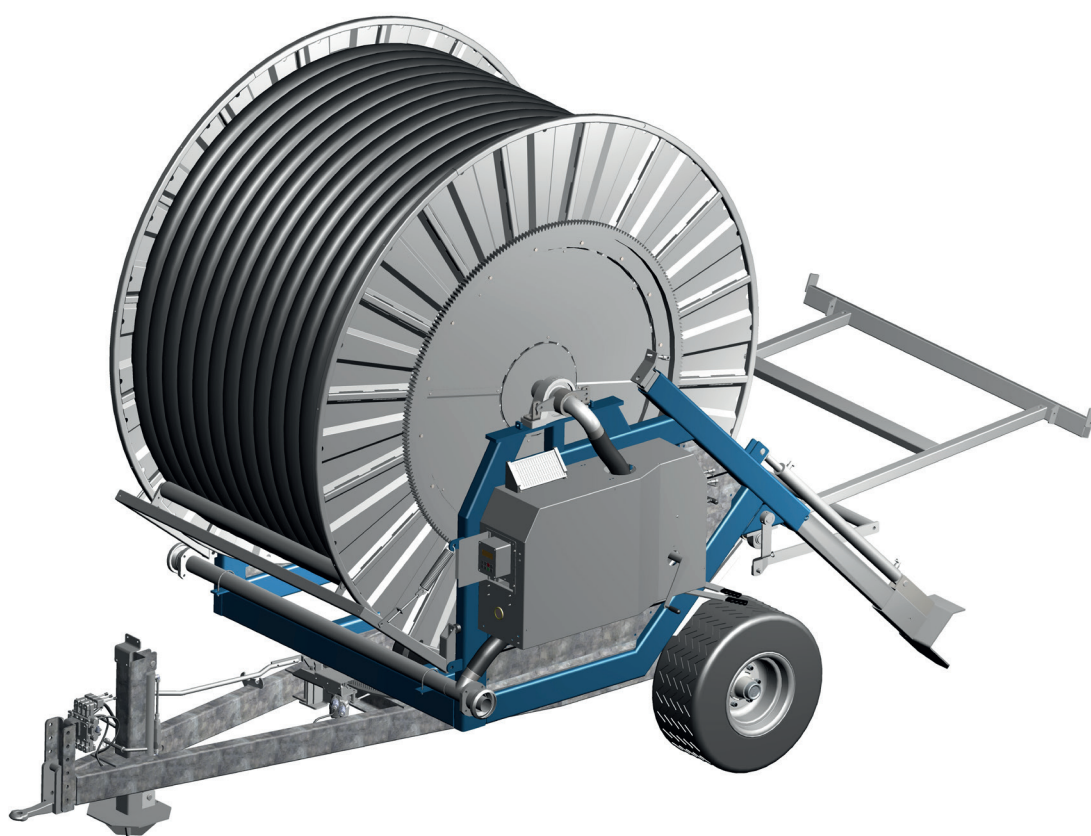


# FASTERHOLT

## User Manual & Spare Parts Catalogue

(EN) 21-04-2021



## Irrigator GT12



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# Declaration of Conformity

## EEC Declaration of conformity

**Manufacture (name and address):**

Adresse: Ejstrupvej 22,  
Fasterholt  
Ort: 7330 Brande  
Country: Denmark  
Web: [www.fasterholt.dk](http://www.fasterholt.dk)

**Fasterholt Maskinfabrik A/S**

CVR: 58 83 28 12  
TEL: +45 97 18 80 66  
FAX: +45 97 18 80 40  
E-Mail: [mail@fasterholt.dk](mailto:mail@fasterholt.dk)

Hereby is certified that the following product:

Description, ID/mark, type: Irrigator GT 12

Serial No. if any: \_\_\_\_\_

Notified body if any: \_\_\_\_\_

EEC-type certificate if any: \_\_\_\_\_

Harmonised standards if any: EN 908:1999+A1:2009.  
DS/EN/ISO 12100:2011.  
DS/EN/ISO 14120:2015.

Is made according to the announcement no.693 of 10. Jun 2013 that implements the DIRECTIV 2006/42/EC.

Name, title and signature of manufacture:

\_\_\_\_\_  
Date

  
\_\_\_\_\_  
Signature

# General safety

## IMPORTANT!

**Read this manual carefully before using your irrigator!**

### Operating Instructions & Information

Your new Fasterholt irrigator is a high quality, Danish built machine, but even the best machines only deliver top results when they are properly handled and maintained.

To ensure that the machine complies with the EU Machinery Directive, only original spare parts may be used. Otherwise, compliance will be lost and safety will be entirely at your own risk.

The irrigator is only suitable for irrigation with clean water from a drilled well or a watercourse.

We must point out that any damage caused by incorrect operation and/or negligence is not covered by the warranty. Fasterholt Maskinfabrik A/S only guarantees new machines sold through an authorised Fasterholt dealer. Any modifications made to the design of the irrigator shall exclude Fasterholt Maskinfabrik A/S of any liability and shall void the warranty.

The Fasterholt FM GT12 is a stationary type irrigator with a hose drum (rewind machine). The hose drum is mounted on a turntable and equipped with a gun trailer lift, so the unwind direction can be changed without having to move the machine. A turbine is used to power the machine and rewind stops automatically when the gun trailer reaches the machine.

The machine is available with an underpressure stop or an overpressure stop. With the overpressure stop function, make sure that the pump is either switched off via a pressostat or can dispose of water by other means when the machine stops irrigation. With the underpressure stop function, the pump must be stopped via a pressostat.

The machine must be supplied with a maximum pump pressure of 12 bar. The recommended pressure 7-9 bar.

### Safety instructions/warnings

If the machine is to be moved via a public road, the machine must first be emptied of water.

As this machine is used for field irrigation involving high water pressure, there is a risk of injury if the machine is used inappropriately. The warnings and safety instructions given here must therefore be respected and followed precisely.

- It is forbidden to stand on the machine during irrigation and transport. **(risk of fatal injury)**
- The guards are fitted for your own safety - please leave them in place
- Remember to tighten the wheel bolts
- During transport on uneven roads/fields, move VERY carefully according to the conditions.
- **DANGER!** Avoid welding in the paint layer! Before welding, remove all paint from the welding area
- Only one person (the operator) should be in the vicinity of the machine during transport, setup and dismantling

**WARNING: If the machine is stopped during rewind, the hose is in tension and the drum may run backwards when the clutch lever is released.**

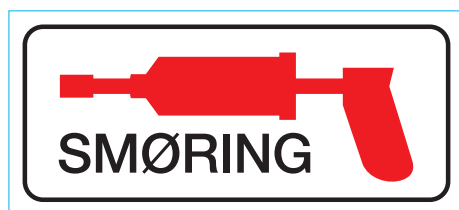
# Product labelling

## Symbols used in this product

The following symbols are used in this product and the following documentation.



**WARNING** Indicates a potentially dangerous situation which, if not prevented, could result in death or serious injury.



**LUBRICATION** Indicates lubrication is required as per the service description



**SERVICE WARNING** Indicates a service hazard

# Intended use

## Nelson SR150

1. Select the nozzle size that best suits your application and install it. Performance data for the different sizes are shown in the table below.
2. Adjust the stop on the part circle to obtain the desired irrigation angle.

### Adjustment:

The only thing you can adjust is the counterweight on the drive arm. By moving the counterweight forward, the gun will slowly irrigate from side to side. If you move the counterweight back, the gun will irrigate quickly. If it does not irrigate quickly enough, you can remove the brake springs in pairs. (Contact the service department).

**WARNING: DO NOT ADJUST WHEN THE GUN IS IRRIGATING!  
HIGH WATER PRESSURE – STAY CLEAR!**

### Dysetabel for Nelson SR150 kanon, 21°:

Tryk (Bar)	18mm		19mm		20mm		21mm		22mm		23mm		24mm	
	m <sup>3</sup> /h	Rad.(m)	m <sup>3</sup> /h	Rad.(m)	m <sup>3</sup> /h	Rad.(m)	m <sup>3</sup> /h	Rad.(m)	m <sup>3</sup> /h	Rad.(m)	m <sup>3</sup> /h	Rad.(m)	m <sup>3</sup> /h	Rad.(m)
3,5	20,2	36,5	22,7	38,0	25,4	39,0	28,0	4,0	30,9	41,5	34,1	42,5	37,5	44,0
4,0	21,6	38,0	24,3	39,0	27,1	40,5	29,9	41,5	33,0	43,0	36,4	44,0	40,1	45,5
4,5	22,9	39,0	25,7	40,5	28,7	41,5	31,7	43,0	35,0	44,5	38,6	46,0	42,5	47,0
5,0	24,2	40,0	27,1	41,5	30,3	43,0	33,4	44,5	36,9	46,0	40,7	47,0	44,8	48,5
5,5	25,3	41,5	28,5	43,0	31,7	44,0	35,1	45,5	38,7	47,0	42,6	48,5	47,0	50,0
6,0	26,5	42,5	29,8	44,0	33,1	45,5	36,6	47,0	40,4	48,5	44,5	50,0	49,0	51,5

Tryk (Bar)	25mm		26mm		27mm		28mm		29mm		30mm		31mm	
	m <sup>3</sup> /h	Rad.(m)	m <sup>3</sup> /h	Rad.(m)	m <sup>3</sup> /h	Rad.(m)	m <sup>3</sup> /h	Rad.(m)	m <sup>3</sup> /h	Rad.(m)	m <sup>3</sup> /h	Rad.(m)	m <sup>3</sup> /h	Rad.(m)
3,5	41,0	45,0	44,8	46,0	49,0	47,5	53,3	48,5	57,9	50,0	62,8	51,0	67,8	52,0
4,0	43,8	46,5	47,8	48,0	52,3	49,0	57,0	50,5	61,9	52,0	67,1	53,0	72,5	54,0
4,5	46,5	48,5	50,7	49,5	55,5	51,0	60,5	52,0	65,7	53,5	71,2	54,5	76,9	56,0
5,0	49,0	50,0	53,5	51,0	58,5	52,5	63,8	54,0	69,2	55,0	75,1	56,5	81,1	57,5
5,5	51,4	51,0	56,1	52,5	61,4	54,0	66,9	55,5	72,6	57,0	78,7	58,0	85,0	59,5
6,0	53,7	52,5	58,6	54,0	64,1	55,5	69,9	56,5	75,8	58,0	82,2	59,5	88,8	61,0

Tryk (Bar)	32mm		33mm		34mm	
	m <sup>3</sup> /h	Rad.(m)	m <sup>3</sup> /h	Rad.(m)	m <sup>3</sup> /h	Rad.(m)
3,5	73,1	53,0	78,7	54,0	84,5	55,0
4,0	78,1	55,0	84,2	56,0	90,3	57,0
4,5	82,9	57,0	89,3	58,0	95,8	59,0
5,0	87,4	59,0	94,1	60,0	101,0	60,5
5,5	91,6	60,5	97,8	61,5	105,9	62,5
6,0	95,7	62,0	103,0	63,0	110,6	64,0



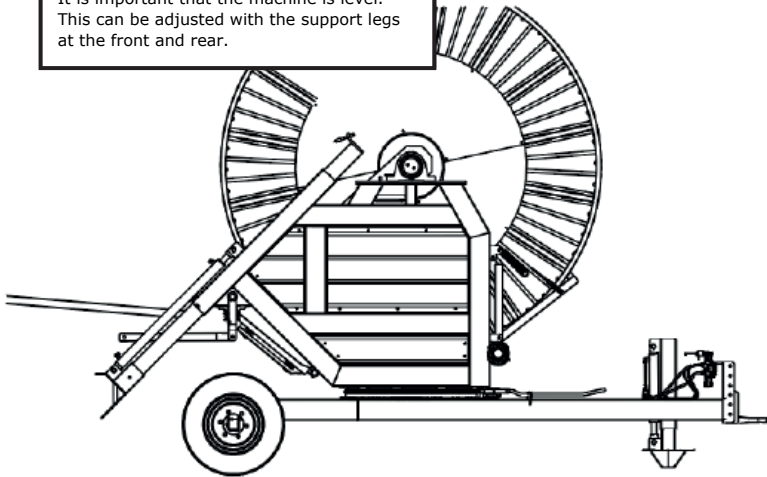
**NELSON**

# Operating instructions

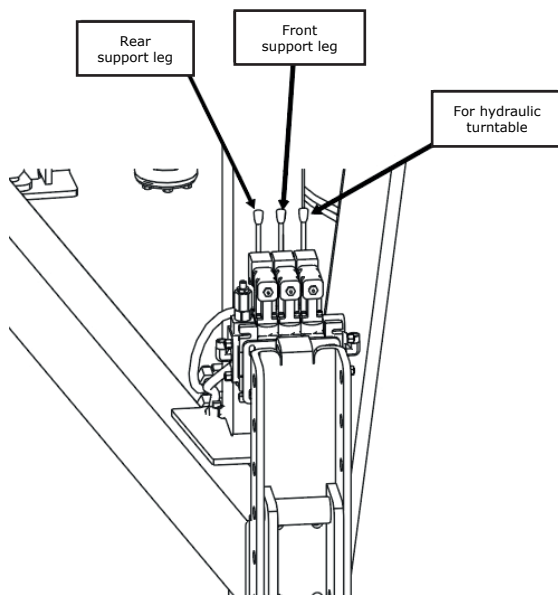
## Starting your irrigator

1. Position the machine horizontally in line with the unwind direction.

It is important that the machine is level.  
This can be adjusted with the support legs  
at the front and rear.



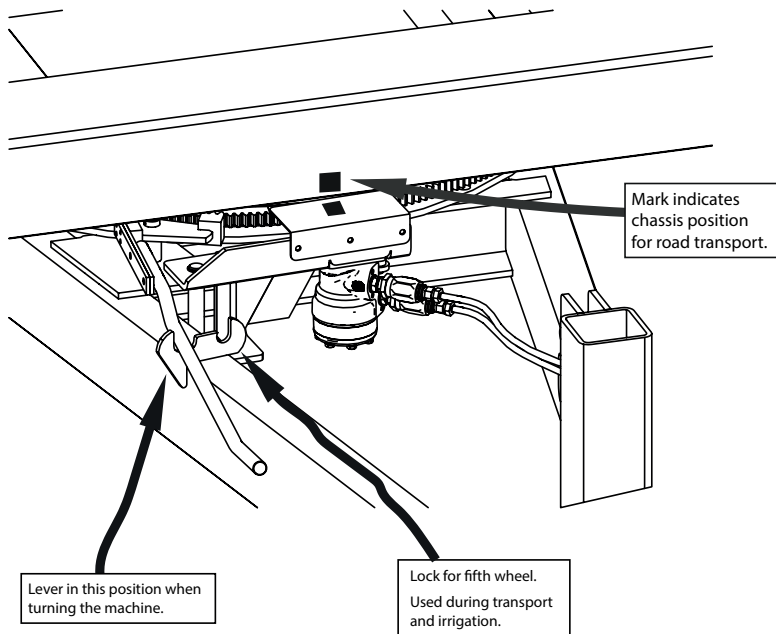
2. The ground must be level for the first 10 m of the unwind direction.
3. Connect the two hydraulic hoses to the tractor.



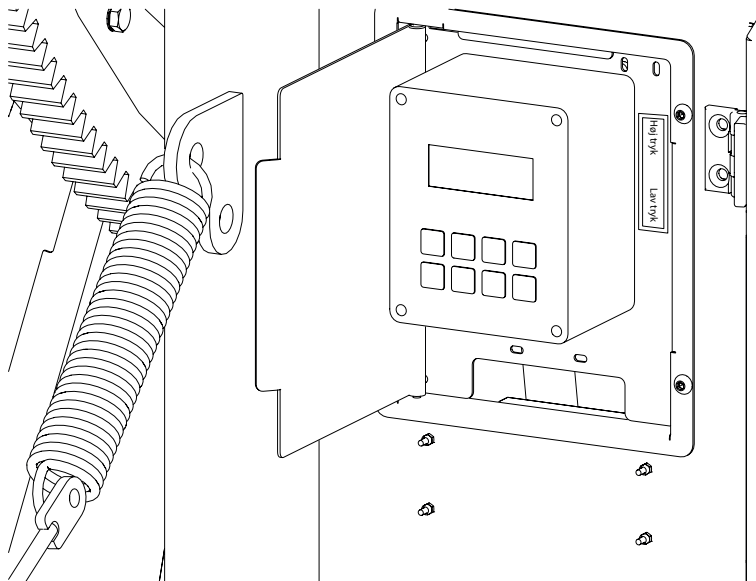
4. Rotate the drum in the desired direction.

5. Lower the two hydraulic support legs to the ground so they are firmly engaged. If the ground is very hard, it may be necessary to move them up and down a few times. **(Warning!! The support legs must not raise the wheels of the machine from the ground.)**

6. The gun trailer lowers automatically when the support legs are lowered.

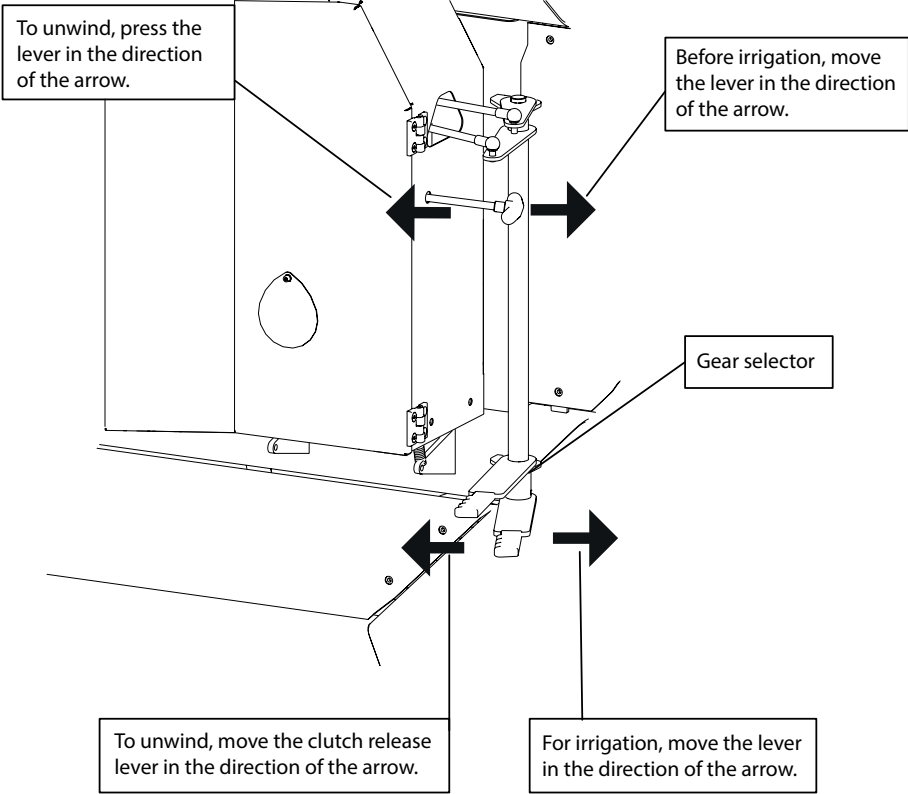


7. If the machine is equipped with a high pressure/low pressure function, ALWAYS REMEMBER to press start before flicking the toggle switch to the desired stop function.





Move the lever on the left hand side to unwind. See the photo below.  
Open the slide valve on the gun trailer to allow the water to flow freely from the hose during unwinding. It is important that the feed hose is not connected to the machine until the hose is fully unwound.



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## Setting up the Gun trailer

**REMEMBER** when unwinding the hose to ensure that the gun trailer lift is adjusted correctly. And remember to make sure the machine is standing on firm ground, otherwise damage may occur to the gun trailer lift and machine.

Connect the gun trailer to the tractor and start unwinding the hose. The unwinding speed must not exceed 3 km/h.

If the water has not started to flow out of the machine after about 10 metres, it may be beneficial to stop unwinding for a moment and start again.

It is important that the gun trailer is unwound in line with the machine for the first 10 metres of unwinding, as excessive movements may prevent the gun trailer from entering the gun trailer lift.

**WARNING: Never unwind the hose too far – always ensure that there are at least 2 hose turns left on the drum, otherwise the hose coupling will be damaged when the hose is rewound. Driving on hilly terrain may therefore require an assistant or a warning lamp, which can be purchased separately.**

**WARNING: If the hose temperature exceeds 30 degrees, e.g. due to the machine being in sunlight, cool it by flushing water through the hose before unwinding it, to avoid damage to the hose. Unwind the machine 2-5 metres to activate the limit stop sensor. This to stop water from passing through.**

When unwinding the hose, it is important to avoid suddenly braking/stopping the tractor, as the hose may tangle on the drum. Instead, slow down gently and stop.

If the hose becomes loose on the drum during unwinding, adjust the drum brake. If the hose is loose on the drum when fully unwound, tighten it with the PTO crank handle. **REMEMBER** to remove the PTO crank handle after tightening. Never place the crank handle on the machine's PTO input during unwinding or operation. Never release/put the clutch lever in neutral position when the crank handle is on the machine's PTO input and the hose is in tension.

