

T R O P H Y

DATASHEET

NPK FERTILIZERS FACTORY
with precision mixing
of components



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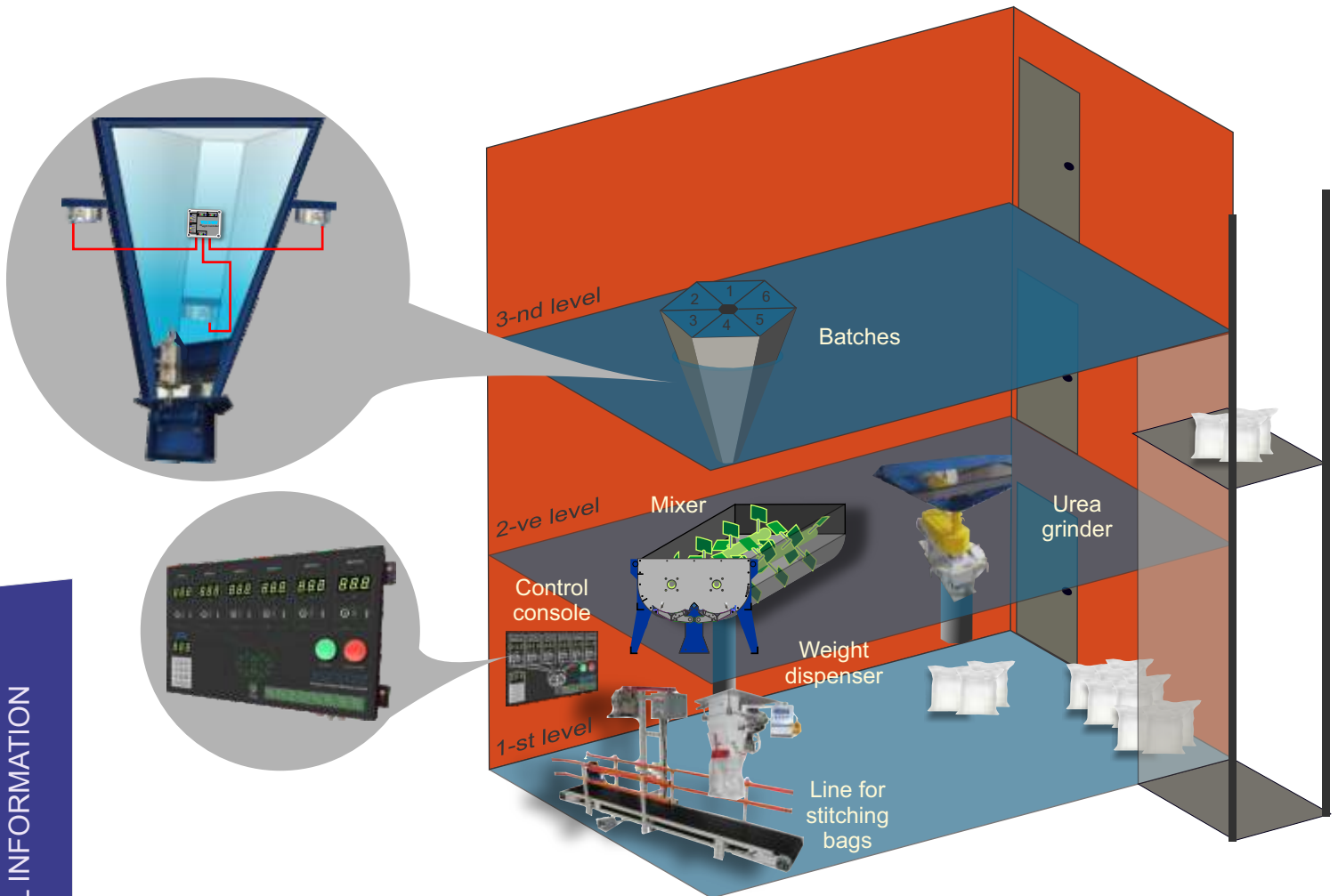
GENERAL INFORMATION

The production line of the factory has a vertical arrangement of the main units.

The equipment is located on three levels:

- 1st level. Weight dispenser and line for sewing bags. Packaging equipment of finished products. Dispensing area for grinded urea.
- 2nd level. Mixer and grinder of urea.
- 3rd level. 6 hoppers for loading of raw materials.

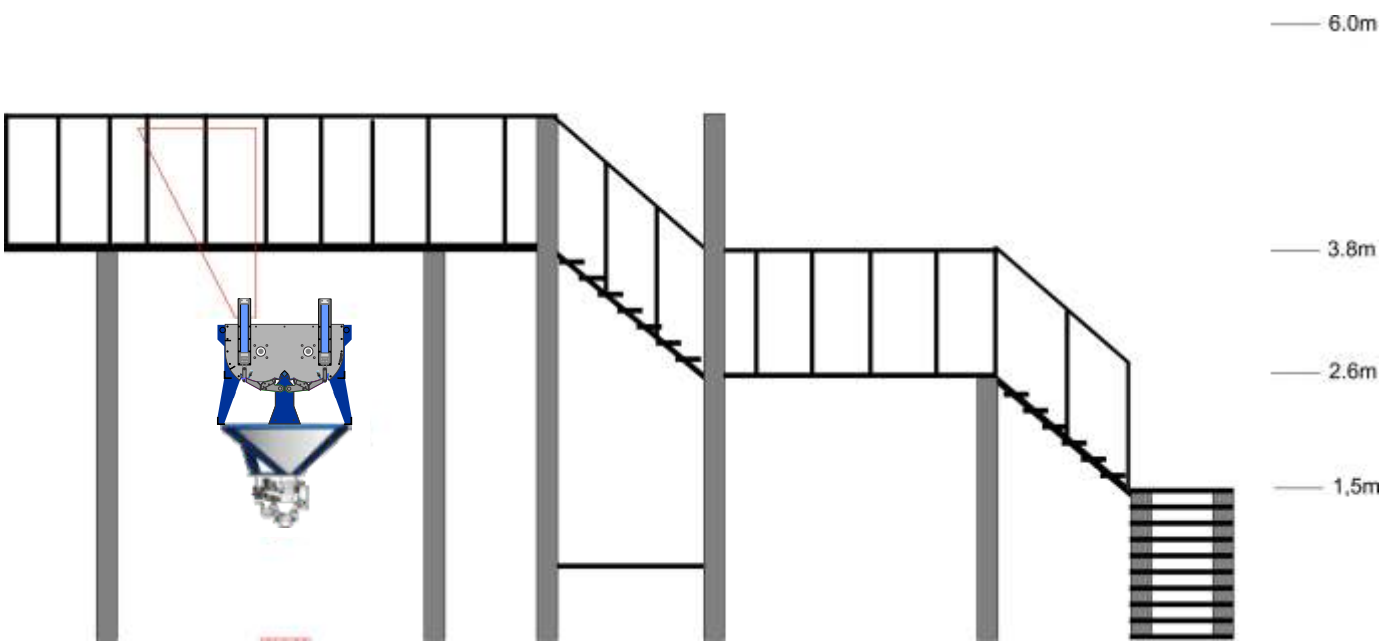
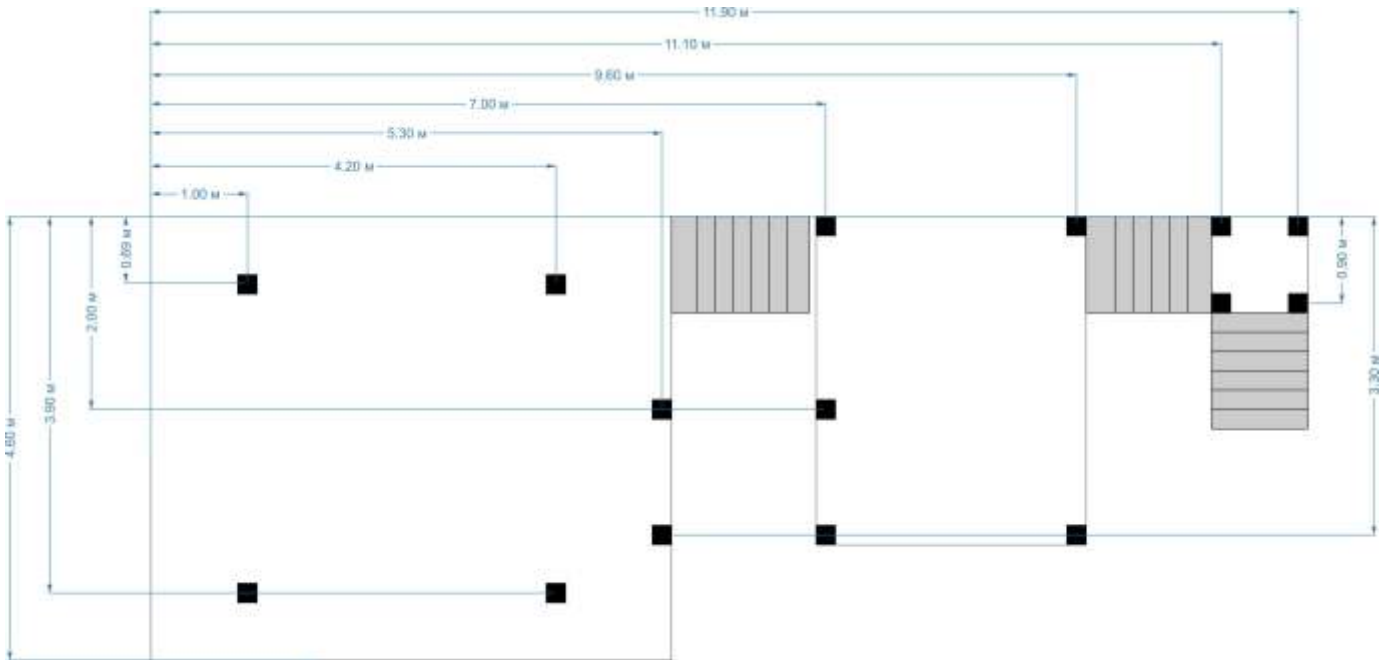
A freight elevator rises to all floors. In addition, the staff has the ability to climb by the stairs. The height of each level is 2 ... 2.5 meters. Factory premises equipped with ventilation and air



GENERAL INFORMATION

FACTORY ROOM DIMENSIONS

All equipment occupies an area of no more than 60 sq. m. not including premises for storing raw materials and finished products.



GENERAL INFORMATION

CENTRAL PROCESSOR UNIT

All modules of the factory are controlled by the central processor which is located in the Control Panel. The information input buttons serve as an interface between the operator and the processor. The running line of the indicator displays all production processes.

CONTROL CONSOLE

The Control Console allows you to control the main processes of production from one point. The Control Console is located on the ground floor of the production area and is attached to a wall. The enclosure of the Console is made of steel which ensures the survivability of the device in industrial conditions. Data from sensors and device control signals are fed to Control Console via wires using the CAN protocol.

EXECUTIVE DEVICES

Due to the fact that some materials may have an increased level of explosive and fire hazard all executive devices of the factory are pneumatically driven. Control signals from the Central Processor go to the pneumatic valves and the compressed air controls the pneumatic cylinders of the actuators. The exception is connection of controllers with weight sensors of the batches. In this case, low-current electric line used. The short-circuit current of the line is limited to a few milliamperes to eliminate the formation of a spark in the event of a short circuit.

HOPPERS

Raw material hoppers are made of stainless steel. 6 hoppers are assembled into a compact figure with an upper hexagon. The volume of each hopper is 0.5 cubic meters. To avoid erroneous filling of the hopper with the wrong raw material it is possible to equip the top covers of the hoppers with pneumatic locks. Upon receipt of raw materials in the warehouse only one hopper lid will be opened. This way boot errors will be eliminated. Each hopper is mounted on three weight sensors.

MIXER

FZM-200 Twin Shaft Fluidized Zone 200L Mixer is installed under the hoppers with raw materials. Mixer made of stainless steel. Highly efficient mixing is produced by creating a weightless vortex, thanks to which the products in the fluidized zone acquires parameters that meet international standards. Fluidized zone created in the mixer provides complete freedom of movement of raw materials which allow sparticles freely move and saturate.

UREA GRINDER

NPK water-soluble fertilizers use grinded urea. Urea is crushed to a fraction of small crystals in a special grinder before being fed to the hopper with raw material. The size of the crystals can be changed by adjusting the rotational speed of the grinder drum.

PACKING LINE FOR FINISHED PRODUCTS AND SEWING OF BAGS

The weight dispenser automatically weights a predetermined dose of the finished product. At the same time the digital display indicates the mass of the dosed material with a cumulative total of the total number of doses. The sewing line sews up filled fabric, paper or polypropylene bags that are moved along the conveyor.

SECURITY MEASURES

The equipment may be operated by service personnel who have studied device and principle of operation of equipment and its components, passed the course training in safety rules in force at the facility.

All devices and equipment must be reliably grounded using shunt wires.

Removal of covers and disassembly of blocks should be done only with power off.

Work on installation, operation, maintenance and repair of factory equipment must be made in accordance with the "Rules for the technical operation of electrical installations consumers" and "Safety regulations for the operation of electrical installations consumers up to 1000 V".

MAINTENANCE

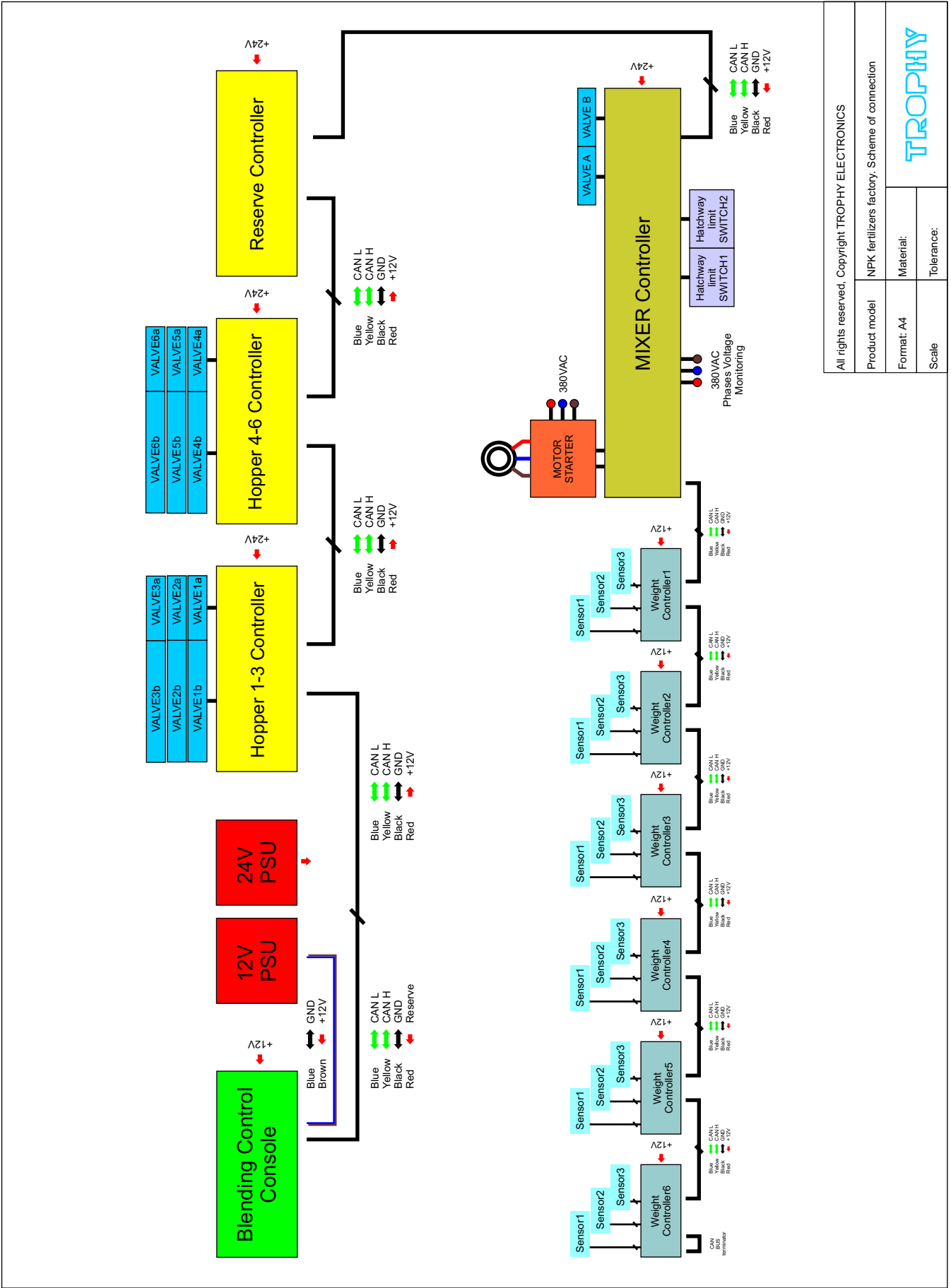
Maintenance of the plant's equipment consists in cleaning the neck of the weighting dispesers from the remnants of the dosed material before starting work, periodically cleaning all units and parts from dust, checking the strength and correctness of fastening of units and parts.

