

NIS K-HU-TELNU30

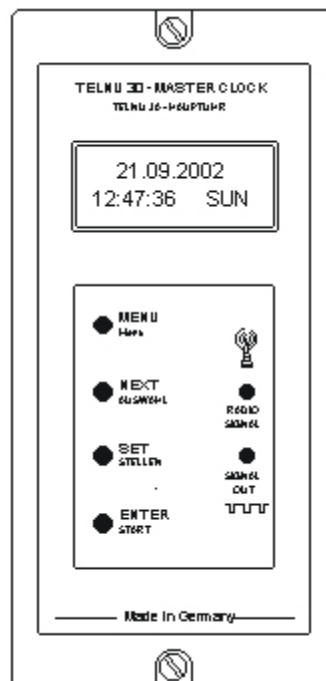
Master Controller

with

DCF Time Code Output

for self-correcting Telnu slave clocks

Operating Manual V1.2



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- 2 Installation Details
- 3 Programming
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1 INTRODUCTION

The Telnu system transmits a reliable DCF time and date code via a serial second impulse message to connected self-correcting Telnu clock movements. The operating reliability is very high due to the use of a complete time and date code transmitted as a slow 1 bit per second data string.

The Telnu slave movements recognise any incomplete or interrupted data and automatically execute corrections.

Expanding a system with additional clocks is very easy and can be done by anyone without the requirement of special knowledge. A new clock is simply connected to the system and hung up. Within a few minutes the clock will automatically display the correct time.

The cost of the wiring is very low requiring only a flexible, twisted 2-core light duty cable for extra low voltage to provide the movements with 24VDC power and the Telnu time code modulation. The cable is terminated directly at the clock movement without the extra cost for wall outlets.

2 INSTALLATION DETAILS A

2.1 Installation

Remove the mounting screws located at the top and bottom of the case and separate the top from the base. Mount the base on the wall or onto a DIN rail in eye height. Connect the base to 240VAC 50Hz or to an external DC power supply. Terminate the Telnu clock line and the optional DCF time code from a GPS receiver.

2.2 Installation Hints

The high quality electronic circuit board is to a large degree protected from external interference. However in situations with very strong magnetic or radio interference the unit may malfunction. To reduce the chances for problems caused by external sources we provide you with following recommendations:

- 2.2.1 Please do not install the Telnu master clock near interference sources like, switchboards, high current, high voltage cables, electro magnetic valves, lighting controls, large electric motors, switch mode power supplies, etc
- 2.2.2 Protect the base with all the terminals from humidity and dripping water
- 2.2.3 Mount the master clock to enable comfortable data entry and service
- 2.2.4 If an optional GPS receiver is being used, install the antenna correctly for maximum reception

2.3 Risk of Abuse

We prohibit any non intended use of the master controller to prevent unforeseen risks. In particular, do not open the unit before the power has been disconnected to prevent personal injury and damage to the master clock.

2.4 Electrical Connection and Fuse Values

The Telnu master controller is supplied factory pre-wired. The only connection that need to be made for the operation of the unit is the 240VAC 50Hz mains connection to the terminals, L = Active, N = Neutral and PE = Earth.

Attention!

Only approved electrical contractors are allowed to make electrical connections!

Fuses must only be replaced with the exact value of the original, otherwise damage will occur.
Mains fuse 20x5mm: 200mA slow blow Time code output fuse 20x5mm: 1A slow blow

2.5 Telnu Output Connection

The Telnu line output has two pairs of output terminals in the base to allow several single cables or cables with different cross sections to be terminated. The terminal pairs Telnu GND and Telnu SIG. are parallel connected. The Telnu clocks are connected via a 2-core cable with one conductor connected to GND and the other to SIG. as per pictogram in the base. Please also refer to the drawing in the back of this manual.

The fuse for the output line is located in the bottom of the top case. The top case has to be removed from the base to be able to get to the fuse holder. First remove the two mounting screws from the top of the case. The fuse value for the Telnu output line is: 1A slow blow 20x5mm

2.6 Satellite Operation via RS422 Serial Port

With the standard RS422 serial port it is possible to connect several Telnu-30 master controllers to form larger networks or create time zone displays in hotels, banks or stock exchanges, etc.

