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## SCREW CONVEYORS

### Models:

PS220-N3/200

PS220-N4/200

PS220-N6/300

PS160-N1.5/400

PS160-N3.0/400

PSW100

PSW200

PSW220-BIN100

PSW220-BIN200

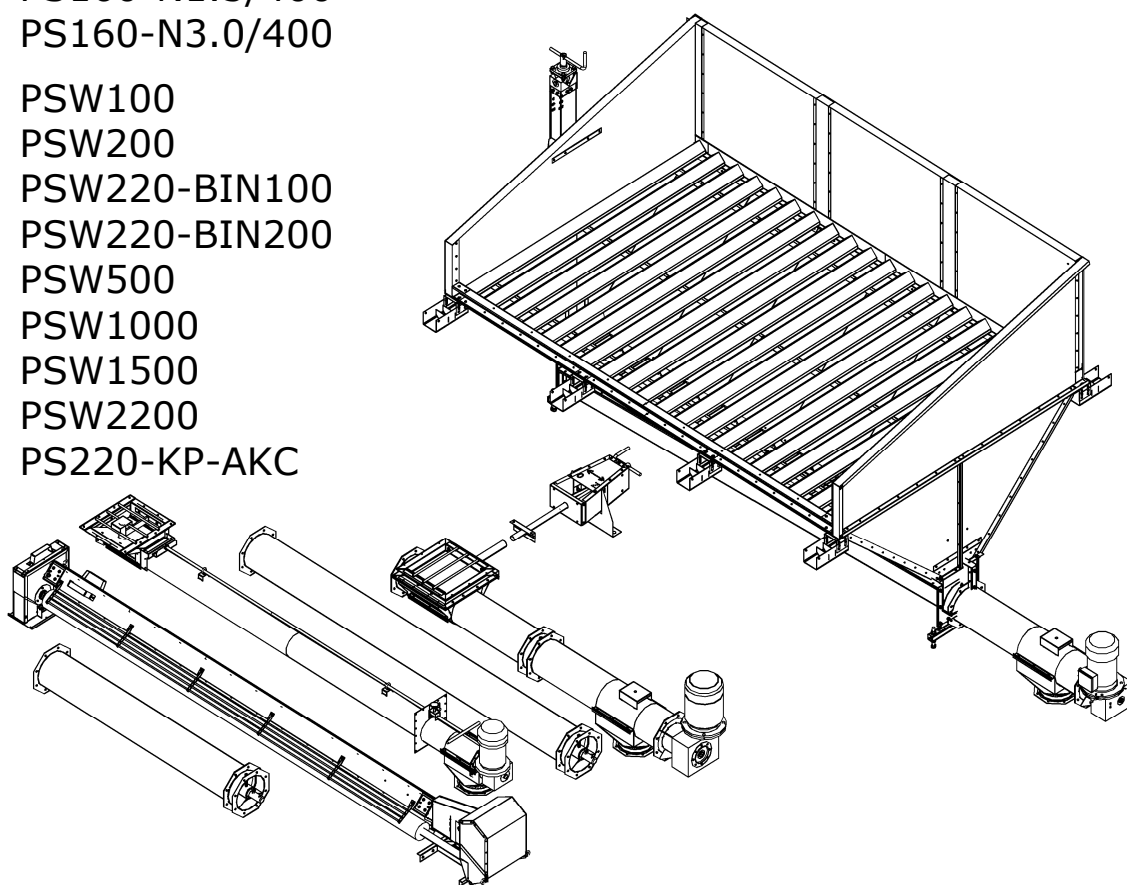
PSW500

PSW1000

PSW1500

PSW2200

PS220-KP-AKC



Model:

Year of production:

## SERVICE MANUAL

Before placing an order, the Customer may obtain comprehensive and up-to-date information on the products to be ordered. We reserve the right for introducing any changes. All rights reserved.

Duplicating, also partial, is allowed with our consent only.

**Eg**

Aleksandrów Kujawski / Format A4



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**SECTION I - GENERAL AND INTRODUCTION INFORMATION****1. Introduction**

The aim of this instruction manual is to acquaint the user with proper operation of the purchased product. It includes some practical recommendations, which must be well known to the user of screw conveyors system.

**If the text contained in this instruction manual is not understood by or not clear for the user, please, contact the producer or his representative.**



**This instruction manual is an integral part of the product.**



**Before the starting screw conveyors operation, it is required to read this instruction manual, and, in particular, the chapter concerning safety of work.**



**Each application of the equipment for purposes other than the ones specified in the instruction manual will be treated as the misuse.  
The manufacturer of the product is not responsible for damages resulting from misuse.  
The risk of the damage lies only on the user's side. All unauthorised changes to the product exclude the manufacturer's responsibility regarding any damages.**



**Screw conveyors are high power mechanical – electrical equipment.  
Misuse may cause fire, lethal electric shock, burns or other serious injury.**



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

## 2. Safety rules

### 2.1. Basic safety rules

1. People, who operate, maintain and repair conveyors, as well as the persons staying nearby, are obliged to follow the general safety regulations.
2. The user is obliged to read and understand instruction manuals for screw conveyors and for all other equipment operating with screw conveyors in question, and to follow instructions and recommendations contained in those manuals.
3. Before starting conveyors, make sure that there are no people or animals at the location, where the grain will be conveyed (silo, for example).
4. In particular, it is forbidden to:
  - operate the equipment by "third" persons, who are not familiar with the instruction manual,
  - operate the equipment by ill, intoxicated (with alcohol or drugs), or juvenile persons, etc.
5. Children and non-authorized persons cannot have an access to the location, where conveyor is operated and where are steering elements.
6. The owner of the conveyor is obliged to provide the screw conveyor with detailed occupational health and safety instruction manuals.
7. If case of insufficient lighting in the location, where conveyors are operated, provide additional general lighting.
8. Conveyor requires continuous attendance, when running.
9. Always keep conveyors and their surroundings clean.
10. It is forbidden to start the conveyor without guards, and to remove guards, when the screw conveyor runs.
11. The electric motor cannot be covered, when running. Remove the dust from the motor before each start-up. Non-compliance with the recommendations mentioned above may cause motor overheating and damage, or even fire.
12. The electric system, to which the conveyor is connected, shall be provided with proper short circuit protections, proper PE protect cable and phase-failure detectors.
13. The investor is obliged to provide proper silo grounding, if the conveyors are intended for operation with the silo.
14. Protect all electric system components against damage.
15. In case of power failure, set the O-Y-Δ switch, or master switch to "0" position, and protect it with padlock against unintentional starting. Switch off all equipment, which operates inline with the conveyor.
16. All wiring and first test start up of the conveyor must be done in accordance with wiring diagrams contained in this manual by qualified electrician with proper authorisation.
17. Electric system descriptions and diagrams contained in this manual are the general guidelines for designing the electric system for the screw conveyor by authorised persons.
18. Modifications of electric diagrams mentioned above may be done so that protection functions of devices as specified in the electric system descriptions and diagrams are maintained.
19. At least once a year, the User shall order the qualified electrician with proper authorisation to inspect all electric equipment components.
20. The power supply cable cannot be twisted or exposed to cutting. Danger of electric shock, when the power supply cable is damaged.
21. Install the power supply cable so that it cannot cause other dangers.
22. Never work with screw conveyor motor O-Y-Δ selector switch in "Y" position for longer time than 10 seconds. Continuous work with the switch in that position may cause motor damage.
23. Switch off the screw conveyor motor by smooth turning O-Y-Δ switch off to "0" position.
24. The user within his capacity shall provide the master switch with a padlock with key to prevent switching it on by unauthorized persons, as well as unintended switching on, when maintenance and repair works are carried out.
25. The user is responsible for correct wiring to the power supply network and proper operation.

26. The screw conveyor operation location must be kept so that the fire is prevented, and it should be provided with manual fire extinguishing equipment, including dry powder or carbon-dioxide extinguisher.
27. In case of fire:
  - evacuate the persons from the danger zone,
  - inform/call fire-fighting brigade,
  - disconnect the equipment from the power supply mains,
  - start to extinguish fire.
28. Never extinguish the fire of electric equipment with the use of water or foam extinguisher.
29. Before starting installation, make sure that conveyor and its components have not been damaged during transport or storage.
30. In case of when lifting the screw conveyor is necessary, use special transport eyes located at the screw conveyor body, which are marked with "UCHWYT DO PODNOSZENIA (lifting eye)" inscription.
31. Protect the master switch or O-Y-Δ switch with padlock after switching off the screw conveyor.
32. In case of danger to human's life and health, immediately switch off the equipment and disconnect it from the mains.
33. Any technical service, overhauls, or repair works may be carried out, when the power supply is switched off with the master switch and master switch is protected by means of a padlock only.
34. The investor is obliged to read and follow strictly the electric motor instruction manual.
35. If the conveyors are working with type BIN silos, the Investor is obliged to read and follow the silos instruction manual.
36. Type BIN silos, which are operated with screw conveyors, must be provided with emergency duct (by the investor, when the silos are not provided with such duct as a standard) to make possible to discharge the grain from the silo in case of screw conveyor failure or when the grain is bridged at the screw conveyor inlet.
37. It is strictly forbidden to start the PSW screw conveyor in the silo, where the central grain inlet to the under-floor screw conveyor is covered with grain (independently of the cause). Before each start-up of PSW conveyor, check if the PSW screw conveyor drive guard (in the centre line) is not covered with grain.
38. Screw conveyors intended for installation in the silo are provided with protective (limit) switches to protect the entrance through the lower manhole and with use of ladder. Protective (limit) switches mentioned above must be wired correctly, operative and used in accordance with their intended application.
39. Warning signs, identification plates and other marks present at the equipment must be kept legible and clean. In case when the signs or marks mentioned above are damaged, destroyed or the part containing them is replaced, it is necessary to buy new plates from BIN Company and place them on the product.
40. When the Investor itself or any other installation company not authorised by BIN installs the screw conveyor(s) (because of reasons, which are not dependent of the producer), the Investor is obliged to obtain the detailed screw conveyor installation instruction manual and placing warning and information signs on the product.
41. In case of the equipment is delivered without the identification plate or when the plate is damaged, the User shall inform the producer on that in writing to obtain a new identification plate.
42. It is forbidden to make any structural changes or change the application of the equipment without the producer's consent in writing.

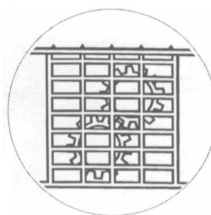
## 2.2. Information and warning signs



**READ THE INSTRUCTION  
MANUAL**



**CAUTION!  
DANGER**



**GUARDS MUST BE  
INSTALLED**



**DANGER OF  
ELECTRIC SHOCK**



**NO USING FIRE AND SMOKING**

**CE mark is located adjacent to the information plate.**



Name plate

		<b>BIN Sp. z o.o.</b> 87-700 ALEKSANDRÓW KUJAWSKI ul. Narutowicza 12, tel. (0-54) 282 22 55 e-mail bin@bin.net.pl	
Model			
Year of production			
Series number			
Weight		kg	
Useful capacity		m³	
Maximum density of material stored		kg/m³	
Power		kW	
Voltage		V	
Frequency		Hz	
Protection class		IP	
Maximum working temperature - see Operation Instruction Manual. See Operation Instruction Manual for further information.			

All information and warning signs, information plates and other information are placed on the cover of screw conveyor, close to electric motor and on the top rims of intake hopper.



**Attention!**

**Warning signs, information plates and other information located on the product shall be kept in legible and clean. In case when the signs or marks mentioned above are damaged, destroyed or the part containing them is replaced, it is necessary to buy new plates from BIN Company and place them on the product.**

### 3. Information on ordering

Place the orders for the screw conveyors and spare parts for them either at BIN Ltd. or at authorised BIN commercial representatives.

Each time, before purchasing the units, the customer shall consult in details the investment planned with the producer or its authorised commercial representative.

The producer makes complementation of conveyor together with additional equipment, spare parts, etc.

### 4. Information on transportation

Transport of units is arranged either by the seller or by the customer, on the basis of additional agreement.

For transport of units, the transport mean is necessary, which dimensions and load capacity result from the data in Section II, III, IV and V, point 1.2. It is required that the lorry is provided with tight canvass cover. All units must be protected against unwanted movements during transport.

All screw conveyors are provided with lifting eyebolts- which are marked on a product with the sign – Fig.1. Intake hoppers are delivered on 2 and 3 meters pallets.

For loading and unloading the units, use fork-lifts, which load capacity results from data contained in the Section II, III, IV, V point 1.2.



**LIFTING EYE**

**Fig.1.**

**The lifting eyes are marked with the following mark**



**IS FORBIDDEN TO CARRY THE LOADS ABOVE PEOPLE AND ANIMALS**



**PROTECT SCREW CONVEYOR'S MODULES, IN PARTICULAR ELECTRIC SYSTEM COMPONENTS, AGAINST MOISTURE, WHEN TRANSPORTING AND STORING.**

**In case of wetting, carefully dry the screw conveyor components and check their proper functioning. Storage of wet screw conveyor components may cause irreversible changes to equipment features. The producer is not responsible for over mentioned defects caused by non-compliance with recommendations contained herein**



## Section II - PS220 Conveyors

### 1. General description of the product

The list of appliances produced within the frames of PS220 screw conveyors system

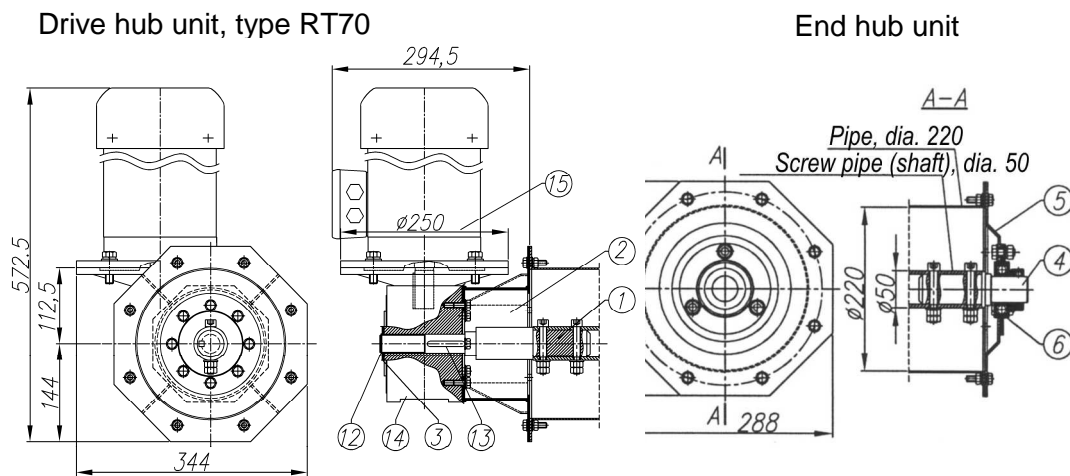


Fig..2 **PS220-N3/200**- screw conveyor Ø Ø220 – drive power P=3kW, n=200 rpm

Drive hub unit, type RT85

End hub unit

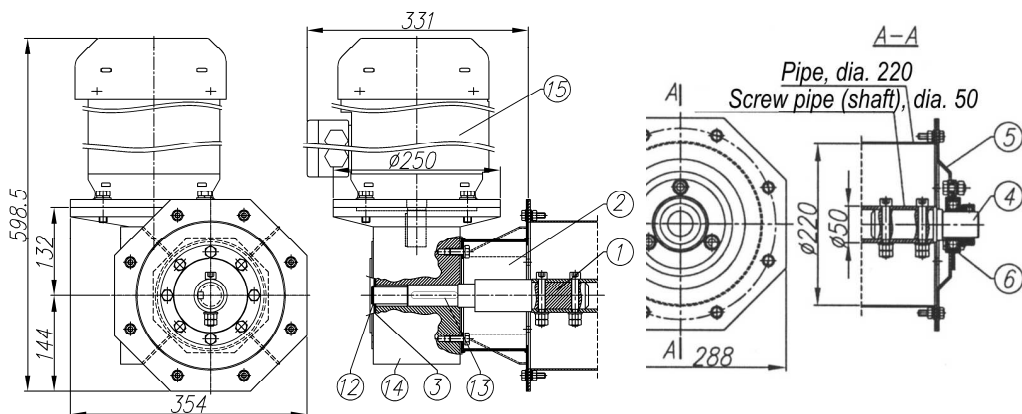


Fig.3 **PS220-N6/300**- screw conveyor ➤ Ø220 - drive power P=6kW, n=300 rpm

Drive hub unit, type RT85

End hub unit

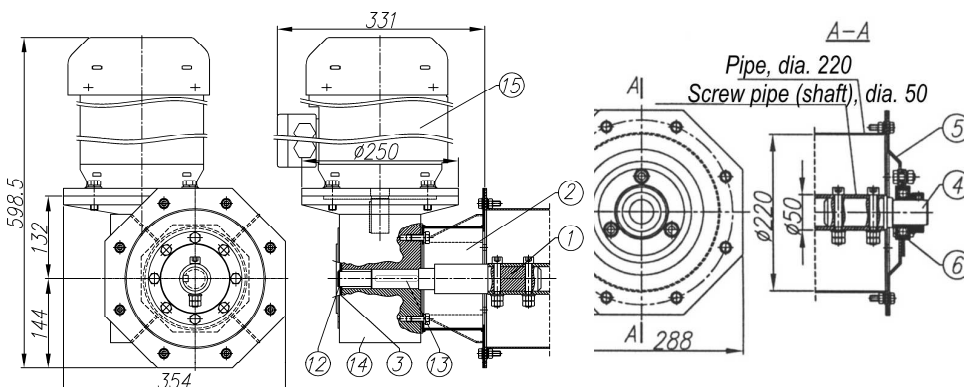


Fig..4 **PS220-N4/200**- screw conveyor Ø Ø220 – drive power P=4kW, n=200 rpm

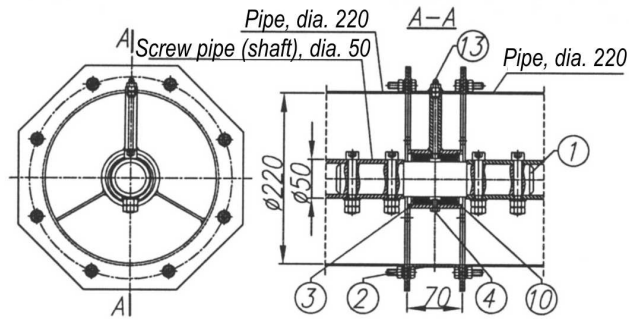


Fig.5 **PS220-LOZ/P1**- screw conveyor  $\varnothing\varnothing 220$  – polyamide intermediate bearing

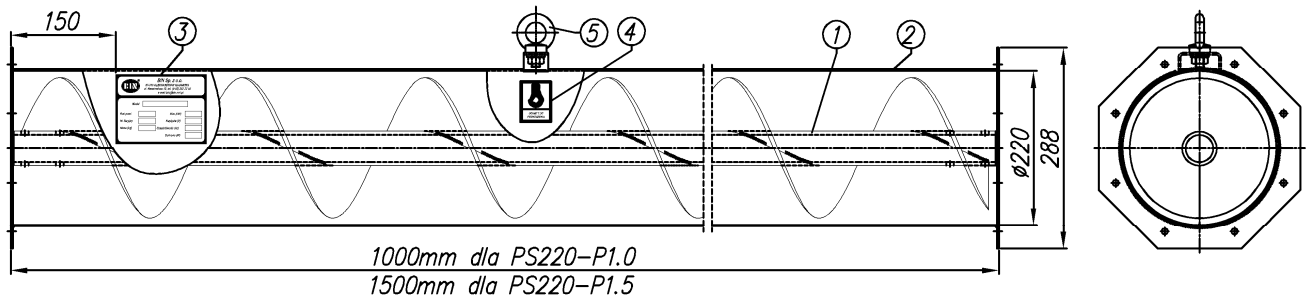


Fig.6 **PS220-P1.0**- screw conveyor  $\varnothing\varnothing 220$  – 1m screw conveyor extension  
**PS220-P1.5**- screw conveyor  $\varnothing\varnothing 220$  – 1,5m screw conveyor extension

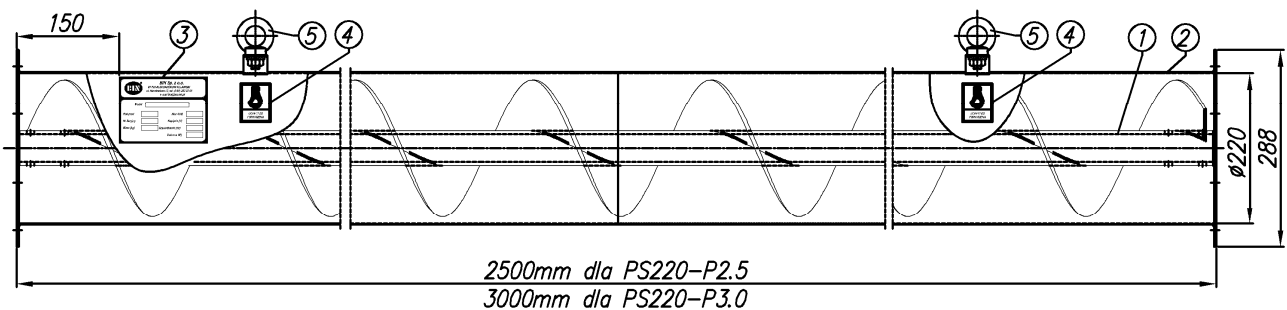


Fig.7 **PS220-P2.5**- screw conveyor  $\varnothing\varnothing 220$  – 2,5m screw conveyor extension  
**PS220-P3.0**- screw conveyor  $\varnothing\varnothing 220$  – 3m screw conveyor extension

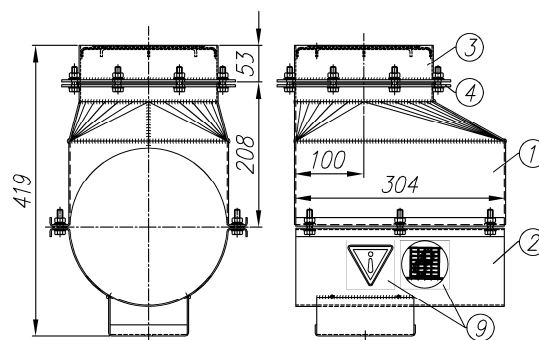
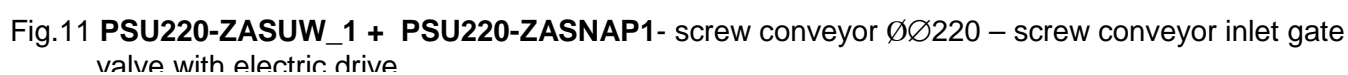
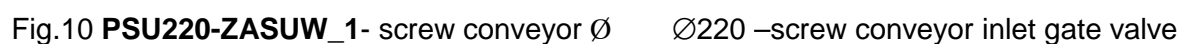


Fig.8 **PSU220-I/O-200**- screw conveyor  $\varnothing\varnothing 220$  – inlet/ outlet  $\varnothing\varnothing 200$  of screw conveyor



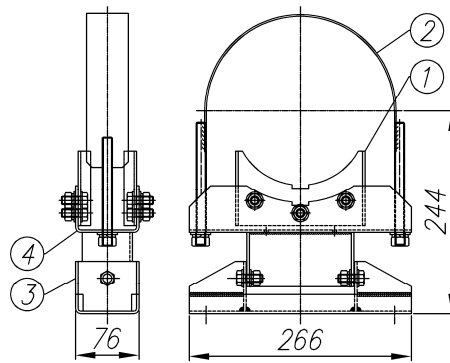


Fig.12

**MOCRUR200** - screw conveyor pipe fixing,  $\varnothing 160$  and  $\varnothing 220$

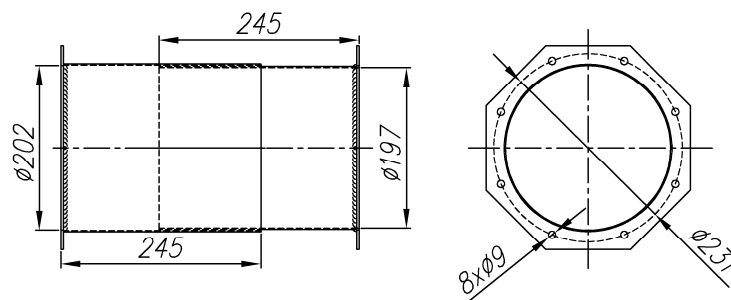


Fig.13

**RURATEL200-0.4** - telescopic pipe, maximum length 450mm

## 1.1 Construction and product application

### PS220 screw conveyor application.

Screw conveyors PS220 are intended for conveying cereal and maize grain and seeds of oily plants. Moreover, they may be used for discharging the material from under the hoppers, discharge bins, tanks and other conveyors to move it to another tanks or conveyors. In particular, they are suitable for conveying the grain to/from silos produced by the BIN Company and to move the grain between two silos, as well as to transport it to the intake hopper, bucket elevator, etc.

### PS220 screw conveyor construction.

The PS220 screw conveyor structure consists of units (modules). All units produced within the frames of PS220 screw conveyor system are shown in the Section II, point 1, of this manual. Selection of units depends on processing and technical requirements and investor's needs.

Structure of individual modules is as follows:

- **PS220-N3/200**

Drive power  $P = 3$  kW,  $n = 200$  rpm (see Fig. 2) consists of the worm reducer, 14, reduction ratio  $i = 7$ , driven by the electric motor, 15, motor power 3 kW and motor revolutions 1500 rpm; the reducer is mounted to the special adapter, 2, which makes possible to install other PS220 screw conveyor system modules. The drive hub, 1, which is mounted to the reducer with the use of key joint, 13, circlip, 12, and hexagonal washer, 3, transfers the drive power from the electric motor, 15, via the reducer, 14. Moreover, the PS220-N3.0/200 includes the end hub unit (module), which comprises the end flange, 5, to which the bearing unit, 6, with end journal, 4, is mounted. The complete module also includes bolts, nuts and washers, which are necessary to install other PS220 system modules, as well as safety (warning) signs (stickers), identification plate and electric equipment.

- **PS220-N6/300**

Drive power  $P = 6 \text{ kW}$ ,  $n = 300 \text{ rpm}$  (see Fig. 3) consists of the worm reducer, 14, reduction ratio  $i = 10$ , driven by the electric motor, 15, motor power 6 kW and motor revolutions 3000 rpm. The motor is started by means of 0-Y-□ selector switch. The reducer is mounted to the special adapter, 2, which makes possible to install other PS220 screw conveyor system modules. The drive hub, 1, which is mounted to the reducer with the use of key joint, 13, circlip, 12, and hexagonal washer, 3, transfers the drive power from the electric motor, 15, via the reducer, 14. Moreover, the PS220-N6.0/300 includes the end hub unit (module), which comprises the end flange, 5, to which the bearing unit, 6, with end journal, 4, is mounted. The complete module also includes bolts, nuts and washers, which are necessary to install other PS220 system modules, as well as safety (warning) signs (stickers), identification plate and electric equipment.

- **PS220-N4/200**

Drive power  $P = 4 \text{ kW}$ ,  $n = 200 \text{ rpm}$  (see Fig. 4) consists of the worm reducer, 14, reduction ratio  $i = 7$ , driven by the electric motor, 15, motor power 4 kW and motor revolutions 1500 rpm; the reducer is mounted to the special adapter, 2, which makes possible to install other PS220 screw conveyor system modules. The drive hub, 1, which is mounted to the reducer with the use of key joint, 13, circlip, 12, and hexagonal washer, 3, transfers the drive power from the electric motor, 15, via the reducer, 14. Moreover, the PS220-N4.0/200 includes the end hub unit (module), which comprises the end flange, 5, to which the bearing unit, 6, with end journal, 4, is mounted. The complete module also includes bolts, nuts and washers, which are necessary to install other PS220 system modules, as well as safety (warning) signs (stickers), identification plate and electric equipment.

- **PS220-LOZ/P1**

Polyamide intermediate bearing (see Fig. 5), consisting of the bearing casing, 2, in which the slide bearing, 3, is mounted and protected by means of circlips, 10, and bolt, 4. The slide bearing, 3, is intended for installation of the intermediate hub, 1, and it is lubricated via the special lubrication bore ended with the greasing nip, 13. The complete module also includes bolts, nuts and washers, which are necessary to install other PS220 system modules.

- **PS220-P1.0**

Screw conveyor extension (see Fig. 6), extension length 1 m, which includes the screw, 1, length 990 mm and diameter 200 mm, and screw casing (extension pipe), 2, length 1000 mm and diameter 220 mm. The extension casing, 2, is provided with the transport eye, 5, marking sticker, 4, and identification plate, 3.

- **PS220-P1.5**

Screw conveyor extension (see Fig. 6), extension length 1.5 m, which includes the screw, 1, length 1490 mm and diameter 200 mm, and screw casing (extension pipe), 2, length 1500 mm and diameter 220 mm. The extension casing, 2, is provided with the transport eye, 5, marking sticker, 4, and identification plate, 3.

- **PS220-P2,5**

Screw conveyor extension (see Fig. 7), extension length 2.5 m, which includes the screw, 1, length 2490 mm and diameter 200 mm, and screw casing (extension pipe), 2, length 2500 mm and diameter 220 mm. The extension casing, 2, is provided with the transport eye, 5, marking sticker, 4, and identification plate, 3.

- **PS220-P3,0**

Screw conveyor extension (see Fig. 7), extension length 3 m, which includes the screw, 1, length 2990 mm and diameter 200 mm, and screw casing (extension pipe), 2, length 3000 mm and diameter 220 mm. The extension casing, 2, is provided with the transport eye, 5, marking sticker, 4, and identification plate, 3.

- **PSU220-I/O-200**

Screw conveyor inlet/outlet, diameter 200 mm (see Fig. 8), which consists of the body, 1, which, together with the clamp, 2, makes possible installation of this unit to the screw conveyor casing (pipe), diameter 220 mm. In order to ensure the proper safety level, the inlet/outlet module is provided with the guard, 3, which is mounted to the flange, 4, by means of bolts.

- **PSU220-WL-CENT**

The central inlet from the silo to the screw conveyor (see Fig. 9). This is a module, with the use of which the PS160 or PS220 screw conveyor system may be operated as the under-floor discharge screw conveyor to discharge the BIN type silo. This module consists of the body, 1, which is mounted to the BIN silo bottom and to PS220 or PS160 screw conveyor at the other end. The central inlet may be mounted to the PS160 screw conveyor with the use of seal, 12, and clamp, dia. 160, 13. In the module body, 1, the gate valve is installed that is operated by means of the pull link, 7, connected to the control lever, 5, which is fixed to the silo side wall (shell) and to foundation plate with the use of extension bolts, 6. In order to ensure proper safety level, the central inlet module is provided with the guard, 3, which is mounted to the body, 1. Moreover, this module includes the silo shell mask, 8, with PS220-LOZ/P1 intermediate bearing lubrication system parts, 9 and 10, mounted to it, and, in addition, the PS160 silo shell mask, 11. In case the central inlet module is mounted to the PS160 screw conveyor, use the PS160 silo shell mask, 11, with PS160-LOZ/P1 intermediate bearing lubrication system parts, 9 and 10, mounted to it previously.

- **PSU220-ZASUW\_1**

Screw conveyor inlet gate valve (see Fig. 10 and 11), consisting of the body, 2, which, together with the clamp, 4, makes possible to install it in the PS220 screw conveyor system. In the body, 2, the gate valve is installed that is operated: either manually, via the control lever (see Fig. 10), or via the motoreducer, 1 (see Fig 11). In order to ensure the proper safety level, the central inlet module is provided with the guard, 3, which is mounted to the body flange, 2.

- **MOCRUR200**

Screw conveyor pipe fixing device, diameter 160 and diameter 220 (see Fig. 12), consisting of a split base (the fixed base part, 3, to be secured to the floor, and the adjustable base part, 4, to which the PS220 screw conveyor is installed with various slope angles in relation to the floor) and the clamp, 2. To the adjustable part, 4, diameter reduction parts, 1, are mounted, which shall be removed, when installing diameter 220 mm pipes. When installing diameter 160 mm pipes, use the diameter reduction parts, 1.

- **RURATEL200-0.4**

Telescopic pipe, maximum length 450 mm (see Fig. 13), consisting of two pipe sections, each 245 mm long. One of pipe section is of the inner diameter 202 mm, and it may be inserted into the second pipe section, inner diameter 202 mm. Both pipe sections are provided with identical flanges for connecting them to the PS220 screw conveyor system modules and other equipment.

## 1.2. PSP SCREW CONVEYOR SPECIFICATIONS

		PS220-N3/200	PS220-N6/300	PS220-N4/200	PS220-LOZIP1	PS220-P1.0	PS220-P1.5	PS220-P2.5	PS220-P3.0	PSU220-I/O-200	PSU220-WL-CENT	PSU220-ZASUW_1	PSU220-ZASUW_1 + PSU220-ZASNAP1	MOCRUR200	RURATEL200-0.4
Motor type		Skg100L4B	Skg112M2PC	Skg112M4	-	-	-	-	-	-	-	-	Skg564B	-	-
Motor nominal power	kW	3.0	6.0	4.0	-	-	-	-	-	-	-	-	0.09	-	-
Motor rpms	Obr/min	1500	3000	1500	-	-	-	-	-	-	-	-	1380	-	-
Power supply voltage	V	3x400	3x400	3x400	-	-	-	-	-	-	-	-	3x400	-	-
Frequency	Hz	50	50	50	-	-	-	-	-	-	-	-	50	-	-
Protection class (IP)		54	54	54	-	-	-	-	-	-	-	-	54	-	-
Screw conveyor rpms	Obr/min	200	300	200	-	-	-	-	-	-	-	-	-	-	-
Screw diameter	mm	-	-	-	-	200	200	200	200	-	-	-	-	-	-
Total length	mm	-	-	-	250	1000	1500	2500	3000	304	-	607	607	-	max.450
Total height	mm	573	599	599	-	-	-	-	-	419	311	448	448	360	-
Inlet/outlet dimensions (diameter)	mm	-	-	-	-	-	-	-	-	200	315x315	200	200	-	202/197
Weight	kg	56	69	68	7	26	37	58	68	12	74	25	30	6	7

Table 1 Specifications of PS220 screw conveyor system

For all equipment included in the Instruction Manual, the equivalent acoustic pressure level does not exceed 70 dB (A).

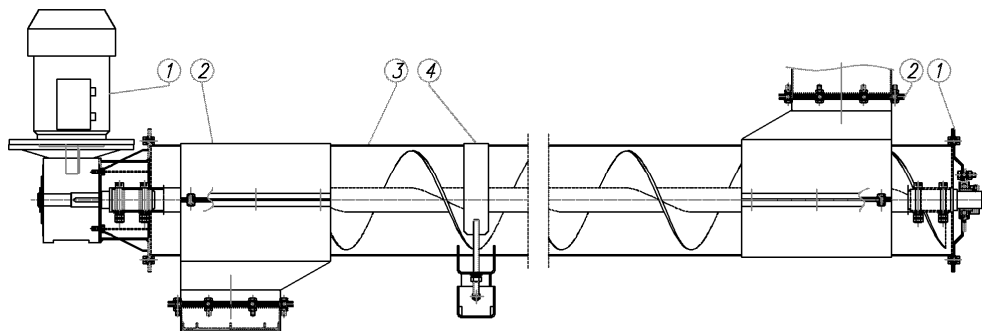


Fig.14: PS220— basic version

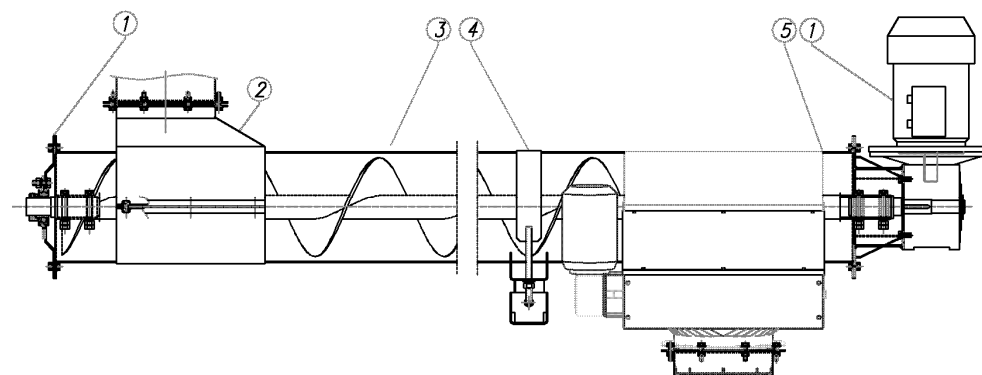


Fig.15: PS220— version with PSU220-ZASUW\_1 and PSU220-ZASNAP1

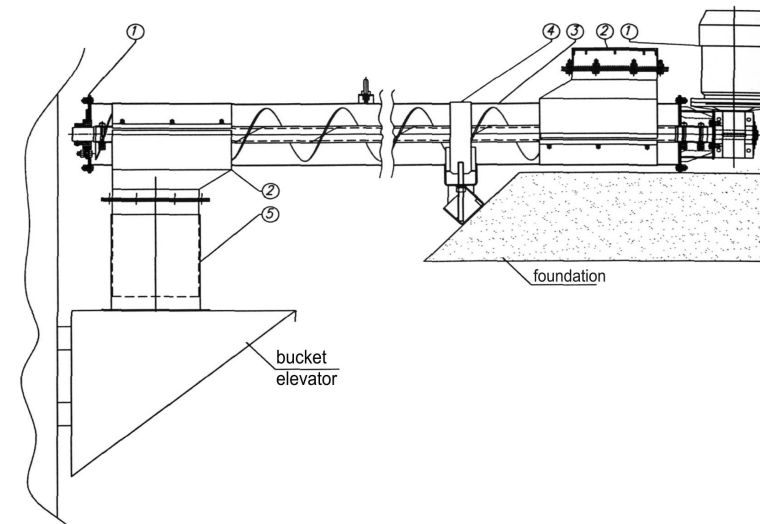


Fig. 16: PS220 – version with RURATEL200-0.4

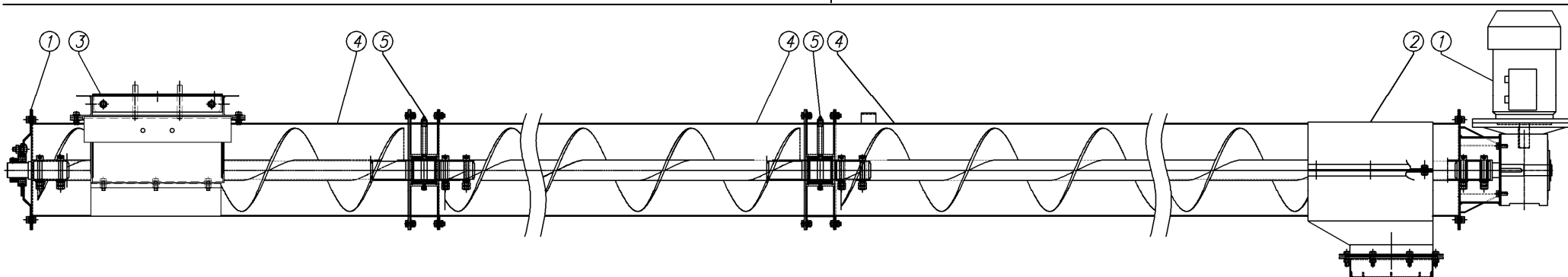


Fig. 17: PS220 – version with PSU220-WL-CENT.

