



# CHAPTER 2

## MAINTENANCE

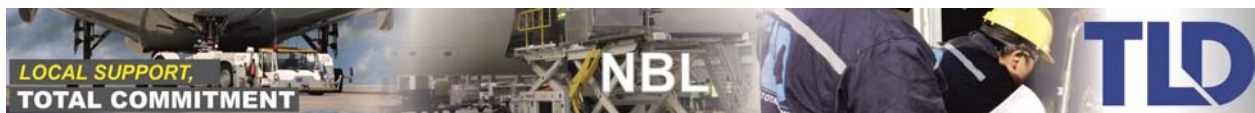


# NBL

Original manual



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## 0-TABLE OF CONTENTS

0- TABLE OF CONTENTS .....	3
1- MAINTENANCE.....	1
1-1- INSTRUCTIONS FOR CLEANING .....	1
1-2- MAINTENANCE TABLES.....	2
1-2-1- COMMISSIONING – 1ST WEEK.....	3
1-2-2- COMMISSIONING – 50H .....	3
1-2-3- DAILY CHECKS ON VEHICLE CONDITION .....	4
1-2-4- 500 H CHECKS ON VEHICLE CONDITION .....	5
1-2-5- 500 H CHECKS ON VEHICLE CONDITION (CONT) .....	6
1-2-6- 1000 HRS OR 1 YEAR CHECK (whichever occurs first) - VEHICLE MAINTENANCE .....	7
1-2-7- 2000 HRS OR 2 YEARLY CHECK (whichever occurs first) - VEHICLE MAINTENANCE.....	8
1-2-8- 3,000 HRS OR 5 YEAR CHECK (whichever occurs first) - VEHICLE MAINTENANCE .....	9
1-2-9- 14,000 HRS OR 7 YEAR CHECK (whichever occurs first) - VEHICLE MAINTENANCE .....	10
1-2-10- WHEELS.....	11
1-3- MAINTENANCE OPERATIONS.....	12
1-3-1- MAINTENANCE WORK WITH VEHICLE IN RAISED POSITION (WORKING BENEATH VEHICLE) .....	13
1-3-2- GREASES, LUBRICATION AND OTHER LIQUIDS .....	14
1-3-3- OIL QUALITY .....	15
1-3-4- LUBRICATION.....	16
1-3-5- LEVELS.....	17
1-3-6- CHECKING, DRAINING AND FILLING THE DIFFERENTIAL OIL .....	19
1-4- ELECTRICAL / HYDRAULIC DIAGRAMS .....	20
1-4-1- ELECTRICAL DIAGRAM .....	20
1-4-2- HYDRAULIC DIAGRAM .....	20
2- TROUBLESHOOTING .....	1
2-1- EMERGENCY MANOEUVRES - VEHICLE EVACUATION - TOWING.....	1
2-1-1- MANUAL EMERGENCY COMMANDS .....	1
2-1-2- VEHICLE ELEVATION - PARKING BRAKE:.....	4
2-2- DIAGNOSTIC.....	6
2-2-1- DIAGNOSTIC TABLES.....	6
3- REPAIRS .....	1
3-1- TIGHTENING TORQUE .....	1
3-1-1- GENERAL .....	1
3-2- DOCUMENTS ACCESSIBLE ON THE TLD SITE .....	2
3-2-1- FACTORY PARAMETERS, CE CERTIFICATE, LOAD TEST REPORT .....	2
3-3- SETTINGS .....	3
3-3-1- CHECKING AND ADJUSTING THE FRONT AXLE BALANCE .....	3
3-3-2- HYDRAULIC CAP TIGHTENING TORQUE .....	4
3-3-3- PARKING BRAKE CABLE TENSION ADJUSTMENT .....	4
3-3-4- BELT CENTRING AND TENSION .....	5
3-3-5- BOOM ANTI-PINCH PROTECTION ADJUSTMENT .....	10
3-3-6- FRONT BRAKE - MAINTENANCE AND REPAIRS .....	11
3-4- ASSEMBLY - DISASSEMBLY.....	18
3-4-1- INFORMATION ON ASSEMBLING THE BELT.....	18
3-4-2- MOUNTING THE BELT .....	19
3-4-3- MOUNTING THE BELT (CONT) .....	20
3-4-4- MOUNTING THE BELT (CONT) - TENSION (SEE ADJUSTMENTS).....	20
3-4-5- REMOVING THE FRONT ROLLER ("GLUED BELT" VERSION) .....	21
3-4-6- MOUNTING THE BOOM .....	22
3-4-7- INSTRUCTIONS FOR FITTING AND MAINTAINING THE FENNER TENSION METER TO MEASURE THE BELT TENSION.....	27



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## 1-MAINTENANCE

### 1-1-INSTRUCTIONS FOR CLEANING

To clean the equipment, clean normally (HIGH PRESSURE JET WASHERS NOT RECOMMENDED) taking care to protect the electrical components, the manufacturer's identification plate, back-up equipment and adhesive labels.

Take care to prevent water entering the air filter and the air vents from the hydraulic reservoir and fuel tanks.

To clean electrical parts: use an appropriate suction device.

Use appropriate products to clean mechanical parts.

Clean batteries to prevent salt formation and stray currents which could lead to serious damage. Wash the tops of the batteries without removing the plugs in order to prevent water and contaminants entering the cells.

Keep the cab clean and tidy in order to prevent potential accidents.



**WARNING:**

**ALWAYS REFER TO THE MANUFACTURER'S INSTRUCTIONS FOR USE WHEN USING CLEANING PRODUCTS AND WEAR SUITABLE PROTECTIVE CLOTHING.**

## 1-2-MAINTENANCE TABLES

The TLD spare parts department can supply, on request, a list of spare parts recommended for periodic maintenance. See the information manual for contact details.

If required:

- Change the hydraulic oil and filters after replacing a hydraulic component.
- Change the rear axle oil after repairing/maintaining them.
- Change the gearbox oil and filter after repairing/maintaining it.



**REMARK:**

**WE WOULD ACCEPT A +/- 10% DEVIATION ON MAINTENANCE INTERVAL SCHEDULE FOR OUR EQUIPMENT.**

**ANYHOW, FOR EQUIPMENT USED IN HARSH ENVIRONMENT WITH DUST, LOW FUEL QUALITY, WITH DEMANDING APPLICATIONS AND TOUGH DUTY CYCLES, OR IN CASES OF USAGE WITH EXTREME WEATHER CONDITIONS, THE MAINTENANCE INTERVAL MAY HAVE TO BE REDUCED AND ADAPTED.**



**WARNING:**

**ANY DAMAGE MUST BE INDICATED TO THE RELEVANT AUTHORITIES.**



**WARNING:**

**USERS ARE RESPONSIBLE FOR THEIR OWN MACHINE.  
FAILURE TO RETURN IT IN GOOD CONDITION MAY ENDANGER THE NEXT USER.  
IT IS THEREFORE IMPORTANT TO RESPECT THE ELEMENTARY RULES.**



**IMPORTANT:**

**DURING CHECKS OR INSPECTIONS: IF A LEVEL IS TOO LOW, A PART, A SETTING OR A MECHANISM IS DEFECTIVE, CARRY OUT THE UPGRADE, REPLACEMENT OR REPAIR OPERATIONS NECESSARY.**



**IMPORTANT:**

**THE INSPECTION FREQUENCIES FOR THE ENGINES IN THE MAINTENANCE TABLES ARE PROVIDED FOR INFORMATION PURPOSES ONLY AND DO NOT REPLACE THE ENGINE PRODUCERS' RECOMMENDATIONS IN CHAPTER 5.**



**DANGER:**

**RISK OF BURNING HOT ENGINE, NOTABLY ON THE EXHAUST.**





### 1-2-1-COMMISSIONING – 1ST WEEK

Vehicle number: _____	Hour meter _____	Date: _____ / /
Start time _____	End time: _____	INITIALS: _____
<input checked="" type="checkbox"/> Checked as OK <input type="checkbox"/> Final adjustment <input type="checkbox"/> Requires repair		

CHECKED?	TASKS TO BE CARRIED OUT	PROCEDURE REFERENCE	TOOLING / PARTS REQUIRED	REMARKS
<input type="checkbox"/>	Check the visual condition of the vehicle on delivery (impacts, scratches).			
<input type="checkbox"/>	Check the routing of hydraulic hoses, electrical cables under the cab and re-secure them if necessary.			
	<b>WHEELS</b>			
<input type="checkbox"/>	Check the tightness of the wheels.	Chap 2		
	<b>ENGINE</b>			
<input type="checkbox"/>	Apply the manufacturer's inspection plan	Chap 5		
<input type="checkbox"/>	Check the engine supports.			
<input type="checkbox"/>	Check the attachments, duct connectors/collars.			
	<b>HYDRAULICS</b>			
<input type="checkbox"/>	Check that there are no leaks present.			
<input type="checkbox"/>	Re-tighten connections if necessary.			

### 1-2-2-COMMISSIONING – 50H

Vehicle number: _____	Hour meter _____	Date: _____ / /
Start time _____	End time: _____	INITIALS: _____
<input checked="" type="checkbox"/> Checked as OK <input type="checkbox"/> Final adjustment <input type="checkbox"/> Requires repair		

CHECKED?	TASKS TO BE CARRIED OUT	PROCEDURE REFERENCE	TOOLING / PARTS REQUIRED	REMARKS
	<b>WHEELS</b>			
<input type="checkbox"/>	Check the tightness of the wheels.	Chap 2		
	<b>GEARBOX</b>			
<input type="checkbox"/>	Apply the manufacturer's inspection plan (drain, oil level, ...)	Chap 5		



## 1-2-3-DAILY CHECKS ON VEHICLE CONDITION

Vehicle number: \_\_\_\_\_ Hour meter \_\_\_\_\_ Date: \_\_\_\_\_ / /

Start time \_\_\_\_\_ End time: \_\_\_\_\_ INITIALS: \_\_\_\_\_

☒ Checked as OK

☐ Final adjustment

☐ Requires repair

CHECKED?	TASKS TO BE CARRIED OUT	PROCEDURE REFERENCE	TOOLING / PARTS REQUIRED	REMARKS
<input type="checkbox"/>	Extinguisher check, validity date and presence of clip (depending on versions).			
<input type="checkbox"/>	Drive and test all functions (brakes, hydrostatics, steering, warning device, buzzer etc.)			
<input type="checkbox"/>	Check the front and rear lighting and the working, indicator and stop lights.			
<input type="checkbox"/>	Check that there are no leaks under the vehicle.			
<input type="checkbox"/>	Clean the working position.			
<input type="checkbox"/>	The correct adjustment for the rear view mirror(s)			
<input type="checkbox"/>	The horn's operation			
<input type="checkbox"/>	The correct mechanical operation of the barriers			
<input type="checkbox"/>	The operation of the reversing buzzer			
<input type="checkbox"/>	Make sure that the boom protections are present and adjusted (see § "ADJUSTMENT")			





## 1-2-4-500 H CHECKS ON VEHICLE CONDITION

Vehicle number: _____	Date: _____ / /
Start time: _____	End time: _____ INITIALS: _____
<input checked="" type="checkbox"/> Checked as OK	<input type="checkbox"/> Final adjustment
<input type="checkbox"/> Requires repair	

CHECKED?	TASKS TO BE CARRIED OUT	PROCEDURE REFERENCE	TOOLING / PARTS REQUIRED	REMARKS
	<b>ENGINE</b>			
<input type="checkbox"/>	Apply the manufacturer's inspection plan	Chap 5		
<input type="checkbox"/>	Oil change and filter change.	Chap 5		
<input type="checkbox"/>	Check the condition of the engine, radiator (depending on version) and silencer attachments.			
	<b>GEARBOX</b>			
<input type="checkbox"/>	Apply the manufacturer's inspection plan (replace the filter, oil level, ...)	Chap 5		
	<b>BRAKING</b>			
<input type="checkbox"/>	Check the level of brake fluid			
<input type="checkbox"/>	Check the pedal clearance.			
<input type="checkbox"/>	Check the brake hoses and pipes			
<input type="checkbox"/>	Check the service brake efficiency			
<input type="checkbox"/>	Check the efficiency of the parking brake and the cable condition.			
<input type="checkbox"/>	Check the wear on the front brake disks and pads.			
	<b>WHEELS</b>			
<input type="checkbox"/>	Retighten the wheel nuts.	Chap 2		
<input type="checkbox"/>	Check the wear on the tyres (check there are no cuts or cracks).			
	<b>LUBRICATION</b>			
<input type="checkbox"/>	Lubricate according to plan	Chap 2		
	<b>ELECTRICAL EQUIPMENT</b>			
<input type="checkbox"/>	Check the operation of the electricity equipment, the emergency stops and the lighting.			
<input type="checkbox"/>	Battery charge condition, check connections, clean terminals and protect them with Vaseline.			
<input type="checkbox"/>	Connection condition.			
<input type="checkbox"/>	Check all fuses; replace them if necessary.			



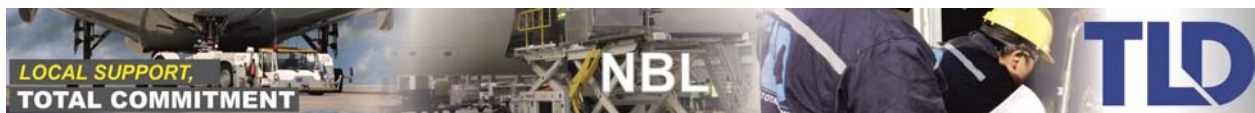
## 1-2-5-500 H CHECKS ON VEHICLE CONDITION (CONT)

Vehicle number: \_\_\_\_\_ Date: \_\_\_\_\_ / /

Start time: \_\_\_\_\_ End time: \_\_\_\_\_ INITIALS: \_\_\_\_\_

☒ Checked as OK
 ☐ Final adjustment
 ☐ Requires repair

CHECKED?	TASKS TO BE CARRIED OUT	PROCEDURE REFERENCE	TOOLING / PARTS REQUIRED	REMARKS
	<b>HYDRAULIC EQUIPMENT</b>			
<input type="checkbox"/>	Check the clogging indicator for the filtering elements and replace them if necessary	Chap 2		
<input type="checkbox"/>	Check the hydraulic tank level	Chap 2		
<input type="checkbox"/>	Check the condition of the hoses.			
<input type="checkbox"/>	Check that there are no leaks			
<input type="checkbox"/>	Check the condition of the cylinders			
	<b>BOOM</b>			
<input type="checkbox"/>	Check the max boom protection dimensions and adjust them if necessary.			
<input type="checkbox"/>	Check that the guard rails are locked in up position			
<input type="checkbox"/>	Check the locking and sliding of the guard rails extensions.			
<input type="checkbox"/>	Check the condition of the guard rails hinges			
<input type="checkbox"/>	Check the condition of the belt and replace if necessary. When changing belt, check condition of grid support and bearings. Replace if necessary. It is suggested to replace the bearings when a belt change is done as preventive maintenance.			
	<b>LIFTING SYSTEM</b>			
<input type="checkbox"/>	Check the condition of the structures			
<input type="checkbox"/>	Check that there are no cracks on the welds			
	<b>STAIRS</b>			
<input type="checkbox"/>	Check the condition of the anti-slip strips			
	<b>CAB (DEPENDING ON VERSIONS)</b>			
<input type="checkbox"/>	Check the windscreen wipers and replace them if worn.			



