

# USE AND MAINTENANCE MANUAL



## Rail Extraction System BEL/SSAK

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## 1. INTRODUCTION

The purpose of the present Use and Maintenance Manual is to supply User with directions within the range of application, assembly, start-up and operational use of the **BEL/SSAK** Rail Extraction System.



**Prior to assembly at the place of operation and use, it is important to get thoroughly acquainted with the contents of the present instruction.**



**With regard to continuity of work carried on improvement of our products, we reserve for ourselves the revision possibility of the draft and technological changes improving their functional features and safety.**

Construction of **BEL/SSAK** meets the requirements of the current state of technology as well as the safety and health assurances included in:

**2006/42/EC Directive** of the European Parliament and of the Council of the 17 May, 2006 on machinery, amending the 95/16/EC Directive (recast) / Official Journal EC L157 of the 09.06.2006, page 24);

Additionally, it is in accordance with the subsequent harmonised standards:

**EN ISO-12100:2012** Safety of machinery – General principles of design – Assessment and reduction of hazard

**EN 60204-1:2010** Safety of machinery – Electrical equipment of machines – Part 1: General requirements

## 2. PURPOSE

**BEL/SSAK** rail extraction system has been engineered for effective removal of the exhaust volume emitted by vehicle from the garage. The system is especially constructed for vehicles of permanent stationing place i.e. fire department depots, medical emergency units and other rescue units, where absolute readiness for emergency action departure is required. It can be applied for vehicles with a side- or back exhaust pipe.

## 3. RESERVATIONS OF MANUFACTURER

- Manufacturer accepts no liability for any consequences following from the operational use that is in contradiction to the purpose of application.
- Installing of any additional elements that are not belonging to the normal device structure (or accessory set) is not acceptable.
- Do not introduce any structural or constructional modifications of the system on one's own.
- Protect the housing of the system from mechanical damage.
- Prior to installing – check the load carrying capacity of the ceiling / wall, in a place where the unit shall be installed; unsure setting of mounting bolts could result in uncontrolled device detachment, its damage and risk to the operator / people in the vicinity.
- While the served vehicle leaves the depot garage, its velocity must not exceed 10 km/h.

## 4. TECHNICAL DATA

Table No.1

Type	unit of measure	BEL-SSAK-6	BEL-SSAK-9	BEL-SSAK-12	BEL-SSAK-15
recommended volume flow at the suction funnel	m <sup>3</sup> /h	1200 – 1500	1200 – 1500	1200 – 1500	1200 – 1500
flow resistances	Pa	1400 – 1800	1800 – 2100	2300 – 2600	2500 – 2900
length of the guide beam "L"	m	6	9	12	15
range of the operational funnel movement L <sub>1max</sub>	m	4,2	6,5	8,7	11
weight	kg	40	60	70	82
thermal resistance of the hose	°C	200	200	200	200

Inlet diameter of the suction funnel: 170 mm

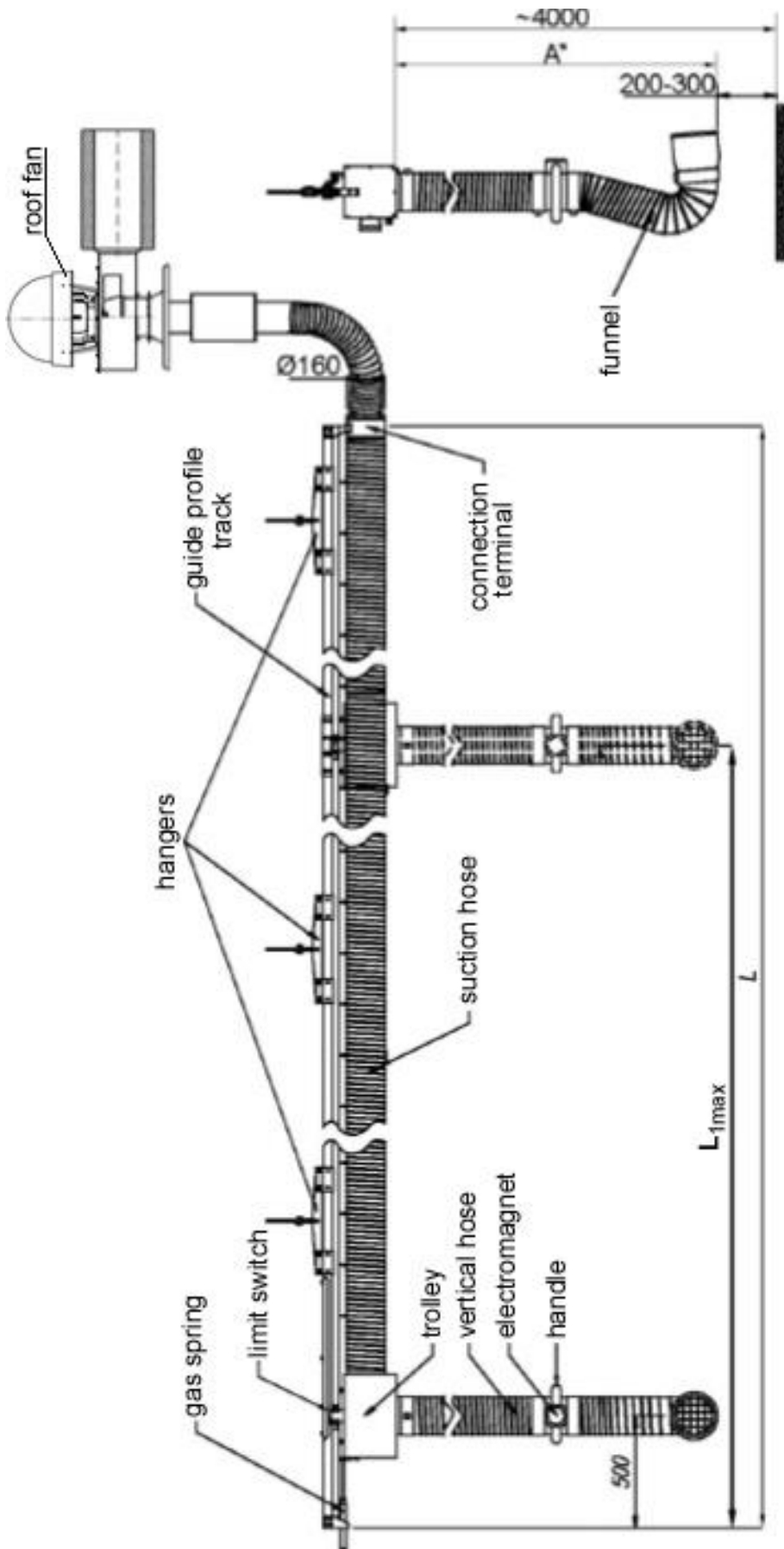
Dimensions specified in the table are illustrated in Fig. No.1 Placement of elements, dimensions.

