



# **TELESCOPIC CYLINDERS**



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# INTRODUCTION

This manual provides instructions on how to handle your telescopic cylinder from the moment of receiving it, through installation and commissioning, and how to correctly maintain it for it's working life.

Applying these instructions as a minimum will ensure the maximum life of the telescopic hoist. Failure to apply these instructions may cause damage and therefore void the warranty.

# **RECEIPT INSPECTION**

Upon receipt, the hoist should be inspected for damage. For example:

- Is the hoist dented or heavily marked?
- Are the stage hardchrome surfaces damaged?
- Are the stage wipers damaged?
- Are any components missing or damaged?
- Is the valving damaged? (if applicable)
- Are all components still installed correctly?
- Are there any oil leaks from the cylinder? (Plastic plugs may leak slightly)
- Does the supplied cylinder meet the order requirements?

In the case of damage during transit under FOB supply, it is the customer's responsibility to rectify any problems. In the case of a manufacturing fault detected during the warranty period, the supplier must be immediately contacted according to the Warranty Procedure. In the case of a design fault detected in or outside of the warranty period, the supplier must be immediately contacted.

# HOIST IDENTIFICATION

Each hoist is fitted with an identification plate (ID plate) which states the part number and the serial number. This is located near the port on the outer stage. These numbers should be quoted in case of servicing or spare part needs.

# STORAGE

#### Short term storage (up to 12 weeks)

The residual oil in the cylinder from testing during manufacture will prevent internal corrosion. The storage of the cylinder must be as follows:

- cylinder protected from damage, with stages retracted & ports plugged
- cylinder mounted in vertical orientation (if practical)
- in non-corrosive atmosphere
- ambient temperature -10 to 45°C, preferably not in direct sunlight

#### Long term storage (over 12 weeks)

The residual oil in the cylinder from testing during manufacture will not prevent internal corrosion for extended periods. In the case of long term storage, the storage of the cylinder must be as follows:

- cylinder filled with storage oil and all air bled out
- cylinder protected from damage, with rod retracted & ports plugged
- cylinder mounted in vertical orientation (if practical) with appropriate supports
- in non-corrosive atmosphere
- ambient temperature -10 to 45°C, preferably not in direct sunlight

At 12 month intervals the cylinder is to be cycled 5 times, the storage oil replaced and all air bled out. Following this the cylinder is to be returned to the storage condition as above. After 5 years in storage the cylinder is to be disassembled and inspected, and seals replaced according to their condition and life expectancy.

# INSTALLATION REQUIREMENTS

The cylinder must always be handled in such a way so as to avoid damage, especially the types of damage as described in "Receipt Inspection" (page 2).

#### Mechanical Mounting of Cylinder

- The cylinder must clear the tray during all points of travel.
- All mount pin centrelines must be parallel to the tray pivot centreline, within 0.5mm over the width of the trunnion.
- For top mount type cylinders, the trunnion mount centreline and the top pivot pin centreline must be parallel within 0.25mm to each other.
- For suspension tube type cylinders, the trunnion mount centreline and the lifting bracket pin centreline must be parallel within 0.25mm to each other.
- For suspension tube type cylinders, dimensions 'A' and 'B' must be within 2mm of each other for adequate operation (refer to figure 1). This will require the hoist to be tilting towards the tray in applications where the tray pivot is low.
- The tray pivot must be square to the truck chassis in *both* directions.
- The cylinder must be located centrally on the truck chassis.
- Use high tensile bolts of the maximum size practicable for mounting holes. *Do not* drill out mounts to suit oversize bolts.
- Care must be taken if the hardchromed surface of the stages is exposed, as any damage to this surface will cause cylinder leakage.
- All hose connections to the cylinder must have enough length to allow for full cylinder movement and must not rub on any equipment during operation.
- The final stage must be extended by 20mm when the body is fully lowered. This prevents the body from riding on the hoist, which may cause damage.
- The primary limit on hoist life in truck applications is the wear caused by vibration of the hoist as the vehicle travels along the road. The cylinder stages are hardchromed, which extends life over a non-hardchrome hoist by approximately 5 times. To attain full life, it is recommended that body locks are fitted.



