



OPERATION AND MAINTENANCE MANUAL

RM-470TL

Product code:

314-06-01

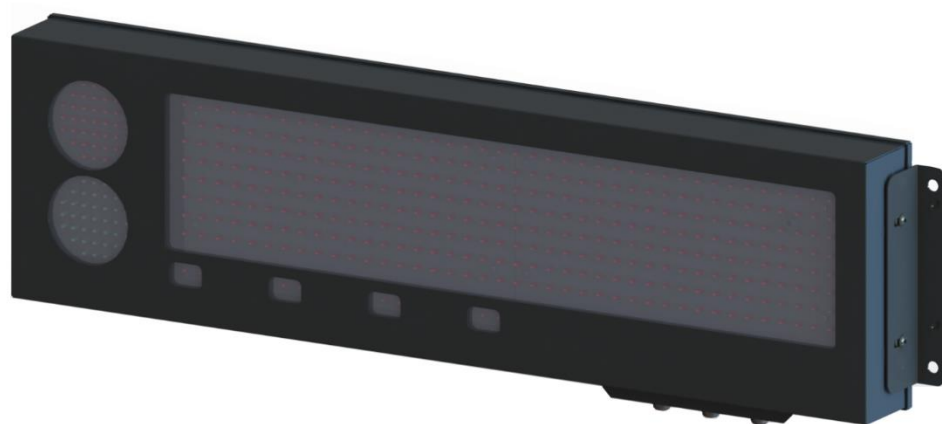


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1. Specification

RM-470TL remote display

Dimensions: ¹	791 mm x 244 mm x 74 mm / 31.14 in x 9.6 in x 2.91 in
Digit height:	120 mm / 4.7 in
Accepted input voltage range (long-term):	100 ÷ 240 VAC
Accepted input voltage range (short-term):	85 ÷ 264 VAC
Accepted input voltage range:	47 ÷ 63 Hz
Operating temperature (ambient):	-25°C ÷ 45°C / -13°F ÷ 113°F
Operating temperature (device surface):	-25°C ÷ 70°C / -13°F ÷ 158°F
Average power consumption:	7 W
Ingress protection rating ² :	IP 65 / NEMA 4
Device weight:	6,6 kg / 14.5 lbs

2. Transport and storage

The device is sensitive to mechanical damage. It should be ensured that it is properly secured for transport so as to avoid any damage caused during transportation. It is forbidden to transport the device components separately in a collective package – each item must be packed individually and cannot hit one another during transportation.

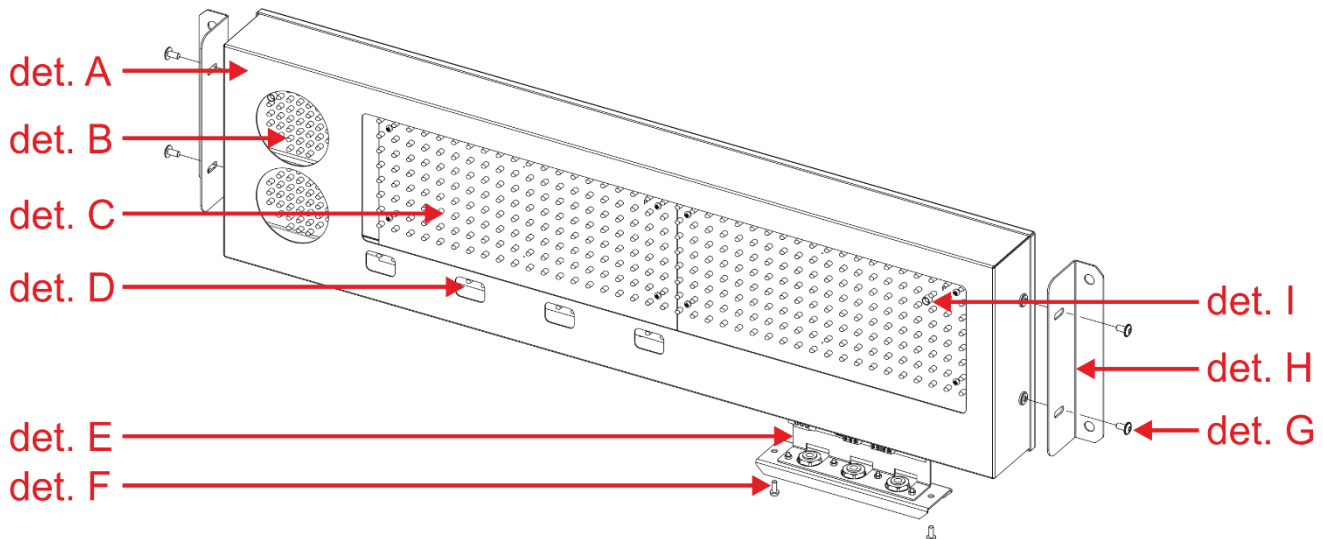
The device should be stored in the temperature of -20°C to +60°C, at the humidity below 99% RH due to the protective packaging.

