QWTIME III KNX MASTER CLOCK
User Manual

Document: DOK11025en01.doc
Author: CF
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Page: 1 (47)

User Manual
Master Clock WDP-Q KNX

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Document: DOK11025en01.doc
Author: CF
Date: 2018-07-04
Page: 2 (47)

List of contents

QWTIME III KNX MASTER CLOCK
User Manual

Document: DOK11025en01.doc
Author: CF
Date: 2018-07-04
Page: 3 (47)

Technical specifications

Crystal Frequency:	4,915200 MHz.
Accuracy:	0,1 sec./24 hours (at +20°C).
Microprocessor:	HD6412394.
Max. load impulse output:	Minute 1A, second 0,5A. (The output is equipped with short circuit protection which resets automatically.)
Impulse duration:	Minute 2 sec. selectable 0.1-9.9 sec.
	Seconds 0.5 sec. selectable 0.1-1 sec.
Impulse memory:	72 hours (impulse memory with rapid impulsing after power failure).
Connection voltage:	230 50 Hz -5% +10%
Overvoltage category:	III
Rated impulse voltage	4kV
Rated insulation voltage Ur:	>=250V
Power consumption:	Max 30 W, depending on the use of outgoing minute impulses
KNX bus current:	10mA
Ambient temperature:	Between 0°C and +40°C.
Relative humidity:	Max. 85% non-condensing.
Case:	IP 20, light grey plastic (Polystyrol) with transparent protection cover.
CE-Approval, EMC	Emission acc. to EN61000-6-3, Immunity acc. to. EN61000-6-2.
Art. number:	123312-06

QWTIME III KNX MASTER CLOCK
User Manual

Document: DOK11025en01.doc
Author: CF
Date: 2018-07-04
Page: 4 (47)
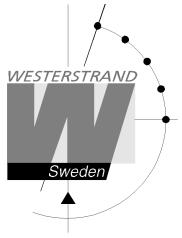
General description

The WDP-Q KNX is an electronic quartz Master Clock for operating and control of analogue and digital slave clocks. The slave clocks are controlled over a KNX network or by impulses.
In case of power failure, the built in real time clock keeps the internal time updated. Connected Slave Clocks are automatically corrected when power returns.
Summer/winter time correction (daylight saving) is pre-programmed and fully automatic.

ALARM — Indication for alarm
POWER — Indication for mains voltage
RADIO — Indication for radio synchronisation

Indication for outgoing minute impulse

WDP

Connection space

QWTIME III KNX MASTER CLOCK
User Manual

Document: DOK11025en01.doc
Author: CF
Date: 2018-07-04
Page: 5 (47)
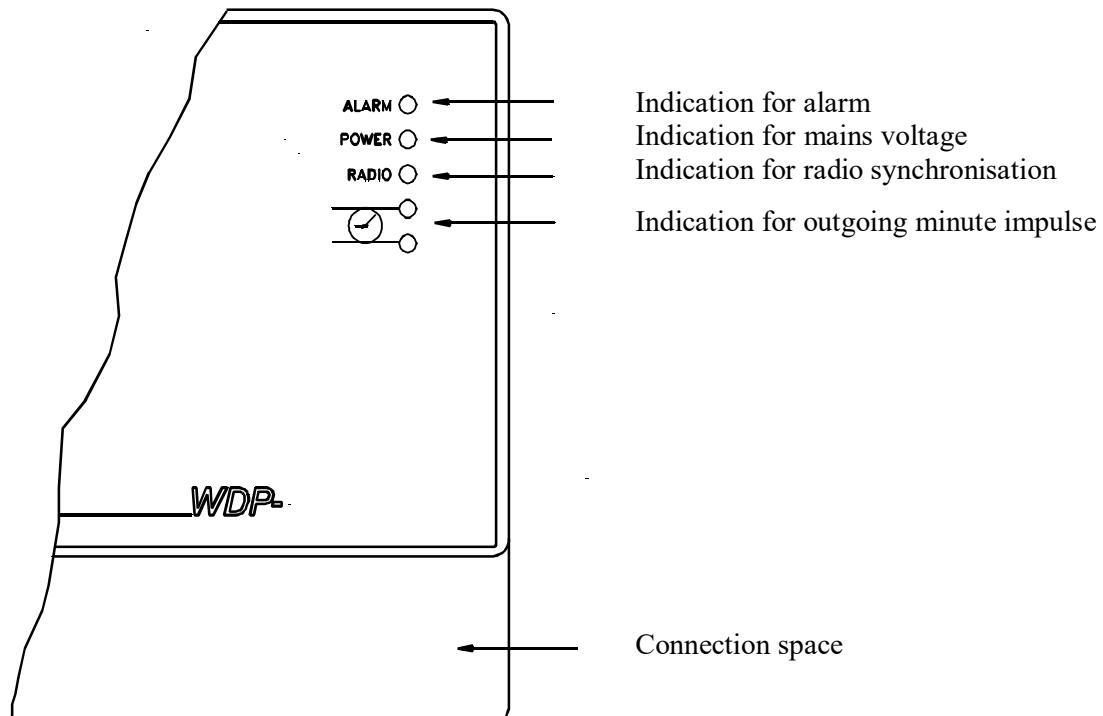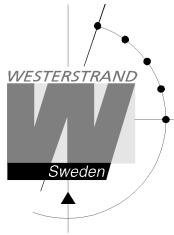
Installation

The Master Clock is intended for wall mounting.

1. Screw in the upper fixing screw halfway and hang up the unit.
2. Screw in the two lower screws, accessible under the connection space cover.
3. Connect the KNX bus to the connector on the right side of the master clock.
4. The KNX programming button is indicated with the text "►PROG".
5. Connect any slave clock lines.
6. Connect, if included, other accessories/options such as radio synchronisation.
7. Connect the supply voltage.

QWTIME III KNX MASTER CLOCK
User Manual

Document: DOK11025en01.doc
Author: CF
Date: 2018-07-04
Page: 6 (47)
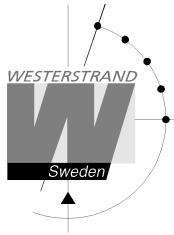
KNX configuration

The master clock must be configured with ETS4/5 before use. The available group objects and parameters are listed below:

ID	Object	Datapoint Type	Direction	Size	Configuration Flags						
					U	T	RI	W	R	C	Priority
1	LocalDateTime	19.001	Output	8 bytes	0	1	0	0	0	N/A	Low
2	UTCDateTime	19.001	Output	8 bytes	0	1	0	0	0	N/A	Low
3	LocalTime	10.001	Output	3 bytes	0	1	0	0	0	N/A	Low
4	UTCTime	10.001	Output	3 bytes	0	1	0	0	0	N/A	Low
5	LocalDate	11.001	Output	3 bytes	0	1	0	0	0	N/A	Low
6	UTCDate	11.001	Output	3 bytes	0	1	0	0	0	N/A	Low
7	SystemClockSetting	19.001	Input	8 bytes	1	0	0	1	0	N/A	Low
8	TimeRequest	1.001	Input	1 bit	1	0	0	1	0	N/A	Low
9	Timeout Alarm	1.005	Output	1 bit	0	1	0	1	0	N/A	Low
10-17	Relay outputs 1-8	1.001	Output	1 bit	0	1	0	1	0	N/A	Low

Group Objects

| Parameter	Description	Datapoint type	Range	Default
SCLOMode	Clock type	20.001	ReadOnly	2=Master
SystemClockHeartbeat	Time transmission interval	7.006	1-1440	10 (minutes)
EnableSystemClockSetting	Enable synchronisation from the KNX bus*	1.003	{0,1}	0=disabled
EnableTimeoutAlarm	Send synchronisation timeout alarm on bus	1.003	{0,1}	0=disabled
Activate relay outputs 1-8	Activates relay outputs	1.003	{0,1}	0=disabled

Parameters

*If enabled, KNX synchronisation must also be selected as synchronisation source in the master clock settings. Otherwise, the synchronisation messages will be ignored.

QWTIME III KNX MASTER CLOCK
User Manual

Document: DOK11025en01.doc
Author: CF
Date: 2018-07-04
Page: 7 (47)
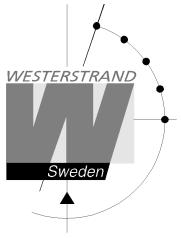
Description of Group Objects

Group objects containing time and date information (Objects 1-6) will be sent cyclically with the interval set in parameter "SystemClockHeartbeat". The transmission will always start at second 25. If more than one group object is being used, one object will be sent each second in numerical order. For example, if Local DateTime is sent to one group address and UTC Date is sent to another, the Local DateTime will be sent on second 25 and the UTC Date will be sent on second 26.

