



TSNZ FULL COLOUR VMS USER MANUAL

NZ PATENT No 755693

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TSNZ Operational Notes

- The Verdegro LTMA 70K must only be deployed on a vehicle combined with a TSNZ Full Colour Level 1 VMS board on Level 1 roads where a risk assessment has determined their deployment to be safe and appropriate for the road environment as detailed in the CoPTTM and the end users' HSW policies and procedures.
- The support vehicle must have a tare weight of between 2500kg and 5500kg and when stationary be deployed in "Park" or second gear with brakes applied.
- Appropriate training and SOP on the correct use and operations of the LTMA in a level 1 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 LTMA
- A confirmation of available roll-ahead distance of 10m, as a risk assessed minimum, must be provided for in all TMPs/TMDs and On-site records when deployed.
- The LTMA and FC VMS 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. 400 AH of battery supply is recommended for the system
- LTMA Power supply is 24volts
- Full Colour VMS supply is 24volts
- Full Colour VMS board featuring lower power consumption Polycarbonate LED lenses offer wider observation angles, better performance and longer lifespan.
- Can display 2 selected images or text with a further 1 line of text supplementary, provide concise feedback to road users of the work zone and activities carried out, with the ability to change within cab within 3 seconds.
- 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 frame.
- Refer to warranties and specifications for both operational user manuals.

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Main features

| | |
|-------------------------------|---|
| Certificate | EN12966-1:2005+A1: 2009. |
| Type of sign | Traffic colour sign, consists of full colour LED matrix field Shows pictograms and text in six traffic colours – white, yellow, green, orange, red and blue. |
| LED | LEDs with high luminous intensity and long life time. |
| 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 2 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 sensors 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 depend on implemented hardware: VMS reset, maximal and minimal temperature in the cabinet, cooling and heating system activation, messages displayed, malfunctions as – LED error for each individual LED per each colour, light sensor malfunction, overheating, communication errors. Precise time when each log happens also is recorded in the VMS memory. |
| Cooling | Air circulation cooling with fans with air filters and vents. |
| Interfaces | Serial RS232 and WiFi communication WiFi includes: WiFi module integrated into the sign and anti vandal antenna. Sign can communicate with tablet or laptop with WiFi communication. Distance range is up to 100 m. |
| Power consumption | Maximum consumption (when all LEDs are turn on in white color at maximal brightness): 380W Average consumption (when the sign displays realistic scenario- some text or pictogram): between 60- 150W |
| Power supply | 24VDC |

Mechanical features

| | |
|---------------------------------|--|
| Housing dimensions (VxH) | 1130 x 1710 mm |
| Approximate weight | ~ 70 kg |
| Material | Aluminium AlMg3, powder coated housing, resistant to aggressive atmosphere and permanent presence of dust, rain and/or snow. |
| Housing colour | Gray, RAL 9007 |
| Front colour | Black, RAL 9005 |
| Physical performance | T1, T2, T3 / P3 in accordance with EN12966 |
| Resistance to pollution | D3 in accordance with EN12966 |
| Opening | From the front side. |

Optical features

| | |
|---|---|
| Optical performance in accordance to EN12966 | Luminous intensity: class L3 / L3(*) / L3 (T) Contrast ratio: class R3 Beam width: class B6 Colour: class C2 |
| LED currents | Less than 15% of nominated current for each colour. This provides very long life time of LEDs. Constant current LED drivers, stable luminance, independent of the mains voltage tolerances. |
| LED protection | UV resistant lenses for each LED. |

