

*Road Blocker
with Built-In Hydraulic Unit
Installation and Operation
Manual AUJA-K-357/358
(Speed Bump)*



ROAD BLOCKING SYSTEMS

Road Blocker AUJA-K-357/358 (Speed Bump)

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Annex 1: "Wiring Diagram AUJA-K-357/358".



The following abbreviations are used in this Manual:

- M - Maintenance;
- HU - Hydraulic Unit;
- HC - Hydraulic Cylinder;
- R.s.l - Road surface level (reference point ± 0.000)

1.

General Guidelines:



- *The Manual should be scrutinized prior to the equipment installation and operation;*
- *The Manual should be kept for future use.*

1.1 Instructions to installer:

1. *The equipment installation instructions shall be complied with for the purpose of safety.*
2. *The road blocker shall be installed according to the code of practice in compliance with safety regulations for installation.*
3. *The equipment shall be installed when it is deenergized.*
4. *Packing materials are subject to disposal according to the applicable standards.*
5. *The road blocker installation procedure, specified in the instruction, shall be strictly observed.*
6. *It is forbidden to modify the equipment configuration and to use materials and components being outside the scope of delivery and not specified by this Manual.*
7. *It is forbidden to install equipment during thunderstorm, heavy rain or snowfall, in explosive environment and obscured conditions.*
8. *Installation area shall be prepared according to the applicable standards.*
9. *The road blocker shall be installed, connected and precommissioned by qualified professionals.*
10. *When faults or defects are detected, the Supplier's service department shall be referred to.*
11. *The "TiSO Blockers" Company shall not be liable for the equipment operation in the following events:*
 - *noncompliance with installation procedure,*
 - *use of nonstandard materials and components,*
 - *performance of work by unqualified personnel.*
12. *The "TiSO Blockers" Company shall not be liable for compliance with safety measures during installation of equipment by the personnel outside the Company's service department.*
13. *Upon completion of installation the road blocker housing shall be sealed (in the specified points).*
14. *Commissioning of equipment shall be documented with appropriate deed to be kept for further use.*



The information about installation of equipment (date, company, terms, precommissioning results, sealer No., deed of commissioning No.) are recorded in the service book to ensure the manufacturer's warranty liabilities.

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1.2 Instructions to user:

1. The operation regulations, prescribed by this Manual, shall be strictly observed.
2. No modifications of the equipment components shall be made.
3. The equipment shall be used for intended purposes, specified by the manufacturer.
4. Don't try to repair or adjust the road blocker on your own. The relevant service department shall be referred to. Breaking of seals shall cancel the manufacturer's warranty liabilities.
5. The road blocker control units (panels) shall be beyond the reach of outsiders.
6. The "TiSO Blockers" Company shall not be liable for improper operation of equipment and violation of safety measures by the user.



- In case of improper operation and noncompliance with requirements of instruction manuals the road blocker may constitute a danger to life and health of people by presence of increased voltage in electric circuits and movable parts!
- The road blocker must be operated by the personnel having at least level II of electrical safety qualification. The road blocker should be serviced and repaired by the personnel having at least level III of qualification and being familiar with the product design and instruction manuals:
 - installation and operation manual;
 - datasheet;
 - instruction manuals for components.
- Technical inspections, maintenance, adjustment and repair shall be performed only when the road blocker is deenergized.



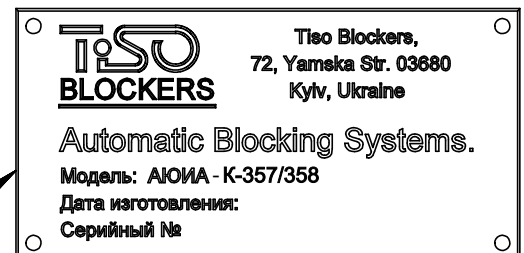
This manual is an integral part of the product and shall be handed over to the customer. The manual shall be kept for future use and to be consulted, if appropriate.

If the road blocker is resold, handed over to another owner or transported to another place, make sure that this manual is enclosed to the product to be used by new owner and/or maintenance staff during installation and/or operation.



Make sure of availability of factory seals and the plate with manufacturer's details:

- Manufacturer;
- Product type;
- Date of manufacture;
- Model No. XX XX;
- Serial No. XXX XX XX.



Compare with the data specified in the product datasheet and the warranty coupon.

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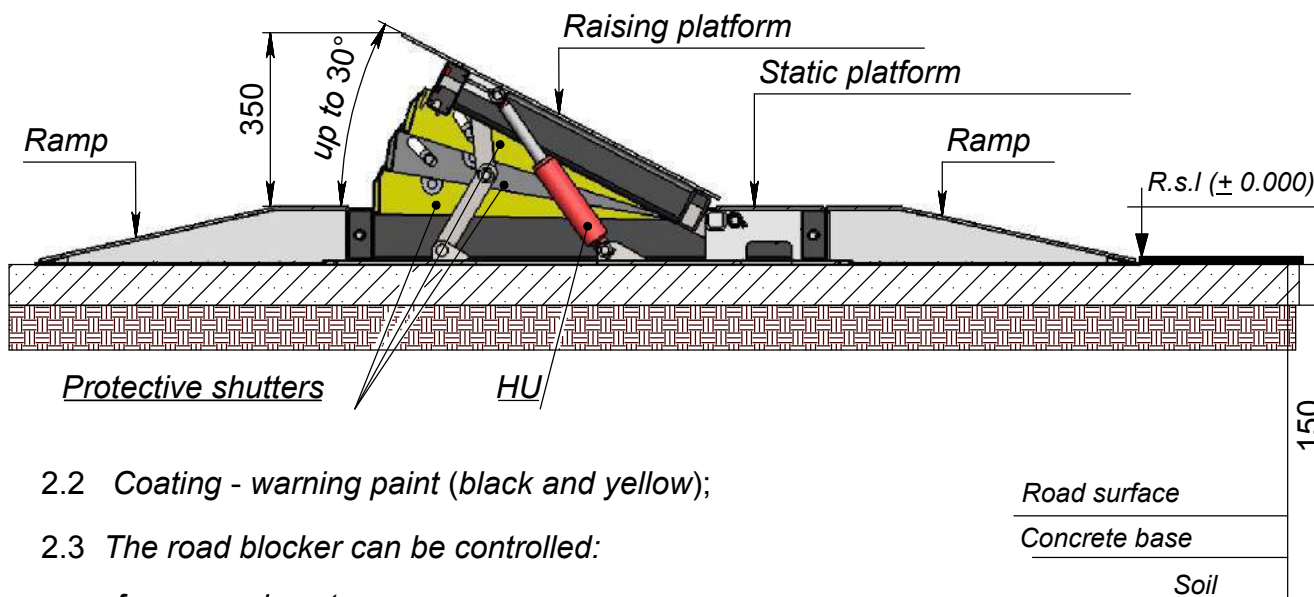
Road Blocker AUIA-K-357/358 (Speed Bump)

2. Product Description:



2.1 The automatic road blocker (speed bump AUIA-K-357/358) is a static platform with front and side ramps* and built-in barrage element (raising platform). In down position it serves as a "speed bump" to reduce the vehicle speed during vehicle access to the protected area (site) and does not obstruct the traffic. In up position the barrage platform blocks unauthorized vehicle access.

* The road blocker may be manufactured in submersible version (without ramps) and installed on the roadbed level.



2.2 Coating - warning paint (black and yellow);

2.3 The road blocker can be controlled:

- from guard post;
- from remote control unit;
- from external control unit;
- automatically with preset time interval;
- manually.

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Road Blocker AUIA-K-357/358 (Speed Bump)

3. Purpose

3.1 The road blockers are used at public, commercial and private facilities for unauthorized vehicle access control, vehicular traffic management and regulation at different sites and adjacent areas.

3.2 The road blockers are recommended for passenger transport facilities, approaches to sports facilities and government facilities, to be installed in front of shops, hotels, shopping malls and office centers, health care facilities, at the approaches to cottages and cottage settlements, at central urban and historical sites, industrial and special facilities.

3.3 The road blockers can be installed in conjunction with other traffic control and unauthorized access prevention equipment.

3.4 By impact of environmental factors the road blocker complies with GOST 15150-69 and is designed for operation in moderate climate (Y1) with acceptable ambient temperature - 30°C to +45°C.

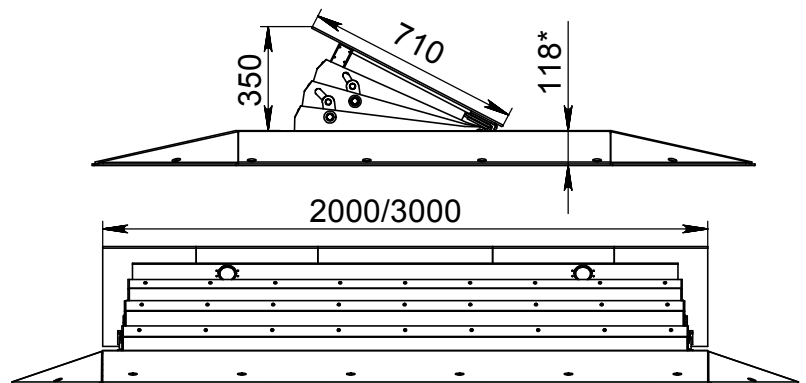
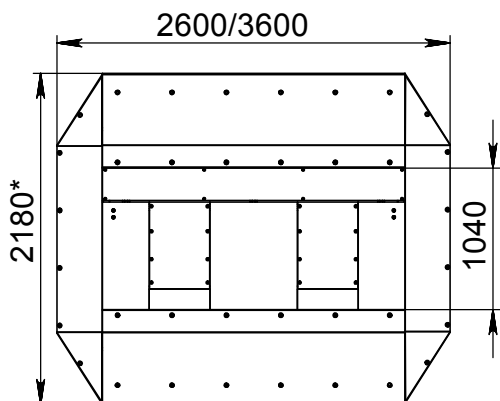


ROAD BLOCKING SYSTEMS

Road Blocker AUIA-K-357/358 (Speed Bump)

4. Technical Features

Model	<i>AUIA-K-357</i>	<i>AUIA-K-358</i>
Installation type	<i>surface-mount*</i>	<i>submersible</i>
Actuator type / location	<i>hydraulic</i>	<i>integrated</i>
Barrage platform lift height, mm	350	
Blocking width, m	2	3
Road blocker dimensions, mm	2000x1040x118	3000x1040x118
Dimensions with ramp*, mm	2600x2180x118	3600x2180x118
Max. axle weight limit, m	10	
Material	<i>structural steel C22</i>	
Impact resistance, kJ	40	
Penetration resistance, kJ	130	
Raising time, s	5	7,5
Sinking time	5	7,5
Power supply	~ 220V, 50Hz	
Power consumption	550 W	
Road blocker index of protection	IP 67	
Control box index of protection	IP 55	
Weight, kg	385	570
Temperature conditions, C°	-10 / +50	
Heating system temperature conditions (optional), C°	-30 / +50	
Light indication	<i>built-in LEDs</i>	
Raised position locking	<i>hydraulic unit hydraulic lock</i>	
Manual emergency sinking	<i>Manual unlocking mechanical device</i>	
Operating mode	<i>Intensive</i>	

