

INSTRUCTION MANUAL

State-of-the-art technology digital clock

SLH-DC series

addition to the standard DC series instruction manual (for SLH-DC only)



Certification of the Producer

STANDARDS

The digital clock SLH-DC has been developed and produced in accordance with the EU Standards 2006/95/ES (LVD), 2004/108/ES (EMC), 2011/65/EU (RoHS), 2002/96/EC (WEEE):

Applied Standards:

EN 60950-1/Cor. (2011)

EN 55022 (2010), class B

EN 55024 (2010)

EN 50121-4/Cor. (2008)

References to the Instruction Manual

1. The information in this Instruction Manual can be changed at any time without notice. The current version is available for download on www.mobatime.com.
2. This Instruction Manual has been composed with the utmost care, in order to explain all details in respect of the operation of the product. Should you, nevertheless, have questions or discover errors on this manual, please contact us.
3. We do not answer for direct or indirect damages, which could occur, when using this Manual.
4. Please read the instructions carefully and only start setting-up the product, after you have correctly understood all the information for the installation and operation.
5. The installation must only be carried out by skilled staff.
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NOTE:

Chapters 2.7 - 15 are the same as in the DC Instruction manual.

Use the DC user manual to control and set parameters for the SLH-DC clock.

1 Description

LED digital clock specially designed for use in Operating rooms in hospitals ▪ various types of time synchronisation ▪ anti glare front side polycarbonate glass ▪ protected against direct sprays from all directions ▪ easily washable with water and hygienic detergent ▪ sanitary safe ▪ reliable ▪ easy keyboard control ▪ customer-specific adaptation, for example table top model or double-sided clock ▪ suitable for environments such as pharmaceutical and food industries ▪ flush or wall mounting ▪ IP 54

Basic properties

- 7-segment LED display
- digit height 57 mm for hour, minute and 38 mm, for second
- readability distance of 25 m
- digits in red, pure green, yellow colour
- manual or automatic adjustment of the luminosity of LED displays
- excellent visibility, even from extremely sharp angles
- alternating display of time, date and temperature, with adjustable time period for the displaying of the corresponding figures
- single or double sided design, flush or wall mounting (only for single sided clock design), ceiling suspension or wall bracket mounting
- stainless steel clock frame particularly resistant to acids, cleaning and disinfectant, protected against direct sprays from all direction (limited ingress permitted) and dust
- easy installation
- structural depth 55 / 90 mm of single/double sided design respectively
- anti-glare front side polycarbonate glass, which prevents the occurrence of reflections and improves the readability
- mineral glass on special request
- working temperature 0 to + 50°C
- protection degree IP 54
- autonomous, quartz controlled time base with the possibility of synchronization using the following: DCF 77 radio signal, 24 V minute impulses, the MOBATIME serial code, MOBALine, RS 232, RS 485, IRIG-B or GPS
- NTP multicast or unicast synchronization in Ethernet or unicast synchronization in WiFi network
- Ethernet versions powered over PoE or mains
- configuration / supervision by means of MOBA-NMS software or SNMP protocol
- slave clock operation in wireless WTD system (868MHz) based on a transmitter which broadcasts the time signal
- possibility to set up the world time zones with indication of the time shift (DST) for the particular time zone. Control over the DCF receiver or the master clock

The clocks

- time display in 12 or 24 hour cycle; six-digit HH:MM^{SS} format.
- display of calendar date in six-digit DD.MM.^{YY}
- possibility of leading zero suppression when displaying the time and date;
- temperature indication (providing the temperature sensor is connected) in °C or °F, up to two sensors connectable

Stopwatch

- counting upwards from zero, up to 24 hours
- counting downwards from a specified value, with stop at zero, with automatic restart or counting into negative values
- display of intermediate time values, "freezing" of display, cumulated intermediate time
- counting in steps of 1 minute, 1 second or 1/100 seconds
- operation via keyboard or remote IR controller
- possibility to connect another display unit(s)
- possibility of parallel switching over into the time/date or temperature display mode

Accessories

- DCF 77 signal receiver
- temperature sensor with protection degree IP 66
- stainless steel keyboard for clock and stopwatch control, cable 5 m, handheld
- stainless steel keyboard for clock and stopwatch control, flush mounting
- remote IR controller for clock set up and stopwatch control

On request

- internal relay – relay can switch for specified duration, when the stopwatch in the countdown mode reach the zero.
- protection degree IP 54

2 Assembly



The connection to the 110/230 V AC power network can only be done by authorized personnel with appropriate qualification and training.



Danger of electric shock when dismantling the cover with warning triangle.



