

Installation instructions

METROLINE- industrial clocks, single-sided, round, IP 54

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.
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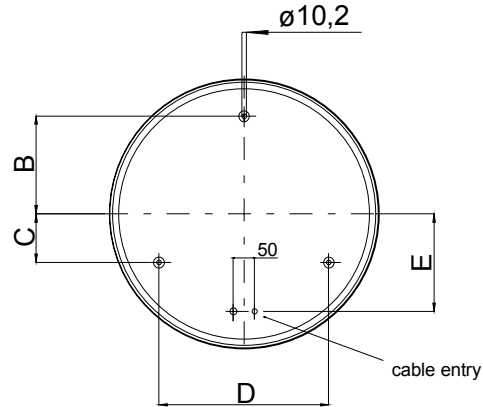
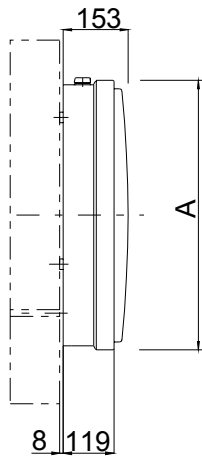
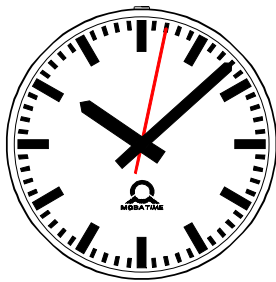
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1. Mounting guidelines

1.1 Fastening "W "

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



Nenn-Ø	Ø A	B	C	D	E
50	534	190	95	330	190
60	634	230	115	400	230
80	834	300	150	520	300

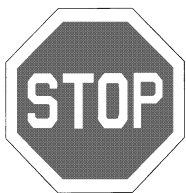
1.2 Building Department / Authority Permit

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

1.3 Open 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.



Self-setting movements: Do not touch the hands!

1.4 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.

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).

Electrical connections:

- **Autonomous clocks with quartz controlled movement (QU)**
ML(B).QU.50.E, ML(B).QU.60.E, ML(B).QU.80.E
see mounting plate with clock movement QU 192t **Page 9/20**
- **Autonomous clocks synchronized with DCF 77 timecode (FWU)**
ML(B).FWU.50.3xx.E.xx, ML(B).FWU.60.3xx.E.xx, ML(B).FWU.80.E.3xx.xx
see mounting plate with clock movement FU 192t **Page 9/20**
- **Autonomous clocks synchronized from GPS (GU)**
ML(B).GU.50.E, ML(B).GU.60.E, ML(B).GU.80.E
see mounting plate with clock movement GU 192t **Page 9/20**
- **Slave clocks for minute pulses (A, F)**
ML(B).A.50.E, ML(B).A.60.E, ML(B).A.80.E
see mounting plate with clock movement NU 90t **Page 10/20**
ML(B).F.50.E, ML(B).F.60.E, ML(B).F.80.E
see mounting plate with clock movement NU 90t/SYN **Page 10/20**
- **Slave clocks for MOBALine without mains connection (SAM, SFM)**
ML(B).SAM.50.E, ML(B).SAM.60.E, ML(B).SAM.80.E
see mounting plate with clock movement MLU 190t **Page 11/20**
ML(B).SFM.50.E, ML(B).SFM.60.E, ML(B).SFM.80.E
see mounting plate with clock movement MLU 190t S 48 **Page 11/20**
- **Slave clocks for MOBALine with mains connection (SAM230, SFM230)**
ML(B).SAM.50.E, ML(B).SAM.60.E, ML(B).SAM.80.E
see mounting plate with clock movement MLU 190t 230 **Page 11/20**
ML(B).SFM.50.E, ML(B).SFM.60.E, ML(B).SFM.80.E
see mounting plate with clock movement MLU 190t S 230 **Page 11/20**
- **Slave clocks for DCF 77 timecode with mains connection (SAA, SFA)**
ML(B).SAA.50.E, ML(B).SAA.60.E, ML(B).SAA.80.E
see mounting plate with clock movement BU 190t 230 **Page 14/20**
ML(B).SFA.50.E, ML(B).SFA.60.E, ML(B).SFA.80.E
see mounting plate with clock movement BU 190t S 230 **Page 14/20**
- **Slave clocks for audio frequency clock movement and mains connection (SAT, SFT)**
ML(B).SAT.50.E, ML(B).SAT.60.E, ML(B).SAT.80.E
see mounting plate with clock movement ATBU 190t 230 **Page 15/20**
ML(B).SFT.50.E, ML(B).SFT.60.E, ML(B).SFT.80.E
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.E, ML(B).SAS.60.E, ML(B).SAS.80.E
see mounting plate with clock movement SU 190t 230 **Page 16/20**
ML(B).SFS.50.E, ML(B).SFS.60.E, ML(B).SFS.80.E
see mounting plate with clock movement SU 190t S 230 **Page 16/20**

2.2 Internal connections

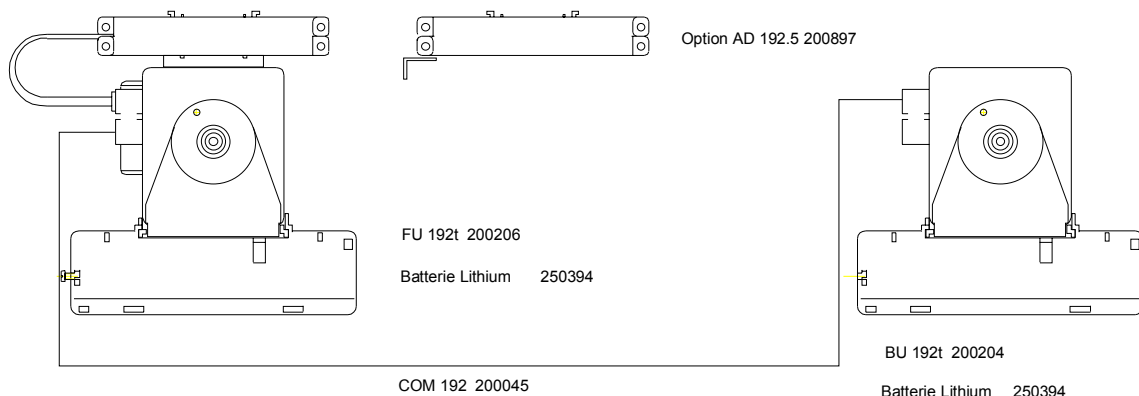
The internal wiring is made in factory. It's important not to modify the internal wiring.

