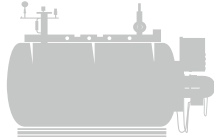
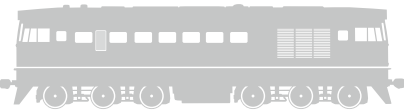
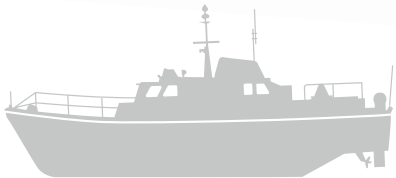
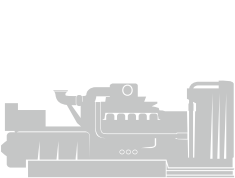
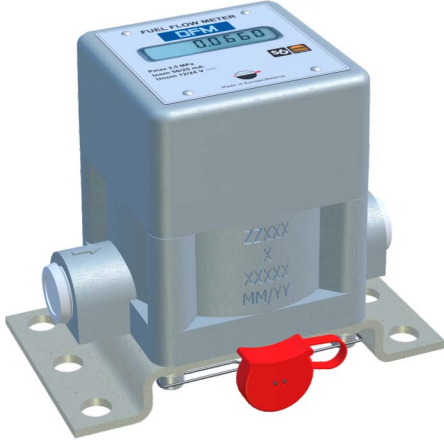




Fuel flow meters

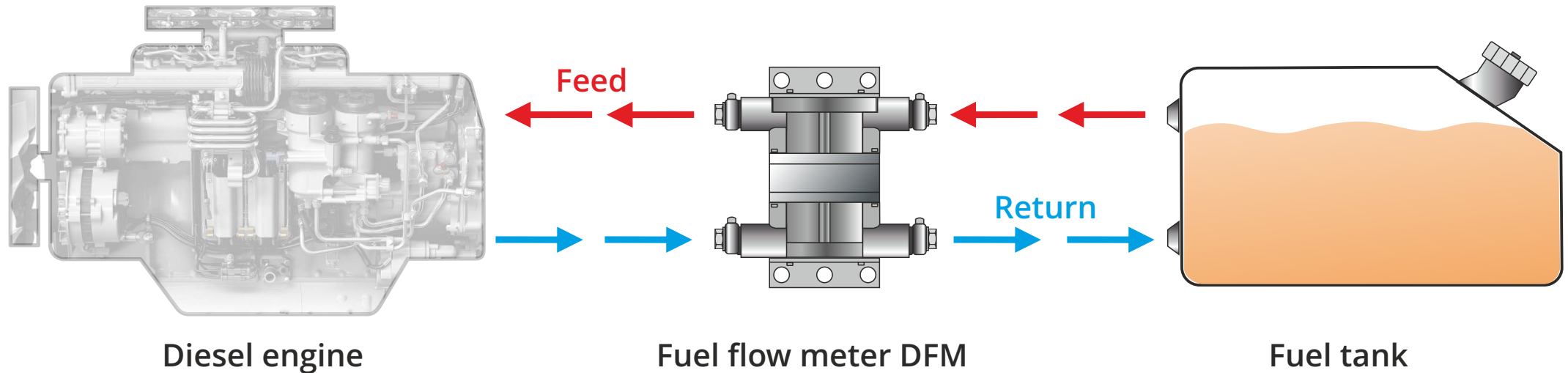


TECHNOTON
FUEL MONITORING EXPERT



www.jv-technoton.com

Purpose



Direct fuel consumption measurement inside fuel lines of diesel engines of vehicles and stationary machinery.

Goals



Monitoring of real fuel consumption



Machine running time tracking



Fuel consumption optimization



Preventing fuel theft



Engine diagnostics by consumption rate



See video: "Fuel Consumption Monitoring. DFM Fuel Flow Meter."

