

FLAIL MOWER

OPERATIONS MANUAL



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 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.

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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

The 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.

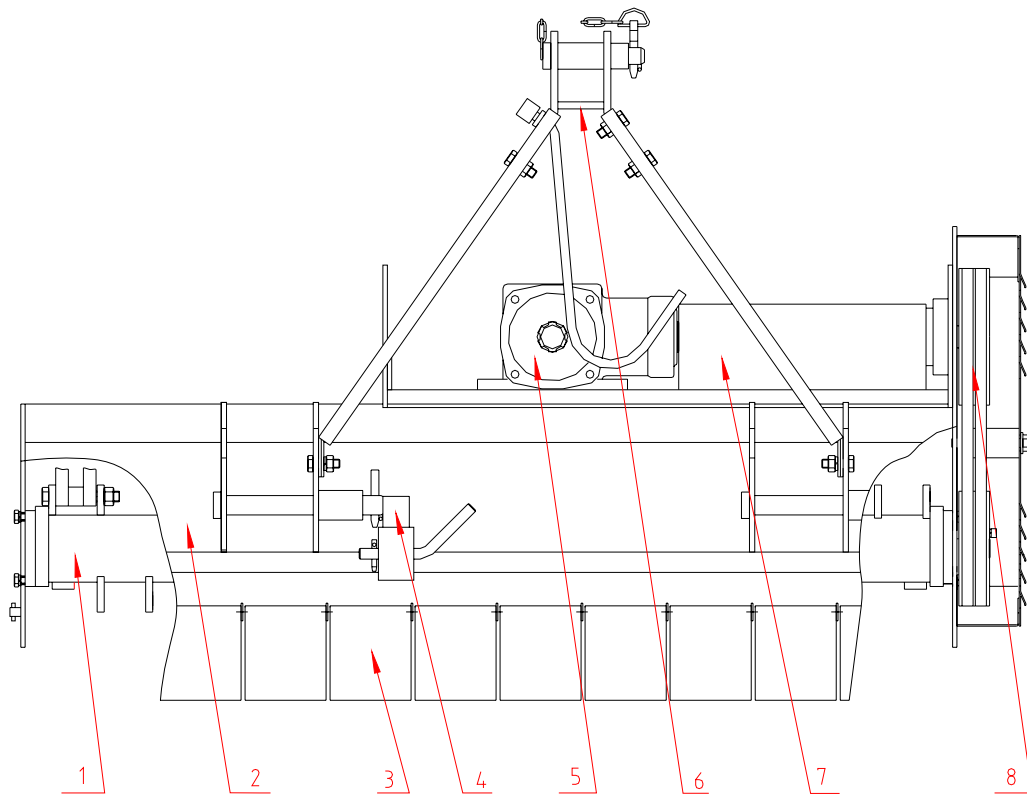


Fig. 2.1 Main components of the Flail mower

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	EF95	EF105	EF115
Dimensions (L×W×H) (mm)	1050×687×722	1150×687×722	1250×687×722
Structure weight (kg)	115	130	145
Cutting width (mm)	929	1029	1129
Working efficiency (m ² /h)	2500-7500	3000-8000	3300-9000
Input rotating speed (RPM)	540		
PTO spline size	6-tooth Φ 35mm Rectangular spline		
Power required (HP)	16-20	20-30	20-30

Model	EF125	EF135	EF145
Dimensions (L×W×H) (mm)	1350×687×722	1450×687×722	1550×687×722
Structure weight (kg)	160	175	190
Cutting width (mm)	1229	1329	1429
Working efficiency (m ² /h)	3700-9800	4000-10600	4300-11400
Input rotating speed (RPM)	540		
PTO spline size	6-tooth Φ 35 mm Rectangular spline		
Power required (HP)	20-35	25-35	25-35

Model	EF155	EF165	EF175
Dimensions (L×W×H) (mm)	1650×687×722	1750×687×722	1850×687×722
Structure weight (kg)	210	235	255
Cutting width (mm)	1529	1629	1729
Working efficiency (m ² /h)	4600-12240	4900-13000	5200-13800
Input rotating speed (RPM)	540		
PTO spline size	6-tooth Φ 35 mm Rectangular spline		
Power required (HP)	30-40	30-40	30-40

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. Before starting up the machine, check and Lubricate all grease points, all lubricated parts inside the machine.
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.

