



TMB-134 RADAR USER GUIDE

Vers. 1.3.2

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FIGURES



Figure 1: delivery



Figure 2: identification label



Figure 3: serial number label



Figure 4: rear face, LV and MV versions



Figure 5: rear face, HV version

THEORY OF OPERATION

The TMB is a microwave sensor for traffic management available in different configurations according to the applications (intersection management and traffic data collection).



intersection



data collection

The TMB-134 is a microwave sensor for intersection management. The output consists of a RS-485 protocol which provides information on the virtual loops that are triggered on movement or when vehicles stop at the stop line. The information sent over RS-485 can be converted in dry contacts by using the optional relay board with 9 dry contact outputs.

A scaled-down version of the TMB-134 also exists with 3 internal relays.

1. Unpack the unit and check that the following items are in the box, see Fig. 1, p. 5:
 - A. Radar with rear side socket
 - B. Sticker for front face closure (optional for some configurations)
 - C. Cable(s) with connector
 - D. Mounting bracket
 - E. User's guide and Tune up procedure
2. Assemble the unit with the bracket (see "Tune up procedure").
3. Place the radar on the field according to configuration and to the specific tune-up procedure.
4. Connect the cable(s) according to title WIRING, p. 7.
5. Power the radar.
6. If a configuration software is available, configure the radar using the accompanying software
7. The front face sensor LEDs will switch on when a detection is made according to the application and the chosen settings.

SAFETY PRECAUTIONS

Only skilled and instructed persons should carry out work with the radar product. Experience and safety procedures in the following areas may be relevant:

- Working with mains power
- Working with modern electronic and electric equipment
- Working at height
- Working at the roadside or highways

Please follow these safety precautions:

- Make sure the electricity supply is within the range shown on the label and the manual of the product.
- All connections must be made whilst the power supply is switched off.
- Ensure the wiring is correct as shown in the manual before switching on the power supply.
- Never use a damaged radar.
- Opening the outer casing is deemed dangerous and will void all warranties.
- Ensure the radar is mounted correctly and the screws and bolts of both radar and bracket are firmly tightened. The radar needs to point to the region of interest for proper detection.
- Ensure the radar is configured properly.

WARNING: For the HV version of the radar, a Residual Current Device (RCD), also known as the Residual Current Circuit Breaker (RCCB), with a tripping current not exceeding 30 mA must be installed in the supply circuit.

WIRING

LV (12-60 VDC – 10-30 VAC) & MV (21-75 VDC – 15-54 VAC) & HV		
PIN nr	Color	Function
1	RED	Power ~ (AC), + (DC) (LV and MV only)
2	BLACK	Power ~(AC), - (DC GND) (LV and MV only)
3	WHITE	COM Relay *
4	GREEN	X
5	BROWN	GND RS-485
6	BLUE	RX Radar (RS-232) (not used)
7	YELLOW	TX Radar (RS-232) (not used)
8	ORANGE	B (TX/RX –) (RS-485)
9	PURPLE	A (TX/RX +) (RS-485)
10	PINK	NO Relay 1 *
11	TURQUOISE	NO Relay 2 *
12	GREY	NO Relay 3 *

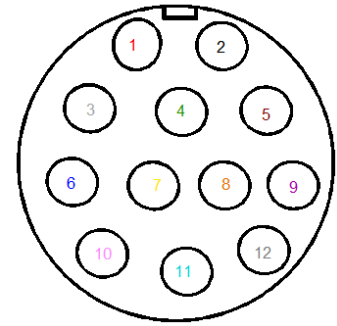


Figure 6: TMB-134LV/MV/HV radar connector - Weipu SA2012

See Fig. 4, p. 5.

* For the version with internal relays only

HV (100-240 VAC)		
PIN nr	Color	Function
1	BLUE	~ Power Supply
2	BROWN	~ Power Supply
3	YELLOW/ GREEN	EARTH
4	x	
5	x	
6	x	
7	x	

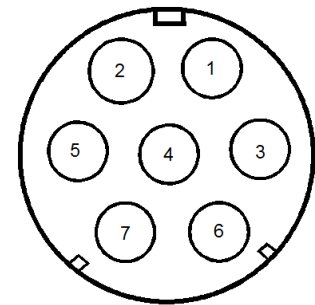


Figure 7: TMB-134 HV radar connector - Weipu SP2112/P7

See Fig. 5: rear face, HV version, p. 5.