## 5. STRUCTURE AND FUNCTION

BEL/SSAK system consists of subsequent elements (see Fig. No.1):

- guide profile
- suction hose – suspended under the guide profile
- trolley
- vertical hose
- electromagnet assembly
- suction funnel

The trolley displaces along the guide profile of the BEL/SSAK extraction system. Along with the trolley moves the suction hose (suspended underneath the guide profile). Under the trolley is attached the vertical hose that is equipped with a handle with an electromagnet anchor assembly. Electromagnet connects the hose to the gripper on the carbody. Inside the hose is located an electrical cable to supply current to the electromagnet. At the end of the hose (with the electromagnet assembly) is attached a specially shaped suction funnel for connection to the exhaust pipe of the served vehicle at not large distance. The distance should provide safe funnel disconnection.



A\* - dimension depends on the draft specifications  
 Fig. No.1 – BEL/SSAK – Placement of elements

Type of the extractor	L [mm]		weight [kg]
	L	L <sub>1max</sub>	
BEL-SSAK-6	6000	4200	40,0
BEL-SSAK-9	9000	6500	60,0
BEL-SSAK-12	12000	8700	70,0
BEL-SSAK-15	15000	11000	82,0

At the moment of sudden vehicle departure (from the garage/depot), the trolley with the horizontal suction hose displaces along the guide profile. At the trolley is attached limit switch, that automatically disconnects the funnel electromagnet from the vehicle. After disconnection, the vertical hose is pulled up by a spring (located inside the hose). Gas spring (at the end of the guide profile) slows down smoothly the trolley movement. It is recommended to apply the extraction system with a roof fan or flange fan (see catalogue card with electrical accessories). Extraction fan can be operated manually or via radio (by means of the transmitter).

A standard electrical system consists of subsequent elements:

- ZE-SSAK control unit – installed in the garage
- limit switches **WK.1**, **WK.2** – installed at the extractor trolley
- electromagnet K1 – located in the handle of the suction funnel
- button **S7**

On demand, the electrical system can be equipped additionally with elements of remote control. i.e.:

- a/ supporting control unit ZP-1/24V, ZP-2/24V – for remote control by cable – to operate the fan (control cassette);
- b/ radio transmitter NR-1Ap (remote control) – installed in the vehicle and radio receiver OR-1 installed near the ZE-SSAK control unit. These units are elements of remote control for the fan via radio.

## 6. ASSEMBLY AND STARTUP

Complete system consists of:

- guide profile with hangers
- fan
- hose
- trolley
- funnel-electromagnet assembly
- ZE-SSAK control unit
- limit switches of the garage door.

The system has to be installed to the supporting beam by hangers. The supporting beam should be installed to the ceiling or indirectly (by means of wall brackets) to the wall of the process room.

On the side wall or at the back of the carbody – install the gripping plate for the electromagnet – in such a height that provides efficient removal of exhaust fumes through the funnel. The outlet of the exhaust pipe (of the served vehicle) should be in one plane with the carbody surface. If the exhaust pipe is ended underneath the vehicle – special extension is needed – at least 25 cm from the edge of the vehicle wheel.