Local DateTime
Transmits local date and time using datapoint type 19.001

UTC DateTime
Cyclically transmits UTC date and time using datapoint type 19.001.

Local Time
Cyclically transmits local time using datapoint type 10.001.

UTC Time
Cyclically transmits UTC time using datapoint type 10.001.

Local Date
Cyclically transmits local date using datapoint type 11.001.

UTC Date
Cyclically transmits UTC date using datapoint type 11.001.

SystemClockSetting
Receives UTC time using datapoint 19.001. If parameter "EnableSystemClockSetting" is enabled and KNX is selected as a synchronisation source in the master clock, the master clock will be synchronised according to this message. See section "Setup synchronisation source" later in this manual for instructions on how to select KNX as a synchronisation source.

TimeRequest
Receives a time request using datapoint 1.001. When received, the master clock will send the time and date on all used group objects (Of 1-6). If more than one object is used, one will be sent each second in numerical order.

TimeoutAlarm
If parameter "EnableTimeoutAlarm" is enabled, the master clock will set group object TimeoutAlarm to '1' and transmit on bus to indicate an alarm when a sync. timeout occurs. The alarm will also be indicated with a red LED on the master clock. The alarm is only sent once. The alarm will not be removed when the synchronisation is restored, but must be cleared in the master clock interface.

QWTIME III KNX MASTER CLOCK
User Manual

Document: DOK11025en01.doc
Author: CF
Date: 2018-07-04
Page: 8 (47)
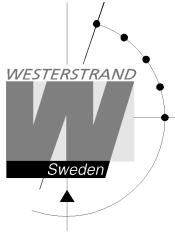
Relay Outputs

The master clock has 8 programmable relay outputs that can be programmed to switch on or off at different times. Each relay is connected to a group object, for example, relay output 1 is connected to the group object "Output 1". See section "Week Program & Date Program" for information on how to program the outputs.

Description of Parameters

SCLOMode

SCLOMode is a read only parameter that indicates that the clock is a master clock.

SystemClockHeartbeat

The time transmission interval is set using the SystemClockHeartbeat parameter. The default value is 10 minutes. The timeout value in connected slave clocks should be set using the following formula:

$$\text{Timeout} = (\text{SystemClockHeartbeat} \times 2) + 1$$

EnableSystemClockSetting

Enabling the EnableSystemClockSetting allows the user to select KNX as a synchronisation source in the master clock settings. If another synchronisation source is selected, such as GPS, the synchronisation messages from the bus will be ignored.

EnableTimeoutAlarm

When selecting the synchronisation source in the master clock settings, an alarm limit time is selected. When this time has passed without any synchronisation, the master clock will indicate an alarm with a red LED. To also send an alarm on the KNX bus, the parameter EnableTimeoutAlarm must be enabled.

QWTIME III KNX MASTER CLOCK
User Manual

Document: DOK11025en01.doc
Author: CF
Date: 2018-07-04
Page: 9 (47)
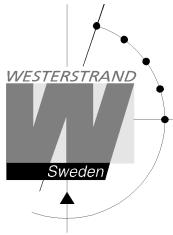
Calculation of cable area for impulse clocks

General

To make a time system with impulse operated analogue and digital slave clocks perform satisfactory, the cable from the Master Clock to the Slave Clocks need to be dimensioned correctly.
A 10% voltage drop is allowed in the cable.
The length and area of the cable and also the current (load) on the cable affect the voltage drop.

Formula

$$A = l \times I \times k$$

```
A = Area [mm²]
l = cable length [m]
I = current [A]
k = 0,015 [constant]
```

Power consumption

Impulse Slave Clocks

Analogue clocks minute ≤ 400 mm: 7,5 mA
Analogue clocks minute ≤ 900 mm: 15 mA
Analogue clocks minute + sweep seconds hand ≤ 400 mm: 25 mA
Digital Clocks: 4 mA

Time-Code (TC) Slave Clocks

Analogue clocks minute ≤ 400 mm:	14 mA
Analogue clocks minute ≤ 900 mm:	20 mA
Analogue clocks minute + sweep seconds hand ≤ 400 mm, indoor:	12 mA
Analogue clocks minute + sweep seconds hand ≤ 400 mm, outdoor:	20 mA
Analogue clocks minute + sweep seconds hand ≤ 900 mm:	27 mA

Example

A time system consists of 40 pcs. analogue clocks with diameter 300 mm.
The power consumption will then be 40 x 7,5 = 300 mA = 0,3A.
Cable length is 100 metres.

$A = 100 \times 0,3 \times 0,015 = 0,45$ mm^2

Choose a cable with an area of at least 0,45 mm^2.

QWTIME III KNX MASTER CLOCK
User Manual

Document: DOK11025en01.doc
Author: CF
Date: 2018-07-04
Page: 10 (47)
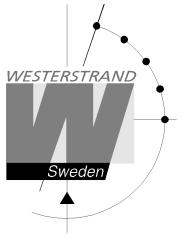
Connection of hourly correction (SR2/3) clocks

The impulse output can be configured to send out hourly correction pulses according to the SR2/3 standard. See *Special functions /Setup /impulse output* for more details.

The following hourly correction standards are supported:
SR2-58   : (SR2, hourly correction 2-wired, with imp. correction on the 58th minute).
SR2-59   : (SR2, hourly correction 2-wired, with imp. correction on the 59th minute).
SR3-58   : (SR3, hourly correction 3-wired, with imp. correction on the 58th minute).
SR3-59   : (SR3, hourly correction 3-wired, with imp. correction on the 59th minute).

Connection of 2-wired clocks:

Master Clock   Slave Clock
19 ------------------------------- PC
20 ------------------------------- AB

Connection of 3-wired clocks:

Master Clock   Slave Clock
19 ------------------------------- A
20 ------------------------------- B
24 ------------------------------- C

QWTIME III KNX MASTER CLOCK
User Manual

Document: DOK11025en01.doc
Author: CF
Date: 2018-07-04
Page: 11 (47)
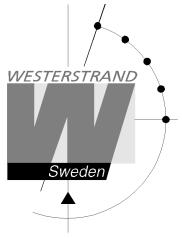
Synchronisation input connection

General

The Master Clock is equipped with a synchronisation input intended for connection to an external synchronisation source. The sync. source can be either a radio receiver type GPS, RDS, MSF, DCF77 or another Master Clock. The Master Clock is factory prepared for connection to a radio receiver. Detailed connection diagram for different radio receivers can be found in the separate manual delivered together with respectively receiver. If the Master Clock is going to be synchronised from another Master Clock with synchronisation pulses, it must be reconfigured. See below.

If the Master Clock is to be configured from another Master Clock on the KNX network, no reconfiguration is needed.

Synchronisation from another Master Clock

1. Turn off power.
2. Open the Master Clock by loosening the four screws holding the front panel. Lift the panel and set the jumpers B4-B6 according to the instruction below.
3. Remount the front panel and turn on the power again.
4. Set the sync. source parameter by using the special function *SETUP/SYNC.SOURCE* .
5. Connect the sync. pulses to screw terminal 25 and 26.
6. Set the master clock to correct time +/- 30 sec.
7. When the synchronisation pulses have been accepted by the master clock the colon (:) between hours and minutes in the display starts to flash.
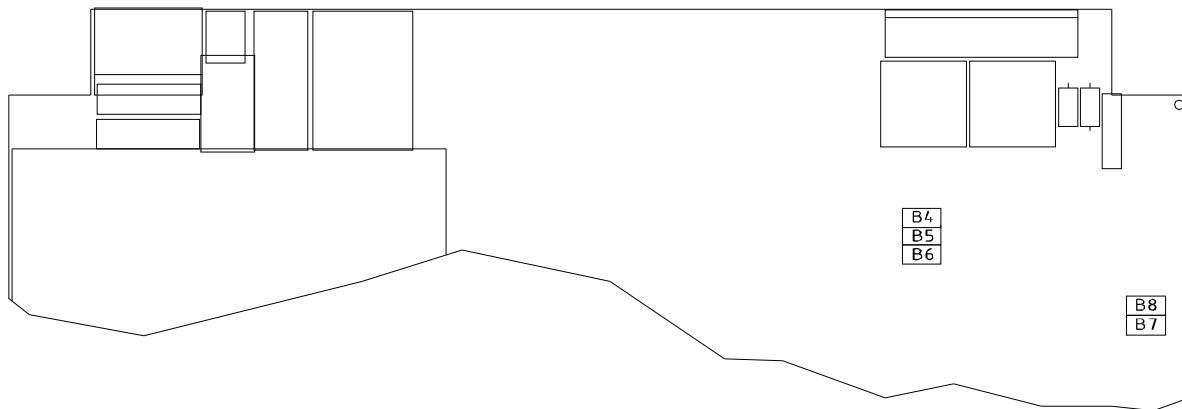
	B4	B5	B6	
PREPARED FOR RADIO RECEIVER	X	X		FACTORY DEFAULT
PREPARED FOR SYNC. PULSE FROM ANOTHER MASTER CLOCK			X	