USER'S OUTPUTS

Depends on the radar configuration, see "Tune up procedure".

REMARKS

- Make sure the plug is fully inserted in the socket and the cap is firmly tightened on the socket.
- Please disconnect the radar from power before maintenance intervention.

TMB-134 CONFIGURATION – TUNE UP



intersection

The TMB-134 is a microwave sensor for intersection management. The output consists of a RS-485 protocol which provides information on the virtual loops that are triggered on movement or when vehicles stop at the stop line. A version of the TMB-134 exists with an output with 3 relays linked to three detection zones.

The information sent over RS-485 can be converted in dry contacts by using the optional relay board with 9 dry contact outputs.

I PARAMETERS DESCRIPTION

I.1 REGION OF INTEREST AND AZIMUTH

The Region of Interest (ROI) allows to define the detection zone and disregard anything detected outside the zone. Not only does this make the configuration easier, it also allows the radar to avoid using internal resources (track allocation, memory and computing capacity) for moving objects outside the Region of Interest.

The azimuth is the angle at which the radar is installed in relation to the direction of the vehicles. Setting the azimuth allows to have vertical tracks on the graphical interface, and to position loops longitudinally in relation to vehicle tracks.

I.2 VIRTUAL LOOP SIZE AND POSITION

The TMB-134 radar emulates one or more virtual loops.

Each virtual loop can be set in the software using a mouse or by editing the coordinates x_{min} , x_{max} , y_{min} and y_{max} representing the x and y values compared to the (0,0) point which represents the radar.

When a movement is detected in any configured virtual loop, the radar will update the value of the corresponding register. When polled, the radar will respond with the register value which is then communicated through the RS-485 channel. When there is no vehicle, the register value for the virtual loop is set to 0. The communication protocol is detailed in a separate document.

I.3 FUNCTION OF THE VIRTUAL LOOP

The virtual loop can be set to apply different type of functions:

- a. Movement detection: up to 70 meters from the radar installation point
- b. Movement and presence detection: up to 50 meters of the radar installation point, 1 per lane only, the closest to the stopline.

I.4 MAXIMUM RELAY HOLD TIME

This setting defines the maximum hold time for the relay register for "movement and presence" virtual loops. After this maximum time, the radar will reset the relay, regardless of the presence of a vehicle. If there is no relay (radar with serial output only), the virtual contacts hold time can be defined as well.

I.5 RF CHANNEL

This parameter allows to shift the radar's frequency. If two units face each other, they must be put on different channels as to not interfere with each other.

2 LED INDICATOR

2.1 VERSION WITHOUT INTERNAL RELAYS

- The red LED lights up if any "movement" virtual loop is activated
- The green LED lights up if any "movement and presence" virtual loop is activated.

2.2 VERSION WITH 3 INTERNAL RELAYS

- The red LED lights up when virtual loop 1 is active.
- The green LED

- flashes slowly when loop 2 is active (and loop 3 is inactive). The flashing frequency is approximately 2 flashes per second.
- flashes rapidly when loop 3 is active (and loop 2 is inactive). Flash frequency is approx. 8 flashes per second.
- lights up continuously when loops 2 and 3 are active

3 INSTALLATION GUIDE

3.1 GENERAL

- Installation height: min. 3 m - max. 5 m. The installation height must be chosen in order to avoid masking of the transverse traffic.
- Distance between pole and the stop-line (D): minimum 14 m
- ●: aiming point, at 20 m behind the stop-line
- If improperly installed, radars can interfere with each other. Installation of multiple radars sharing the same frequency band requires channel configuration. Please contact your reseller for any guidance.

