

**OJSC “BELAZ” – Management Company of Holding
“BELAZ–HOLDING”**

**MINING DUMP TRUCK
BELAZ–75131**

**(with modified design of steering cylinders,
link of steering trapezoid and cylinders
of dumping mechanism)**

**Addition to the Operation Manual,
Repair Manual and Parts Catalogue**

Republic of Belarus

Addition to the Operation Manual and to the Repair Manual.

Traction electric drive.

Procedure on detection of power circuit section, which has chassis ground when actuating protection device "Chassis".

The scheme of connection of the protection device at chassis ground of current carrying part of power circuit element, at its occasional joint with the chassis or essential drop of insulation resistance is shown in figure 1.

Such scheme of connection together with further reviewed technology controlling the condition of the electrical equipment ensure not only actuation of the protection device but also the subsequent selective detection of the power circuit section having dump truck chassis fault. These sections are numbered in the figure from 1 to 6.

The operation principle of the selective protection device lies in the following.

When dump truck moving in a traction mode the chassis fault of any section 1 – 6 of power circuit causes at voltage equal or higher of 500 V on the output of rectifier UZ1 or UZ2, actuation one of the channels measuring voltage of power circuit relatively to case UK1 or UK2, as well as the indicator "CHASSIS" on the instrumentation panel in the cabin.

The further operations on localization of a place of short circuit are to be performed in the following sequence:

- at actuation of the protection device at power circuit chassis fault an information about measuring channel being ON appears on the visualization panel. This information is registered in first two columns of the table 1 in the form of numbers "0" or "1": "0" – means OFF, as "1" – means ON. After that by pushing button "F5" on the visualization panel bring the system to the initial condition, indicator "CHASSIS" will be switched off;
- apply the parking brake system, set the toggle-switch SA9 on the panel of unit "БППР" in the position "ON" and press accelerator pedal. Rectifiers UZ1, UZ2 appear loaded on brake resistors RB1.1, RB1.2. Increasing the engine speed and voltage of the traction generator again reach the actuation of the protection device. The information is to be registered in the third and fourth columns of the table 1. Pushing button "F5" on the visualization panel bring the system to the initial condition, indicator "CHASSIS" will be switched off.

The information registered in columns 1 – 4 of the table 1 (the aggregate value of "0" and "1") forms the four-digit code featuring the section of power circuit having the chassis fault. Numbers of sections corresponding to codes mentioned in the table 1 are specified in the fifth column of the table.

The protection device has following features:

- it is tolerant to short circuit on the chassis in a mode of electric braking that gives the chance to the driver stop moving in the specified mode even having the power circuit chassis faults.
- the protection device gets actuated at the first actuation of traction mode power circuit after stopping movement in a mode of electric braking;
- the protection device should be adjusted on the minimum voltage leading the actuation, which is higher than half power of the traction generator in a traction mode. This is necessary for avoiding spontaneous actuation of the device in normal operating modes when voltage of one rectifier is applied to two consistently engaged input circuits.

