CUSTERS SAFEAERO

**SERVICE AND MAINTENANCE INSTRUCTIONS**

# SAFEAERO TYPHOON

## $^{S}/_{N}$ 17523

**Type :Typhoon 16**

**Machine number :16351**

**Year of construction :2016** CE

TEXTRON GSE


# CUSTERS HYDRAULICA B.V.

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ORIGINAL INSTRUCTIONS

# SERVICE AND MAINTENANCE INSTRUCTIONS

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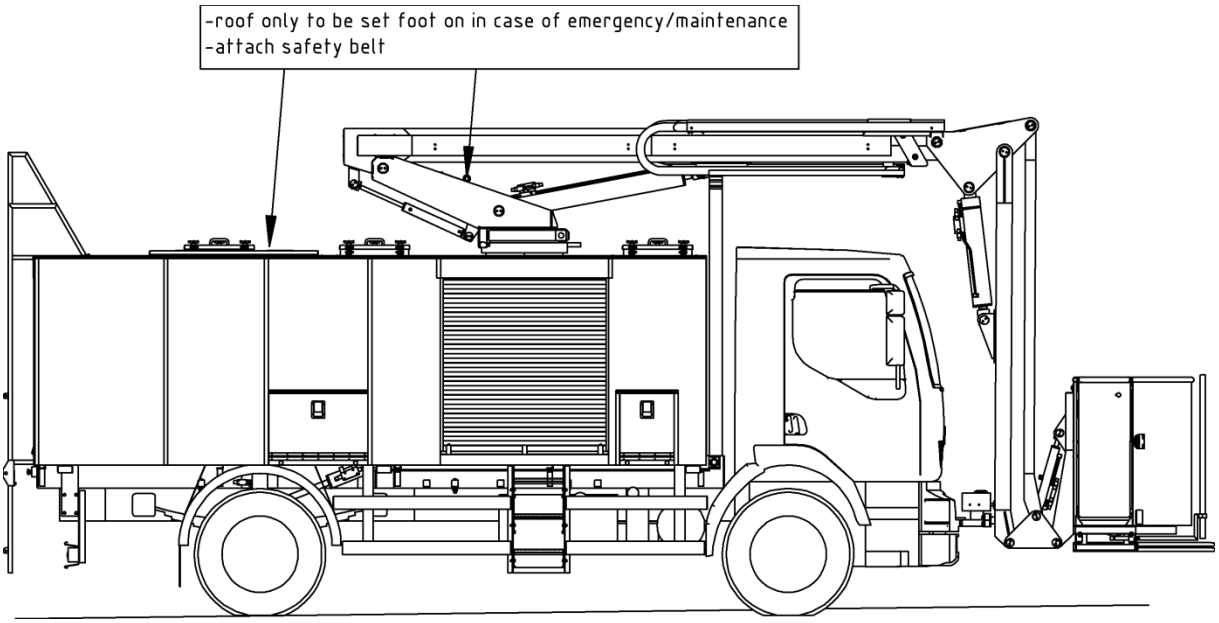
**APPENDICES:**
Spare parts list
Hydraulic diagram (enclosed separately) no. 0116.601.111
Circuit diagram (enclosed separately) no. 0116.701.109/110

These service and maintenance instructions form an integral part of the de-icer and must always be kept with the machine so that it can be consulted whenever necessary.
This handbook contains instructions of the service and maintenance of the SAFEAERO truck de-icer. Please refer to the manual provided by the vehicle manufacturer for the use and maintenance of the vehicle.
Pictures and captions may contain general information and be intended for illustrative purpose; hence the specific deicer may vary.

## 1. MAINTENANCE

In order to keep the SAFEAERO de-icer in good working order and, through this, to ensure its safe and effective use, maintenance must be carried out at regular intervals.

Maintenance of the de-icer may only be carried out by trained and skilled professionals.




The maintenance of the de-icer consists of:

- Checking whether the de-icer functions correctly.
- Checking the de-icer for faults.
- Preventative maintenance, such as checking the oil level and making sure the moving parts work correctly.
- Corrective measures, such as replacing faulty components.
- Checking whether all the stickers containing instructions and warnings are in place and are still legible.

The de-icer must be maintained in accordance with the schedule shown below.

| MAINTENANCE SCHEDULE | Daily | Weekly | Monthly | Yearly | Comment |
|---|---|---|---|---|---|
| Visual inspection | * | | | | 1 |
| Check the oil level (when the de-icer is in the rest position) | | * | | | |
| Check the vehicle's battery | | * | | | 2 |
| Check the attachment of the rotating joint | | | * | | 3 |
| Check the bolt attachment to the chassis | | | * | | |
| Lubrication | | | * | | 4 |
| Check the hoses | | | * | | 5 |
| Lubricate the swing drive | | | * | | 6 |
| Check the axle locks | | | * | | |
| Check the hand pump | | | * | | 7 |
| Check the switches | | | * | | 8 |
| Grease locks of shutters | | | | * | |
| Clean/replace the hydraulic system's filter | | | | * | |
| Check the hydraulic oil | | | | * | 9 |

Comment 1: During the visual inspection, attention must be given to:

- Damage/cracks (particularly to the welds). Check the welds for signs of fatigue. Rust and hairline cracks in a weld are a strong indication of fatigue. Every structural weld that is considered to be in a poor condition must be rectified and must never be ignored.
- Deformation.
- Rust.
- Oil leaks.
- Loose components.
- Whether all the stickers containing instructions and warnings are in place and are still legible.

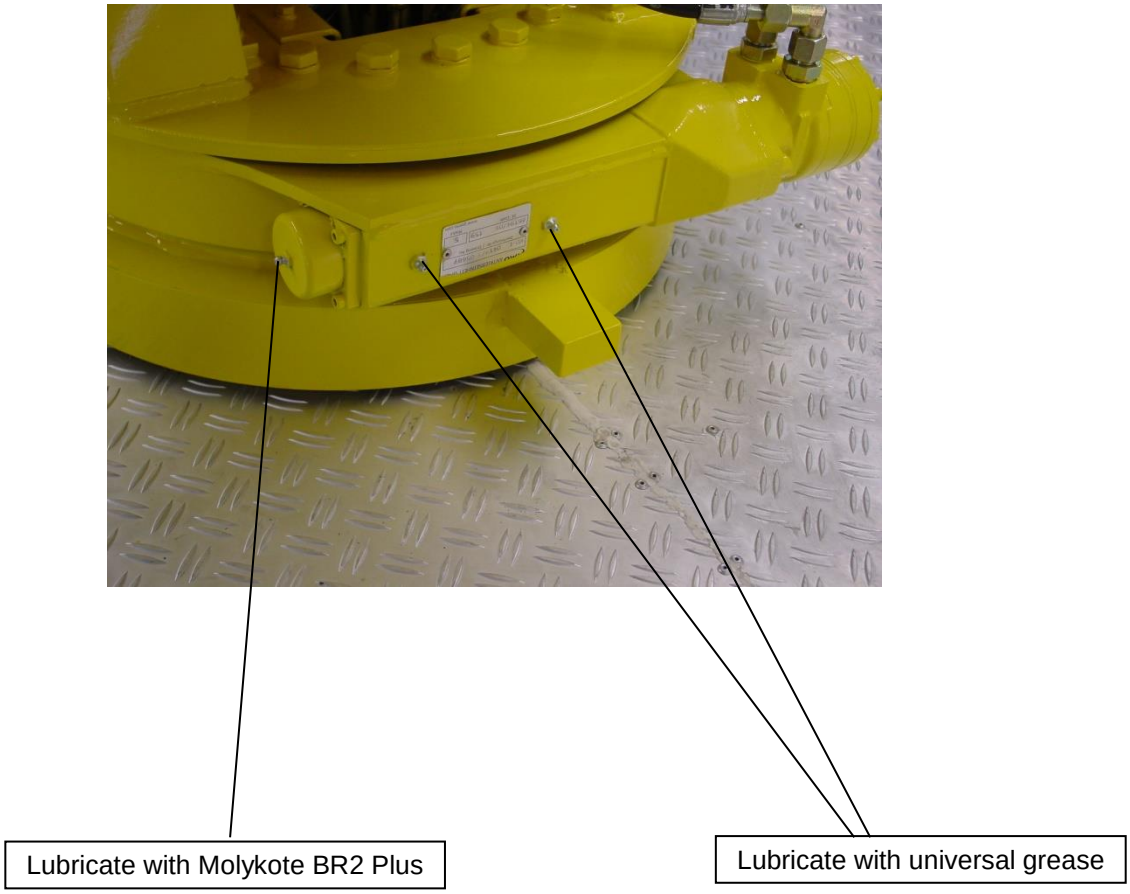
Comment 2: Keep the vehicle's battery in a good condition. The good operation of the de-icer depends on the condition of the vehicle's battery.

