

FlexControl Module

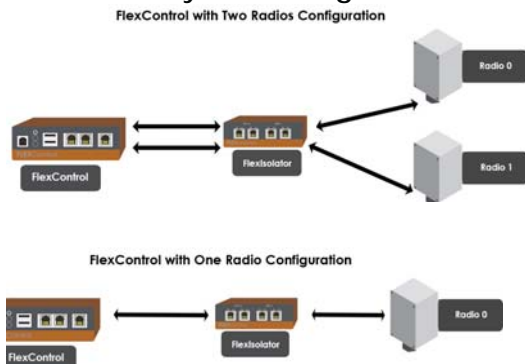
The Sensys Networks FlexControl Module is a compact unit that controls the components of the Sensys Networks Wireless Vehicle Detection System (VDS). It maintains two-way wireless links to the sensors and repeaters, establishes overall time synchronization, transmits configuration commands and message acknowledgements, and receives and processes data from the sensors. The FlexControl Module then relays the sensor detection data to a roadside traffic controller or remote server traffic management system. The FlexControl Module provides equivalent functionality as the FlexControl Card (APCC) except for the internal contact closures.

The FlexControl Module uses an ARM-based Linux computer to provide layers of processing and networking. Processing includes analytics for traffic data, traffic signal control, specialized control applications (e.g., wrong way ramp detection and speed enforcement), and system performance and diagnostic reports. Networking includes complete SNP⁺ functions, SNP security and proxying, as well as Linux-based IP, VPN, secure access (ssh), and secure web server (https) capabilities. Custom add-ons can be developed by qualified customers for their own remote applications.

Sensys provides an add-on for sensing Bluetooth and Wi-Fi MAC addresses from Bluetooth and Wi-Fi radios connected to the USB host ports.

The FlexControl Module includes dual Radio ports (SPP-0 and SPP-1) and an expansion (EX) port. The EX port connects to the EX card or the FlexConnect module to relay detection events to a traffic controller. The FlexControl Module has two USB 2.0 full speed host ports, one 10/100Base-T Ethernet port, and one USB device port. The FlexControl Module is powered by a 9-28 VDC source via a barrel connector or a pluggable terminal block connector. The FlexControl Module includes a DIN mount and a bracket mount kit for installation in a traffic cabinet. The FlexControl Module is configured by TrafficDOT over the Ethernet port.

FlexControl Module System Configuration



A typical FlexControl Module system configuration consists of one FlexControl Module and two Radios with a FlexIsolator. The system can also consist of a FlexIsolator and a Radio. The FlexIsolator offers electrical isolation up to 2,500 V, surge protection up to 12 A, and AC power cross protection.

†SNP (Sensys NanoPower) is a proprietary wireless link protocol.



Functions / Features

Processing of sensor data

- Per-lane or per-vehicle data
- Data binning over selectable time intervals
- Data filtering (e.g., adaptive holdover)
- Platform for remote applications

Storage of sensor data

- Data buffering (event caching) 500 KB
- Data storage (processed data) 1 MB

Master timebase for all supported wireless sensors

- Common clock for sensor timestamps
- Can be synchronized to NIST timing signals

SNP radio communications

- To/from Radio modules

Relay of sensor data

- Via EX card or FlexConnect SDLC link to traffic controller
- Via IP connectivity (wired or wireless) to traffic controllers and upstream servers.

Diagnostics and Supervisory

- Daily diagnostic report
- Intrusion detection and packet authentication
- Sensor health monitor (RSSI, battery, downtime)

Firmware upgrades

- Upgraded via IP connectivity
- Delivers upgrades to all other Sensys Networks VDS devices

Simple installation

- Mounts in traffic cabinet with DIN mount or bracket mount. Mounting kit supplied with module.

