

Installation and Operating

SU 190(t) S 230
Movement for RS 422 / 485 Timecode

Please read this instructions carefully before installation.



References to the User's Manual

1. The information in this User's Manual can be changed at any time without previous notice. The current version is available for download on www.mobatime.com – Downloads.
2. This User's Manual has been composed with utmost care, in order to explain all details in respect of the operation of the product. Should you, nevertheless, have questions or discover errors in 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 start the setting-up of the product, only once you have correctly understood all information for the installation and of the operation.
5. The installation must only be carried out by skilled staff.
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Guidelines for installation and handling



1. This movement has no incorporated disconnect device from the mains supply power. An appropriate disconnect device must be provided external to the movement, concerning to the national installation regulations.
2. The movement has to be transported or stocked only in the original packing and in a dry environment.

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1. Dimensions, Definitions

Diameter	Type	Art.-No.
30 - 80 cm	Movement: SU 190 S 230	202291
30 - 80 cm	Movement: SU 190t S 230	202292

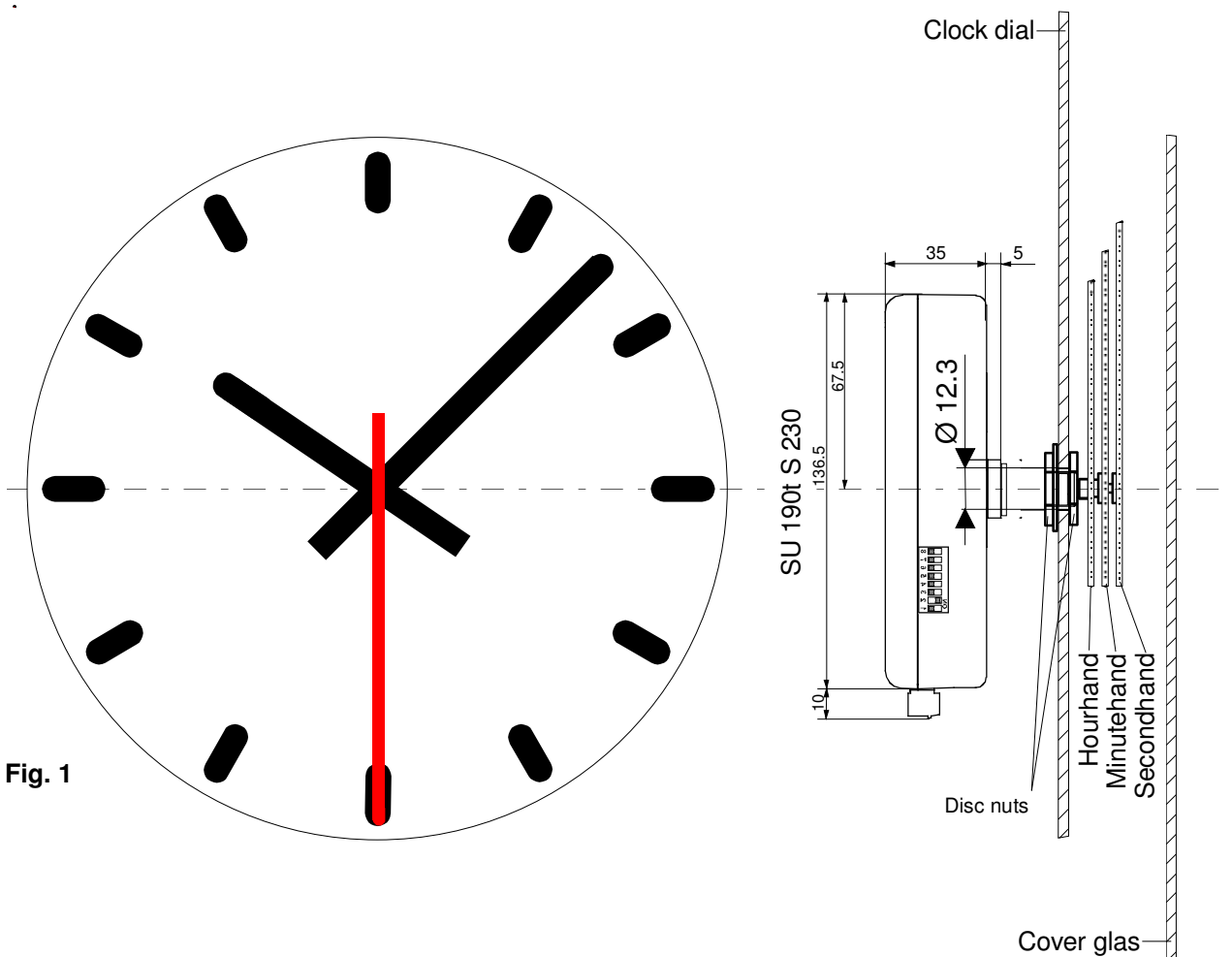


Fig. 1

Connection to the mains supply should be realized according to the class II protection.

Power AC 230V

Cable lenght 800mm

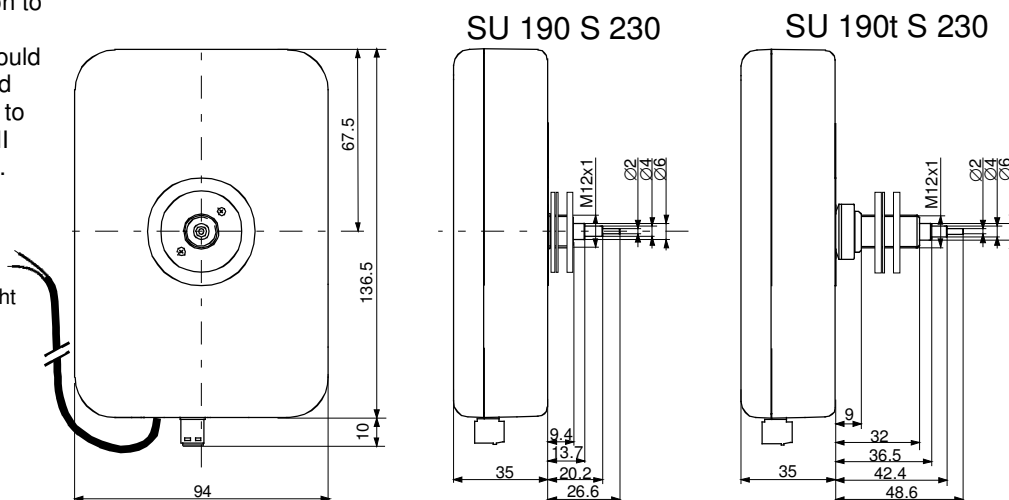


Fig. 2

2. Function description

