



**LARGE SIZE
DIGITAL CLOCKS
DZ2 AND DZ3 TYPES**



USER'S MANUAL



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1. APPLICATIONS

The DZ digital clock shows the date and time alternately. The quantity switching over is set arbitrarily. The default value is equal 5 seconds.

These digital clocks are intended to be installed outside and inside shops, by production lines, in stores, refrigeration plants, sports and commercial objects.

The DZ2 clock (digits of 200 mm high) ensures a good readout from 80 m distance. The DZ3 clock (digits of 300 mm high) ensures a good readout from 120 m distance.

These clocks are offered with digits in 3 versions of colours: red, green and yellow.

DZ clocks co-operate with an external DCF receiver, atomic time standard. These clocks are synchronized every now and again with the time standard.

They have additionally the RS-485 interface with MODBUS RTU protocol. This interface enables to set the clock in case when the DCF signal is too weak and there is no possibility to synchronize the clock with the time standard.

The luminosity of digits is programmed by the user taking into consideration the night-time.

2. CLOCK SET

The set consists of:

- | | |
|---------------------------------|-------|
| - digital clock | 1 pc. |
| - user's manual | 1 pc. |
| - warranty card | 1 pc. |
| - female connector on the cable | 2 pcs |
| - DCF receiver with the cable | 1 pc |

When unpacking the watt-hour meter, please check the delivery completeness and whether the type and version code on the data plate correspond to the order.

3. BASIC REQUIREMENTS, OPERATIONAL SAFETY

Symbols located in this user's manual mean:



WARNING!

Warning of potential, hazardous situations. Especially important. One must be familiar with this before connecting the digital clock. The non-observance of notices marked by these symbols can occasion severe injuries of the personnel and the damage of the device.



CAUTION!

Designates a general useful note. If you observe it, handling of DZ digital clocks is made easier. One must take note of this, when the digital clock is working inconsistently to the expectations.

Possible consequences if disregarded!

In the security scope the DZ digital clock fulfils the requirements of the international EN 61010-1 standard.

Remarks concerning the operator safety:



1. General

- The digital clock is destined to be installed inside or outside buildings.
- Non-authorized removal of the required housing, inappropriate use, incorrect installation or operation create the risk of injury to personnel or damage to equipment. For more detailed information please study the user's manual.
- All operations concerning transport, installation, and commissioning as well as maintenance must be carried out by qualified, skilled personnel and national regulations for the prevention of accidents must be observed.
- According to this basic safety information, qualified, skilled personnel are persons who are familiar with the installation, assembly, commissioning, and operation of the product and who have qualifications necessary for their occupation.

2. Transport, storage

Please observe the notes on transport, storage and appropriate handling.

Observe the climatic conditions given in Technical Data.

3. Installation

- The DZ digital clock must be installed according to the regulation and instructions given in this user's manual.
- Ensure proper handling and avoid mechanical stress.
- Do not bend any components and do not change any insulation distances.
- Do not touch any electronic components and contacts.
- Electronic devices may contain electrostatically sensitive components, which can easily be damaged by inappropriate handling.
- Do not damage or destroy any electrical components since this might endanger your health!

4. Electrical connection

- Before switching the digital clock on, one must check the correctness of connection to the network.
- In case of the protection terminal connection with a separate lead one must remember to connect it before the connection of the digital clock to the mains.
- When working on live instruments or devices, the applicable national regulations for the prevention of accidents must be observed.
- The electrical installation must be carried out according to the appropriate regulations (cable cross-sections, fuses, PE connection). Additional information can be obtained from the user's manual.
- Do not connect the digital clock to the mains via an autotransformer.
- The documentation contains information about installation in compliance with EMC (shielding, grounding, filters and cables). These notes must be observed for all CE-marked products.
- The manufacturer of the installation or installed auxiliary devices is responsible for the compliance with the required limit values demanded by the EMC legislation.
- The **RS-485 socket** serves only for the connection of digital clocks operating with the MODBUS protocol.

5. Operation

- Installations including DZ2 or DZ3 digital clocks must be equipped with protection devices according to the corresponding standard and regulations for prevention of accidents.
- After the digital clock has been disconnected from the supply voltage, live components and power connections must not be touched immediately because capacitors can be charged.
- The housing must be closed during operation.

