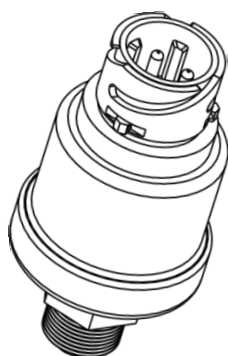
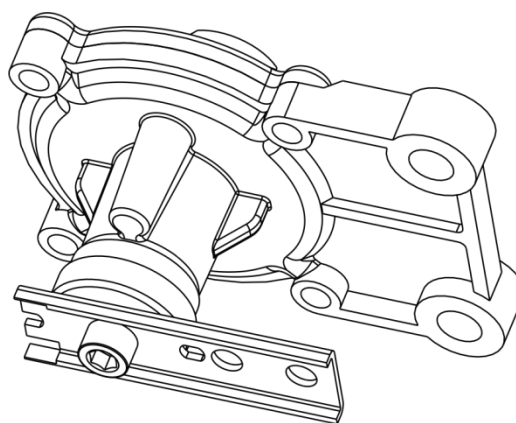




## **AXLE LOAD SENSOR**



**GNOM DDE**



**GNOM DP**

## **OPERATION MANUAL**

**Version 1.0**

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## Introduction

The Operation Manual contains guidelines and rules which refer to **Axle load sensors GNOM** (hereinafter GNOM) including information on design, operation principle, specifications, and instructions on installation, use and maintenance of the sensor.



**axle load sensors are used in vehicle telematics systems to measure axle load of the vehicle.**

### **Key features of GNOM:**

- **mounting on vehicles with leaf spring\* suspension and air suspension\*\*;**
- **compliance with national and European automobile standards** for electromagnetic compatibility, resistance to climatic and mechanical stress;
- **magnetoresistive operation principle\*;**
- **tensoresistive measurement principle\*\*;**
- **linear characteristic of the output signal;**
- **built-in power supply stabilizer** — output signal does not depend on supply voltage;
- **short-circuit and reverse polarity protection;**
- **construction with no friction elements for better wear resistance of the sensor;**
- **mounting accessories included\*\*.**

**ATTENTION!** It is strongly recommended to follow strictly the instructions of the present Manual when using, mounting or maintaining GNOM DDE.

The Manual is intended for specialists who are familiar with automobile repair, mounting and maintenance and possessing professional knowledge in the field of electrical and electronic equipment of various vehicles.

To ensure proper GNOM DDE functioning its mounting and configuration should be carried out by certified professionals who have successfully passed manufacturer's [technical training](http://www.jv-technoton.com/). Check out the web-site for details: <http://www.jv-technoton.com/>.

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\* GNOM DP.

\*\* GNOM DDE.

**GNOM model range includes the following versions:**

- **GNOM DP** is a position sensor used for vehicles with leaf spring suspension.
- **GNOM DDE** is a pressure sensor used for vehicles with air suspension.

Manufacturer guarantees GNOM compliance with the requirements of technical regulations under the conditions of storage, transportation and operation as well as application guidelines stated in this manual.

**ATTENTION!** Manufacturer reserves the right to modify GNOM specifications that do not lead to a deterioration of the consumer qualities without prior customer notice.

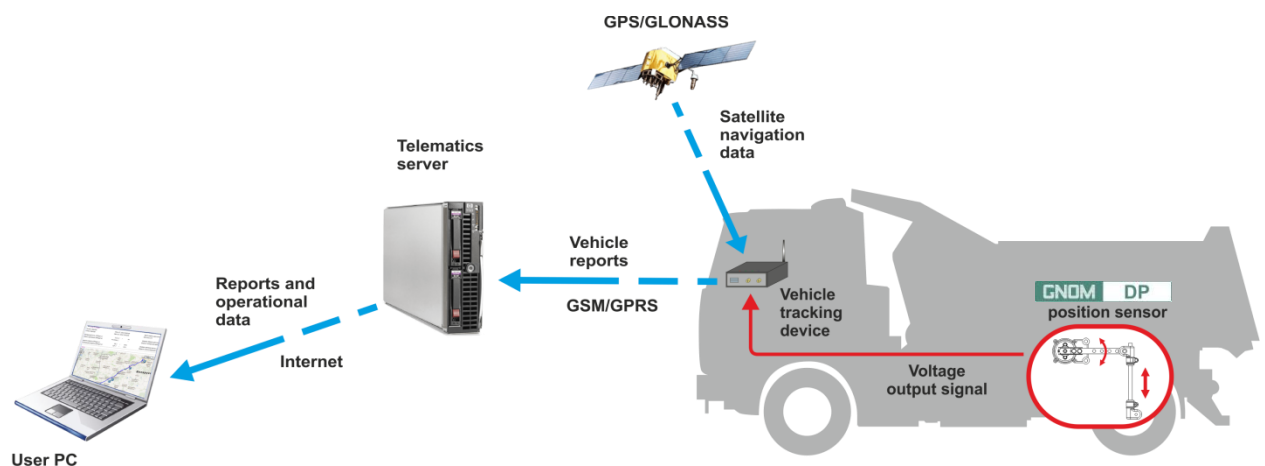
# 1 General information and technical specifications

## 1.1 Purpose of use and application area

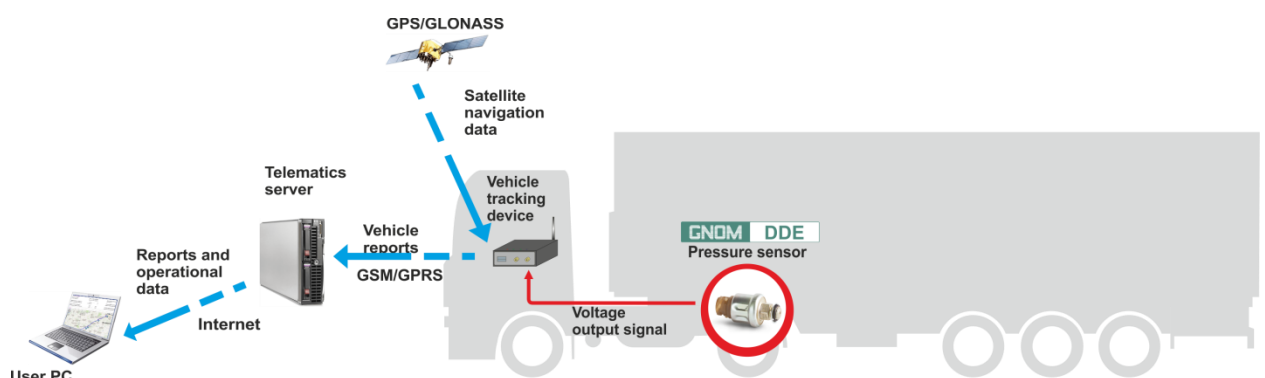
**GNOM DP** position sensor is designed to measure axle load and cargo weight on vehicles with leaf spring suspension.

**GNOM DDE** pressure sensor is designed to measure axle load and cargo weight on vehicles with air suspension.

**Application area** — GPS/GLONASS vehicle tracking and fleet management systems (see Figure 1).



a) GNOM DP



b) GNOM DDE

Figure 1 — GNOM DP, GNOM DDE application

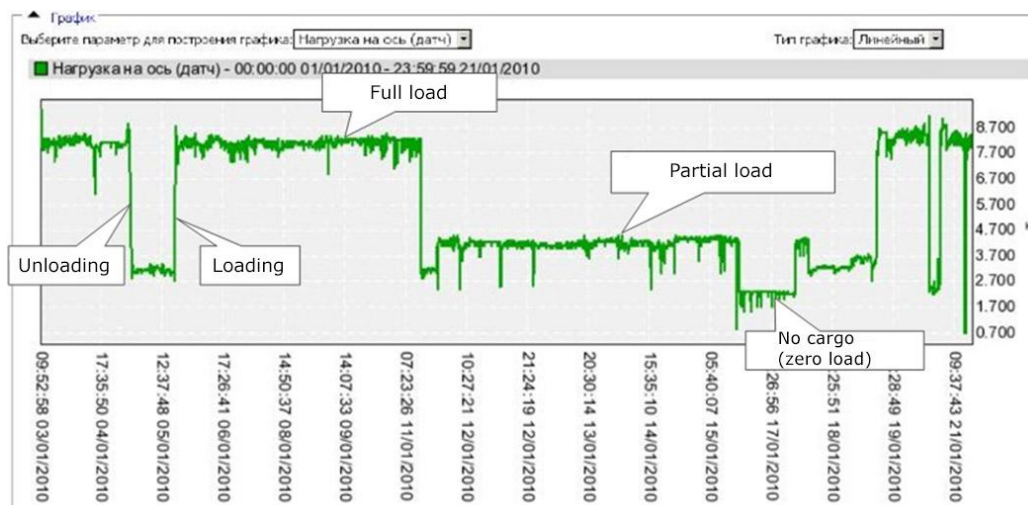
The operational principle of axle load sensors in the vehicle tracking system is the following:

- GNOM DDE measures the pressure of compressed air in suspension circuit of the vehicle. Pressure depends on the weight of the load;
- GNOM DP is fixed to the vehicle frame (chassis) and is connected to the rear axle with the set of leverages. Sensor measures the distance between the frame and the axle which depends on the weight of the load;

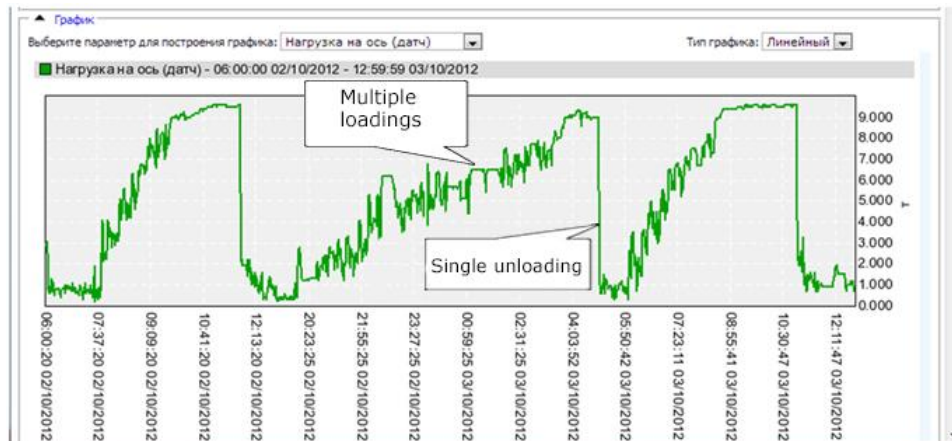
sensors transmit measured values to the tracking device by generating analog voltage output signal. Tracker records and processes the sensor data for further transmission to the telematics server. Server software processes and analyzes the received data to generate analytical reports for a selected period of time. The user gets the report containing figures, counters, charts on vehicle axle load.

Using GNOM as a part of the vehicle tracking system makes the fleet operator able to analyze the process of freight carriage (see Figure 2) providing the following features and benefits:

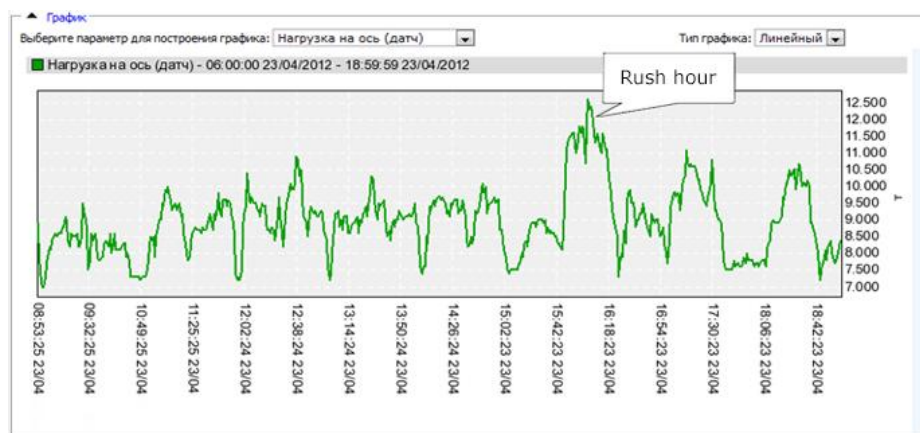
- optimal load of the vehicle;
- driver behavior inspection, avoiding underhand cargo carriage;
- load/unload events location, time and duration monitoring;
- cargo weight online monitoring;
- overloading prevention to avoid charges for violation of road axle load limits.



a) axle load of the lorry truck



b) garbage weight carried by refuse truck



c) axle load of the bus

Figure 2 — Instance of the data achieved with GNOM sensors for different vehicle types

### 1.1.1 Cargo weight monitoring

Fleet operator can monitor carried cargo weight of vehicles equipped with axle load sensors.

Mounting sensor on each axle of the vehicle is not always possible from technical point of view and is not economically feasible. Front axle load which is created by the weight of the driver's cabin and vehicle engine is insignificant comparing with rear axle (rear bogie) load created by the weight of the vehicle body (loading platform) and carried cargo. That is why a single sensor should be mounted on **the most loaded axle**.

The most loaded axle of two-axle vehicles is the rear one. The rear bogie is most loaded on three-axle vehicles (see Figure 3).







*Figure 3 — Most loaded axle of various vehicles*

Processing the axle load data the server can estimate approximate cargo weight for different types of vehicles (see Chart 1 and Chart 2).

*Chart 1 — Cargo weight estimation for two-axial truck with three-axial semitrailer by truck rear axle load value*

Axle load*, tons	Approximate cargo weight**, tons	Note
Less than 2	—	Wrong calibration
2.3		Semitrailer unhitched
4	0	Semitrailer hitched
6	9.0 to 9.5	
8	18 to 19	
10	27 to 28	
<p>* This chart compiled for MAZ–5440 truck. These characteristics may differ for other vehicles.</p> <p>** If the vehicle has isolated suspension circuits for left and right sides, then specified values will be valid only for a uniform distribution of load across the vehicle body.</p>		

*Chart 2 — Carried load weight estimation for three-axial dump truck by rear bogie load value*

Rear bogie load, tons	Approximate cargo weight, tons
Less than 7	0
10	3.5 to 4.0
13	6.5 to 7.0
16	9.5 to 10.0
19	13.0 to 13.5
22	16.5 to 17.0
25	19.5 to 20.0

Performing calibration procedure with the loads of given weight (see Paragraph 2.7) provides much more accurate characteristics of axle (rear bogie) load versus carried load weight.

As a result using axle load sensors in vehicle tracking systems provides the fleet operator with an instrument for:

- building an effective system for detailed analysis of the technological process of freight and passenger carriage;
- optimization of logistics processes;

- automation of monitoring, operational management and information support of goods carriage;
- improvement of safety of freight and passenger transport operation.

## 1.2 Exterior view and delivery set

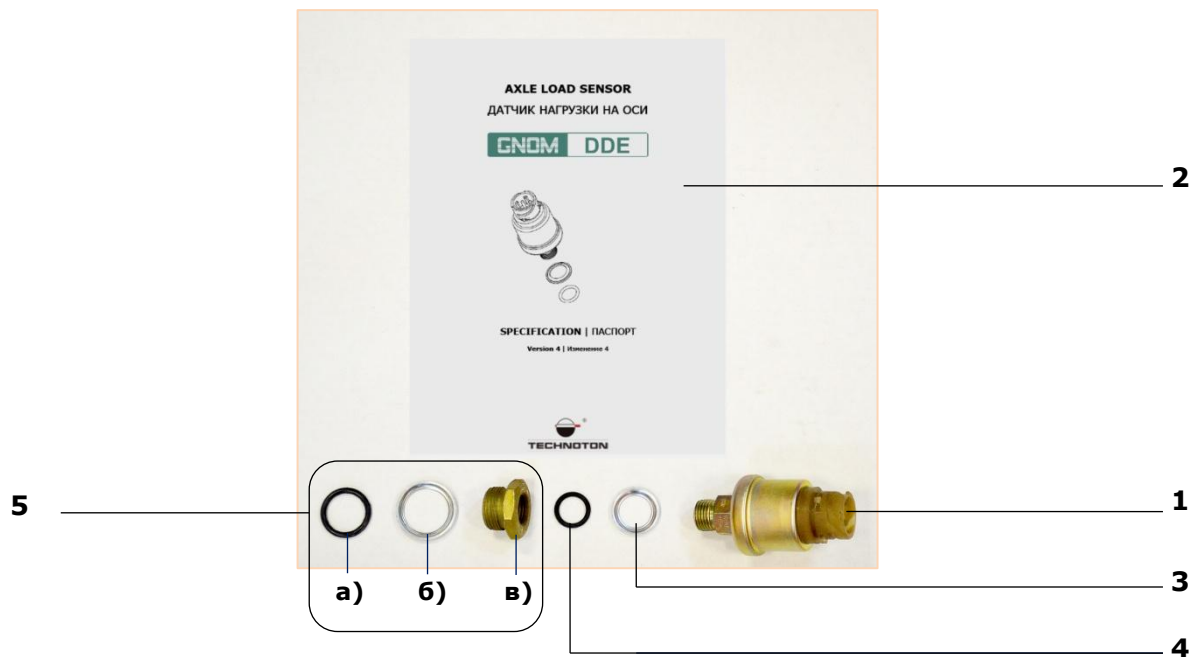
**1)** GNOM DP delivery set includes (see Figure 4):



- |   |                         |          |
|---|-------------------------|----------|
| 1 | GNOM DP position sensor | – 1 pc.; |
| 2 | Specification           | – 1 pc.  |

*Figure 4 — GNOM DP delivery set*

2) GNOM DDE delivery set includes (see Figure 5):



- |    |                           |          |
|----|---------------------------|----------|
| 1  | GNOM DDE pressure sensor  | - 1 pc.; |
| 2  | Specification             | - 1 pc.; |
| 3  | Washer                    | - 1 pc.; |
| 4  | O-ring                    | - 1 pc.; |
| 5  | Mounting kit GNOM MK DDE1 | - 1 pc.; |
| a) | O-ring                    | - 1 pc.; |
| b) | washer                    | - 1 pc.; |
| c) | adapter nut               | - 1 pc.  |

Figure 5 — GNOM DDE delivery set

## 1.3 Structure and operation principle

**1) GNOM DP position sensor** consists of measuring head **1** with angle shift transducer inside, pivot lever **2**, mounting bracket **3**, power supply connector **4** (see Figure 6 a).

