










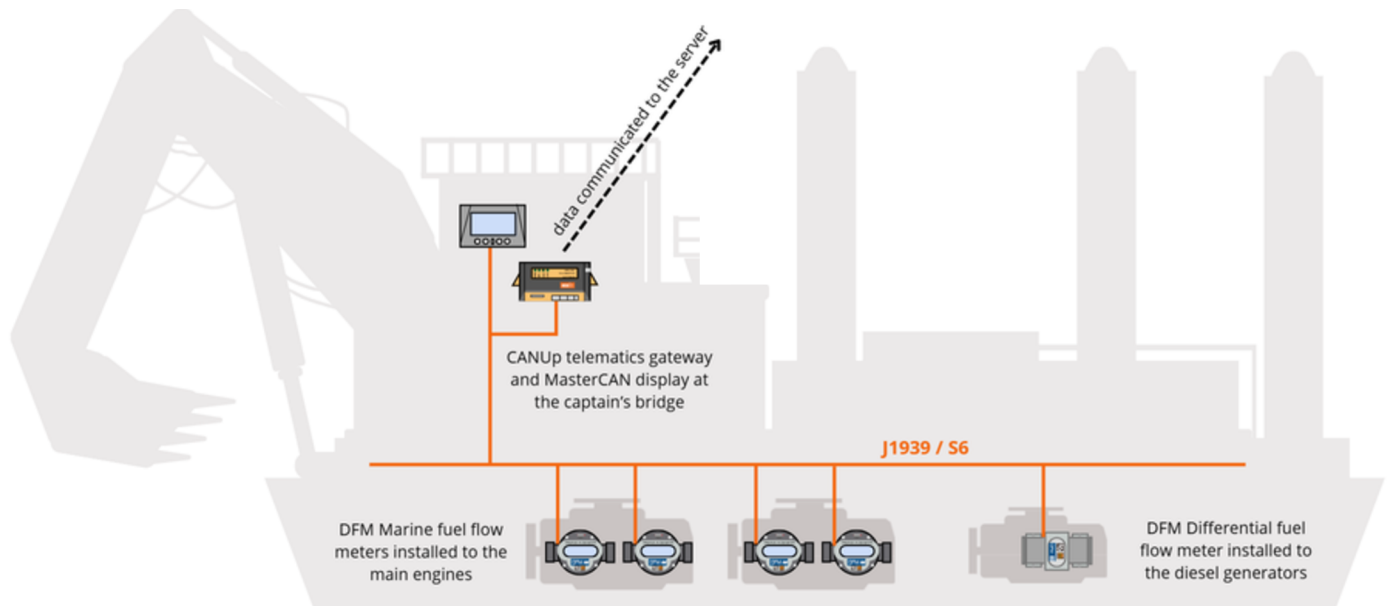
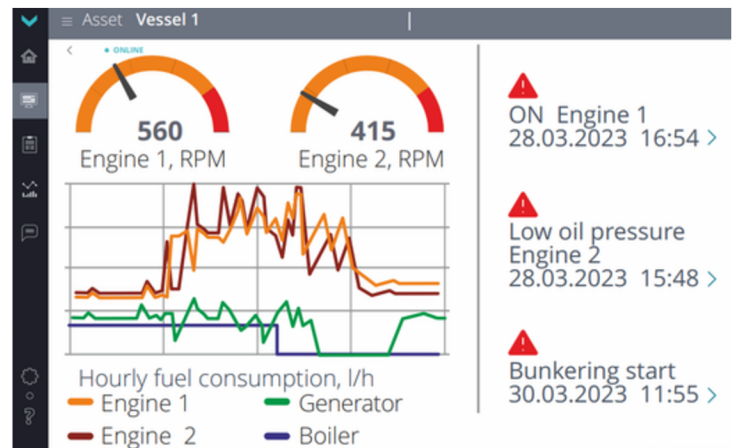
-  Fuel consumption monitoring for each engine
-  Operation time tracking, updating fuel norms
-  Prevention of the fuel theft from the main pipeline
-  Motion, location and course monitoring
-  CO2 emissions monitoring and reduction
-  Remote diagnostics, predictive maintenance
-  Control over engine performance parameter

