

# Performance is not merely power output but a matter of overall capability

And capability is typical of the VOLVO 89, designed and built for heavy duty transport operations with profit making economy at high average speeds. The engine, optional gearboxes and final-drives are specially adapted to meet the severe demands made by the traffic of the 1970's which apply to even the heaviest trucks.

Not only does the TD 120 engine provide outstanding resources of power, but this is done with unparalleled economy and dependability.

The unit is based on the well-tried principles of other engines in the Volvo range, 6 cylinders in-line turbocharged to an exceptionally high power output.

The principle of the Volvo Turbo is an exhaust-driven compressor which charges the cylinders with air under pressure. This extra air means that more fuel can be burned per stroke to produce a higher output. The Turbo has many advantages. Fuel consumption is lower than in the case of a normally-aspirated engine with the same output, noise level is lower and exhaust emission is much cleaner.

## Dimensioned for hard work

Volvo has had more experience of super-charged engines than any other truck manufacturer. That is why the TD 120 is designed and built in every detail for Turbo operation. Each cylinder has a separate head secured by eight studs and

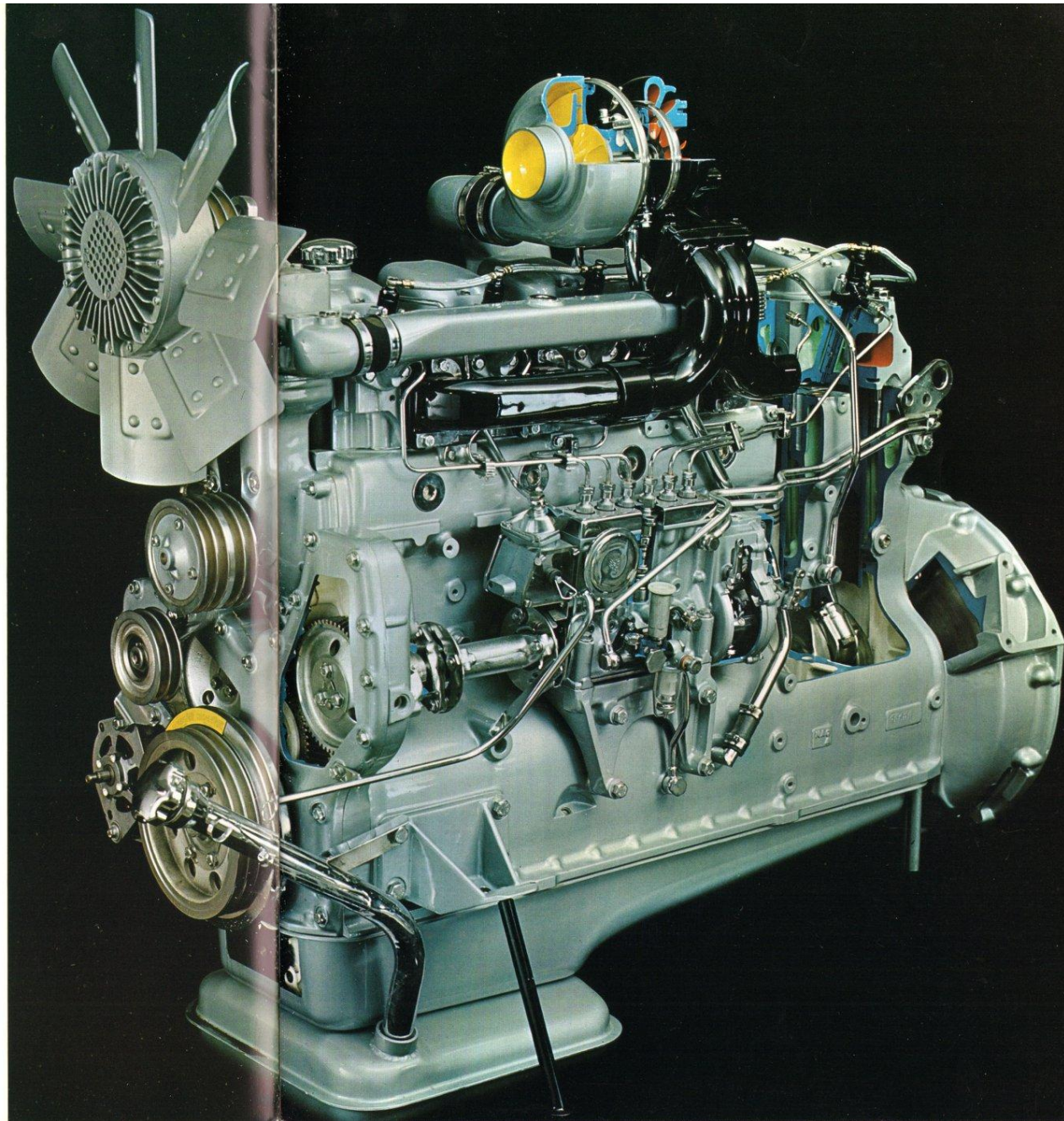
is fitted with a solid steel gasket with rubber seals round all water and oil passages. The wet-type cylinder liners have stepped edges to ensure perfect sealing.

