



# GRASSLAND SUBSOILER



## 2010 Operator Manual and Parts List



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## 2.0 Summary

The SUMO Grassland Subsoiler has been developed to rejuvenate tired, stale and compacted grassland.

### **Firstly**

A leading row of straight serrated discs cut through the turf on individually suspended arms. The discs have adjustable depth positions which are easily altered via a one-bolt system. This allows the following Subsoiler legs easy entry into the pre-cut soil.

### **Secondly**

The legs, which are cut from 15mm Hardox 500, then lift and fracture the earth which has a pin adjustable depth of between 4”- 14” deep. The legs are available with either shear pin or hydraulic auto reset protection.

### **Finally**

The legs are followed by a packer which has a diameter of 508mm. The shark fin design ensures important surface aeration across the full working width of the machine. A ring of packer teeth run directly behind each that close up and firms the opening the leg has made in the worked pasture. The teeth also work as a continuous grip ensuring that the packer always turns and drives in any condition. Finally the scarifying harrow disturbs and removes any dead vegetation. The adjustable harrow can be moved out of work when not required.

Before using the SUMO Grassland Subsoiler it is absolutely necessary that you read this Operators Manual and Safety Instructions attentively.

Specifications, descriptions and illustrations in this brochure are accurate, as known, at the time of publication but may be subject to change.

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## **3.0 Safety**

This manual contains basic advice which should be observed during setting-up, operation and maintenance. Therefore, this operating manual must be read by the personnel concerned prior to starting up, using the machine and be available at all times.

If safety instructions are not complied with, then this can lead to the risk of injury to yourself and others as well as damage to the environment or the machine. Non-compliance to the safety instructions can also lead to claims for damages becoming invalid.

### **3.1 Qualification and Training**

- Ensure that only reliable, authorized personnel work on or with the machine. Statutory minimum age limits must be observed.
- Employ only trained or instructed staff; the individual responsibilities of the personnel concerning operation, setting up, maintenance and repair must be clearly established.
- Define the machine operators' responsibilities – also with regard to observing traffic regulations. The operator must have the authority to refuse any instructions issued by third parties, which contravene safety.
- Persons undergoing training or instruction or taking part in a general training course should not be allowed to work on or with the machine unless they are under the constant supervision of an experienced person.
- The use of spare parts, accessories and ancillary equipment not supplied and/or not approved by SUMO could have detrimental effects to the construction of the SUMO machine or on its functions and hence impair the active and/or passive driving and/or operational safety (accident prevention).
- SUMO shall not be responsible for any damage caused by the use of spare parts, accessories and ancillary equipment not supplied and/or approved by SUMO.
- Conversions of or modifications to the machine may only be carried out after consultation with SUMO.

### **3.2 General safety**

- Warning signs and other notices on the machine provide important information for the safe operation. Observing them will serve your safety.
- Before starting work, make yourself familiar with all the equipment and controls as well as their functions.
- The user should wear close-fitting clothing.
- Keep the machine and in particular the bearings clean to avoid risk of fire.
- Check around the machine before moving off or starting up (watch out for children!). Make sure you have adequate all-round visibility.
- Always match your speed to the local conditions. Avoid sudden turning manoeuvres when driving uphill or downhill or when travelling across a slope.
- Observe the respective regulations when using public roads.
- Take into account the wide overhang and/or the sideways force acting on the machine when turning or negotiating curves.

### **3.3 Special safety instructions**

- Take extreme care when hitching up or unhitching machine to/from the tractor.
- Never allow persons to stand between the tractor and the machine unless the tractor is secured against rolling away by means of parking brake and/or wheel chocks.
- During transport, secure the packer (using both pins) to prevent shock loading when encountering road undulations. Ensure stands are raised to their transport position.
- It is forbidden to allow persons to ride on the machine at any time. A safe distance should be maintained from the machine by observers when in work.
- Driving, steering and braking characteristics are influenced by mounted machines and ballast weights. Therefore, ensure adequate steering and braking ability.
- Never stand or work beneath suspended loads. Ensure stands are in position before commencing maintenance work.
- If there is a requirement to lift the Sumo Grassland Subsoiler, appropriate lifting apparatus must be used. The Grassland Subsoiler weighs approximately 1400kg (3 leg) and 1800kg (5 leg).
- When making adjustments to the machines care should be taken not to trap any body parts in moving or pivoting parts.

## **4.0 Operation and Adjustment**

### **4.1 Operation**

Before attaching the Grassland Subsoiler to a tractor is essential that the **stands are in the down position** to ensure a short top link once attached. Once attached securely to the tractor the machine can then be raised and the stands lifted out of the way. When the machine is removed from the tractor it is equally as important to leave the machine on the stands.

Due to the physical nature and weight distribution of the Sumo Grassland Subsoiler **a category three enclosed ball top link** is highly recommended as the best option for dealing with the exaggerated loads experienced during normal working conditions.

The top link should be as short as possible whilst remaining as close to horizontal as is achievable. In the majority of cases this means using the bottom hole on the Subsoiler and the top hole on the tractor. It is important to ensure the machine is running level to allow the optimum level of soil disturbance as well as to prolong the life of the wearing parts.

Changing the points on the Grassland Subsoiler must only be done on level ground. When it is deemed necessary to change the points, the stands should be lowered to the static position and other appropriate jacks, stands and chocks put into position in sensible locations. To avoid the risk of sinking and potential injury it is important to only change the points where ground conditions permit, i.e. solid concrete, tarmac etc. Care should be taken to ensure the Grassland Subsoiler is firmly and safely held before changing the points. The tractor engine must be turned off with the parking brake applied.

Bearings should be greased (see section 5.0 Maintenance); stands must be in the raised position and all relevant pins in the correct holes prior to commencing work.

Forward working speed should be governed by the local conditions as well as the finish produced by the Sumo Grassland Subsoiler.

### **4.2 Adjustments**

Depth adjustment of the Subsoiler legs on the Grassland Subsoiler is achieved by removing the lynch pin and depth pin (items 3 and 4 on page 16, 17) then lifting or lowering the leg by the handle at the top and replacing the pin in the appropriate hole. The maximum leg depth is 350mm.

To adjust the working depth, the weight must first be taken off the packer arms before the lynch pins and depth pins (items 7 and 8 on page 19) are removed. A new depth position can then be selected by replacing the pins in higher or lower holes.

### **4.3 Auto-Reset Legs**

The pressure in the hydraulic circuit controlling the auto-reset subsoiler legs can be altered depending on circumstances and preference up to a maximum of 50 bar. (Exceeding this pressure may result in damage to the machine). The higher the hydraulic pressure, the more resistance the legs have to tripping.

This is achieved by opening the flow control valve tap (item 6 on page 25, 26) and then by increasing the hydraulic pressure from the tractor until the desired system pressure is displayed on the pressure gauge. At this point close off the tap. To reduce pressure in the circuit, set the tractor to float and slowly open the tap whilst watching the pressure gauge, once the desired lower pressure is reached, shut off the tap immediately.

## **5.0 Maintenance**

The packer bearings should be greased with one pump once a week and after washing off.

The disc bearings should be greased until old grease is forced out once a week when in normal use and after washing off.

The condition of the subsoiler legs, the points and the discs should be regularly monitored in order to maintain the most efficient use of the machine.

The condition and position of the packer scrapers should also be observed in order to prevent soil building up on the packer. Ensure the scrapers are not touching the packer though, as this will add rolling resistance as well as causing premature wear of the packer.

**Auto Reset** - Grease points can be found on all rams on auto reset machines. These require one pump of grease every 50 hours. Exposed chrome ram rods should also be greased weekly to prevent these valuable parts from rusting and causing costly oil leaks.

### **5.1 Spares**

When ordering replacement parts please have your serial number, part numbers (listed in Section 6.0) and quantities at hand.

### **5.2 Winter storage**

When machines are to be parked up for the winter period, correct storage techniques are an important part of protecting the machine to ensuring a hassle free season. When the machine has finished work it should be cleaned down and washed off to remove all traces of soil.

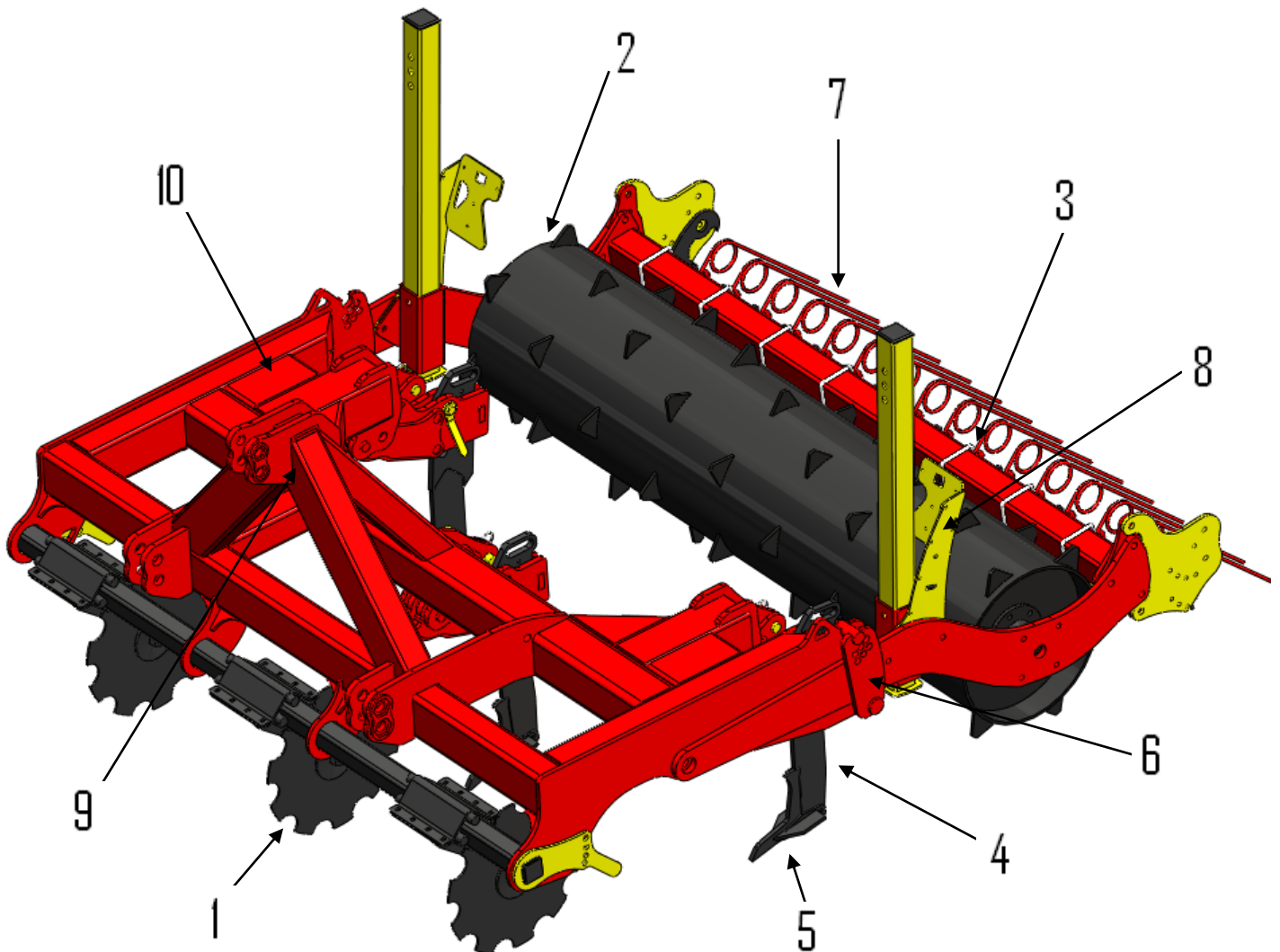
After washing the Sumo Grassland Subsoiler, the packer bearings should be greased with one pump and the disc bearings should be greased until old grease is forced out. Other grease points are located on all rams on auto reset machines and these should receive two or three pumps of grease.