Parameter monitoring

- ✓ Instant fuel consumption control - both for the vessels engines, and for the attached equipment
- ✓ Operation time of each fuel consumer in "Idling", "Normal load", "Overload" modes
- ✓ Engine RPM, temperature of liquids and other data from standard and additional sensors
- ✓ Calculation of CO2 emissions for each consumer, opportunity of its reduction
- ✓ Location, route and distance traveled

Event detection

- ✓ Flow meter consumption data tampering, exceeding engine RPM limit, boiler overheating
- ✓ Start/stop of engines, attached equipment on/off
- ✓ Event notification over SMS and e-mail





Online monitoring of fuel consumption by each engine



Maintenance according to real equipment condition



Monitoring operation time of each engine



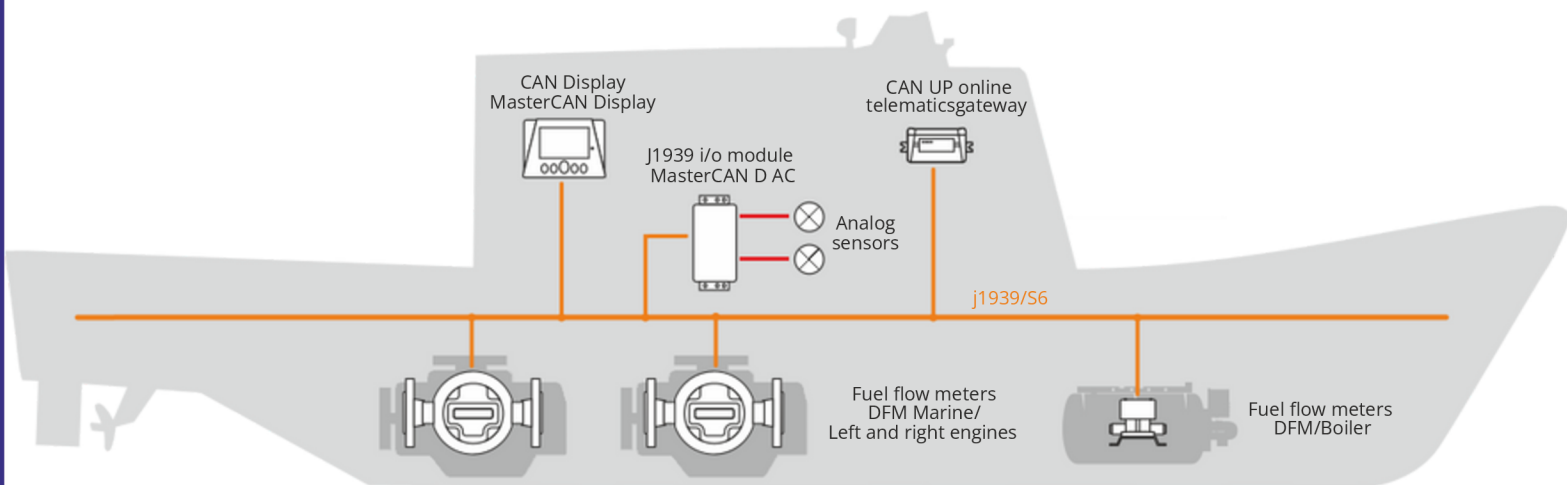
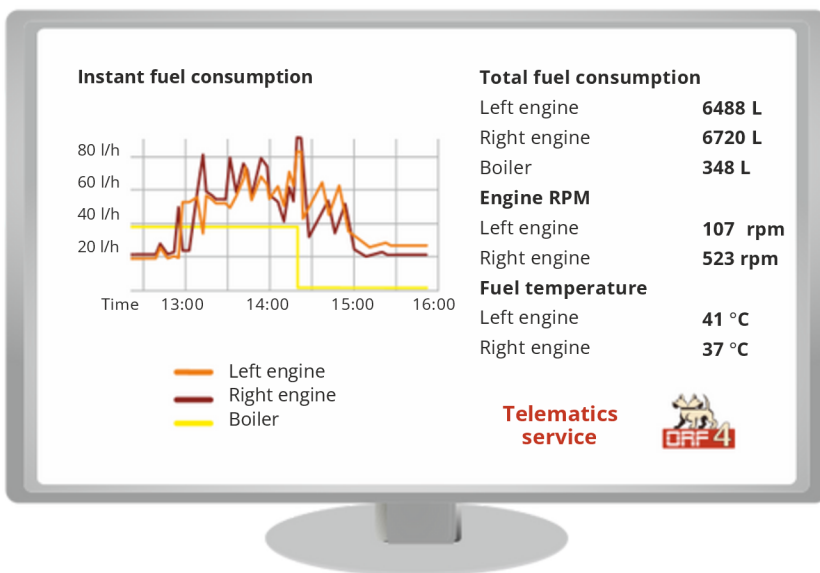
Updating fuel consumption quotas

