SOLERO
TECHNOLOGIES

LINNIG®
Pneumatic Clutches

Intelligent pneumatic solutions for highest demands

LINNIG®

A clutch for extreme situations

The LINNIG® Pneumatic clutch

LINNIG® pneumatic clutches stand out for a wide range of applications, and can engage/disengage virtually any auxiliary unit. Typical applications include:

- Engaging/disengaging of high-pressure water pumps, vacuum pumps and suction pumps
- Engaging/disengaging radial suction fans
- As sectioning point between set-up motor and machine in special vehicles
- Engagement of drives in test benches
- In agricultural engineering (harvesters, agricultural machinery)

Trust the LINNIG® Original

Did you know that Solero was the first company that developed this technology for pneumatic clutches? Thanks to the use of sintered linings, a suitable solution for the special requirements of sludge-vacuum vehicles was already on the market in the 1970‘s.

Ever since, the pneumatic clutch was continuously further optimized in terms of the lining wear resistance and the service life of the pressure discs.

Thus, the pneumatic clutch is used in a great variety of the most different vehicles: Whenever auxiliary units require reliable engagement or disengagement, the original Kendrion Linnig pneumatic clutch is the right choice.

Clutch engagement can take place swiftly or over a period of several seconds with moderate progression – a flexibility that also pays off in your specific application.

Advantages at a glance

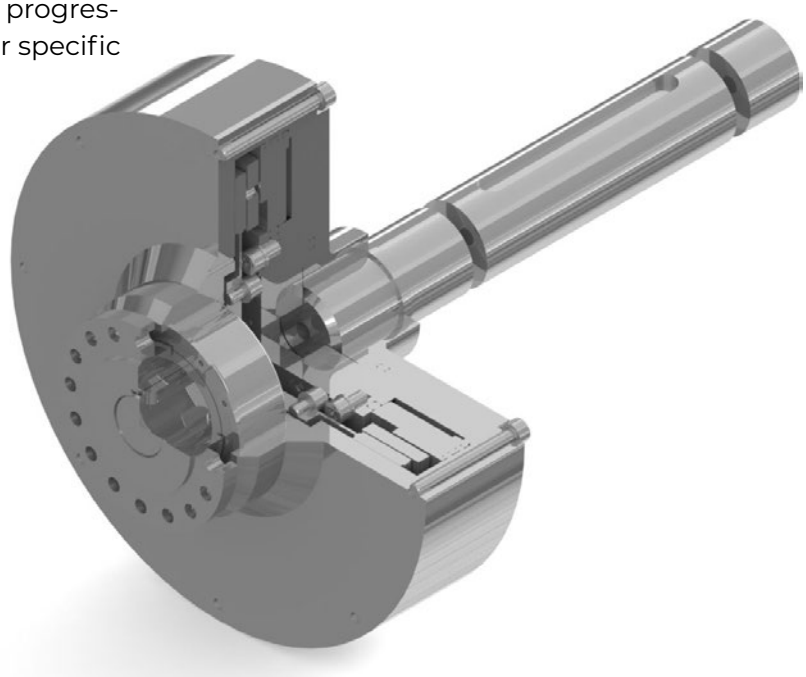
- No spark formation
- Simple design → Easy to service
- Maintenance-free due to hermetical seal
- No residual torque
- Compact construction
- Torque-transmission without torsional play
- Long service life
- No gearing
- Low wear due to surface-treated friction surfaces → Enabling very high switching frequency
- Slower switching than with electromagnetic clutch, therefore protection of the units to be driven

That‘s how LINNIG® pneumatic clutches work

The friction disc is firmly connected to the hub (yellow). The hub itself is slid onto the pump shaft and secured in axial direction. The torque is transferred by means of a key between the shaft and the hub.

When the clutch is deactivated, the hub and the friction disc are not in motion.

The pulley/shaft as well as the rotor (blue) are driven via the engine‘s power take-off. The pressure plate with piston is also firmly connected with the clutch housing via a key and thus also rotates along.



