Operating instructions TASU/... digi 322 J
(for channel 2 – 4) digi 322 JF

WA-EKF 3172/05.96/S:MMS/D:Bau/80.10.0757.7

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2. Connection

Operating instructions for the time switch

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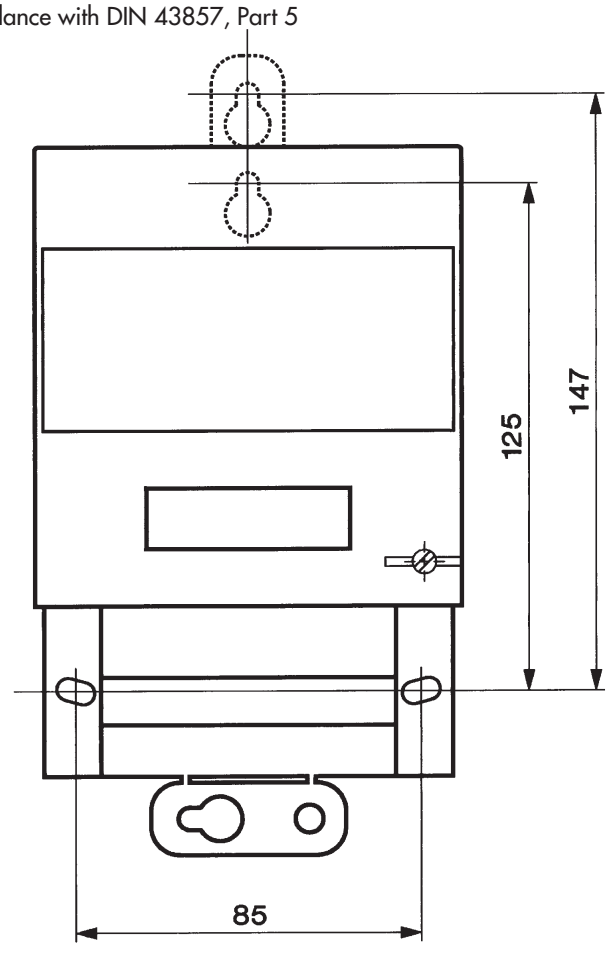
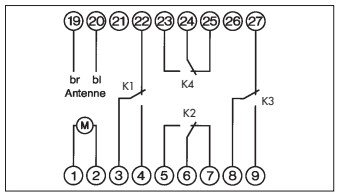
1. Assembly

The time switch has the classic 3-point fastening system
a) on the meter panel
b) on the meter terminal cover in accordance with DIN 43857, Part 5



2. Connection
See unit sticker/circuit diagram

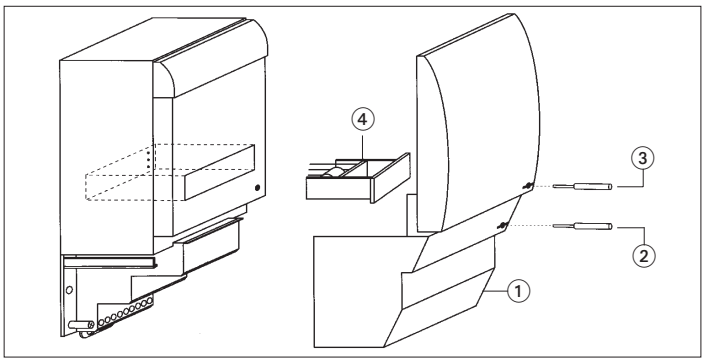


⑲ = brown
⑳ = blue

After correct connection, attach the terminal cover ① and tighten the sealing screw ②. After setting or programming the switching times, attach the transparent cover to the upper edge of the housing, tilt it down and secure it in place with the sealing screw ③. Both housing sections can be fitted, sealed and opened independently of each other.

Before sealing the control panel, ensure that all switching outputs/channels are set to clock program, e.g. ⏲ I or ⏲ 0.
If necessary, correct with the keys I/0.

The battery ④ (plug-in unit) can be replaced if required.
Only batteries of an appropriate type may be replaced. See unit sticker.
! Replace battery with care **!**
Securely hold both side ends and pull out.



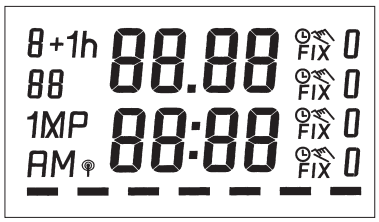
Note
Electrical appliances may only be installed by a skilled electrician. The term "skilled electrician" is defined in VDE 0105. Grässlin time switches are largely protected from external faults. If faults still occur, countermeasures can be taken against voltage peaks by using known components (varistors, suppresser diodes). When doing so, pay particular attention if inductive loads are connected.