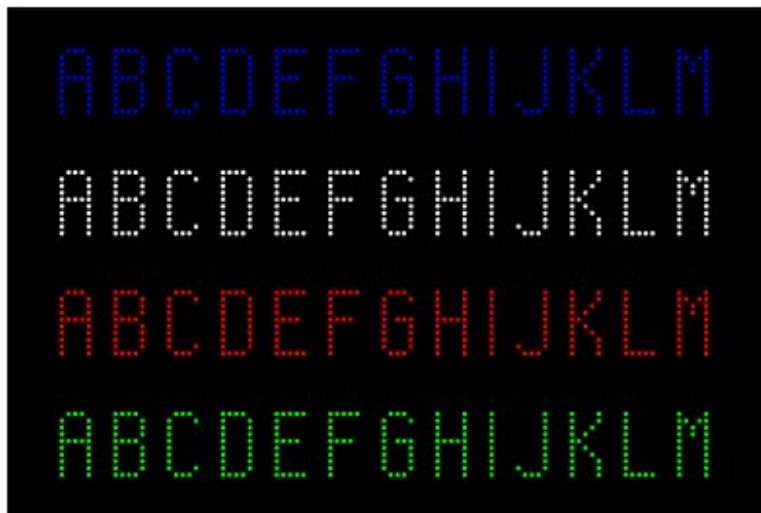
Display features

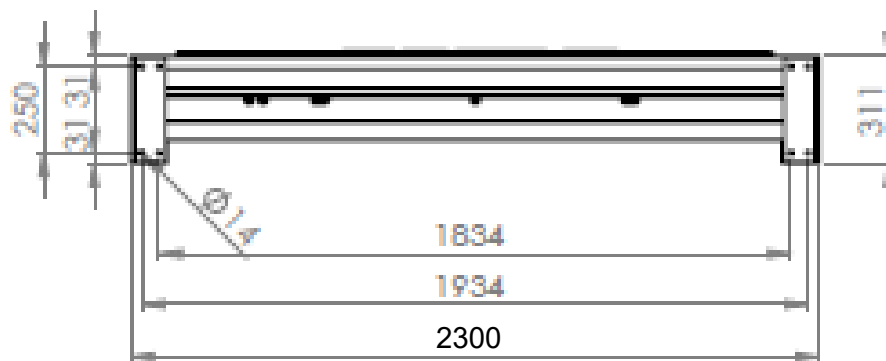
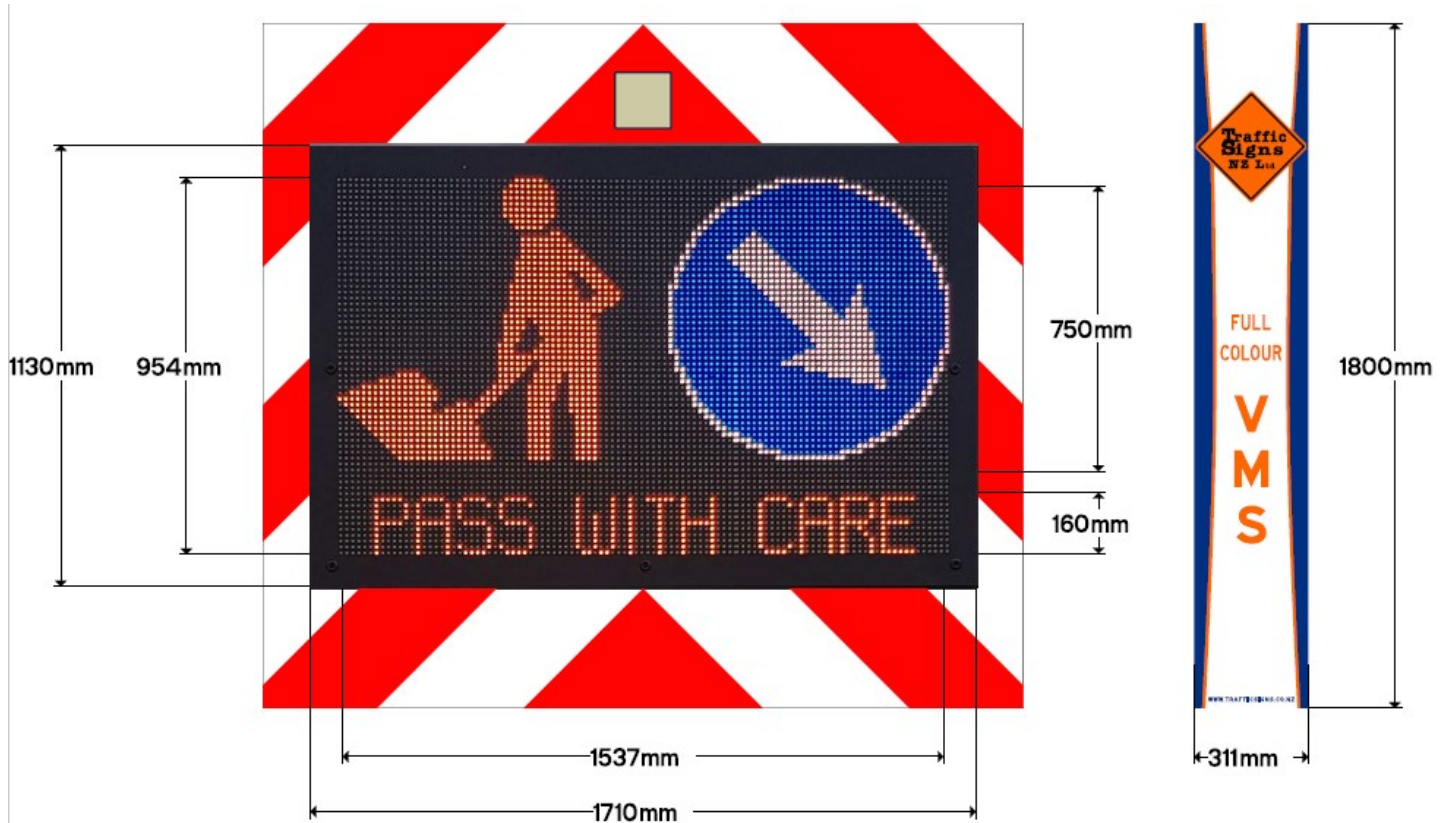
| | |
|-------------------------------------|-----------------|
| Resolution | 64 x 104 pixels |
| Pixels pitch | 15 mm |
| Matrix field dimension (VxH) | 960 x 1560 mm |
| Pixel composition | 1 SMD LED |

