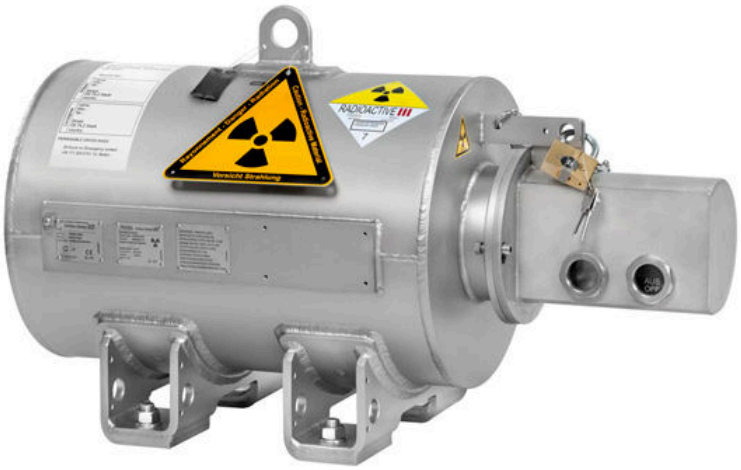
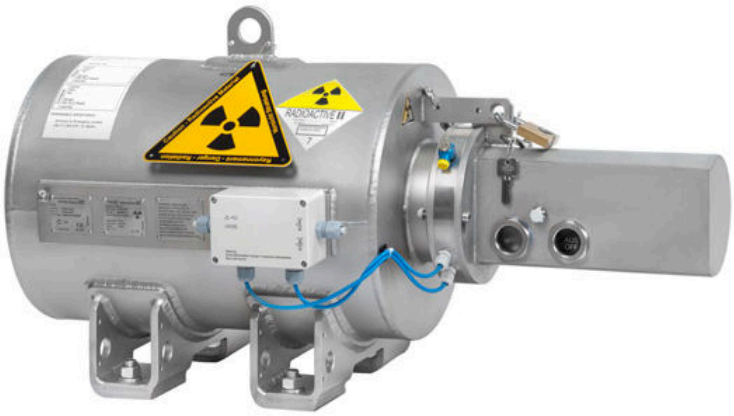
SD03258F/00/EN/01.24-00
71653215
2024-03-19

Special Documentation
Source container FQG66

Loading, unloading and replacing radiation sources
Label set





Endress+Hauser
People for Process Automation

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1 About this document

This document provides a description of the loading and replacement of radiation sources for the source container FQG66.

1.1 Symbols

1.1.1 Safety symbols

⚠ DANGER
This symbol alerts you to a dangerous situation. Failure to avoid this situation will result in serious or fatal injury.

⚠ WARNING
This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in serious or fatal injury.

⚠ CAUTION
This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in minor or medium injury.

NOTICE
This symbol contains information on procedures and other facts which do not result in personal injury.

1.1.2 Symbols for certain types of information and graphics

☢
Warning of radioactive substances or ionizing radiation sources

Tip
Indicates additional information

Reference to page

▶
Notice or individual step to be observed

1, 2, 3, ...
Item numbers

A, B, C, ...
Views

1.2 Documentation

The following document types are available in the Downloads area of the Endress+Hauser website (www.endress.com/downloads):

For an overview of the scope of the associated Technical Documentation, refer to the following:
- *Device Viewer* (www.endress.com/deviceviewer): Enter the serial number from the nameplate
- *Endress+Hauser Operations app*: Enter serial number from nameplate or scan matrix code on nameplate.

TI00445F/00; Source container FQG60
- The documentation is provided with the device.
- The documentation is available on the Internet:
  → www.de.endress.com

Additional notes

- SD00292F/00
  Supplementary Instruction Manual for Canada (FQG60, FQG61, FQG62, FQG63, FQG66)
- SD01316F/00
  Instructions for the transportation cask for the transportation of source capsules

2 Basic safety instructions

2.1 Requirements for personnel

⚠ DANGER

Personnel responsible for loading the sources must fulfill the following requirements:

- Technical staff responsible for loading and trained by Endress+Hauser in the process must have the qualifications that meet the relevant national requirements for this function and activity.
- They must be mentioned by name in the document "Confirmation of Safety Training FQG66" and have signed this document.
- Before starting work, they must have read and understand the instructions. All safety instructions contained in this documentation, especially the instructions on radiation protection, must be strictly observed.

The supplier (the company carrying out loading of the source container) must immediately report any damage to the packaging of the source container upon delivery. The next steps must then be clarified with the customer.

2.2 Preparation and implementation

⚠ DANGER

Preparation and implementation

- Detailed preparations are necessary to ensure the quickest possible installation of the radiation source. All necessary tools and equipment must be made available before work begins.
- When installing the radiation source, strictly observe all instructions given in this manual.
- When working with radiation sources, avoid any unnecessary exposure to radiation. All unavoidable radiation exposure must be kept to a minimum. All work must be carried out from a protected position. Suitable measures (e.g. blocking of access, shielding etc.) must be taken to protect people from all possible risk. **The relevant national requirements shall apply, e.g. StrlSchV.**
- The source holder must be easily movable and may not show corrosion or damage.

2.3 Freedom from contamination

⚠ DANGER

Freedom from contamination

- Loading of the source and handling of the source container must be carried out in such a way to prevent contamination of the source container by radioactive material. This must be verified by means of a wipe test or equivalent method.

