

WORKSHOP MANUAL 1.3 03/2017 EN

AS-MOTOR Sherpa:

AS 920 2WD

AS 940 4WD

AS 940 4WD XL



Service Information


Adjustment, maintenance and repair instructions

Workshop Manual AS-MOTOR Sherpa:

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Introduction

Preface and validity



Preface

This Repair Manual is designed to make it easier for you to properly make adjustments, perform maintenance and make repairs on an AS 920 2WD, an AS 940 Sherpa 4WD and on an AS 940 Sherpa 4WD XL.

As a reference work it will be a useful aid at all times for the tasks that occur in your workshop.

The online service portal "parts&more" is very helpful for all tasks. Please use the online service portal for exploded drawings, parts lists, instructions and orders. It shows you the correct assembly sequence, even for complex parts.

Naturally, good workshop equipment and trained specialists are the prerequisites for faultless maintenance. Please take advantage of our regularly offered service training courses.

With this Workshop Manual we are providing a valuable tool for you and your workshop team.

Regards

AS-MOTOR GERMANY
SERVICE

Validity

This Workshop Manual is based on the following device versions:

- AS 920 Sherpa 2WD: Serial number (SN:) (0) 276 16 03 00001, March 2016
- AS 940 Sherpa 4WD: Serial number (SN:) (0) 219 16 10 0001, October 2016
- AS 940 Sherpa 4WD XL: Serial number (SN:) (0) 264 16 11 0001, Nov. 2016

The serial number of each of your AS-Motor Sherpas is provided at two points on the device:

1. As sticker at the top of the right control panel
2. As an aluminium plate on the chassis, on the right underneath the seat, permanently riveted

Explanation of the 11-digit serial number:

Example:



- Device type: (0) 264
- Year of manufacture: 16
- Month: 11
- Consecutive number: 0001

Introduction

Deviating device versions and safety instructions



Deviating device versions (older or newer)

Since the market launch of the AS 940 Sherpa 4WD in 2010, technical improvements of the device have been undertaken on a constant basis.


If your device is older than the devices versions that are the basis of this manual (October/November 2016), please note the following:

The changes made since 2009 in general affect only minor details and parts. There have been no major, extensive, design changes. For you this means that this manual can also be used and is helpful for older model years.

The executing mechanic can view deviating and older parts in the parts lists and drawings on our online service portal "www.parts-and-more.org" (PAM). (See section: "parts&more")

In this case the designation of an assembly is: "From serial number 0264...".

For future device versions this Workshop Manual will be revised annually. Please ensure on a regular basis that your version of the Workshop Manual is the right one/or is up to date.


If for some activities there are different alternative possibilities then you will be alerted to this situation through our symbol  "Tip/note".

Safety instructions for all activities:

Only authorised AS-MOTOR Workshops are allowed to execute the activities cited in this manual.

Comply with the following instructions and the warnings in the respective sections, otherwise accidents with severe injuries can occur and/or the device can be damaged.

Prior to starting work:


- Before all tasks on the machine, **disconnect the negative terminal of the battery!**
- Place the device on a level and non-slip substrate.
- Only use ramps and hoists that are suitable for the device.
- Safeguard the device against rolling off and falling over.
- Let the device cool for at least 20 minutes.
- Close the fuel tap and the tank ventilation.
- Never place the device with petrol in the tank, inside a building where petrol fumes can come into contact with open fire or sparks.
- Do not inhale fuel fumes, they are harmful.
- Use gloves, particularly for tasks on cutting tools.
- Avoid skin contact with fuel and operating fluids.
- Caution when handling batteries: Battery acid is corrosive. Protect your hands and eyes from escaping fluid.
- This  symbol signals a warning. Failure to comply with the warning can result in accidents, injuries and damage!

Introduction

Notice – original spare parts and technical data (1/3)



Original spare parts

Important note: 

Only original AS-MOTOR spare parts ensure safety, keep the guarantee intact and protect against damage. Consequently only use original AS-MOTOR spare parts; do not use any imitation or counterfeit parts.

Installation of non-original parts invalidates the guarantee claim and the operating authorisation. Accidents with severe or fatal injuries can be the result.

All original wear parts, all original blades and many original spare parts bear the stamped AS-MOTOR logo, as well as the EXXXXX and/or G OXXXXXXX part number.

Technical data – AS 940 Sherpa 4WD (1/2):

Type	AS 940 Sherpa 4WD	AS 940 Sherpa 4WD XL and AS 940 Sherpa 4WD with big wheels as accessories
Range of application (temperature)	0 - 30 °C For temperatures below 5 °C, observe the engine manufacturer's information regarding the engine oil.	
Engine, type Manufacturer Type Cylinder capacity Performance Engine speed	Two cylinder four stroke OHV engine Briggs & Stratton 44 Professional Series 8, V-Twin 724 cm ³ 16.5 kW (22.4 PS) 3300 min ⁻¹	
Starting device	Electric start	
Battery	12 V, approx. 30 Ah	
Fuses Main fuse Fuse controller generator	25 A 25 A	
Drive Rear Front	Permanent all-wheel drive Rear axle with differential lock. Pendular portal axle, with two hydraulic engines and upright shafts.	
Speed forward Speed reverse	0 to 6.2 km/h 0 to 6.0 km/h	0 to 6.7 km/h 0 to 6.5 km/h
Maximum area coverage	approx. 5500 m ² /h	approx. 6000 m ² /h
Turning radius	approx. 1.4 m	approx. 1.2 m
Seat	Movable, spring mounted, adjustable to the driver's weight.	
Cutting device, type Cutting width Cutting height in 5 levels Transport position Drive of cutting tool Clutch of cutting tool Growth height	Cutter bar with screwed-on reversing blades and mulching blades 90 cm 50 to 105 mm 130 mm V-belt Belt tension clutch up to approx. 150 cm	
		80 to 135 mm 160 mm

Introduction

Technical data (2/3)



Technical data – AS 940 Sherpa 4WD (2/2):

Type	AS 940 Sherpa 4WD	AS 940 Sherpa 4WDXL and AS 940 Sherpa 4WD with big wheels as accessories
Measures and weights		
Weight	290 kg	298 kg
Transport size with packaging L/W/H	195/111/112 cm	195/111/112 cm
Max. tyre dimensions L/W/H	191/98/152 cm	191/106/156 cm
Height when rollbar is folded down	ca 100 cm	ca 103 cm
max. max. vertical load	100 kg 25 kg	
Capacities	15 litres including reserve (unleaded regular petrol) approx. 1.9 litres 5 W50 fully synthetic engine oil (see also Checking the oil level). approx. 6.8 litres 5 W50 fully synthetic engine oil.	
Fuel tank		
Engine oil		
Transmission oil (hydrostat)		
Sound level	99.2 dB according to DIN EN 12733 90 dB according to DIN EN 12733 3.0 dB (A)	
Measured sound level L_{WA}		
Sound level at working place L_{pA}		
Measurement uncertainty k		
Vibration emission value according to DIN EN 12733		
Hand-arm-vibrations $a_{h,w}$	1.4 m/s ²	1.2 m/s ²
Measurement uncertainty U	0.2 m/s ²	0.2 m/s ²
Whole body vibration $a_{h,w}$	0.28 m/s ²	0.24 m/s ²
Measurement uncertainty U	0.2 m/s ²	0.2 m/s ²
Tyre pressure	2 bar	
Front	0.9 to 1.2 bar	2 bar
Rear	0.4 to 1.2 bar	1,5 bar
Tyre designation	Big wheels	
Front	Small wheels 15x5.00-6	4,80/5,00-8
Rear	18x9.50-8	20x10.00-8
Stability (in accordance with the standard measuring method)	20°	21°

Technical data – AS 920 Sherpa 4WD (1/2):

Type	AS 920 Sherpa 2WD
Range of application (temperature)	0 - 30 °C For temperatures below 5 °C, observe the engine manufacturer's information regarding the engine oil.
Engine, type	Two cylinder four stroke OHV engine
Manufacturer	Briggs & Stratton
Type	44 Professional Series 8, V-Twin
Cylinder capacity	724 cm ³
Performance	16.5 kW (22.4 PS)
Engine speed	3300 min ⁻¹
Starting device	Electric start
Battery	12 V, approx. 30 Ah
Fuses	
Main fuse	25 A
Fuse controller generator	25 A
Drive	
Rear	Hydrostatic transmission with differential lock.
Speed forward	0 to 10,5 km/h
Speed reverse	0 to 8,2 km/h
Maximum area coverage	approx. 6500 - 9450 m ² /h
Turning radius	approx. 0,6 m
Seat	Movable, spring mounted, adjustable to the driver's weight.
Cutting device, type	Cutter bar with screwed-on reversing blades and mulching blades
Cutting width	90 cm
Cutting height in 5 levels	50 to 105 mm
Transport position	130 mm
Drive of cutting tool	V-belt
Clutch of cutting tool	Belt tension clutch
Growth height	up to approx. 150 cm

Introduction

Technical data (3/3) and accessories



Technical data – AS 920 Sherpa 4WD (2/2):

Type	AS 920 Sherpa 2WD
Measures and weights Weight Transport size with packaging L/W/H Max. tyre dimensions L/W/H Height when rollbar is folded down	280 kg 195/111/112 cm 191/98/152 cm ca 100 cm
max. towing load max. vertical load	100 kg 25 kg
Capacities Fuel tank Engine oil Transmission oil (hydrostat)	15 litres including reserve (unleaded regular petrol) approx. 1.9 litres 5 W50 fully synthetic engine oil (see also Checking the oil level) approx. 3.9 litres 5 W50 fully synthetic engine oil.
Sound level Measured sound level L_{WA} Sound level at working place L_{pA} Measurement uncertainty k	99,2 dB according to DIN EN 12733 90 dB according to DIN EN 12733 3,0 dB (A)
Vibration emission value according to DIN EN 12733 Hand-arm-vibrations $a_{h,w}$ Measurement uncertainty U Whole body vibration $a_{h,w}$ Measurement uncertainty U	1.4 m/s ² 0.2 m/s ² 0.28 m/s ² 0.2 m/s ²
Tyre pressure Front Rear	0.9 to 1.2 bar 0.4 to 1.2 bar
Tyre designation Front Rear	Small wheels 15x5.00-6 18x9.50-8
Stability (in accordance with the standard measuring method)	18°

Accessories – AS 920/940 Sherpa:

- Trailer (max. 100 kg)
- Trailer hitch
- Snow blade
- Adapter for snow blade
- Adapter for snow blade with weather cab
- Snow chains (only rear wheels, not for XL and RC)
- Weather cab
- Twin tyres rear (strong traction, only AS 920 und AS 940 4WD)
- Set XL wheels (for AS 940 4WD, not for AS 920 2WD)
- Lawn/mulch accessories (mulch kit, for grass heights up to max. 40 cm)
- Tilt meter
- Steering wheel knob (not recommended)
- Airless front wheels, solid PUR foam (AS 940 Sherpa 4WD XL and RC)
- Spray-paint, orange, RAL 2000

Accessory is not available as spare part in "parts&more.org" (PAM).

Accessories are ordered the same way that machines are ordered.

Introduction

Online service portal "parts-and-more.org" (PAM) 1/2



Online service portal "parts-and-more.org" (PAM)

For all tasks shown in this Workshop Manual the online service portal "parts-and-more.org" is your most important companion. It offers you the following functions for every single AS-MOTOR device:

- Exploded drawings of each assembly
- Spare parts lists for each assembly
- Modification information for parts
- Current availability (online stock) of spare parts
- Spare part ordering function
- Management of current shopping carts and older orders
- FAQ and general technical information
- Guarantee claims
- Device orders (if released)

Access to the online service portal "parts-and-more.org":

Every official AS-Motor dealer has access to the online service portal via his customer number.

Login access to the system occurs via the website:

www.parts-and-more.org

Access data is issued within one to two days after "Dealer first login" using the AS-Motor customer number.

After receipt of the access data (parts ID and password) you can log in via "Immediate login" and use all functions immediately.

For questions concerning "parts-and-more.org" please contact:

- info@as-motor.de or
- service@parts-and-more.info
- AS-Motor Germany +49 7973 9123-0

Introduction

Online Service Portal "parts-and-more.org" (PAM) 2/2



Parts search

Language selection

Shopping cart

Device and assembly selection

Spare part function

Availability

Other useful functions

The screenshot displays the AS-Motor online service portal interface. On the left, a navigation tree lists various components like 'AS 799 Rider', 'AS 900 from serial No.', 'AS 920 Sherpa 2WD', and 'Blades with drive'. The main area shows an exploded view of a blade assembly with numbered parts. A magnifying glass is positioned over the assembly. Below the assembly is a 'Stückliste: Blades with drive' table. The table has columns for 'Item', 'Art.No.', 'Art.No. (former)', 'Quantity (min.)', 'Description', 'Info', 'Modell', and 'Price'. The first row is highlighted in red, indicating a selected part.

Item	Art.No.	Art.No. (former)	Quantity (min.)	Description	Info	Modell	Price
305	G009011	E00949	1 (1)	Feather key			
306	G00825016	E11700	1 (1)	Belt pulley hub			
307	G00825008	E11698	1 (1)	Belt pulley drum			
308	G00825009	E11699	1 (1)	Belt pulley half			
309	G07838017	E03262	12 (10)	Hexagon screw (10 Stk.)			
310	G07861004	E07213	3 (1)	Disc			
312	G07847015	E03920	2 (1)	Supporting disc			
313	G08923004	E11694	1 (1)	Winding protection cover			
314	G08923019	E11466	1 (1)	Replaced by G08980016			
	G08980016	G08980016	1	Upper mulching blade+blade disc			

Print function

Magnifying glass function

Complete overview

Parts direct selection highlighted red

Spare parts list

Parts information
Change notifications

General information

Frequent faults and rectification (troubleshooting) 1/5



Fault	Possible fault	Remedy
Starter does not turn	Safety switches are not activated	<ul style="list-style-type: none">▪ Bring drive lever into zero position.▪ Bring cutting height adjustment into transport position.▪ Load seat contact switch through the weight of the driver.
	Battery is depleted: <ul style="list-style-type: none">▪ Ignition key was not in the "Off" position▪ Excessive standstill time▪ Storage at low temperatures	<ul style="list-style-type: none">▪ Charge battery.▪ Check battery (see section: Checking the battery)▪ Charge conservation via 12 V on-board electrical outlet.
	Fuse is defective	Check fuses, replace if necessary.
	Battery is defective	Replace battery.
Engine does not start	Petrol tap is closed.	Open petrol tap.
	Tank ventilation screw is closed.	Open tank ventilation screw.
	No fuel, or insufficient fuel in the tank.	Top-up fuel or if necessary place petrol tap in the "Reserve" position.
	Open starter flap / choke (choke on the throttle lever not activated at start).	Close starter flap / choke (activate choke on the throttle lever at start).
	Device has been tipped over – air filter is oily.	Replace air filter, unscrew spark plug and start several times with the petrol tap closed, dry spark plug and screw it back in.
	Engine flooded due to multiple start attempts	Unscrew spark plug and start several times with the petrol tap closed, dry spark plug and screw it back in.

General information

Frequent faults and rectification (troubleshooting) 2/5



Fault	Possible cause	Remedy
Engine does not start (continued)	Spark plug connector unplugged.	Fit on spark plug connector.
	Air filter contaminated.	Service air filter (see under Maintenance and cleaning)
	Sparkplug sooted, damaged or wrong electrode gap.	Clean spark plug and check electrode gap (see under section "Engine". Replace spark plugs as needed.
	No oil pressure: Insufficient engine oil.	Check engine oil level, top-up. (SAE5W50)
	No oil pressure: Excessive inclination.	Bring device into a level position.
	Poor, contaminated, or old fuel	Clean fuel system. Replace fuel filter. Use fresh fuel.
Engine starts poorly or runs irregularly	Starter flap / choke closed (activated on the throttle lever)	Open starter flap / choke (after starting deactivate on the throttle lever)
	Air filter contaminated	Service air filter (see under section Engine)
	Poor, contaminated, or old fuel	Clean fuel system. Replace fuel filter. Use fresh fuel.
	Sparkplug sooted, damaged or wrong electrode gap.	Clean spark plug and check electrode gap (see under section "Engine". Replace spark plugs as needed.