3. Device construction

RM-470TL is manufactured in a powder-coated steel housing. The properly installed device is characterized by tightness class IP65.

3.1 RM-470TL construction

The figure shows the RM-470TL remote display construction³.



det. A – device front; det. B – traffic lights; det. C – screen; det. D – annunciators; det. E – sliding drawer with controller board; det. F – drawer fixing screws; det. G – fixing screws; det. H – mounting bracket; det. I – brightness sensor.

Fig. 1

¹ Dimensions without accessories.

² Ingress protection rating according to EN 60529 standard.

³ Explanatory figure.

3.2 RM-470TL dimensions

3.2.1 Dimensions of the device with standard side mount

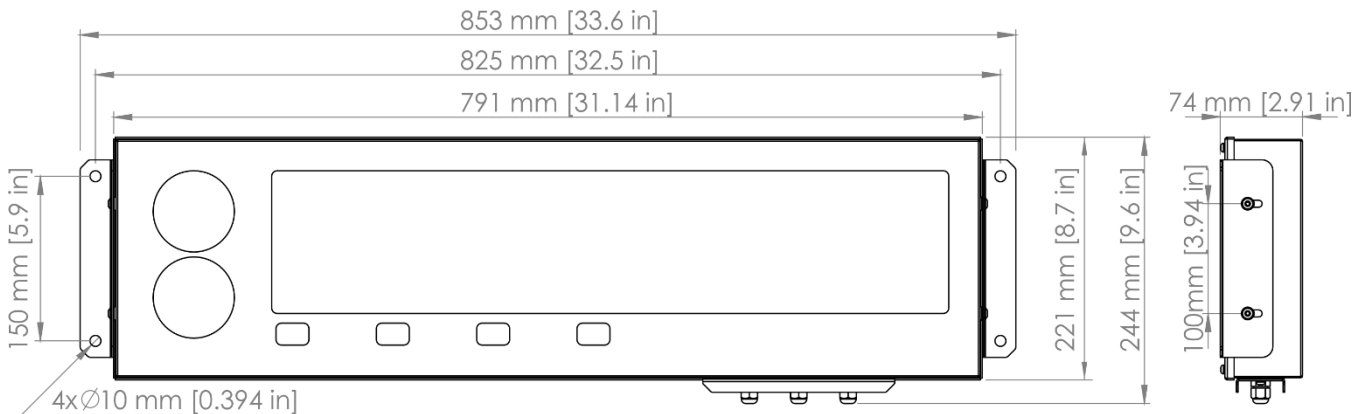


Fig. 2

4. Device installation

The device should be mounted on a flat surface, with the wires facing down. Only the correct installation of the device ensures its proper operation and the maintenance of the device parameters, such as housing tightness to the declared IP class.

NOTICE!

Before any installation or maintenance operations, refer to the manual supplied by the manufacturer. Improper connection to the mains power supply, incautious device installation, or improper use may cause property damage, loss of health or death from an electric shock! In addition, failure to comply with the manufacturer's instructions may void the warranty.

NOTICE!

It is forbidden to make any additional mounting points or any holes in the device components.

4.1 RM-470TL application

RM-470TL is designed to display measurement results transmitted by weighing terminals. The displays operate in the automatic mode by default (see 4.2 "Autolearn") and, in typical cases, they do not require prior configuration. In special situations, it may be necessary to adjust the settings using KAZEL WagSet software (from version v3.00) or the Web browser or through the user menu embedded in the device.

4.2 "Autolearn" function

The "Autolearn" mode is enabled by default (position #0 is set in the "proto" submenu). To disable it, the communication protocol should be selected manually using the embedded user menu or KAZEL WagSet software or the Web browser. When this mode is active, at each start-up, the device detects the parameters of communication with the weighing terminal and analyses the structure of the data frames which are sent to it. It then adjusts its settings to allow proper communication with the terminal. The whole operation lasts a few seconds, depending on the baud rate and time intervals between the consecutive frames. All communication interfaces are supported, i.e. RS-232, RS-485/RS-422, 0/20mA digital current loop and the Ethernet.

The "Autolearn" procedure steps and their signaling are as follows:

1. Baud rate detection - dot 1 is flashing on the display.
2. Baud rate verification - dot 1 is solid, dot 2 is flashing.
3. Analysis of the protocol and its frame structure - dots 1 and 2 are solid, dot 3 is flashing.

