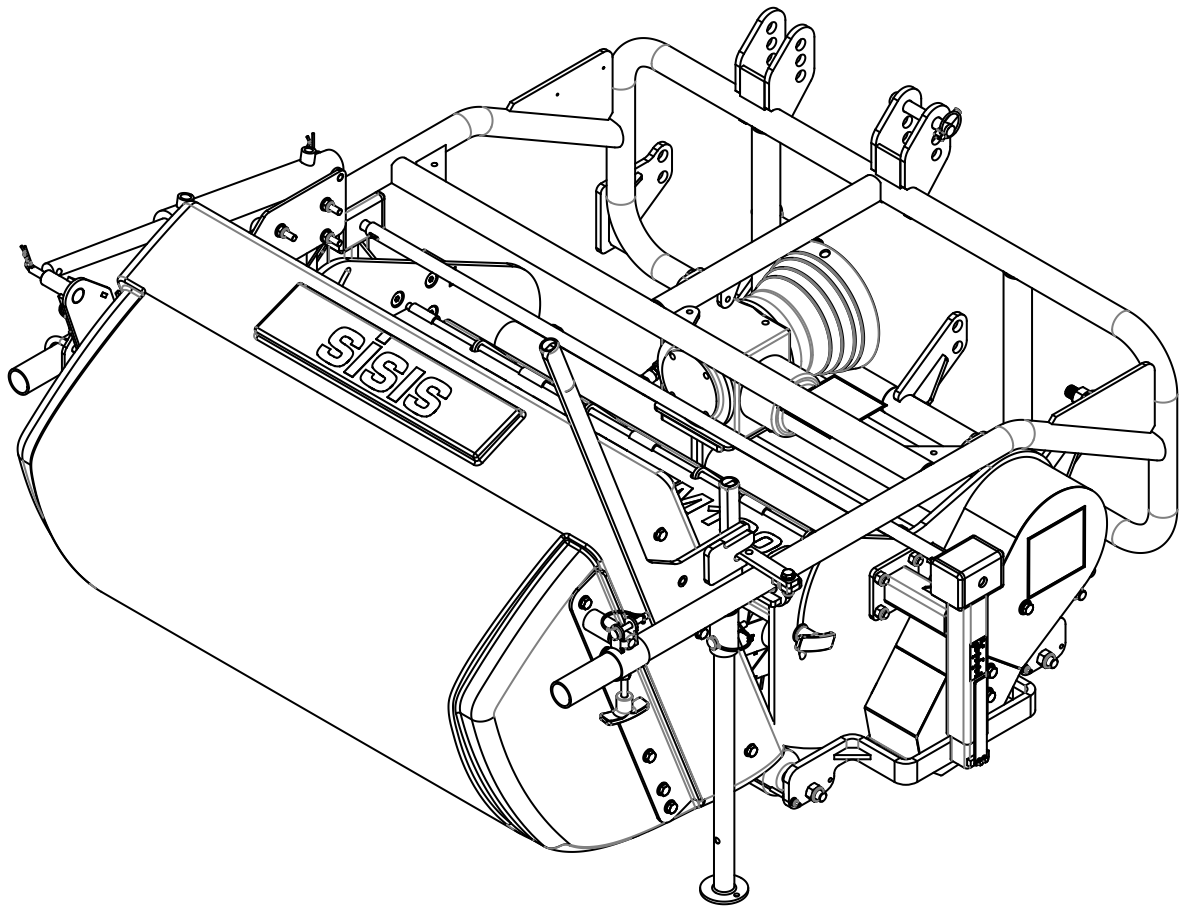


sisis[®]

ROTORAKE TM1000 INSTRUCTION MANUAL



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A division of Howardson Ltd. - a proudly British company
Company reg no 641526 - Vat No GB 345 9918 12

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02/15

Certificate of Conformity

TM1000 FS1258

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:-

Complies with the applicable requirements of:-

- Machine Directive 2006/42/EC

Managing Director



Ian Howard

Serial Numbers



NOTE

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

MACHINE SERIAL NUMBER

Introduction

The reliability and quality of performance of the **SISIS 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.

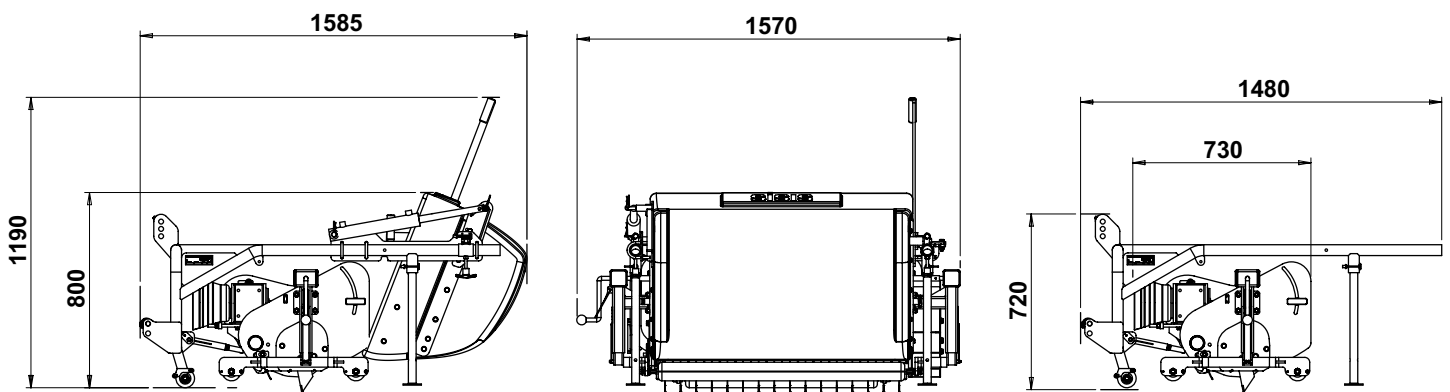
It is advisable to read the instructions carefully. Proper care and attention will enable the machine to give a continuous, satisfactory, and reliable service. Failure to carry out regular lubrication and maintenance as outlined in this manual may render any guarantee or warranty invalid.

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 number of the machine when making enquiries.

This is to be found on a plate attached to the side frame. We suggest you write the numbers on the front page of this book.

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Technical Data



Model	TM1000
Dimensions	See Above
Weight (No Reel) (Kg)	197
Operating Width (mm)	1000mm
Cutting Range (mm)	50
Approx Ground Coverage (m ² /hr)	1000 - 2500

NOTE:- Average golf green can be scarified (8mm deep) in 10 - 15 mins

Tractor Requirements	
Power (Hp)	20 - 25
PTO Speed (Max RPM)	540

OVERVIEW

We want you to obtain the best performance from this machine. If, after reading the following instructions, you have any problems please contact SISIS or your local area manager or SISIS dealer.