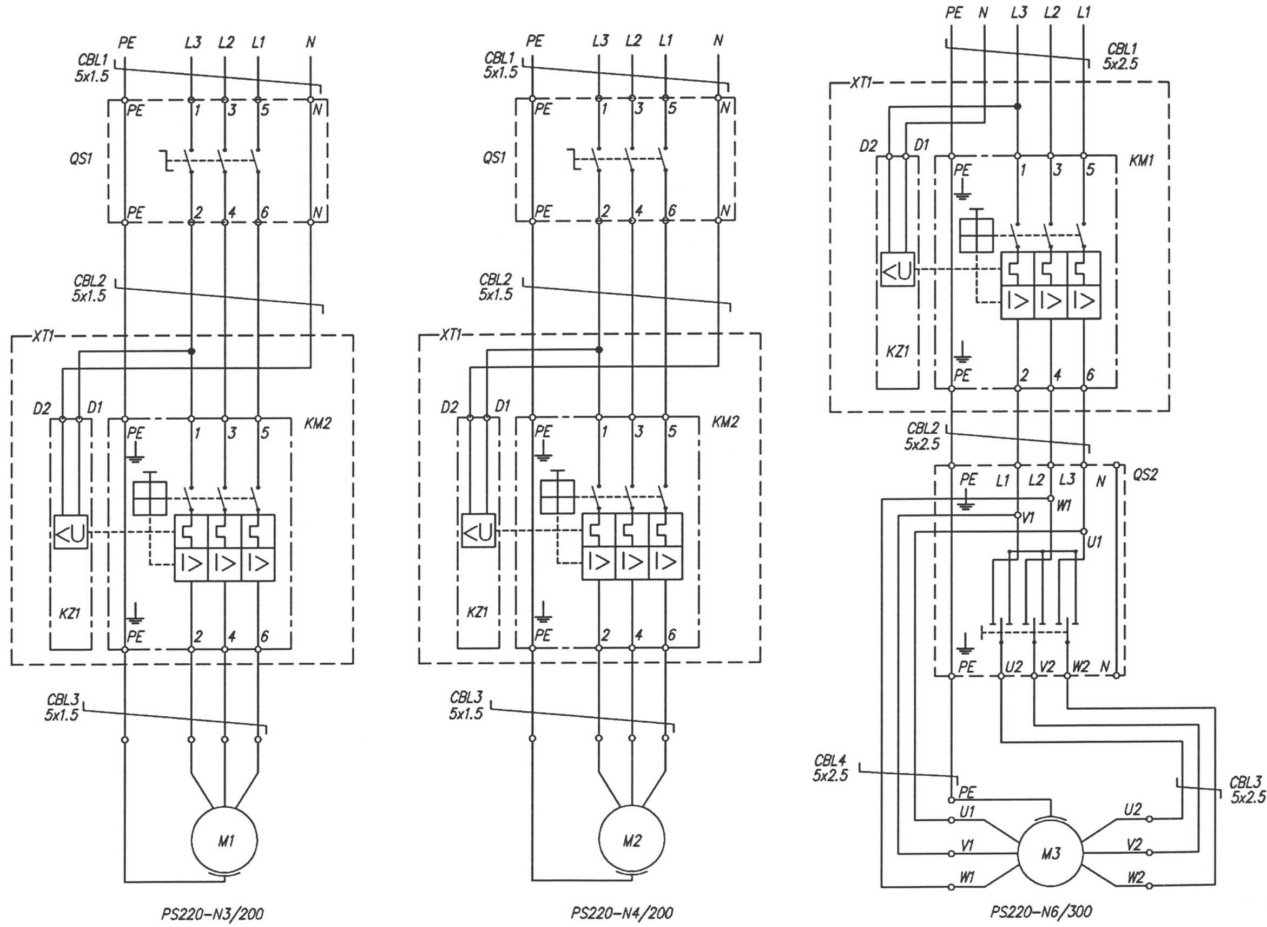



- a) The simplest version of the screw conveyor made on the basis of PS220 system modules (see Fig. 14) consists of the following: drive, 1, PS220-N3/200 or PS220-N4/200 or PS220-N6/300; screw conveyor extension, 3, PS220-P1.0 or PS220-P1.5 or PS220-P2.5 or PS220-P3.0; inlet/outlet, 2, PSU220-I/O-200 (2 pieces) and fitting MOCRUR200, where number of pieces depends on installation conditions and screw conveyor length (the rule is that the screw conveyor should be secured every 4.5 m).
- b) When very long screw conveyor is needed (see Fig. 17) (however, the total screw conveyor length cannot exceed 9 m for drives PS220-N3/200 and PS220-N6/300 and 12 m for drive PS220-N4/200), install few screw conveyor extension pieces, 4, with the use of intermediate bearings, 5, PS220-LOZ/P1.
- c) The use of the telescopic pipe (see Fig. 16), 5, RURATEL200-0.4, makes possible to adapt the screw conveyor to another equipment, such as bucket elevators, silos, etc.
- d) If there is a need to close the screw conveyor outlet (see Fig. 15), use the outlet gate valve, 5, either PSU220-ZASUW\_1 – manually controlled one, or PSU220-ZASNAP1 – electrically controlled one.
- e) PS220 screw conveyors may be used as under-floor ones for discharging BIN type silos (see Fig. 17). To do that, add the central inlet, 3, PSU220-WL-CENT.

### 1.3. Electric system

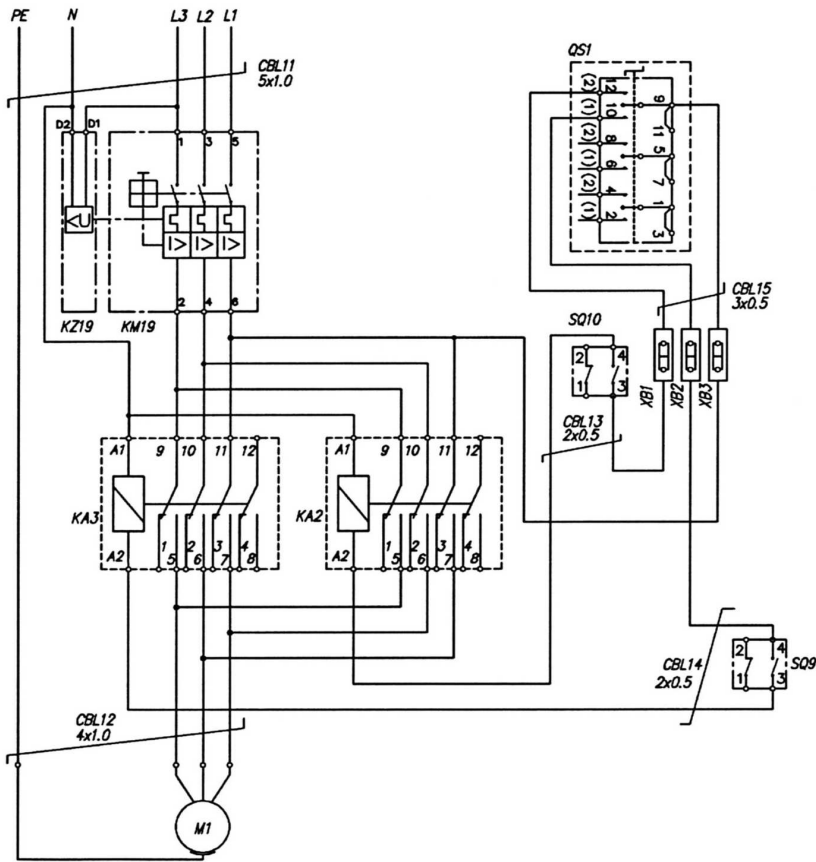
The producer provides screw conveyors with all electric devices necessary for proper installation, excluding power supply cables. The Investor shall order the qualified electrician with proper authorization to install the electric system in accordance with the wiring diagrams shown below. Electric system descriptions and diagrams contained in this manual are the general guidelines for designing the electric system for the screw conveyor by authorized persons. Modifications of electric diagrams mentioned above may be done so that all protection functions of devices as specified in the electric system descriptions and diagrams are maintained.

All controls shall be installed in the location, which ensures safe operation of the equipment. When making electric installation, comply with requirements and recommendations for other equipment, which will operate with screw conveyors. Because of many various screw conveyor configurations, the BIN Company does not deliver electric cables for screw conveyors. The User is obliged to supply (at his cost) proper quantity of cables of proper type in accordance with the requirements contained in this manual.

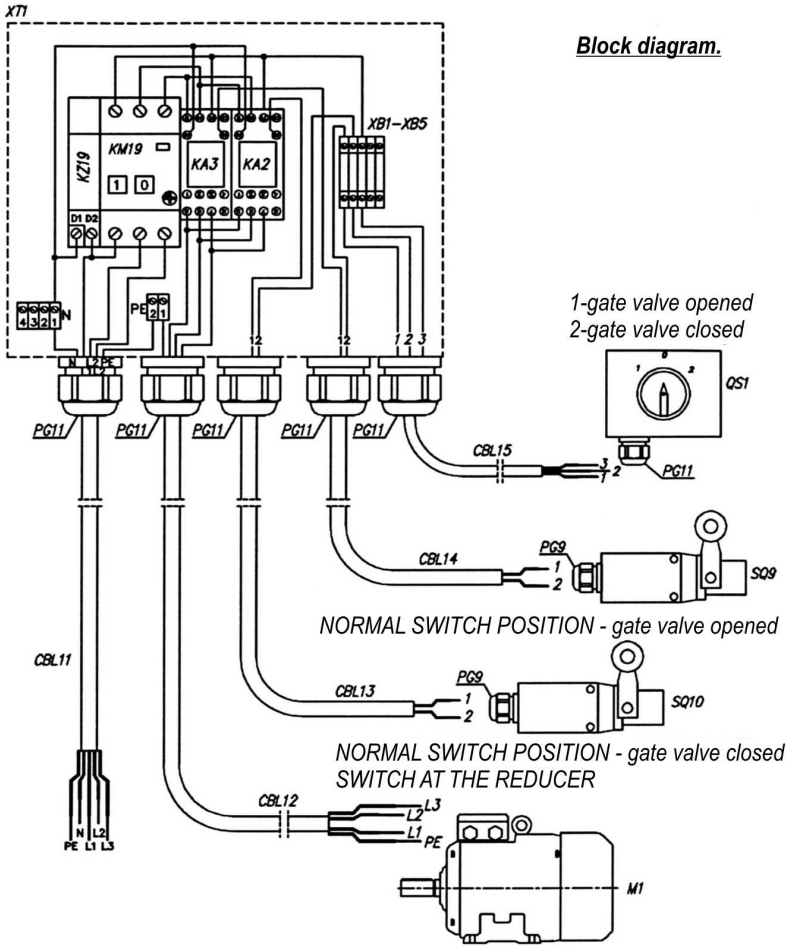


9	XT1	GV2-MC	Telemecanique	Motor protection switch casing	NOTES: 1. The wiring diagram is the general guideline for designing the electric system. 2. Modifications of electric diagrams may be done so that all protection functions of devices are maintained.					
8	QS2	ŁK25R-4.831 OB2Z	SPAMEL	Selector switch 0-Y-Δ						
7	QS1	ŁK25R-2.8211 OB2Z	SPAMEL	Main; master switch						
6	KZ1	GZ1-AU225	Telemecanique	Undervoltage protection (230V)	Designed by:				Unit/part name: <b>Electric system – basic diagram</b> <b>PS220-N3/200</b> <b>PS220-N4/200</b> <b>PS220-N6/300</b>	
5	KM2	GZ1-M10	Telemecanique	Motor protection switch , range 4.0-6.3A	Drawn by:					
4	KM1	GZ1-M14	Telemecanique	Motor protection switch, range 6.0-10A	Checked by:					
3	M3	Skg112M-2PC	TAMEL	P = 6.0 kW, n = 3000 rpm, B5		Name	Signature	Date		
2	M2	Skg112M-4	TAMEL	P = 4.0 kW, n = 1500 rpm, B5						
1	M1	Skg100L-4B	TAMEL	P = 3.0 kW, n = 1500 rpm, B5	Scale:		"BIN" Sp. z o.o. Aleksandrów Kuj.	Drwg. No.: <b>PS220-084-00</b>	Equipment symbol:	Format:
Pos.	Symbol	Type	Producer	Notes						

Basic diagram.

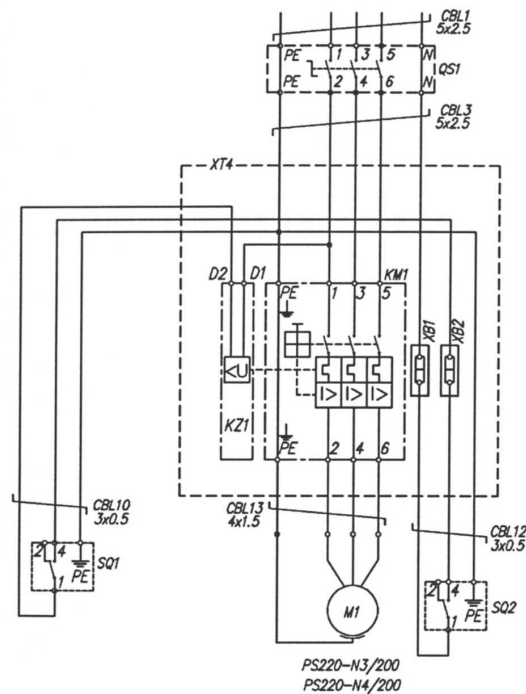


Block diagram.

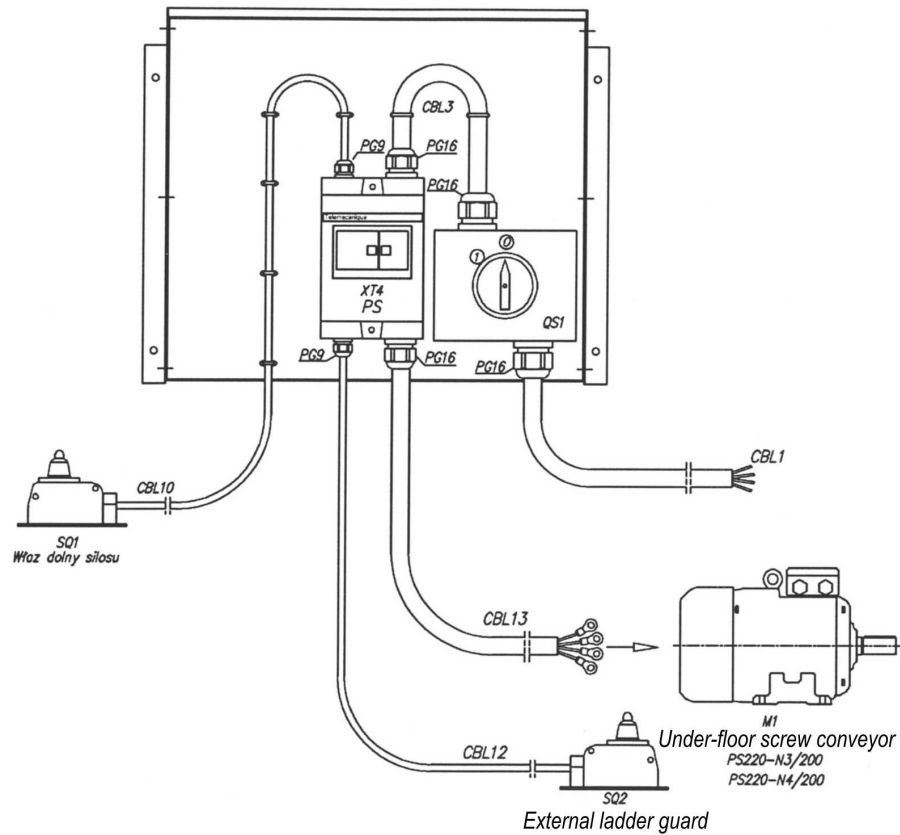


10	SQ1	ŁK6R-3.8380 OB2	SPAMEL	Selector 0-1-2
9	SQ9	83420-0	PROMET	Limit switch
8	SQ10	83420-0	PROMET	Limit switch
7	KA2	R4-2014-23-5220	RELPOL	Mini-relay
6	KA3	R4-2014-23-5220	RELPOL	Mini-relay.
5	KM19	GZ1-M03	Telemechanique	Motor protection switch , range 0.25-0.40A
4	KZ19	GZ1-AU225	Telemechanique	Undervoltage protection (230V)
3	M1	Skg56-4B	INDUKTA	P=90W, n=1500, type Skg56-4B, flange B14
2	XT1	Sg56-4B	ELPLAST	Casing for 13 modules, IP55.
1	XB1-XB5	ZUG-G4	PROMET	Installation cube for DIN 50 bus
Pos.	Symbol	Type	Producer	Notes

Designed by:				Unit/part name:	Material:
Drawn by:				Electric system	Weight of 1 pc:
Checked by:					
Scale:		Name „BIN” Sp. z o.o. Aleksandrów Kuj.	Signature Date	Equipment symbol: PSU220-ZASUW_1	Format:



Block diagram



NOTES:

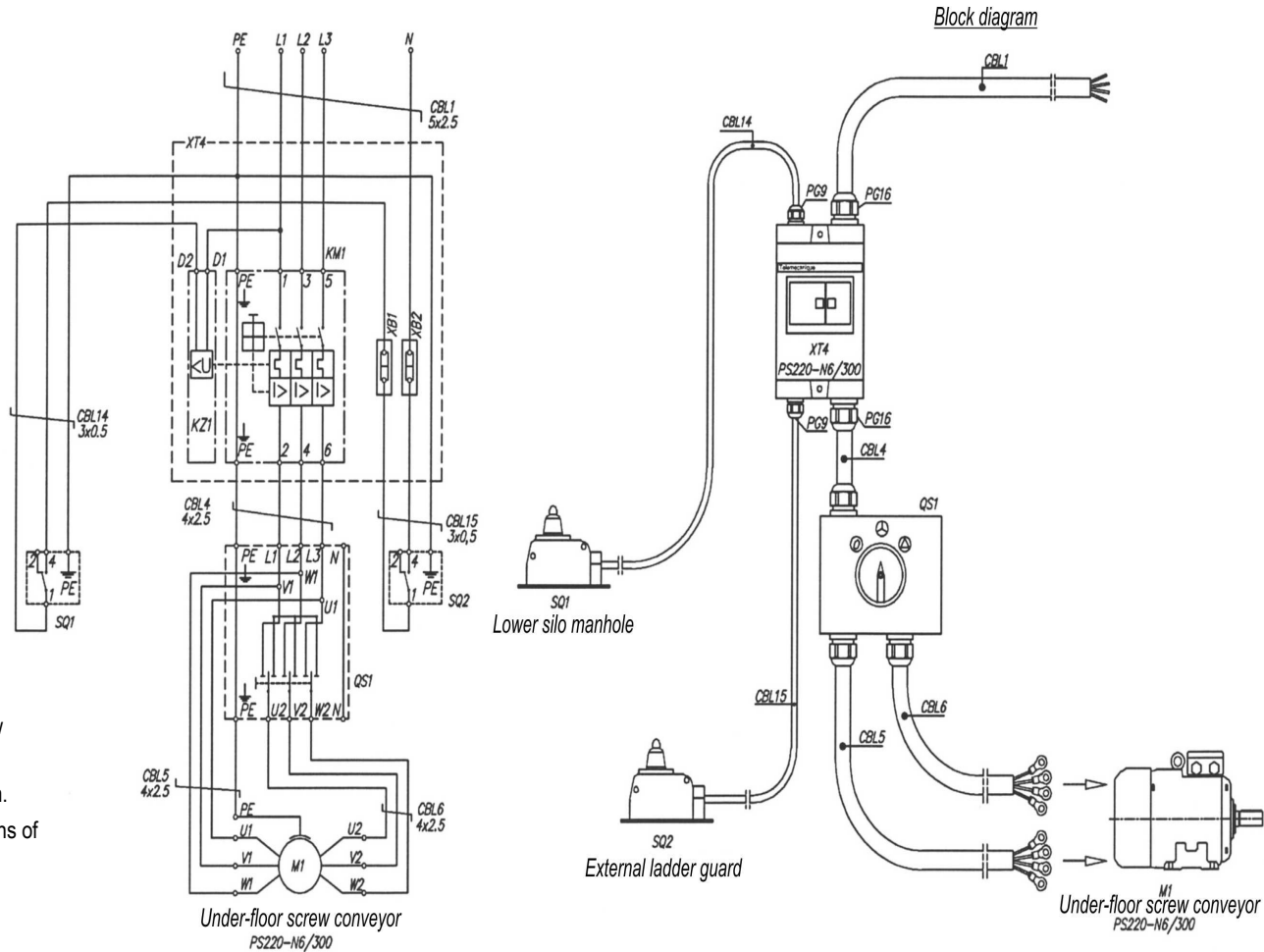
1. For silos, which are provided with: PS220-N3/200 or PS220-N4/200 only.
2. The wiring diagram is the general guideline for designing the electric system.
3. Modifications of electric diagrams may be done so that all protection functions of devices are maintained.

8	XT4	GV2-MC	Telemechanique	Motor protection switch casing
7	XB1-XB2	ZUG-G4	PROMET	Installation cube for DIN 50 bus
6	SQ2	LM10	PROMET	Limit switch
5	SQ1	LM10	PROMET	Limit switch
4	QS1	ŁK25R-2.8211 0B2Z	SPAMEL	Main switch
3	KZ1	GZ1-AU225	Telemechanique	Undervoltage protection (230V)
2	KM1	GZ1-M14	Telemechanique	Motor protection, 6.0-10A
1b	M1	SkG112M-4	TAMEL	P = 4.0 kW, n = 1500 rpm, B5; for PS220-N4/200
1a	M1	SkG100L-4B	TAMEL	P = 3.0 kW, n = 1500 rpm, B5; for PS220-N3/200
Pos.	Symbol	Type	Producer	Notes

Designed by:				Unit/part name: <b>Electric system – basic diagram</b> <b>PS220-N3/200</b> <b>PS220-N4/200</b>	
Drawn by:					
Checked by:					
	Name	Signature	Date		
Scale:		„BIN” Sp. z o.o. Aleksandrów Kuj.	Drwg. No.: <b>PS220-090-00</b>	Equipment symbol:	Format:

NOTES:

- 1. For the silo, which is provided with: PS220-N6/300 only (without PSW screw conveyor).
- 2. The wiring diagram is the general guideline for designing the electric system.
- 3. Modifications of electric diagrams may be done so that all protection functions of devices are maintained.



9	XT4	GV2-MC	Telemechanique	Motor protection casing
8	XB1-XB2	ZUG-G4	PROMET	Installation cube for DIN 50 bus
7	SQ2	LM10	PROMET	Limit switch
6	SQ1	LM10	PROMET	Limit switch
5	QS1	ŁK25R-4.831 OB2Z	SPAMEL	Selector switch 0-Y-Δ
4	KZ1	GZ1-AU225	Telemechanique	Undervoltage protection (230V)
2	KM1	GZ1-M16	Telemechanique	Motor protection, 9.0-14A
1	M1	Skg112M-2PC	TAMEL	P = 6.0 kW, n = 3000 rpm, B5
Pos.	Symbol	Type	Producer	Notes

Designed by:				Unit/part name: <b>Electric system – basic diagram</b> <b>PS220-N6/300</b>
Drawn by:				
Checked by:				
	Name	Signature	Date	
Scale:		„BIN” Sp. z o.o. Aleksandrów Kuj.	Drwg. No.: <b>PS220-085-00</b>	Equipment symbol:
				Format:

## 2. Installation and first start-up

### Installation of the screw conveyor.

Depending on the needs and application, the PS220 system screw conveyors may be installed in many different ways. The producer allows operation of the equipment installed both horizontally and with various slope angles (sees Fig. 18 and 19, and Tables 2, 3 and 4). However, independently of the way and type of operation, screw conveyors must be installed on a stable base, and the distance between adjacent elements, which fix the screw conveyor pipe to the base, cannot exceed 4.5 metres. The screw conveyor shall be installed so that it is secured (supported) in a stable way at its ends, that is, near the drive motoreducer and end hub. Such way of installation prevents undesirable conveyor movements, vibration, etc.

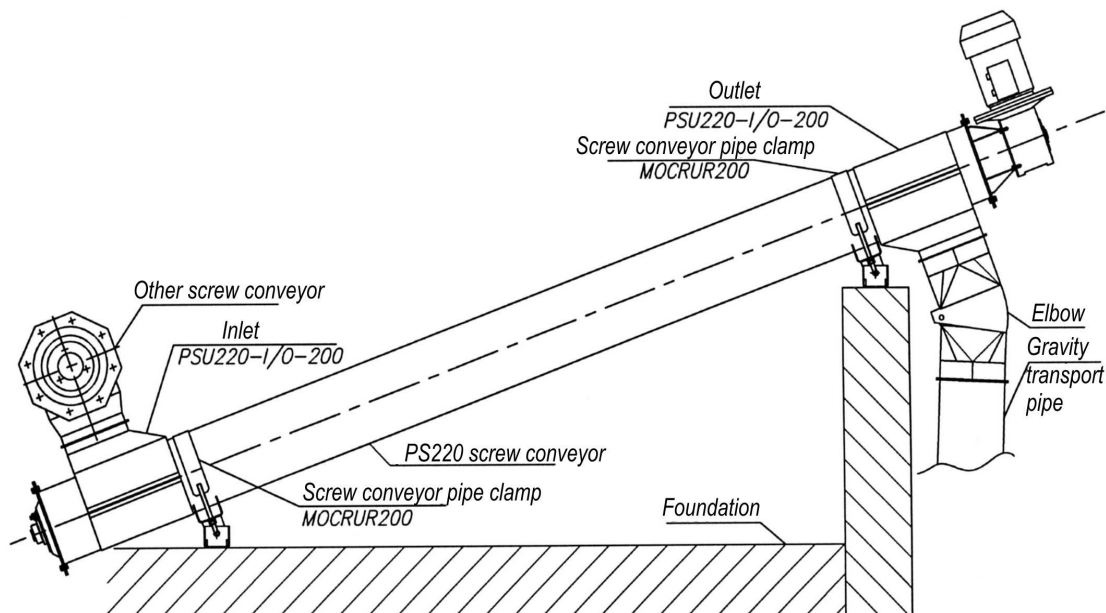
Use MOCRUR200 clamping units produced by BIN Company to fix the screw conveyor to the base (foundation), after removal of diameter reduction units intended for installation of lower diameter screw conveyor pipes.

Depending on the needs and types of modules of PS220 screw conveyor, the User shall make (inlet and outlet) openings in the conveyor pipe and install the devices to allow connection of the modules mentioned above to the conveyor (see Fig. 20).

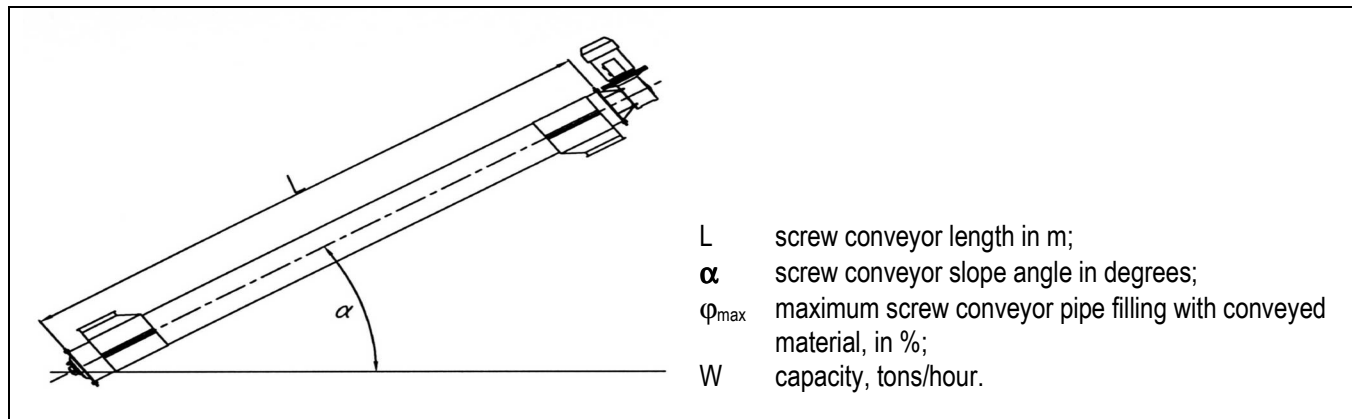
Screw conveyor installation requires special installation equipment and proper knowledge. Therefore, screw conveyors should be installed by installing companies authorized by BIN Company. The installing company shall co-operate with the investor within the range of arrangement of works, settlement of balances and acceptance of installation works.



**When the investor itself or any other installing company not authorized by BIN installs the screw conveyor(s) (because of reasons, which are not dependent of the producer), the investor is obliged to obtain the detailed screw conveyor installation instruction manual and placing warning and information signs on the equipment.**



**Fig. 18: Example of installation of PS220 system screw conveyor**



**Fig. 19:**  
**Explanation of symbols used in Tables 2, 3 and 4**

Table 2:

Estimated data for designing screw conveyors with the use of PS220-N3/200 module.

L (m)	$\alpha = 0^\circ$		$\alpha = 10^\circ$		$\alpha = 15^\circ$		$\alpha = 20^\circ$		$\alpha = 25^\circ$	
	$\phi_{\max}$ (%)	W (t/hour)	$\phi_{\max}$ (%)	W (t/hour)	$\phi_{\max}$ (%)	W (t/hour)	$\phi_{\max}$ (%)	W (t/hour)	$\phi_{\max}$ (%)	W (t/hour)
3	85	48	85	42	85	38	85	35	85	32
6	85	48	85	42	85	38	85	35	85	32
9	78	45	75	37	80	36	85	35	85	32

Table 3:

Estimated data for designing screw conveyors with the use of PS220-N4/200 module.

L (m)	$\alpha = 0^\circ$		$\alpha = 10^\circ$		$\alpha = 15^\circ$		$\alpha = 20^\circ$		$\alpha = 25^\circ$	
	$\phi_{\max}$ (%)	W (t/hour)	$\phi_{\max}$ (%)	W (t/hour)	$\phi_{\max}$ (%)	W (t/hour)	$\phi_{\max}$ (%)	W (t/hour)	$\phi_{\max}$ (%)	W (t/hour)
3	85	48	85	42	85	38	85	35	85	32
6	85	48	85	42	85	38	85	35	85	32
9	78	45	75	37	80	36	85	35	85	32
12	78	45	75	37	80	36	85	35	85	32

Table 4:

Estimated data for designing screw conveyors with the use of PS220-N6/300 module

L (m)	$\alpha = 0^\circ$		$\alpha = 10^\circ$		$\alpha = 15^\circ$		$\alpha = 20^\circ$		$\alpha = 25^\circ$	
	$\phi_{\max}$ (%)	W (t/hour)	$\phi_{\max}$ (%)	W (t/hour)	$\phi_{\max}$ (%)	W (t/hour)	$\phi_{\max}$ (%)	W (t/hour)	$\phi_{\max}$ (%)	W (t/hour)
3	85	70	85	60	85	55	85	50	85	45
6	85	70	85	60	85	55	85	50	85	45
9	85	70	85	60	85	55	85	50	85	45

When designing and/or operating the screw conveyor system, it shall be considered that the screw conveyor system capacity depends, amongst others, on the following:

- Type of material conveyed.
- Humidity of material conveyed.
- Degree of contamination.
- Screw conveyor slope angle.
- Screw conveyor pipe filling.

Therefore, the values given in Tables 2, 3 and 4 shall be treated as estimated data for orientation only and general guidelines for designing the screw conveyor system.

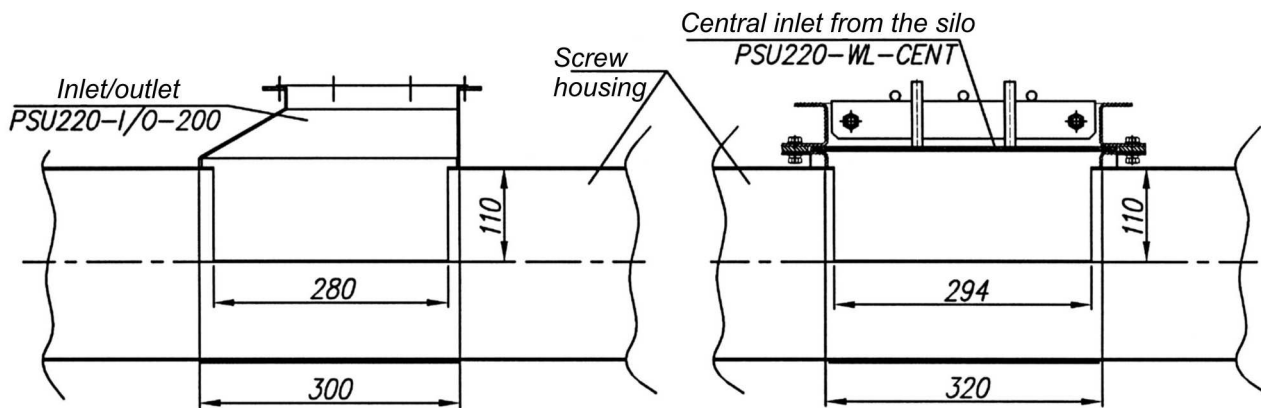


Fig. 20

Way of installation of PSU-I/O-200 and PSU220-WL-CENT modules.



When using the PS220 screw conveyors as discharging units for BIN silos, no more than one PSU220-WL-CENT inlet module is allowed (in one silo) and/or this module cannot be installed in other positions than the central one.



The total PS220 system screw conveyor length cannot exceed 9 m for drives PS220-N3/200 and PS220-N6/300, and 12 m for drive PS220-N4/200.

### First start-up

The User himself, at his cost, shall order the qualified electrician with proper authorization to install the electric system. To ensure correct wiring, the User shall provide the electrician with the wiring diagrams. After installing, the electrician shall carry out the test start-up of the equipment. In particular, correct sense of motor revolutions shall be checked and motor protection setting shall be compared with the data contained in the motor information plate. Installation of power supply points for screw conveyors and equipment, which is operated with screw conveyors, shall be made by the qualified electrician with proper authorization in accordance with instruction manuals provided for them.



The producer requires the confirmation in writing that the electrician with proper authorization has wired and checked the electric system of the equipment.



The producer does not agree for operation of screw conveyors with uncovered (non-guarded) inlet/outlet. Both inlet and outlet shall be adapted for connection of other equipment (other screw conveyor pipes, gravity transport pipes, etc.), or proper guards shall be used, which are the standard equipment of respective PS220 modules.



### 3. Operation

#### 3.1. Operation of screw conveyors

##### Start-up of the screw conveyor

PS220-N3/200 and PS220-N4/200:

- Set the main switch to position “I” (see Figure 21).
- Press the black start pushbutton located at the motor protection (see Figure 21).

PS220-N6/300:

- Press the black start pushbutton located at the motor protection (see Figure 22).
- Set the 0-Y-Δ selector switch (see Figure 22) to “Y” position and wait approximately 10 seconds, until the motor reaches its full speed.
- Set the 0-Y-Δ selector switch to “Δ” position.

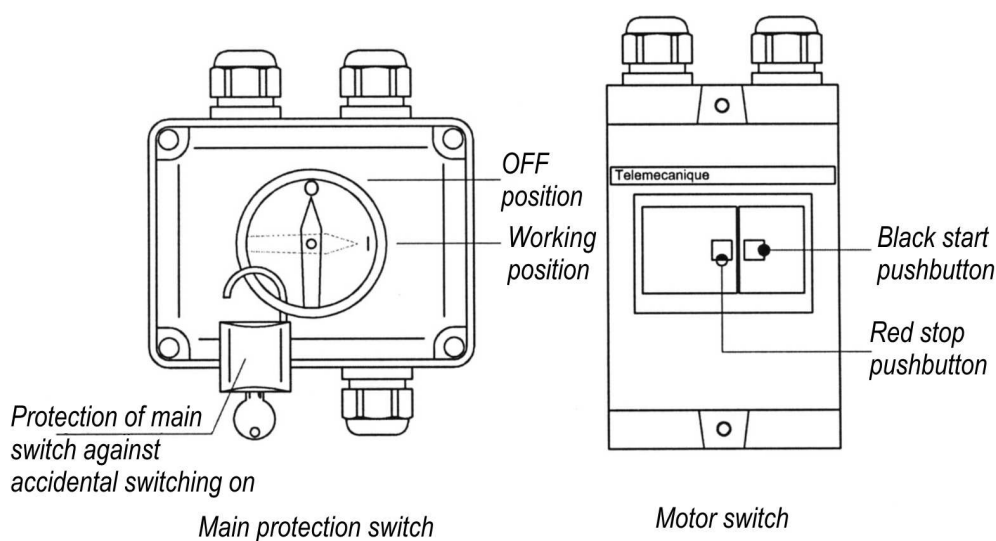
##### Stopping the screw conveyor.

