



**RGB Technology**<sup>®</sup>  
MODERN TECHNOLOGIES

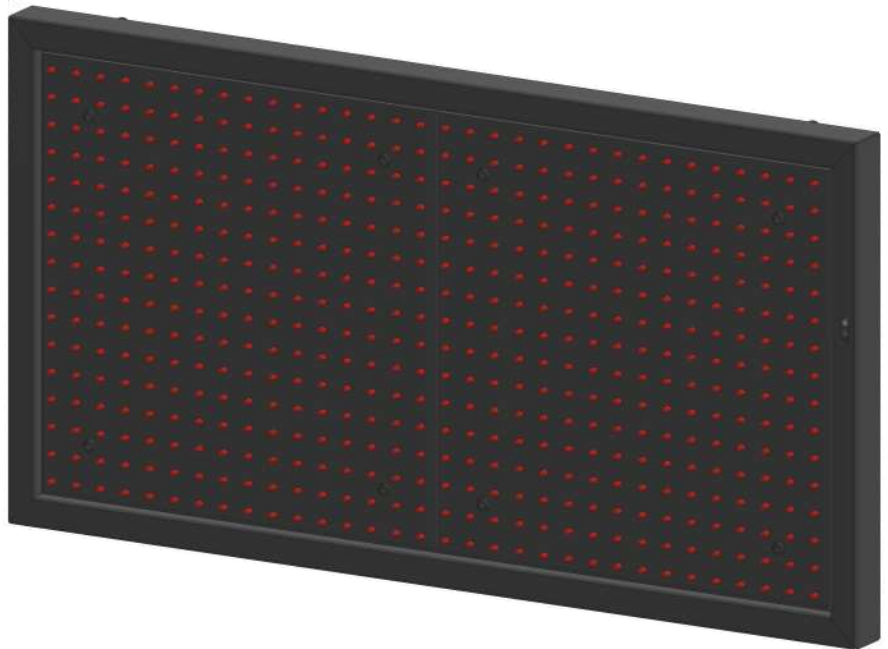
# OPERATION AND MAINTENANCE MANUAL

## MATRIX CLOCKS

**Product code:**

301-96-31  
301-96-32  
301-96-33  
301-96-34  
301-96-35  
301-96-36

**Nätverksklockor Extra large. Kontakta oss om exakta mått önskas på din valda modell**



\*Explanatory figure

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## 2 Specifications

### ZA30-L MATRIX

Dimensions of the device (WxHxD) [mm]:	621 x 333 x 92,5
Display format:	HH:MM
Permissible input voltage range (long-term):	100 ÷ 240 VAC
Permissible input voltage range (short-term):	85 ÷ 264 VAC
Acceptable input voltage frequency range:	47 ÷ 63 Hz
Digit height [mm]:	270mm
Weight of the device:	8kg
Casing tightness rating <sup>1</sup> IP:	67
Average power consumption of the device:	4W
Device operation temperature (ambient):	-25°C ÷ 45°C
Device operation temperature (device surface)	-25°C ÷ 60°C

Available LED colours:

- red
- green
- blue
- yellow
- amber
- white

## 3 Transport and storage

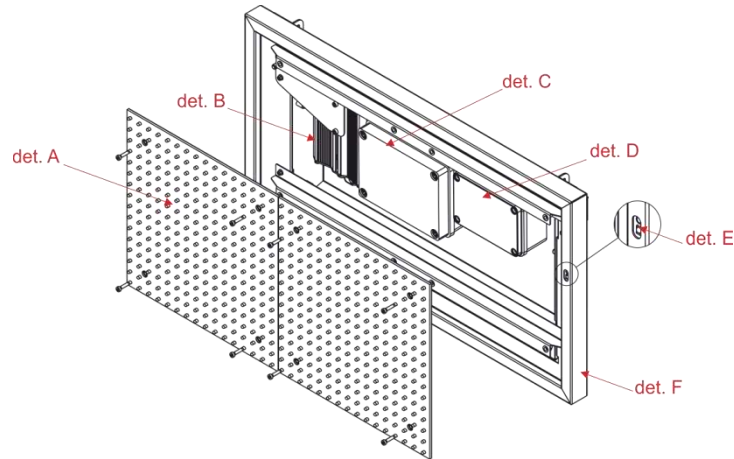
Care should be taken to properly protect the devices so as to eliminate any damage during transport. It is forbidden to transport the devices in a collective package without adequate amortisation - each device must be packed separately and cannot have freedom of movement during transportation.

