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Precision in Aircraft Support

Operating Instructions
+
Spare Parts List

Tow Bar

TOWB737-C

Serial number:..... 9780082

Year of Construction: 2012

CE

Original of the
Operating Instructions

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Precision in Aircraft Support

EC Declaration of Conformity

in the sense of the Machinery Directive 2006/42/EC

Designation of machine:	Tow Bar
Type/model:	TOWB737-C
Serial number:	9780082
Year of manufacture:	2012

We hereby declare that the above-mentioned machine, in the version put into circulation, complies with the essential safety and health requirements defined in the directive and also with the corresponding national legislation as far as its design and construction is concerned

A further compliance with the relevant and applicable EC directives as well as the provisions of the following harmonized standards is confirmed:

EN 12312-7:2005	Aircraft ground support equipment — Specific requirements — Part 7: Aircraft movement equipment
EN ISO 12100-1	Safety machinery – Basic concepts, general principles for design – Part 1: Basic terminology, methodology
EN ISO 12100-2	Safety of machinery – Basic concepts, general principles for design – Part 2: Technical principles

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Person responsible for the technical documentation:
Mr. Enrico Müller

Biberach,
03.02.2012
Date

i.A. Standards Department

This declaration will no longer be valid if the product is modified, retrofitted or transformed in any other way without the explicit approval of the manufacturer. This declaration will also lose its validity if components that are not HYDRO accessories are installed in the product or if the product is used inappropriately or not as intended.

Record of Revisions

The basic issue of this manual for the TOWB737-C has been published in June 2002:

02.06.0

year month revision number

Revision No.	Chapter	Revised Pages	Date	Inserted By
03.04.1	5-0	A8	11.04.2003	L. Schober
04.07.2	Data sheet	II	01.07.2004	A. Müller
	1-4	8	01.07.2004	A. Müller
	2-4	14	01.07.2004	A. Müller
	5-0	A2-A3, A6-8	01.07.2004	A. Müller
05.09.3	5-0	A12-A14	28.09.2005	M. Biegert
06.06.4	0-2	2	26.06.2006	M. Biegert
06.08.5	1-2	8		
	5-0	A2, A15	07.08.2006	L. Schober
07.09.6	5-0	A9	04.09.2007	L. Schober
07.10.7	Completely revised		01.10.2007	M. Biegert B. Maier
07.12.8	0-7	5	05.12.2007	B. Maier
	3-4	22		
	3-5	23		
	3-6	24		

Data sheet for tow bar TOWB737-C

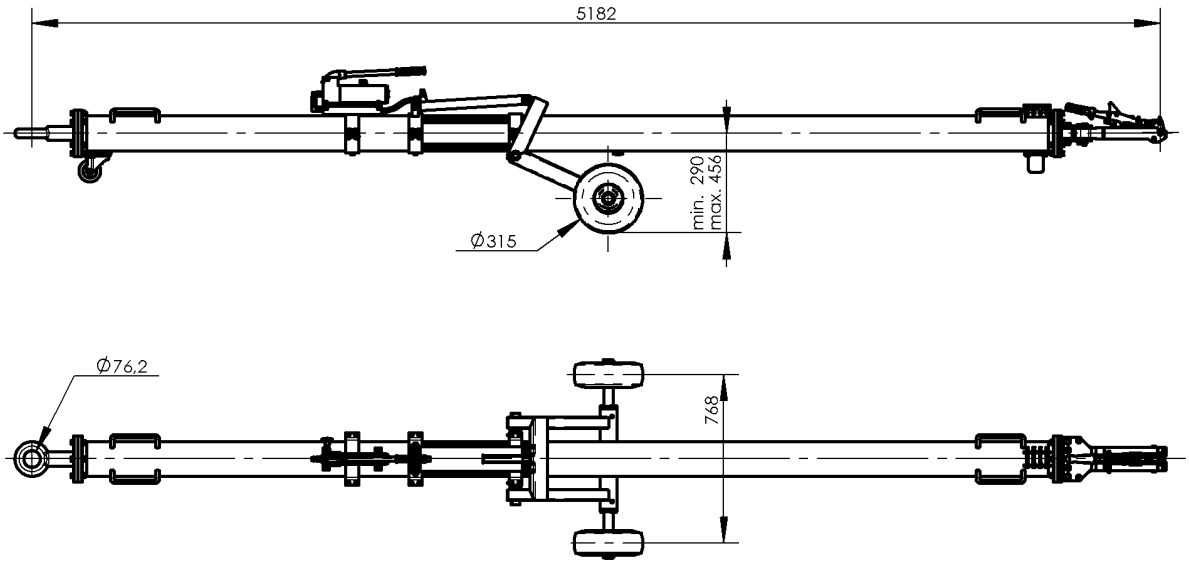

Fig.: 1 Data sheet

Total length:	5286 mm
Total width:	906 mm
Tube:	steel tube, ∅ 160 mm
Weight:	210 kg
Operating temperature:	- 20° C to + 60° C / (- 4° F to + 140° F)
Tires:	4.00-4; 7 bar
Tow eye:	rigid
Tow head:	not revolving
Shear pin:	part no 00432-305-000 for B737-300 to -700
	part no 00432-348-000 for B737-800/-900

Suitable for the following aircraft types:

B737

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Introduction

A safe operation of the equipment is only guaranteed, if the operator has read and understood the operating instructions. Authorized personnel may only operate the equipment.

Safety instructions are included in chapter 0-0 as well as in the chapters where operating principles and movements are described.

Any person who is entrusted with operation, maintenance or repair of the equipment must have read and understood these instructions, and in particular chapter 0-0 “Safety”.

A disregard of these operating instructions and any damage resulting from such a disregard leads to an exclusion of liability by ***HYDRO Systems KG***.

These operating instructions cannot anticipate every potential application. For further information or in case of problems that are not described or described insufficiently in these operating instructions, please contact manufacturer.

0-0 SAFETY

0-1 Explanation of Directions Used in this Manual

Caution:	*Caution* stands for a potentially dangerous situation.

A negligence of these directions can result in injury
to a person or can cause damage to the equipment.

Important:	*Important* stands for an important direction for the proper usage of the machine.

A negligence of these directions can result in damage
to the machine or the machine surroundings.

0-2 General Remarks

- These operating instructions are part of the equipment. They must always be accessible to the operator, allowing the operator to inform himself.

- If the tow bar is sold, the operating instructions must be supplied with the equipment.

- The tow bar may only be used for the purpose defined in the following paragraph.

Important:	Attach the tow bar to the towing vehicle's hitching point appropriate to the towing height for the aircraft. Warning! Take into account the tow bar's height to avoid risk of collision into the aircraft.

Notice:	The max. towing speed depends on the instructions given by the aircraft manufacturer, the local regulations of the airport operator as well as any applicable regulations of national organizations and aircraft owner. In addition, the prevailing weather conditions as well as ambient conditions are to be taken into consideration when selecting the towing speed.

Max. admissible towing speeds		
without aircraft	See information sticker **P/N 10326_00** which is attached to the product.	In case of a lack of regulations and optimum conditions, the manufacturer recommends not to exceed the max. towing speed indicated on the product.
with aircraft	See information sticker **P/N 10325_00** which is attached to the product.	

Tab.: 1 Towing speed

0-3 Purpose / Use According to Intended Purpose

- The tow bar has been designed for towing operations of all aircraft types listed in the data sheet, e.g. to tow the aircraft to and from its parking position and push it out of a so-called "Nose-In-Position" at a terminal point.
- During this procedure the tow bar may only be connected to the defined attachment point of the aircraft.

0-4 Responsibility of Operators

- Only trained and instructed personnel may work with the tow bar. The operating instructions are to be respected.

- The personnel's responsibility for start-up, operation, maintenance and repair of the tow bar must be clearly defined.

0-5 Safety Instructions

- All safety instructions and warnings on the equipment and in the operating instructions must be respected.
- In addition to the operating instructions, the general as well as the local regulations regarding accident prevention and environment protection must be provided by the operator and respected.
- All safety instructions and warnings on the equipment must be kept in a readable condition.

0-6 Safety Features and Protective Devices

- All safety features must be checked at periodic intervals.

- Before every use of the tow bar, all protective devices must be mounted and work properly.

