



EUROPEAN ARROW BOARD – FULL COLOUR VMS Patent No 766719

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TSNZ OPERATIONAL NOTES

Appropriate training and SOP on the correct use and operations of the Euro VMS in a level 2/3 roading environment to ensure the correct and safe use of the unit and compliance with CoPTTM guidelines is required for all staff who operate a TMA.

The Euro VMS and TMA should be operated from a separate power supply to the vehicle and be fitted with a voltage regulator to protect both units. This power supply can be recharged from the vehicles' charging system. 600 AH of battery supply is recommended for the system.

Euro VMS supply is 24 volts.

Euro VMS board featuring lower power consumption Polycarbonate LED lenses offer wider observation angles, better performance and longer lifespan.

Euro VMS can perform all standard European arrow board functions as per CoPTTM. The Euro VMS, text, image and radar functions are all added key features to the unit. The user needs to ensure the VMS combinations under the X hazard display are TMP approved CoPTTM compliant.

Pre-programmed favourites and quick select message functions.

Radar Functions: Speed Radar capability to display and record speeds and evaluate site safety and message performance.

European manufactured quality with New Zealand designed software functions specific to market.

15mm Pixel Pitch High design resolution LED Impact resistant screen.

Fully patented design and market leading radar feedback speed control functions - Patent Number 755693.

Full Colour VMS Unit designed to meet NZTA P37 requirements.

NZTA accepted design with customised text function levels to ensure compliant message display.

CoPTTM approved symbols for TTM and Regulatory & CoPTTM approved TEXT display.

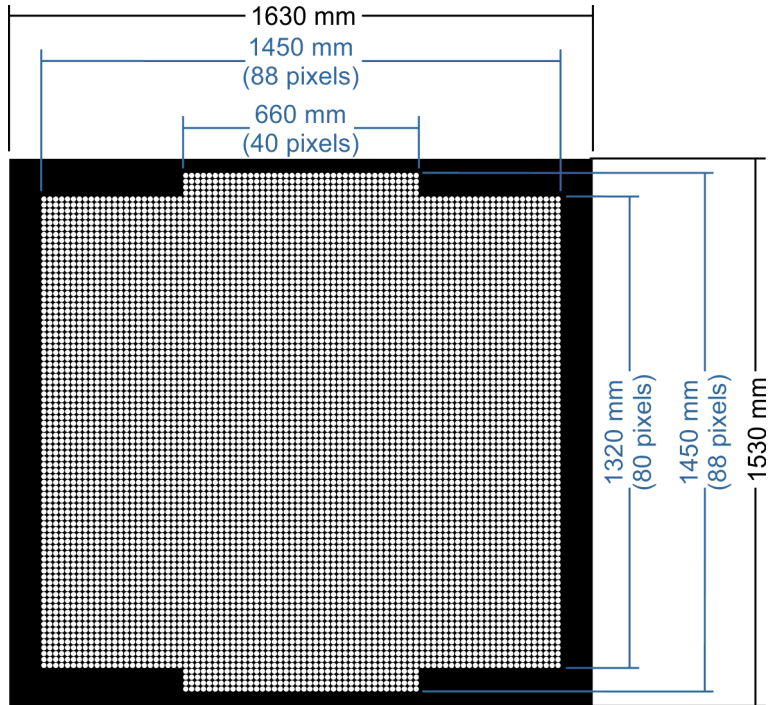
24-month warranty on VMS display. 12-month warranty on LTMA and VMS lifting gear.

Refer to warranties and specifications for both operational user manuals.

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1 INTRODUCTION

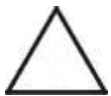


To ensure proper use of this product, please read this manual carefully and retain for future reference. This document will give you information how to use, install and service the unit. In case of unit failure and required service, contact an authorized service or local distributor.

Symbols used in this manual



Indicates that personal injury or electrical or mechanical damage of the unit can result if proper precautions are not taken.



Indicates important information.

2 GENERAL INFORMATION

2.1 Technical specification

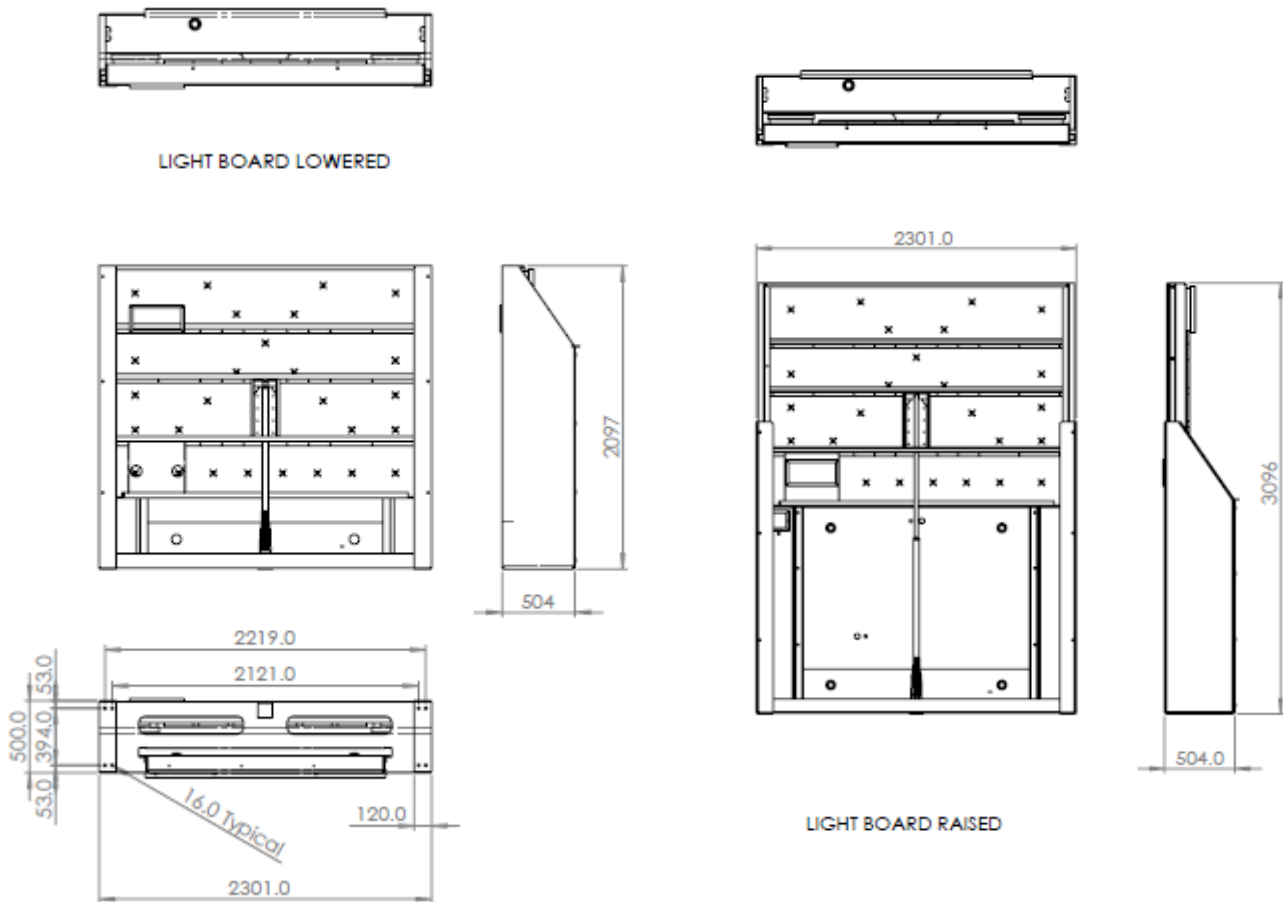
Technical specification	
Model	TRS-MVMS-RTNMFC-P1V22-80x88+2x4x40-ETH-WiFi-2LS
Electrical data	
Maximal power consumption	~ 416W
Typical power consumption	~ 60W to 140W
Power supply	24 VDC
Communication interface	RS232 / Ethernet/ Wi-Fi
Radar data	
Factory set distance	150m
Maximum distance	250m
Horizontal beam width	12°
Accuracy	± 1 KPH or MPH
Power	12VDC
Optical features	
Classification	C2, L3/L3(*)/L3(T), R3, B6 (EN 12966-1:2005+A1:2009)
LED protection	UV resistant lenses for each LED.
LED currents	Less than 15% of rated nominal current for each color, providing long-life time of LEDs. Constant current LED drivers, stable luminance, independent of the mains voltage tolerances.
Mechanical data	
Housing dimensions (VxHxD)	1530 x 1630 x 160mm
Weight – Board Only	85 kg
Weight – Overall Board & Frame	315kg
Material	Aluminium AlMg3, powder coated, resistant to aggressive atmosphere. Front 3mm thickness.
Housing color	Gray, RAL 9007
Front color	Black, RAL 9005
Fixation	On the back side / On the lateral side
Access inside	From the front side
Temperature range	T1, T2, T3 (EN 12966-1), from -40°C to +60°C
Humidity	up to 100%
Mechanical protection	P3 (EN 12966-1); IP56 (IEC / EN 60529)
Resistance to pollution	D3 in accordance with EN12966
Horizontal load	WL9, DSL4, TDB2