Comment 3: Make sure the bolts that fix the rotating joint into place are not loose. If necessary, tighten them.

Comment 4: Spray the slide contacts (steel/steel or steel/slide plate) with a Teflon based lubricant. This concerns the extending and retracting components of the telescopic arm.
Slide the components to be lubricated out as far as possible and then spray the entire length of the sliding surfaces. Allow the lubricant enough time to take effect (a couple of hours) before sliding the components back in.

Comment 5: Check the hoses (particularly the hoses in a hinged point) for kinks, wear and damage.
Hydraulic hoses must not be repaired. A hydraulic hose must always be replaced by a new, unused hose.

Comment 6: Lubricate according to the instructions given below:



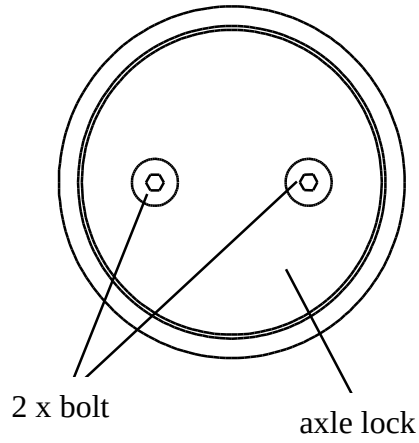

Comment 7: The hand pump must be kept operational (oiled and lubricated) and it must be tested to see whether it is in good working order.

Comment 8: Visually check the limit switches and proximity switches and keep them free of dust, dirt, ice and snow.

Comment 9: Contamination of the oil by solid particles, foreign liquids or water has a negative effect on the life span and the properties of the oil. Contamination may be the cause of faults and increased wear. Hydraulic oil has the tendency to age as a result of oxidization. In that case, there will be rubber-like deposits.
The following method can be used to get an impression of the condition of the oil. Allow a drop of oil to fall onto filter paper. The oil will run and create a spot. If the oil is clean, then the spot will be even. If the oil is old, the spot will have a dark area in the middle as a result of the ageing products. Also check the colour of the oil. If it is white, then there is water in the oil.
Therefore, the degree of contamination and ageing of the oil must be checked at regular intervals. Depending on the results, measures must be taken, such as:

- Filtering when solid, non-soluble contamination is found.
- Separation when mixed with water.

- Changing the oil when it has aged or when the contamination can no longer be filtered out. When changing the oil, the hydraulic system must always be cleaned before the new oil is added to the system.




The bolts for the axle lock plates are secured using Loctite 243
**After disassembly, Loctite must be reapplied to these bolts.**

Oils, lubricants and grease to be used:

| | |
|---|---|
| Hydraulic oil | According to ISO32 |
| Grease for lubricating the swing drive brake | Molykote BR2 Plus |
| Grease for lubricating the hinged points | Assembly: Universal lithium based grease<br>Maintenance: silicone spray |
| Grease for lubricating the gearing | Universal lithium based grease |
| Slide contacts (steel/steel or steel/plastic) | Teflon based lubricant |
| Grease for locks | Lockspray (silicone spray) |

**THE DE-ICER HAS BEEN DESIGNED FOR A TOTAL OF 100,000 CYCLES (FOR EXAMPLE, 10 YEARS AT 50 WEEKS PER YEAR, 40 HOURS PER WEEK AND 5 CYCLES PER HOUR).**
**THE MACHINE MUST UNDERGO A TOTAL OVERHAUL AND INSPECTION BY THE MANUFACTURER WITHIN THE SPECIFIED NUMBER OF CYCLES AND NO LATER THAN AFTER 12 YEARS.**
**IN THE CASE OF INTENSIVE USE, THE OVERHAUL MUST BE CARRIED OUT EARLIER.**

As a result of the applicable legal regulations, the de-icer must undergo a periodic inspection (at least once a year) by an authorized inspector.

The periodic (annual) inspection is basically a visual and functional inspection and concerns:
- The condition of the components and safety devices, as well as checking whether any alterations have been made.
- Checking whether the safety devices are still complete and operational.

General information relating to this periodic inspection (not all the information may be applicable) can be found in the following table:

| ***Component to be inspected*** | ***Inspection points*** |
|---|---|
| Type plate, text plates and inscriptions | Attachment, legibility, completeness |
| Maintenance and operating instructions | Condition, legibility |
| Logbook | Condition, legibility, correct use |
| Warning inscriptions | Condition, visibility |
| Protection against unauthorized use | Condition, function, operation |
| Operating instruments for<br>- Lifting, lowering, swinging<br>- Driving | Condition, function, operation, permanent indication of the direction of movement, protection against unauthorized operation |
| Emergency stop | Condition, function, operation |
| Equipment for communication purposes | Condition, function, observability, reliability |
| Equipment for a stable set-up<br>- Levelling | Condition, function, operation, wear, deformation, corrosion, cracks, welds |
| Supporting components | Cracks, deformation, corrosion, operation and wear of guides, rollers, hinged points, bearings, attachment and locks of removable connections, operation of locks, welds |
| Basket/working platform<br>- Railing<br><br><br>- Base<br>- Parallel guide rail<br>- Step/ladder/entrance | <br>- Condition, corrosion, deformation, attachment and locks of removable components, operation of locks, moveability of moving components, welds<br>- Anti-slip, deformation, corrosion<br>- Condition, function, wear, cracks, corrosion, welds<br>- Anti-slip, deformation, corrosion, damage, attachment and locks of moveable components, welds |
| Chains/steel cables<br>- Rollers/wheels<br>- Tensioning device | Operation, wear, cracks, lock of the chain pins<br>- Condition, function<br>- Condition, function |
| Hydraulic system<br>- Oil<br><br>- Lines/connections<br>- Hoses/connections<br>- Cylinders<br><br><br>- Filter<br>- Pressure limiting valve | Oil leak, bleeding<br>- Contamination/ageing/mixing with water, condition and legibility of dipstick/glass, quantity<br>- Attachment, damage, deformation, corrosion<br>- Attachment, damage, fragility, porosity<br>- Attachment, cracks, welds, line and hose connections, seals, surface of piston rod (grooves), contamination<br>- Condition<br>- Condition |
| Driving drives<br>- Service brake<br>- Hand brake<br>- Shaft lock | <br>- Wear, operation<br>- Wear, operation<br>- Condition, operation |
| Other drives<br>- Brakes, self-braking drives, connections | Connections of the drive components, running without knocks<br>- Wear, operation |
| Electrical system<br>- Lines/Pipes<br>- Earth connections | <br>- Damage, attachment, strain relief of loose pipes<br>- Attachment, damage |
| Special safety devices, such as emergency limit switch, chain/cable switch, catch | Completeness, operation, attachment, condition, deformation, operation of the switching elements, contamination, condition of the (pressure) springs |

## 2. SIMPLE FAULTS

Check the following first before searching for the cause of a fault:

- Are all emergency stop buttons reset (not pressed)? An emergency stop button is reset by turning it clockwise a quarter of a turn.
- Has the basket door been closed properly?
- Does the hydraulic system contain enough oil?

