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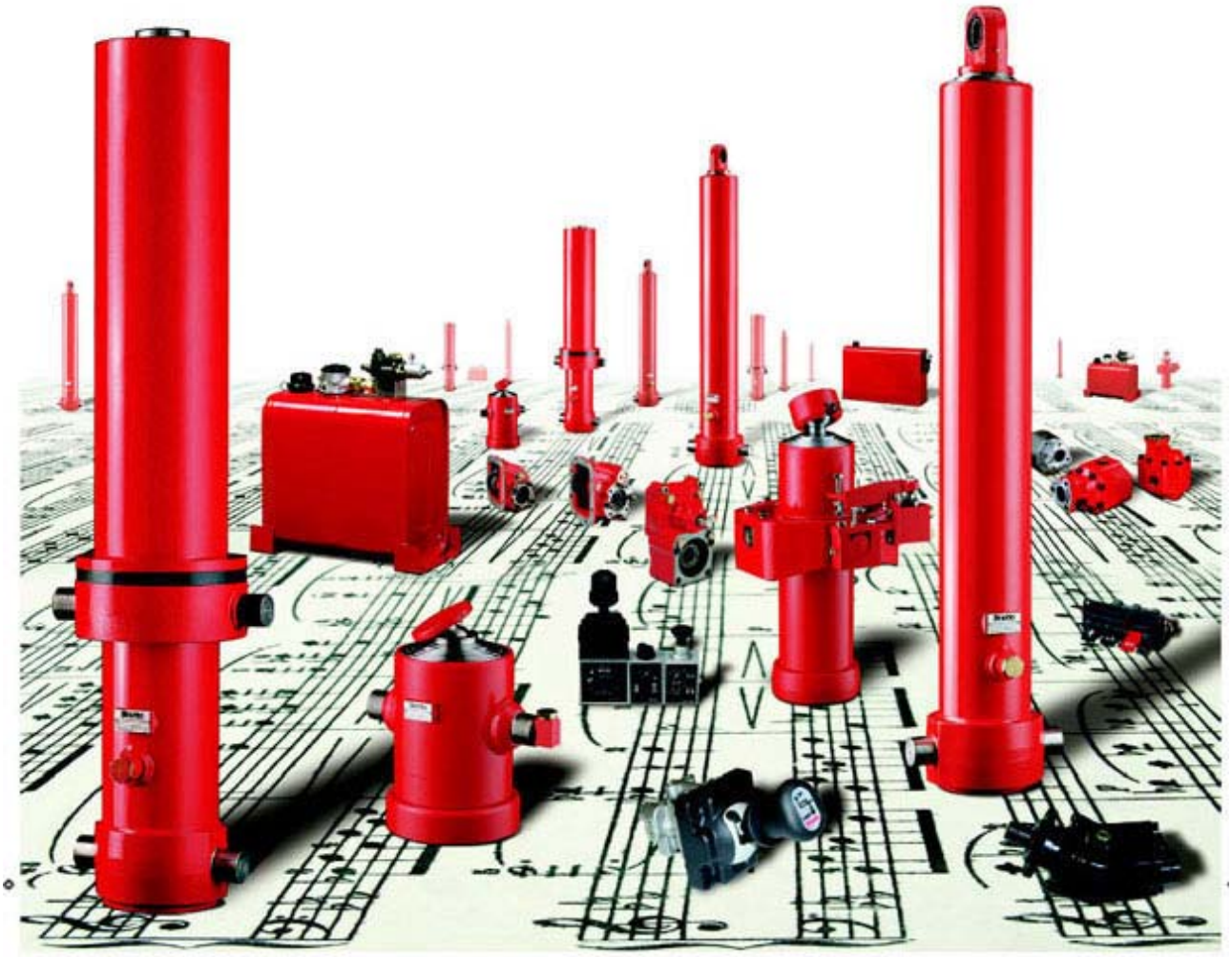

complete hydraulic system

operating and maintenance instruction

Operating & Maintenance Instructions
Complete Tipper (with front end or underbody cylinder)

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1. Introduction

This manual has been written to assist the operation and maintenance of the Binotto cylinder and associated hydraulic equipment.
The Binotto Front-end cylinder range includes cylinders with Outer Cover (MFC), with Eye (MF-RP) and with Eye/Eye (MF-RO).