During the analysis of the protocol and its frame structure, the measurement unit is also recognized, if sent by indicator. The following tags are recognized - "kg", "k", "K", "tn", "TN", "T", "t", "LB", "lb", "L", "l", "OZ", "oz", "o", "O". In case the indicator does not send units or sends units that are not recognized by the "Autolearn" function, the default unit will be set. Depending on the purchased regional version, it is "kg" or "lb".

The "Autolearn" function also detects gross/net measurements if the following markers are sent in the frame:

- for the Net measurement: "N" from the ASCII table,
- for the Gross measurement: "G" from the ASCII table.

In this case, the marker position will also be saved. If, during the operation of the device, the transmitted measurement marker changes, e.g. from "N" to "G", the indicator will change accordingly.

The "Autolearn" function supports the following transmission parameters:

Baud rate:	2400, 4800, 9600, 19200
Transmission parameters (data bits, parity, stop bits):	8N1, 7E1, 7O1

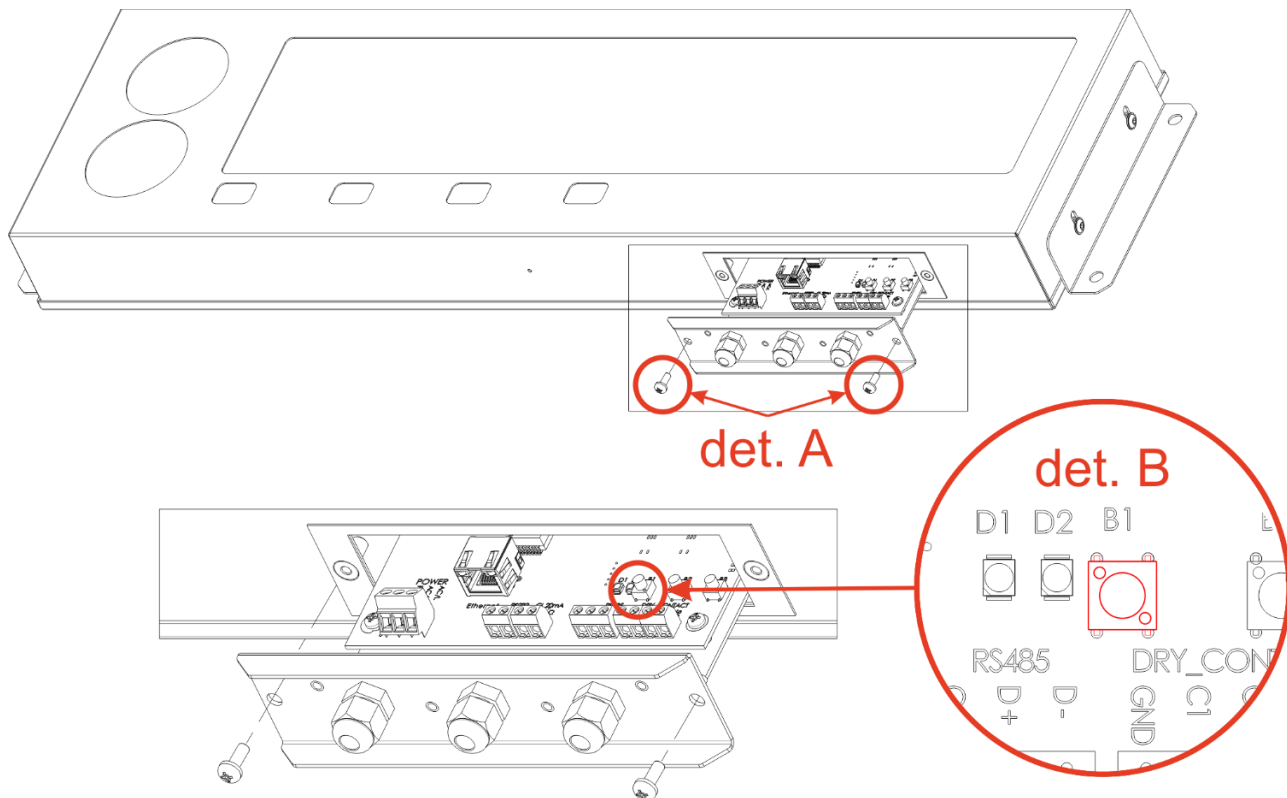
Table 1

4.3 RM-470TL manual configuration (Communication protocol selection)

4.3.1 Communication protocol selection

4.3.1.1 Embedded user menu (micro button)

The user menu embedded in the device allows to select the communication protocol, display the information about the software version, reset to the default settings. The "B1" micro button, used to operate the menu, is located inside the display, and is accessible after unscrewing two screws M4x10 (Fig. 3, det. A) and after pulling out the drawer as indicated by the black arrow. The micro button is located on the controller board as illustrated below (Fig. 3, det. B). There is no need to open the external covers.



det. A – M4x10 Screw; det. B – micro button.

