



Technology



SMART SORT C series

1 to 6 sections

Shape Sorting

CSort AI (Smart) Mode

High capacity
by difficult products

SmartSort is a top-of-the-line model of the color sorter that incorporates the latest developments of the company. It was designed for the clients looking for the "pinpoint" accuracy of sorting even if the initial content of impurities is high and greater productivity without resorting is required.

SmartSort is suited for sorting food and non-food bulk products as well as for difficult color sorting applications. Thanks to the new **CSort Cloud** platform, the operator is now able to monitor and control the technological process of sorting.



2007

30 Countries



We Are

CSort LLC – international innovative manufacturer of color sorting machines – high-tech equipment for sorting bulk products. We supply high quality and high efficient production worldwide offering the modern solution for agriculture, food industry and waste processing cases.

Our team works on new solutions, projects, innovative ideas and technologies all the time upgrading our machines to achieve the best results.

We keep on progressing always contacting food industry and agricultural institutions to be aware of the current trends and react on rising needs on time.

Nowadays CSort is represented in 9 countries supplying color sorting machines to 30 countries all over the world (European Union, South-East Asia, CIS states). More than 80 food and nonfood industry segments are equipped with 1500 by CSort produced color sorting machines.

30 Countries

1500 working machines



Our equipment is the guaranteed high purity of processing products, stable work and reliable service available for assisting in technical and software support anywhere in the world.

Own-production

+

Research and Advanced Development

=

Personal approach, solutions for unique cases

Own production

We use processing equipment supplied by leading manufacturers such as TRUMPF, LISSMAC, HAAS, MECAL for metal processing, EWM for welding works and FANUC robots for assisting.

Developers

Research and Advanced Development is the base for constant technologies maturing to find the solutions for unique cases and competing with leaders in optical sorting branch.

Design, electronics, IT and quality control departments include employees with scientific experience and degrees.

Commissioning, warranty and post-warranty service, coaching.

CSort service provides technical support, quick and professional commissioning works, performs the installation and adjusting of equipment.

Coaching

CSort engineers coach the customers' employees to operate with color sorter for reaching high level sorting quality and reducing downtimes.

Online color sorter monitoring

CSort developed assisting online service — CSort Cloud, which informs the operator about necessary maintenance works and software updates to prevent breakdowns

The customer can use a personal CSort Cloud account to analyze statistics of color sorter spare parts work. This is possible at any place in the world if the customer is connected to the Net.

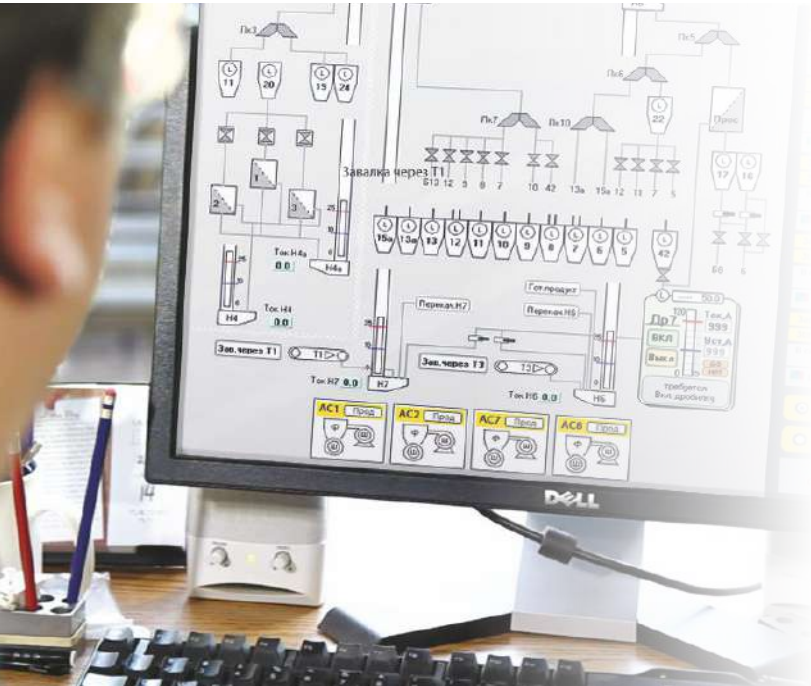
No lack in spare parts for service and upgrade

Having own spare parts warehouse CSort delivers the parts for servicing color sorters anywhere in the world.

