



PENTACLE OIL FIELD SUPPLY INC.

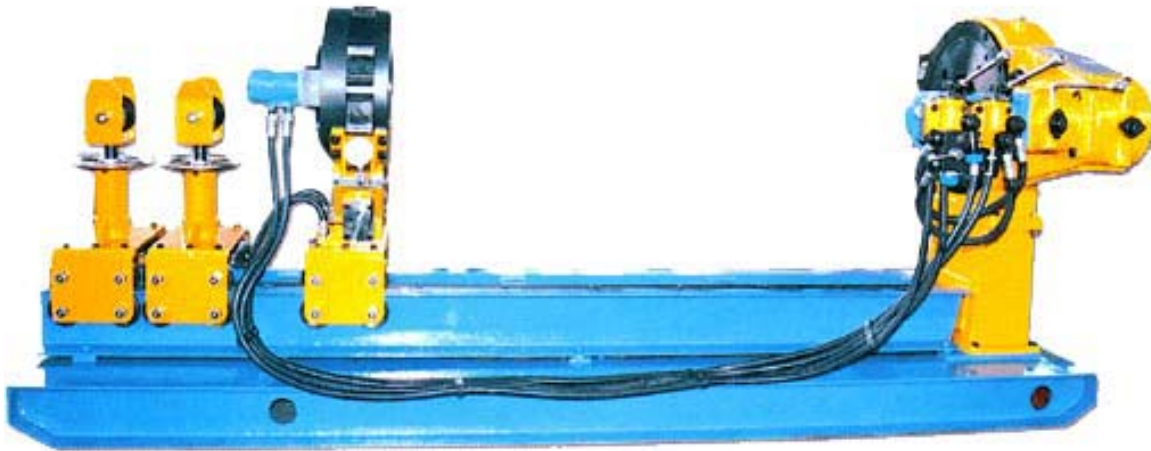
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MODEL: YNJ200/15

Hydraulic Make-up and Break-out Unit

MAINTENANCE AND OPERATION MANUAL



SAFETY CAUTION

1. Operators should read and understand this manual before operation.
2. Keep hands away from rotating parts.
3. Keep sundries out of the operation range.
4. Cut off the hydraulic source during maintenance, changing dies or other parts.
5. Never use the unit under over-pressure or over-torque conditions, otherwise the tubing will be damaged and so the planetary gear of the unit will be damaged.
6. Keep the unit turning center according to the center of pipe before make-up/break-out, otherwise the planetary gear of the tong would be damaged.
7. Don't dismantle or add parts to the unit.
8. Please adopt the original fitting parts made by TEDA.

Meaning of the Symbol

 **WARNING**

 **CAUTION**

 **ADVICE**

**If the manual is changed or revised later, we have no obligation to notify any person.
If the pictures vary from the practicality, please accept the practicality.**

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1 Summary

Model YNJ-200/15 Hydraulic Make- up/Break - out Units is a kind of machine for making up and breaking out thread joint, which is suitable for the assembly and disassembly of downhole pump, downhole tools, tubing, casing and other thread joint tools. This Product has the following features:

- Unit' head is driven by low speed large torque hydraulic motor. Control valve set connects with the hydraulic motor directly. The structure is compact and concise.
- Hydraulic backup tong and units' head are parallel hydraulic circuit. Operating control valve on units' head, backup tong clips or loosens simultaneously.
- Units' head and backup tong are four planetary claw of bi-direction clipping mechanism. When clipping tube of various OD in application range, just change the direction of knob.
- Automatic Torque Control system can be provided according to the demands of customers. This system can set the best torque value freely, control the making-up torque automatically, record each maximum torque value, which can be checked by technical and checkout departments.
- The backup tong is equipped with hydraulic walking mechanism Which can move with tube.
- Four speeds. Torque has wide application range.

2 Technical parameters

2.1 Range	Φ60-195 mm	(2 ⁷ / ₈ "—7 ⁵ / ₈ "
2.2 Low gear max. torque	15 kN.m	(11060 ft.lbs)
2.3 Second low gear max. torque	8.5 kN.m	(6270 ft.lbs)
2.4 Second high gear max. torque	4.7 kN.m	(3450 ft.lbs)
2.5 High gear max. torque	2.6 kN.m	(1920 ft.lbs)
2.6 High gear max. rotation speed	64 RPM	
2.7 Second high gear max. rotation speed	36 RPM	
2.8 Second low gear max. rotation speed	19 RPM	
2.9 Low gear max. rotation speed	11 RPM	
2.10 Max. work pressure	14 MPa	(2030 psi)
2.11 Max. oil supply	100 LPM	(26 GPM)
2.12 Weight	1220 kg	(2690 lbs)
2.13 Overall dimensions	3000×1300×1290 mm	(118 ⁷ / ₆₄ "×51 ³ / ₁₆ "×50 ²⁵ / ₃₂ "

3 Operation illustration

3.1 Installation

The center line of master tong and backup tong should be level, and accord with the center line of pipe.

3.2 Pipe connection

3.2.1 The inlet and outlet are shown in Fig. 1.

(The hand control valve of Fig. 1 is open in normal state. Operating handle 2 of Fig. 5. the backup tong will not move. If the hand control valve turn toward the shut off position, operating handle 2 of Fig. 5. the backup tong will move, the turn angle is bigger, the backup tong moving quickly.)

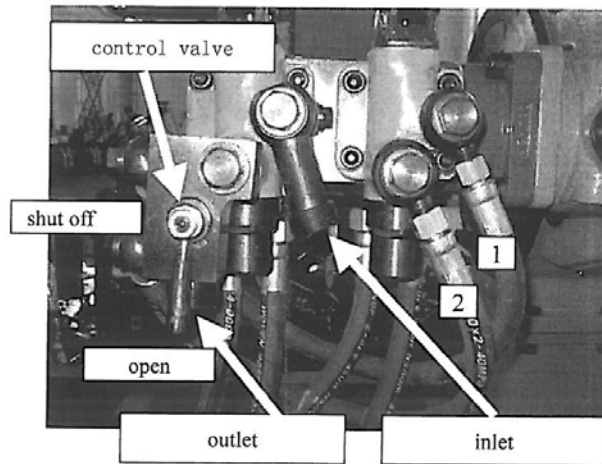


Fig.1

3.2.2 Hose connection of hydraulic makeup and breakout unit

There are total six hose in this unit, the hose connection are shown in Fig. 2.