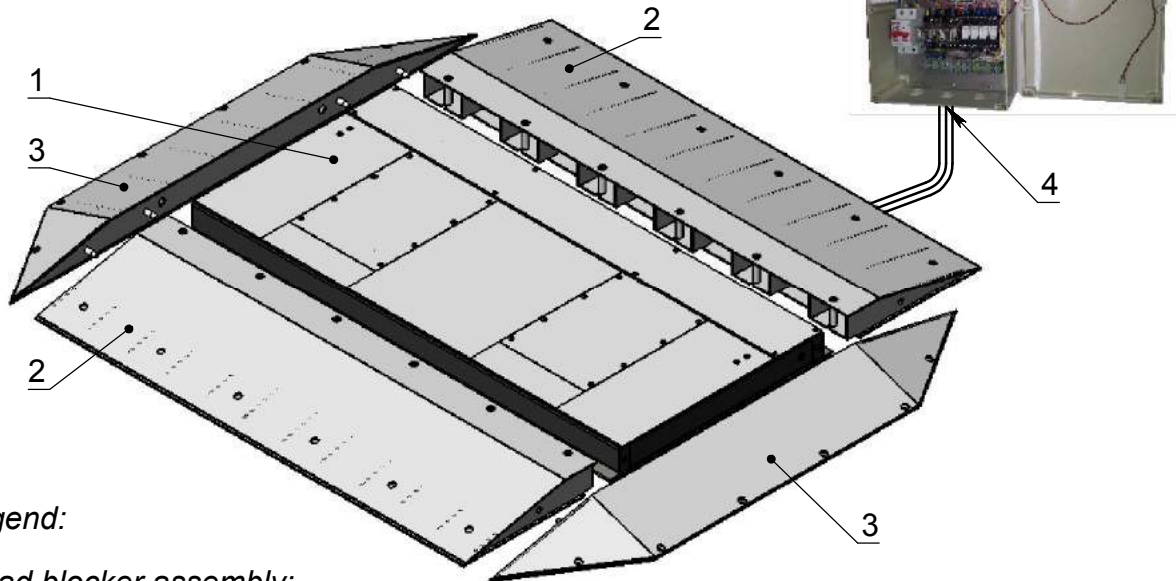


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5. Specification

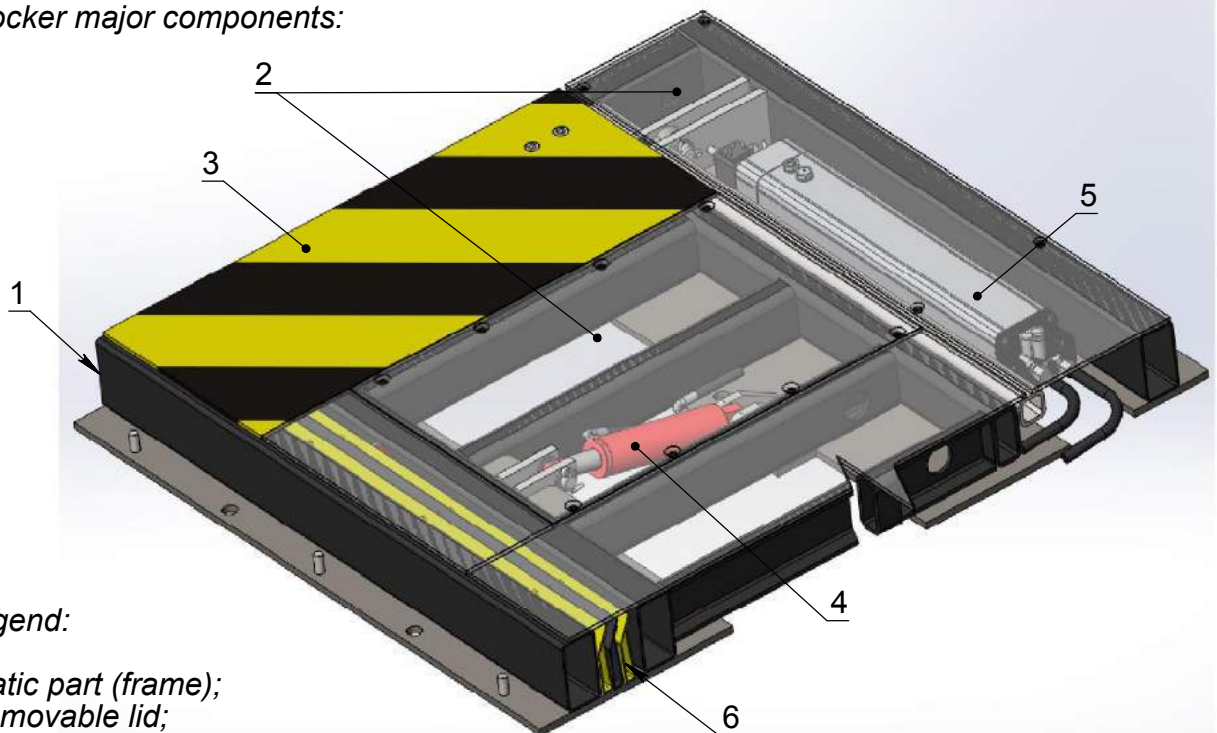
Road Blocker. Scope of Delivery



Legend:

1. Road blocker assembly;
2. Front ramp;
3. Side ramp;
4. Box with electronic control unit.

Road Blocker major components:



Legend:

1. Static part (frame);
2. Removable lid;
3. Dynamic part (raising platform);
4. Hydraulic cylinder (HC);
5. Hydraulic unit (HU);
6. Protective shutters.

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6. Road Blocker Installation

6.1 Arrangement of installation site:

- Arrangement of installation site must comply with requirements of applicable regulations and standards.
- Installation area shall be fenced along perimeter with temporary security fencing or caution tape at the distance of 3 meters from the installation site.
- The appropriate warning signs GOST (State Standard) 12.4.026-76 CCBT (Labour Safety Standards System) shall be installed in front of the entrance to the installation site.



- Make sure that there are no underground utilities at the installation site!
- Keep outsiders away from the installation site!
- Safety regulations must be observed during installation!

6.2 Installation sequence:

- Preparation of installation pit;
- Arrangement of concrete base (foundation);
- Installation of utility conduit;
- Installation of road blocker in the designed position;
- Installation of ramps in the designed position*;
- Connection of utilities.

* If surface mounted.

6.3 Installation procedure:

6.3.1 Preparation of installation pit for surface-mount installation:

1. The required marking according to the design solutions to be made;
2. The roadbed to be removed, if appropriate;
3. A pit with dimensions of 1800mm x 3800mm and depth of 400mm to be dug;
4. 50 mm sand cushion to be prepared;
5. Geotextile to be put on the pit bottom (GOST R 50275-92);
6. The pit to be filled with gravel (10-20mm grain size) GOST 8267-93 at the height of 200mm;
7. Drain pipes of $\varnothing 75\text{mm}$ H=210mm to be installed into gravel at the depth of 50mm;
8. Reinforcing net (reinforcement cage) to be installed;
9. 150mm concrete layer to be poured (Concrete M400. GOST 7473-94).

* for AUIA-K-358 (3m)

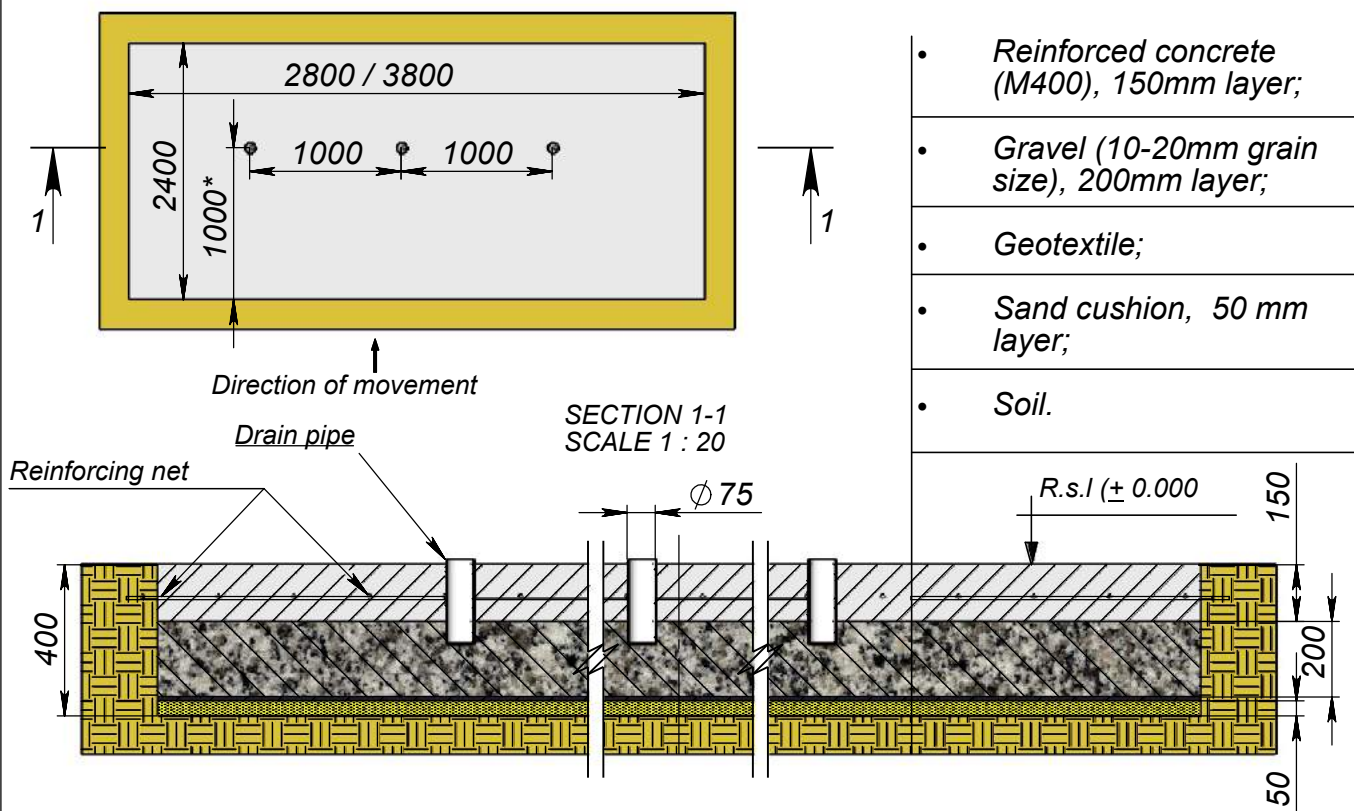


- Reinforcing and concreting shall be performed according to the applicable standards;
- It is advised to use waterproof additives to obtain water-resistant concrete.

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Road Blocker AUJA-K-357/358 (Speed Bump)

6.3.1 The pit for the road blocker surface-mount installation



6.3.2 Preparation of installation pit for submersible installation:

1. The required marking according to the design solutions to be made;
2. The roadbed to be removed, if appropriate;
3. A pit with dimensions of 1400mm x 2400 / 3400*mm and depth of 530*mm to be dug;
4. 50 mm sand cushion to be prepared;
5. Geotextile to be put on the pit bottom (GOST R 50275-92);
6. The pit to be filled with gravel (10-20mm grain size) GOST 8267-93 at the height of 200mm;
7. Drain pipes of $\phi 75$ MM H=210mm to be installed into gravel at the depth of 50mm;
8. Reinforcing net (reinforcement cage) to be installed;
9. 150mm concrete layer to be poured (Concrete M400. GOST 7473-94);
10. Formwork to be installed (outer dimensions: 1060x2020/3020mm, H=150mm);
11. Reinforcing net (reinforcement cage) to be installed;
12. 120mm second concrete layer to be poured (Concrete M400. GOST 7473-94).

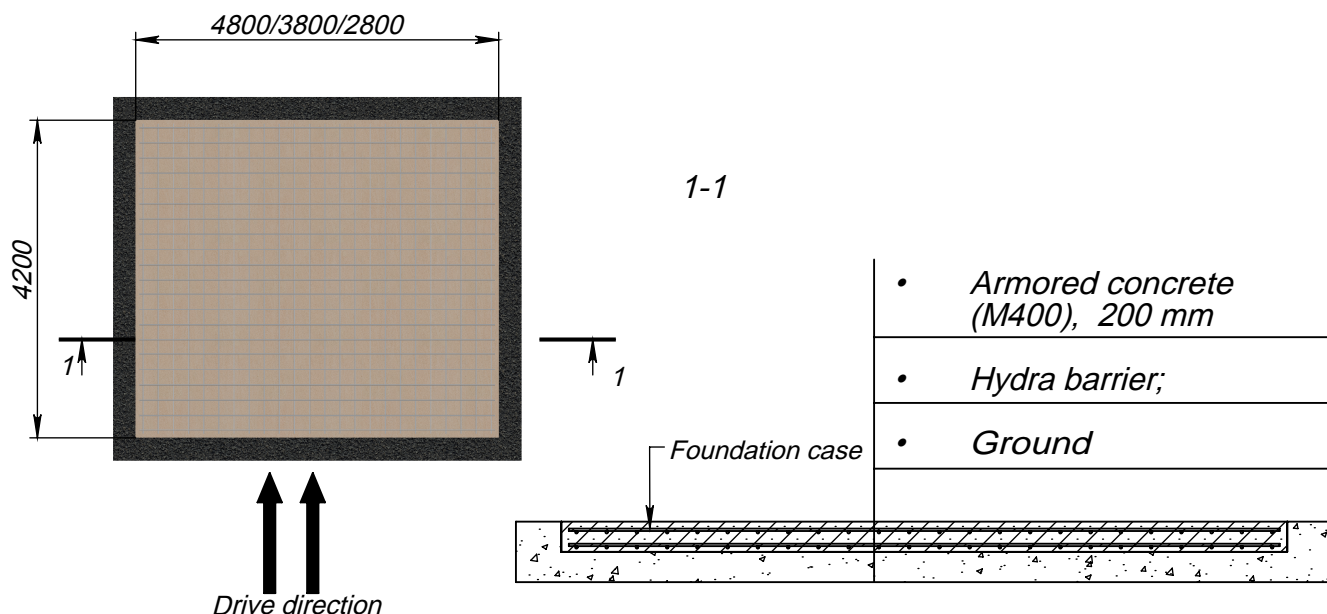


Reinforcement cage (Reinforcing net) can be delivered as additional option along with the road blocker or can be manufactured by the site supervisor according to drawings of the company "TISO BLOCKERS".

