

# FURTHER INFORMATION "PNEUMATIC SUSPENSION" PRODUCT

## By structural type

The **structural** types essentially differ in the type of air spring used, but some technical features are not directly perceptible from an image.

The images below show only the macroscopic differences of the various versions.



Examples of versions, from left: Light, Standard, Reinforced, comfort or super comfort on FIAT Ducato X250 and derived vehicles.

## Light

The name of the version must not be misleading and lead to the assumption that it is a "series B" version. In some cases it is necessary to provide only a little help to the already sufficient load capacity of the vehicle, to preserve its structural integrity in sporadic cases of excessive load, we have developed functional versions but that with a low price can offer a real and own Top Drive System even "only when needed", making the system almost *invisible* in standard working conditions.

## Standard

As the word suggests, this is the most common product, suitable for roughly all basic needs. It is generally the most chosen product by customers.

The standard design usually involves an air spring that can withstand a medium payload, not too heavy. This feature makes the project extremely versatile and robust and is the main choice for those approaching the world of air springs.

In some cases, in which the vehicle load is not excessive, but approaches the maximum allowed only sporadically, it is the most suitable and recommended solution, therefore the "standard" is not necessarily synonymous with conformity, but it can be the most suitable choice. balanced to a specific need. In case of doubt, the standard allows to solve the

vehicle load problem and frees the user from an otherwise complicated choice, which can concentrate more on his work.

## **Reinforced**

When the vehicle is particularly stressed, or when the permanent load is almost always at the (upper) limits, the standard versions may not be sufficient.

Top Drive System therefore offers, on a large variety of vehicles, reinforced versions that meet the needs of the heaviest load.

The solution provides for an air spring that tends to be larger than the standard version provided for the corresponding version of the vehicle, in order to redistribute the load over a larger surface, always with a view to preserving the structural mechanical components of each vehicle.

## **Comfort**

Different in type, but sometimes united by air springs of a larger size than the standard, the comfort versions are designed to reduce direct stresses on the frame in a decidedly more progressive way.

In addition to an air spring of a larger size than the standard versions, a restraint system is added, specifically designed and tested by the TOP DRIVE SYSTEM team that allows you to distribute the load on larger surfaces in a variable manner depending on the excursion of the spring itself. This technology reduces the impact of bumps, holes, obstacles or sudden changes in direction.

It is the normally preferred and suggested solution for people transport vehicles, for campers, ambulances or special transport of fragile materials and sophisticated equipment.

## **Super comfort**

Natural evolution of the comfort versions, they are specific products, normally designed on customer request.

The experience accumulated in numerous special projects has allowed us to create standardized solutions, widely used in special applications.

The *super comfort* projects, go beyond the application of an air spring, are solutions oriented to the study of particular components that reduce vibrations and impacts on the vehicle chassis as much as possible, offering particular driving comfort, even on traditional vehicles. from transport.

## **By type of inflation**

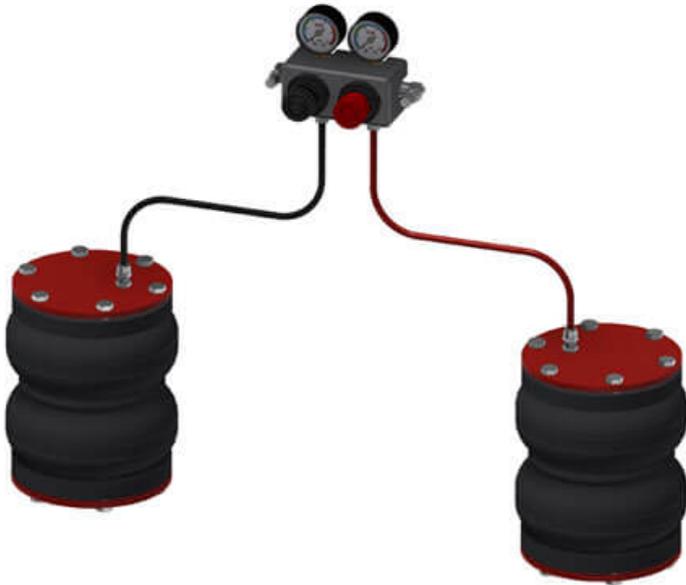
### **Standard**

Top Drive System products have always offered higher safety standards than the

competition, so the product we define as standard has been an option for similar products on the market for decades.