**Connection to the power supply system should be carried out by User, by selecting the appropriate sort and section of the cables and efficient protection from short-circuit- and overload effects.**

To energise the system is applied the ZE-SSAK control unit – installed in the garage.

## 7. OPERATIONAL USE

**Switching ON and OFF:**

1. Set the **S1** switch into position “**ON**”. This will be indicated by the white signalling lamp **S1.H1** integrated in switch **S1**.
2. By means of the **S3** switch – select the mode of control:
  - a) “**L**” – local – from the ZE-SSAK control unit
  - b) “**Z**” – remote – by means of the supporting controllers or via radio;
3. To disconnect the system – set the **S1** switch into position “**OFF**”.

The control unit, depending on the size of the extraction fan, is equipped with adequately selected motor protective switch and a contactor. The unit serves as a short-circuit- and thermal protection and is equipped with a time relay delaying the moment when the fan switches off. Manufacturers setting for the time delay is 2 minutes.

**Table No.2 – Specification of the control units – applied in dependence of the size of the fan**

Type	Part No.	Supply voltage [V]; 50 Hz	Current range [A]	Motor rate [kW]	Cooperating fans
ZE-SSAK-4-3	511Z50	3x400	2,5-4	1,5	WPA-8-E-3-N; WPA-8-D-3-N
ZE-SSAK-6,3-3	511Z51	3x400	4-6,3	2,2	WPA-9-E-3-N; WPA-9-D-3-N
ZE-SSAK-10-3	511Z52	3x400	6-10	3	WPA-10-E-3-N; WPA-10-D-3-N
ZE-SSAK-14-3	511Z53	3x400	9-13	5	WPA-11-E-3-N; WPA-11-D-3-N
ZE-SSAK-16-3	511Z54	3x400	13-18	7,5	WPA-13-E-3-N; WPA-13-D-3-N



Fig. No.2 – ZE-SSAK control unit

**Local control:**

1. To start the fan press the green field in the double button **S4** (**S4.2 "START"**) – see Connection Diagram. The fan function will be indicated by the green **S2.H2** lamp in the double button **S4**.
2. To stop the fan – press the red field in the double switch **S4** (**S4.1 "STOP"** – see Connection Diagram) When the fan is switched off – the green **S4.H2** goes off (or the lamp in the supporting controller goes off. The fan will stop after the delay time – as adjusted in the time relay **KT1** (manufacturers setting 2 minutes).

**The use of supporting controllers**



Fig. No.3 ZP-2/24V



Fig. No.4 ZP-1/24V

1. Press the green field in the double button (of the **ZP-1/24V** supporting control unit) to start the fan. This will be indicated by the green lamp in the button;
2. Press the red field in the double button (of the **ZP-1/24V** supporting control unit) to stop the fan. The green lamp in the button goes off;
3. Set the switch in the double button (of the **ZP-2/24V** supporting control unit) into position **ON** to start the fan. This will be indicated by the green lamp in the button;
4. Set the switch in the double button (of the **ZP-2/24V** supporting control unit) into position **OFF** to stop the fan. The green lamp in the button goes off.

#### Remote control – via radio:



Fig. No.5 NR-1Ap radio transmitter



Fig. No.6 OR-1 radio receiver

1. The fan is switched on at the moment when the vehicle engine is started or when driver turns the ignition starter key. NR-1Ap radio transmitter sends a signal to the OR-1 radio receiver and the fan is automatically operated.
2. The fan will be automatically be switched off – after the vehicle leaves the garage / depot – and the radio contact between the transmitter and receiver is interrupted (approx. 200 metres – depending on the local conditions). After the signal is lost, the fan will switch off after the adjusted time delay.

#### CAUTION:

1. The fan will automatically start again, when the vehicle returns near the garage door.
2. If there is need for the vehicle to wait near the garage door for a longer time – it is possible to switch off the working fan by pressing the button in the transmitter.

#### How to switch off the whole system:

1. Set the **S1** switch (in the ZE-SSAK control unit) into position **OFF**. The built-in white lamp **S1.H1** goes off.

The suction funnel must be adjusted right opposite the vehicle exhaust pipe and the electromagnet anchor should be engaged with the gripper plate on the carbody (while its engine is not running). Subsequently switch on the extraction fan. The distance provides a safe disconnection of the exhaust hose.

Placement of the elements of the control system is illustrated in Fig No.7, whereas connection of the radio transmitter is shown in Fig No.8; connection of the receiver and the supporting control units in Fig. No.11.