Addition to the Operation Manual, Repair Manual and Parts Catalogue

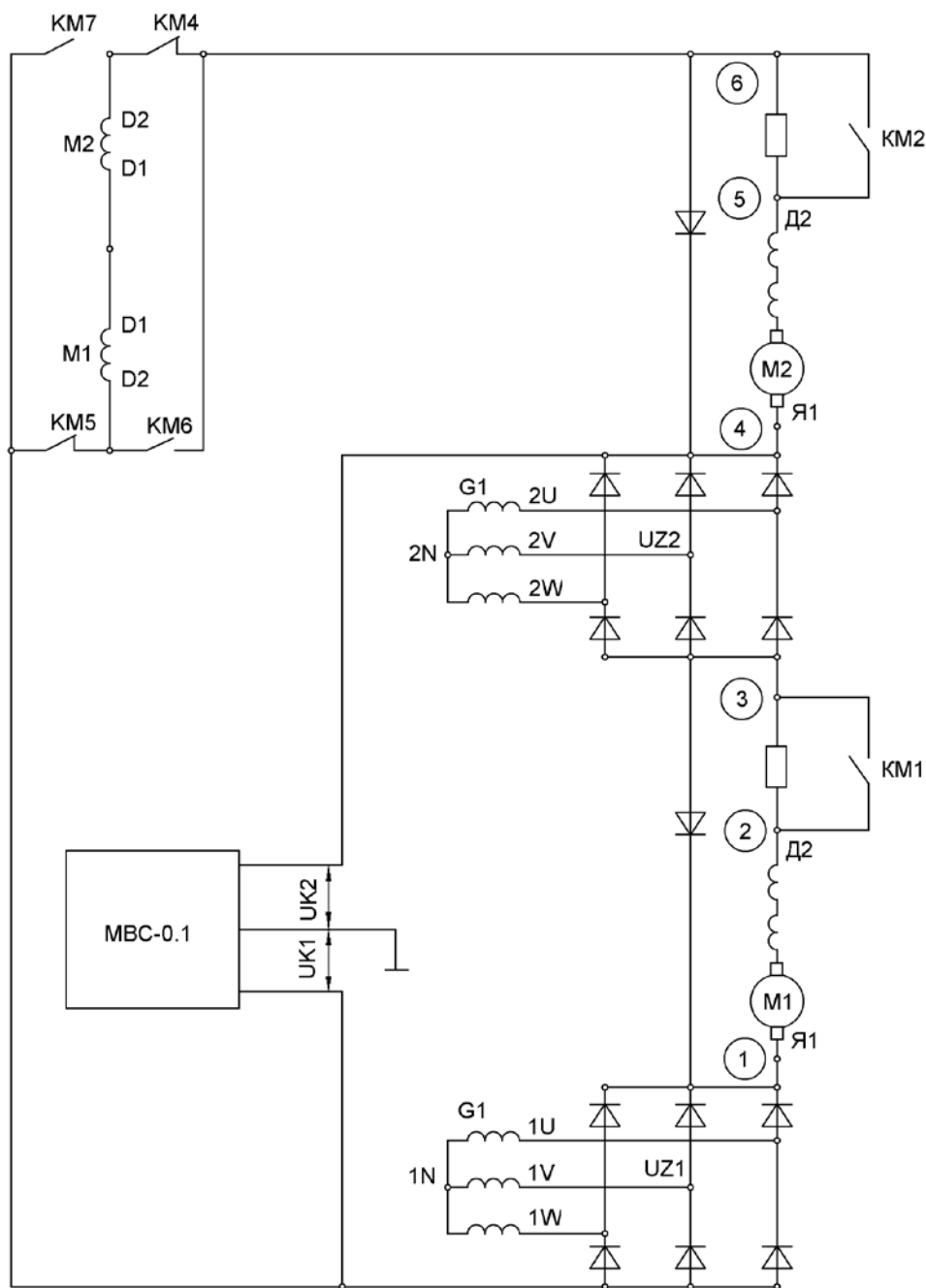


Figure 1

Table 1

Dump truck condition				The section of the power circuit having chassis fault
Dump truck moves in the traction mode		Dump truck is stopped, brakes are applied, the switch SA9 is ON.		
Designation of the channel				
UK1	UK2	UK1	UK2	
1	0	1	0	
0	1	1	0	
0	1	0	1	

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Steering.

Dump trucks are equipped with steering cylinders and link of steering trapezoid of modified design (see below).

Order number of figures for convenience of using is applied in accordance with Operation Manual 75131–3902015 OM, attached to the set of operational documentation for dump trucks.

The **steering cylinder** is of follower action, consists of the cylinder body 15 (figure 9.8) and rod 14 with the piston 13. The piston is fixed on rod by self-locking nut 10. The cover 7 is fastened to the cylinder body by bolts 24. There is end-tip 5 screwed on the end of rod, which is locked by terminal joint by means of bolts 6 and nuts 18. Steering cylinders by bodies are fastened to the front axle brackets, and by rods do to the steering levers of the steering trapezoid by means of fingers and hinged spherical bearings 3.

The movable joint of the piston 13 with cylinder body 15 is sealed by piston sealing 12. The piston moves along cylinder body surface over guiding rings 11 made of polyamide material.

The movable joint of the rod 14 with cover 7 is sealed by rod sealing 20, cup 22. The rod moves over the cover surface along guides 19 and 21 made of polyamide material.

To prevent hit of dirt into the cylinder the cover has polyamide dirt remover 23.

Motionless joints of the rod 14 with the piston 13 are sealed by safety rings 8 and ring 9; covers 7 with the body 15 are sealed correspondingly by safety ring 17 and ring 16.

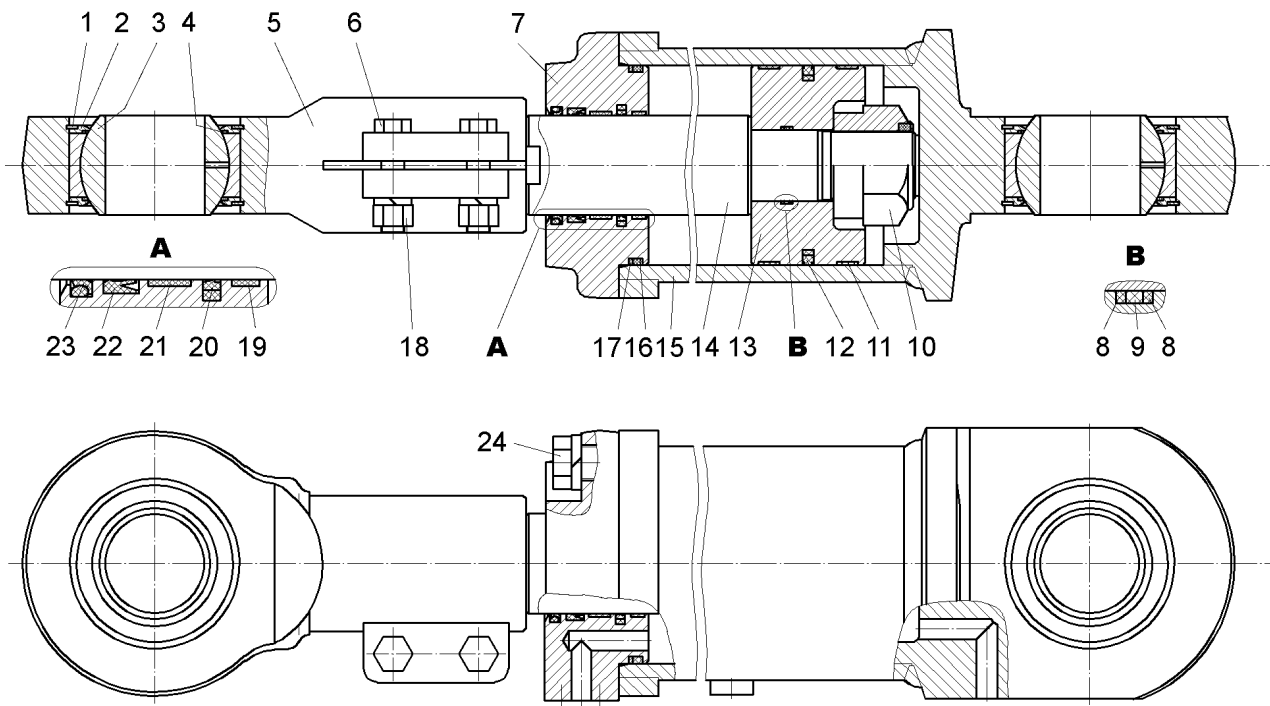


Figure 9.8 – Steering cylinder:

1 – locking ring; 2 – scraper; 3 – spherical bearing; 4 – protective washer; 5 – end-tip; 6, 24 – bolts; 7 – front cover; 8, 17 – safety rings; 9, 16 – rings; 10 – self-locking nut; 11, 19, 21 – guiding rings; 12 – piston sealing; 13 – piston; 14 – rod; 15 – cylinder body; 18 – nut; 20 – rod sealing; 22 – cup; 23 – dirt remover

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Link of steering trapezoid consists of link tube 8 (figure 9.9), two end-tips 5 and 9, which are screwed into the link and locked by terminal joint. Link with steering levers is connected hingedly through spherical bearings 3 by fingers (look figure 9.10).

