

Torque Limiters “L” Series 310

Fitting Adjustment Maintenance

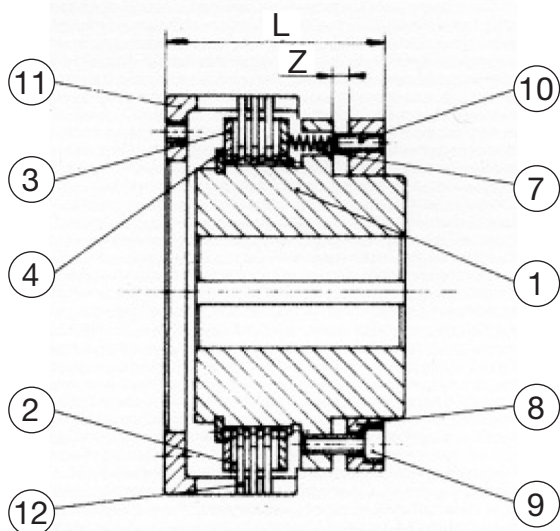
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“L” Series 310



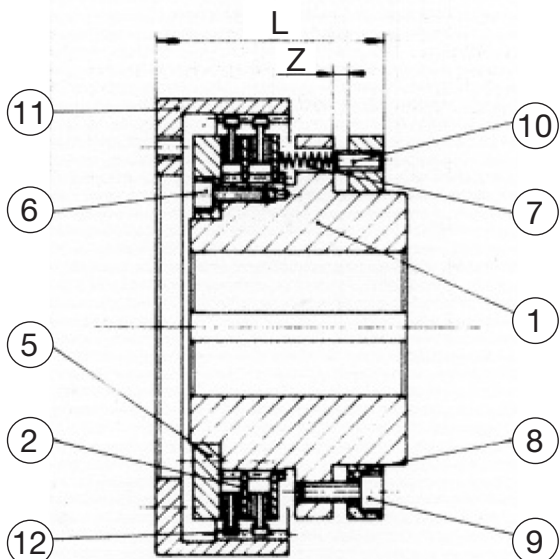
 **Warner**[®]
Electric

An Altra Industrial Motion Company

- Fig. 1 -



- Fig. 2 -



KEY:

- | | |
|----------------------|----------------------------------|
| ① - Hub | ⑦ - Compression-spring |
| ② - Inner Disc | ⑧ - Adjusting washer |
| ③ - Thrust-plate | ⑨ - Clamping and adjusting screw |
| ④ - Safety-ring | ⑩ - Wear compensation screw |
| ⑤ - Thrust-cheek | ⑪ - Spider |
| ⑥ - Connecting Screw | ⑫ - Outer disc |

The "L" limiter is a multi-disc unit used to limit the torque absorbed when starting or protect parts of machines against intermittent overloads. It can be mounted vertically, horizontally or in any other position.

Two models are available:

- For running in oil or in contaminated atmosphere : units fitted with steel disc rubbing against sintered disc, reference : L - B.
- For running in dry conditions : units fitted with steel disc rubbing against lined steel disc, reference L - Gr with reinforced disc.

1 **DESCRIPTION:**

The limiter includes:

1.1 - **The driving part, consisting of:**

- A hub ① keyed to the driving shaft.
- Inner disc ②, one or two thrust places ③, the latter being integral with hub ① by their involute tothing.
- Depending on the size of the unit : either a safety ring ④ or a thrust-cheek ⑤ bound to the hub ① by means of screws ⑥.
- Compression springs ⑦.
- An adjusting washer ⑧.
- Adjusting and clamping screws ⑨.
- Wear compensation screws ⑩.

1.2 - **The driven part includes:**

- A spider ⑪ with either notches (Fig. 1) or inside tothing (Fig. 2)
- A outer disc ⑫ integral with spider ⑪.

Note: instead of having the hub driving and the spider driven, as described above, it is possible to have the reserve, if the conditions of the application require so. (hub drive, spider driving).

2 **OPERATION**

The torque limiter is used to transmit a rotating movement while limiting the effort to pre-established value. When this calibrated torque is exceeded, slipping occurs and the driving and driven parts do not rotate at the same speed any more.

The springs ⑦ press the inner discs ② and outer disc ⑫ against one another, the compressing effort being adjusted by the adjusting and clamping screws ⑨ and the wear compensation screws ⑩ to obtain the chosen slipping torque.