When the hose is fully unwound, close the slide valve of the gun trailer again.

# Start-up

1. Enter the rewind speed on the computer using the arrow keys.
2. Select the gear according to the table below. (Table is also in the machine cabinet)

Gear	Speed	m/h
1	7	20
2	15	45
3	25	65
4	40	200

1. For pre-irrigation, press "PRE" (highlighted in display). For post-irrigation, press "POST" (highlighted in display).
2. Connect the feed hose.
3. Press "START".
4. Open the hydrant and start the water supply pump. The water must not be fed too quickly into the machine to prevent air in the machine, hose and pipe. This can cause pressure surge and kickback in the system.

## WARNING:

- **If the hose is in tension when uncoupling, the drum can run back with great force.**
- **All other adjustments to the machine, gun trailer and gun should only be made when the machine is not in operation.**

## Automatic and manual stop

Rewind stops automatically when the gun trailer is wound back into the machine, thereby affecting the stop bracket. The machine stops due to either overpressure or underpressure. The machine can also be stopped either at the pump or by pressing "STOP" on the computer.

## Emergency stop and safety stop

The safety cable ensures that the machine will stop in case of computer failure.

The machine is equipped with a rewind error bracket that stops rewind if the hose guide should come out of alignment, causing the hose to tangle. The rewind error bracket will activate the stop bracket when the reel comes off the edge of the drum.

**REMEMBER** when starting for the first time, to check that the rewind error bracket and cable are adjusted correctly.

## Gun trailer and hose guide

The gun trailer can be adjusted with different track widths. This is done by loosening the locking bolts on the chassis and extending the legs to the desired track width.

If the gun trailer does not follow the same track during rewind as during unwind, loosen the centre bolt on the steering wheel and move the wheel axle back and forth on one side by turning the steering wheel.

The hose guide ensures that the hose is wound properly on the drum. If the hose does not wind properly on the drum, the hose guide should be adjusted. The hose must be unwound until there are two to three turns left on the drum. Remove the hose guide chains and adjust the hose guide so the hose passing through the hose guide is against the hose already on the drum. (Contact the service department at Fasterholt Maskinfabrik A/S)

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## Maintenance

After winding for the first time, you should:

1. Retighten the machine.

### Weekly:

1. Lubricate the sliding bushing on the drum inlet pipe. Stop lubricating the sliding bushing in the inlet bend of the hose drum when there is a slight increase in pressure in the grease gun.
2. Lubricate the main bearing on the drum.
3. Lubricate the slide for the hose guide. The axle must never be dry.
4. Lubricate the floor reel for the hose guide.
5. Lubricate the wheels on the gun trailer.
6. Lubricate the turntable.
7. Grease the gear wheel on the drum.

### Annually:

In addition to the above, the following should be performed annually:

1. Check the oil level in the reduction gear after every 200 hours of operation. If necessary, top up with type 80/90 gear oil or equivalent.
2. Check the air pressure in the wheels.  
On machine: 40psi (2.7 bar)  
On gun trailer: 45psi (3.3 bar)

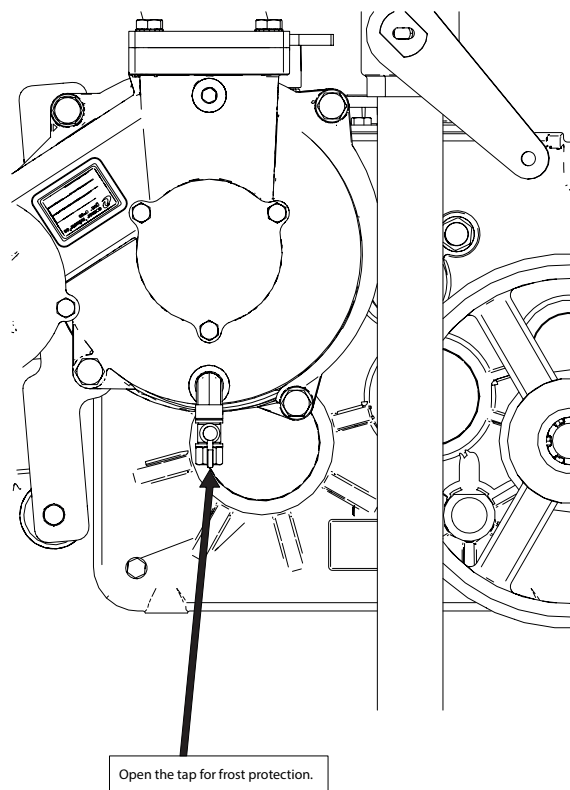
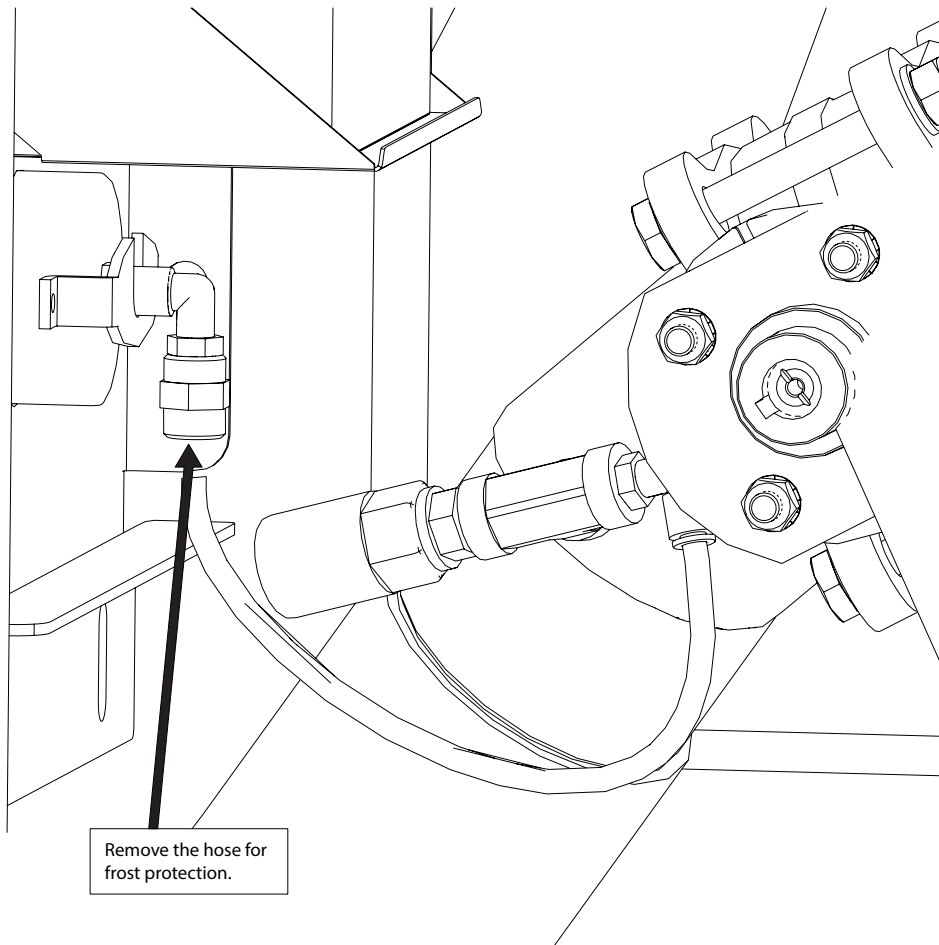
## Preparation for winter

Before the frost sets in, prepare the machine for winter. Contact FASTERHOLT Maskinfabrik A/S for a winter service inspection. This avoids unnecessary downtime during the season.

Preparation includes the following points:

1. Drain water from the machine and hose with compressed air. Open the slide valve on the gun trailer. Note: Butterfly valve MUST be open.
2. Grease the slide shafts on the hose guide.
3. Clean the gun and inject acid-free oil.
4. Check the air pressure in the wheels.
5. Lubricate all moving parts with anti-corrosion oil.
6. Remove the battery and store it fully charged in a dry, frost-free environment.

See the photos on the following page for frost protection.



## Troubleshooting table

<u>Error</u>	<u>Cause</u>	<u>Solution</u>
<b>Drum stop</b>	Foreign object in turbine	Remove front cover and clean turbine. <b>Turbine must <u>never</u> be turned forcibly</b>
	Clutch lever not engaged	Engage lever
	Computer failure	Check computer
	3-way valve is stuck	Check 3-way valve
<b>Computer error</b>	Battery flat	Charge or replace
	Stop sensor on stop bracket activated	Adjust or replace
	Fuse in computer	Replace fuse
	Control error	Contact dealer or Fasterholt Maskinfabrik A/S
<b>Rewinding error</b>	Hose guide out of alignment	Adjust the hose guide
	Too much hose on drum	Check hose length
<b>Unwinding error (loose hose)</b>	Brake loose	Adjust brake
	Stops too quickly when unwinding	Reduce speed over a longer distance
<b>Gun does not work</b>	Pressure too low	Increase pressure or switch to smaller nozzle
	Sector guide damaged	Replace/Repair stop trigger





<p><b>Functions:</b></p> <ul style="list-style-type: none"> <li>Speed regulator</li> <li>Pre- and Post-irrigation</li> <li>4 different speeds on sections of the lane</li> <li>Clock</li> <li>Setting the start time</li> <li>Stop time is shown on the display</li> <li>Length of hose</li> <li>Current speed</li> <li>Battery volts</li> <li>Charge regulator</li> </ul>	<ul style="list-style-type: none"> <li>Pressure sensor</li> <li>Stop sensor</li> <li>Speed sensor</li> <li>Motor 1, regulating motor</li> <li>Motor 2, stop motor</li> <li>Slow start of turbine</li> <li>Slow closing of inlet</li> <li>Water volume + spreading width</li> </ul> <p><b>Accessories:</b></p> <ul style="list-style-type: none"> <li>GSM, SMS messages for remote control.</li> <li>Analogue pressure sensor.</li> </ul>
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## Short instructions for use



Place machine:

<b>SPEED</b>	30.0m/h
<b>DOSE</b>	22 mm
<b>TIME</b>	7:28 STOP 7:28
<b>STATUS</b>	STOP Sensor

Move machine to a new lane. Display shows start and stop time. Pull hose out to end of the lane. ( ex 250 m )

Select Speed:

<b>SPEED</b>	30.0m/h
<b>DOSE</b>	22 mm
<b>TIME</b>	7:56 STOP17:16
<b>STATUS</b>	STOP Sensor

Display now shows stop after 9h 20m. Press the "+" or "-" key to set the speed. Speed can be adjusted during irrigation.

<b>SPEED</b>	25.0m/h
<b>DOSE</b>	26 mm
<b>TIME</b>	7:58 STOP17:58
<b>STATUS</b>	STOP Sensor

SPEED has decreased, DOSE has increased and STOP time is later.

Start Irrigate, Select PRE- and POST Irrigation.

<b>SPEED</b>	25.0m/h
<b>DOSE</b>	26 mm
<b>TIME</b>	7:58 STOP17:58
<b>STATUS</b>	STOP Sensor

Press START to start. Press PRE and POST for pre- and post-irrigation respectively. STOP time will be later when PRE and POST irrigation are selected.

Starting:

<b>SPEED</b>	25.0m/h
<b>DOSE</b>	26 mm
<b>TIME</b>	8:00 STOP18:38
<b>STATUS</b>	Running

The turbine will start when the water pressure increases. After a short period, the regulator finds the correct speed. Irrigation continues until STOP SENSOR is activated at the end of the lane.

-PRE Irrigation

<b>SPEED</b>	25.0m/h
<b>DOSE</b>	26 mm
<b>TIME</b>	8:02 STOP18:38
<b>STATUS</b>	PRE Irrigate

If pre-irrigation is selected, the turbine stops immediately after performing a start and pre-irrigation. When the pre-irrigation time has elapsed, the turbine starts and the machine changes status to Irrigating.

-POST Irrigation

<b>SPEED</b>	25.0m/h
<b>DOSE</b>	26 mm
<b>TIME</b>	18:20 STOP18:38
<b>STATUS</b>	POST Irri.

If post-irrigation is selected, the turbine stops at the end of the lane when the stop sensor is activated. Post-irrigation then starts.

Stop:

<b>SPEED</b>	25.0m/h
<b>DOSE</b>	26 mm
<b>TIME</b>	18:38 STOP18:38
<b>STATUS</b>	STOP Sensor

Stop sensor is activated, turbine and water are shut off. The machine is now ready to be moved to a new lane.

## General instructions for use

### MENU's

SPEED	30.0m/h
DOSE	22 mm
TIME	14:10 STOP 7:43
STATUS	Running

Standard display

ZONE	1	30.0m/h
DOSE		22 mm
TIME		14:10 STOP 7:43
STATUS		Running

Standard display, ZONE irrigation is selected.

DISTANCE	123m
BATTERY	12.8V
CHARGE ON	0.231A
PRE.	0:45 POST 0:45

Press the **MENU** key 1 time to display menu 2

PRESS SENSOR	■
STOP SENSOR	■
SPEED SENSOR	■
MOT1 0.0A MOT2	1.8A

Press the **MENU** key 2 times to display menu 3

ACTUAL SPEED	22m/h
START	0:00
STOP	7:45
WORKING HOURS	123h

Press the **MENU** key 3 times to display menu 4

0m	30.0m/h	0m
0m	30.0m/h	0m
0m	30.0m/h	0m
0m	30.0m/h	0m

Press the **MENU** key 4 times to display menu 5

SIGNAL	23
NETWORK HOME	
A:	+45123456
B:	+45234567

Press the **MENU** key 5 times to display menu 6  
(Only if GSM is selected)

Sprinkler	2:00
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When ■ appears in the display, this indicates that the relevant function is ON

**Standard menu:**

SPEED	30.0m/h
DOSE	22 mm
TIME	14:10 STOP 7:43
STATUS	Running

Standard display

- SPEED** Speed. Can be changed at any time during irrigation using the "+" and "-" keys.
- ZONE** Current zone 1...4, with corresponding speed. The speed cannot be changed. (Zone active)
- DOSE** The dose is calculated from the speed and constants and shows the current number of mm for irrigation. As SPEED increases, DOSE decreases. (Constants 11 and 12)
- TIME** To set the time: Set SPEED to 11.1 m/h and press the **PROG key 3 + 1 times** until the display shows **<CONST 1 TIME>**. The time can then be set with the "+" and "-" keys. When the battery has been disconnected, the clock will show 0:00 until it is set again.
- STOP** The time that irrigation is completed, incl. pre- and post-irrigation. If the clock is not set and shows 0:00, the total irrigation time is displayed.
- STATUS** Irrigation status, e.g.:
- < Stop Sensor >
  - < Irrigating >
  - < Pre-irrigating >
  - < Post-irrigating >
  - < LOW pressure >
- See explanation in STATUS chapter.

If the display shows: **LOW BATTERY** instead of **SPEED**, the battery voltage is below **11.8 V** and the battery needs to be charged.

**MENU 2**

DISTANCE	123m
BATTERY	12.8V
CHARGE ON	0.231A
PRE. 0:45	POST 0:45

- DISTANCE Length of the unwound hose. The length can be changed immediately after pressing the **PROG key 3 times, using the "+" and "-" keys.**
- BATTERY Battery voltage.
- CHARGER ON Shows when the battery is being charged by a solar cell. The battery is charged when the voltage is below 14.0 volts.
- PRE Shows the pre-irrigation time.
- POST Shows the post-irrigation time.
- The pre- and post-irrigation times can be changed immediately after pressing the **PRE- or POST- keys, using the "+" and "-" keys.**

## MENU 3

PRESS SENSOR		■
STOP SENSOR		■
SPEED SENSOR	■	■
MOT1 0.0A	MOT2	1.8A

### PRESSURE SENSOR

Shows that the pressure is high when block is lit. **The machine can only move when the pressure is high.** If no pressure sensor is fitted (machine data 14 = 0), the machine will move regardless of pressure status.

**The machine can be fitted with analogue pressure sensors. Sensors must be connected according to the diagram. Pressure sensor functions, except for pressure display, are the same as for digital pressure sensors. There are constants for the pressure sensor type. Similarly, set point and hysteresis can be selected for each machine.**

PRESSURE	6.2	■
STOP SENSOR		■
SPEED SENSOR	■	■
MOT1 0.0A	MOT2	0.0A

Shows pressure in [BAR] (00.0) or [PSI] (000). Pressure is high when ■ is lit.

**The machine can only move when the pressure is high.**

If no pressure sensor is fitted (machine data 14 = 0), the machine will operate regardless of pressure status.

PRESSURE	--.-	
STOP SENSOR		■
SPEED SENSOR	■	■
MOT1 0.0A	MOT2	0.0A

### STOP SENSOR

Shows that the magnet is aligned with the stop sensor when block is lit.

**The machine can only start when the magnet is aligned with the stop sensor.**

The stop sensor has 3 functions:

1. Reset distance.
2. Post-irrigation.
3. Stop pulses to the regulator motor.

### SPEED SENSOR

For the speed sensor test, block is only lit when the magnet passes the sensor.

### MOT1, MOT2

Displays the current motor current. When the current exceeds 4.5 A, the motor stops.

**If the current exceeds 4.5 A and the valve is not in the outer position, there may be a blockage in the valve.**

## MENU 4

ACTUAL SPEED	22m/h
START	0:00
STOP	7:43
WORKING HOURS	123h

- CURR. SPEED** Shows the current speed. That is, the speed at which the machine is moving now. This can be used to find how fast the machine can move. The current speed may differ slightly from the set speed, especially at the start. This does not matter, as regulation ensures that the average speed within 10 metres is correct.
- START** Start machine delay. The machine start time can be delayed by up to 24 hours. To set the start time, press the **PROG key 3 times, then set the time using the "+" and "-" keys.**
- STOP** The time that irrigation is completed with a delayed start.
- OPERATING HOURS** Shows how many hours the machine has been running since the electronics started for the first time.

## MENU 5

0m	30.0m/h	0m
0m	30.0m/h	0m
0m	30.0m/h	0m
0m	30.0m/h	0m

This menu is for irrigation at different speeds in zones of the lane.  
Press the **PROG key 3 times to program the zones.**  
**See later chapter for details.**

## MENU 6

```
SIGNAL 23
NETWORK HOME
A: +45123456
B: +45234567
```

SIGNAL GSM signal strength.  
NETWORK GSM network  
A: First number on "SMS" list.  
B: Second number on "SMS" list.

See GSM chapter for details.

### START:

The turbine can only start if the magnet is aligned with the end stop sensor (or end stop sensors). See menu 3 for control of the **STOP SENSOR**. Press the **START** key to turn on the water. The regulator valve for bypass around the turbine then closes. (Turbine starts). If the end stop sensor is not in place, only the main valve can be opened, which then immediately closes again. Used to relieve pressure before removing charge hose from hydrant.

### DEFERRAL OF START TIME

First press the **STOP** key to shut off the water. Then press the **MENU** key 3 times and **PROG** 3 times. The start time can be set using the "+" and "-" keys. Finally, select pre- and post-irrigation. To exit, press **MENU**. Info: The clock can only be set forwards.

### STOP:

When the magnet is removed from the end stop sensor, the turbine stops and the main valve shuts off the water (turns on the water at negative pressure). If post-irrigation is selected, rewinding stops when the magnet is removed from the sensor. When the post-irrigation time has elapsed, the main valve closes. When the **STOP** key is pressed, the turbine stops immediately and the main valve shuts off the water, regardless of whether post-irrigation is selected.

### SUPERVISION:

Program Rain has a built-in supervision system. The supervision system will be activated if for any reason the machine has water in the same location for longer than a specified time. This time is factory-set to 20 minutes. If the time is set to 0, there is no supervision. (See constants on page 17 for setting the supervision time.) If speed supervision less than 50 % of pre-selection is required, select speed supervision together with the above time.

### SPEED:

The speed is set using the "+" and "-" keys. First count up in steps of 0.1 m/h. After 10 steps, count up in steps of 1 m/h. The speed can be changed at any time during irrigation. If the speed changes during irrigation, the dose and time for the remaining irrigation will be calculated immediately based on the new speed.

**PRE-IRRIGATION:**

If pre-irrigation is required, press the PRE- key. The pre-irrigation time is calculated as 8 x the time to move 1 m at the current speed. The constant can be changed individually for pre- and post-irrigation. (See constants). If pre-irrigation is selected, the machine will move forward approx. ½ m, after which the machine will stop and stand still for as long as pre-irrigation is performed. Menu 2 shows the number of minutes remaining of the pre-irrigation time. If you want to cancel pre-irrigation, press the START key. This will cancel both pre- and post-irrigation and the turbine will start.

**POST-IRRIGATION:**

If post-irrigation is required, press the POST- key. The post-irrigation time is calculated as 8 x the time to move 1 m at the current speed. The constant "8" can be changed individually for pre- and post-irrigation. (See constants on page 17). Post-irrigation starts counting down when the magnet is removed from the stop sensor. When the stop sensor is activated, the turbine stops and post-irrigation starts counting down (see menu 2). When the post-irrigation time has elapsed, the main valve closes. (Opens in installations with negative pressure stops). For machines with mechanical end stops: The turbine stops when the stop sensor is activated. When the post-irrigation time has elapsed, the turbine starts and the machine moves to the mechanical end stop. Press START to cancel post-irrigation. If constant "8" (early stop) is selected, the machine will stop when it reaches the selected distance.

