

Installation instructions

METROLINE- industrial clocks, double-sided, round

Before installation of the clock please read the manual carefully.



References to the Instruction Manual

1. The information in this Instruction Manual can be changed at any time without previous notice.
2. This Instruction 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.
6. It is prohibited to reproduce, to store in a computer system or to transfer this publication in a way or another, even part of it. The copyright remains with all the rights with MOSER-BAER AG – CH 3454 Sumiswald / SWITZERLAND.

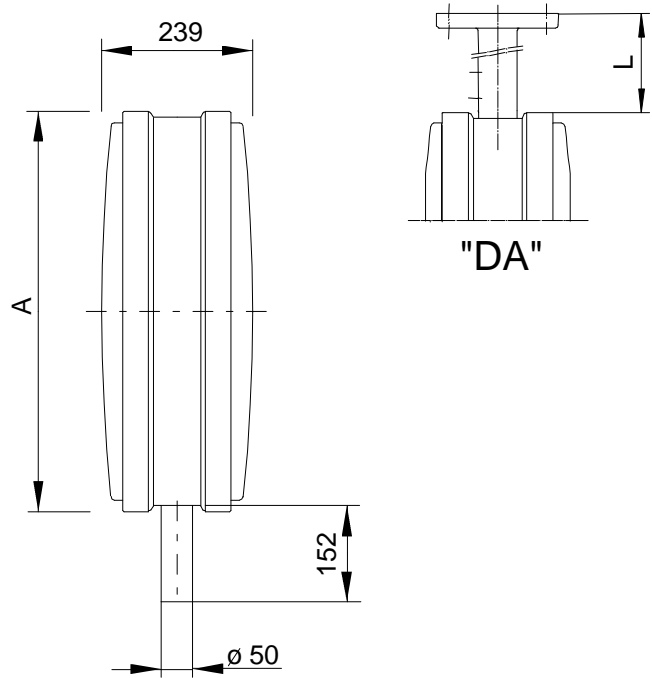
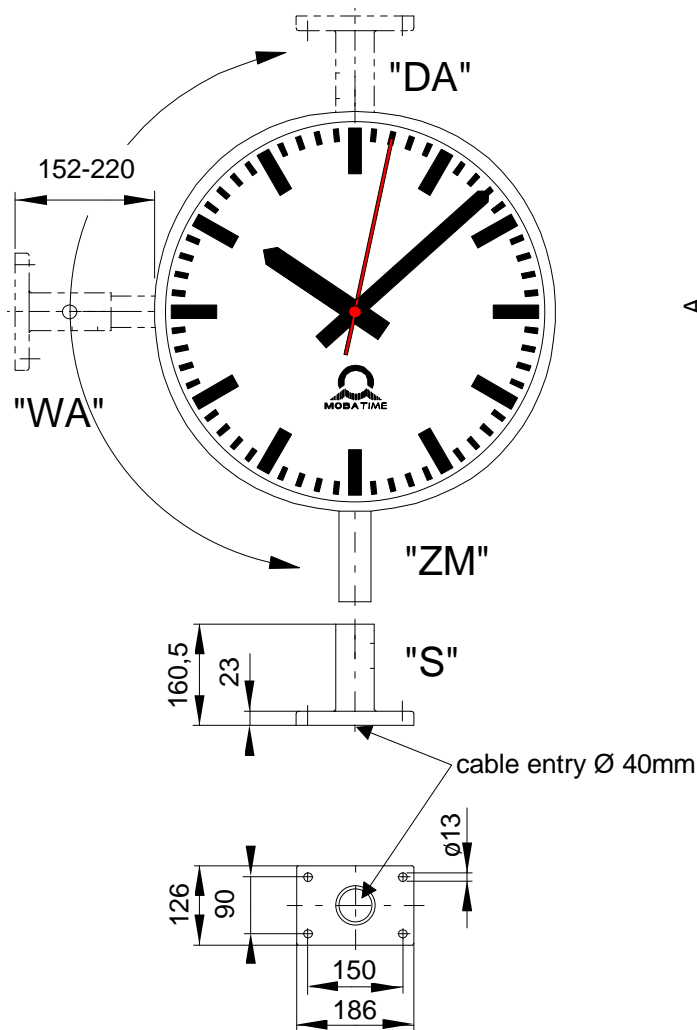
List of contents

	Seite
Mounting guidelines	3
1.1 Fastening "DA" "WA" "S" und "ZM"	3
1.2 Building Department / Authority Permit	3
1.3 Wall Mounting.....	4
1.4 Ceiling Mounting.....	4
1.5 Central Pole Mounting	4
1.6 Open Clock.....	5
1.7 Close Clock	5
1.8 Cleaning	5
2. Electrical connections	5
2.1 Mains power supply	5
2.2 Internal connections	7
2.3 Autonomous quartz clocks (QU)	7
2.4 Autonomous clocks with external DCF 77 radio receiver (FWU).....	7
2.5 Autonomous clocks with external GPS-receiver, battery or mains powered (GU).....	8
2.6 Slave clocks for minute impulses (A, F)	8
2.7 Slave clocks (SAX, SFX).....	9
3 Set clock to correct time	10
3.1 Pulse controlled slave clocks (NU 90t / NU 90t SYN)	10
3.2 Self-setting movements.....	10
4 Replacement of lamp and starter	10
4.1 Opening clock.....	10
4.2 Replacement of lamp	10
4.3 Replacement of starter	10
4.4 Replacement of ballast.....	10
4.5 Close clock	10
4.6 Cleaning	10
5 Valid documents	10
6 Connection diagrams	11
6.1 Battery-driven autonomous clocks (QU, FWU, GU).....	11
6.2 Slave clocks for minute pulses without synchronous seconds (A)	13
6.3 Slave clocks for minute pulses with synchronous seconds (F)	13
6.4 Slave clocks with MOBALine (SAM, SFM)	14
6.5 Slave clocks with MOBALine (SAM230, SFM230)	14
6.6 Slave clocks for DCF- 77 radio reception (SAA, SFA)	15
6.7 Slave clocks for serial telegram synchronization (SAT, SFT)	15
6.8 Slave clocks for synchronization over RS-485 (SAS, SFS).....	16
6.9 Slave clocks for NTP-Synchronization over NCI.....	17
6.10 Slave clocks for NTP-Synchronization	18

Mounting guidelines

1.1 Fastening "DA" "WA" "S" und "ZM"

Nominal- Ø	without illumination types	with illumination types
2-seitig 50 cm	ML.xxx.50.3xx.xx	MLB.xxx.50.3xx.xx
2-seitig 60 cm	ML.xxx.60.3xx.xx	MLB.xxx.60.3xx.xx
2-seitig 80 cm	ML.xxx.80.3xx.xx	MLB.xxx.80.3xx.xx



dial-Ø	A [mm]
50	534
60	634
80	834

Option "DA":	
L [mm]	500 / 600 / 800

1.2 Building Department / Authority Permit

If necessary a building department / authority permit should be requested before mounting.

1.3 Wall Mounting

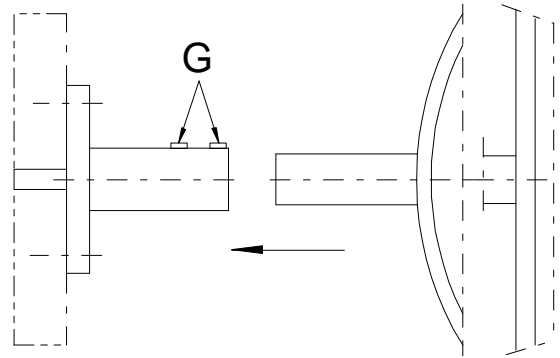
All electrical lines are to be fed through the console (cable entry $\varnothing 40$ mm).

Prior to any installation works the mains power has to be disconnected!

Set four bolts or plugs for screws according to the mounting sketch of figure in chapter 1. Feed the cables through the console, slide the clock onto the console and adjust the clock face to a vertical position.

Tighten both locking screws (G).

Locking screws (G) M5
Hex head wrench 2,5 mm



1.4 Ceiling Mounting

All electrical lines are to be fed through the console (cable entry $\varnothing 40$ mm).

Prior to any installation works the mains power has to be disconnected!