Wet cleaning of the equipment is prohibited!

In the process of equipment maintenance it is necessary to check: the absence of breaks or damage to the communication lines and the grounding of the units.

Perform daily visual inspection of the condition of flexible hoses and butt joints as well as monitor the pressure.

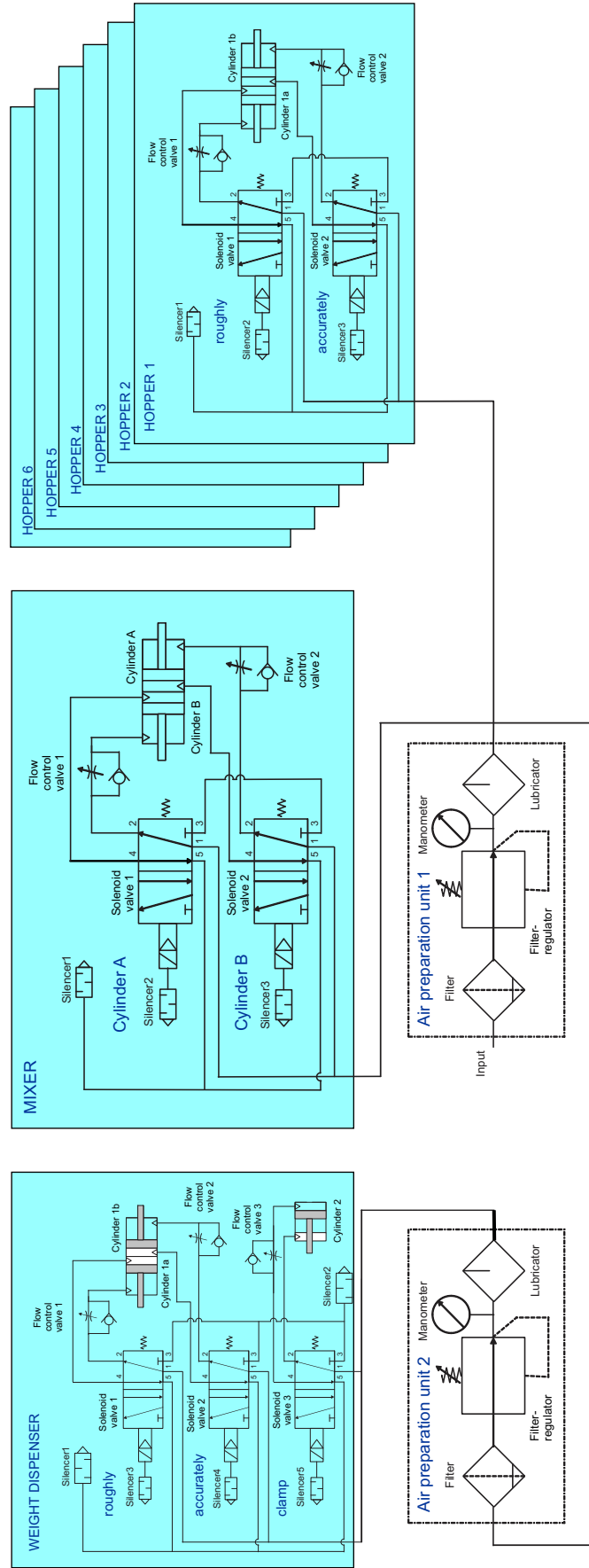
Regularly check the condition, clean or replace the filter element in the filter regulator and remove condensation.



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Product model	NPK fertilizers factory. Scheme of connection		
Format: A4	Material:		
Scale	Tolerance:		

TROPHY



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Product model NPK fertilizers factory. Pneumatic scheme

Format: A4

Material:

Scale:



PRECISION FERTILIZER BLENDING CONTROL CONSOLE

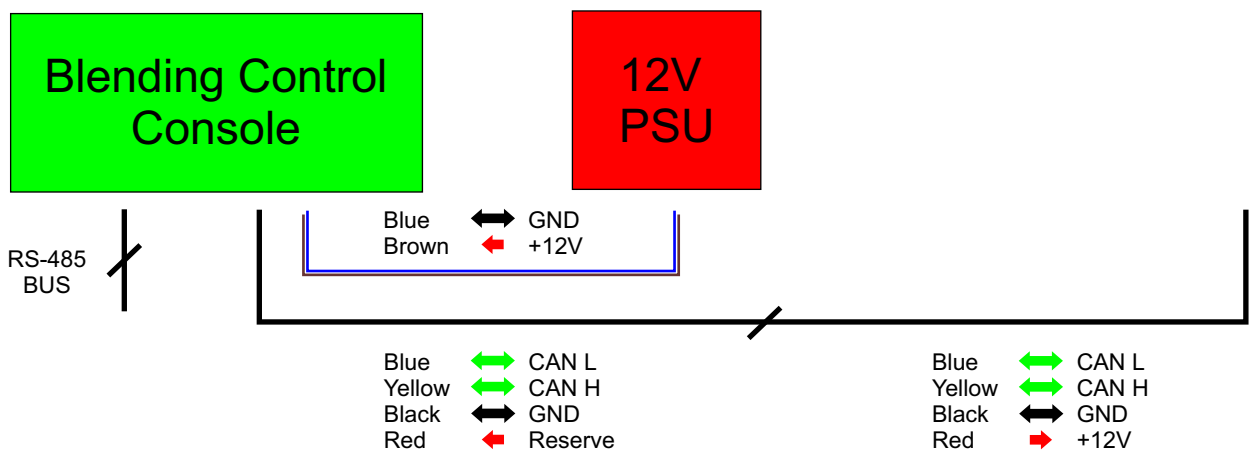
All units of the factory will be controlled by the Processor located in the Control Console. Due to the fact that production has an increased level of explosion and fire hazard all actuators must have a pneumatic drive. Control signals from the Console will go to the pneumatic valves and the compressed air through the tubes will control the pneumatic cylinders of the executing devices.

Control Console sends commands to Controllers and receives data from Controllers via CAN-bus.

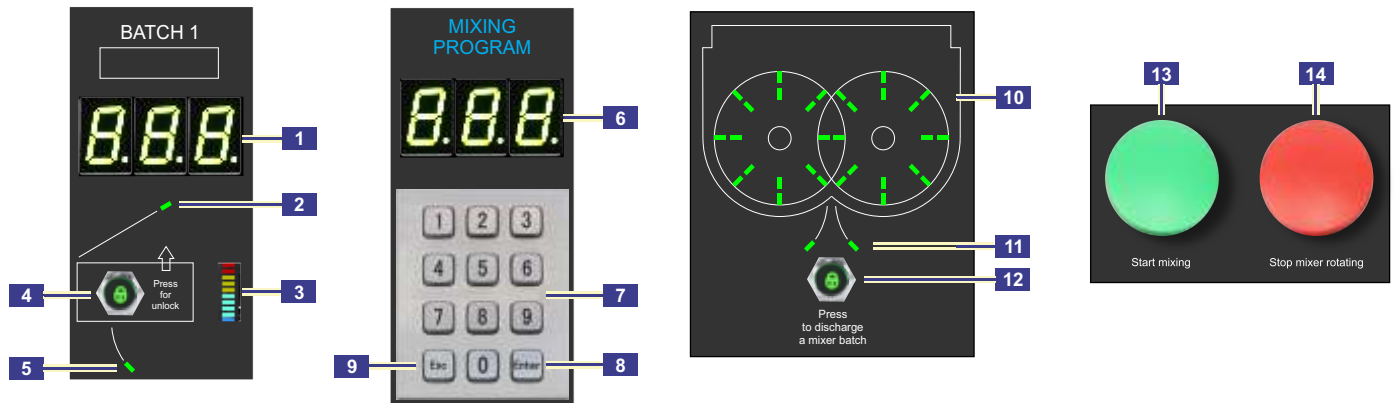
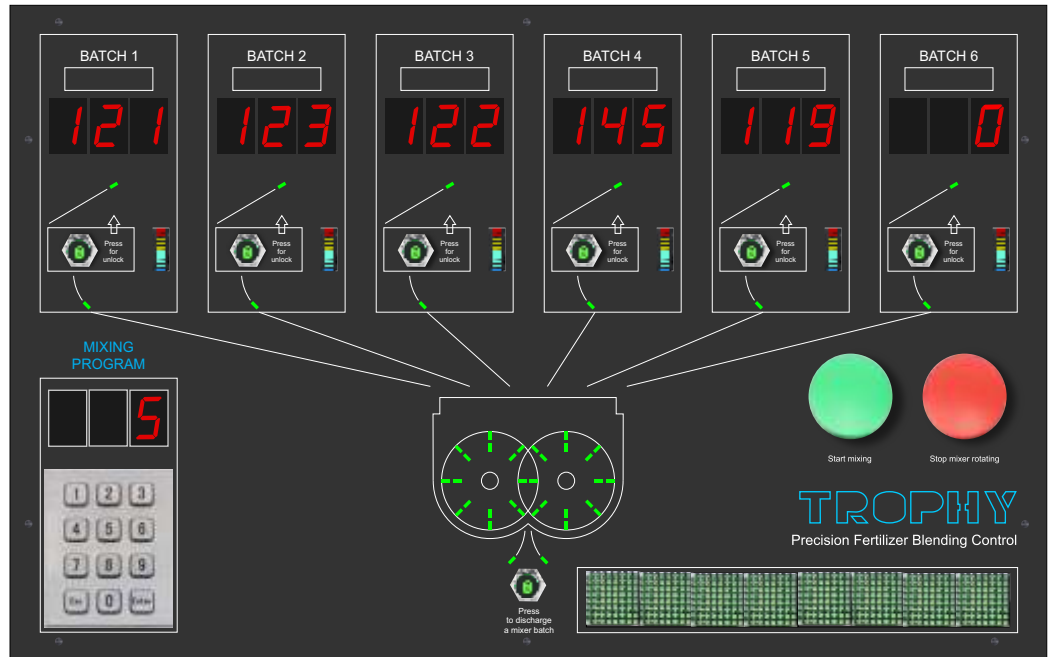


Main functions:

- control of loading raw materials (up to six types of raw materials);
- indication of the current weight of each type of raw material;
- selection of a fertilizer production program (so-called fertilizer formula);
- command to unload the finished fertilizer into the hopper of the packing line;
- emergency stop of processes;
- indication of current operations;
- issuing error messages.



FUNCTIONAL ELEMENTS



- 1 3 Display of the current net weight of raw materials in the hoppers
- 2 Hopper open lid LED (optional)
- 4 Hopper lid open button (optional)
- 5 Hopper dispenser open flap LED
- 6 Indication of the number of the current program (formula)
- 7 Program Dialing Buttons
- 8 Storing a program number
- 9 Reset button for wrongly dialed program number
- 10 Mixer paddles rotation LEDs
- 11 Mixer hatch opening LED
- 12 Mixer hatch open / close button
- 13 Submitting the program start command
- 14 Submitting a command to stop the rotation of the mixer paddles.
Press the START MIXING button to resume mixer operation

CONTROL CONSOLE

ALGORITHM OF WORK

First of all, load the Hoppers with raw materials. Recommended correspondence of Hopper numbers and raw material designation:

- Hopper 1 - grinded urea;
- Hopper 2 - Monoammonium Phosphate (MAP);
- Hopper 3 - potassium sulfate (SOP);
- Hopper 4 - calcium nitrate;
- Hopper 5 - Monopotassium phosphate (MKP);
- Hopper 6 - ammonium sulfate.

The numbering of the bunkers you have chosen should not change during the operation of the plant!

Control Console indicators will show the current weight of raw materials in each of the Hoppers.

Create mixing programs for the fertilizer formulas you intend to produce.

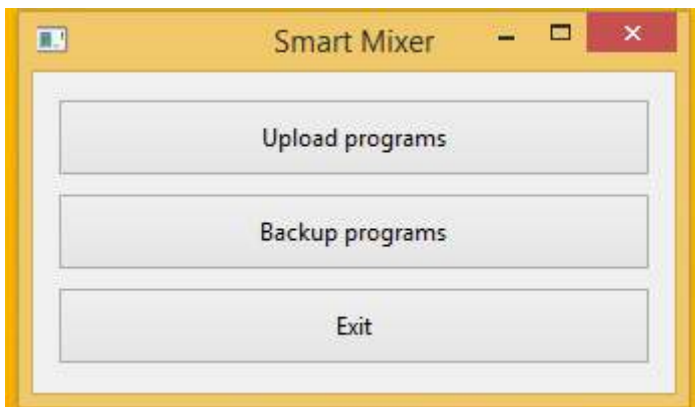
Mixing program structure:

<i>Parameter</i>	<i>Value</i>
Program number Program numbers must not be repeated. In case of duplicate number the old program is removed and replaced.	1-999
Mixing duration, seconds	1-9999
Whether a pause is required for the put of trace elements before mixing	Yes / No
Component weight from Hopper1, kg	1-500
Component weight from Hopper2, kg	1-500
Component weight from Hopper3, kg	1-500
Component weight from Hopper4, kg	1-500
Component weight from Hopper5, kg	1-500
Component weight from Hopper6, kg	1-500

The mixing programs are in the form of Excel spreadsheets. You can use the **programs.xlsx** template to write your own formulas/PRGs (download from <http://mixer.ge/?product=control-console>).

	A	B	C	D	E	F	G	H	I	J
1	PRG No	Comp 1	Comp 2	Comp 3	Comp 4	Comp 5	Comp 6	Pause	Mix time, sec	
2	4	99	100	14	15	16	0		60	
3	5	99	101	14	15	16	0		60	
4	6	98	102	14	15	16	0	Pause	60	
5	7	97	103	14	22	23	0	Pause	60	
6	55	77	104	14	15	16	0		60	
7										
8										

Install **ProgCtrl.exe** program to your laptop (download from <http://mixer.ge/?product=control-console>). Connect laptop to the Control Console via RS-485 bus using USB / RS485 adapter. Control Console equipped by Micro USB connector for Virtual COM-port interface. The protocol specification is CDC (Communication Device Class).



Upload programs

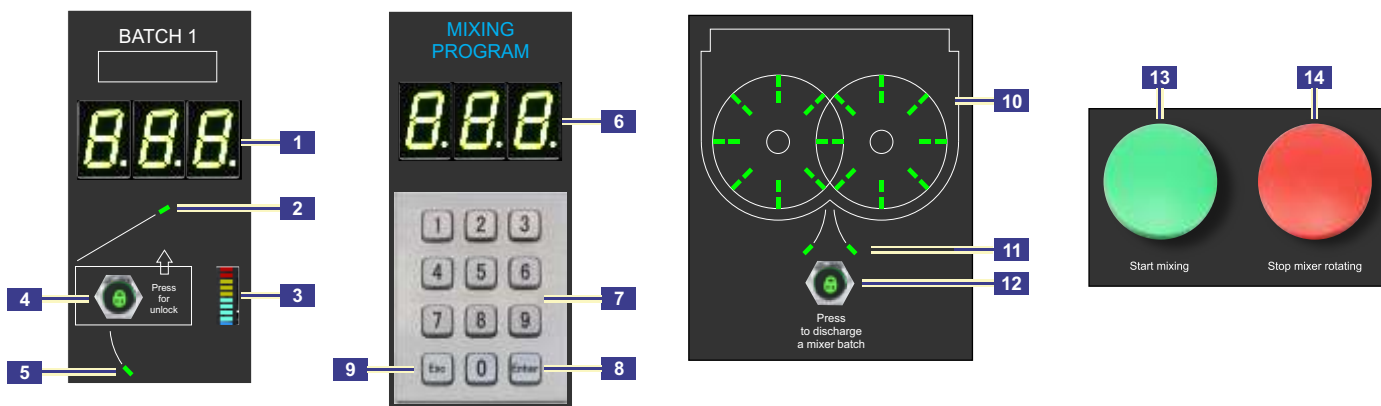
Uploading a file with mixing formulas to the Control Console

Backup programs

Saving a backup copy of a file with mixing formulas from the Control Console

Exit

Exiting the program



Once you have created the mixing programs proceed with the production of the required fertilizer formula:

- Enter the mixing program number using the **7** buttons on the Control Console keypad;
- Store the program number by pressing **8** button;
- Close the lower mixer hatches by pressing button **12**;
- Please note that when the hatches are open further operation of the mixing program will be blocked;
- Press the green **START MIXING** button;
- The equipment will immediately start executing the program you have chosen, namely:
 - dispensers located in each of the Hoppers will start pouring the required number of components into the mixer;
 - after the end of the mixer filling procedure, the rotation of the mixer blades will automatically turn on. If you have applied a delay to turn on the mixer for adding trace elements in the program then press the green **START MIXING** button again after adding trace elements;
 - the rotation will stop after the expiration of the period set by the program.
- Open the lower mixer hatches by pressing button **12**. After the hatches are fully opened the rotation of the mixer blades will turn on for 5 seconds;
- The mixer hatches will remain open until the next push of the button **12**.

