User Manual HC Series

Telescopic Cylinders built to robust and rugged standards to do the tough jobs that you need them to do

Legend on symbols in this document:

DANGER	Read this instruction carefully before using the product covered in this document to avoid dangerous product use.
CAUTION	These caution signs tell you do's and don'ts and will give you as a user of these products, a better insight how to use the product covered in this document in a safe way.

POWAUTO
DAVID BROWN HYDRAULICS
HYDRECO

HYDRECO POWAUTO
HYDRAULIC SOLUTIONS PROVIDER

www.hydreco.com

Storage of telescopic cylinders

Before installation

To store telescopic cylinders properly and to maximize their useable life pay attention to the following:

- Store in a dry subject, clean and normal temperature location
  - Excessive moisture can cause rusting
    too hot environment can cause seals to dry out and
    extreme low temperatures can result in water condensation and potential rusting.
  - Contamination ingress into the cylinder can adversely affect the life of both the cylinder and the whole hydraulic system.
- Ideal storage is indoors to avoid outdoor climate changes.
  - Always ensure that plugs, closures, and transportation packing remains in place until the cylinder is fitted to the vehicle.
  - Do not over-tighten oil port plugs.
- If the rod moving segment extends due to high temperature (by increased pressure in the closed cylinder slightly open the oil port or bleeder valve screw to push it back in again.
  - Always store the cylinder in its closed non-extended position.
- Handle the cylinders with care and keep them protected from physical damage.
  - Any kind of damage to the cylinder, particularly on its moving parts, could adversely affect the functionality or life of the cylinder.
- The best storage position for the cylinders are in a vertical position with the rod end down.
  - Be sure they are blocked securely to keep them from falling over. Storing with the rod ends down keeps oil on the seals, which protects them from drying out. Storing with the rod end down also minimizes the temptation to lift a cylinder by the rod eye – a dangerous practice.
  - If horizontal storage cannot be avoided, the cylinder should be rolled into a new position every two months or so to prevent drying, distortion and deterioration of the seals.

Cylinders being idle

If an assembled cylinder is left for some time, and will not be used, follow the below advice to extend its useful life and ease of startup after the idle time.

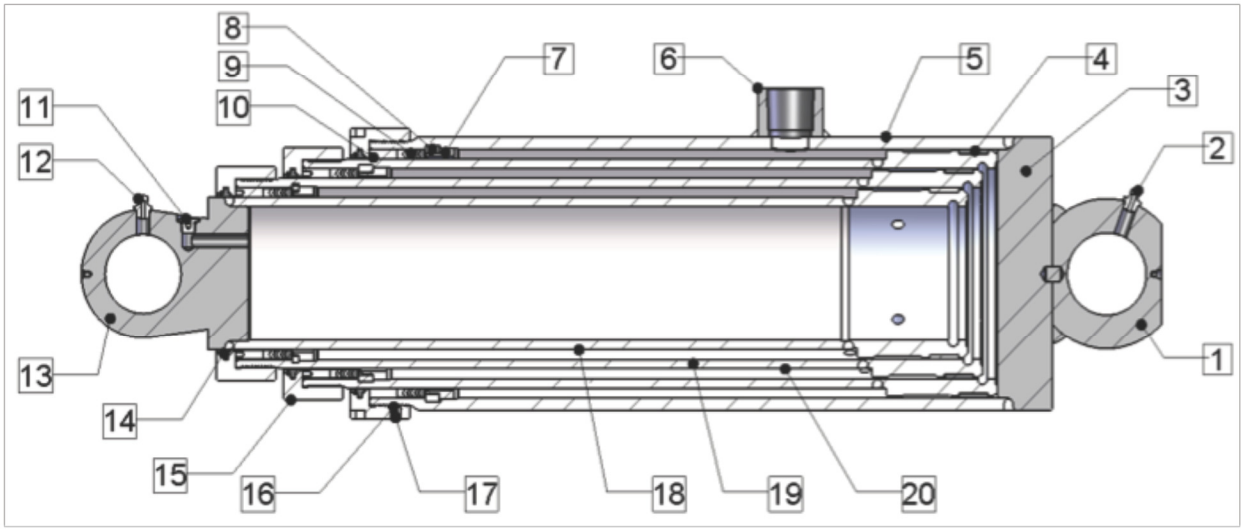
- All machined surfaces left exposed should be coated with a light film of grease to avoid rusting.
- If rusting has started, apply a light coat of oil to the surfaces.
  - Polish surfaces with 320 or 400 grit sandpaper. Do not polish surfaces up and down the length, only polish around the circumference. Wipe off surface after polishing.
  - If after this the surfaces show evidence of rust damage, i.e. pitting, the cylinder should be inspected by an authorized service center for evaluation.
- Operation of a hydraulic cylinder with surface damage will shorten the useable life of its seals.