DESCRIPTION

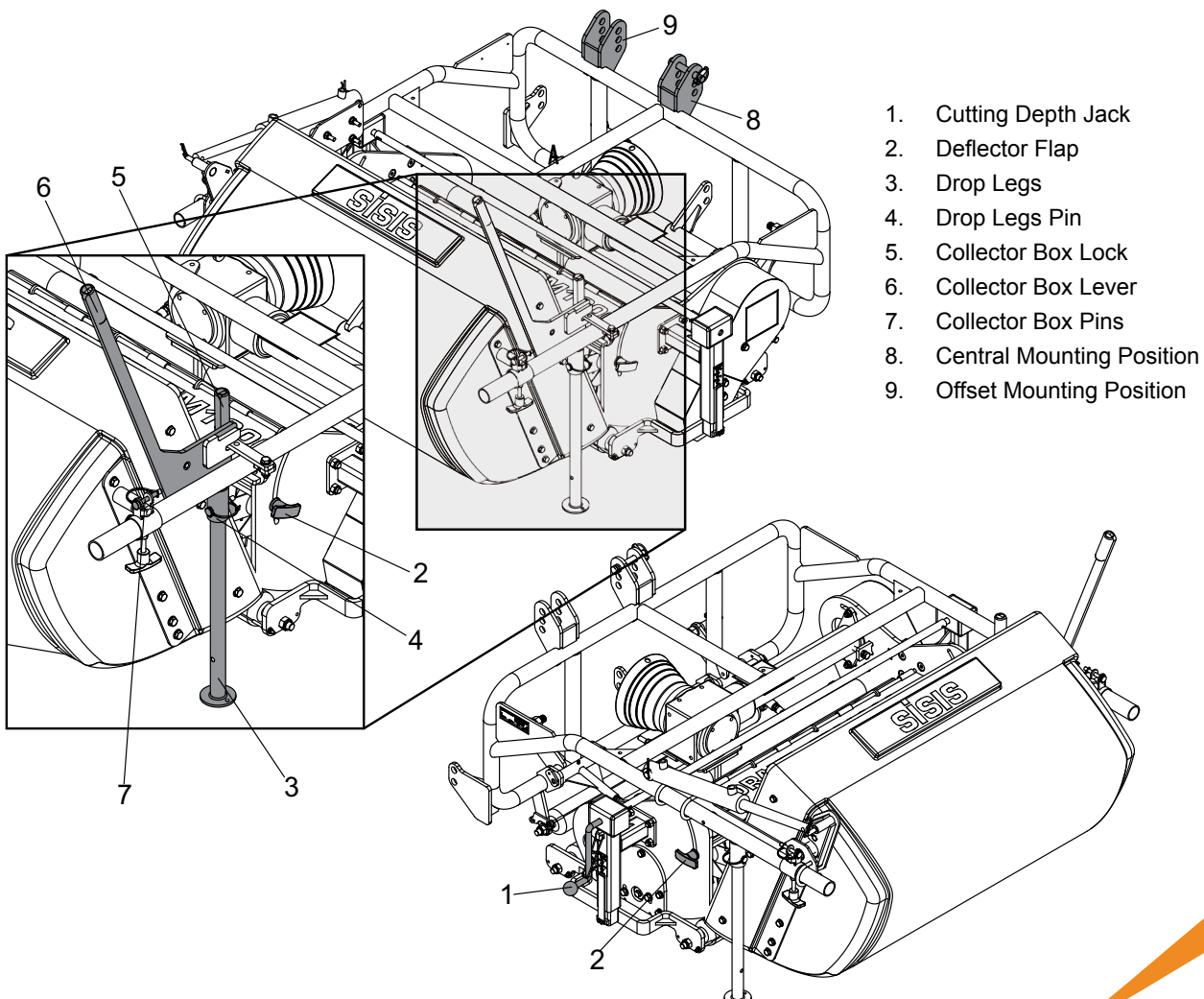
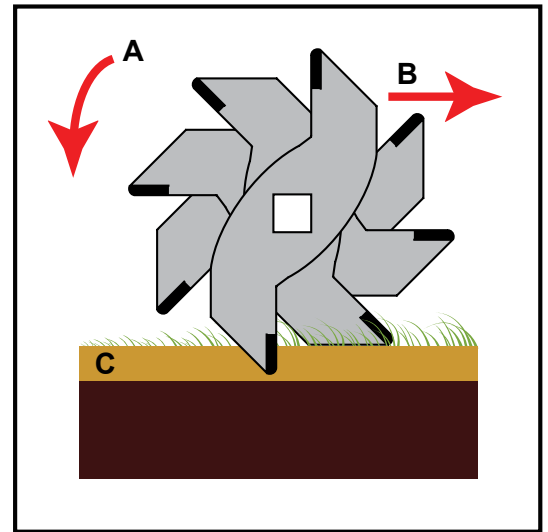
The TM1000 is a tractor mounted PTO driven scarifier. The scarifying unit floats inside the main chassis to follow ground contours.

When the collector box is fitted, the TM1000 will scarify and collect the thatch debris to a depth of approximately 25mm. When scarifying to greater depths and sand / soil is being removed the collection box must be removed.

The TM1000 incorporates the well proven SISIS rotorake contra-rotation principle, whereby the reel rotates at high speed against the direction of travel. The blades therefore cut upwards continuously throwing the thatch forwards rather than pushing it into the surface. This action also holds the machine to the ground, maintaining a regular working depth.

As well as thatch removal the TM1000 also aids aeration. The clean continuous slits assist water and air absorption through the thatch layer. These characteristic slits also improve the integration of top dressing and form an excellent surface for re-seeding.

The TM1000 is ideal to improve all fine turf areas such as golf greens, bowling greens, cricket squares, lawn tennis courts etc.



Important Safety Instructions

Keep in mind that the operators / users of the machinery are responsible for accidents or hazards occurring to themselves, other people and property. People who are unfamiliar with these instructions should not use this machinery. Local regulations or insurance may restrict the age of the operator. Children should not use this machinery. Take note of the following:

- Always switch off the PTO and the tractor engine before emptying the grass box or adjusting the machine.
- Always lower the machine to the ground before making any adjustments
- The box is not for collecting soil. Doing this may cause damage and invalidate warranty.
- The machine is designed to be used ONLY for the scarification / aeration of natural turf.
- Do not put hands and feet near or under the rotating parts.
- Only operate in daylight or good artificial light.
- Do not operate on excessively steep slopes.
- Exercise extreme care on slopes when changing direction.
- Keep clear of the discharge opening at all times.
- Never operate the machine while people, especially children, or pets are nearby.
- Never operate the machine with defective guards or safety devices.
- Before starting work, always carry out a visual check for damaged / loose parts or wear to working parts such as tines / blades.
- Always use manufactures genuine, guaranteed spare parts and tines.

PTO Drives from Tractors

- The PTO requires cutting to length before use.
- Before attaching or adjusting the PTO driven implements, always stop the engine and disengage the PTO drive.
- Never operate PTO shafts at extreme angles and take particular care to avoid high linkage lift positions with the PTO in operation (i.e. at the end of a working run)
- Many tractors now have multi speed PTO systems. Take special care that the PTO speed selected is suitable for the implement being used (TM1000 540rpm. i.e. never use 1000rpm on an implement designed for 540rpm.)



CAUTION

BEFORE YOU OPERATE THIS MACHINERY YOU MUST READ AND UNDERSTAND THIS MANUAL. IF YOU ARE IN ANY DOUBT PLEASE ASK YOUR EMPLOYER OR CONTACT US AT SISIS DIRECTLY.