Due to the protective packing the module should be stored in the temperature not lower than -25°C and not higher than +60°C at the humidity below 99%RH.

<sup>1</sup> Specified on the basis of EN 60529.

## 4 Device construction

MATRIX is cased in a powder-coated steel housing. The properly installed device meets the IP67 tightness requirements.



det. A - LED module; det. B - power supply unit; det. C - controller; det. D - junction box; det. E - lighting and IR sensors; det. F - case;

fig. 1

### 4.1.1 List of clock cables

1. Two-metre power cord (2 x 0.5mm<sup>2</sup>);
2. Ten-metre LAN cord, terminated with RJ45 plug.

## 4.2

All the dimensions shown in the drawings are given in [mm].

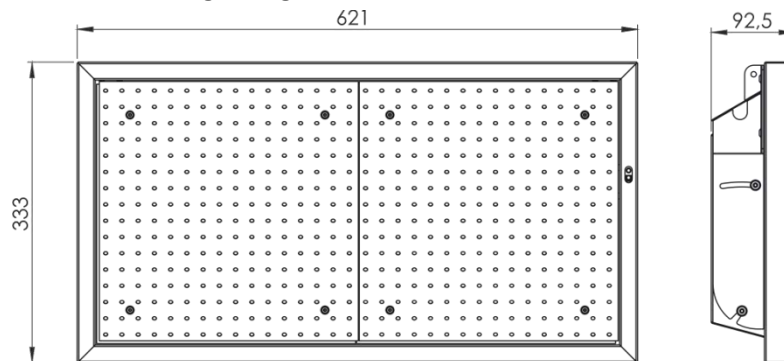


fig. 2

### 4.2.1 Mounting

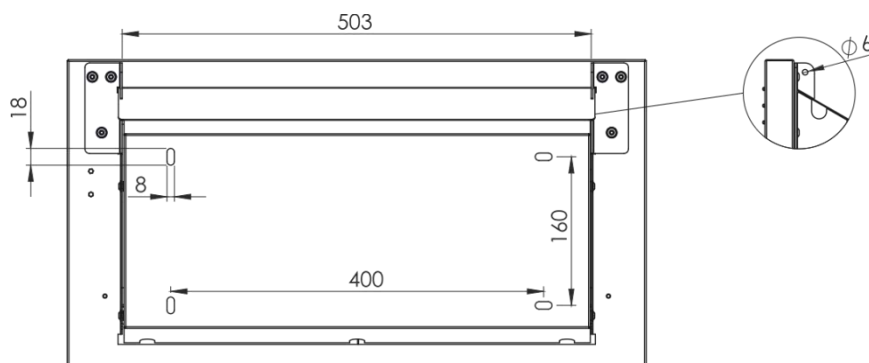


fig. 3

<sup>2</sup> Explanatory figure.

## 5 Installation of the device

Proper installation consists in mounting the device in one of ways proposed by Producer. The device must be orientated to ensure that all leads in hermetic components are facing down. Only the correct installation of the device ensures its proper operation and maintaining the device parameters, e.g. casing tightness rating to satisfy the IP code.

### 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 the property damage, loss of health or death from electrical shock! In addition, any failure to follow the manufacturer's instructions may void your warranty.

### NOTICE!

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

In standard way the device is mounted on flat surface using the factory mounting holes on the back of the device as shown on fig. 4. The case construction allows adjusting the tilt angle in range from 0° to 15° and leading out the cables from various sides of the device.