- Protective devices may only be removed
  - if the machine is out of operation
  - if safety measures have been taken to prevent a putting into operation of the tow bar.

- After the delivery of individual components and after repair works (carried out with the manufacturer's consent) all protective devices must be mounted properly again.

0-7 Risks Due to Hydraulic Energy

- Persons with special knowledge and experience in hydraulics may only carry out Works on the hydraulic system.

- System sections and pressure lines, which have to be opened, must be depressurized before starting with the repair works.

- Check hydraulic hose lines in regular intervals. The recommended inspection period is 12 months.

- Immediately replace the hydraulic hose lines when damaged.

- Replace hydraulic hose lines in appropriate intervals, even if there are no recognisable technical-safety defects. The recommended replacement interval is six years, including a storage time of two years.

- Observe additional local and national safety regulations and guidelines for hydraulic hose lines.

- Do not change any factory-set parameters.

0-8 Modification of the Equipment

- Do not make any modifications to the equipment without consent of the manufacturer. Extensions or conversions are not allowed either.

- Any retrofit work requires a confirmation in writing from **HYDRO Systems KG**.

- Use only original manufacturer's spare parts.

0-9 Appropriate Disposal

Safe Environmental disposal of

- consumables (e.g. oil, lubricant)
- cleaning agents and
- the complete device when no longer used (redundant)

must be carried out using local disposal regulations.

0-10 Copyright

- These operating instructions are only intended for the operator and his personnel.

- **HYDRO Systems KG**, D-77781 Biberach/Baden has the copyright of these operating instructions.

0-11 Potential Sources of Danger

	Where	What	How to avoid
Mechanical system	Tow head	During attachment to the aircraft risk of contusion for fingers / hands.	Watch for contusion points during attachment.
	Tow eye	During attachment to the tractor risk of contusion for fingers / hands.	Watch for contusion points during attachment.
		During attachment risk of contusion for legs.	Do not stand between tractor and tow eye.
	Height-adjustable undercarriage (if available).	During retraction of undercarriage risk of contusion for fingers in return springs.	Keep hands away from return springs.

Tab.: 2 Sources of Danger

1-0 DESCRIPTION

1-1 General Information

The tow bar has been designed for towing operations of all aircraft types listed in the data sheet.

During these towing operations the tow bar is coupled to the defined attachment fitting on the aircraft NLG and to a suitable tractor.

Regarding the max. admissible towing speed, see table in chap. 0-2 of this manual.

Basically, the tow bar consists of the following components:

- tube body with handles
- tow eye
- tow head with overload protection (shear pins) and retaining pin
- hydraulic undercarriage, adjustable in height

1-2 Tube Body

The tube body connects the tow eye with the tow head and accommodates the undercarriage.

At both ends of the tube there are handles facilitating the maneuvering operation.

A support on the tow eye side and a support on the tow head side prevent a crashing of the tow eye and the tow head onto the ground.

1-3 Tow Eye

The tow bar is delivered with a tow eye for hanging on to an appropriate tractor (for inside diameter of the tow eye, see data sheet).

1-4 Tow Head

The tow head is the connection between tow bar and aircraft.

The tow head is designed to fit in the defined attachment fitting on the NLG of the aircraft.

A locking mechanism prevents an unintentional opening of the tow head.

Shear pins protect the NLG against overload. An additional retaining pin prevents a total separation of tow head and tube body.

Fig.: 2 Application of Shear pins

1-5 Hydraulic Undercarriage

Basically, the undercarriage consists of the following components:

- welded tube construction
- floating axle with two air-inflated tires
- single-acting hydraulic cylinder
- return spring
- hand pump with release and safety valve.

To extend the undercarriage, the operator must activate the hydraulic cylinder by means of the hand pump. During this process, the release valve must be closed.

To retract the undercarriage, the operator must open the release valve. The undercarriage returns to its upper end position by means of a return spring system.

To transport the tow bar the undercarriage must be extended; to tow the aircraft it must be retracted to avoid damage to the tow bar.

1-6 Safety

The tow bar has been so designed that damage to the aircraft nose landing gear, which might be caused by the transmission of excessive forces on the attach fittings, is avoided.

In overload cases the shear pins integrated in the tow head break.

A retaining pin prevents a total separation of tow head and tube body.

1-7 Spare Parts Service

Delivery of all spare parts manufactured by ***HYDRO*** is guaranteed for ten (10) years.

2-0 OPERATION

2-1 Transport of Tow Bar to Aircraft

2-1-1 Check whether undercarriage is fully extended and whether release valve (to be found on hand pump) is closed.

Important:	Transport of tow bar without aircraft is only allowed with fully extended undercarriage!

2-1-2 Connect tow eye of tow bar to coupling of tractor.

2-1-3 Move tow bar to required position at the aircraft (NLG).

2-1-4 Uncouple tow bar from tractor and tilt tow eye side carefully towards the ground.

Attention:	Note max. towing speed (see chapter 0-2).

2-2 Connection to Aircraft

Caution:	A tow bar that is not coupled horizontally can lead to a changed fracture behaviour of the shear bolts. In extreme cases this can cause to damages to the nose landing gear and to the tow bar, as well as lead to raising the landing gear. When connecting to the aircraft make sure that the tow bar is positioned horizontally as far as possible while connected.

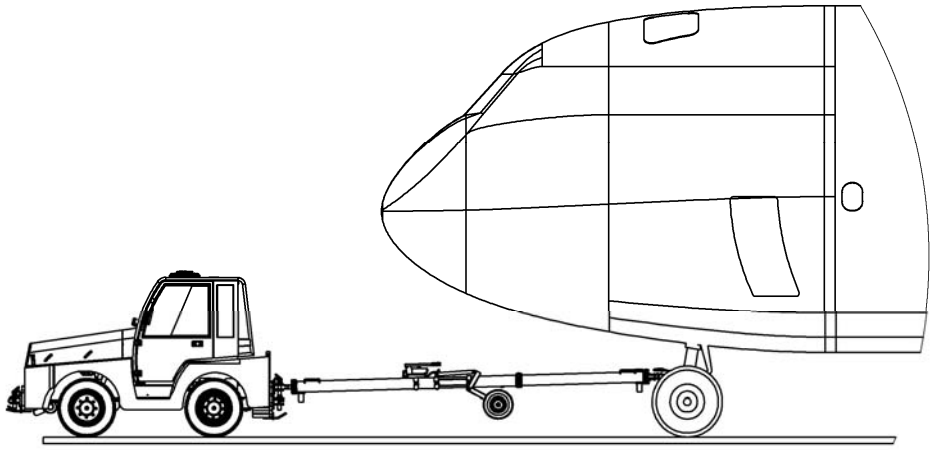


Fig.: 3 Horizontally coupled tow bar

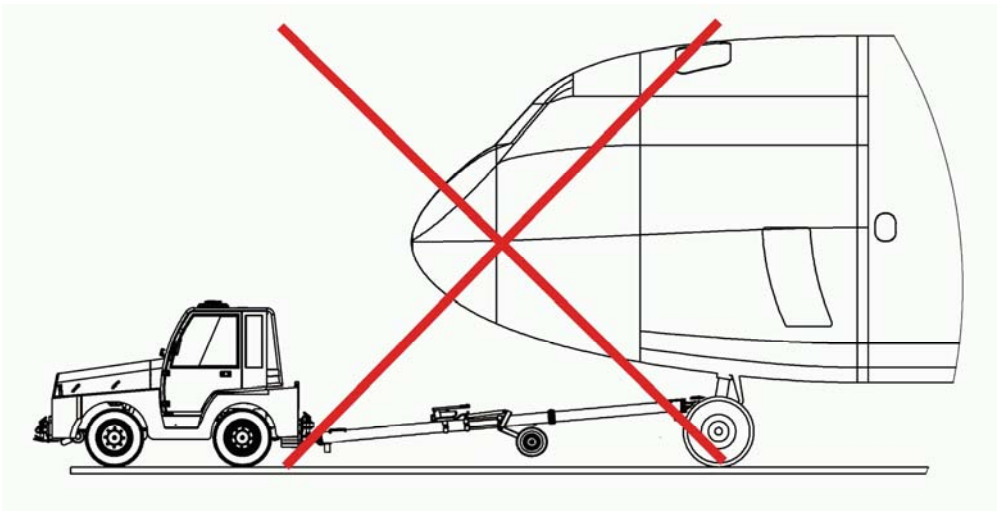


Fig.: 4 Tow bar not coupled horizontally

2-2-1 Move tow bar manually to correct position at NLG fitting.