PS220-N3/200 and PS220-N4/200:

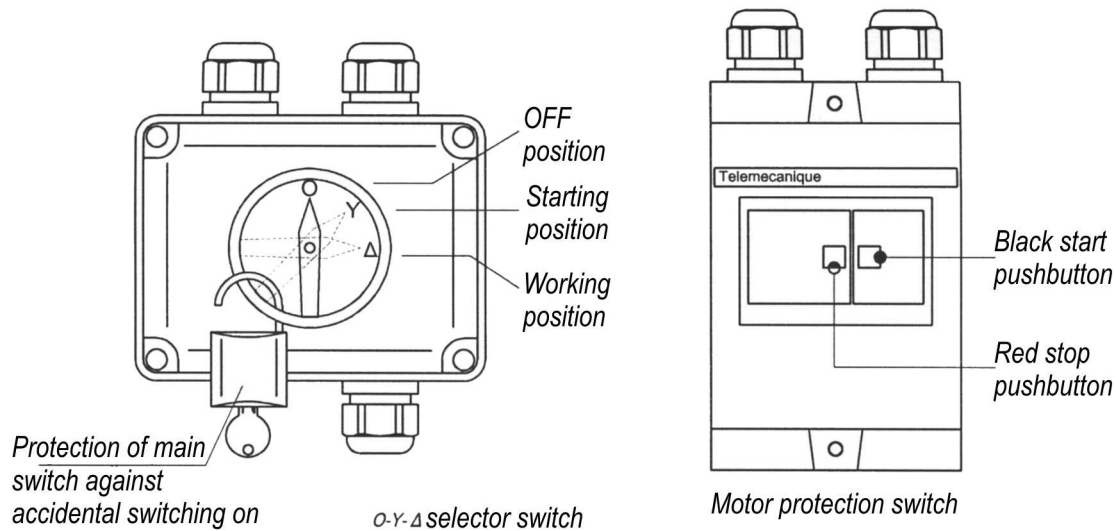
- Cut off the grain inflow to the screw conveyor (close the gate valves) and wait, until the equipment is empty.
- Press the red stop pushbutton located at the motor protection (see Figure 21).
- Set the main switch to position “0” (see Figure 21).

PS220-N6/300:

- Cut off the grain inflow to the screw conveyor (close the gate valves) and wait, until the equipment is empty.
- Set smoothly the 0-Y-Δ selector switch (see Figure 22) to “0” position
- Press the red stop pushbutton located at the motor protection (see Figure 22).



**Fig. 21:**  
**Controls for PS220-N3/200 and PS220-N4/200 screw conveyors.**



**Fig. 22:**  
**Controls for PS220-N6/300 screw conveyors.**

### Grain conveying

Proceed as follows before starting to transport the grain:

- Check the technical condition of screw conveyors and the equipment working with them.
- Be sure that no people are present at the location of grain inlet and outlet.
- Ensure that the grain flow at the outlet device is smooth so that no screw conveyor jamming (overload) takes place.

Never stop the screw conveyor, which pipe and screw are filled with grain. The problems with restart may occur.



**Screw conveyors must be provided with the devices for dosing and cutting off the material being conveyed. The use of the equipment mentioned above prevents screw conveyor overfilling (jamming) and damage.**

The screw conveyor system cannot convey very contaminated materials or materials with lumps, etc. Never try to transport such materials, because you may cause screw conveyor overloading and/or damage resulting in screw conveyor stoppage.

Taking into account the remarks contained above, you may start the screw conveyor.



**In case of emergency, stop the screw conveyor by pressing the red stop pushbutton at the motor protection switch.**

In case of power supply failure, the screw conveyor system is permanently stopped. It does not start automatically, when the power supply is restored. Repeat the whole starting procedure to start the screw conveyor again.



**All screw conveyor types are intended for operation with filling factor not exceeding 85%. In case this value of filling factor is exceeded, the resistance to motion increases considerably, what may lead to overloading and locking the drive system (including motor).**

### 3.2. Maintenance

Correct and in-time maintenance, inspections and possible repairs guarantees full capacity and correct operation of the screw conveyor and prevents premature and excessive screw conveyor wear.

#### Routine inspections and repairs

The routine inspection includes:

- Checking safety devices, that is: motor protection switch, main switch, etc. (check their proper functioning, for mechanical defects, etc.).
- Checking the condition of electric system by the electrician with proper authorization.
- Checking the technical condition of welded, bolted, etc. joints.
- Checking anticorrosion coats.
- Checking the condition of slide and rolling bearings.
- Lubrication of slide bearings.
- Cleaning and lubrication of gate valve drive screw.
- Checking other moving and stationary parts.

Frequency of inspections:

The frequency of routine inspections shall be adapted properly for intensity of operation, but they should be carried out not less than once a year. All safety devices, that is: motor protection switch, main switch, etc. shall be inspected at least once a month or before each screw conveyor start-up after longer downtime.



**At least once a year, the User shall order the qualified electrician with proper authorization to inspect all electric equipment components.**



**The screw conveyors are provided with slide bearing lubrication system. Fill those bearing with grease every 30 hours of operation.**



**When using the PSU220-WL-CENT central inlet, clean and grease (after each start-up) the gate valve drive screw.**

The routine repairs include small repairs and, possibly, removing the defects of painted coats. Anti-corrosion coats may be damaged during installation (tightening of bolts). In such a case, the routine repair includes painting of damaged places with anti-corrosion paint.

#### General overhaul

General overhauls are made as needed, depending on the screw, bolted joints, etc. degree of wear (but not less than once per 8 years), and they include repair or replacement of parts with new ones.

General overhaul includes activities carried out during the routine repair and the following:

- Replacement of slide and rolling bearings, seals, etc.
- Making new anti-corrosion coats.
- Other necessary repairs.



**Remove all defects and repair or replace all defected or worn parts with new ones immediately.**

## Section III. PS160 screw conveyors

### 1. General description of the product

#### The list of appliances produced within the frames of PS160 screw conveyors system

Drive hub unit, type RT50 (1.5kW, 400 rpms)

End hub unit

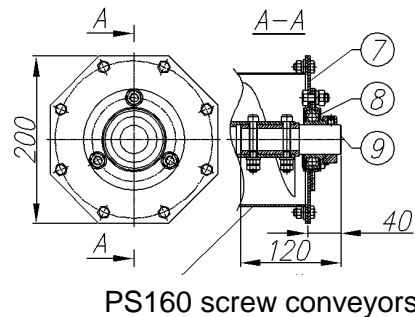
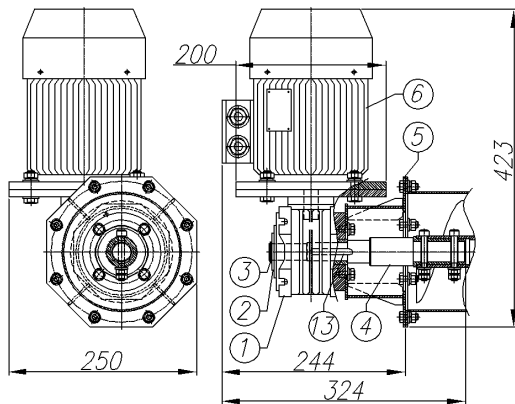


Fig. 23 **PS160-N1.5/400**-screw conveyor  $\varnothing 160\text{mm}$  – drive power  $P=1.5\text{kW}$ ,  $n=400\text{rpm}$ .

Drive hub unit, type RT60 (3.0kW, 400 rpms)

End hub unit

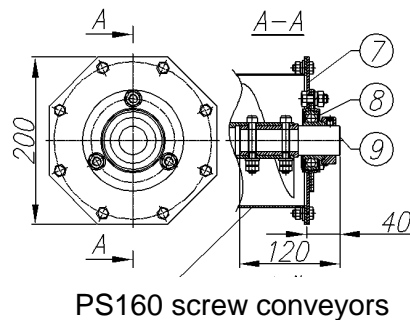
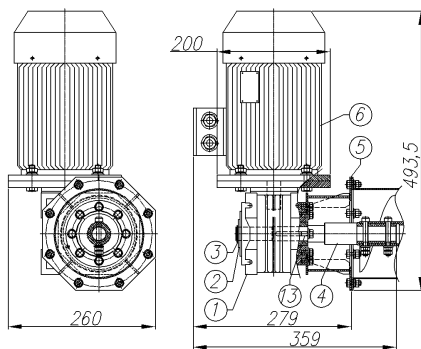


Fig. 24 **PS160-N3.0/400**-screw conveyor  $\varnothing 160\text{mm}$  – drive power  $P=3.0\text{kW}$ ,  $n=400\text{rpm}$ .

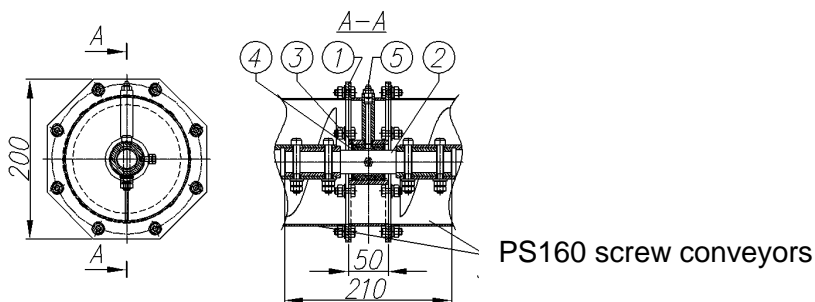


Fig.25 **PS160-LOZ/P1**-screw conveyor  $\varnothing 160\text{mm}$  – polyamide intermediate bearing

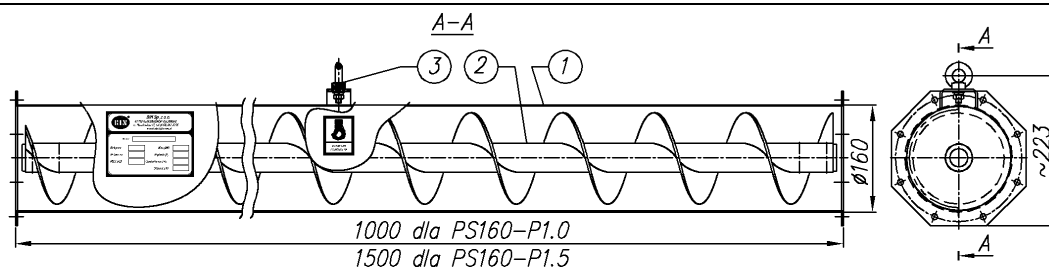


Fig.26 **PS160-P1.0**- Screw conveyor  $\varnothing 160\text{ mm}$  – 1m length  
**PS160-P1.5**- Screw conveyor  $\varnothing 160\text{mm}$  – 1,5m length

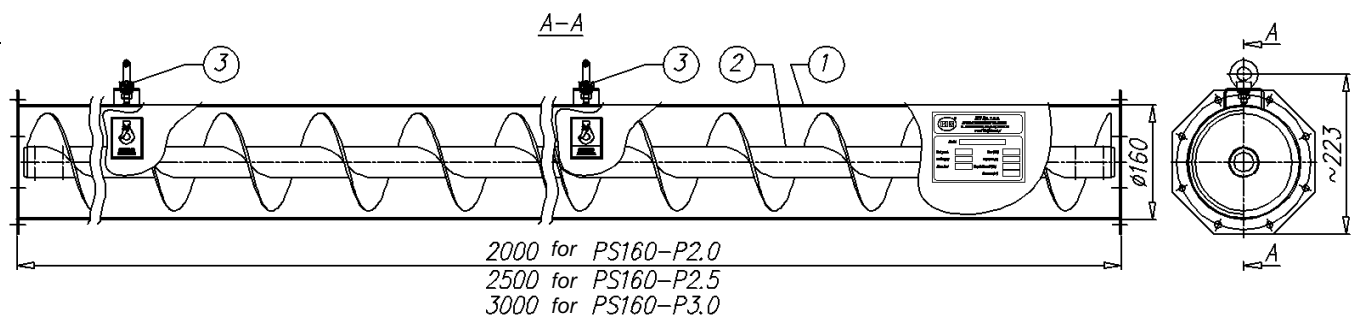


Fig.27 **PS160-P2.5**-screw conveyor  $\varnothing\varnothing 160\text{mm}$  – 2.5m length  
**PS160-P2.0**- screw conveyor  $\varnothing\varnothing 160\text{mm}$  – 2.0m length  
**PS160-P3.0**- screw conveyor  $\varnothing\varnothing 160\text{mm}$  – 3.0m length

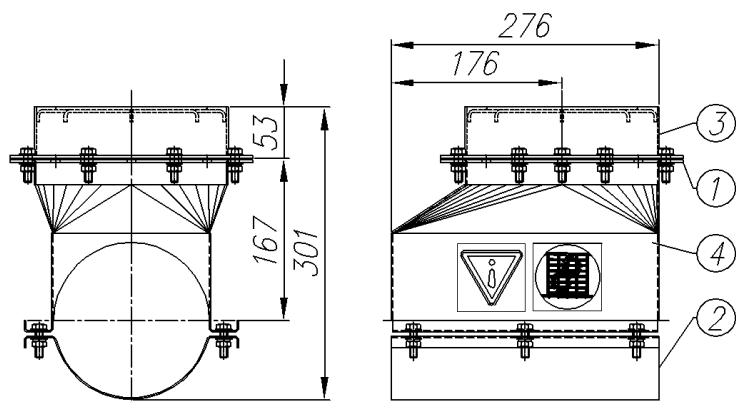


Fig.28 **PSU160-I/O-200**- inlet/outlet  $\varnothing 200$  for PS160 screw conveyor

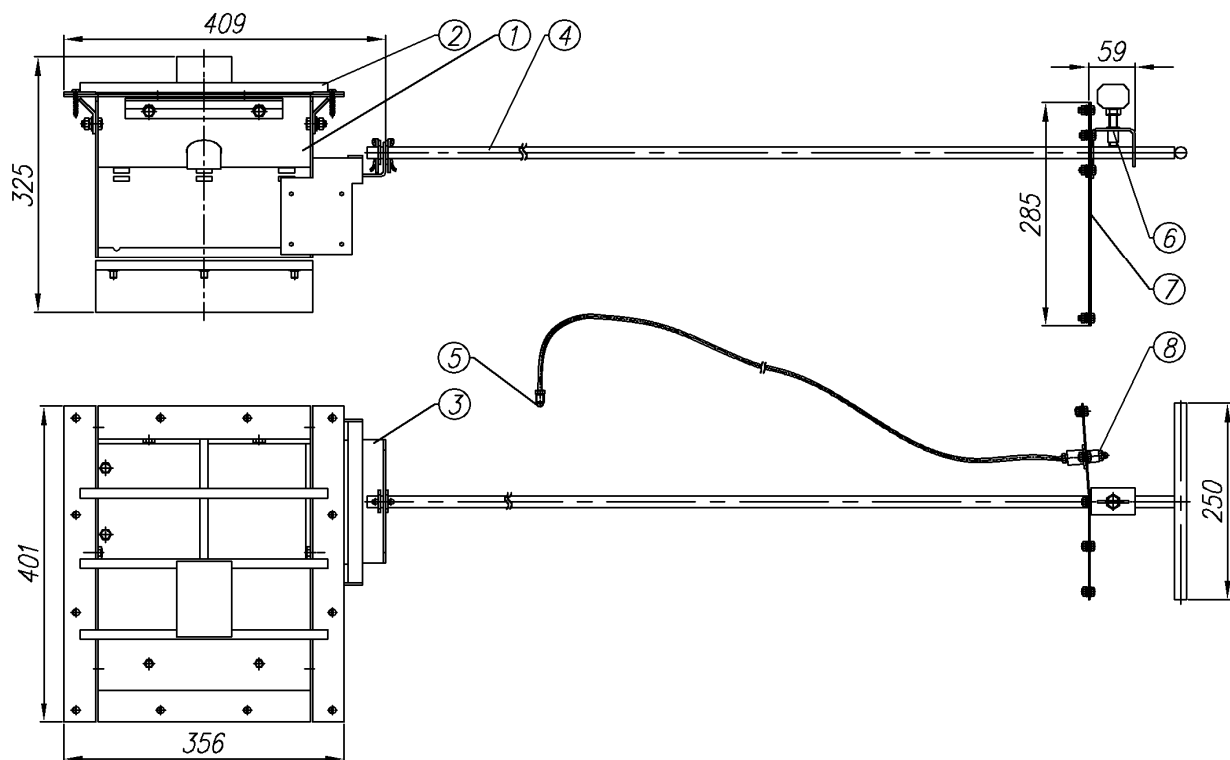


Fig.29 **PSU160-WL-CENT**- central inlet from silo to PS160 screw conveyor.

## 1.1. Construction and application

### PS160 screw conveyor application

Screw conveyors PS160 are intended for conveying cereal and maize grain and seeds of oily plants. Moreover, they may be used for discharging the material from under the hoppers, discharge bins, tanks and other conveyors to move it to another tanks or conveyors. In particular, they are suitable for conveying the grain to/from silos produced by the BIN Company and to move the grain between two silos, as well as to transport it to the intake hopper, bucket elevator, etc.

### PS160 screw conveyor construction

The PS160 screw conveyor structure consists of units (modules). All units produced within the frames of PS160 screw conveyor system are shown in the Section II, point 1, of this manual. Selection of units depends on processing and technical requirements and investor's needs.

The structure of the particular modules is as follows:

#### PS160-N1.5/400

A motor with nominal power  $P=1.5\text{kW}$ ,  $n=400\text{rpm}$  (Fig.23) build up from a screw reducer 1 with a transmission ratio  $i=7$ , which is driven by the electrical engine 6 with 1.5kW power and the rotational speed of 3000rpm. The reducer is attached to a special adapter 5 that allows assembling with other modules of the PS160 conveyor system. The transmission of the drive from the engine 6 through the reducer 1 is done by the driving pin 4 assembled to the reducer with the inlet connection 13 and the mounting ring 3 and a hexagonal plate 2. Furthermore, the PS160-N1.5/400 consists of: an ending bearing set built by an ending collar 7, with a mounted bearing set 8 with the ending pin 9. The complete module consists also of the screws, naps and plates necessary for assembling with other modules of the PS160 system and the emergency signs (stickers), a nominal plate and the electrical fittings.

#### PS160-N3.0/400

A motor with nominal power  $P=3.0\text{kW}$ ,  $n=400\text{rpm}$  (Fig.24) build up from a screw reducer 1 with a transmission ratio  $i=7$ , which is driven by the electrical engine 6 with 3.0kW power and the rotational speed of 3000rpm. The reducer is attached to a special adapter 5 that allows assembling with other modules of the PS160 conveyor system. The transmission of the drive from the engine 6 through the reducer 1 is done by the driving pin 4 assembled to the reducer with the inlet connection 13 and the mounting ring 3 and a hexagonal plate 2. Furthermore, the PS160-N3.0/400 consists of: an ending bearing set build by an ending collar 7, with a mounted bearing set 8 with the ending pin 9. The complete module consists also of the screws, naps and plates necessary for assembling with other modules of the PS160 system and the emergency signs (stickers), a nominal plate and the electrical fittings.

#### PS160-LOZ/P1

Intermediate polyamide bearing (Fig.25) build up from a mounting 1, mounted with the sliding bearing 3 secured with mounting rings 4. The sliding bearing 3 is used for mounting the intermediate pin 2 and it is lubricated by a special channel ending with the lubricant nipple 5. The complete module consists also of the screws, naps and plates necessary for assembling with other modules of the PS160 system.

#### PS160-P1.0

Screw conveyor  $\varnothing 160\text{mm}$  – 1m length (Fig.26) w the module consists of a conveying worm 2 980mm length and  $\varnothing 136\text{mm}$  and it's housing 1 1000mm length  $\varnothing 160\text{mm}$ . The housing 1 is mounted with the transport grip 3, it's signing (a sticker) and a nominal plate.

#### PS160-P1.5

Screw conveyor  $\varnothing 160\text{mm}$  – 1,5m length (Fig.26) w the module consists of a conveying worm 2 1480mm length and  $\varnothing 136\text{mm}$  and it's housing 1 1500mm length  $\varnothing 160\text{mm}$ . The housing 1 is mounted with the transport grip 3, it's signing (a sticker) and a nominal plate.

#### PS160-P2.0

Screw conveyor  $\varnothing 160\text{mm}$  – 1,5m length (Fig.27) w the module consists of a conveying worm 2 1980mm length and  $\varnothing 136\text{mm}$  and it's housing 1 2000mm length  $\varnothing 160\text{mm}$ . The housing 1 is mounted with the transport grip 3, it's signing (a sticker) and a nominal plate.

**PS160-P2.5**

Screw conveyor Ø160mm – 2,5m length (Fig.27) w the module consists of a conveying worm 2 2480mm length and Ø136mm and it's housing 1 2500mm length Ø160mm. The housing 1 is mounted with the transport grip 3, it's signing (a sticker) and a nominal plate

**PS160-P3.0**

Screw conveyor Ø160mm – 3m length (Fig.27) w the module consists of a conveying worm 2 2980mm length and Ø136mm and it's housing 1 3000mm length Ø 160mm. The housing 1 is mounted with the transport grip 3, it's signing (a sticker) and a nominal plate.

**PSU160-I/O-200**

Inlet/outlet Ø200 for the PS160 screw conveyor (Fig.28) build up of the frame 4, which, together with the connection clip 2, allows connection of this set to the screw conveyor's housing • 160mm. To ensure security, the inlet/outlet is equipped with the guard 3 fitted to the collar 1.

**PSU160-WL-CENT**

The central inlet from the silo to the screw conveyor (Fig.29) it's a module through which the screw conveyor of the PS160 system as an underfloor unloading conveyor for the BIN type silos. W This set consists of the frame 1, which is used for mounting the inlet with the silo floor and with the PS160 conveyor. In the frame 1 works the gate valve 3 controlled by the string 4 together with the protection 6. In order to ensure security the central inlet is equipped with the guard 2 fitted to the frame 1. Furthermore, this module consists of the masking frame of the mantle of the silo 7 mounted with the elements 5 and 8 of the lubrication mechanism of the PS160-LOZ/P1 intermediate bearings.

**1.2. Specifications and selection****Table 5** - Specifications of PS160 screw conveyor system

		PS160-N1.5/400	PS160-N3.0/400	PS160-LOZ/P1	PS160-P1.0	PS160-P1.5	PS160-P2.0	PS160-P2.5	PS160-P3.0	PSU160-I/O-200	PSU160-WL-CENT
Motor type		Skg80 2PC	Skg90L 2PC	-	-	-	-	-	-	-	-
Motor nominal power	kW	1.5	3.0	-	-	-	-	-	-	-	-
Motor rpms	rpm	3000	3000	-	-	-	-	-	-	-	-
Power supply voltage	V	3x400	3x400	-	-	-	-	-	-	-	-
Frequency	Hz	50	50	-	-	-	-	-	-	-	-
Protection class (IP)		54	54	-	-	-	-	-	-	-	-
Screw conveyor rpms	rpm	400	400	-	-	-	-	-	-	-	-
Screw diameter	mm	-	-	-	136	136	136	136	136	-	-
Total length	mm	-	-	210	1000	1500	2000	2500	3000	276	-
Total height	mm	423	493.5	-	-	-	-	-	-	301	325
Inlet/outlet dimensions (diameter)	mm	-	-	-	-	-	-	-	-	200	356x401
Weight	kg	22	29	4.5	20	28	36	44	52	8	33

For all equipment included in the Instruction Manual, the equivalent acoustic pressure level does not exceed 70 dB(A).

- a) The simplest complete construction made up of the elements of the PS160 system (Fig. 30) consists of: the drive 3 - PS160-N1.5/400 or PS160-N3.0/400, the screw conveyor 1 - PS160-P1.0 or PS160-P1.5 or PS160-P2.0 or PS160-P2.5 or PS160-P3.0, inlet/outlet 2 – PSU160-I/O-200 (2pcs.) and the mounting MOCRUR200 quantity adjusted for the conditions i and the length of the conveyor (preserving the rule of mounting the conveyor once every 3m).
- b) In case of a need to build a conveyor of a significant length - Fig.33 (but not exceeding the total length of the conveyor equaling 6m – for the PS160-N1.5/400 drive and 12m – for the PS160-N3.0/400 drive) one should connect several screw conveyors 1 using intermediate bearings 5 - PS160-LOZ/P1.
- c) Using the telescopic pipe 9 (Fig.32) - RURATEL200-0.4 in the assembling allows mounting the conveyor to other technological devices, such as bucket conveyors, silos etc.
- d) The PS160 screw conveyors can be used as underfloor unloading devices in BIN type silos (Fig.31 and 33) , to achieve that the system needs to be broadened by the central inlet 8 - PSU160-WL-CENT (Fig. 31) or the central inlet 7 – PSU220-WL-CENT (Fig. 33). If the underfloor conveyor PS160 is supposed to be working with the inside screw conveyor PSW100 or PSW200 (Chapter IV) then the required inlet is PSU160-WL-CENT. In case of using the inside conveyor PSW220-BIN200, PSW500, PSW1000 or PSW1500 (Chapter IV) with the PS160 underfloor conveyor, it requires the central inlet PSU220-WL-CENT.

### 1.3. Electric system

The producer provides screw conveyors with all electric devices necessary for proper installation, excluding power supply cables. The Investor shall order the qualified electrician with proper authorization to install the electric system in accordance with the wiring diagrams shown below. Electric system descriptions and diagrams contained in this manual are the general guidelines for designing the electric system for the screw conveyor by authorized persons. Modifications of electric diagrams mentioned above may be done so that all protection functions of devices as specified in the electric system descriptions and diagrams are maintained.

All controls shall be installed in the location, which ensures safe operation of the equipment. When making electric installation, comply with requirements and recommendations for other equipment, which will operate with screw conveyors. Because of many various screw conveyor configurations, the BIN Company does not deliver electric cables for screw conveyors. The User is obliged to supply (at his cost) proper quantity of cables of proper type in accordance with the requirements contained in this manual.



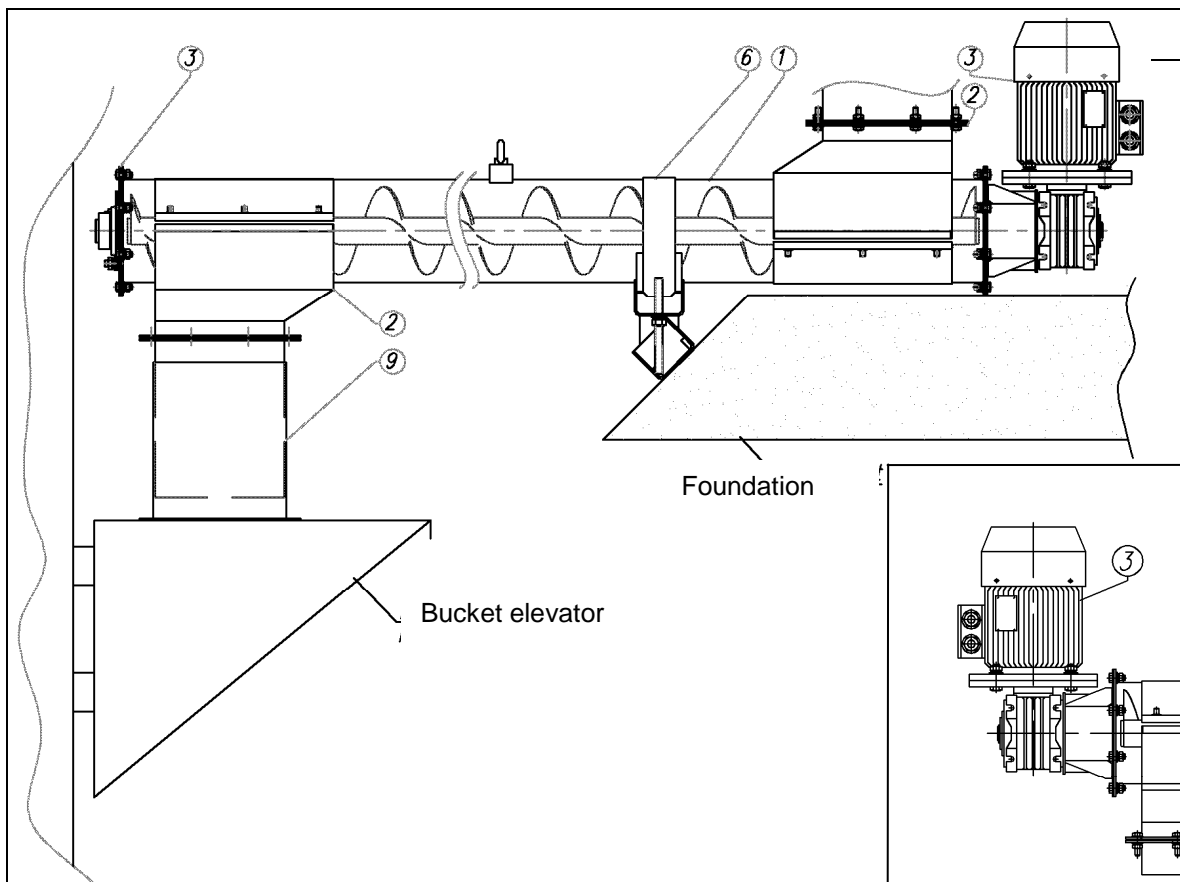


Fig.32 PS160- version with RURATEL200-0.4

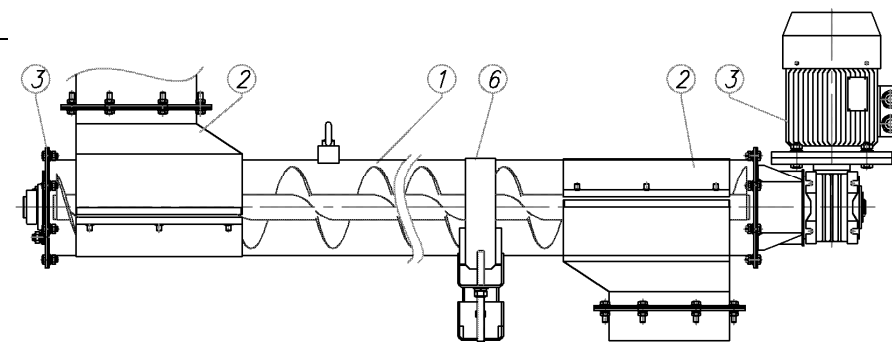


Fig.30 PS160-basic version

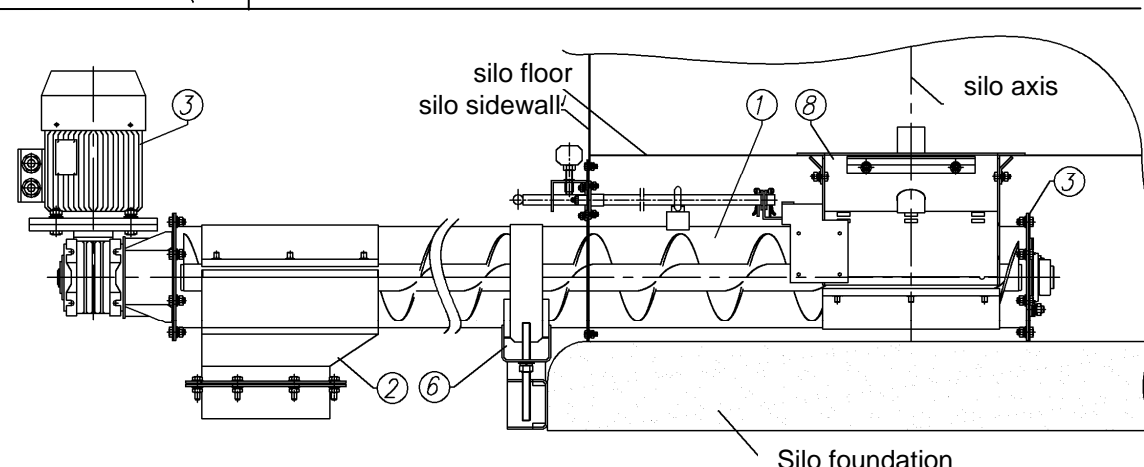


Fig.31 PS160-version with PSU160-WL-CENT

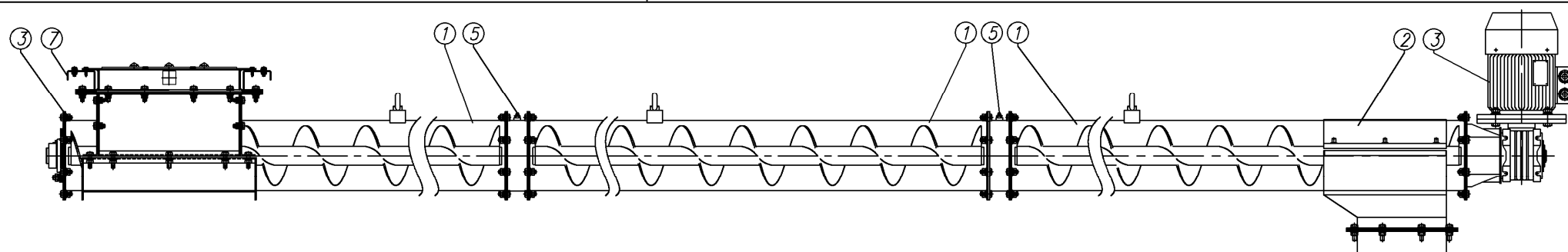
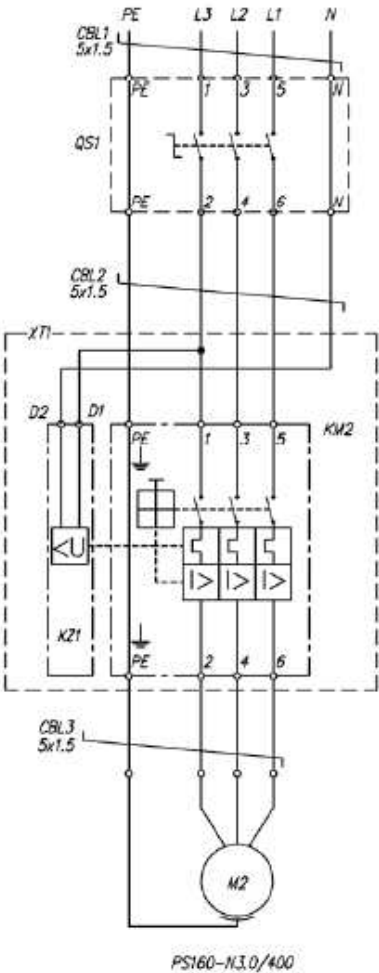
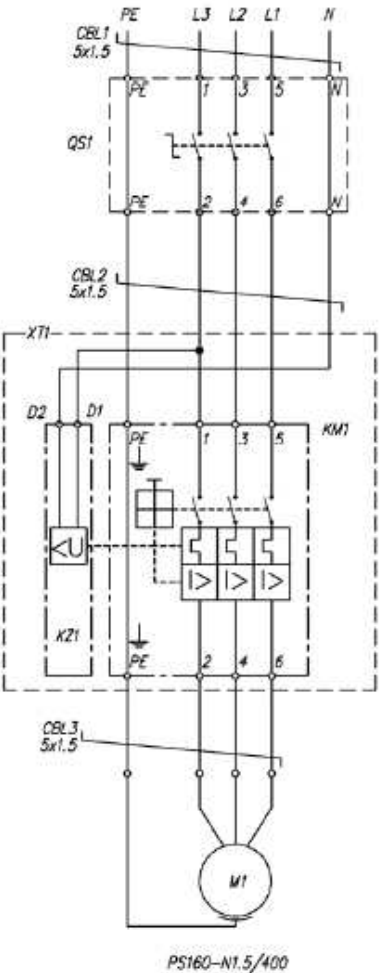



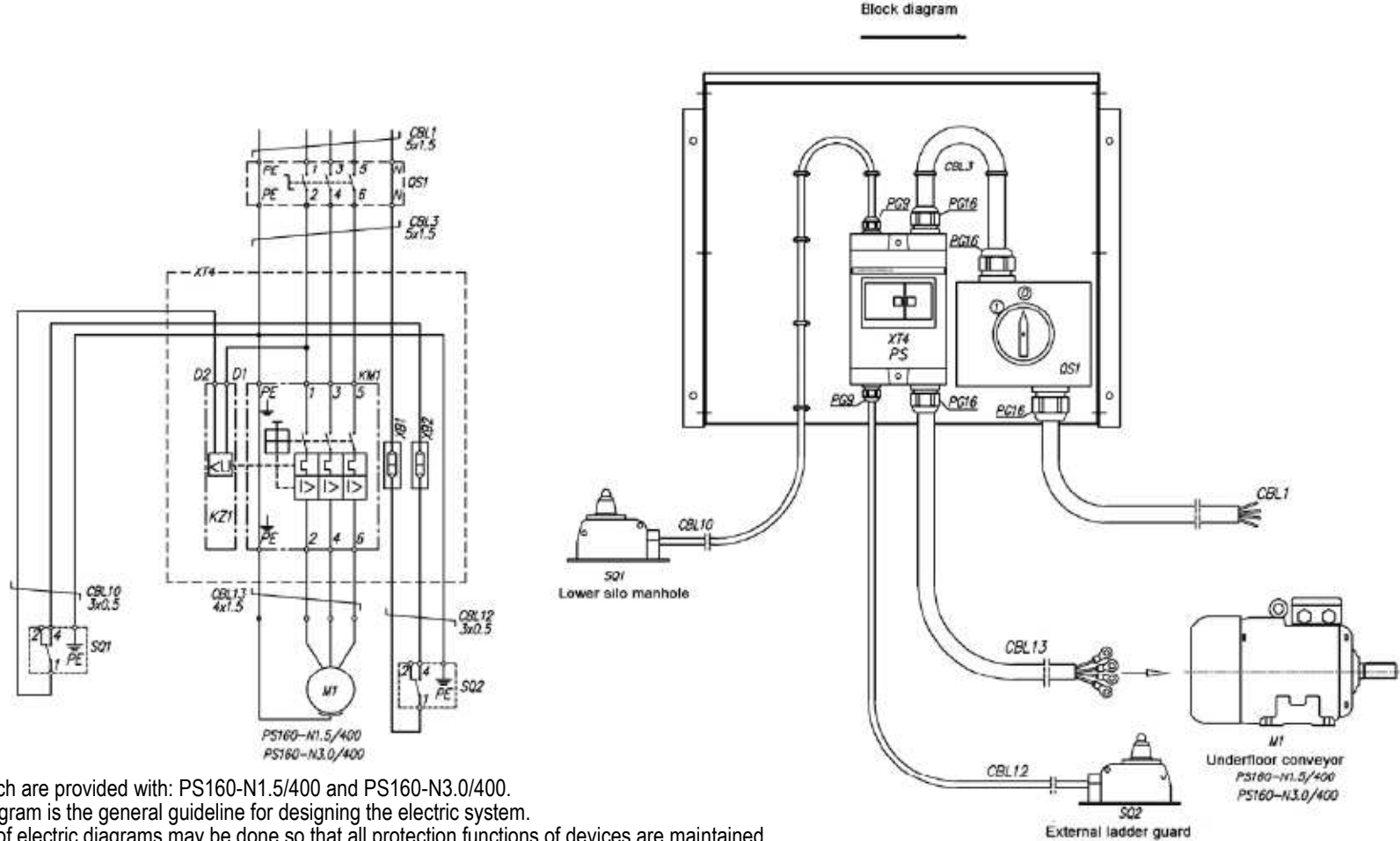
Fig.33 PS160-version with PSU220-WL-CENT




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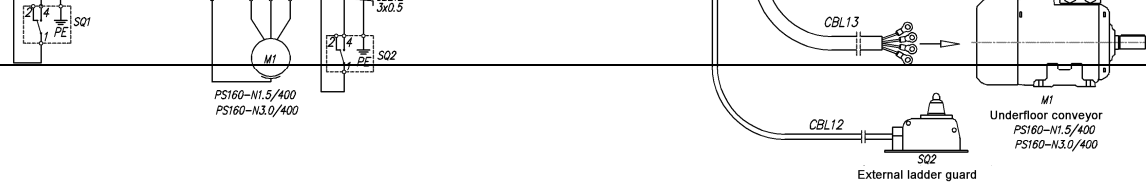
1. The wiring diagram is the general guideline for designing the electric system.
2. Modifications of electric diagrams may be done so that all protection functions of devices are maintained.