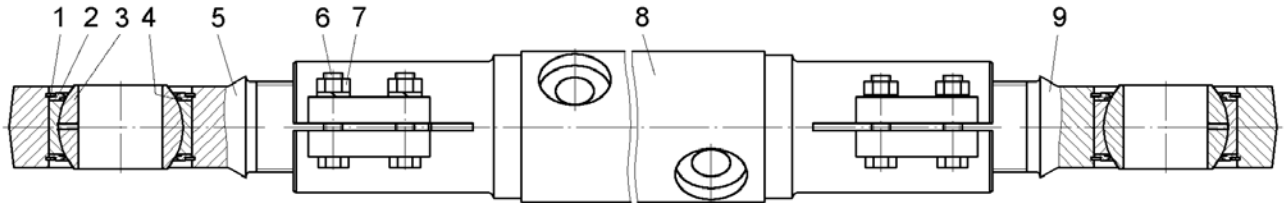


Figure 9.9 – Link of steering trapezoid:

1 – locking ring; 2 – scraper; 3 – spherical bearing; 4 – protective washer; 5, 9 – end-tips; 6 – bolt; 7 – nut; 8 – link tube with end-tips

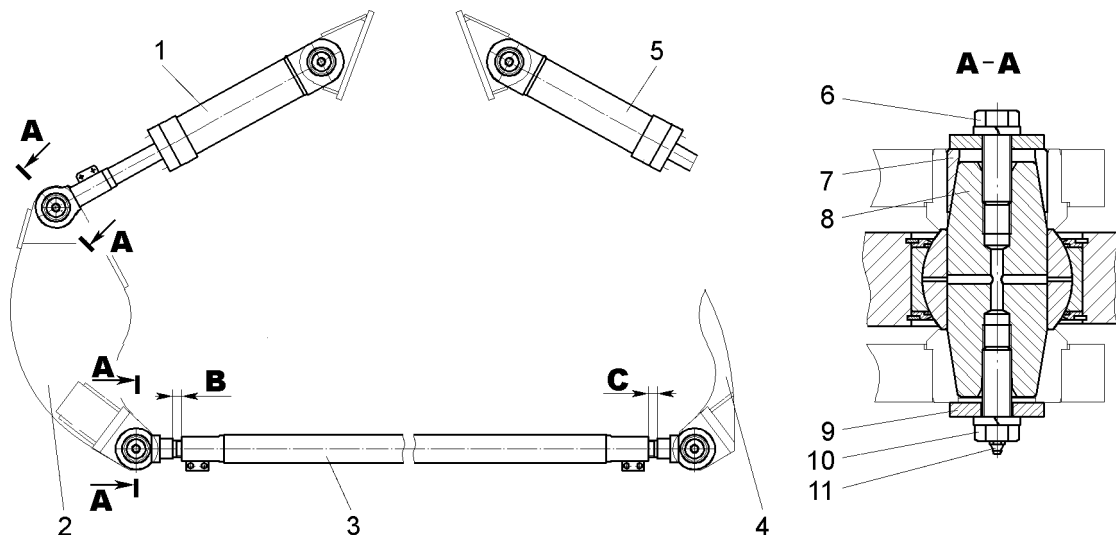


Figure 9.10 – Steering trapezoid:

1, 5 – steering cylinders; 2, 4 – steering knuckles; 3 – link of steering trapezoid; 6, 10 – bolts; 7 – spacer bushing; 8 – finger; 9 – clamping plate; 11 – greaser;
B, C – sizes

Removal from the truck, disassembly and assembly of steering cylinders and steering link, adjusting of toe-in should be performed in accordance with requirements set out in the Repair Manual.

When assembling the steering cylinders following parts: dirt remover 23 (see Figure 9.8), the guide ring 19, rod sealing 20 and the piston sealing 12 prior to installing should be heated up to temperature of 80 – 100°C for 3 – 5 minutes. Perform heating in boiling water (with following removal it from the parts surface) or in the working fluid preheated up to 80 – 100°C.

When mounting the seals, rings and cup keep up that parts are not twisted, not undercut, skewed and damaged.

Locks of guide rings 11, 19 and 21 during assembly should be placed on the opposite sides.

Surfaces of spherical bearings 3 before installing are to be coated with grease Litol-24. When mounting the bearings the plane of bearing outer race parting is to be disposed at an angle of $90^\circ + 5^\circ$ to the cylinder axis. Wherein marking on the ends of both semi-rings is to be on the same side.

The inner race of bearings being lubricated should be rotated with torque of 150 Nm at most.

Perform tightening the nut 10 with torque of 2400 – 3000 Nm.

Dumping mechanism.

Dump trucks are equipped with dumping mechanism cylinders of modified design (see below).

Cylinders of dumping mechanism – are of telescopic three-section type with one double-action section.

When lifting the working fluid is supplied through chamber IV (Figure 14.11) via the inner tube 14 into head end III. Under the pressure of working fluid, cover 28 and outer tube 18 connected rigidly by bolts 25 moves. At the end of the moving out, the retaining ring 12 with circular section of the outer tube thrust against the flange of second telescopic tube 17 and the latter starts moving-out until it thrusts by limiting ring 32 to the collar of the tube 16. The tube 16 gets extended along with bushing 13, which is fixed in the tube by restrictive nut 3. Bushing 13, moving upwards, shuts the hole in the rod 15, thereby braking of the cylinder stroke and stopping occurs.

The body lowering is performed forcedly. The working fluid is supplied through chamber I into rod end II, and tube 16 together with the bushing 13 moves downwards up to the stop of retaining nut 3 in cylinder head 1. The working fluid being displaced from the head end through inner tube 14 is drained into the oil tank. The folding of first and second sections is done under the weight of the empty body.

For braking of the body at the end of lowering and smooth landing of frame onto shock absorbers the valve 21 is designed. At the end of lowering the valve sits onto the piston end and closes the main stream of the working fluid drainage. Subsequently, the working fluid gets drained through the throttle holes in the stem 31; backup of working fluid gets created in the piston cavity III, thus smooth landing of the body onto the frame is reached.

