

Library “Determination of Position”

applications & TOOLS

**Description of the GPS-NMEA Communication-
library for STEP7-Micro/WIN**

SIEMENS

Addon to Micro Automation Set 21

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1 Applications

1.1 Determination of Position

The library enables determining the current position. The position is indicated in direction, degrees and decimal minutes¹. The library contains a routine for calculating the decimal degrees² from the data above.

1.2 Clock Synchronization

In order to determine the position, the current time and the current date are required. This information is equally transmitted by the receiver and provided by the library.

¹e.g.: N 49° 27,123'; E 11° 5,123'

²e.g.: +49,48754°; +11,17421°

2 Requirements

GPS receiver

A "NL-208P" navilock GPS receiver with RS232 adapter cable must be connected to the control unit.



The library has only been tested with a "NL-208P" navilock GPS receiver. If the NMEA data set of another GPS receiver is identical to the "NL-208P" navilock GPS receiver, that one may be used, too.

Despite the NMEA standard, the datasets of different devices can differ slightly from each other.

3 How to Use the Library

Integrating the library into STEP7 Micro/WIN

Integrate the library as described in the documentation to STEP7 Micro/WIN.

4 Overview of All Library Blocks

Content

The library contains the following (visible) blocks:

- GPS_NMEA_POS
- GPS_NMEA_UTC_Time
- GPS_NMEA_INFO
- GPS_Convert2DecimalDeg

GPS_NMEA_POS

This block is **mandatory**. It evaluates the received datasets and provides the position data, the altitude and the speed.

The block must be called cyclically.

GPS_NMEA_UTC_Time

This block can be used optionally; it provides the UTC time and the date.

GPS_NMEA_INFO

This block can be used optionally. It provides important information about the reception and the validity of the received/calculated position.



Attention

The block provides a GPS warning. This message indicates that the received data may be incorrect!

GPS_Convert2DecimalDeg

This block can be used optionally. It converts the position data into decimal degrees.

5 Interface Description

5.1 The block GPS_NMEA_POS

Table 5-1

No	Name	Type	Description
1.	LATITUDE_DEG	Output, Word	Contains the latitude in integer degrees [°].
2.	LATITUDE_MIN	Output, Real	Contains the latitude in decimal minutes.
3.	LATITUDE_DIR	Output, Char	Contains the direction (N or S)
4.	LONGITUDE_DEG	Output, Word	Contains the longitude in integer degrees [°].
5.	LONGITUDE_MIN	Output, Real	Contains the longitude in decimal minutes.
6.	LONGITUDE_DIR	Output, Char	Contains the direction (E or W)
7.	ALTITUDE	Output, Real	Contains the altitude above sea level.
8.	ALTITUDE_UNIT	Output, Char	Unit of the altitude
9.	SPEED	Output, Real	Speed compared to ground in knots.

5.2 GPS_NMEA.UTC_Time

Table 5-2

No	Name	Type	Description
1.	YEAR	Output, Byte	Contains the year
2.	MONTH	Output, Byte	Contains the month
3.	DAY	Output, Byte	Contains the day
4.	HOUR	Output, Byte	Contains the hour
5.	MINUTE	Output, Byte	Contains the minute
6.	SECOND	Output, Byte	Contains the second

5.3 GPS_NMEA_INFO

Table 5-3

No	Name	Type	Description
7.	SATSinVIEW	Output, Byte	Contains the number of visible satellites used to determine the position.
8.	HDoP	Output, Real	Indicates the accuracy of the position determination The smaller this value, the more exact the information
9.	GPS_2D_3D_FIX	Output, Byte	
10.	RECEIVER_WARNING	Output, Bool	Outputs the receiver warning. If it is active, the received data may be incorrect!

5.4 GPS_Convert2DecimalDeg

Table 5-4

No	Name	Type	Description
11.	LATITUDE_DEG	Input, Word	Requires the latitude in integer degrees [°].
12.	LATITUDE_MIN	Input, Real	Requires the latitude in decimal minutes.
13.	LATITUDE_DIR	Input, Char	Requires the direction (N or S)
14.	LONGITUDE_DEG	Input, Word	Requires the longitude in integer degrees [°].
15.	LONGITUDE_MIN	Input, Real	Requires the longitude in decimal minutes.
16.	LONGITUDE_DIR	Input, Char	Requires the direction (E or W)
17.	LATITUDE_DECIMAL	Output, Real	Contains the calculated latitude in decimal degrees.
18.	LONGITUDE_DECIMAL	Output, Real	Contains the calculated longitude in decimal degrees.
19.	ERROR_LATITUDE	Output, Bool	Error calculating the latitude
20.	ERROR_LONGITUDE	Output, Bool	Error calculating the longitude