

Special Documentation **Collimator (sensor side) for Gammapiilot FMG50**

Collimator (sensor side) for Gammapiilot FMG50



1 About this document

1.1 Document function

This document describes the operating principle, structure and installation of the collimator for the Gammapiilot FMG50.

1.2 Symbols

1.2.1 Safety symbols

CAUTION

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

DANGER

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

NOTICE

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

WARNING

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

1.2.2 Symbols for certain types of Information

Permitted

Procedures, processes or actions that are permitted

Forbidden

Procedures, processes or actions that are forbidden



This symbol indicates additional information



This symbol indicates a reference to documentation



Notice or individual step to be observed

Series of steps



Result of a step

Indicates item numbers

A, B, C, ...

Indicates views

2 Basic safety instructions

2.1 Requirements for the personnel

Personnel involved in installation, commissioning, diagnostics, maintenance and disassembly must meet the following requirements:

- ▶ Trained, qualified specialists must have a relevant qualification for this specific function and task.
- ▶ Are authorized by the plant owner/operator
- ▶ Are familiar with federal/national regulations
- ▶ Before starting work, read and understand the instructions in the manual and supplementary documentation as well as the certificates (depending on the application)
- ▶ Follow instructions and comply with basic conditions

The operating personnel must satisfy the following requirements:

- ▶ Operating personnel are instructed and authorized according to the requirements of the task by the facility's owner-operator
- ▶ Follow the instructions in this manual

2.2 Intended use

The collimator can be used to increase measuring accuracy.

The collimator reduces interference radiation (e.g. from gammagraphy or scattered radiation) and background radiation at the detector. It only allows gamma radiation coming from the direction of the useful beam source to pass to the Gammapiot FMG50 detector and reliably shields interference radiation from the environment. The collimator consists of a lead jacket that effectively shields the radiation-sensitive measuring range of the Gammapiot FMG50. The lead jacket has a side opening and is suitable for the lateral radiation of the Gammapiot FMG50 with the 2" NaI(Tl) scintillator.



Please contact an Endress+Hauser sales organization for applications with frontal radiation or other scintillator versions.

2.3 Radiation protection



Radiation protection

- ▶ The source container must be in the "OFF" position and secured in this position by a lock.

2.4 Workplace safety

For work on and with the device:

- ▶ Wear the required personal protective equipment according to federal/national regulations.

2.5 Safety instructions

WARNING

Heavy components and devices

- ▶ The use of hoists is recommended
- ▶ Comply with national occupational safety and health regulations

Note the following when mounting the device:

- The mounting device must be installed in such a way as to withstand the weight of the Gammapiot FMG50 and the collimator under all anticipated operating conditions (e.g. vibrations).
- If the eye bolts are used, it is essential to comply with the corresponding mounting instructions/instruction manual. The mounting instructions are provided with the delivery. The latest version of the mounting instructions/instruction manual can be downloaded from the manufacturer of the eye bolts.



Manufacturer and type of eye bolt used: RUD STARPOINT VRS-M8

<https://www.rud.com/en/products/sling-lashing-systems/rud-sling-systems/lifting-points/detail/vrs-starpoint-metric-thread.html>

WARNING

Risk of injury from climbing on the mounting clamps, collimator or measuring device

- ▶ The collimator can become detached from the mounting device or be damaged
- ▶ The measuring device can become detached from the collimator or be damaged
- ▶ **Do not climb on the mounting clamps or measuring device!**

WARNING

Risk of injury from loose parts if the wrong torque is applied

- ▶ The collimator can become detached from the mounting clamps
- ▶ The measuring device can become detached from the collimator
- ▶ **Tighten the screws with the necessary torque**

NOTICE

Risk of damaging the measuring device if the wrong torque is applied

- ▶ Tighten the screws with the necessary torque

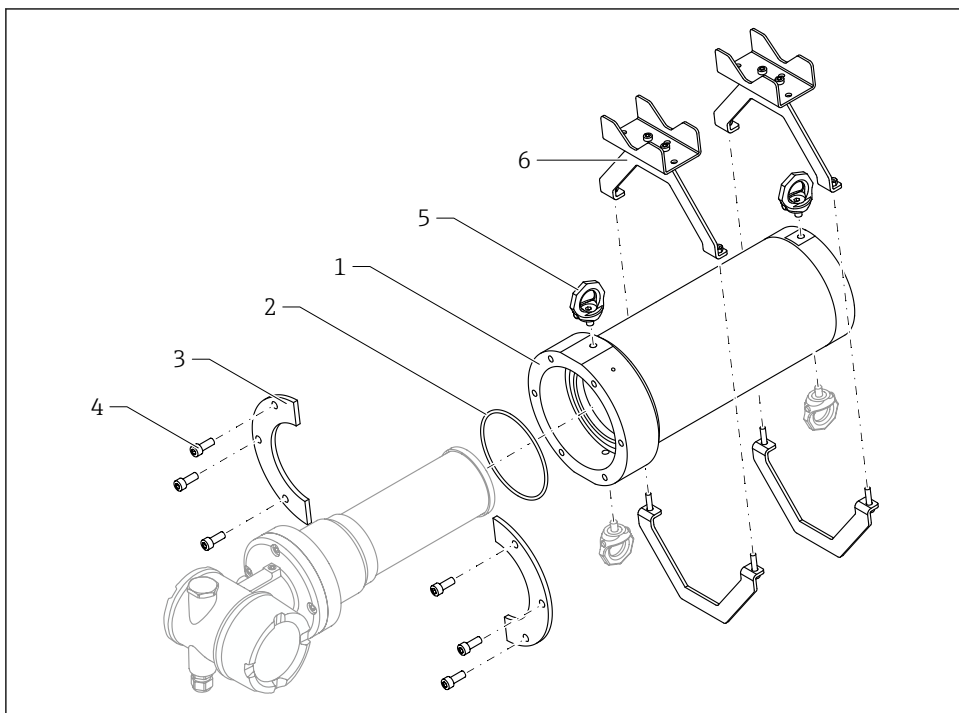
CAUTION

This device contains more than 0.1% lead with CAS no. 7439-92-1.

