Boughton Engineering Limited

Operation & Maintenance Manual

Power-Reach

PR18 Skiploader

Incorporating Optional

IntacoVa Sheeting System

Original Instructions.

"Over a century of British Engineering experience"

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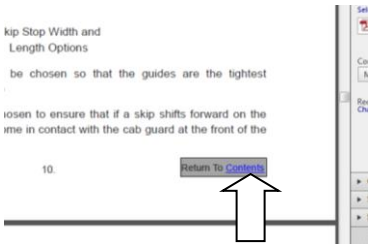

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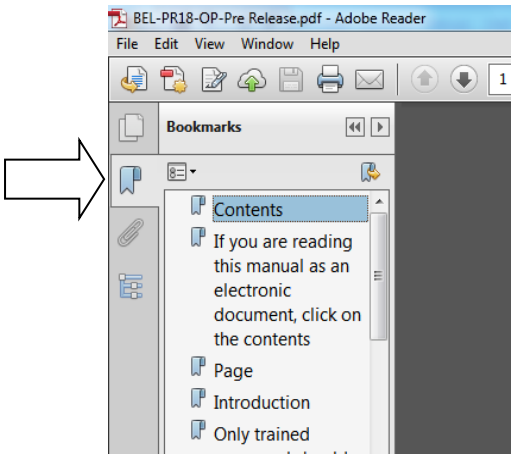

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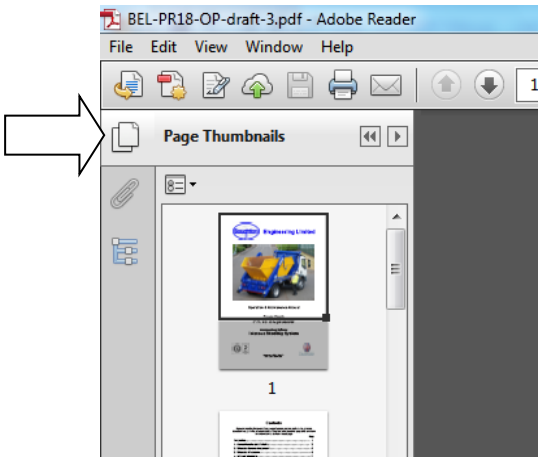

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Contents

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Introduction

This manual has been produced, by Boughton Engineering Limited, to ensure that users of the PR 18 Skiploader have the information required to operate the equipment safely.

It is the responsibility of the operator's management to ensure that all health and safety requirements, relating to the use of this equipment, are assessed and that all personnel who use the equipment are aware of its functionality and limitations.

Only trained personnel should use this equipment.

A Copy of this manual should be kept in a safe place in the vehicle cab. All users of the equipment should be made aware of the location of the manual and should be instructed to read through and familiarise themselves with its contents prior to operating the equipment.

The following symbols have been used, in this publication, to bring certain items relating to safety to the attention of the user of the equipment: -

Highlights a risk to personnel or the general public which could result in serious injury or death.

Highlights a risk to the equipment due to improper use.

Please take note of these symbols and take action to avoid unsafe operation of the equipment.

The information contained in this manual is correct at the date of publication.
Boughton Engineering Limited reserves the right to modify the design and/or construction of its products, at any time.

1. General Function and Limitations

WARNING
Failure to observe the limitations of the equipment and using non approved skips may result in serious injury, death and/or damage to the equipment.
This equipment must never be used: -

- **To carry persons or animals.**
- **To raise the vehicle to change a tyre or conduct any other maintenance.**
- **To lift or pull any item other than approved skips.**

The PR 18 skiploader is designed for transporting materials contained in skips. The equipment allows the operator to lift and load empty and loaded skips onto the bed of the vehicle or lift and unload empty and loaded skips onto the ground.
In addition, this equipment can be used to tip skips provided that they have been designed for this purpose.

NOTE: This equipment you are using has been supplied to meet your specific requirements. Please ensure that only skips which meet the requirements of the original specification are used with this equipment.
Before lifting ensure that the skip dimensions are compatible with the equipment and that the skip is in sound condition.

Refer to CHEM TS14 – Skip Group B and Group C, for guidance on the general dimensions for skips which are suitable to be used with this equipment.
It is the responsibility of the user to determine the suitability of the equipment for loading and unloading skips which deviate from the specifications contained in this standard.

Before lifting ensure that the container dimensions are compatible with the equipment and that the container is in sound condition.

WARNING
Failure to observe the maximum permitted payload and/or plated axle loads may result in instability of the equipment during loading and unloading and/or instability of the vehicle when driving. Serious injury, death and/or damage to the vehicle or skiploader equipment may result.

The maximum permitted payload, for which this equipment is approved to lift and carry, is quoted on the load plate.

Maximum transferable loads are quoted for lifting from ground level.

For lifts below ground level the maximum transferable load will decrease.

Your Skiploader has been individually load tested after fitting to the chassis. It will operate with complete safety, provided the maximum transferable load, quoted on the load plate, is not exceeded.

Due to the variety of skip sizes that may be loaded, responsibility to ensure that the vehicle axle loads remain within the limits specified by the chassis manufacture and meet the requirements of any applicable legislation remains with the driver.

Note: The equipment maximum transferable loads, quoted on the load plate, may exceed the maximum payload for which the vehicle is plated. Do not drive the vehicle on the highway if there is any doubt that the payload is within the limits required for the vehicle to operate legally.

Failure to observe plated and legislated axle loads may result in prosecution and /or damage to the vehicle.
This manual also includes operating instructions for the Boughton Engineering Limited's Intacova sheeting system. This system is optional and may not be fitted to all vehicles.

The Intacova sheeting system is designed to make sheeting of loaded skips a quick and safe operation. Sheeting of the load is achieved remotely via the control block.

Loaded skips should be sheeted to ensure that the contents remain within the skip during operation on the highway.

Boughton Engineering Limited has designed and manufactured this equipment to meet all relevant safety regulations. The equipment design has taken into account ease of operation and maintenance, conforms to the requirements of the EU Machineries Directive 2006/42/EC , EMC Directive 2014/30/EU and, where applicable, the Radio Equipment Directive 2014/53/EU This Equipment is CE marked in accordance with these directives.

This machinery emits A-weighted sound power up to a maximum level of 110 dB measured by tests laid down in SI 2001/170.

It is recommended that, when operating this equipment for prolonged periods, ear defenders are worn.

WARNING
Always keep clear of moving parts when the skiploader equipment is operating. Failure to observe this warning may result in serious injury or death from pinching and crushing hazards.

As with all machinery, during operation there are moving parts which pose a risk of pinching or crushing. Always apply the clearance zone rule, Section 8 point 2, when operating the equipment, to ensure that any risk to the public or animals is limited. The operator of the equipment should also consider pinching and crushing hazards and keep clear of all moving parts.

WARNING

Correct maintenance of this equipment is essential for safe operation. Always maintain the equipment to the schedule prescribed in the maintenance manual.

NEVER operate the equipment if there is a known fault. Take the vehicle out of service and affect a repair before returning into service.

ALWAYS use approved spares and recommended fluids and lubricants. Non approved items may seriously affect the performance and will increase the risk of a failure which may result in serious injury, death and/or damage to the equipment.

Any maintenance required on the skiploader equipment should be conducted by a qualified technician.

Spare parts used during repair and maintenance procedures must be approved by Boughton Engineering Limited.

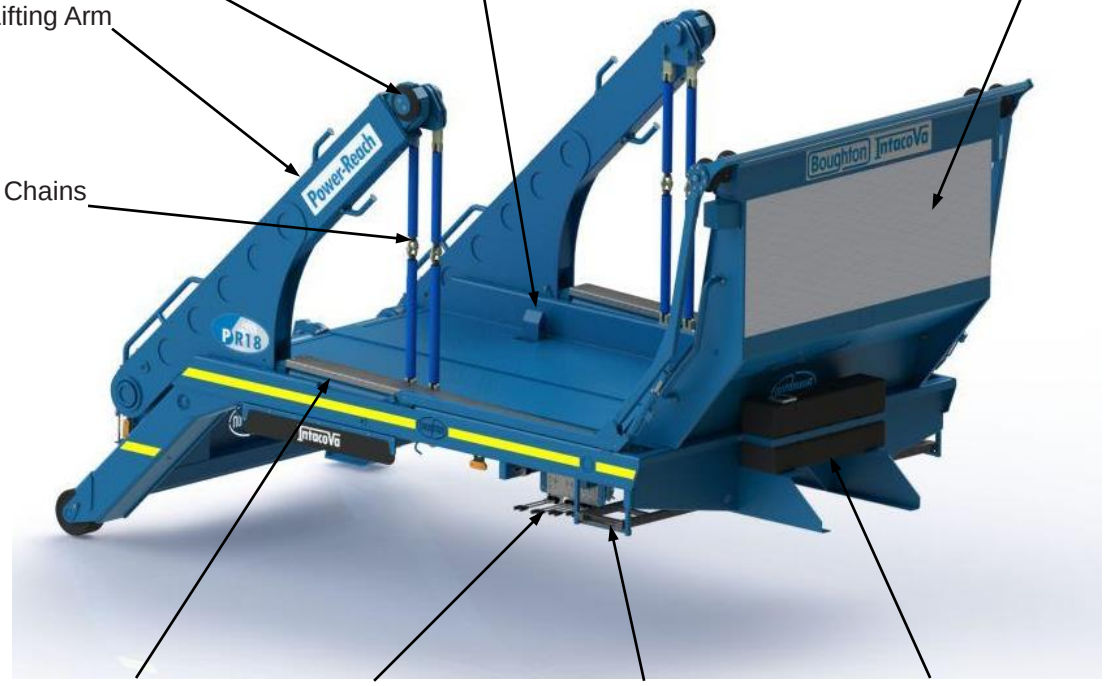
Please refer to the equipment maintenance section of this manual, Section 10, and the PR18 spare parts catalogue, S1001-ML-580, for information on procedures for maintaining the equipment in a safe operational condition.

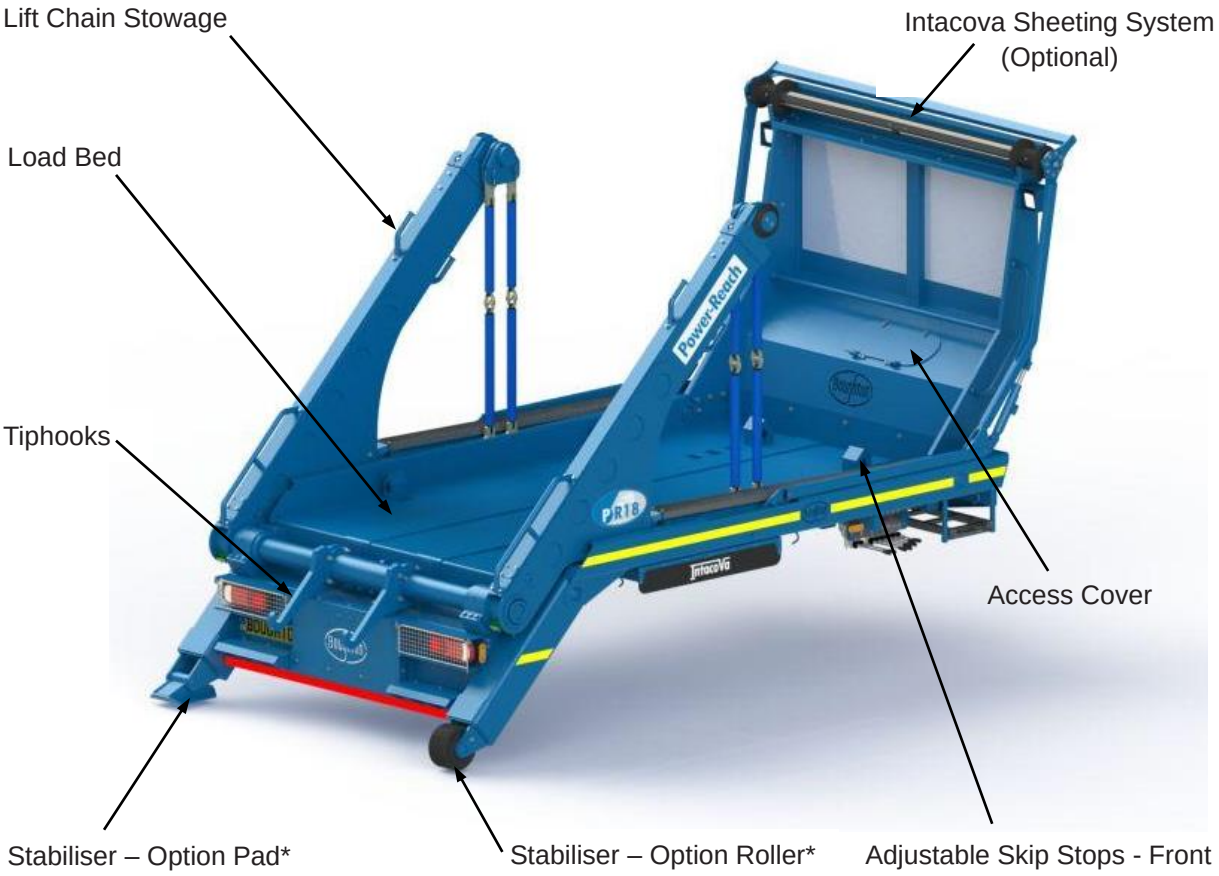
The operation and maintenance of optional components, fitted to your vehicle, such as towing hitches, load cells, auto-lube systems etc. are covered in the component manufacturers manuals supplied with the vehicle.

Where optional components are fitted the operator must read through the contents of these manual(s) before operation.

Refer to the optional component manuals for all maintenance schedules and procedures.

2. Skiploader General Arrangement

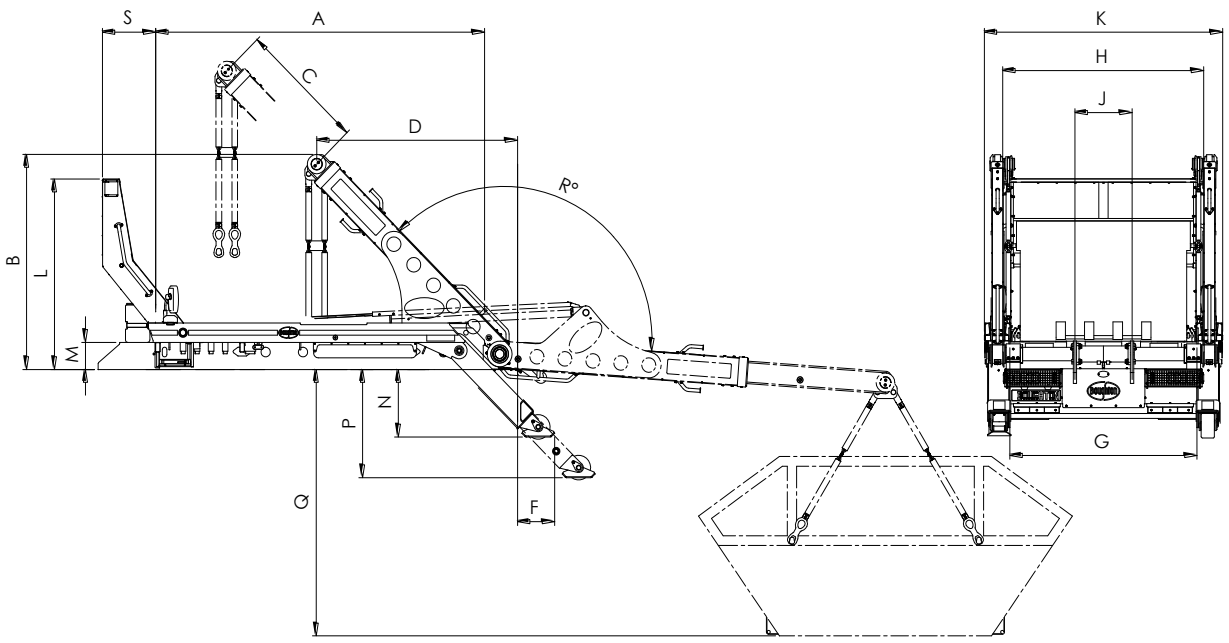




* All skiploaders will have flat feet (Pad) rear stabilisers fitted unless the chassis is fitted with front axle parking brakes, in which case, roller stabilisers can be fitted

3. Skiploader Weights & Dimension

Model: Power-Reach – PR 18 (Standard Model Only)