When the machine is parked up a note should be made of what wearing parts require replacing ready for the next seasons work. The wearing parts can then be ordered in time ready for the next season's work in good time to avoid delays when the machine is required earlier than expected!

## 6.0 Parts and Assembly

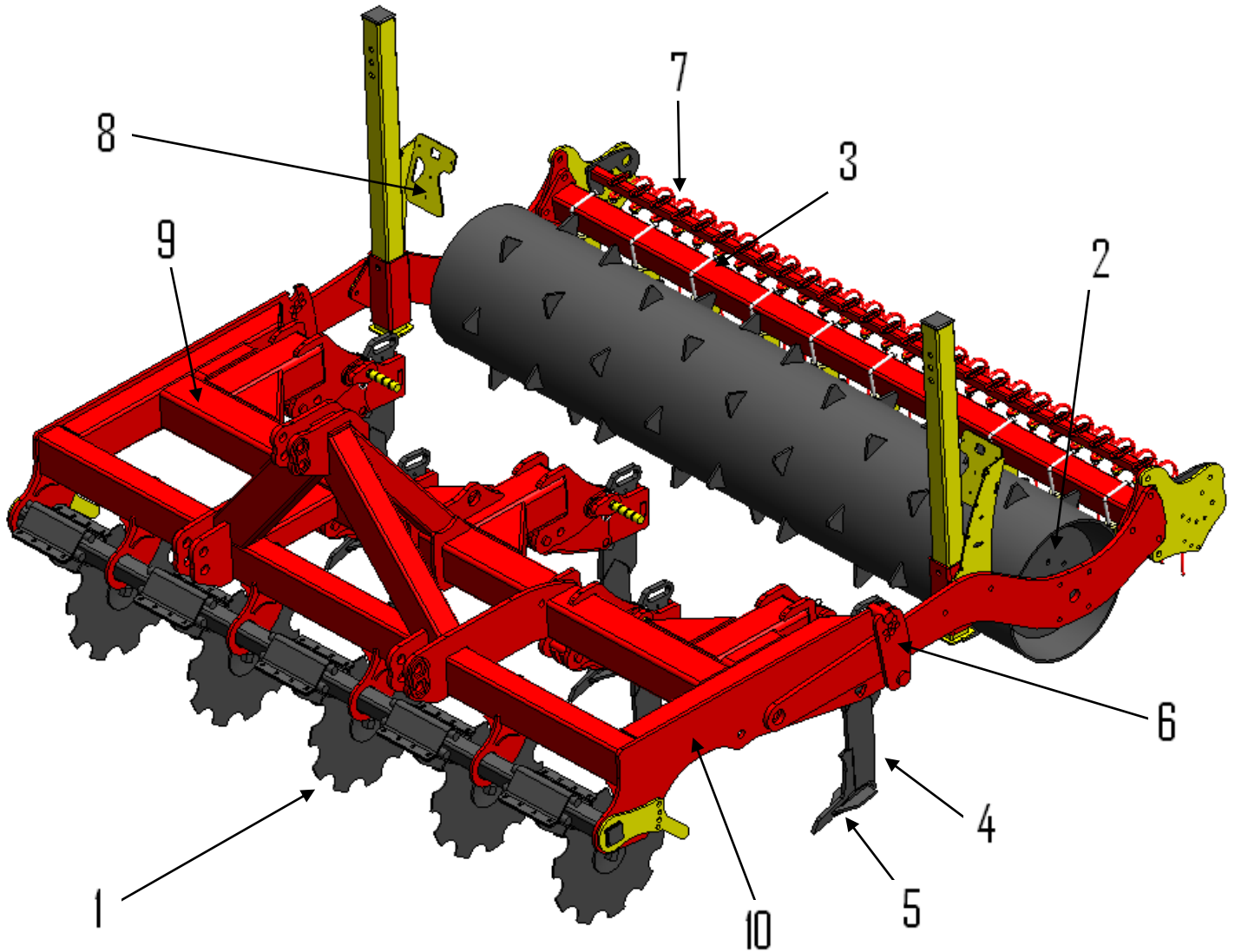
### 6.1 Assembly Overviews

# 3 Leg Shearbar



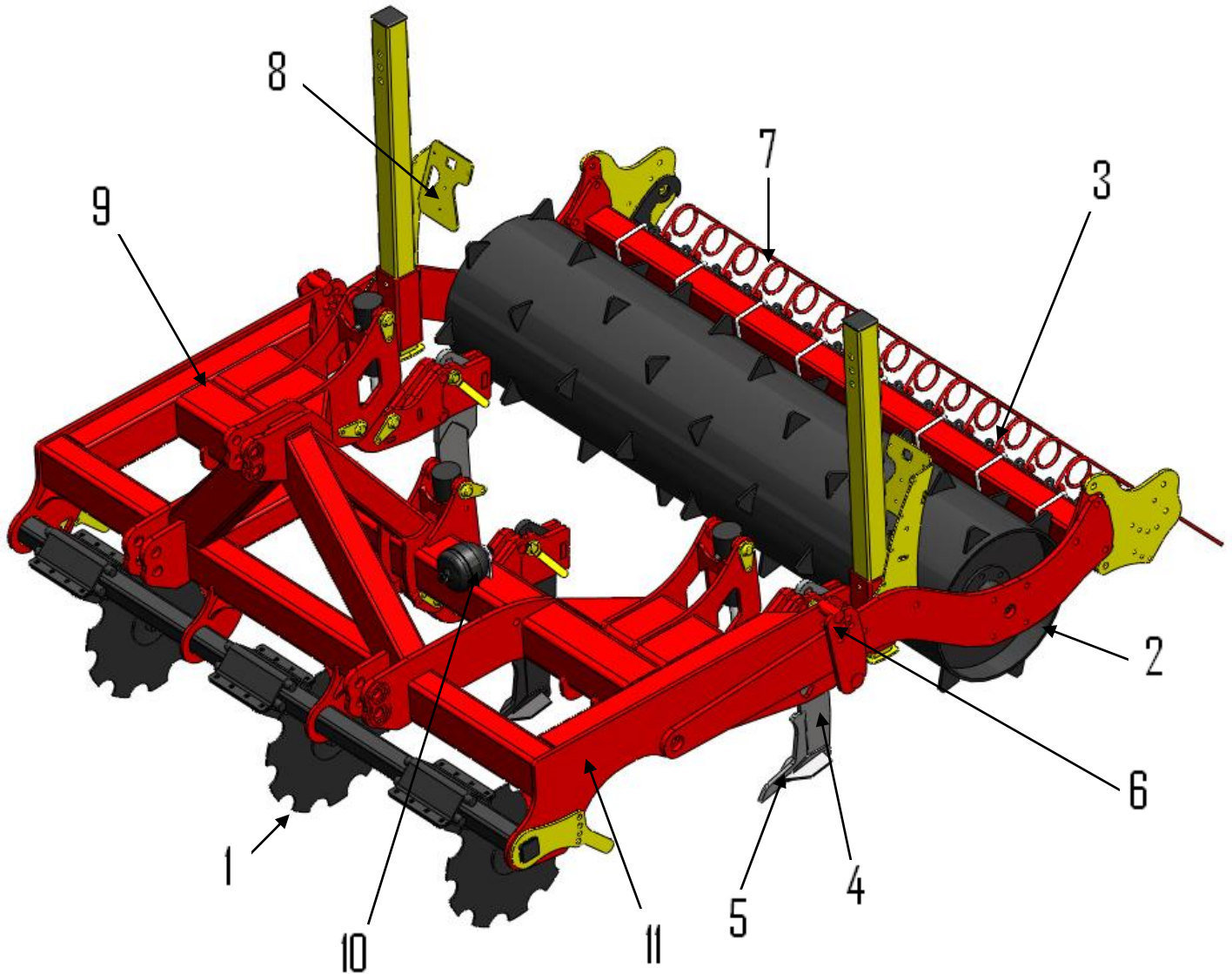
Item	Description	Page
1	Disc Assembly	12
2	Packer Assembly	14
3	Scraper Assembly	15
4	Leg Assemblies	16 -17
5	Point Assemblies	18
6	Depth Control	19
7	Harrow Assembly	20
8	Lights	23
9	Main frame	24
10	Stickers and Paint	27

# 5 Leg Shearbar



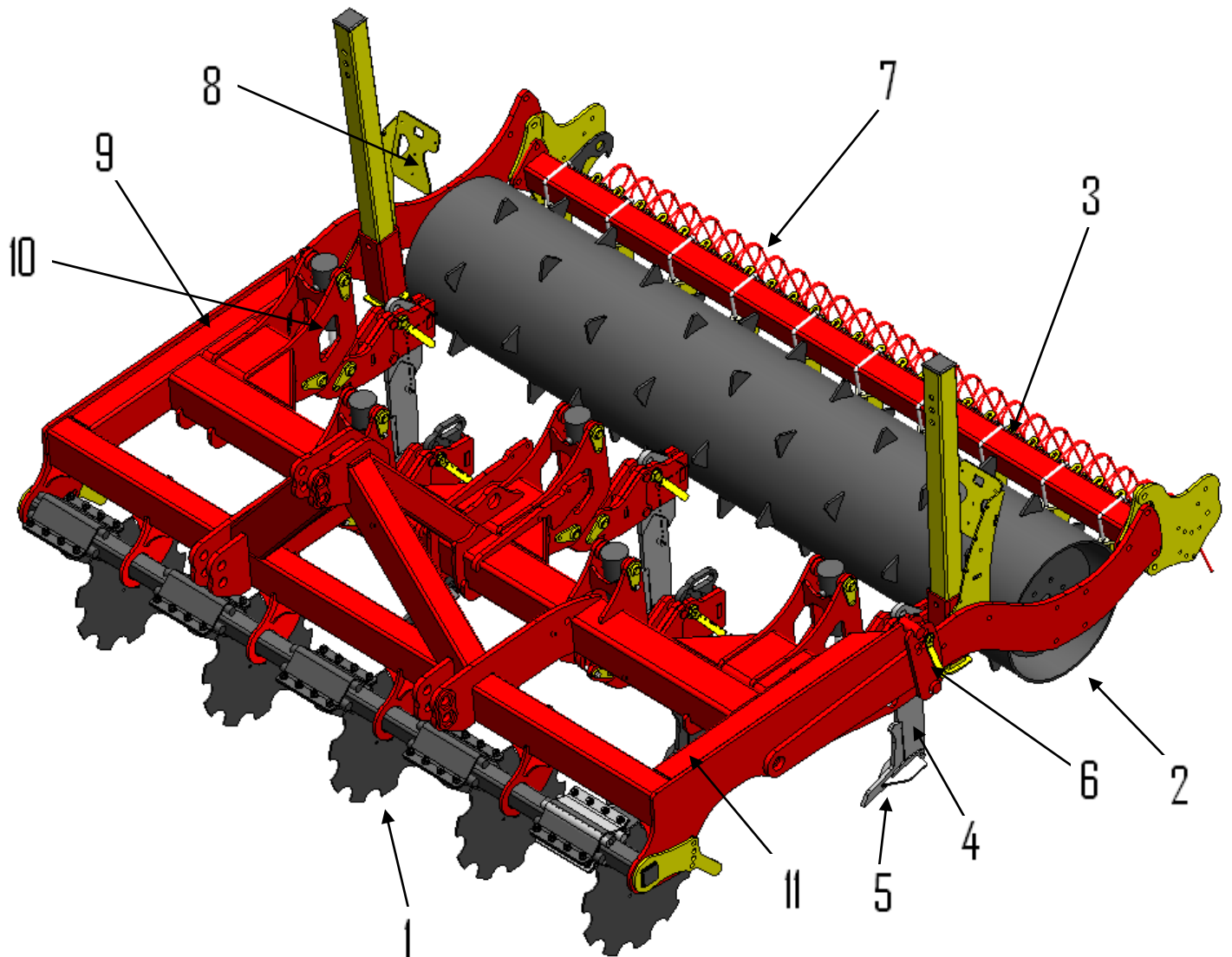
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# 3 Leg Auto Reset