Fig. 3

The user menu is called up by pressing and holding down the "B1" microswitch and releasing it when the desired option is displayed. Regardless the option, you can exit the user menu by pressing the micro button and releasing it when switching between the options (while switching between the options, the display is not displaying any information).

The user menu has the following options:

- 1) info - This option allows you to display the software version. For displays with the Ethernet interface, network layer settings are also provided (IP address, network mask, communication port for KAZEL WagSet software and communication port for the weighing indicator). Exiting the "info" submenu happens automatically after displaying the information.
- 2) proto - This option enables the selection of the communication protocol saved in the display memory, which enables cooperation with the selected weighing indicator. The protocol is changed by pressing the micro button. Saving the selected protocol is accomplished by long holding down the microbutton (until the message "Saved" appears). Exiting the "proto" submenu comes after 30 seconds of the user inactivity.
- 3) custm –The "custm" option allows you to select the dedicated communication protocol to work with the weighing indicators of selected clients. The protocols have special custom settings required by the given client. Setting the protocol is done in the same way as in the case of the "proto" option - saving the selected protocol is accomplished by long holding down the micro button (until the message "Saved" appears), while exiting the "custm" submenu comes automatically after 30 seconds of the user inactivity.
- 4) lights - the "lights" option allows you to choose the configuration of the traffic lights. Three profiles are available:
 - 1 – lights: if there is no communication for more than 0.5 second, the red light will show,
 - 2 – lights: if there is no communication for more than 3 seconds, the "X" characters will be displayed on both red and green light,
 - 3 – lights: if there is no communication, the status of the traffic light will not change.

Switching between the individual profiles is done by pressing the "B1" micro button. Saving the selected profile is accomplished by long holding down the "B1" micro button, until the message "Saved" appears. Exiting the "lights" option comes after 30 seconds of the user inactivity.

- 5) reset - This option allows you to reset the default remote display protocol and to activate the "Autolearn" mode. In addition, in the devices with the Ethernet interface, you can restore the default network layer settings (IP address: 192.168.0.11, network mask: 255.255.255.0, communication port for KAZEL WagSet software: 2101 and communication port for the weighing terminal: 2102). To restore the default settings you should, during the normal operation of the device, press the micro button and hold it down until the message "reset" appears. Hold the button down until the message "reset" starts blinking and do not release it until the message "default" is displayed. Releasing the button before the message "default" appears will result in interrupting the process of restoring the default settings and the display will continue working according to the previously programmed parameters. Defining new network settings is possible through the embedded Web-panel or by using KAZEL WagSet software.

4.3.1.2 Supported parameters and baud rates

Interface	Transmission parameters	Communication speed
RS232, RS485, RS422, CL	Data bits: 7, Parity: Odd, Even Data bits: 8, Parity: None, Odd, Even Stop bits: 1	300, 600, 1200, 2400, 4800, 9600, 14400, 19200, 28800, 38400, 57600, 76800, 115200, 230400

Table 2

4.3.2 KAZEL WagSet software

Using KAZEL WagSet software, you can perform advanced configuration of the device. The software enables:

- precise defining of the communication protocol with any weighing terminal,
- precise setup of traffic lights, including arrows,
- determining the response of the display to the events reported by the weighing terminal (e.g. overload, underload, instability, etc.),
- entering and editing advertising text.

The detailed information concerning the configuration via your computer can be found in the manual supplied with KAZEL WagSet software.

4.3.3 Web browser

The embedded Web panel allows:

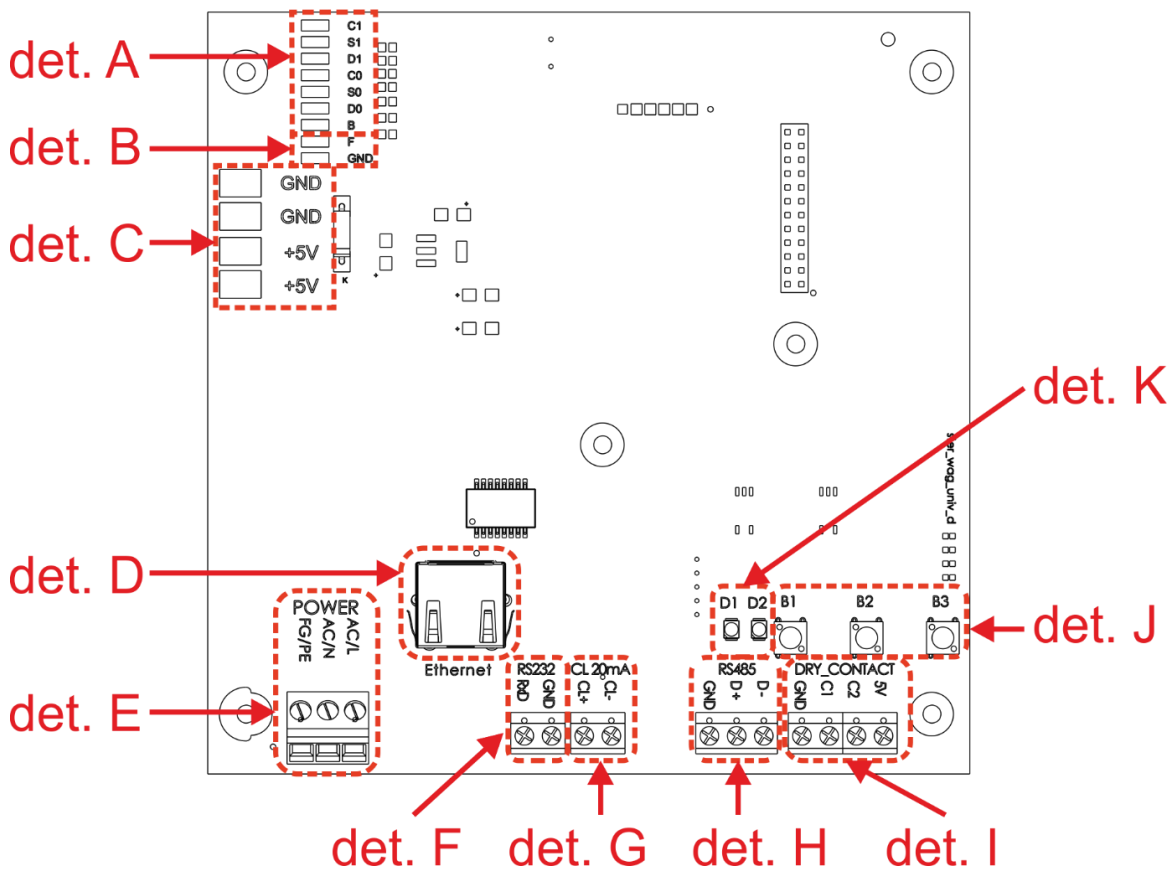
- selecting the communication protocol of the weighing indicator,
- selecting a pre-configured profile for traffic lights,
- changing settings for the displayed measurement unit,
- changing the network settings,
- checking the version of and updating the display software.

The detailed information concerning the Web-panel operation and its capabilities can be found in the device operation manual.

5. Display controller board

The controller board is responsible for processing and displaying the weighing result incoming from the weighing indicator.

5.1 Connectors and buttons on the controller board



det. A – LED module connector; det. B – brightness sensor connector; det. C – controller power supply [5V]; det. D - Ethernet connector; det. E – mains power supply connector; det. F – RS-232 connector; det. G – 0/20mA digital current loop; det. H - RS-485 / RS-422 connector; det. I – dry-contact connector for traffic lights; det. J – micro button (B1, B2, B3); det. K - status LEDs (D1 wired data transmission).

Fig. 4

5.2 List of connectors of the display controller board

Table 3 lists the controller connectors in RM-470TL remote display. The connectors can be accessed by pulling out the controller board drawer (Fig. 3), without opening the entire device, or removing any connections or parts.

NOTICE!

The housing should be disassembled only when the power supply is disconnected.

Interface / Function	Connector markings	Notes
RS-232	RxD	The RXD line of the RS-232 interface should be connected with the weighing indicator TXD output
	GND	GND line of the RS-232 interface
0/20mA (CL) digital current loop	CL+	CL line of the current loop. The line should be connected with the weighing indicator TXD output
	CL-	GND line of the current loop interface
RS-485 RS-422	D+	RS-485 and RS-422 interface non-inverting line
	D-	RS-485 and RS-422 interface inverting line
	GND	GND line of the RS-485 and RS-422 interfaces for use at risk of a significant difference in the potentials of the display mass and the weighing indicator mass
Dry contact	GND	GND line of the operator panel
	C1	Signal line activating the red light
	C2	Signal line activating the green light
	5V	- not used -
Ethernet	Ethernet	RJ-45 socket

Table 3

5.2.1 RS-232 connector

For configuration purposes, the user connects the remote display to the computer with installed KAZEL WagSet software via RS-232 connector.

5.2.2 RS-485 / RS-422 connector

For configuration purposes, the user connects the remote display to the computer with installed KAZEL WagSet software via RS-485 / RS-422 connector.

5.2.3 0/20mA digital current loop

For configuration purposes, the user connects the remote display to the computer with installed KAZEL WagSet software via digital current loop connector.