**GNOM DP operation principle** is based on transformation of sensor lever rotation angle into output voltage. Magneto-resistive sensing element is used as a transducer. The output of the sensor generates stabilized analog voltage signal. Voltage signal depends on the position of the sensor lever (rotation angle) which varies according to axle load of the vehicle.

**2) GNOM DDE pressure sensor** consists of a body with pressure transducer inside **1**, cable connector **2**, inlet thread fitting **3** with mounting nut **4** (see Figure 6 b).

**GNOM DDE operation principle** is based on transformation of compressed air pressure into output voltage. Tensoresistive bridge is used as a transducer. The output of the sensor generates stabilized analog voltage signal. Voltage signal varies depending on pressure in the vehicle air suspension circuit coming through the inlet thread fitting to the transducer.

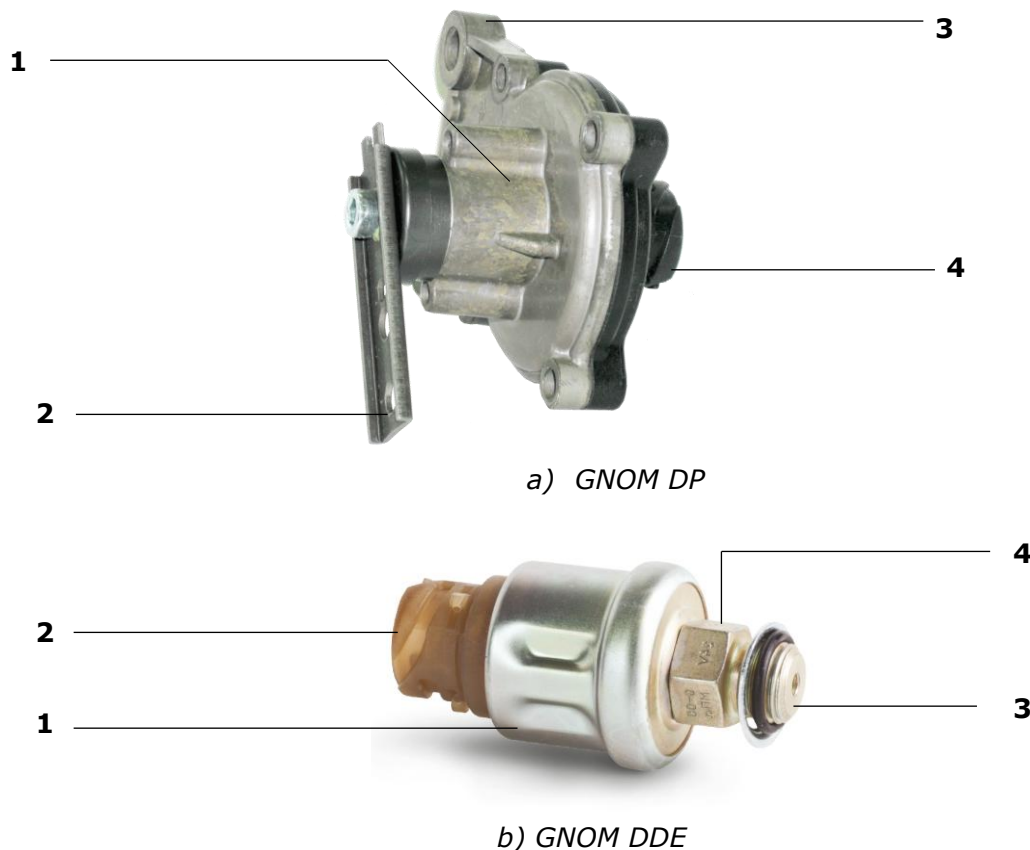


Figure 6 — Components of sensors

To determine correspondence between GNOM output voltage and axle load value for particular vehicle the calibration procedure should be performed (see Paragraph 2.7).

Depending on particular GPS/GLONASS tracking system the calculation of axle load values is either performed by the tracking device for example, by a GPS-tracker or on the server side by server software.

## 1.4 Technical characteristics

### 1.4.1 Basic features

GNOM basic characteristics are listed in Chart 3.

Chart 3 — GNOM basic features

Parameter name, unit of measure	Value	
	GNOM DDE	GNOM DP
Supply voltage range, V	8...32	
Output voltage range, V	0.25...3.80	1.54...3.46
Pressure measurement range, MPa	0...0.8	—
Permissible accuracy error limit of output signal generation, %, not more than	±2,5	—
Absolute error of output voltage generating, mV, not more than	—	±80
Lever rotation angle range, °	—	-40...+40
Ingress Protection Rating	IP55	
Connection thread	M16x1,5 M22x1,5*	—
Operation temperature range, °C	-40...+80	
Vibration resistance	The maximum acceleration of 50 m/s <sup>2</sup> in the frequency range from 10 Hz to 50 Hz for at least 8 h (GOST 3940, GOST R 50607)	
Shock resistance	Acceleration of 100 m/s <sup>2</sup> with 100 shocks/min frequency	
Electromagnetic compatibility	<ul style="list-style-type: none"><li>• resistance to EMI (UNECE regulation 10)</li><li>• electrostatic discharge (EDS) protection (GOST 30378);</li><li>• protection against conducted interference on the supply lines (STB ISO 7637-2, GOST 28751);</li><li>• protection against conducted interference on control and signal board circuits (STB ISO 7637-3, GOST 29157)</li></ul>	
Weight, g, not more than	150	800
Mean lifetime, years	10	
* Using the adapter nut from the mounting kit MK GNOM DDE1.		

### 1.4.2 Output signal characteristics

GNOM output signal is stabilized and does not depend on the supply voltage value.

**1) GNOM DP** output signal value is linearly dependent on lever rotation angle value (see Figure 7).

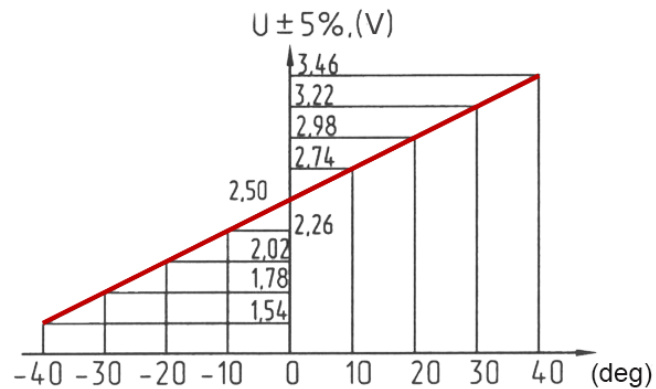


Figure 7 — Output voltage versus lever rotation angle characteristic

GNOM DP output signal characteristics are listed in Chart 4.

Chart 4 — GNOM DP output signal characteristics

Rotation angle of the sensor lever, degrees	Output voltage, V
- 40	1,54
- 30	1,78
- 20	2,02
- 10	2,26
0	2,50
10	2,74
20	2,98
30	3,22
40	3,46

**2)** Output signal voltage value of **GNOM DDE** is linearly dependent on the value of pressure of compressed air on sensor output (see Figure 8).

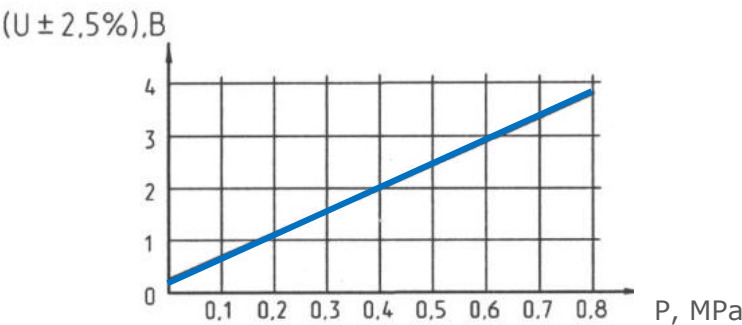


Figure 8 — Output voltage versus pressure characteristic

GNOM DDE output signal characteristics are listed in Chart 5.

Chart 5 — GNOM DDE output signal characteristics

Pressure at sensor inlet, MPa	Output voltage, V
0	0,25
0,1	0,70
0,2	1,20
0,3	1,55
0,4	2,00
0,5	2,50
0,6	2,95
0,7	3,30
0,8	3,80

### 1.4.3 Compatibility

GNOM is compatible with GPS/GLONASS tracking devices that have the inputs which correspond to sensor output signal characteristics in accordance with paragraph 1.4.2.