Hydraulic oil operating parameters

Temperature	Minimum at start-up	-40° C (-40°F)
	Maximum continuous.	+80°C (+176°F)
	Maximum intermittent	+100°C (+212°F)
Viscosity	Maximum at start-up	2000 mm2/sec (9,000 SSU)
	Maximum continuous	250 mm2/sec (1150 SSU)
	Minimum continuous	10 mm2/sec (60 SSU)

	Optimum	15-25 mm²/sec (78-124 SSU)
Fluid Cleanliness	To ISO4406 solid contaminant	
	Start-up period	21/17
	Maximum in service	19/15
	Optimum	16/11
	Maximum water	0.1%
Fluid Velocity	Maximum in INLET line	2.5 m/sec (8 ft/sec)
	Recommended in INLET line	1.5 m/sec (5 ft/sec)
Fluids	All data is quoted for mineral oils HM and HV. For fire resistant and environmentally aware fluids please contact your Hydreco representative.	

Product parts list (simplified)



Item	Description		Item	Description		Item	Description		Item	Description
1	Base Cap Cross Tube		7	Stop Ring		13	Rod Eye		21	Tube
2	Base Cap Grease Nipple		8	Retainer Ring		14	Wiper		22	Tube
3	Base Cap		9	Vee packing set		15	Cap Nut		23	-
4	Piston Bearing		10	Top Bearing		16	Nylon ball		24-	
5	Barrel Tube		11	Air Bleeder		17	Set screw in Cap nut		25	-
6	Hydraulic port		12	Rod Grease Nipple		20	Rod Tube			

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Installation of telescopic cylinders

Cleanliness during the hydraulic circuitry installation is important, and Hydreco cylinders are shipped with the ports plugged to protect them from ingress of contaminant. These plugs should not be removed until the piping shall be installed.

Before connection the piping to the cylinder ports, ensure that all hoses and pipe-work are clean, removing any loose particles which might have resulted from any threading or flaring or hose assembly operations.

- Any contaminant can cause serious damage and affect the life of either the cylinder or system.

Ensure that all sliding surfaces are free of any form of corrosion, no matter how small.

To minimize any side loading of the cylinder, proper alignment of its piston rod and the mating component on the dump body is essential.

- Check this in both the extended and retracted positions. Improper alignment will result in excessive rod seal, bearing and/or cylinder tube wear.

The cylinder should float in the pin mountings to minimize any side loads on the cylinder.

- Use following measures to enable sufficient float to allow the body to sway slightly while dumping, without putting a side load on the cylinder:

	Eye width less or equal to 5”	Eye width greater than 5”
Pin to pin bore diameter clearance	1/16” to 1/8” bore clearance	1/8" to 3/16" bore clearance
Sideways clearance	1/8” to 1/4” clearance per side	1/4" to 1/2" clearance per side

Protect the telescopic cylinders from any environment where air drying material is present (such as fast- drying chemicals), paint, or welding splatter, or other hazardous conditions such as excessive heat.

- Install shields to prevent damage to the rod end and its seals.

One of the moving stages should be extended a minimum of 1/4” when the dump body is in the down position.

Lubricate cylinder end mounts regularly.

Safety precautions if a cylinder is being serviced when assembled to the truck or trailer

Make sure that there are strong supports in place to keep the body from lowering by mistake before any adjustments or service is done to the cylinder or any other part of the hydraulic circuit. Place the dump control in its “lower” position to eliminate any oil pressure in the cylinder (i.e. the hydraulic system is pressure relieved before any service work commences).

