DIGITAL CLOCK
DLZ Type

Service manual

CE

Table of contents:

1. Application

Digital clocks of the DLZ type are used to display current time indoors. They can also display the current date and, in cooperation with the P18 transducer, the temperature and humidity. The communication interface of the clock allows for easy configuration of the clock, and the second inbuilt interface RS485 makes it possible to cooperate with the temperature and humidity transducer. The transducer output values can be read by means of the user interface.

The DLZ clocks are equipped with a programmed brightness function to allow for energy savings when the clock does not need to work, or when full brightness could dazzle the user.

The DLZ clocks are used wherever there is a need for the current time, date, temperature and humidity to be displayed.

It is possible to adjust the clock in accordance with the customer alignments.

2. Clock kit

The clock kit consists of:
- DLZ clock - 1 pc.
- Assembly holder - 2 pc.
- Service manual
- Guarantee certificate

3. Basic requirements and operational safety instructions

The DLZ clocks conform to the PN-EN 61010-1 safety standard. The following advice must be observed and adhered to during the installation process and operational use:

- Only qualified technical personnel should perform the installation and connections of the clock. All possible safety stipulations should be observed.
- The correctness of electrical connections must be checked before supplying them with current.
- Do not use an autotransformer for connecting the clock to the mains supply.
- Do not mount the clock outdoors.
- The display must be used according to its intended purposes only.
- Removing the panels housing within the guarantee period will cause the guarantee to expire.
- Disconnect the display from the power supply before opening the housing. The housing contains live terminals hazardous to life and health.
- When connecting the mains, protect the device with the breaker switch or circuit breaker. The mentioned switch should be in the vicinity of the device, easily accessible to the user and labelled as the cut out of the device.

4. Construction and installation

The DLZ clock is made of black painted aluminium sections. The housing offers Protection Classification IP40 in general and of IP 20 on the housing side where connections are located. The view and dimensions of the clock are shown in Fig. 1.
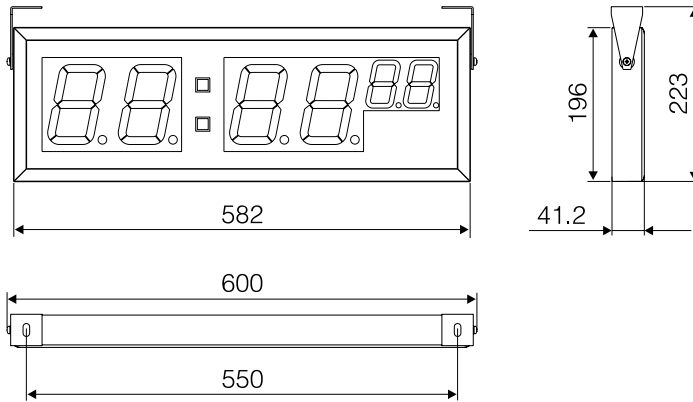
Figure 1. View of the clock.

The clock may be wall mounted or underslung. It be mounted at any angle.

5. Electrical connections

Supply and interface connections should be connected according to this instruction. Improper connection could damage the clock, so prior to making connections **carefully read the information given in chapter 3**.

For connecting interface signal, use cable consisting of twisted pairs from the shield. Each pair should contain the A and B line of each interface. The connecting terminals and function of the terminals are shown in Figure 2.
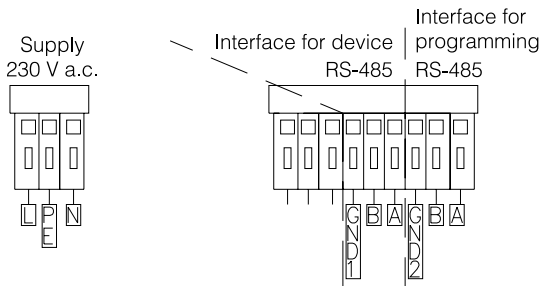
Figure 2. Description of the clock's terminals.

If the ambient temperature was changed rapidly before installation, wait for at least 60 minutes before first switching it on.

Attention: RS-485 interfaces are galvaniclly separated from one another and galvanically separated from power supply. Do not connect interface and signals together.

After switching on the clock performs a display test. It lights all segments and increases their brightness. After reaching the maximum brightness, the clock proceeds to normal operation.

Attention: If during the cooperation of clock and P18 transducer, the clock displays time instead of temperature or humidity.