This manual is intended both for those experienced fitters that are new to Binotto hydraulic equipment and also for those that are already familiar with Binotto products.
Mainly insufficient maintenance or incorrect operations cause troubles and defects.
We strongly suggest:

- not to forget to carry out lubrication and maintenance work at the specified intervals (see dedicated section in this manual);
- to keep this manual in the truck cab.

Please read some general remarks on safety and precautions to be taken before and during installation.
For further information or for check operations concerning the application, installation or repair of any Binotto product, please contact our Sale&Service Point near you.
If you need service assistance, we strongly suggest to ask a Binotto representative Sale&Service point to carry out the work. Binotto could not accept any claims or complaints caused by and/or to the tipper due to unskilled use or wrong maintenance and/or repairs (see also section 3).

Explanation of guidance

Tip
There are suggestments to simplify future tasks or warns of potential problems.

Warning
Warning of danger to the operator or product.
The operator can be seriously hurt or the equipment severely damaged
if the recommended procedure is not followed.

Danger
There is a serious threat to the life of the operator.

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2. General remarks for safety

The Binotto tipping system has been developed only for being used in a non-explosive, above ground, environments and for the transportation and tipping of payloads except of perishable foodstuffs.
Specification sheets are available for all Binotto cylinders; these sheets contain all relevant dimensional and application details about your cylinder.

The Binotto cylinder is developed for lifting purposes only. It is prohibited to use the cylinder in any other way. The cylinder is not to be used as a stabiliser and any kind of side-load must be avoided whenever possible.
Specification sheets for the other hydraulic components are also available.
We cannot accept any complaints for troubles directly or indirectly connected with the information contained in this manual, especially with images and designs. In fact, we have continuous development programmes to improve our products and it is possible that some design modification have occurred without being mentioned in this manual.

Warning
Applying side-load to any cylinder is dangerous.
The cylinder should be mounted with a minimum pull out of 15 mm and a maximum pull out of 35 mm (the closed length of the cylinder on the Binotto specification sheet already includes 20 mm pull out).

Ensure there is enough free working space to mount the cylinder.
If the tipper body is on the truck chassis, lift the body using an overhead crane so that the cab protector is well clear to mount the cylinder.
If the tipper body is raised to create working space, support the body using body props before mounting the cylinder.

Danger
Working under an unsupported tipper body is a danger to life.

To avoid damage to the truck cabin, cover the rear of the cab with a tarpaulin.
If necessary tilt the vehicles cabin (see the truck manual for details).
Disconnect the vehicle's battery leads before any welding.
While lifting a cylinder the other stages can extend, to avoid this use a sling around the cover or piston and base tube (between the trunnion and anti-rattle ring).
Extend the cylinder until the sling is locked and transport the cylinder using a suitable lifting device (see chapter 4.4).

Danger
Not using the appropriate equipment when lifting parts (such as the proper sling for a cylinder) is a danger to life.
Ensure any oil, spilt during installation and testing, is disposed of in an environmentally friendly way.

For further questions concerning the application, installation, operation or repair of any Binotto product, please contact your nearest Binotto Service Point.

Binotto cylinders are also compatible with *biodegradable oils*
such as the following synthetic ester based oils:
• BP - Biohyd SE-S
• Castrol - Carelube HES
• Texaco - Hydra
• Elf - Hydrelf Bio Safety

For other safety instructions see also section 6.

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3. Warranty

Binotto Terms of Warranty

Binotto only issues warranty to products under agreed conditions.
This section is not complete or contractual, it is just an overview to the Binotto general terms of warranty.
For any problem with a Binotto product you should contact your nearest Binotto Sale&Service point.
The following products are covered by warranty:

1. Hydraulic Cylinder
2. PTO & Pump
3. Tipping valve & Air Control
4. Oil Tank

The warranty is only valid under the following conditions:

01. All Binotto products must be **installed, operated, maintained and repaired** in accordance with the relevant Binotto guidelines.
02. For the parts listed above, the warranty period covering is valid 12 months from date of delivery or up to a maximum, whichever comes first, of:
    - 20.000 tipping cycles for the cylinder, tipping valve, control and body.
    - 300 running hours for the PTO and pump.
    - 100.000 km for the oil tank.
03. The warranty period does not cover:
    - Wear of parts during normal operation (e.g. sealing set), parts made of rubber or with limited lifetime.
    - Paint coatings.
    - Damage caused by forces beyond our control.
    - Damage caused by incomplete or erroneous installation.
    - Damage caused by abusive or inappropriate operation.
    - Damage as a result of service not carried out in accordance with the Binotto Operating & Maintenance Instructions.
04. This warranty is valid only in accordance with the Binotto General Terms unless otherwise specified.
05. A completed Claim Report shall be delivered with every claim.
06. All broken parts shall be kept for inspection, these parts will be returned to Binotto Group or one of his authorized Sale&Service point for inspection on request (transportation costs to be met by end user).
07. Where warranty is granted, Binotto will meet the cost of the following:
    - All necessary spare parts.
    - A replacement part where the original cannot be repaired.
08. Binotto does not accept any liability for transport costs or travel expenses.
09. During the warranty period the equipment must be serviced at the appropriate periods (costs to be met by the end user). Checks listed in the Binotto Operating & Maintenance Instructions must be completed.
10. Drivers must be trained to operate the Binotto equipment with the appropriate operating instructions made available.
11. Drivers should include the Binotto equipment in their daily vehicle inspection and arrange service for the vehicle/equipment as described in the Maintenance Instructions.

Any variation from the conditions listed above must be agreed with Binotto prior to the operation of the equipment.

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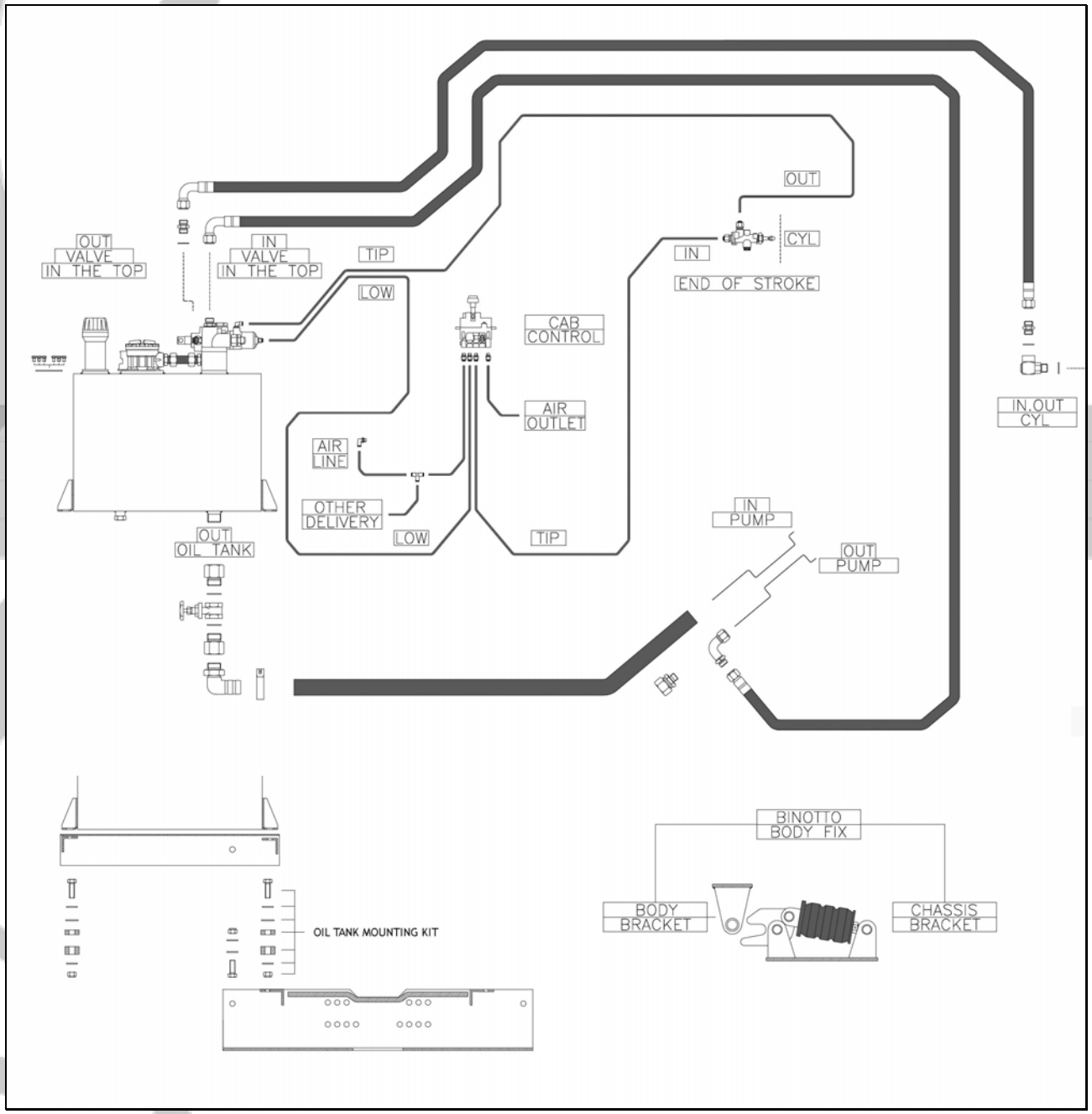
4. Operating Instructions