Application

+ Vehicles

Trucks

Tracktors

Locomotives

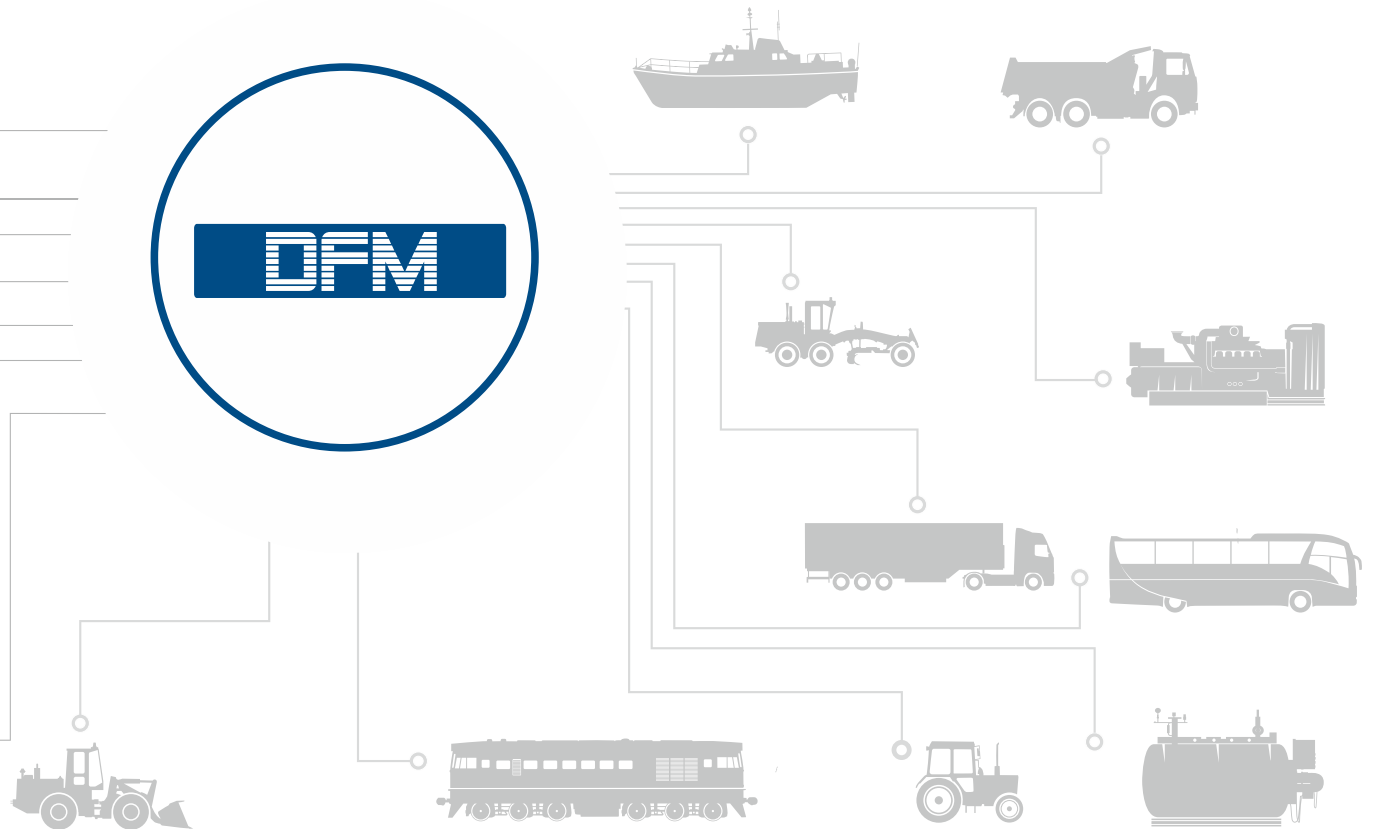
Vessels

+ Stationary objects

Boilers

Burners

Generators





Advantages

Direct consumption measurement in fuel lines of engine

Accurate data regardless of vehicle tilt position and fuel tank shape

Over 40 counters of fuel consumption and machinery working time in various engine load modes – “Idle”, “Optimal”, “Overload”

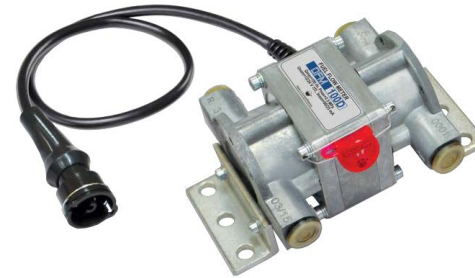
Detection of fuel theft from return fuel line

Robust design: measuring chamber of Zamak alloy, embedded mud filter and built-in battery

Types



One-chamber with display and interface cable



Differential with interface cable



One-chamber with interface cable



Differential autonomous



One-chamber autonomous

Specification

Measurement flow rate range	from 0,5 to 600 l/h
Relative accuracy error, one-chamber,%, increased accuracy	0.5%
Relative accuracy error, one-chamber, %,	1%
Relative accuracy error, differential,%,	1 – 3%
Supply voltage range	10–50 V
Operation temperature range	from -40 to + 85 °C
Nominal pressure	to 2 bar
Max pressure	to 25 bar
Output interface	pulse, RS-232, RS-485, Modbus, CAN J1939/S6, NMEA 2000

Order identification codes

MAX flow rate l/h values of the range:
50,100,250, 500

Attribute meaning differential measurement principle:
D – differential

Increased accuracy version:

Increased measurement accuracy, inaccuracy rate is mentioned

X

Y

D

Z

U

P

Model:

- A** – without display
- B** – with display
- C** – with display, extended functionality

