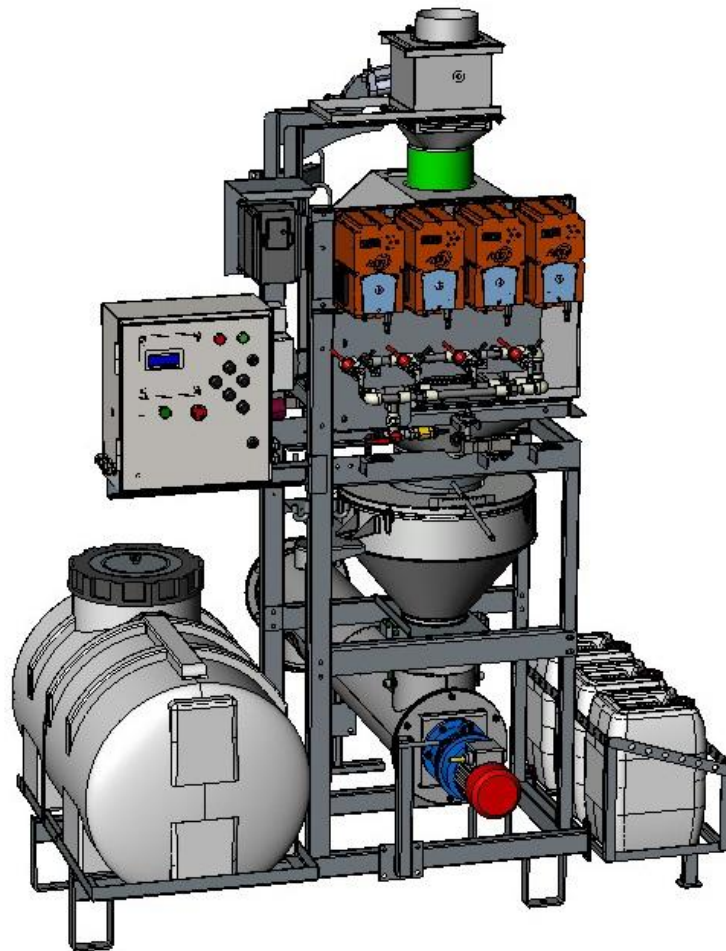




STATIONARY CHAMBER SEED TREATER *STM-800P*

Operational manual



Due to the fact that the treater is modernized in the process of manufacture, there can be slight differences in the operational manual from the model you received.



For reliable and durable operation of the treater, quality treatment of seeds, one must thoroughly study and fulfill the requirements of this operational manual. In case of operation of the machine without

observing the requirements of the manual, the treater is not subject to warranty maintenance.

To avoid getting out of service of some details of hydraulic communication, for preparation of the operating fluid, **it is not recommended to use other substances** than the treaters recommended on the territory of the country of the consumer.

For reliable operation of the treater, every day after the end of treatment works, **make sure to wash** the hydraulic communication with clean water.



The treater is equipped with a frequency converter, which is intended for change of the rotation frequency of the shaft of the mixing and unloading screw depending on the established productivity (table 8.3).

Failure to observe the requirements indicated in the table may become the cause of breakdown of the disperser, getting out of service of electrical motors.

CHECK THE CORRECTNESS OF CONNECTION of the cable to the electric network. The directions of rotation of all the shafts of the electric motors must correspond to the directions of the arrows on the case or the body. In case of reverse rotation of the shafts, switch the places of ONLY TWO phase cores at the point of the juncture of the socket to the electric network.

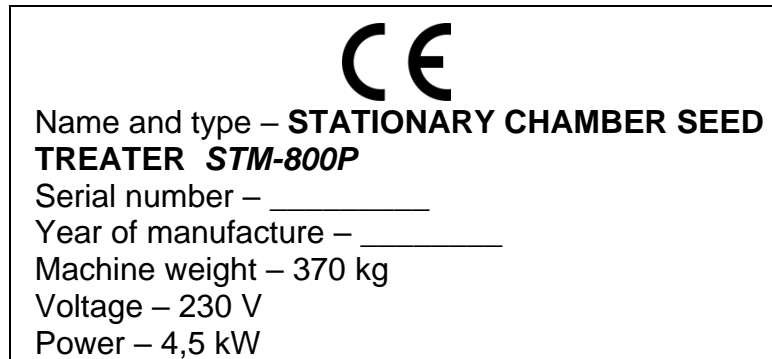
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1 GENERAL INFORMATION

1.1 Identification of the machine and equipment

The name and address of the manufacturer, designation, year of manufacture, serial number and basic technical data of the machine are shown on a plate attached to the frame of the seed treater.



1.2 The operational manual (hereafter – manual) is meant for familiarization with the construction and the rules for operation of the chamber fixed treater STM-800P (hereafter – treater) and contains a brief description of the machine, its mode of functioning, technical characteristics and other information about the treater.

1.3 This operational manual is to be considered as an integral part of the treater. The suppliers of both new and used treaters must keep the documentary confirmation of the fact that the treater is completed according to the manual.

1.4 The treater is intended for preparation of operating fluid and chemical protection of plants by the method of semi-dry treatment of the seeds of cereal crops with water suspensions or solutions of pesticides (fungicides-treaters) with water expense no more than 1/8 gal/100 lb of seed, recommended for use on the territory of the country, in specially equipped facilities or treatment stations.

The treater is used at the enterprises of agro-industrial complex.

1.5 The seed treater should be used in closed rooms equipped with proper and effective ventilation.

1.6 Do not use the seed treater in areas with potentially explosive atmospheres.

1.7 Do not use the seed treater for transportation of foodstuffs.

1.8 The water used for preparation of operating fluid (treater+water) must be clean, without any mechanical infiltrations, with reaction close to neutral.

1.9 The seeds which are subject to treatment must be cleaned from any impurities and dust and correspond to the requirements by the dimensions and their uniformity, similarity and sowing properties DSTU 2240-93.

1.10 Seeds treatment must be performed at above-zero air temperatures.

1.11 The treater in terms of climatic version is meant for operation in macroclimatic areas with moderate climate 'U' of the location category 4 according to GOST 15150-69.

2 SAFETY REQUIREMENTS



The manufacturer is not liable for caused damage to life, health or property, income deficiency and production downtime in case of accidents related to failure to observe instructions and regulations of this manual.

2.1 Before putting the treater into operation, read attentively these safety rules and operational instructions.

2.2 The room where the treater is installed must comply with the current hygienic requirements to design, setup and operation of the units of centralized treatment approved in the established order (closed room equipped with water supply, water disposal system (including special), supply and exhaust ventilation and aspiration, with guaranteed air temperature at least +4 °C).

2.3 Mechanized treatment stations (or facilities) must be located outside the boundaries of residential areas, at a minimum distance of 200 meters (approx. 656 feet) downwind, and must have official approval from the district sanitary and epidemiological authority.

2.4 During loading, transportation and unloading of the treater from vehicles, adhere to the instructions described in the section 'TRANSPORTATION' of this manual.

2.5 Putting the treater into operation is allowed only upon completion of all assembly works, with presence of the corresponding electrotechnical staff and appointed person responsible for electrical facilities who has passed special training.

2.6 The treater and the module for preparation of operating fluid must be earthed according to the requirements of 'Rules for setup of electrical plants' (RSEP).

2.7 The treater must be connected to the aspiration system of the room.

2.8 The sanitary and hygienic conditions of the technological process of treatment must be ensured with tightness of equipment of the line of supply of untreated and unloading the treated seeds; hydraulic communication of operating fluid, aspiration of the place of packaging, transportation and storage of the treated seeds, organization of disinfection of production wastes (used containers from treaters, drain waters).

2.9 During operation and repair of the treater, one must observe the general labor safety rules, fire safety requirements, electrical safety requirements.

2.10 Modernization of the treater is not allowed.

2.11 When working with pesticides, make sure you use means of individual protection: coverall, safety shoes, respirator, protective goggles and rubber gloves.

2.12 For treatment, fungicides are used with danger class no higher than II according to DSP 8.8.1.2.002-98.

2.13 For maintenance of the treater, persons are admitted who:

- passed annual special training and knowledge check in questions of labor protection, as persons involved in the works mentioned in the list of works with high danger (works connected with storage, transportation and use of pesticides (fungicides) and agrochemicals);
- passed primary instruction on electrical safety (not electro-technical staff) with formalization in the registration log in matters of labor protection. Instruction is carried out by the person responsible for electrical facilities or, by their written order, a person from electrotechnical workers with group at least III. After checking knowledge and entry

in the registration log, that person is assigned I group in electrical safety (without issuance of a certificate);

- passed medical examination and do not have counter-indications;
- studied this manual and State sanitary rules 'Transportation, storage and use of pesticides in the economy'.

2.14 Maintenance, electrical equipment of the treater, conduct of operative switches, organization and performance of repair, adjustment works and tests must be carried out by specially trained electro-technical staff.

2.15 Near the place of treatment, there should be water reserve, soap, towels and medical kit.

2.16 Safety measures during work with pesticides – according to State sanitary rules 'Transportation, storage and use of pesticides in the economy'.

2.17 Before the conduct of planned repairs, one must carry out degassing of the rooms by active aeration, and by disinfection of communications and equipment of the treater (see section 9).

2.18 The places of treatment are to be disinfected with solution of chloride of lime or other recommended and properly approved reagents at least two times a month.

2.19 Inspection, maintenance and repair of the treater is to be carried out only after its disconnection from the electrical network. On the means of disconnection of electrical power, one must hang the poster 'DO NOT TURN ON – MEN AT WORK!'.

2.20 Upon completion of treatment works, disconnect the treater from the network.

2.21 Measures of first premedical aid and prevention in case of intoxication with agrochemicals, fungicides, and in case of electric shock, must be at a visible place near the unit of treatment.

2.22 To keep the warranty for the treater and for long reliable and safe operation, it is strictly forbidden to introduce any changes in the construction of the machine.



2.23 During operation of the treater it is forbidden:

- to install the treater in tight facilities, which do not ensure free access to all of the parts of the machine during operation, maintenance, repair;
- to operate the treater without earthing;
- to work with a faulty device of safety cutout (DSC) of the treater;
- to let work persons who have not reached 18 years, pregnant women and feeding mothers, as well as women over 50, and men over 55;
- to work with fungicides of II class of danger for more than 4 hours, with other classes – more than 6 hours a day;
- to operate the treater without activated aspiration system and use of individual means of protection;
- to work in case of detection of poisonous chemicals in the air exceeding the border permissible concentration (BPC) of 0.0312 mg/ft³;
- to clean, adjust, repair electrical equipment and mobile parts under voltage;
- to wash the treater with a jet of water;

- to store and consume any food products, water etc. at the places where treatment is performed.




2.24 In case of occurrence of accidents or breakdowns with the treater, the operations manager or an authorized person must:

- take measures to provide necessary aid to the affected person, ensure in case of necessity their delivery to the center of medical care and prevention;
- inform the employer immediately about what happened;
- keep, until arrival of the commission for investigation of the accident, the situation at the workplace and machines, mechanisms, equipment, appliances in the condition in which they were at the moment of occurrence of the accident, as well as take measures to prevent similar accidents.






2.25 Information about safety rules and warning signs is dubbed on the treater with special signs presented in table 2.1.

2.26 The position of safety signs on the treater is shown in figure 2.1.

Table 2.1

Aspect of sign or inscription	Meaning
	<p>Sign warning about the presence of toxic chemicals: 'Danger. Toxic substances'. Can cause intoxication</p>
	<p>Signs of labor protection obligating the use of individual means of protection during treatment</p>
	<p>Sign obligating attentive reading of operational documentation before putting the machine into operation</p>

End of table 2.1

Aspect of sign or inscription	Meaning
	<p>Sign warning about rotation of the screw and danger of trauma</p>
	<p>Sign warning about rotation of the pulleys of the passing drive and danger of trauma</p>
	<p>Sign warning about high voltage: 'Danger of electric shock'. Can cause shock, burn or death. Work is to be carried out only by qualified specialists</p>
	<p>Sign of emergency turn-off of the treater</p>
	<p>Informational sign of the place of connection of the network. Voltage 230 V</p>

2.27 User safety

The seed treater may only be used by persons familiar with the contents of this manual. Operate the seed treater in compliance with all safety precautions, in particular:

- when you receive the machine, please check whether it was damaged during transportation and whether it is in good working order;
- before starting the seed treater, read the operating instructions, especially the safety and transportation instructions, operating and adjustment recommendations, and familiarize yourself with the operation and function of the machine;
- before each use of the machine, check its technical condition, paying particular attention to the correct location, technical condition of the electrical installation, completeness, etc.;
- dangerous areas are marked on the machine with yellow safety signs and warning icons. The meanings of the individual symbols are given in table 2.1 "Safety signs". Familiarize yourself with the meaning of all of these symbols. During operation, pay particular attention to the following marked areas on the machine;
- the operating instructions must be included with the seed treater. If the machine is transferred to another person, it must be in good condition and provided with the operating instructions;
- the operator of the seed treater must ensure that no one approaches the machine while it is in operation;
- pay attention to the warnings in front of the compression and cutting points when starting the seed treater;
- the presence of unauthorized persons, especially children, is prohibited while the machine is in operation;
- minors, sick and drunk people are prohibited from working with the seed treater;
- when moving the machine to another vehicle with the help of lifting equipment, unauthorized persons are not allowed in the working area;
- working on sloping terrain is not allowed due to the risk of losing stability;
- during operation of the seed treater, it is forbidden to repair its damage, lubricate and clean it;
- after work, do not leave the seed treater in a place where it can harm people or animals;
- never leave the seed treater unattended (with the drive on);
- during each break in operation, the power supply must be disconnected;
- after completing maintenance work, remove any grease or oil contamination from the machine surfaces;
- when connecting to the power supply, ensure that the electrical equipment of the machine is in good condition and tight. The electrical plugs must be inserted into the appropriate sockets;
- the electrical system must be checked regularly. Outdated cables and damaged components must be replaced with new ones;
- for repairs, use only original spare parts listed in the spare parts catalog. Only they meet the technical requirements and guarantee long and safe operation;
- regularly check the tightness of screws and nuts;
- before each use of the seed treater, pay attention to the condition and fastening of the individual working elements, especially drives, shafts and detachable connections. Immediately replace worn and damaged parts with new ones.



Failure to comply with the above rules may pose a risk to the operator and wide public and may result in damage to the machine. The user is liable for any damage caused by non-compliance with these rules.



The user of the seed treater is obliged to ensure that the pictograms and warning labels on the machine frame are legible throughout the entire period of use.

If they are damaged or destroyed, replace them with new ones. Stickers with pictograms are available at your seed treater supplier.

2.28 Description of residual risk

Even though the manufacturer takes responsibility for the design and labeling of the seed treater to eliminate risks during working process, operation and maintenance, there are certain elements of risk that cannot be avoided.

Residual risk is the result of incorrect or inappropriate behavior by the machine operator.

1 Danger of hurting or injury from protruding parts of the seed treater when loading the tank and during operation.

Before starting the above steps, make sure that there are no unauthorized persons nearby.

2 Crushing hazard when lifting and lowering the machine.

Please be especially careful when performing these steps, make sure that there are no people in the reach of the machine.

3 Hazard of being drawn in or caught by rotating drive elements.

Exercise extreme caution when rotating parts are in motion.

4 Danger of processed material being thrown out of the machine during operation.

Exercise extreme caution when operating the machine.

Bystanders, especially children, should not approach the machine during operation. Keep a safe distance from the machine when it is in operation.

5 Danger of losing stability.

When filling the seed hopper, the machine must be placed on a hard and flat surface.

6 Danger caused by contact with or inhalation of harmful substances.

Always wear the recommended personal protective equipment when operating and handling the seed treater. Please be especially careful when operating the dressing machine.

The greatest danger arises when performing the following prohibited activities:

- operation the machine by minors or persons who are not familiar with the operating instructions or are not qualified to work with electrical devices;
- operation the machine by persons in a state of alcohol intoxication or under the influence of other intoxicating substances;
- transportation and operation without observing appropriate safety measures;
- performing repairs under a raised and unsecured machine;
- performing work related to the operation and adjustment of the machine with the drive turned on.

In the case of residual risk, the seed treater is considered as a machine that was designed and manufactured in accordance with the current state of the art before the start of production.

2.29 Assessment of residual risk

Following recommendations such as:

- carefully reading the user manual;
- prohibition to keep hands in inaccessible and prohibited places;
- maintenance and repair of the machine by properly trained persons only;
- the machine is operated by persons who are qualified to work with the seed treater and are familiar with the operating instructions;
- protection of the machine from access by children;
- during operation, the operator must exercise extreme caution and ensure that unauthorized persons do not approach the machine while it is in operation;
- **danger** of crushing, injury or entrapment.

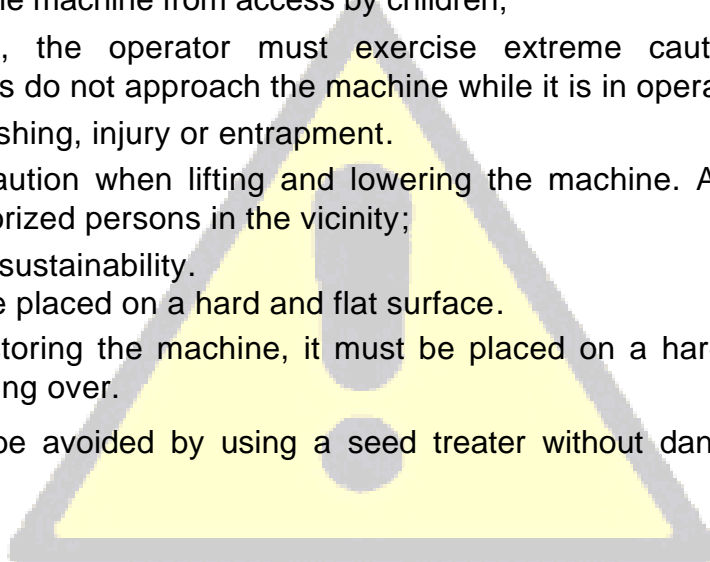
Exercise extreme caution when lifting and lowering the machine. Always make sure that there are no unauthorized persons in the vicinity;

- **danger** of losing sustainability.

Seed treater must be placed on a hard and flat surface.

When placing and storing the machine, it must be placed on a hard and flat surface and secured against tipping over.

Residual risks can be avoided by using a seed treater without danger to people and the environment.



3 TREATER STRUCTURE AND PERFORMANCE

3.1 Treater STM-800P (figure 3.1) is a fixed unit with electrical drive of mechanisms consisting of the following elements:

- sector gate valve (18);
- system of automatic fluid adjustment (hereafter – SAFA (P) (19) and system of separate supply of components (hereafter – SSS) (3) on the basis of the pump-dosimeter NP-02;
- seed hopper with a system of automatic weighing (4);
- drive of the seed dosimeter and disperser (drive of the disks) (21);
- tank (1) and reservoirs for components (15);
- unloading screw (6);
- exhaust (aspiration) installation (figure 3.3).

Control of the operation of the treater and its mechanisms is performed from the control console with display and software (7, figure 3.1), mounted on the frame of the treater (8).

