

# User Manual

## CIRCLE LINE

### NTP PoE

### 190420-02





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## General

Digital clock is for indoor application with time display that has 4 digits and colon as time. The digits consist of 7 segments.

The Digital clock can be configured to show the time/date/temperature alternately in 0-25sec intervals. Temperature sensor is not included. It is an option.

The clock is prepared for time synchronization by Network Time Protocol (NTP) from an NTP server. If the connection to the NTP server is lost the clock will continue to run on the built-in time base.

Configuration of network settings, light intensity and other parameters is done via a WEB-browser.

The factory default setting for the IP address assignment is DHCP with fallback IP address 192.168.3.10. Please note if default settings are used no configuration is needed.

If the function is activated in summer and winter time, this takes place on the last Sunday in March and the last Sunday in October, respectively.

The clock has adjustable light intensity.

If power failure occurs the display is turned off. An internal clock counts the time for approx. 48 hours.

After power failure the display is turned on and it will show bars until it is synchronised by a NTP server. The colon will flash when time from the NTP server is accepted.

## Power-Over-Ethernet

Power-over-Ethernet (PoE) is a network standard based on IEEE 802.3af that provides a means of delivering power to devices connected to the LAN. This technology eliminates AC electrical wiring, wall transformers, allows centralised UPS backup, and is fully compatible with both powered and non-powered Ethernet devices. In addition to providing time synchronisation and control over Ethernet, PoE enabled Ethernet cable provides power to the clock. System installers need run only a single Ethernet cable that carries both power and data to each clock. This allows greater flexibility placing clocks and, in most cases, significantly decreases installation costs. Westerstrand clocks are fully compliant with the IEEE 802.3af standard for providing power over Ethernet.



## Safety

Installation and maintenance of this device must be performed by accredited personnel. This product must not be installed by unauthorized users/operators. Electrical installation of the equipment must comply with applicable electrical standards.

## Functional description

### Start up

When the power is switched on, the clock will display the time from the internal timekeeper.

If no correct time, the display will show lines.

After some seconds, the clock tries to receive a correct time message from an NTP server and then display correct time.

In case the NTP would disappear, the clock will run on built-in quartz crystal.

## Synchronisation

### NTP

The clock is prepared for time synchronization by Network Time Protocol (NTP) from an NTP server. When a correct time message is received the clock will display correct time automatically.

The colon between hours and minutes will flash when the clock is in sync and the time message is accepted.

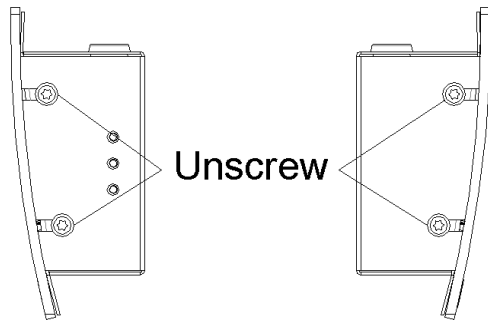
### Stand alone

If the clock does not have an external synchronisation, it operates standalone.

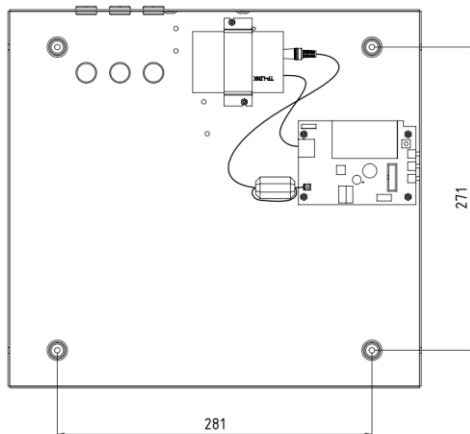
## Installation

### Wall mounted

- Unscrew 4 screws, 2 pieces on each side.



Remove the front and mount the back plate on the wall, using 4 screws suitable for the wall. We recommend  $\varnothing 4$ mm and 30mm long screws.