6. Maintenance and servicing

- Please observe the manufacturer's documentation.
- Read all product-specific safety and application notes in this user's manual.
- Before taking the digital clock housing out, one must turn the supply off.
- The removal of the digital clock housing during the warranty contract period may cause its cancellation.

4. DESIGN AND INSTALLATION

The clock housing is made of steel sheet with the possibility to fix it on a wall or suspend the digital clock.

The protection degree is IP54.

Housing dimensions:

DZ2: 1510 × 284 × 77 mm

DZ3: 2020 × 360 × 77 mm

The DCF receiver is fixed separately and should be distant from electromagnetic field sources, current-carrying wires, big metallic objects, and electronic devices.

If it is possible, the receiver should be situated outside the building. The DCF signal is broadcasted from Germany in the shape of 0.1 sec. and 0.2 sec. pulses, in one second' intervals. If the DCF receiver is properly situated, the receiver diode lights during 0.1 or 0.2 sec and goes out within 0.9 or 0.8 sec.

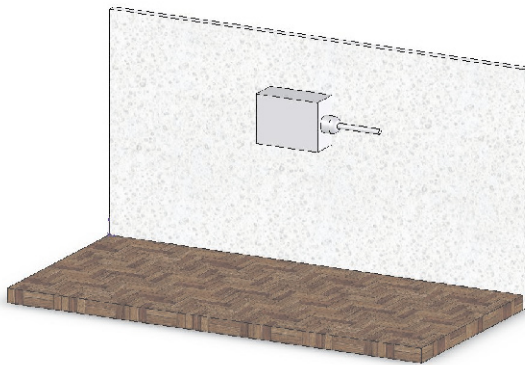
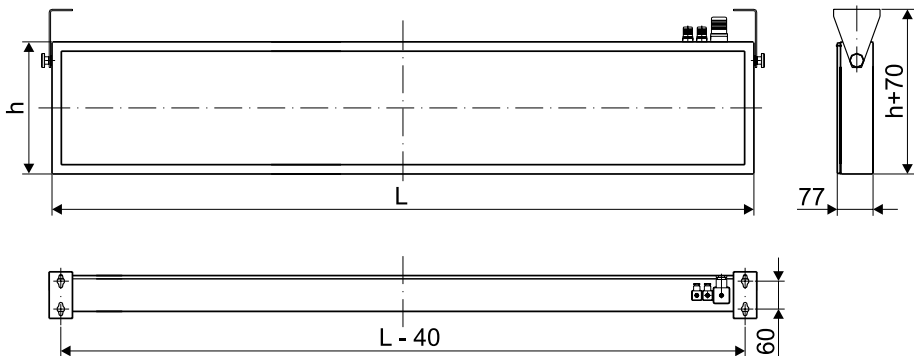


Fig. 1. Fixing way of the DCF receiver

A complete DCF signal lasts 1 minute, the first synchronization follows after a full minute since the moment of the place retrieval of the proper signal.



Dimensions	DZ2	DZ3
L	1510	2020
h	284	360

Fig. 2. Overall dimensions of DZ2 and DZ3 digital clocks and layout of holes and suspension clamps

5. WIRING CONNECTIONS

The clock set includes two female cable connectors: a 3-pole supplying connector and a 4-pole interface connector.

The DCF receiver is delivered with a plug.

One must perform electrical connectors acc. to the Fig. 3.