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Road Bloker AUJA-357-358 (Speed Bump)

6.3.1 Pit for surface on road installation



6.3.2 Preparation of installation pit for submerge type of installation:

1. Take care of necessary marking in accordance with project solution ;
2. If necessary, remove the roadbed;
3. Dig a pit of following dimensions: 2600 mm x 4800/3800/2800 mm, depth – 450 mm;
4. Carry out sand preparation 50 mm;
5. Install a formwork;
6. Cover pit's bottom with a geotextile;
7. Fill in pit with a gravel - 200 mm;
8. Install drainage pipes \varnothing 100 mm ϕ
9. Install foundation case;
10. Install a road blocker according to project solution;
11. Weld foundation case's net to loops around entire road blocker's perimeter;
12. Pour the concrete layer – 200 mm

* - Before-installation compound of foundation case and road blocker with further mounting is allowed.



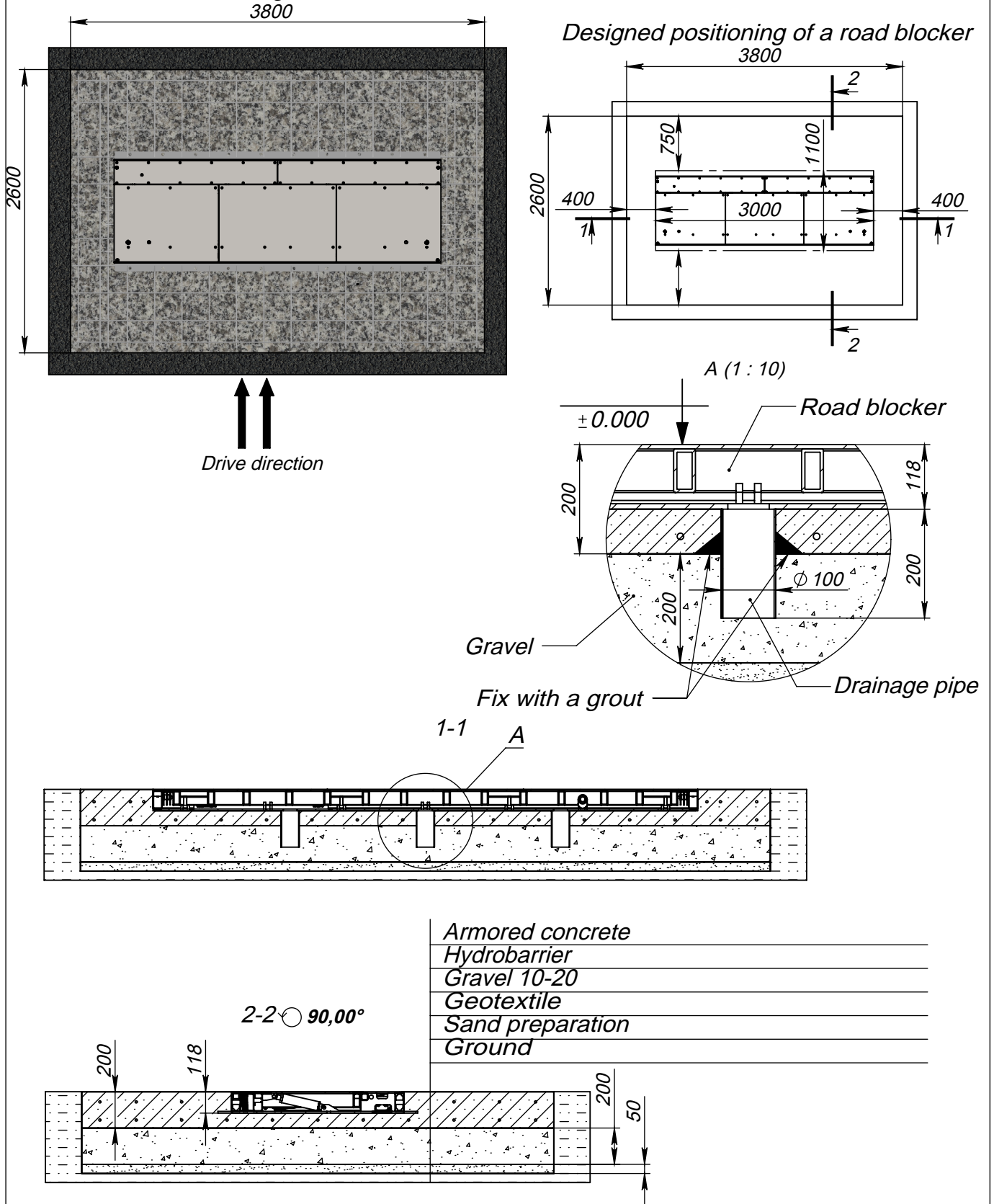
Foundation case can be delivered as additional option along with the road blocker or can be manufactured by the site supervisor according to drawings of the company "TISO PRODUCTION"

ROAD BLOCKING SYSTEMS



Road Bloker AUIA-357-358 (Speed Bump)

6.3.2 Pit for submerge installation of a road blocker



ROAD BLOCKING SYSTEMS

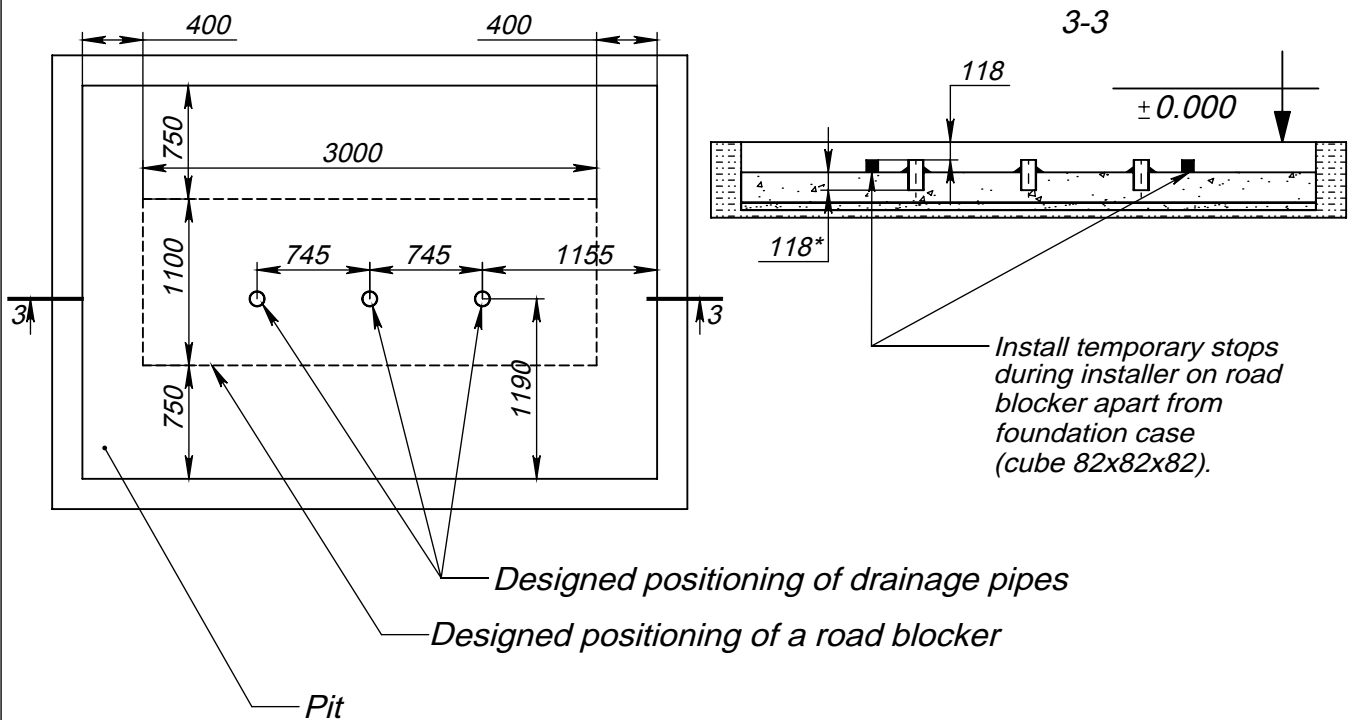


Road Bloker AUJA-357-358 (Speed Bump)

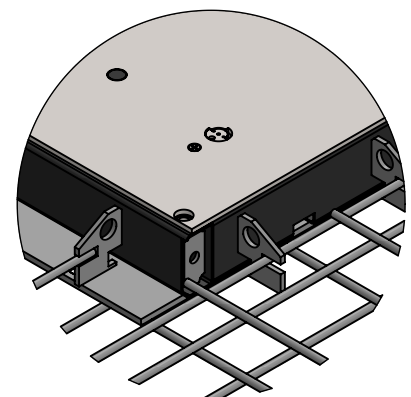
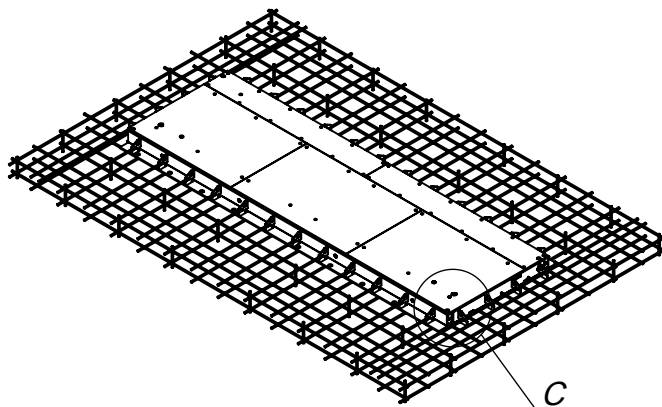
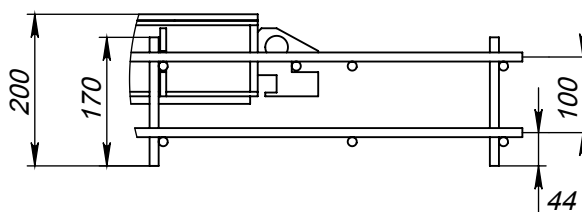
Installation and operation manual.