When compressed air is applied to the piston, the piston moves the pressure plate against the rotor and in this manner transfers the torque. When the compressed air is relieved, a spring pulls the piston with the pressure plate back to the starting position. The driven auxiliary unit is no longer in motion.

The pneumatic clutch is a friction clutch that can be actuated in operation; this means, it utilizes the friction resistance between two plates in order to transfer force from one plate to the other.

In this, the transferable torque depends on

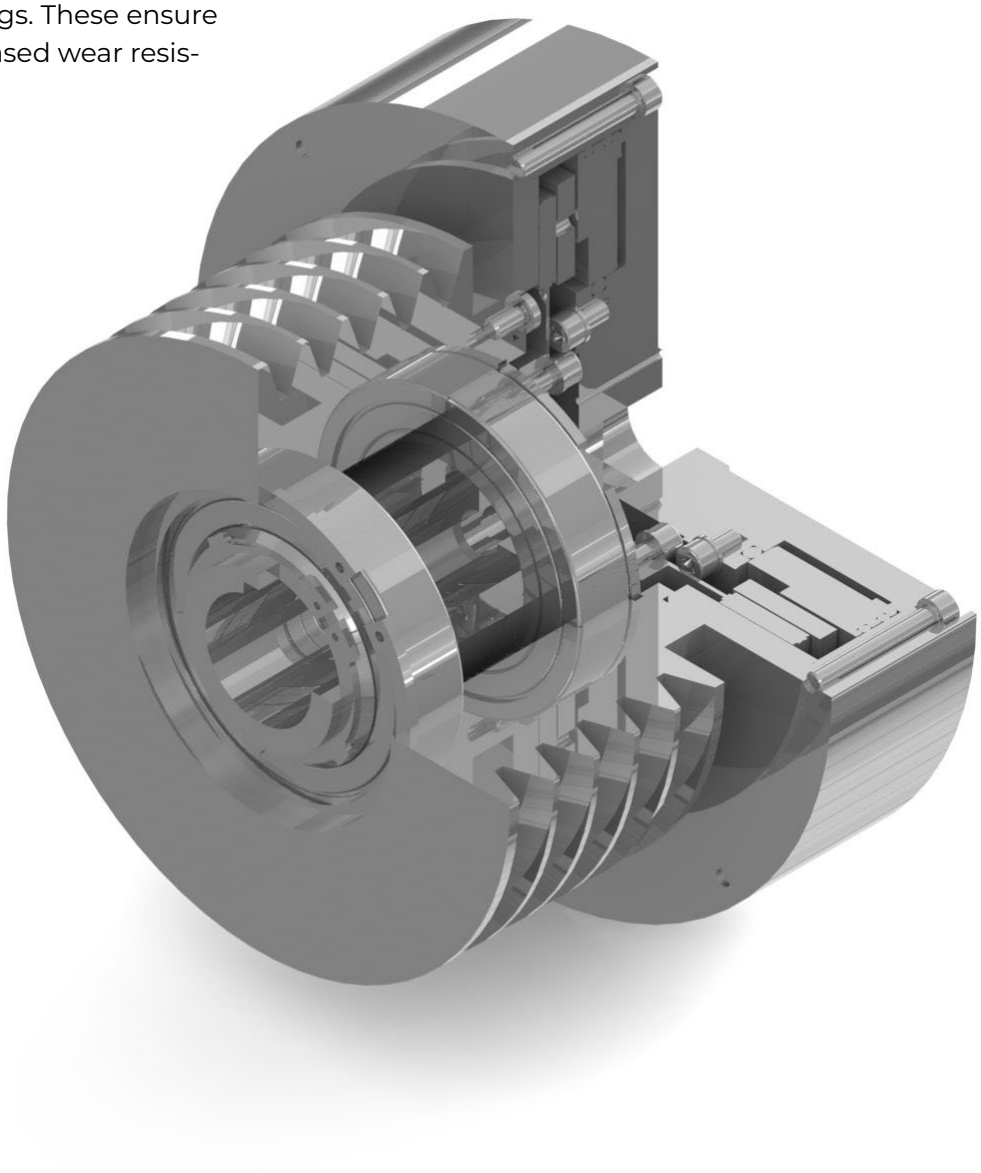
- the diameter,
- the material,
- the force, with which the plates are pressed against each other.