7	XT1	GV2-MC	TELEMECANIQUE	Motor protection switch casing	Designed by: Drawn by: Checked by: Unit/part name: Electric system – basic diagram <b>PS160-N1.5/400</b> <b>PS160-N3.0/160</b>			
6	OS1	LK25R-2.8211 0B2Z	SPAMEL	Main switch				
5	KZ1	GZ1-AU225	TELEMECANIQUE	Undervoltage protection (230V)				
4	KM2	GZ1-M08	TELEMECANIQUE	Motor protection switch, range 2.5-4.0A, for PS160-N 1.5/400				
3	KM1	GZ1-M14	TELEMECANIQUE	Motor protection switch, range 6.0-10A, for PS160-N 3.0/400	Name      Signature      Date			
2	M2	Skq90L-2PC	TAMEL	P-3.0kW, n-3000, B5				
1	M1	Skq80-2PC	TAMEL	P=1.5kW, n=3000, B5	Scale:  "BIN" Sp. z o.o. Aleksandrów Kuj. Drwg. No.: <b>PS160-086-00</b>			
Pos.	Symbol	Type	Producer	Notes				
					Equipment symbol:	Format:		

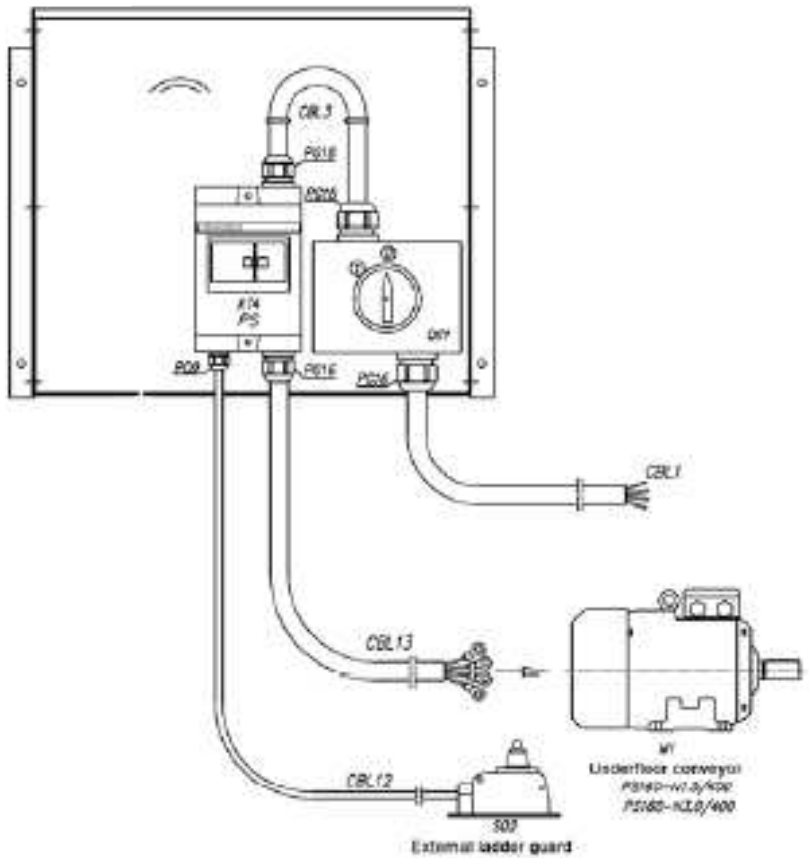
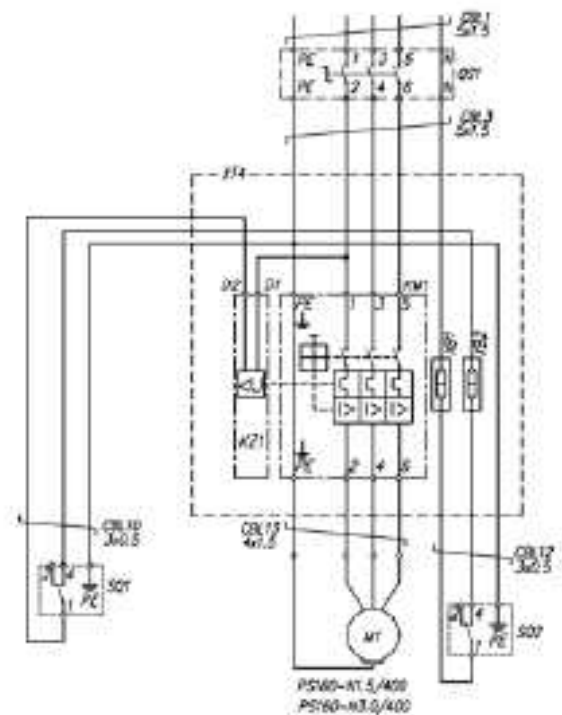


- Notes:
- 1. For silos, which are provided with: PS160-N1.5/400 and PS160-N3.0/400.
  - 2. The wiring diagram is the general guideline for designing the electric system.
  - 3. Modifications of electric diagrams may be done so that all protection functions of devices are maintained.

8	XT4	GV2-MC	TELEMECANIQUE	Motor protection switch casing	Designed by:				Unit/part name:	
7	XB1- XB2	ZUG-G4	PROMET	Installation cube for DIN 50 bus						
6	SQ2	LM10	PROMET	Limit switch						
5	SQ1	LM10	PROMET	Limit switch						
4	QS1	ŁK25R-2.8211 0BZZ	SPAMEL	Main switch						
3	KZ1	GZ1-AU225	TELEMECANIQUE	Undervoltage protection (230V)	Drawn by:				Electric system – basic diagram PS160-N1.5/400, PS160-N3.0/400 With manhole and ladder guard	
2b	KM1	GZ1-M14	TELEMECANIQUE	Motor protection switch, range 6.0-10A for PS160-N3.0/400						
2a	KM1	GZ1-M08	TELEMECANIQUE	Motor protection switch, range 2.5-4.0A for PS160-N1.5/500						
1b	M1	Skq90L-2PC	TAMEL	P=3.0kW, n=3000, B5 for PS160-N3.0/400						
1a	M1	Skq80-2PC	TAMEL	P=1.5kW, n=3000, B5 for PS160-N 1.5/400						
Pos.	Symbol		Producer	Notes	Scale:		„BIN” Sp. z o.o. Aleksandrów Kuj.	Drwg. No.: PS160-087-00	Equipment symbol:	Format:



Block diagram



- Notes:1
- 1. For silos, which are provided with: PS160-N1.5/400 and PS160-N3.0/400.
  - 2. The wiring diagram is the general guideline for designing the electric system.
  - 3. Modifications of electric diagrams may be done so that all protection functions of devices are maintained.

8	XT4	GV2-MC	TELEMECANIQUE	Motor protection switch casing
7	XB1- XB2	ZUG-G4	PROMET	Installation cube for DIN 50 bus
6	SQ2	LM10	PROMET	Limit switch
5	SQ1	LM10	PROMET	Limit switch
4	QS1	ŁK25R-2.8211 0B2Z	SPAMEL	Main switch
3	KZ1	GZ1-AU225	TELEMECANIQUE	Undervoltage protection (230V)
2b	KM1	GZ1-M14	TELEMECANIQUE	Motor protection switch, range 6.0-10A for PS160-N3.0/400
2a	KM1	GZ1-M08	TELEMECANIQUE	Motor protection switch, range 2.5-4.0A for PS160-N1.5/500
1b	M1	Skq90L-2PC	TAMEL	P=3.0kW, n=3000, B5 for PS160-N3.0/400
1a	M1	Skq80-2PC	TAMEL	P=1.5kW, n=3000, B5 for PS160-N 1.5/400
Pos.	Symbol	Type	Producer	Notes

Designed by:				Unit/part name: <b>Electric system – basic diagram</b> <b>PS160-N1.5/400, PS160-N3.0/400</b> <b>With ladder guard</b>
Drawn by:				
Checked by:				
	Name	Signature	Date	Equipment symbol:
Scale:		„BIN” Sp. z o.o. Aleksandrów Kuj.	Drwg. No.: <b>PS160-088-00</b>	
				Format:



## 2. INSTALLATION AND FIRST START-UP

### Installation of the screw conveyor

Depending on the needs and application, the PS160 system screw conveyors may be installed in many different ways. The producer allows operation of the equipment installed both horizontally. However, independently of the way and type of operation, screw conveyors must be installed on a stable base, and the distance between adjacent elements, which fix the screw conveyor pipe to the base, cannot exceed 3 metres. The screw conveyor shall be installed so that it is secured (supported) in a stable way at its ends, that is, near the drive motored reducer and end hub. Such way of installation prevents undesirable conveyor movements, vibration, etc.

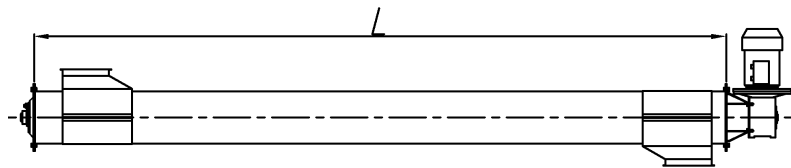
Use MOCRUR200 clamping units produced by BIN Company to fix the screw conveyor to the base (foundation).

Depending on the needs and types of modules of PS160 screw conveyor, the User shall make (inlet and outlet) openings in the conveyor pipe and install the devices to allow connection of the modules mentioned above to the conveyor (see Fig. 35, 36 and 37).

Screw conveyor installation requires special installation equipment and proper knowledge. Therefore, screw conveyors should be installed by installing companies authorized by BIN Company. The installing company shall co-operate with the investor within the range of arrangement of works, settlement of balances and acceptance of installation works.



**When the investor itself or any other installing company not authorized by BIN installs the screw conveyor(s) (because of reasons, which are not dependent of the producer), the investor is obliged to obtain the detailed screw conveyor installation instruction manual and placing warning and information signs on the equipment.**



- L screw conveyor length in m;  
 $\alpha$  screw conveyor slope angle in degrees;  
 $\varphi_{\max}$  maximum screw conveyor pipe filling with conveyed material, in %;  
W capacity, tons/hour.

L (m)	$\alpha = 0^\circ$	
	$\varphi_{\max}$ (%)	W (t/hour)
3	80	28
4.5	75	26
5	70	24
6	65	23

Table 6  
Estimated data for designing screw conveyors with the use of PS160-N1.5/400 module.

L (m)	$\alpha = 0^\circ$	
	$\varphi_{\max}$ (%)	W (t/hour)
3	80	28
6	80	28
9	70	25
12	60	21

Table 7  
Estimated data for designing screw conveyors with the use of PS160-N3.0/400 module.

When designing and/or operating the screw conveyor system, it shall be considered that the screw conveyor system capacity depends, amongst others, on the following:

- Type of material conveyed.
- Humidity of material conveyed.
- Degree of contamination.
- Screw conveyor slope angle.
- Screw conveyor pipe filling.

Therefore, the values given in Tables 6 and 7 shall be treated as estimated data for orientation only and general guidelines for designing the screw conveyor system.



**When using the PS160 screw conveyors as discharging units for BIN silos, no more than one PSU160-WL-CENT or PSU220-WL-CENT inlet module is allowed (in one silo) and/or this module cannot be installed in other positions than the central one.**



**The total PS160 system screw conveyor length cannot exceed 6 m for drives PS160-N1.5/400 and PS220-N6/300, and 12 m for drive PS160-N3.0/400.**

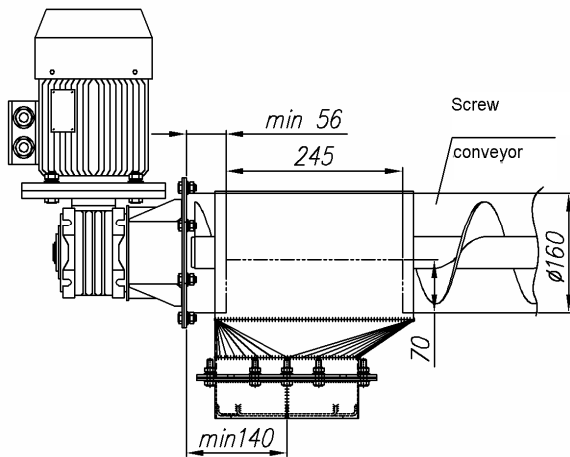


Fig.35 The way of installation PS160-I/O-200 module.

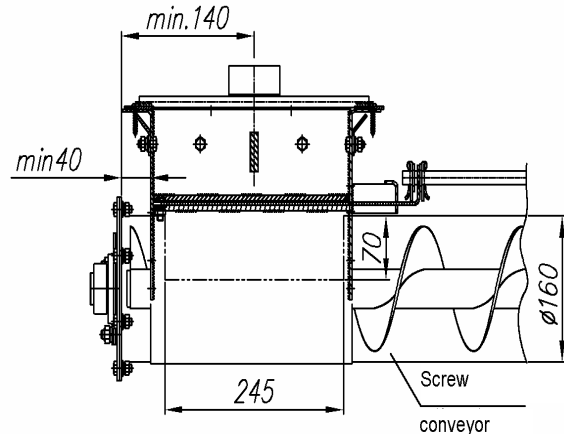


Fig.36 The way of installation PS160-WL-CENT module.

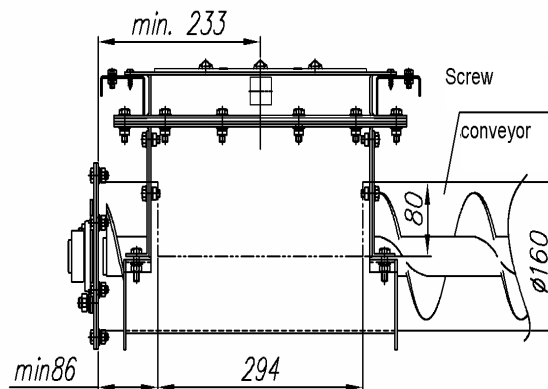


Fig.37 The way of installation PS220-WL-CENT module.

### First start-up

The User himself, at his cost, shall order the qualified electrician with proper authorization to install the electric system. To ensure correct wiring, the User shall provide the electrician with the wiring diagrams. After installing, the electrician shall carry out the test start-up of the equipment. In particular, correct sense of motor revolutions shall be checked and motor protection setting shall be compared with the data contained in the motor information plate. Installation of power supply points for screw conveyors and equipment, which is operated with screw conveyors, shall be made by the qualified electrician with proper authorization in accordance with instruction manuals provided for them.



**The producer requires the confirmation in writing that the electrician with proper authorization has wired and checked the electric system of the equipment.**



**The producer does not agree for operation of screw conveyors with uncovered (non-guarded) inlet/outlet. Both inlet and outlet shall be adapted for connection of other equipment (other screw conveyor pipes, gravity transport pipes, etc.), or proper guards shall be used, which are the standard equipment of respective PS160 modules.**

### 3. Operation

#### 3.1. Operation of screw conveyors

##### Start up of screw conveyor

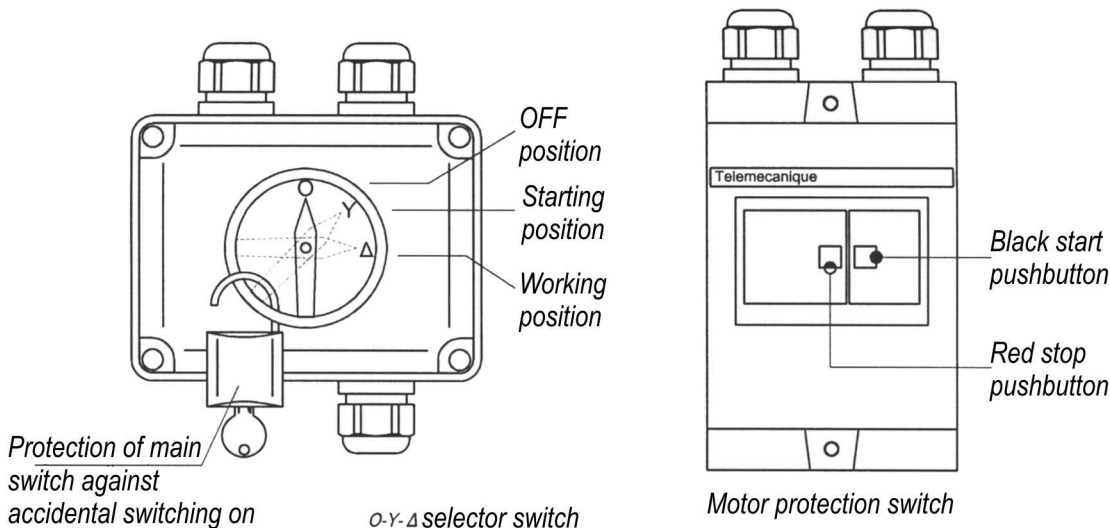
##### PS160-N1.5/400 or PS160-N3.0/400

- Set the main switch to position „I” (see Fig.38),
- Press the black start pushbutton located at the motor switch (see Fig.38).

##### Stopping the conveyor.

##### PS160-N1.5/400 or PS160-N3.0/400

- Cut off the inflow of the grain to the conveyor (close the bolts) and wait for the complete emptying of the device,
- Push the red stop pushbutton on the motor protection switch (Fig.38),
- Set the selector switch in the OFF position - „0” (Fig.38),



**Fig.38 Controls for PS160-N1.5/400 or PS160-N3.0/400 screw conveyors.**

##### Grain conveying

Proceed as follows before starting to transport the grain:

- Check the technical condition of screw conveyors and the equipment working with them.
- Be sure that no people are present at the location of grain inlet and outlet.
- Ensure that the grain flow at the outlet device is smooth so that no screw conveyor jamming (overload) takes place.

Never stop the screw conveyor, which pipe and screw are filled with grain. The problems with restart may occur.



**Screw conveyors must be provided with the devices for dosing and cutting off the material being conveyed. The use of the equipment mentioned above prevents screw conveyor overfilling (jamming) and damage.**



The screw conveyor system cannot convey very contaminated materials or materials with lumps, etc. Never try to transport such materials, because you may cause screw conveyor overloading and/or damage resulting in screw conveyor stoppage.

Taking into account the remarks contained above, you may start the screw conveyor.



**In case of emergency, stop the screw conveyor by pressing the red stop pushbutton at the motor protection switch.**

In case of power supply failure, the screw conveyor system is permanently stopped. It does not start automatically, when the power supply is restored. Repeat the whole starting procedure to start the screw conveyor again.



**All screw conveyor types are intended for operation with filling factor not exceeding 85%. In case this value of filling factor is exceeded, the resistance to motion increases considerably, what may lead to overloading and locking the drive system (including motor).**

### 3.2. Maintenance

Correct and in-time maintenance, inspections and possible repairs guarantees full capacity and correct operation of the screw conveyor and prevents premature and excessive screw conveyor wear.

#### Routine inspections and repairs

The routine inspection includes:

- Checking safety devices, that is: motor protection switch, main switch, etc. (check their proper functioning, for mechanical defects, etc.).
- Checking the condition of electric system by the electrician with proper authorization.
- Checking the technical condition of welded, bolted, etc. joints.
- Checking anticorrosion coats.
- Checking the condition of slide and rolling bearings.
- Lubrication of slide bearings.
- Cleaning and lubrication of gate valve drive screw.
- Checking other moving and stationary parts.

Frequency of inspections:

The frequency of routine inspections shall be adapted properly for intensity of operation, but they should be carried out not less than once a year. All safety devices, that is: motor protection switch, main switch, etc. shall be inspected at least once a month or before each screw conveyor start-up after longer downtime.



**At least once a year, the User shall order the qualified electrician with proper authorization to inspect all electric equipment components.**



**The screw conveyors are provided with slide bearing lubrication system. Fill those bearing with grease every 30 hours of operation.**



**When using the PSU220-WL-CENT central inlet, clean and grease (after each start-up) the gate valve drive screw.**

The routine repairs include small repairs and, possibly, removing the defects of painted coats. Anti-corrosion coats may be damaged during installation (tightening of bolts). In such a case, the routine repair includes painting of damaged places with anti-corrosion paint.

### General overhaul

General overhauls are made as needed, depending on the screw, bolted joints, etc. degree of wear (but not less than once per 8 years), and they include repair or replacement of parts with new ones.

General overhaul includes activities carried out during the routine repair and the following:

- Replacement of slide and rolling bearings, seals, etc.
- Making new anti-corrosion coats.
- Other necessary repairs.



**Remove all defects and repair or replace all defected or worn parts with new ones immediately.**

## SECTION IV - PSW SCREW CONVEYORS

### 1. General description of the product

#### 1.1. Construction and application.

##### Application of PSW screw conveyors.

**The Internal Screw Conveyor (PSW)** is used for discharging BIN type silos, and it is auxiliary equipment for discharging that portion of the grain, which has not been discharged by the under-floor screw conveyor by gravity. Usually, the portion in question includes 15 – 20 % of silo working capacity. Under-floor and internal conveyors, which are operated together, allow complete silo emptying, excluding spaces impossible to empty due to silo structure (that is, areas of internal ladder, emergency duct, etc.). The internal screw conveyor cannot be installed alone in the silo – it always must be operated in conjunction with the under-floor discharge screw conveyor.

##### PSW screw conveyor construction.

The under-floor discharge screw conveyor discharges the grain, which moves by gravity to the central outlet located at the centre of silo floor. Since the silo bottom is flat, some part of grain cannot move to the outlet and is left in the silo. Therefore, 40 tons of grain is left in the silo types BIN200 and BIN200W, that is 15 – 20 % of total silo working capacity. The grain, which is remained in the silo, may be discharged either by pushing it towards the central inlet by hand or with the use of internal screw conveyor PSW installed, which pushes most of grain to the central outlet mechanically. Due to the considerable volume of grain left in BIN500, BIN1000 and BIN1500, BIN 2200 silos, it is strongly recommended to install PSW screw conveyors.

The internal screw conveyor (PSW) conveys the grain along the silo radius to the central discharge opening, and, at the same time, it rotates clockwise around the silo centre line, viewing from above to the silo bottom direction. Gradually, the grain is discharged, until the PSW screw conveyor makes almost full revolution around the silo centre.

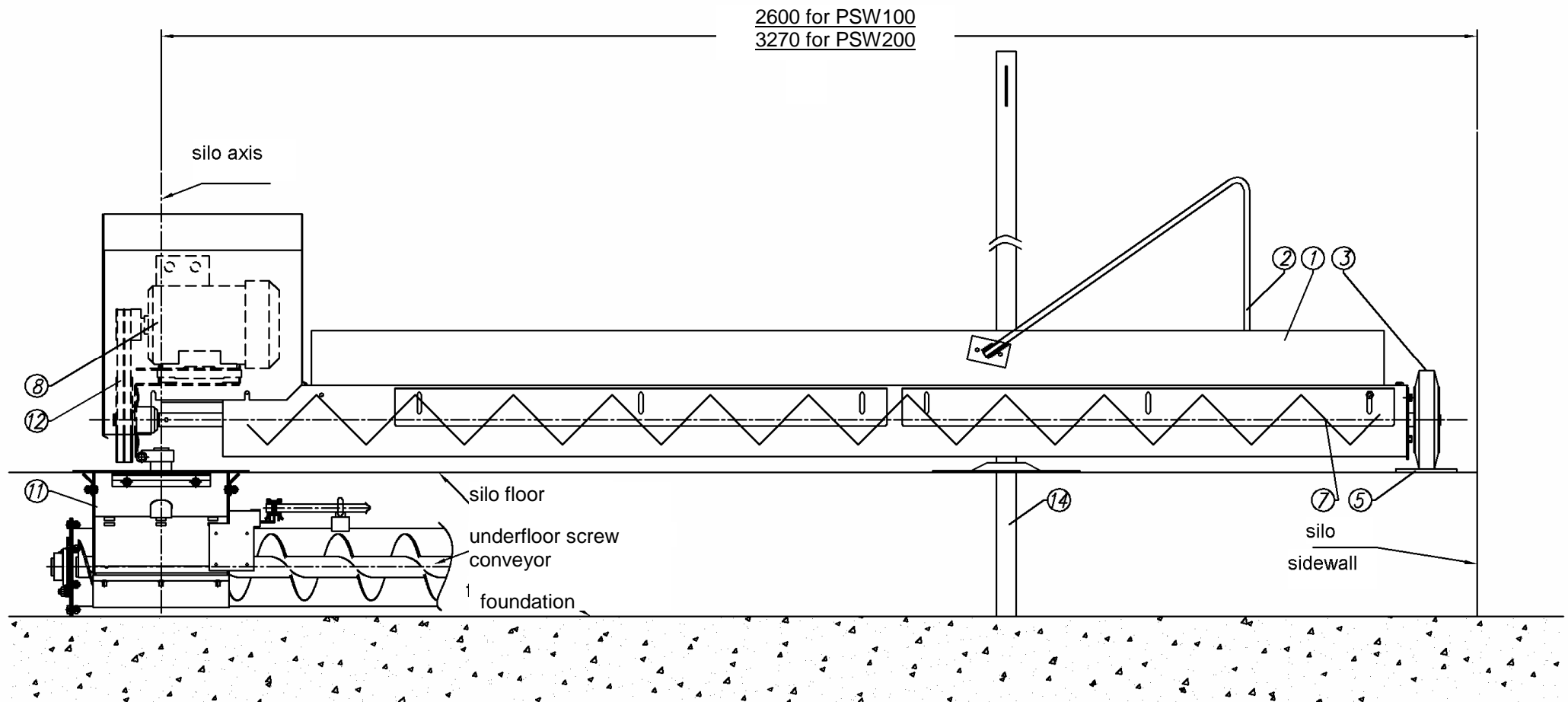
The internal screw conveyor (PSW) – see Figures 39, 40, 41, 42, 43 and 44 – consists of the screw conveyor body (pipe) 1 in which the screw 7 runs. The PSW100 and PSW200 screws 7 – see Figure 39 diameter is 100. PSW220-BIN100 and PSW220-BIN200 – see Fig. 40 – have the same diameters, dia 116 – the movable casing, 17, is used to cover these conveyors, when filling the silo with grain. The screw for PSW500 screw conveyor – see Fig. 41 – has a changing diameter: dia. 166/dia. 136, the screw for PSW1000 – see Fig. 42 – has a changing diameter: dia. 166/dia. 130, the screw for PSW1500 – see Fig. 43 – has a changing diameter: dia. 100/dia. 166/dia. 130, and the screw for PSW2200 – see Fig. 44 – is constant – dia 136. The screw 7 is driven by the electric motor 8 via the reducer 9, which is mounted to the screw conveyor body 1 with bolts or with belt transmission 12 (only PSW100 and PSW200) – see Figure 39. The rotational screw conveyor movement on the track 5 (which is a part of the PSW screw conveyor) is carried out by means of the drive wheel 3, which is driven by the electric motor 8 mentioned above via the screw 7.

The PSW1500 is an exception – see Figure 42, and the wheel 3 is provided with additional, individual drive motor, 13. The drive wheel 3 is mounted directly to the screw 7 for the PSW100, PSW200, PSW220-BIN100, PSW220-BIN200 screw conveyor (see Fig. 39 and 40), by means of the reducer for PSW500 and PSW1000, PSW1500 screw conveyors (see Fig. 41, 42 and 43). The driving wheel, 3, for PSW220-BIN100 and PSW220-BIN200 – see Fig. 40 – is provided with guarding cover, 4, which is installed for the time period of silo filling.

PSW screw conveyor is installed in the silo centre line by means of the central stand, which is bolted to the central inlet, 11, where the central stand is a rotating support for the conveyor body, 1. Moreover, for the time period of silo filling, PSW220-BIN100, PSW220-BIN200, PSW500, PSW100 and PSW2200 conveyor body, 1 – see Fig 40, 41, 42 and 44 – is supported with a special single support, 6, at the side of silo wall, and PSW1500 conveyor body – see Fig. 43 - is supported with two supports, 6. PSW100 and PSW200 screw conveyors – see Fig. 39 – are provided with a support, 14, which is used to hang the screw conveyor before starting silo filling. The PSW2200 screw conveyor – see Fig. 44 – is provided with moving carriage, 15, which stands for the middle support, and with the cover – the guarding duct, 16, located above the conveyor screw, 1, and screw, 7.

Conveyor electric motors, 8 and 13, are provided with guarding covers. All PSW conveyors are provided with electric equipment, handles for transporting, 10, information and warning plates.



**Fig.39**

**Internal screw conveyor PSW100/PSW200, for type BIN100/BIN200 silos**

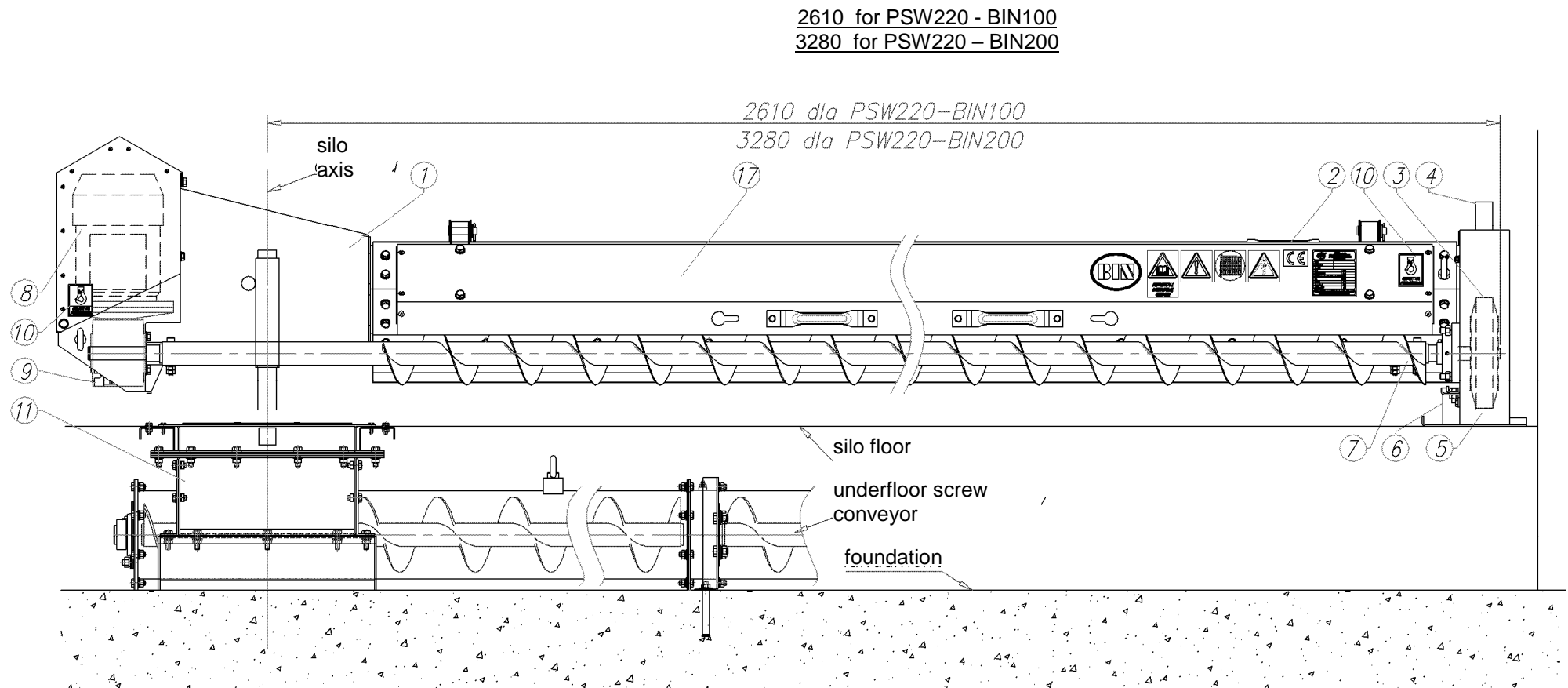
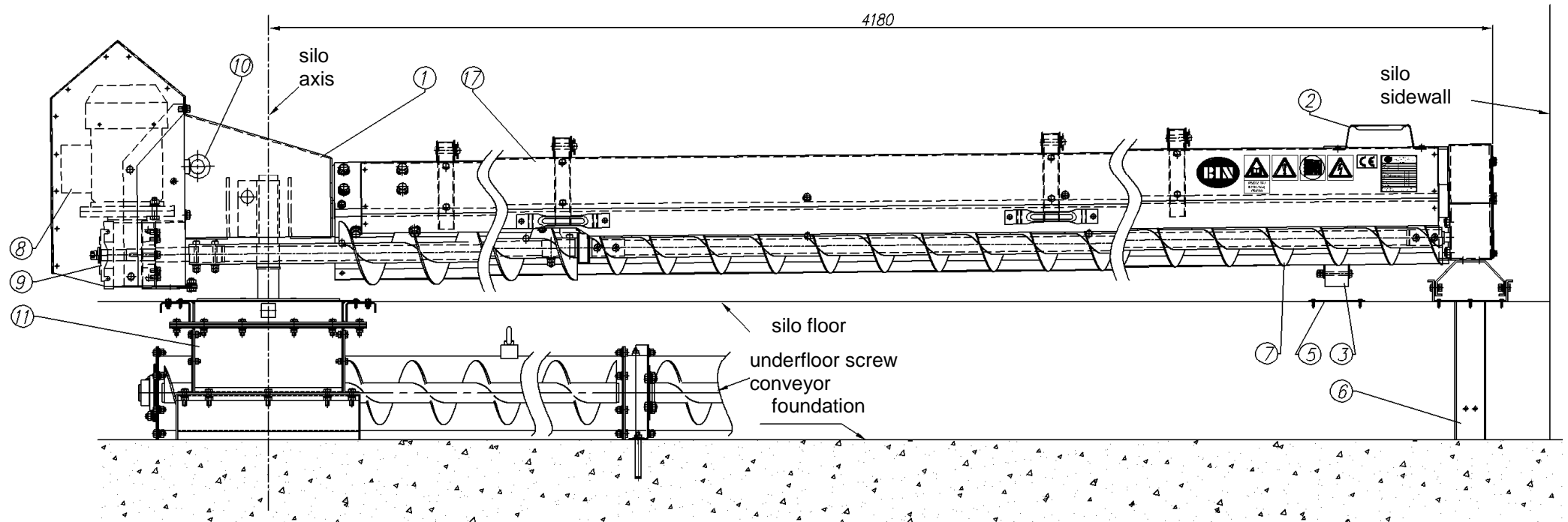
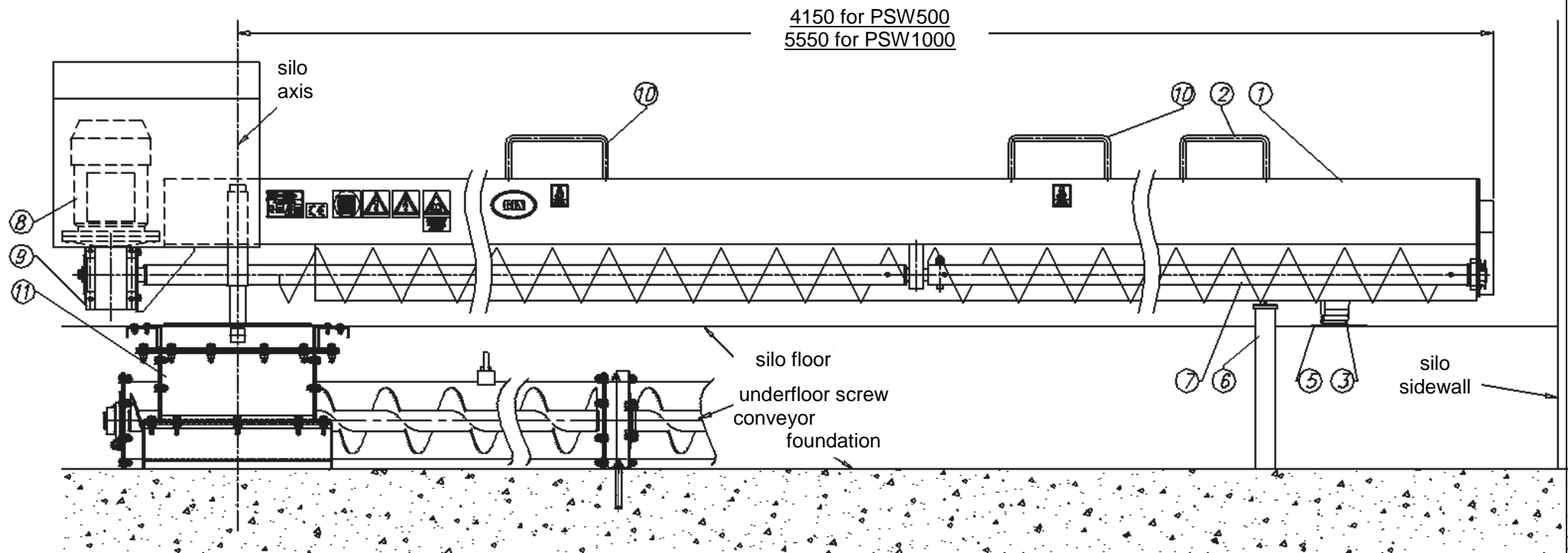