ELECTRICAL FAULT

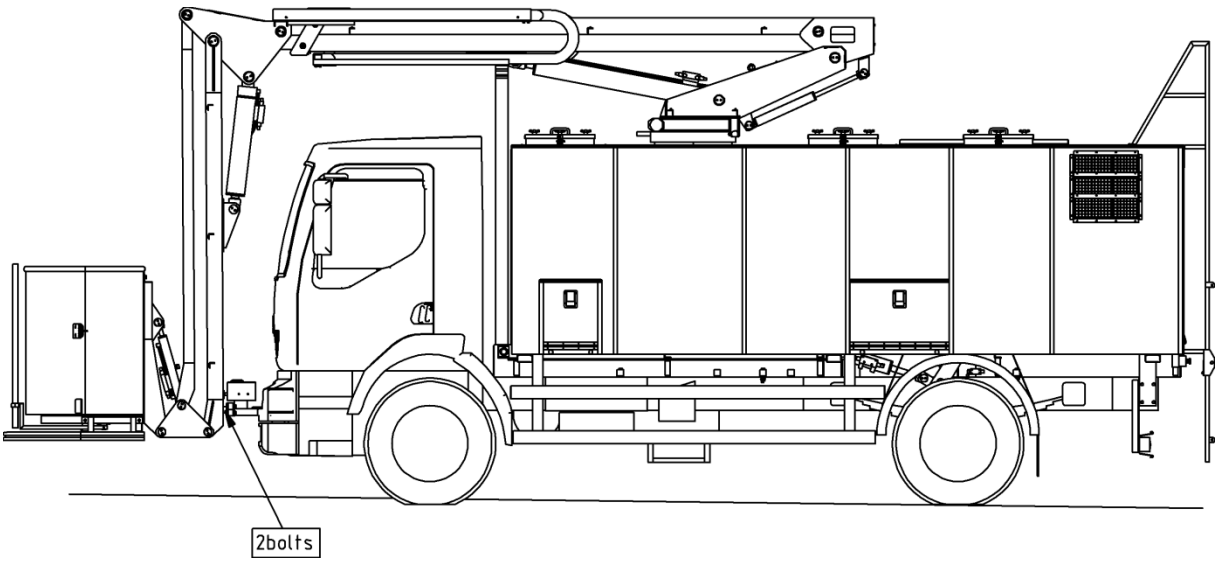
- Check the fuses.
- Check whether the wiring on the switches and in the clamps is in place.

HYDRAULIC FAULT

- When, regardless of the position of the selector switch, the movement is always the same, the magnetic valve concerned has got stuck (e.g. as a result of dirt in the oil). This fault is usually solved by manually operating the valve a couple of times.
- If only the swinging movement is possible, then this is probably caused by a slide in the proportional valve being stuck. Clean the valve.

## 3. OTHER

- Dismantling the machine: before the machine is disassembled, the hydraulic oil must be removed from the hydraulic system and disposed of in accordance with the environmental regulations. Plastic and metal components must be separated. Have the machine disassembled by the manufacturer, the dealer or an authorized company.
- When moving the deicer over greater distances (for instance transport over public road) it is strongly recommended to fasten the upperarm to the support by means of 2 bolts.



## 4. OPTIONAL EXTRAS

*** START/STOP in combination with a START PROTECTION DEVICE**
With the START/STOP option, the vehicle's engine can be started and stopped from the basket.
The start protection device ensures that the vehicle cannot be started from the basket if the gearbox is not in neutral. The vehicle can also not be started if the engine is already running.

***AXLE LOCK**
It is only possible to use the de-icer if the rear axle has been locked.
The rear axle is automatically locked when the upper arm has been moved out of the transport position and is automatically unlocked again when the upper arm has been returned to the transport position.
If the axle is locked, all the de-icer movements are possible and it is also possible to drive the vehicle at a maximum speed of 6 km/h.
If the axle is unlocked, no de-icer movements are possible and it is possible to drive the vehicle at a speed greater than 6 km/h.

***BASKET DOOR SAFETY DEVICE**
Deicer movement is not possible, unless the basket door is closed.
Opening the basket door is impossible, if the basket is not in the rest position.

## 5. OVERVIEW OF THE STICKERS

Basket load (black on white)

205KG

max. + 45 kg

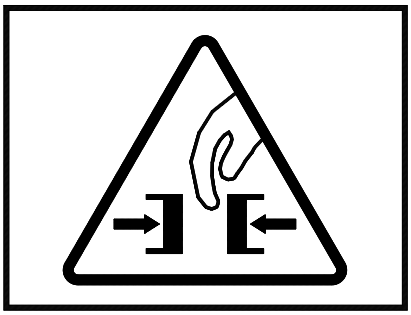
Basket load (white on blue)

Max wind and jet blast velocity: 20,6m/s
Max load in basket: 205 kg
Max 2 persons

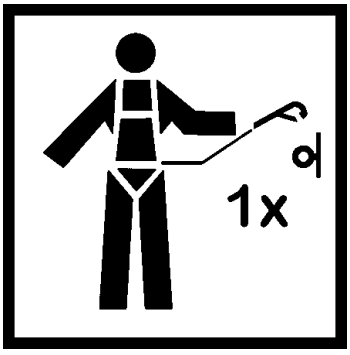
Toxic fluids (black on yellow)

Do not use with toxic fluids

Danger for trapping/shearing (black on yellow)



Attach belt (black on white)



Safety belt (black on yellow)

**MAINTENANCE/EMERGENCY OPERATION**

# ATTACH SAFETY BELT

Wheelforce (black on white)

**MAX. WHEELFORCE**

**11000 kg**

Pressure rear (black on white)

**PRESSURE**

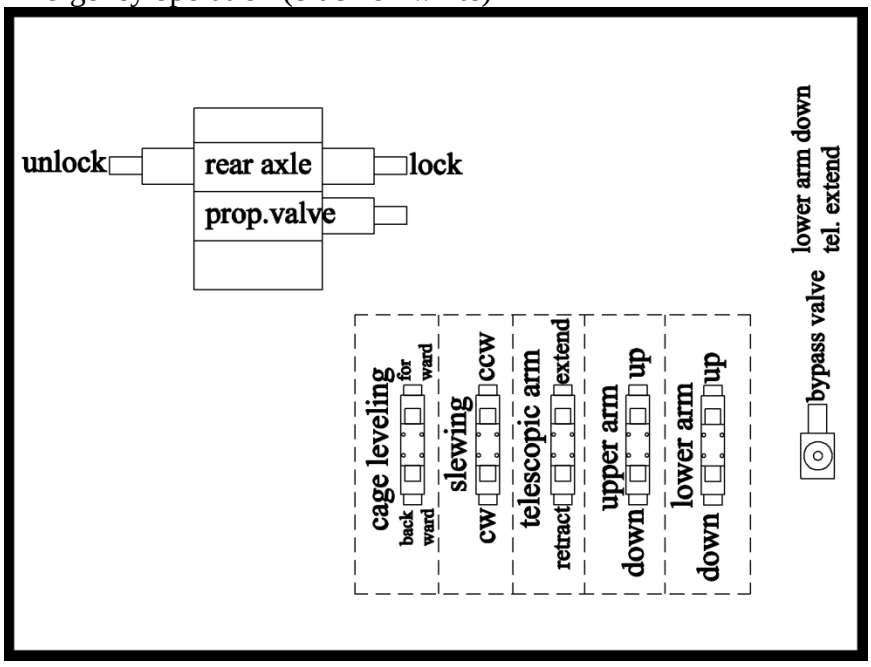
**5,75 BAR**

Pressure front (black on white)