- ▶ If the collimator is damaged, national regulations surrounding the handling of lead must be observed
- ▶ When the Gammapiot FMG50 is mounted, the lead is not accessible
- ▶ Comply with national regulations governing the disposal of lead

3 Components

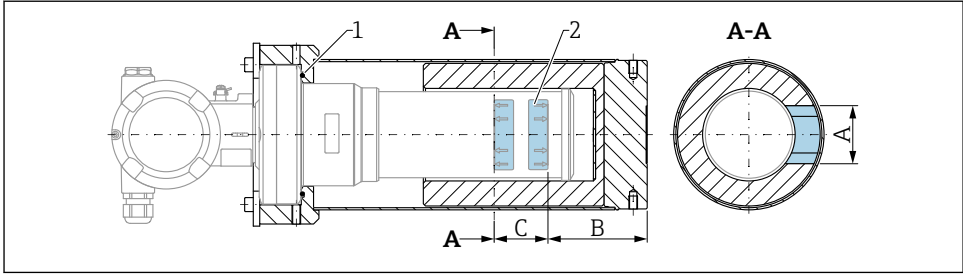
3.1 Collimator



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1 Exploded drawing

- 1 Collimator housing
- 2 Sealing ring
- 3 2 x retaining plates to secure the GammapiLOT FMG50 in the collimator
- 4 6 Allen screws
- 5 2 RUD STARPOINT VRS-M8 eye bolts (enclosed for mounting)
- 6 2 mounting clamps (the complete mounting clamp is illustrated in Section 3.2)



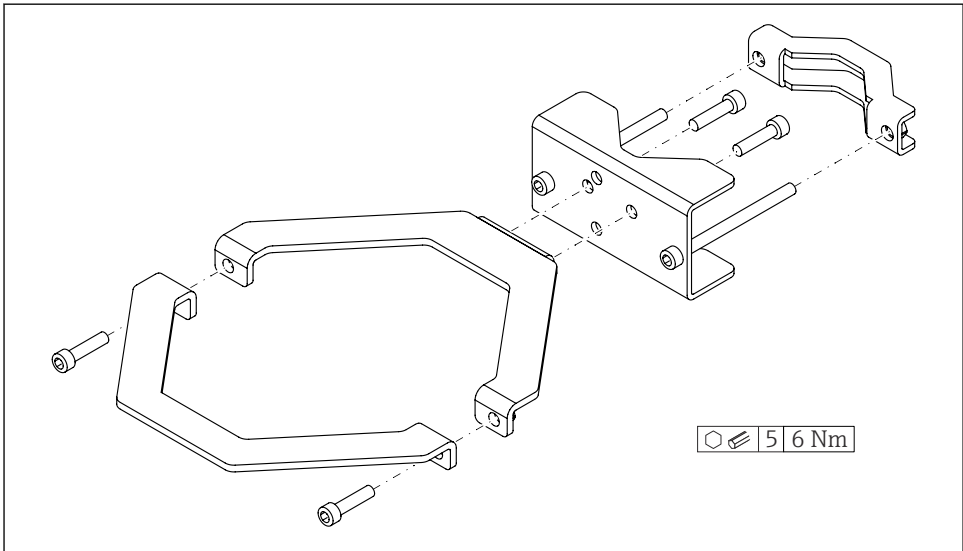
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2 Cross section

- A Lateral collimator opening 54 mm (2.13 in)
- B Distance 92.4 mm (3.64 in)
- C Measuring range length 50 mm (2 in)
- 1 O-ring to seal the collimator from environmental influences
- 2 Measuring range marks

3.2 Mounting clamp

The mounting clamps are designed for a pipe diameter of $\varnothing$ 40 to 65 mm (1.57 to 2.36 in).

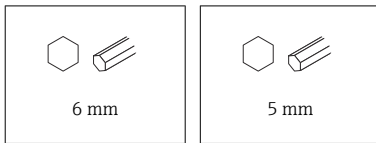


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3 Mounting clamp

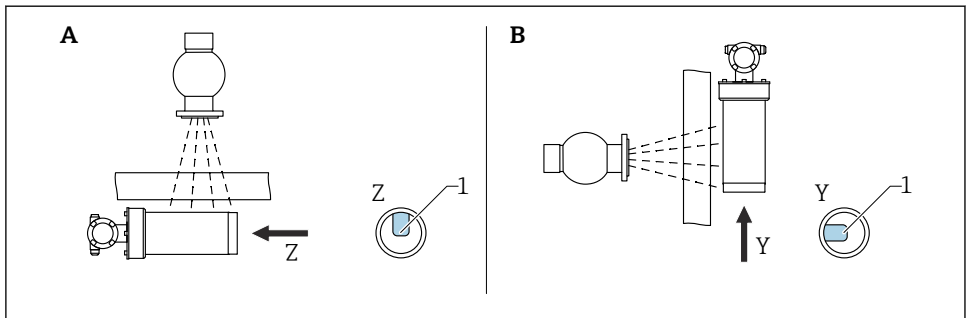
- A 2 mounting clamps $\varnothing$ 140 mm (5.5 in)

4 Tools list



5 Mounting

5.1 Alignment of the collimator to the radiation source



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4 Alignment of the opening of the collimator

- A Horizontal alignment
 B Vertical alignment
 1 Marking in the collimator floor

NOTICE

The collimator has a slot-like opening that must be aligned in the direction of the useful radiation source.

