

# sisis®

## AUTO-ROTORAKE Mk.5 INSTRUCTION MANUAL



# CERTIFICATE OF CONFORMITY

**Auto-Rotorake CN Code: 8432 29 10**

**Manufacturer:-** Howardson Ltd, Howardson Works, Kirk Langley, Derby, DE6 4NJ. UK

**Owner of Technical Document:-** Mr I.D. Howard, Howardson Ltd, Howardson Works Kirk Langley, Derby, DE6 4NJ, UK

I the under signed Declare that these machines:-

MODEL	OPERATING WIDTH	POWER (HONDA)	MEASURED SOUND POWER LEVEL	GUARANTEED SOUND POWER LEVEL	SERIAL NUMBER
ARR/5	20" (510MM)	GX160	79dB Lwa	98dB Lwa	See Product ID range

**Tested at:-** Howardson Works test site September 2011

Complies with the applicable requirements of:-

- Machine Directive 2006/42/EC
- Noise Directive 2000/14/EC (Annex VI Procedure 1)

**Managing Director**



**Ian Howard**

## SERIAL NUMBERS



**NOTE:-**

*MAKE A NOTE OF THE SERIAL NUMBERS OF YOUR MACHINE & ENGINE AND ALWAYS QUOTE THEM IN ANY COMMUNICATION WITH PERSONNEL AT DENNIS.*

**MACHINE SERIAL NUMBER**

**ENGINE SERIAL NUMBER**

## INTRODUCTION

The reliability and quality of performance of the **SISIS Auto-rotorake** depends upon some simple care maintenance carried out regularly. This manual has been prepared to allow the user to carry out all such work.

It is advisable to read the instructions carefully. Proper care and attention will enable the machine to give a continuous, satisfactory, and reliable service. Failure to carry out regular lubrication and maintenance as outlined in this manual may render any guarantee or warranty invalid.

In the case of any difficulty, or if further information or advice is required, our Service Department is always at your call. In the interests of speed and accuracy of information please quote the serial numbers of the machine and engine when making enquiries.

For the machine, this is to be found on a plate attached to the side frame. The engine number is stamped on either the crank case or the gear casing facing towards the front of the machine. We suggest you write the numbers on the front page of this book.

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## TECHNICAL DATA

MODEL	AUTO-ROTORAKE MK.5
WIDTH (mm)	780
LENGTH WITH GRASS BOX (mm)	1850
LENGTH WITHOUT GRASS BOX (mm)	1450
HEIGHT (mm)	950
WEIGHT (Kg)	102
CUTTING WIDTH (mm)	20" (510mm)
ENGINE	GX160
HAND ARM VIBRATION (m/sec)	4.85
MEASURED SOUND POWER LEVEL (dB(A))	79
GUARANTEED SOUND POWER LEVEL (dB(A))	98

## IMPORTANT SAFETY INTRODUCTIONS



### **WARNING:-**

*WHEN WORKING WITHOUT THE GRASS BOX, LOWER THE DEFLECTOR TO PROTECT THE OPERATOR AND ENGINE AIR INTAKE FROM FLYING DEBRIS.*



### **CAUTION:-**

*READ THE INSTRUCTIONS CAREFULLY AND ALSO THE SEPARATE INSTRUCTION DETAILS ON THE ENGINE..*

### **NEVER**

- carry out adjustments with the engine running.

### **ALWAYS**

- read the operating instructions carefully and understand the controls before commencing work.
- be extra careful to avoid spillage, when using petrol or diesel fuel. **DANGER** no smoking or naked lights
- use safety guards and make sure they are correctly in position. they are supplied for your protection
- visually check machines before starting work for damage or wear to working parts such as blades, tines or loose fasteners
- respect powered machines. always keep hands and feet clear of moving parts and remember that tine cylinders or drums can continue to rotate even after the power unit is switched off
- switch off the power before making adjustments or repairs and never lift or carry a machine whilst any parts are Moving

### **EYE PROTECTION**

In dry, dusty or windy conditions it may be necessary to wear eye protection to protect your eyes from flying debris.

### **FIRE HAZARD**

ALWAYS CLEAN THE MACHINE. REMOVE ALL DEBRIS FROM AROUND THE ENGINE. BLOCKED ENGINE COOLING FINS CAN CAUSE THE ENGINE TO OVERHEAT

In order to operate the machine safely please follow these Health and Safety guidelines.

## TRAINING



### CAUTION

*READ THE INSTRUCTIONS CONTAINED IN THIS MANUAL WITH CARE. IF YOU ARE IN ANY DOUBT PLEASE ASK YOUR EMPLOYER OR CONTACT US DIRECT AT **SISIS. CAUTION***

- Be familiar with the controls and the proper use of the equipment.
- Never allow children or people unfamiliar with these instructions to use the machine. Local regulations or insurance may restrict the age of the operator.
- Never operate while people, especially children, or pets are nearby.
- Keep in mind that the operator or user is responsible for accidents or hazards occurring to other people or their property.

## PREPARATION

- While operating always wear substantial footwear and long trousers. Do not operate the machine barefoot or in open sandals.
- Thoroughly inspect where the equipment is to be used and remove all stones, sticks, wire, bones and other foreign objects.



### WARNING

*PETROL IS HIGHLY FLAMMABLE AND WILL DAMAGE GRASS IF SPILT.*

- A) Store fuel in containers specifically designed for this purpose.
- B) Refuel out doors and do not refuel whilst smoking.
- C) Add fuel before starting the engine. Never remove the cap of the fuel tank or add petrol while the engine is running or when the engine is hot.
- D) If petrol is spilled do not attempt to start the engine but move the machine away from the area of spill and avoid creating any sources of ignition until the vapours have dissipated.

- Replace damaged or faulty silencers.
- Before using the machine always inspect the safety devices including the cut off switch and the blades for excessive wear or damage. Replace if necessary.

## OPERATION

- Do not operate the engine in a confined space where dangerous **CARBON MONOXIDE** fumes can collect.
- Operate only in daylight or good artificial light.
- Always be sure of your footing on slopes.
- Walk. Never run.
- Exercise extreme care on slopes when changing direction.
- Do not operate excessively steep slopes.
- Use extreme caution when reversing or pulling the machine towards you.
- Stop the blades if the machine has to be tilted for transportation when crossing surfaces other than grass and when transporting the machine to and from the area to be mown.
- Never operate the machine with defective guards or shields or without the safety devices, for example without the deflector plate or grassbox in place.
- Do not change the engine governor settings or overspeed the engine.
- Disengage all blades and drive clutches before starting.
- Start the engine carefully following the instructions with feet well away from the blades.
- Do not tilt the machine when starting the engine.
- Do not put hands or feet near or under rotating parts. Keep clear of the discharge opening at all times.
- Never pick up or carry the machine while the engine is running.



## **CAUTION**

*PLEASE READ THESE OPERATING INSTRUCTIONS CAREFULLY BEFORE COMMENCING WORK.*

We want you to obtain the best performance from this machine. If you have any difficulty in carrying out the following instructions please contact SISIS direct or your local SISIS Territory Manager or SISIS Dealer.

## **OPERATING PRINCIPAL**

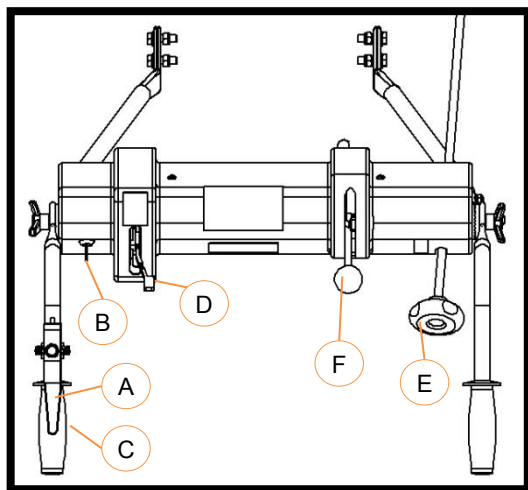
Power from the engine is transmitted through a vee belt clutch mechanism. One belt powers the tine reel through a cross shaft with a final chain drive. Forward travel power is supplied through a cross shaft, spur gearing and a differential gearbox, to the ground wheels. The depth of cut is simple to alter with the micro-adjuster on the handle connecting through to the front roller frame.

## **CONTROLS**

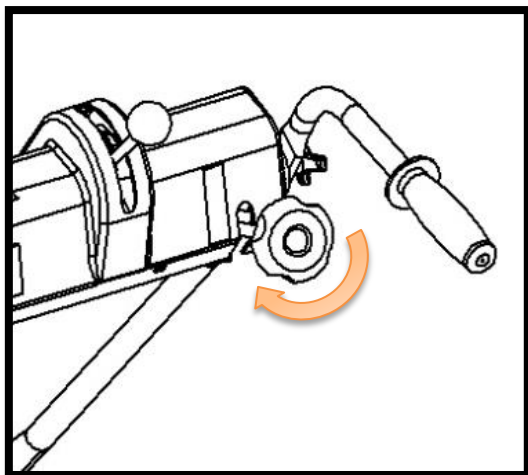


## **CAUTION**

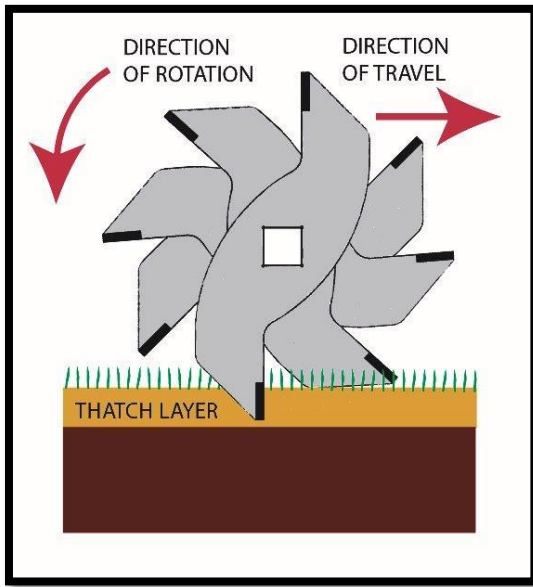
*DISENGAGE THE REEL CLUTCH BEFORE STARTING THE ENGINE. RAISE THE TINE REEL CLEAR OF THE GROUND TO PREVENT CONTACT.*



- A = Engine Cut-out Lever**
- B = Engine Run / Stop Key**
- C = Drive Lever**
- D = Throttle**
- E = Cut Depth Micro Adjuster**
- F = Tine Drive Lever**

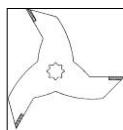


The blades must be **CLEAR** of the ground before adjustment commences. The depth of cut is adjusted by varying the height of the front rollers, using the micro adjuster. Start the engine and allow to warm up. Engage the ground wheel and reel drives and lower the reel using the micro adjuster until the required amount of thatch is being removed. Always disengage the reel drive when the machine is stationary on the green.

**SISIS CONTRA-ROTATION PRINCIPLE**

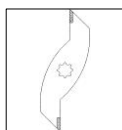
The Rotorake principle incorporates a series of blades rotating at high speed in the opposite direction to that of the conventional cylinder mower. The blades therefore cut upwards, continuously taking grass fibre away from the surface rather than pushing it into the surface of the turf. This also ensures that the machine is held to the ground and a regular working depth maintained.

**1MM LIGHT SCARIFYING REEL** – Order reference number: **FS1098**



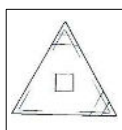
1mm replaceable, wear resistant tungsten tipped blades (12mm spacing) can be used throughout the season.

**1.6MM SCARIFYING/THATCH REMOVAL REEL** – Order reference number: **FS1093**



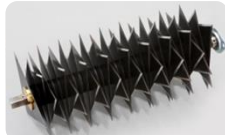
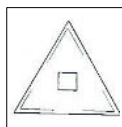
1.6mm replaceable, wear resistant tungsten tipped blades (20mm spacing). Ideal for pre and post playing season renovation work.

