

FLAIL MOWER

FL Series



CE



N1116

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FOREWORD

The purpose of this manual is to assist you in operating and maintaining your Flail mower. Read it carefully before operating and maintaining the Flail mower, it furnishes the specifications, construction, instructions and also the maintenance. Some information may be general in nature due to unknown and varying conditions. However, through experience and these instructions, you should be able to develop operating procedures suitable to your particular situation.

“Right” and “left” as used throughout this manual are determined by facing the direction the machine will travel when in use.

Please kindly note that the contents of this operations manual may be a little bit different from the Flail mower that you actually purchase. This is due to the continuous improvement and development of the EF series Flail mower, however, the specifications and structure of the Flail mower shall be subject to change without notice.

Thank you very much for purchasing our products. We cordially welcome all the suggestions, advises and comments on our products from the users and dealers so that we may make necessary improvements on our products continuously to meet the requirements of every specific market.

We strived to make this operations manual as correct as possible. However, we do not guarantee the accuracy or recentness of the information herein due to having translated the manual to English. We assume no liability for errors or omission.

Editor

November, 2019

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CHAPTER I SAFETY INFORMATION

PLEASE NOTE

Make sure all potential operators of this equipment review this manual and all safety messages contained within.

1.1 Safety First

Read this service manual before using the machine.

This safety alert symbol indicates important safety messages in this manual. When you see this symbol, carefully read this message that follows and be alert to the possibility of personal injury or death.

This machine is designed for pulverizing grass and short bramble, and shall be used in the indicated purpose. You take the responsibility if the machine is used in any other purposes.

For safety of personnel and good performance of the machine, you shall check the performance of the machine and the tractor before starting the machine.

All persons and animals shall keep away the machine when you start it.

The operator shall not put on too loose clothes during operating the machine.

Do not touch the rotor when the machine rotates.

Keep away the machine when it moves.

When the tractor and the machine are moving on the road, always keep the machine off.

Before repairing the machine, stop all movable parts and the tractor, keep the key with yourself.

Always keep the machine in a good state, if necessary, repair or change the defective parts.

Don't use the machine to transport personnel.

Don't modify the machine.

Pay attention to the sharp and pointed parts during repairing the machine.

All protective parts shall be guaranteed to be in good state before starting the machine.

Don't leave the tractor when moving the machine; and always take away the key of the tractor with you.

The machine shall be operated in the recommended speed.

Don't stay between the tractor and the machine.

Don't start the machine in a closed place (due to the smoke from the tractor).

1.2 Safety Signs

1.2.1 Care of Safety Signs

1. Keep safety signs clean and legible at all times.
2. Replace safety signs that are missing or have become illegible.

3. If a component with a safety sign(s) affixed is replaced with a new part, make sure new safety sign(s) are attached in the same locations as the replaced components.
4. Safety signs are available from your authorized Distributor or Dealer Parts Department or the factory.

1.2.2 Safety Signs locations

The types of safety signs and locations on the equipment are shown in the illustrations that follow. Good safety requires that you familiarize yourself with the various safety signs, the type of warning and the area, or particular function related to that area, that requires your **SAFETY AWARENESS**.

CHAPTER II SPECIFICATIONS

2.1 Brief Introduction

EF series Flail mower is designed for pulverizing grass and short bramble, and shall be used in the indicated purpose.

The Flail mower consists of a rotating shaft with many blades attached to it. The blades cut the grass while traveling over the working area. Rotational power to the shaft is provided by the tractor PTO through the gearbox in the center of the machine.

The Flail mower attaches to the 3 point hitch on the tractor.