2-2-2 Adjust tow head to NLG fitting height by lowering undercarriage slowly (open release valve slightly).

2-2-3 Attach tow head to NLG fitting and secure it against unintentional opening (see chapter 2-4).

Caution:	Watch for contusion points. Risk of contusion for hands and fingers.

2-2-4 Move the undercarriage of the tow bar by means of the hydraulics in or out until the tow eye can be hung on the hitch of the tractor.

Caution:	Risk of contusion for hands, fingers and legs. Do not stand between tractor and tow bar.

2-2-5 Retract undercarriage completely by opening release valve on hand pump.

Caution:	If the landing gear is not run in completely during the towing process, it can lead to damages to the aircraft and/or to the tow bar. Run the landing gear in completely during the towing procedure.

Important:	Make sure that the maximum steer angle is not exceeded while towing!

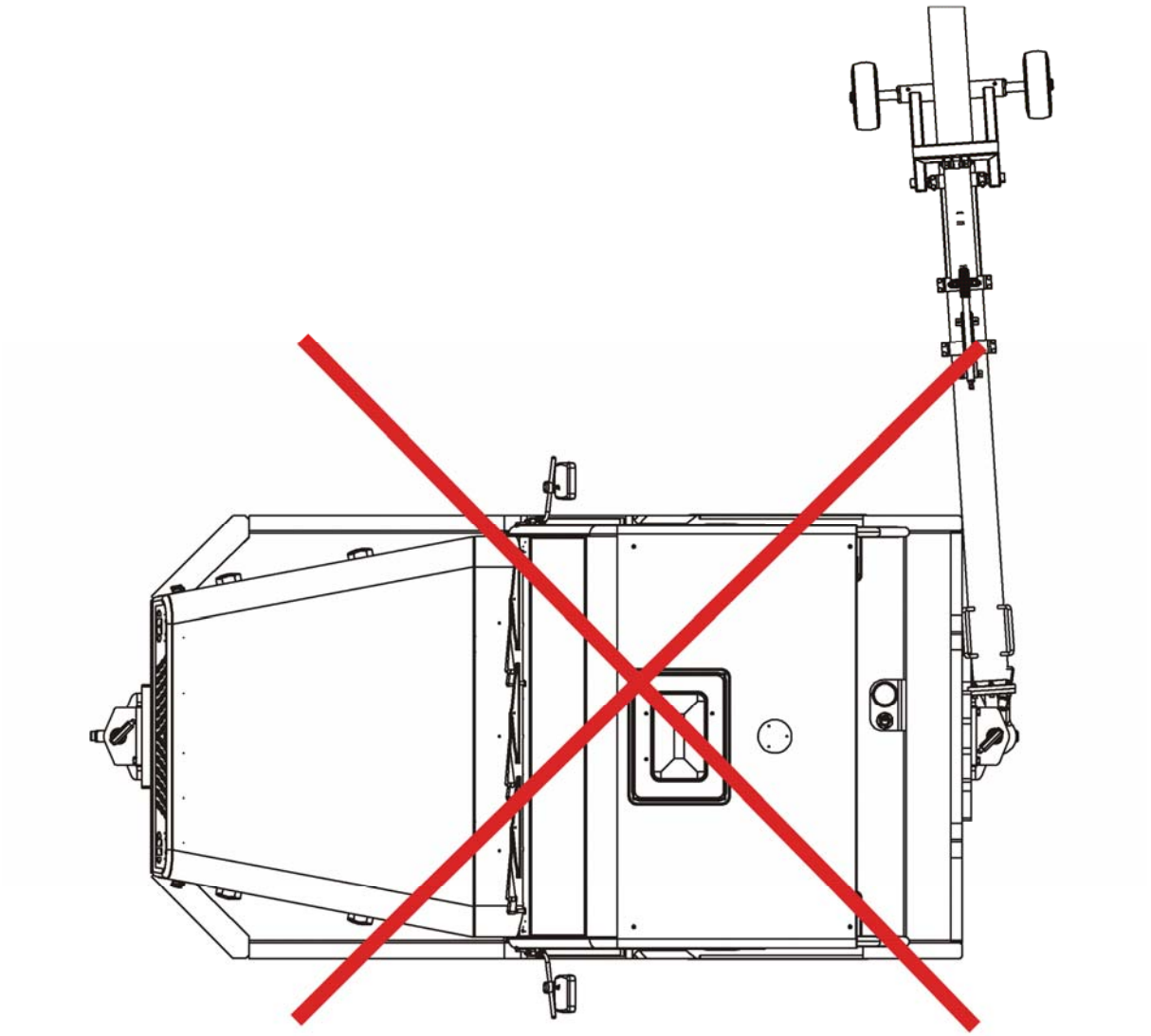


Fig.: 5 Exceeding the maximum steer angle

2-3 Disconnection from Aircraft and Tractor

2-3-1 After completion of aircraft movement, extend undercarriage of tow bar until tow eye can be uncoupled from tractor (close release valve).

2-3-2 Uncouple tow eye from towing tractor. Move towing tractor to the side.

2-3-3 Disconnect tow bar from aircraft and move it to the side (see also chapter 2-4).

Caution:	A collision of the tow bar and aircraft can lead to damages to the aircraft and/or to the tow bar. Avoid collisions while separating the aircraft and tow bar.

2-3-4 Extend undercarriage completely. Couple tow bar to tractor and tow it to parking position.

2-4 Functional Description of Tow Head

How to open

- Pull out safety pin (1)
- Press down lever (2) while pulling ratchet (3) backwards simultaneously.
- Pull lever (2) upwards until jaw (4) is completely opened.

How to close and lock

- Press down lever (2) until ratchet (3) engages.
- Insert safety pin (1).

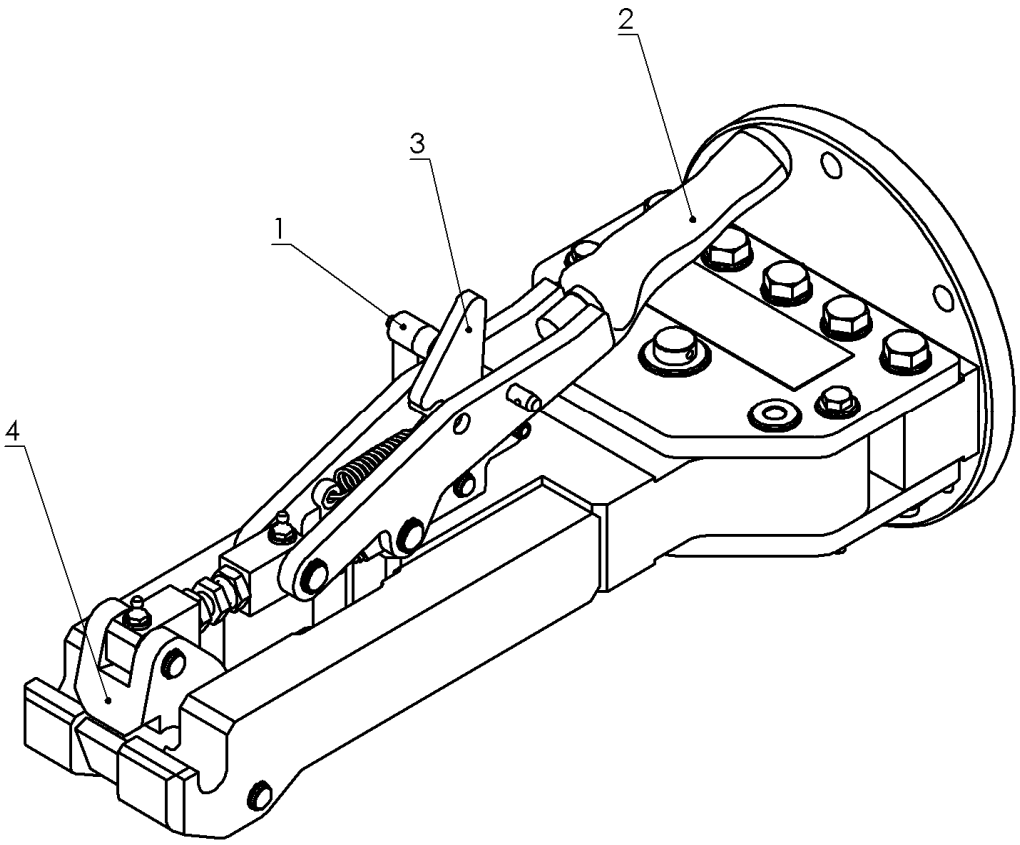


Fig.: 6 Tow Head

3-0 MAINTENANCE

3-1 Table of Maintenance Instructions

To ensure that the tow bar is always ready for operation, we recommend to carry out the following maintenance works:

WHEN	WHAT	REMARKS
Before every use	Check tow head for damage and proper functioning.	- Are all parts complete? - Do the mobile parts move easily?
	Check shear pins.	- Are shear pins available? - Is there any shear pin damage visible in built-in condition? Replace shear pins in case of damage (see chapter 3-2).