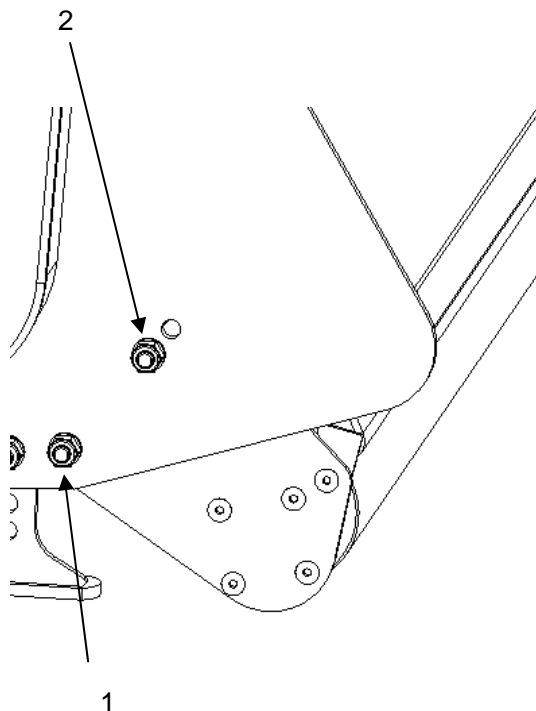
14. Before cleaning, repairing and lubricating the machine, stop the motor and take away the key with you.
15. When the universal joint is not connected with the tractor, they must be connected again through the frame to protect the joint from damaging.
16. Don't approach the machine when the machine 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).

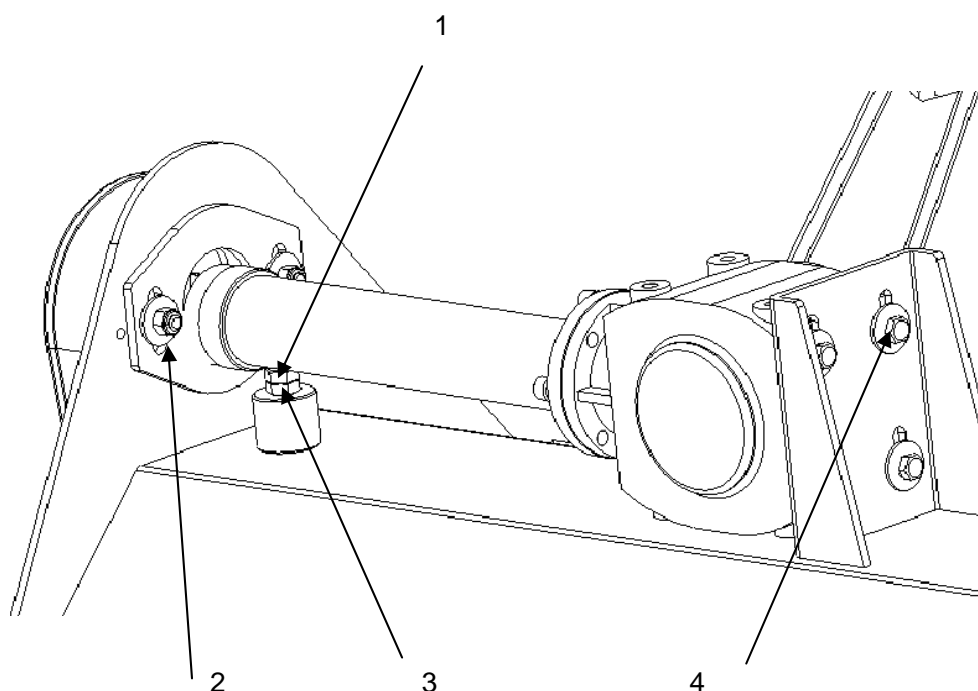


3.3 Regulating the Tension of Driving Belt



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

Remove the driving belt cover. Loosen screws 1 2 3 4. and adjust screw 1. Tighten the screws 1 2 3 4 . Put back the driving belt cover.