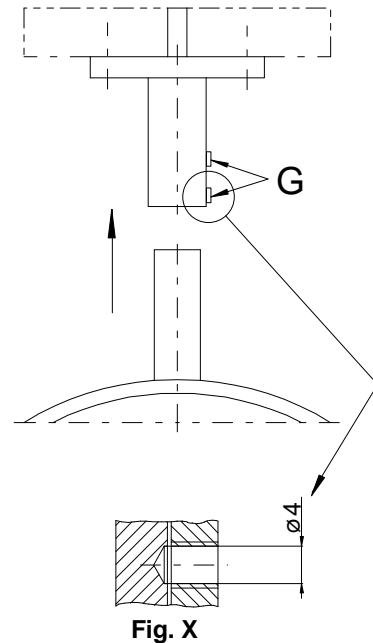
Set four bolts or plugs for screws according to the mounting sketch of figure in chapter 1. Feed the cables through the console, slide the clock onto the console and adjust the clock face to desired angle.

Tighten first locking screw (G).

Remove second locking screw (G) and spot-drill the console according to Fig.X. Reinsert and tighten the locking screw (G).

Remove first locking screw (G) and spot-drill the console according to Fig.X. Reinsert and tighten the locking screw (G).

Locking screws (G) M5
Hex head wrench 2,5 mm



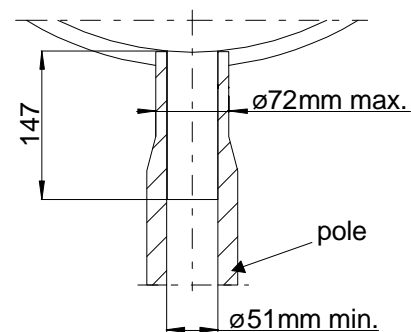
1.5 Central Pole Mounting

Prepare the post with its foundation, taking in account the wind load stressing. All electrical lines are to be fed through the inside of the post.

Prior to any installation works the mains power has to be disconnected!

Feed the cables through the post, slide the clock onto the post and adjust the clock face to desired angle. At least one locking screw has to be used on the pole.

Pole diameter: max. 72 mm.

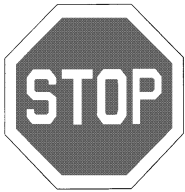


1.6 Open Clock

Prior to any work inside the clock, all electrical lines have to be switched off!

Remove all four screws on one clock side from the case ring. Pull case ring with glass cover and dial from the clock's cabinet. Disconnect electrical terminals from clock movement.

To avoid any damage to the fluorescent tube, it is recommended to remove the fluorescent tube during the installation work.



Self-setting movements: Do not touch the hands!

1.7 Close Clock

Reconnect the electrical terminals to the movement. Put case ring with glass cover and dial onto the clock's cabinet, press lightly and reinsert the four screws.

Be aware of the cable's position inside the clock as they may shade the illuminated dial.

1.8 Cleaning

Clean Glass with a humid cloth. Do not use solvent, evaporating or organic detergent.

2. Electrical connections

2.1 Mains power supply

The mains power supply for illumination and clock movement may only be connected from a licensed electrician.

Provide the same phase with only one fuse for time and clock supply.

The timing switch for the illumination has to be installed with respect to the constructional situation. The power supply for the movements has to be permanent.

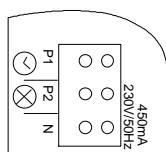
For cable entry of the line for minute impulse resp. the DCF-77 – radio receiver a second membrane rubber bushing is prepared.

Connections and plug-in connections see mounting plates (pages 10-18).

Warning:

Disconnect mains 230V/50Hz BEFORE start working at clock inside!

Detail of mains connection on mounting plates:



- Mains connection for clock movements

- Mains connection for illumination

- Neutral wire

Electrical connections:

- **Autonomous clocks with quartz controlled movement (QU)**
ML(B).QU.50.3xx.xx, ML(B).QU.60.3xx.xx, ML(B).QU.80.3xx.xx
see mounting plate with clock movement QU 192 page 11/20
- **Autonomous clocks synchronized with DCF 77 timecode (FWU)**
ML(B).FWU.50.3xx.xx, ML(B).FWU.60.3xx.xx, ML(B).FWU.80.3xx.xx
see mounting plate with clock movement FU 192 page 11/20
- **Autonomous clocks synchronized from GPS (GU)**
ML(B).GU.50.3xx.xx, ML(B).GU.60.3xx.xx, ML(B).GU.80.3xx.xx
see mounting plate with clock movement GU 192 page 11/20
- **Slave clocks for minute pulses (A, F)**
ML(B).A.50.3xx.xx, ML(B).A.60.3xx.xx, ML(B).A.80.3xx.xx
see mounting plate with clock movement NU 90t page 13/20
ML(B).F.50.3xx.xx, ML(B).F.60.3xx.xx, ML(B).F.80.3xx.xx
see mounting plate with clock movement NU 90t/SYN page 13/20
- **Slave clocks for MOBALine without mains connection (SAM, SFM)**
ML(B).SAM.50.3xx.xx, ML(B).SAM.60.3xx.xx, ML(B).SAM.80.3xx.xx
see mounting plate with clock movement MLU 190t page 14/20
ML(B).SFM.50.3xx.xx, ML(B).SFM.60.3xx.xx, ML(B).SFM.80.3xx.xx
see mounting plate with clock movement MLU 190t S 48 page 14/20
- **Slave clocks for MOBALine with mains connection (SAM230, SFM230)**
ML(B).SAM230.50.3xx.xx, ML(B).SAM230.60.3xx.xx, ML(B).SAM230.80.3xx.xx
see mounting plate with clock movement MLU 190t 230 page 14/20
ML(B).SFM230.50.3xx.xx, ML(B).SFM230.60.3xx.xx, ML(B).SFM230.80.3xx.xx
see mounting plate with clock movement MLU 190t S 230 page 14/20
- **Slave clocks for DCF 77 timecode with mains connection (SAA, SFA)**
ML(B).SAA.50.3xx.xx, ML(B).SAA.60.3xx.xx, ML(B).SAA.80.3xx.xx
see mounting plate with clock movement BU 190t 230 page 15/20
ML(B).SFA.50.3xx.xx, ML(B).SFA.60.3xx.xx, ML(B).SFA.80.3xx.xx
see mounting plate with clock movement BU 190t S 230 page 15/20
- **Slave clocks for audio frequency clock movement and mains connection (SAT, SFT)**
ML(B).SAT.50.3xx.xx, ML(B).SAT.60.3xx.xx, ML(B).SAT.80.3xx.xx
see mounting plate with clock movement ATBU 190t 230 page 15/20
ML(B).SFT.50.3xx.xx, ML(B).SFT.60.3xx.xx, ML(B).SFT.80.3xx.xx
see mounting plate with clock movement ITBU 190t S 230 page 15/20
- **Slave clocks for serial telegram and mains connection (SAS, SFS)**
ML(B).SAS.50.3xx.xx, ML(B).SAS.60.3xx.xx, ML(B).SAS.80.3xx.xx
see mounting plate with clock movement SU 190t 230 page 16/20
ML(B).SFS.50.3xx.xx, ML(B).SFS.60.3xx.xx, ML(B).SFS.80.3xx.xx
see mounting plate with clock movement SU 190t S 230 page 16/20
- **Slave clocks for NTP synchronisation over NCI (SAN2, SFN2)**
ML(B).SAN2.50.3xx.xx, ML(B).SAN2.60.3xx.xx, ML(B).SAN2.80.3xx.xx
see mounting plate with clock movement MLU 190t Seite 17/20
ML(B).SFN2.50.3xx.xx, ML(B).SFN2.60.3xx.xx, ML(B).SFN2.80.3xx.xx
see mounting plate with clock movement MLU 190t S 48 Seite 17/20
- **Slave clocks for NTP synchronisation (SAN3, SFN3)**
ML(B).SAN3.50.3xx.xx, ML(B).SAN3.60.3xx.xx, ML(B).SAN3.80.3xx.xx
see mounting plate with clock movement NBU 190t 24/PoE Seite 18/20
ML(B).SFN3.50.3xx.xx, ML(B).SFN3.60.3xx.xx, ML(B).SFN3.80.3xx.xx
see mounting plate with clock movement NBU 190t S 24/PoE Seite 18/20

