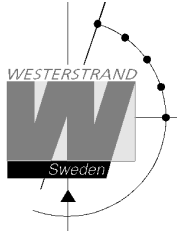


# GPS receiver

## 122980-51

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## General

The Global Positioning System (GPS) is a satellite-based navigation system operated and maintained by the U.S. Department of Defence. GPS consist of a constellation of 24 satellites providing world-wide, 24 hour, three dimensional (3D) coverage. Although originally conceived for military needs, GPS has a broad array of civilian applications including surveying, marine, land, aviation, and precise time. GPS is the most accurate technology available for easy timing.

By computing the distance to satellites orbiting the earth, a GPS receiver can calculate an accurate position. This process is called satellite ranging. A 2-D position calculation requires three satellite ranges. A 3-D position calculation, which includes altitude, requires four satellite ranges. GPS receivers can also provide precise time, speed, and course measurements, which are beneficial for vehicle navigation.

Westerstrand GPS unit uses a miniature 66-channel GPS. Its compact size and low power consumption make it ideal for this small application.

## Technical Specifications

### Antenna/receiver

#### Sensitivity

|                |                     |
|----------------|---------------------|
| Acquisition:   | -148dBm, cold start |
| Reacquisition: | -163dBm, warm start |
| Tracking:      | -165dBm             |

1-PPS timing accuracy:  $\pm 10$ ns RMS

#### Time To First Fix (TTFF)

|             |  |
|-------------|--|
| Hot start:  | 1 second typical (with battery, GPS turned off less than 2 hours),   |
| Warm start: | 33 seconds typical (with battery, GPS turned off more than 2 hours), |
| Cold start: | 35 seconds typical (without battery)                                 |

Antenna noise factor:  $< 1.5$ dB

Working Temperature:  $-40$  °C to  $+85$  °C

Prime power:  $+8$ V to  $35$ V (Power supply from Master Clock / Time Central)

Power consumption: 0.3 watt (nominal)

Backup power: 3V lithium battery\*

Antenna: Compact, active antenna. Short circuit protection

Interfaces: 3-Wire (power supply and open collector signal output)

Connection wire: 3 x 0.25mm<sup>2</sup> shielded, max. Length 300m,  
(The receiver needs a clear view upwards)

Cable example:

ELAKY/ELAQBY 2 x 2 x 0,28 mm<sup>2</sup>, LIYCY 3 x 0,25 mm<sup>2</sup> or similar

### Enclosure

#### Material:

Housing: Polycarbonate

Bracket: Aluminium

Colour: RAL 7035 -light grey

Dimensions: 130 x 130 x 50 mm

\*Remark: From September 2020, serial number 2037248, the battery is no longer enclosed. The battery is replaced by a capacitor which is a passive electronic component that stores electric energy.

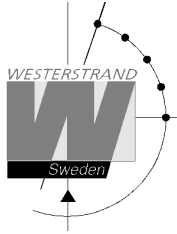
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**Rating**

|                                    |                   |
|------------------------------------|-------------------|
| Ingress Protection (EN 60529):     | IP66/IP67         |
| Impact Resistance (EN 62262):      | IK08              |
| Electrical insulation:             | Totally insulated |
| Halogen free (DIN 0472, Part 815): | 1                 |
| UV resistance:                     | UL 508            |
| Flammability Rating (UL 746 C 5):  | UL 94 5V          |
| Glow Wire Test (IEC 695-2-1) °C:   | 960               |

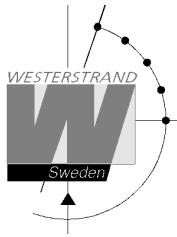
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## Time zone setting

### General

The GPS satellites are always transmitting UTC time. The receiver can either transmit the time as it is (UTC) or convert it to local time (LT). Please note that the different Master Clock generations are handling this different. Some Master Clocks does the time conversion to local time internally and needs therefore that the GPS receiver transmits UTC. Other types need that the GPS receiver does the conversion.