Automation. Aim — high efficiency

Automatically working factory allows improving workforce productivity and ensuring sustained products quality.

Color sorter Smart Sort is fully integrative to the central factory controlling system sharing such technical parameters as:



Product level in the top hopper (productivity) monitoring;



Switching on/off by a signal, other signal reception;



Error and crash warnings;

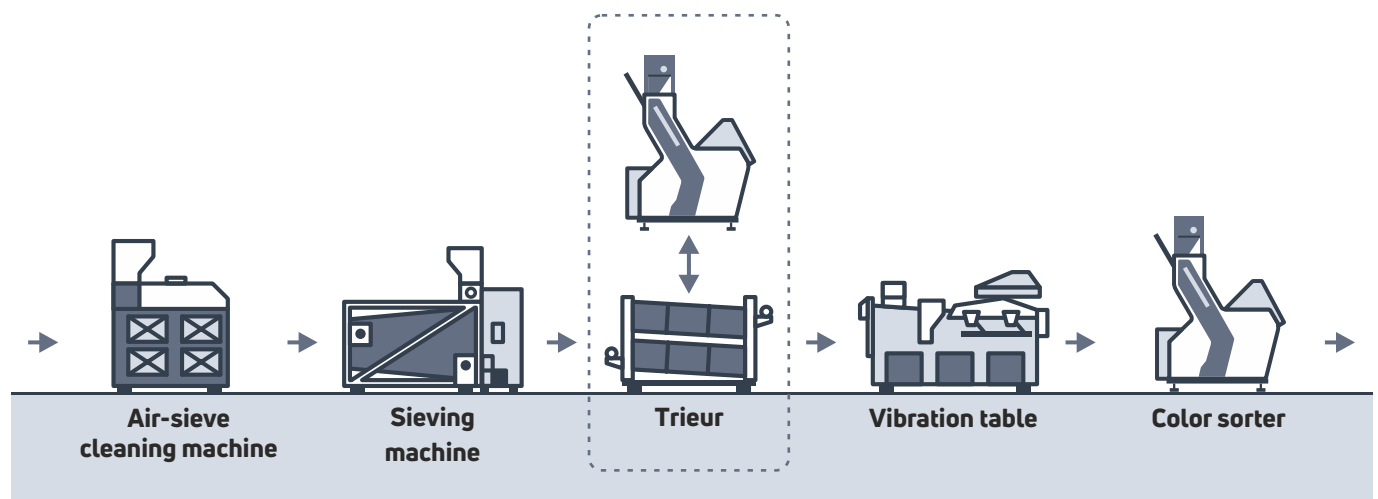


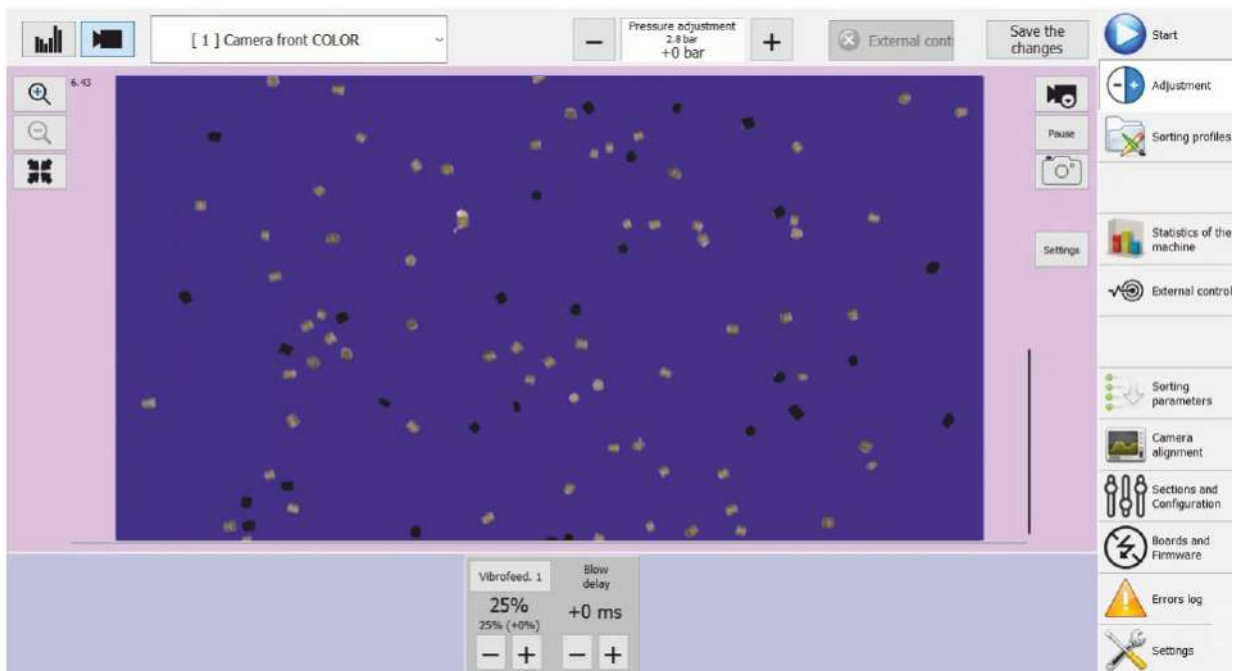
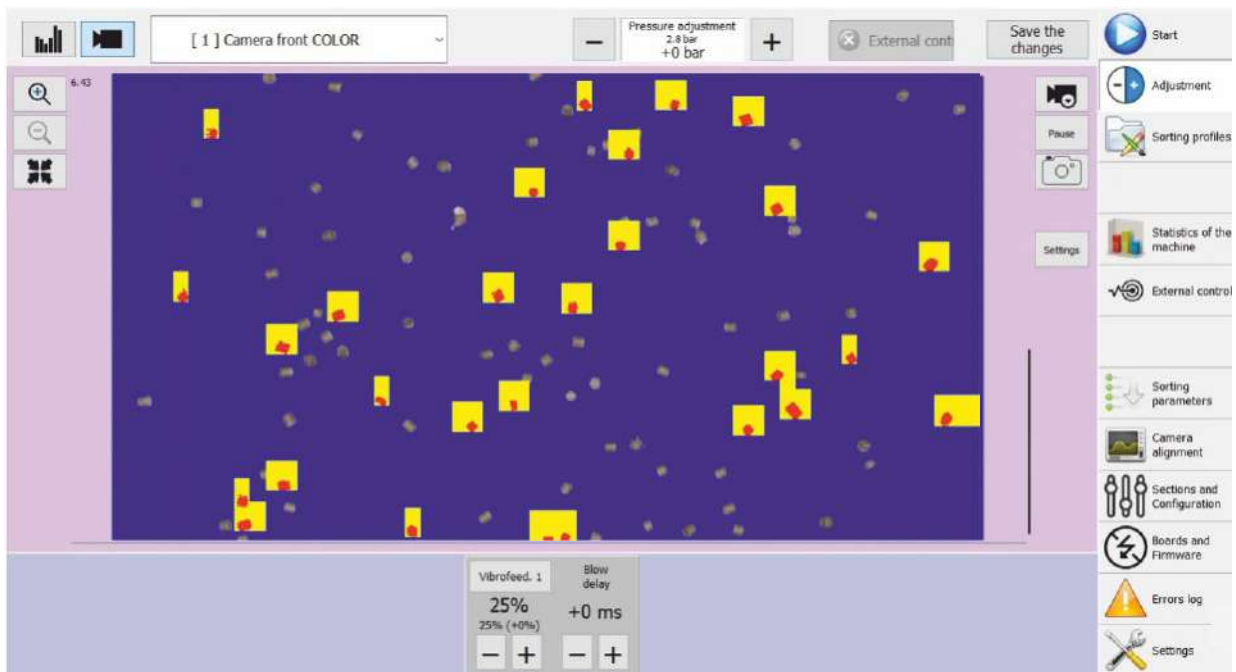
Informing about single sections performance;



Wrong parameters of sorting warnings.

Upgrading the production line due to intelligent sorting development





Using video for small adjustments

The user oriented adjusting interface plays a big role in the daily operating. This statement is the basis for CSort's engineers to develop our own software for the machines.

The perfect example is using video for small adjustments. It allows adjusting of sorting programs controlling such parameter as sensibility. Visually analyzing pictures of product user can see the contaminants on the screen and adjust parameters during the sorting.