4.1. General description

The complete tipping system to suit chassis units consists of a body, a sub frame and the complete hydraulic system.

The hydraulic system with front end tipping gear includes tipper gear, power take off and combined pump, oil tank with a return oil filter, block and tipping valve.
The controls for P.T.O./pump and tipping valve are in the cab.
All necessary hoses and coupling complete the hydraulic equipment.



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4.2. Controls description

The tipping system is activated and controlled by the levers in the cab.
The main controls are PTO and Tipping gear controls.
Others may include tail doors control, or other applications.

These controls are often combined (for more details please see Binotto data sheet available for pneumatic switches).

P.T.O. control
This unit is pneumatically controlled and has two positive positions, which are IN GEAR and OUT OF GEAR.
When the tipping gear is not operating or the engine has stopped, the switch must be placed in OUT OF GEAR position.
If the P.T.O. is operated by air pressure, a warning light fitted next to the switch will advise that the P.T.O. is engaged.
If the PTO control has been mounted by the truck manufacturer, then see the user manual of the truck.

Tipping gear control
This unit is pneumatically controlled and could have 3 positive positions: TIP, LOW, HOLD.
The hold position is neutral.
When tipping gear is not operating, the control lever must be in the HOLD (or “neutral”) position.

4.3. Before tipping: to engage the PTO

Before operating the hydraulic tipping gear it is necessary to check the oil level with tipping gear in LOW position (approximately 5 cm below top of the tank).
All bearings and pivots should be lubricated (see also the greasing schedule in the maintenance section).
Stop the vehicle and apply the parking brake.
The PTO-control lever must be placed in OUT OF GEAR position.

Before tipping see also section 6.

To engage P.T.O.
Start the truck engine and wait until pressure in the system reaches 6 bars (87 PSI).
Ensure tipping valve control lever is in neutral (HOLD) position.
Ensure the gearbox selector lever is in neutral position, depress clutch, wait few seconds (+/- 8 seconds) switch the PTO on and wait the warning light alert, then slowly release the clutch.

 **Warning**
Engage PTO at idle engine speed

4.4. To raise the body

Move ram control lever into TIP position.
Oil will flow under pressure to the hydraulic ram, which will be extended and the body tipped rearwards.
Engine speed can be increased to speed up the tipping action (maximum engine speed 1250 rpm).
Move lever back to HOLD position, when body has reached the maximum height or angle of tip.

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4.5. To lower the body

Depress clutch, wait few seconds (+/- 8 seconds), and disengage the PTO, wait till the warning light turn off and slowly release the clutch.

Warning

Disengage PTO at idle engine speed.
It is advisable to disengage PTO before lowering.
Never drive the vehicle with the PTO engaged.

Put the tipper control slowly into “lower”. When the selector is in “LOW” position, oil returns from the cylinder to the oil tank, retracting the cylinder and lowering the tipper body.
The proportional control, tipping valve and tipper-control make it possible to control the lowering speed of the tipper body.