Figure 1: Suspension tube type cylinder mounting (dimensions to pin centrelines)

#### Hydraulic System Connection to Cylinder

• Basic hydraulic fitting skills are required for the fitting of the cylinder into the system. Standard hydraulic connections are described in figure 2.

- The cylinder must be assembled into the system in a dust free environment, to minimise contamination entering the ports.
- Oil cleanliness is of the utmost importance. *Do not* remove the port plug from the hoist until immediately prior to connection to the system. All elements of the system (hoses and tanks included) must be flushed with clean hydraulic fluid prior to connection to the other elements of the system. In addition the oil used to fill the system must be clean.
- All hydraulic fittings must be free from burrs and have smoothly finished threads. (Note that when screwing into aluminium some fittings and valves may cause a fine slither of aluminium 'wire' to enter into the system, so action must be taken to avoid contamination of the system in this way).

#### WARNINGS:

- Impact loads on the cylinder may cause damage to the cylinder.
- The cylinder must be protected from physical damage.
- The cylinder hardchrome surfaces must be protected from damage (note that some chemicals can damage the hardchrome surface eg. caustic).
- Do not weld directly on the cylinder without first seeking advice from the manufacturer.
- Do not weld near the cylinder so that the welding current passes through the cylinder, as this will damage the cylinder internally.
- The hose sizes and pressure ratings must be correct for the application.





# **OPERATING CONDITIONS**

#### Oil Type

Mineral based hydraulic oil of ISO viscosity grade 32 or 46 is recommended.

#### **Oil Cleanliness**

A minimum fluid cleanliness level of ISO 20/18/15 is recommended, noting that other elements of the system may require a higher cleanliness level than this. Also refer to *Hydraulic System Connection to Cylinder* (page 4) regarding cleanliness.

#### **Oil Pressure**

The hydraulic system must be provided with relief valve protection, to ensure that the working pressure of the cylinder (as marked on the general assembly drawing, if applicable) is not exceeded. For standard hoists the maximum operating pressure is 2500psi, except for 87's and larger for which the maximum operating pressure is 2000psi. Exceeding the working pressure will lead to reduced cylinder life, seal extrusion or cylinder damage.

#### Oil Temperature

Standard hydraulic systems are designed to operate at a normal maximum oil temperature of 65°C, with the optimum oil temperature being 50 to 55°C. Exceeding this maximum operating temperature continuously will reduce seal and oil life dramatically. In this case a heat exchanger should be fitted to the system.

#### Air Breathers

Good quality air breathers must be fitted to hydraulic systems at any openings to the atmosphere, to reduce contamination in the system.

#### **Buckling Failure**

Buckling failures are responsible for the most critical accidents that involve telescopic cylinders in the extended condition. Buckling can occur due to axial overloading or excessive lateral inclination of the hoist. These conditions can be caused by rapid acceleration or deceleration with the hoist at full extension and full load and lateral deflection due to misalignment.

# COMMISSIONING

- 1. Bleed the cylinder according to the instructions in the next section.
- 2. Cycle the cylinder once slowly and check for adequate mechanical clearances, hose lengths etc. and general operation. This may be done in conjunction with the bleeding operation, above.
- 3. Cycle the cylinder 5 times with no load in the tray, checking for:
  - smooth operation
  - external leakage from cylinder (if leakage is found contact the supplier do not attempt to correct the problem yourself as this will void the warranty). Refer to the warranty procedure.
  - general operation and condition of the cylinder.
- 4. Cycle the cylinder with the tray loaded and check as per step 3, above. In addition check that the relief valve settings are correct so that the cylinder will not be over pressurised.
- 5. If all is operating correctly, the cylinder is now ready for service. Inspect the cylinder regularly during the first 10 to 20 cycles in service. Ensure that the cylinder temperature does not exceed allowable levels.