Parameter monitoring







- Instant fuel consumption of left and right engines, boiler.
- Operation time of each fuel consumer in "Idling", "Normal load", "Overload" modes.
- Engine RPM, temperature of liquids and other data from standard and additional analog sensors.
- Location, route and distance traveled.

Event detection

- Start/stop of engines , lighting equipment on/off.
- Flow meter consumption data tampering, exceeding engine RPM limit, boiler overheating.
- Event notification over SMS and e-mail.





-  **Fuel consumption monitoring for each engine**
-  **Prevention of fuel theft from the main pipeline**
-  **Monitoring engine performance parameters**
-  **Updating fuel consumption norms**
-  **Bunkering monitoring**
-  **Location and course monitoring**

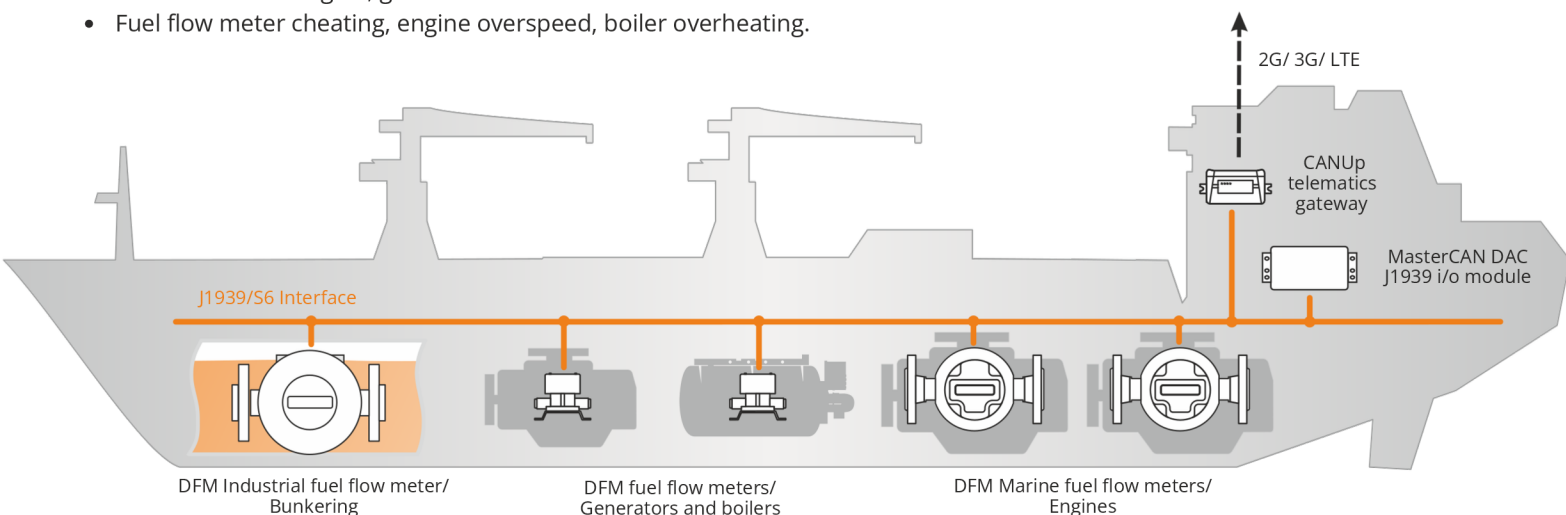
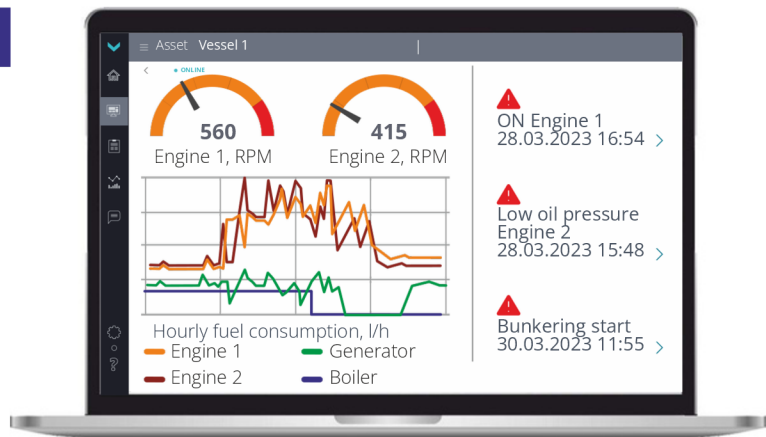
River cargo carriers

