

OPERATING INSTRUCTIONS



HITCHING UP

Connect the 7 pin plug and Check pilot light inside yellow end of the Discriminator (if applicable)

Connect and locate buzzer in the vehicle. Use the extension cable if needed.

TEST THE SYSTEM

Like other components of your vehicle such as the tail lights, Tow Mate New Zealand must be tested on a regular basis to ensure proper operation.

THIS IS YOUR RESPONSIBILITY.

BEFORE EACH JOURNEY

Firmly press the tip of the Red Button. The buzzer should sound after a few seconds.

On a regular basis, hold each height sensor back about 50 mm (2 inches) for about 5 seconds for inbuilt time delay. The buzzer should sound.

Some owners make up a shepherd's hook to make this procedure easier.



TOW MATE

New Zealand
TRAILER MONITORING SYSTEMS

OWNERS MANUAL

Lewis Gray Limited

Toll Free (New Zealand only): 0800 17 18 17

Phone: +64 9 415 3348

Fax: +64 9 415 3396

Office Location

40G William Pickering Drive
North Harbour
Albany
Auckland 0751
New Zealand

Postal Address

P.O Box 302060
North Harbour
Auckland 0751
New Zealand

AUGUST 2007 EDITION

- Check page 2 - Height sensor bolts
- Retain this manual for future reference for maintenance and solving problems.

SOME IMPORTANT POINTS

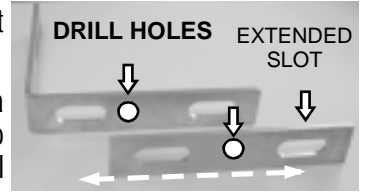
- Coil on the Height sensors must be to the front ~ Page 4
- Height sensor brackets must be in true vertical position ~ Page 5
- Height sensors set about 30~50 mm from the ground and from the tyre ~ page 5
- Heat sensors must be on axle which carries the bearings ~ Page 5
- **Sensors must be connected in parallel - normally open circuit.** ~ Page 6
- If wheels have been removed Check wheel nuts after installation and re-check again after 100 Klm.

INDEX

Electrical Connections	page 3
	page 6
Frequently asked questions	page 8
	page 9
Heat sensors	page 5
Height sensors bolts	page 2
installing	page 4
positioning	page 5
Maintenance	page 1
Marine application	page 1
Operation	page 10
Problem Solving buzzer won't sound	page 7
buzzer sounds when it shouldn't	page 8
Signal circuit	page 6
Warning lights	page 3

How do I fit the bracket to an 80mm round Axle found on some 5th wheelers

Drill two 8mm holes as shown in the diagram and bolt the parts together with nuts to the top.



The extended slot can now be used to accommodate a U-bolt . To get a U bolt large enough you may need to use a muffler clamp type U-bolt but be aware that the full surface of the clamp will not be in contact with the axle for good heat transfer. Either use just the R-angle bracket and U-bolt without the clamp or alternatively place any heat sensors directly on the axle next to the bearings.

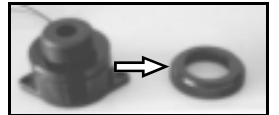
Can I connect the monitor to a separate cable charging the caravan battery ?

Yes but be aware that the system will be connected to the battery and will be permanently in stand-by mode with the pilot light glowing. The power consumption is only 25mA which is miniscule.

SEE SPECIAL NOTE IN PROBLEM B ON PAGE 8

Can the buzzer be mounted in the vehicle dash ?

Yes! Make a 18 mm hole and fix the buzzer in the hole with the screw-off bezel.



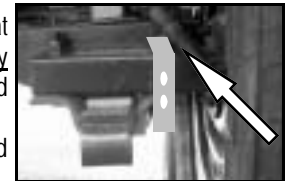
How do I route the buzzer cable up to the dash ?

Enter the vehicle through the grommet with all the other cables which then run under the removable door sills up to the dash. Extra cable joiners are supplied in case the cable needs cutting and re-joining to fit through grommet.



