Smart & Simple Telematics

Turnkey solutions
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MECHATRONICS
innovative sensors
and telematics systems
Mechatronics develops a wide model range of sensors for such telematic applications as fuel consumption monitoring, onboard weighing systems, cold-chain control, etc. Mechatronics’ solutions are easily integrated into fleet management systems, remote monitoring platforms and IoT networks.

The company strives for best quality both of products and technical support. We are proud to have ISO 9001-2008 certificates. Our devices are easy to install and maintain. Also we provide free training for technical and commercial personnel. Mechatronics has a wide network of partners in more than 80 countries worldwide.

Contents

- Fuel consumption monitoring ..........2
- Car tracking ..................................3
- GPS fleet tracking: trucking ..........4
- GPS fleet tracking: special machinery ..........6
- Remote monitoring of agricultural vehicles ..........7
- Driver identification .........................8
- Railroad locomotives tracking ..........9
- Sea and river vessel remote monitoring ..........10
- Fuel delivery monitoring ..........11
- Fuel distribution control ..........12
- Fuel storage monitoring ..........13
- Data acquisition without GSM coverage ..........14
- Event-based video recording ..........15
- Industrial applications ..........16
How to choose fuel consumption sensor

Our main focus — remote fuel consumption monitoring. Mechatronics is the only company that develops and manufactures three types of fuel consumption sensors. The choice of the appropriate sensor depends on the object where it should be installed.

Vehicle list from customer

Tank shape is symmetric, inclination angles are not big? (Yes/No)

Capacitive fuel level sensor can be installed? (Yes/No)

Diesel fuel? (Yes/No)

EuroSens Delta

EuroSens Dizzi

EuroSens Dominator

Choosing suitable fuel sensor
Fuel consumption monitoring
trucks and buses

Fuel level sensors
EuroSens Dominator
- automotive design and accessories
- fuel theft alarm
- modular design
- easy maintenance

<table>
<thead>
<tr>
<th>No.</th>
<th>Day</th>
<th>Spent on the Fuel level sensor</th>
<th>Mileage for all messages</th>
<th>First level</th>
<th>End level</th>
<th>Total refueling</th>
<th>Total sinks</th>
<th>Filled</th>
<th>Theft</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2019-11-11</td>
<td>25.11 l</td>
<td>11.19 km</td>
<td>73 l</td>
<td>131 l</td>
<td>1</td>
<td>0</td>
<td>83 l</td>
<td>0 l</td>
</tr>
<tr>
<td>2</td>
<td>2019-11-12</td>
<td>73 l</td>
<td>66 km</td>
<td>131 l</td>
<td>58 l</td>
<td>0</td>
<td>0</td>
<td>0 l</td>
<td>0 l</td>
</tr>
<tr>
<td>3</td>
<td>2019-11-13</td>
<td>1.57 l</td>
<td>0.53 km</td>
<td>58 l</td>
<td>56 l</td>
<td>0</td>
<td>0</td>
<td>0 l</td>
<td>0 l</td>
</tr>
<tr>
<td>4</td>
<td>2019-11-14</td>
<td>0 l</td>
<td>0.00 km</td>
<td>56 l</td>
<td>56 l</td>
<td>0</td>
<td>0</td>
<td>0 l</td>
<td>0 l</td>
</tr>
<tr>
<td>5</td>
<td>2019-11-15</td>
<td>40.04 l</td>
<td>18.33 km</td>
<td>56 l</td>
<td>100 l</td>
<td>1</td>
<td>0</td>
<td>84 l</td>
<td>0 l</td>
</tr>
</tbody>
</table>

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Fuel consumption monitoring
agricultural and special machinery

Non-symmetric fuel tanks, uneven road surface

Fuel flow meters
EuroSens Delta

- high precision
- insensitivity to interferences and road conditions
- easy installation and maintenance