**PROGRAMMING 4 DIFFERENT SPEEDS:**

The hose must be unwound before programming, so the computer knows the number of metres in the irrigation lane. The following example assumes that the unwound hose is 400 m. Press the PROG key 3 times and the display will show:

400m	30.0m/h	0m
0m	30.0m/h	0m
0m	30.0m/h	0m
0m	30.0m/h	0m

The desired speed can now be selected, in this case 25.0 m/h. Press the **PROG** key and the display will show:

400m	25.0m/h	0m
0m	30.0m/h	0m
0m	30.0m/h	0m
0m	30.0m/h	0m

The desired distance can now be selected, in this case 300 m. Press the **PROG** key and the display will show:

400m	25.0m/h	300m
300m	30.0m/h	0m
0m	30.0m/h	0m
0m	30.0m/h	0m

Now that the first zone is programmed, apply the same procedure to all 4 zones. Zone 4 automatically ends at 0. When zone 4 is programmed, press the **PROG** key again and the display will show:

DELETE	PRESS	MENU
SAVE	PRESS	PROG

If **PROG** is pressed, the program is stored and irrigation will be performed according to this program. If **MENU** is pressed, the program is deleted and the speed is the same for the entire irrigation lane.

<b>STATUS</b>	Status line in display
<b>**IRRIGATING**</b>	The machine has not started, but speed signals are being received and it is attempting to maintain the selected speed.
<b>IRRIGATING</b>	The machine is irrigating and functions as intended.
<b>LOW PRESSURE</b>	Water pressure is low. Individual action according to constants and machine data.
<b>STARTING</b>	User has pressed the <b>START</b> key and start sequence is being performed.
<b>START TELE</b>	The machine is starting after receiving an <b>SMS</b> .
<b>START TIMER</b>	The machine is waiting for start delay. (See Menu 4).
<b>START PRESS</b>	The machine is performing a start after pressure rise. The machine uses the pressure level to start a second machine on the ground line.
<b>START REJECTED</b>	User is pressing the <b>STOP</b> key to block <b>PRESSURE</b> and <b>SMS</b> start.
<b>STOP USER</b>	The machine has received an <b>SMS</b> with <b>STOP</b> and has stopped.
<b>STOP TELE</b>	The machine has reached the end and is stopped by <b>STOP SENSOR</b> .
<b>STOP SENSOR</b>	The machine has reached the stopping distance. (See constant for early stop)
<b>STOP DIST</b>	The machine has reached the end, but waiting xx seconds to perform the stop sequence.
<b>STOP DELAY</b>	User is pressing the <b>START</b> key to block <b>SMS</b> stop.
<b>STOP REJECTED</b>	Monitoring has stopped the machine. The machine has not moved for xx minutes. (See constant for monitoring).
<b>STOP MONITORING</b>	The machine is creating a pressure drop to stop the main pump. After 2 minutes, the valve closes to prevent draining the ground line.
<b>CREATE PRESSURE DROP</b>	The machine is performing pre-irrigation.
<b>PRE-IRRIGATING</b>	User has pressed <b>STOP</b> and the machine has stopped.
<b>POST-IRRIGATING</b>	The machine is performing post-irrigation.



There are a variety of constants that can be modified by the user.  
 These constants will be stored for many years, even if the battery is removed.

**Programming procedure:**

Adjust the speed to 11.1 m/h to access the constants.

Press the PROG key 3 times in quick succession to access and change the constants.

Press the PROG key again to count forward to the constant you wish to change.

Press "+" and "-" to adjust the value of the constant.

Press the MENU to save the change and the display will return to normal.

If the MENU key is not pressed, the display will return to normal after 1 minute and the change will not be saved.

**CONSTANTS**

Const no.	Note	Fact. Adj.	Min. Value	Max. Value	Description
0		100	-	-	Enter 111 to reach machine data
1		00:00	00:00	23:59	Time in line 2 is set
2		8	1	15	Pre irrigation
3		8	1	15	Post irrigation
4		20	0	99	Supervision time [minutes]
5		1	1	15	1 English, 2 Danish, 3 German, 4 French, 5 Dutch, 6 Swedish, 7 Spanish, 8 Italian, 9 Polish, 10 Japanese 11 Hungarian
6		0	0	2	0 = Stop for high pressure slow shutdown 1 = Stop for low pressure, valve opens and close again after 3 minutes 2 = Motor for stop disconnected
7		-	0	1000	Actual distance, can be set by the keyboard [m]
8		0	0	1000	Early stop [m] (* Is only performed when Post Irrigation is selected *)
9		0	0	1000	Post irrigation before stop [m]
10		0	0	1000	Distance for alarm [m] (* Disabled if Machine data 22, Sprinkler, is selected *)
11		40	5	120	Water flow [m <sup>3</sup> /h]
12		60	5	100	Spacing between irrigation lanes [m]

Set Constant no. 0 to 111 to set the machine data.  
 Then press **PROG** to display the machine data.

## MACHINE DATA

Machine data Number of flashing digits		Possible setting	Data for 110 mm	Data for 125 mm
0	Hose length	0 - 1,000m	Not used	Not used
1	Hose diameter	40 - 200 mm	110	125
2	Hose drum int. Diameter	500 - 3,000 mm	Not used	Not used
3	Number of hose turns per layer	5.00 - 30.00	15	12.80
4	Large gear on hose drum	50 - 1000	Not used	Not used
5	Small gear on gearbox	5 - 40	Not used	Not used
6	Number of magnets	1 - 20	Not used	Not used
7	Ovality compared to 100 %	0.70 - 1.00	0.85	0.85
8	Length of first pulse to stop valve	0 - 45 sec.	3	3
9	Length of subsequent short pulses to stop valve	0 - 300 m/sec.	160	160
10	Time between short pulses to stop valve	1 - 5 sec.	2	2
11	Number of short pulses to stop valve	0 - 250	100	100
12	Mechanical stop (with only 1 motor) Electrical stop (closed low pressure) even if the pressostat registers low pressure	0 1	1	1
13	Length of pulse to regulator motor at start-up (Oil pump Motor 1)	26.1 - 0.9 sec.	4.5	4.5
14	Pressostat not connected Pressostat connected (to start/stop) or Radio start Pressostat installed: (can be used (for start only) for 2 machines on the same system, Autostart with special pressostat.)	0 1 2	1	1
15	Length machine moves per pulse: 0 = Moves according to formula FM4300 & FM4300H = 73.5 mm (2 magnets) FM4300 & FM4300H = 38.8 mm (4 magnets)  FM4400 & FM4400H = 46.2 mm (4 magnets) Old Rear axle assembly FM4400 & FM4400H = 46.0 mm (4 magnets) New Rear axle assembly  FM4500 & FM4500H = 85.0 mm (2 magnets) FM4500 & FM4500H = 42.5 mm (4 magnets)  FM4550 & FM4550H = 46.2 mm (4 magnets) Old Rear axle assembly FM4550 & FM4550H = 46.0 mm (4 magnets) New Rear axle assembly  FM4800H = 43.3 mm (4 magnets) Old Rear axle assembly FM4800H = 46.0 mm (4 magnets) New Rear axle assembly  FM4900H = 103.0 mm (2 magnets) FM4900H = 51.5 mm (4 magnets) FM4900H = 46.8 mm (4 magnets) New Rear axle assembly  FM5500H = 47.0 mm (4 magnets) FM5500H = 47.0 mm (4 magnets) New Rear axle assembly 62.5 = When moving with roller Ø80 [mm] 0 = Moves according to formula (with data number 0 to 7)	0 - 160.0 mm	0 - 160.0 mm	0 - 160.0 mm
16	Speed sensor 0 = Round sensor for roller 1 = Double sensor		1	1
17	Opening of inlet valve 0 = Quick opening 1 = Slow opening	0 1	0	0
18	Pressostat 0 = Inlet remains open at low pressure 1 = inlet closes at low pressure	0 1	0	0
19	Delay from stop sensor to turbine stopping (sec)	0	0	0

## MACHINE DATA

40		0	0	2	Analog Pressure gauge 0 = Digital switch 1 = Analog pressure gauge – Display units [BAR] 2 = Analog pressure gauge – Display units [PSI]
41		0.50	0,10	5.00	Voltage Offset [V]
42		0.20	0,05	5.00	Voltage gain [V]
43		3.5	0,0	25.0	Pressure setpoint 0.0 –25.0 [BAR] Pressure level for Off – On
44		0.2	0.2	25.0	Pressure hysteresis 0.2 – 25.0 [BAR] Setpoint - 0.5* hysteresis for Off Setpoint + 0.5* hysteresis for On Default settings 0.2 <ul style="list-style-type: none"> <li>• 3.4 BAR = Off</li> <li>• 3.6 BAR = On</li> </ul>
50		0	0	1	Remote Applikation 0 = Disabled 1 = Change in Status is sent to remote applikation. ( * SMS )
51		-	-	-	Machine ID e.g.: “RAIN A 003”

Program Rain can be set to 2 different types of sensors.

See Machine Data #16 Sensor

One is a round sensor with 4 built-in sensors and can only be used for rollers with 1 magnet. When the battery is connected, the display shows the following for 2 seconds: VERSION n.n0.

The other is a rectangular sensor with 2 built-in sensors (double sensor). This is used for scanning on rollers with more than 1 magnet and for discs with from 1 to 20 magnets. When the battery is connected, the display shows the following for 2 seconds: VERSION n.n1.

Cable connection

Program Rain 10 18 Pol Connector			Program Rain 10		
Cable connection	Version n.n1	Double sensor	Cable connection	Version n.n0	Round sensor
1 + Battery	Brown	12 V	1 + Battery	Brown	12 V
2 - Battery	Blue		2 - Battery	Blue	
3 + Solar Panel	Brown		3 + Solar Panel	Brown	
4 - Solar Panel	Blue		4 - Solar Panel	Blue	
5 Motor 1	Speed Regulation		5 Motor 1	Speed Regulation	
6 Motor 1	Speed regulation		6 Motor 1	Speed regulation	
7 Speed Sensor 1 *	Blue		7 Speed Sensor	Blue	
8 Speed Sensor 1 *	Black		8 Speed Sensor *	Black	
9 Speed Sensor 2 *	Yellow/green		9 Speed Sensor *	Yellow/green (Red)	
10 Speed Sensor 2 *	Brown		10 Speed Sensor	Brown	
11 Stop Sensor	Blue or Brown		11 Stop Sensor	Blue or Brown	
12 Stop Sensor	Blue or Brown		12 Stop Sensor	Blue or Brown	
13 Motor 2		Stop Motor	13 Motor 2		Stop Motor
14 Motor 2		Stop Motor	14 Motor 2		Stop Motor
15 Pressure	Blue or Brown		15 Pressure	Blue or Brown	
16 Pressure	Blue or Brown		16 Pressure	Blue or Brown	
17 - BIP			17 BIP -		
Motor 3	Brown	Sprinkler	Motor 3	Brown	Sprinkler
18 + BIP			18 BIP +		
Motor 3	Blue	Sprinkler	Motor 3	Blue	Sprinkler

\* If the distance counter count the wrong way, the speed sensor should be turned.

\* If the distance counter count the wrong way, the cable on terminal 8 and 9 must be interchange.

Program Rain 10 6 Pol Connector		
19 + GSM	Brown	+12 V
20 - GSM (-Pressure)	Blue (Green)	
21		
22		
23 + Pressure	Brown	+12 V
24 Pressure Signal	White	0-5V

### Technical data

Dimension (h*w*d)	170*140*100 [mm]
Voltage	10-15V DC
Current	6 mA (Rest) 30 mA (with GSM) 80 mA (with light)
Fuse	5A motor max. current 5A Fixed

## Troubleshooting:

?

The turbine does not start when the START key is pressed.

**Answer:**

The magnet at the stop sensor is not in position or the sensor or sensor cable is damaged.

Stop sensor: The mark ■ must be on when the magnet is in position and off when the magnet is removed. See Menu 3.

A damaged cable can be assembled in an epoxy moulded assembly or with shrinkable tubing and glue.

However, since the sensors are more sensitive than telephone cables in the ground, cable assembly must be seen as an emergency solution.

If a pressostat is installed, the water must be pressurized. The mark ■ must be on when there is pressure.

?

No numbers in the display.

**Answer:**

Battery disconnected. Fuse inside the box may have blown. The fuse will blow if the battery is wrongly connected.

An additional fuse is available from the factory on a single fuse terminal on the circuit board.

Fuse 5A. Battery voltage 12V. See Menu 2.

?

Clock is set to 00:00

**Answer:**

If the power is interrupted, the clock is reset. The end time is then the number of hours and minutes until irrigation is complete.

See page 15 for setting the clock.

?

The number of metres is not counted correctly and the speed is not correct.

**Answer:**

If the speed is measured with a roller running on the hose, check whether the roller is running smoothly or if it is not installed properly on the hose. You will also need to check that the roller sensor with cable is functioning properly.

See Menu 3 Speed sensor.

The 2 marks ■ ■ must light up in the following order from the right during unwinding: The first one turns on, then the second one turns on, the first one turns off, then the second one turns off. During rewind, this happens in reverse order.

?

Only half or perhaps 2/3 of the actual length has been counted.

**Answer:**

The stop bracket with magnet for the stop sensor may have jumped, so the magnet has been removed temporarily from the stop sensor. This will reset the counter. Or a hose turn has been so loose that it has impacted the miswinding bracket.

This is usually the same as the impact on the stop bracket and has the same result.

Even if the metres are not saved in the memory, irrigation will still continue at the selected speed and the machine will stop as normal. However, there will be deviations if the speed is measured on a gear disc and the calculation is based on formulas entered in MACHINE DATA. This is because the electronics do not know which hose layer the machine is running on. Finally, the metres can be entered manually.

See page 21. CONSTANT no. 7

---

## Combining the various constants:

The machine will always be able to run with the factory-set constants. However, there will be different conditions from farm to farm and from machine to machine. Many requests can be met by changing the constants.

**1. Slow start-up of turbine. Set machine data no. 13 initially to approx. 2-4.**

This causes the speed regulator valve to close only about halfway, after which continued closing is performed in steps until the rewind speed reaches the set speed. The valve can then be fine-tuned to close first to the point where the turbine starts running and then to close in steps until the set speed is achieved.

**2. Slow opening of inlet. Set machine data no. 17 to 1.**

Opening for the water is then performed in steps.

**3. Only one motor for speed regulation. Set machine data no. 12 to 0.**

Post-irrigation starts once the turbine stops, when the magnet at the stop sensor is affected. After the post-irrigation time has elapsed, the machine will restart and move to the mechanical stop.

**4. Start up no. 2 machine when no. 1 stops. Set machine data no. 12 to 0.**

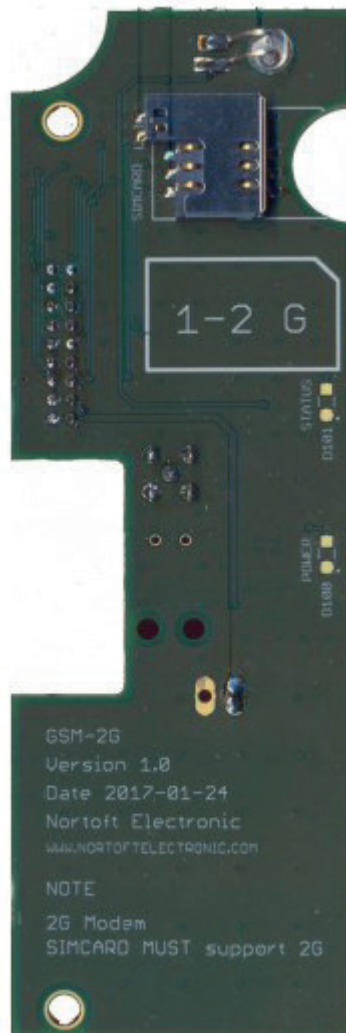
With a pressostat installed on both machines, set the pressostats between the machine's operating pressure and the pump pressostat's stop pressure. For example, the operating pressure may be 6 bar and the pump stop 9 bar. Set the pressostats on the machines to 7.5 bar. No. 2 machine will then start up when the slow closing of the first machine reaches the point where the pressure in the ground line reaches 7.5 bar. Be aware that if the height difference of the fields is too great, the required pressure differentials that the pressostat must be set to may be too great.

**5. The machine should stop due to low pressure and with a pressostat installed.**

**Set constant no. 6 to 1 and set machine data no. 12 to 2.**

This means that the stop valve opens instead of closing if the line connection to the stop valve is the same. After 2 minutes, close it again, otherwise you will not be able to obtain pressure at start-up. When machine data 12 is set to 2, the valve can only be opened with the stop sensor, stop button and monitoring. But not when the pressostat is switched off.

# GSM-2G



<p style="text-align: center;"><b>Functions</b></p> <p>Easy installation on PR10-12 Low power consumption Total 10 mA consumption, PR10-12 and GSM-2G Visible status LED</p> <p>Supplied with Antenna with 2 metre cable. Mounting accessories</p>	<p><b>Modem</b></p> <ul style="list-style-type: none"><li>• Dual band 850/900/1800/1900 MHz</li><li>• GPRS multi slot class 12/10</li><li>• GPRS mobile station class B</li><li>• Compliant to GSM phase 2/2+</li><li>- Class 4 (2 W @850/900 MHz)</li><li>- Class 1 (1 W @1800/1900 MHz)</li><li>• Temperature range: -40 °C ~ 85 °C</li></ul>
--	---

## GSM

GSM-2G is a GSM modem made for PR10-12.

The machine can be started, stopped or queried about status by sending an SMS.

## Commands

<b>Start</b>	Starts the machine.
<b>Stop</b>	Stops the machine
<b>Speed ###</b>	Set the desired speed 3 to 400 m/h
<b>Status</b>	Returns the current machine status.

SMS can be written in small.large or mixed characters.

If you call the modem from a GSM phone, you will receive an SMS with **Status**

## Status

SPEED		30.0 m/h
DOSE		22 mm
TIME	14:10	STOP 18:16
STATUS	IRRIGATING	
DISTANCE		123 m
BATTERY		12.8V
CHARGER	ON	0.231A

SMS sent from machine contains miscellaneous information.

SMS is sent at:

<b>LOW PRESSURE:</b>	The machine has stopped due to a lack of water pressure.
<b>STOP SENSOR:</b>	The machine has reached the end and is ready for a new lane.
<b>STOP TELE:</b>	Machine is stopped via an SMS
<b>STOP DIST:</b>	The machine has reached the stopping distance. (Constant 8)
<b>STOP MONITOR:</b>	Monitoring has stopped the machine. The machine has not moved for xx minutes. (See constant for monitoring)



## How to start the system:

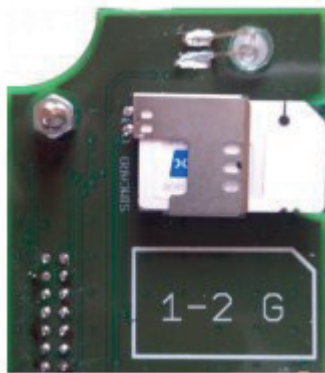
Disconnect the battery from the electronics.

Insert the SIM card in a regular mobile phone and change the pin code to 1111.  
Try sending and receiving an SMS to see whether the SIM and account work as intended.

Note that SIM card **MUST** support **2G**. Some operators do not support 2G.

Install the modem using the supplied threaded rods.

Insert the SIM card in the modem device.



Connect the battery and set machine data #30

- = 0 No GSM
- = 1 Use GSM, all tele numbers can be used, no speed setting
- = 2 Use GSM, only the numbers created in the SMS list can be used.

SPEED	11.1m/h
DOSE	22 mm
TIME	14:10 Stop 7:43
M.DATA	30 1

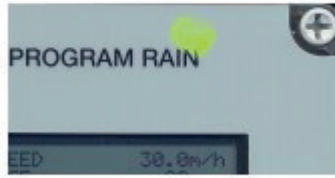
See chapter for setting up data.

After approx. 30-45 seconds, the modem should be connected to the GSM network.

SIGNAL	23
NETWORK	HOME
A:	+45123456
B:	+45234567

Signal strength, 0 - 31 and the network is then displayed in the menu #6  
Signal strength of 10 or above is a stable connection.  
Signal strength of 99 indicates no signal.  
- Missing antenna  
- Very poor signal

Modem has LED to indicate status.



Green

LED

Switched off

Off

- Searching the network
- No SIM card in modem
- Incorrect PIN code
- No GSM network available

Flashes quickly

STANDBY  
(Registered on network)

Flashes slowly

Connection (TALKING)

On

When an SMS is received, the display shows:

```
Receiving SMS
#: +45123456
Status
```

Receiving an SMS, sender's phone number and 40 characters of message. All SMS can be received, but only known commands are accepted.

