

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 RS 232 / 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

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



Autonomous, self-setting radio movement (basic movement)

BU 190(t) 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.

- 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 take-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
- 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.

MLU 190(t) S 48/230
for hour, minute and second hands. Control and power supply by MOBALine, resp. control by MOBALine, power supply 230V / 50-60Hz.

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



Self-setting audio-frequency slave clock movement

ATBU 190(t) 230
for hour and minute hands.
Power supply 230V / 50-60Hz.

ITBU 190(t) S 230
for hour, minute and second hands.
Power supply 230V / 50-60Hz.

MOBATIME Swiss Time Systems

- 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 take-over and daylight saving time change-over
- Signalizing 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).

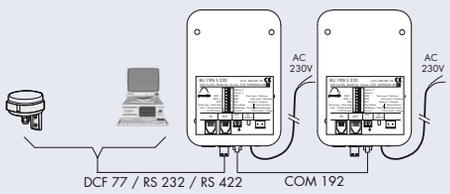
- Synchronization through MB-RS 485 protocol or IF 482 standard protocol over RS 422 / RS 485
- Status query over serial RS 485 bus. (Malfunction of movement and state of illumination)
- Control of clock illumination through RS 485 bus from a master clock e.g. DTS 4801.masterclock
- Signalization of missing time synchronization after a period of 24 hours by setting the hands to 12 o'clock position

Technical Data	Movements for hours/minutes			Movements for hours/minutes/seconds				
	BU 190 230	MLU 190	ATBU 190 230	BU 190 S 230	MLU 190 S 230	MLU 190 S 48	ITBU 190 S 230	SU 190 S 230
	BU 190t 230	MLU 190t	ATBU 190t 230	BU 190t S 230	MLU 190t S 230	MLU 190t S 48	ITBU 190t S 230	SU 190t S 230
Synchronization	DCF, MSF / serial *1	MOBALine *2	audio-frequency *3	DCF, MSF / serial *1	MOBALine *2	MOBALine *2	audio-frequency *3	serial *4
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.	10 – 20 sec.	3 – 4 sec.	3 - 4 sec.
Running time in case of new 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 step - 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 minutes jump every 60 second							
Hour hand	Continual							
Power supply	230 VAC ± 10% 50-60 Hz	controlled and powered from MOBALine	230 VAC ± 10 % 50 - 60 Hz			controlled and powered from MOBALine	230 VAC ± 10 % 50 - 60 Hz	
Power consumption	< 3 VA	< 10 mA	< 3 VA			< 25 mA	< 3 VA	
Stand-by reserve	5 minutes	controlled by MOBALine	-	5 minutes	-	controlled by MOBALine	-	-
Time-keeping with internal real-time clock, typical	> 12 hours	-	> 12 hours	> 12 hours	-	-	> 12 hours	> 12 hours
Number of motors	1 (hour/min.)			2 (hour/ min. + sec.)				
Dimensions of hands max.	As per DIN 41092/3 for dial Ø from 25 to 80 cm							
Max. dial thickness	4 mm - for executions with long hand shafts (190t): 14,5 mm							
Length of the hand shafts	20,2 mm (190t - 42,4 mm)			26,6 mm (190t - 48,6 mm)				
Range of temperature	-30 ... +70° C							
Weight in gram (190t)	320 (360)	320 (360)	300 (340)	360 (400)	360 (400)	340 (380)	340 (380)	360 (400)
Standards	EN 50121-4, EN 61000-6-3, protection class II							
*1 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.							
*2 MOBALine	Frequency-amplitude modulated time signal from a MOBALine computer master clock.							
*3 Audio-frequency	Audio-frequency time code instance IRIG-B, AFNOR or DCF-FSK from a computer master clock.							
*4 Serial	Serial synchronization with standard telegram IF 482 over RS 422 or synch. and monitoring with MB-RS 485 protocol over RS 485 bus.							

