

ROBOT

KR 30-3

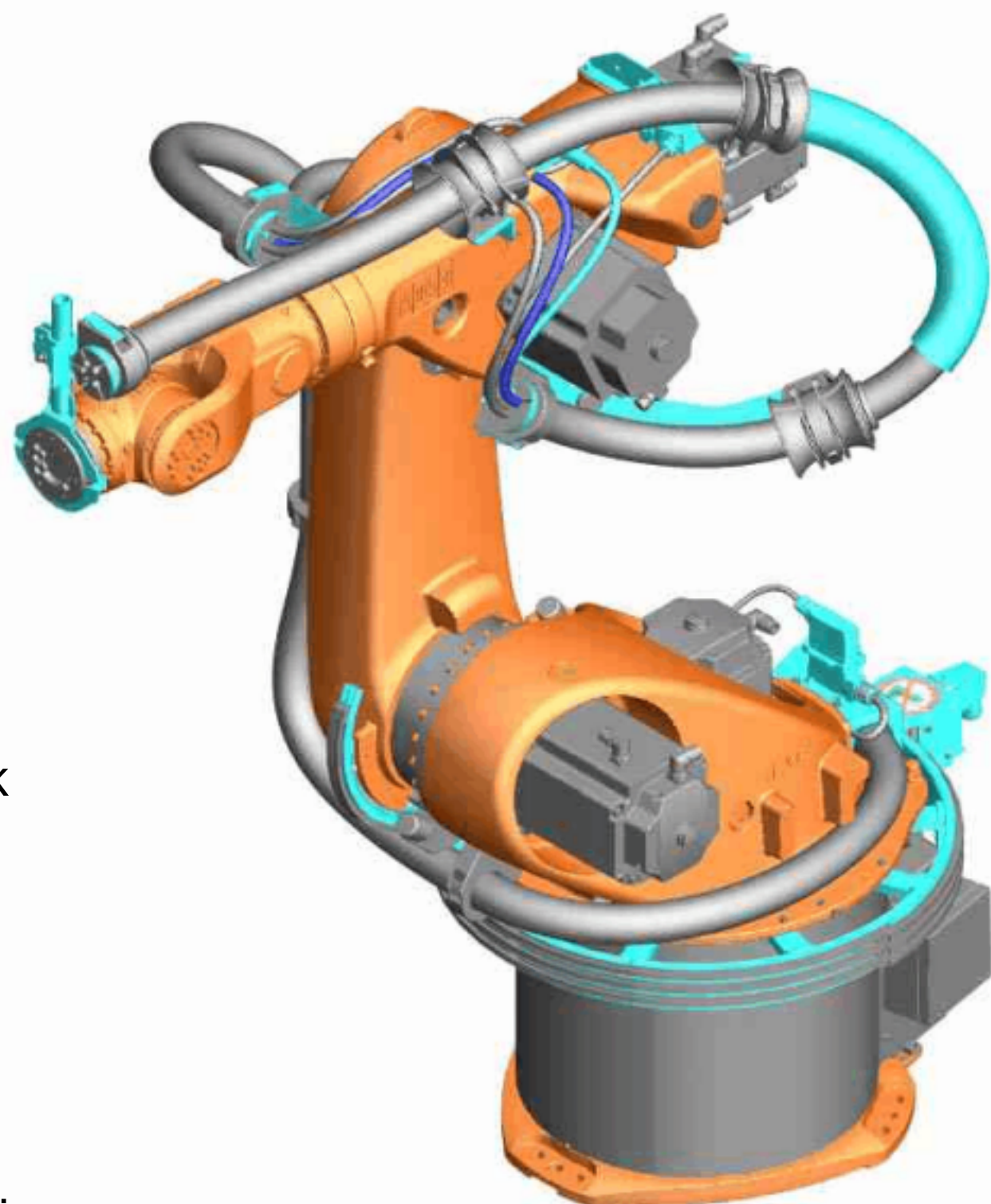
KR 60-3

KR 30 HA

KR 60 HA

Seminar workbook
of

Mechanical Servicing



Issued: September 2005



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We have checked the content of this documentation for conformity with the hardware and software described. Nevertheless, discrepancies cannot be precluded, for which reason we are not able to guarantee total conformity. The information in this documentation is checked on a regular basis, however, and necessary corrections will be incorporated in subsequent editions.

Subject to technical alterations without an effect on the function.

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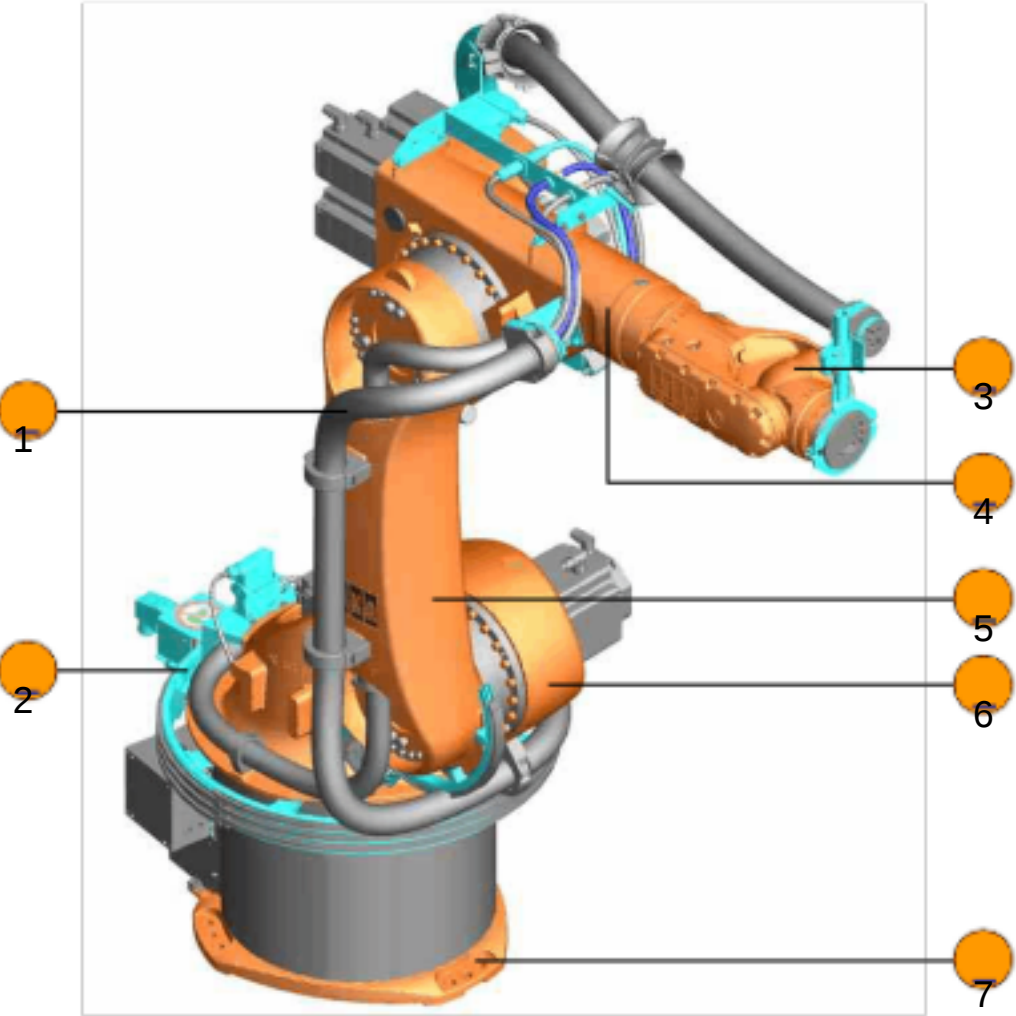


1. Overview Robot





Mechanical servicing, KR 30-3



- 1 Energy supply system
- 2 Axis range monitoring
- 3 Wrist
- 4 Arm
- 5 Link arm
- 6 Rotating column
- 7 Base frame

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2. Disassembly

2.1. Wrist

Wrist disassembly



Use the appropriate equipment to ensure that the wrist does not fall!

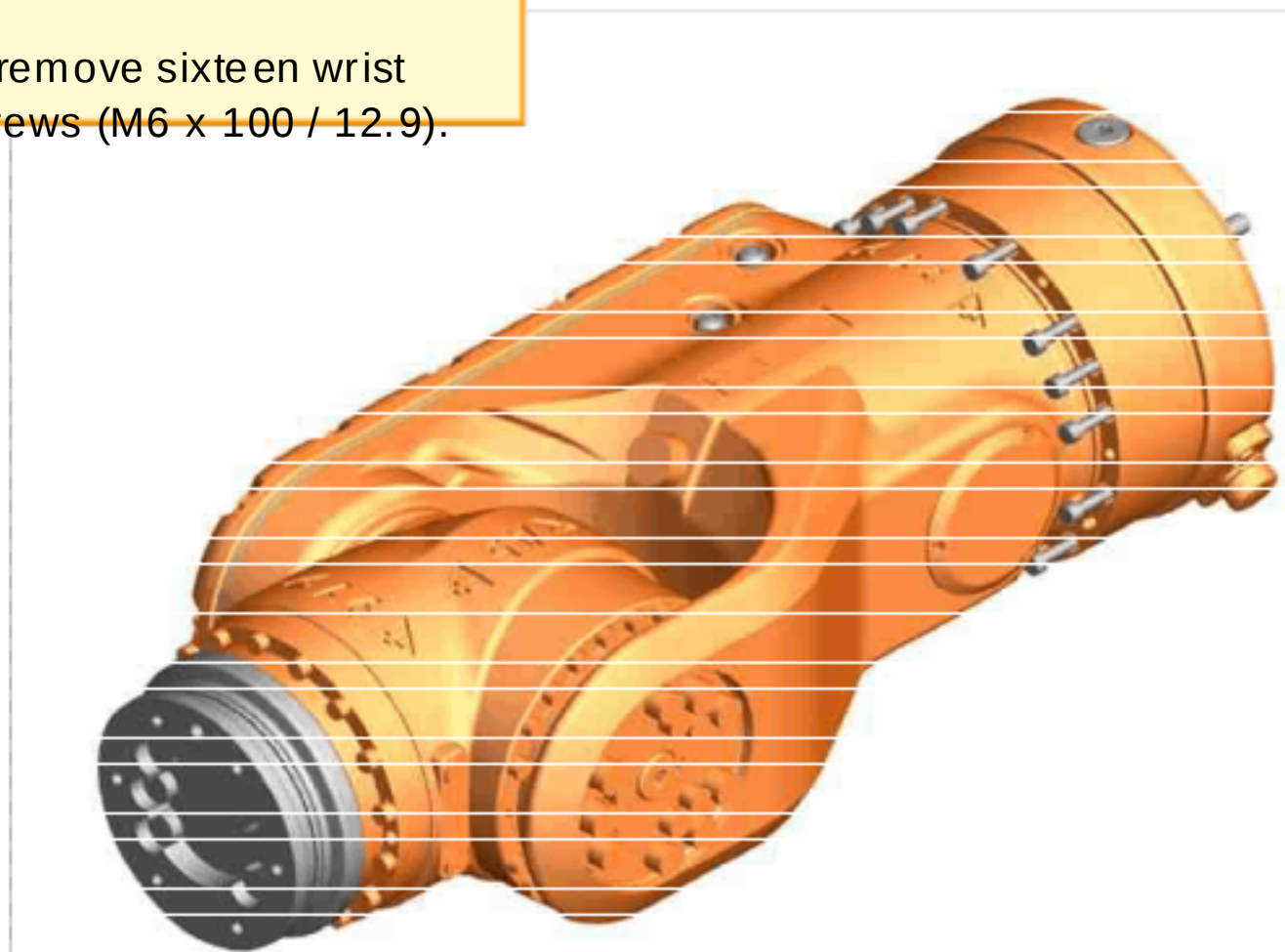


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Wrist disassembly



Loosen and remove sixteen wrist fastening screws (M6 x 100 / 12.9).



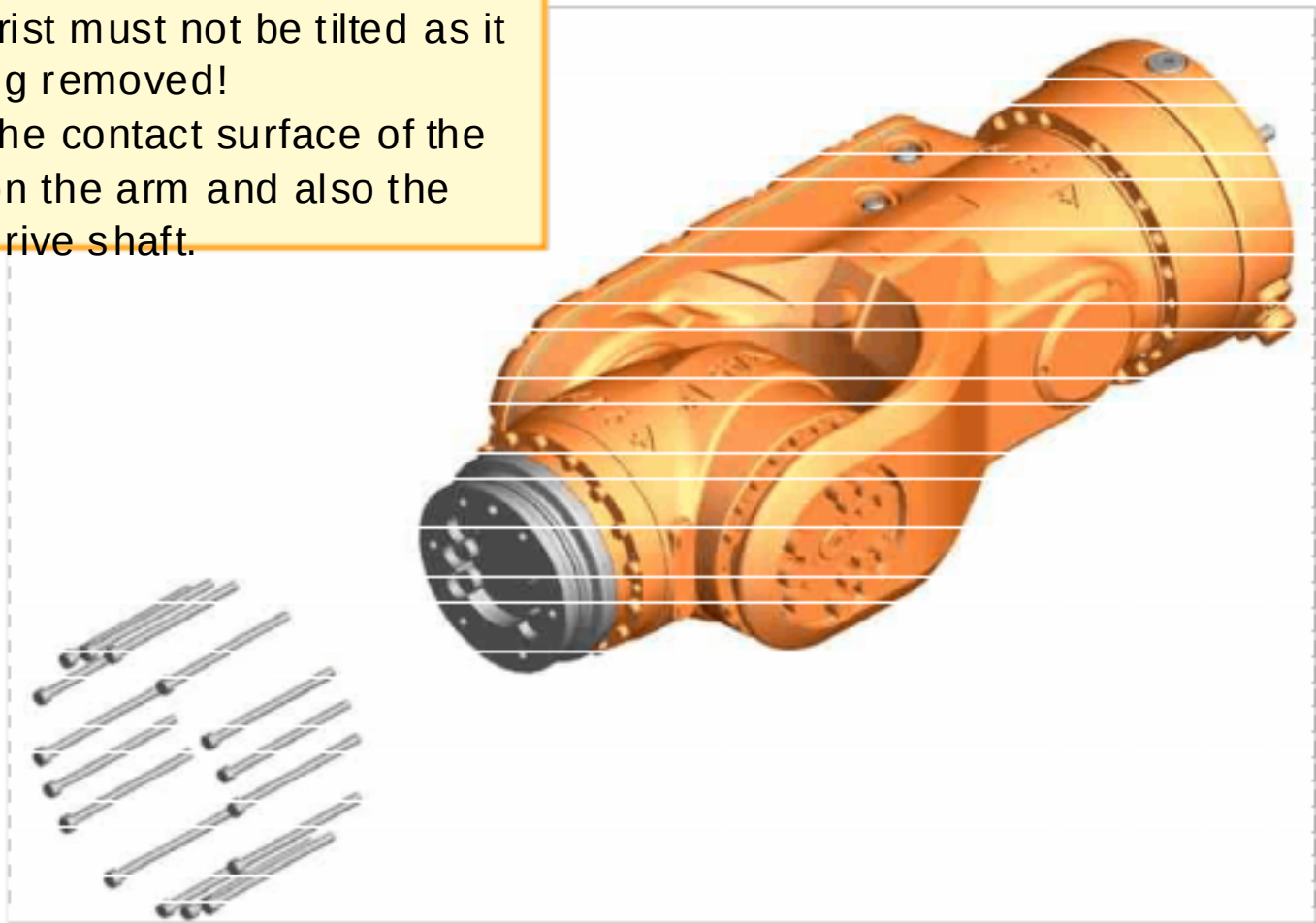
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Wrist disassembly



The wrist must not be tilted as it is being removed!
Mind the contact surface of the wrist on the arm and also the wrist drive shaft.

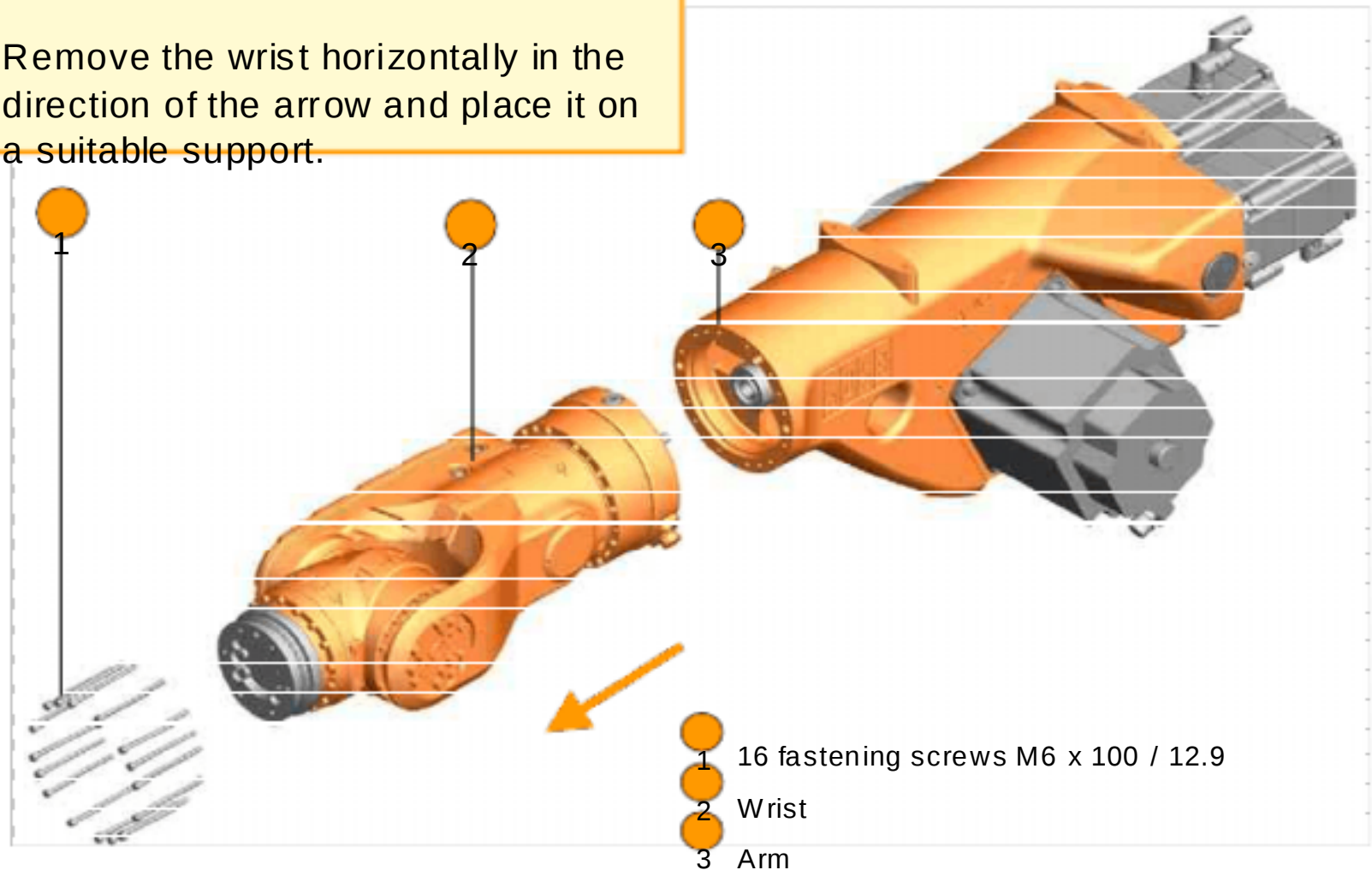


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Wrist disassembly



Remove the wrist horizontally in the direction of the arrow and place it on a suitable support.