These are the most common ways to install the radar:

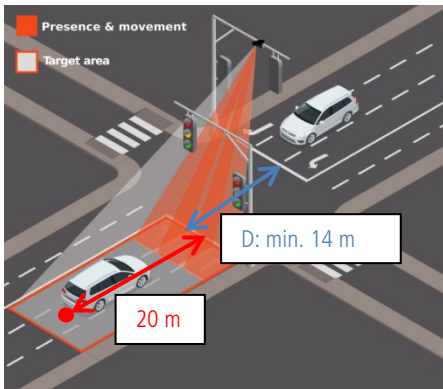


Figure 8: installation of the TMB-134, above the lanes

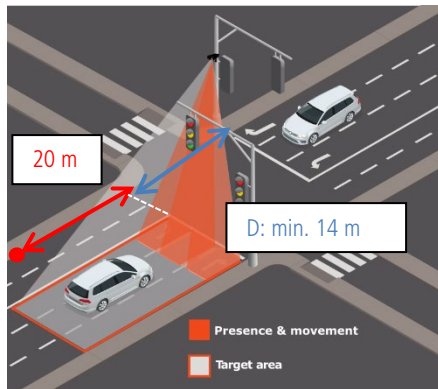


Figure 9: installation of the TMB-134, at the left side of the lanes

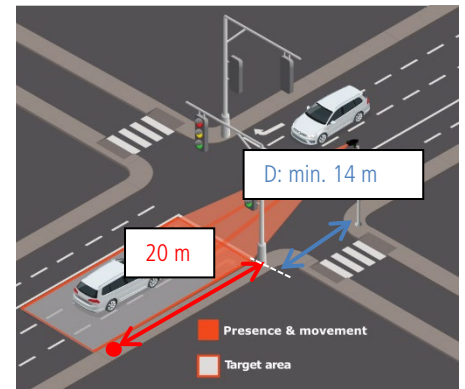


Figure 10: installation of the TMB-134, at the right side of the lanes

3.2 ASSEMBLY AND MOUNTING

Point the radar upper part parallel with the curb and aim about 20 meters behind the stop-line (refer to Figure 8, Figure 9 and Figure 10).

3.3 KEY POINTS

- Lanes: up to 4 lanes
- Direction: approaching
- Virtual loops: up to 9 loops
- Max. number of objects tracked simultaneously: 20 vehicles or bicycles
- Detection mode: movement and presence
- Detection range: 70m
- Maximum detection speed: 99 km/h
- Minimum detection speed: 3.4 km/h
- Minimum vehicle tracking speed: 3.4 km/h
- Range resolution: 0.25m