Tightness of cylinder motionless joints is provided by sealing and protective rings, as one of movable joints – by rod 8, 9, 34 and piston 29 seals.

Disassembling dumping mechanism cylinder.

Disassemble the dumping mechanism cylinder as follows:

- place cylinder to the tilter of suspension cylinders and dumping mechanism cylinders. The sequence of installation operations is set out in the section "Disassembling suspension cylinders" of Repair Manual. When disassembling and assembling rotate the cylinder to a position convenient for repair operations;

- unscrew and remove bolts 25 with washers from the outer tube 18;

- remove the cylinder cover 28 in assembly from the tube 18. Unlock bolts 26, unscrew them from the cover 28, remove the plates 24, 27, stem 31 and the valve 21.

Remove ring 40 and the protective ring 41 from the grooves of the cover;

- unscrew the cylinder head 1 from the rod with piston 15 and extract ring 44, 48 and protective rings 45, 49 from the grooves of head;

- unlock and unscrew bolts 23, remove plates 39 and unscrew the threaded bushing 22 from the tube 17;

- remove the rod with piston 15 from the tube 16. Remove the cylinder tube 14 from the piston, and do guide rings 19, piston seal 29, ring 42 and safety ring 43 from the piston grooves;

- unlock and unscrew restrictive nut 3 from the tube 16;

- remove the rod bushing 13 from the tube 16. Extract rings 46, safety rings 47, guide rings 11, rod seal 8 and dirt remover 2 from the grooves of rod bushing;

- extract the tube 16 from the tube 17. Extract guide rings 30 from the tube grooves;

- extract thrust ring 38, the upper guide 36, rod seal 34, the spacer 33 and restrictive ring 32 from the tube 17. Extract guide rings 35 and dirt remover 37 from the grooves of upper guide 36;

- extract the tube 17 from the outer tube 18. Extract guide rings 20 from the grooves of the tube 17;

- extract locking ring 4, the upper guide 6, rod seal 9, the spacer 10 and restrictive ring 12 from the outer tube 18. Extract guide rings 7 and dirt remover 5 from the grooves of upper guide 6.

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Assembling dumping mechanism cylinder.

Technical requirements, which are necessary to be followed when assembling dumping mechanism units see in the Repair Manual.

Assemble the dumping mechanism cylinder as follows:

- install guide rings 7 and 35, dirt removers 5 and 37 into guides 6 and 36 respectively;
 - install the outer tube 18 of the cylinder in the tilter;
 - install restrictive ring 12, spacer 10, rod sealing 9, the guide 6 in assembly and locking ring 4 into the outer tube;
 - install restrictive ring 32, spacer 33, rod sealing 34, the guide 36 in assembly, locking ring 38 and two guide rings 20 into the tube 17;
 - install the tube 17 in assembly into the inner space of the tube 18. The installation is recommended to be performed in a vertical position to center the tube 17 and to avoid damage of seals, to proceed with caution. Limit movement of the tube 17 downwards beyond the end of the tube 18;
 - Install rings 46, safety rings 47, guide rings 11, rod sealing 8, dirt remover 2 into the grooves of rod 13 bushing;
 - install rod bushing in assembly into inner space of the tube 16 and fasten it using restrictive nut 3 having tightened the nut with torque of 5000 – 5500 Nm. Lock the nut by rolling the edge of the tube into the grooves of the restrictive nut;
 - install guide rings 30 into grooves of the tube 16;
 - install the tube 16 in assembly into the inner space of the tube 17. The installation is recommended to be performed in a vertical position to center the tube 16 and to avoid damage of seals, to proceed with caution. Limit movement of the tube 16 downwards beyond the end of the tube 17;
 - install guide rings 19, piston seal 29, ring 42 and safety ring 43 into the rod grooves with a piston 15. Install the inner tube 14 into the rod inner space.
- Prior to installation heat up the piston seal 29 up to temperature of 80 – 100°C for 3 – 5 minutes. Perform heating in boiling water (with following removal it from the parts surface) or in the working fluid preheated up to 80 – 100°C.
- install the rod in assembly with piston 15 into the inner space of the tube 16. The installation is recommended to be performed in a vertical position to center the rod and to avoid damage of seals, to proceed with caution;
 - screw the threaded bushing 22 into the tube 17. Tightening torque is of 1500 – 2500 Nm. Lock the nut by bolts 23 (Mcr. 29 – 36 Nm), which in their turn are to be locked in pairs by bending of the plates 39 edges;
 - install rings 44, 48 and safety rings 45 and 49 into the groove of the cylinder head 1;
 - screw head 1 into the rod with piston 15. Tightening torque is of 5500 – 6000 Nm. Prior to installing cover part of the head (20⁺³ mm, see figure) with a thin layer of sealant Unigerm 9;
 - install stem 31 with the valve 21 into the cylinder cover 28 and secure the stem by plates 27 with bolts 26 (Mcr. 34 – 43 Nm), having locked bolts by bending the edges of the plates 24;
 - install rings 40 and protective washer 41 into the grooves of the cylinder head 28;
 - install the cylinder head 28 in assembly into the inner space of the outer tube 18 and secure it by bolts 25 (Mcr. 310 – 340 Nm) with washers.

