Synchronized Telescopic Cylinder
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1.0 – GENERAL

Compared to a conventional single stage jack, each stage of a two-section synchronized telescopic cylinder moves at half the speed. Also, for a two-sections, each stage has a travel of half the actual travel, which has a very positive effect on the components’ life.

The two-section cylinder has a collapsed length of just slightly more than half the required travel. This allows for an installation in a much more confined space than otherwise possible with a single stage jack.

1.1 – Synchronized telescopic cylinder of ITI HYDRAULIK

1. With 35 years of experience in fabricating and servicing hydraulic equipment, I.T.I. HYDRAULIK carries a complete line of jacks for hydraulic elevators.

2. Being telescopic, the synchronized jack can be installed behind, beside or under the elevator car as well as in restricted areas. When it is installed under the car, it reduces the pit’s depth by 65% to 75%.

3. While deploying, the telescopic jack in two, three or four sections it keeps a constant speed over its entire travel. It is thus suitable for merchandise elevators as well as for passengers.

4. The good functioning of the jacks is verified in our shop to ensure conformity to the ASTM and CSA B44 standards.

5. Resistance and capacity calculations are made for every quotation request. Still, our large inventory of parts allows for a quick delivery.

6. Guides can be included for each section to provide an increase stiffness of the cylinder during the extension.

7. This type of cylinder is machined, sanded and polished with high precision on specially designed equipments. It is carefully examined before being assembled and protected.

8. Being easy to install, the heads can easily be taken apart for maintenance or for repairs.

9. For a little extra, we can protect the jack against corrosion caused by chemical agents or electrolysis with a tape coat or a PVC casing.

10. The product we offer is manufactured in Quebec and is warranted against any manufacturing defects.
1.2 – List of Components

When you receive your synchronized telescopic jack, you should have the following items:

- The jack
- The heads hardware:
  - Air bleeders
  - A straight coupling for the recuperator
  - A 90° coupling for the recuperator
  - 1 transparent hose Ø3/8", 8’ longer than the closed length.
  - 1 roll of Teflon tape
- This instruction manual.

Every synchronized telescopic jack is shipped in a wooden crate or in a bundle to ease its handling. All other items are included either in a box or an envelope attached to the jack.

Plus:

- Each jack is shipped with a bolt (platen plate). It is assembled to the piston according to your specifications.
- Depending of the type of the oil inlet required, each jack is equipped with the necessary items.
In some cases, the telescopic synchronized jack may require to be in ground. In these cases different items are added, depending on the ordered options:

**If a PVC casing is included**

- The PVC needs to be drained, therefore requiring the following components:
  - 2 couplings
  - 1 safety valve, 35 PSI
  - 1 transparent hose ø3/8", 4’ long (instead of 8’ longer than the closed length)

**If a “pit channel” is included**

- The “pit channel” is attached to the jack or to the bundle containing the casing and contains this hardware:
  - 4 widgets 5/8”
  - 4 bevel washers 5/8”
  - 4 bolts 1/2" NC x 1 1/2” lg
  - 4 lock washers 1/2”
  - 4 nuts 1/2" NC
  - 4 plates 1/2" x 4” x 4”

**If “spring buffers” are included**

- The spring buffers are welded directly on the support or on the plates going on the pit channel. In this case, they will be attached to the jack or on the bundle containing the casing.
  - The springs are inserted in the tubes.

All the ordered items are listed on a packing slip for easy verification. Contact us immediately if any items are missing.
2.0 – TECHNICAL