X = Closed

QWTIME III KNX MASTER CLOCK
User Manual

Document: DOK11025en01.doc
Author: CF
Date: 2018-07-04
Page: 12 (47)
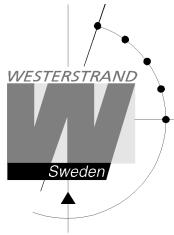
Programming

General

Using 6 buttons and a 2-row 16-character display carries out all programming.
Programming is self-instructive and to simplify the dialogue Yes/No questions are used.

Running mode

When the Master Clock is in operation it shows date and time in the display.
This is called *running mode* in this documentation.
LTs = Local Time summer.
LTw = Local Time winter.

```
MON  15 AUG 2011
 10:11:00   LTs
```

1- Select function   ↑↓

2- Enter programming mode   **YES**

3- Move sideways   ← →

4- Change/scroll   ↑↓

5- Accept   **YES**

6- Cancel / Leave prog. mode ←

```
MON  15 AUG 2011
 10:11:00   LTs
```

```
SET TIME
```

```
SLAVE CLOCK
```

```
ALARMS
```

```
SPEC.-FUNCTIONS
```

QWTIME III KNX MASTER CLOCK
User Manual

Document: DOK11025en01.doc
Author: CF
Date: 2018-07-04
Page: 13 (47)

Start up

STARTING

When the Master Clock is connected for the first time correct/requested language must be entered. Press **NO** until requested language occurs in the display e.g. English. Accept with YES.
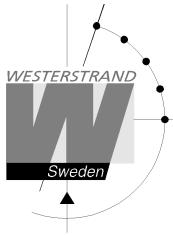
LANGUAGE
ENGLISH?

COUNTRY
DEU   ?

Press **NO** until correct country code occurs.
For Germany, select DEU. Accept with YES.

SET TIME
060313 09:07

Set, by using the arrows, the right time format i.e. year, month, day and hour but a few minutes in advance.
Wait for the right time and synchronise using **YES**.

SLAVE CLOCK
= **12:00**   OFF

Now the question: SLAVE CLOCK 12.00?
If the Slave Clocks show 12.00, answer **YES**, if not set the time shown by the slave clocks. Accept using **YES**.

SLAVE CLOCK
= 12:00   **ON?**

Accept using **YES**.

MON 13 MAR 2006
09:07:00 LTw

The Master Clock is now in running mode.

NOTE!   If a slave clock runs out by a minute, its cabling must be pole changed and the slave clock to be corrected manually.

NOTE!   If the time of the slave clocks is ahead of correct/present time the Master Clock Programmer will wait until correct time corresponds with the slave clocks.

QWTIME III KNX MASTER CLOCK
User Manual

Document: DOK11025en01.doc
Author: CF
Date: 2018-07-04
Page: 14 (47)
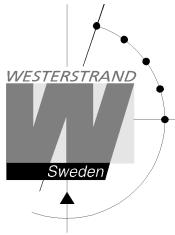
Set time when in operation

MON 13 MAR 2006 09:07:00   LTw

Select function using ↓.

SET TIME

Enter the programming mode with YES.

SET TIME 060313 10:13

Set, by using the arrows, the right time.
Format; year, month, day and hour but a few minutes in advance.
Wait for the right time and synchronise using YES.

SET TIME

Leave programming mode by pressing ← several times.

MON 13 MAR 2006 10:13:00   LTw

The master clock is now back in running mode.

Summer to winter (Day light saving)

Switching between summer and wintertime is fully automatic and does not need programming.

QWTIME III KNX MASTER CLOCK
User Manual

Document: DOK11025en01.doc
Author: CF
Date: 2018-07-04
Page: 15 (47)
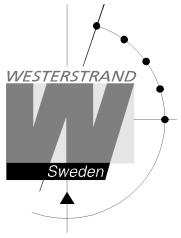
TC or Impulse Slave Clocks

This function is used to enter the time that the slave clocks are showing.
This is useful if, by some reason, the master clock and the slave clocks should show different times.
When the slave clock time has been entered, the master clock will automatically adjust the slave clocks to correct time.
Please note that before using this function make sure that all connected slave clocks are showing the same time.
If any of the slave clocks are showing a divergent time this clock must be manually adjusted to the same time as the other clocks.

The impulses to the slave clocks are temporarily stopped when entering this function.

MON 13 MAR 2006 09:07:00 LTw	Select function using ↓.
SLAVE CLOCK	Enter the programming mode with **YES**.
SLAVE CLOCK = **09**:07 OFF	SLAVE CLOCK = 09.07? (Example) If the slave clocks shows 09.07 answer YES, if not, set the time shown by the slave clocks.
SLAVE CLOCK = 09:**07** OFF	**YES.**
SLAVE CLOCK = 09:07 **ON?**	**YES.**
SLAVE CLOCK	Leave programming mode by pressing ← several times.
MON 13 MAR 2006 09:07:00 LTw	The master clock is now back in running mode.

QWTIME III KNX MASTER CLOCK
User Manual

Document: DOK11025en01.doc
Author: CF
Date: 2018-07-04
Page: 16 (47)
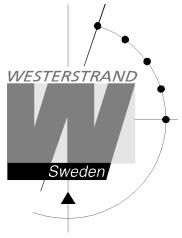
Alarms

The master clock is equipped with several supervision facilities to detect functional disturbances.
When a functional disturbance is detected the following will happen:

- Red alarm LED is lit.
- Alarm relay* is activated.
- An alarm message is displayed in function ALARM.

The function ALARM is used to display and erase (clear) alarm messages.

Type of alarm	Indication	Reason for alarm	Action
NO RADIO	Red alarm LED lit. Alarm relay activated. KNX alarm telegram sent	The radio receiver is not working.	Check the radio receiver. If OK, clear the alarm.
NO KNX SYNCHRONIZATION	Red alarm LED lit. Alarm relay activated. KNX alarm telegram sent	The synchronisation source is set to KNX but no telegrams are received	Check the configuration of the KNX-system. If OK, clear the alarm.
UF LOW	Red alarm LED lit. Alarm relay activated	Impulse voltage below alarm limit.	Check the load on the impulse output. If OK, clear the alarm.
SHORT CIRCUIT	Red alarm LED lit. Alarm relay activated	Short circuit on impulse output	Remove the short circuit. If OK, clear the alarm.
CURRENT LOW	Red alarm LED lit. Alarm relay activated	Impulse current below alarm limit.	Check the load on the impulse output. If OK, check that the alarm limit is correctly configured. If OK, clear the alarm.
CURRENT HIGH	Red alarm LED lit. Alarm relay activated	Impulse current above alarm limit.	Check the load on the impulse output. If OK, check that the alarm limit is correctly configured. If OK, clear the alarm.
POWER DOWN	Red alarm LED lit. Alarm relay activated Works only if the master clock is equipped with batteries for running reserve.	By some reason the power to the master clock has been switched off.	Check the mains. If OK, clear the alarm.

* One of the relay output can be used as an alarm relay. This function is as default disabled but can be enabled via SPECIAL FUNCTION/ SETUP/ ALARM RELAY/YES. See page 45 for more details.

