



CR90 MINI BAGR

OPERAČNÍ MANUAL



Výměny olejů:

1. Výměna do 20 mth motorový olej M7ADS3 (cisticí vložka - při výměně oleje staci vycistit)
hydraulický Olej 0THP 46 – nebo jiný s označením 46 - cisticí vložka

Dále kontrola a vycistení palivového a vzduchového filtru.

2. Výměna : do 70 mth

3. Výměna : do 150 mth

Kontrola a výměna vzduchového filtru.

Údržba:

Mazání – např.: Lioton LT2EP

!! Poznámka:

Po práci je zapotřebí zkontrolovat dotažení pásů. Zvednout bagr - zapřít o přední a zadní lžici a dotáhnout pásy a zkontrolovat vůle. V hnacím a vodícím kole.



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Oddíl V Odstraňování poruch motoru

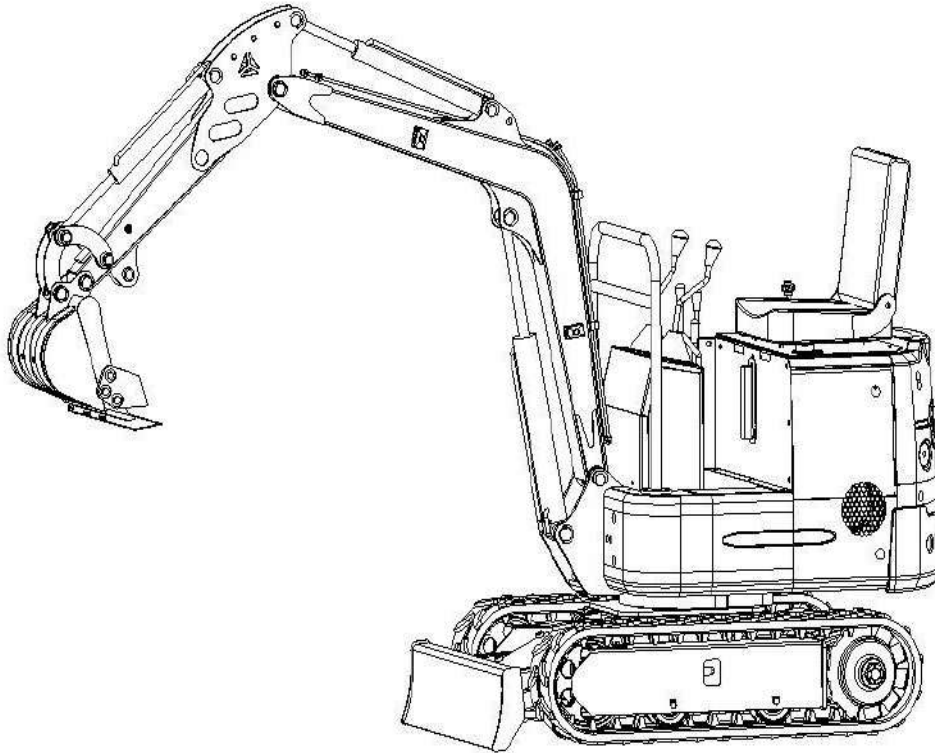
Oddíl VI Ostatní

Příloha: Seznam dílů kusovníku

Kapitola I Vlastnosti využití a výkonnostní parametry rýpadel

Oddíl I Použití a vlastnosti

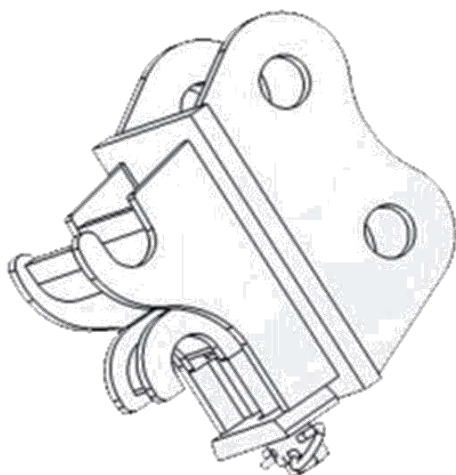
Rýpadla jsou vybavena hloubením, drcením, čištěním příkopu, vrtáním přičemž jejich přídatná zařízení jsou rychle výměnná. Navíc jsou snadno ovladatelné a transportní a flexibilní pro práci na úzkém prostoru.



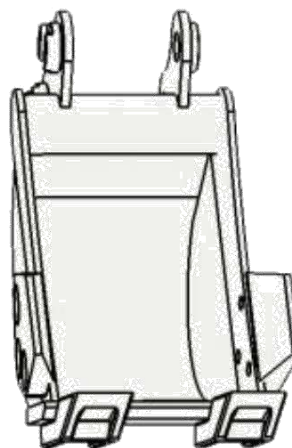
Tento typ rýpadel se používá zejména pro: zemědělství, terénní úpravy, a hnojení v zahradě, zeleninový skleník, zemědělská přeměna, demolice v budovách, malá zemní práce, inženýrské stavby, rekonstrukce silnic, pro suterén a vnitřní stavby, vodovody, zahradní kultivace, a další.

Rýpadlo je vybaveno diesellovými motory Changchai, který nabízí komplexní záruku, trvanlivost a flexibilitu.

Rýpadla je možné vybavit různými pracovními zařízeními, jako je rychloupínací zařízení, uchopovací zařízení, řezačka, svahová lopata, úzká lopatka, stejně jako volitelná střeška, radiátor a další, aby vyhovovaly vašim potřebám.



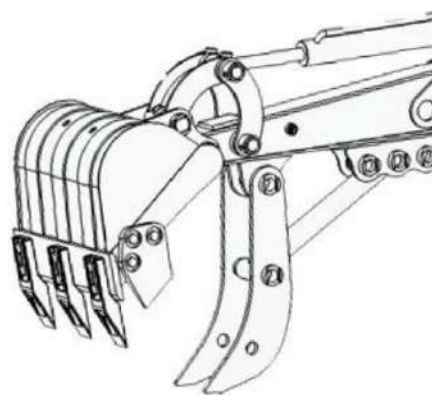
Rychloupínák



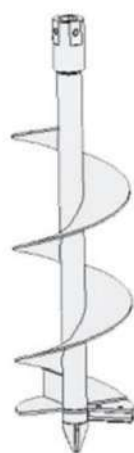
úzká lžička



Drapák na kulatinu



přidržovací prst



Vrták

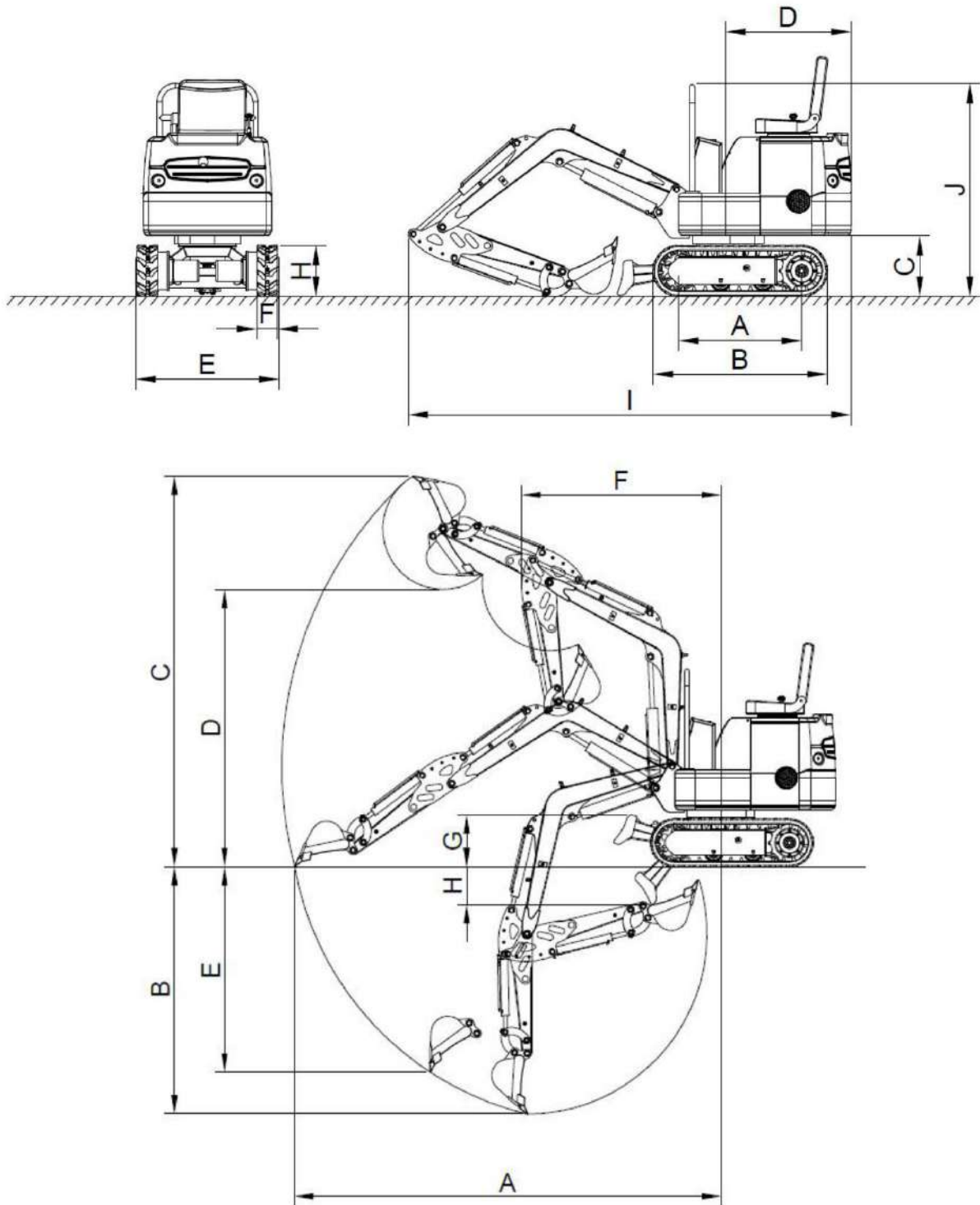


Prst



Hrábě

Část II Hlavní parametry výkonu



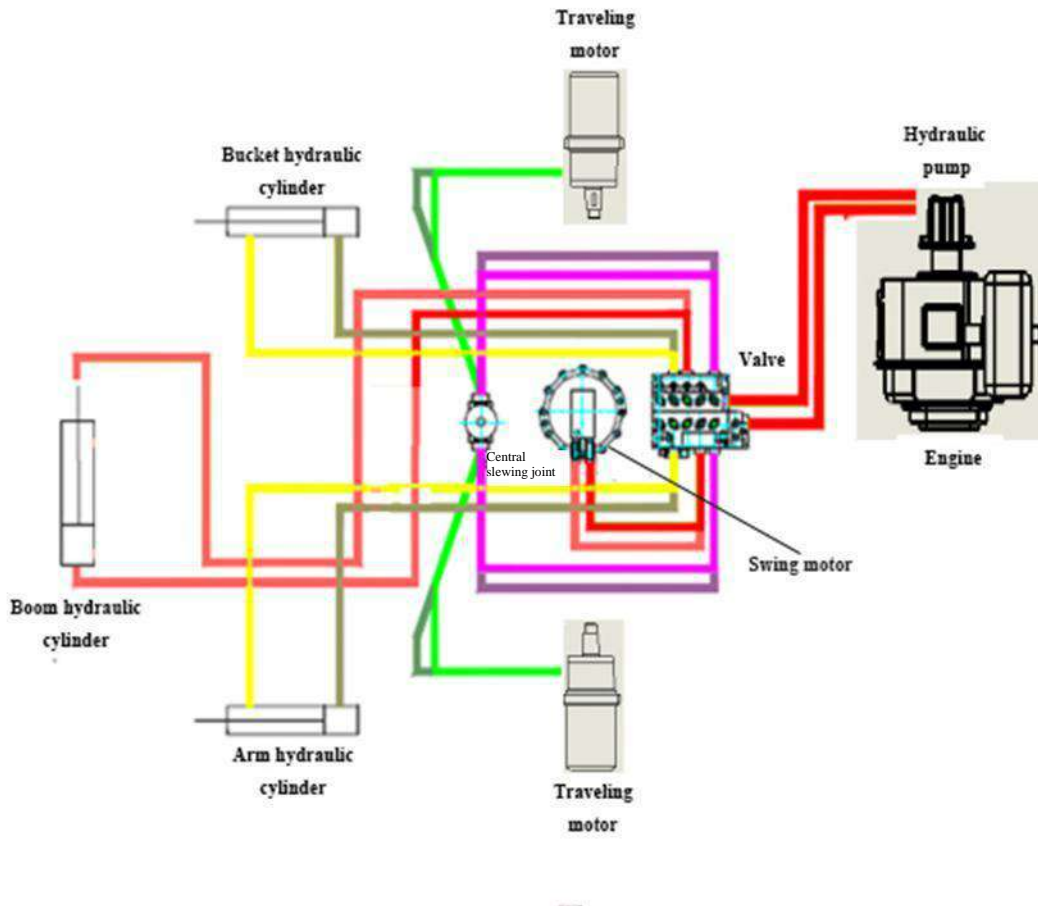


Overall dimensions	Unit: mm
Stopa kola	770
B Celková délka	1090
C Světlá výška plošiny	380
D Světlá výška ocasu plošiny	784
E Šířka podvozku	896
F Šířka pásu	170
H Výška pásu	320
I Dopravní délka	2770
J Celková výška	1330