6. Configuration

The digital DLZ clock can be set through the RS485 interface, using the MODBUS RTU standard. The default **transmission parameters** of the clock are as follows:
- Address: 1;
- Mode: RTU 8n2;
- Bit rate: 9600 bps.

The configuration can be modified by writing the required value into the clock registers. The registers map is described in the next charter. Any program enabling to change the value written in the device's registers and working in the MODBUS RTU standard can be used to change the configuration settings.

Modifiable basic settings are as follows::
- The connection of the panel and the computer or master device parameters;
- The transmission parameters between the panel and the P18 transducer.
- The brightness level for day and night, and the hours of day- and night time changes.
- The display mode - determines which settings are to be displayed by the clock.
- The time of displaying the parameter - determines the time of displaying the value of the individual parameter.
- Current time and date.
- The setting of the P18 connection.

The DLZ clocks can display: time, date, temperature and humidity. The user can choose one of the following configurations to display:
- Time only.
- Date only.
- Time and temperature.
- Time, temperature and humidity.
- Time, date, temperature and humidity.

7. Interface

DLZ clocks contain 2 serial interfaces, working according to the MODBUS RTU standard. One interface is the master in the MODBUS network and it is used to connect the humidity and temperature converter P18. The other is the slave in the network, and is used to connect the clock to the master system, for example the computer. The slave interface makes it possible to set up and read values from the P18 converter.

The DLZ clock is equipped with MODBUS functions 3, 16 and 17.

The register map of the clock is as follows.

Register Address	Operation	Scope	Description	Default
4000	RW	1…247	Address of interface 1 - user interface1	1
4001	RW	0…3	Mode of operation of interface 1: 0: RTU 8N1 1: RTU 8N2 2: RTU 8E1 3: RTU 8O1	1
4002	RW	0…9	Interface 1 bitrate [b/s]: 0 – 2400; 1 – 4800; 2 – 9600; 3 – 14400; 4 – 19200; 5 – 28800; 6 – 38400; 7 – 57600; 8 – 76800; 9 – 115200	2
4003	RW	1…50	Response time of the slave device for port 2 shown in 100 ms multiple	5
4004	RW	0…3	Mode of operation of interface 2: 0: RTU 8N1 1: RTU 8N2 2: RTU 8E1 3: RTU 8O1	1
4005	RW	0…9	Interface 2 bitrate [b/s]: 0 – 2400; 1 – 4800; 2 – 9600; 3 – 14400; 4 – 19200; 5 – 28800; 6 – 38400; 7 – 57600; 8 – 76800; 9 – 115200	2
4006	RW	1…100	Daytime brightness level	100
4007	RW	1…100	Nighttime brightness level	100
4008	RW	0…2359	The day starting hour	600
4009	RW	0…2359	The night starting hour	2200
4010	RW	0..4	Display mode: 0 – time only; 1 – date only; 2 – time; temperature; 3 – time; temperature; humidity; 4 – time; date; temperature; humidity	2
4011	RW	1…250	Page duration time - the time interval of displaying a given parameter value in the displaying cycle. The time is given as 100 ms multiple.	50
4012			Current time in format the hour *100 + minutes	
4013			Current time - seconds	
4014			Current date - month*100 + day	
4015			Current date - year	
4016			Status	
4017			Status of connected devices	

Registers 43XX - configuration for reading additional devices

Register Address	Operation	Scope	Description	Default
4300	RW	0,1…247	Address of slave device. 0 - switches off the device off	1
4301	RW	0…65535	Base address.	7501
4302	RW	1…10	Number of registers read	4
4303	RW	0…6	Register type: 0 – char type variable 1 – unsigned char type variable 2 – integer type variable 3 – unsigned integer type variable 4 – long type variable 5 – unsigned long type variable 6 – float type variable	6
4304	RW	1…60	Review time in seconds. Determines the frequency of querying the slave device.	1

The 75XX registers - read values and system settings (fan operation)

Register Address	Operation	Scope	Description	
7500	R	NA	Device 1 - The first read register. Temperature.	NA
7501	R	NA	Device 1 - Second read register. Humidity.	NA
7502	R	NA	Device 1 - Third read register.	NA
7503	R	NA	Device 1 - Forth read register.	NA
7504	R	NA	Device 1 - Fifth r read register.	NA
7505	R	NA	Device 1 - Sixth read register.	NA
7506	R	NA	Device 1 - Seventh read register.	NA
7507	R	NA	Device 1 - Eighth read register.	NA
7508	R	NA	Device 1 - Ninth read register.	NA
7509	R	NA	Device 1 - Tenth r read register.	NA

8. Specification

Power consumption   < 15 VA

Display   The display field consists of seven-segment displays 100 mm and 57 mm high.