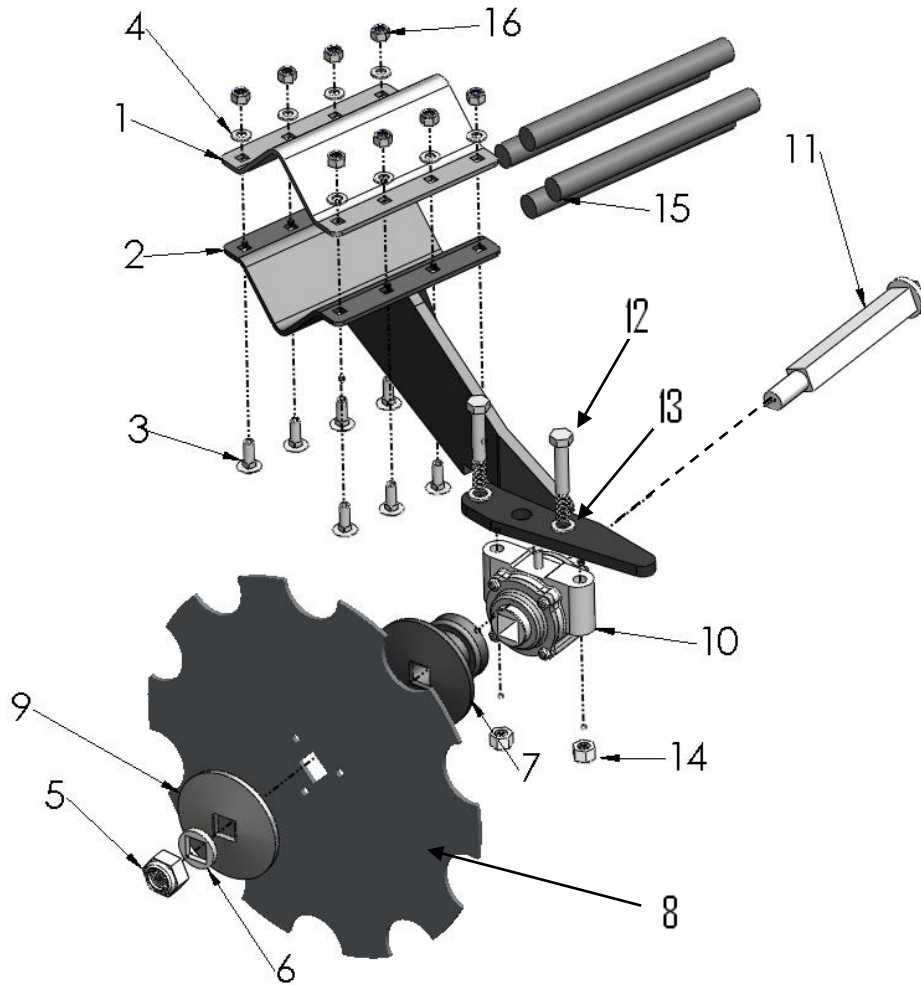
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6	Depth Control	19
7	Harrow Assembly	20
8	Lights	23
9	Main frame	24
10	Auto Reset Hydraulic Circuit	25
11	Stickers and Paint	27

# 5 Leg Auto Reset



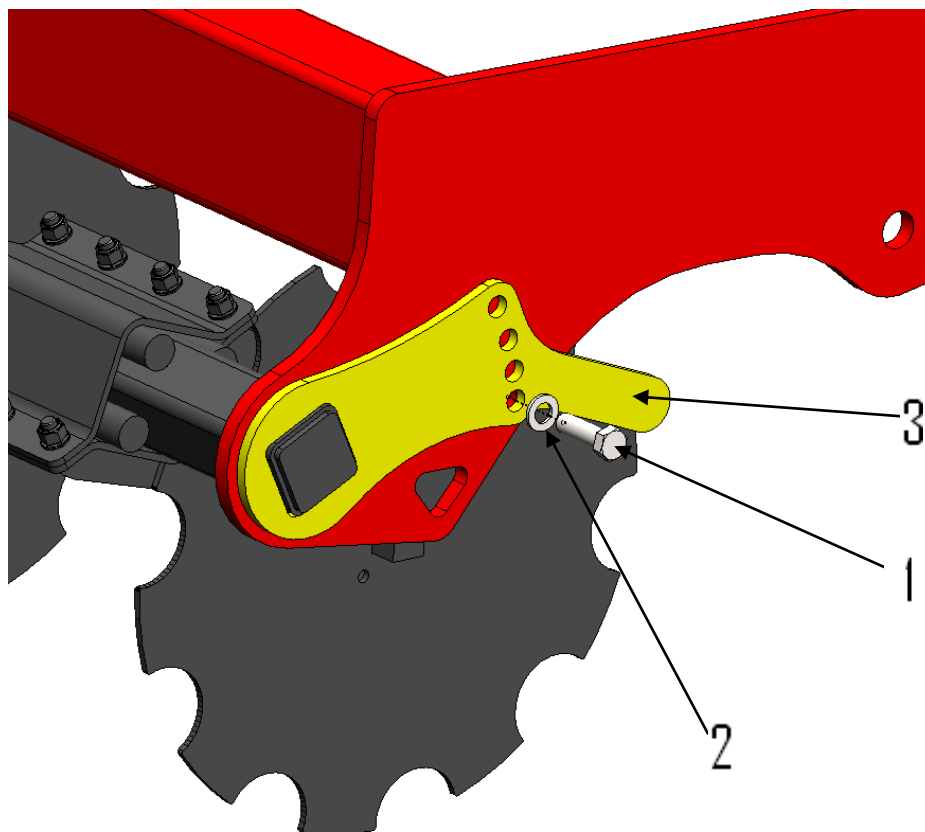
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11	Stickers and Paint	27

## 6.2 Single Disc Unit



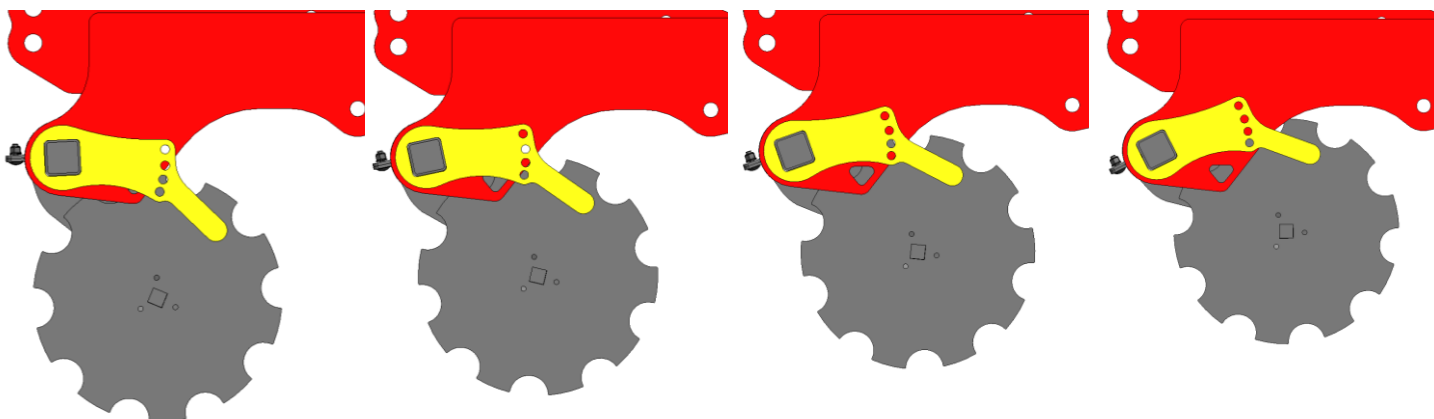
Item	Part No.	Description	Quantity/ unit	Quantity/ 3 leg machine	Quantity/ 5 leg machine
1	SW107	Top clamp bracket	1	3	5
2	SW547	Straight disc arm unit	1	3	5
3	SWM1235chsq	M12 x 35 cup head square	8	24	40
4	SWM12001	M12 Flat washer	8	24	40
5	SWM30004	M30 Nylock	1	3	5
6	SW104	Small washer	2	6	10
7	SW546	Flat disc and dust cover	1	3	5
8	SWB164	20" Straight disc	1	3	5
9	SW548	Large flat washer	1	3	5
10	SWB102	Disc bearing complete	1	3	5
11	SW109	Single disc axle	1	3	5
12	SWM16110	M16 x 110 bolt	2	6	10
13	SWM16001	M16 flat washer	4	12	20
14	SWM16004	M16 Nylock	2	6	10
15	SWB103	Rubber cord	4	12	20
16	SWM12004	M12 Nylock	8	24	40

