

Commissioning and Service Information for Telescopic Cylinders, Series 3PL

1. Commissioning

1.1 Installing the cylinder

During installation, it is important that the cylinder is vertically aligned while it is fully retracted. Measuring over the length of the cylinder tube, it should not be more than 2 mm out of plumb, otherwise lateral forces can be developed. These cause excessive friction (stickslip when travelling at levelling speed) and external leakage. Do not remove the wrapping and the transport restraint until just before the cylinder is extended for the first time. When the wrapping is removed, check that the cylinder heads are clean.

1.2 Bottom and top overtravels

Measure bottom and top overtravels and check that the reserve stroke is being properly apportioned in accordance with next paragraph

1.3 Auxiliary Guides

If guide yokes are fitted, check that they are not exerting any lateral force on the cylinder heads, because this would result in external leakage. The guide shoes should have a clearance of at least 2 to 3 mm.

1.4 Bleeding and Filling

Telescopic cylinders are supplied already filled with special oil. Before extending the cylinder out to the cabin, bleed all rod heads simultaneously until the cylinder is evenly extended. This is best achieved using just the bypass pressure (turn the adjusting screw in by one turn). At the valve remove the plug for the UP solenoid. Attach the cylinder to the car, then lower the car completely (without the buffer). Repeat the bleeding procedure and make sure the car does not move. This procedure can also be used to fill an empty cylinder.

Attention: As soon as any individual stage lifts by more than 3 mm, its check valve closes and the oil chambers above it receive no further fresh oil.

1.5 Servicing

At each service, lower the cylinder completely (if possible, without buffer) to achieve 100% synchronisation. During normal travel, the cylinder only synchronises to the extent necessary to ensure that it reaches the topmost landing. This can give rise to a small starting jolt at the lowest landing.

The Rule of thumb for bottom and top over- travels:

Two-stage telescopic cylinders:

- bottom - 1/2 reserve stroke
- top - 1/2 reserve stroke + 50 mm

Three-stage telescopic cylinders:

- bottom - 1/3 reserve stroke
- top - 2/3 reserve stroke + 50 mm

Four-stage telescopic cylinders:

- bottom - 1/4 reserve stroke
- top - 3/4 reserve stroke + 50 mm

Attention: As soon as any individual stage lifts by more than 3 mm, its check valve closes and the oil chambers above it receive no further fresh oil. At each service, lower the cylinder completely (if possible, without buffer) to achieve 100% synchronisation. During normal travel, the cylinder only synchronises to the extent necessary to ensure that it reaches the topmost landing. This can give rise to a small starting jolt at the lowest landing.

Caution! If at some later date the cylinder has to be extended to the limit of its travel (e.g. for acceptance tests), it must first be lowered onto the buffer. If this is not done, it is possible that the elevator may stop before the end of its maximum possible travel, and the pressure in the upper cylinder chambers may rise to such a level that the rods become permanently distorted.

2. Replacing the outer seals if there is external leakage

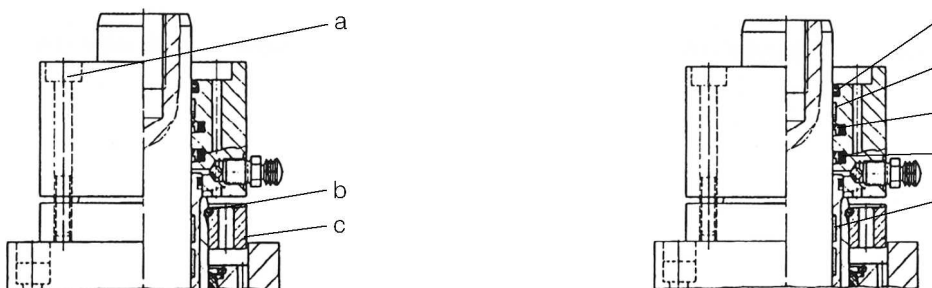
2.1 Locating the cause

Check the piston rods over their full lengths for any damage that can be seen or felt. Rectify any blemishes before replacing the seals. Smooth out any roughnesses using grade 220 emery paper and finish off by polishing with emery cloth

- when there are no more areas of visible damage, check that the cylinder mounting is stress—free, i.e. that the cylinder is perpendicular. If there are any auxiliary guide yokes, check if they are exerting lateral forces on the seals (see section 1 .3)

2.2 Removing the cylinder heads

- retract cylinder completely so that there is no longer any pressure inside it
- remove the cap screws (a) and carefully lift up the cylinder head (a)
- if the second or third cylinder head has to be removed, remove clamp ring (b) so that threaded flange (c) can be lifted up, then remove the wiper ring blocker and subsequently the wiper ring before raising the piston head.