**QWTIME gen. II, (1223XX-XX): Needs LT, that means DIP 5 ON, DIP 6 OFF.**

**QWTIME gen. III, (1233XX-XX): Needs UTC, that means DIP 1-5 OFF, DIP 6 ON.**

**Pro-Line gen. I, (1227XX-XX): Needs LT, that means DIP 5 ON, DIP 6 OFF.**

**Pro-Line gen. II, (1237XX-XX): Needs UTC, that means DIP 1-5 OFF, DIP 6 ON.**

**Marine Master Clock (123375-XX, 123378-XX): Needs UTC, that means DIP 1-5 OFF, DIP 6 ON.**

| UTC-offset | Dip-SWITCH |     |     |     |     |     |                             |
|------------|------------|-----|-----|-----|-----|-----|-----------------------------|
|            | 1          | 2   | 3   | 4   | 5   | 6   |                             |
| 0          | OFF        | OFF | OFF | OFF | OFF | ON  | UTC                         |
| +1         | OFF        | OFF | OFF | OFF | ON  | OFF | Central European Time (CET) |
| +2         | OFF        | OFF | OFF | ON  | OFF |     |                             |
| +3         | OFF        | OFF | OFF | ON  | ON  |     |                             |
| +4         | OFF        | OFF | ON  | OFF | OFF |     |                             |
| +5         | OFF        | OFF | ON  | OFF | ON  |     |                             |
| +6         | OFF        | OFF | ON  | ON  | OFF |     |                             |
| +7         | OFF        | OFF | ON  | ON  | ON  |     |                             |
| +8         | OFF        | ON  | OFF | OFF | OFF |     |                             |
| +9         | OFF        | ON  | OFF | OFF | ON  |     |                             |
| +10        | OFF        | ON  | OFF | ON  | OFF |     |                             |
| +11        | OFF        | ON  | OFF | ON  | ON  |     |                             |
| +12        | OFF        | ON  | ON  | OFF | OFF |     |                             |
| -1         | ON         | OFF | OFF | OFF | ON  |     |                             |
| -2         | ON         | OFF | OFF | ON  | OFF |     |                             |
| -3         | ON         | OFF | OFF | ON  | ON  |     |                             |
| -4         | ON         | OFF | ON  | OFF | OFF |     |                             |
| -5         | ON         | OFF | ON  | OFF | ON  |     |                             |
| -6         | ON         | OFF | ON  | ON  | OFF |     |                             |
| -7         | ON         | OFF | ON  | ON  | ON  |     |                             |
| -8         | ON         | ON  | OFF | OFF | OFF |     |                             |
| -9         | ON         | ON  | OFF | OFF | ON  |     |                             |
| -10        | ON         | ON  | OFF | ON  | OFF |     |                             |
| -11        | ON         | ON  | OFF | ON  | ON  |     |                             |
| -12        | ON         | ON  | ON  | OFF | OFF |     |                             |

DIP-switch number 6 is used for automatic summer/winter change.  
**ON** = No automatic summer / winter time  
**OFF** = Automatic summer / wintertime