3 Label set

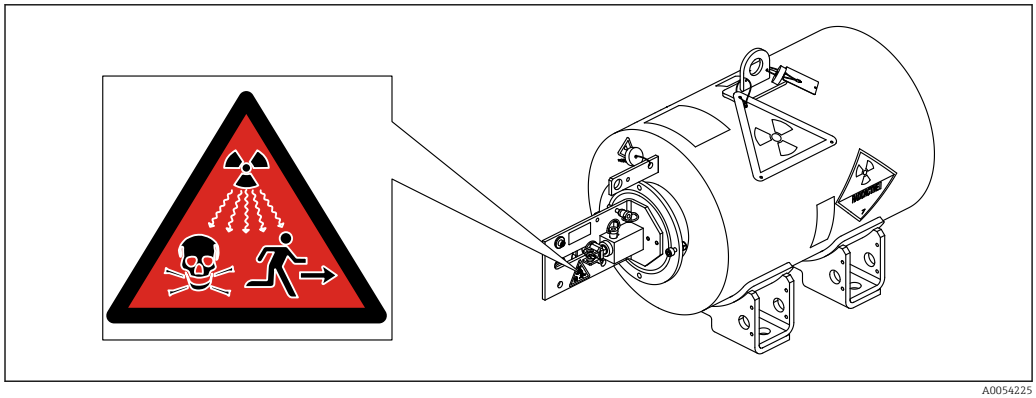
Label set for loading and changing the source

3.1 Scope of delivery

- 1 radiation source nameplate
- 1 adhesive nameplate 30 x 48 mm (1.18 x 1.89 in)
- 1 adhesive label "Radioactive"
- 1 adhesive label "Highly radioactive"
- 1 warning sign "Caution - Radioactive Material"
- 4 grooved pins
- Sealing wire and seals

3.2 Labeling

After loading a source container or replacing a source, the appropriate nameplates for the radiation source must be marked with a durable inscription (e.g. by stamped letters) as follows:



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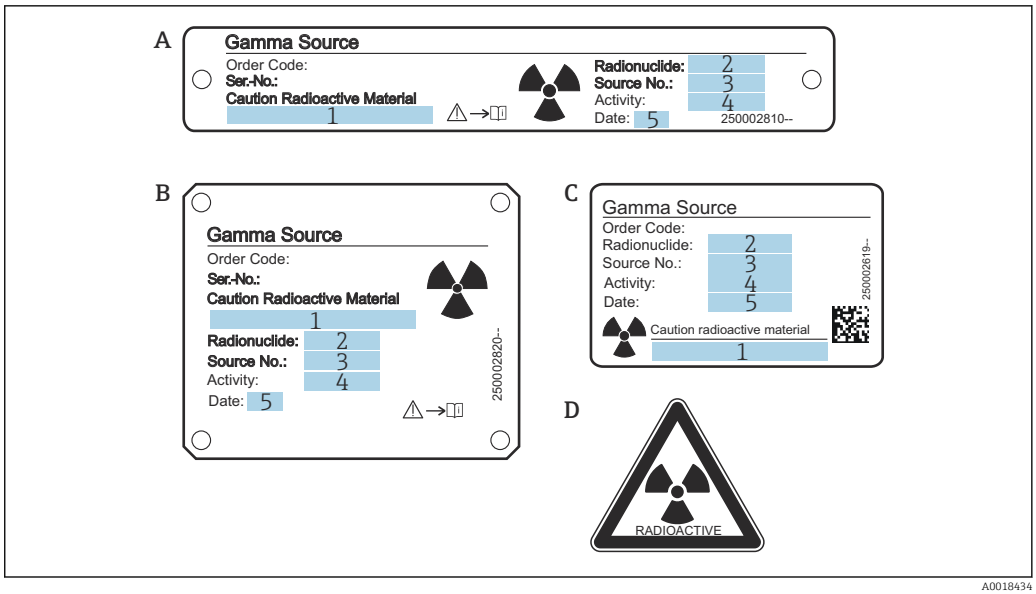
1 *Wording "Caution Radioactive Material", if required*



A Radiation source nameplate 107 x 17 mm (4.21 x 0.67 in), stainless steel
B Radiation source nameplate 45 x 55 mm (1.77 x 2.17 in), stainless steel
C Adhesive nameplate 30 x 48 mm (1.18 x 1.89 in)
D Adhesive labels "Radioactive"
E Adhesive labels "Highly radioactive"
1 Wording "Caution Radioactive Material", if required
2 "Co60" or "Cs137"
3 Serial number of the source capsule (according to supplier certificate)
4 Activity including unit (MBq or GBq)
5 Date of loading (month/year)

3.3 Note on loading the radiation source

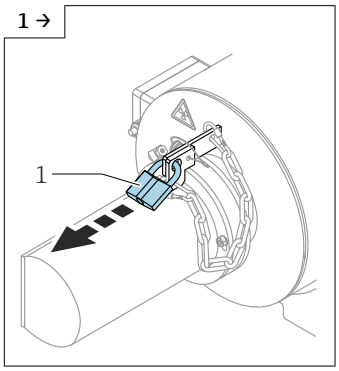
A warning sign "Caution - Radioactive Material" is supplied with the source container, depending on the version or approval.
The warning sign must be secured to the designated location after the source is loaded.

4 Loading the radiation source

4.1 Order code 020, option A (manual operation) and option B (manual operation with proximity switch)

4.1.1 Preparing the source container for loading

1 →



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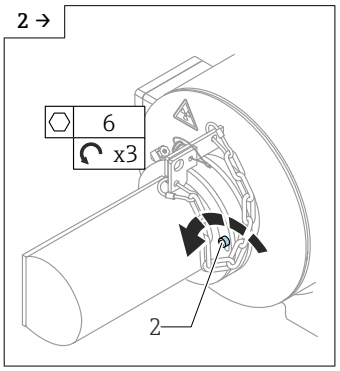
- Remove padlock (1).

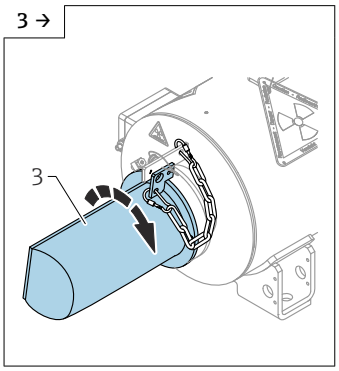
2 →



A0031849

- Turn the screws (2) (AF6) on the cover three times to release them.

