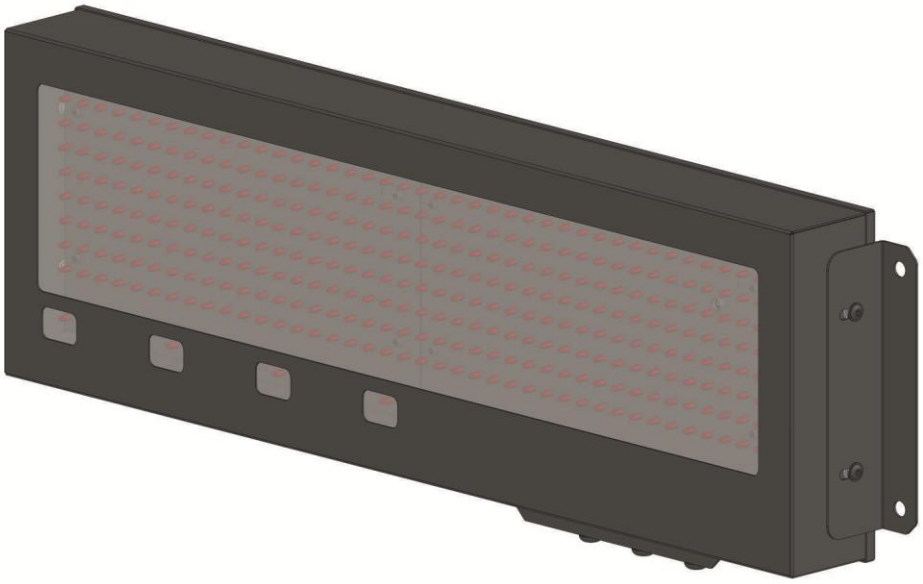
KAZEL®
by RGB Technology

OPERATION AND MAINTENANCE MANUAL

RM-470

Product code:

314-05-01



RoHS COMPLIANT

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1. Specification

RM-470 remote display

Dimensions: [1]	679mm x 242mm x 74mm / 26.7in x 9.5in x 2.9in
Digit height:	120mm / 4.7in
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:	7W
Ingress protection rating[2]:	IP 65 / NEMA 4
Device weight:	5kg / 11lbs

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.

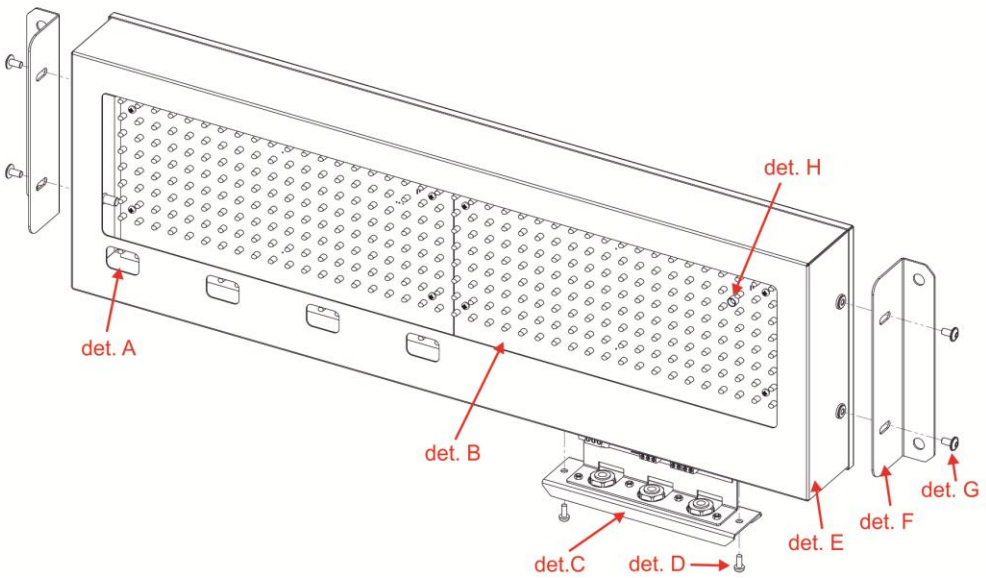
The device should be stored in the temperature of -20°C to +60°C, at the humidity below 99% RH due to the protective packaging.