2.2 Internal connections

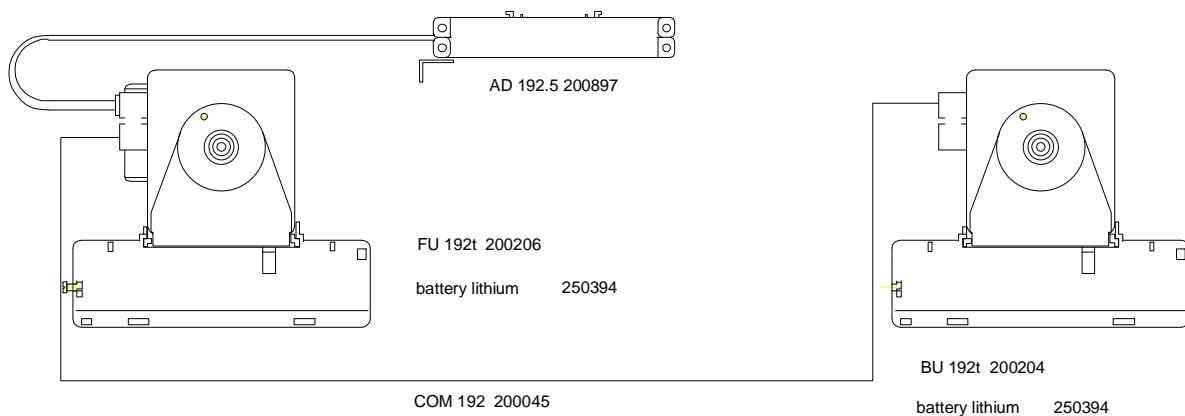
The internal wiring is made in factory. It's important not to modify the internal wiring,

2.3 Autonomous quartz clocks (QU)

The movement is driven by battery.

Battery life with lithium battery (250394): 6 – 7 years.

2.4 Autonomous clocks with external DCF 77 radio receiver (FWU)



The DCF 77 radio receiver AD 192 is as normal fitted on the movement and is used for indoor mounting only. For clocks with illumination, the external radio receiver AD 192.5 has to be used.

If the reception quality is bad, it's recommended to use the external radio receiver too.

The radio receiver AD 192.5 is delivered with protection IP 54 and 5m cable for outdoor mounting.

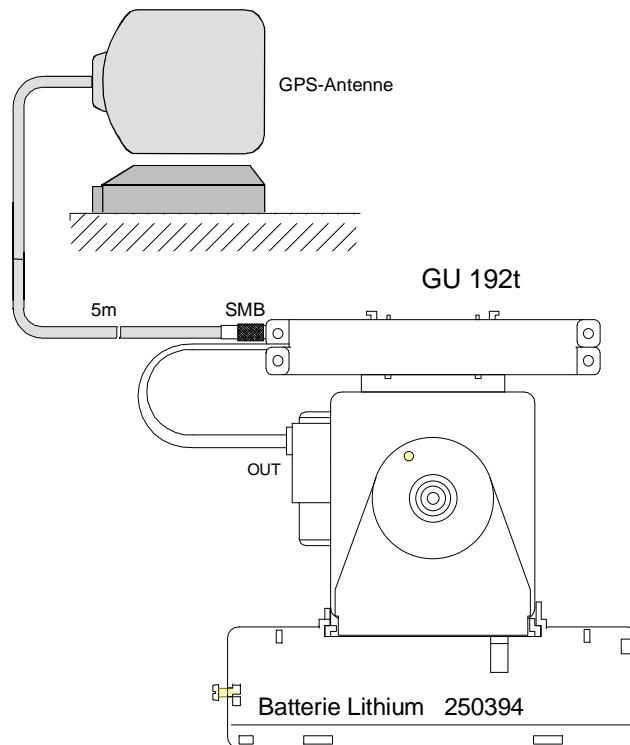
The radio controlled movement FU 192 is driven with two mono cells (only for indoor use), resp. a Lithium battery or an external power supply, protected against power-fail by an accumulator.

To check the reception quality, press the reset button on backside of the movement as long as the clock is open. This activates the radio reception and the LED on the movement should flicker once a second. If not, change the direction of the antenna).

METROLINE clocks with radio-controlled movements FU 192 are delivered with a special, detailed instruction manual (BE-800163).

Battery life with lithium battery (250394): 6 – 7 years.

2.5 Autonomous clocks with external GPS-receiver, battery or mains powered (GU)



The antenna must be mounted outdoors in horizontal position.

METROLINE–clocks with autonomous radio controlled movements GU 192 are delivered with a special, detailed instruction manual (BE – 800 304).

Operation time with lithium battery (250394): > 5 years.

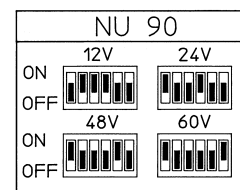
2.6 Slave clocks for minute impulses (A, F)

NU90t, NU 90t/SYN

- Operating voltage switch (C) on back side of movement

The operating voltage is factory set to 24 VDC.

If other voltage required, set DIP – switch according to diagram on backside of movement.



2.7 Slave clocks (SAx, SFx)

applicable documents

- Slave clocks for DCF 77 reception and mains power supply (SAA, SFA)
ML(B).SAA.50.3xx.xx, ML(B).SAA.60.3xx.xx, ML(B).SAA.80.3xx.xx
manual with movement BU 190t 230 **BE – 800 603**
ML(B).SFA.50.3xx.xx, ML(B).SFA.60.3xx.xx, ML(B).SFA.80.3xx.xx
manual with movement BU 190t S 230 **BE – 800 602**

- Slave clocks for MOBALine and mains power supply (SAM230, SFM230)
ML(B).SAM230.50.3xx.xx, ML(B).SAM230.60.3xx.xx, ML(B).SAM230.80.3xx.xx
manual with movement MLU 190t 230 **BE – 800 622**
ML(B).SFM230.50.3xx.xx, ML(B).SFM230.60.3xx.xx, ML(B).SFM230.80.3xx.xx
manual with movement MLU 190t S 230 **BE – 800 565**

- Slave clocks for MOBALine without mains power supply (SAM, SFM)
ML(B).SAM.50.3xx.xx, ML(B).SAM.60.3xx.xx, ML(B).SAM.80.3xx.xx
manual with movement MLU 190t **BE – 800 642**
ML(B).SFM.50.3xx.xx, ML(B).SFM.60.3xx.xx, ML(B).SFM.80.3xx.xx
manual with movement MLU 190t S 48 **BE – 800 621**

- Slave clocks for audio frequency time code and mains power supply (SAT, SFT)
ML(B).SAT.50.3xx.xx, ML(B).SAT.60.3xx.xx, ML(B).SAT.80.3xx.xx
manual with movement ATBU 190t 230 **BE – 800 390**
ML(B).SFT.50.3xx.xx, ML(B).SFT.60.3xx.xx, ML(B).SFT.80.3xx.xx
manual with movement ITBU 190t S 230 **BE – 800 390**

- Slave clocks for serial synchronization and mains connection (SAS, SFS)
ML(B).SAS.50.3xx.xx, ML(B).SAS.60.3xx.xx, ML(B).SAS.80.3xx.xx
manual with movement SU 190t 230 **BE – 800 623**
ML(B).SFS.50.3xx.xx, ML(B).SFS.60.3xx.xx, ML(B).SFS.80.3xx.xx
manual with movement SU 190t S 230 **BE – 800 624**

- Slave clocks for synchronization via NTP protocol (SAN3, SFN3)
ML(B).SAN3.50.3xx.xx, ML(B).SAN3.60.3xx.xx, ML(B).SAN3.80.3xx.xx
manual with movement NBU 190t 230 **BE – 800 xxx**
ML(B).SFN3.50.3xx.xx, ML(B).SFN3.60.3xx.xx, ML(B).SFN3.80.3xx.xx
manual with movement NBU 190t S 230 **BE – 800 540**

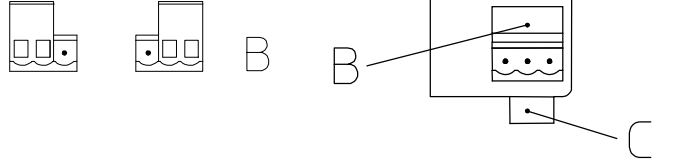
3 Set clock to correct time

3.1 Pulse controlled slave clocks (NU 90t / NU 90t SYN)

Push button (A) and turn, until hour and minute – hands shows desired time.
Never turn the second hand manually, as this will damage the movement. Also, the minute hand may only be turned in clockwise direction.