<table>
<thead>
<tr>
<th>Nº</th>
<th>Day</th>
<th>Distance</th>
<th>Fuel consumed</th>
<th>Avg distance per 1 liter</th>
<th>Max speed</th>
<th>Time in movement</th>
<th>Stops</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2018-06-01</td>
<td>60 km</td>
<td>55 l</td>
<td>1.09 km</td>
<td>43 km/h</td>
<td>3:26:48</td>
<td>11:14:41</td>
</tr>
</tbody>
</table>
Fuel consumption monitoring

cars

Safe connection to the CAN bus of a vehicle. Remote monitoring of fuel consumption and other parameters: rpm, speed, seat belts, coolant and oil temperature and etc.

Cars without CAN bus

Eurosens Dock — vehicle fuel sensor's data improver

We cannot retrofit a capacitive level sensor inside the tank as there is not enough space for that. But we can improve data of vehicle float type sensor with Eurosens Dock device.
GPS fleet tracking
trucking and cold chain solution

Fuel consumption monitoring

Fuel level sensors
**Eurosen Dominaor**
- automotive design and accessories
- fuel theft alarm
- modular design
- easy maintenance

Cold chain monitoring

**Wireless temperature sensors Eurosen DTS RF**
- 1 year battery life
- no cabling inside cold compartments
Cargo weight and axle load monitoring

Onboard weighing system **Eurosens Difference**

- Individual axle load measurement for truck and trailer
- Cargo weight calculation
- Axle overload alarm
- Shows axle load and cargo weight on the driver’s display
- Axle load and cargo weight data transmission to the GPS tracking system

**Cargo weight data**

**Installation of the axle load sensor**
Waste truck monitoring solution

Waste truck monitoring solution

Tilt angle sensor Eurosens Degree

Wireless tilt angle sensor Eurosens Degree BT

Eurosens Degree tilt angle sensor is used as a part of GPS tracking system to detect the position of manipulator’s arm.

Hydraulic telemetry with oil pressure sensors

Hydraulic pressure and manipulator position allows to count the number of loaded waste containers and their weight.

<table>
<thead>
<tr>
<th>Nº</th>
<th>Event</th>
<th>Start</th>
<th>End</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Container</td>
<td>2018-06-01 06:40:40</td>
<td>2018-06-01 06:40:41</td>
<td>Vaneeva, 40, Minsk, Belarus</td>
</tr>
<tr>
<td>2</td>
<td>Container</td>
<td>2018-06-01 06:59:24</td>
<td>2018-06-01 06:59:29</td>
<td>Karla Markska 12a, Minsk, Belarus</td>
</tr>
<tr>
<td>3</td>
<td>Container</td>
<td>2018-06-01 06:59:49</td>
<td>2018-06-01 06:59:53</td>
<td>Karla Markska 12a, Minsk, Belarus</td>
</tr>
<tr>
<td>4</td>
<td>Container</td>
<td>2018-06-01 07:00:41</td>
<td>2018-06-01 07:00:45</td>
<td>Karla Markska 12a, Minsk, Belarus</td>
</tr>
<tr>
<td>5</td>
<td>Container</td>
<td>2018-06-01 07:01:15</td>
<td>2018-06-01 07:01:19</td>
<td>Karla Markska 12a, Minsk, Belarus</td>
</tr>
<tr>
<td>6</td>
<td>Container</td>
<td>2018-06-01 07:01:21</td>
<td>2018-06-01 07:01:25</td>
<td>Karla Markska 12a, Minsk, Belarus</td>
</tr>
<tr>
<td>7</td>
<td>Container</td>
<td>2018-06-01 07:01:49</td>
<td>2018-06-01 07:01:53</td>
<td>Karla Markska 12a, Minsk, Belarus</td>
</tr>
<tr>
<td>8</td>
<td>Container</td>
<td>2018-06-01 07:01:39</td>
<td>2018-06-01 07:05:44</td>
<td>Komsomolskaya 38, Minsk, Belarus</td>
</tr>
</tbody>
</table>