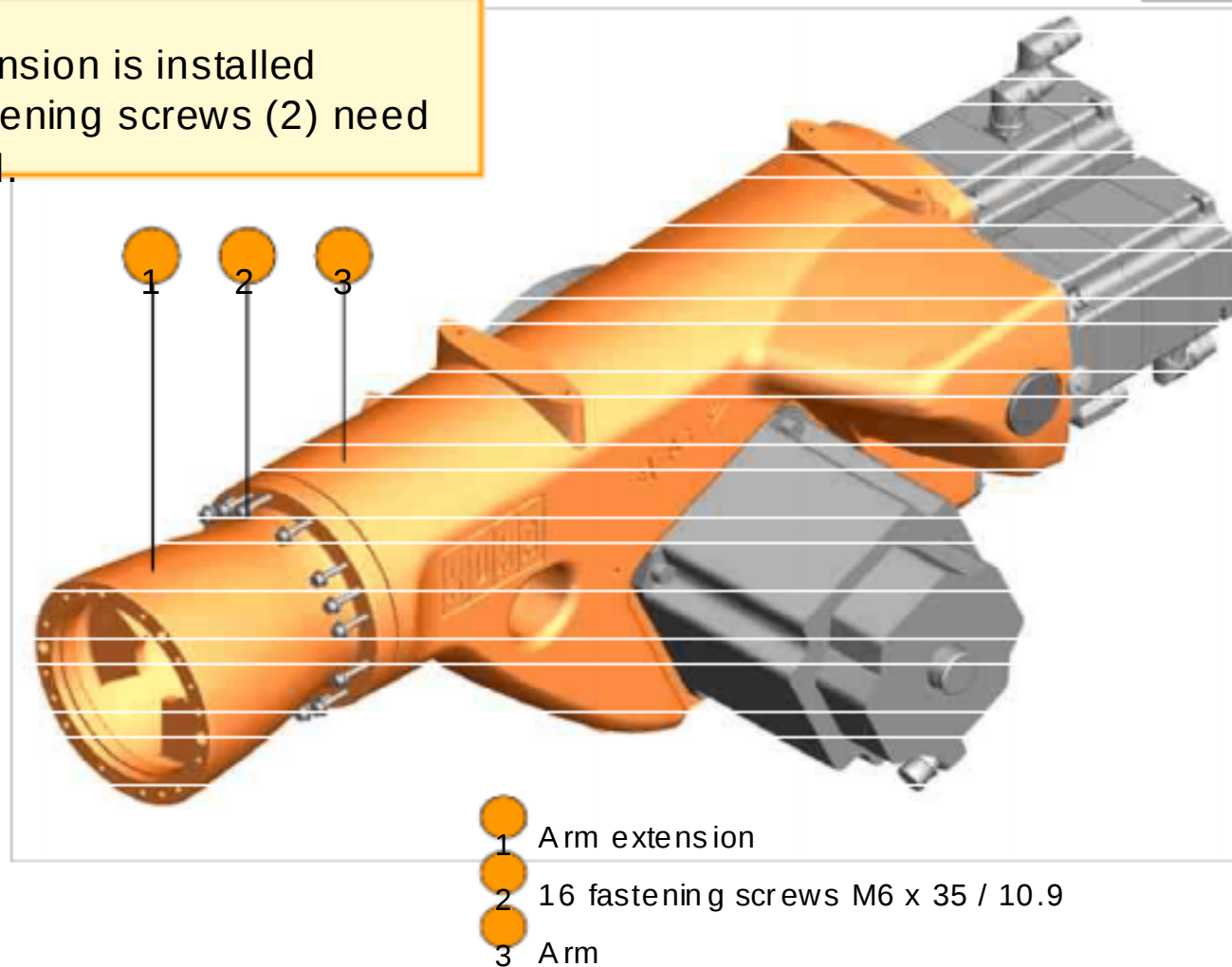


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Wrist disassembly

Arm extension

If an arm extension is installed additional fastening screws (2) need to be removed.

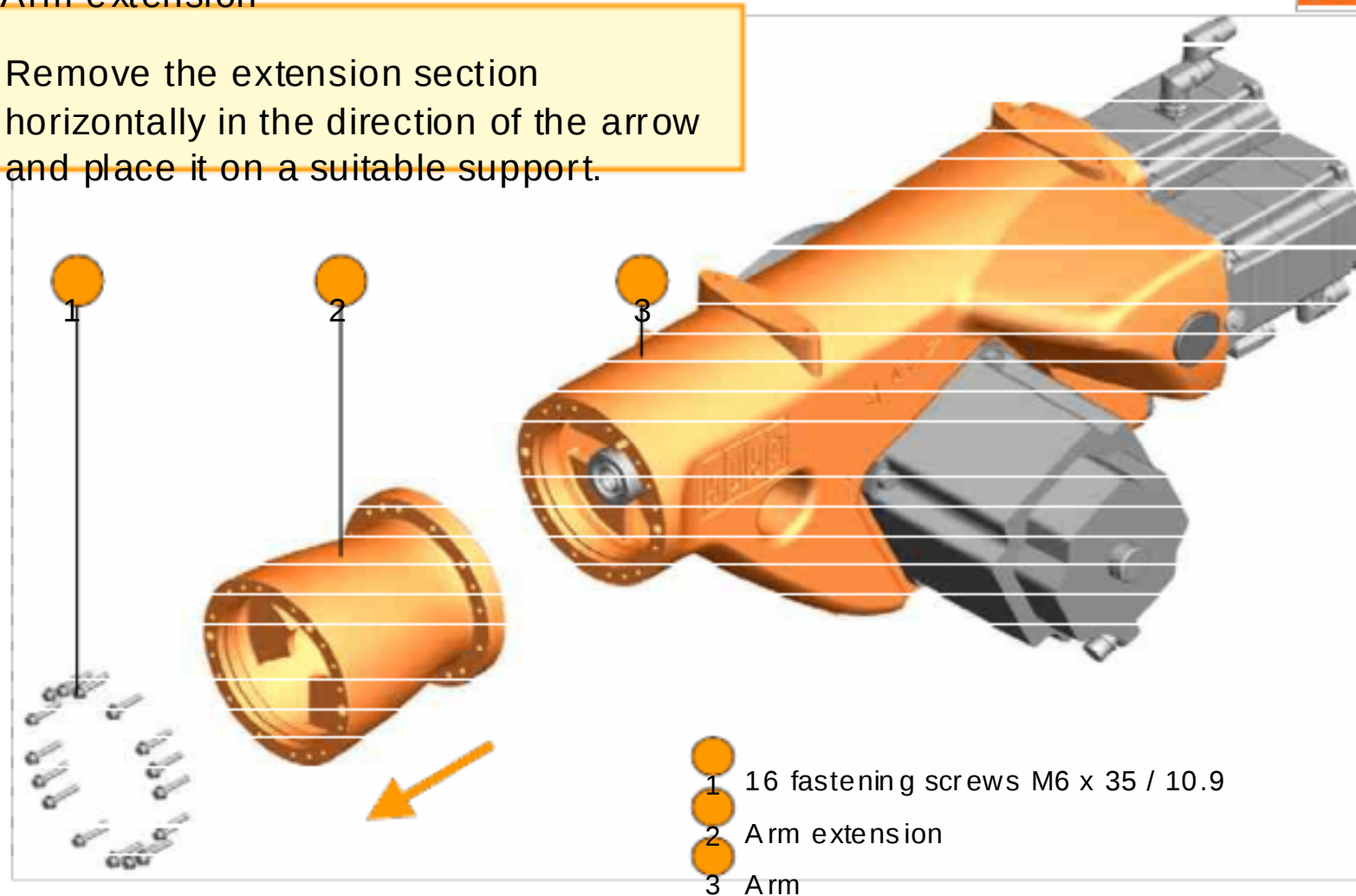


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Wrist disassembly

Arm extension

Remove the extension section horizontally in the direction of the arrow and place it on a suitable support.



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Disassembly

2.2. Arm

Arm disassembly



Unplug the motor and control connectors.



Use the appropriate equipment to ensure that the arm does not fall!



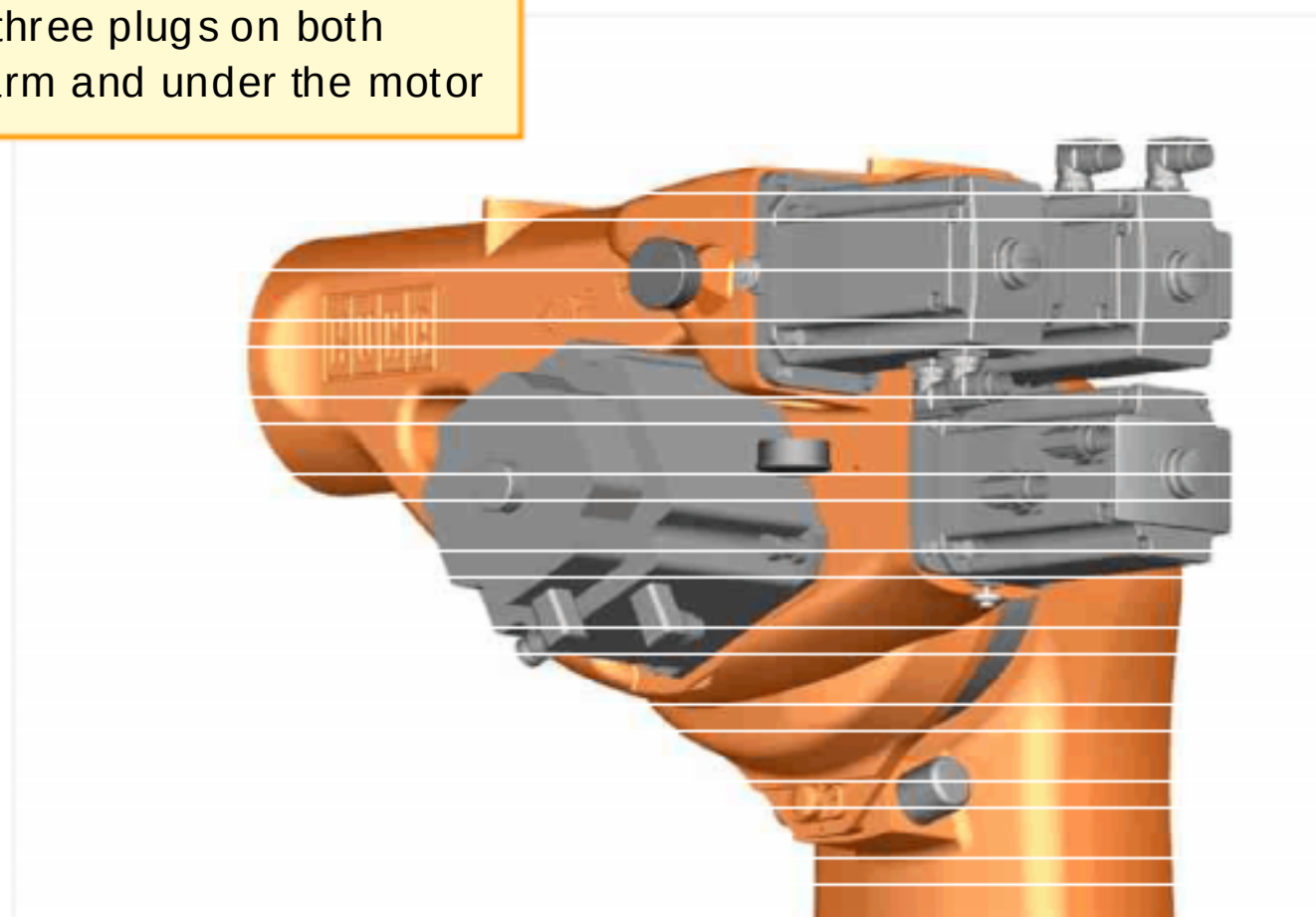
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Arm disassembly



Wrist axis motors, axis 4 to axis 6

Remove the three plugs on both sides of the arm and under the motor of axis 4.



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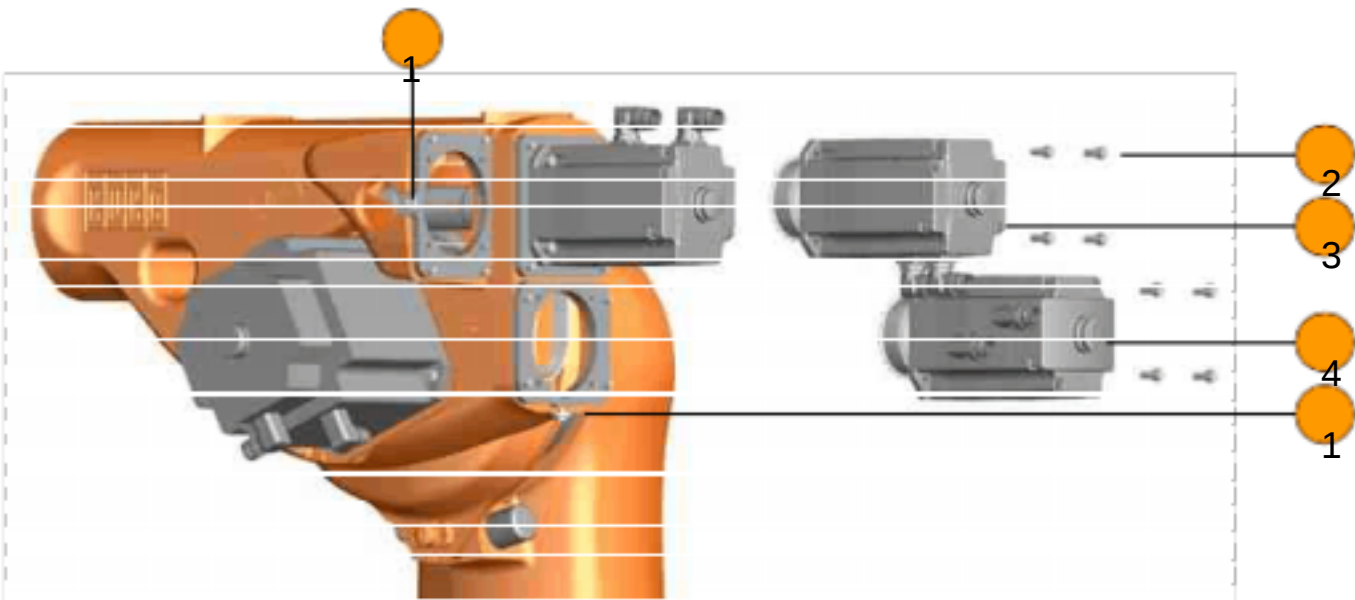


Arm disassembly



Wrist axis motors, axis 4 to axis 6

Unscrew adjusting screws (1) by several turns, remove fastening screws (2) and remove motors.



1 Adjusting screws

3 Wrist axis motor A 4

2 8 motor fastening screws M6 x 25 / 8.8

4 Wrist axis motor A 5

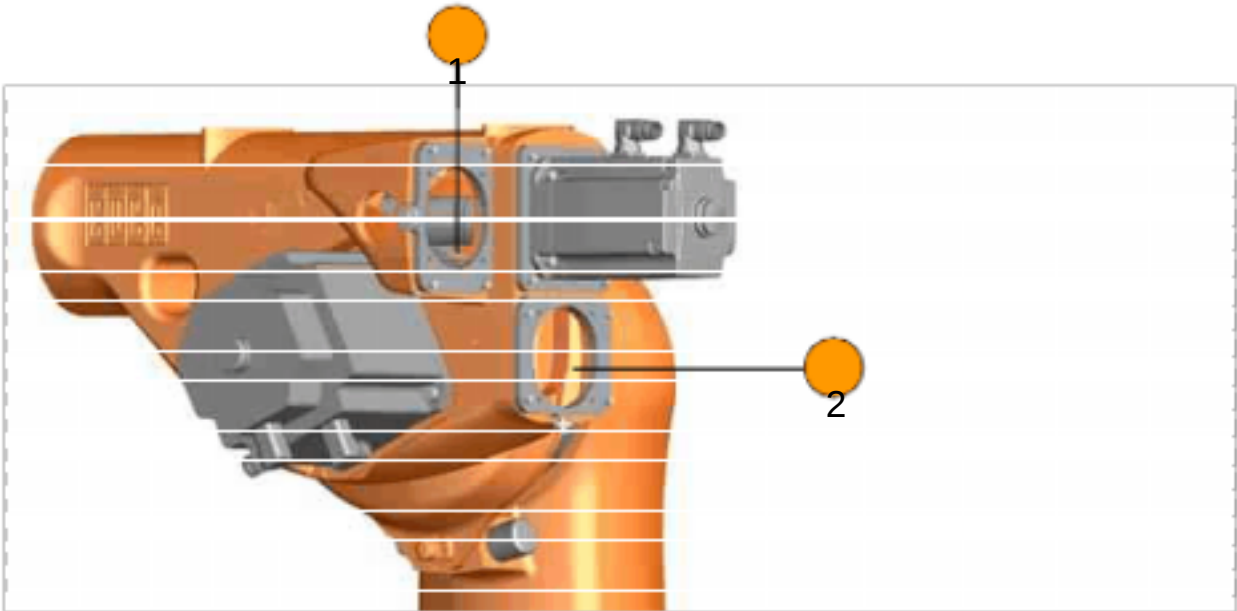
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Arm disassembly



Wrist axis motors, axis 4 to axis 6

When removing the motors their respective toothed belts in the arm must be taken off at the same time.



1 Toothed belt, wrist axis motor A 4

2 Toothed belt, wrist axis motor A 5

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Arm disassembly

Wrist axis motors, axis 4 to axis 6

Remove fastening screws (2) on the axis 6 motor (1) and take the motor out



Attention must be paid to any loose disc springs!



1 Wrist axis motor A 6

2 4 motor fastening screws M8 x 18 / 8.8

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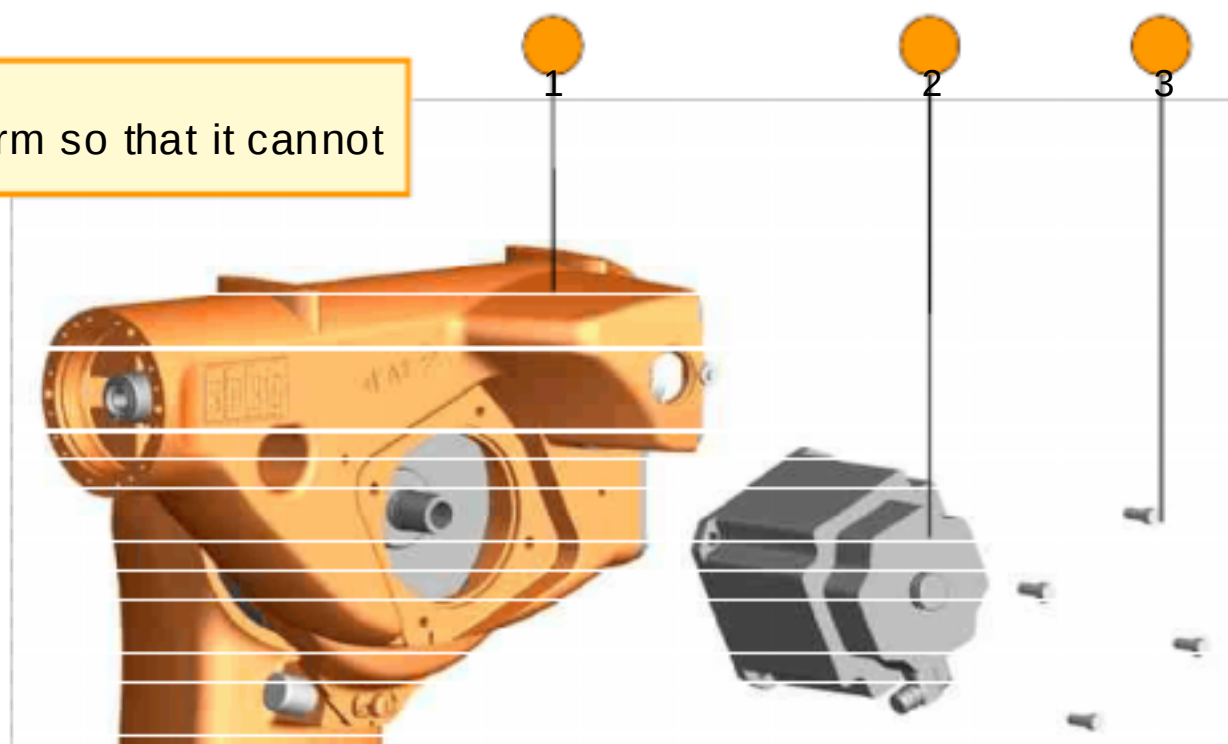
Arm disassembly

Motor A 3

Unscrew fastening screws (3) and remove motor (2).



Secure the arm so that it cannot move!



1 Arm

2 Motor A 3

3 4 motor fastening screws M12 x 30 / 8.8

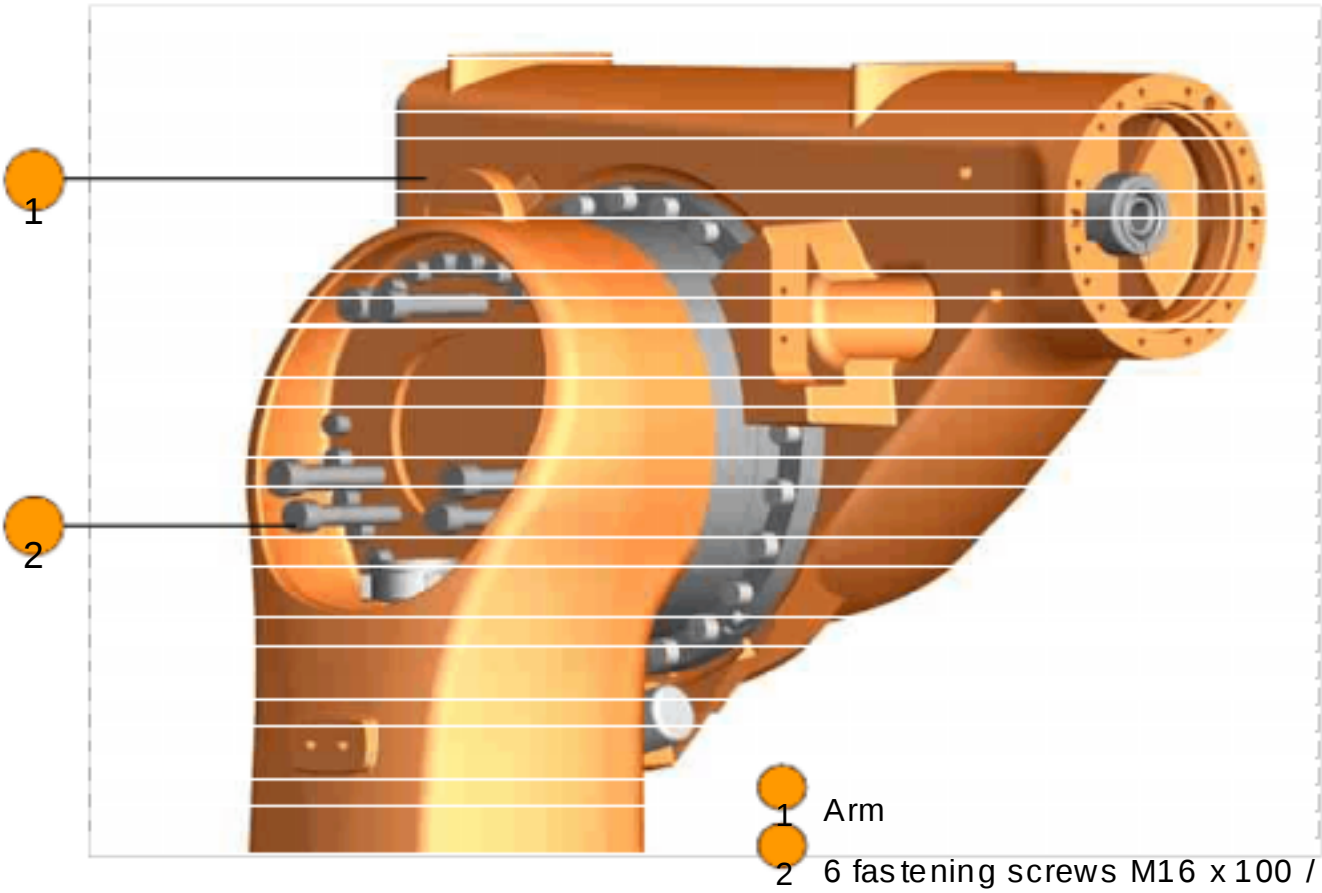
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Arm disassembly



Loosen and remove fastening screws (2).