Operation

| | |
|-------------------------------------|---|
| Pictograms and text messages | VMS is able to display all character heights and types and all standard traffic sign pictograms. A number of available pictograms and text messages in display memory. User can create its own message, font or pictogram. VMS supports English characters. Possible to change alternatively 2 or more pictograms/messages with programmable intervals. Possible to display 4 lines with 13 characters (characters height 150 mm). |
|-------------------------------------|---|

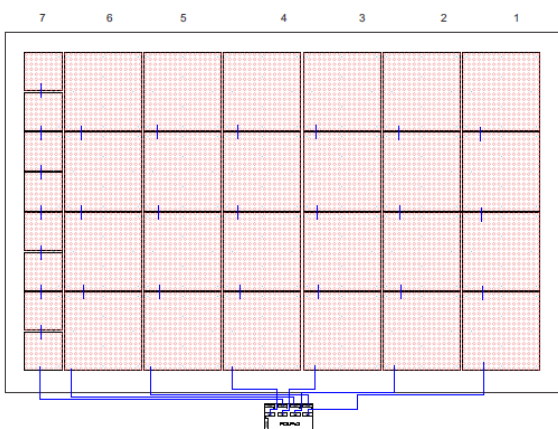
Possible scenario



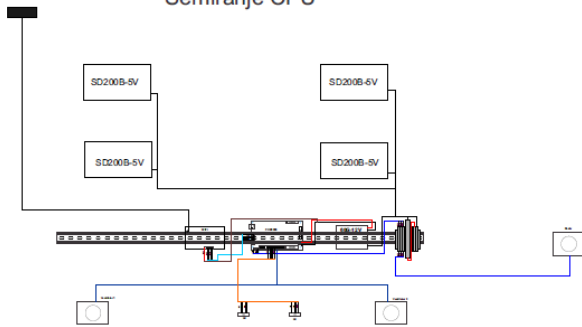


NOTE: Hardware required to bolt down frame must be M12 838

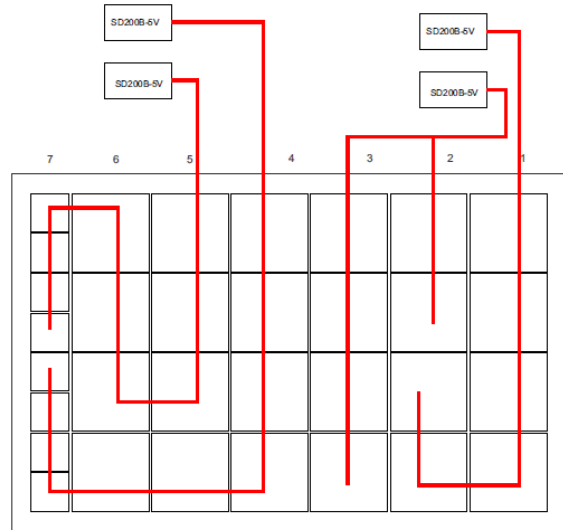
Front-pogled od pozadi



Semiranje CPU



Ozicenje 5V



1 Introduction

TSNZ VMS Display is an Android and Windows application for controlling RGB matrix signs over cable (serial/ethernet) and Wi-Fi.