2.2 Main Features

Main features	
Certificate	EN12966-1:2005+A1: 2009.
Type of sign	Traffic color sign for trailer, consists of full color LED matrix field Shows pictogram in six traffic colors – white, yellow, orange, green, red, and blue and have external Doppler radar.
Radar	Devices with build-in radar use radar that works on the principle of the Doppler effect (measuring the difference in frequencies between the microwave signal sent by the device and the signal reflected from the vehicle). The measured vehicle speed activates the scenario defined in the scheduler. The measured speed is included in the statistics "Per hour" and "Per vehicle".
LED	LEDs with high luminous intensity and long lifetime.
Maintenance	Hardware is designed so that each part can be easily removed and replaced.
Brightness control	Brightness could be: a) Automatically adjustable according to external illumination measured by light sensors. b) Automatically adjustable according to actual day time using precise algorithm. Precise daytime brightness algorithm depends on geographical location where the sign is installed, taking into account daytime changing during whole year. c) Pre-adjusted or set from the system.
Temperature monitoring	The VMS equipped with sensor for continuously measuring the temperature inside the cabinet. Temperature monitoring and control system provides optimal working temperature and prevents condensation or component overheating. System also protects LEDs from temperature peaks that might happen during device operation.
Internal time	VMS has real time clock with 2ppm precision.
Operation logs	Logs system provides a lot of information about working conditions. Logs are stored in VMS internal memory and could be dependent on implemented hardware: VMS reset, maximal and minimal temperature in the cabinet, cooling and heating system activation, messages displayed, malfunctions as - short circuit, open circuit, and thermal error for each individual LED per each color, light sensor malfunction, overheating, communication errors. Precise time when each log happens also is recorded in the VMS memory. Logs in sign memory could be used for maintenance, troubleshooting, statistic analysing and system improvements.
Light sensor	2 light sensors for better and more reliable brightness regulation.
Cooling	Air circulation cooling with fans with air filters and vents.
Protocols	DMV Oblak Setup of IP parameters over network (IP address, mask, gateway address), without opening the sign. Firmware update over network.
Client application	TSNZ Command Console - user friendly PC and Android application for controlling and configuring sign.

Pictograms and text	VMS is able to display all character heights, types, and all standard traffic sign pictograms. A number of available pictograms in display memory. User can create its own messages or pictograms. VMS support English characters. Possible to change alternatively 2 or more pictograms/messages with programmable intervals.
Pictogram dimensions	Circle diameter: 1250 mm (size range E in accordance with EN12966) Triangle side 1500 mm (size range E in accordance with EN12966)
Pixel composition	1 LED

Assembly Details



USER GUIDE

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1 INTRODUCTION

1.1 About the Manual

The purpose of this User manual is to show the end-user how to control and operate a EURO VMS sign using the **TSNZ EURO VMS Command Console** app.

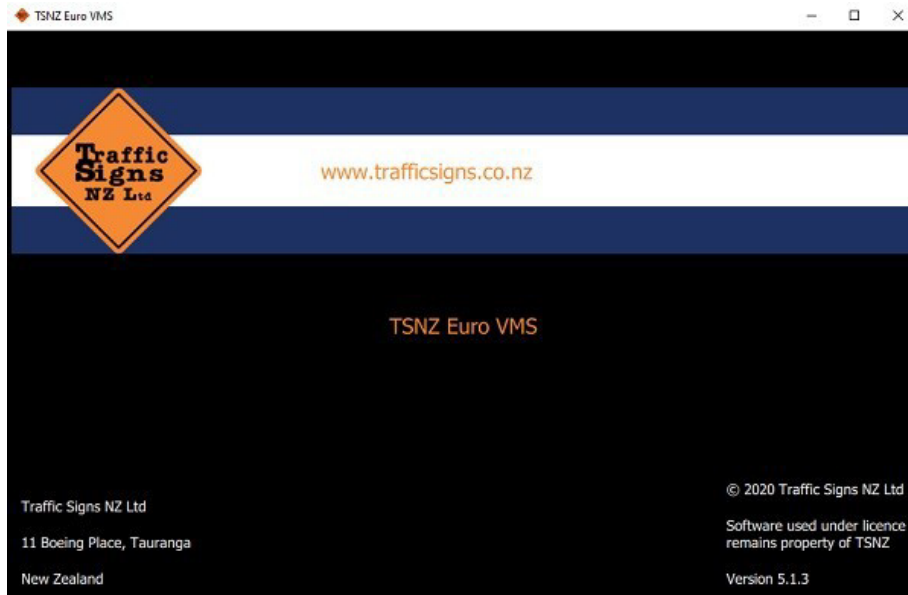
1.2 About the app

TSNZ EURO VMS Command Console is an application for controlling and managing EURO VMS sign.

2 CONNECTING TO THE DEVICE FOR THE FIRST TIME

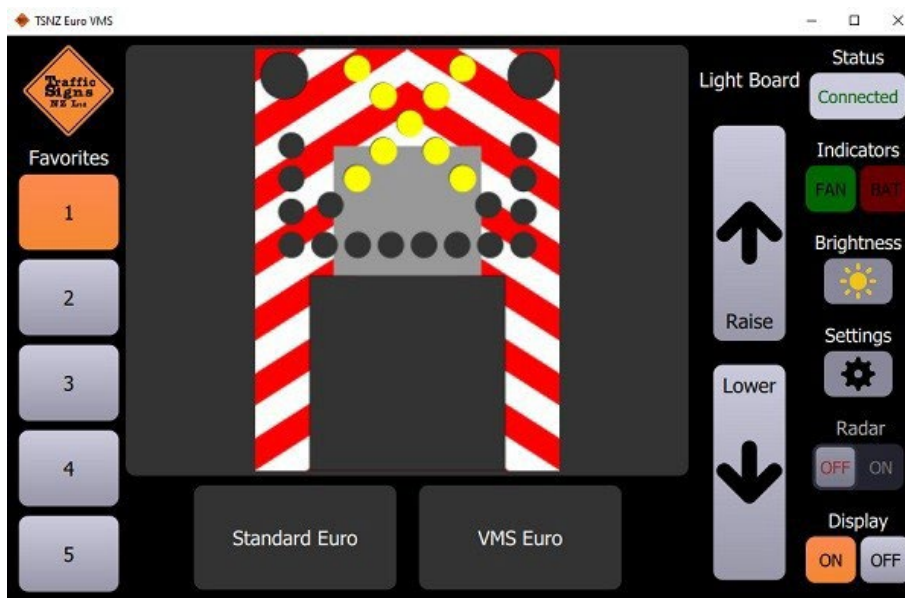
The **TSNZ EURO VMS Command Console** can be run on a PC, tablet, or smartphone.