Hand will be set with each minute pulse!

If there would be a difference of 1 min. between master clock and secondary clock time, move the plug (B) to the opposite pair of pins to reverse polarity and set minute hand 2 minutes forwards.



3.2 Self-setting movements

BU 190t xxx, MLU 190 xxx, xTBU 190t xxx, SU 190t xxx, GU 192, FU 192

No time settings needed, clock will set up automatically to current time.

Movements are set by factory to standard run mode (DIP switch for 12:00 position in OFF position).

If a clock does not run to correct time, set 12:00 position DIP switch to ON and check, if the hands are stopping at 12:00 position exactly (if not, remove the clock hands and fix them exactly at 12:00 position).

Correct time and guaranteed time and power reserve, as well as precision of the clock can only be guaranteed after 2-3 days of working.

For further information read the documentation of respective movements (see 2.7).

4 Replacement of lamp and starter

Except from the replacement of lamp and starter, the clock is maintenance-free.

4.1 Opening clock

Remove all four screws on one clock side from the case ring. Pull case ring with glass cover and dial from the clock's cabinet. Disconnect electrical terminals from clock movement.

To avoid any damage to the fluorescent tube, it is recommended to remove the fluorescent tube during the installation work.

4.2 Replacement of lamp

ML(B).xxx.50... SYLVANIA CIRCLINE, 305 mm Ø, FC 32W/154, daylight

ML(B).xxx.60/80 SYLVANIA CIRCLINE, 413 mm Ø, FC 40W/154, daylight
or OSRAM ring shape LUMILUX, cool white L40/21-840C

4.3 Replacement of starter

SYLVANIA FS 11 or OSRAM ST 111 (4-80 W)

4.4 Replacement of ballast

TRIDONIC.ATCO: EC 36 LC501 K, class EEI = B2

4.5 Close clock

See chapter 1.7.

4.6 Cleaning

See chapter 1.8.

5 Valid documents

Movements series 190t	see chapter 2.7
Movement NU 90t/SYN	BE-800 143
Movement NU 90t	BE-800 142
DCF – receiver DCF 450	TE-800 116

6 Connection diagrams

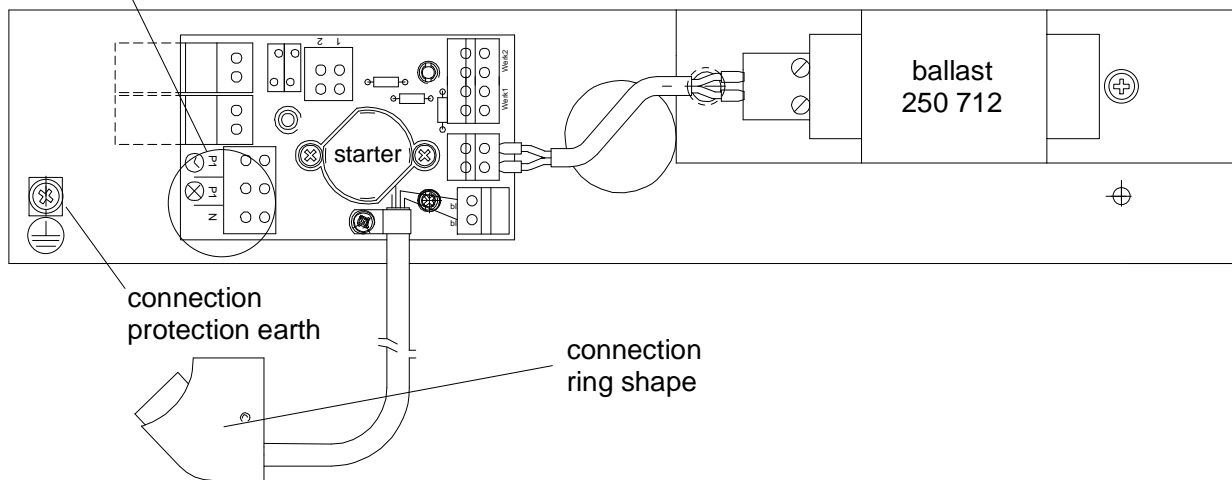
Only mounting plates for slave clock models with illumination are shown.

6.1 Battery-driven autonomous clocks (QU, FWU, GU)

Electrical connections QU 192t
 FWU 192t
 GU 192t

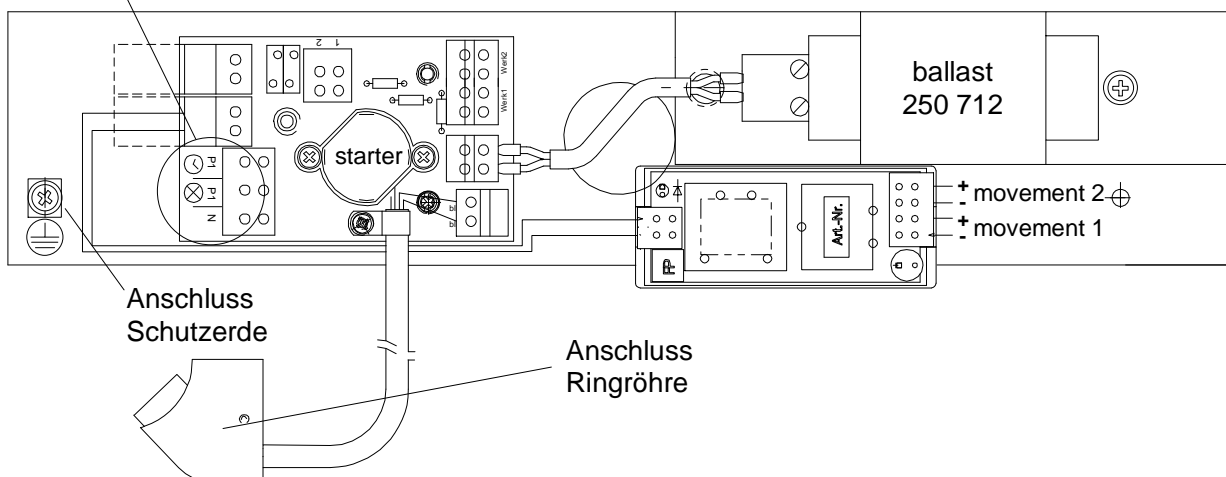
Order-No. ML(B).QU.xx
 ML(B).FWU.xx
 ML(B).GU.xx

P1: Power supply movement (not needed)
 P2: Power supply illumination
 N: Neutral wire

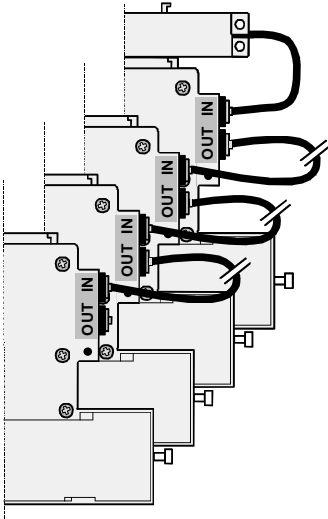


with optional mains power supply (201670):

P1: Power supply movement
 P2: Power supply illumination
 N: Neutral wire



Cascade:



Cascading means that a number of movements will be connected in series.

Up to three slave movements BU 192 can be connected to one master movement.

As master movement the following type can be used:

- FU 192
- QU 192
- BU 192 mit serieller Synchronisation (with IF 494)

The cascading is done by means of a cascade cable COM 192 (length 1m), enabling to synchronize 4 movements with only one reference signal. After starting-up the time synchronization for all movements will follow in a few seconds only. Should the time for the master movement change during the normal operation, the time take-over for each connected movement will take about 2 minutes, which means totally about 8 minutes. This is also valid for the daylight saving time change.