Tank (1) is intended for storage and supply of one of the components of operating fluid (mainly – water). It is equipped with a filling strainer and a sensor of minimal level of fluid. Maintenance of operating fluid in a uniform state is ensured by a magnetic mixer.

Seed hopper (4) performs the role of the compensator-accumulator. It ensures even operation of the treater. Sensors of the level of seeds (14, 13) are meant to control the presence of seeds in the hopper: the sensor (13) is used when determining productivity, the sensor (14) controls automatic mode of functioning of the treater. The hopper is installed with three tension sensors. Effort from the hopper is transformed into an electric signal, which is counted by the program and determines actual productivity of the treater.

Seed dosimeter (figure 8.1) is intended for dosage of seeds when they come into the chamber of treatment. Consists of a cylinder and a disk of seeds that rotates, between which a dosage crevice is formed. Adjustment of productivity of the dosimeter is carried out with the help of the lever and scale. Upon setting the lever on the scale, make sure to fix it with a butterfly bolt.

Drive of the seed dosimeter and disperser (drive of the disks) (21) is intended to give rotational movement to the disk of seeds and disperser. Consists of the electrical motor, passing and chain gears.

Treatment chamber (5) is intended to place operating fluid on seeds and their supply to the unloading screw. The chamber is a conic body. A quickly removable cover is foreseen for revision of the chamber.

Disk disperser (figure 5.2) is meant for dispersion of the operating fluid and its application on seeds.

Unloading screw (6) is meant for additional mixing and unloading of treated seeds.

Rotation frequency of the shaft of the screw depending on seed productivity is adjusted by the **frequency converter (FC)** of the control console.

To clean the body, the screw is easily removed.

The system of automatic fluid adjustment (with a system of separate supply) (SAFA (SSS)) (figure 3.2) is intended for automatic dosage of the corresponding quantity of operating fluid. In the process of treatment, the system itself maintains the required proportion of fluid and seeds.

The system consists of four pumps-dosimeters NP-02 connected with each other, each being a peristaltic (hose) dosage pump with a drive from the stepping motor. Control of pumps-dosimeters is performed by the electric control console PKU-02 (see annex V).

The exhaust (aspiration) installation (figure 3.3) is designed for additional cleaning of the seed from dust, which adversely affects the quality of dressing.

The unit is connected to the power supply through the ~230 V socket of the treater control panel (15, figure 5.1) and the switch (6, figure 3.3). The dust bag is easy and quick to install with a quick-release clamp.

Assembly units are mounted on the sealed frame.

3.2 The treater performs the following technological operations:

- preparation of the operating fluid;
- acceptance of cleaned seeds;
- dosage of seeds and operating fluid;
- application of the operating fluid on seeds;
- unloading of treated seeds.

The treater operates in the following modes:

- a) „Test of electric motors” and «Adjustment» – to check mechanisms and configuration of the parameters of the treater;
- б) automatic «Operation» – to perform the technological process of treatment.

The treater is equipped with the sensors of the level of seeds (14) for synchronic (simultaneous) supply of seeds and operating fluid to the treatment chamber. The technological process stops automatically in case of absence of seeds in the hopper of the treater or overloading of the hopper-accumulator of the weighing unit (5, figure 3.4) with treated seeds.

The treater is also equipped with the sensor of the level of fluid in the tank (15, figure 3.1).

3.3 Description of the technological process of treatment

The system of separate supply of components (SSS) prepares the operating fluid directly before the treatment chamber (3, figure 3.1).

Before treatment, one must perform the following:

- check the presence of seeds in the inlet nozzle;
- check the presence of components of the operating fluid in the tank and reservoirs;
- set the required productivity in the seed dosimeter;
- set the norm of operating fluid in gpm;
- set the per cent proportion of components;
- set the expense of the operating fluid in gal/100lb;
- set the time of checking in minutes;

- set the handles of the cocks in the corresponding position.



The buttons (4, figure 3.2) of the dosing pumps are only used for:

- checking their performance;
- changes in the percentage of components;
- changing the direction of rotation of the rotor (liquid release from the suction hose).

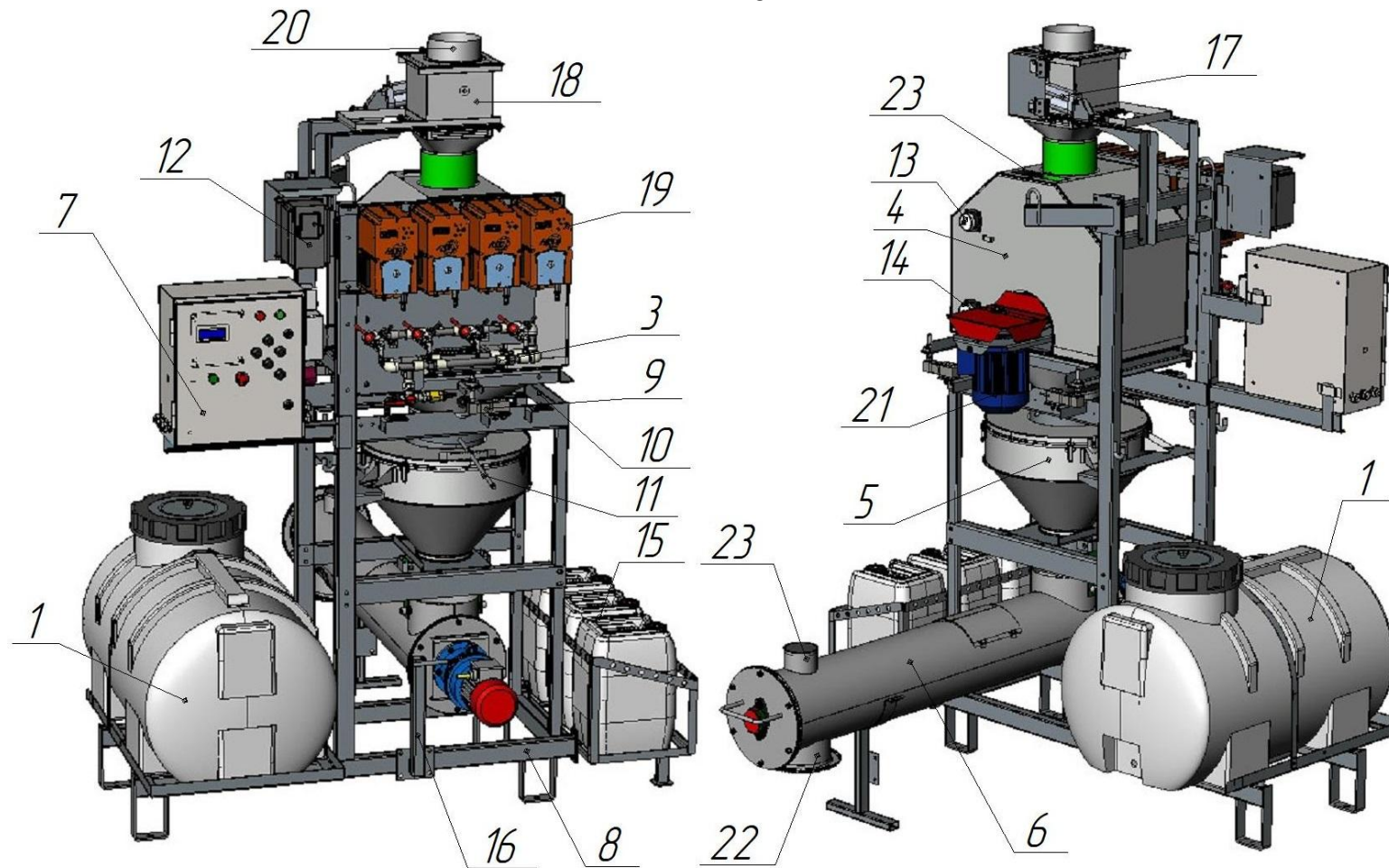
In case of launch of the treater in the automatic mode 'Operation', the electrical motors of the unloading screw (6, figure 3.1) and magnetic mixer liquid tank are turned on. Through an open sector gate valve, seeds come into the hopper of the treater (4). In case of filling the hopper to the level of the sensor (14), the electrical motors of dosing pumps (figure 3.2) and of the drive of the seed dosimeter and disperser (drive of the disks) (21, figure 3.1) are turned on. The dosed seeds come into the treatment chamber on the rotating disk where under the effect of centered force they leave it, cross with operating fluid dispersed by a high-dispersion disk disperser to small-dispersed state.

From the chamber, the treated seeds come to the unloading screw where passes through additional mixing and unloading.

In case of decrease of the level of seeds below the sensor (14), the treatment process stops: the above-mentioned electrical motors turn off, the light indicator of the lower sensor turns off; supply of seeds and operating fluid to the treatment chamber stops.

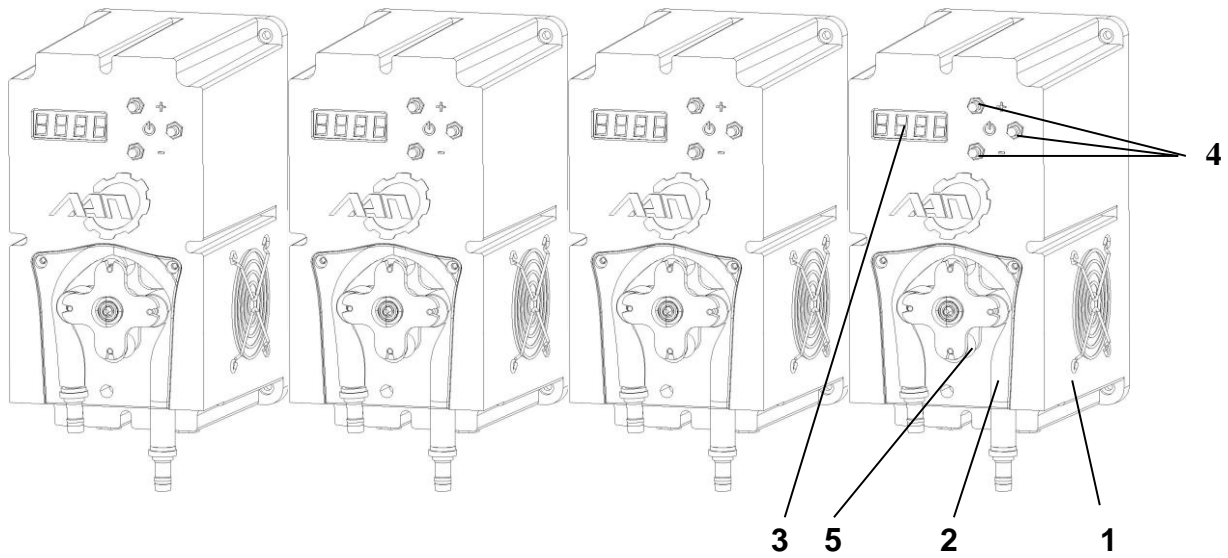
In case of decrease of the level of fluid in the tank (2) to less than 8 gallons, a sound signal is given, and a warning appears on the display of the control console.

In case of necessity to stop the treatment process, the possibility of remote turn-off the treater with a stop button SB (see annex A) is foreseen, which is connected according to the electrical circuit (figure 3.5) and established near the weighing unit. You can also turn off the treater with the 'STOP' button of the control console of the treater.



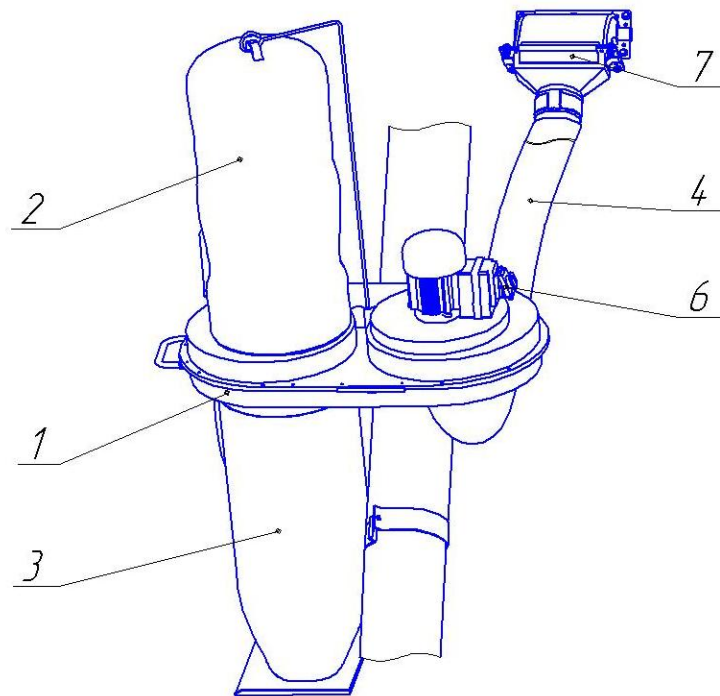
1 – tank with a magnetic mixer; 3 – system of separate supply of components (SSS); 4 – hopper of seeds; 5 – treatment chamber; 6 – unloading screw; 7 – control console; 8 – frame; 9 – tension sensor (3 pc); 10 – transport pin; 11 – level of the seed dosimeter; 12 – frequency converter; 13 – upper sensor of the level of seeds; 14 – lower sensor of the level of seeds; 15 – reservoirs for components; 16 – transport bracket; 17 – drive of the sector gate valve; 18 – sector gate valve; 19 – peristaltic pump; 20 – nozzle of entrance of seeds to the treater; 21 – drive of the seed dosimeter and disperser (drive of the disks); 22 – nozzle of outlet of treated seeds; 23 – nozzle for connection to the aspiration system of the enterprise (air purification)

Figure 3.1 – Chamber fixed treater STM-800P



1 – body of the NP-02 dosing pump; 2 - dosing hose; 3 - display;
4 - control buttons; 5 - rollers

Figure 3.2 – The system of automatic fluid adjustment (SAFA)



1 - body with electric motor; 2 - bag filter; 3 – bag for collecting dust;
4 - hose; 5 – plug ~230 V; 6 - switch; 7 - damper

Figure 3.3 – Exhaust (aspiration) installation of the treater

3.4 In case of turning on the point of the menu 'TEST OF FLOW', and in case of absence of connection with the dosage system, the permission for turn-on of the motors will automatically turn off, and the corresponding warning will appear periodically on the display. If this point is off, a warning about absence of the flow will appear on the display but the operation of the treater will not stop. Operation with the activated point 'TEST OF FLOW' prevents the exit of untreated seeds.

3.5 The lower sensor of the level of seeds of the treater (14, figure 3.1, or 9, figure 3.4) turns on the electrical motor of the drive of the disks (21) if there are seeds (the sensor is covered with seeds), or turns it off if there are no seeds (the sensor is not covered with seeds).

3.6 If the level of fluid in the tank is less than 8 US gallons, the sensor of the level of fluid (15, figure 3.1) turns on sound signalization and shows the corresponding message on the display. To turn off the signal, press any button of the control console ('UP', 'DOWN', 'LEFT' or 'RIGHT'). After a certain range of time, the signal and the message will renew.

3.7 The sensors of the level of seeds from the set of assembly parts (3 pc) are foreseen to agree upon the supply of seeds to the treater from the accumulating hopper (4, figure 3.4), which is situated above the treater, and for unloading the treated seeds to the accumulating hopper (5) of the weighing unit (if necessary).

The lower sensor (10) of the hopper (4), if there are no seeds (the hopper is empty), turns on the bucket elevator (2) and the cleansing machine (1), and the upper sensor (11), if there are seeds (the hopper is full) – turns them off.

The sensor (12) of the accumulating hopper (5), if there are seeds higher than the level of the sensor, turns off the electrical motor of the drive of the disks (21, figure 3.1) – the treatment process is stopped. If the level of seeds is decreased lower than the sensor, the electrical motor is turned on, the treatment process renews.

The elevating bucket (3) must constantly function.

Hoppers (4 and 5, figure 3.4) are necessary for leveling of pulsations occurring during supply of seeds from the cleaning machine and during packaging of seeds into sacks with the weighing unit. This allows excluding negative influence on the operation of the treater and the quality of treated seeds.

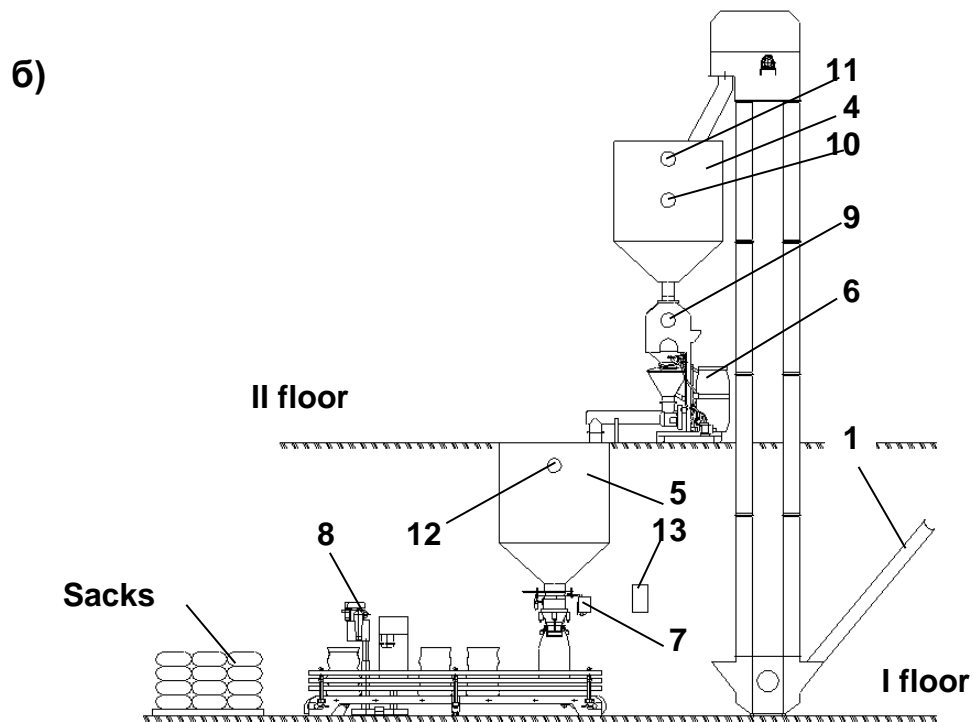
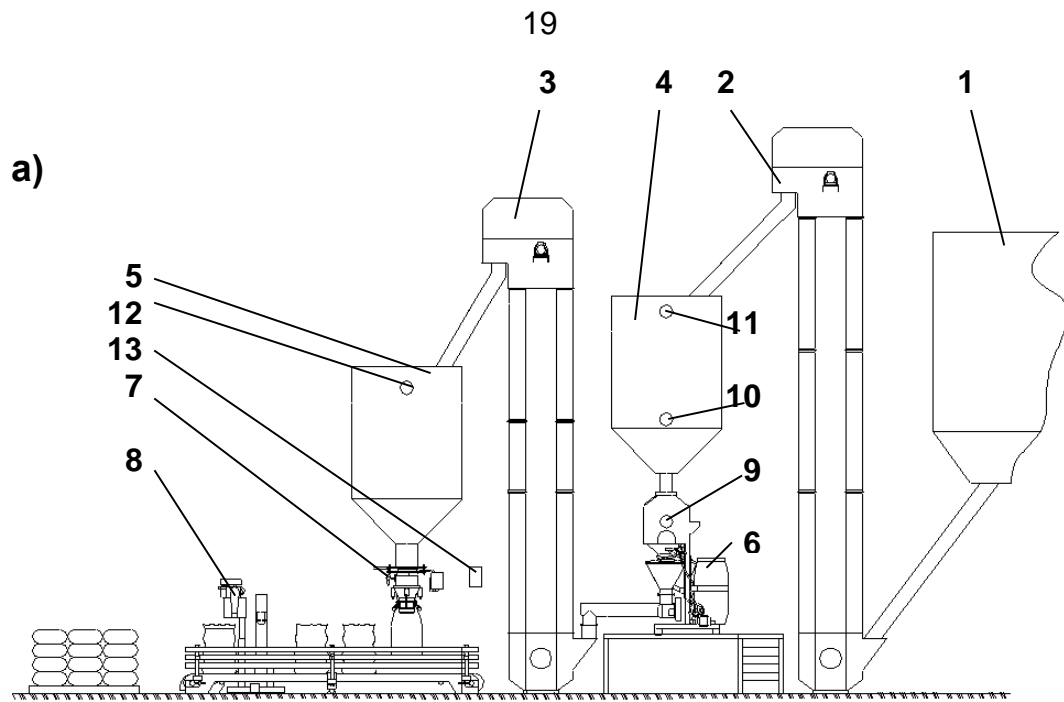
3.8 The technological process of treatment is uninterrupted provided there are seeds and operating fluid.