In order for the clutch diameter not to become too large, Kendrion pneumatic clutches are equipped with specially treated friction linings. These ensure a high friction coefficient at increased wear resistance.

The clutch is dimensioned in such a manner that the transferable torque is significantly higher than the torque of the driven auxiliary unit.

During engaging/disengaging, the clutch must enable the possibility of soft starting. This happens through decreasing sliding friction - down to static friction of the clutch, as very high moments of inertia usually have to be overcome. Sudden or jerky engaging would apply too much load to the drive-train and a heavy burden on the engine, if not cause it to stall.

The working method of the clutch results in heavy mechanical abrasion. Frequent operation in the sliding-friction range causes an enormous thermal load. For this reason, Kendrion applies materials that can meet these increased requirements.



Product overview

Slip-on clutch

Advantages	▌Simple mounting ▌Maintenance-friendly (direct replacement of wear parts with little effort) ▌Drive pulley and hub bore can be variably designed
Technical specifications	▌Full torque from an operating pressure beyond 6 bar ▌Transferable torque up to 2,500 Nm ▌For ambient temperatures between -20°C to 50°C

Shaft clutch

Advantages	▌Simple mounting ▌Maintenance-friendly (clutch components are outside of the pedestal bearings) ▌Output pulley variable
Technical specifications	▌Full torque from an operating pressure beyond 6 bar ▌Transferable torque up to 2,500 Nm ▌For ambient temperatures between -20°C to 50°C

Accessories

Maximum pressure	8 bar
Maximum speed	3,300 rpm/min
Air connection	G1/8

Rotary connections available as an accessory.

Your first step to a Solero pneumatic clutch

With help of the following equation, customers can determine an indication of the static torque.

All that is required is the output rating and the speed:

Safety factor

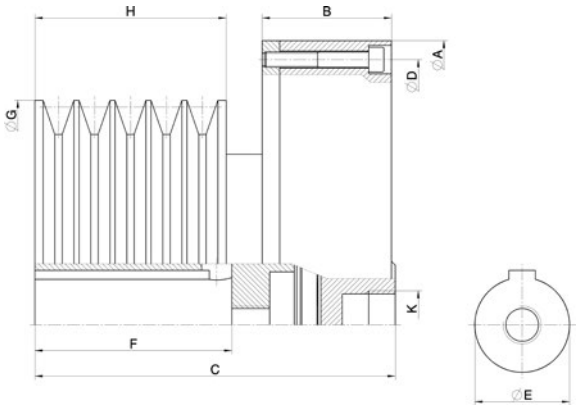
Is dependent of the inertia moment and the switching frequency and will be determined by Kendrion.

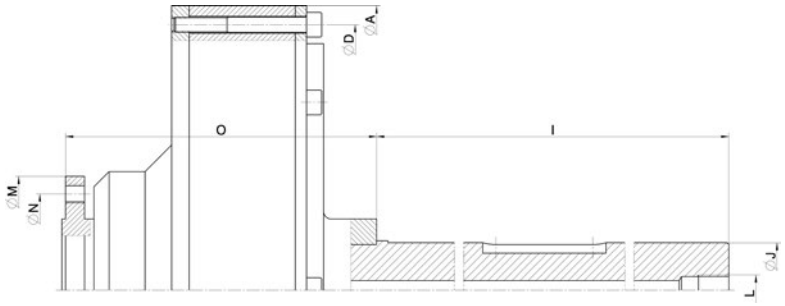
Note: Attention should be paid in supplying dry air to the clutch, as otherwise water or condensate could collect in the clutch. This water could freeze at temperatures below the freezing point and possibly result in damage.