Self-setting movement with hour, minute and second display. For autonomous self-setting clocks for indoor or outdoor use with dial diameters up to 80 cm, with or without illumination.

- Automatic time take-over and synchronization from serial RS 485 bus.
- Synchronization through MB-RS485-protocol or IF482 standard protocol (automatic detection of protocol type).
- Status query over serial RS 485 bus. (Malfunction of movement and state of illumination).
- Device address (1..31) selectable by DIP-Switches.
- Device address (0) reserved for not monitored devices (IF 482 telegrams).
- World time clocks can be realized with directly addressed time telegrams.
- Internal quartz clock for precise time display during periods of no synchronization.
- Immediate resetting to the correct time after mains failure of up to 12 hours due to an internal real-time-clock (battery- less powered).
- Different running modes of the second hand, selectable by means of a DIP-switch.
- Switching output for clock illumination.
- Input for illumination sensor.
- Signalization of missing time synchronization after a period of 24 hours by setting the hands to 12 o'clock position.
- Power supply from mains 230 VAC, 50/60 Hz or from a DC source 15..30 V.

3. Mounting guidelines

3.1 Mounting of movement series 190t

The dial must be sufficiently stable. The fixing hole must have a diameter of 12.3 mm.

The movement must be fixed in vertical position.

Vide Fig. 3 for the position of mounting parts.

The disc nut (2*) M12 x 1 has to be tightened with a special wrench tool (Art. No. 201998) and a torque wrench with a torque of 4.5 Nm +/- 0.2 Nm.

Attention:

The ring nut (5), the compensation ring (6) and the spring washer (7) must not be removed.

After tightening of the disc nut (2*), the movement must not be wrenched!