3.9 Humidity of seeds in the treatment process must not rise more than 1.0% from the conditional one.



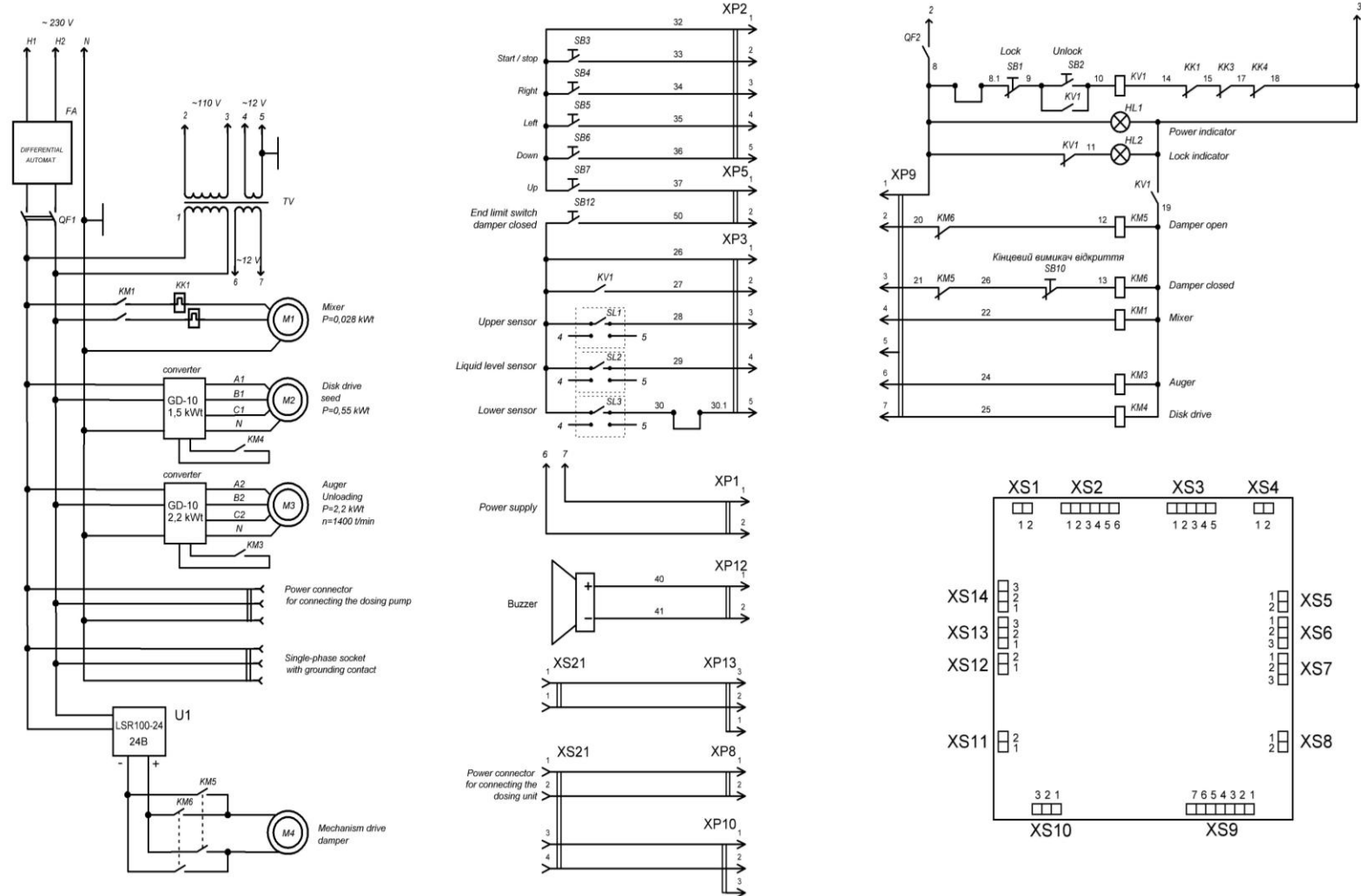
To avoid clogging of the treatment chamber with seeds, their exit from the unloading screw to the elevating bucket (3, figure 3.4) or accumulating hopper (5) of the weighing unit must be free. Clogging of the chamber can cause breakdown of the disperser, getting out of service of the electrical motors.

3.10 The electric circuit diagram of the treater is shown in figure 3.5, conventional signs for the scheme – in table 3.1.



- | | |
|--|--|
| 1 – grain separator; | 7 – weighing unit (dosimeter); |
| 2 – elevating bucket; | 8 – line of linking sacks with the conveyor belt; |
| 3 – elevating bucket (constantly functions); | 9 – sensor of the level of seeds of the treater; |
| 4 – hopper $V=70 \text{ ft}^3 \text{ min}$; | 10, 11, 12 – sensors of the level of seeds; |
| 5 – hopper $V=70 \text{ ft}^3 \text{ min}$; | 13 – stop button SB (red button BS 542 «Knob» with body HJ9-1) |
| 6 – seed treater STM-800P | |

Figure 3.4 – Schemes of installation of the treater in the flow line



Connection of the external stop button: remove the connector 8-8.1 from the terminal block and turn on the stop button instead.

Connection of the sensor of the hopper of the weighing unit: remove the connector 30-30.1 from the terminal block, and connect the break contact of the sensor instead. Power wires of the sensors 4, 5 are situated there as well.

Figure 3.5 – Electric circuit diagram

Table 3.1 – Conventional signs for the electric circuit diagram

Sign	Name	Quantity
	One-phase socket with earthing contact 220 V, with cover	1
FA	Device of safety cutout 2P, 25 A, $I_{\Delta p}=30$ mA	1
QF1	Two-pole automatic switch BA47-29M, 25 A	1
QF2	One-pole automatic switch BA47-29M, C6, 230-400 V	1
KM1 – KM5	Starter PML 11010* 4B, 110 V	7
KV1		
KK1	Stream electro-thermal relay ETR 1007	3
SB1	Red button («Knob») BS542	2
SB2	Green button BA-31 NO+NC	2
SB10-SB12	End switch	3
SL1, SL3	Capacitive sensor of the level of seeds DS - 1	2
SL2	Float-type sensor of the level LS03-1A71-PP-500W	1
	Sound projector PEB 90S	1
FC	Frequency converter GD 100-2R2G-4 2,2 kW	1
HL1	Signal light indicator AD22-22DS green, 110 V	1
HL2	Signal light indicator AD22-22DS red, 110 V	1
TV	Transformer 230/110/12/12	1
U1	Power block 230 V	1
M1	Synchronous motor-reduce 68KTYZ-28W-110R, 220V, $n = 130$ rot./min	1
M2	Asynchronous electrical motor AEM71B6U3, $n = 910$ rot./min, $N = 0,55$ kW	1
M3	Asynchronous electrical motor AEM 90L4U3, $n = 1410$ rot./min, $N = 2,2$ kW	1
M4	Linear drive of the gate valve	1

4 TECHNICAL CHARACTERISTICS

4.1 The technical characteristics of the treater are provided in table 4.1.

Table 4.1

Parameter name and dimension	Unit of measurement	Norm
Make	-	STM-800P
Type	-	fixed
Productivity per 1 hour (with wheat seeds of sowing condition): - main time - operation time	bu/hr	from 92 to 735 from 85 to 590
Dry mass (constructional), with a full set of operating units and devices	lb (kg)	816 (370)
Tank capacity, no more than	gal	66
Supply of the system of automatic fluid adjustment (SAFA) with the system of separate supply (SSS)	gpm	from 0,08 to 0,9
Consumed capacity, no more than	kW	4,5
Power source	-	electrical, from the network of alternating current, frequency 60 Hz
Voltage	V	230
Number of service staff	persons	1 operator and 1 assistant worker
Aspiration installation: - power supply - installed capacity - maximum air flow - dust bag volume	- W CFM gallons	electrical, alternating current, voltage ~230 V 550 676 19.81
Dimensions, no more than: - length - width - height	in	84.7 70.9 98.4
Term of service, at least	years	5

5 UNITS OF CONTROL AND DEVICES

Units of control are intended for control of the technological process of treatment, and the devices – to control the operation of the treater.

Units of control include:

- lever of the seed dosimeter (1, figure 8.1);
- buttons (3, 4, 5, 6, 7, 8, 9);
- current switch «NETWORK» (13);
- cocks (figure 5.2);
- sensors of the level of seeds (13, 14, figure 3.1).

Control devices include:

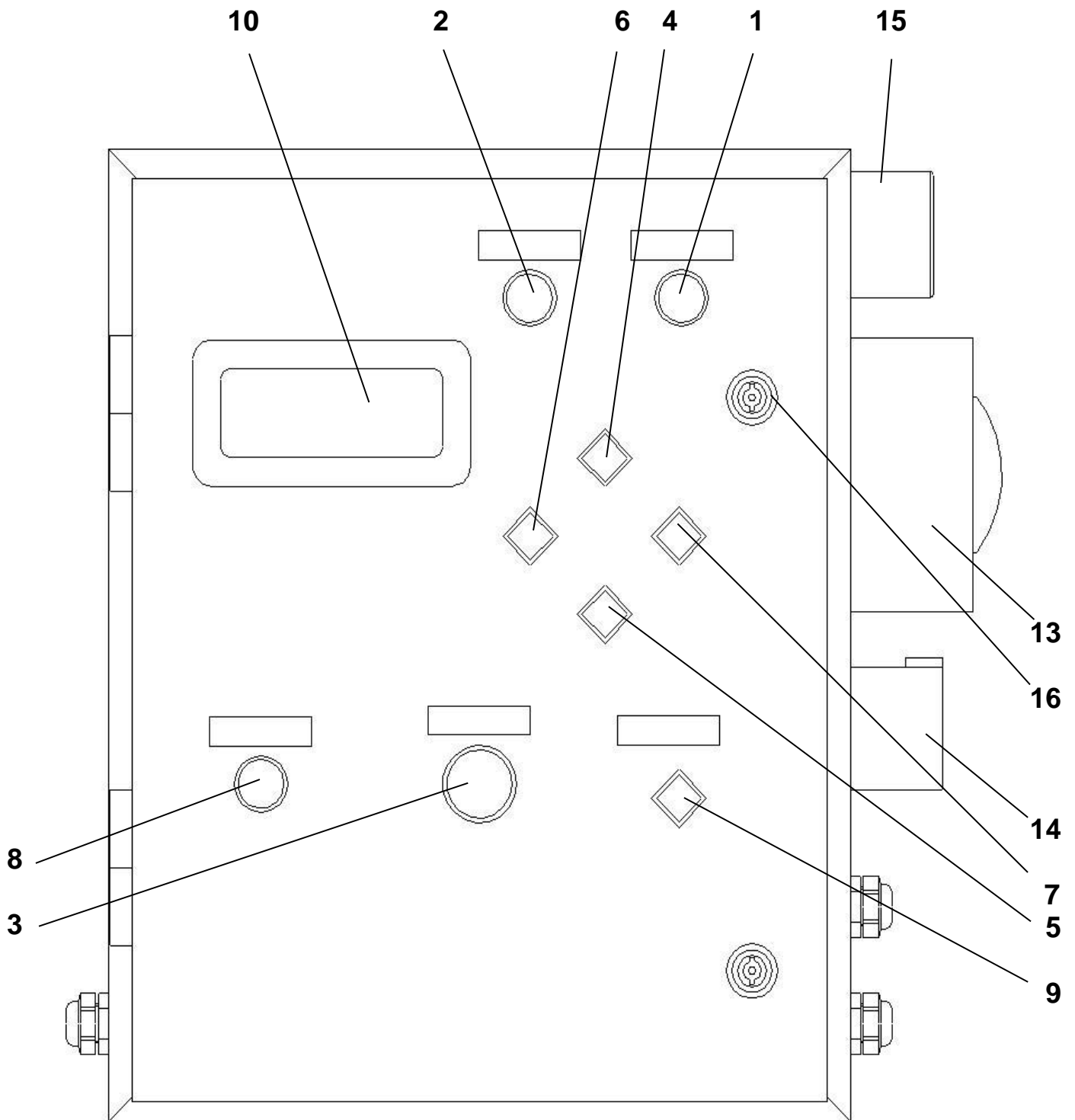
- liquid-crystal display (10, figure 5.1);
- hopper of seeds (4, figure 3.1);
- upper sensor of the level of seeds (13);
- sensor of the level of fluid in the tank (15);
- scales of the dosimeter of seeds and the tank;
- light indicators of the sensors of the level;
- sound projector of the control console.

On the door of the control console (figure 5.1), there are:

- light indicator «NETWORK» (2) – signals about the presence of power voltage;
- light indicator «BLOCKING» (1) – signals about voltage supply, activation of protective thermal relays of the electrical motors of the executive mechanisms, turning on the button of emergency cutout „STOP-BLOCKING”(3);
- button «START» (8) – to start executive mechanisms after configuration of modes on the switches;
- button of emergency cutout «STOP-BLOCKING» («knob») (3) – for emergency turn-off of the chains of control;
- buttons «UP» (4), «DOWN» (5), «LEFT» (6), «RIGHT» (7), “START/STOP” (9) – for navigation in the menu;
- liquid-crystal display (10) for showing the menu and information.

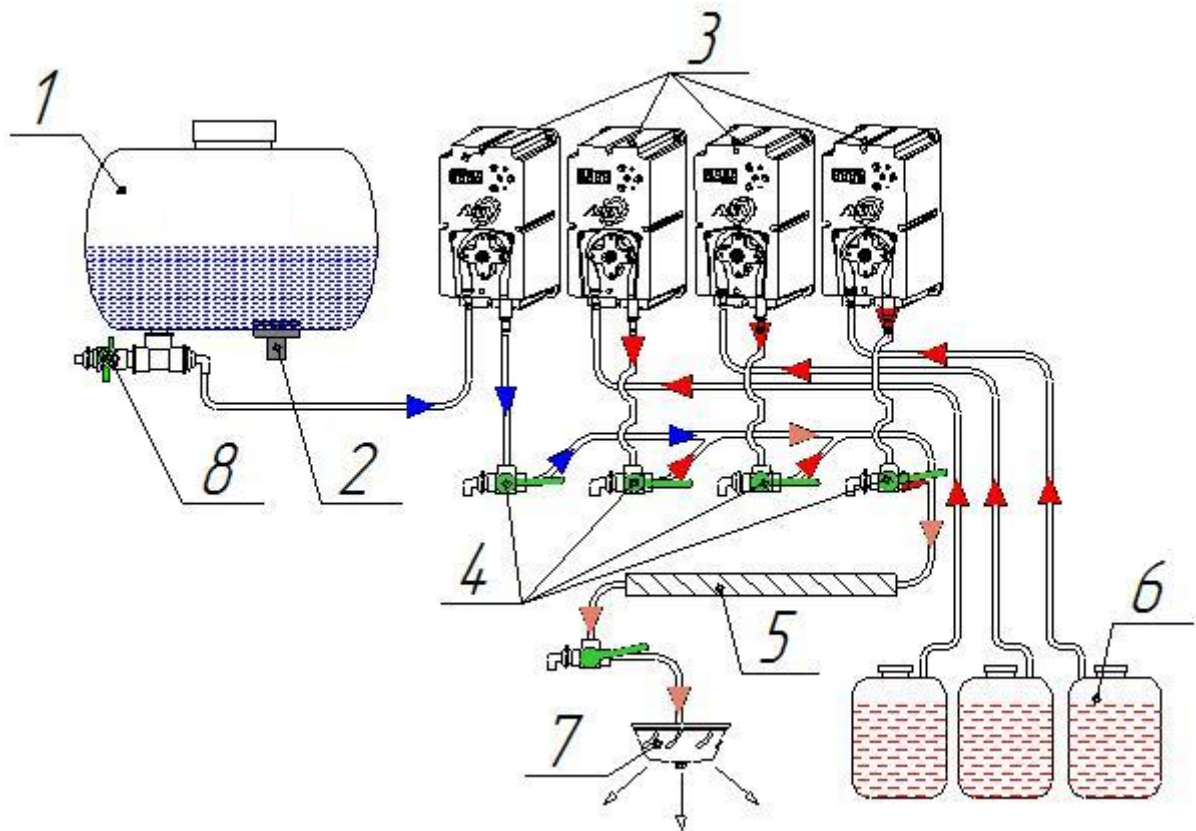
On the side wall of the control console, there are:

- device of safety cutout of current (DSC) «NETWORK» (13) – the device protects a person against electrical shock;
- fork **230 V** (14) – for connection of the power cable;
- socket **230 V** (15);
- sound projector (17).