Can the height sensors be mounted in other way ?

Yes, they do not need to be mounted on the axle. The important thing is that whatever they are mounted to must come closer to the ground when and only when the tyre deflates. With this in mind, special brackets may be designed and used to mount the triggers at various locations on the suspension. A typical example is "Bushtracker" where the R-angle bracket must be welded to the axle housing.



Can heat sensors be adhered to axles or brake backing plates ?

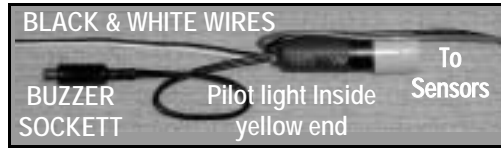
Yes! Use only Loctite 3805 Adhesive (24180). Clean the intended location of the heat sensor. Follow instructions and apply a generous layer to the axle. Position the sensor on the adhesive applying pressure to reduce the adhesive to a minimum thickness between the sensor and axle. Excess adhesive will be squashed out around the sensor. Fold this excess adhesive back over the lower part of the sensor before it hardens.

Can I make up an extra buzzer extension cable ?

Yes! Procure a "RCA Plug and socket" from any electronic store. Unlike the sensor circuit, the buzzer circuit has one positive and one negative wire. The centre connection of plug and socket is used for (+ power) from the wire with a white trace line. The outer connection of plug and socket is used for the negative earth with the plain black wire. Any excess cable from the signal circuit may be used.

**PROBLEM (B)
THE BUZZER SOUNDS WHEN IT SHOULDN'T.**

Disconnect the cable joiners between the Discriminator and Signal Circuit. Make sure that wires are not touching.



If the buzzer continues to sound the Discriminator is faulty.
If the buzzer stops sounding, the Discriminator is OK ~
Reconnect the signal circuit to the Discriminator **and Proceed to next step**

SPECIAL NOTE IF DISCRIMINATOR IS CONNECTED TO CARAVAN BATTERY;
The system is designed to operate on 12 volts. If the power supply drops below about 8 volts, the relay will drop out and activate the buzzer which will still sound with only 3 volts supply. CHECK THE CONDITION OF THE BATTERY, it may not be receiving a charge while traveling or the fridge could be draining the battery.

B1. Inspect the entire signal circuit for earthing to the chassis or frame. At the same time inspect the contacts on each height sensor to ensure they are not damaged.

The large spike should not be touching either of the small spikes. Rectify any damage found. If buzzer continues to sound proceed to next step.

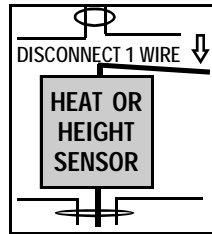


B2. Starting with the **last sensor in the circuit** whether it be a height or heat sensor, disconnect one wire only.

If the buzzer stops sounding the sensor is faulty.

Continue to do this progressively forwards in the circuit until the faulty sensor (Height or heat) is found.

Temporarily leave the faulty item by-passed.



ALTERNATIVELY

Disconnect all the sensors and test each sensor independently with an **OHM METER**. All the sensors are normally open circuit (faulty if closed circuit)

CIRCUIT	TEST WITH OHM METER	
↓	DIGITAL READING	WARNING
OPEN	1	SILENT
CLOSED	-0	SOUNDS

FREQUENTLY ASKED QUESTIONS

What happens if the small yellow tip on height sensors comes off ?

These are used for packing purposes only and serve no other purpose.

Can I run the buzzer cable through my 12 pin trailer plug ?

Yes, providing there are 2 spare terminals. *Make sure the trace wire (positive) is connected to the same numbered terminals in both the plug and socket.*

Dear Customer,

Thank you for buying this product. We are confident that you will receive many years of reliable service from it and that it will give you great peace of mind when towing.

The system has a 1 Year Parts Warranty subject to you completing and forwarding the enclosed registration form within 30 days of purchase.