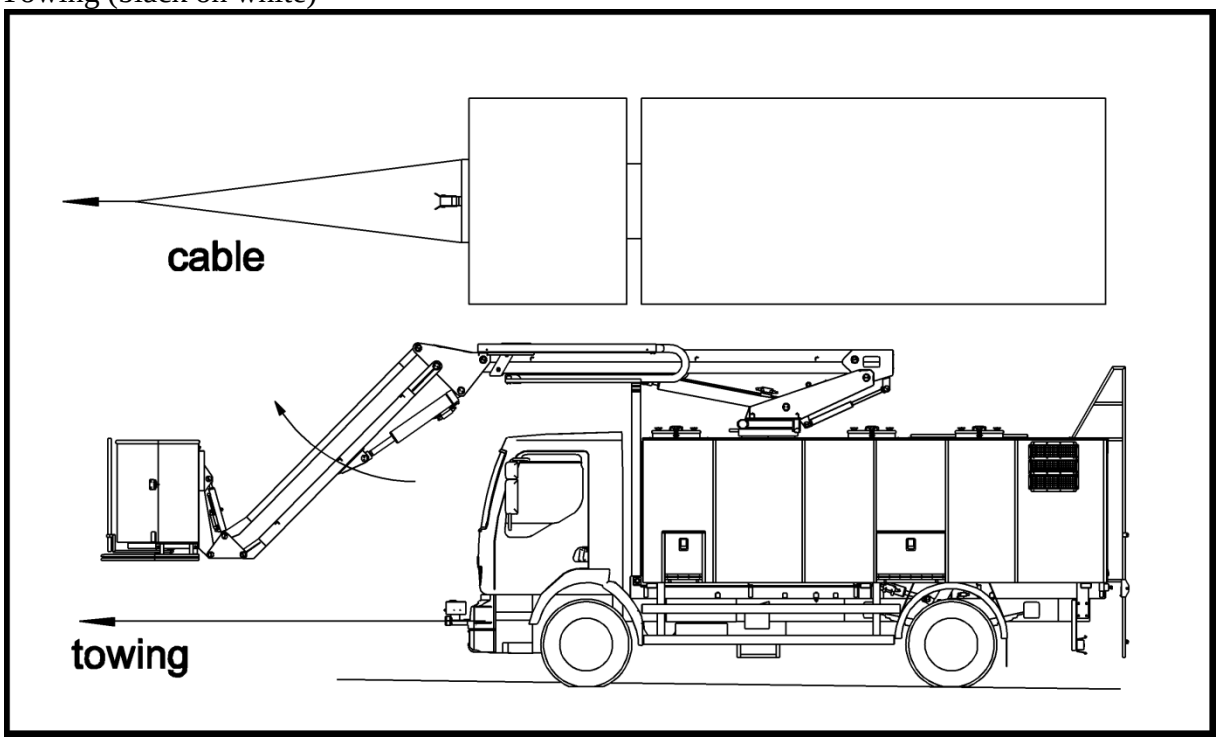
**PRESSURE**

**7,0 BAR**

Emergency operation (black on white)



Towing (black on white)




## REGULATIONS FOR USE

-the operator (minimum age 18) must know the contents of the use and operating regulations
-max. load is 205 kg or 2 persons plus 45 kg; the maximum basket load must not be exceeded
-do not use in a wind greater than wind force 8 Bft (20,6 m/s); max. permissible manual force: 300 N; max. tilt: 1,5°
-always use the hand brake when working with the platform
-only use on a horizontal, flat surface which is able to support the weight; if necessary, use bearing plates
-driving at height only allowed on flat surface, free of obstacles, holes, kerbs
-pay attention to the danger of becoming trapped, particularly near/under the basket
-only enter/exit basket using intended entrance; it is not permitted to enter/exit basket whilst it is at a height
-the operator must make sure that he or she does not put himself/herself or others in danger
-there must not be any obstacles in the hydraulic platform's lifting range
-the hydraulic platform must be used on a surface which will not affect the stability
-it is prohibited to work on or near live (electric) components
-it is prohibited to use the hydraulic platform as a hoisting crane
-it is prohibited to leave the hydraulic platform whilst it is in extended position
-it is forbidden to stand on the railing or to use ladders, scaffolding, etc. in the basket to gain extra height
-it is prohibited to use protruding loads; it is prohibited to increase size of the basket or the basket's wind surface
-avoid undesirable movements of the hydraulic platform's raised components during maintenance work

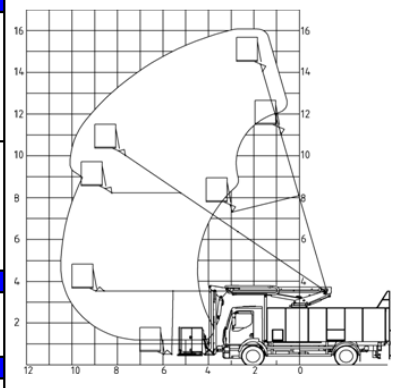
## OPERATION

*PUTTING INTO OPERATION*

-raise upper arm, until arm is free **and** until rear axle is locked
-raise lower arm, until arm is free
-every movement is now possible

*RETURNING TO TRANSPORT POSITION*

-retract telescopic arm
-slew to longitudinal axis of vehicle
-fully lower the bottom arm
-lower the upper arm until it rests in support




## DRIVING AT HEIGHT

-take care of sufficient view on basket
-maximum speed 6 km/h

## PLACING BASKET HORIZONTAL

-turn basket correction button to desired position
-activate with joystick

number 16350

CUSTERS

**Custers Hydraulica B.V.**
**Smakterweg 33 5804AE Venray**
**tel.: 0478 - 553000 www.custers.nl**

## EMERGENCY OPERATION

always disengage P.T.O. first during emergency operation

*PLATFORM* return to transport position as follows:

-when the main drive fails:
- -operate the switch for the desired movement
- -move the joystick out of the neutral position
- -switch on the emergency pump
- -OR pump with handpump

-for an electrical fault:
- -activate the bypass valve (when moving lower arm down or telescopic arm out)
- -activate the relevant magnetic valve
- -pump using the hand pump

## EMERGENCY OPERATION

*REAR AXLE* return to transport position as follows:
- -PTO must be engaged
- -turn corresponding button to the right

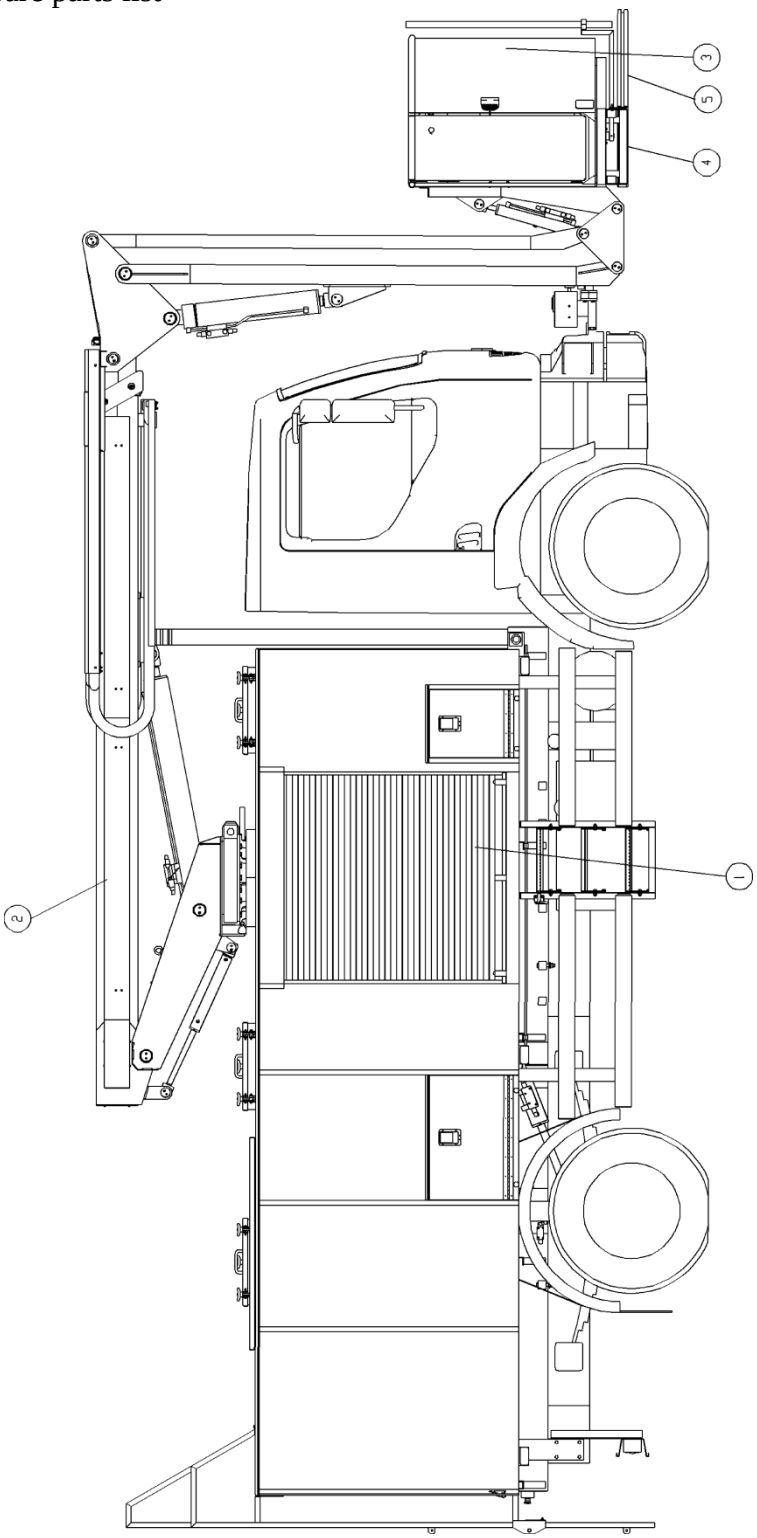
## EM. LOWERING WITH BUTTON

-pay attention for obstacles under lowering deicer
-pull button lowering the bottom arm