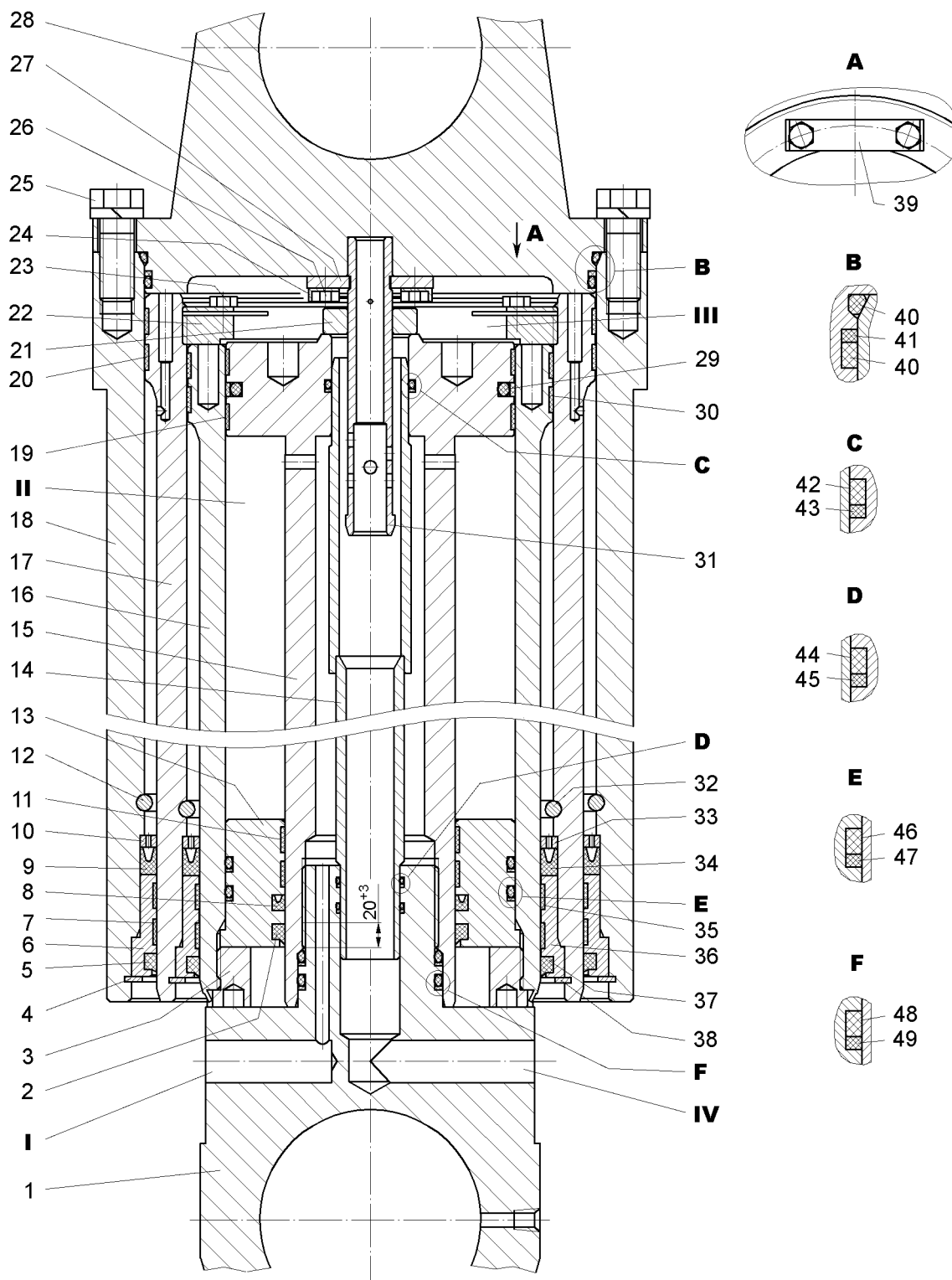


Figure 14.11 – Dumping mechanism cylinder:

1 – cylinder head; 2, 5, 37 – dirt removers; 3 – restrictive nut; 4 – locking ring; 6, 36 – upper guides; 7, 11, 19, 20, 30, 35 – guide rings; 8, 9, 34 – rod sealing; 10, 33 – spacer; 12, 32 – restrictive rings; 13 – rod bushing; 14 – inner cylinder tube; 15 – rod with piston; 16, 17 – tubes; 18 – outer tube; 21 – valve; 22 – threaded bushing; 23, 25, 26 – bolts; 24, 27, 39 – plates; 28 – cylinder cover; 29 – piston sealing; 31 – stem; 38 – thrust ring; 41, 43, 45, 47, 49 – safety rings; 40, 42, 44, 46, 48 – rings

Addition to the Parts Catalogue.

The order number of figures for the user convenience is brought into the correspondence with Parts Catalogue 75131-3902090 КДС, attached to the operation documentation for dump trucks.