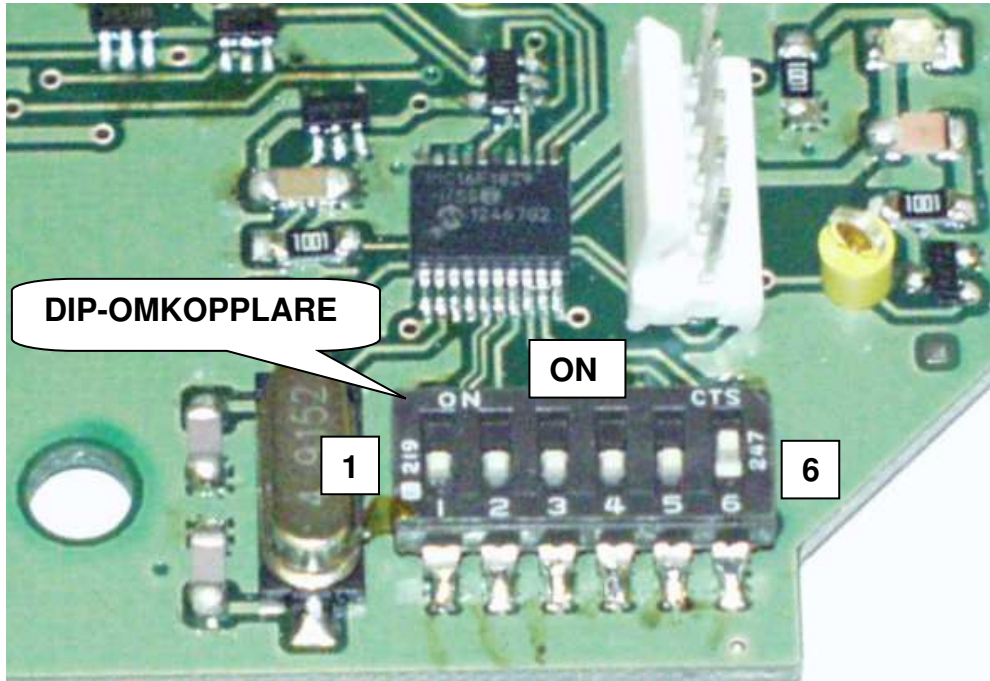
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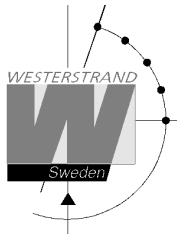
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## DIP-SWITCH





## Installation

### General

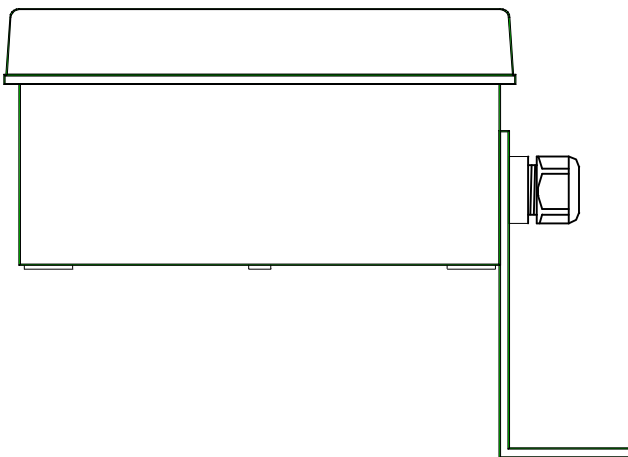
The GPS-receiver is intended for outdoor mounting and the antenna needs clear view upwards.  
The receiver can be mounted on a mast by using a clamp or directly to a wall by using the enclosed aluminium bracket. It is also possible to remove the aluminium bracket and mount the enclosure directly to a roof.  
It is very important that the receiver is mounted with the lid upwards, see picture below.  
Connection to the master clock is done with 3 wires. Please note that the cable connector is detachable to make it easier to connect the cable. The connector can be plugged in two different ways, horizontal or vertical. It doesn't matter which alternative that is used, the main thing is that the incoming cable has space enough.  
After approx. 5 minutes, the receiver starts to send a time code to the master clock.

To be accepted by the master clock the signal must be good in at least 5 minutes.  
A flashing colon between hours and minutes in the master clock display indicates an accepted GPS-signal.  
A green LED, marked RADIO, indicates the signal coming from the receiver and it should flash every second.

1. Check that the DIP-switch is set correctly for the type of Master Clock / Time Central it is going to be connected to. (See time zone setting, page 3)
2. Insert the enclosed lithium battery\*. See picture on next page.
3. Mount the receiver.
4. Connect the 3-wire cable coming from the Master Clock / Time Central.

\*Remark: From September 2020, serial number 2037248, the battery is no longer enclosed. The battery is replaced by a capacitor which is a passive electronic component that stores electric energy.