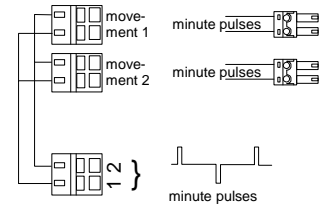
6.2 Slave clocks for minute pulses without synchronous seconds (A)

Electrical connections

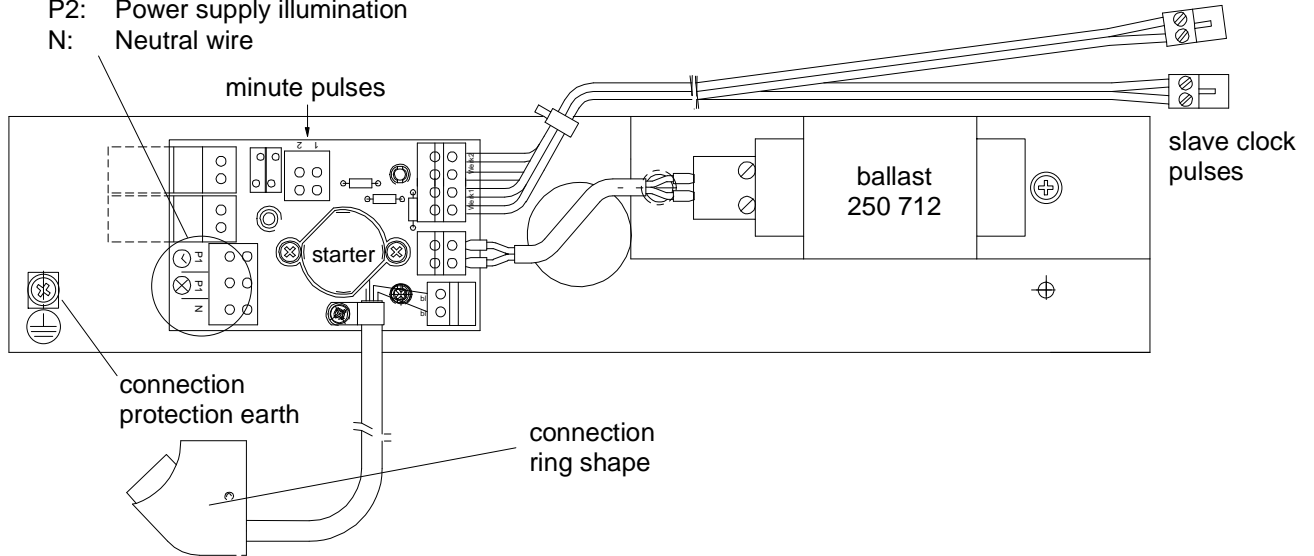
NU 90t

Order – No.

MLB.A.xx.3xx.xx



- P1: Power supply movement (not needed)
- P2: Power supply illumination
- N: Neutral wire



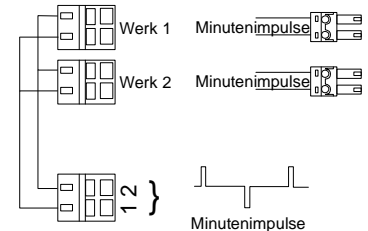
6.3 Slave clocks for minute pulses with synchronous seconds (F)

Electrical connections

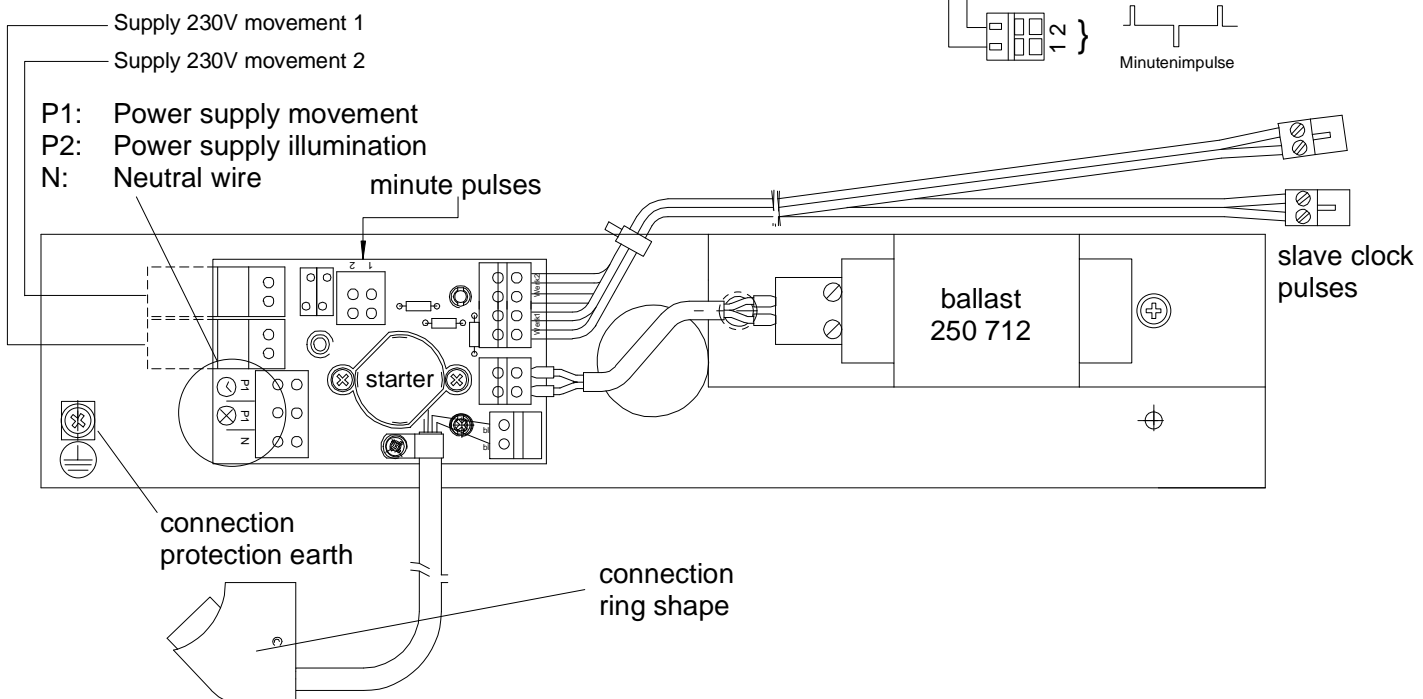
NU 90t SYN

Order – No

MLB.F.xx.3xx.xx



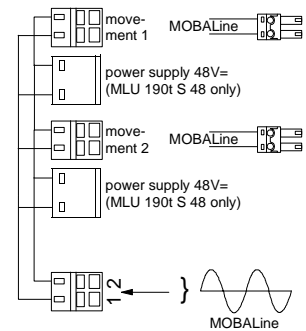
- P1: Power supply movement
- P2: Power supply illumination
- N: Neutral wire



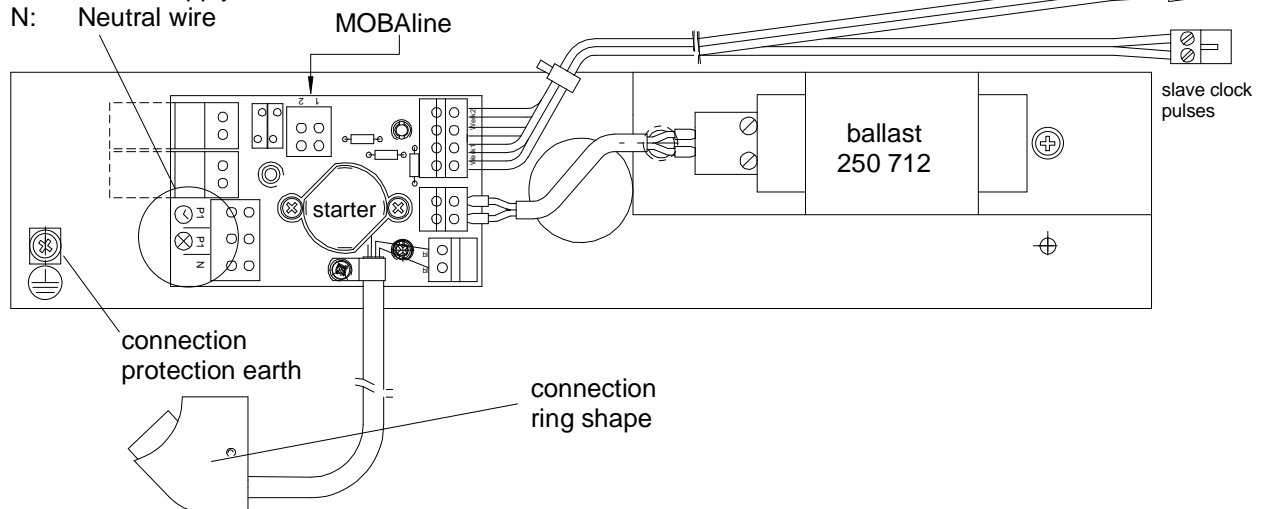
6.4 Slave clocks with MOBALine (SAM, SFM)

