

DEVICE OPERATION MANUAL

ZAS and ZBS Series Clocks

Default clock configuration:

- DHCP addressing, UTC time zone + 1:00, DST: Europe, time display, 24-hour time format, no date display, no colons flashing.
- When activated, the device displays its IP address. If the DHCP address is not obtained in 5 minutes, the clock takes the address from the following pool: 169.254.0.1 - 169.254.255.254. The clock can be detected using the RGB ClockSet or RGB Devicer software.

1. Introduction:

The ZAS and ZBS series devices are compact clocks with comprehensive personalisation possibilities. The clocks are equipped with a network communication module that allows remote configuration through the website and time synchronisation using the Internet time servers. Optionally, you can purchase a remote control.

The clock enables:

- adjusting the time of the presentation: the clock and the date,
- adjusting the date and the time format (12-hour or 24-hour),
- automatic and manual brightness control,
- working in the ECO mode allowing the reduction of power consumption,
- automatic time change from the standard time (winter time) to the daylight saving time (summer time) and from the daylight saving time to the standard time for different locations (Europe, Australia, the United States of America, Canada, Israel),
- manual date configuration for the automatic time change,
- synchronisation using the SNTP Internet servers
- Master Mode - a local time server compatible with NTP,
- synchronisation with the local „Master Mode” time server,
- configuration through the built-in website,
- display (content) synchronisation in three modes (master, basic slave - the master sends only display information, full slave - the master sends display information and temperature) between any types of the RGB Technology clocks equipped with a communication module,
- setting an individual clock name,
- website language selection (English and Polish),
- function of a stopwatch, a timer counting up and counting down,
- DHCP client function,
- DNS client function.
- using the NTP server pool (pool.ntp.org)
- mode of counting down and signaling breaks (school breaks or breaks at work).

2. Power supply:

The clocks use the Power over Ethernet technology and support the IEEE 802.3af (PoE) and IEEE 802.3at (PoE+) standards. This allows you to use a single cable for power and data transmission. The clock must be connected to a compatible power supply unit.

3. Connection with the clock:

The connection with the clock is established through the Ethernet interface, the integrated website is operated via a web browser (recommended browser: Mozilla Firefox version 16.0.2 or later). To connect to the device, enter the IP address assigned to the device into the browser, the address is displayed on the clock when the device is activated.

Then, the device will ask you to enter the username and the password (default User: **admin**, Password: **dbps**).

Device activation - initial animation:

- **DHCP addressing** - the clock displays the word "DHCP", the "IP" and the address (If only the word DHCP is displayed, it means that there has been no active DHCP server in the network),
- **static addressing** - the clock displays the word "IP" and the address.

3.1. Restoring the default network settings:

Table 1 shows the default network settings for the clocks. The return to the factory settings can be done via the website or by holding the reset button on the back of the device for 3 seconds (through the hole with a paper clip) or by using the appropriate user menu function using the remote control. The default clock addressing mode is the DHCP client mode.

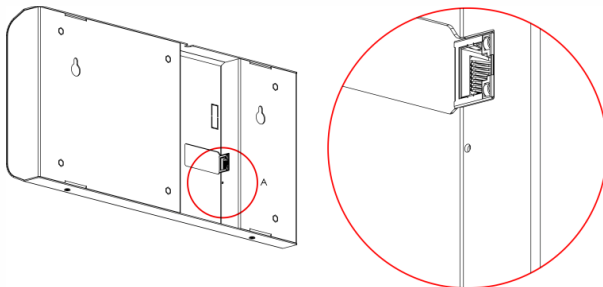


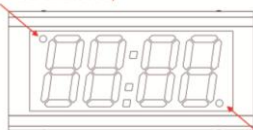
Fig. 1

Tab. 1. Default network settings

Parameter	Default value
User	admin
Password	dbps

4. Additional information shown on the display:

Afternoon time (in 12-hour time format)



No time synchronisation

5. Website operation:

The ZAS and ZBS series clocks are equipped with the network communication module (Ethernet module) enabling intuitive personalisation through the built-in website. The website consists of six pages enabling the configuration of the device individual functions.

NOTICE!

The changes of the device parameter settings should be confirmed each time using the "Save" buttons.

5.1. Time tab:

The tab that allows you to configure time-related parameters.

- **Local time & date** – the manual local time and date settings.
- **Regional settings** – the configuration of the time zone, including the option of the daylight saving time, the daylight saving time rule.
- **Time source for the clock** – the configuration of the remote time synchronisation and the NTP server addresses
- **Time source for other devices** – the configuration of the local time synchronisation.

NOTICE!

To support the time synchronisation from the NTP servers, the correct (including the local network addresses) configuration of the "IP Address", "Mask", "Gateway", "DNS Server" parameters in the **Advanced** tab (or they are downloaded automatically from the DHCP server) and the device connection to the Internet are required.

5.2. Display tab:

The tab that allows you to configure the device display parameters.

- **Format** – the configuration of the displayed functions (clock, date), their duration, date format and time colon flashing (only ZAS).
- **Brightness** – the configuration of the display brightness and the activation of the automatic brightness control.
- **Display synchronisation over Ethernet** – the configuration of display (content) synchronisation, the selection of the operating modes and the master clock IP address field (required for the Slave operating modes).
- **Eco** – the energy saving mode settings (time of the device activation and deactivation).
- **Import/Export configuration** - exporting or importing the configuration file.

5.3. Advanced tab:

The tab that allows you to configure the device advanced parameters.

- **Clock name** – the individual name of the clock, e.g. "Shop", "Warehouse".
- **Network** – the network settings (IP address, subnet mask, default gateway, DNS server addresses), activating the DHCP function and blocking the remote access. When the DHCP function is active, the clock allows you to use the DHCP 42 option and the DHCP private option (default no. 230) - (9. Appendix A).
- **Password** – the user password settings.
- **Schedule reboot** – allows you to program the device to restart at a specified time.
- **Default settings** - restoring the factory settings.
- **Restart** - restarting the clock.
- **Import/Export the whole configuration** - ability to import or export the whole device configuration from or to the file.

NOTICE!

The "Restore **default settings**" function fully restores the factory settings, including the setting of the default network configuration.

5.4. Status tab:

The tab that allows you to read the device status.

- **Date & time** – reading the time and the date.
- **Sensors** - reading the ambient brightness sensor.
- **NTP client status** - reading the information about the communication with the NTP server and the time of the last synchronisation.
- **Network** - reading the network interface configuration.
- **Device** - reading the clock proper name, the software version, the hardware and the product version.
- **Advanced DHCP** - reading the status of the DHCP 42 option and the DHCP private option (default no. 230).

5.5. Firmware tab:

The tab that allows reading the information about the firmware version and switching the device to the update mode.

5.6. Timers tab:

The tab that allows you to change the device operation mode from the clock to the stopwatch or the timer.

- **Direct actions** - setting the device operation mode:
 - ✓ time - time display,
 - ✓ stopwatch - counting time - operated by means of the "Start|Stop" and "Reset" buttons of the Web-panel, or by means of the "A" and "B" buttons on the remote control. The reset option is available when the stopwatch has been stopped.
 - ✓ timer up - counts the time from zero to the preset end value,
 - ✓ timer down - counts the time from the preset start value to zero,
 - ✓ long-range timer up - counts the days and time from zero to the final value,
 - ✓ long-range timer down - counts the days and time from the preset initial value to zero,
 - ✓ breaks - shows the time left to the end of the current break. In the absence of an active break, the device will show the value "00:00".

- **Settings** – setting the start and end values for the "timer up/down" operation mode and setting the countdown end signal duration. The audible signalling device (buzzer) - before the end of the preset time - can be turned off using the "Reset" button or the "B" button on the device remote control. Possibility to set the quick-access timer (activated by the POWER button on the IR remote control or wired RS485 remote control).

5.7. Breaks tab:

The tab allows you to set parameters related to breaks. The device enables configuration of up to 30 breaks. The user defines the beginning of a break at a given time, its duration and the days on which the break is to be active. Additionally, the beginning and end of the break is signaled with an acoustic signal (in the case of a device equipped with an acoustic signaling device). During the break, the clock can work in three modes:

- **Clock**,
- **Timer down** (default setting),
- **Timer up**.

5.8. SNMP tab:

The clock supports the SNMP protocol (agent mode) which enables managing the clock (reading parameters) and sending messages (traps) about events.

6. Master mode configuration:

The ZAS and ZBS series clocks allow local synchronization of the slave clocks with the master clock. Table 1 shows a sample configuration of clocks. NOTE! Time server IP addresses can be entered by the user only via the "Website".

Table 1 Master Mode configuration

	Master clock (Master)	Slave clock (Slave)
Master Mode	active	inactive
Synchronization source	NTP	NTP
Comments	Time server boxes from 1 to 5 should include sever addresses compatible with NTP.	In the Time server box 1, you should enter the master clock (Master) IP address. The Time server IP boxes from 2 to 5 should be filled in with the addresses 0.0.0.0

7. Changing the language of web page

To change the language, click at the bottom right corner on a flag symbolising the language. Available languages are Polish and English (default). After clicking on the desired flag, next to it should be displayed an information "Ustawiono język polski" or "Set english language", which means the correct language setting in the memory clock (feedback from the device).

8. Daylight Saving Time

a) Europe

In accordance with EU Directive 2000/84/EC:

- the standard time is changed to the daylight saving time on the last Sunday in March (by adding one hour),
- the daylight saving time is changed to the standard time on the last Sunday in October (by taking away one hour).

Considering the above, in the countries following EU Directive 2000/84/EC, when the option of taking into account the daylight saving time is activated in the clock:

a) **On the last Sunday in March** there is no time interval between 01:00UTC + TimeZone and 01:59UTC + TimeZone. If you try to set the clock to the time within this interval, one hour earlier value is adopted, and it is assumed that the time has not yet been changed to the daylight saving time. As a result, within the nearest 60 minutes, the clock will take into account the change to the daylight saving time and will add one hour automatically.

b) **On the last Sunday in October**, the time interval between 01:00UTC + TimeZone and 01:59UTC + TimeZone appears twice. If you set the clock to the time within this interval, the clock will be set to the time indicated by the user, and it is assumed that the time has already been changed to the standard time.

b) Australia

- the standard time is changed to the daylight saving time on the first Sunday in October at 2:00 AM of the local time (adding one hour),

- the daylight saving time is changed to the standard time on the first Sunday in April at 3:00 AM of the local time, taking into account DST, (taking away one hour).

The daylight saving time is not applied in North Australia, Queensland and West Australia. Setting time change, the user must consider the fact if the particular Australian territory (time zone) uses DST.

c) United States and Canada

- the standard time is changed to the daylight saving time on the second Sunday in March at 2:00 AM of the local time (adding one hour),

- the daylight saving time is changed to the standard time on the first Sunday in November at 3:00 AM of the local time, taking into account DST, (taking away one hour).

The states of Arizona, Puerto Rico, Hawaii, Virgin Islands and Samoa do not change time. Setting time change, the user must consider the fact if the particular state, situated in the respective time zone, uses DST.

d) Israel

- the standard time is changed to the daylight saving time on Friday before the last Sunday in March at 2:00 AM of the local time to 3:00 AM (adding one hour),

- the daylight saving time is changed to the standard time on the last Sunday in October at 2:00 AM of the local time to 1:00 AM (taking away one hour).

9. Appendix A: Supporting Private DHCP Options (230) - „RGB Config String”

The clock, in addition to the standard DHCP client options (e.g. 1, 3, 6, 42), supports an additional private DHCP option by default no. 230 (vendor specific DHCP option), which allows advanced users and network administrators to perform group device configuration using the string of characters "RGB Config String". The configuration of the DHCP server is entered once and centrally, and the clocks, when obtaining an IP address lease, also download the configuration of: the time server (**tse** parameter), the time zone (**tzo** parameter), the daylight saving time rule (**dst** parameter), the 12-hour time format (**tf12** parameter). These parameters constitute the so-called "RGB Config String"; examples of the configuration strings are presented in Tab. 3.

NOTICE! The clock, when obtaining the DHCP lease (device start-up) and when refreshing the DHCP lease, downloads the configuration data from the "RGB Config String". When the data is different from the currently present, it modifies its own settings and saves them in the non-volatile FLASH memory.

Tab. 3. Examples of the "RGB Config String" - additional option DHCP 230

Location	„RGB Config String” – additional option DHCP 230
Los Angeles	tse=pool.ntp.org;tzo=-08:00;dst=7 2 3 2 7 1 11 2;tf12=Y
Salt Lake City	tse=pool.ntp.org;tzo=-07:00;dst=7 2 3 2 7 1 11 2;tf12=Y
Chicago	tse=pool.ntp.org;tzo=-06:00;dst=7 2 3 2 7 1 11 2;tf12=Y
New York	tse=pool.ntp.org;tzo=-05:00;dst=7 2 3 2 7 1 11 2;tf12=Y
London	tse=pool.ntp.org;tzo=00:00;dst=7 -1 3 1 7 -1 10 2;tf12=N
Warsaw	tse=pool.ntp.org;tzo=01:00;dst=7 -1 3 2 7 -1 10 3;tf12=N
Tallinn	tse=pool.ntp.org;tzo=02:00;dst=7 -1 3 3 7 -1 10 4;tf12=N
Moscow	tse=pool.ntp.org;tzo=03:00;dst=N;tf12=N
Sydney	tse=pool.ntp.org;tzo=10:00;dst=7 1 10 2 7 1 4 3;tf12=N
Dubai	tse=pool.ntp.org;tzo=04:00;dst=N;tf12=N
Tel Aviv	tse=pool.ntp.org;tzo=02:00;dst=5 -1 3 2 7 -1 10 3;tf12=N
Ankara	tse=pool.ntp.org;tzo=03:00;dst=N;tf12=N
Kuala Lumpur	tse=pool.ntp.org;tzo=08:00;dst=N;tf12=N
Johannesburg	tse=pool.ntp.org;tzo=02:00;dst=N;tf12=N

Tab. 4. „RGB Config String” parameters – additional option DHCP 230

Parameter	Description	Examples
tse	Internet (domain) address or IP address of the time server	tse=pool.ntp.org tse=194.146.251.100
tzo	Time zone displayed in the format: HH:MM – zone with positive offset -HHMM – zone with negative offset	tzo=01:00 tzo=-05:00 tzo=00:00
dst	<i>Rule for time change in the “RGB Custom String” format. Details in Tab. 5.</i>	dst=7 -1 3 2 7 -1 10 3 dst=7 2 3 2 7 1 11 2 dst=N (disabling DST change)
tf12	Clock display mode in 12-hour format	tf12=N (24-hour format) tf12=Y (12-hour format)

NOTICE! In the configuration of the “dst” parameter, individual number fields are separated with a “space”. When “dst=N”, time change is disabled.

Tab. 5. Description of the “dst” parameter value

DST start time				DST end time			
Day of a week	Number of the week in a month	Month	Hour	Day of a week	Number of the week in a month	Month	Hour
1 – Monday	-1 – Last	1 – January	0 – 00:00	1 – Monday	-1 – Last	1 – January	0 – 00:00
2 – Tuesday	1 – First	2 – February	1 – 01:00	2 – Tuesday	1 – First	2 – February	1 – 01:00
3 – Wednesday	2 – Second	3 – March	...	3 – Wednesday	2 – Second	3 – March	...
4 – Thursday	3 – Third	4 – April	23 – 23:00	4 – Thursday	3 – Third	4 – April	23 – 23:00
5 – Friday	4 – Fourth	5 – May		5 – Friday	4 – Fourth	5 – May	
6 – Saturday		6 – June		6 – Saturday		6 – June	
7 – Sunday		7 – July		7 – Sunday		7 – July	
		8 – August				8 – August	
		9 – September				9 – September	
		10 – October				10 – October	
		11 – November				11 – November	
		12 – December				12 – December	