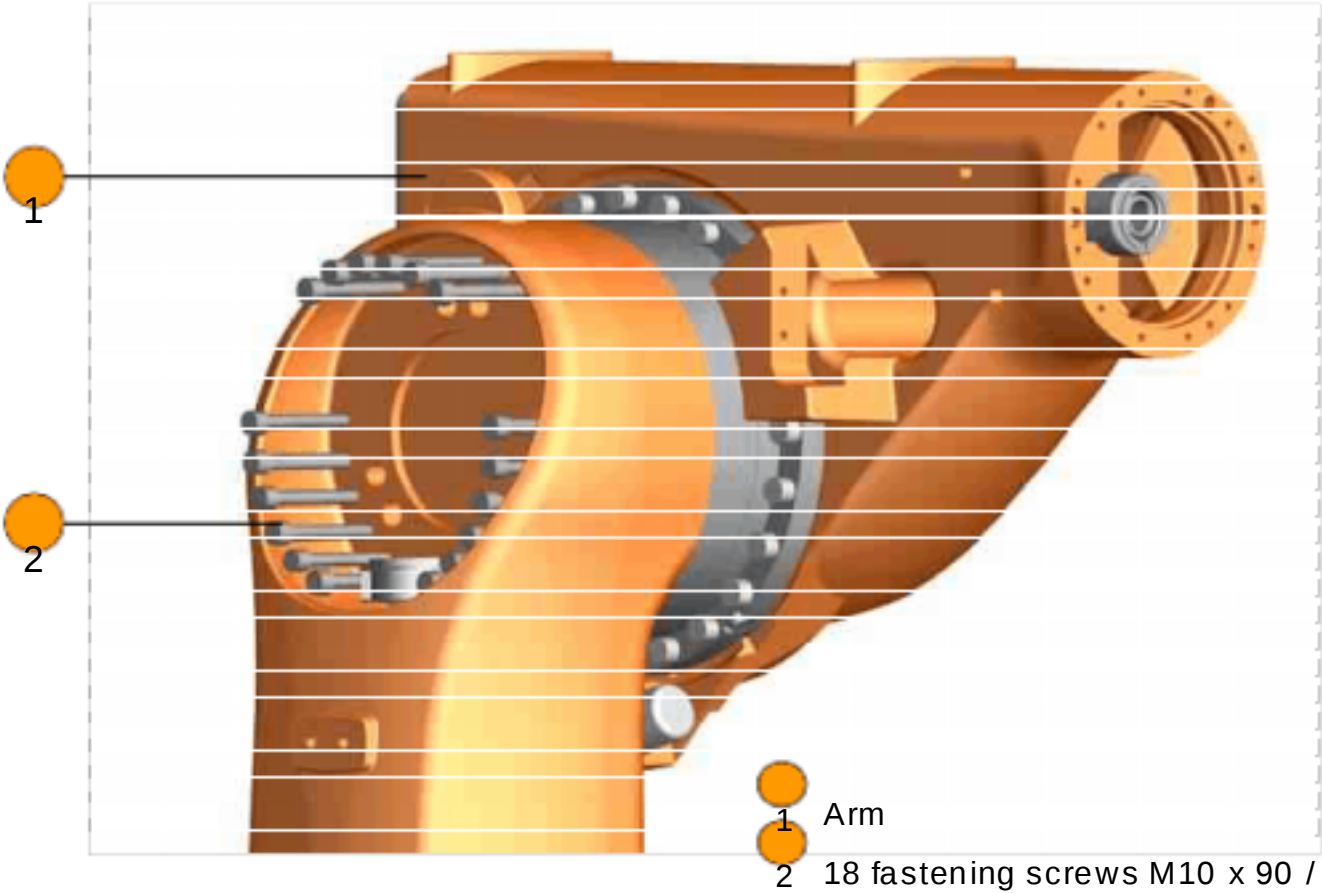
- 1 Arm
- 2 6 fastening screws M16 x 100 / 10.9

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Arm disassembly



Loosen and remove fastening screws (2).



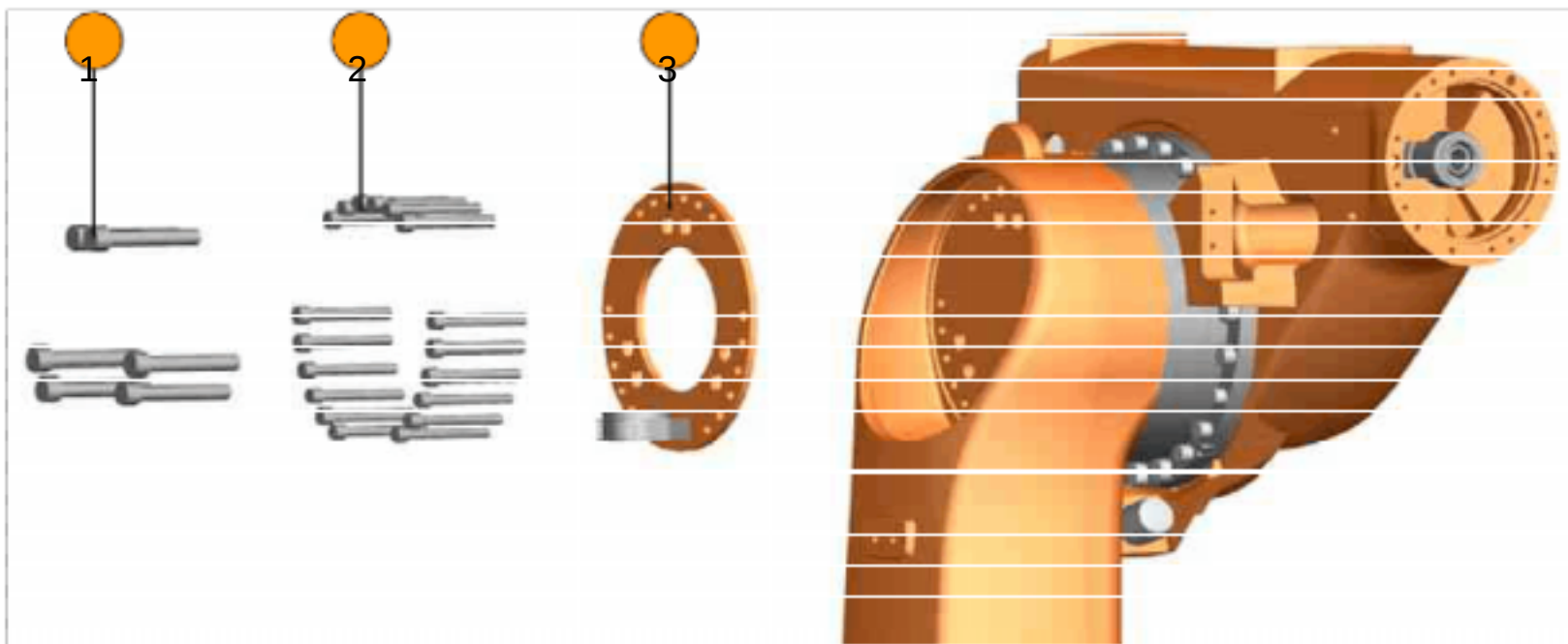
- 1 Arm
- 2 18 fastening screws M10 x 90 / 10.9

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Arm disassembly



Take off support ring (3).



- 1 6 fastening screws M16 x 100 / 10.9
- 2 18 fastening screws M10 x 90 / 10.9
- 3 Support ring

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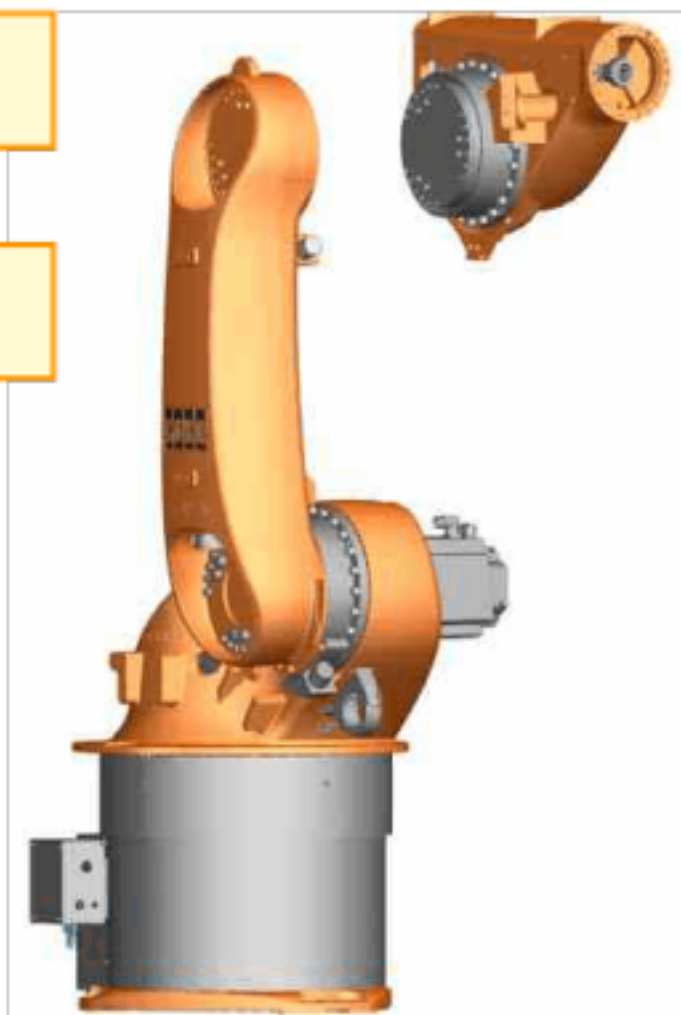
Arm disassembly



Push the arm out of its location and carefully swing it away.



The arm must not be tilted while it is being lifted off.



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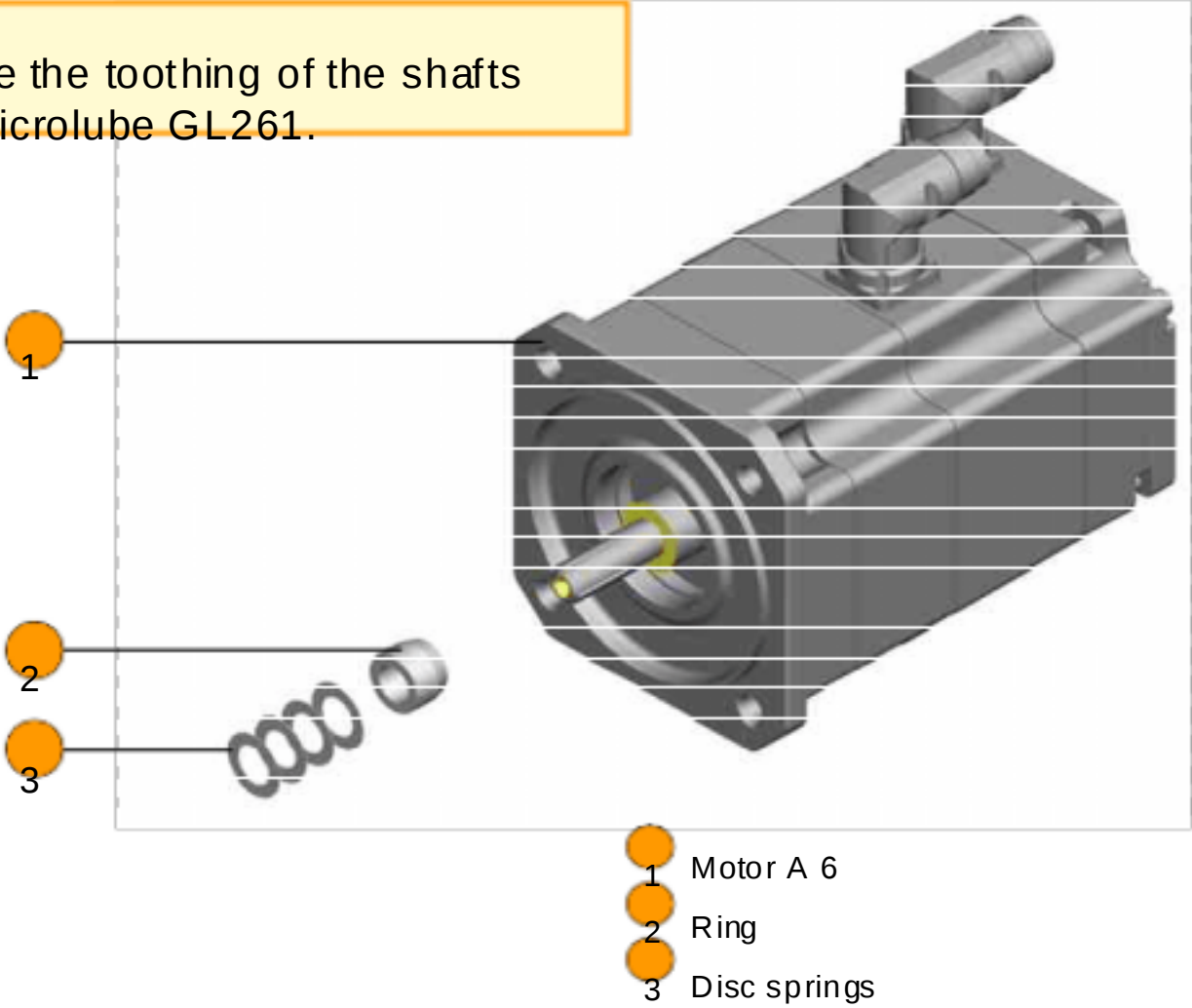


Arm disassembly



Motor A 6

Grease the tothing of the shafts
with Microlube GL261.





Disassembly

2.3. Link arm

Link arm disassembly

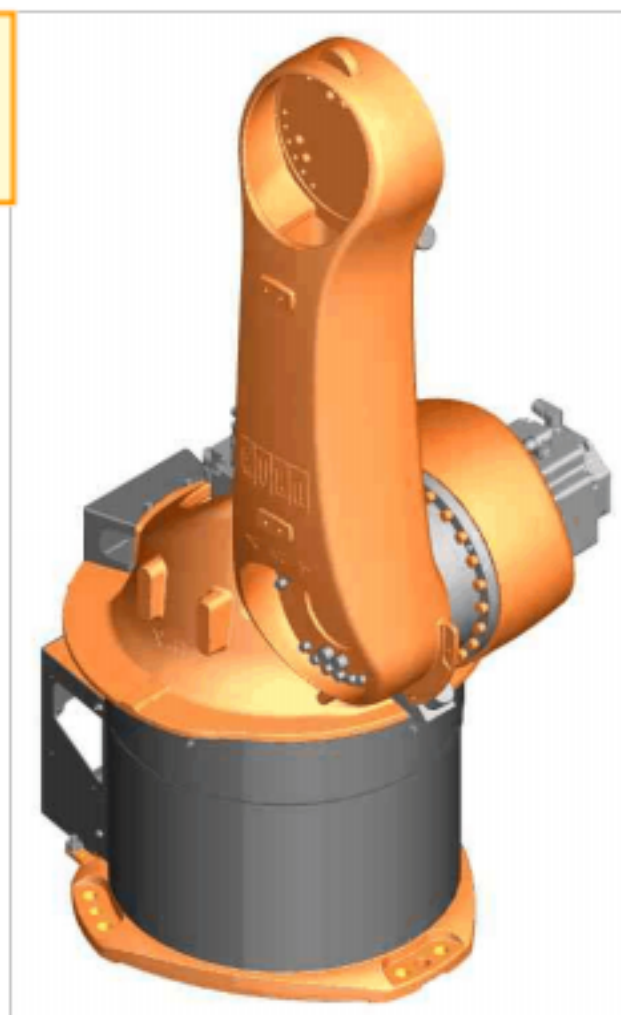


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Link arm disassembly



Use the appropriate equipment to ensure that the link arm does not fall!



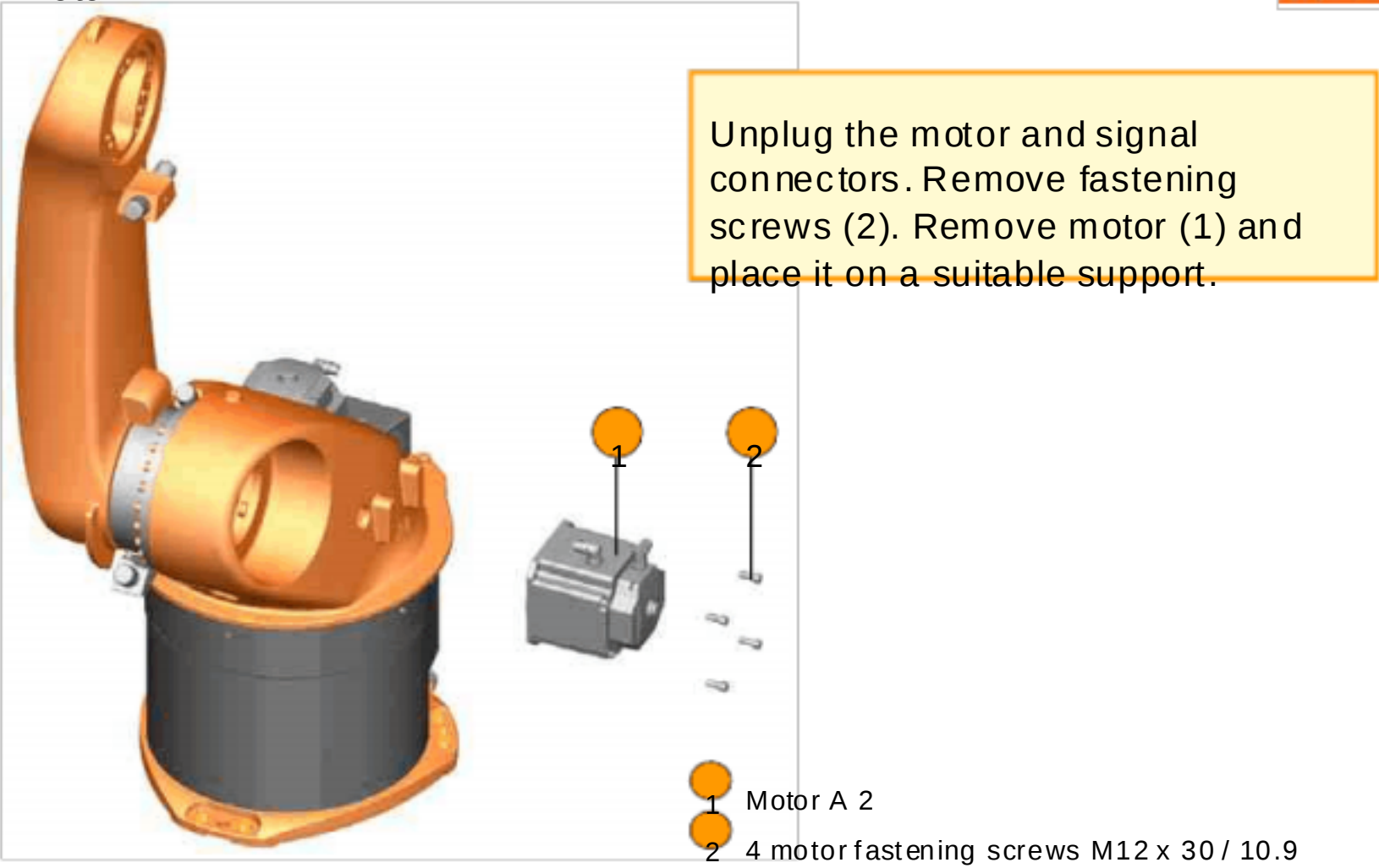
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Link arm disassembly