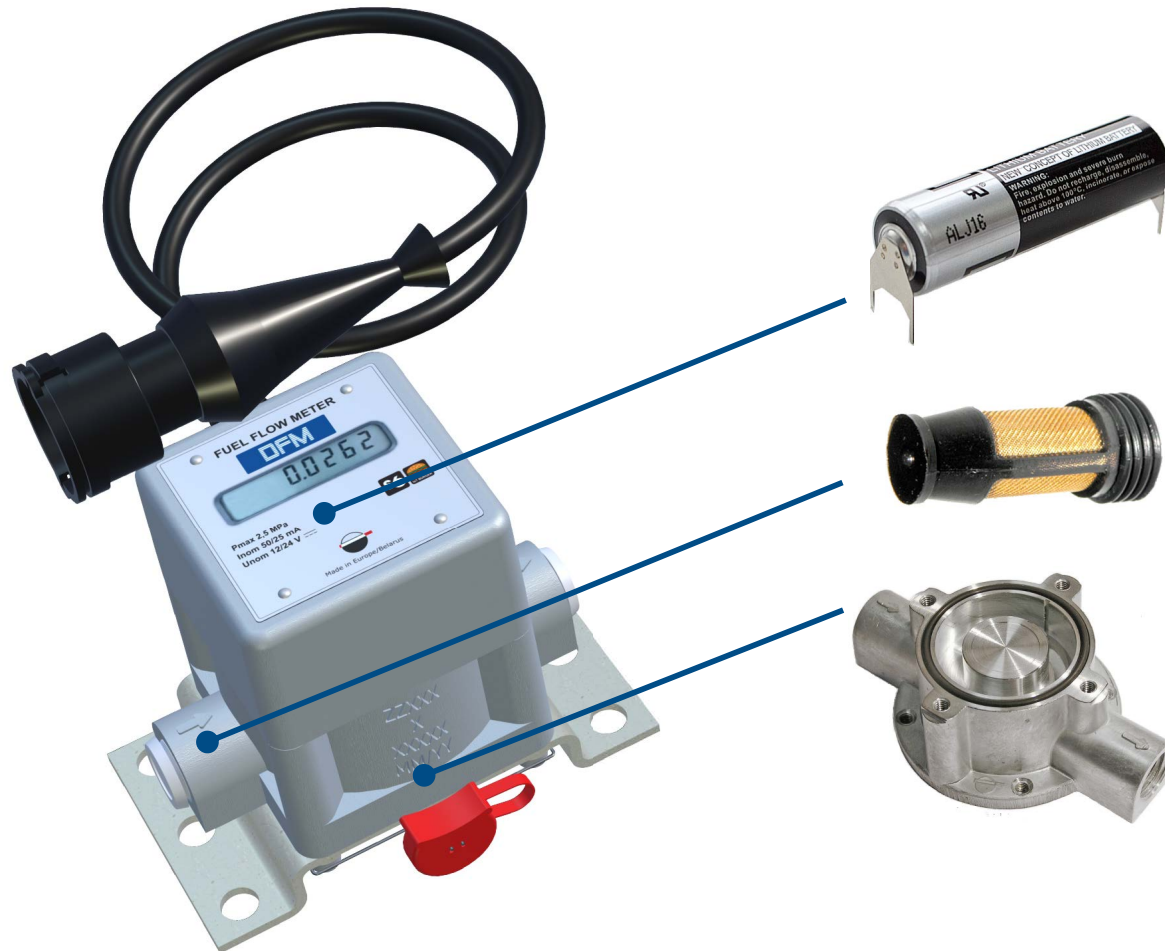
Electronic interface:

- K** – normalized pulse
- 232** – interface RS-232 (DFM COM, Modbus RTU)
- 485** – interface RS-485 (DFM COM, Modbus RTU)
- CAN** – interface CAN j1939/S6 (SAE j1939, S6, NMEA 2000)

Version by performance:

- HP** – increased maximum consumption (flow) rate per chamber
- 350 l/h (for DFM 250)
- 600 l/h (for DFM 500)
- 300 l/h (for DFM 250D)
- 600 l/h (for DFM 500D)

Design

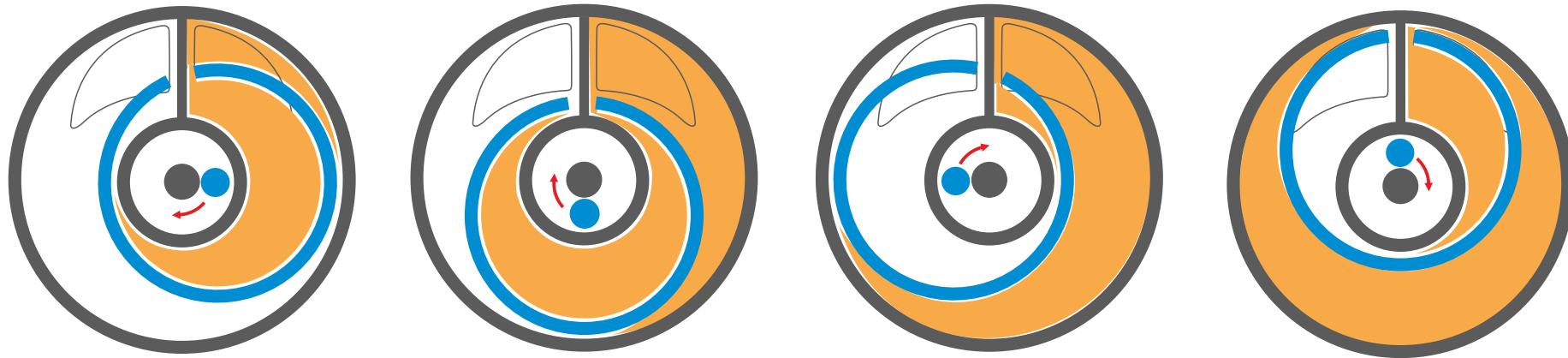


Built-in battery allows recording counters without external power. When external power is back on, the data is sent to telematics unit.

Filter protects chamber from impurities. The filter can be removed and cleaned without disassembling the flow meter.

Measuring chamber of Zamak alloy is solid and durable.