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

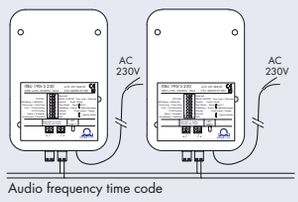


hour/min.
BU 190 230
BU 190t 230

hour/min./sec.
BU 190 S 230
BU 190t S 230

Self-setting audio-frequency slave clock movement

Synchronization by IRIG-B, AFNOR or DCF-FSK
audio-frequency time code (selectable by DIP switch)

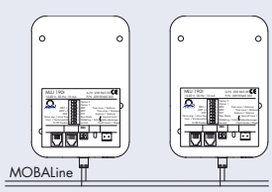


hour/min.
ATBU 190 230
ATBU 190t 230

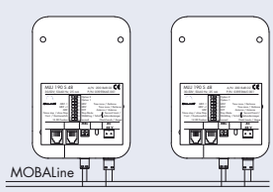
hour/min./sec.
ITBU 190 S 230
ITBU 190t S 230

Self-setting MOBALine slave clock movement

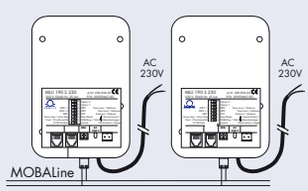
Control and power supply with MOBALine code



hour/min.
MLU 190
MLU 190t



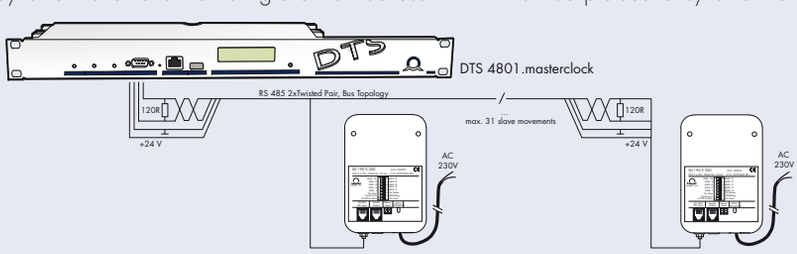
hour/min./sec.
MLU 190 S 48
MLU 190t S 48



hour/min./sec.
MLU 190 S 230
MLU 190t S 230

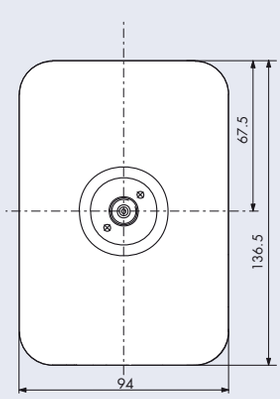
Self-setting serial time telegram controlled movement

Synchronization and monitoring over RS 485 bus with MB-RS 485 protocol or synchronization with IF 482 telegrams over RS 422



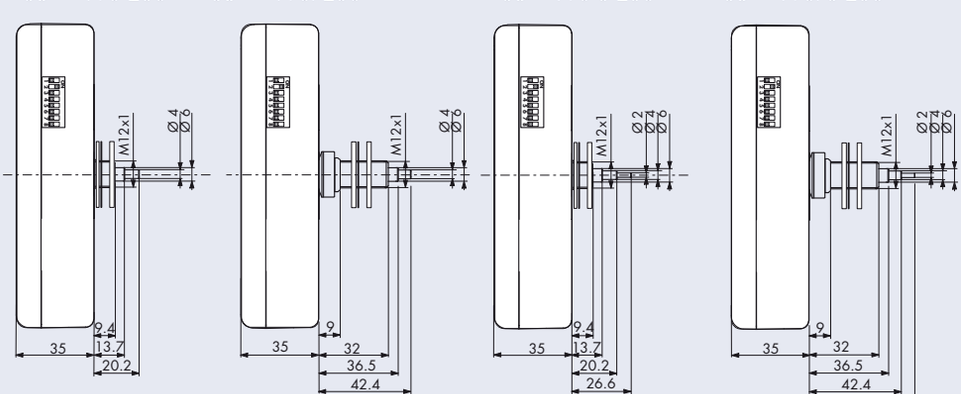
hour/min./sec.
SU 190 S 230
SU 190t S 230

Front view of all models



Side views of the movements for hours/minutes

BU	190 230	BU	190t 230
MLU	190	MLU	190t
ATBU	190 230	ATBU	190t 230
SU	190 230	SU	190t 230



Side views of the movements for hours/minutes/seconds

BU	190 S 230	BU	190t S 230
MLU	190 S 48 /230	MLU	190t S 48 / 230
ITBU	190 S 230	ITBU	190t S 230
SU	190 S 230	SU	190t S 230