PREPARATION (Ref. Machine Description)

- Thoroughly inspect where the equipment is to be used and remove all hazards and foreign objects including stones, sticks, wire, bones etc.
- Thoroughly inspect the machine for missing components, damage and wear. Replace components where necessary. This check must include all guards

MOUNTING THE MACHINE (Ref. Machine Description)

- The TM1000 has two mounting positions, either central (Item 8) or offset (Item 9). The offset position can be used when scarifying without the collector box so the tractor wheels do not run over the debris on the following passes.
- Fit to 3-point linkage (Ref. tractor operators manual)
- Adjust tractor check chains (Ref. tractor operators manual)
- Fit PTO shaft ensuring that it is cut to the correct length. (Ref. PTO instructions)
- Adjust the top link until the front of the main frame is vertical.
- Lift into the transport position and remove the drop legs (Item 3)

CUTTING DEPTH (Ref. Machine Description)

- With the machine mounted to the tractor and raised off the ground, adjust the Jack (Item 1) to set the depth.
Note:- the scale is for guidance only.
- Adjust the deflector flap (Item 2) to the required position

START SCARIFYING (Ref. Machine Description)

- Position the tractor ready for the first run. Lower the implement to hover just clear of the ground (Blades clear)
- With the tractor on tick over ONLY (850 – 900 RPM) engage the PTO drive. The scarifier blades will start to rotate.



CAUTION

NEVER RUN THE PTO AT HIGH SPEED WHILE THE BLADES ARE OFF THE GROUND. THIS COULD SERIOUSLY DAMAGE THE MACHINE.

- Start the tractor moving slowly forward. Lower the implement, as the blades start to contact the turf, build engine RPM increasing the PTO speed to 540RPM.
Note:- When the blades are in contact with the ground the PTO speed should be 540RPM at all times. This reduces shear load on the drive system and will achieve a clean scarifying action.
- The forward speed of the tractor is determined by the depth of scarification and the material being removed. These are infinitely variable and therefore the speed must be adjusted according to the conditions.
Note: Scarifying must be carried out in straight lines. Turning whilst the machine is in operation will cause serious damage to the turf and potentially to the machine.
- At the end of the run, slowly lift the implement on the 3-point linkage and reduce the engine RPM at the same time.
- Disengage PTO drive while turning ready for the next run.



CAUTION

NEVER RUN THE PTO AT HIGH SPEED WHILE THE BLADES ARE OFF THE GROUND. THIS COULD SERIOUSLY DAMAGE THE MACHINE.

- Repeat these steps until the area is completely scarified.



CAUTION

BEFORE YOU OPERATE THIS MACHINERY YOU MUST READ AND UNDERSTAND THIS MANUAL. IF YOU ARE IN ANY DOUBT PLEASE ASK YOUR EMPLOYER OR CONTACT US AT SISIS DIRECTLY.

Note:- The box is for collecting thatch debris ONLY. If working deeper into the soil surface the box MUST be removed.

EMPTY THE COLLECTOR BOX (Ref. Machine Description)

Note:- PTO shaft to be disengaged before emptying collector box.

- Rotate lock (Item 5) to release the tube.
- Using the lever (Item 6), rotate the box toward the machine.
- Return the box to the original position, ensuring the lock (Item 5) is secure.

Note: A Hydraulic tip kit is available and can be retro fitted and used on tractor with a double acting spool valve.

REMOVE THE COLLECTOR BOX (Ref. Machine Description)

- Rotate lock (Item 5) to release the tube.
- Remove 2-off pins (Item 7)
- Lift box clear of the frame.

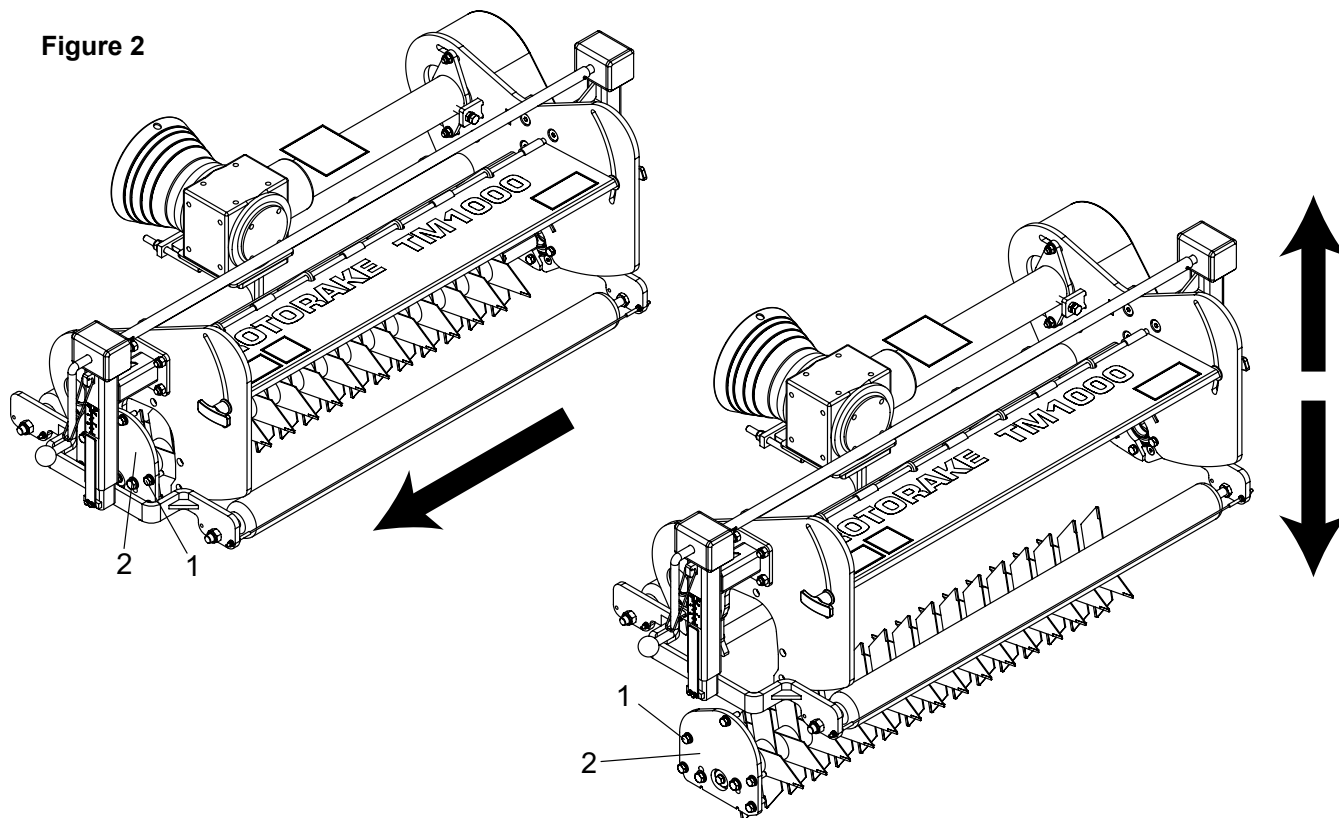
Note:- 2 person lift

STORAGE

- Ensure the machine is cool before storing inside.
- DO NOT power wash near bearings on the machine.

The TM1000 has a quick change reel system. This not only allows damaged or worn blades to be changed easily and quickly, but also makes the machine multi-purpose.

