SELLA CONTROLS

SAFE AND SECURE

AUTOMATIC VEHICLE SPEED MANAGEMENT SYSTEM

AVSMS Overview

The Sella Controls AVSMS system has three main component parts - firstly, the track Tracklink® III beacons mounted transversely between the running rails, secondly, the underfloor Tracklink® III beacon readers mounted on the underside of each tram and, thirdly, an on board controller unit that monitors all the beacon 'reads' and which is linked to a 4G public cellular radio connection or Wi-Fi for reporting back to a workstation in the control room.

A fourth unit is a cab display that indicates that the system is operating normally, whether a trip has occurred, a reset switch and a 'break glass' bypass facility. A driver activating a cab for a journey automatically connects the display of that cab to the on-board controller while a connection from the controller to the brake circuit enables the brake to be applied should a trip occur.

On the approach to any significant curve, a series of beacons (up to four) will be positioned some distance in advance of the curve. Each beacon is programmed with the maximum permitted speed at a specific point ahead which represents the start of a slowing down zone, thus a four-beacon arrangement would signify four zones.

The controller has inputs from two speed sensors and the controller then measures the distance to the start of the first zone, this zone being typically 150 metres in length. The speed at that point is likely to be the line speed. If that speed is exceeded, the system trips and a full service-brake application is made.

The second beacon would similarly give a speed and distance for the start of the second zone, the zone distance being shorter (typically 30 metres) with, say, a maximum speed of 60km/h, as the tram should be slowing down for the curve. Similarly, the third beacon would give a speed for the start of the third zone at, for example, 40km/h and the fourth beacon indicates the speed near to the start of the curve - typically 20km/h.

Under normal driving conditions, the speed at the beginning of each zone should be well under the maximum speed permitted but, if the tram exceeds this, then a trip occurs and a service-brake application is made, bringing the tram to a stop.

The exact distance from the beacon to the zone start is not critical but is typically around 60 metres. The zones are 'virtual' and are not marked in any way. Each beacon will be programmed with the distance to zone commencement, zone length and maximum tram speed within that zone. The four-beacon arrangement is such that the combination of all four can be positioned before the commencement of the first zone, so the Controller odometry is responsible for monitoring the slowing down process as it has to measure the distance to the start of the different zones simultaneously. The system is designed to meet high safety requirements and achieves a safety level of SIL2 in accordance with EN50128.

The system is configurable and can be adapted to fit the requirements of the tram operators and can be fitted to new trams or retrofitted to existing trams.

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Specifications

Power supply:	24 V DC
Controller Outputs :	Service brake Trip, OK indication, Trip indication, bypass indication, + 4 spare outputs
Controller Inputs :	Cab A Active, Cab B Active, Reverse, Forward, Reset, brake relay monitoring + 18 spare inputs
Pulse Inputs:	2 off pulse inputs, 0 – 2kHz, 0 – 15V DC
Pulse Input Isolation:	Isolation of speed sensor inputs via HSD2320 Pulse Isolation module
Tracklink III Radio Frequency:	865.7 to 867.9MHz (Europe) or 918 to 926MHz (Australia), Frequency Hopping
Beacon Read Speed:	70+ mph
Operating temperature:	-25°C to 55°C
Communication:	3G, LTE/4G, Wi-Fi and GNSS
Event logging:	Controller records events locally and also remotely on the server. Option: Crash and fire protected memory module for the controller.
Workstation:	Server and HMI to display and record events

Tracklink® III Beacon

Tracklink® III Reader

Controller with Crash Protected Memory

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