The RS422 data output is available on terminals TxD + and TXD - and is wired into the input terminals RxD + and RxD - of another master clock operating in satellite mode. For the correct data output and input configuration it is necessary to correctly set the appropriate jumpers on the master clock's mother board. Please refer to the jumper setting detail of this manual.

2 INSTALLATION DETAILS B

2.7 External DC Power Supply

It is possible to connect the Telnu-30 master clock to an uninterruptible external DC power supply for the purpose of continuous operation during power failures or increased output capacity.

The external power supply should provide a voltage of 24 ... 30VDC. 'GND or 0V' should be connected to terminal 15 marked on the pictogram in the base as DCF GND. Connect '+V' to terminal 16 marked as EXT. 24V.

2.8 Connection of an optional GPS Receiver (world wide)

For absolute accuracy of 1msec of UTC the Telnu-30 master clock can be connected to a GPS receiver anywhere in the world. The master clock requires an optional DCF synchronisation module E-BGLP-3137. For the correct installation of the GPS receiver please refer to the receiver's manual.

Connect the GPS terminal 'GND' with the master's terminal 15 marked on the pictogram in the base as 'DCF GND' and the GPS terminal 'DCF' with the master's terminal 14 marked 'DCF SIG.'

2.9 Connection of an optional DCF Radio Receiver (Europe only)

For absolute accuracy the master clock can be connected to a DCF long wave receiver, provided the master has been equipped with the optional DCF synchronisation module E-BGLP-3137.

A suitable position for the receiver has to be found, if necessary near a window or outside. The connection is made to the terminals marked with 'DCF xxx' on the pictogram in the base. For optimum reception slowly turn the receiver until the green 'Radio Signal' LED of the Telnu-30 master clock flashes in second rate. The LED must not flicker or be continuously illuminated. After approx. 4 ... 5 minutes the correct official German time and date will be displayed in the window. If that is not the case it could be necessary to find another receiver position in the building. For easy monitoring of the successful DCF synchronisation the master clock displays the letter 'F' in the display on the left hand side of the first line at every 59th second.

DCF Receiver Installation Hints

The DCF77 antenna must not be moved during the initialisation phase, otherwise the reception will not be trouble free.

Always install the receiver housing horizontally.

Should the reception be interrupted during the day and a synchronisation not possible, then it could be sufficient for the receiver to synchronise during the less troublesome night time. A good reception once a day would be sufficient for an accurate time display.

In the following is a list of possible causes for bad reception:

- Position of the receiver too far from the transmitter. The max. transmitter range is approx. 1500 km.
- Unfavourable receiver position, e.g. valley area
- Unfavourable building condition, e.g. shielding by reinforced concrete, facade clad with metal panels, etc
- Antenna not facing the transmitter correctly
- Weather condition, e.g. during lightning the transmitter might be turned off.
- Interference from electro-magnetic sources, like motors, lighting control, electro-magnetic valves, etc.
- Interference from high voltage discharges
- Interference from computers, monitors, TVs, etc.

3 PROGRAMMING A

3.1 Programming - GPS Receiver Operation

The master clock does not need to be programmed except for the selection of the menu language, if it is controlled by a GPS receiver. (Optional input synchronisation module required)

3.2 Programming - Stand Alone Operation (Internal Quartz Time Base)

On delivery the master clock is factory set to European time, date, daylight saving change over and menu in German. During power failures the data is kept in memory by a built-in Lithium battery for up to 10 years. Programming is very easy and self-explanatory. The 'Menu' push button steps through all relevant programming sections. The 'Next' button moves the cursor and the 'Set' button alters the values. The 'Enter' button confirms new values and terminates programming.

3.3 Selection of User Language - Menu Item 'Language'

Push the 'Menu' button for a brief period and then release the button. The language option appears in the display. Select the required language (Deutsch, English or Francais) with the 'set' button. If you do not need to program anything else, push the 'Enter' button to confirm and exit programming, otherwise push the 'Menu' button to continue with the next section.

3.4 Time Setting - Menu Item 'Set Time'

Push the 'Menu' button until the time is displayed in the window with the cursor flashing. With the 'Set' key you can alter the value shadowed by the cursor. With the "Next" button the cursor moves to the next value. A short push on the 'Set' button increases the value by one. Holding the 'Set' button will continuously increase the value. The time is programmed in hours and minutes only. Program the master clock with one minute ahead of time. Call the Telstra Talking Clock on Ph: 1194. When the talking clock announces the same time as displayed, push the 'Enter' button with the third beep. (beep, beep, push: the third beep is the correct time marker). Pushing the 'Enter' button confirms the time entry and terminates programming.