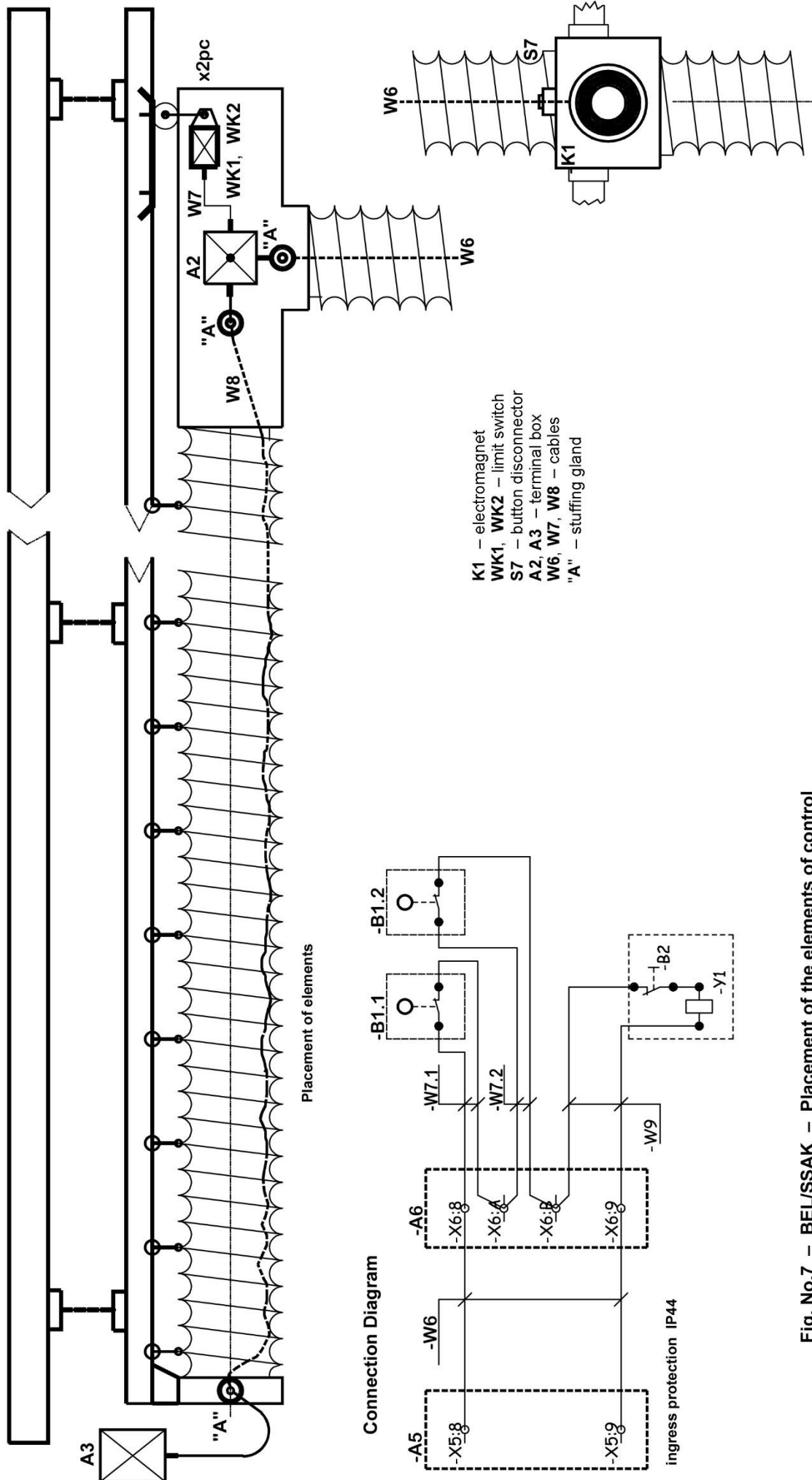


Fig. No.7 – BEL/SSAK – Placement of the elements of control

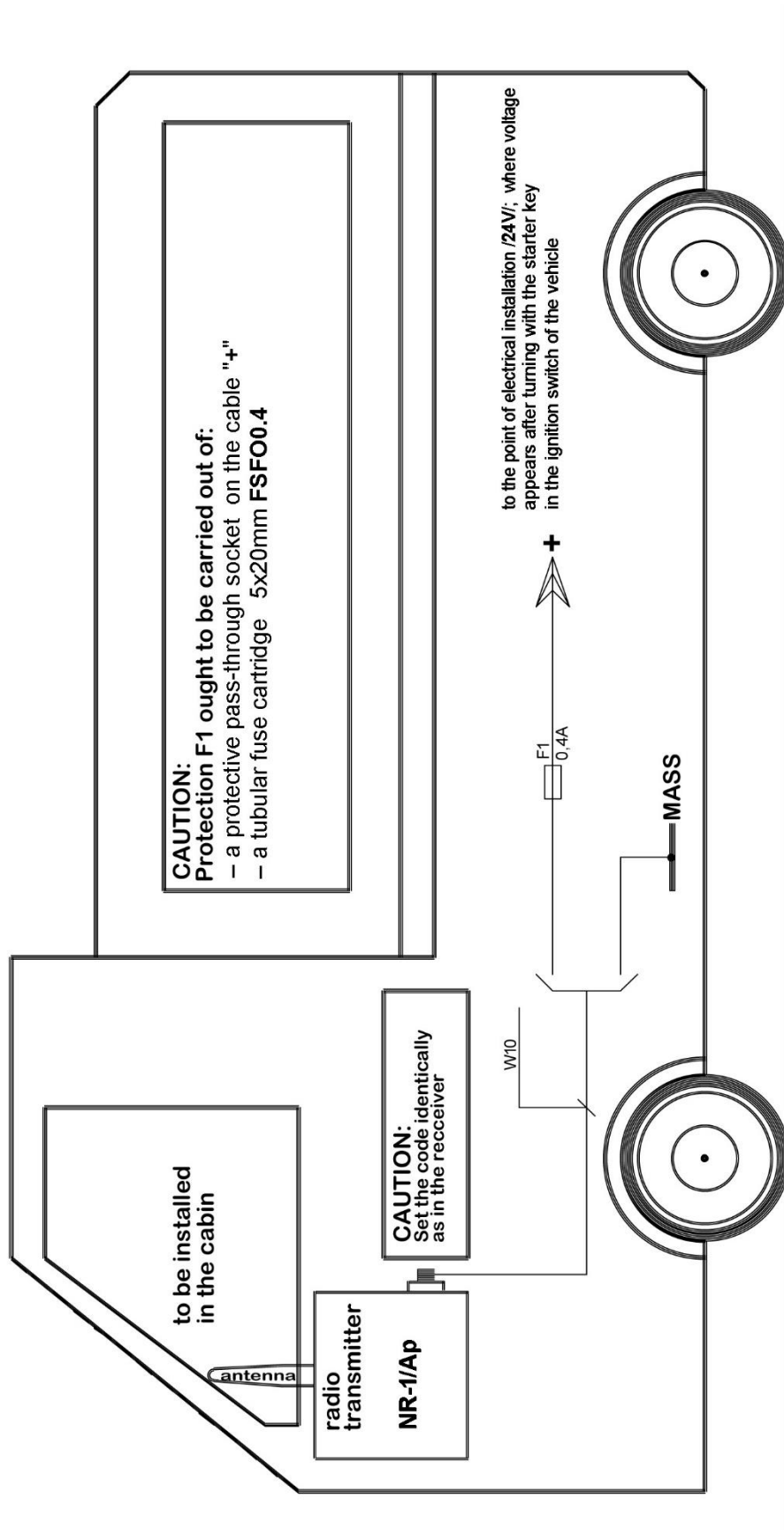


Fig. No.8 – BEL/SSAK – connection of the transmitter



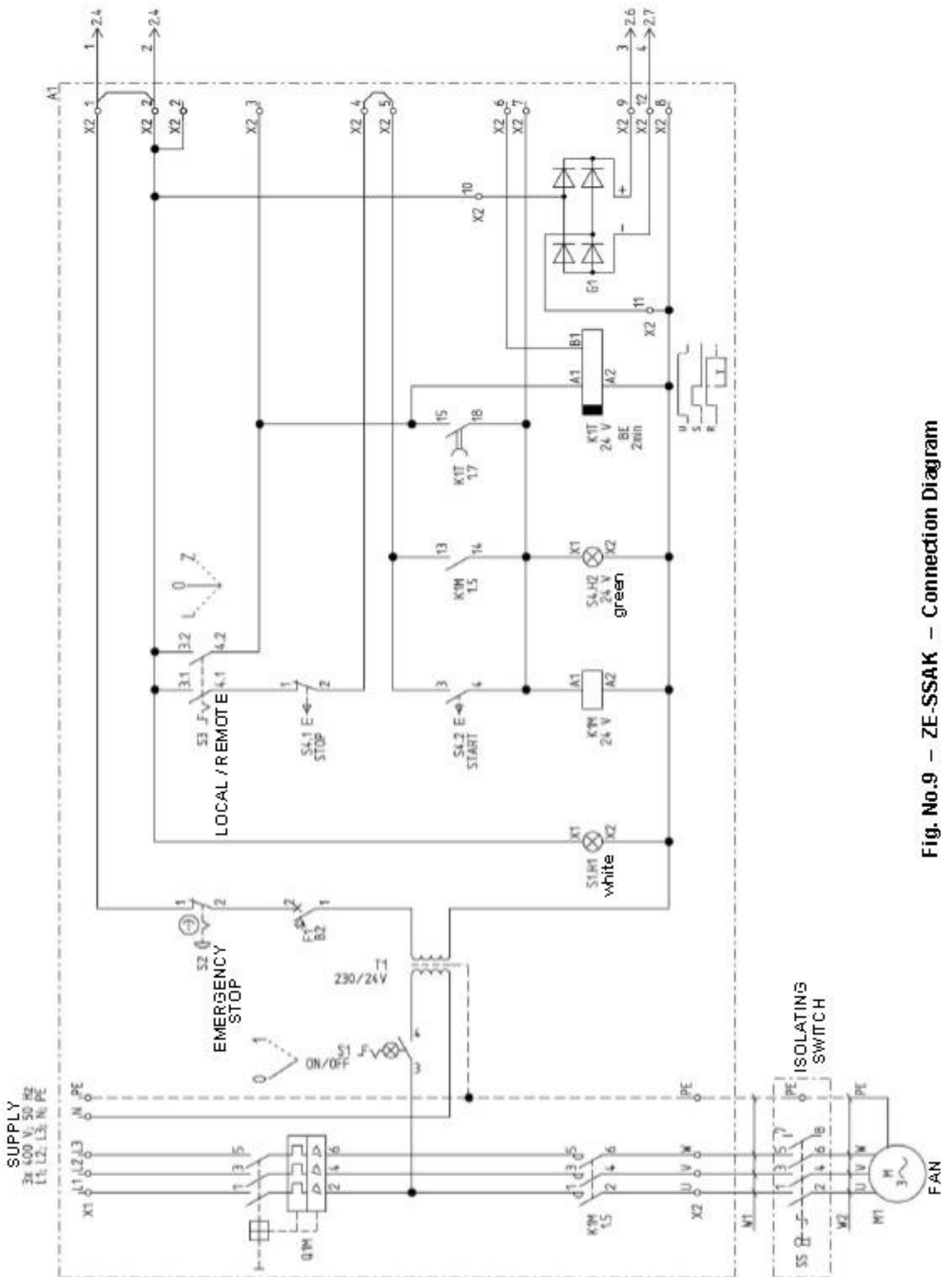


Fig. No.9 – ZE-SSAK – Connection Diagram

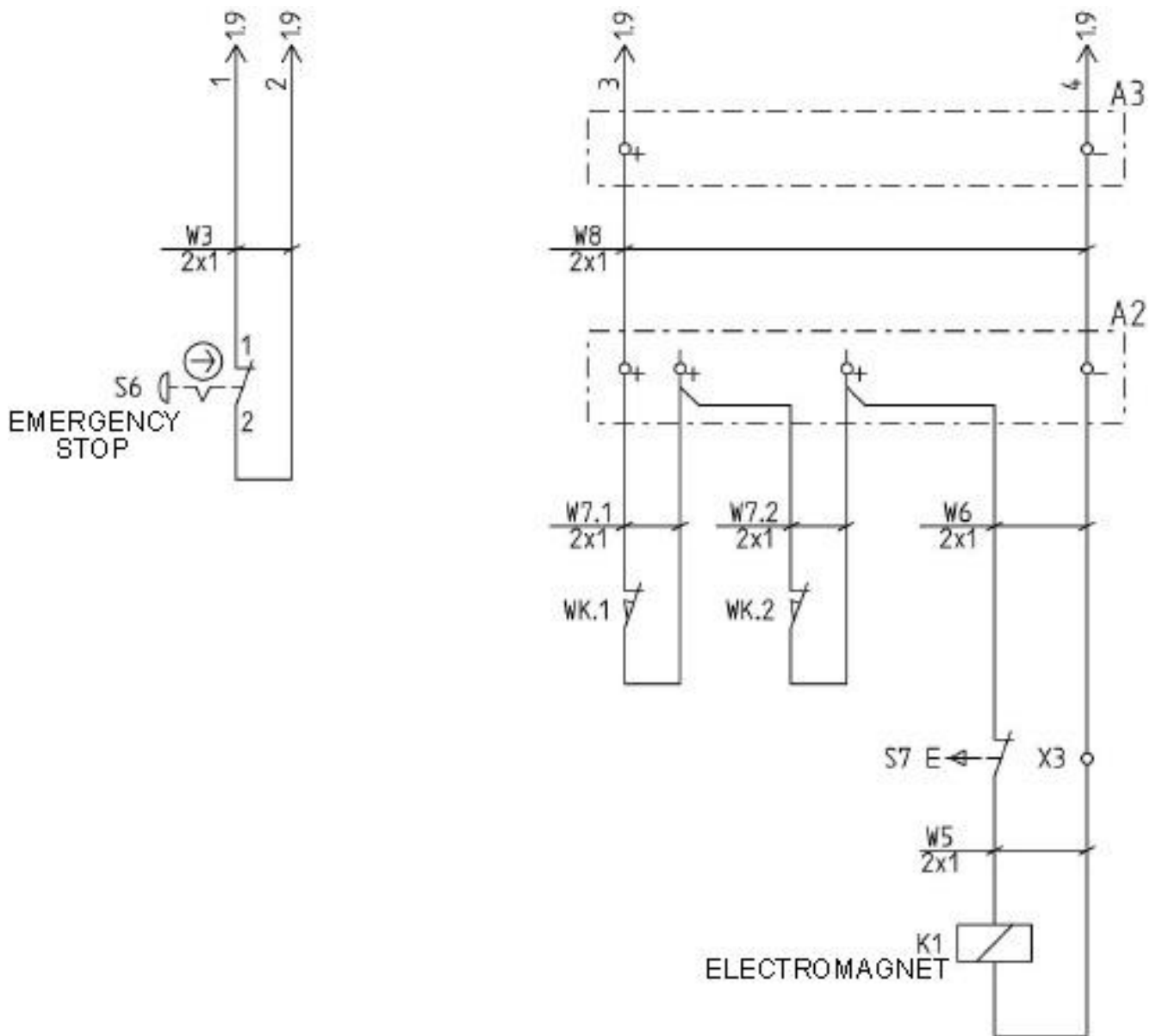


Fig. No.10 – Connection diagram for the electromagnet and limit switches

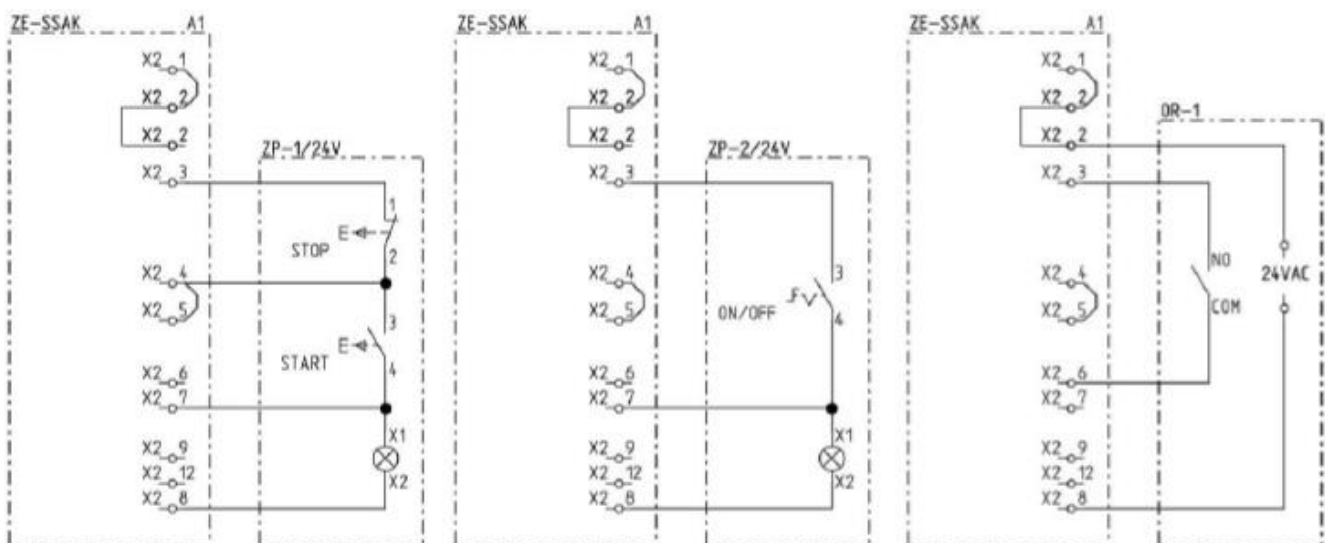


Fig. No.11 – Connection diagrams for the supporting controllers and the receiver with the control unit

## 8. TROUBLESHOOTING GUIDE

Table No.3

	Problem	Possible reason	Corrective action
1.	decrease of the intake air volume	incorrect impeller rotation sense	change the phase connection sense
