Elektronische Uhren- und Informations-Systeme
Valterweg 10
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Masterclock FHU-500MT

Operation manual to DCF77 radio controlled master clock for slave clock with 24V and for tower clock movement with 230V.

Generals

The master clock FHU500MT is radio controlled, automatic analog clock control system and for up to 80 slave clocks with 24V, that have 30 up to 80cm diameter. It has a potential free relay output for motor movement (tower clock movement). This master clock can be mounted into the outdoor box or replaced from the clock with 2-wired cable up to approx. 1000m.
The high performance, replaceable DCF77 time receiver is including at the delivery.

Instruction for the installation and starting

In order to open the case, please screw the two screws out and pull the upper part of the case from the socket out. This socket can be fixed on the wall directly. The fixing clips are suitable for mounting into the 35mm rails. For the wall mounting, the following materials are necessary.
4 pieces of 6mm screw anchor and 4 pieces of 4mm round head screws for wood

1. Please see the dimensioned drawing from the last page of the manual and install the external DCF time receiver in the horizontal. or
2. Take the position of holes from the master clock directly and make a mark for the cable connection.
3. Drill for 6mm screw anchor, fix the connection socket and DCF time receiver on the wall. Please check the DCF time signal reception at sight.

Electronic connection:

Attention danger of life:
The electronic connection working has to be taken place though electrician and be followed VDE agreements.

1. Connect the 230V/AC mains to the clamp L, N and PE at the connection socket of the master clock.
2. Connect the 3 wires of the time receiver to the clamp DCF (same cable color to the clamp color).
3. The master clock starts immediately after the power supply connection. The installation place of a DCF time receiver has to be optimized. Please control the optic control LED “DCF” at the front panel of the master clock. It has to blink 200ms on, 800ms off. If not, the time receiver has to be turned until the control LED “DCF” constant blinks. The time receiver has to be installed in the horizontal. During the start phase, the time receiver should no be moved. The time synchronization of the master clock takes approx. 4 minutes.

4. Connect the master clock to the slave clocks with 2 wires at the clamp with clock symbol. Set the slide switch to “Stellen (Set mode)” and wait until all connected slave clocks show 12 o’clock. If one of slave clocks shows 2 minutes later, please exchange the pole at the movement and correct the hand position.

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Operation and time setting.

The basic setting is only one time at starting necessary.

Possibility 1:	all slave clocks are set to 12 o clock manually. After the power supply at the master clock, press the button “00 Uhr” as long as the minute pulse is sent out. After approx. 4 minutes, the master clock reads the time signal from time receiver and set the time automatically.
Note:	If a slave clock goes ahead one step during pressing the “00 Uhr” button, the pole at the slave clock must be changed.
Possibility 2:	After the time reception, which means that the slave clock gets the minute pulses from the master clock, there is possibility to set the current time manually by hand.
Note:	If there is one minute time difference at a slave clock, please change the pole at the slave clock.

For the manual time setting of all slave clocks, the master clock has a following operation switches

Switch:	**Stop**	Stop mode – no pulse signal / set the slave clock.
	Automatik	Operation mode – pulse a minute.
	Stellen	Set mode- fast pulse for time correction manually.

The integrated optic control clock can be set also manually with small screw driver.

Please do not use the buttons during the automatic time setting of the slave clocks or after power cancellation.

00^{00} clock button:	All connected slave clocks have to be set at 12 o’clock position. After pressing this button and after the master clock synchronizes time signal over DCF77, the master clock sends pulses to the slave clock from 12 o clock until the current time automatically.
red LED fuse failure:	At the short of the slave clock circuit, this red LED flashes. After the problem solving, please exchange the fuse 0,5A
green LED DCF Signal:	At the ideal time reception, this green LED flashes in second tact (200ms on, 800ms off). If the LED flickers or blinks or irregularly, please turn or replace the DCF time receiver slowly.

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Data save function at power cancellation

For the maintenance free operation of a master clock, there is no accumulator integrated. The slave clocks stay during the power cancellation. The last time information is saved electronically at the master clock. After the power cancellation, the master clock reads the time signal over DCF time receiver and adjusts the slave clocks from the time of power cancellation. It takes approx. 3-5 minutes until the master clock understands the current time. The time setting takes place automatically. Please do not use the function button during the automatic time adjustment, otherwise the clocks shows wrong time.