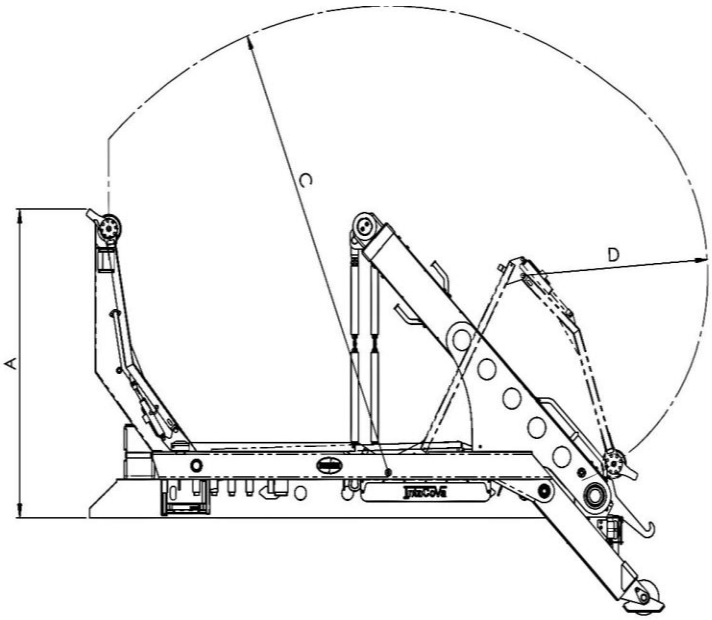


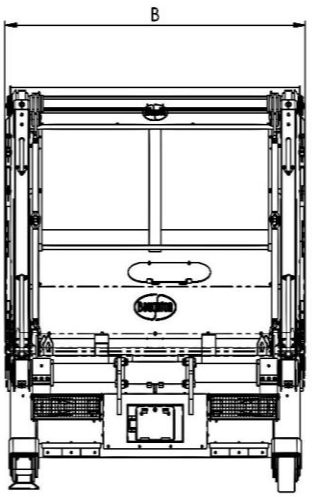
A	Bed Length (Standard equipment only)	3520 mm
B	Height from top of chassis	2214 mm
C	Arm extension	1370 mm
D	Chassis cut-off to load centre	2149 mm
E	Overall length	4884 mm
F	Chassis cut-off to stabiliser (raised)	397 mm
G	Bed width	1990 mm
H	Distance between lift arms	2127 mm
J	Distance between tip hook centres	610 mm
K	Overall width	2540 mm
L	Overall height from top of chassis to top of cab guard	1963 mm
M	Chassis bed height	293 mm
N	Top of chassis to stabiliser (raised)	683mm
P	Top of chassis to stabiliser (lowered)	1116mm
Q	Maximum lift from below ground	2147mm
R	Load arm angle of rotation	139°
S	Cab guard overhang	567mm

Weight of Skiploader including PTO/Pump and hydraulic oil (excluding sheeting system)	3650kg
Safe working load (SWL) - arms in	12500kg
Safe working load (SWL) - arms out	7500kg

4. Intacova Dimensions

The information in this section relates to the Intacova sheeting system. This system is an optional fitment and may not be installed on all vehicles.





IntaCova Dimensions

A	Height from top of chassis	2244mm
B	Maximum width	2550mm
C	Main arm maximum radius	3392mm
D	Secondary arm radius	1572mm

Cycle Times

To sheet at 1500rpm	24 seconds
To unsheet at 1500rpm	24 seconds
To sheet at tick over	31 seconds
To unsheet at tick over	31 seconds

Container Sheeting Range

4yd³ (3.06m³) - 16yd³ (12.23m³)

Containers should comply with C.H.E.M. standards

5. Operating Parameters.

The following table provides information on the limits of use of the equipment and the input and output characteristics of the systems when the equipment is operating.

Warning

DO NOT operate the equipment if the ambient temperature is above or below the maximum and minimum values specified.

Where the ambient temperature is lower than the minimum fluid working temperature, the equipment must be "warmed up" prior to any load/unload or tipping procedure being conducted.

When operating in high ambient temperatures care should be taken not to exceed the maximum fluid working temperature.

Failure to observe the temperature limits specified will adversely affect performance and may damage the equipment.

Ensure that the limits quoted are adhered to. If the equipment operates outside of these limits, use of the equipment should be suspended and the vehicle should be taken out of service and inspected, by a qualified technician, to determine the cause of any deviation from the characteristics quoted.

Continuing to operate the equipment outside operating parameters may damage the equipment and/or cause serious injury or death.

	Skiploader PR18
Maximum Lift Capacity	12500 kg
Minimum Ambient Temp. - Operating	-20^{0}C
Maximum Ambient Temp. - Operating	+40^{0}C
Maximum Working Pressure (Hydraulic)	230 bar
Maximum Fluid Working Temp. (Hydraulic)	+70^{0}C
Minimum Fluid Working Temp. (Hydraulic)	-2^{0}C*
Maximum Pump Flow Rate (Hydraulic)	82 litres /min
Maximum Fluid Contamination Level (Hydraulic)	19/17/14 to ISO 4406
Maximum Supply Pressure (Air)	10.4bar
Minimum Supply Pressure (Air)	7bar
Maximum Working Pressure (Air)	5bar
Maximum Fluid Operating Temp. (Air)	+70^{0}C
Minimum Fluid Operating Temp. (Air)	-10^{0}C*
Maximum Flow Rate (Air)	125 litres/min

***Operating in Low Temperatures**

Where minimum fluid working temperatures are higher than the ambient temperatures i.e., when the outside temperature is lower than the minimum fluid working temperatures, the equipment should be put through a warm-up cycle prior to conducting any load/unload or tipping procedure.

To warm up the equipment operate the lift cylinders by operating the main arms control levers, see page 9. Raise and lower the front beam, several times, to warm up the air and hydraulic fluid.

The warm-up cycle should be conducted, prior to each load/unload or tipping procedure, if the time between procedures allows the air and hydraulic fluid to cool below the minimum fluid working temperatures.

6. Main Control Valve Block Overview

The skiploader equipment is operated using the hydraulic control block situated under the skiploader bed, behind the cab.

The type of control block fitted varies depending on the age of the vehicle and whether the equipment is fitted with a remote-control system.

After July 2022, where a remote-control system is fitted and the hand-held controller is activated, to control the equipment, the hydraulic control block joysticks are deactivated.

Tip Hook Control

Levers - A B C D E F G H

Standard Hydraulic Control Block –
No Remote-control option fitted.
Remote-control Option Fitted **BEFORE** July 2022.

Tip Hook Control **Joystick - A B C D E F G H**

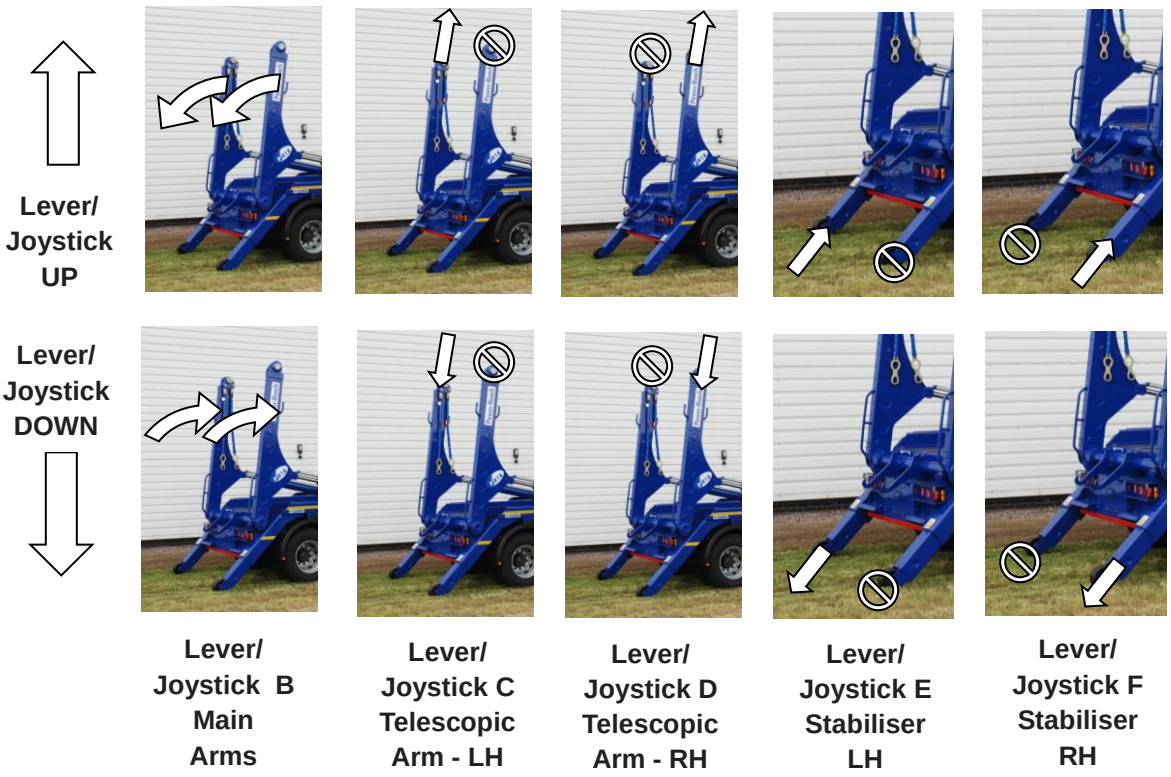
Alternative Hydraulic Control Block
Remote-control Option Fitted **AFTER** July 2022

Lever/Joystick A – Hold to run - must be in either the up or down position when operating the equipment.
In the up position the equipment can conduct a fast offload sequence provided that any skip lifted is EMPTY.
During load or unload sequences, with loaded skips, lever/joystick A must be in the down position.

Note: All levers/joysticks operate on the dead man principle and return to the neutral position if released. To activate any of the controls the user must apply pressure, to lever/joystick A, at all times.

Levers/Joysticks G and H operate the Intacova sheeting system. These levers/joysticks will not be present if the Intacova system is not fitted to your vehicle.

Standard Control Functions – Levers/Joysticks B,C,D,E & F



Note: When extending or retracting the telescopic arms or the stabiliser legs operate both levers/Joysticks at the same time to synchronise left and right sides. Fine tune to level off by operating one or another lever/joystick.

Operate Levers/Joysticks Together to Synchronise.

Standard Control Functions – Tip Hook Control

The tip hook control, located above and to the left of the control levers, raises and lowers the tip hooks.

Pre-July 2022 the tip hook control was a push/pull button type.

Post July 2022 the tip hook control is a joystick type.

When tipping, the tip hooks must be in the raised position. For all other operations, the tip hooks must be lowered.

Pull Button or push joystick Up to Raise

Push Button or push joystick down to Lower

Tip Hooks

Optional Control Functions – Levers/Joysticks G & H

Levers/Joysticks G & H are only present on the control panel if the optional Intacova sheeting system is fitted to the vehicle.

Lever/ Joystick UP

Lever/ Joystick DOWN

Lever/Joystick G Sheeter Main Arms

Lever/Joystick H Sheeter Secondary Arms

7. Remote Operation Handheld Controller Overview

The Boughton remote operation handheld controller is an optional system which may not be fitted to your vehicle.

The Boughton remote operation handheld controller is a portable wireless unit which can be used to operate all skiploader functions with the exception of the tiphooks.

Tiphooks must be operated using the hand operated body mounted control.

Remote Control Main Controls

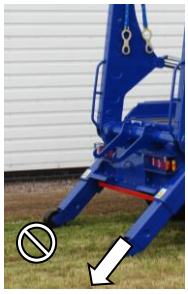
1 - Start Button
2 - Emergency Stop Button
3 - Hold to Run Button
4 - Push Button Keypad
5 - Sheeting System Toggle - Main Arms
6 - Sheeting System Toggle - Secondary Arms
7 - Indicator LED
8 - Indicator LED

Item 4 - Push Button Keypad Functions

Left Button Functions		Right Button Functions
Main Arms - Off Load - Slow/Fast*		Main Arms - Load
Telescopic Arm - Extend Both		Telescopic Arm - Retract Both
Telescopic Arm - Left (NS)-Extend		Telescopic Arm - Right (OS)-Extend
Telescopic Arm - Left (NS)-Retract		Telescopic Arm - Right (OS)-Retract
Stabiliser - Left (NS)-Extend		Stabiliser - Right (NS)- Retract
Stabiliser- Left (OS)-Extend		Stabiliser- Right (OS-Retract

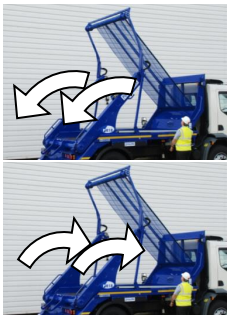
*Note - The "Main Arms Off Load" Button operates at two positions. For slow off load depress the button halfway (first click). For fast off load depress the button fully (second click).
All other buttons operate the equipment at a single speed with the button depressed either halfway or fully.

A summary of the skiploader functions, operated by the push buttons, are detailed below:-

Main Arms	Telescopic Arm -	Telescopic Arm - Left	Telescopic Arm - Right	Stabiliser Left	Stabiliser Right
					
Offload/Fast Offload	Extend	Extend	Extend	Extend	Extend
					
Load	Retract	Retract	Retract	Retract	Retract

Items 5 & 6 - Toggle Switch Functions (Where Fitted)

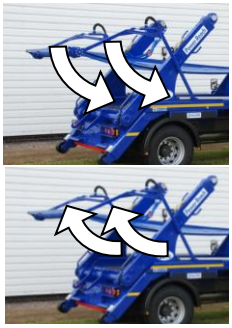
Sheeting System Main Arms



Extend

Retract

Sheeting System Secondary Arms



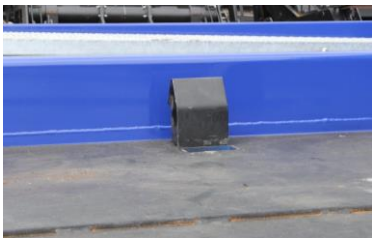
Extend

Retract

8. Adjustable Skip Stops

This vehicle is fitted with sockets towards the front and along the sides of the load platform. Six skip stop blocks are supplied with the vehicle, two for positioning at the front of the platform and two pairs for positioning down the sides.

Adjustable Front Skip Stops

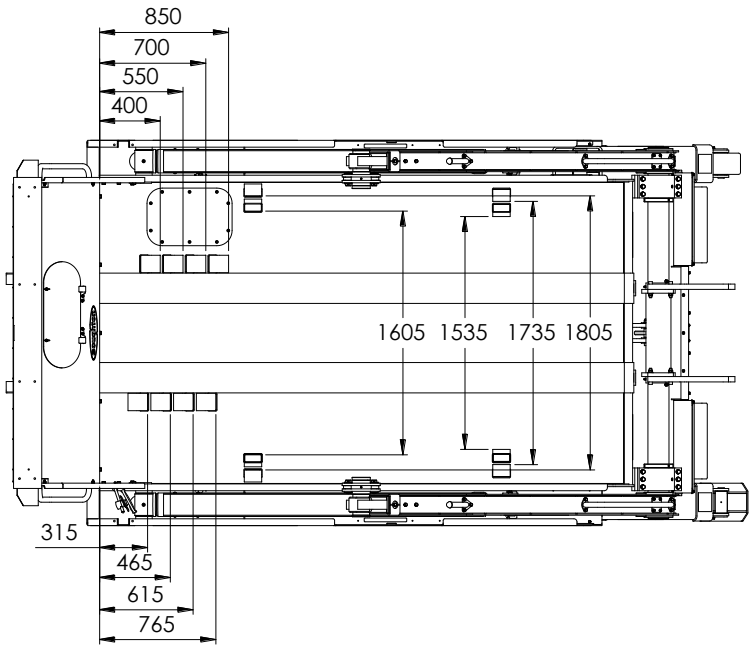


Adjustable Lateral Skip Stops

The skip stops, when fitted, restrain any potential forward or sideways movement of any skip loaded onto the vehicle.

Each stop is asymmetrical giving two stop positions for each socket depending on which way around the stop is inserted into the socket.

For the front stops there are effectively 8 positions.
For the side stops there are effectively 4 positions.



Skip Stop Width and
Length Options

Side skip stop positions should be chosen so that the guides are the tightest practical fit to the width of the skip

Front stop positions should be chosen to ensure that if a skip shifts forward on the platform no part of the skip can come in contact with the cab guard at the front of the load bed.