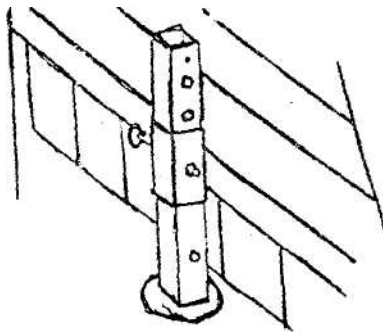


3.4 Starting up

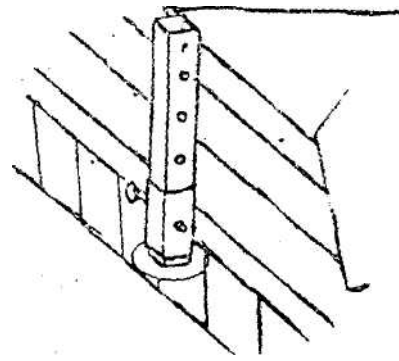
Before starting the machine, control and adjust the following items:

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

Working
Position



Moving
Position

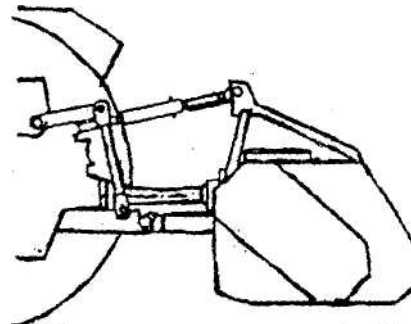
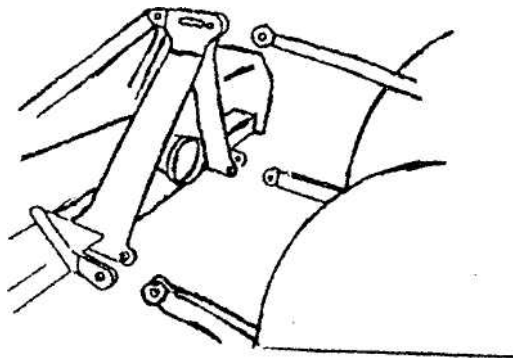


In order to keep the machine stable, install the supporting frame on the machine when the machine is stopped (see above drawing).



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

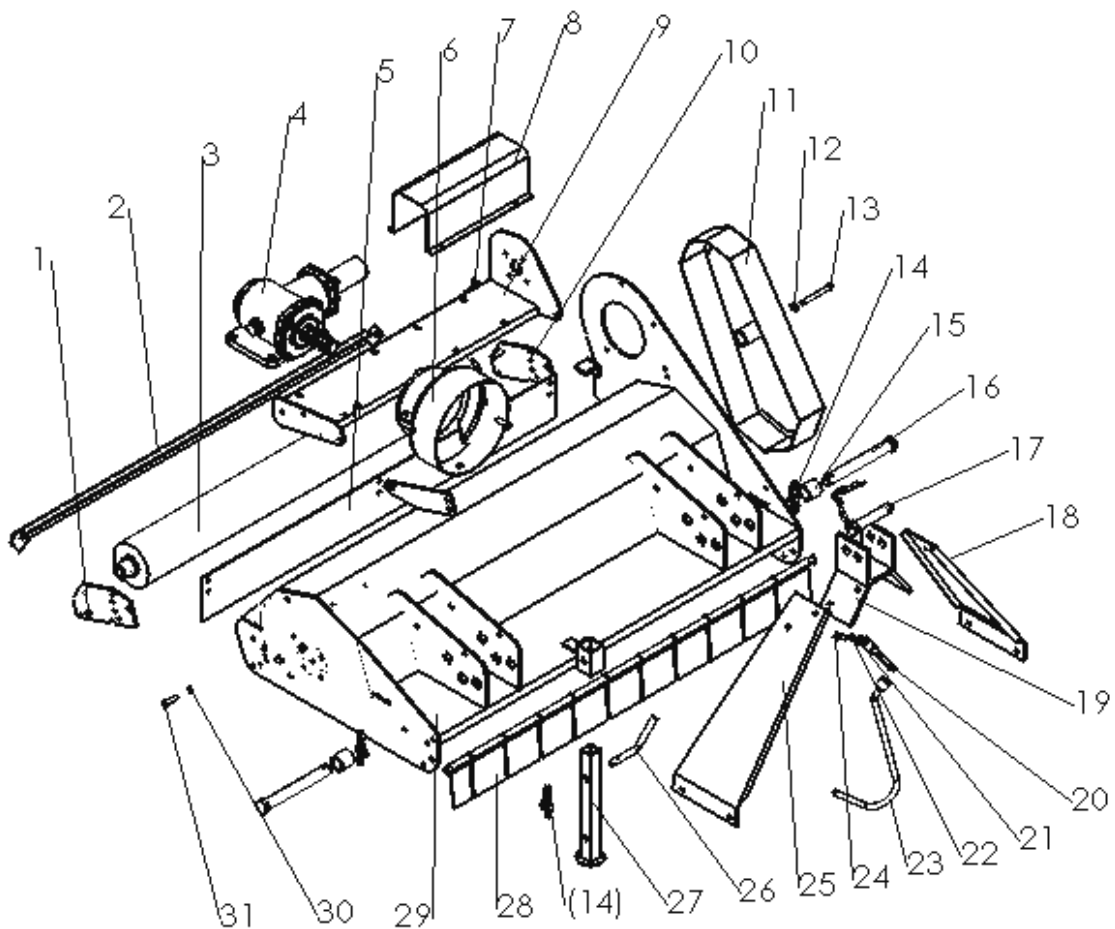
The manual contains a parts list for your machine. It is divided into major sections, which correspond to the groups shown in the Table of Contents and the accompanying illustration.