Weekly	Check entire tow bar (visual inspection and functional inspection).	- General condition
	Check hydraulic system (if available).	- Leakage - Functioning of pump
	Check tires (if available).	- Tire pressure (if available): See data sheet - Condition of tires.
Monthly	Visual inspection of shear pins for cracks and visual damage.	- Dismount shear pins for inspection. Replace them in case of damage (see also chapter 3-2)
	Grease tow head. Grease undercarriage. Check oil level.	See chapter 3-4 See chapter 3-4 See chapter 3-5

Tab.: 3 Maintenance Instructions

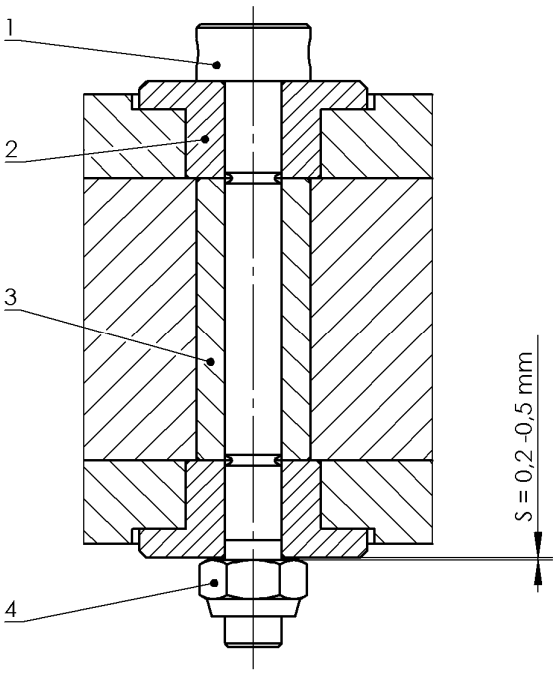
3-2 Replacement of Shear Pins

Caution:	The use of shear pins with different shear values can lead to damages to the landing gear. Use original manufacturer's shear pins only (for part number see data sheet).

Caution:	If the hexagonal nut is firmly tightened on the block it can lead to premature or late breaking of the shear pin during the towing process. Clearance S must be assured by all means (see Fig.: 7).

Important:	Install self-securing hexagonal nut according to sketch (see Fig.: 7). Grease shear pins before installation.

1. Remove safety element of shear pin.
2. Remove shear pin.
3. Check shear bushings for potential damage and replace them by new bushings if necessary.
   Potential damages are for example burrs, formings and/or ovality.
4. Insert new shear pins and secure them.



1 Shear pin
2 Shear bushing (with collar)
3 Shear bushing
4 Safety element

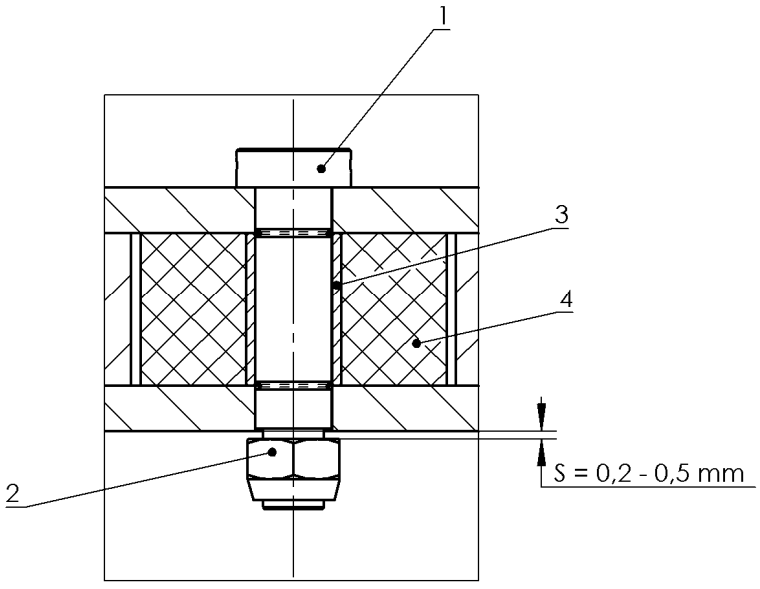
Fig.: 7 Replacement of shear pin

3-3 Replacement of retaining pin

Caution:	The use of retaining pins with different shear values can lead to damages to the landing gear. Use original manufacturer's retaining pins only (for part number see data sheet).

Caution:	If the hexagonal nut is firmly tightened, it can lead to premature or late breaking of the retaining pin. Clearance S must be assured by all means (see Fig.: 8)

1. Unscrew nut (2).
2. Remove retaining pin (1).
3. Check bushing (3) and buffer (4) for possible damages.
4. If necessary, insert retaining pin and secure with nut.



1 Retaining pin
2 Nut
3 Bushing
4 Buffer

Fig.: 8 Replacement of retaining pin

3-4 Grease Requirements and Grease

Clean all mobile parts of tow head and undercarriage and grease them.

Only use lubricants and greases which comply with the following specifications:

Qualitatively high-grade calcium, lithium or a combined calcium-lithium saponified grease with a mineral oil base	ISO6743/9
DIN 51825 quality	KP2K-30 or ISO L-XCEEB2
Consistency class	NLGI 2
Water resistance	0-90 or 1-90

3-5 Checking of Oil Level

Check oil level with completely retracted undercarriage and horizontal position of tow bar. Oil level must reach at least mark at oil dip stick of tank cap. Refill oil if necessary.

On delivery, the unit is filled with **ESSO UNIVIS HVI 13** hydraulic oil.

If other hydraulic oils are used, these need to comply with the following specifications:

HV-hydraulic oil with a mineral oil basis complying with ISO 6743/4	
Viscosity class	ISO VG 15
Viscosity index, AMST D 2270	> 370
Pouring point, °C, ASTM D 97	< - 60
Flashpoint, °C, ASTM D 92	> 101
Copper corrosion, ASTM D130	1A

Important: The hydraulic oil used on delivery contains zink. Different hydraulic oils are not to be mixed together.

If the original hydraulic oil is not used, other product compatibility with the following sealing materials is to be checked:

- PU
- NBR
- FKM/FPM
- PTFE
- PTFE compound
- POM
- PFA

3-6 Tightening torques for common screw connections

Important: This table does not apply to
- shear pins and retaining pins,
- those threaded connections which are explicitly given other values in the operating instructions.

Screw	Property class					
	8.8		10.9		12.9	
	[Nm[1]]	[lbf in[2]]	[Nm[1]]	[lbf in[2]]	[Nm[1]]	[lbf in[2]]
M 2	0,38	3	0,56	5	0,65	6
M 3	1,3	12	1,9	17	2,2	19
M 4	2,9	26	4,1	36	4,9	43
M 5	6,0	53	8,5	75	10	89
M 6	10	89	14	124	17	150
M 8	25	221	35	310	41	363
M 10	49	434	69	611	83	735
M 12	86	761	120	1062	145	1283
M 14	135	1195	190	1682	230	2036
M 16	219	1938	295	2611	355	3142
M 18	290	2567	400	3540	485	4293
M 20	410	3629	580	5133	690	6107
M 24	710	6284	1000	8851	1200	10621
M 30	1420	12568	2033	17994	2380	21065

Tab.: 4 Screw connections

[1]Nm = Newton metre
[2]Lbf in = pound force inch
* 1 Nm = 8.85 Lbf in

4-0 TROUBLE SHOOTING

TROUBLE	PROBABLE CAUSE	REMEDY
Undercarriage (if height-adjustable) does not extend.	Release valve on hand pump is open.	Close release valve.
	Release valve does not close properly.	Replace release valve.
	No oil in oil reservoir.	Refill oil (see chapter 3-5).
	Leakage at - hand pump - tubes - hydraulic cylinder.	Replace damaged part.
Undercarriage (if height-adjustable) does not retract.	Release valve on hand pump is closed.	Open release valve.
	Springs are defective.	Replace springs.