Figure 2



REMOVING / REPLACING THE REEL (ref. Fig 2)

- With the machine mounted to a tractor, Position the reel to be just above the ground.
 - Remove the 5-off bolts (Item 1) holding the bearing plate (Item 2) (17mm spanner)
 - Pull the reel to disengage it from the square drive.
- NOTE:-** Caution should be taken when handling the Reel shaft as the blades are very sharp. Wear gloves.
- With the reel now resting on the ground, manipulate it to be free of the frame.
 - Raise the frame with the tractor, leaving the reel on the ground.
 - Replace the Reel in the same way, ensuring that the square end is securely located in the drive socket and the bearing plate bolts are tight.

REPLACING BLADES ON THE SHAFT (ref. fig 3)

- Remove shaft from machine
- Remove split pin from square end of shaft (Item 2)
- Remove square bore washer (Item 4)
- Remove old blades and rubber spacers.
NOTE:- The direction of rotation of the blade.
- Rebuild the Reel with the new blade, and square bore washer.
- With the Allen key provided (8mm), tighten the M10 x 25 bolts (item 9) to clamp the Tine Compression tool to the shaft as shown.
- With the same Allen key, tighten the M10 x 80 bolts (item 10). This will compress the assembly of tines and spacers until the split pin hole is revealed.
- Replace the split pin.
- Remove the Tine Compression Tool.

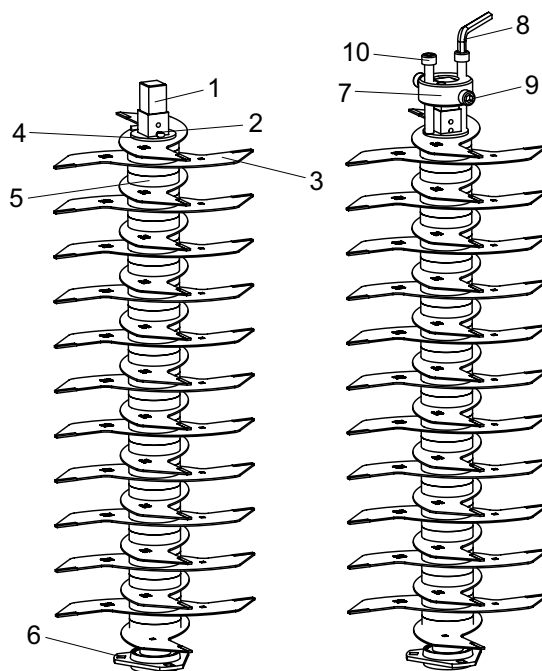
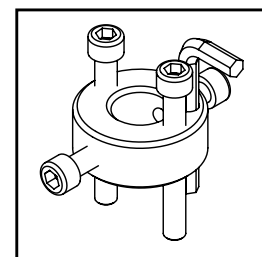


Figure 3



Tine Compression Tool

NOTE:- Tine Compression Tool part number, FS0966

AVAILABLE REELS

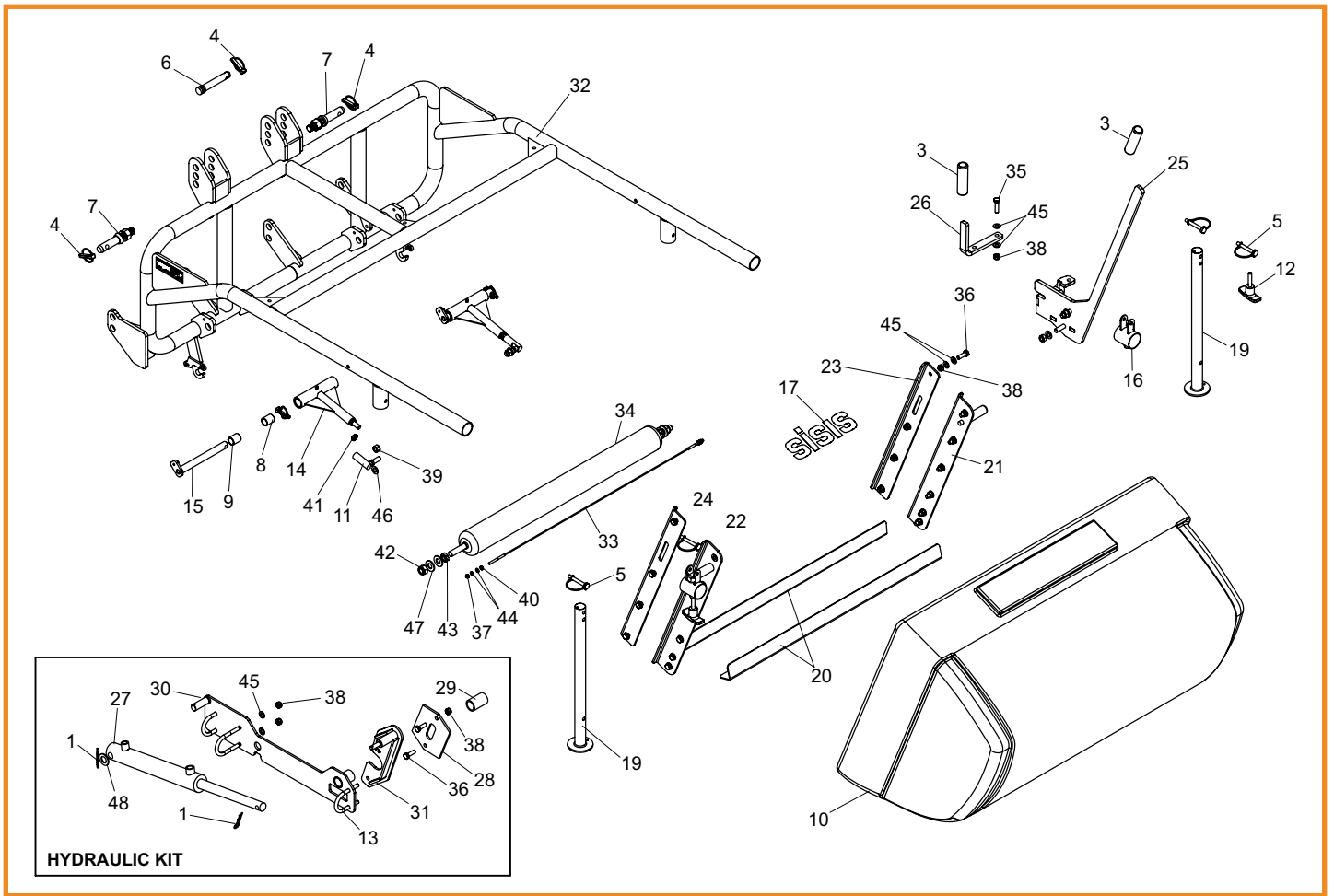
1mm light scarifying Reel	(FS1260)
2mm scarifying / thatch removal Reel	(FS1259)
3mm scarifying / thatch removal Reel	(FS1261)
Brush Reel Std	(FS1263)
Faze-Mo	(FS1262)

General Adjustments

ADJUSTING THE BELT TENSION (Ref. Frame Spare Parts List)

The belt adjustment is achieved by moving the gearbox.

