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NOTE:

The terminal may be connected only to a tractor with efficient electrical system with nominal voltage of 12V!
Voltage in the socket may not be lower than 10V because too low voltage may cause improper operation of the machine!



NOTE:

In the case of any health or safety threatening situation forthwith idle the machine through switching off in the tractor a hydraulic section feeding the machine (cut off oil flow) and then press any of the buttons  which are next to one another in the bottom right corner of the terminal.



NOTE:

Independent installation of table and arm position sensors is not recommended. During installation sensors require preliminary positioning. In such a situation it is necessary to contact the service staff to obtain installation instruction.

Preliminary comments

The machine can keep on performing movements for approximately three seconds from the moment of state of emergency such as: loss of communication with the terminal, loss of power supply by the terminal, mechanical damage to a cable connecting the machine with the terminal, switching off the terminal by an operator when the machine performs any movement or when it performs the automatic operation cycle.

Switching off the terminal with a button  does not disconnect power supply control elements on the machine. In order to switch off all automation elements, pull out from the socket on the tractor the power plug of the machine automation.

Note! It is not a plug of the machine lights.

In order to make a reliable connection of the machine automation, perform the following activities: stop feeding hydraulic oil to the machine, switch off the terminal, wait for 10 seconds and then pull out the power plug of the machine automation.

The power plug of the machine automation may be pulled out only with the switched off terminal and after waiting for at least 10 seconds from switching off.

Before commencement of operation in the automatic mode of the machine ensure that the machine is connected correctly to the hydraulic system of the tractor, later on switch on feeding of hydraulic oil from the tractor to the machine in the right direction.

Handling of the hydraulic section of the tractor, which feeds the machine during automatic operation, may cause improper operation of the machine.

Safe handling of the hydraulic section of the tractor, which feeds the machine, can proceed when the terminal displays the screen with "S T O P !"

During the machine maintain particular caution during setting off the table for loading and unloading.

Do not start loading or stop it when the table for loading is significantly beyond the set position. The arm may damage the table rollers.

Every exit from the automatic operation mode requires re-calibration of the machine at the beginning of next period of operation in the automatic mode.

Despite the casing of the terminal is solid, its throwing may result in mechanical damage to the display, hindering safe operation of the machine.

During wrapping on film large electrostatic loads gather, which can the dazzle the person handling film or wrapped bale. Avoid approaching the terminal to the aforementioned elements. Too high discharge can cause failure of the terminal.

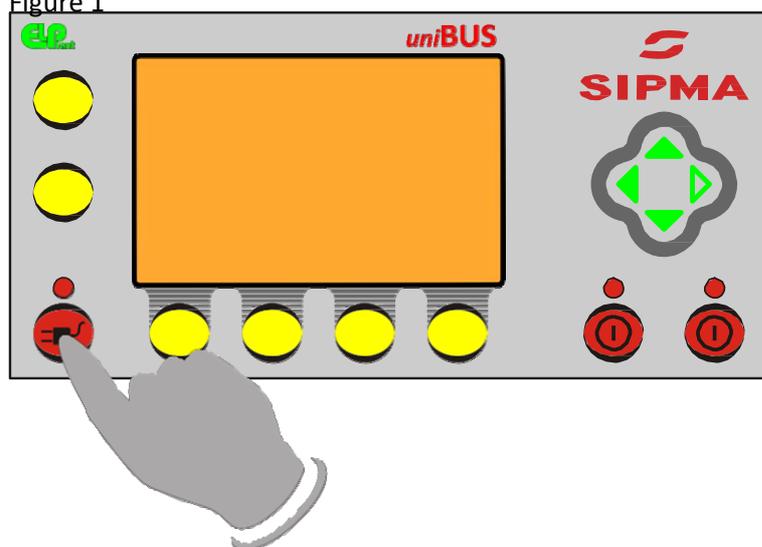
Cold machine behaves slightly differently than heated machine. While heating up the machine during subsequent cycles do not make sudden changes in parameters and exercise particular caution during the automatic cycle.

Controller enables:

1. **Manual or fully automatic handling of the wrapping machine**
2. **Regular observation of the wrapping process (meter of wrapping quantity)**
3. **Measurement of quantity of wrapped bales [n]**
4. **Measurement of operating time of the device [h] down to 1 minute**
5. **Measurement of the obtained efficiency [n/h]**
6. **Measurement of size of operation on five independent programs (fields)**
Operation on five independent programs means independent calculation of the number of wrapped bales, operating time, achieved efficiency. It enables us e.g. comparing the achieved efficiency on various fields.
7. **Programming number of wrappings**
Depending on the type of film we use for wrapping, we can change the number of wrappings.
8. **Displaying sensors' state**
Since sensors are the most exposed to mechanical damages, we have the possibility of assessing quickly efficiency of their operation and removing possible defects on our own, by replacement of the damaged sensor, without the need to call the service staff.
9. **Displaying sum of wrapped bales from the moment of installation on the wrapping machine (non-scalable size)**
It is useful even to calculate depreciation rate. In addition, it provides valuable information to the manufacturer of equipment.

Switching on and off

Figure 1



In order to switch off the terminal press  for about 1 second.

In order to switch off the terminal press power supply button  for about 1 second.

In order to switch off press and hold the power supply button  for approximately 2 seconds.

Between switching off and re-switching on the terminal, it is recommended to wait for 10 seconds and not to handle during that time any of the buttons on the terminal.

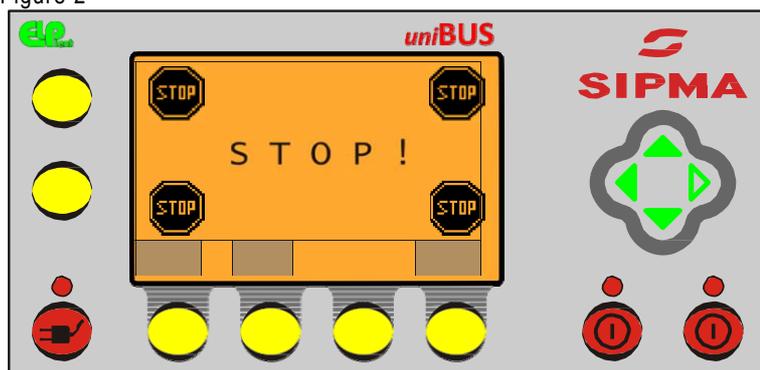


NOTE:

If supply voltage of the terminal is smaller than 6V, then after switching on power supply LED over the  will not be lit. Check the electrical system!

Initial screen

Figure 2



After switching on the terminal, the display will show welcome screen "Wrapping machine OS-7521". After establishing communication between the terminal and the machine, a selection screen will appear with "S T O P !".

