



TQ340/35Y₂ HYDRAULIC CASING TONG

OPERATION MANUAL

TQ340-35Y-SM

STANDARD: SY/T 5074-2004
PRODUCTION PERMIT:
XK14-002-00020



7K-0048

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SECTION I

INTRODUCTION

TQ340/35Y₂ Hydraulic Casing Tong is used to make up and break out for casing operation in oil fields. It greatly reduces the labor of worker, enhances connection quality of thread and diminished accidents in inappropriate casing operation.

Features:

1. Opening type, convenient and prompt to enter and slide off the working position, with an integral tong head of great strength and rigidity.

2. Double swing head jaws, very convenient to assemble and disassemble, with the best design for tangent-diameter ratio, ensuring the reliability of gripping and easy cam-backslide.

3. Band brake of great moment, easy to operate and convenient to maintain and replace.

4. Notched gear new type sporting structure, greatly improving the strength and rigidity.

5. Wholly hydraulic mode. High torque motor of swing cylinder type will supply effective power. The power tong takes mechanical gear changing and its structure is simple and reliable.

6. The shell is thickened with Mn. The jaws are cast with precise technology, artistic and strong.

7. The hydraulic torque gauge as well as the joint for a round-torque gauge makes it possible for computers to manage the process.

SECTION II

PERFORMANCE PARAMETERS

I . Technical parameters

1. Suitable pipe		4"- 13 ³ / ₈ " (101.6-340mm)
2. Opening size		13.78" (350 mm)
3. Head spinning speed	high	50-90 rpm
	low	8-14 rpm
4. Max. torque	high	2580-4425 ft.lbf (3.5-6 kN. m)
	low	16225-27285 ft.lbf (22-37 kN. m)
5. Maximum working pressure		2900 psi (20 MPa)
6. Working flow		29-45 gpm (110-170 L/min)
Max. working flow		52.5 gpm (200 L/min)
7. Overall dimensions		62" × 35" × 42" (1580×900×1060 mm)
8. Weight		1650 lb (750 kg)

II . Speed and Torque Comparison (see Table 1, 2)

Table 1 Speed under different flow		
Flow GPM (L/min)	Speed (rpm)	
	High gear	Low gear
29(110)	48	7.6
32 (120)	52	8.3
37 (140)	61	9.7
42 (160)	70	11
47.5 (180)	78	12.5
53 (200)	87	14

Table 2 Max theoretical torque under different pressure		
Pressure PSI (MPa)	Torque ft.lbf (kN.m)	
	High gear	Low gear
1450(10)	2212 (3)	13275 (18)
1740 (12)	2580 (3.5)	16226 (22)
2030 (14)	2950 (4)	19176 (26)
2320 (16)	3540 (4.8)	22126 (30)
2610 (18)	3982 (5.4)	24340 (33)
2900 (20)	4425 (6)	27290 (37)

SECTION III INSTALLATION

I Hang the tong (see Fig.4)

- 1 . Fix the single pulley (3.3 US ton) under beam of the crown block.
2. Get a wire rope (at least 1/2") through the pulley, with one end fixed on the base beam. The height of the tong should be at the same level as the average height of joint during making up and breaking out casing.

II Level the tong

The tongs must be leveled when hung up, or the dies will be sliding to grip.

Front and back level - adjust the two screws at the joint where the tong is connected with their hanger.

Crosswise level - turn the screw rod at the top of the hanger.

III Connect the rear wire

The wire, at least $\frac{5}{8}$ " , is connected with the ring of the torque cylinder at the end of the tongs, the other end fixed on the derrick or the drilling platform.

NOTE: When the wire rope is tightened, it should be almost at the same level of the tongs, and be at an angle of 90° from the tong medium line.

IV Fill the torque oil cylinder

When the piston rod is pulled out 30mm long, oil must be filled. Use the hand-oiling pump equipped with the tong to oil the torque cylinder until the hand of torque gauge acts.

V Connect the pipes

High pressure oil hose – NPT1 or M30*1.5 joint connects with high-pressure hose from the power unit.

Low-pressure return hose – NPT1 $\frac{1}{4}$ or M42*2 joint connects with low-pressure hose from the power unit.

Drain hose – M18*1.5 joint connects with the small return line from the power unit.

SECTION IV OPERATION

I Requirements

1. Know the tong structure and the properties.
2. Know the use of the hydraulic hand-reversing valve and of the speed-changing handle.
3. Know the operation sequence and safety requirements.
4. Know the functions of the meters.

II Preparation for the operation .

1. Install the jaws that go with the casing pipe. Note that the two jaws should be installed correctly.
2. Put the handles of the hydraulic hand-reversing valve and the speed-changing handle at neutral position.
3. Start the hydraulic power unit.
4. Push or pull the handle of the hydraulic hand-reversing valve, and you will hear the hydraulic motor while the tong head notched gear remains still.
5. Set the handle of the speed-changing handle at high or low gear. Push or pull the handle of the hydraulic hand reversing valve, and the notched gear turns smoothly in forward and reverse direction.

Attention: Do stop the tong when change gear.

III Working process

1. Align the gear's notch with the jaw rack's notch.
2. Set the backing pin into "make up" or "break out" hole, and adjust the brake band.
3. Align the gear notch with the case notch.
4. Draw the safety door open, push the tongs to working position and close the door.

*Making up

a. High gear operation: Set the handle of speed-changing handle at high speed position and the handle of hydraulic reversing valve at "make up" position. Jaws clamp the casing tightly and drive the casing rotate in "make up" direction. At the same time watch the torque gauge. If the reading fails to reach the needed value, change to low gear.

b. Low gear operation: Stop the motor and put the speed-changing handle at low gear, and operate the direction-reversing valve, the casing pipe will turn slowly. Watch the torque gauge at the same time. When the reading reaches the needed value, put the handle of hydraulic reverse valve at mid position.

c. Set the handle of hydraulic reversing valve at "break out" position, then choose high or low gear according to the proficiency of operator and the position of notched gear. Jaws loose. The rotary gear turns in "break out" position. When it aligns with the case notch, set the handle of hydraulic reverse valve at mid position.

d. Open the safety door and draw back the tong. That is one make-up.

* Breaking out

a. Low gear operation: set the speed-changing handle at low gear position, the handle of the hydraulic reversing valve at "break out" position, and the casing turns slowly in the direction to break out.

b. High gear operation: When the casing turns to a certain angle it can turn at high gear, stop the tong and set the speed-changing handle at high gear position, and then the casing turns at high speed in the direction to break out.

c. When the screw threads are apart, the operator may choose a proper position for the speed-changing handle according to his own proficiency and the gear notch position. Push the handle of the hydraulic reversing valve to "make up" position. When the gear notch and the case notch are aligned, set the handle of the hydraulic reversing valve in the middle position.

d. Open the safety door, and slide the tong off the casing. A break-out is done.