Shear pin breaks with marked frequency.	Acceleration/deceleration of the aircraft too rapid.	Ensure soft starting or decelerating during the towing process.
	Tow bar is attached with too great of an incline between tower and aircraft.	Hang towing bar on horizontally.
	Steer angle to great during the towing process.	Note the maximum steer angle during the towing process.
	Damaged shear pins.	Change shear pins.
	Mounting position of the shear bushing and/or shear pin is not correct.	Check mounting position of the shear pin and correct if necessary.

Tab.: 5 Trouble shooting

5-0 ILLUSTRATED SPARE PARTS LIST

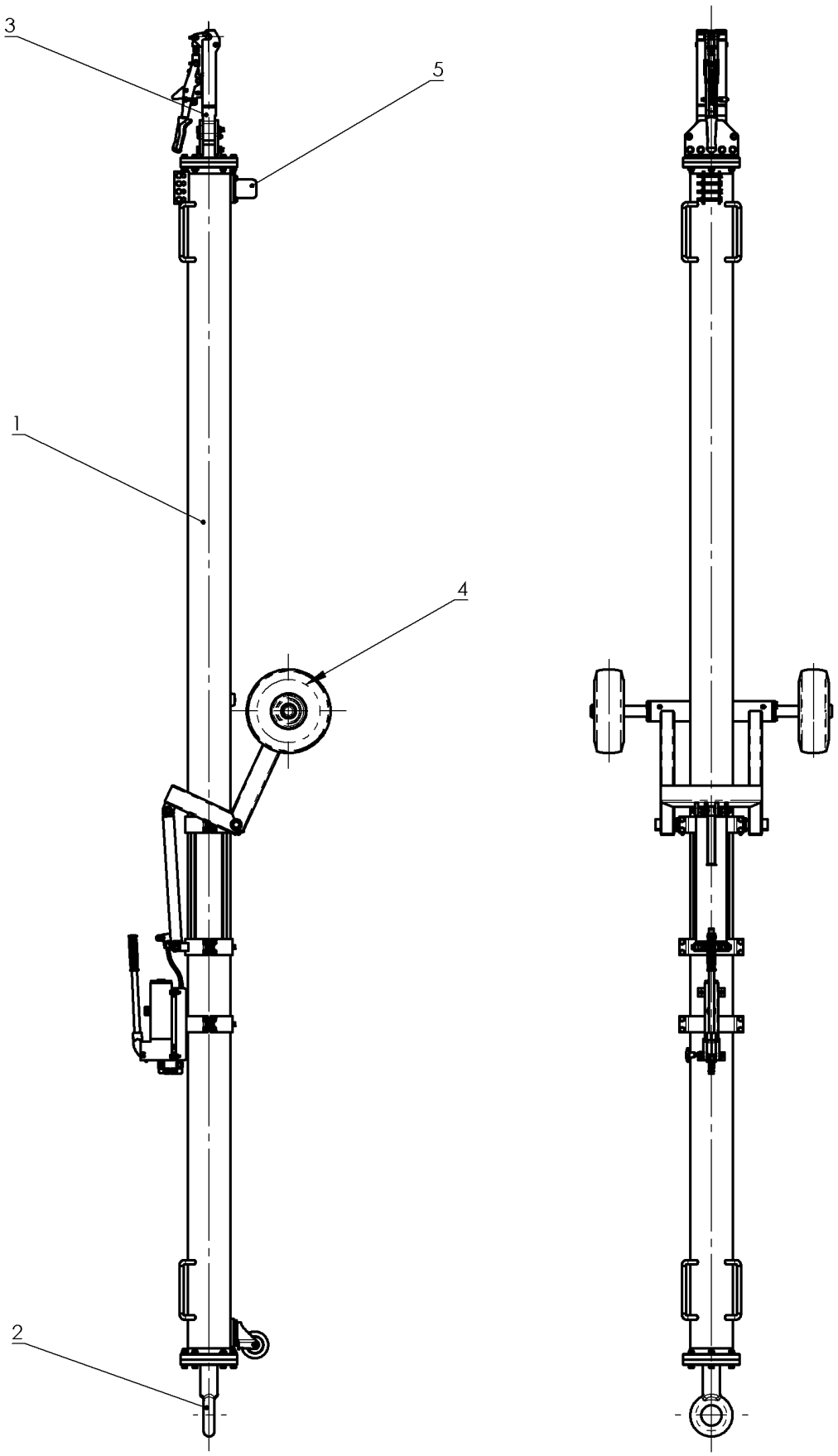
When ordering spare parts, please indicate:

- **year of construction**
- **serial number**
- **part number**
- **designation of part**
- **model**

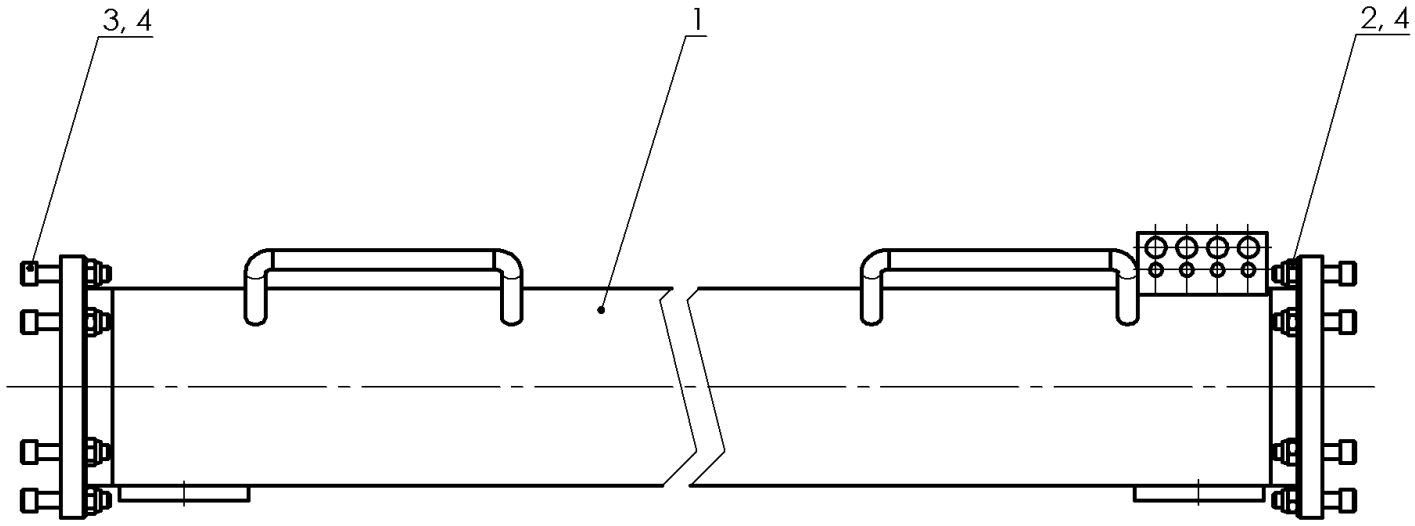
Nummer Number No. No.	Bestellnummer Reference Number No. de référence No. de referencia	Benennung Designation Désignation Disignación	Stück Quantity Quantité Cantídad

TOWB737-C Tow bar

1	33006-054-000	Tube	1	Fig. 2.0
2	33006-017-001	Tow eye	1	Fig. 3.0
3	33006-089-000	Tow head	1	Fig. 4.0
4	33006-062-000	Undercarriage	1	Fig. 5.0
5	33006-108-000	Design	1	Fig. 6.0