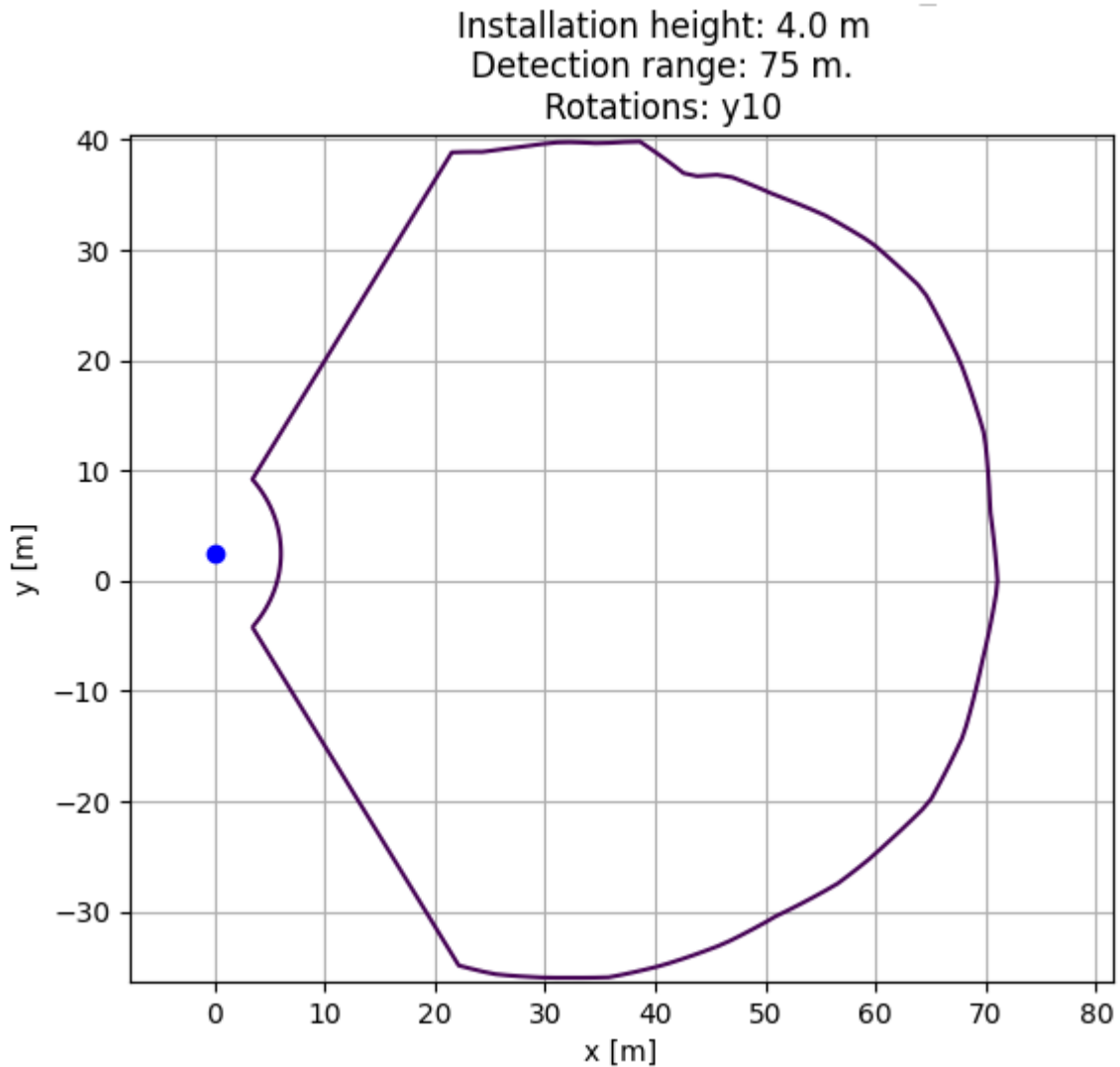


Figure 11: Graphical representation of the detection lobe

4 CONNECT THROUGH WIFI

While standing close to the powered device, search for the Wifi network named "TMB-134-xyz" with xyz being the serial number of the device. This allows to differentiate between devices if more than one device is present nearby.

The default Wifi password to connect is "icomsgateway".

4.1 LOGIN PAGE

- Browse to the URL <http://192.168.0.1> to access the login page. **Do not use HTTPS.**
- Choose the language and use the default password "icomsgateway"
- When logging for the first time, the device will ask to change the password to secure the login.



Please ensure you save the new password to avoid being locked out of the user interface.

Figure 12: Log in page

4.2 PASSWORD RESET


- Contact your reseller and share the serial number of the device to receive the recovery password
- Navigate to <http://192.168.0.1/reset-password> and key in the recovery password as well as the new password.

Recovery password	<input type="text"/>
New password	<input type="text"/>
New password confirmation	<input type="text"/>
	<input type="button" value="Reset password"/>
Language	English <input type="button" value="v"/>

Figure 13: Password reset page

5 DETECTION AREA SETTINGS

5.1 DEFINE THE REGION OF INTEREST

The Home button  shows the detection configuration page as shown in Figure 14.