When an SMS is sent, the display shows:

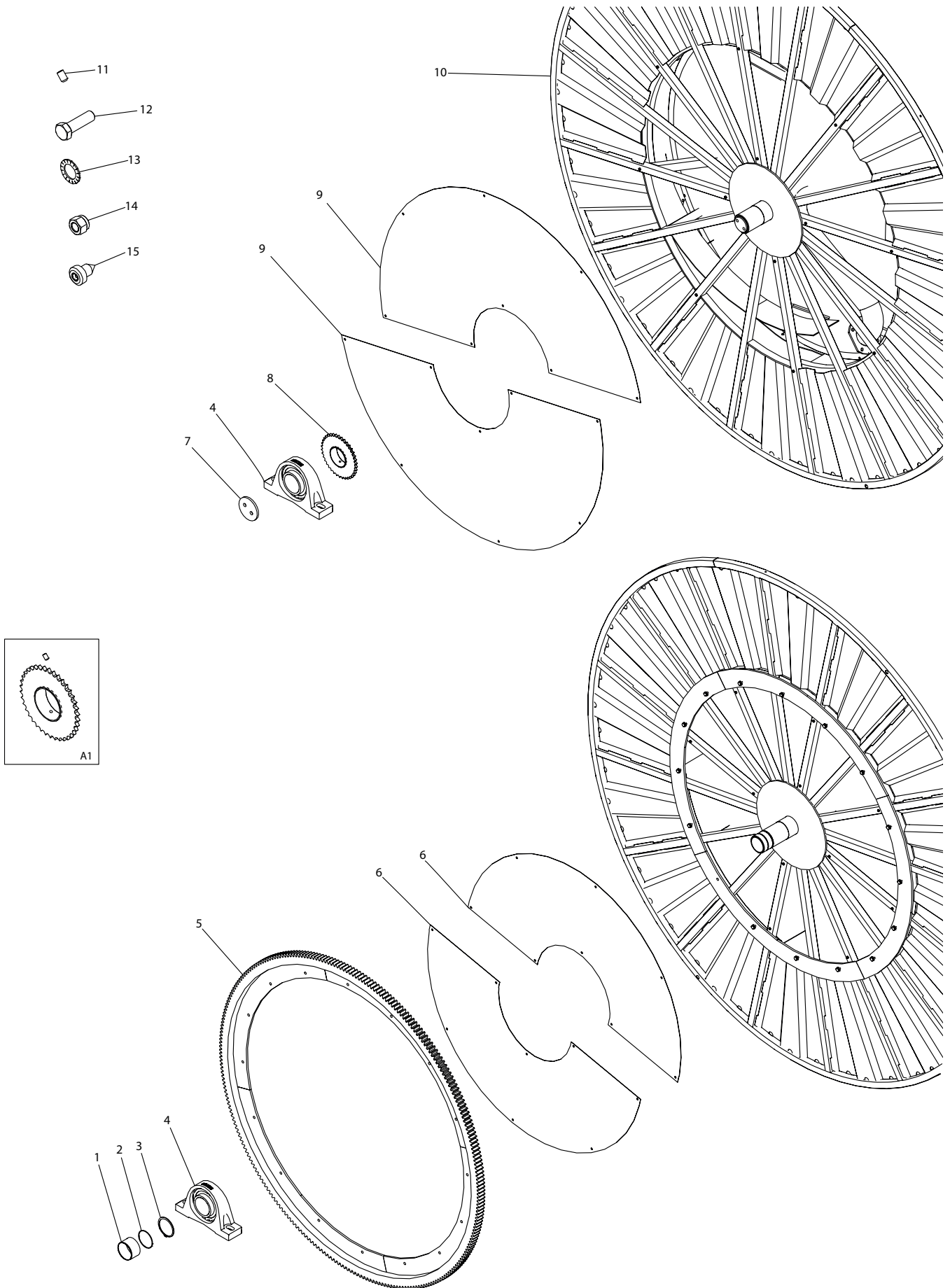
```
Sending SMS
#: +45123456

Status Running
```

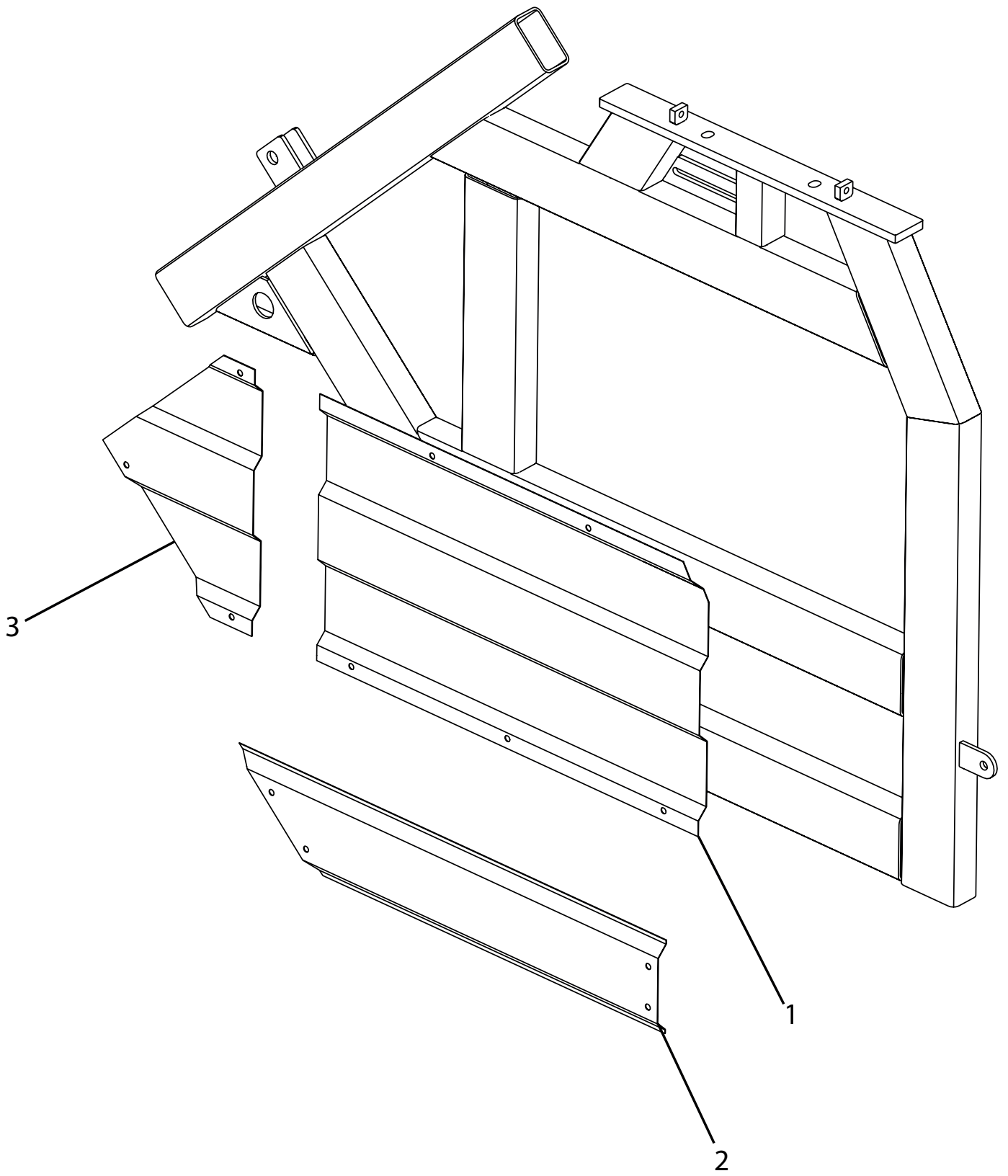
Sending an SMS, receiver's phone number and machine status.



# Spare parts

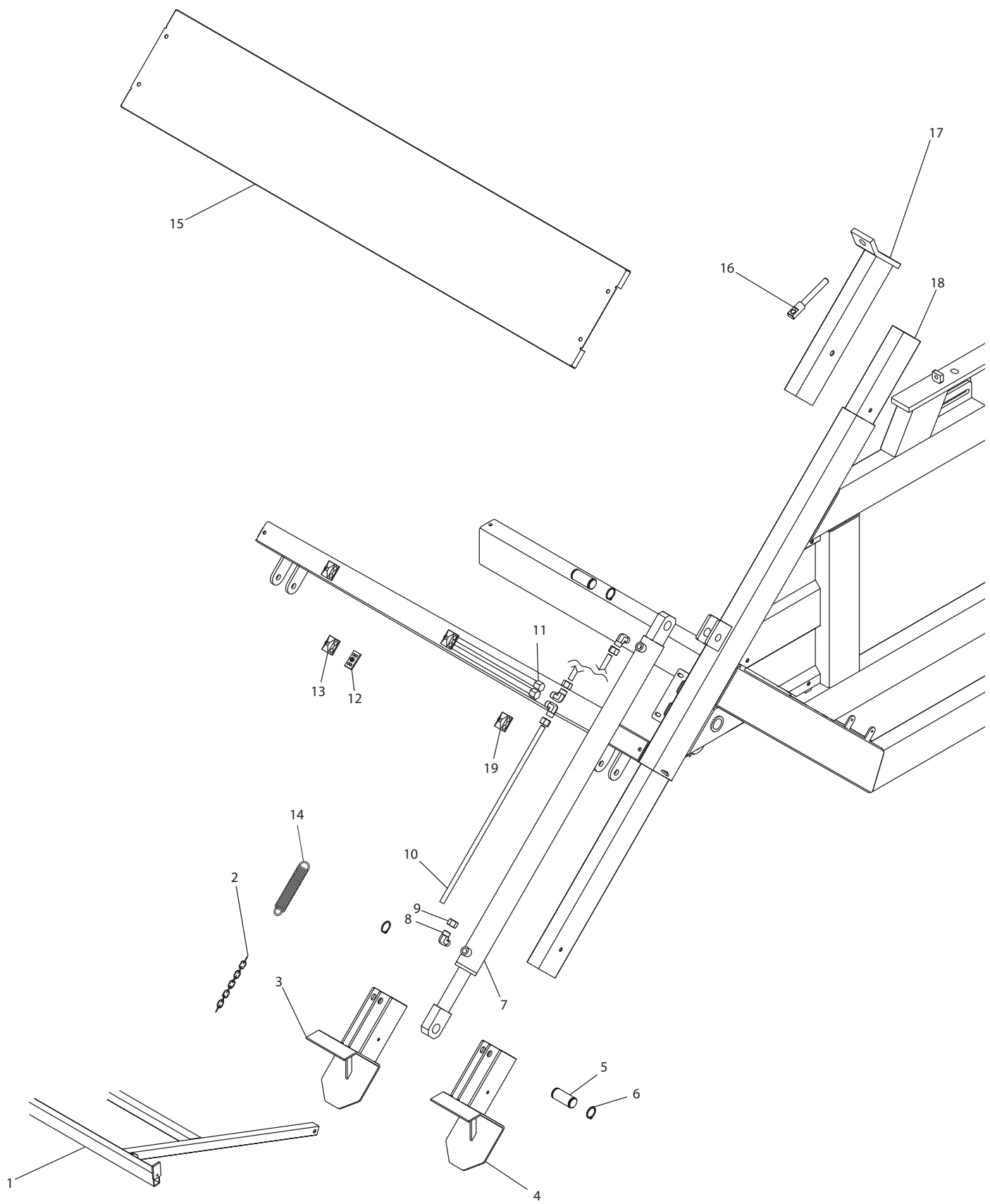


<b>Item no.</b>	<b>Part no.</b>	<b>Qty</b>	<b>Description</b>	<b>Comments</b>
<b>1</b>	<b>36000151</b>	<b>1</b>	<b>Stainless bushing</b>	
<b>2</b>	<b>624101</b>	<b>1</b>	<b>O-ring for stainless bushing</b>	
<b>3</b>	<b>1115150100</b>	<b>1</b>	<b>Retaining ring Ext. Ø100</b>	
<b>4</b>	<b>1010490-2</b>	<b>2</b>	<b>Bearing for 100 mm centre pipe</b>	
<b>5</b>	<b>2008518</b>	<b>1</b>	<b>Gear hose drum</b>	
<b>6</b>	<b>2008565</b>	<b>2</b>	<b>Drum guard</b>	
<b>7</b>	<b>2007108</b>	<b>1</b>	<b>Clamping plate</b>	
<b>8</b>	<b>2008333</b>	<b>1</b>	<b>Gear</b>	
<b>9</b>	<b>16000025</b>	<b>2</b>	<b>Drum guard (with bend)</b>	
<b>10</b>	<b>2008433</b>	<b>1</b>	<b>Hose drum</b>	
<b>11</b>	<b>030516030</b>	<b>2</b>	<b>Int. hex 16x30</b>	<b>A1</b>
<b>12</b>	<b>022212040</b>	<b>16</b>	<b>M12x40 Set bolt</b>	
<b>13</b>	<b>763912</b>	<b>32</b>	<b>M12 Riplock</b>	
<b>14</b>	<b>044012</b>	<b>16</b>	<b>M12 Lock nut</b>	
<b>15</b>	<b>067263019</b>	<b>49</b>	<b>Self-drilling screw 6.3x19 mm</b>	



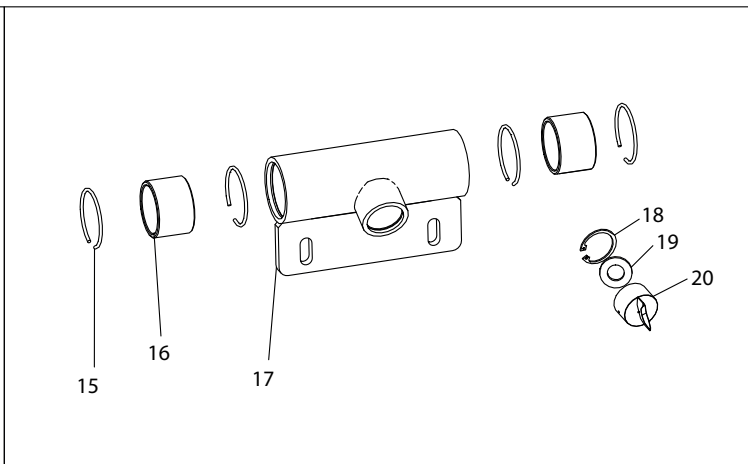
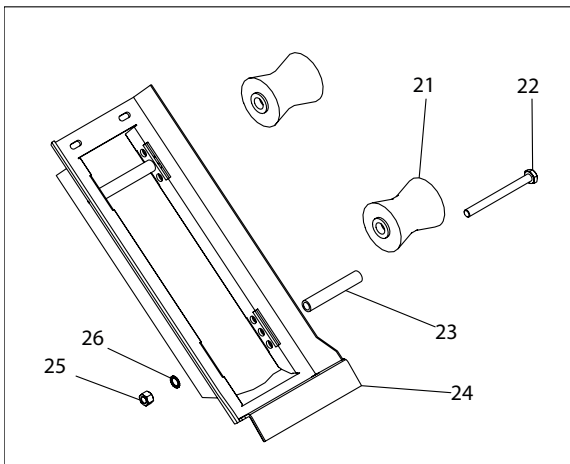
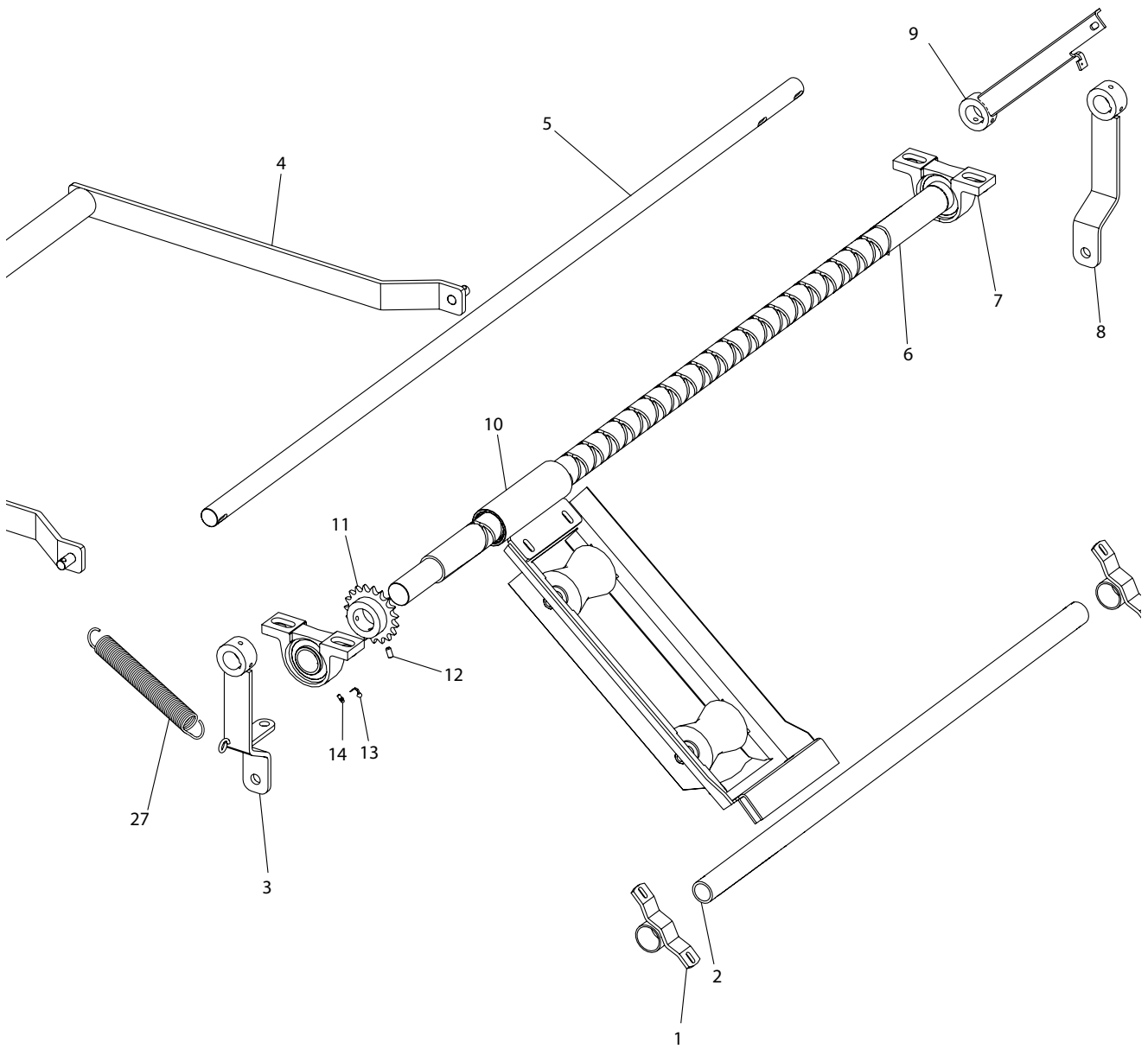
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<b>Item no.</b>	<b>Part no.</b>	<b>Qty</b>	<b>Description</b>	<b>Comments</b>
<b>1</b>	<b>2009543-1</b>	<b>1</b>	<b>Large guard</b>	
<b>2</b>	<b>2008141</b>	<b>2</b>	<b>Lower guard</b>	
<b>3</b>	<b>2008140-1</b>	<b>2</b>	<b>Rear side guard</b>	