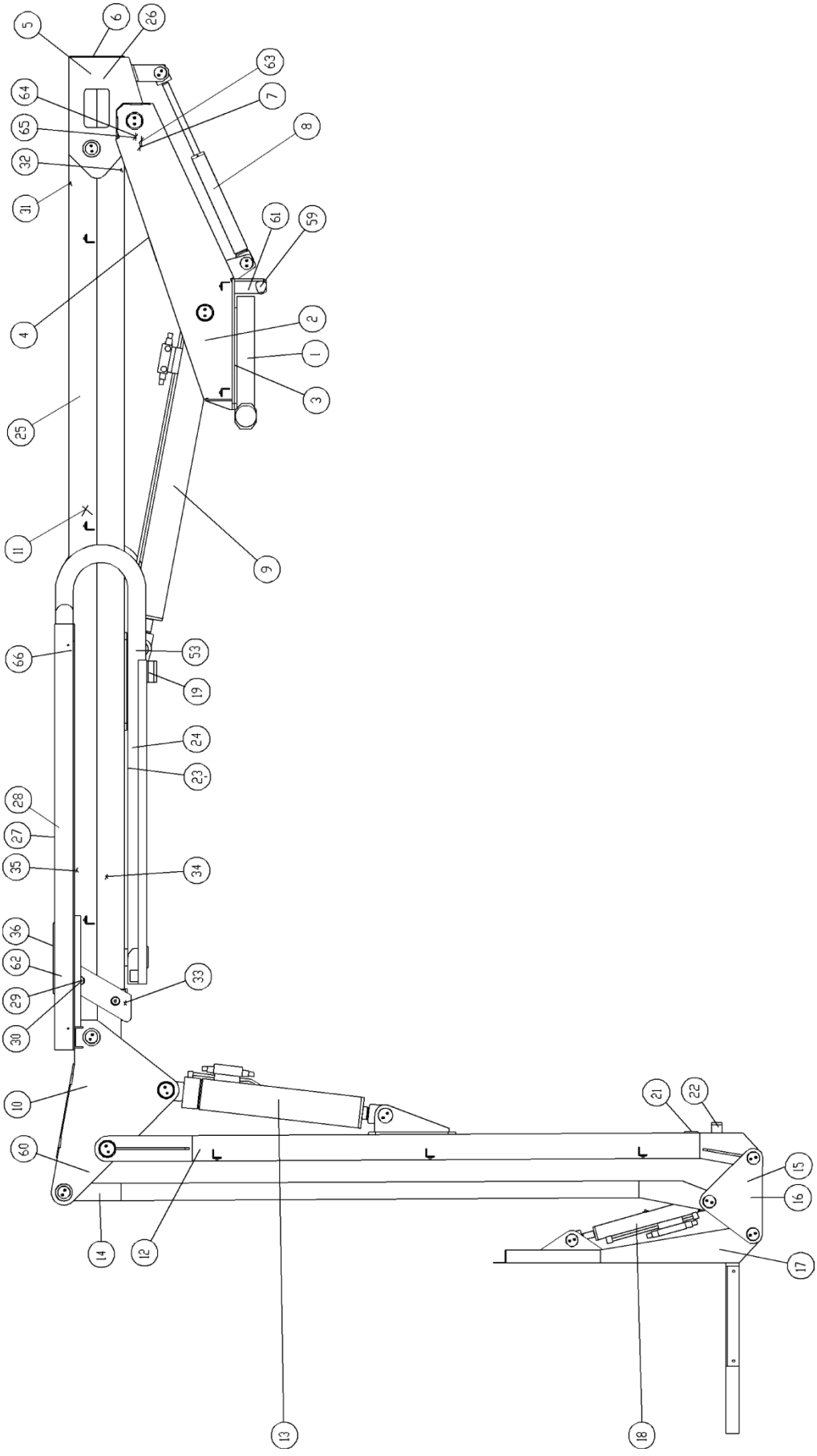
## WARNING

the safety devices wil not work during emergency operation in case of an electrical fault;
therefore only make movements in a safe direction