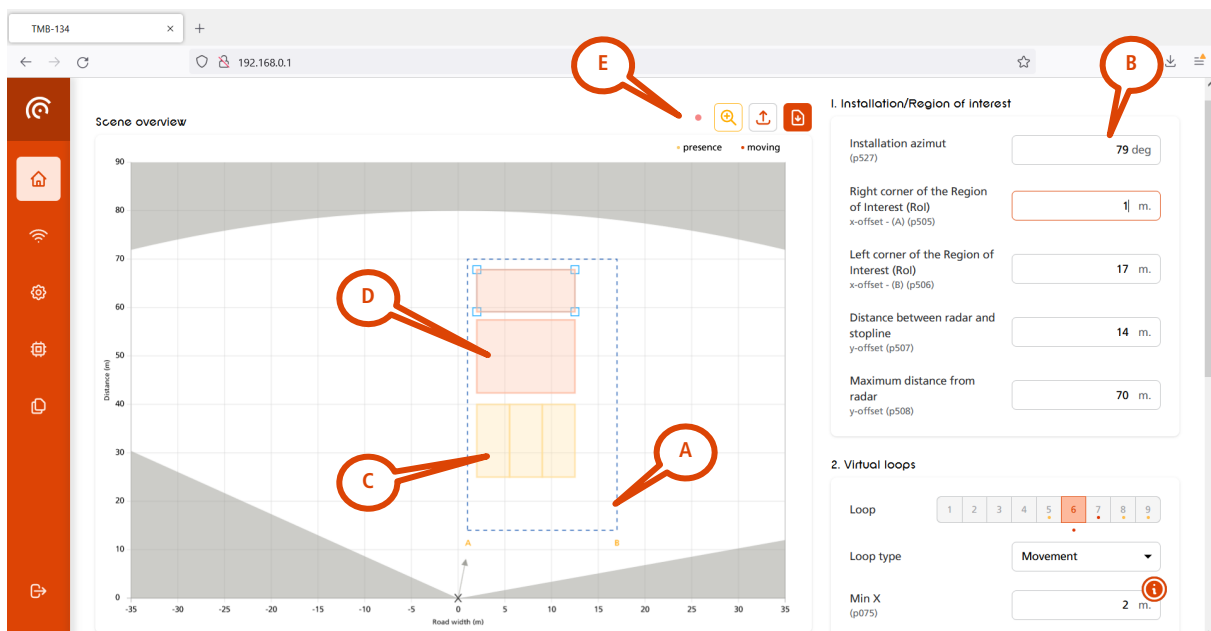


Figure 14: defining the region of interest

The first step is to define the "Region Of Interest (ROI)" (A) depicted in blue dotted lines on Figure 14 and to size this area as close as possible to the lanes to be monitored. The purpose of this step is to avoid unwanted detections, from counterflow traffic, reflections, pedestrians on the footpath, etc.

In the example hereabove, the parameters for ROI configuration are set as follows (B):

- Radar installation azimuth (change this value if the radar angle towards the road differs, see 5.2): 90°
- Road rightmost corner offset compared to the radar installation point: 1 meter
- Road width: 17 meters
- Stopline distance from radar: 14 meters

Once the ROI is defined, save the setting by clicking the "Save the ROI" button on the right of the screen.



Figure 15: save the region of interest

Additional graphical elements:

- (C) : Presence and movement loops are shown using yellow rectangles. When a detection is occurring, the rectangle lines are depicted in bold. The loops can be dragged to the location of your choice using the mouse. It is also possible to use coordinates to define the location of the loops, see the section below for further details.
- (D) : Movement loops are shown using red rectangles. When a detection is occurring, the rectangle lines are depicted in bold. The loops can be dragged to the location of your choice using the mouse. It is also possible to use coordinates to define the location of the loops.
- (E) : The dot is green when the radar settings are up-to-date. An orange dot shows that the settings on the screen are not the same as the settings saved in the radar. Click on the "Save configuration" to update the radar settings.

5.2 SET THE AZIMUTH ANGLE

The next step is to ensure the vehicle tracks are aligned with the Y-axis such as to later have the virtual loops aligned with the tracks. The alignment can be achieved by changing the "azimuth" angle displayed in degrees as shown in Figure 16 and Figure 17.

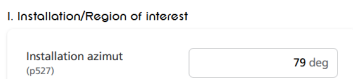


Figure 16: azimuth angle setting

Detected vehicles are shown with a red arrow in real-time while past vehicles leave blue tracks that build up over time, see Figure 17.