After launching the application title screen with TSNZ logo, sign name and version of the application will be displayed.



2.1 Initial interface

After launching the **TSNZ EURO VMS Command Console** for the first time, a home screen with representation of the sign will appear, along with different options, as shown in the image below.



On the left side of the User Interface (UI) are **Favorites** - five buttons which are used for saving and activation of user's favourite sign settings. When users have set all display elements (images and text messages), preferences for sign display will be saved by simply pressing one of the favourite buttons.

User can now activate one of Favorite sign settings at any time, by pressing on it and then choosing **Accept** option (see image below).



In the centre of the UI is a large picture which shows current sign setting and operating modes **Standard Euro** and **VMS Euro**. Difference between these two options is that **VMS Euro** mode has radar functionality enabled.

On the right side of UI is a number of options for sign control. This function described in more detail in chapter 3.3.

Please note that **Settings** button opens up a login window for another user. If the user it not admin, they should press **Back** button and return to the home screen.

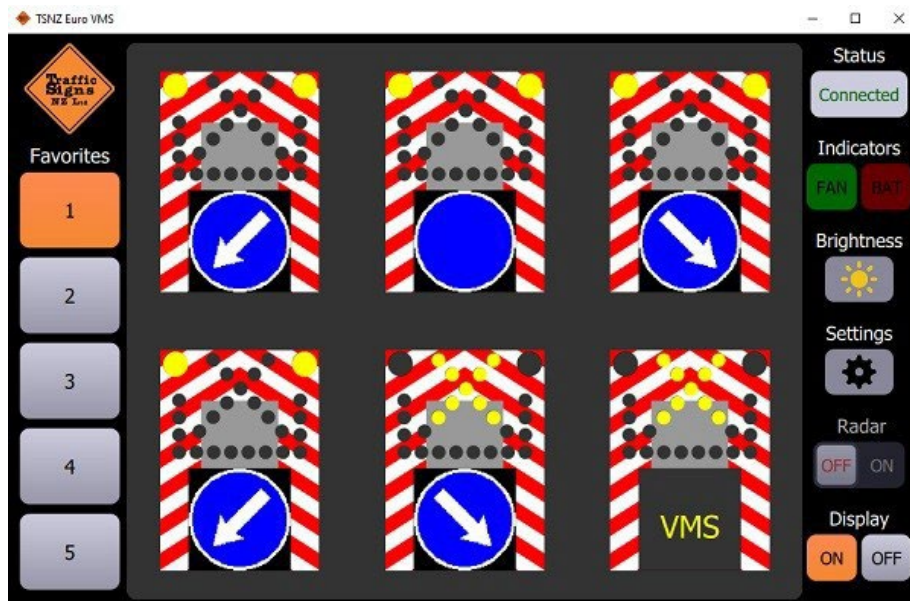


3 WORKING WITH EURO VMS

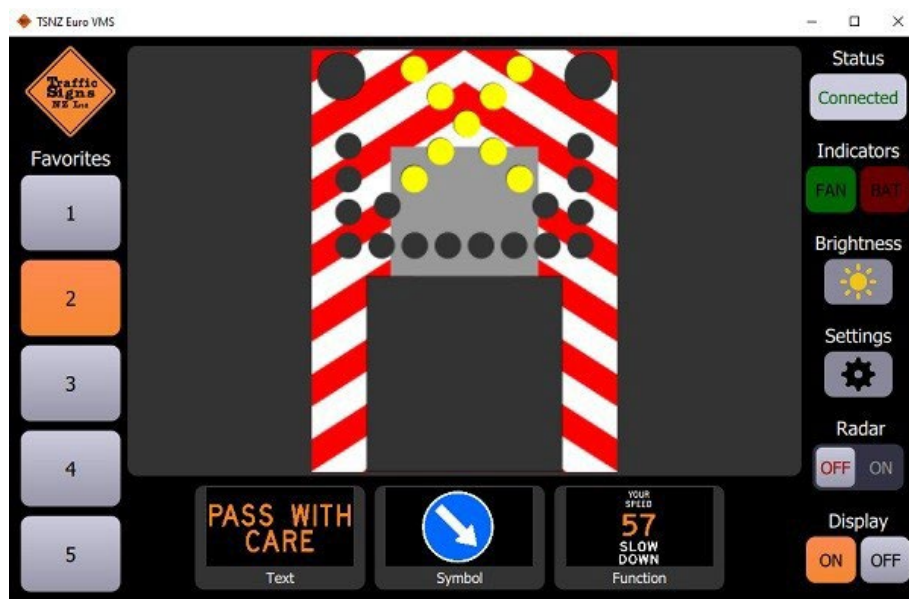
3.1 “Standard Euro” mode

If the user chooses **Standard Euro** mode of operation, they can choose between six options for sign display. First five options are predefined:

1. Left Turn symbol with arrows and flashers
2. Right Turn symbol with arrows and flashers
3. Circle symbol with arrows and flashers
4. Left Turn symbol with cross and flashers
5. Right Turn symbol with cross and flashers



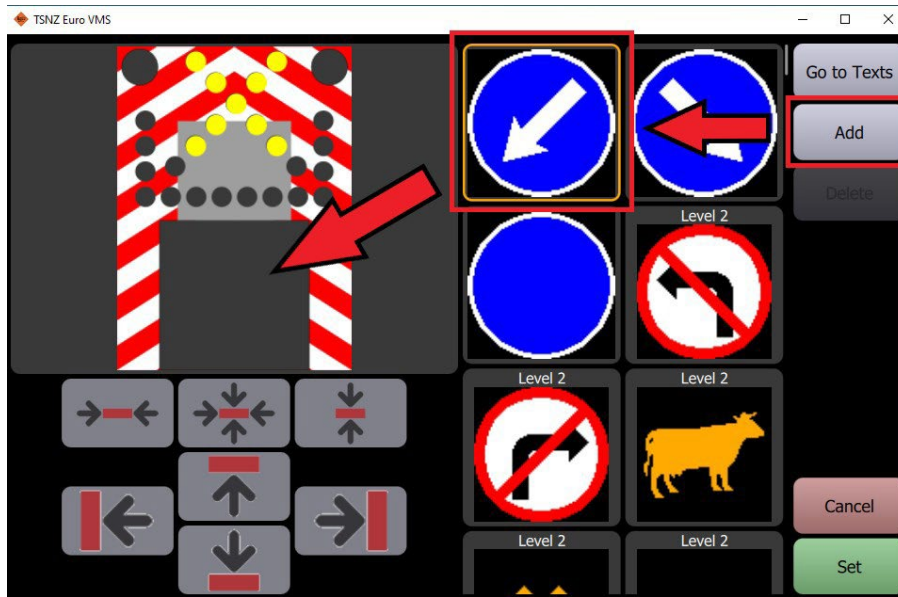
6. Option no. 6 includes different symbols which can be chosen by the user. If the user clicks on this option, a new window in UI will open, with options to change text, symbols, or sign function, as shown in the following image.