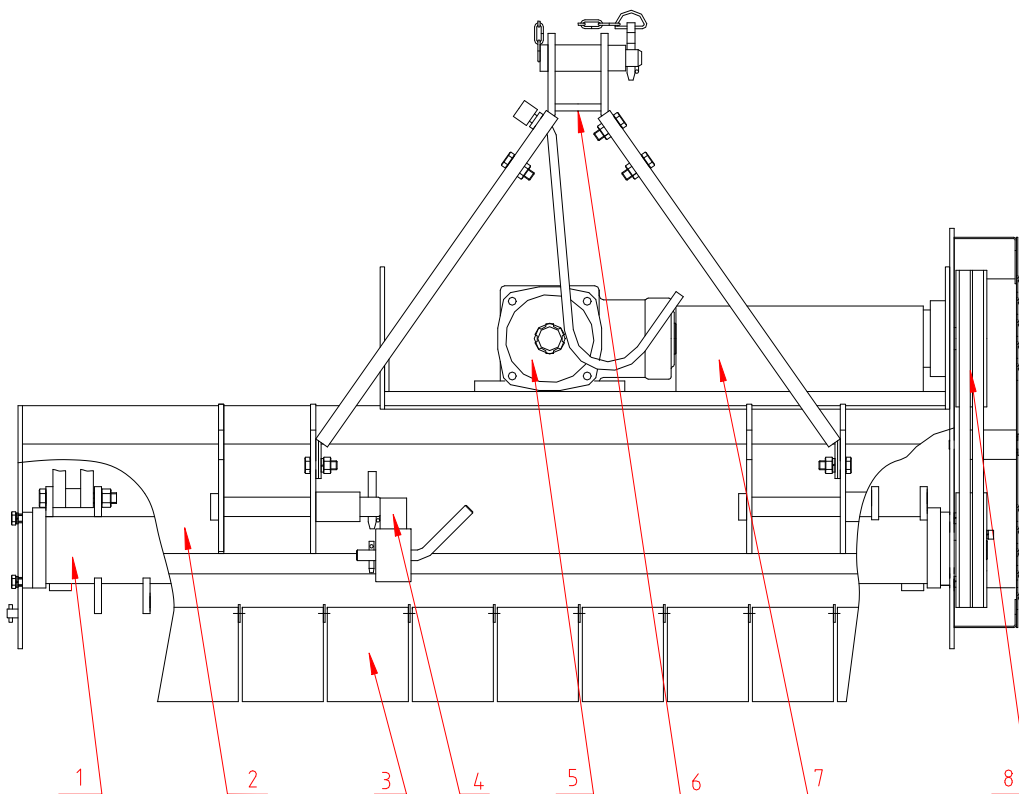


Fig. 2.1 Main components of the Flail mower

1. Blade axle
2. Blade axle cover
3. Combined fender
4. Supporting frame
5. Gearbox assembly
6. Suspension bracket
7. Transmission shaft
8. Belt wheel and belt

2.2 Specifications and Parameters for Flail Mower

MODEL	FL110	FL130	FL150	FL170
Dimensions(mm)	1300x710x720	1500x710x720	1700x710x720	1900x710x720
Structure Weight (kg)	165	180	200	220
Cutting width (cm)	106	126	146	166
Cutting height (mm)	0-60mm	0-60mm	0-60mm	0-60mm
Rotor diameter (mm)	76	76	76	76
Hammer Number	20	24	28	32
PTO Turing speed(rpm)	540	540	540	540
PTO shaft size(mm)	T4-800	T4-800	T4-800	T4-800
Power Required (hp)	20-30	25-35	30-40	30-40
Packing Size (cm)	1300x720x570	1500x720x570	1700x720x570	1900x720x570



CHAPTER III OPERATION

CAUTION: Be familiar with the machine before starting. Read this manual carefully to learn how to operate the machine safely and how to set it to provide maximum field efficiency.

3.1 Checking Before Operating

ATTENTION: Only use universal joint conforming to CE standard and protect them properly.

Before operating the machine, the following areas should be checked off:

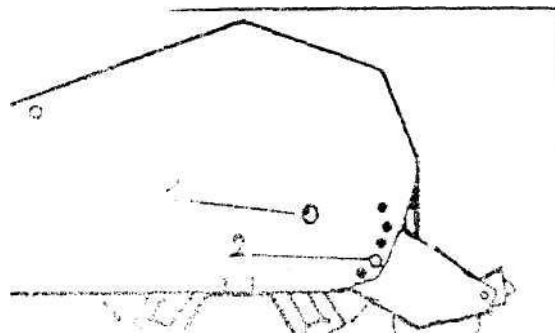
1. **Pay attention to the warning stickers on each greasing point. Before starting the machine, please make sure lubricate each grease point with grease or oil according to requirement on the warning stickers.**
2. Use only an agricultural tractor of horsepower within limits of the machine specified.
3. Check that the machine is properly attached to the tractor. Be sure retainers are used on the mounting pins.
4. Be sure extra weights are mounted on the front of the tractor.
5. Check the oil level in the gearbox. Add as required.
6. Check that the tractor PTO shaft turns freely and that the machine driving shaft can telescope easily.
7. Check the blades. Be sure they are not damaged or broken and swing freely in their mount. Repair or replace as required.
8. Check and tighten the blade bolts.
9. Check for entangled material in all rotating parts. Remove this material.
10. Install and secure all guards, doors and covers before starting.
11. Before installing the universal joint, the tractor and the machine motor shall be stopped and the key be taken away. The universal joints shall be installed in good state, with proper protective parts.
12. The chain on the protective parts of the universal joint shall be guaranteed in good condition, in case, automatic rotation occurs.
13. All other persons shall leave the ground before connecting the driving power from the tractor. Keep the output of the tractor at 540 RPM.
14. Before cleaning, repairing and lubricating the machine, stop the motor and take away the key with you.
15. When the universal joint is not connected with the tractor, they must be connected again through the frame to protect the joint from damaging.
16. Don't approach the machine when the machine runs.

3.2 Adjusting the Height

In order to conduct a precise work, the machine shall be operated according to the recommended cutting height.

For saving fuel and power, and reducing the wear of the machine, the cutting height must be regulated correctly.