$$M = \frac{9550 \times P}{n}$$

- M = Output rating in Nm
- P = Output rating in kW
- n = Speed in min^{-1}

Overview chart for LP clutches – Dimensions and sizes

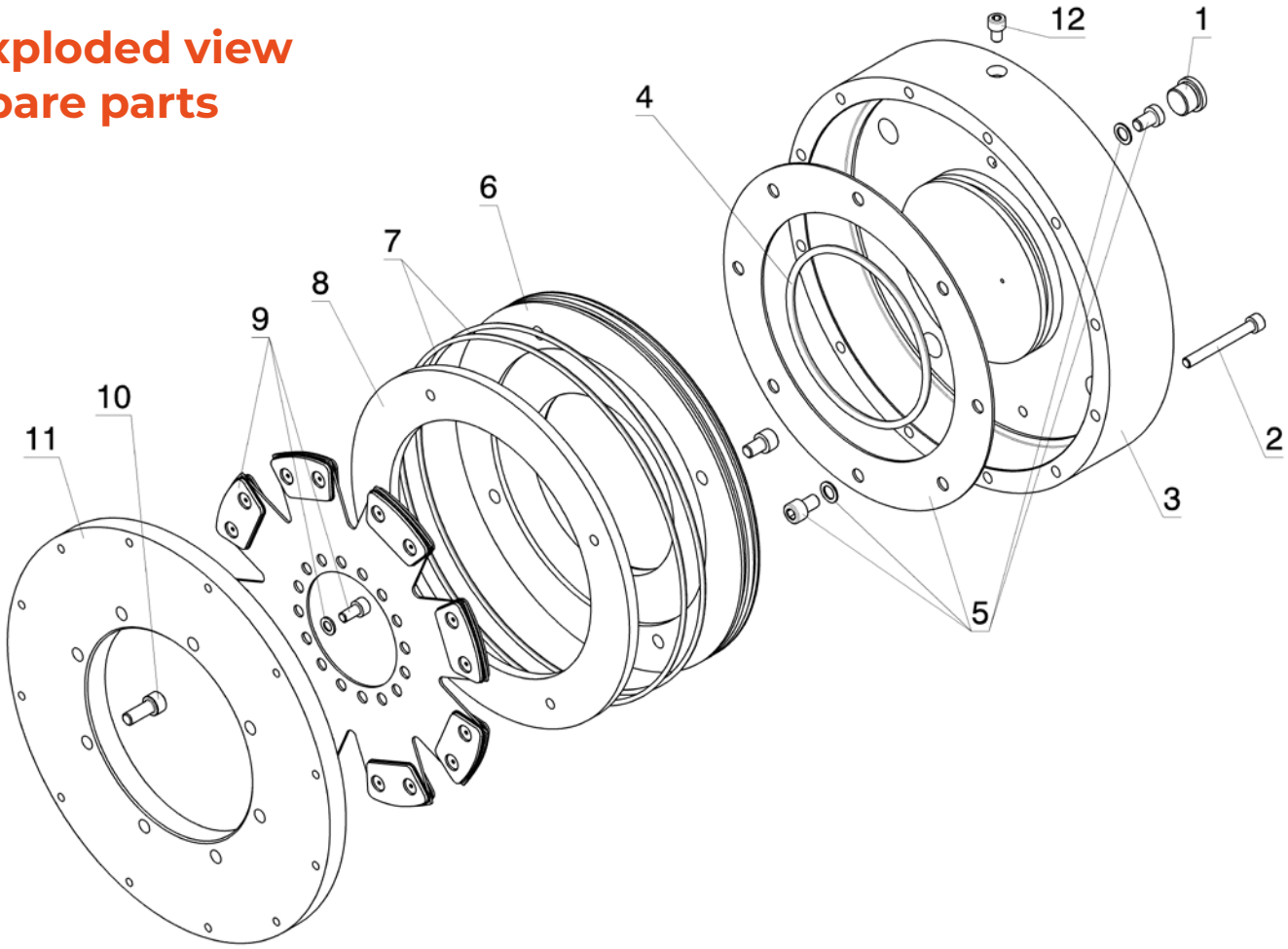




Series	LP600	LP1000	LP1500	LP2500
Torque Md in Nm	600	1000	1500	2500
RPM max.	3500	3500	2500	2000
Min. pressure in bar	6	6	6	6
A Ø Housing in mm	243	300	342	379
B Housing length in mm	69.3	70.3	86	108.5
C* Overall length min – max in mm	140.30 – 227.3	156.3 – 271.3	225 – 301	280 – 375
D Bolt circle	227 / 8 x 45°	280 / 8 x 45°	323 / 12 x 30°	358 / 12 x 30°
E* Hub Ø in mm	26 – 65	35 – 75	22 – 85	50 – 90
F* Hub length in mm	40 – 145	42 – 187	78 – 178	88 – 223
G* Pulley Ø min – max in mm	118 – 335	180 – 335	200 – 450	300 – 446
H* Belt ribs min – max	1 x SPB – 8 x SPB	3 x SPB – 10 x SPB	4 x SPC – 12 x SPB	6 X SPC – 10 x SPC
I* Shaft length	329 – 600	340 – 632	465 – 673	514.5 – 1234.5
J* Shaft Ø	40 – 50	40 – 55	55 – 60	70 – 76.8
K Rotary connection	M16 x 1.5	M16 x 1.5	M16 x 1.5	M16 x 1.5
L Rotary connection shaft clutch	M10 x 1.5	M10 x 1.5	M10 x 1.5	M10 x 1.5
M* Ø Universal shaft in mm	90 – 120	100 – 120	120 – 150	120 – 168.2
N* Bolt circle	LK 74.5 4 x 90° – LK 101.5 8 x 45°	LK 84 12 x 30° – LK 101.5 16 x 22.5°	LK 101.5 16 x 22.5° – LK 130 8 x 45°	LK 101.5 26 x 22.5° – LK 155.6 8 x 45°
O*	145 mm	164.3 mm	192 mm	222.5 mm

* current product range, other versions possible

Exploded view Spare parts



Spare parts list for clutches with suspension hub

Position	Designation	Quantity / Part No. LP 600	Quantity / Part No. LP 1000	Quantity / Part No. LP 1500