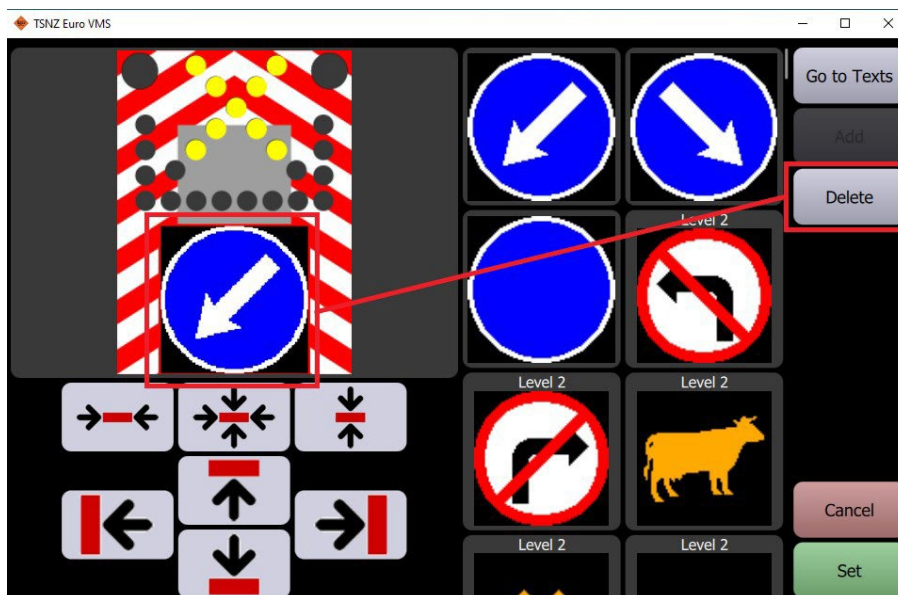
3.1.1 Display settings in “Standard Euro” mode, option no. 6

3.1.1.1 Setting and Erasing elements in “Standard Euro” mode – Option no. 6

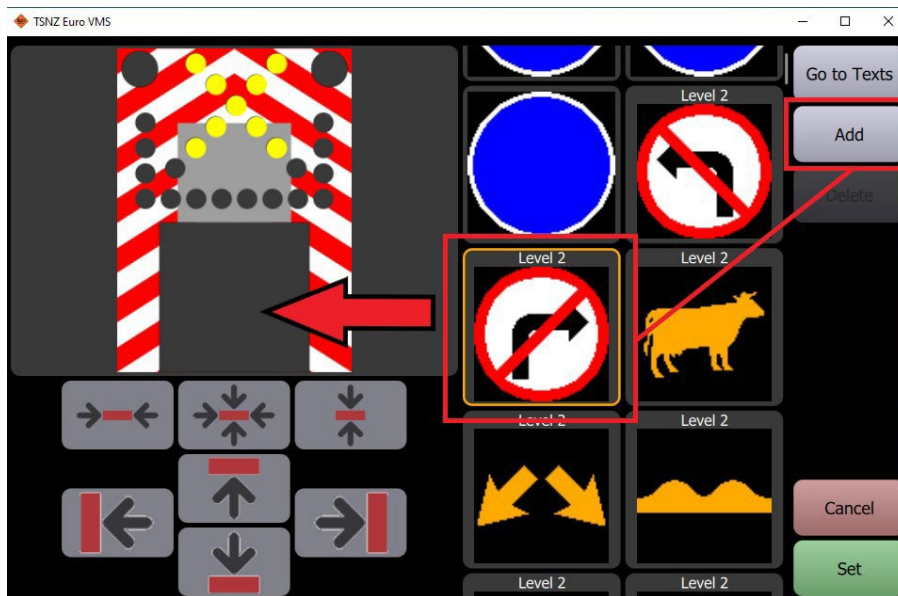
Users can easily set text or symbols in “Standard Euro” mode, under option 6, by simply clicking on the “Standard Euro” button, and then on either Text or Symbol icon, which are located in lower central part of the UI. When user chooses one of these options, new window on the right will open, with available elements. By clicking on a desired text or pictogram and then on “Add” button, new text or pictogram will be placed on the sign display, as shown on the image below.



Users should keep in mind that new element (text or pictogram) cannot be placed over existing ones. In order to change text or pictogram, user should click on the display with currently shown element, and then click on the “Delete” button, as shown in the image below:



After clearing the display in this way, user can now choose new text or pictogram and place it instead of the previously deleted one, in the same manner as before.



3.1.1.2 Text settings

Text messages can be displayed on the display of EURO VMS sign if user presses **Text** icon, located under the image of sign, after which the window with options for predefined textual messages opens and user can choose a message to be displayed by pressing its icon.



On the lower left part of this screen are directional arrows, which are used for placing and alignment of textual messages. They can be used to align text to upper or lower edge of display, to the left or right edge, to display centre, or they can be used to move text in any direction one pixel at a time.

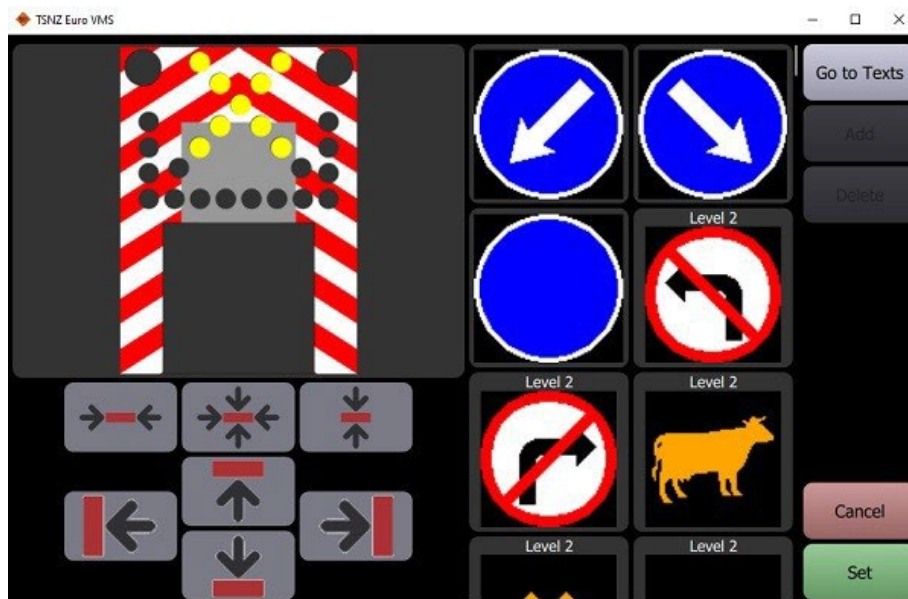
3.1.1.3 Symbol settings

In the similar way as with textual messages, user can select to display symbols of traffic signs, or sign's functions.

Traffic symbols (images) are grouped by their size in three categories:

- Large signs (resolution 88x88 pixels);
- Type 1 signs (resolution 74x74 pixels), and
- Type 2 signs (resolution 46x46 pixels).

NOTE: Large signs, unlike Type 1 and Type 2 signs, cannot be moved with directional arrows on the EURO VMS display, due to their size they can only be placed in display centre.

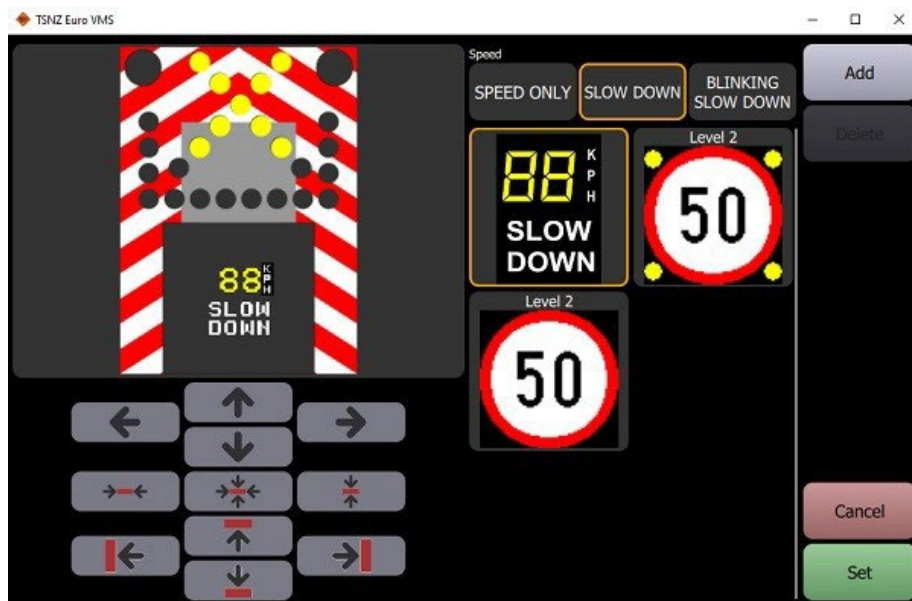


3.1.1.4 Function settings

Function includes three groups of display options: **SPEED ONLY**, **SLOW DOWN** and **BLINKING SLOW DOWN**.