General information

Frequent faults and rectification (troubleshooting) 3/5



Fault	Possible cause	Remedy
Device does not move	Traction drive (hydrostat) on the lever unlocked	Lock traction drive (hydrostat) on the lever
	Hydrostatic drive (hydraulic oil) overheated	Let cool. Check cooling air filter.
Blade clutch does not engage	Lever for cutting height adjustment in transport position	Lower lever for cutting height adjustment to desired cutting height (1 to 5)
Blade does not rotate	V-belt is not sufficiently tensioned or is damaged.	Check belt and belt tensioner. Replace broken belt.
	Bowden cable of the blade clutch is defective.	Check Bowden cable, replace if necessary.
	Feather key of the blade shaft is missing or is defective.	Replace feather key.
Strong vibration in operation	Imbalance on the blade system due to non-uniform re-sharpening or chipping / deformation of the blade.	Resharpen and balance blade. Replace damaged blades immediately.
	Blade drive shaft bent or blade bearing damaged through collisions.	Repair of the blade shaft and blade bearing.
	Engine fastening is loose.	Retighten engine fastening.
	Blade carrier or locking screws are loose.	Check and retighten blade carrier and locking screws.
Abnormal noises	Loose fastening elements.	Localise and eliminate the source of the noise.
	Muffler is loose or defective.	Fasten or repair muffler / manifold.
	Hydrostatic drive overheated	Let cool. Check cooling air filter.
	Air in the hydrostatic drive, insufficient oil in the hydrostatic drive.	Vent the hydrostatic transmission, check oil level and top up supply tank (SAE5W50, see section "Drive system") Find leak and repair it.

General information

Frequent faults and rectification (troubleshooting) 4/5



Fault	Possible cause	Remedy
Engine gets hot	Fan grille contaminated.	Clean fan grille. If necessary, even regularly during operation.
	Insufficient oil level in the engine.	Top up engine oil. See the operating manual provided by the engine manufacturer.
	Cooling fins of the engine are contaminated.	Clean cooling fins of the engine.
Smoke coming from engine	Air filter contaminated or soaked with oil, e.g. after the machine is placed on its side or has fallen over.	Service or replace air filter (see under Maintenance and cleaning)
	Oil level too high.	Reduce oil level to the "Max" mark.
Cut is not clean, lawn / meadow is unsightly	Blade dull or worn.	Sharpen / turn and balance blade. Replace damaged blades immediately.
	Drive speed is too high for the grass height or grass density.	Reduce drive speed and/or adjust the cutting height.
	Mower deck of the device is heavily contaminated.	Clean.
	Different tyre pressure.	Check tyre pressure.
	Mower deck of the mower is not parallel to the ground.	Adjust the parallelity of the mower deck.
	Mow without full-throttle. Blade rotates too slowly.	Accelerate full-throttle.
	Use of the mulch kit in high grass.	Mow high grass without mulch kit
	Mulch blade (top blade) installed upside-down.	Install mulch blade (top blade) correctly.
Mulching result is unsatisfactory in high growth	Drive speed too high.	Reduce drive speed.

General information

Frequent faults and rectification (troubleshooting) 5/5



Fault	Possible cause	Remedy
Mulching result is not satisfactory on short growth / lawn	Growth is discharged too quickly.	Install optional mulch kit. (Maximum grass height for mulch kit 40 cm)
The device does not stop when the brake is activated	Brake is incorrectly adjusted, worn or defective.	Adjust brake correctly or repair it. (See section "Operating elements")
Mow unit bonnet is clogged	Mowing grass that is too tall or too wet.	Adapt cutting height and mowing speed.
	Blade worn.	Service or replace blade system.
	Insufficient engine speed, in spite of full throttle.	Check the engine.
Engine does not switch off	Switch-off system defective.	Close petrol tap.
Tyres go flat or lose air	Thorns or sharp objects damage the tyres.	Tyre / tube repair, tyre sealant, airless front tyres available as accessories for Sherpa XL.


General information

Tyre sizes, wheel dimensions, tyre pressures 1/2



Tyre pressures

A uniform and correct tyre pressure is essential for the following characteristics:


- Traction uphill
- Braking force downhill
- Suspension comfort
- Safety  : The tyre does not come off of the rim!
- Uniform mowing pattern

Rules: 

- Check the air pressure on a regular basis.
- Examine tyres and tyre flanks regularly for damage.
- Replace damaged tyres.
- Only use original AS-MOTOR tyres.
- Do not change tyre diameters or tyre sizes. This can damage the 4WD.

Tips / notes: 


- Inflate the tyres with our recommended tyre pressures. In our opinion, these pressures offer an optimum of suspension comfort and traction.

- High tyre pressures have a negative influence on suspension comfort and traction.
- Do not underrange the recommended tyre pressures. Tyres can come off of the rims. 
- Do not exceed the maximum tyre pressures.
- AS-Motor mowers come from the factory with a tyre pressure that is higher than the recommended pressure.
- Tyre sealant can prevent flat tyres. Particularly in tubeless tyres.
- Anti-puncture insert strips can prevent flat tyres.
- For the AS 940 Sherpa 4WD XL airless front wheels (foamed with PUR) are available at PAM. The suspension comfort suffers greatly in this case. Steering and ball joints are subjected to greater load and wear more quickly. Additional weight of 7 kg per front wheel.
- Pay attention to the running direction of the tyres, left / right for optimal traction.
- Slow pressure loss of a tyre indicates that there is a thorn in the tyre.
- Tubed tyres cannot be easily used without a tube.
- Next page: Overview TABLE "Wheels"

General information

Tyre sizes, wheel dimensions, tyre pressures 2/2



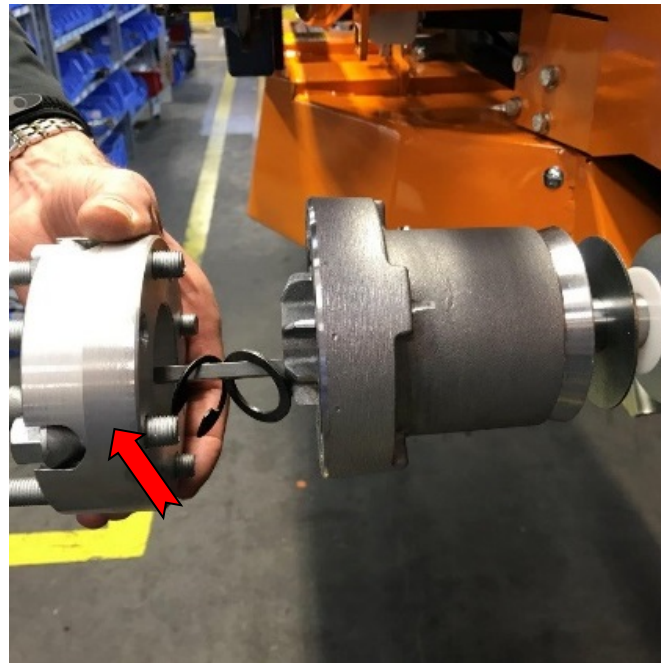
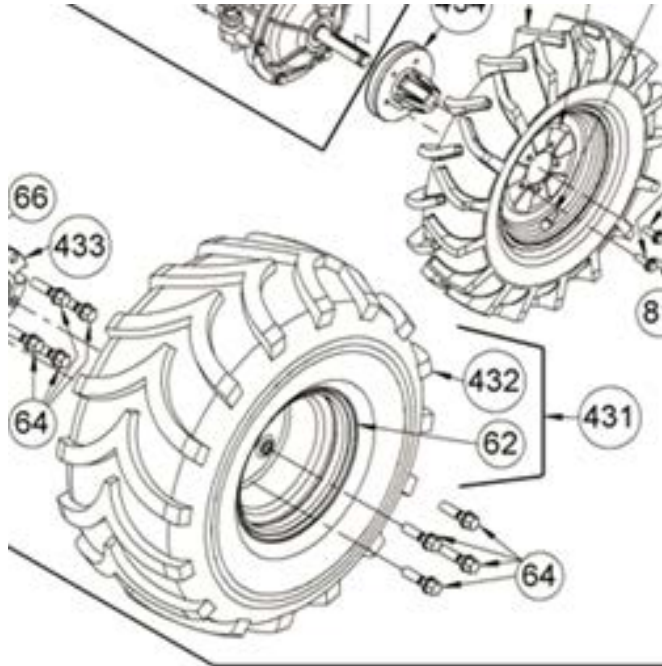
Model:	Front wheel (F) / rear wheel (R):	Tyre size:	Recommended air pressure:	Maximum air pressure:	Tread:	Tubed Tyres (TT) / Tubeless (TL):	Standard equipment / optional:
AS 920 Sherpa 2WD	F:	15 x 5.00-6	17 psi / 1.20 bar	18 psi / 1.24 bar	Terrain	TL	Series
	R:	18 x 9.50-6	15 psi / 1.00 bar	24 psi / 1.65 bar	Terrain	TL	Series
	R: Twin tyre kit	4.00 x 10	24 psi / 1.65 bar	40 psi / 2.80 bar	Agriculture	TL	Optional
AS 940 Sherpa 4WD	F:	15 x 5.00-6	17 psi / 1.20 bar	18 psi / 1.24 bar	Terrain	TL	Series
	R:	18 x 9.50-6	15 psi / 1.00 bar	24 psi / 1.65 bar	Terrain	TL	Series
	F: XL kit	4.80 x 4.00-8	23 psi / 1.60 bar	40 psi / 2.80 bar	AS	TT	Optional
	R: XL kit	20 x 10.00-8	12 psi / 0.80 bar	22 psi / 1.50 bar	AS	TL	Optional
	R: Twin tyre kit	4.00 x 10	24 psi / 1.65 bar	40 psi / 2.80 bar	Agriculture	TL	Optional
AS 940 Sherpa 4WD XL	F:	4.80 x 4.00-8	23 psi / 1.60 bar	40 psi / 2.80 bar	AS	TT	Series
	R:	20 x 10.00-8	12 psi / 0.80 bar	22 psi / 1.50 bar	AS	TL	Series
	F: Airless PUR foam	4.80 x 4.00-8	Foamed	Foamed	AS	Airless PUR 	Optional

Tightening torque wheel bolts:

- Rear wheels: M12 100 Nm
- Front wheels: M8 40 Nm

General information

Conversion to XL wheels 1/1



The AS 940 4WD can be retrofitted to XL wheels. (Accessories)

Effect:

Ground clearance: + 30 mm.

Cutting height: + 30 mm.

Modified wheel adapter on the rear wheel is included in the scope of delivery.

Important:

Underlay 4 washers under each of the stop buffers of the front axle. Otherwise the front wheel will touch the tubular frame.

General information

Tightening torques for bolted connections 1/4



Tightening torques

Correct tightening torques are important to ensure a solid connection of components and to avoid damage

Correct tightening torques are safety-relevant on rotating parts, in particular, like blades, belt pulleys and wheels.

General tightening torques for hexagon bolts, socket head screws with hexagon socket and standard thread in 8.8 quality:


		Bolts with standard thread DIN quality 8.8	Screws or nuts with under-head serrations
Thread:	Width across flats:	Torque in Nm:	Torque in Nm:
M5	8	6 Nm	8 Nm
M6	10	12 Nm	15 Nm
M8	13	25 Nm	35 Nm
M10	17	55 Nm	70 Nm
M12	19	90 Nm	120 Nm

Special tightening torques

In the tables on the following pages the individual torques are presented for essential, special and safety-relevant parts.

Tip / note: 

You will find the listed bolts / threaded fittings based on the position number (#XXX) in the exploded drawings of the respective assembly at parts-and-more.org (PAM). The position numbers are the numbers in circles on each part in the exploded drawing. In the parts list below the drawing the position number (Pos.) is also shown and cited by name.



Attention:  Several bolts of the engines from Briggs & Stratton and all bolts of the transmission from Tuff-Torq / Kanzaki are inch bolts.

Next pages: TABLES – TIGHTENING TORQUES

General information

Tightening torques for bolted connections 2/4




Assembly: (in PAM)	Position number in PAM:	Designation: Function:	Tightening torque in Nm:	Dimensions and standard:
Blade with drive	 #322	Hex nut, self-locking Blade fastening	90	M 12 DIN 985-8 galvanized
	#85	Locking screw Belt pulley	120	M12 x 25 VERBUS-RIPP black
	#111	Locking screw Central locking screw, blade carrier (long)	120	M12 x 50 VERBUS-RIPP black
	#85	Locking screws (2 pcs) Locking screws, blade bars	120	M12 x 25 VERBUS-RIPP black
	#85	Locking screws (2 pcs) Upper mulching blade and wrap protection cup	120	M12 x 25 VERBUS-RIPP black
Engine and belt drive	 #10	Inch bolt! Exhaust manifold fastening	25	Hexagon inch bolt!
	#9	Clip Exhaust fastening	30	
	#5 + #6	Hexagon bolt and locking nut, fastening muffler on the frame	30	M8 x 16 DIN 933-8.8 galvanized M8-8

General information




Tightening torques for bolted connections 3/4

Assembly: (in PAM)	Position number in PAM:	Designation: Function:	Tightening torque in Nm:	Dimensions and standard:
Engine and belt drive (Continued)	#20	Inch bolt Hub fastening	85	7/16" x 1"-20 UNF
Hydraulic system	#213	Screw-in socket	35	GE 10 S9/16 UNF OMDCF
	#211	Fastening, elbow fitting	20	M8 x 35 DIN 933-8.8 galvanized
	#212	Elbow	30	
	#68	Screw-in socket	30	GE 15 L3/4 UNF OMDCF
	#69	Hydraulic hose threaded fittings	30	
	Transmission rear with wheels 	#49	Ventilation	20
Tuff Torq		Two oil drain plugs	22	AF 14
#64		Ball collar screws (4 pcs) Rear wheel fastening	100	M12 x 1.5 x 35-10.9 AF 17
#51 + #50		Vent screw with copper seal	20	M8 x 12 DIN 933-8.8 galvanized
#422		Cover oil filter with O-ring	10	Tuff Torq
#42 + #5		Fastening transmission on frame	30	M8 x 79, washer 8.4 DIN 125, locking nut M8
#55		Special nut Fan wheel fastening	50	M10 special nut

General information

Tightening torques for bolted connections 4/4



Assembly: (in PAM)	Position number in PAM:	Designation: Function:	Tightening torque in Nm:	Dimensions and standard:
Transmission front with wheels 	Kanzaki front axle	Vent screw and oil drain plug with seal (Inch bolt!)	15	AF 10 and AF 12
	#80	Hexagon bolt (5 pcs) Front wheel fastening	40	M8 x 25 VERBUS-RIPP black
	#73	Hexagon bolt (6 pcs) Fastening, pendulum axle	55	M10 x 25 DIN 933-8.8 galvanized

General information

Fuel, lubricants, fill quantities, consumption 1/1



Fuel

The fuel must fulfil the following requirements:

- Clean, fresh, non-leaded petrol.
- At least 87 octane/87 AKI (91 RON).
- Petrol with an ethanol portion up to 10% (E10) is acceptable.
- Fuel stabiliser can be used, e.g. Advanced Formula fuel stabiliser from B&S.
- Fuel ages if it is stored longer than 30 days.
- Due to stagnant fuel residues form in the fuel system or on important parts of the carburettor.
- More extensive information is provided in the engine operating manual

Lubricants

Engine oil AS 920 and AS 940:

- SAE 5W-50. Factory-standard our first choice with the best experiential values in all countries, whether cold climate or hot climate. (Fully synthetic oil)
- Alternatively: SAE 5W-30
- Alternatively: SAE 30. Under 4 degrees Celsius the use of SAE 30 results in starting difficulties. Especially suited for warm regions in summer.
- More extensive information is provided in the Briggs & Stratton operating manual.

Oil for hydrostatic transmission (Tuff Torq / Kanzaki) AS 920 and AS 940:

- SAE 5W-50. Without exception.
- Use of other oils invalidates guarantee claims.

Fill quantities

Fill quantities engine AS 920 and AS 940:

- Engine, Briggs & Stratton: 1.8 – 1.9 litre, (62-64 oz.)