## Connection

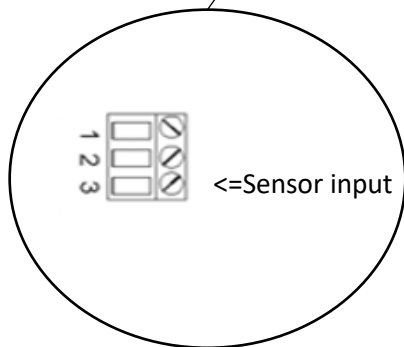
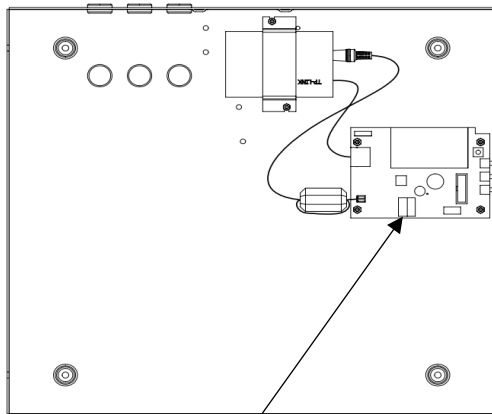
The connections are made on the inside of the back plate (see below.)

- Connect the LAN cable to the RJ45 on Power over Ethernet (PoE) splitter.
- Refit the front.
- Configure the clock.

Connection temperature sensor or temperature/ humidity sensor (option).

### Temperature sensor connection

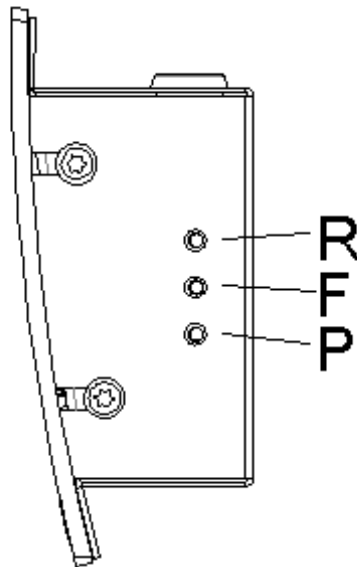
1. Brown
2. Black
5. Screen



## Programming

Configuration of network settings, light intensity and other parameters is done via a WEB-browser. Some of the parameters can also be set using three buttons located at one side of the clock. Please note if default settings are used no configuration is needed.

The programming is made with push buttons placed on the side of the clock (see below).



**R (Return)** Enter the base mode (display time)

**F (Function)** Next function / Accept displayed value

**P (Program)** Enter the displayed function / Increase displayed value.



## Manuel programming time

Push [F] until display shows:

ti ne

Push [P] display shows:

yy 95

year

Push [P] until desired year (00-99)

Accept with [F].

Display show:

nn 1

month

Push [P] until desired month (1-12).

Accept with [F].

Display shows:

dd 1

day

Push [P] until desired date (1-31).

Accept with [F].

Display shows:

hh 12

hour

Puch [P] until desired hour (0-23).

Accept with [F].

Display shows:

nn 07

minute

Push [P] until desired minute (00-59).

Push [F] for synchronisation and the clock starts

Display shows:

ti ne

Push [R]. The Programming is finished.

Display shows:

12 : 07





### Setting light intensity

The light intensity for the digits can be adjusted in 8 levels.

An automatic dimmer function regulates the light intensity.

Push [F] until display shows:

di sp

Push [P]

Display shows:

di 1

. Light intensity 1 (weakest) - 8 (strongest)

Push [P] for desired light intensity. Accept with [F].

Display shows:

Sy nc

Push [R] for entering base mode or push [F] for next function.

### View / configure IP address

The Clocks IP address can be either static or dynamic (DHCP). Configuration of IP addressing work mode is done using a web-browser. The default setting is DHCP.