# BLEEDING

It is of particular importance to fully bleed the air from telescopic hoists, as failure to do so can result in reduced hoist life or damage to the hoist. This has been observed in the field, where telescopic hoists containing air in the oil have failed due to a phenomenon called *dieseling*.

*Dieseling* occurs when pressure spikes in the hydraulic system compress air in the oil, to a point where ignition occurs. This is the same mechanism by which a diesel engine operates. In a telescopic hoist, any air in the oil is held in the upper end of the annulus area, directly adjacent to the

gland seals. If a pressure spike occurs, the seals can actually burn due to the ignition and then begin to leak.

The result of air being present in the hoist is obvious – reduced hoist life or damage. As such the following procedure must be followed to ensure that air is fully bled from the hoist.

# Procedure

The bleed plug is located at the top of the hoist adjacent to the top pivot pin. For suspension tube type hoists it is located above the suspension tube nyloc nut. A 3/8" drive 5/8"AF socket or a tube type spanner is best for access.

- 1. Prior to the first operation of the hoist, loosen the bleed plug and pump oil into the hoist slowly, until oil appears at the bleed plug.
- 2. Shut off the oil supply and tighten the bleed plug.
- 3. Cycle the hoist to full extension and then to full retraction, two times.
- 4. With the hoist in the lowered position, loosen the bleed plug and slowly pump oil into the hoist. Continue until air bubbles no longer appear in the oil coming from the bleeder.
- 5. Shut off the oil supply and tighten the bleed plug.
- 6. The air is now bled from the hoist.

A bleeding kit is available (part no. 0001V0001) which has the following advantages:

- Allows recycling of oil by providing a facility to return oil from the bleed port to a clean receptacle.
- Reduces cleanup (ie. no oil spilt) & environmentally friendly.
- Allows more complete bleeding.

# **PERIODIC INSPECTION & MAINTENANCE**

- For trucks in frequent use the mount pivots should be greased weekly. Inspect the hoist weekly for significant dust buildup indicating oil leakage.
- Check hardchrome surface for damage every 12 months. Surface should be free from dents and scratches.
- Check hoist seals by inspecting for leakage at stage ends and around the base every 12 months.
- The oil should be replaced every 12,000 hours of operation. The seal type used in these cylinders is expected to provide a minimum of 10,000 vehicle operating hours.

# IN CASE OF FAILURE

If the cylinder is still in the warranty period, do not attempt to disassemble and fix the cylinder yourself, as this will void the warranty. Please refer to the Warranty Procedure for instruction on handling the situation of warranty claims.

Please note that it is far preferable for the hydraulic cylinder to be returned to the manufacturer for inspection, to determine the reason for failure. If this is not done, the investigation may not be complete and the possibility exists that the problem will re-occur.

If the cylinder is out of the warranty period, only experienced hydraulic fitters should disassemble and work on the cylinder. The reason for this is to avoid unnecessary damage to the cylinder.

# WARRANTY PROCEDURE

The procedure for Warranty Claims is as follows:

- 1. Customers wishing to claim under warranty are to provide the cylinder part number, serial number and all details of the problem, prior to removing the cylinder from the vehicle. These details are to be provided to the cylinder supplier.
- 2. On receipt of this information, the supplier will discuss the possible remedial action. This will involve either organising return of the cylinder to the manufacturer for inspection & repair, in-situ repairs or cylinder replacement.
- 3. Cylinders that have had attempted repairs or been dismantled by parties other than the manufacturer, without written approval from the manufacturer, will not be considered for claims under warranty.
- 4. On disassembly and inspection of the cylinder, the cause of the problem will be investigated. At this point the responsibility for the problem will be determined and the warranty claim will be approved if the manufacturer is at fault. A warranty report will be provided to the customer if requested.
- 5. On claims approved, the manufacturer will repair the product to the required specifications. Should the product be unrepairable, a replacement will be supplied by the manufacturer.
- 6. On claims rejected, a warranty report with a quote to repair the cylinder will be provided to the customer. On receipt of an official order from the customer, the product will be repaired and returned to the customer, FOB.

