

# Q-RB 4000

## HYDRAULIC RISING ROAD BLOCKER



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**SYSTEM SPECIFICATIONS**

**AND**

**Q-RB 4000**

**HYDRAULIC RISING**

**ROAD BLOCKER**

**DATASHEET**

## 1. GENERAL INFORMATION

Q-RB 4000 HYDRAULIC RISING ROAD BLOCKER is designed especially for entrance points which have a threat of vehicle attack or for the ones that have high security requirements. If there is a threat of vehicle attack in addition to the control of vehicle access in high security applications, hydraulic road blockers are the unique solution and the most secure systems. That is the latest point that vehicle control technologies has reached. Even though the attack is from high tonnage vehicles with high speeds, it's not possible for the vehicle to keep on moving because of the damage given to front wheels and the bottom of the vehicle.

Drive unit is hydraulic, but in case of power failure road blocker can be lowered or lifted manually with the help of hand pumps and valves. Typical raise/lower time is 3 seconds. With the help of PLC controlled electronics, raise/lower function can be achieved by every kind of card readers, biometric readers like fingerprint or hand shape, radio control, on/off key switch etc. Besides, safety accessories like photocells, inductive loop detectors, flashing lights or red/green lights can be integrated to the system. Q-RB 4000 HYDRAULIC RISING ROAD BLOCKER weighs about 1.5-2 tons (depending on road blocker type). Manuel hand pump and oil heater/cooler is standard in hydraulic road blocker



Picture 1. General View of Road blocker

- |                           |                                 |
|---------------------------|---------------------------------|
| 1- Hydraulic Road blocker | 3- Security Photocell(optional) |
| 2- Control Cabinet        | 4- Red/Green Lights(optional)   |

### Environmental Conditions and Power Requirement

Between -20 °C and +75 °C, % 95 non-condensing humidity, 380 V 50~60 Hz  
(or 220 V, 50~60 Hz, optional )

### Optional Accessories

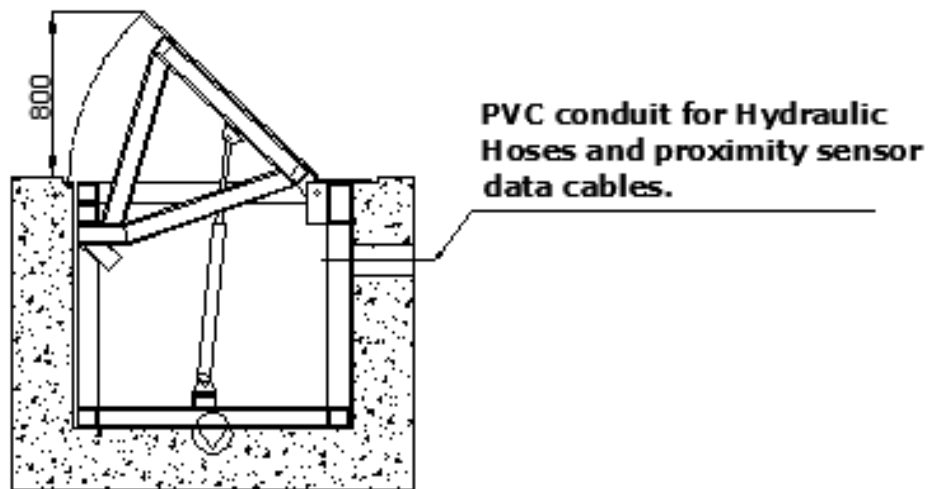
1. Flashing or red/green lights
2. Radio control receiver, transmitter and antenna
3. Safety photocell, stand and casing
4. Inductive loop detector
5. Drainage Pump
6. Card Reader System
7. Uninterrupted Power Supply(UPS) to raise/lower the road blocker few times in case of no electricity.

## **2. SYSTEM COMPONENTS**

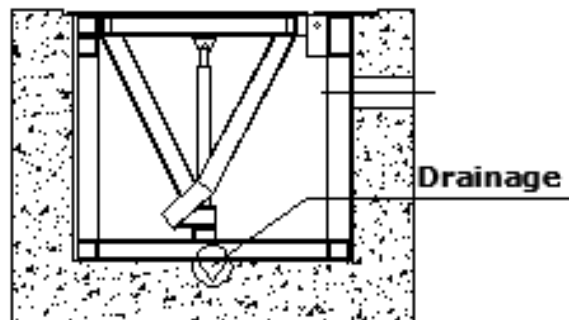
### **2.1 Construction and Foundation**

Main mechanical elements forming the construction are heavy duty, 12 mm anti-skid top plate, blocking construction and the frame consisting of 100 mm I, U and 100x100x4 mm box beams. It's made of steel S235JR / RAEX 250 – quality 37 at least. This sophisticated mechanical design enables the road blocker to withstand 50 tons of axle loads, besides, in case of crash, linkage bars transmit the impact directly to the foundation, therefore help to protect mechanism. Impact resistance of Q-RB 4000 HYDRAULIC RISING ROAD BLOCKER system will withstand 40.000 psi impact load. Meanwhile all the hoses in the system will withstand a minimum of 4.000 psi. A cushioned cylinder powers the road blocker up as it pivots on multi-sealed bearings. The hinges are made of stainless steel. Parts forming the drive unit, namely, piston, piston rod, reservoir, solenoid or manual valves, pump, motor, etc. are very precisely manufactured so that they can stand harsh environmental