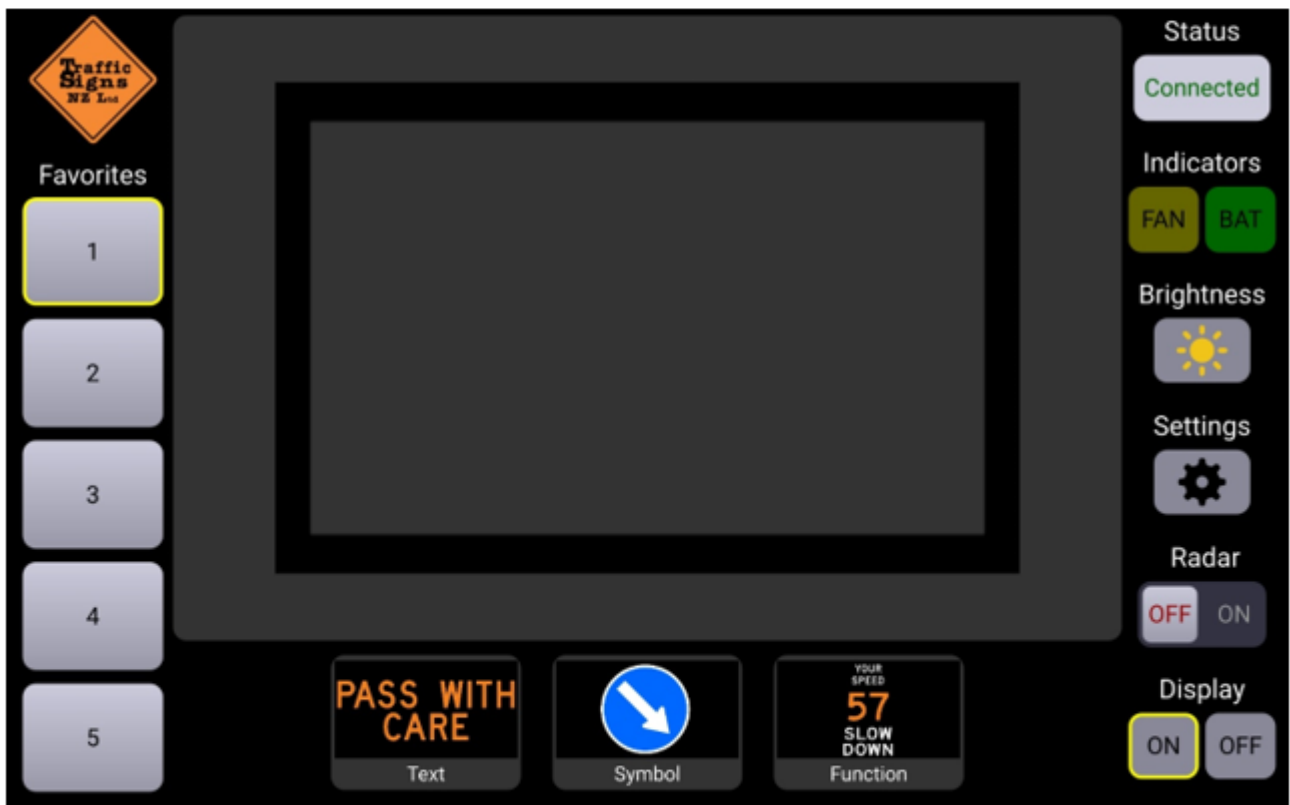
Each tablet is configured to be used with only one device identified by its serial number.

The tablet and application will be provided to the end user with serial number and communication parameters pre-configured.

User can choose if they want to communicate with the sign via cable or wirelessly and the application will handle that automatically.

2 Main screen

On startup, the main screen interface is displayed. This screen enables the operator to configure the display and behavior of the sign in a simple and intuitive way.



In the center of the screen there is a preview of the sign display. This preview is always live and exactly replicates the content on the display.

2.1 Favorites

On the left-hand side of the main screen there is a list of favorites. At any time only one favorite is active, and any changes made are automatically saved. User can switch between favorites by clicking a favorite number and confirming the activation.



2.2 Text, Symbol, Functions

Text, symbols and functions can be added to display by clicking on one of the buttons below the display preview (for detailed instructions see sections 3, 4 and 5 respectively).

2.3 Indicators

Connection status, fan and battery indicators are in the upper left corner. If a connection is lost this will be displayed in the connection indicator and fan and battery indicators will change colour once the temperature and voltage thresholds are reached.

2.4 Display on/off

Display can be turned on or off by clicking on these buttons. The configured content of the display is not lost by turning it off and will be restored when turned back on.

2.5 Radar

Radar activation can be turned on or off. When off, the sign will have one fixed display which is shown on main screen.

When turned on, sign display will be vehicle activated.



User can configure the speed thresholds and display for each threshold. When no vehicles are present the first threshold behavior will be active on the display. When a vehicle is detected it will activate one of the thresholds.



2.6 Brightness

Brightness level of the display can be set to a fixed value, daytime mode and light sensor mode (recommended).



2.6.1 Fix brightness method

If want to set fix brightness value position this method as a first one (top position) and the brightness will be set by slider. Brightness will be constant and defined in percentages, from 1 to 100. It can be fine adjusted by + and – buttons.

When daytime brightness regulation is active, brightness depends on actual time, date and geographical location where sign is installed. It takes into account daytime changes during whole year for particular location. One location per country or in 500km circle in the same time zone is good enough.