EMERGENCY SHUTDOWN OF THE PROGRAM

- You can stop the rotation of the mixer blades by pressing the red button **14**;
- In this case the work of the program is suspended and can be resumed only when you press green button **13**;
- In the absence of one of the 380 V supply phases the mixer motor is switched off. After eliminating the power phase failure press the green button **13**;
- In the event of a power failure of the Mixer Controller or the Control Console the program stops and the current parameters are saved in the internal flash memory of the Control Console.
- Press the green button **13** after eliminating the power failure.

MESSAGES ABOUT THE OPERATION OF THE PROGRAM AND ERRORS

Information about errors and stages of the mixing program is displayed in the form of a creeping line on the indicator of the Control Console.

Control Console Message List:

Messege	Probable cause	Remedy
"Powering On ..."	System boot process	
"Ready ..."	The console is ready for use	
"Started"	Beginning of the filling and mixing process	
"Paused ..."	Mixing program was paused	
"Loading components" "Loading timeout"	Loading materials from Hoppers The weight of the loaded material does not change during the set time.	The hopper metering flap does not open or there is an obstruction to the passage of material into the dispenser. Press the START button again after fixing the problem
"Press START to mixing"	Press the START button to start the filling and mixing process	
"Mixing * sec"	Mixing for *** seconds	
"Mixing complete"	Mixing process completed	
"Mixer not empty"	There is still material in the mixer	Unload material from mixer at the push of a PRESS TO DISCHARGE A MIXER BATCH button
"Program terminated"	Program terminated	
"Mixer door opened"	The mixer doors are open	Close the mixer hatches by pressing the PRESS TO DISCHARGE A MIXER BATCH button
"Mixer door failure!"	The hatch did not close within 5 seconds after command	Check the functionality of the pneumatic cylinders and the limit switches
"Mains phase failure!"	Lack of voltage on a phase or phases of the mixer motor	Ensure the correct power supply

Messege	Probable cause	Remedy
"Controller timeout!"	There is no connection with one of the system Controllers	Check the communication lines between the Control Console and Controllers. Check supply voltage +12V of Controllers
"Bunker * scale error!"	Hopper No* weight sensor is defective	Check the integrity of the communication lines between the Weight Controller and all three Weight Sensors. Replace defective Weight Sensor
"Scales timeout"	Information from the Weight Controller did not arrive at the Control Console within the specified time	Check the communication lines between the console and controllers. Check the + 12V supply voltage of the controllers.
"CAN Bus failure!"	Line break or short circuit in the communication line.	Check the integrity of the wires and the connection of the contacts
"System recovery failed."	Emergency situation in case of power off at a critical moment in the program	To continue working you must unload the material from the mixer by pressing the PRESS TO DISCHARGE A MIXER BATCH button
"Invalid program number: *"	There is no program No* in the programs.xlsx file	Enter the correct program number
"Insufficient component **"	Insufficient component in the Hopper No* to carry out the mixing program	
"Program not completed"	Program not completed after power failure	Press the START button to finish the program
"Mains power restored"	Phases voltage on motor was restored	
"Locked!"	Attempting to open the mixer hatches during the mixing process	
"System recovered"	System recovered from a power failure	Press the START button again to continue the program

ALGORITHM OF HOPPER DISPENSERS WORK

Pressing the Control Console START MIXING button starts the procedure of loading the mixer with materials from the hoppers. The weight of materials is indicated in the **programs.xlsx** file.

	A	B	C	D	E	F	G	H	I	J
1	PRG No	Comp 1	Comp 2	Comp 3	Comp 4	Comp 5	Comp 6	Pause	Mix time, sec	
2	4	99	100	14	15	16	0		60	
3	5	99	101	14	15	16	0		60	
4	6	98	102	14	15	16	0	Pause	60	
5	7	97	103	14	22	23	0	Pause	60	
6	55	77	104	14	15	16	0		60	
7										
8										

For example, the mixing program of formula No.4 will be executed.

The Mixer should receive:

- 99 kg of Component 1
- 100 kg of Component 2
- 14 kg of Component 3
- 15 kg of Component 4
- 16 kg of Component 5
- 0 kg of Component 6

The process of feeding components from Hoppers to the Mixer consists of three stages:

Stage 1

The dispenser opens completely (ROUGHLY mode) and the components are fed until the weight reaches 5 kg (Stage 2 threshold value) less than the required weight.

The Mixer filling program stops if the weight of any opened dispenser does not decrease within 4.5 seconds (Load timeout value). This means that there is an obstruction to the flow of material into the dispenser. Fix this problem and press the START MIXER button. The program will continue the process of filling the Mixer.

Stage 2

The dispenser opens partially (ACCURATELY mode) and several open / close cycles occur until the weight reaches a value 1 kg (Stage 3 threshold value) less than the required one.

The dispenser flap opens for 2 seconds (Stage 2 impulse) and closes for 3.5 seconds (Measure time). The process is repeated until the required weight is reached.

The Mixer filling program stops if the weight of any opened dispenser does not decrease within several cycles. This means that there is an obstruction to the flow of material into the dispenser. Fix this problem and press the START MIXER button. The program will continue the process of filling the Mixer.

Stage 3

The dispenser opens partially (ACCURATELY mode) and several open/close cycles occur until the weight reaches the required one.

The dispenser flap opens for 1 seconds (Stage 3 impulse) and closes for 3.5 seconds (Measure time). The process is repeated until the required weight is reached.

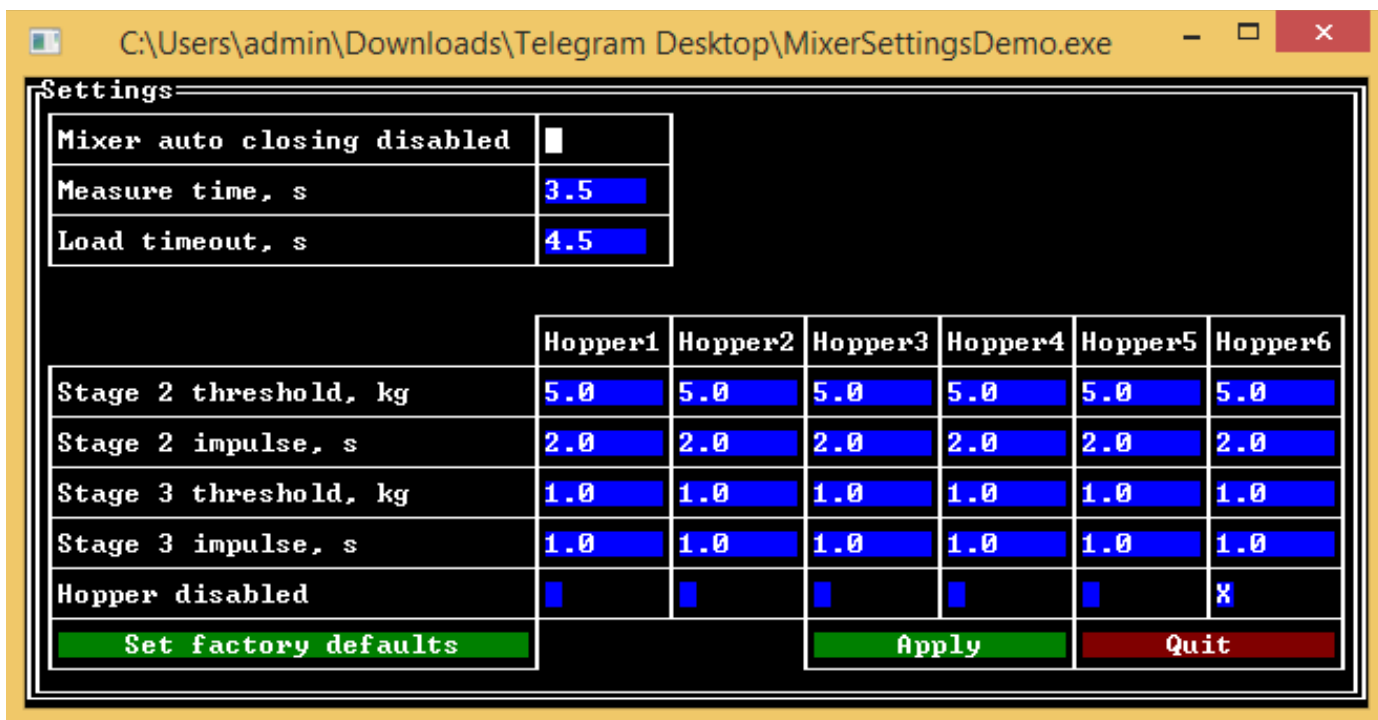
The Mixer filling program stops if the weight of any opened dispenser does not decrease within several cycles. This means that there is an obstruction to the flow of material into the dispenser. Fix this problem and press the START MIXER button. The program will continue the process of filling the Mixer.

Name of Component	Weight after Stage1	Weight after Stage2	Weight after Stage3
Component 1, kg	94 (5kg threshold)	98 (1kg threshold)	99
Component 2, kg	95 (5kg threshold)	99 (1kg threshold)	100
Component 3, kg	9 (5kg threshold)	13 (1kg threshold)	14
Component 4, kg	10 (5kg threshold)	14 (1kg threshold)	15
Component 5, kg	11 (5kg threshold)	15 (1kg threshold)	16
Component 6, kg	0	0	0

MixerSettings.exe program

You can change the parameter values of Measure time, Load timeout, Stage 2 threshold, Stage 3 threshold, Stage 2 impulse, Stage 3 impulse using the Settings.exe program.

Install MixerSettings.exe program to your laptop (download from <http://mixer.ge/?product=500l-hopper-with-dispenser>).



Mixer auto closing disabled

Disabling the function of automatic closing of the mixer hatches after unloading the finished product. In this case the hatch is closed by pressing the “Press to discharge a mixer batch” button again.

Measure time

The dispenser flap closes for 3.5 seconds in Stage 2 and Stage 3 modes.

Load timeout

The Stage 1 process stops if the weight of any opened dispenser does not decrease within 4.5 seconds

Stage 2 threshold

Components will fed during Stage 1 until the weight reaches 5 kg less than the required weight.

Stage 2 impulse

The dispenser flap opens for 2 seconds in Stage 2 mode.

Stage 3 threshold

Components will fed during Stage 2 until the weight reaches 1 kg less than the required weight.

Stage 3 impulse

The dispenser flap opens for 1 seconds in Stage 3 mode.

Hopper disabled

The hopper is not involved in the production process. Information about the weight of the hopper is not displayed on the Control Console.

Set factory defaults

Use the default parameters

Apply

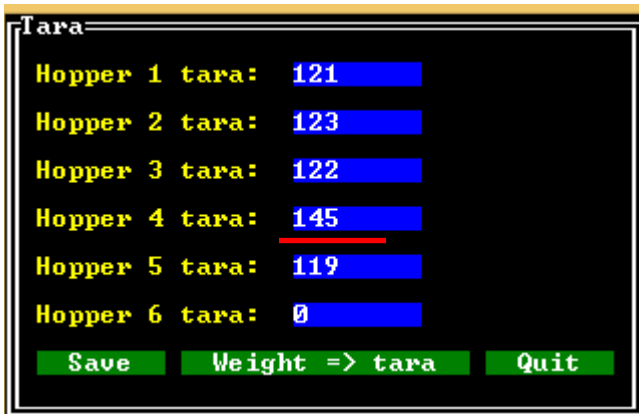
Save a changes

Quit

Quit without saving

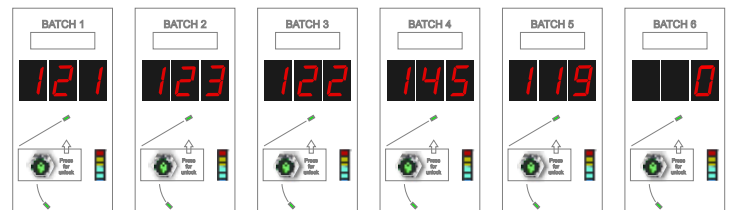
HoppersTara.exe program

Weight sensors measure the total weight of the Hopper and the material that is in the Hopper. It is necessary to zero the readings of all Weight Controllers to display the net weight of each material on the Control Console indicators. You can install zero weight of hoppers using the HoppersTara.exe program.

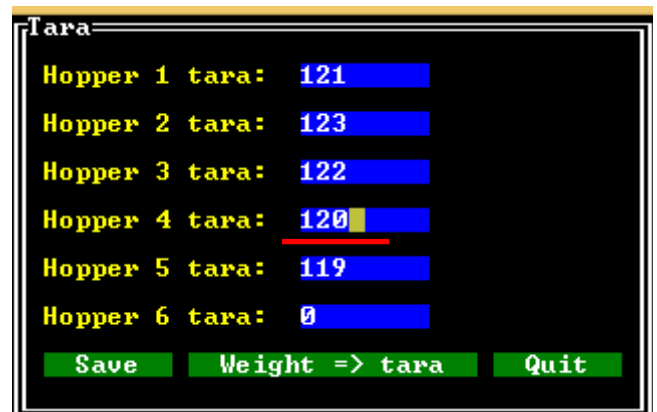


- Weight = tara** You can zero the weight of all hoppers if there is no material in the Hoppers.
- Save** Save the parameters
- Quit** Exit without saving of parameters
- Hopper X tara** It so happened that you poured 25 kg of material into Hopper 4 before zeroing the tare. You have the option to adjust the weight so that after zeroing the Hopper 4 net weight will be 25kg.

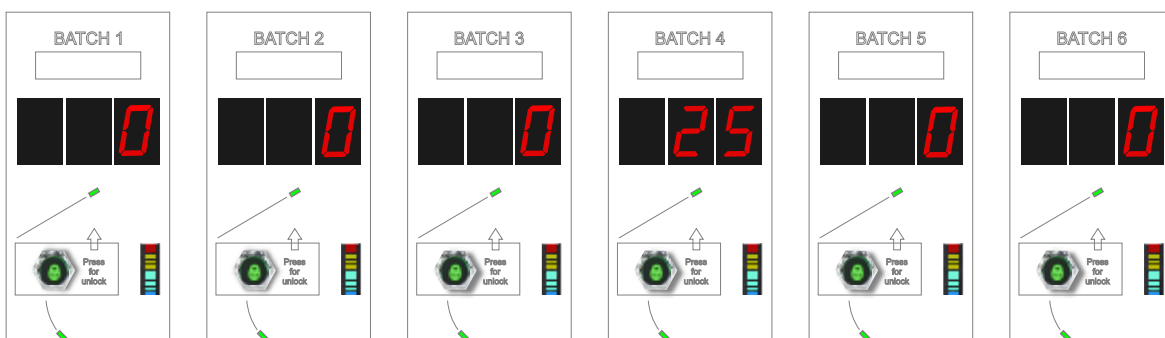
To do this, write down the readings of the weight of all Hoppers on the indicators of the Control Console.



For example, the weight of the Hopper 4 with material is 145kg. Indicate in the program the weight $145 - 25 = 120$ kg for the Hopper 4. For the rest of the Hoppers indicate the same weight as shown on the indicators. Click the SAVE button.



As a result the indicators of Hoppers 1, 2, 3, 5, 6 will indicate 0 and the weight indicator of Hopper 4 will indicate a weight of 25kg.