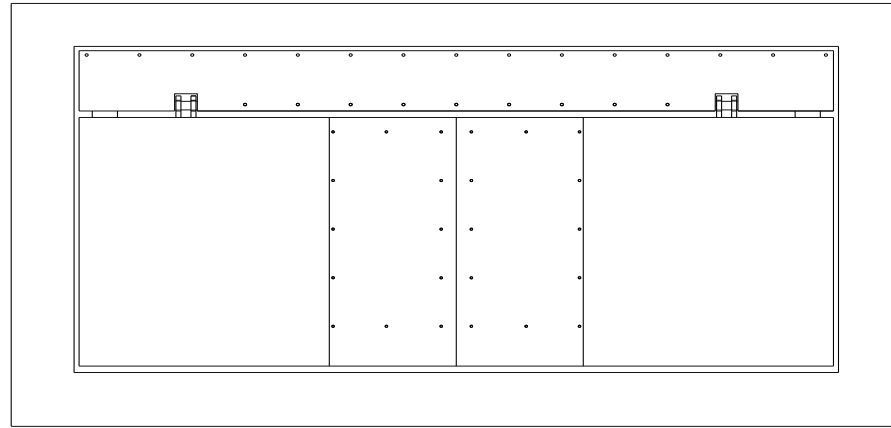
conditions. All the parts are hot dip galvanized (60 micrometers) / Rust-Prevention (Epoxy Coated) painted in order to prevent rusting. Additionally the parts which stand above the ground level are yellow-black painted. The hydraulic rising road blocker will be installed in reinforced concrete foundation by M12 anchors.



**SIDE VIEW RAISED POSITION**



**SIDE VIEW LOWERED POSITION**



**TOP VIEW WITH CONCRETE FOUNDATION LOWERED POSITION**

Figure 1. Road Blocker with its Concrete Foundation

(*Top* → Road Blocker in open position, *Middle* → Road Blocker in closed position, *Bottom* → Top View)

*Height* : 800mm (from the road level to the Top-plate of the Blocker )

*Width* : 1325 mm

*Length* : 4000 mm

*Weight* : 1.5 - 2 tons (depending on road blocker type and accessories etc.)

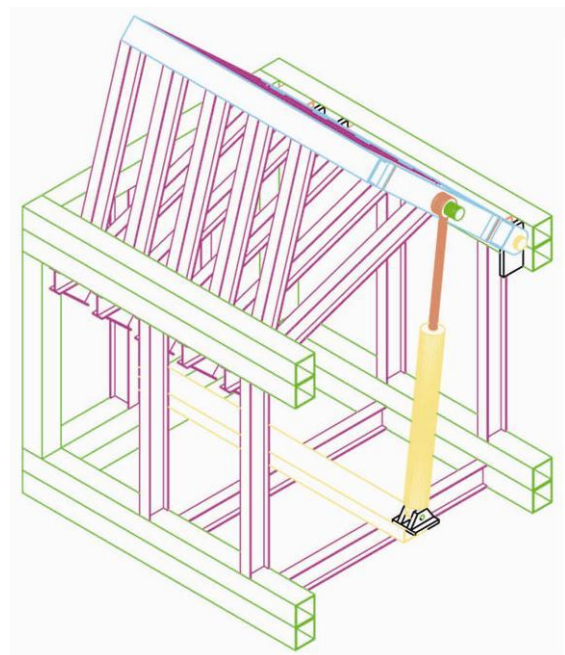
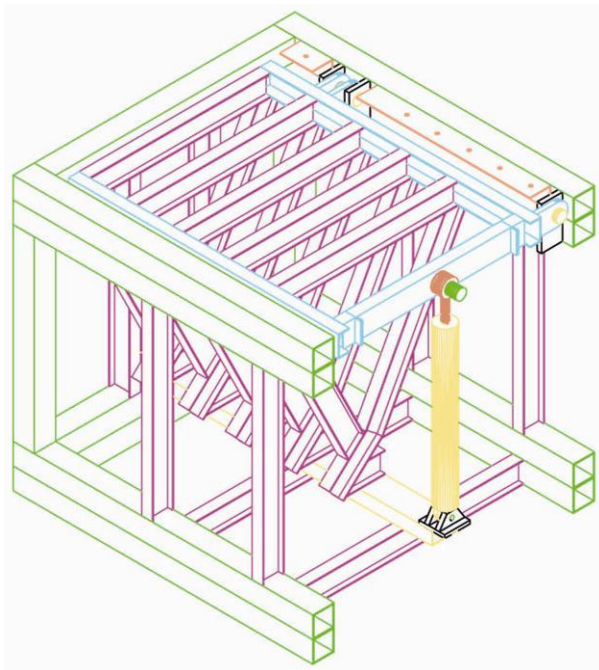