A governor adapts the amount of fuel fed to the air available at any given moment. This eliminates the risk of the engine receiving too much fuel during sudden acceleration before the Turbo-supercharger has picked up speed.

## Hyper-effective filters ensure long life

The fuel, the lubricating oil and the induction air are cleaned in paper insert filters of large capacity. The lubrication system also features an oil cooler.

The three thermostats in the engine cooling system maintain a steady working temperature. The cooling fan is also thermostatically-controlled and only cuts in when required. In its idling position the fan saves up to about seven horsepower and considerably decreases noise level. Another advantage is that the engine warms up more quickly.



# Driver viewpoint—the Volvo 89 is the perfect example of ergonomics

Ergonomics is the science of adapting machinery to fit the human being. This principle has been rigorously pursued in the design of the Volvo F 89 cab.

An example is the frequency with which the various controls are used. This has been plotted and their location optimized to facilitate the driver's work as much as possible.

They are constructed to minimize the risk of mistaken identity. The driver reaches all the important controls without needing to stretch or bend. Much of the driver muscle work has been taken over by power-assistance. Compressed air is used not only to operate the brakes but also to carry out some of the gear-changing work and the greater part of clutch operation. The hydraulic power steering carries out about three quarters of the steering work.

The driver sits comfortably in a Volvo 89. The seat has torsional springing and hydraulic shock absorbers which eliminate impact and vibrations. The suspension of this seat can be adapted to suit individual requirements. Seat upholstery

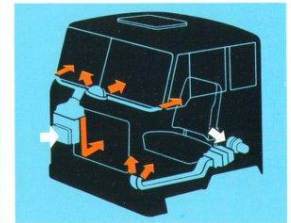
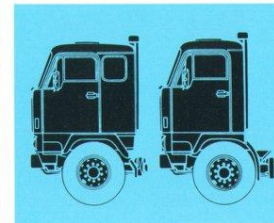
consists of comfortable textile material. The noise level in the cab is low—through its moderate cylinder capacity, the engine has a small noise-producing surface and both the Turbo-supercharger and thermostatically controlled fan keep down noise level. The floor and walls of the cab are effectively sound-insulated. Cab fittings follow a smart blue colour scheme and they are also practically designed. There is a large roof hatch for extra and effective ventilation. All cabs have bright roof lighting—the sleeper cab also having a reading lamp over the bunk.

Alternative equipment on the 89 includes a very well-equipped TIR cab. This includes a radio, a table-topped engine casing, a clothing storage unit of textile-reinforced plastic, a fitted carpet, etc. The illustration on the right shows this cab which, in addition to the TIR equipment is also fitted with an extra bunk.

*The Volvo 89 is supplied with a short-base or a sleeper cab depending on the type of operation. The sleeper cab is 40 cm (16") longer and includes a bunk. Otherwise the level of comfort and the interior fittings are identical.*

*Two heater units provide ample heating without draughts. A thermostat automatically maintains the temperature at the selected level.*

*An adjustable roof hatch provides the possibility of extra ventilation.*



# Volvo 89 trucks can tackle any type of operation

The transmissions and axles used in the 89 power pack are more than adequately designed and manufactured to transmit the exceptionally high engine torque. Optional gearboxes and rear axles, with alternative final drive reduction methods and ratios provide suitable combinations for any mode of operation.