1	Locking screw	–	–	4 x 62.002
2	Cylindrical bolt	8 x 50.014	8 x 50.026	12 x 50.027
3	Flange	1x 06.033	1 x 06.027	1 x 06.176
4	O-ring	1 x 42.010	1 x 42.013	1 x 42.013
5	Spring, complete	1 x EB0038	1 x EB0035	1 x EB0036
6	Piston	1 x 11.002	1 x 11.001	1 x 11.071
7	O-ring	2 x 42.016	2 x 42.018	2 x 42.020
8	Pressure disk	1 x 09.036	1 x 09.027	1 x 09.194
9	Friction disc, complete	1 x EB0009	1 x EB0011	1 x EB0012
10	IN-STAR-LIKO screw	6 x 65.004	6 x 65.004	8 x 50.032
11	Washer	1 x 09.293	1 x 09.118	1 x 09.256
12	Cylindrical bolt	–	–	1 x 50.017
13	Cylindrical bolt	–	–	4 x 50.030

ABOUT SOLERO

We are a global supplier for OEMs and Tier 1 in the automotive industry, specializing in Vehicle Dynamics, Fluid Management, and Transmission/E-Drive.

Contact us

We'll find the right product for your application!

Our qualified employees, the precisely defined manufacturing processes and globally-uniform, strict quality guidelines ensure top quality at the end of every production process – worldwide.

Our customers trust us because we have successfully been on the market for over 100 years, and always with the optimum for them in our focus. The cooperation with leading automotive manufacturers continually improves our know-how and processes. In this, we rely on production and logistics processes that enable both modular and individual production – regardless if large or small-lot orders are placed.

Feel free to contact us!
We‘ll find the right product for your application!

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