4.6. To interrupt the tipping movement

Move ram control lever from TIP to HOLD position even if the pump is running.

- The control lever must be immediately moved back to hold position after having reached either the end of the stroke of the cylinder or the down position.
- It is prohibited to drive with a (partially) raised body or to lower suddenly a (half) loaded body.

The lowering movement of the control is proportional.
If it is necessary to lower a partially loaded body, move the lever carefully and smoothly from HOLD into LOWER and slide it smoothly back into HOLD when the body reaches the desired tipping angle.

Warning

High engine speeds may cause oil starvation and cylinder and/or pump damages

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5. Maintenance Instructions

Daily maintenance

- √ Check the oil level of the oil tank (depending on the type of the tank, the oil level has to be in the middle of the sight glass or level gauge or anyway the oil level must be 50 mm from the top of the tank);
- √ Check the hydraulic system (PTO, pump, valve, hoses and coupling).

Monthly maintenance

- √ Check all pneumatic and hydraulic connections for leakage;
- √ Check all bolts and nuts and if necessary tighten;
- √ Lubricate all greasing points of the tipper (we suggest to use grease or oil SAE 140);
- √ If the hydraulic oil is dirty drain the oil tank and fill it with new oil (see oil recommendation table);
- √ Check the cylinder and clean it out from dirt;
- √ Check oil and air filter and replace if necessary;
- √ Replace oil and air filter twice a year.

Yearly maintenance (or after 1500 operating hours)

- √ Clean tank and change oil;
- √ Check all hydraulic connections and replace damaged hoses;
- √ Replace oil and air filter;
- √ Check gearbox oil level.

Warning

Do not clean the hydraulic system and the cylinder with a steam cleaner or aggressive solvent.
Do not leave a non-chromed cylinder extended in the open air more than 30 minutes.

Tip

If the tipper is expected not to be use for a long period, grease turning points to avoid seizure.

Danger

Maintenance near or on rotating parts is dangerous.
If the tipping body is raised for maintenance purposes, it must be securely propped.

Environmental Conditions (°C)	***ISO VG CLASS***
Less than -40	10
Siberian Winter (to -10)	15
North European	22
South European	32
Middle East (40-50)	46
“Hard” Middle East (>50)	68

Table 01. Oil Specifications

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6. Other Safety precautions

Take care of your tipper to prevent accidents and to reduce the risk to you and your vehicle.
Here are some basic guidelines.

Before tipping:
- Always report to a responsible person on arrival at the site and follow the site rules.
- Always wait for a confirmation: deliver or collect loads only when and where the customer says it is safe to do so.
- The safety of a truck when tipping is the responsibility of the driver. If agreement cannot be reached, then consult your employer.

Never tip:
- if the working area is not properly illuminated;
- on uneven grounds;
- with uneven load;
- if the trailer is not in line the tractor unit (for articulated vehicles);
- with a locked or blocked tail-door.

It is prohibited to:
- stand in the body while the vehicle is loading or is parked in a loading area;
- stand or walk within the immediate working area of the vehicle when the body is raised or during tipping;
- leave a vehicle unattended while it is tipping;
- drive with raised body;
- stay under a raised body unless it is adequately propped;
- change the settings of the hydraulic system (i.e: do not change the pressure settings of the over centre valve);
- engage the PTO while the vehicle is in gear and ensure the pump is out of gear after tipping;
- 'rev' the engine excessively while tipping, as over-speed of the tipping pump can create oil starvation and seizure.

6.1. Contact with overhead power lines

In the event the body (or vehicle) comes into contact with overhead power lines:
- Leave the vehicle by jumping clear.
- CALL THE EMERGENCY SERVICES IMMEDIATELY.
- Do not make contact with the ground and the vehicle at the same time, this could complete the electrical circuit causing serious injury or death.
- Do not allow anyone to return to the vehicle before the electrical circuit is broken and the electricity discharged.