IV Safe rules of operation

1. Do stop the power station when remove the jaws, in case of accidents.

2. When set the jaws, notice the difference between the left and right jaws.
3. Do not turn the notched gear until the safety door is closed, so as to avoid injury.
4. Check regularly the suspension rope and the rear rope to keep safe.
5. The tong should be stopped when change speed.

SECTION V MAINTENANCE

- I Set up system of job responsibility.
- II Grease fittings and slide faces before every use.
- III Run through all the procedures in item II section IV before use.
- IV Thorough cleaning is necessary after use. Grease the head of the tong against rusting.
- V Keep the tong at a dry and clean place far from the drilling platform, the exposed part of the head should be greased.
- VI When moving the tong, be sure to cover each inlet and outlet to prevent dust from entering the pipes.
- VII The tong needs complete repair and maintenance after the tong is already used for about ten wells.

SECTION VI LUBRICATION

1. Inject No.3 Calcium base grease into each fitting by using grease gun. Once a shift. Turn the tong head by means of a pinch bar. Use a brush to grease notched gear, rollers with No.3 calcium base grease. Once a shift. Remove the cap for inspection hole (Fig.5, No.6), and grease drive gear. Once a shift.

Fitting distribution is as follows (Refer to Fig. 5)

No.	1,8	2,10	3	4	5,7	9	11	12
Location	Safety door	Upper and lower jaw racks	Centralizing roller	Drive gear	Gear shift device	Big roller	Speed-measuring gear	Lower bearing cap
Qty.	4	37	10	5	3	22	1	2

2. Remove motor and gearbox cover, wash clean gearbox, and inject molybdenum disulfide lithium base grease into the box. Once every three wells.

Take off upper panel, clean drive gear and housing. Inject No.3 calcium base grease. Once every three wells.

3. When reassemble the tong after repair, bearings and gears in the gearbox should be greased with molybdenum disulfide lithium base grease. And gears and bearings in drive housing should be lubricated with No.3 calcium base grease.

SECTION VII TROUBLE SHOOTING

Trouble	Causes	Measures
The head doesn't turn.	<ol style="list-style-type: none"> 1. No pressure from hydraulic unit. 2. Damage of the hydraulic multi-reversing valve. 3. Gear changing system fails. 	<ol style="list-style-type: none"> 1. Check the station. Add pressure. 2. Replace the valve. 3. Repair
No neutral gear.	<ol style="list-style-type: none"> 1. Damage of multi-reversing valve. 2. Damage of dial fork in the gearshift device. 3. Failure of limit device in the gearshift device. 	<ol style="list-style-type: none"> 1 Change a new valve 2. Repair the fork. 3. Repair the limit device.
Speed is not enough.	<ol style="list-style-type: none"> 1. Low pressure or low flow from the power station. 2. Bad leakage loss from oil motor or multi-reversing valve. 	<ol style="list-style-type: none"> 1. Check the station pressure. 2. Replace the motor or hand-reversing valve.
Head slide.	<ol style="list-style-type: none"> 1. Disagreement of the sizes of the jaws and casing. 2. Tongs not be leveled. 3. Dies worn out. 4. Die notch filled with oil dirt. 5. Brake band too loose or worn out. 6. Jaw roller failure to turn. 	<ol style="list-style-type: none"> 1. Change the jaws. 2. Level the tongs. 3. Change the dies. 4. Get rid of it with a wire brush. 5. Adjust or change the band. 6. Check the roller or oil and repair the pin shaft.
Torque valve less than rated.	<ol style="list-style-type: none"> 1. Low pressure from the hydraulic power unit or its insufficient oil discharge. 2. Function failure of the hydraulic motor or of the reversing valve. 3. Insufficient oil in the torque cylinder or the sealing ring worn out. 4. Torque gauge failure. 	<ol style="list-style-type: none"> 1. Deal with it according to the instructions of hydraulic power unit. 2. Repair or change it. 3. Fill in oil or change the ring. 4. Repair or change the torque gauge.
Motor is running but the tong head keeps still or moves slowly, or will stop even loaded light.	<ol style="list-style-type: none"> 1. Gear changing device fails 2. Much leakage loss from the hydraulic motor or the hand-reversing valve. 3. Gear in gearshift device damaged or seriously worn out. 	<ol style="list-style-type: none"> 1. Repair or change. 2. Repair or change the motor and the valve. 3. Check or repair the gearshift device.

SECTION VIII ATTACHED FIGURES

I Outside drawing of TQ340-35Y casing tongs.

- II Transmission assembly figure of TQ340-35Y casing tongs.
- III The hydraulic pressure system of hydraulic casing tongs.
- IV The suspension of hydraulic casing tongs.
- V Lubrication for the hydraulic casing tongs.
- VI The general layout of TQ340-35Y casing tongs.

SECTION IX PRESSURE TORQUE GAUGE AND OIL FILLER

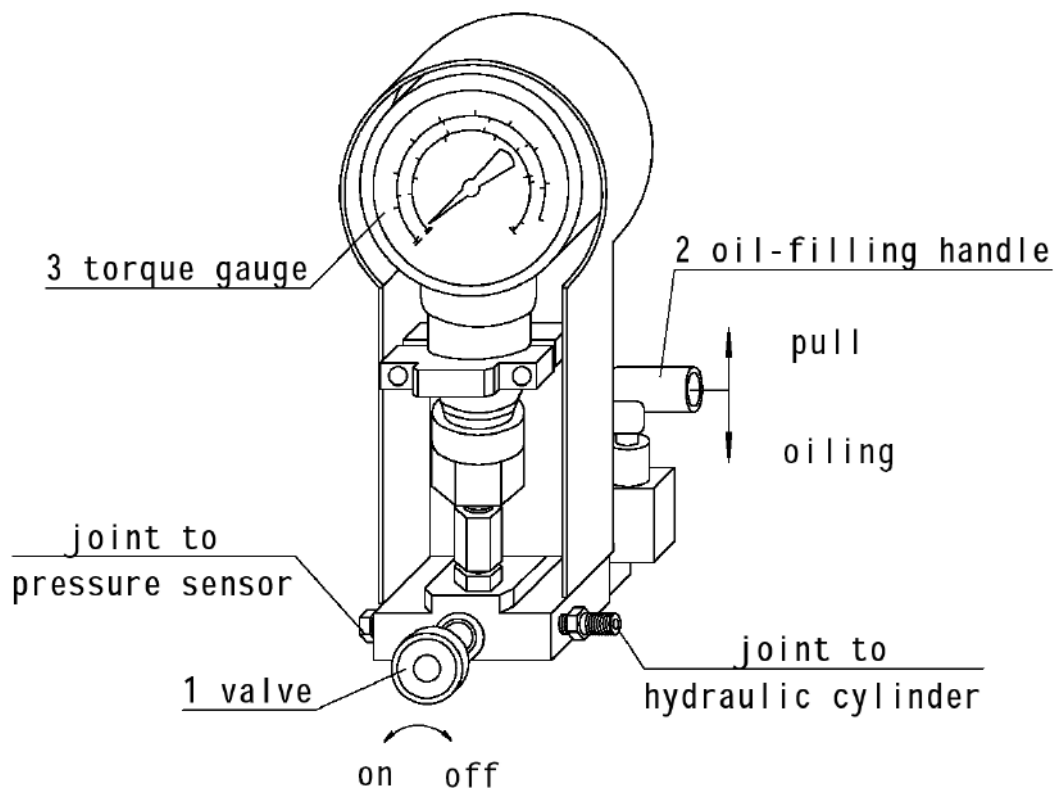
I Pressure-torque Gauge

The torque gauge indicates the casing power tong's torque, while the pressure shows the pressure in the hydraulic torque cylinder, not the inner pressure of the casing power tong.