2.6.2 Daytime dependence method

For better understanding of Daytime dependence method, let's consider the terms of "day", "night" and "twilight". The "day" is the period between the morning and evening moments when the centre of the sun is geometrically on the horizon (sunrise and sunset moments). The "twilight" is the interval of few minutes (15-20min) before the start of the day and after the end of the day. The rest is "night". So, every day has four characteristic time points:

- X1 – Twilight begin
- X2 – Day begin, sunrise
- X3 – Day end, sunset
- X4 – Twilight end

And consequently, every single day is divided to five intervals:

Interval between 00:00 and X1 – is "night", external illumination is low. During this interval brightness is constant and equal to value defined by parameter „Minimal [brightness](#)“.

Interval between X1 and X2 – is morning “twilight”, transition from night to day. External illumination is changing from low to high. During this interval brightness is increasing linearly from value defined by parameter “Minimal brightness” to maximal brightness, 100%.

Interval between X2 and X3 – is “day”, external illumination is high. During this interval brightness is constant and equal to maximal brightness, 100%.

Interval between X3 and X4 – is evening “twilight”, transition from day to night. External illumination is changing from high to low. During this interval brightness is decreasing linearly from maximal brightness (100%) to value defined by parameter „Minimal brightness “.

Interval between X4 and 24:00 – is “night” again, external illumination is low. During this interval brightness is constant and equal to value defined by parameter „Minimal brightness “.

User can see device geographical location on the method bar and critical moments during whole year if pres on “Sunrise/Sunset moments” button.

Example Table – Sunrise/Sunset moments is shown in next example:

| Month | Sunrise, Sunset and Twilight moments | | | |
|-----------|--------------------------------------|------|-------|-------|
| | X1 | X2 | X3 | X4 |
| January | 7:01 | 7:16 | 16:08 | 16:23 |
| February | 6:43 | 6:58 | 16:46 | 17:01 |
| March | 6:01 | 6:16 | 17:25 | 17:40 |
| April | 5:05 | 5:20 | 18:05 | 18:20 |
| May | 4:13 | 4:28 | 18:43 | 18:58 |
| Jun | 3:41 | 3:56 | 19:17 | 19:32 |
| July | 3:41 | 3:56 | 19:28 | 19:43 |
| August | 4:09 | 4:24 | 19:05 | 19:20 |
| September | 4:45 | 5:00 | 18:16 | 18:31 |
| October | 5:21 | 5:36 | 17:19 | 17:34 |
| November | 6:01 | 6:16 | 16:27 | 16:42 |
| December | 6:40 | 6:55 | 15:59 | 16:14 |

DMV usually takes care about sunrise/sunset moments for particular geographical location where the display will be installed and table is not editable, but in some cases the table is editable, and user can enter the moments.