### 6.3 Front Disc angle adjustment

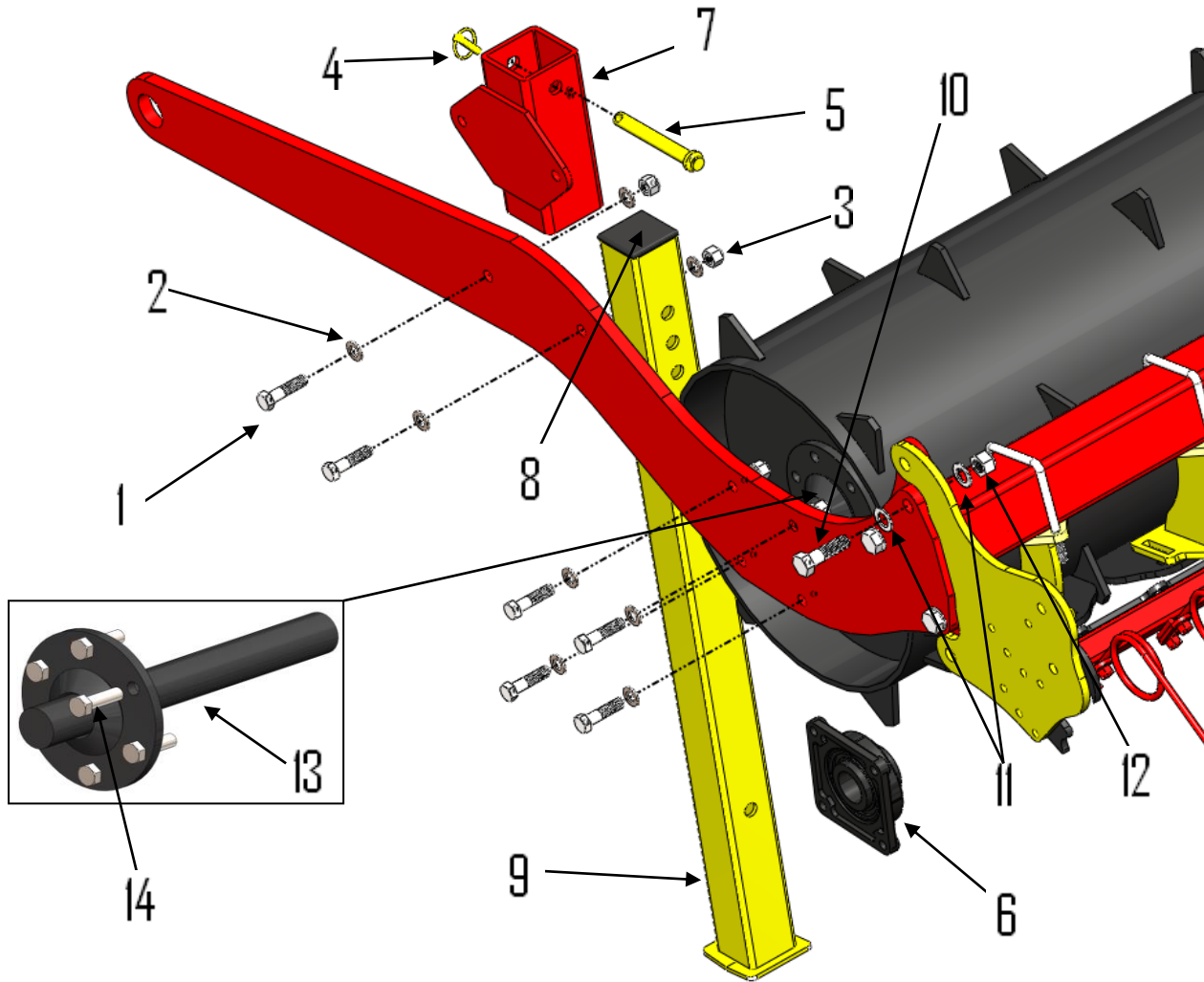


Item	Part No.	Description	Quantity/machine
1	SWM1650	M16 x 50 bolt	2
2	SWM16001	M16 Flat Washer	4
3	SW763	Front disc angle arm	2
4	SWM16004	M16 Nylock nut (not shown)	2

#### Front Disc Angles

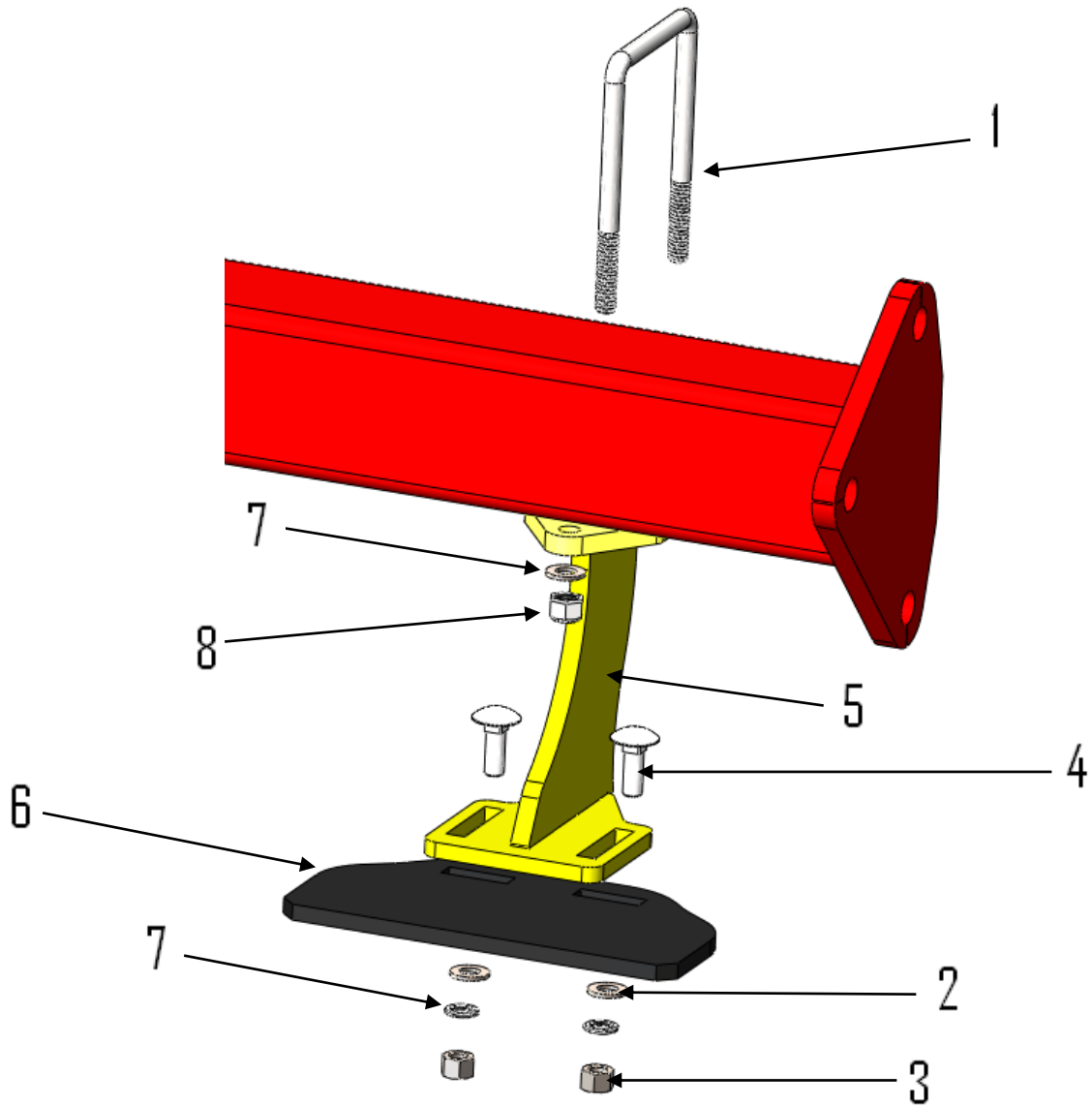


## 6.4 Packer Assembly



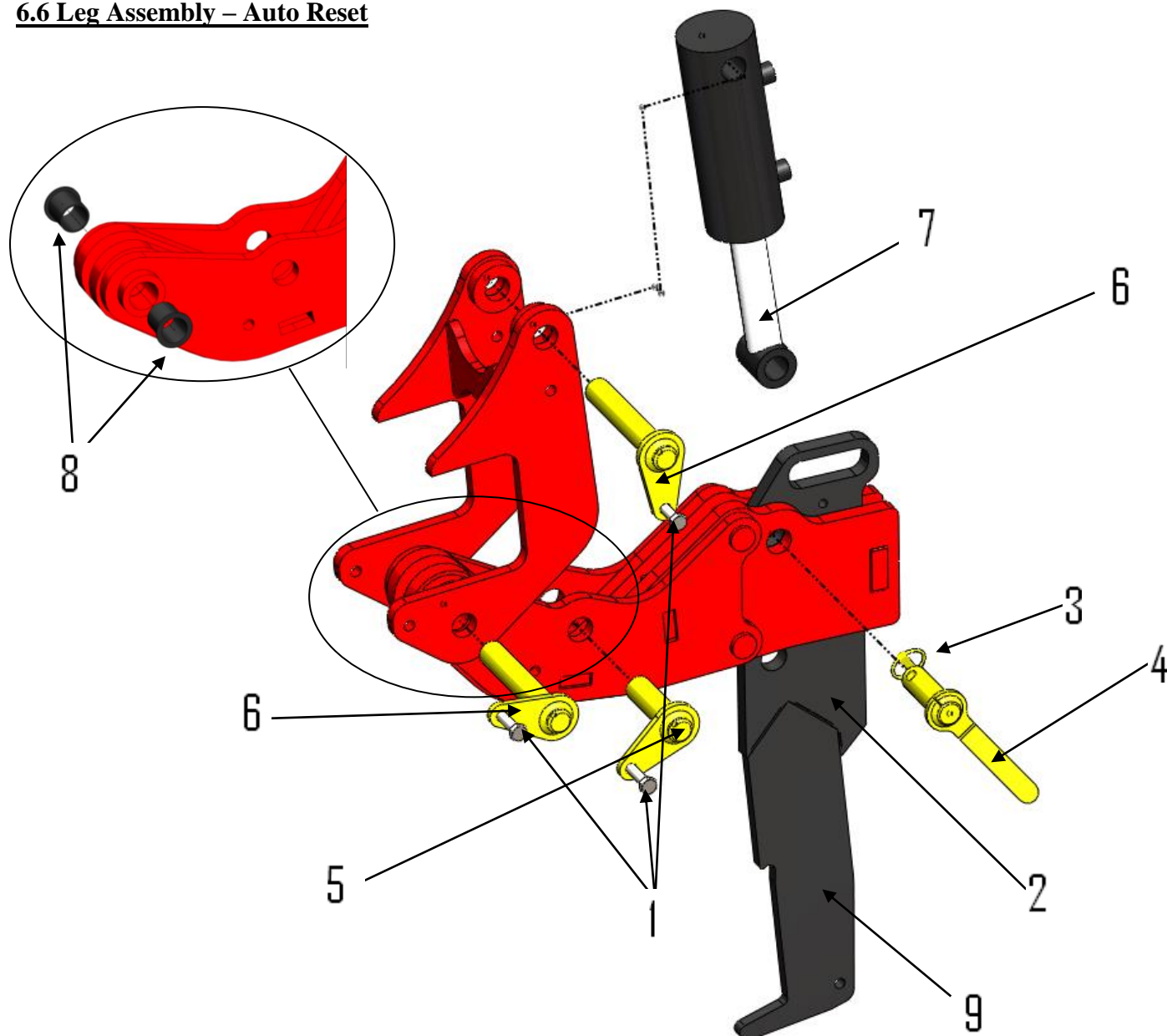
Item	Part No.	Description	Quantity/machine
1	SWM1665	M16 x 65 bolt	12
2	SWM16001	M16 Flat Washer	24
3	SWM16004	M16 Nylock nut	12
4	SWB105	Lynch pin	2
5	SW118	Stand Pin	2
6	SWB104	Packer Bearing TMSF50	2
7	SW112	Stand Holder	2
8	SWB144	80 mm box rubber stand cap	2
9	SW753	Grassland Subsoiler Stand	2
10	SWM2070	M20 x 70 bolt	6
11	SWM20001	M20 Flat Washer	12
12	SWM20004	M20 nylock nut	6
13	SW750	Replacement Packer Shaft (complete)	2
14	SWM1650	M16 x 50 bolt	12