Wireless sensor Eurosens Degree BT can be used as a standalone device. It has onboard memory and you can download the log of manipulator’s actions (date, time, event) to your smartphone.
Waste container monitoring solution

Monitor the waste level in containers remotely with Eurosens LDS optical distance sensor

- effective route planning
- built-in battery
- wireless communication module

**Eurosens LDS-GSM:**
Quectel GSM module

+ Common GSM networks
  - Weak power efficiency. 0.5 year battery life

**Eurosens LDS-IOT:**
Quectel IOT module

+ Great power efficiency, 1 year battery life
  - GSM-IOT network is needed

**Eurosens LDS-LoRa:**
built-in LoRa module

+ Great power efficiency, 1 year battery life
  - Works as a node of LoRa network

Optical measurement improves reliability
Smart event detection
Fuel storage monitoring with Eurosens Monitor

We developed special software for local fuel storage monitoring:
Eurosens Monitor

- the maximum number of tanks — 32
- fuel flow meters and RFID-readers can be integrated for fuel distribution reports
- the data can be forwarded to the cloud service Wialon by Wialon IPS protocol
- event-based video recording to prevent unauthorized fuel distribution
- software can be further customized to the customer’s needs

We offer services of 3D tank reconstruction for tank calibration
Special sensors for liquid monitoring solutions

**Eurosen Dominator capacitive level sensor**
Is used to measure different types of fuel: diesel, gasoline, low viscous oil, water (special version), Tank’s height is up to 10 meters.

**Eurosen MWS contactless sensor**
Can be used for any liquid measurement (food, aggressive chemicals) in the tanks up to 2 meter height. Does not require drilling for plastic tanks.

**Eurosen Dizzi contactless sensor**
Is used for non-invasive liquid level measurement in tanks with up to 5 mm thickness. Does not require drilling. Can measure LPG level.
Driver, trailer and equipment identification and tracking

Euro sens Dot track bluetooth beacon with built-in accelerometer. Can be used for agricultural machinery and trailers identification. Any types of bluetooth devices can be used as beacons to identify person or equipment.

Example of the report

<table>
<thead>
<tr>
<th>Driver</th>
<th>Start</th>
<th>End</th>
<th>Period</th>
<th>Distance</th>
<th>Fuel consumed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gilevich</td>
<td>2016-01-20 08:02:18</td>
<td>2016-01-20 07:56:18</td>
<td>2 days 23:47:40</td>
<td>1827 km</td>
<td>508 l</td>
</tr>
<tr>
<td>Scania r730</td>
<td>2016-01-18 00:01:52</td>
<td>2016-01-20 07:56:18</td>
<td>2 days 7:54:26</td>
<td>1319 km</td>
<td>414 l</td>
</tr>
<tr>
<td>Ivanov</td>
<td>2016-01-18 00:04:20</td>
<td>2016-01-19 23:59:59</td>
<td>1 day 23:51:21</td>
<td>1135 km</td>
<td>364 l</td>
</tr>
<tr>
<td>Scania r730</td>
<td>2016-01-19 08:00:00</td>
<td>2016-01-19 23:59:59</td>
<td>15:59:59</td>
<td>586 km</td>
<td>176 l</td>
</tr>
<tr>
<td>Volvo FH16</td>
<td>2016-01-19 00:04:20</td>
<td>2016-01-19 07:55:42</td>
<td>1 day 7:51:22</td>
<td>549 km</td>
<td>187 l</td>
</tr>
<tr>
<td>Kveten</td>
<td>2016-01-18 00:01:36</td>
<td>2016-01-20 23:59:54</td>
<td>2 days 23:58:18</td>
<td>1558 km</td>
<td>523 l</td>
</tr>
<tr>
<td>Lazarev</td>
<td>2016-01-18 00:03:40</td>
<td>2016-01-19 23:55:44</td>
<td>1 day 23:47:22</td>
<td>334 km</td>
<td>112 l</td>
</tr>
</tbody>
</table>