3. Device construction

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

3.1 RM-470 construction

The figure shows the RM-470 remote display construction[3].



det. A – annuciators; det. B – screen; det. C – sliding drawer with controller board; det. D – drawer fixing screw; det. E – device front; det. F – mounting bracket; det. G – fixing screw; det. H – brightness sensor;

Fig. 1

[1] Dimensions without accessories,
[2] Ingress protection rating according to EN 60529 standard,
[3] Explanatory figure

3.2 RM-470 dimensions

3.2.1 Dimensions without accessories

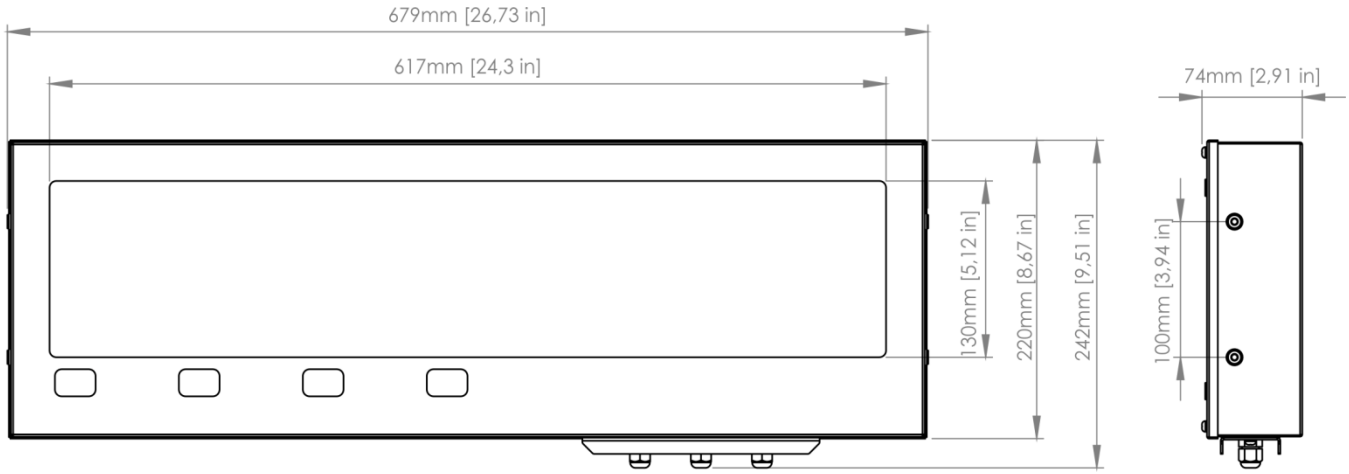


Fig. 2

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-470 application

RM-470 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 RGB WagSet 2 software or the Web-panel 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 RGB WagSet 2 software or the Web-panel. 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 signalling 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 recognised, if sent by indicator. The following tags are recognised - "kg" 'k' 'K' "tn" "TN" " t" 'T' 't' "LB" "lb" 'L' 'l' "OZ" "oz" 'o' 'O'. In case the indicator does not send units or sends units that are not recognised 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' and 'N' from the ASCII table,
- for the Gross measurement: 'g' and '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:

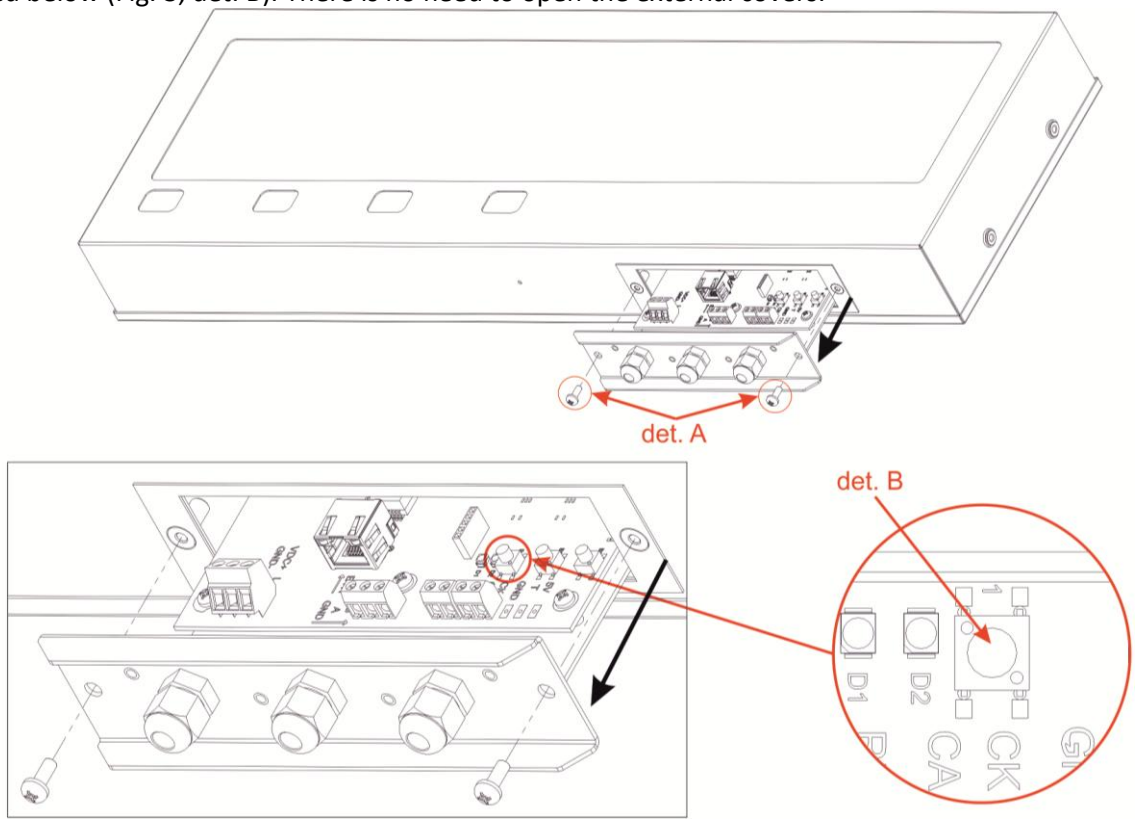
Baud rate:	2400, 4800, 9600, 19200
Transmission parameters (data bits, parity, stop bits): 8N1, 7E1, 7O1	8N1, 7E1, 7O1

Table 1

4.3 RM-470 manual configuration (Communication protocol selection)

4.3.1 Embedded user menu (microswitch)

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" microswitch, 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 microswitch is located on the controller board as illustrated below (Fig. 3, det. B). There is no need to open the external covers.



det. A – Screw M4x10; det. B – microswitch

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 microbutton 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 RGB WagSet 2 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 microbutton. 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 microbutton (until the message "Saved" appears), while exiting the "custm" submenu comes automatically after 30 seconds of the user inactivity.
4) 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 RGB WagSet 2 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 microbutton 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 RGB WagSet 2 software available at www.kazel-displays.com.

4.3.2 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

4.3.3 RGB WagSet 2 software

Using WagSet 2 software, you can perform advanced configuration of the device. The software enables changing:
- parameters of displaying the weighing result,
- entering and editing advertising text,
- response of the display to special situations (e.g. overload, underload, instability, etc.),

The detailed information concerning the configuration via your computer can be found in the manual supplied with RGB WagSet 2 software.

4.3.4 Web-panel

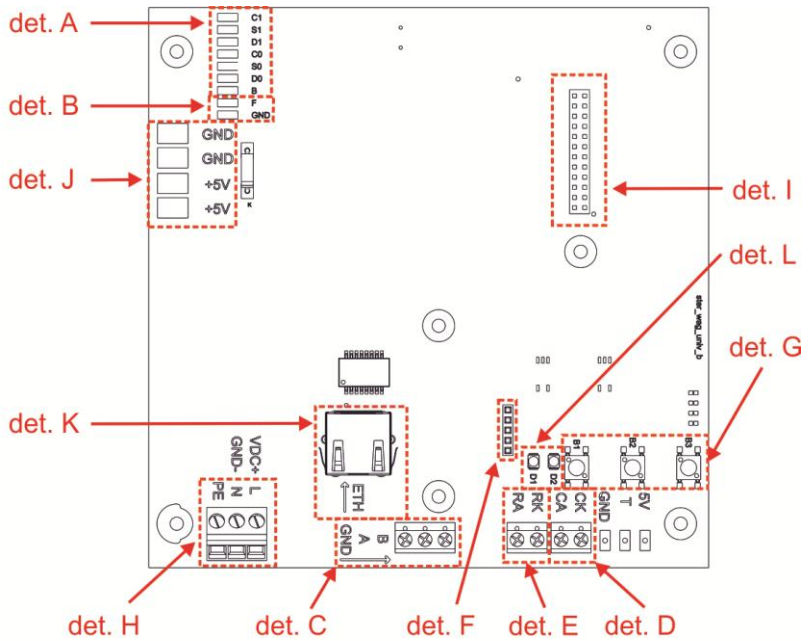
The embedded Web panel allows:
- selecting the communication protocol of the weighing indicator,
- changing the network settings,
- checking the version of and updating the display software,