Pracovní parametry	Unit: mm
Max. kopírování poloměru na zemi	2850
B Max. kopací hloubka	1650
C Max. výška výkopu	2610
D Max. výška vykládky	1850
E Max. vertikální hloubka kopání	1375
F min. poloměru swingu	1330
G Max. výška zdvihu čepele	345
H Max. kopací hloubky břitu žacího stroje	255

Performance parameters	
Hmotnost celého stroje kg	880
Standardní kapacita lopaty m ³	0.025
Jmenovitý výkon kw	7.5

Oddíl II Princip práce rýpadel



Pohyb a silový přenos rýpadla je znázorněn níže:

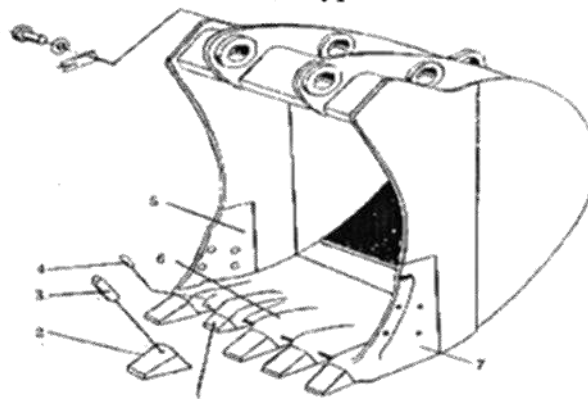
1. Pohybová trasa: vznětový motor - spojka - hydraulické čerpadlo (mechanická energie změněná na hydraulickou energii) - rozdělovací ventil - centrální kloub - kloubový motor (hydraulická energie se mění na mechanickou energii) - řetězové kolo - gumová crawler - začátek práce
2. rychlostní trasa: vznětový motor - spojka - hydraulické čerpadlo (mechanická energie změněná na hydraulickou energii) - rozdělovací ventil - motor výkyvu (hydraulická energie změněná na mechanickou energii) - ložiskové ložisko - realizace křídla
3. Trasa výložníku: vznětový motor - spojka - hydraulické čerpadlo (mechanická energie změněná na hydraulickou energii) - rozdělovací ventil - válec výložníku (hydraulická energie změněná na mechanickou energii) - pohyb výložníku
4. Elektrická trať: diesellový motor - spojka - hydraulické čerpadlo (mechanická energie se mění na hydraulickou energii) - rozdělovací ventil - rameno válce (hydraulická energie se mění na mechanickou energii) - pohyb paže
5. Pohonná lávka: naftový motor - spojka - hydraulické čerpadlo (mechanická energie se mění na hydraulickou energii) - rozdělovací ventil - válec lopaty (hydraulická energie se mění na mechanickou energii) - pohyb



10



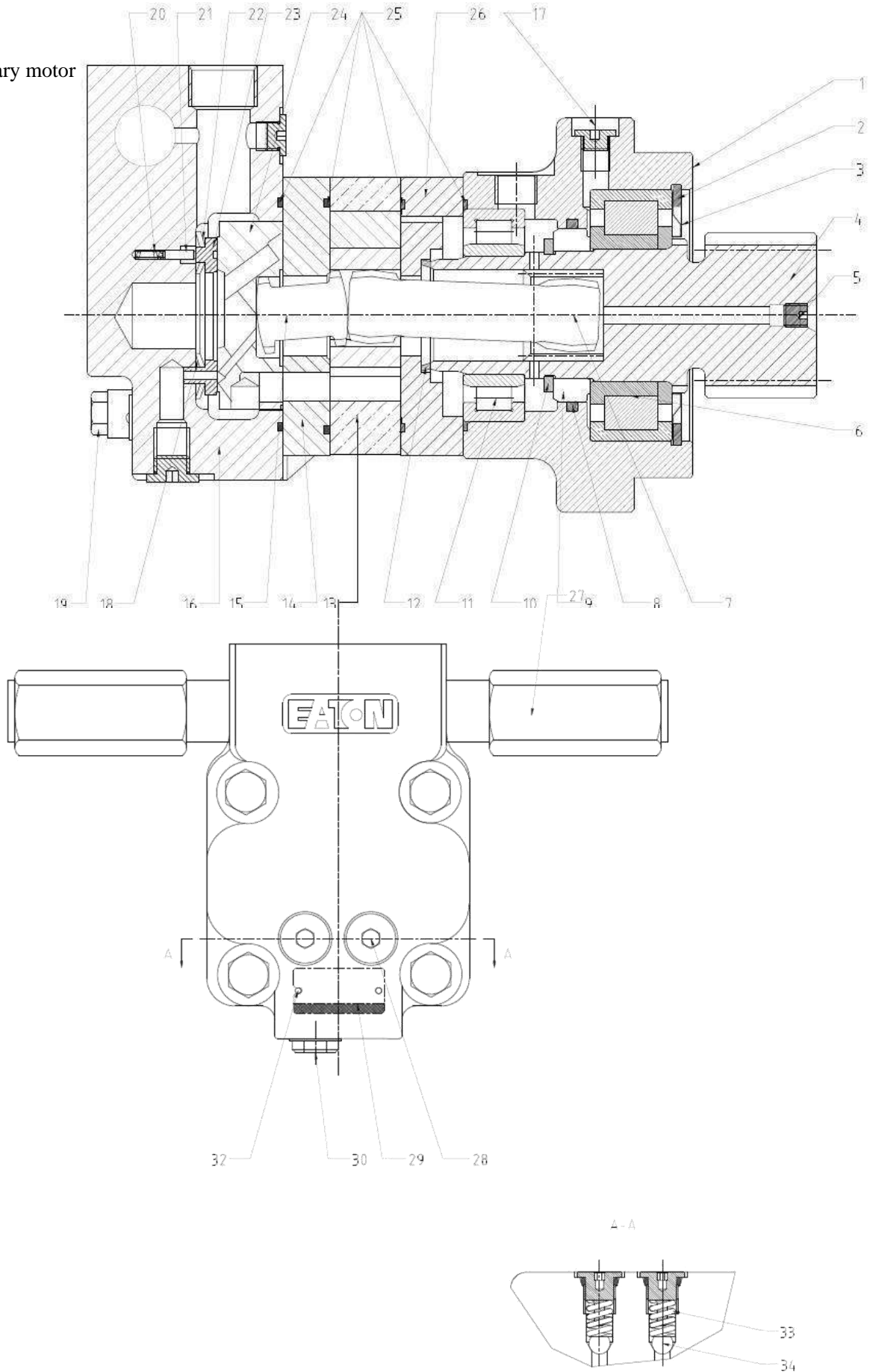
Bucket type

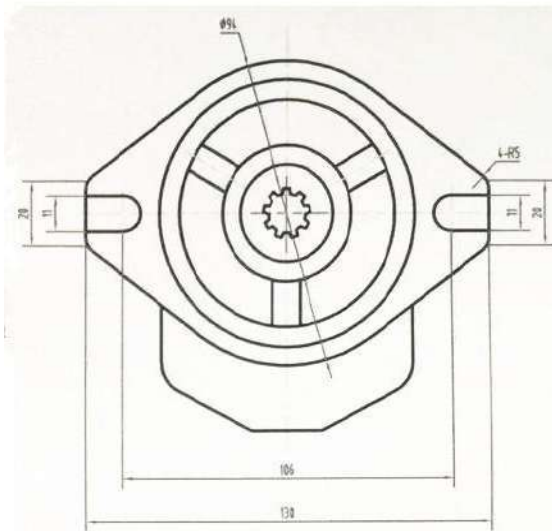
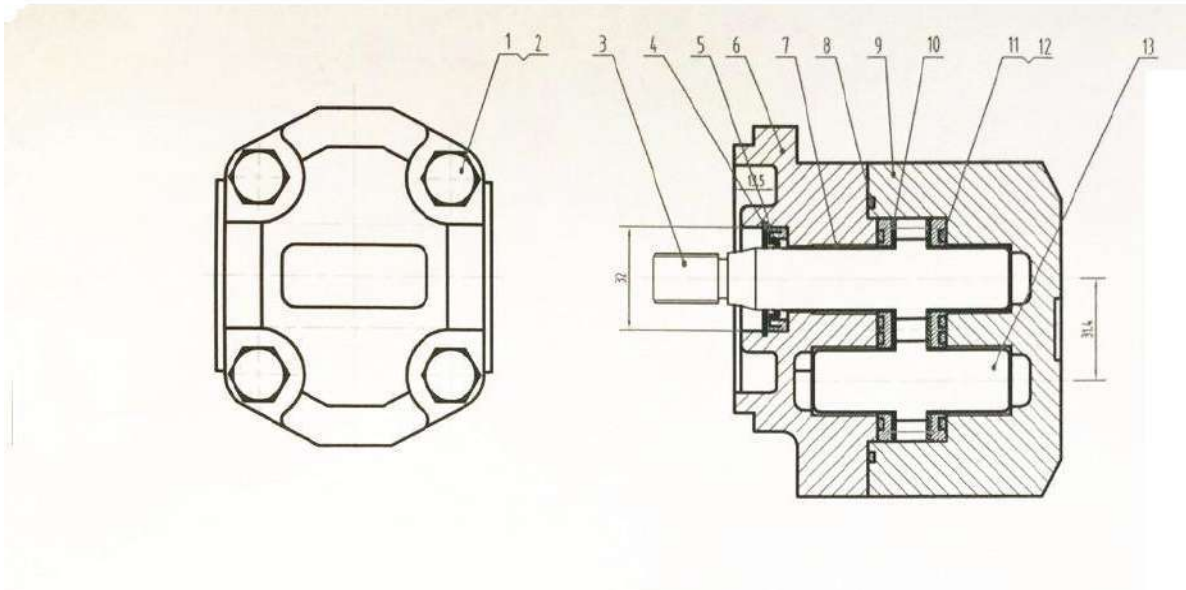


Bucket structure

Hydraulický systém

I. Rotary motor





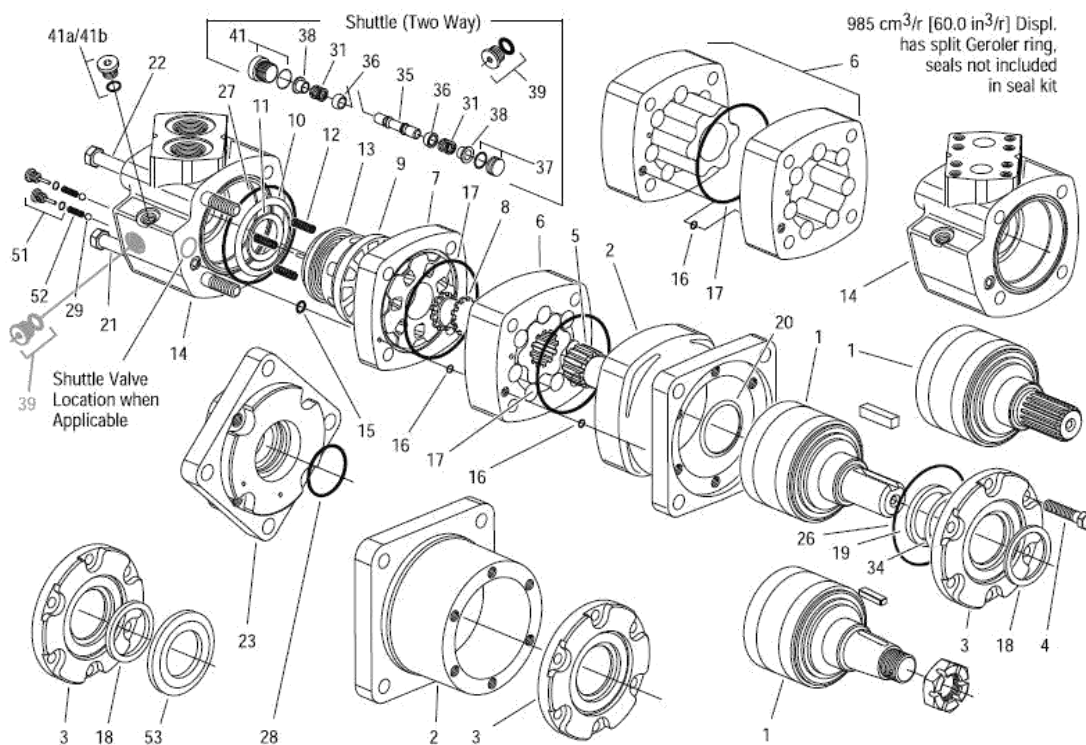
16					
15					
14					
13	DHP006-08	从动齿轮	1	20CrMnTi	
12	DHP006-07	耳形挡片	2	尼龙	
11	DHP006-06	耳形密封垫	2	橡胶-4	
10	DHP006-05	侧板	1	Z5黄铜粉末冶金	
9	DHP006-04	架体	1	QT450-10	
8	DHP006-03	矩形密封圈	1	橡胶-4	
7	DU轴套	$\phi 21 \times \phi 19 \times 20$	4	铝合金	
6	DHP006-02	前盖	1	QT450-10	
5		轴衬NY19X32X7	1	铝合金	
4	GB893.1-86	挡圈 32	1	65Mn	
3	DHP006-01	主动齿轮轴	1	20CrMnTi	
2	GB93-87	垫圈 10	4	65Mn	
1	GB70-85	螺钉M10X65-10.9	4	4.0Cr	



