



Lubricating oil filter

Continuously automatic backflushing lubricating oil filter

The automatic filters, T150, T280 and X280, are designed specifically for full-flow filtering of lubricating oils for trunk piston and crosshead engines.

Unique features

- Robust disc-type filter elements.
- Continuous backflushing.
- Filtered oil drives the backflushing process.
- Constant pressure drop across the filter.
- Compact and space-saving design.

Key benefits

- Robust design reduces risk of filter element cracking.
- Continuous backflushing significantly prevents adhesion of retained solids to filter surfaces, which results in:
 - No manual cleaning of filter elements.
 - Low and constant pressure drop across the filter elements, which further reduces the risk of cracking.
- Robust filter elements and continuous backflushing ensure safe protection of the diesel engine, with normally more than 12,000 operating hours between cleaning and inspection of the filters.
- Use of filtered oil for backflushing process eliminates the need for external power supply and compressed air.
- Constant pressure drop across the filter, combined with the pressure drop indicator, facilitates detection of malfunctions in the lubricating oil system.
- Easy to install and to retrofit as an upgrade to existing installations.



Lubricating oil filter: Protector X280.

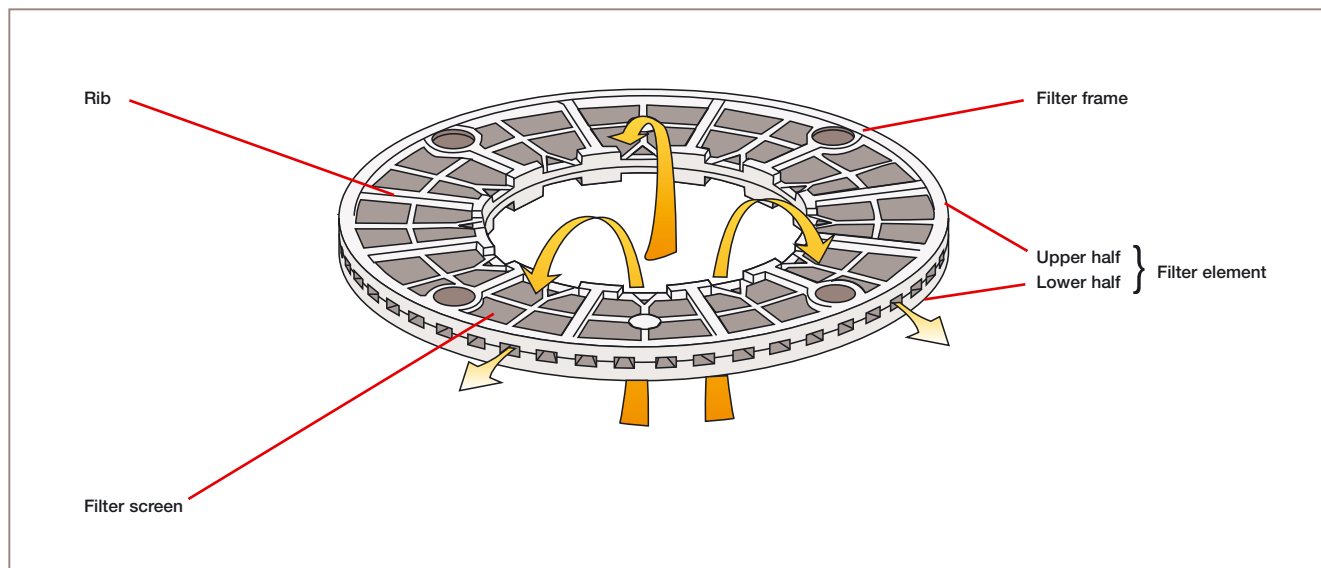


Figure 1. Full-flow element: Flow direction through one filtering element (Filtration).

Diesel engine protection

The filter is installed in the full-flow system as close to the engine as possible to prevent harmful solid particles entering the sensitive parts of the engine.

The separator is installed in the bypass system. Its function is to remove harmful contaminants (solid particles and water) from the lubricating oil system.

Design

The filter elements are assembled into a disc stack. The filter elements comprise a filter frame and filter screen, and are divided into sections by ribs.

The discs, with sleeve, guide rods, springs and flanges, are mounted over the distributor to form the filtering unit. The sections, divided by the ribs, form twelve independent filtering columns.