Hint: DCF- time receiver must be installed at the ideal time reception place.
The ideal time reception is only available, if the green LED “DCF” at the master clock flashes in the second tact. The time receiver has to be installed in the horizontal. During the time reading phase, please do not move or replace the time receiver. After the interference, it takes approx. 4 minutes until the time signal is evaluated. Please be patient for a while.

Manual time setting of the slave clock in the operation mode.

During the normal operation, the manual time corrector can be taken place. Please set the switch to “Stop” mode until the time is set at the slave clock manually or switch to “Set” mode, in order to proceed the slave clock time to the correct time.

Optional special use

For the special application use, it is possible to set without summertime changeover. Please close the bridge “MEZ” with jumper. Please see the following drawing.

Additionally, it is possible to activate a digital clock with 24 hour format. Please close the bridge “24h” with jumper at the electronic board of a master clock. Please see the following drawing.

For the operation of normal slave clock with dial diameter 30 up to 80cm, the master clock is set to the 2 second pulse length. For the operation of tower clock movement (motor driven movement) with dial diameter over 1m, the master clock can be set to 10 second pulse length. Please close the bridge “IMP” with jumper. Please see the following drawing.

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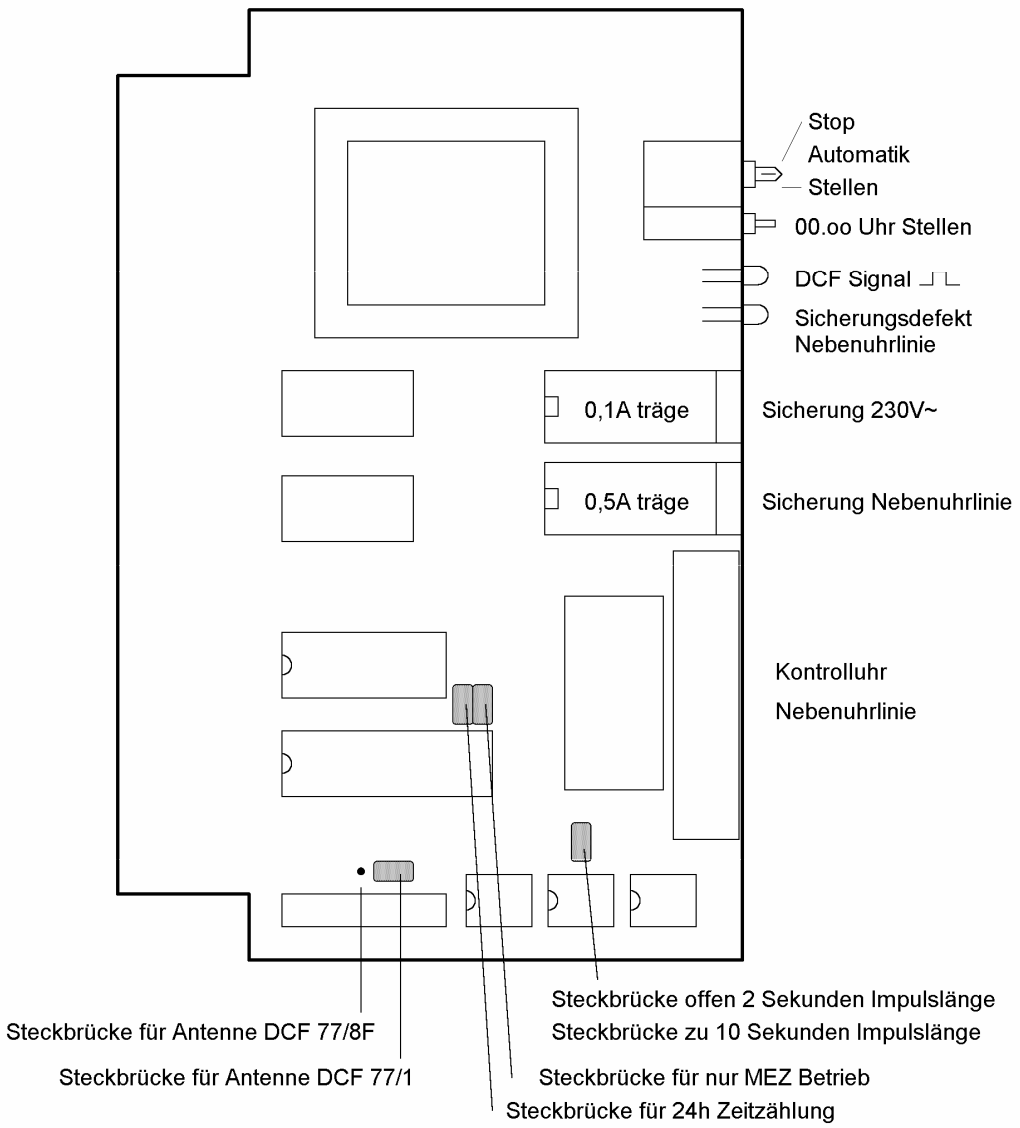
Drawing of electronic board master clock



