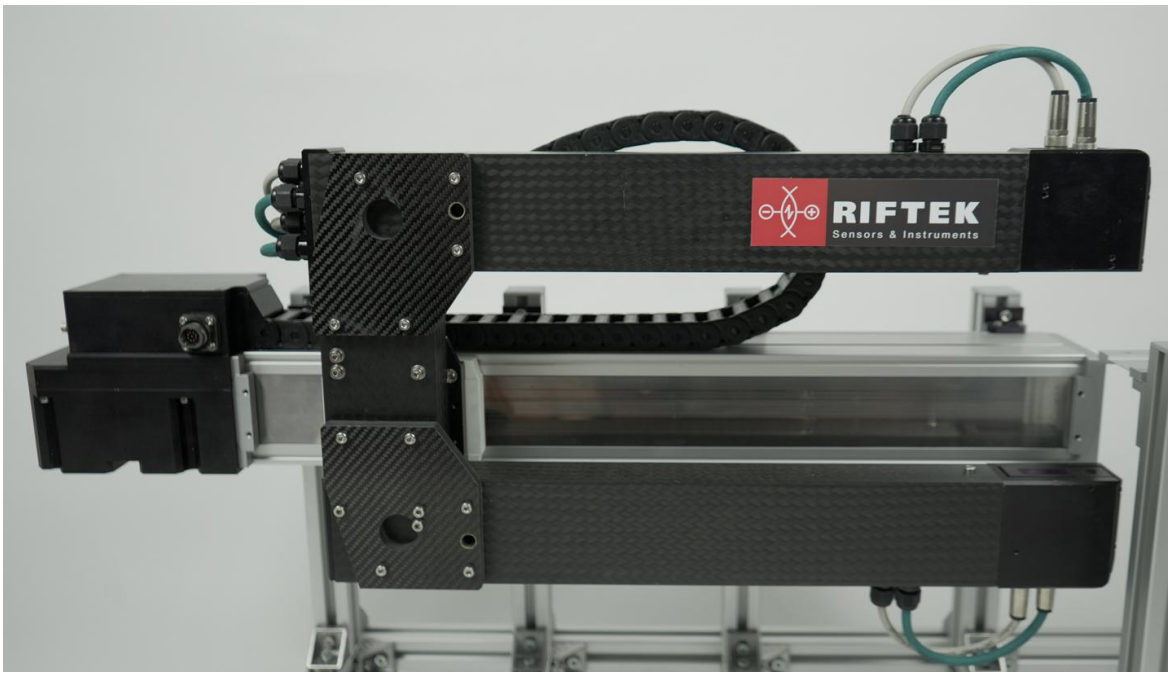
RIFTEK
Sensors & Instruments



THICKNESS MEASUREMENT SYSTEM

RF160.20 Series

User's manual

www.riftek.com
info@riftek.com

Contents

2

1. Safety precautions

- Use supply voltage and interfaces indicated in the system specifications.
- In connection/disconnection of cables, the system power must be switched off.
- Do not use the system in locations close to powerful light sources.
- To obtain stable results, wait about 20 minutes after sensor activation to achieve uniform sensor warm-up.

2. CE compliance

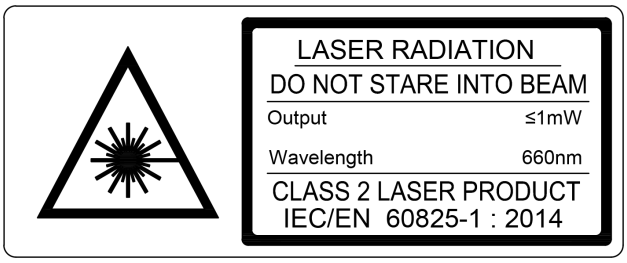
The system has been developed for use in industry and meets the requirements of the following Directives:

- EU directive 2014/30/EU. Electromagnetic compatibility (EMC).
- EU directive 2011/65/EU, “RoHS“ category 9.

3. Laser safety

The system is equipped with the laser sensors that belong to the 2 laser safety class according to IEC/EN 60825-1:2014.

The sensors make use of a c.w. 660 nm wavelength semiconductor laser. Maximum output power is 1 mW. The following warning label is placed on the sensor body:



The following safety measures should be taken while operating the sensor:

- Do not target the laser beam to humans.
- Do not disassemble the sensor.
- Avoid staring into the laser beam.

4. General information

The system is designed for non-contact measurement of the thickness of sheet materials such as tapes, boards, plates, and so on. It is an autonomous software and hardware complex that contains laser sensors, a scanning system, and an indication device.

Technical characteristics of the system can be changed for a specific task.

5. Structure and operating principle

The operation of the system is based on continuous scanning of the sheet surfaces by laser sensors.

The system contains two laser triangulation sensors (2) mounted on the C-frame (3). The C-frame is installed on the carriage of the linear motion module (4). The system also contains a calibration plate (6). The figure below shows the sheet material (1) being measured and the conveyor section (5). The control computer is not shown.

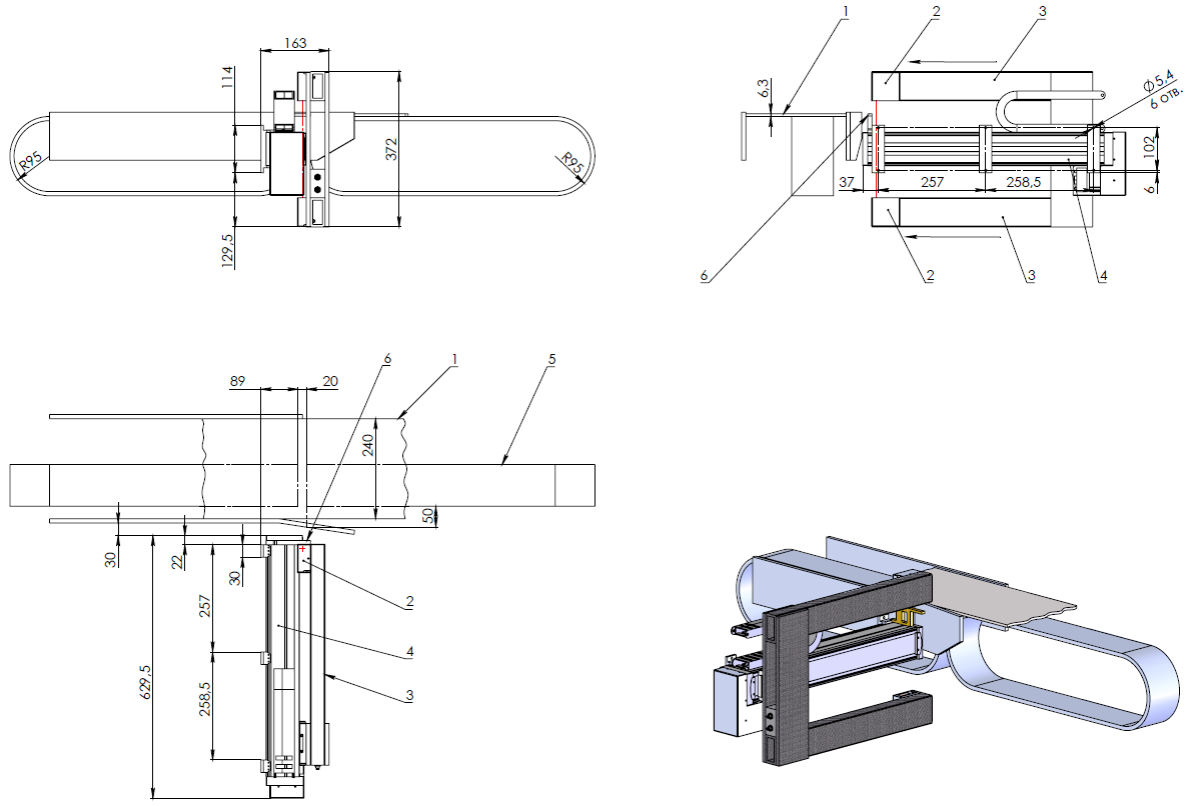


Figure 1. Structure and overall dimensions of the system

In the main mode, the C-frame performs a constant reciprocating motion across the controlled sheet. At one of the extreme positions of the frame outside the conveyor, laser sensors (2) measure the distance to two opposite sides of the calibration plate of known thickness, thereby calibrating the system. When the frame moves in the area of the sheet, laser sensors measure the distance to its upper and lower surfaces. The data from the sensors is sent to the computer. The software calculates the difference in sensor readings based on the calibration data. This difference characterizes the thickness of the material. The system also includes a control cabinet and a touch screen panel computer.

5.1. Laser sensors

Depending on the technical requirements, the system may contain laser triangulation sensors RF603, RF603HS or RF602:

https://riftek.com/products/laser_triangulation_sensor/?change_lang=en

5.2. Control cabinet and panel computer

The control cabinet contains a power supply, a motor driver for the linear motion system, and an Ethernet switch.

The industrial panel computer is designed to receive information from sensors, analyze and display measurement results.

Overall and mounting dimensions of the control cabinet and panel computer are shown in Figure 2.