The connection to the 110/230 V AC power network should be carried out when the mains power is off

2.1 Wall mounting single-sided stainless steel clock

- The clock consists of two parts. Visible front stainless steel panel with display and back stainless steel body with connecting terminal block. Both parts of the clock are screwed by four allen screws. These screws are placed on the front panel.
- Unscrew the allen screws and remove the front panel from the clock body.
- Disconnect the interconnecting cables by decoupling the terminals on the control PCB.
- Drill three anchoring holes into the wall, of a diameter adequate to accommodate wood-type screws of 4 to 5 mm diameter. As a template for marking the position of the holes the anchoring clock body can be used.
- Pull the incoming conductors through the hole in the clock body and fix the clock body to the wall.
- Connect the incoming conductors in accordance with the descriptive sheet placed next to the connecting terminal block (chapter 2.5). Give the conductors an appropriate shape or cut them off to a length that will not obstruct the placement of the front part of the clock into the clock body.
- Mount the connectors to the cable of the temperature sensor, to the keyboard cable, Ethernet or to the RS 232 and RS 485 interface cables, if these have been delivered.
- Push the temperature sensor connector, the keyboard connector, Ethernet connector or the RS 232 and RS 485 jacks into the corresponding terminals on the control PCB (chapter 2.6 and 2.9). Check the marking of the jack-plugs, in order to prevent their mix-up.
- Connect the interconnecting cables into the corresponding terminals on the clock control PCB.
- Put the front panel into the clock body. Check if any cable is not pinched between the back side of front panel and the clock body.
- Fix the front panel to the clock body by the four allen screws.

2.2 Ceiling and side mounting double-sided stainless steel clock

- The double-sided clock consists of three parts, one front panel serving as the control module (this one encompasses the jacks to connect powering voltage, synchronisation source, the temperature sensor and the keyboard to the clock), and the second front panel serving as the display module (with the terminal for the connection of the interconnecting cable). Third part is stainless steel clock body with connecting terminal block. Both front panels are interconnected via a 10-core flat cable. Both front panels are screwed into stainless steel clock body by four allen screws for each side. The clock suspension part is delivered separately.
- Pull the incoming conductors through the pipe which serves as the clock suspension. Secure the ceiling suspension (or the side console) to the ceiling (or the wall), using 4 wood screws of 5 mm diameter.

- Unscrew the allen screws from both front panels.
- Disconnect the interconnecting cables by decoupling the terminals on the control PCB.
- Remove both front panels from the clock body.
- Pull the incoming conductors through the pipe insert in the clock body. Slip-on the clock body onto the suspension in a way that the screws fit into the lower groove on the pipe insert. Fix the connection by tightening the screw using an Allen key.
- Connect the conductors to the terminal block on the clock body, in accordance with the descriptive nameplate (chapter 2.5). Give an appropriate shape to the conductors or cut them off at a length which does not obstruct the mounting of the clock into the clock body.
- Mount the connectors to the cable of the temperature sensor, to the keyboard cable, Ethernet cable or the RS 232 and RS 485 interface connectors, if these have been delivered.
- Put the control front panel to the clock body and screw it by four allen screws. Care should be taken when placing the cables between the clock body edge and the back side of the control front panel, so as not to nip them. Connect the 10-core interconnecting cable to the anchoring connector. Connect the 10-core interconnecting cable into the corresponding plug on the clock control PCB of the display front panel.
- Push the temperature sensor connector, the keyboard connector, Ethernet connector or the RS 232 and RS 485 jacks into the corresponding terminals on the control PCB (chapter 2.6). Check the marking of the jack-plugs, in order to prevent their mix-up.
- Put the display front panel into the clock body and screw it by four allen screws. Care should be taken when placing the cables between the clock body edge and the back side of the display front panel, so as not to nip them.

2.3 Ceiling and side mounting single-sided stainless steel clock

- The single-sided clock consists of two parts, one front panel and stainless steel clock body with connecting terminal block. The front panel is screwed into clock body by four allen screws. The clock suspension part is delivered separately.
- Pull the incoming conductors through the pipe which serves as the clock suspension. Secure the ceiling suspension (or the side console) to the ceiling (or the wall), using 4 wood screws of 5 mm diameter.
- Unscrew the allen screws from front panel.
- Disconnect the interconnecting cables by decoupling the terminals on the control PCB.
- Remove front panel from the clock body.
- Pull the incoming conductors through the pipe insert in the clock body. Slip-on the clock body onto the suspension in a way that the screws fit into the lower groove on the pipe insert. Fix the connection by tightening the screw using an allen key.
- Connect the conductors to the terminal block on the clock body, in accordance with the descriptive nameplate (chapter 2.5). Give an appropriate shape to the conductors or cut them off at a length which does not obstruct the mounting of the clock into the clock body.
- Mount the connectors to the cable of the temperature sensor, to the keyboard cable, Ethernet cable or the RS 232 and RS 485 interface connectors, if these have been delivered.