3.5 Date Setting - Menu Item 'Set Date'

Push the 'menu' button until the date is displayed in the window with the cursor flashing. The date format is DD MM YYYY. Alter the value shadowed by the cursor with the 'Set' key and/or move the cursor to the next value by pushing the 'Next' button. A short push on the 'Set' button increases the value by one. Holding the 'Set' button will continuously increase the value. Enter the day, month and the last two digits of the year. The weekday is calculated by the master clock automatically. Continue with programming pushing the 'Menu' button or terminate programming pushing the 'Enter' button.

3.6 +1h Daylight Saving Forward Changeover Programming - Menu Item 'Set +1h'

First program the changeover time using the 'Next' and 'Set' buttons. In Australia change over is at 2:00 am. Push the 'Menu' button to move to the changeover Sunday. Select the Sunday on which the changeover occurs. 1st, 2nd, 3rd, 4th or L Sunday. L = last Sunday. In Australia the changeover Sunday is the L (last) Sunday. Push the 'Menu' button to move to the forward changeover month. All twelve months (1-12) of the year can be programmed. In Australia the forward (+1h) changeover month is the 10th month (October).

3.7 -1h Daylight Saving Backward Changeover Programming - Menu Item 'Set -1h'

Push the 'Menu' button to move to -1h daylight saving changeover programming. First program the changeover time using the 'Next' and 'Set' buttons. In Australia change over is at 2:00 am.

Push the 'Menu' button to move to the changeover Sunday. Select the Sunday on which the changeover occurs. 1st, 2nd, 3rd, 4th or L Sunday. L = last Sunday. In Australia the changeover Sunday is the L (last) Sunday. Push the 'Menu' button to move to the backward changeover month. All twelve months (1-12) of the year can be programmed. In Australia the backward (-1h) changeover month is the 3rd month (March). (New Zealand daylight saving: 1st Sunday in October and 3rd Sunday in March)

4 SPECIFICATIONS

K-HU-Telnu	Telnu-30 Master Clock Quartz Operation
K-FHU-Telnu	Telnu-30 Master Clock GPS Synchronisation
Input Voltage Current Consumption	230VAC 50Hz +/- 10% 27VA
Output Voltage Output Current	24 ... 30VDC max. 1A = 30 Telnu clocks 30mA/clock
Operating Temperature Range	0° - 45° C non condensing
Accuracy without GPS Receiver	+/-2 x 10 ⁻⁶ at 17° - 23° C = 0.2 sec/day
Case Details	Top: Impact resistant Polystyrol, light grey Base: Material PA 66-gf, dark grey
Protection Rating	IP40 for internal installation
Dimensions	(WxHxD) 75 x 150 x 107 mm
Mounting	Surface or DIN rail mounting
Weight	1100g

K-ANTDCF77/8F (Europe only)	DCF77 Long Wave Receiver with Filter
Only with option FHU - DCF77 incl. module E-BGLP-3137 DCF Real Time Clock	
Operating Voltage	3 ... 12VDC
Current Consumption	typical 0.8mA ... max. 2mA
Sensitivity	30 - 50 µV/m
Filter Bandwidth	typical 414Hz
Operating Temperature	-25° - +70° C
Protection Rating	IP65 weatherproof, fully encapsulated
Dimensions	(WxHxD) 123 x 60 x 67 mm
Mounting	Surface or DIN rail mounting
Weight DCF77 Antenna with Bracket	140g

K-GPS/DCF (World wide)	12 Channel Satellite Receiver
Only with option FHU - DCF77 incl. module E-BGLP-3137 DCF Real Time Clock	
Operating Voltage	115/230VAC 50Hz +/- 10%
Current Consumption	approx. 4VA
Protection Rating	IP65 weatherproof
Dimensions	(WxHxD) 230 x 75 x 67 mm
Mounting	Surface mounting
Weight with Antenna	730g

5 Approvals, Standards, Directives

5.1 Standards

The K-HU-Telnu and K-FHU-Telnu complies with following Standards:

EN 60 335-1 and EN 60 335-2-6 in regards to safety of electrical equipment

EN 55014-2 VDE 0875 Part 14-2

EN 55022 1998

EN 61000-3-2 / VDE 0838 Part 2

EN 61000-4-4 / VDE 0847

CE

5.2 Directives

The K-HU-Telnu and K-FHU-Telnu complies with following European Directives:

73/23/EWG from 19.02.1973 (Low Voltage Directive)

89/336/EWG from 03.05.1989 (EMV-Directive incl. Modification Directive 92/31/EWG)

93/69/EWG from 22.07.1993 (Marking Directive)

6 WARRANTY

The seller's warranty period is 12 months from date of commissioning against failure due to faulty materials or workmanship and based on the goods being properly applied and operated under normal conditions. Starting date of the guarantee liability period: invoice date, day of delivery or installation, whatever occurs earlier.

The seller's responsibility for any claim by the buyer is limited to either repair or replacement of the goods, at the option of the seller, during the aforesaid warranty period.

The seller shall not have any liability for:

- The application of the goods;
- Any freight cost to and from the buyer's premises;
- Any travelling cost to and from the installation site;
- Access facility, e.g. ladder, scaffolding, cherry picker, etc.. (It is the owner's responsibility to provide all required facilities to gain access to the installed equipment.)
- Any solder or assembly or installation labour costs;
- incidental or consequential damages of any kind arising out of the sale, installation, or use of its products.
- Faults due to external causes, like vandalism, wrong handling and operation, mains related, like spikes, common/differential mode, earthing problems, interference of any kind, lightning strikes, acid/salty air, or any adverse or changed environmental conditions.

7 FAULT FINDING

7.1 Damage

In case of damage to the case or the mains cable disconnect the mains plug from the power outlet. Please connect a new mains cable respectively return the master controller to the manufacturer or the local representative/importer.

7.2 Cracked Display

If the display shows cracks please note that the LCD display panel could possibly release an acidic fluid. Avoid contact with skin and eyes. Return the unit to the manufacturer or local representative/importer for repairs.

7.3 Back-up Battery

On the master controller's motherboard is a Lithium battery for time keeping back-up purpose. The life expectancy of the battery is approx. 10 years. This Battery must only be replaced by an authorised service technician. Incorrect handling can otherwise damage the master clock. At the end of the master's life cycle it is essential that the master clock is being properly disposed of and special care is taken in regards to the Lithium battery.

7.4 No Display

Is the master correctly connected to mains? Has the power point be switched on? Is power available at the power point? Has the mains lead been correctly terminated at the base of the master clock? Is the mains fuse on the motherboard O.K.? Fuse value: 250VAC 200mA slow blow, size: 20x5mm glass fuse.

Attention!

Only approved electrical contractors or technicians are allowed to deal with electrical connections!

7.5 Telnu Slave Clocks do not display the right time

Check the cables for any open circuits. Check the polarity of the cables. 'GND' and 'SIG.' connections must not be reversed. Please also refer to the connection diagram at the end of this manual.

Is the LED 'SIGNAL OUT' flashing? If yes, then the output fuse is O.K., if no the output fuse is faulty. Remove the top case from the base. Check the fuse at the bottom of the clock case. Replace with a 20x5mm glass fuse 1A slow blow.

Has the software turned off the output signal? The bottom green LED 'SIGNAL OUT' is illuminated, but doesn't flash. Turn on the output under menu 'Line Condition On/Off' on.

Could there be radio reception problems? Please check all connections to the radio/GPS receiver.

7.6 Can not find fault

If you can not fix a fault, proceed as follows: Unplug the mains cable or turn the power to the unit off. Wait a minimum of two minutes, then reconnect the master clock to the mains supply.

Attention!

Only approved electrical contractors or technicians are allowed to deal with electrical connections!

7.7 Final Consideration

With our experience we can say that most faults are not related to product failure, but based on external problems, like wrong cabling or connections. Wrong operation of the master might also leave the impression of a defect unit. Before you send the unit in for repairs, please get in contact with your local representative for the initial assessment of the situation.

