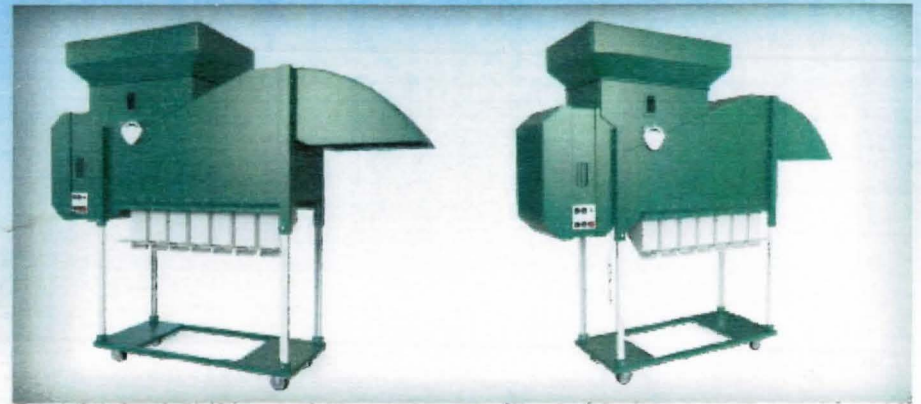




**KHARKOV
GRAIN
CLEANING
MACHINERY
PLANT**



**Impeller Separation Machine
ISM**

LIMITED LIABILITY COMPANY
«KHARKOV GRAINE CLEANING EQUIPMENT PLANT»

(joint exploitative document)

Impeller separator ISM

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INTRODUCTION

This operating manual is a joint exploitative document, and is delivered with every separator.

This document is intended to study the device and its safe operation, as well as, to acquire the skills of handling it.

The persons responsible for the installation, operation of the separator, and record keeping of its work, must read this manual.

The manual contains information about the completeness and construction of a separator, its technical characteristics, as well as, the safety instructions, information about the manufacturer, the warranty conditions.

Throughout the operational period, the consumer must keep a record of the quality of product operation, making entries in the relevant section of the manual.

The manufacturer reserves the right to make changes in order to improve the device. These changes may not be reflected in this manual.

Product Overview

Product name:

IMPELLER SEPARATING MACHINE

Labelling:

ISM - _____ TU U 29.3-37090655-001:2010

Manufacturer: **LIMITED LIABILITY COMPANY
«KHARKOV GRAINE CLEANING EQUIPMENT PLANT»**

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www.agro-vigs.com

Serial number 10923 Date of issue 12, 2016

1. PURPOSE AND INSTALLATION

1.1. Purpose:

Separator (hereinafter "the machine") is designed for calibration and cleaning of seed and commodity material: cereals, legumes, vegetables, melons, fodder and all kinds of granular mixtures.

POSSIBLE MACHINE OPERATION MODES:

- 1- primary treatment mode;
- 2- calibration mode;
- 3- mixed mode (calibration and cleaning at the same time).

1.2. Installation:

Installation of the machine is possible:

- in the covered threshing floor,

- at the grain cleaning complex ZAV-20, ZAV-25, ZAV-30, ZAV-40 (or other), at the grain elevators and factories carrying out processing of agricultural products, which conditions conform to the TU U 29.3-37090655-001: 2010