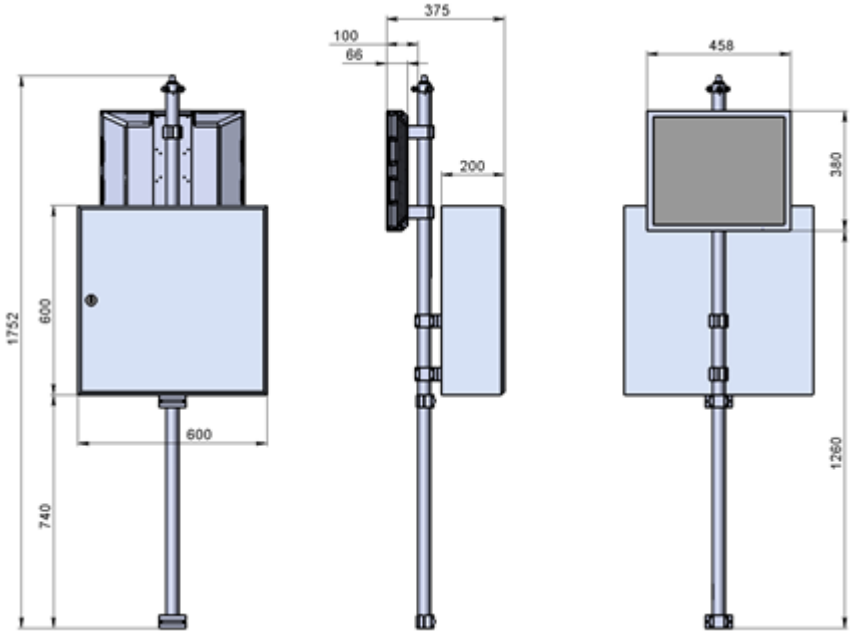


Figure 2. Control cabinet and panel computer

Panel computer connectors:

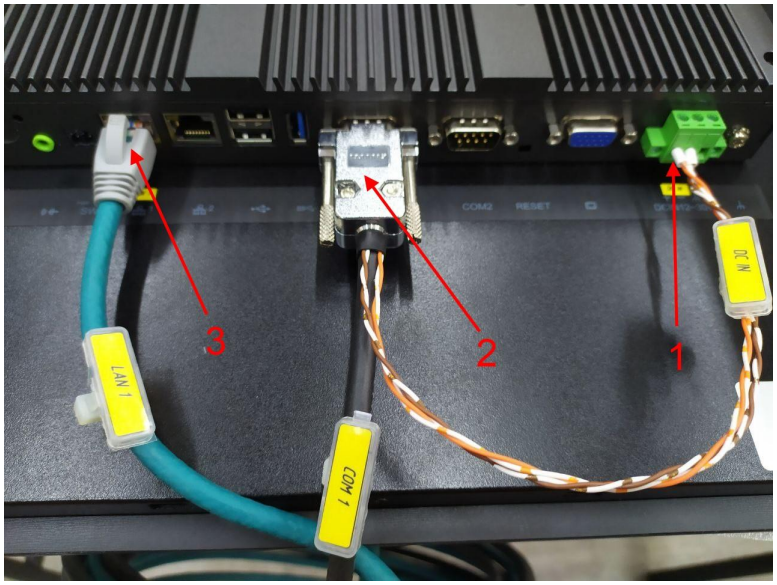


Figure 3. Panel computer connectors

Designations:
1 – Display power cable.
2 – Data cable for connection to COM1 port.
3 – Ethernet cable.

6. Basic technical data

Parameter		Value
Thickness measurement range, mm		10 or 25 or customized
Measurement error, um		±3 (for 10 mm range) or ±7 (for 27 mm range) or customized
Scanning range, mm		by request
Input interface for sensors connection		Ethernet
Measurement speed, kHz		10 or 70
Power supply, V		220 (±10 %) for AC network with frequency of 50 (±1) Hz
Power consumption, not more, W		500
Operating conditions	Ambient temperature, °C	+1...+35
	Relative humidity, %	65 (at 25°C)

Note: System parameters can be changed for a specific task.

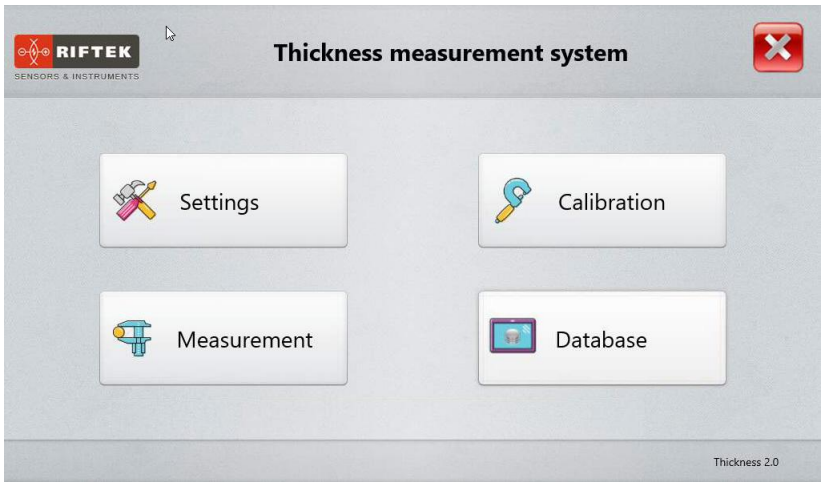
7. Example of item designation when ordering

RF160.20-T-W

Symbol	Description
T	Controlled thickness range, mm.
W	Cross scanning range, mm.

8. Service program

After powering on the panel computer, the main program window appears:

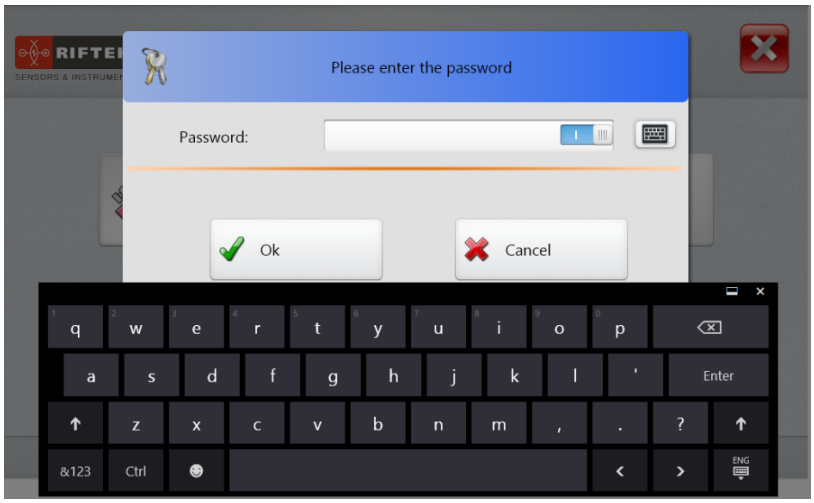


Buttons assignment:

Button	Assignment
Settings	Open the "Settings" window.
Measurement	Open the "Thickness measurement" window.
Calibration	Calibrate the system.
Database	Browse the database.

8.1. Settings

Before starting to work with the system, it is necessary to configure parameters. Tap the **Settings** button in the main window.The program will ask for a password. When initially installed, the program accepts the following password: 1111. Enter the password and tap **Ok**.

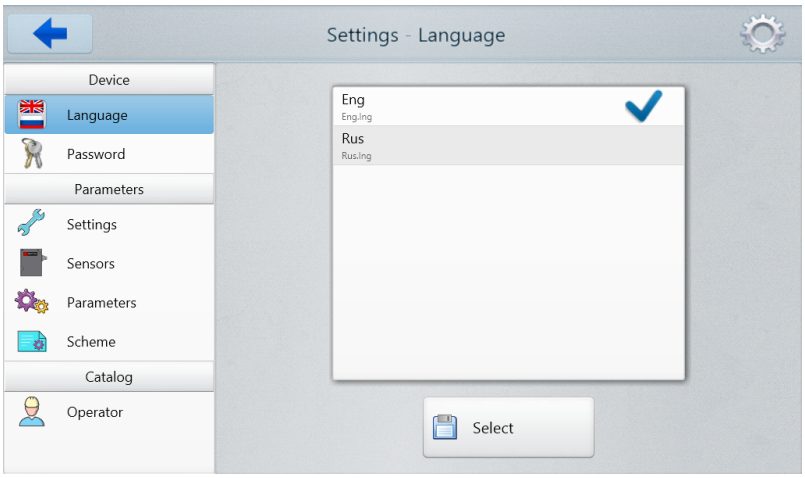


How to change the password, see par. 8.1.1.2.

8.1.1. Device settings

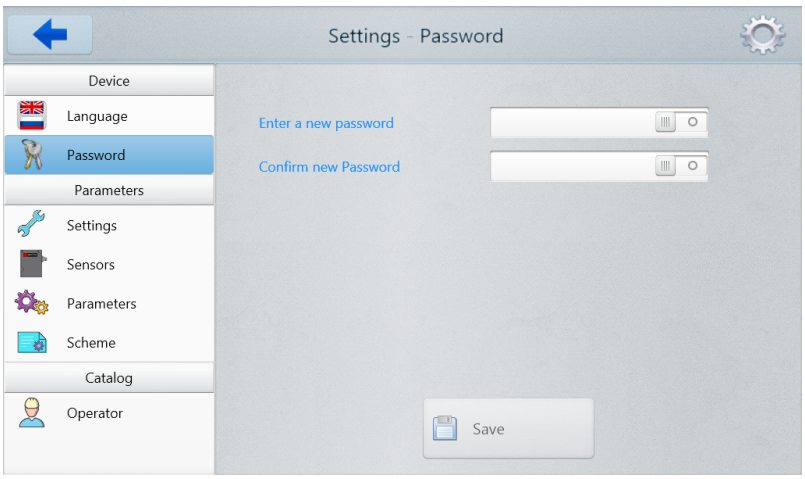
8.1.1.1. Language

To change the program language, tap **Language**, select the language support file, and tap **Select**.