**VERTICUTTER/THATCH CONTROL REEL** – Order reference number: **FS1095**



Sharpened offset triangular blades (6mm spacing) used regularly throughout the playing season to control lateral growth and improve green speed.

**VERTICUTTER** – Order reference number: **FS1200**



Sharpened triangular blades, (12mm spacing) used regularly throughout the playing season to control lateral growth and improve green speed.

**BRUSH REEL** – Order reference number: **FS1088**



Used throughout the year for debris collection and clean up. Also used prior to mowing to stand grasses up and improve cut quality.

**MULTI DENSE/SYNTHETIC BRUSH REEL** – Order reference number: **FS1090**



Used throughout the year for debris collection and clean up. Also used prior to mowing to stand grasses up and improve cut quality.

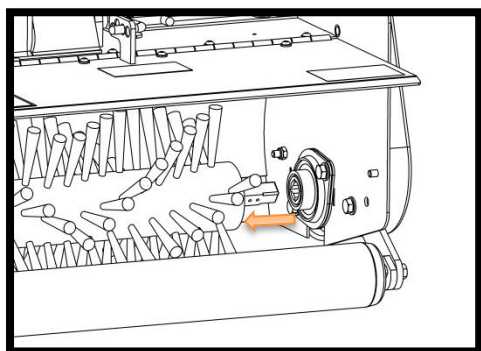
**ROLASPIKE/SOREL ROLLER** – Order reference number: **FS1113**



Provides fast and effective surface aeration. Used during the playing season enables penetration of air, water and fertiliser.

**CHANGING REELS**

**To Remove the Tine Reel**



Raise the reel completely clear of the ground using the micro adjuster. Remove the nuts and washers (*on the right hand side of the machine*) that secure the bearing to the side plate. Slide the tine reel out of the socket on the stub shaft (*see image*). Lower it to the ground and remove it from the machine. Reverse the procedure to fit alternative reel.



## **CAUTION**

ALWAYS SWITCH OFF THE ENGINE BEFORE ATTEMPTING ANY MACHINE MAINTENANCE WORK.

## **REPLACING BLADES**



## **NOTE**

CARRY OUT THE PROCEDURE FOR REMOVING THE REELS. FOR CONVEINIENCE PLACE THE REEL ON A BENCH WHN WORKING ON IT.

**THATCH REMOVAL REEL** reference ARR5/TR

**THATCH CONTROL REEL** reference ARR5/TCR

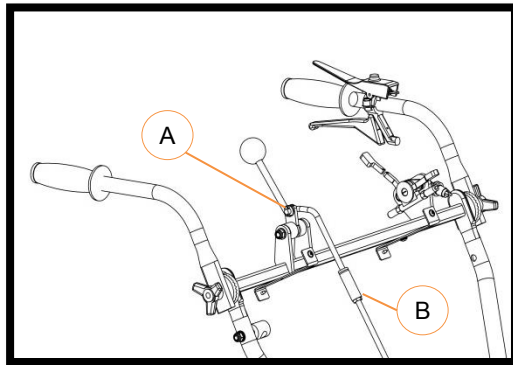
Remove the washer and split pin at the end of the reel (opposite end to which the bearing is fitted) and strip off the knives and rubber spacers. Replace the knives making sure that you follow the original spiral pattern, which is shown on the drawing. Replace the washer and split pin. You will find it necessary to compress the assembly in order to replace the split pin. Use the compression tool supplied with the machine. Replace the reel, reversing the procedure for removal.

It is not advisable to fit a few new knives. Always replace with a full set of new knives. On the thatch control reel **ONLY**, it is possible to maintain even wear on the blades by removing the reel and replacing the blades in the reverse position on the shaft.

## **ADJUSTING BELT TENSION**

The ground wheel drive belt tension is adjusted by slackening the lock nuts on the cable adjuster, turning and then re-locking adjuster under guard.

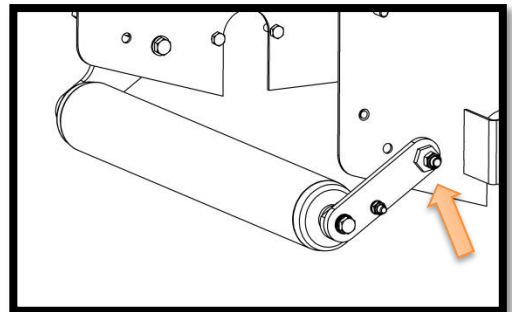
The reel drive belt tension is adjusted by slackening the lock nut on the barrel of the pull rod. Remove split pin, turn rod to desired position. Replace split pin and tighten lock nut.



**A = Split Pin**  
**B = Lock Nut**

## **FRONT ROLLER ADJUSTMENT**

An adjustment pivot nut is fitted at one side of the front roller frame assembly. This has been factory set, during assembly and should not require further adjustment. However, if the machine has been dismantled for maintenance purposes or mishandled at any time, the front roller can be adjusted by placing the machine on a level surface, with the tine reel removed and rotating the pivot nut. The front roller is aligned correctly with the rear ground wheels when all three are resting on the surface.







## **CAUTION**

*ALWAYS SWITCH OFF THE ENGINE BEFORE ATTEMPTING ANY MACHINE MAINTENANCE WORK.*

### **FITTING NEW REEL DRIVE V BELTS**







Ensure engine is switched off and key is removed. Remove covers(2 top and 1 side). Slacken engine bolts and move engine forward. Undo 2 setscrews securing the brake calliper and lift up and pull away clear of the disc. Place some packing (cardboard is ideal) in-between the brake pads to keep them in position. Remove belts on the bearing that is close to the disc and slacken the bolts on the bearing near the large chain pinion. This allows the shaft to be tilted up and the belt can be removed. Fit a new belt and put shaft back into position. Replace and tighten the bolts.

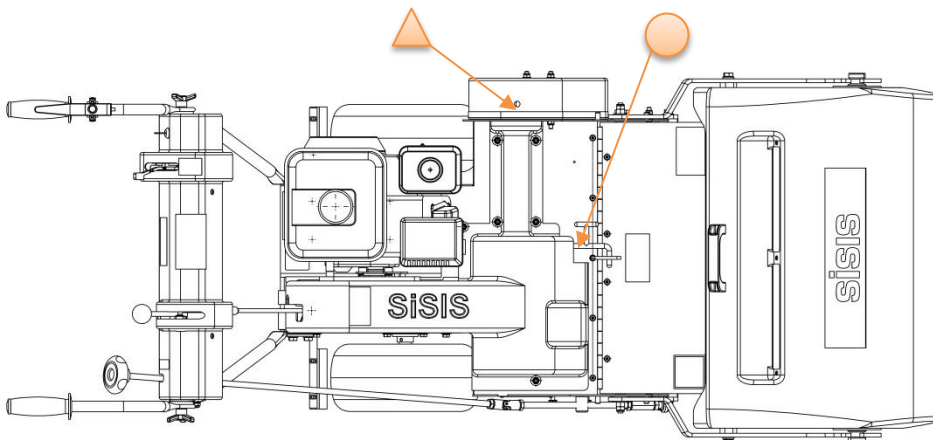
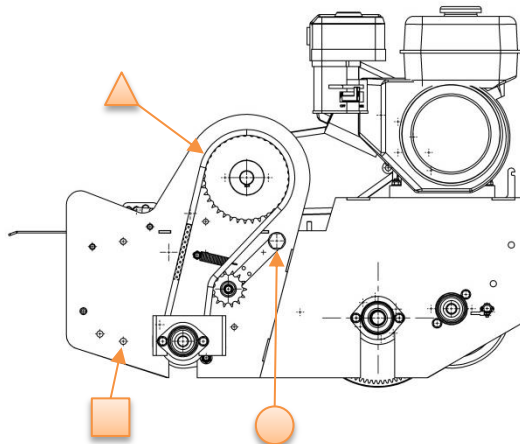
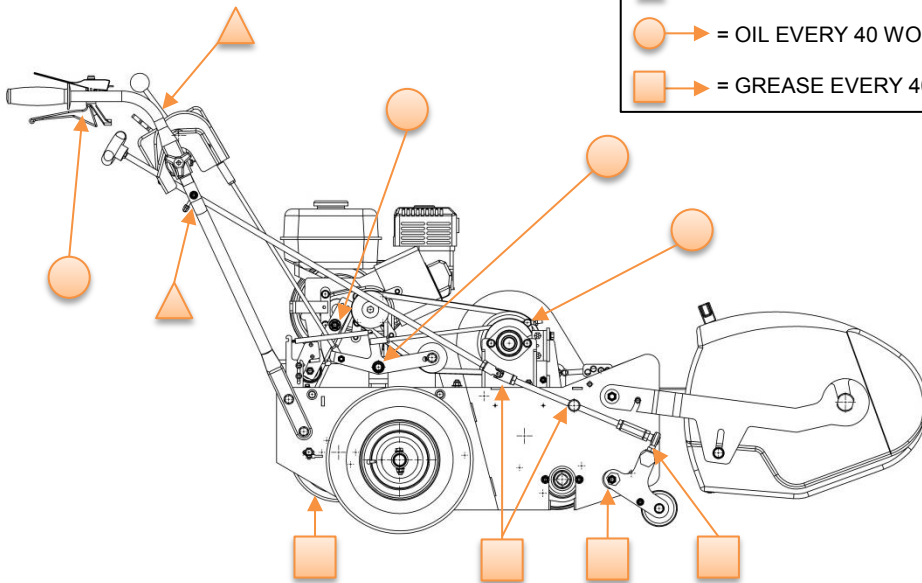
Disconnect brake rod from brake lever with the engine turned off. Put the tine reel into drive with the over centre lever. Ensure that belt fingers on engine are not more than 2mm and not less than 1mm away from the tensioned tine drive belt. Take the over centre lever out of drive and start engine. Put the over centre lever into drive and ensure that the belts stop driving. When the over centre lever is out of drive. If the belt stops driving, turn off the engine and refit the brake rod.

