



BIN Sp. z o.o.

87-700 Aleksandrów Kujawski, at Narutowicza 12

Phone (0-54) 282 22 55; (0-54) 282 88 00;

(0-54) 282 88 25; (0-54) 282 88 27

Fax (0-54) 282 88 63

www.bin.agro.pl e-mail bin@bin.agro.pl

SHUTTER FOR SCREW CONVEYORS

OPERATING MANUAL (IO:PSX-ZAS)

Type: PSX-ZAS

Model: PSX160-ZAS/E

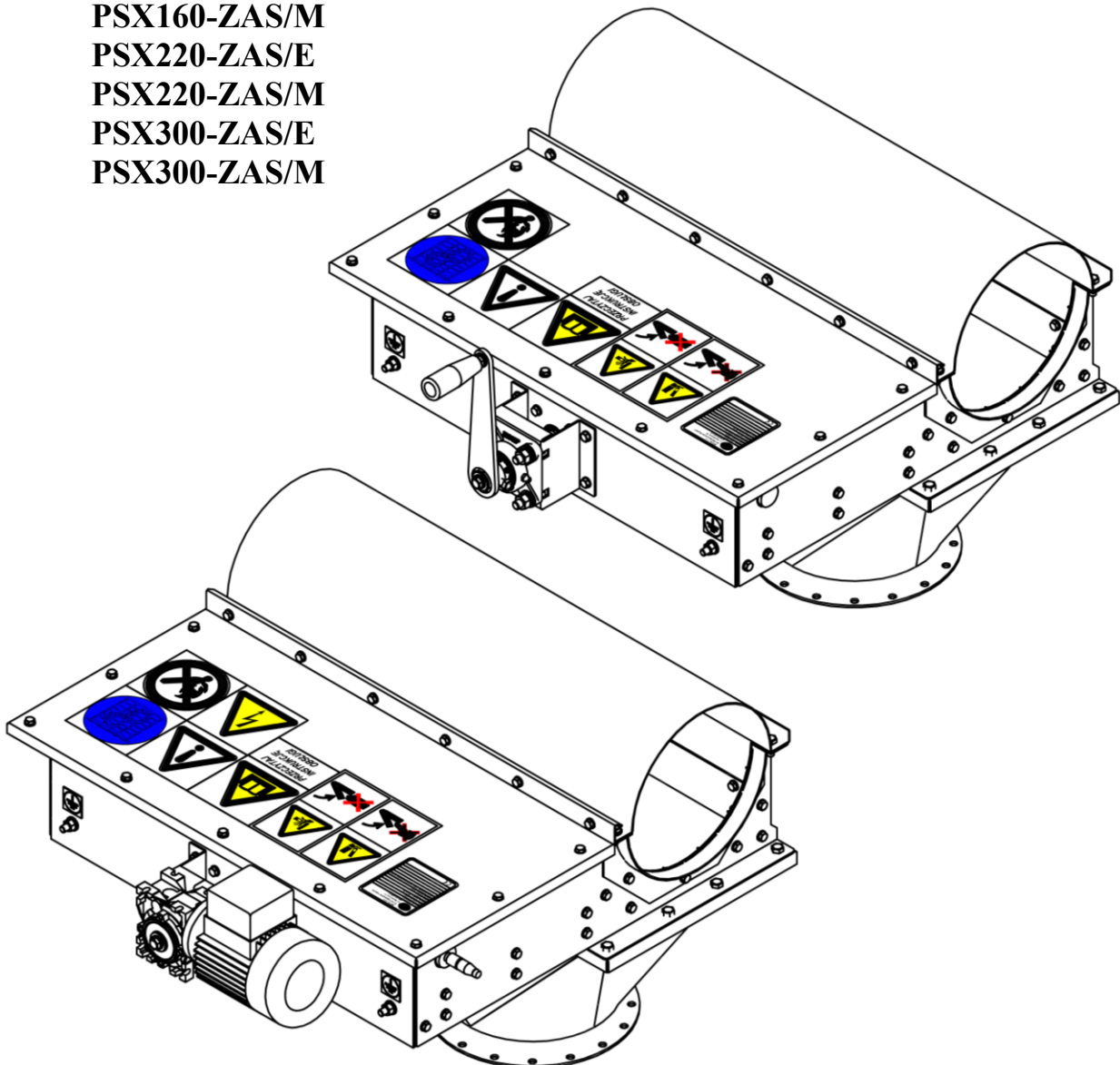
PSX160-ZAS/M

PSX220-ZAS/E

PSX220-ZAS/M

PSX300-ZAS/E

PSX300-ZAS/M



Drawings and descriptions included in this manual may contain optional and special components, not provided in the standard version. Before placing an order, the Customer may obtain comprehensive and up-to-date information on the products to be ordered. We reserve the right to make changes in our products. All rights reserved. Any reproduction, even partial, is allowed solely with our consent.



Aleksandrów Kujawski/A4 format



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Introduction

The Operating Manual aims at acquainting the user with a correct operation of the purchased product. This Operating Manual contains practical guidelines that must be known to the shutter operator.

If any content of this Operating Manual is not understood by or is unclear for the user, please, contact the manufacturer or its representative.



This operating manual forms an integral part of the product, and should be kept for further reference.



Before starting to operate the shutter, read this operating manual, and, in particular, the chapters concerning safety at work.



Each use of the device for purposes other than those specified in the operating manual will be treated as the misuse. The manufacturer of the product shall not be held responsible for damages resulting from misuse. The user bears the sole risk related to the misuse. All and any unauthorised changes to the product design exclude the manufacturer's responsibility regarding any resultant damages.



Shutter are mechanical and electrical devices. Incorrect operation may cause fire, fatal electric shock, burning, or other severe injury.



The warning sign in the operating manual indicates that the special caution must be exercised because of the danger to people and possibility of product damage.

1. Safety

1.1. Basic safety rules

1. People employed to use or operate the shutter, as well as people within the area of their operation are obliged to adhere to general OHS regulations.
2. The user is obliged to read and understand this operating manual for the shutter and manuals for all other auxiliary equipment, and to strictly adhere to them.
3. In particular, the following is forbidden:
 - operation by any “third” persons, who are not familiar with the Operating Manual;
 - operation by any persons that are ill or under an influence of alcohol or narcotic drugs, or by minors.
4. The location of the shutter operation and its controllers should be secured against any access of children and unauthorised people.
5. A shutter owner is obliged to provide it with detailed occupational health and safety instructions.
6. In the event of bad lighting conditions, a location where the shutter is operated should be equipped with additional general lighting.
7. It is strictly forbidden to open the shutter, if the transported material could pose a threat to health and life of humans and animals.
8. Shutters and their surroundings should always be kept tidy and clean.
9. During its operation, the shutter must be supervised at all times.
10. It is forbidden to switch on the shutter without guards or to remove them during work.
11. An electric motor cannot be covered by any items. Ignoring this recommendation may result in motor overheating or fire.
12. The power supply system to which the shutter is connected should be equipped with sufficient differential current and short-circuit protective devices, a PE protective cable, and voltage failure and phase sequence relays.
13. All components of the power supply system must be secured against any damage.
14. Designing, construction of a wiring system and the first test start-up of the shutter must be performed by a person holding relevant licences, on a basis of guidelines provided in this operating manual.
15. Descriptions and diagrams of the wiring system provided in this operating manual represent general guidelines for development of a design for the wiring system by authorised people.
16. Any modifications of the above diagrams can only be made in such way that all protective functions of the devices specified in descriptions and diagrams are maintained.
17. At least once a year, the User should order a qualified electrician holding relevant licences to inspect all electric equipment components.
18. A power supply cable should not be twisted or at risk of being cut. Its damage may cause an electric shock.
19. The power supply cable must be routed in such way that it does not pose any other hazards.
20. The user is responsible for correct connection of power delivery points and their correct operation.
21. A location where the shutter is operated must be used and maintained in a way preventing fire, and it should be provided with fire extinguishing equipment, including a dry powder or carbon-dioxide extinguisher.
22. In the event of the fire:
 - evacuate people from the danger zone;
 - call the fire brigade;
 - disconnect the device from the power supply;
 - start extinguishing fire.
23. It is forbidden to extinguishing fires of power supply systems with water or a foam extinguisher.
24. Before commencing installation, checked whether the shutter and its components were not damaged during transport or storage.
25. When any situation posing a threat to human life or health occurs, the device must be switched off immediately and disconnected from the mains.
26. When any defects or damages to the shutter are found which may affect safety of people or animals, the investor is obliged to immediately notify them in writing to the shutter manufacturer.
27. The technical servicing, maintenance and repairs must be performed with power supply disconnected.
28. The repair and maintenance operations can only be conducted by able-bodied adults holding relevant qualifications.
29. The user is obliged to observe all requirements included in the operating manual of the electric motor, shutter position sensors, switches, and other subunit of the electrical system supplied with the shutter.
30. The user is obliged to read and understand operating manuals for a screw conveyor in which the shutter is installed, and to strictly adhere to it.

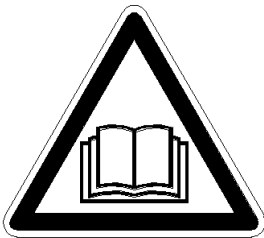
31. The shutters are labelled with safety marks. Each user is obliged to become acquainted with their meaning.
32. Warning signs, nominal plates and other information must be kept legible and clean. When the signs or marks mentioned above are damaged or destroyed, or a part containing them is replaced, new plates should be purchased from BIN Company and installed on the product, replacing damaged ones.
33. When the Investor itself or any other installation company not authorised by BIN installs the shutter (for reasons independent of the producer), the Investor is obliged to obtain the detailed shutter installation instruction.
34. When the device is delivered without a nominal plate or the nominal plate is destroyed, the user should notify this to the producer to receive its copy.
35. It is forbidden to make any changes in design or to change the intended use of the equipment without the manufacturer's consent in writing.

1.2. Information and warning signs

Information and warning signs, and the nominal plate with a CE mark are placed on the shutter housing near the drive.



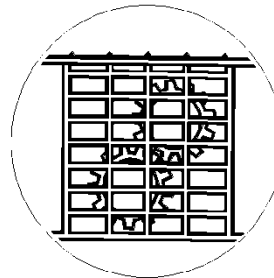
Note! Warning signs, nominal plates and other information must be kept legible and clean. When the signs or marks mentioned above are damaged or destroyed, or a part containing them is replaced, new plates should be purchased from BIN Company and installed on the product, replacing damaged ones.