Operating parameters

- Hourly fuel consumption of engines, diesel generators, boilers.
- Operating time of each fuel consumer in "Idle", "Loading," and "Overload" modes.
- RPM, temperature of technical fluids, and other data from standard and additional sensors.
- Location, route, and travelled distance.
- Bunkering - duration and volume of received fuel.

Events

- On/off status of engine, generator and boiler
- Fuel flow meter cheating, engine overspeed, boiler overheating.



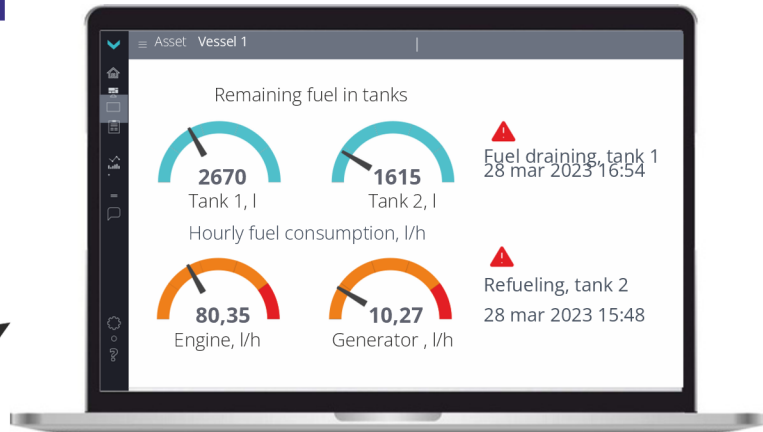
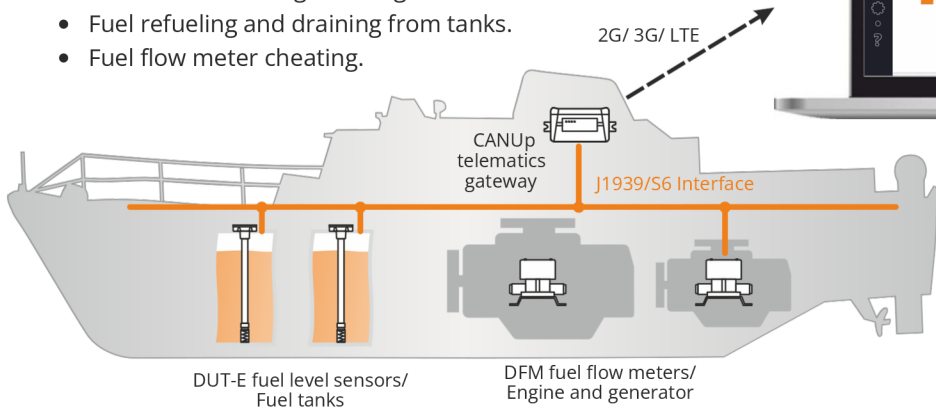
Tugboats, multcats, survey vessels

Operating parameters

- Hourly fuel consumption of engines, diesel generators.
- Operating time of each fuel consumer by modes.
- Fuel level and volume in tanks.
- Location, route, and traveled distance.

Events

- On/off status of engine and generator.
- Fuel refueling and draining from tanks.
- Fuel flow meter cheating.