Fig. 40

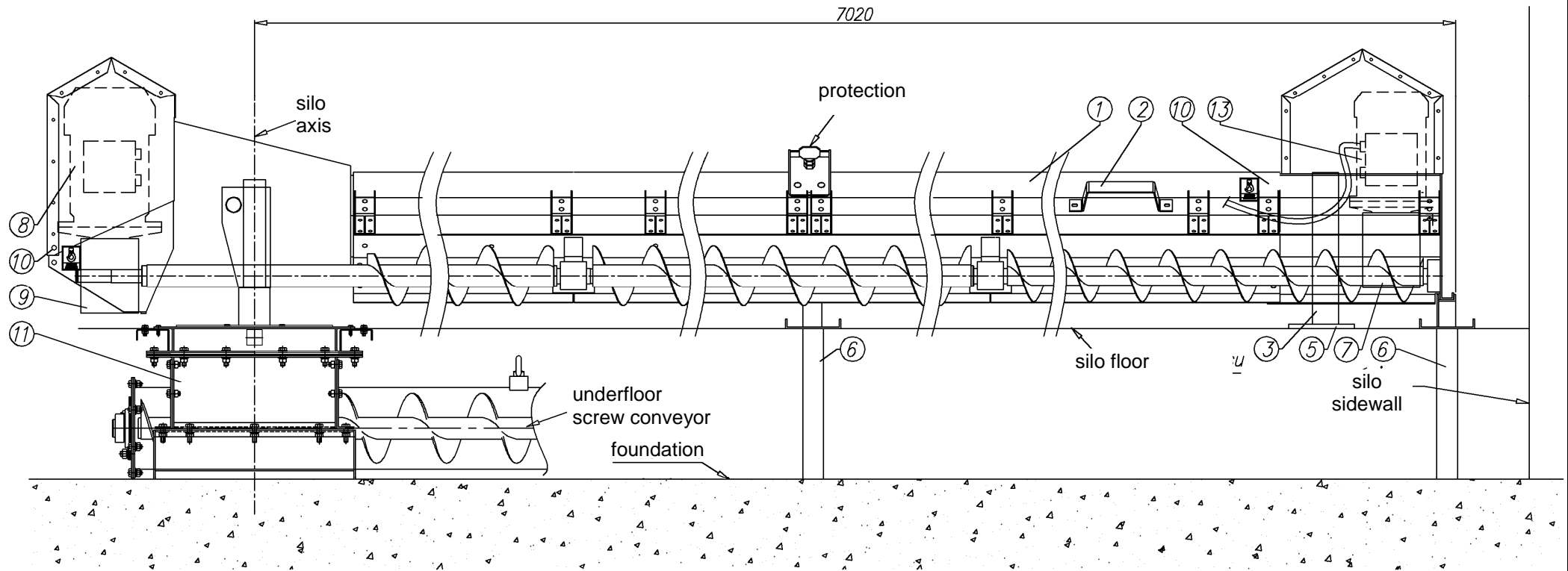
Internal screw conveyor PSW220-BIN100 and PSW220-BIN200, for type BIN100 and BIN200 silos



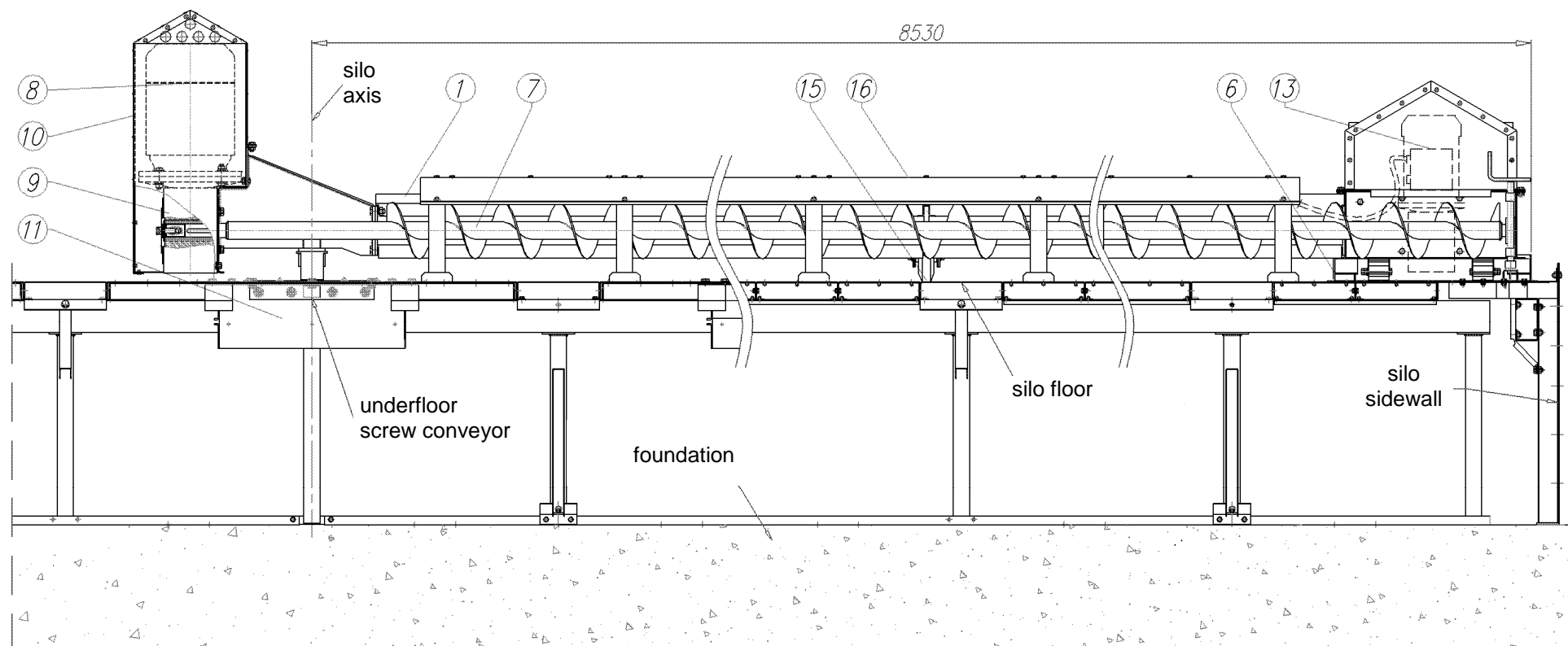
**Fig. 41**  
**Internal screw conveyor PSW500, for types BIN500 silos**

**Fig. 42****Internal screw conveyor PSW1000, for types BIN1000 silos**



**Fig. 43**

**Internal screw conveyor PSW1500, for type BIN1500 silos**

**Fig. 44****Internal screw conveyor PSW2200, for type BIN2200 silos**

## 1.2. Specifications

Table 8: PSW screw conveyor specifications.

Pos.			PSW100	PSW200	PSW220-BIN100 PSW220-BIN200	PSW500	PSW1000	PSW1500	PSW2200
1.	Type and location		Internal screw conveyor	Internal screw conveyor	Internal screw conveyor	Internal screw conveyor	Internal screw conveyor	Internal screw conveyor	Internal screw conveyor
2.	Motor type		Sg90L-4	Sg90L-4	Skg80-2PC	Skg90L-2	Skg90L-2	Skg90L-2PC / Skg(H)71-4B	Skg112M-2PC/ Skg(H)71-4B
3.	Motor nominal power	kW	1.5	1.5	1.5	2.2	2.2	3.0 / 0.37	6.0/0.37
4.	Power supply voltage	V	3x400	3x400	3x400	3x400	3x400	3x400	3x400
5.	Motor rpms	rpm	1410	1410	2855	2855	2855	2845/1440	2910/1440
6.	Transmission type	-	Belt transmission	Belt transmission	Worm gear	Worm gear	Worm gear	Worm gear	Worm gear
7.	Screw rpms	rpm	485	485	408	408	408	408	415
8.	Screw diameter	mm	Ø100	Ø100	Ø116	Ø116/Ø130	Ø116/Ø130	Ø100/Ø116/Ø1	Ø136
9.	Nominal capacity	t/hour	to 12	to 12	to 18	to 24	to 24	to 24	to 35
10.	Total length	mm	2720	3390	3050 3750	4650	6000	7500	8530
11.	Weight	kg	99	126	148 168	275	280	430	805

For all equipment included in the Instruction Manual, the equivalent acoustic pressure level does not exceed 70 dB (A).



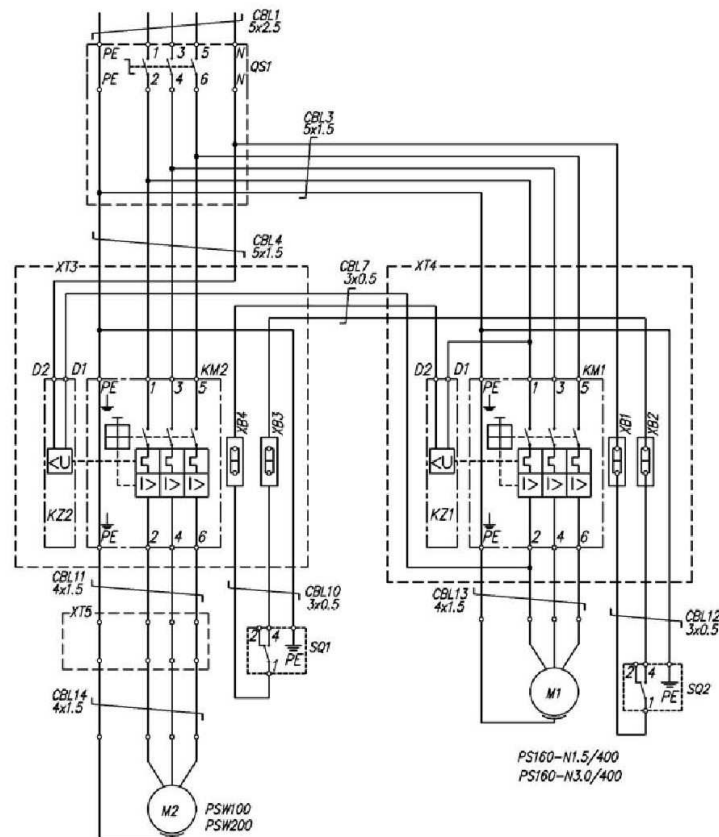
### 1.3. Electric system

The producer provides screw conveyors with all electric devices necessary for proper installation, excluding power supply cables. The Investor shall order the qualified electrician with proper authorization to install the electric system in accordance with the wiring diagrams shown below.

Electric system descriptions and diagrams contained in this manual are the general guidelines for designing the electric system for the screw conveyor by authorized persons. Modifications of electric diagrams mentioned above may be done so that all protection functions of devices as specified in the electric system descriptions and diagrams are maintained.

All controls shall be installed in the location, which ensures safe operation of the equipment. When making electric installation, comply with requirements and recommendations for other equipment, which will operate with screw conveyors. Because of many various screw conveyor configurations, the BIN Company does not deliver electric cables for screw conveyors. The User is obliged to supply (at his cost) proper quantity of cables of proper type in accordance with the requirements contained in this manual.

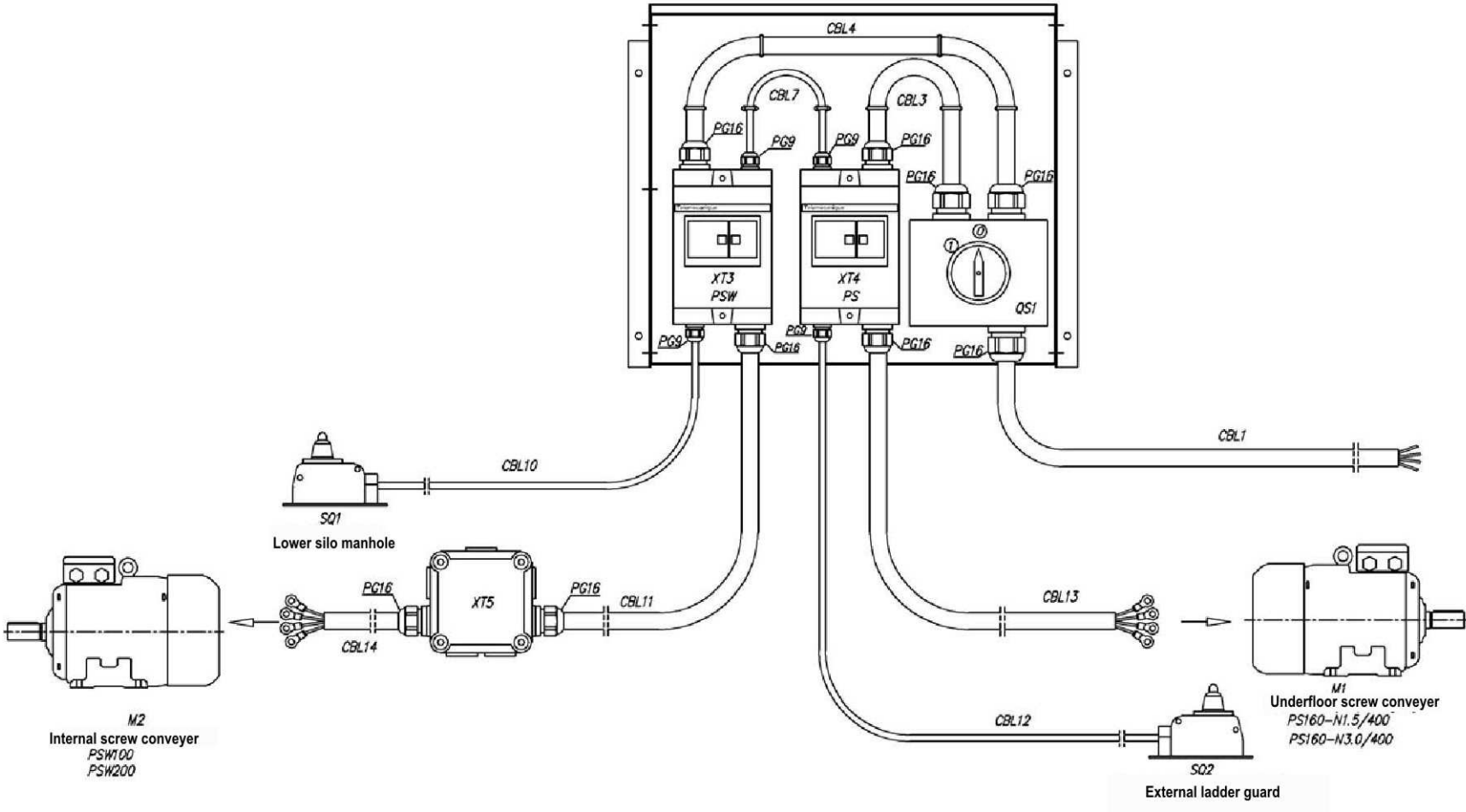
**Connection of the under-floor discharge screw conveyor and PSW screw conveyor in cascade prevents PSW start-up, when the under-floor discharge screw conveyor is not running**




14	CBL14	OLFLEX ROBOT 900P 4G2.5	LAPPKABEL	Anti-flex cable
13	XT5	GW44 204	GEWISS	Distribution box
12	XT4	GV2-MC	TELEMECANIQUE	Motor protection switch casing
11	XT3	GV2-MC	TELEMECANIQUE	Motor protection switch casing
10	KM2	GZ1-M08	TELEMECANIQUE	Motor protection switch, range 2.5-4.0A
9	XB1- XB2	ZUG-G4	PROMET	Installation cube for DIN 50 bus
8	SQ2	LM10	PROMET	Limit switch
7	SQ2	LM10	PROMET	Limit switch
6	QS1	ŁK25R-2.8211	SPAMEL	Main switch
5	KZ2	GZ1-AU225	TELEMECANIQUE	Undervoltage protection (230V)
4	KZ1	GZ1-AU225	TELEMECANIQUE	Undervoltage protection (230V)
3b	KM1	GZ1-M14	TELEMECANIQUE	Motor protection switch, range 6.0-10A for PS160-N3.0/400
3a	KM1	GZ1-M08	TELEMECANIQUE	Motor protection switch, range 2.5-4.0A for PS160-N1.5/400
2	M2	Sk90L-4	TAMEL	P=1.5kW, n=1410
1b	M1	Sk90L-2PC	TAMEL	P=3.0kW, n=3000, B5 for PS160-N3.0/400
1a	M1	Sk90L-2PC	TAMEL	P=1.5kW, n=3000, B5 for PS160-N 1.5/400
Pos.	Symbol	Type	Producer	Notes

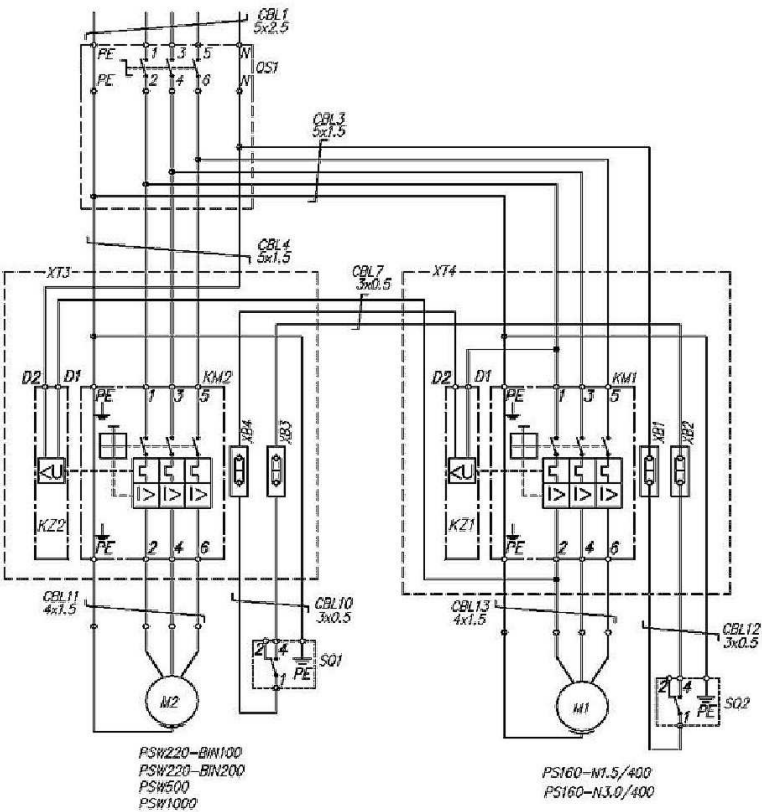
- Notes:1.
- For silos, which are provided with:  
PS160-N1.5/400 and PSW220-BIN200  
Or PS160-N1.5/400 and PSW500  
Or PS160-N3.0/400 and PSW220-BIN200  
Or PS160-N3.0/400 and PSW500  
Or PS160-N3.0/400 and PSW1000 .
  - The wiring diagram is the general guideline for designing the electric system.
  - Modifications of electric diagrams may be done so that all protection functions of devices are maintained

Designed by:				Unit/part name: <b>Electric system – basic diagram</b> <b>PS160-N1.5/400, PS160-N3.0/400</b> <b>PSW100, PSW200</b>	
Drawn by:					
Checked by:					
	Name	Signature	Date		
Scale:		„BIN” Sp. z o.o. Aleksandrów Kuj.	Drwg. No.: <b>PS160-089-00</b>	Equipment symbol:	Format:



Notes:  
See basic diagram for symbols


Designed by:				Unit/part name: <b>Electric system – basic diagram</b> <b>PS160-N1.5/400, PS160-N3.0/400</b> <b>PSW100, PSW200</b>	
Drawn by:					
Checked by:					
	Name	Signature	Date		
Scale:		„BIN” Sp. z o.o. Aleksandrów Kuj.	Drwg. No.: <b>PS160-090-00</b>	Equipment symbol:	Format:



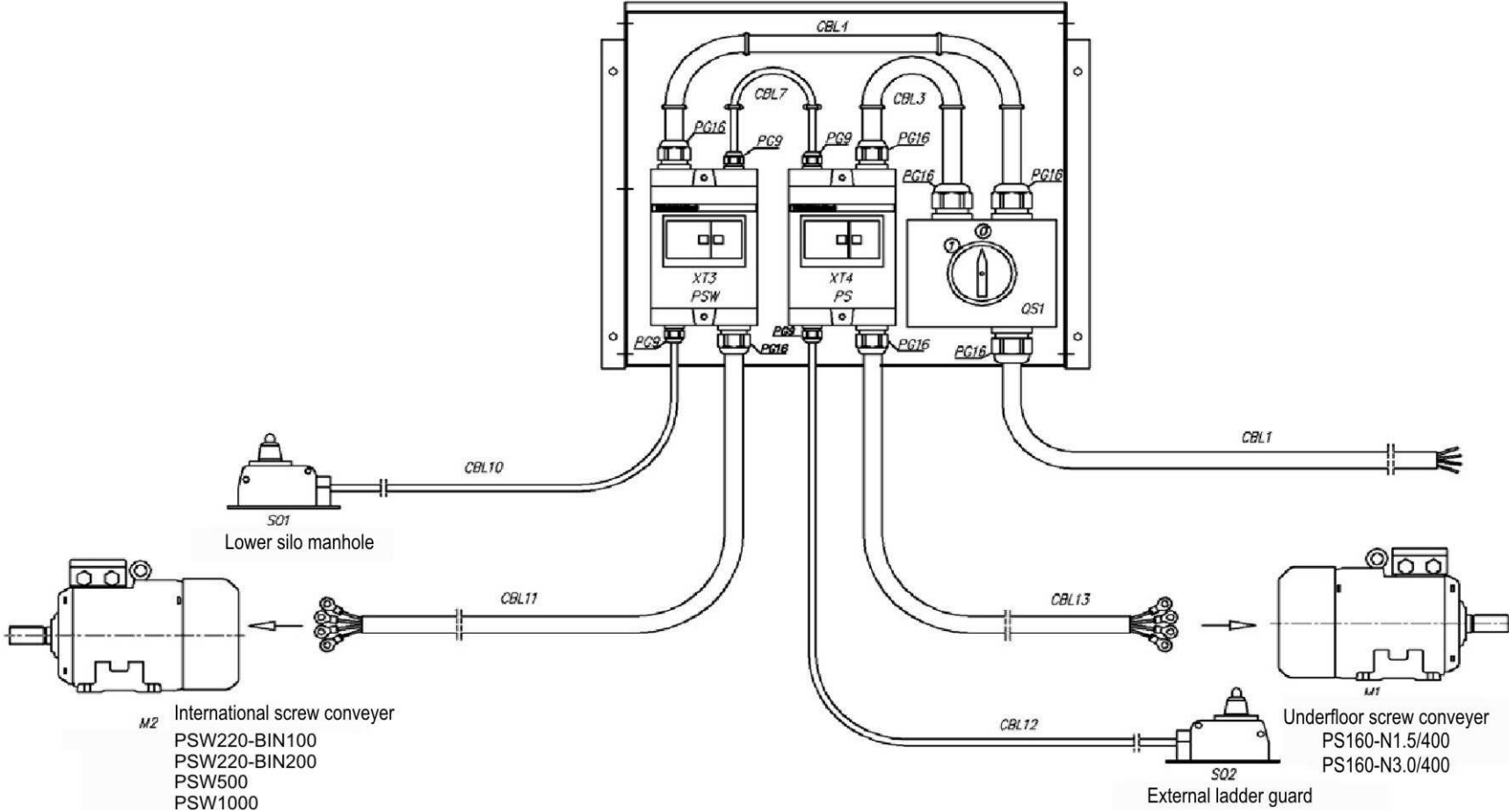
12	XT4	GV2-MC	TELEMECANIQUE	Motor protection switch casing
11	XT3	GV2-MC	TELEMECANIQUE	Motor protection switch casing
10	KM2	GZ1-M08	TELEMECANIQUE	Motor protection switch, range 4.0 – 6.3A
9	XB1- XB4	ZUG-G4	PROMET	Installation cube for DIN 50 bus
8	SQ2	LM10	PROMET	Limit switch
7	SQ1	LM10	PROMET	Limit switch
6	QS1	ŁK25R-2.8211 OBZ	SPAMEL	Main switch
5	KZ2	GZ1-AU225	TELEMECANIQUE	Undervoltage protection (230V)
4	KZ1	GZ1-AU225	TELEMECANIQUE	Undervoltage protection (230V)
3b	KM1	GZ1-M14	TELEMECANIQUE	Motor protection switch, range 6.0-10A for PS160-N3.0/400
3a	KM1	GZ1-M08	TELEMECANIQUE	Motor protection switch, range 2.5-4.0A for PS160-N1.5/400
2b	M2	Skq80-2PC	TAMEL	P=1.5kW, n=3000, B5 for PSW220-BIN200
2a	M2	Skq90S-2PC	TAMEL	P=2.2kW, n=3000, B5 for PSW500-BIN1000
1b	M1	Skq90L-2PC	TAMEL	P=3.0kW, n=3000, B5 for PS160-N3.0/400
1a	M1	Skq80-2PC	TAMEL	P=1.5kW, n=3000, B5 for PS160-N1.5/400
Pos.	Symbol	Type	Producer	Notes

Notes:1.


- For silos, which are provided with:  
PS160-N1.5/400 and PSW220-BIN100  
Or PS160-N1.5/400 and PSW220-BIN200  
Or PS160-N1.5/400 and PSW500  
Or PS160-N3.0/400 and PSW220-BIN200  
Or PS160-N3.0/400 and PSW500  
Or PS160-N3.0/400 and PSW1000 .
- The wiring diagram is the general guideline for designing the electric system.
- Modifications of electric diagrams may be done so that all protection functions of devices are maintained

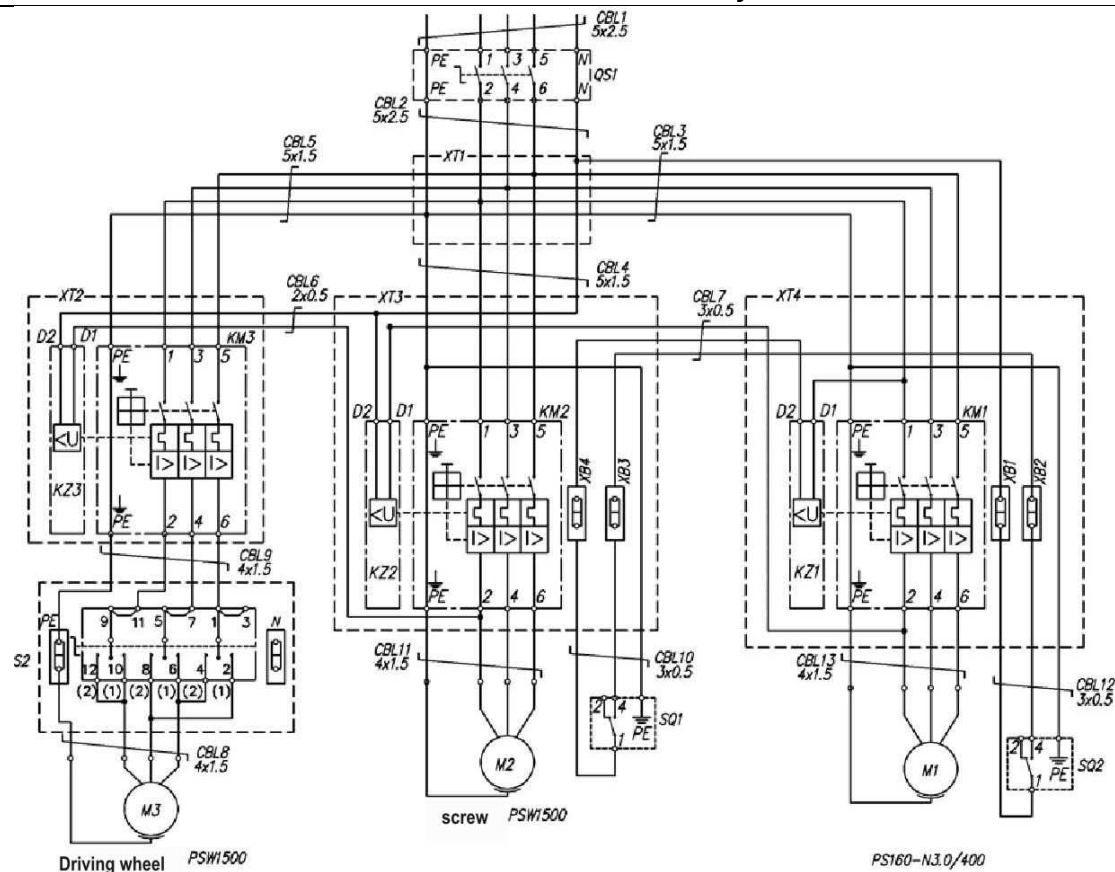
Designed by:				Unit/part name: <b>Electric system – basic diagram</b> <b>PS160-N1.5/400, PS160-N3.0/400</b> <b>PSW220-BIN100, PSW500, PSW1000</b>
Drawn by:				
Checked by:				
	Name	Signature	Date	
Scale:		„BIN” Sp. z o.o. Aleksandrów Kuj.	Drwg. No.: <b>PS160-089-01</b>	Equipment symbol:
				Format:





Notes:  
See basic diagram for symbols

Designed by:				Unit/part name: <b>Electric system – basic diagram</b> <b>PS160-N1.5/400, PS160-N3.0/400</b> <b>PSW220-BIN100/200, PSW500, PSW1000</b>	
Drawn by:					
Checked by:					
	Name	Signature	Date		
Scale:		„BIN” Sp. z o.o. Aleksandrów Kuj.	Drwg. No.: <b>PS160-090-01</b>	Equipment symbol:	Format:

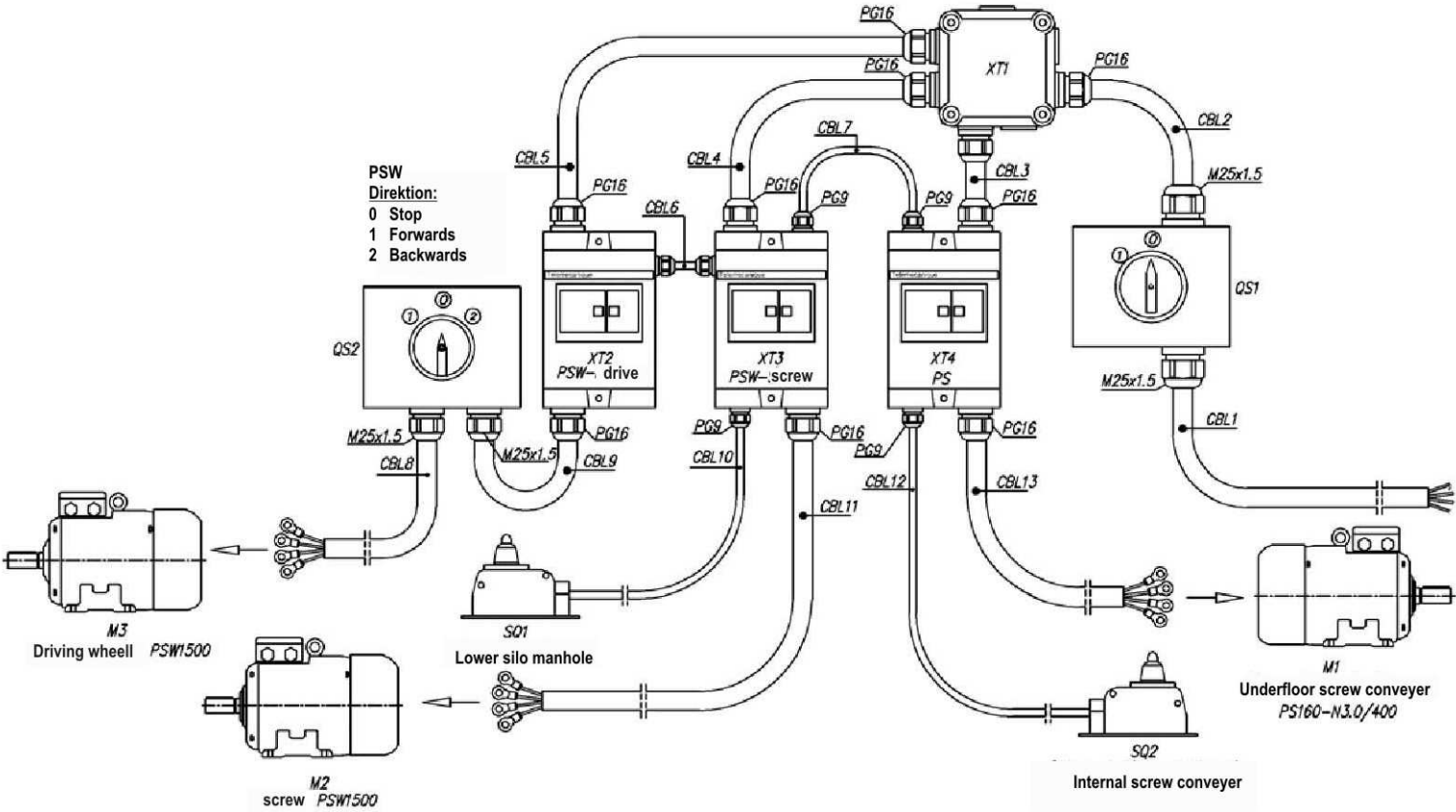


18	XT4	GV2-MC	TELEMECANIQUE	Motor protection switch casing
17	XT3	GV2-MC	TELEMECANIQUE	Motor protection switch casing
16	XT2	GV2-MC	TELEMECANIQUE	Motor protection switch casing
15	KM3	GZ1-M06	TELEMECANIQUE	Motor protection switch, range 1.0-1.6A
14	KM2	GZ1-M10	TELEMECANIQUE	Motor protection switch, range 4.0-6.3A
13	XB1- XB4	ZUG-G4	PROMET	Installation cube for DIN 50 bus
12	XT1	GW44 204	GEWISS	Distribution box
11	SQ2	LM10	PROMET	Limit switch
10	SQ1	LM10	PROMET	Limit switch
9	QS1	ŁK25R-2.8211 OB27	SPAMEL	Main switch
8	QS2	ŁK16R-3.8380 OB2	SPAMEL	0-1-2 switch
7	KZ3	GZ1-AU225	TELEMECANIQUE	Undervoltage protection (230V)
6	KZ2	GZ1-AU225	TELEMECANIQUE	Undervoltage protection (230V)
5	KZ1	GZ1-AU225	TELEMECANIQUE	Undervoltage protection (230V)
4	KM1	GZ1-M14	TELEMECANIQUE	Motor protection switch, range 6.0-10A f
3	M3	Skq71-4B	INDUKTA	P=0.37kW, n=1500 B5
2	M2	Skq90L-4PC	TAMEL	P=2.2kW, n=1380, B5
1	M1	Skq100L-4B	TAMEL	P=3.0kW, n=3000, B5
Pos.	Symbol	Type	Producer	Notes