Version 1.0

08.2016



Road blocker with foundation case:



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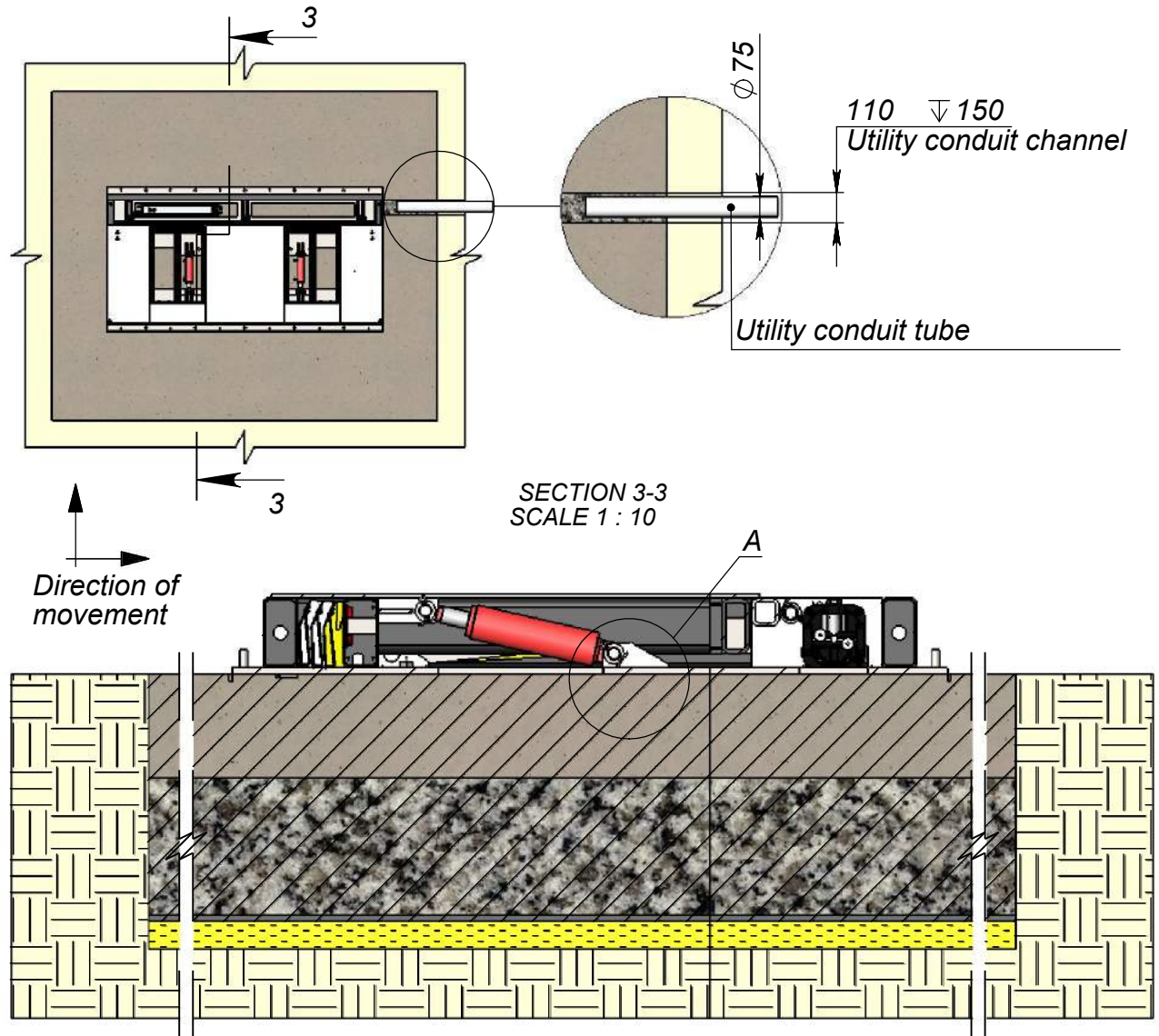
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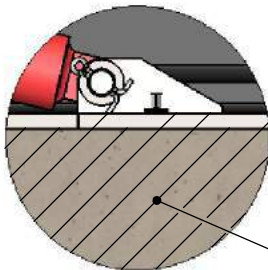
Формат А4

Road Blocker AUIA-K-357/358 (Speed Bump)

The road blocker in the designed position when it is surface mounted:



LOCAL A
SCALE 1 : 5



Expanding masonry anchor M12x120

Sequence of operations:

6. The road blocker chequered plate (lid) to be removed;
7. The road blocker to be fixed in the designed position by means of anchorage;
8. Utility conduit tube to be put into channel.

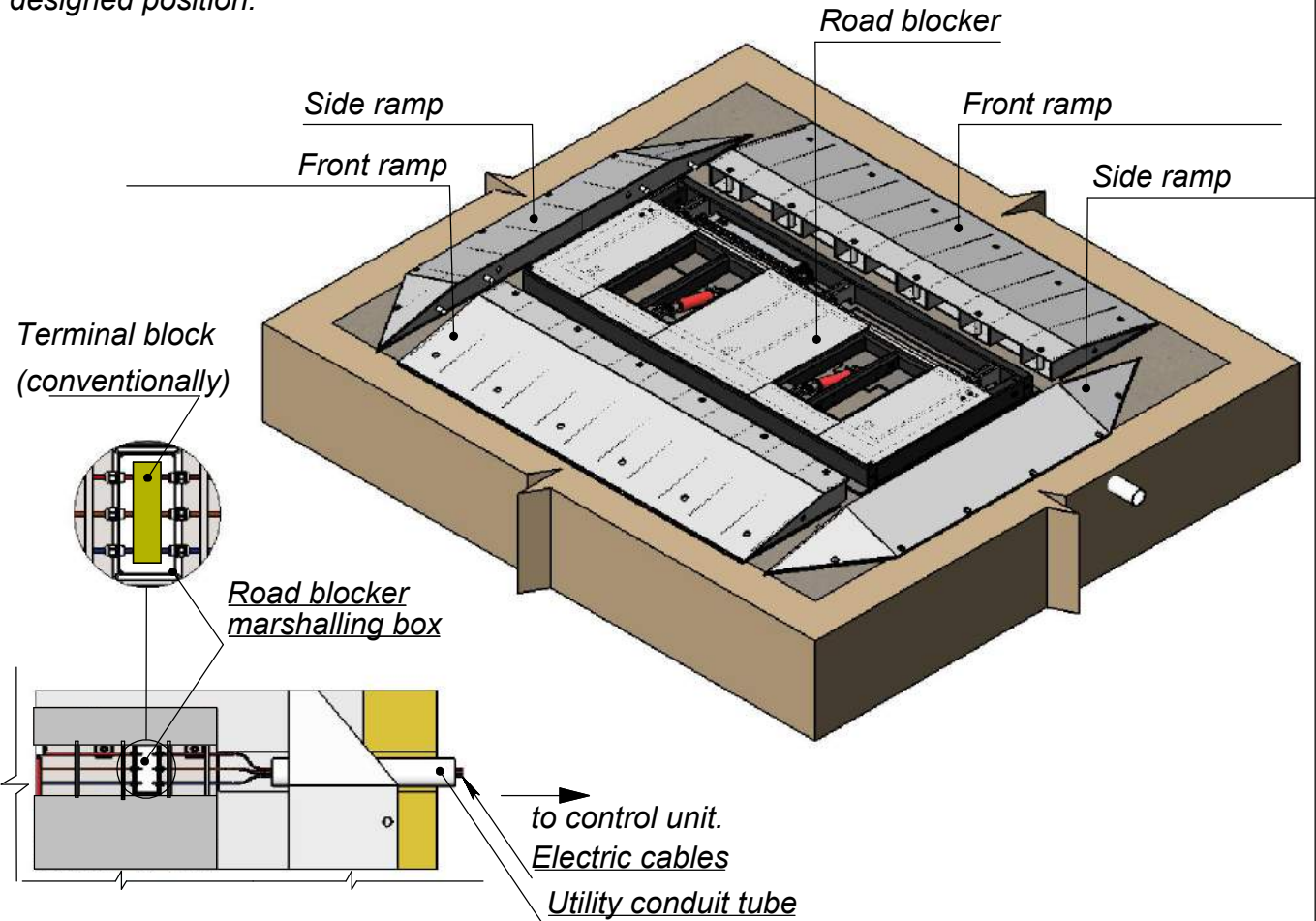


The road blocker horizontal position according to compliance with the design reference marks shall be checked by means of leveling instrument prior to its fixation.
The road blocker submersible installation and fixation is performed similarly.

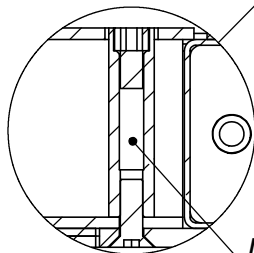
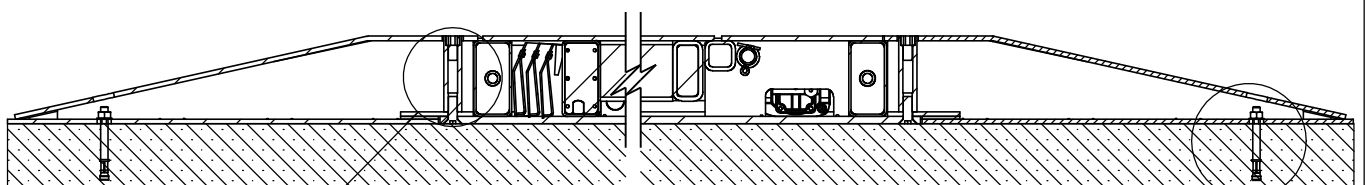
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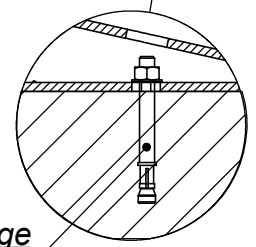
Front and side ramps to be installed and fastened after the road blocker is fixed in the designed position:



Electric cable ends shall be brought in through utility conduit tube into the road blocker marshalling box from the utility conduit side prior to installation of side ramp.



mechanical fixation



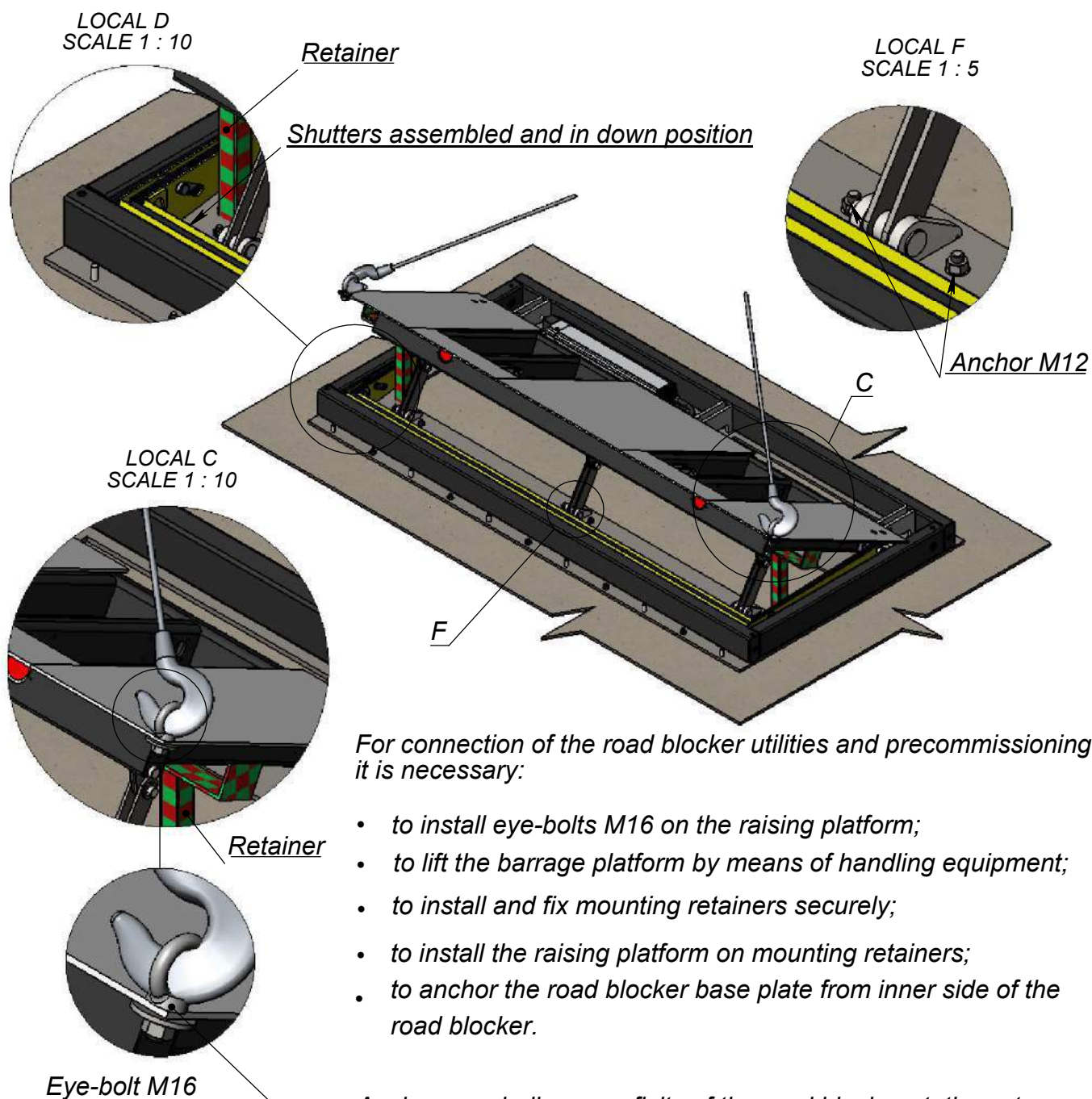
anchorage

Ramps are fixed by means of mechanical fixation specified by fastening and anchorage design to concrete base (foundation) of the road blocker.

