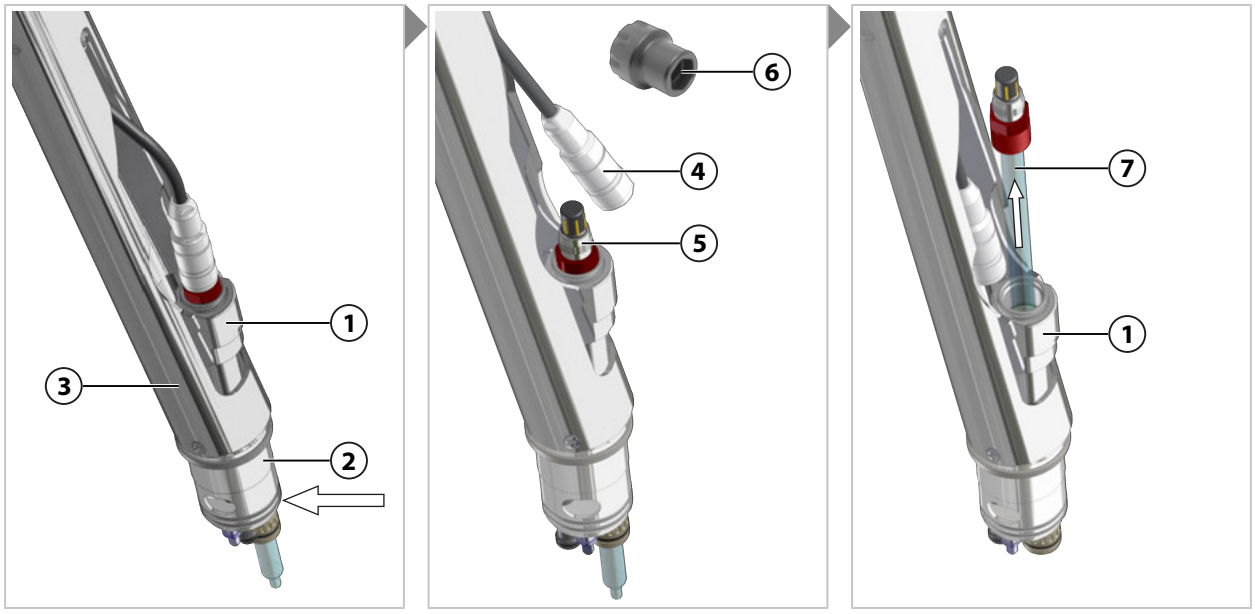


13. Return the sensor endpiece **(5)** to the initial position by pressing in the sensor holder **(4)**.
    ✓ Sensor endpiece perceptibly snaps in **(5)**.
    ✓ The entire sensor holder **(4)** is inside the inner tube **(6)**.
14. Mount the drive unit. → *Drive Unit: Assembly, p. 38*

5.3.3 Solid-Electrolyte Sensor: Removal

Note: Rinse the sensor prior to removal in order to prevent entrainment of chemically aggressive process medium in the area of the sensor holders.

01. Move the Ceramat WA160 into the service position (SERVICE limit position).
→ *Moving into the Service Position (SERVICE Limit Position), p. 28*.
02. Check the outlet for escaping process medium. If process medium escapes, stop the process (depressurize or drain off the process medium if necessary) and perform troubleshooting.
→ *Troubleshooting, p. 40*
03. Remove the drive unit. → *Drive Unit: Disassembly, p. 37*
Note: For sensor installation and dismounting, the drive unit must be disconnected from the process unit.



04. Bend the sensor endpiece **(2)**.
✓ Sensor endpiece perceptibly snaps in **(2)**.
✓ Sensor holder **(1)** protrudes from the inner tube **(3)**.
05. Disconnect the cable connector **(4)** of the sensor cable from the sensor head **(5)**.
06. Remove the sensor **(7)** using the spanning wrench **(6)** (A/F 19). Recommended tool: ZU0647 sensor spanning wrench → *Tools, p. 47*
07. Pull the sensor **(7)** out of the sensor holder **(1)**.
08. If the sensor glass is broken, check the seals of the sensor holder, the sensor socket, and the sealing ring for damage and replace if necessary. → *Troubleshooting, p. 40*

5.4 Cavity Rinsing

In the service position (SERVICE limit position), the inlet and outlet of the Ceramat WA160 are directly connected to the calibration chamber.

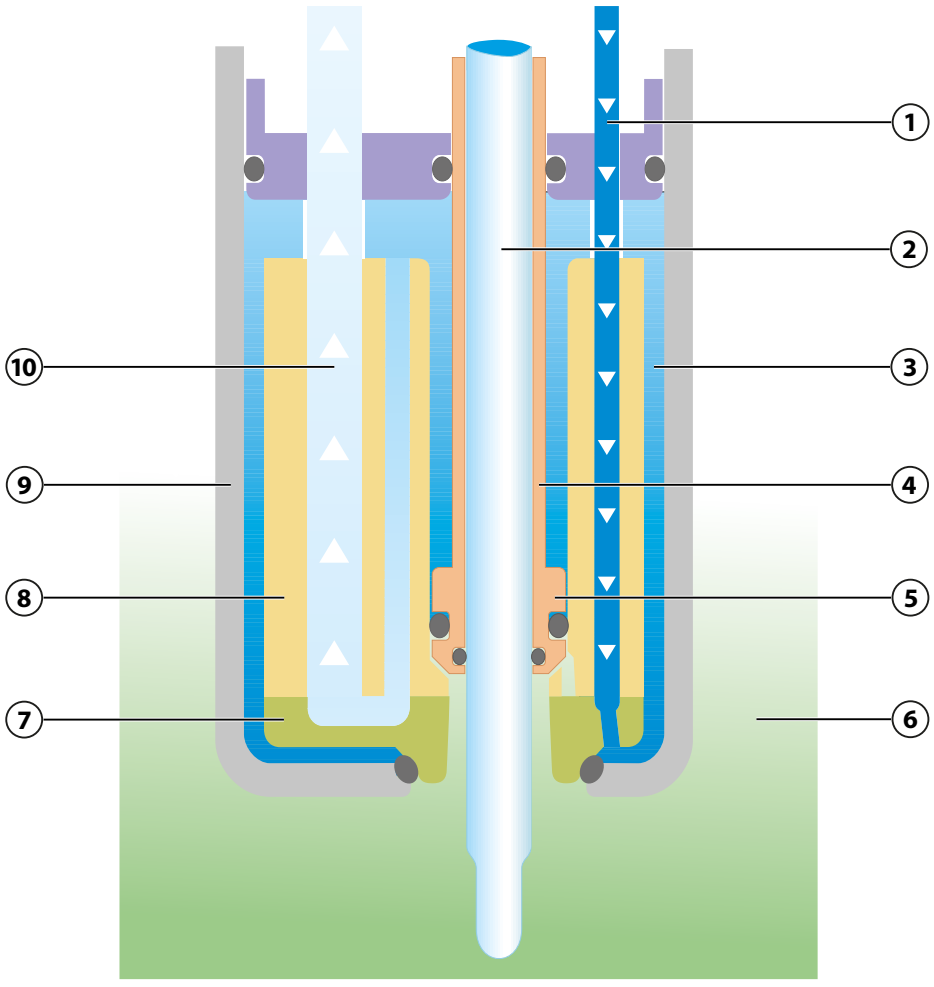
The ceramic rotary slides are installed in the sensor housing and have contact with the process medium. There is a risk that process medium may penetrate the cavities between the ceramic rotary slides and the sensor housing.