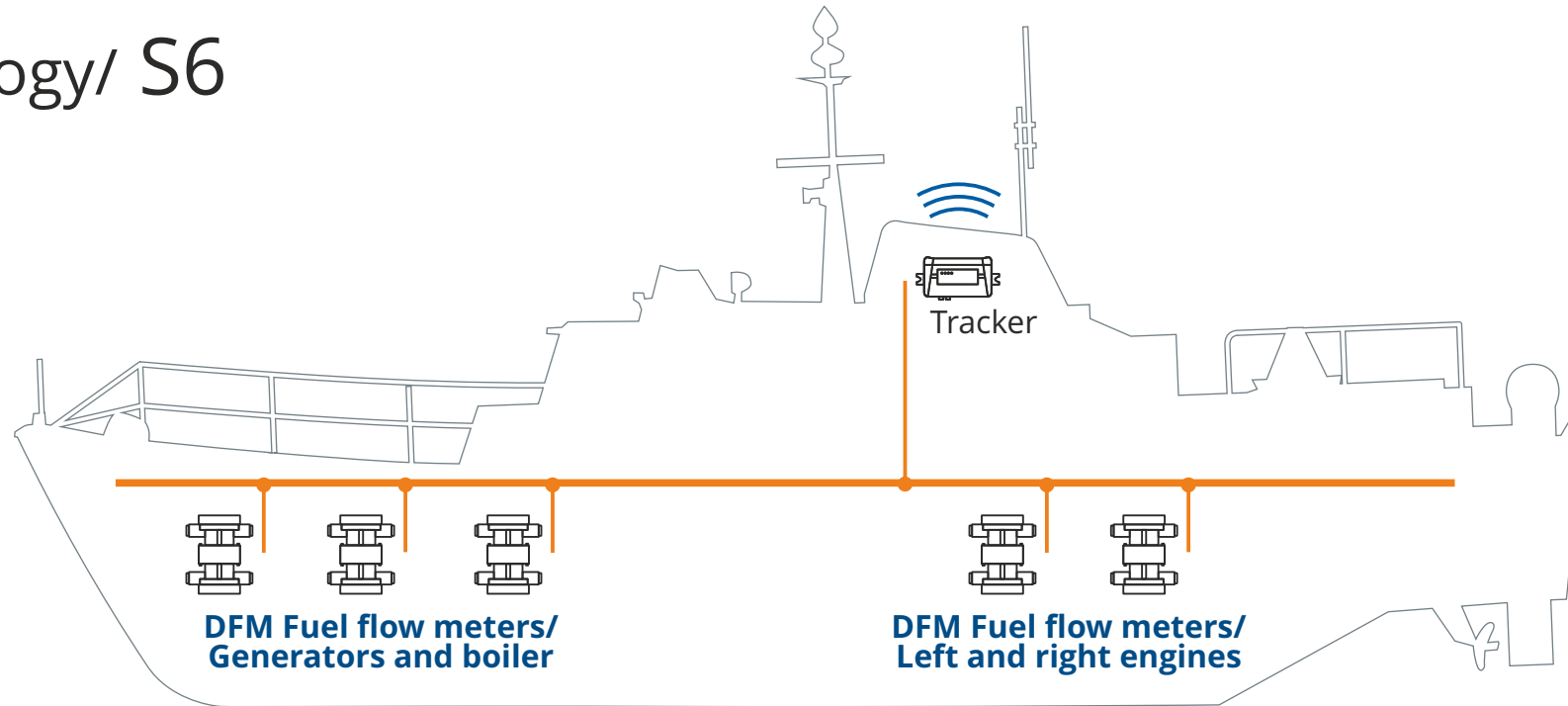
Operation principle



DFM utilizes positive displacement principle: fuel flowing through measuring chamber forces measuring ring to slide along the axis, each revolution of the ring is equal to a volume of displaced fuel. Ring revolutions are detected by flow meter's electronics and transformed into data counters.

Technology/ S6

S6



Up to 8 flow meters within a network – configuration and power supply from a single point

Effortless integration of flow meters, standard and additional sensors into a single network

All data is transferred over the cabling system to a single CAN-port of telematics unit

Technology/ IoT BURGER

Functional modules



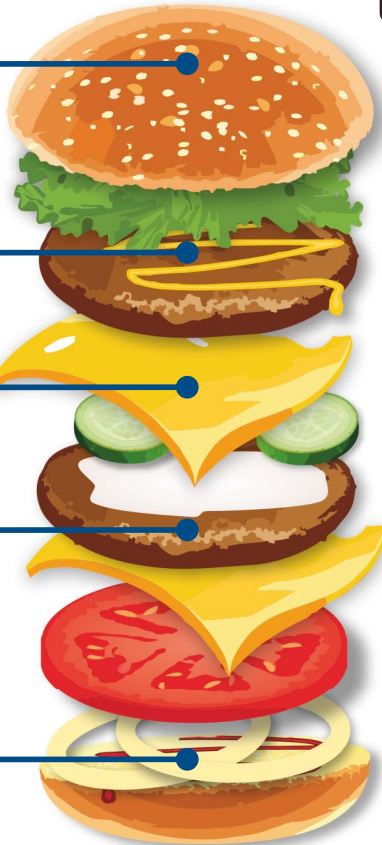
Self-diagnostics

Onboard clock

Flowmeter

Voltage supply monitoring

Battery



Advantages

“On-board” data processing decreases computing load on telematics unit

40+ Counters – saved in internal memory and transferred over CAN j1939/S6 interface

Detection of “Interference”, “Tampering”, “Ignition on/off” and other Events

Self-diagnostics and saving errors codes in Events Journal


Fuel consumption and engine operation time data – total and split by workload modes

Functionality/ Displayed data

- 1 Total Fuel Consumption Counter
- 2 Engine Operation Time Counter
- 3 Engine Operation Time in Optimal Mode Counter
- 4 Engine Operation Time in Optimal Mode Counter
- 5 Fuel Consumption in Tampering Mode
- 6 Interference Time Counter
- 7 Instant Fuel Consumption
- 8 Battery Charge in Percentage of the Maximum
- 9 Temperature in the Measuring Chamber
- 10 Total Negative fuel consumption counter (for differential flow meters)
- 11 Instant flow in feed chamber (for differential flow meters)
- 12 Instant flow in return chamber (for differential flow meters)
- 13 Total Fuel Consumption. Clearable Counter
- 14 Engine Operation Time. Clearable Counter