1. Functional characteristics
This digital electronic time switch contains or offers the following functions/possibilities
- Calendar function up to the year 2090
- Statutory summer time/winter time switchover of the European Union and Switzerland (manual adjustment possible if legislation is changed)
- DCF 77 radio interface (additional antenna required)
- Date-related input of switching commands (both individual days and date ranges)
- Weekday-related input of switching commands (optionally from Monday to Sunday)
- Pulse switching commands: Shortest switching time 1 second

EVU-specific functions
- Two maximum demand indicators (MDI) adjustable independently of each other
  Standard definition on Channel 2
  If required, the MDI can be programmed on Channel 1 or a second MDI (also with mask-out times)
- Channel 4 is fitted with a bistabile relay for the monthly resetting
- Programming can also be performed with the manual programming unit TASU/PROG.
  The time switch remains sealed, and there is no possibility of unauthorised interference.
  The data is entered via the keypad or is read in via the EEPROM and is then transferred via the IR interface.

2. Putting into operation
It must be assumed that the battery of the time switch is flat when it is installed.
If the mains voltage is present, the time switch is ready for operation immediately. Put on the power line, after waiting about 10 minutes the accu is loaded and the time switch is ready.

3. LCD display unit
- Complete contents after reset



- The diagrams below clarify the assignment of the segments during programming and for the relevant current display.

Figure 1

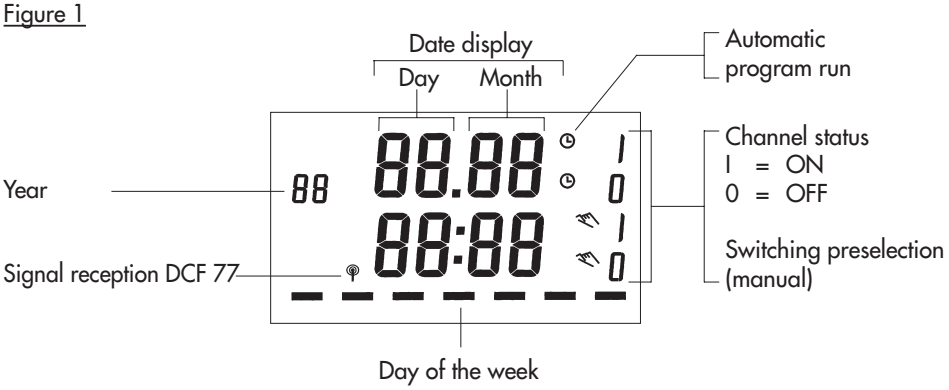


Figure 2

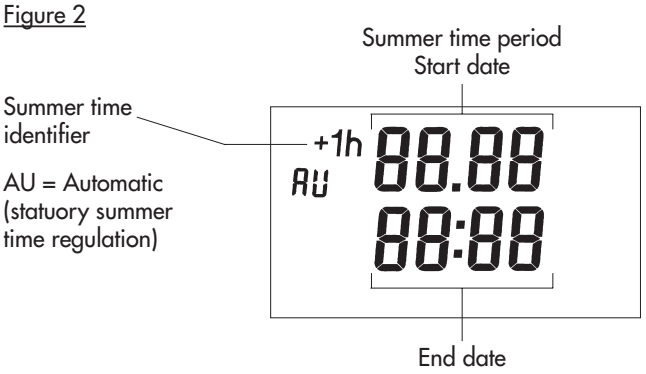
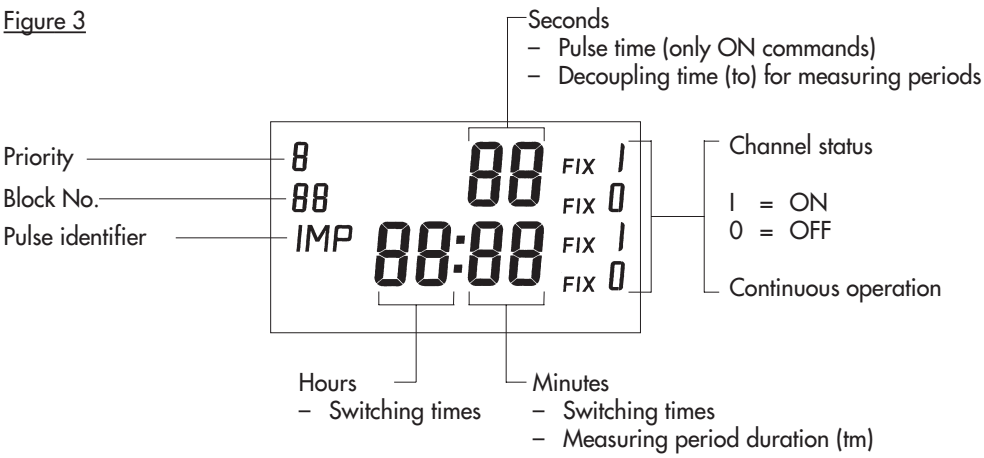


Figure 3



4. Data management inside the time switch

4.1 Blocks

During programming, the time switch assigns block numbers from 00 to 99 – notice block principle.
All switching commands without date assignment automatically receive the block number 00 = routine week program.
All switching commands with date assignment – individual date or date range – receive during programming a block number in ascending order – 01, 02 . . . 99.
All switching commands within a block are stored with N. Not until the last switching time of this block has been entered is the block closed with the key S.