- Field service repair and maintenance should be limited to replacement of oil seals, top bearings, wipers and adjustments of cap nuts for leakage and proper moving segment sequencing.
- Before repairing or maintaining the cylinder, check the moving segments for any damage. If there are any scores or scratches, smooth any such marks out with a fine stone or emery cloth to avoid ruining the new seals.
- After repair, a thin film of oil may be on the moving segment. A small accumulation of oil may be noticed on the top of the moving segment at the adjustable cap nut after many cycles. This should not be mistaken for a leakage.
- If a cylinder can’t be corrected in the field service repair, we recommend that the cylinder is returned to Hydreco, or a factory qualified service centre.
- If it is necessary to take a cylinder apart due to a damaged item such as a moving segment, the cylinder should be completely disassembled and all parts inspected. When requesting information or ordering parts, refer to the cylinder and serial numbers engraved to the outer tube surface between the oil port and the bottom end.

  Look in the section in this document for disassembly illustrations and use them as guide lines for repairing a telescopic cylinder.
- Always use proper safety equipment.

Normal maintenance procedures

Normal wear items and seal adjustment

1) Oil seals, wipers and top bearings are considered normal maintenance or service items. These items are affected by contamination from external and internal particles, many of which are abrasive in nature, causing wear or damage to the parts, to the extent that replacements may be required.
2) Telescopic cylinders may leak oil past the seals for various reasons and therefore require adjustment of cap nuts holding the seal pack. This adjustment is deemed normal maintenance.

How to adjust telescopic cylinder cap nuts

1) Loosen the set screw in the cap nut that holds the packing of the leaking stage.
2) Lightly tap cap nut around its circumference with a hammer.
3) Back head nut off 1/2 to 1 full turn using a wrench or chain wrench.
   If the moving stage tube rotates when the head nut is turned, hold it with a strap wrench.
4) Cycle cylinder 2 to 3 times to reset the oil seal packing.
5) Retighten head nut approximately 1/2 turn further than it was when it loosened.
6) Tighten the set screw.

How to make moving segments move in the right order (so called mis-staging or mis-sequencing cylinder)

1) Loosen set screw in cap nut that holds oil seals that fits over stage that is sticking.
2) Lightly tap cap nut around circumference with a hammer.
3) Back cap nut off 1/2 turn using a wrench or chain wrench.
4) Operate cylinder, if cylinder still mis-stages back head nut off another 1/2 turn.
5) Operate cylinder, if cylinder still mis-stages tighten the head nut of the next moving stage that is extending too early.
6) Tighten set screws.

How to bleed air from telescopic cylinders

1) For smooth operation on these cylinders, it is advisable to bleed the air from the cylinder weekly. Manual bleeding is accomplished by:

2) Empty the dump body of any material.
3) Remove the cover plate from the dog house of the dump body to access the bleeder valve/screw.
4) Fully extend the cylinder, raising the EMPTY dump body.
5) Lower the dump body to within 1 foot from resting on the frame.
6) With the fingers turn the bleeder screw in a counterclockwise direction. This opens the valve and allows the air to escape from the cylinder.
7) When a steady stream of oil comes from the bleeder, turn the screw in a clockwise direction until it is closed.

Precautions on proper use of telescopic cylinders

DANGER **Read Before Use**	Read the below caution warnings before use of the Hydreco telescopic cylinders Do not use the telescopic cylinder as a structural part of the dump truck or trailer, the telescopic cylinder is only designed to provide a lifting force. The cylinder is strictly a lifting device and should be free to find its own trajectory line of extension, free of any lateral loading of the moving segments. Do not allow the vehicle to rollover or tilt laterally since that inevitably can cause the cylinder to bend, bulge or separate causing the dump body to drop suddenly. Do not allow the dump body to drop suddenly since that can result in severe injury or death and/or damage to the chassis and cylinder. Do not move the truck until the dump body or trailer is lowered completely. Do not drive the truck while the P.T.O. (power take off) or hydraulic pump is engaged.
CAUTION **Alignment**	Make sure the top and bottom dump body mountings are properly aligned, and that the mounting pin tolerances are with appropriate clearance. Failing to do so may cause scoring of the moving segments, leakage, or improper sequencing which could cause the unit to upset.
CAUTION **No Side Loads**	The telescopic cylinder is not designed to withstand lateral or side pressure that occurs when the truck or trailer is leaning. Therefore do not activate the telescopic cylinder when the truck or dump trailer is un-level or on soft ground. To avoid potential tip-over the telescopic cylinder should not be used where the truck or dump trailer is on uneven terrain, or soft ground, the same is valid on fresh fill, where wheels may sink on one side, again potentially leading to a potential tip over.
CAUTION **No Heavy Crosswinds**	Do not attempt dumping operations in high or gusty wind conditions or during heavy crosswinds. If possible, raise the dump body directly into the wind.
CAUTION **Check Your Tires**	A blown tire or a severely under-inflated tire can cause instability when dumping. Always check tires visually for cuts or punctures. Make sure all tires are inflated properly. Proper tire inflation also improves wear and fuel economy.
CAUTION **Sticky Loads**	This is a situation when the load doesn't come out of the dump body by itself and it occurs when the composition of the load makes it "glue" itself to the dump body. If you suspect that this can happen (moisture of loaded material etc.) use an observer to watch the dumping and alert the driver if it happens. If it happens the driver should immediately lower the dump body with the cylinder hydraulic control valve partially open. The risk with a sticky load in a partially or fully raised dump body is that the vehicle can rollover or tilt laterally due to the uneven load condition this creates. When the dump body is lowered completely then unload it manually or with suitable mechanical aid.