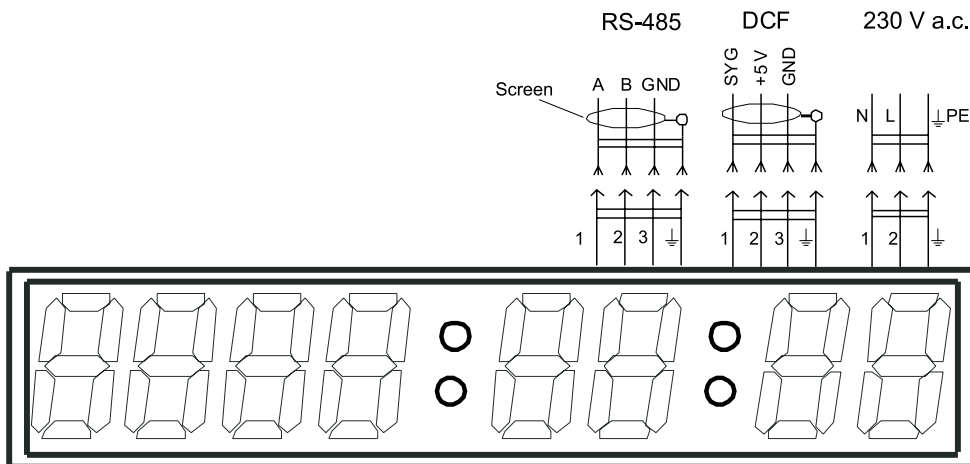


Fig. 3. Electrical connections

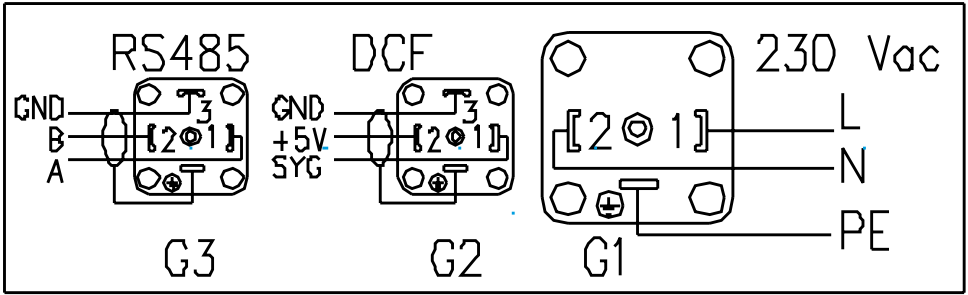


Fig. 4. Description of sockets to connect the supplying network and interface

Wires:

maximal wire cross-section: 1.5 mm²

maximal cable diameter: 4.5... 7 mm



A shielded double spiral wire is recommended to connect the interface
Connect the shield with the PE terminal of the G2 interface socket.

6. REGISTER MAP OF THE CLOCK CONTROLLER

The MODBUS RTU communication protocol has been implemented in the controller.

Applied markings:

R – readout

W – writing

DZ configuration registers – registers 4000...4037

All configuration registers are 16-bit registers of unsigned integer type.

Table 1

Register address	operations	Range	Description
4000	RW	1...247	DZx clock type address in MODBUS network
4001	RW	0...3	Operating mode of the interface no 1: 0: RTU 8N1 1: RTU 8N2 2: RTU 8E1 3: RTU 8O1
4002	RW	0...9	Baud rate of interface no 1 (b/s): 0 –2400; 1 – 4800; 2 – 9600; 3 – 14400; 4 –19200; 5–28800; 6–38400; 7– 57600; 8 – 76800 ; 9 –115200
4007	RW	1...100	Luminosity level for the day
4008	RW	1...100	Luminosity level for the night

4009	RW	0...2359	Starting hour in the day expressed as: GG*100 + MM
4010	RW	0...2359	Starting hour in the day expressed as: GG*100 + MM
4011	RW	5..60	Display time of time/date before switching over.
Controller status			
4037	RW	0x00...0xFFFF	<p>Controller status register. Successive bits are flags informing about the lasting or passed event. Flags can only be erased.</p> <p>If a write follows into the register, then a logic product will be performed on the register value with the written value.</p> <p>The meaning of bits is as follows:</p> <p>Bit 15 – Error of RAM memory.</p> <p>Bit 14 - erroneous settings. Factory settings were restored</p> <p>Bit 13 – Setting error of RTC clock or lack of the correct DCF frame. The flag is automatically erased in case of a correct DCF frame.</p> <p>Bit 12 – A change of summer/winter time has occurred or inversely.</p> <p>Bit 11 – Break in the panel supply.</p> <p>Bit 10...5 – no used.</p>
32-bit registers of float type			
7565	RW	...	Present time in YY format , MMDD
7566	RW	...	Present time in GG format, MMSS

7. TECHNICAL DATA

Power consumption max 45 W

Readout field:

- DZ2 10 characters of 200 mm high;
8 digits + 2 special characters (colon, hyphen, comma)
digit colour: red, yellow, green,
- DZ3 10 characters of 300 mm high;
8 digits + 2 special characters (colon, hyphen, comma)
digit colour: red, yellow, green.