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.

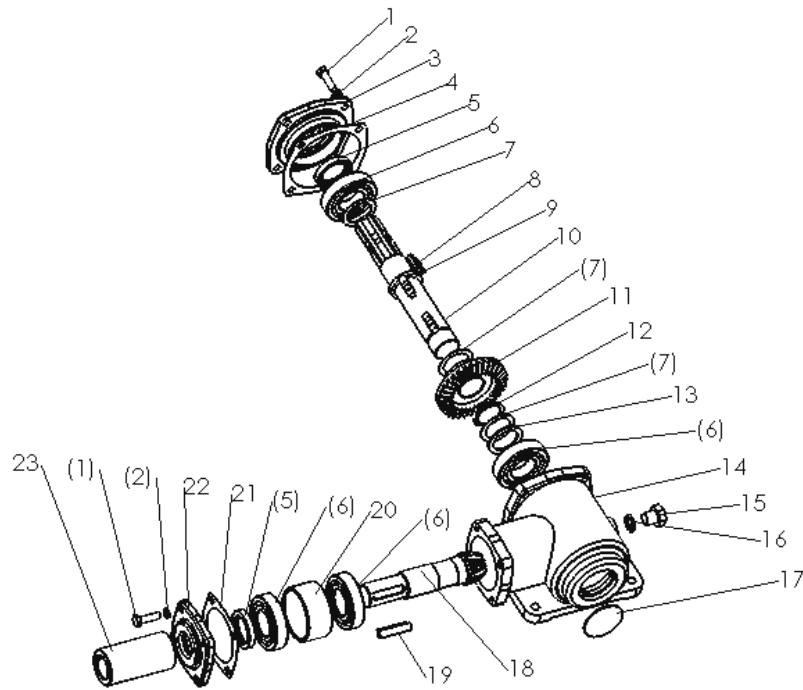
5.1 Flail Mower Assembly (EF95-EF155)