## 6.5 Scraper Assembly



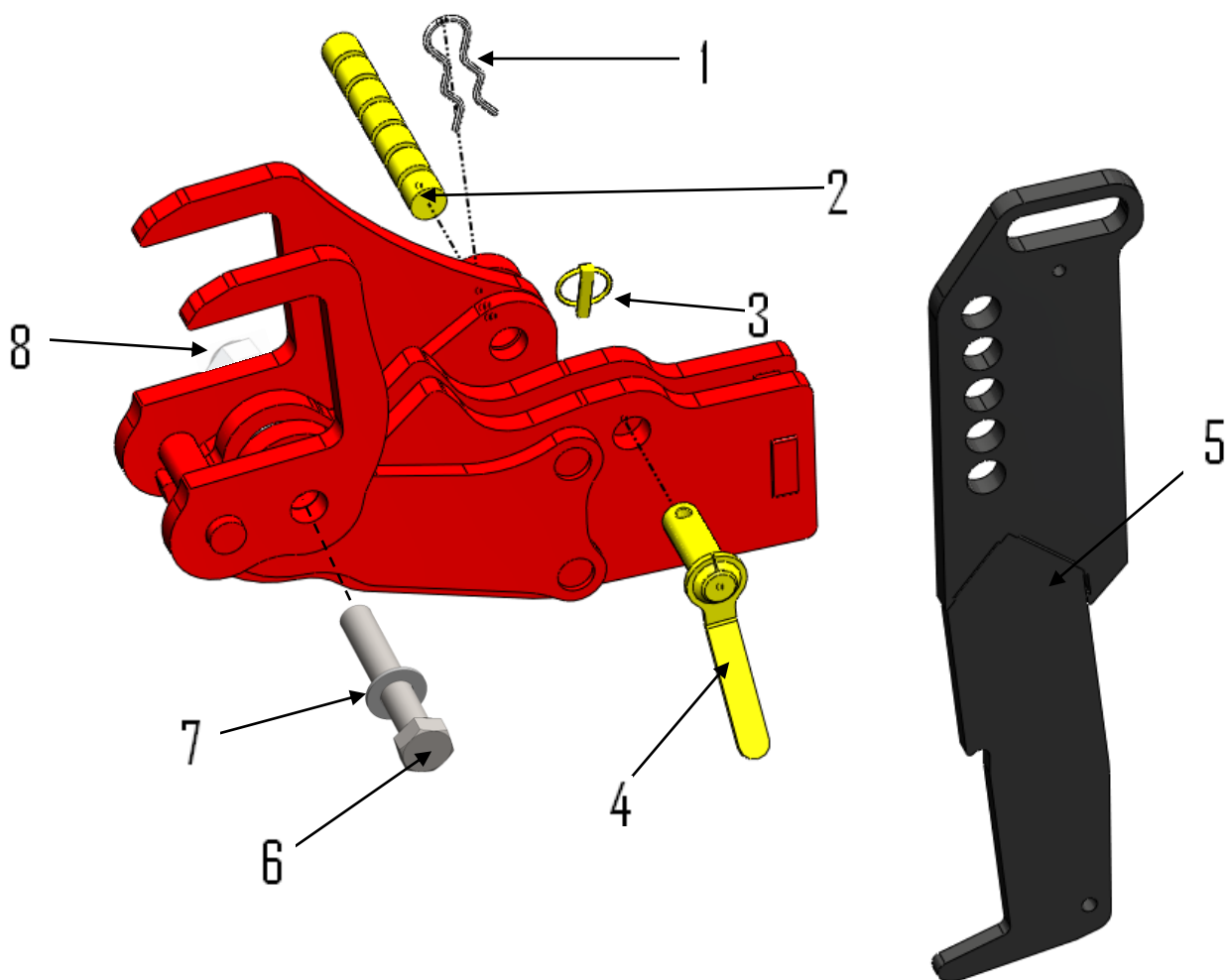
Item	Part No.	Description	Quantity/ 3 leg machine	Quantity/ 5 leg machine
1	SWM12100ub	M12x100 U-bolt	8	10
2	SWM12001	M12 flat washer	16	20
3	SWM12003	M12 nut	16	20
4	SWM1235chsq	M12x35 cup head square bolt	16	20
5	SW751	Scraper hanger	8	10
6	SW752	Grassland Subsoiler Scraper	8	8
	SW754	5 leg end Scraper	N/A	2
7	SWM12002	M12 spring washer	32	40
8	SWM12004	M12 nylock nut	16	20

## 6.6 Leg Assembly – Auto Reset



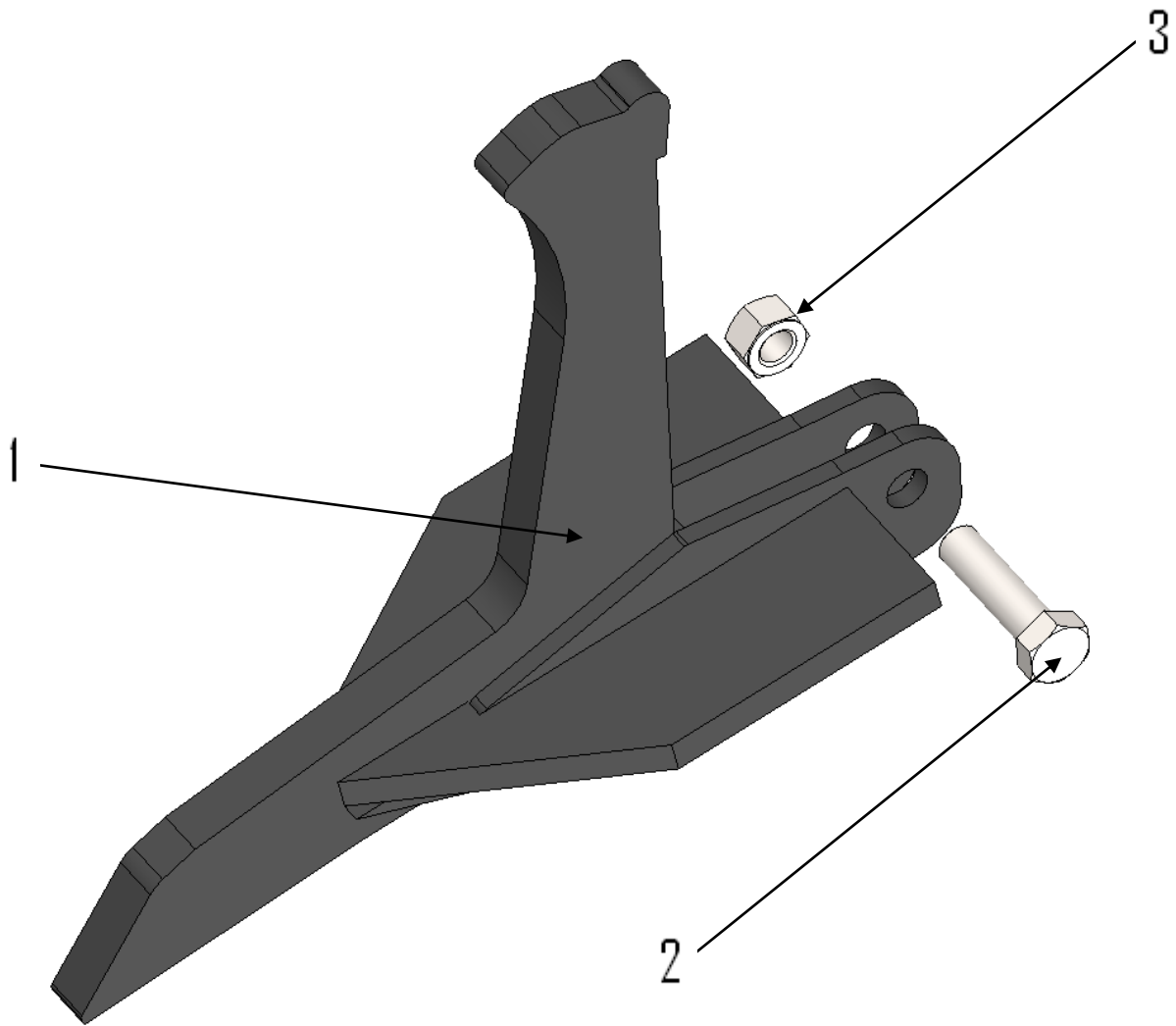
Item	Part No.	Description	Quantity per leg
1	SWM1245	M12 x 45 bolt	3
2	SW756	Grassland Subsoiler leg 2010	1
3	SWB105	Lynch pin	1
4	SW451	Leg depth pin	1
5	SW755	30mm x 100mm tabbed pin	1
6	SW183	30mm x 170mm tabbed pin	2
7	SWH286	705/1 ram	1
8	SWB197	Plastic Flange Bush	2
9	SW778	Grassland Subsoiler repair leg	1

## 6.7 Leg Assembly – Shearbar



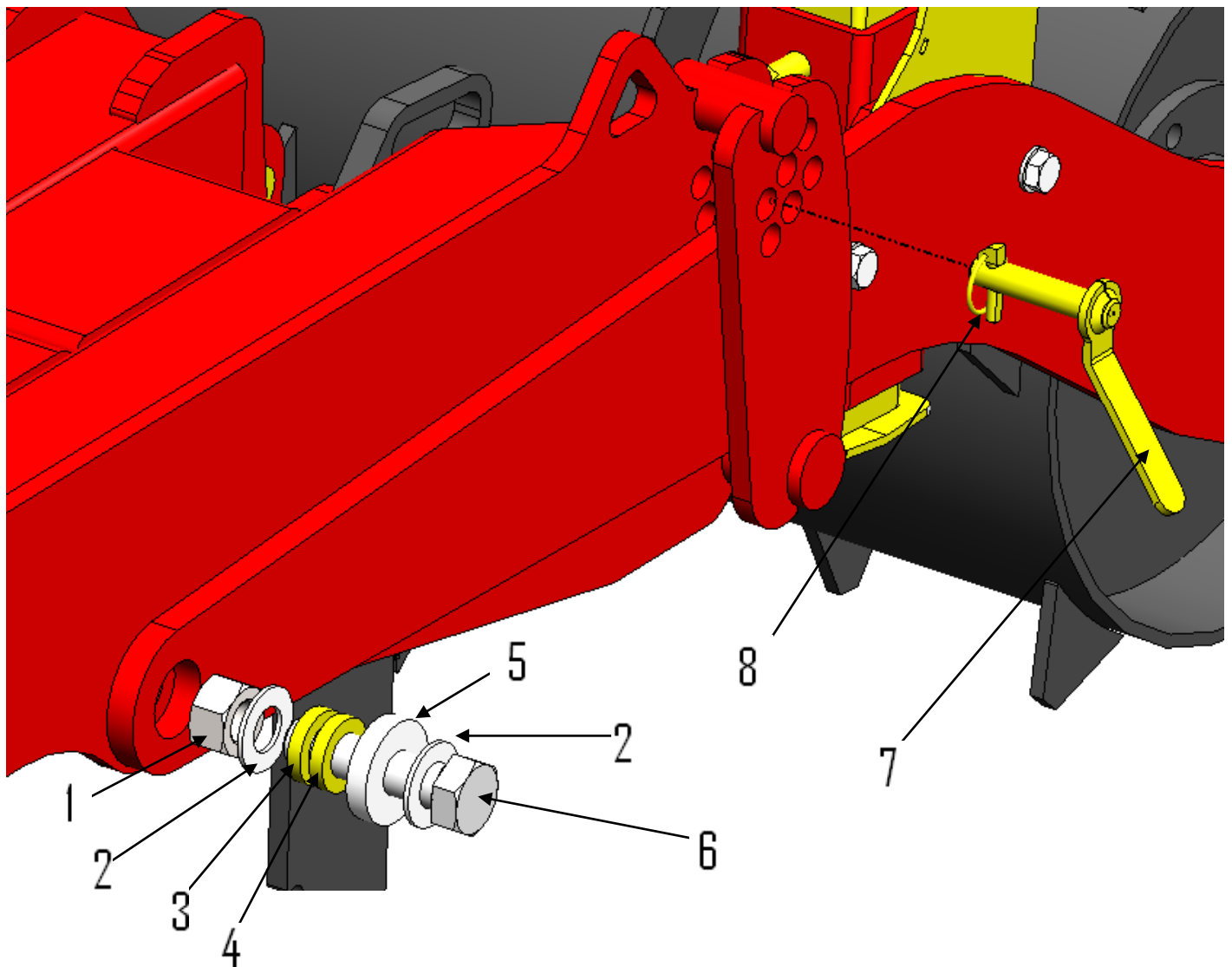
Item	Part No.	Description	Quantity/Leg
1	SWB106	Pin retainer Clip	1
2	SWB160	Shear pin	1
3	SWB105	Lynch pin	1
4	SW121	Leg depth pin	1
5	SW756	Grassland Subsoiler leg 2010	1
6	SWM30180	M30 x 180 bolt	1
7	SWM30001	M30 flat washer	2
8	SWM30004	M30 nylock nut	1
9	SW778	Grassland Subsoiler repair leg	1