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Preparation of Road Blocker Utilities Connection.



For connection of the road blocker utilities and precommissioning it is necessary:

- to install eye-bolts M16 on the raising platform;
- to lift the barrage platform by means of handling equipment;
- to install and fix mounting retainers securely;
- to install the raising platform on mounting retainers;
- to anchor the road blocker base plate from inner side of the road blocker.

Anchorage shall ensure fixity of the road blocker static part.



All operations on connection of the road blocker utilities and preparation of trial operation shall be performed only when retainers are fixed!
Safety Regulations shall be observed during performance of work!
The raising barrage platform weight is 150-160kg.

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8.

Precommissioning:

8.1 Preparation for precommissioning:

- Compliance and reliability of the road blocker, hydraulic unit and control unit electrical cable connections to be checked;
- The roadbed around road blocker to be restored;
- The equipment power network to be checked;
- Reliability of connection with earth loop to be checked.

8.2 Precommissioning:

- Hydraulic unit and control unit to be energized;
- Road blocker trial operation to be conducted;

The following shall be checked while conducting trial operation:

1. Hydraulic unit operation parameters;
2. Control unit and remote control panel operation parameters;
3. Road blocker operation parameters.

- The required equipment performance parameter setting to be set, if appropriate.
- Oil to be refilled after hydraulic unit is actuated and air is removed from hydraulic cylinders;
- If a fault is detected it is necessary to trace the trouble and remedy it, if applicable*.
(* See Table 1).



- Commissioning, equipment adjustment, troubleshooting shall be performed only by the properly qualified professionals!
- Safety regulations should be strictly observed during commissioning and equipment adjustment!

- It is forbidden:

1. to prevent bollard raising/sinking of the road blocker spikes;
2. to touch the road blocker's moving parts during its operation;
3. to initiate movement of vehicles prior to complete sinking of the road blocker's barrage elements.

The area adjacent to road blocker shall be free and clear of foreign items.

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Table 1. Road Blocker Troubleshooting

Symptom	Possible cause	Remedy	Notes
<i>Barrage platform is raising by fits and starts</i>	<ol style="list-style-type: none"> 1. There are foreign particles in guiding grooves. 2. Shaft seizure. 3. Cylinder is jammed. 	<ol style="list-style-type: none"> 1. Guides to be cleaned and shafts to be lubricated. 2. Cylinder condition to be checked and replaced, if appropriate. 	
<i>Incomplete raising and sinking of platform</i>	<i>There are foreign particles in guiding grooves.</i>	<i>Guides to be checked and cleaned. Shafts to be lubricated.</i>	
<i>Actuation of hydraulic unit is far too often</i>	<ol style="list-style-type: none"> 1. Oil leakage. 2. Air inleakage. 	<ol style="list-style-type: none"> 1. Hydraulic connections to be checked. 2. Air to be evacuated from hydraulic system. 	
<i>Operation noise</i>	<ol style="list-style-type: none"> 1. High-viscosity hydrolic fluid. 2. Pump is worn out. 3. Air inleakage. 	<ol style="list-style-type: none"> 1. Oil to be changed. 2. Pump to be replaced. 3. Air to be evacuated from hydraulic system 	
<i>Excessive heating of hydrolic fluid</i>	<ol style="list-style-type: none"> 1. Contamination of hydraulic system. 2. Continuous operation. 	<ol style="list-style-type: none"> 1. Hydraulic system to be cleaned. 2. Operation conditions to be observed according to the datasheet. 	

9.

Road Blocker Operation Regulations

9.1 To ensure the road blocker continuous and reliable operation it is necessary:

- to use the road blocker according to its intended purpose;
- all rules specified in this Manual shall be strictly observed during operation;
- to provide maintenance and repair of equipment in due time;
- to prevent the road blocker operation and maintenance to be performed by unauthorized persons;

9.2 Equipment Maintenance:

9.2.1 The road blocker maintenance includes preventive measures to be taken according to the established frequency to maintain the road blocker in operational condition, decrease component wearing and prevent faults and malfunctions.

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Equipment examination and maintenance shall be performed according to Schedule* and only by properly qualified professionals.

* See Table 2.

9.2.2 Recommended types of the road blocker maintenance (M):

- Daily inspection (each shift);
- M-1 (monthly);
- M-2 (semiannually);
- M-3 (annually);
- Major repair (MR) – after 20000 cycles.

Table 2. Road Blocker maintenance schedule

M type	Frequency	Scope of control/work
Daily inspection	each shift	<p>Normally the daily maintenance is performed before commencement of work and includes visual inspection of the road blocker and, if required, prompt mechanical troubleshooting, elimination of corrosion and surface pollution.</p> <p>The following control shall be conducted during daily maintenance:</p> <ul style="list-style-type: none"> • availability of all units and sensors in their proper locations and their fastening security; • performance of all sensors and cable integrity; • road blocker normal operation without jerks and abnormal noises, jamming of movable constructional elements; • motor heating (over 70°C).
M-1	monthly	<p>M-1 is performed monthly and includes the following measures:</p> <ul style="list-style-type: none"> • measures in the scope of daily inspection; • elimination of dust from the road blocker housing and components; • cleaning of actuators, sensors and drive; • verification of sensors fixation reliability and their performance; • verification of good condition and fastening security of cable connections to actuators, sensors; • check of availability and integrity of protective fences and devices.
M-2	semiannually	<p>M-2 maintenance is performed semiannually including the following types of work:</p> <ul style="list-style-type: none"> • measures in the scope of M-1; • verification of fastening security of units and devices.
M-3	annually	<p>M-3 maintenance is performed annually including the following types of work:</p> <ul style="list-style-type: none"> • measures in the scope of M-2; • check of status of bearings, sealing cups and lubrication; • blowing and cleaning of terminal boxes; • tensioning of screw joints of terminal boxes; • check of reliability and quality of cable connections and earthing; • check of insulation resistance; • repair of paint coatings.

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The hydraulic unit maintenance shall be performed according to the guidelines specified in the hydraulic unit instruction manuals, combining them with M-2 or M-3.

Major repair is recommended to be performed by the manufacturer or dedicated repair service according to the manufacturer's documentation with the use of the manufacturer's spare parts as well as restored or manufactured by special repair facilities according to the manufacturer's documentation.

Mean lifetime between major repair is at least **20000** hours.

- The time of maintenance and major repair can be increased or decreased depending on actual parameters of the road blocker operation and fixed by the company operating this equipment.
- All types of maintenance should be recorded in maintenance and repair work sheet.

9.3 Safety regulations:

The appropriate safety measures shall be observed during operation and maintenance of the road blocker.



9.3.1 IT IS FORBIDDEN TO USE DEFECTIVE APPLIANCES, TOOLS, INSTRUMENTATION THE SERVICE LIFE OF WHICH EXPIRED.

9.3.2 Installation and operation of electrical equipment should be performed at the factory according to the Regulations for Operation of Consumer Electrical Installations, Safety Rules for Operation of Customers' Electrical Installations complied with the Occupational Safety Standards System (GOST 12.3.003, GOST 12.3.019 and GOST 12.3.032).

9.3.3 The road blocker must be repaired by the persons being over 18, having at least level III of electrical safety qualification, relevant permit to work with electrical facilities up to 1000V, be safety briefed at workplace and scrutinized the product instruction manuals.

9.3.4 It shall be the responsibility of the owner to ensure safety measures.

3.3.5 Hazardous characteristics during the road blocker operation are:

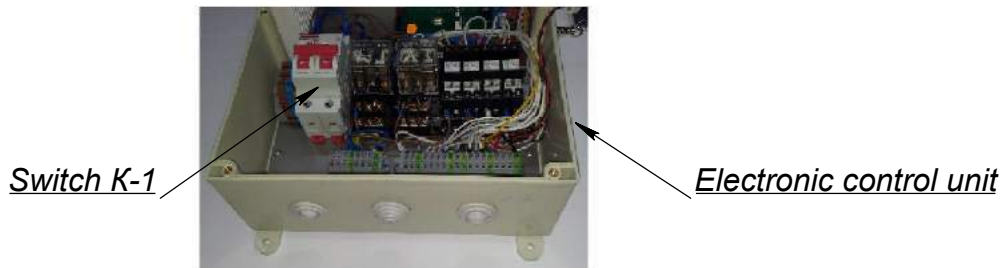
- mechanical impact of raising/sinking dynamic part and
- electric shock by 220V/380V.

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9.3.6 Service and repair shall be performed only when equipment is deenergized, a forbidding safety sign according to GOST 12.4.026 with notation "DO NOT SWITCH ON MEN WORKING!" is put on initiator. After completion of works safety signs should be removed and equipment should be actuated only upon authorization of the work superintendent.

The road block is deenergized by switch K1 (S1) in the control unit box.



9.3.7 The road blocker electrical equipment should be earthed. Resistance between earthing bus and each accessible metal non-current-carrying part of the road blocker electrical equipment housing should not exceed 4 Ohm.

9.3.8 It is forbidden:

- to perform maintenance and repair works when the road blocker electrical equipment is energized.
- to perform maintenance and repair works when equipment is in operation.

9.3.9 The regulations specified in the documents listed below should be observed when using the road blocker:

- "Regulations for Operation of Consumer Electrical Installations";
- "Interbranch rules on labor safety during operation of electricity generating equipment";
- "Electrical Installations Code";
- GOST 12.0.004-90; GOST 12.1.019-85; GOST 12.3.019-80.

9.3.10 General safety requirements accepted in the particular company should be in effect during installation and operation of the road blocker. The safety requirements according to GOST 9.014-78 should be observed during preservation and depreservation.

9.3.11 Fire safety regulations should be observed when paraffin oil for rinsing of units and parts is used.

9.3.12 The safety instructions specified in instruction manuals for purchased products and control system should be additionally governed by.

9.3.13 The road blocker operating in conjunction with other technological equipment should have common locking with it.

ROAD BLOCKING SYSTEMS

Road Blocker AUJA-K-357/358 (Speed Bump)



It is strictly forbidden:

- *to allow the persons being unfamiliar with operation and safety rules to service the road blocker;*
- *to operate the road blocker unearthed;*
- *to touch current carrying elements;*
- *to touch movable parts of the road blocker during operation;*
- *to operate the road blocker when protective devices and switches are removed;*
- *to prevent the road blocker raising and sinking;*
- *to use metalwork of the road blocker for connection of neutral wire of electric welder;*
- *to perform welding works near the road blocker without noncombustible material protection to avoid its burning.*

Important!



- *Prior to operation of the road blocker make sure that all units providing safety of works are in good condition and properly installed;*
- *Take into account that the road blocker could be damaged during transportation;*
- *Don't disconnect the elements providing safety of works and don't try to modify them;*
- *In case of any faults or defects, inform the person in charge of the product service.*

10.

Warranty Liabilities

- *The warranty period is 1 year.*
- *The warranty period is effective from the date of road blocker sale.*
- *The warranty is valid only subject to compliance with operation regulations and safety measures.*
- *The warranty repair shall not be performed in the following cases:*
 - *expiration of the warranty period;*
 - *improper operation;*
 - *the product bears the traces of tampering or attempt of unauthorized repair;*
 - *damage resulted from the use of inappropriate accessories;*
 - *damage caused by environment;*
 - *damage resulted from the use of nonstandard or incompatible equipment;*
 - *damage caused by exceeding of maximum permissible loads.*



In all cases, when the product is not subject to warranty repair, a paid repair may be considered.