Rejected product

Accepted product

SmartSort AI

3900 3,0 mc 17%

Advanced AI (Smart mode)

Integrated to the Smart Sort color sorters advanced AI (Smart mode) creates a sorting program scanning good and bad samples assuming their color, size, surface and shape.

Automatically chosen parameters do not depend on the staff qualifications. It helps to reach top results.

Developed by CSort software allows to use "master"- camera which adjustments are automatically shared with other sections of the machine. This technical feature lays behind precise sorting and usability.

The smart small adjusting mode suits parameters just during the sorting to keep top results even by input quality changing products.



Deep learning technology — present and near future of the optical sorting

Since 2019 CSort uses deep learning based neural computations for sorting bulk products. The first experience showed results cannot be achieved by using any other technologies.

The big advantage of this new feature is the possibility to classify contaminants by more than thousand criteria.

Nowadays CSort shows impressive results in sorting difficult products thanks to this new technology.

CSort prepared the technological platform for general integration of deep learning technology to the chute color sorters. One of the main features is the opportunity for further learning by sharing the data between all the color sorters which connected to the CSort Cloud service.

CSort Algorithm — New approach to sorting by shape

CSort team integrates into color sorters high-tech Smart mode as a new approach to sorting products. This approach is based on the original algorithm which analyses the majority of product shape parameters

Why is it unique?

Most producers use such parameters of products as length, width, size (area) and circularity. The new algorithm allows to set more parameters as well as consider their combinations and effects on each other.

Modern color sorters feature automatically adjusting modes in comparison with the previously used manual settings with complicated calculations which must be studied and performed by operators. Nowadays adjusting is much easier and more flexible for the user. Product quality grows thanks to the quick automatic settings calculating Smart mode included to the new generation of CSort color sorters.

Why is it useful?

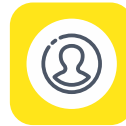
The new algorithm improves efficiency of sorting and completes:

- Optimizing and intensification of specialists work thanks to automatic procedures
- Collecting maximum possible data volume for analyzing
- Spreading products spectrum



Ultrapowerful lighting with intelligence controlling

CSort created the product analyzing system with powerful lighting. It allows to detect the smallest surface and inside defects of products. Intelligence system for lighting adjustments automatically controls the parameters.



Adjustable chute dampers

CSort chute dampers feature smooth regulation for sorting a big variety of products. Transparent surface allows to detect blocks on the way product falls down and improve constant quality and production capacity.



Industrial signal lights

Standard industrial signal lights provide visual indicators of a machine state such as sorting regime, standby, machine fault or emergency situation.



Extended recognition capabilities

Simultaneous 4 sides shooting with RGB and IR cameras ensures analyzing and sorting products by color, shape, texture, and inner properties. For instance, sorting nuts from shells, removing rancid sunflower kernels or separation of mineral admixtures from grains.



High resolution camera

5400 pixels allows **0.05 mm** optical resolution to detect the smallest defects. It has **2,6 times** higher sorting accuracy than was before. High resolution provides color sorters with an ability to detect and reject grains having a similar color but with different textures. Moreover, now it is possible to sort by shape removing malformed or split grains.



Automatic updates of based on deep learning sorting algorithms and software

Automatically updating equipment is a current trend. During the operational life the equipment is updated with adding new features.





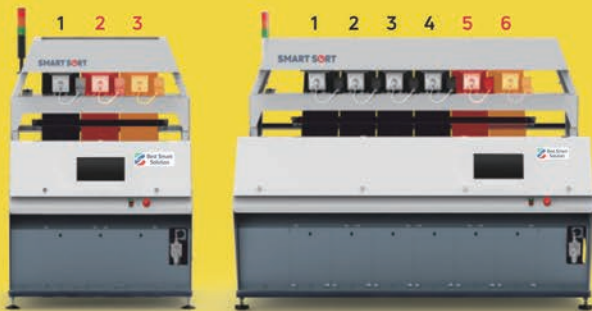
Digital twin is the key for better technical solutions

CSort Cloud service collects all data about operation hours and adjustment parameters for studying by developers. Digital twin allows to create a knowledge base with sorting difficulties, find solutions for them and integrate new adjustments into color sorters together with software updates.