3 ASSEMBLY:

The bores of the hub ① and the spider ⑪ are usually machined to the H7 tolerance.

For fitting the unit on the shaft, we recommend to adopt the js6 tolerance.

The width of the hub ①'s keyway has the JS9 tolerance.

The g6 tolerance is quite suitable for centering the spider ⑪.

To ensure proper alignment of the two shafts, tolerance of Fig. 3 and Fig. 4 should be adhered to.

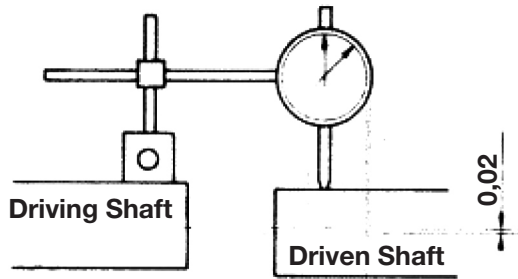


Fig. 3

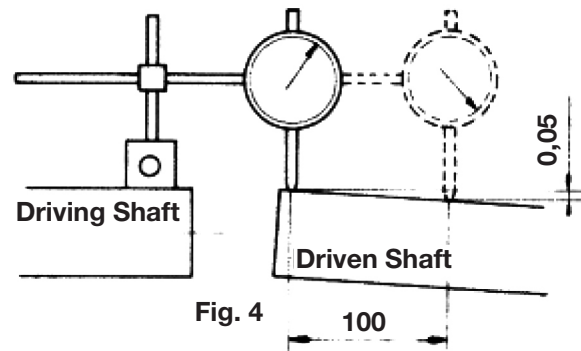


Fig. 4

If such tolerances cannot be achieved, it is advisable to combine the limiter with an elastic coupling between the motor and the driven machine.

The unit is sold in an assembled state. Before fitting it on the machine, remove the spider ⑪.

3.1 - Fitting of the driving part:

After fitting the key on the driving shaft:

- Slide the block : hub ① with discs ② and ⑫, thrust-cheek ⑤, adjusting washer ⑧, etc...into position on the shaft.

IMPORTANT: When doing this, never strike on the end of the hub ① without placing a piece of soft alloy between the hub and the system chosen for pushing the above block on the shaft.

- Lock this block against axial movement by means of safety-ring, a slotted round nut with a brake-washer or a washer with a screw, which will have to be locked by using a thermoplastic liquid, like for example "LOCTITE 243"

3.2 - Fitting of the driven part:

- Center and fix the spider ⑪ on the part to be driven (lock the fixing screws with LOCTITE locking product)
- Allow the slots of the outer disc ⑫, to fit the corresponding notches of the spider ⑪ and put together the driving part and the spider ⑪.

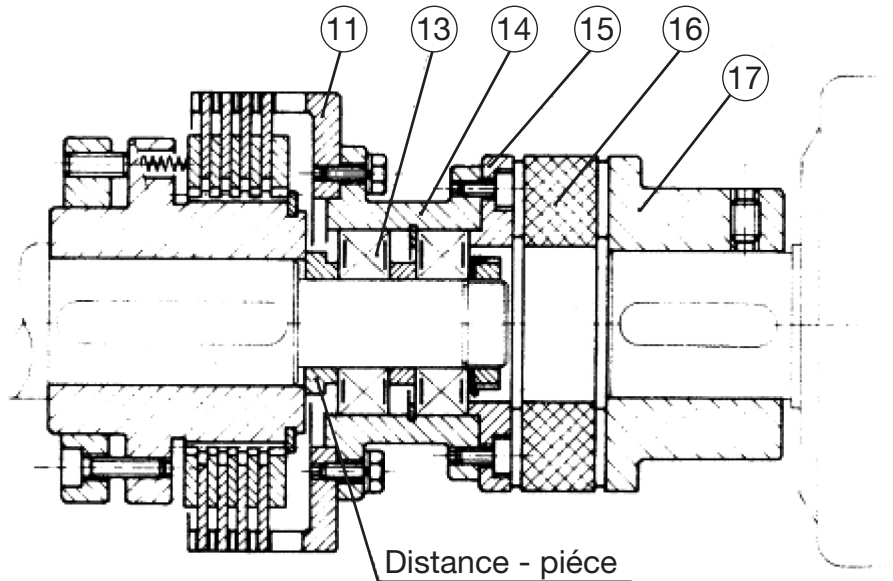
Make sure the length "L" be kept

3.3 - Fitting with elastic coupling : L series 110.05

This fitting method ensures a perfect alignment of both sides of the torque-limiter when coupling two shaft-ends.