Warranty repair shall be performed upon availability:

- *Product datasheet;*
- *Warranty coupon with stamped date of sale.*

ROAD BLOCKING SYSTEMS

Road Blocker AUIA-K-357/358 (Speed Bump)

11. Road Blocker Hydraulic System

11.1 The road blocker hydraulic actuation is provided by hydraulic unit SEA Regular-4

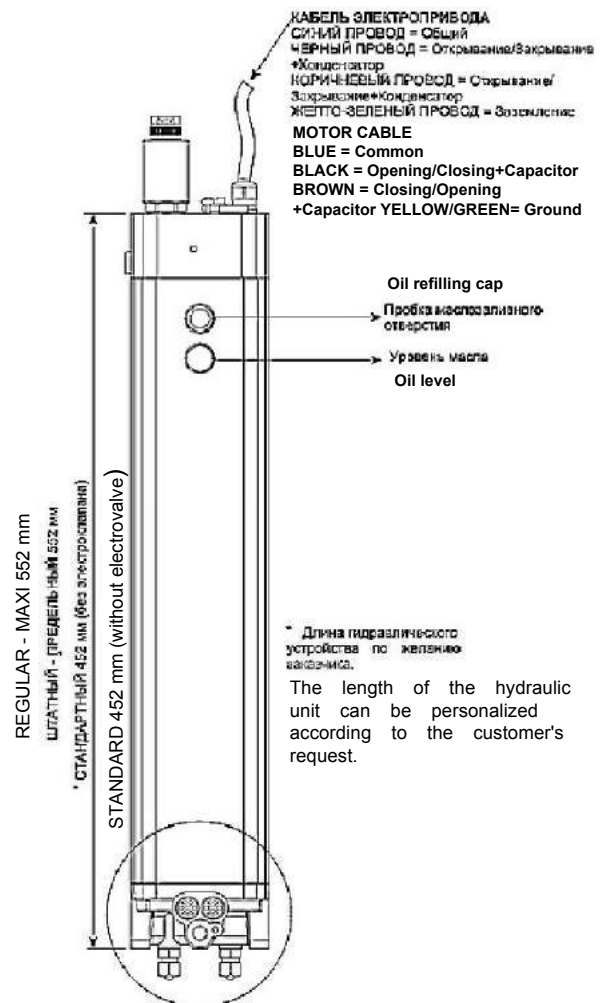
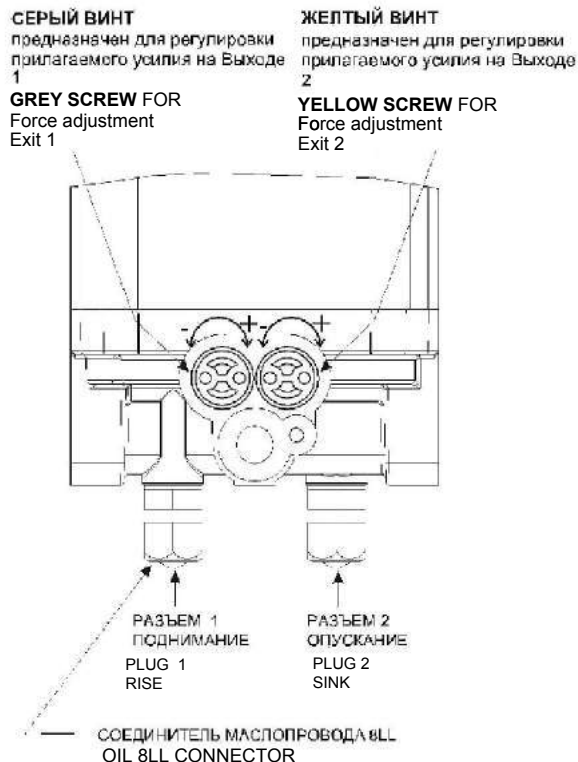
SEA Regular-4 basic technical specifications

Maximum pump capacity	l/min	4
Operating pressure	MPa	3.5
<i>Motor</i>		
<i>Pump</i>		
Shaft speed	rpm	2800
Alternate current	V	220
Solenoid power supply	V	24
Motor capacity	W	550

11.2 Hydraulic unit oil:

Recommended hydraulic fluid: SEA-OX29

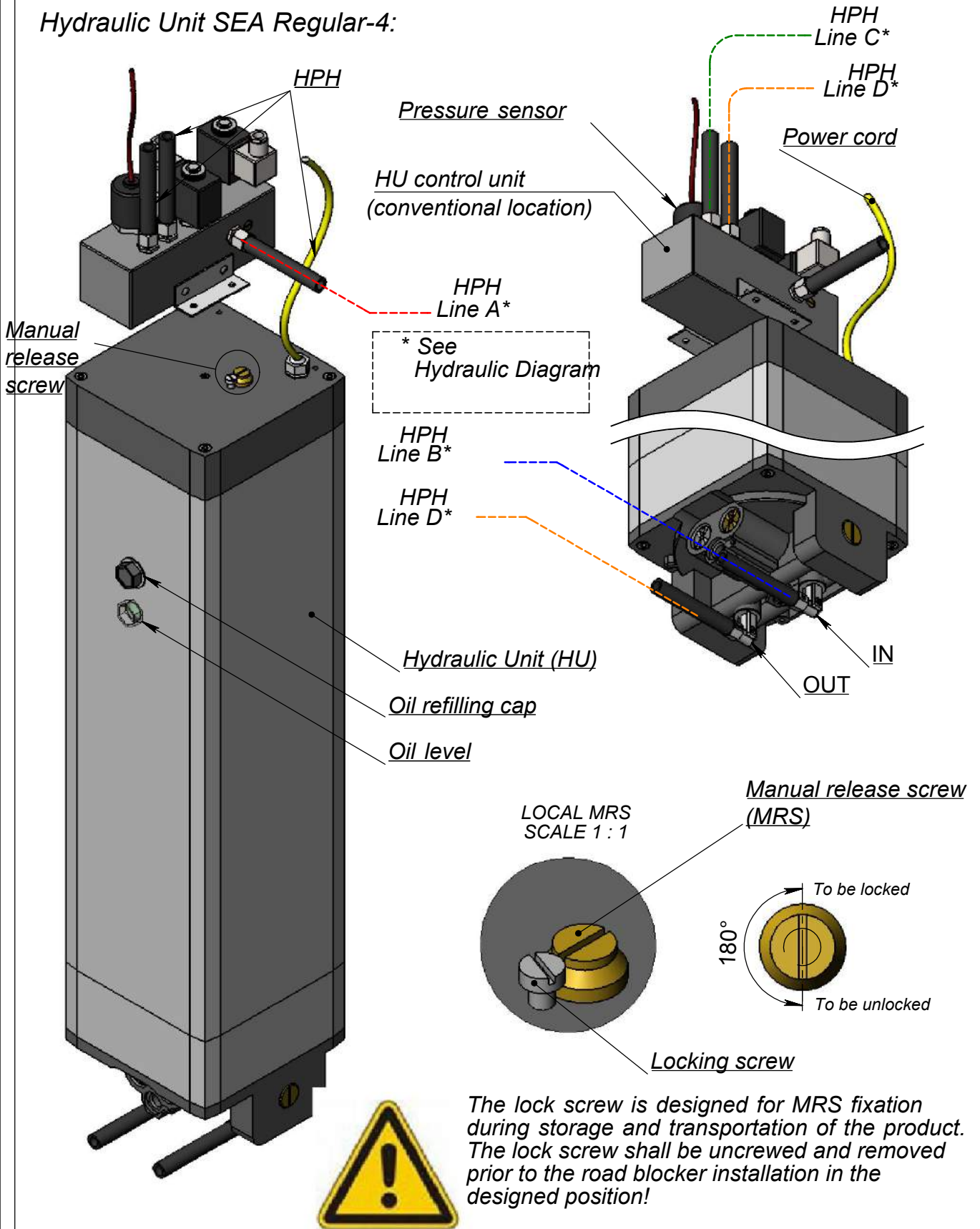
11.3 Hydraulic Unit SEA Regular-4:



ROAD BLOCKING SYSTEMS

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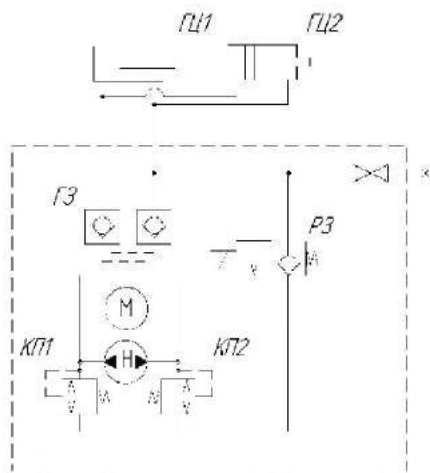
Hydraulic Unit SEA Regular-4:



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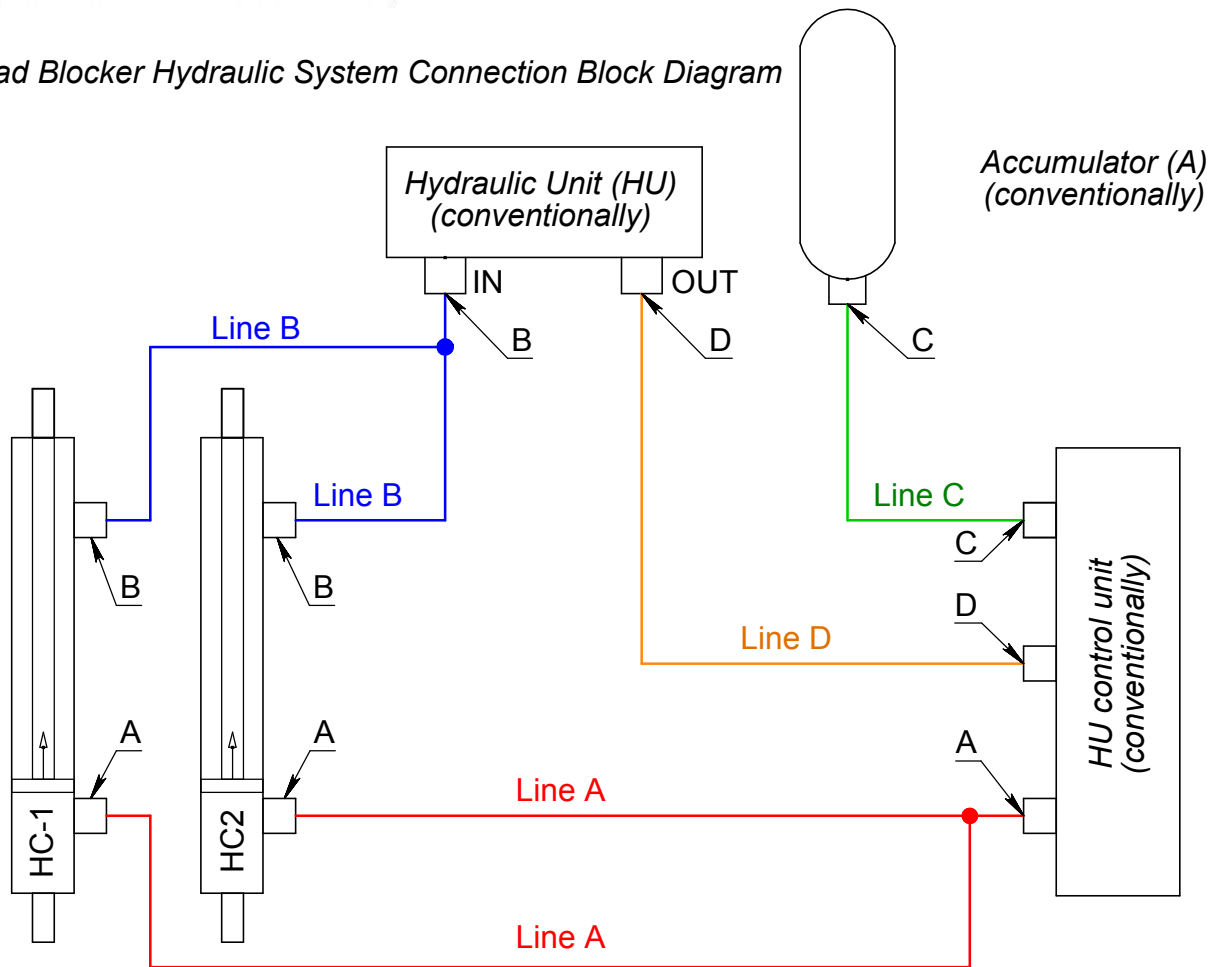
11.4 Hydraulic Diagram:



Legend:

- M - Motor;
- H - Pump;
- КП - Safety valve;
- P3 - Distributor;
- Г3 - Hydraulic lock;
- ГЦ1,2 - Hydraulic cylinders.