Motor A 2

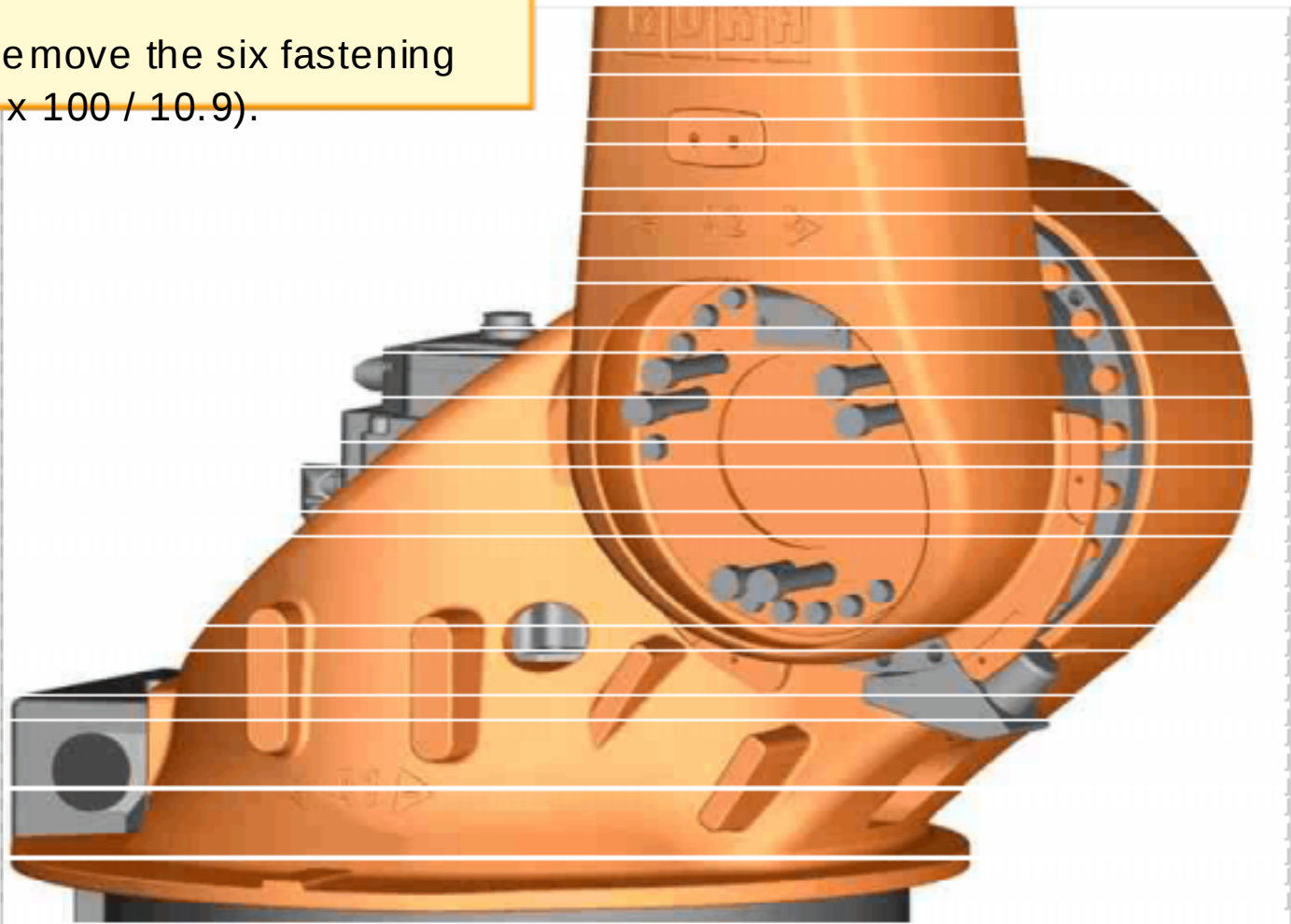


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Link arm disassembly



Loosen and remove the six fastening screws (M16 x 100 / 10.9).

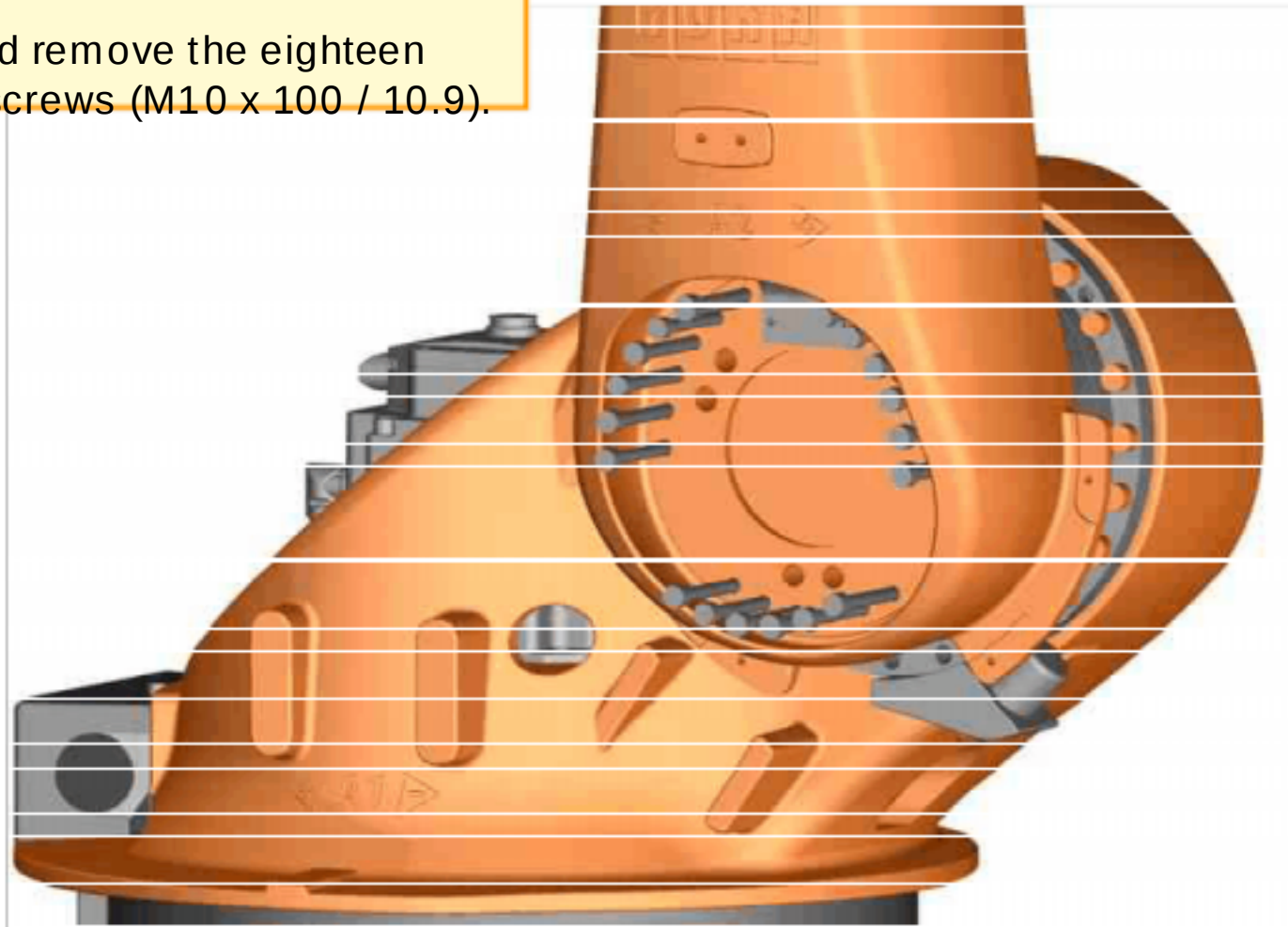


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Link arm disassembly



Loosen and remove the eighteen fastening screws (M10 x 100 / 10.9).

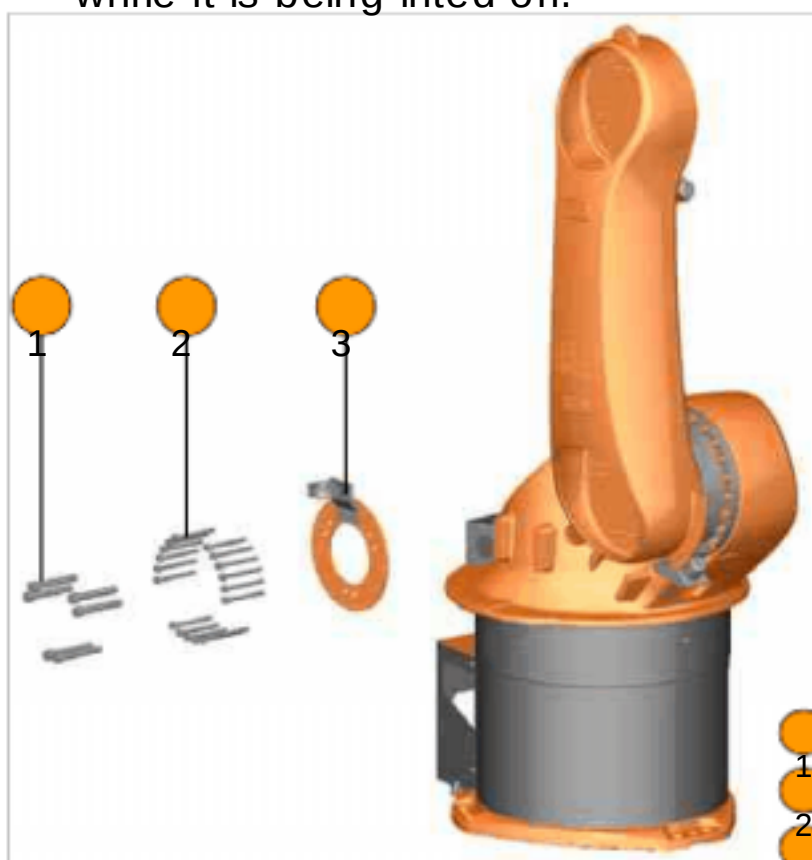


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Link arm disassembly



The link arm must not be tilted while it is being lifted off.



- 1 6 fastening screws M16 x 100 / 10.9
- 2 18 fastening screws M10 x 100 / 10.9
- 3 Support ring

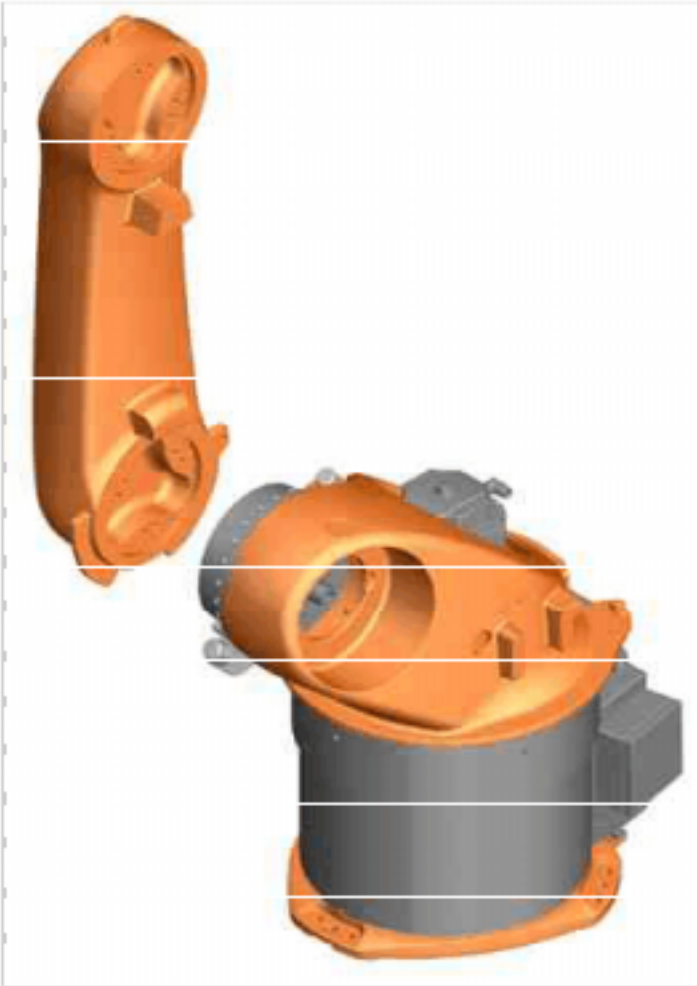
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Link arm disassembly



Carefully lift off the link arm and place it on a suitable support.



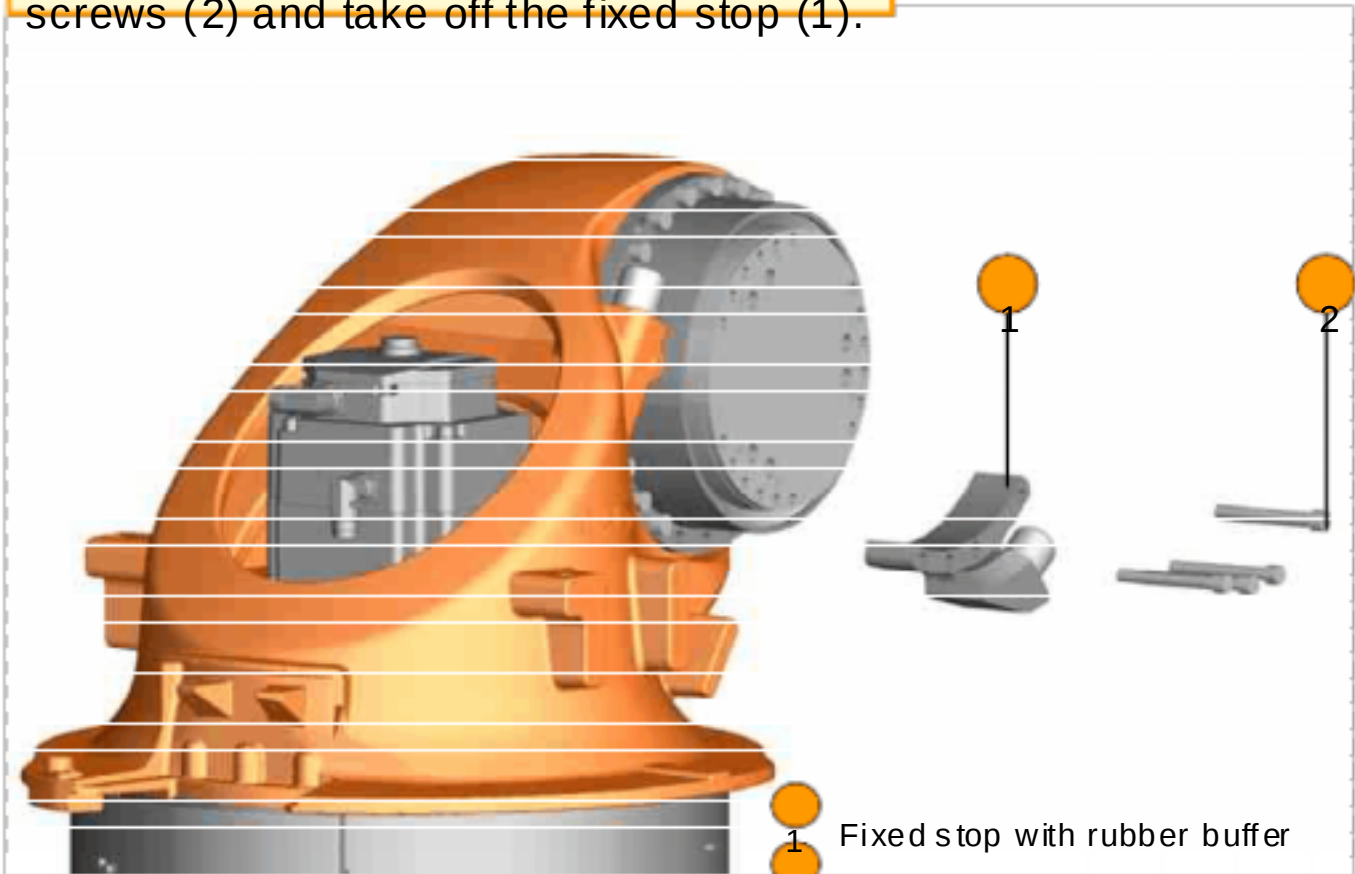
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Link arm disassembly



Gear unit A 2

To remove the motor unit, remove the screws (2) and take off the fixed stop (1).



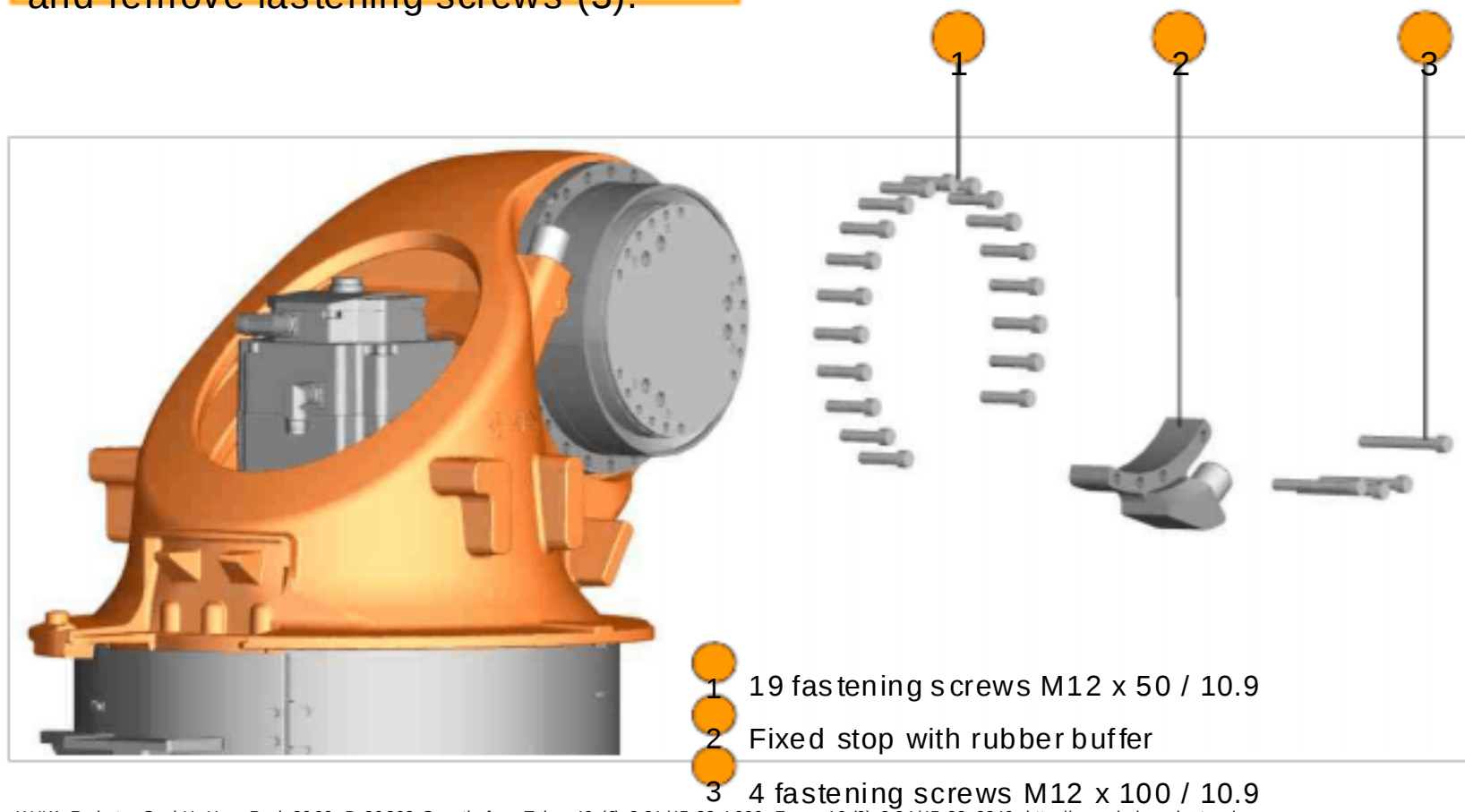
- 1 Fixed stop with rubber buffer
- 2 4 fastening screws M12 x 100 / 10.9

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Link arm disassembly

Gear unit A 2

Remove fixed stop (2), and loosen and remove fastening screws (3).