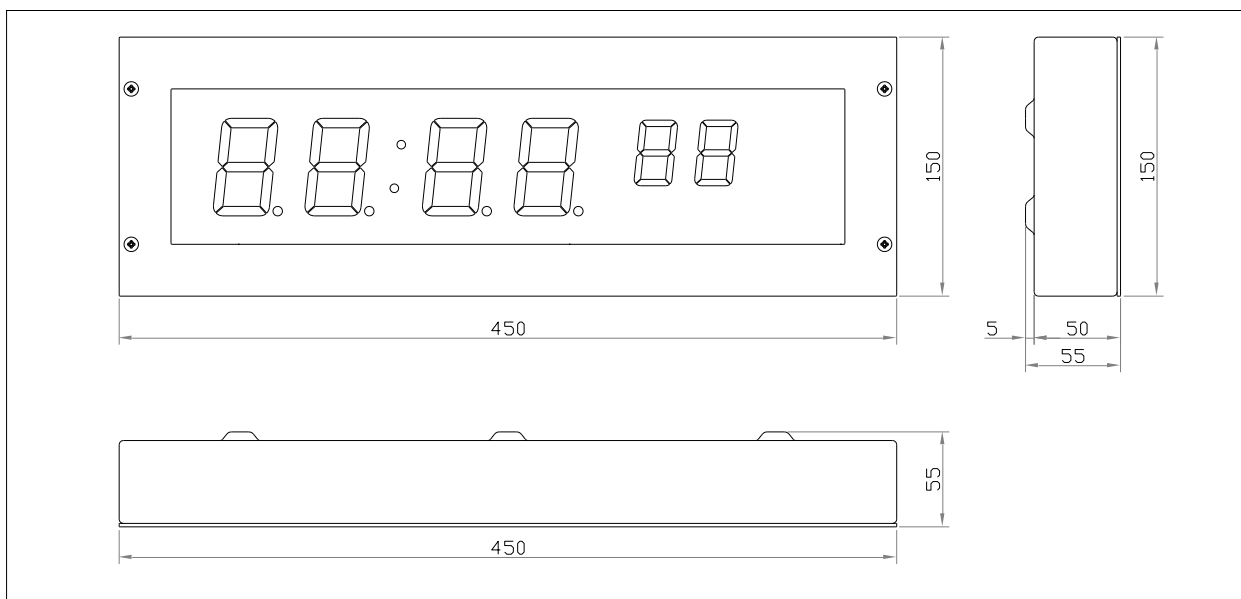
- Push the temperature sensor connector, the keyboard connector, Ethernet connector or the RS 232 and RS 485 jacks into the corresponding terminals on the control PCB (chapter 2.6). Check the marking of the jack-plugs, in order to prevent their mix-up.
- Put the front panel into the clock body and screw it by four allen screws. Care should be taken when placing the cables between the clock body edge and the back side of the display front panel, so as not to nip them.