**1-2-6-1000 HRS OR 1 YEAR CHECK (WHICHEVER OCCURS FIRST) - VEHICLE MAINTENANCE**

Vehicle number: \_\_\_\_\_ Date: \_\_\_\_\_ / /

Start time \_\_\_\_\_ End time: \_\_\_\_\_ INITIALS: \_\_\_\_\_

☒ Checked as OK

☐ Final adjustment

☐ Requires repair

CHECKED?	TASKS TO BE CARRIED OUT	PROCEDURE REFERENCE	TOOLING / PARTS REQUIRED	REMARKS
<input type="checkbox"/>	<b>Carry out the 500 hours recommended operations</b>			
	<b>AXLE</b>			
<input type="checkbox"/>	Check the steering play			
	<b>ELECTRICAL EQUIPMENT</b>			
<input type="checkbox"/>	Checks on condition of the electrical cables (fastenings, friction, corrosion).			
	<b>HYDRAULIC EQUIPMENT</b>			
<input type="checkbox"/>	Check for wear on hoses and replace if necessary.			
<input type="checkbox"/>	Replacement of the filtering element(s)	Chap 2		
	<b>CHASSIS</b>			
<input type="checkbox"/>	Check the condition of welds.			
<input type="checkbox"/>	Touch up paint-work.			
	<b>DIESEL TANK</b>			
<input type="checkbox"/>	Check and clean the tank's venting.			
	<b>BRAKING</b>			
<input type="checkbox"/>	Check that the pedal is hard and the braking is ok.			
	<b>GEARBOX</b>			
<input type="checkbox"/>	Apply the manufacturer's inspection plan (drain, ...)	Chap 5		



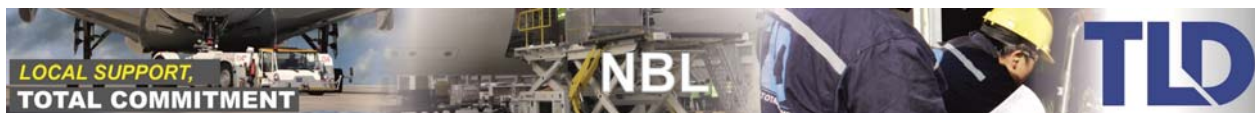
**1-2-7-2000 HRS OR 2 YEARLY CHECK (WHICHEVER OCCURS FIRST) - VEHICLE MAINTENANCE**

Vehicle number: \_\_\_\_\_ Hour meter \_\_\_\_\_ Date: \_\_\_\_\_ / /

Start time \_\_\_\_\_ End time: \_\_\_\_\_ INITIALS: \_\_\_\_\_

☒ Checked as OK
 ☐ Final adjustment
 ☐ Requires repair

CHECKED?	TASKS TO BE CARRIED OUT	PROCEDURE REFERENCE	TOOLING / PARTS REQUIRED	REMARKS
<input type="checkbox"/>	<b>Carry out the 500 and 1000 hours operations</b>			
	<b>ENGINE</b>			
<input type="checkbox"/>	Apply the manufacturer's inspection plan	Chap 5		
<input type="checkbox"/>	Check the engine supports and support silencer.			
	<b>HYDRAULIC EQUIPMENT</b>			
<input type="checkbox"/>	Change the oil			
<input type="checkbox"/>	Remove and clean the magnetic drain plug (depending versions)			
	<b>BRAKING</b>			
<input type="checkbox"/>	Replace the brake fluid and purge the circuit.			
	<b>STEERING</b>			
<input type="checkbox"/>	Check that there are no leaks and check the attachment of the unit and hoses.			
	<b>REAR AXLE</b>			
<input type="checkbox"/>	Drain the rear axle	Chap 5		
<input type="checkbox"/>	Check the degree of wear on the brake linings. Distance between linings and drums: 4.6 mm ± 1mm.	Chap 5		
	<b>ELECTRICAL EQUIPMENT</b>			
<input type="checkbox"/>	Check the density of the electrolyte in the battery			
	<b>HEATING (depending on version)</b>			
<input type="checkbox"/>	If valve 4200456 is installed on the vehicle, replace the seal.			



**1-2-8-3,000 HRS OR 5 YEAR CHECK (WHICHEVER OCCURS FIRST) - VEHICLE MAINTENANCE**

Vehicle number: _____	Hour meter _____	Date: _____ / /
Start time _____	End time: _____	INITIALS: _____
<input checked="" type="checkbox"/> Checked as OK <input type="checkbox"/> Final adjustment <input type="checkbox"/> Requires repair		

CHECKED?	TASKS TO BE CARRIED OUT	PROCEDURE REFERENCE	TOOLING / PARTS REQUIRED	REMARKS
<input type="checkbox"/>	Carry out the recommended 500, 1000 and 2000 hours operations			
	<b>PERKINS ENGINE</b>			
<input type="checkbox"/>	Apply the manufacturer's inspection plan	Chap 5		
	<b>DEUTZ ENGINE</b>			
<input type="checkbox"/>	Replace the notched belt	Chap 5		



**1-2-9-14,000 HRS OR 7 YEAR CHECK (WHICHEVER OCCURS FIRST) - VEHICLE MAINTENANCE**

Vehicle number: _____	Hour meter: _____	Date: _____ / /
Start time: _____	End time: _____	INITIALS: _____
<input checked="" type="checkbox"/> Checked as OK	<input type="checkbox"/> Final adjustment	<input type="checkbox"/> Requires repair

CHECKED?	TASKS TO BE CARRIED OUT	PROCEDURE REFERENCE	TOOLING / PARTS REQUIRED	REMARKS
<input type="checkbox"/>	<b>Carry out the recommended 500, 1000, 2000 and 3000 hours operations</b>			
	On request TLD can advise the user on a list of operations with the aim of extending the life of the equipment.			
	<b>HYDRAULIC EQUIPMENT</b>			
<input type="checkbox"/>	Change the hydraulic hoses, ensuring that the hoses and connectors are of appropriate quality: risk of injury and accidents in the event of them splitting.			Use only components approved by TLD
<input type="checkbox"/>	Check the operation of the pressure limiters			
	<b>STRUCTURES</b>			
<input type="checkbox"/>	Check for wear, fatigue and corrosion of structural components.			
	<b>FULL TEST</b>			
<input type="checkbox"/>	Running			
<input type="checkbox"/>	Braking			
<input type="checkbox"/>	Lighting			
<input type="checkbox"/>	Safeties			
<input type="checkbox"/>	Boom elevation / descent			
<input type="checkbox"/>	Front and rear belt rotation			

## 1-2-10-WHEELS

It is **IMPERATIVE** that you tighten to the recommended torque.

The tightening torque and the tyre inflation pressure are marked on a label pasted near them (or on an engraved plate).

1 – ANNUAL TYRE MONITORING ACTION: Each tyre must be monitored by a TYRE PROFESSIONAL at least once a year to detect any fatigue to the body or damage that may hinder the tyre's grip.

2 – RESPECT FOR THE DIAGNOSTIC & EXPIRY DATE: Any damaged tyre or tyre that presents signs of fatigue on the body must be replaced.

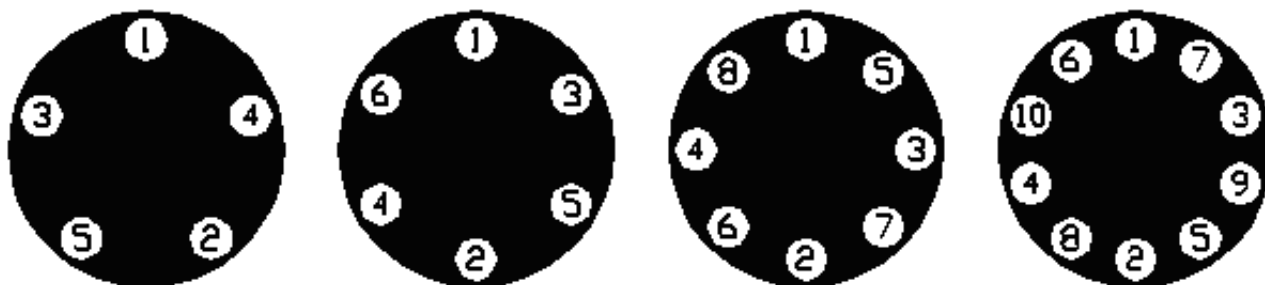
Tyre inflation pressure : 3.5 bars (50 psi)

Tightening torque recommended for wheels : 320 N.m (236lbft)



### 1-2.10.1.MOUNTING THE WHEEL

- Use the attachment elements recommended by the manufacturer (flat, spherical, conical, thread) and respect the tightening order below.
- Tighten the nuts using a torque wrench, respecting the tightening torque.
- Use the impact wrench for loosening only, never for tightening.
- Check the tightening torque for the nuts at the frequency recommended in the maintenance table.



## 1-3-MAINTENANCE OPERATIONS

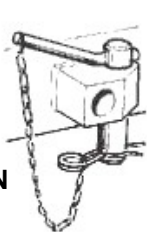


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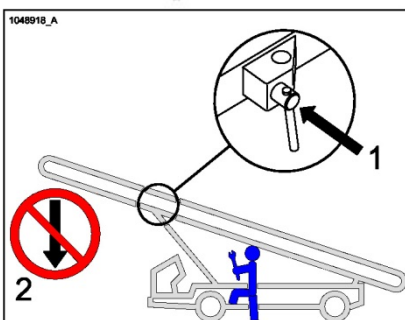
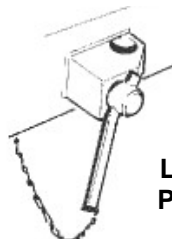
**BEFORE ANY MAINTENANCE INTERVENTIONS, IT IS IMPERATIVE THAT THE BOOM UP POSITION LOCKING PIN IS INSERTED. IT KEEPS THE BOOM RAISED DURING INTERVENTIONS UNDER IT.**

**BOOM  
LOCKING  
PIN**

**POSITION**

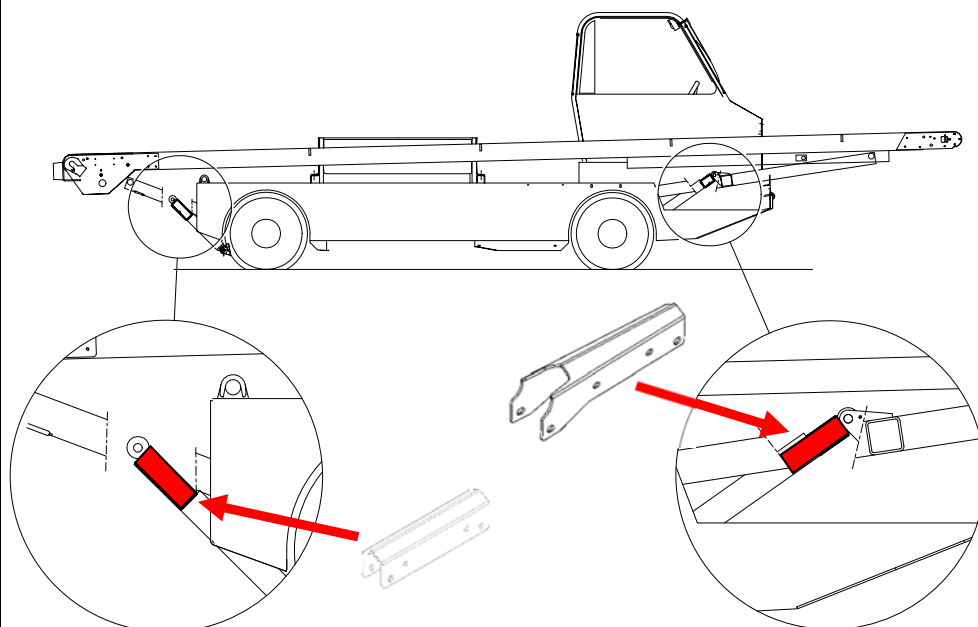


**LOCKING  
POSITION**



**WARNING (DEPENDING ON VERSIONS):**

**BEFORE ANY MAINTENANCE INTERVENTIONS, IT IS IMPERATIVE TO IMPLEMENT 2 HOLD LOCK BOOM HIGH POSITION. IT KEEPS THE BOOM RAISED DURING INTERVENTIONS UNDER IT.**



- UP THE BOOM
- PUT THE 2 LOCKS ON THE FRONT AND REAR RODS CYLINDER AND LOCKS WITH PINS.
- DOWN THE BOOM.



## 1-3-1-MAINTENANCE WORK WITH VEHICLE IN RAISED POSITION (WORKING BENEATH VEHICLE)

### 1 – LIFTING POINT FOR JACKS:

Refer to chapter 1: "LIFTING POINT FOR JACKS"

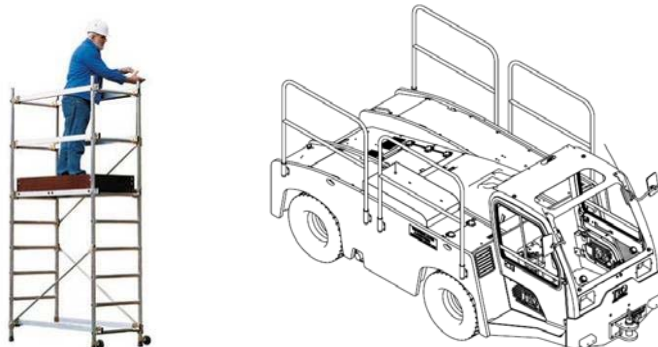
### 2 – LOCATION OF SUPPORT POINTS:

Refer to chapter 1: SUPPORT POINTS



**DANGER: CRUSHING**  
NEVER WORK BENEATH A VEHICLE IF IT IS NOT CORRECTLY SUPPORTED.  
LIFTING JACKS ARE NOT APPROPRIATE SUPPORTS.  
CHECK THAT THE SUPPORTS ARE OF APPROPRIATE CAPACITY AND DIMENSIONS BEFORE CARRYING OUT ANY INTERVENTION.

### 1-3.1.1. MAINTENANCE WORK ON SCAFFOLDING AND SAFETY BARRIERS (AT A HEIGHT)



*Fig 1 : Scaffolding*

During interventions on the top of vehicles (maintenance, etc.) access and fall prevention resources (scaffolding, barriers, etc.) that comply with current regulations must be used.  
A list of tools is available from TLD EUROPE SPARE PARTS DEPARTMENT.

## 1-3-2-GREASES, LUBRICATION AND OTHER LIQUIDS



**IMPORTANT:**  
OILS MUST BE SELECTED DEPENDING ON THE AMBIENT TEMPERATURE THAT EXISTS IN THE EQUIPMENT'S OPERATING LOCATION



COMPONENT	Marking	Capacities	Standards	Additional information
<b>ENGINE OIL</b>				Refer to the engine manual (chapter 5)
<b>ENGINE COOLING FLUID (depending on versions)</b>				Refer to the engine manual (chapter 5)
<b>FUEL TANK</b>	<b>DIESEL</b>	45 liters		Refer to the engine manual (chapter 5)
<b>GEARBOX</b>				Refer to the thermal gear box manual (chapter 5)
<b>REAR AXLE (BODY)</b>		1.75 liters	SAE90 API GL-5 MIL-L-2105B	
<b>HYDRAULIC TANK</b>		75 liters	ISO 11158 category HV	<div style="display: flex; justify-content: space-between;"> <div> <p>Ambient temperatures</p> <p>-40°C to +5°C. 25°C to +20°C. 10°C to +40°C. -5°C to +55°C.</p> </div> <div> <p>- 40°F à 41°F - 13°F à 68°F 14 °F à 104°F 23 °F à 131°F</p> </div> <div> <p>ISO Grade</p> <p>22 32 46 68</p> </div> </div>
<b>BRAKING CIRCUIT (depending on versions)</b>		0.75 liters	SAE J 1703 f FMVSS 116- DOT 4	DOT4 synthetic oil
<b>GREASE</b>		-	-	<p>Lithium soap grease Extreme pressure Temperature: -30°C to +130°C. NLGI 2</p>

Table 1 : Lubrication and liquids



**WARNING:** DO NOT USE LIQUIDS OTHER THAN THOSE THAT ARE RECOMMENDED. IF THESE LIQUIDS/LUBRICANTS/GREASES CANNOT BE OBTAINED, THEN PLEASE CONTACT TLD IN ORDER TO OBTAIN DETAILS OF EQUIVALENTS FROM ANOTHER SUPPLIER OR TO PLACE AN ORDER FOR THE CORRECT OIL.



**NOTE:**

- 1 - DURING THE REPLACEMENT OF PARTS AND/OR MAJOR HYDRAULIC COMPONENTS IN ORDER TO PREVENT DAMAGE TO COMPONENTS IT IS ESSENTIAL THAT HYDRAULIC OIL IS FILTERED AND ANALYSED BEFORE BEING RETURNED TO SERVICE.
- 2 - THE MIXING OF TWO OILS IS PROHIBITED.

## 1-3-3-OIL QUALITY

The degree of cleanliness required for the vehicle to operate correctly is defined by the following standards.

STANDARD	CLASS
ISO/DIS 4406	20/18/15
NAS 1638	9
SAE	5

If the recommendations for the maintenance of the filtration system as well as for oil changes are followed, then the oil should be of the required quality level. It may prove necessary, however, to test the oil quality when the latter appears to have deteriorated, for example when significant deposits are observed in the oil tank return filter.