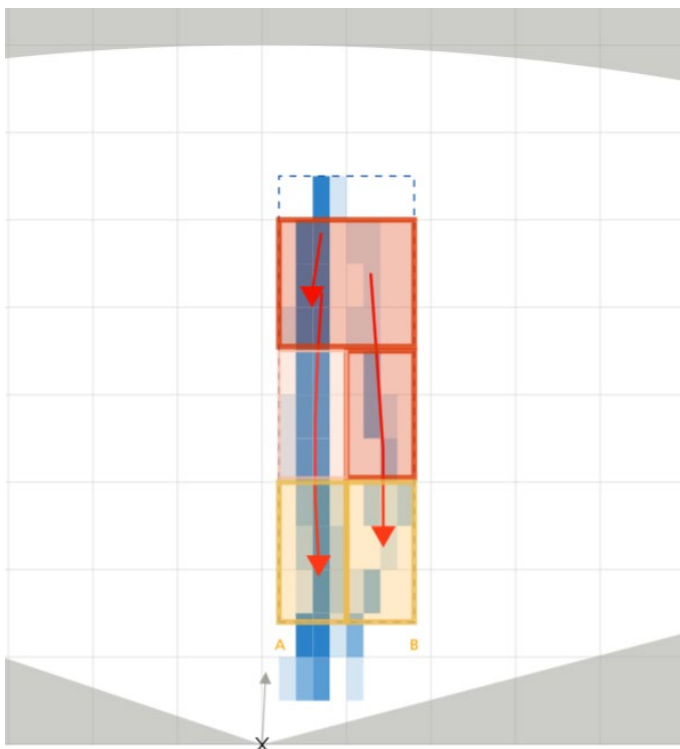


Figure 17: detected vehicles are shown and passed vehicles tracks are shown in blue

5.3 DEFINE THE LOOPS

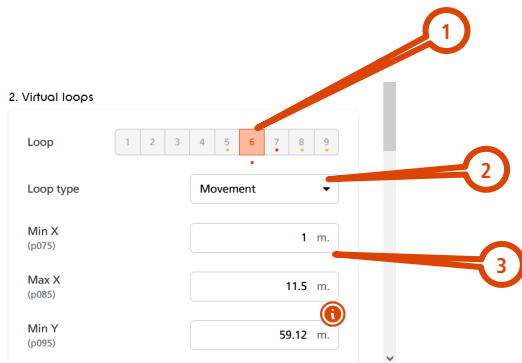



Figure 18: Loop definition

1. select the loop you want to set (you can define up to 9 virtual loops)
2. choose the function:
 - a. movement + presence (yellow, for the stop-line loops only)
 - i. **Please ensure to use only one such loop per lane.**
 - ii.  If you define more than one loop on a lane, the movement + presence one must be the first of the row, starting at the stopline.
 - iii. Max. distance from the radar: 50 m.
 - b. movement only (red)
 - c. disabled
3. define the size and position with the x/y coordinates. **Loops must be at least 4 m long.**

Please ensure that the vehicle tracks are aligned with the centre of the virtual loops to maximize the detection precision.

TIPS

- Define the "Min Y" coordinate of the stop-line loops on the stop-line (same Y value).
- Avoid empty spaces between the loops on adjacent lanes.
- Do not define two presence + movement loops on the same track.
- The virtual loops must be centered on the blue heatmap tracks.

5.4 SET THE RF CHANNEL IN CASE MULTIPLE TMB-134 RADARS ARE PRESENT IN THE SAME AREA

If multiple units are facing each other or are interfering with each other, set the units on different RF channels using the parameter shown in Figure 19.

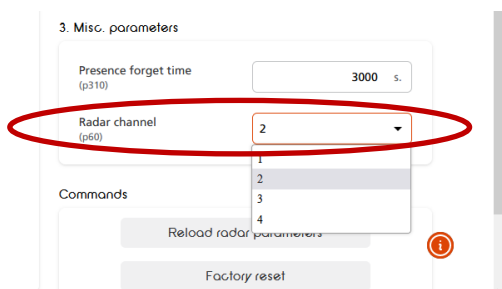


Figure 19: Configuration of the RF channel

5.5 SEND THE CONFIG TO THE RADAR

Click the "Save configuration" button on the right of the screen.