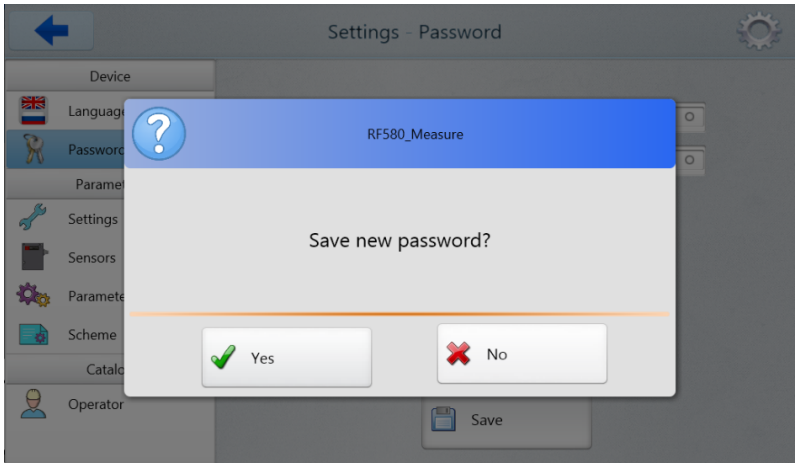


8.1.1.2. Password

To change a password, tap **Password**. Then enter a new password, confirm it, and tap **Save**.



The program will prompt you to confirm the action:

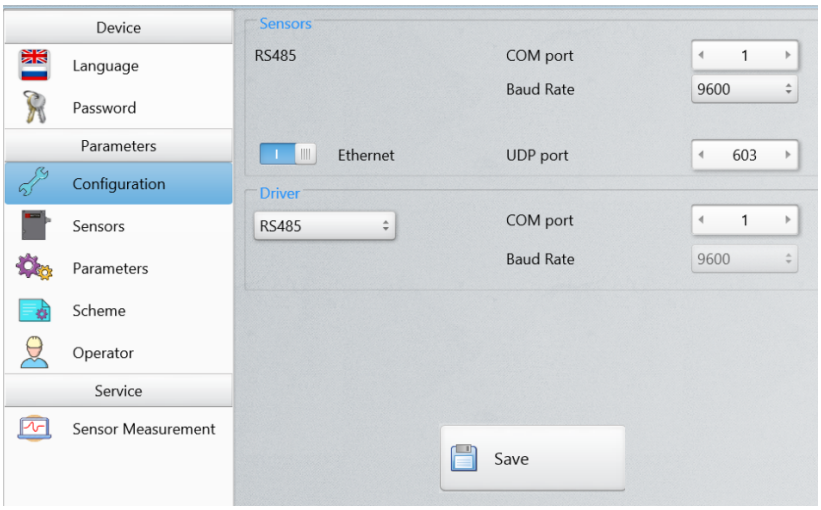


Tap **"Yes"** to save the new password, or tap **"No"** to cancel the action.

8.1.2. Parameters

8.1.2.1. Settings

Вид вкладки **Configuration**:



В области настроек **Sensor** пользователь может указать:

- COM порт для подключения датчиков.
- Скорость передачи данных (Baud rate).
- Если данные передаются по Ethernet, выбрать UDP порт (по умолчанию всегда 603).

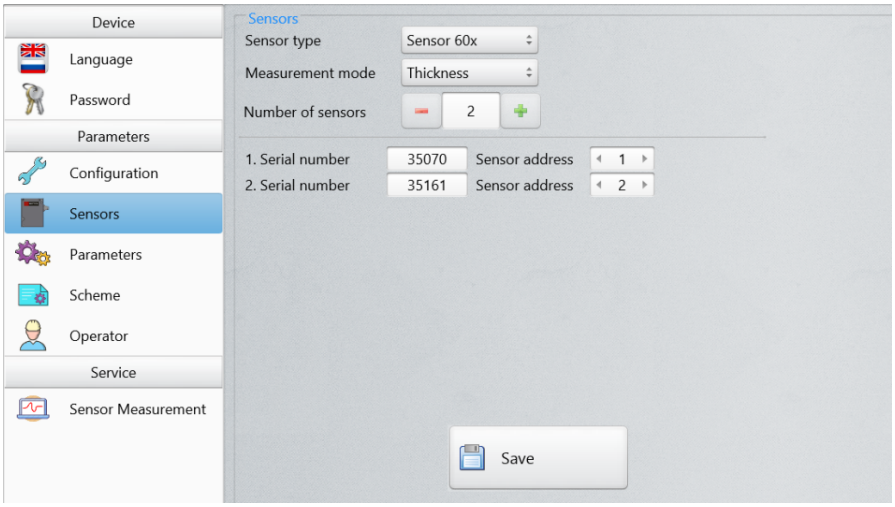
В области настроек **Driver** пользователь может выбрать:

- Интерфейс подключения драйвера двигателя RS485 или Ethernet и указать порт подключения.

Чтобы сохранить изменения, нажмите кнопку **Save**.

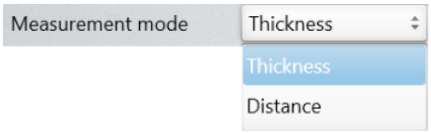
8.1.2.2. Sensors

The **Sensors** tab:



In the **Sensors** tab, the user can select the measurement mode, set the serial numbers of the sensors (when replacing) and their network addresses.

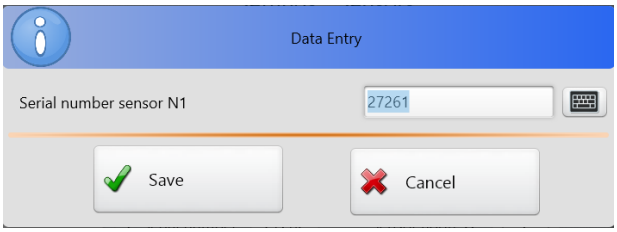
- To select the measurement mode, use the **Measurement mode** drop-down list.



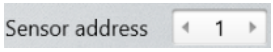
There are two measurement modes: **Thickness** and **Distance**.

For each sensor, it is necessary to enter the serial number and address.

A window for entering the serial number will appear when the cursor is placed in the **Serial number** field.



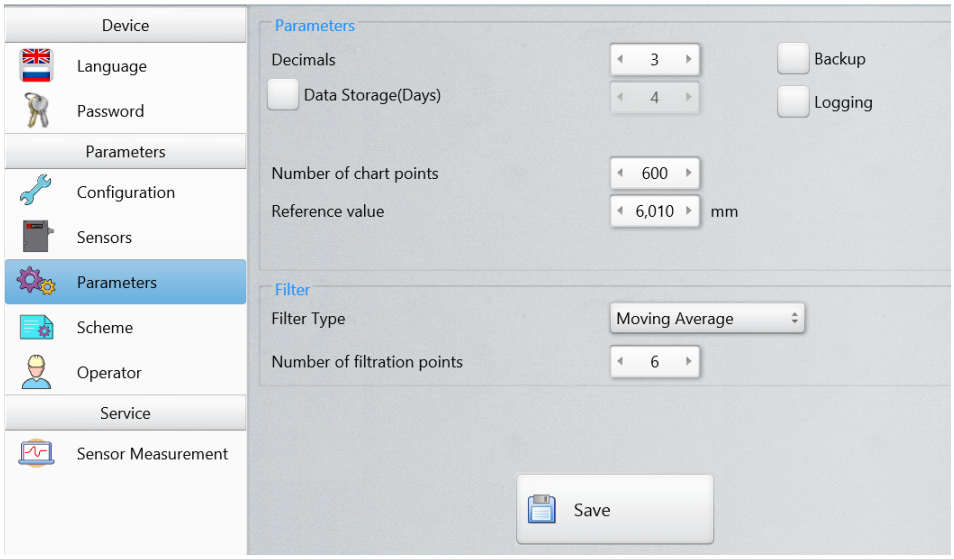
The sensor address is selected in the **Sensor address** field using the left / right arrows.



To save the changes, tap **Save**.

8.1.2.3. Parameters

The **Parameters** tab:



In the **Parameters** tab, the user can set general system parameters and filtering. The general parameters are described in the table below.

Parameter	Description
Decimals	The number of decimals for the measurement results.
Data Storage	The number of days during which the data is stored. If this checkbox is selected, the saved data will be stored in the database for the selected number of days, outdated data will be deleted automatically.
Backup	If this checkbox is selected, a backup copy of the database will be automatically created when you exit the program.
Logging	If this checkbox is selected, the main processes of the system operation will be recorded (logged) to the file.

Parameter	Description
Averaging time	The time for which the measurement results will be output/saved (for example, every 0.1 s).
Number of chart points	The number of measured points displayed on the graph.
Reference value	The reference value used when calibrating the system.