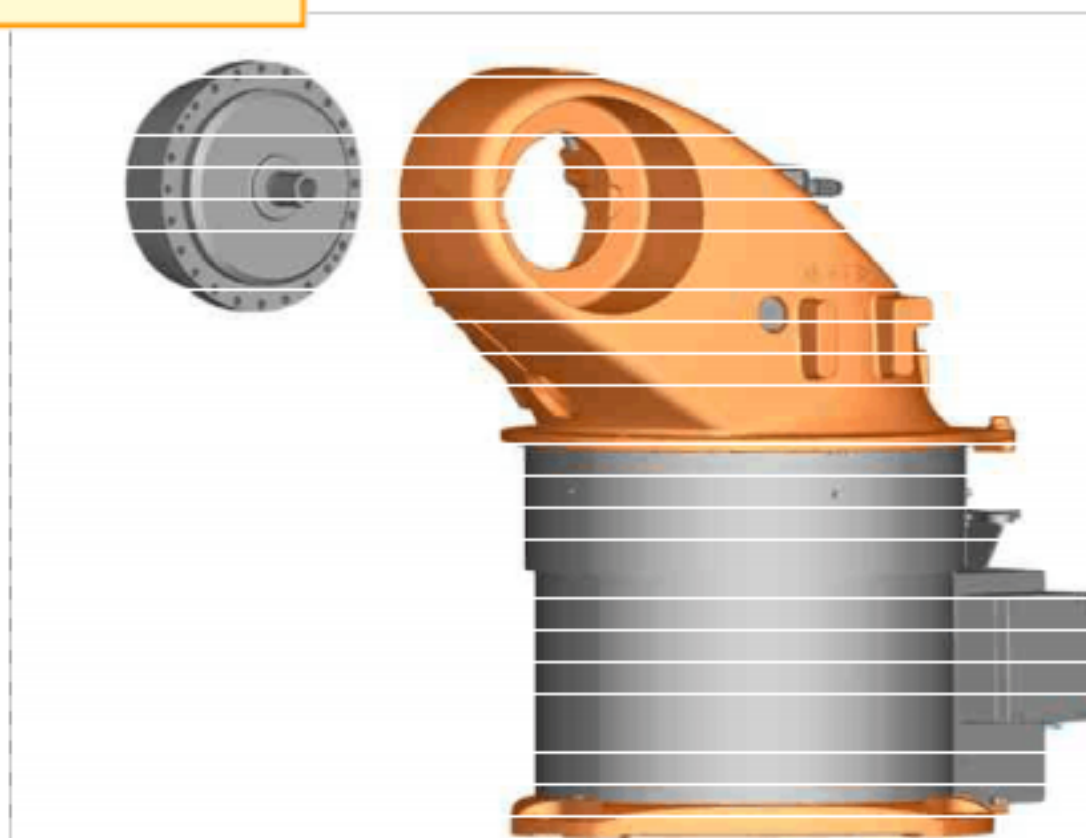


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Link arm disassembly

Gear unit A 2

Secure the gear unit with appropriate equipment, lift off and place on a suitable support.



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2.4. Rotating column

Rotating column disassembly

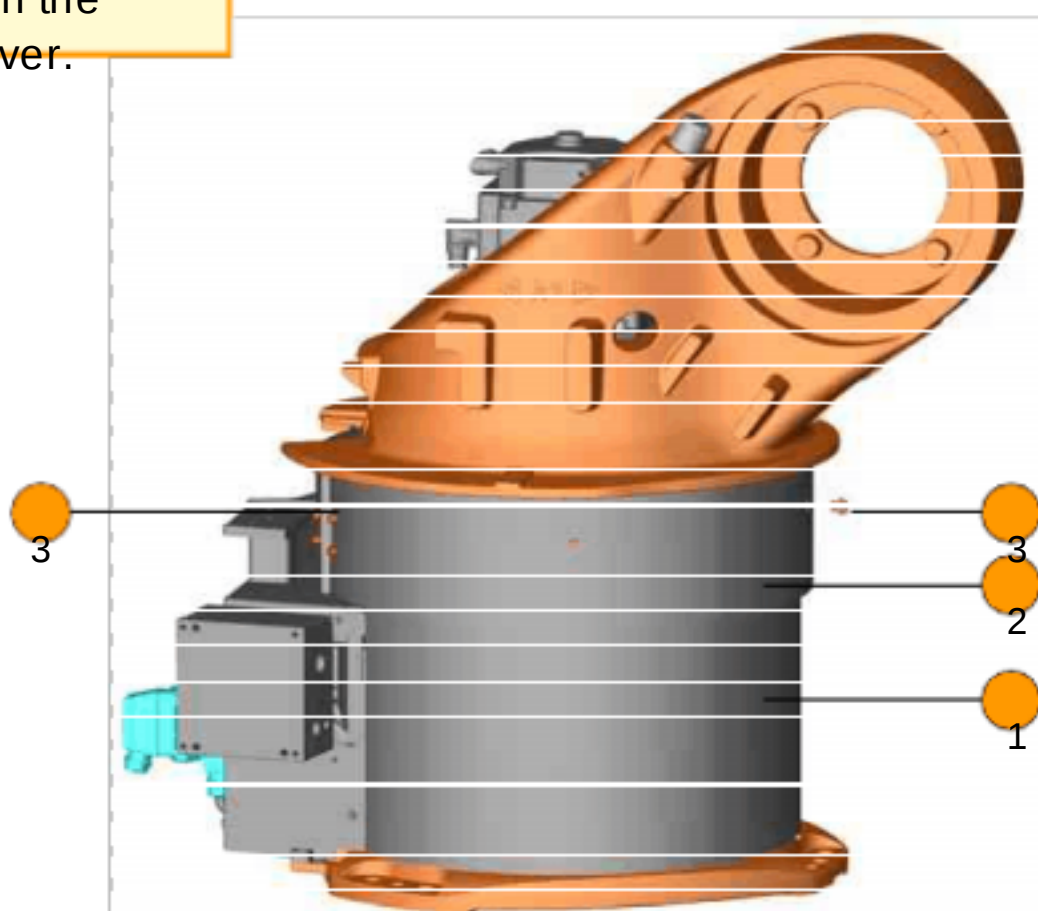


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Rotating column disassembly



Unscrew the eight screws on the upper cover and remove cover.



- 1 Lower cover
- 2 Upper cover
- 3 8 screws M6 x 12 / 8.8

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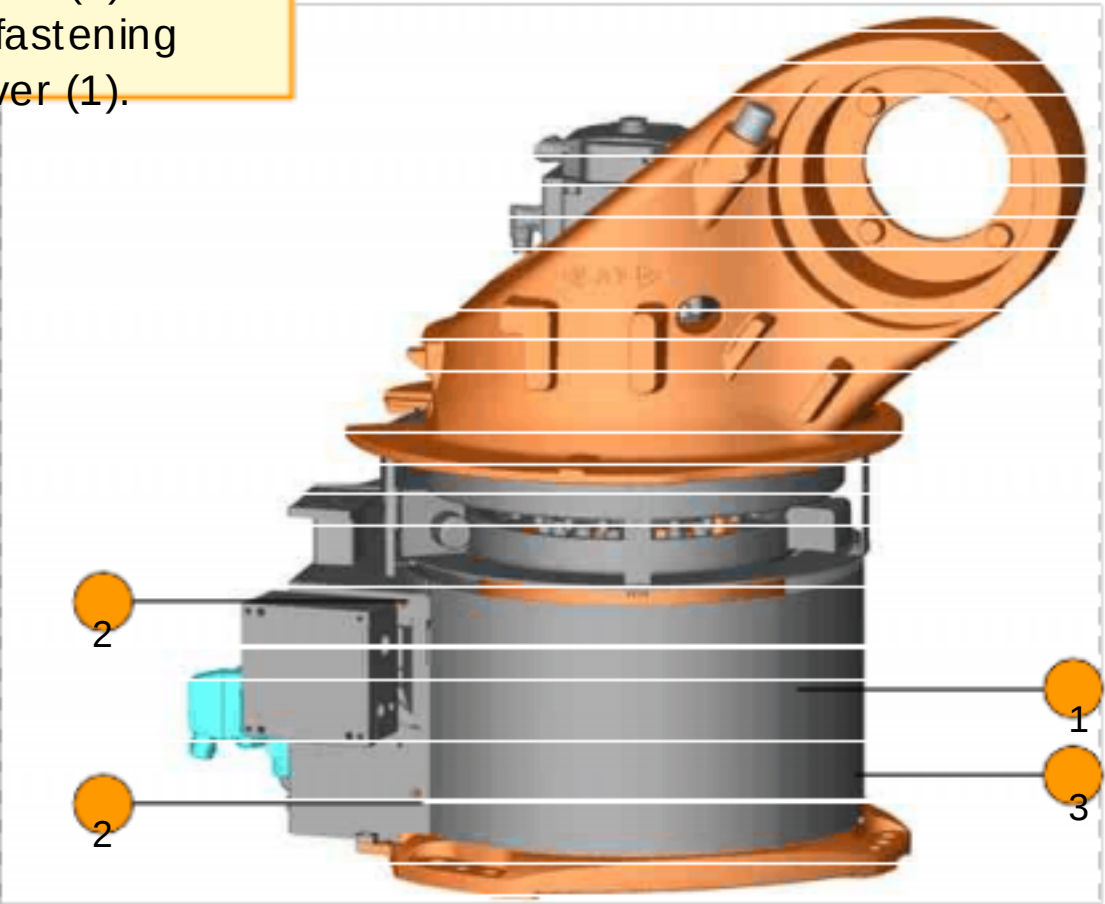


Rotating column disassembly



Remove four hexagon nuts (2) and locking screws and one fastening screw from the lower cover (1).

- 1 Lower cover
- 2 4 hexagon nuts M6 - 8
- 3 Screw M5 x 8 / 8.8



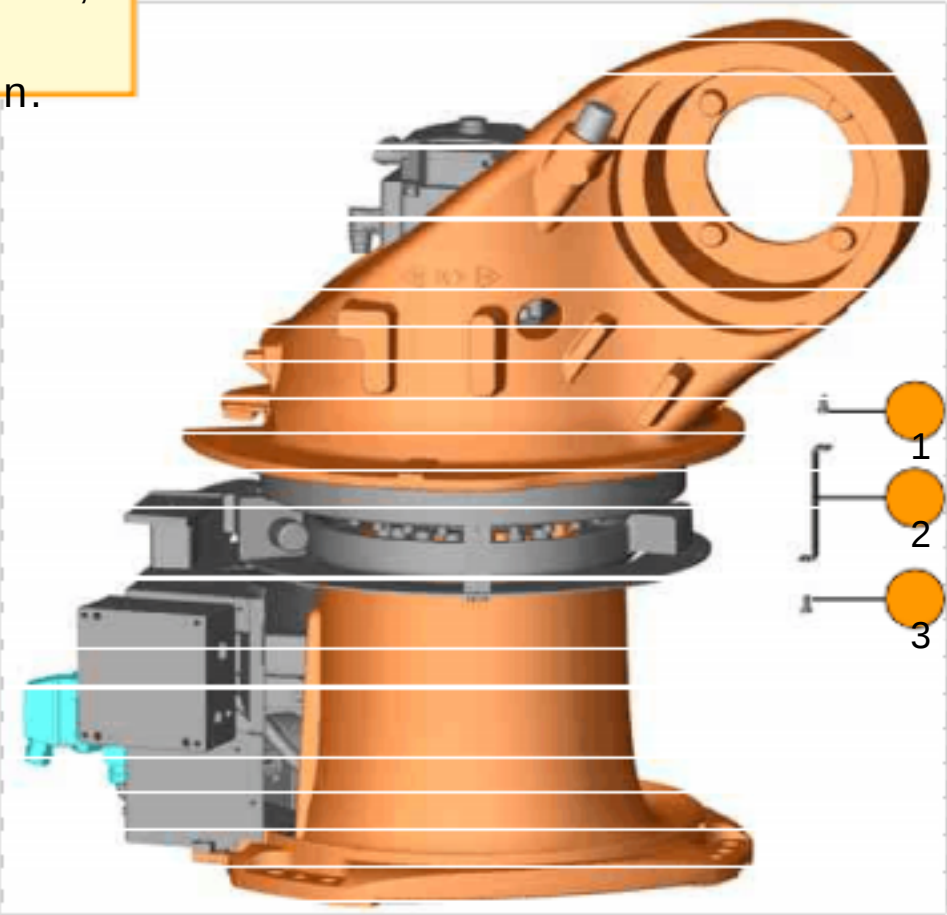
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Rotating column disassembly



Unscrew the screws from the holder, remove the holders and the ring segment from the rotating column.

- 1 6 screws M6 x 12 / 8.8
- 2 3 holders
- 3 6 screws M6 x 12 / 8.8

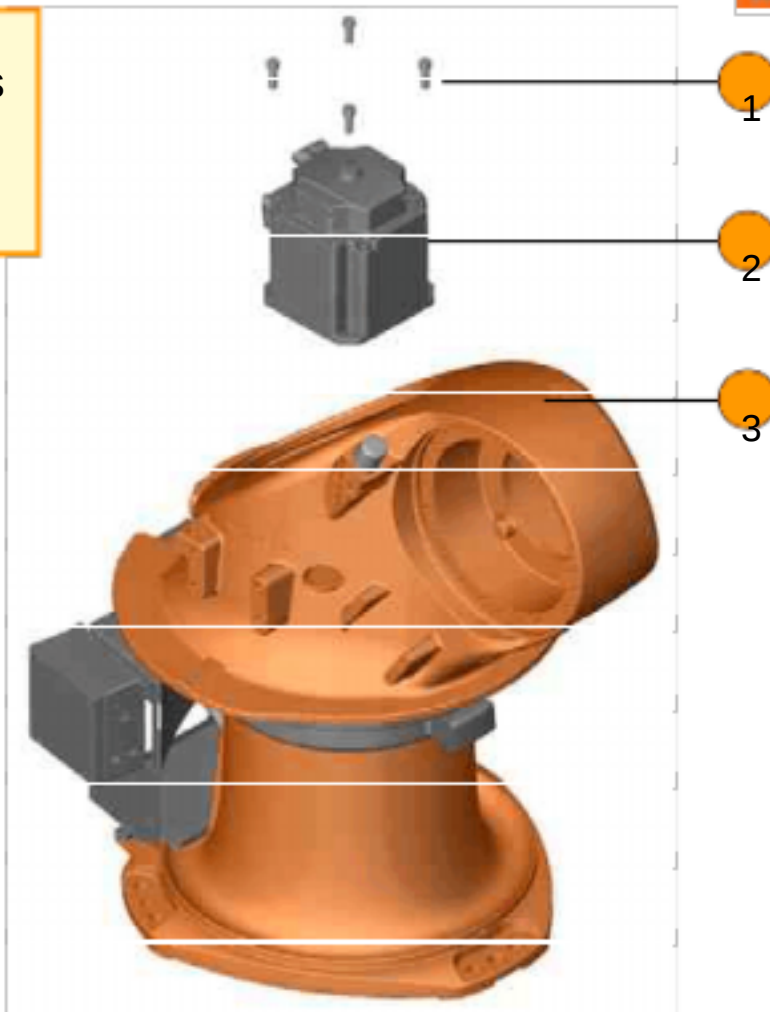


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Rotating column disassembly

Motor A 1

Loosen and remove fastening screws (1) from the motor. Carefully lift out the motor (2) and place it on a suitable support.



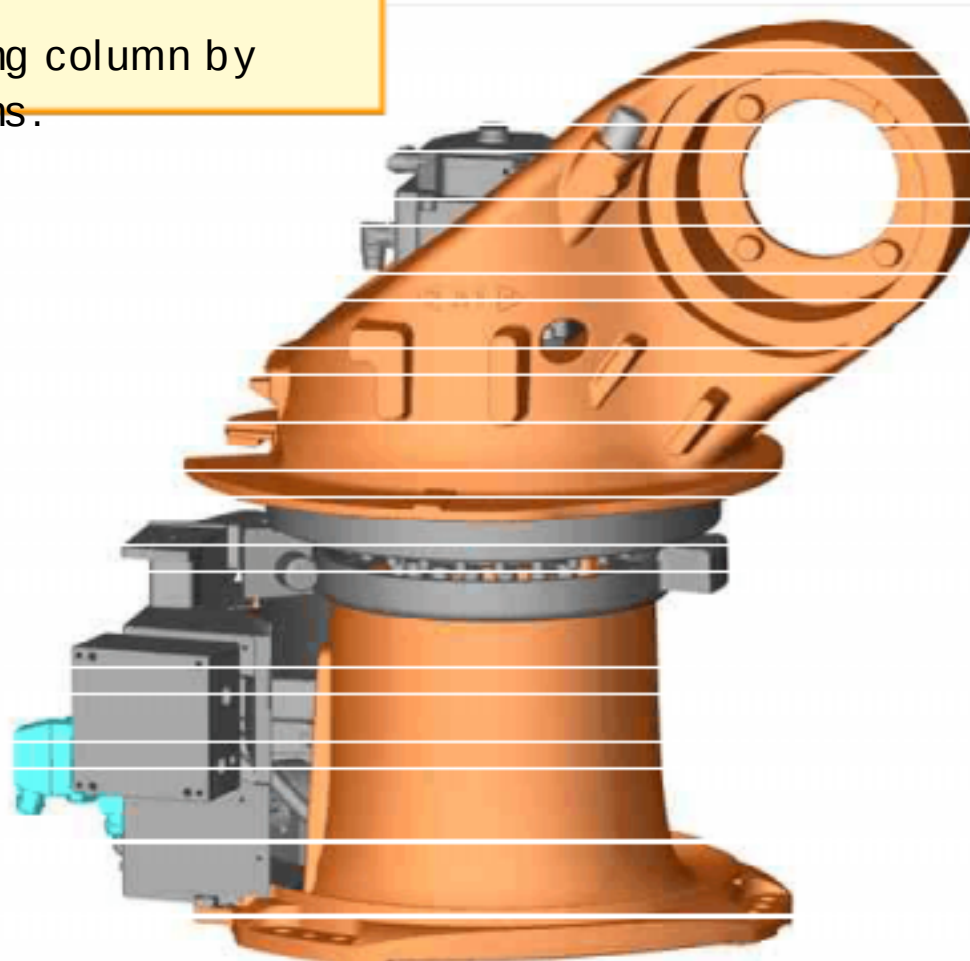
- 1 4 motor fastening screws M12 x 30 / 10.9
- 2 Motor A 1
- 3 Rotating column

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Rotating column disassembly



Secure rotating column by suitable means.



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Rotating column disassembly



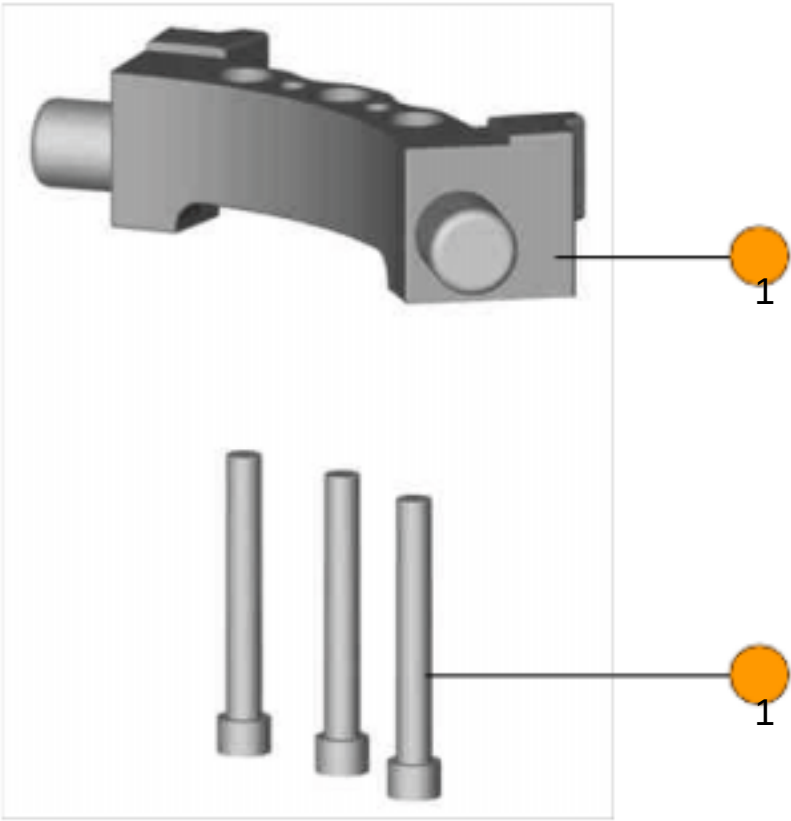
- 1 Rotating column
- 2 Gear unit A 1
- 3 Fastening screws M16 x 60 / 10.9
- 4 Fixed stop, axis 1
- 5 Fastening screws M16 x 120 / 10.9
- 6 Trailing stop
- 7 Base frame

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Rotating column disassembly



Loosen and remove fastening screws (2) from the fixed stop (1). Remove fixed stop (2).