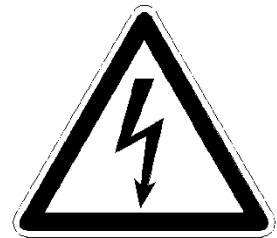
***READ
OPERATING
MANUAL***



***ATTENTION!
DANGER***



***USE THE
GUARDS***



***RISK OF
ELECTRIC
SHOCK***



***NO USE OF NAKED
FLAME OR SMOKING***



***DO NOT ENTER OR REACH
INTO THE CRUSHING AREA IF
COMPONENTS MAY MOVE***

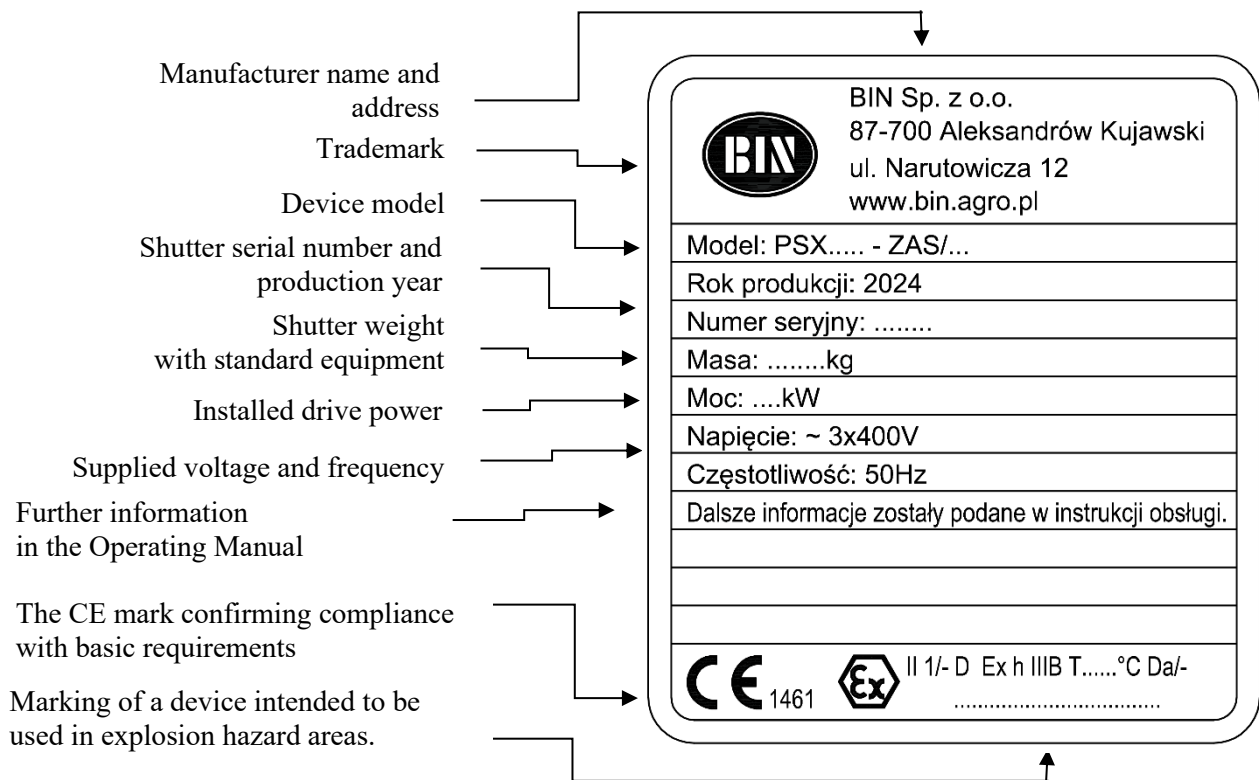


Figure 1. Marking of a device intended to be used in explosion hazard areas (a shutter with an electric drive).

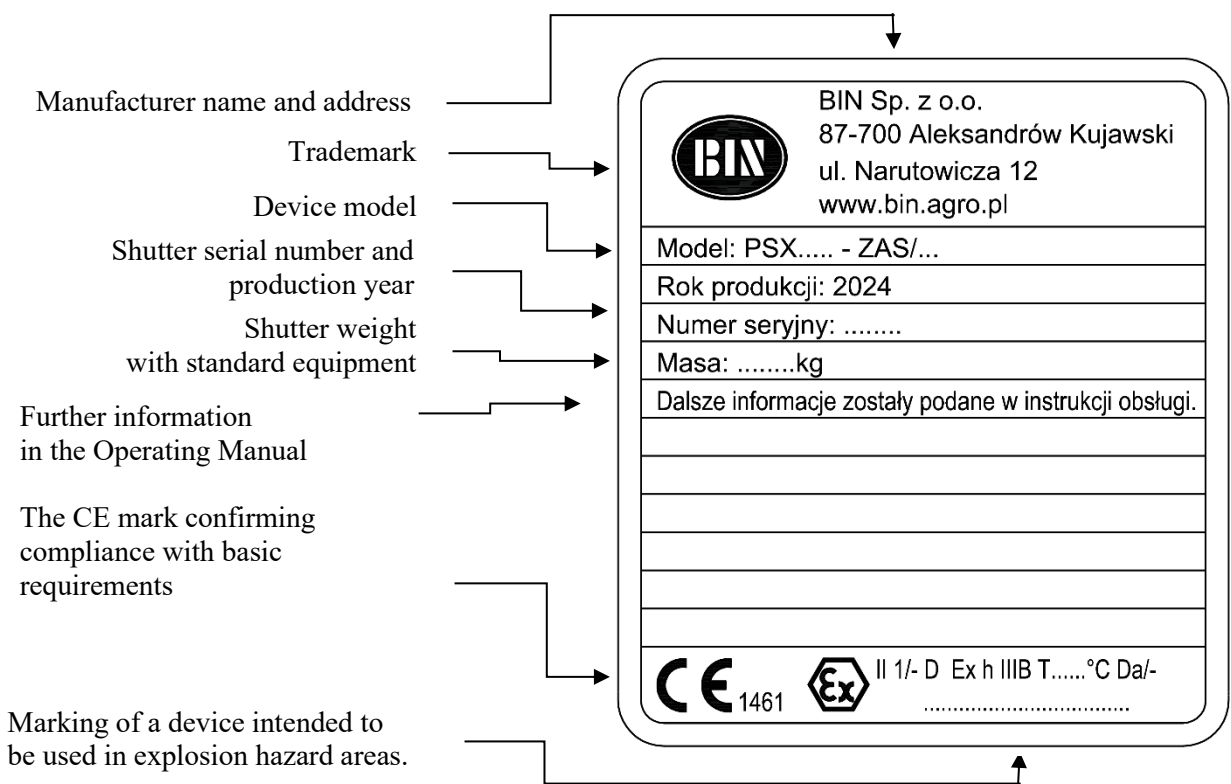

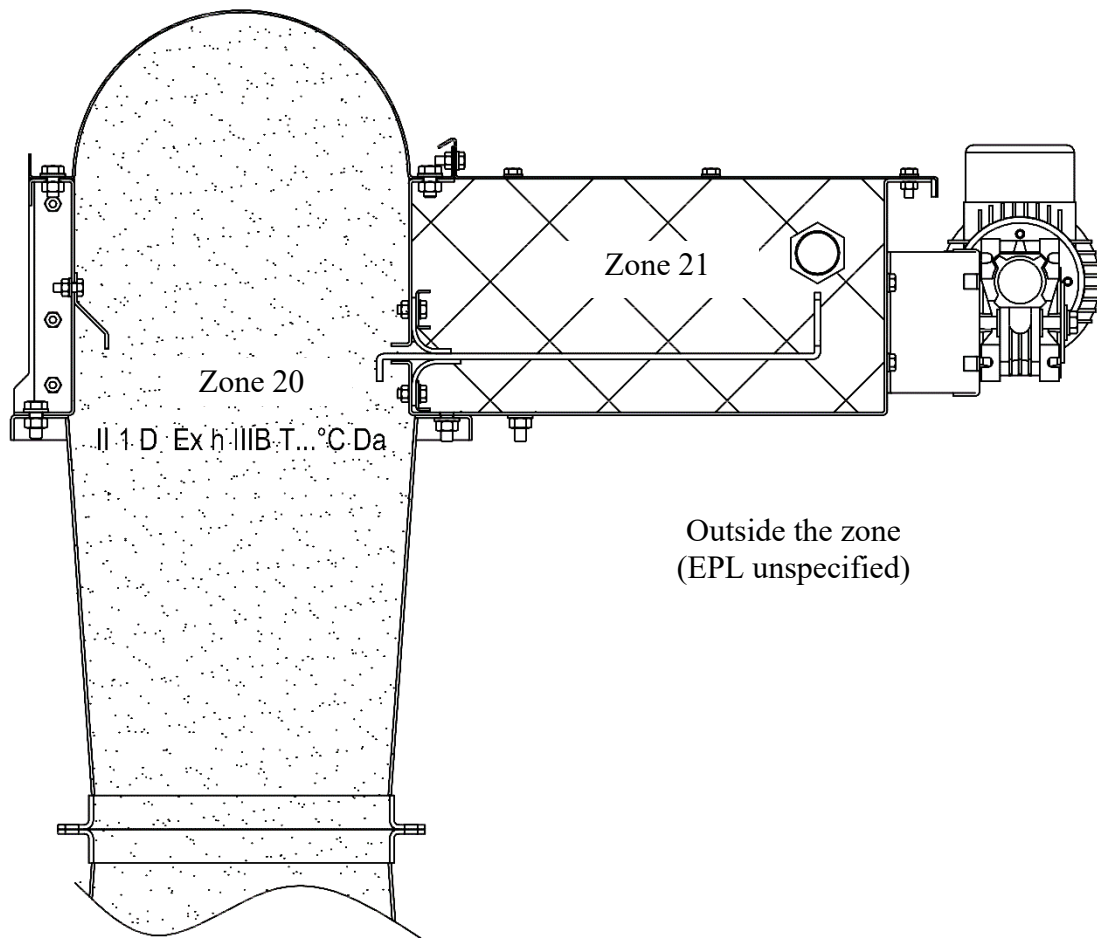


Figure 2. Marking of a device intended to be used in explosion hazard areas (a shutter with a manual drive).