Fill quantities hydrostatic transmission AS 940 4WD/XL:

- Total volume = front axle + rear axle + tank = approx. 7 l

Fill quantity hydrostatic transmission AS 920 2WD:

- Total volume = rear axle + expansion tank = approx. 5 l

Fill quantity – fuel tank AS 920 and AS 940:

- 15 litres with reserve

Consumption (fuel)

- Maximum 5.6 l/h, minimum 2.5 l/h

General information

Hydrostatic transmission "Tuff Torq / Kanzaki" 1/1



Hydrostatic transmission used

AS 940 Sherpa 4WD and AS 940 Sherpa 4WD XL

Front axle: Kanzaki KXH 10 N

Rear axle: Tuff Torq K 664 E

Characteristics:

- Variable hydrostatic transmission with differential lock
- Front axle with hydraulic synchronisation
- Automatic "on-demand" 4WD saves power
- Lawn-friendly front wheel drive
- Tight turning radius through variable front axle speed

Technical data:

- Max. oil flow, KXH 10 N: 37 l/min.
- Oil quantity, KXH 10 N: 2.4 l (without lines and expansion tank)
- Oil quantity, K 664 E: 3.0 l (without lines and expansion tank)
- Oil: only SAE 5W50!
- Max. temperature and pressure: 90° Celsius, 120 bar (K664 E)

Oil and filter change:

After the **first 50 hours** and then **every 200 hours**.

AS 920 Sherpa 2WD

Rear axle: Kanzaki K 66


Characteristics:

- Variable hydrostatic transmission with differential lock

Technical data:

Oil quantity: 2.5 l (without lines and expansion tank)

Oil: only SAE 5W50!

Oil and filter change: 

After the first 50 hours and then every 200 hours.

Service Partner Germany:

(other countries please see: "www.tufftorqservices.com")

Tuff Torq / Kanzaki, Germany

Endress Doberschütz GmbH

An der Mühle 3

04838 Doberschütz, Germany

info@endress-gmbh.de

www.endress-gmbh.de

General information




Maintenance tasks, cleaning and maintenance intervals 1/4

Maintenance and cleaning (general information)

To ensure the full functionality, the safety and a long service life of the machine, regular maintenance and cleaning of the machine is essential.


All necessary activities and their intervals are listed on the following pages.

Prior to maintenance

Danger!  Danger of injury if maintenance and cleaning tasks are performed when the engine is running. Only execute maintenance tasks when the engine is running if this is explicitly required.

Prior to all maintenance and cleaning tasks when the engine is at a standstill:

- Let the device cool for at least 20 minutes.
- Close the fuel tap and the tank ventilation.
- Disconnect the negative terminal of the battery.


Warning!  The device can tip or fall over and cause severe injuries.

The device can be lifted or tilted to execute maintenance, repair or cleaning tasks on the underside of the device.

- Only lift the device on a level substrate.
- Only use hoists and ramps that are suitable.
- Only attach hoists on the main frame, only the main frame can bear the weight.
- Safeguard the device against tipping over or falling.

- Stay out of the tipping area.
- Do not tilt the device more than 23 degrees (AS 940 XL), 18 degrees (AS 920) and 21 degrees (AS 940). Otherwise the device can fall over, it can be damaged and contamination can occur due to escaping fluids.

Clean the device:

- Thoroughly clean the device after each use. Particularly the underside and the blade enclosure.
- Clean the air grille, engine cooling unit and engine.
- Clean the transmission housing and transmission fan.
- **Danger of fire!**  Particularly ensure clean parts on the exhaust system.
- For cleaning use brooms, brushes, damp cloths and wood or plastic spatulas.
- Do not clean with a high-pressure cleaner!
- Do not use any aggressive cleaning agents.

Thorough visual inspection:

Check the following for safe operation of the machine:

- Nuts, bolts, screws, fuel lines, air filter for firm seat
- Ignition cable and ignition connector for damage
- Covers, protective cloths, muffler
- Tank, fuel tap, carburettor, engine, transmission, battery, hydraulic system for leaks

Check safety functions


Check safety switches. (See section "Electrical system", Troubleshooting)

It must not be possible to start the engine, if:

- The seat contact switch in the centre of the seat surface loaded
- The blade clutch is switched on
- The drive lever is not in the zero position

If the engine and the blade are running, the engine must switch off and the blade must stop in 5 seconds as soon as the operator gets out of the seat.

Check parking brake (see section "Operating elements", parking brake)

Danger!  If the parking brake (drive lever in the aperture of the zero position) is not set properly the device can roll off.

Ensure that the parking brake functions faultlessly.

Parking brake test: (see section "Operating elements", parking brake)

- Place device on a level, non-slip substrate.
- Switch off the engine, let it cool.
- Unlock traction drive (hydrostatic transmission), lever in the black fan grille of the transmission fan.
- Activate parking brake, (lever in the aperture of the zero position).

- Attempt to forcefully push the device forwards and backwards.
- If the rear axle is blocked, the parking brake is correctly adjusted.
- Otherwise: See section "Operating elements" parking brake.

Check foot brake (see section "Operating elements" Parking brake)

Check whether the drive lever returns to the aperture of the zero position, when the brake pedal is activated.

Check blades (see section "Mower deck", Blade change and blade maintenance)

Danger!  There is a considerable danger of injury if the blade is improperly mounted and maintained!

Check the blades and all fastening parts for wear, damage and cracks.

Immediately replace blade parts and fastenings if there is:

- Damage or cracks (e.g. wear of the blade bolts and nuts)
- Wear that extends beyond the wear indicators of the blades. (Granularity marks on the blades)
- At least once a year or every 50 operating hours, depending on whether wear is present. Material is subject to fatigue; hairline cracks can develop. (Example: blade bars)

General information

Maintenance tasks, cleaning and maintenance intervals 3/4



Vibration (see section "Mower deck")

Vibration indicates imbalance in the rotating system. Causes can be:

- One-sided wear of the blade
- Missing blade, parts, or chipping
- Damage of the engine, blade, or enclosure fastening
- Dull or poorly sharpened blades increase vibration and can cause cracks and breaks.

Check blade clutch and blade brake

At full speed the blade must come to a complete standstill in less than 5 seconds. "Metallic" brake noise indicates a damaged brake pad.

See section: "Mower deck": Blade brake, blade bearing and blade clutch.

Check engine

See section: "Engine"

Checking the battery

See section: "Electrical system": Checking the battery

Check hydrostatic transmission

See section: "Drive system" and "General"

General information

Maintenance tasks, cleaning and maintenance intervals 4/4



Component	Action	Maintenance interval	
		A	B
Device	Check for safe working condition (basic inspection).	■	▲
	Clean.	■	
	Customer service.		▲
Fuel	Check fuel level.	■	
	Is the tank cap closed?	■	
Tank, fuel valve, and fuel line	Check parts for leaks and check for good condition.	■	▲
Ventilation grid	Clean.	■	▲
Engine cooling	Clean.		▲
Spark plug	Check/replace.		▲
Air filter	Maintain.	■	■▲
Blade and fastening components	Check for wear and damage. See chapter Checking the blade.	■	▲
	Change.		▲
	Clean the screw-on point of the knife blade.	■	
Blade brake	Does the blade function safely and does the blade come to a standstill within 5 seconds?	□	▲
Drive lever	Does the device stop when the lever is in neutral position (parking brake)?	□	▲
	Devices with foot brake: Does the lever move to neutral position when the foot brake is actuated?	■	▲
V-belt	Are the belts tensioned correctly, without fissures, and in good condition?		▲
Bowden cables	Check for proper function and ease of movement.	■	▲
Acceleration lever	Check for proper function.	□	▲

Chassis and impact protection	Check for rust and fissures and check the welding seams.	■	▲
	Are all protective devices and covers in place, fastened correctly and properly functioning?	■	▲
Label	Condition of the labels.	■	▲
Engine	For reliable information, see the operating manual of the engine manufacturer.	■	▲
	Check oil level (see operating instructions of the engine manufacturer).	■	▲
	Oil change.		▲
	Oil filter change.		▲
Parking brake	Check.	■	▲
Check the foot brake	Check the foot brake.	■	▲
Flammable material	Remove easily flammable debris buildup from the engine and the device.	■	▲
Steering	Check the clearance.	■	▲
Tyres	Check tyres and, if necessary, the tyre pressure.	■	▲
Safety switches	Check the switches at the driver seat, cutting height adjustment, and drive for proper function.	■	▲
Ignition lock	Check for proper function.	□	▲
Hydrostatic transmission	Check oil level.	■	▲
	Repair leaks.		▲
	Oil change after 50 h and every 200 h thereafter.		▲
Battery	Check the charging conditions.		▲

- A Before and after each use
- B Yearly or every 50 operating hours
- By the user when the engine is at a standstill
- By the user when the engine is running
- ▲ Through the authorised workshop

Engine

Overview and maintenance schedule 1/1



Overview

Technical data

Engine model: (AS 940 and AS 920)

- B&S Professional Series 8270 V-Twin
- Official designation: Model 440000 INTEK Professional Series
- Displacement: 724 ccm
- Power:
 - Maximum 20.1 kW (27 hp) at 3,600 rpm
 - Nominal 16.5 kW (22.4 hp) at 3,300 rpm (Factory setting)
- Engine speed:
 - Maximum 3350 rpm.
 - Minimum 1700 rpm. (Idle)
- Oil quantity: approx. 1.8 l
- Engine oil:
 - SAE 5W-50 (AS-MOTOR factory-standard)
 - Alternatively see section "General information" or B&S operating manual

Maintenance schedule

The complete maintenance schedule is in the operating manual provided by the engine manufacturer.

The essential maintenance activities are listed here: (See section: "Engine" ff.)

Interval	Service activity
After the first 5 hours	<ul style="list-style-type: none">▪ Change engine oil
Every 8 hours or daily	<ul style="list-style-type: none">▪ Check engine oil level▪ Clean area around muffler▪ Clean air intake grille
Every 25 hours or yearly	<ul style="list-style-type: none">▪ Clean air filter (*)
Every 50 hours or yearly	<ul style="list-style-type: none">▪ Change engine oil▪ Replace oil filter▪ Service exhaust system
Every 100 hours or yearly	<ul style="list-style-type: none">▪ Change engine oil▪ Replace oil filter
Yearly	<ul style="list-style-type: none">▪ Replace spark plugs▪ Replace air filter▪ Replace fuel filter▪ Maintain cooling system (*)

(*) Clean more frequently if there are high levels of dust or many foreign objects.

Engine

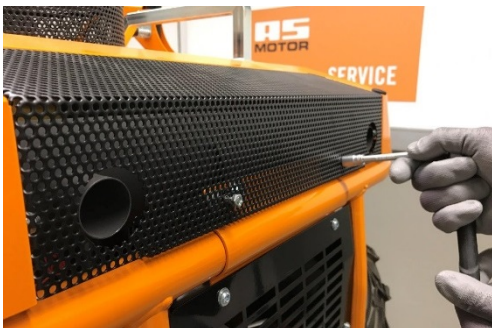
Changing the engine oil (replacing oil filter if necessary) 1/2



Warm up the device slightly.
Move seat to the front-most position.



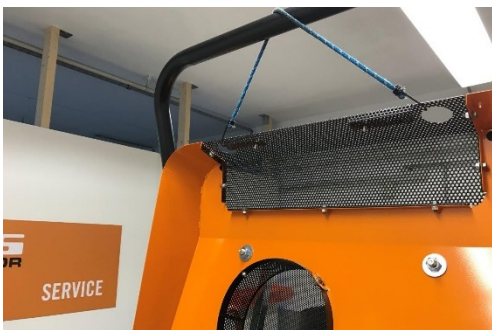
Remove fan grill of the hydrostatic transmission.



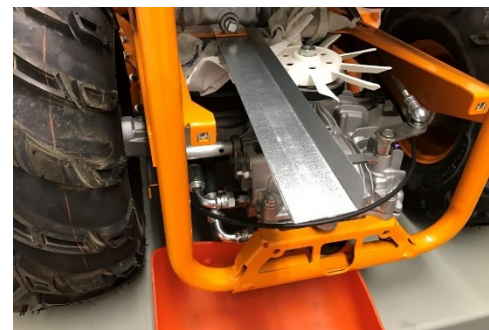
Unscrew engine cover.



Unscrew oil drain plug.



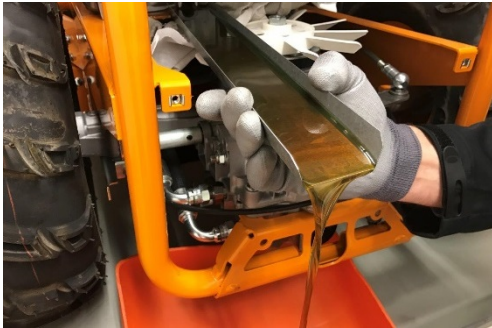
Open the engine cover and fix it in place for safety. ⚠
Danger of injury if the cover falls down!



Bring the trough or discharge into position.

Engine

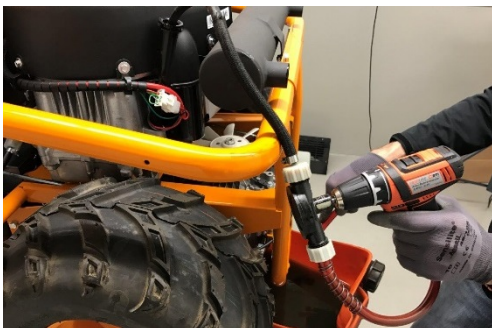
Changing the engine oil (replacing oil filter if necessary) 2/2



Drain oil and dispose of it properly (approx. 1.8 l). Do not get any oil on the drive belt.



If necessary: Unscrew and replace oil filter.



Tip: 👍
Alternatively: Suction out oil via the filler neck.



Top-up with fresh oil (approx. 1.8 l) and check the lever via the dipstick. SAE 5W-50 is used as factory standard.



Retighten the oil drain plug.



Remount the fan grille.
Attention: ⚠️ Rear part of the cover should not touch the fan wheel, but rather it should rest on the frame!

Engine

Cleaning or replacing air filter and spark plug 1/1



Open air filter screw.

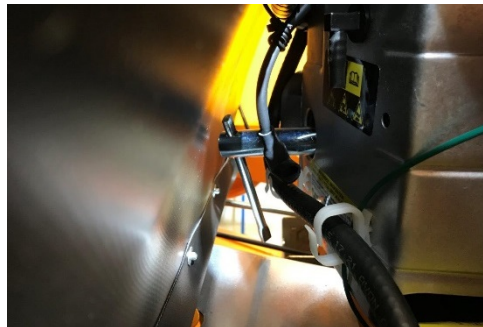


Pull off spark plug connector (rear) and unscrew spark plug.



Take out the spark plug diagonally upwards and clean it.

Prevent contamination from getting into the intake opening!



Pull off spark plug connector (front) and unscrew spark plug.



If necessary, replace with original B&S spare part.



Clean spark plug, replace if necessary. Re-install.

Electrode gap: 0.76 mm

Tightening torque: 20 Nm

Drive

Oil change – hydrostatic transmission 4WD 1/5 (please watch video on youtube)



👍 Tip/note: Watch "Oil change video" at "<https://youtu.be/xggSSpzBWOI?list=PL8ffeQSw3ESDYYTOTIk45toNKYbb9GB63>"



Order oil change kit via "PAM". The contents are the oil filter, new seals and sealing cover.



Take off sealing plug of the expansion tank.



Remove transmission cover.



Open the bypass unlock mechanism of the hydrostatic transmission.



Take off the floor plate.



Place oil pan under the transmission. Unscrew oil filter cover. Approx. 4.5 l oil will flow out.

Drive

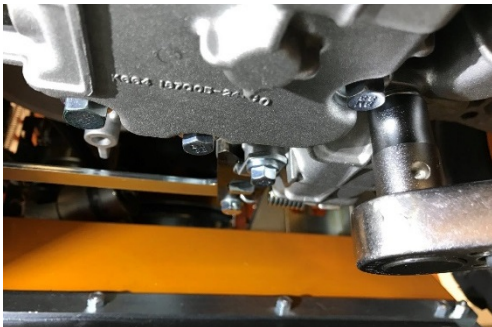
Oil change – hydrostatic transmission 4WD 2/5



Oil flows out. Take out the old oil filter.