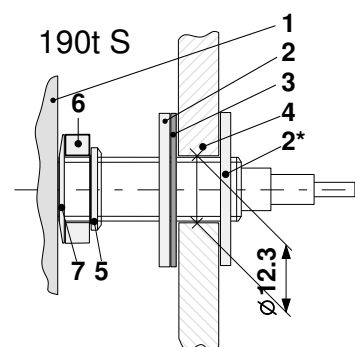


Fig. 3

- 1 Movement
- 2 Disc nut
- 3 Rubber washer
- 4 Dial
- 5 Ring nut
- 6 Compensation ring
- 7 Spring washer

3.2 Mounting of hands and Starting-up

3.2.1 Mounting of hands

The shafts of the hour, minute and second hands are positioned ex-work on the reference position (12 o'clock). The hands shall be carefully fixed and tightened on the shafts. Enough space must be provided between the hands. See Fig. 4.

The position 12 o'clock must be checked on each movement after the mounting (Chap.3.2.2).

3.2.2 Starting-up and check of the hand position

- Set DIP switch 1 to **ON** position (12:00 Position, Fig. 5)
- Install the AC 230V power supply by using the white two wire cable from the movement. The clock runs to 12 o'clock position
 - ➔ Position of hands OK?
- If the hand position is wrong, carefully loosen the hand, adjust and tighten (don't distort the axis).
 - ➔ Check the 12 o'clock position again (initialling by an interruption of the power supply).
- If the hands position is OK, continue with chapter 4 for further setting up.

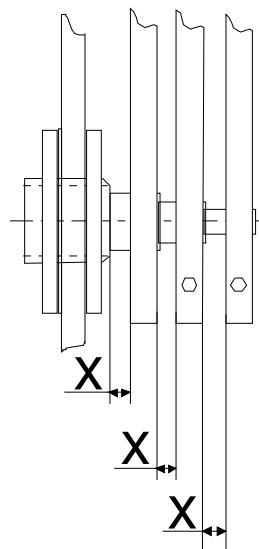


Fig. 4

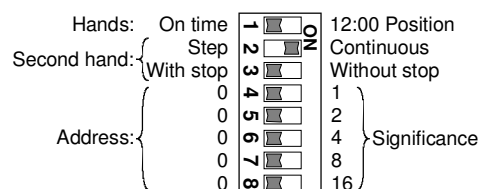


Fig. 5

4. Setting up / Connections

- After checking the 12 o'clock position, reset DIP-Switch 1 to OFF position (Fig. 5).
- Connect line signal (RS 485 or RS 422) to the connector "RS 485" (refer to Fig. 8 and 9). For RS 485 cabling a sufficient cable quality and a correct cabling is important (refer to document TE-800503). The movements can be cascaded. Therefore the RS 485 signals are available on the OUT plug and can be connected to the IN plug of the next movement by using a 1:1 cable. At the input of the last movement a terminating resistor of 120 Ω has to be mounted.
- If no mains power is available, maximum 8 movements can be powered directly via DC In+ input from the master clock (NMC).
- **Setting up the movement address on DIP switches 4 to 8:**
 - Operation without supervision of the movements (synchronization with serial standard telegram IF 482): ➔ Address has to be set to 0 (all DIP switches to OFF position). The number of movements connected to one line is not limited.
 - Operation with supervision of the movements and the illumination:
 - ➔ Maximum 31 movements can be connected to one RS 485 clock line. Pay attention, each address may be used only once per clock line.
- The hands are staying about 3 minutes in 12 o'clock position, until 2 complete telegrams are received.

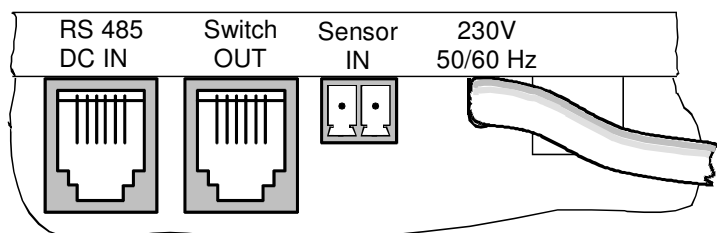


Fig. 6

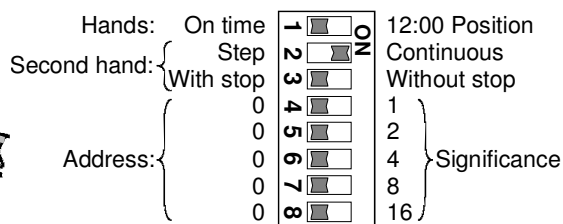


Fig. 7

Example:

Net Master Clock NMC

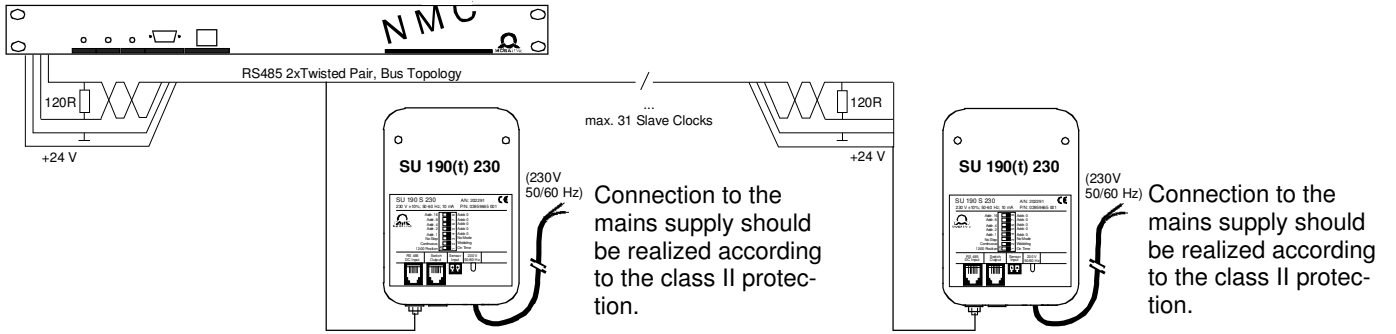
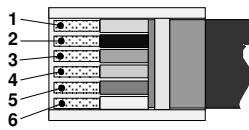


Fig. 8

Plug RS 485:

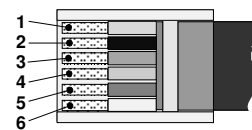
- 1 nc
- 2 GND
- 3 DC In+ (15..30V)
- 4 nc
- 5 RS 485 A
- 6 /RS485 B



View from contact side

Plug illumination control:

- 1 nc
- 2 GND
- 3 DC Out +
- 4 Switch OUT
- 5 RS485 A
- 6 /RS485 B



View from contact side

Fig. 9

5. Technical specification

	SU 190 S 230	SU 190t S 230
Synchronization	Serial from RS 485 bus with MB-RS485 protocol (19200/8/N/1) or IF482 standard protocol (9600/7/E/1). Autom. detection.	
State feedback	Serial over RS 485 bus with MB-RS485 protocol	
Device address	5 DIP switches for addresses 1..31 Address 0 reserved for not monitored devices (only synchronization from broadcast time telegrams)	
Switching output for clock illumination	Output 0V / 3.7V, $I_{L, Omax}=10mA$, $I_{H, lmax}=0.1\mu A$ for Opto-MOS-Relays	
Input for illumination sensor	$U=22V \pm 10\%$ $I_{on}=10mA$, $I_{off}=2mA$, $I_{max}=16mA$	
Setting times:		
Running time to reference pos.	6 minutes maximum	
Read in of time telegram	3 – 5 seconds	
Running time for new adjustment	10 seconds – 6 minutes	
Changes of daylight saving time	max. 5.5 minutes	
Operation mode second shaft	- Continuous or secondly pace shift (wobbling) - 1 revolution in 60 s or 1 revolution in 58 s with stop at 12.00 and start with the minute change	
Operation mode minute shaft	1 step every 60 s	
Operation mode hour shaft	continuous	
Operation voltage	230 VAC $\pm 10\%$ 50 / 60Hz or 15..30 VDC	
Power consumption	< 3 VA from mains, max. 50 mA @24VDC (incl. illumination control)	
Time keeping with internal quartz clock	> 12 h	
Number of motors	2 (hour / min. + sec.)	
Dial diameter	25 – 80 cm	
Max. dial thickness	4 mm	14.5 mm
Temperature range	-30 ... +70°C	
Weight	360 g	400 g
Standards	EN 50121-4, EN 61000-6-3	
Safety	EN 60950-1, Protection class II	

Subject to change without notice

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