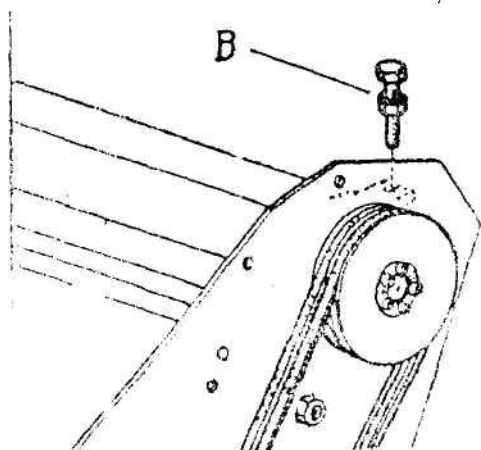
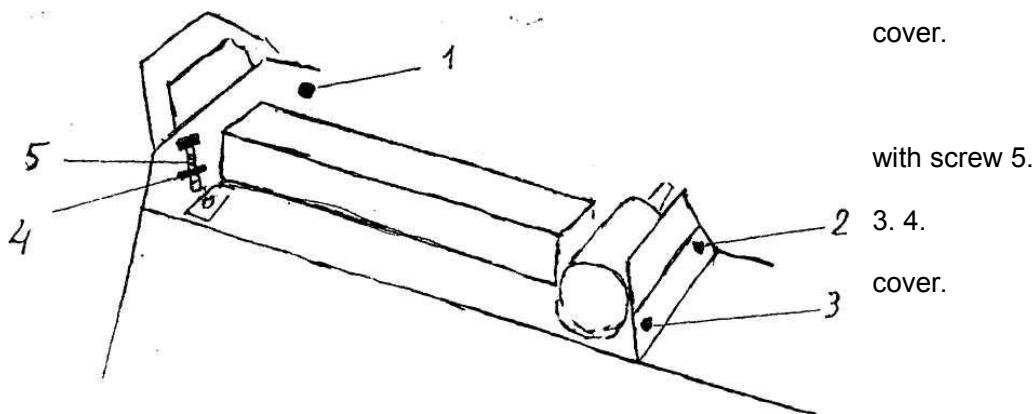
When regulating the working height, loosen the screw (1), remove the screws (2) on both sides; regulate the roller height (see following drawing); fix the parts on the set position. The lowest hole is the highest working height; put the screws (2) into the set hole; tighten screw (1) and screws (2).



3.3 Regulating the Tension of Driving Belt

ATTENTION: The machine shall always stand still for regulating the tension.

- Remove the driving belt
- Loosen screws 1. 2. 3. 4.
- Tighten the driving belt
- Tighten the screws 1. 2.
- Put back the driving belt



The recommended moving forward speed is 1.5 km/h, according to the grass height, thickness and working condition.

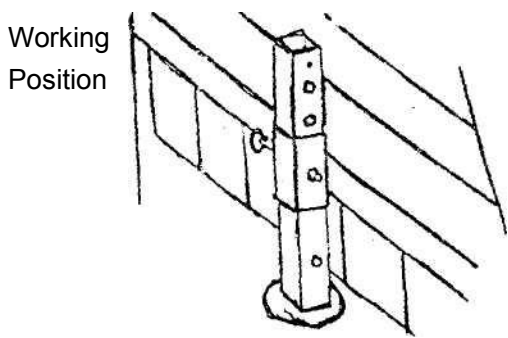
The driving belts are tightened by hand at the regulating point B up to the correct tension. Tighten all screws after regulating.

The driving belts shall be replaced when they are not in a good condition.

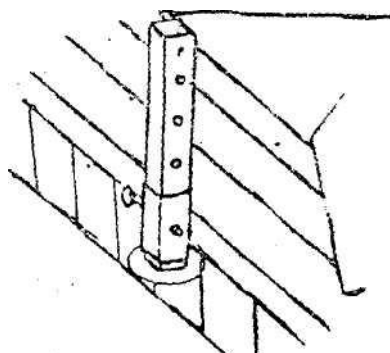
3.4 Starting up

Before starting the machine, control and adjust the following items:

- Tension of trapezoidal driving belt.
- Oil level of gear.
- Point of lubrication
- All bolts, nuts and screws.



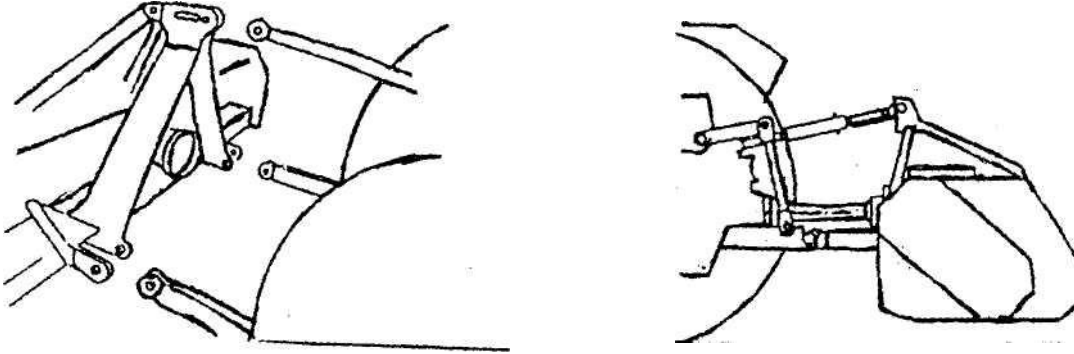
Moving Position



In order to keep the machine stable, install the supporting frame on the machine when the machine is stopped (see above drawing).

