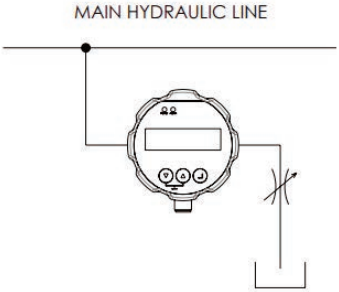
Filtrec FMSC01S0 particles monitor
Hydraulic installation: pipes and hoses

FLOW CONTROL

The Filtrec FMSC01S0 particles counter monitor has been developed to accurately measure the level of contamination according to the main international standards, such as ISO4406, NAS1638, SAE AS4059 and GOST 17216.
The flow rate through the instrument shall be in the range between 50 to 400 ml/min to have an accurate and repeatable measurement.
For this reason, it is necessary to use an auxiliary flow valve installed after the contamination monitor, as shown in the installation diagram below.

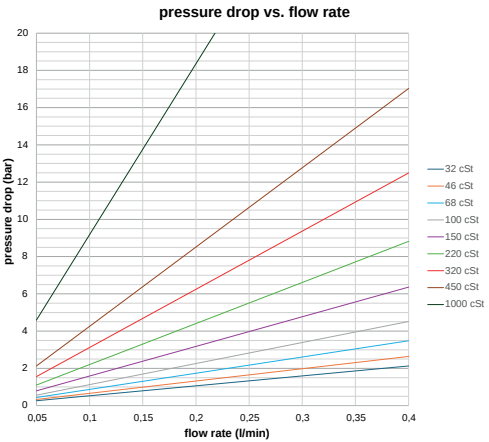


RECOMMENDED CONNECTIONS AND PIPES OR HOSES

One of the most important characteristics of hydraulic oil is the viscosity. According to the application, the oil viscosity can vary from a few cSt to hundreds of cSt.
Viscosity is also affected by temperature; in particular a decrease of the temperature leads to an increase of the viscosity.
There is no viscosity limit to the use of the instrument, but it is very important to consider the pressure drop (Δp) through the device and evaluate the minimum required pressure to obtain the recommended flow, from 0.05 to 0.4 l/min.

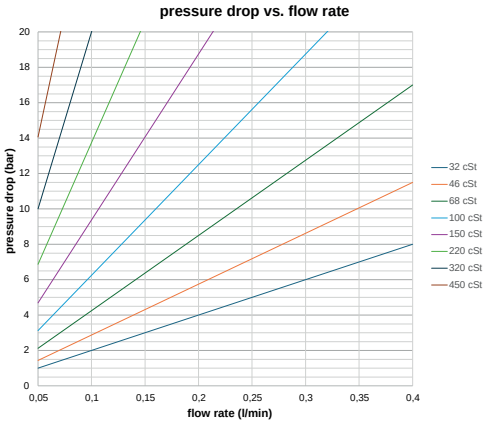
Δp on the instrument

The below graph shows the Δp through the instrument without any connections vs. the flow rate at different viscosity.

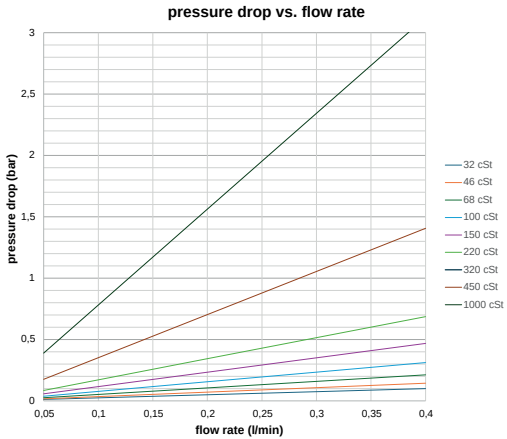


Δp on the connections and hoses

The connections and the hoses/pipes up and downstream the instrument should be considered to calculate the total pressure drop.
The instrument is equipped with two minimess connections for hoses with an internal diameter of 2 mm.
The below graph shows the pressure drops vs. the flow rate for 2 hoses with a length of 1 m and their minimess connections at different viscosity.



Considering the above values, Filtrec suggests using this kind of connection only for viscosity of 150 cSt or less.
If the viscosity is higher than 150 cSt, it is possible to remove the minimess connections and install connections for ¼" diameter hoses (I.D. 6.35 mm).
As shown in the below graph, the pressure drop with these hoses is low even with a viscosity of 1000 cSt.



Example of total Δp calculation

Adding the Δp on the instrument and the Δp on the connections/hoses, it is possible to calculate the total Δp.

Minimess connections and hoses (1 m length each), 0.2 l/min, 46 cSt
Instrument Δp 1.3 bar + Hoses/Connections Δp 5.7 bar = Total Δp 7.0 bar

¼" connections and hoses (1 m length each), 0,2 l/min, 450 cSt
Instrument Δp 8.5 bar + hoses/connections Δp 0.7 bar = Total Δp 9.2 bar

The Filtrec FMSC01S0 should be connected to a line where the pressure is greater than the total calculated Δp.

For more information or installation queries, please contact Filtrec.