Filtering is used to reduce noise and achieve better resolution. Description of the parameters is given in the table below:

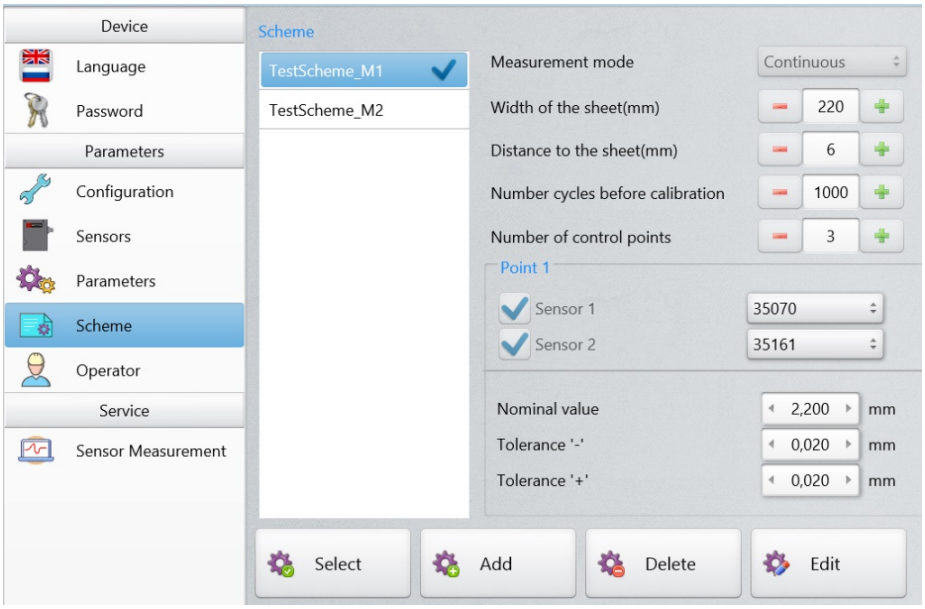
Parameter		Description
Filter type	No filtering	Without filtering.
	Moving Average	The number of filter points for the measured values. It is used to calculate the arithmetic mean. Each new measured value is added, the first measured value is removed from the averaging.
Number of filtration points		This parameter specifies the number of measurement values to which the filter applies.

To save the changes, tap **Save**.

8.1.2.4. Measurement scheme

To work with the system, it is necessary to select a set of parameters that will be used in the measurement process.

The **Scheme** tab:



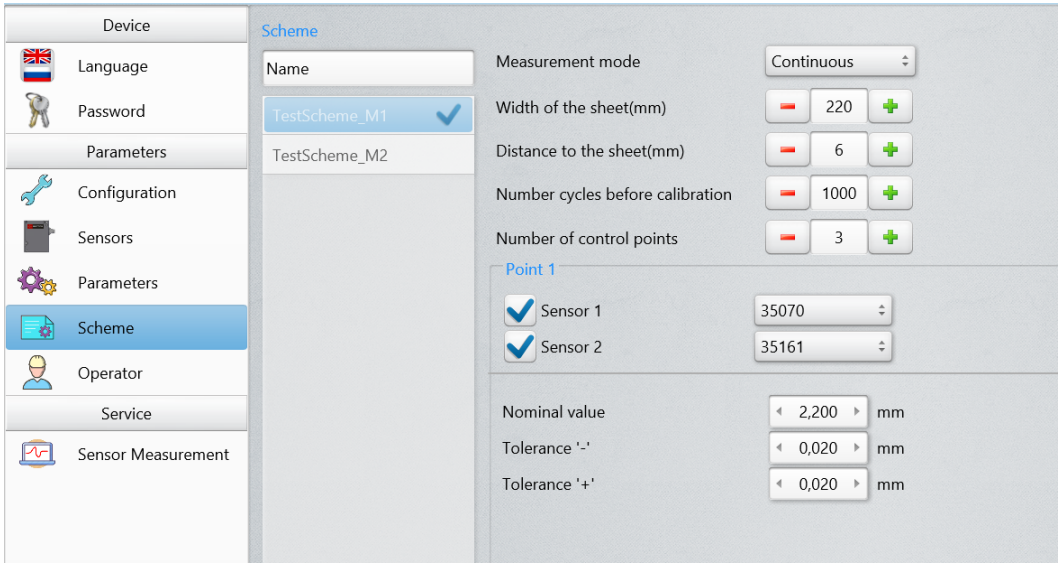
In this tab, the user can create the measurement scheme with the required number of control points and measurement modes.

Buttons assignment:

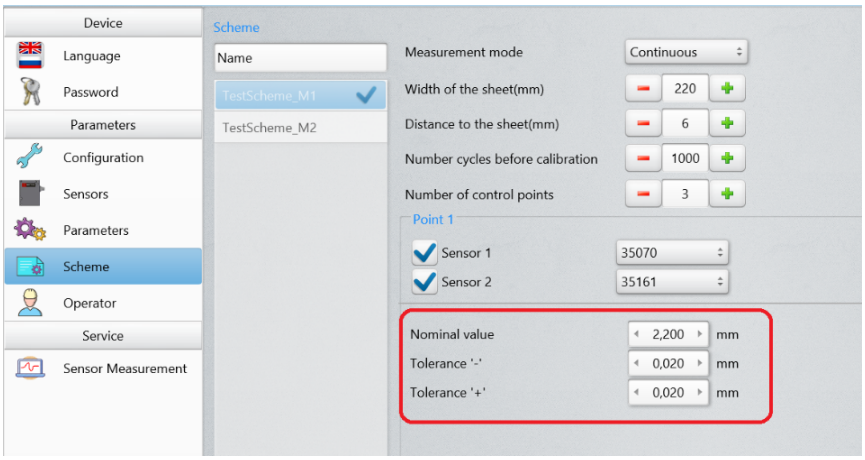
Button	Assignment
Select	Selecting a set of parameters. To select a set of parameters, you need to tap on it in the **Scheme** list and then tap the **Select** button.
Add	Adding a new set of parameters. To add a new set of parameters, you need to tap the **Add** button, specify the nominal thickness of the measured object (**Nominal value**), tolerances (**Tolerance '-'** and **Tolerance '+'**) and set the minimum / maximum thickness value for the analog output (if selected in the settings, see par. 8.1.2.1).
Delete	Deleting a set of parameters. To delete a set of parameters, you need to tap on it in the **Scheme** list and then tap the **Delete** button.
Edit	Editing a set of parameters. To edit a set of parameters, you need to tap on it in the **Scheme** list and then tap the **Edit** button.

An example of adding the measurement scheme with two control points. In the system, the control point means the following: the entire width of the sheet is divided into equal zones, the thickness of the material at the control point is defined as the average thickness over the entire zone.

After clicking the **Add** button, the data entry window for the new scheme appears on the screen:



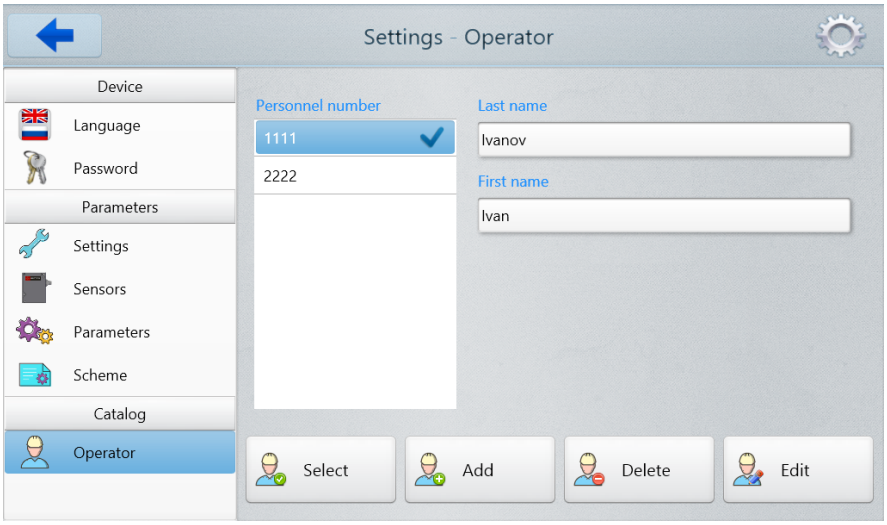
1. Type the name of the scheme in the **Scheme** field.
2. Select the measurement mode (**Continuous**/**By Point**). (**Number of control points**). In **By point** mode, the motion system takes measurements at each control point.
3. Enter the distance from the zero position of the motion system to the nearest edge of the sheet (**Distance to the sheet**).
4. Enter the width of the sheet (**Width of the sheet**) - the range of scanning in width.
5. Number of cycles before the next calibration (**Number cycles before calibration**). After the specified number of measurement cycles, the system will be automatically calibrated using the built-in reference standard.
6. Specify the number of control points in the **Number of control points** field.
7. Specify the nominal thickness value (**Nominal value**), tolerances (**Tolerance '-'** and **Tolerance '+'**).



8. Tap the **Save** button to save the changes.

8.1.2.5. Operator

The **Operator** tab:



In this tab, the user can enter the operator's data. Subsequently, when saving the measurement results to the database, the data of the selected operator will be written to the database.