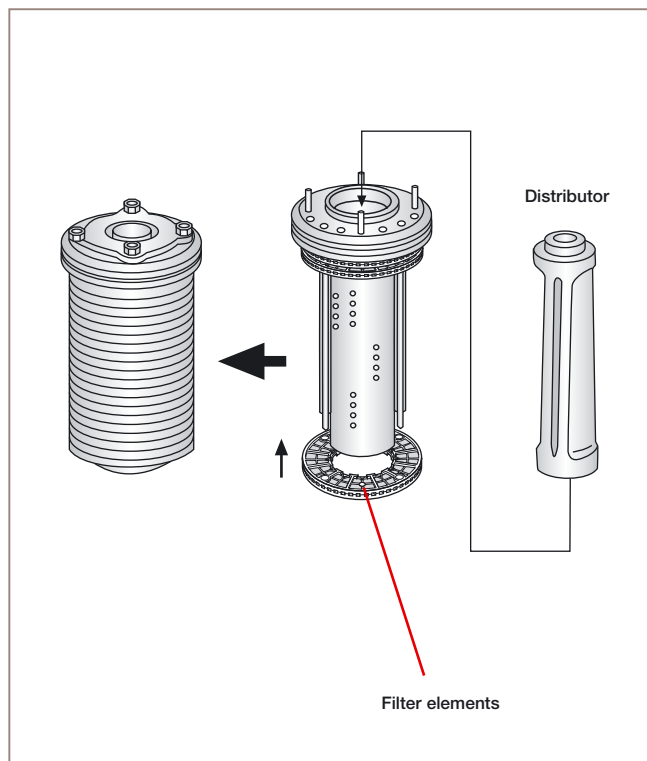


Figure 2. Filtering unit.

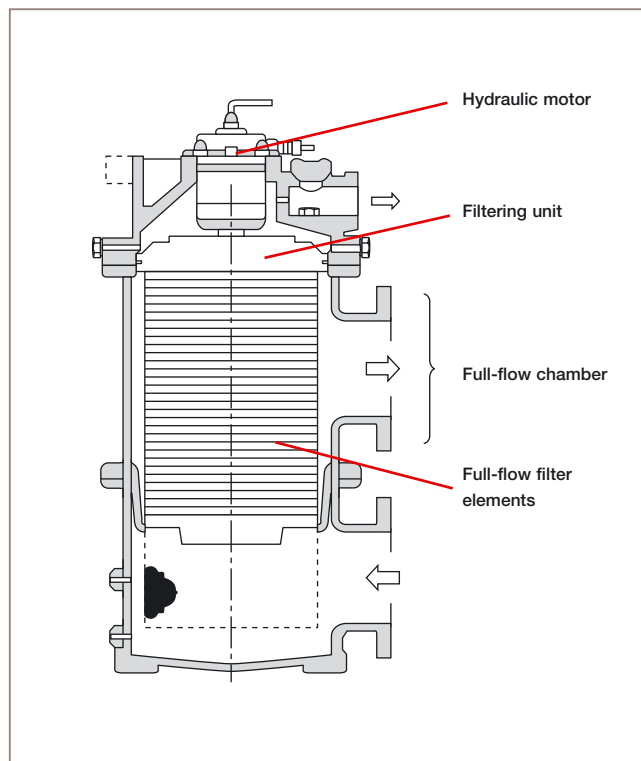


Figure 3. Fully assembled filter showing filtering unit and hydraulic motor.

Key: QP = Lubricating oil pump capacity
 Q1 = Maximum capacity of the filter
 QE = Lubricating oil flow to the engine
 Q3 = Flow of backflushed oil
 P2 = Clean oil outlet pressure
 P3 = Backflushed oil outlet pressure