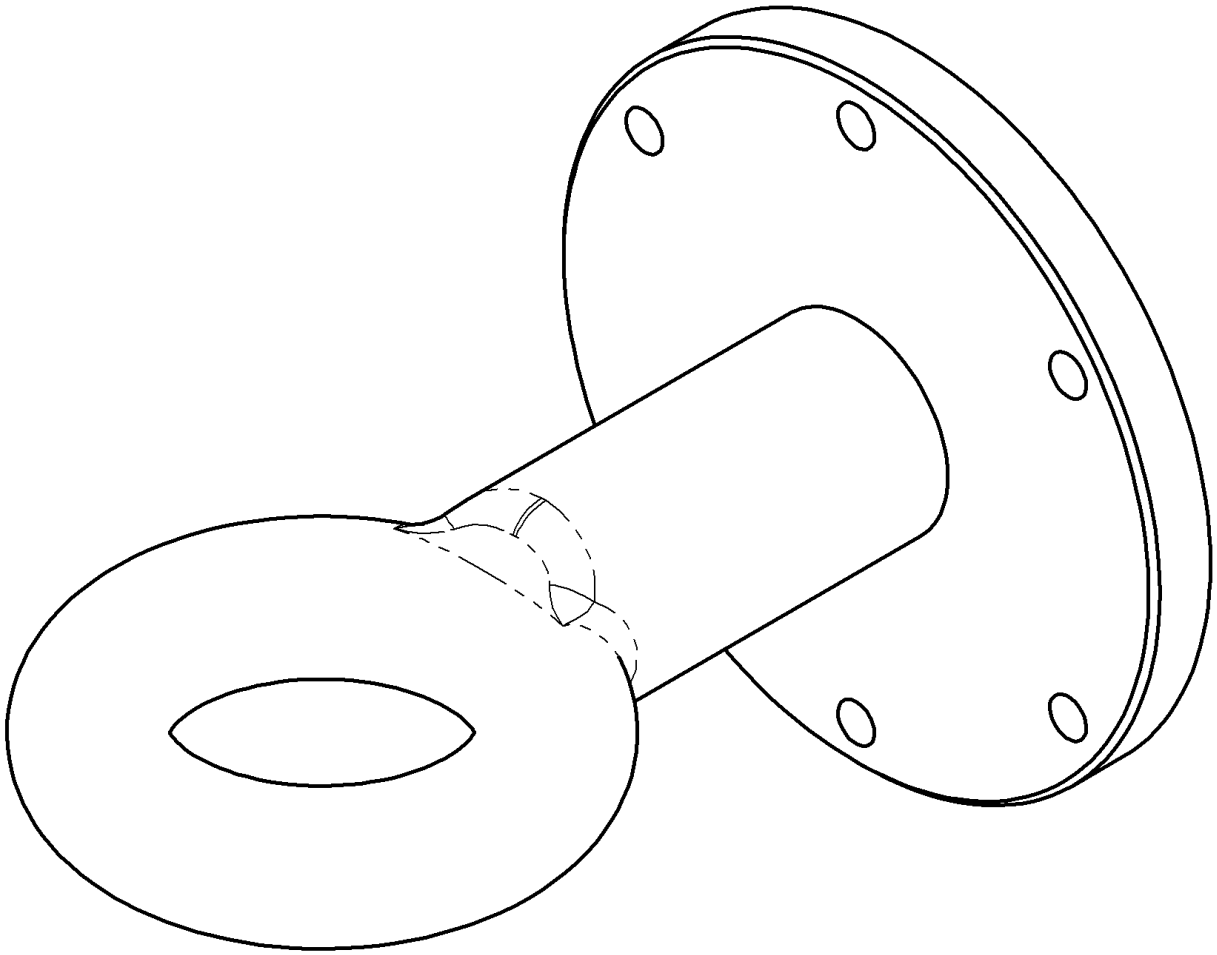

3
5
1
4
2

Nummer Number No. No.	Bestellnummer Reference Number No. de référence No. de referencia	Benennung Designation Désignation Disignación	Stück Quantity Quantité Cantídad
	33006-054-000	Tube	
	---	---	
1	33006-054-001	Tube	1
2	DIN912-M12x55	Cylindric head screw	6
3	DIN912-M12x60	Cylindric head screw	6
4	DIN985-M12	Hexagonal nut	12



Nummer Number No. No.	Bestellnummer Reference Number No. de référence No. de referencia	Benennung Designation Désignation Disignación	Stück Quantity Quantité Cantídad

33006-017-001 Tow eye

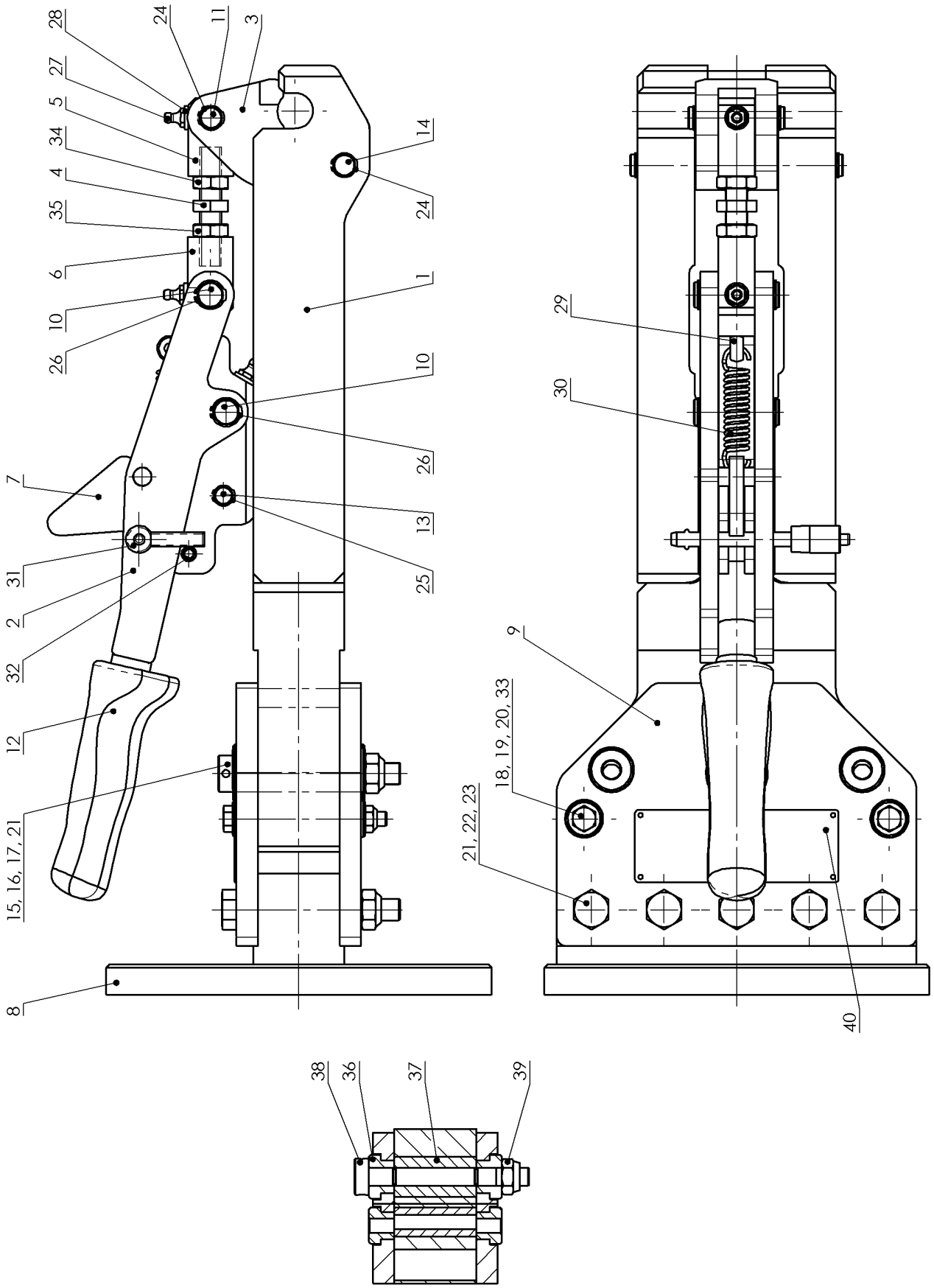


Nummer Number No. No.	Bestellnummer Reference Number No. de référence No. de referencia	Benennung Designation Désignation Disignación	Stück Quantity Quantité Cantídad