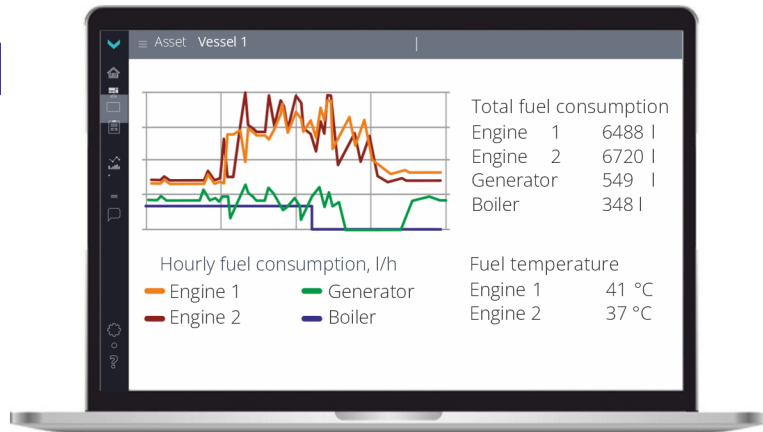
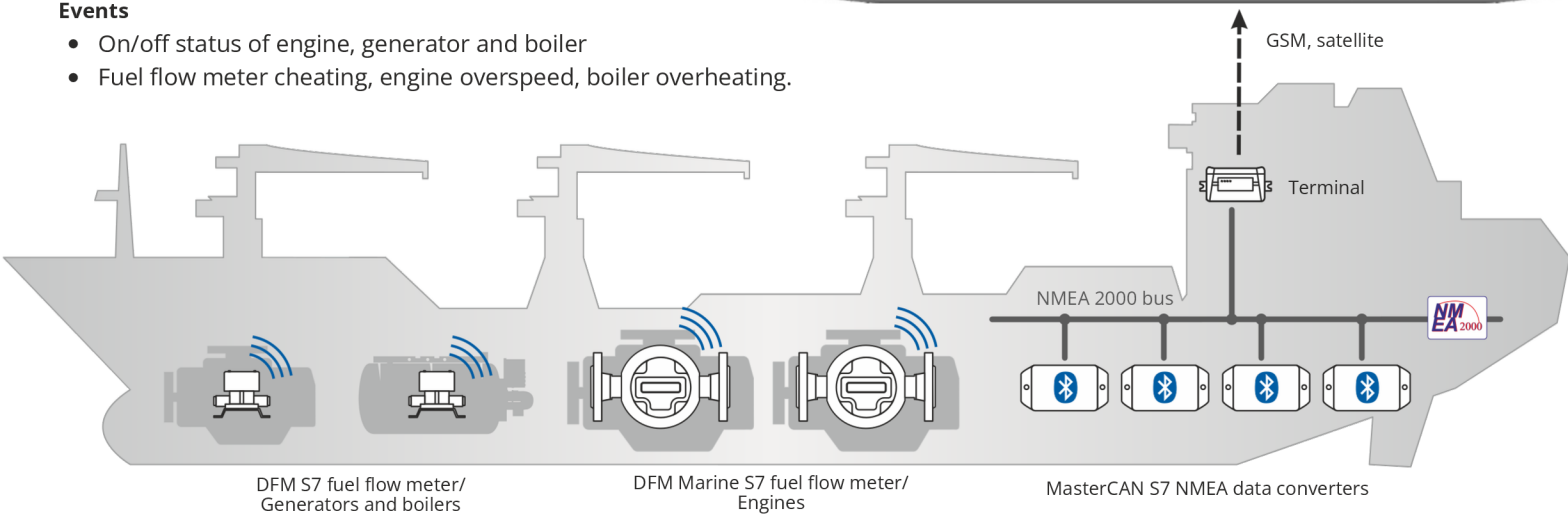
Marine transport vessels