Power efficient quick removing system

CSort machines equipped with sonic speed ejectors gathered with the nozzle blocks. They are able to create super short airshots for removing only contaminants to minimize loss of good product. High speed ejectors allow to configure "height" of the airshot starting from 3 mm. All pneumatic system components are maintenance convenient.



Block-modular construction

Universal Smart Sort frames make it possible to set a variable number of sorting sections: from 1 to 3; from 4 to 6. This allows to increase productivity and save money in comparison with the purchase of a new color sorter, not to increase the occupied space, to avoid dismantling.



High resolution lenses

Big diameter lenses in Smart Sort machines have low distortion level and are quick adjustable for each camera.



Reliable service

Thanks to CSort Cloud and digital twin service department monitors color sorter operation time 24/7.

Service department knows about errors well ahead of user pays attention on them. Anytime CSort technical specialists are available for servicing including remote connection. This helps to save the sorting quality and avoid downtimes.



Clean in- and outside

Improved aspiration system and analyzing area cleaning advantage working with dusty products. Increased inner dimension of pipe channels allows to reach a more efficient aspirating by using same capacity industrial vacuum cleaner.



Reliable and productive construction

Lower weight and dimensions by higher rigidity – lower industrial site loading. New Smart Sort C is easier in maintaining major components. Modular assembly improves reliability and allows low cost upgrading.

Color sorter configurations

Color sorters are configured for clients' specific cases for achieving the highest profit and production efficiency.

«C» — RGB camera

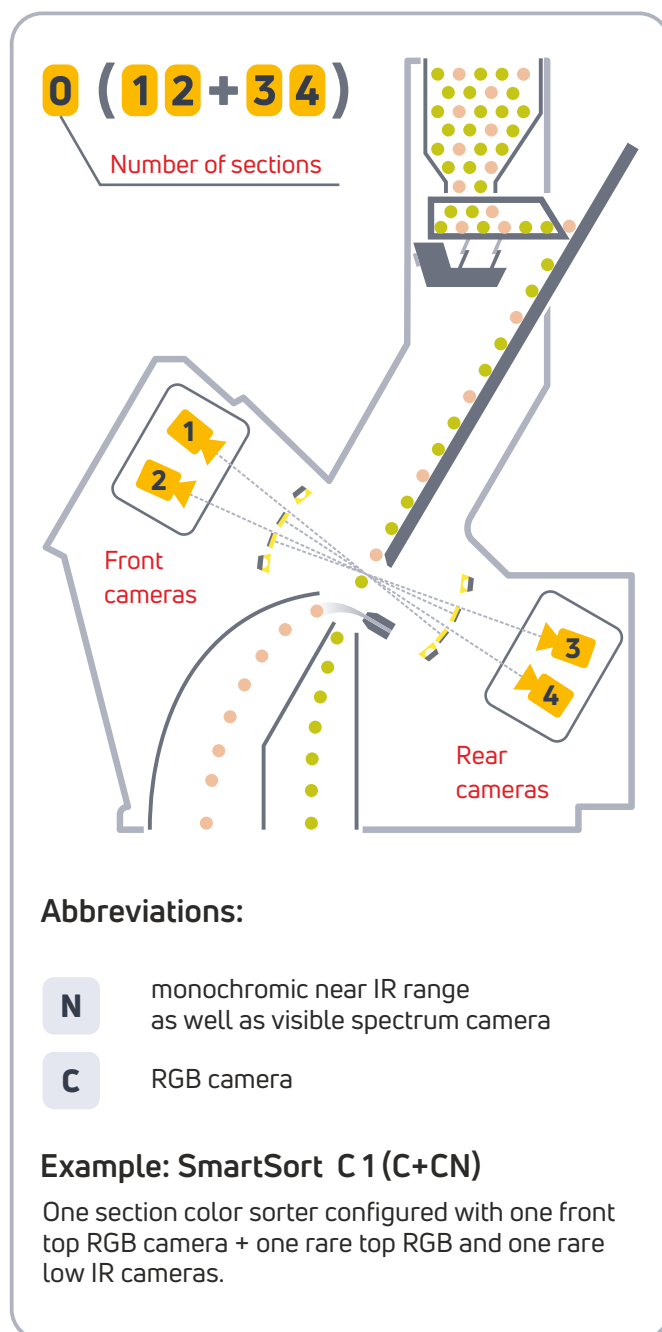
This camera removes from the product stream contaminants differing by color. Front and rear cameras allow to inspect both sides of the product and detect all the defects.