Check again after mounting

- ▶ The opening is visible from outside on the basis of the marking in the collimator floor

5.2 General installation instructions

NOTICE

At least two people are required for the installation

- ▶ Pay attention to the mounting position of the GammapiLOT FMG50

NOTICE

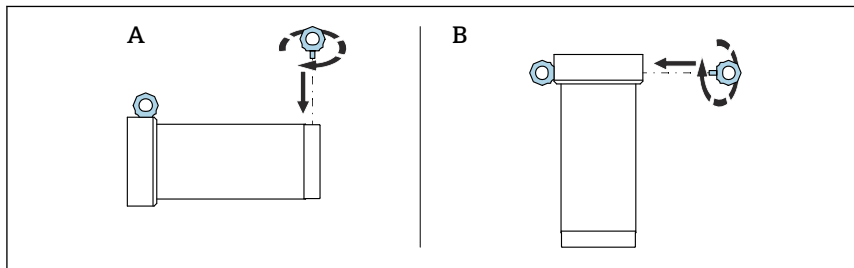
Risk of damaging the measuring device if the wrong torque is applied.

- Tighten the screws with the necessary torque.

1. Attaching the eye bolts

↳ **NOTE**

The eye bolts can collide with the holder during mounting. They may need to be removed before the mounting clamps are finally fastened.



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5 Eye bolts

A Horizontal alignment

B Vertical alignment

The eye bolts must be used according to the mounting position. If the eye bolts are used, it is essential to comply with the enclosed manufacturer's documentation.

2.

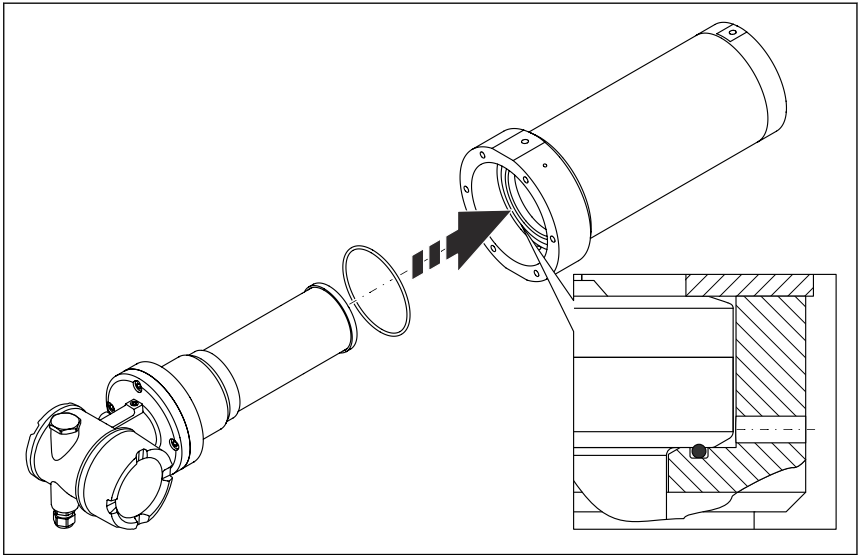
CAUTION**Risk of injury from handling heavy parts!**

- ▶ Use safety gloves
- ▶ Fingers or hands can be pinched or crushed
- ▶ Carefully insert the device into the collimator

Insert device into collimator

↳ **NOTE**

The O-ring prevents water from entering the collimator. If the O-ring is mounted incorrectly, this can affect the measurement accuracy, as stagnant water additionally attenuates the radiation and consequently influences the measuring signal.



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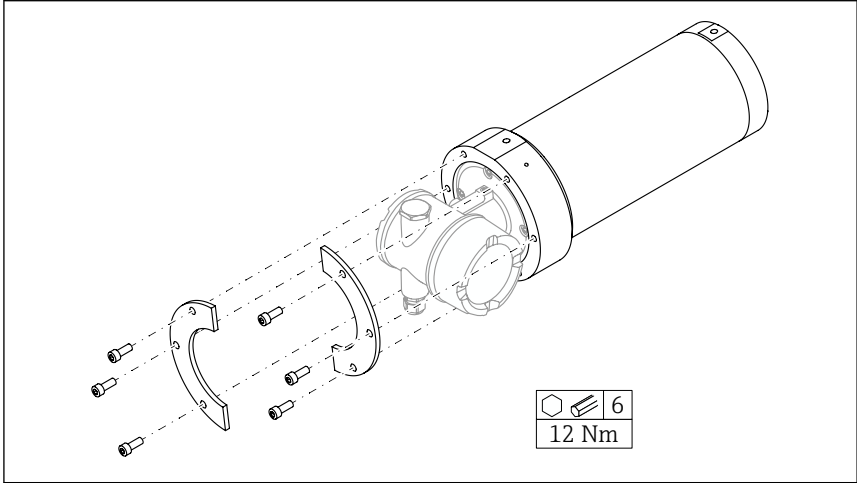
6 The device is inserted into the collimator

The GammapiLOT FMG50 can be installed in the collimator before mounting at the measuring point.

Alternatively, the device can also be installed at the measuring point.