3 →



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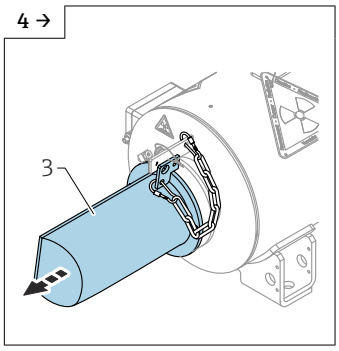
- Turn the cover (3) to the right.

4 →



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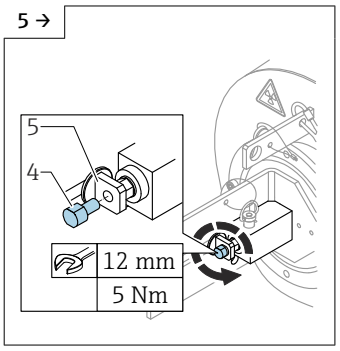
- Remove the cover (3) from the container.

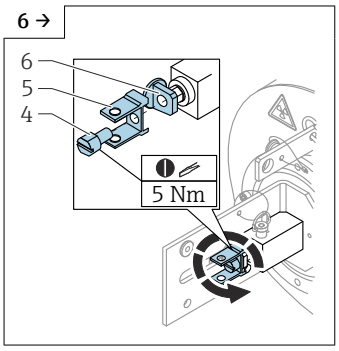
5 →



A0031408

- **Standard version**
- Unscrew the thrust rod (4) (AF12) from the slidable source holder.
- Remove the spacer (5) and thrust washer.
- Continue with Step 7.

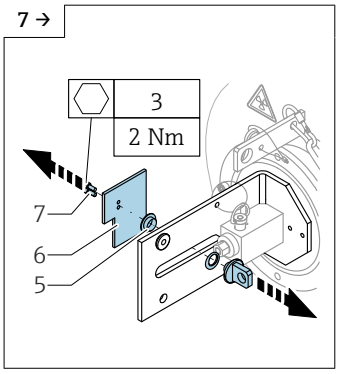
6 →



A0031410

- **NRC version**
- Unscrew the thrust rod (4) (AF12) from the slidable source holder.
- Remove the safety bracket (5), spacer and thrust washer (6).

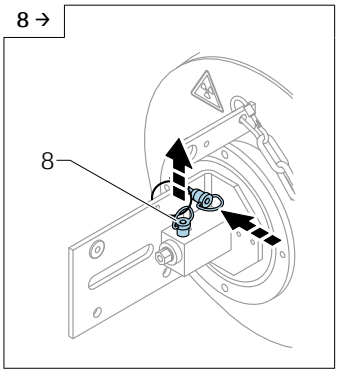
7 →



A0031409

- Release 2 x Allen screws (7) (AF3) to remove the cover plate (6), plain bearing bushing (5), thrust washer and spacer.
- **The slidable source holder is in the "AUS/OFF" switch position and secured by means of the lock pin.**

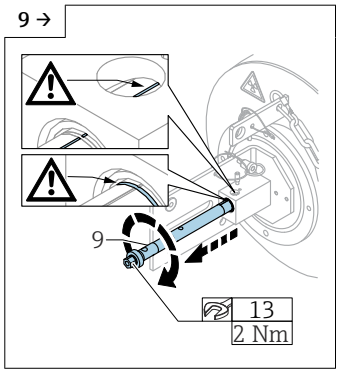
8 →



A0031411

- Remove the lock pin (8) from the slidable source holder and place it into the parking position

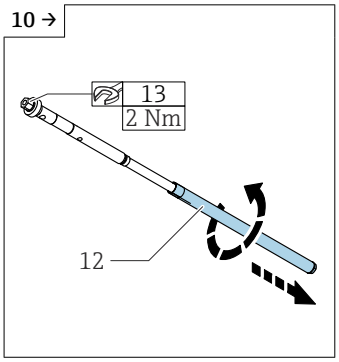
9 →



A0031614

- Pull out the slidable source holder (9) until the annular marking groove is visible. Turn the slidable source holder until you can see the axial marking line in the bore.

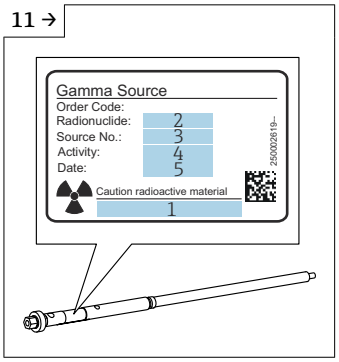
10 →



A0031620

- Turn the slidable source holder to unscrew it from the protection pipe (12)

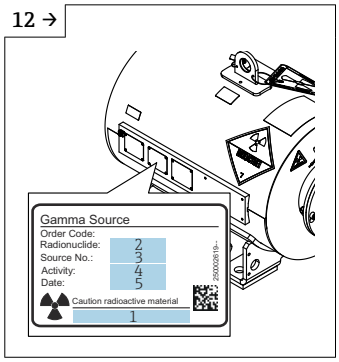
11 →



A0054226

- Attach the "Gamma Source" adhesive nameplate to the slidable source holder.

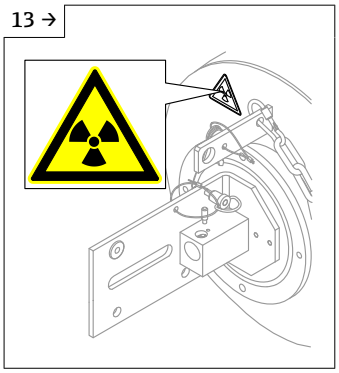
12 →



A0054227

- Attach the "Gamma Source" nameplate to the source on the source container.