4.2 Priority

Priority 0 is automatically assigned to the switching commands **without** date assignment – routine week program – and is stored in Block 00.
Priority 1 is automatically assigned to the switching commands **with** date assignment – range – e. g. 15.4. - 30.4.
Priority 2 is automatically assigned to the switching commands **with** individual date, e. g. 1st May.
Priorities 1 and 2 can be increased up to 9, depending on the importance of the switching commands. See Point 13.

4.3 Exectuion of the switching commands

Every day at 00:00, the processor decides whether the routine week program – Priority 0 – or a switching program with a higher priority must be switched.
Whenever the program is changed – e. g. summer time/winter time switchover, or if a manual change is made – e. g. switching preselection – the status of the switching outputs is checked and is adjusted according to the switching program.
Apart from FIX I and FIX 0 !
Calculation back to 00:00 of the current day of the week. Correcting the switching outputs can last for some time, depending on the memory contents.
The sequence of the inputs is determined by the alocation of the block numbers 00 . . . 99.

Block number

Switching times

Routine week program
– Always without date assignment
– Always Priority 0, cannot be changed
– Always valid if no higher priority exists

Blank line

Routine week program

Identical switching times which are to be executed on various days – individual date and/or date ranges – are best programmed under one block number.

4.4 Memory capacity
322 memory locations can be assigned to the various channels as required for days of the week, switching times and switching commands 1 or 0.

88.88 = All memory locations occupied

If the keys N or S are pressed when an incomplete input has been made, the elements still missing start to flash.

with date assignments – individual days and/or date ranges

Date

Date range – always Priority 1

Easter Whitsun Summer holidays

Blank line

Switching times

Individual days – always Priority 2

Blank line

4.5 Note
Priority 1 or 2 can be changed manually from 3 to 9
Mixed input possible only with Priority 3 . . . 9 with date assignments – individual days and/or date ranges

5. Keyboard description – functions – IR receiver

5.1
To enter the current date and time during putting into operation or when activating auxiliary functions, the appropriate keys must be pressed in combination with a **second** key.

⏲ +	Year	for entering the date – year
⏲ +	Month	for entering the date – month
⏲ +	Day	for entering the date – day
⏲ +	h+/h-	for entering the time – hours
⏲ +	m+/m-	for entering the time – minutes
⏲ +	⟶|	for activating the test run
R + N		for accelerating Reading of the programmed switching times, with and without date assignments

5.2
For all other inputs and for checking the programmed data, it is always necessary to press the relevant keys only **individually**.

⏲	for selecting the standard display – current status
Month	for entering the month in the case of date assignment
Day	for entering the day in the case of date assingment
h+/h-	for entering the hours for switching times
m+/m-	for entering the minutes for switching times
m+	for entering the measuring period duration (tm) in minutes
Mo…Su	for selecting the day of the week when programming switching commands
I/0	for determining the switching functions I or 0 of the switching channels 1 … 4 during programming
✋	for manually changing the relay states of the relevant channels – switching preselection

⎍⎍ – for determining the pulse time – **only** ON commands – between 1 and 59 seconds
– Start of MDI integration time programming (tm)
– Changing the detent time (to) (1 … 59 seconds)
(Factory setting 09 seconds)

S/W for selecting the summer time/winter time switchover

⟶| = up to **connection** of two associated defined dates: Start and end of a date range, see Point 9 (also summer time period)

Prior for manually changing the priority for executing the switching commands

N = next for transferring the data into the memory – within a block which has **not yet** been completed

S = store for transferring the data to the memory with simultaneous completion of a block

R = read for reading the stored data

CL = clear for clearing the respective displayed data **only** of the current display contents

Reset for clearing **all** stored data and also the current time and date

Only with seal open

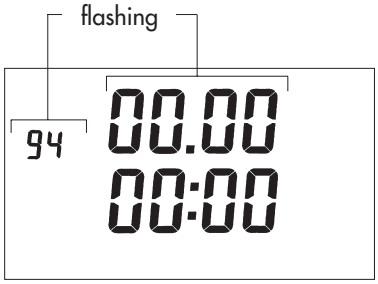
IR recipient – for receiving the entire data if this is transferred into the time switch's memory by the manual programming unit
– for reading the transferred/stored data **without** opening the seal