When mounting, make sure the O-ring with the sealing effect is mounted correctly.

3. Screw the device to the collimator



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7 Fixed in place with retaining plates

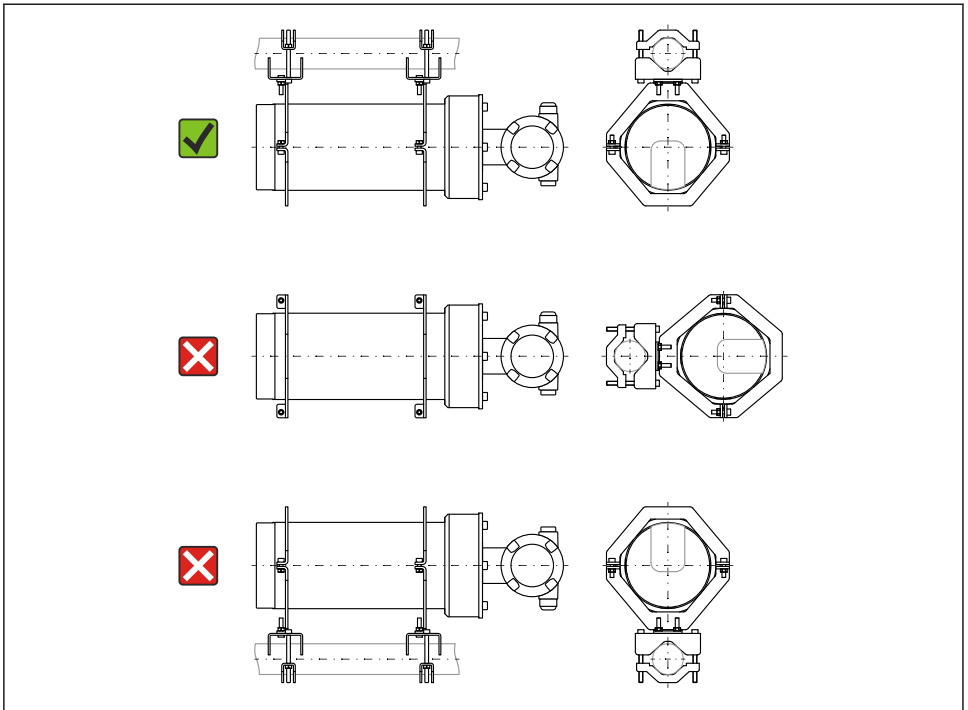
Two retaining plates fix the Gammapiilot FMG50 in place in the collimator. Each retaining plate is screwed tight with three screws tightened with the necessary torque.

5.3 Mounting with Gammapiilot FMG50 aligned horizontally

WARNING

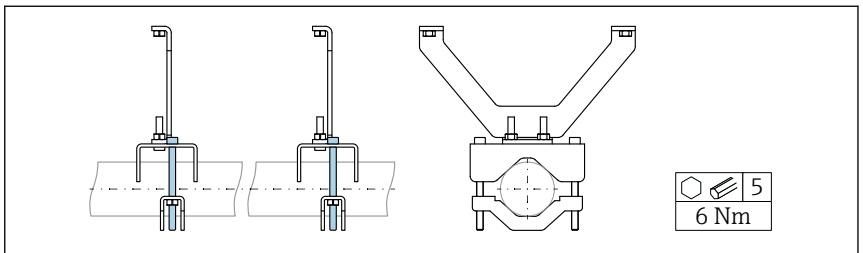
Risk of injury if heavy parts slip!

► Mount the collimator with the device below the pipe only.



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1. Mount the mounting clamps on the pipe
↳ Tighten the screws with the necessary torque.



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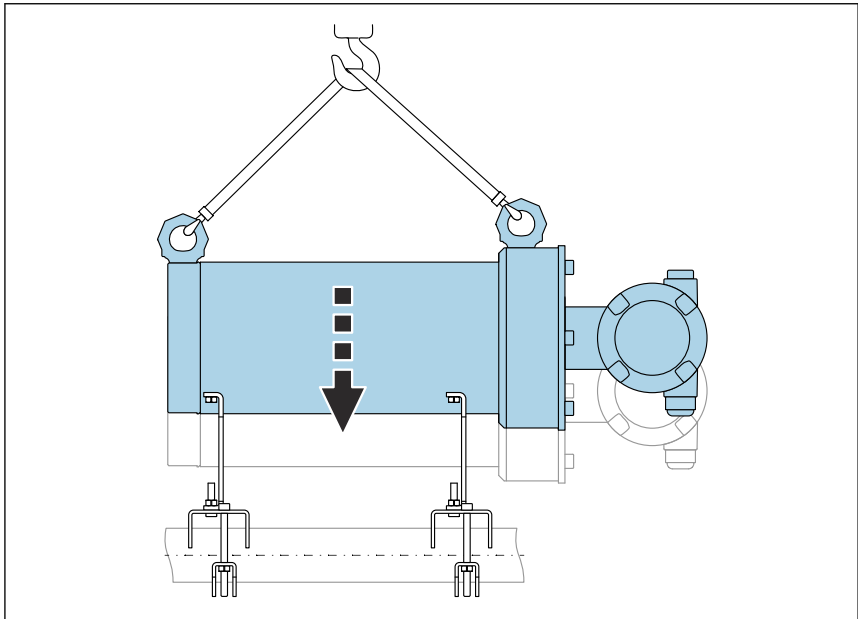
2. ⚠ CAUTION**Risk of injury from handling heavy parts!**

- Observe the general safety regulations.