Stop/Automatik/Stellen = Stop mode / Operation mode/Set mode
00.0 Uhr Stellen = 12 or 00 o'clock setting button
DCF Signal = green LED, in order to control the time reception.
Sicherungsdefekt Nebenuhrlinie = Fuse failure at the slave clock circuit.
Sicherung 230V = Fuse 0,1A for power supply
Sicherung Nebenuhrlinie = Fuse 0,5A for slave clock circuit
Kontrolluhr Nebenuhrlinie = analog control clock /slave clock circuit
Steckbrücke für Antenne DCF77/8F / DCF77/1 = jumper for time receiver 77/8F or 77/1.
Steckbrücke 2 /10 Sekunden Impulslänge = jumper for pulse length (opened 2 second, closed 10 second)
Steckbrück für nur MEZ Betreib = jumper for only MEZ (without summertime) operation
Steckbrück für 24h Zeitzählung = jumper for 24 hour operation.

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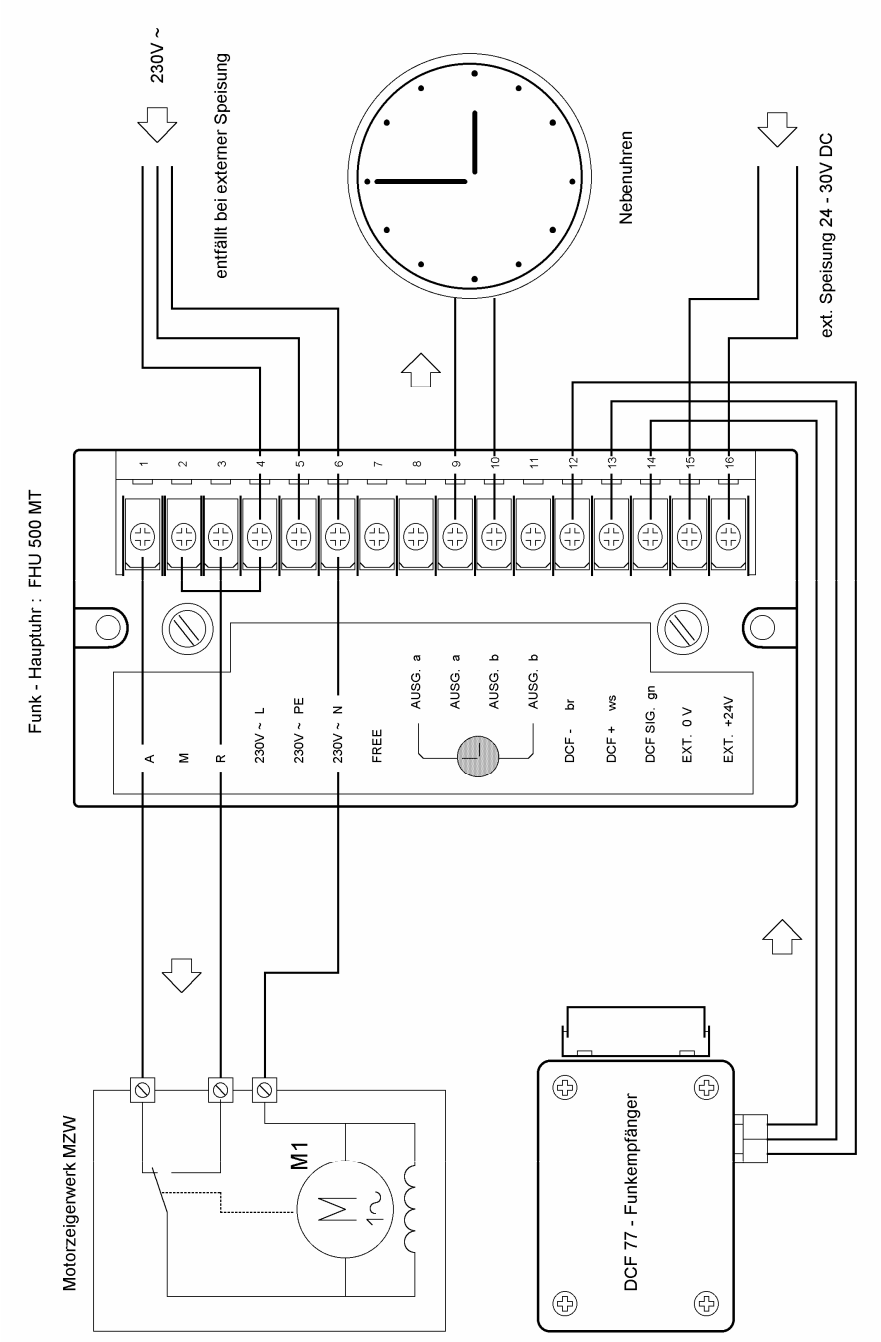
Connection diagram FHU 500 MT with slave clocks, tower clock movement and DCF77 time receiver