5.2.4 Dry contact connector

In order to control the traffic lights, the user uses the operator panel and the relay contacts (C1, C2).

5.2.5 RJ-45 connector (Ethernet)

For configuration purposes, the user connects the remote display to the computer with installed KAZEL WagSet software via the RJ-45 connector. This connection can also be used to access the Web browser configuration.

5.3 RM-470TL Visor

The mounting visor is fixed with four M5x10 screws included in the set and replaces the standard side mounts shown in Fig. 1. The mounting holes on the sides allow the device to be tilted by 5° and 10°.

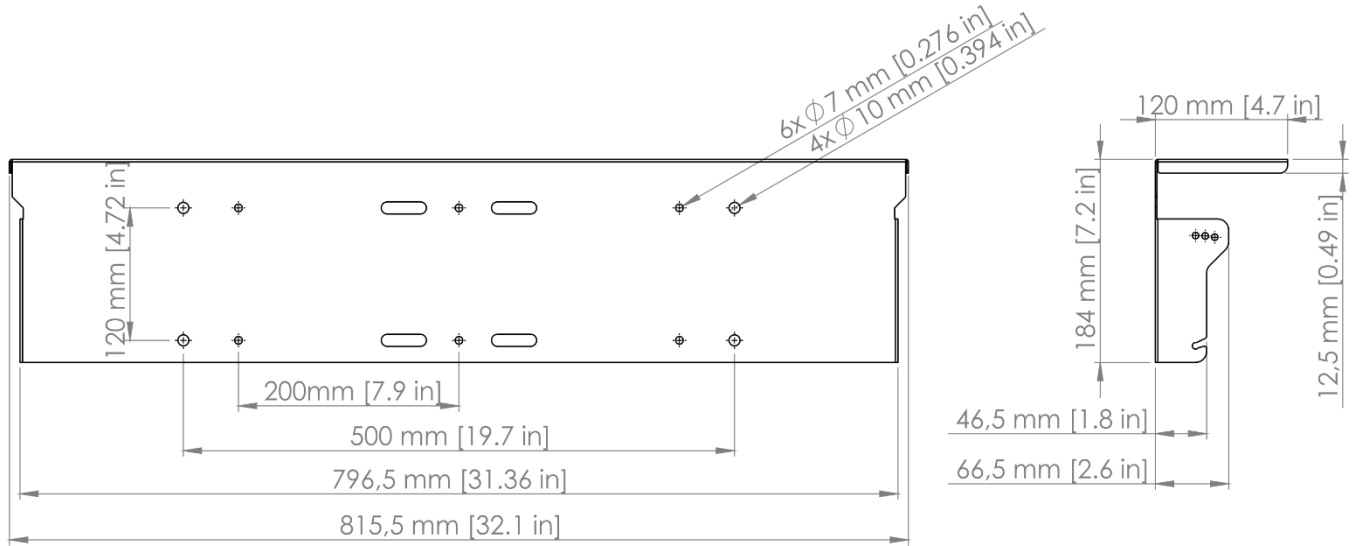


Fig. 5