## Eight speeds or sixteen

The R 61 gearbox has eight speeds while the SR 61 also includes an overdrive for each gear. In both cases the ratios are evenly divided throughout the whole register. This gives the driver the opportunity to utilize the engine very efficiently in all situations. Both gearboxes are extremely convenient to use and provide fast gear-changing—see the more detailed description on page 13.

## Double reduction

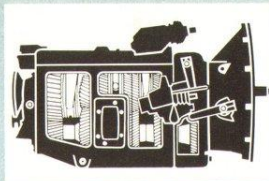
The double reduction final drive is designed for normal operation. Reduction is carried out in two stages—first through a spiral bevel crown wheel and pinion and then through a helical gear. Both gear assemblies are built into the same housing.

Optional ratios: 4.92:1 and 5.43:1.

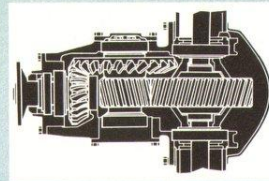
## Hub reduction

Here again reduction is carried out in two stages. The second stage consists of compact epicyclic gears with a ratio of 2:1 located in the wheel hubs. This reduces the stresses on the axle shafts and makes the hub reduction system ideally suited for extremely heavy work.

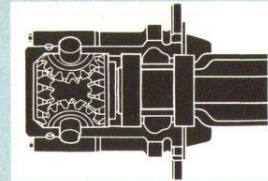
For the very heaviest forms of transportation, F 89 trucks are also available with a tandem drive bogie using either single reduction units or single reduction with hub reduction.



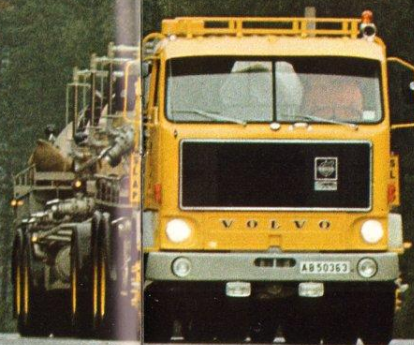
SR 61 gearbox



Double reduction



Hub reduction



F 89 6×2 with three axle trailer and sludge removal equipment.



An F 89 6x2 with three-axle trailer for bulk transportation.

## Brakes designed for heavy loads and high speeds

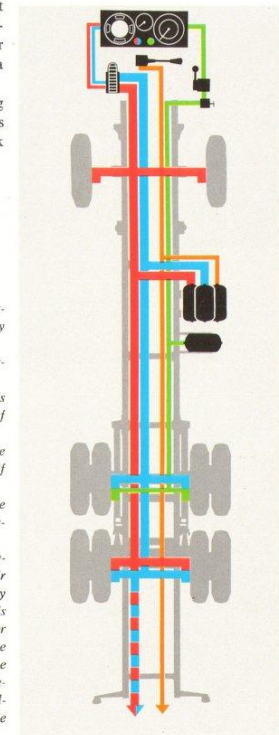
The actual energy developed during heavy braking should be several times greater than maximum engine output.

F 89's are fitted with brakes which are well-adapted to their speed and load resources. The service brakes have large friction areas and are of extremely dependable design. And, in addition to this, there are several completely independent brake systems.

The service brakes are of the compressed air type with two separate circuits—one for the front wheels and one for the driven rear wheels. In the case of the single-drive bogie, the trailing wheels are connected to both circuits. The trailer brakes are connected to both circuits of the tractor unit as well—if one circuit should fail, then the entire trailer is braked by the remaining circuit. The trailer can also be braked by means of a separate manual control in the cab.

A load-sensing valve adapts braking pressure in the rear wheel brake cylinders to the load in order to minimize the risk of wheel lock-up.

The handbrake operates through powerful coil springs and release is carried out by means of compressed air and like application, is infinitely variable. The exhaust brake provides extra engine braking and saves wheel brake wear.



The brakes on a Volvo 89 truck are extremely dependable and four completely independent brake systems are used.

The service brakes have two separate circuits.

One circuit (red) includes the front wheels and the bogie trailing wheels (plus trailer if used).

