The following instructions assume a good working knowledge of the windows operating system. If you are networking this unit, it is assumed that you have a good working knowledge of network systems. If either of these assumptions are incorrect it advised that you consult an expert before attempting to install and commission the Reg-Sentry unit.
## Bosch Number Plate Recognition Access Control System (REG-SENTRY)
### Installation Instructions

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Description

The Reg-Sentry is a self contained access controller that uses automatic number plate recognition (ANPR). It requires a single video input (we recommend only using an ANPR camera) and provides a switched relay output (NO/COM/NC) that can be utilised for access control. The switched output operates in conjunction with a user defineable black/white list that is downloadable to the Reg-Sentry via a TCP/IP connection.

Installation

The REG-SENTRY will accept an input supply of 12V-24V AC or DC and is supplied with 4m of power cable already fitted. The input current at 24Vdc is typical 0.15A (3.6W). The recommended rating of a 12Vdc power supply is 0.34A minimum (4.1W).

The operating temperature range for the unit is -40°C to +50°C.

Camera Installation

Please refer to the installation manual for the ANPR camera unit

Camera Positioning

The camera should be mounted in such a way that in the resulting image of a single line license plate a horizontal line can be drawn which crosses both the left edge and the right edge of the license plate.

![Figure 1 Camera view angles ok](image1.png)

![Figure 2 Camera view angles too big](image2.png)

Mount the camera in such way that an ideal image of the license plate is captured when the license plate is in the centre of in the recorded image. The camera should be focussed on the spot where the incoming vehicle is likely to stop. It is advantageous to mark this area with a stop sign e.t.c. so that you can ensure a good image of the vehicles licence plate.

NB The capture software requires that the license plate should take up from 25 to 33% of the image horizontally. The licence plate should be situated at the specified operating distance of the attached ANPR camera, please refer to the manufacturer’s installation manual.
The maximum vertical view angle of an ANPR camera is 30 degrees.

The maximum horizontal view angle of an ANPR camera is 25 degrees.
In most systems the horizontal angle and vertical angles are somewhere between 15 and 20 degrees.
Avoid possible blocking objects in the view path of the camera such as (moveable) bars.

**Reg-Sentry Installation**

**Wall Mounting**

The REG-SENTRY is supplied in a polycarbonate box, with 4.5mm fixing holes in the base, these can be accessed by removing the lid of the unit. The mounting holes are located directly below the lid screw mounting holes. The mounting holes are 113.5mm apart along the width of the base and 163.5mm apart along the length of the base. See fig 1.

![Figure 3: Mounting Hole Positions](image)
**Cable Connection**

![Diagram of Reg-Sentry with cable connections](image)

**Figure 4: Stand Alone Configuration**

There are five cable glands present on the Reg-Sentry (see fig 4). These glands will accommodate cables with an external diameter of 3mm to 6.5mm.

**Video Cable**

At the top of the box is the video cable entry point. A good quality 75Ω video cable should be used between the camera and the Reg-Sentry.

1) Feed the cable into the top of the sentry unit through the cable gland.
2) Strip back the video cable sheath by no more than 10mm (see fig 4).
3) Peel the braid away from the central insulation and twist into a single conductor.
4) Strip back the central Insulation to expose no more than 5mm of conductor (see fig 4).
5) Insert the braid into the screw terminal labelled “GND” that is associated with the “Y” terminal. The central conductor should be inserted into the screw terminal labelled “Y”. **NB Ensure that the camera is disconnected from its power supply during this operation, and that the video cable screen (braid) is connected before the central conductor.**
6) Lock the cable in position using the screw terminals.
7) Tighten the outer nut of the cable gland until a firm seal has been made to the cable.

**Relay Cable**
A 3 core cable will be required to access the relay outputs (for installation to the barrier), normally closed (NC), Common (COM) and normally open (NO).
1) Feed the cable into the cable gland at the bottom of the Reg-Sentry (see fig 4).
2) Strip the cable sheath to expose no more than 20mm of the 3 internal cables.
3) Strip the internal cables to expose no more than 5mm of conductor.
4) Insert the cables into the NC/COM/NO screw terminals and lock down.
5) Tighten the outer nut of the cable gland until a firm seal has been made to the cable.

The relay outputs will need to be connected to the control mechanism of the barrier / Gate to be controlled. You will need to refer to the manufacturer’s installation manual. The relay is rated at 30W with a maximum operating voltage of 125 VAC and 110VDC.

**Power Cable**
A 4mm power cable is already provided. This will accept both AC and DC inputs from 12 to 24 volts. The input current at 24Vdc is typical 0.15A (3.6W). The recommended rating of a 12Vdc power supply is 0.34A minimum (4.1W).