2.4 Flush mounting single-sided stainless steel clock

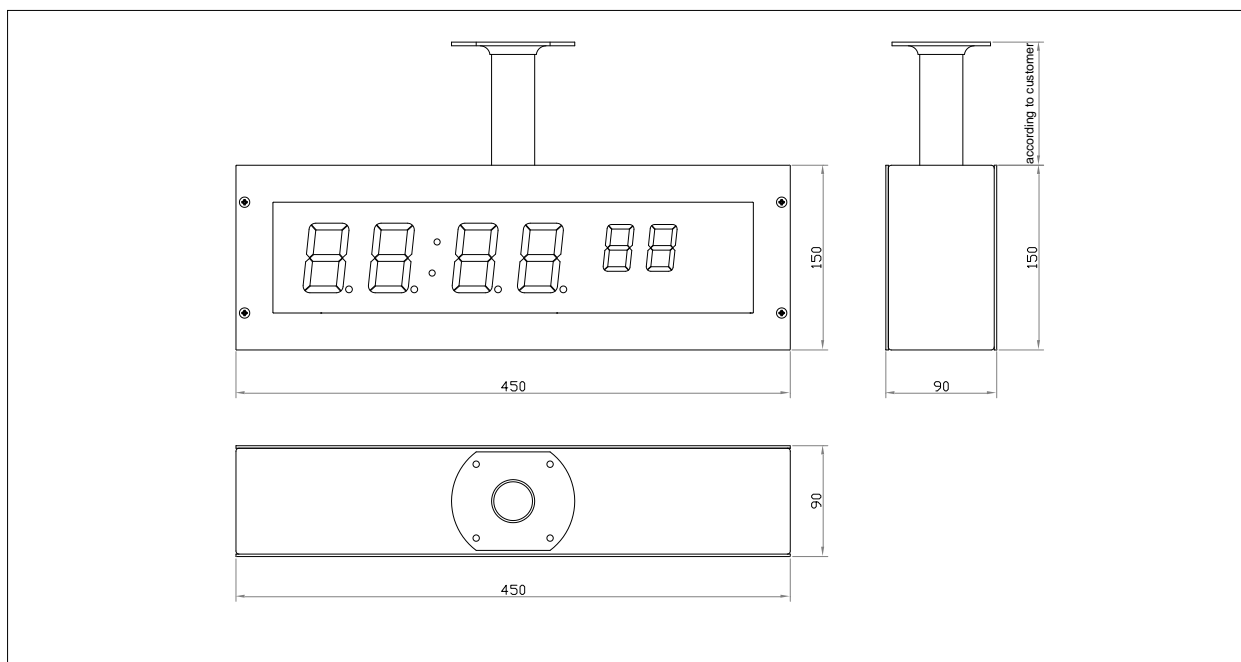
- There exist two basic possibilities of mounting. Mounting of clocks into the wall and mounting of the clocks into the panel. For both mountings is very important to prepare the appropriate holes according to drawings and the clock body.
- The clock consists of two parts. Visible front stainless steel panel with display and back stainless steel clock body with connecting terminal block. Both parts of the clock are screwed by four allen screws. These screws are placed on the front panel.
- Unscrew the allen screws and remove the front panel from the clock body.
- Disconnect the interconnecting cables by decoupling the terminals on the control PCB.
- Insert the clock body into prepared hole in the wall or in the panel.
- For wall mounting drill three anchoring holes into the wall, of a diameter adequate to accommodate wood-type screws of 4 to 5 mm diameter. As a template for marking the position of the holes the anchoring clock body can be used.
- For panel mounting drill four anchoring holes (diameter 2,6mm) into the panel, of a diameter adequate to accommodate wood-type screws of 4 mm diameter. As a template for marking the position of the holes the anchoring clock body can be used.
- Pull the incoming conductors through the hole in the back side of the clock body and fix the clock body into the wall or into panel.
- Connect the incoming conductors in accordance with the descriptive sheet placed next to the connecting terminal block (chapter 2.5). Give the conductors an appropriate shape or cut them off to a length that will not obstruct the placement of the front part of the clock into the clock body.
- Mount the connectors to the cable of the temperature sensor, to the keyboard cable, Ethernet or to the RS 232 and RS 485 interface cables, if these have been delivered.
- Push the temperature sensor connector, the keyboard connector, Ethernet connector or the RS 232 and RS 485 jacks into the corresponding terminals on the control PCB (chapter 2.6 and 2.9). Check the marking of the jack-plugs, in order to prevent their mix-up.
- Connect the interconnecting cables into the corresponding terminals on the clock control PCB.
- Put the front panel into the clock body. Check if any cable is not pinched between the back side of front panel and the clock body.
- Fix the front panel to the clock body by the four allen screws.

2.5 Assembly diagram

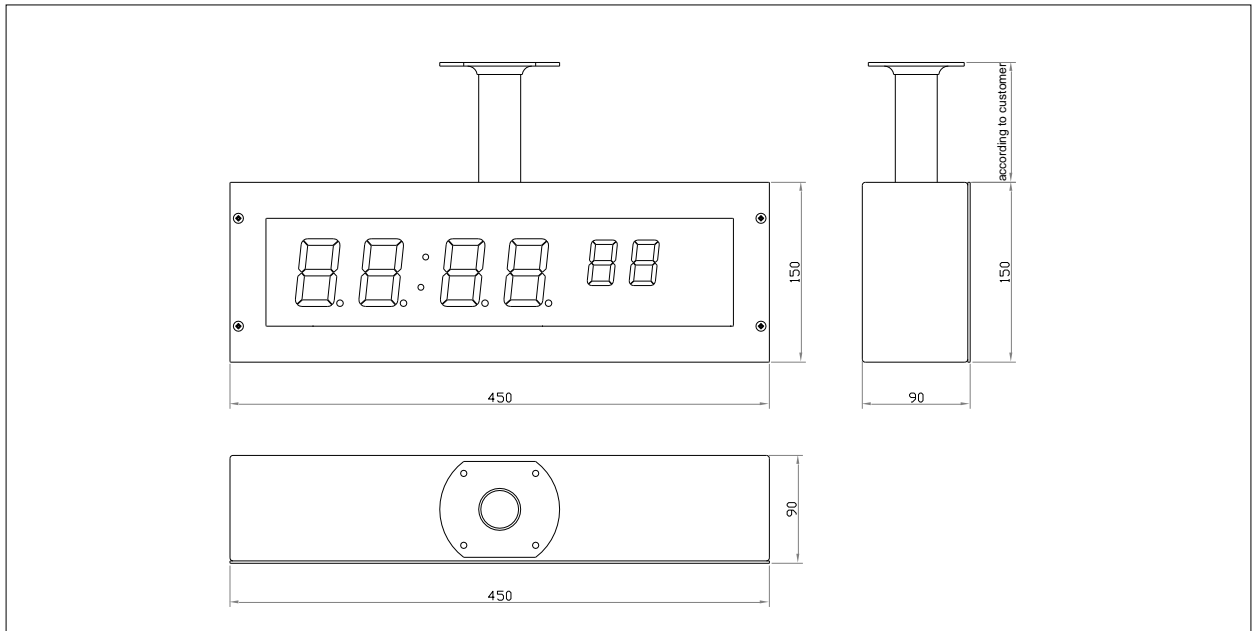
2.5.1 Wall mounting single-sided stainless steel clock