ATTENTION: When transferring the moving state of the machine to the working state, do not stand between the machine and the tractor.

The machine coupling is equipped with 3 pins so that the machine can be coupled with all tractors with universal coupling with 3 pins. Each telescopic pole on the machine can be adjusted properly according to the type of the tractor. Keep the Flail mower away the tractor with a certain distance. The universal joint shall be tense and the largest distance in the closed state shall be 5/10 cm.



Moving the lifting arm, and putting it between axes, insert the joint pins and fix them with pins. Fix the lifting arm with chain and tensioning device so as to prevent lateral movement of the machine. Connect the universal joint to the PTO shaft of the tractor on the side of the tractor. In any event, it cannot produce a collision in any position. While connecting 3 points, pay attention to that the PTO shaft of the tractor shall be parallel with the ground. It is very important to keep the machine driving axle and the PTO shaft of the tractor in parallel.

The machine shall be lifted from the ground before moving the machine.

CHAPTER IV SERVICE AND MAINTENANCE

4.1 Service

4.1.1 FLUIDS AND LUBRICANTS

1. Grease:

Use multi-purpose lithium based grease.

2. Gear Box Oil:

Use N46 drive &hydraulic dual-purpose oil or equivalent for all operating conditions.

Each Gearbox Capacity: 0.85 liter

3. Storing Lubricants:

Your machine can operate at top efficiency only if clean lubricants are used. Use clean containers to handle all lubricants. Store them in an area protected from dust, moisture and other contaminants.

4.1.2 GREASING

- Use a hand-held grease gun for all greasing.
- Wipe grease nipple with a clean cloth before greasing, to avoid injecting dirt and grit.
- Replace and repair broken nipple immediately.
- If nipples will not take grease, remove and clean thoroughly. Also clean lubricant passageway. Replace nipple if necessary.

4.2 Maintenance

ATTENTION: All maintenance, repairing, cleaning and lubricating shall be conducted when the tractor and motor are stopped and the key is taken away.

By following a careful service and maintenance program for your machine, you will enjoy many years of trouble-free operation.

The period recommended is based on normal operating conditions. Severe or unusual conditions may require more frequent maintenance.

4.2.1 8 HOURS OR DAILY MAINTENANCE

- Check and screw all nuts and bolts in connection parts.
- Check the blade and fixing parts every day and replace the damaged parts if they are found damaged. Don't install damaged, worn and unbalanced blade. New sleeve shall be used to replace the worn fixing parts on the blade.

NOTE:

The operator shall put on gloves and use suitable tools before changing blade.

- Check the oil in gearbox. Fill them up to line if it's necessary.
- Press butter in each oil nipple three to five times.
- Clean the implement; take away all grass and mud.

IMPORTANT: Check the oil level only when the unit is cold and the machine is on the level.

4.2.2 SEASON MAINTENANCE

- Check the machine as below beside the terms of daily maintenance.
- Check the oil in gearbox; replace it if it is bad.
- Check the bearings of blade spindles whether mud and water have been enter because oil seals are damaged, if it's so, disassemble and clean them and replace them if it is necessary. And then press butter into them.
- Check the distance between bearings and gears. Adjust them if it's necessary.

4.2.3 ANNUALLY MAINTENANCE

- Cleaning mud and grass on the machine thoroughly.
- Check all clearance between bearings and gears if you have replaced them. Please run it without load for 3-5 minutes.
- Check and clean blade axles. Replace oil seals and press butter into them.
- Check all blades, replace then if they are wear-out or damaged.
- Repair the side skirts; let them to original technical condition. Replace damaged or broken protective devices.
- Remove the driving shaft from the machine. Pull the machine driving shaft apart. Check and replace any components that are damaged or worn. Install the driveline on the machine. The machine driving shaft should telescope easily and the guard turn freely on the shaft
- Let the oil in gearbox drain out thoroughly. Check and clean it. Fill new gear oil up to the dedicated oil level.

The oil shall be drained off after 50 hours of using time. Then the oil shall be drained off every 250 hours. One time every year at least.

The draining procedure is as follows: remove the draining bolt under the gear box, so that the oil drains off. After the oil is drained off, put back the cover and fill the gear oil up to the dedicated oil level.

ATTENTION: Don't forget to disconnect the generator cable and batteries when welding on the machine, while the machine is coupled with the tractor.

4.3 Storage

The machine inside and outside shall be cleaned carefully so as to avoid corrosion.

Don't spray water on the rolling bearing if you clean the machine with high pressure sprayer.

Check and clean the universal joint, driving belt press roller, or replace them if they are not in good state.

Spread oil on all parts required.

Recoat the parts rubbed and damaged for anti corrosion.

Store the machine in a dry, level area. Support the frame with planks if require.

4.4 Operation After Storage

Before the machine is started up, check the following items regularly:

Check oil level and add it if not enough.

