



# SPECIFIC TRANSMISSION MODULE STMLS

- Indoor architecture 2oo3
- Safety Integrity Level SIL 4
- High reliability and stability
- Complete compatibility with ETCS system
- Small dimensions and low power input



### General Description

STMLS module provides interface between the national Automatic Train Protection system of LS type and the ETCS system and ensures smooth mutual transition between the area equipped only by the national system and the area equipped by the ETCS system. Use of STMLS module in tractive vehicles is the basic condition for connection of ATP of LS type to ETCS system.

### Basic Technical Description

In the active mode the STMLS operation provides three basic functions:

- Transmission and display of the signal information between the line and railway ve-

hicle regarding the signal aspect to which the train is approaching

- Check whether the transmitted information was noted by engine driver and respected
- Intervention into traction vehicle control during the negative result of checking function

The coded signal from the track circuit for the relevant section is received through the antenna in front of the the first axel. The received signal is digitally detected and safely processed. The evaluated signal aspect is displayed for the engine driver at the cab signal. Depending on current speed and the signal aspect evaluation the engine driver response is monitored and if the response is inadequate, even after generation of a warning acoustic alert, the device generates a command to stop the train by the emergency brake.

During the train movement on a non-coded line or during the presence of restrictive signal aspect STMLS module also checks the driver's vigilance and if there is no corresponding response it regenerates the order to stop the train through the emergency brake.

The key functions meet the criteria for the safety integrity level SIL4 according to EN 50129.

The STMLS module is implemented as a set of plug-in units installed in a resistant 19" subrack of 3U high. To achieve the required safety and availability the STMLS core consist of three processor units  $\mu K$  operating in architecture 2oo3.

The STMLS core provides all control and supervision functions. Other units with specific functions for STMLS application (timing, input-output, scanning and detection code from the track circuit) are supplemented.

All types of units use powerful 32 and 16 bit processors. STMLS power supply is backed-up and provides a wide range of power supply voltages used in tractive vehicles. The system is equipped by diagnostics with storing of recorded data.

The system wayside elements are the code scanners, cab signalling and acoustic warning.





## Basic Technical Parameters

Operating surrounding temperature:	-40 °C to +40 °C for antennas -40 °C to +70 °C for other parts	
Relative humidity	Annual average max.75 % continually 30 days a year max. 95 %	
Above sea level	-120 m to +2000 m	
Long term vibration:	5 -150 Hz, 2.5 mm to 8.4 Hz, acceleration amplitude 7 mm/s <sup>2</sup> over 8.4 Hz	
Standard compliance	EN 50155	
Short term vibration:	Vertically 3g/30 ms; diagonally 3g/30 ms; longitudinally 5g/30 ms; duration ½ period	
Power supply:	Basic nominal power supply	24, 48, 110 V DC
	Power supply operating tolerance	-30 %, +25 %
	Power supply interruption	max. 10 ms
	Power input	max. 60 W
Cover rating	IP20	
Insulation resistance:	In standard environment	min. 20 MΩ
	After constant humid heat test	min. 7 MΩ
Electric strength:	3750 V / 50 Hz / 1 min	
EMC	Complies with EN 50121-1 and EN 50121-3	
Failure-free operation and reparability:	MTBF	12 000 hours
	MTTR	1,5 hours