In this case, the process medium may be drained off by rinsing the cavities. This helps to keep the Ceramat WA160 in good working condition for longer.

When moving the Ceramat WA160 into the process position (PROCESS limit position), the inflow into the cavities is reversed. By activating the rinse function (e.g., in the process analyzer), the cavities are rinsed and media is drained off via the outlet.

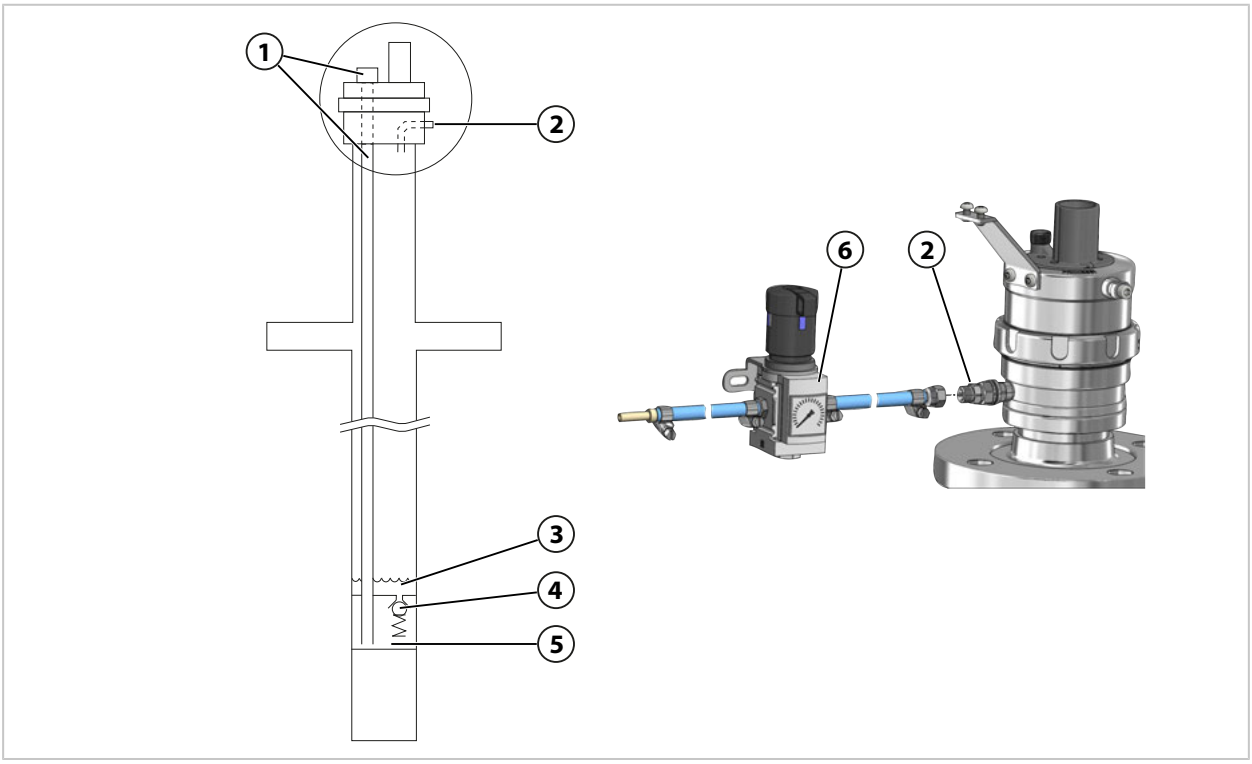
It is advisable to rinse the cavities for 30 seconds every 8 hours. This interval may be adjusted in the event of very frequent movements and if using chemically aggressive or adherent process media.

Note: The figure shows the Ceramat WA160 in the process position (PROCESS limit position).



1	Inlet	**6**	Process medium
2	Sensor	**7**	Ceramic rotary slide, bottom part (fixed)
3	Cavity	**8**	Ceramic rotary slide, top part (rotating)
4	Sensor tube	**9**	Sensor housing
5	Sensor socket	**10**	Outlet

5.5 Draining Condensate



In the bottom section of the immersion tube **(3)**, water can collect due to condensation. This condensate can be conveyed out of the retractable fitting using compressed air.

A spring-loaded check valve **(4)** creates a connection to the channels of the cavity rinsing **(5)**. Applying compressed air (e.g., with ZU0670 pressure regulation valve **(6)**) at the connection **(2)** causes the check valve to open **(4)**. The condensate is conveyed out of the retractable fitting through the channels of the cavity rinsing **(5)** and the outlet **(1)**.

Note: The channels of the cavity rinsing are only connected to the outlet when the retractable fitting is in the process position (PROCESS limit position). → *Service and Process Position, p. 18*

Permitted pressure for condensate drain	4 bar, max. 5 bar (58 psi, max. 72.5 psi)
Compressed air quality	
Standard	In accordance with ISO 8573-1:2001
Quality class	3.3.3 or 3.4.3
Solid contaminants	3 (max. 5 µm, max. 5 mg/m^3)
Water content for temperatures > 15 °C (59 °F)	Class 4, pressure dew point 3 °C (37.4 °F) or lower
Water content for temperatures 5 ... 15 °C (41 ... 59 °F)	Class 3, pressure dew point -20 °C (-4 °F) or lower
Oil content	Class 3 (max. 1 mg/m^3)
Connection	
Compressed air condensate drain	Screw connection with hose insert and coupling nut (tightening torque 5 Nm) for hose DN 6

See also

→ *Automatic Condensate Drain, p. 34*

Automatic Condensate Drain

When operating the retractable fitting inside a process analysis system from Knick, an automatic condensate drain can be carried out.

The interval and user-defined program sequence of automatic condensate drain are configured in the Protos industrial transmitter. More information on parameter setting is available in the Unical 9000 electropneumatic controller user manual. → *knick-international.com*

Possible program sequence:

Display text	Program runtime	Description
01: Probe in PROCESS		Retractable fitting moves into the process position (PROCESS limit position).
02: Compressed air on	00 h 00 min 60 s	Additional medium (compressed air) is switched on. Compressed air is applied to the immersion tube. The condensate is conveyed out of the retractable fitting.
03: Compressed air off	00 h 00 min 15 s	Additional medium (compressed air) is switched off. The immersion tube is vented.
04: Rinsing medium on	00 h 00 min 10 s	Rinsing medium is switched on. The ceramic rotary slides are rinsed.
05: Rinsing medium off		Rinsing medium is switched off.
06: Program end		Marks the conclusion of the program.

The required compressed air can be obtained from the Aux 2 control valve of the Unical 9000 electropneumatic controller.

Accessory ZU 0670/2 "pressure regulation valve" enables the permitted pressure to be regulated.
→ *Accessories, p. 46*

See also
→ *Process Analysis System: Installation Example, p. 19*
→ *Draining Condensate, p. 33*

6 Maintenance

6.1 Inspection and Maintenance

6.1.1 Inspection and Maintenance Intervals

NOTICE! Different process conditions (e.g., pressure, temperature, chemically aggressive media) impact the inspection and maintenance intervals. Analyze the specific application and its process conditions. Determine qualified experiences from comparable applications and derive suitable intervals.