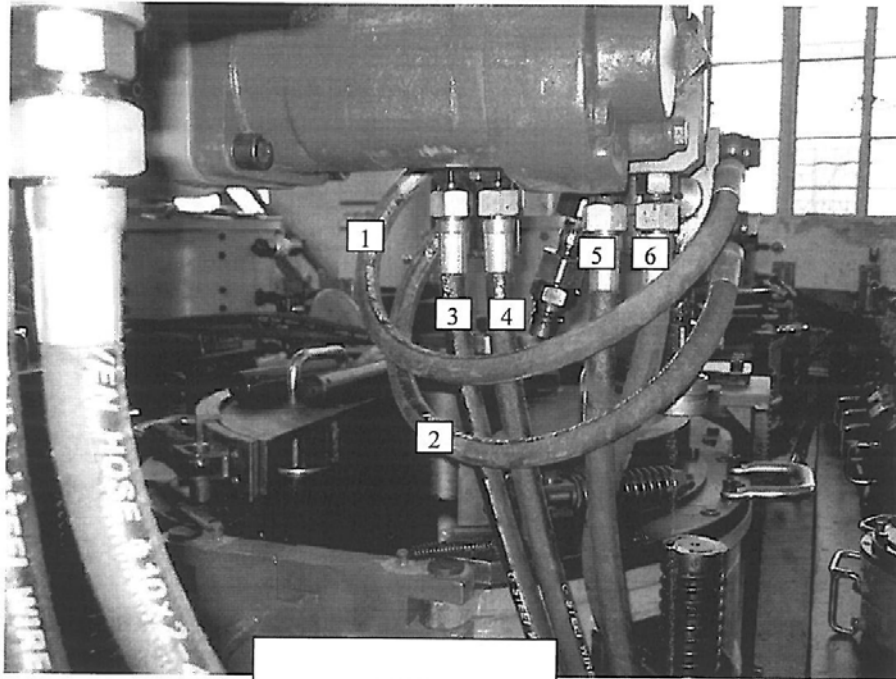
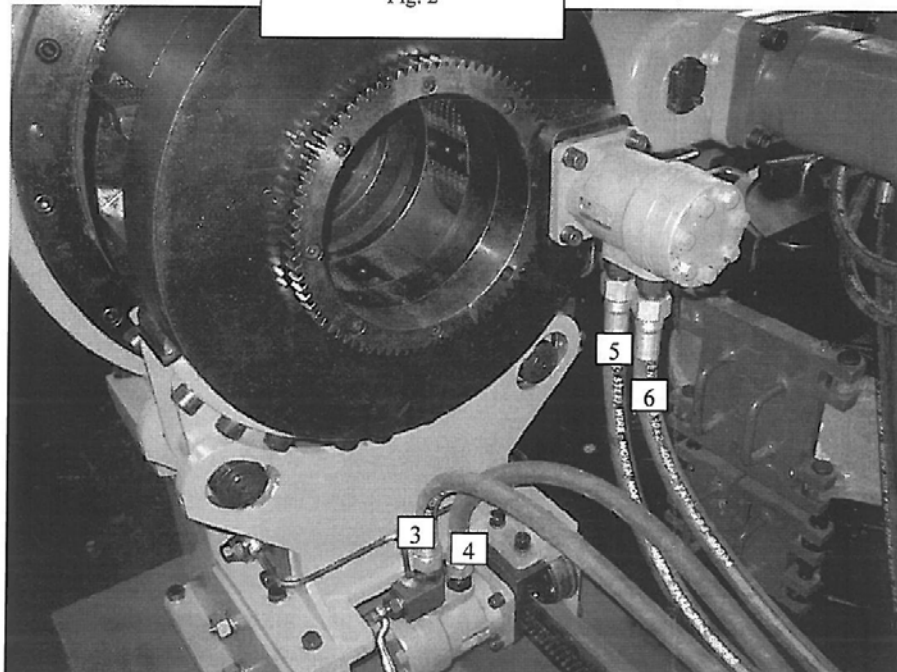


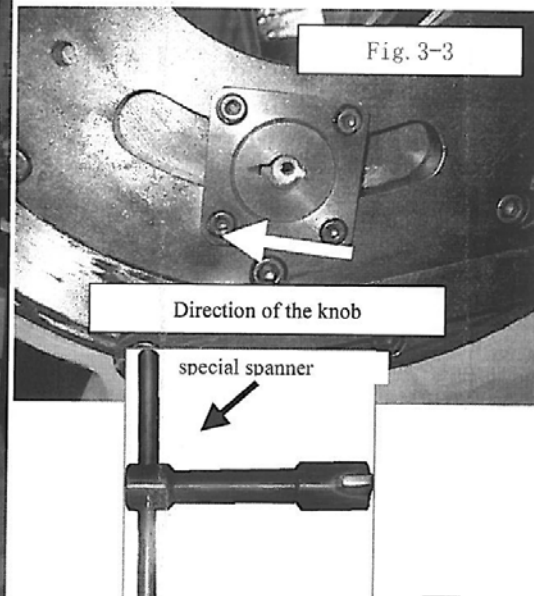
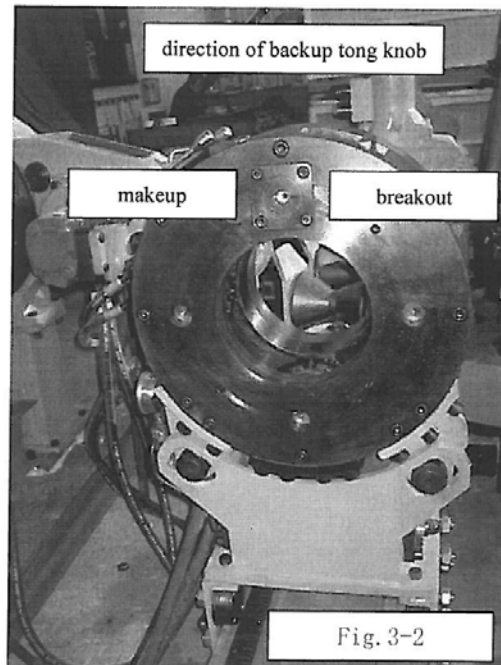
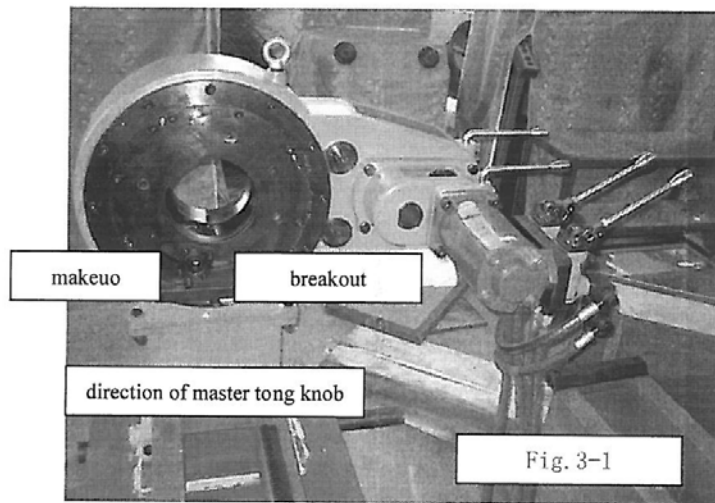
Fig. 2

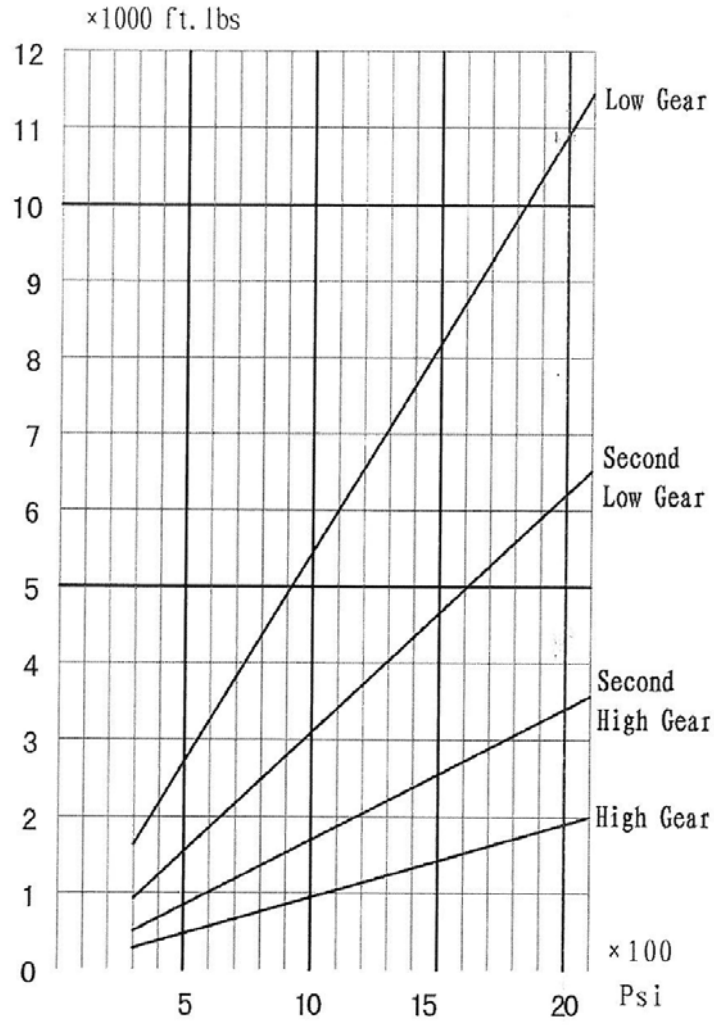


3.3 Make up operation

- Operating the handle of hand control valve to turn the unit head withdraw the planetary claw and stop the unit head.
- Use the special spanner (see the Fig. 3-3.) to adjust reset knob direction according to makeup requirement. Please see the Fig.3.
- Send tubing or casing and corresponding joint to proper position.
- Operating the handle 1 of hand control valve in Fig. 5 to make the unit turning, operating handle 2 in Fig. 5 to move backup tong if necessary,(the specific method of moving backup tong please see 3.2.1, open the control valve 1 fully in Fig. 1 after the backup tong moving to proper position), make the tubing or casing close to joint during moving the backup tong.
- Tubing put into the joint and makeup to proper position, then loose the hand control valve to end makeup operation.

The breakout operation are similar with the makeup operation. The handle position of makeup operation please see Fig. 4 and Fig. 5.





Gears	Low Gear	Second Low Gear	Second High Gear	High Gear
Handle Positions				

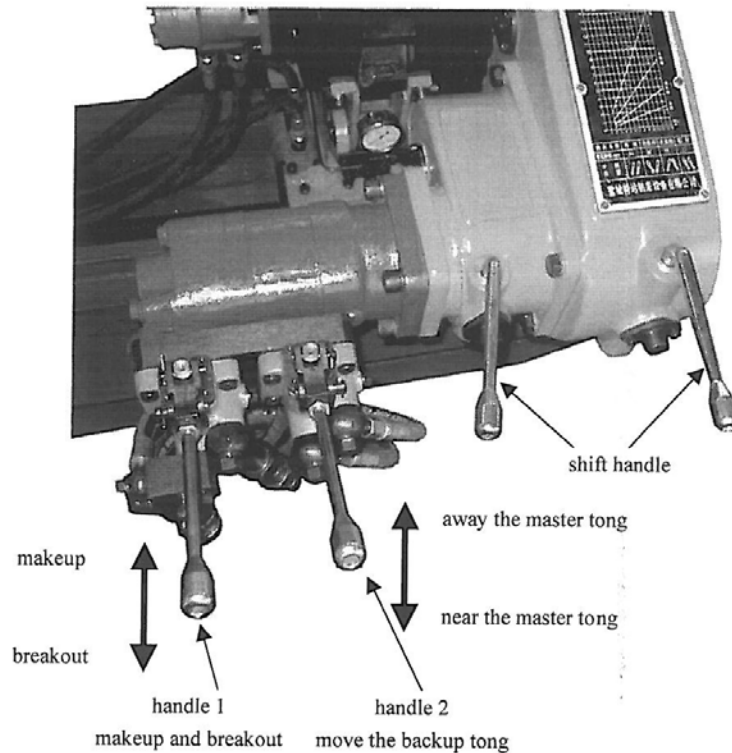


Fig.5

3.4 Shifting gear operation

There are two kinds of shifting handle in this unit, each handle have two position, there are four rotation speeds and four kinds torques available according to different combination of handle and position(the torque corresponding chart please see Fig. 4.). The handle position of all kind gear are shown in the operation illustration plate(please see Fig. 4 and Fig. 5). The operation of shifting gear should be carried through at low gear to avoid damage gear.

3.5 Replacing die operation

Replacing the die when the planetary claw is in the middle of position (please see Fig. 6). Displacing the die retainer and pushing all the die to the retainer space to take them out. During installing the die, fetch the die according to the order and put the die into the proper position from the retainer space, at last, install the die retainer. The replacing die will be done.

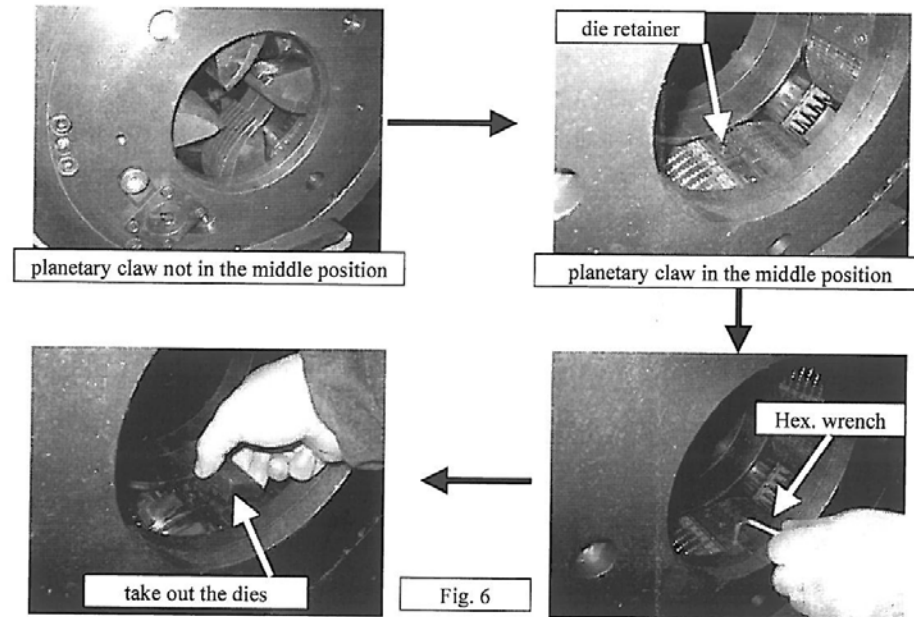


Fig. 6

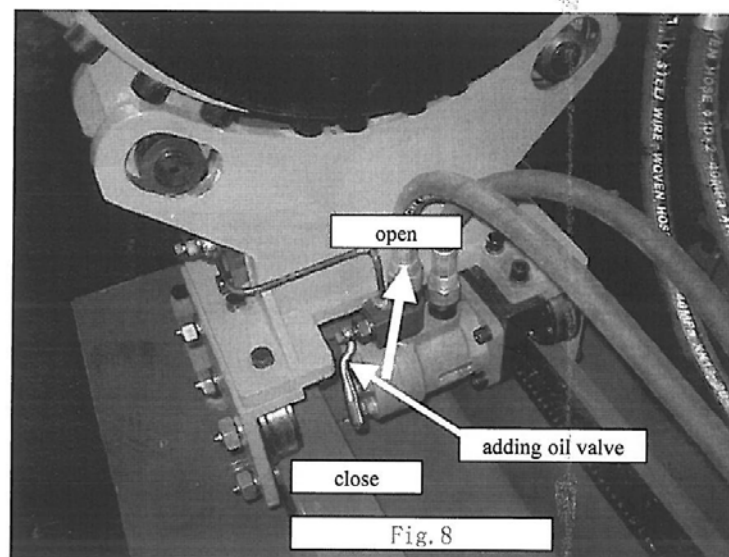
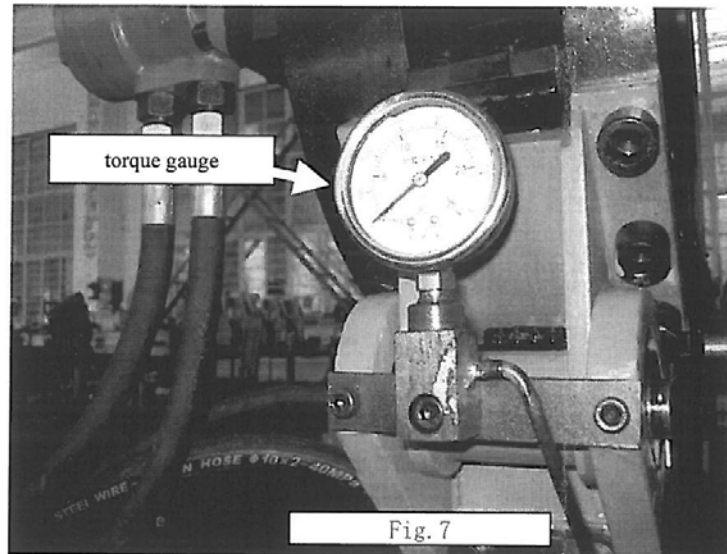
The following chart are shown die suitable for pipe diameter.

item	name	Part No.	clamp pipe diameter range	
1	die (1)	N151-6	$\Phi 60 \pm 10 \text{mm}$	$\Phi 6 \frac{5}{16}'' \sim 7 \frac{11}{16}''$
2	die (2)	N151-4	$\Phi 110 \sim 160 \text{mm}$	$\Phi 4 \frac{5}{16}'' \sim 6 \frac{5}{16}''$
3	die (3)	N151-2	$\Phi 160 \sim 195 \text{mm}$	$\Phi 2 \frac{3}{8}'' \sim 4 \frac{5}{16}''$

3.6 Torque sensor mechanism

Hydraulic makeup and breakout unit test torque by torque sensor cylinder and pressure gauge (it could be connected to torque sense system)(please see Fig. 7). It will not display the torque if the oil cylinder lack of oil. The following method is adding oil to sense oil cylinder(see Fig. 8).

Open the adding oil valve upwardly(Fig. 8), shut off control valve (Fig. 1), the hydraulic power unit supply oil to hydraulic makeup and breakout unit, shut off adding oil valve and open control valve when the pressure of the torque indicating gauge rise.



4 Maintenance and lubrication

4.1 Unit head and planetary claw of backup tong should be injected into lubrication oil before every operation, and clean horniness dirt in the die after every operation.

4.2 Grease to oil cup of unit head and backup tong once a week.

4.3 Grease the face of all gear once a month.

4.4 The temperature of hydraulic oil should be less 65°C, if exceeded, the hydraulic oil should be cooled down compulsively.

4.5 The hydraulic oil must be keep clean, the filter should be cleaned timely, if the hydraulic oil is dirty, replacing them timely.

4.6 The selection of hydraulic oil, The YA-N46 common hydraulic oil could be used under the circumstance that temperature is up to 0°C

4.7 Period inspect backup tong torque display oil cylinder, the display of torque will not be correct if the oil cylinder lack of oil. Torque gauge is replaced by pressure gauge. 1 MPa stand for torque value 1 kN.m.

5 Easy-damaged part number

unit head: N151-2 N151-4 N151-6 N151-20 N151-49 N151-69 N151-72 N151-95

backup tong: N154-47

other: N155—4

6 Common trouble and remedy

Unit head or backup tong clamp slippage	Clamp direction of planetary claw is wrong.	Turning directional knob and readjust the clamp direction of planetary claw.
	Die worn.	Replace new die
	Dirt in the groove of die	Clean up the dirt
The clash of unit head Planetary claw reset is noisy.	The operation of unit head reset is too rush.	Operation smoothly and passing oil interruptedly.
Unit head planetary claw couldn't put out.	Break torque is too small.	Adjusting the break spring properly.

7 Drawings and detailed list of part

7.1 General drawing of YNJ-200/15 hydraulic makeup and breakout unit and detailed list of its parts

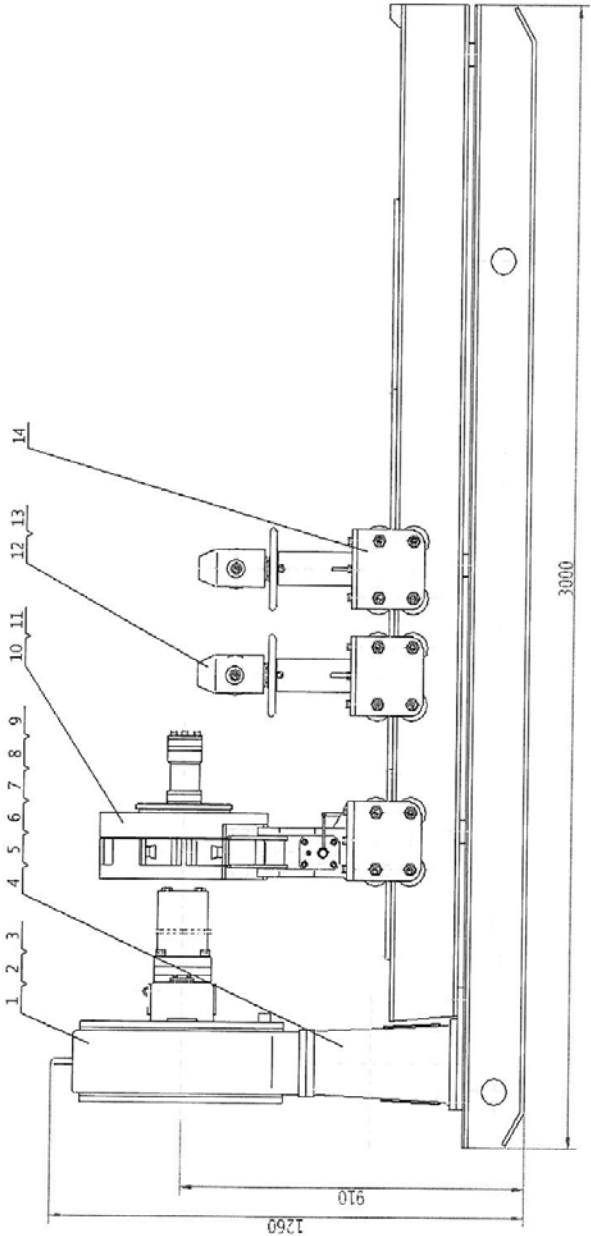
7.2 General drawing of unit head and detailed list of its parts

7.3 General drawing of backup tong and detailed list of its parts

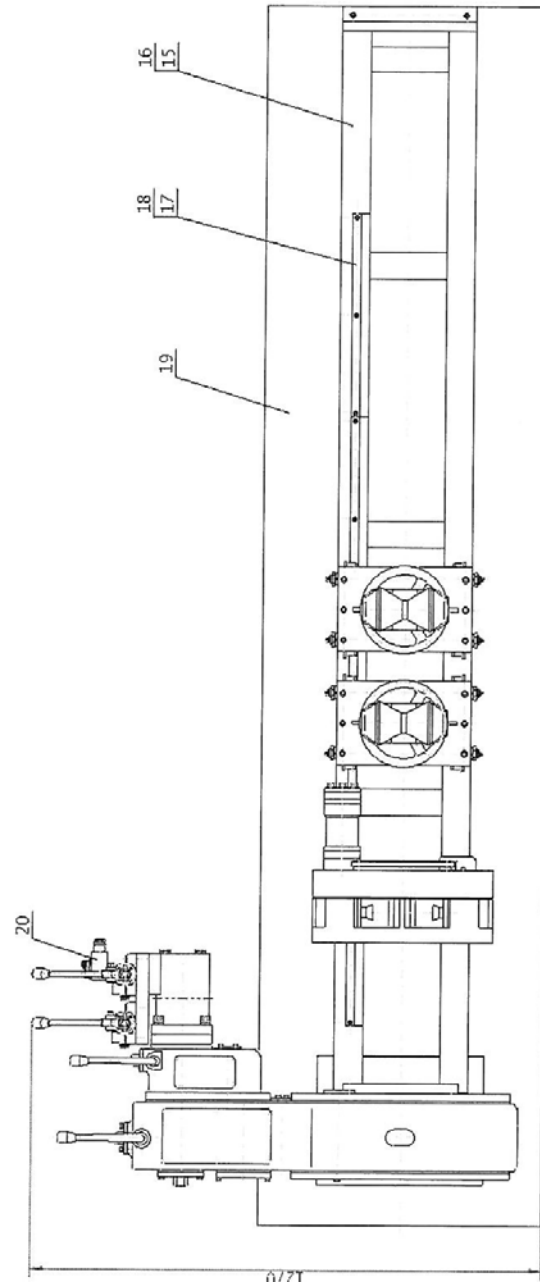
7.4 General drawing of support bracket and detailed list of its parts

7.5 General drawing of guide rail roller and detailed list of its parts

7.1 General drawing of YNJ-200/15 hydraulic makeup and breakout unit and detailed list of its parts (1)

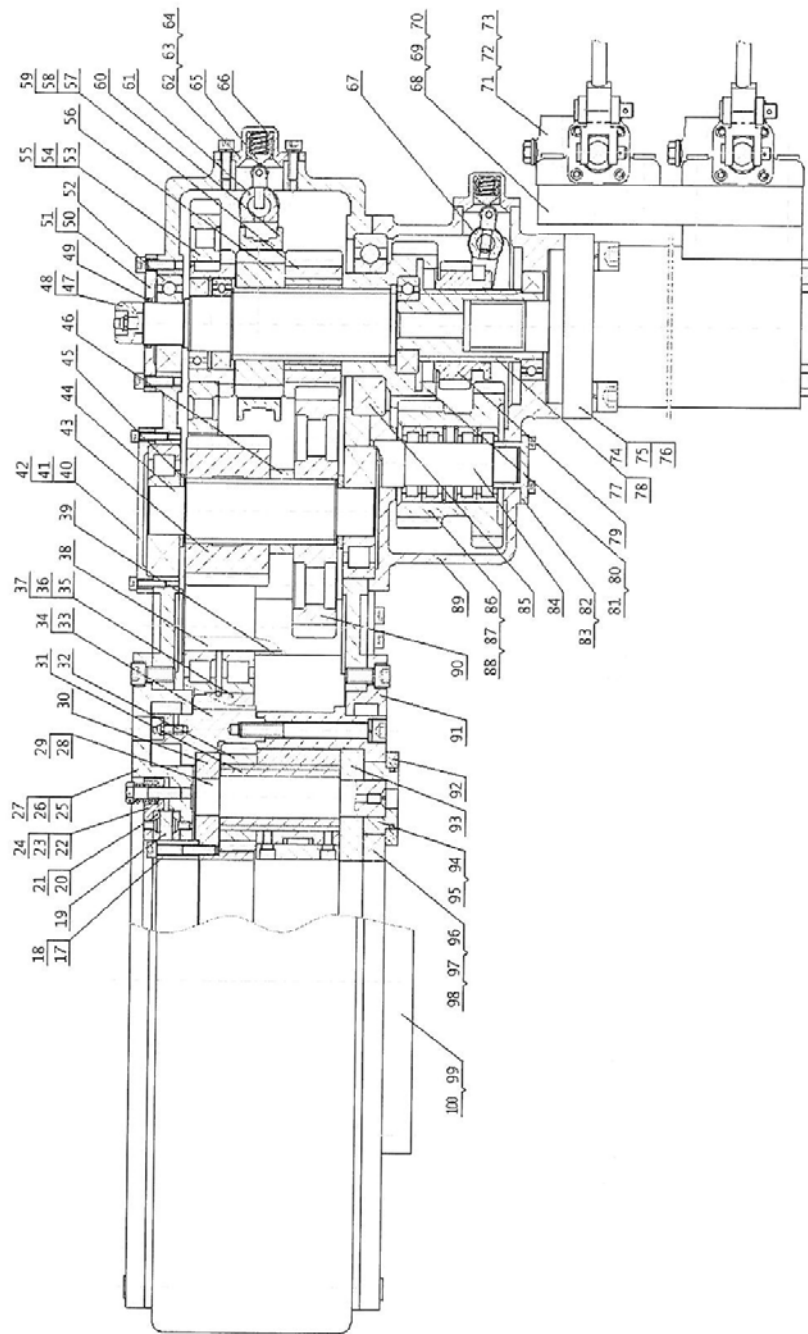


General drawing of YNJ-200/15 hydraulic makeup and breakout unit and detailed list of its parts (2)



item	Part No.	Drawing No.	description	QTY
1	N15-1	NJ200-01.00	unit head	1
2	N15-2	GB5781-86	hex head bolt M16×60	4
3	N15-3	GB6170-86	hex nut M16	4
4	N15-4	NJ200-10	unit head seat	1
5	N15-5	GB5781-86	hex head bolt M16×35	4
6	N15-6	NJ200-14	retainer plate	2
7	N15-7	GB70-85	hexagon socket head cap screw M8×15	8
8	N15-8	NJ200-11A	name plate	1
9	N15-9	GB65-85	slotted head cap screw M6×15	6
10	N15-10	NJ200-02.00	backup tong	1
11	N15-11	GB5781-86	hex head bolt M12×30	6
12	N15-12	NJ200-03.00	support braket	2
13	N15-13	GB5781-86	hex head bolt M12×30	12
14	N15-14	NJ200-06.00	guide rail roller assy.	6
15	N15-15	NJ200-04	guide rail	1
16	N15-16	GB5781-86	hex head bolt M16×35	8
17	N15-17	NJ200-05	rack	4
18	N15-18	GB70-85	hexagon socket head cap screw M8×15	12
19	N15-19	NJ200-08	plane plate	1
20	N15-20	NJ200-07.02.00	integrated hydraulic pipe assy.	1

7.2 General drawing of unit head and detailed list of its parts

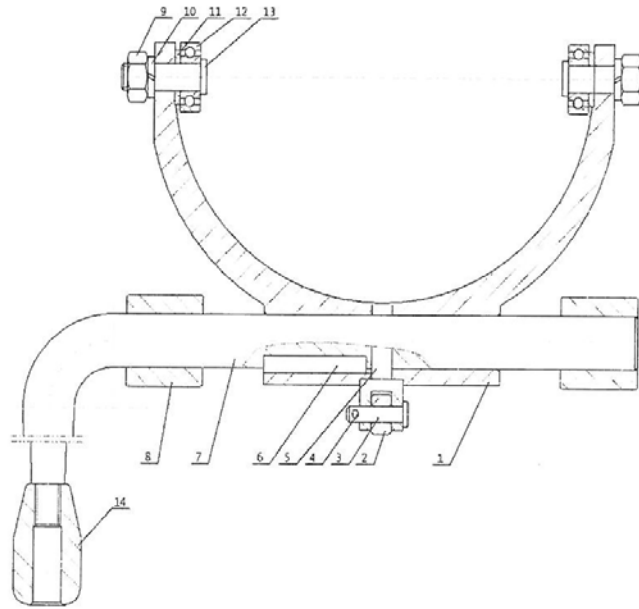


item	Part No.	Drawing No.	description	QTY
37	N151-37	GB283-87	short cylinder roller bearing 42408	4
38	N151-38	NJ200-01.23	idler gear shaft	2
39	N151-39	NJ200-01.24	bushing	2
40	N151-40	NJ200-01.25	end cover(1)	1
41	N151-41	GB283-87	short cylinder roller bearing 42408	4
42	N151-42	GB70-85	hexagon socket head cap screw M6×25	6
43	N151-43	NJ200-01.26	duplex small gear	1
44	N151-44	NJ200-01.27	spline shaft	1
45	N151-45	NJ200-01.29	cushion	3
46	N151-46	NJ200-01.28	bushing	1
47	N151-47	NJ200-01.31	main shaft	1
48	N151-48	GB1152-79	oil cup M10×1	1
49	N151-49	GB1235-76	O ring 40×3.5	1
50	N151-50	NJ200-01.30	end cover (2)	1
51	N151-51	GB70-85	hexagon socket head cap screw M8×25	6
52	N151-52	GB276-82	deep groove ball bearing307	1
53	N151-53	NJ200-01.33	clutch gear	1
54	N151-54	NJ200-01.32	retainer ring	1
55	N151-55	GB276-82	deep groove ball bearing 109	2
56	N151-56	NJ200-01.34	inner spline gear (2)	1
57	N151-57	NJ200-01.37	shift gear	1
58	N151-58	NJ200-01.36	shaft bushing	1
59	N151-59	NJ200-01.35	inner spline sleeve	1
60	N151-60	NJ200-01.38	inner gear sleeve	1
61	N151-61	NJ200-01.39	shifting gear mechanism assy. (2)	1
62	N151-62	XYQ12.Z-60	locating seat	2
63	N151-63	GB93-87	spring washer8	4
64	N151-64	GB70-85	hexagon socket head cap screw M8×25	4
65	N151-65	XYQ12.Z-21	locating seat	2
66	N151-66	XYQ3C.Z-21	spring	2
67	N151-67	NJ200-01.42	shifting gear mechanism assy. (1)	1
68	N151-68	NJ200-07.01A	transition connection board	1
69	N151-69	GB1235-76	O ring 32×3.1	4
70	N151-70	GB70-85	hexagon socket head cap screw M12×30	4
71	N151-71	XYQ3C.Z.5	hand control valve	2
72	N151-72	GB1235-76	O ring 22×2.4	2

item	Part No.	Drawing No.	description	QTY
1	N151-1	NJ200-01.01	unit head case body	1
2	N151-2	NJ200-01.02A	die (3)	8
3	N151-3	NJ200-01.03	planetary claw mend piece	8
4	N151-4	NJ200-01.04A	die (2)	8
5	N151-5	NJ200-01.05A	planetary claw	4
6	N151-6	NJ200-01.06A	die (1)	8
7	N151-7	GB70-85	hexagon socket head cap screw M8×15	8
8	N151-8	NJ200-01.07B	planetary claw retainer block	4
9	N151-9	GB825-88	lift ring screw M20	1
10	N151-10	GB93-87	spring washer20	1
11	N151-11	GB70-85	hexagon socket head cap screw M8×20	8
12	N151-12	NJ200-01.08	end cover	2
13	N151-13	GB5781-86	hex head bolt M16×40	8
14	N151-14	GB65-85	slotted head cap screw M6×15	6
15	N151-15	NJ200-01.09	retainer plate	2
16	N151-16	NJ200-12A	operation illustration plate	1
17	N151-17	NJ200-01.10	break spline sleeve	1
18	N151-18	GB70-85	hexagon socket head cap screw M8×50	8
19	N151-19	NJ200-01.11	break steel plate	1
20	N151-20	NJ200-01.12	break friction disc	2
21	N151-21	GB68-85	countersunk screw M6×10	16
22	N151-22	NJ200-01.14	break disc	1
23	N151-23	XYQ3C.Z-21	spring	8
24	N151-24	GB32.1-88	hex head bolt with hole M10×35	8
25	N151-25	NJ200-01.15	unit head cover(2)	1
26	N151-26	GB70-85	hexagon socket head cap screw M12×25	22
27	N151-27		roller Φ 10 ₂₄ .8	141
28	N151-28	NJ200-01.16	rotation shaft	4
29	N151-29	GB68-85	countersunk screw M8×10	4
30	N151-30	NJ200-01.17	planetary connection board (2)	1
31	N151-31	NJ200-01.18	outer spline sleeve	4
32	N151-32	NJ200-01.19	planetary gear	4
33	N151-33	NJ200-01.20	unit head big gear	1
34	N151-34	GB1152-79	oil cup M8×1	4
35	N151-35	NJ200-01.21	idler gear	2
36	N151-36	NJ200-01.22	retainer ring	2

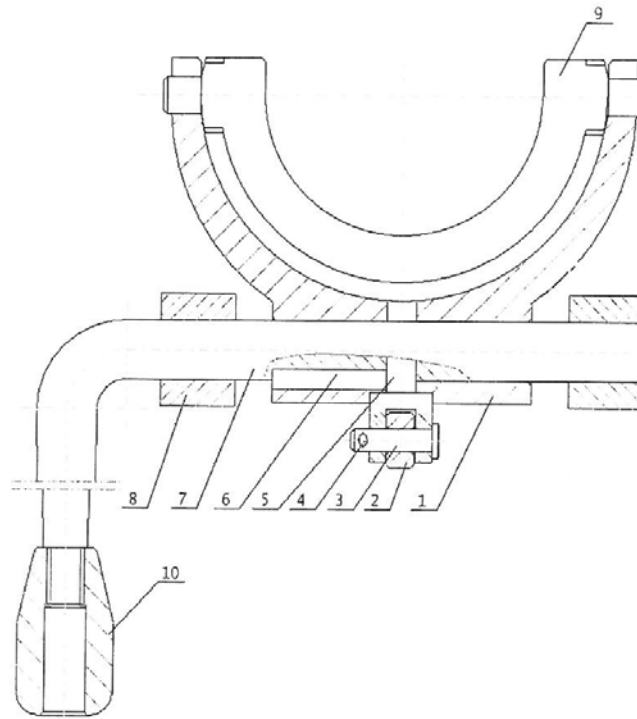
item	Part No.	Drawing No.	description	QTY
73	N151-73	GB70-85	hexagon socket head cap screw M12×30	8
74	N151-74		hydraulic motorJ625	1
75	N151-75	GB93-87	spring washer16	4
76	N151-76	GB70-85	hexagon socket head cap screw M16×40	4
77	N151-77	XYQ12.Z-26	spline shaft	1
78	N151-78	GB276-82	deep groove ball bearing 111	1
79	N151-79	NJ200-01.43	inner spline gear (1)	1
80	N151-80	NJ200-01.44	main shaft gear	1
81	N151-81	GB276-82	deep groove ball bearing 208	1
82	N151-82	NJ200-01.45	end cover (3)	1
83	N151-83	GB70-85	hexagon socket head cap screw M6×20	4
84	N151-84	NJ200-01.46	duplex gear shaft	1
85	N151-85	GB276-82	deep groove ball bearing 217	1
86	N151-86	NJ200-01.47	duplex gear	1
87	N151-87	GB893.2-76	circlip for hole 62	2
88	N151-88	GB284-87	short cylinder roller bearing 292305	4
89	N151-89	NJ200-01.48	case body	1
90	N151-90	NJ200-01.49	duplex big gear	1
91	N151-91	NJ200-01.50	unit head cover (1)	1
92	N151-92	NJ200-01.51	retainer plate	2
93	N151-93	NJ200-01.52	planetary connection board (1)	2
94	N151-94	NJ200-01.53	reverse direction retainer block	2
95	N151-95	GB1235-76	O ring 50×3.5	1
96	N151-96	NJ200-01.54	unit head main body	1
97	N151-97	GB93-87	spring washer 12	12
98	N151-98	GB70-85	hexagon socket head cap screw M12×110	12
99	N151-99	NJ200-01.55	restrict block	1
100	N151-100	GB70-85	hexagon socket head cap screw M12×45	2

NJ200-01.39.00 gear shift assembly (2)



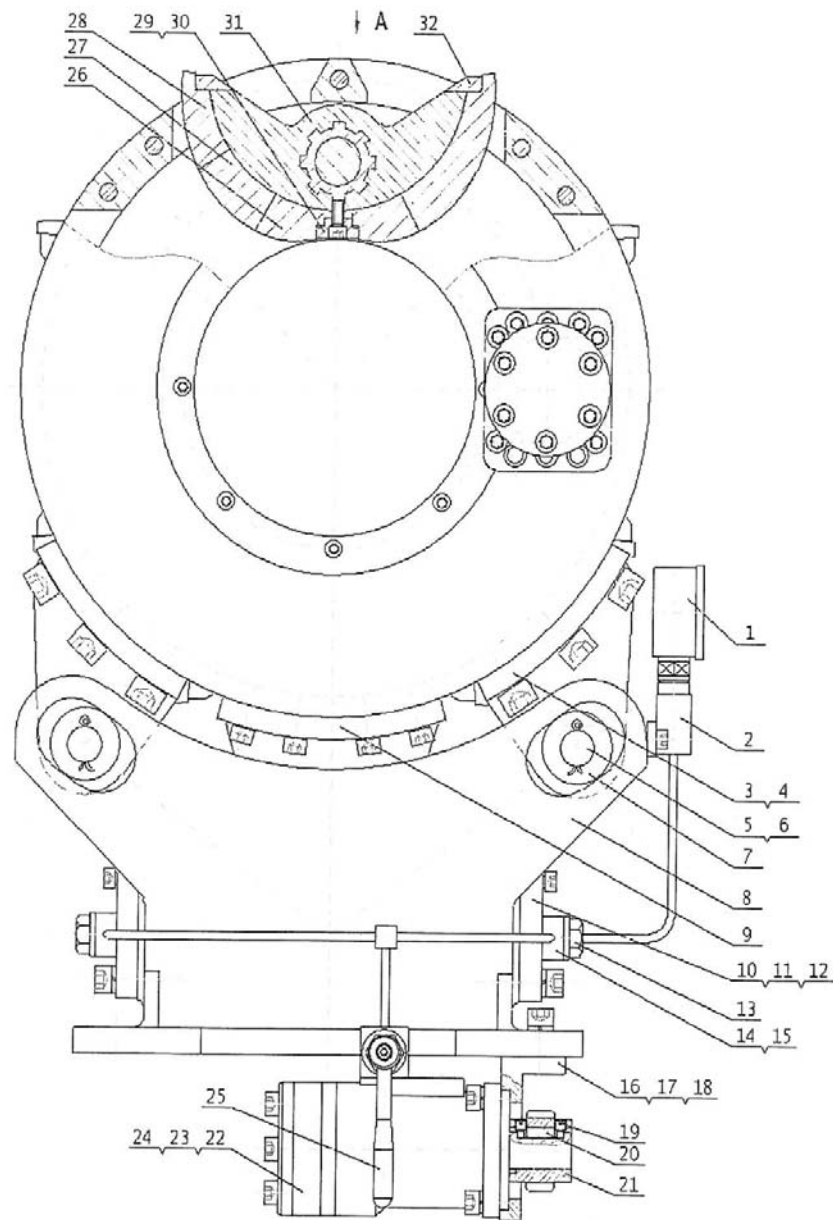
item	Part No.	Drawing No.	description	QTY
1	N152-1	NJ200-01.39.01	fork	1
2	N152-2	XYQ3C.Z.6-3	roller	1
3	N152-3	XYQ3C.Z.6-4	roller shaft	1
4	N152-4	GB91-86	cotter pin2×10	1
5	N152-5	XYQ3C.Z.6-5	roller seat	1
6	N152-6	GB1096-79	flat key6×6×40	1
7	N152-7	NJ200-01.39.02	fork shaft	1
8	N152-8	XYQ12.Z-19.01	shaft bushing	2
9	N152-9	GB41-86	small hex nutM10	2
10	N152-10	GB93-87	spring washer10	2
11	N152-11	GB95-86	flat washer10	2
12	N152-12	GB276-89	deep groove ball bearing100	2
13	N152-13	XYQ12.Z-19.04	bolt shaft	2
14	N152-14	XYQ3C.Z.5-10	ball handle	2

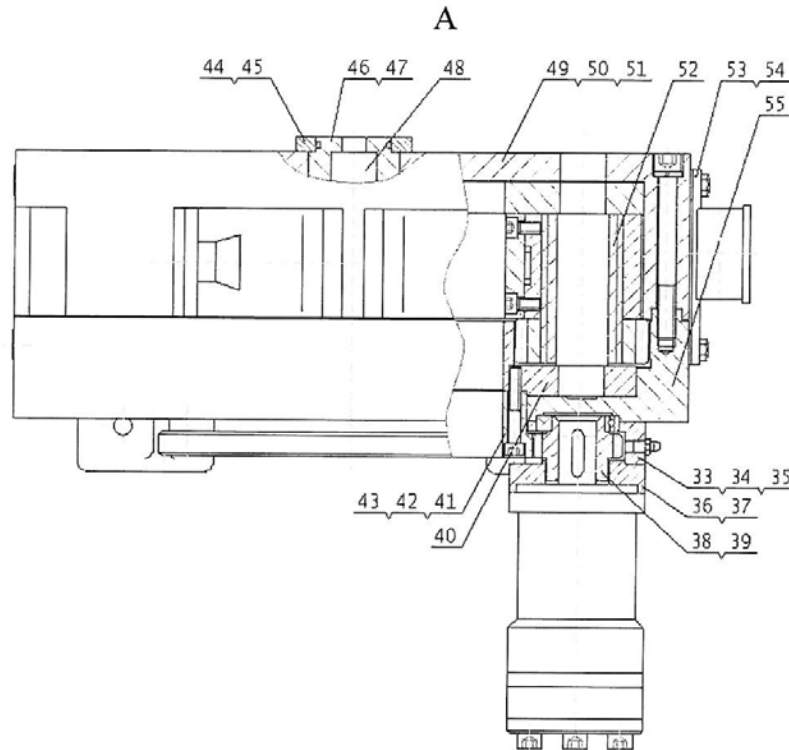
NJ200-01.42.00 gear shift assembly (1)



item	Part No.	Drawing No.	description	QTY
1	N153-1	NJ200-01.42.01	fork	1
2	N153-2	XYQ3C.Z.6-3	roller	1
3	N153-3	XYQ3C.Z.6-4	roller shaft	1
4	N153-4	GB91-86	cotter pin 2×10	1
5	N153-5	XYQ3C.Z.6-5	roller seat	1
6	N153-6	GB1096-79	flat key 6×6×40	1
7	N153-7	NJ200-01.42.02	fork shaft	1
8	N153-8	XYQ12.Z-19.01	shaft sleeve	2
9	N153-9	NJ200-01.42.03	fork ring	1
10	N153-10	XYQ3C.Z.5-10	ball handle	2

7.3 General drawing of backup tong and detailed list of its parts

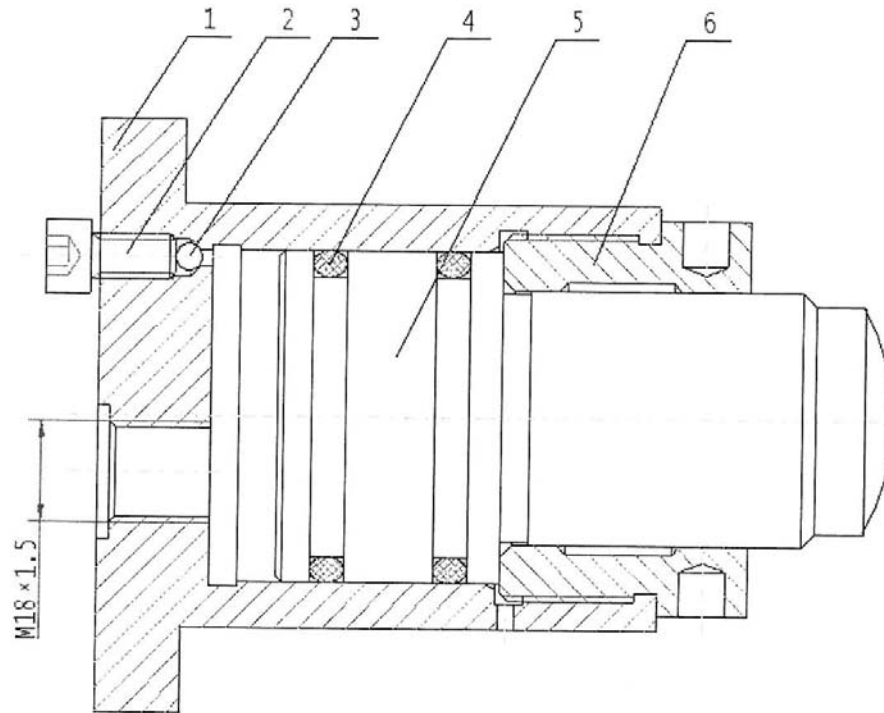




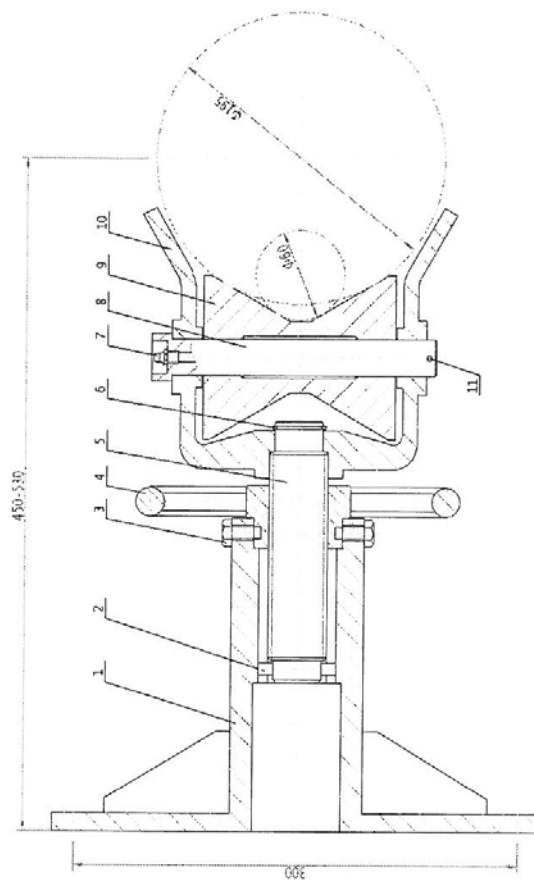
item	Part No.	Drawing No.	description	QTY
1	N154-1		torque gauge Y-60(0-25MPa)	1
2	N154-2	NJ200-02.01	pressure gauge adapter	1
3	N154-3	NJ200-02.02	backup tong support seat	2
4	N154-4	GB70-85	hexagon socket head cap screw M16×35	20
5	N154-5	NJ200-02.04	rotation shaft	2
6	N154-6	GB91-86	cotter pin 4×40	2
7	N154-7	NJ200-02.05	roller	4
8	N154-8	NJ200-02.06	backup tong unit seat	1
9	N154-9	NJ200-02.07	test strength arm	1
10	N154-10	NJ200-02.08.00	torque display oil cylinder	2
11	N154-11	GB93-87	spring washer12	8
12	N154-12	GB70-85	hexagon socket head cap screwM12×30	8
13	N154-13	NJ200-02.09 (2)	hollow bolt (2)	2
14	N154-14	NJ200-02.11	connection joint	2

item	Part No.	Drawing No.	description	QTY
15	N154-15		seamless steel pipe $\Phi 6 \times 1$ (L=500)	1
16	N154-16	NJ200-02.12	walking motor seat	1
17	N154-17	GB93-87	spring washer12	2
18	N154-18	GB70-85	hexagon socket head cap screwM12 \times 40	2
19	N154-19	GB75-85	slotted long cap fasten screw M8 \times 12	2
20	N154-20	NJ200-02.13	flat key	1
21	N154-21	NJ200-02.14	walking gear	1
22	N154-22		hydraulic motor BM-D100	1
23	N154-23	GB93-87	spring washer10	2
24	N154-24	GB70-85	hexagon socket head cap screw M10 \times 25	2
25	N154-25	NJ200-13.00	automatic add oil mechanism	1
26	N154-26	NJ200-01.06A	die (1)	8
27	N154-27	NJ200-01.04A	die (2)	8
28	N154-28	NJ200-01.02A	die (3)	8
29	N154-29	NJ200-01.07B	planetary claw retainer piece	4
30	N154-30	GB70-85	hexagon socket head cap screwM8 \times 15	8
31	N154-31	NJ200-01.05A	planetary claw	4
32	N154-32	NJ200-01.03A	planetary claw mending piece	8
33	N154-33	NJ200-02.17	connection board	1
34	N154-34	GB1152-79	oil cupM8 \times 1	1
35	N154-35	GB70-85	hexagon socket head cap screw M10 \times 30	2
36	N154-36	NJ200-02.18	oil motor seat	1
37	N154-37	GB70-85	hexagon socket head cap screw M10 \times 45	4
38	N154-38	NJ200-02.19	backup small gear	1
39	N154-39	GB276-82	deep groove ball bearing1000907	1
40	N154-40	NJ200-01.17	planetary connection board(2)	1
41	N154-41	NJ200-02.20	planetary bracket gear	1
42	N154-42	GB93-87	spring washer8	8
43	N154-43	GB70-85	hexagon socket head cap screw M8 \times 50	8
44	N154-44	NJ200-01.51	retainer plate	1
45	N154-45	GB70-85	hexagon socket head cap screw M8 \times 15	4
46	N154-46	NJ200-01.53	reverse direction retainer block	1
47	N154-47	GB1235-76	O ring 50 \times 3.5	1
48	N154-48	NJ200-01.16	rotation shaft	4
49	N154-49	NJ200-02.21	backup tong main body	1
50	N154-50	GB93-87	spring washer12	12
51	N154-51	GB70-85	hexagon socket head cap screw M12 \times 110	12
52	N154-52	NJ200-01.18	outer spline sleeve	4
53	N154-53	NJ200-02.22	support plate	1
54	N154-54	GB5781-86	hex head bolt M8 \times 20	2
55	N154-55	NJ200-02.23	backup tong gear ring	1

NJ200-02.08.00 oil cylinder for torque measurement

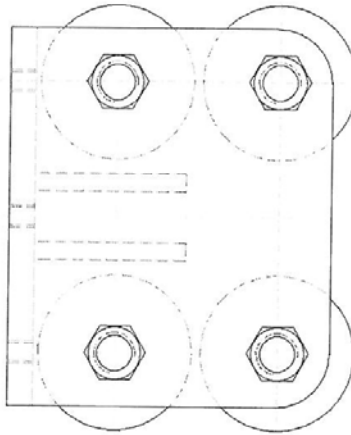
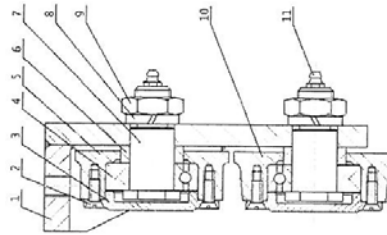


item	Part No.	Drawing No.	description	QTY
1	N155-1	NJ200-02.08.01	oil cylinder main body	1
2	N155-2	GB70-85	hexagon socket head cap screw M8×15	1
3	N155-3	GB308-89	steel ball Φ5	1
4	N155-4	GB3452.1	O ring 48.7×5.3	2
5	N155-5	NJ200-02.08.02	piston	1
6	N155-6	NJ200-02.08.03	piston pressure cover	1



item	Part No.	Drawing No.	description	QTY
1	N156-1	NJ200-03.01	bottom seat	1
2	N156-2	GB119-86	cylindrical pin 8×50	1
3	N156-3	GB85-88	square head fasten screw M10×20	2
4	N156-4	NJ200-03.02	hand wheel nut	1
5	N156-5	NJ200-03.03	screw rod	1
6	N156-6	GB894.1-86	32 retainer ring	1
7	N156-7	GB1152-89	oil cup M8×1	1
8	N156-8	NJ200-03.04	gear shaft	1
9	N156-9	NJ200-03.05	support gear	1
10	N156-10	NJ200-03.06	support gear seat	1
11	N156-11	GB91-86	cotter pin 4×40	1

7.5 General drawing of guide rail roller and detailed list of its parts



item	Part No.	Drawing No.	description	QTY
1	N157-1	NJ200-06.01	connection board	1
2	N157-2	GB68-85	slotted countersunk screw M6×16	16
3	N157-3	GB276-82	deep groove ball bearing 205	4
4	N157-4	NJ200-06.02	bearing cover	4
5	N157-5	NJ200-06.03	upper roller	2
6	N157-6	NJ200-06.04	sleeve	4
7	N157-7	NJ200-06.05	roller shaft	4
8	N157-8	GB93-87	spring washer 20	4
9	N157-9	GB6170-86	hex nut M20	4
10	N157-10	NJ200-06.06	lower roller	2
11	N157-11	GB1152-89	oil cup M8×1	4