Figure 1 : (a) Sectional 3-D Construction View (Road Blocker lowered)

(b) Sectional 3-D Construction View (Road Blocker raised)

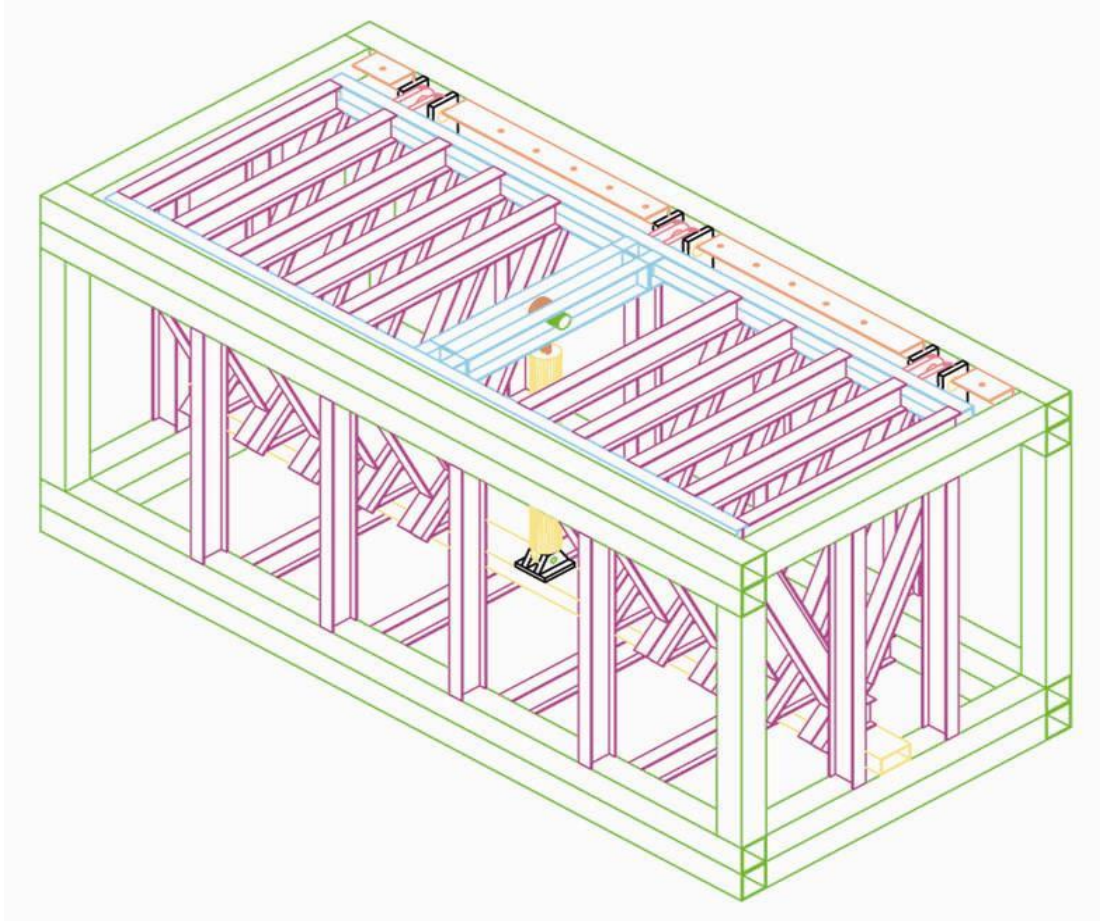


Figure 2 : (c) 3-D Construction View (Road Blocker closed)



(e)

