

Digital Filter Suite

Intelligent Filter Monitoring



MANN+HUMMEL Digital Filter Suite

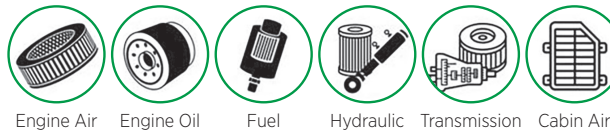
Intelligent Filter Monitoring

CONCEPT ADVANTAGES:

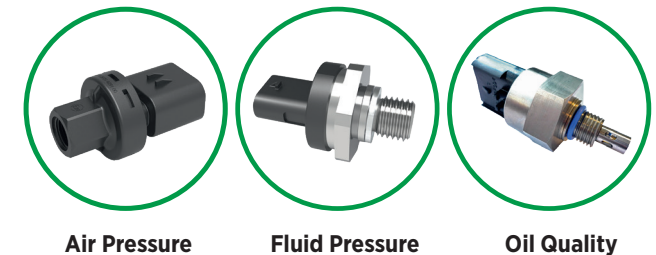
- **Condition-based monitoring** of the vehicle fleet
- **Optimized service intervals** based on machine needs
- Avoidance of unexpected machine downtime
- Reduction of maintenance time
- Improved **total cost of ownership** and efficiency
- **Simple integration** into existing ecosystems
- Extended end **customer loyalty** and recognition of service parts

PRODUCT FEATURES:

- Data is collected from integrated sensors and supplemented with vehicle meta data to provide a **real-time status and comprehensive monitoring for all filter types**



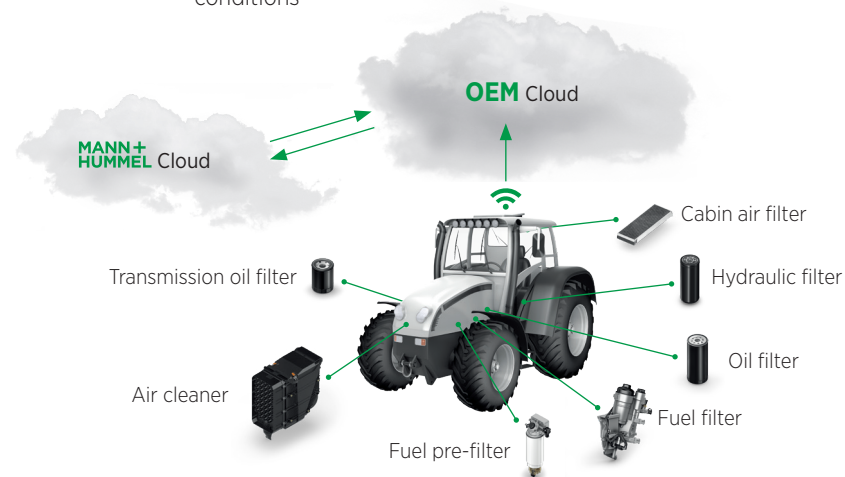
SENSOR PORTFOLIO:



CORE FEATURES:

- **Remaining Useful Life:**
How long before I need to change my filter?
- **Percent Dust Load:**
How much of my filter has been used?
- **Fluid Health:**
How clean is the oil/fuel?
- **Interval Optimization:**
How can I optimize my maintenance to reduce costs, waste, and downtime?

- Algorithms analyze the data and return precise remaining filter life and dust load figures for predictive maintenance in existing OEM telematics systems
- Particularly relevant in altering or extremely dusty working conditions



FILTER LIFETIME | FLEET OVERVIEW:



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SENSOR OVERVIEW



	Liquid pressure sensor	Liquid pressure sensor	Liquid pressure sensor	Liquid pressure sensor
Recommended Application				
<ul style="list-style-type: none"> Engine oil 				
<ul style="list-style-type: none"> Fuel 				
<ul style="list-style-type: none"> Hydraulic oil 				
<ul style="list-style-type: none"> Transmission oil 				
Dimensions	Ø 23 x 46 mm	Ø 23 x 46 mm	Ø 23 x 46 mm	Ø 23 x 46 mm
Thread	Male type - M12 x 1.5	Male type - M12 x 1.5	Male type - M12 x 1.5	Male type - M12 x 1.5
Connector type	Mates to: SealStar 1.2 (Hirschmann) P/N: 14 928 30 S01 (Key B)	Mates to: SealStar 1.2 (Hirschmann) P/N: 872-858-542 (Key B)	Mates to: SealStar 1.2 (Hirschmann) P/N: 872-858-542 (Key B)	Mates to: SealStar 1.2 (Hirschmann) P/N: 872-858-542 (Key B)
Operating voltage	5V +-0,25 V	5V +-0,25 V	5V +-0,25 V	5V +-0,25 V
Output type	Analog voltage (0,5 to 4,5V)	Analog voltage (0,5 to 4,5V)	Analog voltage (0,5 to 4,5V)	Analog voltage (0,5 to 4,5V)
Operating ranges	0,2 - 1,2 bar (absolute)	0 - 12 bar (rel.)	0 - 20 bar (rel.)	0 - 40 bar (rel.)
Accuracy	+ - 2,5% FSO	+ - 1,5% FSO	+ - 1,5% FSO	+ - 1,5% FSO
Operating temperature	-40°C to 130°C	-40°C to 150°C	-40°C to 150°C	-40°C to 150°C
IP rating	IP6K9K	IP6K9K	IP6K9K	IP6K9K

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SENSOR OVERVIEW



	Cabin air pressure sensor	Engine air pressure sensor
Recommended Application		
<ul style="list-style-type: none"> Cabin air 		
<ul style="list-style-type: none"> Engine air 		
Dimensions	Ø 27 x 46 mm	Ø 27 x 46 mm
Thread	Female type - M10 x 1	Female type - M10x1
Connector type	Mates to: TE AMPSEL 16 P/N: 776429-2	Mates to: TE AMPSEL 16 P/N: 776429-2
Operating voltage	5V +-0,25V	5V +-0,25V
Output type	Analog voltage (0,5 to 4,5V)	Analog voltage (0,5 to 4,5V)
Operating ranges	0 to -8 mbar (relative)	0 to -100 mbar (relative)
Accuracy	+/- 2,5% FSO	+/- 2,5% FSO
Operating temperature	-40°C to 125°C	-40°C to 125°C
IP rating	IP6K6	IP6K6

SENSOR OVERVIEW



	Oil quality sensor
Dimensions	Ø 30 x 75 mm
Thread	Male type - M14 x 1.5
Connector type	Mates to: Aptiv/Delphi APEX 2.8
Output type	CAN bus (SAE J1939)
Operating ranges	Dynamic viscosity - μ : 0.5 to 50 mPa-s (cP) Density - μ : 0.65 to 1.5 g/cm3 Dielectric constant - μ : 1 to 6 Rp: 1.0 E+06 to 1.0 E+08 Ω Fluid temperature - T: -40 to 150°C
Accuracy	Dynamic viscosity - μ : +/- 5% for $\mu > 10\text{cP}$ and +/- 0.5cP for $\mu \leq 10\text{cP}$ Density - μ : +/- 3% Dielectric constant - μ : +/- 3% Rp: +/- 5% Fluid temperature - T: +/- 2°C Final tolerances depends on the application
Operating temperature	-40°C to 125°C (electronics) -40°C to 150°C (oil)
IP rating	IP6K9K



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