II Oil Filler

It is possible that oil will leak from the joint of hydraulic cylinder of torque-measuring device. Our casing power tong provides a manual oil filler. (See attached figure).

Oiling: turn on valve 1, and push and pull repeatedly the handle 2 to oil, until the pressure-torque gauge shows some reading. Turn off the valve1.



SECTION X RECOMMENDED SPARE PARTS

No.	Part No.	Description	Unit	For Which Site	Remarks
-----	----------	-------------	------	----------------	---------

1	24.100-03	Die	20	Jaw	
2	24.100-02	Jaw shaft	2	Tong head	
3	56.600-04	Cam	4	Tong head	
4	52.100-15C	Clutch gear	1	Gearshift device	
5	52.100-17C	Dial fork	1	Gearshift device	
6	56.520.00	Brake band	1	Tong head	
7	56.540.00	Big roller parts	22	Tong head	
8	56.610.00	Jaw assy. 51/2"	2	Tong head	
9	56.620.00	Jaw assy.7"	2	Tong head	
10	56.630.00	Jaw assy. 95/8"	2	Tong head	
11	56.640.00	Jaw assy. 133/8"	2	Tong head	
12	56.650.00	Small roller parts	38	Tong head	
13	20.13.10.00	Torque cylinder	1		
14	DL-F20L-T/Y-T/O	Multi-way reverse valve	1		

Bearing					
Item	Part No.	Description	Unit	For Which Site	Remarks
1	GB/T5801	Bearing RNA4904	4	Guard door	Φ25×Φ37×17
2		Bearing K50×58×20	2	Gearshift device	Φ50×Φ58×20
3		Bearing K45×53×20	4	Gearshift device	Φ45×Φ53×20
4		Bearing 644907	22	Big roller parts	Φ38×Φ58×32
5	GB5801-86	Bearing 4084106	3	Dual gear	Φ40.1×Φ55×25
6	GB5801-86	Bearing 4624906	10	Centralizing roller	Φ35×Φ47×17

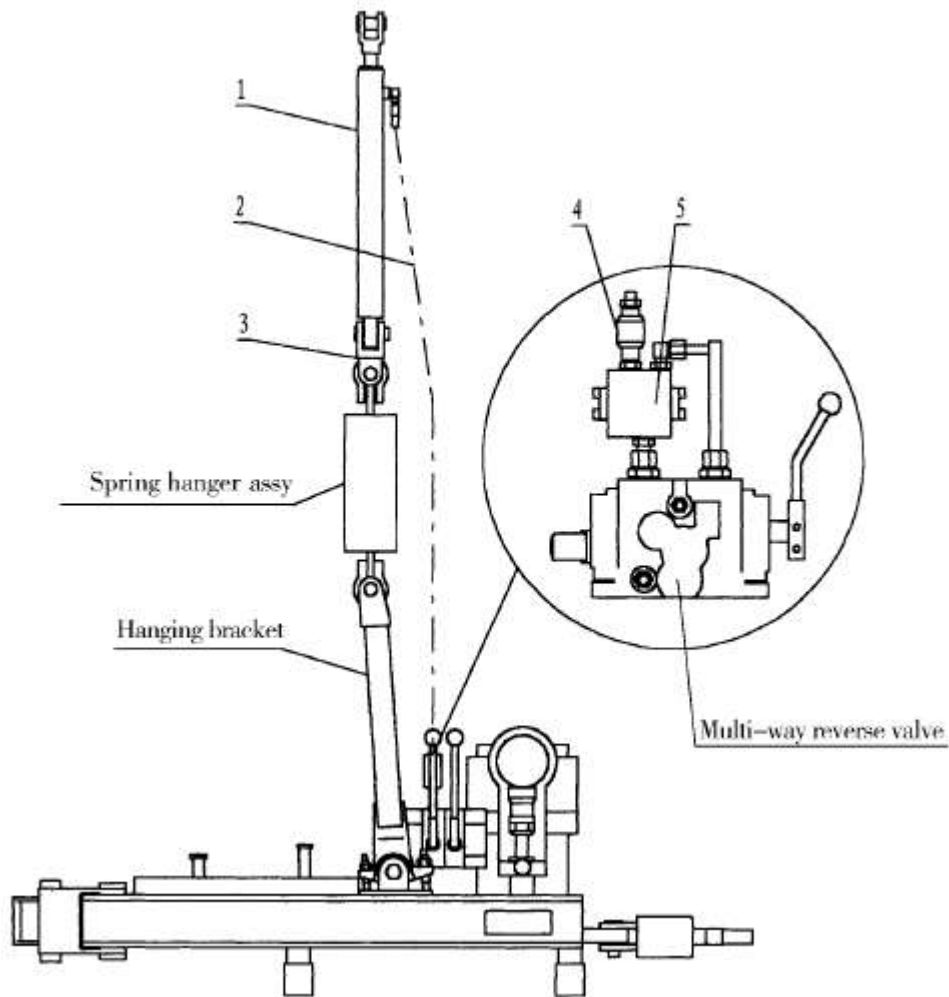
Sealing element					
Item	Part No.	Description	Unit	For Which Site	Remarks
1	JB982-77	Washer 33	1	Hydraulic line	
2	JB982-77	Washer 30	4	Hydraulic line	
3	JB982-77	Washer 27	2	Hydraulic line	
4	JB982-77	Washer 18	2	Hydraulic line	
5	JB/ZQ4224-97	O ring 35×3.1	1	Hydraulic line	
6	JB/ZQ4224-97	O ring 30×3.1	5	Hydraulic line	
7	JB/ZQ4224-97	O ring 16×2.4	4	Hydraulic line	
8	JB/ZQ4224-97	O ring 46×3.5	1	Torque cylinder	
9	GB1235-76	Retainer ring	1	Torque cylinder	
10	GSD0650	Step ring D65	1	Torque cylinder	
11	GST	Guide ring D65 ×	1	Oil filler	
12	GB3452.1	O ring 26502120	1	Oil filler	
13	GB3452.1	O ring 26501180	3	Oil filler	
14	JB/ZQ4224-97	O ring 22×2.4	3	Oil filler	
15	24.420-07	Seal gasket	1	Oil filler	
16	24.420-15	Copper gasket	1	Oil filler	