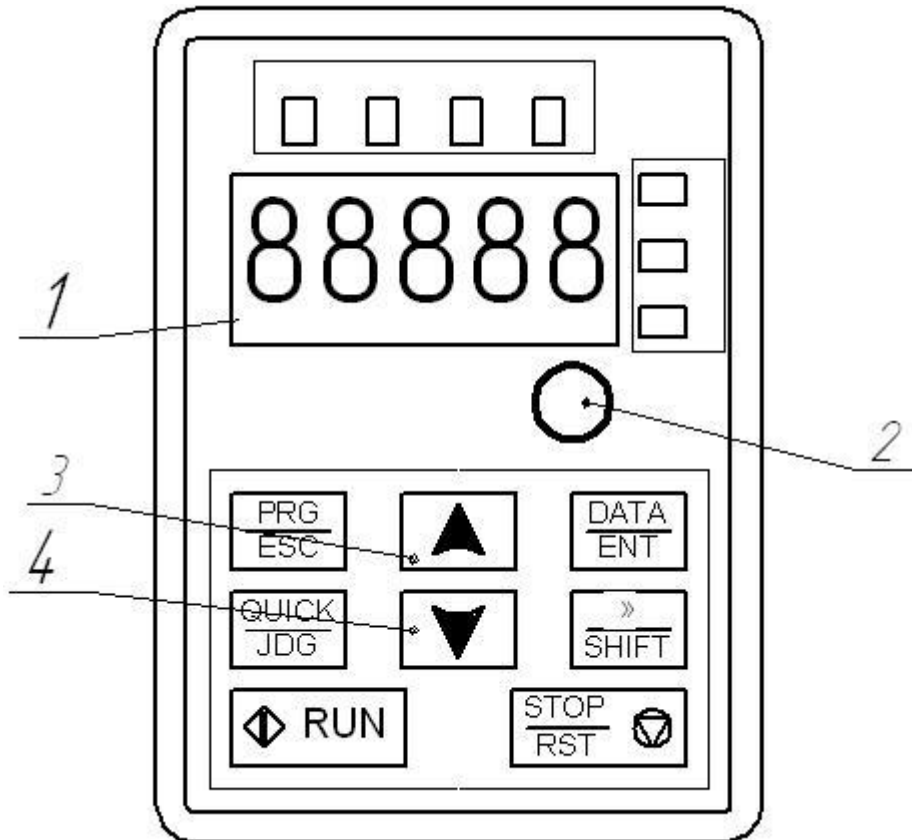
1 – light signal indicator «NETWORK»; 2 – light signal indicator «BLOCKING»; 3 – button of emergency cutout «STOP - BLOCKING»; buttons of navigation in the menu - «UP» (4), «DOWN» (5), «LEFT» (6), «RIGHT» (7); 8 – button «LAUNCH»; 9 – button «START/STOP»; 10 – liquid-crystal display; 13 – device of safety cutout of current (DSC) «NETOWRK»; 14 – fork 230 V; 15 – socket 230 V; 16 – lock

Figure 5.1 – Control console



1 – tank; 2 – magnetic mixer; 3 – pumps NP-02; 4 – cocks for calibration of pumps NP-02;
5 – hydrostatic mixer; 6 – reservoirs for components; 7 – disk disperser; 8 - faucet

Figure 5.2 – Scheme of hydraulic communication



1 – seven-segment LED display;
 2 – digital potentiometer;
 3 – button for increase of rotations of the screw;

4 – button for decrease of rotations of the screw

Figure 5.3 – Control panel of the frequency converter

To turn on the screw, press 'LAUNCH' button, choose the point of the menu «TEST OF EL. MOTORS», then the point «UNLOADING». With the button «START/STOP» turn on the electrical motor. Adjustment of rotations of the shaft of the screw is carried out with the help of the frequency converter (FC) (figure 5.3): to increase the number of rotations, press the button (3), to decrease – the button (4). On the display (1), the number of rotations of the screw per 1 minute is shown. During configuration, first the display shows the value of the outgoing frequency in Hz, then – the number of rotations of the screw per 1 minute.

6 PREPARATION FOR OPERATION

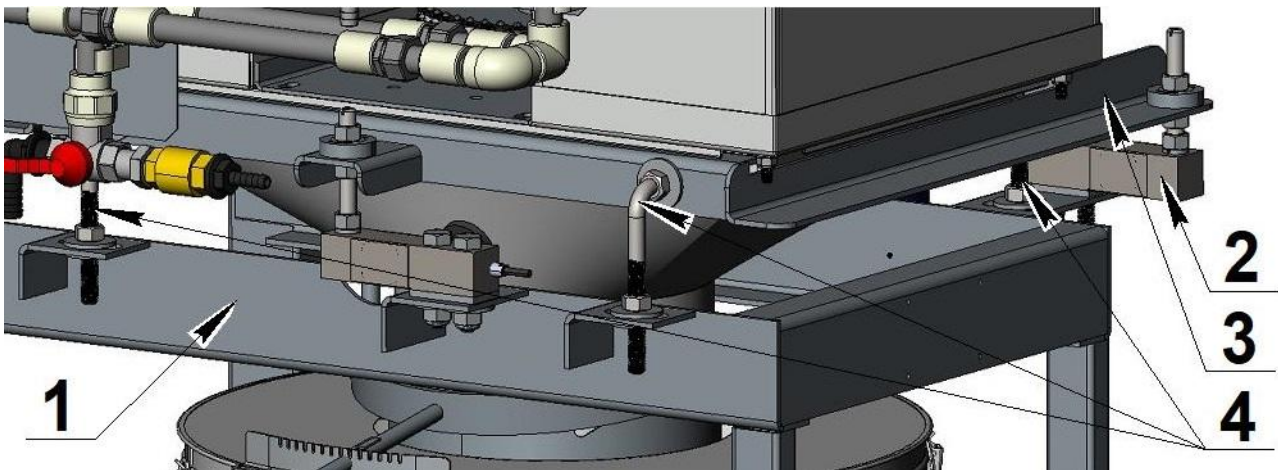
6.1 Check the completeness of the treater according to Annex A of this manual and carry out depreservation of the machine according to section 9.

6.2 Check bracing of assembly units, details, hose connections, check the tension of passing and chain gears.

6.3 Prepare and install foundation bolts to fix the frame of the treater according to the scheme (figure 6.4).

6.4 Disassemble the transport bracket (16, figure 3.1).

6.5 Install the treater strictly horizontally on the foundation bolts and fix it.



1 – lower frame; 2 – tension sensors (to determine the mass); 3 – upper frame with a seed hopper mounted on it; 4 – transport restrictors

Figure 6.1

To eliminate the fault when determining productivity of the treater, one must ensure reliable bracing of the lower frame and strict horizontal position of the planes of the lower and upper frames to which tension sensors are fixed. For that purpose:

- tighten up the nut (1, figure 6.2) on the pin of each tension sensor until resistance in the upper frame;

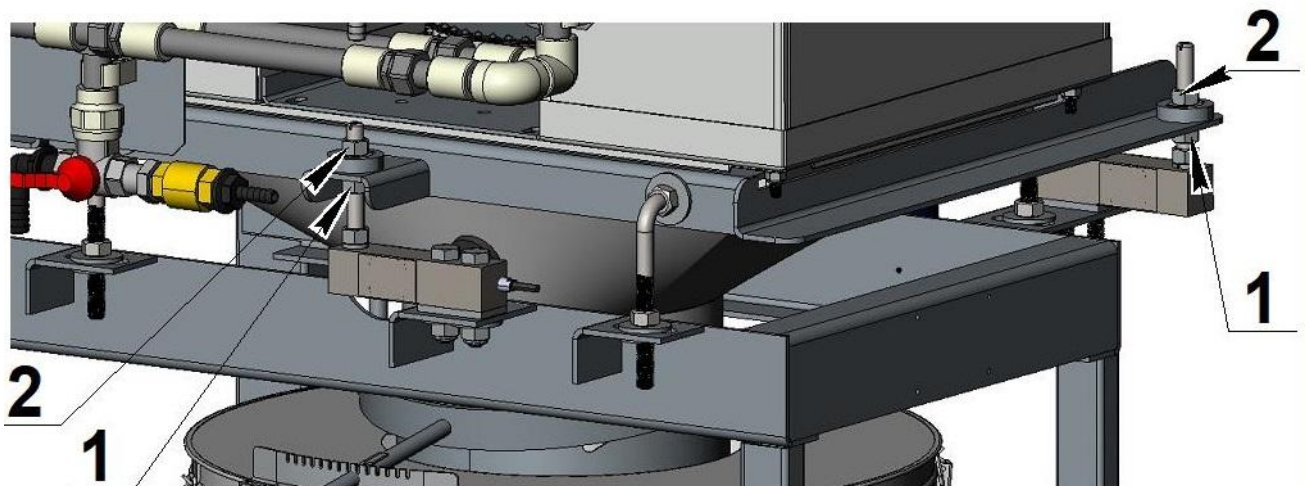


Figure 6.2

- after undoing the nuts on the transport restrictors, remove them; then the upper frame will rest upon the nuts (1, figure 6.2);

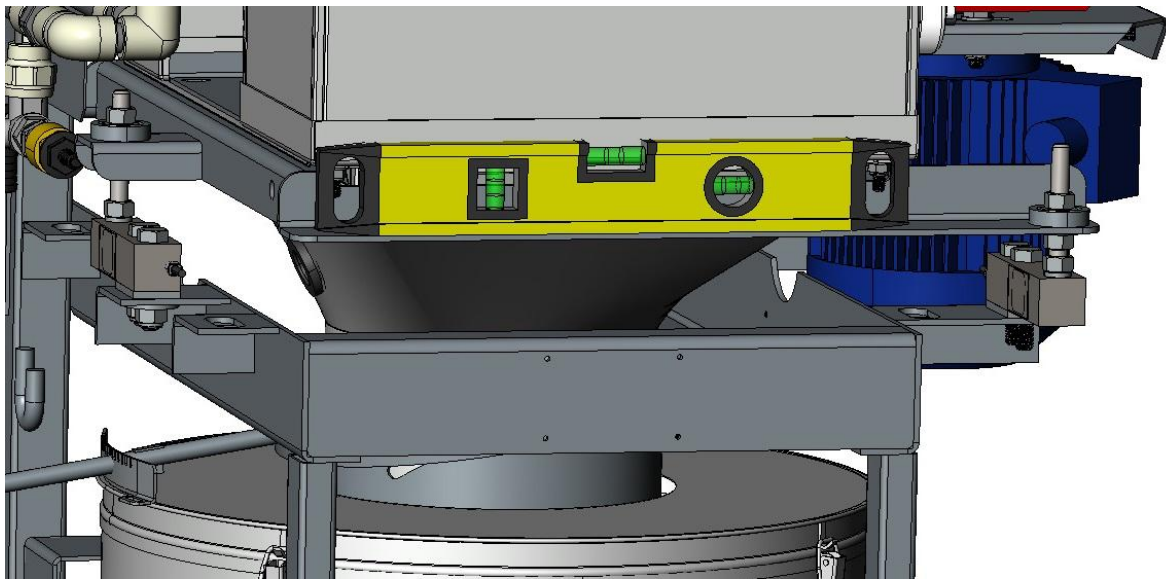


Figure 6.3

- with the help of a gauge, set the upper frame (figure 6.3). For that purpose, correct the position of the upper frame with nuts (1, figure 6.2) if each tension sensor. After the upper frame is set horizontally, tighten the nuts (2, figure 6.2) on each tension sensor.

Transition into transport position occurs in reverse order:

- set the transport restrictors and tighten them with nuts;
- undo the nuts (1, 2, figure 6.2) on support pins of each tension sensor.

6.6 Connect the control console to the electrical network ~ 230 V, by using the cable PK-20.00.490 (see annex A).

6.7 Connect earthing to the frame of the treater.

6.8 Connect the hopper of the treater to the supply line of seeds.

6.9 Connect the unloading screw to the accumulating hopper of the weighing unit or elevating bucket.

6.10 Connect the nozzle of the unloading screw (23, figure 3.1) to the aspiration system of the enterprise.



To prevent clogging of the treatment chamber with seeds, exit of seeds from the unloading screw to the hopper of the weighing unit must be free. Chamber clogging can cause breakdown of the disperser, getting out of service of electrical motors.

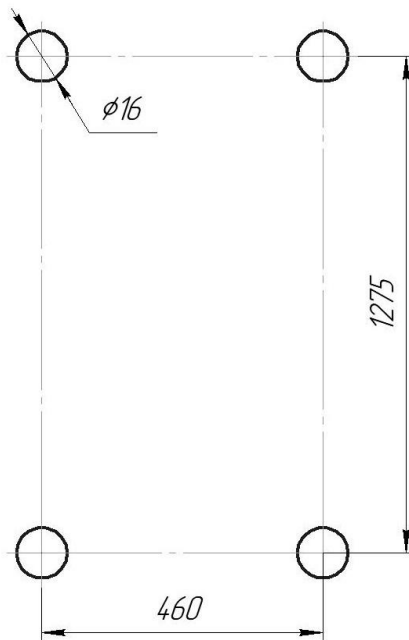


Figure 6.4 – Scheme of position of foundation bolts

6.11 Before turning on the control console, check reliability of bracing of devices, communications, indication, absence of damages of internal assembly.



Check: the device of safety cutout of current (DSC) «NETWORK» (1, figure 6.5) must be in the position «OFF».

6.12 Open the door of the control console, turn on the automatic switches – three-pole (3) and one-pole (4) (figure 6.5) (up). Lock the door.

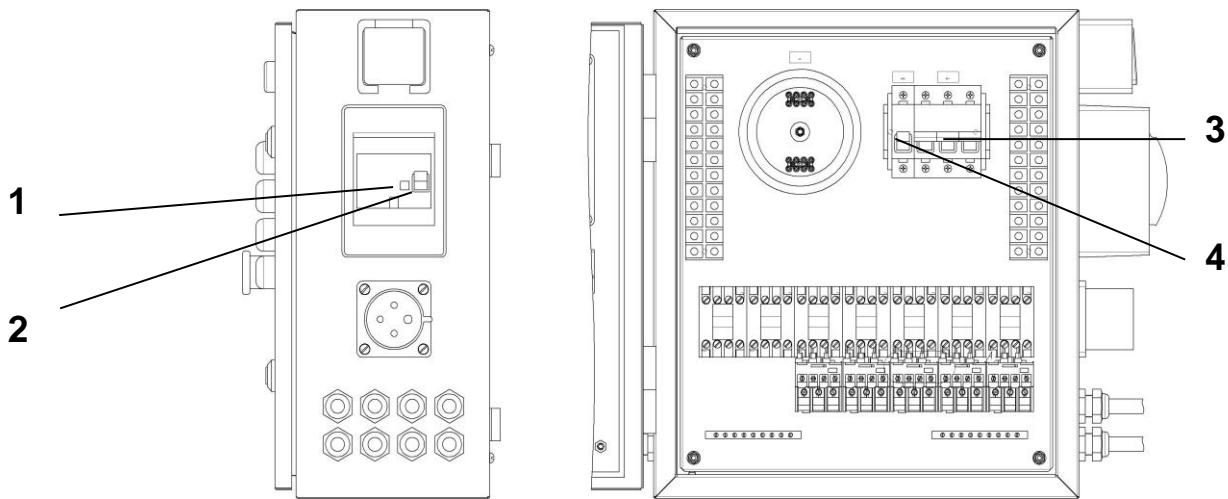
Turn on DSC (1, figure 6.5): it will light up the indicators «NETWORK» (1, figure 5.1) and «BLOCKING», the display (10) will appear. Press the button «LAUNCH» (9) – the indicator «BLOCKING» will disappear.

Press the button «TEST» (2, figure 6.5) to check serviceability of the switch. Serviceable DSC (1) must turn off power, the light indicator «NETWORK» and the display.

Repeat inspection, turn on the device of safety cutout of current DSC (1, figure 6.5).





It is forbidden to work with a faulty device of safety cutout of current (DSC). Before start of work, make sure you check its serviceability.



1 – device of safety cutout of current (DSC); 2 - button «TEST» to check serviceability of the device; 3 – automatic three-pole switch; 4 – one-pole automatic switch

Figure 6.5 – Turning on the control console

6.13 Pour **at least 40 l** of clean water into the tank (1, figure 3.1).

	 ATTENTION!
	<p>Before performing the actions described below, familiarize yourself with the user's manual of the control console PKU-02 (annex C) where operation from the menu of the console is fully described.</p>

6.14 Check correctness of connection to the electrical network. Press the button «LAUNCH», enter the point of the menu «TEST OF EL. MOTORS» and choose the point «UNLOADING». Press the button «START / STOP». The direction of rotation of the shaft of the electrical motor of the unloading screw must correspond to the

direction of the arrow indicated on the protective case. In case of reverse rotation, switch places of any two phase wires at the place of connection to the electrical network. Enter the menu «OPERATION», press the button «START / STOP» and attach a sack with seeds to the lower sensor (14, figure 3.1) from inside the hopper. The direction of rotation of all the shafts of the electrical motors of the treater must correspond to the direction of the arrows on protective cases.

7 RUN-IN AND ADJUSTMENT

7.1 Before starting the operation, one must carry out run-in and adjustment of the treater in the sequence presented below.

Carry out run-in in two modes: «TEST OF EL. MOTORS» and «OPERATION».

7.2 Before starting run-in, set DSC (1, figure 6.5) to the position «ON», it will light up the indicators «NETWORK» (1, figure 5.1) and «BLOCKING» (2) and the display (10) will be on.

7.3 During run-in, check operation of electric equipment and mechanisms.

For that purpose: press «LAUNCH», enter the menu point «TEST OF EL. MOTORS» and alternately with the button «START / STOP» try to turn on and off the electrical motors (points «MIXER», «UNLOADING» and «DRIVE OF DISKS»).

7.4 Choose the menu point «OPERATION», check operation in the mode of treatment. Press the button «START / STOP»: it will turn on the electrical motors of the unloading screw and liquid mixer in the tank. Check operation of the lower sensor of seeds (14, figure 3.1) by means of imitation of presence of seeds (attach a sack with seeds to the sensor of seeds from inside the hopper): it will turn on the electrical motor of the drive of the dosimeter (21).

Go to the additional page, choose the point «CHECKING». Check operation of the upper sensor of seeds (13) by means of imitation of presence of seeds (at the same time, attach sacks with seeds to the lower (14) and upper (13) sensors from inside the hopper): the sector gate valve must close, and the drive of the disks must turn on again (21).



Sensors of the level of seeds are considered to be adjusted if on the display of the control console and on the sensors themselves (figure 3.2) the indicators of the lower and upper sensors show that the

hopper is full, and during emptying of the hopper they go out in the order: upper, lower. If one of the indicators does not light up or does not go out, the corresponding sensor is to be adjusted (see annex B).

7.5 Check operation of the sensor of the level of fluid (15, figure 3.1) in the tank. For that purpose, set the level of fluid in the tank to less than 8 gallons (30 liters): a periodic sound signal should appear, and at the same time, on the display, there must appear a message about the low level of operating fluid in the tank. For temporary turn-off of the signal, press any of the buttons: «UP», «DOWN», «LEFT», «RIGHT».


7.6 Carry out run-in of the treater in each mode during 10...15 min. There should not be any knocking or noises during operation of the mechanisms.


7.7 Check the level of heating of the electrical motors, bodies of bearing nodes. The temperature of their heating must not exceed 60°...70 °C. (140F – 160F).


7.8 Perform rough calibration of the fluid dispenser:

a) Make sure the handles of the cocks are set according to figure 8.2, and bring up a measuring container (treatment set) to the cock.


b) Carry out pumping of the dosimeter; for that purpose, you can use the function of averse and reverse:

- Turn off the fluid dispenser by pressing the button «»; the following will be shown on the display:
- To pass to the menu of the function of averse and reverse, one needs to press simultaneously the buttons «+» and «-»; the following inscription will be shown on the display:
- When pressing and retaining the button '+', the pump will start pumping the fluid, and while the button is retained, the following will be shown on the display:
- When pressing and retaining the button '-', the pump will start pumping the fluid in the reverse direction, and while the button is retained, the following will be shown on the display:


c) Turn off the fluid dispenser by pressing «», the following will be shown on the display:

d) By pressing and retaining the button «-» press the button «». The following will be shown on the display:

e) Press the button '+', the following will be shown on the display:

f) Press «». After the dosimeter completes 100 rotations, it will stop automatically, measure the amount of pumped fluid (for example, 1.230).