33006-089-000 Tow head

1	33006-089-001	Locking jaw	1
2	33006-076-006	Hinged lever assy.	1
3	33006-076-009	Jaw, upper part	1
4	LFT00743	Tightening screw	1
5	LFT03550	Hinge, right	1
6	LFT03552	Hinge, left	1
7	LFT03549	Ratchet	1
8	33006-005-001	Fitting	1
9	33006-089-003	Plate	2
10	00405-120-000	Bolt	2
11	00405-006-000	Bolt	1
12	LFT03547	Handle	1
13	00405-055-000	Bolt	1
14	00405-121-000	Bolt	1
15	33021-002-024	Shear bushing	2
16	00432-252-000	Retaining pin	1
17	00512-509-000	Rubber buffer	1
18	33006-077-014	Shear bushing	4
19	00432-305-000	Shear pin	4
20	00432-099-000	Nut	4
21	DIN 985-M12	Hexagonal nut	6
22	DIN 931-M12x90	Hexagonal head screw	5
23	DIN 125-B13	Washer	10
24	DIN 471-12x1-A2	Safety ring	4
25	DIN 471-10X1-A2	Safety ring	2
26	DIN 471-14x1-A2	Safety ring	4
27	DIN 71412-AM8X1	Lubrication nipple	4
28	00480-016-000	Washer	4
29	DIN 444-BM6x30	Eye bolt	1
30	LFT03558	Tension spring	1

Nummer Number No. No.	Bestellnummer Reference Number No. de référence No. de referencia	Benennung Designation Désignation Disignación	Stück Quantity Quantité Cantídad
31	00464-501-000	Ball lock pin	1
32	DIN 1481-6x40-A2	Clamping sleeve	1
33	33006-077-015	Shear bushing	2
34	DIN 936-M12	Hexagonal nut	1
35	DIN 936-M12-LH	Hexagonal nut	1
36	33006-089-004	Shear bushing	4
37	33006-089-005	Shear bushing	2
38	00432-348-000	Shear pin	4
39	DIN 985-M10	Hexagonal nut	4
40	10121_EN	Label	1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Nummer Number No. No.	Bestellnummer Reference Number No. de référence No. de referencia	Benennung Designation Désignation Disignación	Stück Quantity Quantité Cantídad	
	33006-062-000	Undercarriage		
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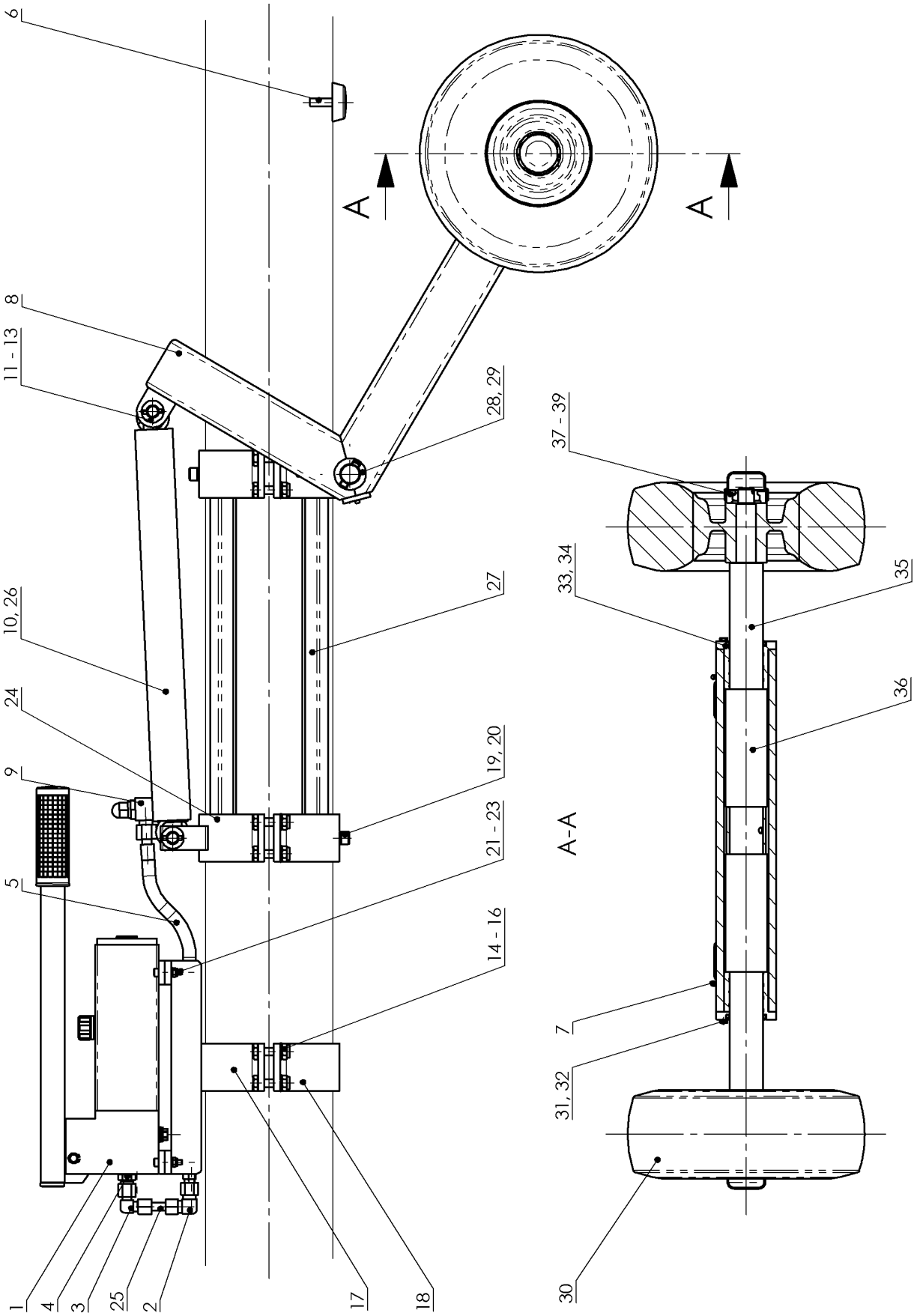
1	15151-000-000	Hand pump	1	Fig. 5.1
2	00433-135-000	Equal elbow coupling	1	
3	00433-054-000	Adjustable male stud elbow	1	
4	00433-046-000	Male stud coupling	1	
5	00310-367-00480	High-pressure hose	1	
6	00480-236-000	Buffer	1	
7	DIN 71412-AM8X1	Lubrication nipple	2	
8	33021-025-001	Wheel suspension	1	
9	00489-045-000	Throttle valve	1	
10	00180-027-000	Hydraulic lift cylinder	1	
11	00418-101-000	Bolt	2	
12	DIN 1440-16	Washer	4	
13	DIN 1481-5X 26	Spacer bushing	4	
14	DIN 931-M10X 40	Hexagonal head screw	12	
15	DIN 125-B10,5	Washer	12	
16	DIN 985-M10	Hexagonal nut	12	
17	00105-239-000	Holder	1	
18	00462-012-000	Clamp	1	
19	DIN 912-M10X 20	Cylindric head screw	2	
20	54568	Spring washer	2	
21	DIN 912-M 6X 30	Cylindric head screw	4	
22	DIN 125-B6,4	Washer	4	
23	DIN 985-M6	Hexagonal nut	4	
24	33006-060-002	Cylinder suspension assy.	1	
25	00417-003-00048	Pipe line	1	
26	00403-033-000	Tension spring	2	
27	33006-060-003	Holder	1	
28	DIN 1481-8X 36	Spacer bushing	2	
29	00418-113-000	Bolt	1	
30	00465-017-000	Wheel	2	