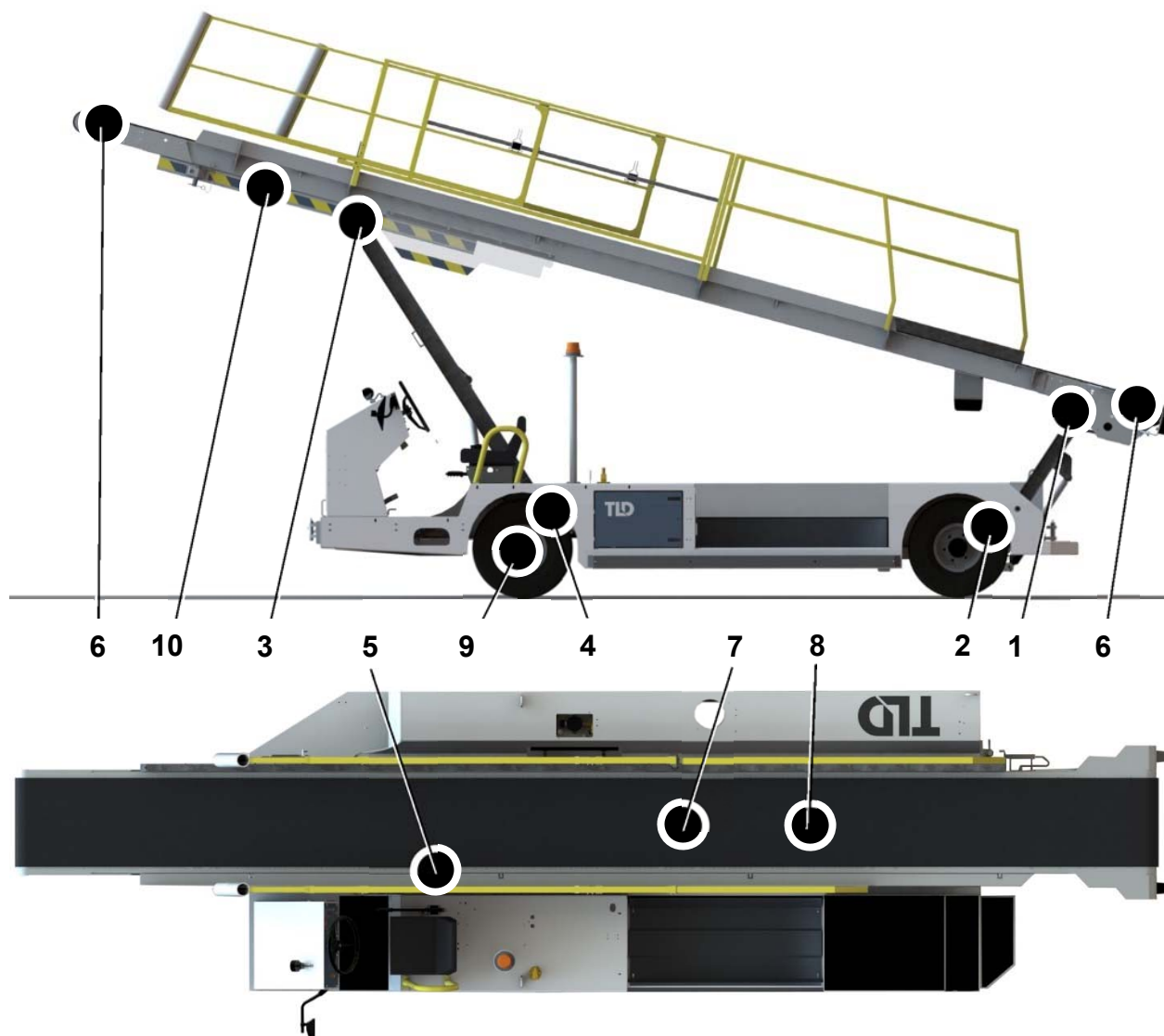


**REMARK:**

**THE COLOUR OF THE OIL IS NOT A GOOD INDICATOR OF ITS LEVEL OF CLEANLINESS**

A specialist oil laboratory should be used for a full assessment of the quality and degree of contamination of the oil.

## 1-3-4-LUBRICATION



1 + 2: Rear lifting cylinder ball joint greaser

3 + 4: Front lifting cylinder ball joint greaser

5: Steering cylinder ball joint greaser

6: Belt flange bearings\*

7 + 8: Transmission shaft greaser

9: Wheel pivot greaser (2)

10: Grease inside the barrier



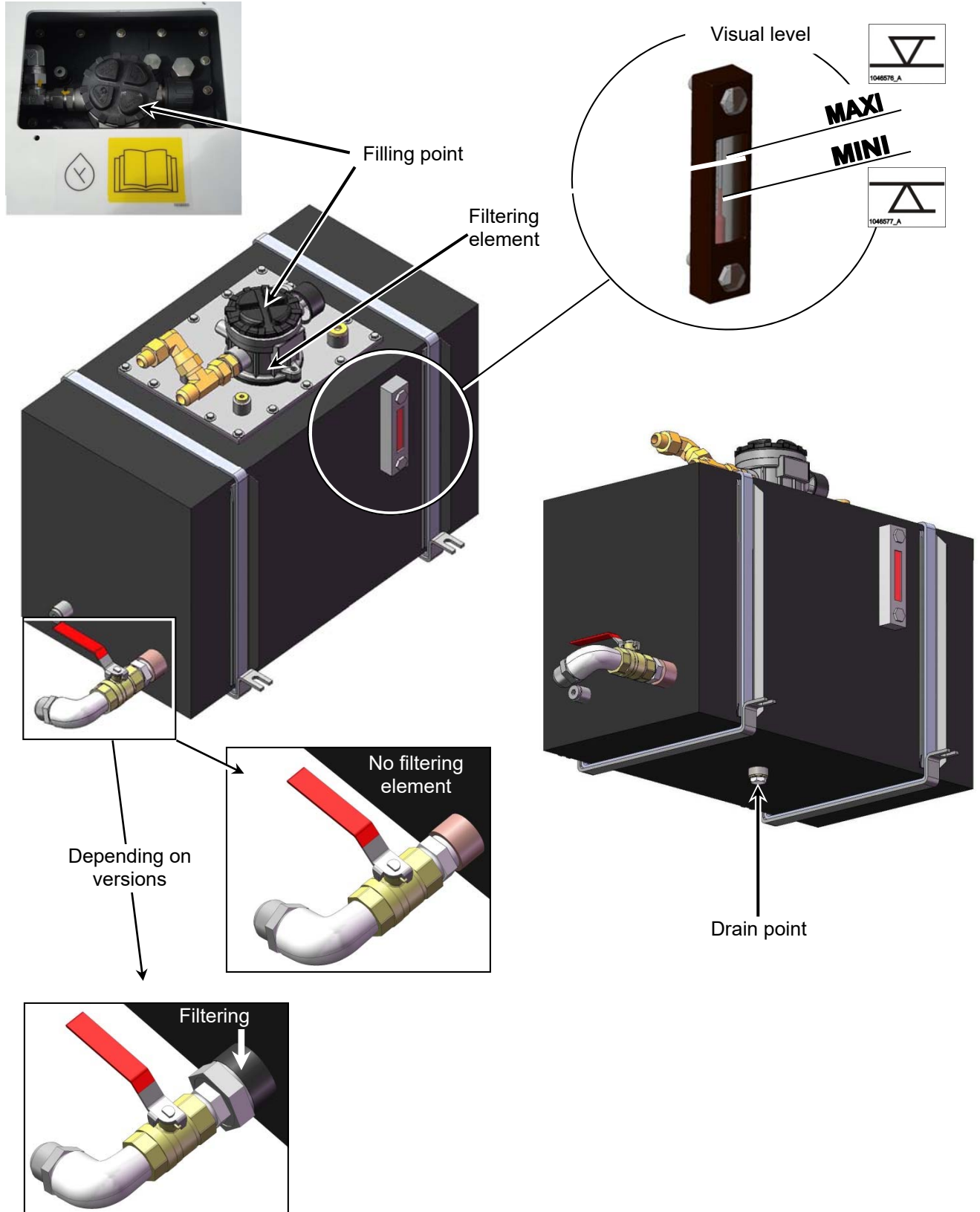
### NOTE:

1- THE BELT FLANGE BEARINGS ARE GREASED FOR LIFE. THEY DO NOT NEED PERIODICAL GREASING UNLESS EXTREME CONDITIONS ARE ENCOUNTERED OR IF PRESSURE JET WASHING WASHED AWAY THE BEARING GREASE. IT IS RECOMMENDED TO INSPECT THESE BEARINGS WHEN PERFORMING BELT MAINTENANCE OR TO REPLACE THEM AT THE SAME TIME AS THE BELT AS PREVENTIVE MAINTENANCE.

## 1-3-5-LEVELS

### 1-3-5.1. HYDRAULIC OIL

The level must be between the visual level min and max.

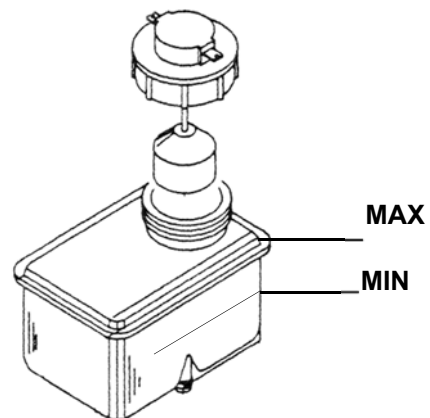
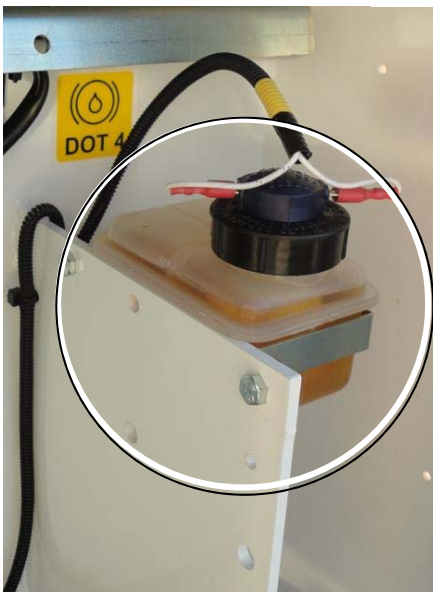
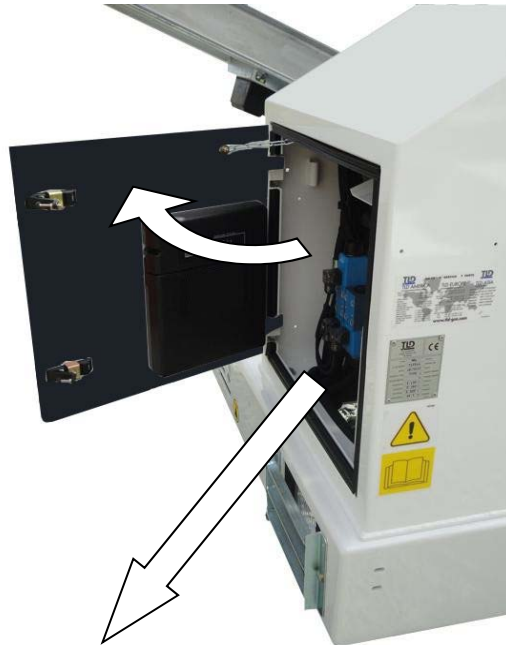




### 1-3.5.2.BRAKE FLUID

Access to the brake fluid tank: open the door in front of the driving position

The level must be between the min and max indicated on the tank.



### 1-3-6-CHECKING, DRAINING AND FILLING THE DIFFERENTIAL OIL

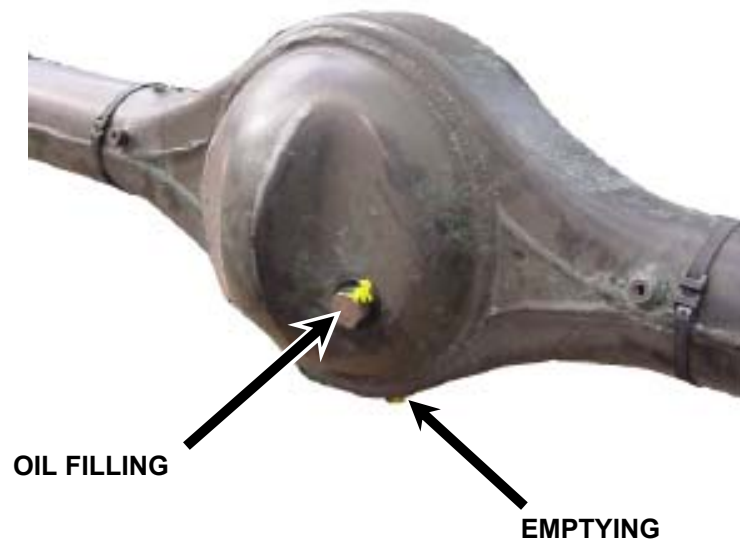
- a) Clean and remove any dirt located around the differential body filling cap.
- b) Gently remove the filling cap. If you notice any seepage around the thread, stop immediately. Put the cap back on to avoid any oil leaks. This situation indicates that the oil level is satisfactory. The bottom of the filling hole is the usual service fill level.

Note: Check the oil level only if you notice or suspect leaks. Period oil level checks increase the risk of the oil level falling or introducing any contaminating materials through the filling hole.

- c) If you are only topping up the oil level, fill up to the filling hole with transmission oil that conforms to specifications.

- d) If you are replacing the oil, drain the oil, remove the rear axle closure plate and let the oil run out into a container. Remove the residue built up on the bottom of the rear axle body. Apply a seal to the top of the closure plate and put the plate back on the rear axle body. Top up the level as described in c)

Note: You may drain the oil using a vacuum pump but this method does not remove all the residues which may have attached to the bottom of the rear axle's body.





## 1-4-ELECTRICAL / HYDRAULIC DIAGRAMS

### 1-4-1-ELECTRICAL DIAGRAM

Electrical diagrams and the symbols shown in the electrical diagram are in accordance with the standardisation rules:

*CEI 60617 and CEI 1082*

### 1-4-2-HYDRAULIC DIAGRAM

The hydraulics diagrams and the symbols shown in the hydraulic diagram are in accordance with the standardisation rules:

- ISO 1219. ISO 1219 sets the principles for the use of symbols, specific basic symbols and the rules for the use of these.
- ISO 3511, Processes for the inspection, measurement and instrumentation — symbolic representation
- ISO128, Technical drawings — General principles of representation.
- ISO 5598, Fluid systems and components - Vocabulary.

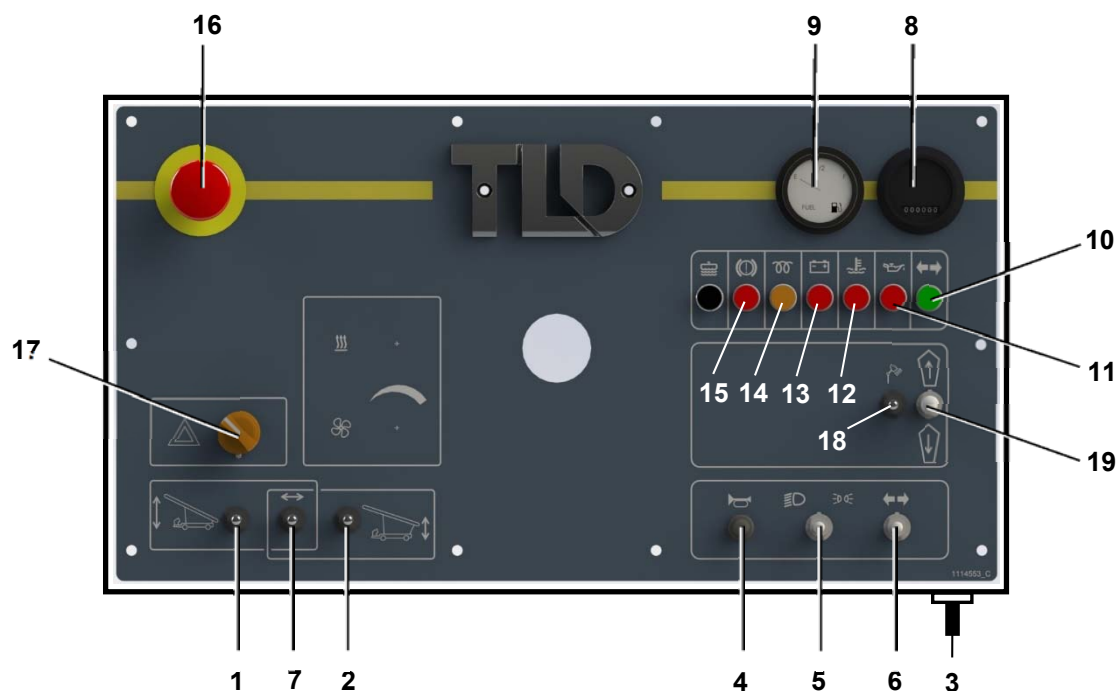


## 2- TROUBLESHOOTING

### 2-1- EMERGENCY MANOEUVRES - VEHICLE EVACUATION - TOWING

#### 2-1-1-MANUAL EMERGENCY COMMANDS

Fig 2-1-2: Control position



**WARNING:**

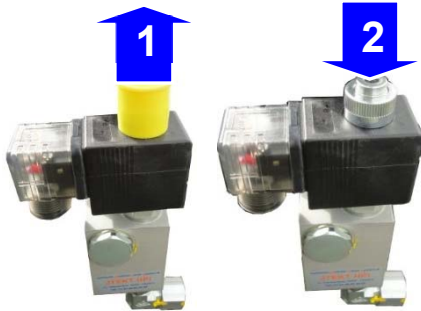
IT IS STRICTLY PROHIBITED TO CARRY OUT EMERGENCY MANOEUVRES WITH PERSONNEL ON THE BOOM. HAVE THE PERSONNEL COME DOWN FROM THE HOLD FIRST OR ASK THEM TO STAY THERE AND WAIT FOR OTHER EVACUATION EQUIPMENT. IN THE SAME WAY, PREVENT ANYONE FROM ACCESSING THE AREA UNDER THE BOOM DURING AN EMERGENCY MANOEUVRE.

### 2-1.1.1. BOOM LOWERING

#### Electrically

Hold the front or rear elevation-descent control levers (**1 and 2 fig.2-1-2**) in descent direction.