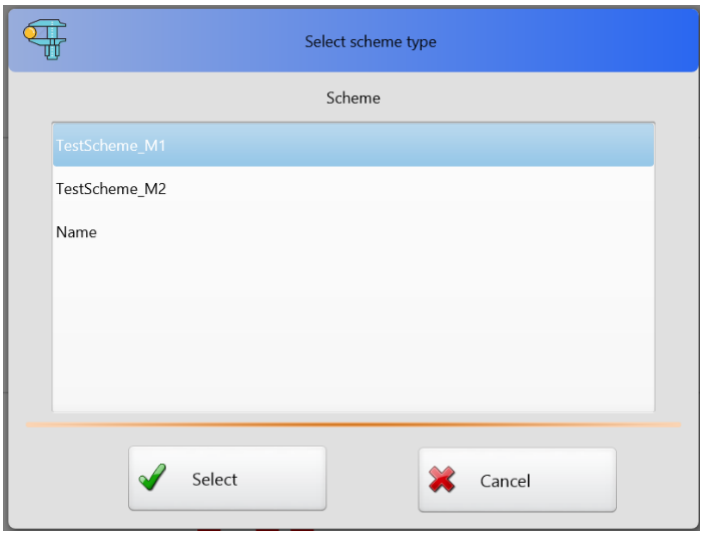
Buttons assignment:

Button	Assignment
Select	Selecting the current operator. To select the current operator, tap on the personnel number and then tap the **Select** button.
Add	Adding a new operator. To add a new operator, tap the **Add** button, specify the personnel number, last name and first name of the operator.
Delete	Deleting the operator. To delete the operator, tap on the personnel number and then tap the **Delete** button.
Edit	Editing the operator's data. To edit the operator's data, tap on the personnel number and then tap the **Edit** button.

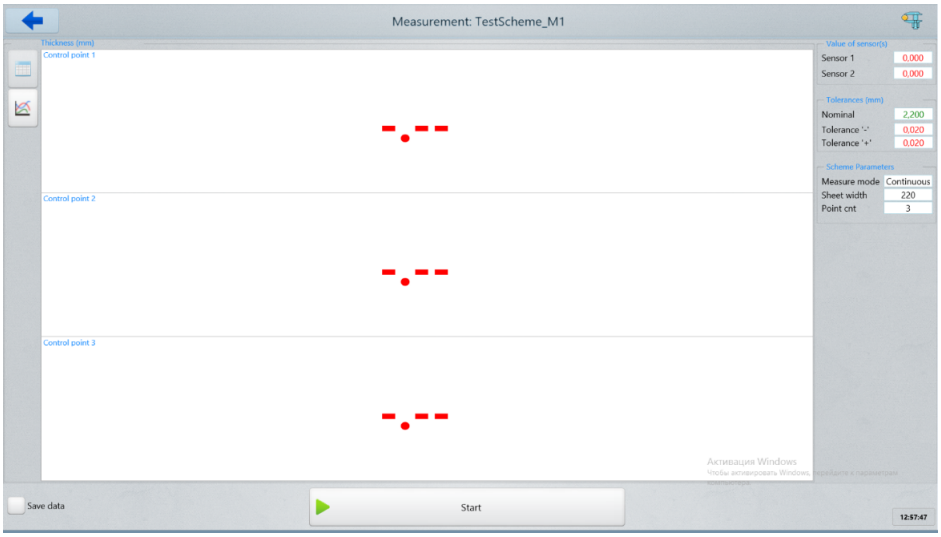
To save the changes, tap **Save**.

8.2. Measurement

In the main menu, tap the **Measurement** button.
Before measuring, select the measurement scheme.



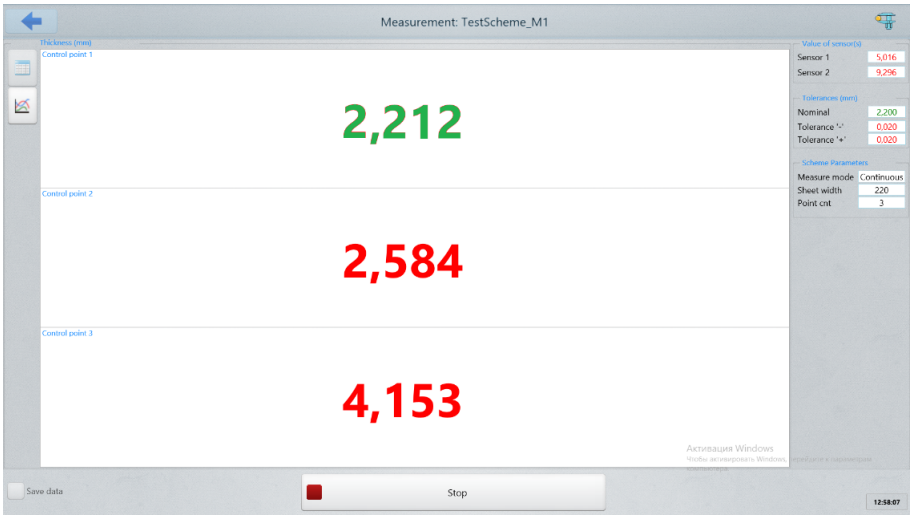
The **Measurement** window:



This window displays:

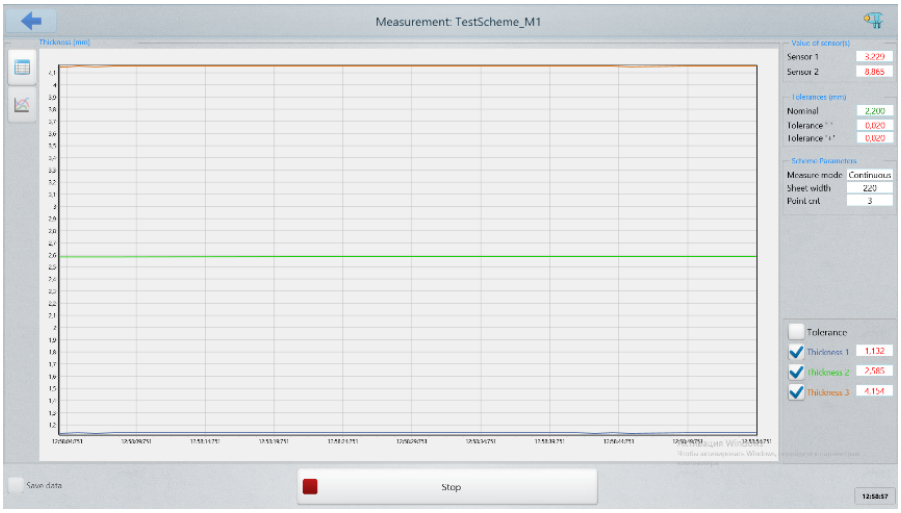
- Name of the selected set of parameters (to the right of the window name).
- Current measured thickness (green or red).
- Sensor readings (**Sensor1**, **Sensor2**).
- Nominal thickness (**Nominal**).
- Tolerances (**Tolerance '-'** and **Tolerance '+'**).
- Buttons for selecting the mode of displaying the measurement results: numerical  or graphical  .

To save the measurement results to the database, tick the **Save data** checkbox.
To start the measurement process, tap the **Start** button.
The **Measurement** window:



If the measured thickness value at the control point is within the specified tolerances, it is displayed in green, otherwise - in red.

To switch to the graphical display of results, tap  .



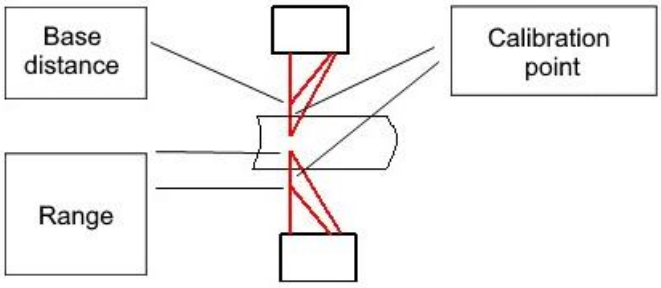
To cancel the data output at the control point, clear the corresponding **Thickness** checkbox.

To stop the measurement process, tap the **Stop** button.

8.3. Calibration

The thickness of the product is controlled within the working range of the sensor (sensors).

The scheme:



For optimum thickness control, the sensors should be mounted so that the controlled surfaces of the sample of nominal thickness is located in the middle of the sensor's working range. Since the sensors are calibrated in their own coordinate system, it is necessary to link the coordinates of the two sensors (Scheme), i.e. calibrate the device. Calibration must be carried out using a sample of known thickness.