Flail Mower Assembly

Ser.No	Part No	Name and Specification	Quantity	Remarks
1	SL100.00.023	Hanging Plate (left)	1	
2	SL100.00.024	Mud shield	1	
3	SL100.00.025	roller	1	
	SL100.00.165	Copper sheath	2	
4	SL100.01.001	Gearbox	1	
5	SL100.00.101	Rear fender	1	
6	SL100.00.115	Guard shade	1	
7	GB 5783-86	Hex.head bolt M10×60	1	
8	SL100.00.112	Guard cover	1	
9	SL100.00.015	Gearbox seat	1	
10	SL100.00.022	Hanging plate(right)	1	
11	SL100.00.021	Belt cover	1	
12	GB 97.1-85	Plain washer 12	1	
13	GB 5780-86	Hex.head bolt M10×80	1	
14	200.56.011	Lock pin	3	
15	SL100.00.106	spacer	2	
16	SL100.00.104	pin	2	
17	SL100.00.019	Pin weldment	1	
18	SL100.00.020	Suspension plate(right)	1	
19	SL100.00.018	Bracket	1	
20	SL100.00.107	Fixing plate	1	
21	GB 6170-86	Hex. nut M10	10	
22	GB 93-87	Spring lock washer 10	8	
23	SL100.00.017	Hook	1	
24	GB 5783-86	Hex. head bolt M10×30	8	
25	SL100.00.016	Suspension plate(left)	1	
26	SL100.00.105	Bent pin	1	
27	SL100.00.014	Supporting frame	1	
28	SL100.00.011	Combined fender	1	
29	SL100.00.013	Blade axle cover	1	
30	GB 5783-86	Hex. head bolt M8×20	3	
31	GB 6170-86	Hex. nut M8	3	

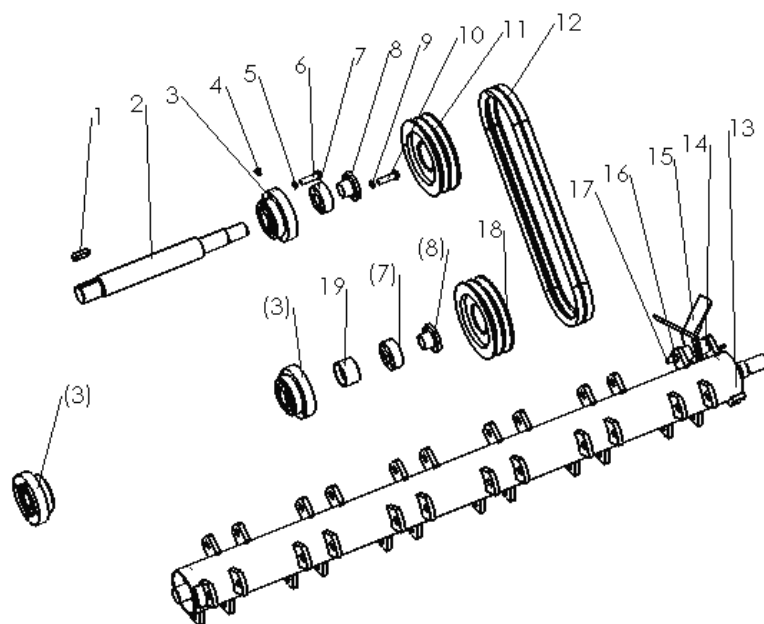
5.2 Gearbox assembly (EF95-EF155)



Gearbox Assembly

Ser.No	Part No	Name and Specification	Quantity	Remarks
1	GB 5783-86	Hex. head bolt M8x30	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 35x50x8	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 10x45	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	

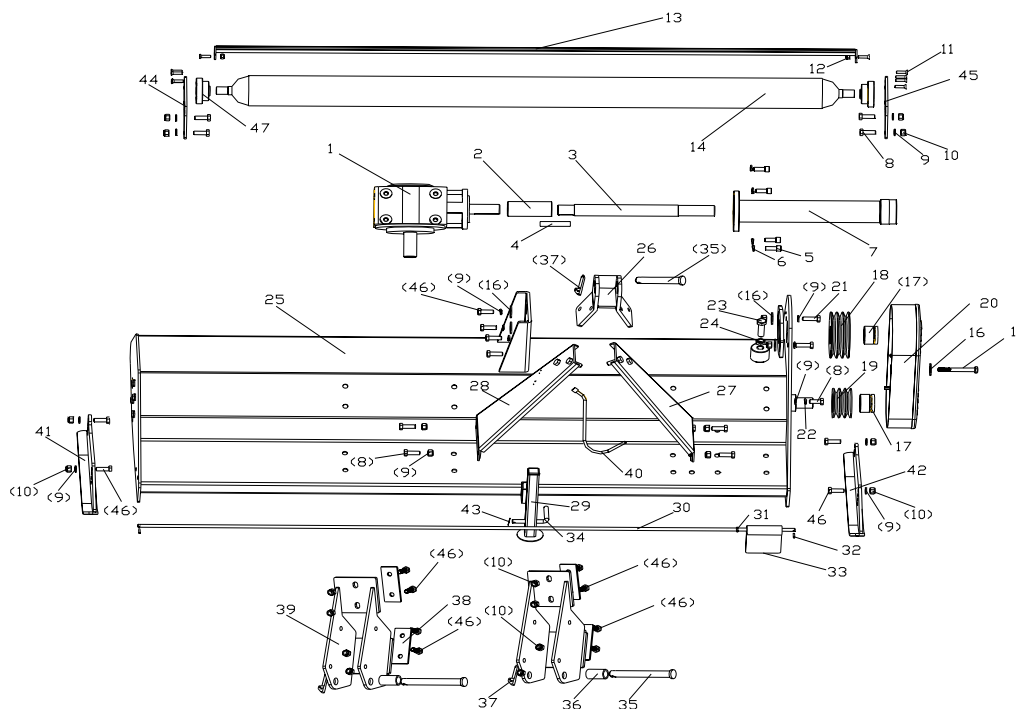
5.3 Blade Axle and Transmission Parts (EF95-EF155)