	Marking of an explosion proof protection
II	Group of devices: II - to be used at locations other than mining plants
1/-	Category of devices to be used in zones: 1 in zones 20, 21 and 22 - outside the zone
D	D - dust explosive atmospheres
Ex	A symbol indicating that a device corresponds to one or several types of the explosion-proof designs
h	Non-electrical equipment for explosive atmospheres - symbol
IIIB	Marking of the non-electrical equipment group: IIIB - devices are designated to be used at locations with explosive dust atmospheres other than in mines and corresponding to flammable airborne particles and non-conductive dust
T.....°C	Maximum equipment surface temperature.
Da/-	Equipment Protection Level (EPL): Da - equipment for explosive atmospheres due to the presence of combustible dust, which does not constitute a source of ignition in normal operation, when subject to expected failures, or when subject to rare failures - EPL unspecified



2. General product description

2.1. Intended use of the shutter

A shutter for screw conveyors, of the PSX-ZAS type, is a shutter of a scissor type. It is used to close and open the flow of cereals and maize grain, and oilseeds. The shutter enables the flow of materials in screw conveyors of the PS160, PS220, and PS300 type manufactured by BIN Sp. z o.o. Materials flowing through the shutter should be free of contaminations (especially contaminations hindering flow, such as twigs, straw, steel rods, ropes, and similar) and have the required moisture content (generally considered as safe for individual cereal species, maize, and oilseeds). The shutter is equipped with an outlet spigot with a connection flange for installation of auxiliary devices and machines. The device is intended to be used for transport of grain of the following parameters ¹⁾:

- the minimum ignition temperature of dust clouds (MIT) cannot be lower than 500°C,
- the minimum ignition temperature of 5 mm thick dust layer (T5mm) cannot be lower than 200°C,

2.2. Technical specification

Table 1. Technical parameters of shutters of the PSX-ZAS type.

Shutter model	PSX160-ZAS/M	PSX220-ZAS/M	PSX300-ZAS/M	PSX160-ZAS/E	PSX220-ZAS/E	PSX300-ZAS/E
Drive type	Driven manually with a crank			Driven by an electric motor		
Nominal motor power	-			0.09 kW		
Supply voltage	-			3x400 V		
Extending speed (unloaded)	No more than for the electric drive			9.2 mm/s		
Shutter opening/closing time	No more than for the electric drive			16 s	23 s	32s
Type of a conveyor with which the shutter can be used	PS160	PS220	PS300	PS160	PS220	PS300
Outlet connector diameter	Ø 200 mm		Ø 300 mm	Ø 200 mm		Ø 300 mm
Types of transmissions used	-			Toothed gear (worm)		
Ambient temperature	-20°C to +40°C					
Shutter weight	56 kg	63 kg	80 kg	59 kg	65 kg	83 kg

In no device shown in the manual, the level of noise exceeds 70 dB(A).

The conformance was verified against the following harmonised standards:

PN-EN ISO 80079-36:2016 Explosive atmospheres. Part 36: Non-electrical equipment for explosive atmospheres. Basic method and requirements.

PN-EN ISO 80079-37:2016 Explosive atmospheres. Part 37: Non-electrical equipment for explosive atmospheres.

Non-electrical type of protection constructional safety "c", control of ignition sources "b", liquid immersion "k".

PN-EN ISO 12100:2012 Safety of machinery. – General principles for design. – Risk assessment and risk reduction.

PN-EN 618+A1:2011 Continuous handling equipment and systems. Safety and EMC requirements for equipment for mechanical handling of bulk materials except fixed belt conveyors.

PN-EN 60204-1:2010 Safety of machinery. Electrical equipment of machines. Part 1. General requirements.

^[1] Source: *Bezpieczeństwo pracy - Wybuchy przestrzenne* 11/2005 (Centralny Instytut Ochrony Pracy i Państwowy Instytut Badawczy),

(Translation of the original title: *Occupational safety - Spatial explosions*, 11/2005/ (Central Institute for Labor Protection and National Research Institute),

Przeciwdziałanie wybuchom pyłów i materiałów sypkich składowanych w silosach 2/2012

(Inżynier budownictwa -Wydawnictwo Polskiej Izby Inżynierów Budownictwa sp. z o. o).

(Translation of the original title: *Civil engineer - Counteracting explosions of dust of bulk materials stored in silos*, 2/2012 / Civil Engineer - The Publication of the Polish Chamber of Civil Engineers Ltd.)

3. Design description

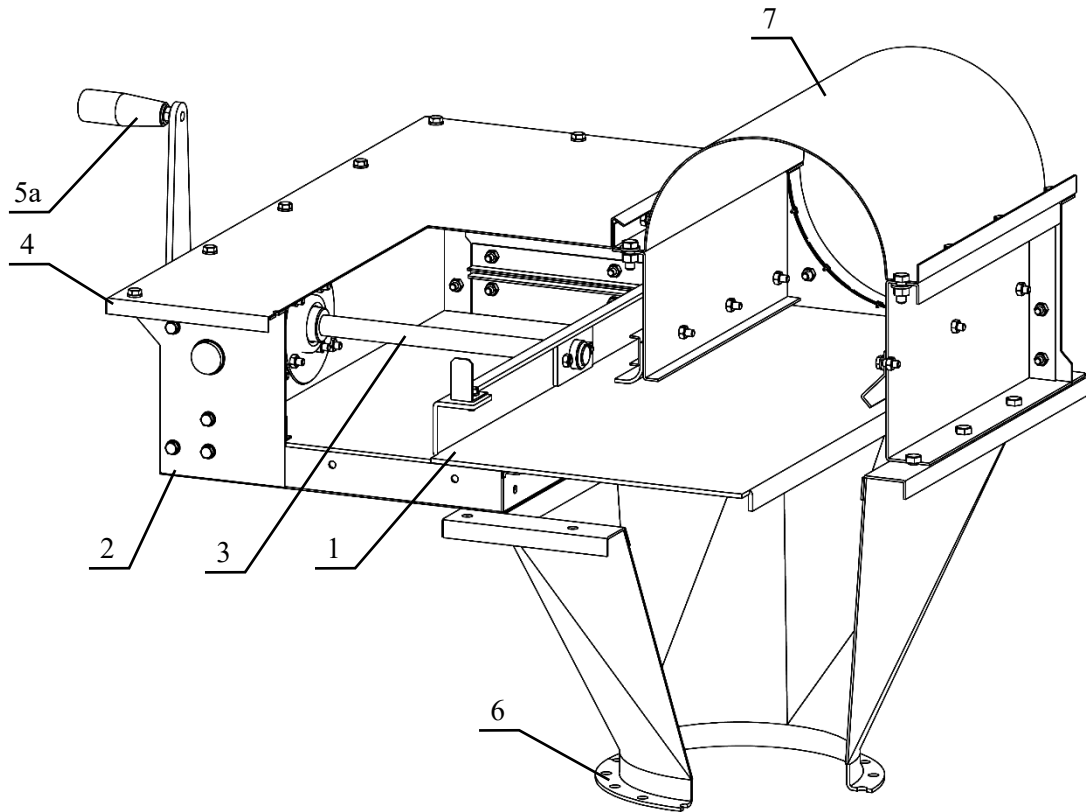


Figure 3. Design of shutters of the PSX... type – ZAS/M (crank driven). 1 – shutter plate, 2 – body, 3 – feed screw with a nut, 4 – cover, 5a – drive crank, 6 – outlet spigot, 7 – clamp of the conveyor fixing.

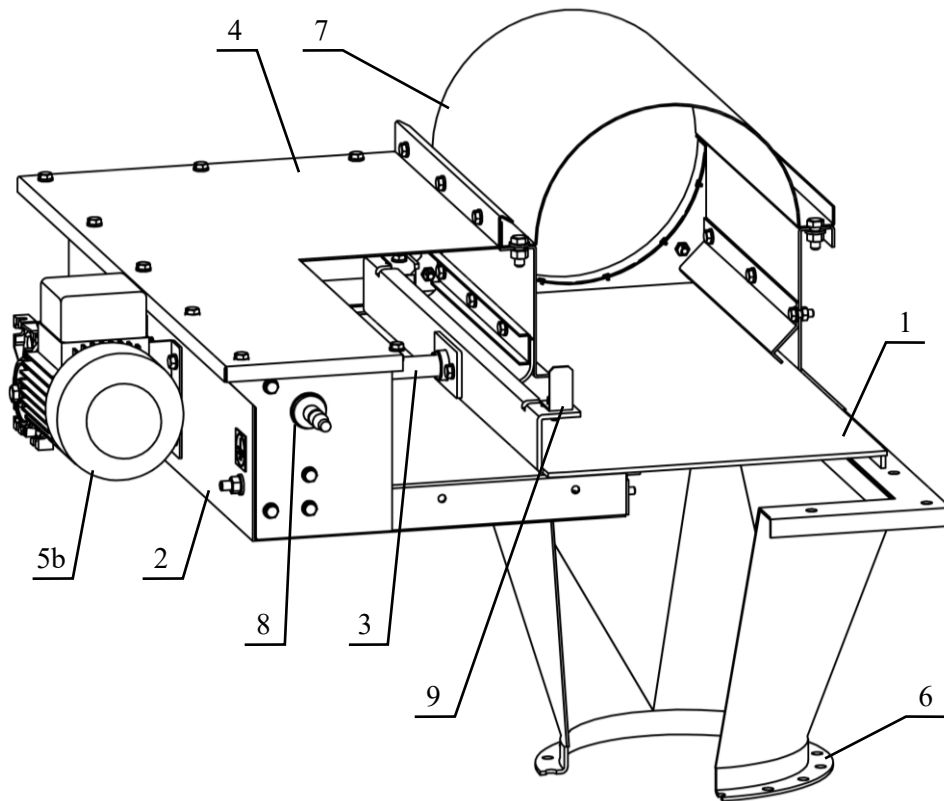


Figure 4. Design of shutters of the PSX... type - ZAS/E (driven by an electric motor) 1 – shutter plate, 2 – body, 3 – feed screw with a nut, 4 – cover, 5b – an electric motor, 6 – outlet spigot, 7 – clamp of the conveyor fixing, 8 – plate position sensor, 9 – sensor trigger.

The shutter for screw conveyors with detailed presentation of basic mechanisms is shown in Figure 3 (a shutter driven manually with a crank), and in Figure 4 (a shutter driven by an electric motor).

