

Globaltech Group Oy



Setup Instructions
for the Equipment Set “The On-Board System of Weighing and Controlling the
Axle Load of Trucks
GTscales-XX”

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Globaltech Group Oy
www.globaltech.fi
E-mail:gt@globaltech.fi
Tel.: +358 9 5245 1018

1 Introduction

These instructions specify the setting procedure for the equipment set “The On-Board System of Weighing and Controlling the Axle Load of Trucks GTscales-XX” (hereinafter – the System, the Equipment set). Before starting the System setup, it is strongly recommended to read carefully these instructions. Do not allow untrained staff to set up and calibrate the System. To obtain the adjusted characteristics and ensure the proper functioning of the equipment set, you should strictly adhere to the provisions of these instructions.

Important Information!

The illustrations and contents given in these instructions may slightly differ from the actual product.

Product design and specifications are subject to change without notice.

2 Equipment Set Description and Operation

2.1 Intended Use

The equipment sets of axle weighing are designed for static weighing of tractors, trailers, semi-trailers (including tanks), road trains, containers, as well as any large-sized objects, the dimensions and design features of which enable the installation of pressure sensors to pneumatic line/contour of rolling lobe and sleeve air springs. The pressure sensor readings are transmitted to the switching unit. The switching unit transfer the received information to the driver display showing the load on each axle of a semi-trailer truck, the weight of cargo transported, the overload indication of each axle of a semi-trailer truck. Furthermore, the data from the switching unit are transmitted to the web server through the tracker unit. An authorized web server user can see the following information: the tractor static axle load, the weight of cargo transported, GPS monitoring, statistical reports and other information depending on the unit type and the adjusted access rights.

2.2 General Information

The standard equipment set consists of the following main units: driver display – 1 pc., switching unit – 1 pc., truck pressure sensor unit – 2 pcs. Depending on the delivery option, an equipment set may include: cables with connectors to connect units (quantity depends on the delivery option); up to 4 additional pressure sensor units; interconnect cables with connectors to connect units; sockets for trailers/semi-trailers; tractor-trailer/semi-trailer truck interconnect coiled cable with connectors.

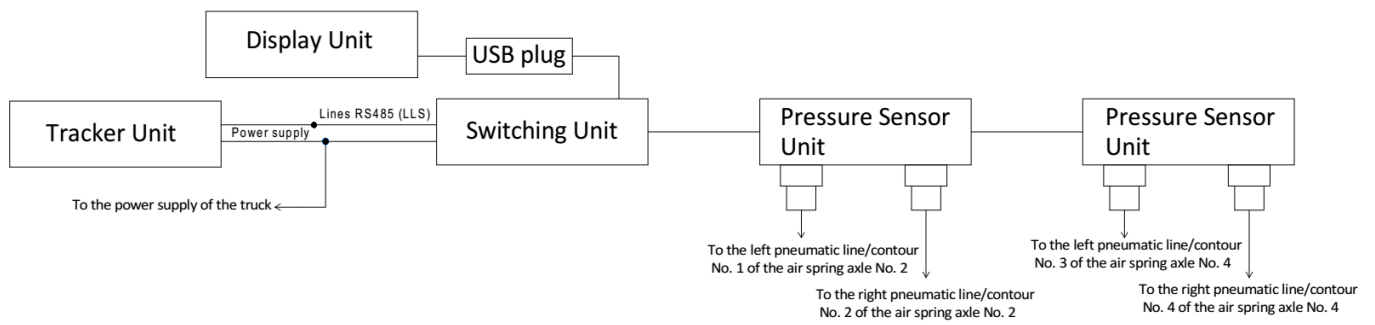
The driver display shows the current gross weight of a semi-trailer truck and loads on each axle. This is due to the fact that the exceeding of specified weight limits causes the accelerated road damage. The equipment set contributes to the absence of vehicle overloading, vehicle load control on each axle, risk reduction for road users, and avoidance of penalties for the exceeding of regulatory limits (weight per axle) when using public roads.

The output of additional information to the driver display is described in the instructions below (fuel level in tanks, date and time, tractor onboard voltage).

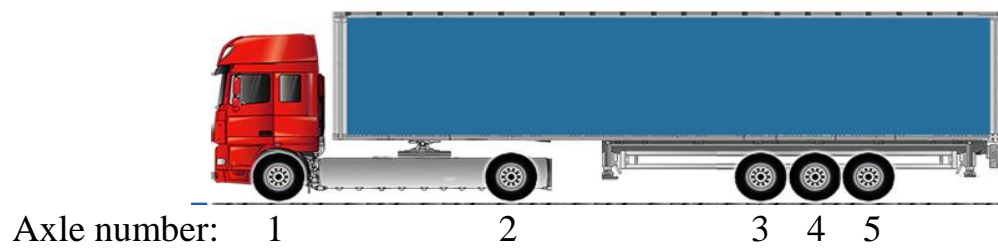
3 Safety Precautions

Before installing an equipment set, read this instruction manual carefully. Keep it easily accessible so that you can use for future reference. Improper installation of an equipment set, wrong connection of devices and equipment may lead to electric shock, short circuit, air leaks in pneumatic lines/contours, fire and other damage. Make sure that you use materials and equipment, which meet the manufacturer's requirements (specifications). Only qualified personnel are allowed to install the equipment. In case of any doubts concerning the installation or operation of the equipment set, please refer to your local dealer for more information and advice.

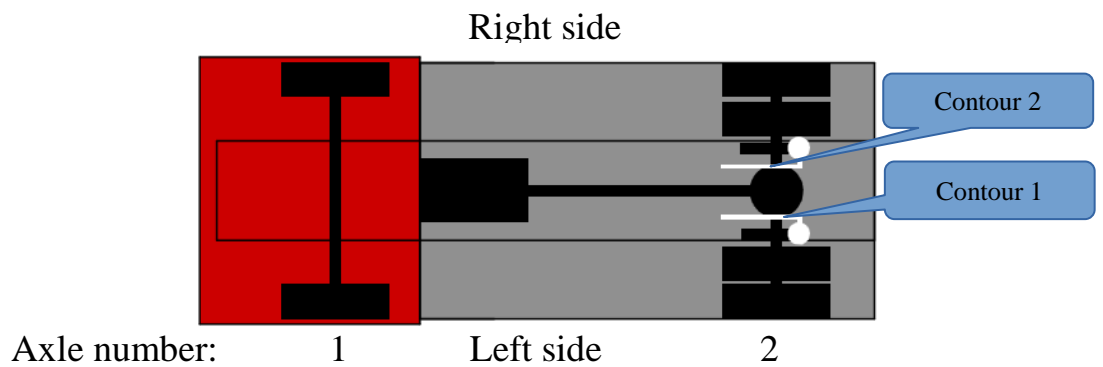
4 Equipment Set Installation Diagram



Equipment Installation Diagram



Conventional Truck Top View



Conventional Semi-Trailer Top View

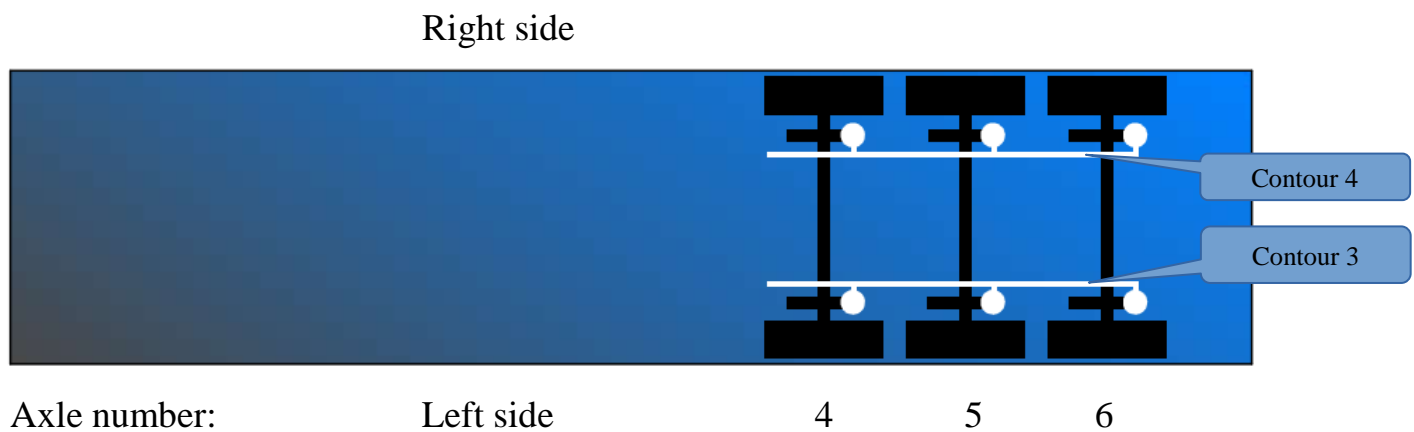


Table for the System Setup by Numbers of Axles and Pressure Sensors

| Item No. | Pressure Sensor Unit Installation Location | Unit No. | Pressure Sensor No. | Tractor/Semi-Trailer Axle No. | Pneumatic Contour Number/Side |
|-----------------|---|-----------------|----------------------------|--------------------------------------|--------------------------------------|
| 1 | Tractor | 1 | 1 | 1,2 | 1/left |
| 2 | Tractor | 1 | 2 | 1,2 | 2/right |
| 3 | Semi-trailer | 2 | 1 | 3,4,5 | 3/left |
| 4 | Semi-trailer | 2 | 2 | 3,4,5 | 4/right |

5 Equipment Set Setup









Examples of the Driver Display Installation (Display Unit)

In the picture below you can see the user interface start screen.


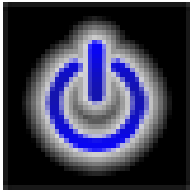
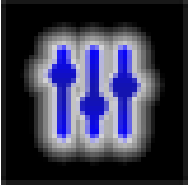
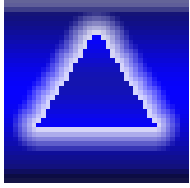
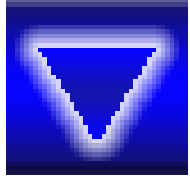

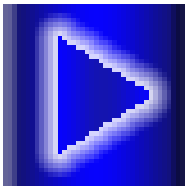
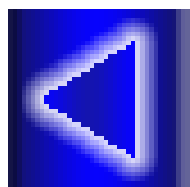






The equipment set shall be set up in accordance with the equipment installation diagram. The display unit is equipped with a touch screen. By touching an icon with a symbol, the screen enters the corresponding operating mode.

Start Screen Symbols (Icons)

| No. | Symbol (Icon) | Icon Name | Short Description |
|-----|---|---------------------|---|
| 1 | 2 | 3 | 4 |
| 1 |  | Clock | Time and date setting and displaying |
| 2 |  | Volmeter | BC voltage displaying |
| 3 |  | Amount of fuel | Setting and displaying the amount of fuel contained in tanks |
| 4 |  | Scales | Setting and displaying the axle load of a semi-trailer truck |
| 5 |  | Display turning off | Display unit turning off |
| 6 |  | Settings | Setting the parameters shown on the driver display (display unit) |

Auxiliary Symbols (Icons)

| Auxiliary Symbols (Icons) | Short Description |
|---|---|
|  | Exit to main menu |
|  | Display unit turning off |
|  | Setting the parameters shown on the driver display (display unit) |
|  | Configurable parameter increment (change) |
|  | Configurable parameter decrement (change) |
|  | Save settings |
|  | Configurable parameter change |
|  | Configurable parameter change |

| | |
|---|--------------------------------|
|  | Cancel settings |
|  | Delete value |
|  | Digit keys to enter settings |
|  | Data calculations (show value) |

5.1 Date and Time Setting

Touch the icon “clock”  on the user interface start screen.



The information about date, time, day of the week and auxiliary symbols are displayed on the display unit.



To enter the time setting mode touch the time image “13:59”.

The display unit enters the setup mode as shown in the picture below.



Using the icons  and  set up the desired hour and minute values.

To save the desired values touch the icon





To cancel the set values touch the icon



To enter the date setting mode touch the date image “28.02.2018”.

The display unit enters the setup mode as shown in the picture below.



Using the icons  and  set up the desired date values. To save the desired values touch the icon



To cancel the set values touch the icon



Attention!!!

There is a holder for CR1220 battery on the back of the display unit. When the power is turned off, the time and date will be reset to initial values, if there is no battery in the holder.

5.2 On-Board DC Voltage Displaying

Touch the icon “voltmeter”  on the user interface start screen.

The display unit enters the tractor on-board DC voltage display mode as shown in the picture below.



The display unit shows the current value of the tractor on-board DC voltage provided that the equipment set is connected directly to the vehicle's on-board electrical system (without the use of voltage adapters/voltage inverters).

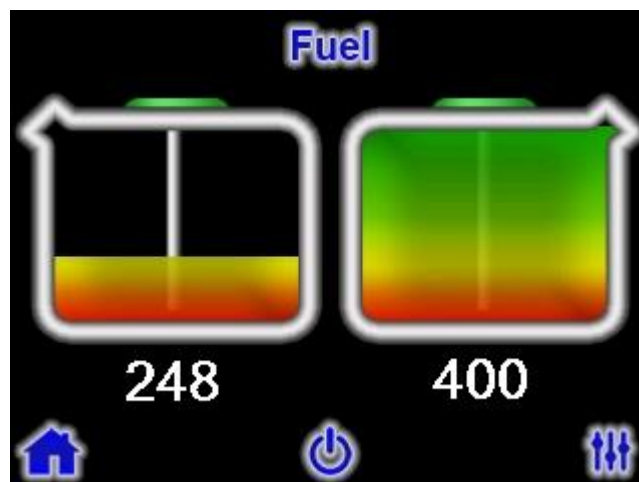
5.3 Setting and Displaying the Amount of Fuel in Tanks

Attention!!!

This function is under development.

Touch the icon “amount of fuel”  on the user interface start screen.

The display unit enters the mode of displaying the amount of fuel in the tractor tanks as shown in the picture below.



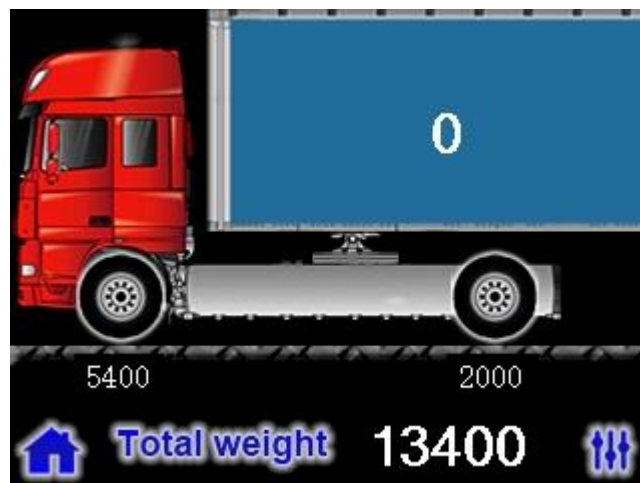
If your vehicle is equipped with a vehicle monitoring system to which the digital fuel level sensors are connected, then it is possible to display the readings from these FLSs. The system supports operation with two digital fuel level sensors through the LLS protocol. The level and amount of fuel in liters contained in each of the tanks are shown on the display. Data on the amount of fuel in tanks are also used to calculate the cargo weight.

5.4 Setting and Displaying the Semi-Trailer Truck Axle Load

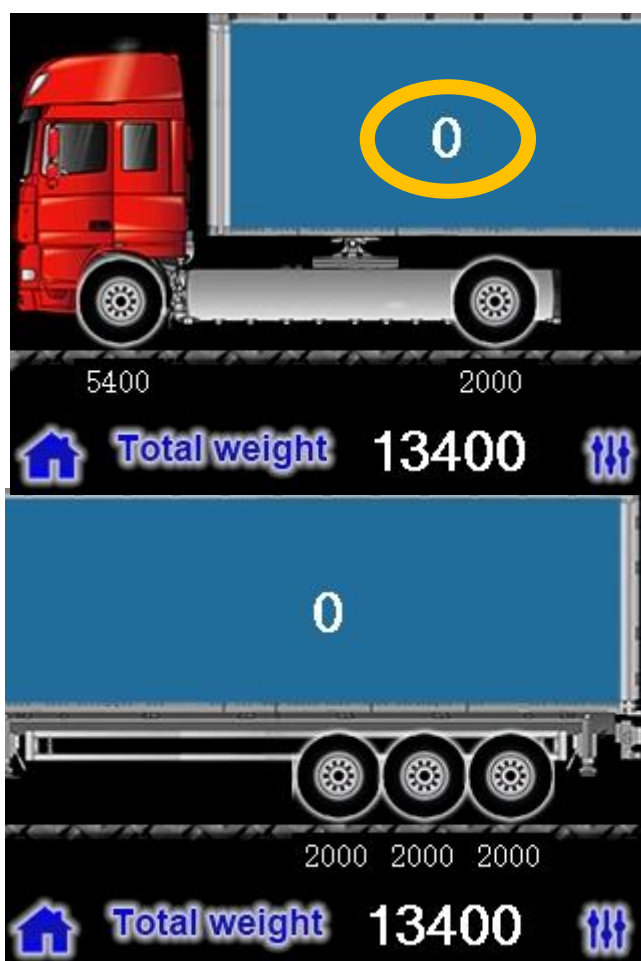
5.4.1 Displaying the Semi-Trailer Truck Axle Load

Touch the icon “scales”  on the user interface start screen.

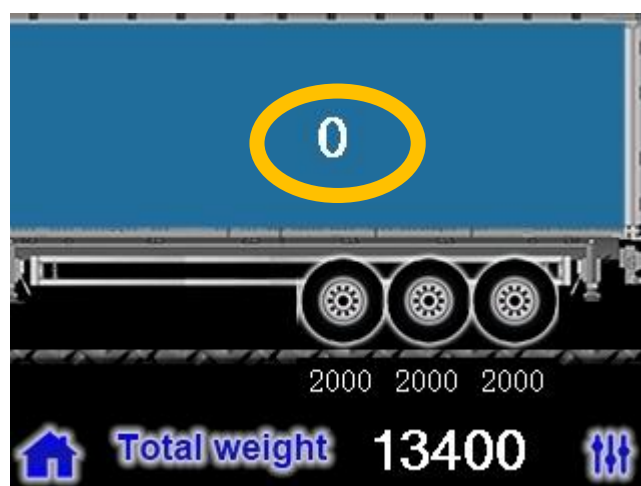
The display unit enters the semi-trailer truck axle load display mode (the data on the road-train gross weight, weight of cargo transported and loads on each axle of a tractor and semi-trailer are displayed) as shown in the picture below.

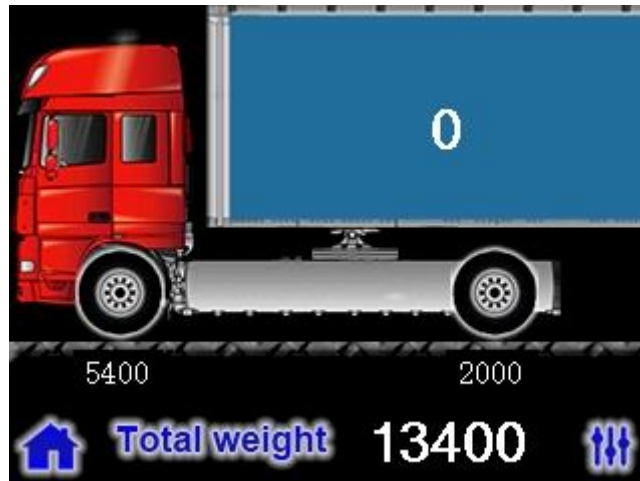


To see the semi-trailer axle loads touch the semi-trailer image (highlighted in yellow).



To return to the screen displaying a tractor touch the image depicting a tractor (highlighted in yellow).






To see the weight characteristics in a table format touch the caption “Gross Weight” (highlighted in yellow).

| | | | |
|-----------------------|---------------------|-------|--------------------------------------|
| 5400 | | 2000 | |
| 🏠 | Total weight | 13400 | ⬆️⬆️ |
| t r u c k | 1 | 5400 | 2000 |
| | 2 | 2000 | 2000 |
| | | | 2000 |
| | | | 1 t r a i l e r |
| Total weight | | 13400 | |
| cargo weight | | 0 | |



To return to the screen displaying a tractor touch the caption “Tractor” in the left side of the table. To return to the screen displaying a semi-trailer touch the caption “Trailer” in the right side of the table.

To set up the scale parameters, touch the icon  on the user interface start screen or other operating modes of the display unit.