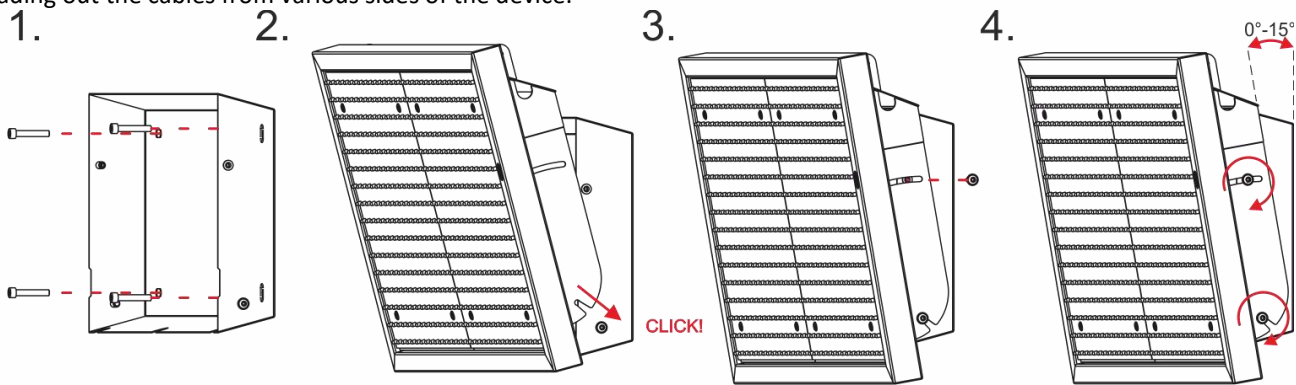


fig. 4

Alternatively, the device can be hung on steel cords or chains.

### 5.1 application

The MATRIX device is designed to display time, date and optionally temperature. Additionally the clock enables signalling alarms using an embedded executive relay and could be used as a time standard for other devices.

For the proper operation of the device, it should be correctly configured.

## 5.2 MATRIX configuration

The configuration process consists in personalising the device by a user. In standard the device is configured using LAN interface and optionally it could be done using IR remote sold separately.

### 5.2.1 Configuration of the device through the embedded website - Web panel

To connect with the clock, first you should configure the network card of the computer to which it is connected. The proper configuration of the network card can be downloaded from <http://rgbtechnology.pl/soft/>. Having configured the network connection correctly, you can, through a Web browser, connect with the embedded website (Web panel), where you can personalise the device. On the embedded clock website, you may use the following tabs:

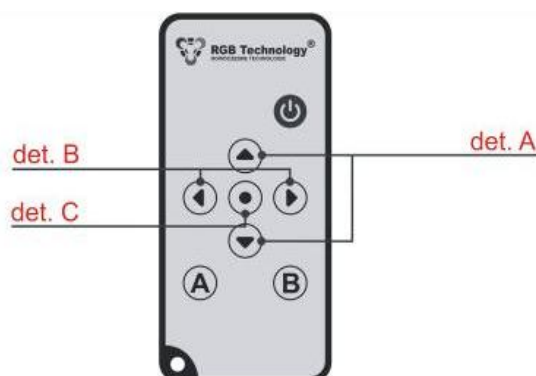
- TIME -> tab allowing you to configure the parameters connected with time;
- DISPLAY -> tab allowing you to configure the parameters connected with the device display;
- ALARMS -> tab allowing you to configure the parameters connected with alarms (option available in the version with an audible signalling device);
- ADVANCED -> tab allowing you to configure the advanced parameters of the device;
- STATUS -> tab allowing you to read the device status.

The detailed description of the tabs is available in the device operation manual `instr_hardware_037`.

### 5.2.2 Configuration of the device through the IR remote

The basic configuration method is by means of the remote control through the user menu. fig. 5 shows the remote control, along with the explanation of the function of each button. You enter the user menu using the **MENU** button. You navigate and modify the respective parameters using the buttons **↑**, **↓**, **←** and **→**.

**Modell med IR är  
beställningsvara,  
kontakta oss**



- det. A – Change the parameter (VALUE PLUS/VALUE MINUS)
- det. B – move to the next position (PREVIOUS/NEXT);
- det. C – „MENU” button

fig. 5

Main menu structure:

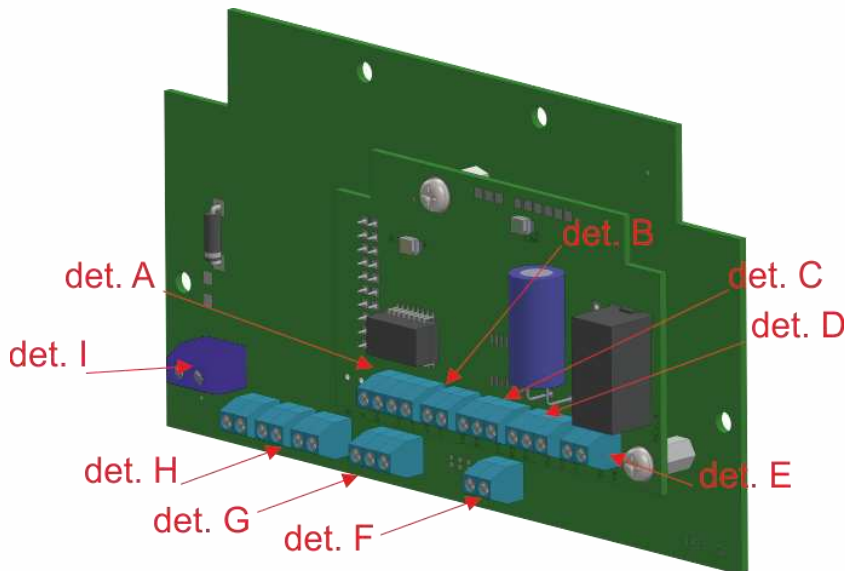
Menu position	Function description
F1	Manual setting of the time and the date
F2	Configuration of the presented parameters
F3	Configuration of the date format
F4	Configuration of the time synchronization <sup>3</sup>
F5	Configuration of the display brightness
F6	Configuration of the alarms
F7	Configuration of the ECO mode
F8	Configuration of the display font
F9	Restoring the default settings
F10	Configuration of temperature offset
F11	Configuration of display synchronization
F12	Displaying information about the signal strength or disconnection of the GPS module
F13	Regional settings, such as location, time zones, daylight saving time/standard time
F14	Stopwatch function / timer counting up / timer counting down

<sup>3</sup> Option available in the variant equipped with the network synchronizations module or the GPS module.



## 6 Controller

The controller module (fig. 6) is responsible for the time counting, displaying the content by LED modules and enables the operation of peripheral devices. Thanks to a supercapacitor, the device provides correct time keeping when there is no external power supply



det. A – LAN connector; det. B – not used; det. C – temperature probe connector; det. D – GPS connector; det. E – relay connector  
 det. F – brightness sensor connector; det. G – IR sensor connector; det. H – LED modules connectors; det. I – controllers power supply connector;

fig. 6

## 7 List of the controller connectors

Table 1 contains the description of the device signal connectors. The connectors are accessible after the disassembly of the LED module and controller case lid.

	Purpose	Symbol	Remarks	Wire colour
STANDARD	Power supply for controller	POWER 5V	-	red
		POWER GND	-	black
	Relay (alarm signalling device)	RA	Closing contact, normally open;	brown ("return")
		RB		blue ("input")
	GPS module	GPS	GPS module signal	orange
		5V	GPS power supply	red
		GND	Mass of the system	black
	Brightness sensor	F	Brightness sensor signal	yellow
		GND	Mass of the system	green
	IR sensor	IR	IR sensor signal	white
		5V	IR sensor power supply	brown
		GND	Mass of the system	-
	Temp. probe	TEM	Temp. probe signal	orange
		5V	Temp. probe power supply.	red
		GND	Mass of the system	black
	Ethernet	TX+	Pin no. 1 plugs RJ-45	orange-white
		TX-	Pin no. 2 plugs RJ-45	orange
		RX+	Pin no. 3 plugs RJ-45	green-white
		RX-	Pin no. 6 plugs RJ-45	green
	Content display	S1, S2, S3	LED modules signals	white
GND		Mass of the system	green	

Table 1

## 8 Accuracy

In standard the accuracy of the device is based on the built-in RTC quartz crystal oscillator. Declared accuracy with a stable power supply and at the operating temperature of 25°C is +/- 1 minute per month.

To eliminate the RTC clock aberration (loss or gain) and increase accuracy, the device can be synchronized with the alternative time standard. Declared in Table 2 aberration in regard to the time standard is non-recurring and non-cumulative.

Time standard	Communication method	Aberration in regard to the time standard
NTP time server	LAN	depends on server, maximum: +/- 20 ms
GPS	GPS GM-2 module	strong and stable signal: +/- 20 ms poor signal: +/- 100 ms
Master clock	LAN	depends on accuracy of the master clock

Table 2

Notice! During the first time synchronization or resume (e.g. after signal loss), the device recovers full accuracy after 40 to 80s.

## 9 Executive relay module

The device is equipped with an embedded executive relay, which enables signalling up to 30 alarms. The duration of each alarm can be set in a time interval between 1 and 59 seconds. Sample applications:

- 1) Activating an acoustic signalling device for industrial applications<sup>4</sup>, signalling, for example, a break or a shift rotation in an industrial plant;
- 2) Activating a school bell;
- 3) Giving a time signal to separate systems or devices.