- 1 – the shutter plate is a basic working unit of the device. It works in the body guides, closing and opening the gap of the outlet spigot. It is equipped with a bracket with a nut for installation of a feed screw. The maximum plate shift (depending on the body design) is ca. 140 mm for PSX160-ZAS/... shutters, 210 mm for PSX220-ZAS/... shutters, and 290 mm for PSX300-ZAS/... shutters.
- 2 - the body of the shutter, in which all subunits of the device are installed, is made of galvanised metal sheet.
- 3 - the feed screw is a subunit directly ensuring the movement of the shutter plate. The screw is connected to the plate nut on one end, and to the drive unit on the other.
- 4 - the cover is installed in the upper part of the body. It is made of galvanised metal sheet and protects access to moving shutter subunits installed inside in its body.
- 5a and 5b - with either the crank or the electric motor equipped with the screw reducer, the feed screw makes a rotating movement and moves the shutter plat. When the electric motor is used as a drive, triggers and sensors of the shutter plate position need to be installed.
- 6 - the outlet spigot is installed in the bottom part of the body, under the shutter plate. The spigot outlet diameter is 200 mm in PSX160-ZAS/... and PSX220-ZAS/... shutters, and 300 mm in PSX300-ZAS/... shutters. The spigot outlet is equipped with a connecting flange for installation of various devices for grain transport.
- 7 - the conveyor fixing clamp is provided in the upper part of the shutter body. The shutter is fixed to the screw conveyor housing with the conveyor fixing clamp. The clamp enables installation of conveyors of a housing diameter of 160 mm in PSX160-ZAS/..., 220 mm in PSX220-ZAS/... shutters, and 300 mm in PSX300-ZAS/... shutters.
- 8, 9 - the plate position sensor and the trigger are units required for the correct operation of shutters driven by an electric motor. Each shutter with an electric drive is equipped with two sensors and two triggers. One of the sensors enables automatic stopping of the drive when the plate is completely shut. The other sensor enables automatic stopping of the drive when the plate is completely open. The plate position sensors are inductive sensors which, together with the drive motor, need to be connected to a correctly constructed electrical system.

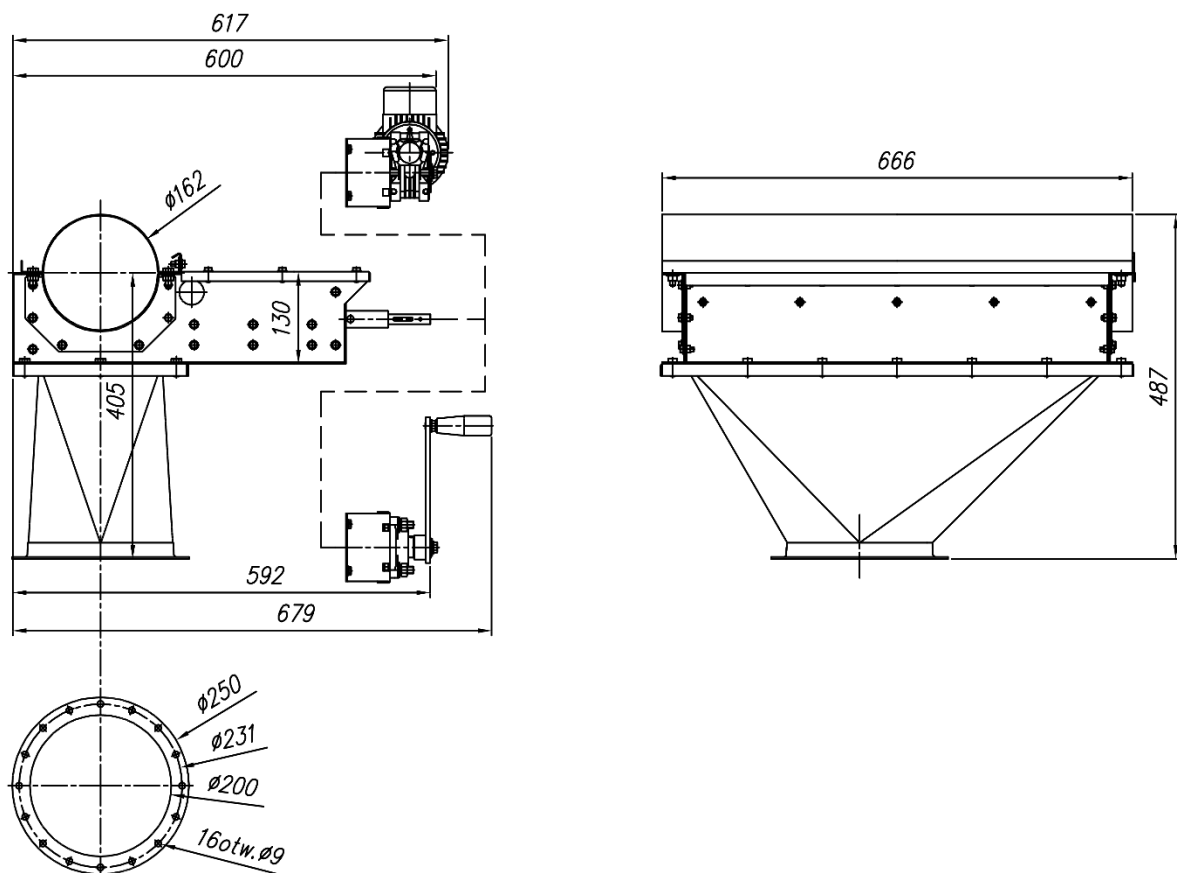


Figure 5. Basic installation dimensions of PSX160-ZAS/... shutters. (dimensions as mm).

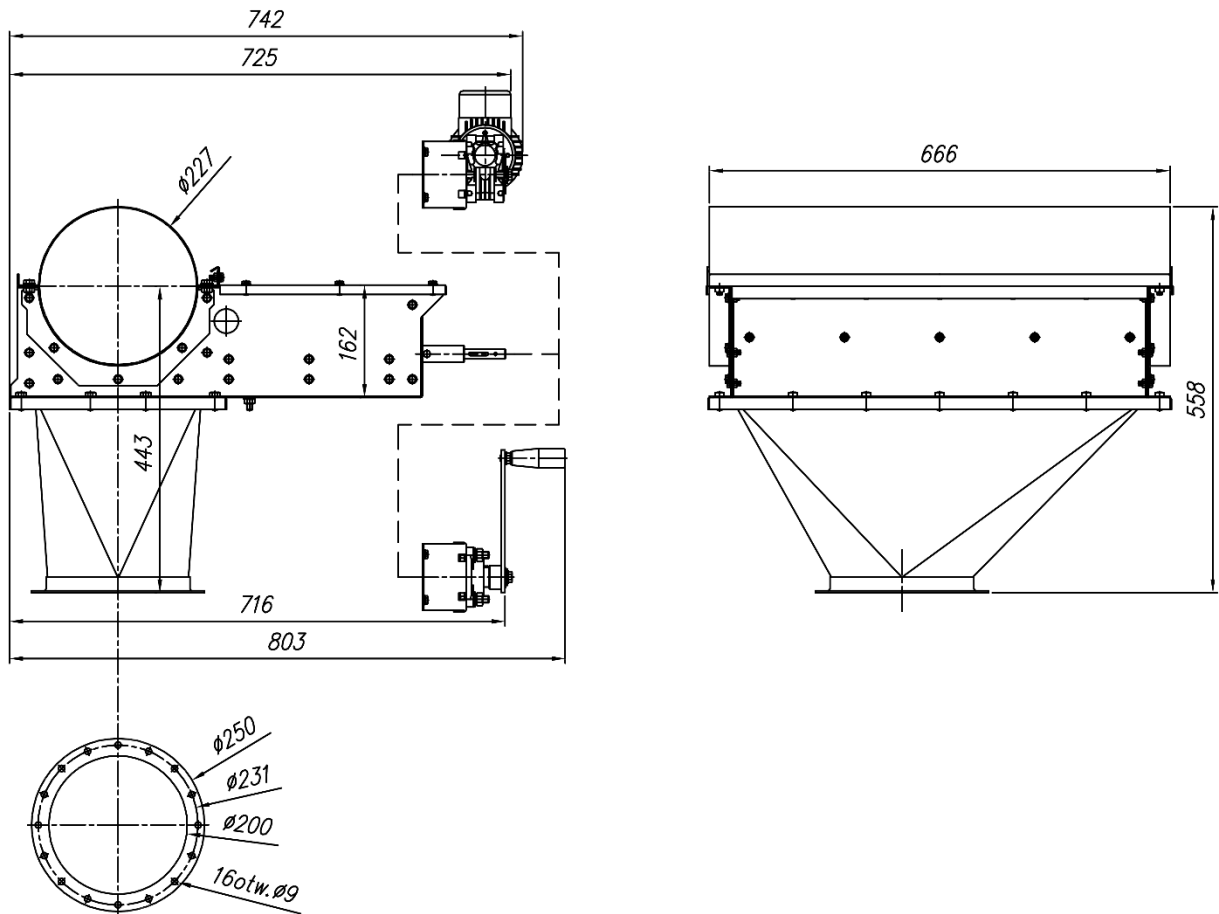


Figure 6. Basic installation dimensions of PSX220-ZAS/... shutters. (dimensions as mm).