5.3 Programming via the IR interface
The time switch can be given a 4-digit code number.
This prevents unauthorised reprogramming/changing of the program via the IR interface.
Only authorised persons have access to the manual programming unit, thereby **also** guaranteeing that reprogramming can only take place if the code numbers correspond.
The code number **must** be entered to transfer the data. This also applies in the case of the manual programming unit.
The code number can **only** be entered after a reset and **must** be stored with **S**.
The code number is entered with the keys We, Th, Fr, Sa and can be selected from 0000 to 9999.
The code **cannot** be read and is also cleared after a **reset !**

If the time switch is programmed with the manual programming unit, **all** data – code number, date, time, switching commands, special functions – is transferred from the user section to the clock.
Transfer time approx. 4 seconds.

6. Entering the current date and time

Before programming, we recommend that the time switch be brought into a defined state with a **reset**.
All segments in the display are visible for approximately 5 seconds. The following the appears:

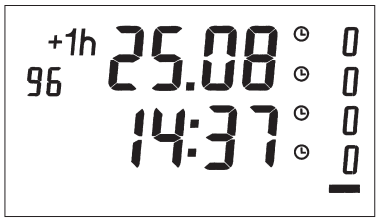


6.1
When the time signal DCF 77 is received, the date and time and automatically read in.
See Point 17.
Entering the date and time manually:

Example:	25.08.96	14:37

► Key ⏲ – Keep pressed
Year – Set year (only the last two numbers)
Month – Set month
Day – Set day
h+/h- – Set hour
m+/m- – Set minute
A fast run-through occurs if these keys are kept pressed for more than 2 seconds.

Key ⏲ – release!
The time switch calculates the relevant day of the week. In this case Sunday



The colon between the hour and minute displays flashes every second.

Note:
If the current time is in the summer half-year, the indicator +1h **automatically** appears in the display.
The 31st calendar day of the relevant month, e. g. January, can only then be entered if it has previously been selected, e. g. 01.
29.02. is only "accepted" if the current calendar year is also a leap year.

7. Summer time/winter time switchover

The following information can be called up or modified with the key S/W:

AU (automatic) = fixed switchover
The S/W time switchover takes place on the basis of a predefined calendar program which is permanently programmed up to the year 2090 and which **cannot** be changed. (Statutory summer time regulation of the European Union and Switzerland).

Start of summer time: Always the last Sunday in March. The hour counting is advanced 1 hour from 2 to 3.
End of summer time: Always the last Sunday in Oktober. The hour counting is moved back 1 hour from 3 to 2.

HA (semi-automatic) = freely selectable switchover with date reference
You enter the valid start and end date of summer time for your location/country. In the following years, the time switchover will always take place on the same date.