9. Warning Lights

WARNING

It is the drivers' responsibility to always ensure that the vehicle is operated within overall heights, specified on the vehicle height notice located in the cab, and that before using the vehicle on the highway the sheeting system, if fitted, is in the driving position, the stabilisers are retracted the telescopic arms are retracted and main arms are in the fully down position

Failure to ensure that the vehicle is readied for driving on the highway may result in a collision, serious injury or death, damage to the vehicle structure and/or an unstable load.

Warning lamps are included to provide the operator with guidance relating to the position of certain parts of the equipment.

The operator MUST always make a visual check of the equipment to ensure that the vehicle is readied for driving.

Always ensure that, before driving on the highway, all RED warning lamps are extinguished.

A warning system is fitted to advise drivers when the skiploader equipment has not been returned to the correct position to give the minimum travel height.
The warning system also indicates when the rear stabilisers have not been retracted to a safe driving position

Note: The minimum travel height is the height of the skiploader equipment with the telescopic arms fully retracted and the main arms in the fully down position. The height quoted on the vehicle height notice, located in the vehicle cab, relates to the equipment when at the minimum travel height.

Operating the vehicle outside the overall height limit specified on the vehicle height notice may result in prosecution.

The warning system fitted may be one of two types:-

Type 1 – Current System Fitted to All New Vehicles

A single warning light is located either within the cab dashboard display or as a separate light positioned on the dash (exact location is dependent on the base vehicle make and model).

An optional blue indication light may also be fitted near to the red warning light.

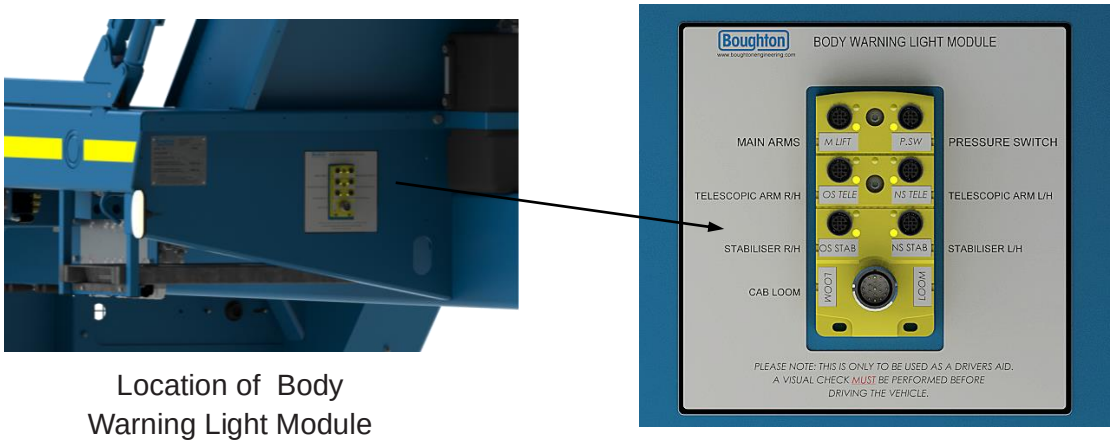
The standard red warning lamp will illuminate when sensors detect:-

1. Stabiliser feet not in fully raised position.
2. Telescopic arms not in fully retracted position.
3. Main arms not in fully down position.

The optional blue indication lamp will illuminate when the sensors detect that the sheeting system is NOT in the stowed position. This lamp is intended to provide the driver with an indication of the position of the sheeting system. When the sheeting system is deployed this lamp will remain illuminated. The sheeter indication lamp is not a warning lamp and the vehicle can be driven with the lamp illuminated.

If the red warning light illuminates the vehicle driver should leave the cab and ascertain which of the above items is out of position.

The vehicle is fitted with a display, located on the front of the skiploader bulkhead, indicating which item(s) is out of position.



Location of Body
Warning Light Module

The driver should check the display to see which lights are illuminated, indicating an item out of position.

Note: The pressure switch lamp is illuminated when a signal is sent to set auto revs when operating the equipment. When illuminated this lamp does not indicate that the equipment is out of its minimum height position and does not indicate that there is a fault with the system.

The driver should engage the power take off (P.T.O) and using the appropriate lever, see section 6. , operate the equipment to reposition the item(s) indicated by the display warning light.

When all the lights are extinguished, on the body warning light module, the driver should check to see that the in-cab red warning light is also extinguished.

A further visual check of the equipment must be made, by the driver, before the vehicle is driven on the highway.

Always ensure that the vehicle is not driven on the highway until all of the warning lamps have been extinguished and the P.T.O is disengaged.

It is recommended that the vehicle driver conducts a check when the equipment has been operated and:-

a) the P.T.O is engaged.
b) the stabilisers are extended
c) the telescopic arms are extended
d) the main arms are rotated to the rear.

With the equipment in this state check the body warning light module display, located on the front of the skiploader bulkhead. All lights on the display must be illuminated indicating that the auto revs signal is active, and all of the proximity sensors are detecting equipment is out of the minimum travel height position.

In addition, check the in-cab warning light. If operating correctly this light must also be illuminated.

If any light fails to illuminate the vehicle should be taken for repair by a qualified technician.

Type 2 – Old System - Obsolete.

A bank of three LED warning lamps is located on the dashboard of the vehicle cab.

In Cab
LED Warning
Lamps

The warning lamps are activated by proximity sensors which detect:-

1. Stabiliser feet not in fully raised position.
2. Telescopic arms not in fully retracted position.
3. Main arms not in fully down position.

If any of the LED warning lamps is lit the driver of the vehicle should inspect the skiploader equipment to ascertain the positions of the three items listed above.
The driver should engage the power take off (P.T.O) and operate the skiploader equipment to ensure that it has been returned to the correct minimum travel height and that the stabilisers have been fully retracted.

Always ensure that the vehicle is not driven on the highway until all three of the LED warning lamps have been extinguished and the P.T.O is disengaged.

A further visual check of the equipment must be made by the driver before the vehicle is driven on the highway.

Press Button to Test
LED Operation

The LED warning lamps are fitted with a test button. It is recommended that the driver operates the test button after each load/unload sequence prior to driving off.

The button should be pressed and held. The warning lamp bank is operating correctly if all three lights illuminate. If any light fails to illuminate the vehicle should be taken for repair by a qualified technician

10. General Safety Checks Prior To Operating

WARNING
NEVER operate the equipment if there is a known fault. Take the vehicle out of service and affect a repair before returning into service.
Only qualified technicians should conduct repair of faulty equipment.
Continued use of faulty equipment may result in serious injury, death and/or damage to the equipment.

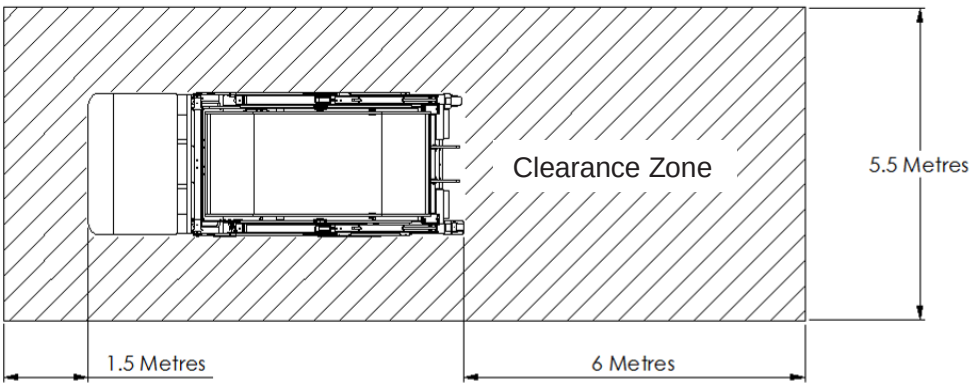
When operating the skiploader equipment it is essential that all precautions are taken to ensure the safety of the driver and the general public.

Operators of commercial vehicles will have procedures in place to minimize risks. These procedures should always be followed. In addition, the following safety checks are specific to skiploader operations and should be conducted prior to any lifting operations:-

1. A general visual inspect of the skiploader equipment should be undertaken. Walk around the vehicle looking for any signs of damage to components.
   Look for patches of fluid under the vehicle. If fresh fluid is detected inspect the vehicle in the area above the patch to see if there are any leaks.
   If damage or leaks are detected take the vehicle for repair by a qualified technician.

2. Before loading or unloading a skip check the ground onto which the vehicle must drive to ensure it is stable enough to support the loads imposed through the stabilising legs.
   The ground should be essentially level. Although the stabilising jacks will level off a limited amount of inconsistency, in ground level, excessive slopes may result in an unstable lift.

3. Ensure that the area around the skip is clear. DO NOT conduct a loading or unloading operation if any person or animal is close to the vehicle or skip. It is recommended that a 1.5 metre clearance zone, around vehicle and skip, is applied.



4. Check the area above the vehicle and lifting equipment. DO NOT lift if there is any risk of a collision.

5. When unloading ensure that there is adequate space to accommodate the skip. To reduce the risk of a crushing hazard it is recommended that there is space all around the skip when unloaded.

6. Check the skip prior to lifting to ensure that it is in sound condition. Take particular note of the condition of the lifting lugs and, if tipping, the tipping bar.
   If loaded check that the load is safely inside the skip and cannot fall out during the lift.
   It is the operator's responsibility to ensure that a skip is not overloaded. Check the skip load. If there is any doubt that the skip may be overloaded DO NOT attempt a lift.

7. Check the lifting chains to ensure that they are in sound condition. Make sure that the chains are not knotted or twisted.

WARNING
Lift chains are critical safety components.

DO NOT attempt to modify the lift chains by changing their length.
DO NOT attempt repair of chains by cutting or welding.

If a chain is damaged or worn beyond usable limits it must be replaced.

Serious injury and/or damage to the vehicle may result from using damaged or worn lift chains.
WARNING

Refer to Maintenance Procedure 3 for details relating to the inspection of the lift chains

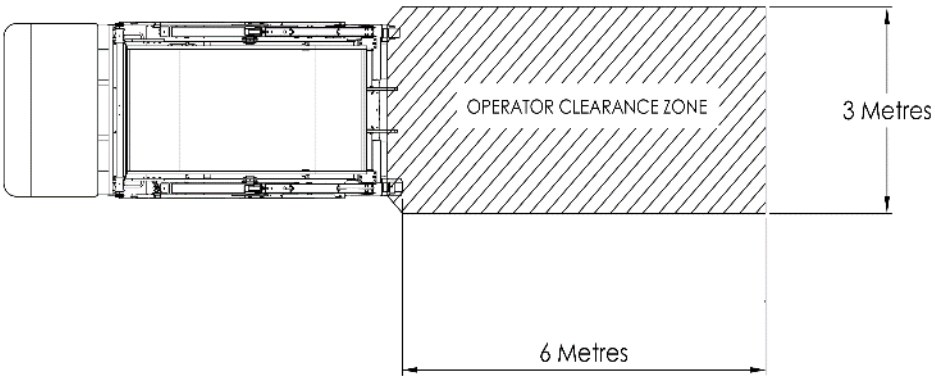
8. Where a vehicle is fitted with an optional remote operation handheld controller the following procedures must be followed:-

   8.1 Before proceeding to the operating instructions, which follow, operators must familiarise themselves with the location and function of each button/switch as described in the overview section above.

   8.2 Operator must leave the vehicle cab after engaging the PTO and ensuring that the remote-control system switch is in the "REMOTE" position. Operators must remain outside the vehicle during any skiploader operation.

   8.3 The vehicle and equipment must remain clearly visible to the operator when the system is active and during any load/unload and tipping sequences.

   8.4 When operating the system, the operator must remain outside of the clearance zone shown in figure below:-



11. Operating the Skiploader Equipment

In these instructions the following symbols are used to indicate the correct levers/joysticks to operate when completing an instruction:-

Note: In the following instructions the tiphook control is assumed to be the newer joystick control. For vehicles fitted with older push pull controls, where the instruction requires that the joystick is pushed up, the button should be pulled out. Where instruction requires that the joystick is pushed down the button should be pushed in.

Note: Limit the operation of the hydraulic system to 30 minutes at a time where possible. Excessive operation will warm up and thin the hydraulic fluid resulting in reduced performance.

For optional remote-control operation refer to Section 7 ,Remote Operation Handheld Controller Overview, for equivalent functions.

Remote Operation Handheld Controller Start Sequence (Not Applicable to All Vehicles).

For vehicles fitted with the optional remote operation handheld controller the following start sequence must be followed:-

In Cab Dash Mounted Switch

To switch on and operate to switch on and operate remote controller:-

1) Ensure that the in-cab dashboard mounted switch is moved to the "REMOTE" position.

   Note: With the switch in the "MANUAL" position it is not possible to operate the equipment using the remote controller.

2) Ensure that the emergency stop button is in the out (run) position. If the emergency stop is in the pushed in (stop) position pull the button fully out. Note: It is not necessary to turn the button to set it to the out (run) position

3) Depress the start button. Keep the button depressed until the green LED indicator light (A) illuminates then release the start button.

4) Depress and release the "EXTEND O/S LEG" button on the main keypad.

5) Depress and release the start button. The green LED indicator (A) should now flash quickly to indicate that the controller is communicating with the receiver fitted to the vehicle.

6) Depress and release the start button . The green LED indicator (A) will revert to a slow flash to indicate that the system is now activated.

7) Depress the "Hold to Run" button on the side of the controller unit. This is a two-position button which must be held at the first position (depressed halfway) to enable the keypad and toggle switches to be used to operate the equipment.
Note: The button second position (fully depressed) is a safety feature to prevent accidental operation. If the "Hold to Run" button is in the fully depressed position the keypad and toggle switches are disabled.

   The "Hold to Run " button must be held at its first position throughout any operation of the skiploader equipment.

8) The keypad and toggle switches are now active. Press the keypad button or toggle the switch relevant to the required function.

9) To switch off the remote controller functions release the "Hold to Run button".
To completely shut down remote controller press the emergency stop.
The system will automatically completely shut down after 5 minutes of inactivity.
To shut of power supply to the remote-control receiver move the in-cab switch to the "MANUAL" position.
If further operation is required, after complete shutdown, the start sequence will need to be repeated, go to 1).

Remote Controller LED Light - System Status

Green LED (A)
Off - Transmitter Off.
Steady On - Transmitter On - No Communication With receiver.
Fast Flash - Transmitter and Receiver Communicating - Press START button to send commands.
Slow Flash - System Active - Commands Can Be Sent.

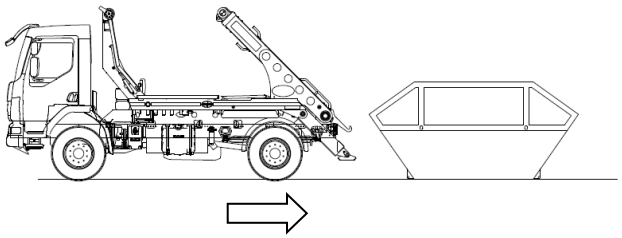
Red LED (B)
Off - Transmitter OK.
Steady On During Start Up - The Stop Button Is Pressed In (Stop Position) or Damaged.
Slow Flash (1 Flash/Second) - Battery Has Less Than 1 Hour Run Time.
Fast Flash - Battery Has A 10 Minute Run Time.
LED Flashes 3 Times/Sec During Start Up - Battery is flat

For problems indicated by any other LED sequence please contact Boughton Engineering Limited.

11.1 Loading a Skip

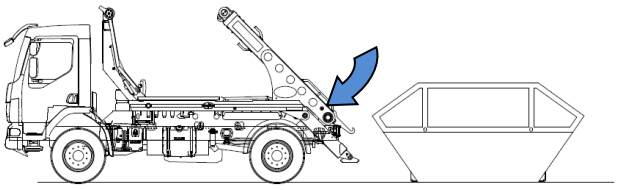
Prior to starting operation read through the "General Safety Checks Prior To Operating" section 10, and assess the skip and its location to ensure that it is suitable for lifting.

1. Reverse skiploader vehicle to a position in front of the skip. Position the rear of the vehicle as close to the skip as possible.