2.1 – Nomenclature Sketches

HEAD VIEW
## 2.2 – Nomenclature & Materials

<table>
<thead>
<tr>
<th>#</th>
<th>Description</th>
<th>Material</th>
<th>Page</th>
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<tbody>
<tr>
<td>1</td>
<td>Wiper</td>
<td>------</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>Gland</td>
<td>Bronze</td>
<td>6</td>
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<tr>
<td>3</td>
<td>Seal</td>
<td>------</td>
<td>6</td>
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<td>4</td>
<td>Wiper</td>
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<td>6</td>
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<td>6</td>
<td>Wear ring</td>
<td>------</td>
<td>6</td>
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<tr>
<td>7</td>
<td>Seal</td>
<td>------</td>
<td>6</td>
</tr>
<tr>
<td>8</td>
<td>O-ring</td>
<td>------</td>
<td>6</td>
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<td>Bolt</td>
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<td>1\textsuperscript{st} section’s shaft or tube</td>
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<td>11</td>
<td>Head</td>
<td>Steel</td>
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<td>12</td>
<td>Air Bleeder</td>
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<tr>
<td>13</td>
<td>O-ring</td>
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<td>6</td>
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<tr>
<td>14</td>
<td>Coupling, straight or 90°</td>
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<td>15</td>
<td>Air Bleeder</td>
<td>------</td>
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<td>16</td>
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<td>17</td>
<td>Cast Iron Piston</td>
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<td>25</td>
<td>Spirolock</td>
<td>------</td>
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3.0 – INSTALLATION

**Important**: The jack is delivered filled with oil containing a special additive. Be careful not to lose too much of it during the installation process.

### 3.1 – Alignment of the holeless telescopic cylinder

1- Temporarily locate the jack’s support plate on the pit floor through the centerline of the mounting plate, under the car.

2- Position the jack on the pit support plate, plumb the jack with a level and fix a clamp on the wall of the jack close to the head.

3- Set the plumb line off the rails in the hoistway through the centerline of the platen plate under the car, at the highest possible point.

4- Adjust the wall clamp, so the jack will be centered on the plumb line.

5- Plug the hydraulic feed line to the jack. When installing the telescopic jack, the oil feed line should be connected as quickly as possible to reduce the loss of pre-filled oil.

6- Raise the jack to approximately half the “travel” and, using the plumb line, check that the jack stays on the same centerline as the mounting plate.

7- Make final adjustments to the pit support plate should the jack be slightly out of plumb.

8- For safety reasons it is advisable, and in some cases mandatory, to install a line rupture valve at the inlet port of the jack when a hose is used as the inlet line.

9- It will be necessary to bleed air from each stage through the air bleeder valve located on each head. See sketch on page 6 for reference. To bleed all air from the jack, follow venting procedure in section 3.3.

It is important that the actual site conditions are as specified on the layout drawing. Before leaving the job, ensure that the total undertravel and overtravel ratios are as specified. Any discrepancy should be noted and corrected before shipping the lift to the customer.

Any small scratches visible on the stages should be polished with very smooth emery (400 grit). Report any serious damages of stages to I.T.I. HYDRAULIK. 1-800-953-3229
3.2 – Alignment of the in ground telescopic cylinder

When the telescopic jack is in ground and the top stage is hollow, an alignment cable is supplied to facilitate the installation. In order to install the jack properly, all the sections should be in a completely collapsed position. To obtain a completely collapsed position, buffers must be removed: there must not be any obstruction restricting this position.

Using the alignment cable:

The alignment cable fixed at the center of the piston allows a quick and efficient alignment of the jack.
3.3 – Venting the synchronized telescopic cylinder

To assure the proper functioning of the jack, it is important to take any air out of it by applying the following procedure.

1- Remove the "Spring Buffers".

2- Lower the car (if already installed) so that the jack is completely retracted. Always be sure that the cylinder remains completely retracted.

3- Adjust the relief valve (Maxton, EECO) from 25 to 50 PSI, so that the system is pressurized without lifting the car.

4- Open the bleeder purge valve of the top section.

5- Start the pumping unit and shut it down as soon as there is no more air coming out of the bleeder. Close the bleeder to prevent unnecessary oil loss.

6- Repeat these two steps for each section, beginning with the top one and finishing with the lowest.

7- Run the cylinder about 5 whole strokes, both extension and retraction, to be sure of its proper functioning.

8- Repeat steps 2 through 6 to verify that there is no air in the cylinder.

If two people are bleeding the jack, it is possible to open all the bleeders at once since one person stays at the power unit whereas the other closes the bleeders. A mechanic alone will have to bleed the sections one at a time.
3.4 – PVC Protection Casing

Whenever the telescopic jack has a PVC protection, it is assembled in ITI's production plant. The information found on this page should help to locate the different components during the draining procedure of section 4.2.