QWTIME III KNX MASTER CLOCK
User Manual

Document: DOK11025en01.doc
Author: CF
Date: 2018-07-04
Page: 17 (47)
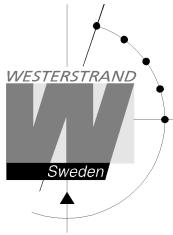
| ALARMS- DISPLAY | To show the alarms |

| ALARMS- ERASE | To erase the alarms |

Example 1, display alarms

| MON 13 MAR 2006
 09:07:00   LTw | Select function using ↑↓ . |

| ALARMS | Accept with YES. |

| ALARMS- DISPLAY | Press NO until the wished function is shown.
Accept with YES. |

| 09MAR 15:52
NO RADIO | The alarm is displayed.
Press ↑↓ to see next alarm.
Return to running mode press ←. |

| ALARMS- DISPLAY | ←. |

| ALARMS | ←. |

| MON 13 MAR 2006
09:07:00   LTw | |

QWTIME III KNX MASTER CLOCK
User Manual

Document: DOK11025en01.doc
Author: CF
Date: 2018-07-04
Page: 18 (47)
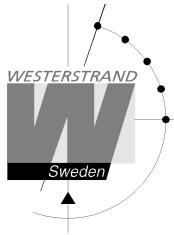
Example 2, erase (clear) alarms

MON 13 MAR 2006 09:07:00 LTw	Select function using ↑↓ .
ALARMS	Accept with YES.
ALARMS- ERASE	Press NO until the wished function is shown. Accept with YES.
09MAR 15:52 NO RADIO	The alarm is displayed. Press YES to erase the alarm.
ERASE?	Accept with YES.
ALARMS- ERASE	Return to running mode press ←.
ALARMS	←.
MON 13 MAR 2006 09:07:00 LTw	

QWTIME III KNX MASTER CLOCK
User Manual

Document: DOK11025en01.doc
Author: CF
Date: 2018-07-04
Page: 19 (47)
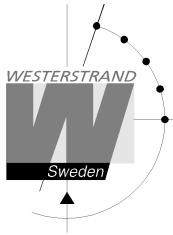
Spec.-Functions

The special functions contain functions used during setup and configuration of the Master Clock.
If the default settings are used no configuration is needed.

| MON 14 MAR 2005
09:07:00 LTw | Select function using ↓ . |

| SPEC.-FUNCTIONS | Accept with YES. |

| SPEC.-FUNCTIONS
STATUS | Press NO until wished function is shown.
Accept with YES. |

| STATUS | Show status information of the different output/ input in the Master Clock. |

| KEYLOCK | Keylock and password function. |

| LANGUAGE | Language selection. |

| COUNTRY | Country selection. |

| POSITION | Selection of position for astronomical function. |

| SETUP | Setup / configuration of the different impulse system, type of synchronisation etc. |

| HOLIDAYS | Change holidays |

| DISPLAY FORMAT | Display format in running mode. |

| SOFTWARE VERSION | Present software version. |

| SPEC.-FUNCTIONS
STATUS | Return to running mode press ←. |

| MON 14 MAR 2005
09:07:00 LTw | |

QWTIME III KNX MASTER CLOCK
User Manual

Document: DOK11025en01.doc
Author: CF
Date: 2018-07-04
Page: 20 (47)
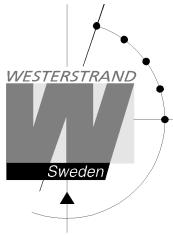
Status

With this function each input/output status can be checked.

Example:
Check the status of the radio receiver.

| MON 14 MAR 2005
09:07:00   LTw | Select function using ↓ . |

| SPEC.-FUNCTIONS | Accept with YES.
Press NO until wished function is shown. |

| SPEC.-FUNCTIONS
STATUS | Accept with YES. |

| STATUS
SYNC.SOURCE | Press NO until wished input/output is shown.
Accept with YES. |

| DCF77   60%
13MAR   19:59:00 | The radio receiver has accepted 60% of the radio messages.
Last reception was 14/10 19:59:00. |

| STATUS
SYNC.SOURCE | Return to running mode press ←. |

| SPEC.-FUNCTIONS
STATUS | ← |

| SPEC.-FUNCTIONS | ← |

| MON 14 MAR 2005
09:07:00   LTw | |

QWTIME III KNX MASTER CLOCK
User Manual

Document: DOK11025en01.doc
Author: CF
Date: 2018-07-04
Page: 21 (47)

Status sync. source

| Type of synchronisation | | % of accepted messages |

```
DCF77          60%
01 MAY 12:00:00
```

Last reception was 01MAY12:00:00*.
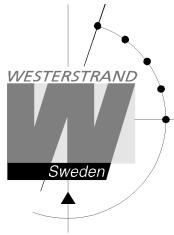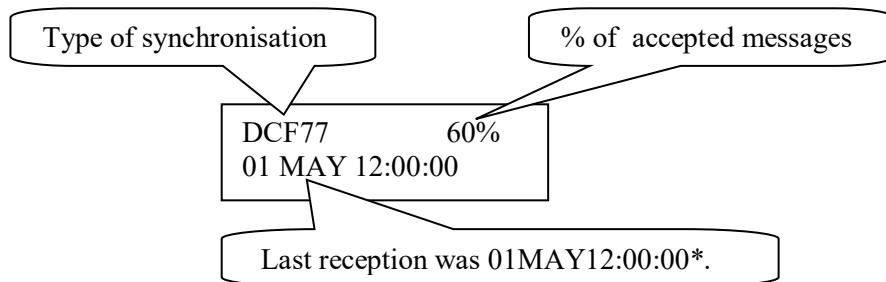
*Remark: The marked position always shows the actual second. This information is updated every other second.

Status impulse output
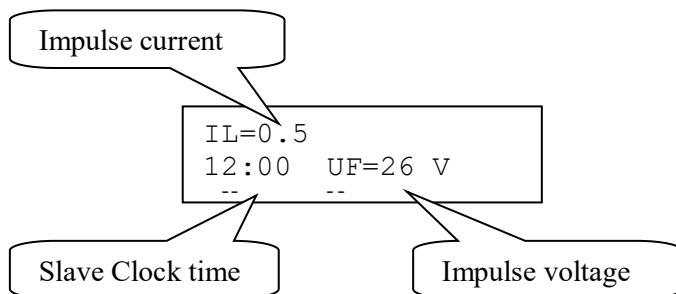
Impulse current

```
IL=0.5
12:00  UF=26 V
--      --
```

Slave Clock time

Impulse voltage

QWTIME III KNX MASTER CLOCK
User Manual

Document: DOK11025en01.doc
Author: CF
Date: 2018-07-04
Page: 22 (47)
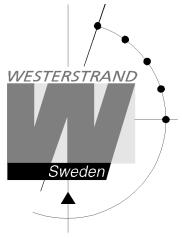
Status Alarm relay

This function is not used for Master Clock WDP-Q

Status IP

```
              S   L A
192.168.1.10
```

Work mode — Link indicator — Activity indicator — Present IP address
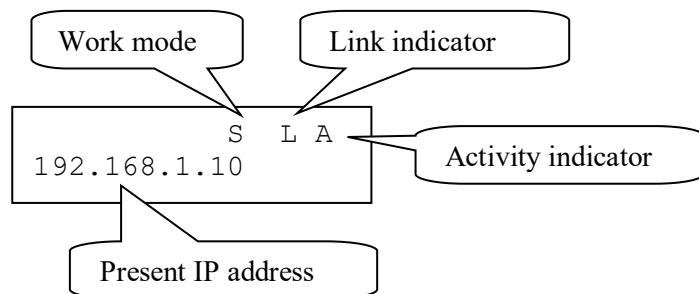
Work mode	S = Server. The Master Clock is configured to work as an NTP Time Server.
	C = Client. The Master Clock is configured to work as an NTP Time Client.

Link indicator	L = Link activated. The Master Clock is connected to a network.
	= No link. The Master Clock is not connected to a network.

Activity indicator A = The Master Clock is accessed via the network.

QWTIME III KNX MASTER CLOCK
User Manual

Document: DOK11025en01.doc
Author: CF
Date: 2018-07-04
Page: 23 (47)
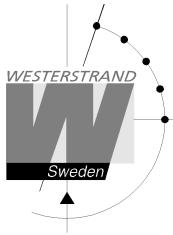
Keylock

With this function it is possible to lock the keyboard. When activated the keylock will lock all buttons in the Master Clock.
There are two levels of keyboard protection.