Road Blocker Hydraulic System Connection Block Diagram



Marking of connections shall be strictly followed during HPH connection.

ROAD BLOCKING SYSTEMS



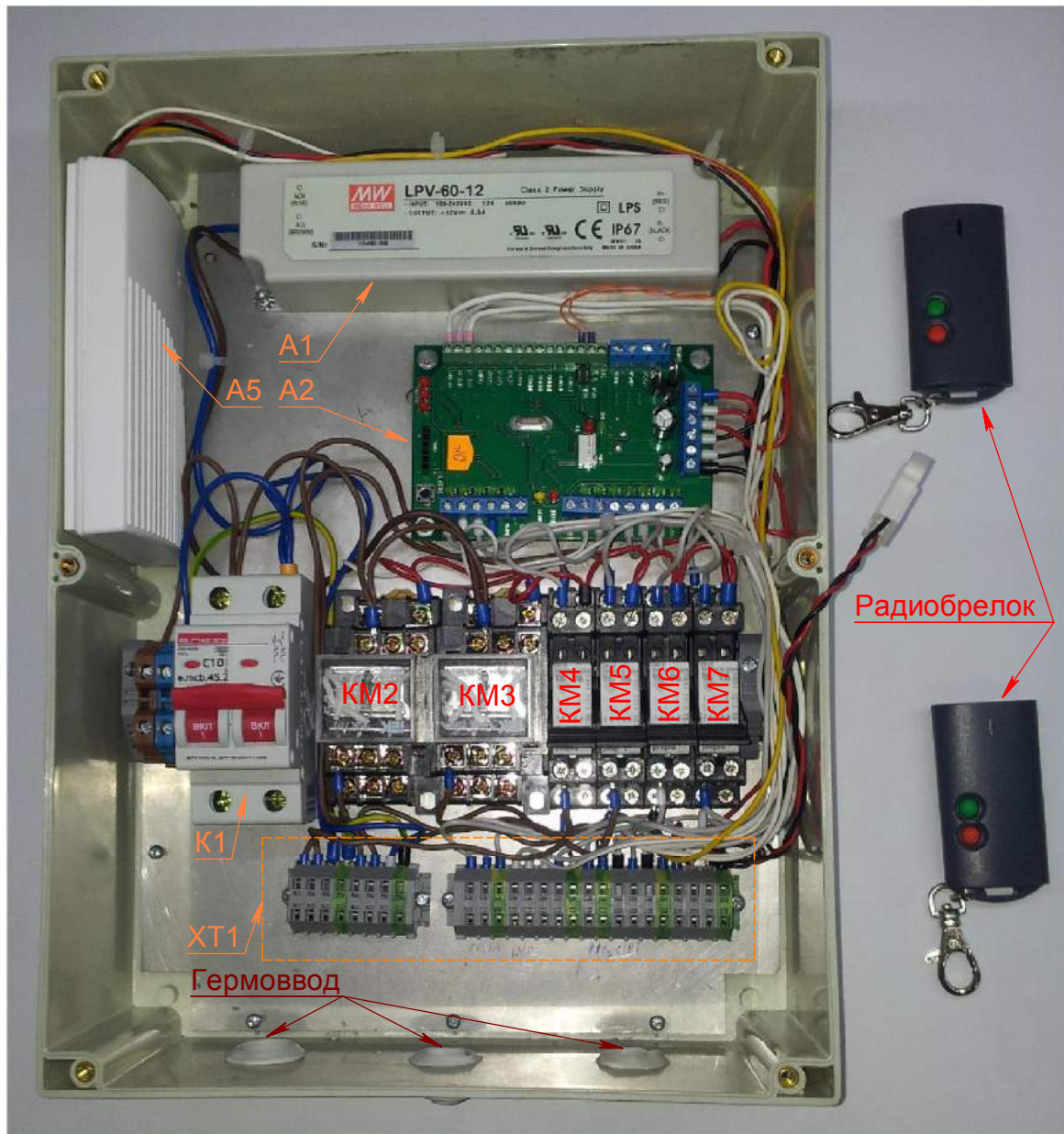
Road Blocker AUIA-K-357/358 (Speed Bump)

12. Road Blocker Wiring Diagram

12.1 Road Blocker Wiring Diagram is shown in Annex 1

12.2 Electronic Control Unit

Fig.1 Electronic Control Unit



Electric control unit is in IP64 water protection index plastic box. The control unit should be placed in installation-, power supply connection- and operation-friendly location, preferably in the protected area.

ROAD BLOCKING SYSTEMS

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Legend:

- XT1.- Main terminal block
- K1. - Safety switch C10
e.mcb.45.2
- KM2 - Relay RM84-2012-35-1012
"Motor-on"
- KM3 - Relay RM84-2012-35-1012
"Motor direction"
- KM4 - Relay RM84-2012-35-1012
"Solenoid"
- KM5 - Relay PEK 77/3 PPM 77/3
"Traffic lights"
- KM6 - Relay PEK 77/3 PPM 77/3
"Display"
- A1.- Power supply unit LPV-60-12
- A2. - Controller PCB 112.21.20.00
- A3. - Controller of EMX induction loops
- A4. - Controller of EMX induction loops
- A5. - Radio controller Satel RX-2K
- XT2. - Road blocker terminal block
- A6. - Heating cable ELSR-N-40-2-A0
- A7. - LED display LED3W (Red)
- A12. - Thermostat MQT8K 5X(bar)C
+5 deg. MATSUO
- A8. - Magnetic contacts Satel S-2
(2 pcs)
- A9. - Remote control unit
PCB 111.22.00.00
- B4. - Protective induction loops
A and B

Fig.2 Electronic control unit with lid



Control unit fastening

ROAD BLOCKING SYSTEMS

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12.2.1 Electronic Control Unit

Controller (A2. Controller PCB 112.21.20.00) controls operation of device, analyzing signals from control panel, remote control panel, potential control inputs, position sensor.

Main terminal block X1 (XT1. Main terminal block) is designed for connection of power supply voltage, motor, solenoid, internal display, traffic light, potential control devices, position sensors, remote control panel, protective induction loops, heating.

Common switch (K1. Common switch C10 e.mcb.45.2) is designed for energizing devices and safety shutdown in case of overload. This switch switches power supply of the entire device on the whole. In order to switch it on it is necessary to deenergize K1.

Motor-on relay (KM2 Relay RM84-2012-35-1012 "Motor-on") is designed for switching power supply of motor M1 (1-phase, 220 V) by controller.

Motor direction selection relay (KM3 Реле RM84-2012-35-1012 "Motor direction") is designed for selection of motor direction, i.e. raising or sinking.

When the road blocker has to raise then **Relay KM2** is ON and **Relay KM3** is OFF. When the blocker has to sink then **Relay KM2** is ON and **Relay KM3** is ON too.

Hydraulic unit solenoid relay (KM4 Relay RM84-2012-35-1012 "Solenoid") (optional) is designed for hydraulic unit solenoid control.

LED display relay (KM6 Relay PEK 77/3 PPM 77/3 "Display") is designed for bollard LED display control. It is blinking when in motion and continuously lit when stopping.

Electronic device power supply unit (A1.Power Supply Unit LPV-60-12) is designed for energization of controller and other low-voltage circuits of the device 12V.

Induction loop controllers (A3. Induction loop controller EMX, A4. Induction loop controller EMX) (optional) are designed for implementation of capability and connection of two protective induction loops. Induction loops prevent raising of road blocker if a vehicle is next to it.

Radio controller (A5. Radio controller Satel RX-2K) (optional) is designed for making possible and remote control of bollard via radio link by means of remote control panels.

ROAD BLOCKING SYSTEMS

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12.2.2. Road Blocker Terminal Box

Fig.3: Road blocker terminal box

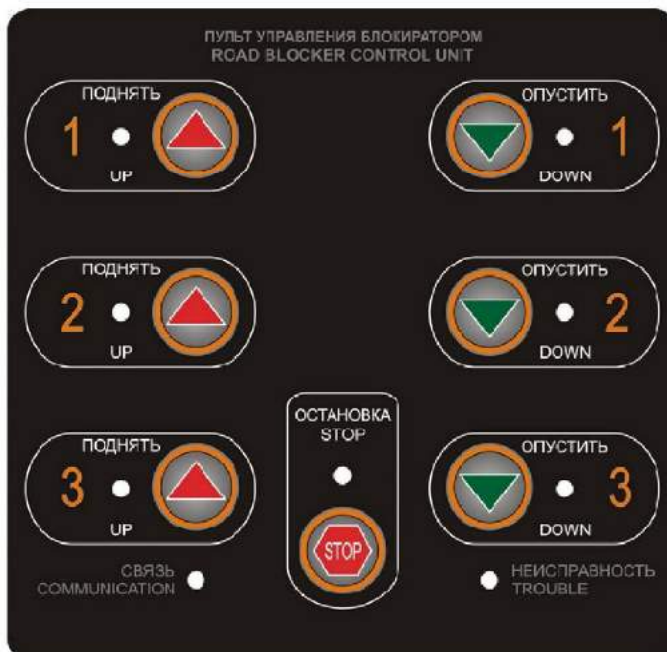


The road blocker inspection box terminal block (XT2. **Road blocker terminal block**) is designed for connection of electric cables to the road blocker.

12.2.3 Remote Control Unit

The wired remote control unit (A9. **Remote Control Unit PCB 111.22.00.00**) (optional) is designed for the road blocker remote control.

Fig.4 A9: Remote control unit PCB 111.22.00.00



The remote control unit PCB 111.22.00.00 can be used for the road blocker control.

In general the remote control unit can control three independent devices.

In this particular case there is only one device and only buttons "1 UP", "1 DOWN", "1 STOP" are used for control.

ROAD BLOCKING SYSTEMS

Road Blocker AUJA-K-357/358 (Speed Bump)

12.2.4 Induction Loops

Induction loops (B4. **Protective Induction Loops A and B**) (optional) are designed to prevent raising of the road blocker barrage elements, if a vehicle is within the loop coverage area.

12.2.5 Power and Heating Cable

The heating cable (**A6. Heating Cable ELSR-N-40-2-A0**) (optional) is designed for the road blocker heating, when it is installed at the sites with negative temperature to prevent freezing of water penetrating into the road blocker housing.

The thermostat (**A12. Thermostat MQT8K 5X(bar)C +5 deg. MATSUO**) (optional) is designed for heating cable temperature control.

12.3 Road blocker connection

The following devices are connected to the main terminal block of the electronic control box: **"1. Heater 220V L"** and **"2. Heater 220V N"** - heating module (optional). If the road blocker is ordered with heating module, then the terminals **"1. 220V L Heater"** and **"2. 220V N Heater"** of the main terminal block XT1 to be connected to **"220V L Heater"** and **"220V N Heater"** of the road blocker terminal block XT2.

The cable PVS 2x0,75 - PVS 2x1 can be used for connection of heating, depending on distance (PVS 2x1) - for long distances.

Terminals 6-9 of the main terminal block XT1 to be connected to terminals **1-4** of the road blocker terminal block XT2 (motor of mini-hydraulic unit).

The cable PVS 4x0,75 - PVS 4x1 can be used for connection of motor, depending on distance (PVS 4x1) - for long distances.

Terminal **«6. Motor "Up" L» XT1** to be connected to terminal **"1. 220V Motor Up L" XT2**.