Lifting at the mounting location

↳ NOTE

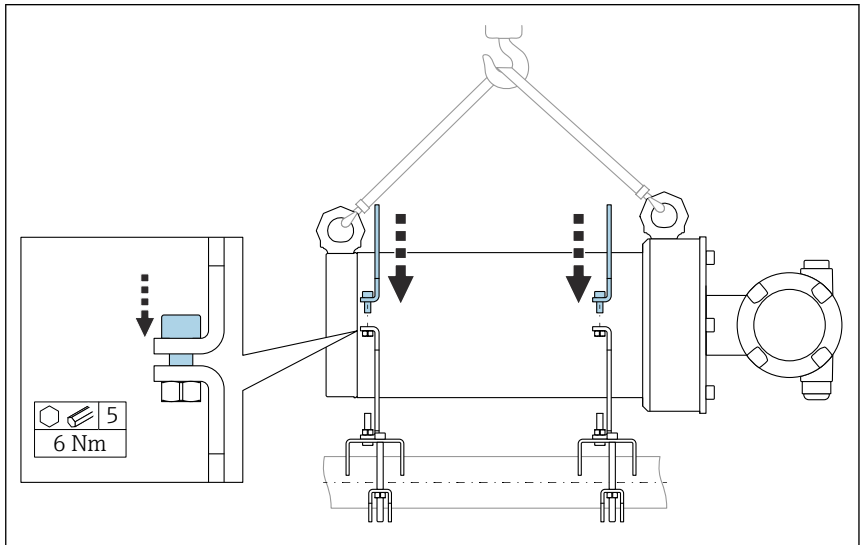
In this device position, the collimator opening must face away from the assigned radiation source so that the collimator opening is aligned with the assigned radiation source when the collimator is in the end position.



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3. Mounting at the measuring point

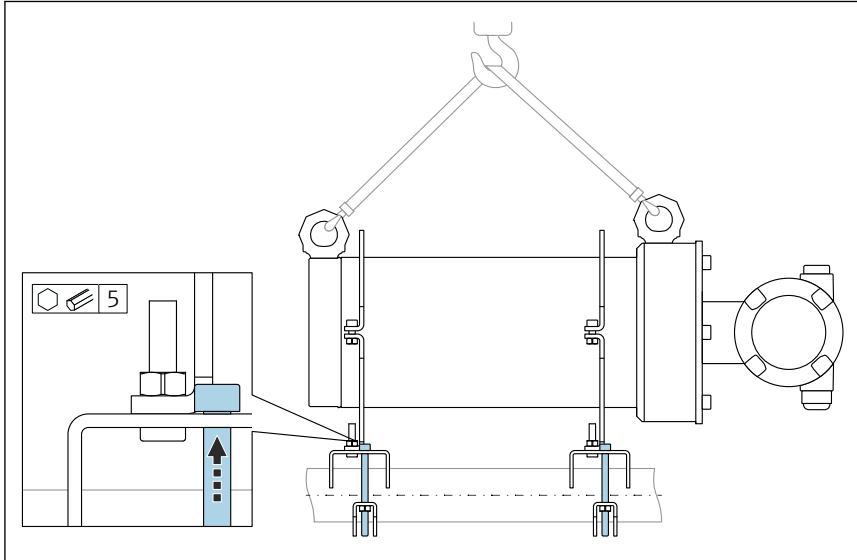
- Tighten the screws of the mounting clamps on the collimator with the necessary torque.



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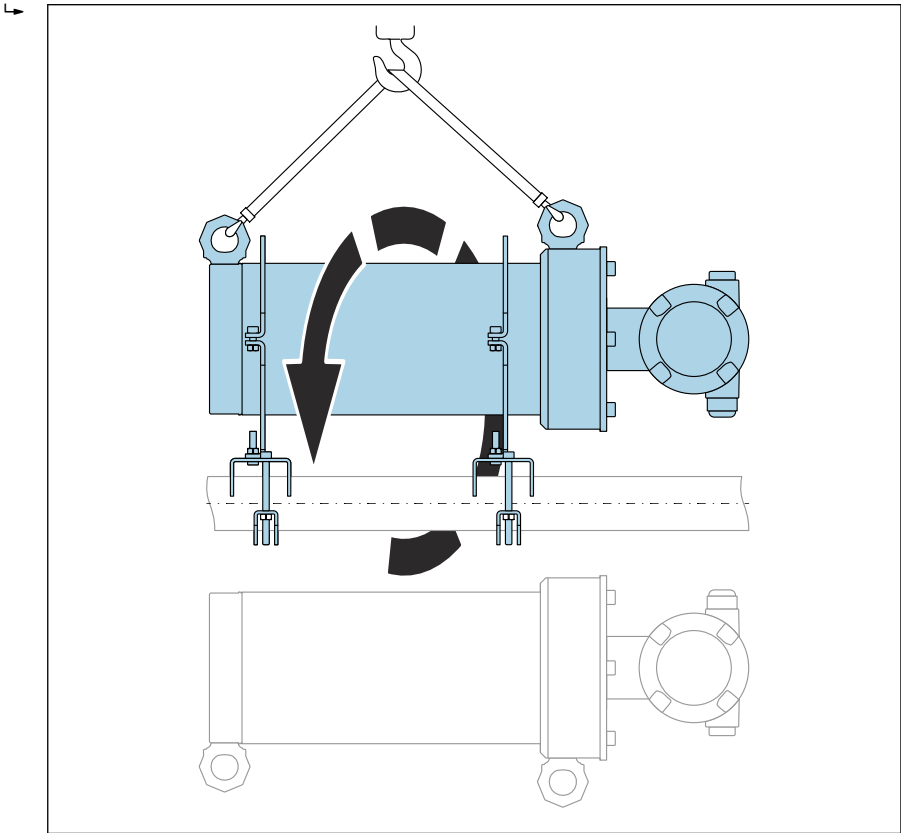
4. Loosen the screws on the pipe slightly

- ↳ Loosen the screws on the pipe slightly again so that the collimator, along with the device, can slide downwards. Pay attention to interference from any fittings. The slings must remain on the eye bolts for safety reasons.