A four-digit number and the inscription 'dPS_' will be shown on the display. With buttons '+' or '-', introduce the value of the volume of fluid in liters received after pumping fluid in 100 rotations.

g) Press «». A three-digit number with P index and the inscription 'PrSt' will be shown on the display. With button '+', set the value - 100P. Press the button '+' and confirm the value of the number shown on the display:

If there is only one pump-dosimeter, this point must be obligatorily set to the value of 100P.

7.9 After the end of run-in, go to the main page.













8 OPERATION AND REGULATION RULES



It is recommended to choose the value of seed productivity of the treater from the condition of continuity of the technological process of treatment – the level of seeds in the hopper must be higher than the level of the lower sensor, on the display and on the sensor itself, activation of indication of the lower sensor is observed.

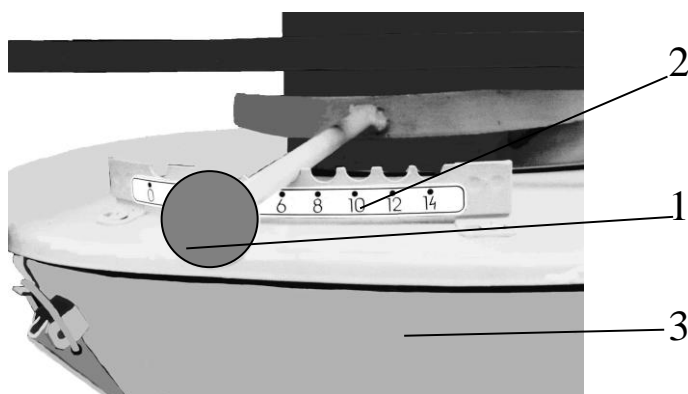
The following is to be performed before treatment:

- a) set the chosen productivity on the seed dosimeter and the corresponding auger speed;
- b) pour water and components into the tank and reservoirs;
- c) with the help of the control console, establish:
 - norm of operating fluid in gpm;
 - expense of operating fluid in gallon per 100 pounds ;
 - time of inspection in min.
- d) calibrate the pumps NP-02.

8.1 Actual **productivity of the seed dosimeter** can differ from the data in table 8.1 due to different physical properties of seeds, their cleanliness etc.

Table 8.1

Crop	Scale divisions of the seed dispenser										
	4	5	6	7	8	9	10	11	12	13	14
	Productivity P, bu/hr										
Wheat	73	110	202	257	294	386	441	514	588	661	735
Barley			138		207		322		413		689
Maize			157		217		295		472		709
Peas			165		257		404		551		661
Oat					138	172	207	275	448	620	895
Soy	73		184		276		386		551		661



1 – lever; 2 – scale; 3 – treatment chamber

Figure 8.1 – Seed dosimeter

8.1.1 Decide at which seed productivity you are going to work.

8.1.2 Set the lever (1, figure 8.1) according to table 8.1 to the chosen division of the scale (2) of the seed dosimeter.

8.1.3 Set the screw speed on the frequency converter panel (figure 5.3) according to the selected (tested) performance according to table 8.2.

Table 8.2

Seed Treater Capacity, P (bu/hr) (Wheat)	Screw Shaft Speed n, rpm
110	27
184	45
257	55
367	80
551	120
735	150

8.2 Adjustment of the system of separate supply of components

Before starting the operation, you need to carry out adjustment of the system in the sequence presented below.

8.2.1 Pour at least 8 gallons (30 liters) of water or main solution into the tank of the treater.

8.2.2 In the basket, install reservoirs (canisters) with components of operating solution. Remove the covers of the canisters and install the corresponding component suction tube into each one.

8.2.3 Turn on the treater.

8.2.4 The pumps will immediately pass to the condition of readiness for operation, and on the display of each of them, zeros and per cent proportion will be shown alternately.



8.2.5 The system doses the components according to their percentage proportion in the prepare operating solution. In each pump, you need to calculate and adjust the portion of the preparation it supplies.

Calculation of percentage proportion for the system of three pumps-dosimeters SSS-3.

Example 1.

Pump 1 – water.

Pump 2 – fungicide. Norm of expense – 0.025 gal/100 lb.

Pump 3 – liquid fertilizer. Norm of expense – 0.01 gal/100 lb.

We calculate the water expense according to the formula:

$$q_1 = q_p - (q_2 + q_3),$$

where:

q_p - expense of operating fluid per 100 lb of seeds gal/100 lb;

q_1 - expense of preparation through the first pump (water) per 100 lb of seeds gal/100 lb;

q_2 - expense of preparation through the second pump (fungicide) per 100 lb of seeds gal/100 lb;

q_3 - expense of preparation through the third pump (liquid fertilizer) per 100 lb of seeds gal/100 lb.

As in treaters it is recommended to use operating solution from calculation of 1/8 gallon per 100 pounds of seed, then $q_p = 1/8$ gal/100 lb.

Then the water expense:

$$q_1 = 1/8 - (0.025 + 0.01) = 0.09 \text{ (gal/100 lb)}.$$

Respectively:

Expense of operating fluid – 1/8 gal/100 lb – 100 %;

1 % = (1/8)/100 = 0.00125;

Expense through the pump 1 – 0.09 (gal/100 lb) – 72 % (0.09/0.00125=72).

Expense through the pump 2 – 0.025 l/t – 20 % (0.025/0.00125=20).

Expense through the pump 3 – 0.01 l/t – 8 % (0.01/0.00125=8).

The use of this system is possible for a larger number of components as well.

Example 2.

Recipe:

Fungicide 1. Norm of expense – 0.019 gal/100 lb

Fungicide 2. Norm of expense – 0.003 gal/100 lb

Liquid fertilizer. Norm of expense – 0.006 gal/100 lb.

Water.

Supply of components by pumps:

Pump 1 – main solution (water and fungicide 1).

Pump 2 – fungicide 2.

Pump 3 – liquid fertilizer.

We calculate the expense of the main solution q_1 :

$$q_1 = 1/8 - (0.003 + 0.006) = 0.116 \text{ (gal/100 lb)}.$$

Expense of the pump 1 – 0.116 gal/100 lb – 92.8% (0.116/0.00125=92.8).

Expense of the pump 2 – 0.003 gal/100 lb – 2.4% (0.003/0.00125=2.4).

Expense of the pump 3 – 0.006 gal/100 lb – 4.8% (0.006/0.00125=4.8).

Calculation of the amount of fungicide 1, which is to be supplied to the main tank of the treater, is performed according to the formula:

$$Q = (Ut \times q) / q_1 = (63 \times q) / q_1,$$

where:

Q – amount of the treater for the full volume of the tank, gal;

Ut – volume of the tank, l, $Ut = 63$ gal (volume of the main tank in the treater);

q – expense of the treater, gal/100 lb;

q_1 – expense of the main solution per 1 t of seeds, gal/100 lb.

In our case:

$$Q=(63 \times 0.019) / 0.116 = 10.32 \text{ (gal)}$$

8.2.6 Introduce the received percentage proportions in each pump, for that:

- Turn off the pump with the button «SET»; the following will appear on the display of the pump:

The image shows a rectangular LCD display with a black border. Inside, the text 'OFF_' is displayed in a white, monospaced font. The 'O' and 'F' are slightly larger than the 'F' and the underscore.

- Enter the menu of the pump. For that, press the button « - » and, while retaining it, press the button «SET». The following will appear on the display:

The image shows a rectangular LCD display with a black border. Inside, the text 'End_' is displayed in a white, monospaced font. The 'E' and 'n' are slightly larger than the 'd' and the underscore.

- With the help of the buttons « + », and « - » choose the point of introduction of the percentage proportion:

The image shows a rectangular LCD display with a black border. Inside, the text 'PrSt' is displayed in a white, monospaced font. The 'P' and 'S' are slightly larger than the 'r' and 't'.

- Press the button «SET» and enter the menu to introduce the percentage proportion.
- Introduce, by pressing the buttons « + » and « - », the value of the percentage proportion for the corresponding pump.
- By pressing the button «SET», leave the menu. On the display, there must again appear zeros and a new percentage proportion.

8.2.7 Perform calibration of each pump.

For that, open the cock corresponding to each pump to the position of calibration (figure 8.2) and perform calibration according to p. 7.8.

After completion of calibration, turn the cock to the position 'OPERATION'.

Repeat for each pump of the system.



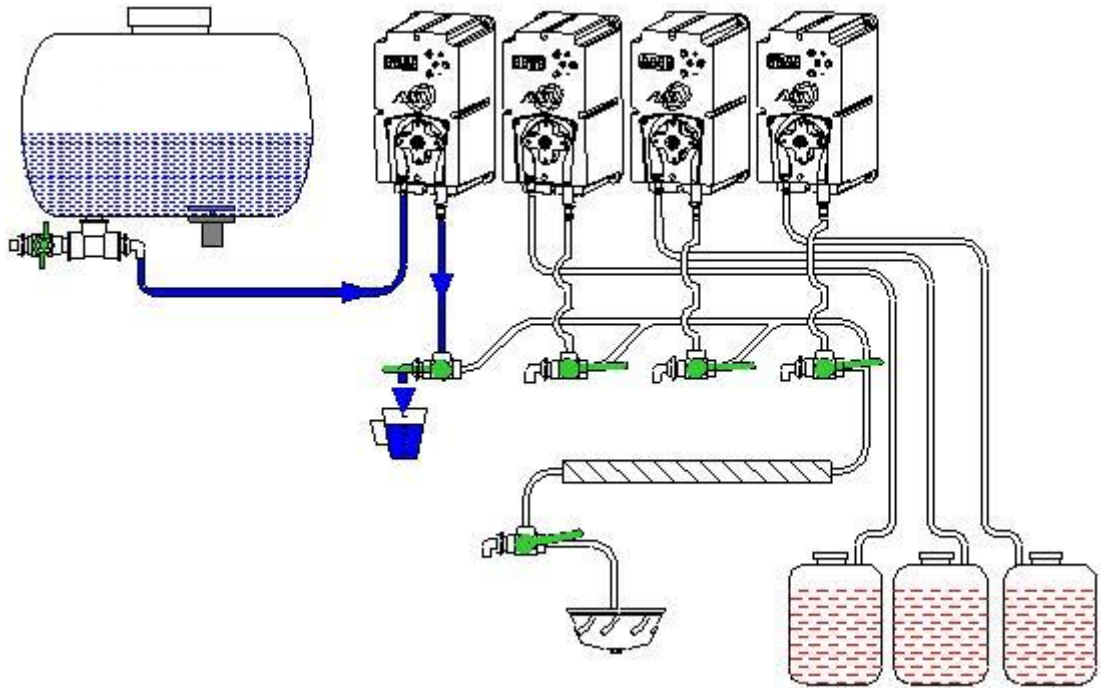
Calibration of each pump is to be performed in the component it is going to dose.

Dosing occurs automatically, according to the commands sent by the treater's SAFA system.

8.2.8 In the process of work, the operator must visually observe the number of components in reservoirs (canisters). When the component has run out, you need to replace the reservoir (canister).

Scheme of calibration of the first

pump NP-02



Scheme of calibration of the second pump NP-02

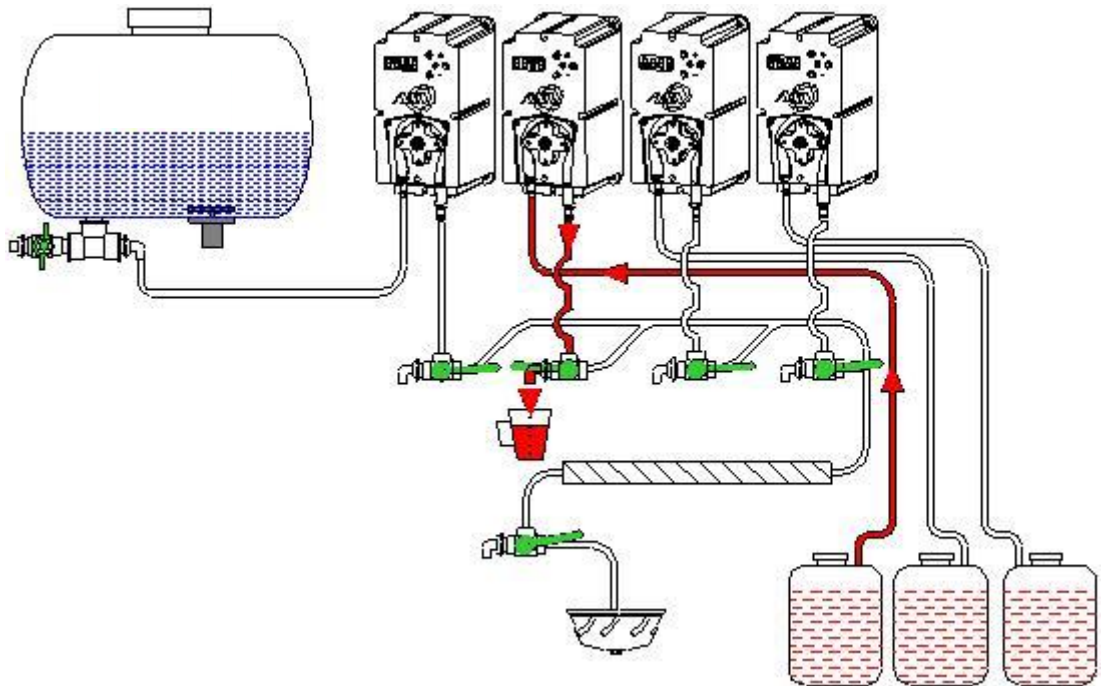


Figure 8.2

8.3 Adjustment of operation modes of the system of automatic fluid adjustment (SAFA)

Taking into account the productivity **P** chosen according to table 8.3, bu/hr and expense of operating fluid per 100 lb of seeds **q_p**= 1/8 gallon per 100 lb, choose the required norm of expense of operating fluid **q**, gpm (gallons/minute).

Table 8.3

Capacity, P (bu/hr) - Wheat, Soybeans,Peas	Capacity, P (bu/hr) - Barley	Capacity, P (bu/hr) - Corn	Capacity, P (bu/hr) -Oats	Working Solution Flow Rate, q (gpm), based on a consumption of 1/8 gallon per 100 lb of seed
73.5	91.9	78.7	138	0.09
110	138	118	207	0.13
147	184	157	275	0.18
184	230	197	344	0.22
220	276	236	413	0.26
257	322	276	482	0.31
294	367	315	551	0.35
331	413	354	620	0.4
367	459	394	689	0.44
404	505	433	758	0.48
441	551	472	826	0.53
478	597	512	895	0.57
514	643	551	-	0.62
551	689	591	-	0.66
588	-	630	-	0.71
625	-	669	-	0.75
661	-	709	-	0.79
698	-	-	-	0.84
735	-	-	-	0.87

When choosing norms of expense of operating fluid not indicated in table 8.3, supply of the dosimeter **Q₁** depending on the recommended norms of expense of operating fluid per 100 lb of seeds **q_p**, can be determined according to the formula:

$$Q_1 = \frac{P_f \times K \times q_p}{60},$$

where:

Q₁ – expense of operating fluid (supply of the dosimeter), gpm;

P_f – checked (actual) productivity of the treater, bushels/hour.

for wheat, peas, and soybeans, K = 0.6;

for barley, K = 0.48;

for corn, K = 0.56;

for oats, K = 0.32.

Example 3. Calculate the supply of the dosimeter Q_1 if the productivity of the treater $P_f=560$ bushels/hour and the norm of expense of operating fluid $q_p=1/8$ gallon/100 pounds. Supply of the dosimeter equals to:

$$Q_1 = \frac{560 \times 0,6 \times 1/8}{60} = 0,7 \text{ (gpm).}$$

8.3.1 Perform precise calibration of the fluid dispenser:

a) Make sure the handles of the cocks are set according to figure 8.2, and bring up a measuring container to the cock.

b) The hose of fluid supply to the dispenser must be fully filled with fluid, if not, repeat the operation described in p. 7.8b).

c) Turn off the fluid dispenser by pressing « ⏻ »; the following will be shown on the display:

d) Retaining the button « ← », press the button « ⏻ ». The following will be shown on the display:

e) Press the button « ← »; the following will be shown on the display:

f) Press the button « ⏻ », a four-digit number and the inscription «dOSE» will be shown on the display:

By pressing the buttons « + » and « ← » set the calculated value of fluid supply (for example, 0.69).

g) Press « ⏻ ». After the dosimeter completes 100 rotations, it will stop automatically, measure the amount of pumped fluid (for example, 0.28). A four-digit number and the inscription 'dPS_' will be shown on the display. With the buttons « + » or « ← » introduce the value of the volume of fluid in liters received after pumping the fluid in 100 rotations.

h) Press « ⏻ »; the following will be shown on the display:

i) Press « ⏻ »; the following will be shown on the display.

j) Press « ⏻ »; a four-digit number that indicates the established supply of the dosimeter (for example, 0.69) will be shown on the display.

8.3.2 Adjustment of the **automatic (main) mode** of the system for the required norm of expense of operating fluid

8.3.2.1 Perform adjustment of the system according to the example.

Example 4. Seed crop – wheat; the value of productivity according to table 8.1 constitutes 441 bushels/hour (division of the scale of the seed dosimeter – 10). Adjustment algorithm:

- a) according to table 8.3, according to the value of productivity established on the seed dosimeter $P = 441$ bushels/hour, the norm of expense of operating fluid constitutes $q=0.53$ gpm ;
- b) press the button «LAUNCH», choose the point of the menu «ADJUSTMENT», with the index arrow highlight the line «NORM GPM» and press the button «RIGHT». After that, the index arrow will move from the beginning of the line to the beginning of the number. With the buttons «UP»-«DOWN» set the number 0.53, press the button «RIGHT» - the value of saved (see annex V);
- c) highlight with the index arrow the line «EXPENSE gallon per 100 lb», press the button «RIGHT», set similarly the number 1/8 gallon per 100 lb;
- d) highlight with the index arrow the line «CHECKING PERIOD», press the button «RIGHT», set the period of automatic launch of the process of checking productivity in minutes, for example, «15», and save it.

8.3.2.2 Having completed the adjustment, return to the main page – point «LEAVE», or the button «LEFT».



In case of extreme necessity to treat seeds with expense of operating fluid more or less than 10 l/t, after the line «EXPENSE 1/8 gallon per 100 lb» appears on the display, set the required expense with the help of the buttons.

THE TREATER IS READY FOR OPERATION.

8.4 Treater performance

8.4.1 Choose the point of the menu «OPERATION», press the button «START / STOP» - the treatment process will start (see annex V).

8.4.2 Open the additional page, choose the point of the menu «CHECKING» and press the button «RIGHT» - the electrical motor of the drive of the disks will turn off. The hopper will be filled with seeds higher than the level of the upper sensor, after which seed supply to the hopper will be stopped, the motor of the drive of the disks will turn on. After reaction of the upper sensor, time countdown (on the right) and calculation of the weight of seeds (on the left) will start, to specify the actual productivity shown on the display.



During operation of the treater in 'CHECKING' mode, contact with the weighing unit (seed hopper) is not permitted.