2.6.3 Brightness controlled by ambient light

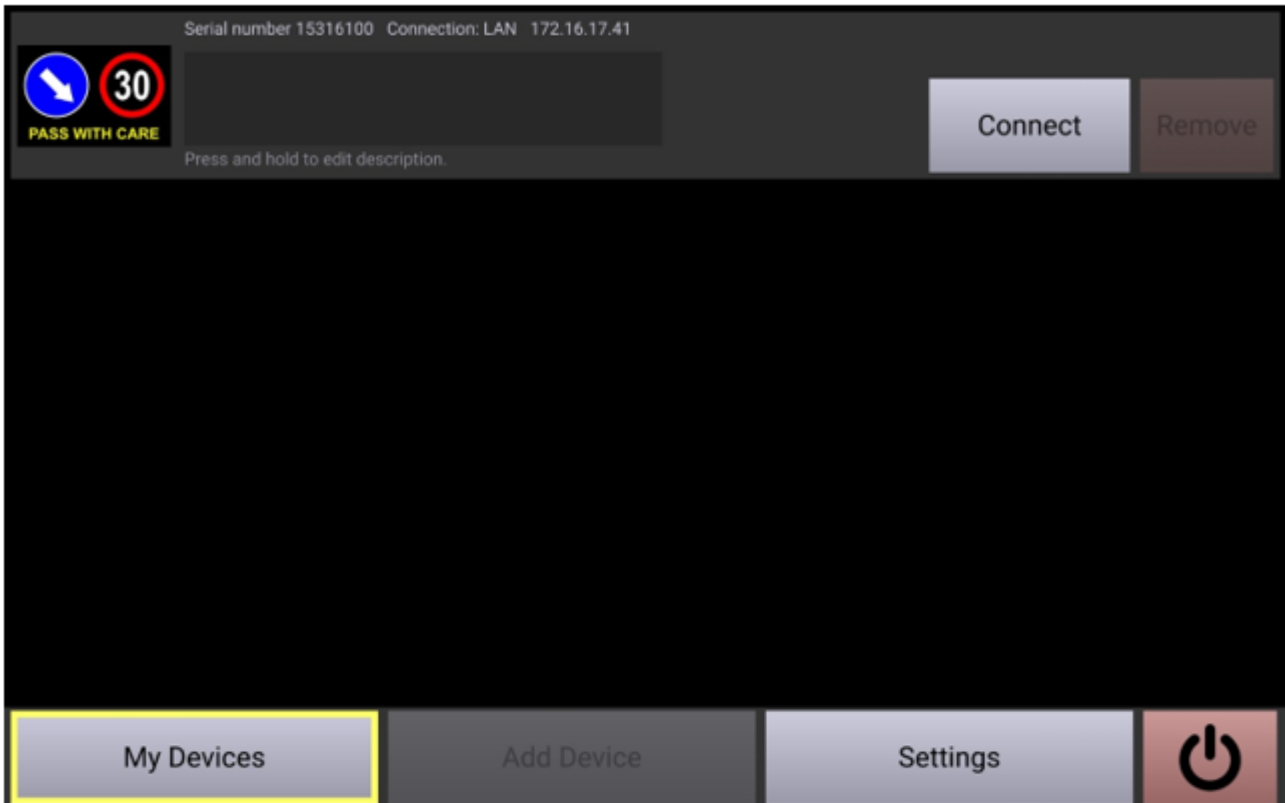
In this method, display brightness depends of external illumination measured by light sensors. Display can have one or two built in light sensors (usually one on front and one on rear side of the housing) measuring external illumination in a range from 0 to 64.000 Lux. Display brightness will be adjusted to the measured external illumination. In case of two light sensors, higher measured value will be taken into account. In order to prevent sudden and frequent brightness oscillations caused by car light illumination or similarly, display is averaging light sensor values in 10 seconds interval.

The device detects light sensors failure and also detects if the sensor is dirty and its measurement cannot be considered as relevant. In case of failure of one light sensor, another one will keep on working and the method will be functional. In case of failure of all light sensors, sign will switch automatically to next brightness regulation method with the highest priority.

Advanced users can also adjust Brightness Regulation Curve. This is the function how display converts measured ambient light (Sun illumination) into its brightness. The function is linear in range from Darkness illumination to Bright day illumination and rises from Minimal brightness to 100%. If external illumination is lower than Darkness illumination (parameter) display brightness will be Minimal brightness (parameter). If external illumination is higher than Bright day illumination (parameter) display brightness will be 100% (or Maximal allowed brightness, if such parameter exists). Between those two values display brightness will linearly depend on External illumination. All those parameter values can be set in “Regulation Curve Settings”.

2.6.4 Settings (advanced)

Advanced settings are password protected. To access them login credentials provided by TSNZ are required.



Once logged in, user can connect to the sign and access advanced features – e.g. Text Editor.

2.7 Text

Operator of the application has access to predefined texts and ability to add, remove and position them on the display.

Advanced users can manage predefined texts (remove/add, change font/color) by accessing advanced settings, connecting to the sign and opening Text Editor.