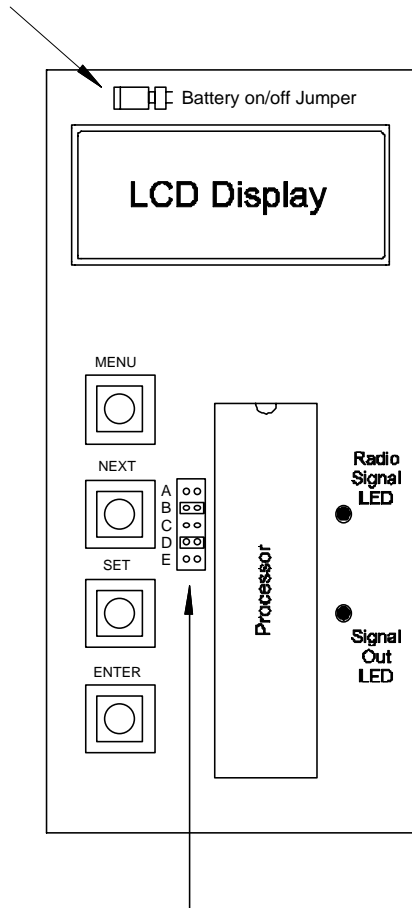
8 DRAWINGS

- 1 Operating Parameters
- 2 DCF/GPS Module
- 3 Connection Diagram

OPERATING PARAMETER PROGRAMMING

NIS K-HU-Telnu-30

'Battery' Jumper: Closed = Battery on (normal setting: time & date back-up)
Open = Battery off (loss of time & date if power fails)



Jumper A Spare

Jumper B Open = weekday displayed

Jumper B Closed = calibration value displayed instead of weekday

Jumper C Spare

Jumper D Open = satellite mode: second synchronisation only

Jumper D Closed = satellite mode: full synchronisation

Jumper E Open = DCF/GPS synchronisation

Jumper E Closed = RS422 synchronisation

With DCF/GPS synchronisation

Jumper D = closed

Jumper E = open

DCF/GPS SYNCHRONISATION MODULE

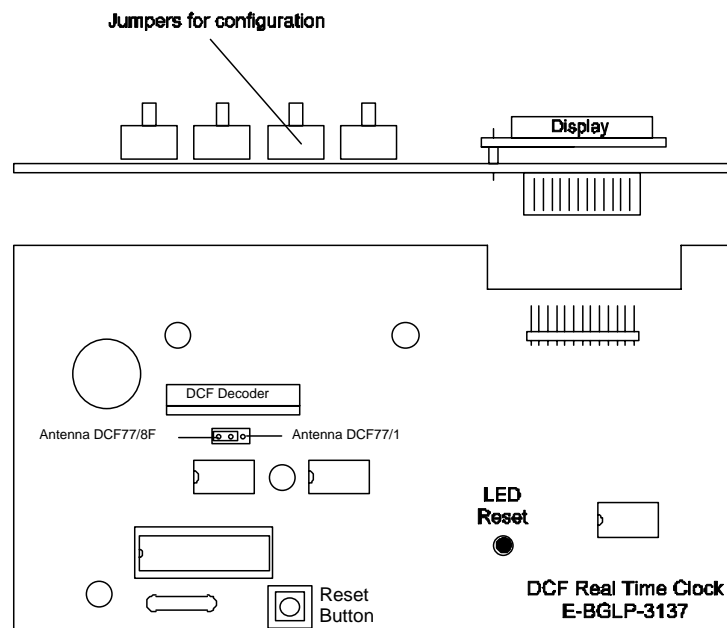
NIS K-HU-Telnu-30

Installation of the optional DCF Input Module - DCF/GPS Synchronisation

For the optional external DCF/GPS synchronisation the real time clock module E-BGLP-3137 and a DCF/GPS receiver are required.