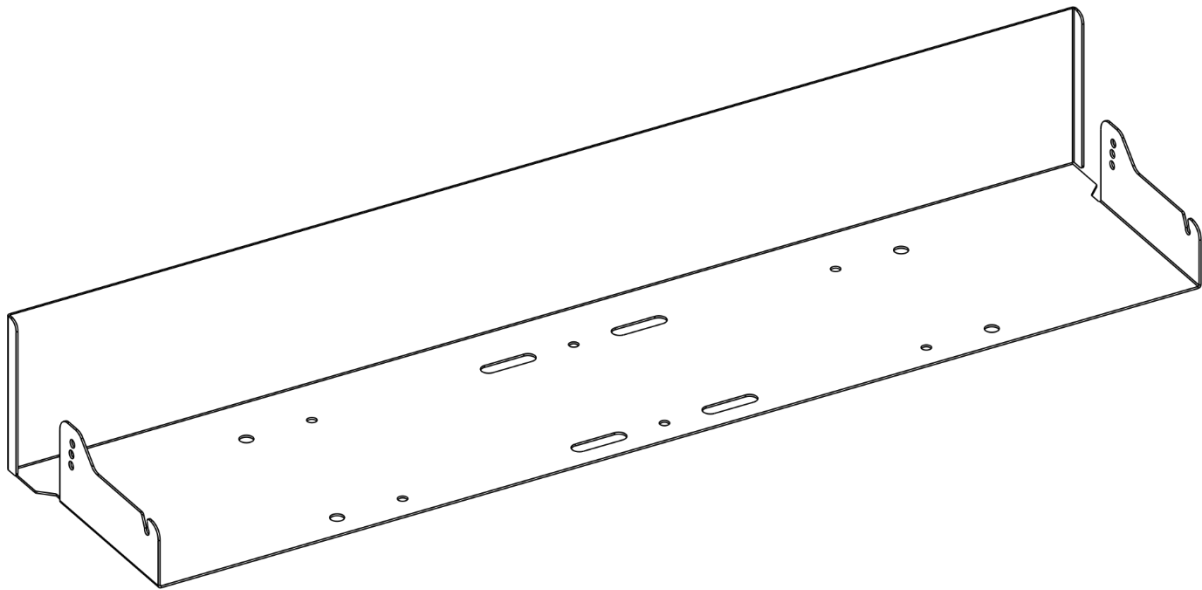


Fig. 6

5.4 Mounting rails

The mounting rails are fitted directly to the rear part of the device housing with the screws included in the set. They enable the installation of mounting clamps, which are used to install the device on a pole. Two mounting rails are provided for each device.

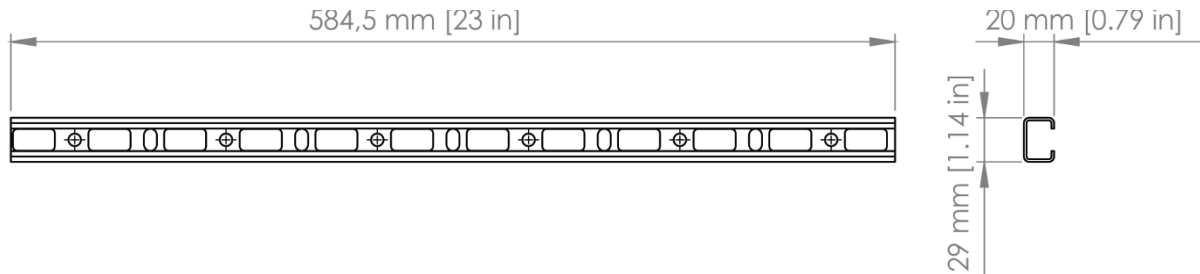


Fig. 7

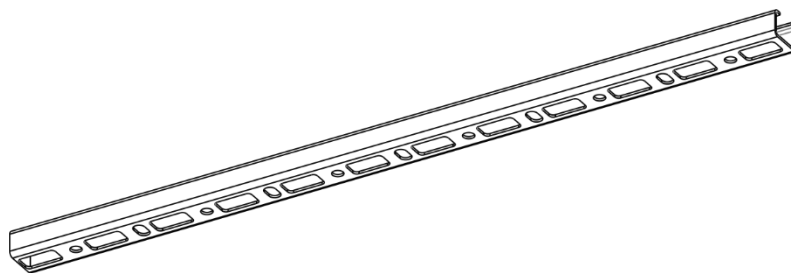


Fig. 8

5.5 Mounting brackets

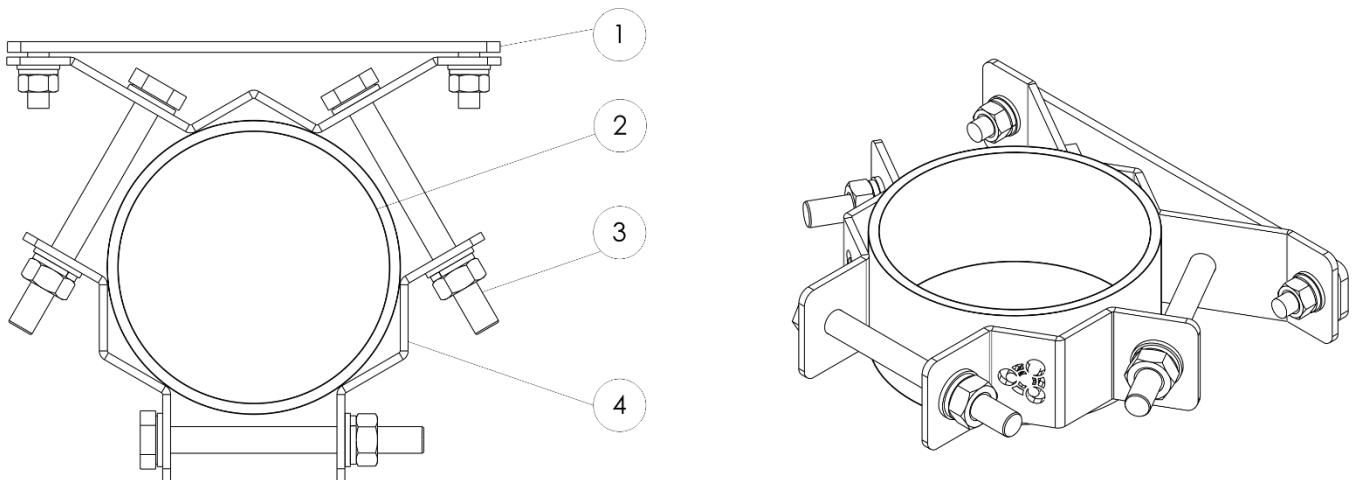


Fig. 9

Key:

- 1 - flat bar with threaded pivots to be inserted into the mounting rail,
- 2 - pipe / pole,
- 3 - mounting bolts with a set of nuts and washers,
- 4 - mounting elements of the fastening.