Pohon Hydraulického Čerpadla

Disc Valve Motors---6000 series -005 and -006

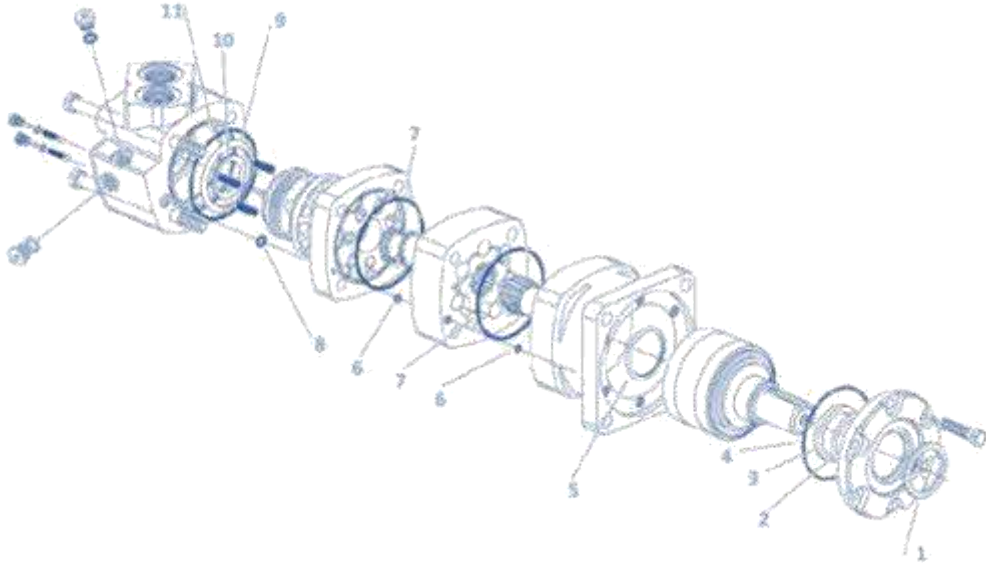
Displacement Cm ³ /r(in ³ /r)	Drive, Main Item No.5--Part No /Length		Geroler Item No.6--Part No /Width		Screw, Cap Item No.6--Part No /Length		Screw, Cap Item No.6--Part No /Length	
	Part No	mm(inch)	Part No	mm(inch)	Part No	mm(inch)	Part No	mm(inch)
310(19.0)	21373-003	118.1(4.65)	8507-003	34.6(1.36)	14409-003	138.4(5.45)	14409-007	172.4(6.79)



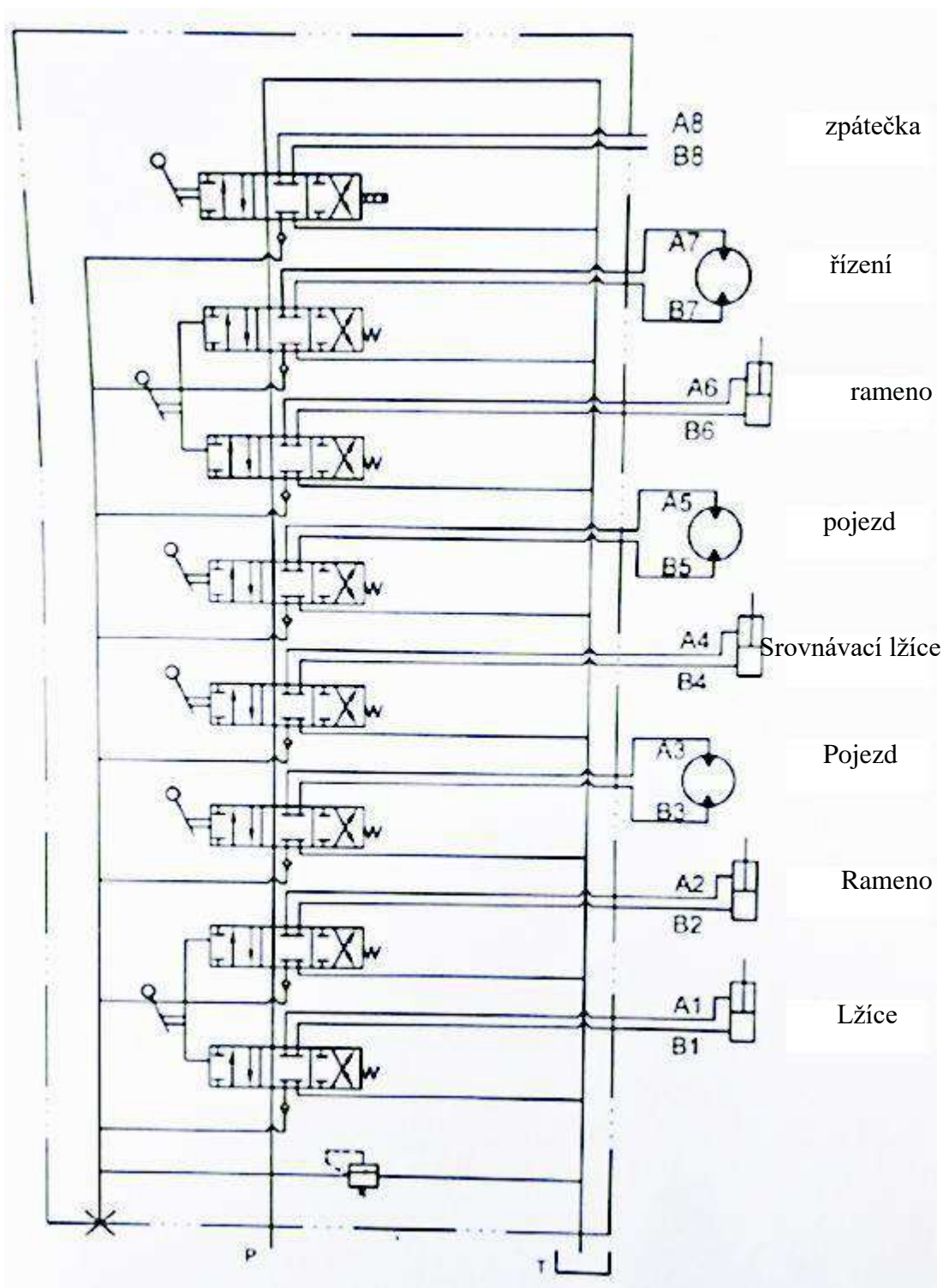


Seal package

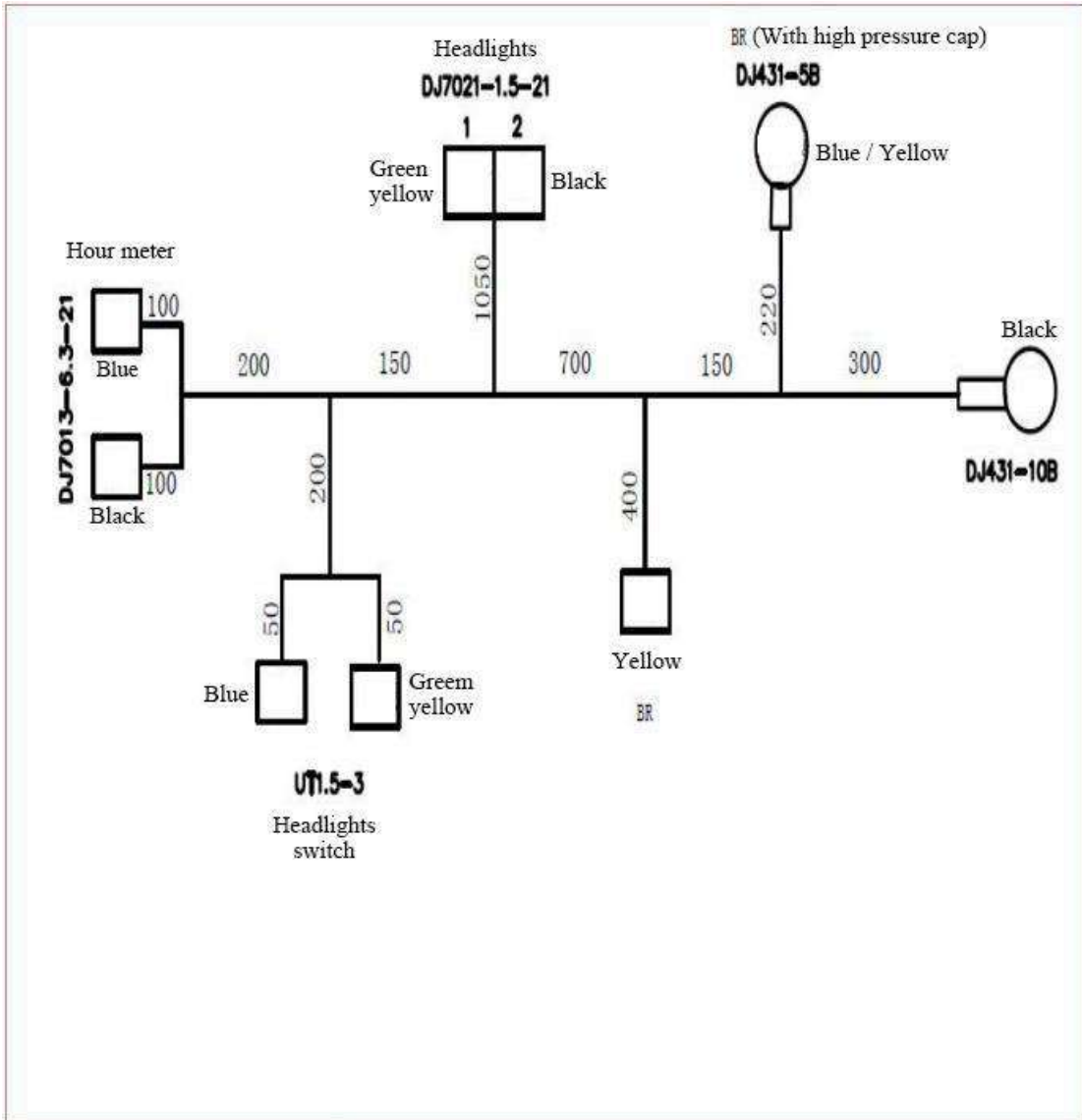
Code	Name (reference dimensions mm)	Quantity
1	Dust cover (OD 50.9)	1
2	Copper sheet (OD 60.45)	1
3	Seal ring of output shaft (OD 63.56)	1
4	O-ring (ID92.87, Shore hardness70)	1
5	End seal ring (ID 45.72)	1
6	O-ring (ID 6.07)	2
7	O-ring (ID 94.97)	2
8	O-ring (ID 11.2)	1
9	Front-type seal ring (ID 62.23)	1
10	Front-type seal ring (ID 35.82)	1
11	O-ring (ID 92.33, Shore hardness 90)	1



Oddíl IV Schéma hlavního ventilu



Oddíl V. Electrické schema





Kapitola III Servis

Při vysokých teplotách a tlaku může být teplota 85 stupňů, výtlak 700 °C a tlaky v hydraulickém systému až 16-18MPa.

Obecně platí, že tažení / tlačení hydraulického válce a otáčení hydraulického motoru je řízeno třícestným axiálním posuvným ventilem přes směr toku oleje.



Pokud je teplota hydraulického oleje nižší než 25 °C, je nutné předehřívat stroj před jakoukoli prací; jinak stroj nemusí reagovat nebo reagovat velmi rychle, což vede k těžké havárii.

Proto je potřeba předehřívat stroj, pokud je studený:

①. Nastavte ruční pedál akcelérátoru tak, aby motor běžel při střední rychlosti, a pak pomalu přesunujte lžici dopředu a dozadu po dobu 5 minut.

Pozor: Nepoužívejte jiné pohony než na lžici.

②. Nastavte ruční akcelérátor tak, aby motor běžel vysokou rychlostí, a potom přesunujte rameno, rameno a lopatku po dobu 5-10min.

Upozornění: operace jsou omezeny pouze na rameno a lopatku, ne na otáčení nebo jízdu.

Oddíl III provoz

2.2 Základní výkopy

1. Před kopáním by měl být ramenní válec v úhlu 90° , lopatka se zemí by měla být v úhlu kol. 30° . Pouze v takovém případě může každý válec mít max. hloubicí síla. Je vhodný pro poměrně tvrdou zeminu, aby se snížila odolnost proti hloubení.

2. Při vykopávání jakékoliv měkké půdy by měla být lžice ve sklonu s půdou o 60° , čímž se zvýší efektivita práce.

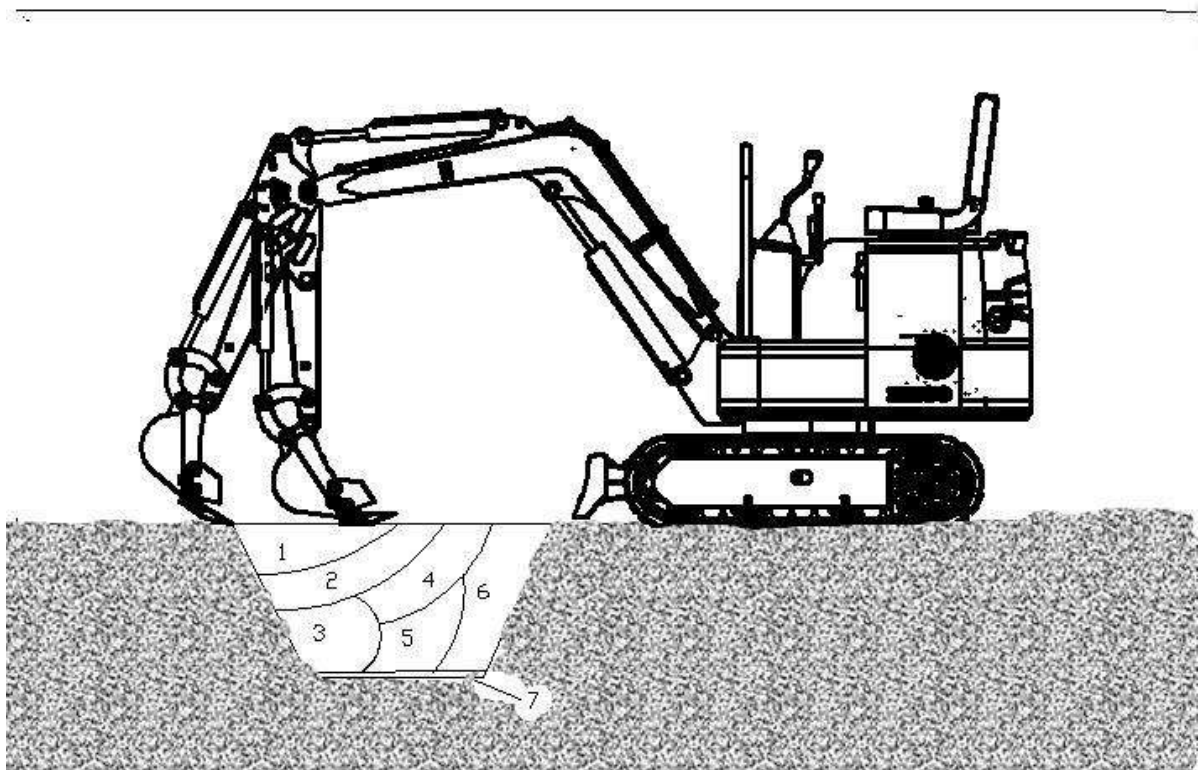
2.3 Nižší výkopy

Udržujte úhel mezi základnou lopaty a zkosením 30° a zatlačte rameno tak, aby se spustila práce.

2.4 Horní ražba

Udržujte lžici lopaty vertikálně k zemi a zatlačte rameno, abyste zahájili práci.

2.5 Přestavení se provádí v 7 krocích, jak je znázorněno na obrázku.





Oddíl IV Provozní opatření

Zákazy a opatření pro hydraulické rypadla

1. Vyhýbejte se sesuvům a pádu kamene.
2. Vyhýbejte se poškození pracovního zařízení.
3. Vyhýbejte se, aby se rýpadlo ponořilo do měkké země nebo mokřiny.
4. Při pojezdu se vyvarujte velkých překážek, jako je velký kámen.
5. Je zakázáno pracovat s hloubkou vody, která přesahuje dovolenou mez.
6. Při vykládce nebo nakládání by se s velkými kameny mělo pečlivě manipulovat, aby nedošlo k pádu.
8. V chladných dnech zaparkujte stroj na pevnou zem, aby nedošlo k zamrznutí. Odstraňte veškerý odpad ze stopy a jejího rámu.
9. Při jízdě na dlouhé vzdálenosti nechte odpočinku od 5 - 20min, aby nedošlo k poškození pojízdného motoru.
10. Nikdy se nepokoušejte přejet sklon více než 15 stupňů, aby se zabránilo převrácení.
11. Vyhýbejte se nehodám, ke kterým dochází během reverzace nebo otáčení stroje.
12. Vyhýbejte se kolapsu: Nikdy nepoužívejte na vysokých přehradách nebo svazích, které by jinak mohly stroj zhroutit nebo klouzat, což vede k těžké havárii.
13. Dávejte pozor na podzemní zařízení: neočekávané odpojení podzemních kabelů nebo plynovodu může vést k výbuchu, požáru nebo dokonce k osobní nehodě.
14. Dávejte pozor na nadzemní zařízení, jako je most: pokud dojde k srážce pracovního zařízení nebo jiných součástí, může dojít k poranění osob; je třeba dbát na to, aby se rameno nebo rameno nemohly srazit s jakýmkoli zvýšenými předměty



Kapitola VI Údržba rýpadel

Část I Denní prohlídky a údržba

S/N	Item	počet	Interval (h)		Remark
			10	50	
	Zkontrolujte hladinu motorového oleje	1	★		
	Zkontrolujte stav hydraulického oleje v nádrži hydraulického oleje	1	★		
	Zkontrolujte hladinu paliva v nádrži	1		★	
	Zkontrolujte, stav filtrů	1		★	
	Zkontrolujte, zda není přívod paliva ohnutý nebo prasklé.	----	★		
	Zkontrolujte, zda je potrubí paliva prasklé nebo ohnuté.	----	★		
	Zkontrolujte čepy pracovního zařízení a namažte.	----	★		
	Zkontrolujte, zda nedošlo k úniku hydraulické hadice a potrubí	----	★		
	Zkontrolujte, zda jsou zuby lopaty opotřebované nebo uvolněné.	4		★	
	Zkontrolujte bezpečnostní pás	1	★		
	Zkontrolujte šrouby a matice pro utahovací moment	----		●	
	Zkontrolujte šrouby a matice pro utahovací moment	----	Aperiodically		

Note: ★: Maintenance interval under normal conditions

●: Maintenance needed at the first inspection

◆: Initial 100h



Section II Periods of overhaul, medium and minor repair

S/N	Item	Quantity	Interval (h)								Remark
			100	250	500	1000	1500	2000	2500	4000	
1	Greasing of slewing bearing			★							
2	Greasing of slewing bearing gears		★								
3	Change the engine oil		●	▲	★						
4	Change the hydraulic oil.						△	★	△		
5	Change the hydraulic oil suction filter elements					★					
6	Check if the fuel pipe is cracked or bent.			★							
7	Change the oil-water separator				★						
8	Check the fuel hose for leakage / crack			★							
9	Check the fuel hose for crack / leakage			★							
10	Change the bucket										
11	Connection of bucket										
12	Remove the traveling handle										
13	Replace the seatbelt										
14	Check the defection of track				★						
15	Maintenance of tensioner				★	★					

Note: ★: Maintenance interval under normal conditions
 ▲: Maintenance interval of engine oil
 △: Change interval of hydraulic oil is dependent on the work oil type.
 ☆: Under the dusty environment, shorten the maintenance interval.



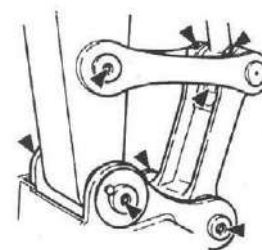
Technical maintenance

A Grease									
Parts		Quantity	Interval (h)						
			10	50	100	250	500	1000	2000
1. Lubrication of work equipment pins	Pivot at base of boom	10							
	Pivot at base of boom cylinder		★						
	Pivots of bucket and connecting rod								
	Others:	6	★						
2. Lubrication of slewing bearing		2				★			
3. Lubrication of external meshing gear of slewing bearing		1					★		

Note: it is recommended to use the lithium grease.
 ★ Maintenance interval under normal conditions

1. Maintenance and lubrication of work equipment pivots

- Pivot between bucket and connecting rod



- Pivot at base of boom

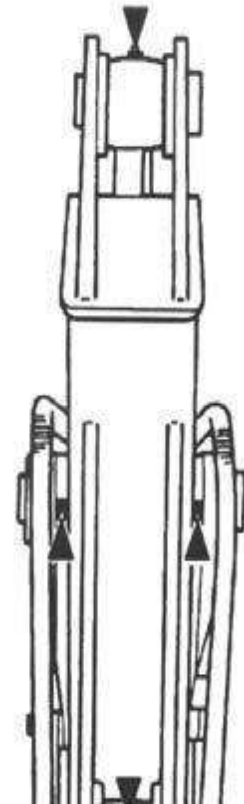


- Pivot at base of boom cylinder



● Others

Pivot between boom and arm; pivot of arm cylinder plunger; pivot at base of bucket cylinder.



2. Slewing bearing - every 250h

1. Park machine on the flat ground.
2. Lower the bucket onto ground.
3. Idle engine at low speed for 5min.
4. Turn the ignition switch to OFF and then take off the key.
5. With the upper-structure standing still, add the grease into the two grease nipples.
6. Start up engine to lift the bucket free from the ground, and then swing the upper-structure by 45 degree (1/8 cycle).
7. Lower the bucket onto ground.

3. External meshing gear 45 of slewing bearing ---- every 500h

Lower the bucket onto the ground

Turn off the engine.

1. Park machine on the flat ground.
2. Lower the bucket onto ground.
3. Idle engine at low speed for 5min.
4. Turn the ignition switch to OFF and then take off the key.
5. The grease has to be stored on the top of external meshing gear of slewing bearing, free of any pollution.

Add approximate 0.5kg of grease if needed.

Any polluted grease should be replaced with new one.



B. Engine oil

Parts	Quantity	Interval (h)						
		10	50	100	250	500	1000	2000
Engine oil	1			●	▲	★		
Engine oil filter	1			●	▲	★		

According to the temperature range during the interval, select the viscosity of oil listed in the table below:

Recommended engine oil brand: 15W—40 engine oil





Inspection of engine oil level ———each day

Change of engine oil ———every 500 h

Change the engine oil filter ———every 500 h

1. Start up engine to preheat up engine oil properly.
2. Park the vehicle on the flat ground.
3. Lower the bucket onto the ground.
4. Idle engine at low speed for 5min.
5. Turn the ignition switch to OFF and then take off the key.
6. Take off the drain plug to have oil pass through clean cloth into the 2L container.
7. After that, check if there is metal scrap or others left on cloth.
8. Put the drain plug back on and tighten it
9. Loosen the drain plug to have oil flow through the filter cylinder into a container.
10. Take off the screws fixing the engine oil filter elements with a screwdriver to take the filter element out.
11. Reinstall the new filter and tighten the screws fixing the new element with a screwdriver.
12. Remove the oil filter cap to add the recommended oil into engine. After 15 min, check if the oil level is between the circle markers.
13. Put the oil filler cap back on.
14. Shut down engine Unplug the ignition key.
15. Check if the drain plug is leaking.
16. Check the oil level on dipstick.



Caution: keep your body and face away from the breather. When gear oil is still hot, please wait until it cools down and then slowly release the breather pressure!

C. Hydraulic system

Parts	Quantity	Interval (h)								
		10	50	100	250	500	1000	1500	2500	4000
Check the hydraulic oil level	1	★								
Clean the drain pipe of hydraulic oil reservoir	1				★					
Change the hydraulic oil.	16.5L								★	
Change the hydraulic oil suction filter elements	1						★			
Check the hose and pipeline	--	★								
	--			★						
Change the hose	39									★
Note: ★ normal maintenance interval										



Inspection and maintenance of hydraulic system



Caution: in work, the hydraulic system may become very hot. Please cool the machine down before inspection or maintenance!

1. Before maintenance of hydraulic system, make sure the machine stands on flat and solid ground.
2. Lower the bucket onto ground and shut down engine.
3. Do not start any maintenance until the systems, hydraulic oil and lubricant completely cool down, as the hydraulic system may be still hot and pressurized as soon as work is over.
 - a. Drain the air out of hydraulic oil reservoir to release inside pressure.
 - b. Cool the machine down.



Caution: inspection and maintenance of hot and pressure parts may cause them or hydraulic oil to spray out, leading to personal injury!

- c. While removing the bolts or nuts, do not have your body facing them, as the hydraulic parts, even if they cools down, still have pressure. .
 - d. Never try to check the traveling or slewing motor circuits on slope, as they may have pressure due to their dead weight. .
4. While connecting the hydraulic hoses and pipeline, keep the seal surface free of any dirt and damage. Keep the above mentioned in mind:
 - a. Clean the hose, the pipeline and inside of hydraulic oil tank with detergent, and then thoroughly dry them.
 - b. Use the O-ring free of any damage or defect.
 - c. While connecting the pressure hose, do not twist it; otherwise its service span will be shortened. .
 - d. Carefully tighten the low-pressure hose clamp.
5. The hydraulic oil to be added should have the same grade. Namely, do not mix the oil with different grades. The hydraulic oil has been added before delivery, and therefore, please use the recommended oil. All oil in system should be changed at once.
6. With no hydraulic oil, never start up engine.

I. Inspection of hydraulic oil level --- each day



Important: With no hydraulic oil, never start up engine!

1. Park machine on the flat ground.
2. Completely retract the arm cylinder and extend out the bucket cylinder, so as to locate the machine.
3. Lower the bucket onto the ground.
5. Idle engine at low speed for 5min.
6. Shut down engine Unplug the ignition key.
8. Check if the oil level in hydraulic oil tank between the markers on dipstick, and add it if needed. . .

Caution: Hydraulic oil tank has pressure, and therefore slowly open its cap to release pressure before adding of oil. .

9. Open the hydraulic oil tank to add oil and then check the oil level again. .
10. Put the cap back on hydraulic oil tank



III. Change the hydraulic oil ---2000 h

Replace the hydraulic oil suction filter element ----every 1000 h



Caution: do not do so until the hydraulic oil cools down as it may be very hot.

1. Park machine on the flat ground.
2. Completely retract the arm cylinder and extend out the bucket cylinder, so as to locate the machine.
3. Lower the bucket onto the ground.
4. Idle engine at low speed for 5min.
5. Shut down engine Unplug the ignition key.
6. Dismantle the covers
7. Clean the top of hydraulic oil reservoir to avoid any dirt into its system.
8. Slowly open the hydraulic oil cap to release the pressure.
9. Loosen and take down the oil-pickup filter element cap.
10. Loosen and take down the drain plug at bottom of hydraulic oil tank to drain the oil out of tank.
11. Take out the oil-pickup filter and the levers.

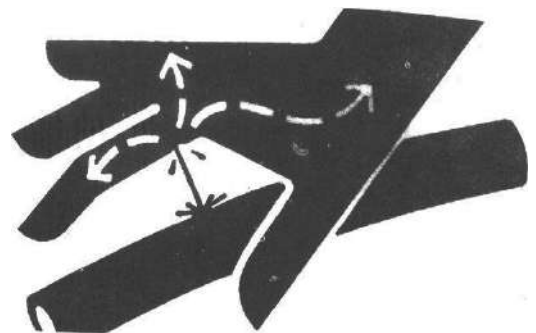


Caution: the hydraulic oil tank has pressure. Slowly open the hydraulic oil cap to release the pressure before taking off the cap!

12. Clean the filter and inside of hydraulic tank.
13. Use oil -pickup pump to suck the oil residue out of bottom of hydraulic oil tank.
14. Put on the filter and the levers to make sure the filter is correctly fixed onto the outlet.
15. Clean and re-install the drain plug onto the bottom of tank.
16. Add the oil until between markers on oil dipstick.
17. Put on the oil-pickup filter element cap to make sure the filter and the levers are at correct position and then tighten the bolts to 49N.m.

Important: with no oil in hydraulic pump, starting up of engine may damage to hydraulic pump!

18. Tighten the oil tank cap.
19. With engine idling at low speed, slowly and steadily control the lever for 15min to drain the air out of hydraulic system.
20. Completely retract the arm cylinder and extend out the bucket cylinder, so as to locate the machine.



21. Lower the bucket onto the ground.
22. Turn off the engine. Unplug the ignition key.

23. Check the hydraulic oil level in hydraulic oil tank and add it if needed. .

V. Inspection of hose and pipeline

--- Each day

---every 250 h



Caution: any sprayed fluid could penetrate your skin, leading to personal casualty!

Therefore, use a paperboard to check for leakage.

In addition, care must be taken to keep your hands and body away from pressure oil.

In case of accident, please immediately go to doctor with trauma experience. Any fluid into skin has to be removed in a few hours, which otherwise may lead to gangrene.



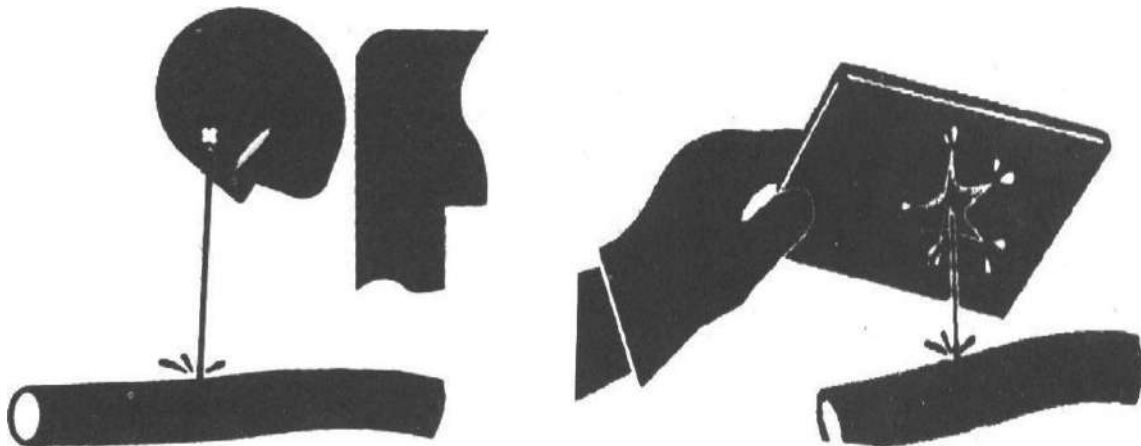
Caution: leaked hydraulic oil and lubricant may lead to fire or personal casualty!

1. Park machine on the flat ground. Lower the bucket onto the ground. Shift the pilot switch to Lock Turn off the engine. Unplug the ignition key.
2. Check if there is lost part, loosened pipe clamps, twisted hose, pipeline or hose rubbing with each other. In case of any abnormal, please replace or tighten it according to table 1-3.
3. Tighten, repair or replace any loosened, damaged or lost pipe clamps, hoses, pipes, oil cooler and flange bolts.

Do not bend or impact any pressure pipeline.

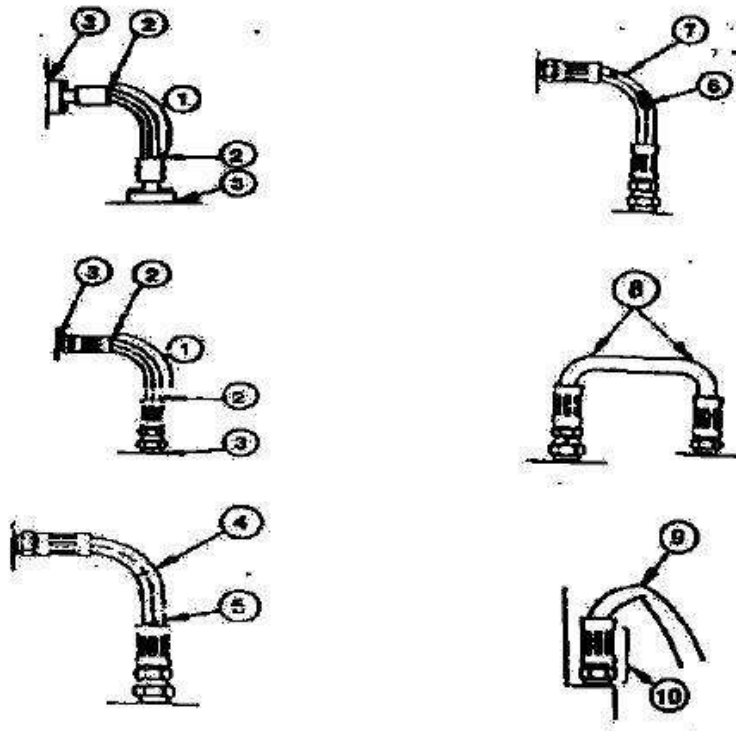
Never install any bent or damaged hose or pipeline.

Caution: related positions of check points and the abnormalities



Please use the genuine Rhinoceros excavator parts

Interval (h)	Check points	Abnormal	Measures
Every day	Hose surface Hose end Connector body	Leakage 1 Leakage 2 Leakage 3	Replace it Replace it Tighten or replace the hose or O-ring
Every 250h	Hose surface Hose end Hose surface Hose surface Hose Hose Hose end and joint body	Crack 4 Crack 5 Reinforcing material protruded 6 Local part protruded 7 Bend 8 Bend 9 Deformation or corrosion 10	Replace it Replace it Replace it Replace it Replace it Change it (proper bending radius) Replace it





Fuel system

capacity of fuel tank: 7L

Parts	Quantity	Interval (h)						
		10	50	100	250	500	1000	2000
Drain dirt out of collector of fuel tank	1	★						
Check the oil-water separator	1		★					
Change the oil-water separator	1					★		
Check the fuel hose.	Leakage	--	★			★		
	Crack / twist / others	--	★			★		

★ Maintenance interval under normal conditions

Recommended fuel:

Merely use the quality diesel (selection of fuel grade should be dependent on environmental temperature).

Fill up the fuel

1. Park machine on the flat ground.
2. Lower the bucket onto ground.
4. Idle engine at low speed for 5min.
5. Shut down engine Unplug the ignition key.



Caution: fuel should be disposed carefully. Before filling of fuel, shut down engine. No smoking before filling fuel or with fuel system working.

6. Pay attention to the fuel scale. Add the fuel if needed.

Important: keep any dirt, dust, water or other foreign material from getting into fuel system!

7. While filling of fuel tank, make sure the fuel is not sprayed on machine and added properly.
8. Put the cap back on fuel filler to avoid any lost or damage.

Inspection of oil-water separator ---every 200h

Oil-water separator ① is used to separate the water or sediment from fuel. Oil-water separator ① has a float able to rise up when water becomes full. When there is water or sediment in the collector of oil-water separator, please drain oil-water separator ①.

Important: shorten the inspection interval of oil-water separator ① if there is excessive water in the fuel!

Drain steps:

Caution: the drain plug is designed to be counter - thread type and should be turned with hands, instead of vise and wrench for protection of threads.

1. Manually loosen the drain plug at bottom of oil-water separator.
2. After the draining, manually tighten the drain to ensure no leakage of oil or air.

Caution: after the draining, make sure air is drained out of fuel system to make sure the engine could start up normally.



Electrical system - battery

- I. Check the battery electrolyte level and the terminals.



Caution: gas inside of battery may explode it. Therefore, keep any spark and flame away from battery. Use a flashlight to check the electrolyte level. In addition, the sulphuric acid in battery electrolyte is as toxic as to burn your skin or your cloth holes or to blind your eyes. . .

Therefore, take the following methods to avoid any rick:

1. Refilling of battery should be done at well-ventilated site.
2. Put on goggles and plastic gloves.
3. Care must be taken not to spray out the electrolyte.
4. Use the proper measures to assist battery startup.

If touched with acid:

1. Rinse the skin
2. Use the soda or the lime to neutralize the acid.
3. Rinse eyes for 10 - 15 min and then go to doctor.



Caution:

- a. Always firstly disconnect the battery clips (-) away from the ground and then lastly connect it.
- b. Always keep the terminals at top to battery and the breather clean, to avoid the battery from discharging. Check if the battery terminal is loosened or rusted. Coat the terminals with vaseline to avoid any corrosion.



Replace the battery

There is a 12V battery with one negative pole (-) grounded.

If battery cannot be charged or store any electricity, replace the battery with same model.

Replace the fuse.

If the electrical device does not work, please firstly check the fuse.

Important: please install the fuse with correct amperage, so as to prevent against burning of electrical system due to overloading!

Others

Parts	Quantity	Interval (h)							
		10	50	100	250	500	1000	2000	4000
Check if the bucket teeth is worn or loosened.		★							
Change the bucket	—	If needed							
Replace the bucket and connect the new one to machine.	—	If needed, replace the bucket and connect the new one to machine.							
Adjust the connecting rod of bucket	1	If needed							
Take down the traveling lever	2	If needed							
Check and replace the fuse	1	★	Every 3 years						
Check the track deflection	2					★			
Maintenance of tensioner	2						★		
Check the fuel injection timing	—	If needed							
Measure the compression pressure of engine	—						※		
Check the starter and the A/C generator	—						※		
Check the bolts and nuts for tightening torque	—		●		★				

Note:

- ★ Maintenance interval under normal conditions
- Maintenance needed at the first inspection
- ※ Contact dealers.

Check the bucket teeth --- each day

1. Check if the bucket teeth is worn or loosened.

Worn beyond the service limit, the bucket teeth may be replaced.

Bucket tooth dimensions mm

New	Service limit
190	130



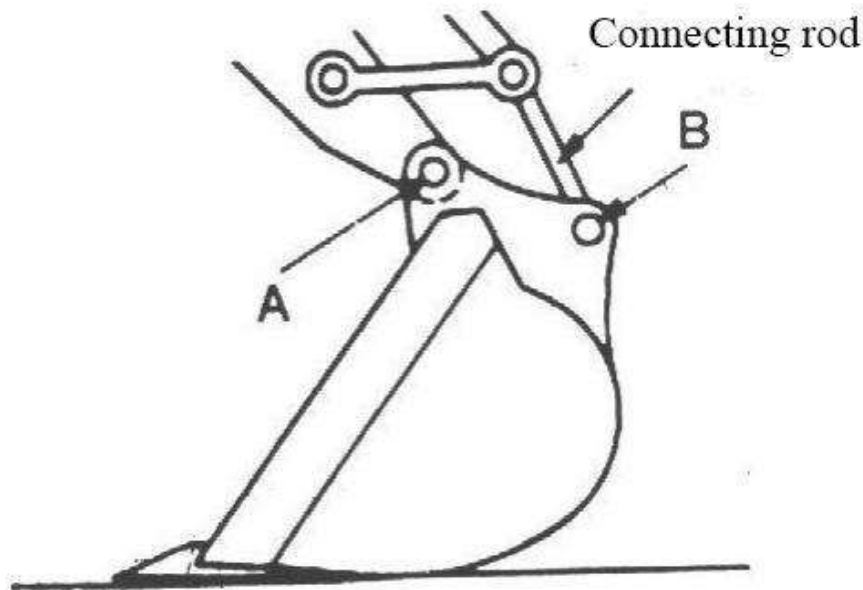
Caution: care must be taken to avoid the metal scrap from flying out, leading to personal injury. Wear the goggles or the safe glasses or safe devices suitable for operations!

Change the bucket



Caution: while hitting out or into the connecting pin, care must be taken to prevent against any personal injury due to out-flied metal scrap. Wear the goggles or the safe glasses or safe devices suitable for operations!

1. Park the machine on flat ground and lower the flat surface of bucket onto ground to make sure the bucket does not move after the removal of pin.
2. Slide the O-ring out, as shown in the figure.
3. Remove the bucket pins A and B to separate the bucket and the arm. Clean the pin and its pin hole and then properly grease them.
4. Adjust the arm and the new bucket correctly, and make sure the bucket does not roll away. .
5. Install the bucket pins A and B.
6. Put the locker and ring onto pins A and B.
7. Adjust the connection clearance of bucket at pin A. Refer to the way to adjust the bucket connection clearance.
8. Grease the pins A and B.
9. Start up engine and run it at low speed. Slowly rotate the bucket to two directions to check if there is any interference to movement of bucket. Do not use any machine with interference, which should be solved immediately. .





Check the bolts and nuts for tightening torque

.....every 250 h (initially at 50 h)

Check the tightness at initial 50h and then every 250 h. Tighten it to the set torque if needed. Replace it with bolts and nuts with same or higher grade.



Important: please use the torque wrench to check the torques of bolts and nuts!

Metric bolts and nuts			
Thread dimensions	Standard torque (N.m)	Thread dimensions	Standard torque (N.m)
M6	12±3	M14	160±30
M8	28±7	M16	240±40
M10	55±10	M20	460±60
M12	100±20	M30	1600±200

2. Torque of main components: (N.m)

Thread dimensions	Recommended torque
M16 bolts fixing the traveling motor	252±39.2
M16 bolts fixing the sprocket	252±39.2
M20 bolts fixing the slewing bearing	570±60
M20 bolts fixing the swing mechanism	570±60



Important:

1. Before installed, the bolts and nuts should be cleaned.
2. Grease the bolts and the nuts (such as the white zinc b able to be dissolved to lubricant), so as to stabilize their abrasion coefficient.
3. The counterweight bolts should be kept tightened up.

Caution: all the tightening torques should be expressed with kgf.m.

For example: use a wrench with 1m long to tighten the bolts and nuts, and apply 12kgf of force to the end of wrench, generating the following torque:

$$1\text{m} \times 12\text{kgf} = 12\text{kgf.m}$$

To generate the same torque with 0.25m wrench: $0.25\text{m} \times y = 12\text{kgf.m}$

Needed force: $y = 12\text{kgf.m} / 0.25\text{m} = 48\text{kgf}$



Maintenance under the special cases

Operational conditions	Precautions for maintenance
Moor land, rainy or snowy	Before operation, check all the drain plugs are tightened up. After operation, clean machine and check bolts and nuts for break, damage, looseness or loss. Lubricate all parts to be lubricated on time.
On beach	Before operation, check all the drain plugs are tightened up. After work, thoroughly clean the clean to remove the salt. Frequently maintain the electrical system from being corroded.
Dusty environment	Air filter: clean the filter element periodically or at shorter interval Radiator: clean the oil cooler screen to avoid any blockage. Fuel system: clean the filter and its element periodically or at shorter interval. Electrical devices: periodically clean it, specially the AC generator and starter's rectifier.
Stony roads	Track: careful operations Frequently check if bolts and nuts are broken, damaged or lost. Loosen the track a little than the usual. Work equipment: parts may be damaged on stony roads, and therefore please use the reinforced bucket or heavy-duty bucket. .
Freezing cold	Fuel: use the high fuel suitable for low temperature Lubricant: hydraulic oil and engine oil with dry quality and low viscosity. Battery: keep the battery fully charged and maintain it at shorter interval. The electrolyte may be frozen if it is not fully charged. Track: keep the track clean. Park the machine on solid ground to avoid the track frozen.
Falling stone	Roof at driver seat: add the protective for cab roof if needed to prevent the machine from being damaged with falling stone.

Storage of machine

1. Repair any worn or damaged parts, and put the new one if needed. .
2. Clean the primary air filter elements.
3. If possible, retract all the hydraulic cylinders. If not, grease all the plungers exposed out of cylinder.
4. Lubricate all the grease points.
5. Put the track on the solid and long pad.
6. Cleaning of machine especially in winter, clean each part of excavator, especially the track.
7. Fully charged, the battery should be stored at dry and safe site. If battery cannot be taken down, separate the battery negative pole from (-) pole.
8. Painting if needed to avoid rusting.
9. Store the machine at dry and safe site. If outdoors, it should be covered with water-proof cloth.
10. If machine is to be stored for long time, run it at least once each month.



Chapter XII Troubleshooting

Section I General

To ensure excellent performance of excavator, all components and parts are of high quality. Machine's performance and service life are determined not only by manufacturing quality and assembling quality, but also maintenance quality.

The marketing representative and service engineer shall remind the user that preventive maintenance is the easiest and most economical one among various ways of maintenance.

There are daily inspection and long-, medium- and short-term maintenance according to maintenance frequency.

Section II Troubleshooting of mechanism system

Symptom	Possible causes	How to solve
Noisy structural components	<ol style="list-style-type: none"> 1. The loose fasteners make noise. 2. Aggravated abrasion between bucket and end face of bucket rod 	<ol style="list-style-type: none"> 1. Inspect and tighten 2. Adjust the clearance to less than 1mm
Bucket teeth have dropped during operation	<ol style="list-style-type: none"> 1. Deformed spring and weakened elasticity of bucket tooth pin 2. Unmatched bucket tooth pin and seat 	Change the bucket tooth pin
The crawler has tangled up	<ol style="list-style-type: none"> 1. Loose crawler 2. The driving wheel moves fast in front on rugged road. 	<ol style="list-style-type: none"> 1. Tighten the crawler 2. The guide wheel shall move slowly in front on rugged road

Section III Troubleshooting of hydraulic system

Symptom	Possible causes	How to solve
The whole excavator does not move	Low oil level of hydraulic oil tank that the main pump sucks no oil	Add enough hydraulic oil
	Oil filter is blocked	Change the filter and clean the system
	Engine coupling is damaged (such as plastic plate, elastic plate)	Change
	The main pump is damaged	Change or repair the main pump
	The servo system pressure is low or zero	Adjust to regular pressure. If it fails to increase the pressure of servo overflow valve, disassemble to wash; if the spring is fatigue, add a washer or change the spring.
	The safety valve is set at low pressure or stuck.	Adjust to regular pressure. If it fails to increase the pressure, disassemble and wash. If the spring is fatigued, ass a washer or change the spring.
	Oil suction pipe of main pump explodes or comes off	Change with a new one



Symptom	Possible causes	How to solve
The unilateral crawler fails to move	The main pump supplying fuel to unilateral crawler is damaged.	Change
	The main valve rod is stuck and the spring is broken	Repair or change
	Traveling motor is damaged	Change
	The upper and lower chambers of swivel joint are connected	Change the oil seal or clean the assembly
	Fuel pipe of traveling system explodes.	Change
The whole excavator moves slowly or powerless	Less oil in hydraulic oil tank	Add enough hydraulic oil
	Low engine rpm	Adjust engine rpm
	Low system safety valve pressure	Adjust to specified pressure
	Serious leak inside the main pump	Change or repair the pump
	The traveling motor, rotation motor and cylinder are worn of different degree, which causes internal leak.	Change or repair the worn parts
	The aged sealing components, worn hydraulic elements, degraded oil of old excavator cause the operation speed becomes powerless along with the increase of temperature.	Change hydraulic oil, change sealing components of the whole machine, adjust the fit clearance and pressure of hydraulic components.
	The blocked engine filter causes serious decrease of loaded rpm and even flames out.	Change the element
The blocked hydraulic filter accelerates abrasion of pump, motor and valve and leads to internal leak.	Clean and change the element according to the maintenance schedule.	
Serious between main valve rod and valve hole causes serious internal leak	Repair the valve rod	
The right and left traveling systems do not move (no other abnormalities)	Central rotation connector is damaged.	Change the oil seal and change the groove if it is damaged
	The high pressure chamber and low pressure chamber of traveling operation valve is connected.	Change
	Serious leak inside the traveling operation valve	Change
	Low overloaded pressure of traveling valve of main valve or the valve rod is stuck.	Adjust and grind
	The left and right traveling reducers fail	Repair
	The left and right traveling motors fail	Repair
	The oil pipe explodes	Change
Deviation during traveling (no other abnormalities)	Wrong adjustment of variable point of main valve or serious internal leak of a pump	Adjust or repair
	Internal or external spring of one traveling valve core of main valve is damaged or tightened	Change
	The traveling motor leaks inside due to abrasion.	Repair or change



Symptom	Possible causes	How to solve
	The sealing component of central rotation connector is aged and damaged.	Change the sealing component
	The left and right crawlers are of different tightening.	Adjust
Boom (bucket rod and bucket) move to one direction only.	Main valve core is stuck or valve rod spring breaks.	Repair or change
Boom (bucket rod and bucket) does not move.	Boom valve rod is stuck or of low overloaded pressure	Repair
	Fuel supply pipe leaks, detached, O ring damaged or pipe fitting is loose	Change the damaged component
	Sandstone in main valve or the low pressure chamber is connected to the high pressure chamber	Change
Boom (bucket rod and bucket) drops too quick or the cylinder drops at a certain height even it is not operated due to dead weight	Low overloaded valve pressure	Adjust
	Serious internal leak of cylinder	Change the sealing component, repair the inner wall or groove of cylinder or change the cylinder.
	Loose oil pipe fitting, damaged O ring	Change
Boom (bucket rod and bucket) works powerlessly	Serious internal leak of multiway valve or sandstone inside it	Change
	Low overloaded pressure	Adjust
	Serious internal leak of oil cylinder	Change the oil seal
	The main valve is disabled due to internal leak.	Repair or change
Boom (bucket rod and bucket) moves even it is not operated	Multiway valve core is stuck or serious internal leak	Grind or change
	Multiway valve rod spring breaks	Change
	Leak of working cylinder, or the working device drops due to dead weight	Change the oil seal
	Low pressure of overload overflow valve or the spring breaks	Adjust to specified pressure. Change the spring if it is broken.
Hot hydraulic oil	Wrong grade of hydraulic oil for excavator	Change the hydraulic oil
	Hydraulic oil cooler surface is polluted by oil and dirt, which blocks the air hole.	Wash
	Low oil level of hydraulic oil tank	Add enough hydraulic oil
	The hydraulic components such as motor, main valve and oil cylinder or sealing components are seriously worn and cause internal leak, which increases the oil temperature. Traveling rotation and working device are delayed and powerless. The hot temperature degrades the hydraulic oil. The safety valve is of poor air tightness, which leads to overflow.	Change the elements in time
No action of rotation (no	Hydraulic oil pipe breaks	Change