Terminal **«7. Motor "Down" L» XT1** to be connected to terminal **"2. 220V Motor Down L" XT2**.

Terminal **"8. Motor N" XT1** to be connected to terminal **"3. 220V Motor N" XT2**.

Terminal **"9. Motor PE" XT1** to be connected to terminal **"4. 220V Motor PE" XT2**.

Terminal **"10. Solenoid +12" XT1** to be connected to terminal **"7. +12V Solenoid" XT2**. (optional, if the road blocker is delivered with solenoid).

Terminal **"11. Solenoid GND" XT1** to be connected to terminal **"8. Solenoid GND" XT2** (optional, if the road blocker is delivered with solenoid).

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Traffic light can be connected to terminals **"12. Traffic Light NO (Green)"**, **"13. Traffic Light NC (Red)"**, **"14. Traffic Light COM"**. If the road blocker is in down position fully, then terminals **"12. Traffic Light NO (Green)"**, **"14. Traffic Light COM"** are closed (green lamp of traffic light should be lit), otherwise, if the road blocker is in down position partially or in up position, then terminals **"13. Traffic Light NC (Red)"**, **"14. Traffic Light COM"** are closed (red lamp of traffic light should be lit).

Terminals 15-17 of the main terminal block **XT1** to be connected to terminals **10-12 (Sensor)** of the road blocker terminal block **XT2 (Sensors)**.

Terminal **«15. Sensor "Up"» XT1** to be connected to terminal **"10. Sensor "Up" XT2**.
Terminal **«16. Sensor "Down"» XT1** to be connected to terminal **"11. Sensor "Down" XT2**.

Terminal **"17. Sensor GND" XT1** to be connected to terminal **"12. Sensor GND" XT2**. The conductors number 1,2,3 of the cable **JZ- 500 Halukabel** should be used for connection of sensors.

Terminal **"18. Display +12" XT1** to be connected to terminal **"9. +12V Display" XT2**. The conductor number 4 of the cable **JZ- 500 Halukabel** should be used for connection of sensors.

Dry contacts or open control collectors can be connected to control input terminal **«20. "Up" Control»**, **«21. "Down" Control»**, **«22. "Stop" Control»**, **«23. GND Control»**, **XT1**.

Dry contact or open **"Up"** command control collector can be connected to terminal **«20. "Up" Control» XT1**. If contact **«20. "Up" Control»** is impermanently closed with **«23. GND Control»**, then the road blocker starts raising.

Dry contact or open **"Down"** command control collector can be connected to terminal **«21. "Down" Control» XT1**. If contact **«21. "Down" Control»** is impermanently closed with **«23. GND Control»**, then road blocker starts sinking.

Dry contact or open **"Stop"** command control collector can be connected to terminal **«22. "Stop" Control» XT1**. If contact **«22. "Stop" Control»** is impermanently closed with **«23. GND Control»**, then road blocker will stop.

Input **«22. "Stop" Control» XT1** has the highest priority. If this command comes to **«20. "Up" Control»**, **«21. "Down" Control»**, **«22. "Stop" Control»** simultaneously, then bollard will be stopped.

The wired control unit **"Remote Control Unit PCB 111.22.00.00"** can be connected to terminals **"24. Control Unit 12V"**, **"25. Control Unit RS A"**, **"26. Control Unit RS B"**, **"27. Control Unit GND»**, **XT1** for remote wired control of road blocker by means of seven-button control unit.

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Contact "**1. +12V Control Unit**" (Red) of the remote control unit **PCB 111.22.00.00** can be connected to terminal "**24. Control Unit 12V**" XT1.

Contact "**2. RS485 A Control Unit**" (White) of the remote control unit **PCB 111.22.00.00** can be connected to terminal "**25. Control Unit RS A**" XT1.

Contact "**3. RS485 B Control Unit**" (Blue) of the remote control unit **PCB 111.22.00.00** can be connected to terminal "**26. Control Unit RS B**" XT1.

Contact "**4. GND Control Unit**" (Black) of the remote control unit **PCB 111.22.00.00** can be connected to terminal "**27. Control Unit GND**" XT1.

Protective induction loops can be connected to terminals 28-33 "**Induction loops**", (optionally).

Induction loop itself to be connected to terminals "**28. Induction loop A 1**" and "**29. Induction loop A 2**". Loop connection cable screen to be connected to terminal "**30. Grounding**". Similarly, induction loop itself to be connected to terminals "**31. Induction loop B 1**" and "**32. Induction loop B 2**". Loop connection cable screen to be connected to terminal "**33. Grounding**".

Induction loops shall be installed according to the EMX induction loop controller manual.

Scope of delivery includes three 10 m length cables for connection of motor, heating (optionally) and control signals: PVS 2x0,75 for connection of heating, PVS 4x0,75 for connection of motor, JZ-500 8x0,5 for connection of signals.

ROAD BLOCKING SYSTEMS

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Fig.5: Control unit main terminal block XT1

Fig.6: Road blocker main terminal block XT2

Heater 220V	1	Нагреватель 220V L	1
Heater 220V	2	Нагреватель 220V N	2
Power circuit L	3	Сеть питания L	3
Power circuit N	4	Сеть питания N	4
Power circuit PE	5	Сеть питания PE	5
Motor "Up" L	6	Электромотор "Вверх" L	6
Motor "Down" L	7	Электромотор "Вниз" L	7
Motor N	8	Электромотор N	8
Motor PE	9	Электромотор PE	9
Solenoid +12	10	Электроклапан +12	10
Solenoid GND	11	Электроклапан GND	11
Traffic light NO (Green)	12	Светофор NO (Зеленый)	12
Traffic light NC (Red)	13	Светофор NC (Красный)	13
Traffic light COM	14	Светофор COM	14
"Up" Sensor	15	Датчик "Вверх"	15
"Down" Sensor	16	Датчик "Вниз"	16
GND Sensor	17	Датчик GND	17
Display +12	18	Индикация +12	18
Display GND	19	Индикация GND	19
"Up" control	20	Управление "Вверх"	20
"Down" control	21	Управление "Вниз"	21
"Stop" control	22	Управление "Стоп"	22
GND control	23	Управление GND	23
Control unit 12V	24	Пульт управления 12V	24
Control unit RS A	25	Пульт управления RS A	25
Control unit RS B	26	Пульт управления RS B	26
Control unit GND	27	Пульт управления GND	27
Induction loop A 1	28	Индуктивная петля A 1	28
Induction loop A 2	29	Индуктивная петля A 2	29
Grounding	30	Земля	30
Induction loop B 1	31	Индуктивная петля B 1	31
Induction loop B 2	32	Индуктивная петля B 2	32
	33	Земля	33

220 V Motor Up L	1	220V Мотор Верх L	1
220 V Motor Down L	2	220V Мотор Низ L	2
220 V Motor N	3	220V Мотор N	3
220 V Motor PE	4	Мотор PE	4
220V L Heater	5	220V L Нагреватель	5
220V N Heater	6	220V N Нагреватель	6
Solenoid +12	7	Электроклапан +12В	7
Solenoid GND	8	Электроклапан GND	8
Display +12	9	Индикатор +12V	9
Sensor Up	10	Датчик Верх	10
Sensor Down	11	Датчик Низ	11
Grounding GND	12	Земля GND	12



The road blocker utilities must be connected only by qualified professionals having the appropriate permit!



After connection the sealed lead-in of the road blocker terminal box should be carefully clamped (where XT2 is located) and its top lid should be tightly closed to prevent moisture penetration into the box!

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12.4 Road Blocker Control

The device can be controlled by:

- remote control unit PCB 111.22.00.00;
- remote control pendant.

Fig.7: Remote control unit front panel

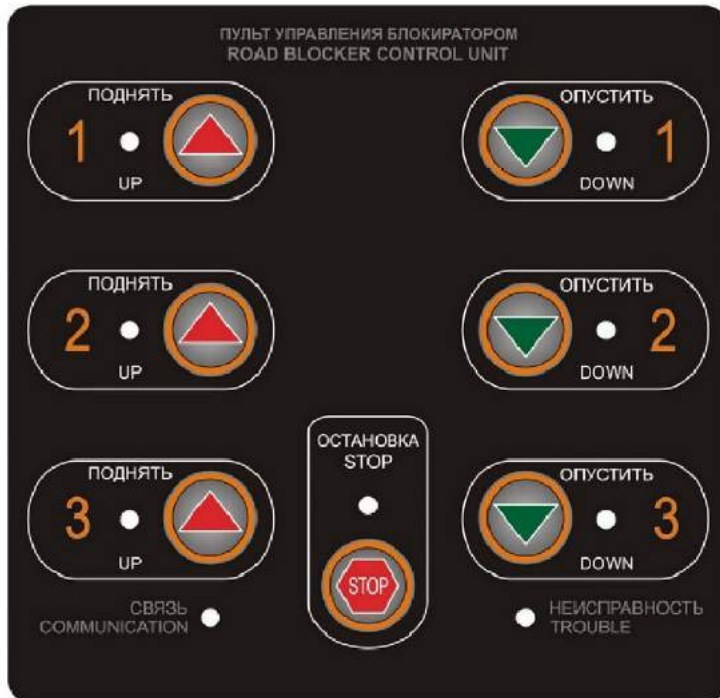


Fig.8: Remote control pendant



12.4.1 Road Blocker control by means of remote control unit (RCU).

The road blocker operates the following commands: raising, sinking, stopping.

Barrage elements (platform) raising

This command can be initiated by pushing "1 UP" button on remote control unit by impermanent connection of potential control inputs 20 «"UP" Control»» and 23 "GND Control" of the main terminal block of the electronic control unit or by pushing raising button on remote control unit (pendant).

When this command is operated, the road blocker platform starts raising until reaching uppermost position of top position sensor (reed switch) or termination of 15 sec. raising timeout or reaching uppermost position (limit stop). When platform is moving up, green LED display "1 UP" will be blinking on remote control unit, and after actuation of uppermost position sensor and platform stopping it will be lit (up position display).

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Barrage elements sinking

This command can be initiated by pushing "1 DOWN" button on remote control unit by impermanent connection of potential control inputs 21 «"Down" Control»» and 23 "GND Control" of the main terminal block of the electronic control unit or by pushing sinking button on remote control unit (pendant).

When this command is operated, the road blocker platform starts sinking until reaching lowermost position of bottom position sensor (reed switch) or termination of 15 sec. raising timeout or reaching lowermost position (limit stop). When platform is moving down, green LED display "1 DOWN" will be blinking on remote control unit, and after actuation of lowermost position sensor and platform stopping it will be lit (down position display).

When barrage elements are in down position, then the traffic light relay contacts **14. "Traffic Light COM"** and **12. "Traffic Light NO (Green)"** are closed and the traffic light relay contacts **14. "Traffic Light COM"** and **13. "Traffic Light NC (Red)"** are open.

If platform is not in down position, then relay contacts are closed vice versa: **14. "Traffic Light COM"** and **12. "Traffic Light NO (Green)"** are open and **14. "Traffic Light COM"** and **13. "Traffic Light NC (Red)"** are closed.

Thus, the phase (L) of traffic light power supply can be connected to the the traffic light relay contacts **14. "Traffic Light COM"**. The traffic light green lamp input can be connected to terminal **12. "Traffic Light NO (Green)"**. The traffic light red lamp input of can be connected to terminal **13. "Traffic Light NC (Red)"**.

Road blocker stopping

This command can be initiated by pushing down "STOP" button on remote control unit or by impermanent connection of potential control inputs 22 «"Stop" Control»» and 23 "GND Control" of the main terminal block. When this command is operated while platform is raising or sinking, the road blocker stops and will be fixed until other commands being operated.

Input 22 «"Stop" Control» has the highest priority. When input 22 «"Stop" Control» and input 23 "GND Control" are connected, the road blocker barrage elements will be stopping even if any other command is generated. This is done for emergency stop when an alarm comes from induction loop or infrared barriers.

The indicator "Communication" displays presence or absence of link with controller. If it is green then communication is normal and if it is red then communication is absent.

The indicator "Trouble" displays presence or absence of control unit troubles. If it is green then control unit is operating normally and if it is red then control unit is operating improperly.



The road blocker is pertained to traffic control equipment. Keep unauthorized persons and untrained personnel away from the road blocker control!

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