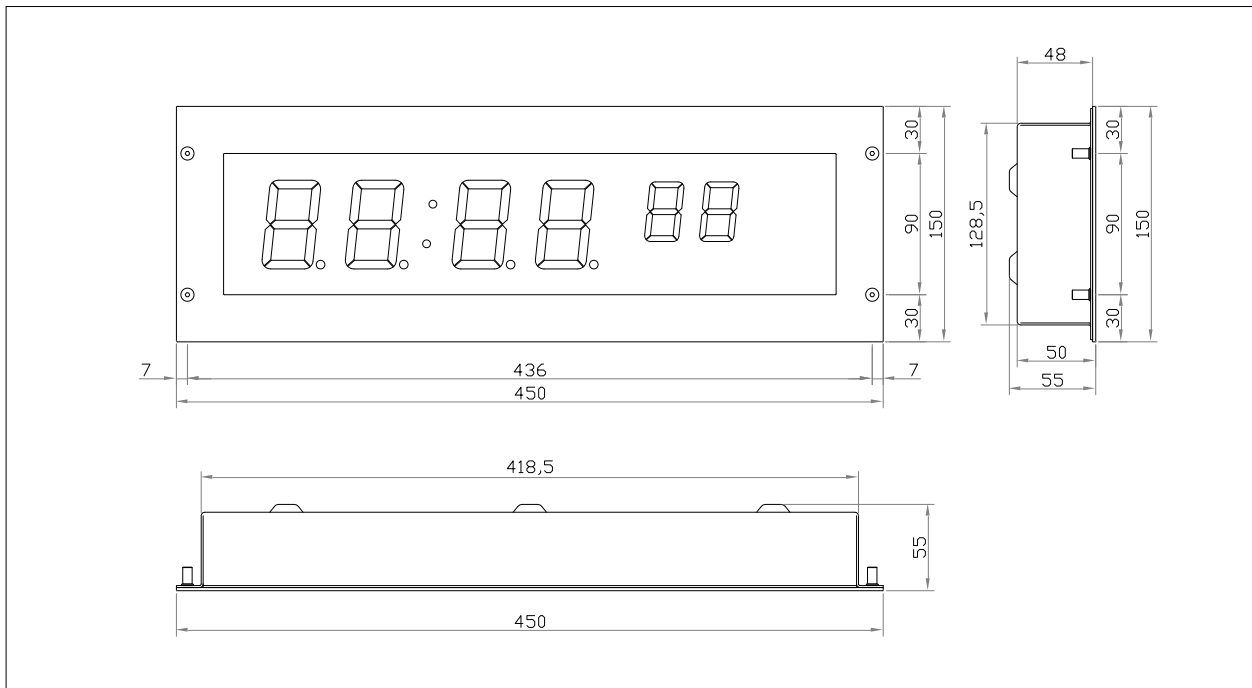
2.5.2 Ceiling and side mounting double-sided stainless steel clock



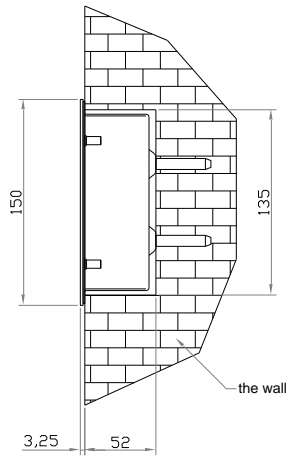
2.5.3 Ceiling and side mounting single-sided stainless steel clock



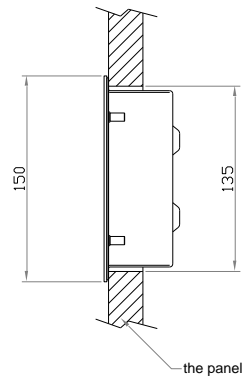
2.5.4 Flush mounting single-sided stainless steel clock