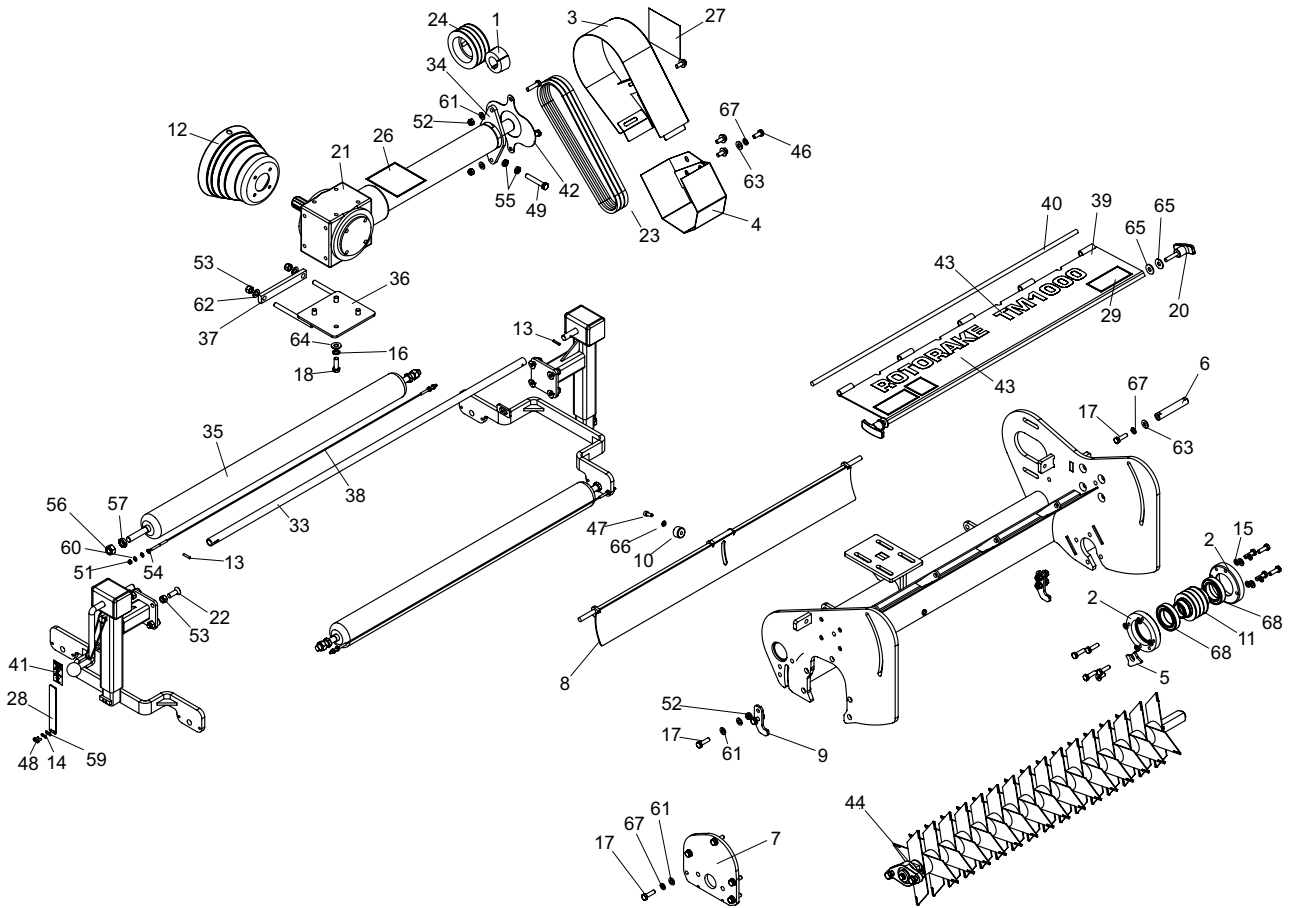
Item 36 (gearbox plate) can be slid backwards and forwards therefore adjusting the belts. This must be done in conjunction with Item 34 (extension shaft adjuster) to keep the gearbox square to the side plate.



1.01

Frame Assembly

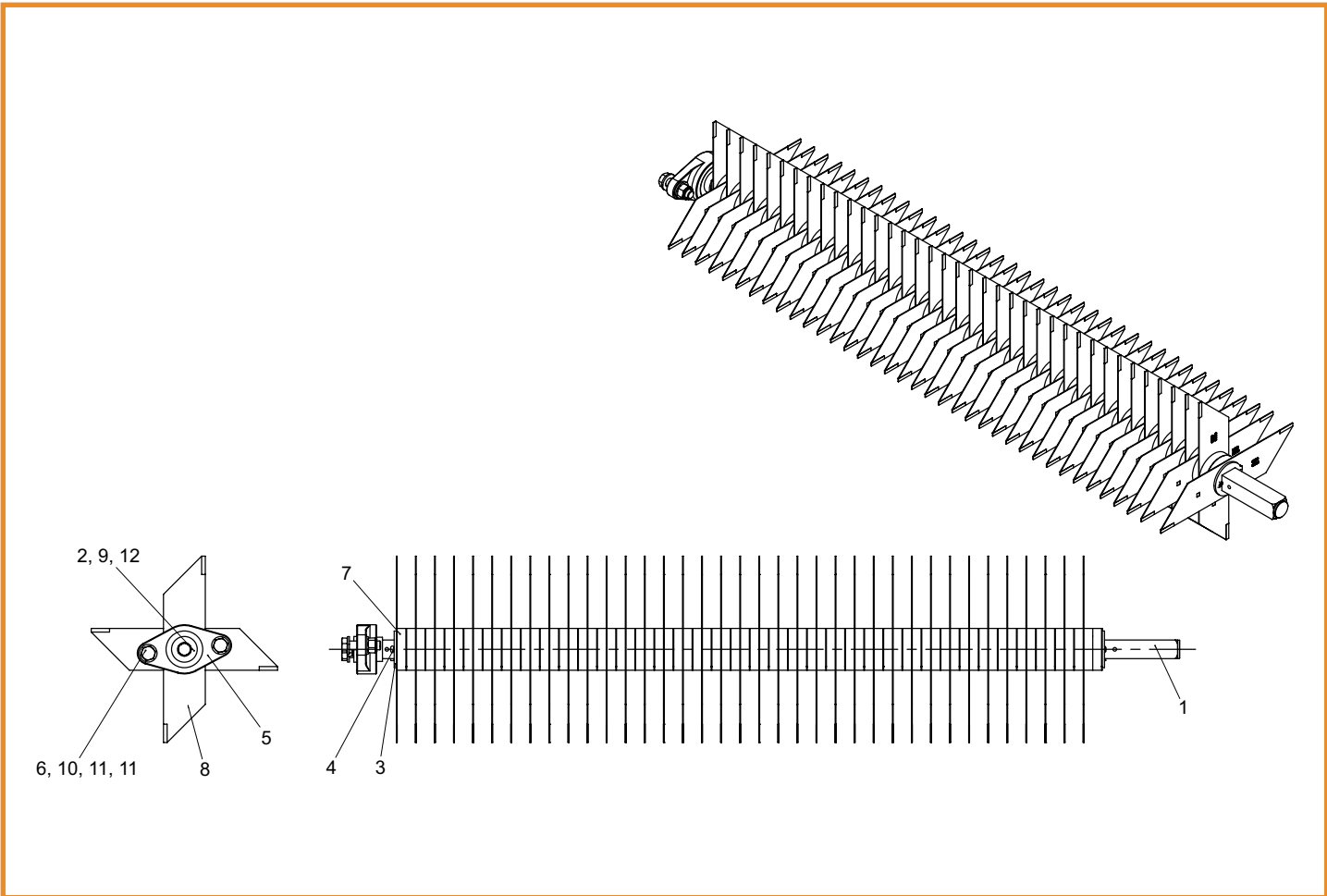
Item No.	Part No.	Description	Quantity	Item No.	Part No.	Description	Quantity
1	D1900	Clip R (Sparex Ref S9)	2	41	SP02014	Nut M12 Lock (Thin)	2
2	D1947	Grease Nipple M6	2	42	SP02028	Nut M16 Nyloc (T)	2
3	D8256	Foam Handle Grip	2	43	SP02029	Nut M16 Lock (Thin)	2
4	D8326	Pin Linch 7/16"	3	44	SP03010	Washer M6 Form A	4
5	D8436	Pin Linch Dia 9.2	4	45	SP03011	Washer M10 Form A	46
6	D8617	Top Link Pin 3/4"	1	46	SP03012	Washer M12 Form A	4
7	F20327	Implement Mounting Pin	2	47	SP03021	Washer M16 Form C	4
8	F21090	Pin Linch 9mm	2	48	SP03022	Washer M20 Form A	1
9	F21467	Bush Oilite AM2025 - 30	4				
10	F21730	Collector 42"	1				
11	F21735	Ball Joint M12	2				
12	F21851	Tee Handle M10 x 45	2				
13	F22040	U Bolt 50Mm	3				
14	F35983	Pivot Arm Assy	2				
15	F35984	Pivot Pin	2				
16	F35988	Collector Positioner	2				
17	F35993	Decal Sisis Orange	1				
18	F36000	Serial No Plate (Sisis)	1				
19	F36022	Drop Leg TM1000	2				
20	F36114	Collector Baffle	2				
21	F36211	Stiffener L.H. (Outside)	1				
22	F36212	Stiffener R.H. (Outside)	1				
23	F36214	Stiffener L.H. (Inside)	1				
24	F36215	Stiffener R.H. (Inside)	1				
25	F36300	Handle Latch WA	1				
26	F36302	Lock Plate	1				
27	F36717	Hydraulic Cylinder	1				
28	F36854	Mounting Plate	1				
29	F36856	Spacer	1				
30	F36857	Mounting Plate	1				
31	F36858	Swivel Plate Assy	1				
32	F37000	Frame TM1000	1				
33	HU60143	Wire Scraper	1				
34	HU60146	Roller	1				
35	SP01020	Hex Set Screw M10 x 40	1				
36	SP01105	Hex Set Screw M10 x 30	20				
37	SP02004	Nut M6 Nyloc	2				
38	SP02008	Nut M10 Nyloc (T)	25				
39	SP02010	Nut M12 Nyloc (T)	4				
40	SP02011	Nut M6 Lock (Thin)	2				