SPEED ONLY option allows user to choose speed limit signs from 10kmh to 100kmh, and it shows speed limit symbol with pulsing red circle. Speed of pulsing can be chosen from options **Slow**, **Medium**, and **Fast**.

SLOW DOWN option shows recorded speed of vehicle on the display, as well as flashing text "SLOW DOWN" if the vehicle speed exceeds predefined speed threshold; this option is only available in **VMS Euro** operating mode!



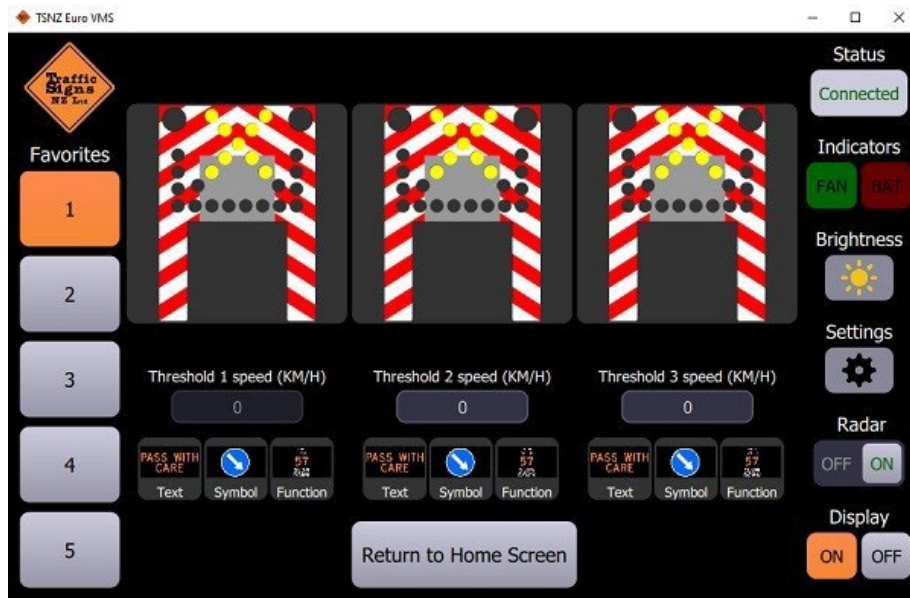
BLINKING SLOW DOWN option is similar to **SPEED ONLY** but instead of pulsing red circle blinking yellow corner flashers are shown with the speed limit sign.



After the users have chosen and appropriately positioned content which they want to display on sign, pressing green **Set** button in the lower right corner will show desired content on sign. Alternatively, if users have changed mind and don't want to save changes, they can press red **Cancel** button to discard changes. Saved content can afterwards also be saved in **Favourites**.

3.2“VMS Euro” mode

VMS Euro mode of operation is used for signs which have a Doppler radar for detection of vehicles. When chosen, this option opens a new home window with three images, which all have same functions and commands as **Standard Euro** mode. Each of these three signs displays represents a different speed threshold and they are shown to drivers if they exceed that threshold, i.e., if they exceed 30km/h, only a symbol of speed limit will appear, and if they exceed 50km/h a speed limit symbol with blinking yellow flashers will appear.



Setting of text, symbols or functions is the same as in previous mode of operation.

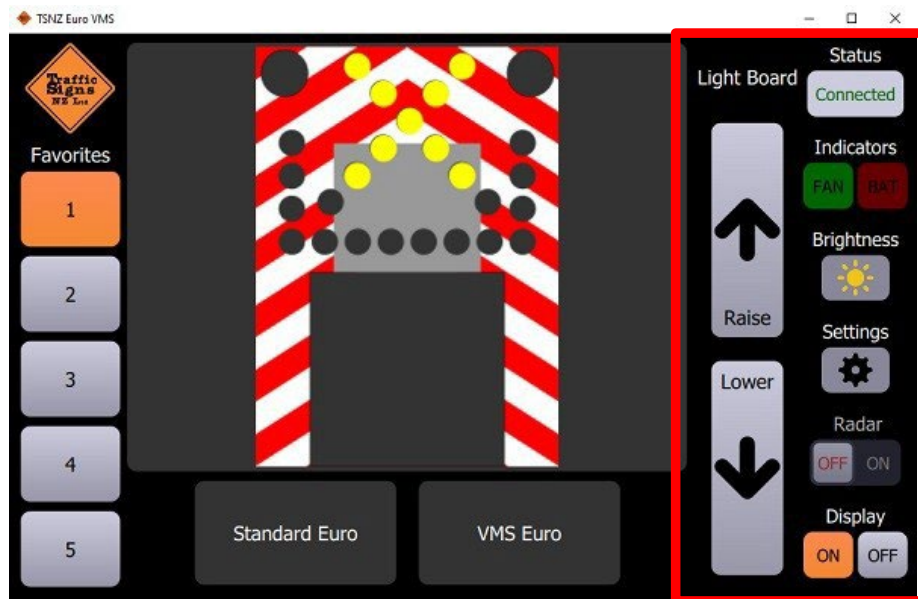
Measured vehicle speeds with warning message “SLOW DOWN” can be shown in this mode, with a different recorded speed for each vehicle that passes the sign.



3.3 Other controls and indicators

Different options for control and status indicators are on the left side of the UI:

- Sign connection status,
- Indicators for sign fans and battery,
- Brightness control, Settings,
- Radar On-Off slider,
- Display On-Off buttons and
- Buttons for raising and lowering of sign.



3.3.1 Brightness control

By pressing the **Brightness** button users can manually set predefined level of display brightness or choose some form of automatic brightness regulation (**Daytime**, which uses calendar settings, or **Sensor** which uses automatic regulation of display brightness via light sensor).



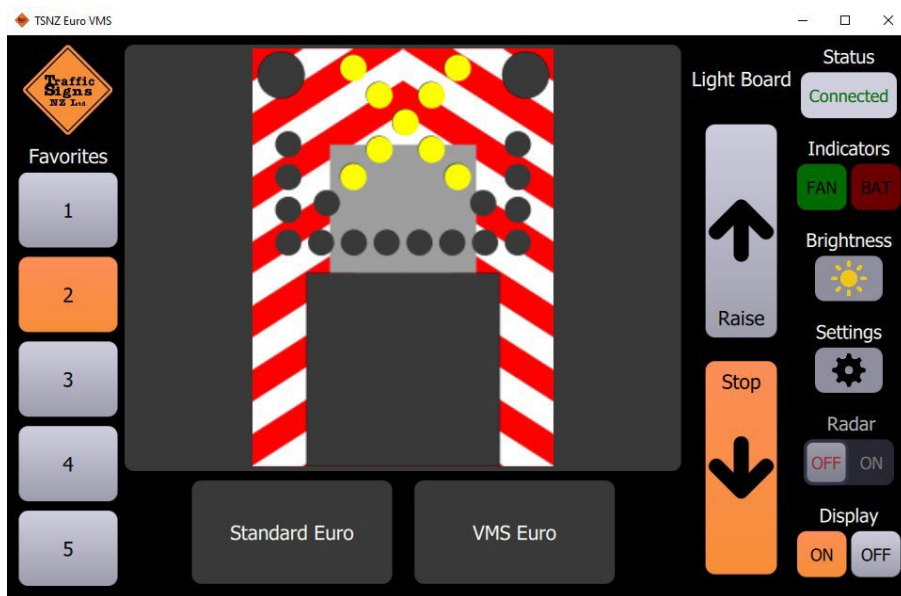
3.3.2 Radar On/Off slider

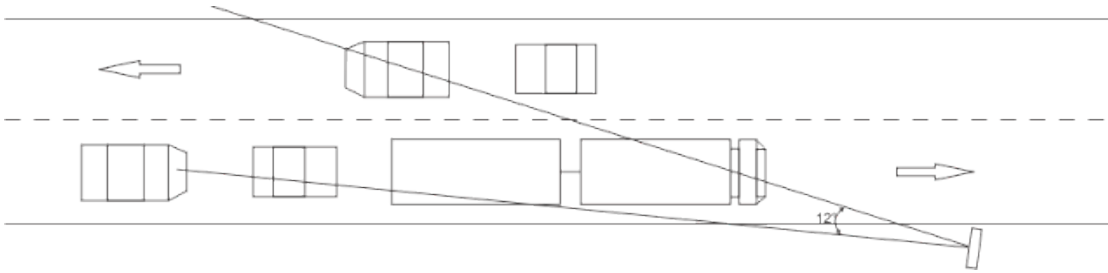
This slider can turn on or off Doppler radar, in signs which are equipped with them.

