GPS-BL1

User’s Manual

Contents

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Using the GPS

Description

The GPS-BL1 is a 10 / 20Hz GPS that is suitable for the high dynamics of motor sport applications and is compatible with Motec ADL2, SDL & ACL logging devices.

The GPS-BL1 consists of a GPS unit and a separate antenna.

The unit comes standard as 10Hz but can be upgraded to 20Hz at any time using an upgrade code.

The unit provides 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.

GPS Mounting

The GPS unit should be mounted inside the vehicle in a position where it is protected from water and other fluids.

Antenna Mounting

The antenna is fully sealed and should be mounted on an external horizontal surface that has a clear view of the sky.

The antenna 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 that to improve the signal level. The ground plane should be at least 150mm (6in) square and may be made of aluminium or steel.

The antenna has a magnetic mounting base.

Antenna Connection

Insert the antenna connector until it clicks into place - check by ensuring the connector cannot be pulled out easily.

Be careful not to damage the antenna cable when routing it through the vehicle and ensure that the cable cannot be squashed or otherwise damaged during use.

GPS Unit Electrical Connections

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

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

The following table shows how to wire the GPS unit to a number of Motec logging devices using the supplied adapter cable.

GPS Adapter Pin	GPS Name	Logging Device Name	ADL2	SDL	ACL
1	Bat -	Bat -	7	4	1
2	TX	RX	79	34	15
3	Bat+	Bat+	8	3	2

Note that while the unit has a 5V to 18V power supply range the unit draws too much current to be powered from the 5V supply on the logging device so it must be powered from the battery supply.

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 logging equipment.

Logging Device Configuration

Software Version

The logging device 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

Click on "RS232" in the list then Select the "GPS - Standard RMC GGA" template

Change the baud rate to 57600

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 20Hz (even though the GPS may be 10Hz)

GPS Operation

In normal use the GPS unit should start operating within 20 seconds to 3 minutes of power up, however during first start-up or if the GPS has been moved to a new location it may take up to 30 minutes before it gains satellite lock and starts transmitting data.

When the unit is powered up the PWR light should be illuminated. When the GPS is ready to use the GPS light should illuminate.

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

The GPS requires at least 4 satellites to function however normally the GPS should see at least 7 satellites, more satellites improves accuracy and minimises 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 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:

1. Plot the actual path travelled on a GPS Track component.
   To do this Select Add | GPS Track.
2. Generate the conventional track map.
   To do this select Tools | Track Editor, then click Generate Track and select the GPS method.
3. Plot the path travelled over a Google Earth image.
   To do this select File | Google Earth Export.

Specifications

Electrical

Power Supply Voltage	14V Nominal (5V to 18V)
Power Supply Current	100mA (at 14V input), 270mA (at 5V input)

Connections

Pinout for 3 pin Adapter Cable

Mating Connector Deutsch DTM06-3S

Pin	Name	Description
1	Bat -	Connect to Battery Negative on the logging device
2	TX	Connect to RX pin on logging device
3	Bat+	Connect to Battery Positive on the logging device

Pinout for 9 pin Connector on GPS Unit

Pin	Name	Description
1	Bat +	Connect to Battery positive on the logging device
2	RX	Don't Connect (Only used for programming)
3	TX	Connect to RX pin on logging device
5	Bat -	Connect to Battery Negative on the logging device

Data

Output Type	RS232
Output Levels	+/- 6V (nominal)
Baud Rate	57600 (Motec default)
NMEA Sentences	RMC, GGA (Motec default)

GPS Unit Physical

Size	91 x 76 x 25mm (3.6 x 3.0 x 1.0in) (LxWxH)
Weight	105g (3.7oz)
Operating Temp	-30C to +70C (-22 to 158F)

Antenna Physical

Size	44 x 44 x 15mm (1.7 x 1.7 x 0.6in) (LxWxH)
Weight	70g (2.5oz)
Cable length	3m (10ft)
Operating Temp	-30C to + 80C (-22 to 176F)
Mounting	Magnetic base

GPS Performance

Update Rate	10Hz (20 Hz Optional)
Satellite Channels	12
Reacquisition Time	< 1secs
Hot Start Time	20 seconds
Warm Start Time	2 minutes
Cold Start Time	30 minutes
Dynamics	>4G