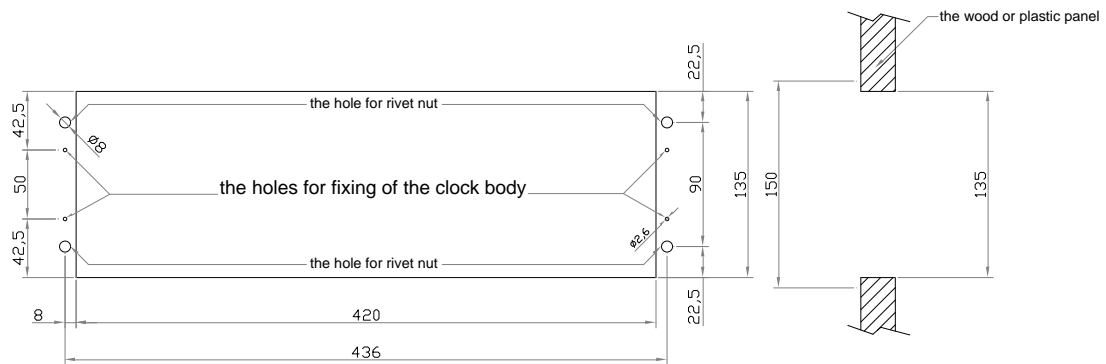
Wall mounting of the clock



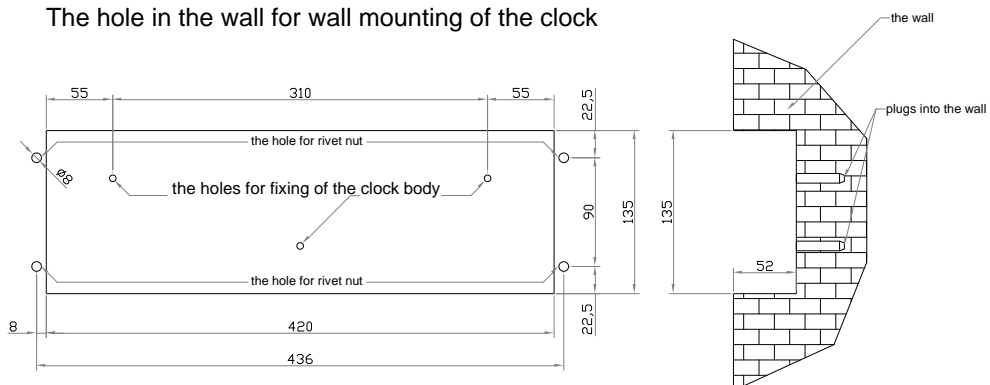
Panel mounting of the clock

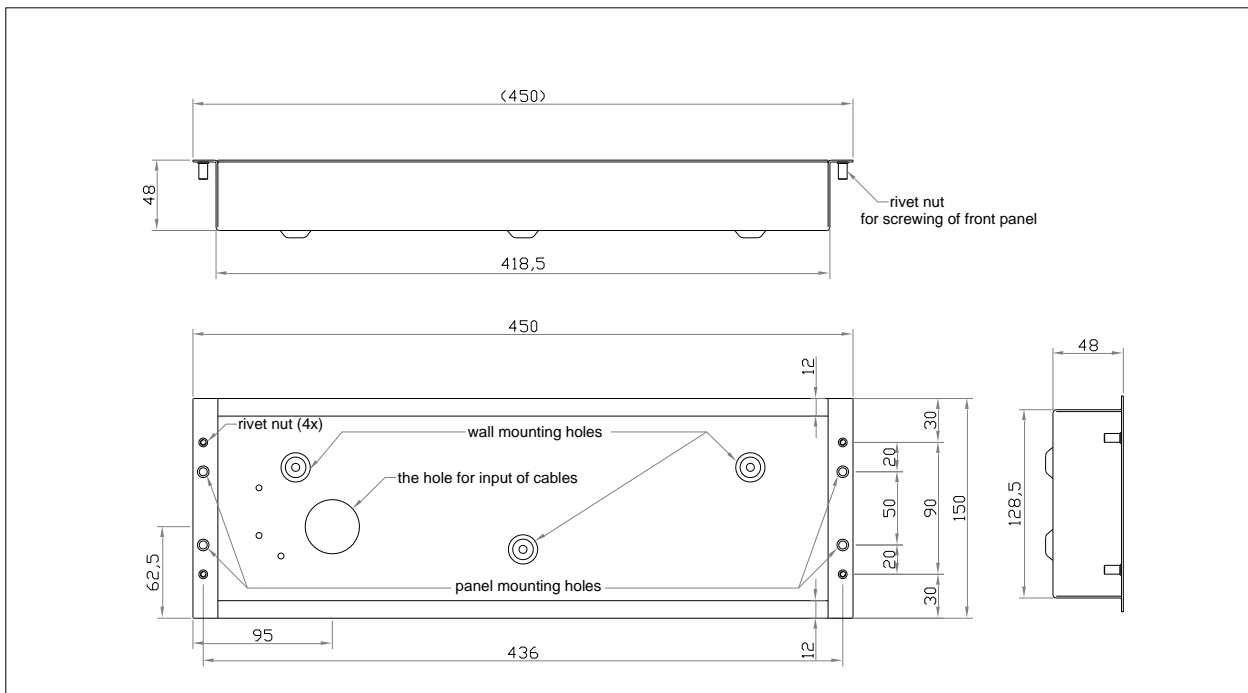


The hole in the panel for panel mounting of the clock

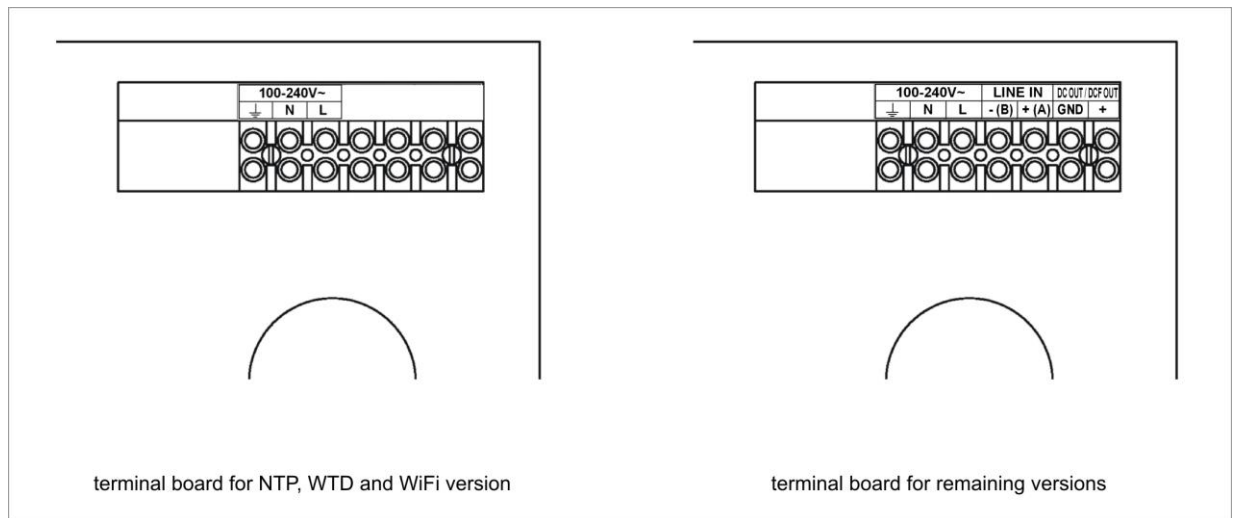


The hole in the wall for wall mounting of the clock





2.6 Connecting terminal block



terminal board for NTP, WTD and WiFi version

terminal board for remaining versions

8 Stopwatch menu table

Program option	Function	Scope of the values (default values are printed in bold)		
S0	Counting direction	1 - 4		
		1	upwards	
		2	downwards from a time value set in advance, with stop at zero	
		3	downwards from a time value set in advance until zero, with automatic restart from the specified time value	
		4	downwards from a set time value, until zero, and keeping the count into minus value	
S1	Control of intermediate time periods (corresponding keyboard keys are listed in brackets)	1 - 4		
		1	S/S (PB3S)	Alternating START - STOP - „UNFREEZE“ of DISPLAY (if it was frozen)
			HOLD (PB1S)	“Freezing” of displaying data with the counter proceeding in the counting
			RES (PB1L)	Setting the counter to zero in STOP operation mode, for counting up, and return to a present value in all other counting mode
		2	S/S (TL3S)	Alternating START - STOP - „UNFREEZE“ of DISPLAY (if it was frozen)
			HOLD (PB1S)	The first depression of this button causes the display to freeze on the respective time achieved and lets the counter running. Further activation of the button shows the intermediate time elapsed from the first depression of the button.
			RES (PB1L)	Reset of the counter in the STOP mode while in counting up. Return to a preset value in other counting modes.
		3	S/S (PB3S)	count up from zero, or from a present value in countdown mode. Next activation of the button causes the display to freeze and to resume the count from zero in counting up, or from a preset value in countdown mode.
			HOLD (PB1S)	Unfreezing of the display, leaving the counter to continue in counting
			RES (PB1L)	Counter reset (to zero), or return to a preset time followed with counter stop
		4	S/S (PB3S)	Triggering the counter
			HOLD (PB1S)	Stopping the counter
			RES (PB1L)	Resetting the counter or return to a preset time, with counter stop