Blade Axle and Transmission Parts

Ser.No	Part No	Name and Specification	Quantity	Remarks
1	GB1096-79	Key 10x30	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 M8x25	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 M6x25	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 M12x80	18	
18	SL100.00.111	Belt wheel (little)	1	
19	SL100.00.108	Sleeve	1	

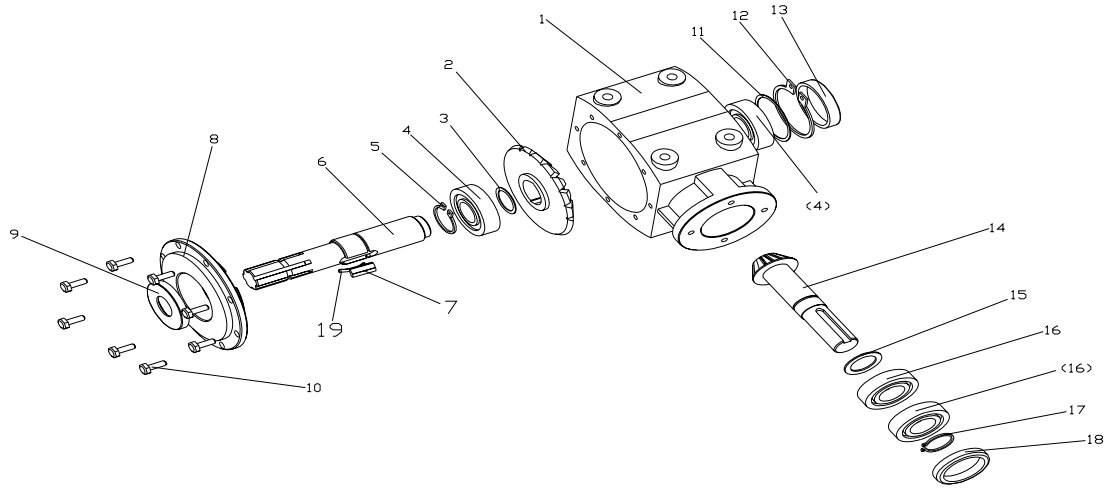
5.4 Flail Mower Assembly(EF165-175)



Ser. No.	Part No	Name and Specification	Quantity	Remarks
1	EF175-0006	Gearbox	1	
2	EF175-1023	Shaft Sleeve	1	
3	EF175-1022	Shaft	1	
4	DIN 6885	Key 10*65	1	
5	GB13912	Hex. head bolt M8*35	4	
6	GB93-87	Spring lock washer 8	4	
7	EF175-0004	Shaft tube	1	
8	GB5783-86	Hex. head bolt M12*30	12	
9	GB848	Washer 12	30	
10	GB982	Nylon lock nuts M12	34	
11	GBIT70.3-2000	Screw M8*30	10	
12	GB848	Nylon lock nuts M18	2	
13	EF175-0007	Mud shield	1	
14	EF175-0002	Roller	1	
15	GB5783-86	Hex. head bolt M12*100	1	
16	GB848	Plain washer 12	6	
17	REACH-04 D35	Swell Sleeve	2	
18	EF175-1024	Belt wheel (large)	1	