## Notes:

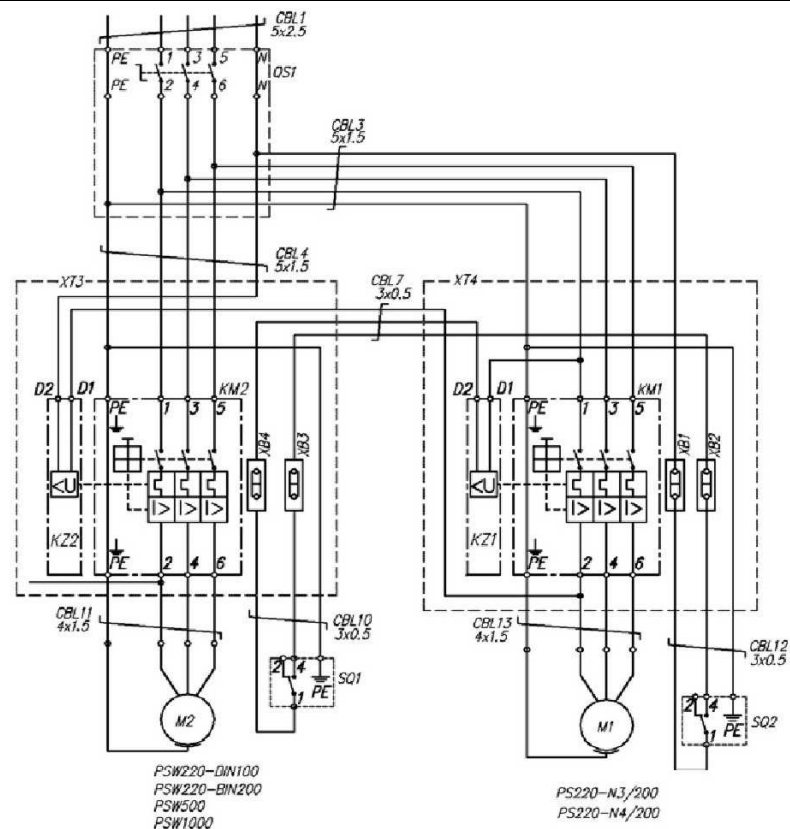
- For BIN1500 silos, which are provided with: PS160-N3.0/400 and PSW1500.
- The wiring diagram is the general guideline for designing the electric system.
- Modifications of electric diagrams may be done so that all protection functions of devices are maintained

Designed by:			Unit/part name:
Drawn by:			Electric system – basic diagram
Checked by:			PS160-N3.0/400 PSW1500
Scale:	Name <b>BIN</b>	Signature „BIN” Sp. z o.o. Aleksandrów Kuj.	Date Drwg. No.: <b>PS160-091-00</b>
			Equipment symbol:
			Format:




Notes:  
See basic diagram for symbols

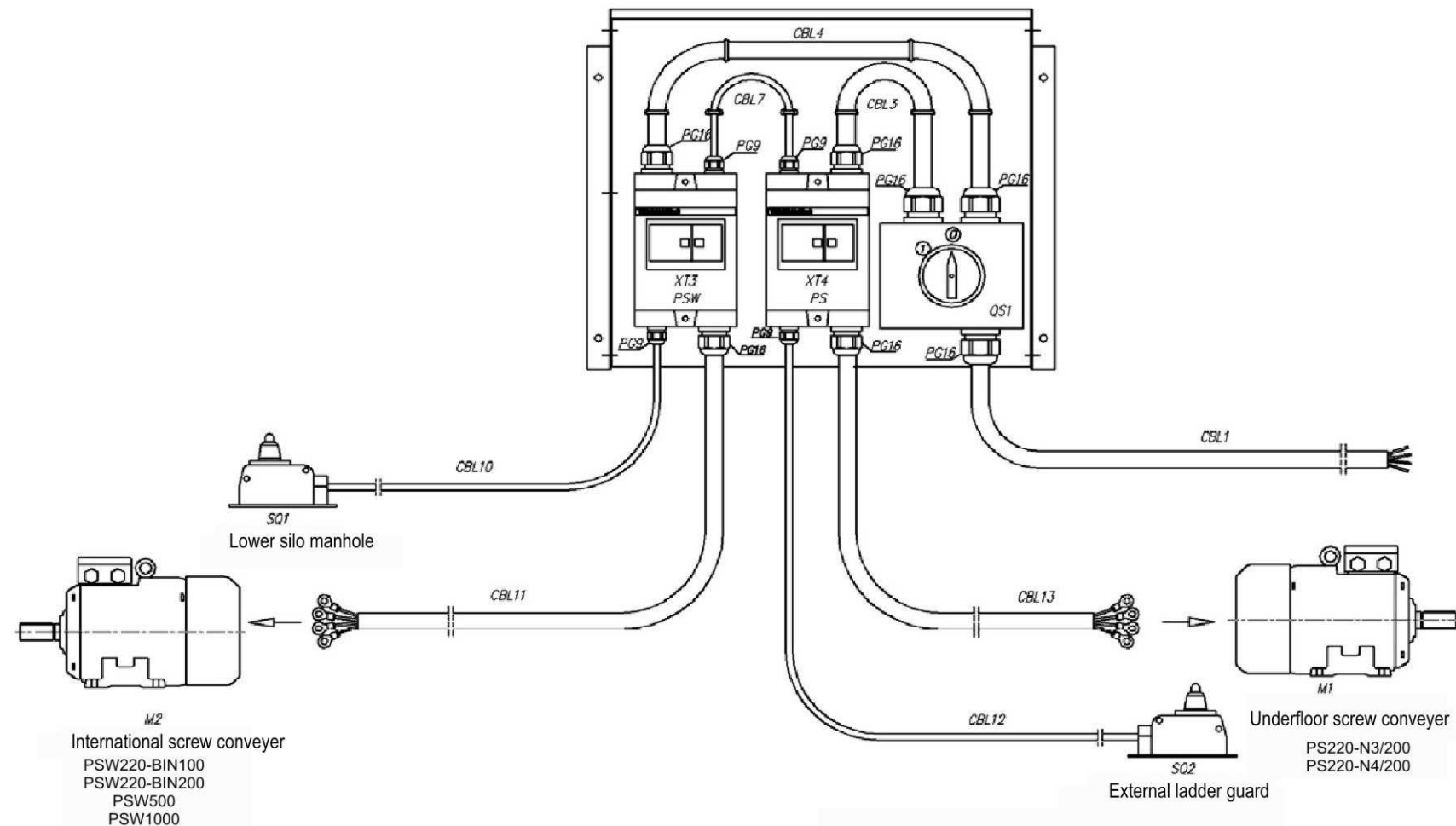
Designed by:				Unit/part name: <b>Electric system – basic diagram</b> <b>PS160-N3.0/400, PSW1500</b>	
Drawn by:					
Checked by:					
	Name	Signature	Date		
Scale:		„BIN” Sp. z o.o. Aleksandrów Kuj.	Drwg. No.: <b>PS160-092-00</b>	Equipment symbol:	Format:

**NOTES:**

- For silos, which are provided with:  
PS220-N3/200 and PSW220-BIN200, or  
PS220-N3/200 and PSW500, or  
PS220-N3/200 and PSW1000, or  
PS220-N4/200 and PSW220-BIN200, or  
PS220-N4/200 and PSW500, or  
PS220-N4/200 and PSW1000.
- The wiring diagram is the general guideline for designing the electric system.
- Modifications of electric diagrams may be done so that all protection functions of devices are maintained.


12	XT4	GV2-MC	Telemecanique	Motor protection switch casing
11	XT3	GV2-MC	Telemecanique	Motor protection switch casing
10	KM2	GZ1-M10	Telemecanique	Motor protection switch, range 4.0-6.3A
9	XB1-XB4	ZUG-G4	PROMET	Installation cube for DIN 50 bus
8	SQ2	LM10	PROMET	Limit switch
7	SQ1	LM10	PROMET	Limit switch
6	QS1	ŁK25R-2.8211 OB2Z	SPAMEL	Main switch
5	KZ2	GZ1-AU225	Telemecanique	Undervoltage protection (230V)
4	KZ1	GZ1-AU225	Telemecanique	Undervoltage protection (230V)
3	KM1	GZ1-M14	Telemecanique	Motor protection switch, range 6.0-10A
2b	M2	Skq80-2PC	TAMEL	P = 1.5 kW, n = 3000 rpm, B5; for PSW220-BIN100/200
2a	M2	Skq90S-2PC	TAMEL	P = 2.2 kW, n = 3000 rpm, B5; for PSW500, PSW1000
1b	M1	Skq112M-4	TAMEL	P = 4.0 kW, n = 1500 rpm, B5; for PS220-N4/200
1a	M1	Skq100L-4B	TAMEL	P = 3.0 kW, n = 1500 rpm, B5; for PS220-N3/200
Pos.	Symbol	Type	Producer	Notes

<b>Designed by:</b>				Unit/part name: <b>Electric system – basic diagram</b> <b>PS220-N3/200, PS220-N4/200</b> <b>PSW220-BIN100/200, PSW500, PSW1000</b>
<b>Drawn by:</b>				
<b>Checked by:</b>				
	<b>Name</b>	<b>Signature</b>	<b>Date</b>	
<b>Scale:</b>		„BIN” Sp. z o.o. Aleksandrów Kuj.	Drwg. No.: PS220-091-01	Equipment symbol:      Format:



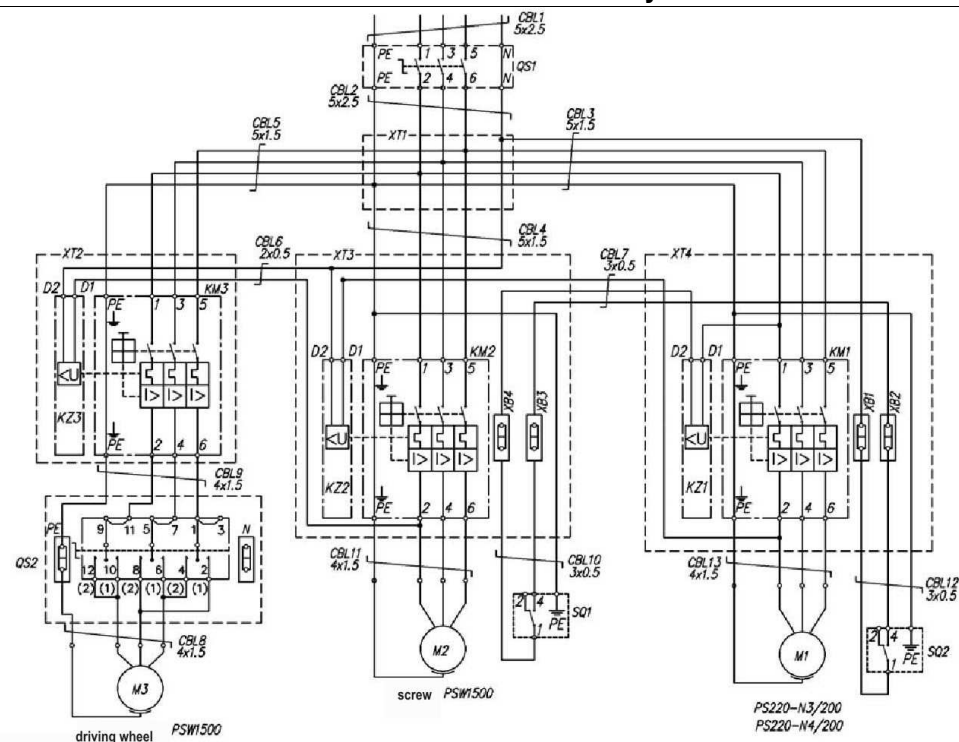
Notes:

See basic diagram for symbols

Designed by:				Unit/part name: <b>Electric system – basic diagram</b> <b>PS220-N3/200, PS220-N4/200</b> <b>PSW220-BIN100/200, PSW500, PSW1000</b>	
Drawn by:					
Checked by:					
	Name	Signature	Date	Equipment symbol:	Format:
Scale:		„BIN” Sp. z o.o. Aleksandrów Kuj.	Drwg. No.: <b>PS220-092-01</b>		

## Section IV

## PSW screw conveyors

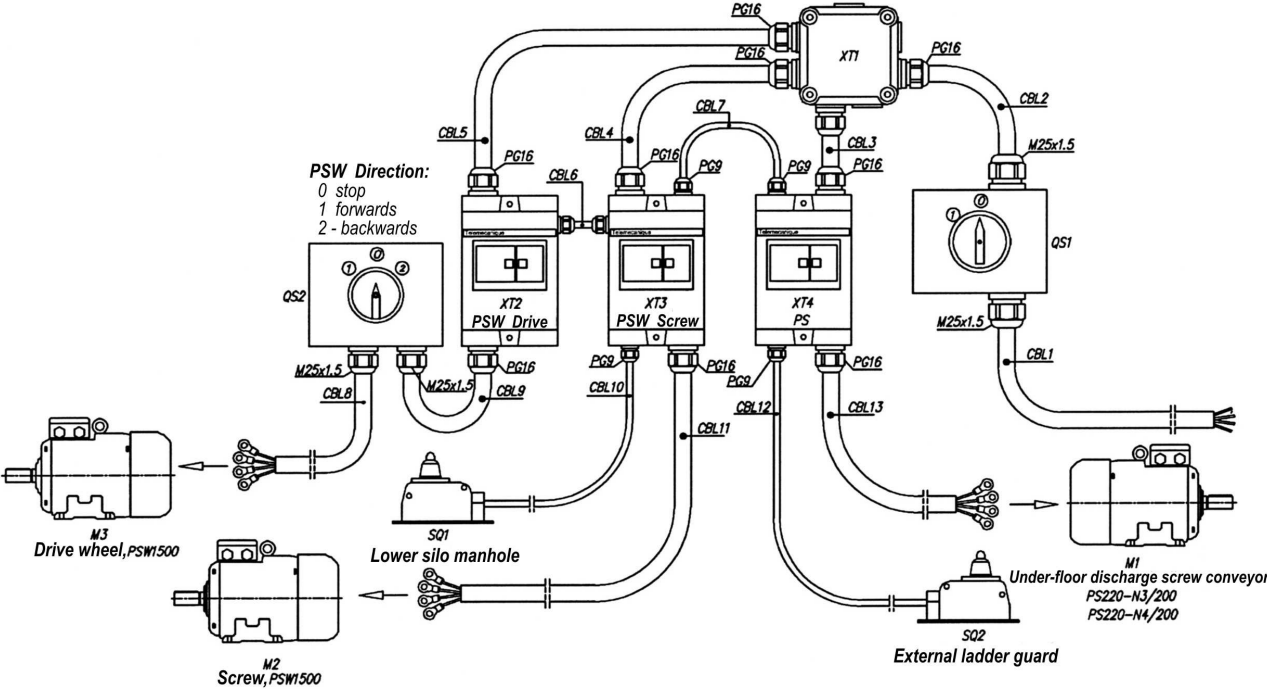


18	XT4	GV2-MC	Telemecanique	Motor protection switch casing
17	XT3	GV2-MC	Telemecanique	Motor protection switch casing
16	XT2	GV2-MC	Telemecanique	Motor protection switch casing
15	KM3	GZ1-M10	Telemecanique	Motor protection switch, range 1.0-1.6A
14	KM2	GZ1-M10	Telemecanique	Motor protection switch, range 4.0-6.3A
13	XB1-XB4	ZUG-G4	PROMET	Installation cube for DIN 50 bus
12	XT1	GW 44 204	GEWIS	Distribution box
11	SQ2	LM10	PROMET	Limit switch
10	SQ1	LM10	PROMET	Limit switch
9	QS1	ŁK25R-2.8211 OB2Z	SPAMEL	Main switch
8	QS2	ŁK16R-3.8380 OB2	SPAMEL	0-1-2 selector switch
7	KZ3	GZ1-AU225	Telemecanique	Undervoltage protection (230V)
6	KZ2	GZ1-AU225	Telemecanique	Undervoltage protection (230V)
5	KZ1	GZ1-AU225	Telemecanique	Undervoltage protection (230V)
4	KM1	GZ1-M14	Telemecanique	Motor protection switch, range 6.0-10A
3	M3	Skq71-4B	INDUKTA	P = 0.37 kW, n = 1500 rpm, B5
2	M2	Skq90L-4PC	TAMEL	P = 2.2 kW, n = 1380 rpm, B5
1b	M1	Skq112M-4	TAMEL	P = 4.0 kW, n = 1500 rpm, B5; for PS220-N4/200
1a	M1	Skq100L-4B	TAMEL	P = 3.0 kW, n = 1500 rpm, B5; for PS220-N3/200
Pos.	Symbol	Type	Producer	Notes


## NOTES:

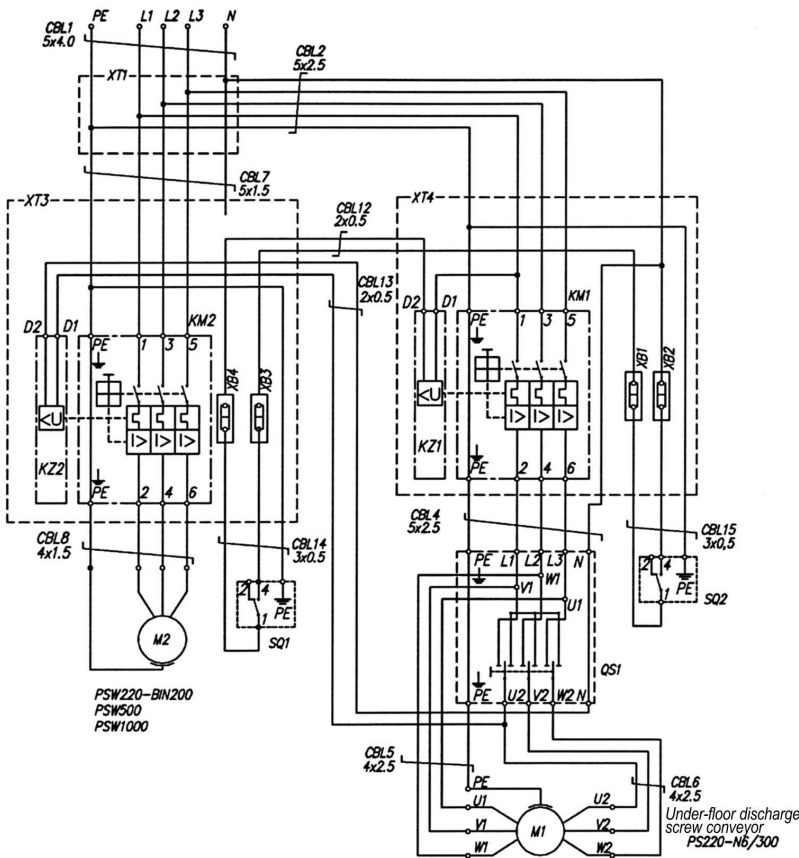
- For BIN1500 type silos, which are provided with:  
PS220-N3/200 and PSW1500, or  
PS220-N4/200 and PSW1500.
- The wiring diagram is the general guideline for designing the electric system.
- Modifications of electric diagrams may be done so that all protection functions of devices are maintained.

Designed by:				Unit/part name: Electric system – basic diagram <b>PS220-N3/200, PS220-N4/200</b> <b>PSW1500</b>	
Drawn by:					
Checked by:					
	Name	Signature	Date		
Scale:		„BIN” Sp. z o.o. Aleksandrów Kuj.	Drwg. No.: <b>PS220-093-00</b>	Equipment symbol:	Format:



Notes:  
See basic diagram for symbols

Designed by:				Unit/part name: Electric system – block diagram PS220-N3/200, PS220-N4/200 PSW1500	
Drawn by:					
Checked by:					
	Name	Signature	Date		
Scale:		„BIN” Sp. z o.o. Aleksandrów Kuj.	Drwg. No.: PS220-094-00	Equipment symbol:	Format:



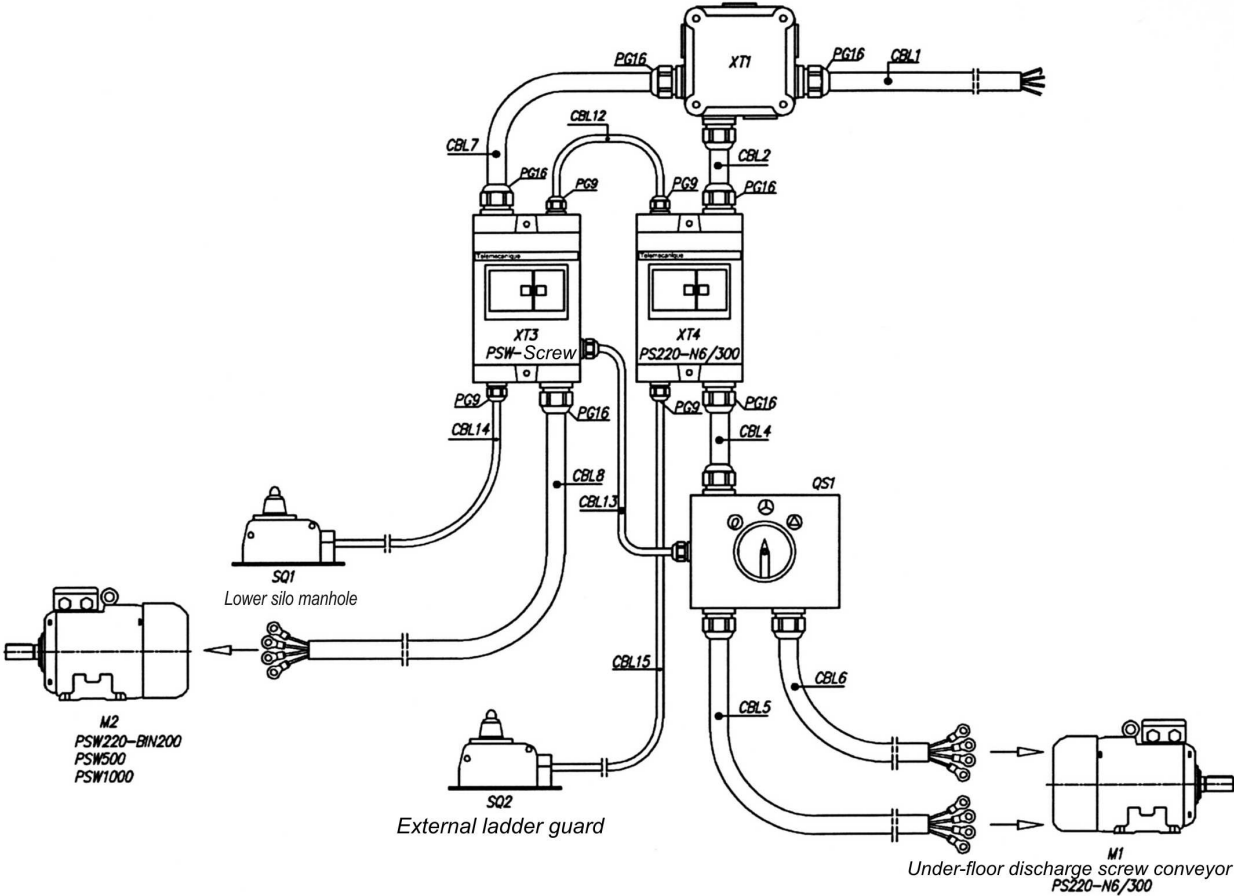
NOTES:

1. For silos, which are provided with:  
PS220-N6/300 and PSW500, or  
PS220-N6/300 and PSW1000.
2. The wiring diagram is the general guideline for designing the electric system.
3. Modifications of electric diagrams may be done so that all protection functions of devices are maintained.


13	XT4	GV2-MC	Telemechanique	Motor protection switch casing
12	XT3	GV2-MC	Telemechanique	Motor protection switch casing
11	KM2	GZ1-M10	Telemechanique	Motor protection switch, range 4.0-6.3A
10	XB1-XB4	ZUG-G4	PROMET	Installation cube for DIN 50 bus
9	XT1	GW 44 204	GEWISS	Distribution box
8	SQ2	LM10	PROMET	Limit switch
7	SQ1	LM10	PROMET	0-Y-Δ selector switch
6	QS1	ŁK25R-4.831 OB2Z	SPAMEL	Main switch
5	KZ2	GZ1-AU225	Telemechanique	Undervoltage protection (230V)
4	KZ1	GZ1-AU225	Telemechanique	Undervoltage protection (230V)
3	KM1	GZ1-M16	Telemechanique	Motor protection switch, range 9.0-14A
3	M3	Skq80-2PC	TAMEL	P = 1.5 kW, n = 3000 rpm, B5; for PSW220-BIN200
2	M2	Skq90S-2PC	TAMEL	P = 2.2 kW, n = 3000 rpm, B5; for PSW500, PSW100
1	M1	Skq112M-2PC	TAMEL	P = 6.0 kW, n = 3000 rpm, B5
Pos.	Symbol	Type	Producer	Notes

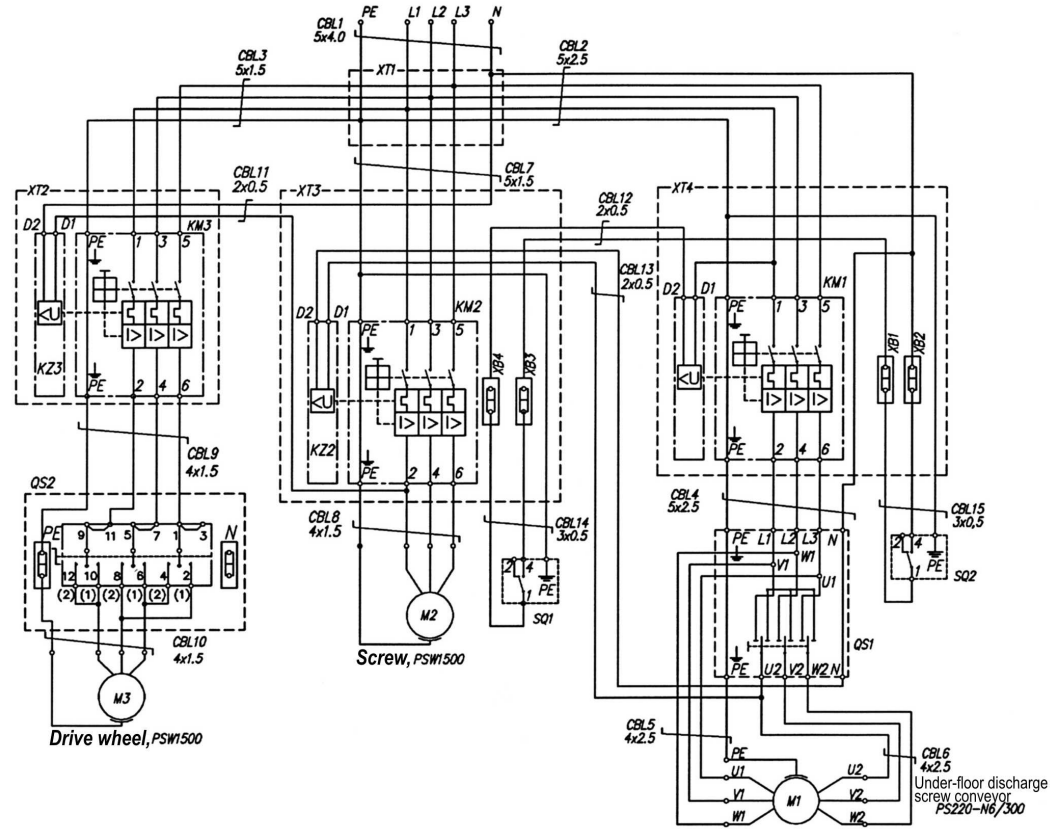
Designed by:				Unit/part name: <b>Electric system – basic diagram</b> <b>PS220-N6/300,</b> <b>PSW500, PSW1000</b>	
Drawn by:					
Checked by:					
Name	Signature	Date		Equipment symbol:	Format:
Scale:		„BIN” Sp. z o.o. Aleksandrów Kuj.	Drwg. No.: PS220-086-00		





Notes:  
See basic diagram for symbols


Designed by:				Unit/part name: Electric system – block diagram PS220-N6/300, PSW500, PSW1000	
Drawn by:					
Checked by:					
	Name	Signature	Date		
Scale:		„BIN” Sp. z o.o. Aleksandrów Kuj.	Drwg. No.: PS220-087-00	Equipment symbol:	Format:

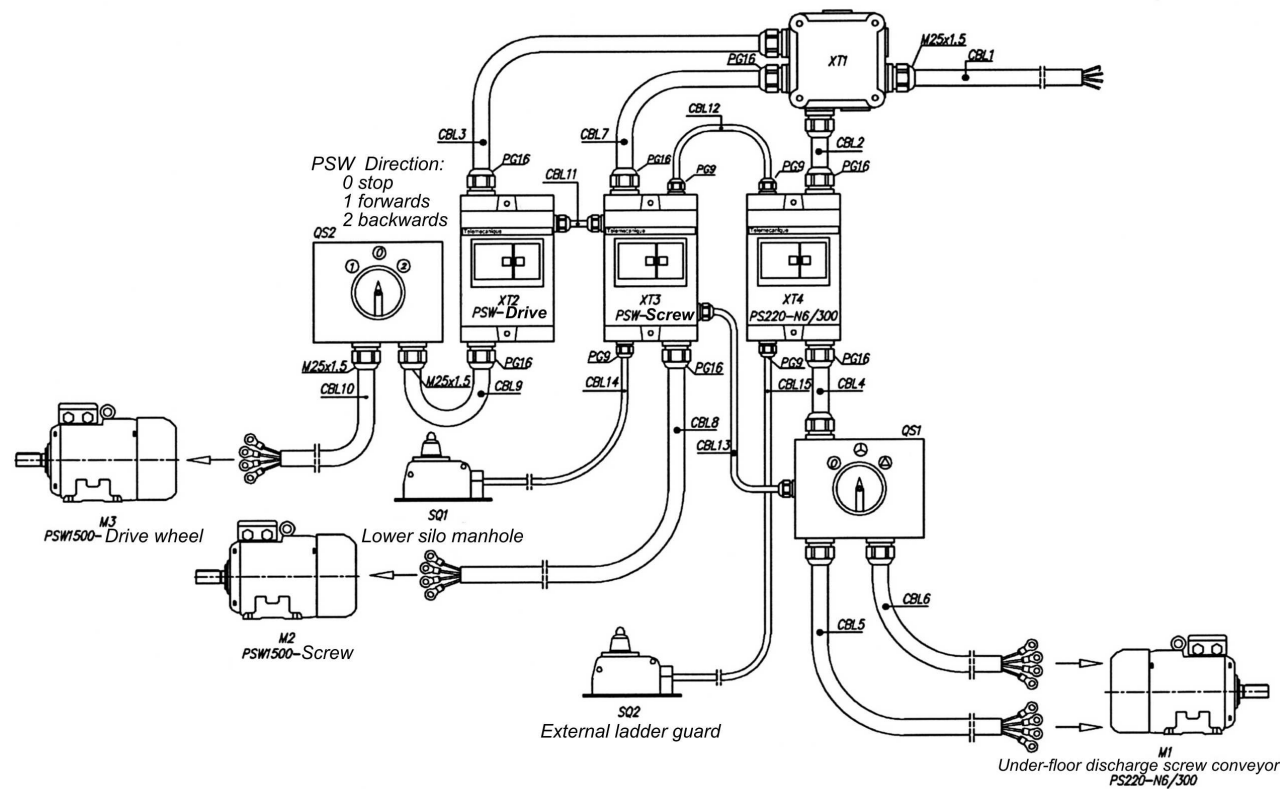


18	XT4	GV2-MC	Telemecanique	Motor protection switch casing
17	XT3	GV2-MC	Telemecanique	Motor protection switch casing
16	XT2	GV2-MC	Telemecanique	Motor protection switch casing
15	KM3	GZ1-M10	Telemecanique	Motor protection switch, range 1.0-1.6A
14	KM2	GZ1-M10	Telemecanique	Motor protection switch, range 4.0-6.3A
13	XB1-XB4	ZUG-G4	PROMET	Installation cube for DIN 50 bus
12	XT1	GW 44 204	GEWISS	Distribution box
11	SQ2	LM10	PROMET	Limit switch
10	SQ1	LM10	PROMET	Limit switch
9	QS1	ŁK25R-4.831 OB2Z	SPAMEL	0-Y selector switch
8	QS2	LK16R-3.8380 OB2	SPAMEL	0-1-2 selector switch
7	KZ3	GZ1-AU225	Telemecanique	Undervoltage protection (230V)
6	KZ2	GZ1-AU225	Telemecanique	Undervoltage protection (230V)
5	KZ1	GZ1-AU225	Telemecanique	Undervoltage protection (230V)
4	KM1	GZ1-M16	Telemecanique	Motor protection switch, range 9.0-14A
3	M3	Skq71-4B	INDUKTA	P = 0.37 kW, n = 1500 rpm, B5
2	M2	Skq90L-4PC	TAMEL	P = 2.2 kW, n = 1380 rpm, B5
1	M1	Skq112M-2PC	TAMEL	P = 6.0 kW, n = 3000 rpm, B5
Pos.	Symbol	Type	Producer	Notes


NOTES:

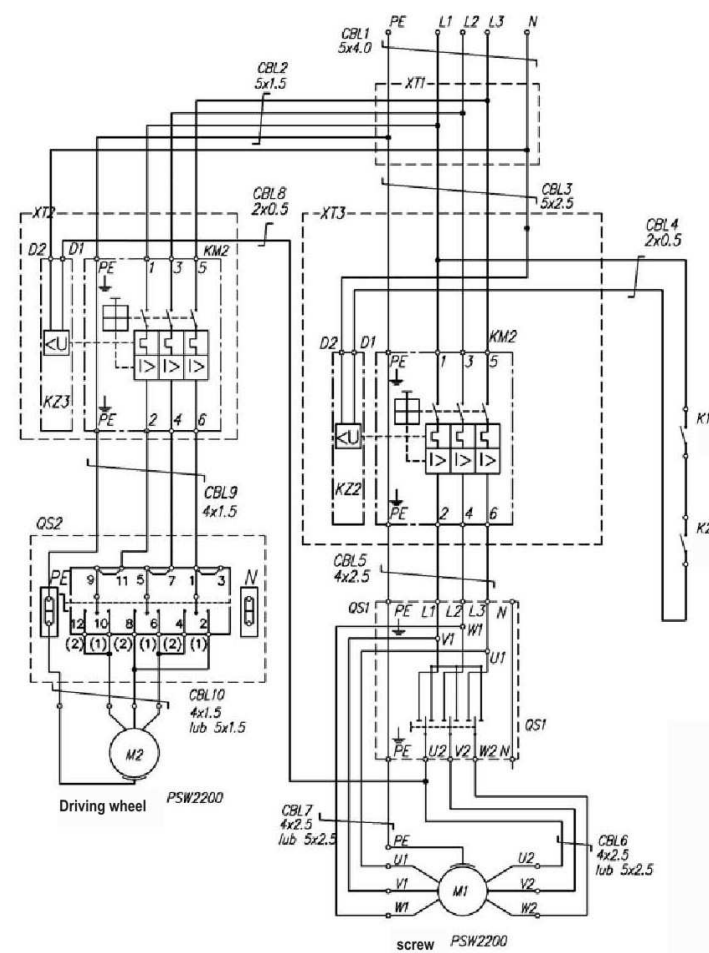
1. For BIN1500 type silos, which are provided with: PS220-N6/300 and PSW1500.
2. The wiring diagram is the general guideline for designing the electric system.
3. Modifications of electric diagrams may be done so that all protection functions of devices are maintained.

Designed by:				Unit/part name: <b>Electric system – basic diagram</b> <b>PS220-N6/300, PSW1500</b>
Drawn by:				
Checked by:				
	Name	Signature	Date	
Scale:		„BIN“ Sp. z o.o. Aleksandrów Kuj.	Drwg. No.: <b>PS220-088-00</b>	Equipment symbol:      Format:



Notes:  
See basic diagram for symbols

Designed by:				Unit/part name: Electric system – block diagram PS220-N6/300, PSW1500	
Drawn by:					
Checked by:					
	Name	Signature	Date		
Scale:		„BIN” Sp. z o.o. Aleksandrów Kuj.	Drwg. No.: PS220-089-00	Equipment symbol:	Format:



Signal from the equipment receiving the grain from PSW2200.

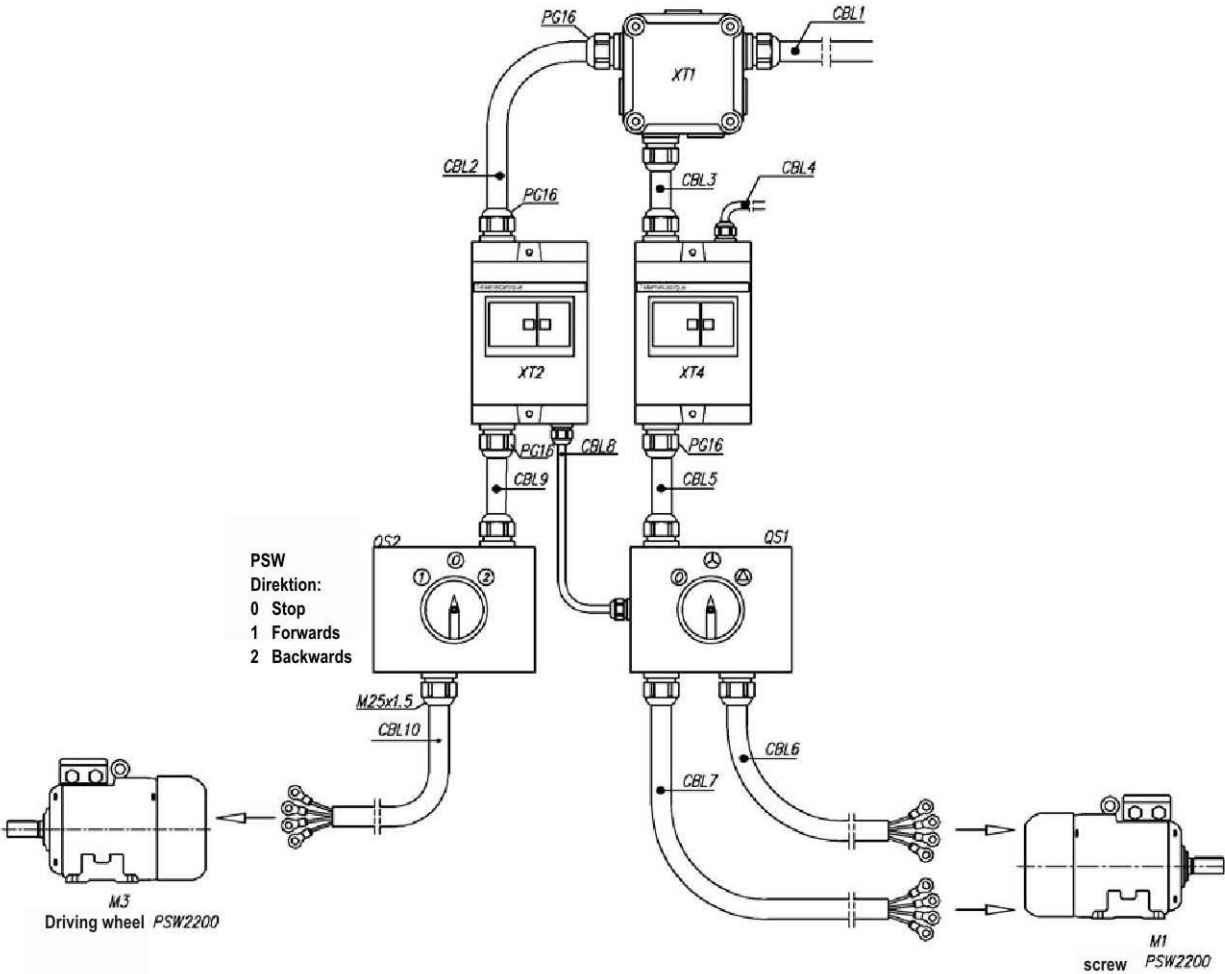
Signal from monitoring system of manholes

Notes:

- 1. The diagram is a general guideline for the electric system design.
- 2. Any modifications to the diagram must be done so that all protective functions are maintained.
- 3. The contract K1 is closed, when the grain reception equipment from PSW2200 is running (the Investor shall deliver the control contact K1).
- 4. The contract K2 is closed, when silo manholes and hatches are closed (the Investor shall deliver the control contact K2).
- 5. The Investor shall deliver all cables.