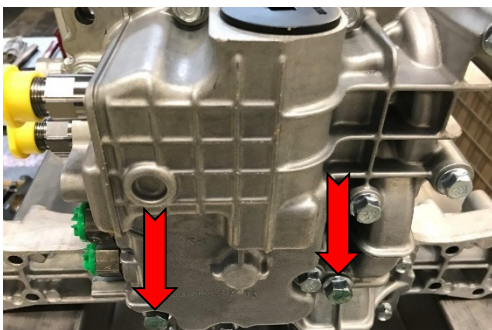
Now, unscrew the vent screw on the top of the hydrostatic transmission – in this process counter by holding the filler neck.



Unscrew the oil drain plugs under the transmission.



Unscrew the oil drain plugs of the front axle left and right. Place 1.2 l containers under each oil drain plug.



The two oil drain plugs are marked green.



Unscrew the vent screws of the front axle left and right.

Drive

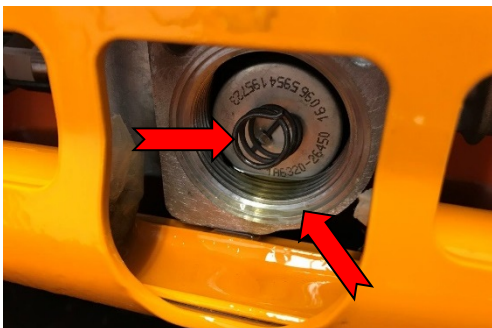
Oil change – hydrostatic transmission 4WD 3/5



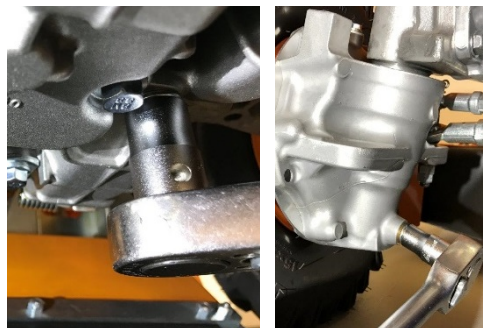
Clean and unscrew sealing plugs of the front axle.



Replace the old seals on all oil drain screws and vent screws.



Properly insert new filter into the hydrostatic transmission. Spring facing the opening. When properly inserted approx. 1 cm of the thread is visible.



Screw in oil drain plugs front and rear with the new seals and tighten. Front with 15 Nm, rear with 22 Nm.



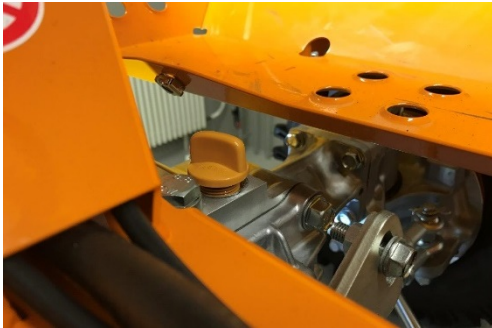
Important:
Do not tilt or jam the filter.
Screw in new cover and seal from the set. 10 Nm tightening torque.



Fit on vent screws front and rear several thread turns. Do not tighten! Air must escape when filling.

Drive

Oil change – hydrostatic transmission 4WD 4/5



Fit sealing plug back onto the front axle. Do not tighten. It must be possible for air to escape.




Now fill expansion tank with oil to the maximum level.
The oil runs slowly into the two axles and the transmission.



Close the hydrostatic transmission bypass.




Attention: 
Always ensure that there is still enough oil in the expansion tank! Top up regularly!



Have approx. 8 litres of room-temperature SAE 5W 50 on hand. Cold oil significantly slows the filling process!
Do not use any other oil!



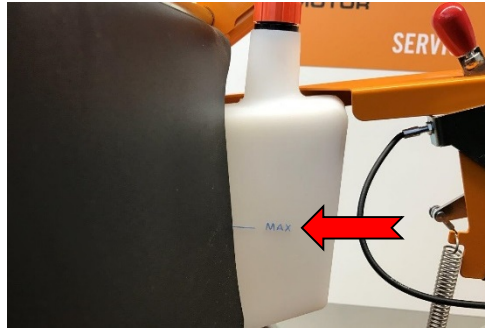
Attention: 
If air gets into the system, then the system must be completely vented again. Air damages the hydrostatic transmission.

Drive

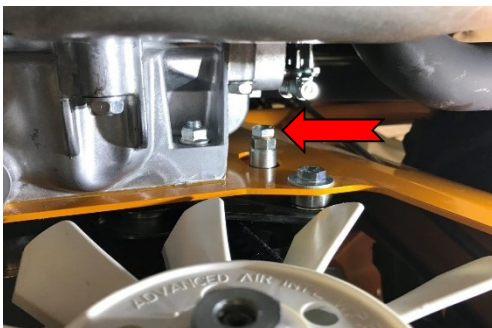
Oil change – hydrostatic transmission 4WD 5/5



As soon as oil escapes at the front vent screws, tighten them with 5 Nm.



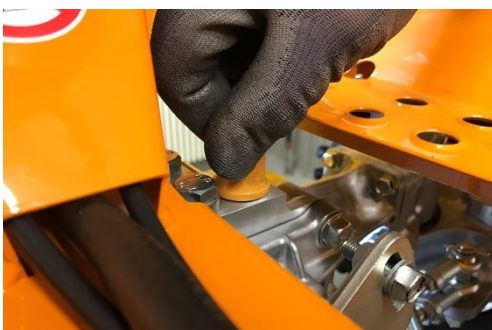
At the end of the oil change procedure the oil level must be at the "MAX" mark.



As soon as oil escapes at the rear vent screw, tighten it with 20 Nm.



Refasten covers and execute a test drive. If there are strange noises, stop immediately and **completely vent again**. (Repeat) ⚠️



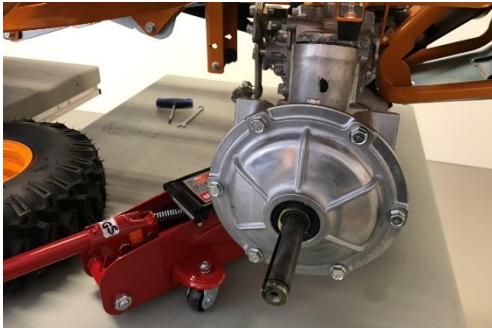
As soon as oil comes out of the sealing plug of the, firmly seal the sealing plug.



Tip/note: 👍
Ensure that the transmission cover does not touch the fan-wheel and that it rests on the frame.

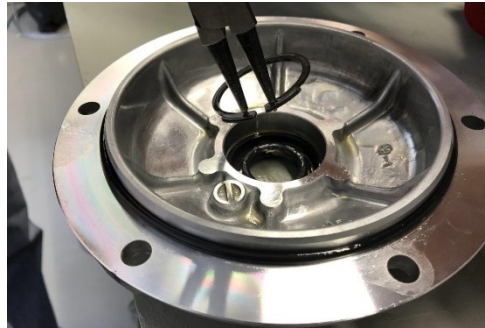
Drive

Replacing the shaft seals of the drive axles 1/2



1. Front axle:

If oil escapes from the front axle, the shaft seal must be replaced.



Remove circlip.



Drain the hydraulic oil of the system. See section "Oil change – hydrostatic transmission". Unscrew the screws of the transmission.



Knock out the shaft seal.



Tip/note: 👍

Shaft can now be taken out. If necessary for bearing or shaft replacement.



Press in new shaft seal with a suitable tool. (Do-it-yourself construction)

Drive

Replacing the shaft seals of the drive axles 2/2



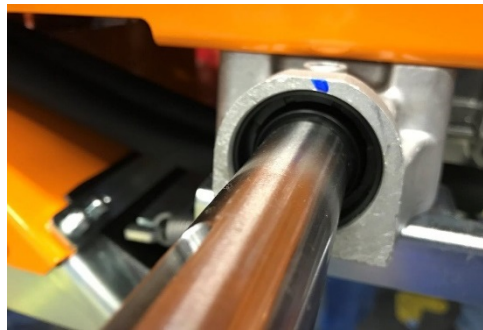
Re-insert circlip.



Re-install transmission cover. Check for uniform seat of the seal. When installing the cover do not damage the seal.



Refilling and venting of the hydraulic system. (See section "Oil change – hydrostatic transmission")



2. Rear axle:

If oil escapes from the rear axle, the shaft seal must be replaced.



Drain the hydraulic oil of the system. See "Oil change – hydrostatic transmission". Pull out sealing ring. Knock-in new sealing ring with tool.



Refilling and venting of the hydraulic system. (See section "Oil change – hydrostatic transmission")

Drive

Replacing the drive belt (hydrostatic transmission) 1/5



⚠ Safety: Disconnect battery.



Necessary preliminary work:
Dismount the blade drive belt.
(See section "Mower deck",
Replace blade belt)



Lift belt with a screwdriver and
pull it off by turning the belt
pulley with an open-ended
spanner.



Unscrew fan wheel. In this
process counter by holding the
belt pulley.



Take drive belt off of the
tension pulley.



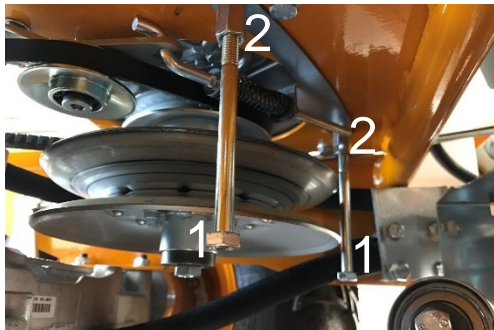
**Version 1: Belt change with
current belt tensioner with
new compression spring (from
SN 02XX16100001, October
2016, see illustration)**



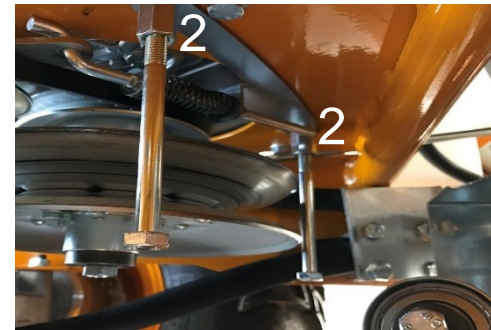
Tip/note: 👍
A retrofit kit for transition from
old belt tensioner (tension
spring) to new belt tensioner
(compression spring) is
available via "PAM".

Drive

Replacing the drive belt (hydrostatic transmission) 2/5



Unscrew both belt guide (long screws #1). Loosen, but do not take off connection nuts #2.



Screw belt tensioner with compression spring back on #2. In this process, the belt must be on the engine belt pulley!



Belt can now be threaded out between loose belt tensioner and belt pulley.



Screw on belt guides #1. Do not forget! Blade belt must later be positioned within the screws #1!



Pull new belt onto the belt pulley. Thread in belt between loose belt tensioner and belt pulley.



Place belt over the tension roller. Then with a hook, pull tension roller in the arrow direction and pull belt onto the belt pulley.

Drive

Replacing the drive belt (hydrostatic transmission) 3/5



With the wrench turn belt pulley further until belt moves onto the pulley.



Version 2: Belt replacement with old belt tensioner with tension spring (to SN. 02XX1609XXXX, September 2016, see illustration)

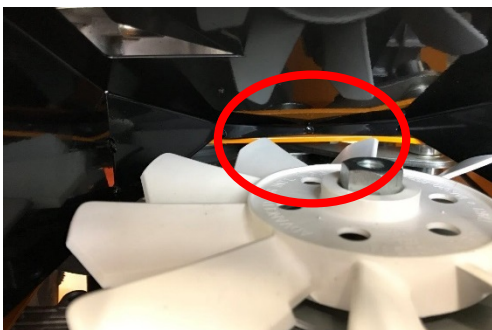


Tighten fan-wheel with special nut. Counter by holding the belt pulley.

Tightening torque: 50 Nm



Necessary preliminary work:
Dismount blade drive belt. (See section "Replacing the blade drive belt")



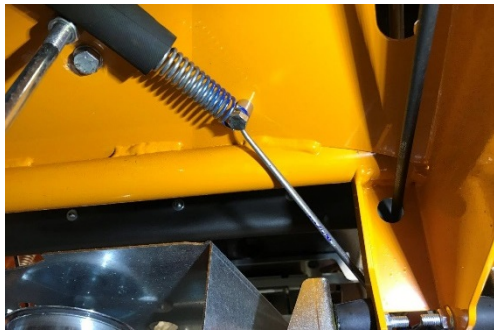
Tip/note: 👍
Ensure that the transmission cover does not touch the fan-wheel and that it rests on the frame.



Unscrew fan wheel. In this process counter by holding the belt pulley.

Drive

Replacing the drive belt (hydrostatic transmission) 4/5



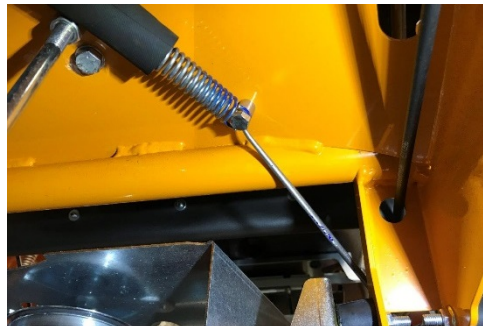
Unhook tension spring at the fastening point.



Pull new belt and tensioning roller, onto both belt pulleys in the same manner as described for dismounting.



Tip/note: 👍
Grasp the spring with a hook.
(Do-it-yourself construction)



Retension and hook-in the tension spring of the belt tensioner.



Dismount the V-belt by pulling and simultaneously pulling the belt pulley with an open-ended spanner.



Tip/note: 👍
A retrofit kit for transition from old belt tensioner (tension spring) to new belt tensioner (compression spring) is available via PAM.

Drive

Replacing the drive belt (hydrostatic transmission) 5/5



Tighten fan-wheel with special nut. Counter by holding the belt pulley.

Tightening torque: 50 Nm



Tip/note: 👍

Ensure that the transmission cover does not touch the fan-wheel and that it rests on the frame.

Mower deck

Blade belt replacement (without removal of the mower deck) 1/4



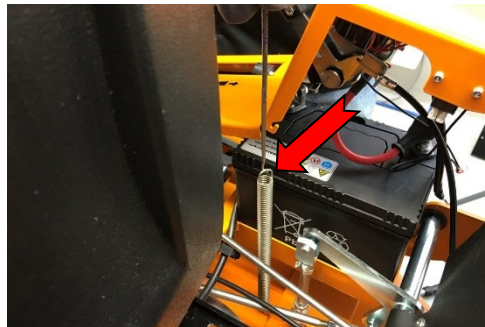
Remove side cover, right.



Slide seat to the front-most position.



Disconnect the negative terminal of the battery. Remove ignition key.



Remove right tension spring of the mower deck suspension (to do this, bring the height adjustment element into transport position).



Take off transmission cover.



Place the mower deck height adjustment element on the lowest position "1".

Mower deck

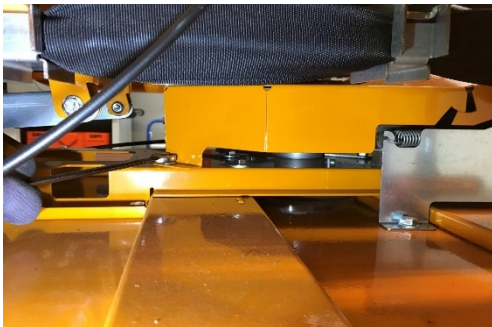
Blade belt replacement (without removal of the mower deck) 2/4



Remove belt cover. Two screws on the top of the behind the seat.



Take blade belt off of the belt pulley.



Remove belt cover. One screw and one nut at the front.



Place blade switch-on lever in the "On" position and secure it.