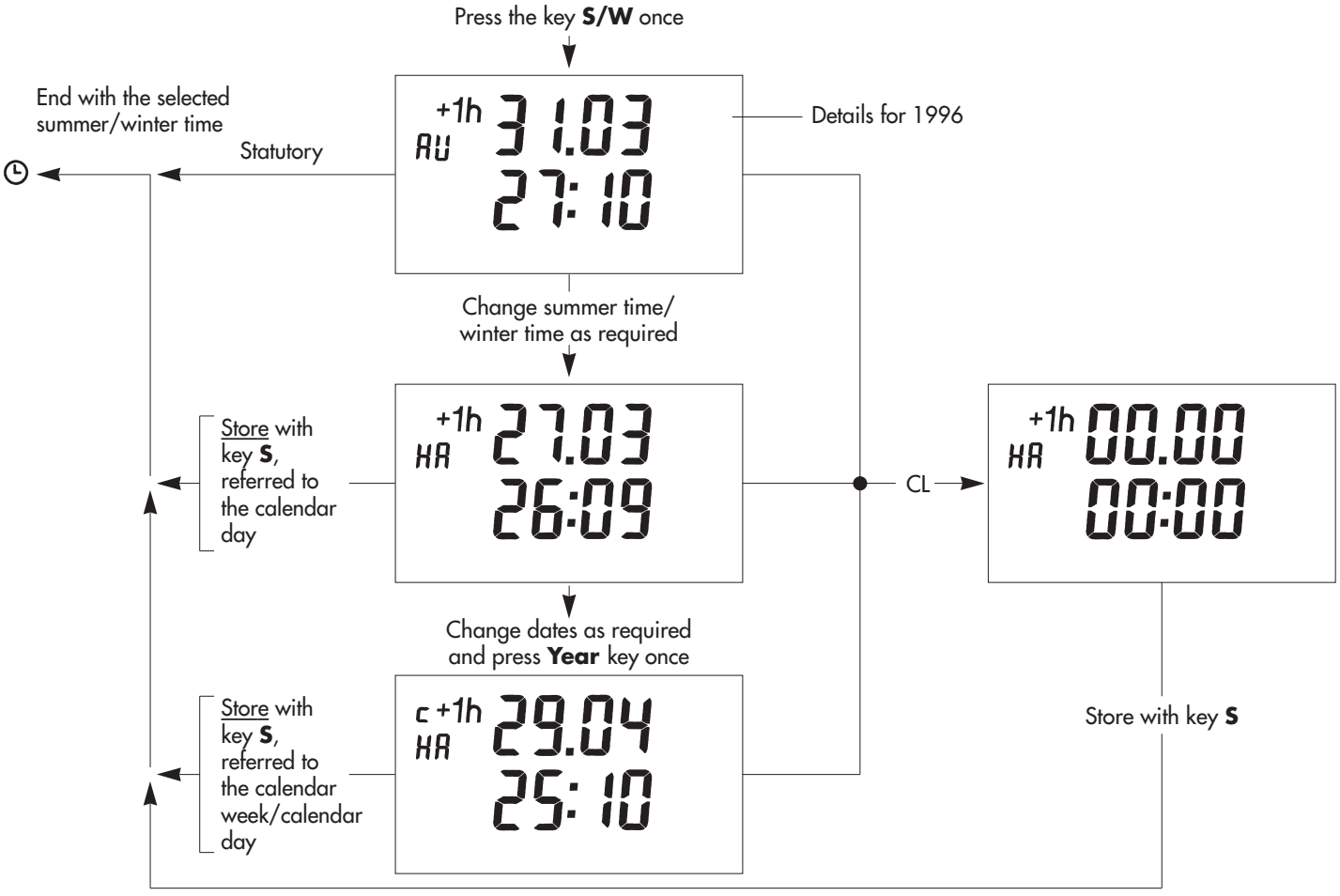
cHA (calculated semi-automatic) = freely selectable switchover with weekday reference

! If the statuory summer time/winter time switchover is changed **!**

You enter the valid summer time starting date for your location/country (e.g. date of the last Sunday in April of the current calendar year) and also the end date of the first Sunday in October of the current calendar year). The program automatically assigns these dates to the correct day of the week.

In the following years, the time is always switched over on the calculated day of the week, irrespective of the date (e.g. last Sunday in April and first Saturday in October).

Note: No switchover occurs when every digit is 0.



Note:
On the date of the summer time/wintr time and winter time/summer time switchover, no switching commands may be programmed between 02:00 and 03:00.

Reactivation of the statutory summer time period:

► Press the S/W key twice!
The displayed AU summer time period (statutory) **must** be stored with the key **S**.

Switchover results in back-calculation and the switching outputs are updated in accordance with the program. See Point 4.3

8. Programming as a week time switch – routine week program

The routine week program is automatically **always** assigned to the block number 00 and **always** has Priority 0.
The days of the week and the channels can be combined into a block as required.
A particular switching time is then assigned to this selection.

Free weekday and channel block formation

Note: Channel 2 – optionally Channel 1 – is reserved for the MDI integration times.

Example: Monday to Friday 06:00
Channel 1 ON = I; Channel 3 OFF = 0

The input mode is opened with one of the following keys: Mo … | Su, h+, h-, m+, m-, I/0

All 7 days of the week are displayed. the days of the week **not** required can be deselected by pressing the relevant Mo … Su key.

Note:
Switching commands **without** date assignment (routine week program) but with weekday(s), switching time and channel state represent a complete input and can be stored both with **N** and **S**.

Entering the data

► Keys h+, h- = Enter hours for switching time
m+, m- = Enter minutes for switching time
I/0 = Enter switching state for Channels 1 and 3

► Store this data with the key **N** or **S**.
If programming is interrupted for approximately 2 minutes, the display contents change back to the current time/date.

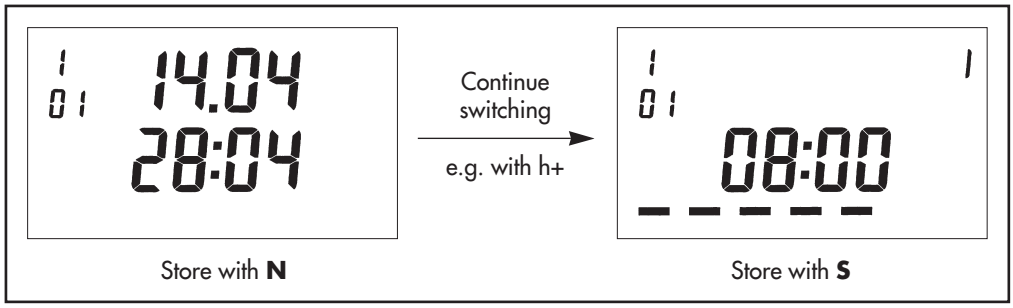
► It is possible to switch to the current state at any time with the key ⏲.