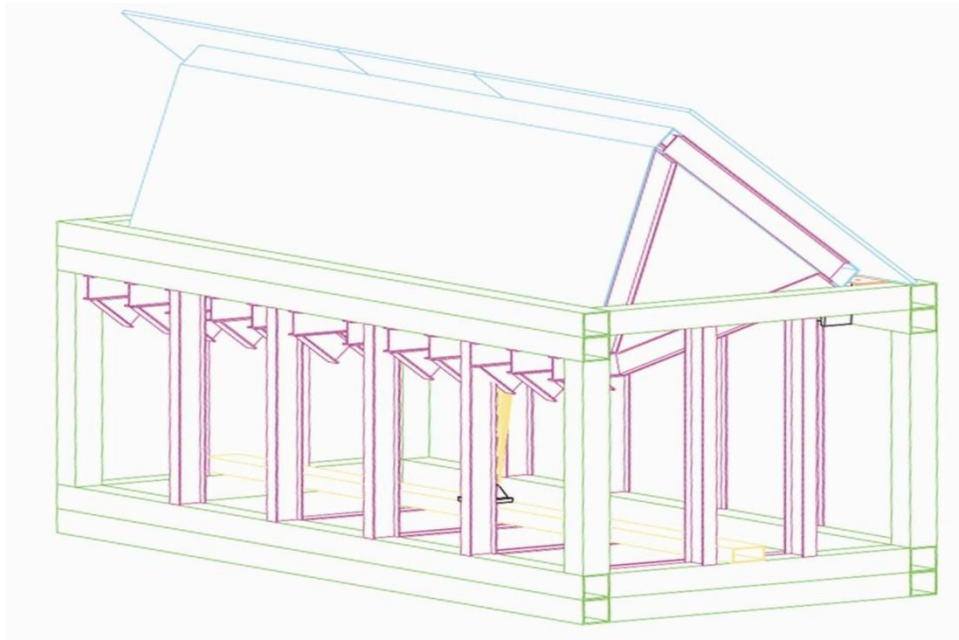


Figure 4 : (e) 3-D Construction - Isometric (Road Blocker raised)

### Sample Concrete Foundation Dimensions

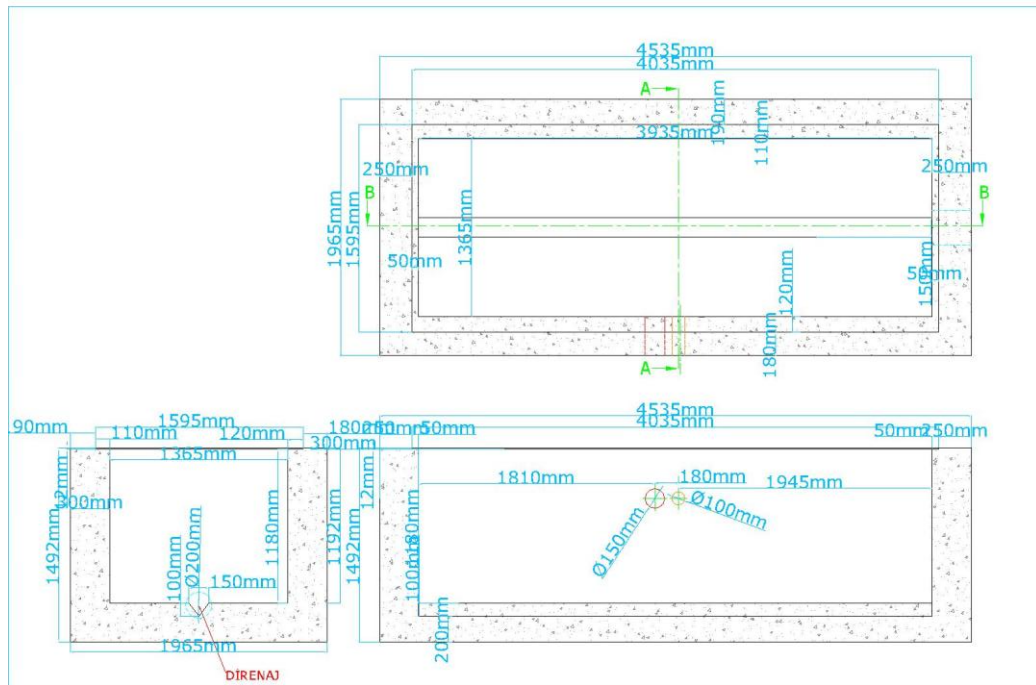


Figure 4. Road Blocker Concrete Foundation View

*Depth* : 1180 mm

*Width* : 1365 mm

*Length* : 3935mm

*Wall thickness* : 300 mm

Customer must request a layout drawing for each project from the manufacturer as dimension may vary in every application.

## 2.2 Control Cabinet

### Material:

- 2 mm thick sheet metal (electrogalvanized, RAL 7035 electrostatically(epoxy) powder coated and furnace) for water-resistant outdoor applications.
- 2.5 mm thick sheet metal (electrogalvanized, RAL 7035 electrostatically(epoxy) powder coated and furnace) for hydraulic and electric group carriages

### Dimensions :

77.5 cm x 106.5 cm x 110 cm (Cabinet may be manufactured in different dimensions according to requirements)

The cabinet is fitted with espagnolet fastening and half europrofile cylinder.



Picture 2. Control Cabinet Views

1- Cabinet Side Cover  
2- Air Circulation Opening  
3- Cabinet Front Cover

4-Gasket  
5-Automation  
6-Hydraulic

## 2.3 Electrical and Electronics Components

Control electronics utilized in hydraulic road blocker is microprocessor PLC controlled. Raise/lower function can be achieved by every kind of card readers, biometric readers like fingerprint or hand shape, radio control, on/off switches or key switches etc. Besides, safety accessories like inductive loop detectors, photocells, flashing lights or red/green lights can be integrated to control electronics very easily. If required, automatic time delay raising of the hydraulic road blocker can be used and adjusted between any time period. Power requirement of the hydraulic road blocker is 380 V 50~60 Hz (or 220 V 50~60 Hz, optional).