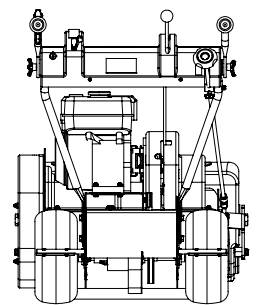
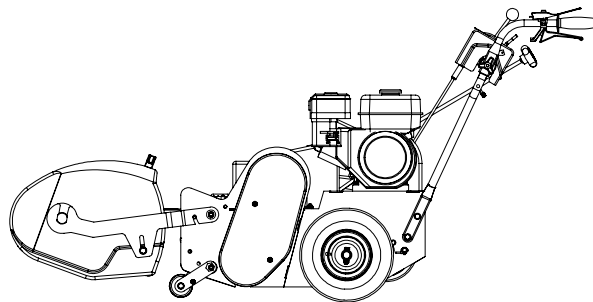
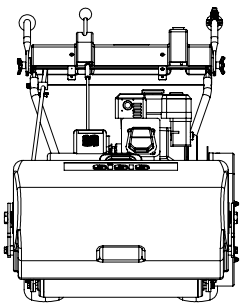
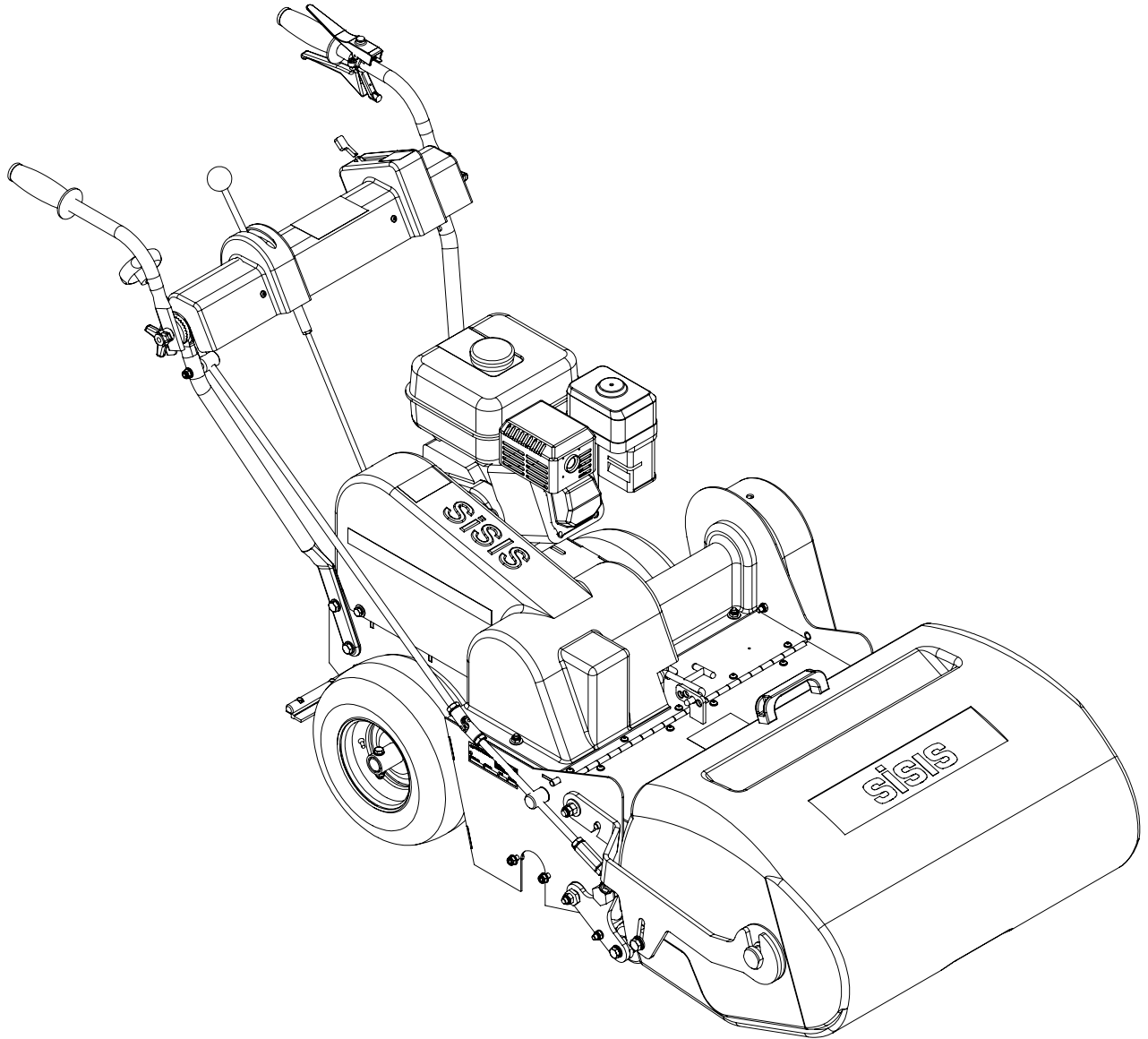


**NOTE**

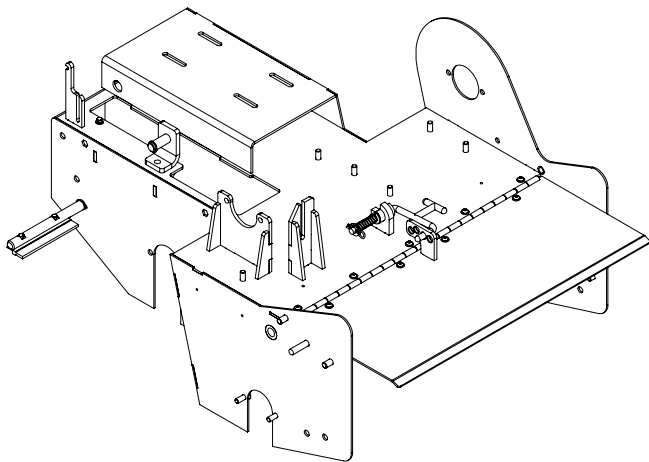
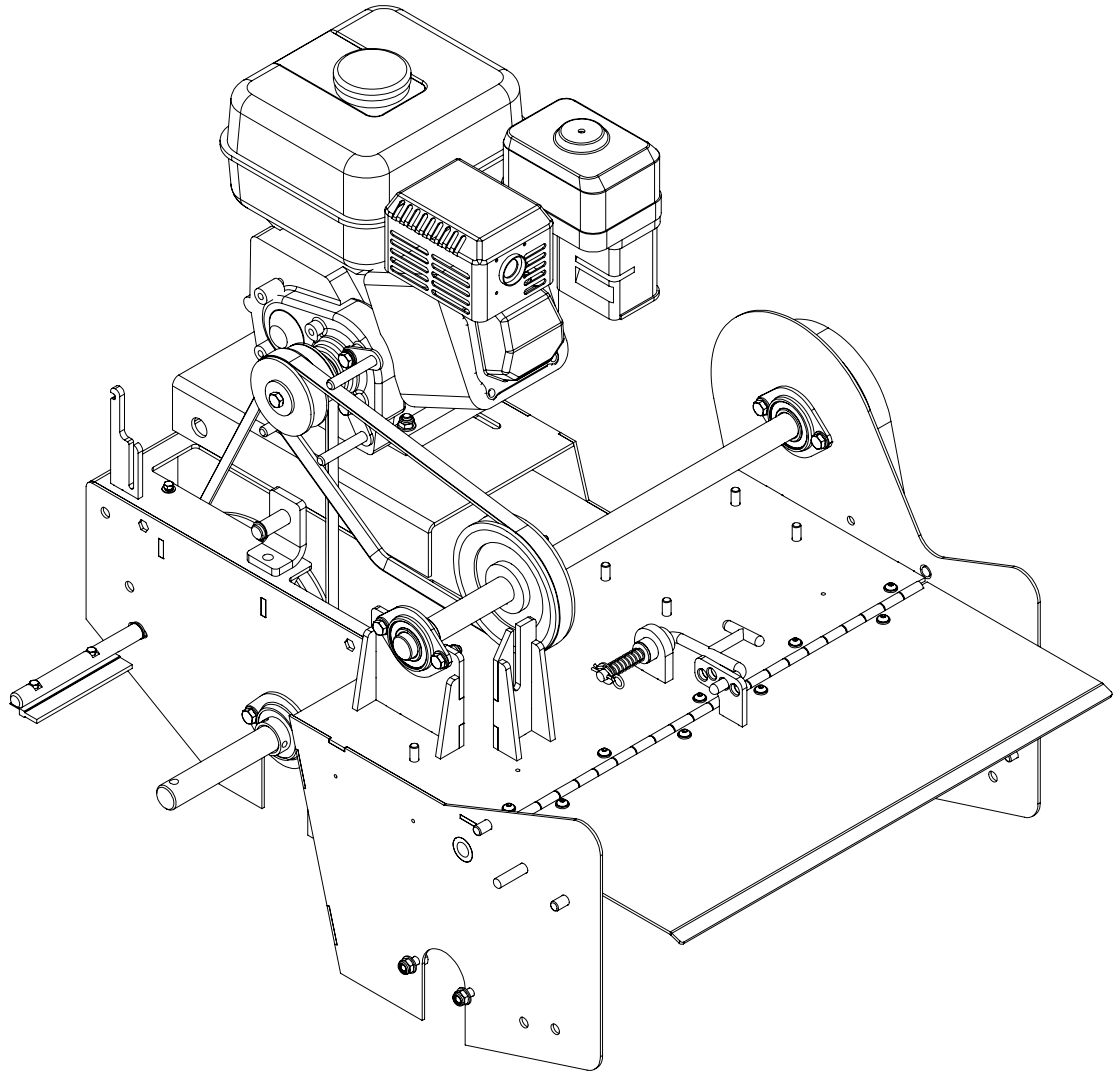
ENSURE THAT THE ENGINE IS FILLED TO THE CORRECT LEVEL WITH THE RECOMMENDED GRADE OF OIL. ALWAYS CHECK THE OIL WITH THE ENGINE LEVEL.

