GPS-G1

GPS- G1(T)

User Manual

MoTeC *GPS- G1 User Manual*

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Description

The GPS-G1 is a 5 Hz GPS that is suitable for the high dynamics of motor sport applications and is compatible with Motec ADL2, SDL & ACL logging devices.

The standard GPS-G1 unit operates at a baud rate of 19200, while the GPS-G1(T) version operates at a baud rate of 38400.

The GPS-G1 consists of a GPS unit with a built in antenna.

The units provide speed and position information, as well as altitude, heading, date, time and GPS statistics.

The speed information can be used for display and logging purposes avoiding the need for wheel speed sensors.

The position information can be used in the i2 data analysis software to create track maps and to show and compare the driven lines.

Throughout this manual both the standard GPS-G1 version and the GPS-G1(T) version will be referred to as GPS-G1 except where details specific to a particular model are discussed.

Mounting

The GPS unit has an integrated antenna and should be mounted on an external horizontal surface that has a clear view of the sky.

The unit should be mounted away from sources of interference including other antennas.

If mounting on a non metallic surface it may be necessary to add a metallic ground plane under the unit to improve the signal level. The ground plane should be at least 150 mm (6 in) square and may be made of aluminium or steel.

The unit has a magnetic mounting base and includes an M3 thread in the centre.

Electrical Connections

The GPS unit sends data to the logging device via an RS232 serial connection.

The wiring between the GPS connector and the logging device should be as short as possible, preferably less than 1 m (3 ft)

The following table shows how to wire the GPS unit to a number of MoTeC logging devices.

GPS Pin	GPS Name	Logging Device Name	ADL2	SDL	ACL
1	Bat -	Bat -	7	4	Bat- from VIM
2	TX	RX	79	34	15
3	RX	Not Used			
4	5V	5V	18 etc	14	Requires 5V from VIM

Note that the ADL2 and SDL logging devices only have one serial connection therefore if an ECU is to be connected then it must be connected via CAN (Note that not all ECUs have a CAN connection)

GPS Configuration

The GPS comes preconfigured from MoTeC to suit MoTeC's data loggers.

Data Logger Configuration

Software Version

The Data Logger must be running the following software version (or higher)

      SDL   Version 1.3 or higher
      ADL2 Version 4.4 or higher
      ACL   Version 1.1 or higher

Setup Requirements

- In the communications setup
    - Select *RS232* in the list then select *GPS - Standard RMC GGA* template
    - Change the baud rate to 19200 for GPS-G1
      Change the baud rate to 38400 for GPS-G1(T)
- In the logging setup
    - The following channels must be logged:
      GPS Latitude, GPS Longitude, GPS Speed.
      The other GPS channels are optional.
    - The Logging Rate for all GPS channels should be set to 20 Hz (even though the GPS is 5 Hz)

GPS Operation

In normal use the GPS unit should start operating within 15 to 45 seconds of power up, however during first start-up or if the GPS has been moved to a new location it may take up to 5 minutes before it gains satellite lock and starts transmitting data.

To check that the GPS is operating correctly check the number of satellites being received using the logging device Manager software.

The GPS requires a minimum of 4 satellites to function however normally the GPS should see at least 7 satellites. If the GPS sees more satellites it will improve accuracy and minimise satellite drop out.

Loss of signal may occur when the satellites are obscured by trees, buildings or a bridge. The GPS will take a second or two to recover from this situation.

Data Analysis

GPS data analysis requires *i2* data analysis software version 1.02 or higher.

All GPS channels (speed, heading, altitude etc) can be used in the usual way including plotting on a graph etc.

The GPS position data (latitude and longitude) can also be used for the following:

- To plot the actual path travelled on a GPS Track component.
    - o   On the *Add* menu select *GPS Track*.
- To generate the conventional track map
    - o   On Tools menu select Track Editor
    - o   Select Generate Track and then GPS method.
- To plot the path travelled over a Google Earth image. (*i2 Pro* feature only)
    - o   On the File menu select Google Earth Export.

Specifications

Electrical

Power Supply Voltage   4.0 to 5.5 V
Power Supply Current   65 mA

Connections

Mating Connector   Deutsch DTM06-4S

Pin	Name	Description
1	Bat -	Connect to Battery Negative on the logging device
2	TX	Connect to RX pin on logging device
3	RX	Don't connect (This pin is only used for programming)
4	5V	Connect to 5 V sensor supply on the logging device

Data

Output Type   RS232
Output Levels   0 V / 5 V (nominal)
Baud Rate GPS-G1   19200 (MoTeC default)
Baud Rate GPS-G1(T) 38400
NMEA Sentences   RMC, GGA (MoTeC default)

Physical

Antenna   Built into GPS unit
Size   61 mm diameter x 19.5 mm (2.4" diameter x 0.77")
Weight   170 g (6.0 oz)
Cable length   4.5 m (15 ft)
Operating Temp   -30 °C to +80 °C (-22 F to 176 F)
Mounting   Magnetic base + M3 centre thread

GPS Performance

Update Rate   5 Hz
Satellite Channels   12
Reacquisition Time   < 2 secs
Hot Start Time   15 seconds
Warm Start Time   45 seconds
Cold Start Time   5 minutes
Dynamics   >4G