The spider ^⑪ is centered and fitted on the shaft-end on which the other side of the unit is assembled (see chapter 3.1) by means of two ball-bearings ^⑬ and a case ^⑭ bound to the elastic coupling, which consists of a flange ^⑮, a toothed ring ^⑯ and a sleeve ^⑰.

Note: After the unit has been fitted on the shaft, the screws used to fasten the flange ^⑮ onto the case ^⑭ will have to be secured by the customer with LOCTITE - 270



4 ADJUSTMENT

The limiter is adjusted to be calibrated torque by acting on the adjusting screws ^⑨ after unscrewing the wear compensation screws ^⑩ :

- Screwing the adjusting screws ^⑨ (clockwise) increases the torque.
- Unscrewing them (anti-clockwise) reduces it.

Proceed as follows:

- Lock the spider ^⑪
- Measure the static or slipping torque of the hub ^① by means of a torque wrench.

Or:

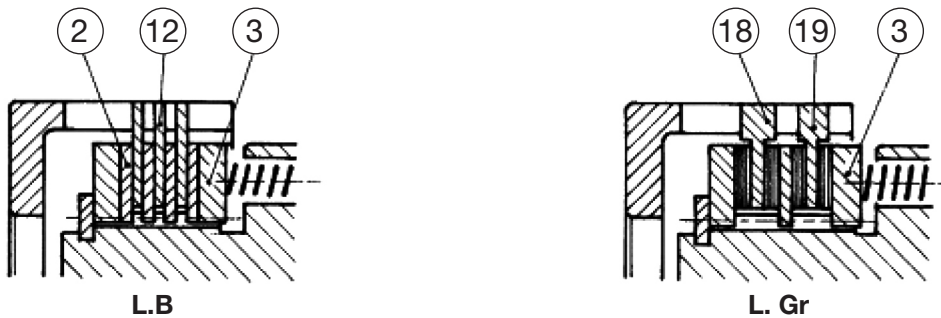
- Submit the hub ^① to a torque (by using a lever arm for example) :
- Measure this torque with a pair of scales or with a mass equal to the torque to be limited and placed at the end of a one-meter long lever arm.
- Check dimensions "Z" in several places : it should be the same for all.
- Tighten the wear compensation screws ^⑩ after adjusting the torque.

5 MAINTENANCE

After some period of use involving a certain number of slipping, more or less depending on the conditions of the application, the torque transmitted is reduced. It is therefore necessary to check this transmitted torque from time to time as well as the state of the disc ② and ⑫ and to change them if necessary.

5.1 - Disassembly

- Separate the driving and driven parts.
- Unscrew the adjusting screws ⑨ and wear compensation screws ⑩ in order to release the springs ⑦.
- Remove the safety-ring ④ or the thrust-cheek ⑤.
- Examine the disc. If the inner disc ② and outer disc ⑫ show some wear or some distortion or have an irregular look caused by heating (more or less strong traces), it is necessary to change them.



5.2 - Reinstallation

Impregnate the disc with oil as explained in paragraph 6, except for exceptional use in dry conditions.

5.2.1 - Set of "B" disc (reference of the unit L-B)

Fitting order:

First the thrust-plate ③, then a sintered inner disc ②, then an outer steel disc ⑫, and so on in the same succession with, at the end, a sintered inner disc ②.

5.2.2 - Set of "Gr" disc (reference of the unit L-Gr)

Fitting order:

First the thrust-plate ③, then a lined outer disc ⑲, then an inner steel disc ⑱, and so on in the same succession with, at the end, a lined outer disc ⑲.

After fitting the disc,

- Place on the hub ① the second thrust-plate ③ and the safety-ring ④ or the thrust-cheek ⑤ with the screws ⑥, depending on the type of unit.

- Cover the fixing screws ⑥ with a thermoplastic liquid, like for example “LOCTITE 243”, before fitting the unit. Tighten these screws right hand.
- Complete the fitting of the driving part (see chapter 3 - ASSEMBLY for refitting the unit on the machine).
- Re-adjust the torque (see chapter 4 - ADJUSTMENT).