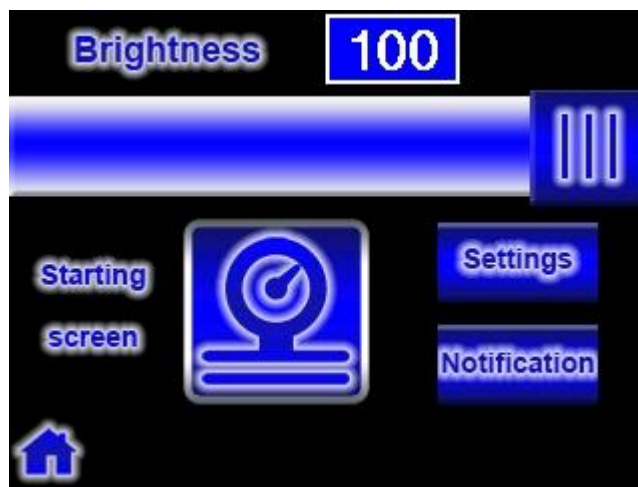
5.4.2 Setting the Scale Parameters

Attention!!!

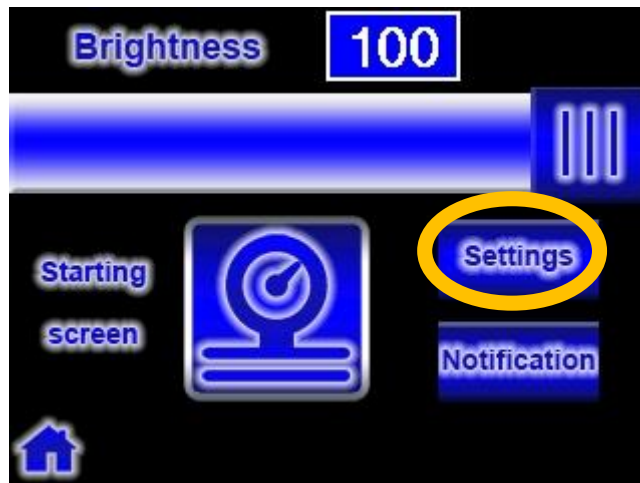
The stationary tractor weighing scales are required to set up pressure sensors. After each tractor weighing, the axle load data obtained shall be entered to the pressure sensor unit settings. For the correct data entry in the system settings, the tractor has to be located on a flat horizontal and vertical surface. This requirement is due to the reading parameters from the pressure sensors and their calibrating in the system.

Touch the settings icon  on the user interface start screen or other operating modes of the display unit depicting the icon 



The display unit enters the settings display mode (as shown in the picture below).



In the appeared screen touch the icon “Calibration”

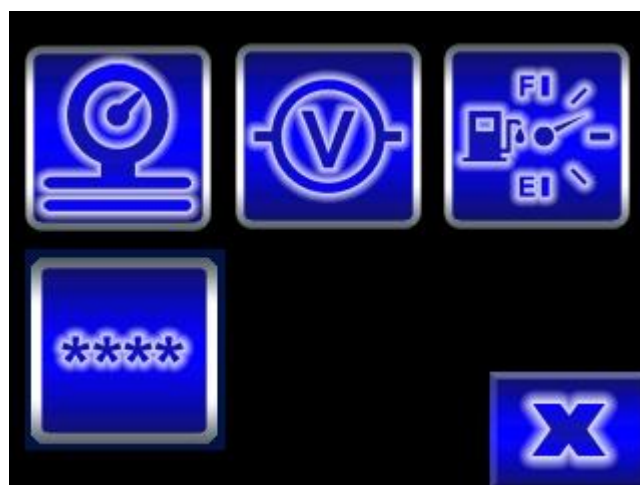


The display unit enters the PIN code entry mode (as shown in the picture below).

Enter a PIN code (**default PIN is 1234**) and confirm the entry by touching the icon . Touch the icon  to show the entered PIN.



The display unit enters the settings display mode (as shown in the picture below).

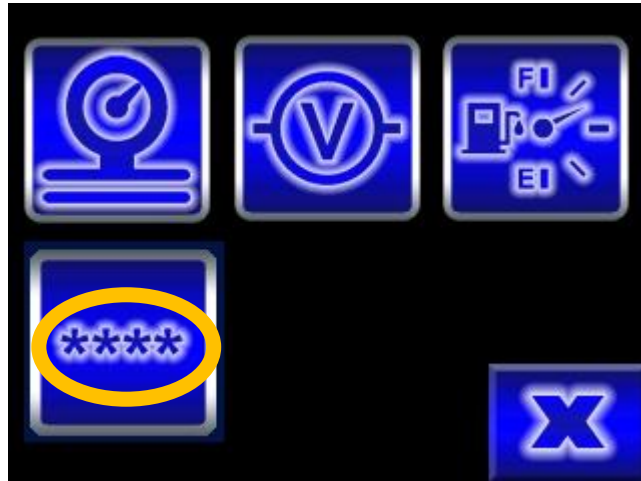


5.4.3 Changing PIN Code

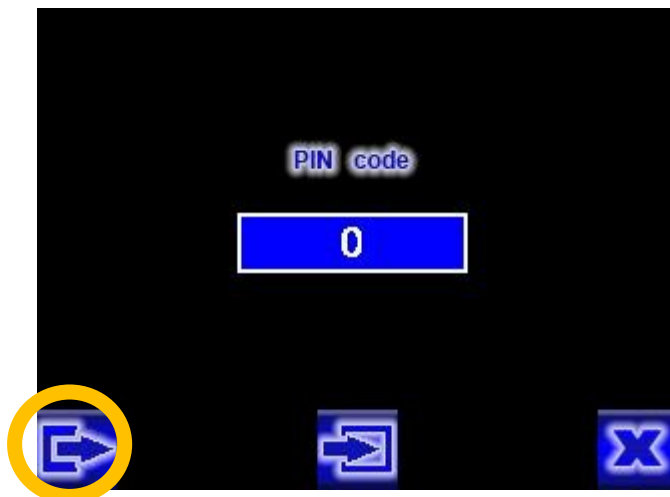
Attention!!!

Be sure to write down the new PIN code, as it will not be possible to reset the PIN code and configure the units after changing.

To change PIN code touch the icon  and the PIN code setup menu will be displayed.



To load the PIN code from the unit touch the icon



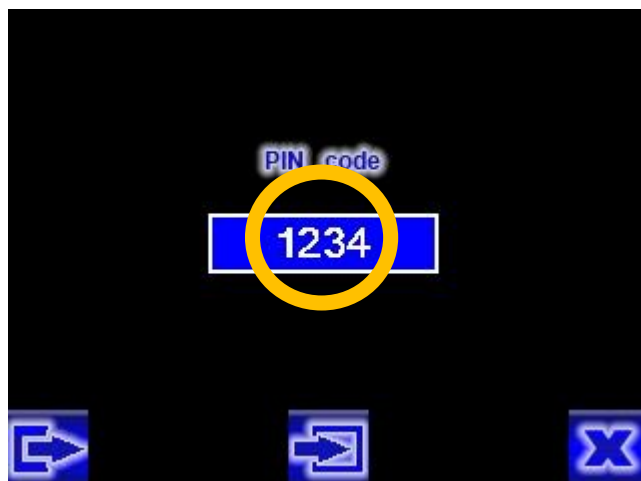
The message about the PIN code loading appears. Touch the icon  to confirm your selection.



The PIN code is displayed on the screen.



To change the PIN code touch the displayed digits "1234".





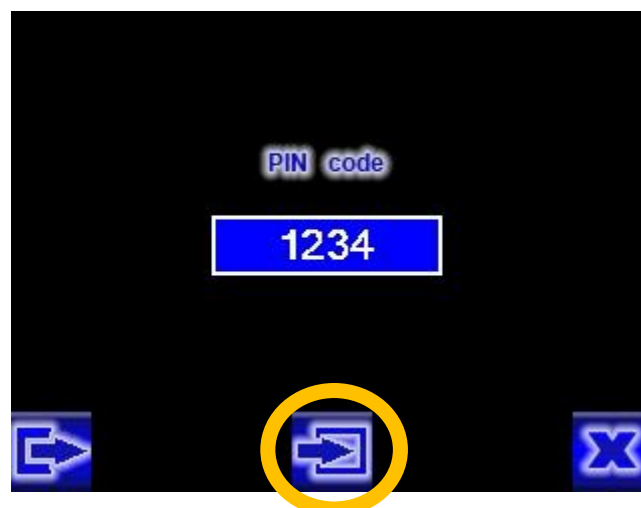
Enter a new PIN code and confirm by touching the icon

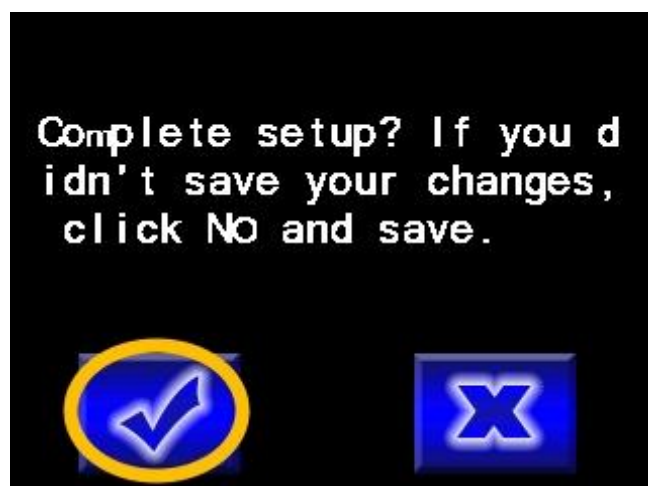




The new PIN code is displayed on the screen.

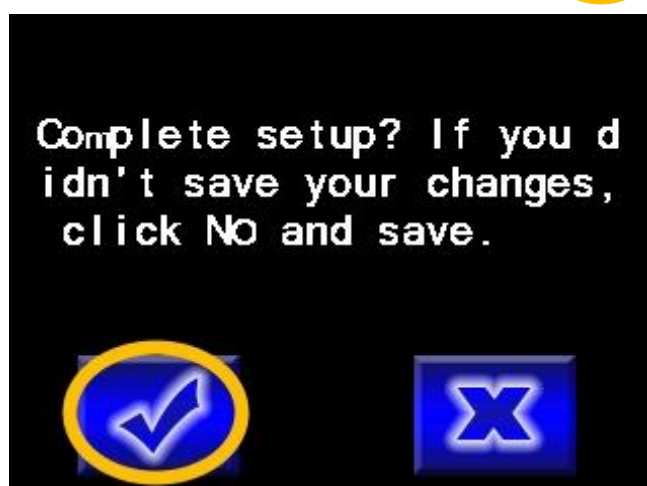


To save the new PIN code in the unit's memory touch the icon . Confirm saving by touching the icon  when the corresponding message appears.





The new PIN code is saved in the unit's memory. To return to the "Calibration" main menu touch the icon  and confirm by clicking the icon 



5.4.4 Tractor Pressure Sensor Unit Setting

Let's consider an example of the equipment set setting up on a semi-trailer (3 axles) truck (2 axles). The figures, installation/wiring diagrams of the mounted equipment set are presented below.

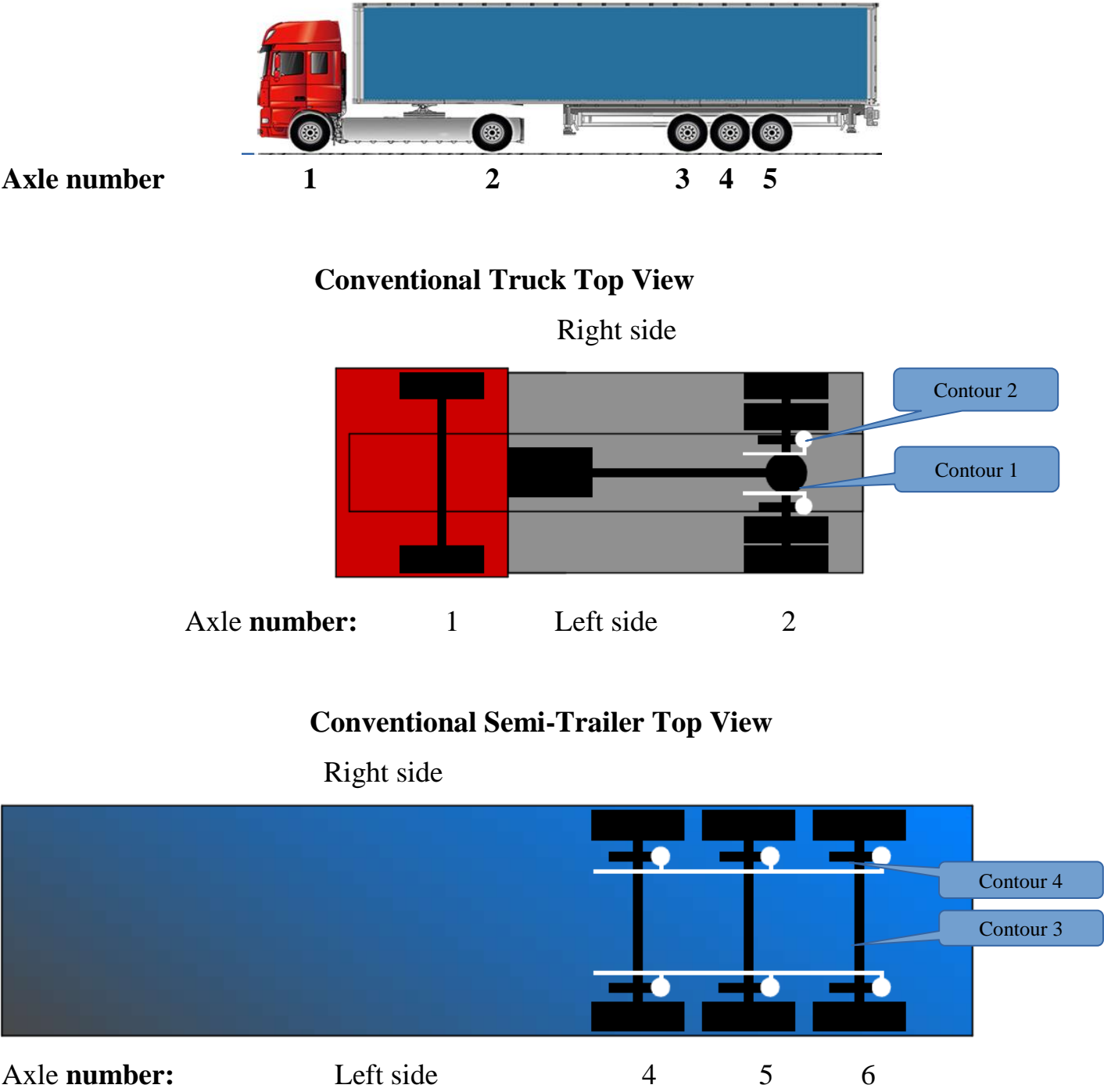


Table of Sensor Numbering by Axles

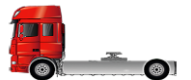
| Item No. | Pressure Sensor Unit Installation Location | Unit No. | Pressure Sensor No. | Tractor/Semi-Trailer Axle No. | Pneumatic Contour Number/Side |
|----------|--|----------|---------------------|-------------------------------|-------------------------------|
| 1 | Tractor | 1 | 1 | 1,2 | 1/left |
| 2 | Tractor | 1 | 2 | 1,2 | 2/right |
| 3 | Semi-trailer | 2 | 1 | 3,4,5 | 3/left |
| 4 | Semi-trailer | 2 | 2 | 3,4,5 | 4/right |

Attention!!!


The tractor air ride suspension must be in traveling condition. The semi-trailer must be uncoupled.

In the table below, you can see the readings obtained as a result of tractor weighing.


Axle Load Table

| No. | Name of cargo to be weighed | Axle load, kg | | | | | |
|-----|---|---------------|------|---|---|---|-------|
| | | 1 | 2 | 3 | 4 | 5 | Total |
| 1 |  | 5100 | 2200 | - | - | - | 7300 |

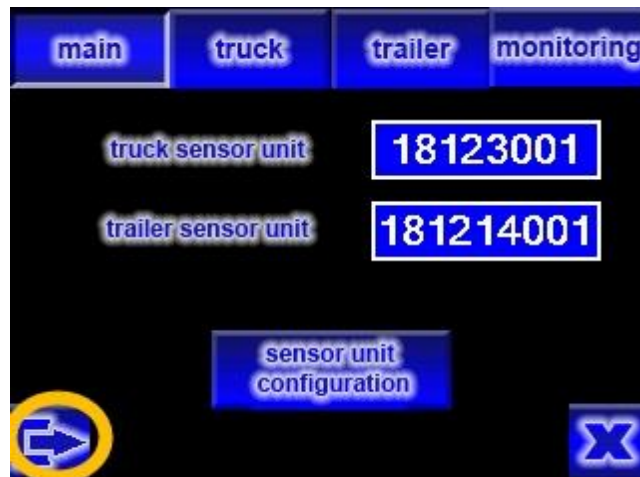
5.4.4.1 Defining the Tractor Pressure Sensor Unit

After installing the equipment set, you have to define which of the sensor units is installed on the tractor. Enter the “Calibration” menu and select the icon 

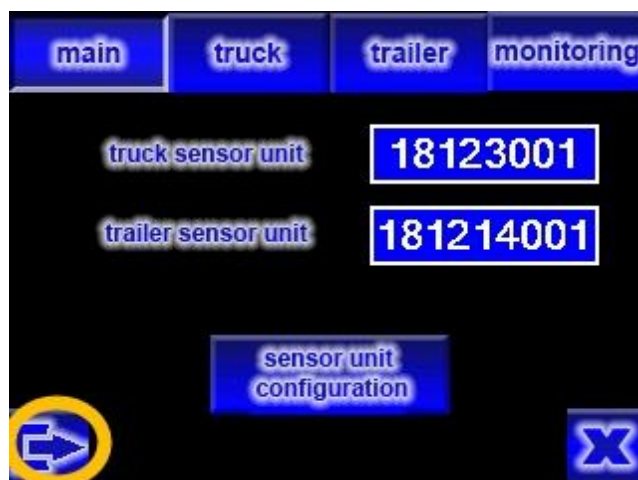


When the numeric display is appeared (as shown in the picture below), enter PIN code (**default PIN: 1234**) and confirm by touching the icon .


To show the entered PIN code touch the icon .

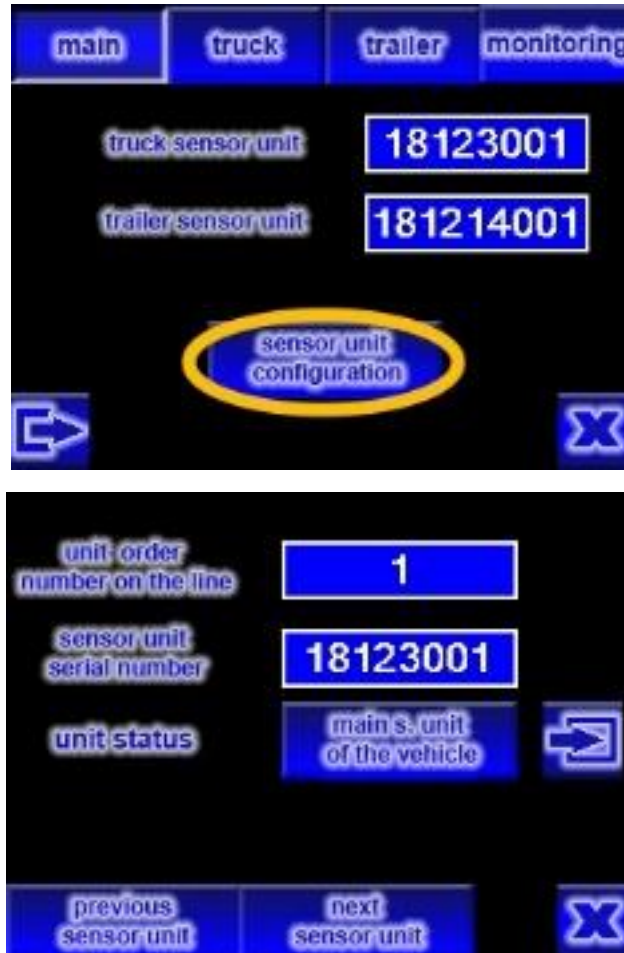


To load the values from the switching unit memory touch the icon .



When the corresponding message displays confirm your choice by touching the icon 

To enter the “Unit Configuration” menu touch the icon . The unit type configuration menu will be displayed.



Using the icons “previous unit” and “next unit” choose the sequence numbers of pressure sensor units in the line and assign the unit type.

The system automatically determines the serial number of a pressure sensor unit and the number of connected pressure sensor unit in the line. The system requires to specify which of the units will be the main or additional (this parameter shall be separately configured for a tractor and a semi-trailer). In this example, there are only 2 pressure sensor units and both of them are main, i.e. one unit is mounted on the tractor, the second one – on the semi-trailer.

If two pressure sensor units (4 pressure sensors) are installed on the 3-axle tractor, the pressure sensor unit, which is connected by the interconnect cable to the switching

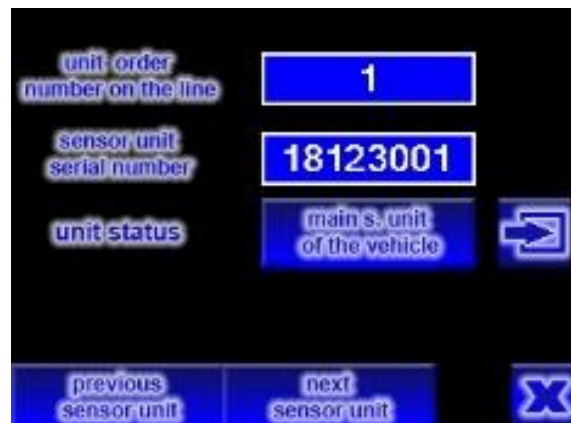
unit, is main and the unit following it is additional. The sequence numbers of the pressure sensor units in the system correspond to the sequence order in which they are connected to the line. The numbering of pressure sensors is shown in the table below.