**APPENDIX:** Spare parts list




| | | | |
|---|---|---|---|
| 5 | 1 | bump protection | 7113110010 |
| 4 | 1 | stairs | 7100110255 |
| 3 | 1 | basket | 7100110240 |
| 2 | 1 | de-icer elevator | 7116012300 |
| 1 | 1 | de-icer truck | 7113410001 |
| pos | qty | part | number |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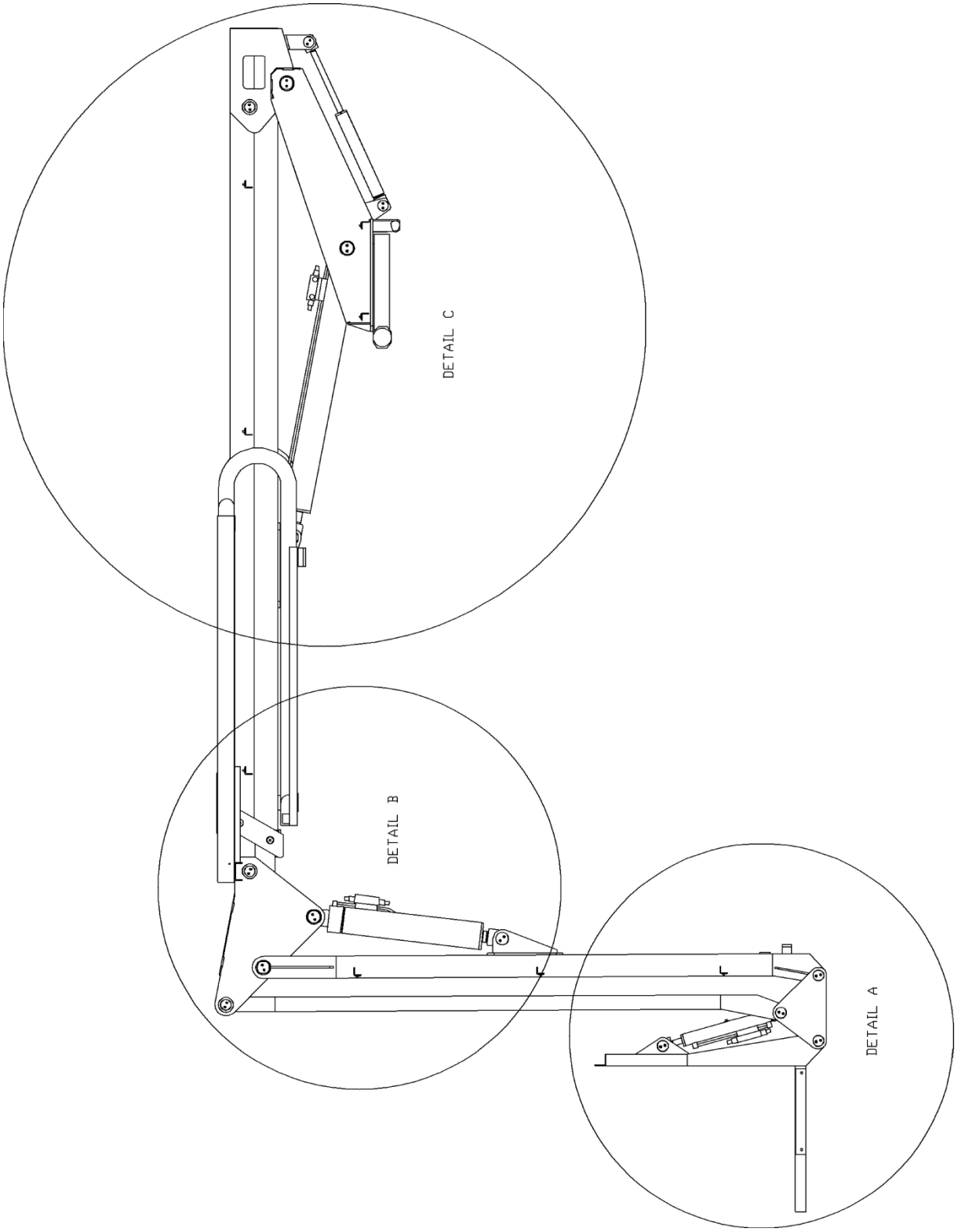
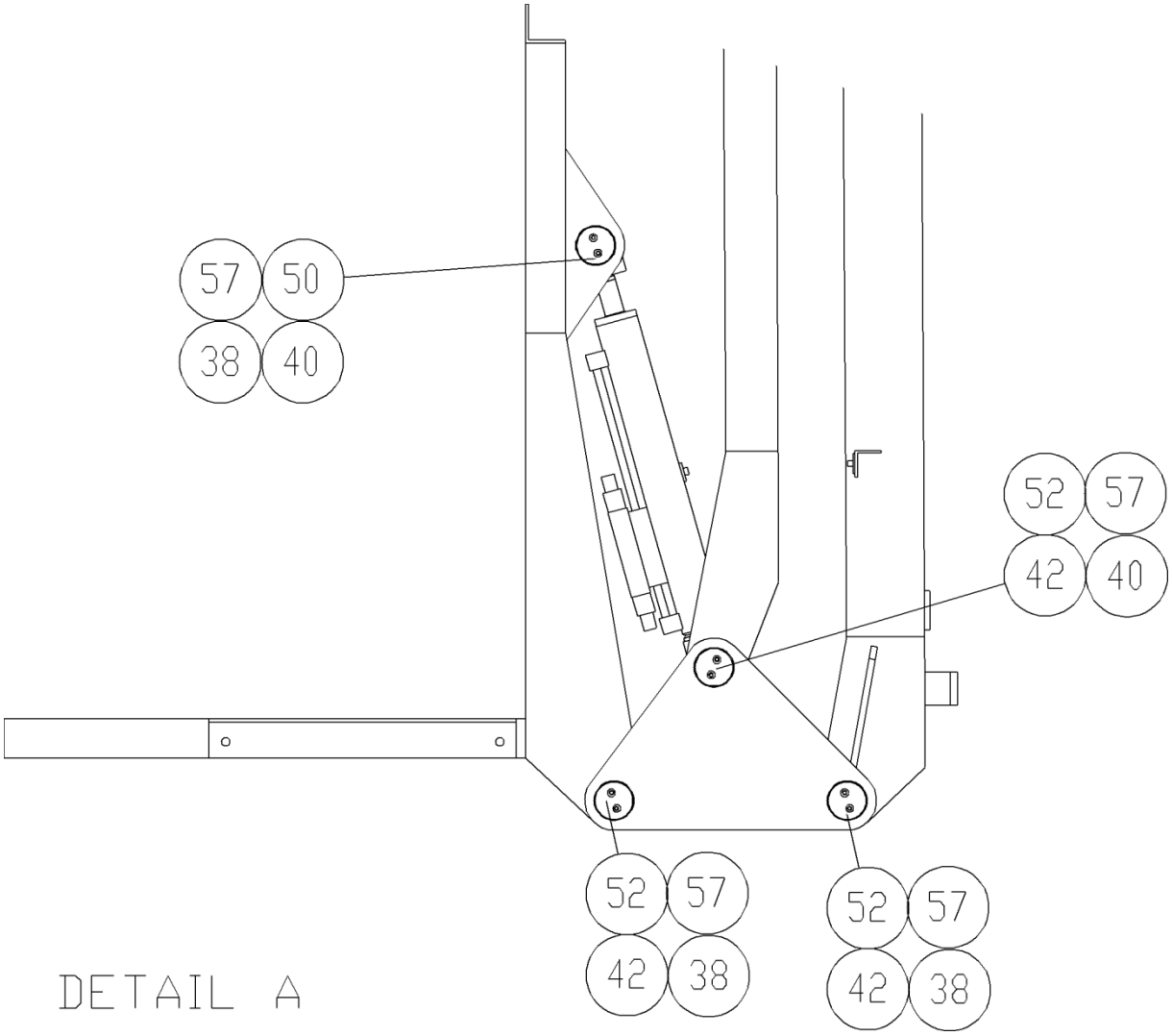