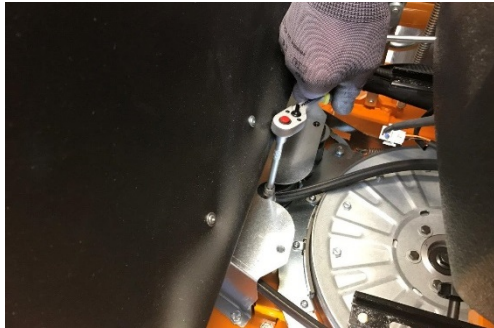
Take out belt cover to the right side.



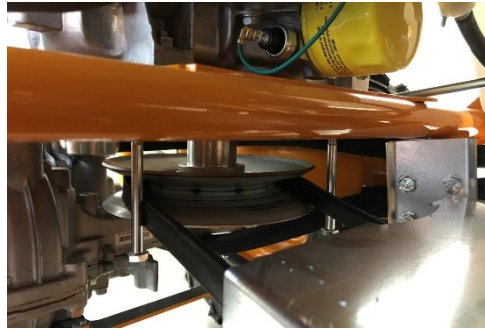
Through this measure the tensioning roller behind the sight becomes visible.

Mower deck

Blade belt replacement (without removal of the mower deck) 3/4



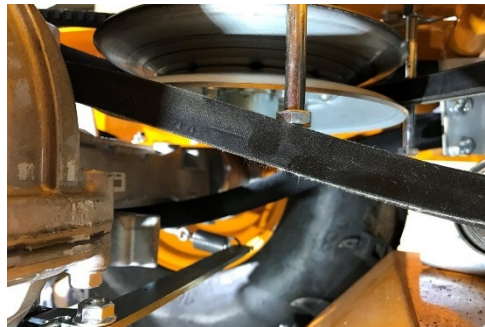
Unscrew belt guide.



Belt guide of the engine belt pulley as viewed from the mower deck.



Take out belt guide.



Guide blade belt over both belt guides, left and right (long screws).



Pull the blade belt to the rear, slightly off the engine belt pulley.



Twist blade belt in order to come through the rear axle and engine belt pulley.

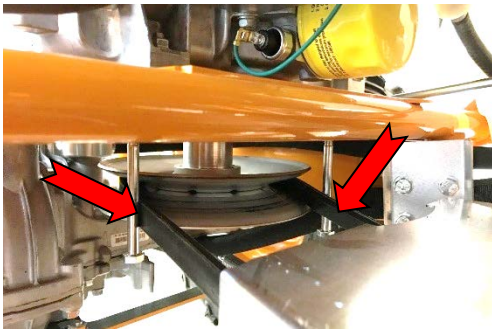
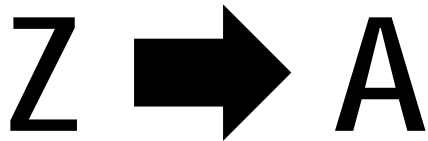
Mower deck

Blade belt replacement (without removal of the mower deck) 4/4



Pull out blade belt to the rear.

Install new belt in the reverse sequence.



Final check: The belt must run within the belt guides of the engine belt pulley!!

Mower deck

Blade replacement and blade maintenance 1/3



⚠ Safety: Disconnect battery first.



Unscrew blade bar for blades. Central lock screw is longer than the side lock screw.



Blades can be used on both sides. Re-sharpening is possible on both sides. Maximum to the wear marks (red arrows) ⚠



Unscrew nuts of the blade screws.



Balance! ⚠
After sharpening the blades, check for equal weight, resharpen if necessary.



Assembly sequence. Pay attention to the cup spring between blade and blade bar.



Worn blade screws and nuts must be replaced immediately! Always replace in pairs and completely. Daily check by the user! ⚠

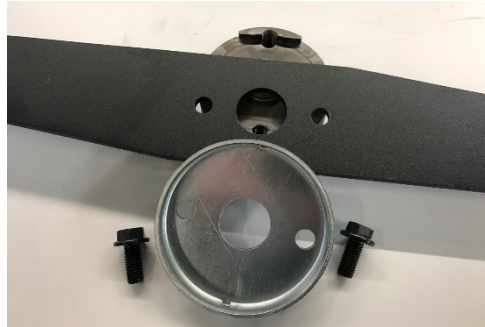
Mower deck

Blade replacement and blade maintenance 2/3

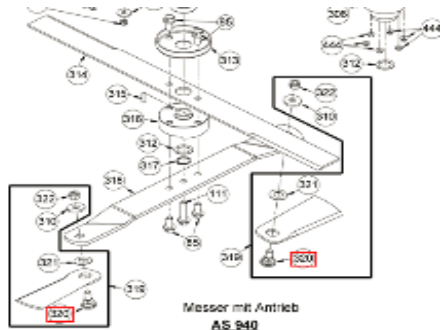


Fasten blades with blade screws. Blades underneath the blade bar are freely moveable. ⚠️

Tightening Torque: 90 Nm



Assembly sequence.



Replace all blade parts if there is damage, every 50 hours, or once a year. ⚠️

(Also blade bars!)



Tighten locking screws. ⚠️

Tightening torque: 120 Nm



Remove top mulching blade with blade pulley.

To do this take off the circlip and support disk.



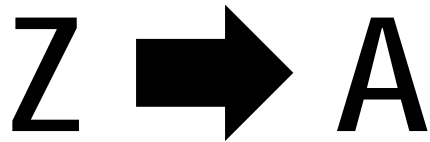
Coat the blade shaft with feather key with a little copper paste. Check feather key for deformation and replace if necessary.

Mower deck

Blade replacement and blade maintenance 3/3



Installation in the reverse sequence.



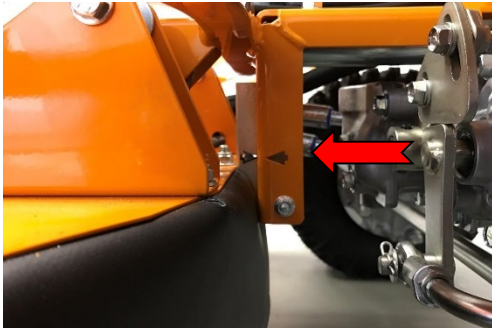
Tighten locking screws. ⚠️
Tightening torque: 120 Nm



Tip/note: 👍
Install direction is correct if the "AS" stamp marks are visible.

Mower deck

Checking the blade enclosure 1/2



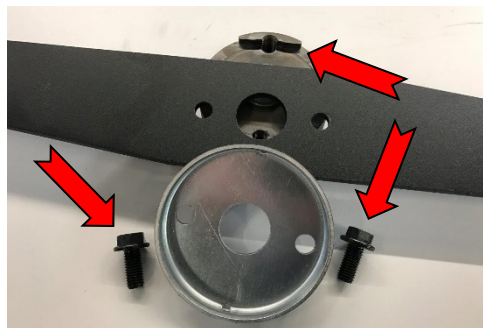
Check parallelity and height:
All three check points must be correctly adjusted. (See "Adjusting the blade enclosure")



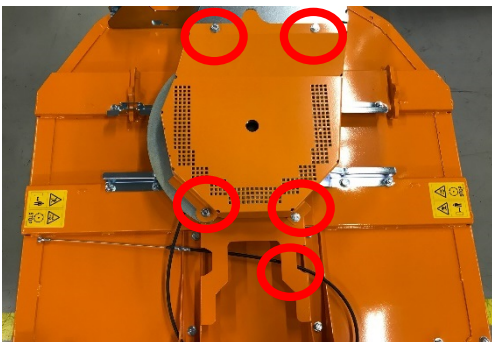
Check blade system:
See ⚠ Section "Blade maintenance"



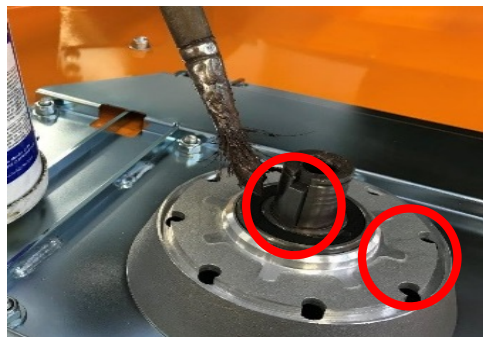
Check for warping:
Distance of the blades to the enclosure must be identical left and right.



Tip/note: 👍
If there are collisions always check the blade pulley, lock screws and feather key immediately.



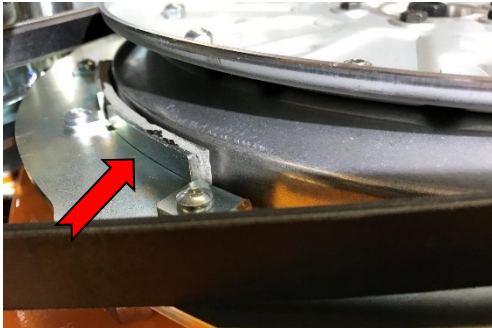
Check for cracks:
Caused by vibration (blade imbalance) and collisions (stone impact). Repair if necessary.



If the screw heads of the upper mulching blade are sheared off, the blade bearing can be damaged. Likewise a defective feather key.

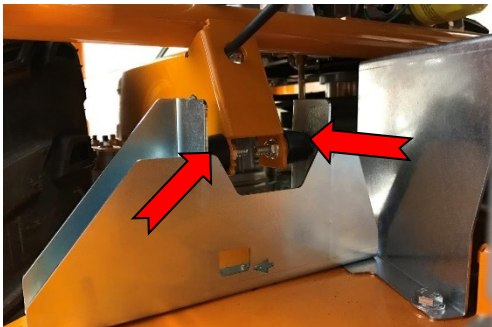
Mower deck

Checking the blade enclosure 2/2



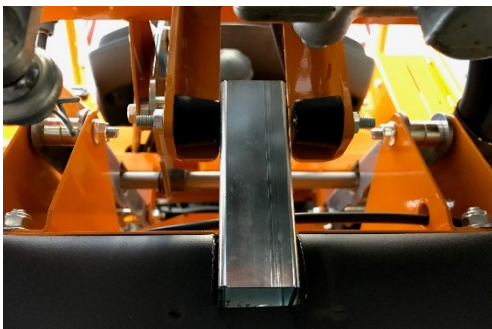
Check blade brake:

At switch-off, the brake must stop the blade within 5 seconds. See "Blade maintenance"



Check side guide:

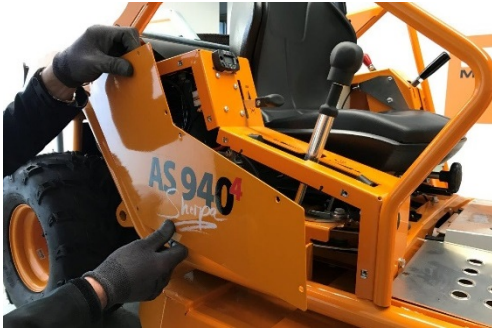
Check both stop buffers in the side guide, right rear. Leave a max. play of 5 mm. Grease lightly.



Check both stop buffers in the side guide, front middle. Leave a max. play of 5 mm. Grease lightly.

Mower deck

Blade enclosure removal 1/3



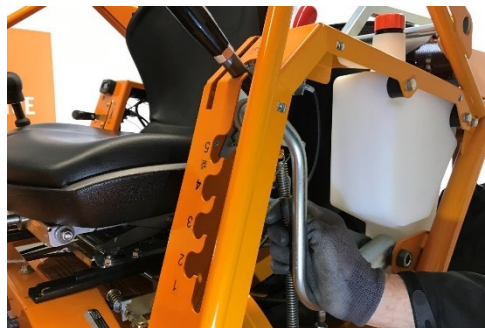
Remove side cover, right.



Take off transmission cover.



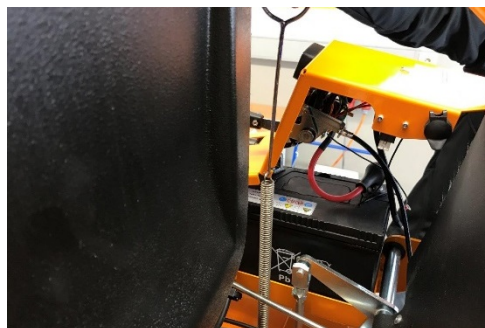
Take off the floor plate.



Bring cutting height adjustment into transport position and unhook left tension spring.



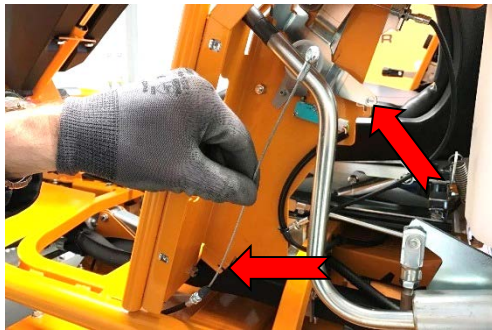
Take off side cover, left.



Unhook tension spring, right.

Mower deck

Blade enclosure removal 2/3



Dismount the blade drive cable.



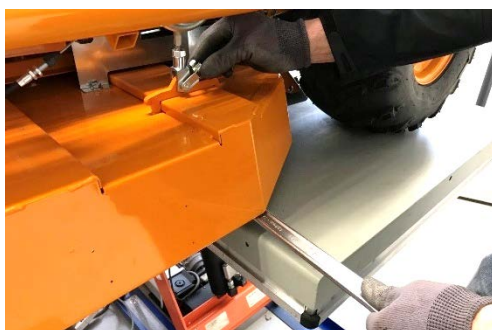
Unscrew both screws of the front blade enclosure fastening.



Bring cutting height adjustment into the lowest position.



Blade enclosure is now loose and only still connected to the device with the blade belt.



Take out folding spring bolts of the blade enclosure, left and right.



Bring the cutting height adjustment element into transport position and slide the blade enclosure to the stop on the rear wheels.

Mower deck

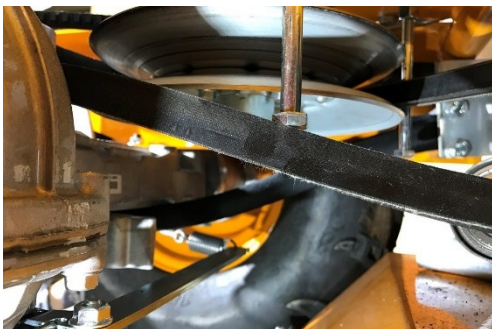
Blade enclosure removal 3/3



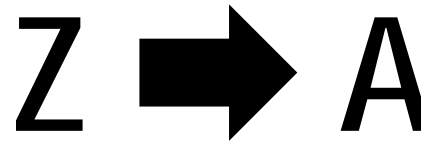
Pull the blade belt slightly to the rear, and pull it off the engine belt pulley.



Extend blade enclosure forward and to the side.



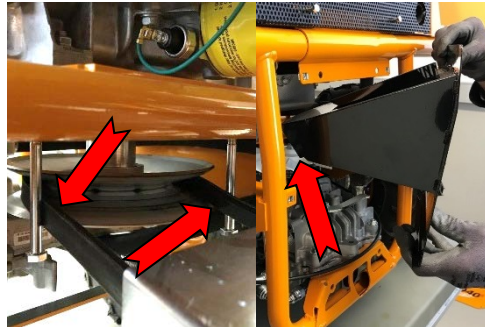
Guide blade belt over both belt guides, left and right (long screws).



Installation in the reverse sequence.



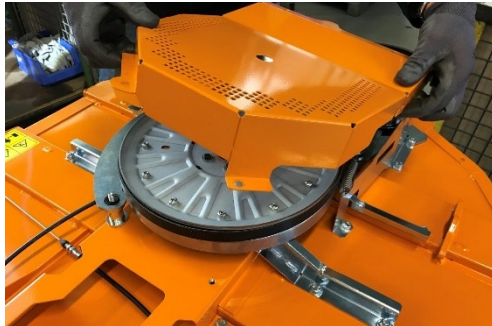
Twist blade belt in order to come through the rear axle and engine belt pulley.



Tip/note: 👍
At the end belt must rest within the two belt guides. The grille must not touch the fan-wheel.

Mower deck

Blade brake, blade bearing and blade clutch (1/3)



First, remove the mower deck. Access is possible from above, behind the seat. (See section Blade enclosure.) Now unscrew the belt cover.