## 6.8 Point Assembly



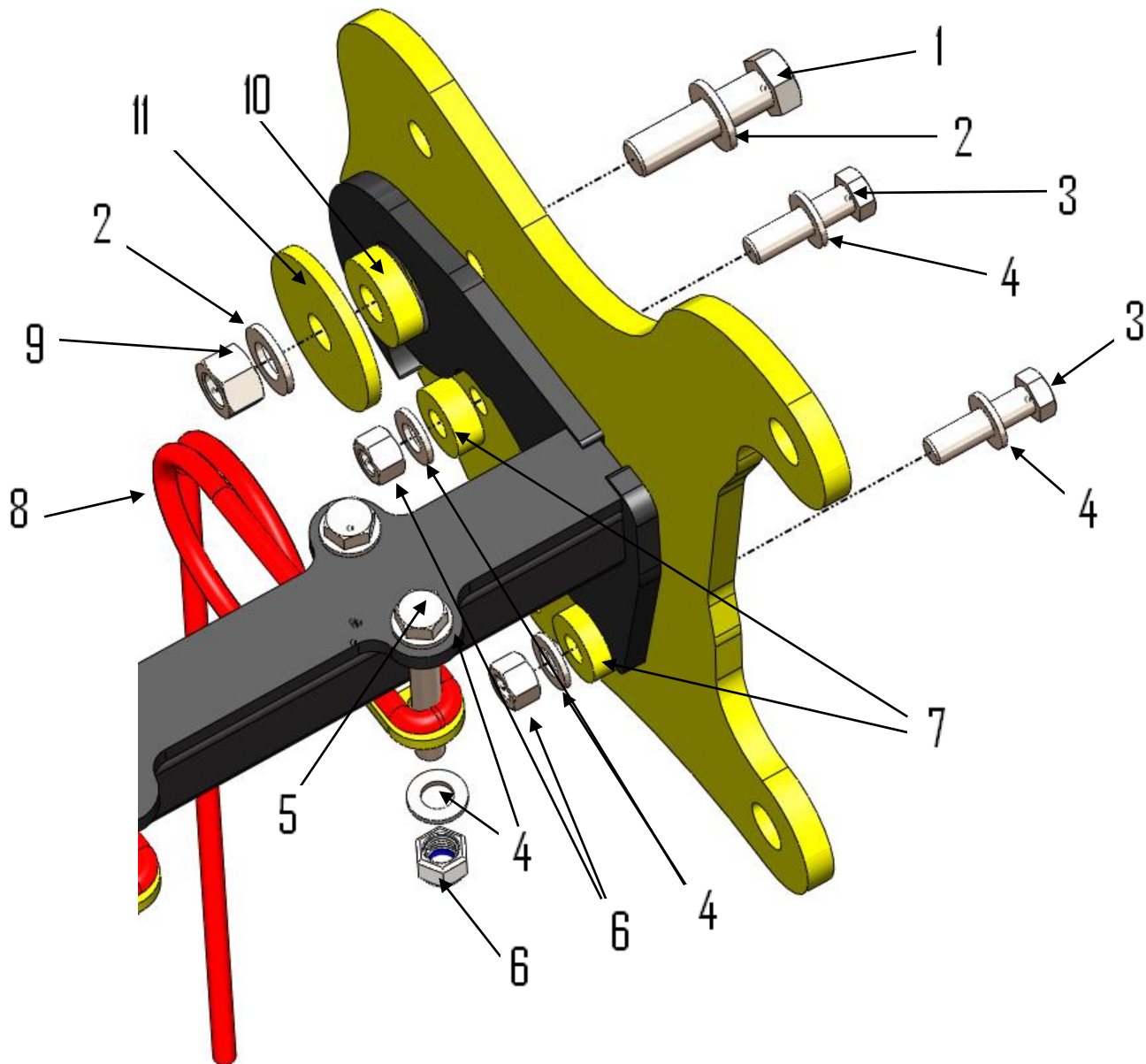
Item	Part No.	Description	Quantity/leg
1	SW762	Grassland Subsoiler Point	1
2	SWM1245	M12 x 45 bolt	1
3	SWM12004	M12 nylock nut	1

## 6.9 Depth Control



Item	Part No.	Description	Quantity/side	Quantity/machine
1	SWM30004	M30 Nylock	1	2
2	SWM30001	M30 flat washer	2	4
3	SW723	12mm spacer	1	2
4	SW722	10mm spacer	1	2
5	SW129	15mm large washer	1	2
6	SWM30110	M30 x 110 bolt	1	2
7	SW130	Packer depth adjust pin	1	2
8	SWB105	Lynch pin	1	2

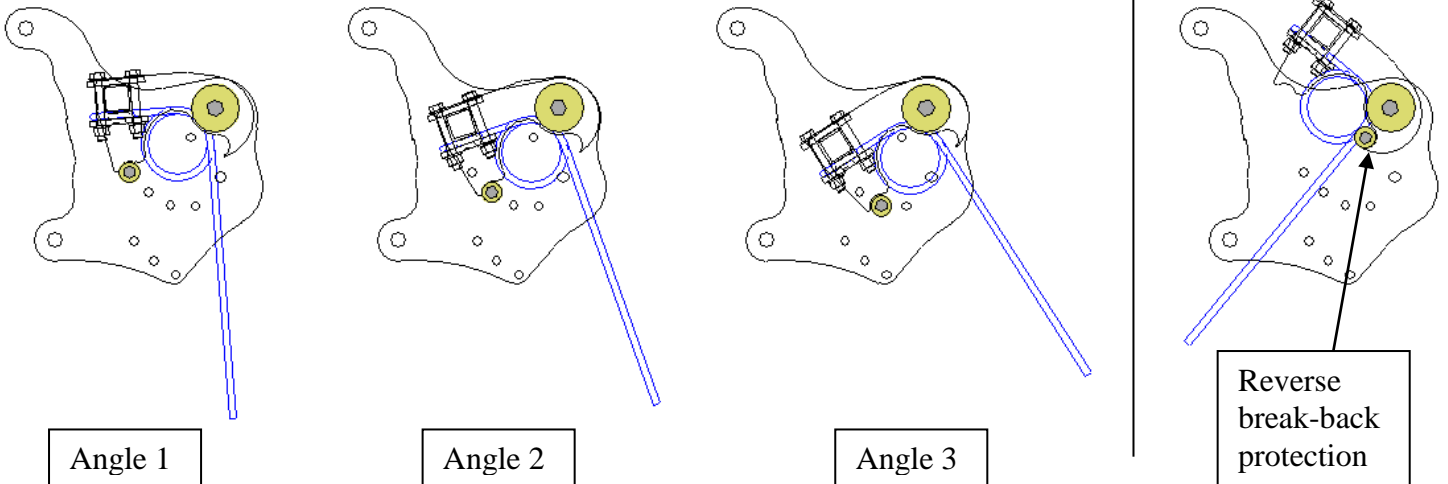
## 6.10 Scarifying Harrow Assembly



Item	Part No.	Description	Quantity/ 3 leg machine	Quantity/ 5 leg machine
1	SWM1660	M16 x 60 bolt	2	2
2	SWM16001	M16 flat washer	4	4
3	SWM1245	M12 x 45 bolt	4	4
4	SWM12001	M12 flat washer	40	48
5	SWM1290	M12 x 90 bolt	32	40
6	SWM12004	M12 nylock nut	36	44
7	SW757	30mm x 12mm spacer	4	4
8	SWB198	Harrow tine	16	20
9	SWM16004	M16 nylock nut	2	2
10	SW758	39mm x 12mm spacer	2	2
11	SW759	70mm large washer	2	2

## 6.11 Scarifying Harrow Adjustment

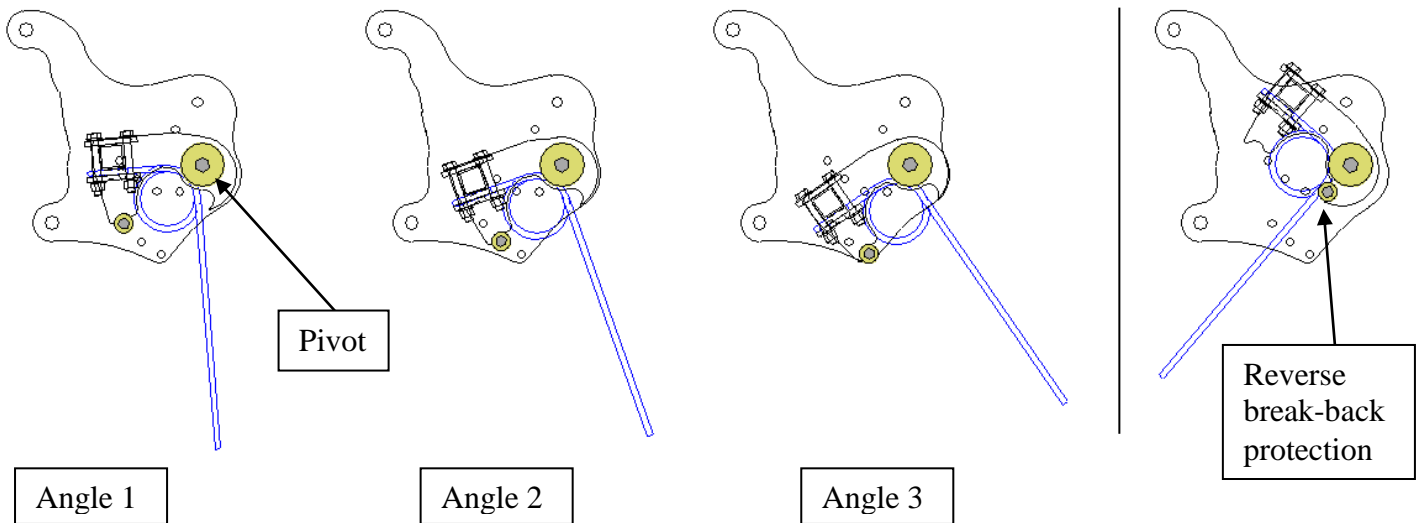
### 1. Angle adjustment – Height 1



Changing the position of item 7 (previous page) can allow the harrow to sit at three different angles.