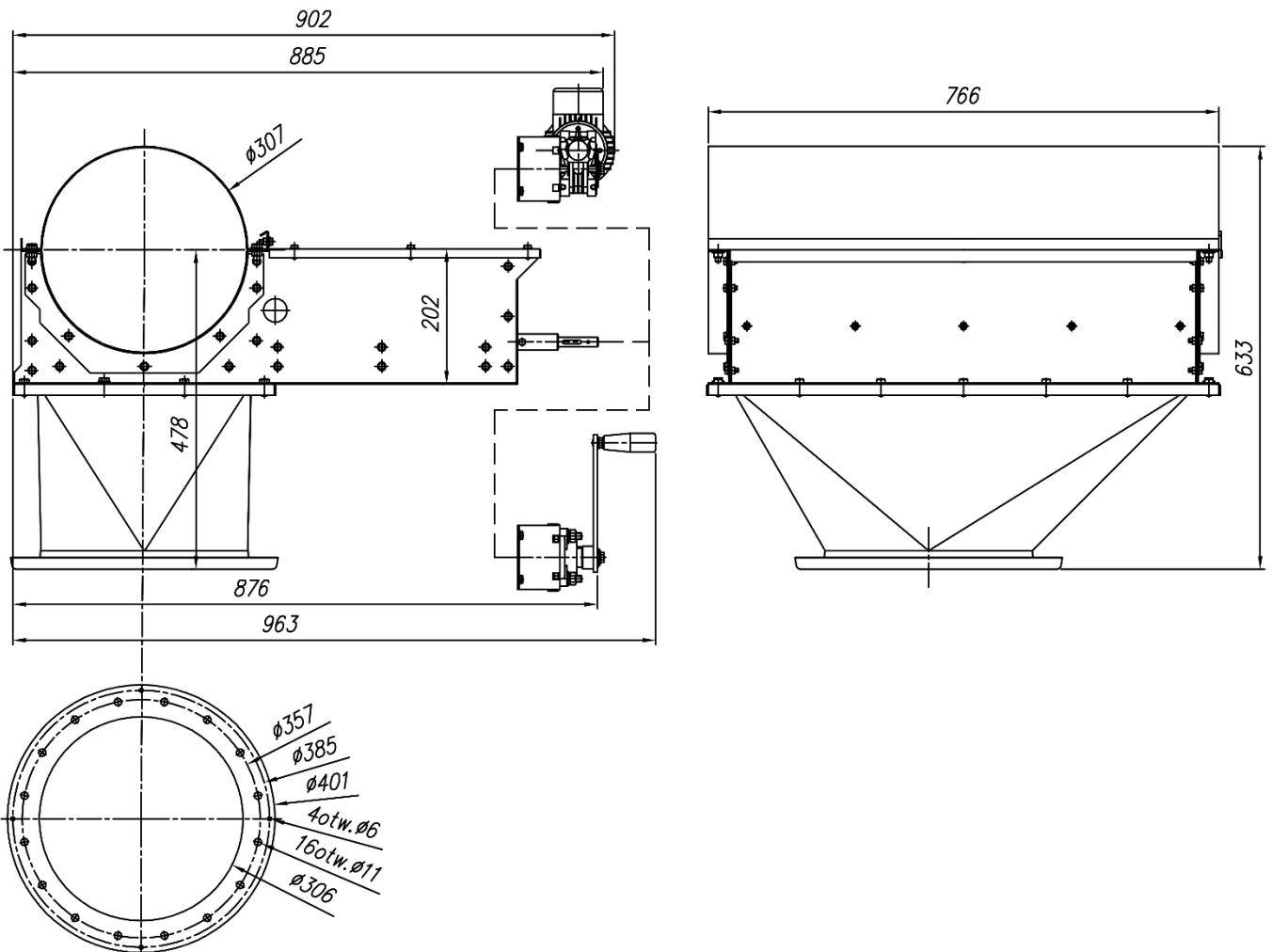


Figure 7. Basic installation dimensions of PSX300-ZAS/... shutters. (dimensions as mm).

3.1. Ordering the product

Orders for the shutter and spare parts can be placed with BIN Sp. z o.o. or with authorised BIN sales representatives. Each time, before purchasing any components a person placing the order should consult the manufacturer or a sales representative in detail about planned investment.

3.2. Transport of purchased devices

Transport of the components is arranged by a seller or the ordering person, under an additional agreement. For the transport of the components, a transport vehicle of dimensions and capacity resulting from data - Table 1 and Figure 5, Figure 6, Figure 7 is required. The cargo body of the vehicle must be provided with a tight tarpaulin. In transport, all equipment must be secured against sudden movement.



IT IS FORBIDDEN TO CARRY THE LOAD ABOVE PEOPLE AND ANIMALS



DURING TRANSPORT AND STORAGE SHUTTER SUBASSEMBLIES SHOULD BE PROTECTED AGAINST MOISTURE, ESPECIALLY COMPONENTS OF THE ELECTRICAL WIRING.

When the components become wet, they must be dried thoroughly, and their correct operation must be verified. Storage of wet elements may cause irreversible changes in the product parameters.

The manufacturer shall not be held responsible for the above-mentioned defects resulting from a failure to observe the above recommendations.

3.3. Shutter installation

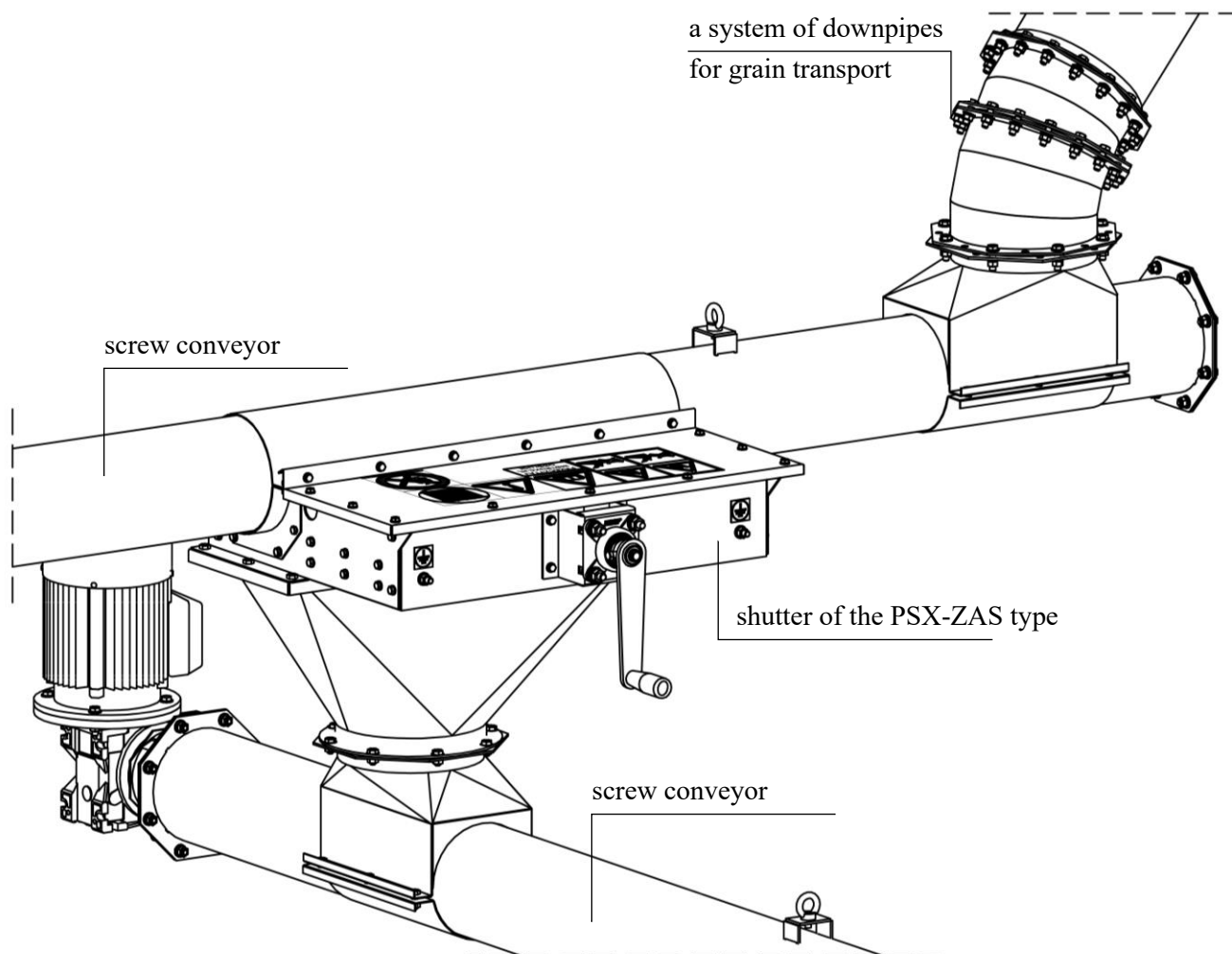


Figure 8. The example of the shutter installation for two screw conveyors



The shutter of the PSX-ZAS type cannot work alone. Both the shutter and the outlet spigot need to be connected to a screw conveyor and other devices for grain transport in such a way that there is no access to the moving plate. If the shutter is installed in a different way, guards preventing access to the moving plate need to be installed.

Installation of the shutter requires the use of special equipment, and relevant know-how. Therefore, the equipment can only be installed by installation companies authorised by BIN, excluding construction and connection to the electrical system. The installation company should cooperate with an entity ordering installation, in terms of works organisation, financial settlements, and acceptance of installation works.



When the Investor themselves or any other installation company not authorised by BIN performs installation works, the Investor is obliged to obtain the detailed shutter installation instruction from the manufacturer.

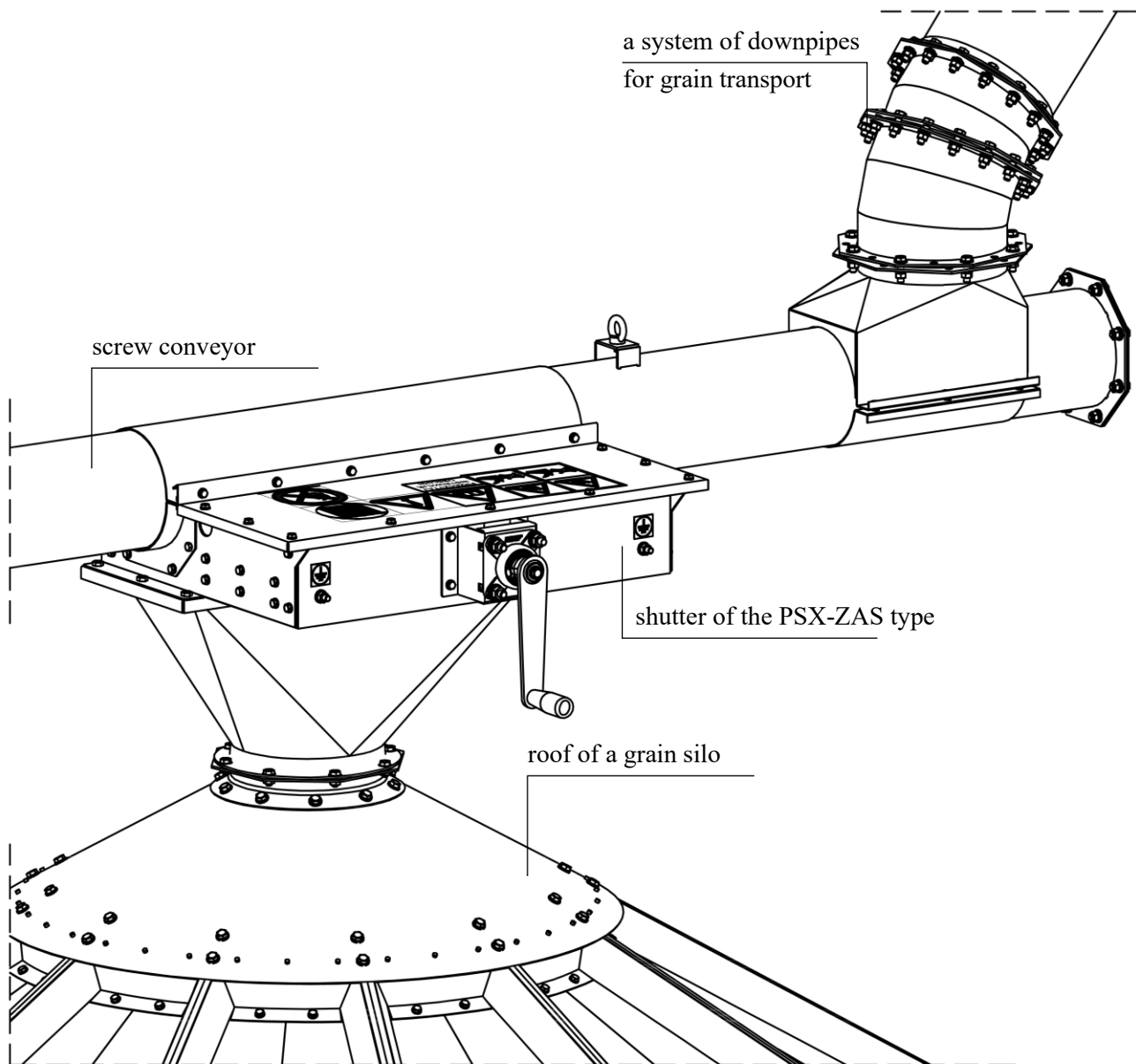


Figure 9. An example of the shutter installation to a screw conveyor and a silo.