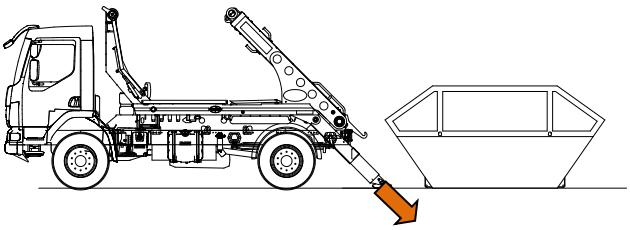


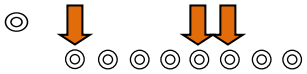
2. Apply hand brake.
3. Engage PTO.
4. Check that the tip hooks are in the down position.

   If the tip hooks are up, push the tiphook joystick down to lower.



5. Extend stabiliser legs. The legs should be extended so that the load is just removed from the rear suspension.

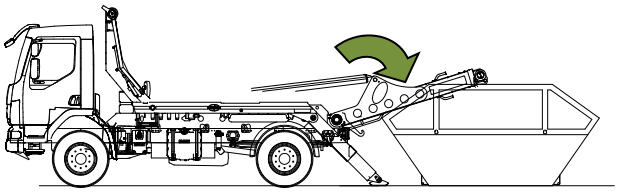


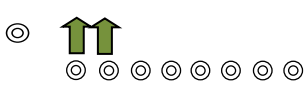


Note: The stabilisers should be used to level the rear of the vehicle. The rear wheels should remain in contact with the ground to retain the effectiveness of the handbrake.

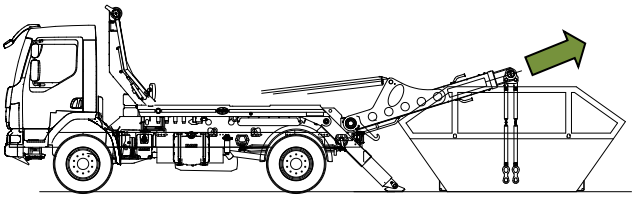
6. Rotate the main arms. Use the fast offload (move lever A up).

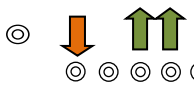
   Rotate arms until the chain pivot is just above skip top.





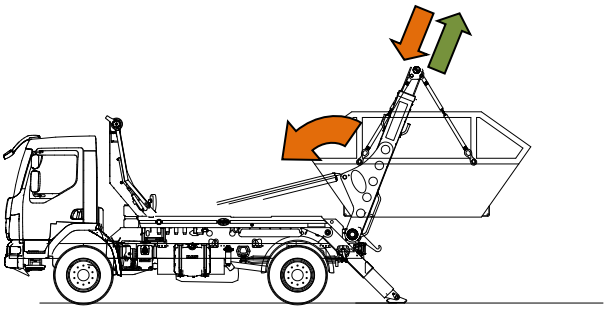
7. Extend the telescopic arms, if necessary, to place the chain pivot centrally over the skip lifting lugs.

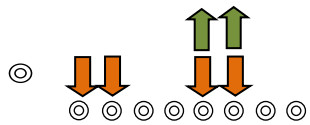




8. Attach the four chain key plates to the lifting lugs. Ensure that the plates are fully over the lug and that the chains are not twisted or tangled.

9. Lift the skip off the ground using the main arms.
   Note: To ensure that the skip does not collide with the rear of the vehicle use the telescopic arms to increase clearance. Keep the skip as close to the vehicle as possible whilst maintaining clearance.

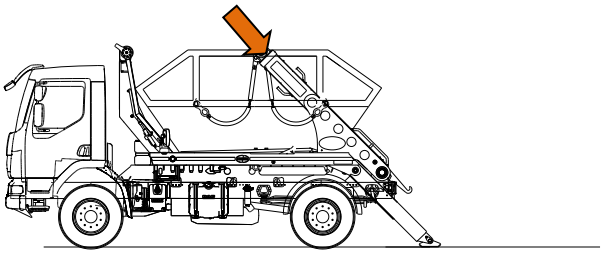


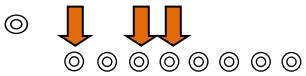


Stop the loading cycle just prior to the skip resting on the load bed and check that the skip stops have been correctly positioned.

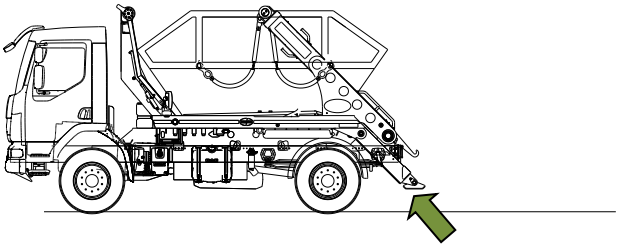
WARNING
Do not attempt to reposition the skip stops with the skip supported on chains over the platform. Remove the skip from over the load bed reposition the guides then reload the skip. Failure to observe this warning will result in a potential crushing hazard which may cause serious injury or death.

10. With correctly positioned skip stops complete the loading sequence by resting the skip on the load bed.
    Ensure that the main arms are rotated to the fully down position and that the telescopic arm is fully retracted.





11. Retract the stabiliser legs.



Prior to driving on the highway, a check should be made to ensure that the vehicle and its load are safe.
Check the in-cab warning light(s). If lights are illuminated check:-

1) Main arms.
2) Telescopic arms
3) Stabilisers

Refer to section 9.

If no sheeting system is fitted and the vehicle is ready to depart ensure that the PTO is disengaged.

If the vehicle is fitted with an Intacova sheeting system deploy the sheeting system prior to driving off, see below.

11.2 Deploying Intacova Sheeting System

The Intacova sheeting system (when fitted) must always be deployed when carrying a loaded open top skip to prevent potential loss of load during transit.

1. With the skip in position on the vehicle load bed activate the Intacova main arms bringing the sheeting system over the skip.

2. Operate the main arms until the sheeting roller has rotated beyond the rear of the skip.

3. Activate the Intacova secondary arms. The sheeting roller will move forward, in an arc, pulling the sheet over the rear of the skip. Continue operating the secondary arms until the roller contacts with the main lifting arms.

With the sheeting system deployed disengage the PTO prior to departure.

11.3 Retracting Intacova Sheeting System

WARNING
During transit, Intacova Sheeting System must be in either the Fully Stowed or Fully Deployed positions to avoid damage to sheeter equipment.

Prior to unloading or tipping a skip ensure that, if fitted, the Intacova sheeting system has been retracted.

1. Engage PTO.

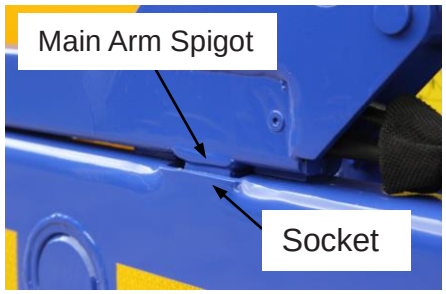
2. Rotate secondary arms away from the rear of the skip.

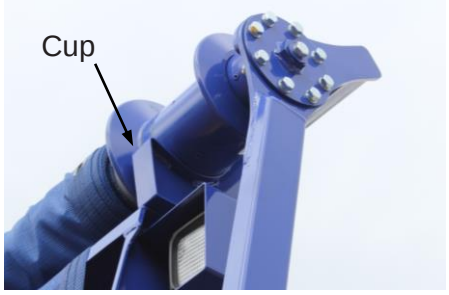
3. Ensure sheeting roller is clear of the rear of the skip before proceeding.

4. Activate the Intacova main arms to bring the sheeting system over the skip towards the load bed cab guard.
   A continual check must be made to ensure that no collision takes place between the Intacova and any other part of the vehicle structure during this operation.

5. The Intacova sheeting system is fully retracted when the main arm spigot is engaged in the socket on the side rave of the load bed and the sheet roller is sitting down in the cups at the top of the cab guard.

   It may be necessary to further use the sheeter main arm and secondary arm controls to ensure that the system is fully retracted and, in the drive, away position.



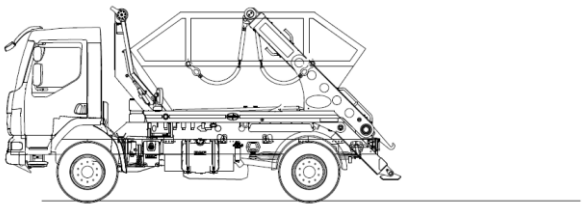


11.4 Unloading a Skip

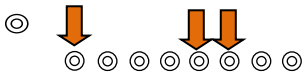
Prior to starting operation read through the "General Safety Checks Prior To Operating" section 10, and assess the proposed unload location to ensure that it is suitable.
Take particular note of the available space and stability of the ground and ensure that there is adequate clearance behind the vehicle to accommodate the skip when unloaded.

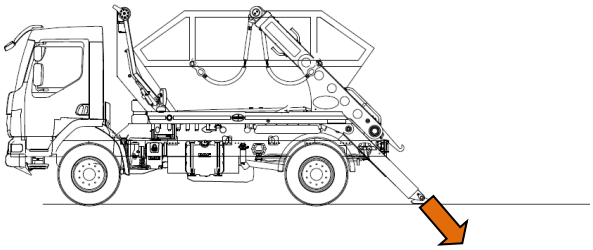
Any sheeting must be removed from the skip prior to commencing the unloading procedure. Refer to section 11.3 for instructions on retracting the Intacova sheeting system.

1. Drive the vehicle into position.
2. Apply handbrake.
3. Engage PTO.



4. Extend stabiliser legs. The legs should be extended so that the load is just removed from the rear suspension.

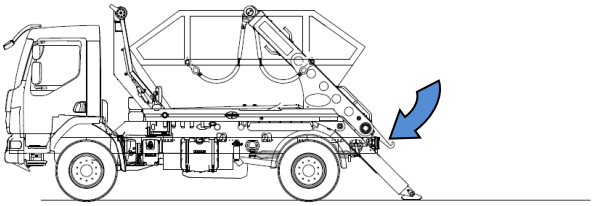




Note: The stabilisers should be used to level the rear of the vehicle. The rear wheels should remain in contact with the ground to retain the effectiveness of the handbrake.

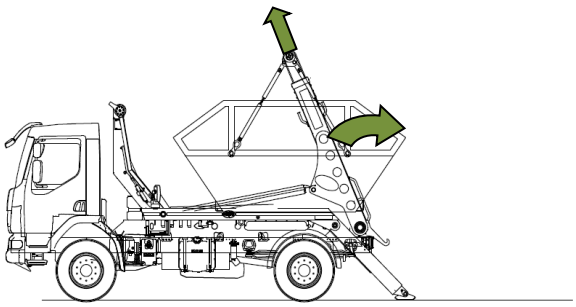
5. Check that the tip hooks are in the down position.

   If the tip hooks are up, push the tip hook button in to lower.



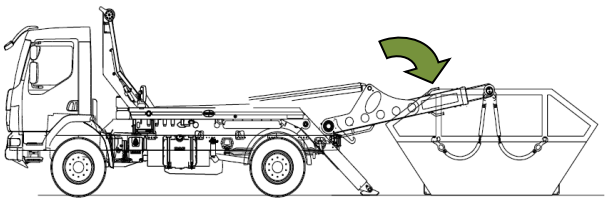
6. Check that all four chains are securely attached to the skip lifting lugs.

7. Rotate the main arms and lift the skip off the load platform.
   Note: It may be necessary to extend the telescopic arms, prior to lifting, to avoid the skip dragging back along the platform. Check that the chain pivot is central over the skip just as the chains tighten.

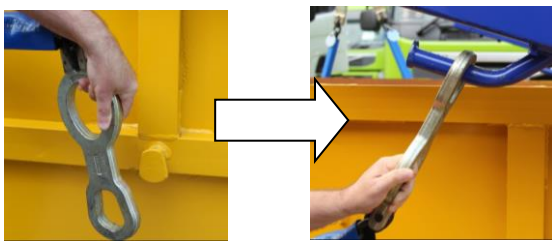


Note: If an empty skip is being unloaded the fast unload facility may be used. Lever A and lever B should be in the up positions for fast unload. This function will not operate if an attempt is made to lift a fully loaded skip.
Note: When operating in fast unload mode the main arm lever will operate in the unload direction when in the up or down position. Care must be taken if circumstances arise which require the skip to be reloaded onto the vehicle. Lever A and lever B must be moved to the down position to facilitate reloading of the skip.

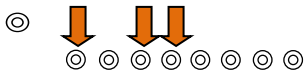
8. Continue the off load using the main arms.
Rotate the skip over the rear of the vehicle and onto the ground.
Continue rotating the main arms until there is sufficient slack in the lift chains to allow them to be disconnected from the skip lifting lugs.

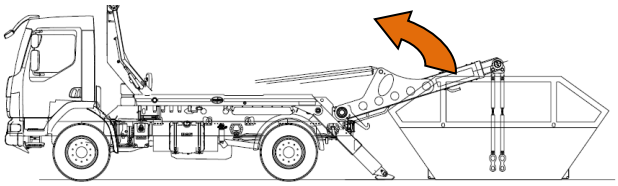


9. Detach the chains from the skip lifting lugs and stow on the chain hooks provided on the main lift arms.

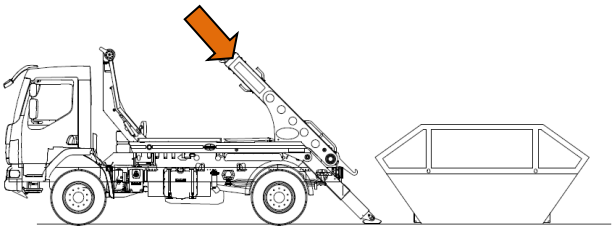


10. Rotate main arms until they are in the fully down position.

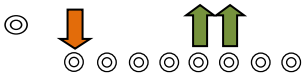


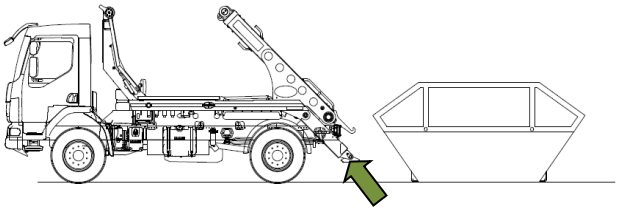


11. Retract telescopic arms around until they are in the fully down position.



12. Retract the stabilisers.





A check should be made to ensure that the vehicle skiploader system is correctly set up prior to driving on the highway.

Check the in-cab warning light(s). If lights are illuminated check:-

1) Main arms.
2) Telescopic arms
3) Stabilisers

Refer to section 9.

Disengage the PTO prior to departure.

11.5 Tipping a Skip

The following procedure applies to tipping a skip using the standard fitment tip hooks. Where tip chains are fitted to your vehicle see section 12.3 for tipping with tip chains.

WARNING
During the tip cycle, if the load does not discharge, under no circumstances should anyone attempt to dislodge the load manually with the skip in the tipped condition. Return the skip to the horizontal position and repeat the tip cycle.
Do not walk behind the vehicle at any time when tipping.
Unexpected discharge of the skip load may result in serious injury or death.

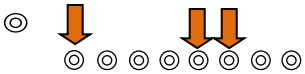
WARNING
Never over tip. Check chain tension during the tip cycle.
If, during the tip cycle, chains go slack stop immediately and return the bin to a stable position where all chains are in tension.
Continuing to tip when chains have slackened off will result in the bin detaching from the tip hooks, becoming unstable and unpredictable and may result in damage to the equipment and/or serious injury or death.

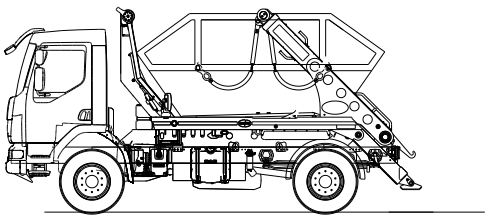
The skiploader system can be used to tip a loaded skip provided the skip is equipped with tipping bars designed for the purpose.

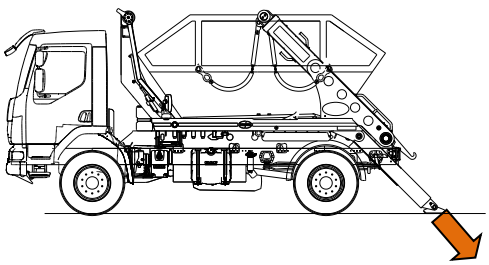
Prior to starting operation read through the "General Safety Checks Prior To Operating" section 10, and assess the skip and the intended tipping location to ensure that they are suitable.

Any sheeting must be removed from the skip prior to commencing the tipping procedure. Refer to section 11.3 for instructions on retracting the Intacova sheeting system.