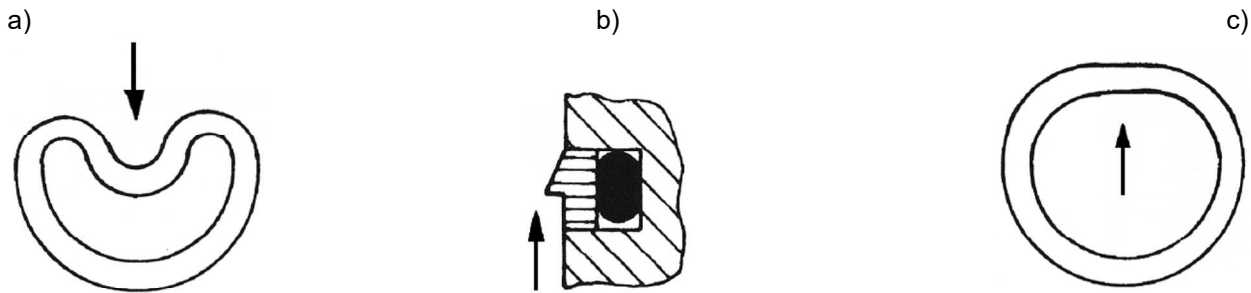


2.3 Replacing the seals

remove old seals and check them for damages

- warm the Teflon seal to about 60C (140°F) to make it more pliable. The best way of doing this is to use a hair dryer

- the seal must be distorted (a) to put it into position. Make sure the sealing lip is facing the pressure side (b)



- as soon as the seal is fitted into the groove, push it back into its original shape (c)
- replace the cylinder head using the reverse procedure. When sliding the cylinder head over the piston rod, take care not to damage the seal
- prior to, and while tightening the cap screws, make sure that the clamp ring is correctly positioned in its groove
- When the re-assembly work is complete, repeat the air bleeding procedure (see section 1 .4)

3. Replacing the inner seals if there is internal leakage

3.1 If the individual stages are not synchronised

If it is obvious that the individual stages are not synchronised, remove the buffer and completely retract the cylinder in order to restore synchronisation. Then operate the installation in the normal manner so that the cylinder can be observed to determine which stage or stages go out of synchronisation.

If the smallest stage advances at the highest speed, there is no internal leakage in the telescopic cylinder! The bottom overtravel must be checked, however, to ensure that the cylinder can synchronise itself automatically (see previous chapters)

3.2 Determining which stage has internal leakage

Fig. a : two—stage cylinder

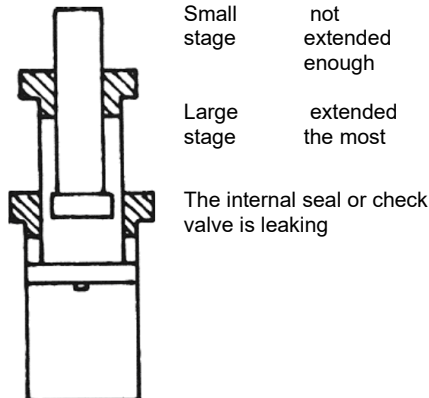


Fig. b : three—stage cylinder

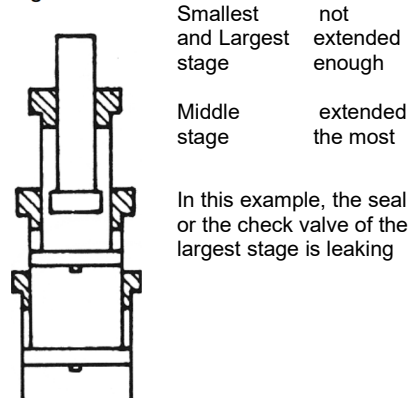
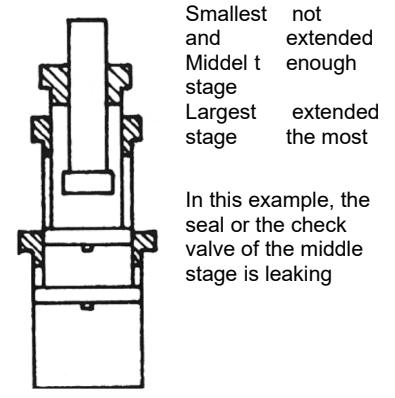


Fig. c : three—stage cylinder



3.3 Dismantling the stages

- remove all the cylinder heads (see section 2.2)
- lift out the smallest piston rod, taking care that it does not get damaged
- lift out the middle rod (refit the clamp ring and threaded flange in order to lift it up).