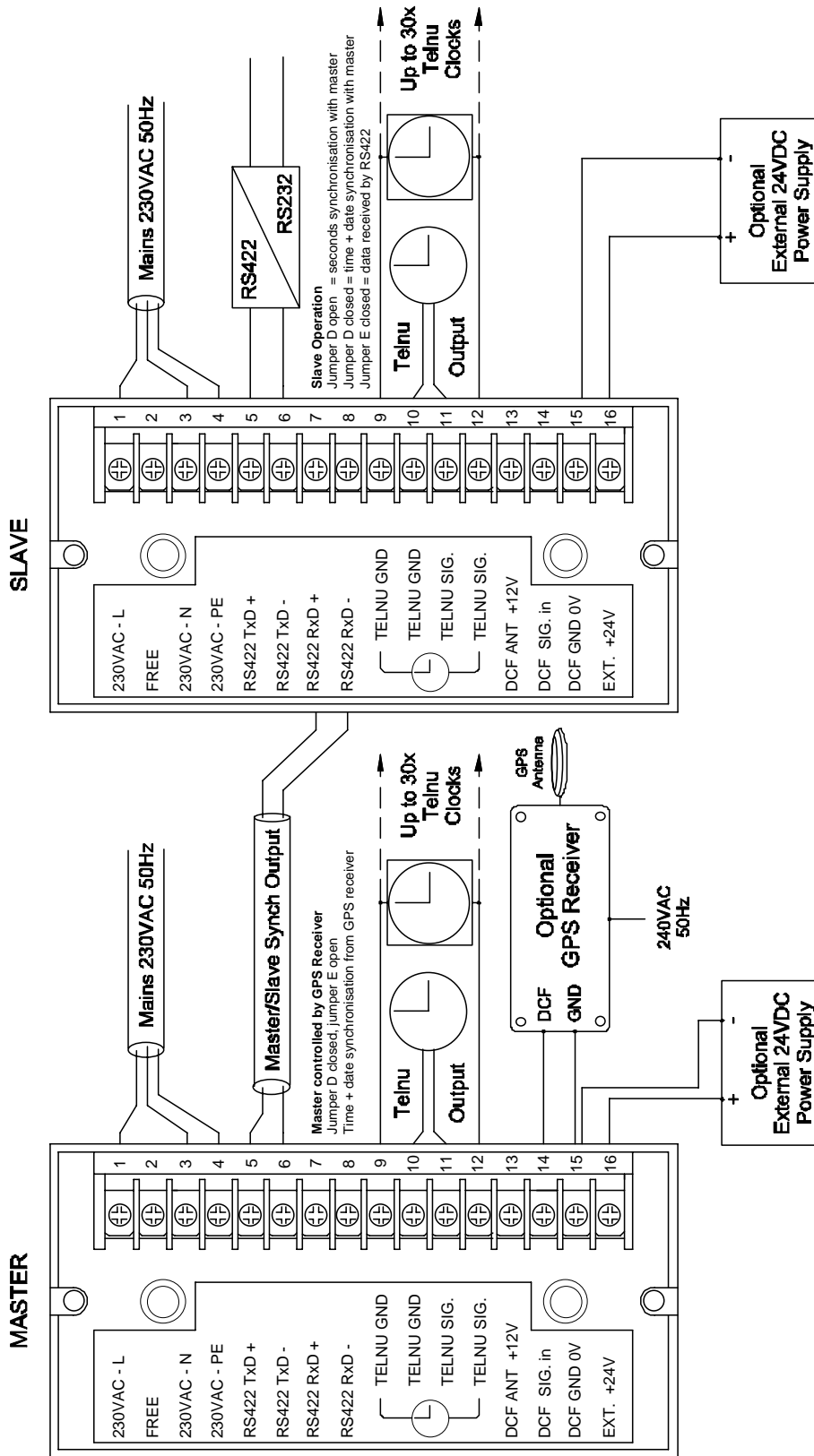
For after market modification proceed as follows:

1. Undo the two mounting screws and remove the master clock housing from the base.
2. Remove the circuit board and set jumper D to 'closed' and 'E' to open (RS422 is turned off)
3. Insert the DCF synchronisation module E-BGLP-3137 with the male connector correctly lined up with the female socket of the Telnu-30 master clock's main board. Please ensure correct positioning!
4. Return the entire assembly into the master clock's housing using provided guides.
5. Close the base of the housing with the cover panel ensuring accessibility of the output line fuse holder.
6. Connect the DCF time code of the GPS receiver.
7. Mount the housing on to the base and secure it with the two mounting screws.
8. Start the telnu-30 master clock.