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5. Turn the collimator with the device downwards



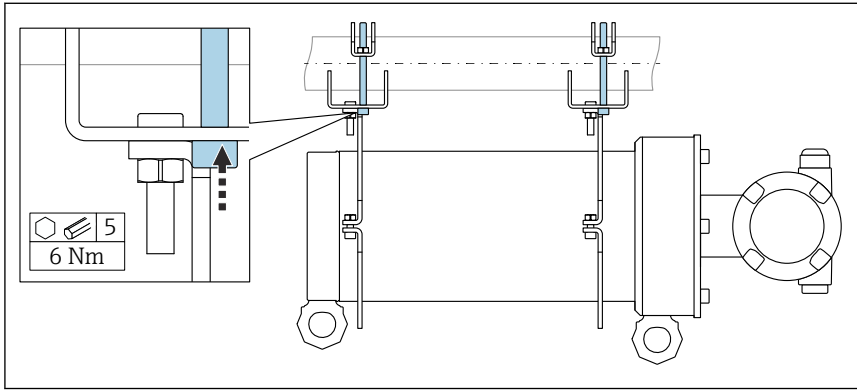
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6. Tighten the screws of the mounting clamps on the pipe with the necessary torque.

↳ The collimator with the device must be in the lowest possible position.

NOTE

When the collimator is in the end position, the collimator opening must be aligned with the assigned radiation source.

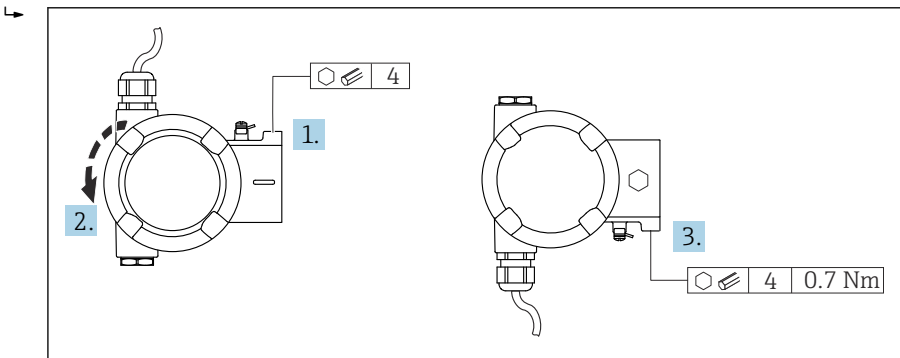


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5.3.1 Turning the housing

The housing can be turned to align the display or the cable glands

1. Loosen the locking screw by 0.5 to 1.5 turns (**max.**)
2. Turning the housing
3. Tighten the locking screw with 0.7 Nm (0.52 lbf ft)



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i Depending on the application, the cable gland may have to point downwards. The cable gland and dummy plug can be swapped for this purpose.

Tighten the cable gland with maximum 3.75 Nm (2.77 lbf ft).

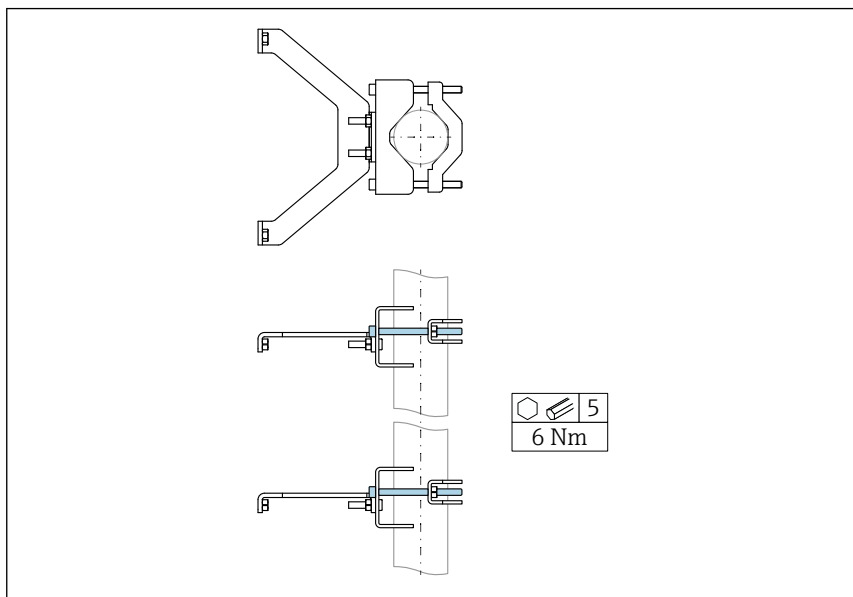
5.4 Mounting with Gammapiilot FMG50 aligned vertically

⚠ WARNING

Risk of collimator falling if mounting orientation incorrect

- ▶ Mount the collimator with the connection compartment towards the top. The collimator is safeguarded against falling in this installation position.
- ▶ If it is necessary to mount the device with the connection compartment pointing downwards, suitable measures must be taken by the customer onsite to prevent the collimator from falling.