3.4. Electric systems and start-up

The manufacturer equips shutters of the PSX-ZAS/E type with:

- (M1) three-phase electric motor;
- (SQ1 and SQ2) two inductive sensors of the intrinsically safe design.

The design documentation of the investment must include appropriate design study for the electrical system, taking into account the shutter connection, together with auxiliary equipment. The investor is responsible for ensuring that this design study is drawn up by a person holding relevant licences in accordance with current legislation. An example of the wiring diagram is shown in Figure 11.

The electrical system (Figure 11) must meet the following requirements:

- a motor (M1) correctly connected (as required by a motor manufacturer), including its effective earthing;
- motor secured by a correct connection and adjustment of the thermal switch (FT1);
- securing against unintended starting of the shutter after power outage (F2);
- an option of securing against unexpected switching of the shutter on (Q1);
- voltage supplied to all units should be within ranges specified by manufacturers of those units;
- all devices and subunits of the electrical system (Figure 11), except for the sensors (SQ1 and SQ2), should be installed outside the explosion hazard zone.

The investor is responsible for delivery (at its own expense) of all electrical equipment and units not being a part of shutter equipment, but necessary for construction of required electrical wiring. The Investor is responsible for providing guidelines of the shutter manufacturer (included in this operating manual) to a person designing and constructing the electrical system.

A person constructing the electrical system should perform the first test starting of the shutter, check correctness of the motor rotations and consistence of current values on nominal plates of the motor and the thermal switch.

The manufacturer requires a written confirmation of construction and checking of the wiring system by an electrician holding required licences.

NOTE: Devices and subunits (Figure 11): Q1, F1, F2, FT1, Z1, KM1, KM2, L1, L2, L3, L4, SB1, S1, S2 and FTP1 are not the shutter equipment.



Usually, during starting of the PSX-ZAS/E shutter, its electrical motor is subjected to the maximum load. For this reasons, the use of the “star-delta” layouts, “soft start” devices and other solutions of this kind, preventing the electric motor from reaching its full nominal capacity during its start is forbidden.

NOTE: Screw conveyors and other devices and subunits in the grain transport system working with the shutter must be effectively grounded.

NOTE: All shutters of the PSX-ZAS type must be effectively grounded. The grounding terminal of the shutter must be constructed - Figure 10.

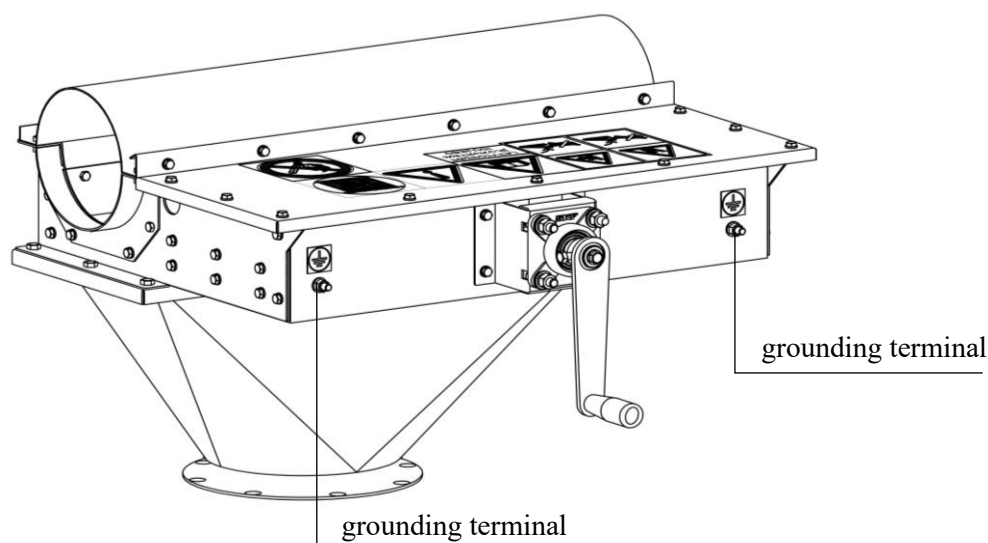


Figure 10. Grounding of shutters of the PSX-ZAS type.

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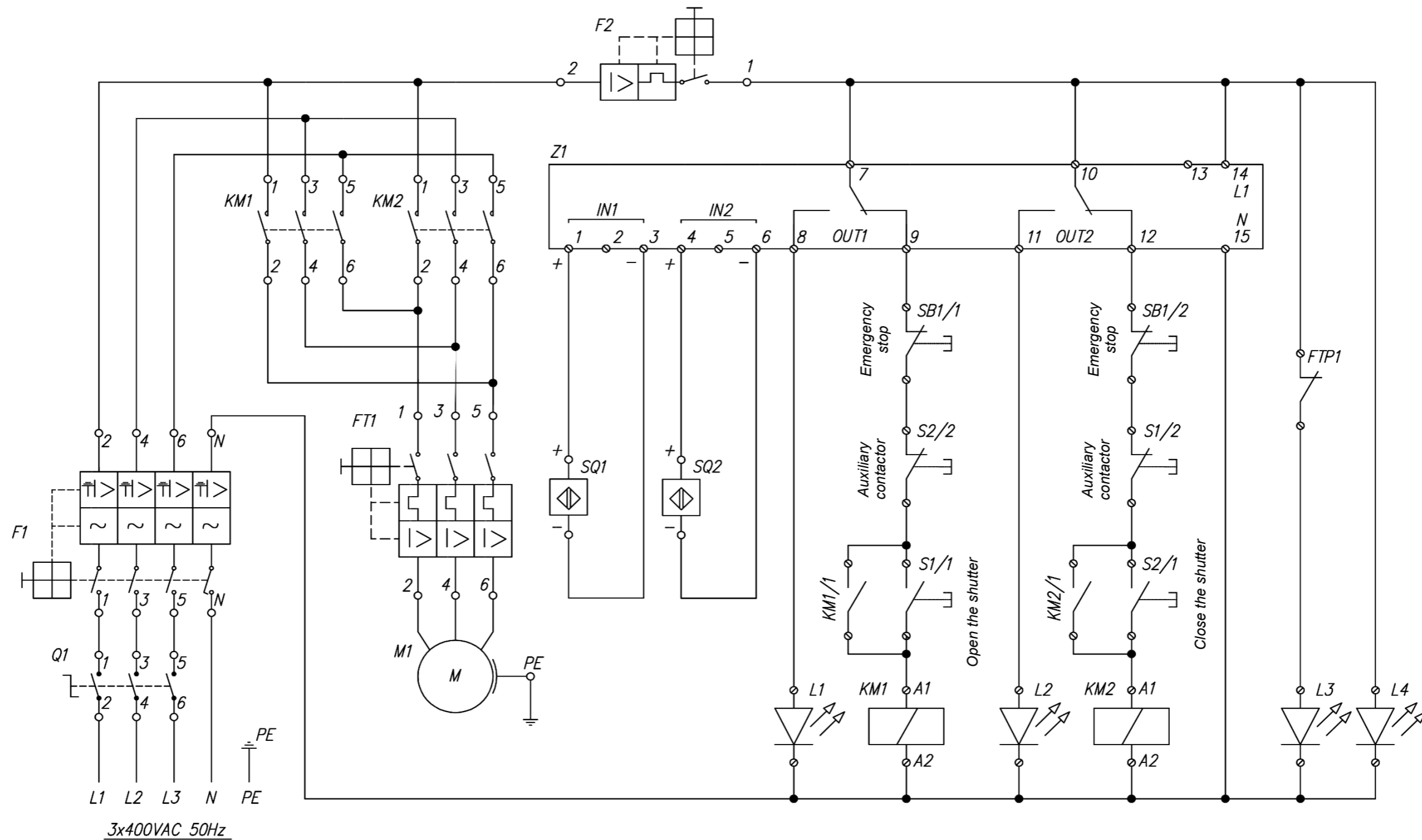


Figure 11. An example of the wiring diagram for shutters of the PSX.....-ZAS/E type

The diagram represents general guidelines for construction of the wiring system for the shutter.

The units used can be replaced by equivalent devices having identical functions.

M1 - three-phase electric motor (type: SKh56-4B2, 3x400V, 50Hz, 0.09kW, 1400 rpm, B14).

SQ1 and SQ2 - intrinsically safe inductive sensors (type: PCIN -10, manufacturer: SELS, designation: II 2D Ex ia III C T85°C Db or type: BES M30ME1-GNX15B-S04C-EEX, manufacturer: BALLUFF, designation: II 1D Ex ia III C T90°C Da).

Q1 - Cam switch 0-1 for incorporation (type: GX1610U25, 3P 10A IP65, manufacturer: LOVATO).

F1 - 3-phase differential current switch (type: CDC425J, 25A 400V 30mA, manufacturer: HAGER).

F2 - Overcurrent switch (type: PL6 286528, 1P C 2A 6kA AC PL6-C2/1, manufacturer: EATON).

FT1 - Motor switch with a push-on drive (type: GZ1E03, 0.25-0.40A, manufacturer: SCHNEIDER).

