



# TRANSPORT DETECTORS

## General Description

Detectors used in the road transport are technical devices monitoring the actual transport situation on the specific place. By means of these detectors, it is possible to ensure the dynamic traffic control, strategic traffic control and to receive required traffic information.

The detection serves especially for receiving information on the presence of vehicles or pedestrians in given detection zones in the area of cross-roads, controlled by the traffic light signals (SSZ), on pedestrian crossings or on motorways, eventually on important roads (city through roads). By means of detectors, it is possible to receive traffic parameters and information influencing the control and organisation of transport, such as for example traffic flow intensity, speed of vehicles and occupancy of traffic lanes or classification of vehicles according to their category. The obtained information can further be used for prediction of travel times of vehicles, optimization

of traffic flows' control and other functions. Their usage significantly improves the effectiveness of the operation of whole areas and enables to prevent the traffic congestions during peak hours in large towns.

Induction loops, video-detections and microwave detectors belong to the most often practically used types of detectors. In the operation we can also find installations of infrared, laser and ultrasound detectors.

## Basic Technical Description

### Induction Loops

The induction detector uses for its operation changing of inductance of a loop, located under the roadway surface, mostly in the prior cut gap in the traffic lane. The device consists of the conductor (wire) forming the own loop, of impedance transformer and of the detector in controller. The change of inductance occurs at overrunning of the vehicle eventually of other metal subject (bicycle, motorcycle) over the loop. This change is, through the impedance transformer, recorded in the evaluation device and transferred for following processing (into the SSZ controller, traffic control centre etc.). The size, location and form of the loop in the traffic lane depend on the monitored traffic indicator and on the way of the traffic control on the cross-road.

Induction loops are very sensitive



and reliable devices for detecting of vehicles' presence. The individual traffic parameters and values obtained by means of induction loops have a sufficient quality for influencing and control of operation on roads, especially on cross-roads with SSZ.

### Systems of Video Detection

These systems use the image analyses to get information on presence of vehicles on the monitored place. This information can be transmitted on inputs of the SSZ controller, eventually on other traffic devices (Traffic centres). Due to creating of the virtual loop (detection zones) there occurs no intervention into the roadway surface here. The system has another not negligible ability, to detect the traffic operation obstacles (accident, immobile vehicle, larger objects on the road etc.) and to inform dispatchers on it. It can be used also in integrated traffic systems as a source of data informing about the actual situation on the monitored section of



Video Detector





the road network. Configurations of the video-detection system enable its maximum variability.

The system is used on places, where it is not possible or suitable to use induction loops (frequent reconstruction works, unsuitable road cover surface, presence of tram traffic, historical town centres).

It is used for detection of movement of pedestrians on pedestrian crossings placed outside the cross-road areas to secure their higher safety. These detectors are connected to the control unit, which will, after identification of the pedestrian on the pedestrian crossing, initialize warning visual signals for drivers of incoming vehicles, for example in the form of flashing LED lights in the roadway.

Video detection uses two system types – integrated video detectors or video detection modular systems.

#### *Integrated Video Detectors*

Camera systems integrate the camera and the detector in one complex.

Within this system it is possible to adjust directly (for example by means of the service PC) lay-out and number of detection zones.

#### *Video Detection Modular Systems*

These systems enable advanced more complex functions outside the scope of informing the SSZ controller. They can form a source of traffic-engineering data, or they can be used as a sectional detector for measuring of speed, of section occupancy etc. By means of a video signal from the camera output, it is possible to adjust, in the higher level above the video-image, necessary number of detection zones of different types (zone of presence, of motorcades, of direction of running, counting of vehicles etc.).

The main advantage of the modular video detection system is the possibility to connect it to the already existing camera system with analogue output. However this system is, due to its technical equipment, extremely cost demanding, while from the traffic control point of view, it

only integrates capabilities of several induction loops, located physically in the roadway, into one complex.

#### *Microwave Detectors*

The microwave detector is a device, based on the principle of transmitting and consequent receiving of microwave rays. Microwave detectors create, due to their small dimensions and simple assembling on the pole, possible replacement of induction loops especially where the intervention into the roadway surface is impossible.

As well as loop detectors and video detectors, also microwave detectors inform the SSZ controller on the occupancy of the detection zone by the vehicle. Subsequently, the controller is able to respond flexibly to the actual traffic situation. Microwave detectors work reliably in any weather, they classify the passing vehicles and enable speed measuring. They are less used for the vehicles traffic control on the cross-road.



*Microwave Detector and Infrared Detector*



*Infrared Detector*