13 →



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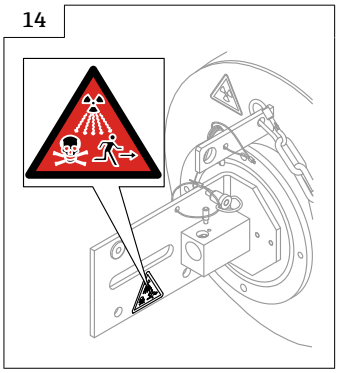
- Attach the "Caution radiation" adhesive label on the source container.

14



A0054951

- If necessary, attach the "Highly radioactive" adhesive label to the source container.

4.1.2 Loading the container

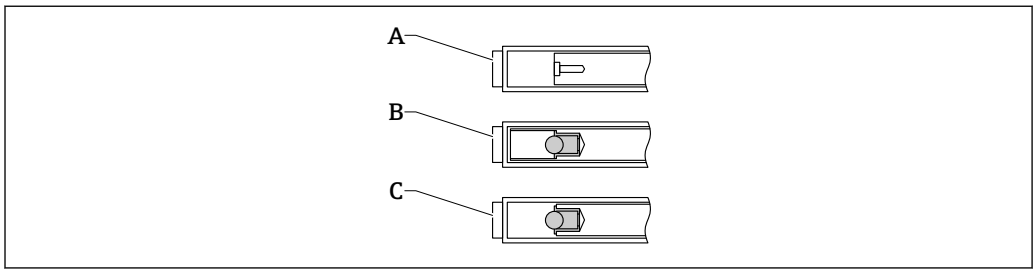
DANGER

Ionizing radiation is used as of the following step in the work process.

- Only authorized personnel involved in loading operations are permitted within the danger zone, provided they adhere to appropriate protective measures. The dimensions of the danger zone must be determined and cordoned off accordingly in accordance with the applicable national requirements (e.g. StrlSchV).

Mounting the capsule in the source holder-protection pipe combination

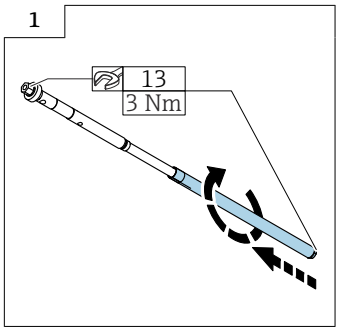
The source must be securely installed in the source holder or protection pipe.



A0054228

A Fix the capsule with thread in an appropriate device and turn the slidable source holder.
B Insert the cylindrical capsule (≤ Ø8.1 mm) into the upright slidable source holder (recess facing upwards) and then fit the protection pipe.
C Place the cylindrical capsule (≤ Ø8.2 to 12.9 mm) in the protection pipe and insert the slidable source holder.

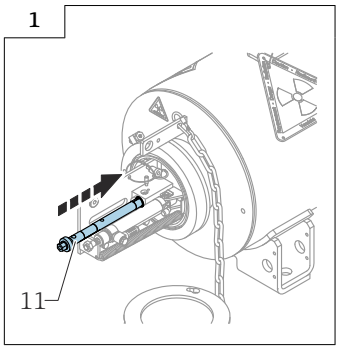
Screwing the source holder-protection pipe combination



A0054229

- Using a torque wrench (AF13) and open-ended wrench (AF13), tighten the source holder combination to 3 Nm.

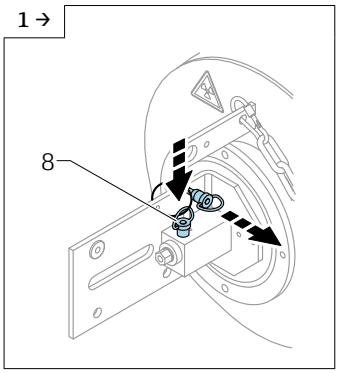
Inserting the source holder into the container



A0054193

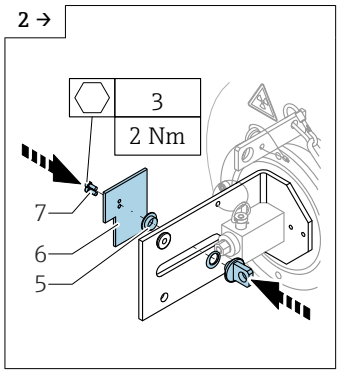
- Insert the complete slidable source holder (11) along with the protection pipe into the source container.

Securing the lock pin in the "OFF position"



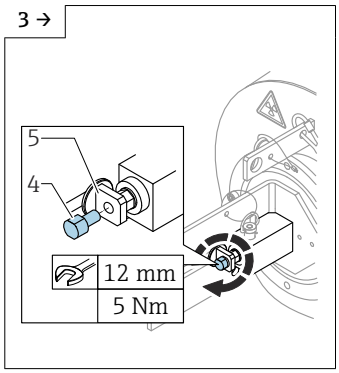
A0054194

- Remove the lock pin (8) from the parking position and insert it into the slidable source holder.
- Ensure that the slidable source holder is in the "AUS/OFF" switch position. It is then secured by means of the lock pin.



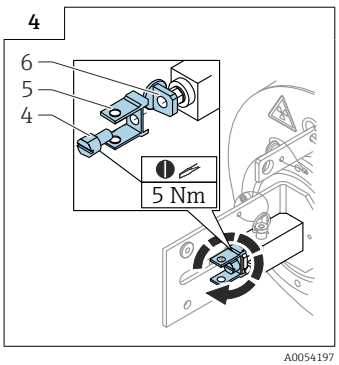
A0054195

- Tighten 2 x Allen screws (7) (AF3) to secure the cover plate (6) and the plain bearing bushing (5).



A0054196

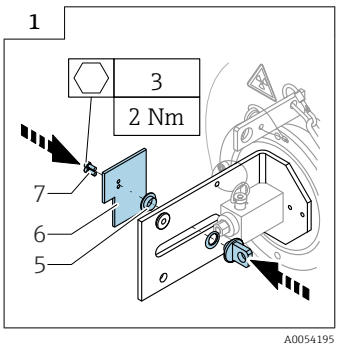
- Attach the spacer (5) and thrust washer.
- **Standard version:** Screw the thrust rod (4) (AF12) into the slidable source holder.
- Continue with "Check after loading".