Z1 - 2-channel separation amplifier for NAMUR sensors (type: N0033A, NV1221/230VAC/RL/1D/1G, 8.2V, manufacturer: IFM, designation: II 1D Ex ia Da III C).

KM1 and KM2 - Contactor (type: LC1K1610P5, 7.5kW-380/415V, controller: 230V, 50Hz, manufacturer: SCHNEIDER).

L1, L2, L4 - Green LED control light (type: LKM220-G, 10mm, 230VAC, manufacturer: ELPROD).

L3 - Green LED control light (type: LKM220-R, 10mm, 230VAC, manufacturer: ELPROD).

SB1 - Press button, (type: M22-DRP-R, 22 mm with 2xM22-K01 contactors. manufacturer: EATON).

S1, S2 - Press button, (type: M22-D-G, 22 mm with 1xM22-K10 + 1xM22-K01 contactors, manufacturer: EATON).

FTP1 - Auxiliary contactors for motor protection, FT1 (type: GZ1AN11, manufacturer: SCHNEIDER).

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4. Operation

4.1. Shutter use



Before the shutter is started, ensure there are no people or animals at a location, to which the grain flow will be opened.



When the grain transport is completed, the shutter must always be kept in the closed position.



It is strictly forbidden to transport contaminated materials through the shutter (in particular, contaminations hindering the flow, such as twigs, straw, steel rods, ropes, and similar)



Never put your hand or any other part of your body in the operating area of the moving plate and the feed screw of the shutter.

The shutter in an open position – the start of the material flow through the shutter (Figure 12).

In shutters of the PSX-ZAS/E type, start the electric motor. In shutters of the PSX-ZAS/M type, turn the drive crank clockwise. The rotating movement of the feed screw moves the shutter plate and opens the gap of the screw conveyor and the outlet spigot of the shutter.

The electrical drive in the shutters of the PSX-ZAS/E type is equipped with inductive sensors acting as limit switches. The power supply of the electric motor is cut off automatically when the shutter is opened. In the shutters of the PSX-ZAS/M type, the resistance of the feed screw movement increases significantly when the shutter is fully open. If the resistance of the feed screw movement increases significantly, stop turning the crank of the shutter drive.

The shutter in a closed position – the end of the material flow through the shutter (Figure 13).

In shutters of the PSX-ZAS/E type, start the electric motor. In shutters of the PSX-ZAS/M type, turn the drive crank counterclockwise. The rotating movement of the feed screw moves the shutter plate and closes the gap of the screw conveyor and the outlet spigot of the shutter.

The electrical drive in the shutters of the PSX-ZAS/E type is equipped with inductive sensors acting as limit switches. The power supply of the electric motor is cut off automatically when the shutter is closed. In the shutters of the PSX-ZAS/M type, the resistance of the feed screw movement increases significantly when the shutter is fully closed. If the resistance of the feed screw movement increases significantly, stop turning the crank of the shutter drive.

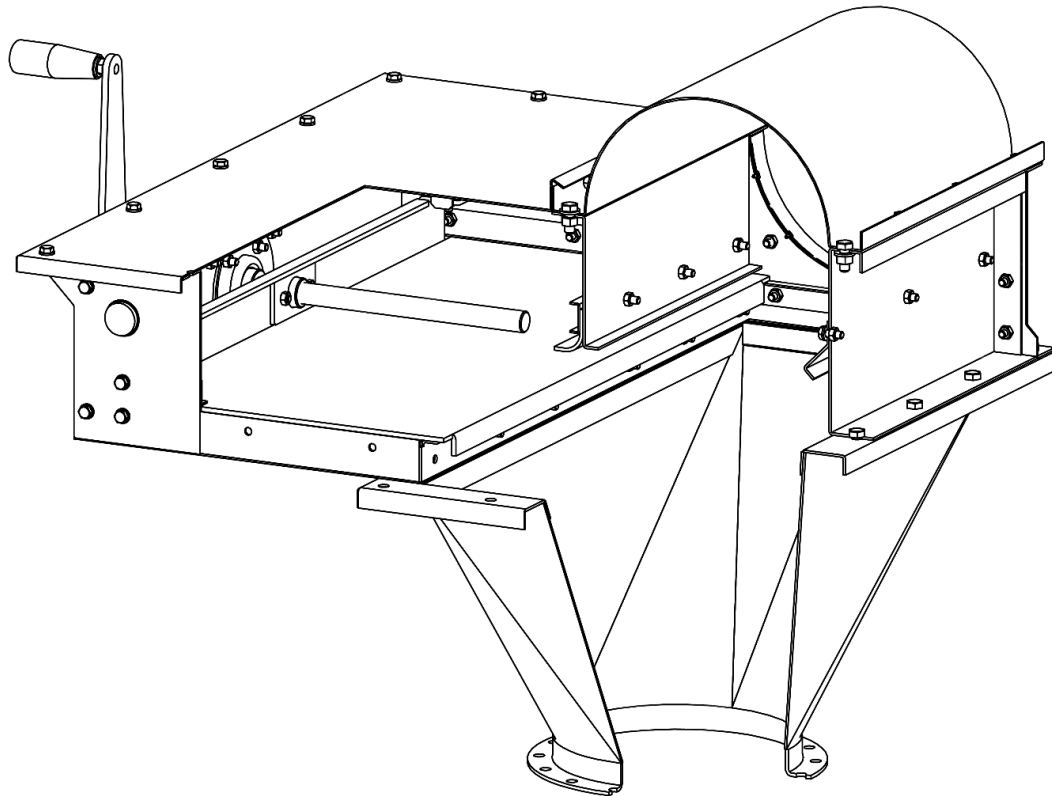


Figure 12 A shutter of the PSX-ZAS/M type in the open position - the moving plate of the shutter is outside the light of the screw conveyor and the outlet spigot.

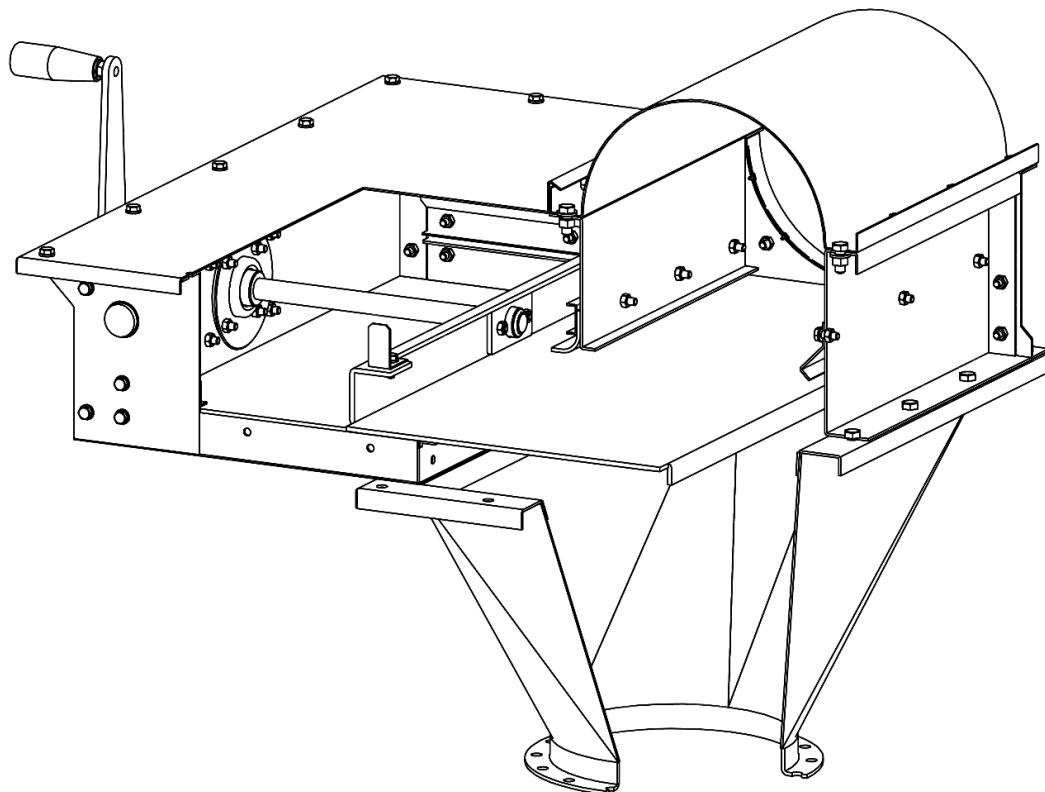


Figure 13 A shutter of the PSX-ZAS/M type in the closed position - the moving plate of the shutter is in the light of the screw conveyor and the outlet spigot.

4.2. Shutter operation

Correct and punctual maintenance inspections, maintenance and possible repairs guarantee availability of the full operational capacity of the shutters, and prevent their premature and excessive wear and development of situations posing a hazard to health and life.

1. Each time, before the shutters is started after any longer break in its operation, check its control devices, i.e., the motor switch, inductive sensors and possible other devices, if they were installed (normal operation, a direction of motor rotations, no mechanical damage, etc.). If any anomalies are found, perform necessary repairs or replace damaged subunits.
2. Perform inspections and maintenance of the electric motor, inductive sensors, switches, and other installed subunits in accordance with the requirements of manufacturers of these devices. The relevant requirements are provided in operating manuals or other documents supplied with the shutters or available at websites of manufacturers of these devices and subunits.
3. The electrical wiring system must be inspected by an authorised electrician, including effectiveness of the shutter earthing and effectiveness of the electric motor earthing (if installed). If any anomalies are found, perform necessary repairs or replace damaged subunits.



At least once a year, the Investor should order a qualified electrician holding relevant licences to inspect all electric equipment components, including measurements of earthing effectiveness.