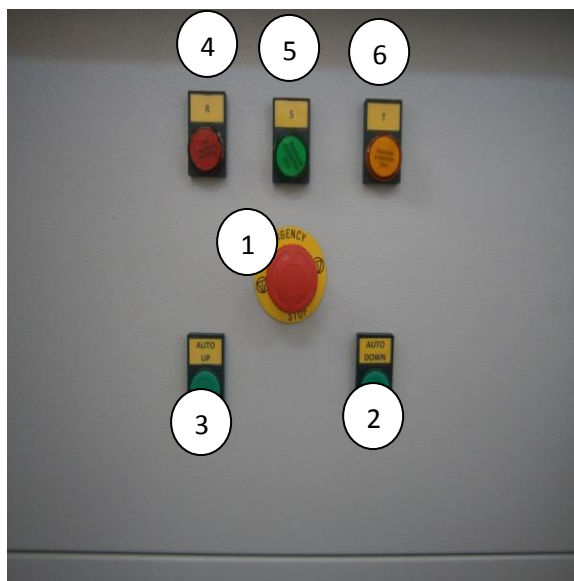


Figure: 7. Cabinet Control Panel

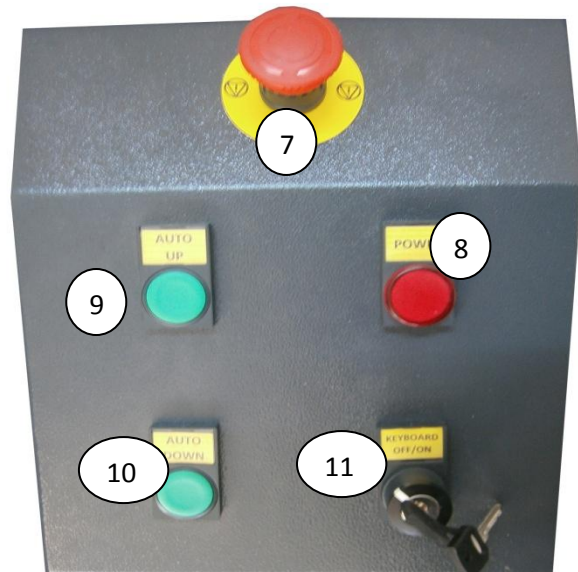
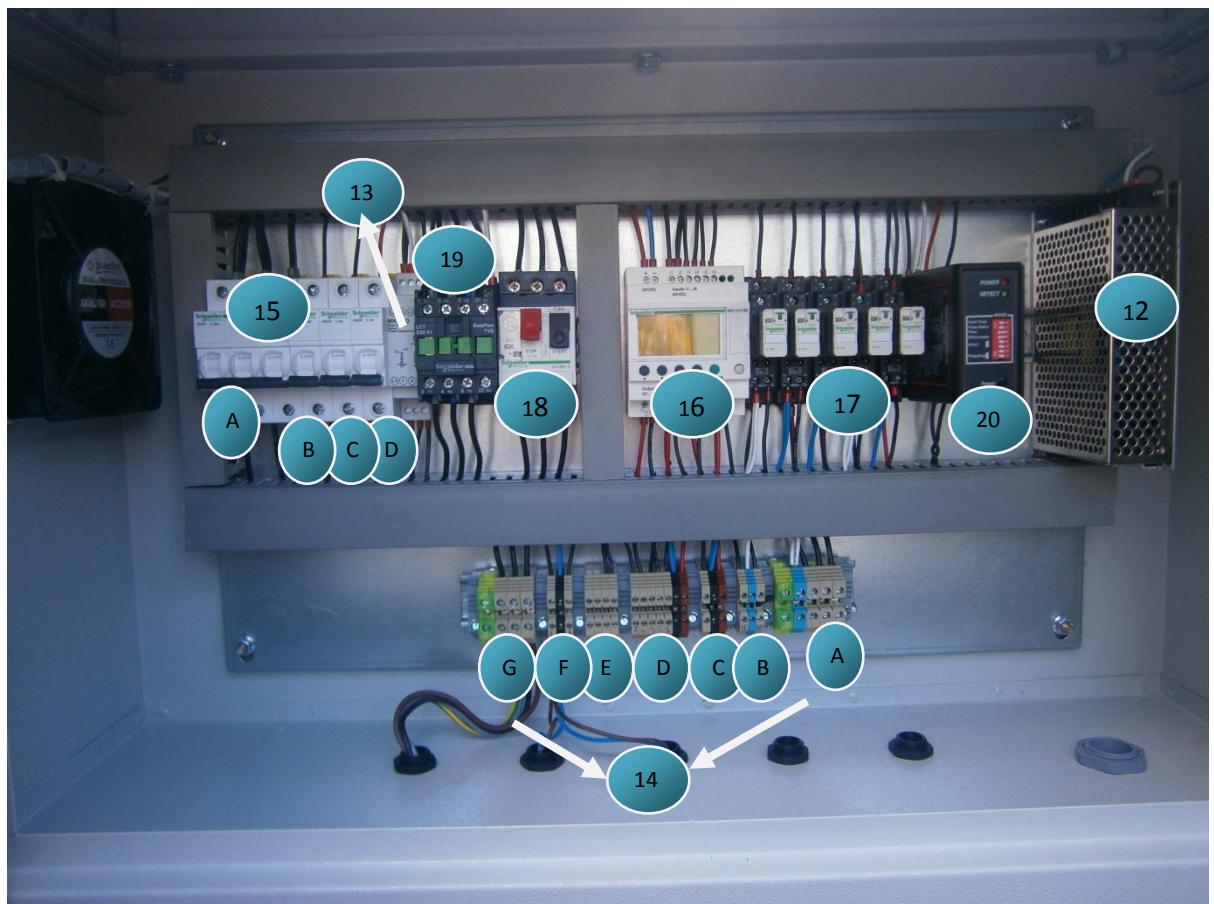