Camera adjustments help to separate even close colored products. What is more, RGB cameras are also specified for shape sorting.

«N» — near infrared range camera

This camera allows to sort out the same colored but differing by material type objects from the product. As example this camera is able to remove mineral, glass and metal pieces from cereals and nuts. Another ability is removing organic impurities (sticks, shells etc.) from good product.

IR camera also works in visible spectrum as the addition to RGB camera increasing the quality of product in any sorting cases



Option: Ultrapowerful lighting with liquid cooling

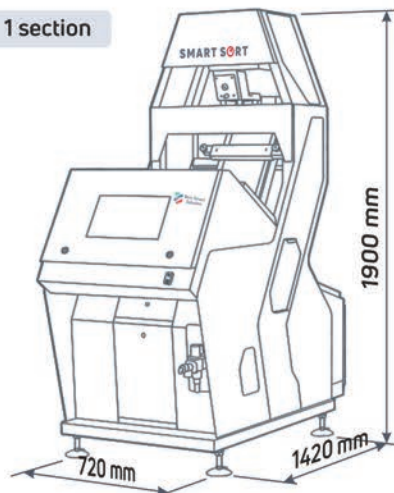
Ultrapowerful lighting allows to see through the product detecting inner defects. Bright lighting is also specified for sorting low-contrasting products.

SMART SORT Eco (1-2)

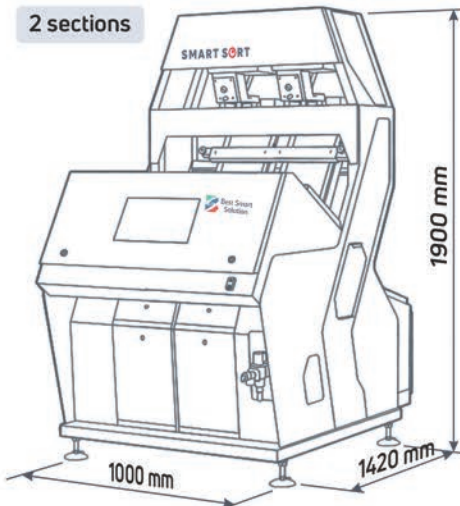
Multiprogram color sorter

Parameters: Small size,
Smart AI mode,
CSort Cloud

1 section



2 sections



Cleanliness coefficient, %, min.*	99.5
CCD-matrix resolution (per chute), pixel	5400
Power, V / Hz	230 / 50
Air pressure, MPa	from 0.6 to 0.8
Air purity according to GOST 17433, ISO 8573-1:	• particles 1 • humidity 4 • oil 1
Maximum air consumption (at 0.6 MPa), m ³ /h	225
Air consumption for the aspiration, m ³ /h, max.:	• standard aspiration 2100 • with additional aspiration nozzles on chutes 3100
Electric shock protection class according to GOST IEC 61140-2012	I
Degree of protection provided by enclosures according to GOST 14254	IP54
Ambient temperature, °C	from 5 to 40
Relative air humidity at the temperature of 25 °C, %	from 20 to 80
Noise level at the work site, dBA, max.	80

* With the initial content of foreign materials of 2% or less and the volume weight of the product of 0.750 t/m³

	1 section	2 section
Number of channels	54	108
Production capacity (for wheat), tons per hour*	7	14
Nominal power, kW	0.5	1.0
Air consumption for the technical process (wheat), m ³ /h, max.*	40	80
Weight, kg, max.	400	500



High precision
sorting



Sorting in visible-
light or IR spectrum



Quick adjusting
for product



Efficient
operation



1 section

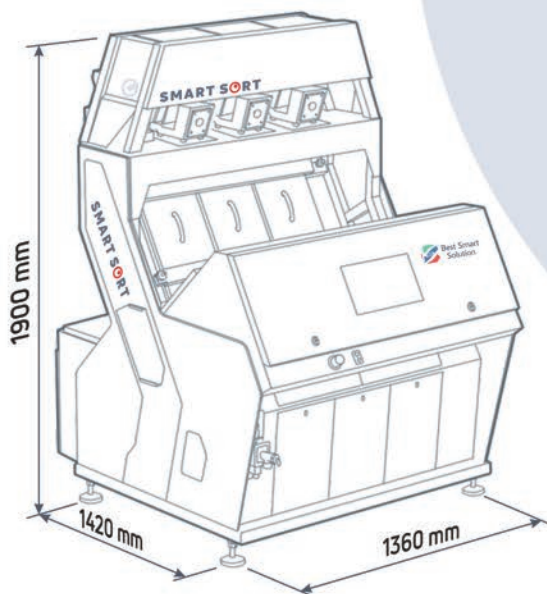


2 sections

SMART SORT (1-3)