**Network Connection**
A network connection is required to commission the Reg-Sentry. This can either be from a standalone PC/Laptop (i.e. an adhoc connection) or a networked system. A standard network cable (Cat 5e) will be adequate for either situation.

A cable gland has been provided should you wish to hardwire the unit to your network, however you will need to crimp an RJ45 connector internally to the Reg-Sentry to do this as the RJ45 connector will not pass through the cable gland.
Commissioning

To commission the Reg-Sentry you will need to connect the unit to a PC using the network connector on the p.c.b. Use a standard network cable (Cat 5e) to make this connection.

The following instructions assume a good working knowledge of the Windows operating system. If you are networking this unit, it is assumed that you have a good working knowledge of network systems. If either of these assumptions are incorrect, it advised that you consult an expert before attempting to commission the Reg-Sentry unit.

The Reg-Sentry uses a TCP/IP interface which is DHCP enabled. If a DHCP server is not detected the Reg-Sentry unit will default to a static IP address of 192.168.0.204.

The Reg-Sentry uses port 50000 for its communications, if you are using a firewall you will need to configure the firewall to allow access to port 50000 and to the SentryViewer program.

1) Install the Sentry Viewer onto your PC/Laptop by copying the “Reg-Sentry Viewer” folder onto your computer (i.e. C:). The “Reg-Sentry Viewer” folder can be found on the CD provided with the Reg-Sentry. Alternatively you can use the installer package provided on the Reg-Sentry CD.

2) Apply power to the Reg-Sentry. The “DSP_F” LED will start flashing, wait until this LED stops flashing and is continually lit (the LED is orange in colour). N.B. no processing will occur until this LED has stopped flashing.

3) Launch the Sentry Viewer using the executable file “SentryViewer.exe”.

4) Enter the Reg-Sentry MAC address into the drop down box at the top left of the sentry viewer labelled “Sentry ID:”. The MAC address can be located on the serial label of the reg-sentry.

5) Left click on the connect button at the top left of the viewer, the sentry viewer will now try to locate the reg-sentry this may take a minute or so.

6) If the Sentry viewer does not recognise the MAC address then the IP address assigned to the device can be entered into Sentry ID box. The default IP address when not using a DHCP server is 192.168.0.204. If you are connecting to a DHCP server then you will need to contact your network administrator to obtain the IP address of your device. If you have problems connecting to the Reg-Sentry then refer to the Network settings section of this manual.
7) Once connected, the password box will now appear in front of the viewer. Initially, the password is unset. Clicking on the ok button without entering any text into the box will give you full access to the sentry viewer.

![Figure 6: Password Box](image)

8) The Sentry Viewer has a live video stream facility. This live video stream will however slow down the function of the Reg-Sentry significantly and is only provided as an aid to commissioning the unit i.e. for setting up your camera placement to achieve an optimum viewing angle. The live video stream is activated by clicking on the “Start” button. The blue LED labelled “DSP 2” indicates when the live video stream is active. The “Stop” button will deactivate the live video stream. The “Capture” button enables a single frame from the camera to be captured, this can then be stored by clicking on the “Save” button. The resulting JPEG file is stored in a file location that can be set in the settings menu.

![Figure 7: Live Stream Function](image)

Once you have commissioned your Reg-Sentry unit please capture an image and send it to the following email address, RegSentry_TechSupport@uk.bosch.com
We will inspect your image to ensure the optimum placement has been achieved.
9) The Settings menu has several functions and is activated by clicking on the “Settings” button (see fig 9).

The name of the sentry unit can be set by entering an appropriate name into the camera name text box.

The onboard date can be set using the dropdown calendar.

The onboard time can be set using the “time” text box and the up/down arrows.

Security level, this can be set for high, medium and low. The high setting only allows for exact matches to the black/white list. The medium setting will allow for a 1 character difference and the low setting will allow a 2 character difference from the black/white list.

A variable time period for the relay switch can be set using the “Close Relay Duration” text box.

Black/White List Type, a white list will close the relay switch for any number plate on the black/white list. A black list will close the relay switch for any number plate not on the black/white list. The Reg-Sentry can only be operated as either a black list or a white list.

While the Sentry Viewer is active it will copy the transaction list (text only) into a text file. The location of this text file can be specified using the “storage directory” text box. NB Any captured camera frames that are saved will also be saved in this directory.

The sentry password can be set by clicking on the “change password” button.

Figure 8: Settings Window

10) The basic function of the Reg-Sentry is to compare captured licence plates with those stored on a list. To enter a single number plate onto the list, enter the text string (i.e. number plate) into the text box labelled “Black / White list”.

Click the “ADD” button. This will add the number plate the list displayed on the sentry viewer. To upload the displayed list to the Reg-Sentry, click on the “Upload” button. The entire number plate list is then copied to the Reg-Sentry.