NOTE: This option is only available in **VMS Euro** mode.

3.3.3 Sign Lower/Raise buttons

Sign can be lowered or raised automatically on it carrying construction. In order to do this user has to press **Raise** or **Lower** button, after which the button changes color and the word "STOP" appear on it. If the user pressed the button again, sign will stop lowering or raising and button will regain its normal appearance.








When properly set radar can reach a distance range of about

250m for passenger cars in the free field. The distance at which the built-in radar measures an object, mostly depends on the size of an object, or more precise, on the size of the area which reflects radar waves back to the detector.

Generally, the distance range for trucks is due to the big truck front surfaces 50 to 100 % higher in compare to passenger cars, for motor bikes it will be 50 % and lower.

3.2 Electrical installation

Installation warnings

-  Carefully read the instructions for installation before switching on the device.
-  While closing the front door it is necessary to take care on tight fitting.
-  Device must be connected to grounded electrical socket

All cables should enter sign through cable glands at the bottom back side. There are two glands for main supply cable and communication cable.

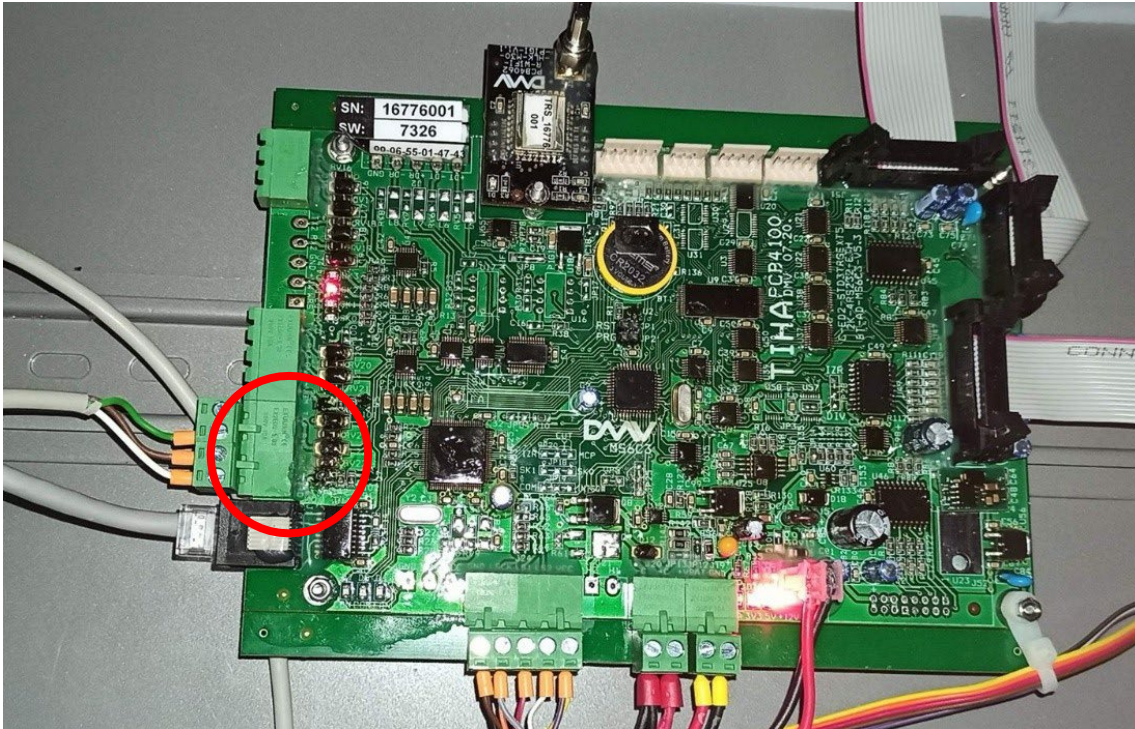
3.2.1 Power supply connections

Take into sign 24VDC. Main power cable using PG gland at the bottom of the sign. Locate three screw terminals for phase, neutral and earth wire. Trained person should attach wires to the terminals. Wire cross section allowed is up to 4mm².



3.2.2 Ethernet communication connection

By default, Ethernet connector on CPU board is connected to a cable which is used for direct external connection with tablet which has control software, via LAVA adapter which has USB Type C connector on one side (for connection with tablet) and power and Ethernet connector on the other side (for connection with sign) . On the lower image Ethernet connector is shown with the cable.

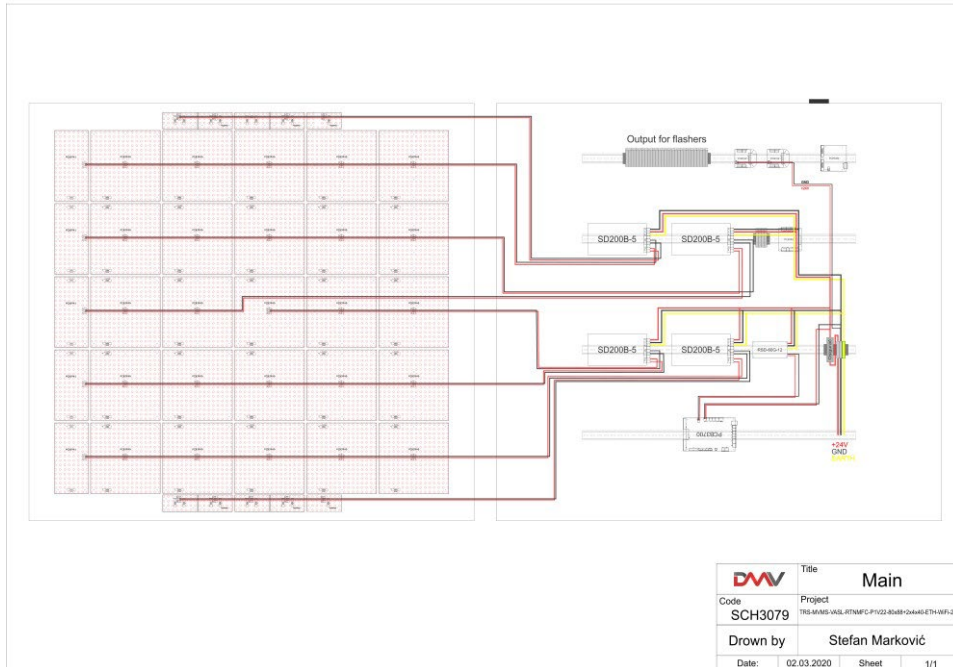


On the back of the sign, locate appropriate cable with Ethernet and power connectors and connect them with LAVA adapter, then use USB Type C cable to connect tablet to the adapter. On the lower images LAVA adapter front and back are shown, with Ethernet, power, and USB Type C connectors.