Table of the Pressure Sensor Numbering by Axles

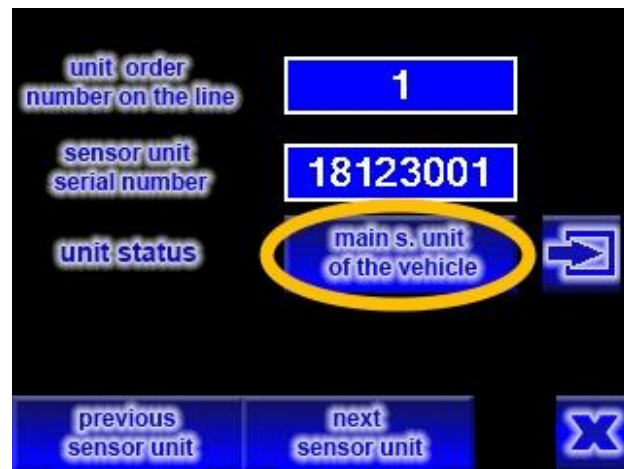
| Seq. No. | Pressure Sensor Unit Installation Location | Unit. No. | Pressure Sensor No. | Tractor/Semi-Trailer Axle No. | Pneumatic Contour Number/Side | Unit Type |
|----------|--|-----------|---------------------|-------------------------------|-------------------------------|------------|
| 1 | Tractor | 1 | 1 | 1(front axle) | 1/left | Main |
| 2 | Tractor | 1 | 2 | 1(front axle) | 2/right | Main |
| 3 | Tractor | 2 | 3 | 2(rear axle) | 3/left | Additional |
| 4 | Tractor | 2 | 4 | 2(rear axle) | 4/right | Additional |
| 5 | Tractor | 3 | 5 | 3(rear axle) | 5/ left | Additional |
| 6 | Tractor | 3 | 6 | 3(rear axle) | 6/right | Additional |

If the number of defined pressure sensor units is less than the number of the installed and connected pressure sensor units, it means that the switching unit did not find a part of the pressure sensor units in the line. It is required to check the operation of the installed patch cables and repeat the procedure of defining the pressure sensors units.

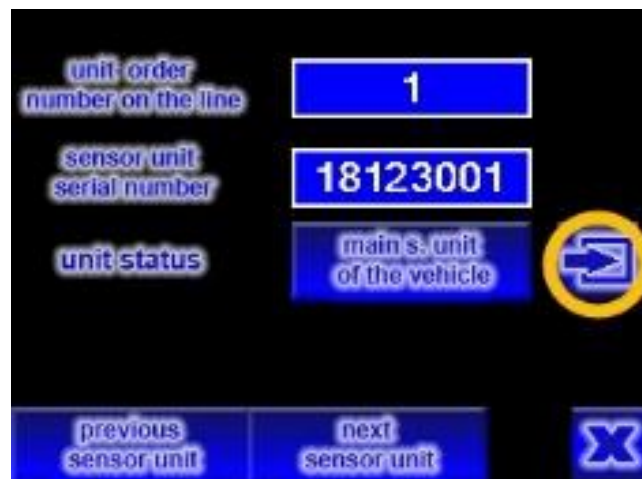
The system automatically determines the serial number of the tractor pressure sensor unit. The sequence numbers of the pressure sensor units in the system correspond to the sequence order in which they are connected to the line. The numbering of pressure sensor units starts from the switching unit.



Choose the first sequence number of the unit in the line and assign the unit type “TC Main Unit”.



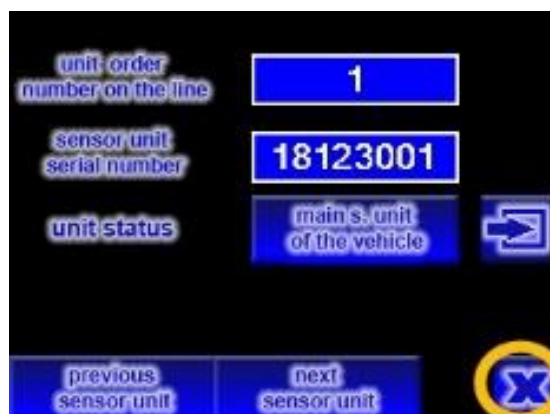
To save the unit type settings touch the icon

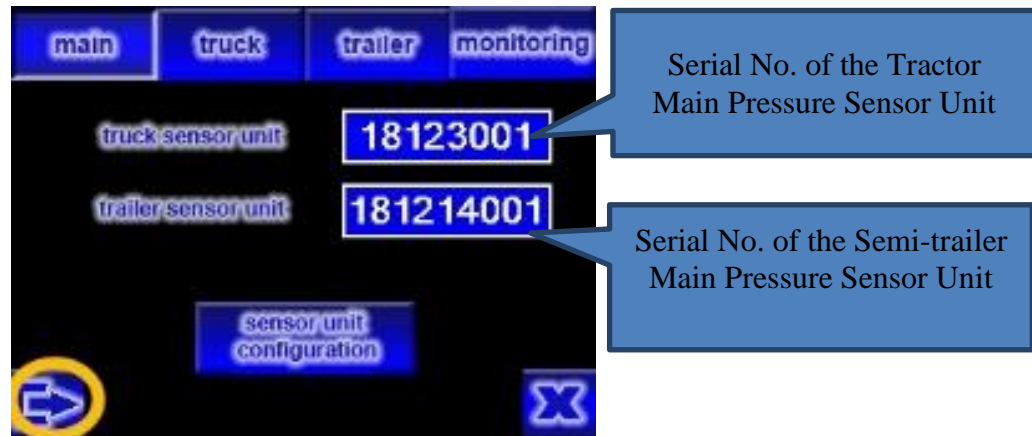


When the corresponding message displays on the screen, confirm the action by touching the icon 

The defining and setting the sequential order of the tractor pressure sensor units is completed.

To get back to the parameter setting main menu touch the icon





Perform the same operations to define and set up the semi-trailer pressure sensor units.

5.4.4.2 Reading Data from the Tractor Pressure Sensor Unit

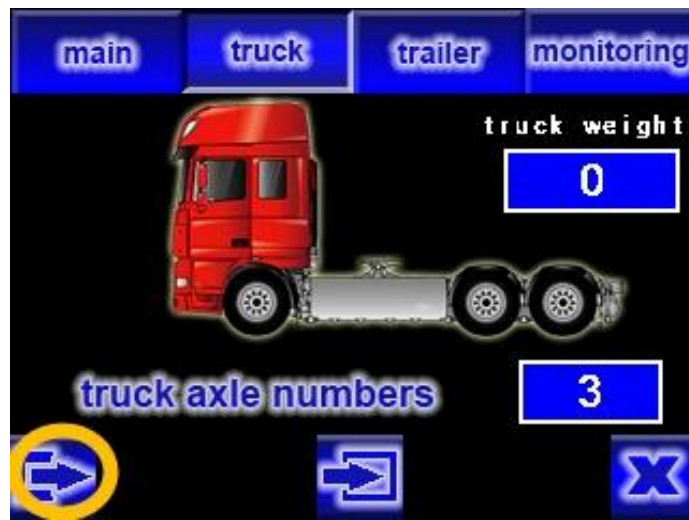
Enter the obtained readings to the tractor pressure sensor unit settings.

Touch the icon “TRUCK” . The display unit enters the tractor settings display mode as shown in the picture below.



First read the settings from the tractor sensor unit; to do this, touch the icon

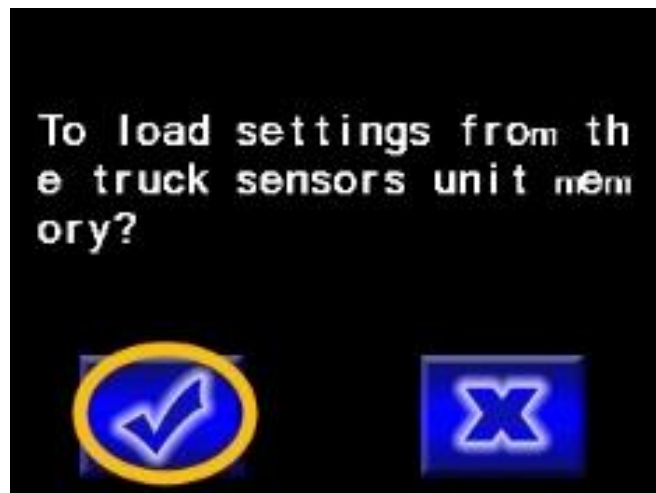




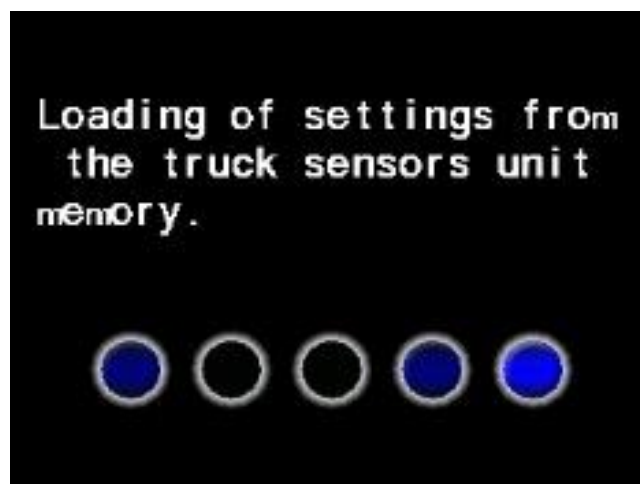
Attention!!!

Be sure to perform this action when making any changes in settings.

When the corresponding message displays, touch the icon  to confirm the action.



The data begin loading from the tractor pressure sensor unit. The data loading process is shown in the picture below.



If an error message appears (as shown below in the picture), repeat the reading data from the tractor sensor unit again.



If the reading of data from the tractor pressure sensor unit is successful, the following screen is displayed.



5.4.4.3 Tractor Axle Number Setting

To change the tractor axle number touch the icon

3



The display unit enters the tractor axle number entry mode as shown in the picture below. Choose the value "2".



The parameter “Tractor Axle Number” changes to the selected value.



5.4.4.4 Tractor Weight Setting

Set the weight of an empty tractor from the table above, equal to 7300 kg. Touch the icon **0** and enter this value.



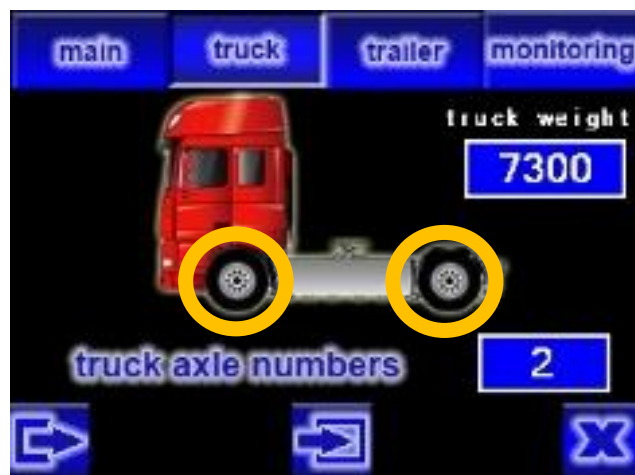
Touch the icon  to confirm.



The parameter “Tractor Weight” changes to the selected value.



5.4.4.5 Tractor Axle Load Setting



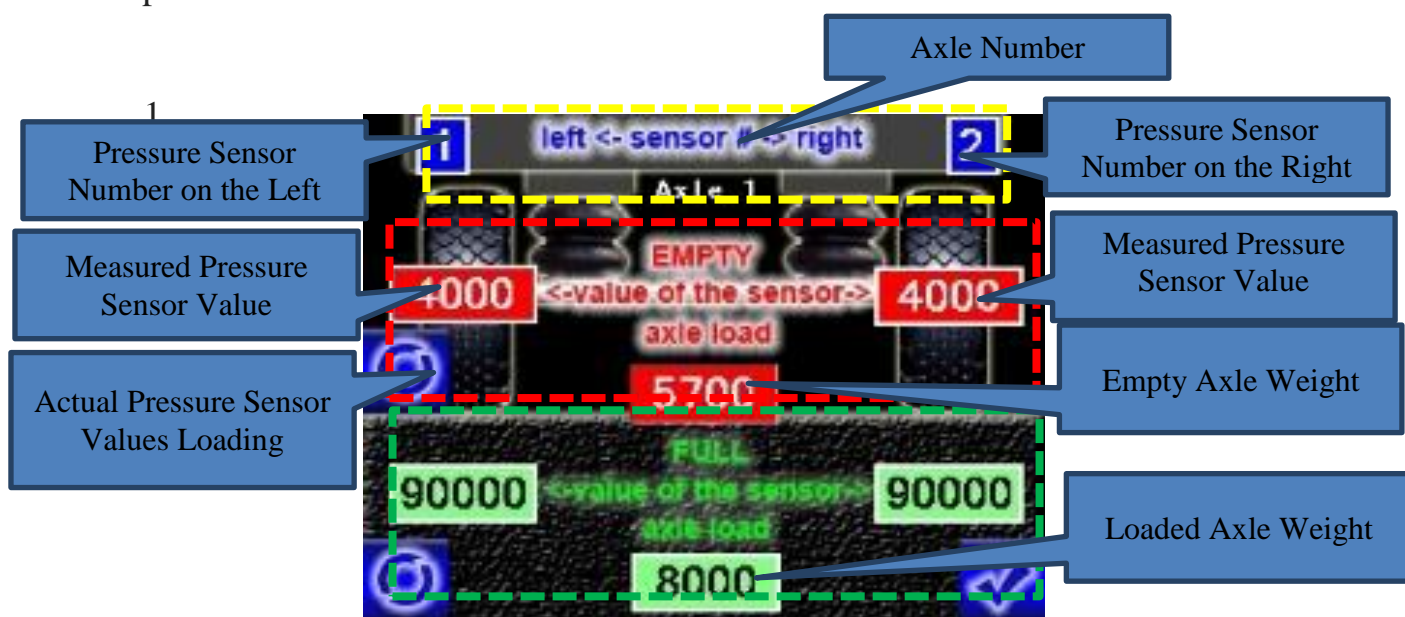
To set up the values of the tractor axle loads, on the tractor icon touch the wheel (highlighted in yellow) the axle of which is subject to configuration.

5.4.4.5.1 Setting the Pressure Sensor Numbers for the Axle No. 1

Touch the tractor wheel icon of the axle No. 1 (under the cab) as shown in the picture below.



The display unit enters the settings entry mode for the tractor axle No. 1 as shown in the picture below.



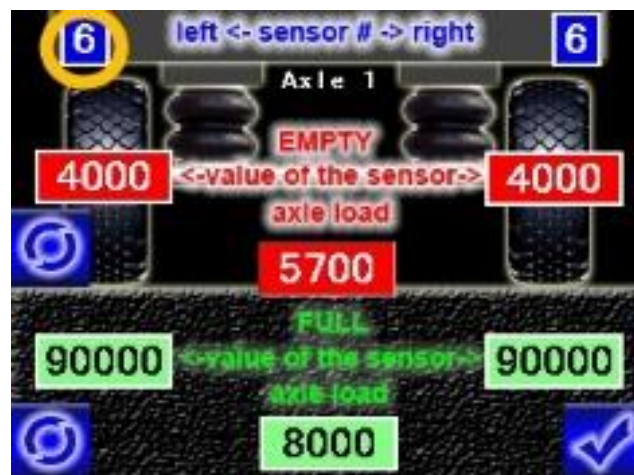
The user display is divided into 3 parts horizontally:

- setting the numbers of pressure sensors transmitting the axle load data (highlighted by a yellow dotted line);
- setting the axle load values (tractor without a trailer) in accordance with the pressure sensor(s) values (highlighted by a red dotted line);
- setting the axle load values (tractor with a loaded semi-trailer) in accordance with the pressure sensor(s) readings (highlighted by a green dotted line).

Set up the numbers of pressure sensors transmitting the axle load data (highlighted by a yellow dotted line);

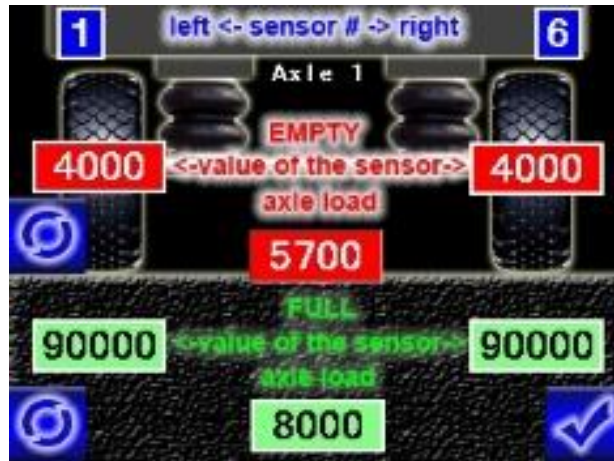
In accordance with the table of the pressure sensor numbering by axles, set up the number of a sensor on the basis of which the system will calculate the loads on each axle.

To do this, touch the sensor number icon located on the left (the number “6” to the left of the picture) and select the sensor number (in our example, sensor No. “1” is located on the left).

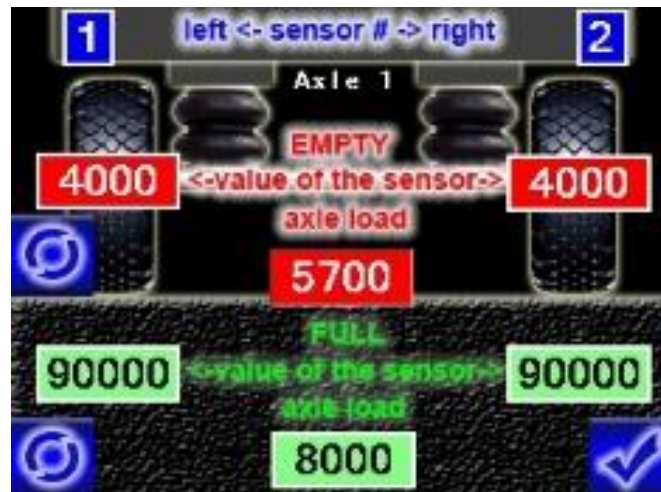


The number of the sensor in the upper left corner changes to the set value as shown in the picture below.



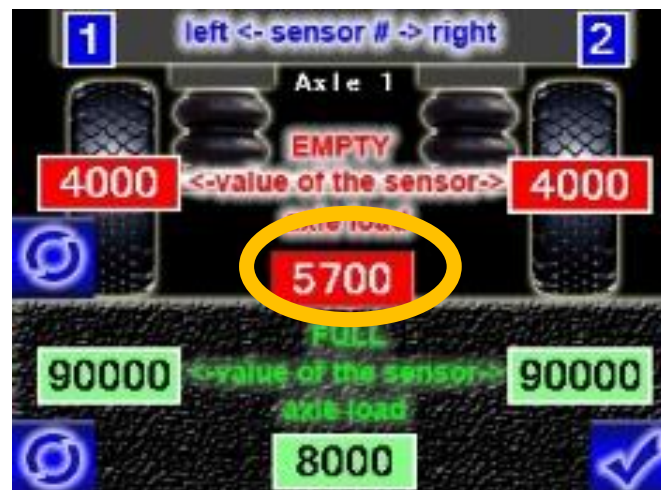


Set up similarly the number for the right sensor of the tractor axle No.1. Assign number “2”. To do this, touch the sensor number icon located on the right (the number “6” to the right of the picture) and enter the sensor number “2”. When setup is completed, the sensor numbers should be displayed in accordance with the picture below.




5.4.4.5.2 Setting the Pressure Sensor Load Values for the Axle No. 1

Set up the load value of the tractor axle No. 1 (the number “5700” with a red background in the picture) in accordance with the table of axle loads. Touch the icon “5700” in the red rectangle.

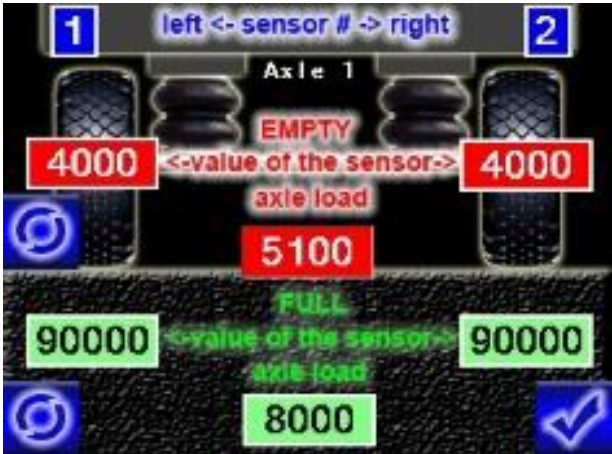


The display unit enters the data entry mode. Using the displayed digit keys enter the number “5100 kg” in accordance with the table.