A0054197

- **NRC version**
- Attach the safety bracket (5), spacer and thrust washer (6).
- Screw the thrust rod (4) (AF12) into the slidable source holder.
- Continue with "Check after loading".

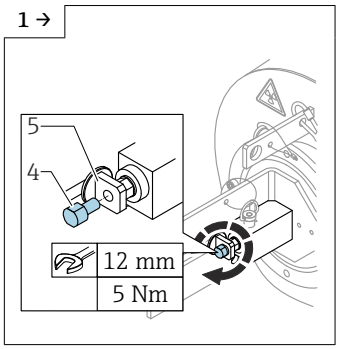
Fitting the mounted parts



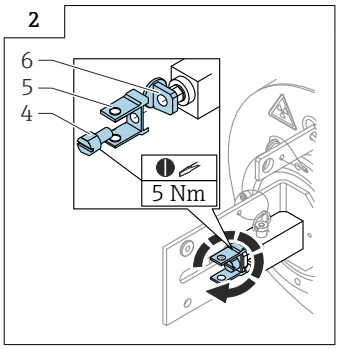
A0054195

- Tighten 2 x Allen screws (7) (AF3) to secure the cover plate (6) and the plain bearing bushing (5).

Mounting the thrust rod



- Attach the spacer (5) and thrust washer.
- **Standard version:** Screw the thrust rod (4) (AF12) into the slidable source holder.
- Continue with "Check after loading".

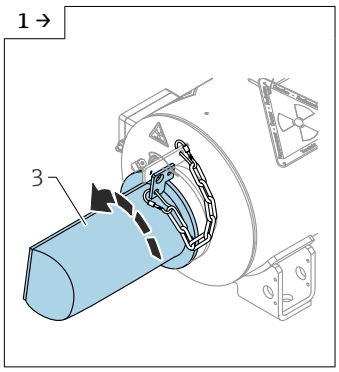


- **NRC version**
- Attach the safety bracket (5), spacer and thrust washer (6).
- Using a flat-blade screwdriver, screw the thrust rod (4) into the slidable source holder.
- Continue with "Check after loading".

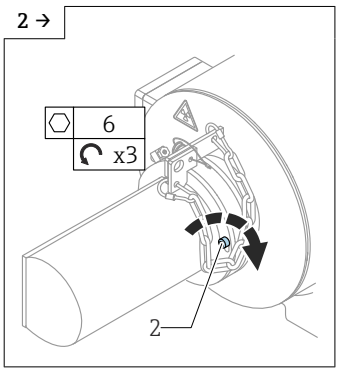
4.1.3 Check after loading the radiation source

Finally, the correct operation of the source container must be checked:
- Do the specifications on the nameplate of the source match the specifications on the source certificate?
- Is the ON/OFF indicator correctly installed?
- Are the locking bolt and the lock pin in the parking position?
- Can the slidable source holder be easily inserted into the ON/OFF position?
- Are the padlock and lock pin fully operational and undamaged?
  Replace the padlock and lock pin if they are damaged or not working correctly.
- Once the checks are completed, set the slidable source holder to the OFF position. Then move the lock pin out of the parking position and engage it in the OFF position. Check whether the O-ring is inserted and fit the cover. The lock pin in the OFF position protects the slidable source holder from being switched on. This action should only occur prior to transporting the source container. The padlock then secures the container against tampering and manipulation.
- The limit values that apply in your country must be checked and observed.
- If one or more criteria are not met, do not continue to use the source container. For more information, contact the Service Department at Endress+Hauser.

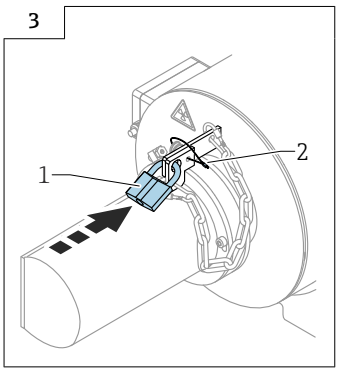
4.1.4 Fitting the cover



- Fit the cover (3) and turn it towards the left.



- Tighten the screws (2) (AF6) on the cover.

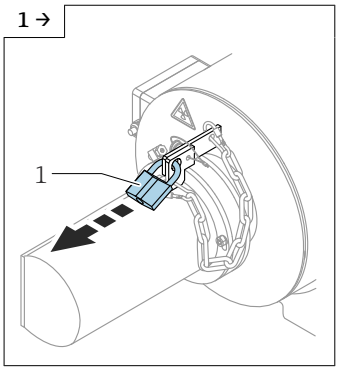


- Attach padlock (1) and sealing wire with seal (2).

4.2 Order code 020, option L (pneumatic drive)

4.2.1 Preparing the source container for loading

1 →



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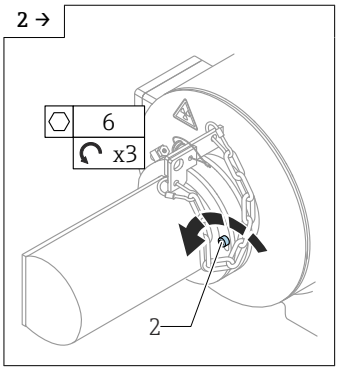
- Remove padlock (1).

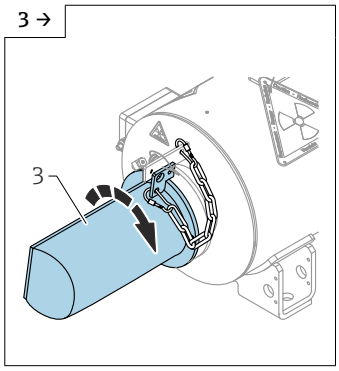
2 →



A0031849

- Using an Allen key, turn the screws (2) on the cover three times to release them.