8.4.3 Checking will be stopped, the measured information will appear on the display, for example: **Norm gpm 0.53, Grain bu/hr 440.**

Operation of the treater continues.

8.5 After the end of operation, free the treater from seeds, drain the residues of operating fluid and wash the hydraulic communication (tank, SAFA, hoses) with water, clean the filling filter.

8.5.1 Order of freeing (cleaning) the treater from seeds:

- set the sector gate valve (18, figure 3.1) to the position «CLOSED», for that, in the control console, go to the page «TEST OF MOTORS»→ «SEED SUPPLY»→ «OFF»;
- for treatment and unloading of seeds from the hopper, choose the point of the menu «OPERATION» - press the button «START / STOP»;
- for treatment and unloading of seeds from the hopper, which are situated between the lower sensor of the level and the disk of seeds, choose the point of the menu «OPERATION», «TOTAL UNLOADING» and press the button «START / STOP»;
- go to the previous menu;



Disconnect the treater from the electrical network!

- open the end cover of the unloading screw, remove the screw, pull out seeds.



For reliable operation of the treater, make sure, every day after completion of treatment works, to wash the hydraulic communication with clean water.

The rest of the working fluid in the hydraulic communication, in particular in the flow meter, can cause the impeller to slow down or stop rotating (sticking) and, as a result, the failure of the SAFA.



The residues of the operating fluid (water) in hydraulic communications at below-zero temperatures can cause getting out of service of some details.



Immediately after start of operation of the treater in the automatic mode «OPERATION» make sure to check (specify) the value of the indicator of productivity of the seed dosimeter and expenses of the operating fluid. Menu point «CHECKING».

9 TECHNICAL MAINTENANCE

9.1 Timely and quality maintenance of the treater allows determining and eliminating the reasons which cause its early wear and breakdown, and guarantees uninterrupted operation during the whole term of service.

9.2 Types and periodicity of technical maintenance are indicated in table 9.1.

Table 9.1

Type of technical maintenance	Periodicity or term of setting for TM, h
1 Every-shift technical maintenance (ETM)	6 – 12
2 First technical maintenance (TM-1)	60
3 Technical maintenance during storage	once a season

9.3 List of works performed during technical maintenance, indicated in the corresponding tables:

ETM	-	table 9.2
TM-1	-	table 9.3
Preparation for long-term storage	-	table 9.4
Withdrawal from long-term storage	-	table 9.5

Table 9.2 – List of works performed during ETM

Content of works and methodology of their performance	Technical requirements	Appliances, tools, devices and materials	Note
1 Free (clean) the treater from seeds according to p. 8.5.1 of this manual	Residues of seeds are not permitted	-	
2 Drain the residues of the operating fluid	Residues of operating fluid are not permitted	Tight containers with the inscription «TOXIC»	Draining is to be performed in a specially allocated place
3 Wash the hydraulic communication	The same	-	The same
4 Drain water residues	Water residues are not permitted	-	-//-

Table 9.3 – List of works performed during TM-1

Content of works and methodology of their performance	Technical requirements	Appliances, tools, devices and materials	Note
1 Fulfill the requirements of lines 1 – 4 of table 9.2	-	-	
2 Clean the assembly units of the machine from the residues of seeds, dust, dirt and operating fluid	The machine must be clean	Wiping material, water, detergent, bucket	Cleaning is to be performed with a wet rag. Use of petroleum or other solvents of paint and varnish materials is not permitted
3 Check completeness, technical condition, reliability of fixing of the external bracings of the machine	Bolts and nuts must be securely tightened	Set of wrenches	
4 Check, and, if necessary, tighten the scraper and the disperser in the treatment chamber	The scraper and the disperser must be securely fixed	Wrenches 12x13, 14x17	Operation is to be performed through the sight cover of the chamber
5 Check tension of passes by pulling the branch of the pass by means of a force meter	The value of bending of the branch of the pass for the drive of the seed dosimeter, disperser, with force of 15 N (1,5 kg) must not exceed 4 mm	Wrenches 12x13, 17x19, Force meter, ruler	
6 Remove the covers of the pumps-fluid dosimeters NP-02 and lubricate the rollers and the dosage hose with thick silicone oil (see p. 9.4.4)	-	Screwdriver, thick silicone oil resistant to temperature	

Table 9.4 – List of works performed during preparation for long-term storage

Content of works and methodology of their performance	Technical requirements	Appliances, tools, devices and materials	Note
1 Fulfill the requirements of the lines 1 – 4 of table 9.3	-	-	
2 Wash the surfaces of the machine contaminated with the operating fluid with a solution of chloride of lime or a 5-10% solution of synthetic detergents heated to 50-80 °C, treat them with 3-10% solution of chromium-sulphurous sodium, and wash with tepid water, wipe the dirty places with a wet rag	Presence of dust, dirt, pesticides is not permitted	Wiping material, water, chloride of lime, synthetic detergent, chromium-sulphurous sodium	Use of petroleum or other solvents of paint and varnish materials is not permitted
3 At a specially equipped area, clean the walls of the chamber from dirt. Check the technical condition of the disperser and the scraper	Presence of dirt, crevices and damages of the disperser is not permitted	Wiping material, water	
4 Conduct technical diagnostics and determine the technical condition of the SAFA, disperser, drive of the disk of seeds and the disperser, the drive of the screw	-	Set of wrenches	
5 Remove the drive passes, wash them with soapy water, dry, sprinkle with talc and send them to the storeroom, indicate the number of the machine from which they are taken	Passes must be clean and dry	Wrenches 12x13, 17x19. Wiping material, water, soap, talc	
6 Remove the hoses, wash, dry, close the openings and send them to the storeroom, indicate the name and number of the machine from which they are taken. Cover the connection places with film	Openings must be tightly closed	Screwdriver, plugs, dummies, lacing cord or adhesive tape, polyethylene film	

End of table 9.4

Content of works and methodology of their performance	Technical requirements	Appliances, tools, devices and materials	Note
7 Remove the covers of the pumps-fluid dispensers, disassemble the dosage hose, previously disconnect it from the pressure and suction lines. Lubricate with thick silicone oil resistant to temperature and send them to the storeroom (see p. 9.4.4)	-	Screwdriver, thick silicone oil resistant to temperature	
8 Clean the electrical motors. Check and, if necessary, isolate the damaged places of the electrical wires, clean and lubricate the terminal blocks with protective oil	Presence of wires with damaged isolation is not permitted	Compressor, electrician's tape, solid oil (synthetic or grease), lithium grease, wiping material	
9 Wash, dry and lubricate unpainted threaded surfaces, the chain and the stars	Apply oil in thin layers	Wiping material, washing fluid, oil NH-203A or wax mixture ZVVD	Does not require depreservation
10 Clean the places of damaged paint, degrease and paint	The paint must correspond to the color of the machine	Coated abrasive, paint TIKKURILA, solvent	

Table 9.5 – List of works performed during withdrawal from long-term storage

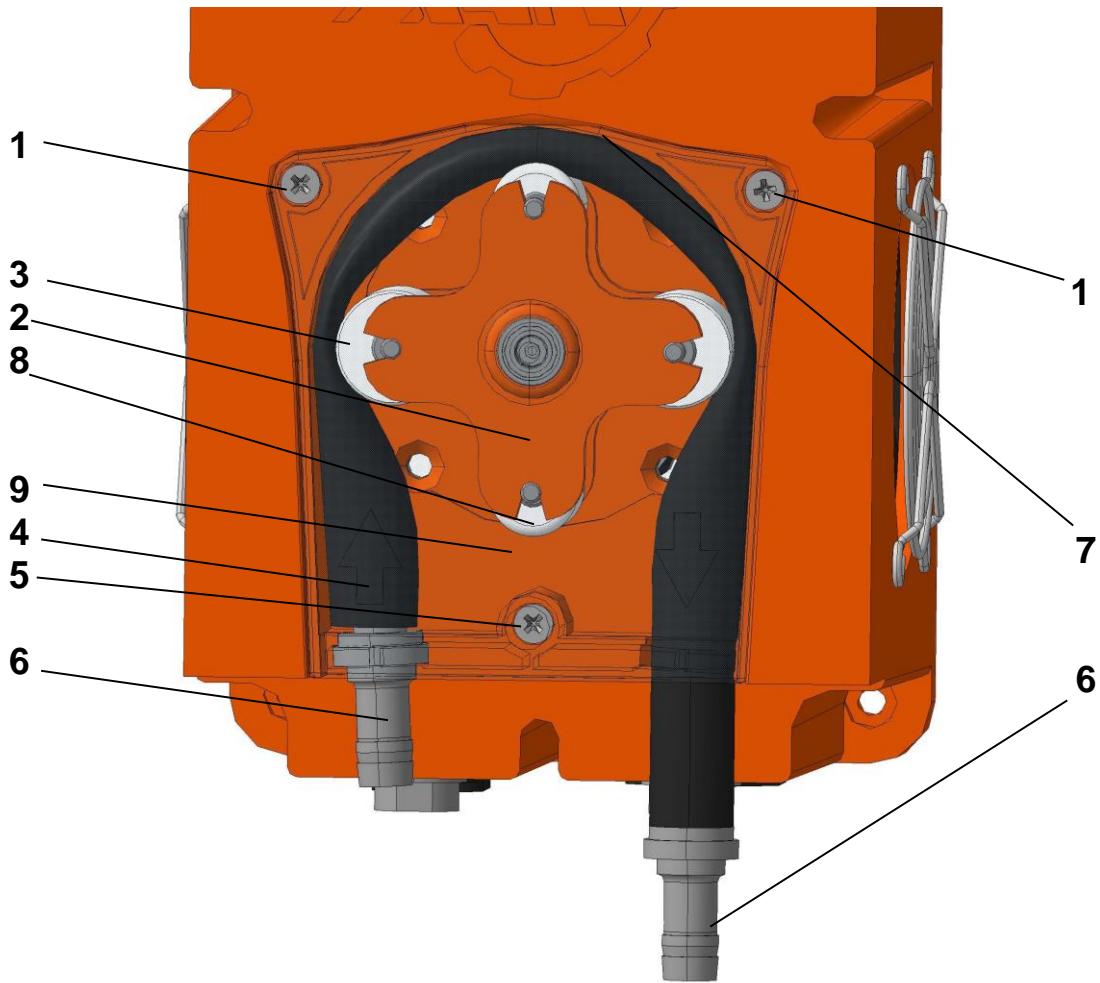
Content of works and methodology of their performance	Technical requirements	Appliances, tools, devices and materials	Note
1 Lubricate the rollers and install the lubricated dosage hoses of the pumps-fluid dispensers NP-02 between the rollers and the body. Install the covers. Connect the hoses of suction and pressurizing lines, fix them with clamps (the hose must be soft) (see p. 9.4.4)	-	Screwdriver, thick silicone oil resistant to temperature	
2 Check, and, if necessary, tighten the loosened braces	The components of the machine must be securely fixed	Set of wrenches	
3 Install the drive passes, hoses	Fulfill the technical requirements of line 5 of table 9.3	Wrenches 12x13, 14x17, 17x19, force meter, ruler	
4 Open the door of the control console. Check, and, if necessary, tighten the bolt connections of electrical appliances	All bolt connections must be securely fixed	Screwdriver	
5 Prepare the treater for operation	-	Perform preparation according to section 6 OM	

9.4 Procedure of replacement of spare parts

9.4.1 **Dispenser.** Undo the bolt M8 with washers fixing the dispenser to the end of the drive shaft, screw the bolt M12 (as a remover) in a metallic inset, remove the dispenser. Insert the metallic inset into a spare dispenser and install it on the shaft.

9.4.2 **Sensor of the level of seeds.** Connection and adjustment of the sensor – see annex B of this manual.

9.4.3 Replacement of the **dosage hose** and lubrication.



1- bolt; 2- rotor; 3- wedging roller; 4- dosing hose; 5- bolt; 6- nipple; 7- surface of the body (operating) contacting with the dosing hose; 8- guiding roller; 9- transparent cover


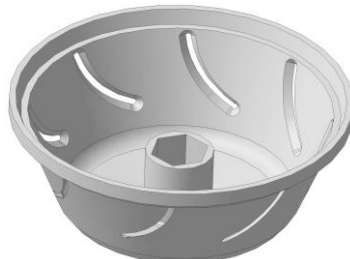






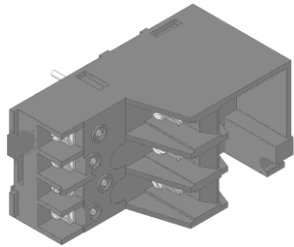

Figure 9.1

For replacement and lubrication of the dosing hose (hereafter - hose) one needs to:

- Undo the bolts (1 and 5, figure 9.1).
- Remove the transparent cover.
- Remove the hose (4).
- From the faulty hose, disconnect the nipples (6) and install them similarly on a new hose.
- Lubricate the hose with thick silicone oil resistant to temperature along the whole surface.
- Lubricate the operating surface of the rollers (3, 8) and the body of the pump.
- Install the hose to its place, for better sitting of the hose, turn the rotor (2) at the same time.
- Install the transparent cover.
- Screw the bolts (1) until resistance, and only start the bolts (5).
- Turn on the pump-dosimeter for 10...15 s with productivity 0.3...0.4 gpm for the hose to be installed with required tension.
- After that, stop the pump and tighten the bolts (5).

9.5 Catalog of spare parts of the machine is presented in table 9.6.

Table 9.6 – Catalog of spare and assembly parts

Sign of detail or assembly unit	Name	Figure
1 DS - 1	Sensor of the level of seeds	
2 PK-20.00.015-01	Dispenser	
3	Washer (Ø33 x Ø45)	
4	Washer (Ø21 x Ø33)	
5	Rubber ring (Ø10,5; S=2)	
6	Rubber ring (Ø=13,1; S=2,6)	
7	Rubber ring (Ø=20,2; S=2,6)	
8	Link S-PR-12,7-1820-2 GOST 13 568-75	
9	Stream electro-thermal relay PTЛ 1007	
10	Plastic fuel funnel with spout and filter SA-121	

9.6 The list of electrical motors, passes, bearings and cuffs of the treater is presented in table 9.7.

Table 9.7


Sign of the product	Name of the document	Name of the node which embraces the product	Quantity for product	Quantity for machine
ELECTRICAL MOTORS				
1 AIP 90L4Y3 (flange) n=1410 rot./min, N=2,2 kW	GOST 183-74	Unloading screw (reducing motor)	1	1
2 AIP 71B6Y3 (flange); n=910 rot./min, N=0,55 kW		Drive of the seed dosimeter and disperser	1	1
PASSES				
Z(O) 1 L=710 mm	GOST 1284.1-85	Drive of the seed dosimeter and disperser	1	1
2 L=1000 mm			1	1
3 B(Б) 1250 Ш or B(Б) 1040 Ш	TU 38.105.1789-87	Unloading screw	2	2
			2	2
BEARINGS				
1 Bearing with body UC/FL 205	-	Unloading screw	1	1
2 Bearing 180506	GOST 8882-75		2	2
3 180 108		Drive of the seed dosimeter and disperser	2	2
4 180 502K1C17		Roller of the drive of the seed dosimeter and disperser	5	5
		Drive of the seed dosimeter and disperser		
CUFFS				
1 1.1-15x30.1	GOST 8752-79	Drive of the seed dosimeter and disperser	1	1

Note. The signs of electrical motors, bearings, cuffs of the reducing motor are indicated in the certificate for the reducing motor (attached to the operational manual).

10 POSSIBLE DEFECTS AND METHODS OF THEIR ELIMINATION

10.1 External manifestation of defects, methods of their elimination and the required tools are indicated in table 10.1.

Table 10.1

Defect, external manifestation	Possible reason	Method of elimination	Note
1 When turning on the treater, the the indicator 'NETWORK' does not light up	In the control console, the three-pole automatic current switch QF-1 is off	Turn on the device of safety cutout of current (DSC)	In case of recurrent reactions of the automatic current switch, see line 5
	The indicator 'BLOCKING' is illuminated, the machine functions – probably the indicator 'NETWORK' got out of service	Replace the light indicator	
	Voltage does not come to the machine – external DSC (FA) or internal one (QF1), transformer got out of service	Check voltage in the socket connected to the cable, cut off the current of the machine and check the mentioned elements	Works are to be carried out by an electro-technical employee with the help of a voltage meter
2 The indicators 'NETWORK' and 'BLOCKING' are on, there are no proper actions after pressing the button 'LAUNCH'	The button 'STOP-BLOCKING' is pressed in (in some models the button has fixation in the pressed position)	Turn the button in the directions of the arrows indicated on it	
	The thermal relay was activated	You need to turn off power with the external switch, make sure that in the console all the thermal relays are set for maximum current (sensibility regulator – to the left). Wait for 5 min and press the buttons on all the termal relays, try to turn on the machine	In case of recurrent activations of thermal relays, see line 7
3 The button 'TEST on DSC 'NETWORK' does not work	There is no earthing	Check the socket and the cable of power	 attention It is strictly forbidden to work with unprotected machine
	The switch got out of service	Replace the switch	


Continuation of table 10.1

Defect, external manifestation	Possible reason	Method of elimination	Note	
4 External DSC is activated again (FA, differential relay)	The switch reacts with the turn-on of the machine: possible short failure of the phase wire and earthing wire or of the body in the console scheme	Cut off the current of the machine and examine the console for presence of mechanical damages of isolation, eliminate them	Works are to be carried out by an electro-technical employee	
	The switch reacts with the turn-on of the mode 'OPERATION' or 'TEST OF EL.MOTORS': possible failure of the phase wire with the earthing wire in the motor or in the wire by which the motor is connected	One needs, with the help of the mode 'TEST OF EL.MOTORS', to determine, with turn-on of which motor the switch reacts. Cut off the current of the machine and examine the wire and the motor. If there are no visible damages, probably, some water entered the motor. Perform inspection and replacement of the motor		
	The switch got out of service	Replace		
5 Internal DSC (QF-1) is activated again	The switch reacts with the turn-on of the machine – possible short failure between two phases in the console scheme	Cut off the current of the machine and examine the console for presence of mechanical damages of isolation, traces of short failure, and replace completely the damaged elements	Works are to be carried out by an electrotechnical employee	
	If the switch reacts with the turn-on of the mode «OPERATION», or "TEST OF EL.MOTORS" – possible short failure between two phases in the motor, or in the wire by which the motor is connected	You need to completely cut off the current of the machine and examine all the wires and motors for presence of failure traces; if there are no visible traces, then, with the help of the mode "TEST OF EL.MOTORS", determine, with turn-on of which motor the switch reacts. Cut off the machine and examine once again the wire and the motor. If there are no visible damages, it is possible that there is short failure in the motor. Perform inspection and replacement of the motor and the starter corresponding to the motor		