2.8 Displaying text

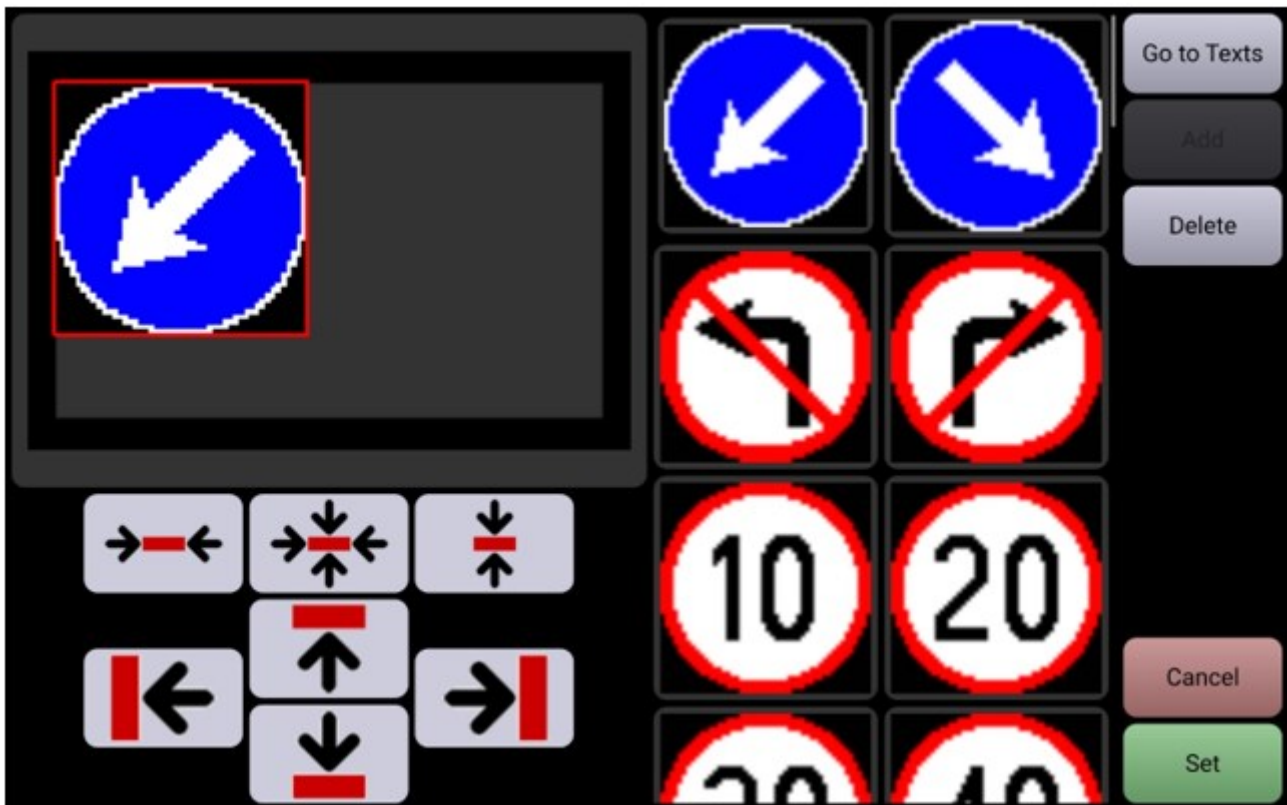


2.9 Defining text



2.10 Symbols

On Symbols page user can select one of the pre-loaded pictograms and position them on display. Up to two symbols can be displayed at one time.