Interval[1)]	To Do
Initial inspection after a few weeks	1. Move the Ceramat WA160 to the process position (PROCESS limit position). → *Moving into the Process Position (PROCESS Limit Position), p. 28* 2. Check the outlet hose for escaping process medium. If process medium is escaping: Stop the process (depressurize or discharge the process medium, if necessary) and remedy the fault. → *Troubleshooting, p. 40*
	1. Move the Ceramat WA160 to the service position (SERVICE limit position). → *Moving into the Service Position (SERVICE Limit Position), p. 28* 2. Remove the drive unit. → *Drive Unit: Disassembly, p. 37* 3. Visual inspection of the O-rings to check the basic suitability of the materials used under the existing process conditions. Replace O-rings if necessary. → *Seal Kits, p. 43* 4. Mount the drive unit. → *Drive Unit: Assembly, p. 38*
After 1 to 2 years or 30 000 strokes[2)]	1. Move the Ceramat WA160 to the service position (SERVICE limit position). → *Moving into the Service Position (SERVICE Limit Position), p. 28* 2. Remove the drive unit. → *Drive Unit: Disassembly, p. 37* 3. Visual inspection of O-rings subject to dynamic load on the sensor socket and the O-rings subject to static load. Replace O-rings if necessary. → *Seal Kits, p. 43* 4. If necessary, check that the cavity rinsing is functioning perfectly. 5. Mount the drive unit. → *Drive Unit: Assembly, p. 38*
	1. Upon suspicion of deposits or in case of chemical attacks on the sensor housing (visible in the sensor housing after drive unit is removed), check the process unit. 2. If necessary, send the process unit to the responsible local representative for repair. → *knick-international.com*
After 10 years or after 500 000 strokes	1. Remove the Ceramat WA160. → *Retractable Fitting: Removal, p. 42* 2. Send the Ceramat WA160 to the responsible local representative for complete maintenance (replacement of pneumatic seals and lubricating grease, check all functions, pressure test, and leak test). → *knick-international.com*

1) The intervals listed are approximate recommendations based on the experience of Knick. The actual intervals depend on the specific application.

2) Following successful first inspection and confirmation of the suitability of all materials used, the interval may be lengthened.

6.1.2 Lubricants Used and Permitted

Application	Pharma and Food		Chemicals and Wastewater
Lubricant	Beruglide L[1] (silicone-free)	Paraliq GTE 703[2] (containing silicone)	Syntheso Glep 1 (silicone-free)
Elastomer seal materials			
FKM	+	+	+
FFKM	+	+	+
EPDM	+	+	+

Note: Lubricant Paraliq GTE 703 contains silicone and has good lubricating properties even at elevated temperatures and with numerous travel movements. Paraliq GTE 703 is used as a special version at the customer's express request.

6.1.3 Characteristics of Process-Wetted Materials

Note: The stated values are reference values and provide general information. Concentrations of acids or alkalis, temperatures, mechanical effects, and the duration of the effect impact the materials to a greater or lesser degree. Therefore, no guarantee is given for the stated values. A pretest is recommended for cases where there has been no prior experience using the material in the process. Mixtures of substances constitute a prime example.

	Mechanical strength	Temperature resistance	Resistance to acids	Resistance to alkalis	Resistance to saline solutions	Resistance to cleaning agents or solvents
Stainless steel material no. 1.4571	1	1	3[3]	2	3	2
Hastelloy C-22 Material no. 2.4602	1	1	2	1	1	1
PEEK (carbon fiber-reinforced)	1	1	2[4]	1	1	2
PVDF (carbon fiber-reinforced)	2	2	2[5]	2	1	2

1 = very suitable; 5 = unsuitable

See also
→ *Product Code, p. 10*

6.2 Corrective Maintenance

6.2.1 Corrective Maintenance Safety Instructions

⚠ **WARNING! Process medium, potentially containing hazardous substances, may escape from the Ceramat WA160.** Only perform corrective maintenance in the service position (SERVICE limit position). Disconnect the Ceramat WA160 from all power sources and secure it against accidental reconnection. Follow the safety instructions. → *Safety, p. 5*

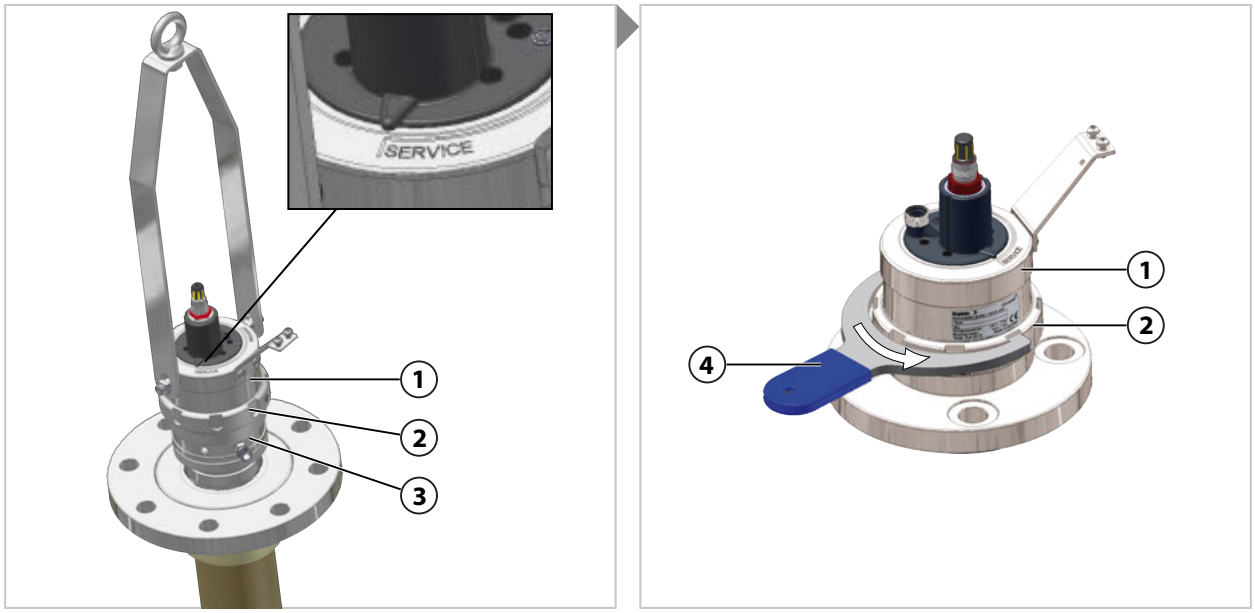
⚠ **CAUTION! Risk of cutting injuries from broken sensor glass.** Handle the sensor with care. Follow the safety instructions in the sensor manufacturer's documentation.

Note: The sensor housing with the ceramic rotary slides is the first barrier to the process. In case of a defect, the drive unit, e.g., broken ceramic, as the second barrier.

