

## A. GENERAL

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### 1. Introduction

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The **TEMPUS III** device is a master clock for controlling electromechanical slave clocks with the following properties:

- 24V polarized impulses. This output can supply 0.25A and is secured against shortcircuits (**slave clock**).
- 3-wire system via mechanical relay (**tower clock**).

Besides this simple version there is also an extensive version of the **TEMPUS III** device. We call this version the ‘**TEMPUS E**’ device. This extensive version is equipped with two **fixed** FET-outputs, to which the hammer coil can be connected directly. This enables the **TEMPUS III E** device to give impulses to 2 different strikers. The **TEMPUS III E** device takes care of the hour-, half-hour- and quarter of the hour strokes, the angelus and/or simulated pealing.

The functions with \* are only present in the ‘**TEMPUS III E**’ device.

All properties of the **TEMPUS III** device also apply to the **TEMPUS III E** device, unless explicitly mentioned otherwise.

The **TEMPUS III** device has 3 states:

- Information concerning the time and date appears on the **main display**.
- In the **user menu**, the end user can execute various actions, such as switching programs on/off and starting executions (tolling, simulated pealing, ...) . The user menu can be secured with a user code set by the installer.
- The third menu, the **function menu**, allows the installer to define the whole installation. For example which hour stroke impulses will be placed on the solid state relays for that purpose. The function menu can be secured with a function code.



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## 5. Radio synchronisation (DCF / GPS)

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On the OLED screen, the radio synchronisation status is indicated by the aerial symbol (far right on the first line).



When using an aerial, the following method is used to check whether synchronisation has occurred. Switch the power of the device on and off. The TEMPUS III device will now try to synchronize. If the TEMPUS III device does not receive any signal, the aerial symbol on the device will blink together with the led on the aerial. If the TEMPUS device does receive time code signals, the aerial symbol on the device will blink inverse to the led on the aerial. The aerial symbol on the device is not on when the led on the aerial is and vice versa. The synchronisation always takes place on second zero. If there is synchronisation, the aerial symbol on the device will be **continuously** visible. The synchronisation takes place between 03 and 05h at night, during normal operation (without power interruptions). When the aerial symbol is visible during the day, we know that there was synchronisation the night before. If the aerial symbol is not visible, there was no synchronisation. Attention: the aerial should be installed at about 80 to 150 cm from the device. It is also very important to position it correctly, i.e. horizontal and at a 90° angle in relation to the transmitting aerial in Frankfurt (Germany).

# **B. SOFTWARE**

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## **1. Main menu**

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When the TEMPUS III device is powered, the main menu will be reached automatically after a while. This menu offers the user information concerning the time and date.

09:39:02 14/04/20 †

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## **2. User menu**

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The user menu contains various possibilities, allowing the client to:

- Change time and date main display (only useful if no aerial is being used)
- Set time tower clock and slave clock
- Switching programs on/off (hour stroke, angelus and automatic pealing) \*
- Manual tolling and starting simulated pealing \*

\* **only with 'TEMPUS III E' device**

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## **3. Function menu**

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- In the function menu, the installer can program the executions of the TEMPUS III device. It is possible to choose e.g. the type of hour stroke and/or angelus, program simulated pealing, etc.

From the main display, the function menu is reached through successively pressing the arrows '↓', '↑', '⇒' and '⇐'.

The following page shows an overview of the various functions to be found in the function menu:

- |                            |    |   |
|----------------------------|----|---|
| 1) SET-UP                  | => | CONTRAST DISPLAY<br>USER CODE<br>FUNCTION CODE<br>INTERNAL MEMORY<br>SERVICE CODE<br>SERVICE DATE   |
| 2) INTERNAL CLOCK          | => | CHANGE TIME<br>CHANGE DATE<br>TIME FORMAT<br>RUNNING SPEED<br>SHIFT RADIO<br>TYPE RADIO SYNCHRO<br>DAYLIGHT SAVING  |
| 3) TOWER CLOCK             | => | TIME TOWER CLOCK<br>TYPE TOWER CLOCK<br>PULSE DUR. TOWER CLOCK  |
| 4) SLAVE CLOCK             | => | TIME SLAVE CLOCK<br>TYPE SLAVE CLOCK<br>PULSE DUR. SLAVE CLOCK  |
| 5) <i>HOUR STROKE</i>      | => | <i>1/1 HOUR STROKE *</i><br><i>QUARTER STROKE *</i><br><i>NIGHT SWITCH-OFF *</i><br><i>TEMPO HOUR STROKE *</i><br><i>TIME HR.STR. – REP *</i><br><i>TIME BIM-BAM *</i><br><i>TIME BIMBAM – BIMBAM *</i><br><i>TIME BIMBAM – HOUR STR. *</i> |
| 6) <i>ANGELUS</i>          | => | <i>TYPE ANGELUS *</i><br><i>HOURS ANGELUS *</i><br><i>TIME HOUR STR – ANGELUS *</i><br><i>TIME 1-1-1 *</i><br><i>TIME 3-3-3 *</i><br><i>TIME 3-3-3-TOLLING *</i><br><i>TIME TOLLING *</i>   |
| 7) <i>PARAMETERS BELLS</i> | => | <i>TEMPO SWINGING BELL 1 *</i><br><i>TEMPO SWINGING BELL 2 *</i><br><i>DURATION SWINGING *</i><br><i>PULSE DUR. STRIKER *</i>   |
| 8) <i>RINGING PROGRAMS</i> | => | <i>RINGING PROGRAM 1 *</i><br><i>RINGING PROGRAM 2 *</i><br><i>RINGING PROGRAM 3 *</i><br><i>RINGING PROGRAM 4 *</i><br><i>RINGING PROGRAM 5 *</i>  |

**\* only with 'TEMPUS III E' device**

The desired function can be selected with the '↑', '↓', '←' and '⇒' keys. Using the '⇒' key, you can enter the function. The value of a parameter can be altered through the '↑' and the '↓' keys.

## C. FUNCTIONS

\* **SET-UP** (TEMPUS III and TEMPUS III E)  
– to change the general settings of the device

### CONTRAST DISPLAY

This function enables the contrast of the display to be set. The higher the value, the darker the characters will appear on the display.

Min: 0 Max: 10

### USER CODE

The user menu can be secured by means of this user code. When you press ‘↓’ or ‘↑’ to enter the user menu, you will be asked to enter the user code. However, if the user code is set as ‘0000’, the device will not ask for a code and immediately show the user menu.

Min: 0000 Max: 9999

### FUNCTION CODE

The function or installer menu can be secured by means of this function code. When you press ‘↓’ or ‘↑’ to enter the function menu, you will be asked to enter the function code. However, if the function code is set as ‘0000’, the device will not ask for a code and immediately show the function menu.

Min: 0000 Max: 9999

### INTERNAL MEMORY

This function can be used to execute memory actions – choose the desired action and press ‘⇒’:

- clear functions: all functions are set to their original (standard) value
- load software: only for the manufacturer

### SERVICE CODE

The TEMPUS III master clock has a service code and service date feature. This feature can be used if you wish to automatically block the master clock, starting on a specific date in the future (for example if you fear non-payments). In order to avoid that a service code is introduced by accident, the service code has to be introduced twice. If the service codes are not identical or if they contain 1 or more zeros (0's), the service code and service date will not be applied.

Min: 1111 Max : 9999

### SERVICE DATE

The TEMPUS III master clock can be blocked, starting on the service date that was entered. If a valid service code has been entered (see above), the TEMPUS III will block all outputs (tower clock and strikers) as from the service date entered.

When the service date has been reached, the end user has to enter the correct service code in order to unblock the outputs. If the end user knows the service code before the service date has been reached, he can avoid the outputs being blocked by switching the TEMPUS III off and on. In this case, the end user will be asked to enter the service code immediately after the TEMPUS III has started again.

If the client does not know the service code and the service date has not been reached, the TEMPUS III master clock will go automatically go to the main screen after a 10-second delay and execute functions and outputs correctly.

## **\* INTERNAL CLOCK** (*TEMPUS III and TEMPUS III E*)

- **changes the settings of the internal clock, which appear on the main display**

The use of an aerial (DCF, GPS) overrules the set of time, date, RUNNING SPEED and summer time. The use of an aerial is always recommended.