Functionality/ Event registration



Interference time	Interference text	Interference text	Interference time
19.05.2016 14:32:52	3022 7637 BA-2	Interference detected - Magnetic field	2016-05-19 14:32:55
19.05.2016 16:44:59	3022 7637 BA-2	Interference detected - Magnetic field	2016-05-19 16:45:02
20.05.2016 06:47:43	3022 7637 BA-2	Interference detected - Magnetic field	2016-05-20 06:48:33
20.05.2016 08:45:07	3022 7637 BA-2	Interference detected - Magnetic field	2016-05-20 08:45:09
24.05.2016 08:24:18	3022 7637 BA-2	Interference detected - Magnetic field	2016-05-24 08:24:22
24.05.2016 08:42:25	3022 7637 BA-2	Interference detected - Tampering	2016-05-24 08:42:27

Notifications:

- interference, tampering;
- ignition on/off, high/low power supply voltage.

Functionality/ Exposure protection



“Interference with magnet” – number and duration of attempts



“Tampering” – artificial flow volume and duration of tampering attempt

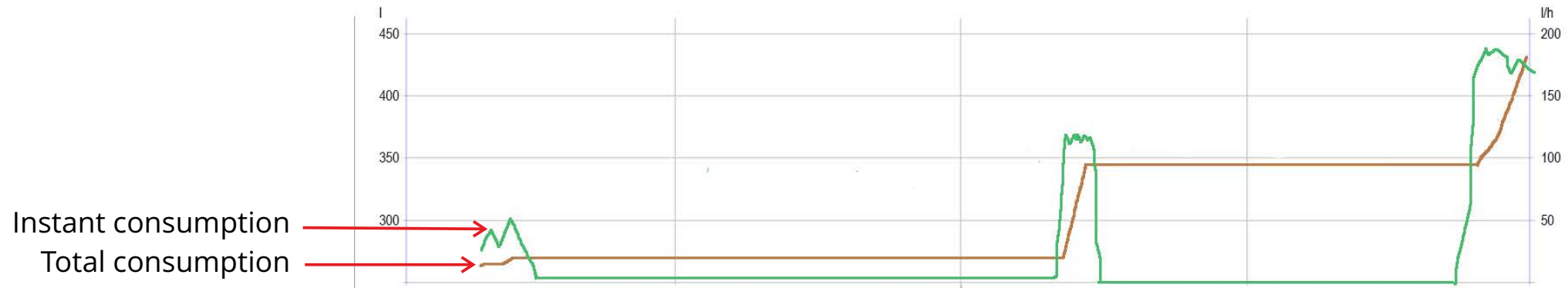


“Negative consumption” – artificial flow volume and flow duration through return chamber

These Counters are saved in internal memory of DFM and sent to tracking unit

View in telematics service

Graph of instant and total fuel consumption



Graph of instant fuel consumption and boundaries of operation modes



Interfaces/ Data set in various interfaces #1

Parameters processed by DFM	Parameters sent		
	DFM K	DFM 232/485	DFM CAN
1. Temperature	-	+	+
2. Low resolution total fuel consumption	-	+	+
3. Hourly fuel consumption rate	*	+	+
4. Engine Mode by Fuel Rate	-	**	+
5. High resolution total fuel consumption	-	**	+
6. High resolution total fuel consumption in Idle mode	-	**	+
7. High resolution total fuel consumption in Optimal mode	-	**	+
8. High resolution total fuel consumption in Overload mode	-	**	+
9. High resolution total fuel consumption in Cheat (Tampering) mode	-	**	+