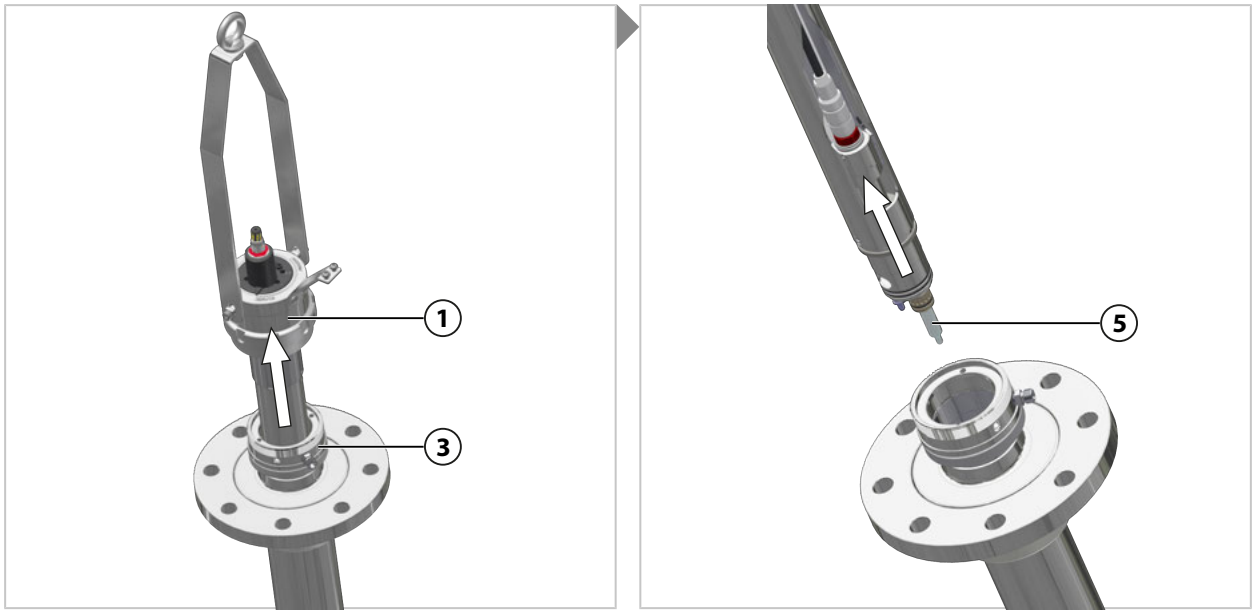
1) FDA-compliant, registered in accordance with NSF-H1.
2) FDA-compliant, registered in accordance with USDA-H1.
3) Not resistant to saline or sulphuric acids.
4) Not resistant to highly oxidizing media (concentrated sulphuric acids, nitric acids, or hydrogen fluoride).
5) Not resistant to ketones, aminos, smoking sulphuric acids, and nitric acids.

6.2.2 Drive Unit: Disassembly

Note: It is necessary to disconnect the drive unit, e.g., in order to replace the sensor or for maintenance, cleaning, and troubleshooting. → *Troubleshooting, p. 40*

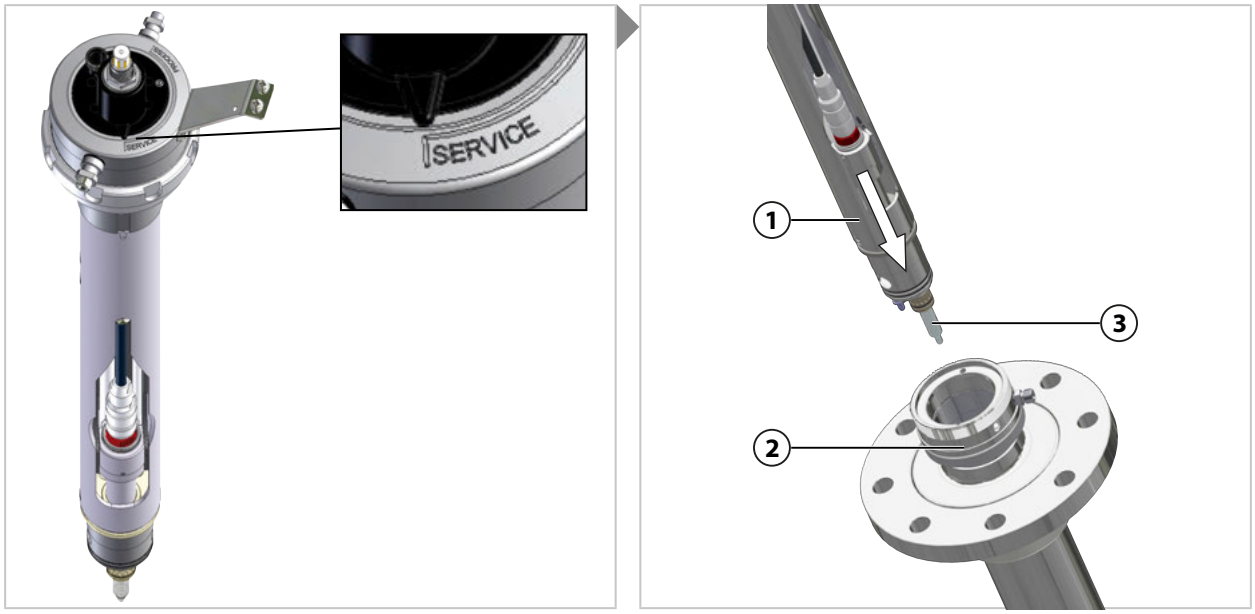


01. Move the Ceramat WA160 into the service position (SERVICE limit position).
→ *Moving into the Service Position (SERVICE Limit Position), p. 28*.
02. Check the outlet for escaping process medium. If process medium escapes, stop the process (depressurize or drain off the process medium if necessary) and perform troubleshooting.
→ *Troubleshooting, p. 40*
03. Rinse the media connections and blow free if necessary, in order to avoid carry over of the process medium. → *Process Analysis System: Installation Example, p. 19*
04. Switch off the compressed air supply and vent the compressed air system.
05. Disconnect the multiplug from the drive unit **(1)**, if necessary.
06. Disconnect the outlet hose from the drive unit, **(1)** if necessary.
07. Disconnect the cable socket of the sensor cable from the sensor adapter, if necessary.
08. Loosen the coupling nut **(2)** approx. 1.5 turns counterclockwise using the spanning wrench, **(4)** but do not completely unscrew it.
Note: Do not tilt the coupling nut. Recommended tool: ZU0648 Ceramat spanning wrench.
→ *Tools, p. 47*
09. Check the outlet for escaping process medium. If process medium escapes, stop the process (depressurize or drain off the process medium if necessary) and perform troubleshooting.
→ *Troubleshooting, p. 40*
10. Completely release the coupling nut **(2)**. While doing so, the drive unit **(1)** is pulled out of the process unit **(3)**. This motion can be supported by slightly lifting the drive unit **(1)** while turning the coupling nut **(2)**.