2. MAIN TECHNICAL SPECIFICATIONS

Table 1

Separator name	Performance in the calibration/cleaning mode (t/h)	Dimensions: -length (mm.) -width (mm.) -height (mm.)	Power Consumption	Weight (kg.)
ISM-10m.a.	10/ up to 5	2300x650x2400	0.2 - 1.5 kW, 380 V, 50 Hz	370
ISM-15	15/ up to 7	2300x650x2400	0.2-2.2 kW, 380 V, 50 Hz	380
ISM-20	20/ up to 10	2300x650x2400	0.2 - 3 kW, 380 V, 50 Hz	410
ISM-30	30/ up to 15	2300x650x2400	0.4 - 4.4 kW, 380 V, 50 Hz	440
ISM-40	40/ up to 20	2300x1150x2400	0.4 - 6 kW, 380 V, 50 Hz	480
ISM-50	50/ up to 25	2340x1150x2400	0.4 - 7.5 kW, 380 V, 50 Hz	500
ISM-15 CSC	15/ up to 7	4800x1150x2800	0.2 - 2.2 kW, 380 V, 50 Hz	750
ISM-20 CSC	20/ up to 10	4800x1150x2800	0.2 - 3 kW, 380 V, 50 Hz	800
ISM-30 CSC	30/ up to 15	5200x1150x2800	0.4 - 4.4 kW, 380 V, 50 Hz	870
ISM-40 CSC	40/ up to 20	5200x1600x2800	0.4 - 5.5 kW, 380 V, 50 Hz	920
ISM-50 CSC	50/ up to 25	5200x1600x2800	0.4 - 6 kW, 380 V, 50 Hz	970

3. MACHINE CONFIGURATION

The machine of any model is delivered to the consumer in basic configuration. Machine configuration can be changed, at customer's request, while the contract is concluded.

Basic configuration includes:

- 1- machine assembly;
- 2- operation manual (data sheet) – 1 pc.
- 3- locking-transport tab - 2 pcs. (completed with the additional order).

4. DISTINCTIVE FEATURES OF SEPARATORS "ICM"

Structure:

Separator "ICM" is a machine designed to separate the various fractions of a homogeneous material from each other. As a driving force is used well-formed air flow, formed by the impeller. Application of the impeller on machines of this type as a power plant, allows:

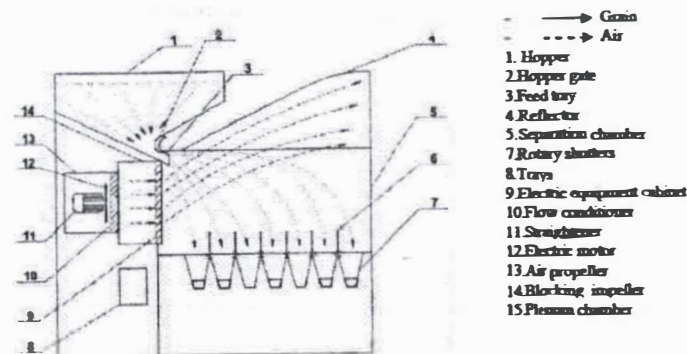
- Minimize the power loss of the air flow created by the impeller, because the machine has no air ducts, to overcome the resistance of which is spent considerable power of the electric fan.
- Avoid getting into the air intake of the device of small impurities located on the floor around the machine, due to the constructive solution, high location of the node relative to the floor.
- Through the use of the fan of the impeller of proper aerodynamic shape, designed specifically for machines "TOP" by the manufacturer of aviation equipment, it became possible to significantly reduce the power of the electric motor, while maintaining the parameters of the air flow to eliminate vibration.
- In its design, the machine has no the turbulence screen, eliminating the need to periodically clean it, making it possible to operate the machine without the technological stops.
- Application of the frequency converter to adjust the RPM of the impeller allows a smooth starting of the electric motor.
- Possibility to work in a reverse mode of the impeller to clean the node.

5. MACHINE OPERATION

5.1. Machine operation brings to change the trajectory of free falling of "grain", by the air flow generated by the blocking impeller, and further distribution and dividing of the starting material into fractions according to weight, size and shape.

The starting material, hereinafter "grain" is supplied to the hopper and distributed across the width of the tray by its own weight, and in this form enters as a uniform flow in the separation chamber, where occurs its separation and division by mass, size and shape, by affecting the grain by the air flow from the blocking impeller.

Grain, divided into factions, is fed from the trays corresponding to fractions.



6. LABELLING

6.1. Machine labelling.

Plate, made in accordance with GOST 12971, with the text corresponds to GOST 12969 is mounted on the outer surface of each machine.