Using the R F & P buttons it is possible to view or change the current IP-address. It is also possible to see if the Clock is using static or dynamic IP address.

If the work mode is DHCP it is not possible to change the IP address manually.

To view the current IP address:

In this example we demonstrate IP address 192.168.2.51

1. Push [F] until display shows  
IP mode d = dynamic (DHCP), s = static IP
2. Push [P] to select
3. Display shows
4. Push [P] to select
5. Display shows
6. Push [P] to select
7. Display shows
8. Push [P] to select
9. Display shows
10. Push [R]. Return to base mode

IP d

(IP mode)

A1 92

(first part)

b1 68

(second part)

C 2

(third part)

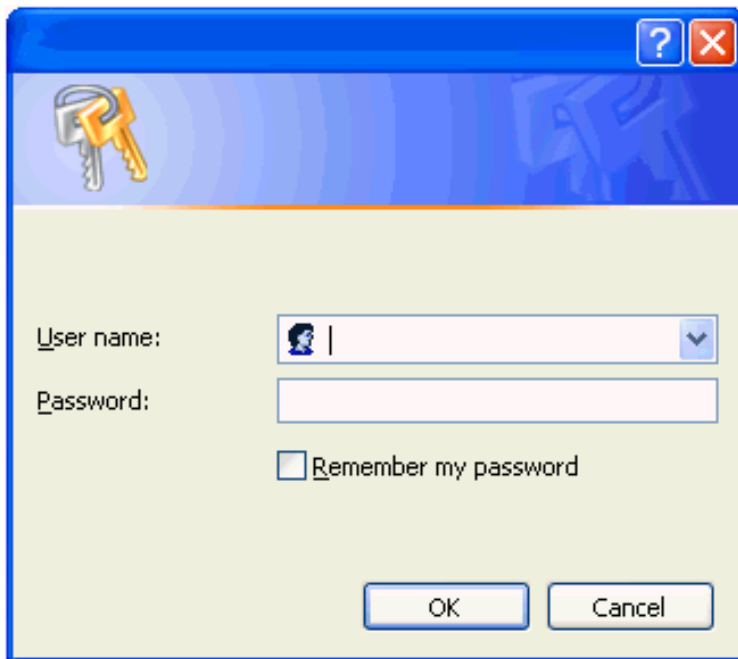
d 51

(fourth part)

## Configuration using a WEB browser

### Login

It is possible to login as administrator or guest. The administrator has the rights to read and to write/change configuration. A guest can read only.

A screenshot of a login dialog box. The window has a blue title bar with a question mark and a close button. The main area has a light green background. At the top left, there is an icon of two keys. Below the icon, there are two input fields: 'User name:' with a dropdown menu showing a user icon, and 'Password:' with a text box. Below the password field is a checkbox labeled 'Remember my password'. At the bottom, there are two buttons: 'OK' and 'Cancel'.

### Username

*admin or guest.*

### Password

Enter a password. Default password is *password*.  
After the login a function menu will be shown.



## Status

The status of the watch is shown on the first page of the function menu.

Name	Clock_Name	<a href="#">Refresh</a>
UTC	2022-11-03 13:44:58, week 44 Thu	
LT	2022-11-03 14:44:58, week 44 Thu	
Timezone	UTC+01:00, winter (CET)	
IP	192.168.2.8 (DHCP)	
Netmask	255.255.240.0	
Gateway	192.168.1.1	
DNS	192.168.1.13	
MAC	00-07-09-10-36-9A	
Alarms	No alarms	
NTP	Synchronized: ntp.se (194.58.200.20), s=1, n=3, TO=60 m	
Sensor	Dimmer=5/5, Sensor=6436, Temp= -- °C	
Uptime	21 min, 7 sec	
Firmware	LISA-Q181 (Nov 3 2022 13:20:52)= -- °C	

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### Name

Symbolic name. The name is set in function General

### UTC/LT

Current time

### Timezone

Offset to UTC during normal time (=winter time).