#### Hydraulically (no special tools):



*Fig. 2-1-3: Elevation cylinder flaps (depending on version)*

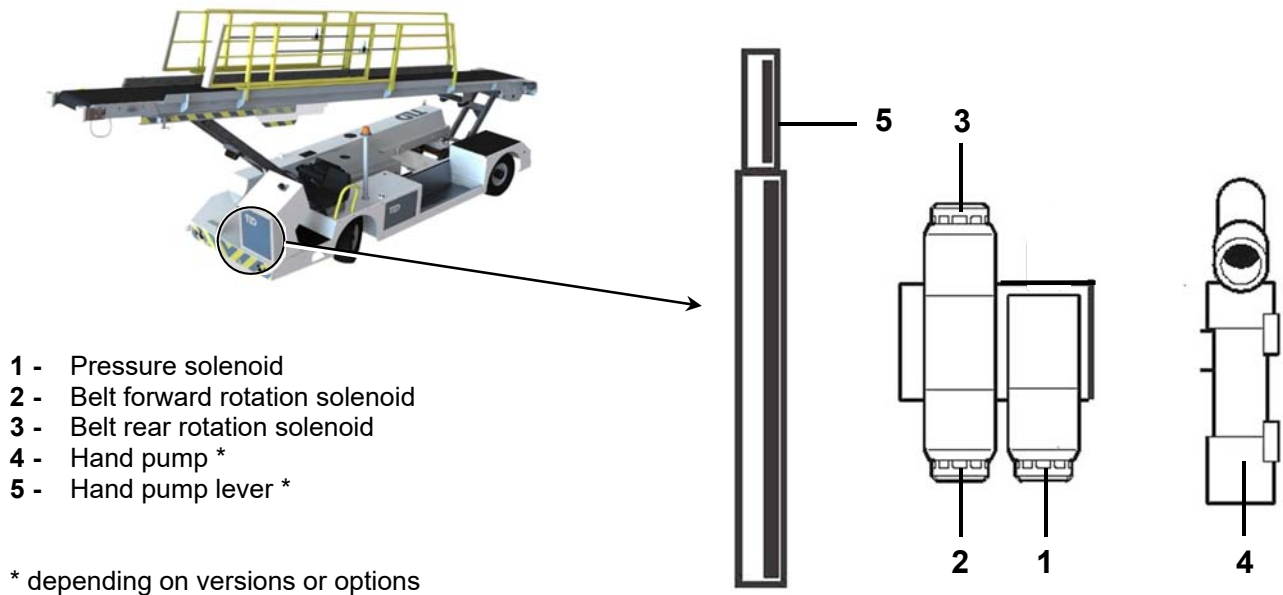
Press the end piece (**fig.2-1-3**) located under the flap covers at the base of each elevation cylinder.



**WARNING:**  
FOR SAFETY REASONS,  
WORK ON THE UNDERSIDE OF THE VEHICLE.



Fig.2-1-4 : Hydraulic compartment location



### 2-1.1.2.ELEVATION MOVEMENT (WITH HAND PUMP\*)

#### **In the event of a engine fault:**

Activate the hand pump and hold the front or rear control levers (1 and 2 fig.2-1-2) in elevation direction.

#### **In the event of an electrical fault:**

Activate the hand pump and press the manual controls for the pressure solenoid (1 fig.2-1-4) and elevation cylinder flaps (1 fig.2-1-3).



#### **WARNING:**

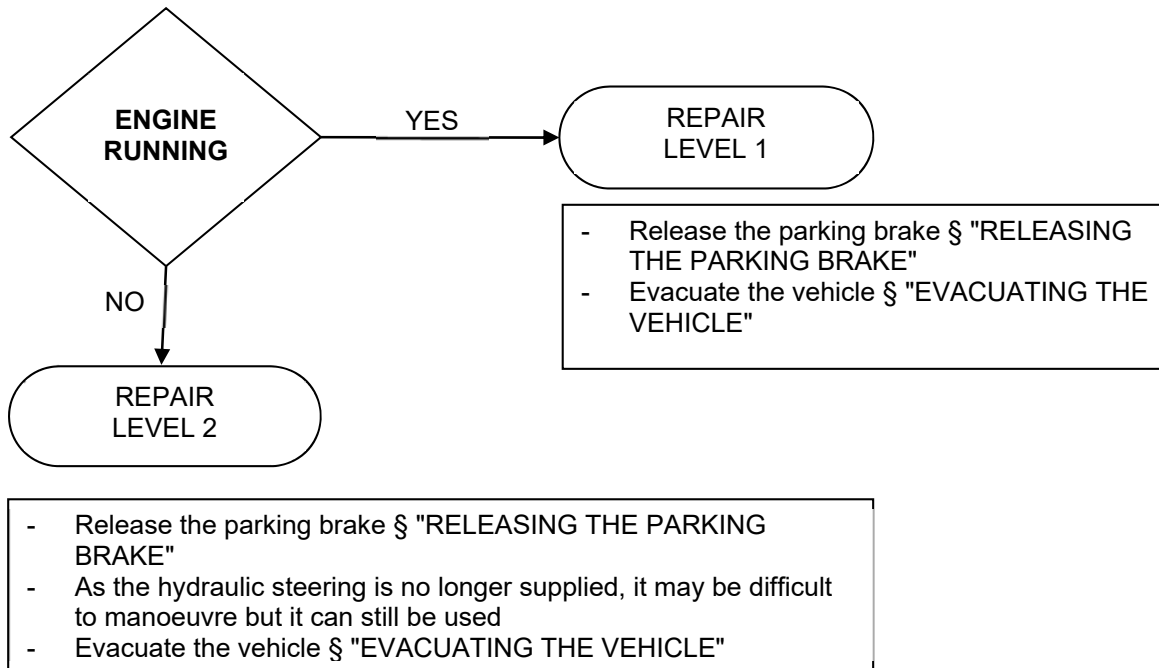
**FOR SAFETY REASONS, WORK ON THE UNDERSIDE OF THE VEHICLE.**



## 2-1-2-VEHICLE ELEVATION - PARKING BRAKE:

### IN THE EVENT OF COMPLETE BREAKDOWN:

In the event of complete breakdown, when in situ repairs are not possible or where the vehicle is blocking traffic areas used by other vehicles, it may be necessary to move the vehicle.



**WARNING:**  
DO NOT USE STRAPS OR OTHER FLEXIBLE ELEMENTS FOR TRACTION, ONLY A TOW BAR.



**WARNING:**  
CHOOSE A TRACTION RESOURCE THAT IS SUITED TO THE VEHICLE'S WEIGHT AND MAKE SURE THAT IT IS IN GOOD CONDITION.  
THE TOWING VEHICLE MUST BE CAPABLE OF BRAKING A NON-BRAKED MASS OF 5 TONNES.



**WARNING:**  
MAX TOWING SPEED: 5 km/h  
LEAVE AN OPERATOR AT THE WHEEL.

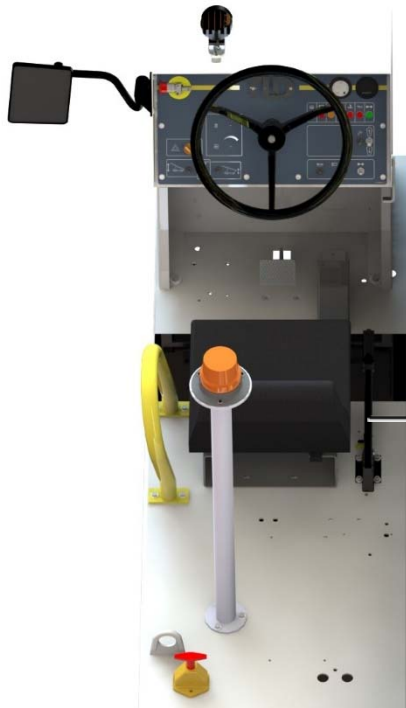


**WARNING:**  
THE VEHICLE MAY ONLY BE TOWED/PULLED ON FLAT GROUND, OVER A SHORT DISTANCE AND WITH A TOW BAR.



**NOTE:**  
THE TOWING INSTRUCTIONS AND PROCEDURES ARE LOCATED INSIDE THE DRIVING POSITION'S FRONT DOOR.

### 2-1.2.1.RELEASING THE PARKING BRAKE:

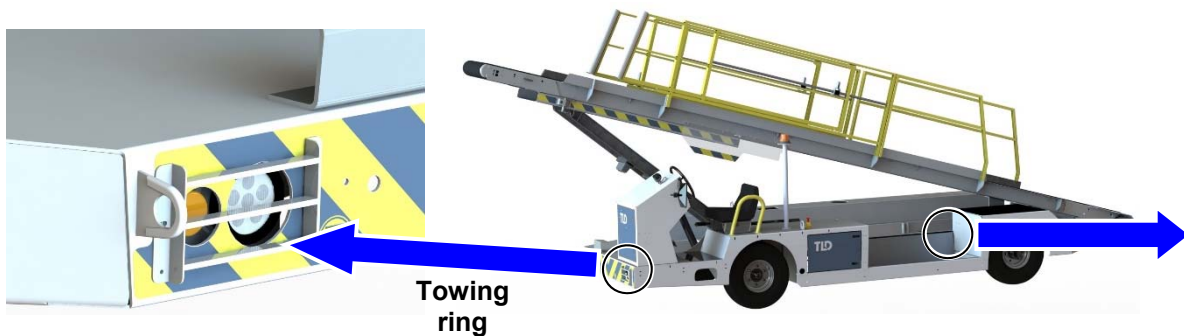


The command is performed by lowering the parking brake handle (5 fig. 1-3-1).

5

### 2-1.2.2.EVACUATING THE VEHICLE:

- Fit a tow bar to the tow ring then the towing vehicle ;
- Set the selector (**11 fig.1**) to neutral;
- Release the parking brake;
- The vehicle is then ready to be towed.



## 2-2-DIAGNOSTIC

### DIAGNOSTIC TABLES

All of the tables below must be used with the electrical and hydraulic diagrams to find the problem and fully understand the solutions.



**IMPORTANT:**  
THE INDICATIONS IN THE DIAGNOSTIC TABLES CONCERNING THE ENGINE ARE PROVIDED FOR INFORMATION PURPOSES ONLY AND DO NOT REPLACE THE ENGINE MANUFACTURERS' INDICATIONS INCLUDED IN CHAPTER 5.

### 2-2-1-DIAGNOSTIC TABLES

#### 2-2.1.1. – POWER UP PROBLEM

PROBLEM	CAUSE	ACTION
<b>Powering up problem (nothing switches on)</b>	The key contactor is not active.	Set the contact.
	The battery is discharged or has no mass.	Check that the battery voltage is 12 Volts.
	The battery disconnect is in OFF position	Set the battery disconnect to ON position. Check the main relays.
	An emergency stop button has been pushed.	Release the emergency stop.
	Main fuse blown.	Seek the reason why the fuse blew, repair and replace the fuse.
	Defective cabling	Check the connections (corrosion, loosening, disconnections, etc.)



### 2-2.1.2.– THE ENGINE DOES NOT START OR HAS TROUBLE STARTING

PROBLEM	CAUSE	ACTION
<b>The engine does not start or has trouble starting.</b>	Fuel level low or no fuel.	Check the fuel level and fill up.
	Batteries weak or defective.	Recharge or replace the batteries.
	Fuel filter clogged.	Replace the fuel filter.
	Reduced fuel supply (choking ) or leaks in the supply system.	Look for and repair the choking or leaks.
	Fuel pump out of service.	If the fuel pump does not flow, repair or replace the pump.
	Air in the supply circuit.	Bleed the air.
	Insufficient air intake.	Check and replace the air filter.
	Connection/cabling fault between the batteries, the starter and the earth.	Check the connections
	Starter relay at fault.	Replace the starter relay.
	Low external temperature.	See "THE ENGINE DOES NOT START DUE TO LOWER TEMPERATURE"
	Low compression, injection system at fault, engine defective or engine stuck/jammed	See engine documentation or contact a representative



### 2-2.1.3. – NO SIDEWAYS MOVEMENT

PROBLEM	CAUSE	ACTION
<b>No sideways movement</b>	Key contact at fault.	Check the connections and cabling. Replace if necessary.
	Starter relay at fault.	Replace the starter relay.
	Starter at fault.	Check the loss of voltage on the starter. Replace or repair.
	Internal engine fault	If all the components needed for the engine to start are operating without the starter managing to start the engine, it is clear that the cause is the engine itself. Contact the engine's manufacturer for repair.
	"Anti-restart" timed relay at fault.	Replace the relay and adjust if necessary. (see Electrical diagram).
	Movement direction not selected.	Select a gear using the movement direction selector.
	Acceleration pedal not activated.	Activate the pedal.
	Defective cabling.	Check the connections (corrosion, loosening, disconnections, etc.)



#### **2-2.1.4.– THE ENGINE STARTS THEN STOPS OR HAS UNSTABLE BEHAVIOUR**

<b>PROBLEM</b>	<b>CAUSE</b>	<b>ACTION</b>
<b>The engine starts then stops or has unstable behaviour</b>	Fuel level low or no fuel.	Check the fuel level and fill up.
	Engine oil pressure low	Check and add engine oil.
	Cooling fluid temperature too high.	Check the fluid level. Inspect the radiator.
	Fuel filter clogged.	Replace the fuel filter.
	Reduced fuel supply (choking) or leaks in the supply system.	Look for and repair the choking or leaks.
	Fuel pump operated poorly.	If the fuel flow is too low, repair or replace the pump.
	Air in the supply circuit.	Bleed the air.
	Insufficient air intake.	Check and replace the air filter.
	Exhaust line obstruction.	Examine the exhaust line.
	Incorrect fuel supply pump or valve delays.	Check the valve or supply pump according to the manufacturer's recommendations.
	Low compression, injection system fault, Engine fault	Contact the engine's supplier.

#### **2-2.1.5. – THE ENGINE DOES NOT START OR HAS TROUBLE STARTING AT LOW TEMPERATURES**

<b>PROBLEM</b>	<b>CAUSE</b>	<b>ACTION</b>
<b>The engine does not start or has trouble starting at low temperatures</b>	Batteries discharged	Recharge or replace the batteries.
	Warm up "Wait to start"	Wait.
	Warm up fault.	Contact the engine's supplier.
	Poor oil viscosity	Check the engine oil



### **2-2.1.6. – LOSS OF POWER**

<b>PROBLEM</b>	<b>CAUSE</b>	<b>ACTION</b>
<b>Loss of power</b>	Fuel supply system, air intake and exhaust system fault.	Contact the engine's supplier.

### **2-2.1.7.– IMPOSSIBLE TO MAINTAIN THE ENGINE – USAGE TEMPERATURE**

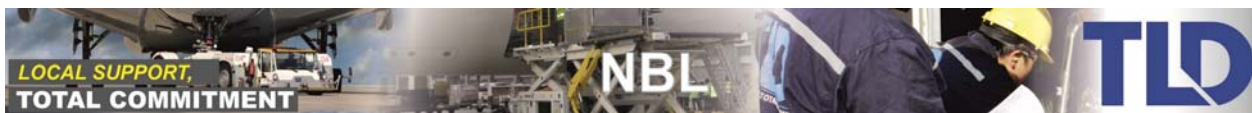
<b>PROBLEM</b>	<b>CAUSE</b>	<b>ACTION</b>
<b>Impossible to maintain the engine - Usage temperature</b>	Cooling fluid level low (depending on version)	Check the level and top up.
	Hot air recycling in front of the radiator.	Locate and block the hot air intake.
	Radiator clogged.	Inspect the radiator.
	Deterioration to the cooling hoses.	Replace the hoses.
	Oil cooler clogged (depending on versions)	Replace the cooler
	The thermostat no longer works	Contact the engine's supplier.
	Ventilation problem	Contact the engine's supplier.
	Water pump belt or water pump does not work	Contact the engine's supplier.

### 2-2.1.8.– THE VEHICLE HAS NO STEERING OR STEERING IS HARD

PROBLEM	CAUSE	ACTION
<b>The vehicle has no steering or steering is hard</b>	Lack of pressure in the tyres Damaged tyres/rim	Check the pressure and condition of the tyres and rims, change if necessary.
	Steering valve fault.	Check and replace the valve
	Steering column damaged.	Check and replace the steering column.
	Steering cylinder or seal damaged.	Replace
	Axle ball joints or articulations damaged.	Replace

### 2-2.1.9.- STEERING: THE VEHICLE PULLS TO ONE SIDE

PROBLEM	CAUSE	ACTION
<b>Steering: the vehicle pulls to one side</b>	Lack of pressure in the tyres Damaged tyres/rim	Check the pressure and condition of the tyres and rims, change if necessary.
	Steering bar ball joints defective.	Replace



#### **2-2.1.10. - BRAKING SYSTEM: EXCESSIVE BRAKING DISTANCE**

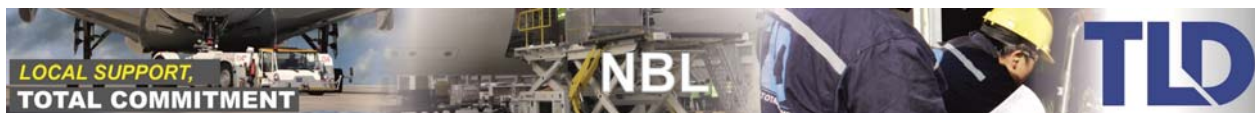
PROBLEM	CAUSE	ACTION
<b>Braking system: excessive braking distance</b>	Brake fluid level low.	Top up.
	Excessive wear on brake pads or disks.	Check the wear and replace if necessary.
	Air in the brake circuit.	Find the leak and repair it, bleed the circuit.
	Master cylinder out of service.	Repair or replace the master cylinder.
	Brake fluid leak	Find the leak, repair it and top up

#### **2-2.1.11. - BRAKING SYSTEM: PEDAL SPONGY OR PEDAL RUN TOO HIGH**

PROBLEM	CAUSE	ACTION
<b>Braking system: Pedal spongy or pedal run too high</b>	Insufficient fluid in the circuit.	Check the leaks and fill
	Air in the circuit	Check, repair and bleed.
	Excessive wear in the braking system.	Contact TLD.