Nummer Number No. No.	Bestellnummer Reference Number No. de référence No. de referencia	Benennung Designation Désignation Disignación	Stück Quantity Quantité Cantídad
31	DIN 933-M5X16	Hexagonal head screw	8
32	DIN 127-B5	Spring washer	8
33	00443-106-000	Guide bushing	2
34	00302-051-000	Wiper	2
35	33004-006-010	Wheel axle	1
36	00404-038-000	Compression spring	2
37	DIN 937-M20X1,5	Castle nut	2
38	DIN 125-B21	Washer	2
39	DIN 94-4x40	Cotter pin	2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Nummer Number No. No.	Bestellnummer Reference Number No. de référence No. de referencia	Benennung Designation Désignation Disignación	Stück Quantity Quantité Cantídad	
	15151-000-000	Hand pump		
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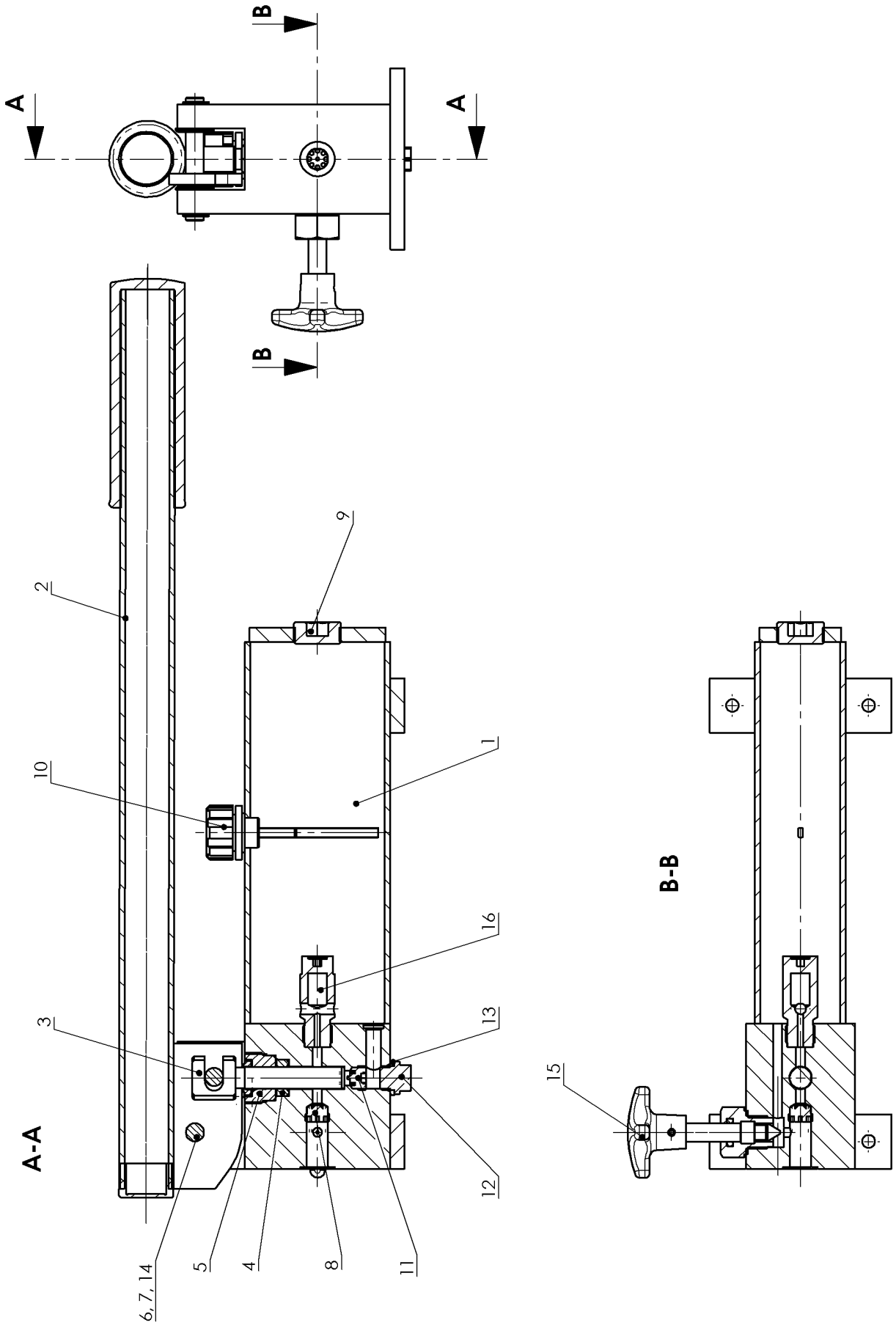
1	15151-001-001	Oil reservoir assy.	1	
2	00423-018-000	Pump lever	1	Fig. 5.1.1
3	15135-001-017	Pump piston	1	
4	00304-134-000	Grooved ring	1	
5	00443-132-000	Guide bushing	1	
6	00405-104-000	Bolt	1	
7	DIN 471-10X1	Retaining ring	2	
8	00489-053-000	Non-return valve	1	
9	DIN 906-M26X1,5	Screw plug	1	
10	00154-014-000	Screw plug	1	
11	00489-077-000	Non-return valve	1	
12	DIN 910-G1/4x8	Locking screw	1	
13	00305-004-000	NOBÜ-washer	1	
14	DIN 125-B10,5	Washer	2	
15	00151-032-000	Release valve	1	
16	00150-014-000	Pressure relief valve	1	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Nummer Number No. No.	Bestellnummer Reference Number No. de référence No. de referencia	Benennung Designation Désignation Disignación	Stück Quantity Quantité Cantídad
	00423-018-000	Pump lever	
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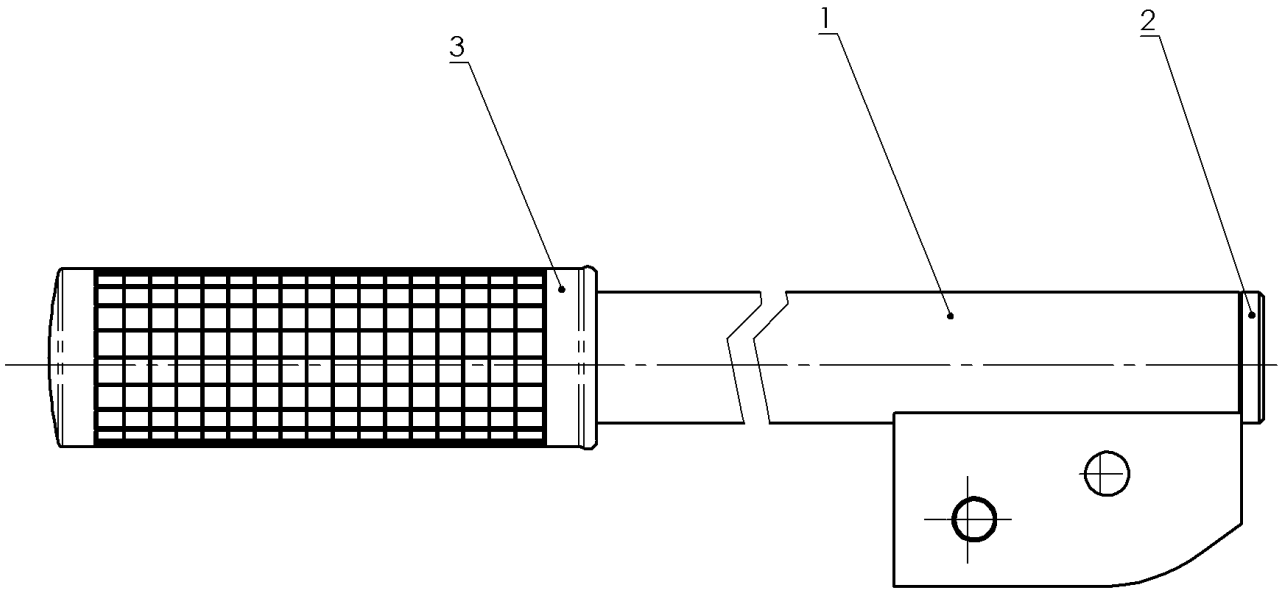
1	00423-018-001	Pump lever	1
2	00514-096-000	Plug	1
3	00422-211-000	Handle	1



Nummer Number No. No.	Bestellnummer Reference Number No. de référence No. de referencia	Benennung Designation Désignation Disignación	Stück Quantity Quantité Cantídad

33006-108-000 Design

1	33001-077-001	Support foot	1
2	33006-068-001	Support foot	1
3	DIN933-M8x16	Hexagonal head screw	8
4	54553	Spring lock washer	8