Motorzeigerwerk MZW = Tower clock movement
Funk-Hauptuhr: FHU500MT = radio controlled master clock FHU500MT
Entfällt bei externer Speisung = at the external power supply 24V/DC, it is not applicable.
Nebenuhren = slave clocks
DCF77-Funkempfänger = DCF77 radio time receiver
Ext. Speisung 24-30V DC = external power supply 24-30V DC

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Technical Data

Model number	Data
K-FHU 500 MT	DCF77 radio controlled master clock
Operation voltage Power consumption	230V / 50Hz AC ±10% approx. 12 VA
Output voltage Output current	24V – 30VDC 500mA = 80 slave movements each 6mA
Output pulse length FHU500**M** Output pulse length FHU500**MT**	2 seconds for slave movement 10 seconds for tower clock movement
case protection grade dimensions WxHxD	Polystyrol plastic case IP40 75x150x106mm
Operation temperature range	-25℃ … +60℃
Weight	840g
Variation of the time display MET (Middle European time) and MEST (Summertime)	It is possible to drive the master clock only MEZ without summertime and also possible to drive the calendar clock with 24 hour format.

K-ANTDCF77/1	DCF77 time receiver
Operation voltage	8V ... 30V DC
Cable colors	white = +12 V; green = DCF Signal; brawn = 0 V
Power consumption	approx. 2mA without bargraph display
sensibility	better 100µV/m
Amplitude range	≤90dB
Operation temperature range	-25℃ … +75℃
weight DCF77 with fixing arm	440g
Dimensions WxHxD	110x80x67mm

K-ANTDCF77/8F	DCF77 time receiver with interference filter
Operation voltage	3V ... 12V DC
Cable colors	red = +12V; white = DCF Signal; shield= 0V
Power consumption	approx. 1,6mA
sensibility	30 - 50µV/m
Band range of filters	approx. ±30Hz
Operation temperature range	-25℃ … +70℃
weight DCF77 with fixing arm	140g
Dimensions WxHxD	123x60x67mm

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clause, Norms, Guidelines

This appliance refers following norms:
EN 60950 about guideline electronic appliance of the information
EN 55014-2 / VDE 0875 part 14-2
EN 61000-3-2 / VDE 0838 part 2
EN 61000-3-3 / VDE 0838 part 3 about basic protection requirement to EMV

CE This appliance refers to EG-Guideline

73/23/EWG dated 19.02.1973 low voltage guideline
89/336/EWG dated 03.05.1989 EMV- guideline with amendment 92/31/EWG

Stand 6.2003