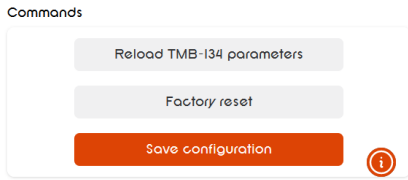



Figure 20: Save the configuration to the radar

6 DISABLING AUTOMATICALLY THE WIFI COMMUNICATION

Click on the WiFi symbol  on the left navigation pane to access the WiFi settings. Use the selection button to disable automatically the WiFi signal after 60 minutes of inactivity. After changing the setting, **click on the "Update" button to save the setting to the radar.**

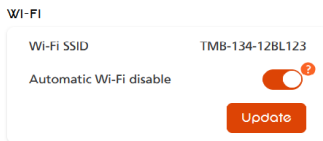


Figure 21: disable the WiFi automatically after 60 minutes of inactivity

7 WHAT TO TRY IF...

- "Glued" relay (the relay stays on and does not switch off after a vehicle leaves):
 - o Please ensure that there is no space between adjacent virtual loops.
 - o Please ensure that there is maximum one presence loop per lane.

TMB-134 – Relays board option

A DIN rail mountable board with 9 relay outputs is available as an option. It converts the information received from the TMB-134 radar over RS-485 in dry contacts, for each configured detection area.

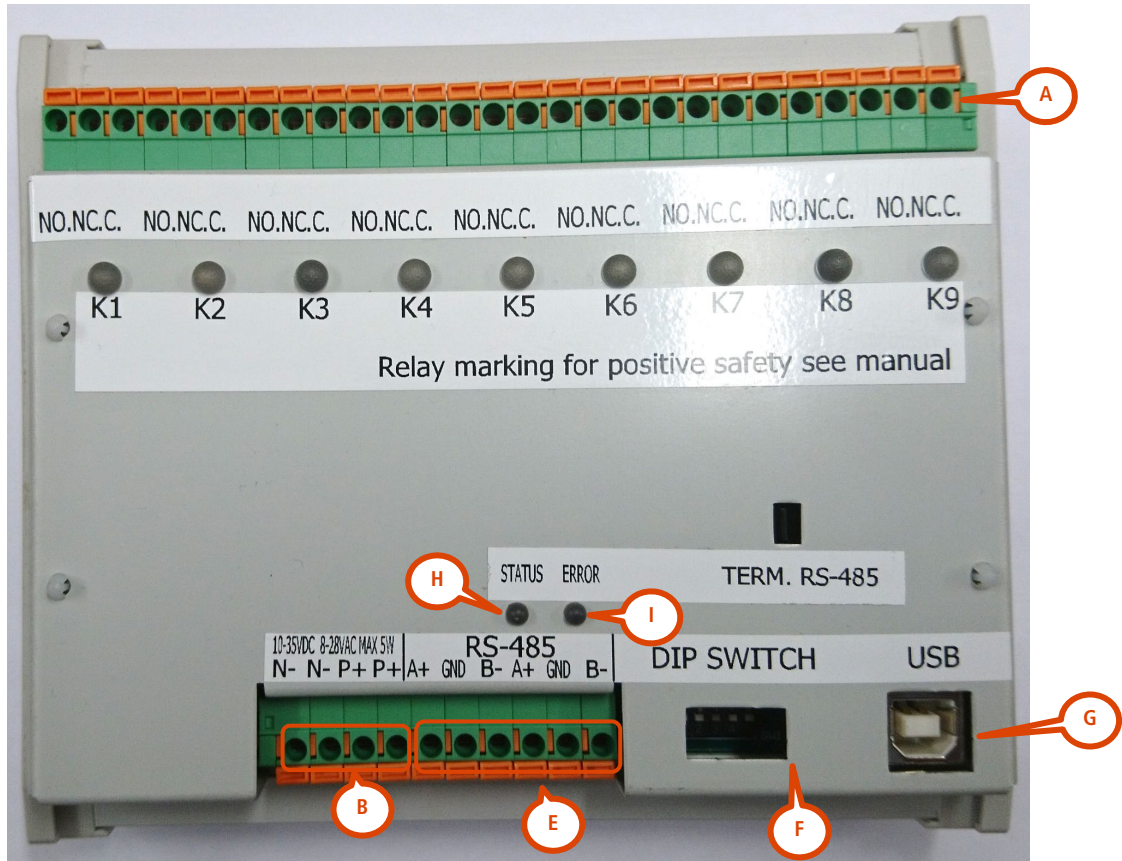


Figure 22: 9 relay outputs board



Figure 23: optional transformer for the relay board

I CABLING

A: relays (NC, NO, COM, for each of the 9 relays)

B: power (10-35 V DC/8-25 V AC, 50-60Hz). For power supply above these values, please use the optional rail mount module
(J) 100-240V AC, 50-60Hz.