### IP

The clock IP address

### Netmask

Shows the netmask setting

### Gateway

Shows the IP-address of the gateway

### DNS

Shows the address of the DNS server

### MAC

A MAC address has format 00-07-09-xx-xx-xx



### Alarms

Shows if the Clocks has any alarms. The following alarm texts can be displayed.

*No Alarms* = Clock OK.

*Not synchronised* = The Clock is not synchronised.

*5-minute limit* = The received time message is more than 5 minutes wrong compared to internal time. The message is not accepted.

*Authentication* = The MD5 authentication has failed.

*Temp is out of bounds* = Temperature reading is currently out of bounds.

### NTP

Synchronised = The clock has been synchronised from an NTP server with name/IP ntp.se

s = Stratum, time quality. A low value is better.

n = Number of time settings from this NTP server.

TO = Timeout in minutes before NTP alarm.

### Sensor

Dimmer=4/5: Current dimmer value / Set dimmer level. Maximum value 8.

Sensor=8784: Current light sensor data. Possible values 0-65535.

Temp=21° C: Current temperature reading.

### Uptime

Time in operation since last power failure.


### Firmware

Firmware version.



## Network

Enter general network parameters.

**Westerstrand Urfabrik AB**

**Status** **Network** NTP Clock General **Advanced**

**DHCP**  
Use DHCP   
Fallback   
**Static IP**  
Use static IP   
Address   
Subnetmask   
Gateway   
DNS 1   
DNS 2   
**VLAN**  
Enable VLAN   
VLAN tag (0-4094)   
VLAN prio (0-7)   
**Utilities**  
Syslog    
Identity access   
Telnet   
HTTP   
HTTPS   
**SNMP**  
Enable SNMP   
Read community   
Read/write community   
Trap address 1   
Trap address 2   
Trap address 3   
Trap type v1  v2

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## DHCP

Off – Static IP address according to static IP below.

On – DHCP IP address with fallback according to IP fallback below.

Fallback: If DHCP is activated this will be the DHCP fallback address.

## Static IP

To be checked if static IP address is used.

Address: Enter the static IP-address.

Subnetmask: Enter the subnetmask.

Gateway: Gateway IP address.

DNS: IP address of DNS server. Two different addresses can be entered, DNS1 and DNS 2.

## Utilities

Syslog: Syslog server IP address. Send syslog messages if checked.

Identify access: Identify access is used in combination with application software Wunser. Wunser is a PC program that is used for finding and doing light configuration on Westerstrand Ethernet products. Firmware updates are also handled by Wunser.

Wunser uses UDP port 9999 when communicating with other Westerstrand products and UDP port 69 when downloading new firmware. These ports can be open, closed or prepared for encrypted communication.

*Identify access = Normal* ; port 9999 and port 69 is open.

*Identify access = Password* ; port 9999 and port 69 are using AES encryption. The password used is the same as the administrator login password.

*Identify access = Disabled* ; port 9999 and port 69 is closed.

Telnet: Use of Telnet protocol allowed if checked.

Web server: Use of HTTP protocol (web-browser) allowed if checked.

HTTPS: Use of secure communication protocol HTTPS (web-browser) if checked.

## SNMP

This function is used to activate the SNMP, enter the address of one or more SNMP servers and to define the SNMP community. The IP address can be specified as an IP address or as a full domain name. Up to three SNMP server addresses can be entered.



Trap type: This function is used to choose SNMP trap version.

Trap type v1 = Trap according to SNMPv1

Trap type v2 = Trap according to SNMPv2

## NTP

### NTP settings

#### General Description

Westerstrand NTP Clients has several features to achieve a reliable and accurate time. The configuration of the different facilities is flexible, and the features can be selected or deselected depending on each customer's individual needs.

As an NTP Client the unit has three different ways to determine the most accurate and reliable candidates to synchronize the system clock. Which model that is used depends on the specific installation and the customer requirements. The NTP client has also a server list where up to 5 different time servers can be entered.