2.3 Autonomous quartz clocks

The movement is driven by battery.

Battery life with lithium battery (250394): 5 – 7 years.

2.4 Autonomous clocks with external DCF 77 radio receiver, battery or mains powered (FU)



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.

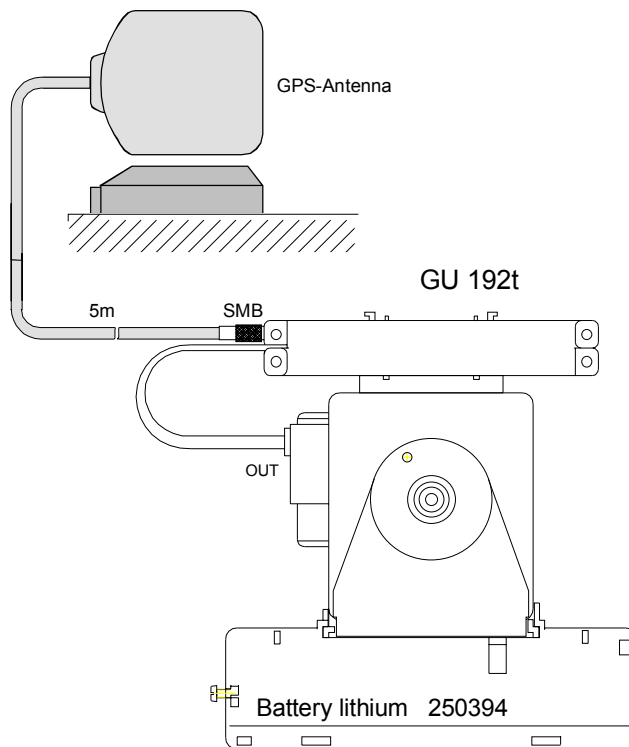
The radio controlled movement FU 192 is driven with two mono cells (only for indoor use), resp. a Lithium battery or an external power supply, protected against power-fail by an accumulator.

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): 4 – 6 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).

Battery life with lithium-battery (250394): > 4 years.

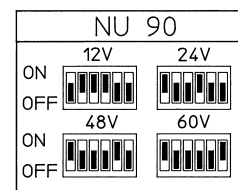
2.6 Slave clocks for minute pulses (A, F)

NU90t, NU 90t/SYN

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

The operating voltage is factory set to 24VDC.

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)N.SAA.50.E, ML(B)N.SAA.60.E, ML(B)N.SAA.80.E manual with movement BU 190t 230	TE – 800 603
ML(B)N.SFA.50.E, ML(B)N.SFA.60.E, ML(B)N.SFA.80.E manual with movement BU 190t S 230	TE – 800 602
- Slave clocks for MOBALine without mains power supply (SAM, SFM)	
ML(B)N.SAM.50.E, ML(B)N.SAM.60.E, ML(B)N.SAM.80.E manual with movement MLU 190t	TE – 800 642
ML(B)N.SFM.50.E, ML(B)N.SFM.60.E, ML(B)N.SFM.80.E manual with movement MLU 190t S 48	TE – 800 621
- Slave clocks for MOBALine and mains power supply (SAM230, SFM230)	
ML(B)N.SAM230.50.E, ML(B)N.SAM230.60.E, ML(B)N.SAM230.80.E manual with movement MLU 190t 230	TE – 800 622
ML(B)N.SFM230.50.E, ML(B)N.SFM230.60.E, ML(B)N.SFM230.80.E manual with movement MLU 190t S 230	TE – 800 565
- Slave clocks for serial synchronization and mains power supply (SAS, SFS)	
ML(B)N.SAS.50.E, ML(B)N.SAS.60.E, ML(B)N.SAS.80.E manual with movement SU 190t 230	TE – 800 623
ML(B)N.SFS.50.E, ML(B)N.SFS.60.E, ML(B)N.SFS.80.E manual with movement SU 190t S 230	TE – 800 624
- Slave clocks for audio frequency time code movement and mains power supply (SAT, SFT)	
ML(B)N.SAT.50.E, ML(B)N.SAT.60.E, ML(B)N.SAT.80.E manual with movement ATBU 190t 230	TE – 800 390
ML(B)N.SFT.50.E, ML(B)N.SFT.60.E, ML(B)N.SFT.80.E Manual with movement ITBU 190t S 230	TE – 800 390

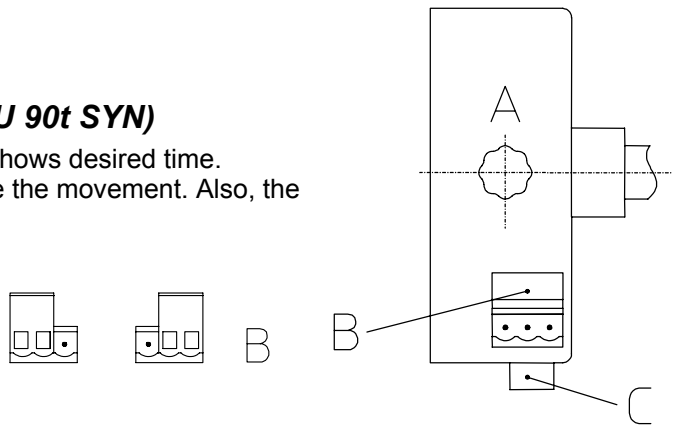
3. Regulate the movement

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, SU 190t xxx, MLU 190 xxx, xTBU 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 choke

Except from the replacement of lamp and choke, 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 choke

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

4.5 Closing clock

see pos. 2.3

4.6 Cleaning

Clean glass with a humid (leather-) cloth.