1. Drive the vehicle into position.
2. Apply handbrake.
3. Engage PTO.
4. Extend stabiliser legs. The legs should be extended so that the load is just removed from the rear suspension.



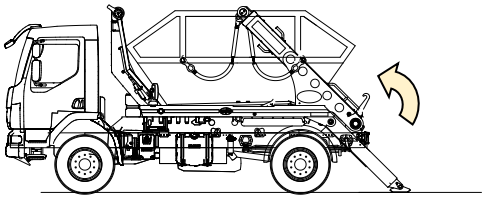




Note: The stabilisers should be used to level the rear of the vehicle. The rear wheels should remain in contact with the ground to retain the effectiveness of the handbrake.

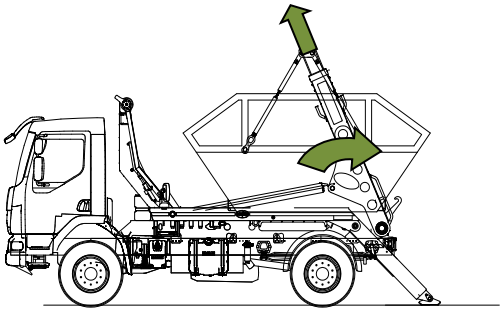
5. Check that all four chains are securely attached to the skip lifting lugs.

6. Raise the tip hooks.

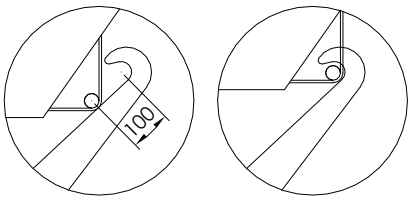


7. Rotate the main arms and lift the skip off the load platform.

   Note: It may be necessary to extend the telescopic arms, prior to lifting, to avoid the skip dragging back along the bed. Check that the chain pivot is central over the skip just as the chains tighten.



8. Rotate the main arms around until the tipping bar on the skip contacts the leading edge of the tip hooks.
   The tipping bar should contact the leading edge approximately 100mm below the throat of the hook.
   Use the telescopic arms to adjust the height of the skip until the required 100mm is achieved.

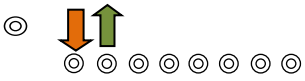


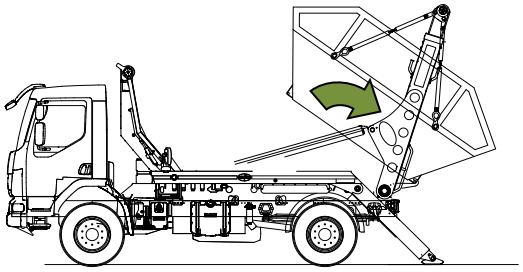
Correct Incorrect

Once the skip tipping bar is correctly located against the leading edges of the tip hook the telescopic arms must not be operated throughout the remainder of the tipping sequence.

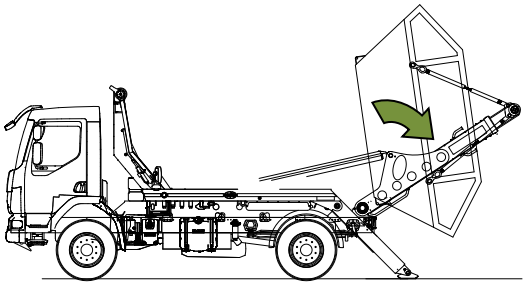
WARNING
If the skip tipping bars are engaged directly into the throat of the tip hooks, or the telescopic arm controls are operated when the skip tip bars are engaged in the throat of the tip hooks, the tip hooks, and mountings and/or load shaft will be seriously damaged.

9. Rotate the main arms rearward, allowing the tipping bar to engage in the throat of the hook. The skip will start to tip as the main arms rotate.

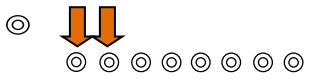


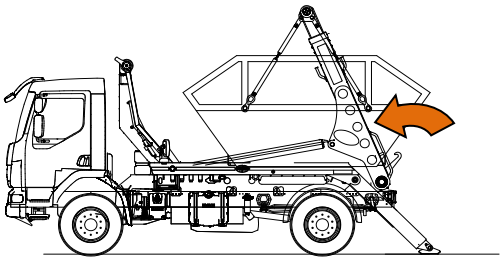


10. Continue rotating the main arms rearward until the load has cleared the skip. Do not allow the skip to touch the ground or any other obstacle during the tip cycle.

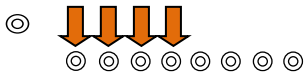


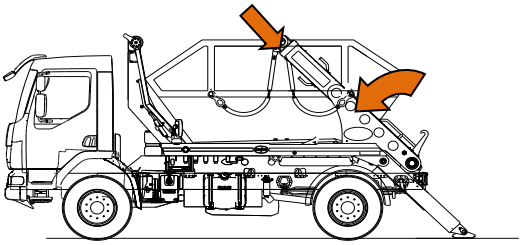
11. On completion of the tip rotate main arms forward to return the skip to the horizontal position.



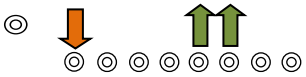


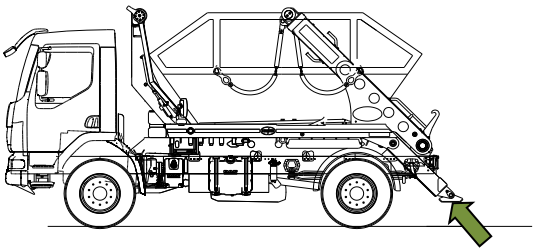
12. Complete the loading sequence by resting the skip on the load bed.
Ensure that the main arms are rotated to the fully down position and that the telescopic arm is fully retracted.



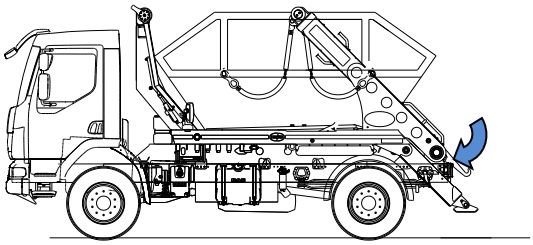


13. Retract the stabilisers.





14. Lower the tip hooks.



A check should be made to ensure that the vehicle skiploader system is correctly set up prior to driving on the highway.

Check the in-cab warning light(s). If lights are illuminated check:-

1) Main arms.
2) Telescopic arms
3) Stabilisers

Refer to section 9.

Disengage the PTO prior to departure.

12. Optional Equipment

The following items and procedures relate to optional equipment which may be fitted to your vehicle.

Optional equipment, not fitted to the standard Skiploader, includes:-

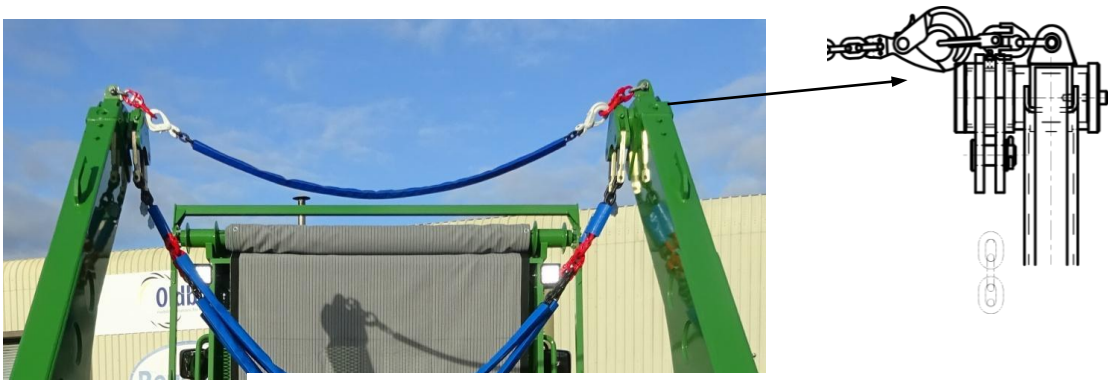
12.1. Over Tip Chains.
12.2. Tip Chains
12.3. Auto Rev Override

If any of these items is fitted to your vehicle please read the relevant instructions, in this section, for instructions on correct use.

12.1 Over Tip Chains.

WARNING
Never use the Over Tip chains as a method of restraining the load. The over tip chains must not be pulled down over a tip, by rotating the main arms fully forward.
If the Over Tip chain is installed, on the telescopic arms, the arms should always be extended together. Any significant difference in the extension of one telescopic arm compared to the other may result in damage to the equipment.

Where fitted the Over Tip chain can be installed onto the top of the telescopic arms and is designed to prevent a skip from over tipping during a tip operation.



Attach the Over Tip chains to the attachment points at the top of the telescopic arms

When using the equipment, with the Over Tip chains installed, the operator must ensure that, during any operation, the telescopic arms are extended and retracted together. Any significant difference in the height of the telescopic arms will introduce forces into the ends of the bar causing damage to the equipment.

12.2 Tip Chains.

The following procedure applies to tipping a skip using the OPTIONAL fitment tip chains. If you intend tipping using the standard tip hooks, fitted to your vehicle, refer to section 11.5.

WARNING
During the tip cycle, if the load does not discharge, under no circumstances should anyone attempt to dislodge the load manually with the skip in the tipped condition. Return the skip to the horizontal position and repeat the tip cycle.
Do not walk behind the vehicle at any time when tipping.
Unexpected discharge of the skip load may result in serious injury or death.

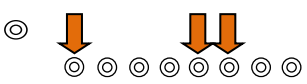
WARNING
Never over tip. Check chain tension during the tip cycle.
If, during the tip cycle, chains go slack stop immediately and return the bin to a stable position where all chains are in tension.
Continuing to tip when chains have slackened off will result in the bin becoming unstable and unpredictable and may result in damage to the equipment and/or serious injury or death.

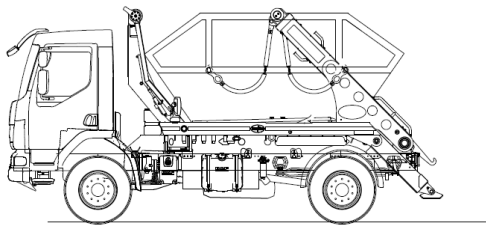
The skiploader system can be used to tip a loaded skip provided the skip is equipped with tipping bars designed for the purpose.

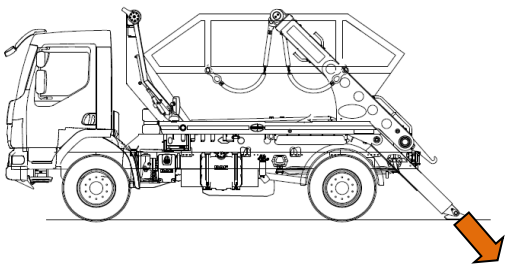
Prior to starting operation read through the "General Safety Checks Prior to Operating" section 10, and assess the skip and the intended tipping location to ensure that they are suitable.

Any sheeting must be removed from the skip prior to commencing the tipping procedure. Refer to section 11.3 for instructions on retracting the Intacova sheeting system.

1. Drive the vehicle into position.
2. Apply handbrake.
3. Engage PTO.
4. Extend stabiliser legs. The legs should be extended so that the load is just removed from the rear suspension.







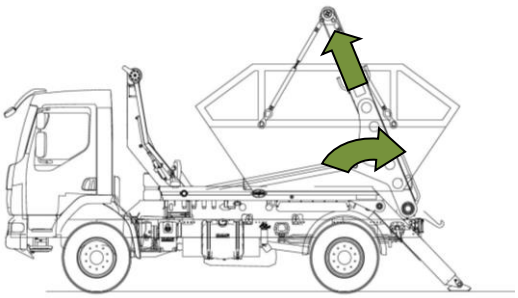
Note: The stabilisers should be used to level the rear of the vehicle. The rear wheels should remain in contact with the ground to retain the effectiveness of the handbrake.

5. Check that all four chains are securely attached to the skip lifting lugs.

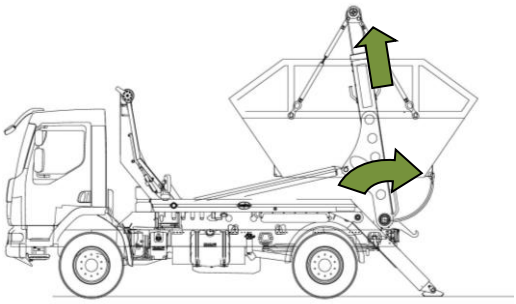
6. Attach the tip chains to the shackles on the rear of the vehicle and to the tipping bar on the skip.
   Ensure both tip chains are installed and that they do not cross over each other.

7. Rotate the main arms and lift the skip off the load platform.

   Note: It may be necessary to extend the telescopic arms, prior to lifting, to avoid the skip dragging back along the bed. Check that the chain pivot is central over the skip just as the chains tighten.

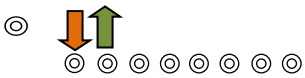


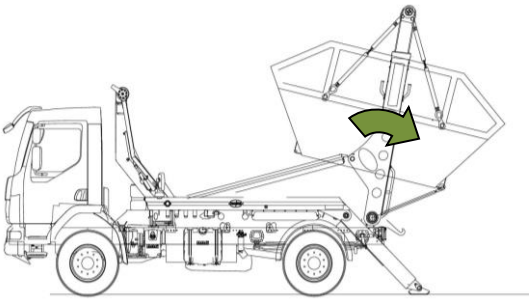
8. Rotate the main arms around until they are near vertical.
   Extend the telescopic arms until the tip chain are just at the point of full extension. Stop extending the telescopic arms ensuring that the tip chains retain some slack.



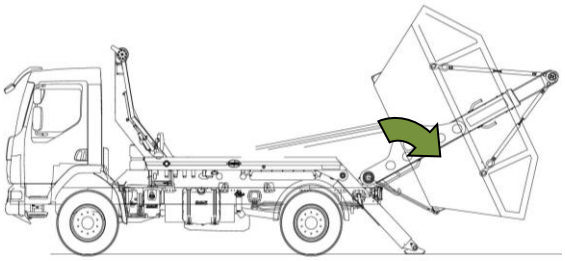
WARNING
At the point at which the tip chains are at full extension (tight) the telescopic arms must not be extended.
DO NOT extend the telescopic arms at any point during the remainder of the tip sequence.
Failure to observe this warning will result in damage to the chain mounts and/or load shaft.

9. Rotate the main arms rearward, allowing the tip chain to tighten.
   The skip will start to tip as the main arms rotate.

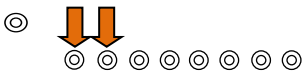


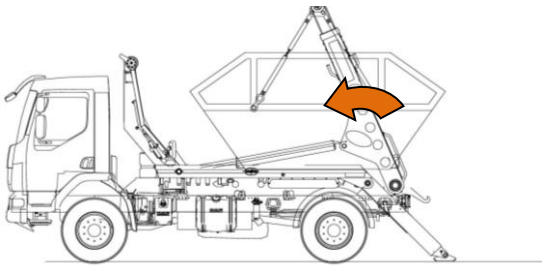


10. Continue rotating the main arms rearward until the load has cleared the skip. Do not allow the skip to touch the ground or any other obstacle during the tip cycle.

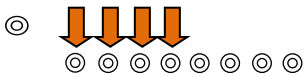


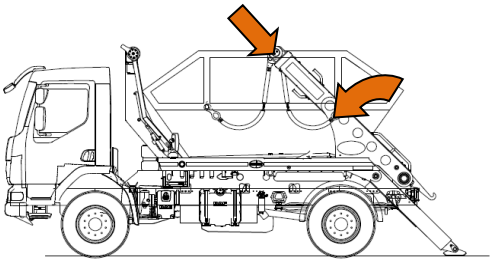
11. On completion of the tip rotate main arms forward to return the skip to the horizontal position.



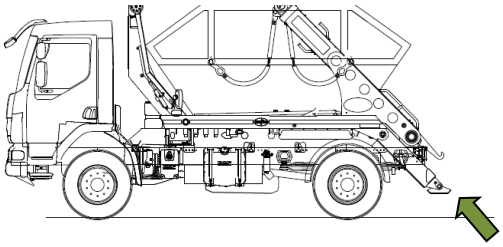


12. Complete the loading sequence by resting the skip on the load bed.
    Ensure that the main arms are rotated to the fully down position and that the telescopic arm is fully retracted.