2.01

Head Assembly

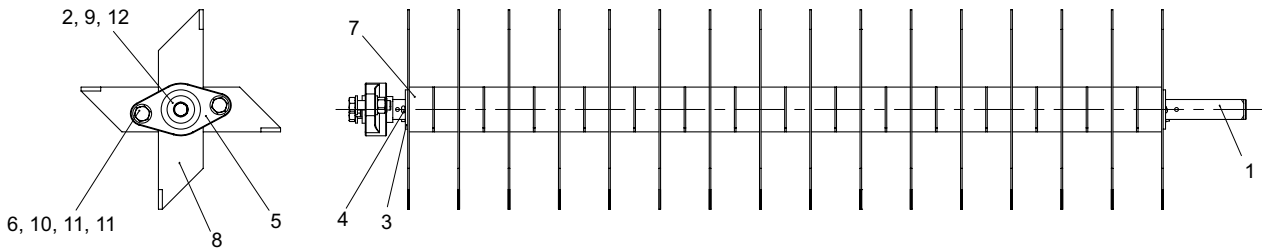
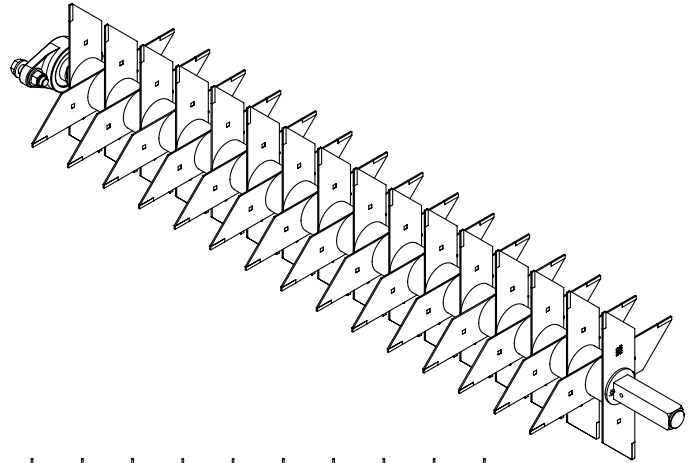
Item No.	Part No.	Description	Quantity	Item No.	Part No.	Description	Quantity
1	22404	Taper Bush 2012-35	1	39	F36582	Deflector Assy	1
2	401864	Bearing Housing	2	40	F36583	Deflector Shaft	1
3	401865	Belt Guard Upper	1	41	F36586	Depth Label	2
4	401866	Belt Guard Lower	1	42	F36587	Shield	1
5	401875	Guard Plate Seal	1	43	F36638	Decal Tm1000	1
6	401876	Post Guard	1	44	See Pages 3.01 - 3.05	Reel	1
7	401883	Subplate Bearing	1	45	SP01020	Hex Set Screw M10 x 40	2
8	401885	Sliding Deflector WA	1	46	SP01035	Hex Set Screw M10 x 25	5
9	401892	Height Stop	2	47	SP01049	Cap Head M8 x 20	1
10	401909	Boss Skid Guard	1	48	SP01074	Hex Set Screw M5 x 12	4
11	401917	Pulley 3 Groove 80 PCD	1	49	SP01102	Hex Set Screw M12 x 70	1
12	D1734	Implement Shield	1	50	SP01105	Hex Set Screw M10 x 30	4
13	D8161	Pin Slotted M5 x 25	2	51	SP02004	Nut M6 Nyloc	4
14	E1-1060	M5 Spring Washer	4	52	SP02008	Nut M10 Nyloc (T)	6
15	E1-1063	M10 Spring Washer	8	53	SP02010	Nut M12 Nyloc (T)	10
16	E1-1065	Spring Washer M12 Square Section	4	54	SP02011	Nut M6 Lock (Thin)	4
17	E1-1119	Hex Set Screw M10 x 35	14	55	SP02014	Nut M12 Lock (Thin)	2
18	E1-1154	Hex Set Screw M12 x 35	4	56	SP02028	Nut M16 Nyloc (T)	4
19	E1-1202	Csk Cap Head M10 x 25	1	57	SP02029	Nut M16 Lock (Thin)	4
20	F21851	Tee Handle M10 x 45	2	58	SP02046	Rivnut Hex M10 (1.0-3.5) [No Head]	1
21	F21955	Gearbox TI	1	59	SP03009	Washer M5 Form A	4
22	F21964	Csk Cap Head M12 x 35	8	60	SP03010	Washer M6 Form A	8
23	F21966	Belt V A36 944	3	61	SP03011	Washer M10 Form A	20
24	F21967	Pulley 3 Groove 112 PCD	1	62	SP03012	Washer M12 Form A	2
25	F30465	Safety Warning Label	1	63	SP03016	Washer M10 Form C	5
26	F31154	Safety Pto Label	1	64	SP03017	Washer M12 Form C	4
27	F31274	Cover Remove Label	1	65	SP03018	Washer M10 Form G	4
28	F33540	Depth Indicator	2	66	SP03029	Washer M8 Spring Lock	1
29	F34053	Debris Warning Label	2	67	SP03034	Washer M10 Spring Lock	11
30	F36558	L.H. Jack Assembly	1	68	SP06019	Bearing 6010-2RS	2
31	F36559	R.H. Jack Assembly	1				
32	F36570	TM1000 Chassis	1				
33	F36571	Jack Cross Shaft	1				
34	F36573	Extension Shaft Adjuster	1				
35	F36575	Roller	2				
36	F36576	Gearbox Plate	1				
37	F36577	Adj Strap	1				
38	F36581	Wire Scraper	2				