### CHANGE TIME

Here you can set the time of the internal clock.

### CHANGE DATE

Here, you can set the date of the internal clock. (day month year)

### TIME FORMAT

This function determines the format in which the internal time is mentioned on the main display.

|           |          |             |
|-----------|----------|-------------|
| EUROPEAN: | 17:55:49 | 17/03/21    |
| AMERICAN: | 05:55:49 | PM 03/17/21 |

### RUNNING SPEED

When you do not use an aerial, you can set the RUNNING SPEED (time calibration) here. By setting the calibration number, you can slow down or speed up the internal time basis of the TEMPUS III device (increasing or reducing the value with 1 unit equals – or + 2,5 sec per month).

The correct value is calculated by the manufacturer during testing and is automatically written in this function. The tests' average calibration number is 50. The calculated calibration number is also always written on the printed circuit board.

Min: 00 Max: 127

### SHIFT RADIO

When you are using a DCF aerial in a different time zone than the one provided, you can correct this manually with this function.

#### **Example 1: use of a DCF aerial in the UK**

UK : time zone +0 (London)

DCF: time zone +1 (Brussels, Paris, ...)

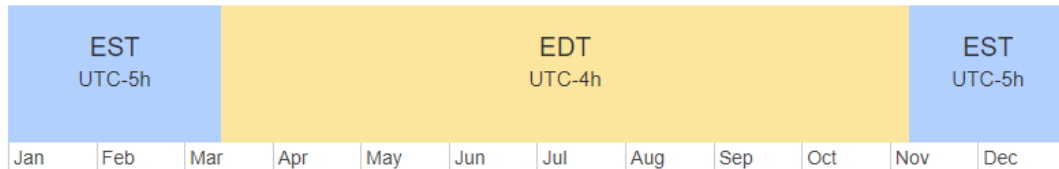
When using a DCF aerial in the UK, you have to set -1.00 hour in this function. The device will then subtract 1 hour of the received time by itself.



## **Example 2: use of an internal gps aerial in New York (USA)**

The internal gps aerial always receives GMT (Greenwich Mean Time). If you use the TEMPUS III master clock in New York, you have to set SHIFT RADIO to -5.00 hour as well as set the parameter “DAYLIGHT SAVING” to AMERICAN.

“-5.00 hour” is the standard time zone (during winter)



## **TYPE RADIO SYNCHRO**

The ‘Type Radiosynhro’ parameter can be set to 2 different values:

### **A. SYNCHRO HOUR+DATE**

When the parameter is set to “SYNCHRO HOUR+DATE”, the TEMPUS III master clock will use all the data coming from the DCF or external GPS. In this case, you will have to set the “SHIFT RADIO” parameter, the “DAYLIGHT SAVING” parameter and the dipoles of the external GPS correctly.

### **B. SYNCHRO MINUTE+SEC.**

When the parameter is set to “SYNCHRO MINUTE + SEC.” the TEMPUS III master clock will only use the minute and second information coming from the DCF or GPS.

In order to use this mode, you have to enter the correct date. You also have to enter the time (hours, minutes + seconds), which cannot deviate more than 30 minutes from the actual time. The DCF or GPS will only synchronise the minutes and seconds, it will not change the date or hour.

When using a GPS, it is recommended to use this mode for the following reasons:

- **Rollover:** every GPS module functions within a 20-year time frame that starts on a specific date (e.g. 01/01/2000). When the GPS has completed these 20 years, it will start counting again as from the original start date. You can opt to only use the minute and second information in order to avoid the master clock going back in time by 20 years.
- **GPS interferences:** If the GPS is used in very densely populated areas (offices, PC rooms etc.), it is possible that the wrong date is being read. You can avoid this situation by only using the minutes and seconds.

### DAYLIGHT SAVING

Here, you can set the automatic summer-winter time changeover. Attention: as mentioned before, a DCF (GPS) aerial overrules the values set here. However, it is still recommended to set this function correctly.