After switching on the terminal, the display will show welcome screen "Wrapping machine OS-7521". After establishing communication between the terminal and the machine a selection screen will appear with "S T O P !" ; also LEDs over buttons  will be lit .



NOTE:

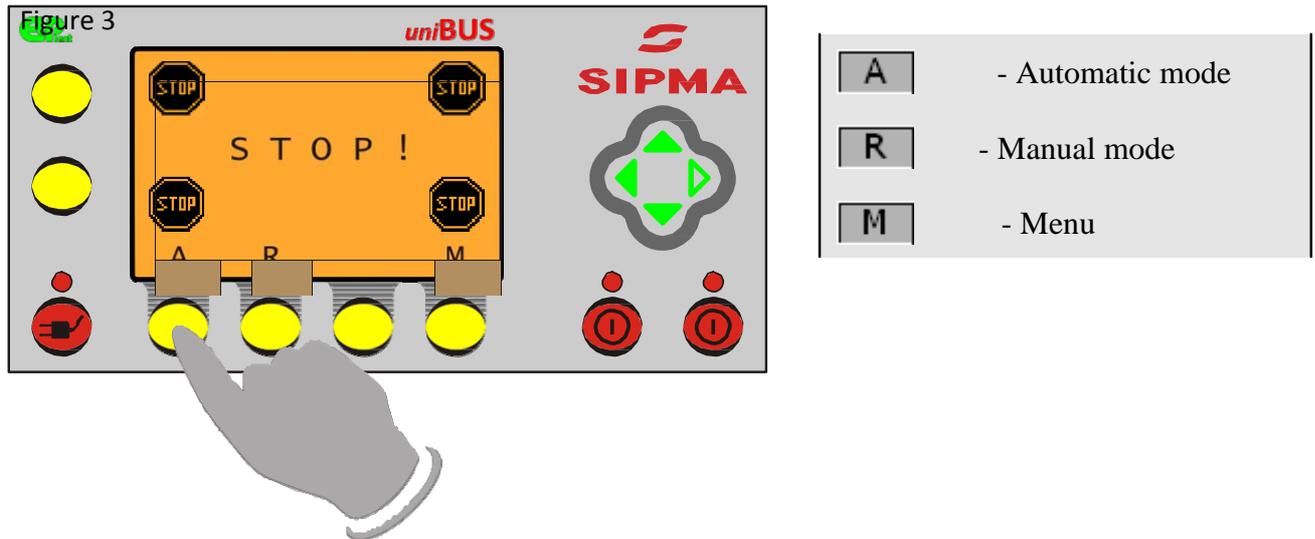
If the screen with "S T O P !" does not appear within 30 seconds from switching off the terminal: switch off the terminal, wait for 10 seconds, pull out the power plug of the machine automation from the socket on the tractor, check correctness of connection of the conductor connecting the terminal with a machine part of the control on both sides (joints must be connected correctly and trapped), check the aforementioned conductor for signs of mechanical damage (cutting, wear, visible on the mechanical shield: twisting, breaking, crushing, pulled out conductors from joints or traces of such situation). After the inspection or at least 30 seconds pull the power plug out of the machine automation to the socket on the tractor and re-switch on the terminal. If the above activities do not give effect, contact the service staff.



NOTE:

If the display of the terminal during operation displays welcome screen with the name of machine "WRAPPING MACHINE OS-7521" it means that the terminal has lost communication with the machine. In this case stop operation of the machine, switch off power supply of the hydraulics and the electrical system of the machine, carry out inspection of cabling (described above), re-switch on the machine. If the situation repeats, contact the service staff.

To activate right operation mode, press one of function keys **A** (automatic operation mode), **R** (manual operation mode) or **M** (settings menu).



Return to the initial screen is possible always by pressing one of the buttons . It can create a rapid stop of the machine, definitively interrupts operation in the automatic mode (the interrupted cycle needs to be re-started from the beginnings).



NOTE:

When the terminal displays screen " S T O P !", do not perform any automatic operations. In this case, immediately stop feeding oil to the machine, then switch off the terminal, wait for 10 seconds, pull out the main power plug of the machine automation from the socket of the tractor, wait for 30 seconds, re-put the power plug into the socket and switch on the controller. If the situation repeats, contact the service staff.

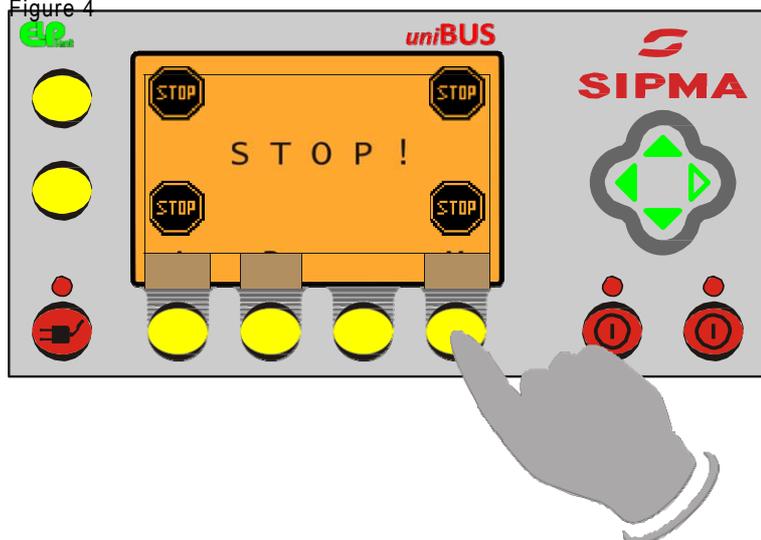


NOTE:

If, during operation, the terminal's display will show "interferences" that interfere or prevent correct operation, stop the automatic cycle in the emergency mode, switch off the terminal, wait for 10 seconds, switch on the terminal and continue work. If the situation repeats, contact the service staff.

Settings menu

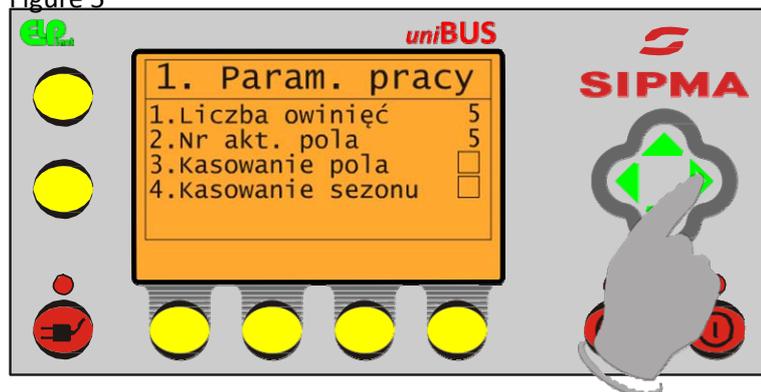
Figure 4



To go to the settings menu, press the key **M** on the initial screen.