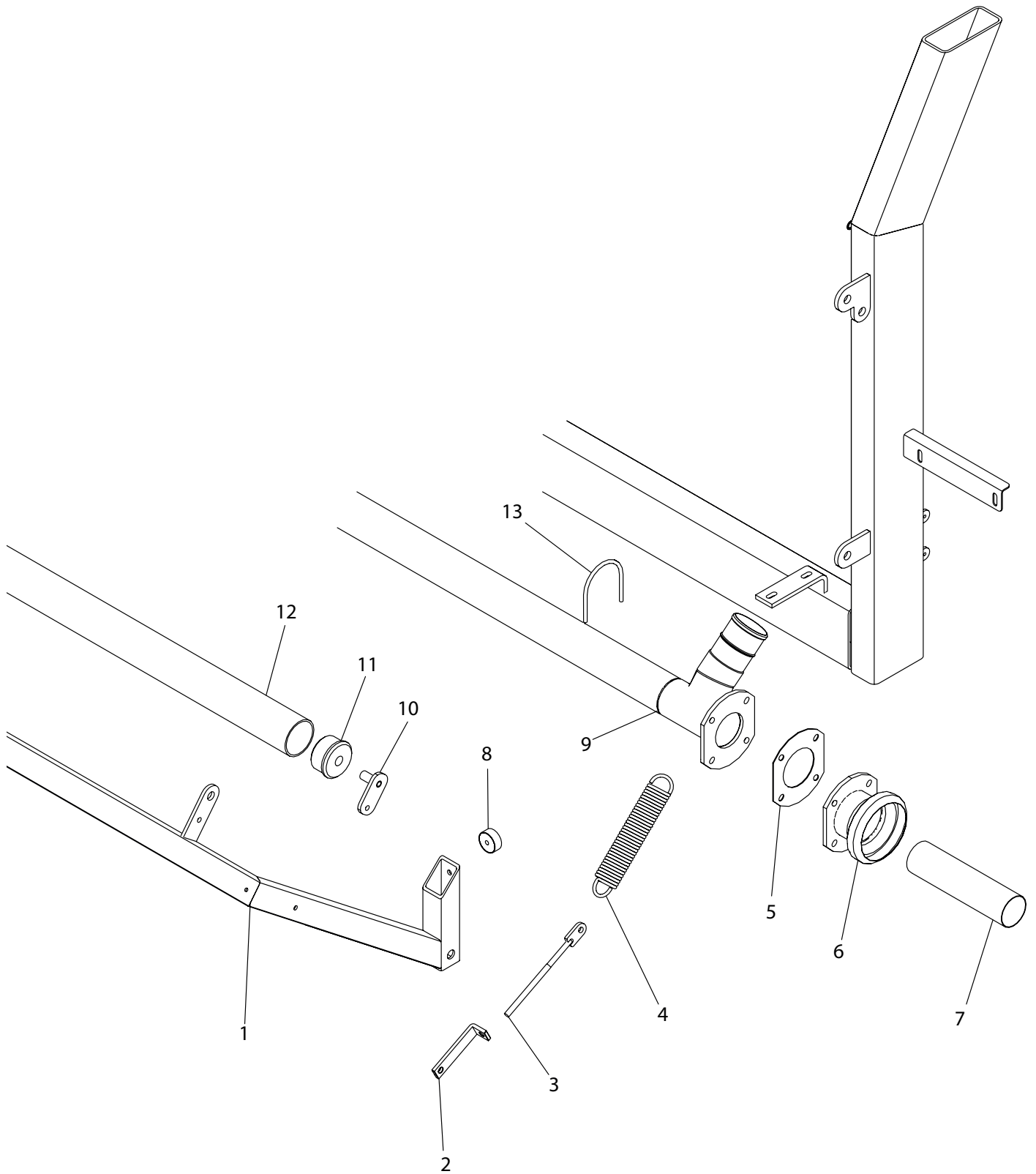




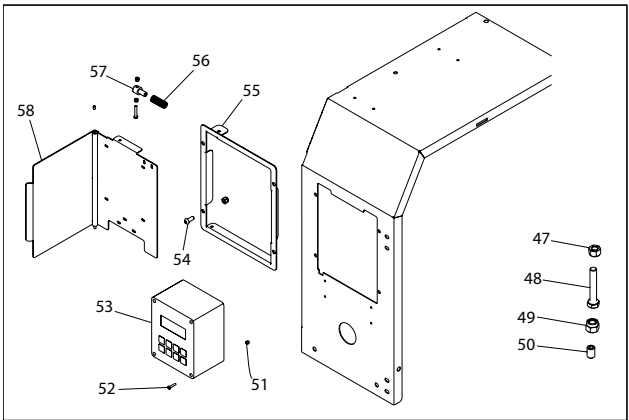
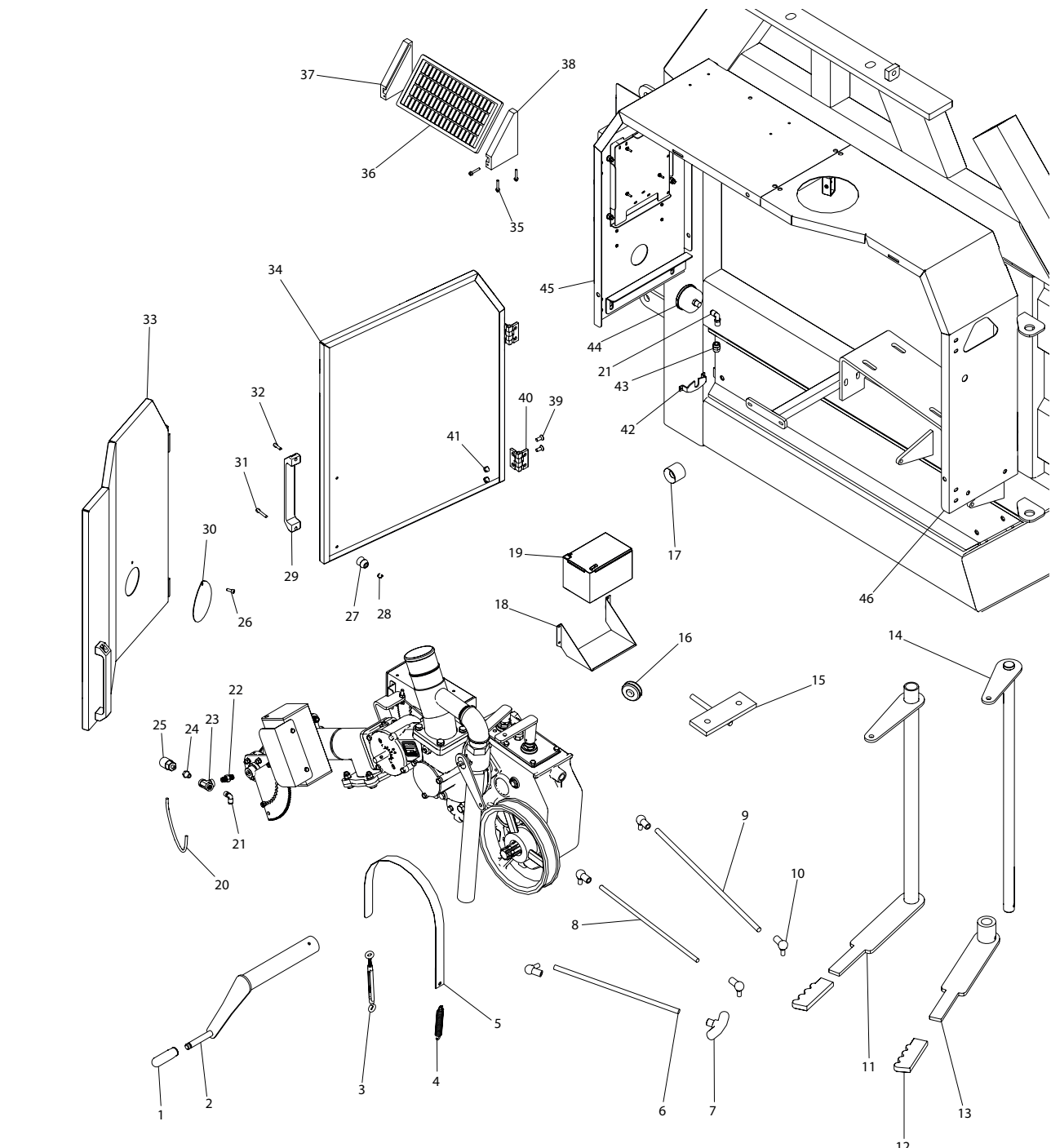
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<b>1</b>	<b>2008418</b>	<b>1</b>	<b>Lift</b>	
<b>2</b>	<b>35000140</b>	<b>2</b>	<b>Chain for lift</b>	
<b>3</b>	<b>2000577</b>	<b>1</b>	<b>Foot for support leg Right</b>	
<b>4</b>	<b>2000408</b>	<b>1</b>	<b>Foot for support leg Left</b>	
<b>5</b>	<b>04000880</b>	<b>4</b>	<b>Shaft for cylinder</b>	
<b>6</b>	<b>700030</b>	<b>8</b>	<b>Retaining ring ext. Ø30</b>	
<b>7</b>	<b>550000</b>	<b>2</b>	<b>Cylinder</b>	
<b>8</b>	<b>121005BK06</b>	<b>4</b>	<b>Angle 3/8</b>	
<b>9</b>	<b>1007505</b>	<b>8</b>	<b>12 mm union nut</b>	
<b>10</b>	<b>35000342</b>	<b>4</b>	<b>Hydraulic pipe Same part no. Just different lengths</b>	<b>2 lengths 600 mm 340 mm</b>
<b>11</b>	<b>2009229</b>	<b>2</b>	<b>Hyd. Hose</b>	<b>1925 mm</b>
<b>12</b>	<b>1007514-1</b>	<b>3</b>	<b>Welding plate for hose holder</b>	
<b>13</b>	<b>1007514</b>	<b>3</b>	<b>Hose clamp Ø16x16</b>	
<b>14</b>	<b>661323</b>	<b>2</b>	<b>Drawbar spring</b>	
<b>15</b>	<b>2008447</b>	<b>1</b>	<b>Cover plate for cross track shaft</b>	
<b>16</b>	<b>40000870</b>	<b>2</b>	<b>Tension spindle</b>	
<b>17</b>	<b>40000665</b>	<b>2</b>	<b>Telescope for long support legs</b>	
<b>18</b>	<b>15000105</b>	<b>2</b>	<b>Long support leg</b>	
<b>19</b>	<b>552037</b>	<b>2</b>	<b>Double pipe holder Ø18xØ18</b>	



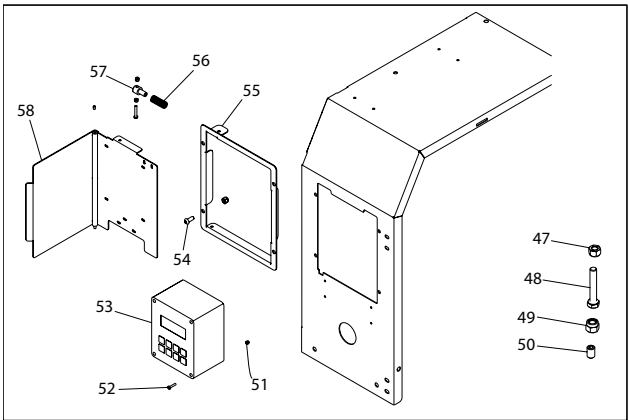
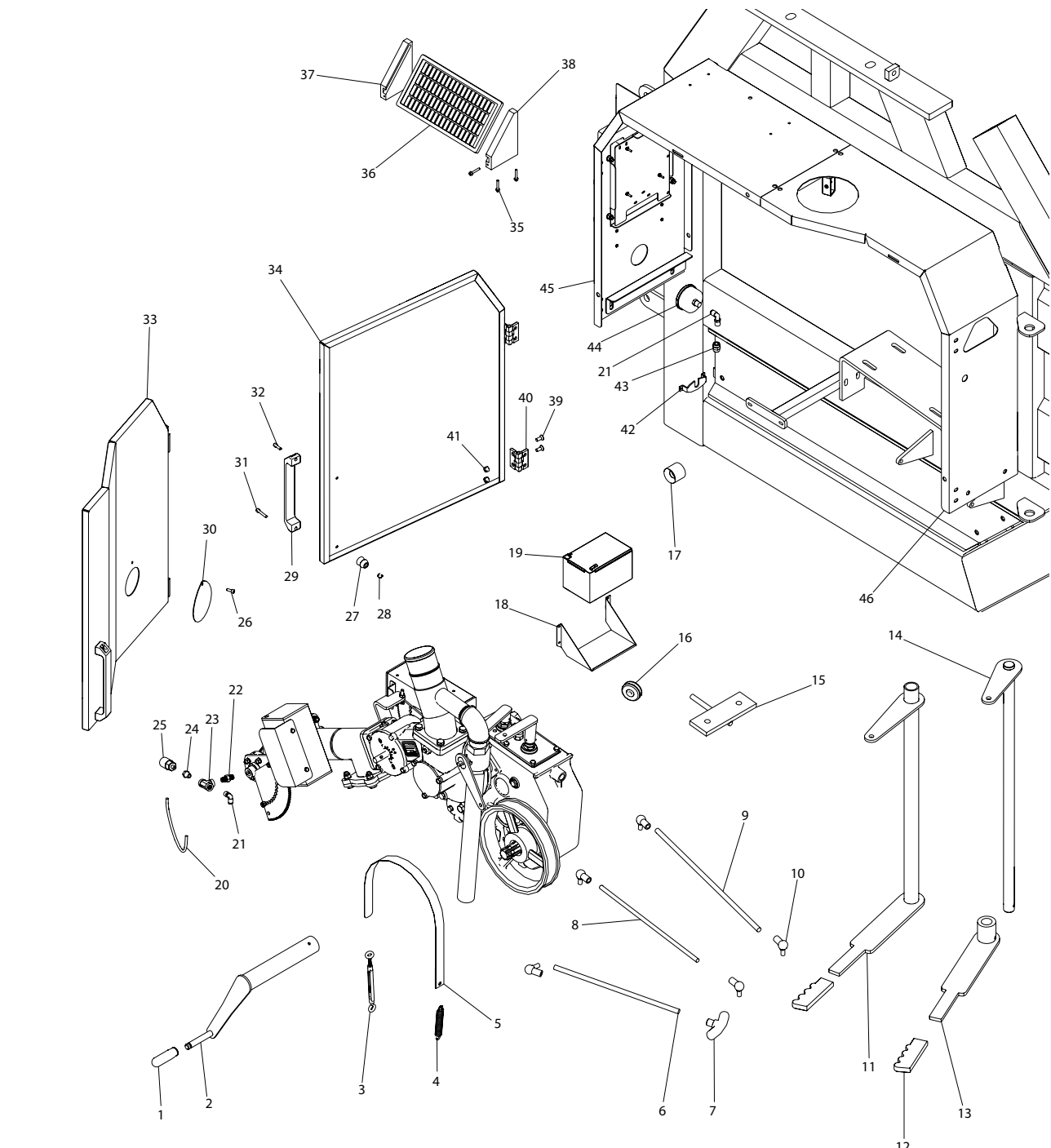
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<b>1</b>	<b>1008485</b>	<b>2</b>	<b>Holder for support pipe</b>	
<b>2</b>	<b>2008427</b>	<b>1</b>	<b>Support pipe carriage</b>	
<b>3</b>	<b>2009542</b>	<b>1</b>	<b>Stop arm complete R</b>	
<b>4</b>	<b>2008414</b>	<b>1</b>	<b>Stop bracket</b>	
<b>5</b>	<b>2008398</b>	<b>1</b>	<b>Shaft for stop bracket arms</b>	
<b>6</b>	<b>2008431</b>	<b>1</b>	<b>Cross track shaft</b>	
<b>7</b>	<b>761289</b>	<b>2</b>	<b>Pillow block</b>	
<b>8</b>	<b>2009540</b>	<b>1</b>	<b>Stop arm complete L</b>	
<b>9</b>	<b>2008897</b>	<b>1</b>	<b>Arm for stop arm and magnet</b>	
<b>10</b>	<b>1009875</b>	<b>1</b>	<b>Guide sleeve</b>	
<b>11</b>	<b>1001290-1</b>	<b>1</b>	<b>Sprocket 3/4 19T</b>	
<b>12</b>	<b>033010020</b>	<b>2</b>	<b>M10x20 Int. hex</b>	
<b>13</b>	<b>761286-2</b>	<b>2</b>	<b>Cap for lubrication nipple</b>	
<b>14</b>	<b>761286</b>	<b>2</b>	<b>Lubrication nipple</b>	
<b>15</b>	<b>761329</b>	<b>4</b>	<b>Retaining ring Int. Ø60</b>	
<b>16</b>	<b>761293</b>	<b>2</b>	<b>Bushing</b>	
<b>17</b>	<b>761282</b>	<b>1</b>	<b>Guide sleeve with bushings</b>	
<b>18</b>	<b>701040</b>	<b>1</b>	<b>Retaining ring Int. Ø40</b>	
<b>19</b>	<b>761284</b>	<b>1</b>	<b>Plain washer</b>	
<b>20</b>	<b>761283</b>	<b>1</b>	<b>Guide shaft (Pin)</b>	
<b>21</b>	<b>34000055</b>	<b>2</b>	<b>Floor roller</b>	
<b>22</b>	<b>021016180</b>	<b>2</b>	<b>M16x180 Steel bolt</b>	
<b>23</b>	<b>34000047</b>	<b>2</b>	<b>Bushing for support roller</b>	
<b>24</b>	<b>2009546</b>	<b>1</b>	<b>Main plate</b>	
<b>25</b>	<b>763916</b>	<b>2</b>	<b>M16 Riplock</b>	
<b>26</b>	<b>040416</b>	<b>2</b>	<b>M16 Steel nut</b>	
<b>27</b>	<b>661323</b>	<b>1</b>	<b>Drawbar spring</b>	



<b>Item no.</b>	<b>Part no.</b>	<b>Qty</b>	<b>Description</b>	<b>Comments</b>
<b>1</b>	<b>2008441</b>	<b>1</b>	<b>Retaining bar</b>	
<b>2</b>	<b>2009284</b>	<b>2</b>	<b>Angle Tension bracket</b>	
<b>3</b>	<b>31000050</b>	<b>2</b>	<b>Threaded rod Fault bar</b>	
<b>4</b>	<b>661545</b>	<b>2</b>	<b>Drawbar spring</b>	
<b>5</b>	<b>631109</b>	<b>2</b>	<b>Flange gasket</b>	
<b>6</b>	<b>1009328</b>	<b>2</b>	<b>Flange with HK Cup</b>	
<b>7</b>	<b>1005750</b>	<b>1</b>	<b>Filter</b>	
<b>8</b>	<b>SI20024-1</b>	<b>1</b>	<b>Rubber damper</b>	
<b>9</b>	<b>2008537</b>	<b>1</b>	<b>Feed pipe</b>	
<b>10</b>	<b>15000106</b>	<b>2</b>	<b>Pin for roller on miswinder</b>	
<b>11</b>	<b>35000207</b>	<b>2</b>	<b>End plug for roller</b>	
<b>12</b>	<b>2008443</b>	<b>1</b>	<b>Roller for retaining bar</b>	
<b>13</b>	<b>1160300102</b>	<b>2</b>	<b>Tension bar</b>	