- 1 Fixed stop, axis 1
- 2 Fastening screws M16 x 120 / 10.9

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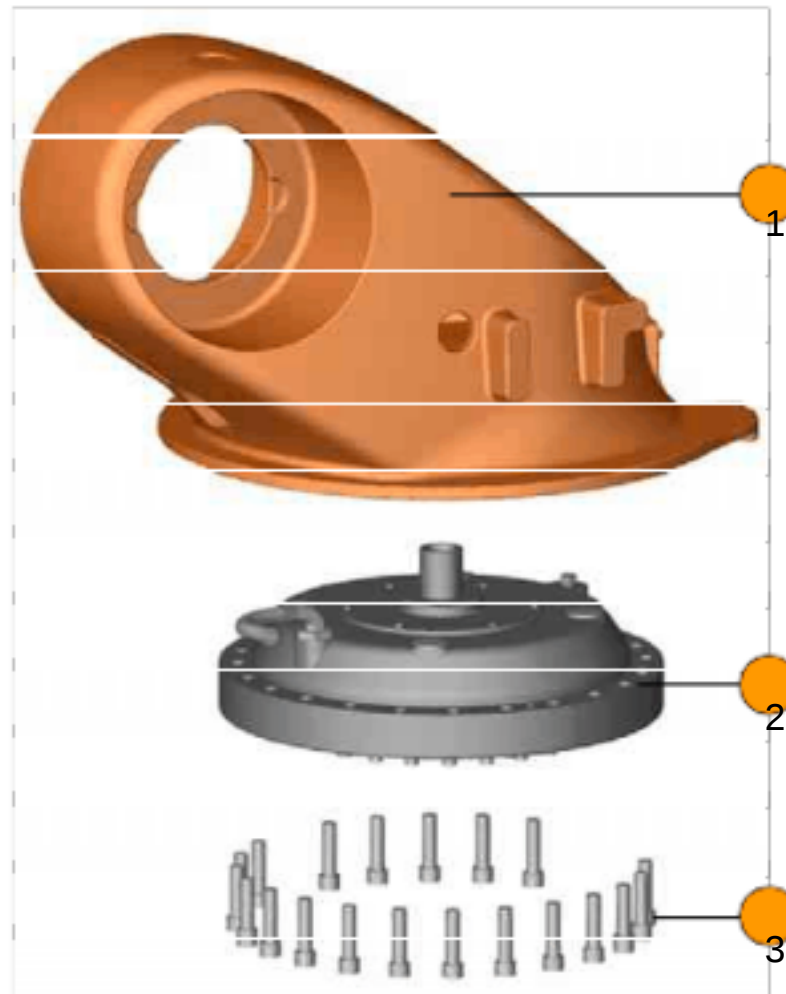
Rotating column disassembly



Remove the twenty fastening screws from the rotating column. Lift off the rotating column from the base frame with appropriate equipment, and place it on a suitable support.



The rotating column must not be tilted while it is being lifted off!



- 1 Rotating column
- 2 Gear unit A 1
- 3 20 fastening screws M16 x 60 / 10.9

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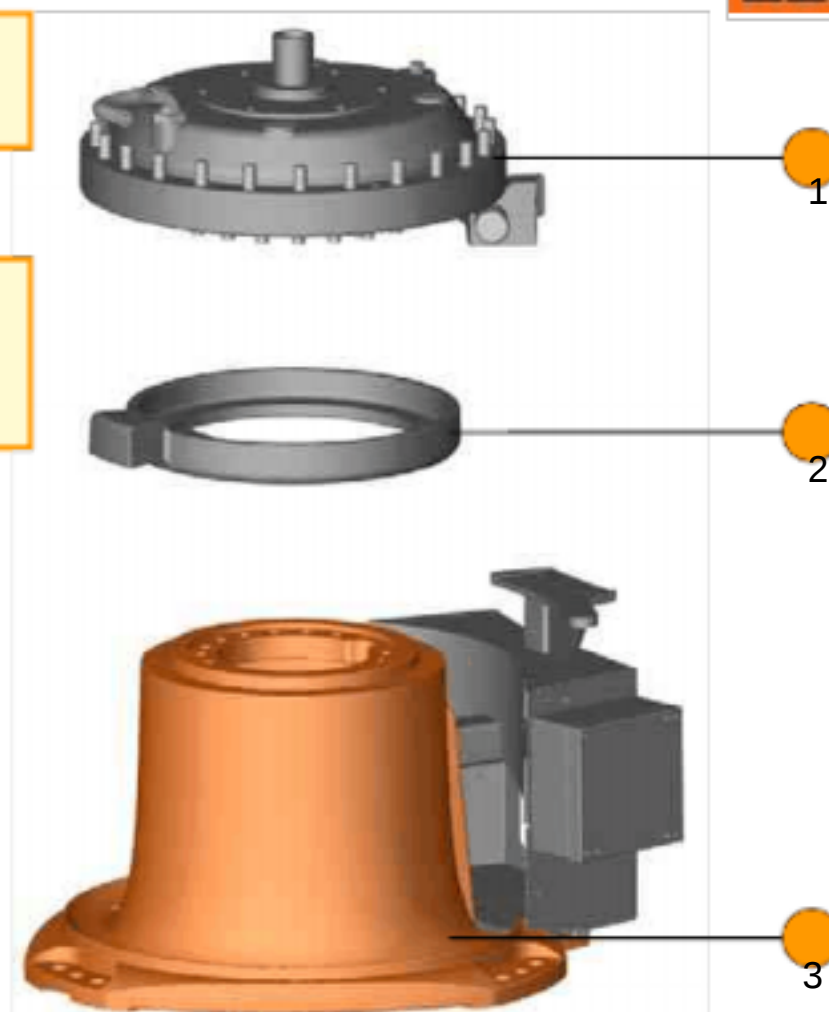
Rotating column disassembly



Take the gear unit and the trailing stop from the base frame.



When removing the gear unit pay attention to the oil drain hose.



- 1 Gear unit A 1
- 2 Trailing stop
- 3 Base frame

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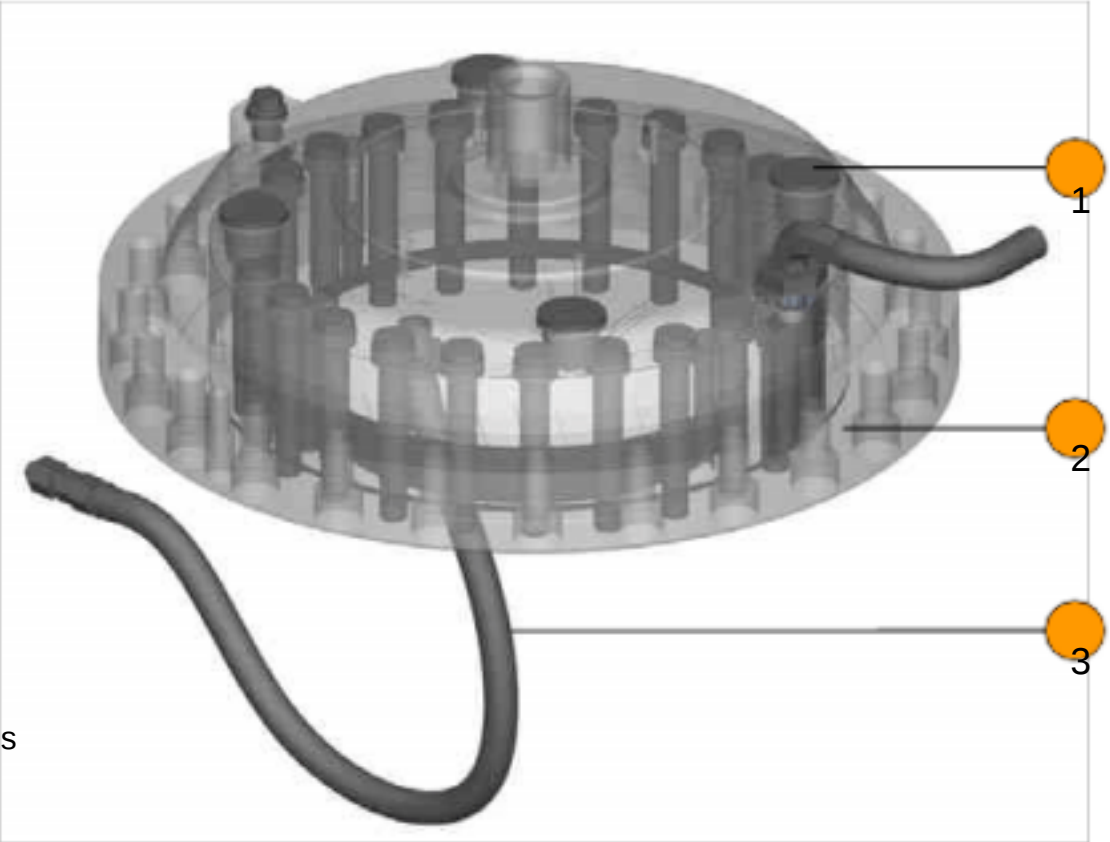


Rotating column disassembly



Gear unit A 1

The oil must be fully drained before the gear unit can be disassembled.



- 1 Screw plug for threaded holes
- 2 Gear unit A 1
- 3 Oil drain hose

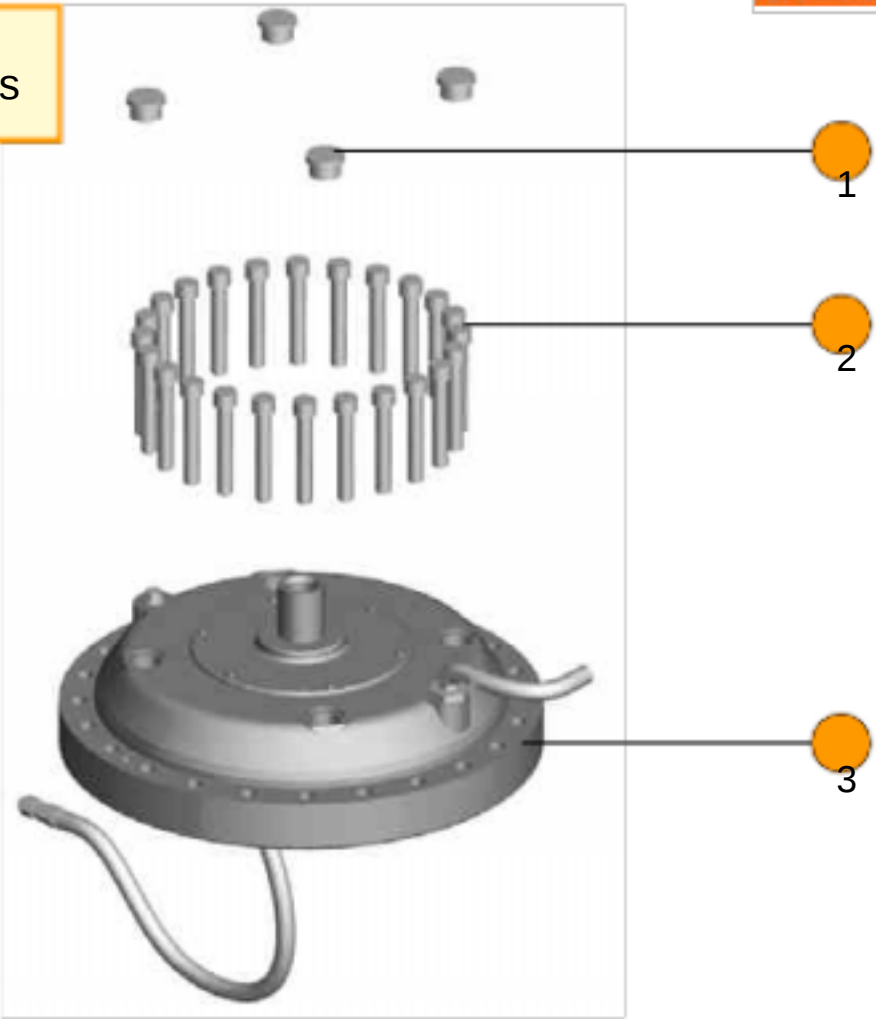
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Rotating column disassembly



Gear unit A 1

Slacken and remove the screw plugs (1) and the screws (2).



- 1 Screw plug for threaded holes
- 2 24 screws M16 x 100 / 10.9
- 3 Gear unit A 1

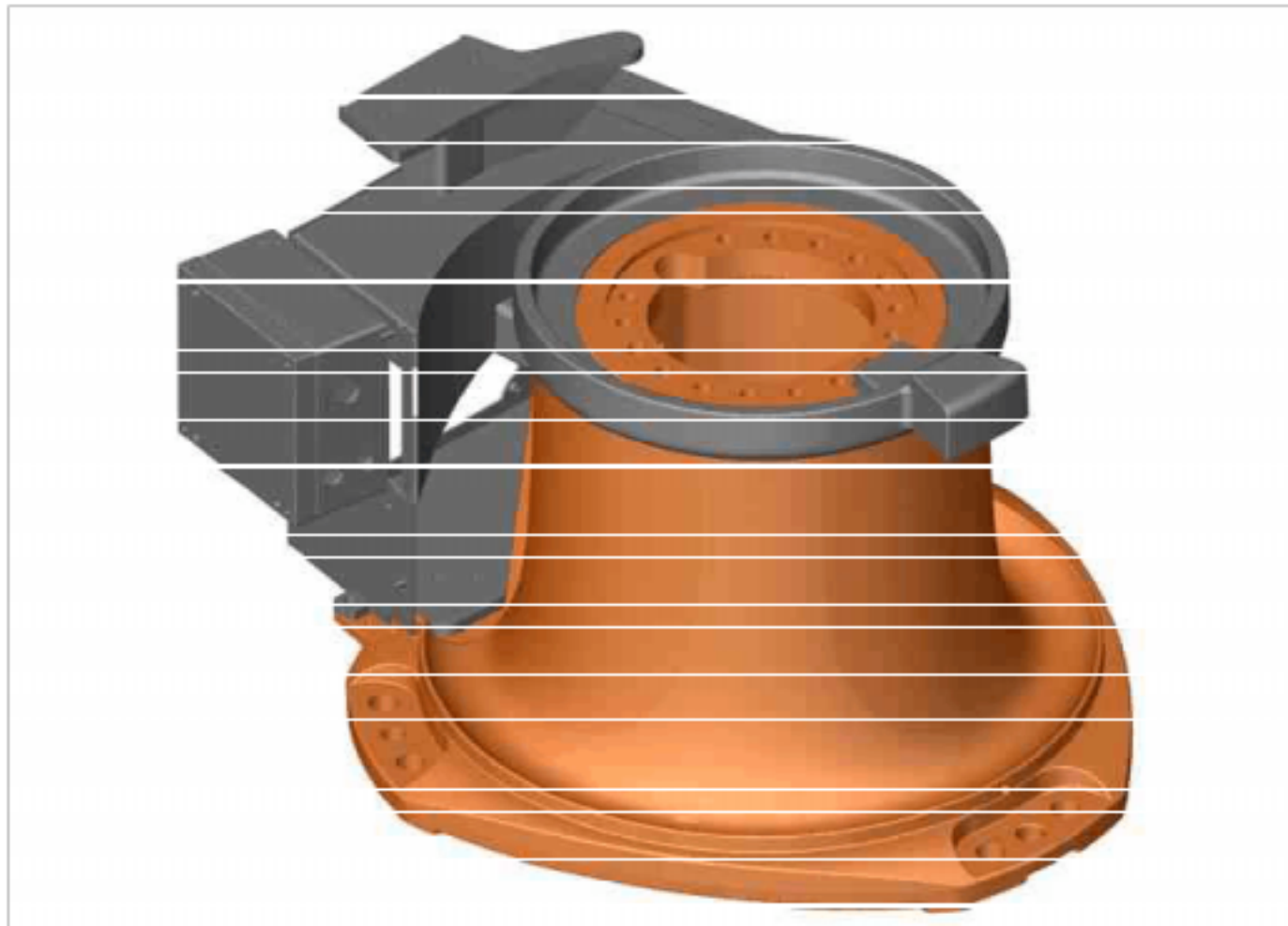
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Disassembly

2.5. Base unit

Base frame

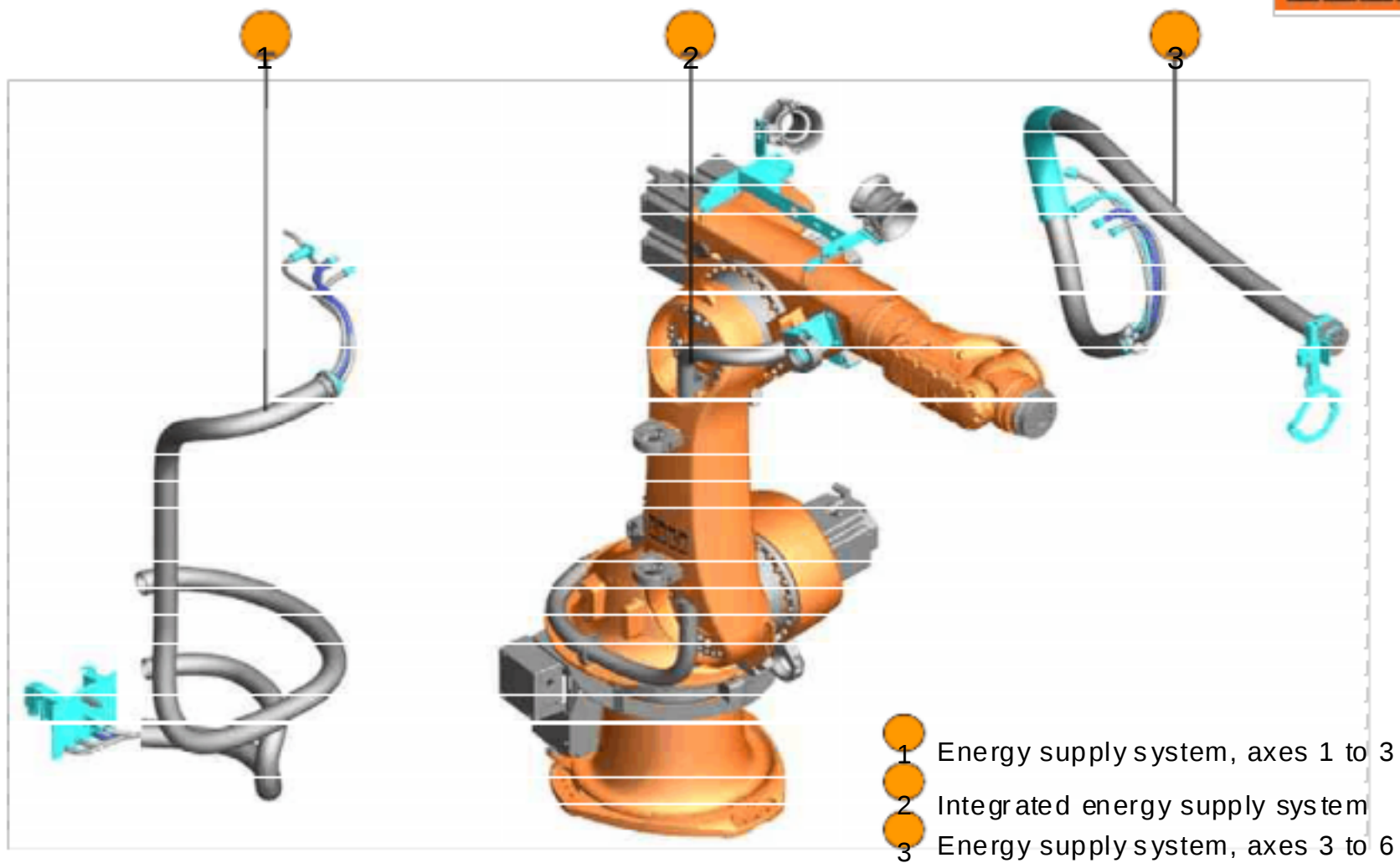


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2.6. Energy supply

Energy supply system disassembly



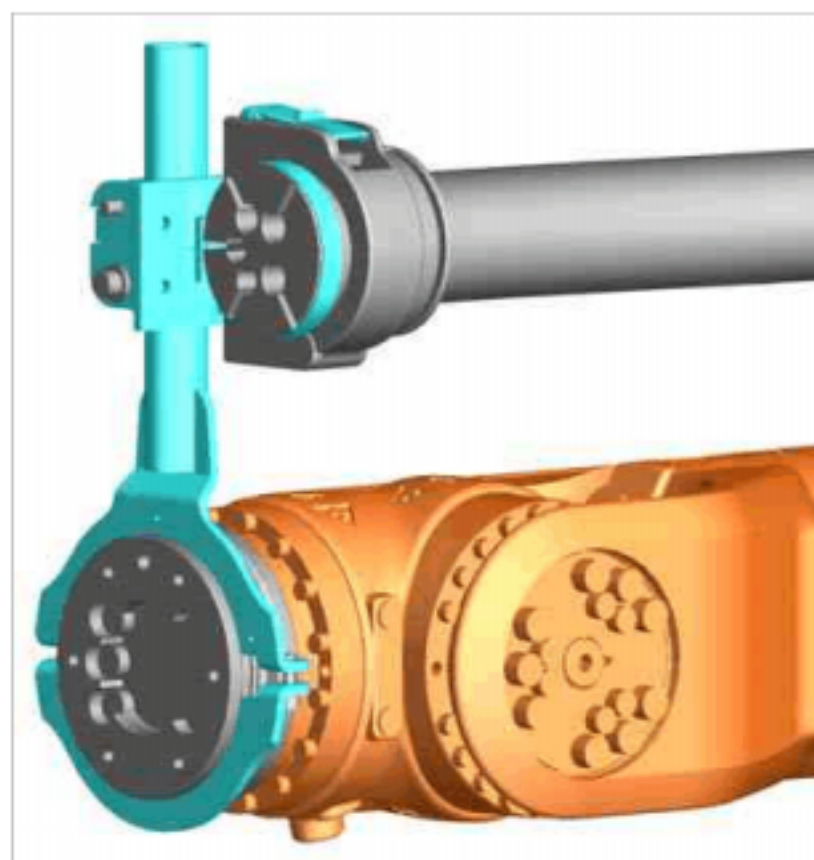
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Energy supply system disassembly



Energy supply system, axes 3 to 6

Mark position of the adjustable holder on axis 6 before disassembly.