Console specifications:

<i>Parameter</i>		<i>Volume</i>
Power supply, V		12
Power consumption, W, not more		100
Configuration port connector type		309 MIC 8P male
Control BUS		CAN
Configuration port protocol		RS-485
Dimensions, mm	long wide height	388 668 57
Weight, kg		8
Life time, years		7

FZM-200 TWIN SHAFT FLUIDIZED ZONE 200L MIXER

The mixer interior, shafts and paddles are made of stainless steel. Highly effective mixing is produced by creating a weightless vortex thanks to which the products in the fluidized zone acquire parameters that meet international standards. The fluidized zone created in the mixer provides complete freedom of movement of the raw material which allows the particles to move and saturate freely. All mixer functions are controlled by the Mixer Controller.



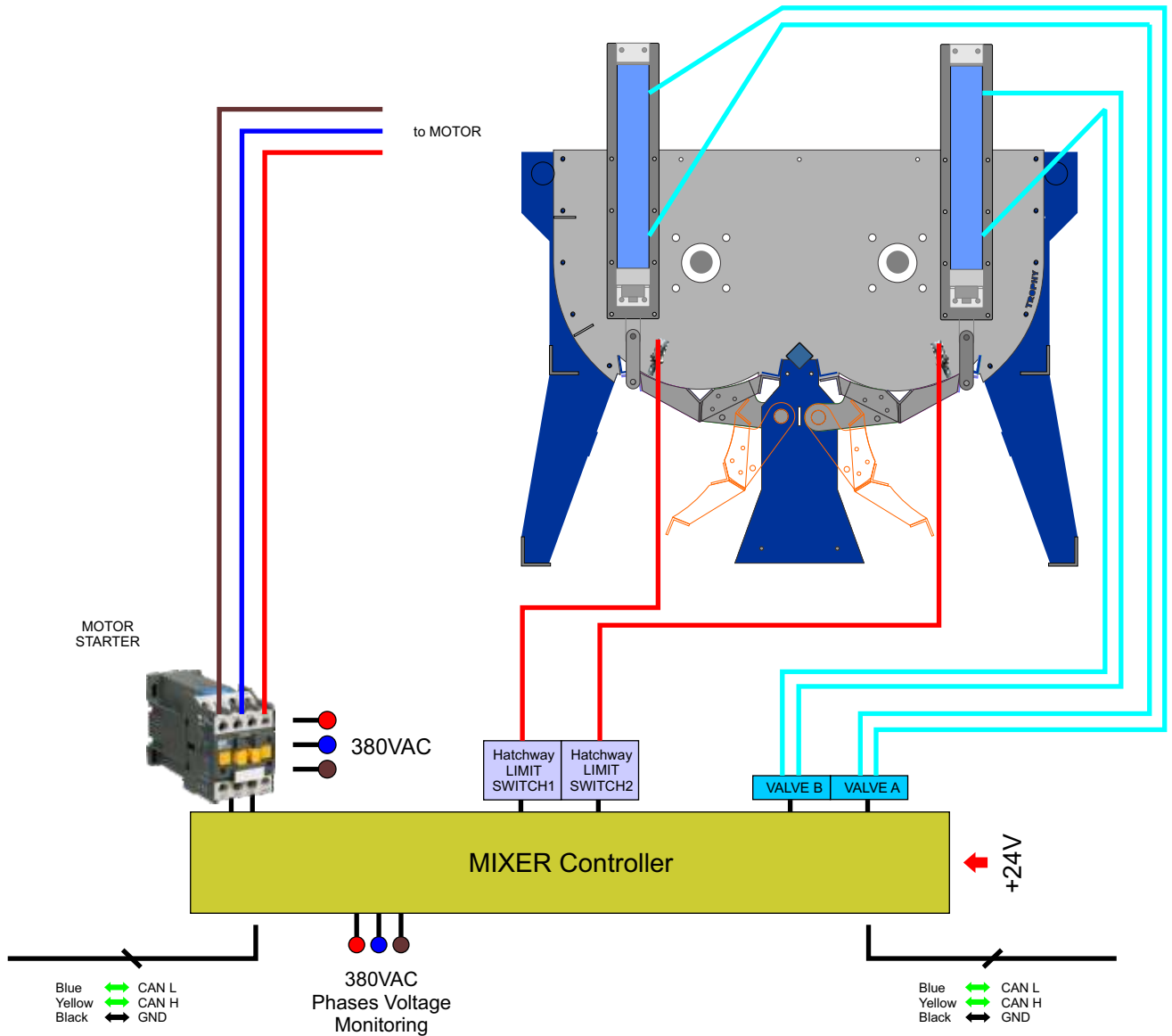
Specifications:

Parameter		Volume
Maximum download volume, l		200
Material of mixer		Stainless steel
Power consumption (3/50/380V), kW		11
Rated motor speed, rpm		1750
Nominal speed of mixer shafts, rpm		36
Shafts diameter (2pcs), inches		2
Paddles posts diameter (28pcs), inches		1
Working diameter of pneumatic cylinders of bottom outlets (2pcs), mm		63
Hatches size (2pcs), mm		360x970
Mixer dimensions, mm	long	1640
	wide	1430
	height	1200
Size of big paddles (24pcs), mm	thick	142
	wide	190
Size of small paddles (4pcs), mm	thick	142
	wide	154
Weight, kg		250
Life time, years		8

MIXER CONTROLLER

The Controller is designed to control the FZM-200 mixer. The Controller receives commands from the Control Panel processor via the CAN-bus and sends control signals to turn on/off the mixer motor and to open/close the bottom hatches.

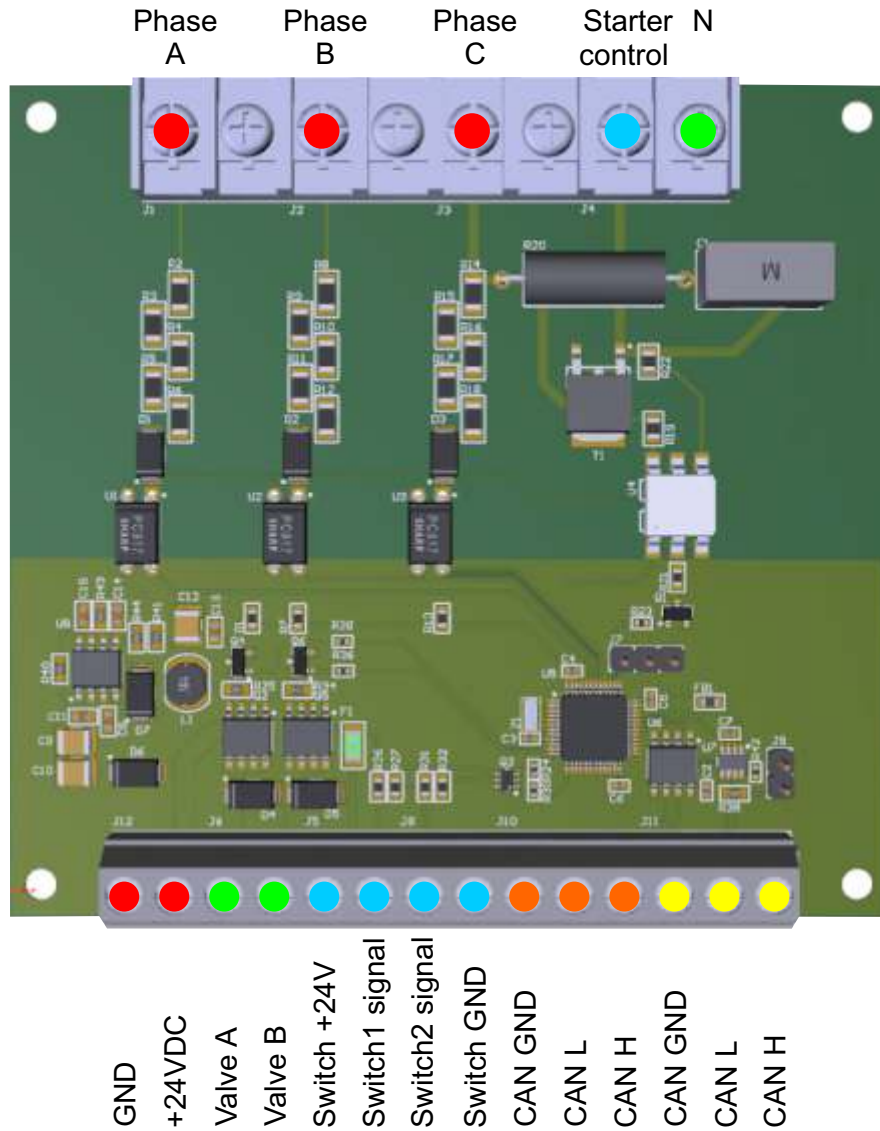
The Controller analyzes the operation of the hatch closing limit switches. In addition, the Controller monitors the voltage of all three phases of the motor supply. In the absence of one of the voltages the motor is switched off.



MIXER CONTROLLER

Connectors

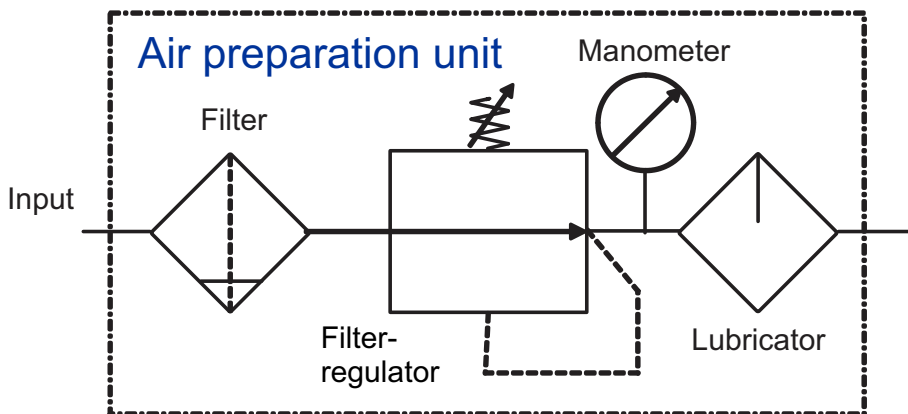
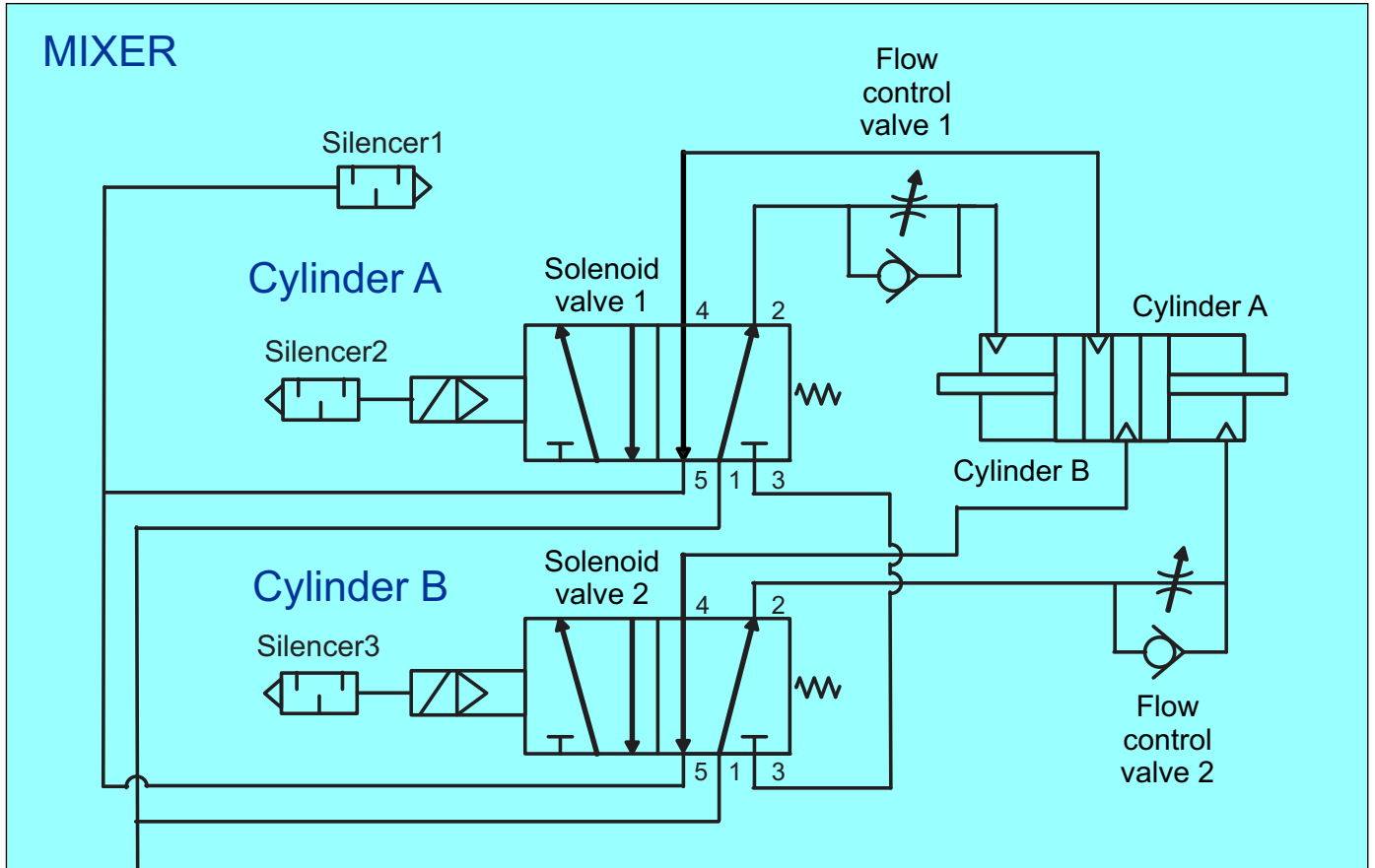
The wires are connected to the Controller using screw connectors.



MIXER CONTROLLER

- | | |
|---|---|
| <ul style="list-style-type: none"> ● PHASE A/B/C and N ● Starter control ● GND ● +24VDC ● Valve A, Valve B ● Switch +24V ● Switch1 and Switch2 signal ● Switch GND ● CAN GND (2) ● CAN L (2) ● CAN H (2) | <ul style="list-style-type: none"> Checking voltages on 3 phases of motor power supply Provides control voltage to the motor starter Common wire Supply voltage of the Controller Control signals for pneumatic cylinders of mixer hatches Supply voltage of mixer limit switches Input signals from mixer limit switches Common wire of mixer limit switches Common CAN-bus CAN-bus signal wire CAN-bus signal wire |
|---|---|

PNEUMATIC SCHEME



MIXER CONTROLLER



MIXER CONTROLLER

The Mixer flow control valves are controlled by Mixer Controller. The pneumatic valves are mounted on a mounting plate equipped with silencers to eliminate or reduce compressed air noise during exhaust. Compressed air is supplied from the mains through the filter-regulator. Pressure control is carried out with a pressure gauge. The air then passes through the lubricator. A filter-regulator with a pressure gauge and a lubricator make up the air preparation unit. Lubrication through an oil spray is optional as the Camozzi products are manufactured with grease. The added lubricant is sufficient for the entire service life of a standard product. If pneumatic elements which usually work without lubrication have worked even for a short time in air with oil then the addition of oil to the air cannot be stopped in the future since the grease will be washed out with air with oil and thinning of the cuffs and seals and product failure may occur. The maximum amount of oil is 1 drop per minute for medium speed machines. An oil with a viscosity of 32 cSt at 40 ° C must be used. The following type of oil is recommended:

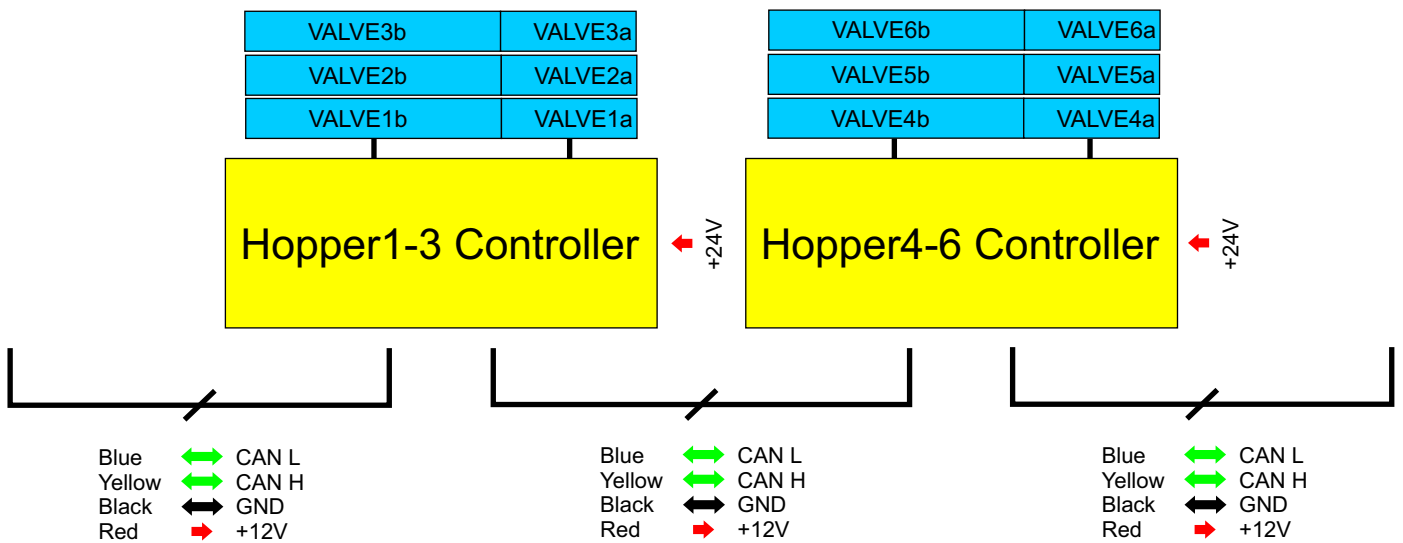
Camozzi supplies RENOLIN ISO VG 32 for pneumatic systems;

Other compatible oil types:

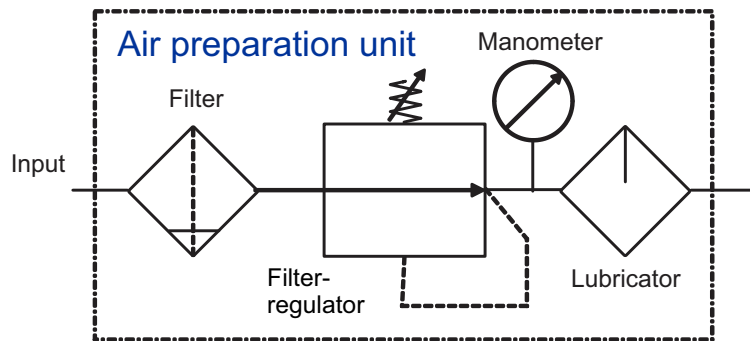
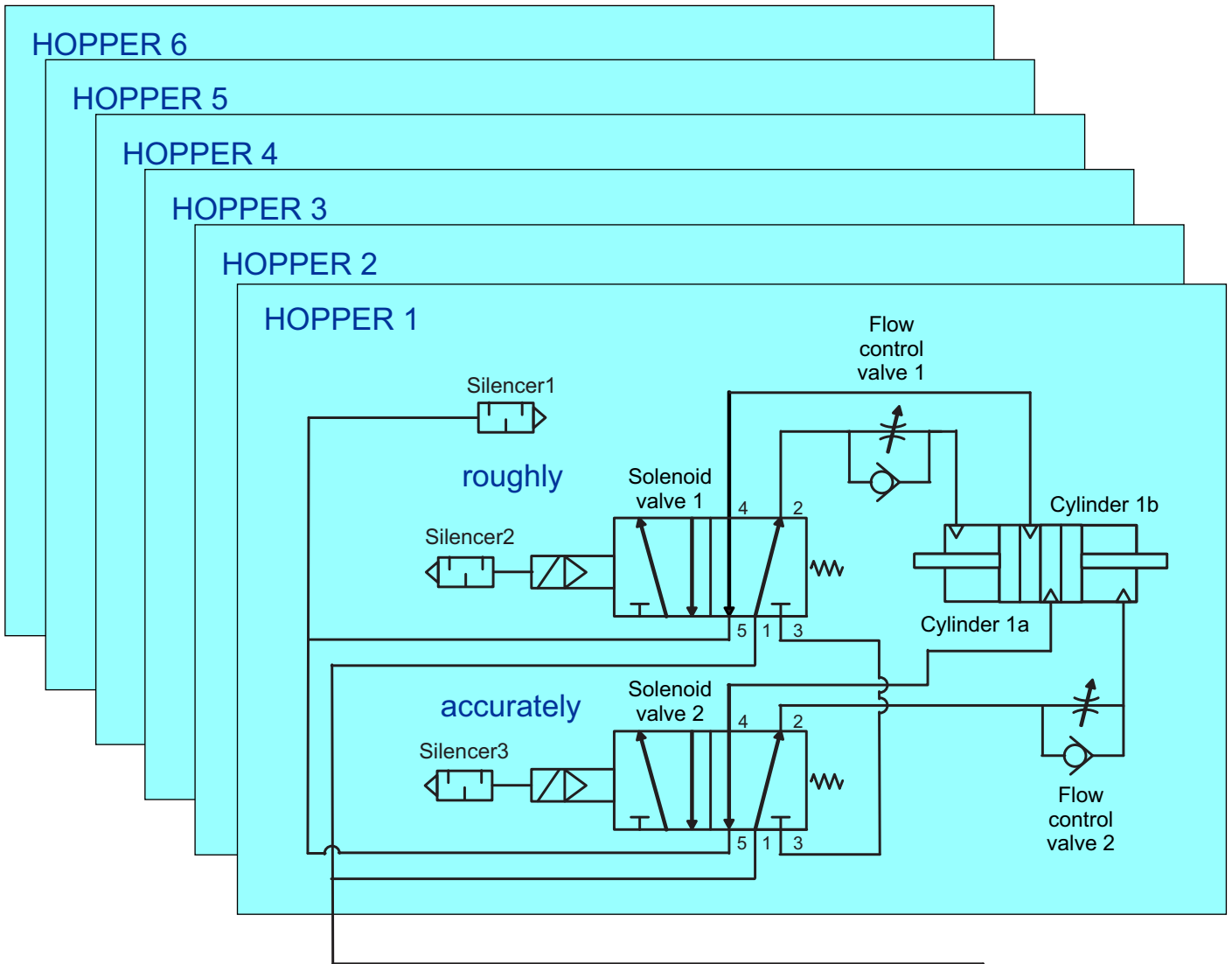
- ARAL Vitam GF 32;
- BP Energol HLP 32;
- Esso Nuto H 32;
- Mobil DTE 24;
- Shell Tellus Oil DO 32.
- Viscosity range: 32 mm²/s (=cSt) at 40 °C; VG 32 according ISO 3448.

HOPPER CONTROLLER

The Controller is designed to control weighing dispensers of 3 hoppers. The Controller receives commands from the central processor via the CAN-bus and sends control signals to the valves of the pneumatic cylinders of the hopper dispensers. Two Controllers operate all six hoppers.



PNEUMATIC SCHEME



HOPPER CONTROLLER

The Hopper flow control valves are controlled by Hopper Controllers. The pneumatic valves are mounted on a mounting plate equipped with silencers to eliminate or reduce compressed air noise during exhaust. Compressed air is supplied from the mains through the filter-regulator. Pressure control is carried out with a pressure gauge. The air then passes through the lubricator. A filter-regulator with a pressure gauge and a lubricator make up the air preparation unit. Lubrication through an oil spray is optional as the Camozzi products are manufactured with grease. The added lubricant is sufficient for the entire service life of a standard product. If pneumatic elements which usually work without lubrication have worked even for a short time in air with oil then the addition of oil to the air cannot be stopped in the future since the grease will be washed out with air with oil and thinning of the cuffs and seals and product failure may occur. The maximum amount of oil is 1 drop per minute for medium speed machines. An oil with a viscosity of 32 cSt at 40 ° C must be used. The following type of oil is recommended:

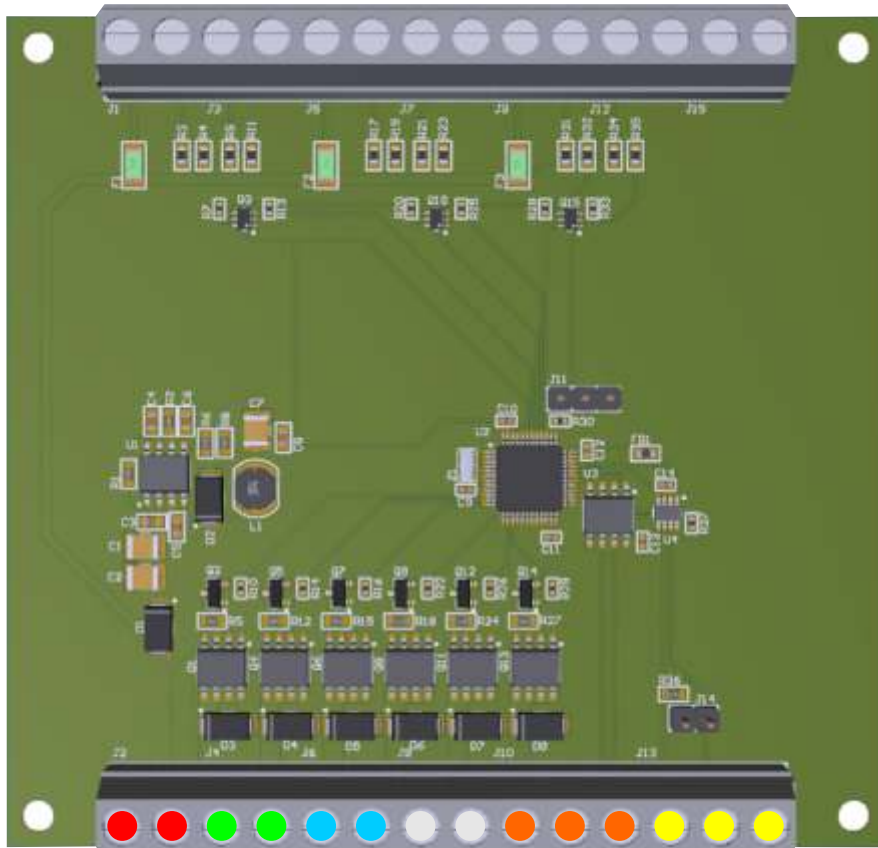
Camozzi supplies RENOLIN ISO VG 32 for pneumatic systems;

Other compatible oil types:

- ARAL Vitam GF 32;
- BP Energol HLP 32;
- Esso Nuto H 32;
- Mobil DTE 24;
- Shell Tellus Oil DO 32.
- Viscosity range: 32 mm²/s (=cSt) at 40 °C; VG 32 according ISO 3448.

Connectors

The wires are connected to the Controller using screw connectors.



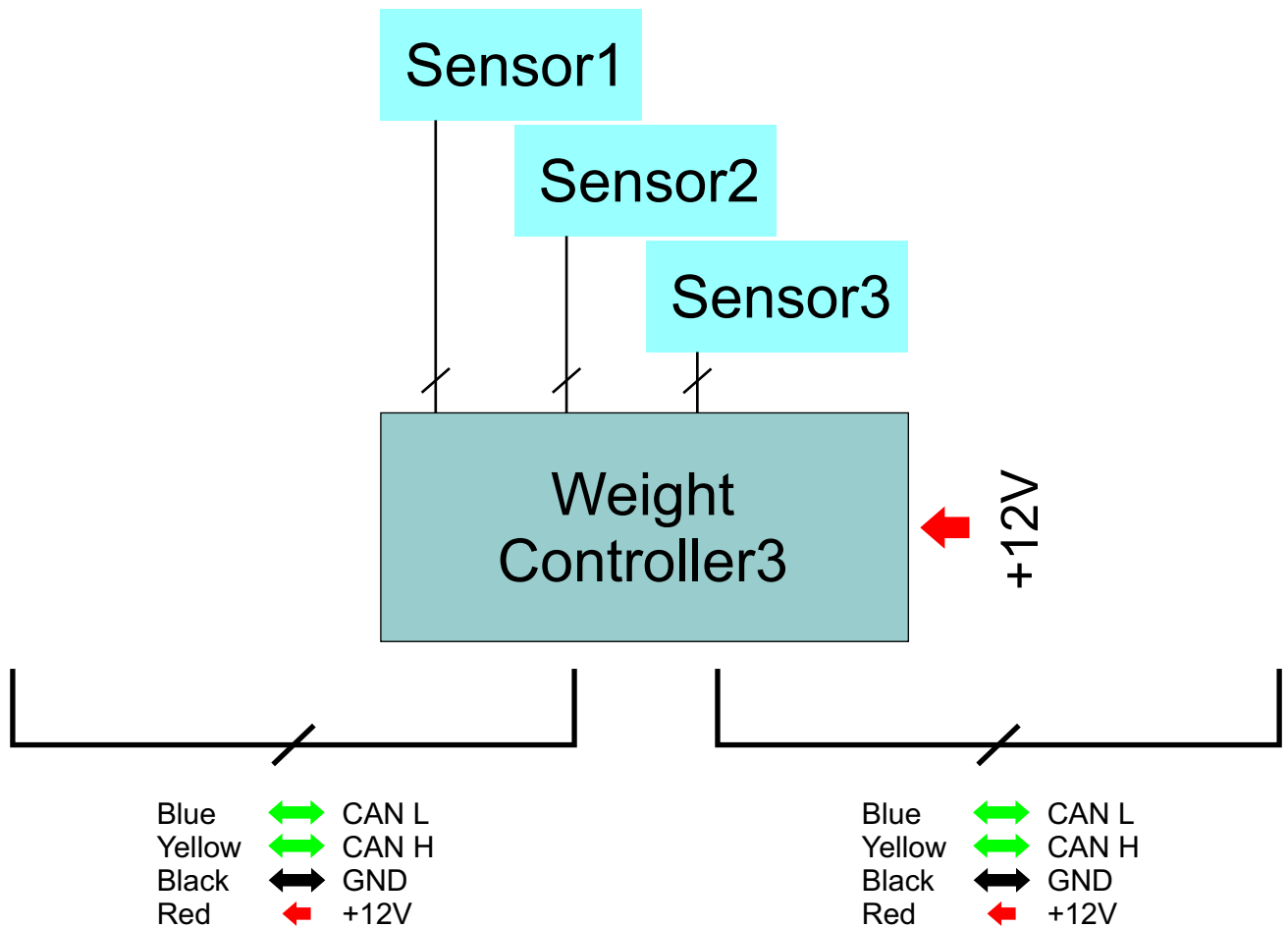
- GND
- +24VDC
- Valve1a
- Valve1b
- Valve2a
- Valve2b
- Valve3a
- Valve3b
- CAN GND
- CAN L
- CAN H
- CAN GND
- CAN L
- CAN H

- GND
- +24VDC
- Valve 1a, 1b
- Valve 2a, 2b
- Valve 3a, 3b
- CAN GND (2)
- CAN L (2)
- CAN H (2)

