25-contact female HE501 SubD connector pin out:

Pin No.	Signal Name	Definition
1	+12VS	12 V DC supply output
2	Ground	
3	TX2	RS232 Port No.2 TDG
4	RTS2	
5	RX2	
6	CTS2	
7	Ground	
8	INTD3	External inputs
9	INTD2	
10	INTD1	
11	SDA	Not used
12	SDM	Direction of motion
13	ODO+	Odometer (+)

Pin No.	Signal Name	Definition
14	+12VS	12 V DC supply output
15	Ground	
16	TX1	RS232 Port No.1 GPS
17	RTS1	
18	RX1	
19	CTS1	
20	Ground	
21	OUTD3	External outputs
22	OUTD2	
23	OUTD1	
24	SCL	Not used
25	ODO-	Odometer (-)

The RX and TX signals must cross over in the cable that links this 25-contact connector to the 9C-f SubD connector of the control computer.

6-contact male connector pin out:

Pin No.	Signal Name
1	+VE (9 to 36 V DC)
2	Ground
3	+VEPIS (V out)
4	Ground
5	+TELEC
6	-TELEC

Changing gyrometer orientation:

1. Remove the cover
2. Unplug the gyrometer
3. Remove the support + gyrometer assembly from the unit.
4. Change the position of the gyrometer on its support, then that of the support inside the unit in such a way that the position criterion mentioned in the 1st page of this guide is met.
5. Once the gyrometer + support assembly has been correctly fixed inside the unit, re-connect the gyrometer then put the cover back in place and close the unit. Then proceed with the installation procedure.

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DSNP

Capricorn 2001M

Installation & Start-up Guide

1. The unit should be installed in a dry area, away from engine vibrations.

   The overall dimensions of the unit on its bracket being D×W×H=60×150×264 mm, allow for this space plus extra space for cable connections (from above and from the left).

   Also choose a mounting surface, which is either as vertical as possible (recommended), or as horizontal as possible, as the internal gyrometer must always function in a vertical position. Then prepare the support according to **Fig. 1**.

   Afterwards (see **3.**), it is still possible to correct the position if the unit is not exactly vertical (or horizontal).

   Gyrometer mounting criterion: The right position for the gyrometer is that obtained when, once the unit is definitively installed in the vehicle, its connection wires protrude from its upper part.

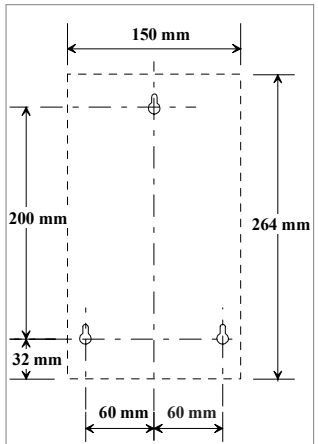

Fig. 1 - Drilling diagram
(3 holes, dia. 5.5 to 10 mm in vehicle chassis)

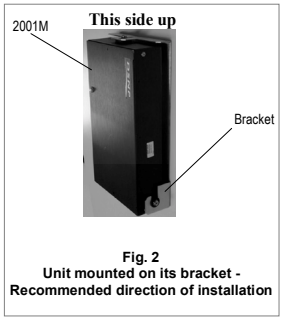

Fig. 2
Unit mounted on its bracket - Recommended direction of installation

As a consequence, the way the mobile unit should be mounted in the vehicle depends on how the gyrometer has been mounted inside the unit.

At delivery, the gyrometer has been fixed in such a way that if you position the mobile unit as depicted in **Fig. 2**, **you will not have to open the unit to correct the orientation of the gyrometer**.

If you do not wish to install the mobile this way, you should open it beforehand to rotate the gyrometer. (see instructions overleaf).

2. Fix the bracket on to the vehicle chassis (screws not provided).

3. Mount the unit onto its bracket:

According to the verticality (or horizontality) of the bracket once it has been attached, on each side of the unit, place a screw+standoff+grommet+washer into the appropriate hole (see **Fig. 3**). Then insert the unit into the bracket mounting lugs. The grommets act as dampers.