13. Retract the stabilisers.



14. Remove the tip chains from the skip tipping bar and stow on the vehicle.

A check should be made to ensure that the vehicle skiploader system is correctly set up prior to driving on the highway.

Check the in-cab warning lamp(s). If lamp(s) are illuminated check:-

1) Main arms.
2) Telescopic arms.
3) Stabilisers.
4) Sheeting system (if fitted).

Refer to section 9.

Disengage the PTO prior to departure.

12.3. Auto Rev Override

In certain environments it may be necessary, between night-time hours, to minimise the noise associated with operation of the skiploader equipment.

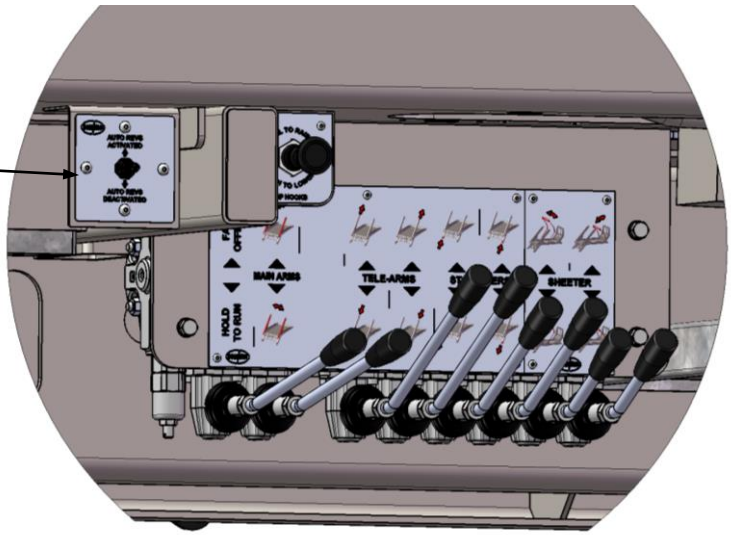
Vehicles may be fitted with an Auto Rev Override switch which, when activated, deactivates the automatic rev function, and limits the engine revs to tick over.

The Auto Rev Override switch is located next to the main valve block and tip hook control.

Auto Rev Override Switch

Push toggle switch up to activate auto revs.

Push toggle switch down to deactivate auto revs.



Note:
With Auto Revs deactivated the performance of the equipment will be reduced. For optimum performance and where regulations do not require minimum operational noise, Auto Revs should be activated.

13. Maintenance

SAFETY

WARNING

Correct maintenance of this equipment is essential for safe operation. Always maintain the equipment to the schedule prescribed.

Only trained technicians should be permitted to carry out maintenance and repair work on the skiploader equipment.

NEVER operate the equipment if there is a known fault. Take the vehicle out of service and affect a repair before returning into service.

DO NOT carry out any modification or adjustment (not described in this manual) to the skiploader equipment without obtaining written consent from Boughton Engineering Ltd.

Maintenance work should always be carried out with the vehicle unladen. In the event of emergency repairs, by the roadside, all efforts must be made to remove any load prior to commencing work.

When working on the equipment always ensure that it is disabled to prevent accidental operation of moving parts. Remove the vehicle ignition key unless a test on the equipment is to be run. Ensure that the area around and under the vehicle is clear before activating and operating the equipment.

Work should be carried out with rams in the closed position wherever possible.

ALWAYS ensure that hydraulic systems are unpressurised before disassembly.
When working with hydraulic fluids care must be taken to avoid contact with the skin and/or ingestion.

ALWAYS ensure the tiphooks are in the lowered position before commencing any work at the rear of the vehicle.

Hydraulic fluid can be harmful to the environment. Clean up any spillages immediately and dispose of any waste fluid conscientiously.

ALWAYS use approved spares and recommended fluids and lubricants. Non approved items may seriously affect the performance and will increase the risk of a failure.

After carrying out maintenance or repair work a check should be made to ensure that all safety devices operate correctly.

Schedule

Safety, life expectancy and performance of the skiploader equipment is significantly enhanced if maintenance is carried out as prescribed.

The vehicle and skiploader equipment should be washed regularly (recommend washing weekly and more frequently if the type of operation demands). A build up of tipped materials on the bed, or around all moveable parts, can cause damage. In particular pay attention to the hydraulic cylinders, pivot points and stabiliser leg within the stabiliser housings. Wipe, with a clean cloth, all exposed piston rods.

Daily Checks by the Vehicle Operator (Driver)

Check	Check Type	Action
Check for hydraulic leaks.	**Visual**	Immediately report any leaks for investigation and repair.
Check hydraulic tank level. Use sight gauge – cylinders must be closed.	**Visual**	Immediately report low levels for rectification – Maintenance procedure 1.
Check Hydraulic fluid filter is not blocked.	**Visual**	Immediately report a blocked filter for rectification – Maintenance procedure 2.
Check for pneumatic leaks.	**Audible**	Immediately report any leaks for investigation and repair.
Check operation of the in-cab warning lights.	**Operation**	See section 9 for warning light checks. Report for investigation and repair if warning lights fail test or warning lights do not extinguish.
Check condition of lift chains.	**Visual**	Immediately report any damage or wear. Replace chains before commencing operation – Maintenance procedure 3.
Check condition of hydraulic hoses.	**Visual**	Immediately report any damage for investigation and repair.
Check condition of all structural parts of lift equipment.	**Visual**	Immediately report any damage for repair.
Check remote controller (if fitted).	**Operation**	Refer to Page 21 & 22 "Remote Controller LED Light - System Status". Re-charge batteries if required. Refer to Maintenance procedure 8.

Maintenance Schedule – Workshop

WARNING
During maintenance of the equipment:
DO NOT change any pressure relief valve settings.
The relief valves are installed to protect the equipment from misuse and to ensure the safety of the operator and the public. Failure to observe these restrictions may result in serious injury, death and/or damage to the equipment.

The following schedule and procedures should be carried out by a qualified technician in a workshop environment.

RECOMMENDED HYDRAULIC OIL

Hydex 32 (OE Specification) *
Mobil D T E 24*
Shell Tellus 46
BP Energol HLP 46
Castrol Hyspin AWS 46
Mobil D T E 25

RECOMMENDED GREASE

Fuchs (Century Oils) Renolit MP3
BP Energrease L2
Mobilgrease MP
Shell Alvania R3
Castrol Spheerol AP3
Any good quality Lithium EP2 multi-purpose grease.

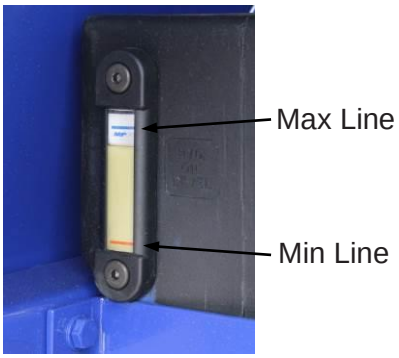
*Preferred oils for use in lower temperature environments.

	6 Weekly	6 Monthly	Annually	Procedure
Daily Checks – See Above	x	x	x	1, 2 & 3
Grease all grease points	x	x	x	4
Grease stabiliser leg stanchions	x	x	x	5
Check nut and bolt torque values	x	x	x	6
Replace hydraulic fluid filter	*See Note	x	x	2
Renew hydraulic fluid			x	7
Optional Equipment, i.e., towing hitches, load cells, auto-lube……	Refer to the maintenance instruction provided in additional manuals supplied with your vehicle			

*Note
Due to initial component bedding in, the hydraulic fluid filter must be changed at the first 6 weekly maintenance check. Thereafter filters should be changed every 6 months.

Maintenance Procedure 1 – Check and Fill Hydraulic Tank

WARNING
Always use new fluid when topping up the hydraulic tank. Old fluid will be contaminated and will adversely affect the performance of the equipment. To avoid fresh contamination, ensure that the top of the tank is clean and the working environment dry, before opening the filler cap.



Hydraulic Tank Site Gauge

The level of fluid in the hydraulic tank can be checked using the site glass situated on the tank offside.

Prior to checking the fluid levels ensure that all hydraulic cylinders are in the full closed position.

The fluid level must be between the maximum and minimum indicator lines.

If the level of fluid is near to or below the min line, then the fluid must be topped up.

Note: Topping up of the hydraulic fluid should be carried out by a qualified technician in the workshop:-

1) Access the top of the hydraulic tank through the hatch at the base of the Cab Guard (fig 1.1).
   Note: Where a short cab guard is fitted accessing the top of the hydraulic tank must be undertaken from the side of the vehicle. Depending on cab design it may be necessary to tip the cab to gain access.

2) Unscrew the tank filler cap (fig 1.2).

3) Top up the tank to the maximum level line using recommended fluid types.

4) Check that the tank filler cap vents are clear before replacing filler cap.


Fig 1.1. Access Panel


Fig 1.2. Filler Cap Removed

Maintenance Procedure 2 – Filter Check/Change

Filter Housing with Pressure Gauge

To check to ensure that the hydraulic fluid filter is not blocked the PTO must first be engaged.

View the filter housing, located on the top of the hydraulic fluid tank, from the vehicle offside.

The gauge on the side of the housing indicates the line pressure in the return line.

The gauge must show a pressure reading in the green zone.

If the reading is in the red zone this indicates a blockage, and the filter should be removed and replaced

Note: Changing the hydraulic fluid filter should be carried out by a qualified technician in the workshop:-

WARNING
To avoid contamination, ensure that the top of the tank is clean and the working environment dry, before opening the filter cap.

1) Ensure PTO is disengaged.

   Access the top of the hydraulic tank through the hatch at the base of the platform bulkhead (fig 2.1.).
   Note: Where a short cab guard is fitted accessing the top of the hydraulic tank must be undertaken from the side of the vehicle. Depending on cab design it may be necessary to tip the cab to gain access.

2) Turn the filter cap anticlockwise to remove and gain access to the filter (fig 2.2).

   Note: The filter cap is sprung against the filter and will be pushed away from the housing when the threads disengage.

3) Remove the filter from the housing (fig 2.3).

4) Fit a new filter (fig 2.4).

5) Replace filter cap. Note: Push the filter cap down, to compress the filter spring, and turn clockwise to engage the threads (fig 2.5).

Fig 2.1

Fig 2.2

Fig 2.3

Fig 2.4

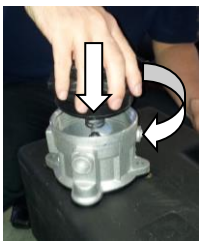


Fig 2.5

Maintenance Procedure 3 – Chain Inspection

WARNING
Lift chains are critical safety components.

DO NOT attempt to modify the lift chains by changing their length.
DO NOT attempt repair of chains by cutting or welding.

If a chain is damaged or worn beyond usable limits it must be replaced.

Serious injury and/or damage to the vehicle may result from using damaged or worn lift chains.

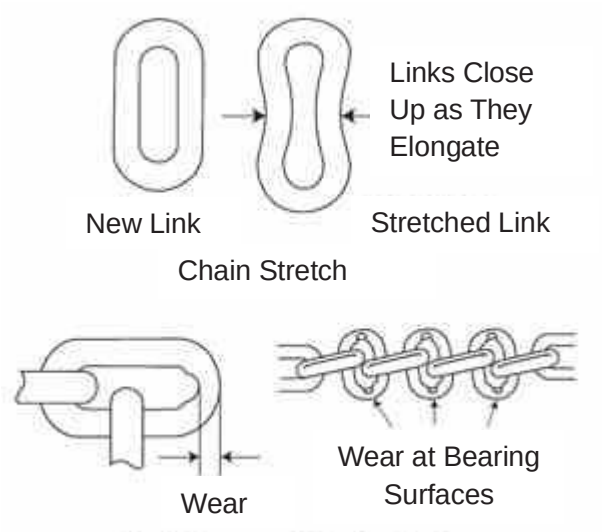
Lift chains should be carefully inspected to ascertain if they are serviceable.
Check that the chain does not exhibit the following characteristics:-

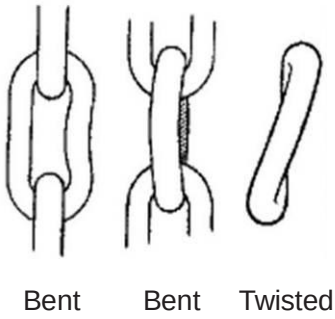
1) Chain stretch – the links of the chain elongate causing the overall chain length to increase.

2) Deformation through bending or twisting of the links.

3) Chain wear – the links wear at the bearing surfaces weakening the chain and causing the overall chain length to increase.

4) Cracks in the links.

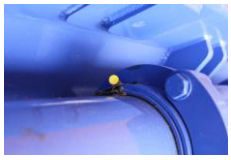




Any chain exhibiting any of these characteristics should be replaced and taken out of service.

Maintenance Procedure 4 - Grease Points

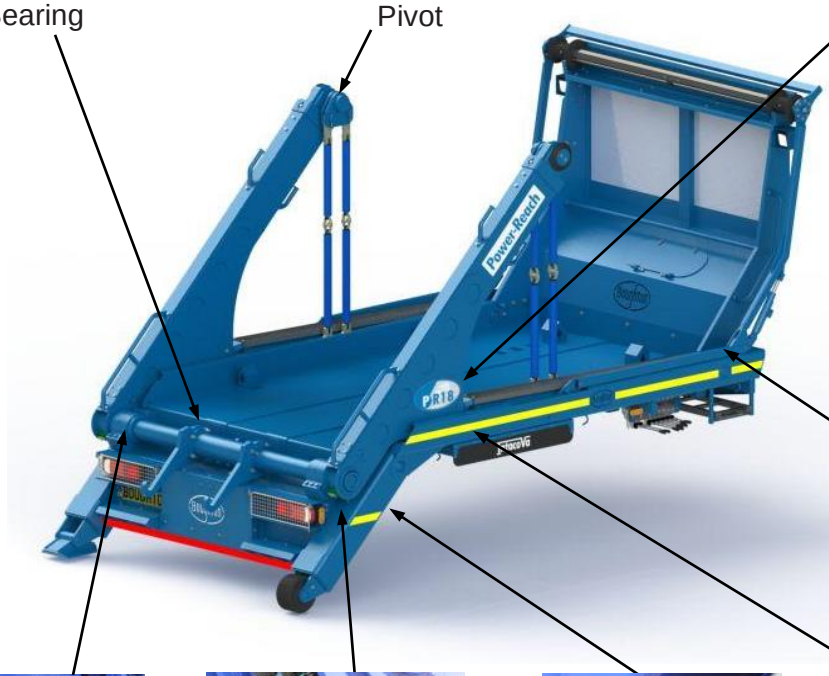
Grease points are located as shown in the diagram below.
Use a grease gun to apply grease to the bearing surfaces at these locations.

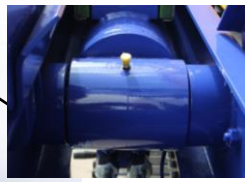


Tiphook Pivot Bearing

Chain Mounting Pivot

Main Hydraulic Cylinder Pivot Rear

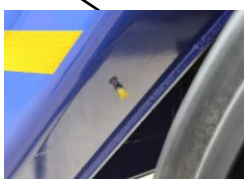




Main Hydraulic Cylinder Pivot Front

Main Arm Pivot Bearing

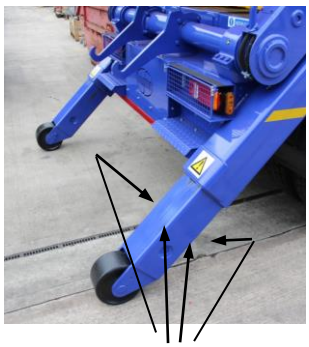
Stabiliser Rear



Stabiliser Front

Intacova (Optional) Main

Maintenance Procedure 5 – Grease Stabiliser Leg Stanchions



Apply Grease to All Surfaces

Apply grease to the stabiliser leg inner stanchion.

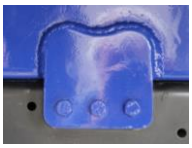
Extend the stabiliser leg to expose the inner box surfaces.

The grease should be applied liberally to the box section surfaces and spread using a brush.

After application retract the stabiliser legs and clean away any excess grease.

Maintenance Procedure 6 – Check Nut & Bolt Torque Values

All nuts and bolts should be checked to ensure that they are at the correct torque.
Use a calibrated torque wrench set to the required torque.



Recommended tightening torque for the chassis mounting bolts 201Nm.

Recommended tightening torque for main arm pivot cap bolts - 312Nm.

For all other fasteners use the following table which gives recommended tightening torques for various metric bolts.