Software Compatibility

- Requires TrafficDOT software 2.12.7 or later

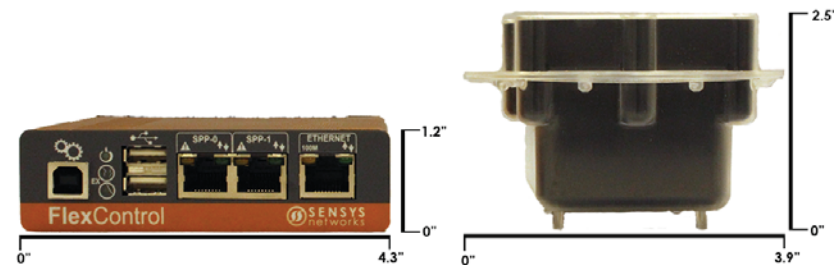
FlexControl Module Front Panel

	USB B device port
	Link LED for Radio/Ethernet ports: on (operational); off (no link); blinking (data transmission)
	Fault LED for Radio ports: on (an enabled link has a fault)
	Power LED: on (operational); off (no power)
	Link LED for EX port: on (operational); off (no link); blinking (data transmission)
	Fault LED for EX port: on (an enabled channel has a fault)
	USB host ports for USB device connections
SPP-0 and SPP-1	RJ45 ports for Radio connections
ETHERNET	Ethernet port for PC or network connections
100M	Ethernet port speed LED: on (speed at 100Base-T); off (speed at 10Base-T)

FlexControl Module Back Panel

	Master Reset: resets board (hold for 20 seconds to restore factory defaults)
EX	RJ45 port to EX card or FlexConnect
	9-28 VDC barrel power socket to power adapter or cabinet power terminal blocks
	9-28 VDC power socket to pluggable power terminal block

Relative Size of FlexControl Module



The picture above shows the relative size of the FlexControl Module compared to a VSN240-F-2 sensor.

Functional Specifications

interfaces	<ul style="list-style-type: none"> • (2) RS-422 full duplex to Radio(s) via RJ45 connector • (2) USB 2.0 full speed host ports • (1) RS-485 full duplex to EX cards via RJ45 connector • (1) 10/100Base-T Ethernet port via RJ45 connector • (1) USB device port
IP connectivity	<ul style="list-style-type: none"> • HTTP, HTTPS, Open VPN, PPP, PPTP, SSH, optional encryption over tunnel
per-lane data processing	<ul style="list-style-type: none"> • counts (volume) • occupancy • average and median speeds • binned speeds and vehicle lengths over selectable time intervals • output formats include Caltrans, AustRoads, TTI, and CSV
per-vehicle data processing	<ul style="list-style-type: none"> • initial vehicle detect time • gap • speed • length • output formats include Marksman and CSV
processor	<ul style="list-style-type: none"> • 400 MHz ARM9 processor • Linux 3.14 operating system • 256 MB Flash • 128 MB SDRAM
over-the-air protocol	Sensys NanoPower (SNP) protocol (TDMA-based)

Power, Physical, & Environmental

input voltage	<ul style="list-style-type: none"> • 9-28 VDC: 5.5 mm x 2.1 mm barrel power connector, or • 9-28 VDC: pluggable terminal block (3 pos 5 mm) for 24-12 gage wire
power consumption	less than 700 mW
dimensions	4.3" x 3.5" x 1.2" (10.9 cm x 8.8 cm x 3 cm) without mount
weight	8.5 oz (240.9 g) without mount
operating temp	industrial -40°C to 85°C
mounting	DIN or bracket mount

Available Products

Order Code	Description
FLEX-CTRL-M	FlexControl Module: Controls radios and wireless links to detection sensors and relays detection data (DIN and bracket mounting kit included).
FLEX-CTRL-M-E	FlexControl Module Enhanced: Controls radios and wireless links to detection sensors, relays detection data, and generates traffic data statistics (DIN and bracket mounting kit included).
FLEX-CTRL-ACC-2:	FlexControl Power Leads: Leads to connect FlexControl with cabinet power terminal block .
FLEX-CTRL-ACC-3:	FlexControl Power Supply with power cords: Industrial rated power supply adapter (US only).

Compliance



safety	2006/95/EC
EMC	<ul style="list-style-type: none"> FCC: This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. 2004/108/EC IC: This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device. IC : Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Local Distributor