Check removed brake lever for warping or deformation. Check ball bearing for ease of movement.



Unhook tension spring of the brake lever.



Check brake pad holder and brake pad. Replace if necessary. Flying off brake pads could be a sign of a non opening brake lever. Check opening mechanism.



By hand thread the brake lever out of the belt tensioner. Somewhat difficult, but possible.



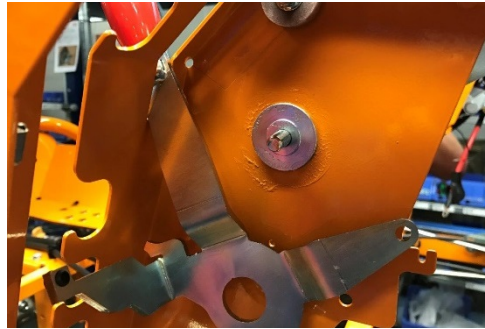
Installation in the reverse sequence. Do not forget to check ball bearing and cup spring with arch upward. (Arrow)

Mower deck

Blade brake, blade bearing and blade clutch (2/3)



(Test the function: pulling on the blade drive cable) tensions the belt tensioner and the brake pad lifts off approx. 3 mm.



Blade switch-on lever, installation: Step #1

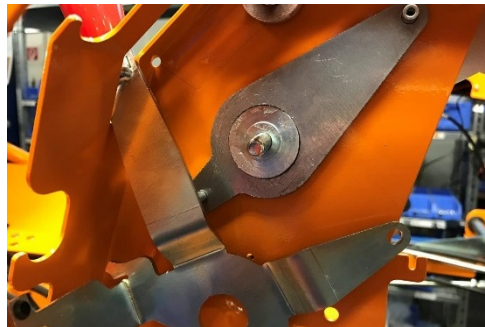
Tip/note: 👍

Apply a little grease. Holds the components in place.

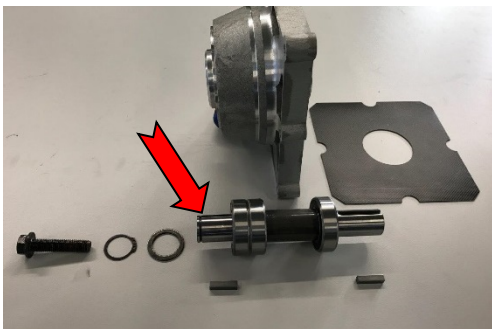


Tip/note: 👍

Check free belt pulley for ease of motion / concentricity and bearing play.



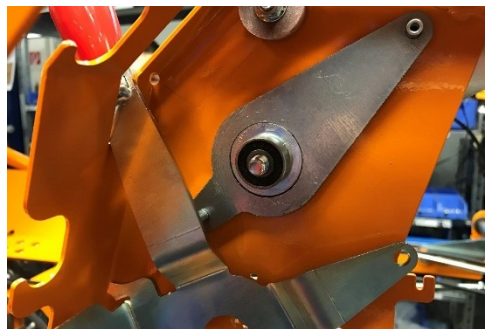
Step #2



Mounting parts – blade bearing and blade shaft.

Tip/note: 👍

Install blade shaft with groove for lock ring downward.



Step #3

Mower deck

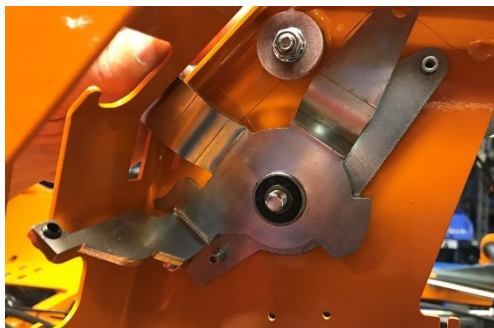
Blade brake, blade bearing and blade clutch (3/3)



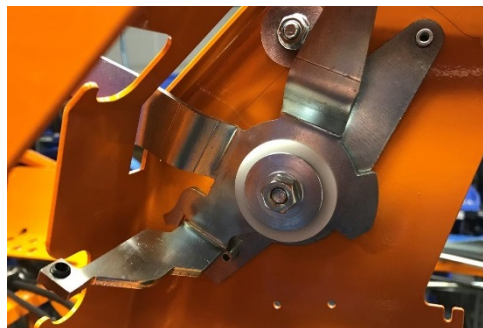
Blade switch-on lever,
installation: Step #4 (continued)



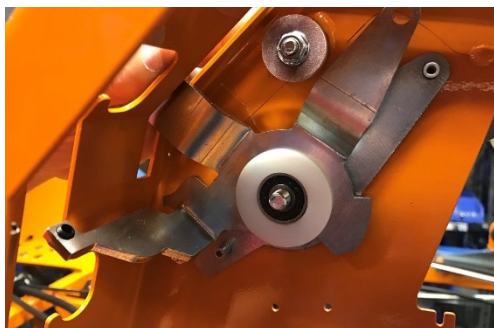
Step #7



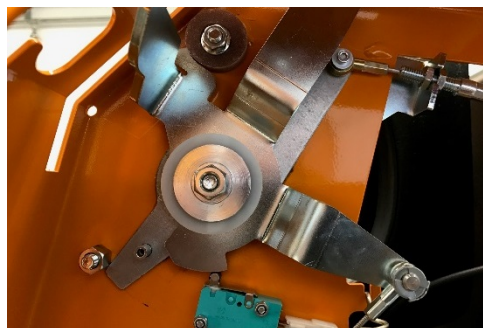
Step #5



Step #8



Step #6



Step #9

Finished:

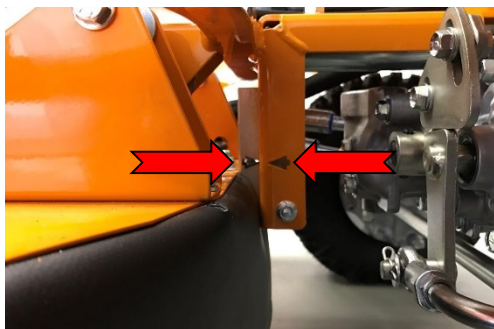
Connect to blade drive cable
and emergency stop cable
(blade emergency stop to the
driver seat).

Mower deck

Adjust the blade enclosure (parallelity) 1/2



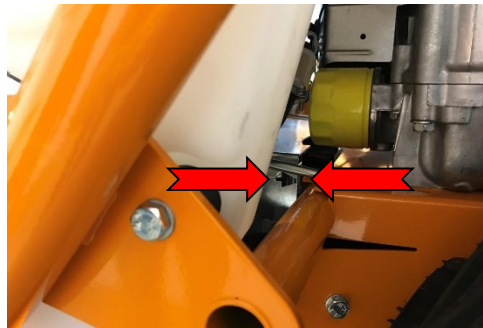
Take off side cover left/right and floor cover.
Place cutting height adjustment element in transport position.



Objective of the adjustments:
To adjust three arrow marks to each other.
First marking: Front blade enclosure guide.



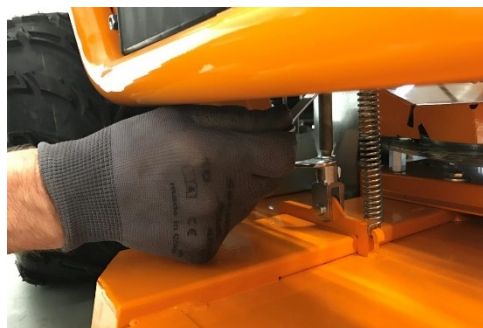
Second marking:
Right rear on the rear blade enclosure guide.



Third marking:
Left rear, near the frame round tube.



Adjustment left rear on lever rod with fork head and lock nuts.



Adjustment right rear on lever rod with fork head and lock nuts.

Mower deck

Adjusting the blade enclosure (parallelity) 2/2



Adjustment of the lift rod with fork head. First, unscrew lock nuts front and rear. Then adjust (Illustration: front end)



For new belt: 👍

Front hole. (Here in the illustration)

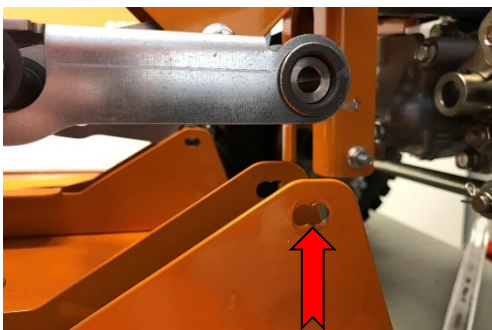
For older belt:

Rear hole. (More tension)



Lift rod with fork head and lock nuts. (Illustration: rear end)

For the final step, counter nuts.



Tip/note: 👍

Mow unit bonnet fastening, front with double hole.

Operating elements

Removing the driver seat and seat contact 1/2



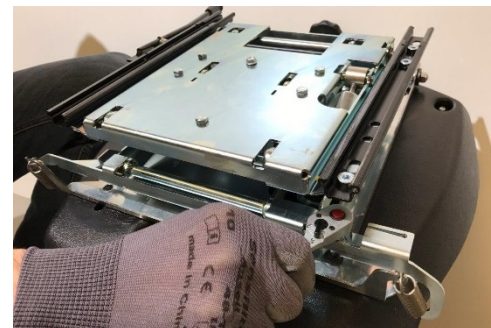
Unscrew locking screw of the seat adjustment element.



Unhook safety cable and extend seat forward.



Unplug safety contact switch behind the seat.



Unscrew seat suspension pack from the seat.



Detach blade clutch safety cable.



Seat contact switch is accessible. Check fastening of the switch through screws.

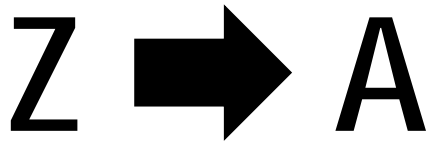
Operating elements

Removing the driver seat and seat contact 2/2



Check cover cap for firm seat.

Installation in the reverse sequence.

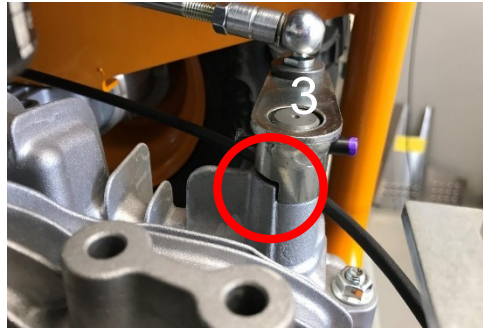


Operating elements

Parking brake 1/2



Drive lever in aperture "P" in the shift gate activates the parking brake.



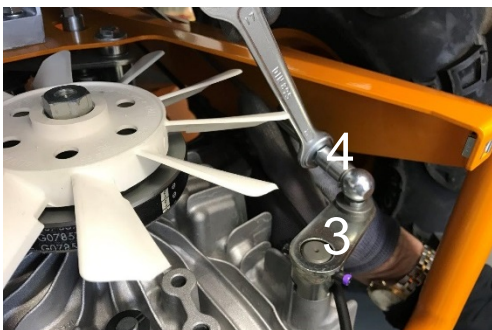
Parking brake "disengaged" if the drive lever is not in the "P" position. Brake arm (3) positioned at 90° relative to the hydrostatic transmission. Distance approx 0 to 1 mm.



Brake bracket (1) activates the brake arm (3) via the brake rod (2). Adjusting the parking brake via the length of the brake rod.



Parking brake "engaged" with drive lever in the "P" position. Brake arm (3) is positioned slightly in the direction of travel. Gap ≥ 3 mm.



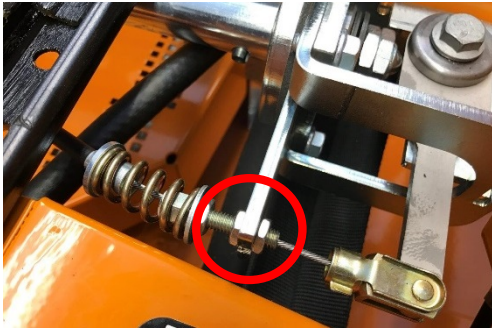
For adjustment of the brake rod, open the threaded fittings (4), adjust the rod by turning it, and relock it.



Brake pedal (right) brings the drive lever into position "P" via a Bowden cable.

Operating elements

Parking brake 2/2



Brake pedal cable pulls on the trigger lever at activation. Adjustment "play-free" on the cable fastening, without the lever being activated.



Test: Activation of the brake pedal brings the drive lever into position "P" before it touches the frame.



Overall test of the parking brake:

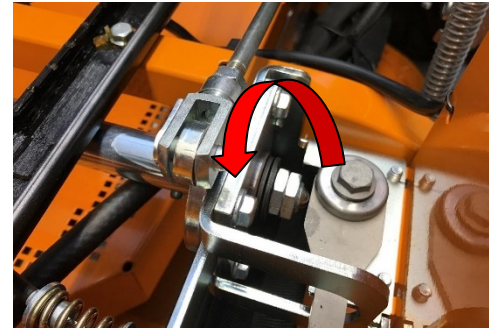
See section "General information", Maintenance, Testing the safety functions

Operating elements

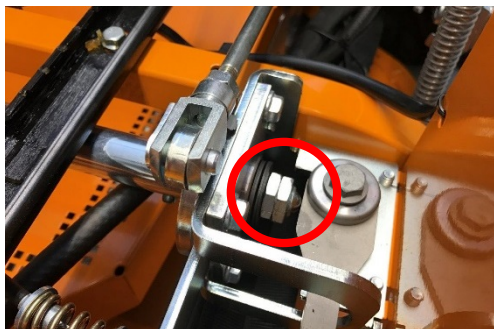
Drive lever (restoring force) 1/1



The restoring force of the drive lever in the direction "P" can be adjusted.



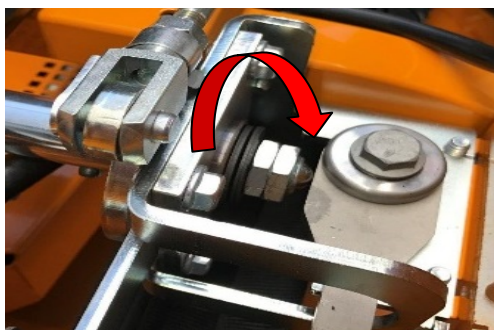
Unscrewing counter-clockwise:
Easier to move the lever. At release the lever goes back in "P" direction.



Adjustment of the force through one nut and locknut.

Tip/note: 👍

Use flat open-ended spanners and counter forcefully



Turn clockwise to tighten:
The lever moves with more difficulty and remains in its position when released.
Restoring force in "P" direction is minimal.

Operating elements

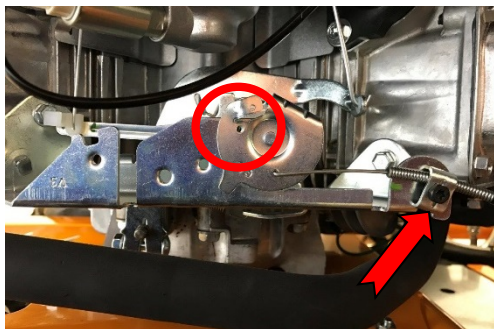
Accelerator cable / choke and drive speed



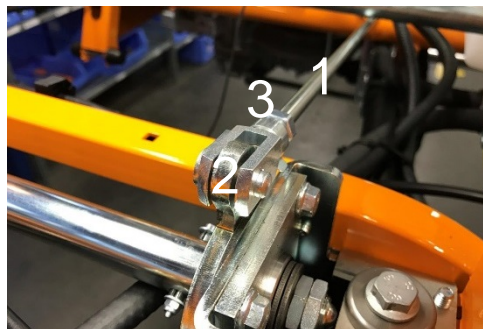
Move throttle lever to "max." position. Throttle lever tangibly engages at this position. Further pressing brings you into choke position.



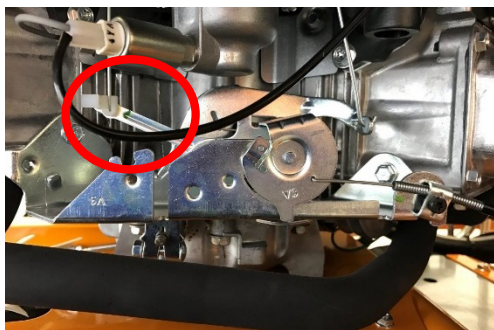
To adjust the drive speed place the drive lever in the "P" position.