Quoted ‘U’ torque values are for self colour un-lubricated bolts and zinc plated bolts into un-plated holes and nuts.

Quoted ‘P’ torque values are for zinc plated bolts into zinc plated nuts.

For cap screws use grade 10.9 torque values.

Nominal Bolt Size	Grade 8.8 ‘U’ Torque Nm		Grade 8.8 ‘P’ Torque Nm			Grade 10.9 Torque Nm	
	Course	Fine	Course	Fine		Course	Fine
M6	10.9	-	12.7	-		15	-
M8	25.8	27.7	31	33.2		36.3	38.9
M10	51.2	54	61.4	64.8		72	76
M12	89.3	97.6	107.2	117.1		125.7	137.1
M14	142.1	154.5	170.5	185.4		199.5	217.1
M16	221.7	235.9	266	283.1		312	331.4
M18	305.1	343.2	366.1	411.8		429	482.6
M20	432.5	480.2	519	576.2		609.1	675.1
M22	588.4	646.7	706.1	776		827.1	909.8
M24	747.8	813.5	897.4	976.2		1051.3	1143.6
M27	1083.9	1182.1	1312.7	1418.5		1538.3	1662.2

Maintenance Procedure 7 – Renew Hydraulic Fluid

Hydraulic fluid is hydroscopic and over time will absorb water. Contaminated fluid will reduce the performance of the hydraulic system. Frequent changes of the fluid, see schedule, are essential to maintain optimum performance.

During the change procedure old fluid must be drained from the hydraulic fluid tank. A suitable container, with a capacity of approximately 100 litres, will be required to drain the fluid into. The container will be positioned underneath the vehicle and must be shallow enough to fit in the space available.

Note: The following hydraulic fluid change procedure must be carried out with all hydraulic cylinders in the closed position.

WARNING
Always use new fluid when renewing the fluid in the hydraulic tank. Old fluid will be contaminated and will adversely affect the performance of the equipment.
To avoid fresh contamination, ensure that the top of the tank is clean and the working environment dry, before opening the filler cap.

1) Ensure PTO is disengaged.
2) Shut off the stop cock on the hydraulic fluid suction line. The stop cock is located underneath the hydraulic fluid tank (see fig 7.1).
3) Disconnect the suction line at the hydraulic pump, located on the back of the PTO (see fig 7.2).
4) Position the detached end of the suction line in the container into which the old fluid will be drained.
5) Remove the hydraulic tank filler cap (see fig 7.3).
6) Open the stop cock on the hydraulic fluid suction line. The hydraulic fluid will drain from the tank into the container.
7) When the hydraulic fluid tank is empty shut off the suction line stop cock.
8) Re-connect the suction line to the hydraulic pump.
9) Fill the tank with new hydraulic fluid to the recommended specification. The tank should be filled to the maximum line on the tank sight gauge (see fig 7.4).
10) Re-place the tank filler cap.


Fig 7.1
Stop Cock


Fig 7.2
Suction Tube


Fig 7.3
Filler Cap

Fig 7.4
Hydraulic Tank
Site Gauge

After completing the fluid change clean up any spilt hydraulic fluid. Old fluid must be disposed of responsibly.

Maintenance Procedure 8 - Remote Controller Care

Where vehicles are fitted with a remote-control unit:-

Batteries

WARNING
Use only batteries provided specifically for use with the Boughton remote control unit.
Read the battery and battery charger manual supplied as part of the vehicle document pack.
Failure to follow the instructions on the safe use of the batteries and battery charger may result in serious injury or death and/or may cause damage to equipment.

The batteries fitted to the remote control are rechargeable. Recharge batteries using only the charger provided in the vehicle cab see fig. below.

Charge batteries before first use.
Follow all instructions in the battery / battery charger manual to ensure safe use and to prolong the life of the battery.
When storing the remote-control unit remove the batteries and store them in a cool dry place. **DO NOT** store batteries at low charge levels.

Remote Controller Storage

The remote controller should be stored, when not in use, in a location where possible damage from impacts can be avoided.
When storing the controller for long periods remove the batteries from the unit and follow storage instructions above.
Keep the controller in a location where immersion in liquids can be avoided.

Controller Faults

The Boughton remote operation handheld controller is not a serviceable part. If the unit fails for any reason, contact Boughton Engineering Limited for replacement.

Maintenance Procedure 9. Intacova Sheeting System

9.1. Sheet Removal

WARNING
The Intacova arms must be in the fully retracted (fully forward) position prior to carrying out this procedure. Do not attempt disassembly unless the sheet roller is correctly stowed.

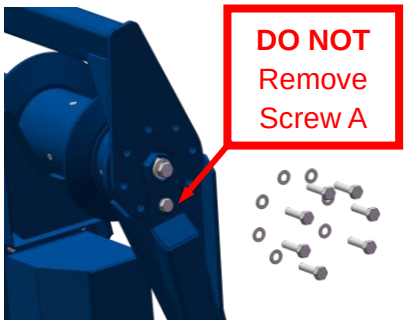
1) Ensure that the Intacova arms are in the fully retracted (fully forward) position and correctly stowed so that the roller is supported by the sheet tray at both ends.

2) Remove the crossbar.

WARNING
The sheet roller spring tension is secured by a single set screw on each end of the roller. When removing the crossbar fixing screws ensure that this screw (Screw A below) is not disturbed.
The crossbar must be held in position whilst removing the screws. It is recommended that two people carry out this procedure, one to hold the crossbar whilst the fixing screws are removed.

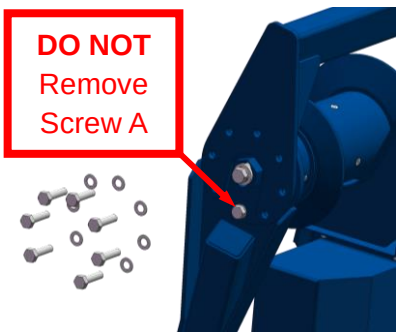
2.1 On the vehicle nearside (left hand side) main arm undo and remove the set screws, nuts and washers holding the cross bar in place. DO NOT remove the tension securing screw (A), see right.

Note: Screw A does not secure the crossbar. It may be orientated differently from view on right. Make a note of actual orientation.

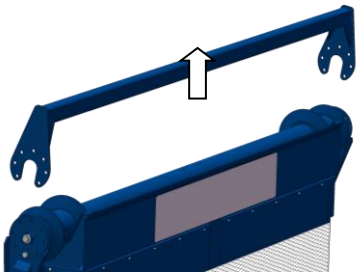


2.2 On the vehicle offside (right hand side) main arm undo and remove the set screws, nuts and washers holding the cross bar in place. DO NOT remove the tension securing screw (A), see right.

Note: Screw A does not secure the crossbar. It may be orientated differently from view on right. Make a note of actual orientation.



2.3 Remove the crossbar and set to one side.

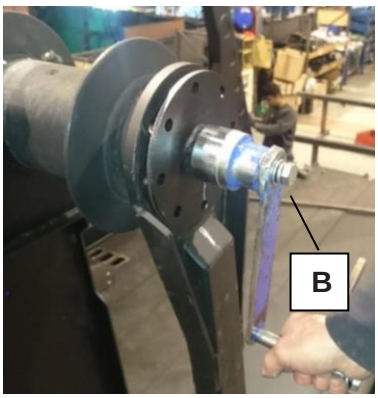


3) On the nearside main arm remove the set screw and washer securing the spring shaft anchor plate to the roller.

WARNING
DO NOT attempt to tension the roller tension spring without installing the Boughton Engineering Limited spring tensioning tool. This tool must be correctly secured to the end of the spring shaft. Failure to use and correctly secure the specified tool may result in the tool detaching whilst under load causing an explosive release of the tension springs.

4) Install the Boughton Engineering Limited spring tensioning tool (Pt. No. H1004-Handle) onto the hexagonal boss on the spring shaft anchor plate.

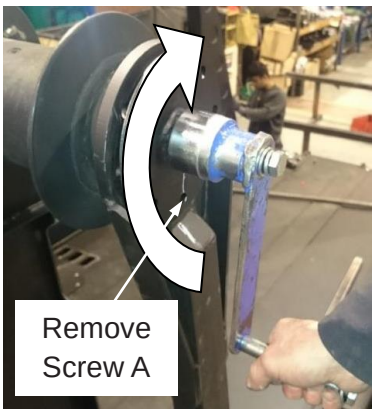
With the tool in position, over the boss, screw the securing bolt (B) into the end of the spring shaft.



WARNING
The spring tension must be held, using the Boughton Engineering Limited spring tensioning tool, before the tension securing screw can be removed. DO NOT let go of the tensioning tool until the spring tension has been released. If the tool is released, with tension in the spring, the tool will rotate at speed and can cause serious injury.

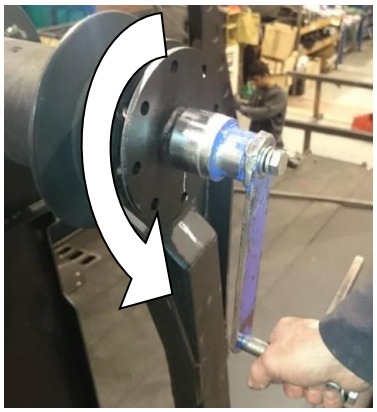
5) Rotate the tool **clockwise** until spring tension is held by the tool allowing removal of tension securing screw A.

The tensioning tool must be held, at all times, during this part of the procedure.



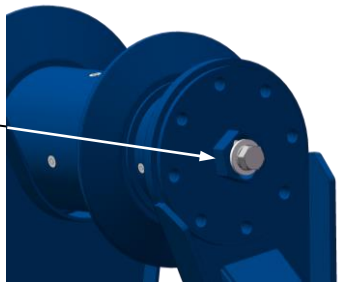
6) With the tension securing screw removed keep a secure hold on the tensioning tool handle and allow it to slowly rotate **anticlockwise** to release the tension in the spring.

Continue rotating until spring tension is eliminated.



7) Remove the tensioning tool from the spring shaft anchor plate and refit the set screw and washers into the end of the spring shaft. Hand tighten only.

The set screw on the nearside **MUST** be fitted prior to continuing onto step 8.



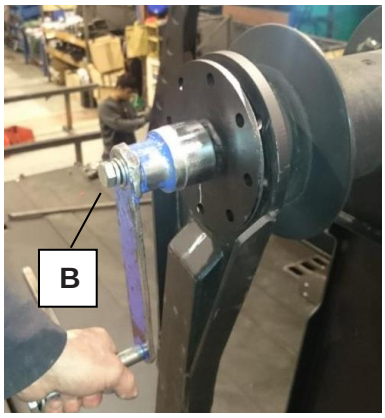
WARNING
Do not remove the offside set screw, securing the spring shaft anchor plate to the spring shaft, unless the nearside set screw has been refitted. Failure to observe this instruction may result in the roller and sheet assembly detaching completely from the main arms.

8) On the offside main arm remove the set screw and washer securing the spring shaft anchor plate to the roller.

WARNING
DO NOT attempt to tension the roller tension spring without installing the Boughton Engineering Limited spring tensioning tool. This tool must be correctly secured to the end of the spring shaft. Failure to use and correctly secure the specified tool may result in the tool detaching whilst under load causing an explosive release of the tension springs.

9) Install the Boughton Engineering Limited spring tensioning tool (Pt. No. H1004-Handle) onto the hexagonal boss on the spring shaft anchor plate.

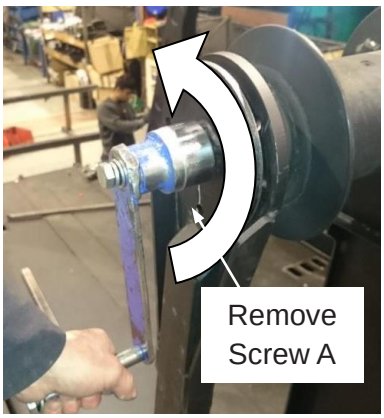
With the tool in position, over the boss, screw the securing bolt (B) into the end of the spring shaft.



WARNING
The spring tension must be held, using the Boughton Engineering Limited spring tensioning tool, before the tension securing screw can be removed. DO NOT let go of the tensioning tool until the spring tension has been released. If the tool is released, with tension in the spring, the tool will rotate at speed and can cause serious injury.

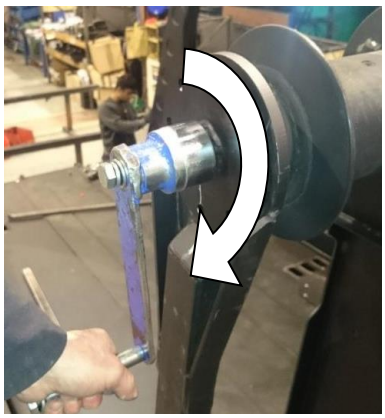
10) Rotate the tool **anticlockwise** until spring tension is held by the tool allowing removal of tension securing screw A.

The tensioning tool must be held, at all times, during this part of the procedure.



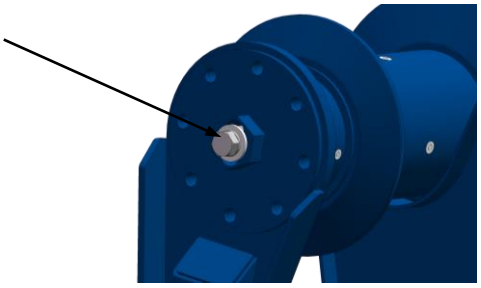
11) With the tension securing screw removed keep a secure hold on the tensioning tool handle and allow it to slowly rotate **clockwise** to release the tension in the spring.

Continue rotating until spring tension is eliminated.



12) Remove the tensioning tool from the spring shaft anchor plate and refit the set screw and washers into the end of the spring shaft. Hand tighten only.

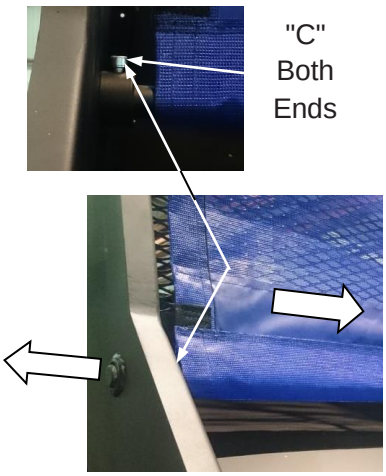
Check that the spring shaft anchor plate securing screws are fitted on both the nearside and offside before continuing to step 13.



13) Remove the sheet anchor tube to release the bottom end of the sheet.

    The tube is held in position by socket head set screws, "C", which pass through the tube location bosses and clamp onto the tube.

    Slacken of the set screws and slide the bar out far enough to allow the sheet to be detached.



14) The old sheet can now be unrolled from the sheet roller.

15) When the sheet is fully unrolled the end secured to the sheet roller can be detached by sliding the ends towards the centre of the roller and removing from the sheet rails.

If it is intended to remove and replace the sheet roller follow the instructions in the next section, section 9.2. “Intacova Sheeting System – Roller Replacement”.

If the existing roller does not require replacement and a sheet is to be re-fitted, follow the instructions in section 9.3. “Intacova Sheeting System – Fitting New Sheet”.

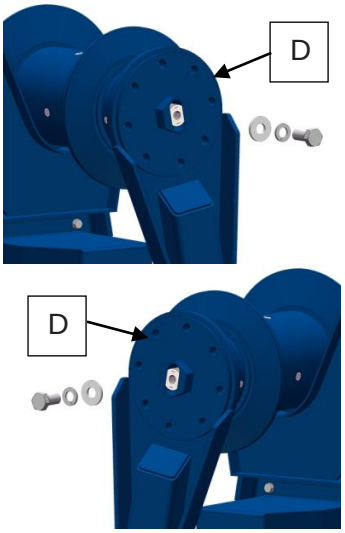
9.2. Roller Replacement

If it is intended to replace the roller, follow the procedure in section 9.1. “Intacova Sheeting System – Removal of Sheet”.

With the sheet removed the following procedure should be followed to remove and replace the roller.

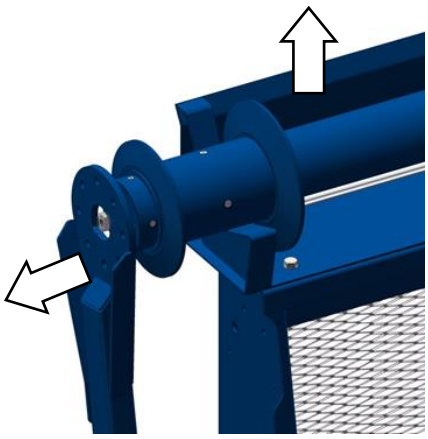
WARNING
The roller assembly is heavy and long. To carry out the removal and replacement process two people will be required to avoid the posibility of injury and/or damage to the equipment.

