



Virtual Fluid Lab (VFL) Next Generation

Smart Determination of the Filter Element's Remaining Service Life

Smart

SAE J1939

Back pressure

Element service life for service planning

1. DESCRIPTION

The new generation of smart sensors provides additional relevant information in addition to the regular process data. This enables dynamic and self-organising processes that are optimised in real time, thus optimising availability and resource consumption and reducing costs.

The Virtual Fluid Lab V $\frac{1}{4}$ VFL with CAN SAE J1939 interface has been developed specifically for the purpose of enabling demand-orientated and predictive maintenance of filter elements based on the measurement of back pressure.

To do this, the pressure drop of the filter and the temperature of the medium (this is read in via the CAN bus) measured by the sensor are analysed in real time using a smart algorithm and the current filter load is then calculated.

Based on a prediction model, the algorithm works out the remaining service life of the filter element and calculates exactly when the filter element actually needs to be replaced. This provides information that helps to optimise the planning of maintenance work and minimise downtimes.

This is supplemented by internal logging of the filter's operating conditions so that the usage profile and the number of filter replacements carried out can be recorded and retrieved when needed.

Media compatibility includes hydraulic oils, lubricating oils and HFD as well as all other environmentally compatible fluids¹⁾.

The Virtual Fluid Lab is used in systems requiring continuous and smart monitoring of the remaining service life in order to facilitate well-organised servicing and make the most of the service life of the filter elements. The Virtual Fluid Lab is typically fitted to a dedicated connection on the filter housing.

2. TECHNICAL DATA

Input data

Measuring ranges	Back pressure 2; 5 bar
Permitted operating pressure	16 bar
Mechanical connection	G $\frac{1}{4}$
Tightening torque, recommended	20 Nm
Parts in contact with fluid	<ul style="list-style-type: none"> ■ Mech. connector: Stainless steel ■ O-ring: FKM

Output variables (pressure)

Output signal	CAN SAE J1939 – Protocol
Accuracy according to DIN16086	$\leq \pm 3\%$ FS typ. $\leq \pm 5\%$ FS max.
Terminal based	
Temperature compensation zero point	$\leq \pm 0.05\%$ FS / °C max.
Temperature compensation span	$\leq \pm 0.05\%$ FS / °C max.
Long-term drift	$\leq \pm 0.5\%$ FS typ. / year

Environmental conditions

Compensated temperature range	-25 °C to +85 °C
Operating temperature range	-30 °C to +100 °C
Storage temperature range	-40 °C to +100 °C
EMC	2014/30/EU; EN 61000-1 / 2 / 3 / 4
CE - / UKCA -Conformity	present
Vibration resistance acc. to DIN EN 68-2-6 at 10 .. 500 Hz	≤ 250 m/s ²
Shock resistance acc. to DIN EN 60068-2-27	100 g / 6 ms / half sine 500 g / 1 ms / half sine
Protection type acc. to DIN EN 60529 ²⁾	IP 67

Protocol data for SAE J1939

Data link layer	SAE J1939-21
Network Layer	SAE J1939-31
Network Management	SAE J1939-81
Default settings	Bit rate: 250 kbit/s Node ID: 1
Process Data Output 2 Parameter groups	Filter remaining service life, operating hours, dynamic pressure, filter loading, status information, operating status messages
Process Data Input 1 Parameter Group	Fluid temperature

Smart functions

Operating data recording (over entire service life, last 10 replacement intervals)	<ul style="list-style-type: none"> ■ Histogram of back pressure and fluid temperature ■ Temperature peak monitoring including logging ■ Filter change statistics incl. logging
---	---

Other data

Electrical connection	DT04, 4-pin
Supply voltage	9 to 35 V DC
Residual ripple of supply voltage	$\leq 5\%$
Current consumption	≤ 25 mA
Life expectancy	at least 1 million cycles (max. permissible operating pressure)
Weight	~ 90 g

Note:

Reverse polarity protection of the supply voltage, excess voltage, override and short circuit protection are provided.

¹⁾ HFC media compatibility available upon request

²⁾ with mounted mating connector in corresponding protection type

3. MODEL CODE

V¹/₄ X VFL X /-V-J4D040

Type

V¹/₄ Back pressure measurement (G ¹/₄)

Measuring ranges in bar

2; 5

Type

VFL Virtual Fluid Lab

Modification code

X the latest version of the specific type is always supplied

Supplementary details

V FKM seal

J4D040 CAN SAE J1939, 4-pin, DT04

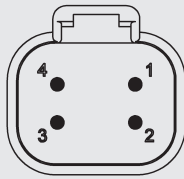
Accessories

01329854 ADAPTER VMF ¹/₄-S.0 => G ¹/₈

01329852 ADAPTER VR ¹/₄-p.1 => G ¹/₂ Connection to Hydac filter

4. PIN CONNECTIONS

DT04, 4-pin



Pin	Signal	Description
1	+U _B	Supply +
2	0 V	Supply - / GND
3	CAN_H	Bus line dominant high
4	CAN_L	Bus line dominant low

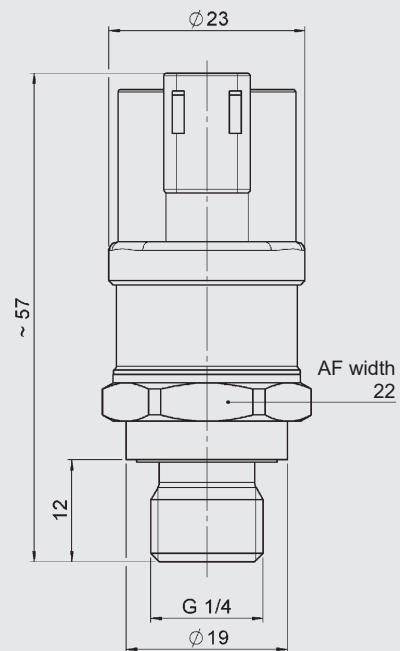
NOTE

The information in this brochure relates to the operating conditions and fields of application described.

For applications and/or operating conditions not described, please contact the relevant technical department.

Subject to technical modifications.

5. EQUIPMENT DIMENSIONS



HYDAC FILTERTECHNIK GmbH
 Industriegebiet
66280 Sulzbach/Saar, Germany
 Tel.: +49 6897 509-01
 E-mail: filter@hydac.com
 Website: www.hydac.com