By pressing the function key **M** on the initial screen you will go to the settings menu of the controller and the machine. Settings are divided into 5 separate screens: operating parameters, service price, configuration, arm and table.

Figure 5



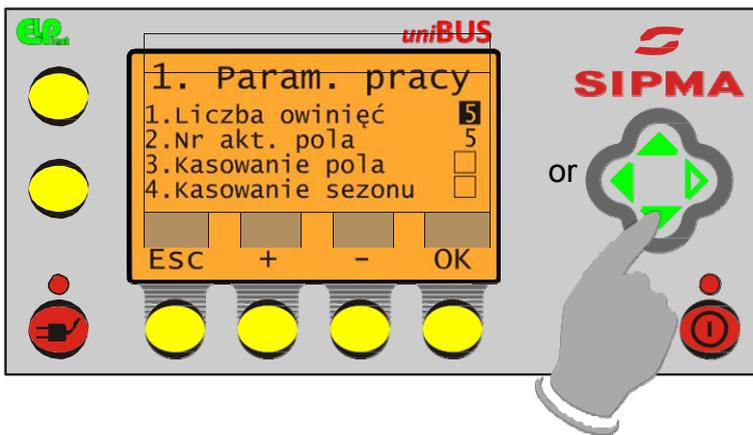
Changes in the settings menu are made by pressing the button **▶** or **◀**.

- 1 - Operating parameters
- 2 - Service price
- 3 - Configuration
- 4 - Arm
- 5 - Table

After entering the settings menu, the recently used screen will open; to go to the next screen, press the button of arrow to the right **▶**; to go to the previous screen, press the left arrow button **◀**.

Editing settings

Figure 6

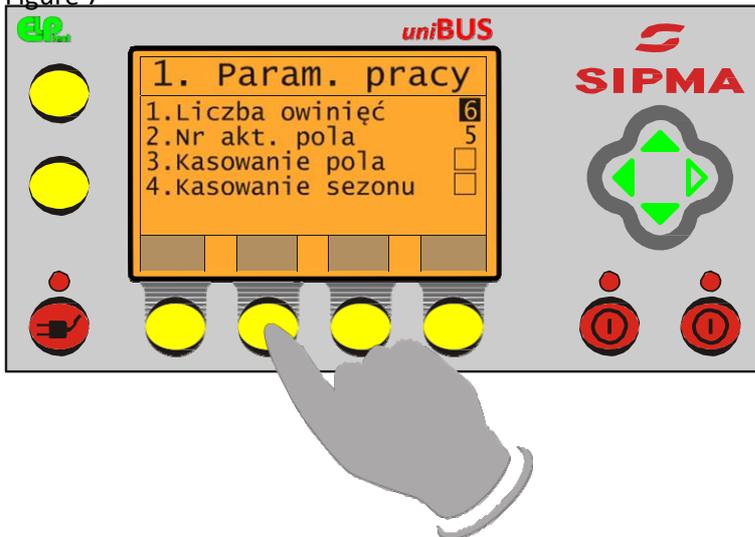


We select the element to editing by pressing button

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To select element whose value we want to change, press the arrow down button ; value of the element in the first line will be backlit; to select element from a different line, press the arrow up or down buttons , as long as appropriate value is not backlit.

Figure 7



	- increasing value
	- reducing value
	- approving change
	- cancelling

After selecting the requested element, we can change its value by pressing buttons or .

If the parameter of the machine in the mode of editing parameters of the machine is *on/off* or *yes/no*, its state is represented by a square on the right side of the name in the same row. If the parameter is not being edited and its current value is **"yes"** or **"on"** the square has a black dot



on the other hand, if the value of parameter is **"no"** or **"off"** the square is empty



Such parameters are edited in a similar way to digital parameters. Using top and down arrows, select such square (the square appears on black background) for editing and



select its state by using buttons.

After the end of editing, confirm changes with the button or return to the previous value by using the button .

To leave the settings menu and return to the screen with the text "S T O P!" approve or cancel the entered parameter edition, and then press one of the buttons .

Settings menu details

1. Operating parameters

1. Number of wrappings

We set the number of film wrappings necessary for wrapping of bales; The number of wrappings below 5 is not recommended.

2. Current field number

Selection of field (program) for which, from this moment, operating values will be measured. The controller measures size of operation on five independent fields (programs). Operation on five independent fields means independent calculation of the number of wrapped bales, operating time and the achieved efficiency. It enables us e.g. to compare the achieved efficiency on various fields.

3. Deleting field

Deleting fields means resetting to zero value of the number of wrapped bales, operating time and the achieved efficiency on the selected field.

4. Deleting season

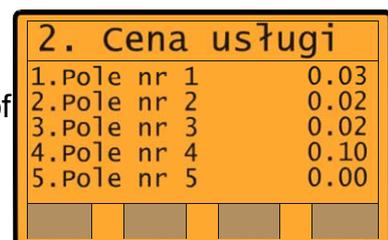
The values of the number of wrapped bales, operating time and the achieved efficiency of seasonal meters will be reseted to zero. Seasonal meters count all performed bales from any field and operating time. In this case, determined efficiency is general seasonal efficiency.



2. Service price

1 - 5. Field no. 1 - 5

We determine the price for service wrapping of one bale for the selected field (program).



3. Configuration

1. Film sensor

It enables switching on or off film feeding control. If the bales keeps on rotating on the table film rupture it may be wrapped incorrectly.



If the film sensor is selected as active (- square with a dot) when during wrapping impulses from the sensor generated by rotating film roll cease to appear, the table will stop and the screen will show a screen informing about film rupture.

In this case, the operator must:

-  **switch off the hydraulic section, which feeds the wrapping machine,**
- approach the table of the wrapping machine,
- fasten manually the end of film to the bale (e.g. sticking it to a part already wrapped on the bale),
- return to the cabin,
- **switch on the hydraulic section, which feeds the wrapping machine,**
- confirm making the aforementioned activity by pressing the button  on the terminal.

The wrapping machine starts the interrupted wrapping.

The film sensor is at the top of the mast where the film feeder is located. If the sensor is functional and well-mounted during rotations of the film roll, a LED located on it flashes to the rhythm of the generated impulses. The sensor LED always signals generation of impulses regardless of setting of the parameter "Film sensor".