### 9.1 Executive relay parameters

Embedded executive relay parameters	
Types of contacts	NO (normal open)
Maximum resistive load	5A
Maximum inductive load	2A
Maximum applied voltage	250VAC/30VDC

Table 3

There is a possibility to connect a different signalling device (e.g. visual or visual-acoustic) to the relay connector. In such case, be careful not to exceed the relay electric parameters.

## 10 Automatic brightness control of the device

In the standard version, a lighting sensor is included. The device, in response to the ambient lighting conditions, adjusts the brightness of the clock display.

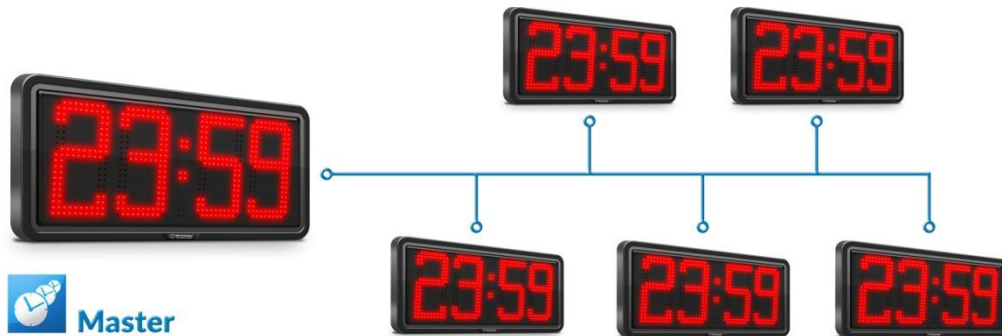
<sup>4</sup> Optionally, an audible signalling device is available.



## 11 Additional options

### 11.1 Cooperation between clocks

The device with LAN support has an option to cooperate with other clocks through the network. In this system the Master clock is a time standard for Slave clocks. Also it controls the displayed information. Thanks to that all the clocks show exactly the same time and type of information e.g. display the temperature simultaneously. The cooperation is possible between different models of RGB Technology clocks.



### 11.2 GPS module

Optionally, the device may be equipped with an external GPS module. The properly configured clock equipped with the GPS module can synchronise the time with a satellite. The standard cable length is 10m. The detailed description of the module is available in the DTR documentation of the GPS module.



fig. 7

### 11.3 Temperature probe

The optional temperature probe is available with two versions of a signal cable length 0.5m and 2m. The probe enables measuring and displaying temperature in °C (Celsius) or °F (Fahrenheit). The detailed description of the temperature probe is available in the DTR documentation according to the catalogue index number.



fig. 8

## 11.4 Audible signalling device

Optionally, the device is equipped with an audible signalling device. The user may choose one of two signalling device versions:

- 1) volume of the audio signal at the level of 88dB;
- 2) volume of the audio signal at the level of 108dB.

The standard cable length is 10m

The detailed description of the signalling device is available in the DTR documentation according to the catalogue index number.

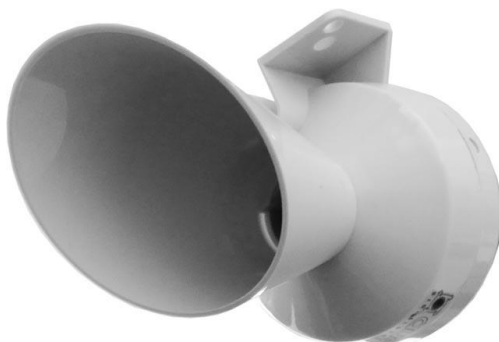


fig. 9

## 12 Initial start-up

Step 1: Connect the device to 230V power supply,

Step 2: Properly connected system should display pre-set (current) time and date.

## 13 Disposal and recycling

### 13.1 Recycling of the package

The packaging materials must be segregated, then recycled in accordance with local regulations for waste disposal regulations.

### 13.2 Disposal of the device

The device can not be disposed with regular household waste!

According to Directive 2002 / 96 / EC ( WEEE ), when repair is not economically reasonable, user is obligated to hand over damaged or destroyed device to an appropriate disposal facility .



## 14 Most common installation errors

1. Device installed contrary to the instructions,
2. Drilling additional holes in the casing.
3. No plugs in unused holes of the hermetic connectors.