1. **Manufacturer name:** LIMITED LIABILITY COMPANY «KHARKOV GRAINE CLEANING EQUIPMENT PLANT»;
2. **Name and symbol of the machine;**
3. **Designation of the terms of reference (technical specifications), which requirements correspond the machine;**
4. **Serial number of the machine;**
5. **Month and year of manufacture.**

6.2. Labelling of controls.

The controls of machine operation, switch buttons "On" "Off" "Start", "Stop", "Direction of rotation".

7. ACCIDENT PREVENTION.

The operator must have 1 group tolerance for non-electrical personnel.

Before working with the equipment, the operator must perform the following safety requirements:

1. Verify the reliability of connection to the equipment of visible grounding (protective earth) conductors, the availability and reliability of fastening of grounding (protective earth) contacts, plugs and sockets, plug sockets;

The total resistance of grounding devices: all re-grounding of the neutral conductor of a power line shall not exceed 10 ohms. (According to paragraph 1.7.103 of the Electrical Installation Regulations.).

2. Connector plugs must be designed so that they cannot be plugged into the sockets with a higher nominal voltage than the voltage of the plug. Before connecting, make sure that the suitable voltage is applied according to the connector pinout. When you connect equipment do not allow pulling and twisting the cables, power cords, do not expose them to mechanical stress, and do not put the cargo on them. Also, do not allow direct contact between the wires and cables with hot, wet, oily surfaces or objects.

When working with disease-treated seeds is necessary to conduct medical examinations and provide of maintenance personnel with personal protective equipment.

When you use the machine without a cyclone or an aspiration hood, the operator should work in a dust-proof goggles and a respirator.

CAUTION!

Assembly (disassembly) of the machine is carried out only with de-energized equipment.

Assembly (disassembly) of the machine is carried out only on a flat, stable surface, in compliance with all standards and requirements of the safety regulations for the installation work.

FORBIDDEN!

- operate the machine without reading this instruction manual.
- operate the machine without a ground connection;
- operate the machine with mains voltage not complying with requirements of the Electrical installation code, namely, for the voltage of 220V + - 10%, for the voltage of 380V + - 10%.
- operate the machine with no protective elements of the rotating parts of the machine;
- open units and components under voltage;
- make changes to the work program of the frequency converter.
- Operate the machine for personnel without 1 group tolerance for non-electrical personnel.
- Operate the machine in a location where can fall precipitation (rain, snow, fog, dew, etc.).

8. MACHINE INSTALLATION

See *Attachment 2* during installation.

8.1. Recommendations for machine installation.

Access from all sides should be at least 1200 mm for the convenience of the service when installing the machines in the hangars and grain cleaning complex.

The machine must be put on a level using screw supports.

Though getting of debris into the air intake does not impair the machine operation, it's worth contain the workplace clean.

8.2. Installation procedure of the separator before operation.

Set the machine to the place of further exploitation.

1. On delivery of the machine with the removed hopper and reflector, install them at place, fixing with bolts. See *"Attachment 2"*.

2. If the machine is supplied with the outlet for light fractions, install the outlet, and then secure it with bolts to the reflector. See *"Attachment 2"*.

3. Install a feeding and an outlet conveyor so as to provide a continuous separation process. (If necessary, completed optional).

8.3. Electric communications connection.

Connection of the machine to the mains must be performed by a qualified worker with at least 3-rd group of electrical tolerance.

- Connect the ground lead to the general grounding circuit.
- Connect the power cord to the power supply 220/380 V *according to Table 1.*

- Connections are made with the cable, cross section of which is not less than the cross section shown in table 2 that complies with the requirements of the Electrical installation code, taking into account losses in the supply line.