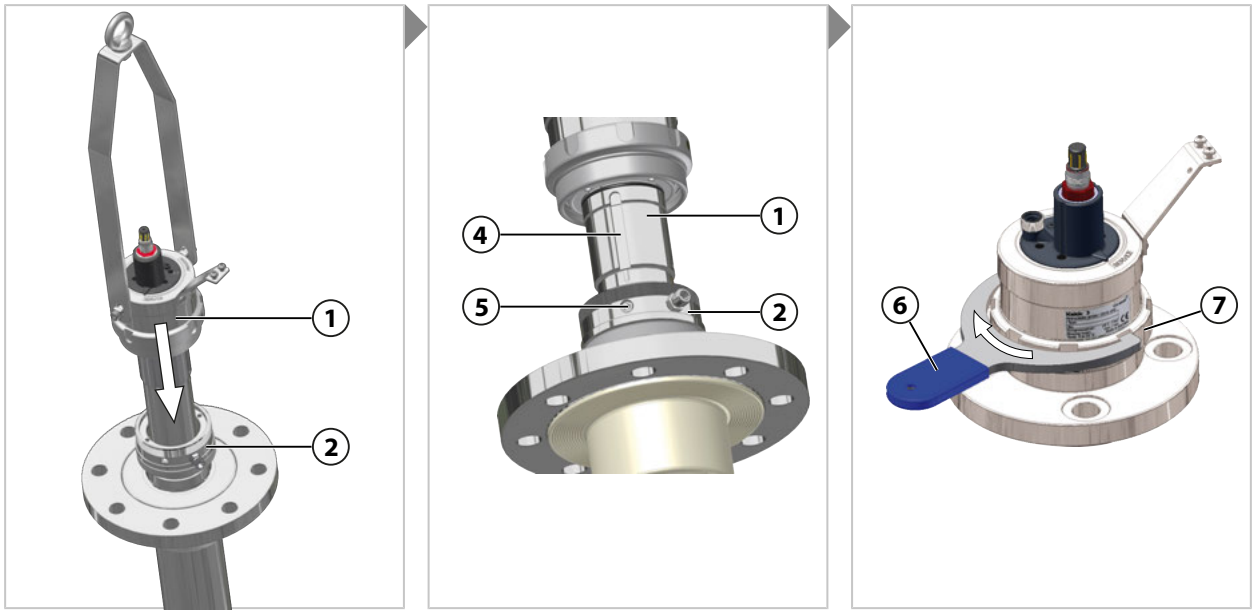


11. Pull the drive unit **(1)** out of the process unit **(3)**. While doing so, do not tilt the drive unit **(1)** or damage the sensor **(5)**.
    Note: For versions with immersion depths greater than 600 mm, Knick recommends using ZU0651, the bail handle accessory. → *Accessories, p. 46*

6.2.3 Drive Unit: Assembly



01. Make sure that the drive unit **(1)** is located in the service position (SERVICE limit position).
    → *Service and Process Position, p. 18*
02. Push the drive unit **(1)** into the process unit **(2)**. While doing so, do not tilt the drive unit **(1)** or damage the sensor **(3)**.
    Note: For versions with immersion depths greater than 600 mm, Knick recommends using ZU0651, the bail handle accessory. → *Accessories, p. 46*



03. While pushing it in, align the drive unit **(1)** such that the hinge pin **(5)** of the process unit **(2)** goes into the groove **(4)**.
    Note: The coupling nut can only be tightened if the process unit is correctly inserted and pushed in far enough that the coupling nut's thread can engage.
04. Put the coupling nut in place **(7)** and screw it on clockwise up to the perceptible stop. When screwing on the coupling nut **(7)**, continue to push down the drive unit **(1)** to make it easier to screw on.
    Note: Do not tilt the coupling nut. Recommended tool: ZU0648 Ceramat spanning wrench.
    → *Tools, p. 47*
05. Tighten the coupling nut **(7)** hand-tight, turning the spanning wrench **(6)** clockwise.
06. Connect the outlet hose to the drive unit **(1)** if necessary. → *Outlet, p. 22*
07. Connect the multiplug to the drive unit **(1)** if necessary. → *Multiplug: Installation, p. 25*
08. Connect the cable socket of the sensor cable to the sensor adapter if necessary.
    → *Sensor Cable: Installation, p. 26*

6.2.4 Knick Repair Service

The Knick Repair Service offers professional corrective maintenance for the product to the original quality. Upon request, a replacement unit can be obtained for the period of the repair.

Further information can be found at www.knick-international.com.

See also
→ *Return, p. 42*

7 Troubleshooting

USE CAUTION WHEN CONDUCTING ANY TROUBLESHOOTING. FAILURE TO ABIDE BY THE REQUIREMENTS SET FORTH HEREIN MAY RESULT IN SERIOUS INJURY OR DEATH, AS WELL AS DAMAGE TO PROPERTY.

Fault status	Possible cause	Remedy
Medium escapes from the outlet hose.	Ceramic rotary slide defective.	Send the Ceramat WA160 to the responsible local representative for repair. → *knick-international.com*
	Sensor housing defective.	Send the Ceramat WA160 to the responsible local representative for repair. → *knick-international.com*
Medium escapes from the connection point of the multiplug.	Multiplug installed incorrectly.	Install the multiplug correctly. → *Multiplug: Installation, p. 25*
	Seals or O-rings of the multiplug damaged or missing.	Check seals and O-rings of the multiplug for correct position and damage; replace if necessary.
	Connection point soiled.	Clean the connection point and multiplug.
	Foreign body between connection point and multiplug.	Remove any foreign bodies (e.g., old O-rings).
	Multiplug defective.	Send the media connection to the responsible local representative for repair. → *knick-international.com*
Ceramat WA160 does not move.	Multiplug installed incorrectly.	Install the multiplug correctly. → *Multiplug: Installation, p. 25*
	Sensor installed incorrectly.	Install the sensor correctly. → *Installing and Dismounting Sensors, p. 29*
	Compression ring or O-ring of the sensor damaged or missing.	Check the compression ring and O-ring of the sensor for correct position and damage; replace if necessary.
	Foreign body in the sensor holder.	Remove any foreign bodies (e.g., old compression ring or old O-ring).
	Seals or O-rings of the drive unit damaged.	Replace the seals or O-rings of the drive unit and the calibration chamber.
	Drive unit defective.	Send the Ceramat WA160 to the responsible local representative for repair. → *knick-international.com*
	Compressed air supply interrupted.	Install the multiplug correctly. → *Multiplug: Installation, p. 25*
		Check the compressed air system for proper functioning.
		Check the electropneumatic controller for proper functioning.
		Check the industrial transmitter for error messages.
Ceramat WA160 does not fully move to the SERVICE or PROCESS limit position.	Faulty drive unit.	Follow the instructions for help. → *Malfunction: Retractable fitting does not move completely to the SERVICE or PROCESS limit position, p. 41*
	No compressed air supply.	Install the multiplug correctly. → *Multiplug: Installation, p. 25*
		Check the function of the compressed air system.
		Check the function of the electro-pneumatic controller.
		Check the process analyzer for error messages.

Fault status	Possible cause	Remedy
Sensor glass shattered.	Mechanical impact on the sensor glass (e.g., by process medium).	Replace the sensor. → *Installing and Dismounting Sensors, p. 29*
		Remove any glass splinters from the sensor holder and the sensor housing. Check the sensor tube gaskets for damage and replace them if necessary.
		If required, stop the process (depressurize or drain off the process medium if necessary) and remove the Ceramat WA160. Remove glass splinters from the ceramic rotary slides and check the sensor housing gaskets for damage; replace them if necessary.
No or wrong measured value displayed.	Faulty sensor.	Replace the sensor. → *Installing and Dismounting Sensors, p. 29*
	Defective plug connection or damaged sensor cable.	Fasten plug connection or replace damaged sensor cable. → *Sensor Cable: Installation, p. 26*.
	Process analyzer incorrectly configured.	Correctly configure the process analyzer (see relevant documentation).