CONNECTION DIAGRAM

NIS K-HU-Telnu-30



K-HU-Telnu

Intelligent Telnu Master Clock
for self-correcting Telnu slave clocks

Made in Germany

K-HU-Telnu

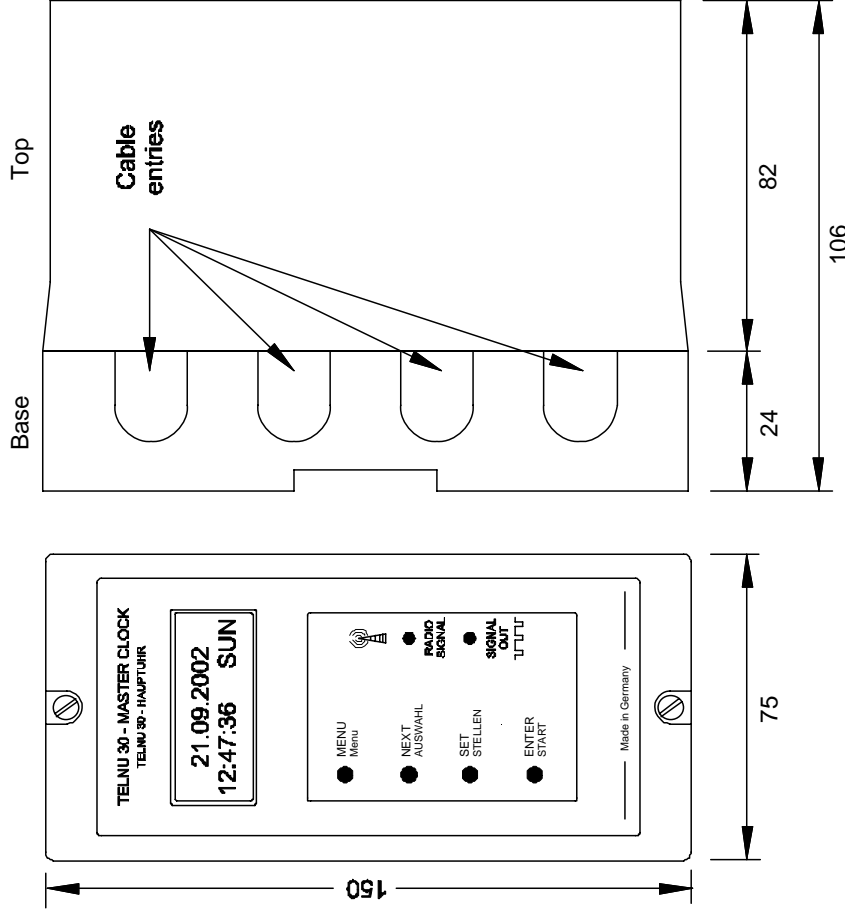
- 10x years battery back-up
- Automatic daylight saving change-over
- up to 30x self-correcting Telnu slave clocks
- Output voltage: 24-30VDC
- Output current: 1A = 30 Telnu clocks of 30mA each
- Operating temperature: 0 - 45 degrees Celsius
- Accuracy without GPS receiver: 0.2sec/day at 17-32 deg C (calibration: 1 - 255 in 0.1 sec steps)
- Enclosure: Impact resistant Polystyrol, light grey
- Mounting base: dark grey, material PA 66-gf
- Protection grade: IP40 for internal installation
- Mounting type: surface or DIN Rail mounting
- Master of satellite operation
- Power Supply: 230/240VAC 50Hz 27VA
- Dimensions: K-HU-Telnu HxWxD 150x75x106mm
- Weight: approx. 1100 g

OPTION FHU - GPS (Module E-BGLP 3137 required)

- K-GPS-DCF 12 channel GPS Satellite Receiver
- Power supply: 240VAC 50Hz +/- 10%
- Power consumption: approx. 4VA
- Operating temperature range: -25 to + 65 degrees C

ORDER CODES

- K-HU-Telnu = Telnu Master Clock, max. 30 clocks
- K-FHU-Telnu = Telnu Master Clock, max. 30 clocks with external GPS/DCF synchronisation
- K-GPS/DCF = 12 Channel GPS satellite receiver
- K-N230/DC24 = External Power Supply 230VAC/24VDC 1.5A, max 45 clocks
- K-TELNU-BOOST-W = Telnu Booster with 2x outputs 2.5A, max. 80x Clocks



This Unit complies with following Standards:
 EN 60 335-1 and EN 60 335-2-6
 EN 55014-2 VDE 0875 Part 14-2
 EN 55022 1998
 EN 61000-3-2 / VDE 0838 Part 2
 EN 61000-4-4 / VDE 0847

This Unit complies with following EU-Directives:
 73/23/EWG from 19-02-1973
 89/336/EWG from 03-05-1989
 93/69/EWG from 22-07-1993

Telnu... The fully hands-free self-correcting clock system!