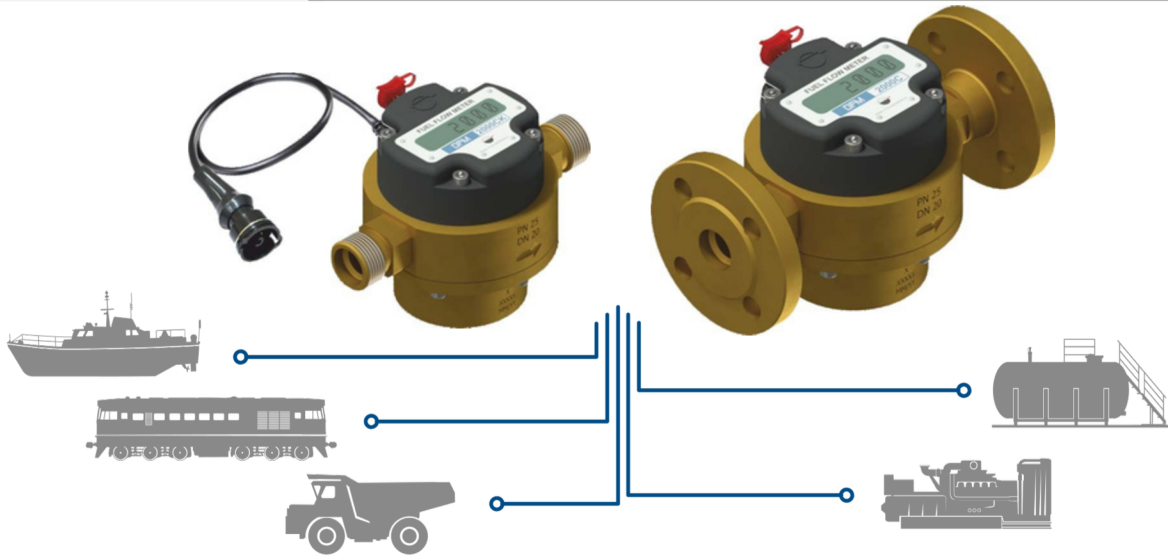
Operating parameters

- Hourly fuel consumption of engines, diesel generators, boilers.
- Operating time of each fuel consumer in "Idle", "Loading," and "Overload" modes.
- RPM, temperature of technical fluids, and other data from standard and additional sensors.
- Bunkering - duration and volume of received fuel.

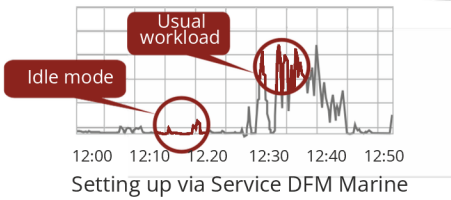
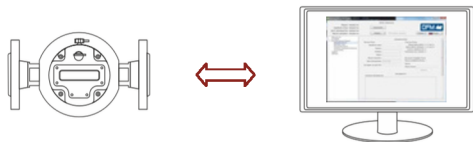
Events

- On/off status of engine, generator and boiler
- Fuel flow meter cheating, engine overspeed, boiler overheating.





DFM Marine measures engine fuel consumption and operating time of engines, boilers/burners, defining fuel consumption in different operation modes.



Diagnostics

- Instant fuel consumption chart
- Event log: tampering, interference, ignition ON/OFF, low/high level of supply voltage
- Fuel temperature
- Self-diagnostics code



Setting up

- Operation modes boundaries
- Temperature correction coefficient
- Switching on/off display of particular screens
- Units of measure: metric/us

Counters

Information shown on DFM Marine display:

- hourly fuel consumption;
- total fuel consumption;
- total operating time;
- engine operating time in idle mode;
- engine operating time in optimal mode; engine operating time in overload mode.

Digital interfaces contain fuel consumption data on **idle**, **optimal** and **overload** modes of engine.

Features

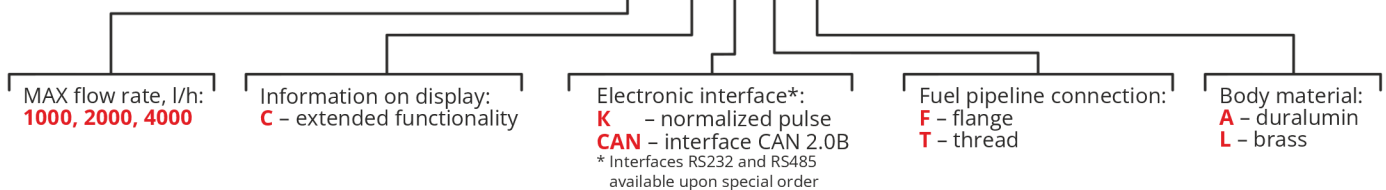
- Data transfer protocols SAE J1939 and NMEA 2000
- MAX pressure:
 - flange connection 25 bar
 - connection thread 16 bar
- Viscosity of working fluid 1,5 - 6,0 mm²/s (cSt)
- Operating temperature - 40 .. +60/150 °C *
- Measuring chamber material brass
- Inaccuracy rate** ± 0,5 %