The second circuit (blue) includes the driven wheels, trailing wheels and trailer if used.

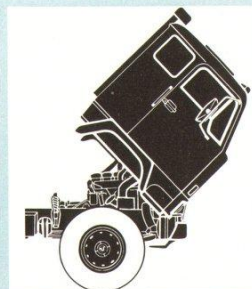
Both the bogie trailing wheels and the trailer wheels are thus braked by both circuits.

The handbrake (green) works through powerful coil springs and is compressed air operated. Should the driver forget to apply the handbrake on parking the truck, it is applied automatically after a moment or two at standstill as the air pressure in the system is released and the coil springs come into operation. A special check-valve prevents unintentional release of the handbrake when the engine is started and the air system primed.

# An in-line six means simpler servicing

Volvo has maintained its well-tested technology for the TD 120 engine creating the basic conditions for economical servicing. Many parts are identical with those used in the Volvo 100 engine—a rationalization which results in lower replacement costs. These are but a few of the many design features of the 89 which result in low servicing costs, excellent reliability and good profitability.

*An F 89 6×2 rigid with two-axle trailer for the long-distance haulage of mixed goods.*



The entire engine, gearbox and front end are readily accessible when the cab is tilted forward which is facilitated by torsion springs in the front edge of the cab. Routine inspection and control of coolant and lubricating oil can be carried out at the front of the truck without tilting the cab.





An F 89 6x2 with platform (and trailer) for the transport of pre-fabricated building elements

## Well-balanced suspension

Together with the fully-sprung driving seat and the soft cab mountings, the suspension system of the Volvo 89 provides excellent travelling comfort with all loads. The springs are also balanced so as to counteract rolling tendencies in curves.

On the two-axle models there is automatic adaption of rear springs to the load. Under loading the active section of the spring becomes shorter and the suspension becomes stiffer. If loading is increased even more, a helper spring comes into operation as well. In the case

of certain superstructures, the suspension can be stiffened by using extra hollow rubber springs which do not come into operation until the vehicle is loaded. The front leaf springs are combined with shock absorbers.

Slipper-type contact points on the main spring plus a helper spring which comes into operation at a certain load result in progressive rear springing—the heavier the load, the stiffer the suspension.

On bogie-equipped models, both axles use the same spring with the help of a balance arm. The balance arm increases the load on the driven axle during acceleration.

The spring pins are threaded—this providing an important advantage: better retention of grease, which cuts wear considerably.

Three-axle models have slots in the rear spring leaves to prevent the spring assembly from splaying.



# The truck for jobs needing both strength and speed

All versions of the F 89 are built for the very heaviest haulage. Ideal combinations of gearbox, final drive, cab and superstructure result in a vehicle which is specially adapted to the type of operation for which it is to be used.

The illustrations show examples of superstructures for ranges of work in which the exceptional performance of the Volvo 89 is thoroughly utilized.



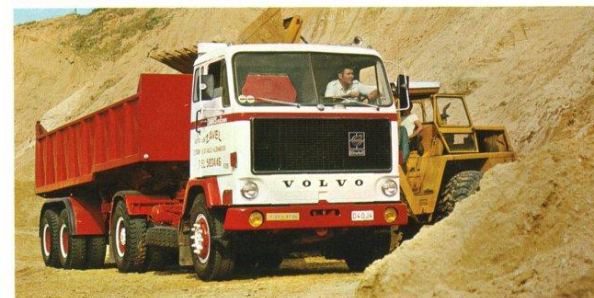
*An F 89 6x2 tractor unit with a special drop-bed semi-trailer for the transport of heavy machinery*



*An F 89-32 4x2 with two-axle semi-trailer. TD 120 engine, SR 61 gearbox, double reduction final drive.*



*An F 89-32 4x2 with two-axle semi-trailer. TD 120 engine, SR 61 gearbox, double reduction final drive.*



*An F 89-38 4x2 tractor unit with tipper semi-trailer. TD 120 engine, SR 61 gearbox, single reduction final drive with hub reduction.*



*An F 89-32 4x2 with two-axle folding trailer for timber transport. TD 120 engine, SR 61 gearbox, single reduction final drive with hub reduction.*