To confirm touch the icon 




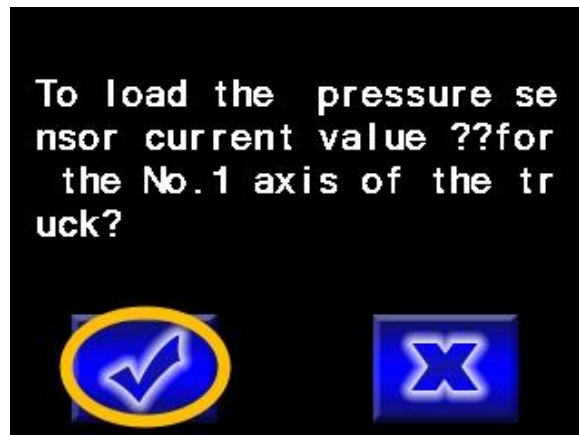
The entered load value displays in the red rectangle as shown in the picture below.




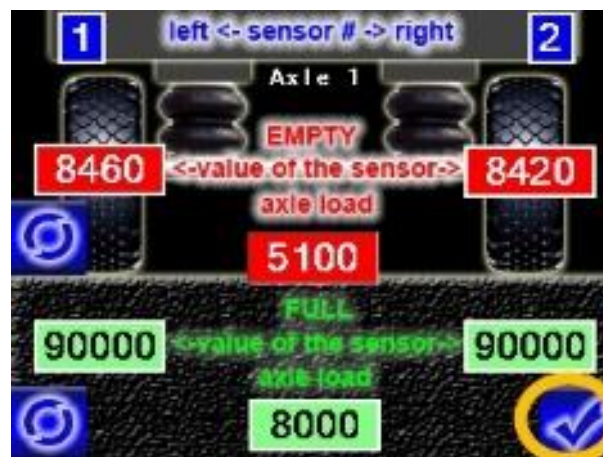
To display the current sensor readings touch the icon .



A message appears on the display unit screen. Confirm the action by touching the icon . The current sensor readings are loaded.



To save settings for the tractor axle No.1 touch the icon 



The display unit enters the tractor settings entry mode as shown in the picture below.



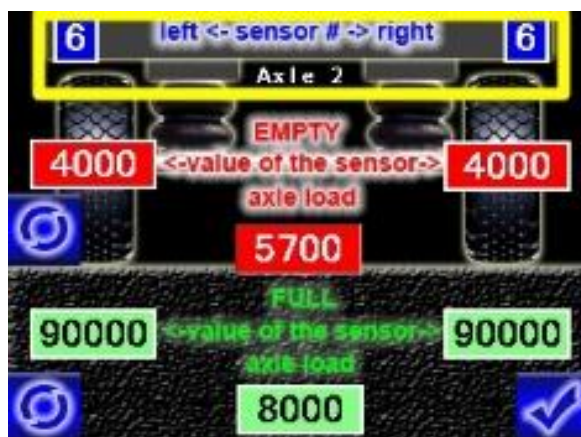
5.4.4.6 Setting the Pressure Sensor Numbers for the Axle No. 2

To adjust the parameters for the axle No. 2 repeat the same setup procedure that you performed when setting up the axle No. 1. The load values for the axle No. 2 are presented in tables of axle loads and pressure sensor numbering by axles.

Touch the wheel icon of the tractor axle No. 2.



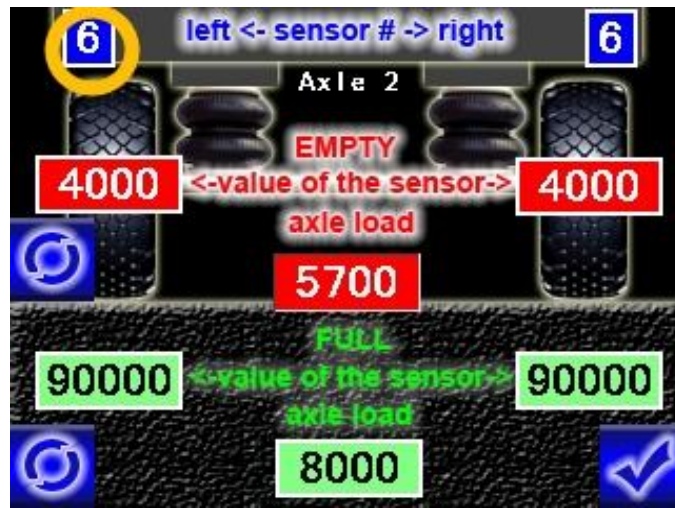
The display unit enters the settings entry mode for the tractor axle No. 2 as shown in the picture below.



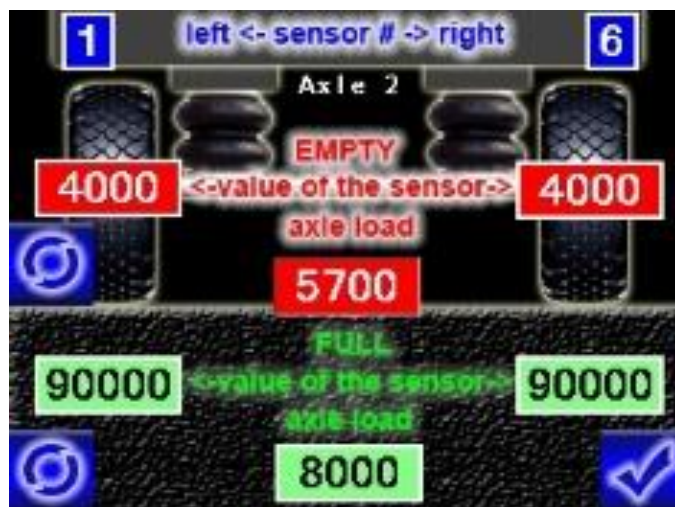
Set up the numbers of pressure sensors transmitting the axle load data (highlighted by a yellow dotted line);

In accordance with the table of the pressure sensor numbering by axles, set up the number of a sensor on the basis of which the system will calculate the loads on each axle.

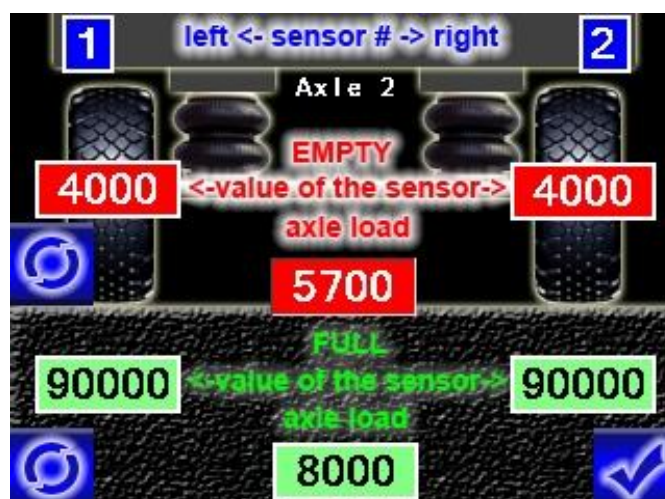
To do this, touch the sensor number icon located on the left (the number “6” to the left of the picture) and select the sensor number (in our example, sensor No. “1” is located on the left).



The number of the sensor in the upper left corner changes to the set value as shown in the picture below.

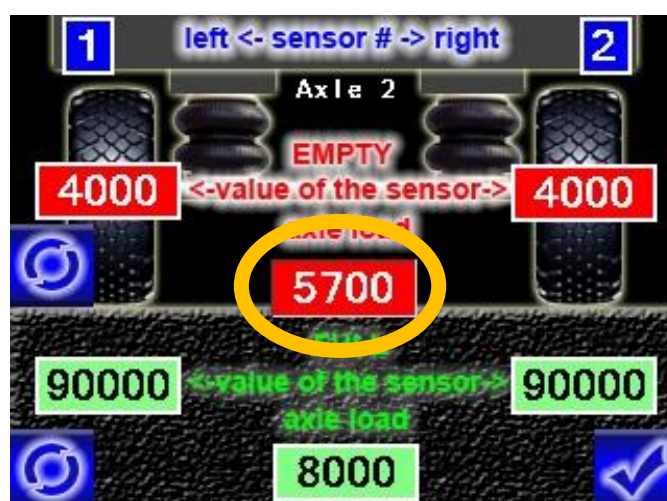


Set up similarly the number for the right sensor of the tractor axle No.2. Assign number “2”. To do this, touch the sensor number icon located on the right (the number “6” to the right of the picture) and enter the sensor number “2”. When setup is completed, the sensor numbers should be displayed in accordance with the picture below.



5.4.4.7 Setting the Pressure Sensor Load Values for the Axle No. 2

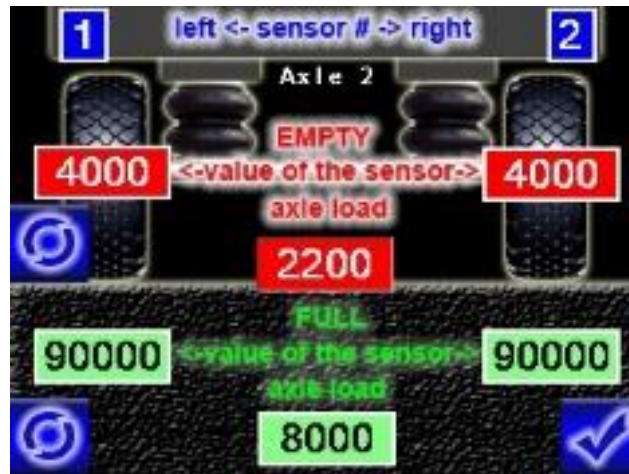
Set up the load value of the empty tractor axle No. 2 (the number “5700” with a red background in the picture). Touch the icon “5700” in the red rectangle.



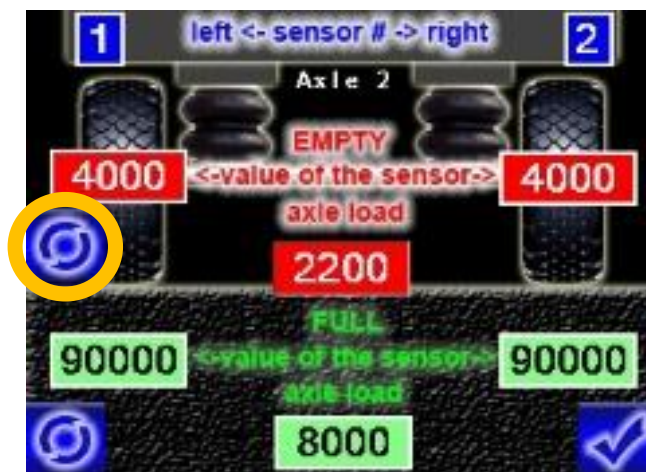
Enter the load value on the axle No. 2 in accordance with the table of axle loads (2200 kg in our example.) To confirm touch the icon




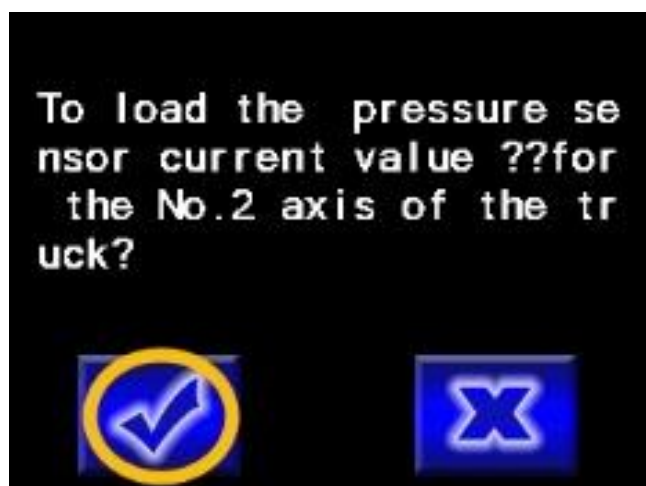
The entered load value displays in the red rectangle as shown in the picture below.



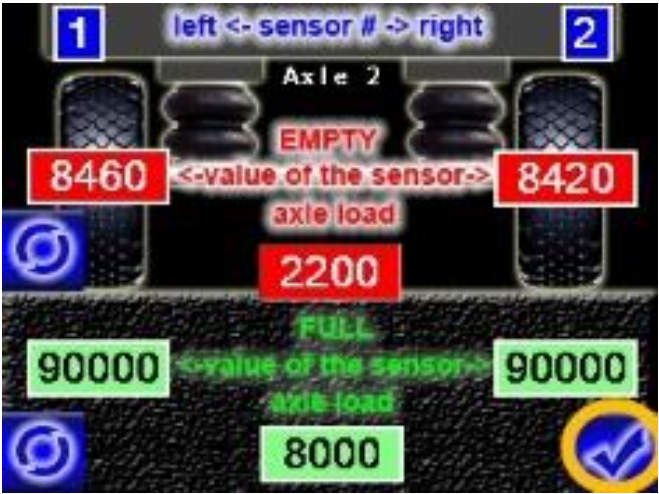
To display the current sensor readings touch the icon



A message appears on the display unit screen. Confirm the action by touching the icon . The current sensor readings are loaded.



The parameter setup for the second tractor axle is completed. Touch the icon 



The display unit enters the tractor settings entry mode as shown in the picture below.



The parameter setup for the pressure sensor unit of the tractor axles is completed.


5.4.4.8 Saving Settings to the Tractor Pressure Sensor Unit

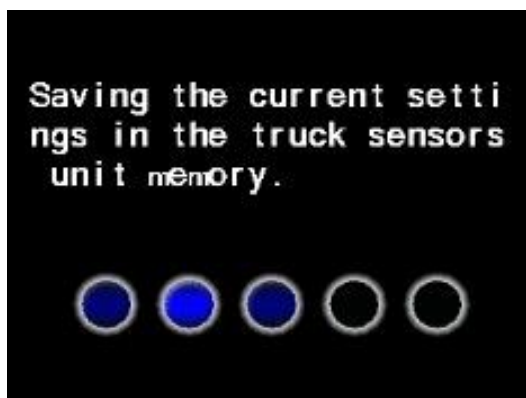
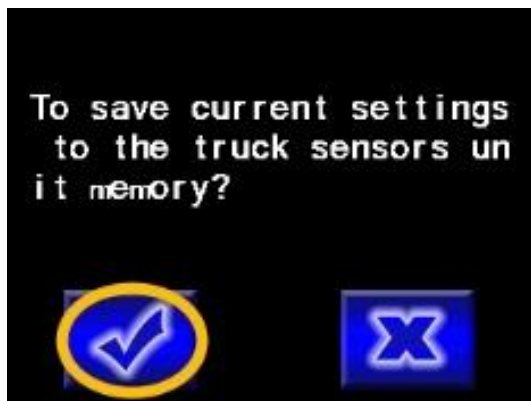
To save the entered values in the tractor pressure sensor unit touch the icon 



Attention!!!

Be sure to load the set values each time you make changes in the settings of the tractor sensor unit.

A message appears on the display unit screen. To confirm the action touch the icon . The saving settings to the tractor sensor unit memory begins.



If an error message appears (as shown below in the picture), repeat the saving again by touching the icon .



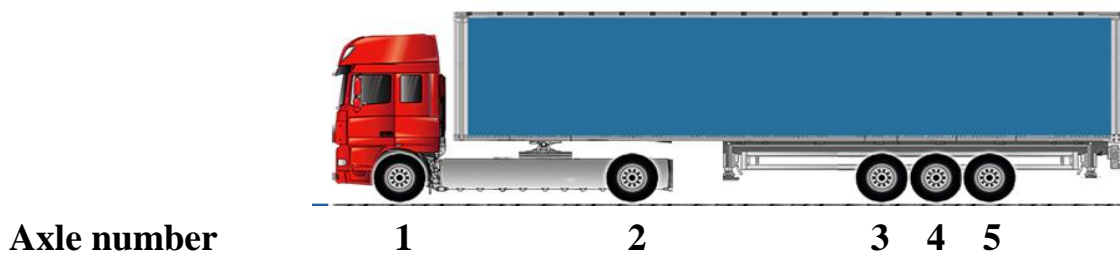
The setup for an empty tractor pressure sensors is completed.

To get back to the main menu touch the icon .

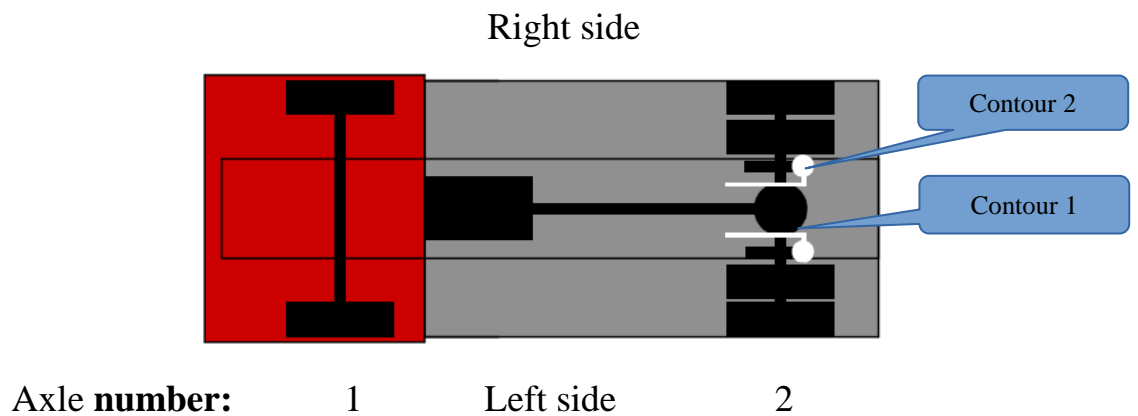


5.4.5 Setting the Empty Semi-Trailer Pressure Sensor Unit

Let's consider an example of the equipment set setting up on a semi-trailer (3 axles) truck (2 axles).

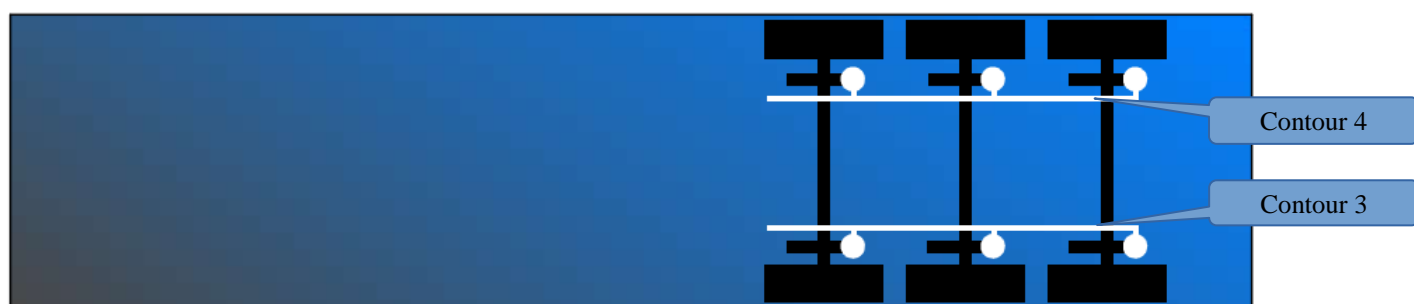


Conventional Truck Top View



Conventional Semi-Trailer Top View

Right side



Axle number:

Left side

4

5

6

Table of Sensor Numbering by Axles



| Item No. | Pressure Sensor Unit Installation Location | Unit No. | Pressure Sensor No. | Tractor/Semi-Trailer Axle No. | Pneumatic Contour Number/Side | Unit Type |
|----------|--|----------|---------------------|-------------------------------|-------------------------------|-----------|
| 1 | Tractor | 1 | 1 | 1,2 | 1/left | Main |
| 2 | Tractor | 1 | 2 | 1,2 | 2/right | Main |
| 3 | Semi-trailer | 2 | 1 | 3,4,5 | 3/left | Main |
| 4 | Semi-trailer | 2 | 2 | 3,4,5 | 4/right | Main |

Attention!!!

The trailer must be coupled with the tractor. The air ride suspension of the tractor and semitrailer must be in traveling condition. The trailer lift axles must be forcibly lowered. Connect the cable of the semi-trailer (interconnect coiled cable of the tractor-trailer/semi-trailer) to the tractor. The semi-trailer must be empty.

In the table below (in the row No. 2), you can see the readings obtained as a result of a semi-trailer truck weighing.

Semi-Trailer Truck Axle Load Table


| No. | Name of cargo to be weighed | Axle load, kg | | | | | |
|-------------------------|---|---------------|------|------|------|------|-------|
| | | 1 | 2 | 3 | 4 | 5 | Total |
| 1 |  | 5100 | 2200 | - | - | - | 7300 |
| 2 |  | 5200 | 3250 | 1800 | 1700 | 1650 | 13700 |
| Tractor weight, kg | | 7300 | | | | | |
| Semi-trailer weight, kg | | 6400 | | | | | |

Calculate the weight of the semi-trailer according to the formula: semi-trailer weight = weight of a tractor with an empty semi-trailer – tractor weight


Semi-trailer weight = 13700 kg – 7300 kg = 6400 kg

Enter the obtained values into the semi-trailer system settings.