In the "max." position the two holes on the sheet metal elements must be lined up, one above the other. Adjustment via the cable stop.



Now adjust the traction drive rod (1) only far enough that it has a little play in the part (2).



In the "Choke" position of the throttle lever, the arm lifts for activation of the choke. It must not move into the "max." position.



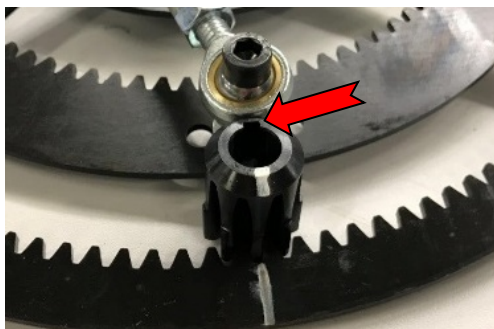
For adjustment, counter the lock nuts (3) on both sides, turn rod and counter again.

Operating elements

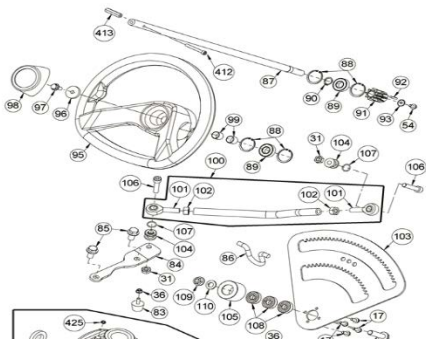
Steering / steering pinion and limited slip differential 1/1



At installation, the steering pinion (gear) must be in the middle of the sheet metal gear element. (At tooth number 16 of 31)



The groove for the feather key points to the bearing of the sheet metal gear plate. This is the only way that the steering rod and the steering wheel are straight.



Tip/note: 🍷

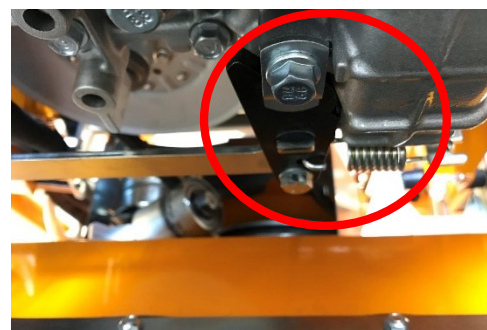
The exploded drawing on PAM (parts&more.org) shows the assembly sequence of the parts.



The left pedal interconnects the limited slip differential of the rear axle, as needed. The lock can be operated at any time, even at full-load.



Adjust the differential cable on the counter-holder "play-free" without it activating the lever of the lock.

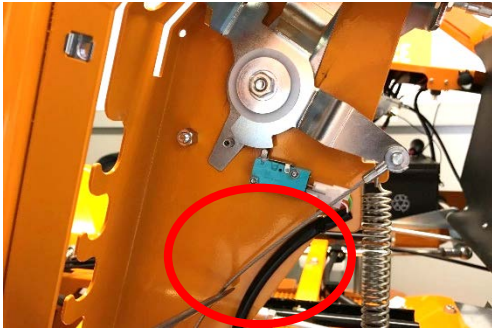


Tip/note: 🍷

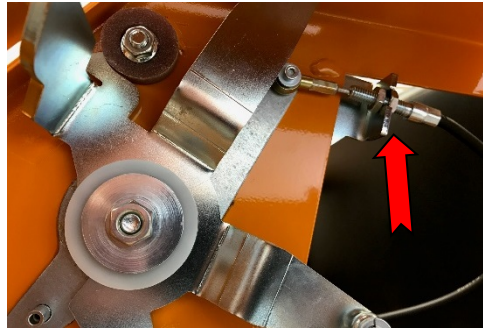
Tension spring, lever and lever holder are available as a set via PAM.

Operating elements

Blade drive cable and blade emergency stop cable 1/1 (Blade emergency stop)



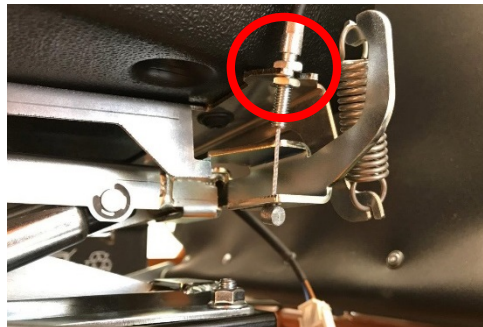
With the blade switched off the blade drive cable must be slack (slight sag).



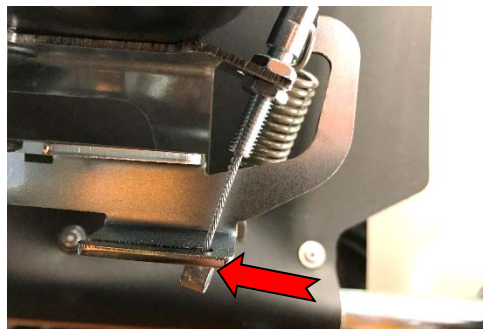
The blade emergency stop cable switches off the blade as soon as the driver gets off the seat. (Blade emergency stop)



Adjustment of the blade drive cable on the counter-holder.



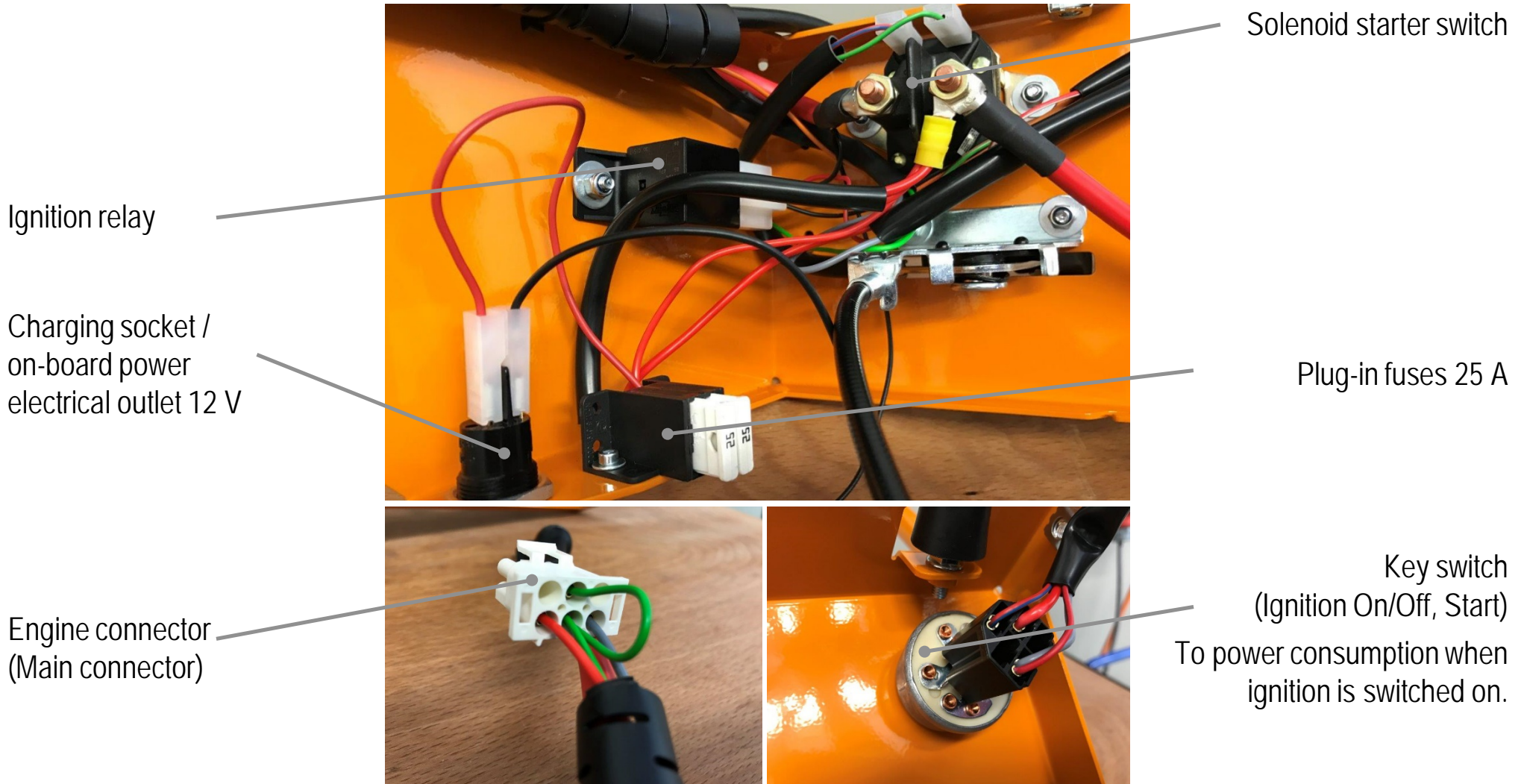
Adjustment with no weight on the driver seat on the cable counter-holder.



Hook in the end head of the emergency stop cable on the aperture of the seat suspension. Without driver the end nipple should not touch the sheet metal! Distance approx . 1 mm.

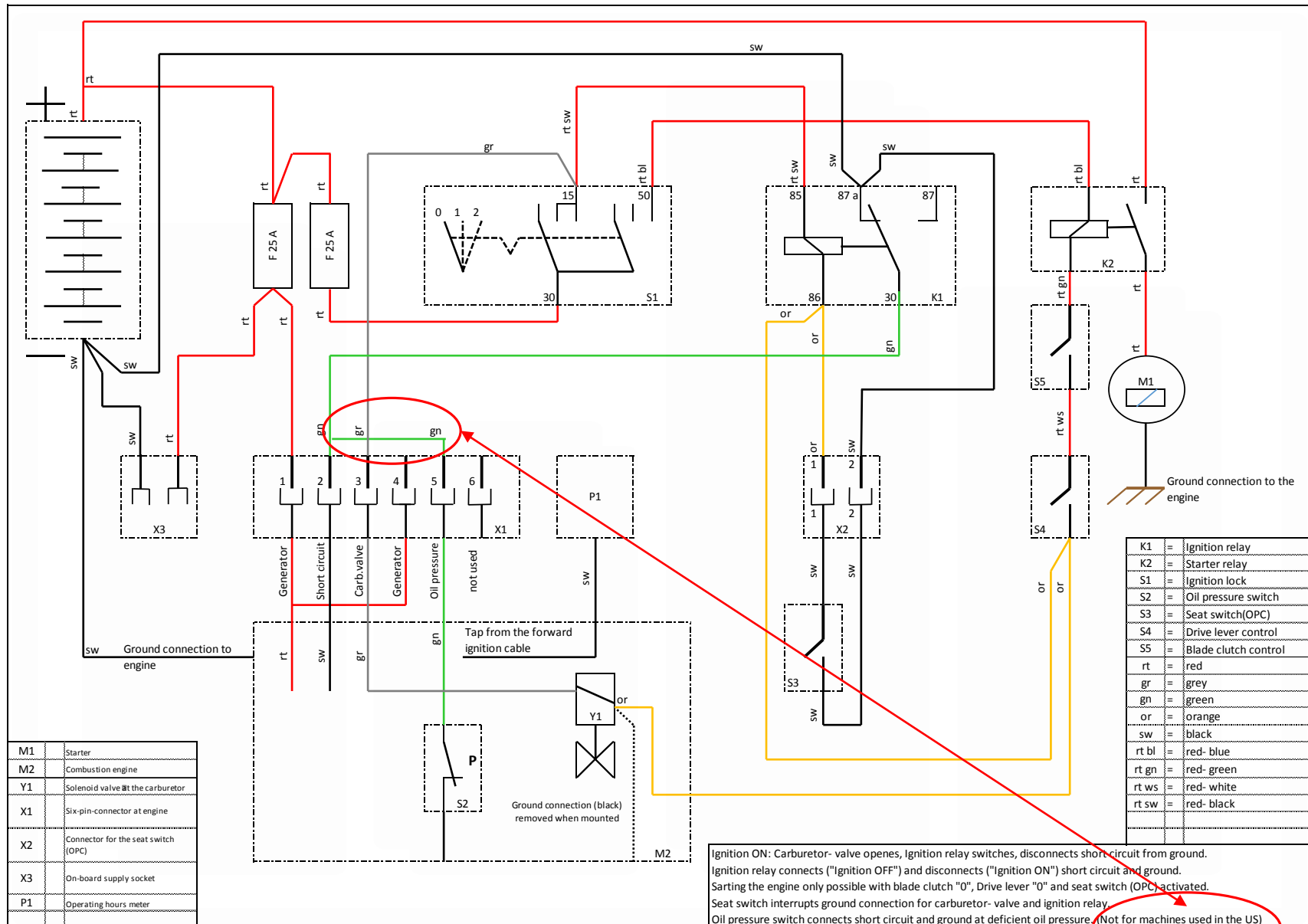
Electrical system

Electrical components (overview) 1/1



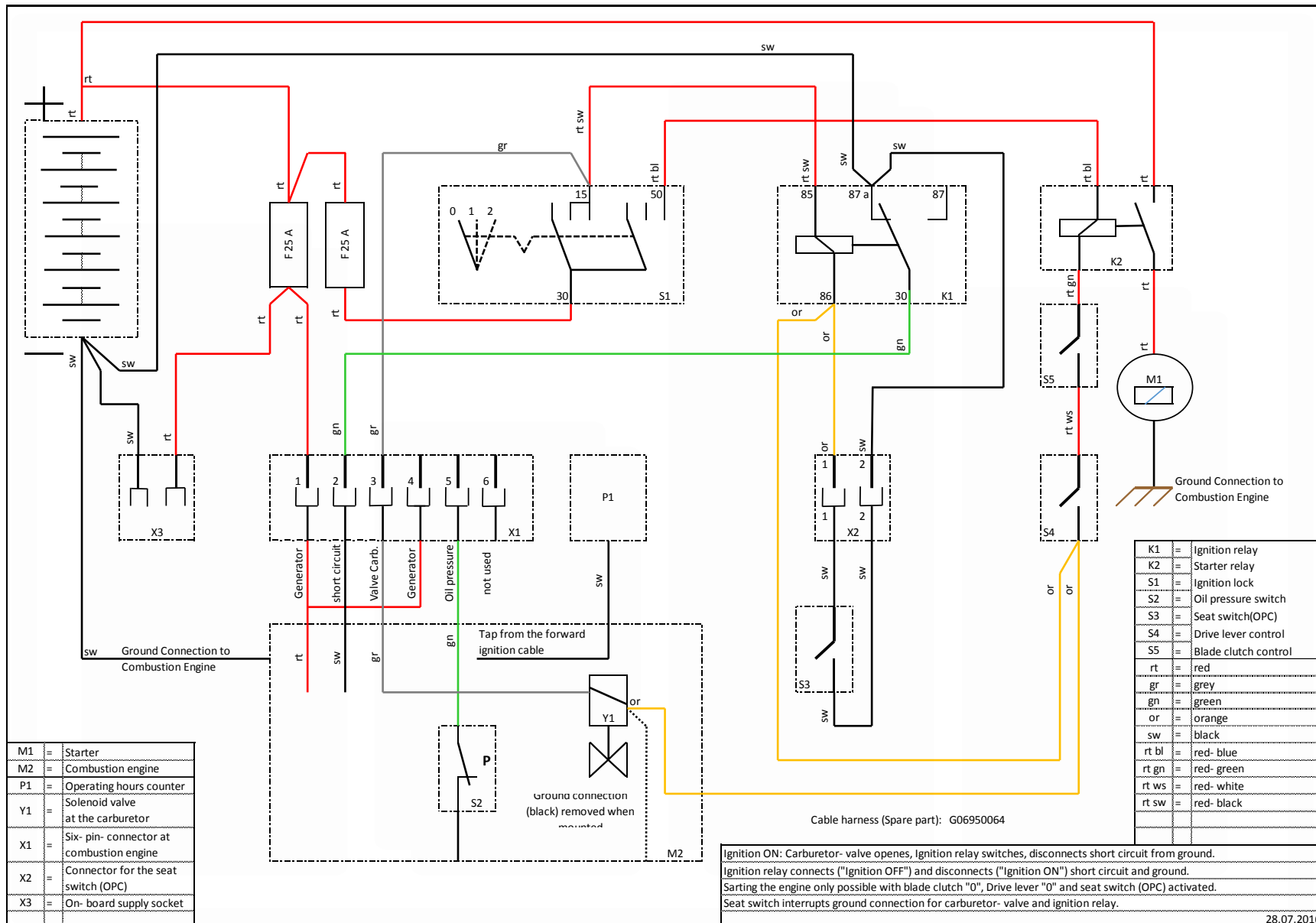
Electrical system

Circuit diagram AS 920 2WD and AS 940 4WD/XL Europe & ROW (not for US) 1/2



Electrical system

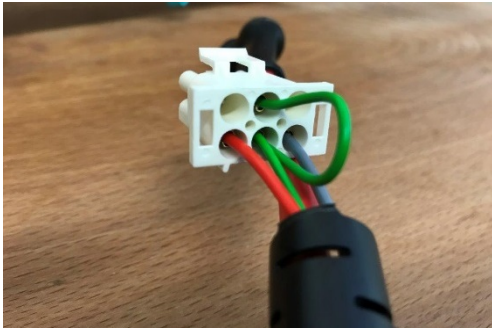
Circuit diagram AS 920 2WD and AS 940 4WD/XL for US-Versions 2/2