1. Low level protection
   Keylock **ON**   : Keyboard locked, press ← YES to open.

2. High level protection
   Keylock with **Password** :   Keyboard locked, enter password to open.

Remark: "PASSWORD --" means that no password is used

Example 1:
Activate keylock without password

MON 14 MAR 2005 09:07:00 LT	Select function using ↓ .
SPEC.-FUNCTIONS	Accept with YES. Press NO until wished function is shown.
SPEC.-FUNCTIONS KEYLOCK	Accept with YES.
KEYLOCK **OFF** PASSWORD --	Change to keylock ON.
KEYLOCK **ON** PASSWORD --	Accept with YES.
KEYLOCK ON PASSWORD **--**	Accept with YES.
SPEC.-FUNCTIONS KEYLOCK	Return to running mode press ←.
MON 14 MAR 2005 09:07:00 LT	

QWTIME III KNX MASTER CLOCK
User Manual

Document: DOK11025en01.doc
Author: CF
Date: 2018-07-04
Page: 24 (47)

Example 2:
Activate keylock with password

MON 14 MAR 2005 09:07:00 LT	Select function using ↓ .
SPEC.-FUNCTIONS	Accept with YES. Press NO until wished function is shown.
SPEC.-FUNCTIONS KEYLOCK	Accept with YES.
KEYLOCK **OFF** PASSWORD – –	Change to keylock ON.
KEYLOCK **ON** PASSWORD – –	Accept with YES.
KEYLOCK ON PASSWORD **99**	Enter, by using the arrows, a 2-digit password. Accept with YES.
SPEC.-FUNCTIONS KEYLOCK	Return to running mode press ←.
MON 14 MAR 2005 09:07:00 LT	

QWTIME III KNX MASTER CLOCK
User Manual

Document: DOK11025en01.doc
Author: CF
Date: 2018-07-04
Page: 25 (47)
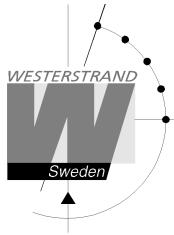
Language

With this function the language can be selected.

Example:

| MON 14 MAR 2005 09:07:00 LT | Select function using ↓ . |

| SPEC.-FUNCTIONS | Accept with YES. Press NO until wished function is shown. |

| SPEC.-FUNCTIONS LANGUAGE | Accept with YES. |

| LANGUAGE ENGLISH? | Select, by using the arrows, the wished language. Accept with YES. |

| SPEC.-FUNCTIONS LANGUAGE | Return to running mode press ←. |

| MON 14 MAR 2005 09:07:00 LT | |

QWTIME III KNX MASTER CLOCK
User Manual

Document: DOK11025en01.doc
Author: CF
Date: 2018-07-04
Page: 26 (47)
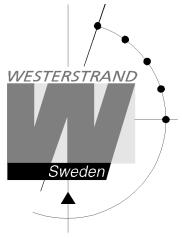
Country

With this function the Country can be selected.
The following country codes are available:

ALG = Algeria	ESP-W	NLD = Netherlands
Au-EST	EST = Estonia	NOR = Norway
AuCSTN	FIN = Finland	NZL = New Zealand
AuCSTS	FRA = France	PHL = Philippines
Au-WST	FRO = Faroe Islands	POL = Poland
Au-TAS	GBR = Great Britain	PRT = Portugal
AUT = Austria	GRC = Greece	QAT = Qatar
BEL-1	GRL = Greenland	OMN = Oman
BEL-2	HKG = Hongkong	ROU = Romania
BEL-3	HRV = Kroatia	RUS-M
BEL-4	HUN = Hungary	SAU = Saudi Arabia
BGR = Bulgaria	IND = India	SGP = Singapore
BRA = Brazil	IRL = Ireland	SWE = Sweden
CAN-P	ISL = Iceland	SYR = Syria
CAN-M	ISR = Israel	TUR = Turkey
CAN-C	ITA = Italy	UAE = United Arab Emirates
CAN-E	JOR = Jordan	US-HAW
CHE = Schweiz	KWT = Kuwait	US-ALA
CYP = Cyprus	LTU = Lithuania	US-P
DEN = Denmark	LUX = Luxembourg	USA-M
DEU = Germany	LVA = Latvia	USA-C
EGY = Egypt	MEX = Mexico	USA-E
ESP = Spain	MLT = Malta	US-ATL
	MUS = Mauritius	VEN = Venezuela
	MYS = Malaysia	ZAF = South Africa
		EUROPÉ = CET, without holidays
		GLOBAL = UTC, without holidays

QWTIME III KNX MASTER CLOCK
User Manual

Document: DOK11025en01.doc
Author: CF
Date: 2018-07-04
Page: 27 (47)
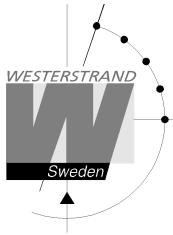
Example:

```
MON 17 MAR 2014
09:07:00   LT
```

Select function using ↓ .

```
SPEC.-FUNCTIONS
```

Accept with YES.
Press NO until wished function is shown.

```
SPEC.-FUNCTIONS
COUNTRY
```

Accept with YES.

```
COUNTRY
DEU ?
```

Select, by using the arrows, the wished country.
Accept with YES.

```
SPEC.-FUNCTIONS
COUNTRY
```

Return to running mode press ←.

```
MON 17 MAR 2014
09:07:00   LT
```

QWTIME III KNX MASTER CLOCK
User Manual

Document: DOK11025en01.doc
Author: CF
Date: 2018-07-04
Page: 28 (47)
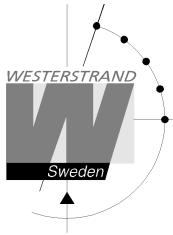
Setup

With this function the different output and input can be configured. If the default setup is used no configuration is needed.

Example:
Set the alarm limit for *radio alarm* to 1 hour. (Default setting is 12 hours.)

MON 14 MAR 2005 09:07:00 LT	Select function using ↓ .
SPEC.-FUNCTIONS	Accept with YES. Press NO until wished function is shown.
SPEC.-FUNCTIONS SETUP	Accept with YES.
SETUP SYNC SOURCE	Press NO until wished input/output is shown. Accept with YES.
DCF77 AL.LIMIT --h -- m	Set, by using the arrows, the alarm limit to 1 hour (01h).
DCF77 AL.LIMIT 01h 00 m	Accept with YES
SETUP SYNC SOURCE	Return to running mode press ←.
SPEC.-FUNCTIONS SETUP	←
SPEC.-FUNCTIONS	←
MON 14 MAR 2005 09:07:00 LT	

QWTIME III KNX MASTER CLOCK
User Manual

Document: DOK11025en01.doc
Author: CF
Date: 2018-07-04
Page: 29 (47)
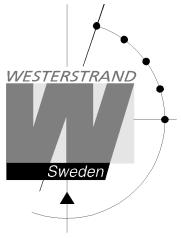
Setup synchronisation source

Below is a description of the different configuration parameters available in the setup menu for *sync. source*. Please remark that if default settings are used no configuration is needed. If sync. source KNX is selected, parameter SystemClockEnable must also be activated in the ETS configuration.

Type of synchronisation

```
DCF77
AL. LIMIT   12h00m
```

Alarm limit
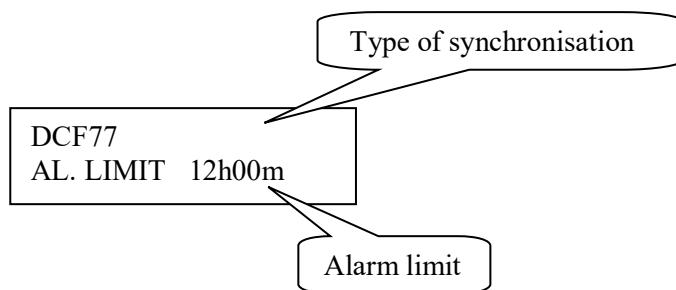
Type of synchronisation

State type of external synchronisation. The following time sources can be selected:

--------	No external synchronisation.
DCF77	Radio synchronisation DCF77.
GPS	Radio synchronisation GPS.
RDS	Radio synchronisation RDS.
MSF	Radio synchronisation MSF/RUGBY.
1/1M SYNC	Polarised 1/1-minute impulse, sync.
1/1M SLAVE	Polarised 1/1-minute impulse, slave.
1/2M SYNC	Polarised 1/2-minute impulse, sync.
1/2M SLAVE	Polarised 1/2-minute impulse, slave.
TC	Time code type hard wired DCF.
TC-POL	Polar reversing time code type hard wired DCF.
FMSF	Finnish FM time signal.
KNX	KNX messages with DPT TYPE 19.001. KNX Synchronisation must be activated in the ETS configuration.

Alarm limit

The configuration parameter *Alarm limit* specifies the time delay before the radio alarm is activated. Default setting is that the radio alarm is inactivated, AL.LIMIT --h--m.