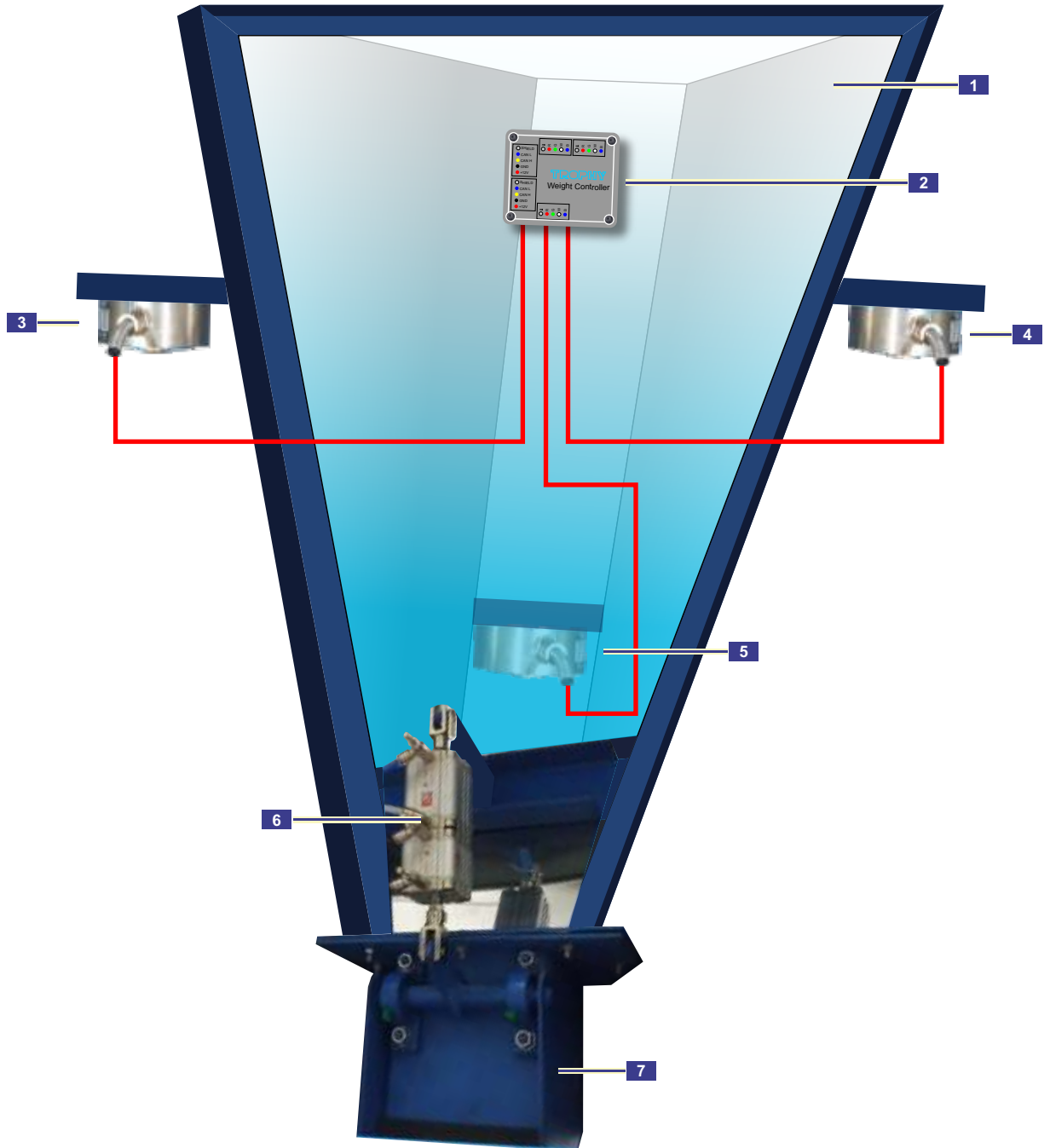
- Common wire
- Supply voltage of the Controller
- Control signals for pneumatic cylinders of dispensers
- Control signals for pneumatic cylinders of dispensers
- Control signals for pneumatic cylinders of dispensers
- Common CAN-bus
- CAN-bus signal wire
- CAN-bus signal wire

WEIGHT CONTROLLER

The Controller is designed to determine the current weight of the hopper. The data from the three weight sensors are fed to the Controller. The readings of the sensors are summarized and the information is transmitted to the Central Processor via the CAN-bus.



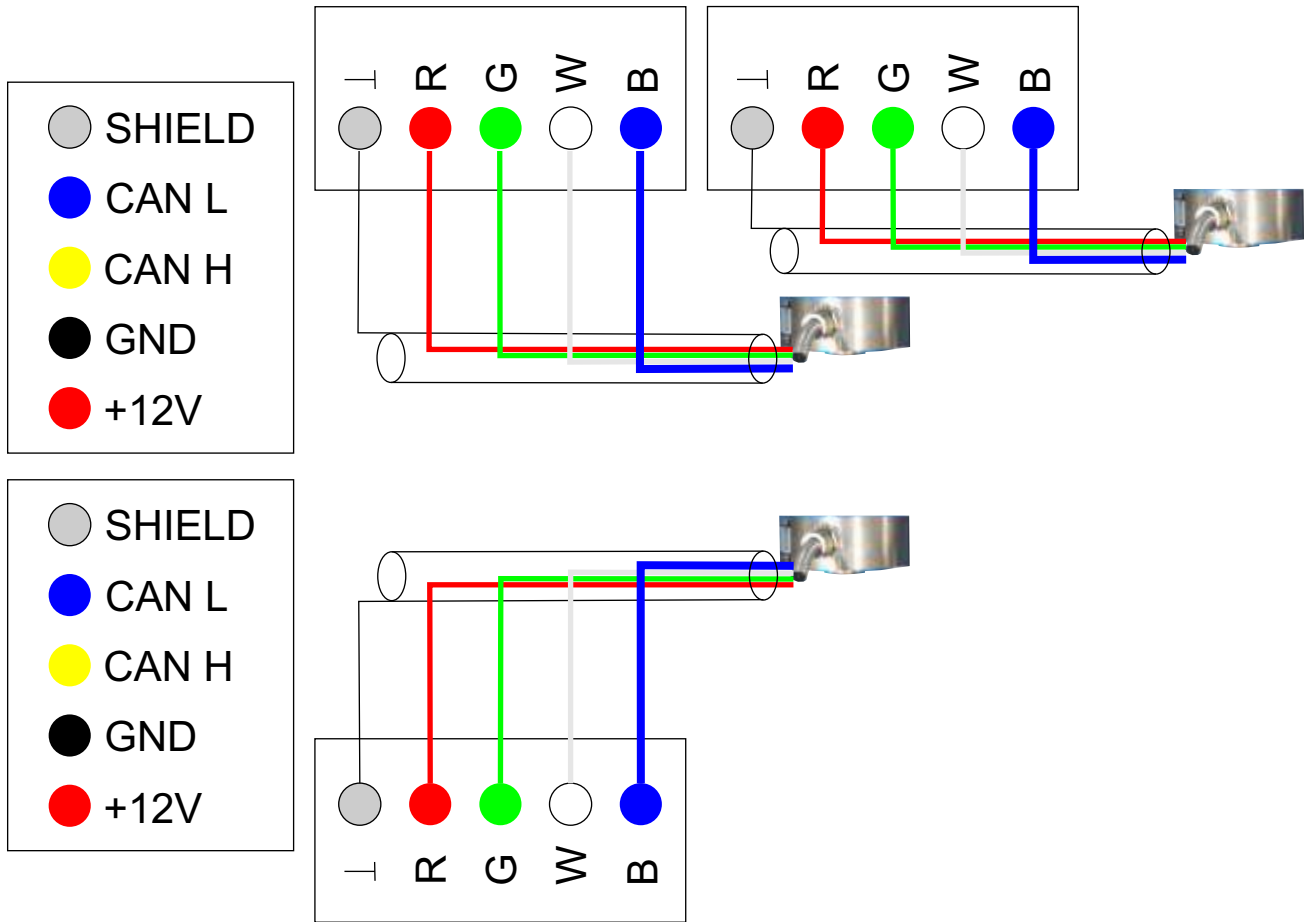
- Controller **2** is attached to the front wall **1** of the hopper. Each Controller is connected to three weight sensors **3**, **4** and **5** on which the hopper installed. An automatic dispenser with a flap **7** is installed on the neck of the hopper, which is regulated by a double pneumatic cylinder **6**. There are three positions of the flap:
 - Closed - normal position in the absence of control signals
 - Roughly - basic material feed
 - Precisely - Precise filling
- A double pneumatic cylinder is installed between the flap and the dispenser body.



WEIGHT CONTROLLER

Connectors

The wires are connected to the Controller using screw connectors.



WEIGHT CONTROLLER

- GND
- +12VDC
- CAN GND (2)
- CAN L (2)
- CAN H (2)

- Common wire
- Supply voltage of the Controller
- Common CAN-bus
- CAN-bus signal wire
- CAN-bus signal wire

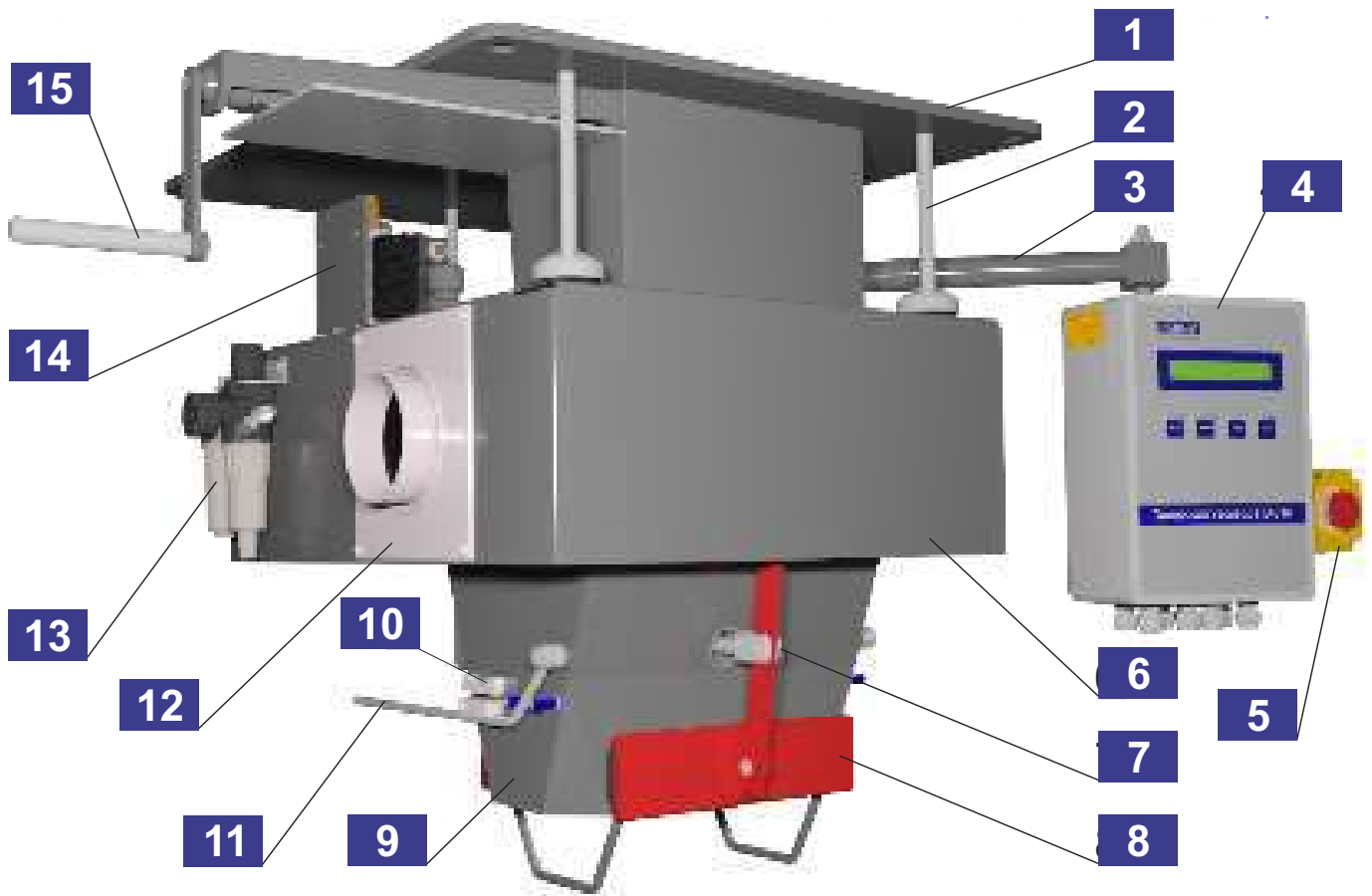
DVS-301 WEIGHT DISPENSER

DVS-301 automatic weight dispenser of discrete action is intended for automatic weighting of predetermined doses of materials. At the same time the digital display indicates the mass of the dosed material with a cumulative total of the total number of doses. The dispenser has an output to external recording devices via a standard RS-485 interface.



Specifications

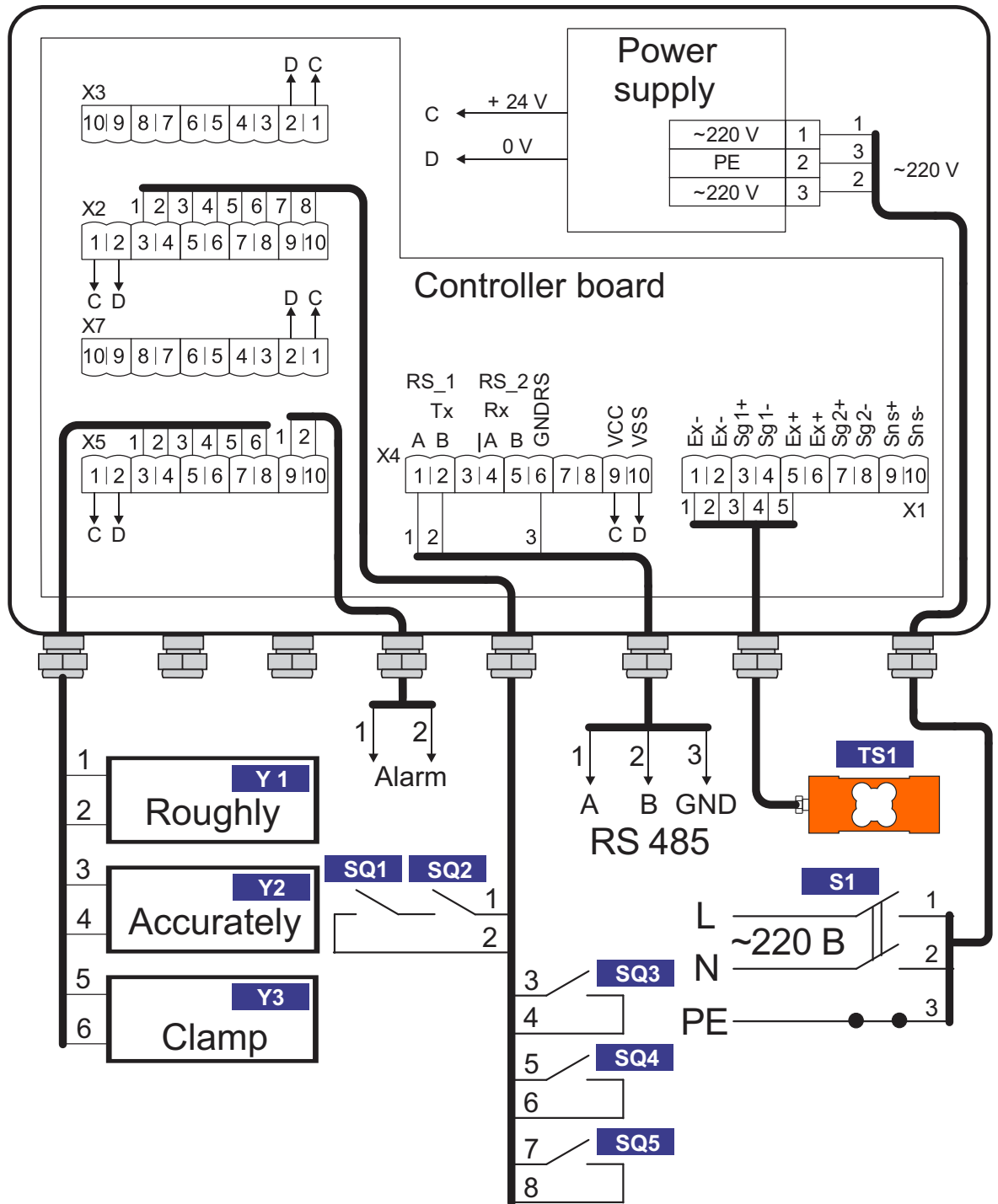
Parameter		Volume
Dosing limits, kg	small throat	1-25
	big throat	25-50
Discreteness of counting, kg		0.005
Dose tolerance, %, not more		0.2
Maximum productivity, bags/ hour		360
Dispenser control		Pneumatic
Power consumption (220V 50Hz), W		25
Nominal compressed air pressure, MPa.		0,4 ± 0,04
Dispenser dimensions, mm	long	805
	wide	615
	height	610
Weight processor dimensions, mm	long	180
	wide	90
	height	280
Weight of dispenser, kg		71
Weight of processor, kg		2.5
Air consumption, q.m./ hour		0.5
Degree of protection against ingress of dust and water	Dispenser	IP54
	Weight processor	IP65
Working temperature range, °C		10...+45
Life time, years		10



- 1 Gate
- 2 Screw
- 3 Bracket
- 4 Weight processor
- 5 TURN ON / STOP button
- 6 Protection cover
- 7 Pneumatic cylinder rod for bag holder
- 8 Bag holder clamp
- 9 Input throat
- 10 Reed switch
- 11 Lever arm
- 12 Aspiration flange
- 13 Air preparation station
- 14 Bracket with pneumatic valves
- 15 Gate handle

WEIGHT DISPENSER

Electrical wiring diagram of the dispenser



- Y 1 Y 2 Y 3
- SQ 1 SQ 2
- SQ 3 SQ 4 SQ 5
- TS 1
- S 1

Pneumatic valves
 START reed switches
 ROUGHLY, ACCURATELY, CLAMP limit switches
 Weight sensor
 TURN OFF button

GETTING STARTED

- Before turning on the dispenser make sure that all cables, connectors, shunts of grounding and pneumatic lines are connected securely.
- Set the pressure in the pneumatic cylinders to at least 0.4 MPa (4 atmospheres) using the valve of the air preparation station controlling the pressure value according to the manometer readings.
- Switch on the dispenser. Turning on is carried out by turning the "On/Stop" button counterclockwise until it stops. Switching off by pressing the "On / Stop" button. After switching on the dispenser switches to operating mode. In this case the digital display of the weight processor displays from left to right: current weight, weight control sign, dose and total for the day for the selected dose.
- Check the correctness of weighing for which purpose hang hooks for weights on the neck of the dispenser and memorize the tare by pressing the "Tare / + 1" key of the weighing processor. Hang the reference weights on the hooks and check that the reading on the left side of the indicator corresponds to the weight of the suspended weights. If the reading is incorrect calibrate the dispenser.
- Pressing the "Menu / Enter" key, view the "Dose", "Accurately", "Roughly", "Bag" parameters and make sure that the entered weight of the bag coincides with its real weight and the settings values coincide with the previously recorded values. If they do not match enter the previously used setting values. If the material supply was blocked by the gate it is necessary to open the gate.