DETAIL C
DETAIL B
DETAIL A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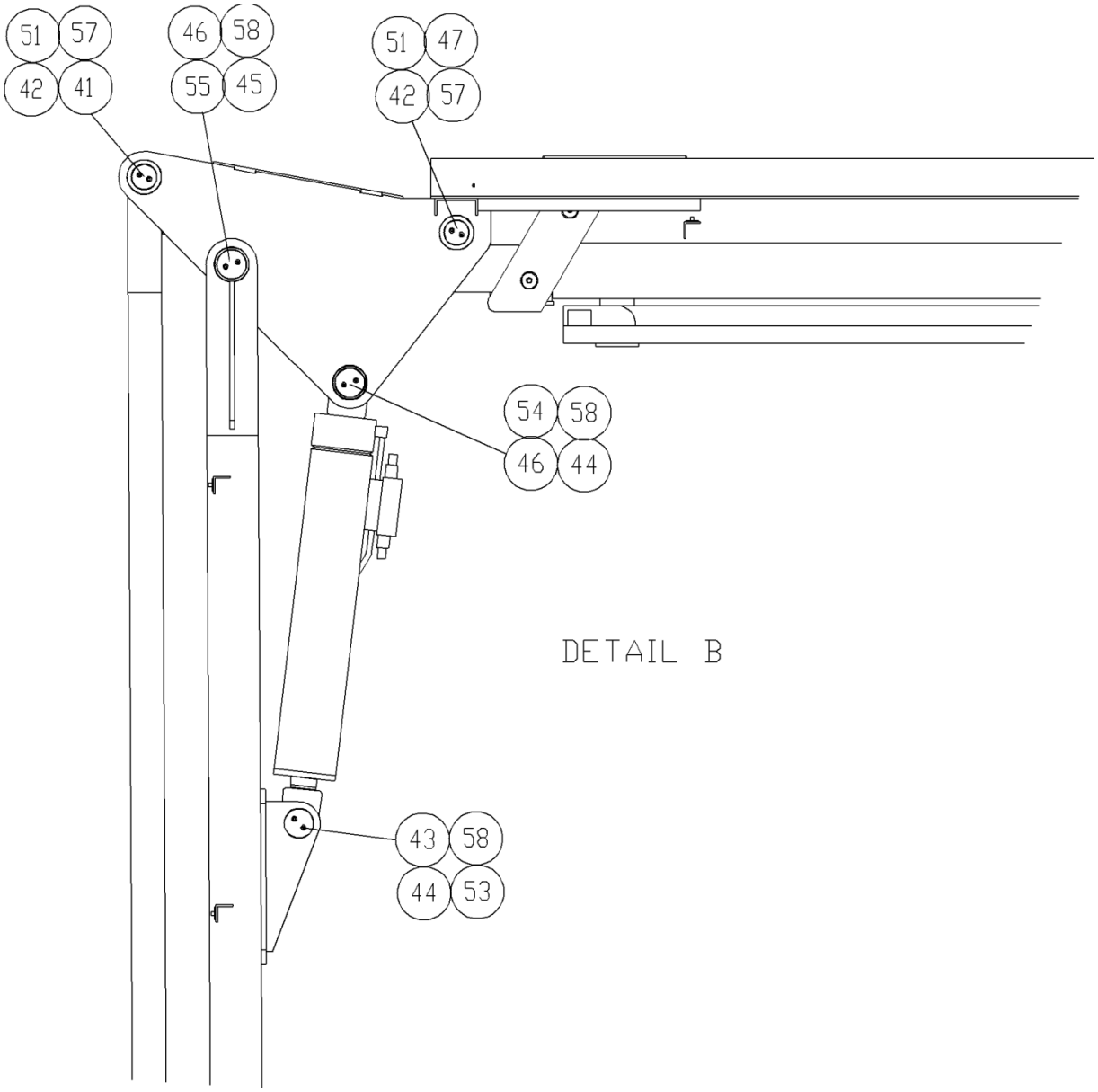
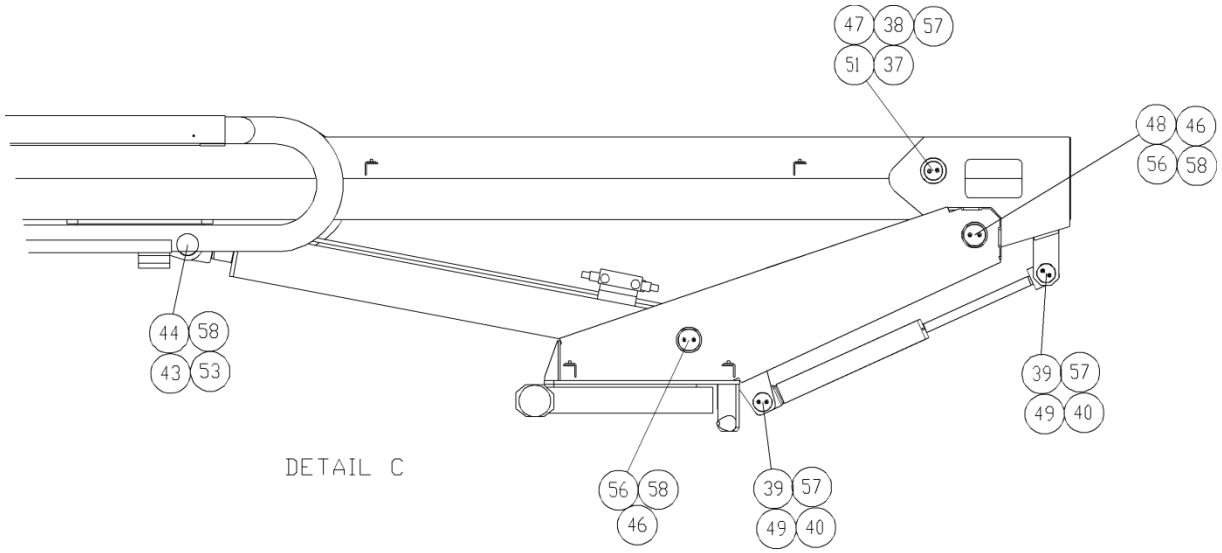
DETAIL A