1. Mount the mounting clamps on the pipe
 - ↳ Tighten the screws with the necessary torque.

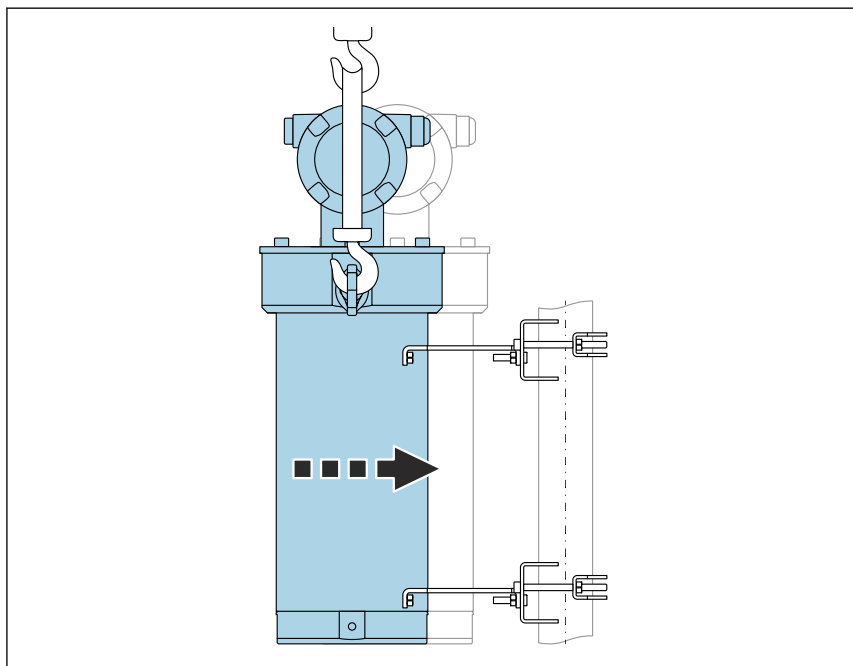


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2. ⚠ CAUTION**Risk of injury from handling heavy parts!**

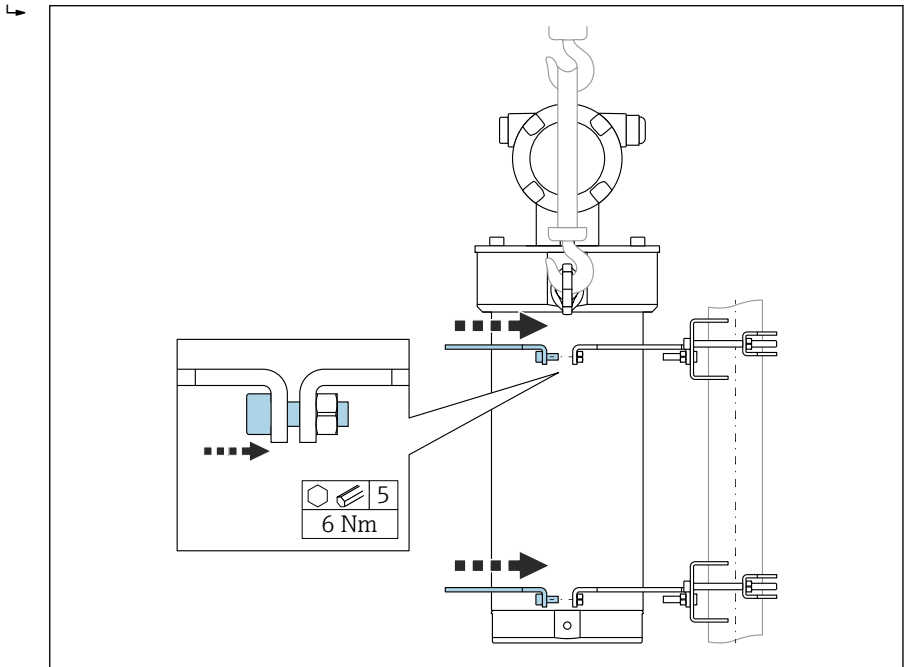
- Observe the general safety regulations.

Lifting at the mounting location



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3. Tighten the screws of the mounting clamps with the necessary torque.



6 Mechanical construction

6.1 Weight

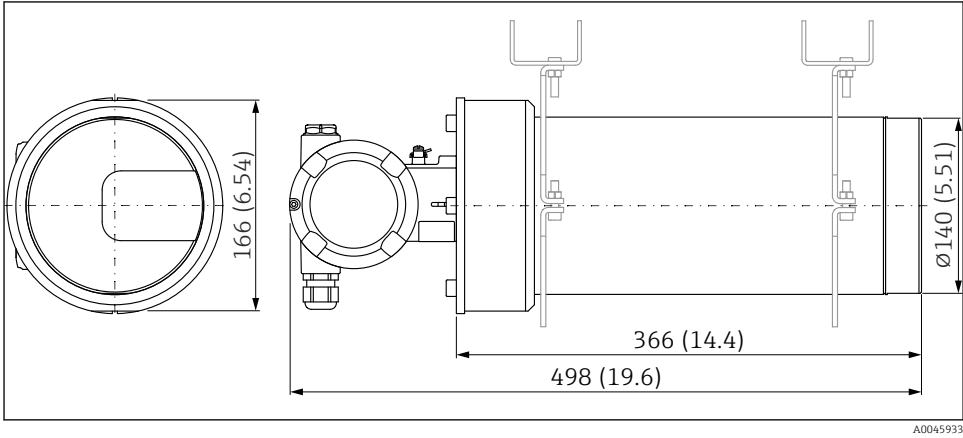
- **Total weight of collimator** (excluding mounted parts and excluding FMG50): 25.5 kg (56.2 lb)
- **Weight per mounting clamp:** 0.85 kg (1.87 lb)