### 2. Angle adjustment – Height 2

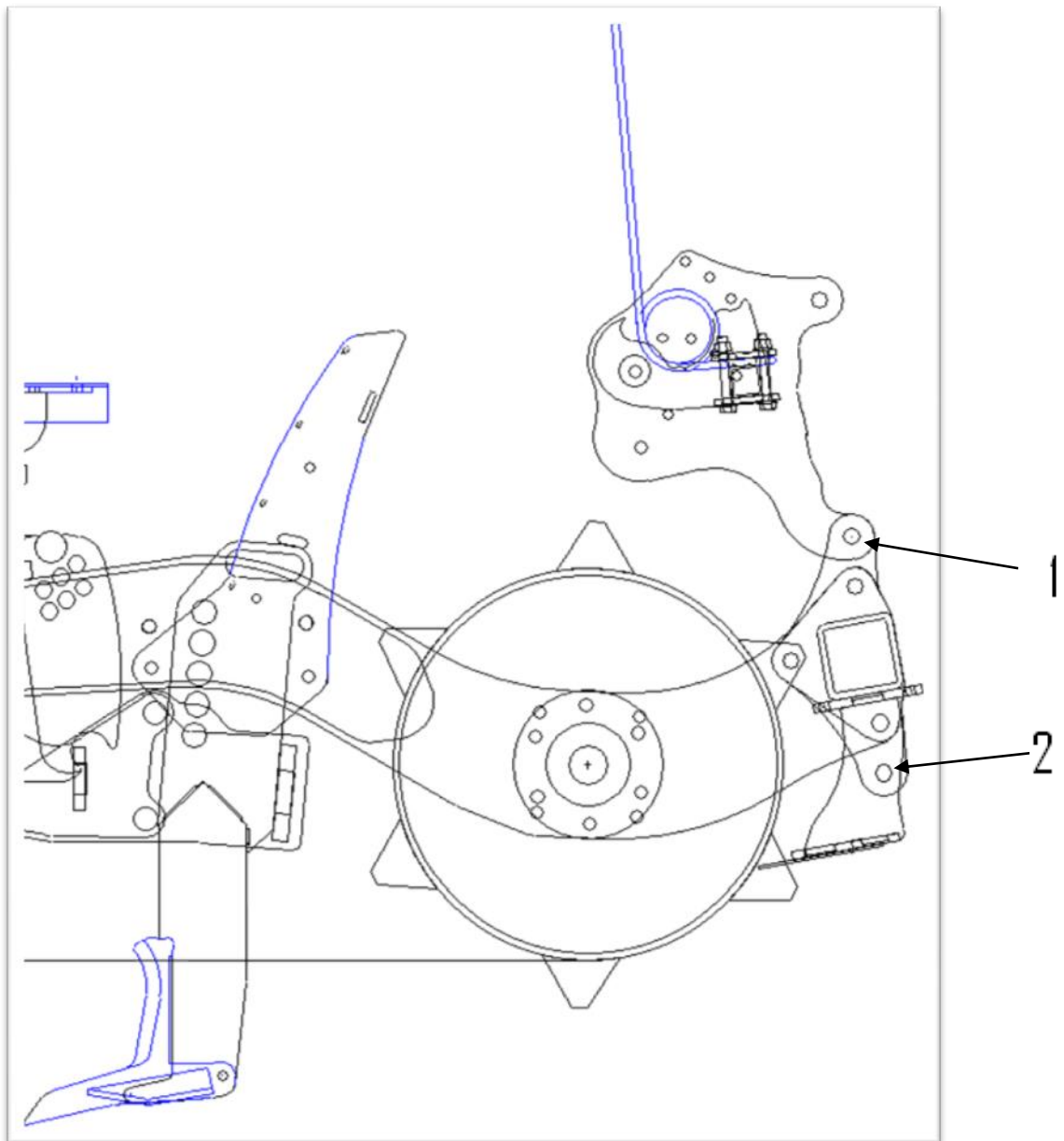
The entire harrow assembly can also be moved to a lower position by moving the pivot to a lower hole.



### 3. Break back protection

The harrow has break back protection at each of the different height positions. This catches the harrow when reversing out of work.

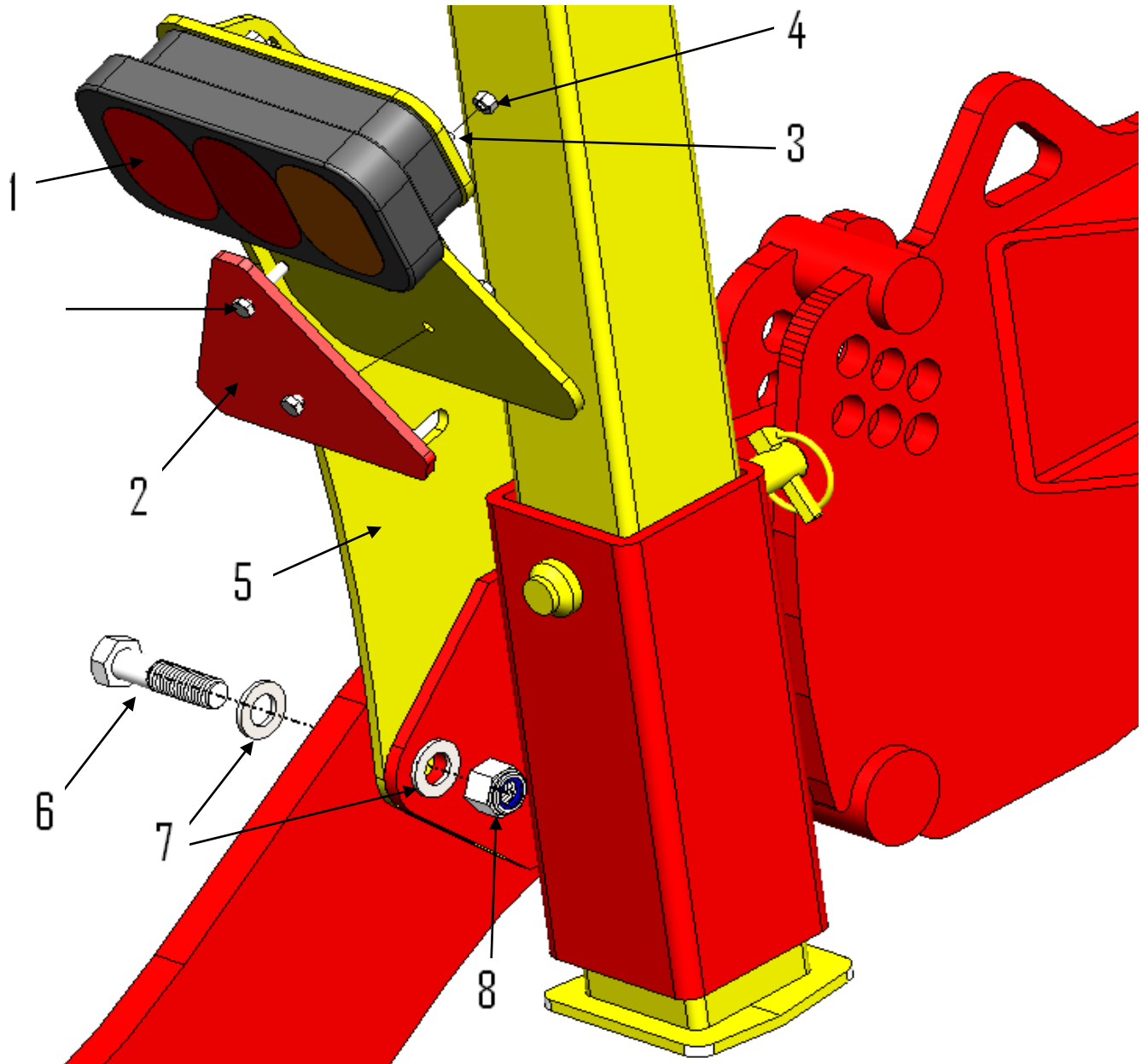
## 6.12 Scarifying Harrow Position



The scarifying harrow assembly on the Grassland Subsoiler can be rotated for transport purposes:

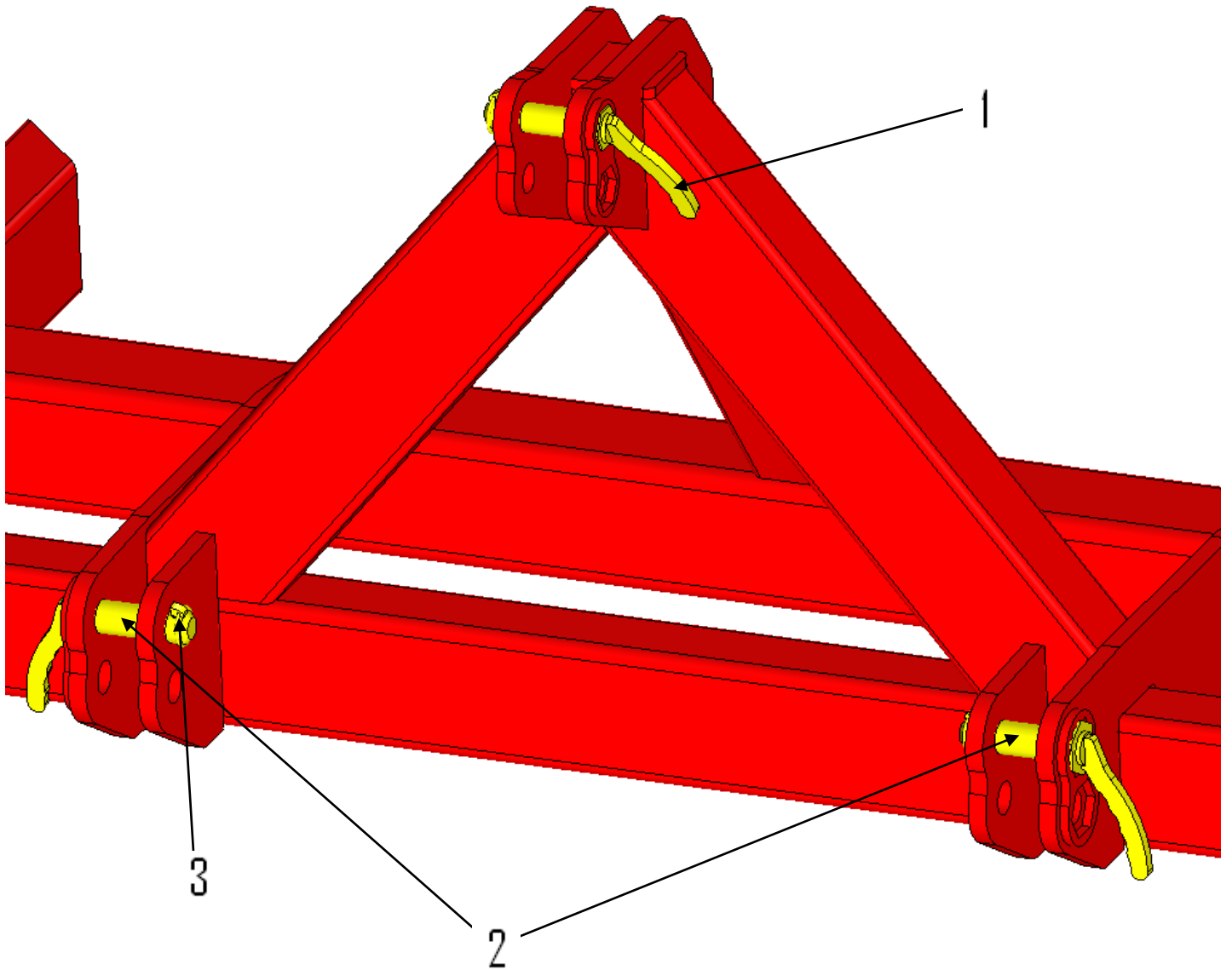
1. Slacken M20 bolt (1) and remove M20 bolt (2) at each side of the Grassland Subsoiler and rotate entire harrow assembly to required position. Tighten M20 bolt (1).