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

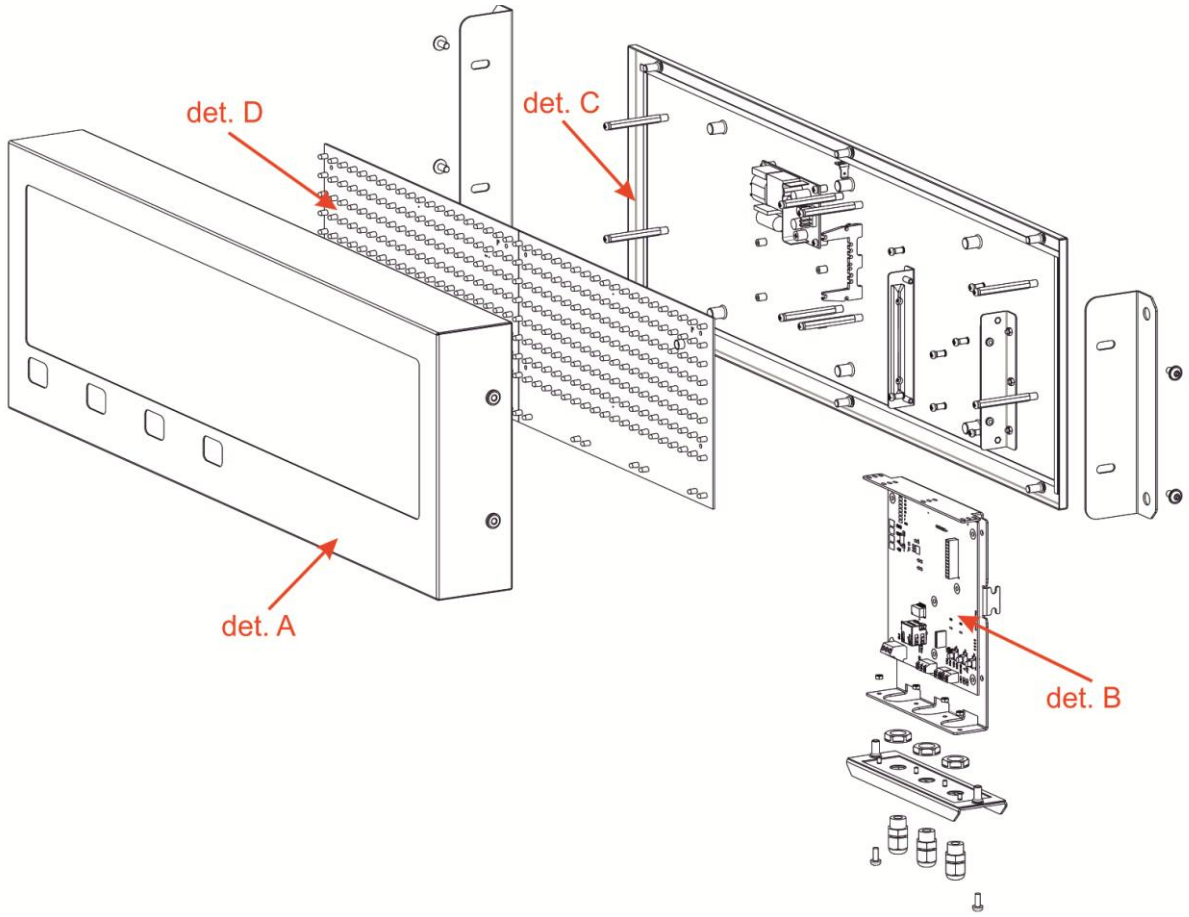


det. A – LED module connector; det. B – brightness sensor connector; det. C – RS-485/RS-422 connector; det. D – 0/20mA digital current loop; det. E – RS-232 connector; det. F – RS isolated interface connector; det. G – microswitch (B1, B2, B3); det. H – mains power supply connector; det. I – radioline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

Fig. 4

5.2 List of connectors of the display controller board

Table 3 lists the controller connectors (Fig. 5, det. B) in RM-470 remote display. The connectors can be accessed by pulling out the controller board drawer, without opening the entire device, or removing any connections or parts. LED modules (Fig. 5, det. D) are fixed to the back cover (Fig. 5, det. C).



det. A – device front; det. B – controller; det. C – back cover; det. D – LED modules

Fig. 5

NOTICE!