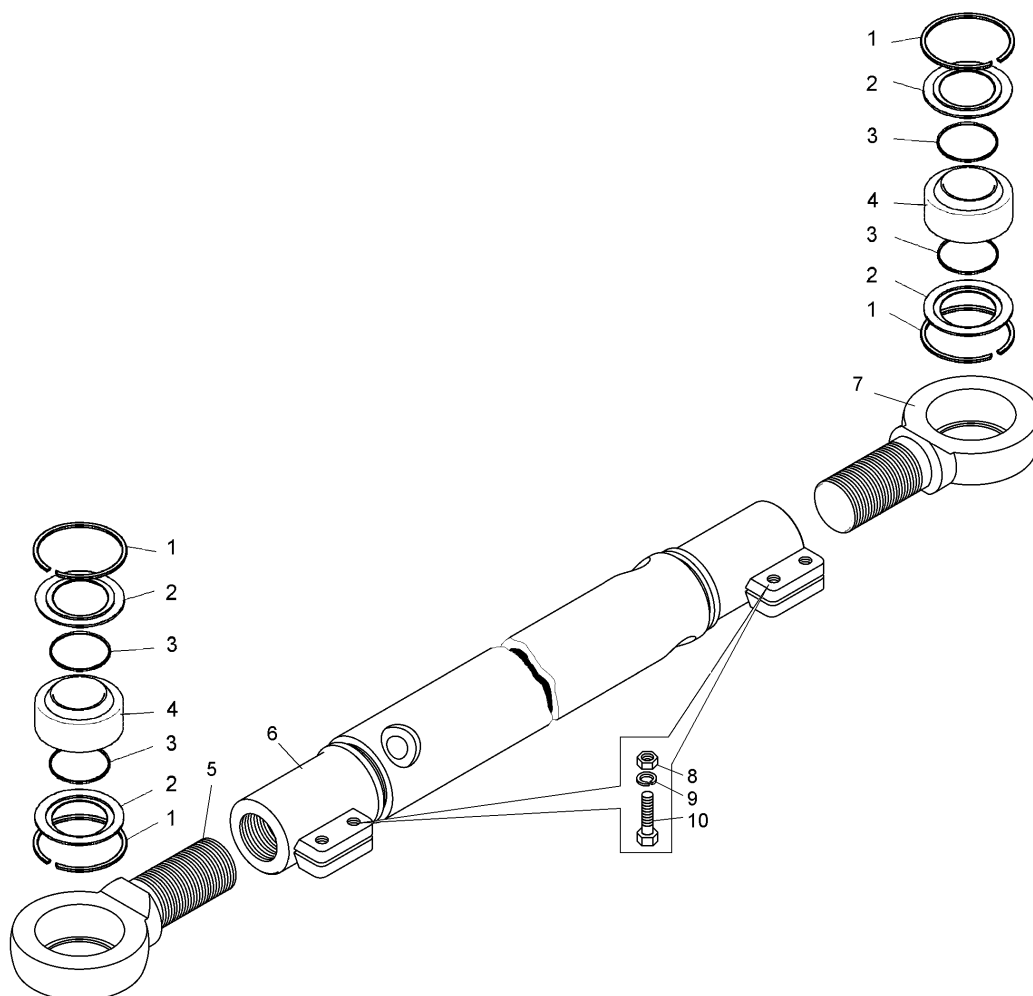


Рисунок 2.10.9 – Тяга рулевой трапеции (75131-3003052-11)

Figure 2.10.9 – Steering trapezoid link

Т а б л и ц а 2.10.9 – Перечень сборочных единиц и деталей

T a b l e 2.10.9 – List of assembly units and parts

Номер позиции Pos. No	Обозначение Designation	Код ОКП OKP code	Наименование сборочных единиц, деталей Assembly units, parts		Количество Q-ty
					75131
1	75131-3429094	45 3647 2294	Кольцо стопорное	Locking ring	4
2	7512-3003068	45 3641 1400	Скребок	Scraper	4
3	7512-3003074	45 3641 1401	Шайба защитная	Washer	4
4	ГШСЛ-70	46 4913 3636	Подшипник	Bearing	2
5	75131-3003063-20	45 3647 2292	Наконечник левый	Left end-tip	1
6	75131-3003080-10	45 3646 5190	Труба тяги с наконечниками	Tube of link with end-tips	1
7	75131-3003062-20	45 3647 2291	Наконечник правый	Right end-tip	1
8	250560	45 9553 1063	Гайка M16	Nut M16	4
9	252139	45 9816 6070	Шайба 16 ОТ	Washer 16 OT	4
10	202127	45 9346 1694	Болт M16x70	Bolt M16x70	4

Addition to the Operation Manual, Repair Manual and Parts Catalogue

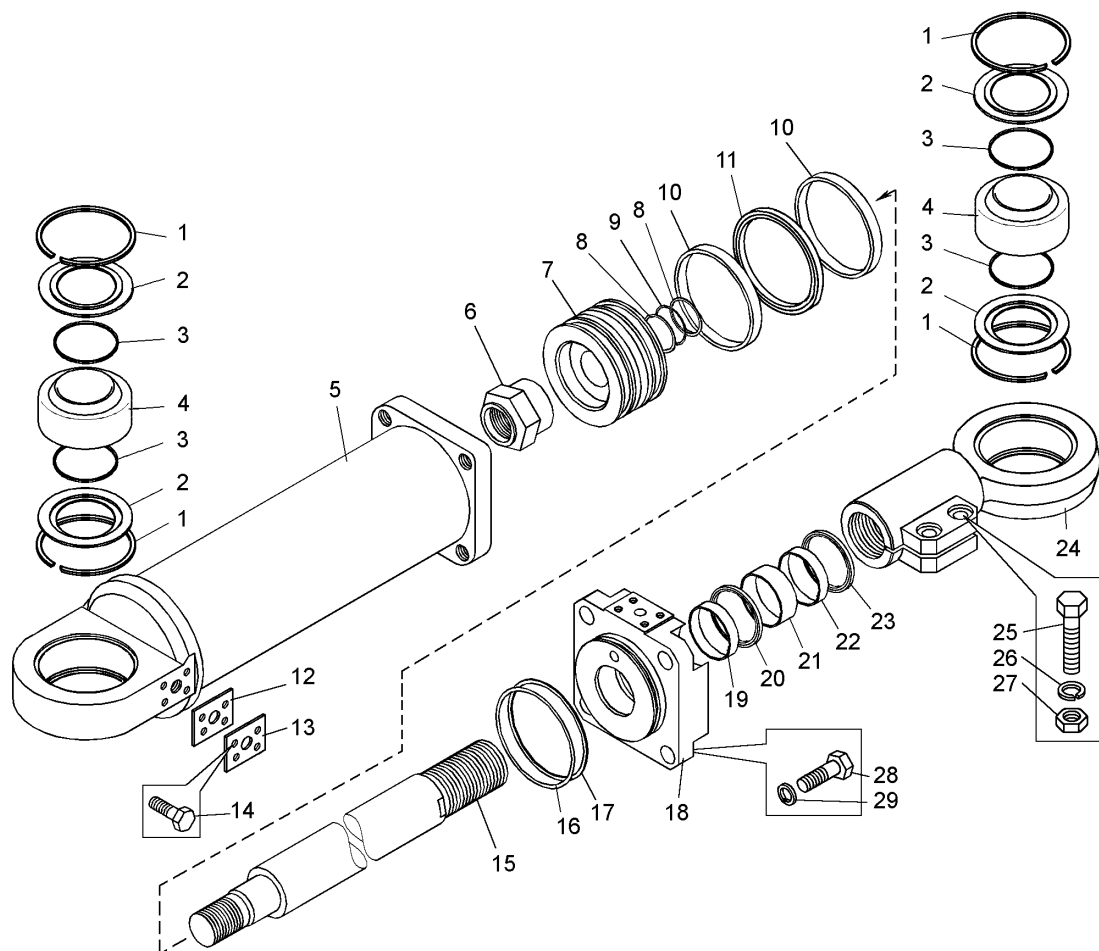


Рисунок 2.10.10 – Цилиндр поворота (75131-3429010-40)
Figure 2.10.10 – Turn cylinders

Т а б л и ц а 2.10.10 – Перечень сборочных единиц и деталей
Table 2.10.10 – List of assembly units and parts