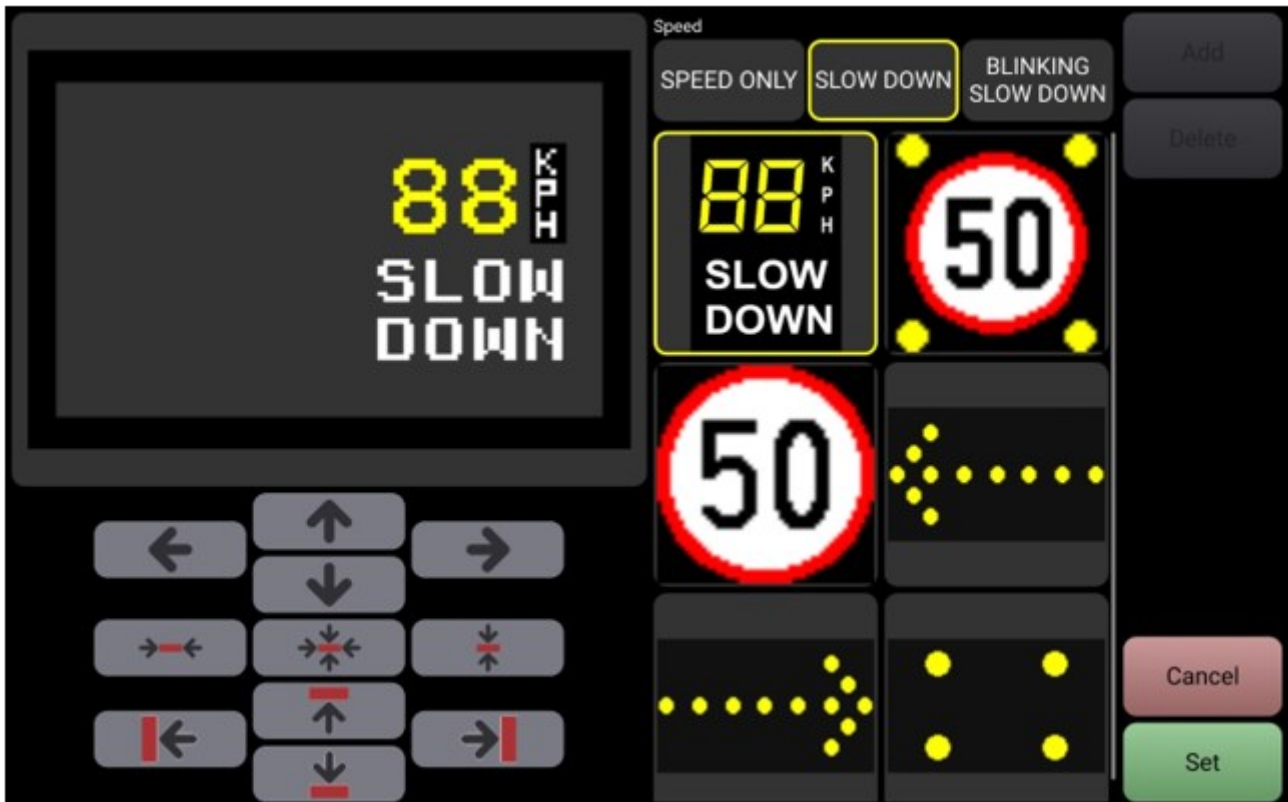


1. Functions

1.1. Radar feedback

User can select one of three variants of radar feedback function:

- Speed Only - Displays current vehicle speed and KPH symbol
- Slow Down - Displays current vehicle speed and "slow down" text below
- Blinking "Slow Down" - Displays vehicle speed and blinking "slow down" text below

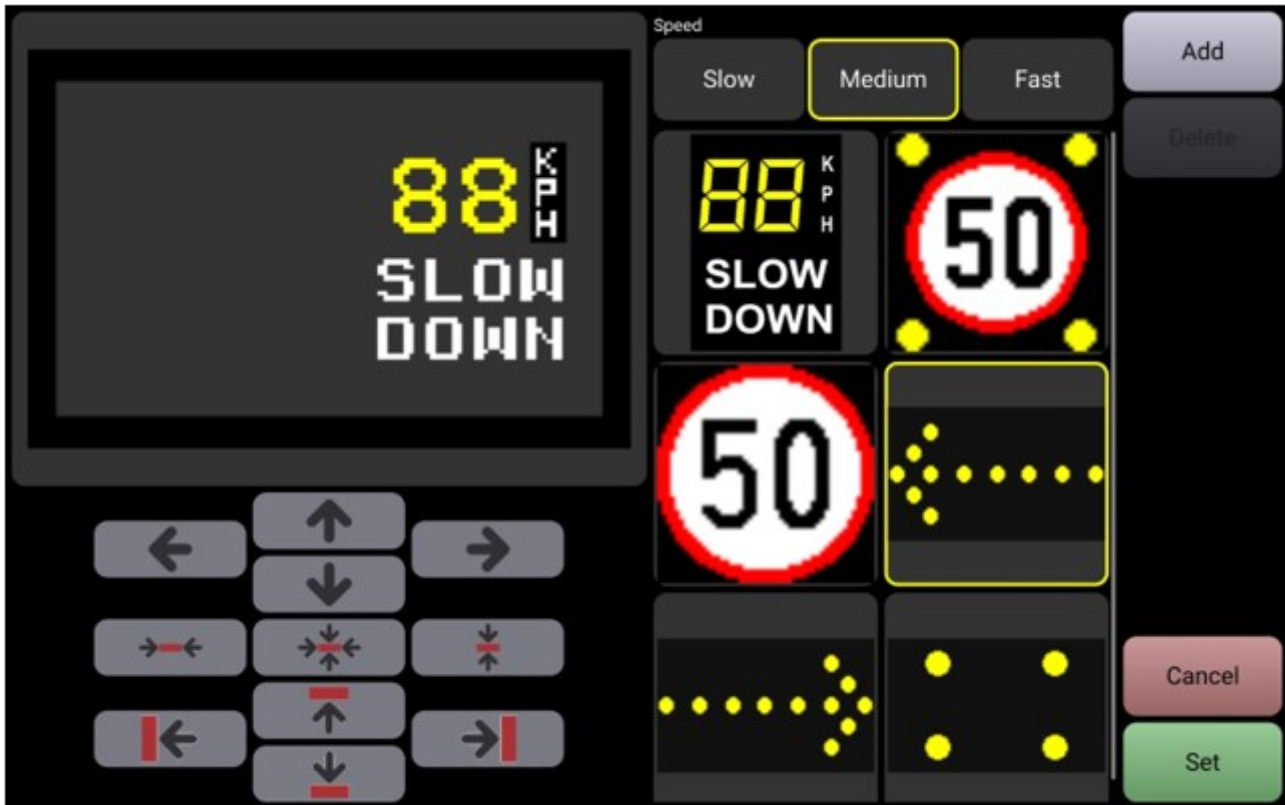


1.1. Speed limit

User can select speed limit symbol with surrounding flashers or speed limit with flashing red ring. Before adding to display user can select the flashing speed.

1.2. Animated arrows and pulse

Animated arrows and pulse are full screen functions. When added to display all other elements will be cleared. User can choose the speed of animation before adding.



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