S2	Counting unit	1 - 4	
		1	Counting in increments of 1/100 sec. (with 4-digit display the counting goes on until 59.99 sec., and then continues with displaying of minutes : seconds), up to 59 minutes and 59.99 seconds, at maximum.
		2	Counting in increments of 1 second (with 4-digit display the counting goes on until 59 minutes and 59 seconds; and follows with displaying of hours: minutes) until 23 hours, 59 minutes and 59 seconds, at maximum.
		3	Counting in 1 minute steps, until 23 hours 59 minutes
		4	Counting in periods after one day. A subtraction or an addition always takes place around midnight. Capacity of counting up to 9999 days. When counting is stopped, the dot is displayed after the last digit.
S3	Contact closing	1 – 30, 0 (function disabled)	
		Time period of contact closing for stopwatches passing through zero, while operating in countdown mode, starting from a preset time moment.	
	Display only stopwatch	0 - 1	
		0	In addition to stopwatch display can show time/date/temperature according to P2 setting and user control.
		1	Display shows only stopwatch.

16 Engineering data

16.1 Standard design of the clock

Specifications		SLH-DC.57.6	SLH-DC.100.6
Display	height of the digits	57 / 38	100 / 57
	number of digits	4 + 2	
Time display format	HH . MM ^{ss}	✓	
Date display format	DD. MM. ^{yy}	✓	
Powering	standard	100-240 VAC, 50-60Hz	
	option VDC	18 - 56 VDC (18 – 40 VAC)	
	option VDC 12V	12 - 16 VDC	
	PoE version	PoE (IEEE 802.3 af-Class 0)	
	PoEclass version	PoE (IEEE 802.3 af-Class 3)	
Power consumption for version AC or DC powering	single sided	8 VA	8 VA
	double sided	16 VA	16 VA
Power consumption for PoE powering version	single sided	8 VA	8 VA
	double sided	15 VA	15 VA
Crystal base	passive running reserve (time + date)	6 years (except PoE)	
	accuracy	±0,3 sec / day (at 20 °C, without synchronization)	
Accuracy of temp. Measurement in range	-25 ÷ +85 °C	±0,5 °C	
	-50÷+125 °C	±2,0 °C	
Operating environment	temperature	0 ÷ +50 °C	
	humidity	0 - 95%, without condensation	
	protection degree	IP 54	
Weight in kg	single sided design	3,1	6
	double sided design	4,8	8,5
Dimensions (W x H x D) mm	single sided design	450 x 150 x 55	680 x 220 x 55
	double sided design	450 x 150 x 90	680 x 220 x 90
	flush mounting	450/418,5 x 150/126 x 55	680/648,5 x 220/198,5 x 55
	keyboard, flush mounting	82/67 x 152/139 x 50	

16.2 Voltage range and electric current consumption of the lines

Type of slave line	Voltage range	Electric current consumption
MOBALine	5 – 30 VAC	6 – 34 uA
MIN, CODE	+ - 12 – 30 V	3 – 7 mA
MIN, CODE (on request)	+ - 30 – 60 V	3 – 7 mA
IRIG B	20 mVpp – 2 Vpp	20 uA – 2 mA

17 Accessories

17.1 Single sided clock

- Allen key for dismounting the front frame 1 pc
- Instruction manual SLH-DC 1 pc
- Instruction manual DC 1 pc
- Additional spacers 3 pcs
- Wood screws for fixing the anchoring plate inclusive dowels 4 pcs

17.2 Double side clock

- Allen key for dismounting the front frame and the suspension 1 pc
- Instruction manual SLH-DC 1 pc
- Instruction manual DC
- Wood screws for fixing the suspension including dowels 4 pcs

18 Cleaning

Clean surface of clock only. Use soft rags and antistatic detergents. Don't use synthetics.

19 DISPOSAL OF USED BATTERIES



The user is lawfully obligated to return unusable batteries. Disposal of used batteries through household waste is prohibited! Batteries which contain dangerous substances are labelled with a picture of a crossed out trash bin. The symbol means that this product may not be disposed through household waste. Below the symbol, the dangerous substance is indicated with an abbreviation: Cd = Cadmium, Hg = Quicksilver, Pb = Lead. Unusable batteries can be returned free of charge at appropriate collection points of your waste disposal company or at shops that sell batteries. By doing so, you fulfil your legal responsibilities and help protect the environment.

20 GUARANTEE AND MAINTENANCE

- The device is intended for a normal operational environment according to the corresponding norm.
- The following circumstances are excluded from the guarantee:
 - inappropriate handling or interventions
 - chemical influences
 - mechanical defects
 - external environmental influences (natural catastrophes)
- Repairs during and after the guarantee period are assured by the manufacturer.



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