* Only pulses, counted by external device

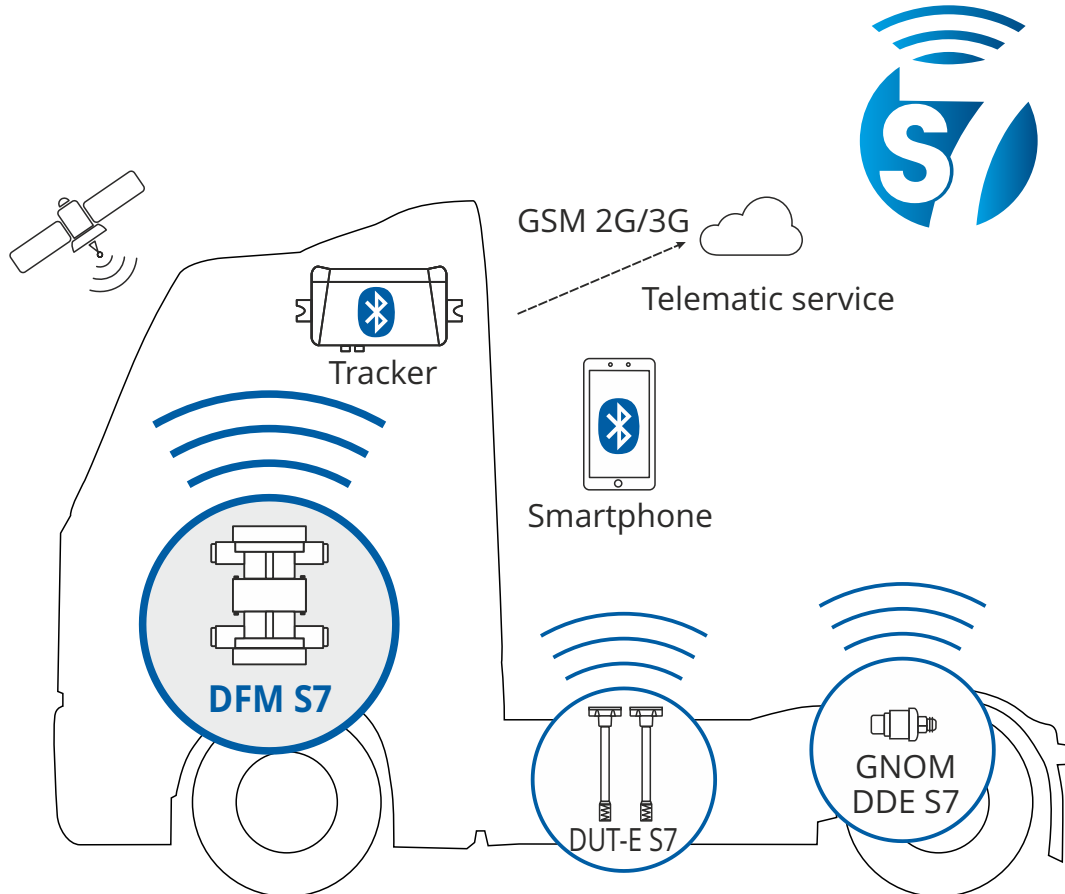
** Modbus protocol only

Interfaces/ Data set in various interfaces #2

Parameters processed by DFM	Parameters sent		
	DFM K	DFM 232/485	DFM CAN
10. Engine working time	-	-	+
11. Engine working time in Idle mode	-	**	+
12. Engine working time in Optimal mode	-	**	+
13. Engine working time in Overload mode	-	**	+
14. Engine working time in Cheat (Tampering) mode	-	**	+
15. Engine working time in Interference mode	-	**	+
16. Average Fuel Rate	-	-	+
17./18. Engine Mode by Fuel Rate feed/return chamber	-	-	+
19./20. High resolution total fuel flow feed/return chamber	-	-	+
21./22. Hourly fuel flow rate feed/return chamber	-	-	+
... 20 parameters more	-	-	+

** Modbus protocol only

Interfaces/ Wireless DFM S7



Using DFM S7 in telematics:

- Reduces installation and configuration time of telematics unit. Handy to use with objects, where cabling is difficult or too expensive.
- Allows driver to see data on smartphone to select optimal operation mode taking in account flow rate and to record fuel consumption and operation time in the end of the shift.
- Allows fleet technician to check flow rate data when carrying out diagnostics and repair of engine and fuel system.

Installation/ Selection according to type of high-pressure pump

Unit injector fuel system



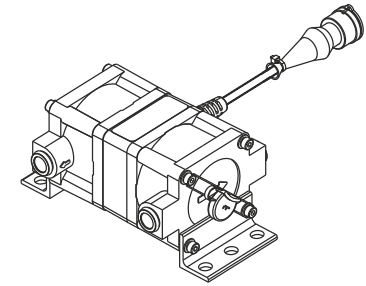
Common rail fuel system



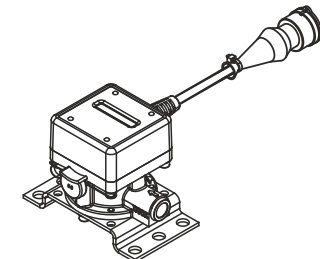
Jerk (inline) pump



Distributor pump



Differential
flow meter



One-chamber
flow meter



See video: "DFM Fuel Flow Meter
Installation"

Installation/ Mounting kit



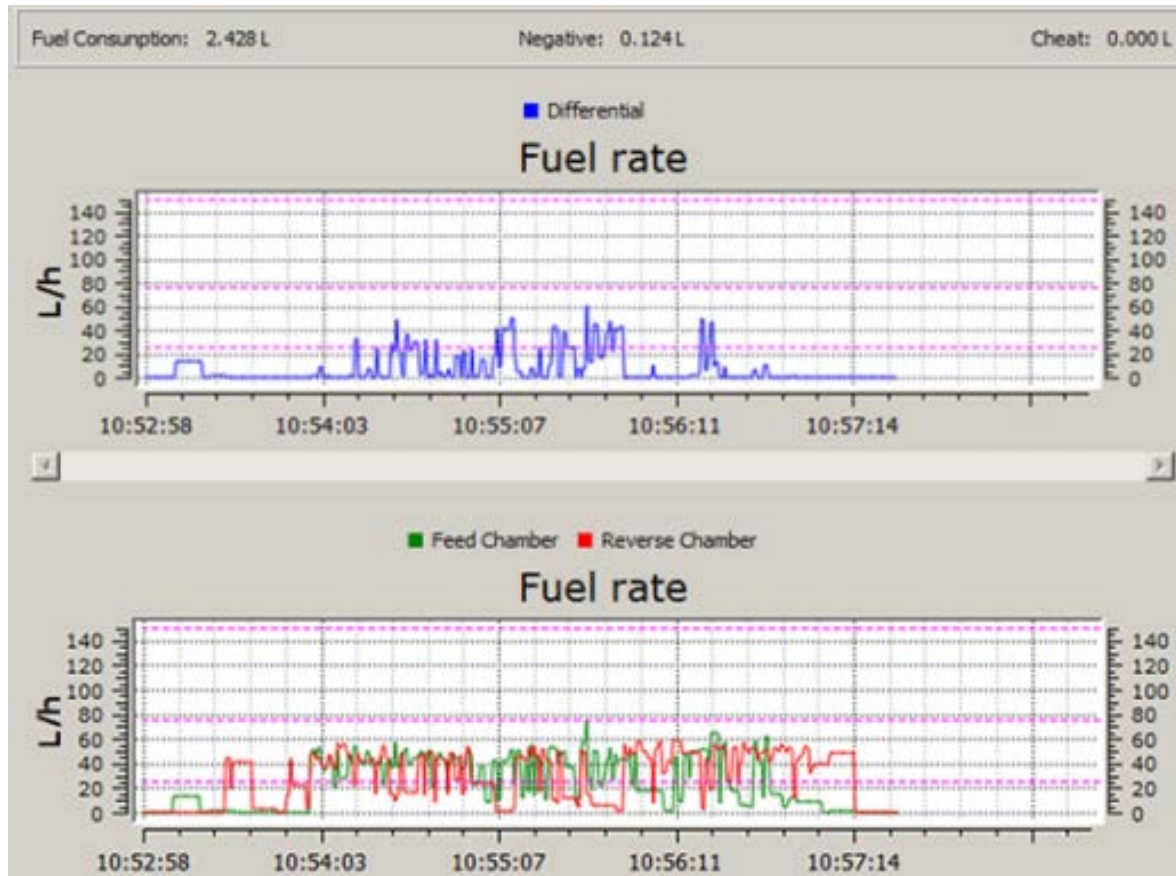
Clean of burrs and shavings – prevents from clogging and fuel system malfunction