NOTE: The PVC is not shown here
3.5 – Follower Guides

Follower guides provide an additional safety method to prevent buckling of the jack. Its assembly procedure is as follows:

1- Align the cylinder using the information of section 3.1 or 3.2.
2- Install a follower guide on the head of the second biggest section of the jack.
3- Repeat the same step for all the sections with a smaller diameter.
4- Install the car on the jack.
5- Install a pair of shoes on each bracket
6- Install brackets on both sides of the follower guides
7- Run the jack up and down a few times.
8- Make any adjustments if it is necessary.
3.6 – Hardware

The synchronized telescopic cylinders are supplied with the hardware required for their installation.

**OIL RECUPERATOR**

1/8” NPT fitting; it must be connected to a 5 gal. container with a flexible hose (supplied).

**ATTACHMENT BOLT**

Supplied according to your specifications with a lock washer.

**LIFTING BLOCKS**

For easy and safety handling of jack.

**AIR BLEEDERS**

One per head to vent the cylinder.

**35 PSI SAFETY VALVE**

Installed permanently.

**PVC COATING**

DRAINING DEVICE

Supplied, see section 4.2 for details.

**OIL INLET**

Victolic or NPT.
3.7 - Twin Jacks

Whenever two jacks are used for a single elevator, the oil inlet should divide into identical sections. Otherwise, the difference of friction (or restriction) between the sections could cause an unbalance of the loads between the cylinders. If for some reason it is impossible to have identical paths, the use of an oil divider is to be considered. Increasing the diameter of the pipe used also helps.
4.0 – MAINTENANCE

4.1 – General Maintenance

Every month, verify:

• The seals
• The oil level
• The oil quality
• If there are leaks on the line

Every year, verify:

• The line strainers
• The surface of the piston

If the seals need to be replaced often, the surface of the piston should be carefully inspected as it can be damaged, wearing the seals prematurely.
4.2 – Drainage of PVC coating

The PVC coating protects the cylinder against deterioration due to electrolysis and rust caused by damp and corrosive environment. Condensation builds up all the same inside the PVC coating so it is very important to drain it regularly.

**STEP # 1**
Remove the setscrew and connect a fitting 1/8 NPT in this inlet.

Connect the flexible hose (supplied), to the 1/8 NPT fitting and connect it to a container (we suggest a 5 gallons container).

**STEP # 2**
Remove the 1/8 NPT cap and connect it to an air pressure device with a MAXIMUM CAPACITY OF 25 PSI.
Blow in the PVC until only air comes out of the hose.

**STEP # 3**
Once the draining is completed, reinstall the caps.
4.3 – Seal Replacement

NOTE: Whenever you have to replace a seal, the piston must be inspected for any visual damage (scratches, etc...) and repaired before you change the seal.

Here are the steps to follow:

***SEE SECTION 2 FOR THE NOMENCLATURE***

1- Lift the cabin up high enough to be able to remove the heads.

2- When the cabin is held securely, turn off the main switch.

3- Unscrew the bolts located above the piston.

4- Open the manual valve (gate valve) until the jack is completely collapsed; there should be no pressure in the jack.

5- Shut off the ball valve (gate valve) to the jack so the oil remains in the reservoir.

6- Open the bleeder on each head.

7- Disconnect the oil recuperator.

8- To facilitate the installation of the heads, mark with a pencil the initial position of the head with a line on the head and on the piston.

9- Remove the heads by using two chain vise-grips.

10- Unscrew (CCW) the head while holding the piston with the other chain vise-grip.

11- Important: Put electric tape on the threads of the tubes to prevent damaging the seals when you put them in.

12- Unscrew the brass gland, remove the old joints, put the new ones and lubricate abundantly

13- Screw back the gland to the maximum without letting any gap between the gland and the head

14- Re-install the heads and tighten them up to the pencil mark.

15- Bleed the air in the jack, following the steps described in section 3.3

16- Re-install the hose to recuperate the oil on the straight coupling or 90°

**WARNING: DO NOT DAMAGE THE O-RINGS**
4.4 – Check Valve Replacement

The following is the general procedure to change the check valve. These instructions show a 2 sections telescopic jack but the procedure is the same no matter the number of sections.

1- Lift the car up to have enough space to remove the entire section of the jack.