Never use solvent or organic material.

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

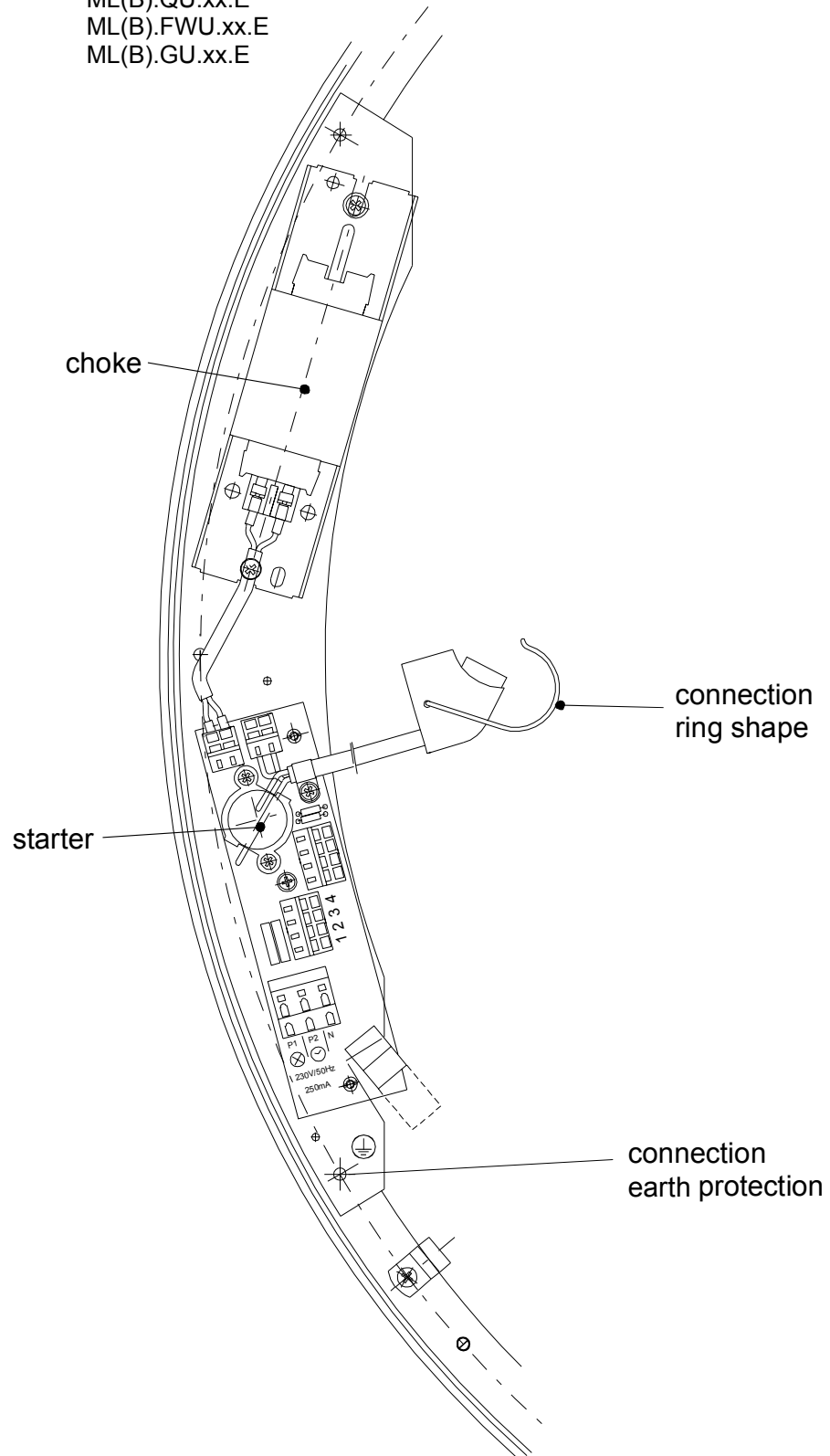
6. Connection diagrams

Only mounting plates for slave clock models with illumination are shown.
On types without illumination choke, starter and connection ring shape are missing.