Malfunction: Retractable fitting does not move completely to the SERVICE or PROCESS limit position

⚠ **CAUTION! Risk of injury to hands and fingers from the drive unit's rotary movement.** Do not manually turn the drive any further or reach inside the Ceramat WA160.

NOTICE! Risk of product damage if additional manual force is applied (i.e., not due to the compressed air in the retractable fitting). Do not turn the drive any further by force.

01. Increase the drive control pressure up to the maximum permissible value to move fully to the service position (SERVICE limit position) or the process position (PROCESS limit position).
    → *Specifications, p. 49*
    ✓ Position indicator points to SERVICE or PROCESS marking.
    Note: If troubleshooting is successful, continue with Step 02. If troubleshooting is not successful, continue with Step 03.
02. Troubleshooting successful: Check the cause of the malfunction. If required, remove the drive unit. Perform maintenance on the drive unit or check the functionality of the process unit using a replacement drive.
03. Troubleshooting unsuccessful: Stop process, depressurize or discharge process medium if necessary. Dismount Ceramat WA160 and send to the local representative responsible for repairs.
    → *knick-international.com*

8 Decommissioning

8.1 Retractable Fitting: Removal

⚠ WARNING! Risk of explosion from mechanically generated sparks when used in explosive atmospheres. Take appropriate action to prevent mechanically generated sparks. Follow the safety instructions. → *Operation in Explosive Atmospheres, p. 6*

⚠ WARNING! Process or rinse medium, potentially containing hazardous substances, may escape from the Ceramat WA160 or the process port. Follow the safety instructions. → *Safety, p. 5*

01. Stop the process; depressurize or drain off the process medium if necessary.
02. Move the Ceramat WA160 into the service position (SERVICE limit position).
    → *Moving into the Service Position (SERVICE Limit Position), p. 28*.
    Note: Rinse the sensor prior to removal in order to prevent entrainment of chemically aggressive process medium in the area of the sensor holders.
03. Switch off the compressed air supply and vent the compressed air system.
04. Disconnect the cable socket of the sensor cable from the sensor adapter.
05. Release the sensor cable from the bracket of the media connection and remove it.
06. Release the equipotential bonding conductor from the bracket of the media connection and remove it if necessary.
07. Remove the multiplug.
08. Remove the outlet hose.
09. Remove the bracket of the media connection or accessory ZU0631 “standard media connection” from the strain relief bracket of the Ceramat WA160.
10. Release the process connection.
11. Remove the Ceramat WA160 from the customer-side process port.
    Note: For versions with immersion depths greater than 600 mm, Knick recommends using ZU0651, the bail handle accessory. → *Accessories, p. 46*
12. Seal the process port suitably.

8.2 Return

If a product must be returned, send it to the responsible local representative in a clean condition and securely packaged. → *knick-international.com*

Upon contact with hazardous substances, decontaminate or disinfect the product before shipping. Always include the relevant return form (Declaration of Decontamination) with shipments, in order to avoid hazards to our Service employees. → *knick-international.com*

8.3 Disposal

To dispose of the product properly, follow the local regulations and laws.

The Ceramat WA160 can contain various materials, depending on the version concerned.
→ *Product Code, p. 10*

9 Spare Parts, Accessories, and Tools

9.1 Seal Kits

The Ceramat WA160 has a modular structure. The ordered version of the retractable fitting is encoded in a product code. → *Product Identification, p. 9*

Depending on the ordered version, different seal kits are required for repair work.

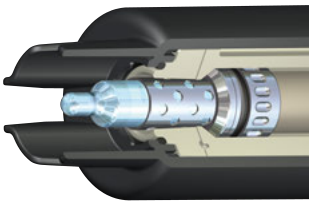
The seal kits are available in different materials.

Each seal kit is supplied with an accompanying slip. The accompanying slip contains information on the package contents, the installation site of the O-rings supplies, and the lubrication points. The replaced O-rings must be lubricated with the accompanying grease.

Immersion tube material	Seal kit	Material of process-wetted seals	Order no.	Suitable grease (accompanying)
Stainless steel 1.4571	Kit A	FKM	ZU0662	Syntheso Glep1
	Kit B	EPDM	ZU0663	Syntheso Glep1
	Kit C	FFKM	ZU0664	Syntheso Glep1
	Kit E	EPDM FDA	ZU0665	Beruglide L
	Kit H	FFKM FDA	ZU1079	Beruglide L
	Kit K	FFKM	On request	Syntheso Glep1
PP or PVDF	Kit A	FKM	ZU0681	Syntheso Glep1
	Kit B	EPDM	ZU0682	Syntheso Glep1
	Kit C	FFKM	ZU0683	Syntheso Glep1
	Kit E	EPDM FDA	ZU0684	Beruglide L
	Kit H	FFKM FDA	On request	Beruglide L
	Kit K	FFKM	ZU1086	Syntheso Glep1
Stainless steel 1.4435	Kit A	FKM	ZU0685	Syntheso Glep1
	Kit B	EPDM	ZU0686	Syntheso Glep1
	Kit C	FFKM	ZU0687	Syntheso Glep1
	Kit E	EPDM FDA	ZU0688	Beruglide L
	Kit H	FFKM FDA	ZU1078	Beruglide L
	Kit K	FFKM	On request	Syntheso Glep1

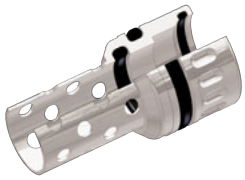
Note: Further seal kits are available on request.

9.2 Spare Parts

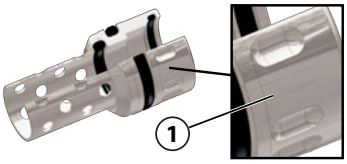


Sensor Socket, Long with Mounted O-Rings

This sensor socket is recommended for brittle incrustations (e.g., lime).

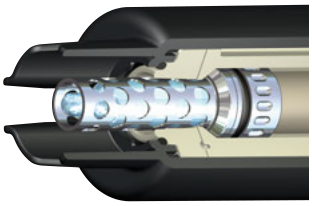


ZU 0672/A sensor socket 1.4571, O-rings FKM
ZU 0672/B sensor socket 1.4571, O-rings EPDM
ZU 0672/C sensor socket 1.4571, O-rings FFKM



ZU 0673/A sensor socket Hastelloy, O-rings FKM
ZU 0673/B sensor socket Hastelloy, O-rings EPDM
ZU 0673/C sensor socket Hastelloy, O-rings FFKM

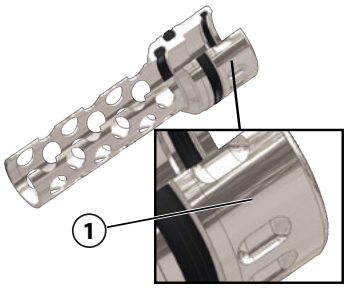
The material Hastelloy C22 is distinguished by the lack of a grip recess **(1)**.



Sensor Socket, Full Sensor Protection with Mounted O-Rings

This sensor socket is recommended for brittle incrustations (e.g., lime).
Additionally, the sensor has better mechanical protection.