-   = OIL EVERY 10 WORKING HOURS
-   = OIL EVERY 40 WORKING HOURS
-   = GREASE EVERY 40 WORKING HOURS

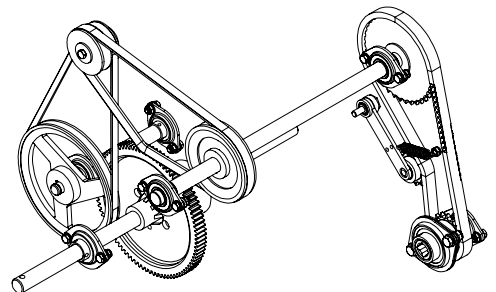




# CHASSIS, ENGINE AND DRIVE SYSTEM

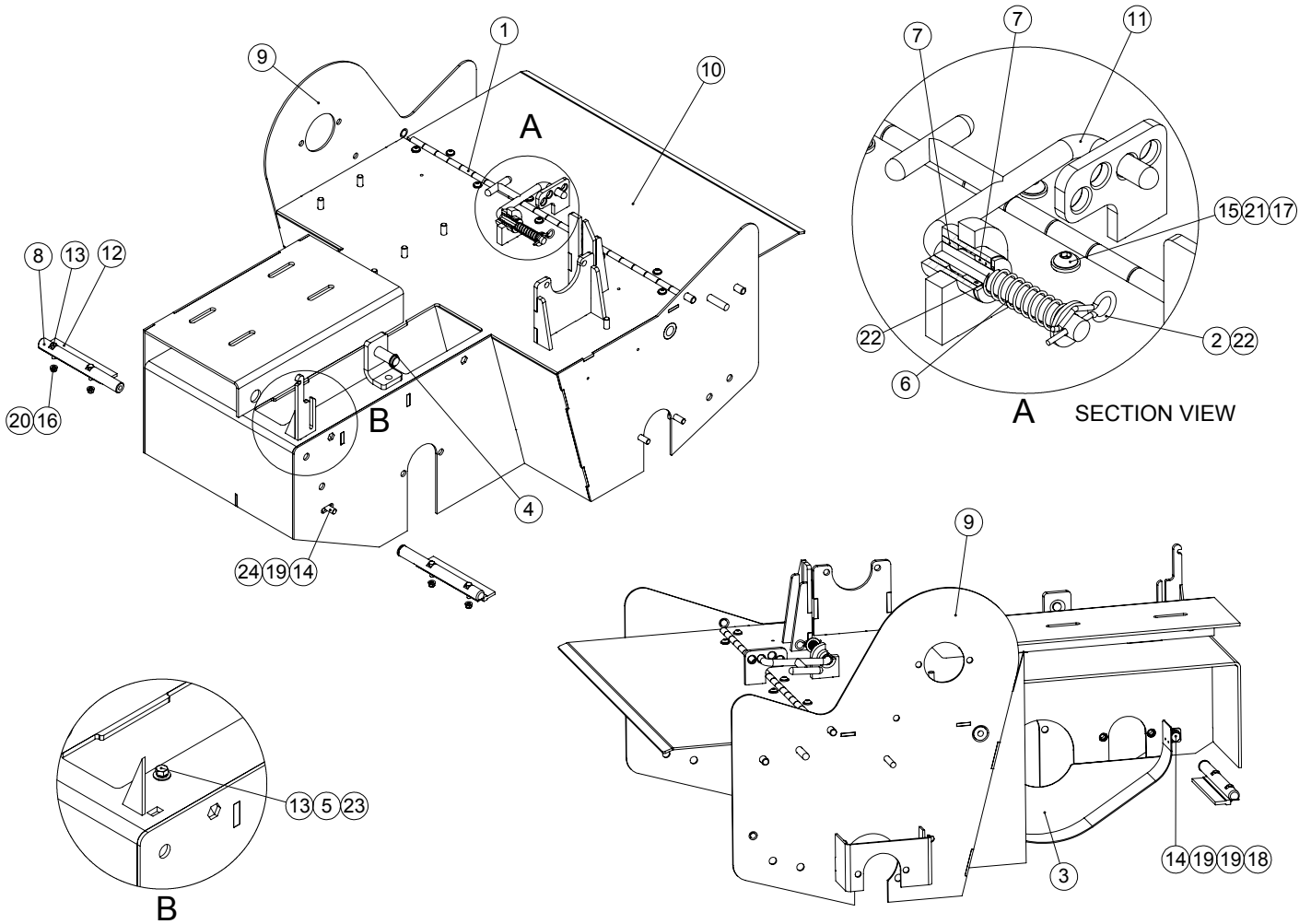


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REF: 3.01

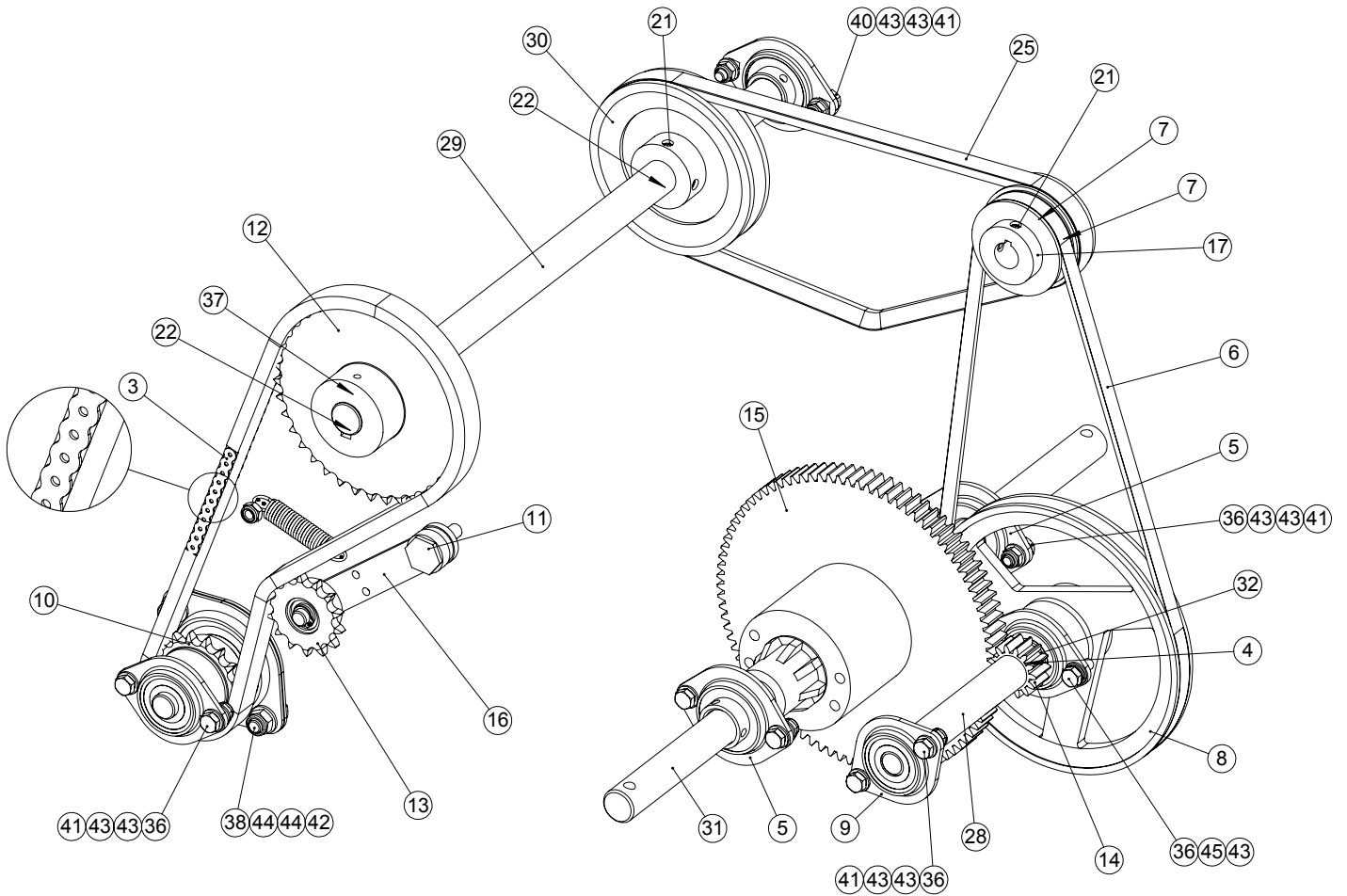
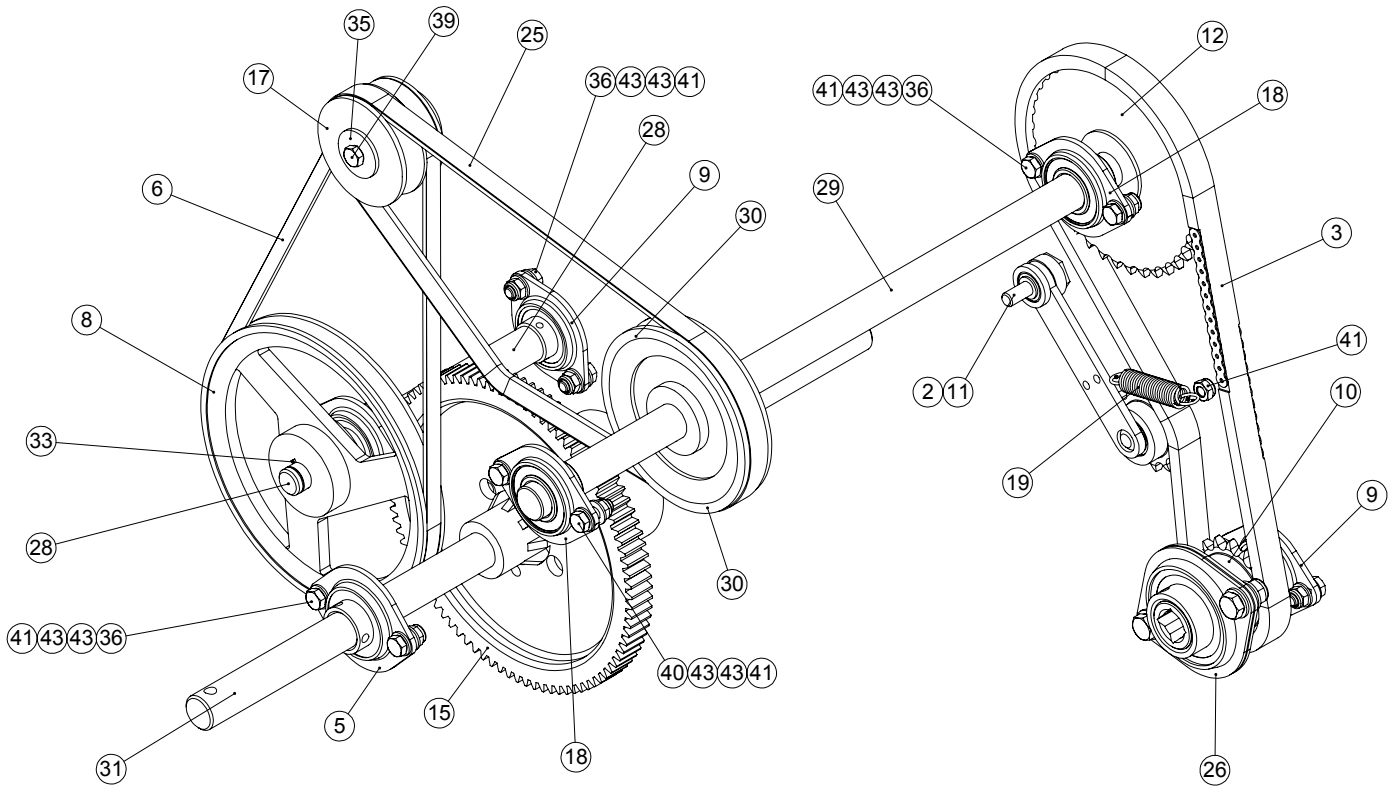
# CHASSIS



NOTE: SOME PARTS OMITTED FOR CLARITY

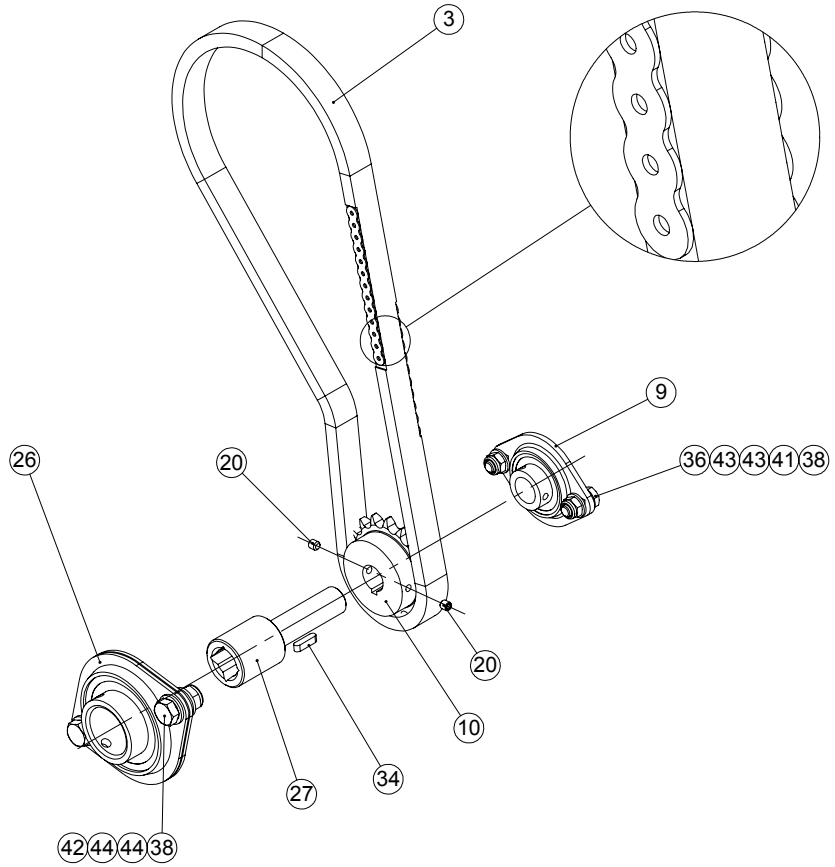
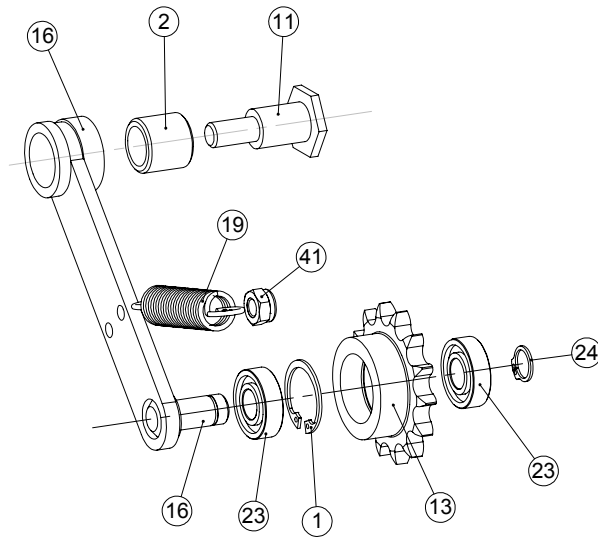
ITEM NO.	PART NUMBER	DESCRIPTION	CHASSIS/QTY.
1	400996_REV1	FLAP HINGE	1
2	D1899_REV1	R-CLIP (REF S490009)	1
3	D7982_REV1	GEAR COVER	1
4	D8056_REV1	CIRCLIP D1400 - 015	1
5	E1-1060_REV0	M5 SPRING WASHER	1
6	F22132_REV1	SPRING	1
7	F22133_REV1	BUSH AM1016 - 10	2
8	F34110_REV3	WHEEL SCRAPER	2
9	F36617_REV8	CHASSIS ASSEMBLY	1
10	F36630_REV3	GRASSBOX FLAP	1
11	F36700_REV1	FLAP ADJUSTER	1
12	F37088_REV2	BRUSH STRIP	2
13	SP01004_REV0	HEX SET SCREW M5 X 20	5
14	SP01009_REV0	HEX SET SCREW M8 X 20	4
15	SP01019_REV0	BUTTON HEAD M6 X 16	9
16	SP02002_REV0	NUT M5 NYLOC (T)	4
17	SP02004_REV0	NUT M6 NYLOC	9
18	SP02006_REV0	NUT M8 NYLOC (T)	2
19	SP03008_REV0	WASHER M8 FORM A	8
20	SP03009_REV0	WASHER M5 FORM A	4
21	SP03010_REV0	WASHER M6 FORM A	9
22	SP03011_REV0	WASHER M10 FORM A	2
23	SP03013_REV0	WASHER M5 FORM C	1
24	SP03029_REV0	WASHER M8 SPRING LOCK	2