Identification of the tractor attached implements

<table>
<thead>
<tr>
<th>N°</th>
<th>Start</th>
<th>End</th>
<th>Period</th>
<th>Attachment</th>
<th>Fuel consumed</th>
<th>Tractor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2016-03-10 16:10:25</td>
<td>2016-03-10 19:53:46</td>
<td>3:43:21</td>
<td>Harrow Degelman</td>
<td>158 l</td>
<td>JD 8335RT 4573</td>
</tr>
<tr>
<td>2</td>
<td>2016-03-10 16:10:59</td>
<td>2016-03-10 19:53:48</td>
<td>3:42:49</td>
<td>Harrow Degelman</td>
<td>121 l</td>
<td>JD 8335RT 4574</td>
</tr>
<tr>
<td>5</td>
<td>2016-03-12 11:47:21</td>
<td>2016-03-12 14:13:35</td>
<td>2:26:14</td>
<td>Harrow Degelman</td>
<td>100 l</td>
<td>JD 8335RT 4574</td>
</tr>
<tr>
<td>8</td>
<td>2016-04-06 10:44:27</td>
<td>2016-04-07 00:59:17</td>
<td>14:14:50</td>
<td>Seed drill JD DB-044</td>
<td>261 l</td>
<td>JD 8335RT 4574</td>
</tr>
</tbody>
</table>
Railroad locomotives tracking
and fuel consumption control

Listed sensors can be used:
- fuel flow meters, fuel level sensors
- oil and coolant temperature sensors
- fuel and oil pressure sensors
- rpm sensor
- voltage and current sensor of electric transmission
- brake air pressure sensor

Remote monitoring system for railroad locomotive can be flexibly configured:
from basic features of the fuel consumption monitoring to the advanced engine and transmission performance monitoring
Sea and river vessel remote monitoring

Remote monitoring of sea and river vessels can be flexibly configured. Main focus is individual fuel consumption monitoring of each engine onboard.

Examples of the solution

- real engine fuel consumption, fuel temperature — with fuel flow meters **Euro sens Direct** and **Delta**
- fuel fillings and fuel theft monitoring — with fuel level sensors **Euro sens Dominator**
- motor-hours monitoring for each engine: in movement, during stops, time of heater operation
- automatic trip time calculation, vessel’s downtime
- instant fuel consumption and engine rpm monitoring for each engine
- shows vessel’s current position on the map, movements history
- geozone entrance and exit alarm

**Euro sens** sensors are compatible with **NMEA2K** data bus and can be used in a cooperation with modern marine electronics such as fishfinders, sensors
Euro sens Display + Euro sens Direct 1500
Fuel consumption monitoring of mining trucks
GPS tracking: fuel delivery monitoring

- current position, history of movement, speed of tanker truck
- fuel movement — refilling and discharges, place, time and volume of the events
- place and time of hatch openings
- tanker truck fuel consumption monitoring
Fuel distribution monitoring

**Before:**
fuel bulk dispenser with mechanical counter

**After:**
mechanical counter is replaced by electronic module with driver identification and dispatch control

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**Sample fuel distribution report**