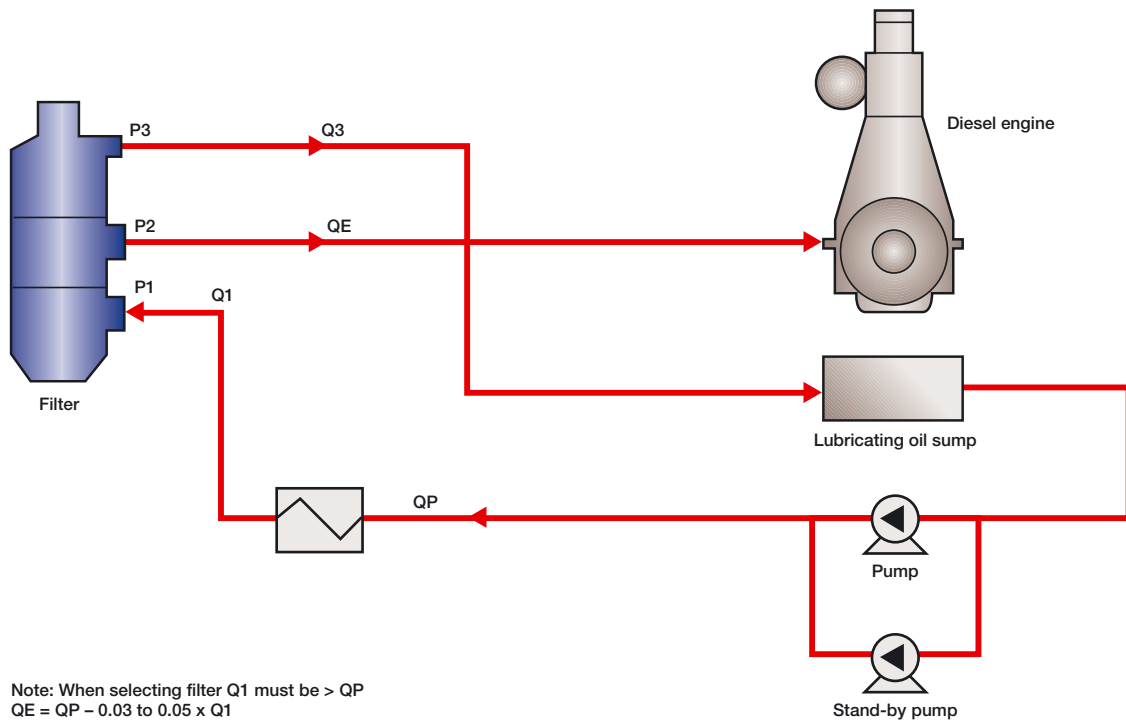


Figure 4. Protector automatic lubricating oil filter showing pressure, flow and capacity.

Operating principle

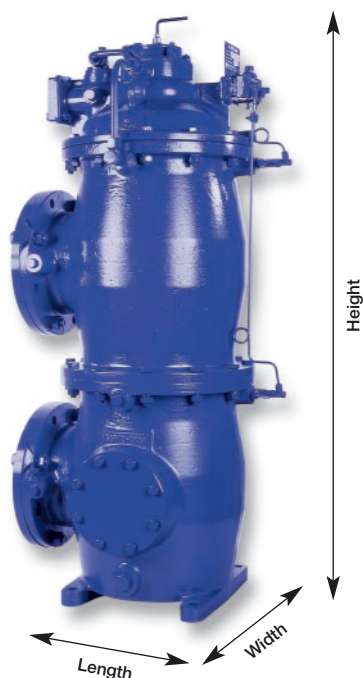
The unfiltered oil entering the filter is fed by the distributor to 11 of the 12 filtering columns. Solids are collected on the filter surface and the filtered oil flows to the engine. Previously collected solids are removed in the twelfth column by back-flushing with a small amount of the filtered oil. This is taken through a passage in the distributor via the backflushed oil outlet and back to the lubricating oil sump.

The distributor, which is driven by the hydraulic motor on top of the filter housing, rotates at regular intervals to feed oil for filtration in 11 columns and to backflush in the twelfth. In this way, all the columns are backflushed once per full rotation of the distributor, which corresponds to every one to three minutes.

The pressure drop indicator connected between the inlet and outlet of the filter provides a reading and signals an alarm condition if for any reason the pressure drop reaches the alarm level. This indicates that there is a problem in the lubricating oil system.

The driving force for the automatic backflushing is the pressure difference between the clean oil outlet (P2) and the backflushed oil outlet (P3) of the filter. A flow sheet illustrating the pressures, flows and capacities is shown in Figure 4.

A pressure drop indicator, inspection covers and counter flanges are provided as ancillary equipment. Options exist for additional features, such as magnetic plates installed on the inlet housing.



Guideline to overall dimensions

Depending on the surface area and number of filter elements required for your application, the number of housings will vary, and hence the overall size of the filter will be different.

Filtration fineness

This can be defined depending on diesel engine requirements and the specific application.

Installation

All Alfa Laval automatic lubricating oil filters are designed for installation in the engine room. Counter flanges are according to DIN standards (JIS as option).

Other Alfa Laval filtration products

Alfa Laval also manufactures filters for other engine room applications, such as automatic fuel oil filters, and manual indicator and bypass filters.

After-sales support

Replacement components and after-sales services are provided through a network of Alfa Laval subsidiaries and representatives worldwide, including Marine Service Centres in all major ports.

Dimensions

Lubricating oil flow (m ³ /h)		Height × Length × Width (mm)
Crosshead	Trunk piston	
40–150	20–100	750 × 450 × 450
150–250	100–220	1300 × 500 × 500
250–500	220–450	1300 × 1050 × 500
500–800	450–700	1300 × 1500 × 500
800–1100	–	1300 × 2100 × 500

Technical documentation

Complete information and documentation for the main components and the installation, operation and maintenance of the filter is contained in the Instruction Book that accompanies delivery of each Alfa Laval filter. Your local Alfa Laval company will be able to provide more details on the application and sizing of Alfa Laval automatic filters.

Technical data

	Crosshead X280	Trunk piston T150, T280
Normal filter outlet pressure	2–3 bar (P2 norm)	3.5–6 bar (P2 norm)
Min. filter outlet pressure	1.4 bar	3 bar
Max. filter inlet pressure	12 bar	12 bar
Test pressure	24 bar	24 bar
Max. viscosity in filter at normal operation	130 cSt	75 cSt
Max. temperature in the filter	100°C	100°C
Alarm Δp	0.9 bar	0.8 bar
Backflushing flow	3% of filter inlet flow	3–5% of filter inlet flow
Housing material	Nodular cast iron	Nodular cast iron
Filter screen material	Stainless steel	Stainless steel

How to contact Alfa Laval

Up-to-date Alfa Laval contact details for all countries are always available on our website at www.alfalaval.com