Table 2

Separator name	Rated power, kW	Cable cross-section, mm ²		Cable length, m
		Copper	Aluminium	
ISM-10mm	2,2-3	5x2,5	5x4	up to 100
ISM-15 / ISM-15 CSC	2,2-3	5x2,5	5x4	up to 100
ISM-20 / ISM-20 CSC	3	5x2,5	5x4	up to 100
ISM-30 / ISM-30 CSC	4,4	5x2,5	5x4	up to 100
ISM-40 / ISM-40 CSC	6	5x4	5x6	up to 100
ISM-50 / ISM-50 CSC	7,5	5x4	5x6	up to 100

9. SETTING PROCEDURE OF SEPARATORS "ISM"

9.1. Turning the machine.

1. Set the handle "feed grain" to "0".
2. Fill the hopper by the grain to the specified level.
3. Clear the "Emergency Stop" button by rotating.
4. Move the handle "Network" to "On", the indicator "Network" lights in the presence of voltage.
5. Set the up "Impeller power controller" in the center position.
6. Turn on the power of the frequency converter, by moving the handle "Rotation direction" in the mode separation or reverse, the indicator lights, the electric motor of the impeller gradually begins to gain momentum with the release of a predetermined amount.
7. Turning off the machine in the reverse order.
8. Emergency shutdown of the machine is carried out by pressing the button "Emergency stop". See "Attachment 1".

9.2. Setting the machine to working modes.

Primary treatment mode.

1. Turn on the machine as described above.
2. Fill the intake hopper by the material. Ensure a continuous supply of material. During separator operation, the operator must control the volume of hopper filling by the raw material (hopper filling at least ¾ of volume).
3. Set the rotary shutters in such a position that they are in a neutral position between the 1st - 2nd and 4th - 5th tray.

4. Move the hopper gate to the "Open" position and turning the handle "Impeller power controller" achieve the maximum possible air flow, at which is not allowed the release of grain by removal of light fractions, along with the exhaust air.

5. If the machine is equipped with a cyclone-sedimentary complex (CSC), you must make sure that all connections with the main separator are tight. Adjust the locking door in the CSC by changing the weight balances, so that it is closed at the operating air flow for a given material. Make sure that the air duct damper is blocked. Constriction or partial overlapping of the output tray of the CSC is not allowed, as this may cause a malfunction of the separator.

In this mode, when properly configured, the machine is able to remove from 30% to 60% of the waste from the original material, depending on the quality of the grain. When the machine is in this mode, the cleaned grains will be supplied from any trays. For a more complete cleaning, you need to use other grain-cleaning machines.

Calibration mode.

1. Turn on the machine.
2. Fill the intake hopper by the material. Ensure a continuous supply of material. During separator operation, the operator must control the volume of hopper filling by the raw material (hopper filling at least ¾ of volume).

3. Set the rotary shutters in such a position that they are in a neutral position between the 1st - 2nd and 4th - 5th tray.

4. Move the hopper gate to the position 0.5: 1 and turning the "Impeller power controller" achieve the same proportion of grain output in the 2nd and 5th trays of finished fractions. If you want to increase the productivity of the machine, then opening the hopper gate, increasing the supply of corn, while increasing the air flow. At correct adjustment of the machine, the first tray will get stones, in the second one - most severe and large grain (trade or seeding); in the third one - less severe grain (trade or seeding); in the fourth and fifth trays - broken grains, half grain, struck by a corn bug, and all sorts of impurity (forage grain). Turning the control handles of shutters, you can achieve the desired quality of calibration. For higher quality of calibration are involved the intermediate fraction.

5. If the machine is equipped with a cyclone-sedimentary complex (CSC), you must make sure that all connections with the main separator are tight. Adjust the locking door in the CSC by changing the weight balances, so that it is closed at the operating air flow for a given material. Make sure that the air duct damper is blocked. Constriction or partial overlapping of the output tray of the CSC is not allowed, as this may cause a malfunction of the separator.

Setting rotary shutters.

During calibration of grain, the operator can by himself make adjustments of the quality of the outgoing grain material by moving the rotary shutters, as well as a smooth change of impeller power. It should be taken into account that an increase of the air flow the bulk of the material is moved to the fifth tray, thereby increasing the amount of material entering the feed conveyor. If you need a calibrated grain material of a higher class, it is necessary to carry out calibration operation for two times.