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

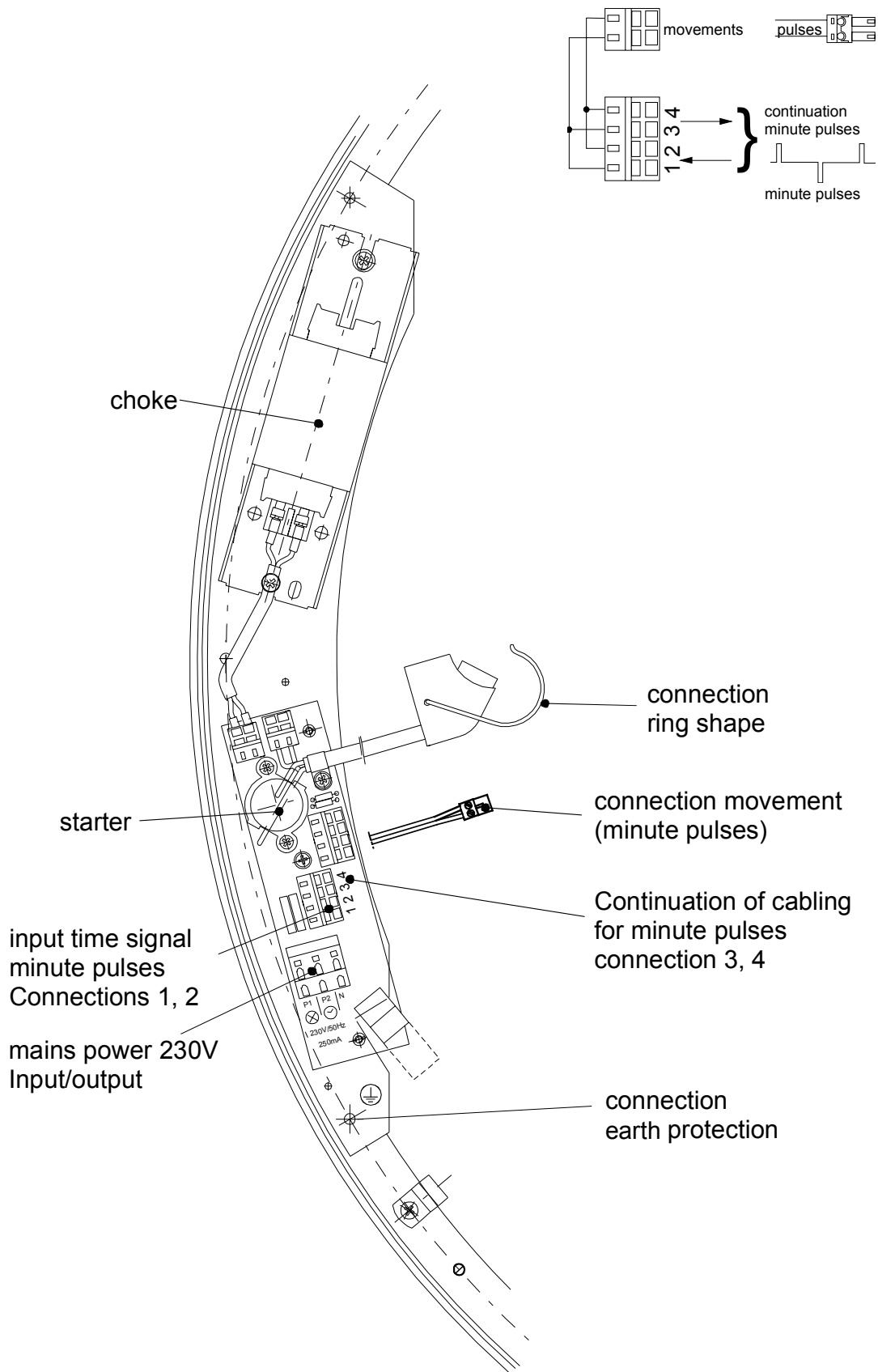
Electrical connections QU 192t
 FWU 192t
 GU 192t

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



6.2 Slave clocks without synchronous second (A)

Electrical connections NU 90t
 Order-No. MLB.A.xx.3xx.xx.E



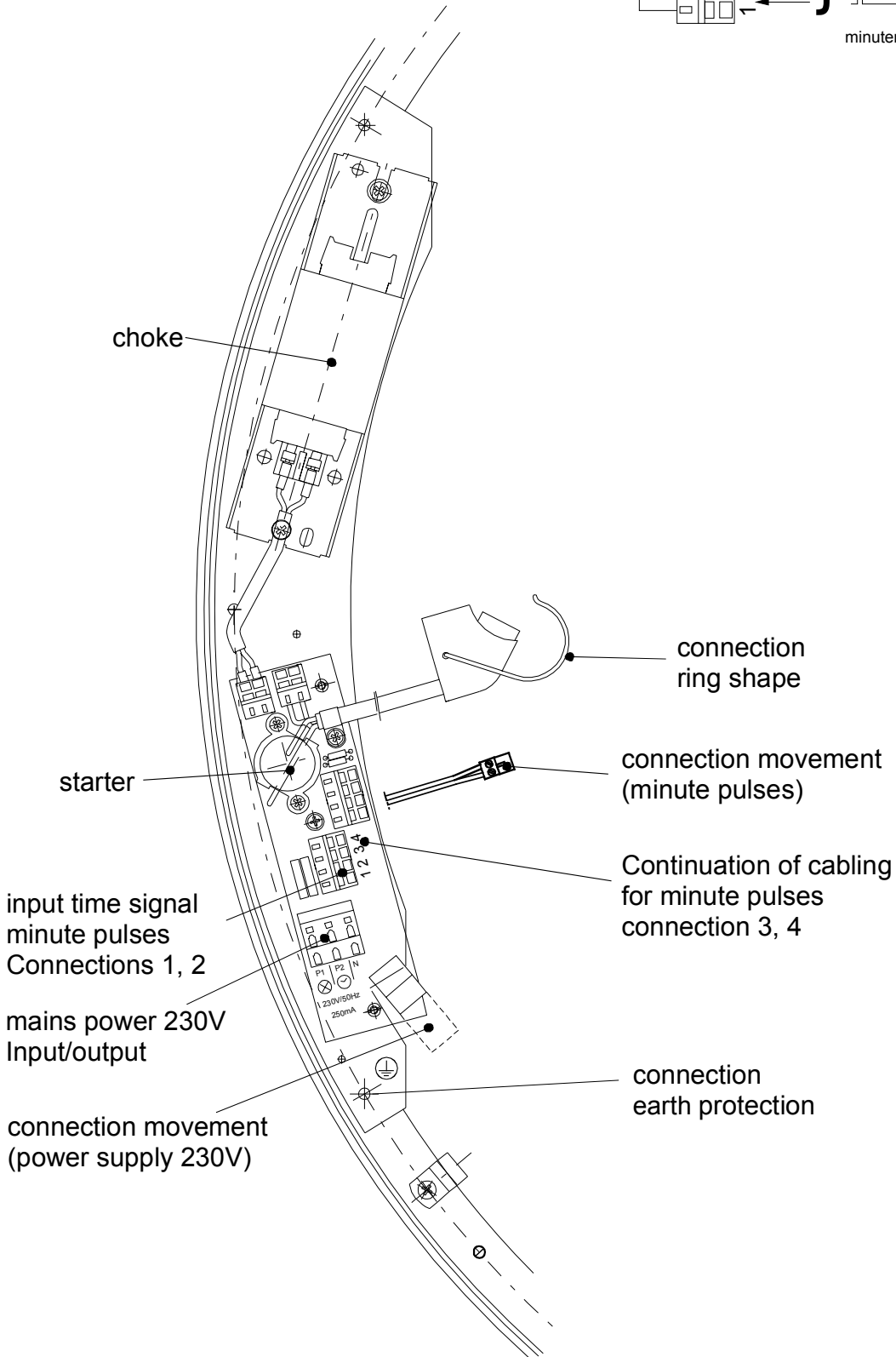
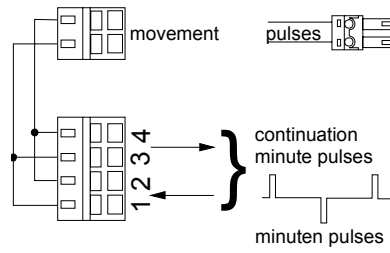
6.3 Slave clocks with minute pulses (F)