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

	Interface / Function	Connector markings	Notes
STANDARD[4]	RS-232	RA	The RXD line of the RS-232 interface should be connected with the weighing indicator TXD output
		RK	GND line of the RS-232 interface
	0/20mA (CL) digital current loop	CA	CL line of the current loop. The line should be connected with the weighing indicator TXD output
		CK	GND line of the current loop interface
	RS-485 RS-422	A	RS-485 and RS-422 interface non-inverting line
		B	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
	Ethernet	ETH	RJ-45 socket

Table 1

[4] All connectors are available as standard on the PCB controller.

5.2.1 RS-232 connector

For configuration purposes, the user connects the remote display to the computer with installed RGB WagSet 2 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 RGB WagSet 2 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 RGB WagSet 2 software via digital current loop connector.

5.2.4 RJ-45 connector (Ethernet)

For configuration purposes, the user connects the remote display to the computer with installed RGB WagSet 2 software via the RJ-45 connector. This connection can also be used to access the Web-panel configuration.

6. Additional accessories

6.1 RM-470 Visor

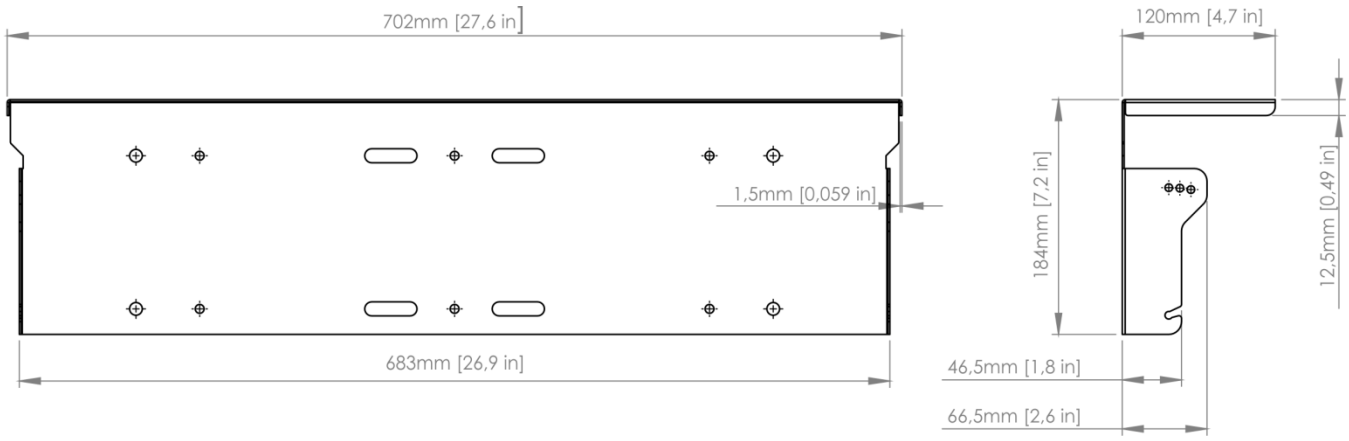


Fig. 6

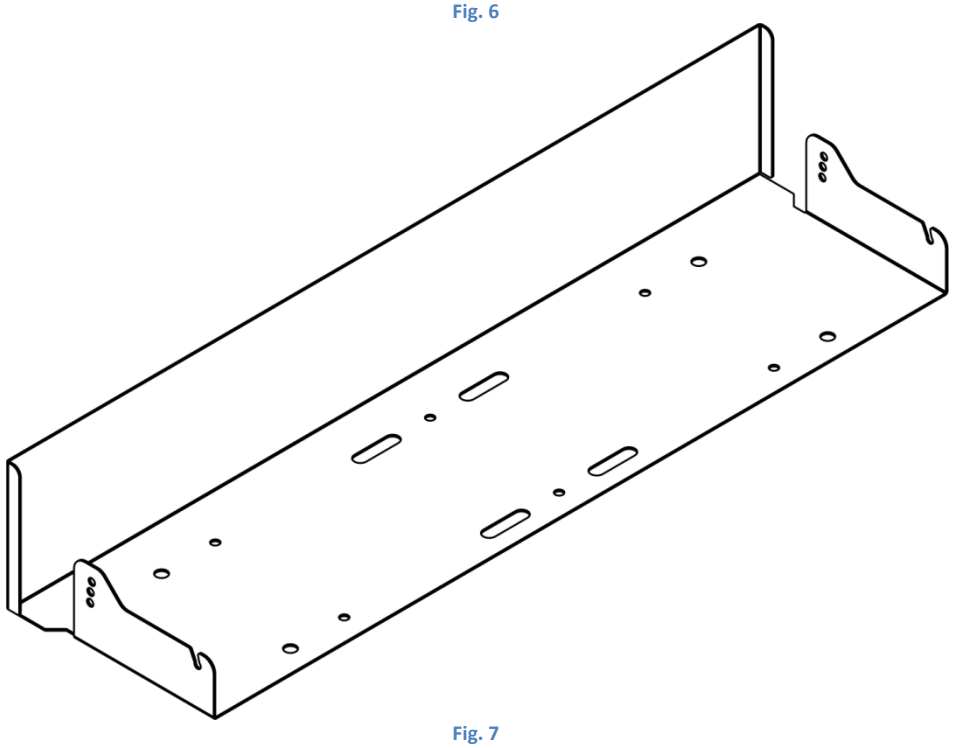


Fig. 7

6.2 Mounting rails

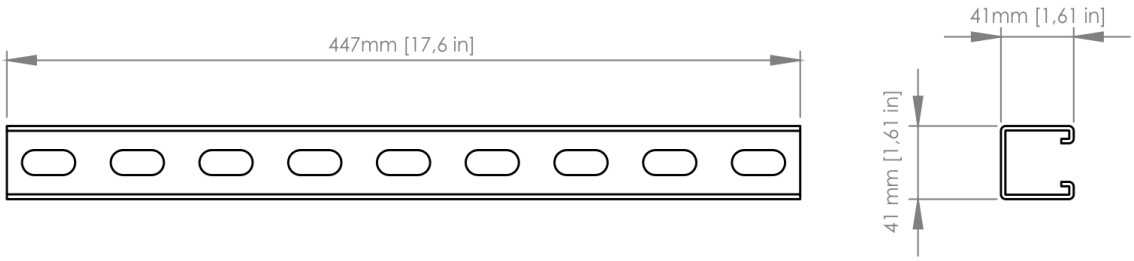


Fig. 8

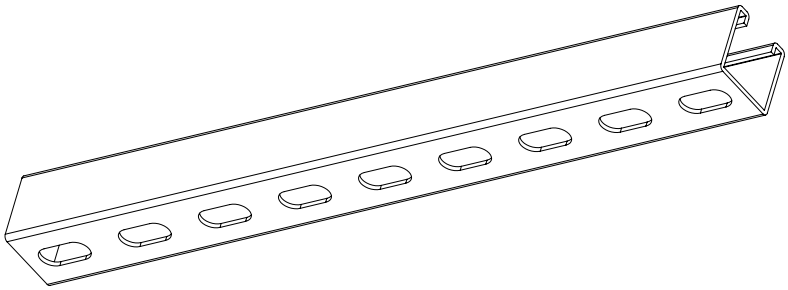


Fig. 9

6.3 Mounting brackets