5.4.5.1 Defining the Semi-Trailer Pressure Sensor Unit

After installing the equipment set, you have to define which of the sensor units is installed on the tractor. Enter the “Calibration” menu and select the icon 

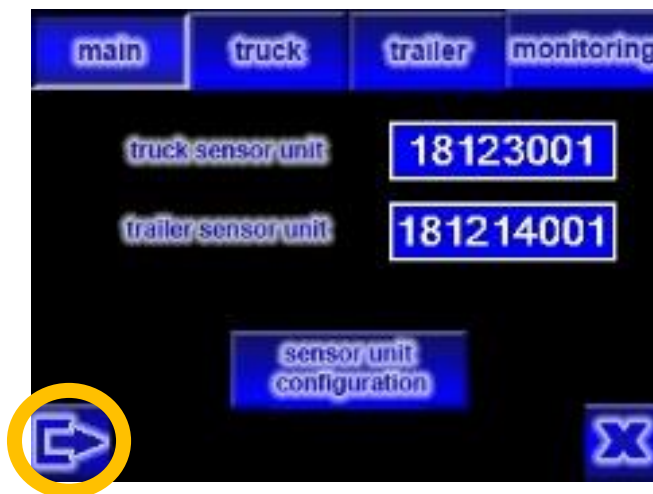


When the numeric display is appeared (as shown in the picture below), enter PIN code (**default PIN: 1234**) and confirm by touching the icon .


To show the entered PIN code touch the icon 

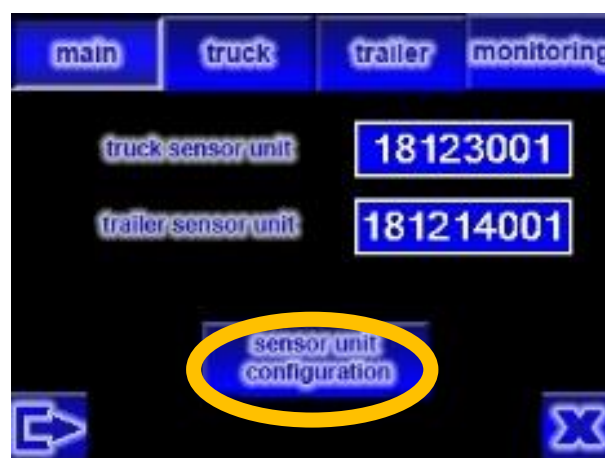


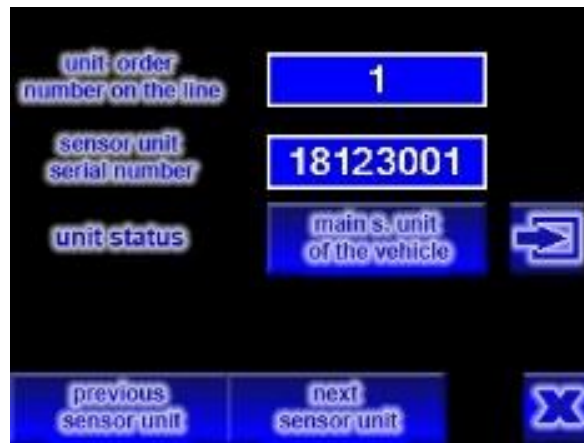
To load the values from the switching unit memory touch the icon



When the corresponding message displays confirm your choice by touching the icon 

To enter the “Unit Configuration” menu touch the icon . The unit type configuration menu will be displayed.





Using the icons “previous unit” and “next unit” choose the sequence numbers of pressure sensor units in the line and assign the unit type.

The system automatically determines the serial number of a pressure sensor unit and the number of connected pressure sensor unit in the line. The system requires to specify which of the units will be the main or additional (this parameter shall be separately configured for a tractor and a semi-trailer). In this example, there are only 2 pressure sensor units and both of them are main, i.e. one unit is mounted on the tractor, the second one – on the semi-trailer.

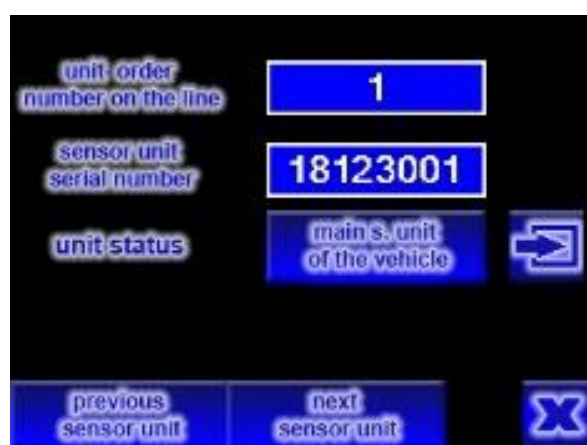
If two pressure sensor units (4 pressure sensors) are installed on the 3-axle tractor, the pressure sensor unit, which is connected by the interconnect cable to the switching unit, is main and the unit following it is additional. The sequence numbers of the pressure sensor units in the system correspond to the sequence order in which they are connected to the line. The numbering of pressure sensors is shown in the table below.

Table of the Pressure Sensor Numbering by Axles

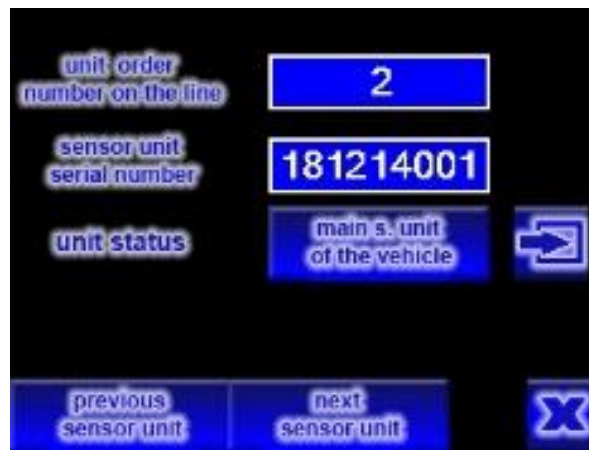
| Seq. No. | Pressure Sensor Unit Installation Location | Unit. No. | Pressure Sensor No. | Tractor/Semi-Trailer Axle No. | Pneumatic Contour Number/Side | Unit Type |
|----------|--|-----------|---------------------|-------------------------------|-------------------------------|------------|
| 1 | Tractor | 1 | 1 | 1(front axle) | 1/left | Main |
| 2 | Tractor | 1 | 2 | 1(front axle) | 2/right | Main |
| 3 | Tractor | 2 | 3 | 2(rear axle) | 3/left | Additional |
| 4 | Tractor | 2 | 4 | 2(rear axle) | 4/right | Additional |
| 5 | Tractor | 3 | 5 | 3(rear axle) | 5/ left | Additional |
| 6 | Tractor | 3 | 6 | 3(rear axle) | 6/right | Additional |

If the number of defined pressure sensor units is less than the number of the installed and connected pressure sensor units, it means that the switching unit did not find a part of the pressure sensor units in the line. It is required to check the operation of the installed patch cables and repeat the procedure of defining the pressure sensors units.

The system automatically determines the serial number of the semi-trailer pressure sensor unit. The sequence numbers of the pressure sensor units in the system correspond to the sequence order in which they are connected to the line. The numbering of pressure sensor units starts from the switching unit.

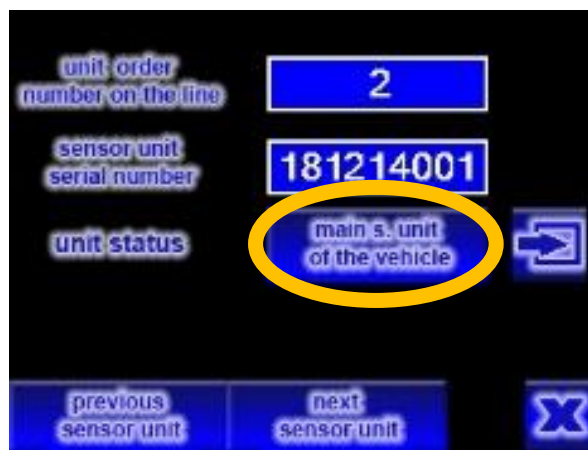


Touch the icon “next sensor unit” and choose the sequence number of the pressure sensor unit equal to “2”.

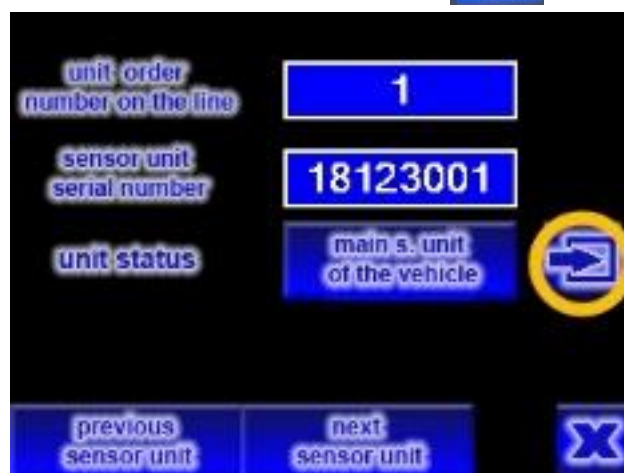


The sequence unit number in the line, the pressure sensor unit serial number and the unit type are displayed.

Assign the unit type “TC Main Unit”.



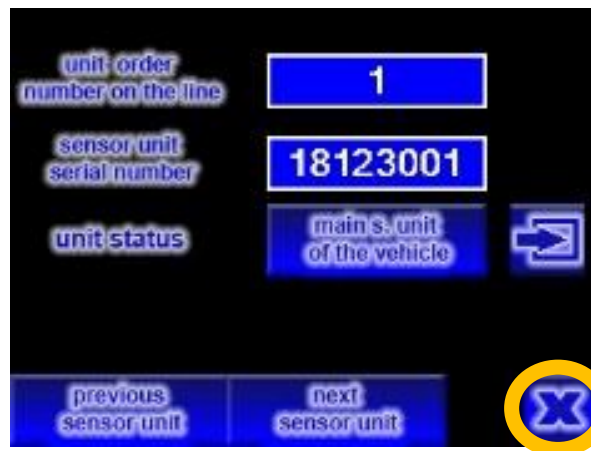
To save the unit type settings touch the icon 



When the message “Change the Unit Type” displays on the screen, confirm the action by touching the icon 

The defining and setting the sequential order of the semi-trailer pressure sensor units is completed.

To get back to the settings main menu touch the icon




5.4.5.2 Reading Data from the Semi-Trailer Pressure Sensor Unit

Touch the icon “Traller”



The display unit enters the semi-trailer settings display mode as shown in the picture below.



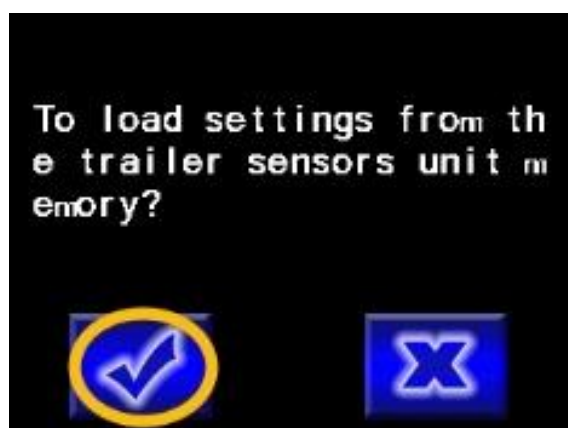
First read the settings from the semi-trailer sensor unit; to do this, touch the icon 



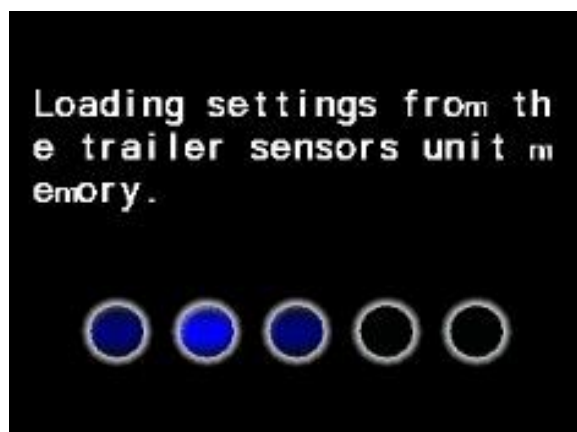
Attention!!!

Be sure to perform this action when making any changes in settings.

To confirm the action touch the icon 



The data begin loading from the semi-trailer pressure sensor unit. The data loading process is shown in the picture below.




If an error message appears (as shown below in the picture), repeat the reading data from the semi-trailer sensor unit again.



If the reading of data from the semi-trailer pressure sensor unit is successful, the following screen is displayed.



5.4.5.3 Semi-Trailer Axle Number Settings

To change the semi-trailer axle number touch the icon .



The display unit enters the tractor axle number entry mode as shown in the picture below. Choose the value "3". The parameter "Semi-Trailer Axle Number" changes to the selected value.



5.4.5.4 Semi-Trailer Weight Setting

Set the weight of an empty semi-trailer from the table above, equal to 6400 kg.

Touch the icon  and enter this value.



To confirm touch the icon





5.4.5.5 Setting the Semi-Trailer Axle Pressure Sensors

To set up the values of the semi-trailer axle loads, on the semi-trailer icon touch the wheel (highlighted in yellow) the axle of which is subject to configuration.

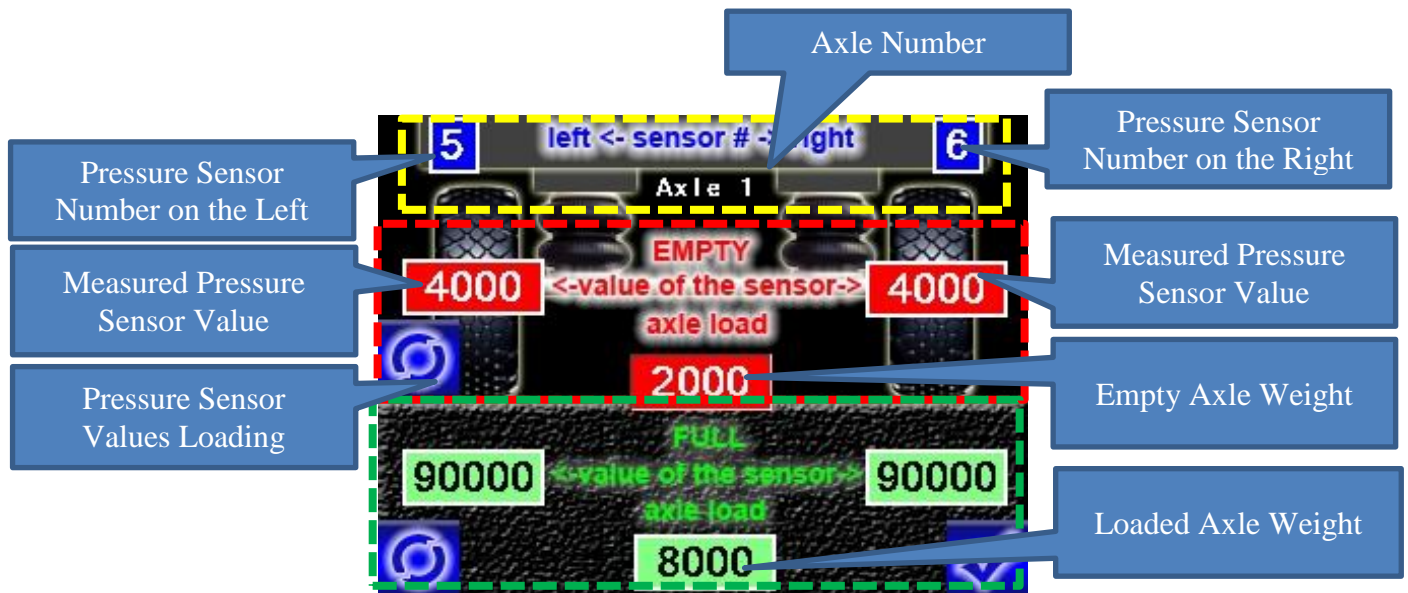


5.4.5.5.1 Setting Load for the Axle No. 3

Touch the wheel icon of the axle No. 3 (the first semi-trailer axle) as shown in the picture below.



The display unit enters the settings entry mode for the axle No. 3 (the first semi-trailer axle) as shown in the picture below.

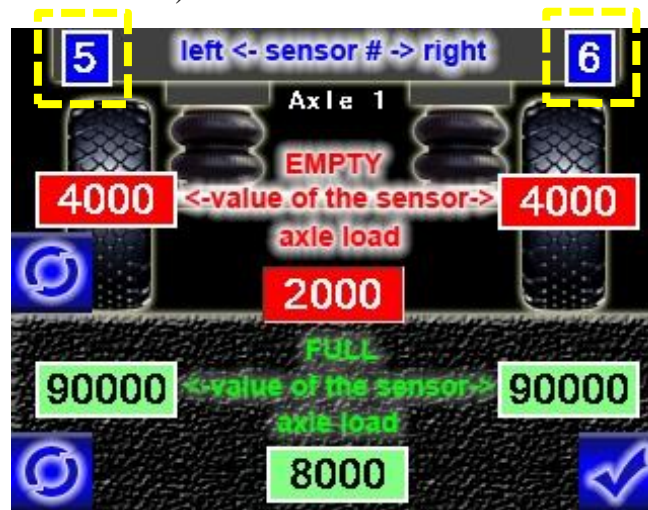


The user display is divided into 3 parts horizontally:

- setting the numbers of pressure sensors transmitting the axle load data (highlighted by a yellow dotted line);
- setting the axle load values (tractor without a trailer) in accordance with the pressure sensor(s) readings (highlighted by a red dotted line);
- setting the axle load values (tractor with a loaded semi-trailer) in accordance with the pressure sensor(s) readings (highlighted by a green dotted line).

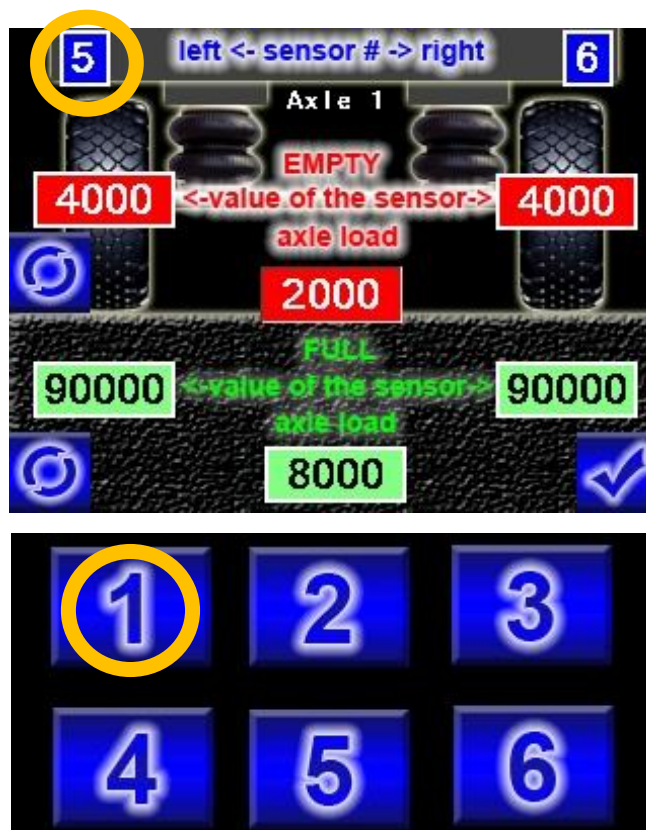
5.4.5.5.2 Setting the Pressure Sensor Numbers for the Axle No. 3

Set up the numbers of pressure sensors transmitting the axle load data (highlighted by a yellow dotted line).

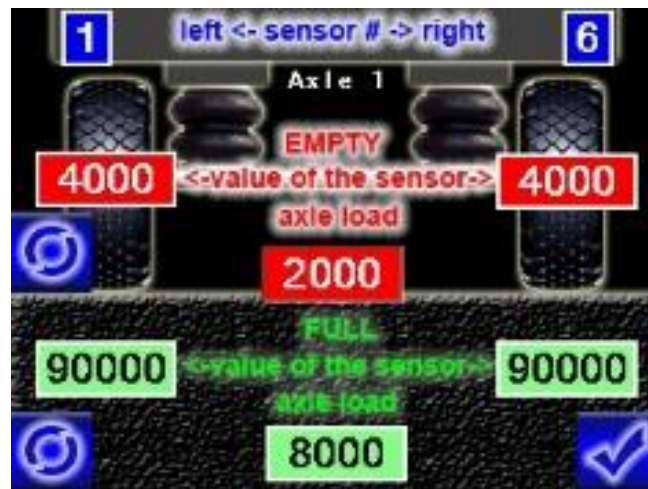


In accordance with the table below, set up the number of a sensor on the basis of which the system will calculate the loads on each axle.