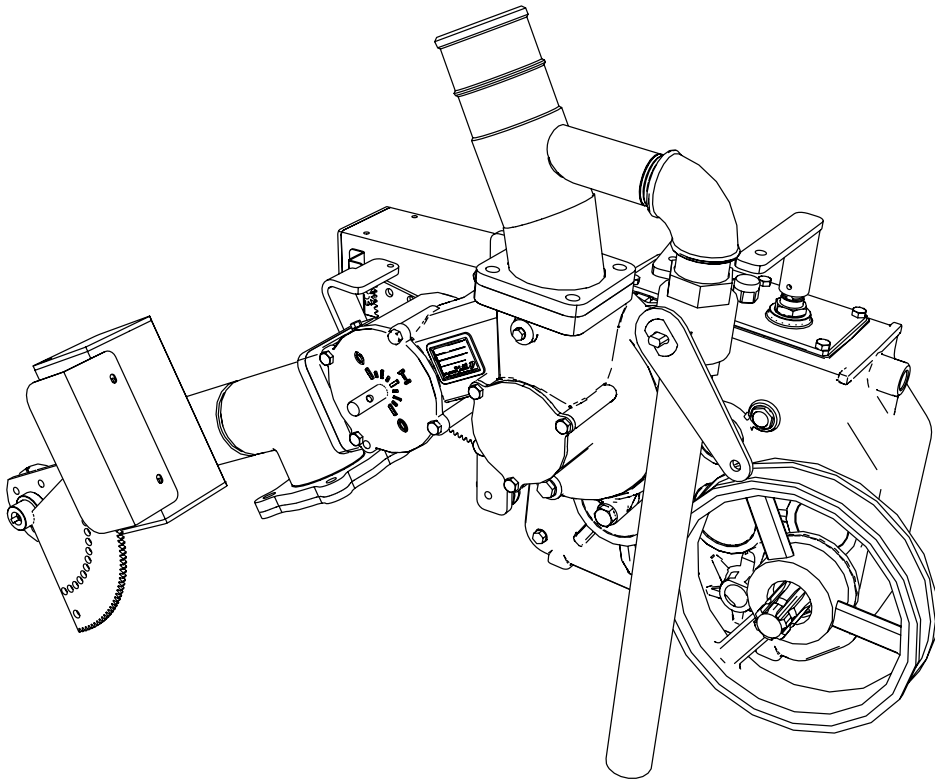
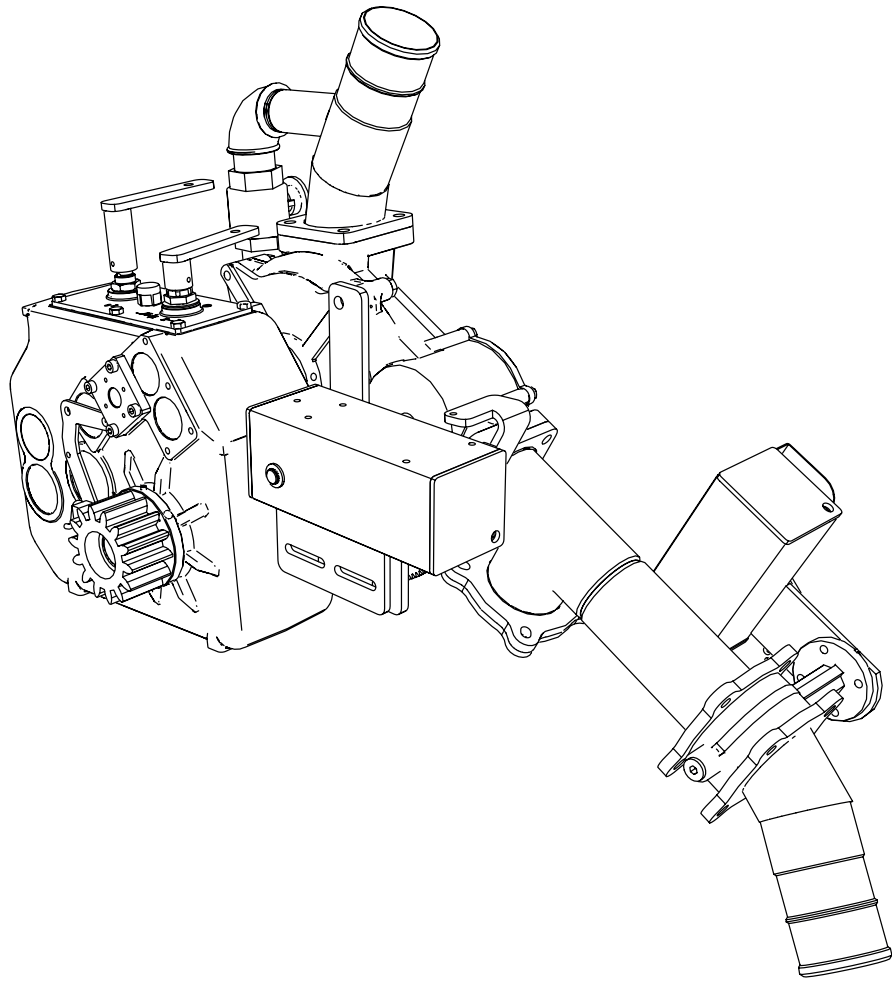
<b>Item no.</b>	<b>Part no.</b>	<b>Qty</b>	<b>Description</b>	<b>Comments</b>
1	895515-8	1	Rubber handle	
2	2008744	1	Key for gear	
3	643608	1	Turnbuckle	
4	2009210	1	Drawbar spring 3x18x109.5	
5	18000419	1	Brake strap	
6	2008482	1	Threaded rod	350 mm
7	680001	1	T-grip for slide valve	
8	2008501	1	Threaded rod for gear shifter	400 mm
9	2008463	1	Threaded rod for gear shifter	490 mm
10	1100151608	5	Angle joint	
11	2009364	1	Gear arm	
12	680006	2	Rubber grip	
13	2008478	1	Lever for decoupling	
14	2008476	1	Decoupling arm	
15	2008409	1	Control for gearbox	
16	761015-15	2	Cable roller loose	
17	1327102020	2	Door holder female	
18	1007590	1	Plate for battery	
19	1005521	1	Battery 12V	
20	1013860	1	Air hose	340 mm
21	591197	2	Swivel angle 1/4 x 8/6 hose	
22	000280402	1	Collar nipple G1/4	
23	000130402	1	Tee G1/4	
24	000241420	1	Nipple sleeve G1/4 - 1/8	
25	1007545	1	Pressostat 2 bar	
26	030506016	1	M6x16 Int. hex	
27	1327102021	2	Door holder Pin	
28	044006	4	M6 Lock nut	
29	662647	2	Handle for cover	
30	2008743	1	Guard for gear hole	
31	030506035	2	M6x35 Int. hex	
32	030506020	2	M6x20 Int. hex	
33	2008445-1	1	Cover for guard	
34	2008446-1	1	Front guard for cabinet	
35	510555	6	Ø4.8x32 mm SuperTEKS hex.	

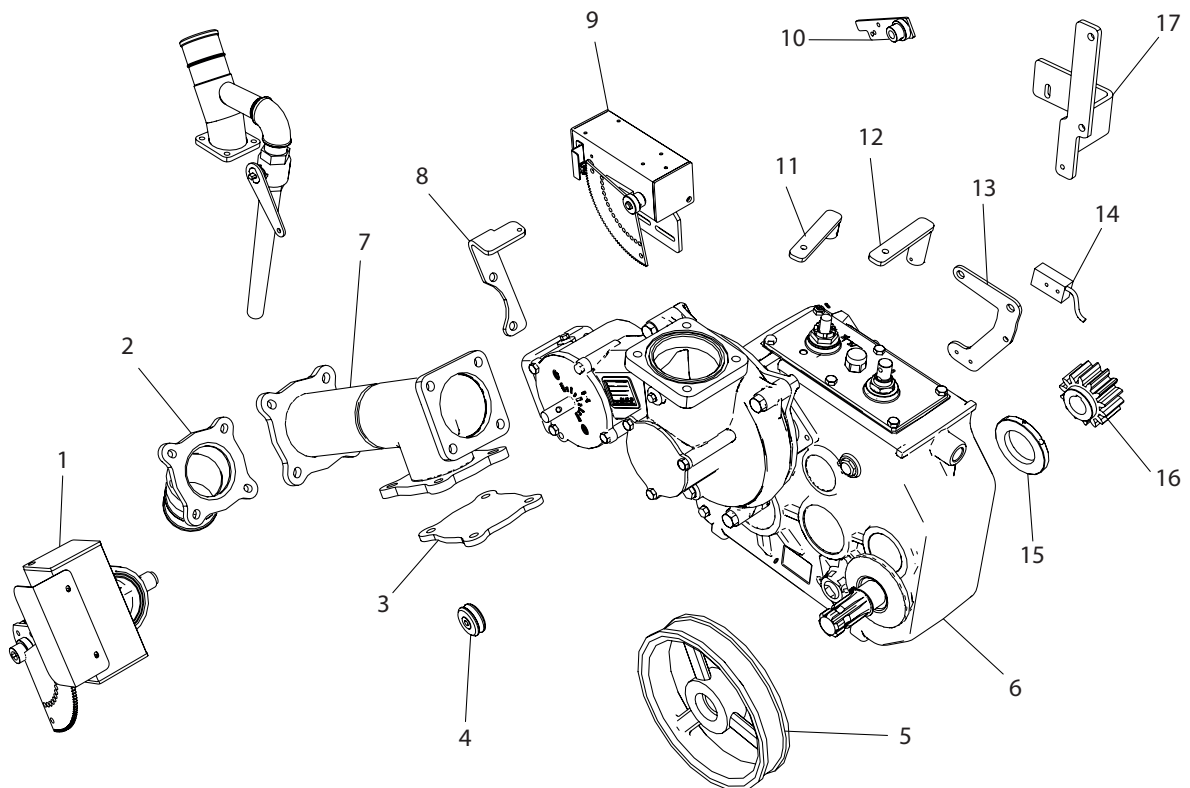
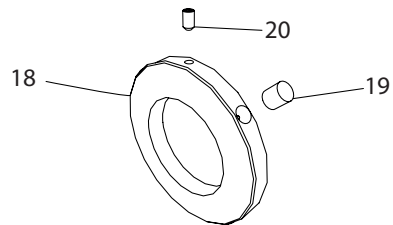
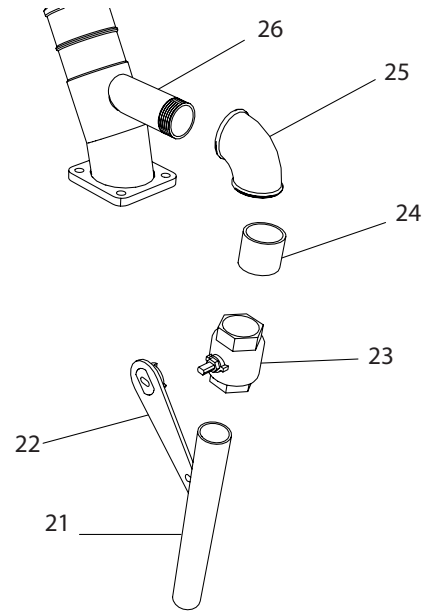
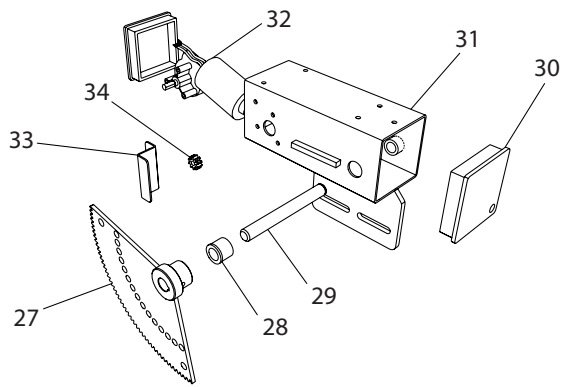
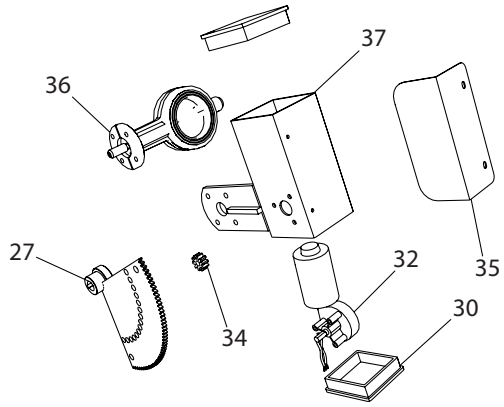




<b>Item no.</b>	<b>Part no.</b>	<b>Qty</b>	<b>Description</b>	<b>Comments</b>
36	1005523	1	Solar panel	
37	2001260	1	Holder Solar cell R	
38	2001259	1	Holder Solar cell L	
39	031608020	8	M8x20 Int. hex	
40	2008465	4	Hinge	
41	044008	8	M8 Lock nut	
42	761163-8	1	Holder for manometer	
43	1916650202B	1	Sleeve 1/4x1/4	
44	949575	1	Manometer	
45	2008412-1	1	Front guard above turbine	
46	2008444-1	1	Rear guard above turbine	
47	040405	2	M5 Steel nut	
48	021005030	2	M5x30 Steel bolt	
49	044005	2	M5 Lock nut	
50	033005010	1	5x10 Int. hex	
51	044004	4	M4 Lock nut	
52	034604020	4	4x20 mm Machine screw	
53	1007549-7	1	Prog. Rain Version 12	
54	095008020	4	8x20 mm Round head int. hex.	
55	35000361	1	Hinge plate for computer	
56	662280	1	Compression spring	
57	15000145	2	Holder for spring	
58	35000362	1	Angle cover for computer	

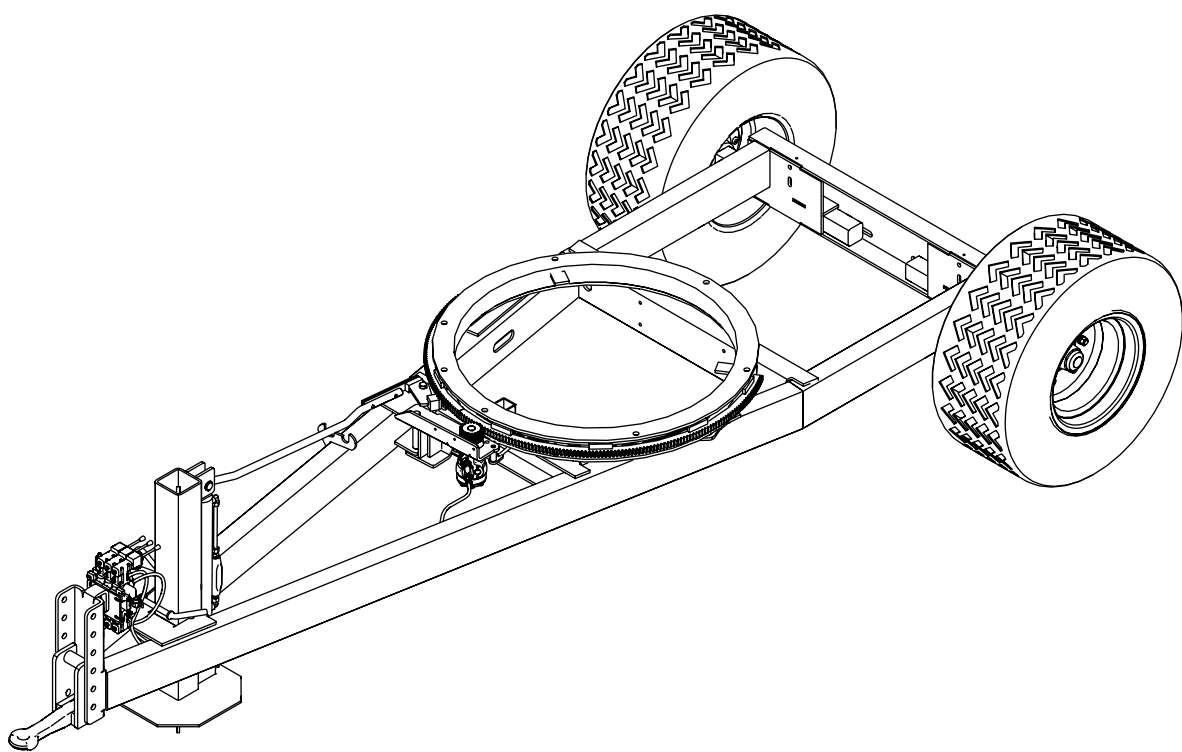


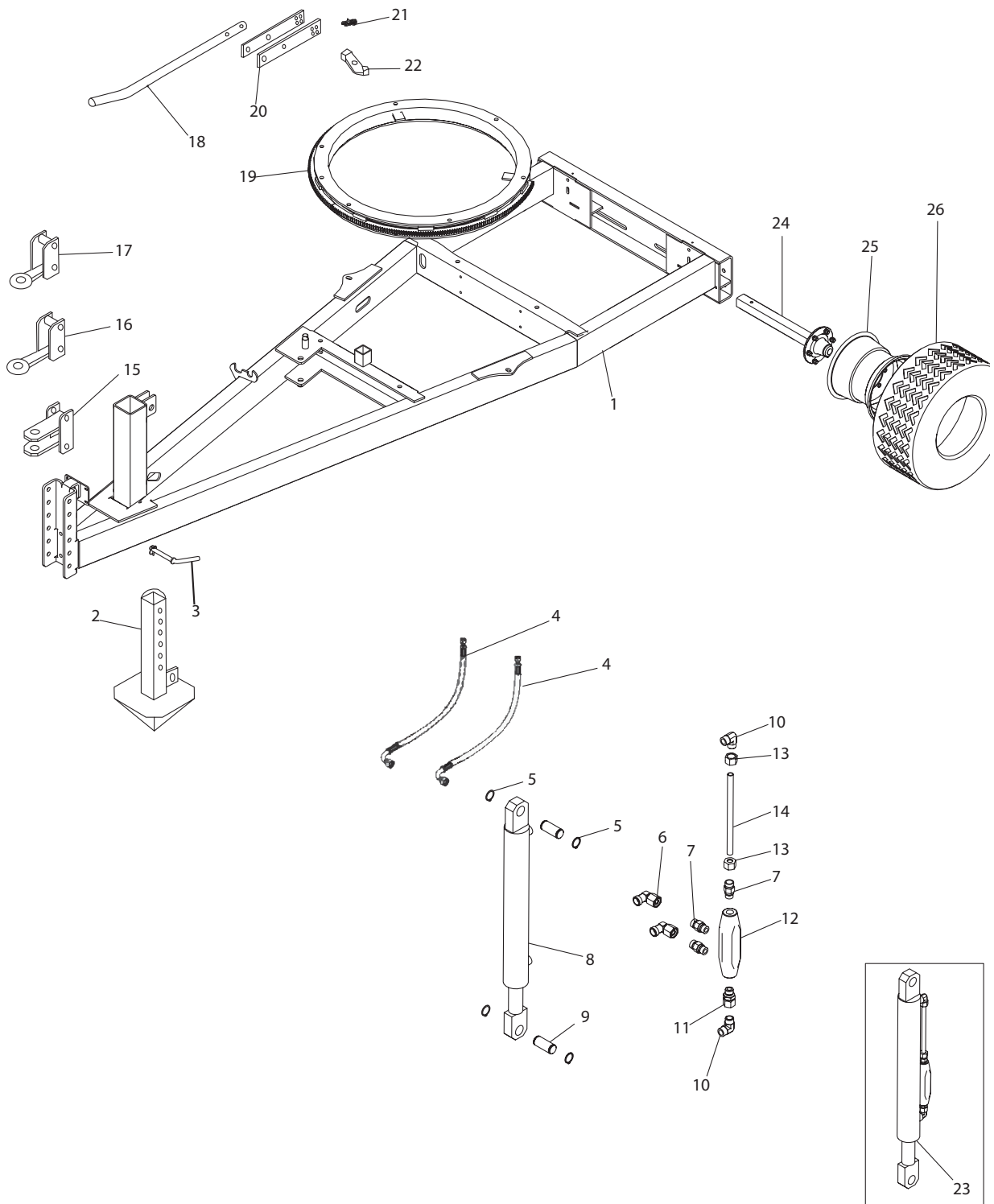
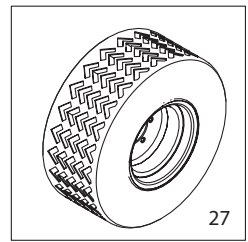




<b>Item no.</b>	<b>Part no.</b>	<b>Qty</b>	<b>Description</b>	<b>Comments</b>
1	1007230	1	Comp. Motor valve	
2	2008168	1	Hose connector with flange	
3	1007098	1	Blind flange	
4	761015-15	1	Cable roller loose	
5	2009686	1	Brake wheel	
6	821305-50	1	Multigear w/ Turbine and valve	
7	2008169	1	Tee for turbine/feed pipe	
8	2009301	1	Holder for Stop turbine	
9	1008904	1	Motor housing w/relay Comp	
10	2008358	1	Arm for turbine	
11	2008455	1	Short gear arm	
12	2008479	1	Gear arm	
13	2008787	1	Holder for magnetic sensor	
14	1007561	1	Double sensor	
15	2008786	1	Measuring roller for gear	
16	2007181	1	Drive wheel Module 7	
17	2008354	1	Bracket for console	
18	2008759	1	Magnetic roller on Gear	
19	1007570	4	Magnet	
20	033006008	1	M6x8 Int. hex	
21	2009226	1	Relief pipe	
22	2008500	1	Handle for Valve 1 1/2	
23	418117971	1	Ball valve w/handle 1.1/2.	
24	012001411	1	Nipple pipe G 1 1/2	
25	000090411	1	Angle G1 1/2	
26	2007180	1	Output from Gear/Turbine	
27	1007195	2	Gear for valve	
28	1008921	2	Bushing	
29	1008920	1	Shaft for electric brake	
30	1007175	4	End plug for motor valve	
31	1008905	1	Housing for motor	
32	1007180	2	Motor for valve	
33	1008945	1	Guard above gear	
34	1007190	2	Gear	
35	1007185	1	Guard for motor valve	
36	1007250	1	Butterfly valve	
37	1007171	1	Motor housing	