The inflation system of this type includes an “inflation and control unit” equipped with traditional inflation valves (Schrader type but made ad hoc), combined with a pair of pressure gauges and valves for limiting the inlet pressure.

This system allows to limit the inflation pressure on the individual air springs, also allowing a differentiated calibration between the right and left side, in this way the user does not have to worry excessively about the pressure control of the air springs and does not need to intervene. after installation or calibration by a professional.



LCV standard inflation scheme.



Inflation and control unit for standard LCV versions

### **Electromechanical automatic control (AC)**

The first version of the system with integrated compressor supplied with the suspension kit was the “automatic control” version.

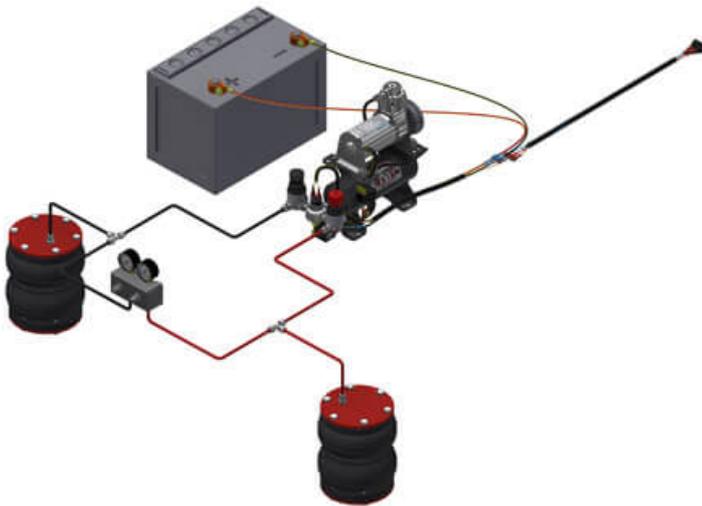
This system, born on roadside assistance vehicles and extended to the entire range of products for light commercial vehicles, includes an air supply system based on a compressor, a small air tank and an integrated valve unit.

Operation is simple: there is a three-position button in the cabin:

- **automatic** : in this mode the system adjusts the pressure up to a maximum established and calibrated by the installer. Depending on the use and the maximum load of the vehicle, it is therefore possible to find a maximum working pressure, set it and literally “forget” the system;
- **neutral** : the neutral position of the switch described above inhibits the system, this is in a “stand by” state, but **without activating any type of user** , therefore without consuming energy;

- **deflation** : by positioning the switch in "deflation", the air is made to flow outwards, leaving the air springs pressure-free.

If you want to work in intermediate conditions of pressure, simply activate the system automatically, wait for it to reach the set pressure level, then partially deflate the air springs by operating the switch and repositioning it in the neutral position. A wide adjustment range is thus obtained, suitable for all vehicle load conditions.



Automatic control system diagram.

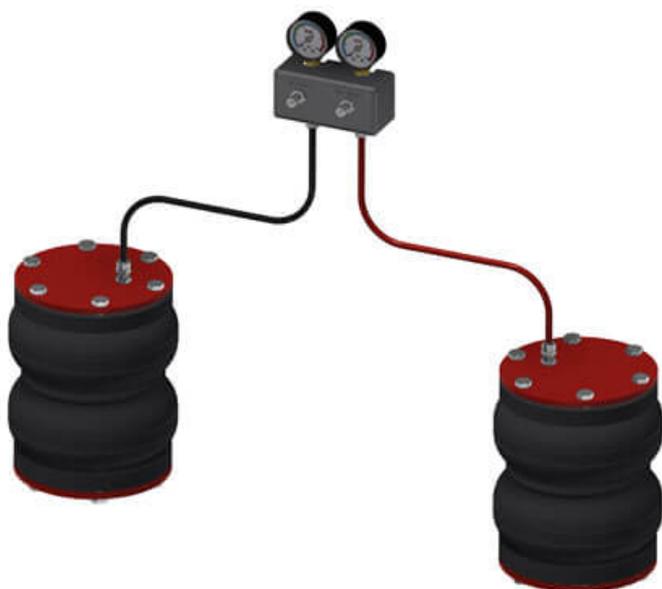


Inflation and control unit for AC systems.

**Direct Inflation (B)** (not in the catalog)

Also the *direct inflation* version , like many others, arises from the specific needs of some customers. It is technically simpler than the standard version, because it does not offer pressure limiting valves, therefore it is not present in the catalog and is managed in agreement with the customer.