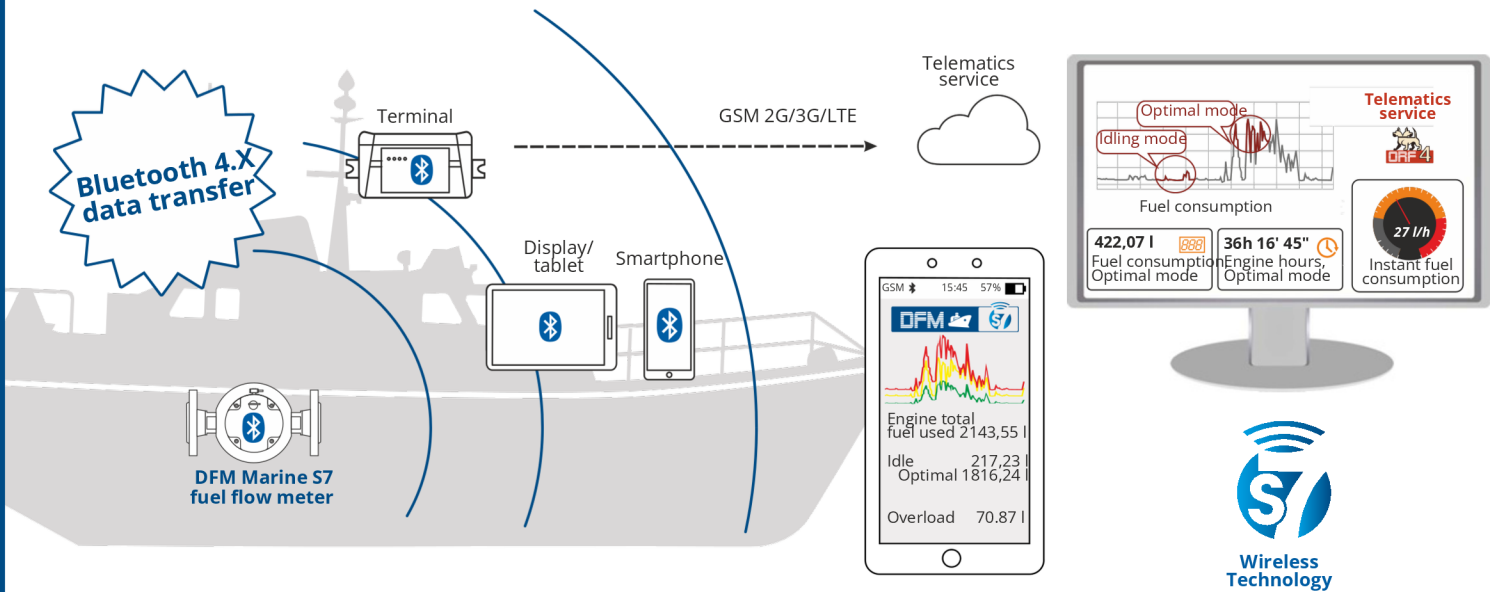
* Special model on request

** For fuel consumption up 50 L/h inaccuracy rate is possible up to ± 1%

Marking

DFM 4000 C K F A





New generation of DFM and DFM Marine flow meters for fuel consumption measurement and engine operation time tracking – data transfer over Bluetooth 4.X, easy connection to telematics unit, handy data check on smartphone display

Parameters and Counters

- instant fuel rate; total fuel consumption; total fuel consumption in "Idling", "Optimal", "Overload",
- "Tampering" engine operation modes;
- differential fuel consumption ;
- total operating time;
- total operating time in "Idling", "Optimal", "Overload" modes;
- operating time in "Tampering" and "Interference" modes;
- current engine operation mode as per fuel consumption rate;
- fuel temperature;
- battery charge.