Activation of rotary shutters, allows you to select a grain having a weight (size) wherein it falls on the border of separable fractions, and could get into any of the adjacent trays. This technique allows sending of the "borderline" grain for recalibration.

Any manipulation of the rotary shutters, for the grain of different types, different humidity, different clogging and rating - are individual, and selected by the operator, depending on the task.

It should be noted: Increase in productivity of the machine can be carried out as long until starts deterioration the quality of calibration (cleaning) of grains, or until begins release of grains with an exhaust air. For different crops the threshold of calibration deterioration is different, so the operator determines its own. In the calibration mode, regardless of the operator's actions, also light impurities are released from the starting material when it passes the separation chamber, i.e. cleaning takes place in conjunction with the calibration.

10. PERFORMANCE CONVERSION

The formula for performance conversion:

$$Q = QH \cdot K1 \cdot K2$$

where: QH- rated, declared, performance, t / h;

K1, K2 - conversion factor (Table 3 and Table 4).

Conversion factors of performance of grain-cleaning machines, depending on the treated crop STO AIST 10.2-2004 (OST 10 10.2-2002)

Table 3

Crop	Bulk weight, kg / cubic meters	Factor K1	Crop	Bulk weight, kg / cubic meters	Factor K1
Beans	-	1.20	Sunflower	355	0,50
Peas	800	1.00	Awmed rice	700	0,50
Corn	760	1.00	Bearded rice	700	0,40
Maize	700	1.00	Sugar beet	300	0,40
Rye	700	0.9	Millet	850	0,30
Barley	650	0.8	Rape	-	0,30
Oat vetch	-	0.75	Linum	700	0,25
Meadow grass	-	0.04	Wheatgrass	-	0,25
Buckwheat	650	0.70	Red clover	780	0,20
Spring vetch	-	0.70	Alfalfa	780	0,20
Oats	500	0.70	Rye grass	-	0,15
Soybeans	720	0.70	Meadow fescue	-	0,14
Sorghum	750	0.60	Timothy	700	0,12
Lentil	765	0.60	Carrot	480	0,10
Hemp mallow	-	0.60	Cocksfoot	-	0,09
Winter vetch	-	0.60			

Depending on the moisture and clogging of the treated crop STO AIST 10.2-2004 (OST 10.2-2002)

Table 4

Humidity, %	Clogging, %	Factor value K2
up to 18 incl.	5	1.0
	10	0.9
	15	0.8
more than 19 "22"	5	0.9
	10	0.8
	15	0.7
«23»26»	5	0.8
	10	0.7
	15	0.6
«27»30»	5	0.7
	10	0.6
	15	0.5

11. ТЕХНІЧЕСЬКЕ МАНТЕНАНС ОФ СЕПАРАТОРС "ISM"

Machine cleaning.

After completion of works or when switching to another crop, the machine must be cleaned of dust and residue of the starting material.

This is carried out as follows:

Turn on the machine, set the maximum power of the impeller, and open the hopper gate. In this mode, allow the machine operation for 3-5 minutes.

Turn idle conveyors for removal of crop residues.

Shake and blow out the hopper of the dispatch conveyor.

Sweep the remains of crops from feeders, gearbox and external protruding parts.

Clean the hopper of non-grain waste.

Before sending the machine for storage or conservation is necessary to clean the machine, check the reliability of fastening of moving parts and mechanisms of the machine, and if necessary to carry out retightening.

When removing the machine from storage or conservation is necessary to make the removal of dust and dirt deposits with a soft cloth, check for smooth rotation of the screw of the impeller, if necessary, to carry out maintenance of the electric motor.

12. TRANSPORTATION.

The machine is transported by road or rail, in accordance with the rules of carriage of goods by road or rail, approved by the Ministry of Transport of Ukraine.

Stowage and Securing of packages is carried out in accordance with the technical specifications for loading and securing of cargo, approved by the Ministry of Transport of Ukraine.