Figure:8. Desktop Control Panel

1→	Emergency Stop	Stops the operation of the road blocker in case of emergency. If pressed, the road blocker is locked and no comment could be given. In order to return to the normal mode of operation, turn the button clockwise until the switch releases itself.
2→	Auto Down	<b>Low</b> ers the road blocker <b>automatically</b> . It is enough to push the button <b>ONCE</b> in order to operate the road blocker from Cabinet Control Panel. No other comment could be given until the process is accomplished.
3→	Auto Up	<b>Rais</b> es the road blocker <b>automatically</b> . It is enough to push the button <b>ONCE</b> in order to operate the road blocker from Cabinet Control Panel. No other comment could be given until the process is accomplished.
4→	Phase R	If it does not light, no voltage.Maintenance is needed.
5→	Phase S	If it does not light, no voltage.Maintenance is needed.
6→	Phase T	If it does not light, no voltage.Maintenance is needed.
7→	Emergency Stop	Stops the operation of the road blocker in case of emergency. If pressed, the road blocker is locked and no comment could be given. In order to return to the normal mode of operation, turn the button clockwise until the switch releases itself.

8→	Enable Lamp	Shows that current Desktop (Override/Guard House) Control Panel is <b>in charge</b> for the operation of the road blocker if this light in <b>ON</b> .
9→	Auto Up	<b>Raises</b> the road blocker <b>automatically</b> . It is enough to push the button <b>ONCE</b> in order to operate the road blocker from Desktop (Override/Guard House) Control Panel. No other comment could be given until the process is accomplished.
10→	Auto Down	<b>Lowers</b> the road blocker <b>automatically</b> . It is enough to push the button <b>ONCE</b> in order to operate the road blocker from Desktop (Override/Guard House) Control Panel. No other comment could be given until the process is accomplished.
11→	Keyboard Disable/Enable	Depending on the priority of the Control Panel, this switch changes the operating Control Panel. The priority is Override Desktop Panel, Guard House Desktop Panel and Cabinet Control Panel from the most prior to the least prior respectively.

A



12→	Power Supply	AC/DC Converter. If the energy is supplied to the system from three phases 220 VAC, this device changes the voltage to 24 VDC in order to supply power to some of the components in the system.
13→	Phase Control Relay	
14→	Terminal	Connects electric (energy) connection of the whole system. A- 380 VAC input B- Traffic Light Output C- Proximity switch input D- Keyboard input. E- Loop dedectör antenna input F- Solenoid valve output G- Motor output
15→	Fuses	A- Main fuse B- For the Power Supply C- Loop dedector and traffic light D- For the Telemechanique Zelio PLC Card.
16→	Telemechanique Zelio PLC Card	24 VDC, Password protected, programmable software operated PLC card user interface. 8 inputs and 4 outputs are used. For the further additions and modifications of the system, 4 inputs and 2 outputs is available.(Total 16 input/10 Output.)
17→	Relay	Relays used for the Telemechanique Zelio PLC Card.
18→	Thermic Magnetic Switch	Motor safety switch. If a problem occurs in the oil pump inside the road blocker, the switch becomes 0 (zero) and cuts the energy of the motor to be available for the maintenance.
19→	Contactator	Drives the Motor
20→	Loop Dedector Control Card	

## 2.4 Hydraulic Units

There are two pumps in the hydraulic system: Electric motor coupled gear pump (17 cc) and manually operated hand pump. The first one is the default used pump in the system. The hand pump is installed in case the gear pump does not work.

The oil level in the hydraulic system could be checked with the help of the "Oil Level Gauge" and oil could be added through "Oil Reservoir Plug".