3 →



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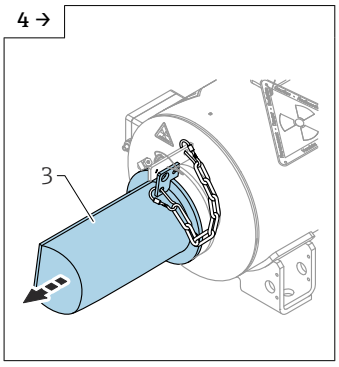
- Turn the cover (3) to the right.

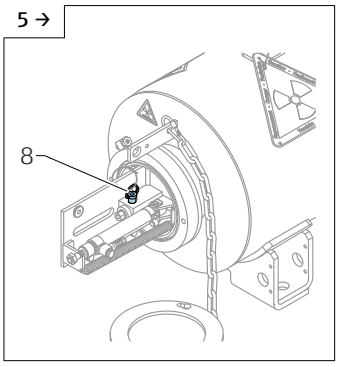
4 →



A0031851

- Remove the cover (3).

5 →



A0054598

- Check whether the lock pin (8) is inserted in the OFF position.

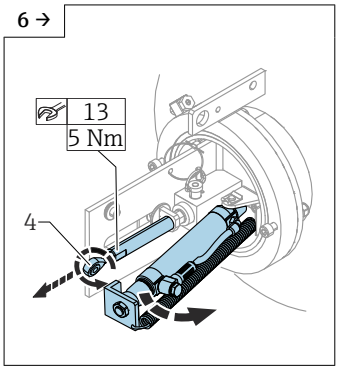
NOTICE

The clearance dimensions must never be changed!

The preset position of the source is no longer achieved.

- Do not release the hexagonal nut and swivel head screw from the thrust rod.

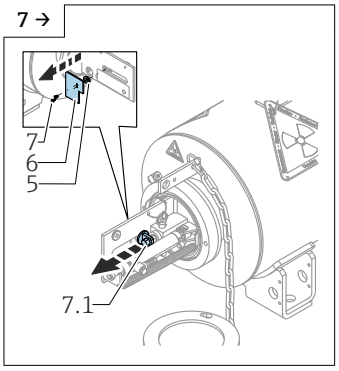
6 →



A0031873

- Unscrew the complete thrust rod (4) (AF13).

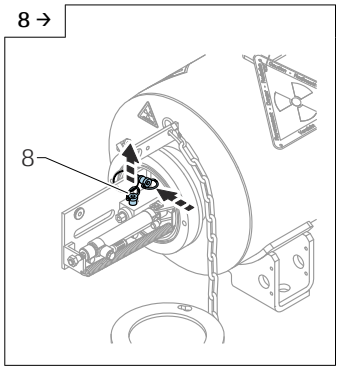
7 →



A0029304

- Release 2 x Allen screws (7) (AF3) to remove the cover plate (6) and the plain bearing bushing (5).
- Remove the spacer and thrust washer (7.1)

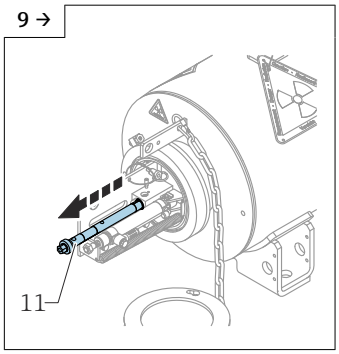
8 →



A0029305

- Move the lock pin (8) out of the "OFF" position and into the parking position.

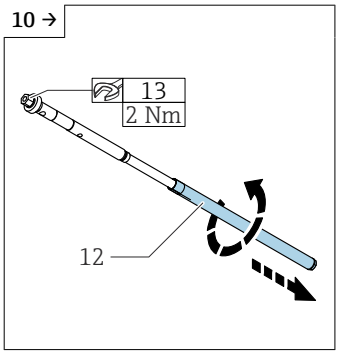
9 →



A0031866

▶ Pull the slidable source holder (11) from the source container.

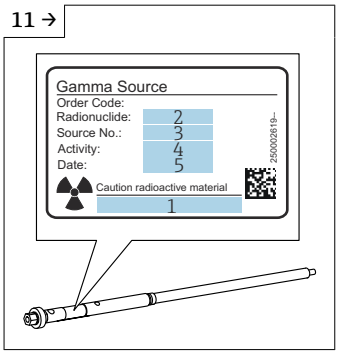
10 →



A0031620

▶ Turn the slidable source holder to unscrew it from the protection pipe (12).

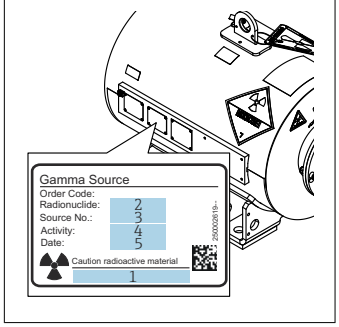
11 →



A0054226

▶ Attach the "Gamma Source" adhesive nameplate to the slidable source holder.

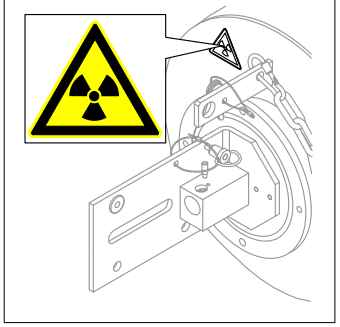
12 →



A0054227

▶ Attach the "Gamma Source" nameplate to the source on the source container.

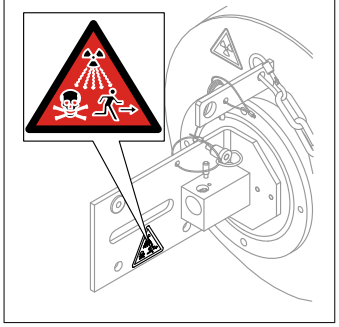
13 →



A0054950

▶ Attach the "Caution radiation" adhesive label on the source container.