Electrical connections MLU 190t
 MLU 190t S 48

Order – No. MLB.SAM.xx.3xx.xx
 MLB.SFM.xx.3xx.xx



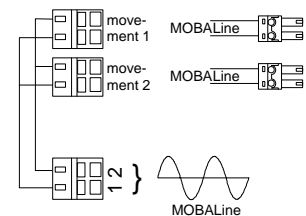
P1: Power supply movement (not needed)
 P2: Power supply illumination
 N: Neutral wire



6.5 Slave clocks with MOBALine (SAM230, SFM230)

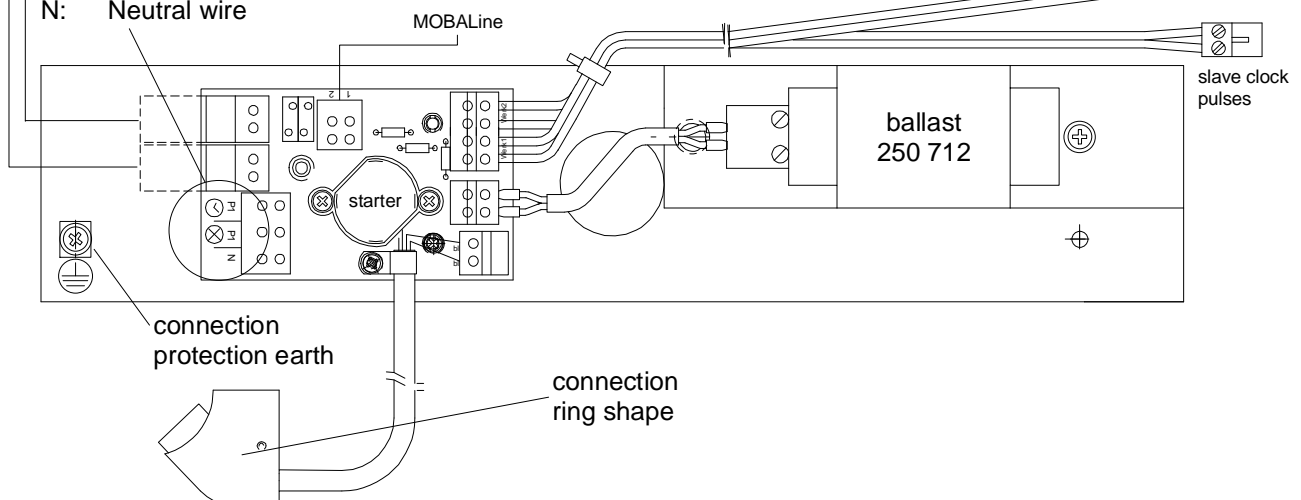
Electrical connections MLU 190t 230
 MLU 190t S 230

Order – No. MLB.SAM230.xx
 MLB.SFM230.xx



Supply 230V movement 1
 Supply 230V movement 2

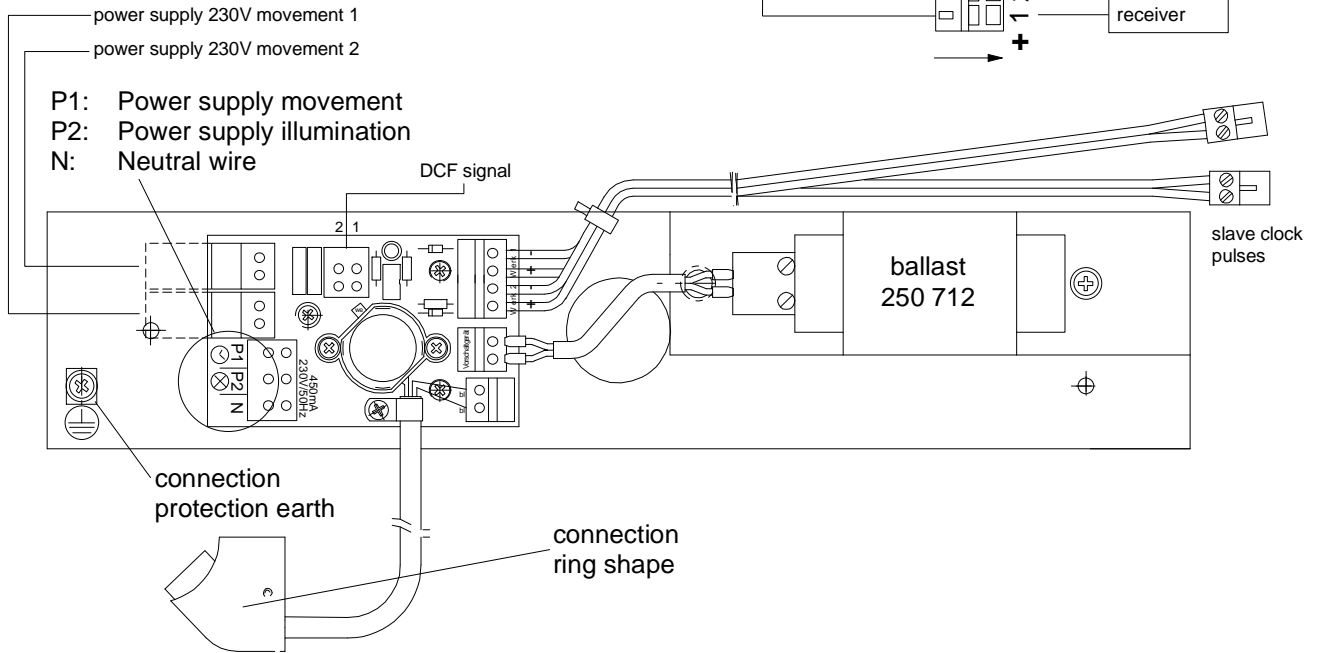
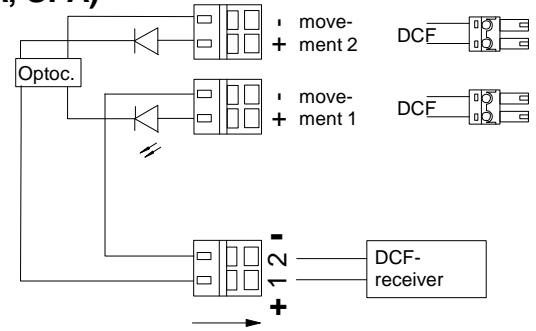
P1: Power supply movement
 P2: Power supply illumination
 N: Neutral wire