Increased cross-section of elements – engine power remains as before installation

Made of high quality metals – significantly increases lifetime of mounting kit components

Each mounting kit has special valves – excluded engine malfunctions due to valve jam

Configuration/ Service software for PC

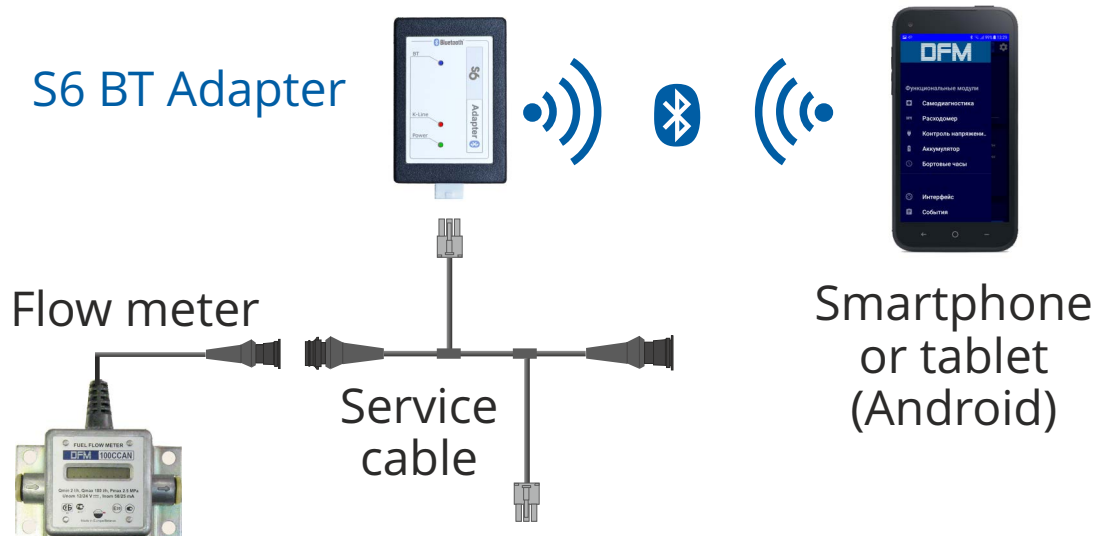
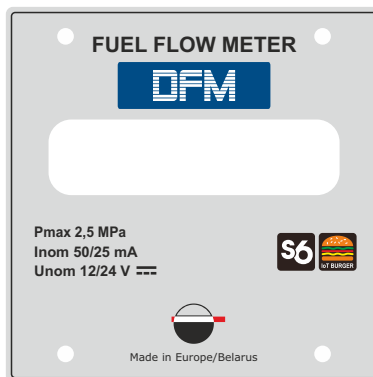


Configuring boundaries of operation modes – “Idle”, “Optimal”, “Overload”.

Real-time data view:

- Graph of instant flow rate in each chamber and differential consumption;
- Current values of total fuel consumption and in “Tampering” mode.

Configuration/ Via Bluetooth



DFM fuel flow meters can be configured over Bluetooth using smartphone or tablet. For that, S6 BT Adapter is used. Free mobile application "Service S6 DFM" can be downloaded from Google Play.

Configuration over Bluetooth is only available for flow meters marked with IoT Burger logo.