PERFORMANCE CHECK

- To check the correct operation of the dispenser dose several bags in the operating mode with a given dose control. preparation is over if dosing is done correctly. If dosing is not done correctly the Roughly and Accurately settings must be adjusted for the following reasons:
 - you can increase the "Roughly" setting if the dosing cycle takes too long and it takes a long time to fill up;
 - reduce the "Roughly" setting if the top-up takes less than 2 seconds;
 - If the weight gained differs from the required one it is necessary to change the "Accurately" setting by an amount equal to the deviation (if the weight is exceeded, the setting must be reduced by the difference, otherwise the setting must be increased);
 - After the last adjustment of the settings it is necessary to repeat the batching of several bags.

DOSAGE

- Put the bag on the neck of the dispenser, raise both levers until the clamp engages bag. The bag must be put on so that it does not touch anything during the dispensing process. ATTENTION! It is strictly forbidden to lift the limit switches without putting the bag on the neck. If the set point values are incorrect (one or both of them are zero) the bag clamp will not be performed and an error message will appear on the display. In this case it is necessary to correct the Roughly and Accurately settings. The process of loading the material into the bag is carried out without the participation of the operator. When the cycle dosing is over, the full bag is either discarded immediately or after the time set for weight control.
 - Then a new dosing cycle can be started.

TARE ADJUSTMENT

The weight of the dispenser neck may vary (due to material buildup, due to more thorough cleaning than in the previous day, etc.). In this case, in the absence of a bag on the neck, the weight on the indicator will differ significantly from zero. To eliminate this it is necessary to memorize the container by pressing the "Tare / + 1" key.

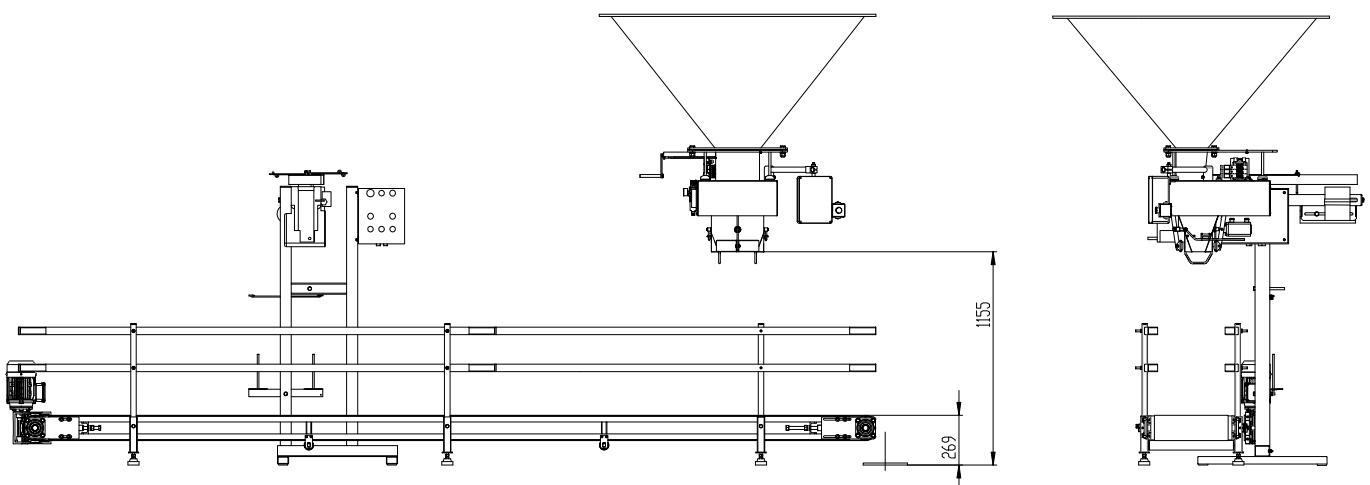
BAG SEWING LINE

The line for sewing bags is designed for sewing filled (packed) fabric, paper or polypropylene bags and their movement along the conveyor from the place of filling with a dispenser to the finishing operation of sewing.



Specifications:

Parameter		Volume
Conveyor length, m		3
Conveyor belt speed (sewing speed), m/s		0,12 ± 0,01
Power consumption (3/50/380V), kW, not more		1.5
Mean time between failures, h, not less		1500
Sewing machine height adjustment range, mm		400
Life time, average/full, years		3/10
Degree of protection against ingress of dust and water	Motor Control cabinet	IP54 IP65
Working temperature range, °C		10...+45



The KeeStar 80800C sewing machine

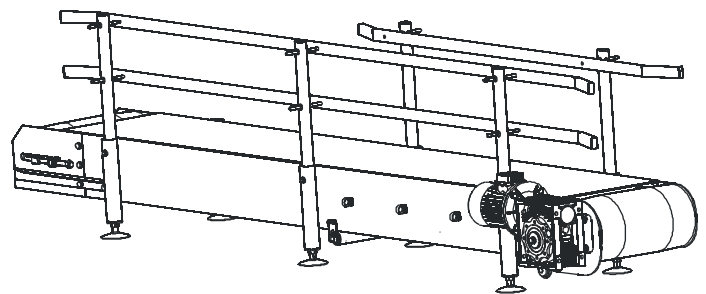
(made in China) is more reliable and quality.

- Productivity (bags / hour): up to 600
- Stitch pitch(mm): 6.5-11
- Shaft speed (rpm): 1800
- Weight (kg no more): 30
- Packing size (mm): 500x500x350
- Equipment: The machine is equipped with two spools of thread, spare needles, a pump oil can and a service tool.



Conveyor belt

The conveyor is designed to move bags filled with product to a sewing machine for sewing and then to a subsequent technological operation. The conveyor is installed on legs (adjustable).

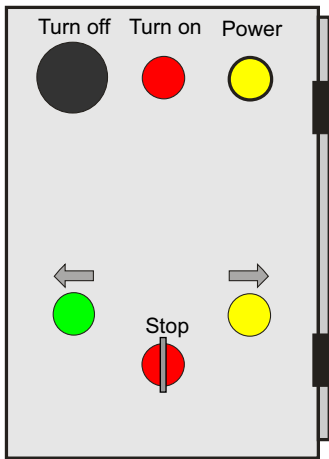


The carrying and traction element of the conveyor belt is an endless flexible belt. The belt slides with its working branch on the metal deck and rests with the idle branch on the roller supports. At the ends of the conveyor, the belt bends around the drive and take-up drums. The movement is transmitted to the belt frictionally from a drive drum rotated by an electromechanical drive. The required initial tension on the running down strand of the tape is created by a tension drum using a screw device.

Bag sewing rack

The rack is designed to be mounted on it movable bracket for the sewing machine. The bracket is also equipped with a machine drive motor, thread loopers and a counterweight. Also on the rack is a control cabinet designed to control the movement of the conveyor and the operation of the sewing machine.

The rack is installed next to the conveyor on a flat surface, leveled in the longitudinal and transverse directions and is attached to the floor with four anchors.

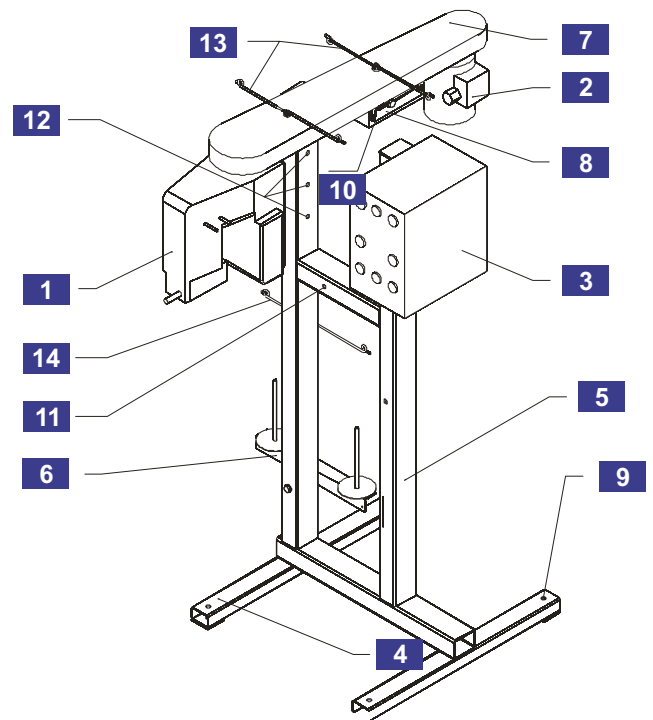


Control cabinet with inverter

The Inverter is used to connect the conveyor motor to the supply network, adjust the conveyor speed and change the direction of the belt movement.

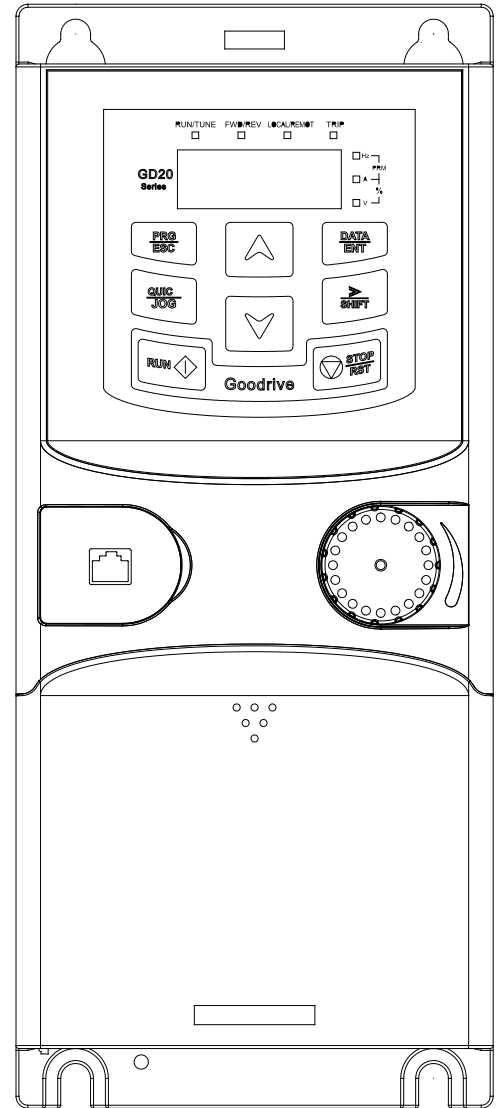
BAG SEWING LINE

- 1 Sewing machine
- 2 Motor
- 3 Control Cabinet
- 4 Base
- 5 Rack
- 6 Bracket for two spools of thread
- 7 Protective cover for V-belt transmission
- 8 Movable bracket for up/down of sewing machine position
- 9 Holes for fixing to the floor
- 10 Balancing weight bracket
- 11 Grounding
- 12 Holes for fixing movable bracket
- 13 Thread loopers
- 14 Thread looper



Inverter setup

Goodrive20 Series Inverter installation instruction you can see in additional datasheet.



	Enter / exit button in the options menu	Entering or resetting from the first level menu and quickly deleting a parameter
	Enter Button	Entering the menu. Parameter confirmation
	UP button	Increase the value of a parameter or function code
	DOWN button	Decrease the value of a parameter or function code
	Right shift button	Move right to select and display a parameter in stop and start modes Selecting a parameter to change the value
	START button	Inverter start button
	STOP / RESET button	Stop button. Limited by function code P07.04 Fault reset button
	Programmable button	Button functions are determined by function code P07.02

Press the PRG / ESC button to enter the edit mode in the state of stop, run, or clear error. See P07.00 if a password is set. The editing status is displayed in two classes and orders menu: function code, function group code, number - parameter of function code. Press DATE / ENT to display the function parameter. Press DATE / ENT in this state to save the parameters or press PRG / ESC to exit the editing mode.

Installed inverter settings:

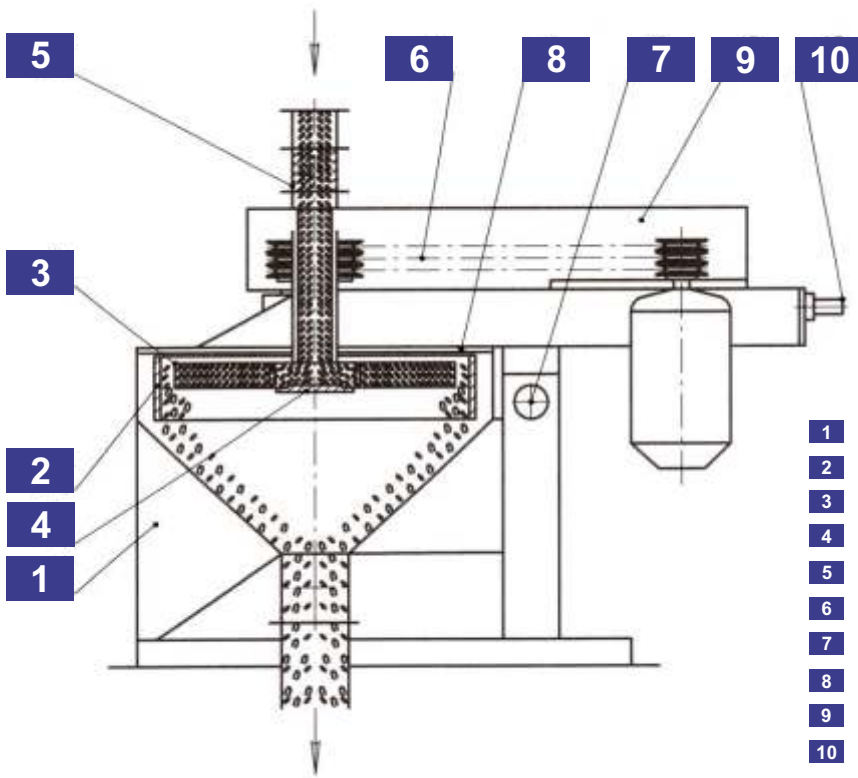
P00.00=2	speed control mode
P00.01=1	start from terminals
P00.03=50	max. output frequency
P00.04=50	upper limit of the frequency
P00.06=6	“A” frequency command selection
P00.10=20	belt speed setting frequency
P00.11=1	speed-up time
P00.12=1	speed-down time
P02.01=0.7	engine power, kW
P02.02=50	rated frequency of motor
P02.03=1380	rated motor speed
P02.04=220	motor rated voltage
P02.05=1.9	motor rated current
P05.01=1	FORWARD
P05.02=2	BACK

Inverter specifications:

Parameter	Volume
Input voltage, V	AC/3 phases/ 380V ± 15%
Power consumption (3/50/380V), kW, not more	0.75
Output voltage, V	3 phase/220V
Output frequency, Hz	0...400
Control mode	U/F, SVC sensorless vector control
Motor type	Asynchronous electric motor
Frequency setting methods	Digital / analogue, from control panel, multi-speed reference, PLC, PID reference, MODBUS protocol
Life time, average/full, years	2/5
Cooling	Air cooling
Working temperature range, °C	-10...+ 50C, power reduction at T> + 40C

UREA GRINDER

The UG-3X continuous centrifugal grinder is designed to grind urea granules. The grinder is supplied complete with a frequency converter which allows you to adjust the rotor speed and, accordingly, change the particle size at the exit of the machine.