6.6 Slave clocks for DCF- 77 radio reception (SAA, SFA)

Electrical connections BU 190t 230
BU 190t S 230

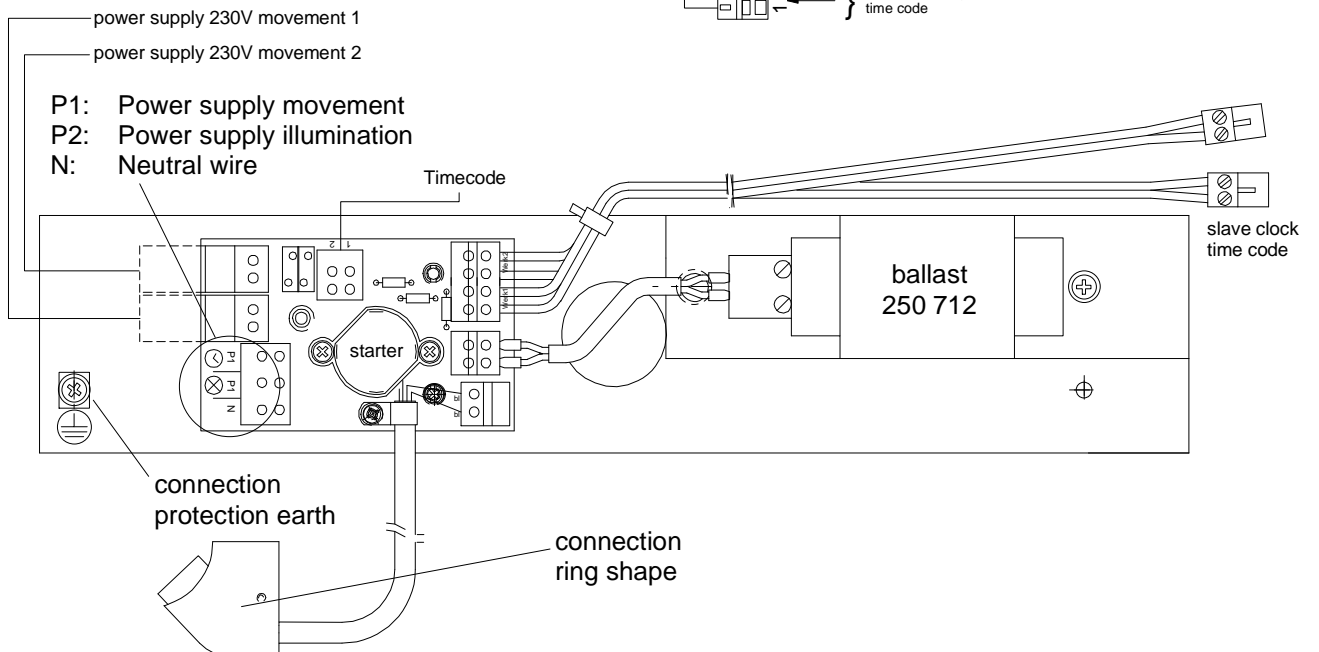
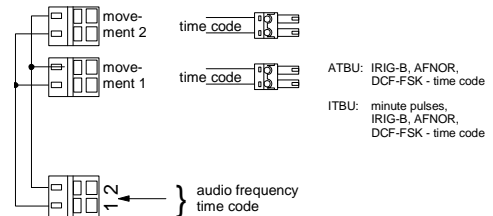
Order – No. MLB.SAA.xx.3xx.xx
MLB.SFA.xx.3xx.xx



6.7 Slave clocks for serial telegram synchronization (SAT, SFT)

Electrical connections ATBU 190t 230
ATBU 190t S 230

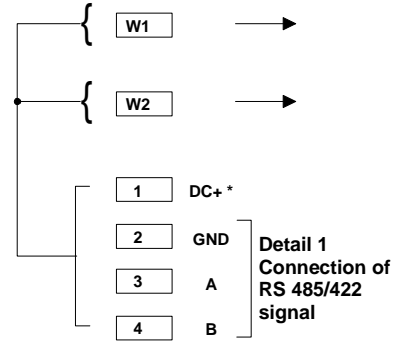
Order – No. MLB.SAS.xx.3xx.xx
MLB.SFS.xx.3xx.xx



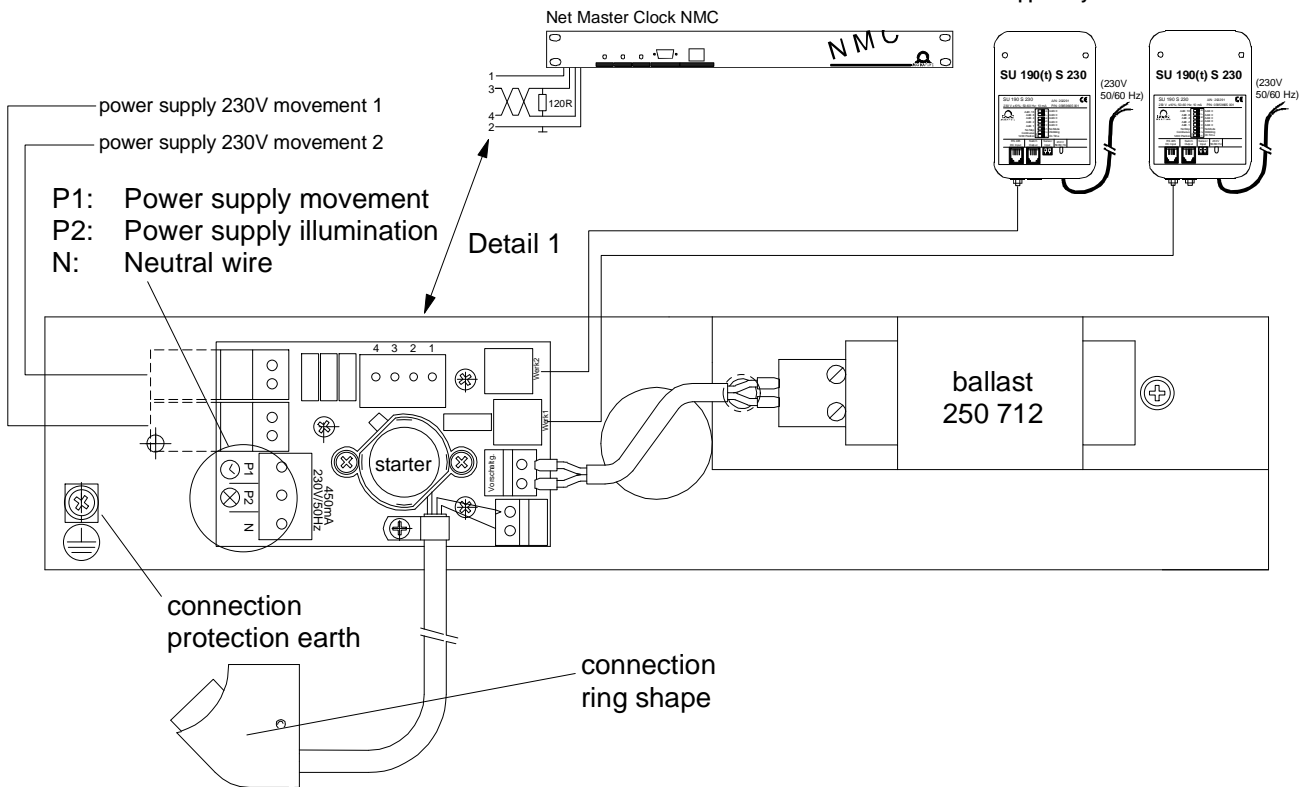
6.8 Slave clocks for synchronization over RS-485 (SAS, SFS)

Electrical connections SU 190t 230
SU 190t S 230

Order – No. MLB.SAS.xx.3xx.xx
MLB.SFS.xx.3xx.xx

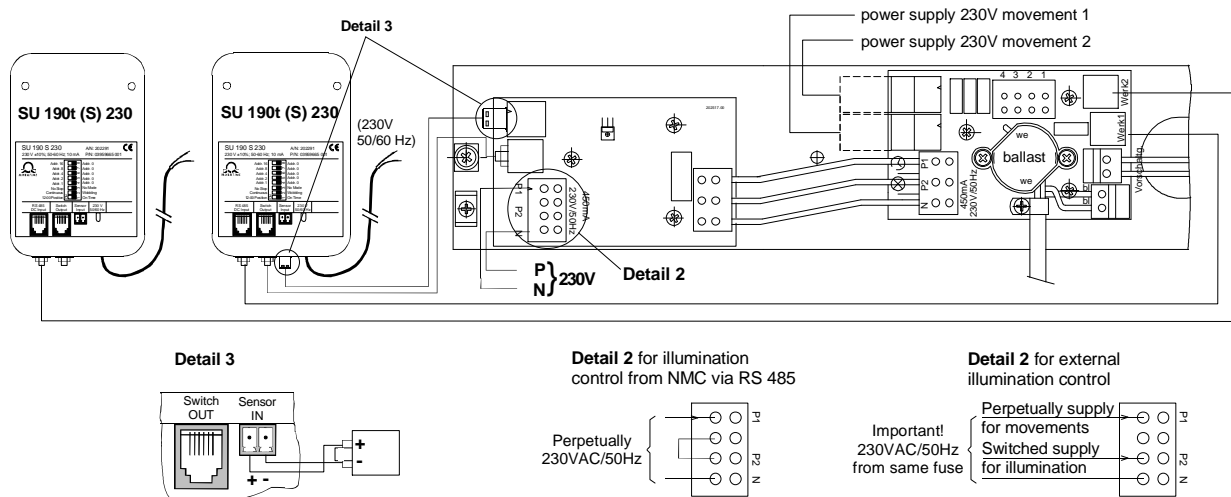


* DC supply only needed, if movements aren't supplied by mains.