**This side up!**



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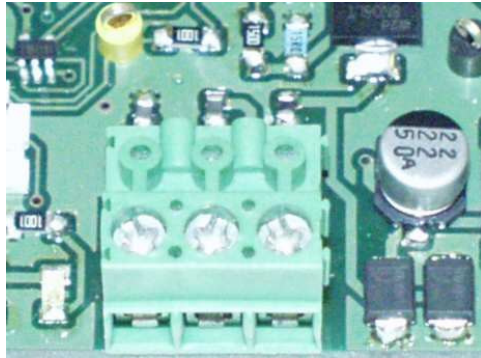
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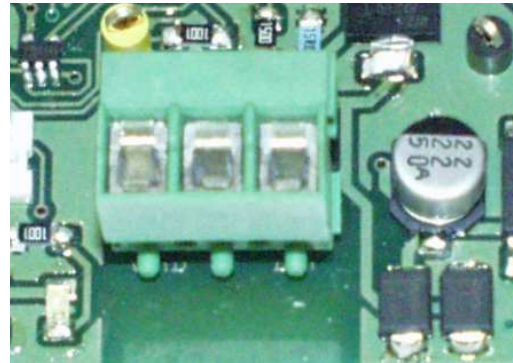
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### Cable connector horizontal

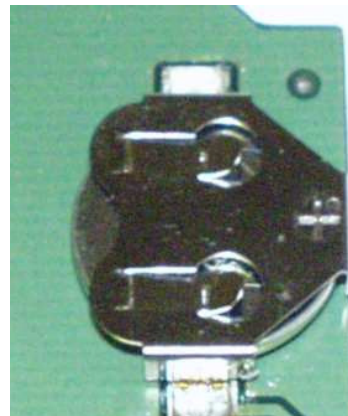
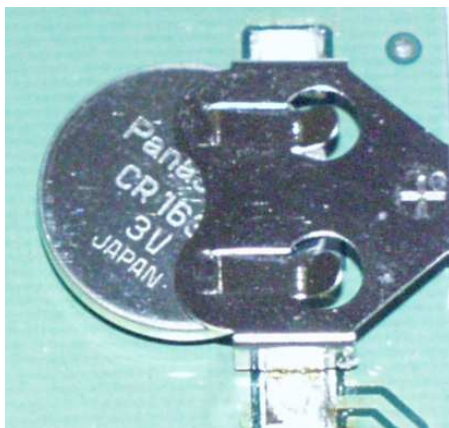


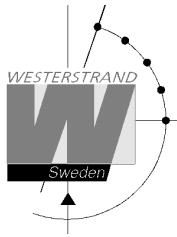
### Cable connector vertical



### Mounting of the lithium battery\*

\*Remark: From September 2020, serial number 2037248, the battery is no longer enclosed. The battery is replaced by a capacitor which is a passive electronic component that stores electric energy.