	**Danger warning!** • Do not use the telescopic cylinder to try to loosen the sticky load, i.e. rapidly moving the control handle between Lower and Raise positions. • Do not move the truck or trailer with the dump body raised. • Do not move the trailer and press brake pedal to cause shaking in the dump body. All of this causes dangerous hydraulic pressure spikes which can destroy the cylinder or other hydraulic circuitry components.
CAUTION **Keep Truck and Trailer in straight line**	To have the best stability of the dump trailer always do the dumping when the tractor truck and trailer are in a straight line (not jack-knifed). If the trailer and tractor truck are in a so called jack-knifed position the upper coupler pivots on its bearings and do not contribute to any dump stability, this shall be avoided by keeping the tractor truck and trailer in a straight line.
CAUTION **Keep people away from tipping truck**	Do not activate the dump function while personnel or equipment are alongside or behind the dump body or dump trailer.
CAUTION **Always Keep Control**	It is important and absolutely vital that the driver stay in control of the entire dumping process. If a dump body starts leaning to any side the operator must immediately lower the dump body and check for and sort out any issues. Then thereafter finish dumping.
CAUTION **Avoid Slopes**	Always perform the load dumping on flat surfaces. There is a potential roll-over risk is if the dumping is done on a slope
CAUTION **Do Not Overload**	Follow the manufacturer's instructions on maximum permissible load in the dump body. If the body is overloaded there is also a danger and might cause a tip over. Overloading can also cause the whole hydraulic circuitry to upset.
CAUTION **Load Evenly**	Make sure the dump body is loaded evenly. If it is not there is an increased risk for a rollover or later tilt.
CAUTION **Keep Normal Pressure**	A fatal risk for people and equipment can appear if the telescopic cylinder is over-pressurized. The factory approved operating pressure (normally 2000PSI / 13.8MPa) shall not be exceeded. Operate the dump function slowly to avoid exposing the hydraulic cylinder to a too high or shock pressure

CAUTION **Check the Hoses**	Hydraulic hoses should be checked regularly and replaced if worn out or damaged since failing hoses can cause severe injury or death and/or damage to the vehicle and telescopic cylinder.
CAUTION **Check the Oil**	The hydraulic oil should be checked and changed regularly to avoid contamination leading to internal cylinder damage.

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1. Preparations	The telescopic cylinder is best serviced mounted in the vertical position, for both disassembly and assembly. Also, it is best located where a hoist or overhead crane can be used directly overhead of the cylinder for removing the moving segments if complete disassembly is required. A typical stand is made of angle iron welded to a base, that is anchored to the floor and an adjustable wraparound chain to secure the cylinder to the stand. Because of oil spillage and safety, we recommend draining the cylinder of oil before disassembling by laying it horizontally with the port down and rotating the last moving stage so the bleeder hole is on top and open.	 Fig. 1
2. Set screws	All cap nuts are secured to the plunger by a set screw. Under the set screw is a nylon ball to protect the threads. To remove the cap nut, the set screw must be loosened using an allen wrench.	 Fig. 2
3. Cap nut	After the set screw has been loosened, tap cap nut gently around its circumference and unscrew the cap nut with a chain wrench, or an equivalent tool. Do not use a chisel, punch or weld any studs to the cap nut to remove.	 Fig. 3
4. Top bearing	The bearing can be removed by simply using a set of picks in the drilled holes and moving back and forth until you can work it high enough to grab it and remove. Our bearings are plastic nylon and can also be removed by inserting a screw type driver rod into the holes provided and pulled up and out. This could damage the bearing and will need to be replaced. 	 Fig. 4