### 1.4.4 Overall dimensions

See Figure 9 for GNOM overall dimensions.

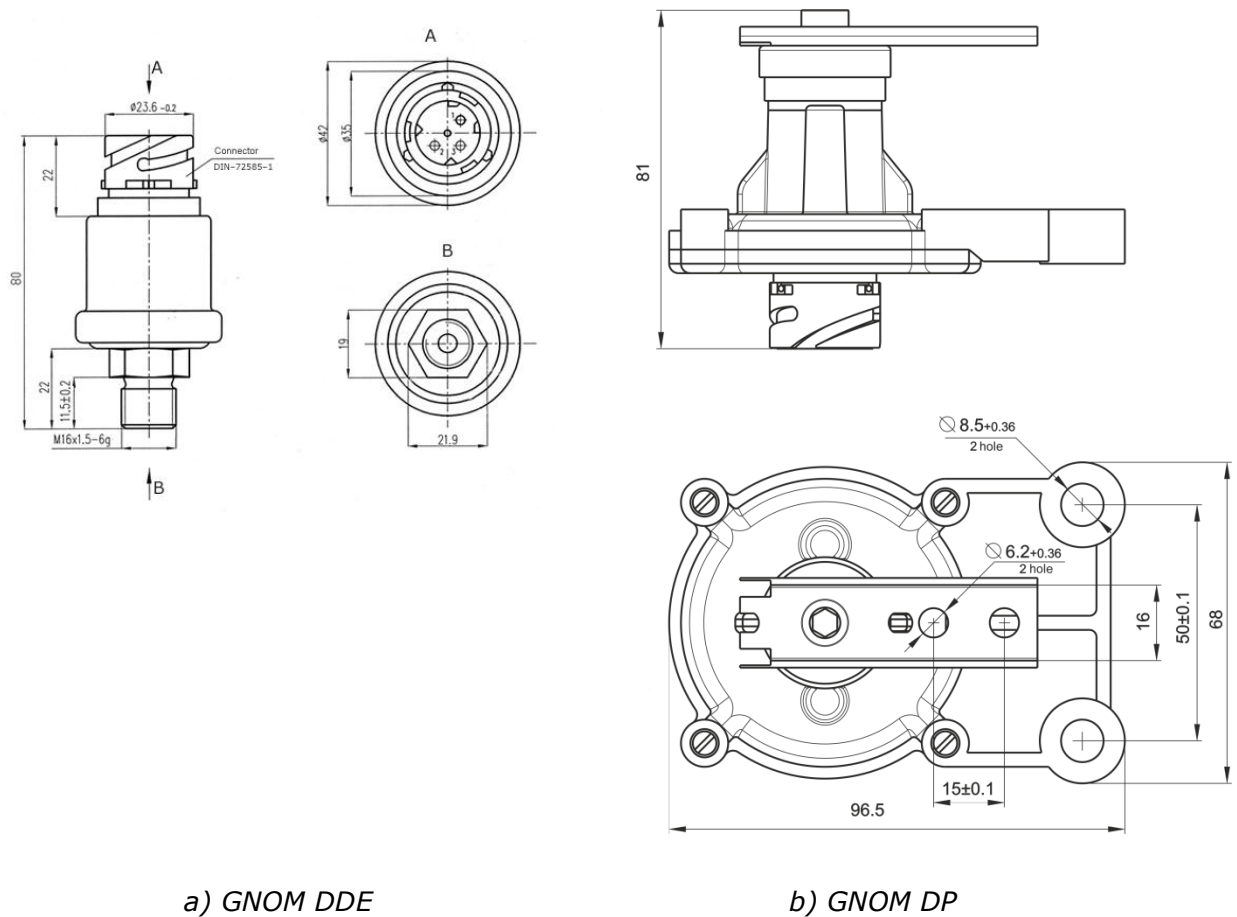


Figure 9 — GNOM overall dimensions



### 1.4.5 Packaging

GNOM delivery set comes in cardboard box of the following shape (Figure 10).



a) GNOM DDE

b) GNOM DP

Figure 10 — GNOM packaging

---

## 2 Mounting

This section provides basic guidelines for GNOM mounting.

### 2.1 Exterior inspection prior to works start

It is necessary to conduct GNOM DP exterior inspection for the presence of the following possible defects arisen at transportation, storage or careless use:

- visible damage of the sensor parts;
- backlash of component parts or gaps between them.

Contact the supplier if any defects detected.

### 2.2 Vehicle status evaluation

You should evaluate vehicle technical condition and make a conclusion about the possibility of GNOM installation before starting any works.

Vehicle status evaluation includes:

- 1** Checking the technical condition of the vehicle leaf spring suspension elements for absence of faults and defects (GNOM DP).  
Inspection of vehicle air suspension circuit for damages and leakage of compressed air (GNOM DDE).
- 2** Checking the voltage of the on-board vehicle electric circuit with a voltage meter. For 12 V vehicles operating voltage should be in the range of 10 to 18 V. For 24 V vehicles voltage should be in range of 18 to 32 V.
- 3** Checking vehicle chassis ground. Resistance between any point on vehicle chassis and the "-" terminal of the battery should not exceed 1 Ohm.

In case the vehicle does not meet the required condition the customer should be notified to eliminate all the faults before GNOM mounting.

## 2.3 GNOM DP mounting

### 2.3.1 General instructions

**ATTENTION!** Strictly follow safety rules of automobile repair works as well as local safety rules of the customer company when mounting GNOM DP.

To install GNOM DP you will need:

- GNOM DP;
- GNOM MK DP mounting kit (hereinafter GNOM MK DP) (ordered separately);
- Steel (**not less than 4mm thick**) mounting brackets for GNOM DP and GNOM MK DP elements are made according to schematic drawings by the installation specialist (see Figure 10);
- garage tools (sets of wrenches, sockets, screwdrivers, etc.).



Figure 11 — Mounting brackets for GNOM DP and GNOM MK DP components

**ATTENTION! Drilling of vehicle frame and transmission components is prohibited** when fixing mounting brackets to vehicle chassis!

**Spot welding** is allowed for fixing the bracket if there is no suitable socket for bolt fixing on the frame.

### 2.3.2 Selecting mounting location and scheme

**ATTENTION!** Decision on GNOM DP mounting position and scheme should be made by a qualified installation engineer depending on the prior inspection of a particular vehicle and its suspension.

GNOM DP should be mounted on the most loaded axle (see Paragraph 1.1.1). Adjust the length of the lever (**L**) and the height of the rod (**H**) **by experiment** (see Figure 11). Sensor and GNOM MK DP elements should be mounted so that lever rotation angle range (see 1.4.2) includes the whole suspension travel of the vehicle (**Δ**).

Lever length is calculated according to formula (1)

$$L = (0.7/1.0) \cdot \Delta \quad (1)$$

Rod height **H** should be adjusted so that GNOM DP output voltage is 1.5 V for a fully unloaded vehicle.

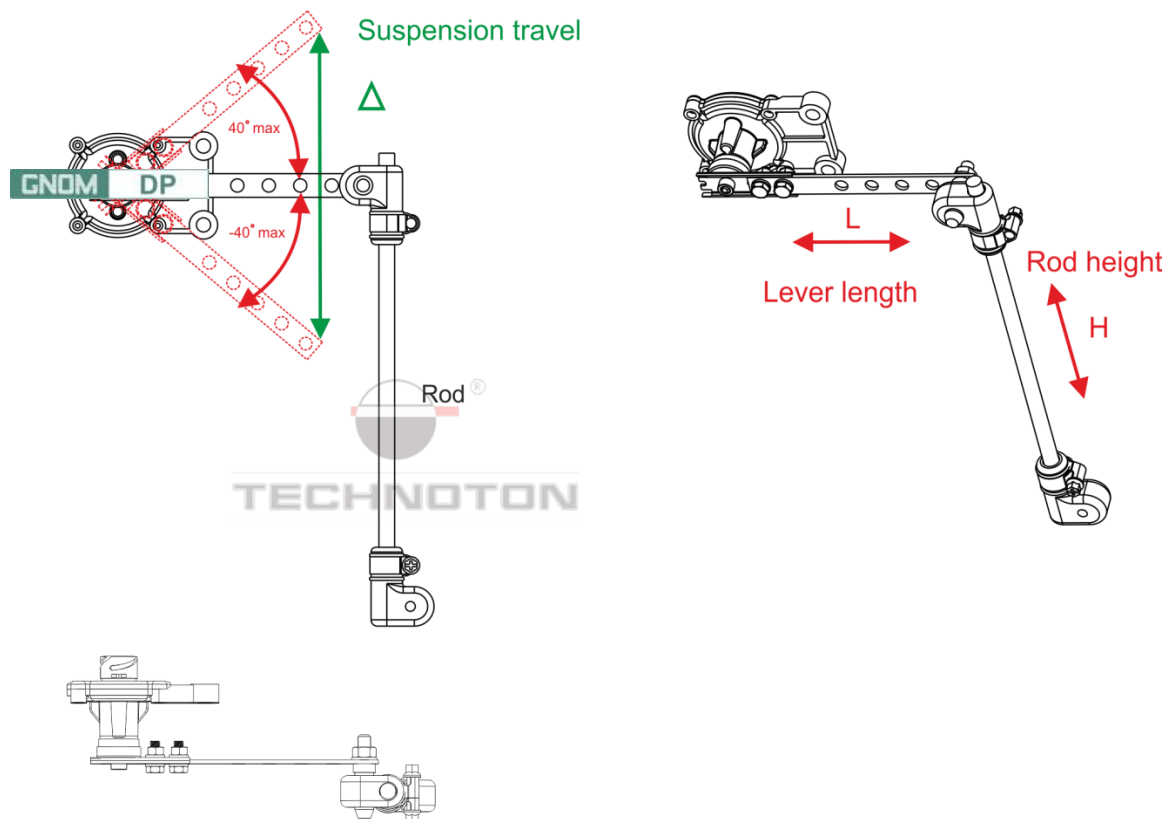


Figure 12 — Adjusting GNOM MK DP rod and lever for GNOM DP mounting

**ATTENTION!** Avoid mechanical deformation (bending) of sensor pivoted lever and GNOM MK DP lever and rod when mounting GNOM DP.