- 1 Bed with outlet funnel
- 2 Reflective ring
- 3 Rotor
- 4 Removable bottom
- 5 Suction branch pipe with damper
- 6 Belting
- 7 Bolt
- 8 Lid
- 9 Fencing
- 10 Belt tension screw

UREA GRINDER

Installation and preparation for operation

Before installing the Grinder inspect it visually for mechanical damage, foreign objects, packaging. Install the Grinder on a previously prepared place according to SNiP II-B.7-70 "Foundations of machines with dynamic loads. Design standards " and consolidate. Provide a free area around the Grinder: front and back - 1000 mm, on the sides - 700 mm.

Check that the guards are securely fastened. Check the fastening of the electric motor to the plate. Check the tightness of the bolts 7. The clamps connecting the roof 8 to the frame 1 must be securely closed.

Connect the Grinder to the product lines. Close the damper.

Connect the electric motor to a frequency converter and the converter to a 3-phase 380VAC network observing all safety requirements. Check the direction of rotation of the electric motor according to the direction of the arrow by briefly switching on. Rotation of the rotor is counterclockwise when looking at the shaft from above.

Test the Grinder in idle mode for 1 hour. There should be no extraneous noise, knocking or increased vibration during the operation of the Grinder. If any malfunctions are detected stop the Grinder, rectify the malfunction and restart the Grinder.

The Grinder is started in the following order:

- a damper above the Grinder in the "Closed" position;
- turn on the Grinder;
- supply urea from the batch by opening the damper;
- before stopping the Grinder, stop feeding the product by closing the damper exhaust all the product;
- turn off the Grinder.

Troubleshooting and remedies

During the operation of the Grinder, various kinds of malfunctions may occur for the elimination of which the necessary measures should be taken in order to prevent the possibility of the Grinder failing.

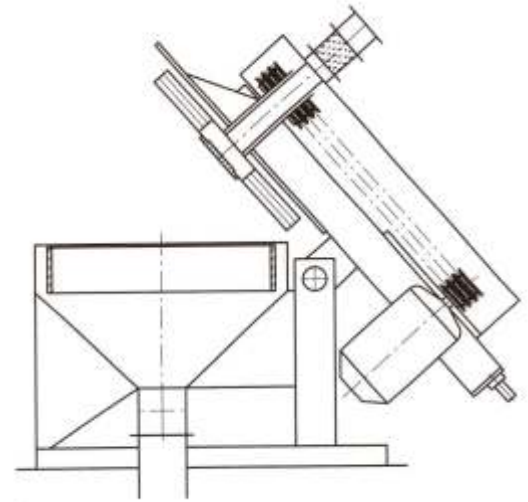
Possible malfunctions and methods of their elimination:

Fault name	Probable cause	Remedy
Excessive machine vibration	Uneven rotor wear	Replace rotor and / or to balance
Urea particle size reduction	Insufficient product feed High rotor speed Baffle ring worn (ring cut)	Increase feed Reduce speed Turn the ring 180 ° or replace
Leakage of oil from bearing unit	Worn oil seals	Replace oil seals
Unusual knocks, vibrations	Loosen bolted connections, clamps	Tighten connections
Overheating of the bearing assembly over 60 °C	Lack of grease or loss lubrication of its properties	Refill or replace grease

Maintenance

A reflective ring **2** is installed on the brackets inside the bed. The ring is centered and clamped by three bolts in the walls of the bed. The distance from the end of the rotor to the baffle ring is within $22 \div 27$ mm.

Attention! For the purpose of uniform wear of the deflector ring during operation of the Grinder it is recommended to rotate the deflector ring by 180° . The baffle ring and the rotor must be completely restored (replaced) in case of extreme wear the working bodies of the Grinder.



To replace the rotor and deflector ring:

- loosen the fastening bolts and open the four clamps;
- turn the roof around the fastening bolts down to the stop;
- remove the removable bottom;
- remove the rotor;
- remove the baffle ring.

Reassemble in reverse order.

It is strictly forbidden to turn on the electric motor in the position shown in the figure!

The roof of the machine must fit snugly against the bed to prevent dust from entering.

Action in extreme conditions

In the event of emergency operating conditions as well as failures of the Grinder systems which can lead to dangerous emergencies it is necessary to stop the operation, disconnect the Grinder from the electrical network. Use accessible means to designate and protect the dangerous place, inform the technical service.

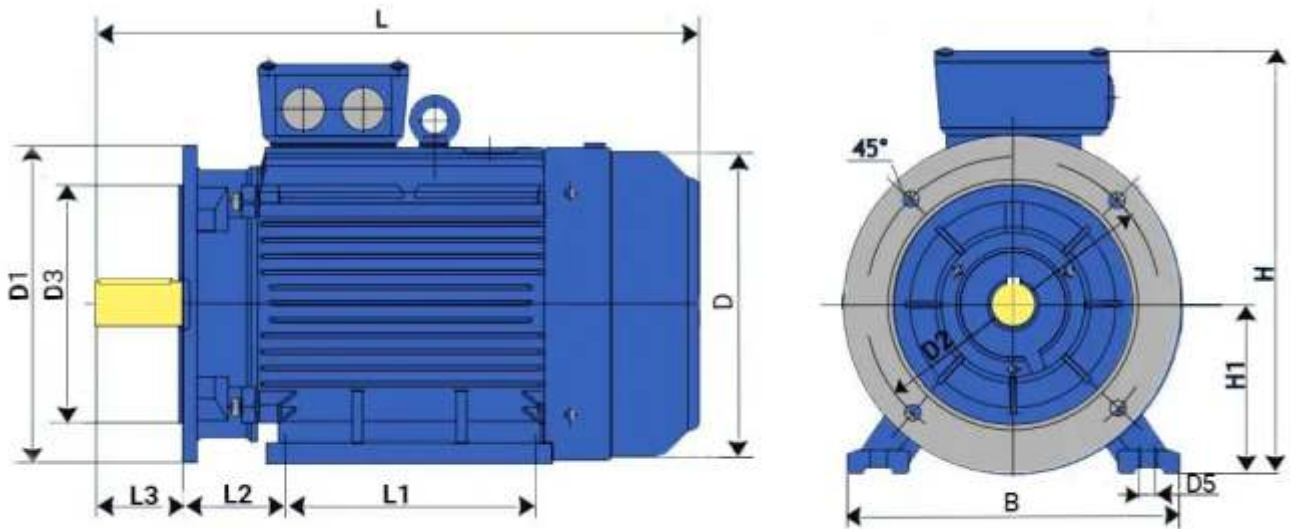
If an emergency evacuation of the operating personnel is required immediately stop work and disconnect the operating equipment from the electrical network.

Grinder specifications:

<i>Parameter</i>	<i>Volume</i>
Productivity, t / hour Note. With an increase in rotor speed the productivity of Grinder can be increased while maintaining parameters technological efficiency. You can change the rotor speed tuning the frequency converter in the motor circuit.	1.5
Rated rotor speed, rpm (rps)	1850 (30,8)
Power consumption, (3/50/380V), kW, not more	5,5
The gap between the baffle ring and the rotor, mm	27
Rotor diameter, mm, not more	500
Baffle ring diameter, mm	550
Dimensions, mm	long wide height
	1400 630 1050
Weight, kg	250
Life time, years	8

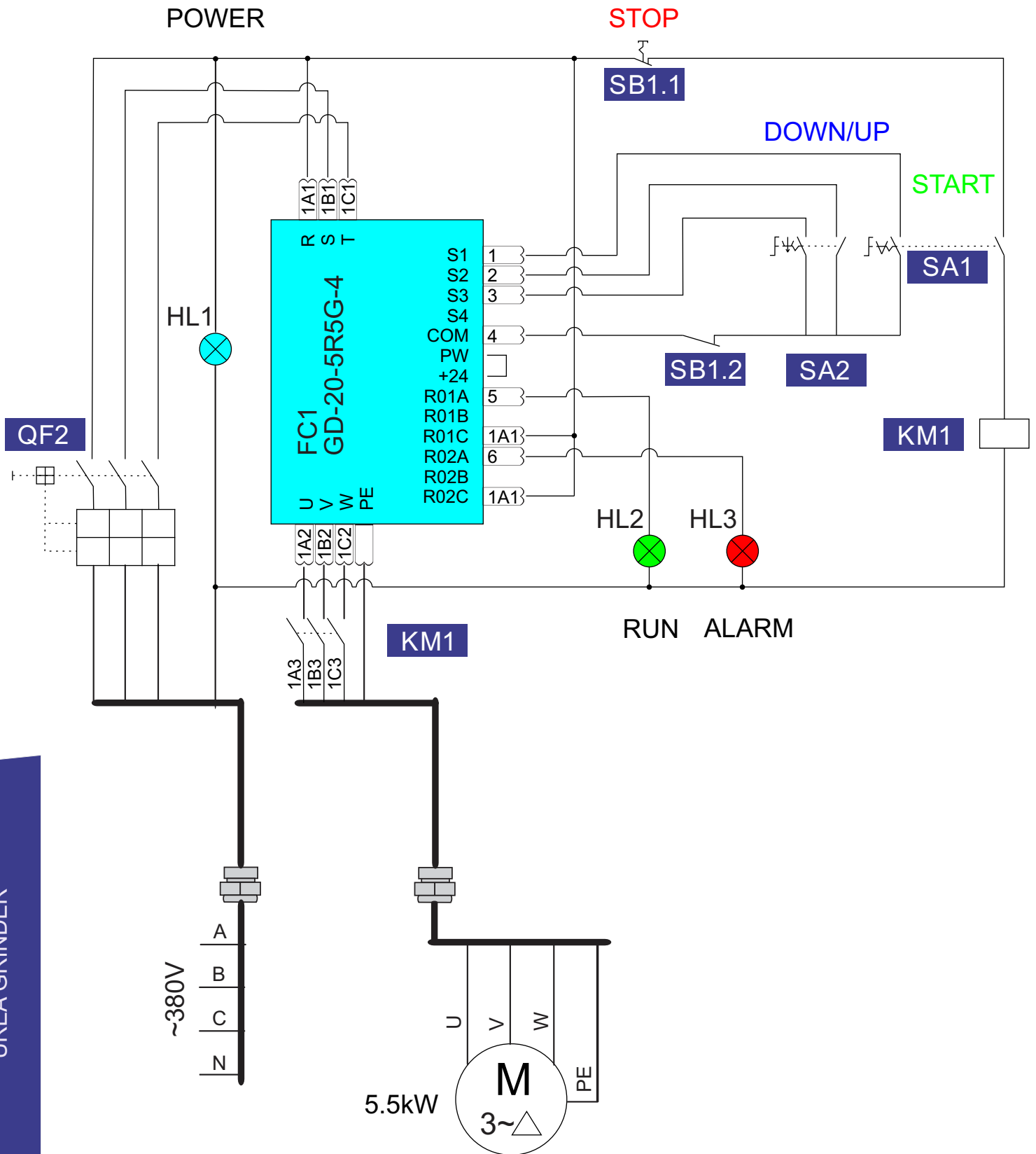
Motor specifications:

Parameter		Volume
Model		AIR100L2 IM2081
Motor shaft speed, rpm		2900
Power consumption, (3/50/380V), kW, not more		5,5
Motor type		asynchronous
Efficiency, %		85.7
Shaft diameter, mm		28
Front/rear bearing		6206 ZZ-C3
Noise level, dB		not more 80
Weight, kg		45
Dimensions, mm	L long	385
	D diameter	215
	H height	270
	L2	63
	D1	250
	D2	215
	D3	180



UREA GRINDER

Electrical wiring diagram of the grinder

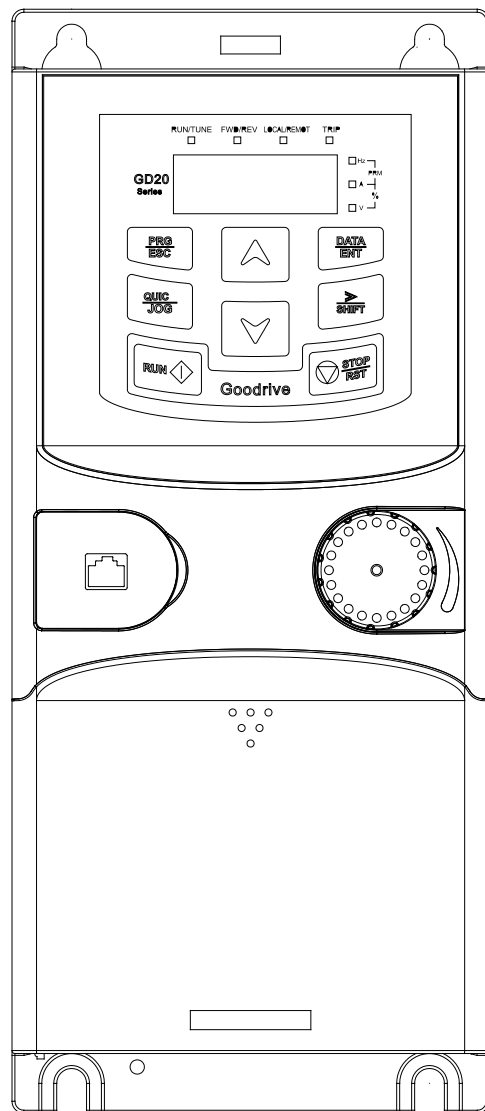


UREA GRINDER

Control cabinet with inverter

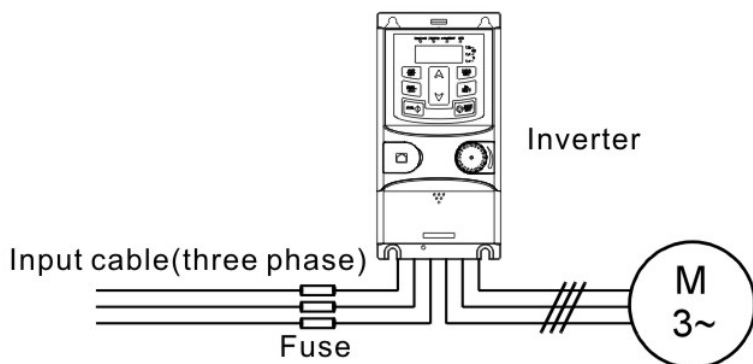
The Inverter is used to connect the grinder motor to the supply network, adjust the grinder speed and change the direction of the movement.

Goodrive20 Series Inverter installation instruction you can see in additional datasheet.



	Enter / exit button in the options menu	Entering or resetting from the first level menu and quickly deleting a parameter
	Enter Button	Entering the menu. Parameter confirmation
	UP button	Increase the value of a parameter or function code
	DOWN button	Decrease the value of a parameter or function code
	Right shift button	Move right to select and display a parameter in stop and start modes Selecting a parameter to change the value
	START button	Inverter start button
	STOP / RESET button	Stop button. Limited by function code P07.04 Fault reset button
	Programmable button	Button functions are determined by function code P07.02

Press the PRG / ESC button to enter the edit mode in the state of stop, run, or clear error. See P07.00 if a password is set. The editing status is displayed in two classes and orders menu: function code, function group code, number - parameter of function code. Press DATE / ENT to display the function parameter. Press DATE / ENT in this state to save the parameters or press PRG / ESC to exit the editing mode.



Installed inverter settings:

P00.00=1	speed control mode
P00.01=1	start from terminals
P00.03=50	max. output frequency
P00.04=50	upper limit of the frequency
P00.11=10	speed-up time
P00.12=10	speed-down time
P01.08=1	stop mode
P01.18=0	terminal running protection
P02.01=5.5	engine power, kW
P02.02=50	main power frequency
P02.03=2950	rated motor speed
P02.04=380	motor rated voltage
P02.05=15	motor rated current
P05.01=1	S1 terminal function
P05.02=10	S2 terminal function
P05.03=11	S3 terminal function
P06.03=1	R01 output function
P06.04=5	R02 output function

Inverter specifications:

Parameter	Volume
Input voltage, V	AC/3 phases/ 380V ± 15%
Power consumption (3/50/380V), kW, not more	5.5
Output voltage, V	0...Input voltage value
Output frequency, Hz	0...400
Control mode	U/F, SVC sensorless vector control
Motor type	Asynchronous electric motor
Frequency setting methods	Digital / analogue, from control panel, multi-speed reference, PLC, PID reference, MODBUS protocol
Life time, average/full, years	2/5
Cooling	Air cooling
Working temperature range, °C	-10...+ 50C, power reduction at t > + 40C