Loading and unloading of separators is carried out in two ways:

by a forklift truck or a crane.

When using a forklift truck:

Forks of a forklift truck should be put into the guide rails located at the base of the frame at the end face.

When using a crane:

Slings of the machine and hopper is carried out according to the diagram, see "Attachment 2".

When transporting the machine in covered vehicles is permitted transportation without packaging or with a partial packaging of individual packages, which provides protection against mechanical damages.

STRONGLY FORBIDDEN.

- Perform slinging of the machine without traverse, see "Attachment 2"
- Perform the loading and unloading of the hopper using a forklift truck. Placing and securing of packages on vehicles should provide a stable position when following the road; displacement and strikes are not allowed.

13. WARRANTY.

Manufacturer guarantees compliance of the machines to the requirements of technical specifications TU U 29.3-37090655-001:2010 while respecting the rules of transportation and operation established in this manual.

Warranty period of operation of the machine is 24 months from the delivery date.

Upon detection of unauthorized access to parts of the machine, making program changes, without proper storage of the machine, the manufacturer is not liable for the correct and safe machine operation. Warranty coverage is withdrawn.

14. ACCEPTANCE CERTIFICATE.

Separator ISM - 100SC

No. 0923

is made in accordance with the regulatory requirements TU U 29.3-37090655-001: 2010, engineering specifications, and found fit for service.



Lampy Sok & U
(printed name)

201 6. december 1
(day- month- year)

15. PRESERVATION CERTIFICATE.

Separator ISM - _____

No. _____

« _____ » _____ 201 _____.

is subject to conservation in accordance with the requirements of TU U 29.3-37090655-

001: 2010

(signature)

(printed name)

STAMP HERE

201 _____ / _____
(day- month- year)

16. STORAGE.

Machine storage is carried out in a dry ventilated place. Do not let precipitation and foreign objects. According to the requirements of GOST 15150-69

Date		Storage conditions	Storage type	Notes
Accept for storage	Remove from storage			

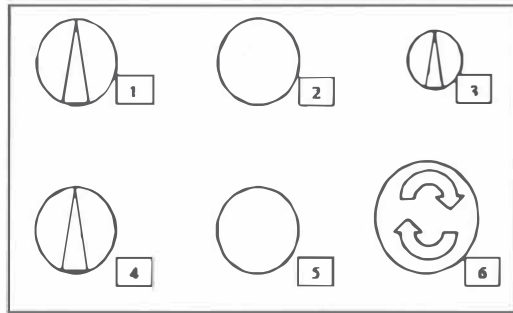
17. REPAIR.

Date	Time since new, hours	Time since overhaul, hours	Repair reason	Information about repair

18. PRODUCT SERVICE RECORD.

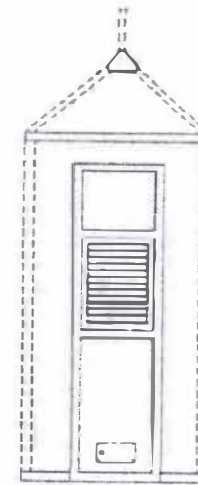
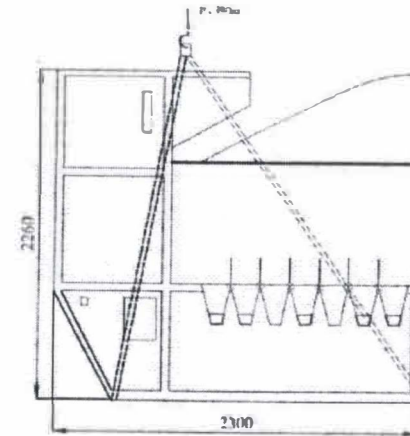
Installation date	Installation place	Removal date	Time since new	Removal reason	FULL NAME and signature

Control panel



- 1. Engine control handle.
- 2. Network indicator.
- 3. Impellor power controller.
- 4. Network.
- 5. Engine operating indicator
- 6. Emergency stop.

Sling arrangement of the machines





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