#### **2-2.1.12. - BRAKING SYSTEM: PEDAL HARD**

PROBLEM	CAUSE	ACTION
<b>Braking system: Pedal hard</b>	Pedal hard	Check the pedal and repair
	Braking oil pressure low	Inspect the hydraulic system. Replace the components if necessary



### 2-2.1.13. – THE BATTERIES DO NOT REMAIN CHARGED

PROBLEM	CAUSE	ACTION
The battery does not remain charged.	Battery out of service	Replace the battery

### 2-2.1.14.- LACK OF CAB HEATING PERFORMANCES (DEPENDING ON VERSIONS)

PROBLEM	CAUSE	ACTION
Lack of cab heating performances	Fan out of service	Replace the fan

### 2-2.1.15. – THE CAB DEICING DOES NOT WORK (DEPENDING ON VERSIONS)

PROBLEM	CAUSE	ACTION
The cab de-icing does not work.	Contacts damaged or disconnected.	Check and repair the conduits.
	Circuit breaker activated.	Seek the reason why the circuit breaker was activated, repair and push back in.
	Defective cabling.	Check the connections (corrosion, loosening, disconnections, etc.)

### 2-2.1.16. – NO MORE CAB VENTILATION (DEPENDING ON VERSIONS)

PROBLEM	CAUSE	ACTION
No more ventilation in the cab	Fan defective.	Check and replace.
	Circuit breaker activated.	Seek the reason why the circuit breaker was activated, repair and push back in.
	Defective cabling.	Check the connections (corrosion, loosening, etc.)

### 2-2.1.17. – NO MORE WIPER OR WIPER FLUID (DEPENDING ON VERSIONS)

PROBLEM	CAUSE	ACTION
No more wiper or wiper fluid.	Wiper engine defective.	Replace the engine
	Circuit breaker activated.	Seek the reason why the circuit breaker was activated, repair and push back in.
	Defective cabling.	Check the connections (corrosion, loosening, disconnections, etc.)



### **2-2.1.18.- NO BOOM MOVEMENT**

<b>PROBLEM</b>	<b>CAUSE</b>	<b>ACTION</b>
<b>No boom movement</b>	"Dead man" button or movement command not activated	Activate the "dead man" button and the command at the same time.
	Circuit breaker activated.	Seek the reason why the circuit breaker was activated, repair and push back in.
	Defective cabling.	Check the connections (corrosion, loosening, disconnections, etc.)

### **2-2.1.19.- NO BELT ROTATION**

<b>PROBLEM</b>	<b>CAUSE</b>	<b>ACTION</b>
<b>No belt rotation.</b>	Circuit breaker activated.	Seek the reason why the circuit breaker was activated, repair and push back in.
	Defective cabling.	Check the connections (corrosion, loosening, disconnections, etc.)

## 3-REPAIRS

### 3-1-TIGHTENING TORQUE

#### 3-1-1-GENERAL



**PRECAUTION:**

DO NOT USE THESE VALUES IF A DIFFERENT TORQUE VALUES OR TIGHTENING PROCEDURES ARE GIVEN FOR A GIVEN APPLICATION.  
THE LISTED TORQUE VALUES ARE DESIGNED FOR GENERAL USE ONLY  
FASTENINGS MUST BE REPLACED USING FASTENINGS OF THE SAME OR SUPERIOR GRADE AND THEY MUST BE TIGHTENED USING THE SAME FORCE AS USED FOR THE ORIGINAL FASTENINGS.  
CHECK THAT THE THREADS ON FASTENINGS ARE CLEAN AND PROPERLY ENGAGED IN ORDER TO AVOID FAILURES DURING TIGHTENING.



**NOTE:**

« LUBRICATED » MEANS COATED WITH ENGINE OIL OR ANOTHER LUBRICANT  
« DRY » SIGNIFIES PLAIN OR ZINC-PLATED WITHOUT LUBRICATION.



## **3-2-DOCUMENTS ACCESSIBLE ON THE TLD SITE**

### **3-2-1-FACTORY PARAMETERS, CE CERTIFICATE, LOAD TEST REPORT**

These documents are accessible on the TLD site.



## 3-3-SETTINGS

### 3-3-1-CHECKING AND ADJUSTING THE FRONT AXLE BALANCE

#### Inspection

- Position two 4-Tonne lifting jacks at the FR of the chassis, to lift the entire machine until the wheels are no longer touching the floor.
- Operate the steering in order to position the steering actuator piston rods at equal distances on either side of the body of the actuator.
- Check that the wheels are parallel using the usual garage equipment (heavy goods vehicle type).

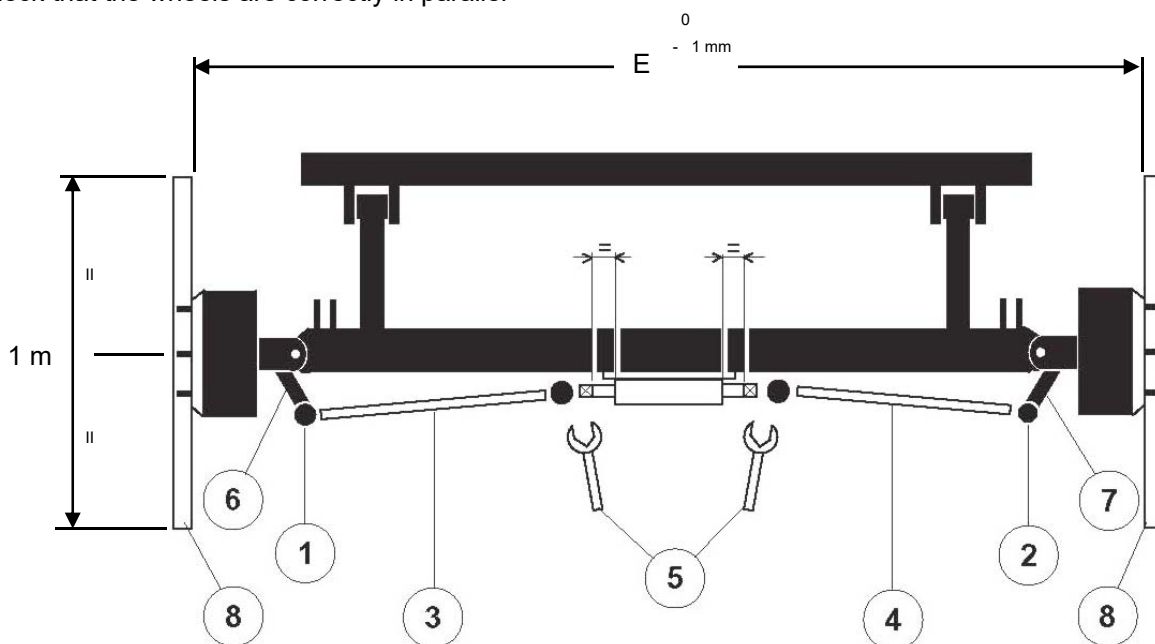
The wheels must be parallel or have a slight toe-in (**dimension E tolerance from 0 to -1 mm**), equivalent to a measurement made with two x 2-metre rules item. 8.

#### Adjustment:

- Place the vehicle in the configuration as described above.
- Release the steering ball joints items. 1 and 2 relative to the bars items. 3 and 4
- Adjust so that they are parallel by rotating the actuator piston rod and bars assembly using the two spanners item. 5
- Re-fit the steering ball joints items. 1 and 2 relative to the bars items. 3 and 4
- Check that the wheels are correctly in parallel

**Note:** Parallel wheel alignment can also be achieved as follows:

- Place the vehicle in the configuration as described above
- Release the steering ball joints items. 1 and 2 relative to the bars items. 3 and 4
- Release the ball joints items. 1 and 2 relative to the steering arms items. 6 and 7
- Tighten or loosen the ball joints items. 1 and 2 relative to the bars items. 3 and 4
- Refit the ball joints items. 1 and 2 in place in the steering arms items. 6 and 7
- Re-tighten the ball-joints items 1 and 2 relative to the bars items 3 and 4
- Check that the wheels are correctly in parallel



### 3-3-2-HYDRAULIC CAP TIGHTENING TORQUE



**WARNING:**  
WHEN PUTTING THE HYDRAULIC CAP BACK IN PLACE, CHECK THAT THE  
TIGHTENING TORQUE IS RESPECTED: 30 m/N



### 3-3-3-PARKING BRAKE CABLE TENSION ADJUSTMENT

- 1 - Raise the rear of the vehicle (so that the wheels do not touch the ground).
  - 2 - Position the lever run in the 2<sup>nd</sup> notch (from the bottom).
  - 3 - Adjust the cable tension until the linings "rub" the drum (slight contact).
- NB: Check this operation by tuning the right and left rear wheels by hand.
- 4 - Check the effectiveness of the parking brake on a 7% slope  $\geq$  to ensure that the vehicle is immobilised.

Carry out these parking brake cable tension adjustment checks periodically during engine oil changes.

### 3-3-4-BELT CENTRING AND TENSION



**WARNING:**  
**MECHANICAL GRABBING, JAMMING, WINDING AND CRUSHING RISKS EXIST, IN PARTICULAR FOR PERSONNEL RESPONSIBLE FOR MAINTENANCE, WITH THE POSSIBILITY OF PARTS OF THE BODY AND/OR CLOTHING BEING PULLED BY THE BELT INTO THE DRIVE SYSTEM (ROLLERS, ETC.).**  
**MAKE SURE THAT LONG HAIR IS TIED UP AND DO NOT WEAR LOOSE CLOTHING.**

#### 3-3.4.1.BELT CENTRING

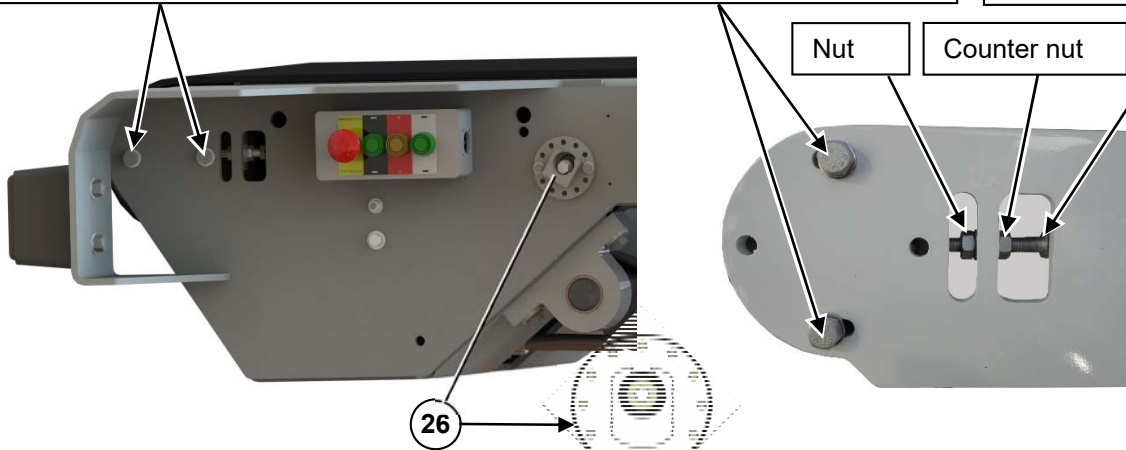


**1-** With the belt stopped, remove the protective metal sheet from behind the boom (1).

Loosen the holding screws then the counter nut on each of the 3 front and rear levels then release the levels to maximum by loosening the level movement screw.

To start, loosen the 2 screws holding each front and rear level.

Movement screw



**2-** Tighten the belt to the minimum with the front and rear level adjustment screws. As shown on the photo below, the off-set (26) at the rear right of the boom must be locked on the roller in this position;

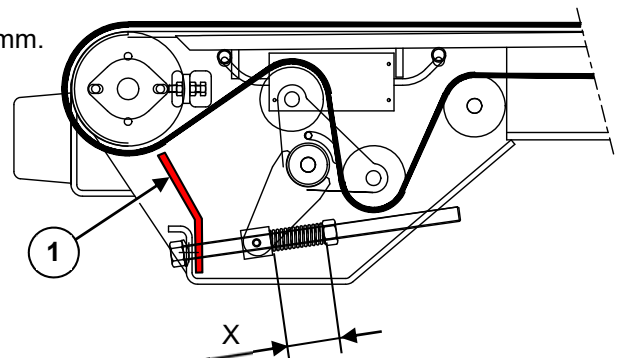
**3-** Put the protective metal sheet back in place behind the boom (1).

**4-** Pre\_tighten the Belleville washers  $X = \text{approx } 68 \text{ mm}$ .

**5-** Have the belt run for 5 min forward then 5 min reverse;

**6-** Lock the accelerator at high rate to have a faster belt speed than on slow down and so make it easier to see any drift;

**7-** Run the belt forwards;



**WARNING:**  
**RESPECT A SAFE DISTANCE IN RELATION TO MOVING PARTS (BELT ROTATING → GRABBING AND CRUSHING RISK).**





Start by adjusting the belt alignment using the offset:

- Clockwise to send the belt to the left,
- Anti-clockwise to send the belt to the right.



**NOTE :**  
EXAGGERATING THE OFFSET POSITION BY ADJUSTING THE FORWARD MOVEMENT MAY CAUSE PROBLEMS DURING REVERSE OPERATION. ADJUST THE OFFSET LITTLE BY LITTLE, BY SEMI-INCREMENTS

Let the belt run for between 2 and 3 minutes.



**WARNING:**  
RESPECT A SAFE DISTANCE IN RELATION TO MOVING PARTS (BELT ROTATING → GRABBING AND CRUSHING RISK).



11- Lock the accelerator at high rate to have a faster belt speed than on slow down and so make it easier to see any drift;

12- Run the belt in reverse. Adjust the rear roller THEN the front roller as follows:

#### AT THE REAR



#### If the belt shifts to the right:

- At the rear, on the right hand side, holding down the nut tighten the screw to push the level back.
- Let the belt run for at least 2 to 3 minutes to the rear and note the centring of the belt in relation to the boom.



**NOTE:**  
IF THE CENTERING IS NOT CORRECT, REPEAT THE OPERATION.



**WARNING:**  
WHILE WAITING, STAY AWARE AND KEEP AWAY FROM THE ROTATING BELT → GRABBING AND CRUSHING RISK.



- Once the centring has been carried out, run the belt forwards for at least 2 to 3 minutes.
- Check the centring at the rear then the front of the NBL and vice versa.
- Adjust if you need to recentre.

#### **If the belt shifts to the left:**

- At the rear, on the right hand side, holding down the nut loosen the screw to push the level forward.
- Let the belt run for at least 2 to 3 minutes to the rear and note the centring of the belt in relation to the boom.



#### **NOTE:**

**IF THE CENTERING IS NOT CORRECT, REPEAT THE OPERATION.**



#### **WARNING:**

**WHILE WAITING, STAY AWARE AND KEEP AWAY FROM THE ROTATING BELT → GRABBING AND CRUSHING RISK.**



- Once the centring has been carried out, run the belt forwards for at least 2 to 3 minutes.
- Check the centring at the rear then the front of the NBL and vice versa.
- Adjust if you need to recentre.

#### **AT THE FRONT**

Screw to the right to push the level to the front → recentre the belt



#### **If the belt shifts to the right:**

- At the front, on the right hand side, holding down the nut tighten the screw to push the level forward.
- Let the belt run for at least 2 to 3 minutes to the rear and note the centring of the belt in relation to the boom.



#### **NOTE:**

**IF THE CENTERING IS NOT CORRECT, REPEAT THE OPERATION.**



#### **WARNING:**

**WHILE WAITING, STAY AWARE AND KEEP AWAY FROM THE ROTATING BELT → GRABBING AND CRUSHING RISK.**



- Once the centring has been carried out, run the belt forwards for at least 2 to 3 minutes.
- Check the centring at the front then the rear of the NBL and vice versa.
- Adjust if you need to recentre.





**If the belt shifts to the left:**

- At the front, on the left hand side, holding down the nut tighten the screw to push the level forward.
- Let the belt run for at least 2 to 3 minutes to the rear and note the centring of the belt in relation to the boom.



**NOTE:**

**IF THE CENTERING IS NOT CORRECT, REPEAT THE OPERATION.**



**WARNING:**

**WHILE WAITING, STAY AWARE AND KEEP AWAY FROM THE ROTATING BELT → GRABBING AND CRUSHING RISK.**



- Once the centring has been carried out, run the belt forwards for at least 2 to 3 minutes.
- Check the centring at the front then the rear of the NBL and vice versa.
- Adjust if you need to recentre.