ZU 0808/A sensor socket 1.4571, O-rings FKM
ZU 0808/B sensor socket 1.4571, O-rings EPDM
ZU 0808/C sensor socket 1.4571, O-rings FFKM

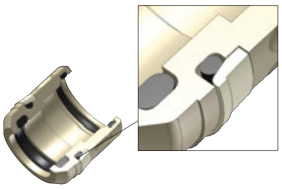


ZU 0820/A sensor socket Hastelloy, O-rings FKM
ZU 0820/B sensor socket Hastelloy, O-rings EPDM
ZU 0820/C sensor socket Hastelloy, O-rings FFKM

The material Hastelloy C22 is distinguished by the lack of a grip recess **(1)**.

Sensor Socket with Mounted O-Rings

ZU0616 sensor socket PEEK, O-rings FKM
ZU0617 sensor socket PEEK, O-rings EPDM
ZU0618 sensor socket PEEK, O-rings FFKM
ZU0619 sensor socket PEEK, O-rings EPDM FDA
ZU0620 sensor socket PVDF, O-rings FKM
ZU0621 sensor socket PVDF, O-rings EPDM
ZU0622 sensor socket PVDF, O-rings FFKM
ZU0623 sensor socket PVDF, O-rings EPDM FDA



Sensor Socket with Mounted O-Rings and Scraper Ring with Scraping Edge Made of PEEK

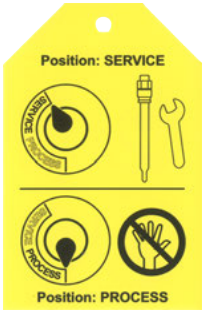
Knick recommends this sensor socket for adherent or sticky media and for particles in the process medium.

ZU0705 sensor socket PEEK, O-rings FKM
ZU0706 sensor socket PEEK, O-rings EPDM
ZU0707 sensor socket PEEK, O-rings FFKM

ZU0889 Outlet Hose

The outlet hose is used to drain calibration solutions and cleaning or rinsing media from the calibration chamber. → *Outlet, p. 22*

Available lengths: 3.5 m and 10 m

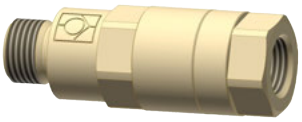


Safety Label

The safety label contains information on safely installing and removing solid-electrolyte sensors. → *Installing and Dismounting Sensors, p. 29*

Damaged or lost safety labels will be replaced on request.

9.3 Accessories



RV01 Check Valve

The RV01 Check Valve prevents the return flow of the process medium, calibration medium, cleaning medium, or rinsing medium into the inlet. The check valve is selected via a product code.

Check Valve		**RV01**	**-**	**_**	**_**	**_**	**_**
Material of housing, valve body	Stainless steel 1.4404			**H**			
	PEEK			**E**			
Material of seals	FKM				**A**		
	EPDM				**B**		
	FFKM				**C**		
	FKM-FDA				**F**		
	EPDM-FDA				**E**		
	FFKM-FDA				**H**		
Inlet connection, female thread	G¼"					**4**	
	G⅛"					**8**	
Outlet connection, male thread	G¼"						**4**
	G⅛"						**8**

ZU0631 Standard Media Connection
ZU0631/PEEK-EPDM Standard Media Connection
ZU0631/PEEK-FKM Standard Media Connection
ZU0631/PEEK-FFLM Standard Media Connection

Connection kit for manual operation of the Ceramat WA160 in conjunction with accessory ZU0646 "manually operated pneumatic valve" or for operation using the process control system (PCS).

ZU0646 Manually Operated Pneumatic Valve

Switch (tilt lever for rerouting the compressed air) for manual operation of the Ceramat WA160 in conjunction with accessory ZU0631 "standard media connection".

ZU0654/ZU0655 Adapter for Additional Media

The adapter enables an additional medium, e.g., hot water or steam, to be directly fed into the Ceramat WA160. A check valve is integrated into the media connection of the adapter.

The adapter is installed between the Ceramat WA160 and the multiplug of the media connection.

ZU0654/1 adapter made of PEEK, O-rings FKM
ZU0654/2 adapter made of PEEK, O-rings EPDM
ZU0654/3 adapter made of PEEK, O-rings FFKM
ZU0655/1 adapter made of 1.4571, O-rings FKM
ZU0655/2 adapter made of 1.4571, O-rings EPDM
ZU0655/3 adapter made of 1.4571, O-rings FFKM

ZU0669 3/8″ Valve for Additional Medium, Pneumatically Controlled

The valve is used for the external infeed of additional media to the retractable fitting. The valve is controlled by auxiliary valve Aux 2 of the Unical 9000 electropneumatic controller.

ZU0670/1 Pressure Regulation Valve 0.5 ... 4 bar
ZU0670/2 Pressure Regulation Valve 1 ... 7 bar
ZU0713 Hose, 20 m (Extension for ZU0670)

The pressure regulation valve enables the permitted compressed air to be regulated.

ZU0651 Bail Handle

For immersion depths greater than 600 mm, Knick recommends using the bail handle for the secure transport of the retractable fitting.

For information on the necessary clearances for installing and dismounting the retractable fitting, see: → *Dimension Drawings, p. 48*

9.4 Tools

ZU0647 Sensor Spanning Wrench

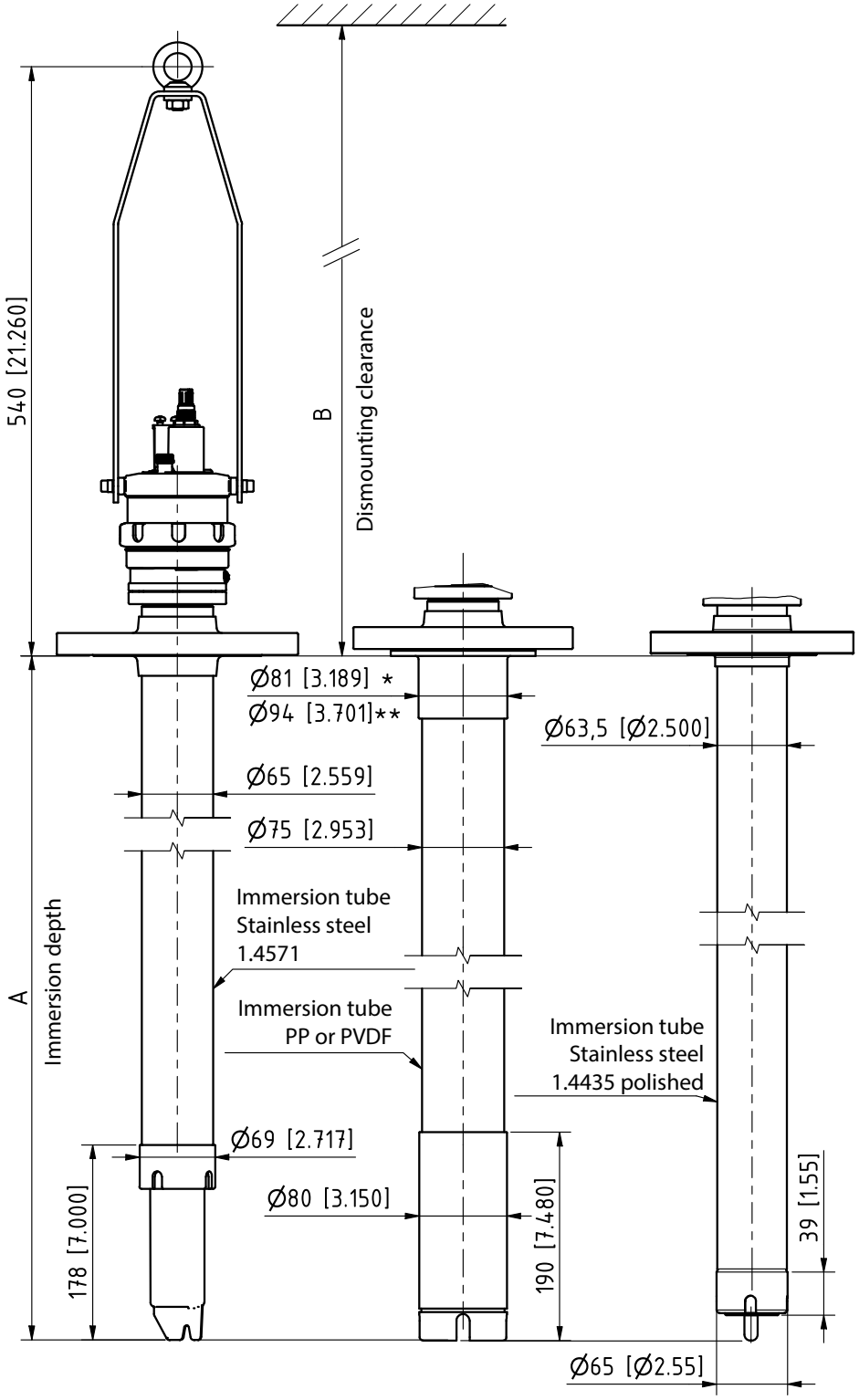
ZU0647 sensor spanning wrench is used to properly tighten sensors. It prevents damage to the PG 13.5 plastic thread of the sensor head caused by applying an excessive tightening torque (e.g., when using an open-end wrench).