Continuation of table 10.1

Defect, external manifestation	Possible reason	Method of elimination	Note
6 Internal one-pole DSC (QF2) is activated again	Short failure in the circuit 110 V of the transformer	Cut off the current of the machine and examine the scheme for presence of failures	Works are to be carried out by an electro-technical employee with the help of an ohmmeter
	The switch got out of service	Replace	
7 Thermal relay is activated again	Faulty motor or faulty thermal relay	You need to determine exactly which thermal relay is activated; after a thermal relay is activated, wait for 5 min, make sure the machine does not turn on with the button 'LAUNCH'. Turn off the external automatic switch, in the console, press the button of the extreme left thermal relay, turn on the machine and try to press the button 'LAUNCH'. If the machine does not function, perform a similar operation on another thermal relay. Keep doing it until you find out which thermal relay is activated. Make sure the relay regulator is set to the maximum. After the relay is activated, try to touch the corresponding motor– if it is too hot (more than 60...70°C), then the defect is in the motor, if not, cut off the current of the machine, replace the thermal relay. If after replacement of a thermal relay the problem persists, you need to measure the current of the corresponding motor – if it exceeds the nominal value, replace the motor	Works are to be carried out by an electro-technical employee with the help of an amperemeter
	In the starter, one contact group does not close, or there is rupture of one line in the thermal relay	As described above, determine which thermal relay is activated. After that check whether there are all three phases at the outlet of the thermal relay with turn-on of the corresponding starter; if one phase lacks, check its presence at the outlet of the starter and replace the faulty device	

Continuation of table 10.1

Defect, external manifestation	Possible reason	Method of elimination	Note
8 The motor does not turn on in the mode "OPERATION" and "TEST OF EL. MOTORS"	The motor is blocked	Cut off the current of the machine and try to turn the shaft of the motor. Eliminate the reason of friction; if the problem is in the motor itself – replace the motor	 attention It is strictly forbidden to work with damaged cables
	Rupture of the wire that supplies power to the motor	Cut off the current of the machine and carry out visual inspection of the cable. Replace or isolate the damaged cable	
	Faulty contacts of a thermal relay or starter	See line 7	Works are to be carried out by an electro-technical employee with the help of a voltage meter
	The corresponding starter got out of service, or there is a damage in the scheme	Check whether the starter is pressed mechanically, whether voltage comes to the starter. If voltage comes – replace the coil or the starter itself	
9 No sensor is activated	Rupture in the power circuit of sensors	With the help of a voltage meter, check presence of voltage in the circuit and eliminate the rupture	Checking and repair are to be carried out by an electro-technical employee
	The transformer got out of service	Replace	
10 Quality of seed treatment has changed: uneven coloring of seeds is observed during visual inspection	Check presence of the disperser	In case of getting out of service – replace	Measuring container, seed hopper
	Check actual fluid supply and actual productivity of the seed dosimeter	Fulfill the point of the menu "CHECKING"	
11 The actual norm of expense of the operating fluid is not shown on the display (Q_1 , l/min)	Flow meter is clogged	Open the door of SAFA, during operation, check the presence of light indication of the flow meter (red blinking light); if there is no indication, wash the system	
12 Pressure increase in the system with SAFA operating in the automatic mode more than 0,15 MPa (1,5 atm)	Clogged pressurizing filter	Clean the pressure line, and also filter	
13 Variations of productivity values exceeding the allowed limits	Rubbing out, blocking of the hopper weighing device	Eliminate the reasons of rubbing out, blocking	

11 RULES OF STORAGE

- 11.1 After the end of works, the treater must be prepared for storage.
- 11.2 Preparation for storage is to be carried out immediately after the end of work, observing the instructions of this manual (tables 9.3, 9.4).
- 11.3 Before putting to storage, inspection of the technical condition of the machine (table 9.4) is to be performed.
- 11.4 Preservation of the machine is to be carried out according to table 9.4.
- 11.5 The machine is to be stored in closed facilities or under a lean-to.
- 11.6 Depreservation is to be performed once a season with elimination of the detected defects.

12 TRANSPORTATION

- 12.1 The treater is shipped to the customer in one cargo item without package (the control console and the electrical motor are covered with film).
- 12.2 Loading and unloading of the treater is to be performed with a crane or automatic loader with lifting capacity of at least 1 t.
- 12.3 During transportation, the treater must be securely fast, moving along the platform or body of vehicles is not permitted.

13 DISPOSAL

13.1 The used equipment of the treater belongs to low-hazard wastes and can be stored openly at the industrial facility. These wastes without negative ecological consequences can be disposed according to the accepted conditions of this or that enterprise.

13.2 Dismantling



Before dismantling, disconnect the machine from the power supply.

- 13.2.1 The machine must be dismantled by persons who are previously familiar with its construction.
- 13.2.2 This should be done after the machine has been placed on a hard and flat surface.
- 13.2.3 Dismantling and replacement of working elements should be carried out according to the tables in the spare parts catalog.
- 13.2.4 Due to the fact that the weight of the machine components exceeds 45 lb (frame, seed hopper), use lifting equipment during dismantling.



Lifting equipment used during dismantling may only be operated by a person with the appropriate authority and qualifications.

13.3 Liquidation

13.3.1 The machine should be scrapped after it has been completely dismantled and the machine components have been inspected.

13.3.2 When dismantling, parts should be grouped by material type: plastic and metal. Plastic items should be sent for recycling (processing or disposal) to companies with appropriate equipment.

PLEASE REMEMBER!!!

Burning plastic materials in devices not intended for this purpose leads to environmental pollution and violates applicable regulations.

13.3.3 Used ferrous metal components should be handed in grouped at collection points for these metals.

14 COMPLETENESS

14.1 Completeness of the treater is provided in the packaging sheet according to annex A.

15 CERTIFICATE OF ACCEPTANCE

Chamber fixed treater STM-800P

Manufacture number _____

complies with the technical conditions TU U 28.3-00237593-009:2017
and recognized as suitable for operation.

Pumps-dosimeters NP-02 numbers: _____

Space for seal

Release date _____

Director of DTC _____
(surname and signature)

EU Certificate of Conformity № EC / 005/2025.

16 MANUFACTURER'S WARRANTIES

16.1 The manufacturing enterprise guarantees serviceable operation of the chamber fixed treater STM-800P during 24 months from the date of putting the treater into operation, but no later than 12 months from the date of sale.

16.2 Once the treater has arrived at the destination point, the consignee must check:

- number of cargo items;
- number of the treater on the certificate table;
- completeness of the treater.

16.3 In case of incompleteness of the treater, one needs to prepare an act signed by the representatives of the organization that receives the treater and the transport organization. By virtue of that act, the consignee can report a claim to the transport organization.

16.4 The manufacturing enterprise is not liable for damage or loss of details during transportation.

If the package is not damaged, and the actual quantity of details, assembly units and tools does not correspond to the section 'COMPLETENESS', one needs to prepare a shortage report and submit it to the DTC of the enterprise. Upon consideration of the report, the manufacturing enterprise urgently delivers the lacking components.

16.5 The manufacturing enterprise does not perform warranty maintenance of the treater if the consumer does not send the filled-in certificate of putting into operation (only for the territory of Ukraine) to the address of the manufacturing enterprise.

16.6 The warranty can be annulled for any of the following reasons:

- wrong operation of the treater (failure to observe the rules provided in this 'Operational manual');
- violation of operating modes, repair or disassembly by specialists who are not authorized to perform such works;
- clogging of the hydraulic communication with impurities of the used substance;
- use for preparation of the operating fluid of treaters (fungicides) which are not recommended for use on the territory of the country-consumer;
- use of other substances, apart from treaters, for preparation of the operating fluid;
- operation of the treater by unqualified staff, irresponsible attitude towards technical maintenance, unauthorized implementation of modifications that affects operation of the treater, stability and safety of its operation;
- use of assembly units, details and spare parts of other manufacturers;

- modification of the treater as a result of which change of any of its functions has occurred;
- loss, damage to the mark plate of the treater or making changes to it;
- operation of the treater under unfavorable conditions, different from the recommended ones (overload, emergency situations etc.).

16.7 The warranty does not screws, drive passes and rubber technical products.

16.8 Any expenses for delivery, postal transmission, time compensations, material losses in business are not subject to reimbursement.

ANNEX A PACKAGING SHEET

«Almaz LLC»

Chamber fixed treater STM-800P

Cargo item 1/1

Gross weight _____ kg

Without package
(type of packaging place)

Table A.1

Indication of assembly unit or detail	Name of assembly unit or detail	Quantity	Note
1 PKST-20.00.000	Chamber fixed treater STM-800P	1	Machine without package
2 DS -01.00.000	Sensor of the level DS -01	1	
3 DS -01.00.010	Electronic circuit board	2	
4 PKS-20.00.490	Cable	1	
5 NP-02.00.003	Rotor	4	
6 PK-20.05.021	Pulley Ø66	1	
7 PK-20.05.022	Pulley Ø60	1	
8 PK-20.00.015-01	Disperser	1	
9	Washer Ø21 × Ø33	2	
10	Washer Ø33 × Ø45	2	
11	Bolt M12-6gx35.58.019 GOST 7796-70	1	
12	Red button «Knob» BS542	1	
13	Body HJ9-1 one-place for posts	1	
14	Screwdriver 3,0x100	1	
15	Measuring container V=1,5 l	1	
16	Measuring polypropylene cylinder 0,5 l, division value 5 ml	1	
17	Hose of the pump-dosimeter Ø9,6×Ø15,9	1	
18	Hose of the pump-dosimeter Ø6,4×Ø12,8	3	
19	Silicone oil resistant to temperature	1	tube
20	Key for control console	2	
21	Link S-PR-12,7-1820-1 GOST 13568-75	1	
22	Stream electro-thermal relay RTL 1007	1	

End of table A.1

Indication of assembly unit or detail	Name of assembly unit or detail	Quantity	Note
23 STM-800P OM	Operational manual	1	
24	Reducing motors. Certificate	1	
25	Frequency converter. Certificate	1	
26 PK-20.00.007-01	Cup	1	
27 PK-20.00.014	Watering can	1	
28 PK-20.05.005	Glass	1	

Packaging officer № _____

Controller № _____

ANNEX B

Sensor with automatic sensitivity setting for grain treaters

1 DESCRIPTION

The sensor is an electronic device which reacts to the presence of bulk materials in the sensibility zone, the dielectric permeability of which differs from the dielectric permeability of the air, including seeds.

As you can see in figure B.1, the sensor consists of: **body**, which is attached to the hopper of the treater by means of four bolts; **cover**, which tightly covers the body and has an opening through which an electric cable enters tightly, and thanks to its transparency, allows controlling operation of the sensor; **electronic plate**, which is the main part of the sensor, connection of the electric cable is carried out to the terminal blocks entering the corresponding sockets on the plate.

A more detailed image of the electronic plate is presented below.

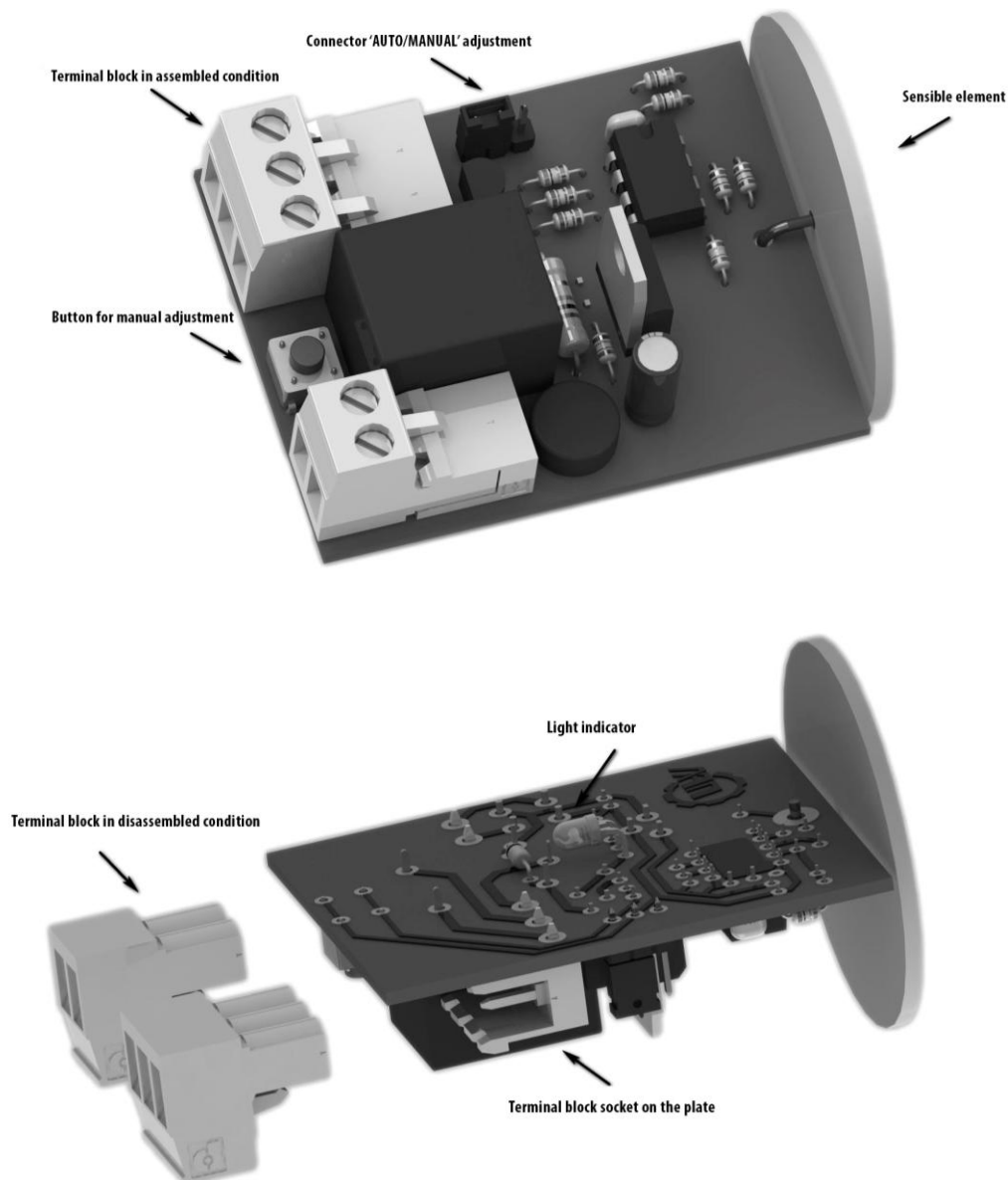


Figure B.1

2 MODE OF OPERATION

The sensor all the time measures the electrical volume of the sensible element, and when the volume exceeds certain configured value, the sensor is activated – a light indicator lights up, and a relay reacts, which closes / opens electric contacts.

Normal mode for the sensor is considered to be the mode with AUTO adjustment of sensibility. In this mode, the sensor corrects its sensibility in the process of operation. At the beginning of the treatment season, and with change of the treated crop, the sensor can react incorrectly to the crop, in such case you will need to perform complete adjustment. Complete adjustment is performed in the following way:

- we turn on the treater with an empty hopper, wait for at least 30 s;
- we load a full hopper of grain, wait for at least 30 s;
- we unload completely the grain, wait for 30 s.

Note. In the process of adjustment, **do not turn off** power of the treater. If the sensors were not adjusted after the process, repeat the effort, check whether the connector of 'AUTO / MANUAL' adjustment is set (figure B.2).

The mode with manual adjustment is considered to be auxiliary and must be applied only if there is no possibility to perform complete adjustment, or for some reasons the sensor cannot operate normally in the mode «AUTO». Manual adjustment is performed in the following way:

- with turn-off power, set the connector to the position 'manual adjustment', or just remove the connector;
- fill the hopper with grain;
- with turn-on power, after making sure the plate is totally inserted in the body, press the button and retain it for several seconds.

Note. If necessary, the procedure can be repeated.

If you want to go for AUTO adjustment again, when the power is on, set the connector to the position «AUTO».

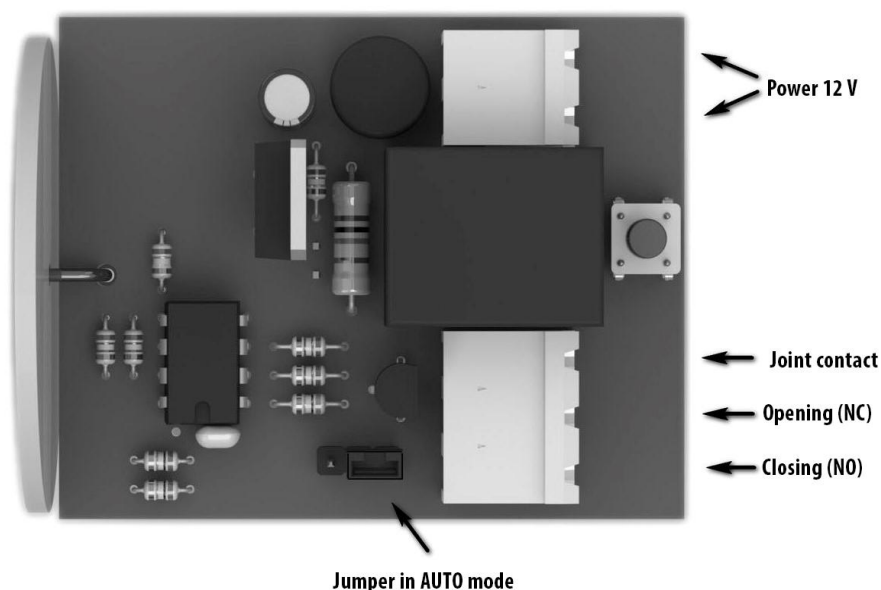


Figure B.2

ANNEX C

User's manual of the control console PKU-02 (treater STM with SAFA)

1 GENERAL PRINCIPLES

When the power is on, the treater is blocked to protect the personnel, that is no electrical motor can be turned on. To leave the blocked condition, you need to press the button «LAUNCH». For immediate turn-off of all the electrical motors, you need to press the button «BLOCKING».

Interaction of the user with the control console is carried out with the help of 5 buttons: «UP», «DOWN», «RIGHT», «LEFT» and «START/STOP», and all the information is shown on the display of the console. The menu interface is structured by the 'pages' principle where for moving between elements of the page, the buttons 'UP' and 'DOWN' are used, the button 'LEFT' to go to the previous page, and the button 'RIGHT' – for activation of the element of the page (opening the page behind the chosen line, going to the mode of configuration of the parameter of the chosen line etc.). The button «START/STOP» is necessary as a prevention means to ensure the user's safety. For quick passing to the dialogue of language selection you need, after turning on the treater, being on the main page, to press simultaneously the buttons «UP» and «DOWN».

2 ELEMENTS OF THE MENU

>Line 1	↑
Line 2	
Line 3	
Line 4	↓

The general aspect of an open page is shown here. The index arrow > points to the highlighted line. The arrows ↑ and ↓ indicate that the page has more lines than can be shown on the display, and with navigation with the help of the buttons up and down, the visible part of the page will move.

The pages are structured in a circle, that is when you reach the last line of the page and press the button down, you will go to the first line and vice versa, when you reach the first line of the page and press the button up, you will go to the last line.

Informative text	↑
>Menu page	
Parameter 1	10.0
Parameter 2	On
Parameter 3	Off
Exit	↓

A page with elements of different types is shown here:

Informative text – this is not an active line, it is not highlighted with the help of the index arrow, if the whole visible part of the page contains informative text, the index arrow will be absent.