E: RS-485 from radar

2 LED INDICATORS

When a relay is activated, its LED indicator lights up.

H: the status LED lights up when the radar communicates, either with the PC either with the relays board.

I: Error

3 SWITCHES

Given for information purpose only. Do not change the position of the dip switches.

- DIP 1 = TMB Baud rate. **Off = 115 200 bps (default value, must be "off")** – on = 19 200 bps
- DIP 2 = error correction (ECC – **"on" by default**). Dip switch "on" disables the ECC. If you encounter errors on the communication channel, contact the manufacturer to switch on the error correction code on the radar.
- DIP 3, 4 & 5 = **must be "off"**

TECHNICAL FEATURES

	TMB-LV	TMB-MV	TMB-HV
Protection level	IP 65		
Power supply	8–30 V AC, 50-60 Hz 10–60 V DC	15–54 V AC, 50-60 Hz 21–75 V DC	100–240 V AC, 50-60 Hz
Power consumption	@12 V DC: < 6 W		@220 V AC: < 6 W
User output	See "Tune up procedure"		
Temperature range	-40° C to +60° C		
Dimensions	68 mm x 99 mm x 163 mm	68 mm x 99 mm x 208 mm	
Weight	446 g	605 g	631 g
Wiring & connectors	Weipu connector: SA2010/S12 for cable & SA2012/P12B for radar		
Operating frequency	76-77GHz		
Max transmit power	< 20 dBm EIRP		

WARRANTY

Icoms Detections warrants its hardware products to be free from defects in workmanship and materials, under normal use and service, for a period of two (2) years from the date of dispatch from Icoms Detections premises, except for the batteries for which a warranty period of six (6) months applies.

If a product does not operate as warranted during the applicable warranty period, Icoms Detections shall, at its option, either repair the defective unit, or deliver an equivalent product or part to replace the defective item. All products that are replaced become property of Icoms Detections.

The defective product must be returned to Icoms Detections within the applicable warranty period. The defective product must be shipped DDP (delivered duty paid) back to Icoms Detections, wrapped in the original or similar shipping package to ensure that it will not be damaged during transportation. It must be accompanied by appropriate paperwork (ask first for a **Return Material Authorisation** number) detailing the nature of the defect experienced.

Icoms Detections shall be under no liability in respect of any defect arising from normal wear and tear, wilful damage, negligence, damage due to inappropriate packaging, abnormal working conditions, failure to follow Icoms Detections instructions (whether oral or in writing), misuse, improper installation, alteration or repair without the approval from Icoms Detections.

DECOMMISSIONING

We encourage customers to send back decommissioned equipment to the manufacturer for recycling. To differentiate between equipment to be recycled and equipment to be repaired, please inform your reseller or the manufacturer about the decommissioned equipment.

Icoms Detections will take care of the recycling for a sustainable end-of-life of the product.

FURTHER INFORMATION

1 Legal notification

Hereby, Icoms Detections declares that this TMB range of products is in compliance with the requirements and other relevant provisions of

- Directive 2014/53/EC – all configurations
- UKCA

2 Version

Issue n°	Date
V 1	June 29, 2020
V 1.1	October 8, 2020
V 1.2	September 9, 2021
V 1.2.7	November 10, 2021
V 1.2.8	January 13, 2022
V 1.2.9	October 19, 2022
V 1.3.0	December 7, 2022
V 1.3.1	October 2023
V 1.3.2	October 2023

Comment
First release TMB-134 LMH
Additional information on software GUI
RF channels
Correction "road width" + mark "C" on relay card
99km/h maximum detection speed
Added section "Decommissioning"
Settings through Wifi board
Relay outputs
Simplified document structure

3 The manufacturer:



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