The three different ways are:

1. FIRST Always use the first server in the list if available. If not available, take the next one.

This suits installations where it is more important to know exactly from where the clients get time than to have the most accurate time. The other NTP servers in the list will then be more of backup servers.

2. STRATUM Use the NTP server with best stratum. The software sends a request to all servers in the list and uses the time from the one with best stratum. If same stratum it will use the one that is first in the server list.

This suits installations where it is important that the time is coming from a time server high up in the pyramid.

3. MEDIAN Send a request to all servers in the list and use the median value (the NTP server that is in the middle). This will filter out all misleading time messages.

In addition to these rules there are some more features such as synchronization limits and a clock discipline algorithm is also included. This algorithm measures the oscillators drift over a longer period and makes compensations for the drift.



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Status Network **NTP** Clock General Advanced

DHCP option 42

Broadcast

Multicast

NTP 1

NTP 2

NTP 3

NTP 4

NTP 5

Set Local Time

Local Time

Interval  minutes

Remove time at alarm

Alarm timeout  minutes

Timezone  ▼

Daylight Saving Time

NTP Advanced

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### DHCP option 042

Ask for time using the server IP addresses received from the DHCP server (DHCP option 0042). Maximum 2 NTP servers are set automatically by option 0042.

### Broadcast

Accept broadcast/multicast time messages. Broadcast address: 255.255.255.255

### Multicast

Accept multicast time messages. Multicast address: 224.0.1.1

### NTP server

Select NTP servers, e.g. *192.168.1.237* or as an URL *ntp.se*. Also see **NTP mode=DHCP** above  
Up to five different NTP servers can be entered. If the first one fails it will automatically go to the next one and so on.

### Set local Time

Used for manual time setting.

### Interval

Interval in seconds between NTP requests.





#### Remove time at alarm

This function is used to define how the clock should behave during a NTP synchronization alarm. See Alarm timeout below. If the checkbox is checked the clock will show --:-- in case of synchronization alarm. If the box is not checked, the clock continues to show time and uses its own built-in quartz oscillator as time reference.

#### Alarm timeout

Time in minutes before the NTP synchronization alarm is activated.

#### Timezone

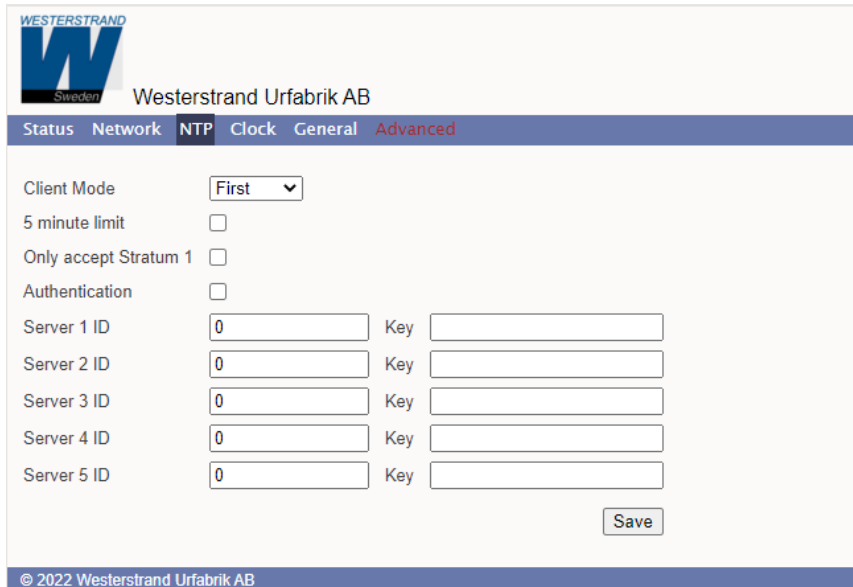
Select country/time zone. A NTP server sends UTC time. The clock will correct this to local time. If Daylight Saving Time (see below) is checked it will also and adjust for DST (Daylight Saving Time) automatically.