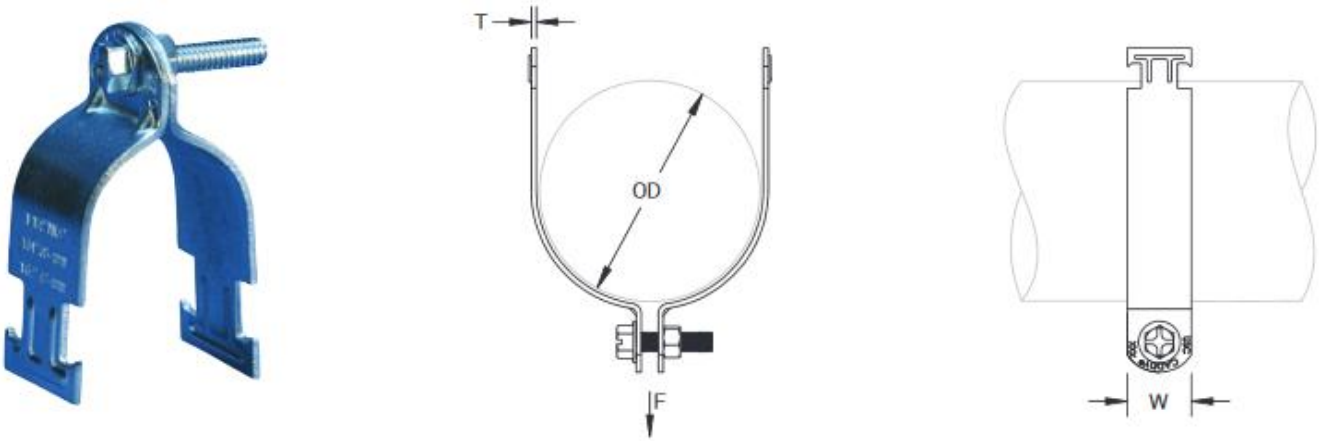


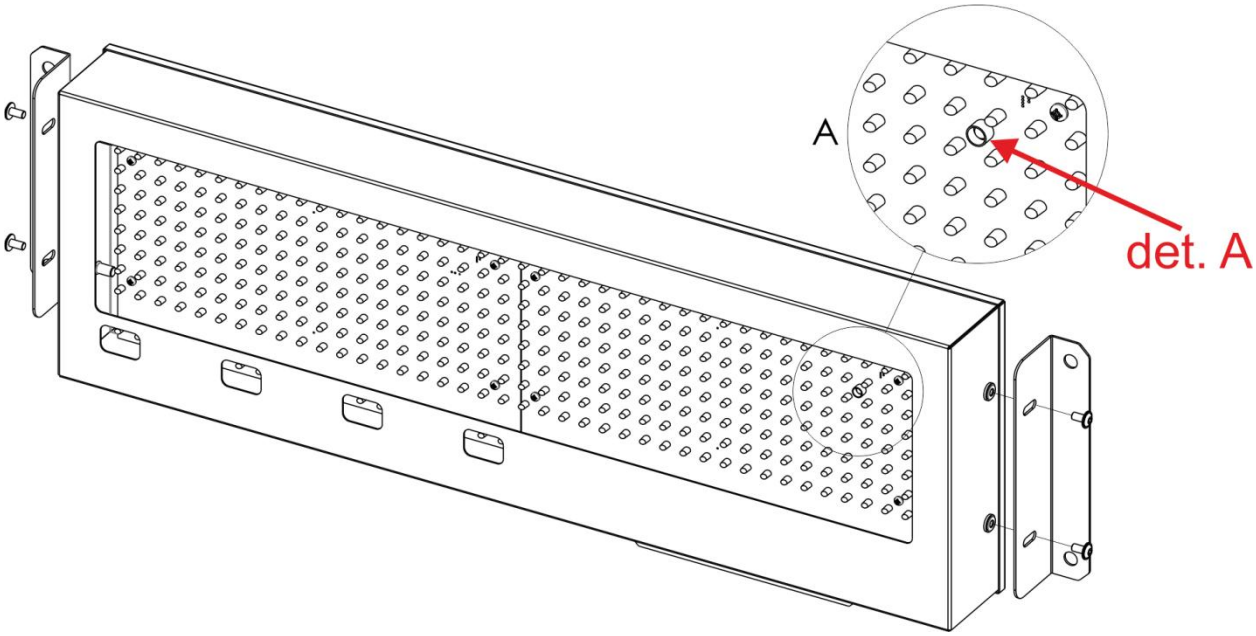
Fig. 10

Pole mounting brackets are available in the following sizes:

- 2" - pole outer diameter 60.3 mm,
- 3" - pole outer diameter 84.0 – 88.9 mm,
- 4" - pole outer diameter 111.1 – 115.3 mm,
- 5" - pole outer diameter 139.7 – 146.1 mm.

7. Automatic brightness control of the remote display

RM-470 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. 11

8. 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.

9. Disposal and recycling

9.1 Packaging material recycling

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

9.2 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.

10. Most common installation errors

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