3.01

1mm Reel Assembly

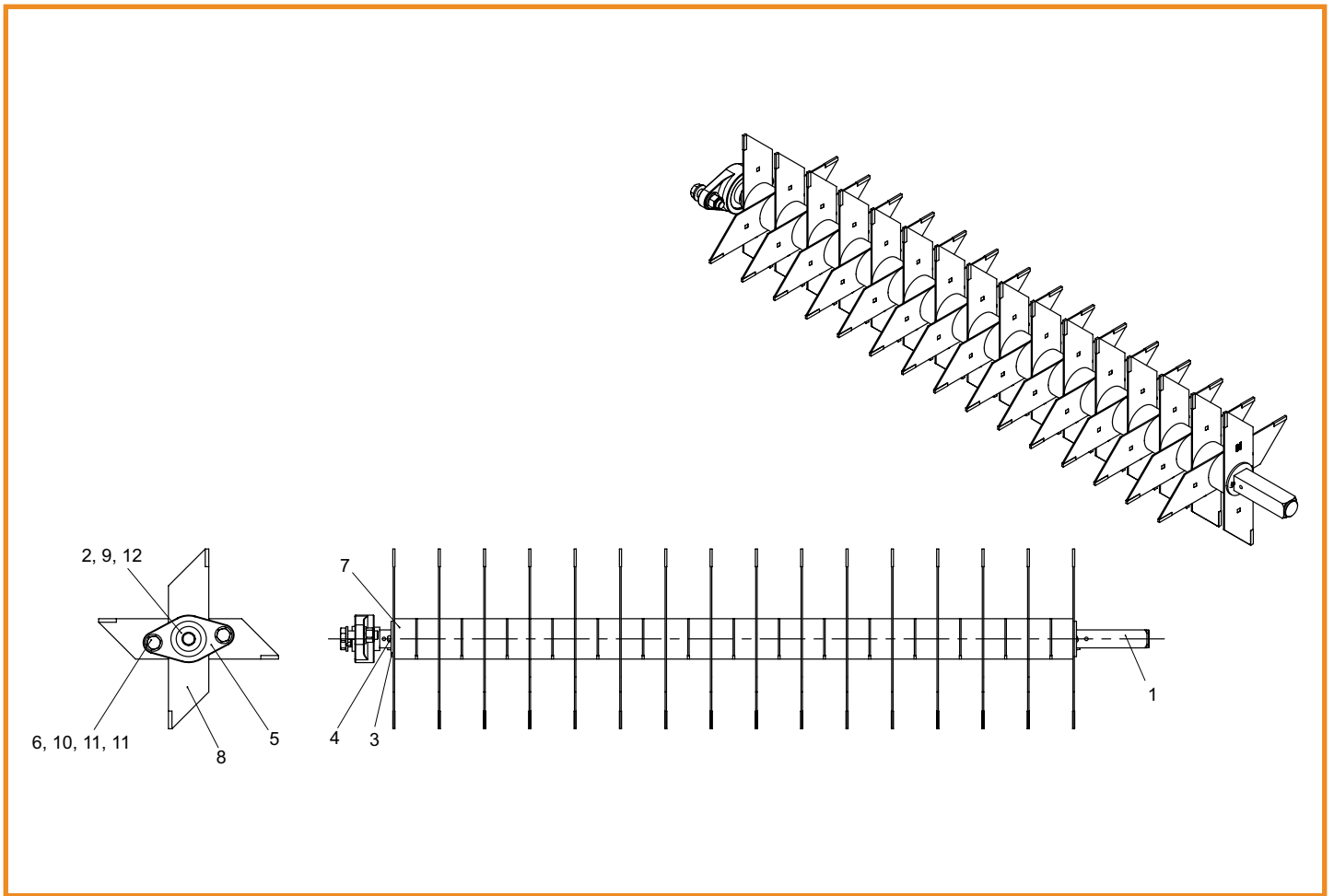
Item No.	Part No.	Description	Quantity
1	401863	Tine Shaft	1
2	401899	Plate End Tineshaft	1
3	D3051	Square Washer	2
4	D5622	Split Pin Dia 5 x 50	2
5	D8298	Bearing 25mm ID Flange UCFL205	1
6	E1-1157	Hex Bolt M12 x 45	2
7	F36235	Rubber Tine Spacer	74
8	F36608	Tine 2 Blade 1mm Tipped	74
9	SP01035	Hex Set Screw M10 x 25	1
10	SP02010	Nut M12 Nyloc (T)	2
11	SP03012	Washer M12 Form A	4
12	SP03034	Washer M10 Spring Lock	1



3.02

2mm Reel Assembly

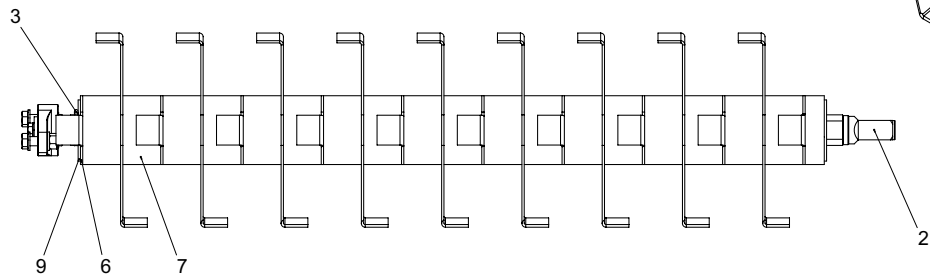
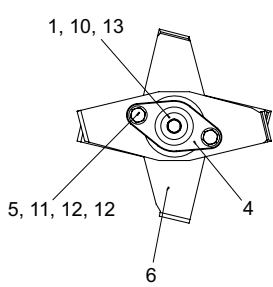
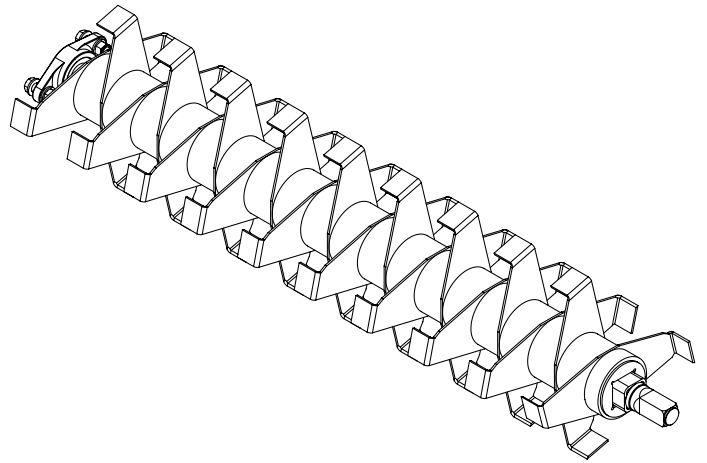
Item No.	Part Number	Description	Quantity
1	401863	Tine Shaft	1
2	401899	Plate End Tineshaft	1
3	D3051	Square Washer	2
4	D5622	Split Pin Dia5 x 50	2
5	D8298	Bearing 25mm ID Flange UCFL205	1
6	E1-1157	Hex Bolt M12 x 45	2
7	F36106	Tine 2 Blade 2mm Tipped	31
8	F36584	Rubber Spacer	30
9	SP01035	Hex Set Screw M10 x 25	1
10	SP02010	Nut M12 Nyloc (T)	2
11	SP03012	Washer M12 Form A	4
12	SP03034	Washer M10 Spring Lock	1