#### Daylight Saving Time

If checked then this timezone uses DST (Daylight Saving Time).

## NTP advanced

### Advanced NTP settings



WESTERSTRAND  
Sweden

Westerstrand Urfabrik AB

Status Network **NTP** Clock General Advanced

Client Mode

5 minute limit

Only accept Stratum 1

Authentication

Server 1 ID  Key

Server 2 ID  Key

Server 3 ID  Key

Server 4 ID  Key

Server 5 ID  Key

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### Client mode

**FIRST.** Always use the first server in the list if available. If not available take next one.

This suits installations where it is more important to know exactly from where the clients get time than to have the most accurate time. The other NTP servers in the list will then be more of backup servers.

**STRATUM.** Use the NTP server with best stratum. The software sends a request to all servers in the list and uses the time from the one with best stratum. If same stratum it will use the one that is first in the server list.

This suits installations where it is important that the time is coming from a time server high up in the pyramid.

**MEDIAN.** Send a request to all servers in the list and use the median value (the NTP server that is in the middle). This will filter out all misleading time messages.

### Only accept Stratum 1

This function makes it possible to synchronise to Stratum 1 time servers only.

Check box = Off ; synchronise to time server independent of stratum level.

Check box = On ; synchronise only if time server is operating on Stratum 1 level.

### Authentication

If authentication is activated: Use MD5 authentication.

Server ID/Key: Authentication data for the external NTP servers configured in the NTP server list.



## Clock

Used to configure general clock parameters.

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Status Network NTP **Clock** General Advanced

Name Clock\_Name

Language Swedish

Leading zero

12h clock

Show Time 4 seconds

Show Date 0 seconds

Show Humidity 0 seconds

Show Temp 0 seconds

Temp Offset 0 (-9..+9 °C)

Temp Alarm

Min

Max

Dimmer 5

Light sensor

Disable buttons

Remove alarms

Save

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### Leading zero

Time: not checked; " 8:29",checked; "08:29".

Date: not checked; " 7.9 ", checked "07.9 " (Sep 7).

### 12h clock

Show e.g. " 2:49" (12h clock) instead of "14.29" (24h clock).

### Show Time

Loop-time in seconds for time.

### Show Date

Loop-time in seconds for date.



#### Show Humidity

Loop-time in seconds for humidity. (Use if sensor is used.)

#### Show Temp

Loop-time in seconds for temperature.

#### Temp Offset

Adjust the temperature reading (-9 to +9 °C).

#### Alarm

Set temperature bounds. The temperature alarm "Temp is out of bounds" will be active when the temperature reading is below the min value, or above the max value.

#### Dimmer

Enter the dimmer value (1-8).

#### Light sensor

Allow for input from light sensor.

#### Disable buttons

Disable buttons on the clock. When the buttons are locked the only thing that can be done using the buttons is to read the IP-address.

#### Remove alarms

Remove alarms.



## General

Used to configure general parameters.

The screenshot shows the 'General' configuration page for Westerstrand Urfabrik AB. The page has a navigation bar with tabs for Status, Network, NTP, Clock, General (selected), and Advanced. The main content area is divided into several sections:

- Name:** A text input field containing 'Clock\_Name'.
- Contact:** An empty text input field.
- Location:** An empty text input field.
- Password:** Two columns of password fields. The first column has 'admin' and 'guest' labels with corresponding password input fields. The second column has 'Repeat' labels with corresponding password input fields.
- Miscellaneous:** A section containing 'Firmware' (LISA-Q181 (Nov 3 2022 13:20:52)), 'Firmware Download' (checkbox), and 'Restart Program' (checkbox).
- Backup/Restore:** A section containing 'Filename' (Clock\_Name.txt), a 'Backup' button, and a 'Restore' button with the text 'Program restarts!'.