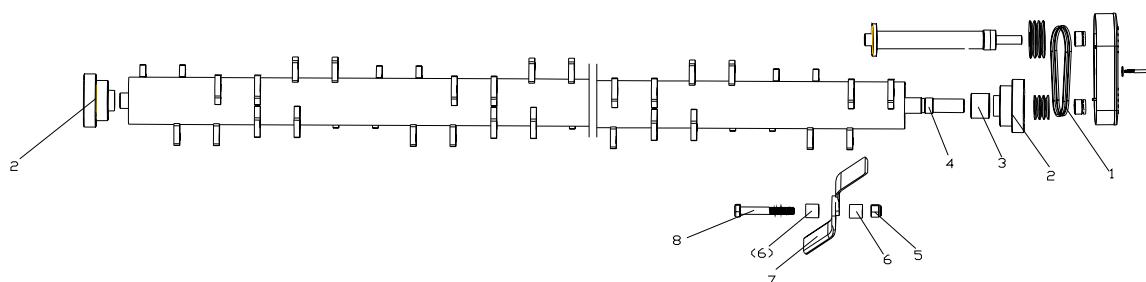
Ser. No.	Part No	Name and Specification	Quantity	Remarks
19	EF175-1025	Belt wheel (little)	1	
20	EF175-0005	Belt cover	1	
21	GB5783-86	Hex. head bolt M12*40	2	
22	GB93-87	Spring locked washer 12	8	
23	GB934	Hex. head bolt M16(1.5)*65	1	
24	GB934	Hex. nut M16*1.5	1	
25	EF175-0001	Blade axle cover	1	
26	EF175-0016	Bracket	1	
27	EF175-0013	Suspension plate (left)	1	
28	EF175-0014	Suspension plate (right)	1	
29	EF175-0015	Supporting fender	1	
30	EF175-1043	Axle	1	
31	GB97.1	Plain washer 12	18	
32	GB879-6	Pin	2	
33	EF175-1041	Combined fender	19	
34	EF175-1050	Bent pin	1	
35	EF175-1046	Pin	2	
36	EF175-1047	Sleeve	2	
37	EF175-1048	"R" Pin	3	
38	EF175-1033	Plate	4	
39	EF175-0008	Bracket	1	
40	EF175-1065	hook	1	
41	EF175-0009	Welding plate (left)	1	
42	EF175-0010	Welding plate (right)	1	
43	GB91-86	Split pin 3*35	2	
44	EF175-1027	Hanging plate(left)	1	
45	EF175-1028	Hanging plate(right)	1	
46	GB5783-86	Hex. head bolt M12*35	24	
47	UC205	Bearing UC205	2	

5.5 Gearbox assembly(EF165-175)



Ser. No.	Part No	Name and Specification	Quantity	Remarks
1	EF175-2001	Gear box	1	
2	EF175-2002	Bevel gear	1	
3	EF175-2003	Adjusting shim	2	
4	UC6007	Bearing 6007	2	
5	GB893-86	Blocked patch 42	1	
6	EF175-2004	Input shaft	1	
7	EF175-2005	Key	2	
8	EF175-2006	Cover	1	
9		Oil seal 35*80*8	1	
10	GB5783-86	Hex. head bolt M12*35	8	
11	EF175-2007	Adjusting shim	2	
12	EF175-2004	Input shaft	1	
13	EF175-2005	Key	2	
14	EF175-2006	Cover	1	
15		Oil seal 35*80*8	1	
16	GB5783-86	Hex. head bolt M12*35	8	
17	EF175-2007	Adjusting shim	2	
18		Oil seal 72*35	1	
19	EF175-2011	Spring	2	

5.6 Blade Axle and Transmission Parts(EF165-175)



Ser. No.	Part No	Name and Specification	Quantity	Remarks
1	13*965	Belt 13*965	3	
2	UC207	Bearing UC207	2	
3	EF175-0003	Sleeve	1	
4	EF175-0004	Blade axle	1	
5	GB982	Nylon lock nut M12	28	
6	EF175-1020	Sleeve	28	
7	EF175-1040	Blade	28	
8	GB5783-86	Hex. head bolt M12*75	28	

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.



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