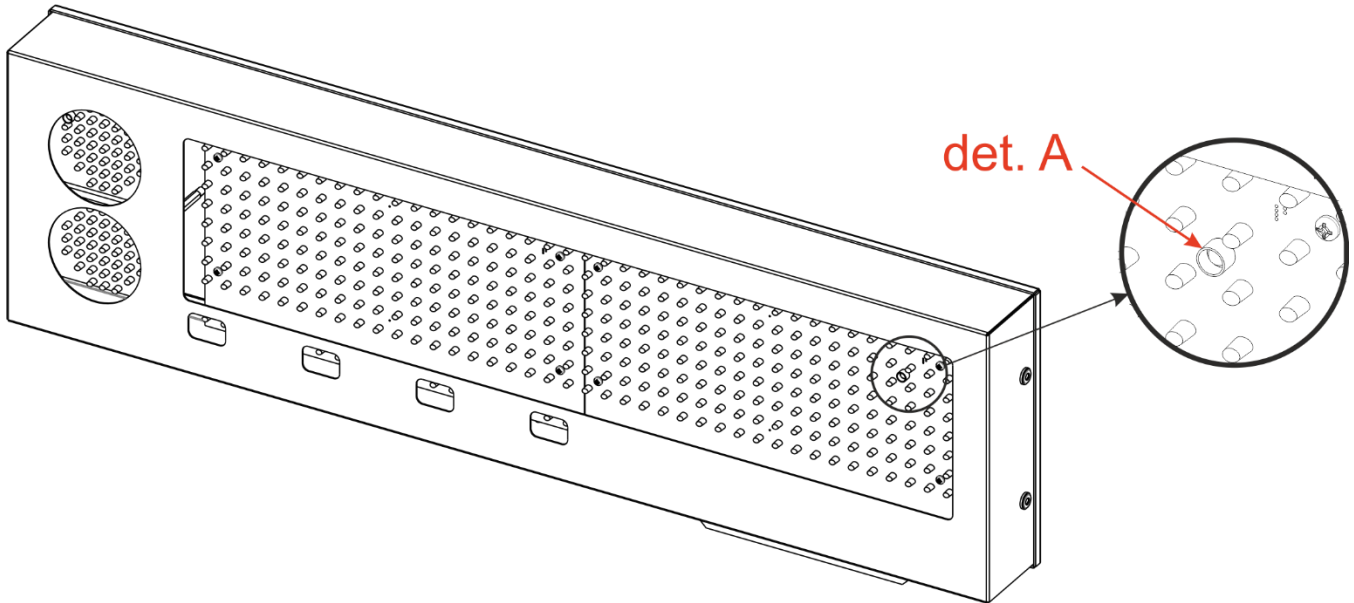
The mounting clamps for pipes are available in the following size:

- 107-01-25-001 - Mounting clamps for mounting the device on poles 2" – 4" (60 - 129 mm in diameter).

In order to properly install the device on the pole, two rails and two mounting clamps should be used.

6. Automatic brightness control of the remote display

RM-470TL has a brightness sensor installed on the LED panel as standard. When the automatic control profile is enabled, the device adjusts its brightness responsively to the intensity of daylight.



det. A – brightness sensor.

Fig. 10

7. Initial start-up

- Step 1: Make sure that all cables are properly connected,
- Step 2: Make sure that all components have been installed in the correct orientation,
- Step 3: Connect the device to the mains power supply,
- Step 4: The properly connected display will show moving arrows (> >> >>>), followed by a hard space symbol () in the bottom right corner. It means that the user has 7 seconds to send the configuration to the remote display. If no configuration is sent to the device, it will launch the "Autolearn" process.

8. Disposal and recycling

8.1 Packaging material recycling

The packaging elements must be segregated and recycled in accordance with the local waste disposal regulations.

8.2 Device disposal

The device must not be disposed of with normal municipal waste! In accordance with Directive 2012/19/EU (WEEE), the user is obliged to deliver the damaged or destroyed device to the appropriate disposal facility if there is no economically justified repair possibility.



9. Most common installation errors

1. Invalid configuration uploaded to the remote display.
2. Drilling additional mounting holes in the display's housing.