**13-** Run the belt forwards again and adjust the front roller using the same procedure.

**14-** If the adjustment is still not suitable, return to step 7.

**15-** To finish, perform one last check on the quality of the belt's transverse centring in both rotation directions.



**16-** Stop the belt rotating;

**17-** Remove the protective metal sheet from behind the boom.

**18-** First tighten the two screws holding each level first then the counter nut on each level movement screw.

**19-** Put the protective metal sheet back in place behind the boom (1).



**WARNING:**

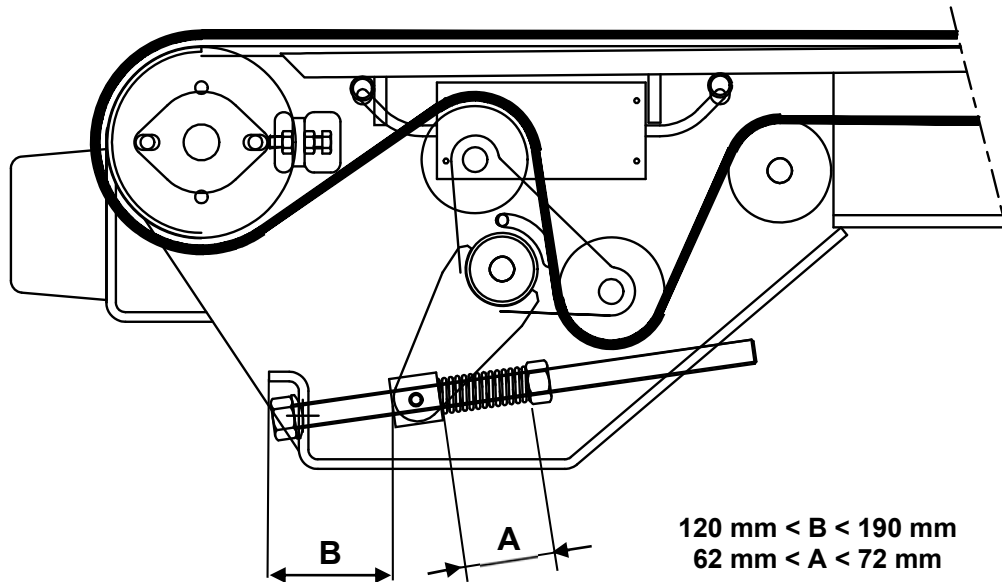
**THE BELT MAY MOVE Laterally slightly during rotation but is must not UNCOVER THE UPRIGHTS OR THE STAINLESS STEEL PROFILES AFTER ADJUSTMENT.**



### 3-3.4.2. ADJUSTING THE BELT TENSION WITH LOAD

Position the distributed 720 kg load and the boom at maximum tilt.

Adjust dimension A to drive the load



**NOTE:**

IF DIMENSION B IS NOT RESPECTED YOU MUST CHANGE THE BELT.

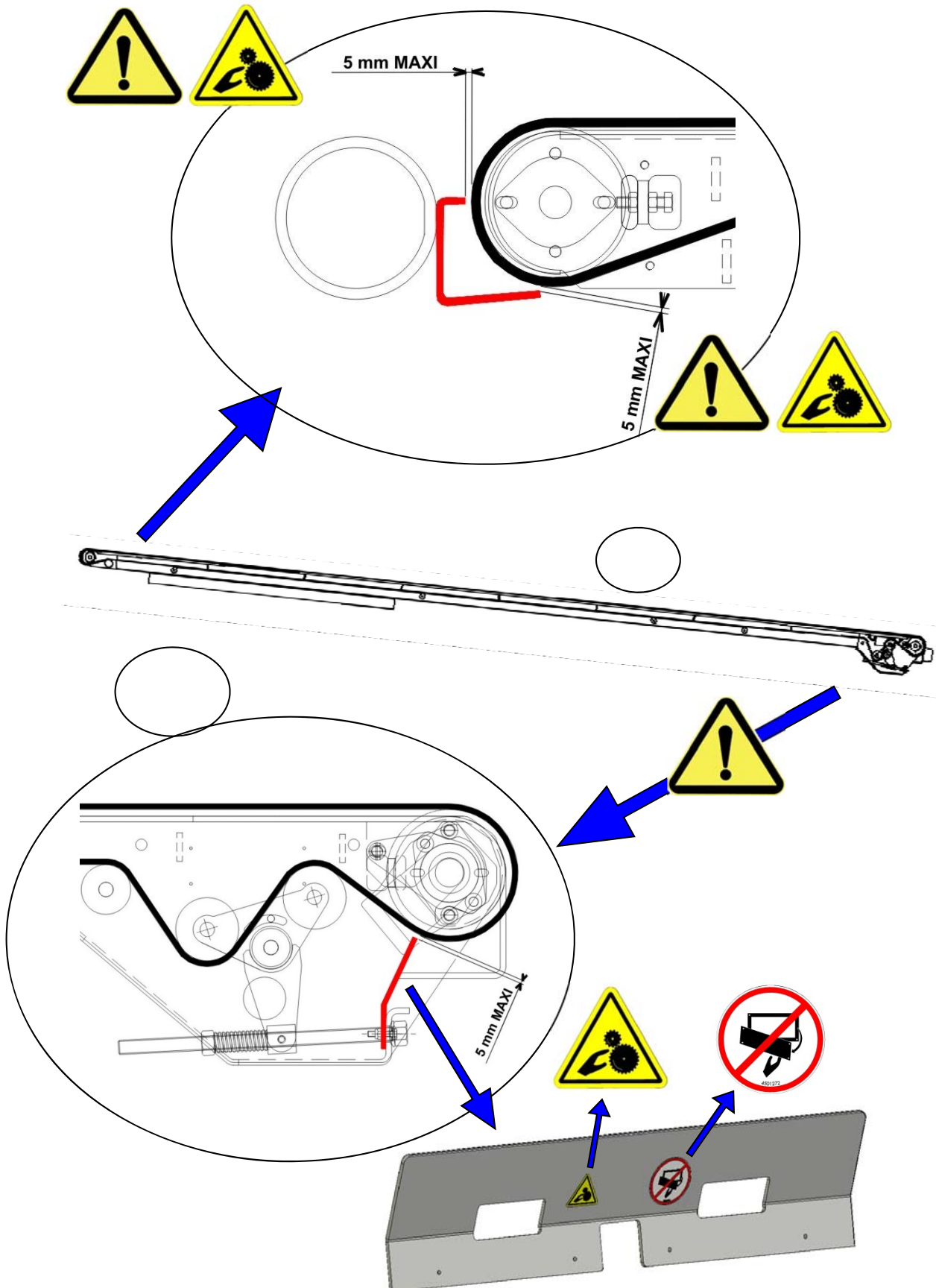


**NOTE:**

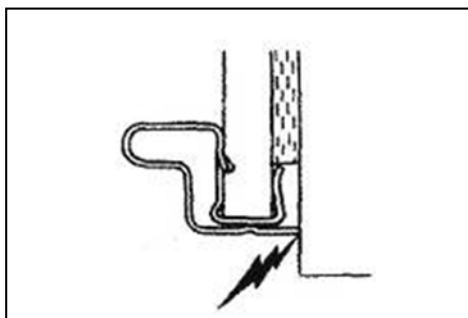
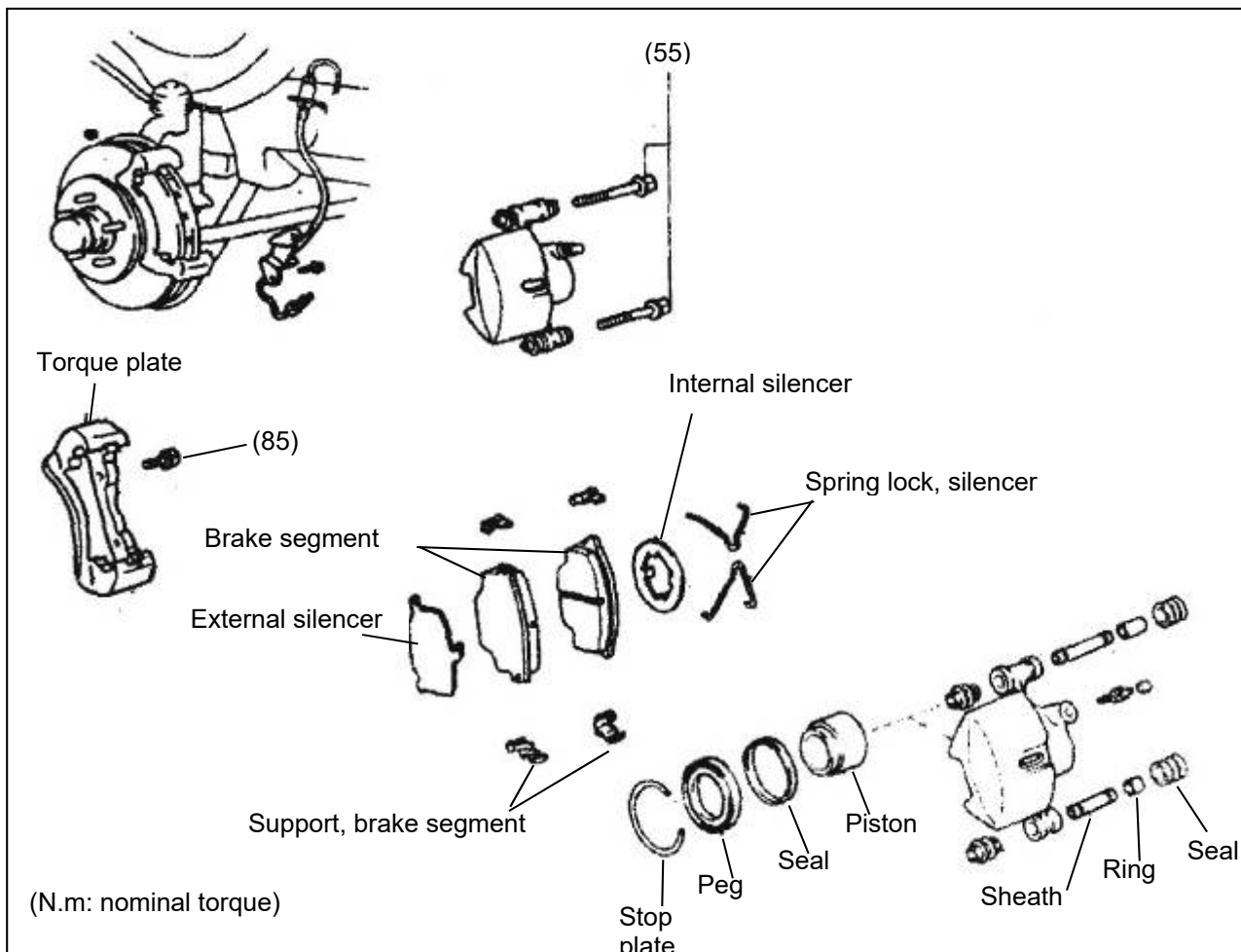
AFTER THIS ADJUSTMENT, THE ACCEPTABLE LIFTING LOAD IS 400KG.



### 3-3-5-BOOM ANTI-PINCH PROTECTION ADJUSTMENT



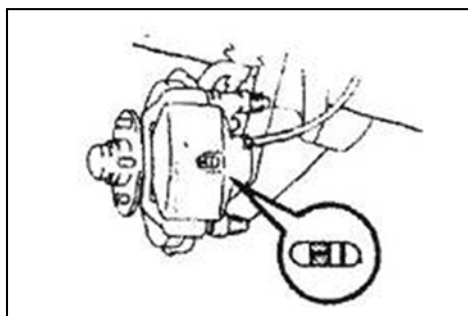
### 3-3-6-FRONT BRAKE - MAINTENANCE AND REPAIRS



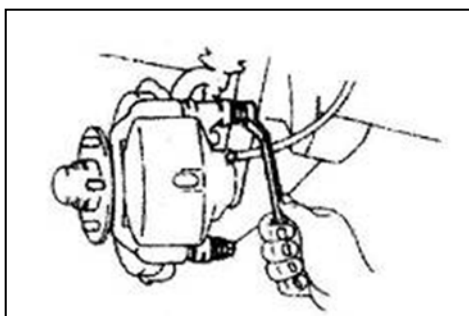
#### A - Brake replacement

**NOTE:** During operation, if you hear a continuous crackle check the brake segment wear indicator. If the end of the indicator is in contact with the disk, replace the segment.

1 - Remove the wheel.

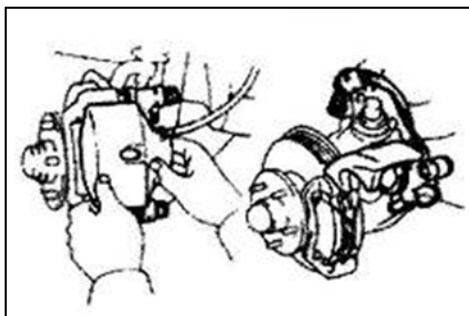


2 - Measure the thickness of the brake segment dowel. Measure the thickness of the dowel from the inspection hole on the pump body. Replace the segment if it is not thick enough. Minimum thickness: 1.5 mm.



3 - Raise the brake cylinder:

- Remove the brake support.



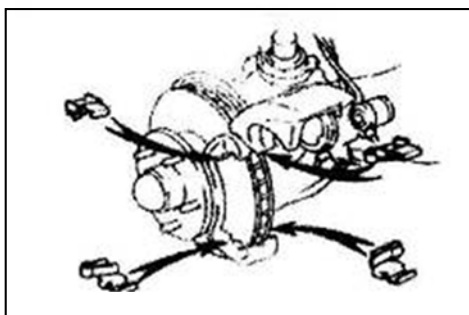
- Raise the brake cylinder and suspend it by a cable, protect the hose.

**Remark:** You do not need to remove the hose.



4 - Remove the parts below:

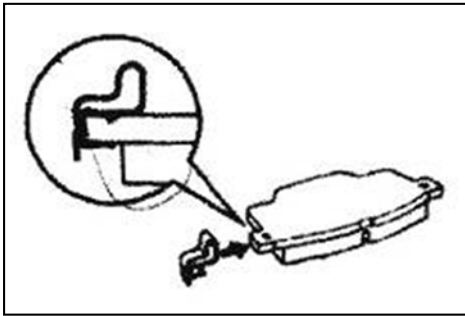
- 2 silencer springs
- 2 brake segments
- 2 silencers
- 4 brake segment supports.



5 - Measure the thickness of the disk.

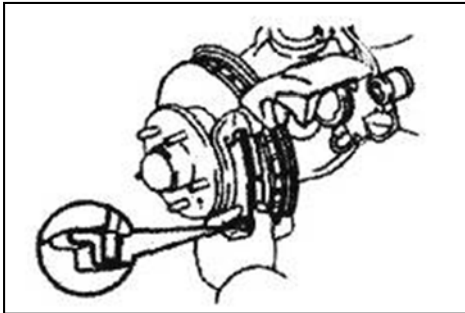
6 - Measure the radial movement of the disk.

7 - Remove the torque plate bolt.



#### 8 - Fit the new brake segment

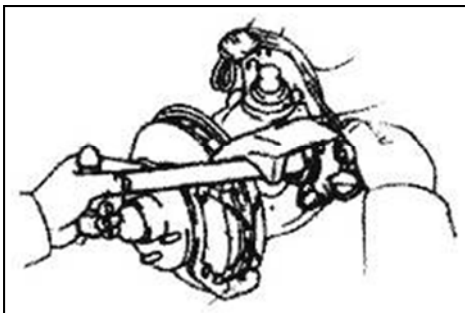
- Fit the wear indicator to the brake segment
- Fit the external silencer to the external brake segment.



- Adjust the wear indicator downwards.

**Warning:** Do not leave any oil on any rubber parts.

- Fit the silencer spring at a correct position.



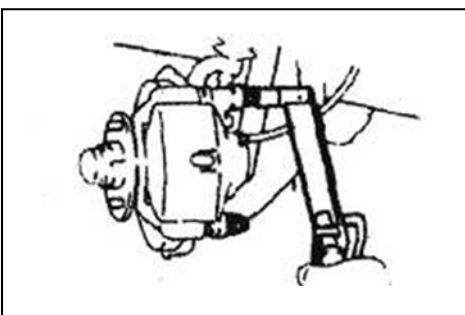
#### 9 - Raise the brake cylinder

- Take a little fluid from the tank.
- Push the piston into the cylinder using a flexible tool.

**Note:** Change one segment at a time, otherwise the piston from another wheel will exit through the press.



- Fix the internal silencer to the piston.
- Check that there is a dust cover when you fix the brake cylinder.