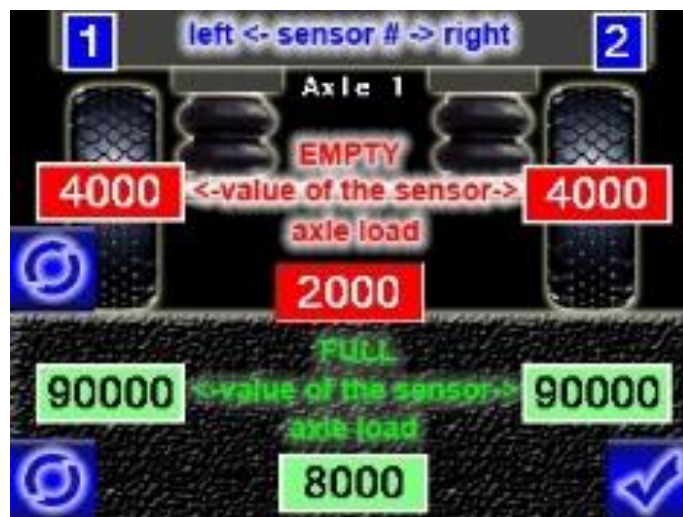
To do this, touch the sensor number icon located on the left (the number “6” to the left of the picture) and select the sensor number (in our example, sensor No. “1” is located on the left).



The number of the sensor in the upper left corner changes to the set value as shown in the picture below.

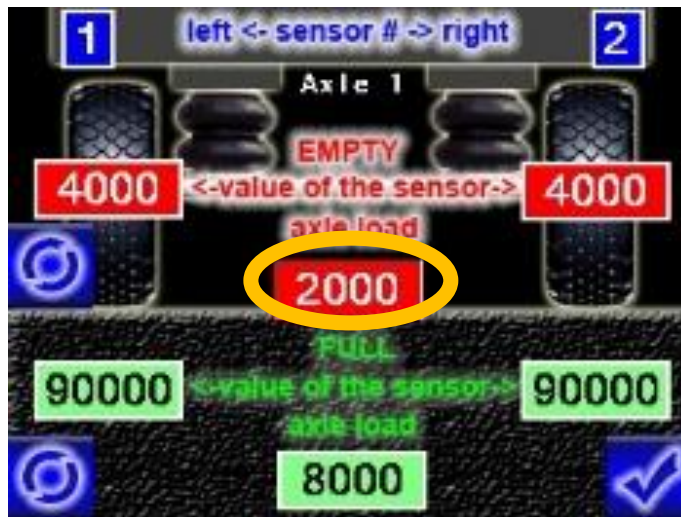


Set up the number for the right sensor of the semi-trailer axle No.1. Assign number “2”. To do this, touch the sensor number icon located on the right (the number “6” to the right of the picture) and enter the sensor number “2”. When setup is completed, the sensor numbers should be displayed in accordance with the picture below.




5.4.5.5.2.1 Setting the Pressure Sensor Load Values for the Axle No. 3

Set up the load value (the number “2000” with a red background in the picture) of the semi-trailer axle No. 3 (the first semi-trailer axle). Touch the icon “5700” in the red rectangle.

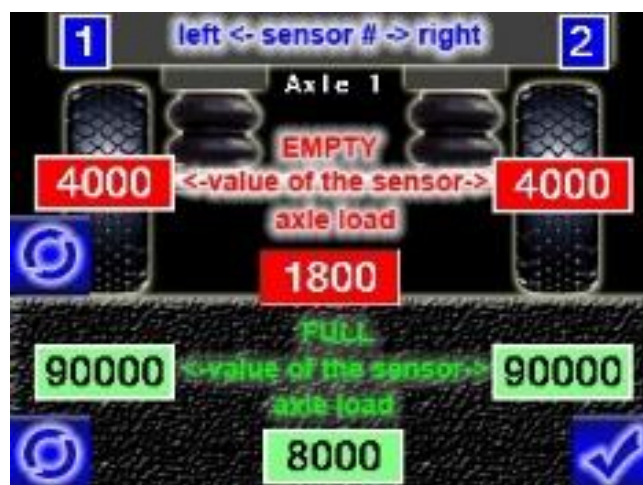


The display unit enters the data entry mode. Using the displayed digit keys enter the number “1800 kg” in accordance with the table of axle loads.

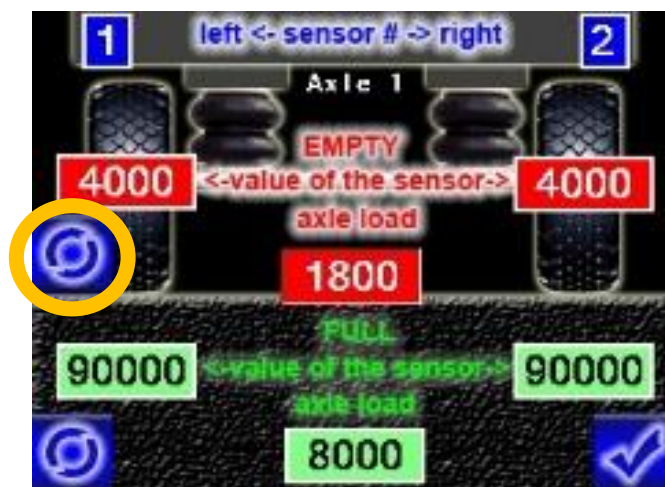
To confirm touch the icon 



The entered load value displays in the red rectangle as shown in the picture below.



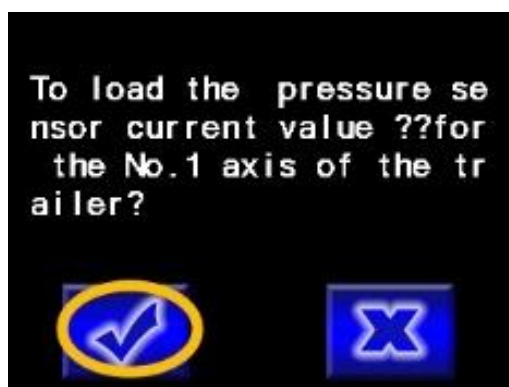
To display the current sensor readings touch the icon



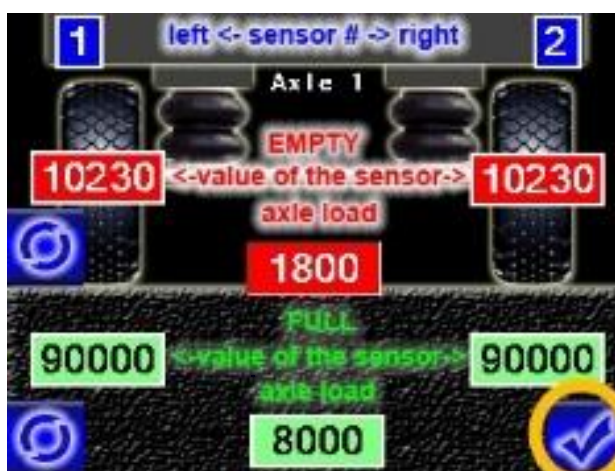
A message appears on the display unit screen. Confirm the action by touching the icon



. The current sensor readings are loaded.



To save settings for the semi-trailer axle No. 3 (the first semi-trailer axle) touch the icon

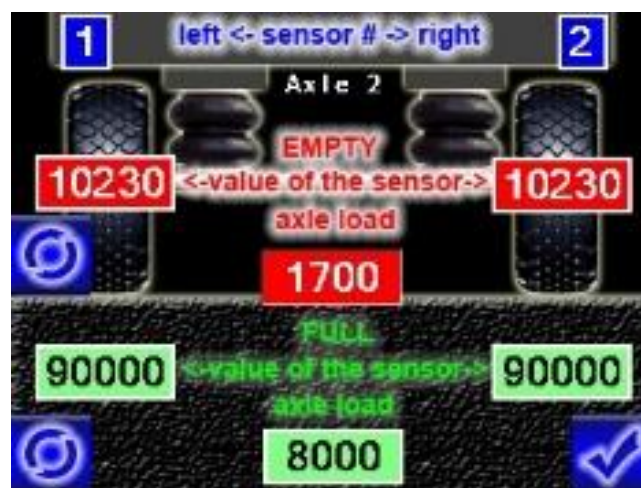


The display unit enters the semi-trailer settings entry mode as shown in the picture below.



Perform the similar setting procedure for the axle No. 4 (the second semi-trailer axle) and No. 5 (the third semi-trailer axle) and enter the values in accordance with the tables of axle loads and pressure sensor numbering by axles. The load value for the axle No. 4 is 1700 kg and 1650 kg for the axle No. 5.

The examples of parameter settings for the axle No. 4 (the second semi-trailer axle) are shown in the picture below.



The examples of parameter settings for the axle No. 5 (the third semi-trailer axle) are shown in the picture below.



The setting up for the empty semi-trailer truck is completed.


5.4.5.6 Saving Settings to the Semi-Trailer Pressure Sensor Unit

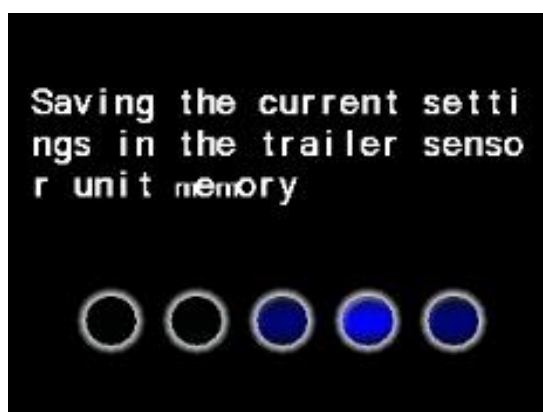
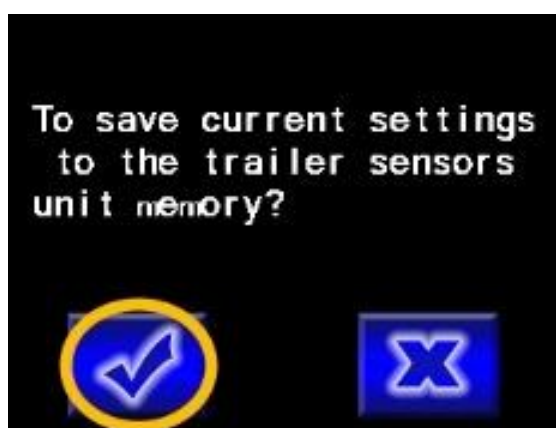
To save settings in the semi-trailer pressure sensor unit touch the icon



Attention!!!

Be sure to load the set values each time you make changes in the settings of the semi-trailer sensor unit.

A message appears on the display unit screen. To confirm the action touch the icon . The saving settings to the semi-trailer sensor unit memory begins.



If an error message appears (as shown below in the picture), repeat the saving again by touching the icon 



The setting up for the empty semi-trailer pressure sensors is completed. To get back to the main menu touch the icon 



5.4.6 Setting the Pressure Sensors for the Axles of Loaded Semi-Trailer Truck

Attention!!!

The stationary semi-trailer truck weighing scales are required to set up pressure sensors. The pneumatic system of a tractor and a semitrailer must be in traveling condition. Immediately after weighing a loaded semi-trailer truck, it is necessary to enter the data on axle loads into the system settings. For the correct data entry in the system settings, s semi-trailer truck has to be located on a flat horizontal and vertical surface. This requirement is due to the reading parameters from the pressure sensors and their calibrating in the system.

Let's consider an example of the equipment set setting up on a semi-trailer (3 axles) truck (2 axles) as follows:

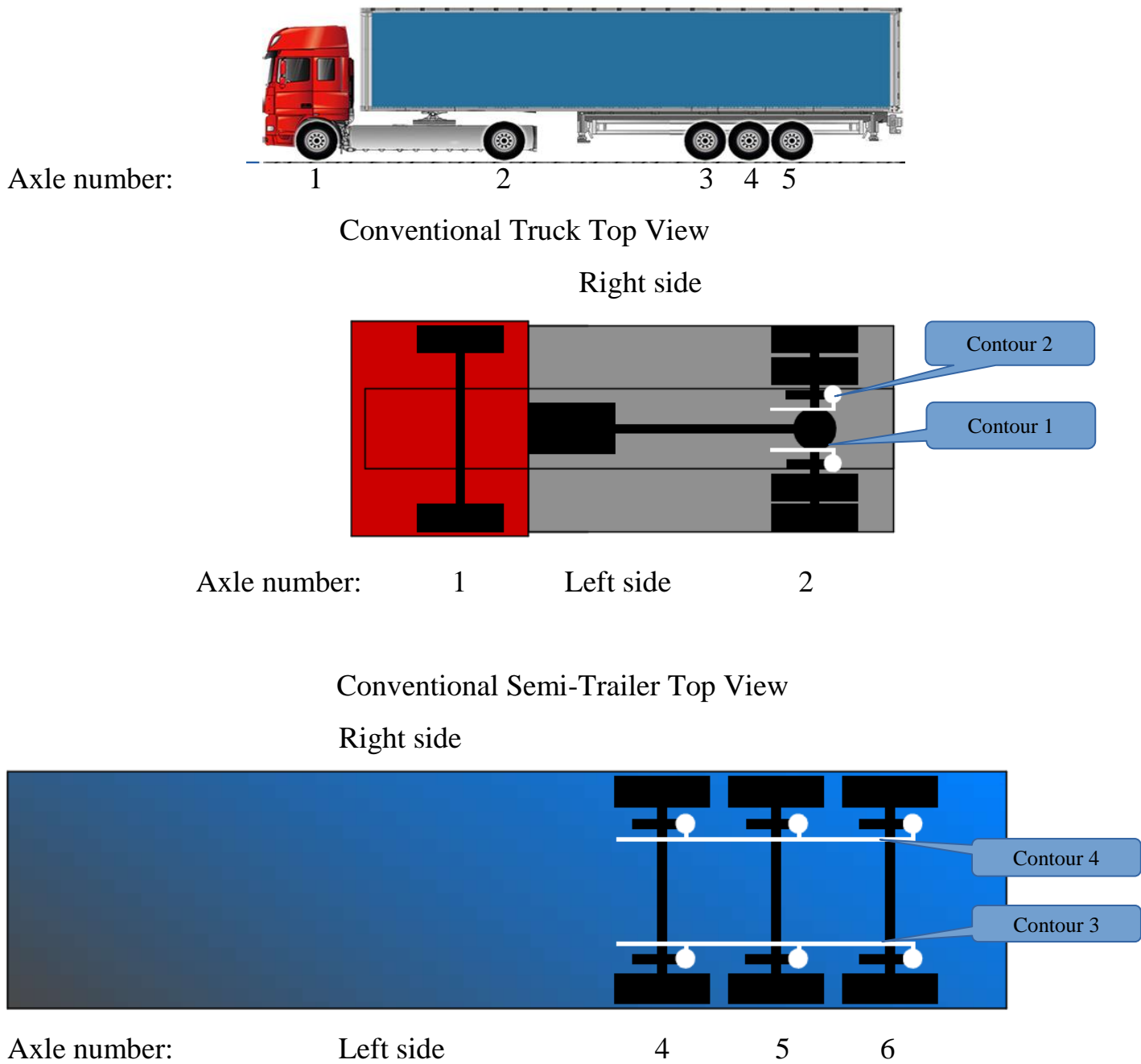
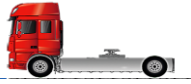




Table of Axle Loads

| Item No. | Pressure Sensor Unit Installation Location | Unit No. | Pressure Sensor No. | Tractor/Semi-Trailer Axle No. | Pneumatic Contour Number/Side | Unit Type |
|----------|--|----------|---------------------|-------------------------------|-------------------------------|-----------|
| 1 | Tractor | 1 | 1 | 1,2 | 1/left | Main |
| 2 | Tractor | 1 | 2 | 1,2 | 2/right | Main |
| 3 | Semi-trailer | 2 | 1 | 3,4,5 | 3/left | Main |
| 4 | Semi-trailer | 2 | 2 | 3,4,5 | 4/right | Main |

In the table below (in the row No. 3), you can see the readings obtained as a result of a loaded semi-trailer truck weighing.



Semi-Trailer Truck Axle Load Table

| No. | Name of cargo to be weighed | Axle load, kg | | | | | |
|------------------|---|---------------|------|------|------|------|-------|
| | | 1 | 2 | 3 | 4 | 5 | Total |
| 1 |  | 5100 | 2200 | - | - | - | 7300 |
| 2 |  | 5200 | 3350 | 1800 | 1700 | 1650 | 13700 |
| 3 |  | 8900 | 8200 | 5600 | 5500 | 5450 | 33650 |
| Cargo weight, kg | | 19950 | | | | | |

The cargo weight calculated value = loaded semi-trailer truck weight – empty semi-trailer truck weight.

The cargo weight calculated value = 33650 kg – 13700 kg = 19950 kg

Enter the obtained values of the axle loads into the system.

Touch the settings icon  on the user interface start screen or other operating modes of the display unit depicting the icon .

The display unit enters the settings display mode (as shown in the picture below).



In the appeared window touch the icon «Settings».

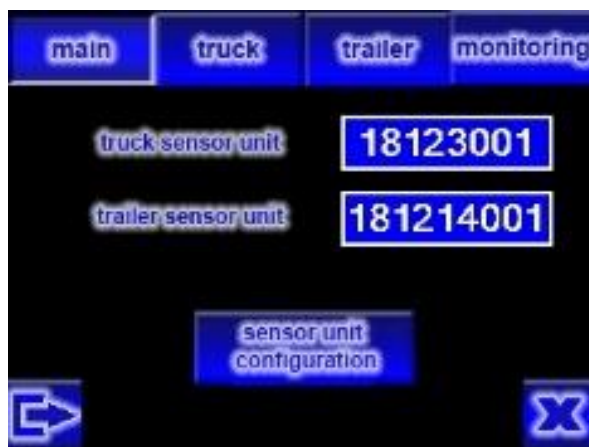
The display unit enters the Pin code entry mode (as shown in the picture below).

Enter a PIN code (**default PIN is 1234**) and touch the icon



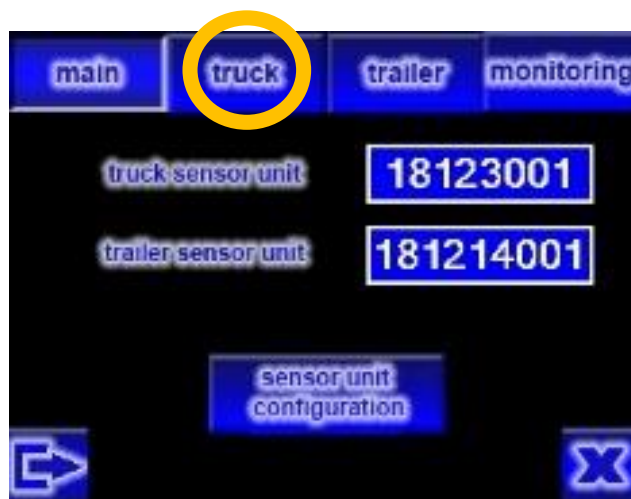
The display unit switches to the settings display mode as shown in the picture below and choose the icon “Scales”





5.4.6.1 Setting the Pressure Sensors for the Tractor Axles No. 1, 2

Enter the obtained axle load values into the tractor system settings. Touch the icon «Truck».

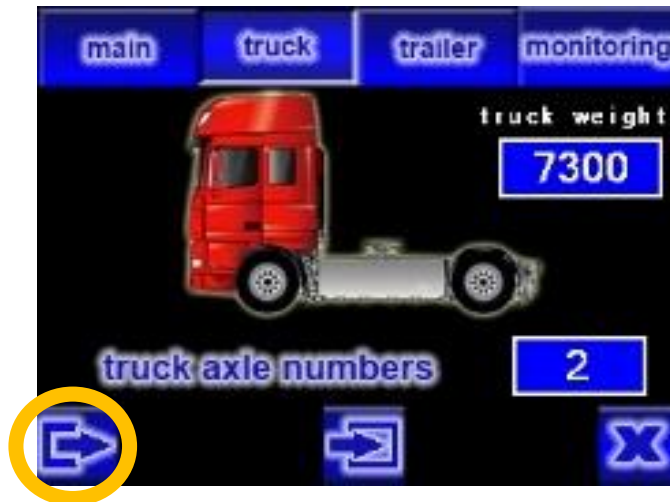


The display unit enters the tractor settings display mode (as shown in the picture below).