ZU0648 Spanning Wrench

Accessory ZU0648 spanning wrench is used to loosen and fasten the coupling nuts of the drive unit (disconnecting or connecting the drive unit).

10 Dimension Drawings

Note: All dimensions are listed in millimeters [inches].



* DN 80, 3½″ ** ≥ DN 100, 4″

A - Immersion Depth	B - Dismounting Clearance
600 mm (23.62″)	1200 mm (47.24″)
1000 mm (39.37″)	1600 mm (62.99″)
1500 mm (59.05″)	2100 mm (82.68″)
2000 mm (78.74″)	2600 mm (102.36″)

11 Specifications

Permitted process pressure and temperature during motion	
Process connection with • Probe housing/sensor socket made of material: PEEK; PVDF or stainless steel 1.4435 • Immersion tube made of material: Stainless steel 1.4571; stainless steel 1.4435 polished or stainless steel, PVDF coated	6 bar at 0 ... 90 °C (87 psi at 32 ... 194 °F)
Process connection with • Probe housing/sensor socket made of material: PEEK or PVDF • Immersion tube made of material: Stainless steel, PP coated	6 bar at 5 ... 30 °C (87 psi at 41 ... 86 °F) linear drop to 1 bar at 80 °C (14.5 psi at 176 °F)
Permitted process pressure and temperature static in service position	16 bar at 0 ... 40 °C (232 psi at 32 ... 104 °F)
Permitted rinsing pressure and temperature	6 bar at 5 ... 60 °C (87 psi at 41 ... 140 °F) with accessory ZU0654/ZU0655 "adapter for additional media" up to 135 °C (275 °F) → *Accessories, p. 46*
Permitted pressure for sensor control	4 ... 7 bar (58 ... 101.5 psi)
Permitted pressure for condensate drain	4 bar, max. 5 bar (58 psi, max. 72.5 psi)
Ambient temperature	-10 ... 70 °C (14 ... 158 °F)
Ingress protection	IP66
Sensors	Solid-electrolyte sensors External diameter 12 mm, length 225 mm, sensor head thread PG 13.5
Process connections	→ *Product Code, p. 10*
Immersion depths/installation dimensions	→ *Dimension Drawings, p. 48*
Wetted materials	→ *Product Code, p. 10*
Compressed air quality	
Standard	In accordance with ISO 8573-1:2001
Quality class	3.3.3 or 3.4.3
Solid contaminants	3 (max. 5 µm, max. 5 mg/m^3)
Water content for temperatures > 15 °C (59 °F)	Class 4, pressure dew point 3 °C (37.4 °F) or lower
Water content for temperatures 5 ... 15 °C (41 ... 59 °F)	Class 3, pressure dew point -20 °C (-4 °F) or lower
Oil content	Class 3 (max. 1 mg/m^3)
Connection	
Outlet	Joining piece that fits the outlet hose of the media connection → *Outlet, p. 22*
Compressed air, rinsing media and calibration solutions (control air retractable fitting)	For Unical multiplug
Compressed air condensate drain	Screw connection with hose insert and coupling nut (tightening torque 5 Nm) for hose DN 6
Weight	Depending on material and version. Please contact Knick or your designated sales representative for detailed information.

Abbreviations

A/F	Width across flats
ANSI	American National Standards Institute
ATEX	Atmosphères Explosibles (explosive atmospheres)
CE	Conformité Européenne (European conformity)
DIN	Deutsches Institut für Normung (German Institute for Standardization)
DN	Diamètre nominal (nominal size)
EPDM	Ethylene propylene diene monomer rubber
EU	European Union
FDA	U.S. Food and Drug Administration
FFKM	Perfluoro rubber
FKM	Fluoro rubber
IEC	International Electrotechnical Commission
IP	International Protection/Ingress Protection
ISO	International Organization for Standardization
KEMA	Keuring van Elektrotechnische Materialen te Arnhem (inspection of electrical equipment in Arnheim)
PCS	Process control system
PEEK	Polyether ether ketone
PG	Panzergewinde
PP	Polypropylene
PVDF	Polyvinylidene fluoride

Glossary

CE Marking

Manufacturer's declaration, in accordance with EU Regulation 765/2008, that the product is in conformity with the applicable requirements set out in the European Union harmonization legislation providing for its affixing.

Corrective Maintenance

Measures taken to return an item under review to an operational condition, with the exception of improvements.

Hazard

A hazard is defined as a potential source of damage. The term "hazard" can be specified to indicate the origin or nature of the expected damage. (Source: EN ISO 12100)

Highly Efficient Charge Generating Mechanism

A highly efficient charge generating mechanism is [...] any charging mechanism stronger than manual rubbing of surfaces. (Source: EN ISO 80079-36)

Inspection

Measures for determining and assessing the actual condition of an item under review, including determining the causes of wear and deriving the necessary steps for future use.

Maintenance

Combination of all technical, administrative and managerial actions during the life cycle of an item intended to retain it in, or restore it to, a state in which it can perform the required function. (Source: EN 13306 Maintenance – Maintenance terminology)

Preventive Maintenance

Measures for maintaining the target condition […] and delaying the reduction of the available wear margin of an item under review.

Risk

Combination of the probability of occurrence of harm and the severity of that harm (source: EN ISO 12100)

Risk Assessment

Overall process of risk analysis and risk evaluation (source: EN ISO 12100)

Zone 0

Area in which an explosive gas atmosphere is present continuously or for long periods or frequently. (Source: IEC 60079-10-1)

Zone 1

A place in which an explosive atmosphere consisting of a mixture with air or flammable substances in the form of gas, vapor, or mist is likely to occur in normal operation occasionally. (Source: EC Directive 1999/92/EC, Annex I)

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