Attention: during this stage, oil is being lifted up as well! The oil in the ring area should be sucked out while the rod is being lifted. This is best done with a small pump powered by an electric hand drill.

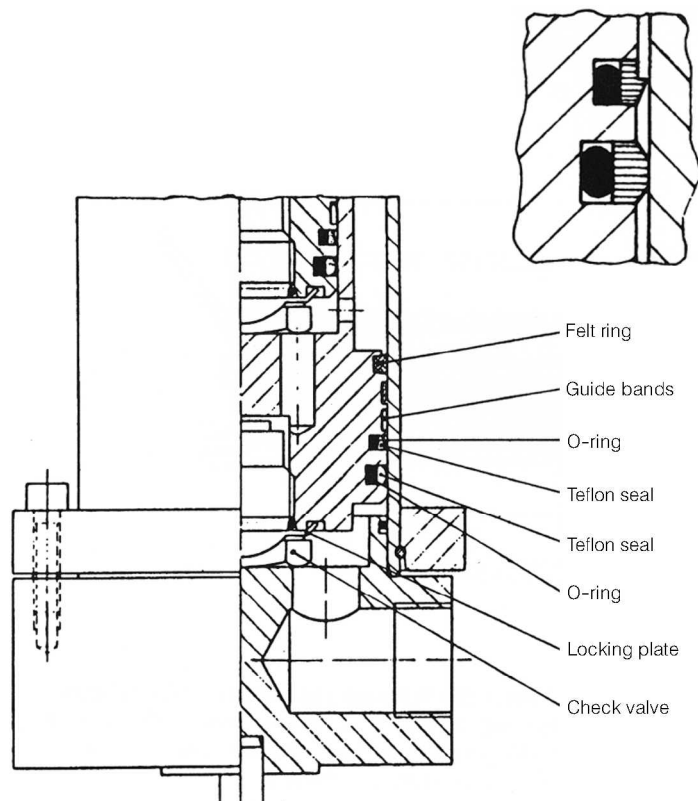
- the procedure for the largest piston rod is the same as for the middle one

3.4 Locating the Cause

- examine all the seals
- if no visible damage can be found, the check valve is the cause

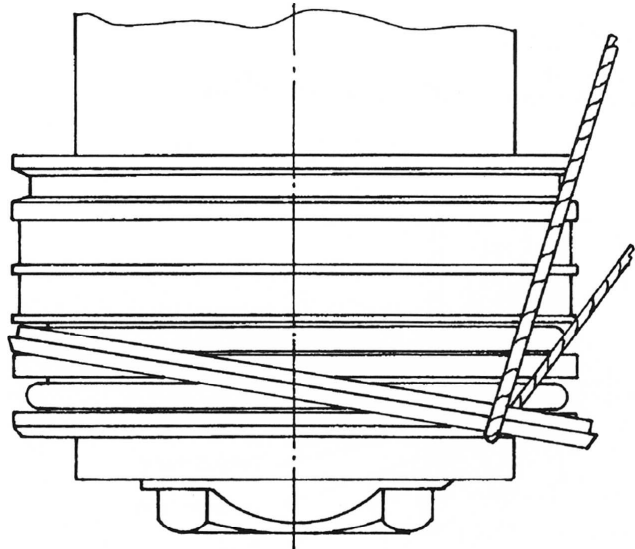
3.5 Replacing the check valve

- bend back the tab washer and unscrew the check valve:
- cylinder type 35/2 -30 mm A/F
- all other types -55 mm A/F
- reassemble in the reverse order



3.6 Replacing the internal seals

- remove the old seals
- fit new O-rings, the smaller one in the upper groove (see illustration)
- warm the Teflon seals to about 60°C (140°F) with a hair dryer to make them more pliable
- fit the warmed-up seal into one side of the groove and then ease it into position by pulling upwards with a string while sliding the string around the circumference of the seal. Fit the upper seal first, making sure that the sealing lip is facing the correct direction, then fit the lower seal



3.7 Assembly

- before re-fitting the large piston rod, unscrew the hose, complete with ball valve, at the control valve. So that oil and air can escape, hold the hose with ball valve half-open into the tank. If this is not done, an air cushion will form under the piston rod and will prevent it from sinking
- reassemble in the reverse order

3.8 Re-commissioning

- since there is now no oil in the cylinder, it must be refilled (see section 1.4, Bleeding / Filling)

3.9 If leakage reappears

if the cylinder starts to leak again after the internal seals have been changed, it must be assumed that the inner surface of one of the cylinder tubes is damaged. In this case, please contact the manufacturer