First read the settings from the tractor sensor unit; to do this, touch the icon

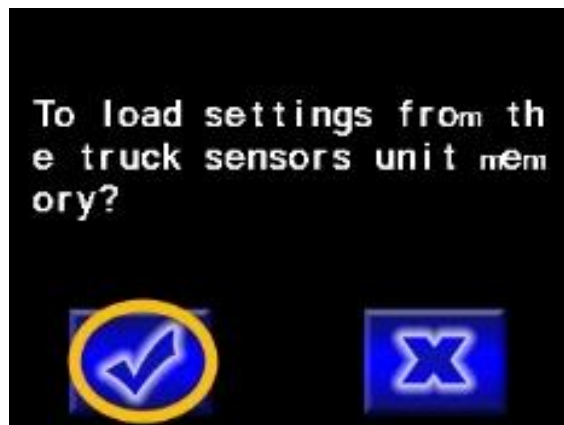




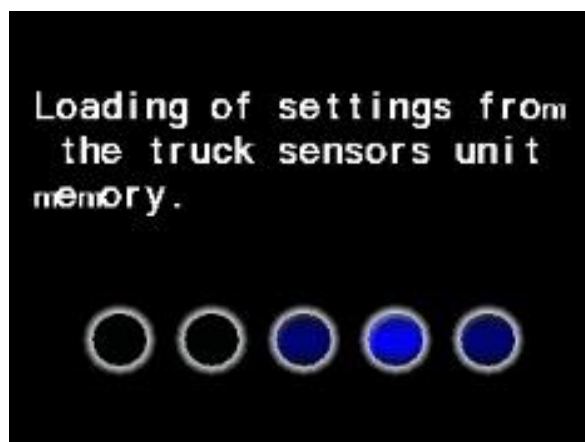
Attention!!!


Be sure to perform this action when making any changes in settings.

To confirm the action touch the icon



The data begin loading from the tractor pressure sensor unit. The data loading process is shown in the picture below.



If an error message appears (as shown below in the picture), repeat the reading data from the tractor sensor unit again. To do this, touch the icon  again.



If the reading of data from the tractor pressure sensor unit is successful, the following screen is displayed.

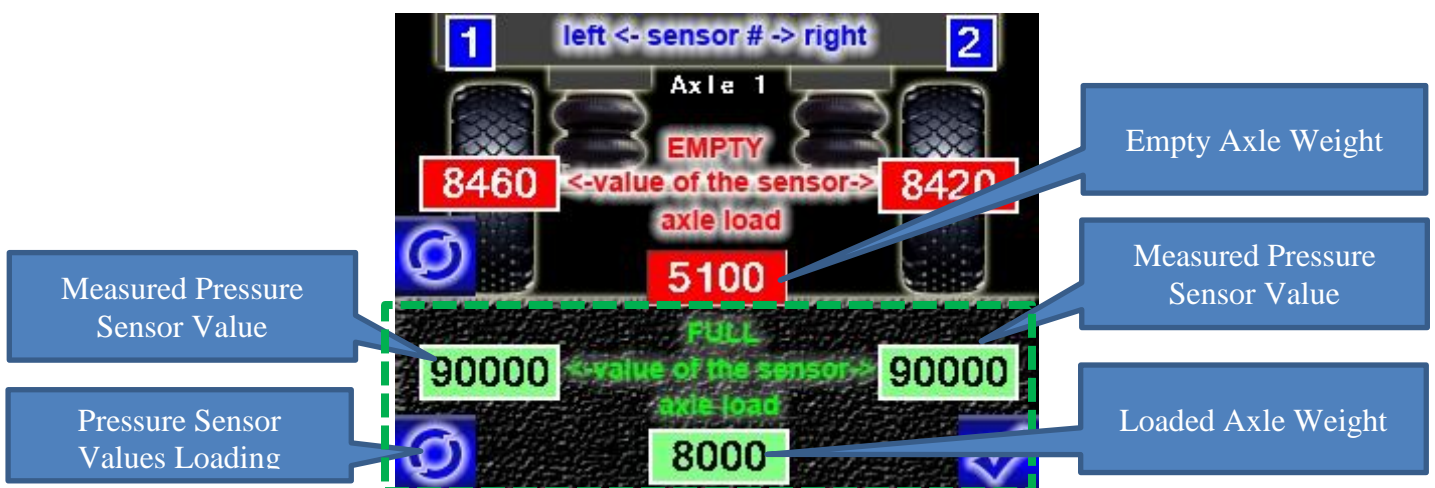


5.4.6.1.1 Setting the Pressure Sensor Load Values for the Tractor Axle No. 1

Touch the tractor wheel icon of the axle No. 1 (as shown in the picture below).

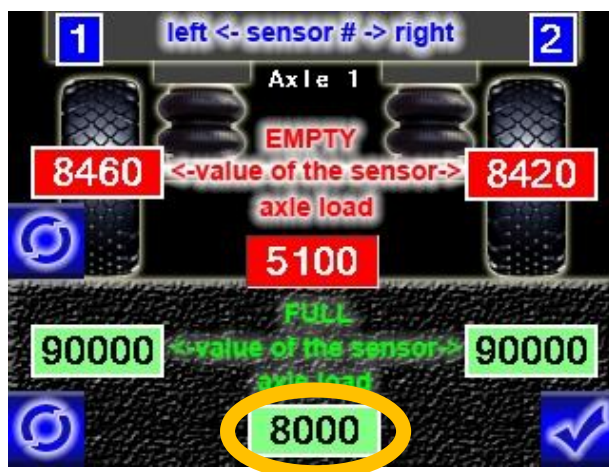


The display unit enters the settings entry mode for the tractor axle No. 1 as shown in the picture below.



Set up the parameters highlighted in green: setting the axle load values in accordance with the pressure sensor(s) readings.

Set the load value for the tractor axle No. 1 (the number “8000” in the green rectangle) in accordance with the table of axle loads (the row No. 3). Touch the icon “8000” in the green rectangle.

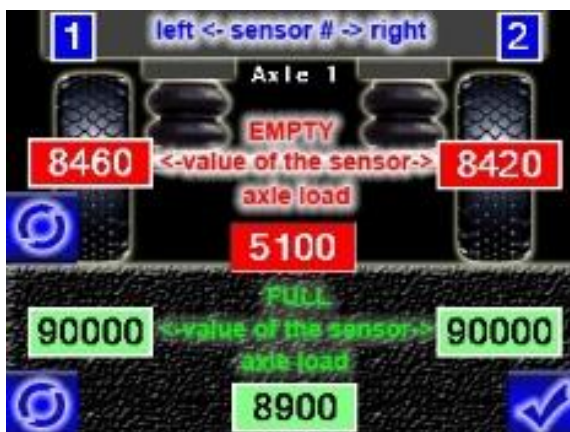


The display unit enters the data entry mode. Using the displayed digit keys enter the number “8900” kg in accordance with the table.

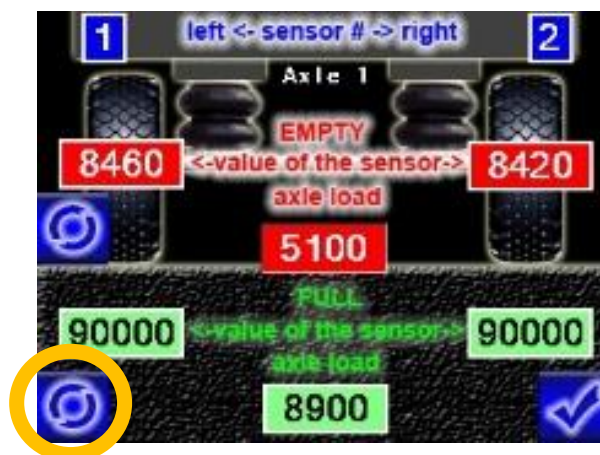
To confirm touch the icon




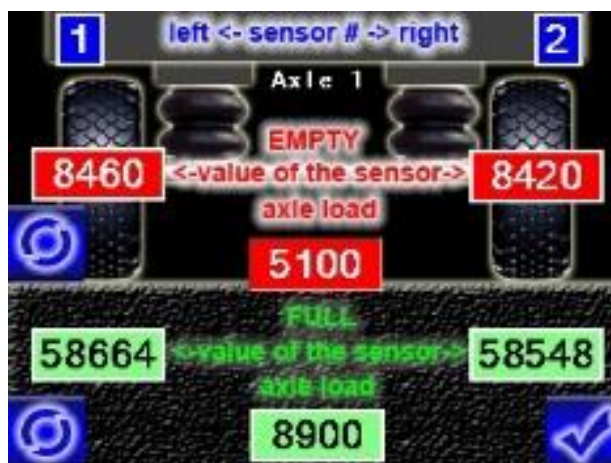
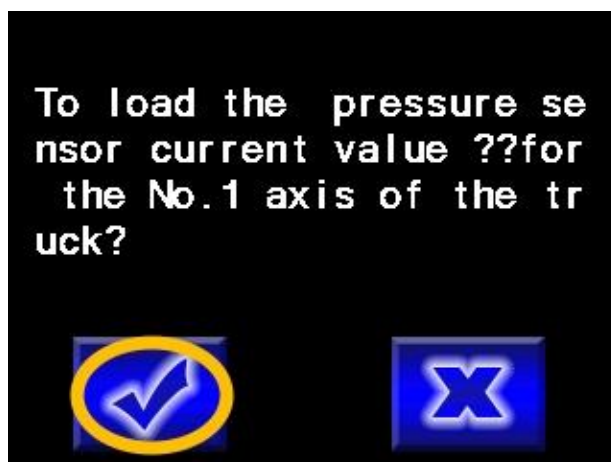
The entered load value displays in the green rectangle (as shown in the picture below).



To display the current sensor readings touch the icon



A message appears on the display unit screen. Confirm the action by touching the icon . The current sensor readings are loaded.



To save settings for the tractor axle No.1 touch the icon





The display unit enters the tractor settings entry mode as shown in the picture below.



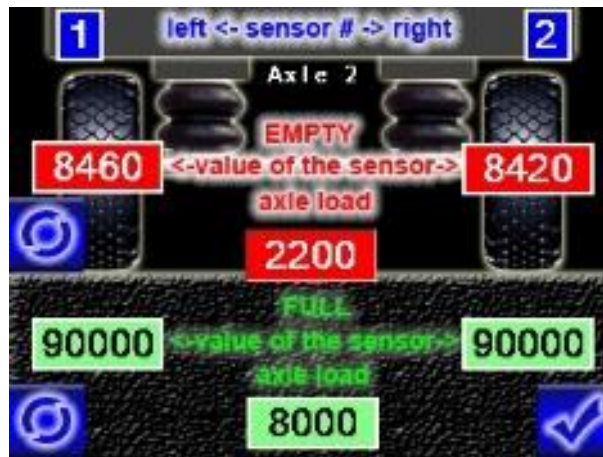
5.4.6.1.2 Setting the Pressure Sensor Load Values for the Tractor Axle No. 2

Repeat the actions for setting the parameters of the tractor axle No. 2 indicated in the table of axle loads (the row No. 3).

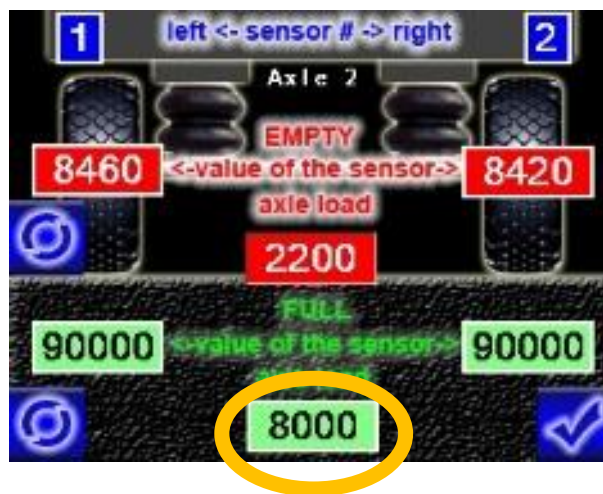
Touch the wheel icon of the tractor axle No. 2 (as shown in the picture below).



The display unit enters the settings entry mode for the tractor axle No. 2 as shown in the picture below.



Set the load value for the axle No. 2 of the loaded semi-trailer truck (the number “8000” in the green rectangle). Touch the icon “8000” in the green rectangle.

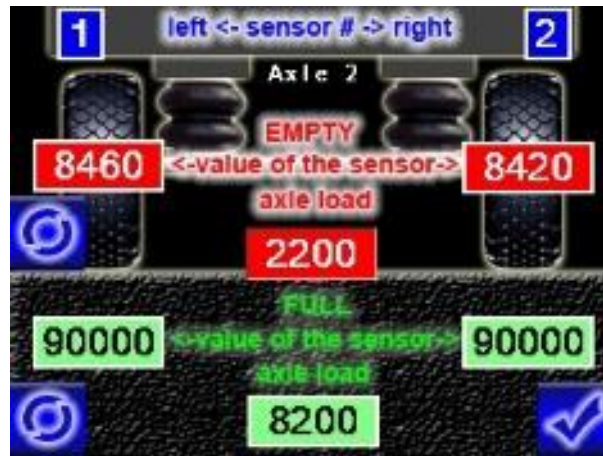


Enter the load value for the axle No.2 (“8200 kg” in this example).

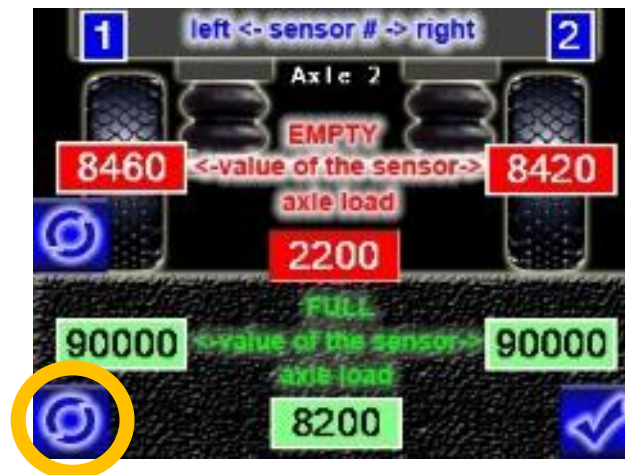
To confirm the action touch the icon 



The entered load value displays in the green rectangle.



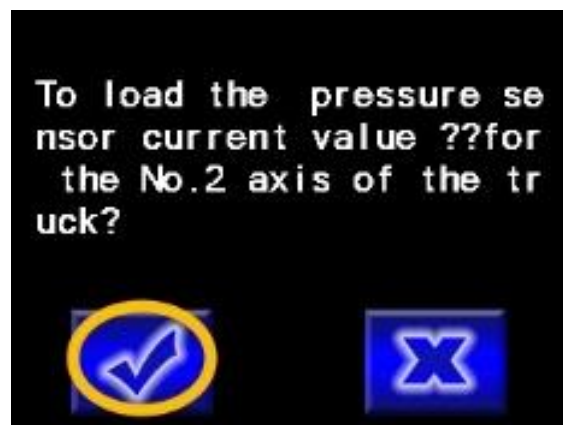
To display the current sensor readings touch the icon

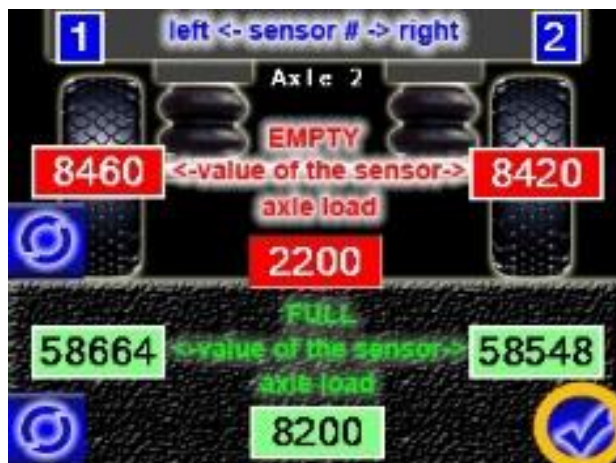



A message appears on the display unit screen. Confirm the action by touching the icon

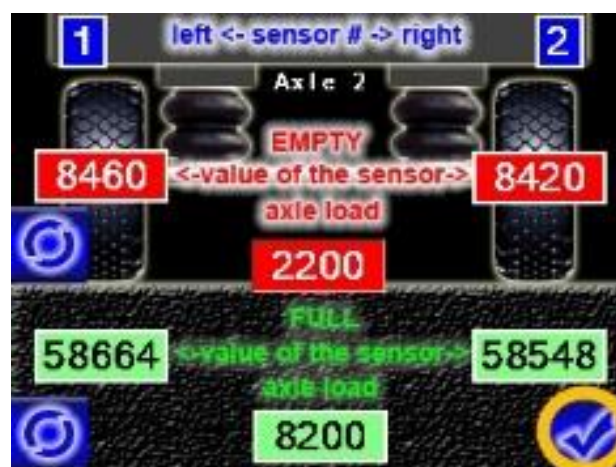


. The current sensor readings are loaded.





The pressure sensor setting for the second tractor axle is completed. Touch the icon 




The display unit enters the tractor settings entry mode.

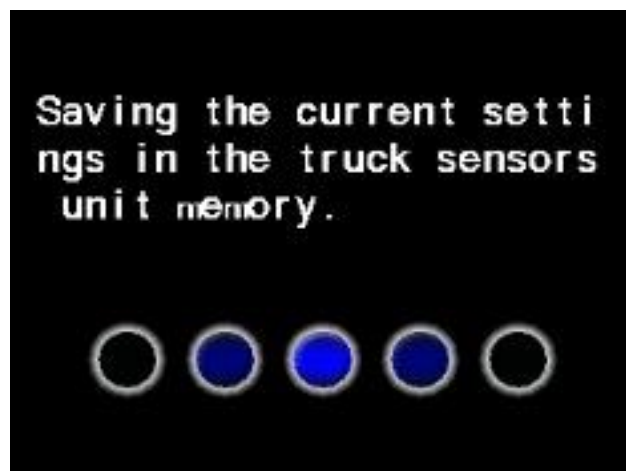


To save the axle settings into the tractor pressure sensor unit touch the icon 

Attention!!!

Be sure to load the set values each time you make changes in the settings of the tractor pressure sensor unit.

The corresponding message appear on the display unit screen. To confirm the action touch the icon . The saving settings into the tractor sensor unit memory begins.



If an error message appears, repeat the saving again by touching the icon 



The setting up for the tractor pressure sensor unit is completed.

Perform the same procedure to set up the semi-trailer pressure sensor unit. To finish the system setup it is required to set the load values for the semi-trailer axles and load the current pressure sensor readings.

5.4.6.2 Setting the Pressure Sensors for the Semi-Trailer Axles No. 3, 4, 5

Enter the obtained axle load values into the semi-trailer system settings. Touch the icon «Traller».



The display unit switches to the semi-trailer settings display mode.



To read the settings from the semi-trailer pressure sensor unit touch the icon

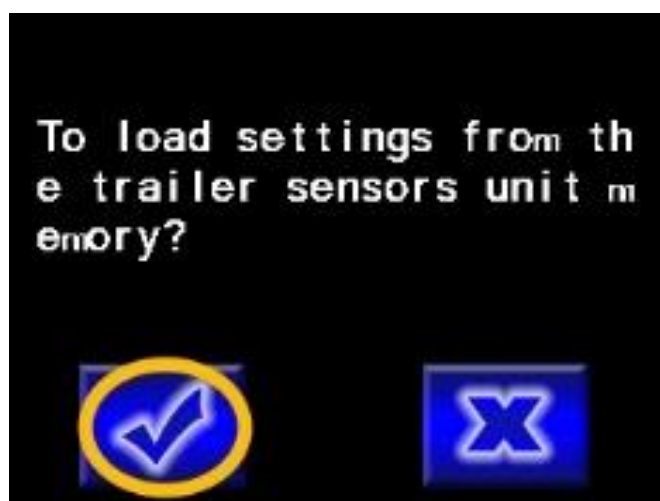


Attention!!!

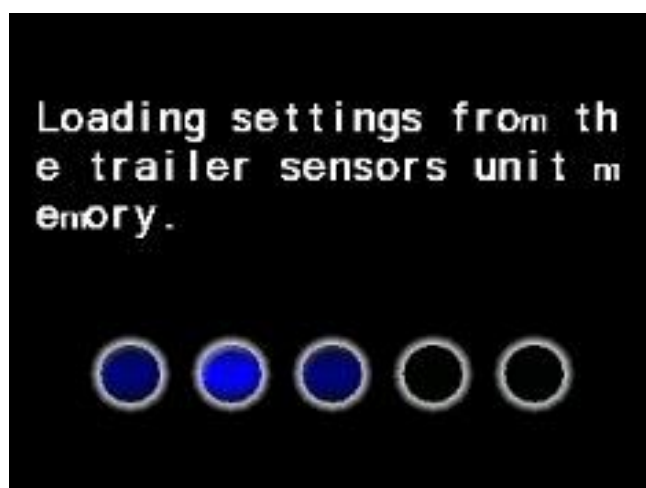
Be sure to perform this action when making any changes in the unit settings.



To confirm the action touch the icon



The data loading from the semi-trailer pressure sensor unit begins. The data loading process is shown in the picture below.



If an error message appears (as shown below in the picture), repeat the data reading from the semi-trailer pressure sensor unit. Touch the icon



If the reading of data from the semi-trailer pressure sensor unit is successful, the following screen is displayed.



To set up the values of the tractor axle loads, on the tractor icon touch the wheel (highlighted in yellow) the axle of which is subject to configuration.