At the bottom right of the main content area, there is a 'Save' button. The footer of the page contains the copyright notice '© 2022 Westerstrand Urfabrik AB'.

### Name

Symbolic name, maximum 64 characters. This name is shown in the status menu and is also included in SNMP and Syslog messages. Example: Digital Clock, reception.

### Contact

Contact person. This information is included in SNMP messages.

### Location

The place where the clocks is located. Example: "Building 3 Room 214". This information is included in SNMP messages.

### Password

Login password.

Admin = Administrator password. The administrator has the rights to read and to write/change configuration. Default password = *password*.

To switch off the password functionality enter password = *nopassword*

Guest = Guest password. A guest can read only. The button [Save] is deactivated for guest users.

Default password = *password*.



## Firmware Download

Function to enable firmware download. See also section *Firmware Download*.

## Restart

Restart the Clock.

## Backup/Restore

### Backup

Save the clock configuration to a file. The clock suggests the Name field as filename (here *MyLanur229.txt*).

Click [Backup].

Passwords are not saved.

The screenshot shows a web interface titled "Backup/Restore". It has a "Filename:" label followed by a text input field containing "myLanur229.txt". To the right of the input field is a "Backup" button. Below the input field is a "Välj fil" button and the text "Ingen fil har valts". To the right of the "Välj fil" button is a "Restore" button followed by the text "Program restarts!".

### Restore

Select file ([Välj fil]). Here file *myLanur229.txt* was selected.

Click [Restore].

The clock restarts. Refresh the page.

The MAC- and IP-address never are restored.

The screenshot shows the same "Backup/Restore" web interface. The "Filename:" input field still contains "myLanur229.txt". The "Välj fil" button is now active, and the text next to it has changed to "Lanur\_JE3.txt". The "Restore" button is now highlighted, and the text "Program restarts!" is visible to its right.



## Advanced

Functionality to configure hardware settings for the clock, and to do a factory reset of the clock. Changing the hardware settings may cause the clock to function improperly.

Westerstrand Urfabrik AB

Status Network NTP Clock General **Advanced**

Important: Change here may cause the product to not work properly.

Name Clock\_Name

Displaytype Circle Line

With Second

Double blink

Sensortype None

Factory reset

Save

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### Display type

Set type of display. (For Circle Line chose "Circle Line")

### With Second

Set whether the clock has second digits. (Not for Circle Line)

### Double blink

Set whether the clock should flash twice when showing seconds. (Not for Circle Line)

### Sensortype

If a temperature sensor or temperature/humidity sensor is used, it must be selected here.

### Factory Reset

Reset the clock to factory settings.



## Firmware Download / Wunser

### General

The Clock has support for firmware upgrade via the network. The utility program Wunser is used for firmware upgrade. Wunser can be downloaded using the following link:

<http://www.westerstrand.com/archives/download.htm>

If checkbox Firmware Download is clicked, then the application jumps to a boot-loader. If no firmware upgrade take place within 60 seconds, then the old application is restarted again with the current firmware. *When the clock is in boot-loader mode, then the green LED on the RJ45-connector is flashing.*

When the program is in boot-loader mode, then the clock will answer on PING only.

For details of the download procedure, see Wunser manual, 4296.

Also other programs, e.g. windows built in client tftp, can be used:

```
c:\ARM\Lisa>tftp 192.168.2.61 put LISA-Q132.MOT
```

```
Successful transfer: 1234092 byte 15 sec., 82272 byte/s
```

### Find IP-address

At delivery, the clock is set to DHCP, with fallback address 192.168.3.10. If this has been changed and is unknown, the clock can be found using Wunser, see manual 4296. The clock is identified in the product list by its MAC-address. Each product is labelled with the individual MAC-address.