Installation of the sensor:

- 0 -The sensor has a countering nut on its body.
- 1 -The place intended for the sensor is empty. In the hole where the sensor is installed we can see interior of the film feed mechanism.
- 2 - Rotate slowly metal rolls of the feeder so as to observe in the aforementioned hole heads of bolts that generate impulses.
- 3 - Set metal rolls so that a head of such bolt would be in axis with the hole through which we are looking,
- 4 - In this position of the film feed mechanism we screw the sensor into the hole deep enough until the face of the sensor touches the bolt head. During screwing the sensor must be disconnected from the system.
- 5 -**NOTE!"** We screw the sensor with its three rotations up.
- 6 - We counter this position with a nut that is wound on the sensor body.
- 7 - We connect the sensor to the electrical system of the wrapping machine.
- 8 - We switch on the controller of the wrapping machine.
- 9 - We test correctness of installation, rotating gently metal rolls of the film feeder. During tests, the rolls must rotate freely; they cannot be blocked or it is unacceptable to feel on them periodical hitting at some obstacle. During turning rollers, LED on the sensor should flash periodically.
- 10 - Film feed sensor is installed correctly.



NOTE:

Wrong installation of the sensor may cause damage to the film feeder mechanism or the sensor itself during operation. Do not allow hitting the sensor at heads of bolts.

2. Setting device time

This is the time that is designed for lowering a bale by the setting device on the ground. In the case when lowering of the setting device loaded with a bale is long and the table rotates for loading before putting the bale on the ground, then this time should be extended. When the table is placed on the ground and then there is a longer break before return of the table to the loading position, this time can be shortened.

The setting device may operate in two modes. In the roll-out mode the bale is unloaded to the ground on its rolling surface. The task performance time is rigidly determined by the aforementioned parameter. In the mode of placing the bale on the bottom the time dedicated for implementation of this process may be shortened through activation of the sensor of the setting device. If the sensor of the setting device recognizes that the process has been performed, the program moves to another step of operation. In this mode, it is recommended to set large value of this parameter, e.g. 10, because the sensor recognizes whether the bale has already been set, and the time is of secondary importance.



NOTE:

With cold oil the setting device sets a bale slower than with heated oil. It is recommended to prolong several bales after a longer pause of operation of the setting device.

4. Frame

This screen is used to set operating parameters of the loading arm. Incorrectly entered parameters can cause damage to the machine. During modification of these parameters, particular caution is recommended.

4. Ramię	
1. Poz. aktualna	835
2. Poz. pobrania	500
3. Poz. przejazdu	480
4. Poz. załadunku	317

1. Current position

Current position of the loading arm, read from the sensor, is displayed. This parameter is not subject to edition (change).

2. Intake position

We set the value of location of the loading arm, at which its position permits taking bale.

3. Passage position

We set the value of location of the loading arm, at which its position permits passage to the next bale without contact with the ground i.e. land unevennesses, molehills, etc.

4. Loading position

We set the value of location of the loading arm, at which its position permits loading (throwing) bale on the table.



NOTE:

If, during rotations of the table, the loading arm raises systematically, stop wrapping because it may result in the collision of the table and the arm. This phenomenon may be caused by very cold and dense hydraulic oil during the morning start-up of the machine and it will decay along with increase in oil temperature, or insufficient passability of the hydraulic system on the part of runoff (to the tank in the tractor). In order to improve passability, switch to another hydraulic section of the tractor, under which the machine is connected, or connect the hydraulic duct of return from the machine to the free runoff socket on the tractor.

Loading arm position adjustment procedure.

- 1 - In the manual mode we set the loading arm in the position in which it starts having contact with an even base or in a position in which we are certain that the bale will be taken by the arm (this position depends on pressure in wheels or susceptibility of the base to the wrapping machine's pressure).
- 2 - We go to screen number 4 menu "Arm ". Position no. 1 indicates current position of the arm sensor. The value of parameter from position number 2 "Intake position" must be set so that it would be smaller by 4 units than the value from position no. 1.
- 3 - The value of parameter from position number 3 "Passage position" must be smaller by the agreed number of units, e.g. 20 than the set value in position number 2. We select the value so that during passage of the machine the loading arm would not catch the base.
- 4 - In the manual mode we set the table for loading bale
- 5 - In the manual mode we lift the loading arm maximally upwards so that the servomotor of the arm would be pulled out to the maximum.
- 6 - We go to screen number 4 menu and in position no. 4 "Loading position" we set value by 4 units greater than the value of current position displayed on position number 1 "Current position".



NOTE:

The value of intake position must always be greater than the value of loading position. The value of passage position must always be closer the value of intake position than of loading position. The difference between the values of intake position and loading position should be ca. 180 units or greater. Incorrect setting of these parameters may make the table hit the arm during automatic operation.



NOTE:

If during operation of the wrapping machine we notice continuous changes of the position (intake, passage, loading) of the arm in spite of the unchanged settings of the aforementioned parameters in the terminal, it may be caused by bad fixing of the sensor to the arm. In this case, it is recommended to contact the service staff. Reassembly of the sensor of the arm would require a special servicing instruction.

5. Table

This screen enables setting operating parameters of the table and adjusting speed of all the movements of the machine. The following parameters, if incorrectly entered, may result in damage to the machine. During modification of these parameters, particular caution is recommended.

5. Stół	
1. Poz. aktualna	618
2. Poz. załadunku	300
3. Poz. wyładunku	400
4. Korekta prędk.	50

ESC + - OK

1. Current position

The current position of the table read from the sensor is displayed. This parameter is not subject to edition (change).

2. Loading position

We set the value of location of the table at which it is in the position permitting loading (throwing) a bale by the loading arm.

3. Unloading position

We set the value of location of the table at which it is in the position permitting unloading bale.

4. Adjusting speed

Information on the parameter Speed Adjustment.

Parameter Speed Adjustment is in the menu of the terminal, screen number 5 position number no. 4. Parameter control range from 0 to 100 units. In a factory this parameter is set at ca. 50.

This parameter is used for acceleration or slowdown of movements performed by the wrapping machine, i.e. rotating, lifting, lowering the table, movements with the loading arm in the manual and automatic mode. It is used to fit parameters of the wrapping machine to the presently used tractor and temperature conditions.

If one of the mentioned movements is too slow, the value of the parameter should be increased. By analogy, when one of the performed movements is too fast the value of the parameter should be decreased.

The optimum value of the parameter adjusting speed may be different for the manual operation and automatic mode.

Setting too high adjustment will result in rapid movements of the machine which will cause jerking and the table will not be set exactly in positions for loading and unloading. Setting too small adjustment value may result in total stop of the machine when making the set movement.

Selection of the value of parameter for the automatic operation mode should be made mindfully and after each adjustment wrapping should be made with the empty table (sensor of bale on the loading arm should be activated manually). A CRITICAL ELEMENT of the test is stopping the table after the stage of wrapping before starting lifting the table to unload bale. Incorrect selection of the parameter adjusting speed or setting of too high wrapping speed can make the table stop too late and beyond the area of the unloading position (the table is set at an angle in respect of the machines, mandrel blocking rotation of the table during unloading is not in the hole blocking the table).