Номер позиции Pos. No	Обозначение Designation	Код ОКП OKP code	Наименование сборочных единиц, деталей Assembly units, parts		Количество Q-ty
					75131
1	75131-3429094	45 3647 2294	Кольцо стопорное	Locking ring	4
2	7512-3003068	45 3641 1400	Скребок	Scrapper	4
3	7512-3003074	45 3641 1401	Шайба защитная	Washer	4
4	GШСЛ-70	46 4913 3636	Подшипник	Bearing	2
5	75137-3429020	45 3647 2289	Корпус цилиндра	Cylinder body	1
6	549A-3001970	45 3619 7523	Гайка	Nut	1
7	75137-3429042	45 3647 1065	Поршень	Piston	1
8	75137-3429110	45 3647 1200	Кольцо защитное	Ring	2
9	050-055-30-2-3	25 3111 4118	Кольцо	Ring	1
10	F01 140x135x14.8	45 3922 2173	Кольцо направляющее	Guiding ring	2
11	K08-D 140x119x8.1	45 3922 2174	Уплотнение поршневое	Piston seal	1
12	75306-8606319	45 3624 9858	Прокладка	Gasket	2
13	75306-8606224	45 3624 9809	Пластина	Plate	2
14	201495	45 9346 1557	Болт M10x20	Bolt M10x20	4
15	7513-3429046	45 3641 3018	Шток	Rod	1
16	130-140-58-2-3	25 3111 4374	Кольцо	Ring	1
17	75137-3429108	45 3647 1114	Кольцо защитное	Ring	1

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Продолжение таблицы 2.10.10
Continuation of Table 2.10.10

Номер позиции Pos. No	Обозначение Designation	Код ОКП ОКР code	Наименование сборочных единиц, деталей Assembly units, parts		Количество Q-ty
					75131
18	75137-3429056*	45 3647 1066	Крышка передняя	Front cover	1
19	F01 70x75x9.6	45 3922 2169	Кольцо направляющее	Guiding ring	1
20	S09-ES 70x85.1x6.3	45 3922 2170	Уплотнение штоковое	Rod seal	1
21	F01 70x75x14.8	45 3922 2171	Кольцо направляющее	Guiding ring	1
22	S17-P 70x82x12.5	45 3922 2172	Манжета	Cup	1
23	A25-F 70x80x7.5	45 3922 2167	Грязесъемник	Dirt remover	1
24	75137-3003060	45 3647 2290	Наконечник	End-tip	1
25	202127	45 9346 1694	Болт М16х70	Bolt M16x70	2
26	252139	45 9816 6070	Шайба 16 ОТ	Washer 16 OT	2
27	250560	45 9553 1063	Гайка М16	Nut M16	2
28	340748	45 9957 1147	Болт М24х60	Bolt M24x60	4
29	252143	45 9816 6054	Шайба 24	Washer 24	4

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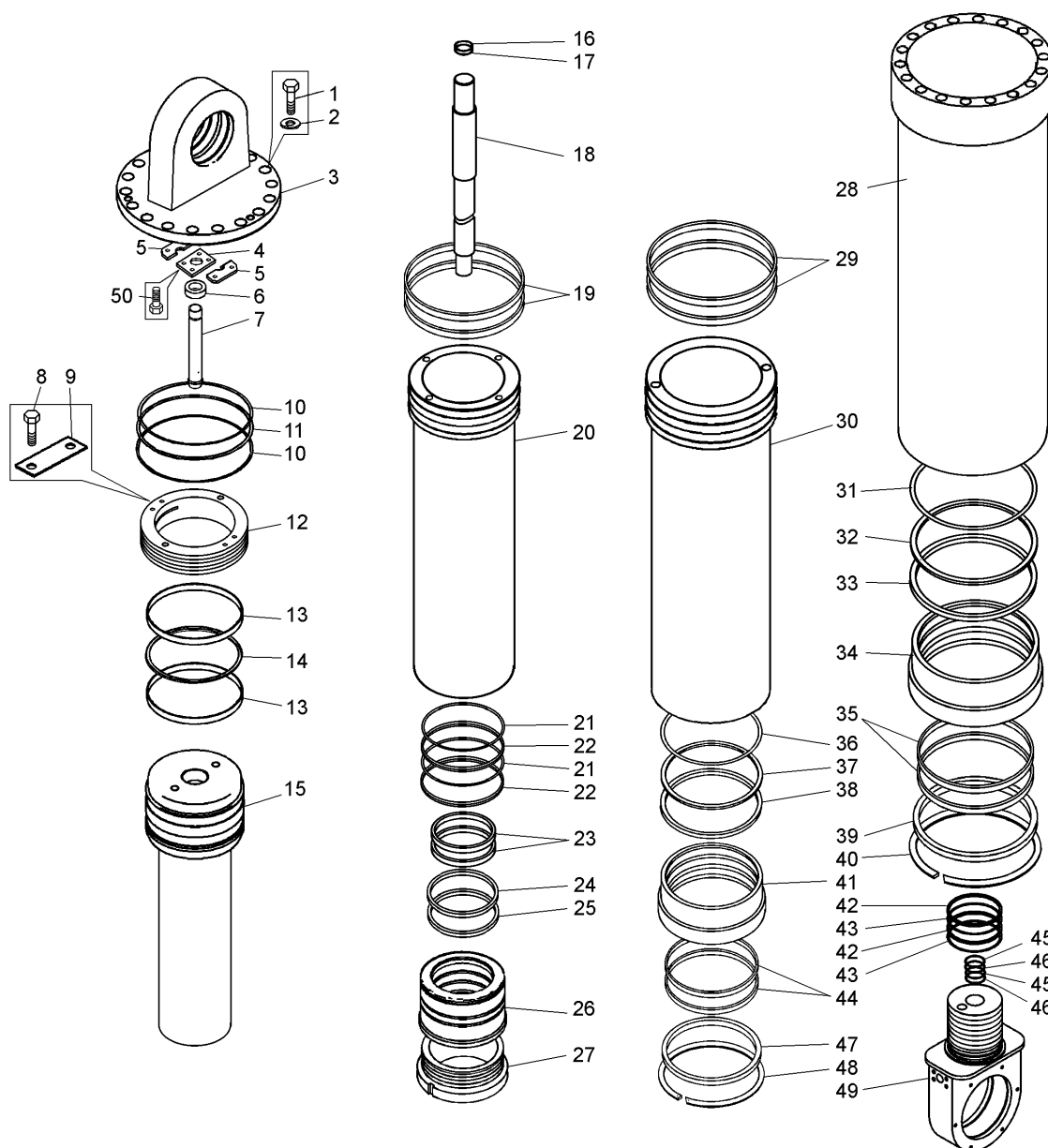