### Connection of Master Clocks type QWTIME generation III (1233XX-XX)

WDP-Q, WDP-Q60,  
WDP-Y2, WDP-Y4,  
WDP-Y8, WYP-8,  
WDP M+S, WDP-WT

GPS-receiver

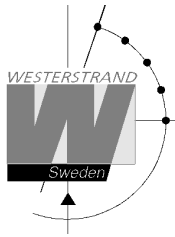
#### Plastic enclosure version

|    |       |     |
|----|-------|-----|
| 24 | ----- | GND |
| 25 | ----- | +   |
| 26 | ----- | DCF |

#### 19" version

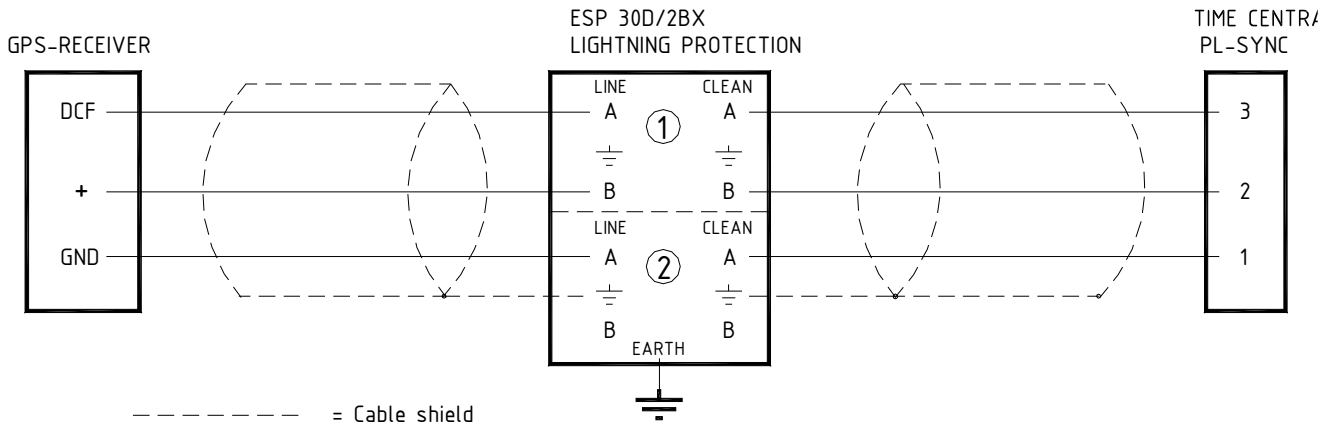
|      |       |     |
|------|-------|-----|
| 01:3 | ----- | GND |
| 01:4 | ----- | +   |
| 01:5 | ----- | DCF |



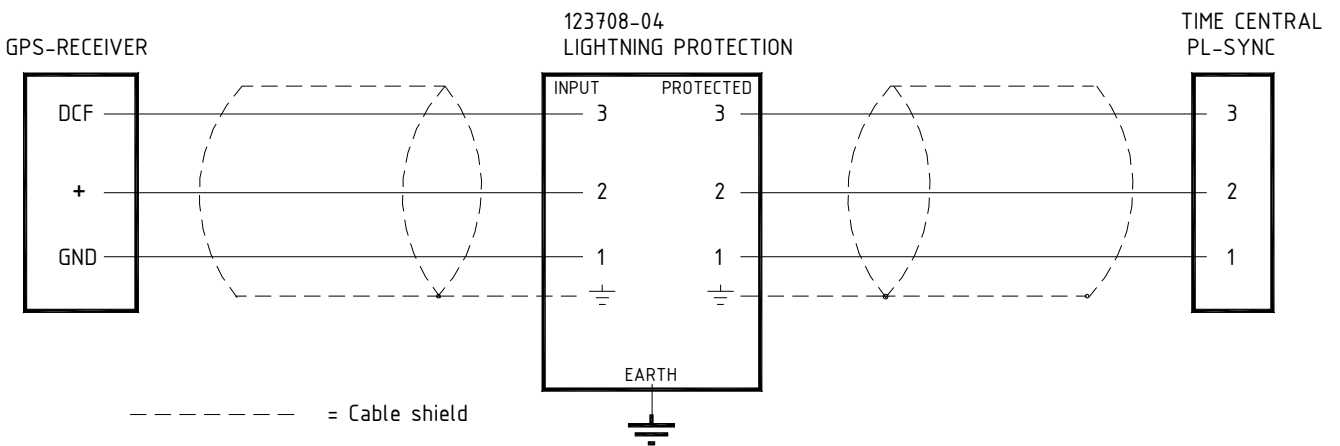


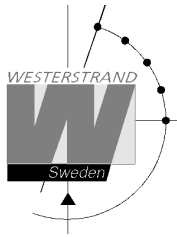
**Connection of Master Clocks / Time Central type Pro-Line generation II (1237XX-XX)**

