Electronic Equipment for Traffic Systems

Traffic Data Aquisition System
VIPER II

04/25

Features

- **data acquisition of individual vehicle data on up to 12 double loops**
- **classification according to SWISS10 and TLS**
- **compact construction with extended operating temperature range (-20 to +70°C)**
- **all data directly available on TCP/IP**
- **easy and cost saving integration into traffic management and traffic control systems**
- **high reliability and maintenence-free operation**

Applications

- **traffic counting and measuring stations on national and cantonal roads with direct connection to traffic management systems such as VM-CH**
- **traffic flow control for traffic management systems on high-performance roads**
- **early detection of vehicle queuing and traffic jams for warning systems in front of tunnels, highway intersections and city access roads**
- **vehicle tailback signaling, e.g. before intersections and exits**
- **wrong-way driver detection and vehicle detection in emergency bays**

Overview

The VIPER traffic data acquisition system is based on vehicle detection using induction loops embedded in the lane. It supports single loop as well as double loop measurement according to TLS* and Swiss10 specification. Using double loops yields additional data such as vehicle speed and allows vehicle classification.

The VIPER system is very compact in size and easy to use. The traffic data provided on a LAN interface allow a variety of evaluation and control functions. VIPER is typically used in applications ranging from simple traffic counting, detection of wrong-way drivers and vehicles in emergency bays, to complex applications such as traffic jam prediction and detection.

Viper can be used as a counting station in accordance with the ASTRA 13012 guidelines and can be connected directly to the VM-CH via TLSoIP in accordance with the “Technical requirements for counting devices in accordance with TLS2012 and SWISS10, V1.4”.

VIPER System, built-in in a 19" frame

Functional principle

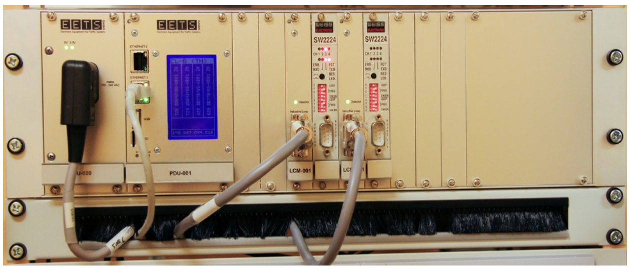
The raw data acquired by the detectors is passed internally by means of a serial EIA-485 bus to the central processing unit. The distinct data records are processed and aggregated and the result is passed to the LAN interface making it available to any TCP/IP client. The basic data processing can be supplemented and expanded with additional modules if required (e.g. jam detection).

The communication connections as well as the loop connections are located on the front side allowing fast and easy access.

Available models

VIPER is designed as a 19" standard rack mount system and can be equipped with up to 6 detector units, which corresponds to a maximum of 12 double loops. Each detector has its own loop connection card LCM.

Detector units are available as single or double loop versions. Classification versions for SWISS10 and TLS are available for the double loop system.



Acquisition unit (84TE) with two double detector units

Software

Operating system

The VIPER systems are equipped with the operating system LINUX. This ensures maximum availability as well as excellent network connectivity.

Functional principle

The data is acquired by means of the LINUX daemon *TDAD* (Traffic Data Acquisition Daemon) operating as server. It permanently polls the available detectors for individual vehicle data via the serial EIA-485 bus. This data is aggregated by the TDAD and periodically made available to the clients via LAN.
The following data is available:

- Individual vehicle data (in real time)
- Aggregated vehicle data, divided into vehicle classes: Number of vehicles, speed and occupancy times of the loops in percent
- system status (including messages about faulty loops)

The data as well as the number of transferred vehicle classes depend on the type of detector.

On request other functions such as jam detection or control of traffic signals are available.

Data transfer

The aggregated data is transferred periodically to the clients by means of LAN and the UDP protocol. This allows a simple and operating system-independent implementation of the clients.

The transmission of individual vehicle data in real time is carried out in the same way.

For traffic counting stations according to ASTRA** guidelines, the TLSoIP protocol is used (according to TLS2012 and the additional ASTRA specifications “Technical requirements for counting devices according to TLS2012 and SWISS10, V1.4”)

On request data may be transferred using other protocols such as TCP streams or ISO8073 over RFC-1006.

Setup

This parameterization can be carried out directly on the system itself via SSH or transferred as a configuration file using upload/download via FTP/SFTP. Amongst others the following parameters are available for configuration:

- IP address and host name of system
- number of detectors and clients
- for each detector its exact type and capabilities (such as classification, protocol, etc.)
- for each client its IP address and UDP port
- the transmission of individual vehicle data
- the data aggregation interval in second
- Parameters for the TLSoIP connection

The ability of configuring multiple clients allows the TDAD to simultaneously forward the data to different users for further processing or archiving.

Technical specifications

Dimensions and mechanics

System rack:	according to IEEE 1101.10 3U, 84HP, closed
Dimensions:	483 x 132 x 250 mm (W x H x D)
Mounting:	front side in 19” frame (84HP)
Slots:	1 x Power Supply (12HP) 1 x Processor unit (16HP) 6 x Detector unit (4HP) 6 x Loop connector module (4HP) 1+1 Extension /General purpose (4HP)
Supply:	Plug-in power supply (12HP) with power plug on front side

Electrical data and Environment

Power supply:	110-240 VAC / 12-24 VDC
Power consumption:	< 10 Watt
Fusing:	6A
Ethernet (LAN):	10/100MBit, RJ45
Operating temperature:	-20°C to +70°C
Storage temperature:	-40°C to +80°C

Detectors

Classifying double loop detector

- 4 channels (2 double loops)
- Feed line: ≤ 250 m (max. 300 m)
- Loop geometry: according to TLS* or Swiss10
- Classification: 2, 5+1, 8+1 vehicle classes according to TLS* or Swiss10 according to ASTRA** specifications

Single loop detector

- 4 channels (4 single loops)
- Feed line: >300 m (up to max 1000 m)
- Loop geometry: according to TLS* or individual (within the allowed inductivity range of the detector)

* Technische Lieferbedingungen für Streckenstationen (D)
TLS is a technical delivery regulation released by the German Federal Ministry of Transport

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