# DRIVE SYSTEM



CONTINUED ON P3.02

# DRIVE SYSTEM



CONTINUED ON P3.03

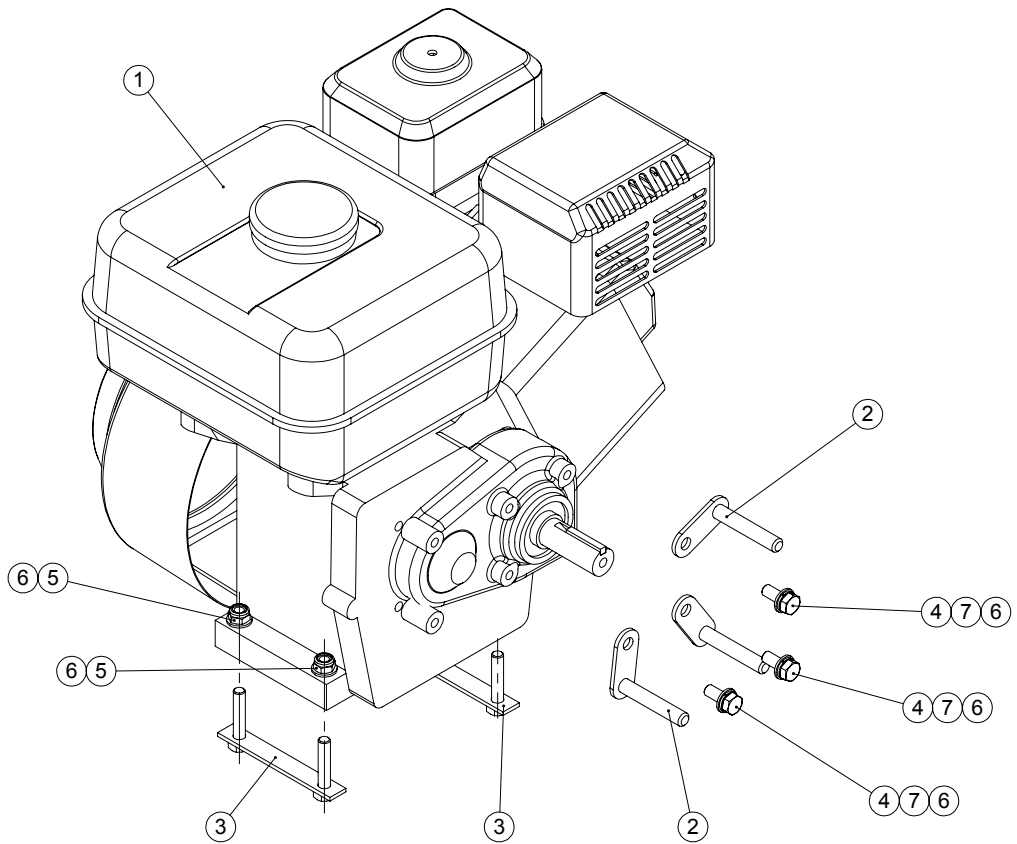
P3.02

## DRIVE SYSTEM

ITEM NO.	PART NUMBER	DESCRIPTION	DRIVE/QTY.
1	229829_REV1	CIRCLIP D1300 0280	1
2	229833_REV1	BUSH AL1622 - 20	1
3	D1558_REV1	CHAIN 77P X 1/2INCHESINCHES PITCH	1
4	D1572_REV1	KEY PARRALLEL 3/16INCHESINCHES X 3/16INCHESINCHES X5/8I	1
5	D1588_REV0	BEARING BPFL5-16	2
6	D1801_REV1	BELT 'V' A 42 1DB COTTON	1
7	D1989_REV0	GRUB SCREW M6 X 10	2
8	D2924_REV2	PULLEY	1
9	D2991_REV1	BEARING BPFL4-12	3
10	D4317_REV1	SPROCKET 17T X 1/2" PITCH	1
11	D6182_REV1	TENSIONER PIVOT SHAFT	1
12	D6186_REV3	SPROCKET 38T X 1/2" PITCH	1
13	D6189_REV1	JOCKEY TENSIONER	1
14	D6603_REV1	GEAR 14 TOOTH	1
15	D7977_REV1	SPUR GEAR	1
16	D7979_REV1	JOCKEY TENSIONER ARM	1
17	D7988_REV2	SPECIAL PULLEY	1
18	D8032_REV0	BEARING BPFL5-25	2
19	D8042_REV1	EXTENSION SPRING	1
20	D8068_REV0	GRUB SCREW M6 X 6	2
21	D8153_REV1	GRUB SCREW M8 X 10	6
22	D8165_REV0	KEY PARALLEL 6 X 6 X 25	2
23	D8173_REV1	BEARING 6001 2RS	2
24	D8175_REV1	CIRCLIP D1400 - 012	1
25	D8989_REV1	BELT 'V' B 35 COTTON	1
26	F20077_REV1	BEARING BPFL7-35	1
27	F36694_REV4	STUB SHAFT	1
28	F36695_REV3	GEAR SHAFT	1
29	F37054_REV2	LAYSHAFT	1
30	F37082_REV2	PULLEY (125 PCD X 1B)	1
31	F37134_REV2	DIFFERENTIAL ASSEMBLY	1
32	F37158_REV2	SPACER	1
33	J20457_REV1	KEY 3/16" X 3/16" X 1" RD END	1
34	J209030_REV1	KEY 3/16" X 3/16" X 3/4" RD END	1
35	J209249_REV0	WASHER 9 X 35 X 3	1
36	SP01009_REV0	HEX SET SCREW M8 X 20	12
37	SP01017_REV0	GRUB SCREW M6 X 12	2
38	SP01035_REV0	HEX SET SCREW M10 X 25	2
39	SP01036_REV0	HEX SET SCREW M8 X 35	1
40	SP01045_REV0	HEX SET SCREW M8 X 25	2
41	SP02006_REV0	NUT M8 NYLOC (T)	13
42	SP02008_REV0	NUT M10 NYLOC (T)	2
43	SP03008_REV0	WASHER M8 FORM A	26
44	SP03011_REV0	WASHER M10 FORM A	4
45	SP03029_REV0	WASHER M8 SPRING LOCK	2