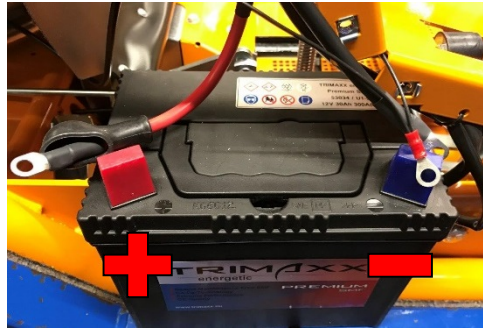
28.07.2016

Electrical system

Cabling (plug connector pin assignment) 1/1



Engine connector
(Main connector)

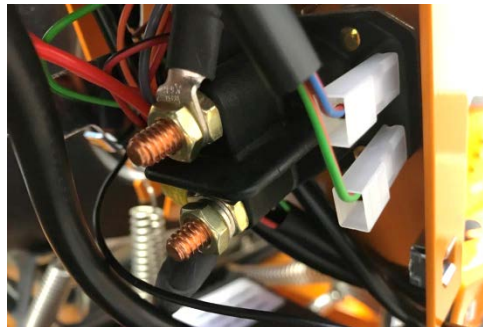


Battery connection:

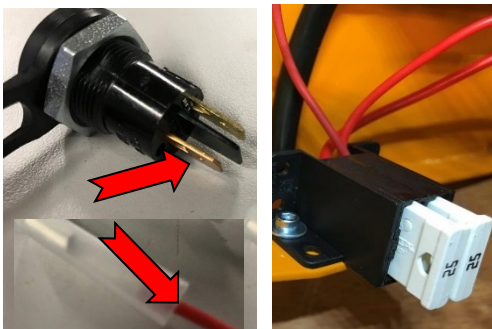
Attention: ⚠️
Pay attention to the polarity!



Key switch.



Solenoid starter switch.



Charging socket 12 V and
Plug-in fuses 25 A
Attention: ⚠️
Connect the copper-coloured
pin of the charging socket to
the red cable!



Ignition relay.

Electrical system

Checking the battery 1/1



Maintenance-free battery
SMF, 12 V, 30 A, 300 A(EN).
Pay attention to the polarity!



Attention: ⚠️
Prior to all tasks on the device,
always disconnect the negative
terminal of the battery.



Check:
With voltmeter.
Good / New: 12 – 13 V
Depleted: under 10 V



Tip/note: 👍
If the machine will be stored for
the winter in a cold location,
remove the battery, store it in a
frost-free location and charge it
once a month.



Charging:
Charge via 12 V on-board
electrical outlet with a suitable
charger. Charge current: max. 3 A
Duration: approx. 10 hours max.

Electrical system

Battery is not charged 1/1



Problem:
Battery repeatedly discharges when using the machine.



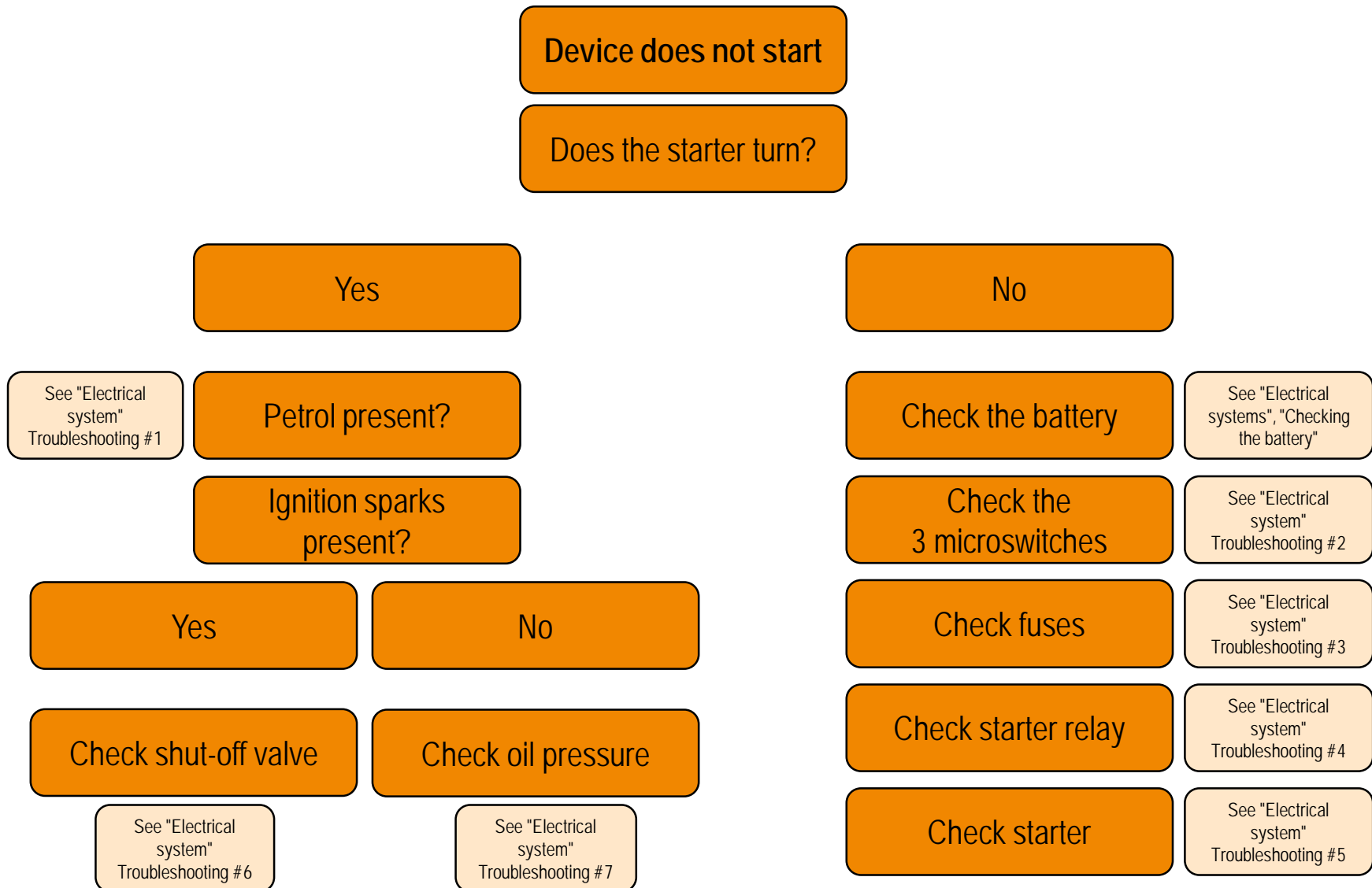
Possible cause:
Voltage regulator on the engine is defective.



Check:
Jump-start the engine and check regulator voltage with the engine running (max. rpm).
Setpoint: 13.8 – 14 V.

Electrical system

Troubleshooting the electrical system (overview) 1/1

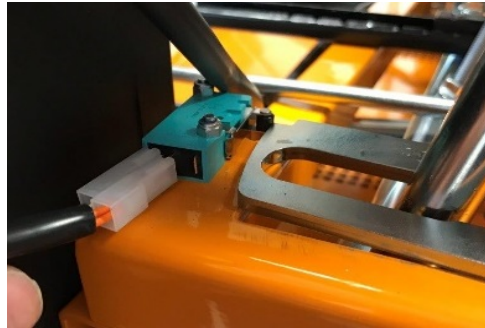


Electrical system

Troubleshooting 1/4



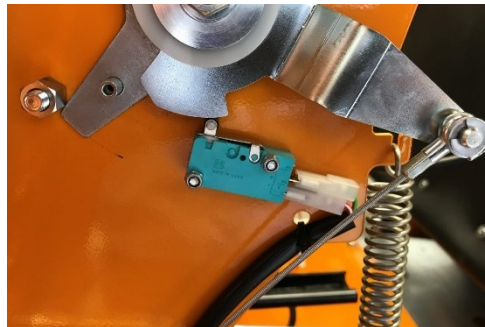
Troubleshooting #1:
Petrol present?
Petrol tap open?



Troubleshooting #2: Safety microswitch no. 1 must be "pressed" at drive level position "P" of the brake bracket.



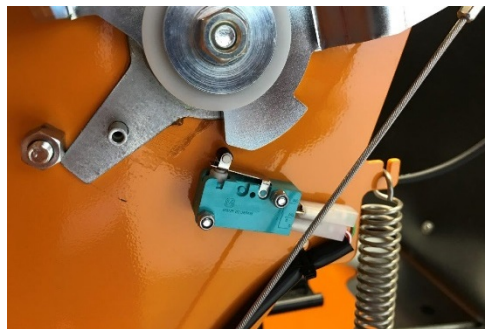
Tank ventilation open?



Microswitch no. 2 must be pressed from blade switch on lever at lever position "0" (blade "Off"). (Here in the illustration)



Fuel filter permeable?
Petrol deposits after winter storage?



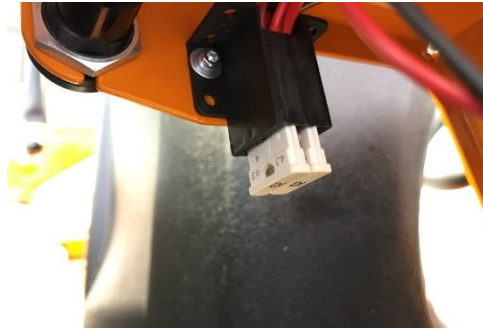
With blade switch-on lever position in position "1" (blade "On") it is opened and starting is not possible.

Electrical system

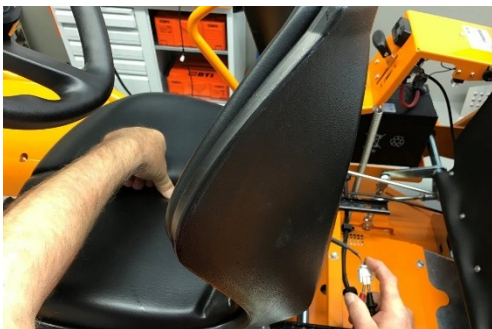
Troubleshooting 2/4



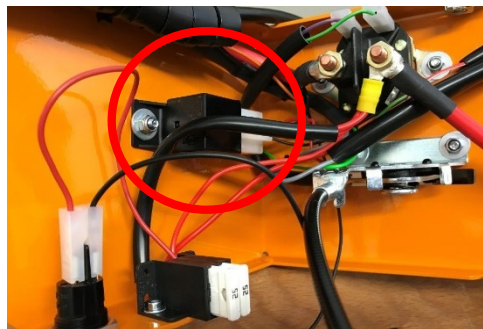
Check plug connection of the seat contact switch.



Troubleshooting #3:
Check both fuses.
Visually and electrically.
25 A.



Check function of the switch in the middle of the seat surface.



Troubleshooting #4:
Check starter relay.
Switch on ignition (do not start)
and press the seat contact.



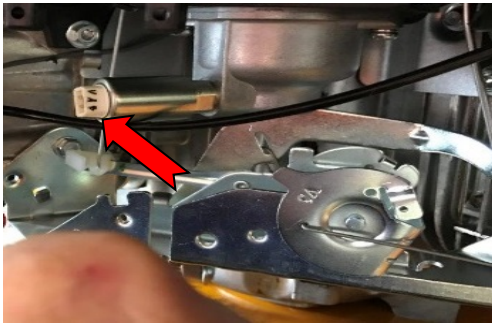
Removed seat contact switch.



Control relay emits a soft
"clicking" on its own each time
the seat contact is switched.

Electrical system

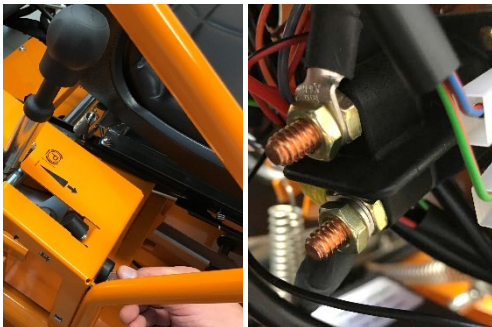
Troubleshooting 3/4



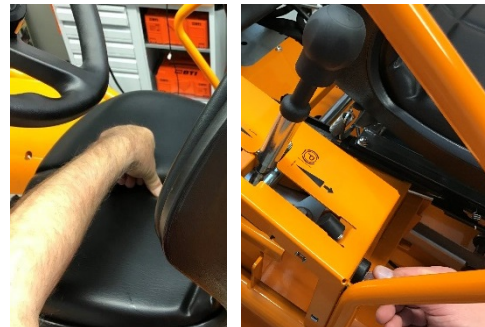
Tip / note: 👍
For the test, unplug the plug connector from the shut-off valve of the carburettor, since it also "clicks".



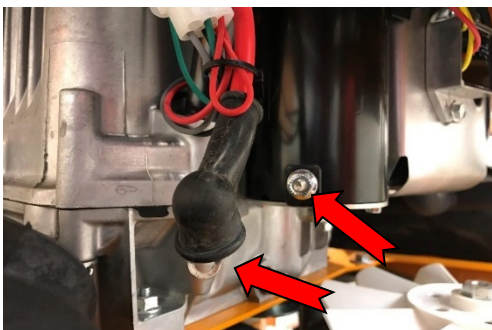
Troubleshooting #6:
Check shut-off valve – carburettor (solenoid valve).



Troubleshooting #5:
Check starter.
When activating the starter the solenoid switch audibly switches.



Switch on ignition and activate seat contact. Audible "clicking" of the shut-off valve.



Start current arrives at the starter.



If there is no audible "clicking", unplug the plug and measure whether current is applied at switching.

Electrical system

Troubleshooting 4/4



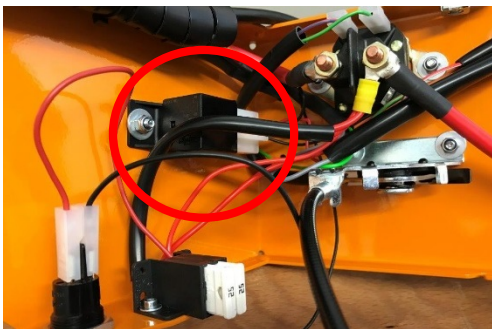
Troubleshooting #7:
Check oil pressure switch. To do this, unplug the cable on the oil pressure switch.



If starter relay is OK and ignition sparks are still not present, then:
Check the ignition coil of the engine



If after unplugging the cable, ignition sparks are present, then the oil pressure switch is defective.



If ignition sparks are still not present, then:
Check the starter relay. (See Troubleshooting #4)



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