This type is only suggested in particular cases and to customers who have specific regulation needs.



Direct inflation diagram.



Inflation and control unit for direct inflation versions.

### Simple direct (G) (not in the catalog)

Special inflation version but standardized on specific customer needs. It does not require the use of pressure limiting valves and control gauges. It is only suggested in particular conditions and on customer specifications.



Simple direct inflation scheme.



Inflation unit for "direct simple" versions.

### Ecas

Some vehicles can be equipped with electronic chassis height control systems.

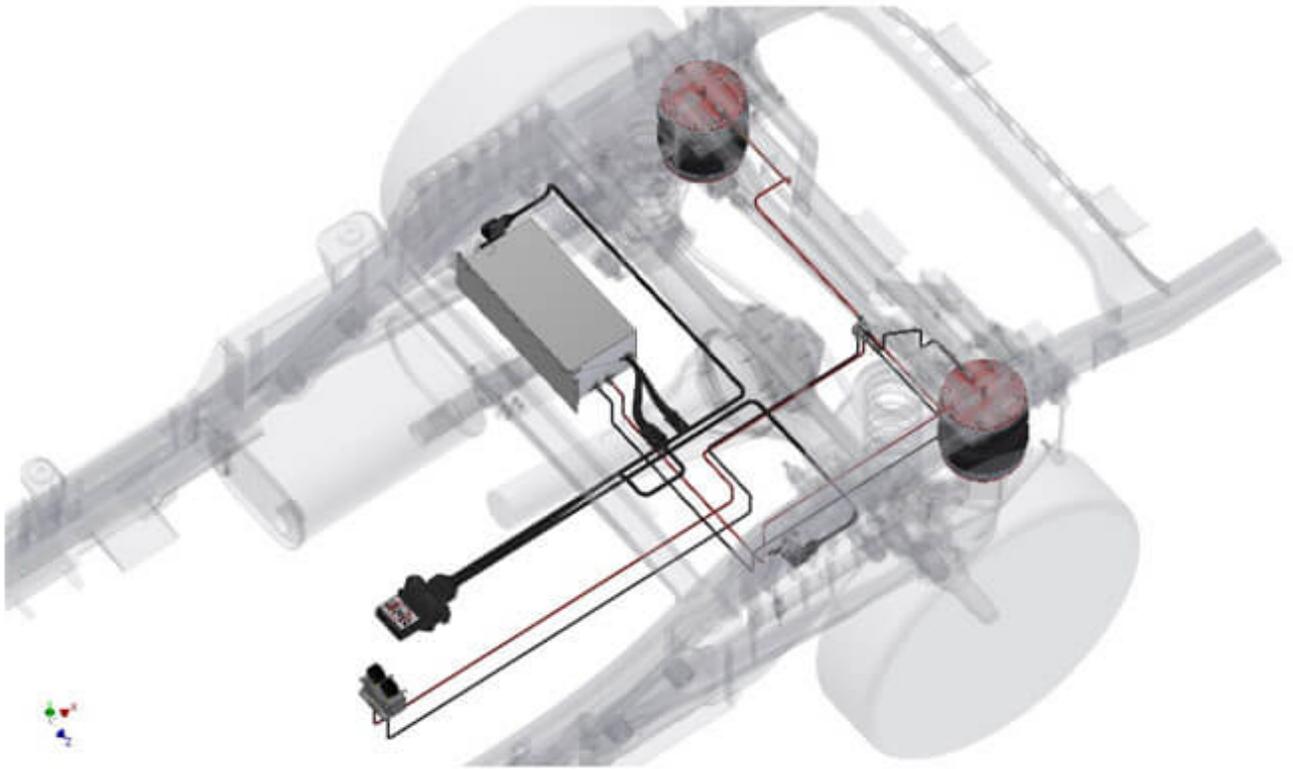
ECAS systems have been on the market for several years now and are very common in passenger vehicles such as buses.

The Top drive system team has studied for a long time the needs of special transport and has developed **the only entirely Italian ECAS system**, all the design and construction is in fact carried out in Italy.

ECAS systems essentially consist of:

- mechanical and pneumatic components;
- air management unit;
- level sensors;
- wiring;
- electronic control unit and software.

In essence, it is a mechatronic system capable of controlling the height of the vehicle chassis from the ground in real time, keeping it constant, within the physical load limits of the vehicle.



Ecas system diagram.