Multiprogram color sorter

Parameters: Smart AI mode,
CSort Cloud, Ultrapowerful
lighting Extralight – optional



Cleanliness coefficient, %, min.*	99.5
CCD-matrix resolution (per chute), pixel	5400
Power, V / Hz	230 / 50
Air pressure, MPa	from 0.6 to 0.8
Air purity according to GOST 17433, ISO 8573-1:	• particles 1 • humidity 4 • oil 1
Maximum air consumption (at 0.6 MPa), m ³ /h	225
Air consumption for the aspiration, m ³ /h, max.:	• standard aspiration 2100 • with additional aspiration nozzles on chutes 3100
Electric shock protection class according to GOST IEC 61140-2012	I
Degree of protection provided by enclosures according to GOST 14254	IP54
Ambient temperature, °C	from 5 to 40
Relative air humidity at the temperature of 25 °C, %	from 20 to 80
Noise level at the work site, dBA, max.	80

* With the initial content of foreign materials of 2% or less and the volume weight of the product of 0.750 t/m³

	1 section	2 section	3 section
Number of channels	54	108	162
Production capacity (for wheat), tons per hour*	7	14	21
Nominal power, kW	1.4	1.6	1.8
Air consumption for the technical process (wheat), m ³ /h, max.*	40	80	120
Weight, kg, max.	600	650	700



1 section



2 sections

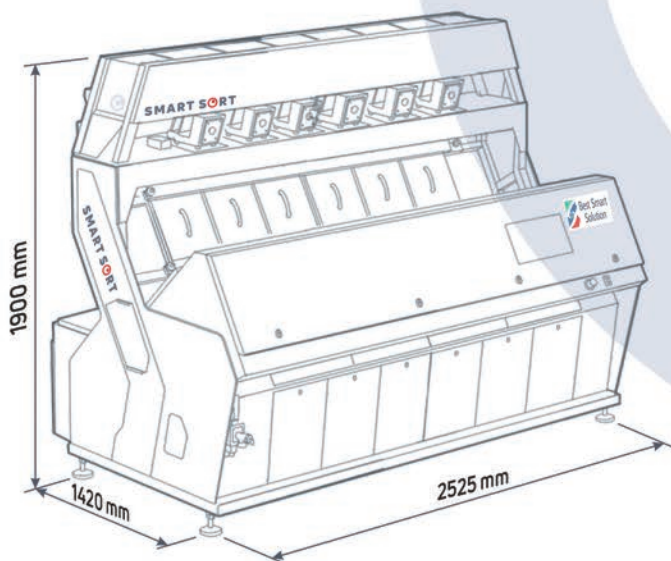


3 sections

SMART SORT (4-6)

Multiprogram color sorter

Parameters: Smart AI mode,
CSort Cloud, Ultrapowerful
lighting Extralight – optional



Cleanliness coefficient, %, min.*	99.5
CCD-matrix resolution (per chute), pixel	5400
Power, V / Hz	230 / 50
Air pressure, MPa	from 0.6 to 0.8
Air purity according to GOST 17433, ISO 8573-1:	• particles 1 • humidity 4 • oil 1
Maximum air consumption (at 0.6 MPa), m³/h	960
Air consumption for the aspiration, m³/h, max.:	• standard aspiration 3700 • with additional aspiration nozzles on chutes 6100
Electric shock protection class according to GOST IEC 61140-2012	I
Degree of protection provided by enclosures according to GOST 14254	IP54
Ambient temperature, °C	from 5 to 40
Relative air humidity at the temperature of 25 °C, %	from 20 to 80
Noise level at the work site, dBA, max.	90

* With the initial content of foreign materials of 2% or less and the volume weight of the product of 0.750 t/m³