See Figure 12 for the recommended GNOM DP mounting scheme on two-axial vehicles using elements of GNOM MK DP (see 2.9.1 for GNOM MK DP details).

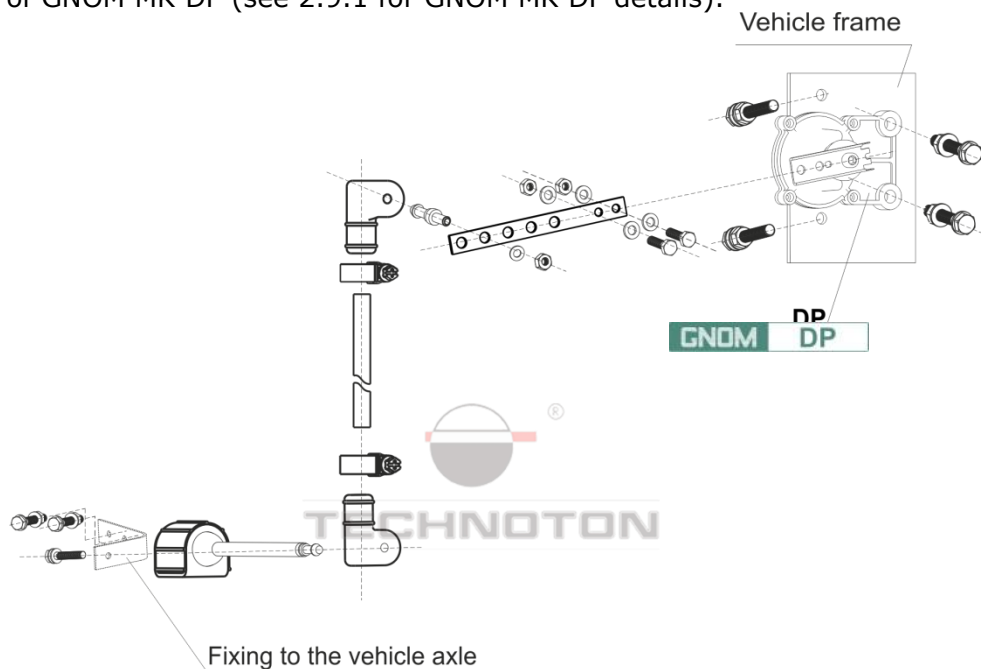


Figure 13 — Typical GNOM DP mounting scheme on two-axial vehicle

Figure 13 shows GNOM DP mounting on the rear axle of vehicles with two axles 4x2. Mounting bracket for GNOM MK DP elastic element is fixed to the rear axle with standard bolts. Mounting bracket for the sensor is fixed to the frame with spot welding.



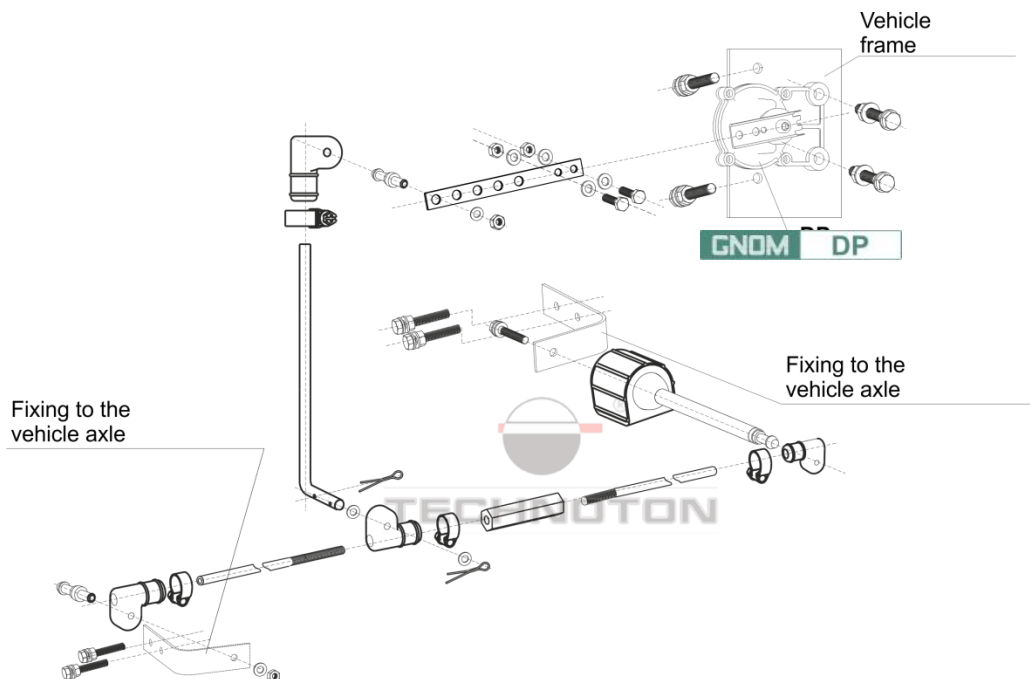
*a) elastic element is mounted in the same plane as the pivoted lever of the sensor*



*b) elastic element is perpendicular to the pivoted lever of the sensor*

*Figure 14 — GNOM DP mounting on vehicles with two axles 4x2*

Figure 14 shows recommended GNOM DP mounting scheme for three-axial vehicles using GNOM MK DP elements.



*Figure 15 — Typical GNOM DP mounting scheme on three-axial vehicle*



See Figure 15 for GNOM DP mounting on the rear bogie of the vehicle with three axles 6x4.

Mounting brackets for GNOM MK DP rods are fixed to the axles of the rear bogie with standard bolts. The mounting bracket for the sensor is fixed to the frame technological sockets between the axles of the rear bogie (see Figure 15a). If there are no sockets in the vehicle frame use spot welding for fixing the bracket (see Figure 15b).



*a) fixing the sensor to the vehicle frame with bolts*



*b) fixing the sensor to the frame with spot welding*

*Figure 16 — GNOM DP mounting on vehicles with three axles 6x4*

Check out the web-site with more pictures of GNOM DP installation:  
<http://www.jv-technoton.com/>.

## 2.4 GNOM DDE mounting

### 2.4.1 General instructions

To install GNOM DDE you will need:

- GNOM DDE pressure sensor;
- GNOM DDE connection cable (ordered separately);
- GNOM MK DDE1 mounting kit (included) or GNOM MK DDE2 mounting kit (ordered separately);
- manual automobile tools (sets of spanners, sockets, screwdrivers, etc.).

#### **CAUTION! HIGH PRESSURE WORKS!**

**1** GNOM DDE mounting must be performed by specialists that have permission to work with high pressure equipment.

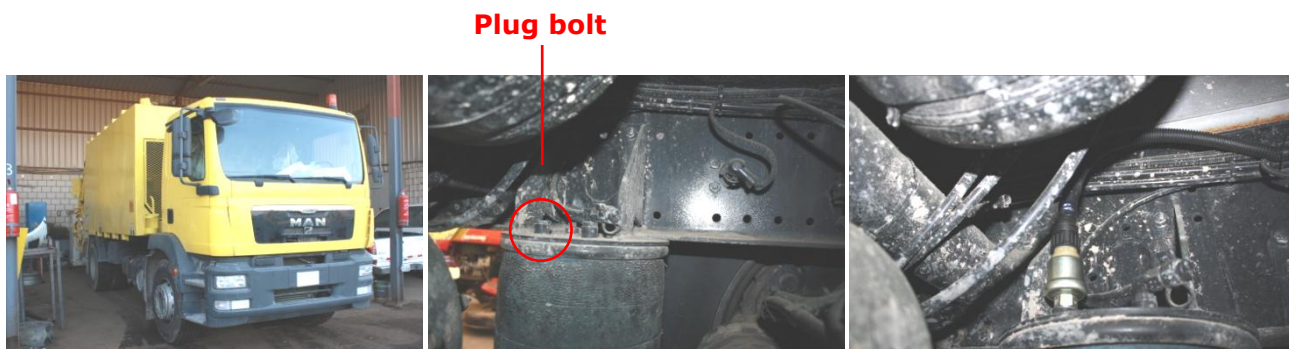
**2** Strictly follow safety rules of automotive repair works as well as local safety rules of the customer company when mounting GNOM DDE.