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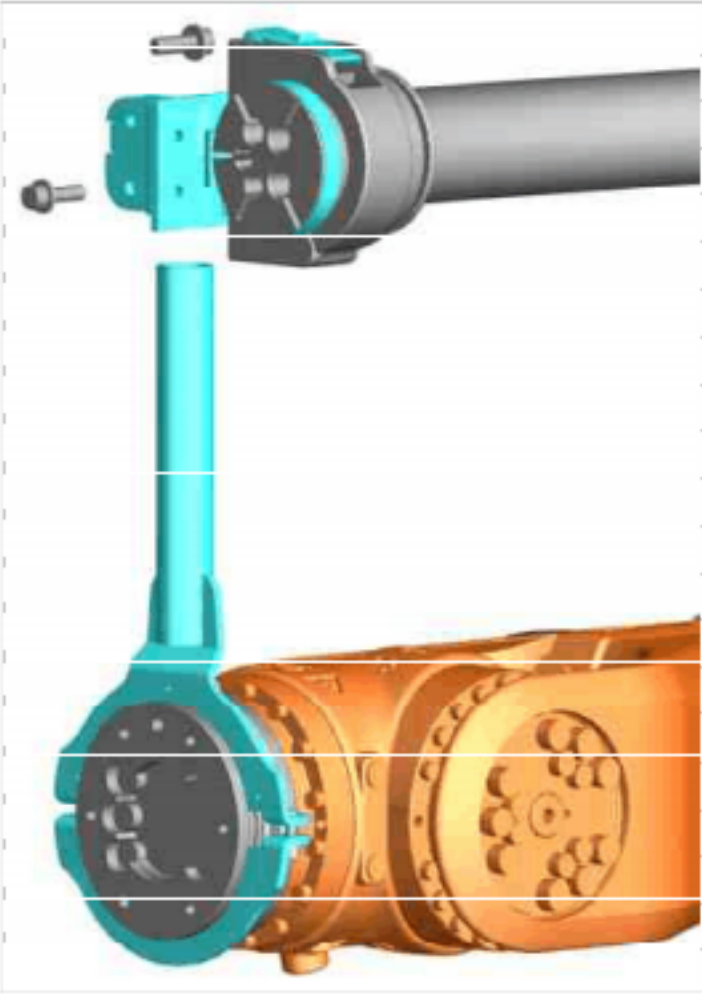


Energy supply system disassembly



Energy supply system, axes 3 to 6

Remove the two screws on the clamping piece of the holder and pull off energy supply system.



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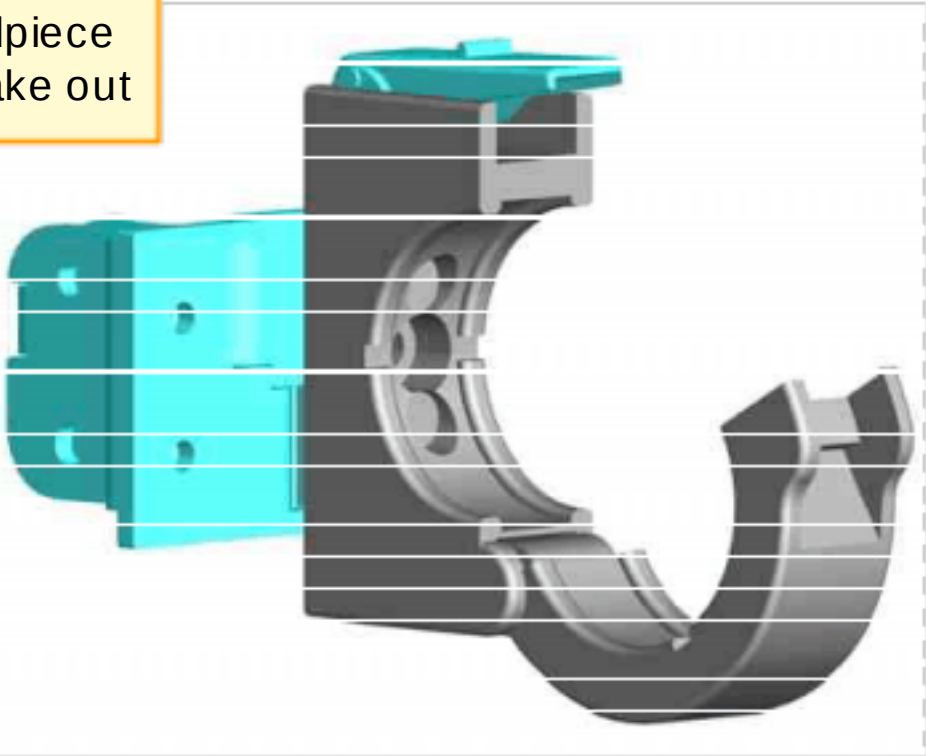
Energy supply system disassembly



Energy supply system, axes 3 to 6

Mark position of the cable set in the hinged clamp.

Open hinged clamp on ball endpiece of energy supply system and take out energy supply system.



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Energy supply system disassembly

Energy supply system, axes 3 to 6

Undo the two screws and remove the holder on axis 6.

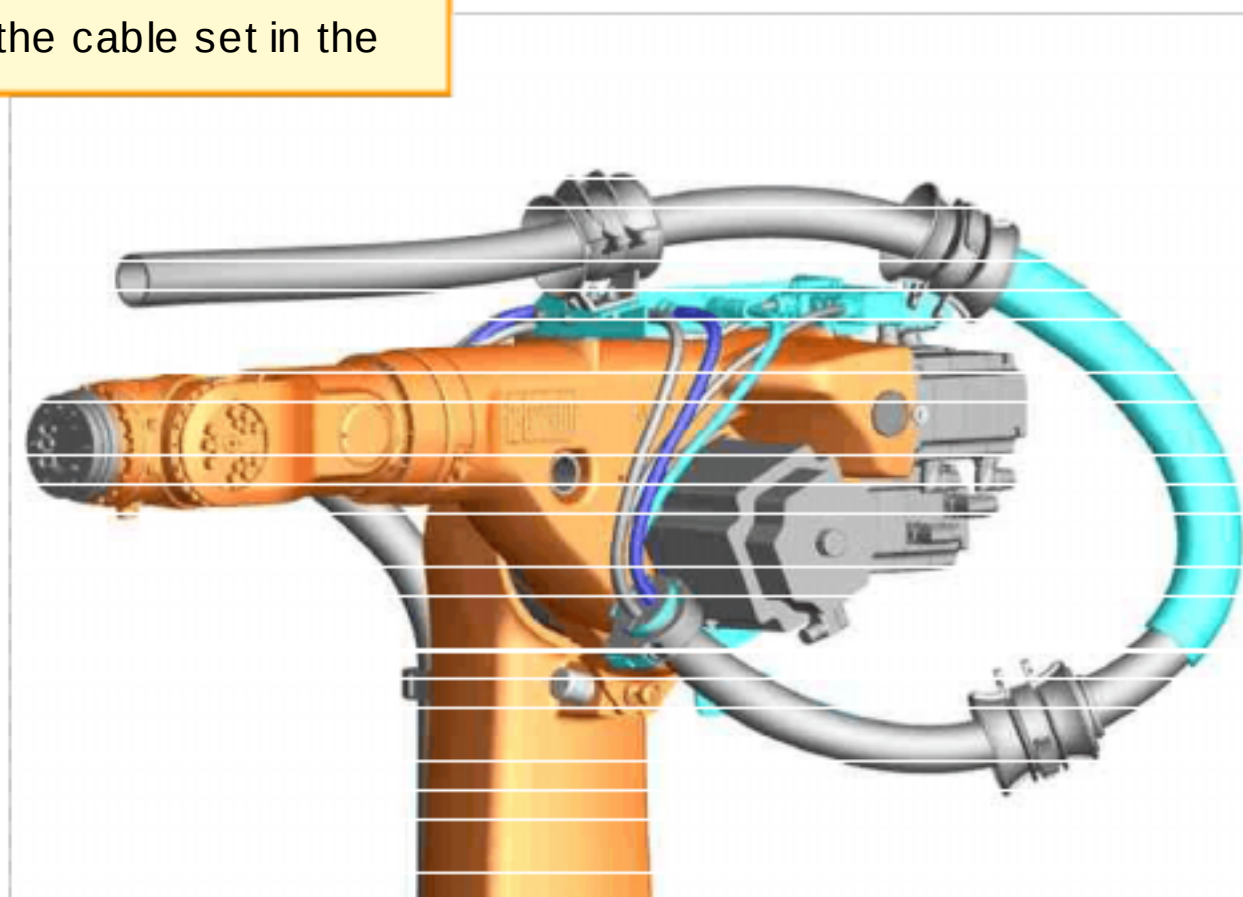


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Energy supply system disassembly

Energy supply system, axes 3 to 6

Mark position of the cable set in the clamps.



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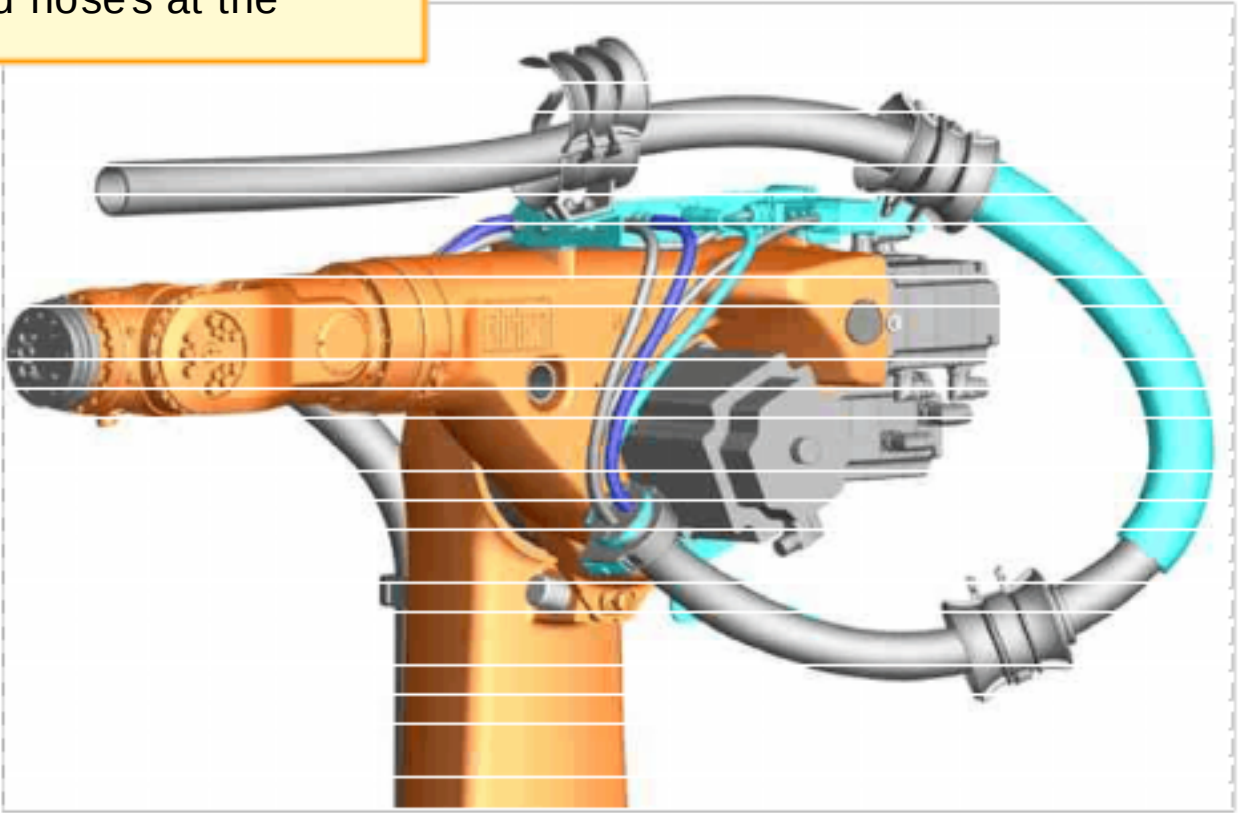


Energy supply system disassembly



Energy supply system, axes 3 to 6

Open clamps on the arm and unscrew cable and hoses at the connection plate.



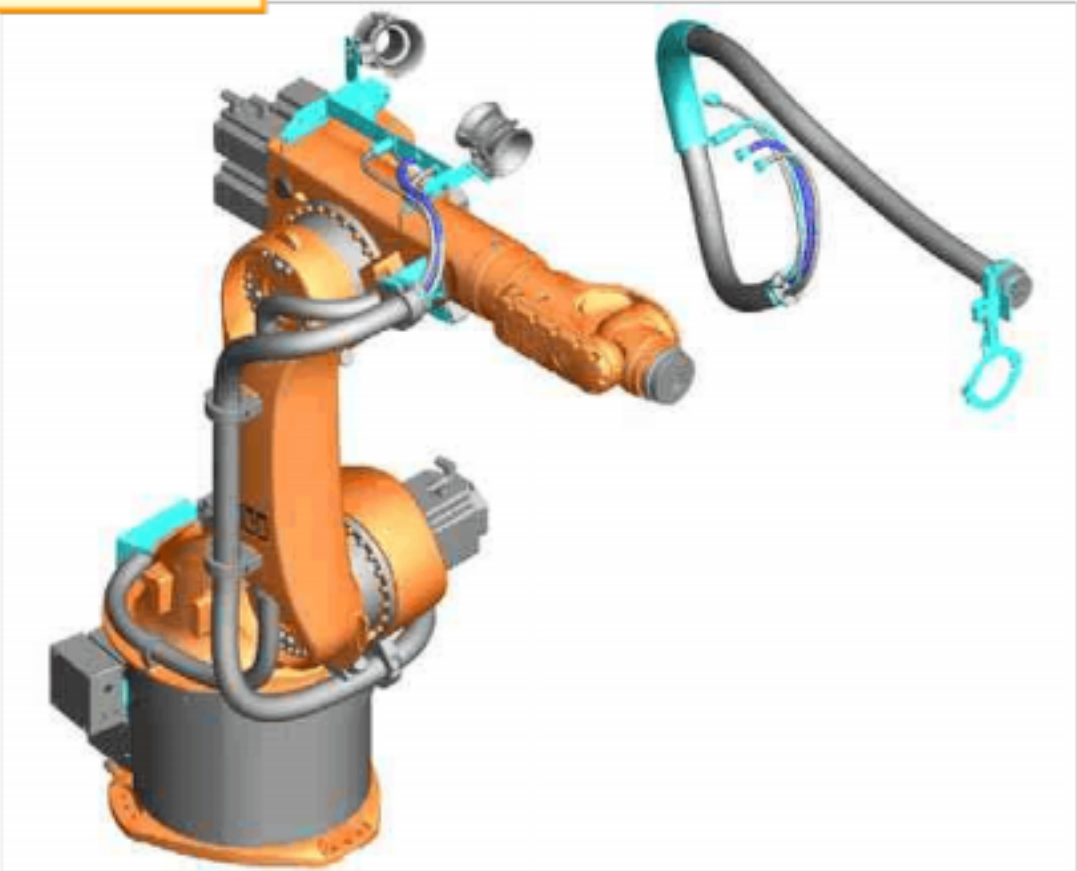
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Energy supply system disassembly



Energy supply system, axes 3 to 6

Lay energy supply system down on a suitable support surface.

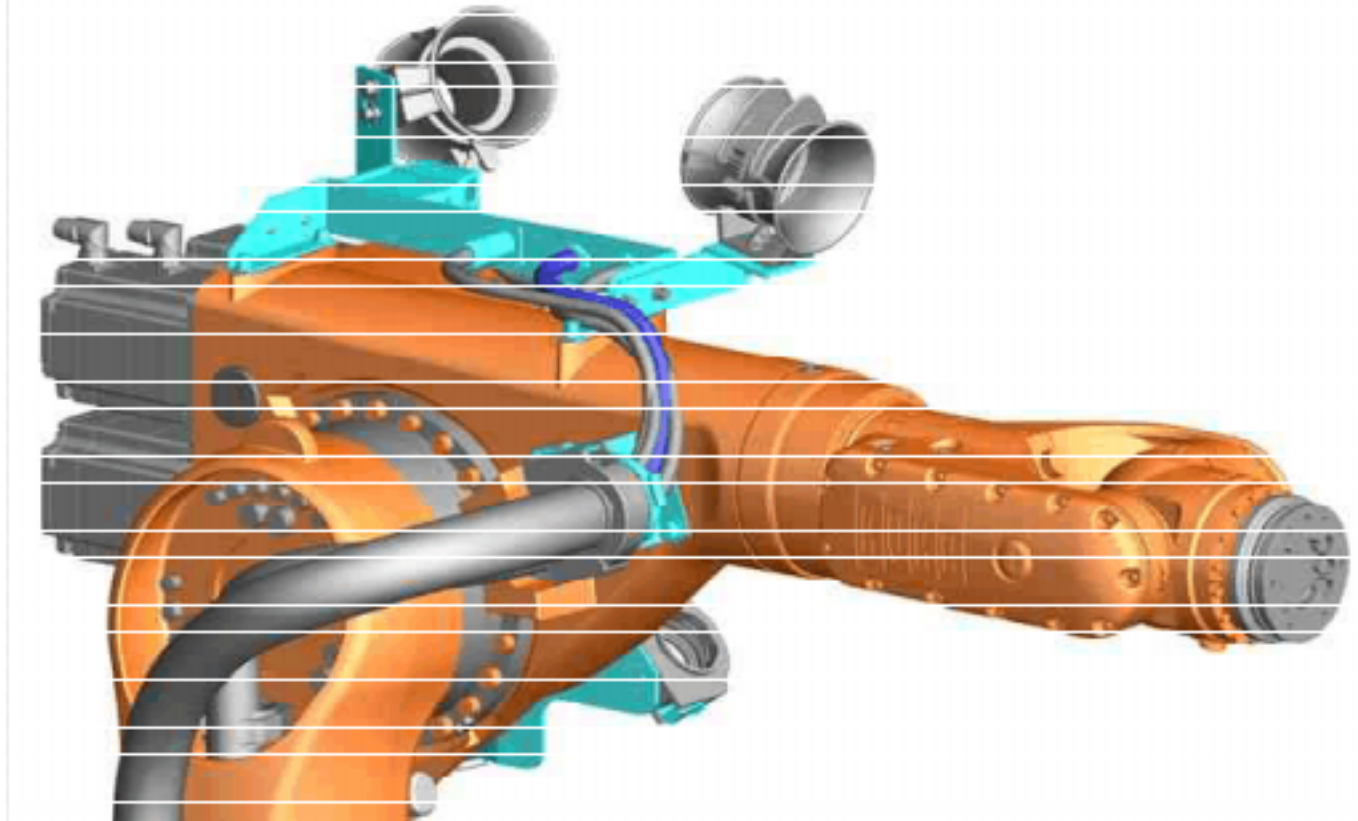


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Energy supply system disassembly

Energy supply system, axes 1 to 3

Unscrew cable and hoses at the connection plate.

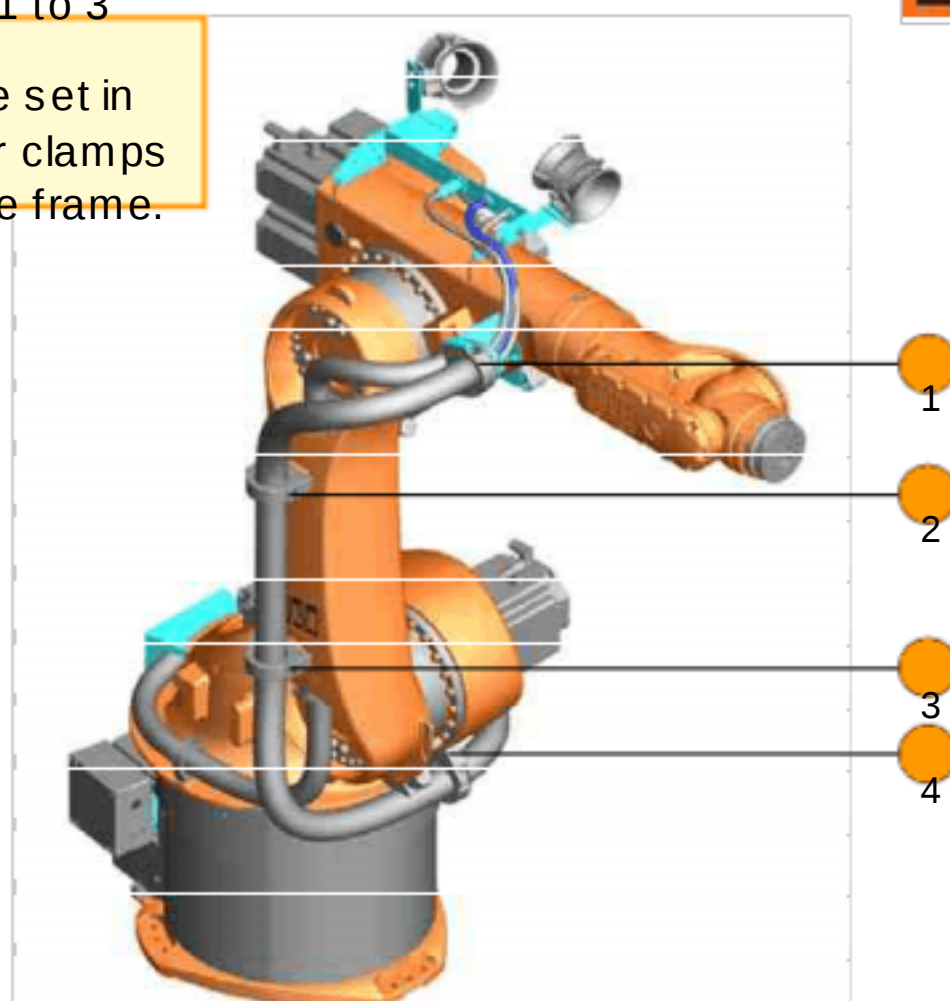


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Energy supply system disassembly

Energy supply system, axes 1 to 3

Mark the position of the cable set in the clamps and open the four clamps on the arm, link arm and base frame.