9. Programming date ranges

If a program other than the routine week program is to be executed – e. g. in a vacation week – it is first necessary to enter and store the corresponding date range.
Block number 01 is automatically assigned to this range. It receives Priority 1 and forms a part-input within this block.
It is, of course, possible to enter several date ranges.

The corresponding switching commands are then entered.

Example:	Data:	Keys:
Block number		
	14.04. to 28.04.	Day, Month → Day, Month
	?	Day, Month → Day, Month
		Store with **N**
Blank line		Continue switching with, for example, h+
	08:00, Channel 1 ON Monday to Friday	
		h+, h-, m+, m-, I/0 Sa, Su, Store with **S**
Blank line		

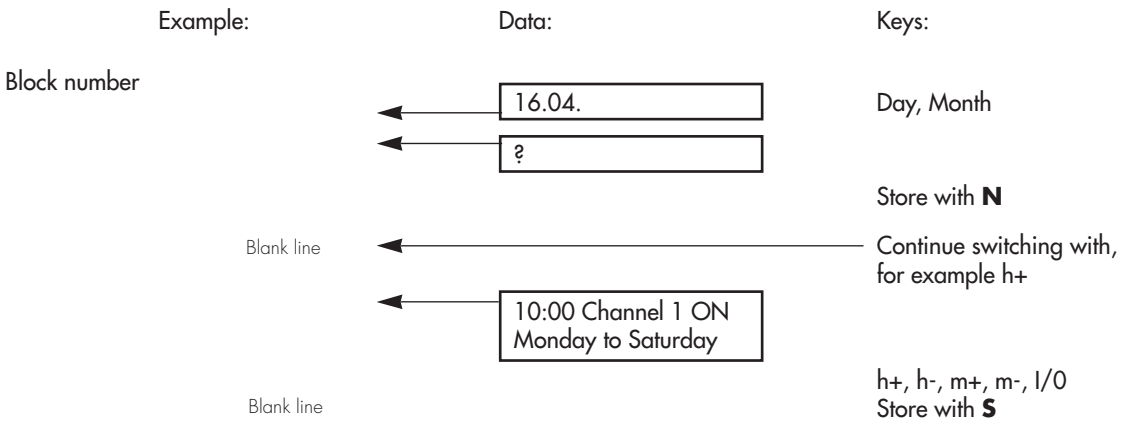


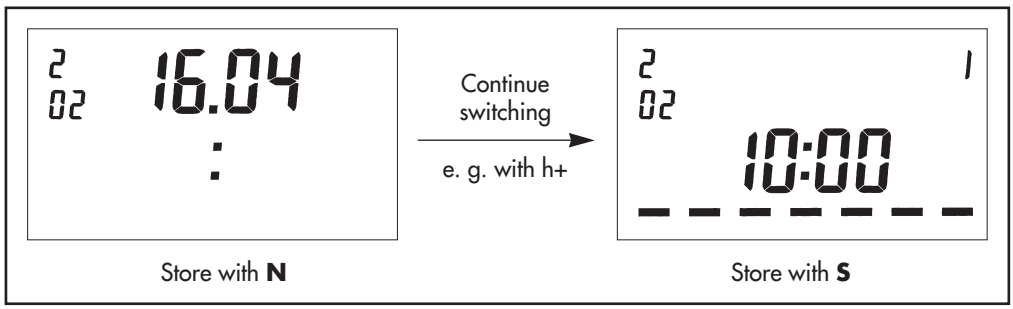
Corresponding switch-off times are programmed in the same way.
All switching times stored in this block have a higher priority than the routine week program and are executed **only** in this period.

10. Programming an individual date

If switching on is to occur only on 16.04. (e. g. Easter Monday), this individual date is automatically assigned the next block number – here 02 – and the Priority 2.
This individual date is a part-input within this block.
It is, of course, possible to enter several individual dates.

The corresponding switching commands are then entered.





Corresponding switch-off times are programmed in the same way.

11. Read – change – supplement – clear, reset

11.1 a) The stored program is read line-by-line with **R**. The display contents correspond to one memory location.
The memory contents is displayed in ascending order of block number: 00 … 99.
Switching commands/dates shown in the display can be changed/supplemented and corrected individually.
Simply overwrite the existing dates and store with **N** or **S**.

b) Read **without** opening the seal!
The entered program is read with a **targeted light flash** (torch) directed at the IR receiver.
The memory contents is **run through** once and the individual memory locations are shown in turn for 1 second each.
After this, the time switch is again in the current operating state.