Guaranteed compatibility with telematics units

40+ compatibility declarations and configuration instructions
www.jv-technoton.com/compatibility/



Business cases/ Autonomous fuel consumption monitoring



On John Deere tractor



On MTZ tractor

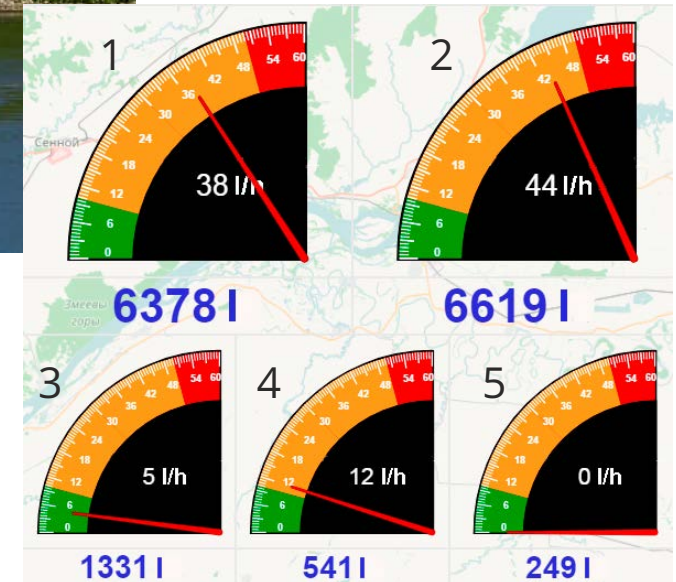


No subscription fee for telematics service.
Technical specialist sees data and records it in special journal (statement).

Business cases/ Fuel consumption monitoring in telematics

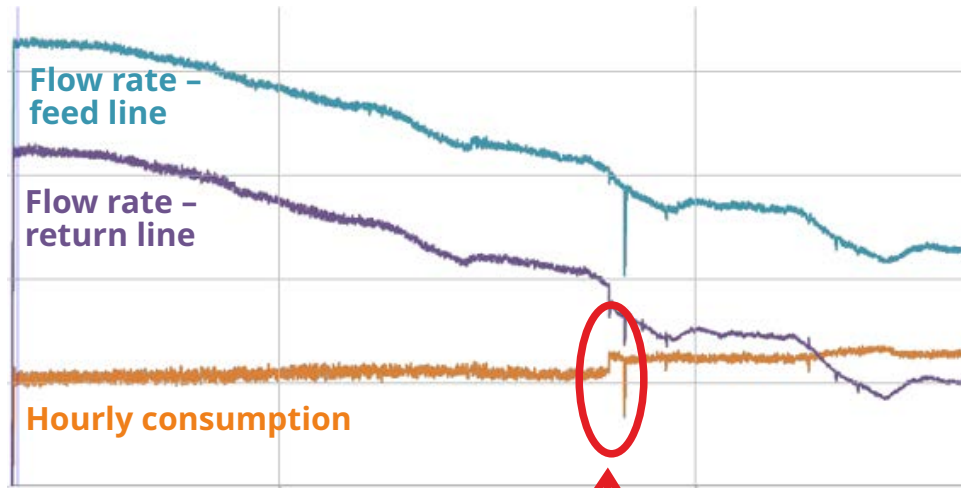


Hourly and total fuel consumption:
1 – left engine;
2 – right engine;
3 – main diesel generator;
4 – reserve diesel generator;
5 – boiler.

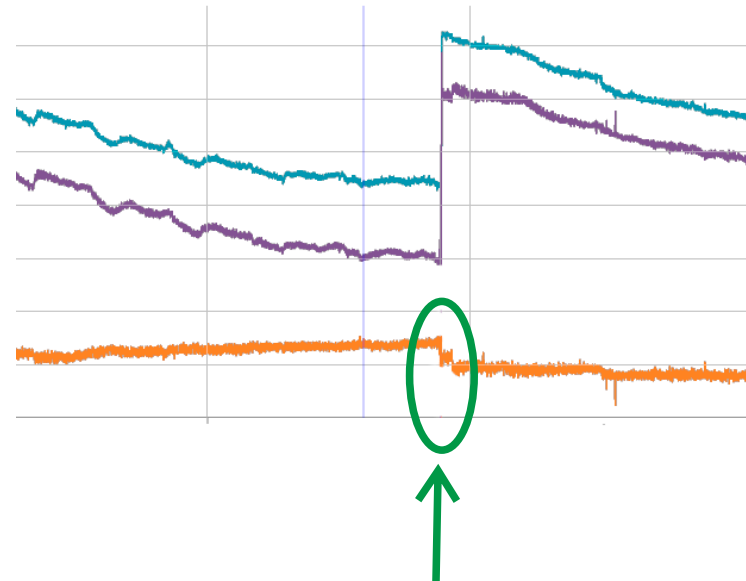


All data is clearly represented on virtual dashboard of ORF4 telematics service

Business cases/ Predictive maintenance



27% increase of hourly consumption.
It's time to change the filter!



Filter changed.
Consumption decreased by 43%!



Diesel-powered pump station. Instant flow rates in feed and return chamber is slowly decreasing. At some point, fuel consumption goes up sharply. After replacement of fuel filter, instant flow rates and hourly consumption rates went back to initial values.

Summary

- ✓ Provides accurate and detailed data on engine operation:
 - Fuel consumption – total and split by operation modes.
 - Operation time of engine/fuel pump, total and broken down by operation modes.

- ✓ Protected against interference into operation. Records Events and sends notifications to telematics unit containing duration and time of exposure occurrence.

- ✓ Up to 8 flow meters can be connected into a single network using S6 Technology.

- ✓ Measures fuel consumption and machinery operation time even without external power, stores data in internal memory.

Learn more

Official web-pages



www.jv-technoton.com

More about S6 Technology



rd-technoton.com

More about IoT Burger Technology



rd-technoton.com

Document center



www.docs.jv-technoton.com

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