The Q-RB 4000 HYDRAULIC RISING ROAD BLOCKER is driven by a hydraulic unit based one 17 cc. pump (with 3 kW motor) or more and a tank capacity of 40 liters or more. In standard configuration Hydraulic Road Blocker will have an operating time of 3 seconds. Minimum working pressure of the hydraulic unit is approximately 50 bar, maximum working pressure is approximately 90 bar. Just like all the hydraulic components, the 3/8" hydraulic hoses that link the unit to the cylinder withstand a pressure of 250 bar. Both ends of the hoses carry standard couplings. Control electronics has built in interface possibilities for traffic lights, detection loops and other safety accessories. There is a proximity switch at the hydraulic cylinder to detect upper and lower positions of the hydraulic road blocker in order to check the good functioning of device. Each hydraulic road blocker is operated from a push button console. The distance between the hydraulic road blocker and the cabinet may not to exceed 15 meters. Hydraulic road blockers feature oil heaters / coolers as standard according to the environmental conditions.



- 1→ Direction Control Valve Filter
- 2→ Pressure Relief Valve (Adjust pressure in the system)
- 3→ Electric Motor
- 4→ Oil Reservoir Plug (To fill the tank)
- 5→ Hand Pump
- 6→ Manometer
- 7→ Oil Level /Temperature Gauge
- 8→ Tank
- 9→ Oil drain plug

# ***OPERATION***

and

# ***MAINTENANCE***

### **3. OPERATION INSTRUCTIONS**

#### **3.1 Taking the Road Blocker Into Operation**

1. Open the control cabinet and UNSCREW THE 4 HOLDING RINGS ON THE BLOCKER.





1. Connect the hoses coming from the hydraulic cylinder with the hydraulic system in the cabinet.
2. If there is a *Drainage Pump* in the Road Blocker System, connect the electric power cable to the terminal.
3. If there is a *Red/Green Traffic Light* in the Road Blocker System, connect the electric power cable of the Red/Green Traffic Light to the terminal.
4. If there is a *Loop Detector* in the Road Blocker System, connect the antenna cables of the Loop dedector to the terminal.
5. If there are *Radio control receiver, transmitter and antenna* in the Road Blocker System, connect the electric power cable of it to the terminal.
6. If there are *Safety photocell, stand and casing* in the Road Blocker System, connect the electric power and data cables of Safety Photocell to the terminal.
7. If there is a *Card Reader System* in the Road Blocker System, connect the electric power and data cables of Card Reader System to the terminal.
8. Make sure that fuses on the Cabinet Panel (Figure 9, No: 15 and 16) are ON (upward position). **TURN ON** Uninterrupted Power Supply (UPS), (Figure 9, No:13).
9. Make sure the **emergency stop buttons** on the Cabinet Control Panel, Override Desktop Panel and Guard House Desktop Panel (Figure 7 No: 1; Figure 8 No: 7) are **not pressed**.
10. Initially, there will be **NO** oil in the hydraulic system, therefore **FILL** the oil reservoir with **Shell Thellus 46**. Check oil level from the gauge (Figure 10, No: 12) on the oil reservoir (Figure 10, No: 11).
11. Make sure that Motor safety switch on the Cabinet Panel (Figure 9, No: 19) are ON.
12. Connect the three/mono phase 380/220 VAC cables to the terminal.

**CHECK MOTOR TURNING DIRECTION.THERE IS A SIGN ON THE MOTOR WHICH SHOWS THE RIGHT MOTOR DIRECTION.CHECK IT WITH THE PROPELLER TURNING DIRECTION.THEY MUST BE THE SAME.OTHERWISE RADIATOR WILL NOT OPERATE AND COOL THE SYSTEM.**

13. Make sure that all mono phase check light (Phase R) on the Cabinet Control Panel (Figure 7, No: 4) is ON.

### 3.2 Operation of the Road Blocker

Depending on the position of the Keyboard Enable / Disable Switch (Figure 8 No: 11) on the Override Desktop Panel or Guard House Desktop Panel, either Override Desktop Panel or Guard House Desktop Panel or Cabinet Control Panel could control the Road Blocker. For each Road Blocker, only ONE panel could be in charge, i.e. two panels can not operate the road blocker at the same time.

*Case 1) The Guard House Desktop Control Panel is in Charge:* Turn the switch to 'keyboard enable' position (switch is heading to the RIGHT). The lamp should be activated.

*Case 2) The Cabinet Control Panel is in Charge:* Turn the switch on the Desktop Control Panel to 'Keyboard Disable' position (switch is heading to LEFT). The lamp should be off.