11.2 Fast reading
Keep key **R** pressed.
The first memory location in block 00 is displayed.

Here, always the first measuring period: detent time (to) and integration time duration (tm)

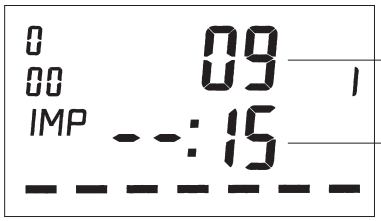
Then, the first date or the first switching time in the relevant block is displayed with **N**.
The information in between is **normally** read with **R**.
The blocks are interrogated in ascending order.

11.3 Clearing
With **CL**, only the information which is respectively shown in the display is cleared.
If only the date assignments are cleared within a particular block – individual days or date range – a **E** appears instead of the priority number during reading.
! Exception: In the case of mask-out times **!** See Point 12.

11.4 The entire memory contents – including the current date – is cleared with **Reset**.
! Exception: Standard definition for measurement periods **!** See Point 12.

12. Entering the MDI integration times

Two independently adjustable integration times can optionally be programmed on Channel 2 and/or Channel 1.
Standard definition on Channel 2: detent time (to) = 09 seconds
integration time duration (tm) = 15 minutes
Press the key ⎍⎍ once:



(to) – detent/pulse time in seconds (01… 59)
(tm) – integration time duration in minutes (05… 60)

The detent time is changed with ascending counting with the key ⎍⎍ (01, 02 … 59, 01, 02 …).
The integration time duration is changed counting upwards with the key **m+** in defined **steps** (05, 10, 15, 20, 30, 60, 05 …).

Note:
If required, the integration time can also be programmed on Channel 1 or a second integration time can be programmed on the free channel.
The channel change/selection is determined with the key I/0 of the corresponding channel.

Store the selected values with **S**.
See Point 11.0 for the values Read – Change – Clear.

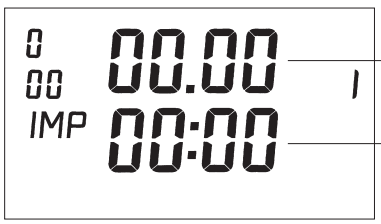
A mask-out time can be programmed for each for the MDIs
The switching state during the mask-out time can optionally be preset to I = ON or 0 = OFF.
Examples for Channel 2:

MDI

Mask-out time
ON = I

22:00 start — 6:00 end

The integration time **must** first be entered in the MDI **and** Mask-out time combination. Store it with **N**.



Hours, minutes (start)
Hours, minutes (end)

For the start time, enter the hours with h+, h- and the minutes with m+, m- .
Press key →|.
Enter the end time as above.
Store with **S** if the data is correct.
It is possible to switch over between the start and end times with the key →| whilst making inputs.

13. Increasing priority

If a higher priority is required for a particular switching command with date assignment – individual date or date range –, this can be selected with the Prior key up to 9.

Example:
However, the corresponding switching commands should be carried out with a higher priority between 12.6. and 15.6. during the date range, e. g. 9.6. to 20.6.

Example:	Data:	Keys:
Block number	12.06. to 15.06. Priority 4	Day, Month →| Day, Month Prior.
		Store with **N**
Blank line	←	Continue switching with, for example, h+
		Enter the switching times, see Point 9
Blank line		Store with **S**

This date range is part of an input within a block.

After the last switching time within this block, store with **S.** This closes this block.

Note:
The increase in the priority **must** be entered in conjunction with the date.

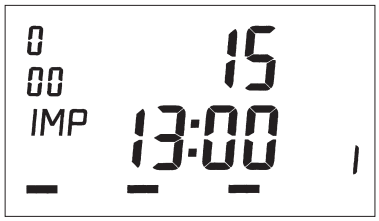
A mixture of individual dates and date ranges can be entered with the Priorities 3 … 9, see Point 4.5.
If no switching is to take place with a date range with a higher priority, e.g. at the weekend, it goes without saying that the days SA and SU must be cleared.

14. Pulse switching commands

Only an **ON** command can be executed as a pulse.
The pulse time itself from 1 to … 59 seconds is also entered with the key ⎍ and **must** be assigned to the relevant channel.

Note:
Channel 2 – optionally Channel 1 – is reserved for the measuring period, see Point 12.

Example:	Data:	Keys:
Block No.	Mo, We, Fr. 13:00, 15 second pulse on Channel 4	Tu, Th, Sa, Su, h+, h-, m+, m- I/0 Channel 4 ⎍⎍ = 15
Blank line		
Blank line		Store with **S**



Pulse switching commands can also be assigned to an individual date or a date range.