# WARRANTY POLICY

- 1. This warranty is made between the manufacturer (hereafter referred to as "The Company") and the purchaser, consumer or buyer of products or services from the company (hereafter referred to as "The Purchaser") and no oral representations, warranties or guarantees, other than this warranty shall be binding upon the company.
- 2. No oral representation, warranty or guarantee by any agent of manufacturer, seller or agent of the company shall be binding upon the company except as expressed in this warranty.
- 3. No provision, clause or part of this warranty may be amended, modified or extended except by written agreement executed by the company and approved by the Sales Administrator, a Director, Accountant or legal representative of the company.
- 4. This warranty will apply only in respect of products and services the purchaser has contracted with the company to provide. It is the company's policy to improve it's products and services whenever possible and practical to do so and whilst the company will endeavour to maintain improvements and modifications at any time without the obligation to make such changes, improvements and modifications on any product or equipment sold previously.
- 5. The company shall in no event, be liable for labour or freight charges or for consequential or incidental damages including, but not limited to, injury to any person or persons or property of the purchaser or any other party or parties property, machine down time, and losses and expenses incurred by the purchaser arising from the use of the company's products and/or services. In no circumstances will the company's liability be greater than (at the company's choice) the cost of supplying the product or service again.

- 6. Consistent with the company's commitment to provide specialist products and services, no warranty is given either express or implied, as to merchantability, fitness for purpose, or otherwise when the purchaser directs the company to either provide a product or service that would otherwise not be recommended by the company.
- 7. Any claim made pursuant to this warranty should be made in writing. The product returned pursuant to this warranty claim and verified by our examination will be repaired or replaced free of charge. Any additional parts or labour required to rebuild or replace (not covered under our warranty) will be charged by agreement to the purchaser.
- 8. No warranty is given in respect of products sold where an existing manufacturers warranty may apply.
- 9. The company shall not be liable whatsoever for plans, drawings or specifications of any other party or parties that themselves do not meet the purchasers requirements including but not limited to being fit for the purpose.
- 10. This warranty does not in any way affect any right the purchaser may have under any existing statute which cannot be excluded.
- 11. The following warranty is given by the company subject to the above paragraphs, in respect of services of repair:
  - a) The company warrants against defects in workmanship for a period of three months from date of the company invoicing the purchaser.
  - b)No materials other than those sold by the company pursuant to an agreement to repair are covered by this warranty.
  - c) No warranty is given for any period where products are not installed, used or operated as per the company's express instructions.
  - d) In this clause the term repair also includes machining, tooling or any other process that involves working on part or parts of machinery not wholly owned by the company
  - e) The warranty is not extended in the case where any other person or persons without express authorisation obtained from the company have attempted to modify, service or repair the item or product, save and except when to do otherwise would be likely to cause injury or damage to persons or property.
  - f) Nothing in this clause is intended to in any way detract, exclude or limit the operation or application of any other provision of this warranty.
- 12. The following warranty is given by the company subject to the above paragraphs, in respect of products sold or manufactured by the company:
  - a) The company warrants against defects in workmanship and material for a minimum period of twelve months from date of the company invoicing the purchaser.
  - b) No warranty is given for any period where products are not installed used or operated as per the company's express instructions.
  - c) The warranty is not extended in the case where any other person or persons without express authorisation obtained from the company have attempted to modify, service or repair the item or product, save and except when to do otherwise would be likely to cause injury or damage to persons or property.
  - d) Nothing in this clause is intended to in any way detract, exclude or limit the operation or application of any other provision of this warranty.



# → DESIGN → MANUFACTURE → SALES → SERVICE → SPARE PARTS