1) Remove the tension bolts and spring shaft anchor plate (“D”) from both the offside and nearside of the vehicle. This procedure **MUST** be carried out by two people with one person at each end of the roller. The tension bolts should be hand tight ref. points 7) and 12) in the sheet removal instructions and when removed the spring shaft anchor plate will slide off the end of the spring shaft.

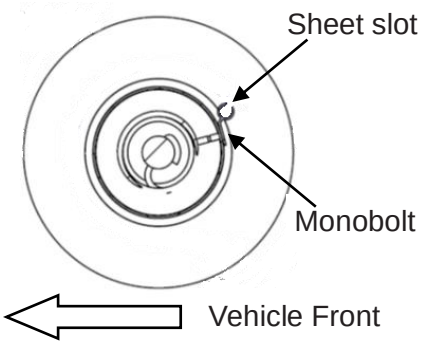


WARNING
With the two tension bolts and the roller assembly removed care must be taken to avoid leaning on the sheeting system arms. The arms could be forced inboard, if any load is exerted, and this may cause damage to the equipment.

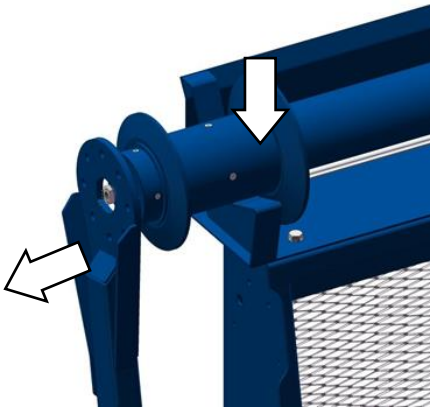
2) Remove the old roller assembly. This process should be carried out by two people, with one person at each end of the roller.
Pull the sheeting system main arms outwards, so that they are just clear of the end of the spring shaft and lift the roller upwards until clear of the sheet tray.
Lift both sides of the roller, clear of the sheet tray, at the same time.
Allow the main arms to return to position after the roller is clear.



3) Prior to fitting the roller assembly check the orientation of the extrusions which secure the end of the sheet.
Viewed from the load bed of the vehicle and looking forward, with the extrusions at the back of the roller the monobolt fixings must be below the slot into which the sheet is fixed.

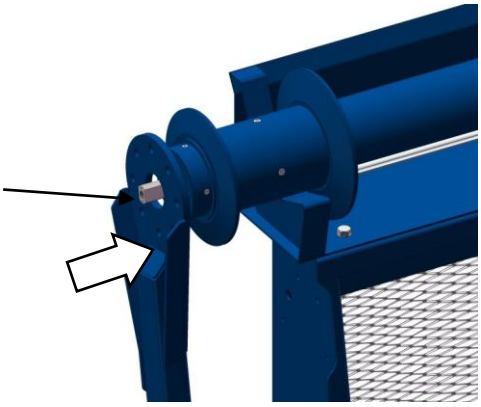


4) Fit the new roller assembly. This process should be carried out by two people, with one person at each end of the roller.
Pull the sheeting system main arms outwards, so that they are just clear of the end of the spring shaft and lower the roller until it rests on the sheet tray.

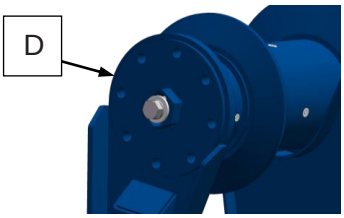


Lower both sides of the roller, onto the sheet tray, at the same time.

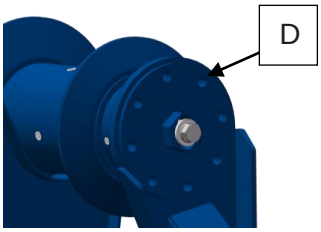
Allow the main arms to return to position, ensuring that the spring shaft passes through the centre hole in the main arm bolt plate.



5) Refit the spring shaft anchor plate “D”, set screw and washers into the end of the spring shaft. Hand tighten screw only.



Check that the spring shaft anchor plate and securing screws are fitted on both the nearside and offside before continuing.



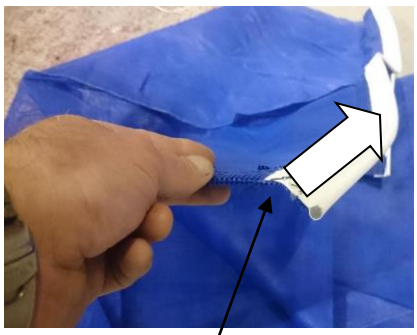
For instructions on fitting a new sheet onto the roller assembly refer to section 9.3. “Intacova Sheeting System – Fitting New Sheet”.

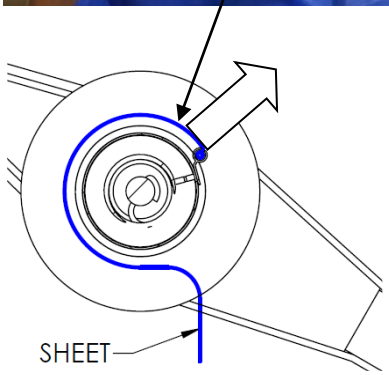
9.3. Fitting New Sheet

1) Attach the new sheet to the sheet roller.

   The ends of the sheet must be slid onto the sheet rails.

   Slide each end of the sheet in from the centre of the roller ensuring that the sheet is routed correctly, and sheet bead is on the upper face (see fig right).



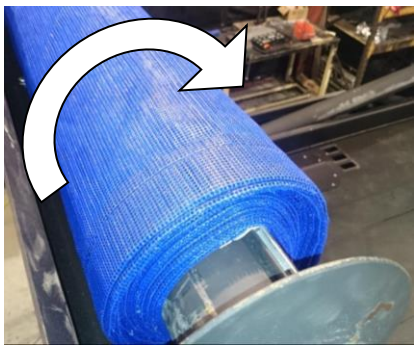


View from Left Hand Side

2) Roll the sheet onto the sheet roller.

   The roller can be rotated manually to allow the sheet to be rolled on.

   Ensure that the sheet goes onto the roller squarely and does not go slack.



3) Before the sheet is completely rolled onto the roller the anchor tube should be refitted to secure the fixed end of the sheet.

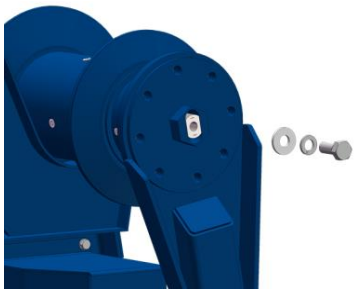
   Ensure that the tube is passed through the pocket at the fixed end of the sheet and locates correctly in bosses.

   Secure by refitting the two socket head screws, "C", into the bosses and tightening them up onto the tube.

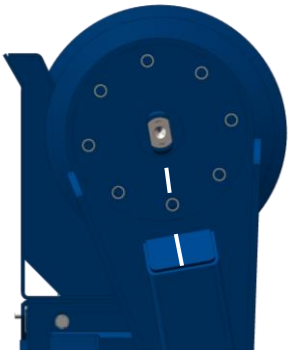
"C" Both Ends

4) Rotate the sheet roller to take out any slack in the sheet.

5) On the nearside main arm remove the set screw and washer securing the spring shaft anchor plate to the roller.

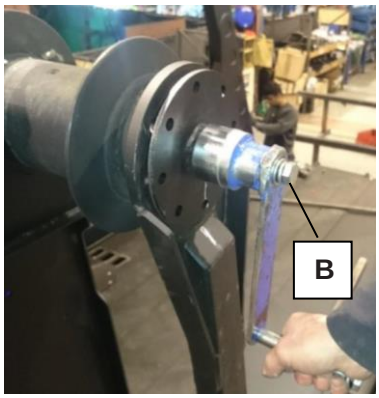


6) On the nearside main arm draw a chalk line parallel with the slot in the hexagonal boss on the spring anchor plate and on the top of the main arm box section, as shown in fig right.



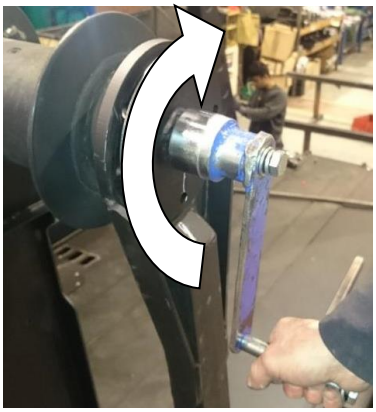
7) Install the Boughton Engineering Limited spring tensioning tool (Pt. No. H1004-Handle) onto the hexagonal boss on the spring shaft anchor plate.

With the tool in position, over the boss, screw the securing bolt (B) into the end of the spring shaft.



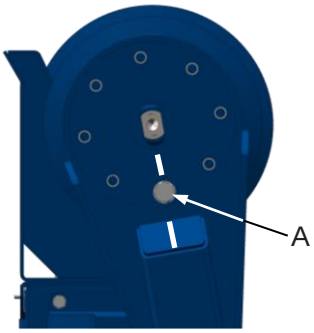
WARNING
When tensioning the spring DO NOT let go of the tensioning tool until the securing screw has been installed. If the tool is released, with tension in the spring, the tool will rotate at speed and can cause serious injury.

8) Turn the tensioning tool **clockwise** until resistance is felt i.e., the spring is starting to be tensioned, then rotate the tool 17 times in a **clockwise** direction ensuring that the tool is not released at any point.



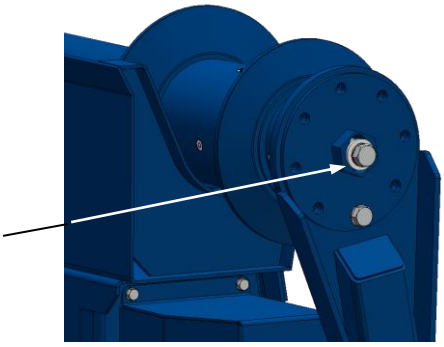
9) After completing the tensioning and before releasing the tool, align the two marks made in step 5.

Insert the tension securing screw A. The screw must be refitted into the same hole from which it was removed, as noted in "9.1. Sheeting System - Removal of Sheet" step 2.1.

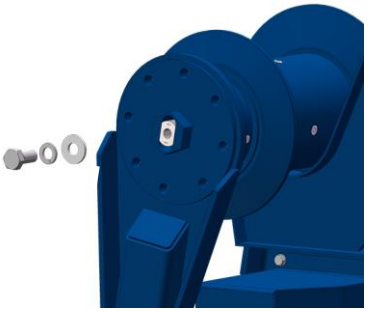


10) Prior to re-installing the securing screw, for the spring shaft anchor plate, apply thread lock.

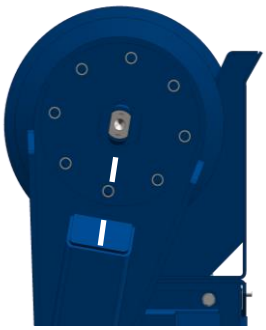
Insert the set screw and washers into the end of the spring shaft and "nip" up. **DO NOT** over tighten.



11) On the offside main arm remove the set screw and washer securing the spring shaft anchor plate to the roller.



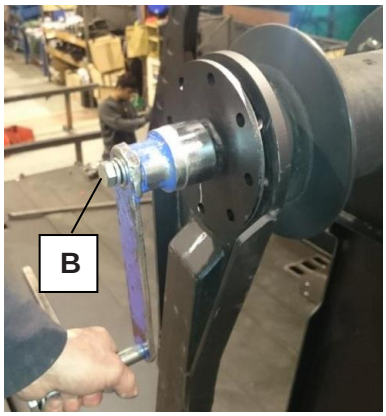
12) On the offside main arm draw a chalk line parallel with the slot in the hexagonal boss on the spring anchor plate and on the top of the main arm box section, as shown in fig right.



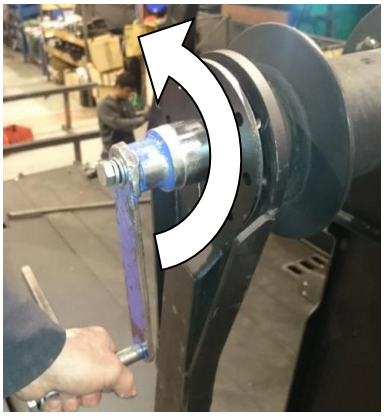
WARNING
When tensioning the spring DO NOT let go of the tensioning tool until the securing screw has been installed. If the tool is released, with tension in the spring, the tool will rotate at speed and can cause serious injury.

13) Install the Boughton Engineering Limited spring tensioning tool (Pt. No. H1004-Handle) onto the hexagonal boss on the spring shaft anchor plate.

With the tool in position, over the boss, screw the securing bolt (B) into the end of the spring shaft.

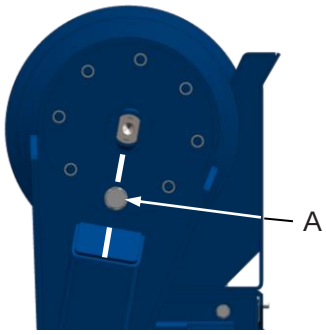


14) Turn the tensioning tool **anticlockwise** until resistance is felt i.e., the spring is starting to be tensioned, then rotate the tool 17 times in an **anticlockwise** direction ensuring that the tool is not released at any point.



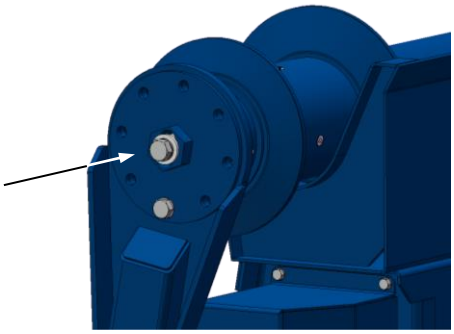
15) After completing the tensioning and before releasing the tool, align the two marks made in step 12.

Insert the tension securing screw A. The screw must be refitted into the same hole from which it was removed, as noted in "9.1. Sheeting System - Removal of Sheet" step 2.2.

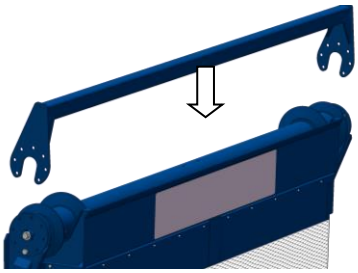


16) Prior to re-installing the securing screw for the spring shaft anchor plate apply thread lock.

Insert the set screw and washers into the end of the spring shaft and "nip" up. **DO NOT** over tighten.

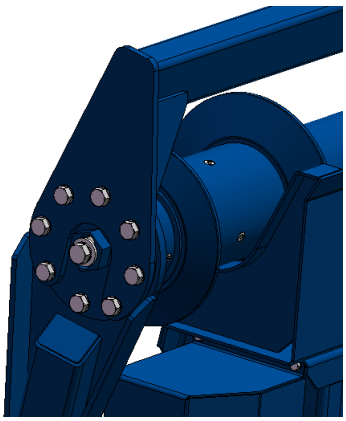


17) Reposition the crossbar.



18) Re-fit the screws washers and nuts to secure the crossbar to the main arms.

Ensure that all screws are fitted (7-off each side) and torque to 50 Nm.



On completion of this procedure and before putting the vehicle back into service, the equipment **MUST** be checked to ensure that the sheeting system works correctly.,

Operate the equipment and check that the sheet unfurls evenly when the main arms are rotated toward the rear and that the system does not twist.

When the main arms are rotated back to the forward (stowed position) check that they return evenly and that the sheet is pulled tightly onto the roller throughout the stowage.

14. Further Information

For further information or assistance in operating the PR18 Skiploader and Intacova Sheeting System contact:-

Boughton Engineering Ltd,
Balliol Business Park,
Wobaston Road,
Wolverhampton.
WV5 9EU.

Tel: +44 (0) 1902 623430
email: enquiries@boughtonengineering.com
www.boughtonengineering.com

For Parts & Service Contact: -

Tel: +44 (0) 1902 623440 - Parts
Tel: +44 (0) 1902 623441 - Service
email: service@boughtonengineering.com