Рисунок 2.19.2 – Цилиндр опрокидывающего механизма (75131-8603010)
Figure 2.19.2 – Hoist cylinders

Т а б л и ц а 2.19.2 – Перечень сборочных единиц и деталей
Table 2.19.2 – List of assembly units and parts

Номер позиции Pos. No	Обозначение Designation	Код ОКП OKP code	Наименование сборочных единиц, деталей Assembly units, parts notation		Кол-во Q-ty
					75131
1	340035	45 9957 1013	Болт М20х55	Bolt M20x55	18
2	252161	45 9816 6012	Шайба 20Л	Washer 20Л	18
3	75131-8603056	45 3647 0025	Крышка цилиндра	Cover of cylinder	1
4	75131-8603579	45 3647 0062	Пластина	Plate	1
5	75131-8603096	45 3647 0034	Пластина	Plate	2
6	75131-8603069	45 3647 0032	Клапан	Valve	1
7	75131-8603059	45 3647 0036	Стержень	Stem	1
8	340230	45 9957 1044	Болт М10х16	Bolt M10x16	4
9	75131-8603580	45 3647 0632	Пластина	Plate	2
10	255-265-58-2-3	25 3111 6696	Кольцо	Ring	2

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Продолжение таблицы 2.19.2
Continuation of Table 2.19.2

Номер позиции Pos. No	Обозначение Designation	Код ОКП OKP code	Наименование сборочных единиц, деталей Assembly units, parts notation		Кол-во Q-ty
					75131
11	75131-8603359	45 3647 0035	Кольцо защитное	Protective washer	1
12	75131-8606332	45 3647 0039	Втулка резьбовая	Threaded bushing	1
13	F 01 165x170x14.8	45 3922 1902	Кольцо направляющее	Guiding ring	2
14	KO8-D 170x150x8.1 EBR	45 3922 1913	Уплотнение поршневое	Sealing	1
15	75131-8603164	45 3647 0037	Шток с поршнем	Rod with piston	1
16	045-053-46-2-3	25 3111 4263	Кольцо	Ring	1
17	75131-8603356	45 3647 0052	Кольцо защитное	Protective washer	1
18	75131-8603100	45 3647 0029	Трубка цилиндра внутренняя	Inner tube	1
19	F 01 210x215x14.8	45 3922 1903	Кольцо направляющее	Guiding ring	2
20	75131-8603134	45 3647 0038	Труба	Tube	1
21	160-170-58-2-3	25 3111 4381	Кольцо	Ring	2
22	75131-8603358	45 3647 0054	Кольцо защитное	Protective washer	2
23	F 01 100x105x14.8	45 3922 1915	Кольцо направляющее	Guiding ring	2
24	S17 100x115x9 EBR T-Ecopur	45 3922 2009	Уплотнение штоковое	Rod seal	1
25	A02-A 100x115x14x9.5 T- Ecopur	45 3922 1910	Грязесъемник	Scraper	1
26	75131-8603071*	45 3647 0028	Втулка штока	Bushing	1
26	75131-8603071-01*	45 3647 0730	Втулка штока	Bushing	1
27	7519-8603088	45 3633 2156	Гайка ограничительная	Nut	1
28	75131-8603114	45 3647 0382	Труба наружная	Tube	1
29	F 01 260x265x14.8	45 3922 1904	Кольцо направляющее	Guiding ring	2
30	75131-8603130	45 3647 0040	Труба	Tube	1
31	75131-8603548	45 3647 0061	Кольцо ограничительное	Restrictive ring	1
32	75131-8603408	45 3647 0057	Проставка	Spacer	1
33	S17 250x270x15 EBR T-Ecopur	45 3922 1909	Уплотнение штоковое	Rod seal	1
34	75131-8603370*	45 3647 0055	Направляющая верхняя	Guide	1
34	75131-8603370-01*	45 3647 0584	Направляющая верхняя	Guide	1
35	F 01 250x255x14.8	45 3922 1906	Кольцо направляющее	Guiding ring	2
36	75131-8603086	45 3647 0033	Кольцо ограничительное	Stop ring	2
37	75131-8603409	45 3647 0058	Проставка	Spacer	1
38	S17 200x220x15 EBR T-Ecopur	45 3922 1908	Уплотнение штоковое	Rod seal	1
39	A02-A 250x265x11.3x9.5 T- Ecopur	45 3922 1912	Грязесъемник	Scraper	1
40	7555-2402044	45 3637 2111	Кольцо стопорное	Locking ring	1
41	75131-8603371*	45 3647 0056	Направляющая верхняя	Guide	1
41	75131-8603371-01*	45 3647 0585	Направляющая верхняя	Guide	1
42	075-085-58-2-3	25 3111 6593	Кольцо	Ring	2
43	75131-8603357	45 3647 0053	Кольцо защитное	Protective washer	2
44	F 01 200x205x14.8	45 3922 1905	Кольцо направляющее	Guiding ring	2
45	035-040-30-2-3	25 3111 4112	Кольцо	Ring	2
46	75131-8603355	45 3647 0051	Кольцо защитное	Protective washer	2
47	A02-A 200x215x14x9.5 T- Ecopur	45 3922 1910	Грязесъемник	Scraper	1
48	75131-8603525	45 3647 0060	Кольцо упорное	Thrust ring	1
49	75131-8603026	45 3647 0023	Головка цилиндра	Head of cylinder	1
50	201497	45 9346 1559	Болт M10x25	Bolt M10x25	4

* - взаимозаменяемые детали (interchangeable parts)