**3** Prior to mounting vehicle air suspension system should be switched to service mode and **pressure should be fully relieved of the circuit.**

### 2.4.2 Selecting mounting location and scheme

Depending on the design of the air suspension of various vehicles and convenience of GNOM DDE installation works the following installation location and mounting schemes are applied:

- 1)** The simplest scheme is mounting GNOM DDE into a **standard air supply thread hole of the suspension air balloon**. The thread hole is plugged with a bolt (see Figure 10). The sensor is mounted instead of the bolt into M16x1.5 thread hole or into M16x1.5 using adapter nut M22x1.5 according to **mounting scheme #1** (see Figure 11).



*Figure 17 — GNOM DDE mounted into suspension air balloon*

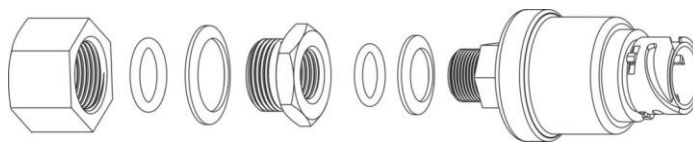


Figure 18 — GNOM DDE mounting order according to scheme #1

**2)** Any suitable **air supply pipes fitting** can be selected for GNOM DDE mounting when using adapter fitting (T splitter) of the GNOM MK DDE2 (see Figure 12).



**Pipe junction of air suspension lines**

**T splitter**

Figure 19 — Using T splitter for GNOM DDE mounting in air supply pipes fitting

According to **scheme #2** GNOM DDE can be mounted into M22x1.5 thread hole with the resumption of compressed air supply pipeline (see Figure 13).

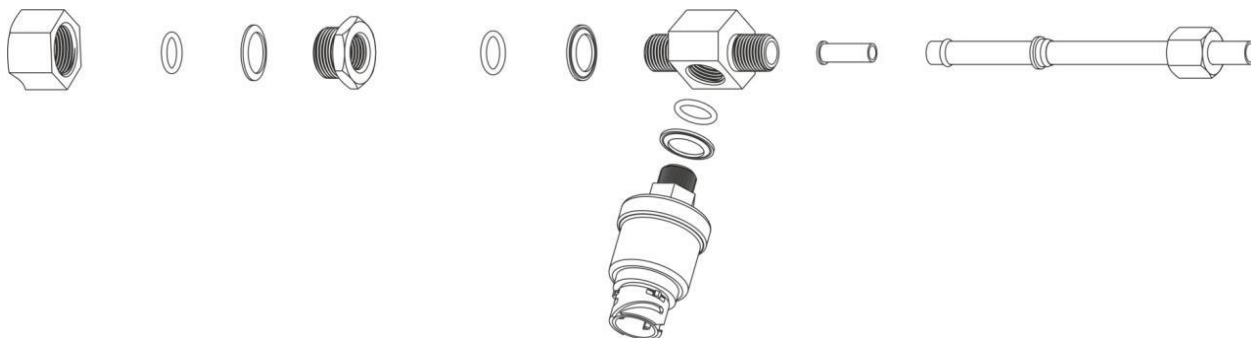
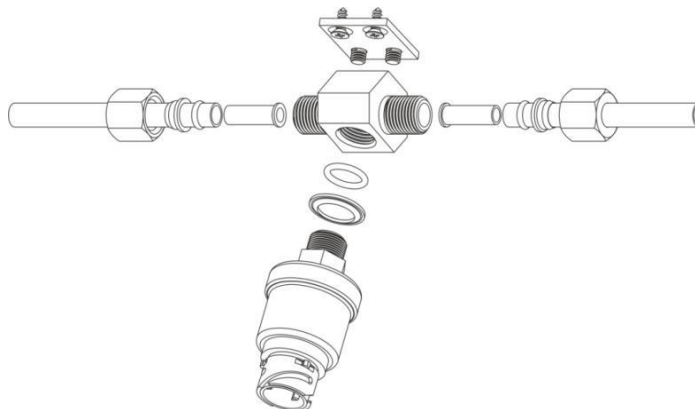


Figure 20 — GNOM DDE mounting order according to scheme #2

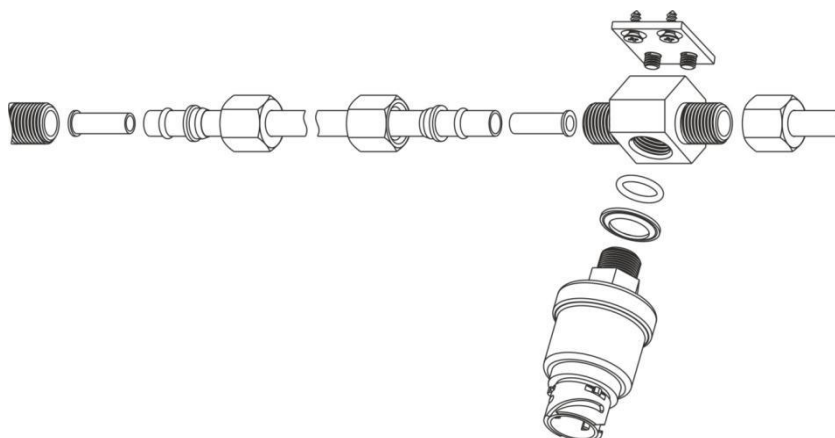


**3)** According to mounting **scheme #3** GNOM DDE is mounted into the **cut of  $\varnothing=8\text{mm}$  suspension supply pipeline**. GNOM MK DDE2 mounting kit is used (see Figure 14).



*Figure 21 — GNOM DDE mounting scheme #3*

**4)** Using mounting kit GNOM MK DDE2 the sensor can be installed into  **$\varnothing=8\text{mm}$  supply pipeline fitting** (see Figure 15).



*Figure 22 — GNOM DDE mounting scheme #4*

Check out the web-site with more pictures of GNOM DP installation:  
<http://www.jv-technoton.com/>.

### 2.4.3 Rules for installation works

Follow the **rules** for works on pneumatic equipment when mounting GNOM DDE:

- 1 Pipelines having cracks, tears, dents and thread defects are not allowed for mounting.
- 2 Do not tighten any bolts, nuts, or other connection elements that are under pressure.
- 3 Do not bend the pipeline or other elements of the air suspension system.
- 4 Make sure the internal area of the pneumatic lines is clean when mounting pipelines.
- 5 Pipelines fastening must be reliable, stress-free, and must have a margin to compensate temperature length changes.
- 6 The maximum tightening torque of plastic air supply pipelines is 60 Nm.

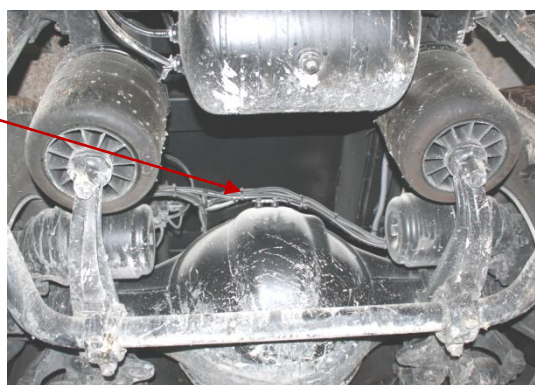
## 2.5 Electrical connection

GNOM power is supplied from the vehicle electrical system.

### ATTENTION!

- 1 Vehicle electrical circuits must be powered off before you start GNOM connection. Use battery switch or remove contact from battery terminal.
- 2 GNOM power supply "+" and ground "-" wires must be connected to the same points of vehicle electric circuit as correspondent wires of the tracking device (data logger).
- 3 It is **strongly recommended** to lay GNOM connection cable together with the standard vehicle wiring with the mandatory tie wrap fixing every 50 cm (see Figure 16).

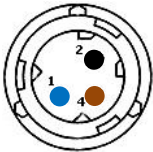
**Signal cable**



*Figure 23 —Signal cable laying*

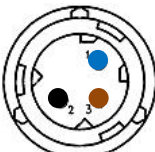
- 1) GNOM DP electrical connection is made according to pinout of the connector and connection cable wires color and marking. See Chart 6 for details.

Chart 6 — GNOM DP electrical connection

GNOM DP pinout	Pin number	Wire marking	Wire color	Assignment	Signal type
	1	VBAT	Blue	Supply voltage "+"	Analog, voltage 8...32 V
	2	GND	Black	Ground "-"	—
	4	OUT	Brown	Output signal	Analog, voltage (see 1.4.2)
Note — <b>GNOM DP connection cable</b> (ordered separately, see 2.9.3) is used for GNOM DP electrical connection.					