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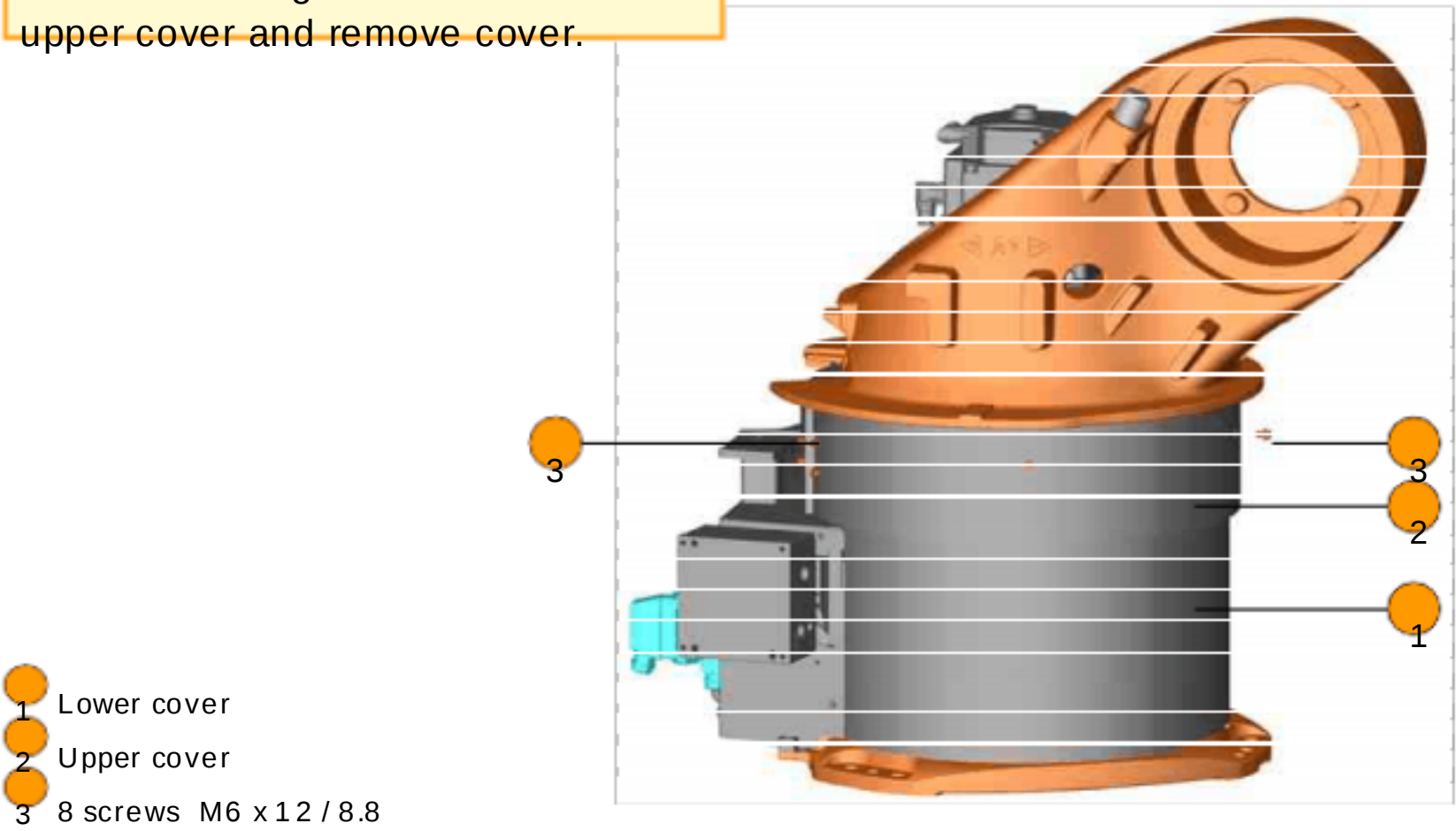


Energy supply system disassembly



Energy supply system, axes 1 to 3

Unscrew the eight screws on the upper cover and remove cover.



- 1 Lower cover
- 2 Upper cover
- 3 8 screws M6 x 12 / 8.8

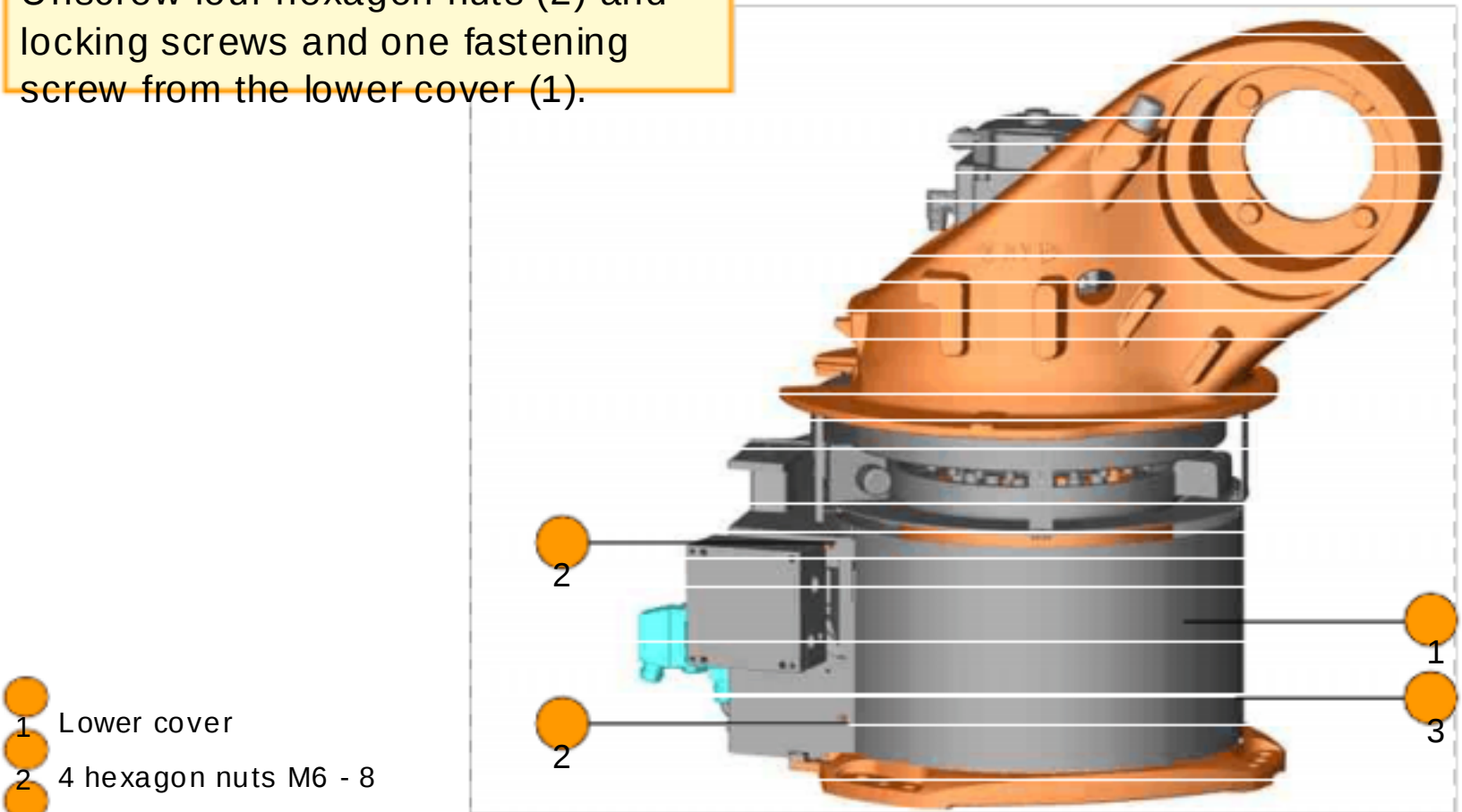
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Energy supply system disassembly



Energy supply system, axes 1 to 3

Unscrew four hexagon nuts (2) and locking screws and one fastening screw from the lower cover (1).



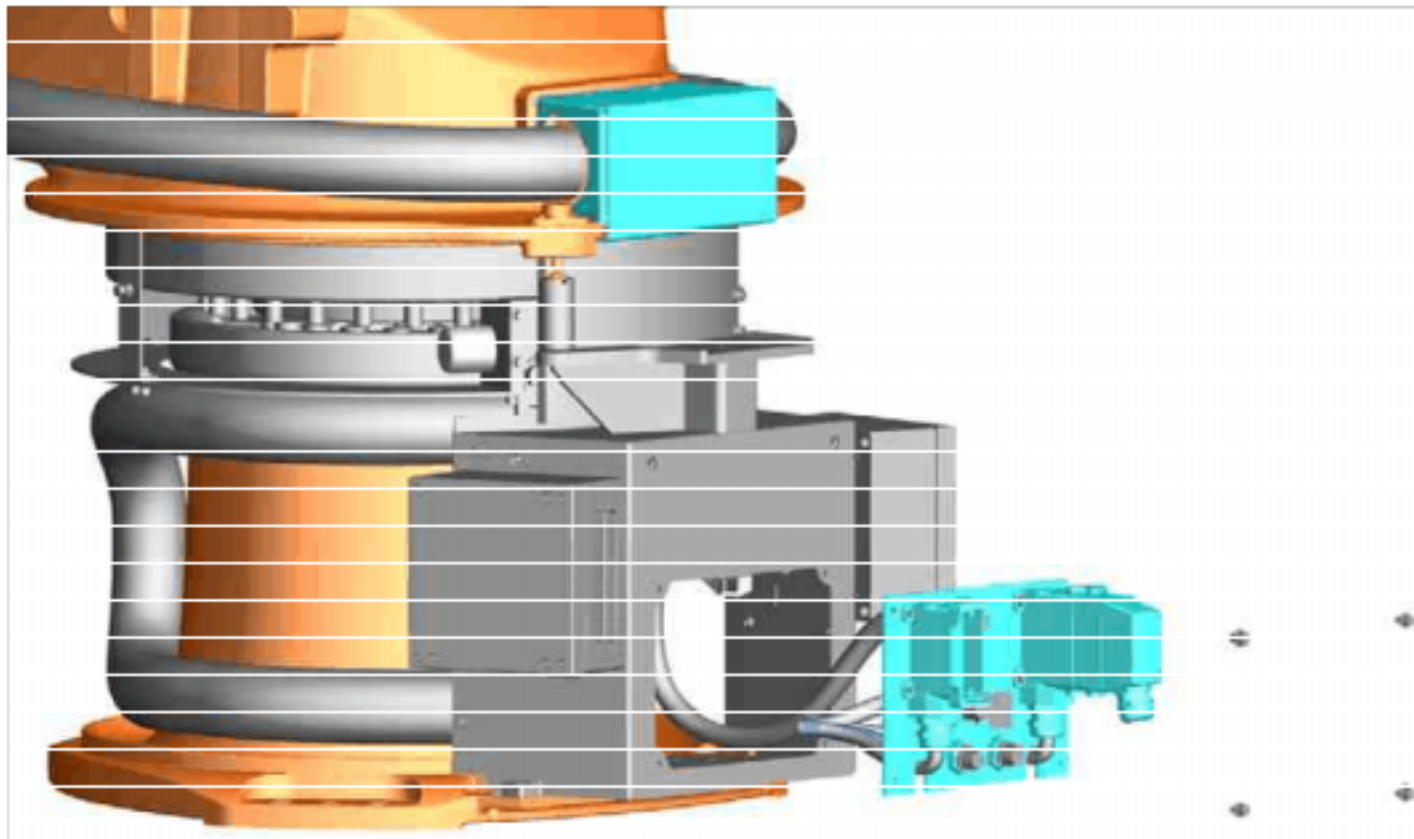
- 1 Lower cover
- 2 4 hexagon nuts M6 - 8
- 3 Screw M5 x 8 / 8.8

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Energy supply system disassembly

Energy supply system, axes 1 to 3

Remove base frame cover plate.

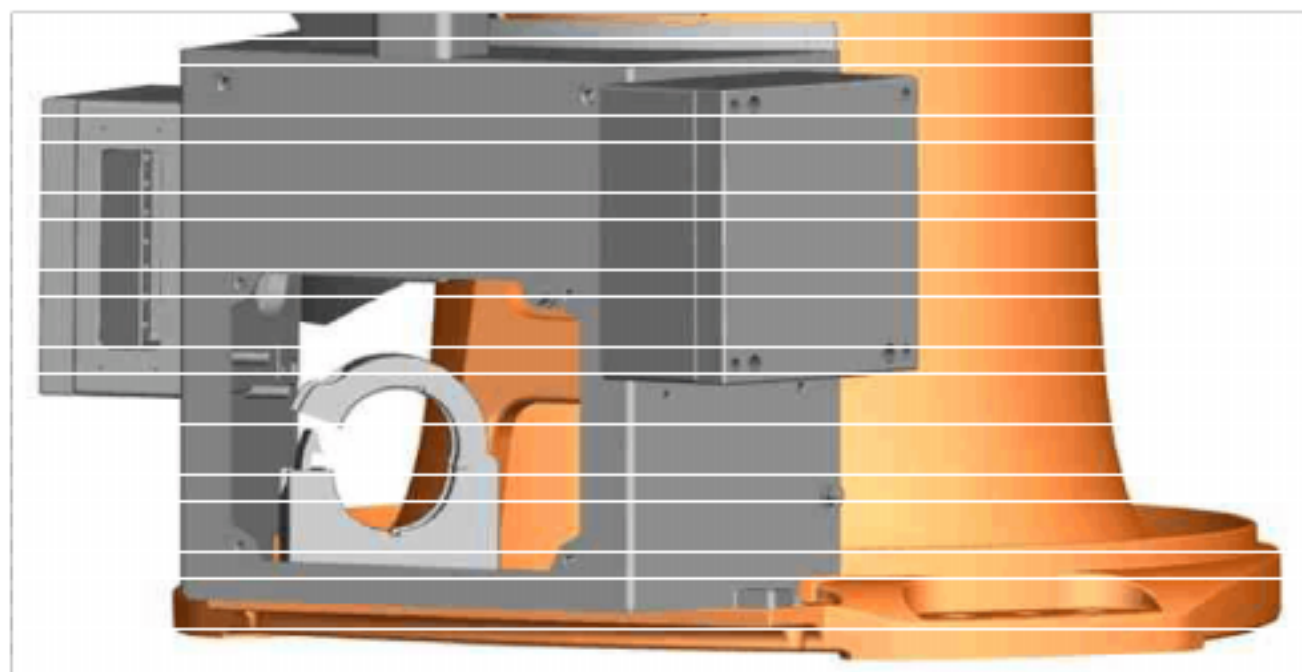


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Energy supply system disassembly

Energy supply system, axes 1 to 3

Mark the position of the cable set in the hinged clamp, open tube clamp in the base frame and take out energy supply system.



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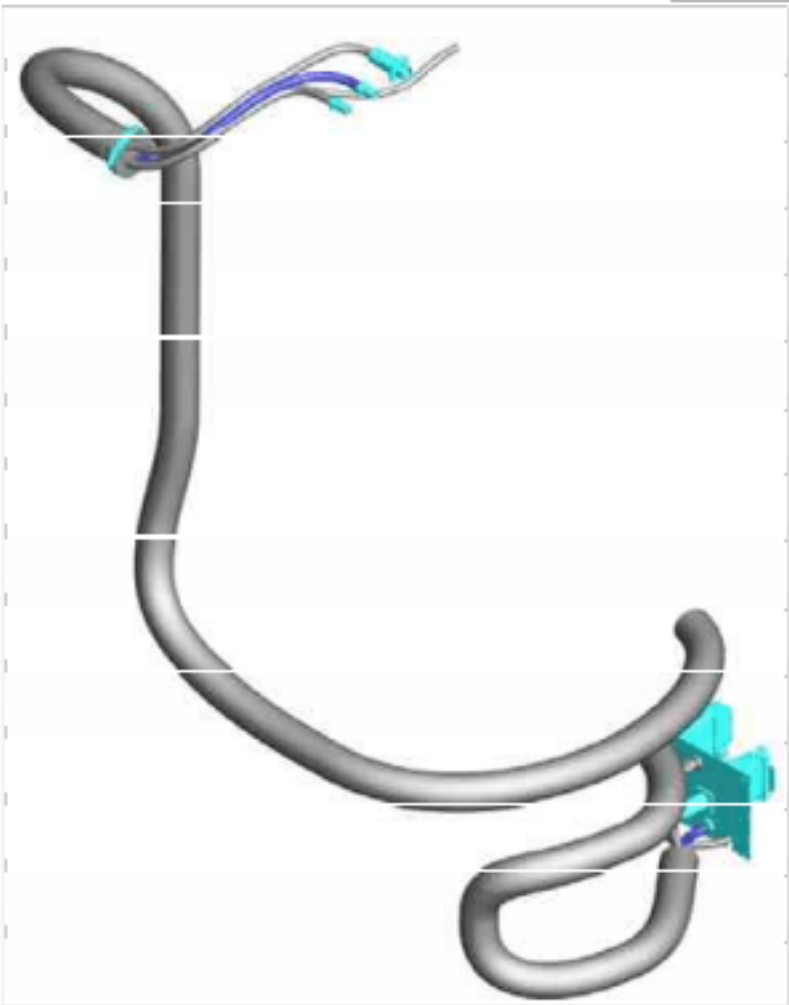


Energy supply system disassembly



Energy supply system, axes 1 to 3

Carefully pull out energy supply system from top to bottom through rotating column and base frame.



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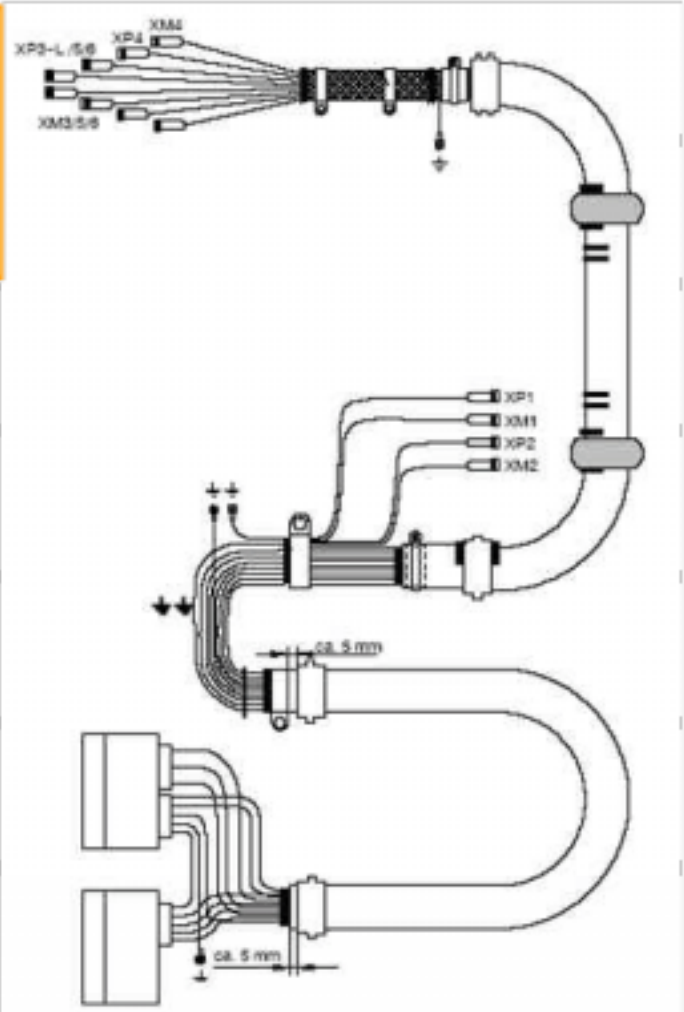
Energy supply system disassembly



Integrated energy supply system



Protective gloves must be worn!
All accident prevention regulations must be observed when handling cable grease.



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Energy supply system, axes 1 to 3

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Energy supply system, axes 1 to 3

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Energy supply system disassembly

Energy supply system, axes 1 to 3

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Energy supply system disassembly

Energy supply system, axes 1 to 3

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Energy supply system disassembly

Energy supply system, axes 1 to 3

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Energy supply system disassembly

Energy supply system, axes 1 to 3

Carefully pull out energy supply system from top to bottom through rotating column and base frame.

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Energy supply system disassembly

Energy supply system, axes 1 to 3

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Energy supply system disassembly

Integrated energy supply system

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Disassembly

Energy supply system disassembly

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