**With lightning protection ESP 30D/2BX (123708-00)**

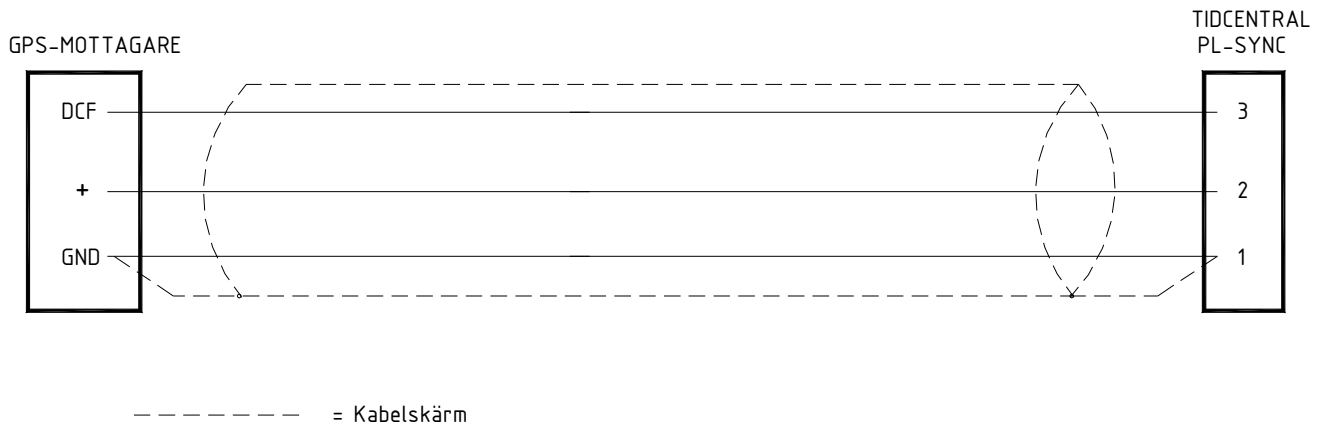


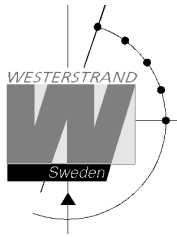
**With lightning barrier BXT ML4 BD 24 (123708-04)**





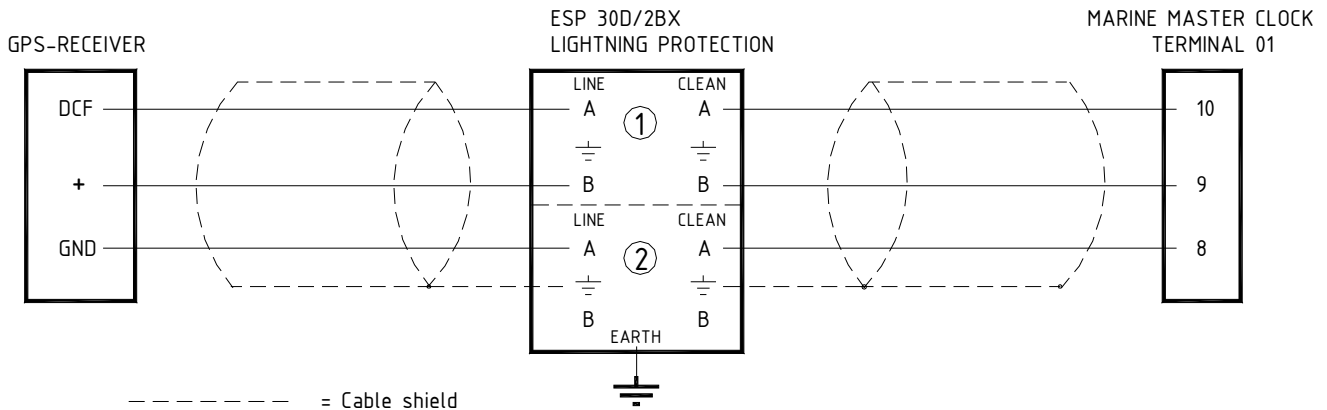
**Without lightning protection**





**Connection of Marine Master Clock, art no. 123375-XX, 123378-XX**

**With lightning protection**



**Without lightning protection**