14



A0054951

▶ If necessary, attach the "Highly radioactive" adhesive label to the source container.

4.2.2 Loading the container

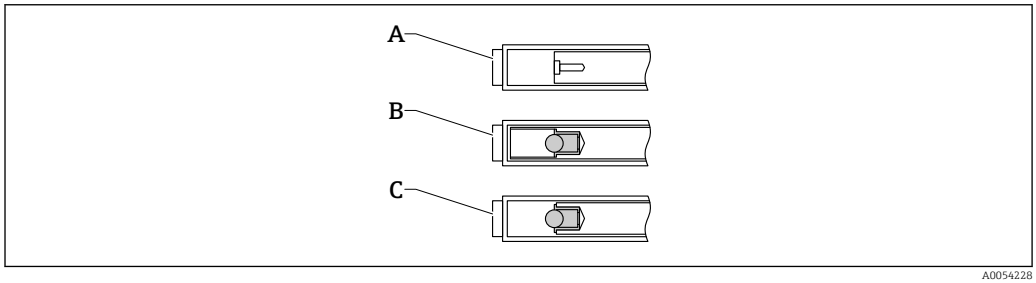
DANGER

Ionizing radiation is used as of the following step in the work process.

▶ Only authorized personnel involved in loading operations are permitted within the danger zone, provided they adhere to appropriate protective measures. The dimensions of the danger zone must be determined and cordoned off accordingly in accordance with the applicable national requirements (e.g. StrlSchV).

Mounting the capsule in the source holder-protection pipe combination

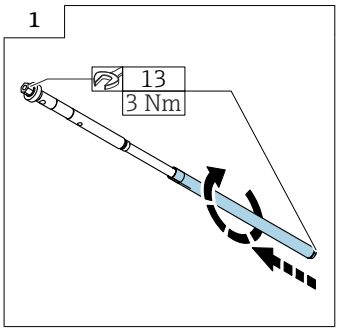
The source must be securely installed in the source holder or protection pipe.



A0054228

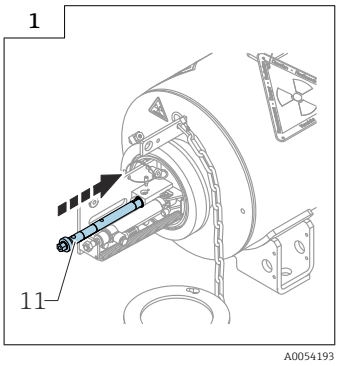
A Fix the capsule with thread in an appropriate device and turn the slidable source holder.
B Insert the cylindrical capsule (≤ Ø8.1 mm) into the upright slidable source holder (recess facing upwards) and then fit the protection pipe.
C Place the cylindrical capsule (≤ Ø8.2 to 12.9 mm) in the protection pipe and insert the slidable source holder.

Screwing the source holder-protection pipe combination



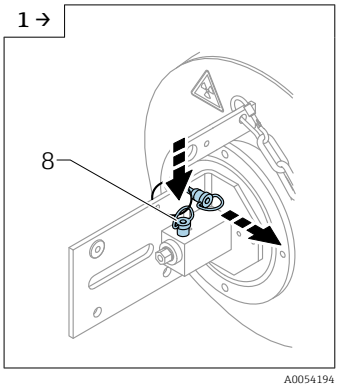
- Using a torque wrench (AF13) and open-ended wrench (AF13), tighten the source holder combination to 3 Nm.

Inserting the source holder into the container

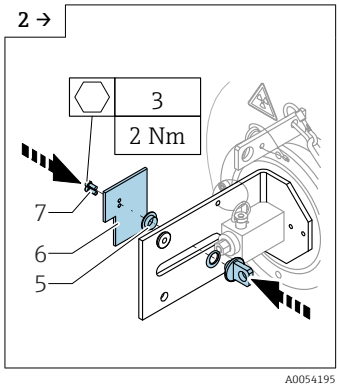


- Insert the complete slidable source holder (11) along with the protection pipe into the source container.

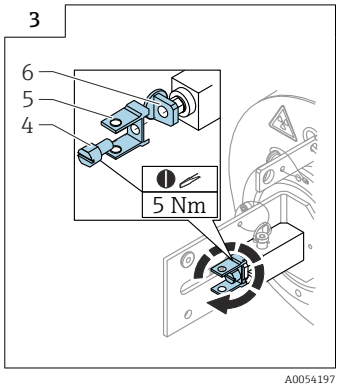
Securing the lock pin in the "OFF position"



- Remove the lock pin (8) from the parking position and insert it into the slidable source holder.
- Ensure that the slidable source holder is in the "AUS/OFF" switch position. It is then secured by means of the lock pin.

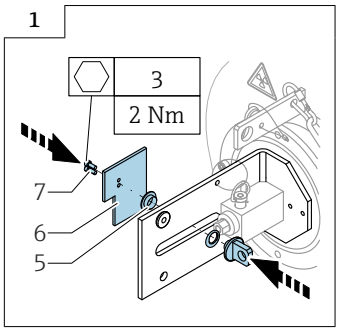


- Tighten 2 x Allen screws (7) (AF3) to secure the cover plate (6) and the plain bearing bushing (5).



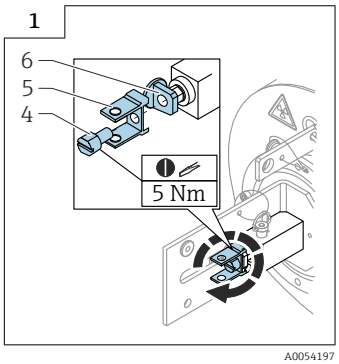
- **NRC version**
- Attach the safety bracket (5), spacer and thrust washer (6).
- Screw the thrust rod (4) (AF12) into the slidable source holder.
- Continue with "Check after loading".