15. Test run

To check the entered program, it is possible to execute the switching command in **time-lapse tempo**.
We recommend that you carry out this test run without connected loads so as to exclude the possibility of hazardous moments on machines and plant.

Keep the key ⏲ pressed, the briefly press the key →| . Release both keys.

The relevant next switching command (calendar-based) is searched for and executed.

The output relays are switched on or off accordingly.

Of course, the defined priority and date assingments are taken into account here.

The date and time must be updated again. See Point 6.1.

16. Manual actuation of the switching outputs

The relevant switching outputs can be influenced as follows with the keys ☜ 1 to ☜ 4.

Automatic mode ⏲	Manual operation ☜	Continuous operation FIX I / Fix 0
⏲ I = ON ⏲ 0 = OFF	☜ 0 = ON ☜ I = OFF	FIX I = continuous ON / FIX 0 = continuous OFF
The switching times correspond to the entered program	If the current switching state is changed manually, the next switching command is again executed automatically after the switching program is entered.	It is **only** possible to return to automatic mode from the switching states FIX 1 and FIX 0 by pressing the ☜ key.

17. Radio clock operation DCF 77

17.1 Time switches with the suffix letter F in the type designation can receive the time signal from the Frankfurt-Mainflingen transmitter if connected to the antenna FA and a power supply unit NT.
The coded signal – DCF 77 – automatically sets the time switch to the current time and date.
CET = Central European Time.

The statutory summer time/winter time switchover and the required switchover in a leap year – 29th February – are also taken into account here.

If the signal is interrupted, e. g. due to transmitter failure, a faulty antenna or line breakage, the time switch continues to operate on its own quartz time basis.

The time and date display is updated again after the signal is restored.

17.2 Setting up and connecting the antenna

The antenna should be fitted near to a window indoors, making sure that one of the two arrows (on the casing) is directed towards Frankfurt/Main.

The antenna has a fixed connecting line of approximately 2 m – 2 x 0.75 mm^2 – and can be installed up to 20 m away, without special cable-laying measures.

Steel structures and metal window frames can cause reception interference. Before final setting-up of the antenna, we recommend that you perform test operation.

If necessary, the line must be laid separately or the antenna must be set up in another location.

17.3 Signal reception and operational check

Following correct connection in accordance with the circuit diagram (see Point 2), the LED in the antenna casing flashes and displays pulses of different lengths every second:
This indicates correct signal reception.

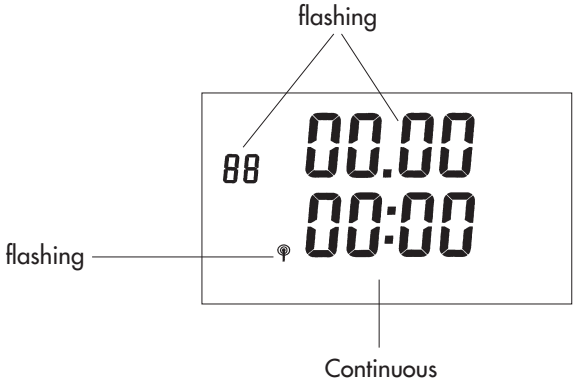
Signal reception correct

Interference with signal reception

Under optimum conditions, the time signal can be received up to a distance of 1500 km away.

The symbol in the time switch also flashes every second and indicates pulses of different lengths as long as the signals are being read in.

The display in the time switch shows the following.



Under perfect reception conditions, the current date and time are displayed after 2 to 6 minutes.

If the symbol is continuously displayed, the time switch is synchronised.

18. Technical data

Dimensions (H x B x T)	175 x 105 x 71 mm
Weight g	approx. 600
Connection	see unit imprint
Power consumption	approx. 5 VA
Switching capacity AC	
– ohmic load (VDE, IEC)	10 A/250 V AC μ
– inductive load cos. φ 0,6	2.5 A/250 V AC μ
Switching output	2 or 4 volt-free relays
Switching contacts	NO contacts or changeover contacts
Contact material	silver cadmium oxide
Ambient temperature	-10°C to +55°C
Protection class (VDE 0633)	II
Protection type	IP 51
Running accuracy	± 0.5 sec./24 h at +20°C
Temperature deviation	± 0.15 sec./24 h/°C
DCF 77	deviation 0
Running reserve	see unit sticker
Charging duration	70 h (NC battery replaceable)
Minimum switching time	1 sec.
Programmable	every minute
Memory locations	322
Switching preselection	yes
Hand switch	automatic operation, Fix I, Fix 0
Switching state display	yes
Connection cross section	2 x 2,5 m^2
Summer time/winter time switchover	automatic
Sealable	yes