- No daylight saving
- European: From end of March to end of October
- American: From mid March to beginning of November
- Australian: From beginning of October to beginning of April
- New- Zealand: From end of September to beginning of April

**TOWER CLOCK** (TEMPUS III and TEMPUS III E), uses outputs A and B (bottom of the device)

– to set the tower clock

#### TIME TOWER CLOCK

When you enter this function, the slave clock will stop. You can then see which time is indicated by the slave clock and enter this time in the function. When leaving the function, the tower clock will equal itself with the internal time.

#### TYPE TOWER CLOCK

2 parameters are set here concerning the type of tower clock

- Type of clock: 12-hour or 24-hour
- Type:
  - MINUTE of ½ MIN. = moment, when the TEMPUS III device sends the impulse to the tower clock, i.e. every minute or every 30 seconds
  - SYNCHRO: for synchronous tower clocks (USA), uses output A
  - SYNC 10: for synchronous tower clocks with 10x correction speed, uses output A for the normal speed and output B for the 10x speed

#### PULSE DUR. TOWER CLOCK

Here you set the impulse duration for the tower clock. This is the number of seconds the pulse for the tower clock lasts.

**SLAVE CLOCK** (TEMPUS III and TEMPUS III E), uses outputs a and b (top of the device)

– to set the slave clocks

#### TIME SLAVE CLOCK

SEE TOWER CLOCK

#### TYPE SLAVE CLOCK

SEE TOWER CLOCK

#### PULSE DUR. SLAVE CLOCK

SEE TOWER CLOCK

**! The following functions can only be found in the TEMPUS III E device!**

**HOUR STROKE** (only TEMPUS III E)

- to set the hour stroke (type, program, night switch-off, ...)

The first 3 functions contain information on the time and the type of execution (program), the last 5 functions contain information on the timing of the executions.

**1/1 HOUR STROKE \***

Here you set the 1/1 hour stroke (on the hour!) – the tempo and the timing of the hour stroke are set in the following functions.

- No 1/1 hour str.: no 1/1 hour stroke is desired
- 1/1 hr.str.bell1: the hour stroke is given on bell 1
- 1/1 hr.str.+rep.1: the hour stroke and hour stroke repetition are both given on bell 1
- 1/1 hr.str.bell2: the hour stroke is given on bell 2
- 1/1 hr.str.+rep.2: the hour stroke and hour stroke repetition are both given on bell 2

**QUARTER STROKE \***

Here you set the quarter strokes (half-hour stroke, stroke on quarter of the hour) – the tempo and timing of the quarter strokes is set in the following functions.

- no quarter str.: no half-hour strokes nor strokes on quarter of the hour are desired
- bim-bam: on the quarters, the bim-bam is played 1, 2, 3 or 4 times
- 1/2/3/4str.bell2: on the quarters, 1,2, 3 or 4 strokes are given on bell 2
- 1/2/3/4str.bell1: on the quarters, 1,2, 3 or 4 strokes are given on bell 1
- 1str.½hr.bell2: on the half hour, a single stroke is given on bell 2
- 1str.½hr.bell1: on the half hour, a single stroke is given on bell 1

The quarter stroke of the hour takes place before the hour stroke – first there is 4 x a stroke (or a bim-bam), followed by the hour stroke.

**NIGHT SWITCH-OFF \***

Here you can set the night switch-off of the TEMPUS device. The night switch-off applies both to the hour stroke, the hour stroke repetitions and the quarter strokes.

If, for example, you want to program the hour stroke and the quarter strokes between 8 o'clock in the morning and 10 o'clock in the evening, you choose **22 08**. If you do not want to program a night switch-off, you can set 24 00.

**TEMPO HOUR STROKE \*(A)**

Here, the tempo (interval) of the hour stroke is set (in 1/10 seconds).

Min: 1 1/10 second (=0.1 sec)      Max = 99 1/10 second (=9.9 sec)

TIME HR.STR. – REP. \* (B)

Here, the interval between the end of the hour stroke and the beginning of the hour stroke repetitions is set (in 1/10 minutes) – Example: 20 1/10 minutes = 2 minutes.

Min: 1 1/10 minutes (=6 sec) Max = 99 1/10 minutes (=9 min 54 sec)

TIME BIM-BAM \* (C)

Here, the interval between bim (stroke bell 2) and bam (stroke bell 1) is set (in 1/10 seconds).