In this case, after waiting for a few seconds, the table will make another attempt of stopping in the unloading position. If the table is set incorrectly, another rotation will be made. The described situation is not a correct element of the operation cycle and indicates that too high value of the parameter Speed Adjustment has been set.



NOTE:

During tests, in order to minimize the time of testing , the min. quantity of wrappings must be 6.

For the purpose of precise setting the position of the table, it is recommended to decrease the parameter "Speed Adjustment" to the value at which the function "OW – slow wrapping" enables very slow rotations of the table. When the table is set , return to prior value of the parameter "Speed Adjustment".

The function "OW – slow wrapping" of the manual mode is used for precise approaching the table to the position being set.

6. Table position adjustment procedure.

- 1 - In the manual mode we set the table in the unloading position (rollers of the table are positioned perpendicular to the loading arm, the cutter at the front of the machine, mandrel blocking rotations of the table during unloading is in the middle of element intended for blocking), we go to the menu on screen number 5 and in position no. 3 "Unloading position " we set the value from position no. 1 "Current position".
- 2 - In the manual mode we set the table in the loading position (rollers of the table are set in parallel to the loading arm, the cutter is at the opposite side of the machine in relation to the loading arm), we go to the menu on screen number 5 and in position no. 2 "Loading position" we set the value from position no. 1 "Current position".



NOTE:

The value of loading position must always be smaller than the value of unloading position.



NOTE:

If, during operation of the wrapping machine, we need to adjust often positions of the table and next adjustments require significant changes in the values of the aforementioned position; it may be caused by bad fixing of the sensor to the table position. In this case, it is recommended to contact the service staff. Reassembly of the sensor of the table requires special servicing instruction.

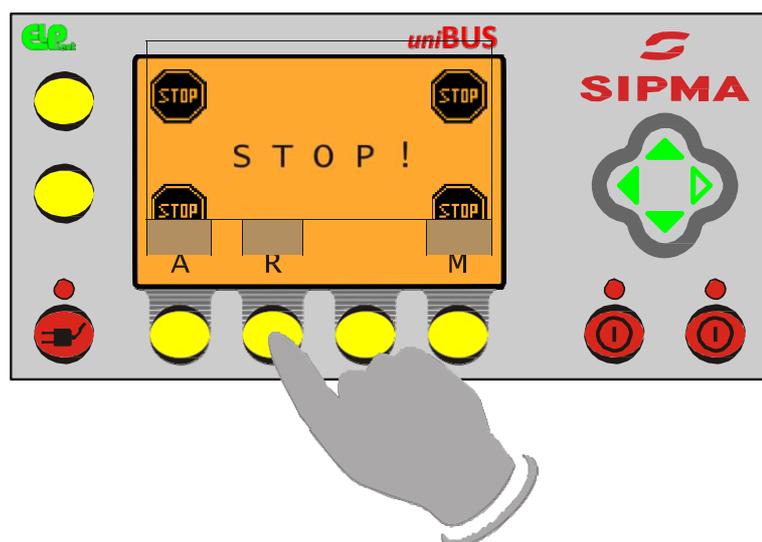
Manual mode



NOTE:

In order to adjust speed of operations to the needs of the operator, it is required to adjust the parameter Speed Adjustment. If one of movements of the machine is too fast or too rapid, this parameter should be reduced, while, when it is too slow, it should be increased. The optimum setting of the parameter Speed Adjustment for the manual mode does not have to be the same as the optimal setting for the automatic mode.

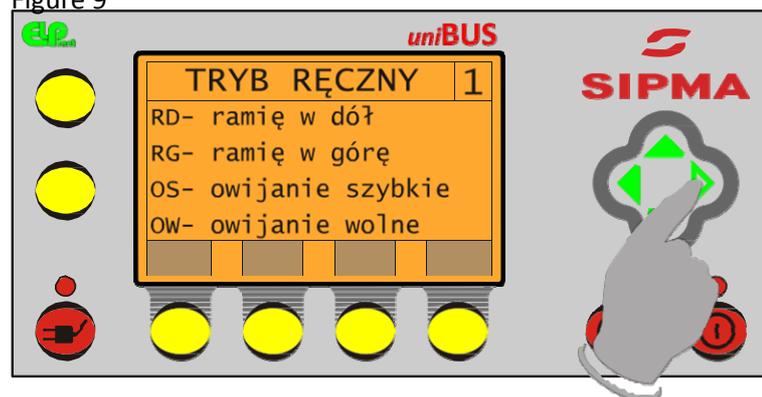
Figure 8



To go to the settings menu, press the key **R** on the initial screen.

By pressing the function key **R** on the initial screen will result in switching to the manual mode of the controller and the machine. In the manual mode we have 3 screens, which enable starting up individual functions of the machine.

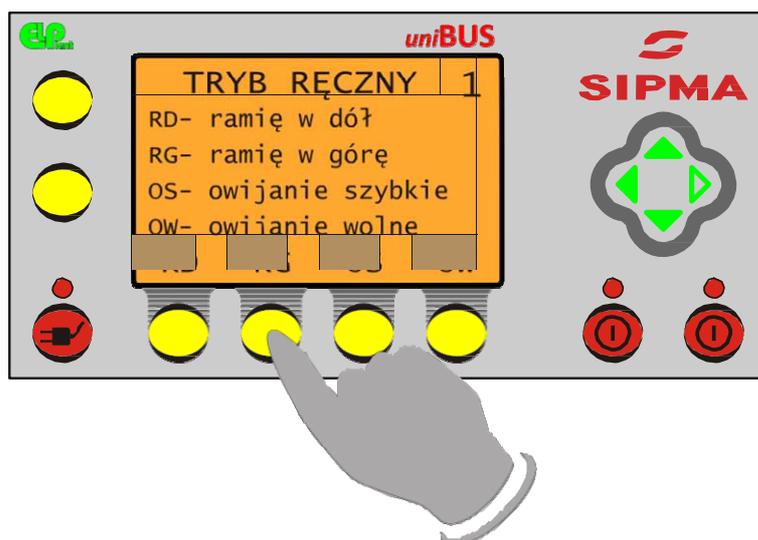
Figure 9



Changes in the settings menu are made by pressing the button **▶** or **◀**.
1 - RD, RG, OS, OW
2 - SD, SG, OBO, OBZ
3 - STD, STG, WP

After entering the manual mode, the recently used screen will be displayed; number of current screen is shown in the upper right corner of the display; to go to the next screen, press the right arrow button **▶**; to go to the previous screen, press the left arrow button **◀**.

Figure 10



The function is enabled after pressing and holding adequate function key.

On each of 3 screens we have function buttons; their pressing and holding enables different actuators of the machine.