Technical specification

| | |
|--|-------------------|
| Maximum fuel pressure | 25 bar |
| Signal transmission rang, cabin | 15 m |
| Signal transmission rang, line of sight | 45 m |
| Number of simultaneously connected receivers | not limited |
| Operating temperature | -40 ... +85 °C |
| Battery life | more than 5 years |
| Inaccuracy: | |
| - DFM S7 single chamber flow meters | ±0.5 – 1% |
| - DFM D S7 differential flow meters | ±1 – 3% |
| - DFM Marine S7 flow meters | ±0,5% |

Advantages

1. Easy flow meter data check when it's installed in hard-to-reach place of fuel system.
2. Quick installation without cabling.
3. Parallel data transfer to telematics unit and smartphone over Bluetooth Low Energy.
4. Fire- and explosion-safety of the meter.
5. Increased resistance to vandalism.



DFM S7 и DFM D S7 – fuel consumption measurement up to 600 l/h



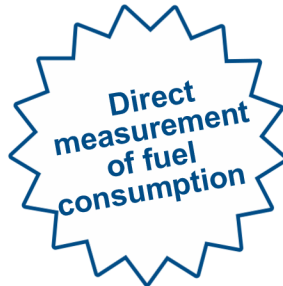
DFM Marine S7 – fuel consumption measurement up to 4000 l/h

Purpose

DFM flow meter – accurate tool for direct fuel consumption measurement and operation time monitoring of diesel engines, diesel generators, oil boilers and burners. Goals: monitoring of real fuel consumption; preventing fuel theft ; fuel consumption optimization; machine hours accounting.



Fuel flow meter with display



Parameters and Counters:

- hourly fuel consumption rate;
- operation by fuel rate;
- fuel temperature;
- total fuel consumption and engine operation time;
- fuel consumption in "Idle", "Optimal", "Overload" modes;
- total fuel consumption – feed and reverse chamber (differential flow meter).
- engine operation time in "Idle", "Optimal", "Overload" modes;
- fuel consumption and operation time in "Tampering" mode;
- operation time in "Interference" mode.



Differential fuel flow meter

Exceptional features:

- inbuilt battery – data recording without external power supply; configuration over Bluetooth; inbuilt mud filter – additional protection of measuring chamber;
- Event recognition:
 - μ cheating (tampering) fuel consumption counter,
 - μ interference time into operation of flow meter's,
 - μ high/low level of supply voltage,
 - μ ignition on/off.
- thermal correction feature.



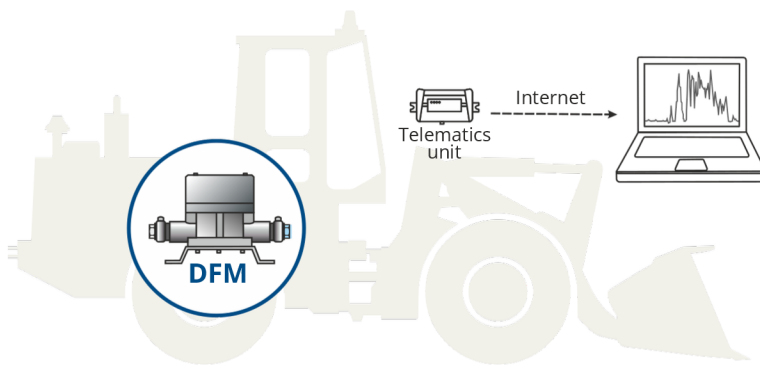
Field of application:

- < GPS vehicle tracking;
- < industrial monitoring systems;
- < engine fuel system diagnostics;
- < "predictive maintenance" – technical maintenance

according to condition of engine and fuel system.

Machinery:

- < tractors, harvesters and other agri- machinery;
- < bulldozers, graders and similar road-building machinery;
- < special machinery – rig drilling vehicles, steam generation vehicles, etc.;
- < railroad machines;
- < diesel gensets, boilers, burners.



Models

| Model | One-chamber, l/h | | Differential, in each chamber, l/h | | Electronic interface: |
|----------------|------------------|---------------|------------------------------------|---------------|---|
| | MIN fuel rate | MAX fuel rate | MIN fuel rate | MAX fuel rate | |
| DFM 50 | 1 | 50 | – | – | 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) |
| DFM 100 | 2 | 100 | 10 | 100 | |
| DFM 250 | 5 | 250/350* | 50 | 250/300* | |
| DFM 500 | 10 | 500/600* | 100 | 500/600* | |

*HP– high performance version, increased MAX fuel rate

Technologies:

