DIGITAL SLAVE CLOCKS OF THE ZWC TYPE

Slave clocks type ZWC are designed for precise current time indication: hours and minutes (version "M") or hours, minutes and seconds (version "S") in 24-hour cycle, for indoor installation e.g. in banks, offices, schools, hospitals, switching stations, dispatch rooms etc. Version /U can be installed outdoor under roofing or indoor in premises with increased dustiness.

Clocks can be a **one-sided** version "J" or a **two-sided** version "P/Z". For the one-sided version each clock consist of the main clock and the wall hanger assembly. For the two-sided version each clock consist of the main clock "Z", the auxiliary clock "P" and the **ceiling hanger or side hanger** assembly. The housings for the main and auxiliary clock are identical. They have catches at the back for fixing them on the hanger. Such construction enables easy unhooking the clock for maintenance purposes from the hanger assembly, which is permanently fixed with screws to the wall or to the ceiling.

In the standard option the clocks are equipped with segment diode display (LED) with the **optional digit height 45, 57, 100 and 125 mm**, enabling the indications **read-out from the distance from 15 to 50 m**. On request versions with even **bigger digits are also available**.

Clocks can operate autonomously, or they can be equipped with one of the following control or synchronizing inputs:

- **Line analog input** LA adapted to receive polarized impulses ±24V changing the clock indication one minute forward. This input enables to connect the clock to the line of analog clocks (clocks with hands), controlled by a master clock, e.g. type MC-20, MC-21 or other.

- **Line digital input** L adapted to receive polarized packets of impulses ±24V sent once every second, which carry the full information on the current time. This input enables to connect the clock to the digital line, controlled by a master clock, e.g. type MC-20.

- **Synchronizing input** L4 , e.g. link of RS-485 type. This input enables connecting the clock to the network of slave digital clocks, controlled e.g. from MC-21 master clock.

- **Input for** connecting signal from the **external antenna DCF-77** (designation "A") **or GPS** (designation "G").

In case of using analog line input the clock does not measure the time independently, but operates as the counter of impulses sent by the master clock. In case of the other inputs listed above, the clock measures the time independently, and its indications are synchronized with the received external information. Such solutions guarantee the high reliability of operation, the identity of indication for all clocks connected to the network, and the immunity to external disturbances.

Additional options and equipment for clocks (to be agreed on at the ordering stage):

- Alternate displaying of time and date (designation /D), time and temperature (designation /T), time and humidity (designation /W) or time and pressure (designation /H). As a standard, the time is displayed for the duration of 8 seconds, and the second parameter is displayed for the duration of 2 seconds. For the version with designation "/D/T" alternately three parameters can also be displayed, e.g. time, date and temperature in the cycle: 10 seconds (time) / 5 seconds (date) / 5 seconds (temperature).

- Color of display : red, green or yellow.

- Adjustment of the display brightness (designation /J).

- Color of housing : the standard colour is black.

- Build-in battery of accumulators supporting operation of the time standard in case of the voltage supply break for the duration of at least 24 hours (designation /R24), 48 hours (/R48), or one year (/R1J). When the clock is supplied from the accumulators, its display is switched off.

- Build-in function of stopper counting out forward or backward, with the possibility of controlling its operation through the external contacts or by voltage impulses 24 V.

- Build-in relay for synchronization of external devices (designation /S) or for controlling external devices such as school or church bells, technological processes, time signal impulses for wire broadcasting system etc. (designation /P). Closing relay contacts may also signalize that the count-out threshold in the build-in stopper has been exceeded.

- Build-in link RS-232 (designation /RS) or RS-485 (designation /R4) for time synchronization in singular PC computers or computer networks. In the clock operation manual the transmission protocol enabling the user to make use of this link in his own applications is described. At the request of the purchaser together with the clocks relevant software working in DOS or WINDOWS 3.x/9x/NT/2000/XP environment can be delivered.

- Build-in controller for analog hand-type clocks with minute indication (designation /C), enabling controlling the operation of maximum 10 clocks connected in the network. These clocks should be adapted for controlling impulses with amplitude ±12V. Data of these clocks are available in the separate information card.

- Build-in outputs with RS-485 link (designation /N) for controlling the time network with connected slave digital clocks.

- Build-in infra-red receiver for the remote control, (designation /Q), enabling remote changing of clock settings. This option is particularly useful in case, when the clock is installed in not easily accessible place (e.g. under the high ceiling) and there is the necessity for the periodic change of settings for generated alarms (e.g. school bells).

Technical data of clocks parameters dependant on the digit dimensions :

Parameter	ZWC-45	ZWC-57	ZWC-100	ZWC-125
Power consumption for one-sided clock	12W*	15W*	22W*	28W*
Power consumption for two-sided clock	17W*	19W*	30W*	40W*
Dimensions of digits for hours and minutes (days and months)	45x27	57x32	100x60	125x76
Dimensions of digits for seconds (year)	30x18	38x22	57x32	100x57
Readability of indications	15m	20m	40m	50m
Dimensions of housing (see the drawing - last page)	256x97x97	315x120x105	560x215x155	760x285x190
Weight of one-sided clock with hanger assembly	2,5kg	2,8kg	8kg	14kg
Weight of two-sided clock with hanger assembly	5kg	6,5kg	22kg	33,8kg

*) The value of the power consumption might change for clocks with displays in color different then the red.

Technical data of clocks common parameters:

Basic supply	230V 10%, 50Hz 2%
Protection class	I acc. to EN 61140:2002 standard
Reserve supply without RTC system	Build-in accumulator 4.8V /0.7Ah
Reserve supply with RTC system – in preparation	Build-in accumulator 3,6V/60mAh
Duration of time standard support in case of basic supply break	Without RTC system : approximately 24h* / with RTC system : approximately one year
Time of full charging of accumulators	Minimum 60 hours
Automatic disconnection of accumulators	Without RTC system at $U_{akum.}$: approximately 4.2V/ with RTC system: no such function
Precision of indication in the whole operating temperature range: - when operating autonomously - when operating with antenna - when controlled from master clock	±1,5x10-5 (appr. ±1,3s / 24h) Equal to atomic time standard precision. Equal to master clock precision.
Display brightness adjustment /J	Discrete , 16 levels.
Controlling signal for version L	±24V++10%--25% (digital, containing groups of polarized impulses, transmitted serially through two-conductor controlling line)
Controlling signal for version LA	Alternate impulses with amplitude ±24V+10%-25% and duration 1s, appearing every one minute in normal mode or every one second in accelerated mode.
Maximum current consumption from controlling line for version L and LA	15mA
Maximum allowed length and resistance of controlling line for version L and LA	1500m / 300?
Minimum voltage of controlling signal for version L and LA	±18V
Maximum allowed cable length for RS-485 interface	1200m (recommended 500)
Maximum number of standard RS-485 receivers	31 receivers with load capacity (2x0,5mA)
Type of conductors for creating network with RS-485	One pair of telephone-type stranded wire, diameter of conductor 0,5mm^2
Amplitude of impulses for analog clocks controller /C	±12V
Load capacity for analog clocks controller /C	0,13A (10 analog clocks)
Load capacity of relay output for version /S and /P	2A, 250V~ (resistance-type load)
Mode of operation of relay output for version /S and /P	Depending on ordered software.
Range and resolution for measurement and indication of temperature /T	-40 C 100 C/1 C

*) Or 48 hours for clocks with analog output LA   **Remark:** some parameters refer to additional / optional functions.

Ambient conditions	Version for indoor installation	Version for outdoor installation
Protection class of housing	IP40 acc. to EN 60529 standard	IP50 acc. to EN 60529 standard
Temperature range	From +5°C to +40°C	From -20°C to +55°C
Pressure range	From 86 to 106kPa	From 86 to 106kPa
Humidity range	From 20% to 80%	From 5% to 95%
Maximum allowed temperature change ratio	5°C / h	
Insolation	No direct sunlight	
Ventilation	Natural	

Technical data of GPS antenna:
- Weight: 40g
- Measurements: 38x43x13
- Protection class   IP 65 acc. to EN 60529
- Standard antenna cable length: 5m
  (concentric cable type RG174U)
- Supply: 3V-, 30mA
- Operating frequency: 1575,42MHz
- Operating temperature range: -40C to +100C

**Technical data of DCF antenna:**
- Measurements: 28 x 115
- Protection class: IP 54 acc. EN 60529
- Supply: 10 mA DC
- Operating frequency: 77.5 kHz
- Operating temperature range: -20C to +60C
- Standard antenna cable length   2m (OMY 2x0,75mm^2)

Determination of clock type when ordering : ZWC-A;B;C;D/E.../ e.g.:

ZWC-57SLP/Z/D/C   slave digital clock with indication of seconds, with line digital synchronizing input, two-sided, displaying alternately time and date, with built-in controller for analog clocks, where the subsequent fields A, B, C, D and E mean:

A - height of digits in mm (standard heights are : **45**, **57**, **100** or **125**)

B - for 4-digit clock with minute indication letter „**M**", and for digital 6-digit clock with indication of seconds letter „**S**"

C - type of synchronizing input for time synchronizing:

   L - line digital input for using with MC-20 master clock.