Manual mode details

1. Screen no. 1

RD- lowering the arm; *press and hold* **RG-** lifting the arm; *press and hold* **OS-** fast wrapping; *press and hold*

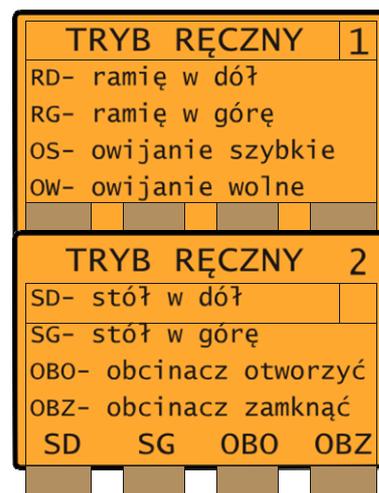
OW- slow wrapping; *press and hold*

2. Screen no. 2

SD- lowering the table; *press and hold* **SG-** lifting the table; *press and hold* **OBO-** opening the cutter; *press and hold* **OBZ-** closing the cutter; *press and hold*

3. Screen no. 3

STD- lowering the setting device; *press and hold* **STG-** lifting the setting device; *press and hold* **WP-** switching on flow; *press and hold*



Wrapping cycle in the manual mode

To facilitate use of the wrapping machine in the manual mode a sample set is presented of further steps of one cycle of bale wrapping with film. Wrapping may be performed also according to the diagram prepared on your own.

The sequence of activities in the manual film wrapping:

- 1 - Movement of the arm down to the position permitting taking bale from the ground – Screen no. 1, button "RD".
- 2 - Setting of the table in the loading position with slow rotations (mechanism of the cutter on the table must be at the opposite side of the table in relation to the loading arm) – Screen no. 1, button "OW".
- 3 - Inserting the bale into the arm (the bale bottom must lean against rear crossbar of the loading arm).
- 4 - Movement of the arm up until the moment when the bale rolls on the table – screen no. 1, button" RG".
- 5 - Movement of the arm down to the position in which for sure there will be no collision with the rotating table – screen no. 1, button" RD".
- 6 - Making of such number of quick rotations with the table (e.g. two) so that film would be secured on the bale being wrapped – screen no. 1, button" OS".
- 7 - Total opening of the cutter's jaw and release of the film tip - screen no. 2, button" OBO".
- 8 - Further making of quick rotations with the table in order to perform the required wrapping - screen no. 1, button" OS".
- 9 - Setting the table to unloading (film cutter is located on the side of the tractor perpendicularly to the axis of the machine-tractor) by means of free rotations of the table – screen no. 1, button" OW".
- 10 - Maximum lift of the table – screen no. 2, button" SG".
- 11 - Closing the cutter until film is cut and film tip is caught - screen no. 2, button" OBZ".
- 12 - Lowering the setter until the bale is set on the ground - screen no. 3, button" STD".
- 13 - Maximum lowering of the table – screen no. 2, button "SD".
- 14 - Maximum lift of the setter – screen no. 3, button "STG".
- 15 - Approach to another bale.
- 16 - Beginning of the next cycle from the first point.

Automatic mode



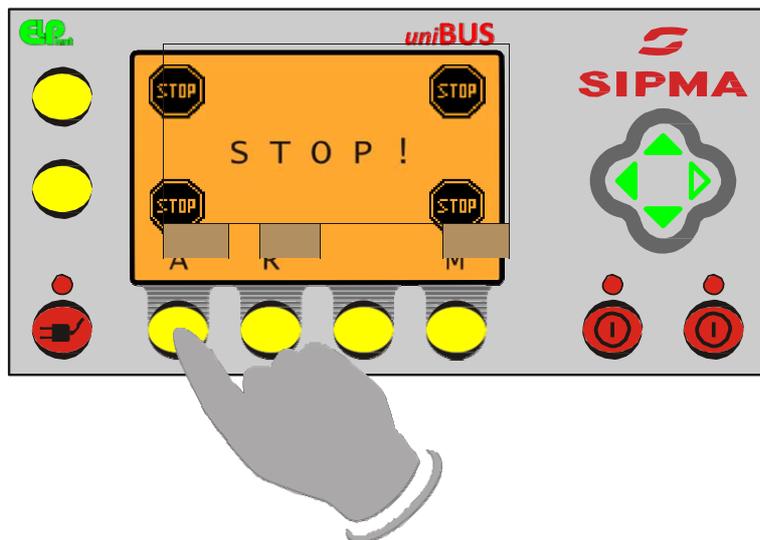
NOTE:

In the automatic mode nearly all stages of operation of the wrapping machine are performed without the user's intervention! In the case of health or safety threatening situation, idle forthwith the machine by switching off operation of the hydraulic section of the tractor feeding the machine and then by pressing one of the buttons



on the terminal!

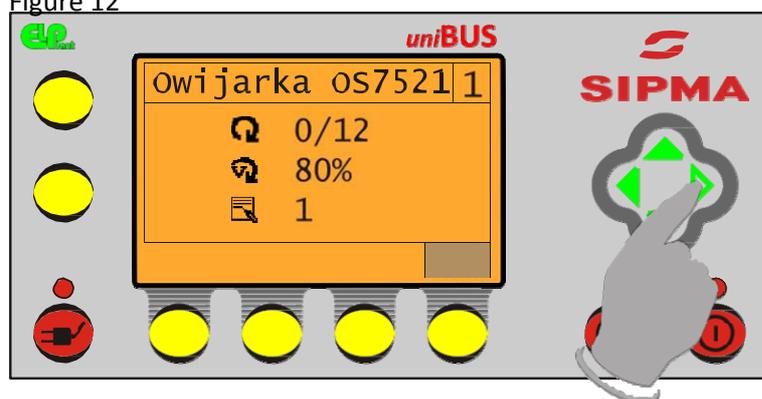
Figure 11



To go to the settings menu, press the key  on the initial screen.

By pressing the function key  on the initial screen will result in passage to the automatic mode service of the controller and of the machine. In the automatic mode we have 5 screens, which enable controlling the machine operation.

Figure 12



Changes screen we make by pressing the butto  or  .
1 - Wrapping machine
2 - Field
3 - Season
4 - Run
5 - Service

After entering the automatic mode, the recently used screen will open; number of current screen is shown in the upper right corner of the display; to go to the next screen, press the right arrow button  ; to go to the previous screen, press left arrow button  . In the automatic mode 5 screens are available: wrapping machine, field, season, run and service

Automatic mode details

1. Screen 1 - Wrapping machine

This screen displays information concerning a given field (program) where work is being carried out.

-  - it displays the number of wrappings with film in the current cycle and the set number of wrappings (3/12)
-  - relative rotational speed of the table expressed as percents
-  number of the currently selected field (program) for which working data are counted



The parameter of relative rotational speed of the table is on the first automatic mode screen entitled " Wrapping machine OS-7521" in the second line of parameters from the top. This parameter can be edited only when the terminal displays automatic mode windows. Editing is performed with the use of two yellow keys on the left side of the display (without description).