Electrical connections

NU 90 / SYN

Order-No.

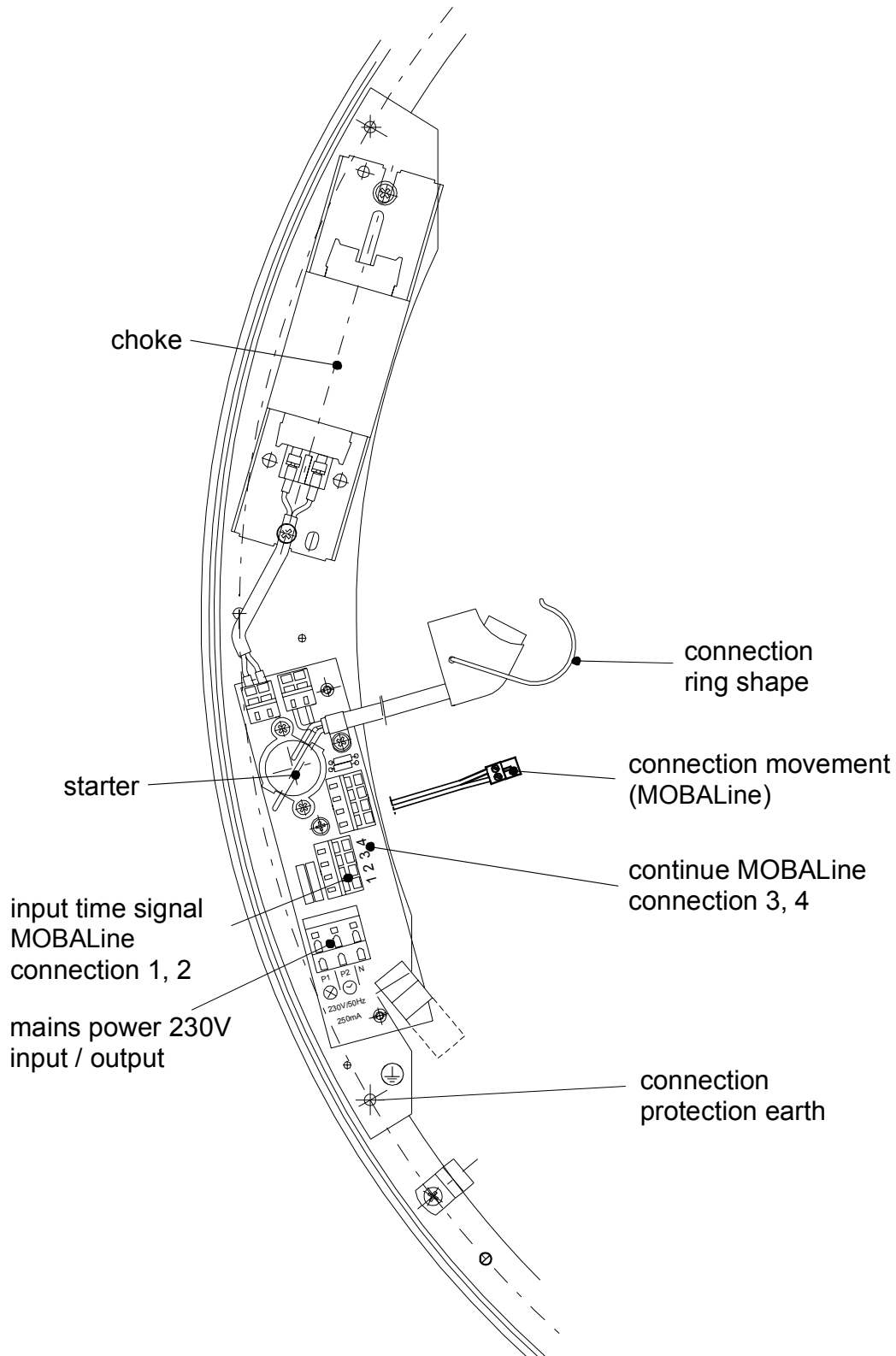
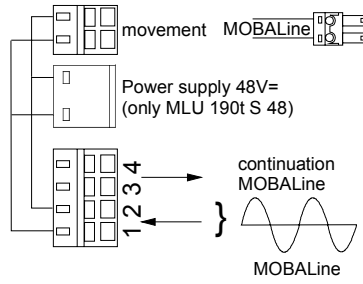
MLB.F.xx.3xx.xx.E