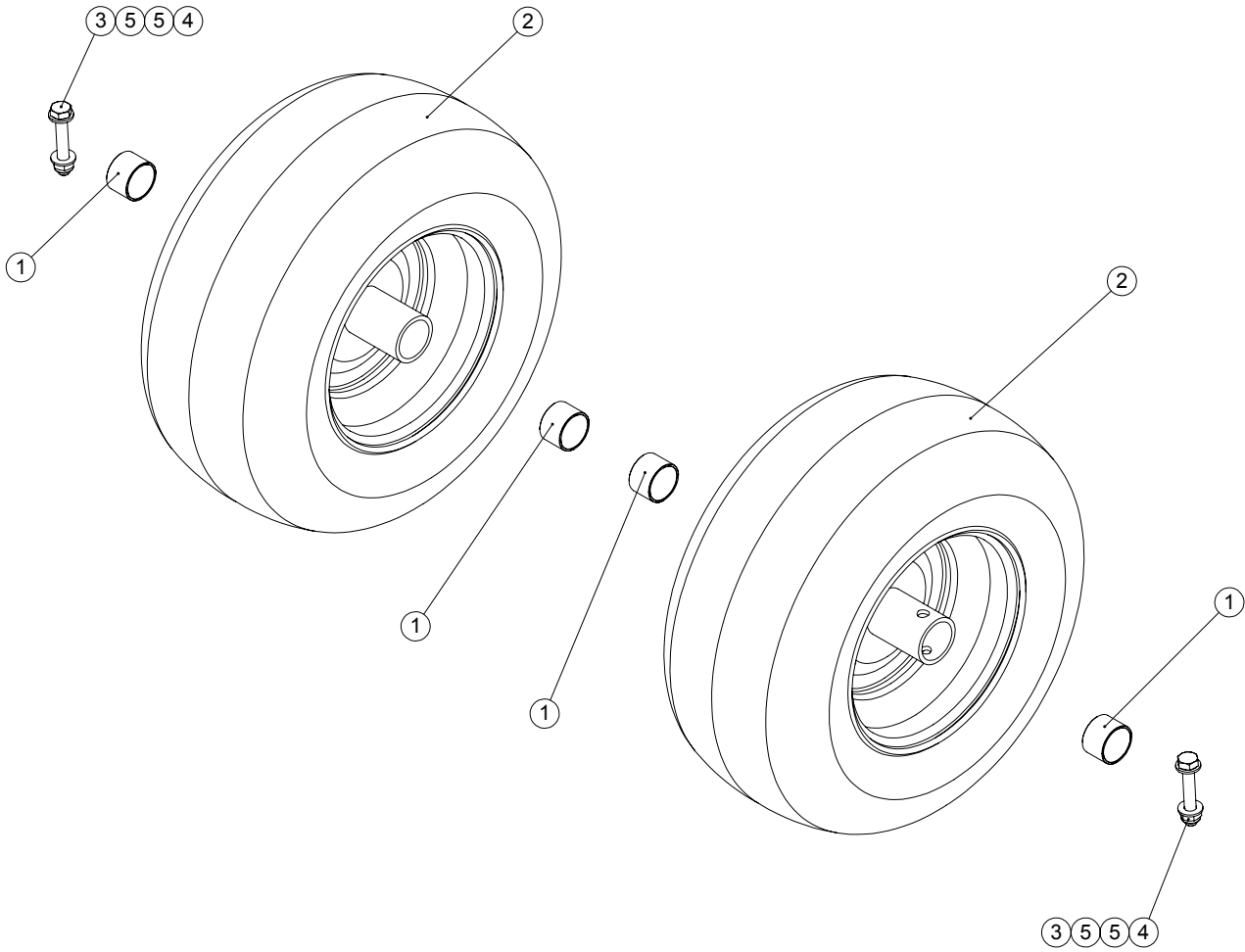


# ENGINE DETAIL



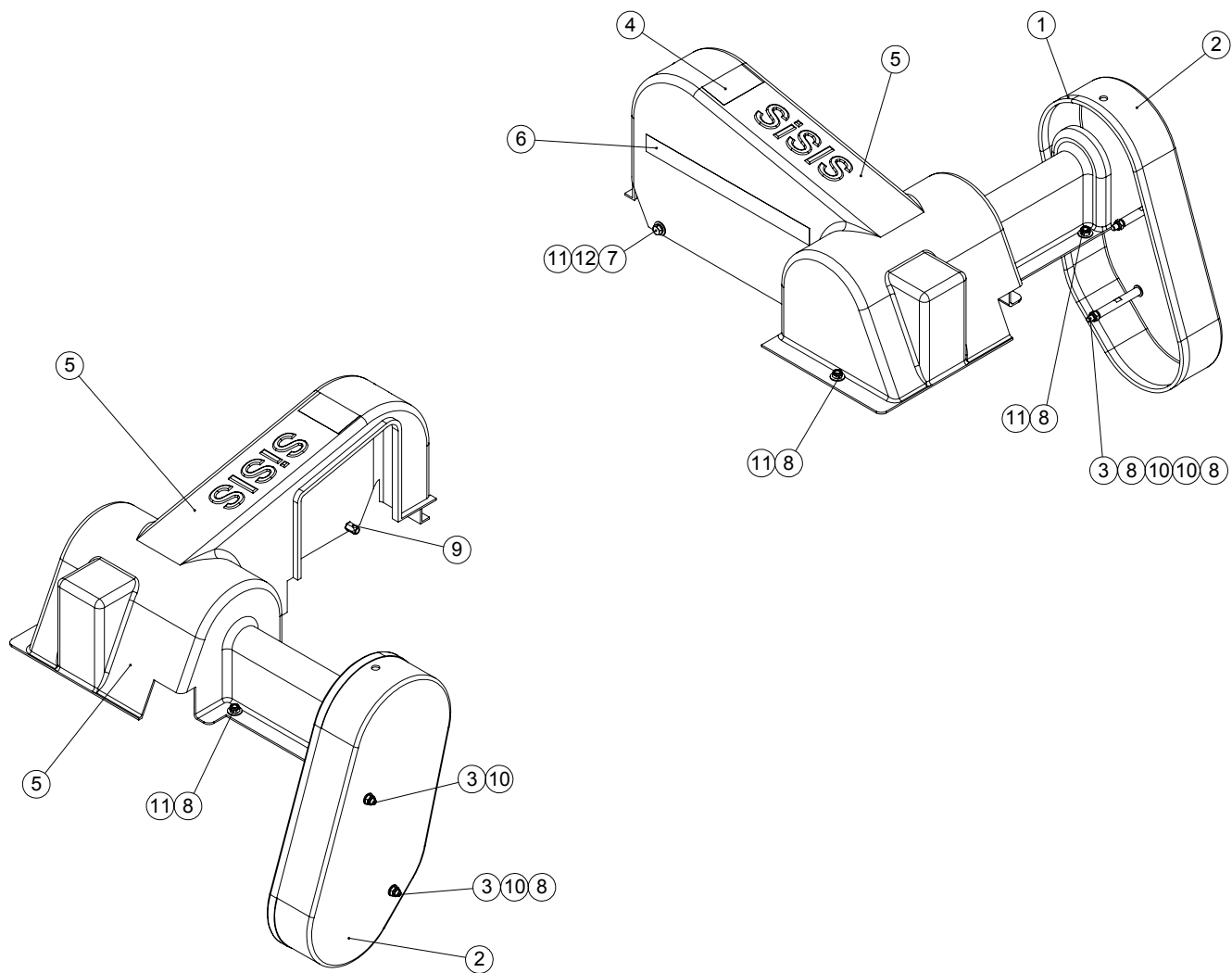
ITEM NO.	PART NUMBER	DESCRIPTION	ENGINE /QTY.
1	F22464_REV1	ENGINE 5.5 HP HONDA GX160 L	1
2	F37161_REV2	BELT GUIDE PEG	3
3	J209050_REV1	FIXING PLATE ASSY	2
4	SP01009_REV0	HEX SET SCREW M8 X 20	3
5	SP02006_REV0	NUT M8 NYLOC (T)	4
6	SP03008_REV0	WASHER M8 FORM A	7
7	SP03029_REV0	WASHER M8 SPRING LOCK	3

# WHEELS



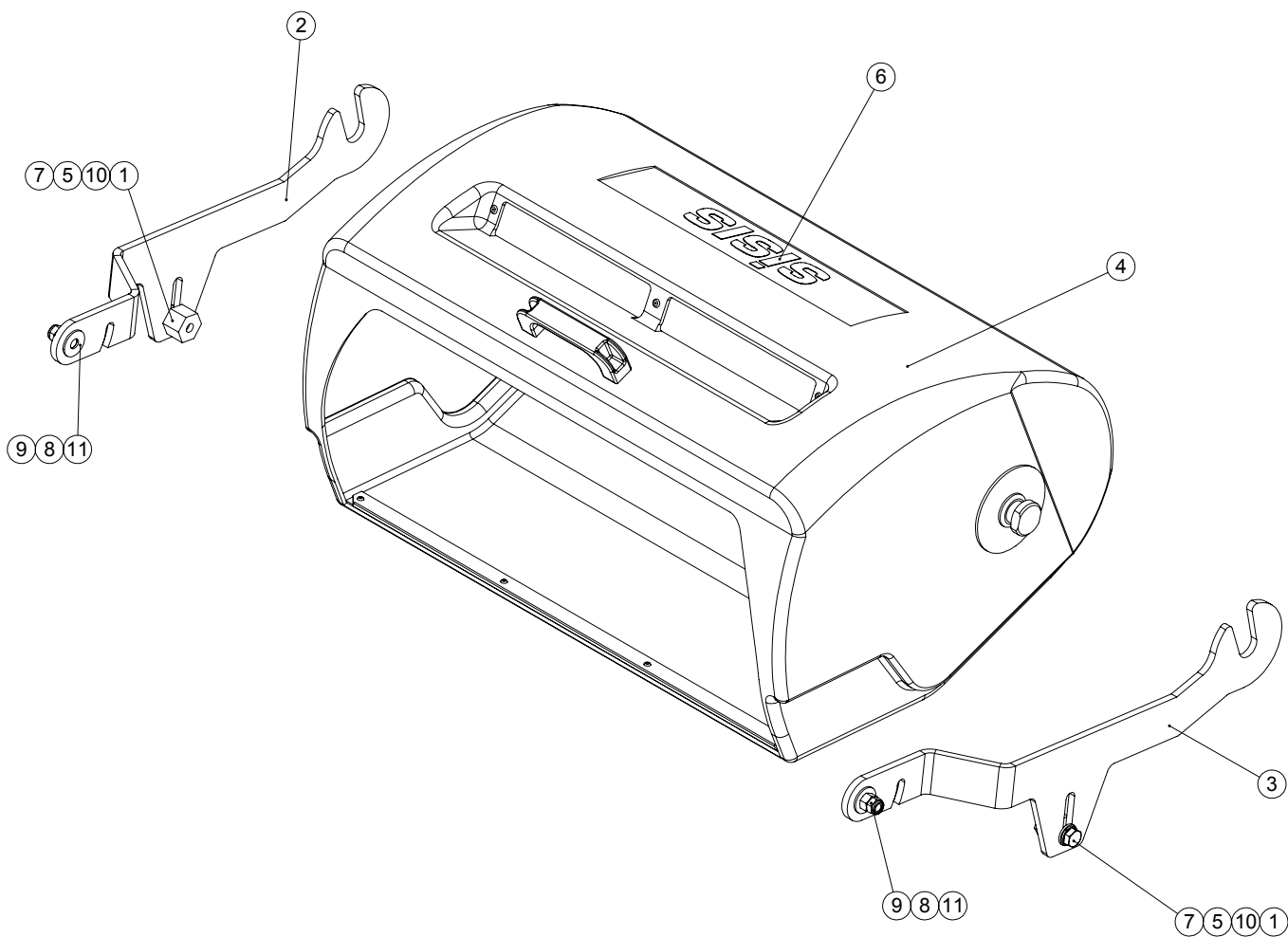
ITEM NO.	PART NUMBER	DESCRIPTION	WHEELS/QTY.
1	D5155_REV1	BUSH Al1618 - 3/4"	4
2	F37135_REV3	WHEEL DETAIL	2
3	SP01022_REV0	HEX SET SCREW M8 X 50	2
4	SP02006_REV0	NUT M8 NYLOC (T)	2
5	SP03008_REV0	WASHER M8 FORM A	4

# GUARDS AND COVERS



ITEM NO.	PART NUMBER	DESCRIPTION	GUARDS/QTY.
1	D3171-D7986_REV1	RUBBER GUARD SEAL	1
2	D7986_REV2	CHAIN GUARD	1
3	E1-5123_REV2	CHAIN GUARD STUD	2
4	F33384_REV1	LABEL CAUTION	1
5	F37047_REV3	BELT GUARD	1
6	F37060_REV1	LABEL AUTO-ROTORAKE	1
7	SP01009_REV0	HEX SET SCREW M8 X 20	2
8	SP02006_REV0	NUT M8 NYLOC (T)	10
9	SP02045_REV0	RIVNUT HEX M8 (4.0-6.0) [NO HEAD]	2
10	SP03008_REV0	WASHER M8 FORM A	4
11	SP03015_REV0	WASHER M8 FORM C	8
12	SP03029_REV0	WASHER M8 SPRING LOCK	2

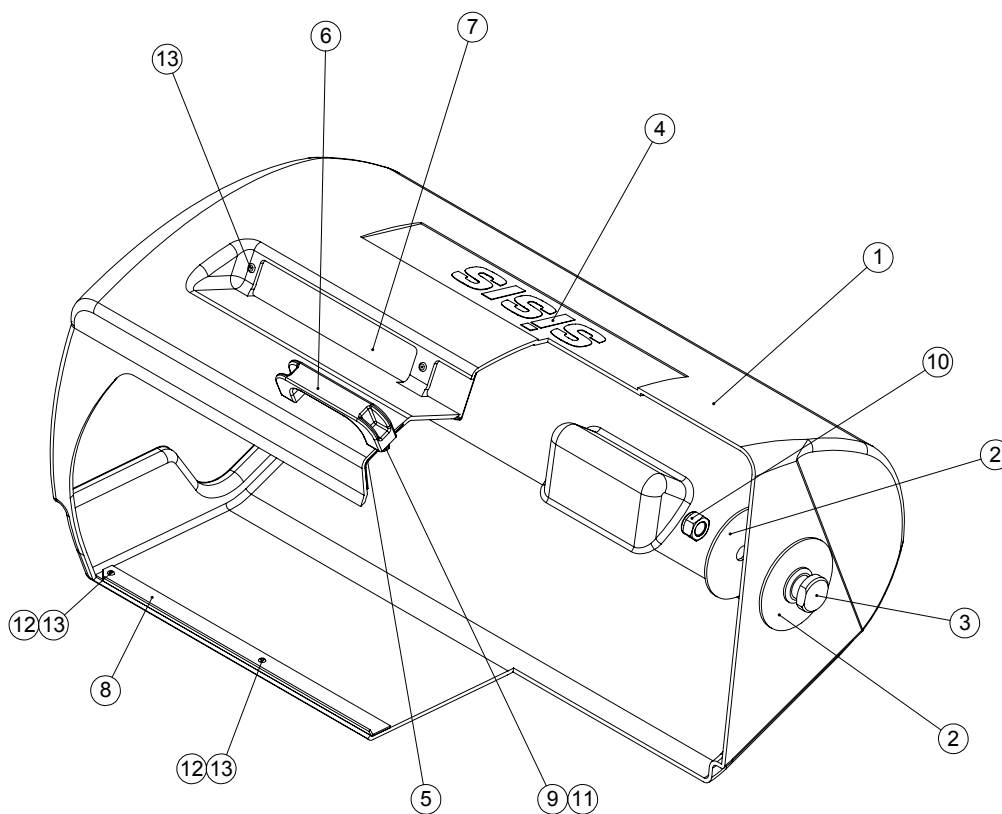
# GRASS BOX



ITEM NO.	PART NUMBER	DESCRIPTION	GRASS BOX/QTY.
1	290050_REV0	GRASSBOX ARM STOP	2
2	403077_REV0	GRASSBOX ARM L.H.	1
3	403078_REV0	GRASSBOX ARM R.H.	1
4	800519_REV0 **	GRASSBOX ASSEMBLY ROTORAKE	1
5	E1-1065_REV0	SPRING WASHER M12 SQUARE SECTION	2
6	F36332_REV0	DECAL SISIS WHITE 50MM HEIGHT	1
7	SP01065_REV0	HEX SET SCREW M12 X 30	2
8	SP02007_REV0	NUT M10 STD	2
9	SP02008_REV0	NUT M10 NYLOC (T)	2
10	SP03012_REV0	WASHER M12 FORM A	2
11	SP03018_REV0	WASHER M10 FORM G	4