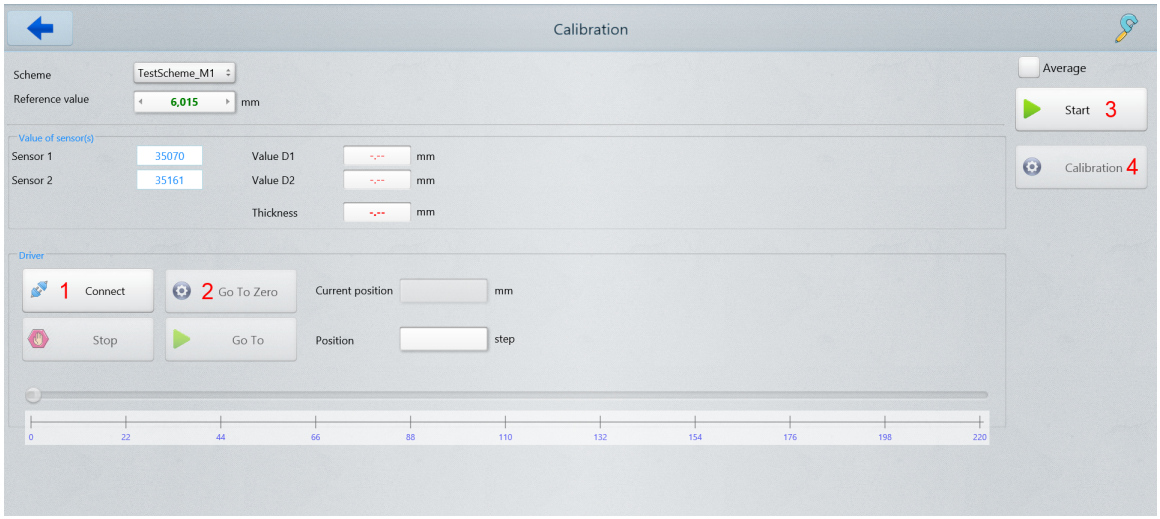
Calibration can be carried out in manual and automatic modes.

Calibration in automatic mode is performed during the thickness measurement. It is necessary to set the **Number cycles before calibration** parameter (see par. 8.1.2.4). Calibration will be performed using the calibration plate automatically after a specified number of measurement cycles.

To calibrate the system manually, do the following:

- Go to the **Settings** window, tap **Parameters** and enter the sample thickness value in the **Reference value** field.
- Go back to the main menu and tap the **Calibration** button. The **Calibration** window will appear. The name of the selected set of parameters is displayed to the right of the window title.

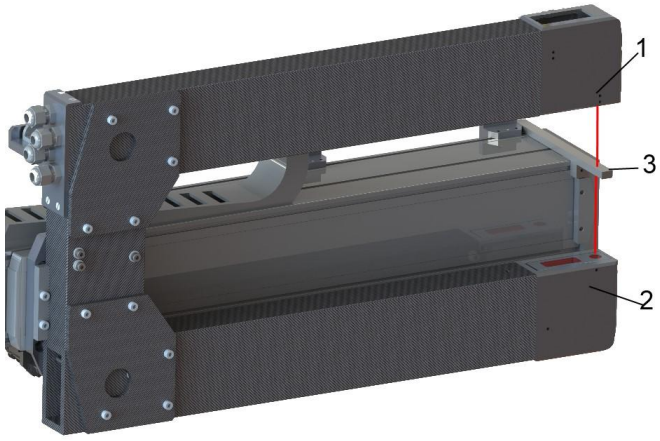
The **Calibration** window:



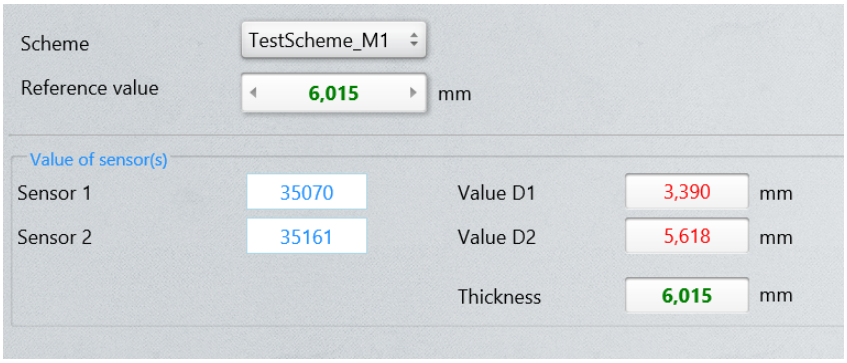
By default, the current measurement scheme is selected for calibration. You can select any other scheme from the **Scheme** drop-down list.

To calibrate the system, it is necessary to place the sensors in the calibration position. To do this, follow the steps:

- Tap the **Connect** button (1) on the **Driver** panel to connect to the motor driver.
- Tap the **Go To Zero** button (2) to move to the starting position (calibration position). The laser beams of the sensors (1, 2) must be aimed at the calibration plate (3).



- Tap the **Start** button (3) to start the measurement process. Parameters **Value D1**, **Value D2**, **Thickness value** take values equal to the readings of the sensors in their own coordinate system.
- To calibrate the system, tap the **Stop** button and then tap the **Calibration** button (4). Parameters **Value D1**, **Value D2** are the readings of the sensors in their own coordinate system. The **Thickness** parameter (sample thickness value) takes values equal to the readings of the sensors in the coordinate system of the calibration standard.
- If the value of the **Thickness** parameter is equal to the value of the **Reference value** parameter, the calibration is correct.



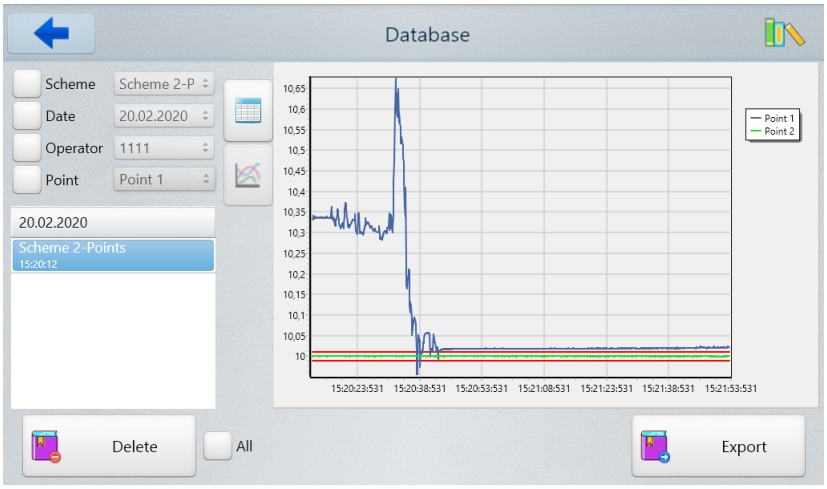
8.4. Database

During the system operation, the thickness values are written to the database (provided that the **Save data** option is selected, see par. 8.2).

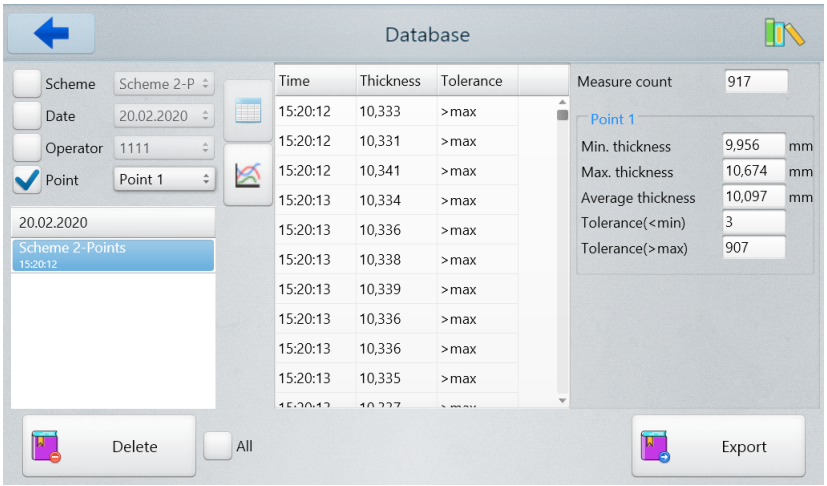
To view the database, tap the **Database** button in the main menu. The **Database** window will appear. Select a set of measurements from the list on the left side of the window.

Data can be presented both in tabular and graphical form.

To view the data in graphical form, tap :



To view the data in tabular form, tap :



To work with the table, use a vertical scrollbar.

To delete a single measurement, tap on it in the table and then tap the **Delete** button.

To delete all measurements, select the **All** checkbox and then tap the **Delete** button.

Data can be exported to CSV and XLS formats - tap the **Export** button and select the required format.

9. Operating the system

Follow these steps:

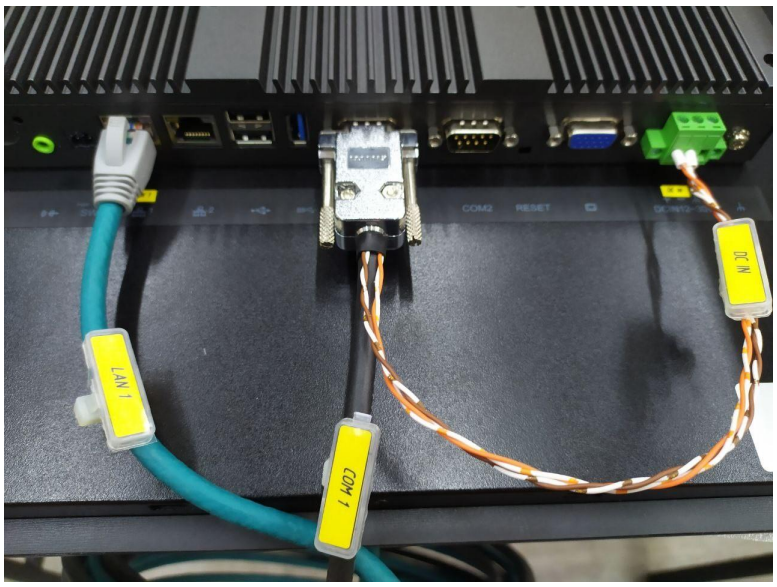
- Connect the measuring system to the panel computer (see par. 9.1).
- Set system parameters (see par. 8.1.2).
- Calibrate the system (see par. 8.3).
- Start the measurement process (see par. 8.2).