2.	decrease of the intake air volume along with the increased noise	solid element, barrier object as an obstacle for the air flow got stuck (clogging) in the suction funnel or in the installation	unclog the suction funnel or the exhaust hose
3.	electromagnet failure	electromagnet coil is burnt through interruption in the electrical circuit; transformer or rectifier system is faulty	localise the failure reason and fix it
		the contact surface of the electromagnet anchor and the electromagnet gripper are polluted	clean the contact surfaces with a brass brush

## 9. MAINTENANCE AND REPAIR

Start up and the operational use are only admissible after getting acquainted with the contents of the present Use and Maintenance Manual. In case when defective function is by noise or visually spotted, undertake technical revision of the appliance.

Within the scope of periodical revisions check: the technical state of the extraction fan, according to the detailed regulations of operational use of electrical driving devices. To improve the contacting efficiency of the electromagnetic gripper, clean the contact surface (if necessary). Carry out technical revisions exclusively after device disconnection from the power supply.

## 10. OCCUPATIONAL HEALTH AND SAFETY

Start up and the operational use are only admissible after getting acquainted with the contents of the present Use and Maintenance Manual. For safety reasons, the fan ought to be connected to the electrical power system according to the valid regulations in range of personal protection from electrical shock and protection from short-circuit- and overload effects.

**Any activities related to connection of the fan with the power system ought to be carried out only by a qualified person – according to the instructions in Section 6 of the present Use and Maintenance Manual** Important is the correct impeller rotation sense of the fan with reference to the arrow on the fan housing. **Any maintenance / repair should be carried out after the device is disconnected from the power supply.**

Manufacturer is not responsible for the results when the system is used in contradiction with the purpose of application and when some changes were introduced by User, without written commitment with Manufacturer.