\*\* SEE 7.02 FOR SUB ASSEMBLY DETAIL

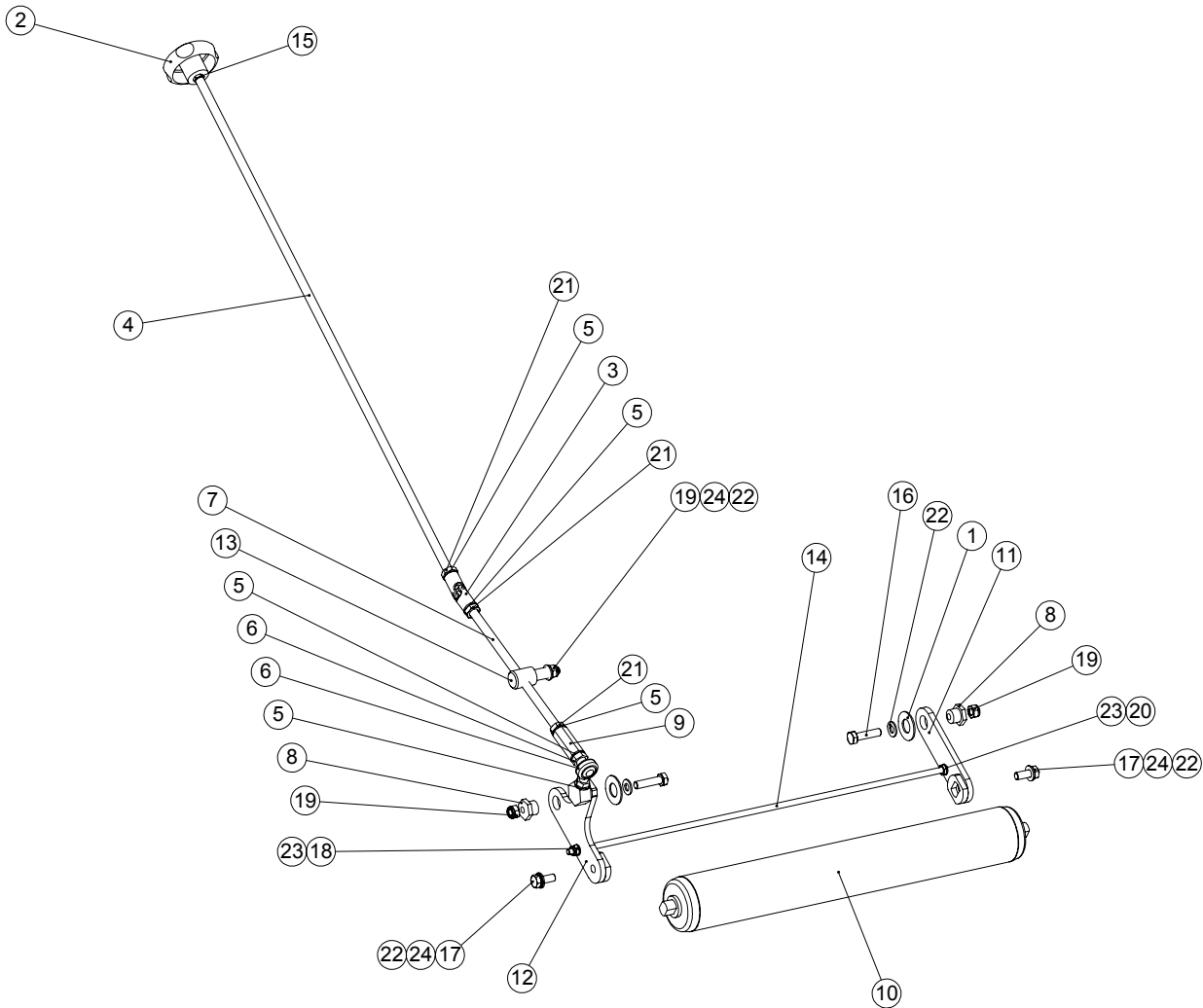
# GRASS BOX SUBASSEMBLY



NOTE: SOME PARTS OMITTED FOR CLARITY

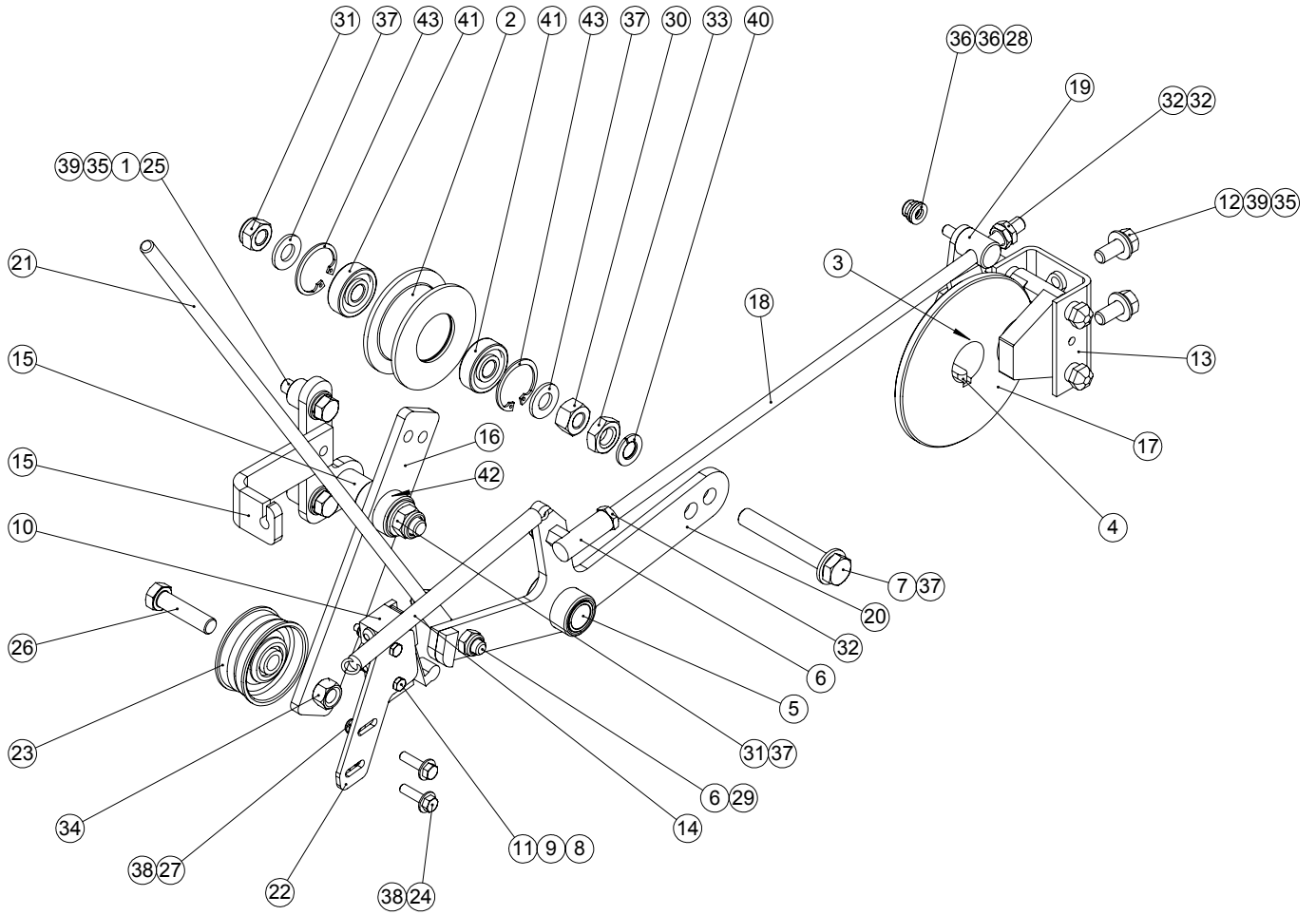
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	290070_REV0	GRASS COLLECTOR 24"	1
2	290071_REV0	WASHER 16 X 100 X 3	4
3	290072_REV0	GRASSBOX PIVOT	2
4	F36332_REV0	DECAL SISIS WHITE 50MM HEIGHT	1
5	J209064_REV2	HANDLE PLATE GRASS BOX	1
6	J209243_REV1	HANDLE GRASSBOX	1
7	J249062_REV1	MESH	1
8	J249063_REV1	24" GRASSBOX EDGING STRIP	1
9	SP01028_REV0	HEX SET SCREW M6 X 20	2
10	SP02028_REV0	NUT M16 NYLOC (T)	2
11	SP03010_REV0	WASHER M6 FORM A	2
12	SP03032_REV0	WASHER M5 REPAIR	7
13	SP05018_REV0	RIVET 4.8 X 18	7

# FRONT ROLLER ASSEMBLY



ITEM NO.	PART NUMBER	DESCRIPTION	FRONT ROLLER/QTY.
1	400971_REV0	FRAME ARM SPACER	2
2	D1879_REV1	HANDWHEEL	1
3	D7907_REV1	UNIVERSAL JOINT	1
4	D7993_REV2	ADJUSTMENT ROD	1
5	E1-1065_REV0	SPRING WASHER M12 SQUARE SECTION	5
6	F21064_REV1	ROD END MJ-12-M-ST5	1
7	F32151_REV1	DEPTH ADJ SCREW	1
8	F36680_REV3	OFFSET PIVOT BUSH	2
9	F37083_REV2	CONNECTOR	1
10	F37138_REV3	ROLLER	1
11	F37140_REV6	ROLLER FRAME L.H.	1
12	F37141_REV4	ROLLER FRAME R.H.	1
13	F37172_REV2	MIDDLE PIVOT	1
14	F37273_REV2	SCRAPER	1
15	J209024_REV0	NUT 5/16 BSF LOCK (THIN)	1
16	SP01020_REV0	HEX SET SCREW M10 X 40	2
17	SP01035_REV0	HEX SET SCREW M10 X 25	2
18	SP02006_REV0	NUT M8 NYLOC (T)	2
19	SP02008_REV0	NUT M10 NYLOC (T)	3
20	SP02012_REV0	NUT M8 LOCK (THIN)	2
21	SP02014_REV0	NUT M12 LOCK (THIN)	3
22	SP03011_REV0	WASHER M10 FORM A	5
23	SP03029_REV0	WASHER M8 SPRING LOCK	4
24	SP03034_REV0	WASHER M10 SPRING LOCK	3