XI. HYDRAULIC LIFT CYLINDER

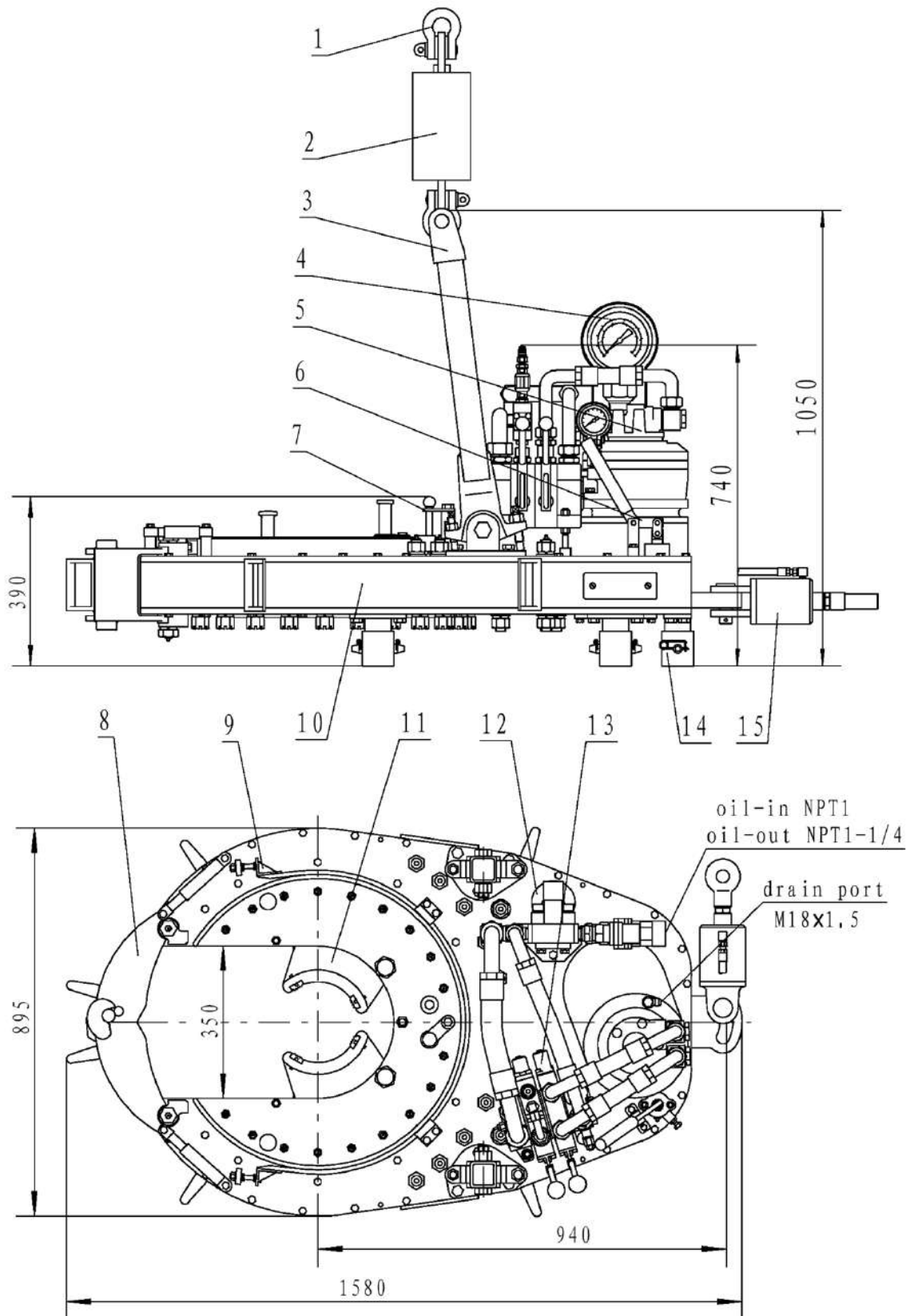
1. The casing power tong is equipped with Hydraulic Lift Cylinder to permit the upward or downward height adjusting of the tong.

2. Installation for the cylinder: shackle(3) of lift cylinder is to joint with spring hanger assy. Pressure hose (2) is to connect with the joint in the throttle valve (4) of multi-way manual reversing valve. (See the following drawing).

3. Control the handle of multi-way reverse valve to perform the lifting and lowering of power tong. Hydraulic check valve (5) is to control the power tong at a certain position



No.	Part No.	Description	Qty.
1	HSGL01-50/32E*615	Hydraulic cylinder	1
2	JB/ZQ4427-86	Hose with A type joint 6.3II*2500	1
3	M4BW3.2	Shackle	1
4	MK8G1.2/2	One-way throttle valve	1
5	SV10GA2-30/2	Hydraulic check valve	1



1.shackle 2.spring hanger assy. 3.hanging bracket 4.torque gauge 5. Hydraulic motor 6.gear-shifting device 7.backing pin 8.safety door 9.brake band 10.transmissin gear case 11.jaw assy. 12.speed-measuring gear 13.hydraulic system 14.support foot 15.torque cylinder