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QWTIME III KNX MASTER CLOCK
User Manual

Document: DOK11025en01.doc
Author: CF
Date: 2018-07-04
Page: 30 (47)
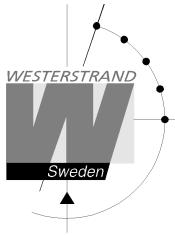
Setup impulse output

Below is a description of the different configuration parameters available in the setup menu for ***impulse output***. Please remark that if default settings are used no configuration is needed.

Impulse type

```
Type of impulse          Type of time

1/1MIN 24H LT
2.0s?

Impulse length
```
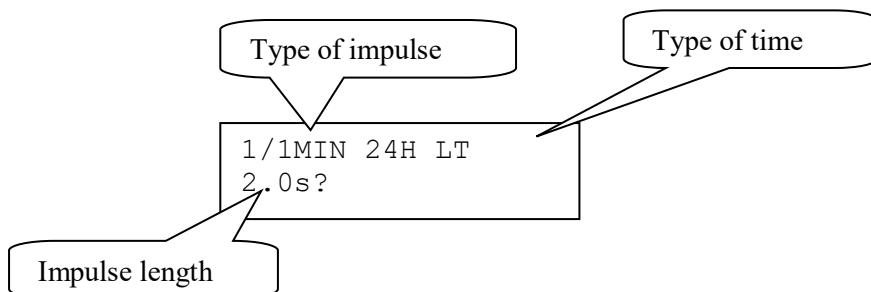
Type of impulse
Selection of impulse type. The following types are available.

1/1M-24H	: Polarised 1/1-minute impulse with 24 hours resetting (default).
1/1M-12H	: Polarised 1/1-minute impulse with 12 hours resetting.
1/2M-24H	: Polarised 1/2-minute impulse with 24 hours resetting
1/2M-12H	: Polarised 1/2-minute impulse with 12 hours resetting.
SEC-12H	: Polarised Second impulses with 12 hours resetting.
SEC-60S	: Polarised Second impulses with 60 seconds resetting.
TC	: Hard wired DCF Time Code.
1/1M-UP	: Non polarised (Uni-Polar) PPM synchronisation pulse. Pulse length 1 second.
SR2-58	: (SR2, hourly correction 2-wired, with imp. correction on the 58th minute).
SR2-59	: (SR2, hourly correction 2-wired, with imp. correction on the 59th minute).
SR3-58	: (SR3, hourly correction 3-wired, with imp. correction on the 58th minute).
SR3-59	: (SR3, hourly correction 3-wired, with imp. correction on the 59th minute).
IRIGB123	: Time code according to IRIG Document 200-98, Format B123.
AFNOR	: Time code according to AFNOR NFS-87500.
-----------	: No impulse system.

Type of time
LT = Local Time.
NT = Normal Time (winter time).
UTC = Universal Time Coordinated.

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QWTIME III KNX MASTER CLOCK
User Manual

Document: DOK11025en01.doc
Author: CF
Date: 2018-07-04
Page: 31 (47)

Impulse length
Configuration of impulse length.

1/1 and 1/2 -minute impulse:	0.1s – 9.9 s.
Second impulses:	0.1 – 1.0 s.

Remark:
When selecting second impulses with pulse length > 0.5 seconds, the pulse length for rapid impulses is automatically adjusted to 0.5 seconds.

Alarm limits


```
IL=0.0 - 1.1A
UF= -- V
   --    --
```

Impulse current low limit

Impulse current high limit

Impulse feedback voltage limit
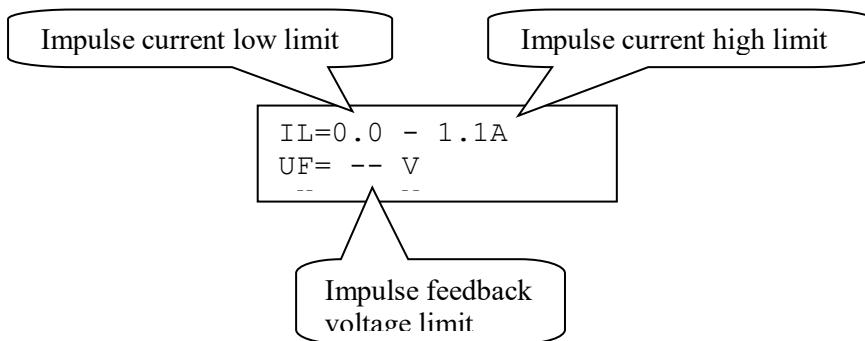
Impulse current low limit
Alarm limit for low current (minimum load). The minimum load can be set from 0A up to 1.1A.

Impulse current high limit
Alarm limit for high current (maximum load). The maximum load can be set from 0A up to 1.1A.

Impulse feedback voltage limit
Alarm limit for feedback impulse voltage.

--	: No limit (default).
01 - 99	: Limit in volts, V.

Type of time
Type of time received or transmitted.

LT = Local Time.
NT = Normal Time (winter time).
UTC = Universal Time Coordinated.

QWTIME III KNX MASTER CLOCK
User Manual

Document: DOK11025en01.doc
Author: CF
Date: 2018-07-04
Page: 32 (47)

Software version

This function shows the software version for the Time Base module.

| MON 14 MAR 2005
09:07:00   LT | Select function using ↓ . |

| SPEC.-FUNCTIONS | Accept with YES.
Press NO until wished function is shown. |

| SPEC.-FUNCTIONS
SOFTWARE VERSION | Accept with YES. |

| QW3-A031
123342-00   11m | The software version is QW3-A031.
11m = Uptime for this Master Clock. |

| SPEC.-FUNCTIONS
SOFTWARE VERSION | Return to running mode press ←. |

| SPEC.-FUNCTIONS | ← |

| MON 14 MAR 2005
09:07:00   LT | |

QWTIME III KNX MASTER CLOCK
User Manual

Document: DOK11025en01.doc
Author: CF
Date: 2018-07-04
Page: 33 (47)
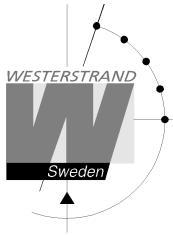
Week Program & Date Program

Using these two functions, programming of the outputs is made.

Concept description

Program
A "program" refers to programming an output to a certain time. The word program represents a single time event and several programs are defined as a *group* of programs.
For example: output 2 switches on every working day (Monday-Friday) at 8.00.

Week program
A week program is a program, which is repeated every week. You can for each program choose for which days of the week it shall be valid:
Individual or block programming.
M = Monday
T = Tuesday
W = Wednesday
T = Thursday
F = Friday
S = Saturday
S = Sunday

Date program
A date program is a program, which is valid for a specific date.

Group
A group of programs, signal events.

Type of signals
There are some different kinds of signals, depending on how the relay output is to be used.

ON/OFF
Is used when a longer lasting switching ON is required, e.g. for controlling fans, door locks, lighting etc.

01s
Is used when a short pulse is required, e.g. for bells/buzzers.
Pulse duration selectable from 1-99 seconds.

Astr.
Astr. (Twilight) is a function which closes/opens a predestined relay at sunrise resp. sunset. Which day and month of the year it is, and where the Master Clock is located geographically, define the time of the sunrise resp. sunset.
The sunrise resp. sunset are calculated in the software of the Y8 module.
The geographic position of the Master Clock is entered at starting up.
A map indicating latitude (Enorth) and longitude (Eeast) is enclosed.

Mask
A program that is repeated f. ex every hour is easily entered by the use of mask program.
XX.15.00 ; the program is repeated every hour att minute 15.
08.XX.00 ; the program is repeated every minute between 08.00 and 09.00.
XX.XX.00 ; The program is repeated every minute.
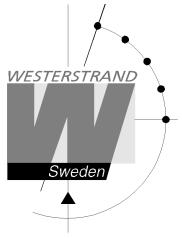
QWTIME III KNX MASTER CLOCK
User Manual

Document: DOK11025en01.doc
Author: CF
Date: 2018-07-04
Page: 34 (47)

To simplify programming 3 sub menus are used:

```
WEEK PROGRAM
NEW         GROUP  A
```
To enter new programs.

```
WEEK PROGRAM
ERASE      GROUP  A
```
To erase a separate existing program.

```
WEEK PROGRAM
CHANGE     GROUP  A
```
To change existing programs.