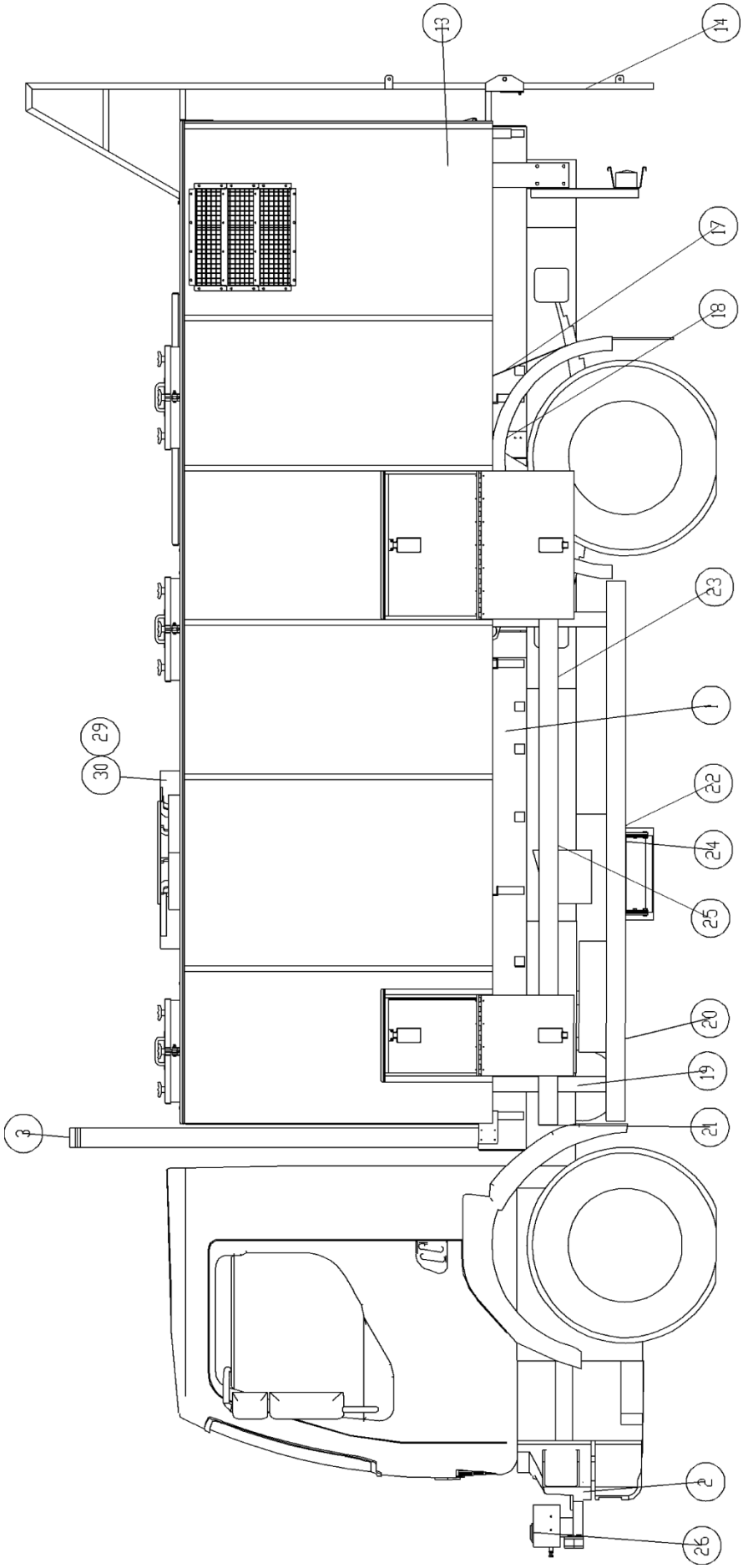



DETAIL B




DETAIL C

| 66 | 2 | tiewrap plate | 3100_ZB-IGUS |
|---|---|---|---|
| 65 | 3 | switch lever | 4213100120-REF |
| 64 | 3 | switch head | 4213100113-REF |
| 63 | 3 | switch body | 4213100107-REF |
| 62 | 2 | switch | 4212061020-REF |
| 61 | 1 | sensor | 4212013125-REF |
| 60 | 1 | sensor | 4212013084-REF |
| 59 | 2 | buffer | 6405035508 |
| 58 | 12 | lockplate | 7901035053 |
| 57 | 18 | lockplate | 7901035043 |
| 56 | 2 | shaft 50 x 570 | 7901151570 |
| 55 | 1 | shaft 50 x 300 | 7901151300 |
| 54 | 1 | shaft 50 x 230 | 7901151230 |
| 53 | 2 | shaft 50 x 120 | 7901151120 |
| 52 | 3 | shaft 40 x 380 | 7901141380 |
| 51 | 3 | shaft 40 x 230 | 7901141230 |
| 50 | 1 | shaft 40 x 140 | 7901141140 |
| 49 | 2 | shaft 40 x 100 | 7901141100 |
| 48 | 2 | bearing | 6141505550 |
| 47 | 2 | bearing | 6141404430 |
| 46 | 14 | bearing | 6140505550 |
| 45 | 2 | bearing | 6140505550-37 |
| 44 | 6 | bearing | 6140505550-35 |
| 43 | 4 | bearing | 6140505550-18 |
| 42 | 12 | bearing | 6140404450 |
| 41 | 2 | bearing | 6140404450-35 |
| 40 | 8 | bearing | 6140404450-26 |
| 39 | 4 | bearing | 6140404450-18 |
| 38 | 8 | bearing | 6140404440 |
| 37 | 4 | bearing | 6140404430 |
| 36 | 1 | cover | 7100730223 |
| 35 | 1 | block | 7902910907 |
| 34 | 1 | block | 7902910903 |
| 33 | 1 | sliding plate | 7100222078 |
| 32 | 1 | sliding plate | 7100222051 |
| 31 | 1 | sliding plate | 7100222050 |
| 30 | 2 | pin ø35 | 7100222012 |
| 29 | 4 | pin ø24 | 7100222011 |
| 28 | 1 | cover | 7100222338 |
| 27 | 1 | cover | 7100222337 |
| 26 | 1 | cover | 7100222336 |
| 25 | 2 | cover | 7100222335 |
| 24 | 1 | track 2 (De-Icer) | 7116222317 |
| 23 | 1 | track 1 (De-Icer) | 7116222316 |
| 22 | 1 | rack | 7100400152 |
| 21 | 1 | plate | 7100730270 |
| 20 | 1 | support | 7112352012 |
| 19 | 1 | sliding plate | 7100412148 |
| 18 | 1 | cilinder | 7912050024 |
| 17 | 1 | cage support | 7100122300 |
| 16 | 1 | level (2) | 7100262305 |
| 15 | 1 | level (1) | 7100262300 |
| 14 | 1 | parallelrod | 7100261300 |
| 13 | 1 | cilinder | 7912125005 |
| 12 | 1 | upperarm | 7100212300 |
| 11 | 1 | cilinder | 7912070025 |
| 10 | 1 | telescop arm 2 | 7116222310 |
| 9 | 1 | cilinder | 7912125004 |
| 8 | 1 | cilinder | 7912050023 |
| 7 | 1 | support | 7100222331 |
| 6 | 1 | cover | 7116222309 |
| 5 | 1 | telescop arm1 | 7116222300 |
| 4 | 1 | cover | 7113312019 |
| 3 | 1 | support | 7113312001 |
| 2 | 1 | turntable | 7113312010 |
| 1 | 1 | swiveldrive | 5387000419 |
| pos | qty | part | number |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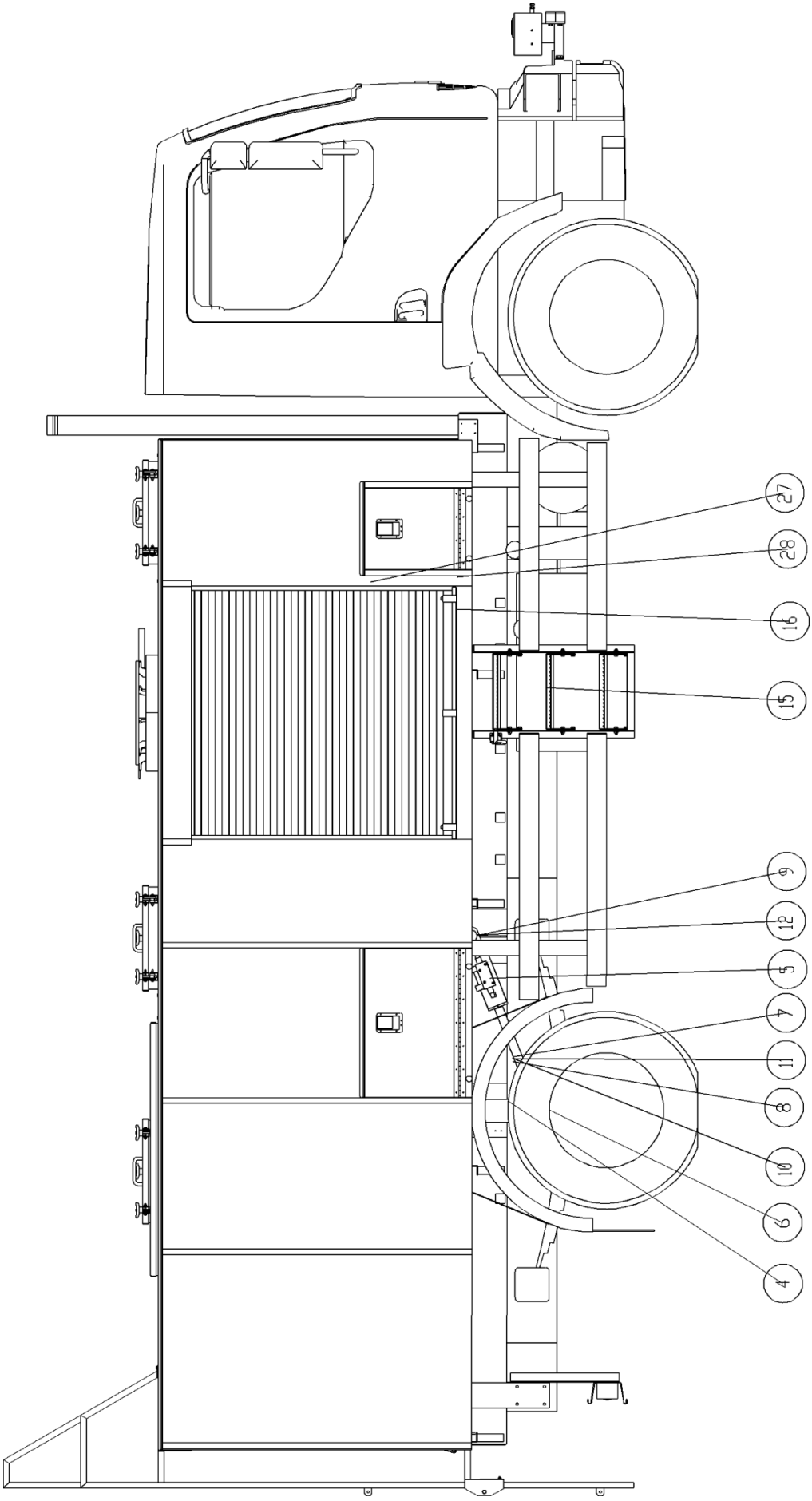
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| 30 | 1 | cover column | 7113730011 |
|---|---|---|---|
| 29 | 1 | cover column | 7113730010 |
| 28 | 1 | pump lever | 7908010120 |
| 27 | 1 | level | 5750030000-REF |
| 26 | 1 | Waterpas | 6411000100 |
| 25 | 1 | side protection | 7100882900 |
| 24 | 1 | side protection | 7100882810 |
| 23 | 1 | side protection | 7100881375 |
| 22 | 1 | side protection | 7100881305 |
| 21 | 1 | side protection | 7100881095 |
| 20 | 1 | side protection | 7100881075 |
| 19 | 4 | support | 7100870102 |
| 18 | 2 | mudguard | SPATSC_DEICER |
| 17 | 4 | support | 7100870128 |
| 16 | 1 | support | 7113870007 |
| 15 | 1 | stairs | 7113412004 |
| 14 | 1 | stairs | 7100870310 |
| 13 | 1 | materialbox | 7113870010 |
| 12 | 4 | lock plate | 7901035053 |
| 11 | 4 | lock plate | 7901035043 |
| 10 | 2 | shaft | 7901141090 |
| 9 | 8 | bearing | 6140505540-21 |
| 8 | 4 | bearing | 6140404450-22 |
| 7 | 4 | bearing | 6140404450-19 |
| 6 | 2 | catch for hook | 7113420060 |
| 5 | 2 | cilinder | 7912090025 |
| 4 | 2 | hook | 7113420050 |
| 3 | 1 | sliding plate | 7100412147 |
| 2 | 1 | support up.arm | 7113412030 |
| 1 | 1 | frame | 7113412010 |
| pos | qty | part | number |

*** END OF DOCUMENT ***