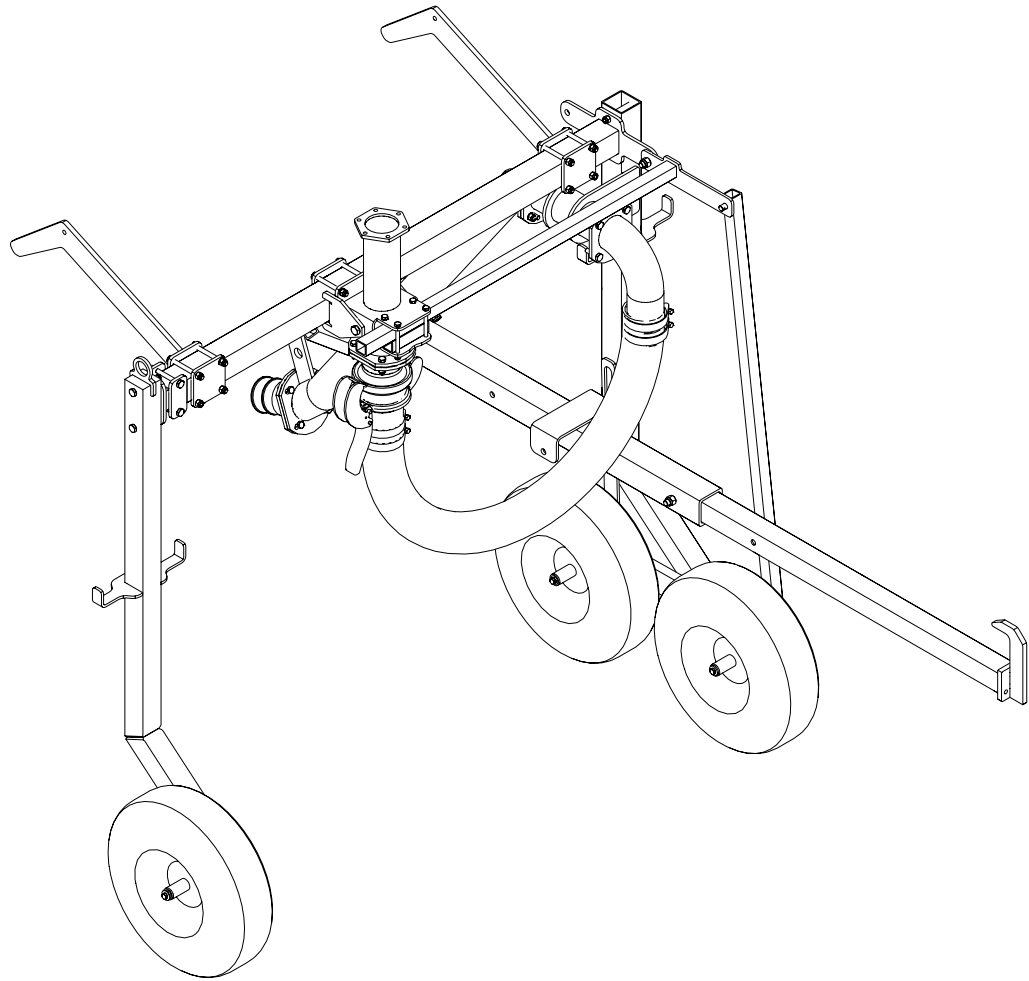


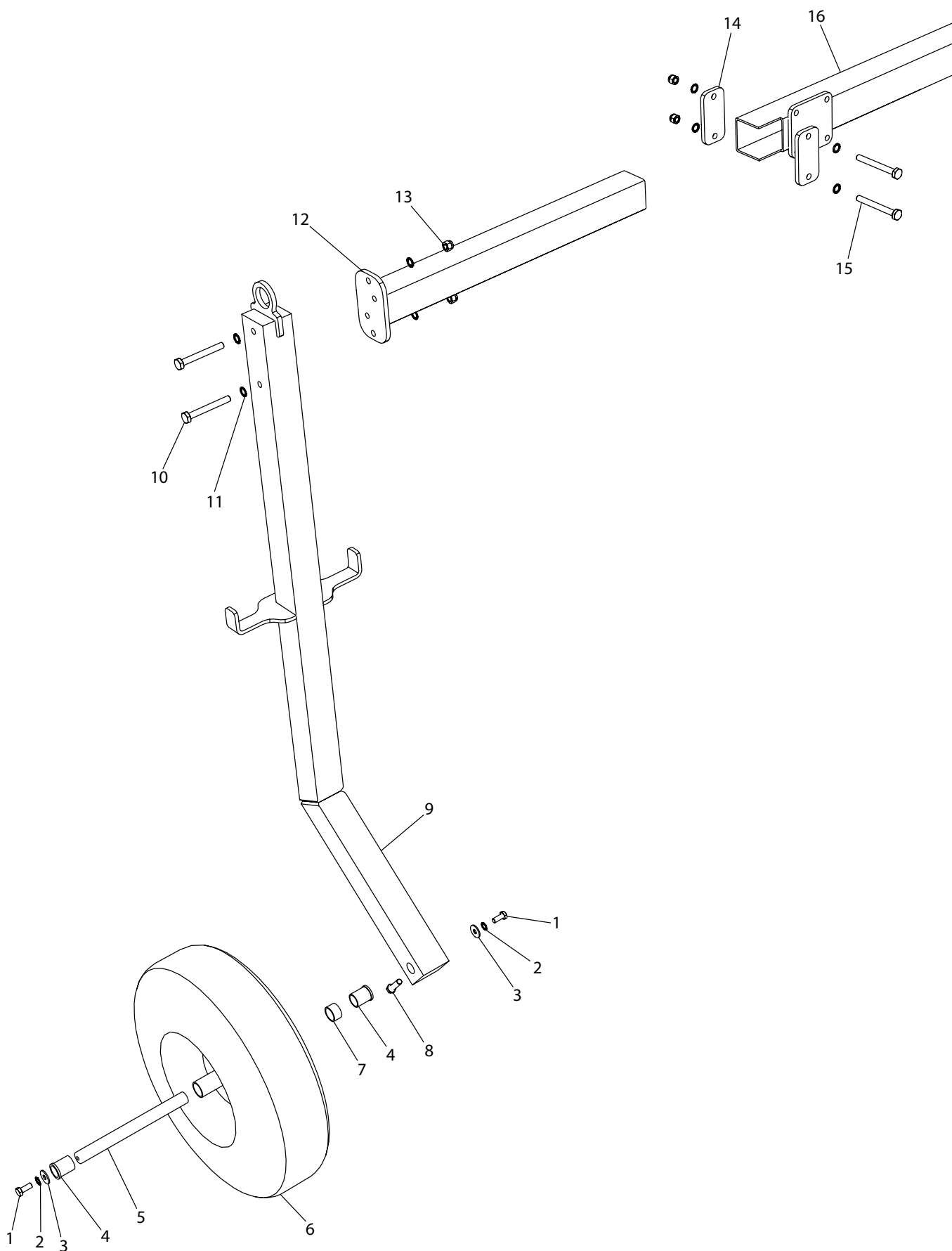




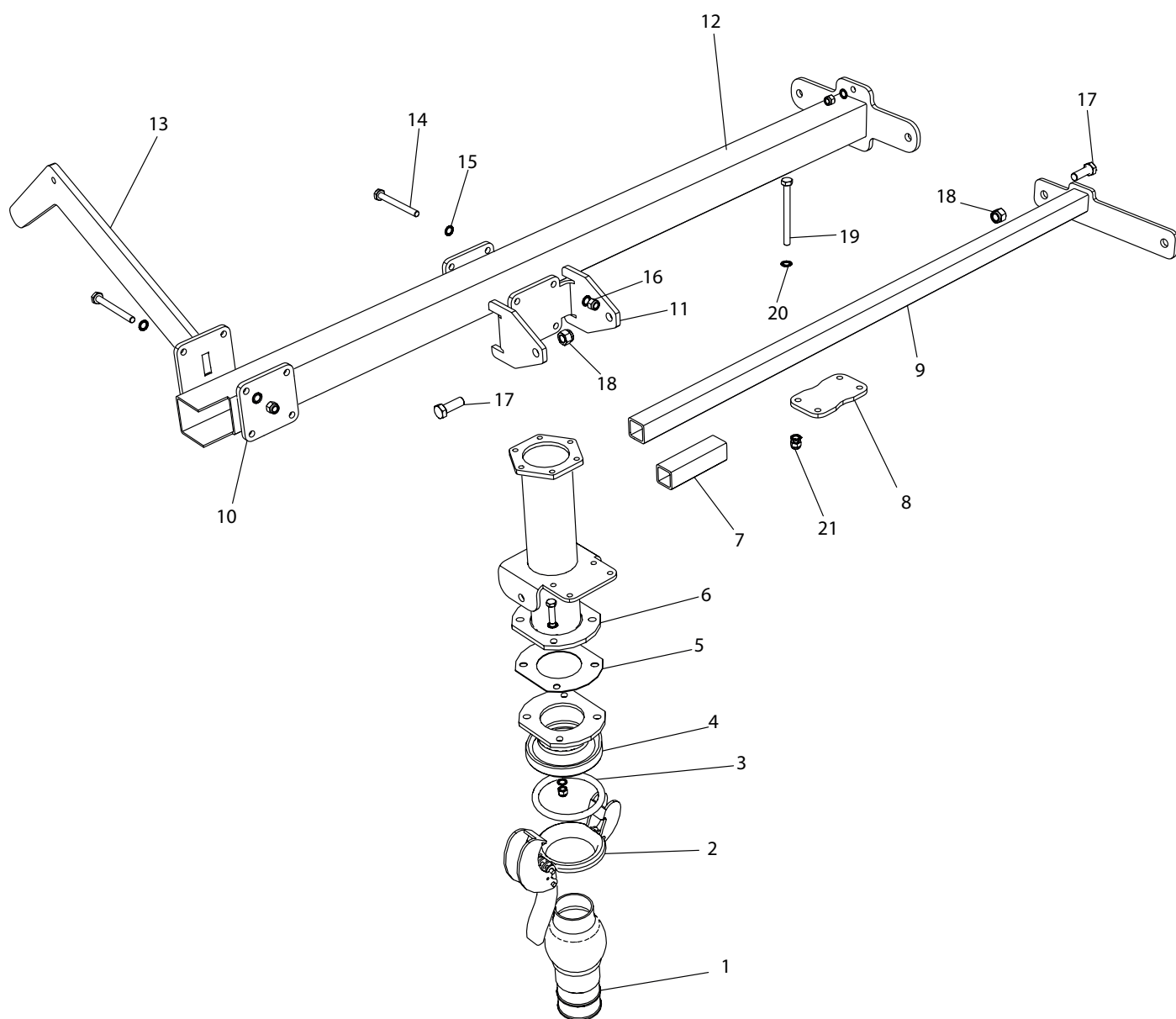
<b>Item no.</b>	<b>Part no.</b>	<b>Qty</b>	<b>Description</b>	<b>Comments</b>
1	2010164	1	Chassis GT12	
2	11000000	1	Support leg	
3	31000077	1	Pin for Support leg	
4	556005	2	Hose 3/8	550 mm
5	700030	4	Retaining ring Ext. Ø30	
6	1008622	2	Angle Ø12 with fixed union nut	
7	1007724	3	Nipple Straight 3/8 Cyl. x Ø12 mm	
8	550002	1	Hyd. Cylinder	
9	04000880	2	Shaft for cylinder	
10	1007544	2	Angle 3/8 x Ø12 Hydraulic	
11	890414	1	Nipple Straight 3/8 x Ø12 Fixed union nut	
12	551009	1	Check valve	
13	1007505	2	12 mm union nut	
14	026152098	1	Hydraulic Pipe	250 mm
15	11000003	1	Fork hitch	
16	11000050	1	Hitch ring Ø40	
17	11000014	1	Hitch ring Ø50	
18	31000236	1	Locking lever for turntable	
19	11000043	1	Turntable	
20	31000218	2	Spring bracket for locking bar	
21	763836	1	Split pin	
22	2010134	1	Locking bracket with teeth	
23	98000245	1	Hydraulic Support leg	
24	837557	2	Wheel shaft	
25	872905	2	Rim	
26	890800-1	2	Tyres	
27	890000	2	Complete Wheel	





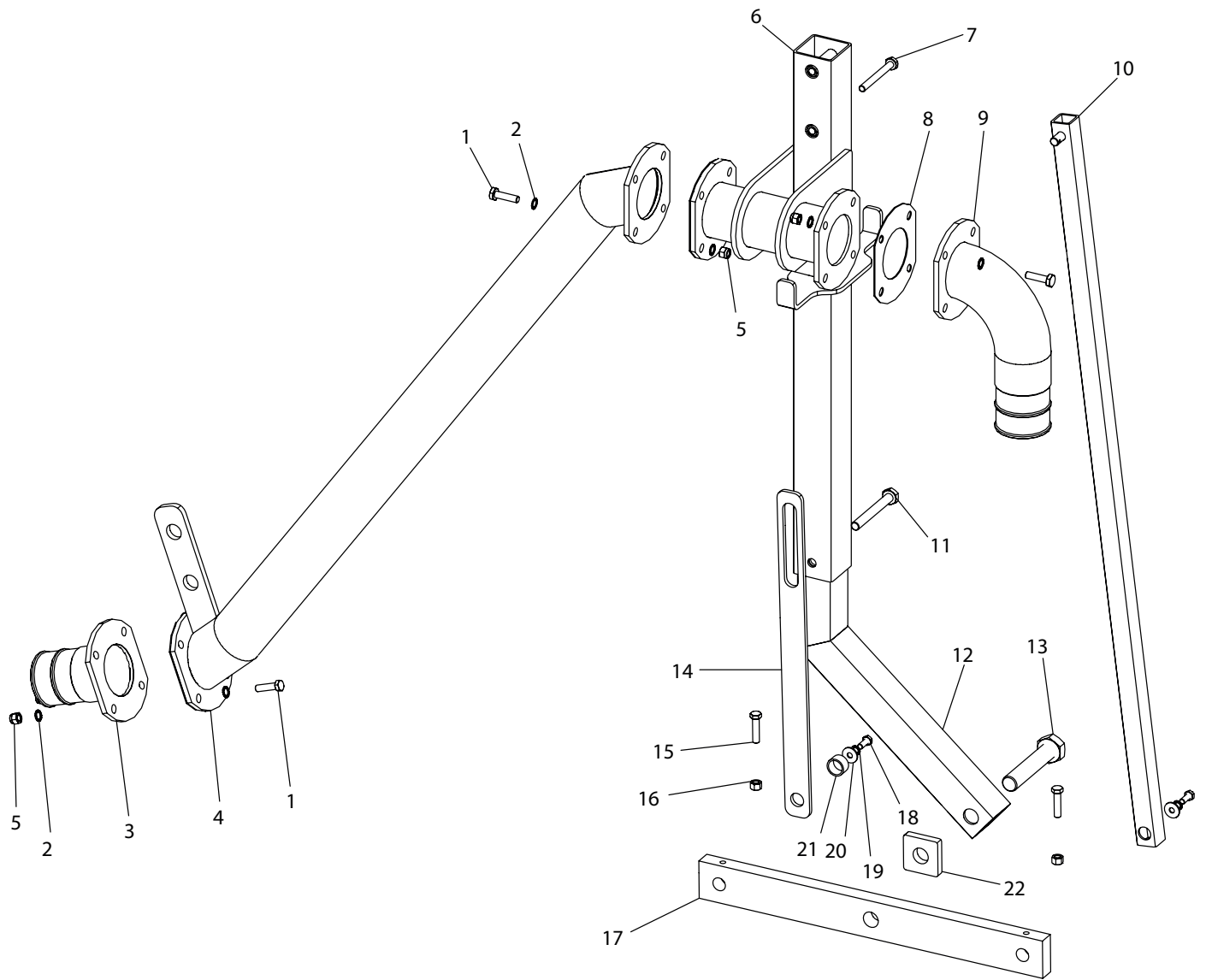


<b>Item no.</b>	<b>Part no.</b>	<b>Qty</b>	<b>Description</b>	<b>Comments</b>
<b>1</b>	<b>022210025</b>	<b>2</b>	<b>M10x25 Steel set bolt</b>	
<b>2</b>	<b>763910</b>	<b>2</b>	<b>M10 Riplock</b>	
<b>3</b>	<b>051010</b>	<b>2</b>	<b>M10 Plain washer</b>	
<b>4</b>	<b>37000100</b>	<b>2</b>	<b>Bushing Gun trailer</b>	
<b>5</b>	<b>2010417</b>	<b>1</b>	<b>Wheel shaft for gun trailer</b>	
<b>6</b>	<b>830600</b>	<b>1</b>	<b>Wheel</b>	
<b>7</b>	<b>37000066</b>	<b>1</b>	<b>Bushing Front wheel</b>	
<b>8</b>	<b>022212050</b>	<b>1</b>	<b>M12x50 Steel set bolt</b>	
<b>9</b>	<b>2010217</b>	<b>1</b>	<b>Single-wheel leg Gun trailer</b>	
<b>10</b>	<b>021012100</b>	<b>2</b>	<b>M12x100 Steel bolt</b>	
<b>11</b>	<b>763912</b>	<b>8</b>	<b>M12 Riplock</b>	
<b>12</b>	<b>2010220</b>	<b>1</b>	<b>Unwinding bar</b>	
<b>13</b>	<b>044012</b>	<b>4</b>	<b>M12 Lock nut</b>	
<b>14</b>	<b>2010438</b>	<b>2</b>	<b>Clamping bracket for gun trailer</b>	
<b>15</b>	<b>021012110</b>	<b>2</b>	<b>M12x110 Steel bolt</b>	
<b>16</b>	<b>2010222</b>	<b>1</b>	<b>Cross bar</b>	



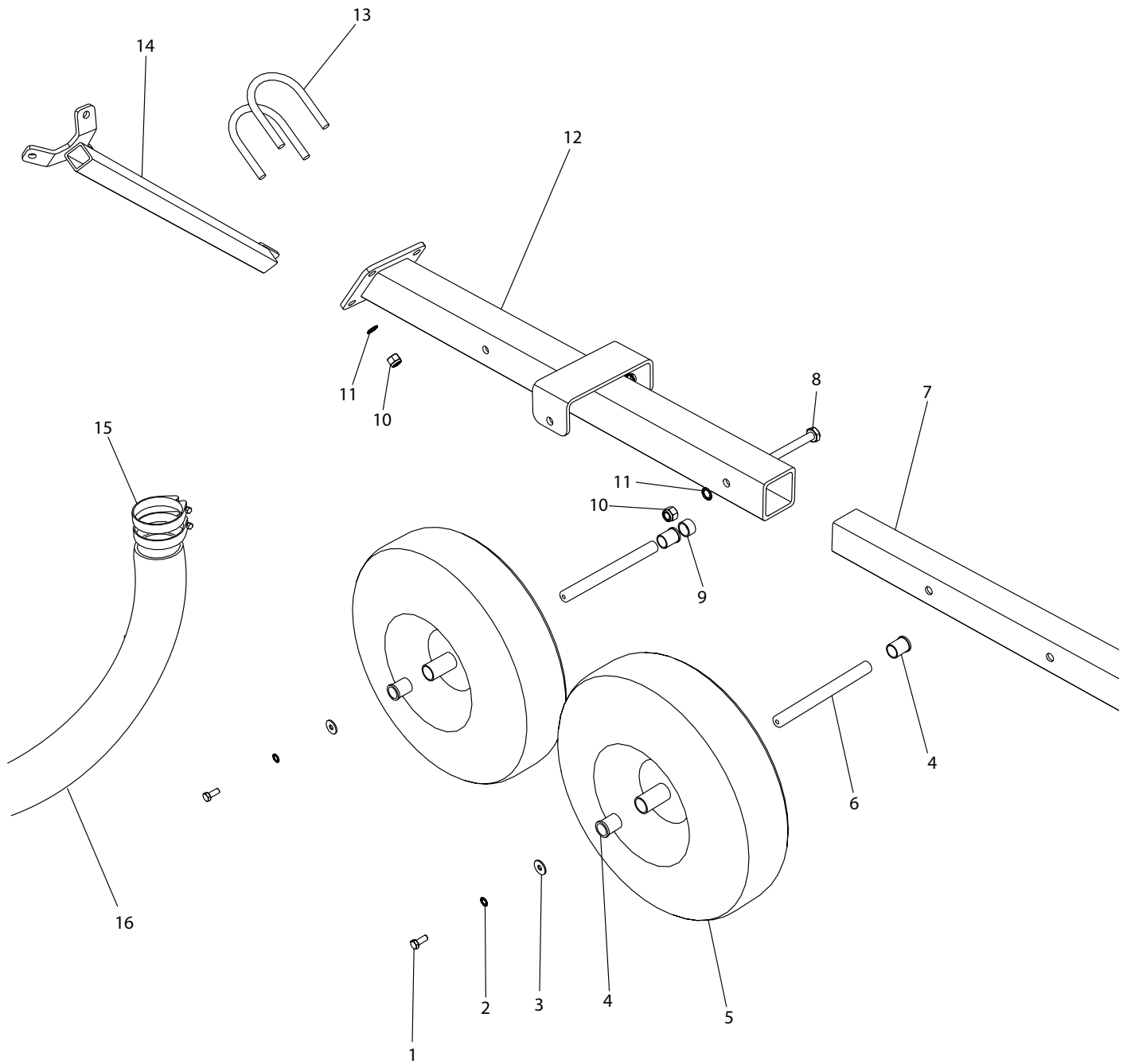
<b>Item no.</b>	<b>Part no.</b>	<b>Qty</b>	<b>Description</b>	<b>Comments</b>
<b>1</b>	<b>1013034</b>	<b>1</b>	<b>HK 108 Ball with hose connector</b>	
<b>2</b>	<b>14050013</b>	<b>1</b>	<b>Galv. Locking ring</b>	
<b>3</b>	<b>14050043</b>	<b>1</b>	<b>Rubber ring</b>	
<b>4</b>	<b>1009328</b>	<b>1</b>	<b>Flange with HK Cup</b>	
<b>5</b>	<b>631109</b>	<b>1</b>	<b>Gasket</b>	
<b>6</b>	<b>2010257</b>	<b>1</b>	<b>Holder for gun pipe</b>	
<b>7</b>	<b>2011381</b>	<b>1</b>	<b>Spacer profile</b>	
<b>8</b>	<b>2010264</b>	<b>1</b>	<b>Clamping plate for profile gun trailer</b>	
<b>9</b>	<b>2010267</b>	<b>1</b>	<b>Adjustment plate</b>	
<b>10</b>	<b>2011124</b>	<b>2</b>	<b>Clamping plate gun trailer</b>	
<b>11</b>	<b>2010250</b>	<b>1</b>	<b>Clamping plate for gun</b>	
<b>12</b>	<b>2010222</b>	<b>1</b>	<b>Cross bar</b>	
<b>13</b>	<b>2010282</b>	<b>2</b>	<b>Support arm</b>	
<b>14</b>	<b>021012120</b>	<b>4</b>	<b>M12x120 Steel bolt</b>	
<b>15</b>	<b>763912</b>	<b>8</b>	<b>M12 Riplock</b>	
<b>16</b>	<b>044012</b>	<b>4</b>	<b>M12 Lock nut</b>	
<b>17</b>	<b>022216045</b>	<b>4</b>	<b>M16x45 Steel set bolt</b>	
<b>18</b>	<b>044016</b>	<b>4</b>	<b>M16 Lock nut</b>	
<b>19</b>	<b>021010110</b>	<b>12</b>	<b>M10x110 Steel bolt</b>	
<b>20</b>	<b>763910</b>	<b>24</b>	<b>M10 Riplock</b>	
<b>21</b>	<b>044010</b>	<b>12</b>	<b>M10 Lock nut</b>	