<table>
<thead>
<tr>
<th>Data</th>
<th>Volume before</th>
<th>Income</th>
<th>Outcome</th>
<th>Volume after</th>
<th>sensor</th>
<th>Driver</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>27.09.2017 8:30:09</td>
<td>4685,2</td>
<td>179</td>
<td></td>
<td>4628,7</td>
<td>TPK</td>
<td>General</td>
<td>Sevastopol, Gagarinski okrug, voennyh stroitelei</td>
</tr>
<tr>
<td>27.09.2017 8:37:09</td>
<td>4619,2</td>
<td>100</td>
<td></td>
<td>4619,2</td>
<td>TPK</td>
<td>General</td>
<td>Sevastopol, Gagarinski okrug, voennyh stroitelei</td>
</tr>
<tr>
<td>27.09.2017 8:49:55</td>
<td>4609,8</td>
<td>200</td>
<td></td>
<td>4440,5</td>
<td>TPK</td>
<td>20 t Kamaz A3478X</td>
<td>Sevastopol, Gagarinski okrug, voennyh stroitelei</td>
</tr>
<tr>
<td>27.09.2017 9:14:05</td>
<td>4412,2</td>
<td>50</td>
<td></td>
<td>4384,1</td>
<td>TPK</td>
<td>General</td>
<td>Sevastopol, Gagarinski okrug, voennyh stroitelei</td>
</tr>
<tr>
<td>27.09.2017 9:41:10</td>
<td>4365,4</td>
<td>150</td>
<td></td>
<td>4262,1</td>
<td>TPK</td>
<td>Loader LT A997</td>
<td>Sevastopol, Gagarinski okrug, voennyh stroitelei</td>
</tr>
</tbody>
</table>

**Total:** 0 679
Data acquisition without GSM coverage

Eurosenst Digistone — Data logger with Wi-Fi connectivity, CAN bus interface, HDMI display support and event-based video recording

**Accessories**

<table>
<thead>
<tr>
<th>HDMI-display</th>
<th>IP-camera</th>
<th>Eurosenst Delta CAN</th>
<th>Eurosenst Dominator CAN</th>
<th>InCan reader</th>
</tr>
</thead>
</table>
Event-based video recording

Each important event in the monitoring system (speeding, fuel fillings and thefts, door opening, leaving the geofences, etc.) will correspond to the recorded video fragment with specified duration. The video will include a predefined time interval before the event.

Example: record fuel theft in fuel storages

Example: video with vehicle identification number will be recorded as soon as the platform scales register weighing process. Weight information and video will come together to the manager who will check the weighing process.
GSM base station monitoring solution

Euro sens Modem + 433 MHz alarm sensors

Features:

- Best solution for remote tank monitoring.
- Reads up to 4 discrete alarm sensors by wireless 433 MHz EV1527 protocol (door opening sensor, smoke sensor, flooding sensor etc).
- Compatible with Mechatronics cloud platform MeOT or other IOT server software (MQTT protocol support is necessary).
EuroSens Armlog

Onboard weighing system **EuroSens Armlog** performs an advanced monitoring of the hydraulic system and manipulator’s arm position. Calculates the weight of the cargo being lifted.

<table>
<thead>
<tr>
<th>Technical data</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Power voltage, V</td>
<td>9...32</td>
</tr>
<tr>
<td>Number of angle sensors</td>
<td>1...2</td>
</tr>
<tr>
<td>Temperature range, °C</td>
<td>-40...+85</td>
</tr>
<tr>
<td>Data output interface</td>
<td>RS485</td>
</tr>
<tr>
<td>Interface for pressure sensors</td>
<td>0-10V, RS485</td>
</tr>
<tr>
<td>Number of pressure sensors</td>
<td>1...2</td>
</tr>
<tr>
<td>Sensors polling interval, ms</td>
<td>50</td>
</tr>
</tbody>
</table>

Can be used as an onboard weighing system for front loaders, manipulator trucks, waste trucks.

- Pressure sensors must be installed in the hydraulic system to monitor oil pressure.
- Angle sensors are installed on the arms of manipulator to monitor their position.
- After EuroSens Armlog installation, the system starts collecting data. Based on the data received, our developers create an event profile to adopt the system for a given vehicle.
- To work in a cargo weighing mode, the system needs to be calibrated.
- Onboard weighing during low outdoor temperatures may require the installation of extra sensors to correct oil viscosity changes.
- It is possible to use already installed onboard pressure sensors.
- System can be customized by customer’s request.

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