Check and tighten all screws and nuts;

Check the regulated state of the machine.

Check the blade state.

Check the air hole on the gearbox. If it is blocked, clean or open the hole with compressed air.

Don't spread oil or grease on the driving belts. If there is oil or grease on the belts, wipe the belts, in case the belt sliding and wearing occur.

ATTENTION: Check the machine every 10 hours. Repair the damaged parts or replace the blade according to the manufacturer's recommendation, to keep the machine balancing.

Check all tightening parts and replace them if necessary.

Don't remove the protective parts on some points and protect the machine.

ATTENTION: In the case of vibration, stop the machine and check the blade. If the blade breaks or is damaged, replace it with same type of the blade. If the machine vibrates still, send the machine to the authorized repairer.

CHAPTER V ILLUSTRATED PARTS CATALOGUE

The manual contains a parts list for your machine. It is divided into major sections, which correspond to the groups shown in the Table of Contents and the accompanying illustration.

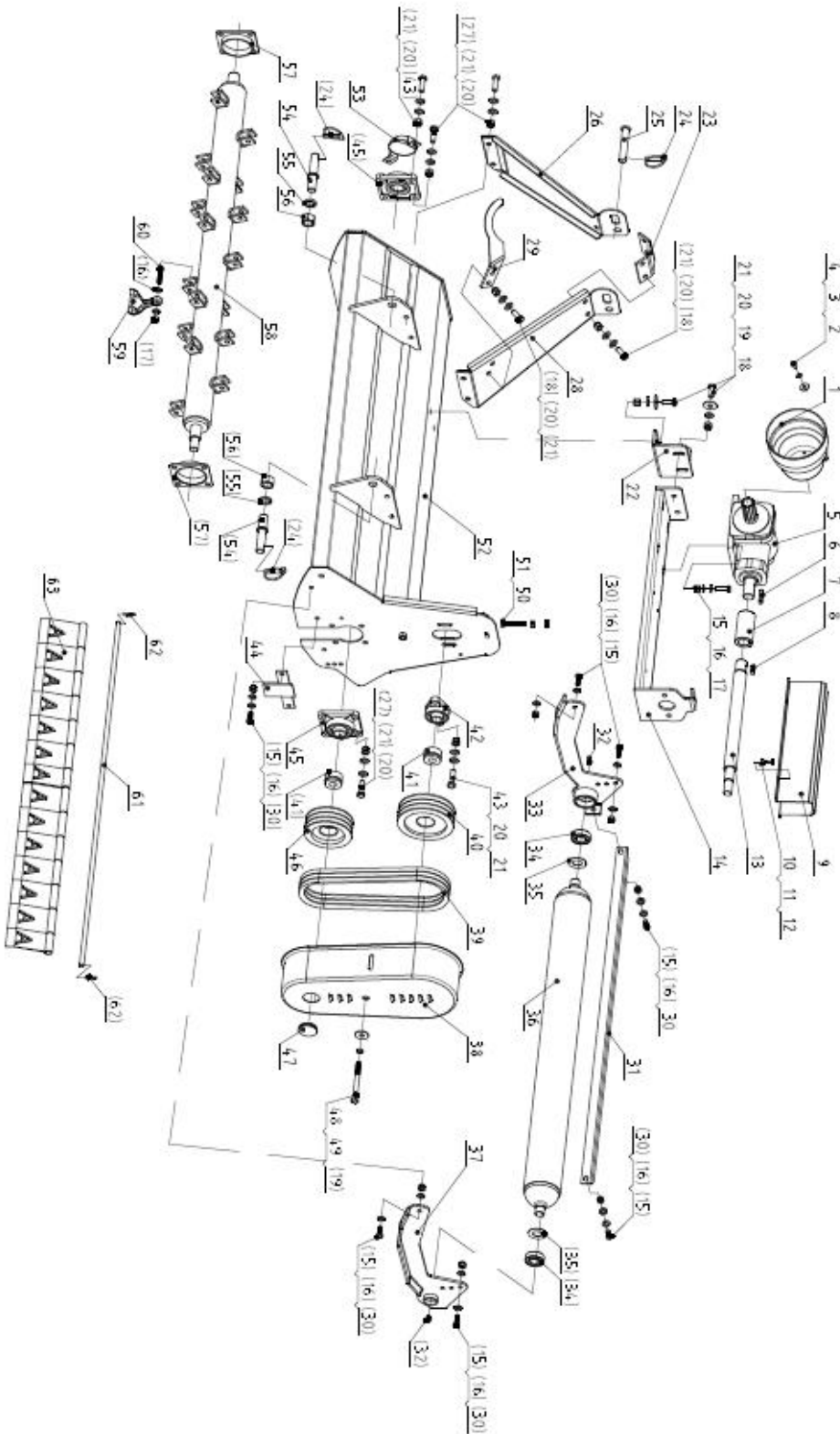
The first page of each major section lists the contents of that section, each of which consists of exploded views and related tabular listings.

When ordering parts

Always give your dealer the Model of your machine to assist him in ordering and obtaining the correct parts. Use the exploded view and tabular listing of the area of interest to exactly identify the required part.

5.1 Flail Mower Assembly

FL Flail Mower Assembly



Flail Mower Assembly

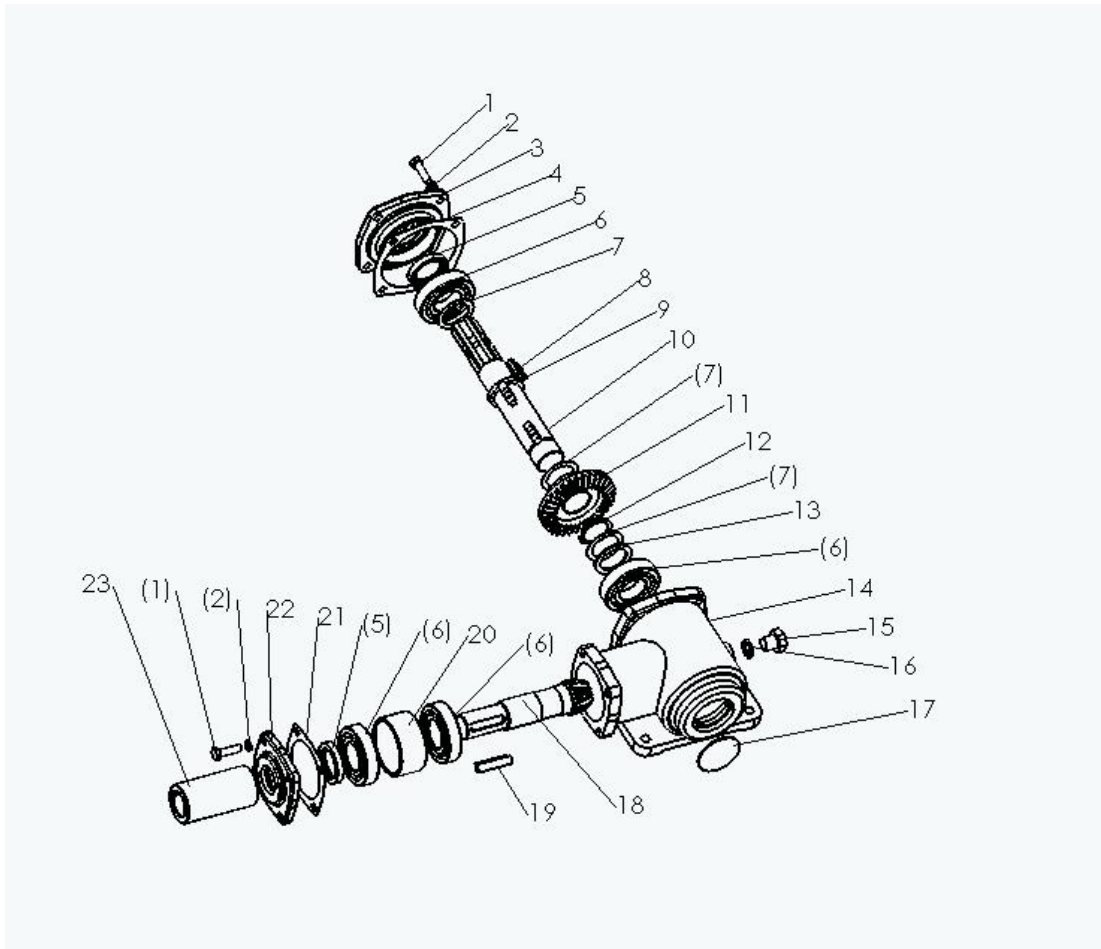
FL Flail Mower Assembly

No.	Part No.	Name & Specification	Quantity	Remarks	
1	EFGC175.123	PTO shielding	PTO保护罩	1	
2	GB5783-M8X16	Bolt M8X16	螺栓M8X16	2	
3	GB 93-8	Spring lock washer 8	弹垫 8	2	
4	GB/T97.1-8	Plain washer 8	平垫 8	2	
5	XH30.290Z.01W	Gearbox assembly	齿轮箱	1	
6	GB/T 1096-2003	flat key A10*45	普通平键 A10x45	1	
7	EF175.110	Coupling	轴套(自带)	1	
8	GB/T 1096-2003	flat key A10*30	普通平键 A10x30	1	
9	FL110.102	Shaft guard	轴防护板	1	
10	GB29.2-M6*15	Six angle cross bolt M6*15	六角十字螺栓M6	4	
11	GB 93-8	Spring lock washer 6	弹垫6	4	
12	GB/T97.1-8	Plain washer 6	平垫6	4	
13	FL110.103	Shaft	传动轴	1	
14	FL110.020	Gear box bracket weld joint	齿轮箱支架焊合件	1	
15	GB5783-M10X35	Bolt M10X35	螺栓M10X35	4	
16	GB/T97.1-10	Plain washer 10	平垫10	24+2N	
17	GB/T889.1-M10	Lock nut M10	防松螺母 M10	32/36/36/40/44	FL110/FL120/FL130/FL150/FL170
18	GB5783-M12X30	Bolt M12X30	螺栓M12X30	10	
19	GB/T 96-12	Large (big) plain washer 12	大平垫12	5	
20	GB/T97.1-12	Plain washer 12	平垫12	44	
21	GB/T889.1-M12	Lock nut M12	防松螺母 M12	24	
22	FL110.019	Support frame welding	齿轮箱支撑架焊合件	1	
23	FL110.101	Hang the board around	左右悬挂连接板	1	
24	DIN11023-φ12	Lock pin φ12	锁销 12	3	
25	EFGC175.116	Upper pin	上悬挂销	1	
26	FL110.015	Hanger Welded parts (left)	左悬挂板焊合件	1	
27	GB5783-M12X40	Bolt M12X40	螺栓 M12X40	10	
28	FL110.014	Hanger Welded parts (Right)	右悬挂板焊合件	1	
29	EFGC175.124	PTO hanging board	PTO挂板	1	备用
30	GB5783-M10X25	Bolt M10X25	螺栓 M10X25	8	
31	FL110.104	Scraping clay weldment	刮泥板	1	
32	JB/T7940.1-M10X1	Oil cup M10X1	油杯 M10X1	2	
33	FL110.016	adjust plate welded parts (L)	左垫板焊合件	1	
34	GB276-1994	Bearing 6205-2Z	轴承6205-2Z	2	
35	EFK190.113	Sealing Cover for Roller	滚筒油封盖	2	备用
36	FL110.012	Roller weldment	滚筒焊合件	1	

FL Flail Mower Assembly

No.	Part No.	Name & Specification	Quantity	Remarks	
37	FL110.017	adjust plate welded parts (R)	右垫板焊合件	1	
38	EFGC175.014	Pulley cover	皮带轮罩焊合件	1	备用
39	XPA 13x930	Belt (13*930)	皮带 13X930	3	
40	EF175.101	Driving pulley	大皮带轮	1	备用
41	JB/T7934	Power lock 22*47	胀套 22x47	2	
42	FL110.105	Bearing with diamond base UCFL205	带菱形座轴承 UCFL205	1	
43	GB5783-M12X45	Bolt M12X45	螺栓 M12X45	4	
44	FL110.018	Side baffle weld joint	侧挡板焊合件	1	
45	GB/T 7810-UCFU206	Bearing UCFU206	UCFU206	2	
46	EF175.102	Driven pulley	小皮带轮	1	备用
47	FM120.111	Rubber cover	橡胶罩	1	
48	GB5782-M12*120	Bolt M12*120	螺栓 M12X120	1	
49	GB 93-12	Spring lock washer 12	弹垫 12	1	
50	GB5783-M10X60	Bolt M10X60	螺栓 M10X60	1	
51	GB/T 6170-M10	Nut M10	螺母 M10	2	
52	FL110.011	Hood weldment	机罩焊合件	1	
53	EFL100.019	Shaft head cover weldment	轴头罩焊合件	1	备用
54	EFGCH175.105	Lower pin	下悬挂销	2	备用
55	GB 93-22	Spring lock washer 22	弹垫 22	2	
56	GB/T 6170-M22	Nut M22	螺母 M22	2	
57	EFL100.012	Knife shaft sinking shields weldment	刀轴防尘罩焊合件	2	备用
58	EFL110.013	Knife shaft weldment	刀轴焊合件	1	
59	EFM130.111	Hoe blade	锄头刀片	N	备用
60	GB5783-M10X45	Bolt M10X45	螺栓 M10X45	20/24/24/28/32	FL110/FL120/FL130/FL150/FL170
61	FL110.106	Axle for baffle	挡板轴	1	
62	GB/T91	Cotter pin 4*25	开口销 4x25	2	
63	EFGC175.109	Baffle	挡板 (配用)	2/12/8/6/12	FL110/FL120/FL130/FL150/FL170
	EFGC175.108	Baffle	挡板 (通用)	12/8/10/14/12	FL110/FL120/FL130/FL150/FL170

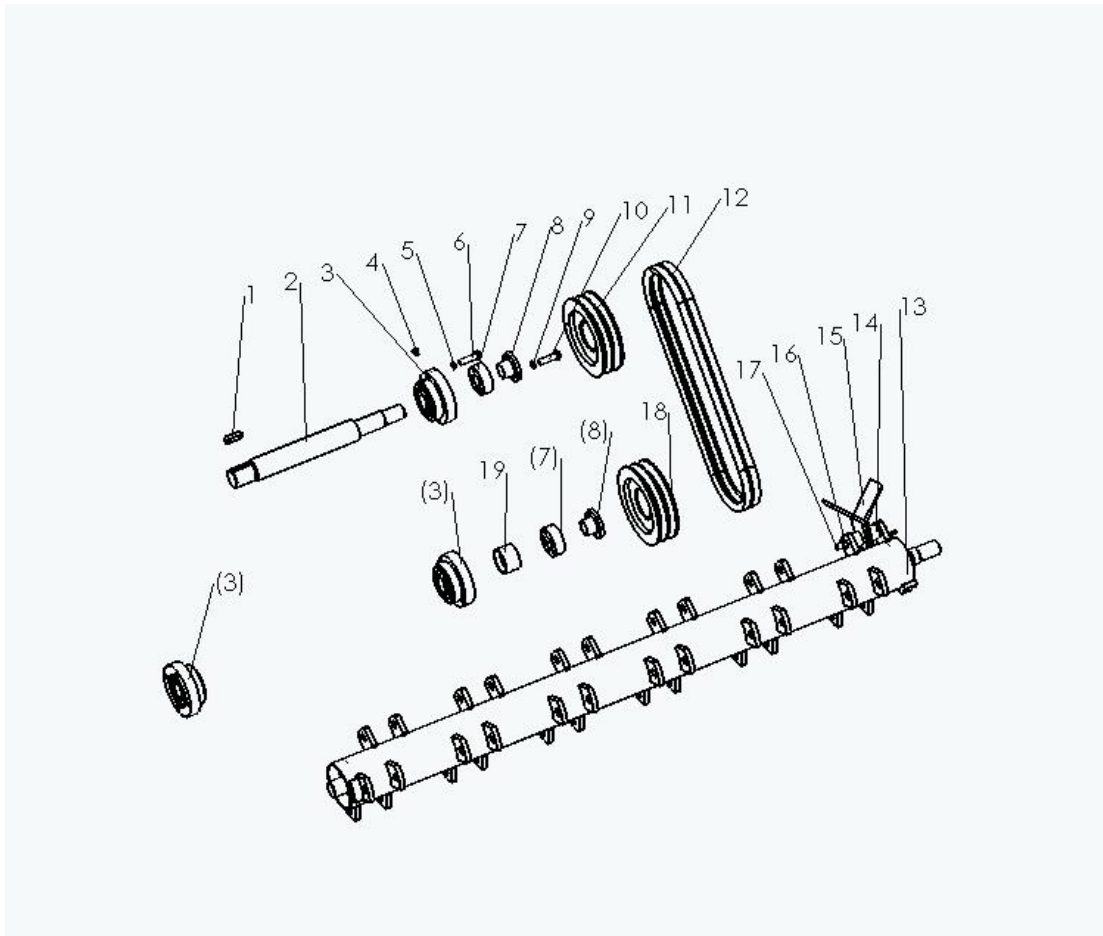
5.2 Gearbox assembly



Gearbox Assembly

Ser.No	Part No	Name and Specification	Quantity	Remarks
1	GB 5783-86	Hex. head bolt M8×30	8	
2	GB 93-87	Spring lock washer 8	8	
3	SL100.01.107	Bearing cover	1	
4	SL100.01.108	Paper gasket	1	
5	GB 13871-94	Oil seal 35×50×8	2	
6	GB/T 276-94	Bearing 6207	4	
7	SL100.01.109	Adjusting shim	4	
8	SL100.01.110	Key	1	
9	SL100.01.111	Pressure spring	2	
10	SL100.01.106	Input shaft	1	
11	SL100.01.112	Bevel gear	1	
12	GB 894.1 - 86	Blocked patch 35	1	
13	SL100.01.114	Retainer	1	
14	SL100.01.113	Case	1	
15	12.37.149	Combined seal washer	1	
16	200.38.024	Oil drain plug	1	
17		Blocked patch	1	
18	SL100.01.105	Output shaft	1	
19	GB1096-79	Key 10×45	1	
20	SL100.01.104	Spacer sleeve	1	
21	SL100.01.103	Paper gasket	1	
22	SL100.01.102	Bearing cover	1	
23	SL100.01.101	Connected sleeve	1	

5.3 Blade Axle and Transmission Parts



Blade Axle and Transmission Parts

Ser.No	Part No	Name and Specification	Quantity	Remarks
1	GB1096-79	Key 10×30	1	
2	SL100.00.113	Transmission shaft	1	
3	UC205-Z	Bearing with flange 90207	3	
4		Grease nipple M8	1	
5	GB 93-87	Spring lock washer 8	14	
6	GB 5783-86	Hex. head bolt M8×25	14	
7	SL100.00.109	Outer swellable sleeve	2	
8	SL100.00.110	Inner swellable sleeve	2	
9	GB 93-87	Spring lock washer 6	6	
10	GB 70-85	Hex. head bolt M6×25	6	
11	SL100.00.114	Belt wheel (large)	1	
12	GB	Belt	2	
13	SL100.00.012	Blade axle	1	
14	SL100.00.103	Spacer	36	
15	SL100.00.102	Blade	36	
16	GB 6170-86	Hex. nut M12	18	
17	GB 5780-86	Hex. head bolt M12×80	18	
18	SL100.00.111	Belt wheel (little)	1	
19	SL100.00.108	Sleeve	1	
20				
21				
22				
23				
24				

The information contained in this operations manual is a general introduction only. The information contained herein may be modified at any time, for any reason. Modification may affect the details or specifications of the product described in this manual. Therefore, users – dealers must include the manufacturing date and serial number when placing an order for spare parts and components. Thanks.

November 2019