Min: 1 1/10 second (=0.1 sec) Max = 99 1/10 second (=9.9 sec)

TIME BIMBAM – BIMBAM \* (D)

Here, the interval between the several quarter strokes (bim-bam or several strokes) is set – Example: the interval between the 4 strokes (or 4 x bim-bam) just before the hour (in 1/10 sec).

Min: 1 1/10 second (=0.1 sec) Max = 99 1/10 second (=9.9 sec)

TIME. BIMBAM – HOUR STR. \* (E)

Here, the interval between the quarter strokes (bim-bam or strokes on bell 1 or 2) and the hour stroke are set (in seconds).

Min: 1 second Max = 99 seconds

**EXAMPLE:**

1/1 HOUR STRIKE = 1/1 HR.STR+REP.1

QUARTER STROKE = BIM-BAM (= stroke bell 2 + stroke bell 1 on the 4 quarters)

NIGHT SWITCH-OFF = 22 08

TEMPO HOUR STROKE \* (A) = 24 1/10 second

TEMPO HR.STR. – REP. \* (B) = 20 1/10 minutes

TIME BIM-BAM \* (C) = 15 1/10 second

TIME BIMBAM – BIMBAM \* (D) = 21 1/10 second

TIME BIMBAM – HOUR STR. \* (E) = 5 seconds

## ANGELUS (TEMPUS III E only)

– to set the angelus (type, program, night switch-off, ...)

The first 2 functions contain information on the time and the type of execution (program), the last 5 functions contain information on the timing of the executions.

### TYPE ANGELUS \*

Here, you set the type of angelus –the timing of the parameters is set in the following functions– you have the following possibilities:

- 9 strokes bell 1
- 11strokes bell 1
- 33strokes bell 1
- 3\*3 + 9str.bell 1
- 3\*3 +11str.bell 1
- 3\*3 +33str.bell 1
- 9strokes bell 2
- 11strokes bell 2
- 33strokes bell 2
- 3\*3 + 9str.bell 2
- 3\*3 +11str.bell 2
- 3\*3 +33str.bell 2

The option ‘no angelus’ is obtained by setting the function ‘hours angelus’ at 00 00 00.

### HOURS ANGELUS \*

You can set a maximum of 3 times, at which you want to program the Angelus. If an hour stroke is programmed as well, the Angelus will always succeed the hour stroke (and eventual hour stroke repetitions) execution.

Example: Angelus at 7 h, 12 h and 19 h

HOURS ANGELUS = 07 12 19

Example: Angelus at 12 h and 19 h

HOURS ANGELUS = 12 12 19

Example: Only Angelus at 12 h

HOURS ANGELUS = 12 12 12

Example: No Angelus

HOURS ANGELUS = 00 00 00

TIME HOUR STR – ANGELUS \*

Here, the interval between the end of the hour stroke (+ repetition) and the beginning of the Angelus is set (in seconds).

Min: 1 second    Max = 99 seconds

TIME 1-1-1 \*

Here, the tempo (interval) of the Angelus strokes is set (in 1/10 seconds) = time between the individual strokes of each trio (time between x and x).

x x x x x x x x x peals (9, 11 or 33 strokes)

Min: 1 1/10 second (=0.1 sec)    Max = 99 1/10 second (=9.9 sec)

TIME 3-3-3 \*

Here, the interval between the 3 striking trios is set (in seconds) = time between the individual trios (time between xxx and xxx).

x x x x x x x x x peals (9, 11 or 33 strokes)

Min: 1 second    Max = 99 seconds

TIME 3-3-3-TOLLING \*

Here, the interval between the last angelus stroke and the first stroke of the tolling is set (In seconds) = time between last xxx and beginning of the tolling.

x x x x x x x x x tolling (9, 11 or 33 strokes)

Min: 1 second    Max = 99 seconds

TIME TOLLING

Here the interval between the strokes is set (in seconds)

x x x x x x x x x tolling (9, 11 or 33 strokes)

Min: 1 1/10 seconds (= 0.1 sec)    Max = 99 1/10 seconds (= 9.9 sec)