VW



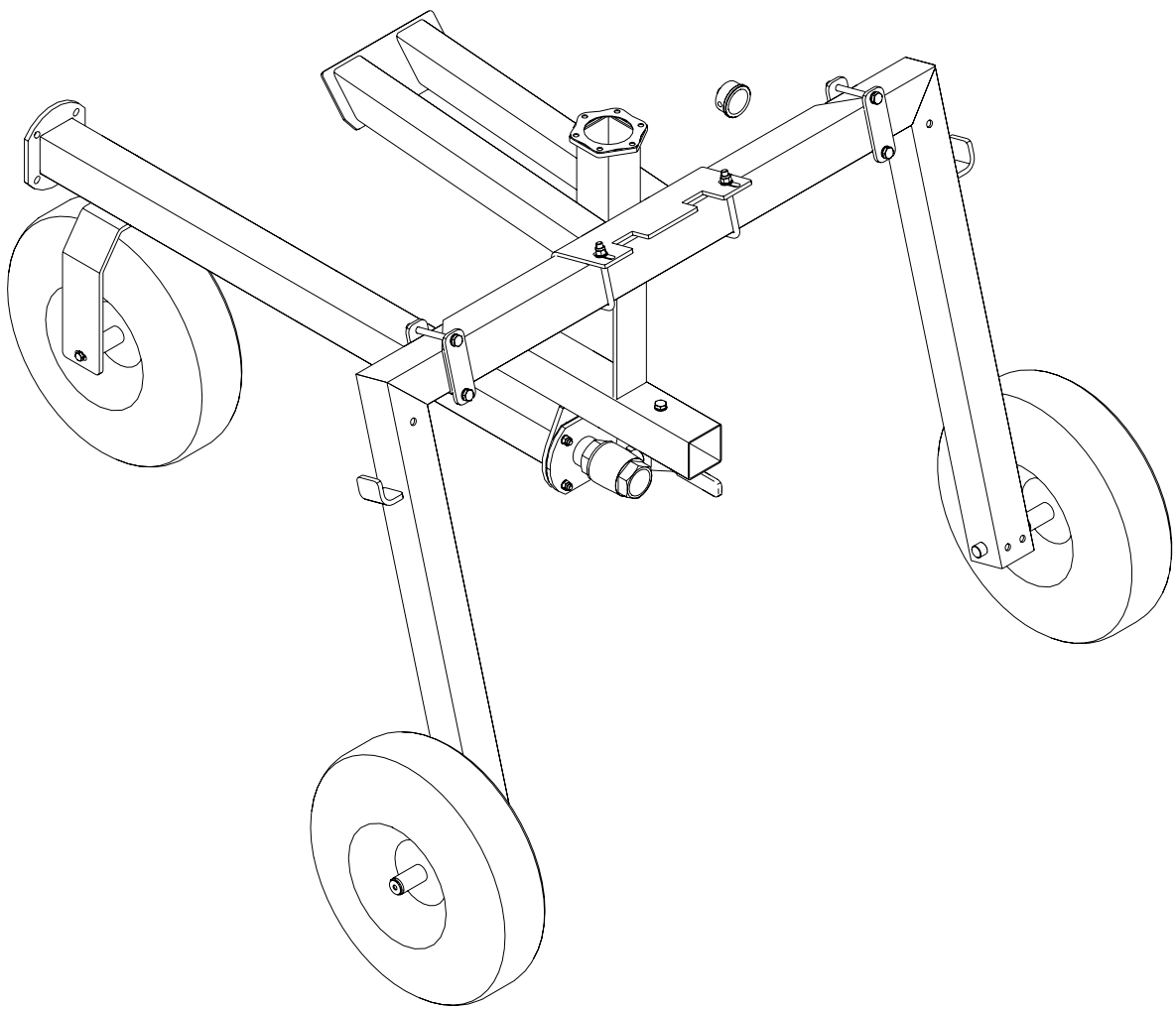


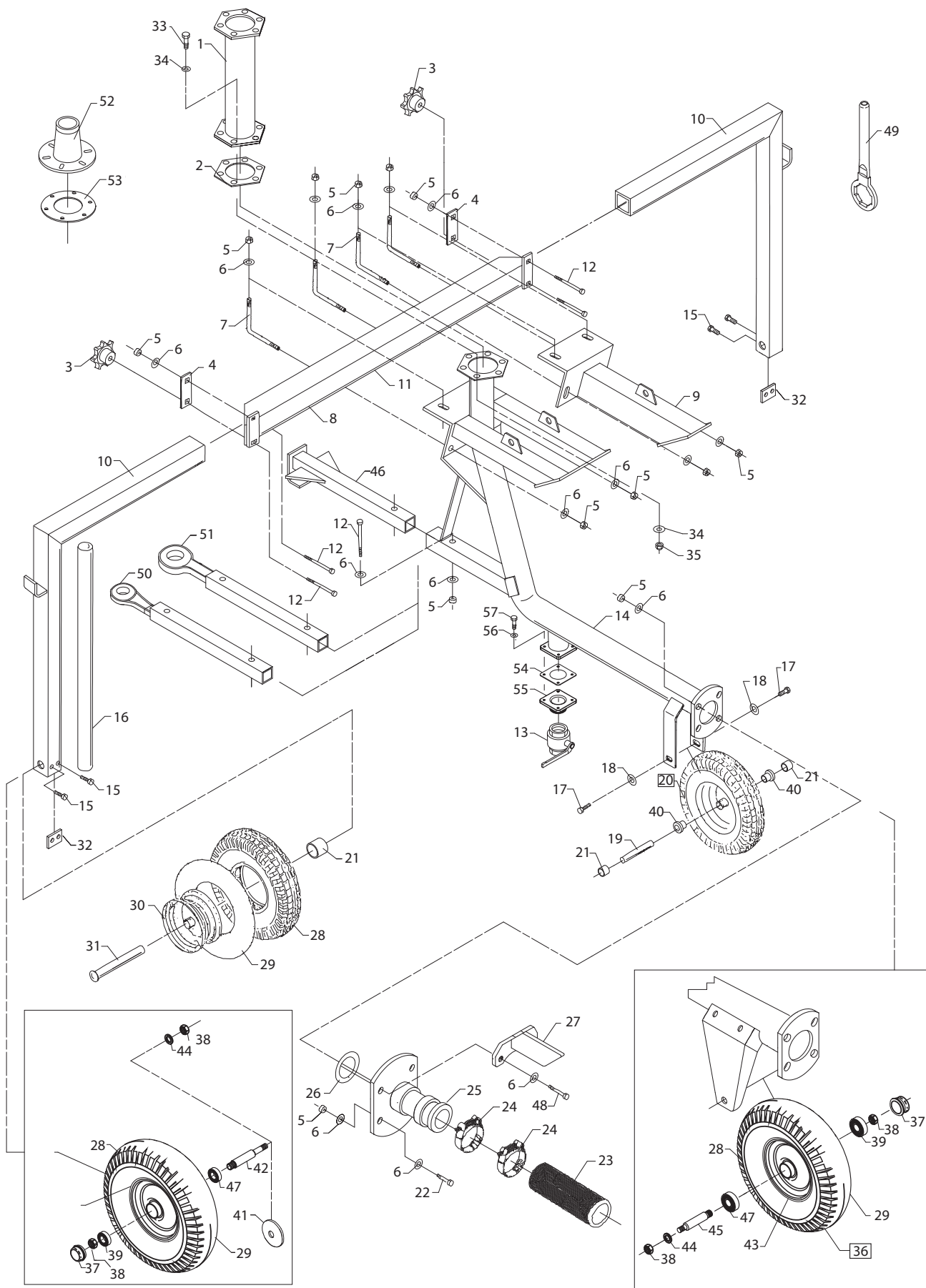
<b>Item no.</b>	<b>Part no.</b>	<b>Qty</b>	<b>Description</b>	<b>Comments</b>
<b>1</b>	<b>021012045</b>	<b>12</b>	<b>M12x45 Steel bolt</b>	
<b>2</b>	<b>763912</b>	<b>24</b>	<b>M12 Riplock</b>	
<b>3</b>	<b>15000127</b>	<b>1</b>	<b>Hose connector with flange</b>	
<b>4</b>	<b>2010242</b>	<b>1</b>	<b>Feed pipe</b>	
<b>5</b>	<b>044012</b>	<b>12</b>	<b>M12 Lock nut</b>	
<b>6</b>	<b>2010226</b>	<b>1</b>	<b>Stand Gun trailer</b>	
<b>7</b>	<b>021012110</b>	<b>2</b>	<b>M12x110 Steel bolt</b>	
<b>8</b>	<b>631109</b>	<b>3</b>	<b>Gasket</b>	
<b>9</b>	<b>2010248</b>	<b>1</b>	<b>Bend Gun trailer</b>	
<b>10</b>	<b>2010374</b>	<b>1</b>	<b>Control arm</b>	
<b>11</b>	<b>021016130</b>	<b>1</b>	<b>M16x130 Steel bolt</b>	
<b>12</b>	<b>2010231</b>	<b>1</b>	<b>Stand Gun trailer</b>	
<b>13</b>	<b>021030150</b>	<b>1</b>	<b>M30x150 Steel bolt</b>	
<b>14</b>	<b>2010277</b>	<b>1</b>	<b>Control bracket</b>	
<b>15</b>	<b>022212050</b>	<b>2</b>	<b>M12x50 Steel set bolt</b>	
<b>16</b>	<b>040412</b>	<b>2</b>	<b>M12 Steel nut</b>	
<b>17</b>	<b>2010010</b>	<b>1</b>	<b>Bogie for right wheel</b>	
<b>18</b>	<b>022210025</b>	<b>2</b>	<b>M10x25 Steel set bolt</b>	
<b>19</b>	<b>763910</b>	<b>2</b>	<b>M10 Riplock</b>	
<b>20</b>	<b>051010</b>	<b>2</b>	<b>M10 Plain washer</b>	
<b>21</b>	<b>37000066</b>	<b>1</b>	<b>Bushing Front wheel</b>	
<b>22</b>	<b>2010436</b>	<b>1</b>	<b>Spacer washer</b>	



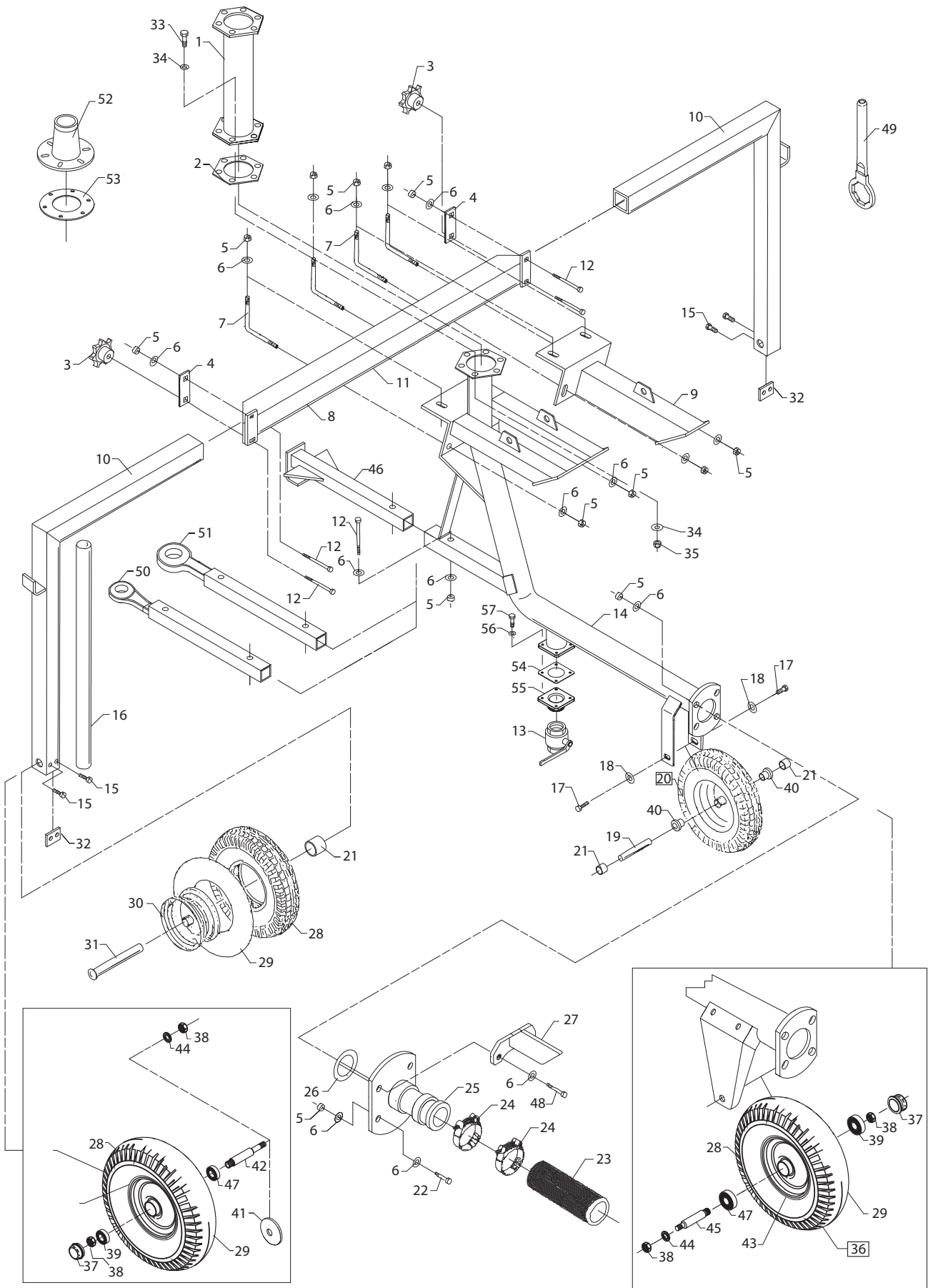
<b>Item no.</b>	<b>Part no.</b>	<b>Qty</b>	<b>Description</b>	<b>Comments</b>
<b>1</b>	<b>022210025</b>	<b>2</b>	<b>M10x25 Steel set bolt</b>	
<b>2</b>	<b>763910</b>	<b>2</b>	<b>M10 Riplock</b>	
<b>3</b>	<b>051010</b>	<b>2</b>	<b>M10 Plain washer</b>	
<b>4</b>	<b>37000100</b>	<b>4</b>	<b>Bushing Gun trailer</b>	
<b>5</b>	<b>830600</b>	<b>2</b>	<b>Wheel</b>	
<b>6</b>	<b>2010417</b>	<b>2</b>	<b>Wheel shaft</b>	
<b>7</b>	<b>2010053</b>	<b>1</b>	<b>Hitch hook</b>	
<b>8</b>	<b>021016120</b>	<b>2</b>	<b>M16x120 Steel bolt</b>	
<b>9</b>	<b>37000066</b>	<b>1</b>	<b>Bushing Front wheel</b>	
<b>10</b>	<b>044016</b>	<b>6</b>	<b>M16 Lock nut</b>	
<b>11</b>	<b>763916</b>	<b>6</b>	<b>M16 Riplock</b>	
<b>12</b>	<b>2010271</b>	<b>1</b>	<b>Drawbar profile</b>	
<b>13</b>	<b>2003693</b>	<b>2</b>	<b>U-bar</b>	
<b>14</b>	<b>2010281</b>	<b>1</b>	<b>Brace</b>	
<b>15</b>	<b>16200355</b>	<b>4</b>	<b>Hose clamp</b>	
<b>16</b>	<b>SL509102</b>	<b>1</b>	<b>Lightflex Hose</b>	







Item no.	Part no.	Qty	Description	Comments
1	15000040	1	Height extender pipe for gun	
2	761614	1	Flange gasket	
3	517542	2	Operating lever	
4	37000062-1	2	Clamping plate for gun trailer	
5	044012	16	M12 Lock nut	
6	050312	32	M12 Plain washer	
7	37000064	4	Tension bar	
8	17000037	1	Overhanging 3m width	
9	17000024	1	Additional lifting arm	
10	17000017	2	Leg for gun trailer	
11	17000018	1	Overhanging for gun trailer	
12	021012120	5	M12 x 120 Steel bolt	
13	540116	1	Ball valve	
14	17000016	1	Gun trailer body	
15	022210035	4	M10 x 35 Steel set bolt	
16	37000067	1	Lever	
17	022210020	2	M10 x 20 Steel set bolt	
18	050320	2	M20 Plain washer	
19	37000065	1	Wheel shaft	
20	830600	1	Wheel Comp	
21	37000066	3	Bushing Front wheel	
22	021012045	4	M12 x 45 Steel bolt	
23		1		
24	16200726	2	Ø90 Hose clamp Ø 100 Hose clamp 16200730 Ø110 Hose clamp 16200732 Ø125 Hose clamp 16200735	
25	150000036	1	Hose connector Ø90 Hose connector Ø100 15000037 Hose connector Ø110 15000120 Hose connector Ø125 15000127	
26	631109	1	Flange gasket Ø185	
27	35000153	1	Stop buffer	
28	830606	2	Tyres	
29	830604	2	Hose	
30	830502	2	Rim	
31	17000019	1	Wheel shaft Gun trailer	
32	37000036	2	Thread plate for wheel leg	
33	021010040	6	M10 x 40 Steel bolt	
34	050310	12	M10 Plain washer	
35	044010	6	M10 Lock nut	
36	831400	2	Wheel comp 600x9	

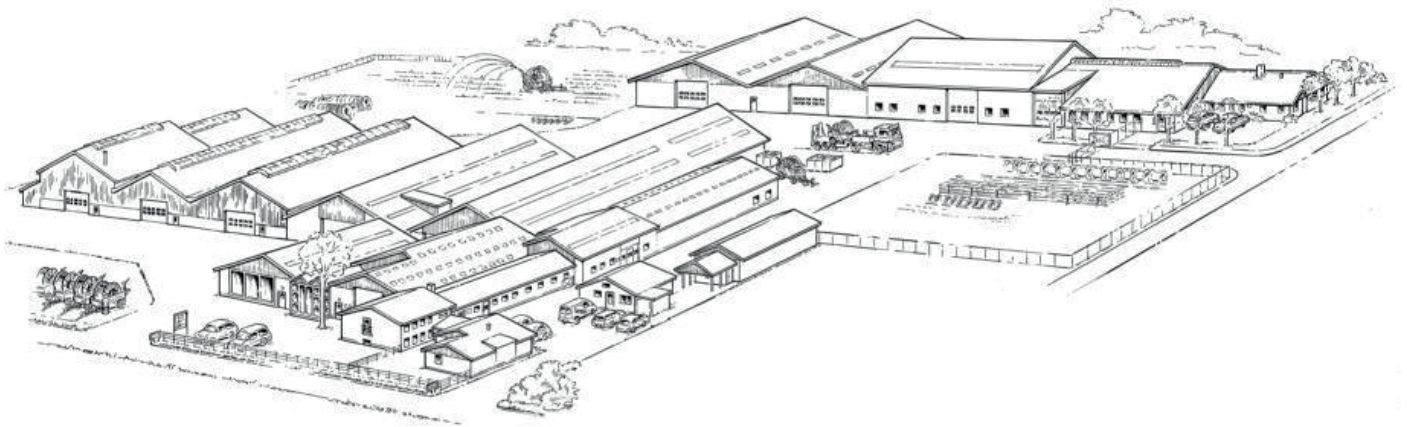




<b>Item no.</b>	<b>Part no.</b>	<b>Qty</b>	<b>Description</b>	<b>Comments</b>
37	837202	2	Hub cap	
38	044016	4	M16 Lock nut	
39	847020	2	Ball bearing	
40	37000100	2	Bushing Gun trailer	
41	37000112	1	Side member for overhanging	
42	17000035	1	Wheel shaft Rear	
43	831402	2	Rim EK 21-30	
44	050316	2	M16 Plain washer	
45	17000034	1	Wheel shaft Front	
46	17000020	1	Unwinding hook	
47	846025	2	Ball bearing 6205	
48	021012065	2	M12 x 65 Steel bolt	
49	761295	1	Nozzle key	
50	17000039	1	Unwinding hook Ø40 Drawbar eye	
51	17000043	1	Unwinding hook Ø50 Drawbar eye	
52	15000041	1	Tapered adapter for gun	
53	631609	1	Gasket for Rain bird	
54	631955	1	Gasket for flange turbine	
55	13000063	1	Flange with 2 Rg for return	
56	050308	8	M8 Plain washer	
57	022208025	4	M8 x 25 Steel set bolt	







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