2) GNOM DDE electrical connection is made according to pinout of the connector and signal cable wires color and marking. See Chart 7 for details.

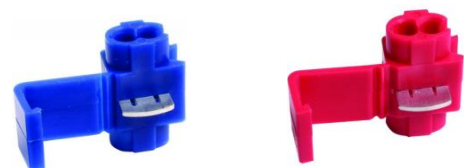
Chart 7 — GNOM DDE electrical connection

GNOM DDE pinout	Pin number	Wire marking	Wire color	Assignment	Signal type
	1	VBAT	Blue	Supply voltage "+"	Analog, voltage 8...32 V
	2	GND	Black	Ground "-"	—
	3	OUT	Brown	Output signal	Analog, voltage (see 1.4.2)
Note — <b>GNOM DDE connection cable</b> (ordered separately, see 2.9.4) is used for GNOM DDE electrical connection.					

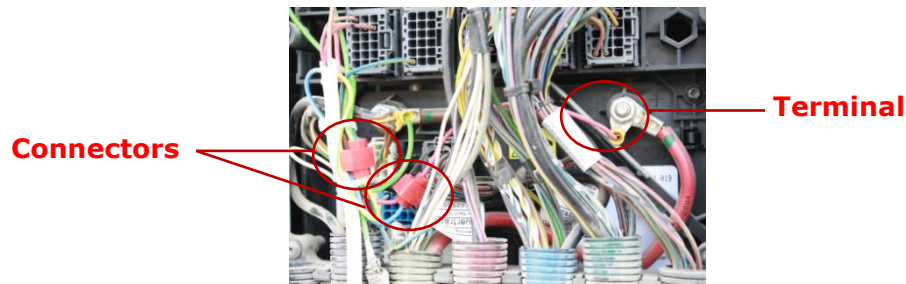
Terminals are recommended for electrical connection of power supply wires and quick splice connectors for output signal wire connection (see Figure 17).



a) terminals



b) connectors



*c) wires connected to terminals and connectors*

*Figure 24 — GNOM electrical connection*

## 2.6 Sealing

It is strongly recommended to seal the connector of the sensor and the points of cable wires connection with optional (see 2.9.5) sealing ropes and disposable plastic seals (see Figure 18) to prevent unauthorized interference into GNOM operation.

To seal the connector put the sealing rope through the special holes on GNOM body and connection power supply connector. Then put the free ends of the rope through two holes in the center of the plastic seal. Clicking the seal will lock the rope. It will be impossible to unlock the seal without breaking it.



*Figure 25 — Plastic seal and sealing rope*

## 2.7 Calibration

GNOM sensors are supplied ready to use and do not require any configuration. **Calibration** is required for correct data processing within GPS/GLONASS fleet monitoring system.

As a result of calibration the table is compiled. **Calibration table** shows the dependence of GNOM output voltage on axle load value (see Figure 19). Calibration points for the table are in the range from minimum axle load (unloaded vehicle) to maximum capacity (the highest permissible load level of the vehicle).

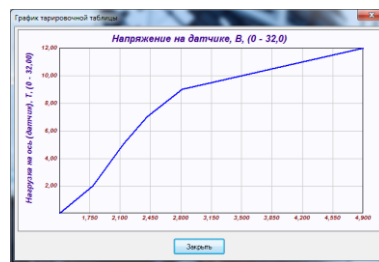


Figure 26 — The graph of GNOM output versus axle load according to compiled calibration table

There are two methods of calibration:

### 1) Loading of given weights (pieces of known weight)

Load weight is calculated according to formula (2)

$$\text{Load weight} = \text{Total weight of loaded pieces} \quad (2)$$

### 2) Weighing with axle weighing scales

- the most loaded axle of loaded vehicle with unknown weight;

With such calibration the system won't be able to process load weight

- the whole vehicle loaded with unknown weight;

Load weight is calculated according to formula (3)

$$\text{Load weight} = \text{Weight of fully loaded vehicle} - \text{Weight of empty vehicle} \quad (3)$$

#### ATTENTION!

- It is recommended to use special truck scales for calibration procedure.
- Both solid and bulk cargo can be used for loading. The load should be evenly distributed along the vehicle body.

## **2.8 GNOM accuracy check**

To check the operational accuracy of the GNOM sensor a test must be performed.

### **2.8.1 The purpose of the test**

GNOM accuracy check test is needed to determine the reduced error of axle load measurement of the vehicle.

### **2.8.2 Test preparation**

Install GNOM and make all necessary electrical connections to power supply and tracking device. Carry out all the works according to GNOM and tracking device manuals.

### **2.8.3 Testing**

To check the accuracy of axle load measurement use the method of most loaded axle weighing.

The procedure includes the following steps for unknown weight calibration:

- 1) Switch on the ignition;
- 2) Load the vehicle with a cargo (not less than 1/2 of maximum load capacity). The load should be evenly distributed along the vehicle body;
- 3) Put the most loaded axle on the scales and record the value into report;
- 4) Unload the vehicle partially (not less than 1/4 of maximum load capacity);
- 5) Put the most loaded axle on the scales and record the value into report;
- 6) Load the previously unloaded cargo back to the vehicle;
- 7) Put the most loaded axle on the scales and record the value into report;
- 8) Calculate and record accuracy error values for loaded and unloaded vehicle into report.

See Annex A for a template of check test report and accuracy error calculation formulae.

## 2.9 Accessories

JV Technoton offers high-quality accessories for installation, connection and operation of GNOM sensor.

### 2.9.1 Mounting kit GNOM MK DP

Mounting kit **GNOM MK DP** (hereinafter GNOM MK DP) is used for GNOM DP mounting on two-axial and three- axial vehicles with leaf spring suspension.

See Figure 20 for GNOM MK DP contents.

GNOM MK DP contains only high-quality components designed for mounting on vehicles.

**Attention!** Manufacturer reserves the right to change the set of GNOM MK DP and replace the components with equivalent without prior customer notice.