6.4 Slave clocks with MOBALine (SAM, SFM)

Electrical connections MLU 190
MLU 190t S 48

Bestell-Nr. MLB.SAM.xx.3xx.xx.E
MLB.SFM.xx.3xx.xx.E



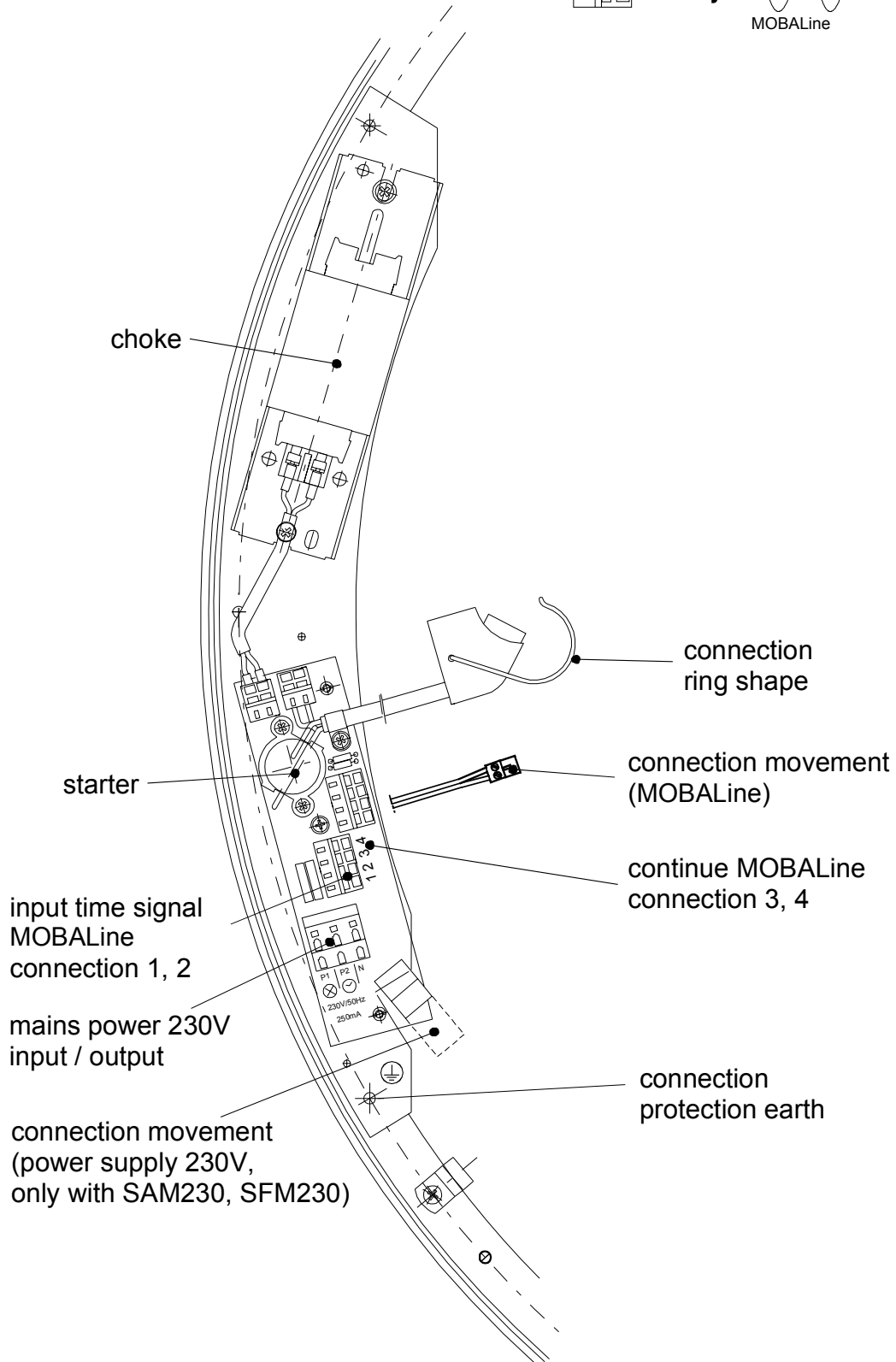
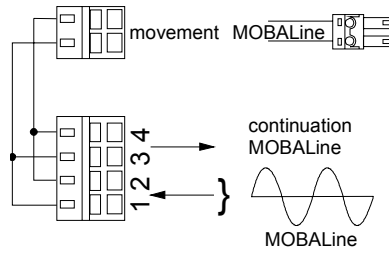
6.5 Slave clocks with MOBALine (SAM 230, SFM 230)

Electrical connections

MLU 190t 230
MLU 190t S 230

Order-No.