11	XT3	GV2-MC	Telemechanique	Motor protection switch casing
10	XT2	GV2-MC	Telemechanique	Motor protection switch casing
9	KM2	GZ1-M06	Telemechanique	Motor protection switch, range 1.0-1.6A
8	XT1	GW 44 204	GEWISS	Distribution box
7	QS2	ŁK16R-3.8380 OB2	SPAMEL	Main switch 0-Y-2
6	QS1	ŁK25R-4.831 OB2Z	SPAMEL	Main switch 0-Y-Δ
5	KZ2	GZ1-AU225	Telemechanique	Undervoltage protection (230V)
4	KZ1	GZ1-AU225	Telemechanique	Undervoltage protection (230V)
3	M3	Skq80-2PC	TAMEL	P = 1.5 kW, n = 3000 rpm, B5; for PSW220-BIN200
2	M2	Skq71-4B	INDUKTA	P = 0,37 kW, n = 1500 rpm, B5
1	M1	Skq112M-2PC	TAMEL	P = 6.0 kW, n = 3000 rpm, B5
Pos.	Symbol	Type	Producer	Notes

Designed by:				Unit/part name: <b>Electric system – basic diagram PSW2200</b>	
Drawn by:					
Checked by:					
	Name	Signature	Date		
Scale:		„BIN” Sp. z o.o. Aleksandrów Kuj.	Drwg. No.: -	Equipment symbol:	Format:



Notes:  
See basic diagram for symbols

Designed by:				Unit/part name: Electric system – block diagram PSW2200	
Drawn by:					
Checked by:					
	Name	Signature	Date		
Scale:		„BIN” Sp. z o.o. Aleksandrów Kuj.	Drwg. No.:	Equipment symbol:	Format:



## 2. Installation and first start-up

### Screw conveyor installation



**The internal screw conveyor cannot be installed alone in the silo – it always must be operated in conjunction with the under-floor discharge screw conveyor.**

Screw conveyor installation requires special installation equipment and proper knowledge. Therefore, screw conveyors should be installed by installing companies authorized by BIN Company. The installing company shall co-operate with the investor within the range of arrangement of works, settlement of balances and acceptance of installation works.



**When the investor itself or any other installing company not authorized by BIN installs the screw conveyor(s) (because of reasons, which are not dependent of the producer), the investor is obliged to obtain the detailed screw conveyor installation instruction manual.**

### First start-up.

The User himself, at his cost, shall order the qualified electrician with proper authorization to install the electric system. To ensure correct wiring, the User shall provide the electrician with the wiring diagrams. After installing, the electrician shall carry out the test start-up of the equipment. In particular, correct sense of motor revolutions shall be checked and motor protection setting shall be compared with the data contained in the motor information plate. Installation of power supply points for screw conveyors and equipment, which is operated with screw conveyors, shall be made by the qualified electrician with proper authorization in accordance with instruction manuals provided for them.



**The producer requires the confirmation in writing that the electrician with proper authorization has wired and checked the electric system of the equipment.**

## 3. Operation

### 3.1. Operation of screw conveyors

Proceed as follows before starting silo filling:

- Check the technical condition of screw conveyors and the equipment working with them
- Ensure that the grain flow at the outlet device is smooth so that no screw conveyor jamming (overload) takes place,
- PSW100 and PSW200 (Fig. 39): Position the screw conveyor on the special support, 14, to allow free conveyor running above the grain layer.
- PSW220-BIN100 and PSW220-BIN200 (Fig. 40): Position the screw conveyor on the special support, 6, to allow free conveyor running above the grain layer, protect the driving wheel by placing the guarding cover on it, 4, remove the screw cover, 17, from their supports and place it on the conveyor body.
- PSW500, PSW100 and PSW1500: Position the screw conveyor on the special support, 6, to allow free conveyor running above the grain layer (for PSW1500: install the guarding; for PSW500: remove the screw cover, 17, from their supports and place it on the conveyor body.)
- PSW2200: Position the screw conveyor on the support and lock it, place the protecting duct, 16, on the screw conveyor.
- Close the inlet gate valve to the under-floor screw conveyor.
- Start the system for a short while to check its proper operation .



**Be sure that no people or animals are in the silo, before starting screw conveyors. The presence of people and/or animals in the silo is strictly forbidden, when any equipment operating with the silo is running. Switch off all electric equipment before entering the silo.**



Never start the PSW screw conveyor in the silo, when the central silo outlet to the under-floor discharge screw conveyor is covered with grain (due to any reason). Before starting the PSW screw conveyor, check if the PSW screw drive guard (at the silo centre line) is not covered with grain.

## Discharging – operation

### Variant 1

**Valid for silos, which are provided with the under-floor discharge screw conveyor and PSW100 or PSW200**

- 1.1. Check if there are no people in the silo.
- 1.2. Check if the external ladder guard doors and lower manhole are closed. Close them, if necessary.
- 1.3. Switch on the main switch at the BIN screw conveyor main control panel.
- 1.4. Switch on the under-floor discharge screw conveyor by pressing the black pushbutton.
- 1.5. Gradually and slowly open the grain inlet gate valve.
- 1.6. Leave the gate valve opened so that the screw conveyor runs smoothly and in a stable way.
- 1.7. The under-floor screw conveyor may run until the grain stops to fall down through the silo central outlet by gravity.

Proceed as follows to remove the grain left in the silo:

- 1.8. Close the inlet gate, wait until the complete emptying of the conveyor, switch of the power of the engine by pushing the red pushbutton.
- 1.9. Disconnect power supply by switching off the main switch.
- 1.10. Protect the main switch with the padlock against unintentional start up.
- 1.11. Enter the silo and take the PSW of the support.
- 1.12. Start the under-floor screw conveyor again in accordance to points 1.1 – 1.7
- 1.13. Switch on the PSW screw conveyor by pressing the black pushbutton at the PSW screw conveyor switch.
- 1.14. The under-floor screw conveyor and PSW screw conveyor may run until the PSW is moved from the position “Beginning of PSW operation” to the position “End of PSW operation”, as shown in Fig. 54.
- 1.15. When the silo emptying is completed, stop the under-floor screw conveyor and PSW screw conveyor.
- 1.16. Disconnect power supply by switching off the main switch.
- 1.17. Protect the main switch with the padlock against unintentional start-up by unauthorized persons.

### Variant 2

**Valid for silos, which are provided with the under-floor discharge screw conveyor and PSW220-BIN100 or PSW220-BIN200.**

- 2.1. Check if there are no people in the silo.
- 2.2. Check if the external ladder guard doors and lower manhole are closed. Close them, if necessary.
- 2.3. Switch on the main switch at the BIN screw conveyor main control panel.
- 2.4. Switch on the under-floor discharge screw conveyor by pressing the black pushbutton.
- 2.5. Gradually and slowly open the grain inlet gate valve.



- 2.6. Leave the gate valve opened so that the screw conveyor runs smoothly and in a stable way.
- 2.7. The under-floor screw conveyor may run until the grain stops to fall down through the silo central outlet by gravity.

Proceed as follows to remove the grain left in the silo:

- 2.8. Switch on the PSW screw conveyor by pressing the black pushbutton at the PSW screw conveyor switch.
- 2.9. Wait, until the PSW screw conveyor completes to transport the grain placed above it to the silo central inlet.
- 2.10. Switch off both screw conveyors by pushing the red STOP pushbutton.
- 2.11. Disconnect power supply by switching off the main switch.
- 2.12. Protect the main switch with the padlock against unintentional start-up.
- 2.13. Enter the silo, lift the screw guarding cover, 17, and place it on its supports, remove the drive wheel cover, remove the PSW conveyor from the support.
- 2.14. Start the under-floor screw conveyor again in accordance with points 2.1 to 2.7.
- 2.15. Switch on the PSW screw conveyor by pressing the black pushbutton at the PSW screw conveyor switch.
- 2.16. The under-floor screw conveyor and PSW screw conveyor may run until the PSW is moved from the position "Beginning of PSW operation" to the position "End of PSW operation", as shown in Fig. 54.
- 2.17. When the silo emptying is completed, stop the under-floor screw conveyor and PSW screw conveyor.
- 2.18. Disconnect power supply by switching off the main switch.
- 2.19. Protect the main switch with the padlock against unintentional start-up by unauthorized persons.

### **Variant 3**

**Valid for silos, which are provided with the under-floor discharge screw conveyor and PSW500 or PSW1000**

- 3.1. Check if there are no people in the silo.
- 3.2. Check if the external ladder guard doors and lower manhole are closed. Close them, if necessary.
- 3.3. Switch on the main switch at the BIN screw conveyor main control panel.
- 3.4. Switch on the under-floor discharge screw conveyor by pressing the black pushbutton.
- 3.5. Gradually and slowly open the grain inlet gate valve.
- 3.6. Leave the gate valve opened so that the screw conveyor runs smoothly and in a stable way.
- 3.7. The under-floor screw conveyor may run until the grain stops to fall down through the silo central outlet by gravity.

Proceed as follows to remove the grain left in the silo:

- 3.8. Switch on the PSW screw conveyor by pressing the black pushbutton at the PSW screw conveyor switch.
- 3.9. Wait, until the PSW screw conveyor completes to transport the grain, placed above it to the silo central inlet.
- 3.10. Switch off both screw conveyors by pushing the red STOP pushbutton.
- 3.11. Disconnect power supply by switching off the main switch.
- 3.12. Protect the main switch with the padlock against unintentional start-up.
- 3.13. Enter the silo and remove the PSW conveyor from the support (in addition, for PSW500: lift the screw guarding cover, 17, and place it on its supports.).

- 3.14. Start the under-floor screw conveyor again in accordance with points 3.1 to 3.7.
- 3.15. Switch on the PSW screw conveyor by pressing the black pushbutton at the PSW screw conveyor switch.
- 3.16. The under-floor screw conveyor and PSW screw conveyor may run until the PSW is moved from the position "Beginning of PSW operation" to the position "End of PSW operation", as shown in Fig. 54.
- 3.17. When the silo emptying is completed, stop the under-floor screw conveyor and PSW screw conveyor.
- 3.18. Disconnect power supply by switching off the main switch.
- 3.19. Protect the main switch with the padlock against unintentional start-up by unauthorized persons.

#### **Variant 4**

##### **Valid for silos, which are provided with the under-floor discharge screw conveyor and PSW1500.**

- 4.1. Check if there are no people in the silo.
- 4.2. Check if the external ladder guard doors and lower manhole are closed. Close them, if necessary.
- 4.3. Switch on the main switch at the BIN screw conveyor main control panel.
- 4.4. Switch on the under-floor discharge screw conveyor by pressing the black pushbutton.
- 4.5. Gradually and slowly open the grain inlet gate valve.
- 4.6. Leave the gate valve opened so that the screw conveyor runs smoothly and in a stable way.
- 4.7. The under-floor screw conveyor may run until the grain stops to fall down through the silo central outlet by gravity.

##### Proceed as follows to remove the grain left in the silo:

- 4.8. Switch on the PSW screw by pressing the black pushbutton at the switch PSW – Screw (XT3).
- 4.9. Wait, until the PSW screw conveyor completes to transport the grain placed above it to the silo central inlet.
- 4.10. Switch off the under-floor screw conveyor by pressing the red pushbutton at the under-floor screw conveyor switch.
- 4.11. Disconnect power supply by switching off the main switch.
- 4.12. Protect the main switch with the padlock against unintentional start-up.
- 4.13. Enter the silo and take the PSW screw conveyor off the support.
- 4.14. Start the under-floor screw conveyor again in accordance with points 4.1 to 4.7.
- 4.15. Switch on the PSW screw by pressing the black pushbutton at the switch PSW – Screw (XT3).
- 4.16. Set the PSW switch – Direction to position "1" (forwards).
- 4.17. Switch on the PSW screw conveyor drive by pressing the black pushbutton at the switch PSW – Drive (XT2).
- 4.18. The under-floor screw conveyor and PSW screw conveyor may run until the PSW is moved from the position "Beginning of PSW operation" to the position "End of PSW operation", as shown in Fig. 54.
- 4.19. When the silo emptying is completed, stop the under-floor screw conveyor and PSW screw conveyor.

In order to move the PSW screw conveyor from the position “End of PSW operation” to the position “Beginning of PSW operation”, as per Fig. 53, proceed as follows:

- 4.20. Repeat the steps from 4.14 to 4.15.
- 4.21. Set the PSW switch – Direction to position “2” (backwards).
- 4.22. Switch on the PSW screw conveyor drive by pressing the black pushbutton at the switch PSW – Drive (XT2).
- 4.23. The PSW screw conveyor may run until the PSW is moved from the position “End of PSW operation” to the position “Beginning of PSW operation”, as shown in Fig. 54.
- 4.24. Disconnect power supply by switching off the main switch.
- 4.25. Protect the main switch with the padlock against unintentional start-up by unauthorized persons.
- 4.26. Secure the conveyor to the central support with the bolt.

### **Variant 5**

**Valid for silos, which are provided with the under-floor discharge screw conveyor and PSW2200.**

- 5.1. Check if there are no people in the silo.
- 5.2. Check if the external ladder guard doors and lower manhole are closed. Close them, if necessary.
- 5.3. Switch on the main switch at the BIN screw conveyor main control panel.
- 5.4. Switch on the under-floor discharge screw conveyor by pressing the black pushbutton.
- 5.5. Gradually and slowly open the grain inlet gate valve.
- 5.6. Leave the gate valve opened so that the screw conveyor runs smoothly and in a stable way.
- 5.7. The under-floor screw conveyor may run until the grain stops to fall down through the silo central outlet by gravity.

Proceed as follows to remove the grain left in the silo:

- 5.8. Switch on the PSW screw by pressing the black pushbutton at the switch PSW – Screw (XT3)- the screw (XT4), then, set the switch (QS1) to „star” position. After approximately 3 seconds, set this switch to „delta” position .
- 5.9. Wait, until the PSW screw conveyor completes to transport the grain placed above it to the silo central inlet.
- 5.10. Switch off the under-floor screw conveyor by pressing the red pushbutton at the under-floor screw conveyor switch.
- 5.11. Disconnect power supply by switching off the main switch.
- 5.12. Protect the main switch with the padlock against unintentional start-up.
- 5.13. Enter the silo and remove the protective enclosure, which covers the conveyor upper part.
- 5.14. Start the under-floor screw conveyor again in accordance with points 5.1 to 5.7.
- 5.15. Switch on the PSW conveyor screw by pressing the black pushbutton PSW – Screw (XT4), then, set the switch (QS1) to „star” position. After approximately 3 seconds, set this switch to „delta” position.
- 5.16. Set the PSW switch – Direction to position “1” (forwards).
- 5.17. Switch on the PSW screw conveyor drive by pressing the black pushbutton at the switch PSW – Drive (XT2).
- 5.18. The under-floor screw conveyor and PSW screw conveyor may run until the PSW is moved from the position “Beginning of PSW operation” to the position “End of PSW operation”, as shown in Fig. 54.
- 5.19. When the silo emptying is completed, stop the under-floor screw conveyor and PSW screw conveyor.

In order to move the PSW screw conveyor from the position “End of PSW operation” to the position “Beginning of PSW operation”, as per Fig. 54, proceed as follows:

- 5.20. Repeat the steps from 4.14 to 4.15.
- 5.21. Set the PSW switch – Direction to position “2” (backwards).
- 5.22. Switch on the PSW screw conveyor drive by pressing the black pushbutton at the switch PSW – Drive (XT2).
- 5.23. The PSW screw conveyor may run until the PSW is moved from the position “End of PSW operation” to the position “Beginning of PSW operation”, as shown in Fig. 54.
- 5.24. Disconnect power supply by switching off the main switch.
- 5.25. Protect the main switch with the padlock against unintentional start-up by unauthorized persons.
- 5.26. Secure the conveyor to the central support with the bolt.



**Due to the electric system features, the PSW screw conveyor may rotate by one full revolution around the silo centre line only. After one full cycle, the PSW screw conveyor must be MOVED BACK to the position “Beginning of PSW operation”, as shown in Fig. 54.**

**The PSW1500 and PSW2200 screw conveyor BACK MOVEMENT function is carried out by means of drive motoreducer (Variant 4 and 5).**



**In the emergency situation, stop the equipment by pressing the red STOP pushbutton at the motor protection switch.**



**BE SURE to secure the conveyor PSW-1500 to the central support with the bolt before each silo filling. Non-compliance with the above may result in conveyor damage.**



**BE SURE to protect the conveyor PSW-1500 with the protective enclosure before each silo filling. Non-compliance with the above may result in conveyor destruction.**

In case when anybody tries to enter the silo, when the screw conveyors are running, limit switches, which are installed to the external ladder guard and lower manhole, immediately switch off all the equipment. In such case, repeat the complete screw conveyor start-up procedure from the beginning to start screw conveyors again.

In case of power supply failure, the screw conveyor system is permanently stopped. It does not start automatically, when the power supply is restored. Repeat the whole starting procedure to start the screw conveyor again.

Never stop the screw conveyor, which pipe and screw are filled with grain. The problems with restart may occur.

The screw conveyor system cannot convey very contaminated materials or materials with lumps, etc. Never try to transport such materials, because you may cause screw conveyor overloading and/or damage resulting in screw conveyor stoppage.

### 3.2. Maintenance

Correct and in-time maintenance, inspections and possible repairs guarantees full capacity and correct operation of the screw conveyor and prevents premature and excessive screw conveyor wear.

#### Routine inspections and repairs

The routine inspection includes:

- Checking safety devices, that is: motor protection switch, main switch, etc. (check their proper functioning, for mechanical defects, etc.).
- Checking the condition of electric system by the electrician with proper authorization.
- Checking the technical condition of welded, bolted, etc. joints.
- Checking anticorrosion coats.
- Checking the condition of rolling bearings.
- Checking other moving and stationary parts.

Frequency of inspections:

The frequency of routine inspections shall be adapted properly for intensity of operation, but they should be carried out not less than once a year. All safety devices, that is: motor protection switch, main switch, etc. shall be inspected at least once a month or before each screw conveyor start-up after longer downtime.



**At least once a year, the User shall order the qualified electrician with proper authorization to inspect all electric equipment components.**

The routine repairs include small repairs and, possibly, removing the defects of painted coats. Anti-corrosion coats may be damaged during installation (tightening of bolts). In such a case, the routine repair includes painting of damaged places with anti-corrosion paint.

#### General overhaul

General overhauls are made as needed, depending on the screw, bolted joints, etc. degree of wear (but not less than once per 8 years), and they include repair or replacement of parts with new ones.

General overhaul includes activities carried out during the routine repair and the following:

- Replacement of slide and rolling bearings, seals, etc.
- Making new anti-corrosion coats.
- Other necessary repairs.



**Remove all defects and repair or replace all defected or worn parts with new ones immediately.**

## Chapter V - Intake hopper

### 1. General description of the product

#### 1.1. Construction and product destination

The intake hopper is a primary device used for assembling the unload point for the grain crop, maize crop and the oil plant seed. It is destined for unloading the material from the agricultural transport trailers and the load-carrying bodies of the trucks. It allows the transport of the material, using screw conveyors, bucket conveyors etc, to storages, silos or other crop and seed storage places. They are exceptionally suitable for building unload points for BIN silos.

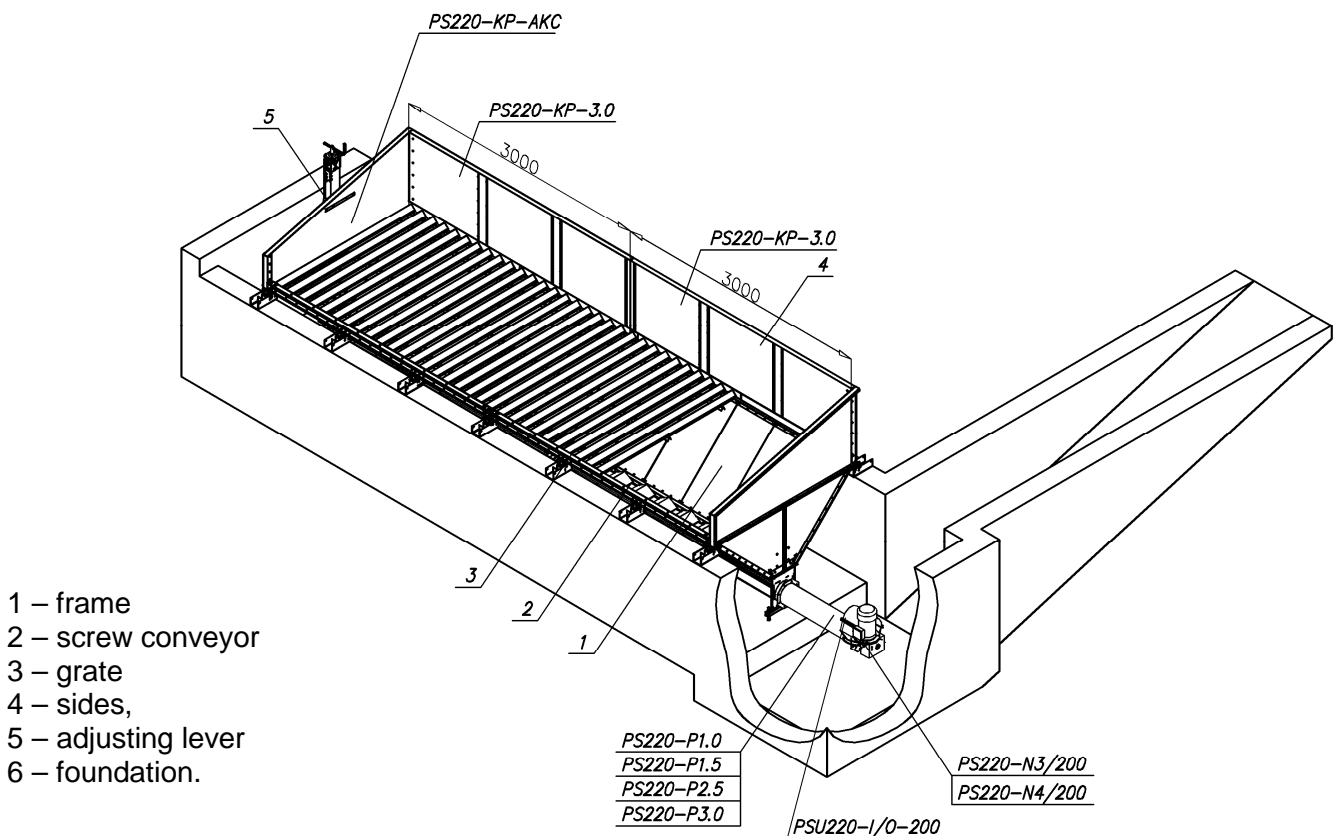
The intake hopper has a module structure:

- PS220-KP-3.0- intake hopper module, 3m length, without the driving set
- PS220-KP-AKC- the intake hopper's accessories

The hopper also consists of PS220 screw conveyors, which allow transportation and unloading of the crop from the intake hopper:

- PS220-P1.0, PS220-P1.5, PS220-P2.5, PS220-P3.0- screw conveyors' extensions
- PS220-N3/200, PS220-N4/200 – screw conveyors drives
- PSU220-I/O-200- the load/unload of the PS220 screw conveyors
- PS220-LOZ/P1- the polyamide bearing connecting the screw conveyors' extensions
- MOCRUR200- the mounting of the screw conveyor pipes

When using PS220-KP-AKC with one, two, or three PS220-KP-3.0 modules results in acquiring a 3m, 6m or 9m length intake hopper.



**Fig.45**  
**The construction of the intake hopper**

## 1.2. Specifications of the intake hopper

Table 9 - Specifications of the intake hopper

Lp	Parameter	Unit	PS220-KP-AKC	PS220-KP-3.0
1.	Screw diameter (Ø)	mm	-	200
2.	Total length	mm	-	3000
3.	Total height	mm	-	2150
4.	Weight	kg	140	460

The sound level doesn't exceed 70dB(A) in any device.

## 1.3. Advisable methods of intake hopper connecting to transport equipment

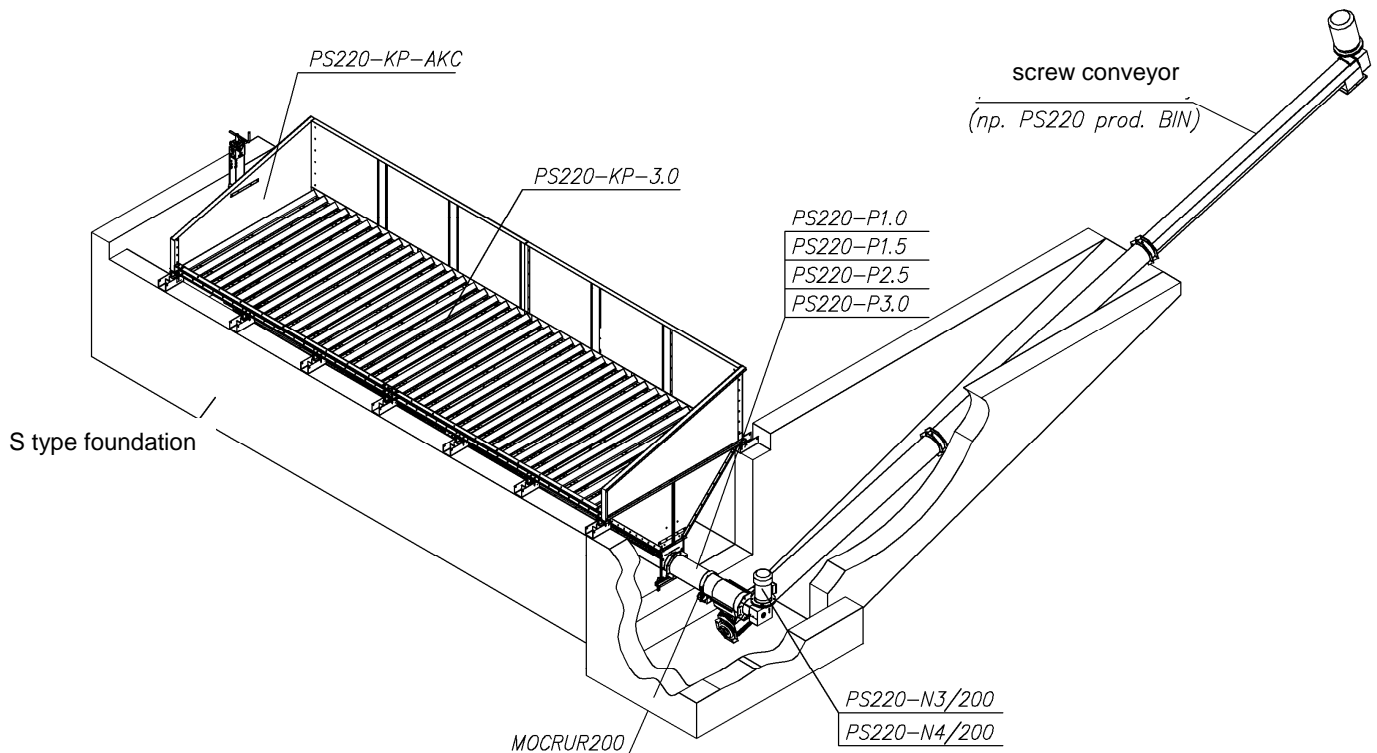
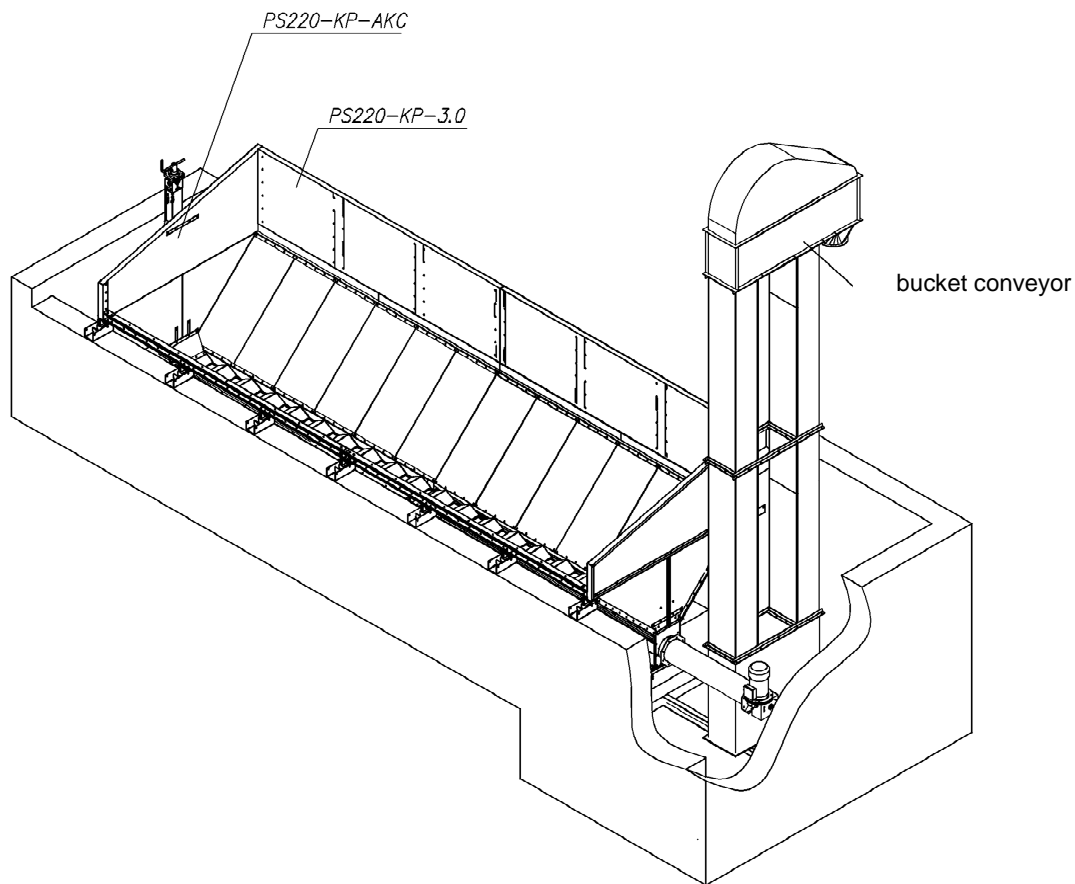


Fig.46

Transport of the material from the intake hopper through the screw conveyor - example

**Fig.47****Transport of the material from the intake hopper through the bucket conveyor - example**

The type of devices taking the material from the intake hopper, as well as their mounting depends on the type and way of operating of the storages, silos etc, the material will be transported to.

In case of any doubts in choosing the mentioned co-operating devices, please consult the manufacturer (BIN Sp. z o. o.) or its affiliates.

**1.4. Electric system**

The electric system is included as a part of the PS220 screw conveyors. The producer equips the conveyors with all the electric accessories required for building a proper electric system except the power cables. The Investor then commissions an authorized electrician to build the system according to the enclosed schemes. The schemes and descriptions are enclosed in chapter II of this manual.

The schemes and descriptions of the electric system enclosed in this manual are an introductory to making a design of the electric system by authorized people. Modifications of the mentioned schemes can only be made in such a way, that all the security functions of the devices are preserved.



## 2. Preliminaries and preparing the intake hopper to exploitation

### 2.1. Initial Investor's operations

#### 2.1.1. Localisation of intake hopper

The intake hopper should work under roofing. Location of the intake hopper must be chosen with correspondence with the valid structural law. Fulfilling of all the requirements is on the behalf of the Investor.

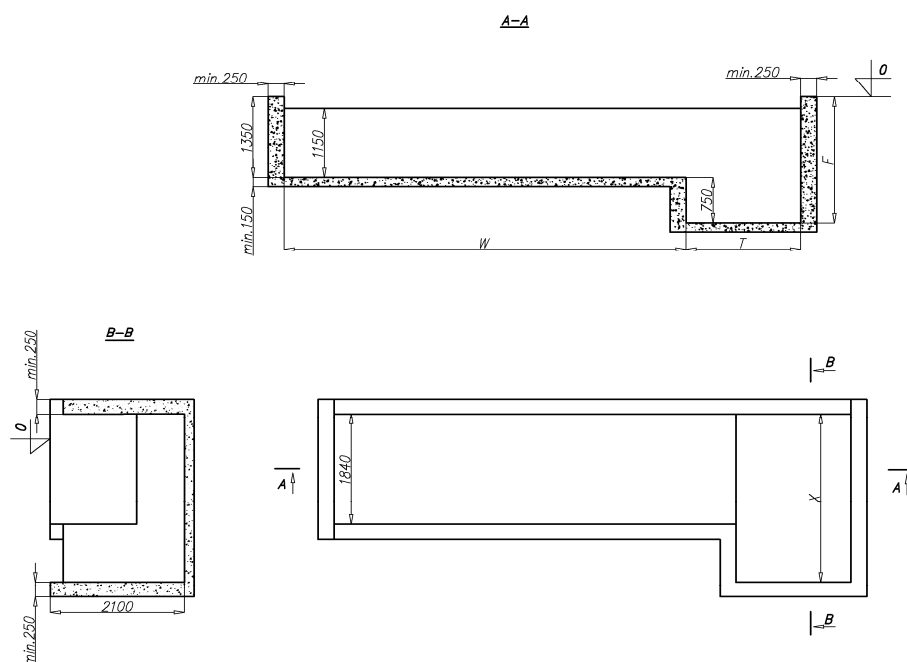
When choosing the location, you one needs to make sure, that the ground chosen will sustain the weight of the intake copper with full crop capacity.

#### 2.1.2. Foundation plate

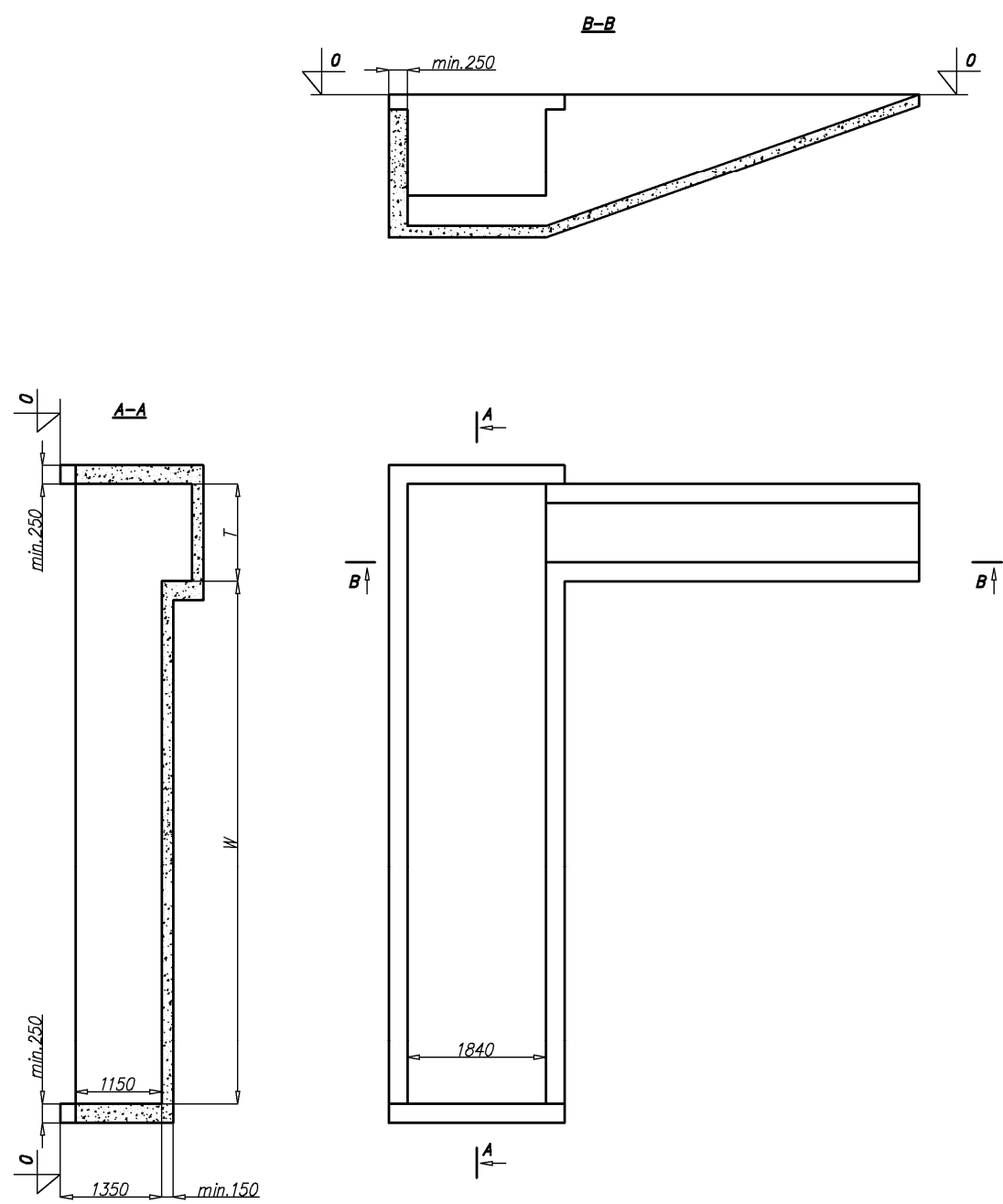
Mounting of the intake hopper is possible only on a special foundation plate. The foundation is made by the Investor in accordance with the architecture rules including analysing the ground under the supervision of an authorized architecture specialist. Each time, before building the foundation, the client should inquire the manufacturer or his affiliates for detailed information according the compatibility of the measurements and other factors concerning the foundation.