2- When the car is held securely, close the main switch.

3- Unscrew the bolt that holds the piston to the car.

4- Open the manual valve until the piston is fully retracted. There should not be any pressure left in the jack.

5- Close the ball valve on the line leading to the jack to prevent any oil to come from the reservoir.

6- Install a chain block under the car, as centered as possible, and tie the chain around the head of the section where the replacement should be.

7- Remove the bleeder on the head just below and screw the \( \frac{1}{8} \) NPT fitting connected to a hose. While lifting the upper sections, oil will be ejected through this hose. You can recuperate it in a clean recipient.

8- Lift the previously tied section until the stopper ring reaches the head with the hose. Then, lower the sections of about one inch and unscrew this head. Once the head has been unscrewed, lift the sections until you have enough room to remove the check valve.

9- Remove the check valve by using a \( \frac{15}{16} \)" or \( \frac{3}{4} \)" socket. Some oil will come out this way; recuperate it in a clean recipient.

10- Install the new check valve and tighten it well.

11- Verify if the seals have not been damaged and replace them if it’s necessary.

12- Insert the sections back in the cylinder and make sure that they are well centered. Screw back the head taken off previously as soon as possible for a better alignment. There is no need to screw it very tight at this moment.
13- Just before the jack reaches a completely retracted position, unscrew the same head again and fill the jack with the recuperated oil. Then, screw the head firmly. Another option is simply to put the oil back in the power unit. Do not forget in this case to have the heads firmly screwed. Moreover, a pressure will have to be maintained on the piston to allow for the oil to fill the jack.

14- Re-install the bleeder taken off in step 7.

15- Attach the piston to the car.

16- Follow the procedure described in section 4.5.1 to resynchronize the jack.
4.5 – Desynchronization of a telescopic cylinder

Desynchronization may be caused by a leak of the seals inside the piston or by a malfunction of the check valve.

4.5.1 – Resynchronization

Applying the venting procedure can usually resynchronize a telescopic cylinder since it “resets” the oil volumes in the sections. This procedure is rewritten below.

1- Remove the "Spring Buffers".

2- Lower the car so that the jack is completely retracted. Always be sure that the cylinder is completely retracted.

3- Adjust the relief valve (Maxton, EECO) from 25 to 50 PSI, so that the system is pressurized without lifting the car.

4- Open the bleeder purge valve of the top section.

5- Start the pumping unit and shut it down as soon as there is no more air coming out of the bleeder. Close the bleeder to prevent unnecessary oil loss.

6- Repeat these two steps for each section, beginning with the top one and finishing with the lowest.

7- Run the cylinder about 5 whole strokes, both extension and retraction, to be sure of its proper functioning.

8- Repeat steps 2 through 6 to verify that there is no air in the cylinder.

Upon completion of these steps the cylinder should be perfectly synchronized
A ONE-YEAR warranty is applicable on all our products, starting on shipping day, from our plant. This warranty is applicable on all manufacturing defaults, (material and labor) as long as the product is being used for the purpose it has been designed and recommended for, and has been properly installed by qualified personnel.

Any request for warranty will require an authorization from the I.T.I. HYDRAULIK (Industries Tournebo Inc.) Sales Department. Following our written authorization, a return date will be determined. The customer will be responsible for the expedition to and from our plant. The same wrapping precautions, as the original reception, will have to be respected. Any material judged defective, will, pending our decision, either be repaired or replaced at no cost.

Claims for indirect damage, loss of time, modification or adjustment not approved by I.T.I. HYDRAULIK (Industries Tournebo Inc.), interrupted maintenance, vandalism and improper handling during transport will not be applicable. Our responsibility is limited to defective material or inadequate repairs, only.

The manufacturer provides notices, technical support and recommendations free of cost. They are aimed to help people who possess skills and knowledge in the domain and who will use them at their own risk. The manufacturer will not assume any responsibility for damages, which occur while equipment is being used by the customer.

Upon receipt of the jack, the elevator company will assume all responsibilities and charges, from delivery date and after, regarding injuries, sickness, death, damages or destruction of property caused from misusage of equipment sold by I.T.I. HYDRAULIK (Industries Tournebo Inc).

ITI HYDRAULIK... Solutions in motion.