9.1. Connecting the measuring system to the panel computer

- Connect the X1 cable of the control cabinet to the X1 connector of the measuring system.
- Connect the X2 cable of the control cabinet to the X2 connector of the measuring system.
- Connect the X3 cable of the control cabinet to the X3 connector of the measuring system.
- Connect the X4 cable of the control cabinet to the X4 connector of the measuring system.

- Connect the X5 cable of the control cabinet to the X5 connector of the measuring system.

- Connect the power cable to the power connector of the panel computer.
- Connect the data cable to the COM1 connector of the panel computer.
- Connect the Ethernet cable to the LAN 1RJ-45 connector of the panel computer.



- Connect the power cable 220V to the control cabinet.

- Turn on the power supply. The white LED indicates that 220V is connected.
- The panel computer turns on automatically after power is applied.
- Wait for the system to complete testing and load the software. This will take about 30-60 seconds.
- Now you can start working with the Thickness Measurement System.

10. Technical support

Technical assistance related to incorrect work of the system and to problems with a service program is free.

Requests for technical assistance should be directed to support@riftek.com.

11. Warranty policy

Warranty assurance for the Thickness Measurement System – 24 months from the date of putting in operation; warranty shelf-life – 12 months.

12. Revisions

Date	Revision	Description
14.06.2023	1.0.0	Starting document.

13. Distributors

AUSTRALIA

Applied Measurement Australia Pty Ltd
RAILWAY INSTRUMENTS ONLY
Thornton Plaza, Unit 5,
27 Thornton Crescent, Mitcham
VIC 3132, Australia
Tel: +61 39874 5777
Fax: +61 39874 5888
sales@appliedmeasurement.com.au
www.appliedmeasurement.com.au

BELGIUM

Althen Sensors & Controls BV
Verrijn Stuartlaan 40, 2288 EL,
Rijswijk, Leidschendam
The Netherlands
Tel: +31 0 70 392 4421
Tel: +31 0 61 396 7830
Tel: +31 0 64 323 8393
sales@althen.nl
info@althen.nl
www.althensensors.com

BOSNIA AND HERZEGOVINA

ASCO RAIL sp. z o.o.
EXCLUSIVE REPRESENTATIVE FOR RAILWAY EQUIPMENT
ul. Wielowiejska 53, 44-120
Pyskowice, Poland
Tel: +48 32 230 45 70
Fax: + 48 32 233 21 34
biuro@ascorail.pl
export@ascorail.pl
www.ascorail.pl

BRAZIL

CAPI Controle e Automação Ltda
Rua Itororó, 121, CEP 13466-240
Americana-SP, Brazil
Tel: +55 19 36047068
Fax: +55 19 34681791
capi@capicontrole.com.br
www.capicontrole.com.br

BULGARIA

ASCO RAIL sp. z o.o.
EXCLUSIVE REPRESENTATIVE FOR RAILWAY EQUIPMENT
ul. Wielowiejska 53, 44-120
Pyskowice, Poland
Tel: +48 32 230 45 70
Fax: + 48 32 233 21 34
biuro@ascorail.pl
export@ascorail.pl
www.ascorail.pl

CHILE

MOL INGENIERIA LTDA
EXCLUSIVE REPRESENTATIVE FOR RAILWAY EQUIPMENT
República de Honduras 11936
Las Condes, Santiago de Chile
Tel: +56 9 59200362
hconcha@molingenieria.com
www.molingenieria.com

CHILE

Verne SpA
Apoquindo 2818, oficina 31
Las Condes, Santiago, Chile
Tel: +56 2 228858633
info@verne.cl
jsaavedra@verne.cl
www.verne.cl

CHINA

Beijing Haiwei Lutong Technology Co., Ltd
Yard 1, Tianxing Street, Fangshan
District, Beijing, China
Tel: +86 10 8366 1866
Fax: +86 10 8366 1866
info@haiwlt.com
www.haiwlt.com

CHINA

Chongqing Wolf Industrial Technology Co., Ltd
Room 2307 / 2308, Light of City
international business building,
No. 19 Jiangnan Avenue, Nan'an
District, Chongqing, China
Tel: 023 62832618
Fax: 023 62832113
info@wolf-hk.com
www.wolf-hk.com

CHINA

Beijing Gemston Mechanical & Electrical Equipment Co., Ltd
RAILWAY INSTRUMENTS ONLY
Room 613, Anfu Mansion, Fengtai
District, Beijing, China
Tel: +86 10 6765 0516
Fax: +86 10 6765 6966
Mobile: +86 137 1755 1423
dh0526@163.com
www.baoft.cn

CHINA

Xi'an Win-Success Automation Technology Co.,Ltd
Room 3-1-1039, Iduhui Building,
No.11 Tangyan South Road
High-Tech Zone, Xi'an
Shaanxi PRC, China
Tel: +86 29 81106280
Fax: +86 29 81106285
Mob: +86 133 19271405
info@maxsenor.com
www.maxsensor.com

CHINA

Micron-Metrology co., Ltd
No.2, Kecheng Rd., Industrial Park
District, Suzhou,
Jiangsu Province., China
Tel: 0512 65589760
Mob: +86 189 1806 9807
sales@micron-metrology.cn
www.micron-metrology.cn

CHINA

Zhenshangyou Technologies Co., Ltd
Rm 2205-2210, Zhongyou Hotel
1110 Nanshan Road, Nanshan
District 518054 Shenzhen, China
Tel: +86 755-26528100/8011/8012
Fax: +86 755-26528210/26435640
info@51sensors.com
www.51sensors.com

CROATIA

ASCO RAIL sp. z o.o.
EXCLUSIVE REPRESENTATIVE FOR RAILWAY EQUIPMENT
ul. Wielowiejska 53, 44-120
Pyskowice, Poland
Tel: +48 32 230 45 70
Fax: + 48 32 233 21 34
biuro@ascorail.pl
export@ascorail.pl
www.ascorail.pl

CZECH REPUBLIC

ASCO RAIL sp. z o.o.
EXCLUSIVE REPRESENTATIVE FOR RAILWAY EQUIPMENT
ul. Wielowiejska 53, 44-120
Pyskowice, Poland
Tel: +48 32 230 45 70
Fax: + 48 32 233 21 34
biuro@ascorail.pl
export@ascorail.pl
www.ascorail.pl

DENMARK

BLConsult
Ryssbält 294
95 291 Kalix, Sweden
Tel: +46 70 663 19 25
info@blconsult.se
www.blconsult.se

ESTONIA

FoodLab OÜ
Haabersti linnaosa, Astangu tn 52
13519 Eesti, Tallinn, Estonia
Tel: +372 56 363110
foodlab.ee@gmail.com

FINLAND

Kvalitest Industrial AB
EXCEPT FOR RAILWAY INSTRUMENTS
Ekbacksvägen 28,
16869 Bromma, Sweden
Tel: +46 0 76 525 5000
sales@kvalitest.com
www.kvalitest.com
www.kvalitest.se

FINLAND

TERÄSPYÖRÄ-STEELWHEEL OY
RAILWAY INSTRUMENTS ONLY
Juvan teollisuuskatu 28
FI-02920 ESPOO, Finland
Tel: +358 400 422 900
Fax: +358 9 2511 5510
steelwheel@steelwheel.fi
www.teraspyora.fi

FRANCE

BLET Measurement Group S.A.S.
1 avenue du Président Georges
Pompidou, 92500 Rueil
Malmaison, France
Tel: + 33 0 1 80 88 57 85
Fax: +33 0 1 80 88 57 93
technique@blet-mesure.fr
www.blet-mesure.fr

GERMANY

Disynet GmbH
Breyeller Str. 2, 41379
Brueggen, Germany
Tel: +49 2157 8799 0
Fax: +49 2157 8799 22
disynet@sensoren.de
www.sensoren.de

GERMANY

Finger GmbH & Co. KG
OPTICAL MICROMETERS ONLY
Sapelloh 172, 31606
Warmsen, Germany
Tel: +49 5767 96020
Fax: +49 5767 93004
finger@finger-kg.de
www.finger-kg.de

GERMANY

ALTHEN GmbH Meß- und Sensortechnik
Dieselstrasse 2, 65779
Kelkheim, Germany
Tel: +49 0 6195 7 00 60
info@althen.de
www.althensensors.com/de/

HUNGARY

ASCO RAIL sp. z o.o.
EXCLUSIVE REPRESENTATIVE FOR RAILWAY EQUIPMENT
ul. Wielowiejska 53, 44-120
Pyskowice, Poland
Tel: +48 32 230 45 70
Fax: + 48 32 233 21 34
biuro@ascorail.pl
export@ascorail.pl
www.ascorail.pl