## 6.13 Lights



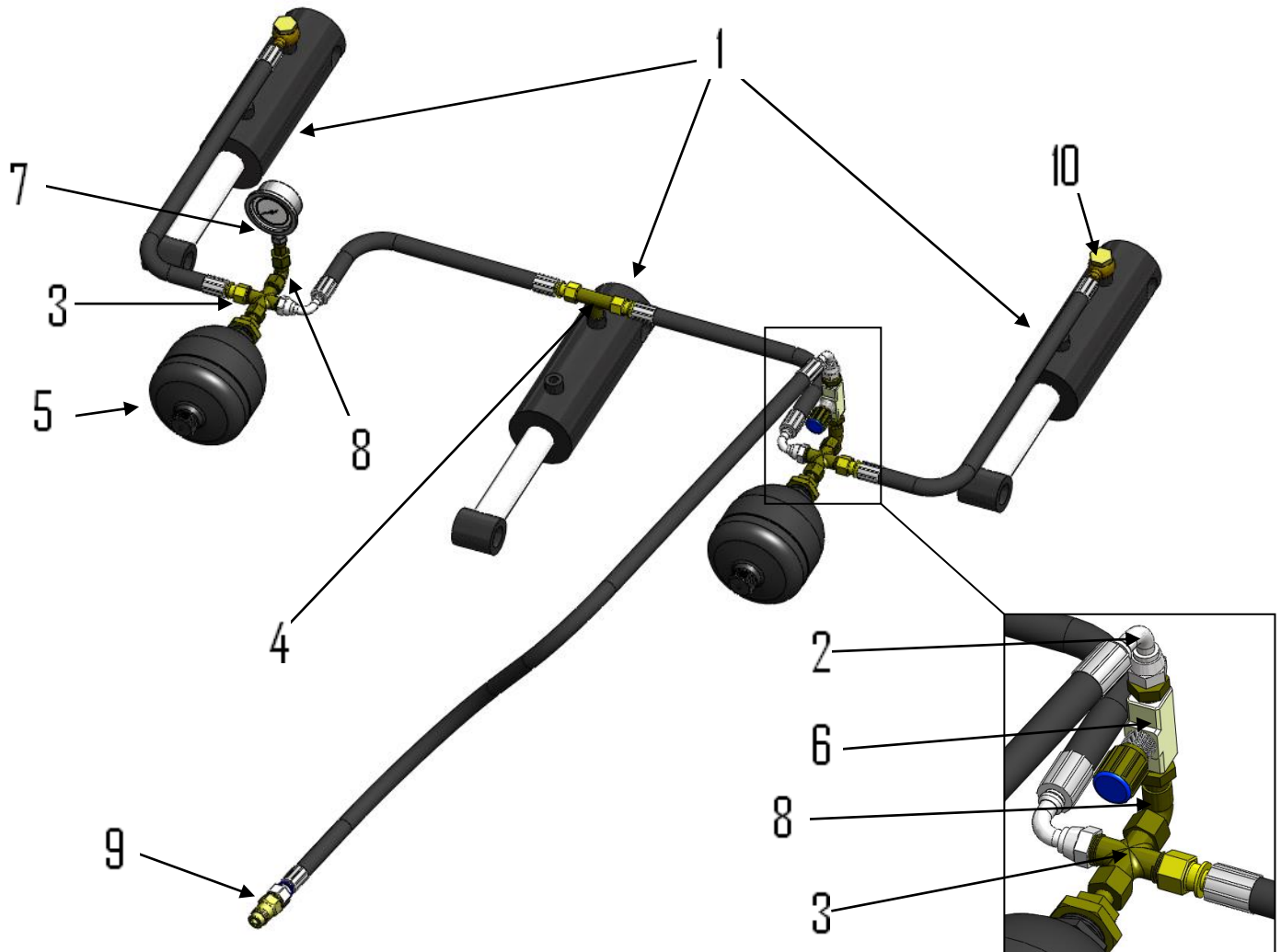
Item	Part No.	Description	Quantity/ machine
1	SWB174	Rear lights with block connector	2
2	SWB162	Warning Triangle	2
3	SWM6001	M6 flat washer	8
4	SWM6003	M6 plain nut	8
5	SW760	bolt on light bracket right (not shown)	1
	SW761	bolt on light bracket left	1
6	SWM1660	M16x60 bolt	4
7	SWM16001	M16 flat washer	8
8	SWM156004	M16 nylock nut	4
9	SWM6030	M6x30 bolt	4
	SWB175	wiring loom (not shown)	1

## 6.14 Main Frame Headstock



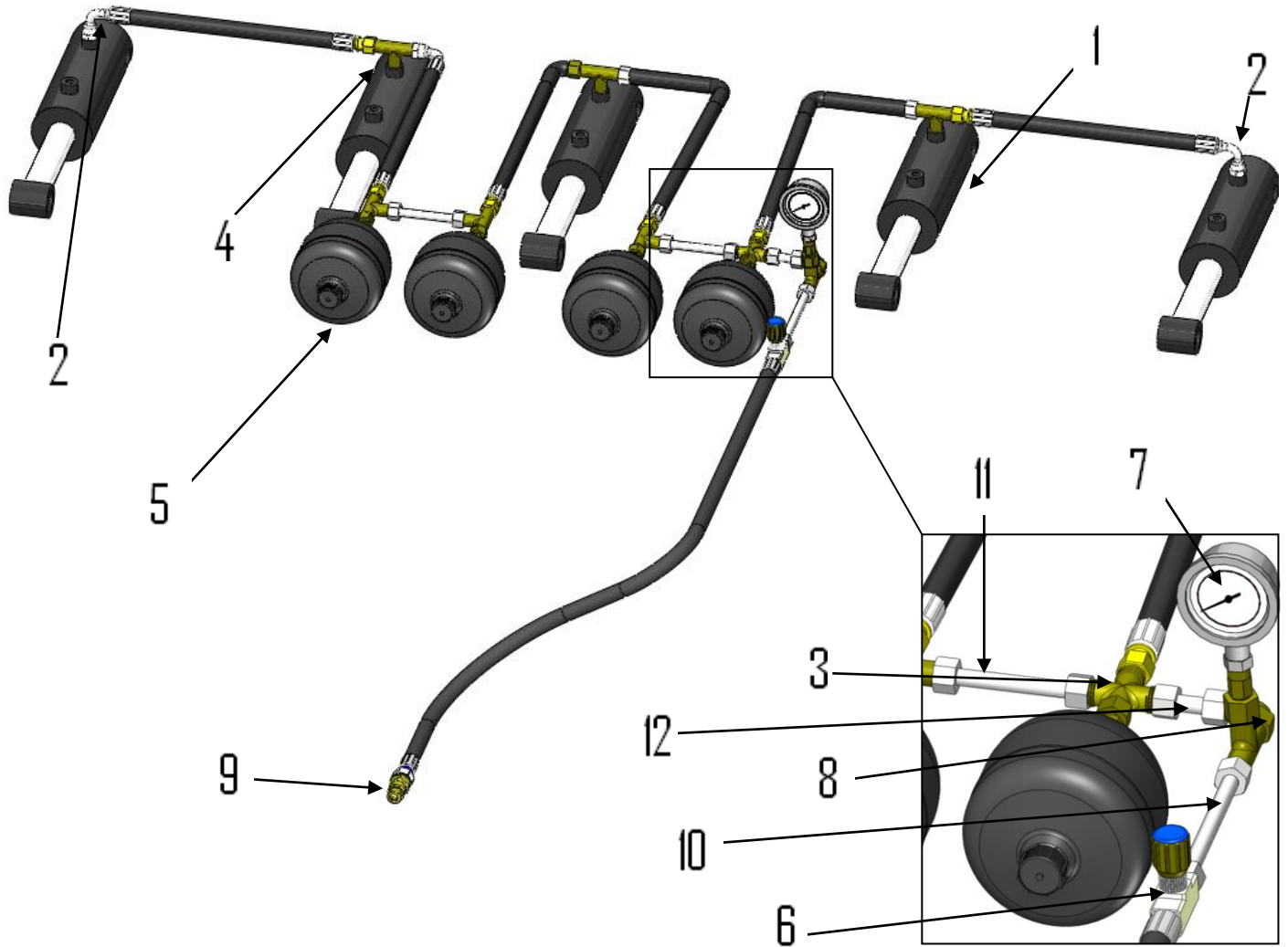
Item	Part No.	Description	Quantity/ machine
1	SW627	2008 Cat III hexagonal top Link pin	1
2	SW626	Cat III hexagonal lower link pin	1
3	SWB107	Cat III safety lynch pin	3

## 6.15 Auto Reset Hydraulic Circuit – 3 leg









Item	Part No.	Description	Quantity/ 3 leg machine
1	SWH286	705/1 ram	3
2	SWH265	12L 90	3
3	SWH155	12L cross	2
4	SWH156	12L T bend	1
5	SWH138	Accumulator	2
6	SWH180	Flow control valve	1
7	SWH181	Pressure gauge	1
8	SWH182	3/8" compact 90 fitting	2
9	SWH147	Male quick-release coupling	1
10	SWH170	3/8" Banjo bolt	2

### 6.16 Auto Reset Hydraulic Circuit – 5 leg



Item	Part No.	Description	Quantity/ 5 leg machine
1	SWH286	705/1 ram	5
2	SWH265	12L 90	2
3	SWH155	12L cross	1
4	SWH156	12L T bend	8
5	SWH138	Accumulator	4
6	SWH180	Flow control valve	1
7	SWH181	Pressure gauge	1
8	SWH182	3/8" compact 90 fitting	1
9	SWH147	Male quick-release coupling	1
10	SWH287	130mm steel pipe	1
11	SWH288	80mm steel pipe	1
12	SWH289	20mm steel pipe	1

## 6.17 Stickers and Paint

Sticker	Description	Quantity	Part No.
	Big Sumo horizontal sticker 450 x 125mm	2	SWB125
	Big Union Jack sticker 150 x 100mm	2	SWB127
	Vertical Sumo sticker 80 x 295mm	2	SWB128
	Small Union Jack sticker	2	SWB129
	Small Sumo Red and White Sticker	2	SWB199
	Small Sumo Horizontal Sticker	4	SWB130
Sumo touch up paint	Sumo Red	1/2 Litre	SWB131
	Sumo Black	1/2 Litre	SWB132