Menu page – this is the line which will open another page of the menu, if it is highlighted with the index arrow and

the button 'RIGHT' is pressed.

Parameter 1 – this is an example of the line which shows and allows making changes to some numeral characteristics. To go to the mode of change of the characteristics, you need to highlight the line with the index arrow, and press the button 'RIGHT'. After that the index arrow will move from the beginning of the line to the beginning of the number. After that, with the buttons «UP» and «DOWN» you can change the value of that number, with retaining the pressed button, the speed of increase / decrease of the value of the number will gradually rise. When reaching the maximum allowed value, in case of further pressing and retaining of the button 'UP', the minimum allowed value will be established and vice versa. When you establish the desired value, press the button 'RIGHT', the value will be saved after that. If you press the button 'LEFT', the value will be dropped to the one which was established before passing to the mode of parameter change.

Parameter 2 and 3 – example of the line which shows and allows making changes in the characteristics of the type «ON / OFF». Configuration is carried out similarly to the previous point, the only difference is that there can be only two values: «ON» and «OFF». However, if the line is responsible for «TURNING ON / OFF» the motor, the value immediately changes to the contrary if you press the button 'RIGHT' when they are highlighted with the index arrow.

Exit – this point exists on many pages and substitutes pressing the left button, that is returns to the previous page.

Information panel – this is fixed informative text, which is situated in the lower line of the display on some menu pages. You can introduce information about the condition of the sensors of seeds, condition of permission for turn-on of the motors there, and there is an arrow which points to possible navigation in the menu. Two examples of an information panel are shown below.

Bunker [* * * * *] ■ >

Bunker [] ○ <

↑ ↑ ↑ ↑
1 2 3 4

1 – Indicator of the condition of the lower sensor, up – the sensor reacts, down – the sensor does not react.

2 – Indicator of the condition of the upper sensor, up – the sensor reacts, down – the sensor does not react.

3 – Indicator of permission for turn-on of the motors, up – the motors are permitted to turn on, down – not permitted. Permission for turn-on of the motors and blocking play the role of protection of people against sudden turn-on of the motors. For the machine to start operating, you need to turn off blocking by pressing the button «LAUNCH», and pressing the button «START/STOP» on the corresponding menu page.

4 – Index arrow which points to possible navigation in the menu: up – the arrow indicates the presence of an additional page of the menu, which will be shown on the display after pressing the button 'RIGHT'; down – the arrow indicates that you are on an additional page.

3 TYPES OF PAGES

Pages are essentially divided into those where the machine is allowed to turn on the motors, and those where it is forbidden to turn on the motors, that is the motors will turn on only when the button 'START/STOP' is pressed with the corresponding page open, or the corresponding line is activated (on some pages, there is 'START/STOP' point). When passing to the page where operation of the motors is not allowed, or when pressing the button or line 'START/STOP' with the operating motors, all the motors will turn off automatically.

Besides, pages can be: warning – where usually important information about faulty operation of the treater is shown, at the same time, illumination of the display glitters periodically; informative – pages containing information about certain parameters, which do not allow any actions, such pages are closed by themselves after some time. Both informative and warning pages are closed when pressing any button.

4 MAIN PAGE

Immediately after turn-on of the treater, the main page will shown on the display, its aspect is shown below:

```

>Set tings
Motor test
Work
Information

```

As you can see in the figure – the page has four lines, each line opens its menu page. Description of each page is presented in a separate section:

- **Settings** – section 5.
- **Motor test** – section 6.
- **Work**– section 7.
- **Information** – section 8.

5 ADJUSTMENT PAGE

On this page, you can adjust the parameters of the treater. Appearance of the page and description of each point is presented below:

```

>Norm gal /min . 0.79 ↑
Exp. oz / 100 lb 15.0
Check period 10
Flow testing On
Language
Metric s . Off
Culture
Teh. Settings
Exit ↓

```

- **Norm** – desired norm of expense of the operating fluid for 1 min. Desired value can be introduced manually.
- **Expense** – amount of operating fluid which must be expended for 100 lb of grain. This parameter is necessary for calculation of productivity and the norm. Desired value can be introduced manually.
- **Checking period** – period of automatic launch of the procedure of checking productivity of the treater in minutes. To turn off periodic checking, set the value of the period to «0». Description of the procedure of checking productivity can be seen in **section 7 of this annex**.
- **Flow test** – this point is responsible for automatic stopping of the operation of the treater in case of absence of the flow of operating fluid for some time. If this point is on, then if during operation the fluid flow disappears, permission for turn-on of the motors will turn off automatically, and the corresponding warning will be shown periodically on the display. If the point is off, then in case of disappearance of the fluid flow, a warning about absence of the operating fluid flow will be shown on the display one time but the operation will not be stopped. The flow test is necessary to protect the pump against idle operation, without fluid, and exit of untreated grain from the treater.
- **Language** – shows on the display the page of selection of the desired language of the menu. The appearance of the page of language selection is shown below:

```

Select language:
Українська
Русский
>English
Limba Romana
Exit

```

- **Metric s.** - This parameter allows you to choose either the metric or imperial system of units.
- **Culture** - Here you can select which crop type will be treated in order to accurately display performance during operation.
- **Technical configuration** – this point includes technical settings of the treater access to which is blocked with a password. During operation the user does not need to make any changes to the technical settings. In case of choosing this point, a warning page will appear on the display:

```

Attention! Change
of settings can
influence operation
of the treater
>Continue
Exit

```

When choosing the point **Continue** you will pass to the page of password entrance:

```

To continue,
enter password
Entering 000300
      ↑

```

Access to technical settings can be of any use only in case of communication with the service center, in such case, you will receive the password and further recommendations.

6 PAGE «TEST OF EL. MOTORS»

The page «TEST OF EL. MOTORS» - is the page where the operator can turn on the motors manually. The appearance of the page 'TEST OF EL. MOTORS' and description of its points are presented below.

```

>Mixer                On ↑
Unloading             Off
Drive of disks       Off
Supply of seeds      Off
Start / stop
Test of SAFA
Exit
-----
Hopper [ * * * ] █

```

- **Mixer, Unloading, Drive of disks** – turn on, turn off and show the condition of the corresponding motors.
- **Supply of seeds** – this point of the menu allows controlling the mechanism of the gate valve, which controls the supply of seeds to the hopper of the treater: of the value of the parameter is 'OFF', the gate valve is closed, and, respectively, if 'ON' – it is open.
- **Start / stop** – pressing the right button when this point is chosen will substitute pressing the button «START/STOP».
- **Test of SAFA** – this point of the menu open a page similar to the page of operation in the automatic mode:

```

Test of SAFA
Norm  l/min    2.00
Flow  l/min    1.99
Hopper [ * * * ] █ >

```

The main difference of this page from the page of operation is absence of information about productivity of seeds, and the fact that when pressing the button 'START', only the pump dispenser will turn on and the flow of the operating fluid will be regulated. The intended use of this page is testing of the system of fluid dosage. Pressing the button 'RIGHT' will show an additional page on the display:

```

>Norm l/min      2.00 ↑
  Start / stop

  Exit
  Return
-----
Hopper [ * * * ] █ <
  
```

Information panel is present both on the main and additional pages in the mode of SAFA testing.

- **Information panel** is also situated on the page «TETS OF EL. MOTORS».

7 PAGE «OPERATION»

You pass to the main mode of operation of the treater, the operating page appears on the display, its aspect is presented below:

```

Norm l/min      2.00
Flow  l/min     1.99
Seeds t/h      12.0
Hopper [ * * * ] █ >
  
```

The following information is shown on the display:

- **Norm** – desired norm of expense of the operating fluid – established manually by the operator, or calculated in the process of checking productivity, which will be described below in this section.
- **Flow** – actual expense of the operating fluid at a given moment of time, which is constantly renewed in operation.
- **Seeds** – productivity of seeds is calculated in the checking mode, or automatically calculated according to the established parameters, in case of manual introduction of the desired norm of expense.
- **Information panel** – contains information about the status of the sensors of seeds in the hopper, the status of permission for turn-on of the motors, and the arrow indicating the presence of an additional page.


The aspect of the additional page and the description of each point is presented below:

```

>Checking
  Expended fluid
  Operation time
  Treated seades
  Compl.unloading Off
  Start / stop
  Exit
  Home
-----
Hopper [ * * * ] █ <
  
```

- **Checking** – when choosing this point and pressing the button «RIGHT» – You will pass to the mode of determination of productivity. In this mode, the treater turns off the drive of disks and allows filling seeds in the hopper to the upper level, after which it stops supply of seeds, turns on the drive of disks and unloads the seeds. In case of decrease of the level of seeds in the hopper lower than the level of the upper sensor, countdown starts (on the right), and the mass of seeds unloaded during that time is shown (on the left). According to the time during which a certain amount of seeds will be unloaded from the hopper, and the parameter 'EXPENSE', productivity and the norm are calculated. During checking, you can also see **Information panel**.

The aspect of the checking page is shown below:

Mode of determination of productivity	
35.4	10.4
Hopper [* * *] 	

If the process of checking was interrupted, the received data do not correspond to the permissible parameters, or breakdown of the sequence occurred – the operation will be stopped, and a warning page will be shown:

The process of productivity checking has failed
--

In case of normal completion of the process of productivity checking, the norm of fluid and seeds will be established, and the information page with a report about the received data will be shown:

End of checking	
Received data:	
Norm l/min	2.05
Seeds t/h	12.3

To receive correct data, the parameter 'EXPENSE' should be set correctly.

- **Expended fluid** – when pressing right, this point opens a page with information about the amount of fluid expended by the treater in the automatic mode of operation from the moment of turn-on and within the whole period of operation. The aspect of the information page is shown below:

Fluid expended in the operation mode for session		25.4
total	1	025.0

- **Operation time** – when pressing right, this point opens a page with information about the time spent by the treater in the automatic mode of operation from the moment of turn-on and within the whole period of operation. The aspect of the information page is shown below.

Time spent by the	
machine in	
operation	
for session	0:17
total	0:10:15

- **Treated seeds** – when pressing right, this point opens a page with information about the amount of seeds (in kg) treated in the automatic mode of operation from the moment of turn-on and within the whole period of operation.

The aspect of the information page is shown below:

Seeds treated in	
the mode of	
operation	
for session	2 550
total	102 000

- **Complete unloading** – complete unloading allows treatment of the remnants of seeds in the hopper if the level of seeds is lower than the level of the lower sensor. If you highlight this point during operation of the treater and press the button 'RIGHT', the drive of disks will be activated for 20 s. If you press the button again before the end of that time, the drive of disks will turn off.
- **Start / stop** – pressing the right button, when this point is selected, will substitute pressing the button «START/STOP».
- **Exit** – returns the work page to the screen, pressing the "LEFT" button or inactivity for 30 s will also return to the work page.
- **Home** – this point of the menu will show the main page on the display.
- **Information panel** is also situated on the additional page.

The sensors in automatic modes perform the following functions:

- **Lower sensor** – in the mode, activates the drive of disks, that is starts the process of treatment.
- **Upper sensor** – is used to determine productivity.
- **Sensor of run-out of the operating fluid** – when the fluid in the operating tank descends lower than 30 l, a sound signal is heard, and a warning is shown, but the operation continues.

8 PAGE «INFORMATION»

The page 'INFORMATION' contains several points, which in their turn open pages with useful information. The aspect of the page 'INFORMATION' is shown below:

>Expende	fluid
Operation	time
Treated	seeds
About	the device
Tension	sensors
Exit	

- **Expended fluid** – when pressing right, this point opens a page with information about the amount of fluid expended by the treater in the automatic mode of operation from

the moment of turn-on, and within the
of the information page is shown below:

whole period of operation. The aspect

Fluid expended in the operation mode for session	25.4
total	1 025.0

- **Operation time** – when pressing right, this point opens a page with information about the time spent by the treater in the automatic mode of operation from the moment of turn-on and within the whole period of operation. The information page is shown below:

Time spent by the machine in operation for session	0:17
total	0:10:10

- **Treated seeds** – when pressing right, this point opens a page with information about the amount of seeds (in kg) treated in the automatic mode of operation from the moment of turn-on and within the whole period of operation.

The aspect of the information page is shown below:

```

Seeds treated in
the operation mode
for session 2 550
total      102 000

```

- **About the device** – when pressing right, this point opens a page with information about the model of the machine, the manufacturer's firm and version of software. The aspect of the information page is shown below.

```

Treater PKS-20PT
with SAFA

ver. PKU-____
>Exit

```

- **Tension sensors** – when pressing right, this point opens a page with information about the current level of the signal of the weighing unit. The aspect of the information page is shown below.

```

Received signal:
Weight kg      75.0

```

9 WARNING PAGES

In this section, warning pages are enumerated, the aspect and explanation of each one is given.

```

Attention!
The machine is
blocked
press 'Launch'

```

This page appears if you are on the page where it is permitted to turn on the motors but the blocking of the treater is not removed.

```

Attention!
No flow of the
operating fluid

```

This message appears on the display if there is no flow of the operating fluid in the process of operation.

```
Attention!  
Low level of  
operating fluid  
in the tank!
```

This message with a periodic sound signal appears on the display if the level of the operating fluid in the process of operation dropped lower than 30 l. To turn off the signal, press any of the buttons «UP», «DOWN», «LEFT», «RIGHT», but after some time the signal and the message will appear again.

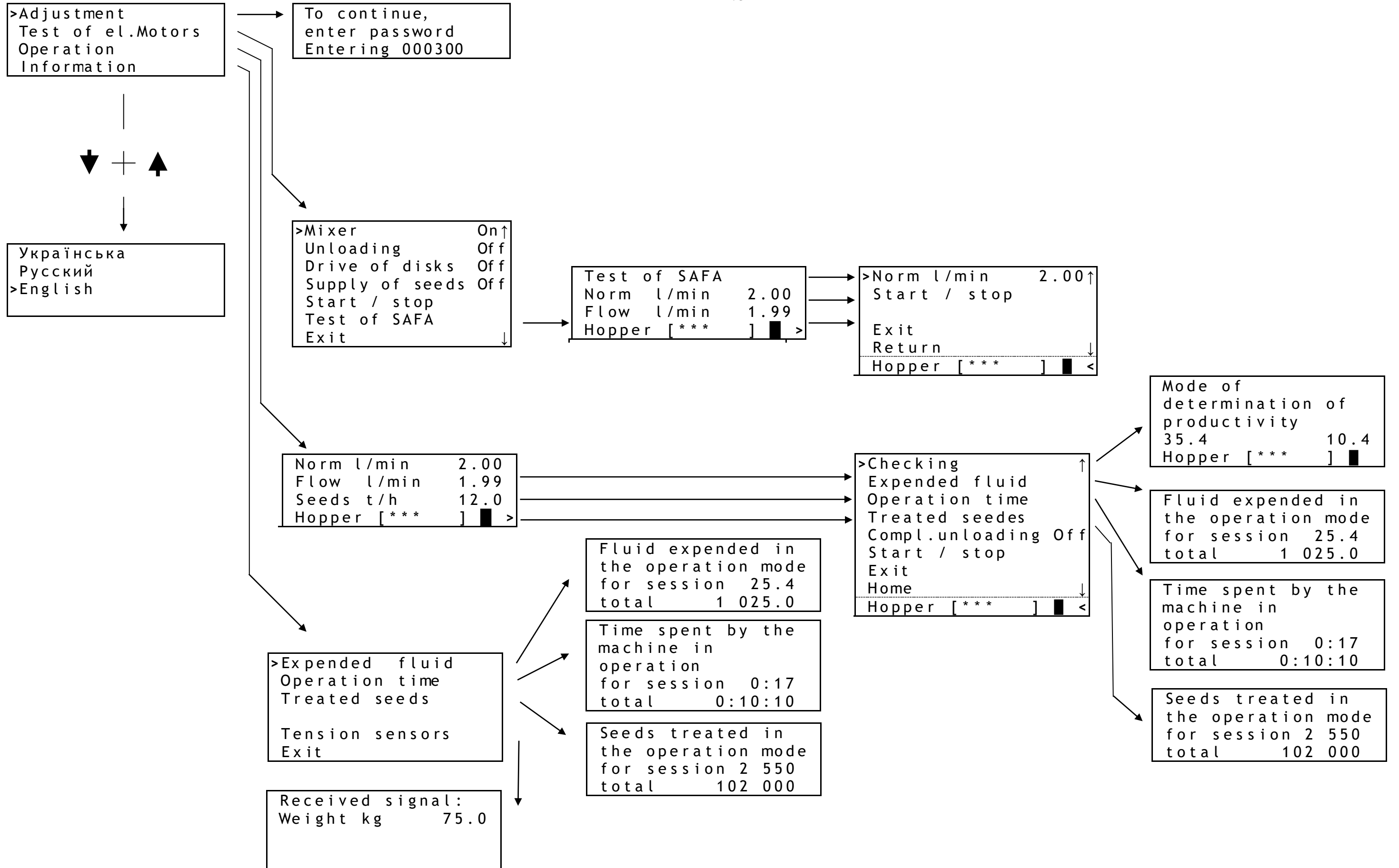
```
Attention!  
Faulty mechanism  
of the gate valve
```

This message appears on the display if there is no corresponding signal of response when the treater tries to close / open the gate valve.

```
Attention!  
Faulty weighing  
device
```

This message appear on the display if there is no connection with the module of tension sensors during performance of the procedure of productivity checking.

As an annex, the general aspect of the menu structure is presented below.



ANNEX D

WARRANTY SHEET

- 1 Chamber fixed treater STM-800P
- 2 Day, month, year of issuance _____
- 3 Factory number of the treater _____
- 4 Pumps-dosimeters NP-02 numbers _____

The treater completely complies with the drawings and technical conditions.

We guarantee serviceability of the treater during 24 months from the date of its putting into operation, but no later than 12 months from the date of sale.

The warranty does not cover the elements of construction which have the property of natural wear and rubber technical products.



Director of DTC _____
(signature)

Space for seal

Date of sale or receipt of the treater at the warehouse of the manufacturing enterprise

(surname, initials, position)

(signature)

ANNEX E

INFORMATION ABOUT USER TRAINING

Please enter the symbol and serial number of the machine (from the nameplate) in the empty boxes and use this data in contacts with the supplier and when ordering spare parts.

Machine name _____
 Machine type _____
 Serial number _____
 Purchase date _____

The undersigned user of the above-mentioned machine has been trained in the operation of the machine, the risks associated with it and the principles of safe work when operating the machine.

Name and surname of the user _____

Date of training _____

Name and surname of the trainer _____

User's signature _____

Trainer's signature and stamp _____

A copy of this certificate remains in the supplier's archives.

The above training does not release the machine user from the obligation to complete specialist training resulting from the legal obligation related to the operation of specific machines.

At the time of purchase of the machine, the seller should enter the symbol, serial number of the machine and the date of production according to the data on the nameplate and provide his/her data.

The buyer of the machine (user) should confirm with a signature that he/she has read the warranty conditions and information contained in the operating instructions.

Product name: _____

Type: _____

Factory number: _____

Year of production: _____

Sale date: _____

Seller: _____

I have read the warranty conditions and information contained in the user manual.

Buyer (user) _____

ATTENTION!: Remember the name and symbol of the machine. In conversations with the seller or manufacturer, always mention this name and symbol.