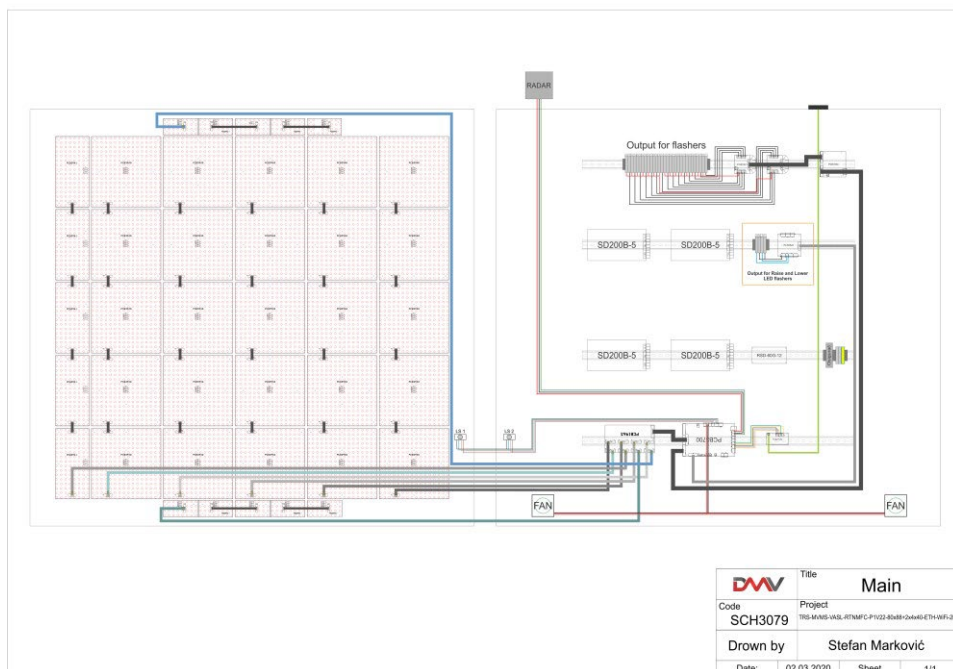
3.2.3 Connection diagram

Power Supply cable connection

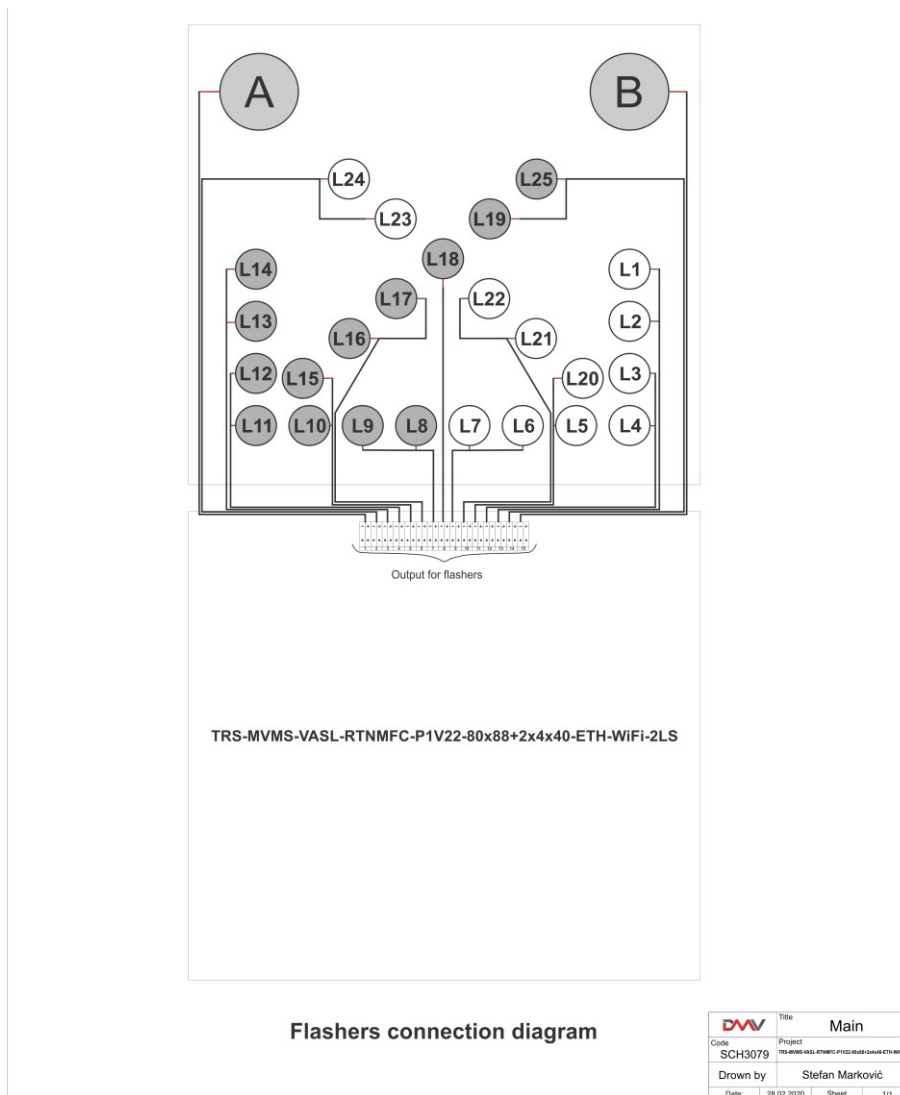


Connection diagram 1

Flet cable connection, radar and external flashers



Connection diagram 2



Connection diagram 3

4 MAINTENANCE

The sign is exposed to severe environmental conditions therefore regular maintenance is of essential importance for reliable and long-lasting operation. The manufacturer recommends a precautionary maintenance of the unit once a year in order to maintain the high quality and stability of product.

Recommended maintenance

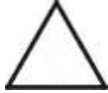
- Visually inspection of the housing for any damages
- Inspection of door sealing
- Clean front surface and light sensors (if installed)
- Control the drainage holes, if water is in the sign and is there any mark of water licking
- Control the functionality
- Setting the clock
- Download "All data" from the sign, save into excel file and send it to manufacturer or supplier

4.1 Cleaning

Regular cleaning of front plate is necessary for good visibility of the VMS. The frequency of cleaning is dependent from the pollution of the environment in which sign is used. We suggest cleaning of the front plate with warm water (temperature around 40 °C) and soft brush. If necessary, a neutral detergent can be added to warm water. In case that this is not sufficient we advise use of cleaning alcohol.

High-pressure cleaners may be used with a maximum working-pressure of 80 Bar at a distance of 150 cm. It is not allowed to direct the jet of water directly onto rubber sealing or ventilation openings.

Cleaning warnings



The device must not be cleaned with aggressive detergents and solvents!

4.2 Service and troubleshooting

Service warnings



Use only original spare parts recommended by the manufacturer of the TRS for replacement.



When replacing spare parts device must be disconnected from power supply!



Before starting any service try to connect to the sign, download "All Data" tables into excel file and save it. Data downloaded from the sign (LED error table, temperature table, event table, etc.) can help to find the cause of the problem and to prevent the same problem happen again!



Explain any non-trivial problem shortly and make few pictures of the device. Send the explanation to the manufacturer or supplier, along with the pictures, serial number of the device and "All Data" tables downloaded from the sign.



Carefully read the instructions for installation before switching on the device.



While closing the front door it is necessary to take care on tight fitting.

Service is performed on the level of parts replacement. Part replacement is usually done in following steps:

- Switch OFF the main power supply.
- 1 Open the sign.
 - 2 Check there are no phase voltages on the terminals.
 - 3 Remove the mechanical parts and connectors.
 - 4 Replace the faulty module.
 - 5 Close the sign.
 - 6 Switch ON the main power supply.

In order to open and close the sign use locker key.



To disassemble faulty module from the board, unscrew nuts and remove star washers.
During the service, special measures of ESD protection must be taken. Recommended regulations of EN 61340-5-1 and EN 61340-5-2 “Protection of electronic devices from electrostatic phenomena” should be applied.