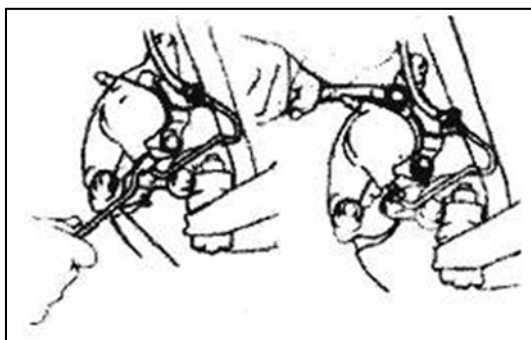


- Tighten the bolts: Torque: 39N.m

#### 10- Fit the front wheel.

#### 11 - Check the brake fluid level; it must reach the "MAX" level

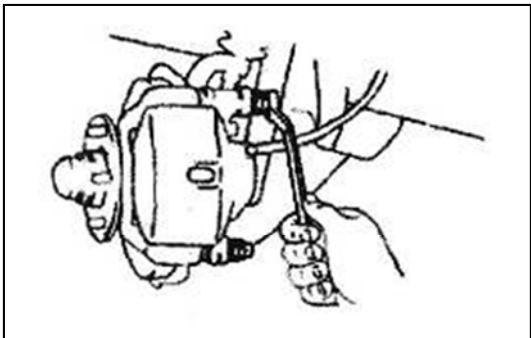




## B - Removing the brake cylinder

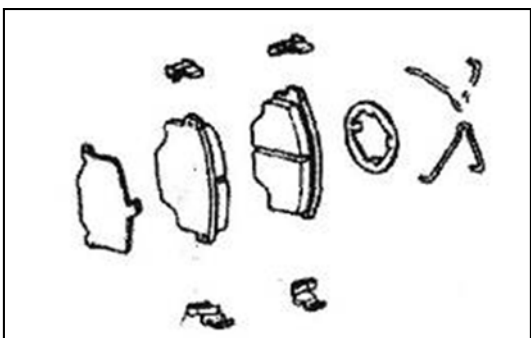
1 - Remove the brake conduit.

- Remove the brake conduit using tools.  
Recover the brake fluid in a tub.
- Remove the cylinder support.

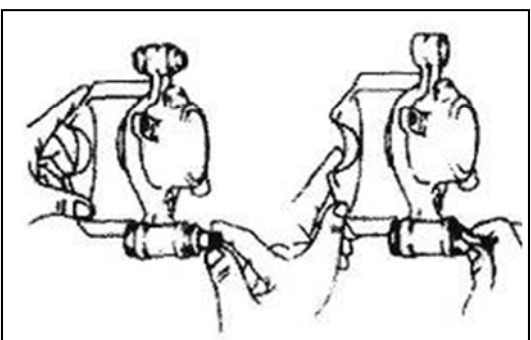


2 - Remove the torque plate cylinder.

- Remove the 2 bolts and the cylinder.



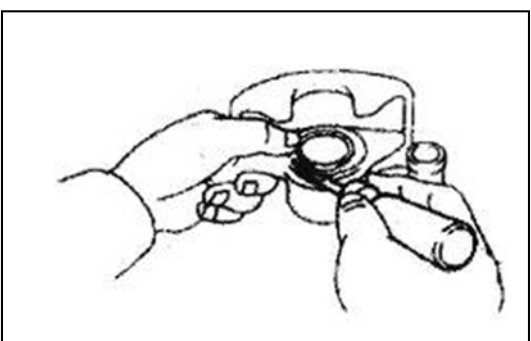
3 - Remove the brake segment



## C - Removing the brake cylinder

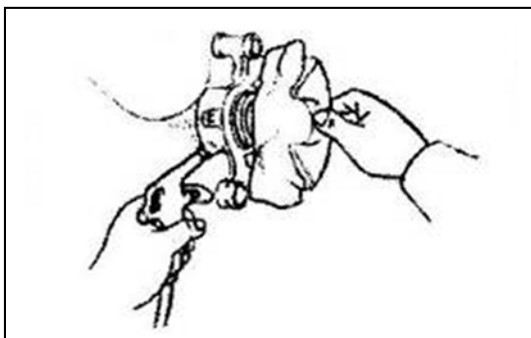
1 - Remove the parts below:

- 2 dowels
- 4 dust cover
- 2 axis rings



2 - Remove the drop hose from the axis ring then the dust cover.

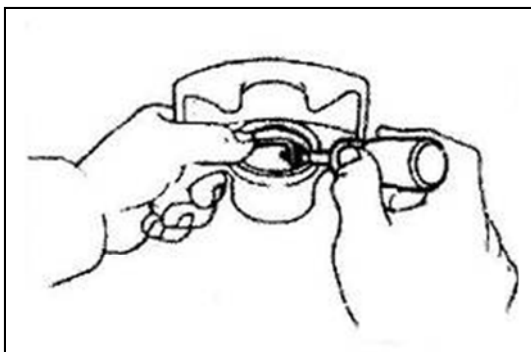
- Remove the drop hose and the dust cover using tools.



3 - Remove the piston from the cylinder.

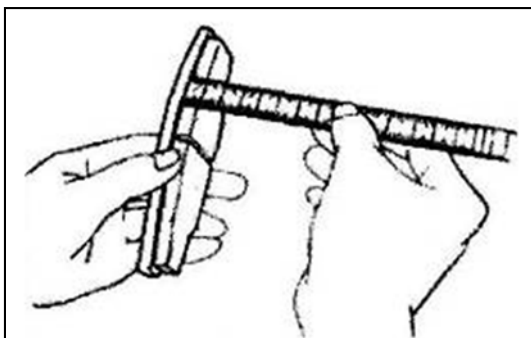
- Place a cloth between the piston and the cylinder.
- Remove the compressed air piston.

**Warning:** Do not place your hand in front of the piston when using compressed air.



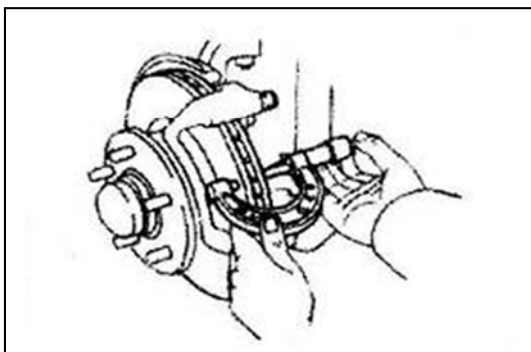
4 - Remove the piston seal from the cylinder.

- To do so, use a screwdriver.

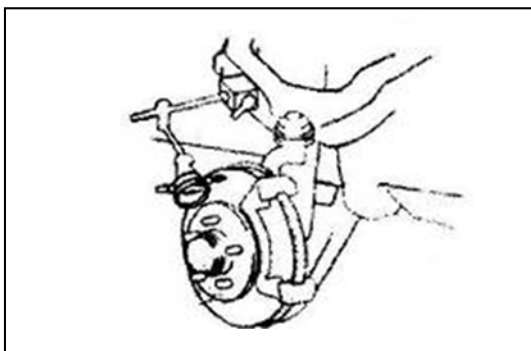


#### D - Checking the front brake parts

- 1- Measure the thickness of the brake segment.  
Standard thickness: 9.5 mm  
If the thickness is less than the minimum (1.0 mm) or unequal wear marks are present, change the brake segment.

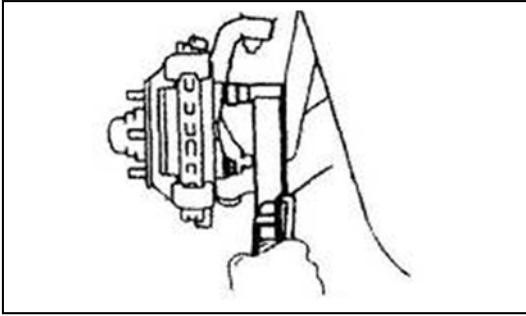


- 2- Measure the thickness of the disk.  
Standard thickness: 25mm  
Minimum thickness: 23mm  
If the disk presents unequal wear or the thickness is less than the minimum, change the disk.



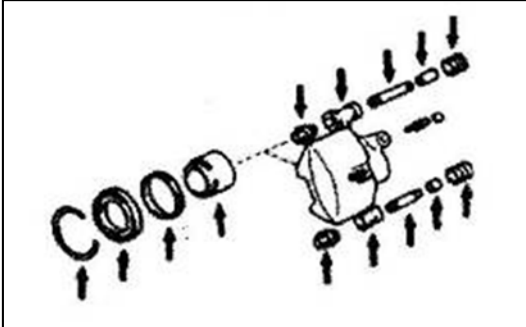
3 - Measure the disk swing.

Note: Check that the front bearing is correctly positioned before measuring.  
The disk swing near the edge must be less than 10  $\mu$ m.  
Maximum swing: 0.09mm



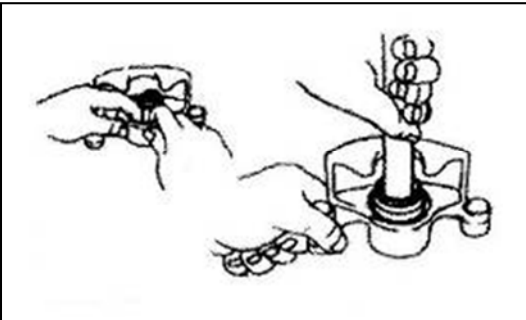
#### 4- Change the disk (if necessary)

- Remove the torque plate from the ball joint.
- Remove the hub.
- Remove the disk from the hub.
- Fit the new disk and tighten the bolts.  
Torque: 64N.m
- Fit the hub and adjust the front bearing preload.
- Fit the torque plate onto the ball joint.  
Torque: 85N.m

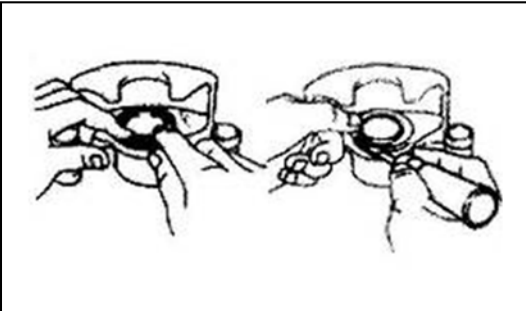


### E - Fitting the cylinder

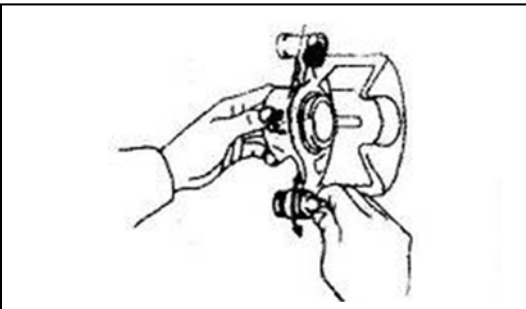
- 1 - Coat the parts indicated on the diagram with lithium grease.



- 2 - Fit the seal and the piston on the cylinder.



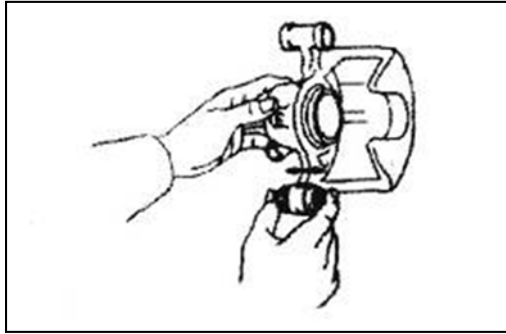
- 3 - Assemble the drop hose and the dust cover.



- 4 - Assemble the axis ring, the dust cover and the dowels.

- Fit the axis ring and the dust cover on the cylinder.
- Check that the dust cover is properly secured in the groove.





- Insert the dowel into the dust cover.
- Check that the dust cover is properly secured in the groove.

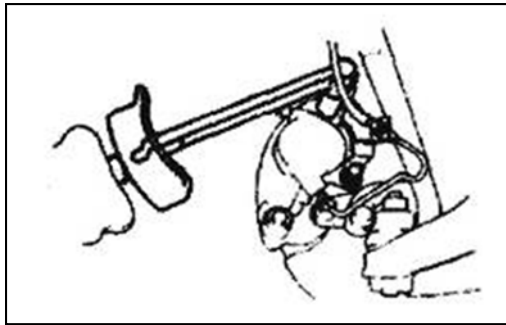


## F - Fitting the cylinder

1 - Fit the brake segment

2 - Assemble the cylinder.

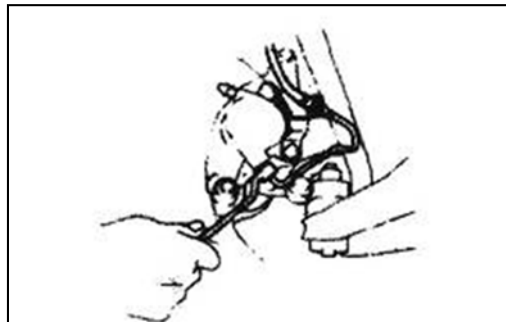
- Fit the cylinder.
- Tighten the bolts: Torque: 55N.m



3 - Connect the brake conduit to the cylinder.

- Fix the support to the cylinder. Torque: 18N.m

- Connect the brake conduit to the cylinder using tools. Torque: 15N.m



4- Pour brake fluid into the tank and bleed the air circuit.

- Check any fluid leaks.

## 3-4-ASSEMBLY - DISASSEMBLY

### 3-4-1-INFORMATION ON ASSEMBLING THE BELT

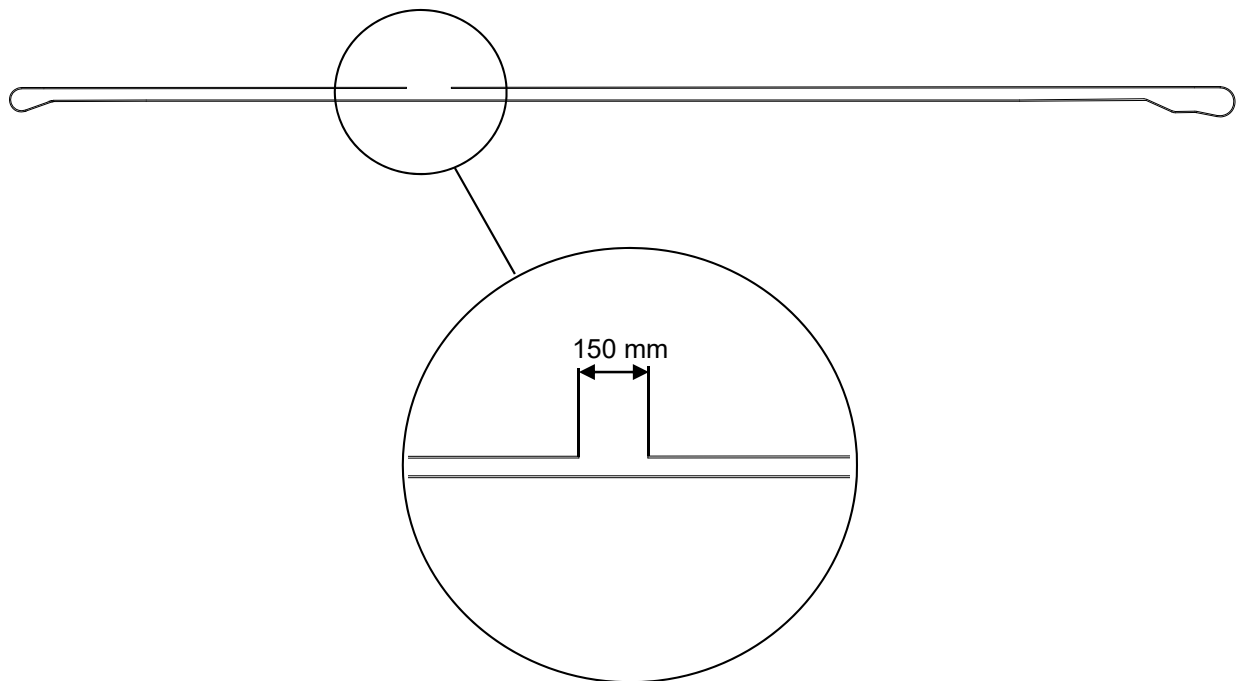
When installing a belt on the NBL boom, it is normal to see an area of 150 mm between its two ends as shown on the diagram below.

#### STAPLED BELT:

TLD tension tools TLD (P/N ° 9900059) are used to seal the stapled belts.

#### GLUED BELT:

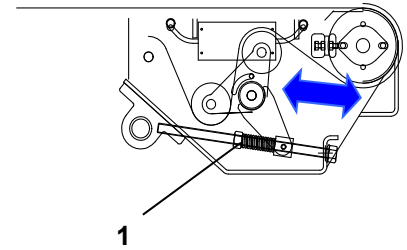
The tension tools used to seal the glued bands is in the possession of the professionals who carry out the gluing process.