The foundation should meet the following requirements:

- The foundation should be built below the ground (Fig.48 and Fig.49) or on sand or gravel surface circa 60÷80cm thick,
- Construct a concrete reinforcement in accordance with the architecture rules considering this type of structures,
- For building the foundation use concrete min. B20,
- Ensure the draining of the rain and ground water, which may accumulate in the lower part of the foundation,
- Figures 48 and 49 only include the critical measurements necessary for mounting the intake hopper. The other measurements (not included in the figure) are related to the length of the outlet conveyor and its connection with other devices for the further transportation of the crop.



**Fig.48**  
**Type K (B) foundation (used with a bucket conveyor)**



**Fig.49**  
**Type S foundation (used with a screw conveyor)**

**Table 10.** Measurements of the foundation depending on the type of the intake hopper (concerning Fig.48 and Fig. 49).

The foundation for the intake hopper of working length:	Specification:	Extensions of the PS220 conveyor	Dimension (mm)	
			T	W
3m	- PS220-KP-AKC (1 pcs) - PS220-KP-3.0 (1pcs)	-PS220-P.1.0	Depending on the length of the output conveying worm:	3950
		- PS220-P.1.5		3950
		- PS220-P.2.5		3950
		- PS220-P.3.0		3950
6m	- PS220-KP-AKC (1 pcs) - PS220-KP-3.0 (2 pcs)	-PS220-P.1.0		6950
		- PS220-P.1.5		6950
		- PS220-P.2.5		6950
		- PS220-P.3.0		6950
9m	- PS220-KP-AKC (1 pcs) - PS220-KP-3.0 (3 pcs)	-PS220-P.1.0		9950
		- PS220-P.1.5		9950
		- PS220-P.2.5		9950
		- PS220-P.3.0		9950



**Properly constructed foundation is a necessary condition for the assembly company to start the assembling works. The manufacturer doesn't take the responsibility for the damage of the intake hopper and other damage caused by the improper construction of the foundation.**

## 2.2. Assembly and start-up

Assembling of the intake hopper requires using special equipment and proper conversion training. In spite of this fact the assembling of the device can only be done by a BIN-authorized assembling company. It is in the interest of the assembling company to cooperate with the commissioner in terms of the worktime schedule, the calculation and the acceptance of the assembly. Taking into consideration the hazards related with the assembling, the assembly by the Investor or any company without BIN authorization is forbidden. The assembly can be started after constructing a proper foundation and accumulating all the parts of the product.

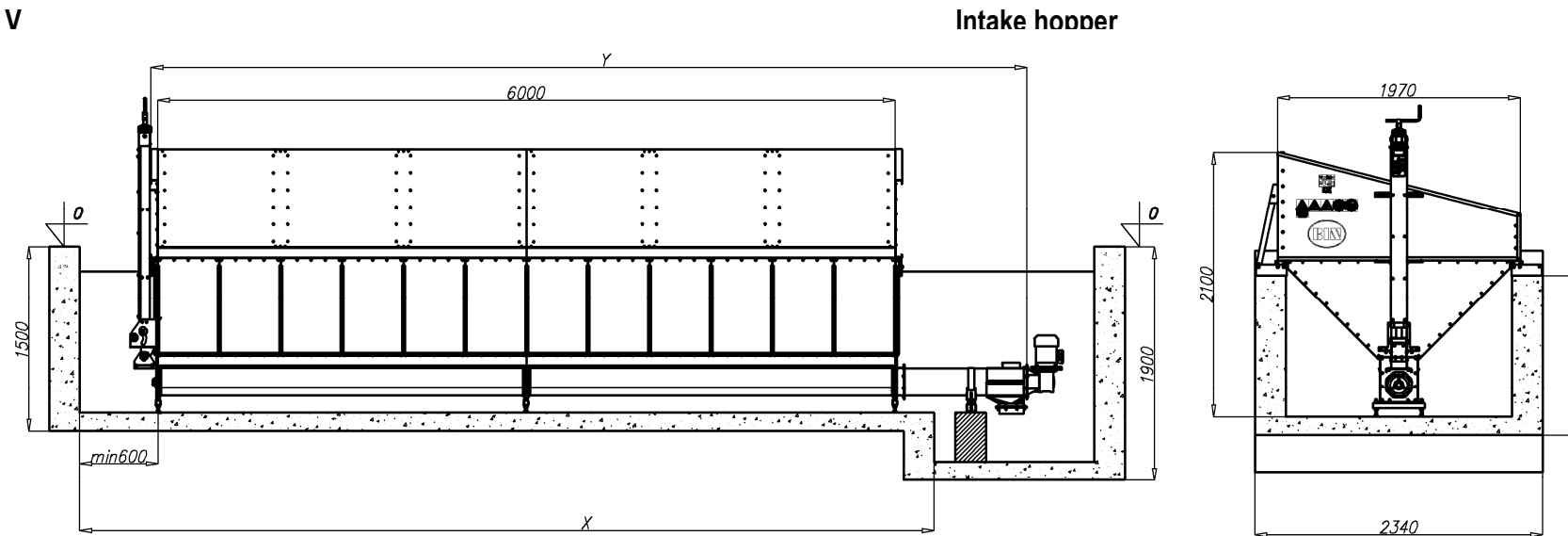
After mounting of the intake hopper, the user, on his own behalf and at his own cost, commissions an electrician with proper authorization to construct the electric system. To ensure the correctness of the connections, the user should allow the electrician to use the electric system scheme- the chapter II of this manual. After constructing the electric system, the electrician should perform a trial start of the devices. In particular check the direction of the rites of the motor.

The producer requires a written authentication of the constructing and checking of the electric system by a certified electrician in the included guarantee book.

The installation of the power consumption points for the intake hopper and the devices cooperating with it should be executed by a certified electrician.



## Section V



**Fig.48 Assembling of the intake hopper**

**Table 11 The measurements depending on the type of the intake hopper (considers Fig.50).**

For the intake hopper of working length:	Specification:	Extensions:	Dimension (mm)	
			X	Y
3m	-PS220-KP-AKC (1 pcs.) -PS220-KP-3.0 (1 pcs.)	-PS220-P.1.0 - PS220-P.1.5 - PS220-P.2.5 - PS220-P.3.0	3950 3950 3950 3950	Depending on the length of the output conveying worm
6m	-PS220-KP-AKC (1 pcs.) -PS220-KP-3.0 (2 pcs.)	-PS220-P.1.0 - PS220-P.1.5 - PS220-P.2.5 - PS220-P.3.0	6950 6950 6950 6950	
9m	-PS220-KP-AKC (1 pcs.) -PS220-KP-3.0 (3 pcs.)	-PS220-P.1.0 - PS220-P.1.5 - PS220-P.2.5 - PS220-P.3.0	9950 9950 9950 9950	

### 2.3. Final Investor's activities

After assembling the intake hopper to the foundation and constructing the electric system the Investor is obliged to embed the supports of the device in concrete (Fig.51).

Furthermore, the Investor should, on his own behalf and at his own cost, construct the casing of those parts of the foundation that are not used by the device technologically, but can pose a danger of slipping, tripping or falling.

The Investor is obliged to construct safety barriers that would prevent driving of the vehicles into the intake hopper (Fig.51).

It is also a duty of the Investor to construct the support for fitting the pipes of the conveyors MOCRUR200 depending on the length of the extensions of the PS220 system (Fig.52).

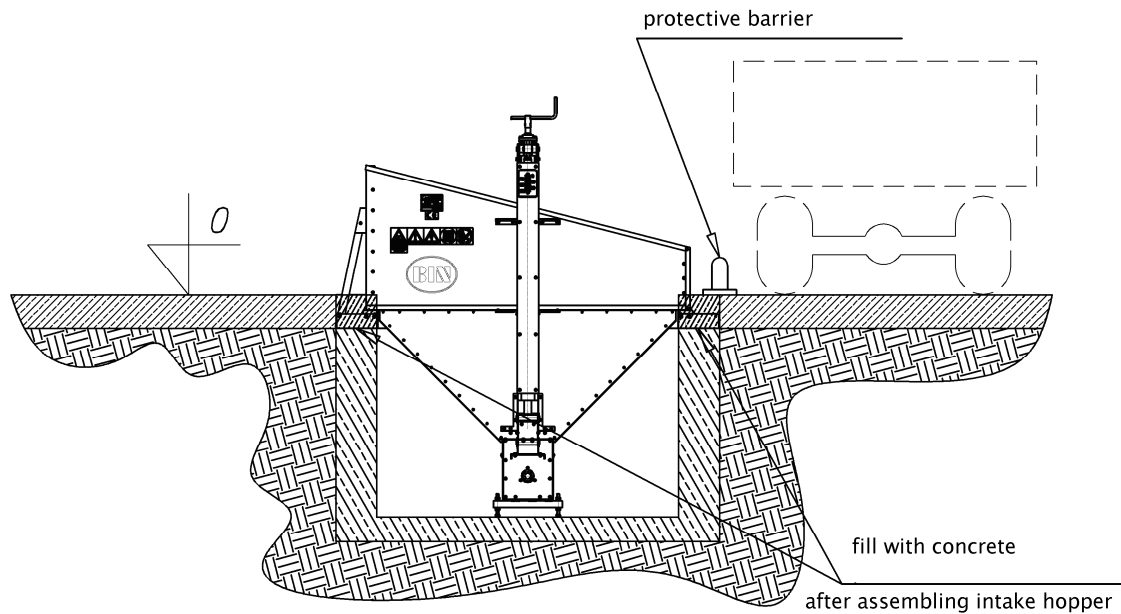


Fig.51 Manner of embedding the supports in concrete and constructing the inroads for to the intake hopper- example.

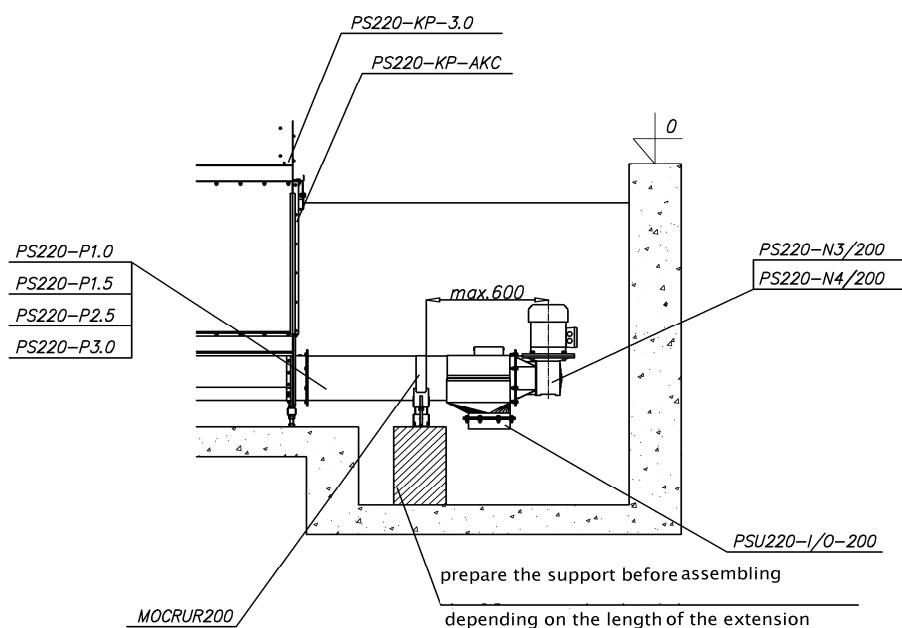


Fig.52 Manner of supporting the extensions of the PS220 system of the intake hopper – example.

### 2.3.1. Fire precautions

Fulfilling all the duties related with the fire precautions is a duty of the investor. This includes providing of: the emergency and access routes, the access to water for extinguishing purposes, disposing of the extinguishing equipment and fire safety instructions. The issue of the fire precautions is regularized by the Minister's of Interior and Administration's Ordinance dated on the 16th June 2003 concerning the fire precautions for buildings, other architectural structures and grounds (Dz. U. Z 2003 Nr121 Pos. 1138) and by the Minister's of Interior and Administration's Ordinance dated on the 16th June 2003 concerning the fire precautions in terms of water supply and emergency routes (Dz. U. Z 2003 Nr121 Pos. 1139).

## 3. Operation

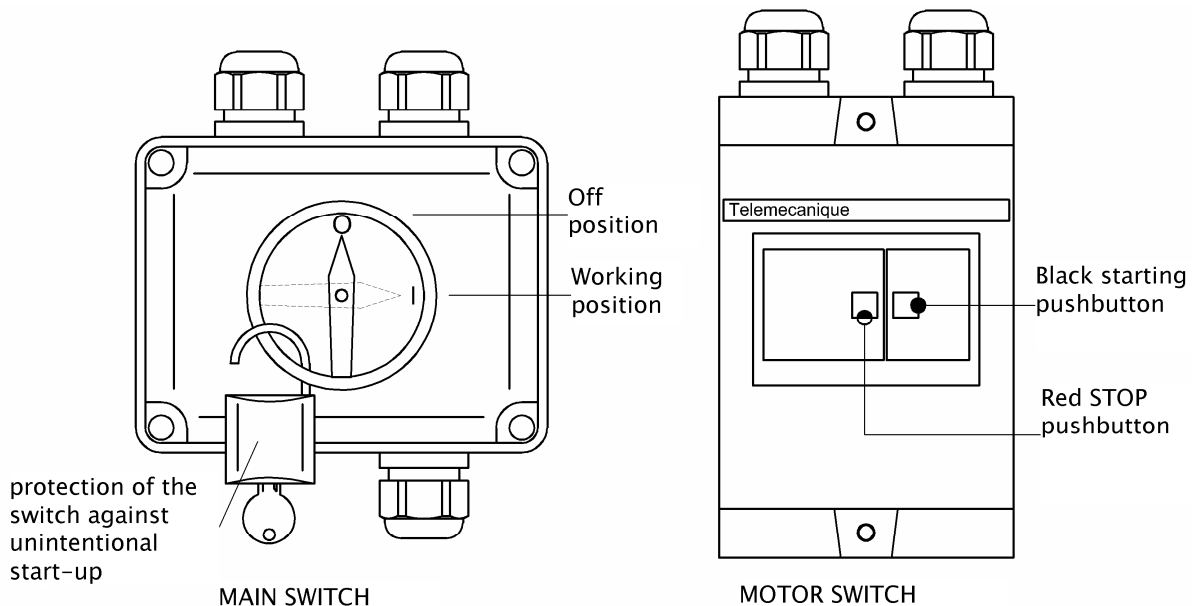
### 3.1. Operation of intake hopper

#### 3.1.1. Starting-up of intake hopper

- Close the bolt using the control lever (Fig.45),
- Set the main switch into the "I" position (Fig.53),
- Push the black pushbutton on the motor switch (Fig.53).

#### 3.1.2. Stopping of intake hopper

- Cut off the inflow of grain to the intake hopper (stop unloading or close the bolt using the control lever Fig.45) and wait until the complete emptying of the device,
- Push the red pushbutton on the motor switch (Fig.53),
- Set the main switch into "0" position (Fig.53),



**Fig.53**  
**Controls of intake hopper**



### 3.1.3. Feed transport

Proceed as follows before starting to transport the grain:

- Check the technical condition of the intake hopper and the equipment working with it,
- Make sure that no people are present at the location of grain outlet,
- Ensure that the grain flow at the outlet device is smooth so that no screw conveyor jamming (overload) takes place.

Never stop the intake hopper, which conveyors are filled with grain. Problems with restart may occur. Filling of the intake hopper must always be performed while the gate valve is closed.



**Intake hopper has a gate valve controlling inflow of the transported material. In spite of this fact after a sudden (emergency) stopping of the intake hopper, before the restart it is necessary to completely close the inflow of the material, in order to prevent overloading the conveyor and damaging the device.**

Given consideration to the remarks mentioned above, it is possible to perform the start-up of intake hopper in accordance with point 5.1.1. of this manual.



**In an emergency situation stop the device by pushing the red STOP pushbutton on the motor switch.**

When undergoing power decay, the intake hopper stops. Restoring the power does not cause a self-acting start-up of the device. In order to restart the devices it is necessary to perform the entire start-up procedure from the beginning (5.1.1) to the end.

In order to stop the work of the intake hopper, follow point 5.1.2 of this manual.

### 3.2. Intake hopper maintenance

Proper and punctual performing of the periodical inspections, maintenance and possible repairs guarantees the full working ability of the device and prevents it's early and excessive wearing.

#### 3.2.1. Periodical inspections and current repairs

A periodical inspection includes:

- controlling the security devices such as the motor switch etc, (working regularity, lack of mechanical damage etc),
- controlling the condition of the electric system by a certified electrician,
- controlling the weldings, fittings etc,
- controlling the anticorrosive coverings,
- controlling the sliding and rolling bearings,
- lubrication of the sliding bearing, the elements of the gate valve and moving screw fittings,
- controlling other moving or stable elements.

Inspection frequency:

The frequency of the periodical inspections should be proportional to the operational use, but not less frequent than once a year. All the security devices, such as the motor switch, main switch etc, should be controlled at least once a month or before every start-up of the intake hopper.



**At least once a year, the user should commission a certified electrician to perform a control of all the electrical parts. The controller should protocol the control.**

The riding bearings, the cooperating connections and the parts of the gate valve should be lubricated after every 30h of work.

A current repair consists of making minor repairs and eventual filling of the paint coverings.



**Anticorrosive coverings of the screw can sustain damaging during the assembly (fitting).**

**In such a case a current repair consists also of filling the anticorrosive covering of the damaged surfaces.**

The user of the hopper should run a maintenance log.

### **3.2.2. General repair work**

General repair work is performed depending on the use of the screws, fittings etc and consist of their repairing or replacing.

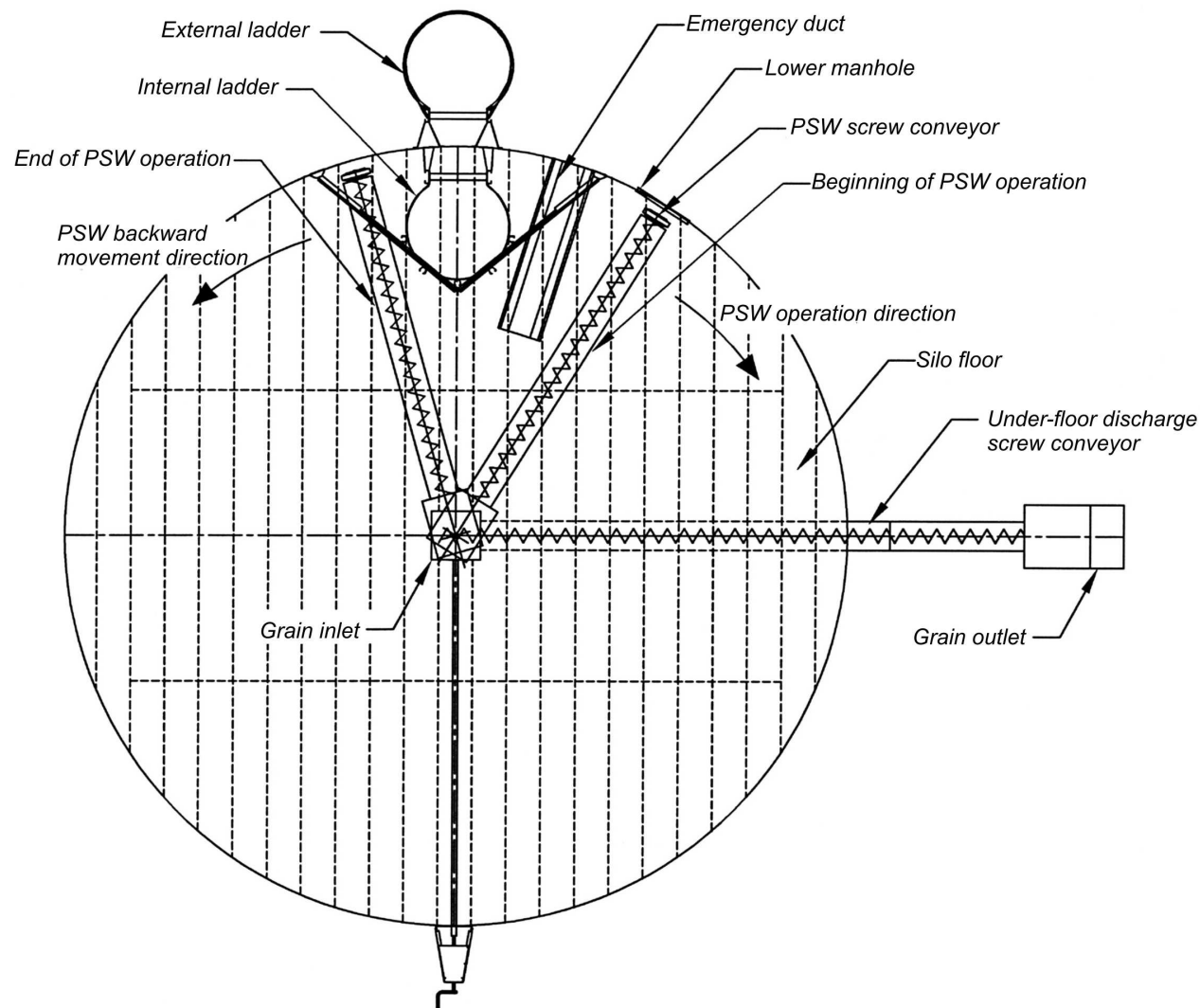
The repair works include the scope of the current repairs and:

- replacing of the sliding and riding bearings and the sealings etc.
- making new anticorrosive coverings,
- other necessary repairs.



**All the failures should be disposed of immediately and the damaged or used parts should be repaired or replaced with new ones.**

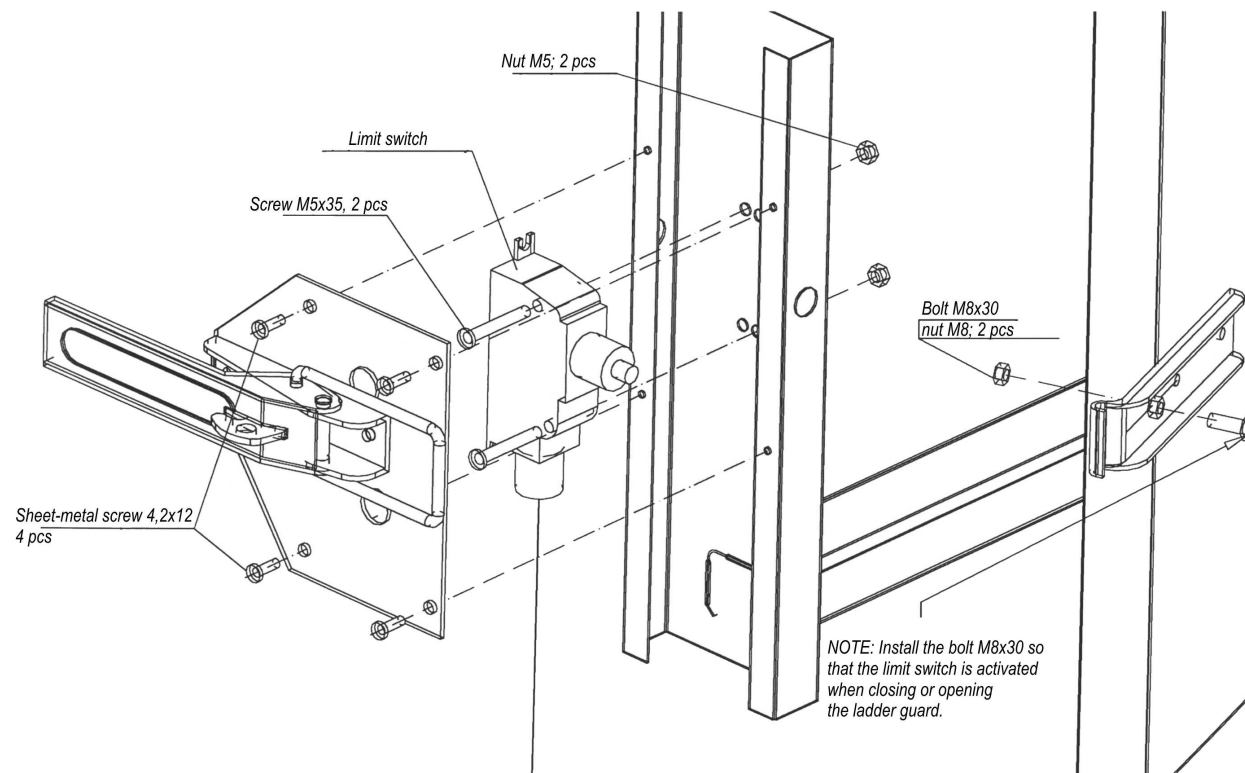


**SECTION IV - BIN TYPE SILO DISCHARGE SYSTEMS****1. Principle of operation**

**Fig. 54: Diagram of operation of screw conveyors for type BIN silo discharge**

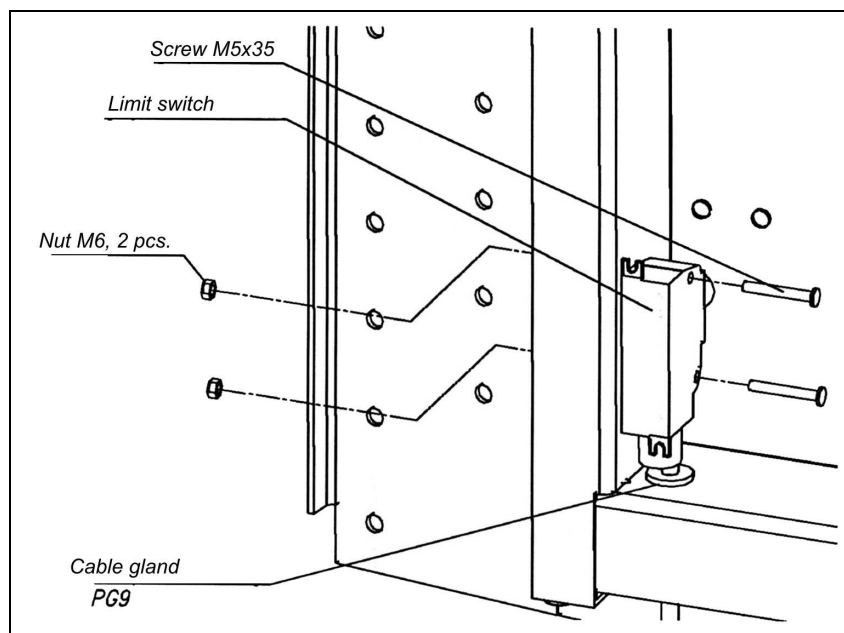
## 2. Installation of protective (limit) switches

Protective limit switches disconnect power supply for screw conveyors installed in the silo, when trying to enter the silo both by the lower silo manhole and upper silo manhole (protection at the entrance on the ladder).

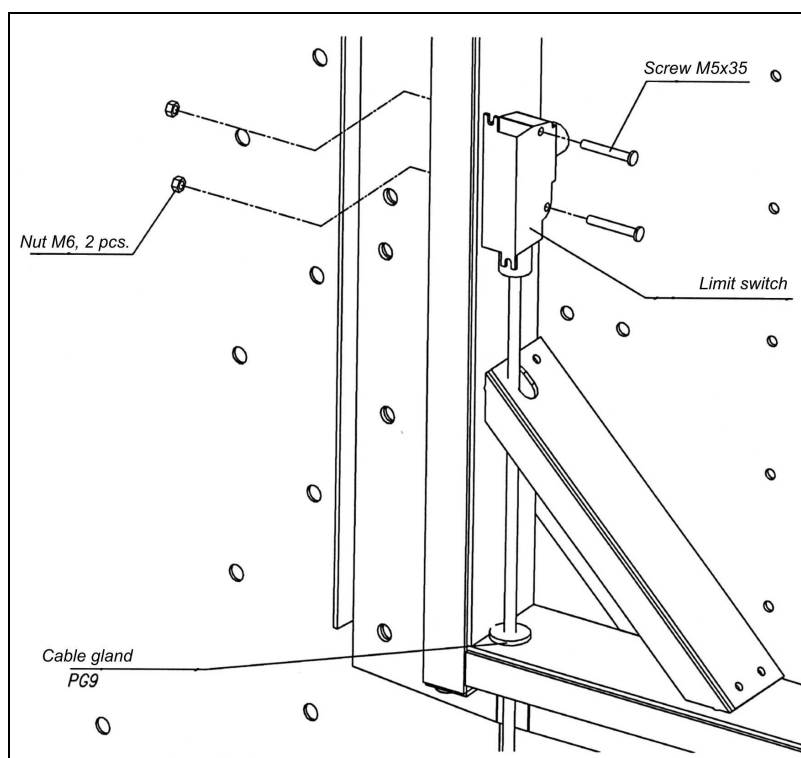


**Fig. 55**  
**Way of installation of the limit switch protecting the entrance on the external ladder**





**Fig. 56: Installation of the limit switch to protect the entrance via the lower manhole in BIN60, BIN100 and BIN200 type silos**



**Fig. 57: Installation of the limit switch to protect the entrance via the lower manhole in BIN500, BIN1000 and BIN1500 type silos**

## SECTION VII - FINAL AND SUPPLEMENT INFORMATION

### 1. Storage

In case of longer downtime, the screw conveyor must be emptied completely, cleaned and necessary maintenance and repair activities must be carried out.

It is recommended to remove the under-floor screw conveyor drive unit together with the screw, protect them against corrosion and store in a dry room. Protect the units mentioned above against the weather, when they are left in place.

When starting the screw conveyor after longer downtime, proceed according to instruction given for the first start-up (as described in this Instruction Manual).

### 2. Disassembly and disposal

After the diagnosis that the screw conveyor cannot be operated any more, proceed as follows:

- Disassemble all screw conveyor parts and units.
- Sort all parts according to the disposal way and location.
- Pass all metal and plastic etc. parts and units to the companies specialized in recycling and disposal of such materials.
- Protect other parts so that they are not the danger for the health and environment.



**When disassembling and disposing of the screw conveyor, exercise the safety rules specified for transport and handling (according to the description contained in this Instruction Manual).**



### 3. Warranty and warranty certificate

BIN Spółka z o. o. guarantees correct operation of the purchased product manufactured by our company. The warranty period is 12 months from the purchase date and is valid only together with a sales confirmation given to the user by us or by our representative. Warranty concerns free of charge removal of faults which substantially affect product functionality. Owing to this the use of regulations concerning warranty according to 558 §1 of the Civil Code is excluded.

#### General terms and conditions of the warranty

##### 1. Territorial range of the warranty

The warranty covers the whole Poland. The warrantor will cover costs of transport related to recognized warranty complaint up to the limit of 250 covered kilometers, according to typical rates.

2. The warranty does not cover faults caused by improper or excessive use, natural wear of components or other causes which the manufacturer is not responsible for.
3. The warranty does not cover any costs not mentioned above, especially costs resulting from equipment shutdown.
4. The warranty becomes invalid in case of:
  - misuse of the product,
  - improper installation or performing unauthorized changes in equipment,
  - performing the works which require special entitlements by unauthorized persons.

#### Detailed terms and conditions of the warranty

##### 1. In case of products:

- containing electric motors, warranty for these motors is issued by their manufacturer.
  - supplied as a set of components – customers will check the condition of the components and will store them on his own responsibility until they will be used during assembly. Flat components made of zinc plated sheets need special care. They should be stored in a manner enabling a free flow of air around each component. Even during short storage the contact of wet zinc plated sheets causes formation of non-removable stains.
2. If arrangements made during placing an order or arrangements specified in the operating manual impose obligations on the buyer, then the warranty does not cover the results of negligence or improper realization of such obligations.
  3. Overdue financial obligations of the buyer with regard to the warrantor or the seller cause the loss of the warranty rights until such obligations are settled.

#### Procedure of exercising the warranty rights

The customer reports in writing the faults to the seller, using enclosed Warranty Certificate.

Within 14 days the seller notifies the customer about reaction for the complaint, the place and the date of warranty repair.

Producer:

BIN Sp. z o. o.  
87-100 Aleksandrów Kujawski  
ul. Narutowicza 12

.....  
Seller's

(Seller's signature is not needed if there's a note concerning warranty transfer on the selling invoice )



**BIN Sp. z o.o.**  
87-700 Aleksandrów Kujawski  
ul. Narutowicza 12  
tel. 0-54 282 22 55

## WARRANTY CERTIFICATE

Model	Year of production	Serial number	Purchase document no.

Possibly the most precise description of the revealed fault

First name and surname (company name)	Town	Street and house number	Postal code and post office

Date	Signature	Phone number	Date, signature and stamp of an electrician who starts up the device

## WARRANTY CERTIFICATE



**BIN Sp. z o.o.**  
87-700 Aleksandrów Kujawski  
ul. Narutowicza 12  
tel. 0-54 282 22 55

Model	Year of production	Serial number	Purchase document no.

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**BIN Spółka z o.o.**  
**87-700 Aleksandrów Kujawski**  
**ul. Narutowicza 12**  
**POLSKA**  
**Tel./Fax. 0-54 282 22 55**

## WE DECLARATION OF CONFORMITY

**Manufacturer: BIN Sp. z o. o.**  
**87-700 Aleksandrów Kujawski**  
**ul. Narutowicza 12**  
**POLAND**

### Declares that the following products:

Model	Machine description
PS160-N1.5/400	Screw conveyor Ø160-drive unit P=1.5kW, n=400 rpm.
PS160-N3.0/400	Screw conveyor Ø160-drive unit P=3.0kW, n=400rpm.
PS220-N3/200	Screw conveyor Ø220-drive unit P=3kW, n=200rpm.
PS220-N4/200	Screw conveyor Ø220-drive unit P=4kW, n=200rpm.
PS220-N6/300	Screw conveyor Ø 220-drive unit P=6kW, n=300rpm.
PSW100	Internal screw conveyor φ100 for silo BIN100
PSW200	Internal screw conveyor φ100 for silo BIN200
PSW220-BIN100	Internal screw conveyor φ116 for silo BIN100
PSW220-BIN200	Internal screw conveyor φ116 for silo BIN200
PSW500	Internal screw conveyor φ116/φ130 for silo BIN500
PSW1000	Internal screw conveyor φ116/φ130 for silo BIN1000
PSW1500	Internal screw conveyor φ100/φ116/φ130 for silo BIN1500
PSW2200	Internal screw conveyor φ136 for silo BIN2200
PS220-KP-AKC	Intake hopper, φ 220 – intake hopper accessories

are in compliance with basic requirements contained in:

- European Parliament and Council Directive 98/37/EC, dated in 22 June 1998, on harmonisation of Member State Laws regarding machines, as amended with the Directive 98/79/EC (EC Official Journal L 207 and 331).
- The Ordinance of the Minister of Economy, dated in 20.12.2005, (Official Journal No. 259, pos. 2170), on basic requirements for machines and safety devices.
- European Parliament and Council Directive 2006/95/EC, dated in 12 December 2006, on harmonisation of Member State Laws regarding electric equipment for use in defined voltage limits (EC Official Journal L 374).
- The Ordinance of the Minister of Economy, dated in 21.08.2007 (Official Journal No. 155, pos. 1089) on basic requirements for electric equipment.

The following harmonised standards were used for evaluation of compliance:

- PN-EN ISO 12100-1:2005 Ap1:2006: Safety of machines. Basic terms, general designing rules. Part 1. Basic terminology and methodology.
- PN-EN ISO 12100-1:2005: Safety of machines. Basic terms, general designing rules. Part 2. Technical rules.
- PN-EN 618:2004 Continuous conveying equipment and systems. Safety and EMC requirements for loose material conveying equipment, excluding fixed belt conveyors.
- PN-EN 60204-1:2006: (U) Safety of machines. Electric equipment for machines. Part 1 General requirements

This Declaration of Compliance is for the following product:

Model:

Serial number:

Year of production:

The Declaration of Compliance becomes null and void, when the product mentioned above is completed, modified or changed in a way, which is not in compliance with guidelines contained in this Instruction Manual, without producer's consent in writing.

Aleksandrów Kujawski, 07.12.2009.

Piotr Chojnacki, Eng