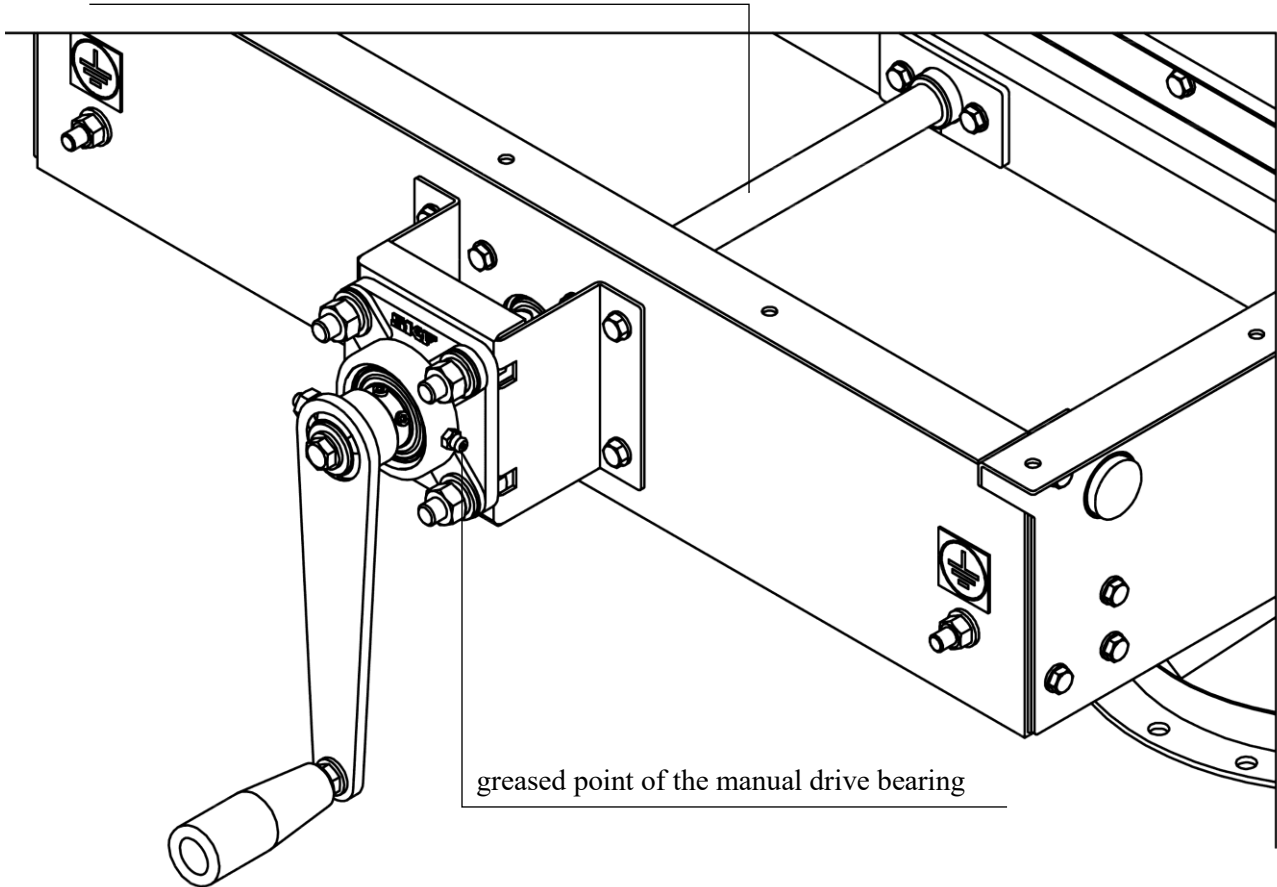
4. At least once a year, perform a visual inspection of:
 - a technical condition of welded, screwed and other connections;
 - anti-corrosion coatings;
 - the condition of the drive crank (if installed);
 - the condition of the feed screw with the nut;
 - the condition of the roller bearings (if installed);
 - other moving and fixed components.If any anomalies are found, perform necessary repairs or replace damaged subunits.
5. Anti-corrosion coating of screws can be damaged during installation (tightening). In such case, anti-corrosion coatings on damaged surfaces must be repaired.
6. The screw drive of the shutter drive contains oil that needs to be checked, refilled, and replaced at regular intervals, according to the requirements of the drive manufacturer. The relevant requirements are provided in operating manuals or other documents supplied with the shutters or available at websites of drive manufacturers. Any damages of the drive, including its sealing system, resulting in oil leaks, should be repaired immediately. For replacement or refill, use oils adopted to the ambient temperature and recommended by the drive manufacturer,
7. At least once a year check and, if necessary, refill the solid grease in the roller bearing of the manual drive.
8. At least once a year check and, if necessary, coat with a thin layer of the solid grease the surfaces of the feed screw and the nut.

To grease the bearing of the drive and the feed screw with the nut, use only the listed solid greases - *Table 2* or replacement greases not listed in this operating manual.

Table 2. Solid greases recommended for roller and slide bearings.

TOTAL	CASTROL	MOBIL
Lical EP2	Sheeprol EPL-2	Mobilux EP2
Nevastane HD2T	-	MobilGrease FM222

greased surfaces of the feed screw with the nut;



greased point of the manual drive bearing

Figure 14. Greased points of the roller bearing and the feed screw of the shutter.

9. If necessary, make new anti-corrosion coatings of the shutter and other required repairs.



All damages must be repaired immediately, and parts that are damaged or worn must be repaired or replaced with new ones.

Table 3 Anomalies (including problems and faults) during operation of the shutter of the PSX-ZAS type.

Shutter malfunction	Possible cause of the shutter malfunction	Way to remove the anomaly
The electric motor cannot be started when the shutter is being started, in any direction of rotations.	<ul style="list-style-type: none"> - no power supply to the electric motor and/or the inductive sensor - the electric motor and/or the inductive sensor is damaged - the moving plate cannot move because it is blocked or damaged 	Check, repair or replace subunits of the electrical system supplying the shutter. Repair or remove the cause of blocking of the moving plate.
The crank of the manual drive of the shutter cannot be moved in any direction.	<ul style="list-style-type: none"> - the damaged bearing of the manual drive - the moving plate cannot move because it is blocked or damaged 	Replace the bearing of the manual drive of the shutter. Repair or remove the cause of blocking of the moving plate.
When the shutter is started, the electric motor works, but the shutter plate does not move.	<ul style="list-style-type: none"> - the damaged feed screw and/or nut of the moving plate 	Repair or replace the feed screw with the nut of the plate.
The crank of the manual drive of the shutter rotates, but the shutter plate does not move.	<ul style="list-style-type: none"> - the damaged feed screw and/or nut of the moving plate 	Repair or replace the feed screw with the nut of the plate.
When the shutter with the electric drive is started, the moving plate does not open/close completely.	<ul style="list-style-type: none"> - damaged or incorrectly installed inductive sensors. 	Install correctly or replace damaged inductive sensors.
During normal operation of the shutter, the electric motor suddenly stops and the shutter operation ends.	<ul style="list-style-type: none"> - sudden lack of power supply to the electric motor - an increase in the current supplying the motor above the motor nominal value (triggered thermal switch) - temporary power outage (triggered undervoltage release) 	Restore power supply to the motor Remove the cause of the current increase (long-term overload of the shutter, incorrect setting or damage to the thermal switch). When the above causes of the motor stopping are removed, re-start the conveyor.
Uneven and unnatural sounds from the screw drive during the shutter operation.	<ul style="list-style-type: none"> - the gear damaged 	Replace the gear (gearbox)
Visible (leaking outside the shutter) dust, grain residues, or other contaminations.	<ul style="list-style-type: none"> - the shutter is not sealed correctly 	Find the place at which the shutter leaks. Seal that place with roofing sealant, after dismantling the necessary units of the shutter.
Visible (leaking into the feed screw operating area) dust, grain residues, or other contaminations.	<ul style="list-style-type: none"> - damaged seals of the moving plate of the shutter 	Replace seals of the moving plate of the shutter

4.3. Spare parts

When any shutter components are worn, damaged or lost, they can be purchased from BIN. The manufacturer does not provide for the use of spare parts from manufacturers other than BIN. To purchase spare parts, contact BIN in writing, specifying the following details:

- Device name
- Proof of purchase number;
- Device model
- Year of production
- Serial number.

Before the order is placed, the type of ordered spare parts must be precisely specified. A need for BIN representative's visit to correctly identify a part cannot be excluded. The manufacturer does not provide the shutter with spare parts.

4.4. Disassembling and disposal

When it is found that the device cannot be no longer operated:

- dismantle all shutter parts and units;
- sort the parts according to a location and a method for their disposal;
- all metal, plastic and other parts and units should be transferred to specialist entities processing and disposing of such materials;
- secure other parts against possible adverse effects on humans, animals, and the natural environment.

Disassembling and disposal should be ordered at a specialist company.

As of 25/02/2025, I approve for use the Operating Manual:
Title - "Shutter for Screw Conveyors"
Revision - 1,
issued on - 25/06/2024

Chief Constructor
Mieczysław Laskowski

.....
(signature)

5. Warranty

BIN Spółka z o. o. guarantees correct operation of the purchased product from our company. The warranty covers 12 months from the date of sales and is valid only together with a proof of sales issued to a user by us or by our representative. The warranty covers free of charge removal of defects significantly affecting product performance. Therefore, application of warranty provisions under Article 558§1 of the Civil Code is explicitly excluded.

General Guarantee Terms and Conditions.

1. The territory of the guarantee application
This guarantee is valid within the territory of Poland. The guarantor shall cover costs of transport related to an accepted guarantee complaint for a distance of up to 250 kilometres covered, according to standard rates.
2. The warranty does not apply to defects resulting from incorrect or excessive operation, natural wear of parts, or other reasons outside the manufacturer's control.
3. The warranty shall not cover any other costs not specified above, especially costs being a consequence of the equipment stoppage.
4. The guarantee becomes invalid in the following cases:
 - use of the product contrary to its intended use;
 - when installation was incorrect or any unapproved changes were made;
 - works requiring specialist licences are performed by unauthorised persons.

Specific Guarantee Terms and Conditions.

1. In the case of products:
 - with electric motors, warranty for motors is granted by their manufacturer.
 - delivered as components - a customer will verify condition of these components on delivery, and then will store them on its own responsibility until they are assembled. Flat components of galvanised sheets require special attention. They should be stored in a way ensuring a free flow of air around each component. When wet galvanised metal sheets are in contact, this results in formation of irremovable spots, even during a short storage.
2. When arrangements made during placement of an order or included in the Operating Manual include obligations for a buyer, then the warranty does not cover consequences of failure to perform or incorrect performance of these obligations.
3. Outdated financial liabilities of a buyer towards the warrantor or the seller result in a loss of the warranty rights until the outstanding liabilities are covered.

Exercising guarantee rights

The customer notifies to the seller in writing any defects found. The seller shall notify the customer about a way of handling their complaint, and a place and a time of warranty repair no later than within 14 days of receiving the notification.

Manufacturer:

BIN Sp. z o.o.
87-700 Aleksandrów Kujawski
at Narutowicza 12

.....
Seller:

(seller's signature is not required when an invoice includes a note of granting the warranty)