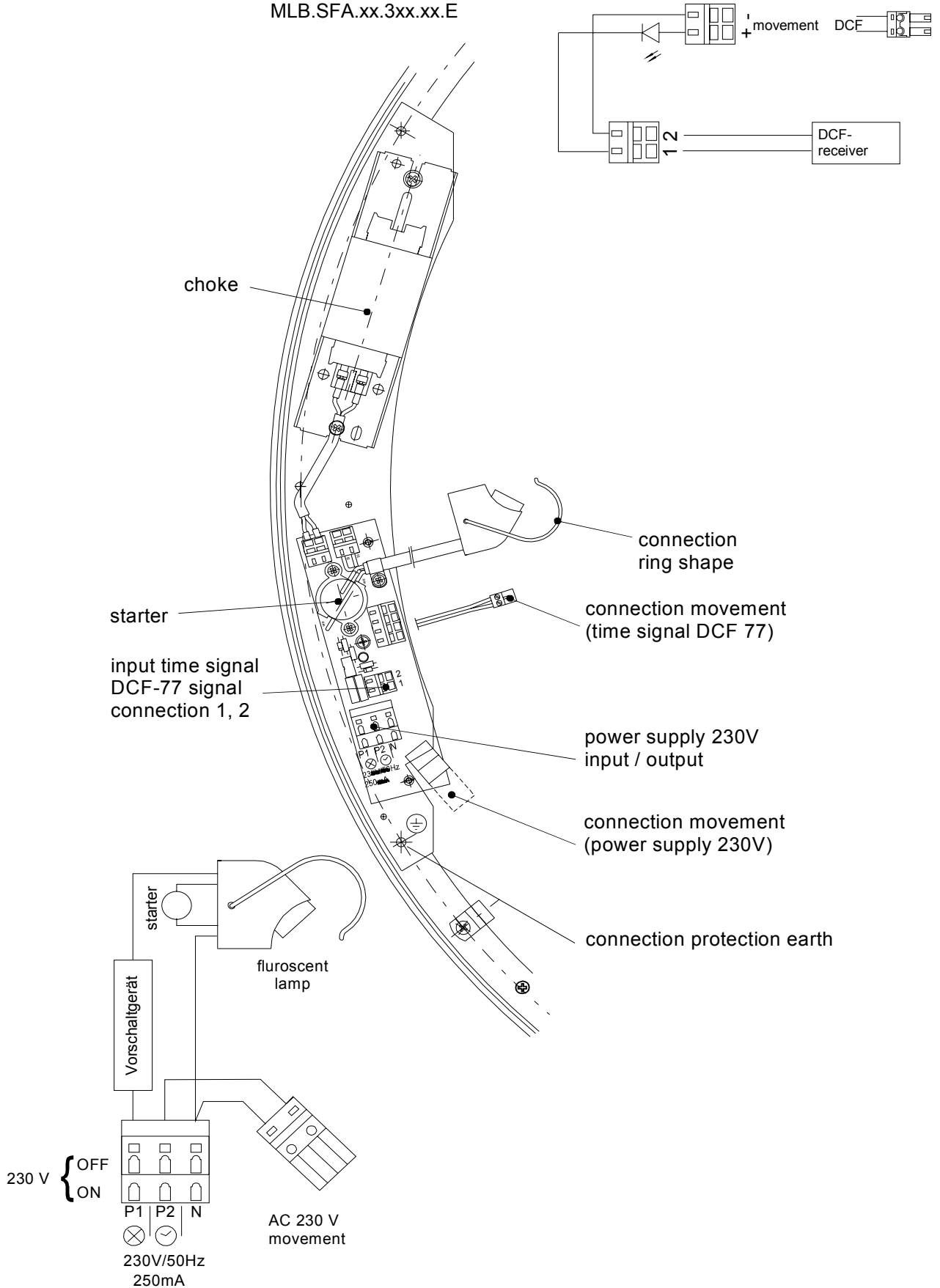
MLB.SAM.xx.3xx.xx.E
MLB.SFM.xx.3xx.xx.E



6.6 Slave clocks for DCF- or serial telegram and mains connection (SAA, SFA)

Electrical connections BU 190t 230
BU 190t S 230

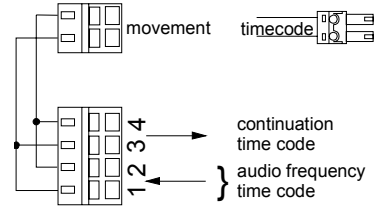
Order-No. MLB.SAA.xx.3xx.xx.E
MLB.SFA.xx.3xx.xx.E



6.7 Slave clocks for synchronization with audio frequency time code (SAT, SFT)

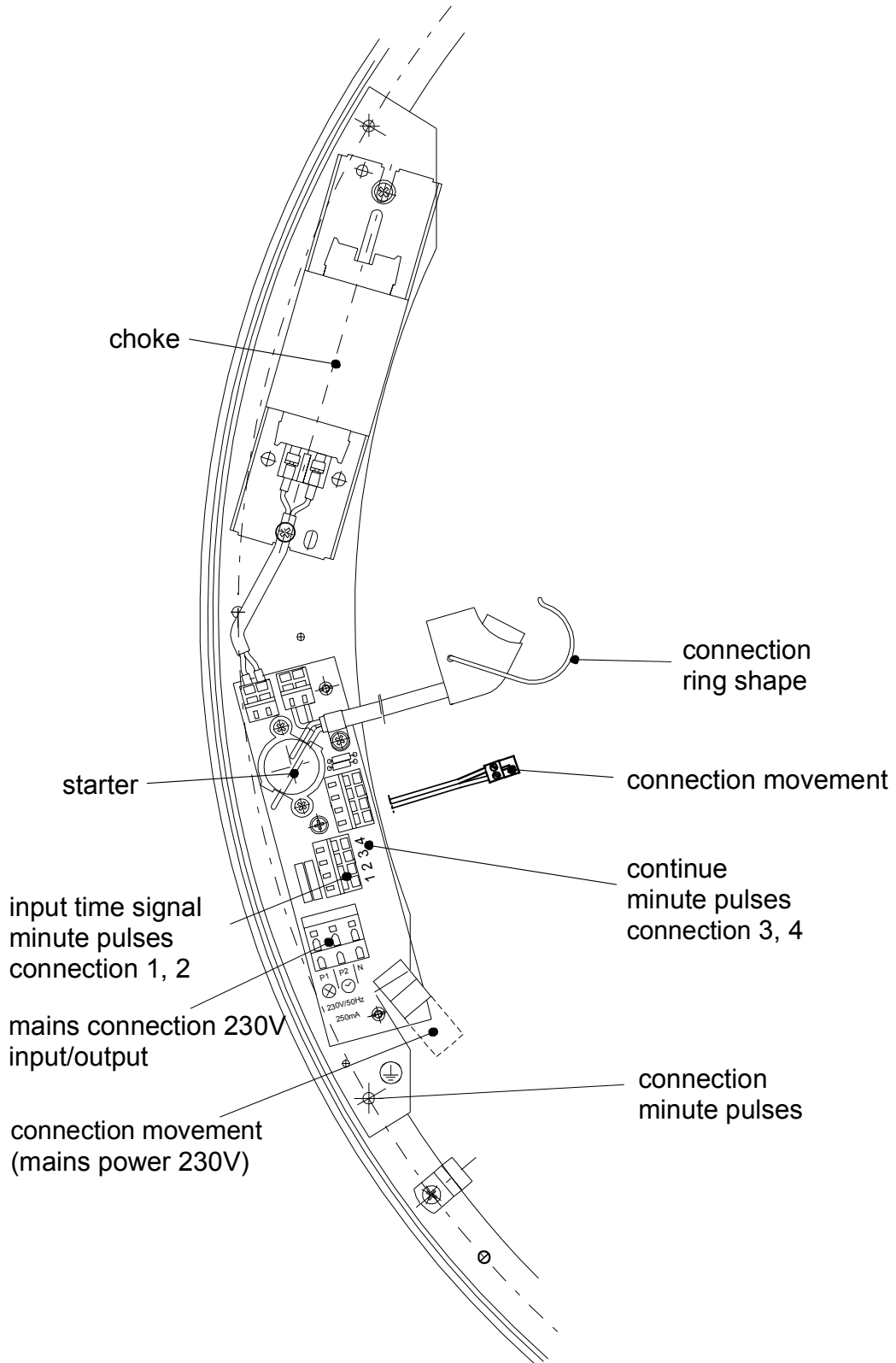
Electrical connections ATBU 190t 230
ITBU 190t S 230