	4 section	5 section	6 section
Number of channels	216	270	324
Production capacity (for wheat), tons per hour*	28	35	42
Nominal power, kW	3.0	3.3	3.5
Air consumption for the technical process (wheat), m³/h, max.*	160	200	240
Weight, kg, max.	1000	1050	1100



4 sections



5 sections

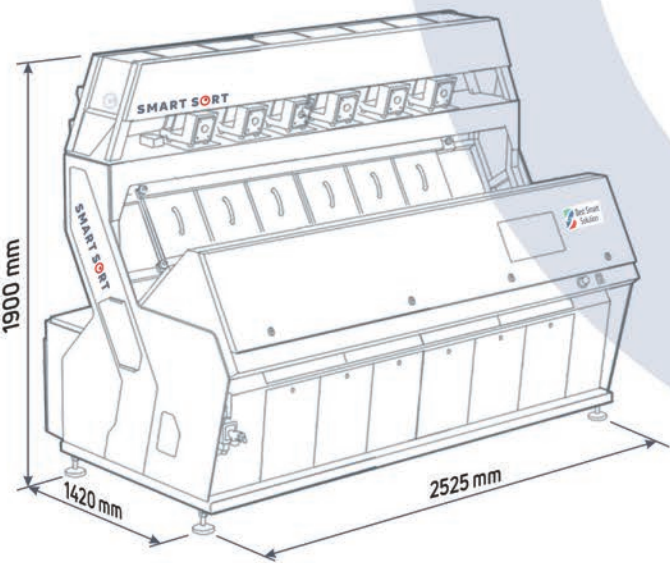


6 sections

SMART SORT 6 (C+C)

Rice color sorter

Parameters: Smart AI Rice mode,
CSort Cloud, chute warming,
one front and one rare RGB cameras



Cleanliness coefficient, %, min.*	99.5
CCD-matrix resolution (per chute), pixel	5400
Power, V / Hz	230 / 50
Air pressure, MPa	from 0.6 to 0.8
Air purity according to GOST 17433, ISO 8573-1:	• particles 1 • humidity 4 • oil 1
Maximum air consumption (at 0.6 MPa), m³/h	960
Air consumption for the aspiration, m³/h, max.:	• standard aspiration 3700 • with additional aspiration nozzles on chutes 6100
Electric shock protection class according to GOST IEC 61140-2012	I
Degree of protection provided by enclosures according to GOST 14254	IP54
Ambient temperature, °C	from 5 to 40
Relative air humidity at the temperature of 25 °C, %	from 20 to 80
Noise level at the work site, dBA, max.	90

* With the initial content of foreign materials of 2% or less and the volume weight of the product of 0.750 t/m³



Basmati rice



Japanese rice



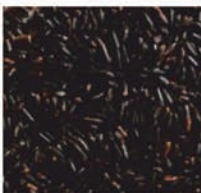
Glutinous rice



Brown rice



Red rice



Black rice



Steamed rice



Organic rice

Number of channels	324
Production capacity (for wheat), tons per hour*	42
Nominal power, kW	3.5
Air consumption for the technical process (wheat), m³/h, max.*	240
Weight, kg, max.	1100



6 sections



Accepted product



Rejected product

Striped sunflower seeds with sticks and small contaminants

Color and shape sorting



Short sunflower seeds, kernels



Sticks



Small contaminants



Accepted product



Rejected product

Sunflower seeds with sclerotium and other contaminants

Color and shape sorting



Sclerotium



Sticks,



hull



Kernels



Accepted product



Rejected product

Sunflower seeds with sticks

Shape sorting



Sticks,



Accepted product



Rejected product

Coriander with difficult contaminants

Color and shape sorting



Wild buckwheat



Sprouted coriander



Half seeds



Wheat



Accepted product



Rejected product

Pea with damaged grains

Shape sorting



Damaged pea grains

Buckwheat with wheat

Color and shape sorting



Accepted product



Rejected product

Pea with wheat

Shape sorting



Accepted product



Rejected product

Rye with ergot, buckwheat

Color and shape sorting



Accepted product



Rejected product

Flax with sticks

Color and shape sorting



Accepted product



Rejected product



AASHATHA VILLAGE , BLOCK NO.44, OPP. JOYTI CNC, NR. METODA GIDC, GATE NO.3, KALAWADA ROAD, RAJKOT(INDIA)

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