Communication:
- interface   2 × R-S485 galvanically separated
- transmission protocol   MODBUS RTU
- functions performed   03, 16, 17
- data format   8n1, 8n2, 8e1, 8o1
- bitrate [KB/s]   2,4; 4,8; 9,6; 14,4; 19,2; 28,8; 38,4; 57,6; 76,8; 115,2
- max response time   < 300 ms

Response to power failure	
and return	The configuration data are saved.
Dimensions	see Fig. 1.
Case protection classification	IP 40, IP 20 on the side of the connecting pins

The reference conditions and nominal operation conditions.

- operating temperature	0...<u>23</u>...50°C
- storage temperature	- 20...75°C
- humidity	25...95%
- power supply	85...<u>230</u>...253 V a.c.
- frequency	45...<u>50</u>...60 Hz
- working position	any

Standards conformance
Electromagnetic compatibility:

- noise immunity	acc. to EN 61000-6-2
- interference emission	acc. to EN61000-6-4
- power failure immunity	acc. to EN 61000-6-2

Safety requirements:
EN 61010-1 standard compatible

- case insulation: basic
- insulation between circuits: basic
- installation category III
- contamination degree 2
- maximum working voltage difference between earth and the power supply circuits 300 V
  and other circuits 50 V.

9. Version code

Digital clock	DLZ -	XX	X
Version			
Standard **00**			
Special ....**XX**			
Acceptance tests			
No additional requirement **0**			
Quality certificates required.....................**1**			
To be agreed on with the customer........ **X**			

X – the numbering to be determined by the manufacturer

Coding example:
DLZ - 00 0 designates a DLZ clock standard version with no additional acceptance tests performed.

10   Before sanding a fault report

If the clock does not work satisfactorily; please check directions below prior to sending a fault report.

Trouble	Solution
The time display flashes	The clock's settings are unreliable or the clock's settings were changed. Try to set up the clock.
Temperature and humidity are not displayed.	Check the clock's configuration and change the contents of register 4010 if needed. If the configuration is proper, check the connection to the transducer. In case of transmission faults the clock displays the time instead of the temperature and humidity.
The clock displays false time and date	Set the time of the clock again. The clock can loose the current time and date due to longer power cut's. Other settings are saved.
The clock displays the time for longer than the date.	Check the clock configuration and register 4010 contents. The clock is set to read the P18 converter's data, and the converter is disconnected or works improperly.
Lack of the communication with the clock	Check if connections are proper and whether the transmission parameters settings conform to the clock's settings.

11. Maintenance and service

DLZ clocks do not need periodical maintenance. For cleaning the clock do not use any dissolvent's, petrols or aggressive chemicals which could damage the clock's painted surfaces or front glass. Most suitable for cleaning are antistatic cleaning foams. Do not moisten the inside of the clock while cleansing.

SALES PROGRAM

- DIGITAL and BARGRAPH PANEL METERS
- MEASURING TRANSDUCERS
- ANALOG PANEL METERS (DIN INSTRUMENTS)
- ANALOG and DIGITAL CLAMP-ON METERS
- INDUSTRIAL and HOUSEHOLD CONTROLLERS
- CHART AND PAPERLESS RECORDERS
- POWER CONTROL UNITS and INVERTERS
- AUTOMOTIVE DASHBOARD INDICATORS
- ACCESSORIES FOR MEASURING INSTRUMENTS
- MEASURING SYSTEMS (ENERGY, HEAT, CONTROL)
- CUSTOM-MADE PRODUCTS

WE ALSO OFFER OUR SERVICES IN THE PRODUCTION OF:
- ALUMINIUM ALLOY PRESSURE CASTINGS
- PRECISION ENGINEERING AND THERMOPLASTICS PARTS

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

DLZ-07

LUMEL

Lubuskie Zakłady Aparatów Elektrycznych **LUMEL S.A.**
ul. Sulechowska 1
65-022 Zielona Góra - Poland
Tel. (48-68) 329 51 00 (exchange)
Fax: (48-68) 329 51 01
e-mail: lumel@lumel.com.pl
http://www.lumel.com.pl

Export Department:
Tel: (48-68) 329 53 02 or 53 04
Fax.: (48-68) 325 40 91
e-mail: export@lumel.com.pl