Symptom	Possible causes	How to solve
other abnormalities)	Rotary valve rod on main valve is stuck.	Repair
	Rotary motor is damaged	Repair or change
	The rotation support is damaged.	Change
Indifferent left and right rotation speed (no other abnormalities)	The right and left rotation of multiway valve is of different overloaded pressure	Adjust
	Rotation valve rod of multiway valve is slightly stuck.	
Delayed or powered rotation (no other abnormalities)	Serious external leak of hydraulic oil pipe	Change pipe fitting and sealing components
	Low overloaded pressure for rotation of multiway valve	Adjust
	Serious internal leak of rotary motor	Repair or change
	The high and low pressure chambers of multiway valve are connected, sand hole on valve body due to casting, which causes one-way action or linked actions	Change
The rotation mechanism moves even it is operated	Main valve rod spring breaks	Change
The excavator makes abnormal noise and shakes during operation.	Low oil level of hydraulic oil tank	Add oil
	The oil contains too much moisture and air	Change
	Safety valve of multiway valve makes noise	Adjust
	Damaged coupling	Change
	Vibration caused by loose pipe clamp	Adjust
	Blocked filter	Change
	Air exists in oil suction hose	Release the air
	Uneven engine rpm	Adjust
	The bearing of working device is not lubricated or scraped	Apply lubrication oil or change the shaft or sleeve
Powerless oil cylinder or oil leak	Damaged sealing components	Change the sealing components
	A groove is found on the piston rod due to abrasion or detachment of chromium coating of piston rod, which causes oil leak.	Coat, paint, repair or change
	The air in the cylinder causes shaking noise during operation	Release the air



Section IV Troubleshooting of electrical control system

Fault codes of electrical control system of excavator
The engine fails to start
The engine flames out during operation
The engine fails to flame out
Automatic slow-down does not work
Slewing and traveling of all working devices.

Principle diagram

1. The engine fails to start

Fault description	●The engine fails to start	
The fuel pump system does not supply fuel or supply less fuel	Low engine rpm	Adjust to regular rpm
	Pump fault	Change
	Less fuel in the tank	Add fuel
	Fuel tube breaks, tube connector is loose and O ring is damaged	Change

Possible causes		Standard value in regular condition and reference value of fault diagnosis		
1	Low battery	Battery voltage	Color of charge state densimeter	
		Above 12V	Green (if it is white, change the battery)	
2	Fuse F1 and F11 fail	In case the fuse is burnt, the GND fail may happen. If he monitoring indicator on the monitor panel is not illuminated, inspect the circuit between battery and specified fuse.		
3	Engine ignition switch fault	★ Turn the start switch of engine to OFF as preparation and keep it at OFF during diagnosis.		
		Ignition switch	Position	Resistance
		Between 30 and 17	OFF	1MΩ
Start	Below 1Ω			
4	Starter relay K3 fault	★Turn the start switch of engine to OFF as preparation and keep it at OFF during diagnosis.		
		Pin	Resistance	
		85-86	200-400Ω	
		87-30	Above 1MΩ	
5	Security lock switch fault (open circuit inside)	★Turn the start switch of engine to OFF as preparation and keep it at OFF during diagnosis.		
			Lock rod	Resistance



Possible causes		Standard value in regular condition and reference value of fault diagnosis		
		Between 105 and GND	Unlocked	1MΩ
			Locked	Below 1Ω
6	Start motor fault (open circuit or short circuit inside)	★Turn the start switch of engine to OFF as preparation and keep it at OFF during diagnosis. If all PS, GND, signals and engine start input are correct while engine start output is abnormal, the engine starter relay fails.		
		Engine or start motor	Engine start switch	Voltage
		PS; terminal B and GND	Start	20~30V
		Input of engine start, terminal C and GND		20~30V
7	Alternator fault	★Turn the start switch of engine to OFF as preparation and keep it at OFF during diagnosis.		
				Voltage
				Below 1V
8	Disconnected wire harness (disconnect from connector or poor contact)	★Turn the start switch of engine to OFF as preparation and keep it at OFF during diagnosis.		
			Resistance	Below 1
9	Poor GND of wire harness (contact with earth circuit)	★Turn the start switch of engine to OFF as preparation and keep it at OFF during diagnosis.		
			Resistance	Above 1M
10	Short circuit of wire harness (contact with 24V circuit)	★Turn the start switch of engine to OFF as preparation and keep it at OFF during diagnosis.		
			Voltage	Below 1V

2. Engine flames out during operation

Symptom		●Engine flames out during operation			
	1	Disconnected wire harness (disconnect from connector or poor contact)	Standard value in regular condition and reference value of fault diagnosis		
			★Turn the start switch of engine to OFF as preparation and keep it at OFF during diagnosis.		
			Between CN-12T ② and CN-132F ⑥	Resistance	Below 1
	2	Poor GND of wire harness (contact with earth circuit)	★Turn the start switch of engine to OFF as preparation and keep it at OFF during diagnosis.		
Between CN-12T ② and CN-132F ⑥			Resistance	Above 1M	



Section V Troubleshooting of diesel engine

1. Symptoms of failed startup of engine:

When starting the engine, the starter drives the engine but the engine fails to be started.

Possible causes:

- (1) Low battery;
- (2) Battery terminal is rusted or loose;
- (3) Battery earth wire is rusted or loose or poor GND of engine;
- (4) Starter relay armature fails to disengage.
- (5) Ignition switch fault or starter fault;

How to solve:

- (1) Low battery is caused by electrical appliances that are not powered off in previous day. Next time, do not forget to power off all electrical appliances at the end of the day. If you have well charged the battery during driving the day before, the battery shall be on a full charge at the end of the day. For failed start-up caused by low battery, change the battery pack or connect to another battery pack in parallel to start the engine.
- (2) Clean the battery terminal, tighten the PS wire clip to contact the PS wire with battery terminal reliably.
- (3) Clean the battery earth wire terminal to ensure reliable GND; ensure reliable GND of engine;
- (4) Repair or change starter relay;
- (5) Inspect and repair ignition switch and inspect and repair the starter;
- (6) Long period operation of battery may increase the internal resistance; therefore, it is necessary to repair the battery and correctly charge the battery and change with new battery pack if necessary; the battery shall be fully charged to ensure successful start-up of engine.

2. Check if it is low fuel level that makes hard to start the diesel engine

Symptom:

When starting the engine, the starter runs at acceptable rpm; however, it fails to start the engine. Possible causes:

- (1) Fuel tank is empty;
- (2) Fuel supply system channel fault;
- (3) Air, water or foreign matter exist in fuel system, which block the system;
- (4) Fuel pump fault;
- (5) Engine fault;

How to solve:

- (1) Fill the fuel tank with standard fuel, start the engine and run the engine to deliver the fuel to carburetor;
- (2) Inspect pipeline of fuel supply system, fuel filter and fuel pump; change blocked and damaged assembly if necessary to ensure unobstructed fuel supply.
- (3) Release air in fuel system. If the engine can not be started due to air blockage, decrease the temperature properly.
- (4) Inspect the fuel pump. Only when the fuel pump works well can the fuel supply be unobstructed. Fuel supply seldom fails and air blockage and water blockage seldom happen when the fuel supply of fuel pump is large.



(5) Inspect and repair the engine. Only when the engine works well can the start-up fail never or seldom happen.

3. Check if it is hard to start the engine

Symptom:

- (1) Starter runs at correct rpm and drives the engine; however, it is hard to start the engine.
- (2) It is hard to start the engine when it is cold.
- (3) It is hard to start the engine when it is hot.

Possible causes:

- (1) Fuel filter is blocked;
- (2) Fuel pump fault;
- (3) Wrong injection timing;
- (4) Low temperature of oil and intake air;
- (5) Intake air filter is blocked.
- (6) Leak of fuel tube;
- (7) Starter fault;
- (8) Improper start operation;
- (9) Wrong fuel grade;
- (10) Engine fault;

How to solve:

- (1) Inspect and change the fuel filter;
- (2) Inspect and change the air filter element;
- (3) Inspect and adjust the fuel pump;
- (4) Inspect the fuel tube and oil channel to ensure unblocked oil supply;
- (5) Inspect the starter and start control device for reliable operation.
- (6) Start the engine in correct ways.
- (7) Add fuel of correct grade and discharge the water in fuel in the low part of fuel tank if necessary;
- (8) Repair the engine.

4. Check if the starter fails to start the engine

Symptoms:

- (1) Turn the ignition switch to ON, the starter does not work.
- (2) The driving gears of starter do not engage.
- (3) The driving gears of starter fail to disengage.
- (4) Low engine rpm and uneven engine rpm;

Possible causes:

- (1) The battery is not fully charged.
- (2) Terminals of battery are loose.
- (3) Battery earth wire is loose.

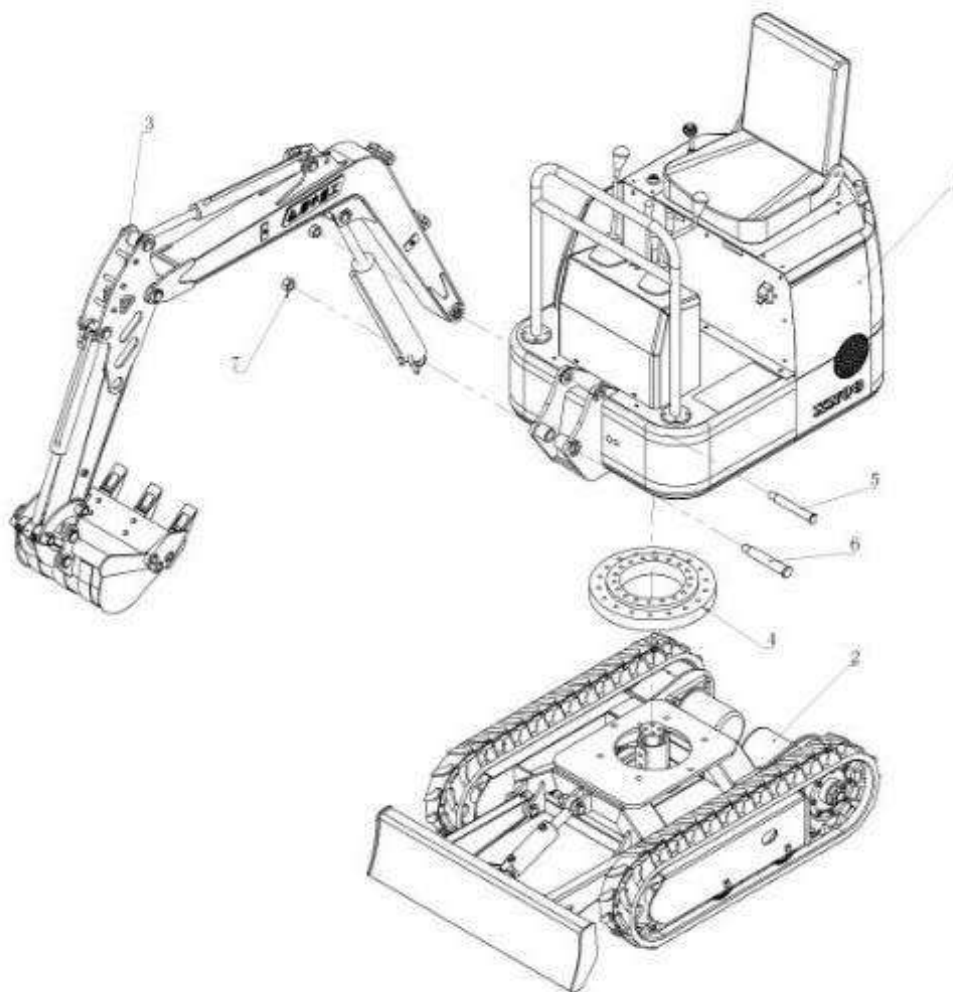


- (4) Start circuit is disabled.
- (5) Electromagnetic relay armature is adherent;
- (6) Starter fault
- (7) Driving gear of starter is stuck by engine flywheel gear ring;
- (8) Driving gear of starter adheres to the bearing.
- (9) The starter fails to drive the engine;
- (10) Engine fault;