Fitting the mounted parts



- Assemble the spacer, thrust washer, and plain bearing bush (5) together. Fasten the cover plate (6) with 2 x Allen screws (7) (AF3).
- The Allen screws must be secured with **LOCTITE® 243** and tightened with a torque of 2 Nm.

Mounting the thrust rod



- **NRC version**
- Secure the thrust rod (4) (AF12) with **LOCTITE® 243** and tighten with a torque of 5 Nm.
- The Allen screw must be secured with **LOCTITE® 243** and tightened with a torque of 5 Nm.
- Continue with "Check after loading".

4.2.3 Check after loading the radiation source

Finally, the correct operation of the source container must be checked:
- Is the drive properly secured?
- Are the padlock and lock pin fully operational and undamaged?
  Replace the padlock and lock pin if they are damaged or not working correctly.
- Do the specifications on the source nameplate match the specifications on the source certificate?
- Is the ON/OFF indicator correctly installed?
- Are the locking bolt and the lock pin in the parking position?

⚠ CAUTION

Risk of injury!

- ▶ Observe the operating data and safety instructions.

Once the checks have been completed, the operational reliability must be checked:

To do this, switch on and off the compressed air (switching pressure is from 5.5 to 7 bar) while checking the movement of the slidable source holder.

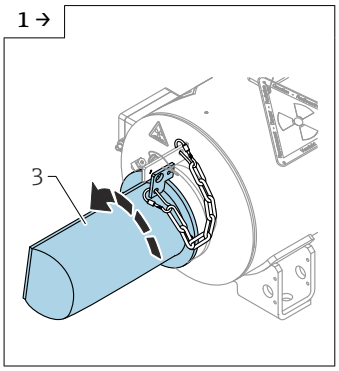
⚠ DANGER

Ionizing radiation

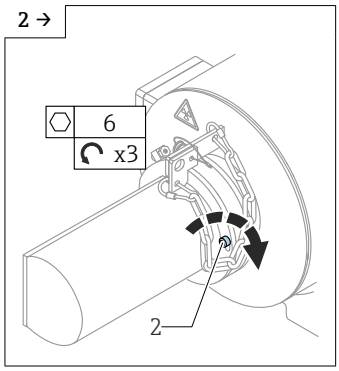
- ▶ Only authorized personnel involved in loading operations are permitted within the danger zone, provided they adhere to appropriate protective measures. The dimensions of the danger zone must be determined and cordoned off accordingly in accordance with the applicable national requirements (e.g. StrlSchV).

- Once the checks are completed, set the slidable source holder to the OFF position, move the lock pin out of the parking position and engage it in the OFF position. Then fit the cover. The lock pin in the OFF position protects the slidable source holder from being switched on. This action should only occur prior to transporting the source container. The padlock then secures the container against tampering and manipulation.
- The limit values that apply in your country must be checked and observed.
- If one or more criteria are not met, do not continue to use the source container. For more information, contact the Service Department at Endress+Hauser.

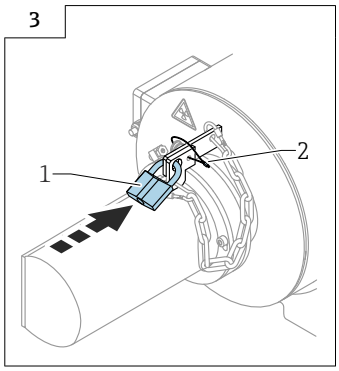
4.2.4 Fitting the cover



▶ Fit the cover (3) and turn it towards the left.



▶ Using an Allen key, tighten the screws (2) on the cover.



▶ Attach padlock (1) and sealing wire with seal (2).

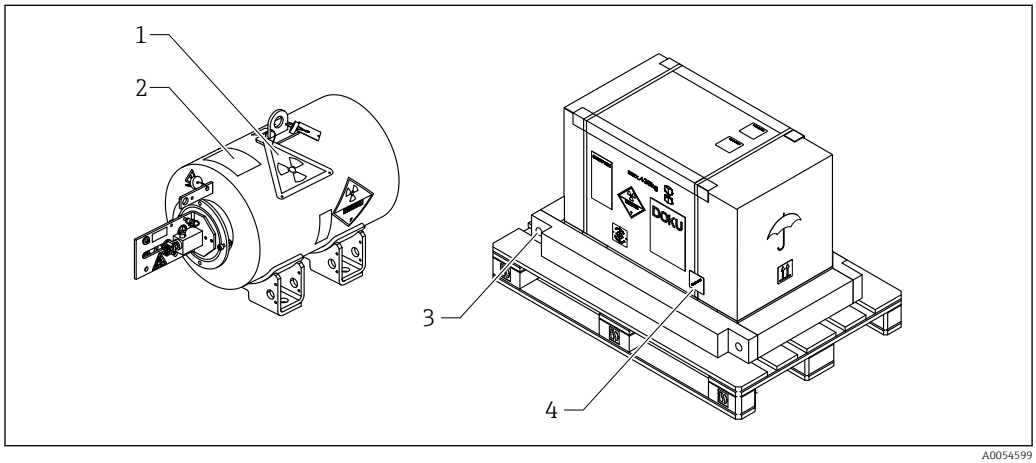
5 Packaging and dispatch

The source container must be packed again after loading and inspection. Use the outer packaging in which the source container was delivered.

NOTICE

Violation of the Dangerous Goods Directive

▶ Attach the labeling required for shipping as "Type A hazardous goods packaging".



1 Warning sign, stainless steel "Caution - Radioactive Material"
2 Sign "UN3332 Type A"
3 Hexagonal-headed bolts of the pallet frame
4 Security seal

- The two hexagonal-headed bolts of the pallet frame must be tightened with a torque of 25 Nm.
- The security seal must be affixed over one of the tensioning bands.

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