The upper part of the unit is held by a screw that is to be tightened. The oblong placement hole allows for final vertical adjustment before tightening the screw. A rubber stop screwed on to the casing acts as a damper between bracket and unit.

Adjust the Capricorn 2001M in vertical position using a level.

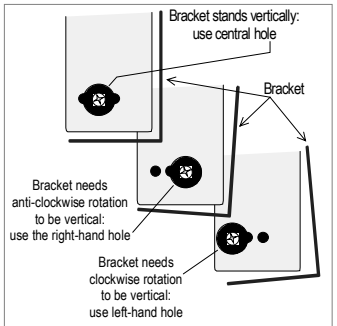

Fig. 3
Choosing the appropriate fixing holes on the unit according to the bracket attitude (to place the unit in vertical position)

4. Power supply the Capricorn 2001M via its male 6-contact connector. To do so, connect the wires from the power source to the corresponding pins on the female connector (provided separately):

- Connect Pin 1 (9 to 36 V DC) to the "+" terminal of the battery
- Connect Pin 2 (Ground) to the "-".

Make these connections directly to the battery or at least on a permanent power supply. A 5-A protection fuse should be inserted into the "+" line.

As indicated above this connector, the allowed voltage range at the unit's power input is 9 to 36 V DC.

5. Connect one of the +TELEC (pin 5) or -TELEC (pin 6) signals respectively to the "+" or "-" of the battery to start up the Capricorn 2001M. Start-up is then immediate.

Shutdown is obtained by simply opening the connection made for power-up. Switching-off is postponed according to a programmable timer whose setting is contained in the configuration of the TDG board.

Typically, the +TELEC signal can be connected to the "+" of the battery just after the ignition switch. If the vehicle is parked, and the key removed, for a time less than the programmed delay, then operation of the Capricorn 2001M will not be disrupted during the time of vehicle parking.

6. Connect the odometer. Continue with the procedure according to the type of odometer used:

Passive type odometer (example: Eaton odometer)	Active type odometer (electronic speedometer or signal originating from the anti-blocking system, etc.)
It must be inserted into the speedometer cable if the speedometer is of the mechanical type. Connect the two output wires of this type of odometer indifferently to pin 25 (ODO-) and pin 13 (ODO+) on the SubD 25 C connector.	• The signal delivered by this type of odometer is generally referenced to the "-" of the vehicle and is of constant amplitude. • Connect the hot spot of this type of odometer to pin 13 (ODO+) on the SubD 25C connector. Do not connect anything to pin 25 (ODO-).

(The 25C male SubD connector is not provided)

7. Connect the hot spot of the vehicle backward moving lights to pin 12 (SDM) on the 25C SubD connector. This connection provides reversing information to the Capricorn 2001M.

8. Install the mobile antenna and make all necessary coaxial connections with the unit:

For a land vehicle	For a boat
The following antenna model is provided: Hirschmann GPS Multi S 921 712-002 + UHF whip antenna 823 688-001. Extension cables are required (SMB-m/TNC-m for GPS; FME-f/FME-m for UHF). These cables are not provided.	To give an example, a 1/2-wave antenna (PROCOM MU9 or CXL70 type) may be used. It must be installed at a minimum height of 2 meters above the bridge.

9. Switch on the Capricorn 2001M by remote control (see point **5.** above). Following this operation, the lamp located on the top of the unit will light up and will remain continually lit throughout the acquisition phase, then it will flash as follows when the GPS sensor delivers GPS data:

- 1flash: GPS signals being received
- 2 flashes: Hybrid position (GPS+external sensors) computed
- 3 flashes: Hybrid position (DGPS+external sensors) computed

End of installation & start-up procedure.

Odometer Calibration

The scale coefficient of the odometer is loaded into the Capricorn 2001M via the $PDAS,SENSOR command. It is expressed in millimetres per half-cycle of signal. As its value is then automatically adjusted by the Capricorn 2001M during vehicle movement, a ± 20 % relative error is tolerated on the coefficient entered by the user.

Examples de scale coefficients:

GyroEaton on R25, R21, Espace : 100
ABSBosch on R25, R21, Espace : 20

Gyrometer calibration

The scale coefficient of the gyrometer is loaded into the Capricorn 2001M by DSNP before delivery.