Fig.1 Outside Drawing of TQ340/35Y casing tong

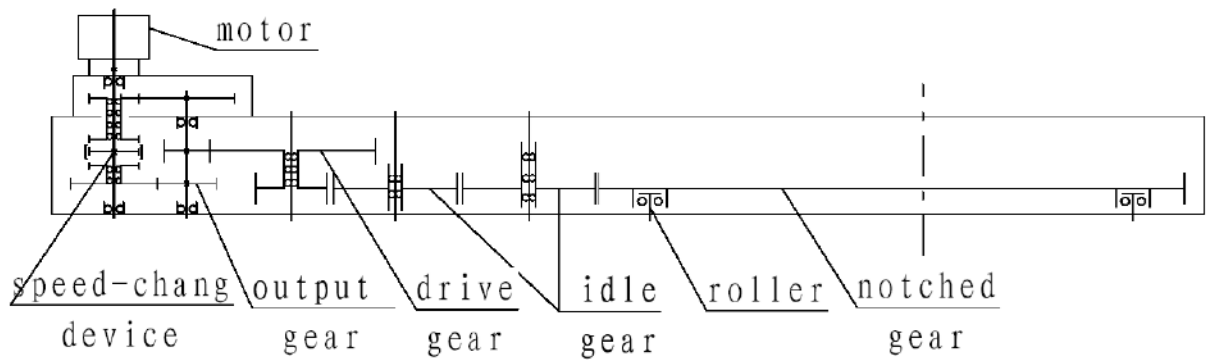


Fig.2 Transmission Diagram of TQ340/35Y casing tong

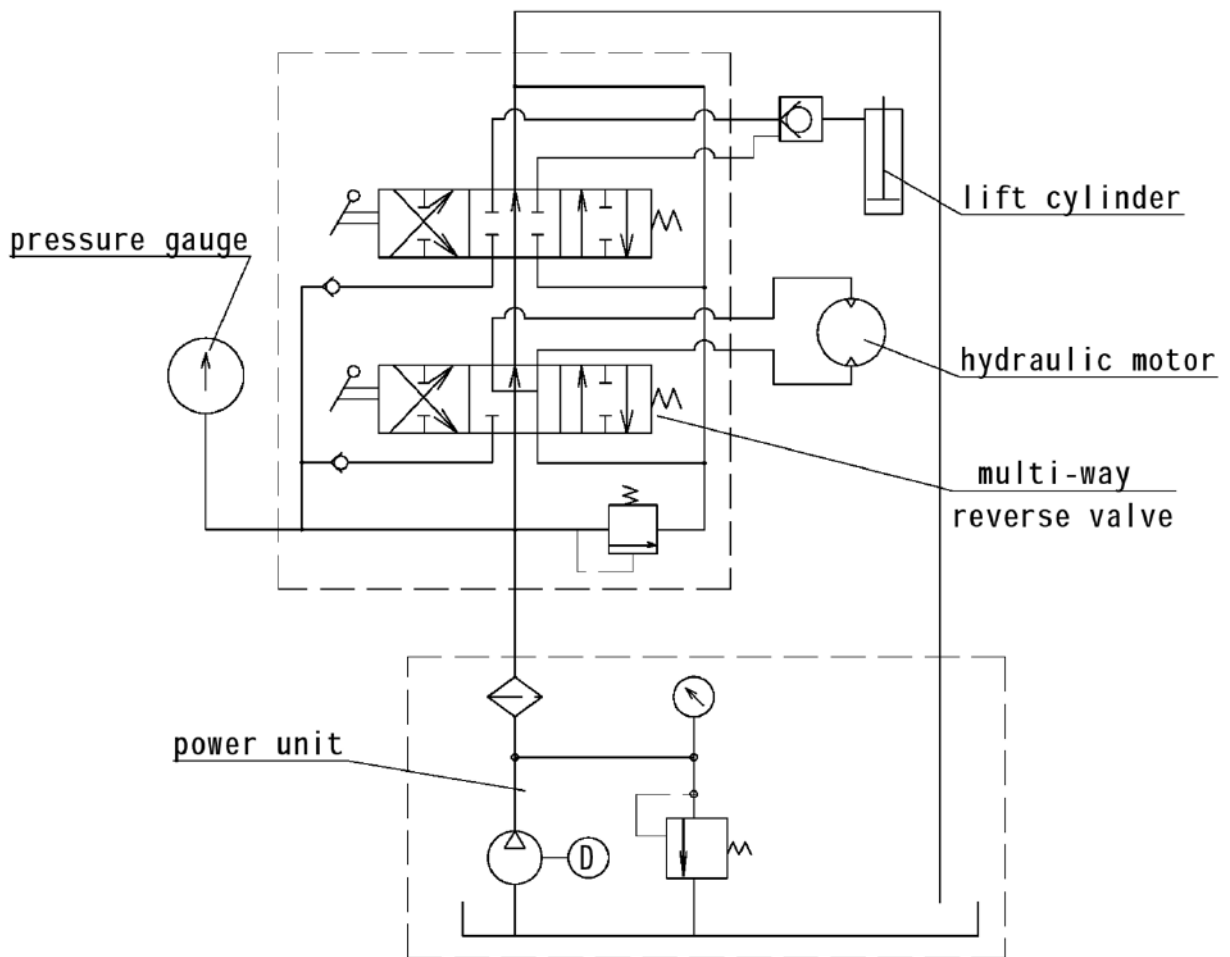


