Swiss Time Systems

Proud Partners with MOBAtime

Movements for autonomous clocks and self-setting slave clocks

Type range 190/190t

Modular movement of the latest technology for the display of hours and minutes or hours, minutes and seconds. For illuminated and non-illuminated clocks up to 80 cm. All types with central nut fixing. Autonomous operation with DCF 77 or MSF 60 radio signal movement (cascading of up to 4 movements possible). Behavior of the second hand selectable by means of DIP switch. In slave clock operation controlled by:
• serial ASCII time telegram RS232/ RS 422 over standard telegram (IF 482)
• MOBALine, incl. power supply
• audio-frequency time code (IRIG-B, AFNOR or DCF-FSK)
• special serial protocol over RS 485. Used to control and monitor slave clocks and clock illumination
Swiss Time Systems

Industrial Movements Model Range - 190/190t

General Features

- Type 190 with short shaft for clocks without illumination
- Type 190t with long shaft for illuminated clocks
- Type 190(t) S: Behavior of the second hand selectable by means of DIP switch
- 190 series movements are equipped with a microprocessor for intelligent functionality
- Internal real-time clock for accurate time display also during reception disturbances of the time code

- Immediate resetting to the correct time after mains failure of up to 12 hours, thanks to an internal real-time-clock
- Internal power reserve (no battery) for > 5 minutes operation in case of mains failure
- Signalization of missing or interrupted DCF time code reception after a period of one week by setting the hands to 12 o’clock position

Options:
- DCF 77-radio receiver DCF 4500 for self-setting radio movements of the type range BU 190

Self-setting MOBALine slave clock movement

MLU 190/MLU 190t for hour and minute hands. Control and power supply by MOBALine.

BU 190(t) S 230 for hour, minute and second display. Operation voltage 230V/50-60Hz.

BU 190(t) S 230 for hour, minute and second display. Operation voltage 230V/50-60Hz.

- Synchronization by DCF 77-radio signal, MSF 60- (Anthorn) radio signal (selectable over DIP-switch) or serial ASCII time telegram (Definition IF 482) over RS 232 / RS 422
- DCF 77 radio control with automatic time-over and daylight saving time change-over
- Signalization of DCF 77 radio signal (selectable by means of DIP switch) or serial ASCII time telegram (Definition IF 482) over RS 232 / RS 422

MLU 190(t) S 48/230 for hour, minute and second hands. Control and power supply by MOBALine.

- Control by MOBALine-code from a computer master clock or time center with fully automatic time-over and daylight saving time change-over
- Signalization of missing MOBALine codes longer than 24 hours by automatic setting of the hands to 12 o’clock position

Technical Data

<table>
<thead>
<tr>
<th>Movements for hours/minutes</th>
<th>Movements for hours/minutes/seconds</th>
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</thead>
<tbody>
<tr>
<td>BU 190 230</td>
<td>MOBALine*</td>
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</tbody>
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- Setting times: Running time to the reference position max. 6 minutes
- Reading of the time telegram 3 – 4 min./3 – 4 sec. (serial)
  10 – 20 sec.
  3 – 4 sec.
  3 – 4 min./3 – 4 sec. (serial)
  10 – 20 sec.
  3 – 4 sec.
- Running time in case of real adjustments
  10 seconds – 6 minutes
- Setting time for change-over daylight saving time max. 5.5 minutes
- Behavior of the hands; Second hand mode (selectable by means of DIP switch)
  - continual or soft stop
  - 1 revolution in 60 seconds or
  - 1 revolution in 58 seconds with stop at 12 o’clock and start with the minute jump

- Minute hand 1 minute jump every 60 second
- Hour hand
  - Continual

- Power supply
  230 VAC ± 10 % 50 – 60 Hz
  controlled and powered from MOBALine

- Power consumption
  < 3 VA
  < 10 mA
  < 3 VA
  < 25 mA
  < 3 VA

- Stand-by reserve
  5 minutes
  controlled by MOBALine

- Timekeeping with internal real-time clock, typical
  > 12 hours
  > 12 hours

- Number of motors
  1 (hour/min.)
  2 (hour/min. + sec.)

- Dimensions of hands max.
  Max. dial Thickness: 4 mm
  Length of the hand shafts: 20.2 mm (300 – 42.4 mm)
  Range of temperature: 30 – 170°C

- Weight in grams (190)
  320 (360)
  320 (360)
  300 (360)
  360 (400)
  360 (400)
  340 (380)
  340 (380)
  360 (400)

- Standards
  EN 50121-4, EN 61000-6-3, protection class II

- **DCF, MSF / serial**
  DCF 77 with radio signal receiver DCF 4500 resp. MSF 60 with radio signal receiver MSF 4500, serial synchronization with standard telegram IF 482 over RS 232.

- **MOBALine**
  Frequency-amplitude modulated time signal from a MOBALine computer master clock.

- **Audio-frequency**
  Audio-frequency time code instance IRIG-B, AFNOR or DCF-FSK from a computer master clock.

- **Serial**
  Serial synchronization with standard telegram IF 482 over RS 422 or sync. and monitoring with MB-RI 485 protocol over RS 422 / RS 485

- Control with audio-frequency time code (IRIG-B, AFNOR or DCF-FSK selectable by DIP switch) from a computer master clock or a time center with fully automatic time-over and daylight saving time change-over

- Signalization of the missing audio-frequency time code longer than 24 hours by automatic setting of the hands to 12 o’clock position

- Self-setting movement for RS 422 or RS 485 serial bus synchronization and monitoring

- SU 190(t) S 230 for hour, minute and second hands.
  Power supply 230V/50-60Hz or from RS 485 bus (24 VDC),
  Synchronization through MB-RS 485 protocol or IF 482 standard protocol over RS 422 / RS 485

- Status query over serial RS 485 bus. (Malfunction of movement and state of illumination)
- Control of clock illumination through RS 485 bus from a master clock e.g. DTS 4801 masterclock
- Signalization of missing time synchronization after a period of 24 hours by setting the hands to 12 o’clock position

Autonomous, self-setting radio movement (basic movement)

BU 190(t) S 230 for hour and minute display. Operation voltage 230V/50-60Hz.

BU 190(t) S 230 for hour, minute and second display. Operation voltage 230V/50-60Hz.

- Power supply 230V/50-60Hz
- DCF 77 radio control with automatic time-over and daylight saving time change-over by means of a connected radio time signal receiver DCF 4500 (option)
- Middle-European time zones MET-1, MET and MET+1 selectable by DIP-switch
Industrial movement Model range 190/190t

Autonomic, self-setting radio-controlled movement
Synchronization with DCF 77 – radio signal, MSF 60 – radio signal or ASCII time telegrams over RS 232/RS 422

Self-setting audio-frequency slave clock movement
Synchronization by IRIG-B, AFNOR or DCF-FSK audio-frequency time code (selectable by DIP switch)

Self-setting MOBAline slave clock movement
Control and power supply with MOBAline code

Self-setting serial time telegram controlled movement
Synchronization and monitoring over RS 485 bus with MB-RS 485 protocol or synchronization with IF 482 telegrams over RS 422

Front view of all models

Side views of the movements for hours/minutes
- BU 190 230
- MLU 190
- ATBU 190 230
- SU 190 230

Side views of the movements for hours/seconds
- BU 190 230
- MLU 190
- ATBU 190 230
- SU 190

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