The top button increases this parameter and the lower button reduces it. Adjustment range from 0 to 100 with leap of one unit. This parameter may be adjusted during wrapping. It enables releasing rotations in the case when material starts sliding down off the table.

Setting 100% means that during wrapping the table will be rotating with maximum speed attainable at a given tractor. With setting 0% the table will not rotate.



NOTE:

This parameter has impact only on rotational speed during wrapping in the automatic mode.

The value of this parameter is selected experimentally during operation of the wrapping machine. So that the machine would operate safely, the upper value of this parameter should be selected, so that during wrapping the bale would lie stably on the table. Too high rotations during wrapping result in throwing the bale off the table which creates threat to the service staff and the machine itself.

Additionally, select the upper value of this parameter so that its changes down would give straightaway a visible effect in the form of release of the table. If visible adjustment effects (the table does not accelerate any longer) end e.g. at 70% then further increase in this value is pointless and, at the same time, may cause delayed reaction to adjustment down when the bale ceases to lie stably on the table (before the table starts slowing down the bale already drops off of the table).



NOTE:

Maximum relative rotational speed of the table may be changed during operation of the machine. It is influenced by many factors: type of tractor, ambient temperature, shape and weight of bale. For this reason, it is recommended to control and adjust this parameter on a regular basis. Safe rotational speed of the table is such at which during wrapping material lies stably on the table, and the table after wrapping stops in the unloading position.

2. Screen 2 - Field number 1 - 5

This screen displays information concerning a given field (program) where work is being carried out.

-  - quantity of bales wrapped in the selected field
-  - total working time on the selected field
-  - efficiency achieved on the selected field
-  - Price of service on the selected field (program); quantity of bales multiplied by the price specified for one bale.

Pole numer 5		2
	99	
	3.40	
	16.00	
	125.00	

3. Screen 3 - Season

This screen displays information concerning operation throughout the current season; it sums up values of the data from all fields (programs) on which operation of the wrapping machine proceeded.

-  - quantity of bales wrapped in the whole season
-  - total working time in the season
-  - efficiency achieved in the season

Sezon		3
	45	
	27.31	
	1.59	

4. Screen 4 - Run

This screen displays information concerning operation of the wrapping machine from the moment of leaving factory.

-  - total quantity of bales wrapped by the machine
-  - total operating time of the machine

Przebieg		4
	45	
	31	

5. Screen 5 -Service

This screen displays information designed for service staff, which is necessary in the case of failure of the wrapping machine. It contains working information concerning condition of the machine in this mode. It enables inspecting the machine or diagnosing reasons for the state of emergency.

Two top lines of the parameters contain states of two-state sensors on the machine.

Description of states of two-state sensors.

- 0 - open circuit of the sensor. Reed sensor is beyond the area of magnetic field of the magnet, induction sensor in the area of activation does not have a metal element, sensor of any kind is not effectively connected to its socket, break in the sensor's circuit.
- 1 - short circuit of the sensor's circuit. Reed sensor is in the magnetic field of the magnet, induction sensor in the area of activation does not have a metal element, circuit of the sensor is electrically shorted in a different way.

Description of symbols.

- BL - state of the sensor of bale presence in the loading arm. 1 – sensor reports presence of bale in the arm.
- FL- state of film intake sensor. If film is taken, this sensor sends short impulses (state one). If film is not taken this sensor may remain stable in any state (zero or one).
- ST - state of the bale setting device sensor. This sensor recognizes whether the setting device has fulfilled its task. Stable state may be any state; the controller reacts to change in the state of this sensor.

-
- FO - state of the oil filter sensor. If filter is clogged this sensor indicates one. The effect of clogging may be caused by cold oil therefore it takes some time to react to this event.
 - SD - state of the bottom table position sensor. If the table is put down the sensor indicates one when the table is "significantly lifted" the sensor indicates 0.
 - SG - state of the upper table position sensor. If the table is lifted maximally, the sensor indicates one, when the table is "significantly lowered" the sensor indicates 0.
 - ZW - state of internal sensor of short-circuit on supply of section control outputs. In the event of short circuit, it is value one.
 - ZC - state of internal sensor of short-circuit on supply of sensors. In the event of short circuit, it is value one.



NOTE:

It is significant that during inspection of the machine the displayed states of sensors should be adequate to the actual situation in the area of the sensor. For instance, when the table is in the maximally bottom position SD = 1, when the table is in the maximally top position SG = 1, when on the film intake sensor LED is lit FL = 1, when flap of the sensor of bale in the arm is pressed BL = 1. In opposite cases, indications are to be 0 for each case.

The left column of parameters contains, looking from the top, states of angular sensors of the machine and value of the flow valve control signal.

KR- current position of angular sensor of the arm. Correct operating range from 180 to 945, 0 proves no connection of the sensor. Indication above 950 proves short-circuit of the sensor.

KS- current position of angular sensor of the table. Correct operating range from 180 to 945.

0 proves no connection of the sensor, value above 950 proves short-circuit of the sensor.

WP - the current condition of signal given to the flow control valve. Correct operating range from 0 to 41600. Values close to zero prove zero flow setting. Values close to 41600 prove full flow setting.

The middle column of parameters contains measurements of currents and voltages on the machine.

IZ - internal parameter for the service staff

IP - current measured at flow control valve, operating range from 0 to 300 along with increase in WP parameter the value of IP parameter should increase, if WP = 41600, and IP = 0 we have break in the power supply system of the flow control section;

UR - voltage measured in the power supply system of the actuating part. Value expressed in volts.

The right column of parameters contains voltage measurement on the machine and operating states of the arm and the table.

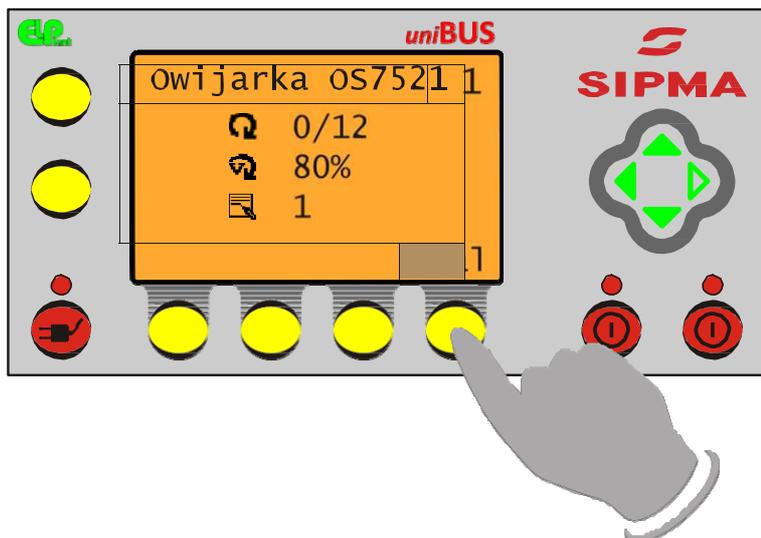
UE - voltage measured in the power supply system of the control part. Value expressed in volts;