Order-No. MLB.SAT.xx.3xx.xx.E
MLB.SFT.xx.3xx.xx.E



ATBU: IRIG-B, AFNOR,
DCF-FSK - timecode

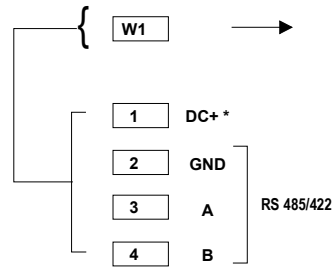
ITBU: minute pulses,
IRIG-B, AFNOR,
DCF-FSK - timecode



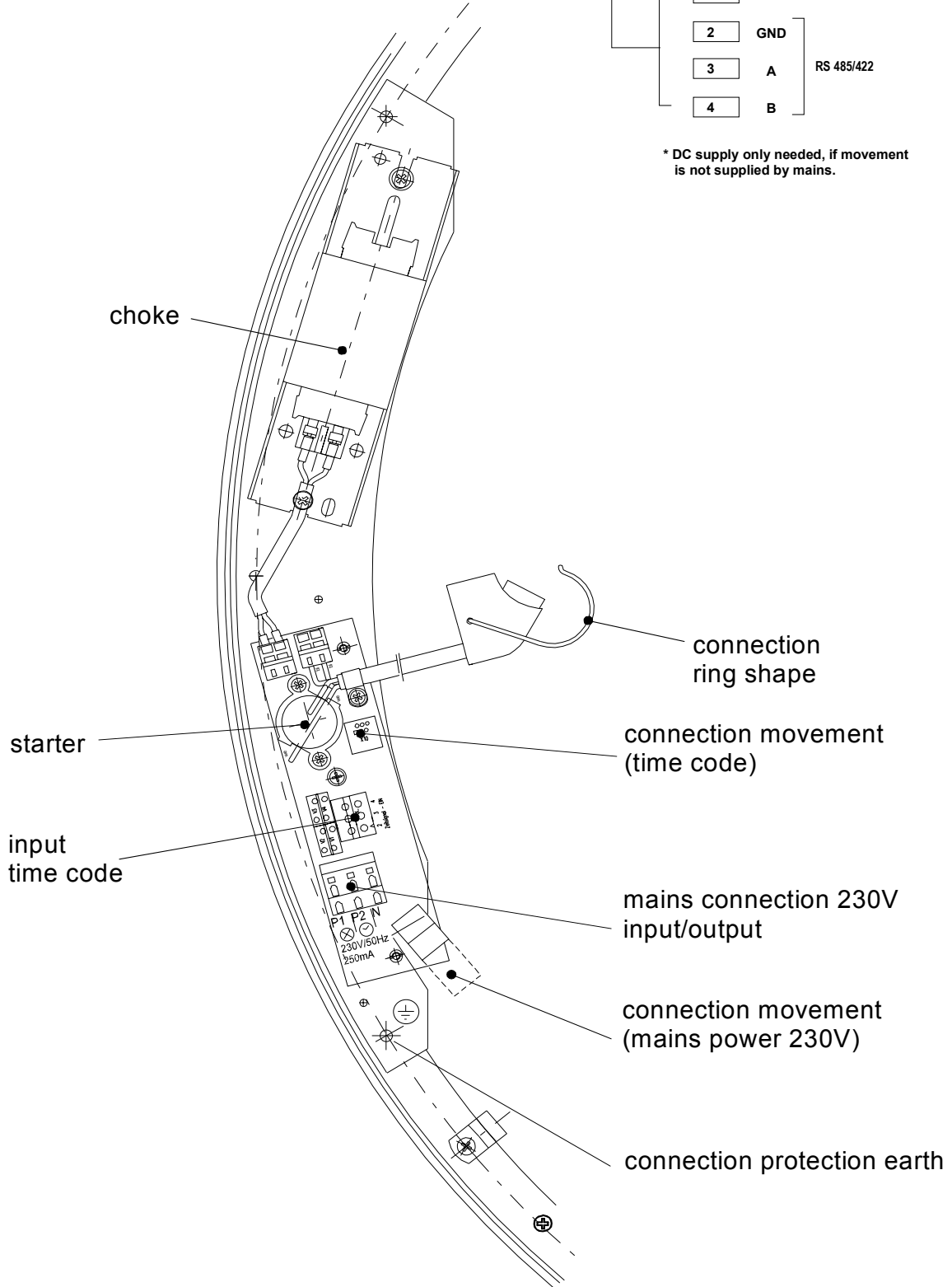
6.8 Slave clocks for serial telegram synchronization (SAS, SFS)

Electrical connections SU 190t 230
 SU 190t S 230

Order-No. MLB.SAM230.xx.3xx.xx.E
 MLB.SFM230.xx.3xx.xx.E



* DC supply only needed, if movement is not supplied by mains.





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