internal wiring type SU 190t (S) 230 (illumination control)

Option SIC



6.9 Slave clocks for NTP-Synchronization over NCI

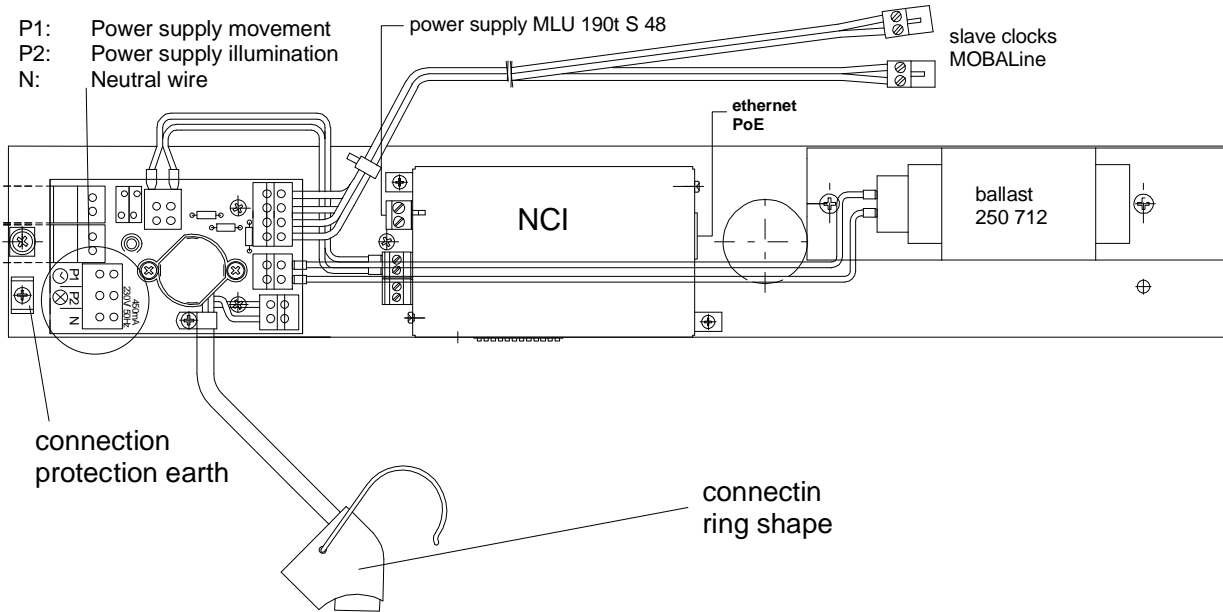
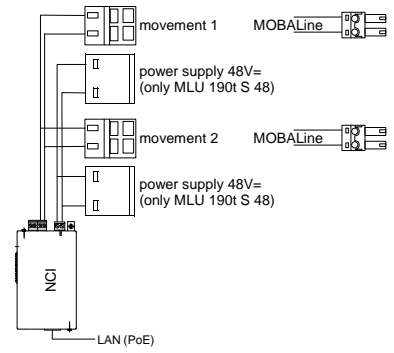
Electrical connections MLU 190t

MLU 190t S 48

Order – No.

ML(B).SAN2.xx.3xx.xx

ML(B).SFN2.xx.3xx.xx

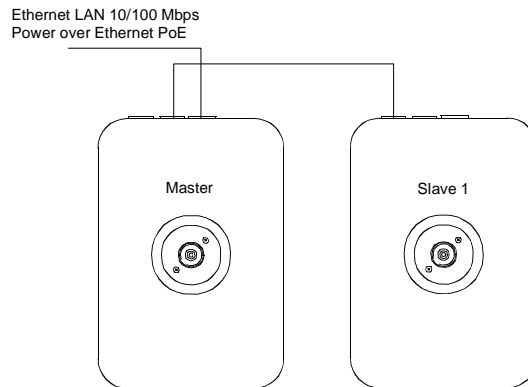


6.10 Slave clocks for NTP-Synchronization

Electrical connections NBU 190t 24/PoE
NBU 190t S 24/PoE

Order – No. ML(B).SAN3.xx.3xx.xx
ML(B).SFN3.xx.3xx.xx

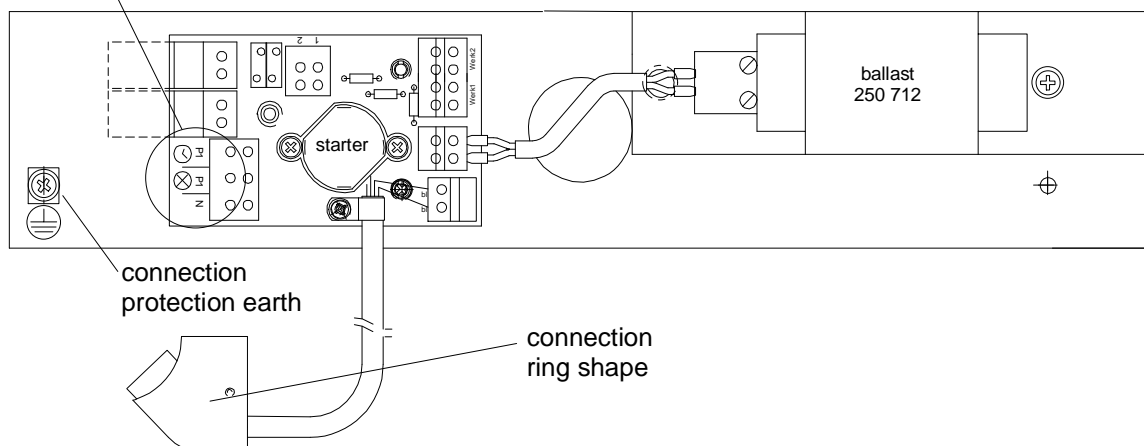
Movements ML(B):



Metroline without illumination (ML): no mounting plate needed, supply and control over LAN-cable (PoE).

Metroline with illumination (MLB): mounting plate needed, to supply the illumination.

- P1: Power supply movement
- P2: Power supply illumination
- N: Neutral wire





SALES SWITZERLAND
MOBATIME SWISS AG

Stettbachstrasse 5 • CH-8600 Dübendorf
Tel. +41 44 802 75 75 • Fax +41 44 802 75 65
info-d@mobatime.ch • www.mobatime.ch

MOBATIME SWISS SA
En Budron H 20 • CH-1052 Le Mont-sur-Lausanne
Tél. +41 21 654 33 50 • Fax +41 21 654 33 69
info-f@mobatime.ch • www.mobatime.ch

SALES WORLDWIDE

MOSER-BAER SA – EXPORT DIVISION
19 chemin du Champ-des-Filles • CH-1228 Plan-les-Ouates/GE
Tel. +41 22 884 96 11 • Fax. +41 22 884 96 90
export@mobatime.com • www.mobatime.com

HEADQUARTER

MOSER-BAER AG
Spitalstrasse 7 • CH-3454 Sumiswald
Tel. +41 34 432 46 46 • Fax. +41 34 432 46 99
moserbaer@mobatime.com • www.mobatime.com



BÜRK MOBATIME GmbH

Postfach 3760 D-78026 VS-Schwenningen
Steinkirchring 46 D-78056 VS-Schwenningen
Telefon (07720) 8535 - 0 Telefax (07720) 8535 - 11
Internet: <http://www.buerk-mobatime.de> E-Mail: buerk@buerk-mobatime.de