To set up the values of the semi-trailer axle loads, on the semi-trailer icon touch the wheel (highlighted in yellow) the axle of which is subject to configuration.

Attention!!!

Be sure to enter the load values for all the semi-trailer axles and read the current readings of the pressure sensors.

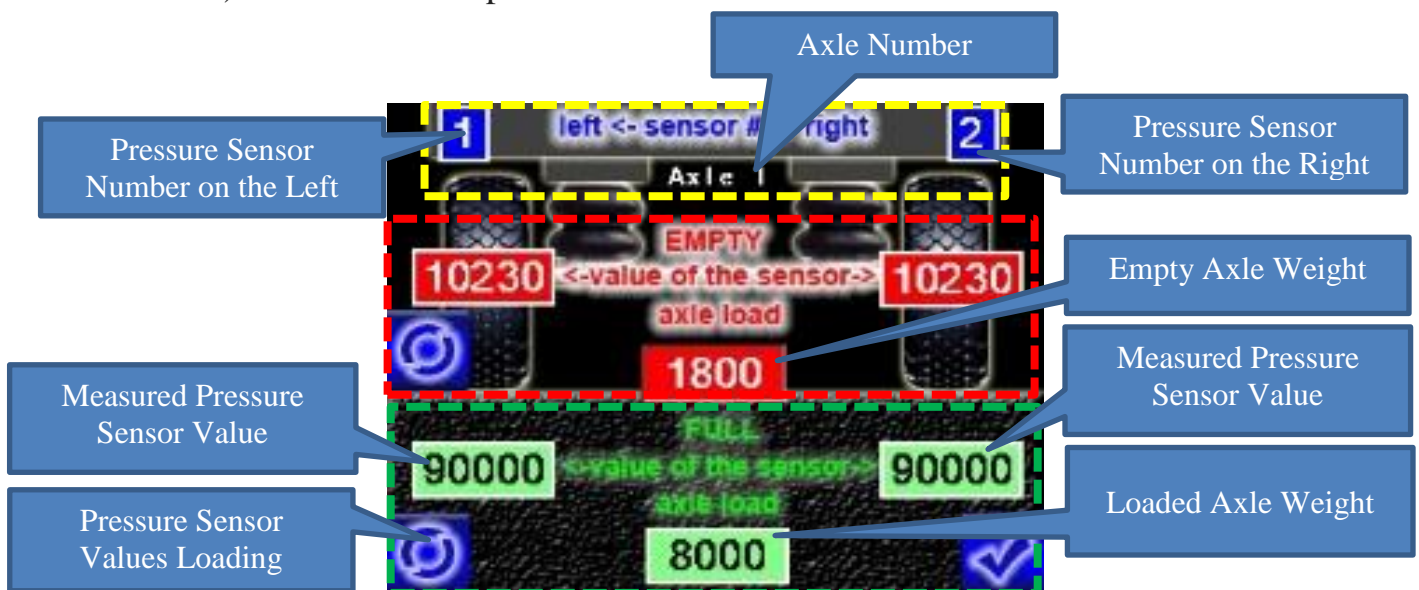


5.4.6.2.1 Setting the Pressure Sensor Load Values for the Semi-Trailer Axle No. 3

Touch the wheel icon of the third axle (the first semi-trailer axle).



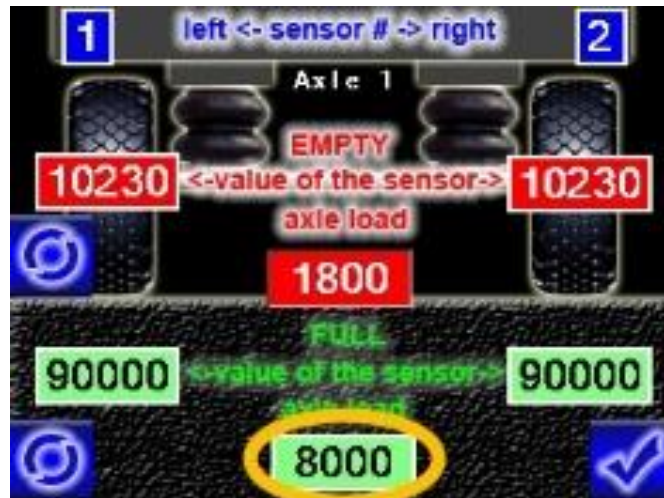
The display unit enters the settings entry mode for the axle No. 3 (the first semi-trailer axle) as shown in the picture below.



The user display is divided into 3 parts horizontally:

- setting the numbers of pressure sensors transmitting the axle load data (highlighted by a yellow dotted line);
- setting the axle load values (tractor without a trailer) in accordance with the pressure sensor(s) readings (highlighted by a red dotted line);
- setting the axle load values (tractor with a loaded semi-trailer) in accordance with the pressure sensor(s) readings (highlighted by a green dotted line).

Set the load value for the semi-trailer axle (the number “8000” in the green rectangle in the picture). Touch the icon “8000” in the green rectangle.

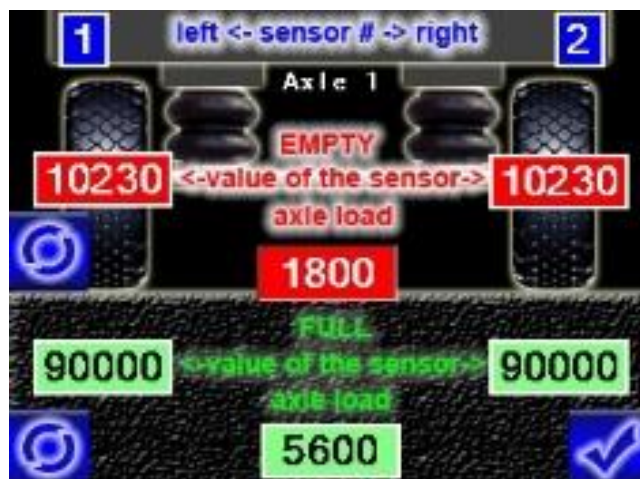


The display unit enters the data entry mode. Using the displayed digit keys enter the number “5600” kg in accordance with the table.

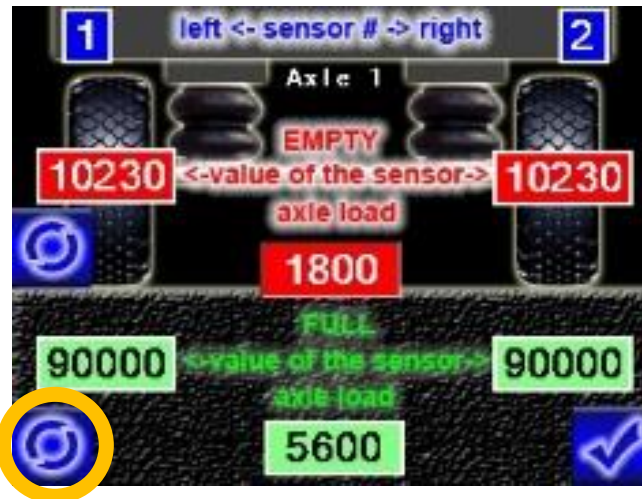
To confirm touch the icon




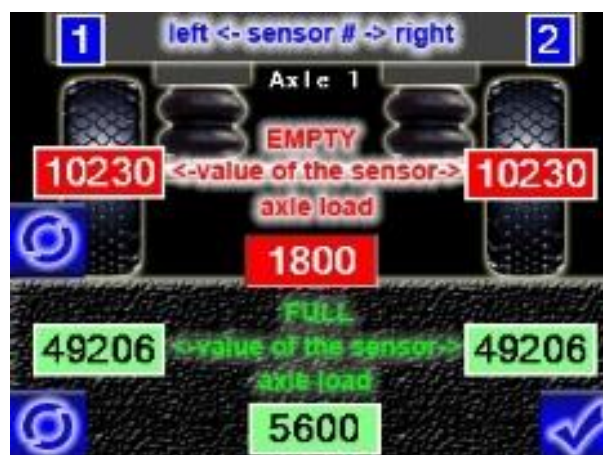
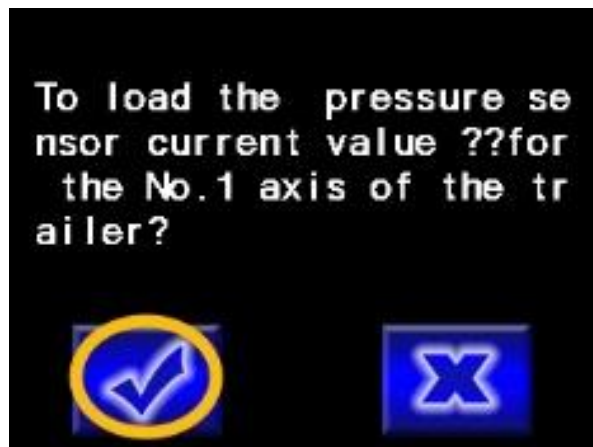
The entered load value displays in the green rectangle as shown in the picture below.



To display the current sensor readings touch the icon

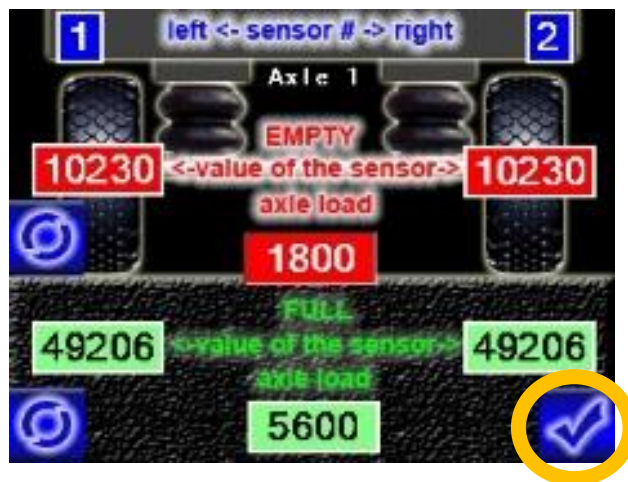


A message appears on the display unit screen. Confirm the action by touching the icon . The current sensor readings are loaded.



To save settings for the semi-trailer axle No.1 touch the icon





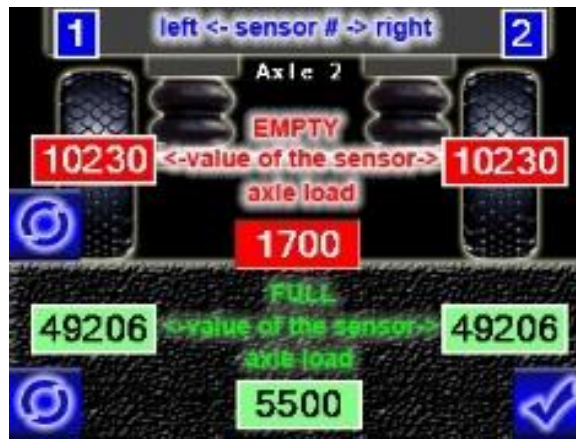
The display unit enters the semi-trailer settings entry mode as shown in the picture below.



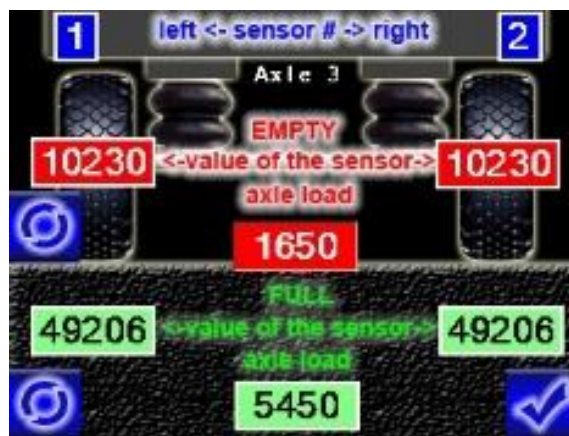
5.4.6.2.2 Setting the Pressure Sensor Load Values for the Semi-Trailer Axles No. 4, 5

Set up the axle No. 4 (the second semi-trailer axle) and No. 5 (the third semi-trailer axle) and enter the axle load values in accordance with the table of axle loads (the row No. 3). The load value for the axle No. 4 is 5500 kg and 5450 kg for the axle No. 5. The setup procedure for the axle No. 4 and 5 is the same as for the axle No. 3.

The examples of parameter settings for the axle No. 4 (the second semi-trailer axle) are shown in the picture below.



The examples of parameter settings for the axle No. 5 (the third semi-trailer axle) are shown in the picture below.




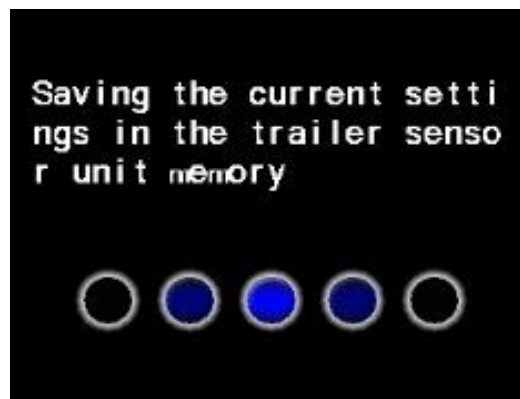
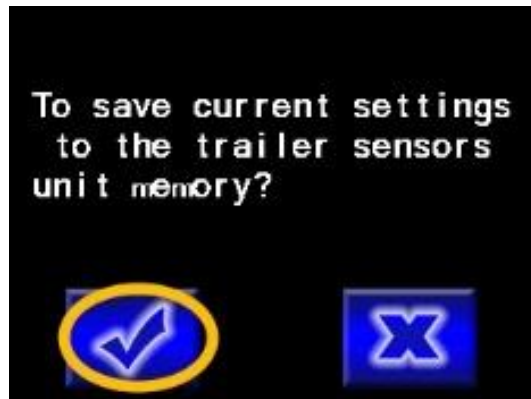
To save settings into the pressure sensor unit touch the icon




Attention!!!

Be sure to load the set values each time you make changes in the settings of the semi-trailer sensor unit.

A message appears on the display unit screen. To confirm the action touch the icon . The saving settings into the semi-trailer sensor unit memory begins.



If an error message appears (as shown below in the picture), repeat the saving again by touching the icon .



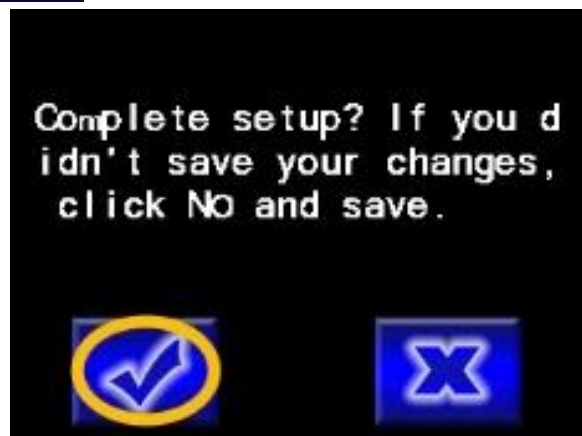
If the settings are successfully saved in the semi-trailer pressure sensor unit, the display unit screen appears.



The semi-trailer pressure sensor unit setup is completed. To get back to the main menu touch the icon



When a message appears (as shown in the picture below), confirm the action by touching the icon



The display unit enters the settings display mode as shown in the picture below. To get back to the start screen touch the icon






Depending on the settings of the start screen find and touch the icon  . The screen displays a picture of a semi-trailer truck.

Check the readings indicated in the table of axle loads (the row No. 3) and the display unit readings (below are examples). If the axial loads depicted on the display unit coincide with the values obtained as a result of weighing and the calculated cargo weight, then the system is configured correctly.




| | | | | | |
|--------------|---|------|-------|---|---------|
| truck | 1 | 8900 | 5600 | 1 | trailer |
| | 2 | 8200 | 5500 | 2 | |
| | | | 5450 | 3 | |
| Total weight | | | 33650 | | |
| cargo weight | | | 19950 | | |

6 Display Unit Turning On and Off

Touch the icon of turning off the display on the start screen of the user interface or other operating modes of the display unit with the displayed icon 

The display unit switches to the power saving mode (the display turns off). At that, the equipment set continues to operate. To turn on the display touch the display unit screen.


7 Setup and Displaying Settings

Touch the icon  on the start screen of the user interface or other operating modes of the display unit.

The display switches to the settings display mode as shown in the picture below.



7.1 Display Unit Brightness Adjustment


To adjust the screen brightness move the slider cursor  to the left or to the right. When the screen brightness changes, the conditional digital value also varies from “0” to “100”.



Screen Brightness
Digital Indicator

Brightness Cursor

7.2 Display Unit Start Screen Setup




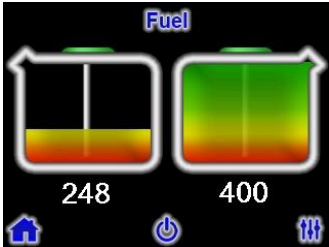


Touch the icon  to set up the user interface start screen.



The display unit switches to the settings display mode as shown in the picture below.



Choose the desired start screen for displaying information (clock, voltage, fuel, scales, main menu), which will be displayed on the screen after turning on.


| Start Screen Icon | Start Screen View | Short Description |
|---|---|-------------------|
|  |  | Clock |
|  |  | Voltage |
|  |  | Fuel |
|  |  | Scales |
|  |  | Main menu |

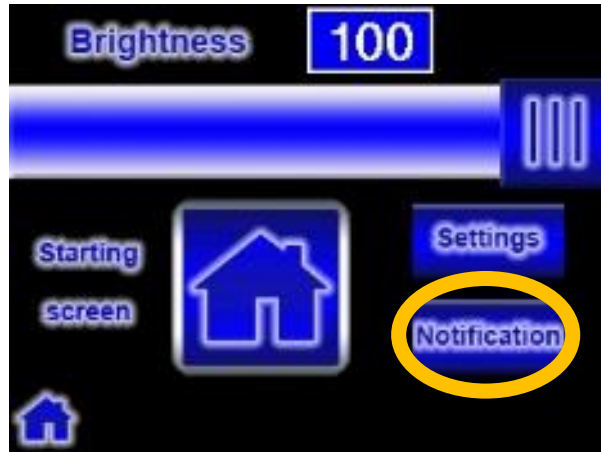
The system automatically saves this setting and enters the settings display mode.

7.3 Setting the Level of Fuel in Tanks

This function is under development and test.


7.4 Setting the Notification about the Axle Load Exceeding

Touch the icon  to set up the notifications of excess load on the tractor and/or semi-trailer axles.



The display unit enters the notification parameters display mode (as shown in the picture below).


| Ultimate load | | | |
|--|------|---------|------|
| Truck | | Trailer | |
| Axle 1 | 8900 | Axle 1 | 3000 |
| Axle 2 | 9000 | Axle 2 | 3000 |
| Axle 3 | 0 | Axle 3 | 0 |
| Axle 4 | 0 | Axle 4 | 0 |
| Axle 5 | 0 | Axle 5 | 0 |
| Axle 6 | 0 | Axle 6 | 0 |
|  notification screen ON  | | | |

The screen shows the values of ultimate axle loads of the semi-trailer truck. If the calculated load values on the tractor and/or semi-trailer axles are exceeded, an icon appears  on the screen in any operation mode, except when the screen is turned off.




To view the notification, touch the icon  . The notification information appears (as shown in the picture below).



To get back to the main menu, touch the screen at any place, except for the icon 

7.4.1 Enable/Disable Notifications

To disable notifications touch the icon  on the screen.

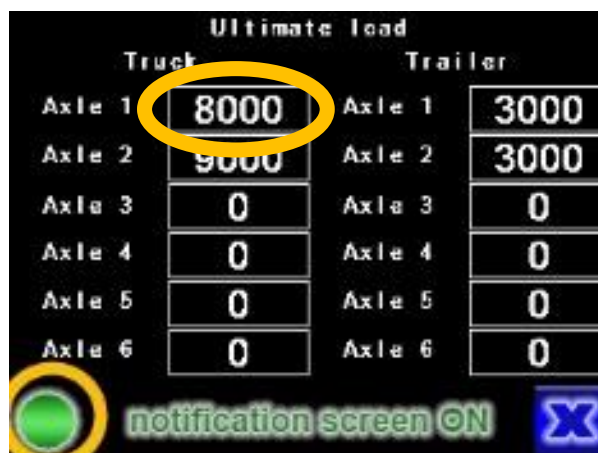


The icon changes its color and the inscription “Notification On” turns to “Notification Off” (as shown in the picture below). To enable notifications, touch the icon



7.4.2 Axle Load Limit Value Input

Input of the axle load limit values must be done for each axle separately. Let’s consider an example of the limit value input for the axle No. 1. Touch the icon “8900” of the axle No. 1.



The display switches to the data entry mode. Use the displayed digits to enter the desired number.

Confirm the action by touching the icon 



The limit load setup for the axis No. 1 is completed. Repeat the input procedure for the existing tractor and semi-trailer axles. The limit load values for the missing axles should be equal to “0”.

Upon completion of the axle limit load setup, get back to the main menu by touching the icon 