### CAUTION:

While the exhaust extractor is suddenly leaving the garage, be careful, and take into account if within the operational area of the hose are no people especially at the moment of suction funnel disconnection. Protect the exhaust hose from squeezing. **Admissible vehicle departure velocity (while leaving the depot) is 10 km/h.**

## 11. TRANSPORT AND STORAGE

The extraction system ought to be stored in a dry room and areas of efficient ventilation. For the time of transport the device ought to be protected from damages, indents and also protected from an uncontrolled displacement / slide or overturn.

## 12. TERMS OF WARRANTY

The period of warranty for the purchased device is indicated in the **Card of Warranty**. The warranty does not comprise:

- mechanical damage and malfunctions caused by User,
- device failures caused during the use which is in contradiction with the purpose of application and with the present Use and Maintenance Manual,
- malfunctions resulting from the improper transport, storage or incorrect maintenance,
- functional inefficiencies of the system being caused by normal operational wear / exhaustion.

Infringement of the Section 3 "Reservations of Producer" of the present Use and Maintenance Manual and, especially modifications undertaken by User on one's own or use in contradiction with the purpose of application – shall result in the loss of warranty validity.

**Stand Assembly instruction Rail Exhaust Extraction System KOS-L/SSAK**

1. Energize the system – set the **S1** switch into position **ON**, this will be indicated by the white **S1.H1** lamp. Select the operational mode of control by **S3** switch:
2. Setting **L** – means local control
  - 2.1 To start the fan – press the green field in the double button **S4**. This will be indicated by the green lamp **S4.H2** in the double button **S4**.
  - 2.2 To stop the fan – press the red field in the double button **S4**. The green lamp **S4.H2** goes off.
3. Setting **Z** – means remote control – by means of supporting control units or via radio.
  - 3.1 To switch on fan by means of the supporting control unit **ZP-1/24V** – press the green field in the double button. The fan function is indicated by the green lamp integrated in the button.
  - 3.2 Switch off the fan by means of the supporting control unit **ZP-1/24V** – press the red field in the double button. The fan is disconnected - the green lamp integrated in the button goes off.
  - 3.3 To switch on fan by means of the supporting control unit **ZP-2/24V** – set the switch into position **ON**. The fan function is indicated by the green lamp integrated in the button.
  - 3.4 To switch on fan by means of the supporting control unit **ZP-2/24V** – set the switch into position **OFF**. The green lamp integrated in the button goes off.
  - 3.5 Fan start via radio – at the moment when driver operates the engine of the vehicle or when turns the ignition starter key in the vehicle. A signal is being sent by the **NR-1Ap** radio transmitter to the **OR-1** radio receiver – and the fan is switched on.
  - 3.6 The fan will be switched off automatically – after the vehicle leaves the garage and the radio wave is interrupted (between the radio transmitter and radio receiver (approx. 200 metres – depending on the local conditions). After the signal is interrupted – the fan will switch off after time delay.
4. Connect the suction hose by means of the electromagnet to the gripper plate crewed on the carbody wall or at the back of the vehicle.
5. The suction funnel must be hanging right opposite the exhaust pipe of the served vehicle – when the engine of the served vehicle is not started.
6. Switch on the whole system – set the **S1** into position **OFF**. The built-in lamp **S1.H1** goes off.
7. In case of a sudden vehicle departure from the garage, precautions have to be taken. Pay attention that no one of the personnel is standing in the work range of the hose/funnel at the moment of funnel disconnection. **Mind that the vehicle departure velocity is not exceeding 10 km/h.**
8. **Protect the exhaust hose and suction funnel from mechanical damage.**

**CAUTION:**

Supporting control units, radio control and the safety button are additional equipment and are delivered on separate order. The safety button disconnects the system in case of emergency.

### 13. DECLARATION OF CONFORMITY



## DECLARATION OF CONFORMITY EC No. \_\_\_\_\_

Manufacturer (eventually also the authorised representative / importer):

*name:* **KLIMAWENT S.A.**

*address:* **81-571 GDYNIA, ul. Chwaszczyńska 194**

A person, authorised for issuing the technical documentation:

*name and address:* Teodor Świrbutowicz, **KLIMAWENT S.A.**

hereby declares that the product: **Rail Extraction System**

*type / model:* **BEL/SSAK**

*serial number:* \_\_\_\_\_

*year of production:* \_\_\_\_\_

Meets the requirements of the subsequent European Directives:

**2006/42/EC Directive** of the European Parliament and of the Council of the 17 May, 2006 on machinery, amending the 95/16/EC Directive (recast) / Official Journal EC L157 of the 09.06.2006, page 24);

is in accordance with the requirements of the following harmonised standards:

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**EN 60204-1:2010** Safety of machinery – Electrical equipment of machines – Part 1: General requirements

*place, date*

*signature of the  
authorised person*

*name, surname,  
function of the signatory*

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