R. - current state of the arm (for the servicing needs);

S. - current state of the table (for the servicing needs).

Operation in the automatic mode

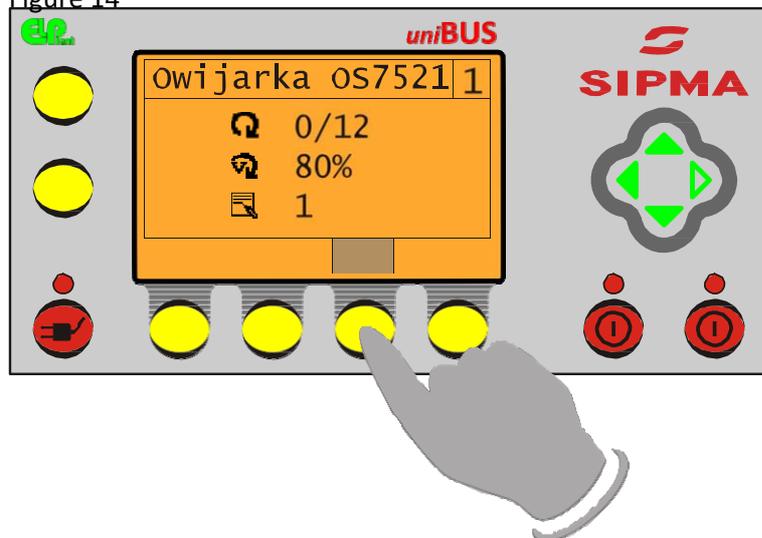
Figure 13



Before commencement of operation in the automatic mode, calibration should be carried out.

After activating the controller in this mode, set elements of the wrapping machine in the exit position to start the operation cycle (calibration). For this purpose, press the button **Kal**. The controller, as necessary, will lower the loading arm and/or the table and then set the table in the position for loading of bales. After the end of calibration, the machine is ready for loading of bales. On the screen the function button **RD** will appear.

Figure 14



Before loading bales press the button **RD**, to lower arm to loading position.

After reaching the bale press the button **RD**, which will lower the arm to the loading position. Approach the bale in a manner ensuring that it will be in the loading arm; at this time, bale sensor in the loading arm should get activated and automatic cycle of loading, wrapping and unloading of bales should start. If the sensor of bale in the loading arm does not get activated, pressing the button **RG** will result in setting the arm in the passage position; then re-press the button **RD**. If the arm is again in the intake position and the bale still has sensor of bale in the loading arm, the process will commence automatically.

The shorted sensor of bale in the arm activates the automatic cycle only when the arm is in the bale intake position (the terminal displays RG). In other positions of the arm, the sensor is inactive.

Supplement

1. Ssensor of clogging insert in the oil filter

The oil sensor is in the oil filter. If the oil filter signalizes, for a longer period of time, the state of clogging, on the terminal, at given time intervals, a screen appears with information on the need to replace the filter. Returning from this screen requires pressing the button confirming reading information on the terminal. Persistent ignoring this message can cause damage to the filter and the whole hydraulic unit. Too frequent clogging of the filter proves bad state of oil in the tractor.

2. Final comments

The emergency stop of automatic operation of the wrapping machine requires switching off the hydraulic section feeding the machine and pressing any red button of the terminal in the bottom right corner.



NOTE:

In the case of stopping the operation cycle with one of buttons  return to the automatic mode may cause a light pull of the machine; it is not a emergency situation.

It is recommended each time after change in operating parameters, i.e. positions of the arm, positions of the table, speed should be adjusted by a test automatic cycle with the empty table and low wrapping speed to verify the entered settings. In the case of observing incorrect placement of moving elements of the wrapping machine during calibration or automatic wrapping, stop the cycle by switching off the hydraulic section of the tractor which feeds the machine and, by pressing any red button of the terminal in the bottom right corner, verify the entered settings and start the test from the beginning.

When the operator handles directly at the machine, all hydraulic and electrical conductors of the wrapping machine should be disconnected from the tractor.

In the case of incorrect behavior of the control system, switch off the terminal and then pull out the power plug of the machine from the socket on the tractor, wait for half a minute, put the power plug of the machines into the socket on the tractor, switch on the terminal and re-start operation.

Along with increase in temperature of oil in the hydraulic system, the pace of movements of the wrapping machine increases. For this reason, for instance during heats, there may be the need for improving operating parameters, such as adjustment of speed and wrapping speed for the purpose of proper operation of the wrapping machine. In the case of heats, these parameters should be reduced. For the abovementioned reasons, it is not recommended to adjust the aforementioned parameters with cold oil. Heating of oil takes approximately

10 full automatic cycles. The heated up wrapping machine is characterized by a clearly hot hydraulic system unit on the machine and oil feed and return ducts.

During operation of the wrapping machine in the automatic mode special attention should be paid to the moment of stop of the table after wrapping. If the table stops in this position that,

when lifting the table, the mandrel blocking its rotating is not in the dedicated hole, stop the automatic cycle manually - switch off the hydraulic section of the tractor which feeds the machine and press any red button of the terminal in the bottom right corner of the terminal. The interrupted cycle should be completed manually (see item Cycle of wrapping in the manual mode from step 9). Before next wrapping, adjust settings of the wrapping machine. The continuation of the automatic cycle with the incorrectly set table during unloading may result in mechanical damage to the machine.

Parametry pracy	Operating parameters
Liczba owinięć	Number of wrappings
Numer aktualnego pola	Current field number
Kasowanie pola	Deleting field
Kasowanie sezonu	Deleting season
Pole nr 1	Field no. 1
Czujnik folii	Film sensor
Czas ustawiacza	Time of the setting device
Pozycja aktualna	Current position
Pozycja pobrania	Intake position
Pozycja przejazdu	Passage position
Pozycja załadunku	Loading position
Pozycja wyładunku	Unloading position
Korekta prędkości	Speed adjustment
Ramię w dół	Arm down
Ramię w górę	Arm up
Owijanie szybkie	Fast wrapping
Owijanie wolne	Slow wrapping
Stół w dół	Table down
Stół w górę	Table up
Obcinacz otworzyć	Open cutter
Obcinacz zamknąć	Close cutter
Stawiacz w dół	Setter down
Stawiacz w górę	Setter up
Włączanie przepływu	Switching on flow
Cena usługi	Service price
Konfiguracja	Configuration
Ramię	Arm
Stół	Table
Tryb ręczny	Manual mode
Owijarka	Wrapping machine
Sezon	Season
Przebieg	Course