6.2. If the vehicle does begin to topple over:
- If you think there is a danger of the vehicle falling over, stop the tipping operation and slowly lower the body and then investigate the cause.
- Beware of loads which are likely to freeze, the load could freeze on one side.
- Beware of loads with varying densities. These loads may discharge unevenly and instability occurs causing the truck to tip over.
- Beware of wind on one of the sides of the tipper. This wind on a great surface can cause the truck to tip over.
- If the load is not discharging when the body is raised to about 25 degrees, (that is about halfway up) stop the tipper and investigate why the load is sticking. Keep well clear of the vehicle and load when walking to the rear.

If the vehicle does begin to topple over:
- Never try to jump out: stay in the truck, you are safer in the cab
- Brace yourself against the back of the driver's seat
- Hold firmly onto the steering wheel
- Ensure that the body is completely empty after discharge.
- Do not drive further than is absolutely necessary

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7. Trouble shooting table

Fault	Potential causes	Checks
The cylinder doesn't extend when the air control is in "tip" position	√ PTO not engaged	√ Engage PTO
	√ Pump doesn't deliver oil	√ Disconnect hose at valve "P" and check if oil circulates
	√ No oil in the tank	√ Fill the oil tank
	√ Air pressure is not enough	√ Increase pneumatic pressure
	√ Cylinder connected to wrong valve port	√ Connected cylinder to port "C"
	√ Stop cock closed	√ Open stop cock
The cylinder doesn't extend when the air control is in "low" position	√ Pneumatic hoses are reverse connected at the tipping valve or air control	√ Connected up as instructed
Cylinder jerks when extending	√ Air in the oil supply	√ Replace pump
Air supply correctly but the tipping valve doesn't work	√ Air control fault	√ Remove all the pneumatic hoses (except the feed and exhaust ones). Check if air passes through relevant port when control moved on to correct position. Replace this valve if faulty.
	√ Air tube "kinked" or restricted	√ Check all tubes for sharp bends. Disconnect both air tubes from valve and check air flow with air control in relevant position. If no air escapes from air tube and replace tubes.
	√ Internal leak in the tipping valve	√ Put air control in "low" position, remove pipe from valve "TIP" port; if air leaks from this port then the O-ring of the air cylinder is faulty
The cylinder doesn't raise or raises too slowly	√ Air pressure is not enough	√ Check air pressure, air control, air tubes and tipping valve as described before.
	√ Pump fault	√ Replace pump
The cylinder raises but it doesn't lower or it lowers slowly	√ Return filter is blocked	√ Replace oil filter
	√ Air control fails	√ Check air-supply in lowering position
	√ Knock-off valve does not work properly	√ Check through the separate instructions for knock-off valves
	√ The oil used is too tick	√ Refill with the oil recommended (see also Table 1. Oil specifications)
The cylinder drops when clutch is depressed	√ The non return valve in port "C" does not work or it is not	Contact your supplier. Each valve has this component pre-assembled

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	properly fitted.	on delivery.
The cylinder doesn't extend smoothly	√ Oil level in tank too low √ Air in the oil √ Pump does not work properly	√ Bleed the system, check oil level in the tank, fill oil tank if necessary √ Replace the pump
Valve works properly but suddenly fails	√ Broken air tube √ Plunger blocked by dirt √ Knock-off valve fails	√ Replace the O-ring seal √ Check air tubes and replace as required √ Clean hydraulic system (oil tank included) √ Replace the tipping valve if necessary √ Check knock-off valve
Valve selector shaft does not move even when air pressure is enough	√ The selector shaft is sticking or trapped	√ Loosen the 4 fixing bolts by half a turn and try to switch the valve again (the torque of the bolts should not exceed 15 Nm)
The cylinder doesn't fully extend	√ Oil level in tank too low √ Relief valve is opening, by returning the oil tank, caused by uneven load or load in excess	√ Fill oil tank √ Remove or redistribute the material in the body

Table 02. Trouble shooting table

If the behaviour of your tipper is not in the list above or the suggested operations seem not to give any results, please contact us or our Sale&Service point near you.

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8. Service points

A global and update overview of main (or national) service agents to contact for checking your equipment is available on the Binotto website (www.binotto.com).
Even if you are considerable distance from the agents listed, you should still contact your nearest agent.
Most agents maintain their own networks and can advise you of the most convenient for your work.
To get the direct contact person and the telephone number please ask the agent or supplier where you bought your hydraulic equipment.

9. Contacts

Binotto General Offices

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