6 IMPORTANT REMARKS

- Dry running limiters (reference Gr) should be kept away from water and greasy splatterings, otherwise the transmitted torque would be reduced.
- Discs of “L.B” units should be impregnated in oil for at least 12 hours before being fitted to the unit, except for exceptional use in dry conditions. Lubrication as per sheets n° M2.01/02
- Never use the wear compensation screws ⑩ to lock the adjusting washer ⑧.
- After assembling the unit for the first time and adjusting it to the theoretical slipping torque, check that it does not slip untimely for a different torque. If it does, adjust again to the actual torque required by the installation.

LUBRICATION

The aim of lubricating multidisc clutches and brakes with a steel/steel or steel/sintered bronze disc friction is:

- To reduce the wear during transmission of the dynamic torque (acceleration or slowing-down) by avoiding a dry friction.
- To dissipate the friction heat and ensure an efficient cooling and the thermal balance
- To eliminate the impurities produced by the friction or metallic surfaces.

On unsealed units type H.BJ with a stationary distributor, the oil used must have the following basic qualities:

• **A low kinematic viscosity:**

We recommend a viscosity of 7,5 to 20 Cst (1,6 to 2,9° Engler) at a temperature of 50° C. It is of course sometimes necessary to reach a compromise to take the lubrication of other neighboring organs into account. We however advise not to exceed a viscosity of 40 Cst (5,34° Engler).

• **No High-Pressure Additive:**

These are generally products on chlorine, sulphur, phosphorus, lead etc. basis. For example, chlorine has a corrosive action on some alloys, such as sintered bronze which is used as a lining on some type of our disc. Moreover, high pressure additives increase the resistance of the oil film to high pressure. This results in an unctuous, or even hydrodynamic operation (dynamic work - clutch or brake off) to dry operation (static work clutch or brake on) difficult to even impossible.

• **A High Viscosity Index (over 80):**

Since the oil viscosity varies according to the temperature, the requirement is for lubricants with which these variations are small as possible. The higher the viscosity index, the smaller the viscosity variations.

• **A Good Resistance to Oxidation:**

Under the influence of air, temperature as well as some catalysts, the oil is subject to ageing, it thickens, changes color, dilapidates and loses its original properties. The oil change frequency partially depends on this quality. The property is improved by adding anti-oxidation agents to the oil.

Some of the oils that can be used are listed in the chart below. They all fulfilled the conditions describes above. This chart is however not exhaustive and all the oil companies can propose equivalent oil qualities enabling a proper operation of our clutches and brakes.

| Lubrication fluid for electromagnetic, pneumatic and mechanical units | Lubrication and control fluid for hydraulic units |
|--|--|
| ELF: SPINELF 10 | ELF: ELFMATIC G2 |
| TOTAL: AZOLLA ZS 22 | TOTAL: DEXRON |
| MOBIL: VELOCITE OIL N°6 | MOBIL: STF 220 |
| SHELL: TELLUS C | SHELL: DONAX TM |

There are four possible methods for lubricating units operating in oil:

- **Oil Immersion:**

The oil level shall be carefully maintained to avoid faulty operation of the units (long response time, overheating etc.) This level is easy to determine, and immersion depth of one centimeter begin generally fully sufficient.

- **Sprinkling:**

With this method, care should be taken not to lubricate too copiously; if need be, one or several baffles will have to be provided for. If, on the contrary, the existing lubrication is not sufficient, it will be necessary to sprinkle the disc separately.

- **Spraying:**

This method of lubrication consist of using a mixture of oil and compressed air under a suitable pressure.

- **Oil Circulation:**

When operating conditions are extremely hard, it is necessary to provide for an oil circulation through the disc. This cooling oil circulation, which may be continuous or intermittent (discontinued when clutch disengaged or brake released), requires the shaft be bored and the unit to be specially machined. Special care should be taken that the oil flow and pressure are suitable, otherwise the result obtained could be contrary to that intended.

The pressure is generally 0,5 bar. The flow, which depends on the application, shall be determined by our Technical Department and will always be adjusted by test on the machine.

Warranty

Warner Electric LLC warrants that it will repair or replace (whichever it deems advisable) any product manufactured and sold by it which proves to be defective in material or workmanship within a period of one (1) year from the date of original purchase for consumer, commercial or industrial use.

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A purchase receipt or other proof of original purchase will be required before warranty service is rendered. If found defective under the terms of this warranty, repair or replacement will be made, without charge, together with a refund for transportation costs. If found not to be defective, you will be notified and, with your consent, the item will be repaired or replaced and returned to you at your expense.

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