# LINKAGE



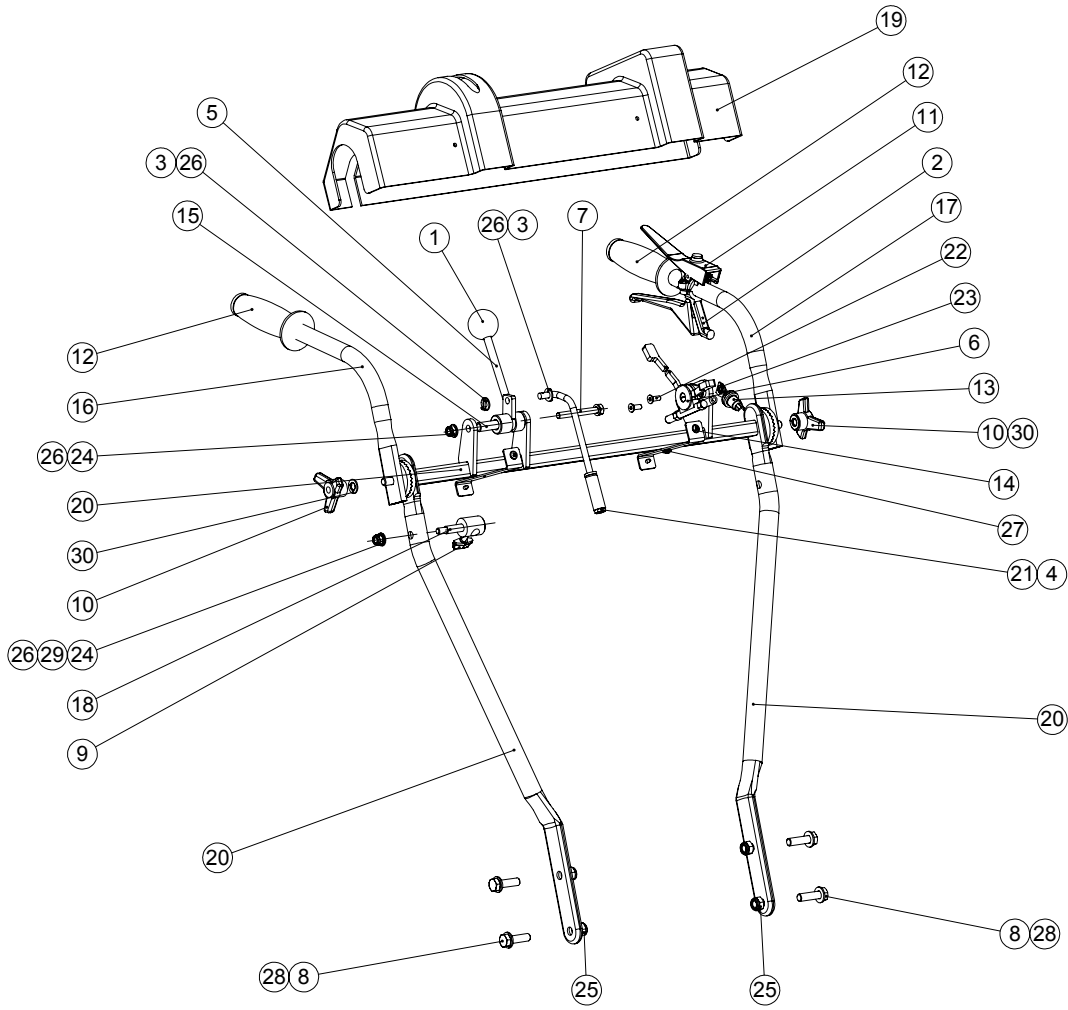
CONTINUED ON P9.02

## LINKAGE CONTINUED

ITEM NO.	PART NUMBER	DESCRIPTION	LINKAGE/QTY.
1	400998_REV0	SPACER ENGINE FLANGE	2
2	401874_REV0	PULLEY BODY 19MM	1
3	D8068_REV0	GRUB SCREW M6 X 6	2
4	D8165_REV0	KEY PARALLEL 6 X 6 X 25	1
5	D8275_REV1	BUSH AM1519 - 30	1
6	D8485_REV1	ROD END R108-M8.	2
7	E1-1131_REV1	HEX SET SCREW M10 X 70	1
8	F20431_REV1	NUT M4 NYLOC	2
9	F20803_REV1	WASHER M4 FORM A	2
10	F21748_REV1	MICROSWITCH	1
11	F22043_REV1	HEX SET SCREW M4 X 30	2
12	F22240_REV1	HEX SETSCREW 5/16" UNC X 3/4"	2
13	F22241_REV1	BRAKE CALIPER	1
14	F22252_REV1	TENSION SPRING	1
15	F36635_REV4	TENSIONER BRACKET	1
16	F36636_REV4	BELT TENSIONER ARM	1
17	F37055_REV3	DISC BRAKE	1
18	F37084_REV2	BRAKE ADJUSTMENT ROD	1
19	F37085_REV3	BRAKE CONNECTOR STUD	1
20	F37086_REV4	TENSIONER ARM ASSY	1
21	F37087_REV2	BELT ADJUSTING ROD	1
22	F37100_REV3	MICROSWITCH PLATE	1
23	J209047_REV0	TENSIONER PULLEY	1
24	SP01004_REV0	HEX SET SCREW M5 X 20	2
25	SP01005_REV0	HEX SET SCREW M8 X 30	2
26	SP01071_REV0	HEX SET SCREW 3/8" UNF X 1 1/2"	1
27	SP02002_REV0	NUT M5 NYLOC (T)	2
28	SP02004_REV0	NUT M6 NYLOC	1
29	SP02006_REV0	NUT M8 NYLOC (T)	2
30	SP02007_REV0	NUT M10 STD	1
31	SP02008_REV0	NUT M10 NYLOC (T)	2
32	SP02012_REV0	NUT M8 LOCK (THIN)	4
33	SP02014_REV0	NUT M12 LOCK (THIN)	1
34	SP02015_REV0	NUT 3/8" UNF	1
35	SP03008_REV0	WASHER M8 FORM A	4
36	SP03010_REV0	WASHER M6 FORM A	2
37	SP03011_REV0	WASHER M10 FORM A	4
38	SP03013_REV0	WASHER M5 FORM C	4
39	SP03029_REV0	WASHER M8 SPRING LOCK	4
40	SP03034_REV0	WASHER M10 SPRING LOCK	1
41	SP06012_REV0	BEARING 6200-2RS	2
42	SP06022_REV0	BUSH AM1216 - 25	1
43	SP07012_REV0	CIRCLIP D1300 - 030	2



# HANDLE BAR ASSEMBLY



CONTINUED ON P10.02

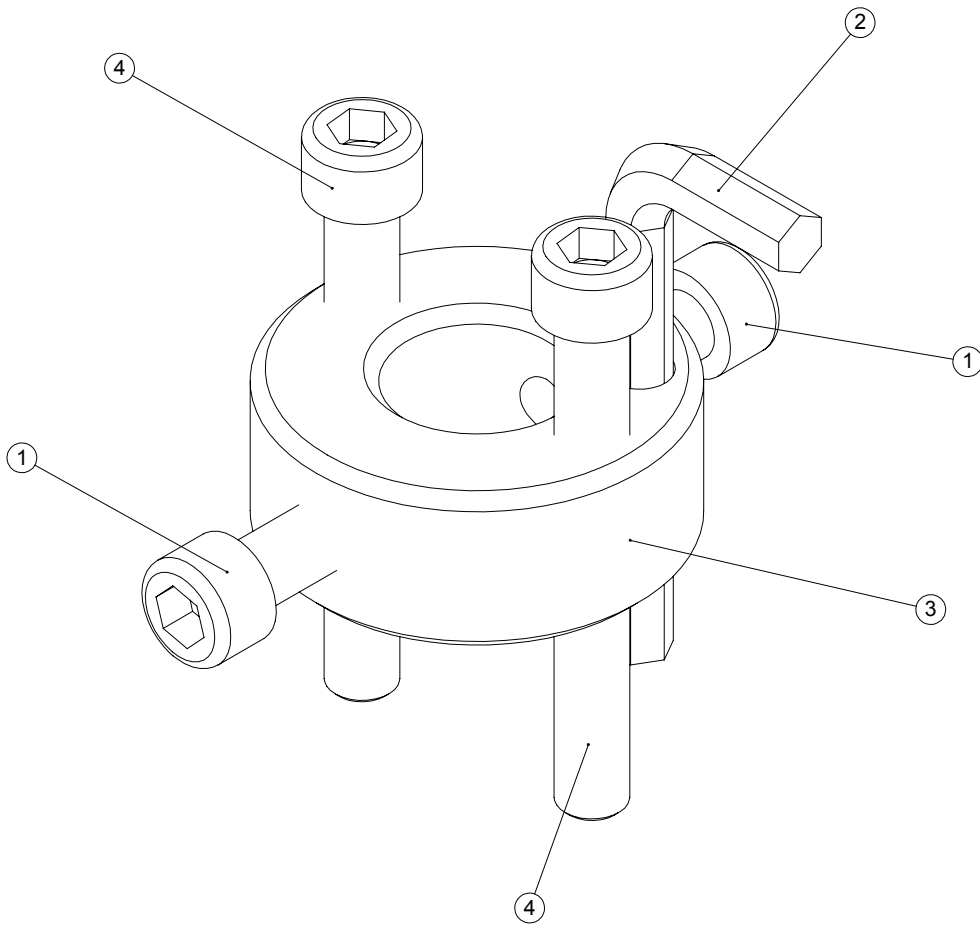
# HANDLE BAR ASSEMBLY

ITEM NO.	PART NUMBER	DESCRIPTION	HANDLE BARS/QTY.
1	176457_REV1	BLACK KNOB M10	1
2	229754_REV0	CLUTCH LEVER LEVER	1
3	D1040_REV0	SPLIT PIN 3/32" X 3/4"	2
4	D6619_REV1	OVER CENTRE ROD	1
5	D6620_REV1	LEVER	1
6	D8271_REV1	THROTTLE CONTROL	1
7	E1-1114_REV0	HEX BOLT M8 X 65	1
8	E1-1119_REV0	HEX SET SCREW M10 X 35	4
9	F20714_REV1	WING SCREW	1
10	F21063_REV1	LOCK KNOB	2
11	F21905_REV0	DEADMAN LEVER	1
12	F22019_REV1	HANDLE GRIP	2
13	F22238_REV1	SWITCH AND KEY	1
14	F22242_REV1	SCREW No 8 POSIPAN WITH FLANGE	5
15	F30963_REV1	DRIVE LEVER PIVOT SHAFT	1
16	F36639_REV3	UPPER HANDLE R.H.	1
17	F36640_REV3	UPPER HANDLE L.H.	1
18	F36696_REV3	ADJUSTMENT ROD SUPPORT	1
19	F37029_REV4	HANDLE SHROUD	1
20	F37051_REV3	LOWER HANDLE ASSY	1
21	J209026_REV0	NUT 5/16 UNF LOCK (THIN)	1
22	SP01149_REV0	CSK SOCKET SCREW M6 X 16	2
23	SP02004_REV0	NUT M6 NYLOC	2
24	SP02006_REV0	NUT M8 NYLOC (T)	2
25	SP02008_REV0	NUT M10 NYLOC (T)	4
26	SP03008_REV0	WASHER M8 FORM A	4
27	SP03009_REV0	WASHER M5 FORM A	2
28	SP03011_REV0	WASHER M10 FORM A	4
29	SP03029_REV0	WASHER M8 SPRING LOCK	2
30	SP03034_REV0	WASHER M10 SPRING LOCK	2

## CABLES AND ELECTRICAL (ITEMS NOT SHOWN)

ITEM NO.	PART NUMBER	DESCRIPTION	WIRES/QTY.
1	F37118_REV1	HARNESS MICRO SWITCH TO NUTRAL	1
2	F37119_REV1	HARNESS KEY TO NUTRAL	1
3	F37120_REV1	HARNESS KEY TO ENGINE	1
4	F37121_REV1	HARNESS DEADMANS HANDLE TO ENGINE	1
5	F37122_REV1	HARNESS DEADMANS HANDLE TO MICRO SWITCH	1
6	F37166_REV5	CLUTCH CABLE	1
7	F37379_REV2	THROTTLE CABLE	1
8	HUHTM507_REV1	CONVOLUTED TUBING 1MTR	1
9	SP12014_REV0	ELECTRICAL CONNECTOR MALE BULLET (RED)	1
10	SP12015_REV0	ELECTRICAL CONNECTOR FEMALE BULLET (RED)	1
11	SP012029_REV1	HEAT SHRINK 12.7 1:2 (BLACK)	1
12	SP21003_REV0	PACKAGING BRACKET VEEMO	2

# TINE COMPRESSION TOOL ASSEMBLY



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	D8757_REV0	CAP HEAD M10 X 25	2
2	F21868_REV0	8MM ALLEN KEY	1
3	F36305_REV1	TINE COMPRESSION TOOL	1
4	SP01061_REV0	CAP HEAD M10 X 80 FULL THREAD	2



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