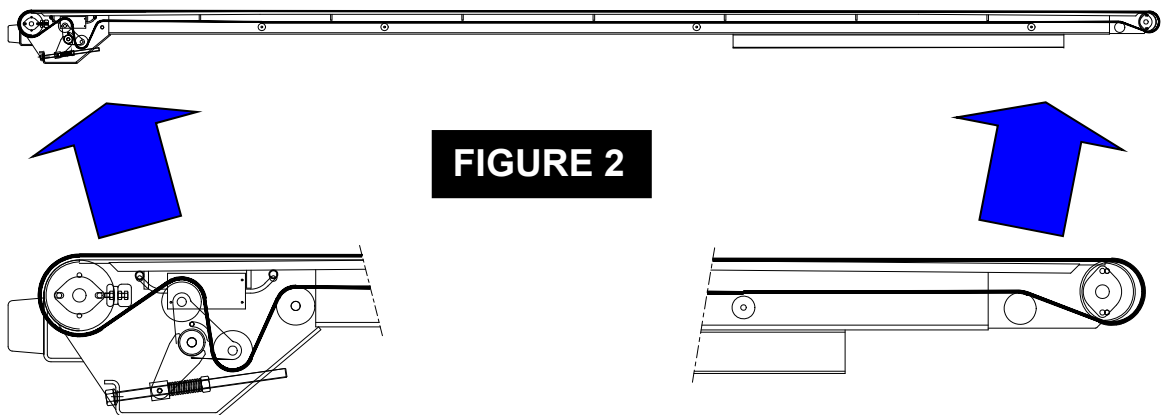
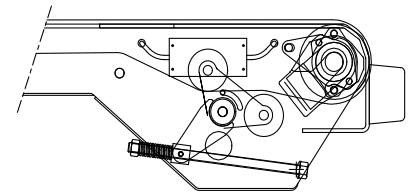
### 3-4-2-MOUNTING THE BELT

#### 1) Mounting the belt with the tools

- \* Loosen the rear tightener using the nut **item 1 fig.1** ;
- \* Install the belt on the boom according to the diagram **fig.2-1-2** ;
- \* Loosen the 4 nuts **item 3 fig.3** on the tool and insert the two ends of the belt between the tightening plates **item 1 and 2 fig.3** then tighten them again to hold the belt;
- \* Tighten the two screws **item 4 fig.3** to tighten the belt and bring the two ends together;
- \* Staple using piano wire **item 5 fig.3**, then fold back the two ends on it correctly;
- \* Remove the tools then set the tension and adjustment according to the instructions in **fig.4**.

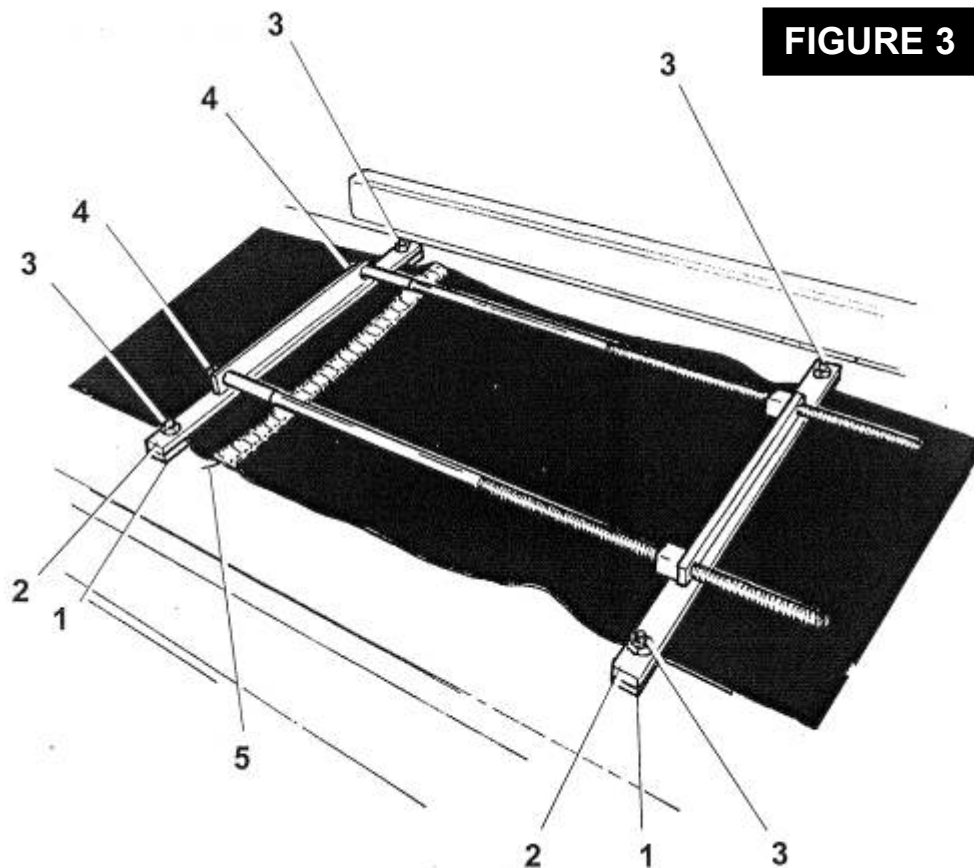


**FIGURE 1**



**FIGURE 2**

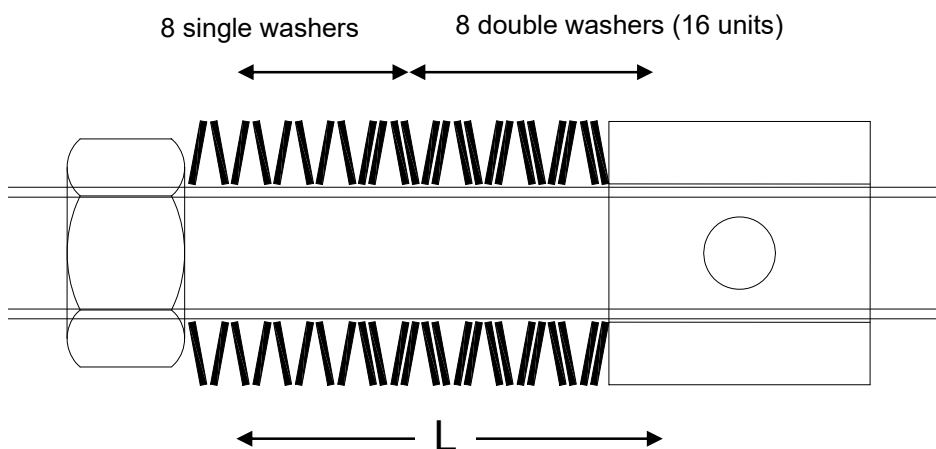
### 3-4-3-MOUNTING THE BELT (CONT)



**FIGURE 3**

### 3-4-4-MOUNTING THE BELT (CONT) - TENSION (SEE ADJUSTMENTS)

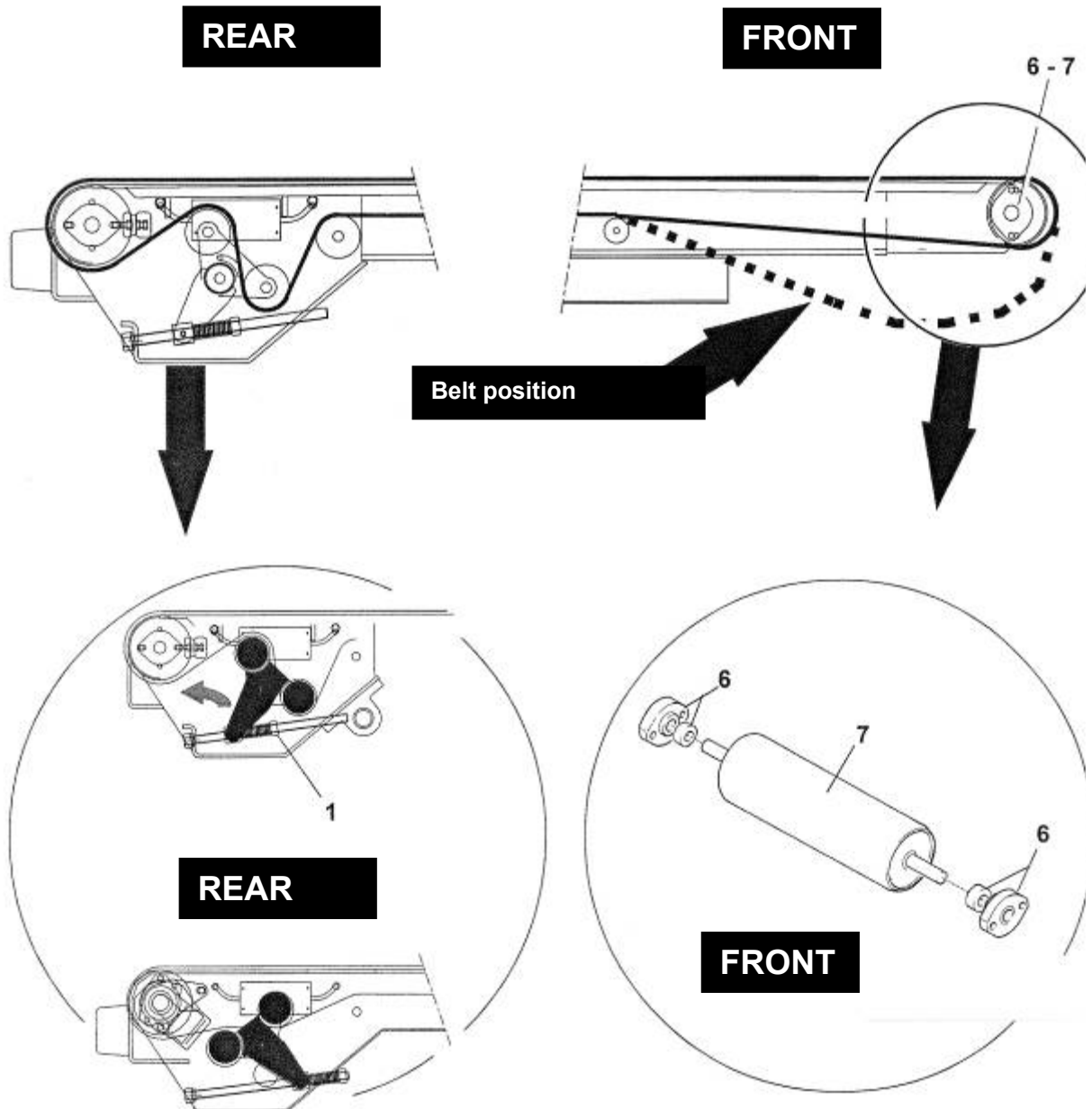
**FIGURE 4**



- Tighten the screw until "L" = 68 mm

### 3-4-5-REMOVING THE FRONT ROLLER ("GLUED BELT" VERSION)

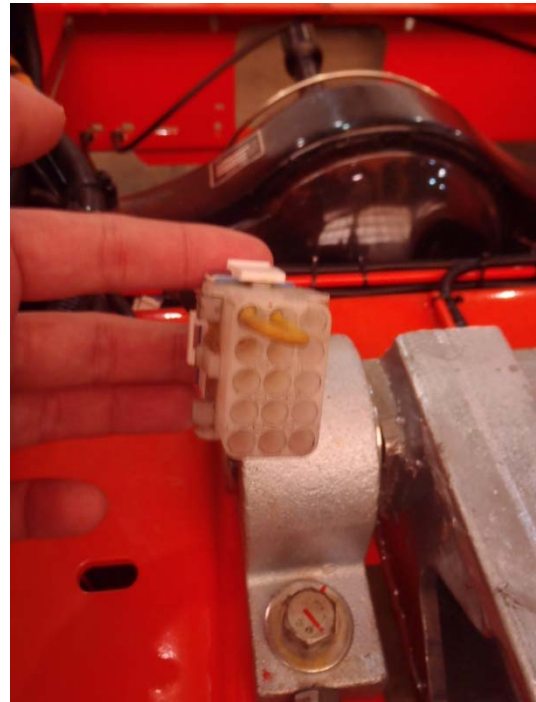
- 1) Make sure that the boom is in low position and activate the battery disconnect;
- 2) Loosen the rear tightener using the nut **item 1**; the belt must then be slack (see diagram below) to enable the levels and the roller to be loosened and removed **item 6** **item 7**.





### 3-4-6-MOUNTING THE BOOM

1) In order to install the boom on the NBL, you will need to start the NBL. You will then have to bypass electrically the “emergency-stop” buttons on the boom electrical connector. Find the electrical connector at the rear of the chassis and install a jumper block like shown below.



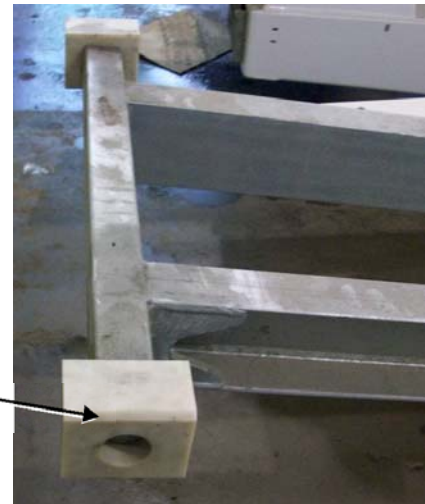
#### 2) Boom installation on the chassis

2.1. Install the sliding blocks at the front with the chamfers outwards and install the bearings at rear with washers inside..



Washers

Chamfers



2.2. Apply clear loctite grease “High Performance synthetic grease” inside the tracks of the boom.



2.3. Apply clear Loctite grease “High Performance synthetic grease” on the sliding blocs.

2.4. Attach the boom with slings.







2.5. Start the engine and raise the front system.

2.6. With the crane, raise the boom, bring it near to the front system and slide slowly the blocs into the rails.



2.7. Pass a tap M12 in the threaded holes of back of the boom.



2.8. Start the engine, raise the rear system at the maximum and install the safety support on the hydraulic cylinder.



2.9. Prepare the bolt with a washer, a sleeve and apply Loctite 243 on the threads.

2.10. Screw the bearings against the boom.





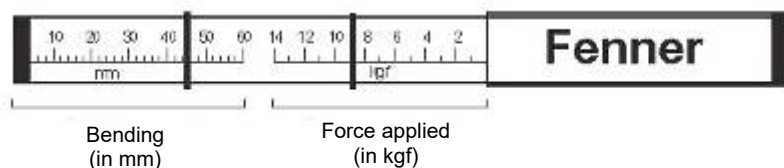
2.11. Remove the jumper from the electrical connector installed at step 1 and connect the boom.

2.12. Remove the plugs from the 2 hoses located at rear of the chassis and connect them to the boom hydraulic system. Test the belt rotation for proper direction. If the direction is inverted, shut off the NBL and invert solenoid valves in the control panel. Attach the hoses and the cable together and against the lifting system in a way the hoses move freely with the rear lifting system without getting damaged.





### 3-4-7-INSTRUCTIONS FOR FITTING AND MAINTAINING THE FENNER TENSION METER TO MEASURE THE BELT TENSION



The high performance of the toothed belts depends on the accuracy of their tension. Therefore, we recommend that you use the FENNER Tension meter which is available in stock from your stockist or our depot.

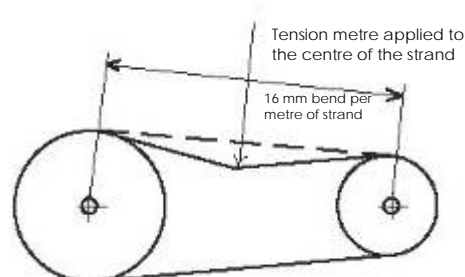
#### Instructions

1. Extend the length by one strand, expressed in metres by 16 to obtain the bend in mm.
2. Align the lower marking ring with the mark that corresponds to the bend calculated in 1.
3. Place the upper marking ring against the lower end of the sliding tube.
4. Place the Tension meter on the top of the belt in the centre of the tightened strand and apply a force perpendicular to this strand until the lower marking ring coincides with the top of the neighbouring belt.
5. The force applied is read just on top of the upper marking ring on the kgf scale.
6. Compare this force to the value in kgf mentioned in the table below.

If the force measured falls within the given limits, the transmission has been correctly tightened. If the force measured falls below the range, the transmission is insufficiently tightened. You must then retighten the transmission to the upper value in the table to take account of the normal drop in tension which will occur during the running-in period.

When the transmission has been running for a few hours, check the voltage again and readjust it to the upper value indicated in the table.

NOTA: For single belt transmission, you must place a rule along the belt to act as a marker to measure the bending.



TENSION FORCES				SPACER ADJUSTMENT RUNS in mm					
Profile metre belt	Diameter of the small pulley (in mm)	Force required to bend strand tightened by 16 mm per Kilogram/ force(kgf)		Primitive length of the belt (mm)	Mounting adjustment				Adjustment tension
		Newton (N)			Z SPZ	A SPA	B SPB	C SPC	
SPZ	63 to 95	10 to 15	1.0 to 1,5	410 to 480					5
	100 to 140	15 to 20	1.5 to 2,0	530 to 830					10
				850 to 1160					15
	90 to 132	20 to 27	2.0 to 2,7	1170 to 1500					20
	SPA			1510 to 1830	20				25
SPB	140 to 200	28 to 35	2.8 to 3,5	1840 to 2170					30
	160 to 224	35 to 50	3.5 to 5,1	2180 to 2330		25			40
	236 to 315	50 to 65	5.1 to 6,6	2840 to 3500			30		60
				3520 to 4160				50	60
	224 to 355	60 to 90	6.1 to 9,2	4170 to 5140					70
SPC	375 to 560	90 to 120	9.2 to 12,2	5220 to 6150					85
DELTA	335 & above	150 to 200	15.3 to 20,4	6180 to 7420					105
Z	56 to 100	5 to 75	0.5 to 0,8	7600 to 8390					125
A	80 to 140	10 to 15	1.0 to 1,5	8880 to 10170					145
B	125 to 200	20 to 30	2.0 to 3,1	10670 to 12500					175
C	200 to 400	40 to 60	4.1 to 6,1						
D	355 to 600	70 to 105	7.1 to 10,7						

The adjustment runs indicated in the table above are lower than the recommendations in standard ISO 155 due to the characteristics of the constant belts.



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