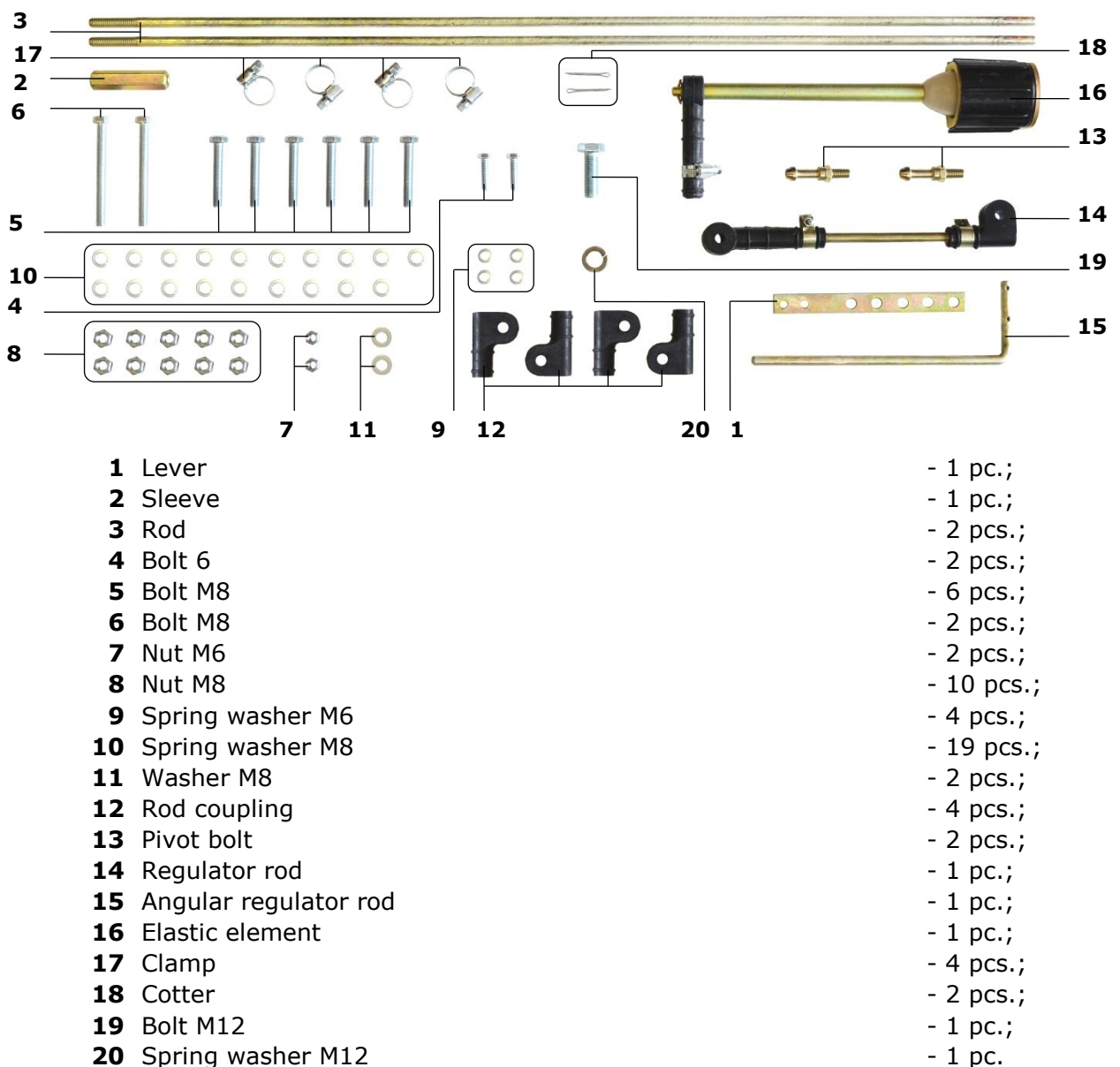


Figure 27 — mounting kit GNOM MK DP

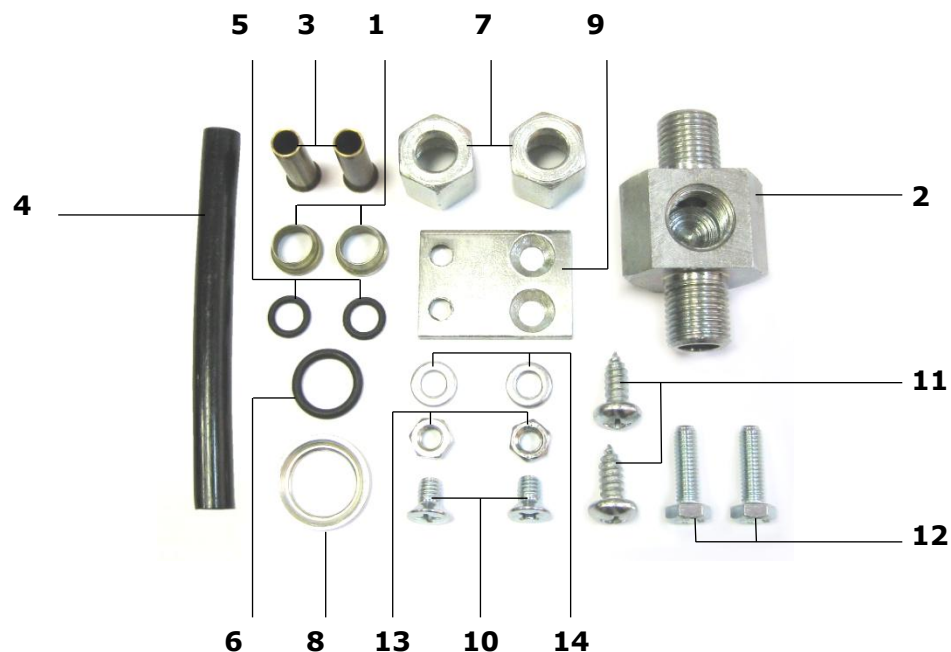
## 2.9.2 Mounting kit GNOM MK DDE2

Mounting kit **GNOM MK DDE2** (hereinafter GNOM MK DDE2) is used for GNOM DDE sensor mounting into air suspension in following cases (see Paragraph 2.4.2):

- mounting of GNOM DDE into M22x1.5 thread hole with the resumption of compressed air supply pipeline;
- GNOM DDE mounting into gap of  $\varnothing=8$  mm pipeline (compressed air supply pipe);
- GNOM DDE mounting into  $\varnothing=8$  mm supply pipeline fitting.

GNOM MK DDE2 (see Figure 21) contains only high-quality components specially designed for use in vehicle air suspension system.

**Attention!** Manufacturer reserves the right to change the set of GNOM MK DDE2 and replace the components with equivalent without prior customer notice.



<b>1</b> Conical sleeve	- 2 pcs.;
<b>2</b> Fitting adapter (T splitter)	- 1 pc.;
<b>3</b> Nipple	- 2 pcs.;
<b>4</b> Pipeline $\varnothing=8$ mm	- 1 pc.;
<b>5</b> O-ring	- 2 pcs.;
<b>6</b> O-ring	- 1 pc.;
<b>7</b> Swivel nut	- 2 pcs.;
<b>8</b> Washer 16	- 1 pc.;
<b>9</b> Mounting bracket	- 1 pcs.;
<b>10</b> Screw M6x8	- 2 pcs.;
<b>11</b> Self-tapping screw 6.3x13	- 2 pcs.;
<b>12</b> Bolt M6x20	- 2 pcs.;
<b>13</b> Nut M6	- 2 pcs.;
<b>14</b> Washer M6	- 2 pcs.;

Figure 28 — Mounting kit GNOM MK DDE2



### 2.9.3 GNOM DP connection cable

For power supply and tracking device connection **041 cable** is used (see Figure 22). The cable is not a part of delivery set and should be ordered additionally. Cable length is 8 meters.



Figure 29 — GNOM DP connection cable (041 cable)

### 2.9.4 GNOM DDE connection cable

For power supply and tracking device connection **040-02 cable** is used (see Figure 23). The cable is not a part of delivery set and should be ordered additionally. Cable length is 12 meters.







Figure 30 — GNOM DDE connection cable (040-02 cable)

## 2.9.5 Optional accessories

The following accessories are recommended for GNOM mounting (see Chart 8).

*Chart 8 — GNOM mounting accessories*

View	Label	Description	Application	Supply options
	CRYSTAL seal	Plastic seal	GNOM connector sealing	—
	UNIVERSAL sealing rope	Sealing rope		50 m per reel
	CoTube9.8	Split corrugated tubing	Fast assembly plastic tube for GNOM cable protection	50 m per reel, Ø 9.8 mm
	Connector 5200	Quick splice connector	For GNOM electrical connection	3x0.8 mm <sup>2</sup> , 85 pcs. per pack

### **3 Storage**

GNOM is recommended to be stored in dry areas.

GNOM storage is allowed only in original packaging at temperature range from -50 to +40° C and relative humidity up to 100% at 25° C.

Do not store GNOM in the same room with substances that cause metal corrosion and/or contain aggressive impurities.

Storage life for GNOM should not exceed 24 months.

### **4 Transportation**

Transportation of GNOM is recommended in closed transport that provides protection for GNOM from mechanical damage and precipitations.

Air environment in transportation compartments must not contain acid, alkaline and other aggressive impurities.

Shipping containers with packed GNOM sensors must be sealed.

### **5 Utilization/re-cycling**

GNOM does not contain harmful substances and ingredients that are dangerous to human health and environment during and after the end of life and during re-cycling. GNOM does not contain precious metals in amount that must be recorded.

## Contacts

### JV Technoton

**Tel/fax: +375 17 298-10-02**

[www.jv-technoton.com](http://www.jv-technoton.com)

[info@jv-technoton.com](mailto:info@jv-technoton.com)



## Annex A

### Template of check test report

#### Report on axle load measurement accuracy test

Date: \_\_\_\_\_

Vehicle type, model, registration number	
Tracking/displaying device model and serial number	

<b>Axle load on the fully loaded vehicle</b>	According to scales $m_{\text{loaded}}$ , tons	
<b>Axle load on unloaded vehicle</b>	According to scales $m_{\text{scales}}$ , tons	
	According to tracking device $m_{\text{track}}$ , tons	
<b>Accuracy error of axle load measurement of unloaded vehicle</b>	Absolute error $\Delta = m_{\text{track}} - m_{\text{scales}}$ tons	
	Normalized to axle load of loaded vehicle $\delta = \frac{m_{\text{track}} - m_{\text{scales}}}{m_{\text{loaded}}} \cdot 100\%$ , %	
<b>Axle load on loaded vehicle</b>	According to scales $m_{\text{scales}}$ , tons	
	According to tracking device $m_{\text{track}}$ , tons	
<b>Accuracy error of axle load measurement of loaded vehicle</b>	Absolute error $\Delta = m_{\text{track}} - m_{\text{scales}}$ , tons	
	Normalized to axle load of loaded vehicle $\delta = \frac{m_{\text{track}} - m_{\text{scales}}}{m_{\text{loaded}}} \cdot 100\%$ , %	

#### Resume:

The results of axle load measurement **match/do not match** specifications.

Comments: \_\_\_\_\_

Representative of the CUSTOMER:

Representative of the CONTRACTOR:

\_\_\_\_\_  
Name, signature

\_\_\_\_\_  
Name, signature

## Annex B

### Videography

#### **Animation “GNOM DP position sensors. Mounting and application”.**

The animation shows sensor mounting schemes for biaxial and threeaxial vehicles as well as instance of the diagrams built on sensor data in vehicle monitoring system.

Links to view video:



[http://www.jv-technoton.com/axle\\_load\\_sensor](http://www.jv-technoton.com/axle_load_sensor)



<https://www.youtube.com/watch?v=9njffVByJog>

Other Technoton videos are on the YouTube channel which is regularly updated:



<https://www.youtube.com/channel/UCq7EF3DHrgl7fOWB2ynsR-A>