Fig.3 Principle Scheme of Hydraulic System for TQ340/35Y

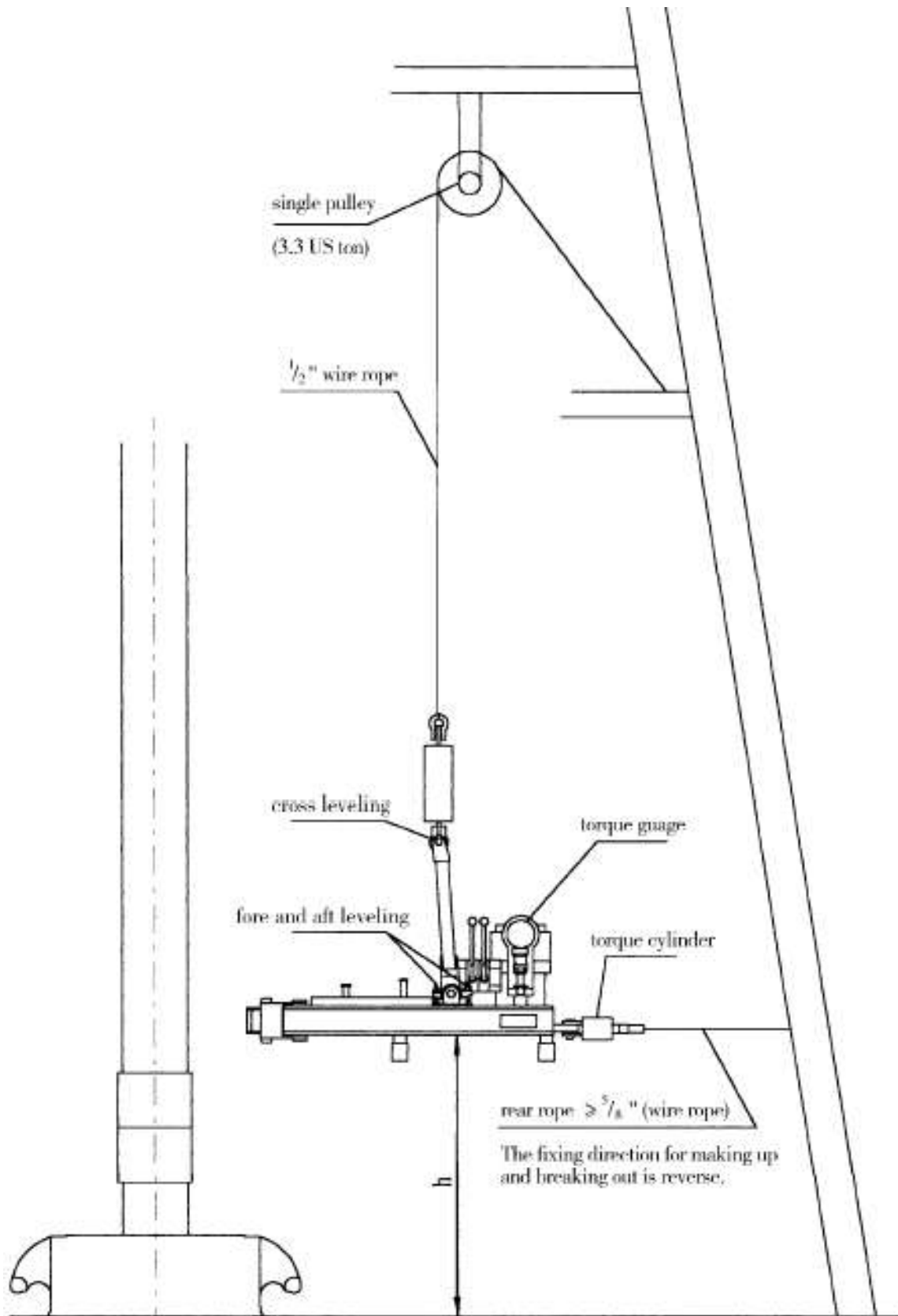
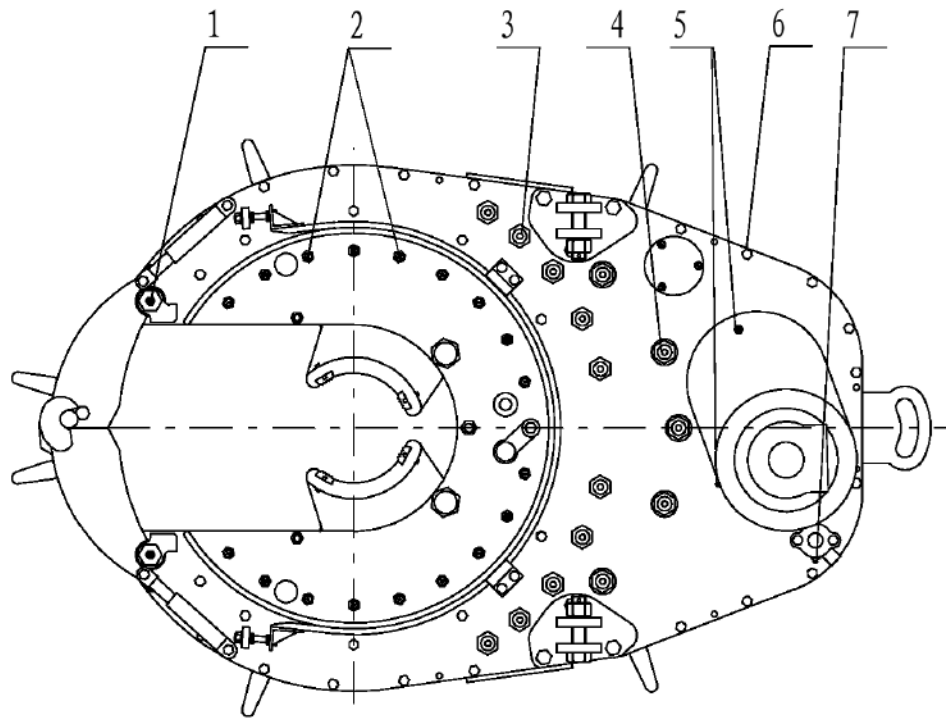
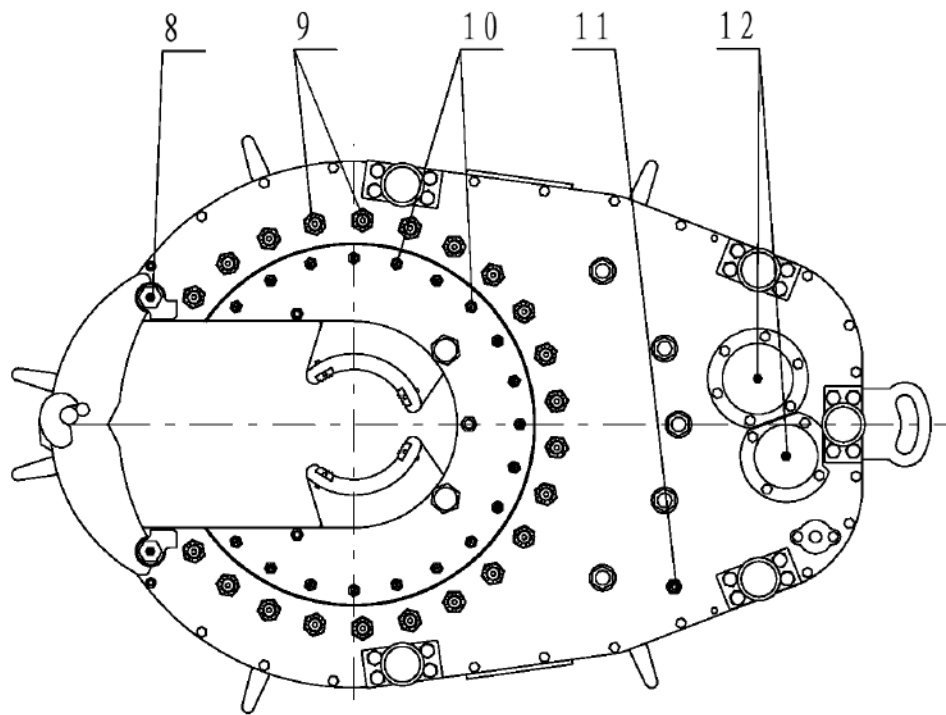


Fig.4 Suspension View of the Casing Tong



TOP



Bottom

Fig.5 Lubrication Schematic Diagram For Casing Tong

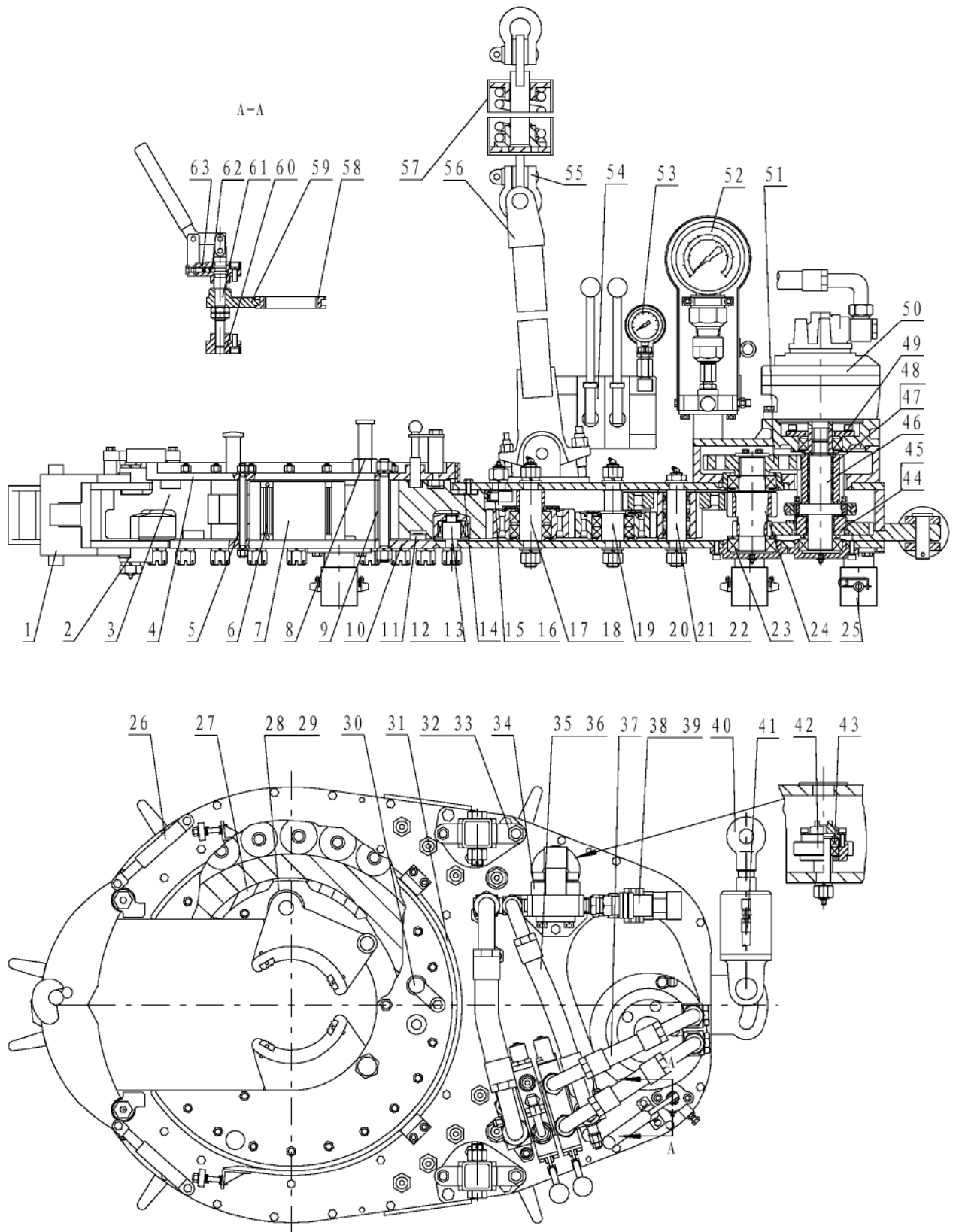


Fig.6 The General Layout of TQ340/35Y₂ casing tong

No.	Part No.	Name	Qty	Note
1	56.510.00B	Safety door	1	
2	GB5801-94	Bearing RNA4904	4	
3	56.600-03A	Notched gear	1	
4	56.660.00	Upper jaw rack	1	
5	56.605.00	Front locating shaft	2	
6	24.100-03	Die	4	
7	56.610.00	Jaw assembly 5 ¹ / ₂ "	2	
	56.620.00	Jaw assembly 7"	2	
	56.630.00	Jaw assembly 9 ⁵ / ₈ "	2	
	56.640.00	Jaw assembly 13 ³ / ₈ "	2	
		Jaw assembly 4"、4 ¹ / ₂ "、5"、7 ⁵ / ₈ "、10 ³ / ₄ "、12 ³ / ₄ "	2/each	Special order
8	24.100-02	Jaw shaft	2	
9	24.230.00	Back locating shaft	1	
10	56.600-01	Lower jaw rack	1	
11	56.650.00	Small roller parts	38	
12	56.540.00	Large roller set	22	
13		Bearing 644907	22	Ø38* Ø58*32
14	52.210-03	Anti-wear bedplate	1	
15	26.230.00	Centralizing roller	10	
16	GB5801-86	Bearing 4624906	10	Ø35* Ø47*17
17	56.550.00A	Idler II	2	
18	GB5801-86	Bearing 22209C/W33	6	Ø45* Ø85*23
19	52.230.00	Idler I	2	
20	GB/T283-94	Bearing N209E	2	Ø45* Ø85*19
21	52.220.00	Dual gear group	1	
22	GB5801-86	Bearing 4084106	3	Ø40.1* Ø55*25
23	GB/T288-1994	Bearing 22211C/W33	2	Ø55* Ø100*25
24	52.100-09C	Dual gear shaft	1	
25	24.130.00A	Support foot	5	
26	24.120.00	Restoration rod	2	
27	56.600-04	cam	4	
28	56.610-03	Roller Ø100	2	
	56.620-02	Roller Ø75	4	
	56.640-03	Roller Ø50	2	

No.	Part No.	Name	Qty	Note
29	56.610-02	Roller shaft	8	
30	24.210.00	Reverse pin	1	
31	56.520.00	Brake band	1	
32	01.05-16M	Adjusting screw 20	2	
33	14.05-05	Adjusting screw M16	2	
34	DB20-1-50/31.5	Relief valve	1	
35	JB1885	Pressure hose 22Ⅲ*430	1	M36*2
36	JB1885	Pressure hose 32 I *460	1	M42*2
37	JB1885	Pressure hose 22Ⅲ*650	2	M36*2
38		NPT1" self-sealing joint	1	
39		NPT1 ¹ / ₄ " self-sealing joint	1	
40	20.13.10.00	Torque cylinder	1	
41	JB/ZQ4427-86	Hose joint 6.3 II -1000	1	M14*1.5
42	24.140.00	Speed-measuring system	1	
43	GB/T276-94	Bearing 6004	2	Ø20*Ø42*12
44	52.110.00C	Speed increase gear set	1	
45		Bearing K50*58*20	2	
46	52.100-12C	Output shaft	1	
47	52.120.00C	Speed decrease gear set	1	
48		Bearing K45*53*20	4	
49	GB/T288-94	Bearing 22210/W33	2	Ø50*Ø90*23
50	BJM1-300HP1	Hydraulic motor	1	
51	52.100-05C	Splined gear	1	
52	YN150	Pressure-torque gauge	1	25MPa,45kN.m
53	YN60	Pressure gauge (0-25MPa)	1	
54	DL-F20L-T/Y-T/O	Multi-reversing valve	1	
55	JB/T8112-99	Shackle M-BW3.2	2	
56	52.300.00A	Hanging bracket	1	
57	56.100.00	Suspension spring assy.	1	
58	52.100-15C	Clutch gear sleeve	2	
59	52.100-17C	Dial fork	1	
60	52.100-18C	Lower guide seat	1	
61	52.100-19C	Fork shaft	1	
62	GB/T308-94	Steel ball 8.5	1	
63	52.100-21C	Upper guide seat	1	