The additional weight for small parts is: 1 kg (2.20 lb)

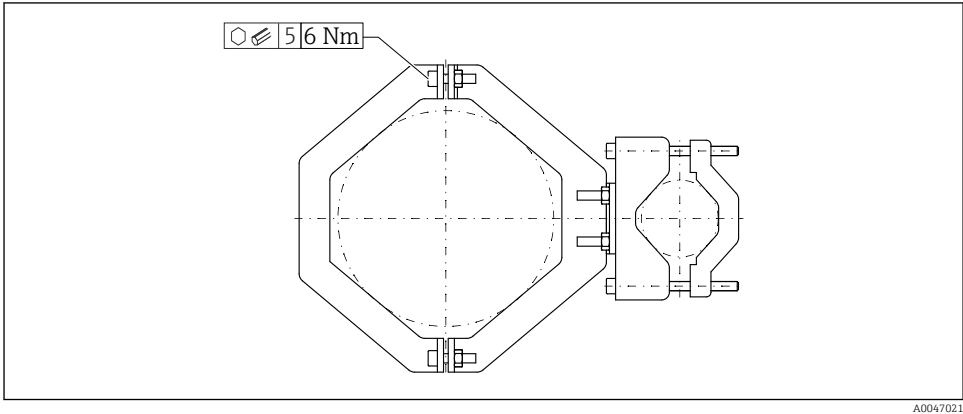
6.2 Dimensions

6.2.1 Dimensions of collimator



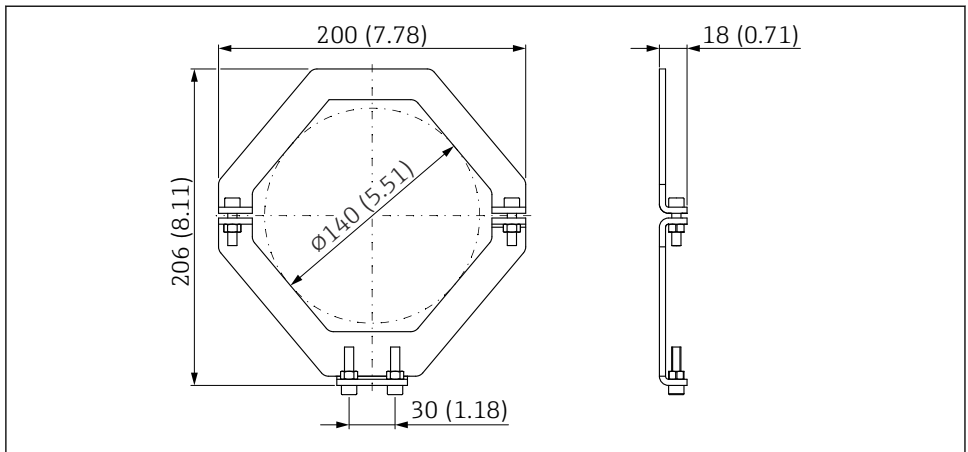
8 Dimensions of Gammapiot FMG50 with collimator

6.2.2 Dimensions of mounting clamp



9 Overview of mounting clamp

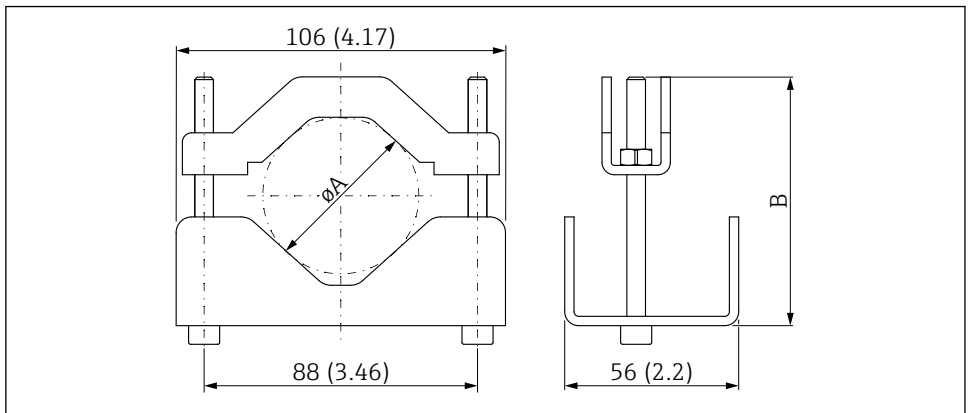
i Tighten the screws with the necessary torque.



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10 Dimensions of mounting clamp (on collimator side)

6.2.3 Dimensions of mounting clamp (on pipe side)



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$\varnothing A$ 40 to 65 mm (1.57 to 2.56 in)

B 80 to 101 mm (3.15 to 3.98 in)

6.3 Materials



This device contains more than 0.1% lead with CAS no. 7439-92-1

Comply with national regulations governing the handling and disposal of lead.

- Collimator housing, retaining plates and mounting clamps: **316L**
 - Connection elements: **A4-70**
 - Collimator seal: **FKM**
 - Collimator: **min. Pb 99.9%**
 - Eye bolts STARPOINT VRS-F-M8 (can be unscrewed, turned): **1.6541**
-  Materials for the Gammapiilot FMG50, see Technical Information (TI01462F)



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