   LA - analog line input for using with analog clocks network.

   L4 - input of RS-485 type for using with ZWC clocks, with additional function **/N** or with master clock e.g. MC-21.

   A - input for using with DCF-77 antenna.

   G - input for using with GPS antenna.

D - for one-sided clock letter „**J**", and for two-sided clock letters „**P/Z**" which mean respectively :

   Z main supplying clock,

   P auxiliary clock.

E - this designation determines the additional function (there might be several additional functions in one clock best is to agree on this issue at the ordering stage with the manufacturer or the distributor).

   /U - version for outdoor installation under the roof.

   /D - alternate time and date display.

   /T - alternate time and temperature display.

   /W - alternate time and humidity display in preparation.

   /H - alternate time and pressure display in preparation

   /J - function of display brightness adjustment.

   /R24 - built-in accumulator supporting time standard operation for 24 hours (without function of time display the display is switched off).

   /R48 - built-in accumulator supporting time standard operation for 48 hours (without function of time display the display is switched off) only for version with L-type input.

   /R1J - built-in accumulator supporting time standard operation for 48 hours (without function of time display the display is switched off) in preparation.

   /S - build-in relay for synchronization of industrial devices (the pulse/switching program shall be agreed with the manufacturer).

   /P - build-in relay for controlling external devices (e.g. school bells).

   /RS - build-in RS-232C interface for communication with the PC computer.

   /R4 - build-in RS-484 interface for communication with the PC computer.

   /C - build-in controller for analog hand-type clocks with indication of minutes.

   /N - build-in output RS-485 for controlling time network equipped with digital slave clocks.

   /Q - build-in infra-red receiver and enclosed remote control pilot.

View and overall measurements housing for clocks in one-sided and two-sided versions.
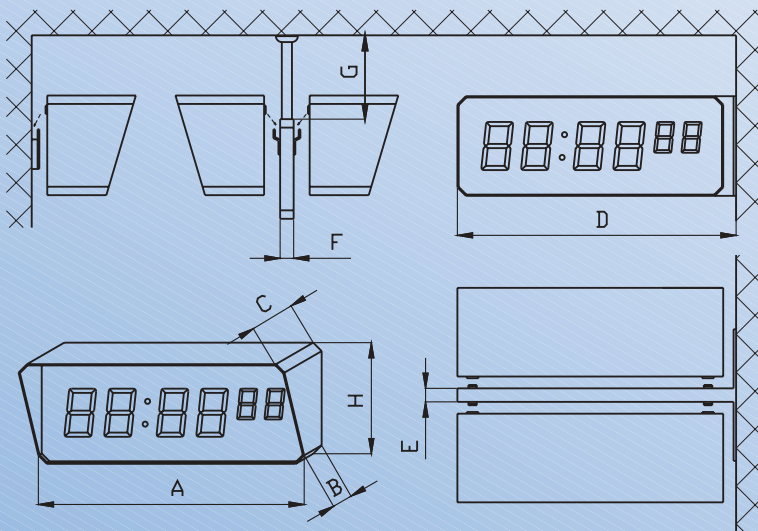
Dimension	ZWC-45	ZWC-57	ZWC-100	ZWC-125
A	255	315	555	760
B	65	70	80	100
C	95	105	155	190
H	92	118	214	282
D	267	326	567	772
E	16	16	25	25
F	16	16	25	25
G	975	975	1440	1440
K	136	176	300	400

There are available two types of hanger assembly for two-sided clocks:

   "Side" hanger fixed to the wall by means of screws.

   „Ceiling hanger", fixed to the ceiling. (dimension H in the table above gives the distance between the two stakes fixing the hanger to the ceiling).

Remarks:

Terminal block located on the clock's hanger can have, depending on number of selected additional functions, from 6 up to 14 terminals adapted for cables with the maximum cross-section of wires $2,5mm^2$.

It is possible to apply additional GPS-antenna high frequency cable extension with maximum length 15m.

The DCF-77 antenna cable can be extended by maximum 25m with cable ($2x0,75mm^2$) without need for any additional actions or equipment.

The manufacturer reserves the right for introducing changes in construction of this product.