A list of number plates can also be loaded into the Sentry Viewer using an unformatted text file (one number plate per line). Clicking on the “Import” button will open a standard browser that will enable you to locate your text file.
11) To remove a number plate from the list, select the number plate by clicking on it and the click on the remove button. This will remove the number plate from the list on the Sentry Viewer. Click on the “upload” button to copy the list to the Reg-Sentry. N.B. You need to upload the list to remove the number plate from the Reg-Sentry.
**Trouble Shooting**

**Network Setting**

The default Reg-Sentry IP address is 192.168.0.204. It is possible that this IP address will be incompatible with your hardware i.e. it is not within the range of IP addresses that your server or computer will allow. If a non DHCP server is used or the device is connected directly to a PC / Laptop this can cause the Reg-Sentry not to communicate with the computer running the Sentry Viewer software.

If this is the case then you will need to alter the network setting of your “Local Area Connection” on your PC or laptop to enable initial access to the Reg-Sentry. This can be done by selecting “My Network places” from the windows start menu and viewing the network connections page.

![Network Connection](image1)

**Figure 11: Network Connection**

Right click on the relevant local area connection and select properties.

![Local Area Connection Properties](image2)

**Figure 12: Local Area Connection Properties**
Select “Internet Protocol (TCP/IP)” and then click on the “Properties” button.

![Image of Internet Protocol (TCP/IP) Properties]

Figure 13: Internet Protocol (TCP/IP) Properties

Select the “Use the following IP address” option and then enter the following IP address, 192.168.0.200. Enter the subnet mask as 255.255.255.0

**N.B.** Make a note of any current settings before changing the network settings.

Once the pc network settings have been change you will be able to access the Reg-Sentry by typing 192.168.0.204 into your web browser.

![Image of Reg-Sentry Web Service Logon Page]

Figure 14: Reg-Sentry Web Service Logon Page

The login password will be the last 4 characters of the Reg-Sentry MAC address. Using the web service provided will enable you to alter the Reg-Sentry’s IP address to a suitable value for your system. Once this is done you should revert to your old network settings.
Once you have logged on select the systems information page

![System Information Hyperlink]

**Figure 15: System Information Hyperlink**

Follow the change network settings hyperlink

![Change Network Settings Hyperlink]

**Figure 16: Change Network Settings Hyperlink**
Network settings

Note that if DHCP is selected, this information is used when DHCP has failed after 30 seconds.

<table>
<thead>
<tr>
<th>IP retrieval mode</th>
<th>dhcp</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>IP address</td>
<td>192.168.168.198</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subnet mask</td>
<td>255.255.255.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gateway</td>
<td>192.168.0.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NTP server</td>
<td>192.168.0.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hostname</td>
<td>192.168.168.193</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Apply

Figure 17: Network Setting Page

This page allows all the relevant network setting to be changed.
LED Location and Function

**Figure 18: LED Location**

DSP 1, Lit when a video input is detected. The LED is orange in colour. If this LED is not lit then you should inspect your video cable and ensure that your camera is functioning correctly.

DSP 2, Lit when a live video stream is being provided to the sentry viewer, the LED is blue in colour. During normal operation the live stream should be switched off, you should always ensure that DSP2 is unlit after you have commissioned the unit.

DSP 3, Lit when a recognised number plate is present on the black/white list, the LED is orange in colour.

DSP 4, Lit when a number plate has been processed, the LED is green in colour.

D1, unused

D2, unused

D3, Lit when relay has been switched. The LED is green in colour. When this LED is lit the relay is energised and your barrier should operate, if this is not the case inspect all connections from the unit to the barrier control box.

D4, unused

DSP_F, Lit when the Reg-Sentry is functioning normally. During power up (and if the unit resets itself) this LED will flash continuously. **No processing will occur while this LED is flashing.** The LED colour is orange. If this LED flashes for a continuously period of more than 4 minutes then there is a fault with the installation. Inspect all connections to the unit, if no fault can be found, please call Bosch Security Systems, Inc. for technical advice.

POWER, this LED will flash briefly if there is a power fault. The LED colour is RED. During normal operation this LED will be unlit. If this LED is lit, inspect all power connections.
Figure 20: Settings Menu Help Document
This product complies with Electromagnetic Compatibility Directive meeting the following standards

- EN55022: 2006 –Class A limits only

FCC:2005 Parts 15.107 & 15.109 –Class A
This equipment has been tested and found to comply with the limits for a class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and if not installed in accordance with the instruction manual, may cause harmful interference to radio communications.
Operation of this equipment in a residential area is likely to cause interference in which case the user will be required to correct the interference at his/her own expense.

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