Protection warnings

Do not touch any of electronic parts inside the device without proper ESD protection.



Use antistatic wrist straps to ground personal to common ground point.



Use antistatic gloves.



Use only ESD packaging for transport.



The use of antistatic wrist straps and antistatic gloves is shown in the following images.



4.3 Troubleshooting list

4.3.1 Display and controller related issues

Symptom	Inspection	Cause and correction
Few or more LEDs are not lighting	Turn off the device, then turn it on and after that watch the LEDs. Are they all ok?	If not, it is LED fault or display PCB damage. Please remove faulty display PCB/s and replace with new one.
	Turn on Demo mode and watch the LEDs. Are they all ok?	If not, it is LED fault or display PCB damage. Remove faulty display PCB/s and replace with new one with the same part number.
Device doesn't display anything	Turn off the device, then turn it on and after that watch the LEDs. Is "88" showed?	If not, it is LED fault or display PCB damage. Please remove faulty display PCB/s and replace with new one.
	Is +5V LED on CPU on? Check further is there 12V on CPU between +12V and GND.	If not, there is no input voltage. Recharge the battery with external charger and display will turn on again when voltage is enough high for input DC/DC converter of the CPU board. If there is voltage of around 12V, CPU board is faulty, replace the CPU board.
	Is +5V red LED on CPU board is lighting?	If not, power is disconnected. Connect power properly.
	If case with AC/DC power supply installed into the sign.	Check if red led on CPU board is lighting. If not, check is green LED is it lighting on power supply. If not, disconnect sign from mains and replace AC/DC power supply.
The device is often reset	Check Disk Error Code parameter	If its value 0, then check if device has uploaded scenarios. If it hasn't then upload dds file with scenarios.
The device has display issue or display is empty	Check Disk Error Code parameter	If its value different from 0, then upload firmware software. If device still has issue, then replace controller (CPU board).
Display LED segment doesn't work	Check LED boards	Display is consisted of display boards, vertically connected by data flat cable. The first display board is the bottom one, and the last is the top one. Therefore, if single display board has fault, it will cause fault of all above display boards in vertical segment. If single vertical segment doesn't work, use longer flat cable to over jump the first faulty display board in it and check if the rest of the display works good without it. If yes, replace the faulty display board. If no, go to next step
	Check power supply cable for LED board failure	If single vertical segment doesn't work, check if power supply cable of first faulty display board is properly connected. If not, fix the cable or connect it properly.
	Check flat cable	If single vertical segment doesn't work, check if input flat cable of first faulty display board is properly connected. If not, replace the cable or connect it properly.
	Check lower LED board failure	If single vertical segment doesn't work, use longer flat cable to over jump the display board below the first faulty one and check if the rest of the display works good without it. If yes, replace the faulty display board.

Symptom	Inspection	Cause and correction
	Check extension board	If two or more vertical segments don't work, check if all faulty segments are connected to the same extension board. If yes, replace the faulty extension board.
	Check supply unit failure	If two or more vertical segments don't work, check if all faulty display boards are connected to the same power supply unit. If yes, check if green indication LED on power supply unit lights up. If not, replace the faulty power supply unit.
LED boards in one vertical or horizontal line lite with different intensity then at others line	Check power supply unit of that LED boards line. Voltage is marked on unit.	If power supply unit has issue, replace unit.
LED board in one vertical or horizontal line lite with different intensity then at other LED boards in same line	Check LED board, replace the one correct LED board and incorrect LED board.	If the status of the incorrect LED board has not changed, replace the LED board with a new one. If after replacement correct LED boards becomes incorrect, replace flat cable or flat connector.

4.3.2 Brightness related issues

Symptom	Inspection	Cause and correction
Display brightness is low or high	Go to Brightness technique in Command Console and check brightness control method	Set appropriate method
	Go to Maintenance technique in Command Console and check light sensor	Light sensor dirty, clean light sensor. Light sensor error, replace faulty light sensor.
	Go to Maintenance technique in Command Console and see is battery voltage low?	If battery voltage is low current brightness is cut for 50% or minimal brightness to save energy. Please recharge the battery.

4.3.3 Communication related issues

Symptom	Inspection	Cause and correction
Bluetooth device cannot be found on scan	Is another laptop/PC connected to the sign? Is blue indication LED on CPU board? LED located near BT module	If yes, please break current Bluetooth connection first. Only One tablet/PC can communicate with sign at the same time. Please check power supply voltage. If voltage is ok and LED is not blinking, replace CPU.
	Is sign still connected in Command Console?	If not, please reconnect, by pressing on icon in right upper corner.

Symptom	Inspection	Cause and correction
Program cannot be read and written from/to device	Can sign be reconnected? Wrong serial configuration	If not, please go to Add new device in Command Console again, through Ethernet, RS232 serial, WiFi or Bluetooth communication Please check if PC is properly connected to serial connector of the sign. Please ensure that proper COM port and bound rate is selected in when adding device.
Sign is unreachable over Ethernet connection	Check device network parameters (IP Address, Subnet Mask, Gateway) Check Ethernet cable, switch or other network kit	Wrong network configuration, correspond to actual network. Ethernet cable disconnected or damaged, connect or replace Ethernet cable.
Device is not discovered	Is GPRS active? (SK1 LED indication should be red) Was serial communication being active before? (SK0 should be yellow) Are SK0, SK1 and SK2 off?	If yes, wait for GPRS communication to be finished and SK2 turn on again If yes, wait for about 30sec for SK2 to be green again. If yes, replace CPU board
Device IP addresses not visible (not available) to Add device in Command Console	Has the NetDevice Toolkit application been launched?	If yes, shut down NetDevice Toolkit application

4.3.4 Radar and battery related issues

Symptom	Inspection	Cause and correction
Device doesn't display anything	Are there vehicles passing or passed by the sign? Is battery voltage OK? Check with Command Console in Maintenance technique or measure voltage between +12V and GND Check threshold settings in Command Console Is RADAR red LED on? Is radar power supply voltage ok? Is Radar LED green when vehicles are passing by?	Wait for the next vehicle with the speed above at least first threshold to pass by the sign. If battery is lower than 9.32V, LED display intentionally turned off to save energy. Very low battery voltage. Recharge the battery with external charger and display will turn on again when voltage exceed 9.82V. Please check if there is defined showing for every speed threshold. If not and If there is around 12V voltage present on CPU board terminal +VR and cable is changed - replace the radar. Check CPU voltage on terminal, between +VR and GND, if there is about 12V - check cable If not, replace/reprogram Radar unit.
Radar statistics cannot be read from device	Go to Maintenance technique in Command Console and see is there disk error?	If yes, flash memory of CPU board is faulty. Replace CPU board

4.4 Safety

Safety



This product should be used only in accordance with the purpose of its manufacturing.



Unit must not be used in explosive atmosphere.



FIRE EXTINGUISHMENT: Devices under voltage must be extinguished with dust or CO2 fire extinguisher!

4.5 Recycling

This product will be considered as electronic waste when it is discarded after the end of its useful life. This means that this product must be handled pursuant to laws regulative of the state in which it became electronic waste.

4.5.1 Decomposition

Parts made of steel and aluminium as well as all the cables can be recycled.

Remove the filling material which is ecologically non-dangerous.

Printed circuit boards are non-recyclable.

4.6 Instructions for transport

Before the transportation the product must be protected with a bubble antistatic foil. Around the product a polyethylene protection should be attached and altogether wrapped up with a PVC packaging foil and packed into box. If handle carefully, box could be reusable.

Transport



Proper pictograms on the package, shown below, give instructions for handling during the transport. Those instructions must be respected during whole transport.



FOR TECHNICAL SUPPORT PLEASE CONTACT OUR ELECTRONICS TEAM

SERVICE PLANNER

M: 027 365 4452

E: service@trafficsigns.co.nz

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