Communication:

- serial interface RS - 485
- transmission protocol MODBUS RTU

Reaction to decays and supply recoveries:

- preservation of configuration data
- continued operation after supply recovery

Protection degree ensured by the housing IP 54

Dimensions:

- DZ2
 - width: 1510 mm
 - height: 285 mm
 - depth: 77 mm
- DZ3
 - width: 2020 mm
 - height: 360 mm
 - depth: 77 mm

Reference conditions and rating operating conditions:

- operating temperature -10...23...55°C
- storage temperature -20... 80°C
- humidity 25... 95%
- supply 85... 253 V
- external magnetic field 0...40...400 A/m
- operating position any
- heating time 1 minute

Standards fulfilled by the digital clock:

Electromagnetic compatibility:

- noise immunity acc. to EN 61000-6-2
- noise emission acc. to EN 61000-6-4

Safety requirements

According to EN 61010-1 standard:

- isolation ensured by the housing: basic
- isolation between circuits: basic
- installation category: III
- pollution level: 2
- maximal phase-to-earth voltage:
 - supply 300 V a.c.
 - interface 50 V a.c.

8. ORDERING CODES

DIGITAL CLOCK	DZ	X-	X	XX
Digit height:				
200 mm				2
300 mm				3
Digit colour on the display field:				
red.....				R
yellow.....				Y
green.....				G
Version:				
standard.....				00
custom-made*				XX

* the code number will be established by the manufacturer

ORDERING EXAMPLE

Code: **DZ 2 - R 00** means:

DZ2 – digital clock with digits of 200 mm high,

R – digit colour on display: red,

00 – standard version

9. BEFORE A FAILURE WILL BE DECLARED

In case of incorrect symptoms, please to get acquainted with the table below.

Table 2

SYMPTOMS	PROCEDURE
1. Messages are not displayed	Check the connection of the network cable
2. flashing of diode point on the last digit of the clock	Lack of synchronization with the time standard
3. Lack of certainty if all character fields are efficient.	The test clock is starting each time when the supply is turned on. Character fields are lighted successively by segments and simultaneously in all digits. If differently, contact the nearest servicing workshop.
4. The clock does not communicate with the computer via the RS-485 interface.	Check the setting of the RS-485 port or the converter: Default setting of the panel: Address 1, Mode RTU 8N2, baud rate 9600 kb/s

10. MAINTENANCE AND WARRANTY

DZ2 and DZ3 digital clocks do not require any periodical maintenance.

In case of some incorrect operations:

1. In the period of 12 months since the date of purchase:

One should take the digital clock down from the installation and return it to the Manufacturer Quality Control Dept. If the unit has been used in compliance with the instructions, the Manufacturer warrants to repair it free of charge.

2. After the warranty period:

One should turn over the digital clock meter to repair it in a certified service workshop. The disassembling of the housing causes the cancellation of the granted warranty. Spare parts are available for the period of five years from the date of purchase.

Our policy is one of continuous improvement and we reserve the right to make changes in design and specifications of any products as engineering advances or necessity requires and revise the above specifications without notice.

This user's manual has been designed as a tool to help you get the most from the ordered product.

We hope that you carefully read this manual and follow its recommended procedures so that you will be able to properly use and maintain this product.

We welcome any suggestions you may have that could help us improve the product and this user's manual.

SALES PROGRAM

- DIGITAL and BARGRAPH PANEL METERS
- MEASURING TRANSDUCERS
- ANALOG PANEL METERS (DIN INSTRUMENTS)
- DIGITAL CLAMP-ON METERS
- INDUSTRIAL PROCESS and POWER CONTROLLERS
- CHART and PAPERLESS RECORDERS
- LARGE SIZE DISPLAY PANELS
- ELEMENTS OF INTEGRATION SYSTEMS
- ACCESSORIES FOR MEASURING INSTRUMENTS (SHUNTS)
- MEASURING SYSTEMS (ENERGY, HEAT, CONTROL)
- CUSTOM-MADE PRODUCTS

WE ALSO OFFER OUR SERVICES IN THE PRODUCTION OF:

- ALUMINIUM ALLOY PRESSURE CASTINGS
- PRECISION ENGINEERING and THERMOPLASTIC PARTS
- SUBCONTRACTING of ELECTRONIC DEVICES (SMT)
- PRESSURE CASTINGS and OTHER TOOLS

QUALITY PROCEDURES:

According to ISO 9001 and ISO 14001 international requirements.

All our instruments have CE mark.

For more information, please write to or phone our Export Department

DZ2-07



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