QWTIME III KNX MASTER CLOCK
User Manual

Document: DOK11025en01.doc
Author: CF
Date: 2018-07-04
Page: 35 (47)
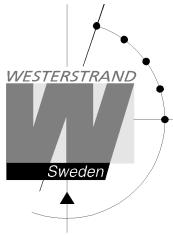
Week Program, example 1 (New program)

Example: Outputs No. 2 shall switch on Monday – Friday at 09.00 and off at 17.00.

```
MON 14 MAR 2005
09:07:00    LT
```
Select function using ↑↓.

```
WEEK PROGRAM
```
Enter programming mode using YES.

```
WEEK PROGRAM
NEW        GROUP A
```
Select new program using YES.

```
WEEK PROGRAM
NEW        GROUP A
```
Select group of programs using ↑↓, accept using YES.

```
OUTPUT 2        ON
------- 08:00:00
```
Select output using ↑↓. Move to the right using →.

```
OUTPUT 2        ON
------- 08:00:00
```
State type of signal using ↑↓.

```
OUTPUT 2        ON
MTWTF-- 08:00:00
```
State the days the program shall function using ↑↓.
Move to the right using →.

```
OUTPUT 2        ON
MTWTF-- 09:00:00
```
State the time of the program using ↑↓.
Move to the right using →.
Accept using YES.
If the program is approved the text "Program saved" is displayed quickly.

```
OUTPUT 2       OFF
MTWTF-- 17:00:00
```
Continue with programming OFF for the same output or leave programming by pressing ← several times.

```
WEEK PROGRAM
```

```
MON 14 MAR 2005
09:07:00    LT
```

QWTIME III KNX MASTER CLOCK
User Manual

Document: DOK11025en01.doc
Author: CF
Date: 2018-07-04
Page: 36 (47)

Week Program, example 2 (Change program)

Example: A signal on output 1, Monday – Friday at 08.00, shall be changed to 08.15. Signal length is 5 seconds.

```
MON 14 MAR 2005
09:07:00   LT
```
Select function using ↑↓ .

```
WEEK PROGRAM

```
Enter programming mode using YES.

```
WEEK PROGRAM
CHANGE    GROUP A
```
Select change program using YES.

```
WEEK PROGRAM
CHANGE    GROUP A
```
Select group of programs using ↑↓, accept using YES.

```
OUTPUT 2      05S
MTWTF-- 08:00:00
```
Select output using ↑↓. Move to the right using →.

```
OUTPUT 2      05S
MTWTF-- 08:00:00
```
Step forward to the program, which is to be changed using NO and YES.

```
OUTPUT 2      05S
MTWTF-- 08:15:00
```
Change the time to 09.15 using the arrows.
Accept using YES.

```
WEEK PROGRAM

```
Leave the programming by pressing ← several times.

```
MON 14 MAR 2005
09:07:00   LT
```

QWTIME III KNX MASTER CLOCK
User Manual

Document: DOK11025en01.doc
Author: CF
Date: 2018-07-04
Page: 37 (47)
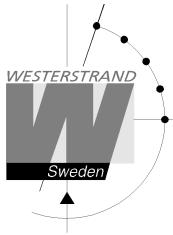
Week Program, example 3 (Erase program)

Example: A signal on output 1, Fridays at 16.30 shall be deleted. Signal length is 5 seconds.

```
MON 14 MAR 2005
09:07:00    LT
```
Select function using ↑↓ .

```
WEEK PROGRAM
```
Enter programming mode using YES.

```
WEEK PROGRAM
ERASE    GROUP A
```
Select erase program using YES.

```
WEEK PROGRAM
ERASE    GROUP A
```
Select group of programs using ↑↓, accept using YES.

```
OUTPUT 1       ON
MTWTF-- 09:00:00
```
Select output using ↑↓. Move to the right using →.

```
OUTPUT 1      05S
----F-- 16:30:00
```
Step forward to the program that is to be erased using NO and YES. Accept using YES.

```
WEEK PROGRAM
```
Leave the programming by pressing ″ several times.

```
MON 14 MAR 2005
09:07:00    LT
```

QWTIME III KNX MASTER CLOCK
User Manual

Document: DOK11025en01.doc
Author: CF
Date: 2018-07-04
Page: 38 (47)
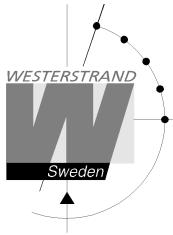
Week Program, example 4 (Astronomical function)

Example: Output No. 1 shall switch ON all sunset All days and switch OFF at sunrise.

```
MON 14 MAR 2005
09:07:00   LT
```
Select function using ↑↓ .

```
WEEK PROGRAM
```
Enter programming mode using YES.

```
WEEK PROGRAM
NEW        GROUP A
```
Select new program using YES.

```
WEEK PROGRAM
NEW        GROUP A
```
Select group of programs using ↑↓, accept using YES.

```
OUTPUT 2 ON
MTWTF-- 08:00:00
```
Select output using ↑↓. Move to the right using →.

```
OUTPUT 2 ASTR
MTWTF--
```
State type of signal using ↑↓.

```
OUTPUT 2 ASTR
MTWTF--
```
State the days the program shall function using ↑↓.
Accept using YES.
If the program is approved the text "Program saved" is displayed quickly.

```
WEEK PROGRAM
```
Leave the programming by pressing ← several times.

```
MON 14 MAR 2005
09:07:00   LT
```

QWTIME III KNX MASTER CLOCK
User Manual

Document: DOK11025en01.doc
Author: CF
Date: 2018-07-04
Page: 39 (47)
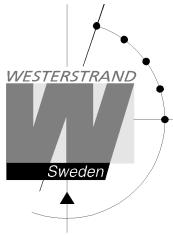
Week Program, example 5 (Block program)

Example: Outputs No. 2 shall switch on Monday, Wednesday and Friday at 09.00.

```
MON 14 MAR 2005
09:07:00    LT
```
Select function using ↑↓ .

```
WEEK PROGRAM
```
Enter programming mode using YES.

```
WEEK PROGRAM
NEW       GROUP A
```
Select new program using YES.

```
WEEK PROGRAM
NEW       GROUP A
```
Select group of programs using ↑↓, accept using YES.

```
OUTPUT 2 ON
-------- 08:00:00
```
Select output using ↑↓. Move to the right using →.

```
OUTPUT 2 ON
-------- 08:00:00
```
State type of signal using ↑↓.

```
OUTPUT 2 ON
M-W-F-- 08:00:00
```
State the days the program shall function using ↑↓.
Move to the right using →.

```
OUTPUT 2 ON
M-W-F-- 09:00:00
```
State the time of the program using ↑↓.
Move to the right using →.
Accept using YES.
If the program is approved the text "Program saved" is displayed quickly.

```
OUTPUT 2 OFF
M-W-F-- 09:00:00
```
Continue with programming OFF for the same output or leave programming by pressing ← several times

```
WEEK PROGRAM
```

```
MON 14 MAR 2005
09:07:00    LT
```

QWTIME III KNX MASTER CLOCK
User Manual

Document: DOK11025en01.doc
Author: CF
Date: 2018-07-04
Page: 40 (47)

Week Program, example 6 (Mask program)

Example: Outputs No. 2 shall switch on for 5 seconds every hour at minute 15, all days in the week.

```
MON  14 OCT 2002
09:07:00   LT
```
Select function using ↑↓ .

```
WEEK PROGRAM
```
Enter programming mode using YES.

```
WEEK PROGRAM
NEW       GROUP A
```
Select new program using YES.

```
WEEK PROGRAM
NEW       GROUP A
```
Select group of programs using ↑↓, accept using YES.

```
OUTPUT 2 ON
------- 08:00:00
```
Select output using ↑↓. Move to the right using →.

```
OUTPUT 2 05S
------- 08:00:00
```
State type of signal using ↑↓.
05S = Pulse with 5 seconds length.

```
OUTPUT 2 05S
MTWTFSS 08:00:00
```
State the days the program shall function using ↑↓.
Move to the right using →.

```
OUTPUT 2 05S
MTWTFSS **:15:00
```
State the time of the program using ↑↓. ** = every hour.
Move to the right using →.
Accept using YES.
If the program is approved the text "Program saved" is displayed quickly.

```
WEEK PROGRAM
```
Leave programming by pressing ← several times.

```
MON  14 OCT 2002
09:07:00   LT
```