For each case, the operation of the road blocker is as follows:

- Raising of the Road blocker is done automatically. In order to raise it automatically, push "Auto Up" button (Figure 7 No: 3, Figure 8 No: 9) ONCE.
- Lowering of the Road blocker is done automatically. In order to lower it automatically, push "Auto Down" button (Figure 7 No: 2, Figure 8 No: 10) ONCE.
- Unless a successive command is sent, the motor will stop in 5 seconds.
- Depending on the customer desire, "DEAD-MAN BUTTON" could be added to the system. In that case, in order to raise and lower the road blocker, either automatically or manually, Guard House Desktop Control Panel and the dead-man button (if available) MUST be pushed at the same time; otherwise the road blocker could not be operated from the guard house. This function is added to the system in order to prevent the road blocker from being operated by people other than the guard staff in case of an emergency .
- Depending on the customer desire, inductive loop detector(s) could be added to the system. These devices generally work on the "PULSE ON EXIT" principle, i.e. when the vehicle leaves the loop detectors magnetic field, it sends to the PLC controller a pulse in order to inform it about the vehicle's position. According to the design of the control logic, the road blocker could be raised and lowered automatically without the pressing the buttons on the desktop panels.
- Depending on the customer desire, card reader system could be added to the system. According to the design of the control logic, the road blocker could be raised and lowered automatically without pressing the buttons on the desktop panels with the help of the pulse sent by the card reader system.

## **4. MAINTENANCE**

### **Oil Check**

- Oil Used: Shell Thellus 46 or equivalent.
- First oil change to be made after 500 working hours, next changes to be made after every 5000 working hours.

### **Filters Check**

- Filters to be changed at every oil change.

### **Oil Leakage Check**

- System to be eye-controlled for oil leakage once in every 3 months.
- Piston to be eye-controlled if there is any leakage once a year.

### **Pressure Check**

- Manometer pressure values must be checked at every leakage control to see if there is any deviation from the values stated by the manufacturer.

### **Maintenance Staff**

- All system controls to be made by qualified technical staff only.
- Only original equipment manufactured or recommended by the manufacturer to be used at repair and/or maintenance procedures.

### **Greasing the Hinges**

- Depending on the frequency of usage of the hydraulic roadblockers, grease must be pumped to the hinges through the grease inlets on the hinge covers, by a grease hand pump, once in every 6 months to 12months.
- High quality, non-hardening (in time), non-melting (at high temperatures) grease must be used.

## 5. PRACTICAL TROUBLESHOOTING PROCEDURES

- If there is no movement observed after pressing auto raise/lower buttons;
  - Make sure the **emergency stop buttons** on the Cabinet Control Panel, Override Desktop Panel and Guard House Desktop Panel (Figure 7 No: 1; Figure 8 No: 7) are **not pressed**.
  - Make sure that fuses on the Cabinet Panel (Figure 9, No: 15 and 16) are ON (upward position).
  - Make sure that Motor safety switch on the Cabinet Panel (Figure 9, No: 19) are ON.
  - Make sure that mono phase check light (Phase R) on the Cabinet Control Panel (Figure 7, No: 4) is ON.
  
- If there are unexpected behaviors in system, quickly stop the system by pressing one of the **emergency stop buttons** on the Cabinet Control Panel, Override Desktop Panel and Guard House Desktop Panel (Figure 7 No: 1; Figure 8 No: 7).
  
- In case of power failure, road blocker could ONLY be controlled by the cabinet control panel as the UPS in the cabinet supplies the needed power for the solenoid. As the system is designed to be active for 4 second periods, it is definitely recommended to use the 'Manual valves for both directions' ( Fig 10, No: 2 ). While pressing one of the buttons at the sides of the Direction Control Valve ( Fig 10, either No: 2 ), pump the manual hand-pump ( Figure 10, No:9 ) up and down.

## 6. HOW TO PUMP MANUALLY?



Figure7a



Figure7b

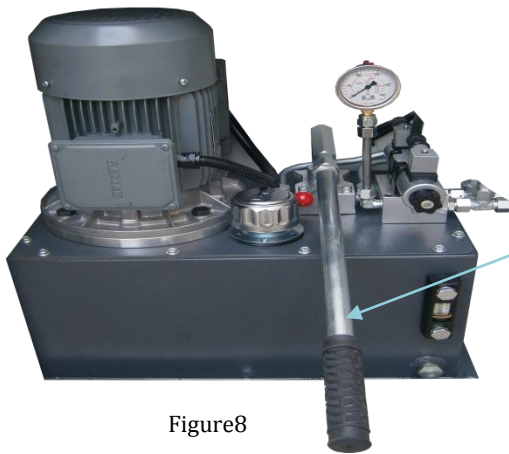


Figure8

Insert the handle of hand pump



Figure 9

To download a road block to the left (figure9)and pull the lever below the hand pump hand pump handle up and down with the help of moving road block download.



Figure10

To remove a road block to the right(Figure10) and pull the lever below the hand pump hand pump lever by moving up and down with the help remove the road block

**NOTE: Manual operation is completed after the hand pump's electrical system under the red lever to the middle position you do to work.(Figure8)**