Smart Gate: how it works

What the section does, which mode to start with, how to connect a relay and what to look at when a plate is not read

1 What it is

The section opens a barrier by a vehicle's number plate. The plate arrives in one of three ways: from **our recognition** (we take a frame from the stream the camera already sends to the server), from **your ANPR camera** by Hikvision or Dahua (it can send the plate by itself), or with the **"Open"** button on the checkpoint page.

Manual opening always works and depends on nothing: it is a request of a hundred bytes, not video. It is also how the relay is tested during installation.

> The section opens **no video stream of its own** to your site. Both the frames for recognition and the live video in the card are taken from the stream that already comes to the server. This is exactly where the pilot went wrong: the recognition gateway pulled RTSP from the site non-stop, and the site's connection could not cope.

2 Three modes, and you start with the middle one

Mode	What it does
Off	Nothing. No log, no gates.
Observe	Keeps a log with frames and shows whom it *would have opened* for. It does not touch the gates at all.
Auto	Opens by the allow list. It can be limited by a schedule: for example, to working hours only. Outside the schedule window, the automatic mode behaves as observation.

> A new checkpoint is created in the **observation** mode on purpose. A week of the log shows whether plates are recognised at your site, and only after that does it make sense to turn on the automatic mode. Between 'the camera is up' and 'we trust the automatic mode' there is a week in which to look at the log.

3 The relay

The gates are opened by a network relay connected to the barrier's manual open button. **Dingtian**, any relay with an HTTP address and **Modbus TCP** are supported. The relay must be reachable from our server: usually this is a port forwarded to the outside. An address on the internal network (192.168.x.x, 10.x.x.x) will not do: there is no way there from the server.

> On a Dingtian, the channels in the board's interface are numbered **from one**, while its own protocol counts them **from zero**. We take the number as it is written on the case and convert it ourselves: enter exactly what you see on the board.

The test button in the card gives a single pulse: the boom should twitch exactly once. For acceptance tests without hardware there is the "Dry run" type: it goes through the whole path and moves nothing.

4 The allow list and the block list

The allow list: whom to let in. A pass can have a validity period, days of the week, hours, a direction and a limit of passages. The block list: whom never to let in.

The block list beats the allow list. If a plate is on both, the vehicle is not let in: otherwise it would be enough to add a pass for yourself to get off the block list.

A plate can be typed in Cyrillic or Latin letters: 'A123BC77' and 'A123BC77' are the same plate for us. **Each checkpoint has its own list**: a pass opens only its own checkpoint. A list is easy to import as a CSV file from Excel, and it is moved from one checkpoint to another with its

own export, together with periods and hours.

5 If a plate is not recognised

First look at the log: it shows the frame and what the system read. Common causes: the camera looks too wide, a steep angle, a dirty plate or an oncoming headlight at night.

> **A plate must take up at least 120 pixels of width in the frame.** This is measured, not chosen: at 180 pixels 74.6% of plates are read correctly, at 120 pixels 71.4%, at 90 pixels 62.3%, at 60 pixels 36.6%. Below 120 pixels, the three-digit region code is the first to go.

We fix single recognition errors ourselves: the position in the plate tells unambiguously whether a letter or a digit stands there, so a ‘7’ in place of a ‘T’ is corrected without any neural network. The log shows how many characters were corrected.

The “Allow one recognition error” setting opens the gates for a vehicle whose plate differs by one character. This is a deliberate trade-off, so it is off by default and never applies to the block list.

The Cameras tab of the checkpoint card has the numbers for the channel: how many frames were requested, how many arrived, with what delay and how many boxes were filtered out as ‘not like a plate’. The investigation starts with them: ‘arrives intermittently’ without a single number cannot be fixed.