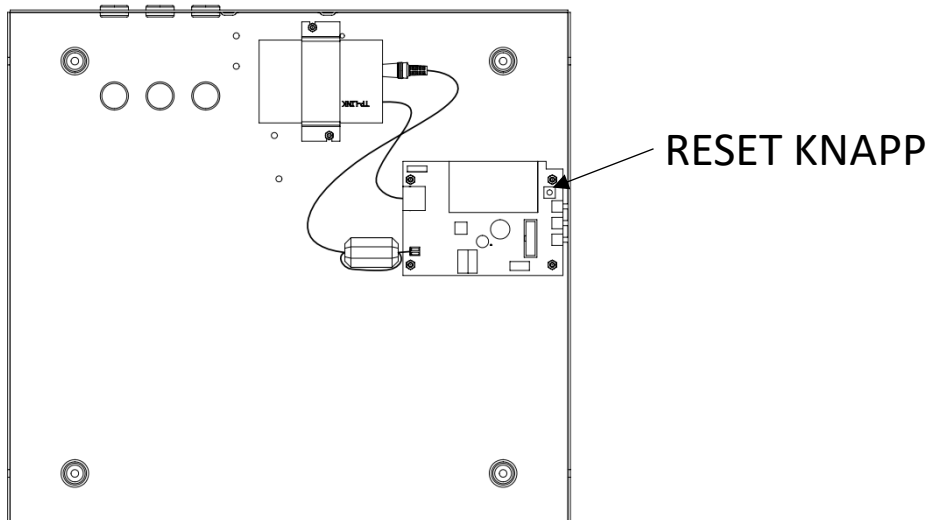


## Reset Button

At a normal start (Reset Button is not pressed) then the green LED is flashing about 2 seconds. Then the green LED is turned off. When the clock is synchronized the green LED is turned on.

Action when the Reset Button is pressed:

Power up	The application stays in boot-loader mode for ever and waits for firmware upgrade.
Application 3-9 seconds	Soft reset. The application restarts immediately.
Application $\geq 10$ seconds	<p>Cold reset. The application restarts immediately in DHCP mode.</p> <p>If no DHCP server exist, the clock will take default address 192.168.3.10 after 60 seconds.</p> <p>All parameters except the MAC address will take default values.</p>





## Technical specification

### General

Art. no.:	190420-02
Denomination:	Circle Line NTP PoE
Mounting/Installation:	Single sided, wall mount
Digits:	Single line red LED. Indicating time in HH:MM
Digit height:	50 mm
Synchronisation:	NTP
Accuracy	0,1 sec/24 h at 22° C (free-running mode)
Internal time keeping during power failure:	48 hours (display is turned off)
Time format:	12- or 24-hour format selectable. Alternatively showing date: day and month.

### Network

Protocols supported:	SNTPv4, RFC 4330, SNMP v2c, MIB II (RFC 1213), RFC2863, HTTP, HTTPS, Telnet, FTP
NTP protocol modes:	Unicast client mode (point to point), support for DHCP option 042, Broadcast/Multicast mode (point to multipoint). Multicast group address 224.0.1.1
Transport protocol:	TCP/IP
IP address assignment:	Static IP address or Dynamic (DHCP)
Compatibility:	Ethernet version 2/IEEE 802.3
Ethernet:	Supports 10/100BASE-T (RJ45) connections
Ethernet cable type:	Shielded
Device Management:	Web-Based (requires web browser) or via Telnet
Additional info.:	Support for DNS

### Power supply

Supply voltage:	IEEE 802.3af
-----------------	--------------

### Environmental

Temperature range:	0°C to +40°C.
IP class:	IP 20
Moisture range:	20-90%RH, non-condensing

### Housing

Housing:	Aluminium
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## Abbreviations

DST	Daylight Saving Time
DHCP	Dynamic Host Configuration Protocol
DNS	Domain Name System. The Internet's system for converting alphabetic names into numeric IP addresses.
LED	Light Emitting Diode
LT	Local time
MAC	Physical address (Media Access Control)
NTP	Network Time Protocol
PING	Packet Internet Grouper
SNMP	Simple Network Management Protocol
UTC	Coordinated Universal Time