SECTION XII API RECOMMENDED TORQUE FOR 4¹/₂" -13³/₈" CASING PIPE

OD	Weight (Kg/m)	Grade of steel	Torque (N.m)					
			Short thread			Long thread		
			Best	Min.	Max.	Best	Min.	Max.
4 ¹ / ₂ "	14.14	H-40	1063	800	1325	--	--	--
	14.14	J-55	1394	1049	1739	--	--	--
	15.62	J-55	1822	1366	2277	--	--	--
	17.26	J-55	2125	1601	2663	1835	1380	2290
	14.14	K-55	1546	1159	1932	--	--	--
	15.62	K-55	2015	1518	2525	--	--	--
	17.26	K-55	2346	1766	2939	2484	1863	3105
	17.26	C-75	--	--	--	2967	2222	3712
	20.09	C-75	--	--	--	3588	2691	4485
	17.26	N-80	--	--	--	3146	2360	3933
	20.09	N-80	--	--	--	3809	2857	4761
	17.26	C-95	--	--	--	3560	2677	4457
	20.09	C-95	--	--	--	4319	3243	5396
	17.26	P-110	--	--	--	4168	3133	5216
	20.09	P-110	--	--	--	5051	3795	6320
	22.47	P-110	--	--	--	6072	4554	7590
5"	17.11	J-55	1835	1380	2291	--	--	--
	19.34	J-55	2332	1753	2912	2512	1891	3146
	22.32	J-55	2857	2139	3574	3077	2305	3850
	17.11	K-55	2029	1518	2539	--	--	--
	19.34	K-55	2567	1932	3215	2774	2084	3464
	22.32	K-55	3146	2360	3933	3395	2553	4250
	22.32	C-75	--	--	--	4085	3064	5106
	26.78	C-75	--	--	--	5203	3905	6500
	22.32	N-80	--	--	--	4333	3257	5423
	26.78	N-80	--	--	--	5520	4140	6900
	22.32	C-95	--	--	--	4913	3685	6141
	26.78	C-95	--	--	--	6279	4706	7852
	22.32	P-110	--	--	--	5755	4319	7190
	26.78	P-110	--	--	--	7079	5492	9163
5 ¹ / ₂ "	20.83	H-40	1794	1352	2249	--	--	--
	20.83	J-55	2374	1780	2967	--	--	--
	23.06	J-55	2788	2098	3491	2995	2249	3740
	25.30	J-55	3160	2374	3947	3409	2553	4264
	20.83	K-55	2608	1960	3257	--	--	--
	23.06	K-55	3064	2305	3836	3298	2247	4126
	25.30	K-55	3478	2608	4347	3798	2815	4692
	25.30	C-55	--	--	--	4513	3381	5644
	29.76	C-75	--	--	--	5561	4168	6955

OD	Weight (Kg/m)	Grade of steel	Torque (N.m)					
			Short thread			Long thread		
			Best	Min.	Max.	Best	Min.	Max.
5 1/2"	34.22	C-75	--	--	--	6527	4899	8156
	25.30	N-80	--	--	--	4802	3602	6003
	29.76	N-80	--	--	--	5906	4430	7383
	34.22	N-80	--	--	--	6928	5203	8666
	25.30	C-95	--	--	--	5465	4099	6831
	29.76	C-95	--	--	--	6721	5037	8404
	34.22	C-95	--	--	--	7894	5920	9867
	25.30	P-110	--	--	--	6376	4789	7976
	29.76	P-110	--	--	--	8225	5389	9778
	34.22	P-110	--	--	--	9218	6914	11937
7"	25.30	H-40	3671	2760	4595	--	--	--
	38.69	H-40	4692	3519	5865	--	--	--
	29.76	J-55	4002	3008	5009	--	--	--
	34.22	J-55	5134	3850	6417	4319	3243	5396
	38.69	J-55	6251	4692	7811	5065	3795	6334
	29.76	K-55	7618	5713	9522	--	--	--
	34.22	K-55	8804	6610	11012	4706	3533	5879
	38.69	K-55	6638	4982	8294	5603	4154	6914
	34.22	C-75	--	--	--	5741	4306	7176
	38.69	C-75	--	--	--	6748	5065	8432
	43.15	C-75	--	--	--	7756	5824	9701
	47.62	C-75	--	--	--	8735	6555	10916
	52.08	C-75	--	--	--	9701	7273	12130
	56.54	C-75	--	--	--	10585	7935	13234
	34.22	N-80	--	--	--	6100	4582	7631
	38.69	N-80	--	--	--	7162	5368	8956
	43.15	N-80	--	--	--	8239	6182	10295
	47.62	N-80	--	--	--	9274	6955	11592
	52.08	N-80	--	--	--	10295	7728	12875
	56.54	N-80	--	--	--	11233	8432	14048
	34.22	C-95	--	--	--	6969	5230	8708
	38.69	C-95	--	--	--	8183	6141	10226
	43.15	C-95	--	--	--	9425	7066	11785
	47.62	C-95	--	--	--	10598	7949	13248
	52.08	C-95	--	--	--	11771	8832	14711
	56.54	C-95	--	--	--	12848	9632	6063
	38.69	P-110	--	--	--	9563	7176	11868
	43.15	P-110	--	--	--	10999	8252	13745
	47.62	P-110	--	--	--	12130	9287	15470
	52.08	P-110	--	--	--	13745	10309	17181
56.54	P-110	--	--	--	15001	11247	18754	

OD	Weight (Kg/m)	Grade of steel	Torque (N.m)					
			Short thread			Long thread		
			Best	Min.	Max.	Best	Min.	Max.
9 ⁵ / ₈ "	48.05	H-40	3500	2650	4400	--	--	--
	53.56	H-40	4100	3100	5100	--	--	--
	53.56	J-55	5400	4100	6800	63000	4700	7800
	59.51	J-55	6200	4700	7800	7200	5400	9000
	53.56	K-55	5800	4400	7300	6800	5100	8500
	59.51	K-55	6700	5000	8400	7800	5800	9700
	59.51	C-75	--	--	--	9600	7200	12000
	64.72	C-75	--	--	--	10700	8000	13400
	70.93	C-95	--	--	--	118000	8800	14700
	79.60	C-75	--	--	--	138000	10400	17300
	59.51	N-80	--	--	--	10200	7600	12700
	64.72	N-80	--	--	--	11400	8600	14200
	70.93	N-80	--	--	--	12500	9400	15600
	79.60	N-80	--	--	--	14700	11000	18400
	59.51	C-95	--	--	--	11700	8800	14600
	64.72	C-95	--	--	--	13100	9800	16400
	70.93	C-95	--	--	--	14400	10800	18000
	79.60	C-95	--	--	--	16900	12700	21100
	64.72	P-110	--	--	--	15300	11500	19100
	70.93	P-110	--	--	--	16800	12600	21000
79.60	P-110	--	--	--	19700	14800	24600	
13 ³ / ₈ "	71.41	H-40	4500	3300	5600	--	--	--
	81.08	J-55	7100	5300	8900	--	--	--
	90.75	J-55	8200	6200	10300	--	--	--
	101.16	J-55	9300	7000	11700	--	--	--
	81.08	K-55	7600	5700	9400	--	--	--
	90.75	K-55	8700	6600	10900	--	--	--
	101.16	K-55	9900	7500	12400	--	--	--
	107.11	C-75	13500	10200	16900	--	--	--
	107.11	N-80	14400	10800	18000	--	--	--
	107.11	C-95	16600	12500	20800	--	--	--