3.03

3mm Reel Assembly

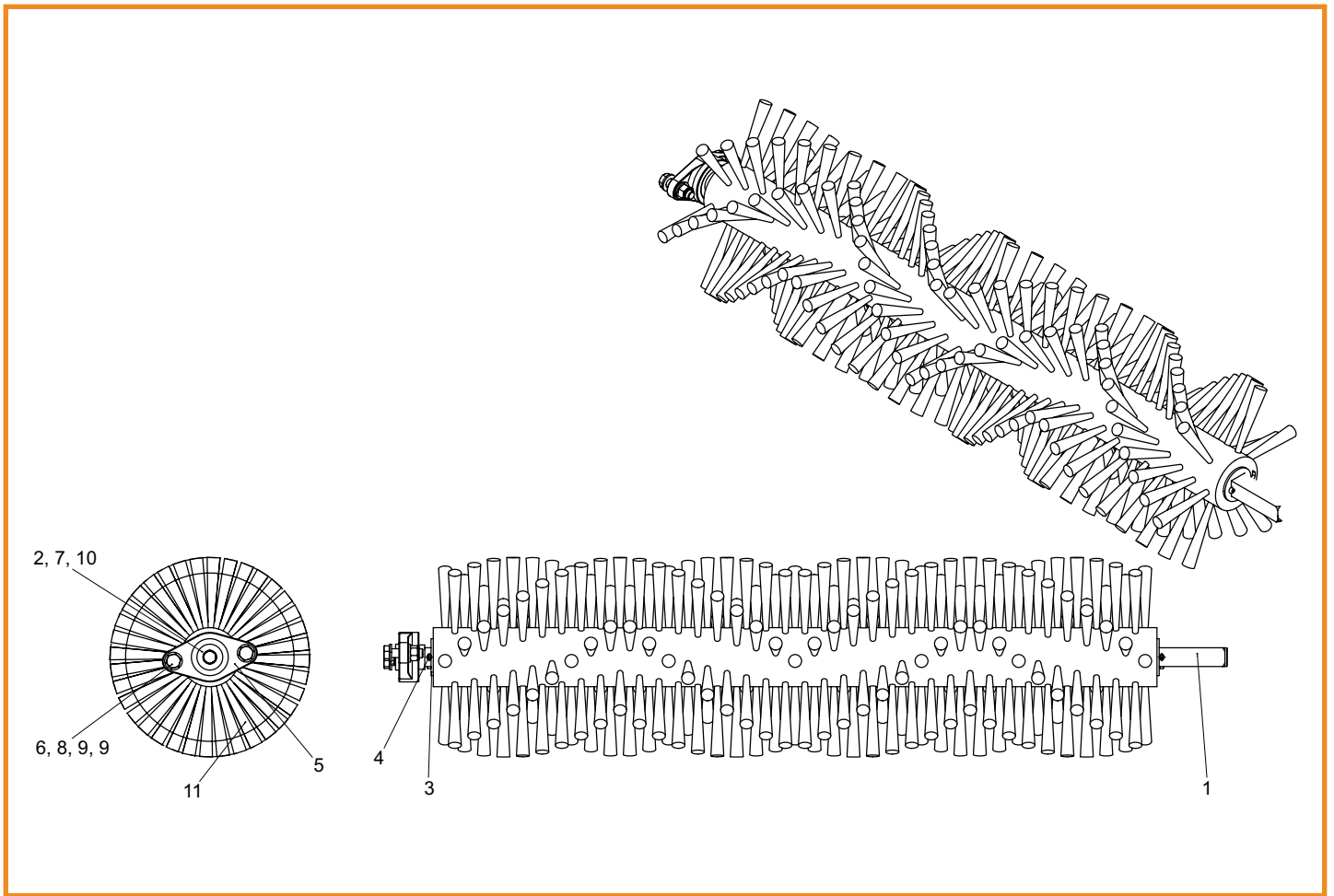
Item No.	Part No.	Description	Quantity
1	401863	Tine Shaft	1
2	401899	Plate End Tineshaft	1
3	D3051	Square Washer	2
4	D5622	Split Pin Dia5 x 50	2
5	D8298	Bearing 25mm ID Flange UCFL205	1
6	E1-1157	Hex Bolt M12 x 45	2
7	F36231	Tine 2 Blade 3mm Tipped	31
8	F36584	Rubber Spacer	30
9	SP01035	Hex Set Screw M10 x 25	1
10	SP02010	Nut M12 Nyloc (T)	2
11	SP03012	Washer M12 Form A	4
12	SP03034	Washer M10 Spring Lock	1



3.04

Faze Reel Assembly

Item No.	Part Number	Description	Quantity
1	401899	Plate End Tineshaft	1
2	403021	Faze Reel Shaft Assy (TM1000)	1
3	D5622	Split Pin Dia5 x 50	2
4	D8298	Bearing 25Mm ID Flange UCFL205	1
5	E1-1157	Hex Bolt M12 x 45	2
6	F37536	Faze Mo Blade	19
7	F37750	Rubber Spacer	18
8	F37751	Rubber Spacer	1
9	F37752	Square Bore Washer	2
10	SP01035	Hex Set Screw M10 x 25	1
11	SP02010	Nut M12 Nyloc (T)	2
12	SP03012	Washer M12 Form A	4
13	SP03034	Washer M10 Spring Lock	1



3.05

Brush Reel Assembly

Item No.	Part No.	Description	Quantity
1	401863	Tine Shaft	1
2	401899	Plate End Tineshaft	1
3	D3051	Square Washer	2
4	D5622	Split Pin Dia5 x 50	2
5	D8298	Bearing 25mm ID Flange UCFL205	1
6	E1-1157	Hex Bolt M12 x 45	2
7	SP01035	Hex Set Screw M10 x 25	1
8	SP02010	Nut M12 Nyloc (T)	2
9	SP03012	Washer M12 Form A	4
10	SP03034	Washer M10 Spring Lock	1
11	SP24005	Double Helical Brush TM1000	1

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