5. Oil seals	To remove oil seals, pull the moving segment up about one foot. Add tape to a clean area. Push the moving segment down past the oil seals then pull the moving segment up. The oil seals will stick to the tape and be pulled out with the moving segment like in Fig. 5. Repeat as needed. Close up of Packing order. **Seven Total Layers of Packing:** Hard plastic top = top flat – bottom groove White soft plastic = top point - bottom groove Soft rubber seal = top point - bottom groove White soft plastic = top point - bottom groove Soft rubber seal = top point - bottom groove Soft rubber seal = top point - bottom groove Hard plastic bottom = top point – bottom flat	 Fig. 5

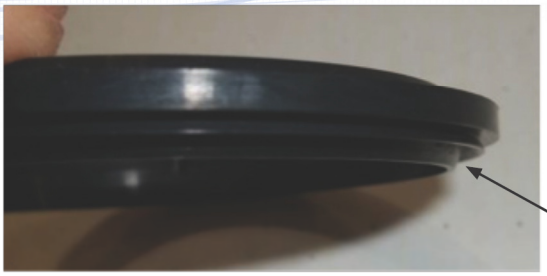

Fig. 7

Wiper Ring

The Top ring being held up, in picture below, is the Wiper Ring that gets installed into the cap nut by itself. There is a groove machined into the inner diameter of the cap, above the threads, that the wiper fits into. The top of the wiper comes to a point and the bottom has a 'V' groove.

Fig. 8

Packing Rings

Each packing ring has a pointed side that should face upward. The bottom of each ring has a groove for the point of each ring below it to fit into, except the bottom ring. The bottom ring is flat to be able to sit onto the retainer ring & top ring is flat on top for the bearing to ride on.

Service and Maintenance Reassembly Instruction

All bores in the packing area and moving segments outside diameters must be free of tool marks and scratches. Polish with a fine paper, crocus cloth or a Scotch Brite pad. All parts should be clean and free of any contamination. Put all moving segments into the bottom tube in the vertical position, as shown in Fig. 1. Assemble the remaining parts in the reverse sequence as listed in the disassembly instruction. The packing should be presoaked in oil before installing (do not use a detergent oil). Install packing, one ring at a time, in the proper sequence as shown in Fig. 8. Make sure to seat each lip individually, making sure packing is nestled uniformly.

Note: The soft, low pressure ring must be in the second position from the retainer ring.

Note: See Fig. 8 for the direction of the packing. Also remember that the top largest plastic ring in the kit is the wiper ring and needs to be installed into the cap nut (Fig. 7).

After the head nuts are adjusted, make sure there is a nylon slug (Fig. 11) under the set screw (Fig. 10) before securing the head nut to the plunger. After installing the cylinder in the unit, open the bleeder screw and extend the cylinder to bleed the air. More than one extension may be needed to assure all the air is removed and cylinder operates smoothly.

Field Repair Kits and Order Information

Hydreco's original replacement parts are available in kits for field maintenance and/or repairs of the cylinders (Fig. 9, 10 & 11). These parts are the same as originally installed. As with all hydraulic repairs, make sure your workshop is properly equipped and that the work area is clean.

Field Repair Kits Contents

• Oil seal kits	• Set Screws
• Wiper Rings	• Nylon slug
• Top bearing rings	

Fig. 9

Fig. 10

Fig. 11

Field repair kit ordering information

Please order by part number

Cylinder Model	Field Repair Kit Part Number
HC53-603-084	HC53-KIT
HC53-603-086	HC53-KIT
HC63-702-110	HC63-KIT
HC63-702-120	HC63-KIT
HC63-702-124	HC63-KIT
HC63-702-126	HC63-KIT
HC63-702-140	HC63-KIT
HC74-702-120	HC74-KIT
HC74-703-135	HC74-KIT
HC74-703-156	HC74-KIT
HC74-703-161	HC74-KIT
HC74-703-167	HC74-KIT
HC85-702-190	HC85-KIT
HC85-702-220	HC85-KIT
HC85-702-235	HC85-KIT
HC85-702-265	HC85-KIT