INDIA

Influx Big Data Solutions Pvt Ltd
No:2, Krishvi, Ground Floor,
Old Airport Road, Domlur,
Bangalore - 560071, India
Tel: +91 73 37748490
Tel: +91 94 48492380
milan@influxtechnology.com
support_india@influxtechnology.com
www.influxtechnology.com

INDIA

Paragon Instrumentation Engineers Pvt. Ltd.
RAILWAY INSTRUMENTS ONLY
200, Station Road,
Roorkee, 247 667, India
Tel: +91 1332 272394
tanuj@paragoninstruments.com
www.paragoninstruments.com

INDONESIA

PT. DHAYA BASWARA SANIYASA
Botanic Junction Blok H-9 NO. 7
Mega Kebon Jeruk, Joglo
Jakarta,11640, Indonesia
Tel: +62 21 2932 5859
management@ptdbs.co.id

ISRAEL

Nisso Dekalo Import Export LTD
1 David Hamelech Street
Herzlia 46661 Israel
Tel: +972 99577888
Fax: +972 99568860
nissodekaloltd@outlook.com
www.fly-supply.net
www.aircraft-partsupply.com

ITALY

FAE s.r.l.
Via Tertulliano, 41
20137 Milano, Italy
Tel: +39 02 55187133
Fax: +39 02 55187399
fae@fae.it
www.fae.it

JAPAN

Tokyo Instruments, Inc.
6-18-14 Nishikasai, Edogawa-ku,
Tokyo, 134-0088 Japan
Tel: +81 3 3686 4711
Fax: +81 3 3686 0831
f_kuribayashi@tokyoinst.co.jp
www.tokyoinst.co.jp

LATVIA

FoodLab OÜ
Haabersti linnaosa, Astangu tn 52
13519 Eesti, Tallinn, Estonia
Tel: +372 56363110
foodlab.ee@gmail.com

LUXEMBOURG

Althen Sensors & Controls BV
Verrijn Stuartlaan 40, 2288 EL,
Rijswijk, Leidschendam
The Netherlands
Tel: +31 0 70 392 4421
Tel: +31 0 61 396 7830
Tel: +31 0 64 323 8393
sales@althen.nl
info@althen.nl
www.althensensors.com

MALAYSIA

OptoCom InstruVentures
H-49-2, Jalan 5, Cosmoplex
Industrial Park, Bandar Baru
Salak Tinggi, Sepang, Malaysia
Tel: 603 8706 6806
Fax: 603 8706 6809
optocom@tm.net.my
www.optocom.com.my

MONTENEGRO

ASCO RAIL sp. z o.o.
EXCLUSIVE REPRESENTATIVE FOR RAILWAY EQUIPMENT
ul. Wielowiejska 53, 44-120
Pyskowice, Poland
Tel: +48 32 230 45 70
Fax: + 48 32 233 21 34
biuro@ascorail.pl
export@ascorail.pl
www.ascorail.pl

NETHERLANDS

Althen Sensors & Controls BV
Verrijn Stuartlaan 40, 2288 EL,
Rijswijk, Leidschendam
The Netherlands
Tel: +31 0 70 392 4421
Tel: +31 0 61 396 7830
Tel: +31 0 64 323 8393
sales@althen.nl
info@althen.nl
www.althensensors.com

NORWAY

BLConsult
Ryssbält 294,
95 291 Kalix, Sweden
Tel: +46 70 663 19 25
info@blconsult.se
www.blconsult.se

NORWAY

Salitec AS
PB 468, N-1327
Lysaker, Norway
Tel: +47 23 891015
Fax: +47 92101005
mail@salitec.no
www.salitec.no

PERU

Verne Perú S.A.C.
Las Codornices 104,
Surquillo, Lima, Peru
Tel/fax: +51 992436734
info@verne.cl
www.verne.cl

POLAND

ASCO RAIL sp. z o.o.
EXCLUSIVE REPRESENTATIVE FOR RAILWAY EQUIPMENT
ul. Wielowiejska 53, 44-120
Pyskowice, Poland
Tel: +48 32 230 45 70
Fax: + 48 32 233 21 34
biuro@ascorail.pl
export@ascorail.pl
www.ascorail.pl

POLAND

RIFTEK EUROPE sp. z o.o.
ul. Domaniewska 17/19, 02-672
Warsaw, Poland
info@riftek.com
www.riftek.com

PORTUGAL

Campal Inovacoes Ferroviarias Lda.
Lagoas Park, Edifício 7, 1° Piso
Sul, 2740-244 Porto Salvo, Oeiras,
Portugal
Tel: +351 21 584 4348
campal@campal.pt
www.campal.pt

SERBIA

ASCO RAIL sp. z o.o.
EXCLUSIVE REPRESENTATIVE FOR RAILWAY EQUIPMENT
ul. Wielowiejska 53, 44-120
Pyskowice, Poland
Tel: +48 32 230 45 70
Fax: + 48 32 233 21 34
biuro@ascorail.pl
export@ascorail.pl
www.ascorail.pl

SLOVAKIA

ASCO RAIL sp. z o.o.
EXCLUSIVE REPRESENTATIVE FOR RAILWAY EQUIPMENT
ul. Wielowiejska 53, 44-120
Pyskowice, Poland
Tel: +48 32 230 45 70
Fax: + 48 32 233 21 34
biuro@ascorail.pl
export@ascorail.pl
www.ascorail.pl

SLOVENIA

ASCO RAIL sp. z o.o.
EXCLUSIVE REPRESENTATIVE FOR RAILWAY EQUIPMENT
ul. Wielowiejska 53, 44-120
Pyskowice, Poland
Tel: +48 32 230 45 70
Fax: + 48 32 233 21 34
biuro@ascorail.pl
export@ascorail.pl
www.ascorail.pl

SOUTH KOREA

BS Holdings
B-201,Wonpogongwon 1ro,
59 Danwon-gu, Ansan-si,
Gyeonggi-do 15455, Republic of Korea
Tel: +82 31 411 5011
Fax: +82 31 411 5015
bsh5011@hanmail.net
www.lasersolution.co.kr

SOUTH KOREA

PROSEN. CO., LTD
M-1001, Songdo techno park IT center, 32, Songdogwahak-ro,
Yeonsu-gu, Incheon, 21984,
Republic of Korea
Tel: +82 32 811 3457
Fax: +82 32 232 7458
trade@prosen.co.kr
www.prosen.co.kr

SPAIN

IBERFLUID Instruments S.A.
C/ Botanica, 122, 08908
L'Hospitalet de Llobregat
Barcelona
Tel: +34 93 447 10 65
Fax: +34 93 334 05 24
myct@iberfluid.com
www.iberfluid.com

SWEDEN

BLConsult
Ryssbält 294,
95 291 Kalix, Sweden
Tel: +46 70 663 19 25
info@blconsult.se
www.blconsult.se

SWEDEN

Kvalitest Industrial AB
EXCEPT FOR RAILWAY INSTRUMENTS
Ekbacksvägen 28,
16869 Bromma, Sweden
Tel: +46 0 76 525 5000
sales@kvalitest.com
www.kvalitest.com
www.kvalitest.se

SWITZERLAND

ID&T GmbH
Gewerbestrasse 12/a
8132 Egg (Zurich), Switzerland
Tel: + 41 44 994 92 32
Fax: + 41 44 994 92 34
info@idtlaser.com
www.idtlaser.com

THAILAND

Advantech Solution Co., Ltd.
20/170 Motorway Rd.,
Kwang Pravet, Khet Pravet,
Bangkok, Thailand 10250
Tel: +662 1848705
Fax: +662 1848708
sales@advantechsolution.com
www.advantechsolution.com

TURKEY

MAK Elektronik Malzeme Analiz ve Kalite Kontrol Cihazlari Dis Tic. Ltd. Sti.
Cenap Sahabettin Sokak, No:39,
34718 Kosuyolu - Kadikoy /
Istanbul - TURKEY
Tel: +90 216 402 10 34
Fax: +90 216 402 10 35
ulastac@metalografi.net
www.makelektronik.com.tr

TURKEY

TEKMA Mühendislik A.S.
Cevizli Mh. M. Kemal Cd.,
Hukukçular Towers,
A-Blok, No: 66-A/39
Kartal - Istanbul
Tel: +90 216 970 1318
Tel: +90 850 840 2334
info@tekma.eu
www.tekma.eu

UKRAINE

KODA
Frunze st. 22, 61002,
Harkov, Ukraine
Tel/Fax: +38 057 714 26 54
mail@koda.com.ua
www.koda.com.ua

UNITED KINGDOM, IRELAND

Althen UK
Northamptonshire
United Kingdom
Tel: +44 0 7823 921427
t.stoyles@althen.co.uk
www.althensensors.com
www.althencontrols.com

USA

Althen Sensors & Controls
2531 Bradley St., Oceanside, CA, 92056, USA
Tel: 858 633 3572
r.ream@althensensors.com

USA, CANADA, MEXICO

Acuity Products of Schmitt Industries, Inc.
2765 NW Nicolai Street
Portland, OR, 97210, USA
Tel: +1 503 227 7908
Fax: +1 503 223 1258
sales@acuitylaser.com
www.acuitylaser.com

USA, CANADA, MEXICO

International Electronic Machines Corporation
RAILWAY INSTRUMENTS ONLY
850 River Street, Troy,
New York, USA
Tel: +1 518 268-1636
Fax: +1 518 268-1639
marketing@iem.net
www.iem.net