QWTIME III KNX MASTER CLOCK
User Manual

Document: DOK11025en01.doc
Author: CF
Date: 2018-07-04
Page: 41 (47)
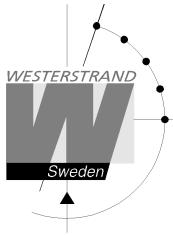
Date Program, example (New program)

Example: Outputs No. 1 shall switch on the 1st of August at 12.00.

```
MON  14 OCT 2002
09:07:00   LT
```
Select function using ↑↓ .

```
DATE PROGRAM
```
Enter programming mode using YES.

```
DATE PROGRAM
NEW
```
Select new program using YES.

```
OUTPUT 1 ON
AUG 01  08:00:00
```
Select output using ↑↓. Move to the right using →.

```
OUTPUT 1 ON
AUG 01  08:00:00
```
State type of signal using ↑↓.

```
OUTPUT 1 ON
AUG 01  08:00:00
```
State the date the program shall function using ↑↓.
Move to the right using →.

```
OUTPUT 1 ON
AUG 01  12:00:00
```
State the time of the program using ↑↓.
Move to the right using →.
Accept using YES.
If the program is approved the text "Program saved" is displayed quickly.

```
OUTPUT 1 OFF
AUG 01  12:00:00
```
Continue with programming OFF for the same output or leave programming by pressing ← several times.

```
DATE PROGRAM
```

```
MON  14 OCT 2002
09:07:00   LT
```

QWTIME III KNX MASTER CLOCK
User Manual

Document: DOK11025en01.doc
Author: CF
Date: 2018-07-04
Page: 42 (47)
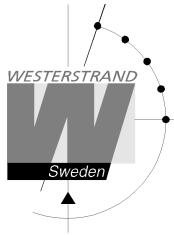
Display Program

```
MON 14 MAR 2005
09:07:00    LT
```
Select function using ↑↓ .

```
DISPLAY PROGRAM
```
Enter display program using YES.

```
DISPLAY PROGRAM
GROUP A
```
Select program group using ↑↓, accept with YES.

```
GROUP A
OUTPUT ALL
```
Select output to be displayed using ↑↓, accept with YES.

```
OUTPUT 2 ON
MTWTF-- 08:00:00
```
Step forwards alt. Backwards using ↑↓.

```
DISPLAY PROGRAM
```
Leave the function display program by pressing ← several times.

```
 MON 14 MAR 2005
09:07:00    LT
```

QWTIME III KNX MASTER CLOCK
User Manual

Document: DOK11025en01.doc
Author: CF
Date: 2018-07-04
Page: 43 (47)
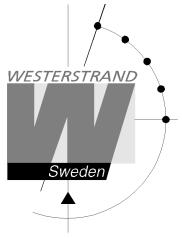
Temporary Program, example

Example: Outputs No. 2 shall switch on immediately 15.35.00 and turn off according to normal week program. The temporary program will automatically be erased when the event has been effected.

```
MON 14 MAR 2005
09:07:00   LT
```

Select function using ↑↓ .

```
TEMPORARY PROGR.
```

Enter programming mode using YES.

```
OUTPUT 2 ON
15:35:00
```

Select output using ↑↓. Move to the right using →.

```
OUTPUT 2 ON
15:35:00
```

State type of signal using ↑↓.
Accept using YES

```
OUTPUT 2 ON
15:35:00
```

Accept using YES or change the time of the program using ↑↓.

```
TEMPORARY PROGR.
```

Leave the programming by pressing ″ several times.

```
 MON 14 MAR 2005
09:07:00   LT
```

QWTIME III KNX MASTER CLOCK
User Manual

Document: DOK11025en01.doc
Author: CF
Date: 2018-07-04
Page: 44 (47)
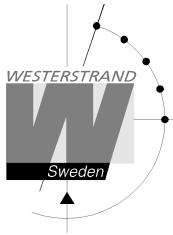
Group => Period

Each program group can be associated to one or several *time periods.* A time period can consist of one or several dates. Maximum 99 time periods can be used. Program group **A** is as default associated to a time period covering the complete year, 1/1-31/12.

Example:
A school has one group of programs that are used during the school season and another used during school holidays. School season = Group **A,** School holidays = Group **B**.

The school holidays are at the following dates: 1/5, 10/6-15/8, 23/9 and so on...

```
MON 14 MAR 2005
09:07:00   LT
```
Select function using ↑↓ .

```
GROUP => PERIOD
```
Enter programming mode using YES.

```
GROUP B
1:____ - _____
```
Select group of programs using ↑↓, accept using YES.

```
GROUP B
1:MAY01 - _____
```
State the date when the period shall begin.
Move to the right using →.

```
GROUP B
1:MAY01 - MAY01
```
State the date when the period shall end.
Accept with Yes.

```
GROUP B
2:____ - _____
```
Continue with next time period.

```
GROUP B
2:JUN07 - _____
```

```
GROUP B
2:JUN07 - AUG15
```
Accept with YES.

```
GROUP => PERIOD
```
Continue with next time period or leave programming by pressing ← several times.

```
MON 14 MAR 2005
09:07:00   LT
```

QWTIME III KNX MASTER CLOCK
User Manual

Document: DOK11025en01.doc
Author: CF
Date: 2018-07-04
Page: 45 (47)
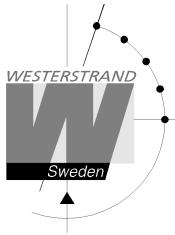
Display Holidays

This function is used to display the public holidays that are stored.

Example:

```
MON 14 MAR 2005
09:07:00    LT
```
Select function using ↑↓ .

```
DISPLAY HOLIDAYS
```
Enter display program using YES.

```
DISPLAY HOLIDAYS
01:  01Jan
```
Scroll using ↑↓.

```
DISPLAY HOLIDAYS
```
Leave the programming by pressing ← several times.

```
MON 14 MAR 2005
09:07:00    LT
```

QWTIME III KNX MASTER CLOCK
User Manual

Document: DOK11025en01.doc
Author: CF
Date: 2018-07-04
Page: 46 (47)
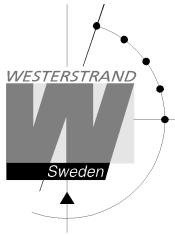
Display format

With this function the display format in running mode can be selected.

The following two formats can be selected:

```
MON  14 MAR 2005
10:11:00   LTw
```

Standard format, default format.
LT = Local Time. (LTs when summer time)
NT = Normal Time (Winter time).
UTC = Universal Time Coordinated.

```
MON  12 DEC 2001
LTw
```

Format 2, used for test / fault finding.

Example:

```
MON 14 MAR 2005
09:07:00   LT
```

Select function using ↓ .

```
SPEC.-FUNCTIONS
```

Accept with YES.
Press NO until wished function is shown.

```
SPEC.-FUNCTIONS
DISPLAY FORMAT
```

Accept with YES.

```
DISPLAY  FORMAT
STANDARD
```

Select, by using the arrows, the wished display format.
Accept with YES.

```
SPEC.-FUNCTIONS
DISPLAY FORMAT
```

Return to running mode press ←.

```
MON 14 MAR 2005
09:07:00   LT
```

QWTIME III KNX MASTER CLOCK
User Manual

Document: DOK11025en01.doc
Author: CF
Date: 2018-07-04
Page: 47 (47)
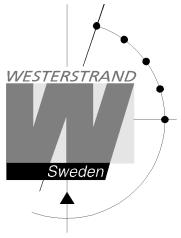
Troubleshooting

The display is blank

A.   The green LED "POWER" is light?

A1.   No.
A1A.   Check the supply voltage.
A1B.   Power supply wires connected correctly?

A2.   Yes.
A2A.   Restart the master clock by switching the supply voltage off and on.

After starting up the master clock, no impulses appear (to correct the slave clocks).

B1.   The master clock awaits the time shown by the slave clocks. Impulses will be distributed when correct time = the time shown by the slave clocks.

Alarm messages

D1.   "Short circuit"

Excessive load on the impulse output. Check the slave clock wiring. Impulses are stored (memorised) during the alarm. When the fault is fixed, all the stored impulses are distributed by rapid impulsing.

RADIO

Radio synchronisation is not working (DCF)

Check that the LED in the antenna is flashing in second's rhythm. The antenna should be mounted in the clear, with the arrow on the box aiming south. Check that the LED "Radio" on the master clock is flashing in second's rhythm.

Use special functions "Status/Sync. source" for information on the reception quality.

Accepted radio reception is shown by a flashing colon (:) between hours and minutes in the display.