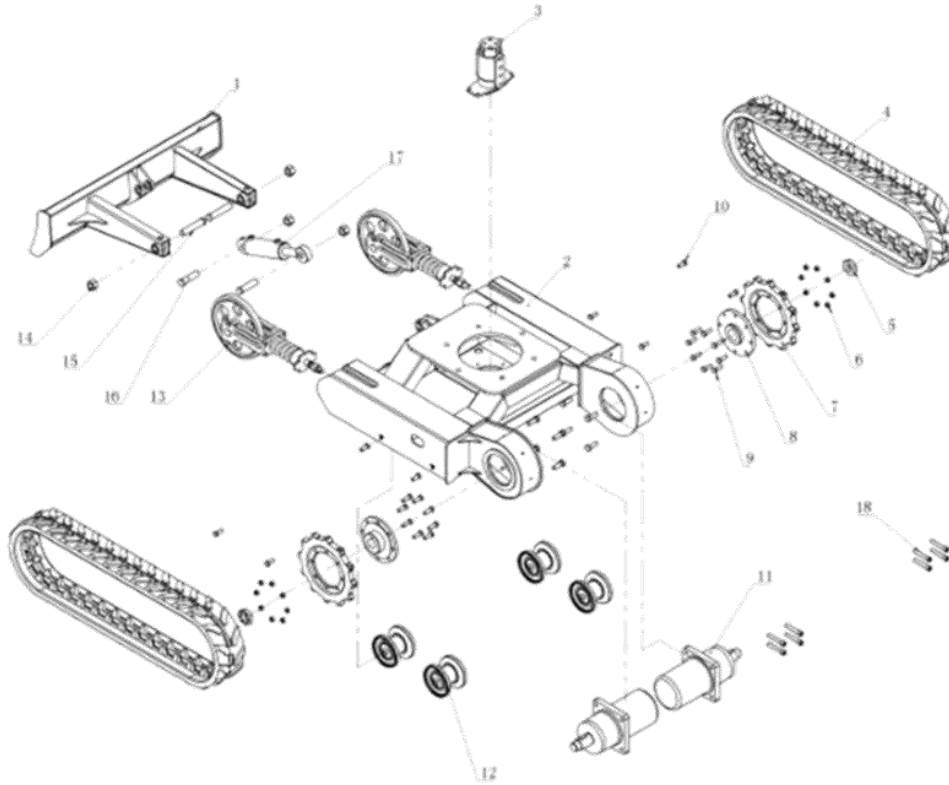
How to solve:

- (1) Check if the battery is fully charged; if not, charge it; change the battery if necessary.
- (2) Connect the battery terminal and connector;
- (3) Repair the battery earth wire.
- (4) Inspect the start circuit and ensure the terminal of starter shall be live.
- (5) Inspect starter electromagnetic relay to eliminate fault of electromagnetic relay; it shall obvious to hear the sound making by the relay when it sucks and separates.
- (6) Inspect and repair the starter.
- (7) Start again to engage the starter driving gear and engine flywheel gear.
- (8) Inspect the bearing on the end of starting shaft of starter;
- (9) Small torque of starter, change the starter if necessary.
- (10) Repair the engine to ensure sound operation of engine.

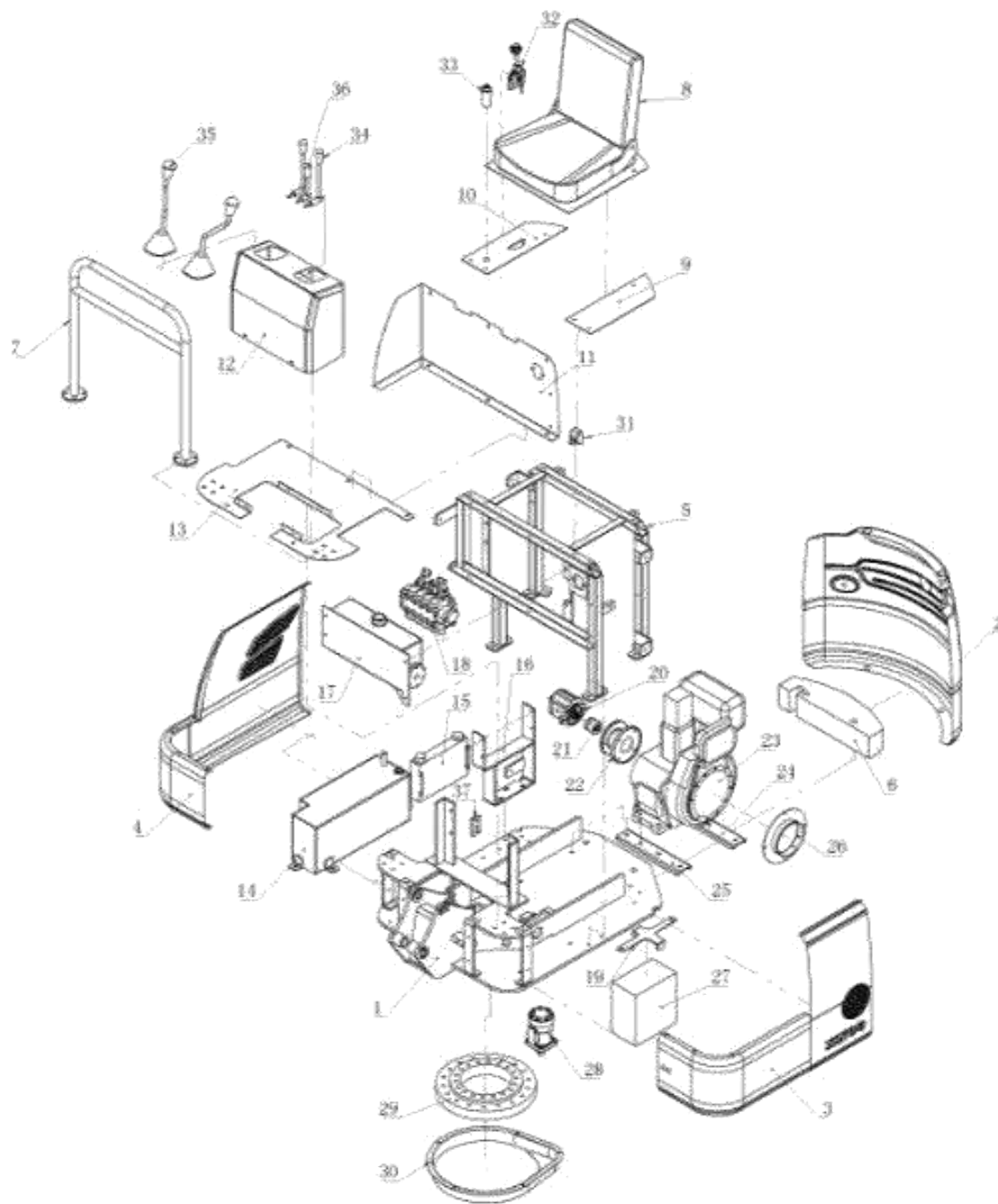
Attachment: BOM of vehicle parts



Exploded drawing of 0.8T excavator assembly			
S/N	Name	Quantity	Remark
1	Upper frame assembly	1	
2	Lower frame assembly	1	
3	Front work equipment assembly	1	
4	Slewing bearing assembly	1	
5	Connecting shaft between boom and upper frame	1	
6	Connecting shaft between boom and upper frame	1	
7	Pivot sleeve	2	



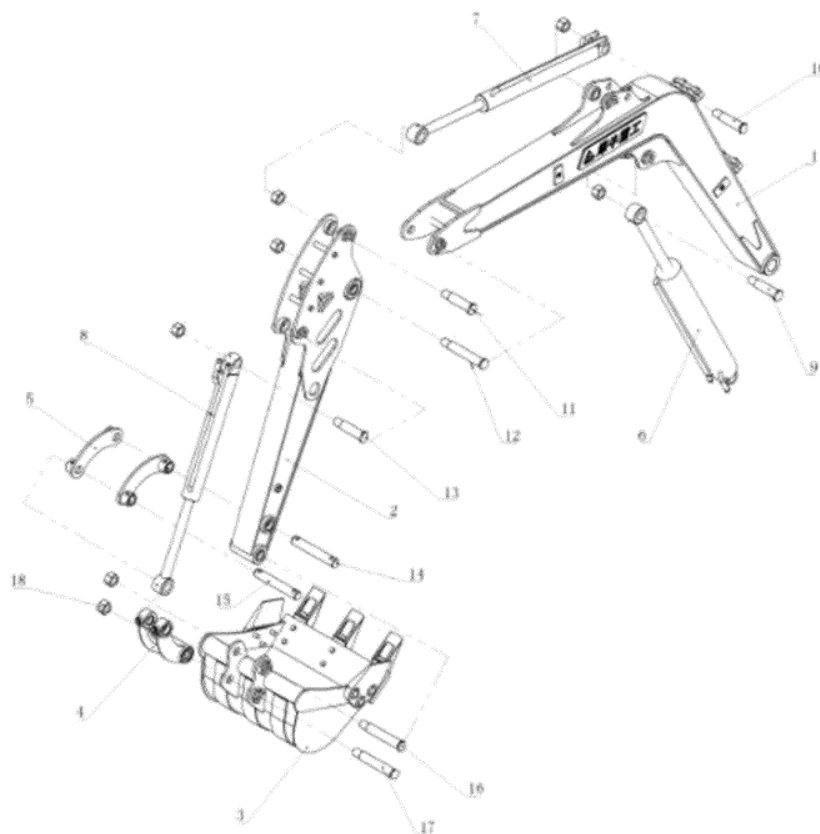
1 Lower frame				
S/N	Part No.	Part Name	Quantity	Remark
1	1.1	Welded dozer shovel	1	
2	1.2	Welded lower frame	1	
3	1.3	Slewing joint	1	
4	1.4	Rubber crawler	2	
5	1.5	Lock nut	2	
6	1.6	Sprocket nuts	16	
7	1.7	Drive wheel	2	
8	1.8	Connecting disc	2	
9	1.9	Sprocket bolts	16	
10	1.10	Bolts fixing the track roller	8	
11	1.11	Traveling motor	2	
12	1.12	Track roller	4	
13	1.13	Idler assembly	2	
14	1.14	Pivot nuts	4	
15	1.15	Connecting shaft of dozer shovel	2	
16	1.16	Connecting shaft of cylinder	2	
17	1.17	Cylinder of dozer shovel	1	
18	1.18	Bolts fixing idler assembly	8	



2 Upper frame assembly				
S/N	Part No.	Part Name	Quantity	Remark
1	2.1	Welded upper frame	1	
2	2.2	Covers of rear housing	1	
3	2.3	Covers of left housing	1	
4	2.4	Covers of right housing	1	
5	2.5	Welded inside support frame	1	
6	2.6	Rear counterweight plate	1 set	
7	2.7	Arm rest	1	
8	2.8	Seat and supports	1	



2 Upper frame assembly				
S/N	Part No.	Part Name	Quantity	Remark
9	2.9	Left- upper cover	1	
10	2.10	Right - upper cover	1	
11	2.11	L- shaped covers	1	
12	2.12	Console	1	
13	2.13	Pedal	1	
14	2.14	Hydraulic oil tank	1	
15	2.15	Hydraulic oil tank	1	
16	2.16	Hydraulic oil tank support	1	
17	2.17	Diesel tank	1	
18	2.18	Multiway valve	1	
19	2.19	Battery platen	1	
20	2.20	Master cylinder	1	
21	2.21	Coupler	1	
22	2.22	Pump disc	1	
23	2.23	Engine	1	
24	2.24	Rear bracket base of engine	1	
25	2.25	Front bracket base of engine	1	
26	2.26	Intake cover	1	
27	2.27	Battery	1	
28	2.28	Rotary motor	1	
29	2.29	Slewing bearing	1	
30	2.30	Dust cover	1	
31	2.31	Main power switch	1	
32	2.32	Manual accelerator	1	
33	2.33	Key starter	1	
34	2.34	Traveling handle	2	
35	2.35	Work handle	2	
36	2.36	Front shovel handle	1	
37	2.37	Slewing joint pallet	1	



3. Front work equipment				
S/N	Part No.	Part Name	Quantity	Remark
1	3.1	Boom	1	
2	3.2	Arm	1	
3	3.3	Bucket	1	
4	3.4	Connecting rod	1	
5	3.5	Push rod	1	
6	3.6	Boom cylinder	1	
7	3.7	Arm cylinder	1	
8	3.8	Bucket cylinder	1	
9	3.9	Medium shaft of boom	1	
10	3.10	Rear shaft of arm cylinder	1	
11	3.11	Front shaft of arm cylinder	1	
12	3.12	Front shaft of boom	1	
13	3.13	Rear shaft of bucket cylinder	1	
14	3.14	Medium shaft of arm	1	
15	3.15	Front shaft of bucket cylinder	1	
16	3.16	Front shaft of arm	1	
17	3.17	Connecting shaft between bucket and connecting rod	1	
18	3.18	Shaft locker sleeve	7	