We recommend that you read through these instructions before starting the installation. Bolts for the height sensors are not supplied because of variations in suspensions. Please refer to page 2 for bolt selection details.

The following is a brief explanation of how the system works. The cables create a normally open signal circuit from the control module through the sensors back to the control module. When the circuit is closed by a sensor the warning device is activated.

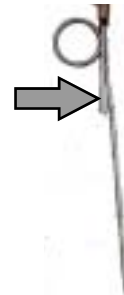
Tow Mate New Zealand like any other type of pressure monitor, will not prevent tyres deflating but when installed and adjusted correctly, will give an early warning when this happens.

The tread can lift off without the tyre losing any pressure and will go un-noticed with any type of pressure sensor system. In the case of Tow Mate New Zealand, the height sensor will not come in contact with ground until the tyre blows out. Certain brands of tyres may be prone to do this. Sometimes you can tow some distance after a blow out. However, a blow-out will not go un-noticed when Tow Mate New Zealand is correctly installed, adjusted and maintained.

Please tell others of your reasons for buying this product and of any good outcomes from using the system. We would also welcome any feed-back from you at any time.

REGULAR MAINTENANCE IS IMPORTANT

The contact areas of the triggers are impregnated with "Lanotec" to retain good surface contact and inhibit corrosion. At regular maintenance periods, treat the contact areas. "Lanotec or Lanoguard" has many applications and is available from hardware stores and accessory shops.



- **HAVE BEARINGS AND BRAKES SERVICED**
- **CHECK TYRES FOR CORRECT INFLATION AND WEAR**

MARINE APPLICATION.

Do not submerge the Discriminator.

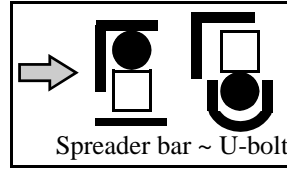
Hose down the sensor components after being in salt water and apply Lanotec

HEIGHT SENSOR BOLTS

PAGE 2

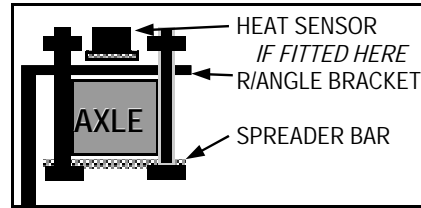
Bolts not supplied because of the variations in suspensions.

- U-bolts are used for round axles
- Normal hexagon headed bolts in conjunction with the spreader bar supplied are used for square axles.
- With overlay axles where one is round and the other is square, the shape of the axle not contacting the R-angle bracket determines the use of U-bolt or spreader bar.



BOLT SELECTION

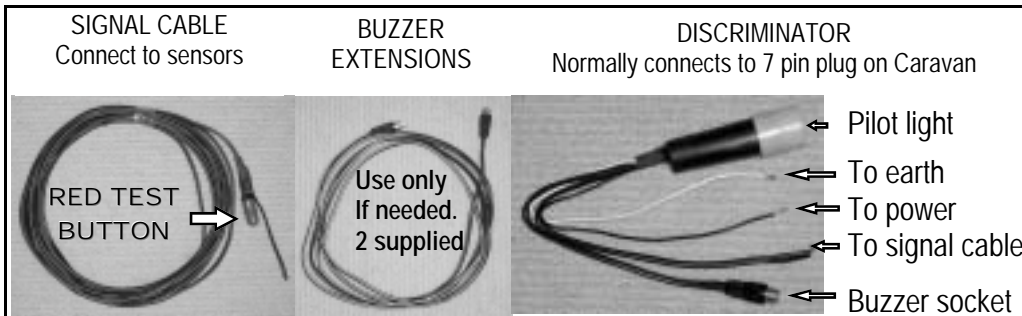
Measure the height of the axle, add 25~30 mm (1 inch) for nut and washers. Procure two 8 mm (5/16 inch) mild steel Hex. Head zinc plated bolts this length with nuts, flat and spring washers for each wheel. Assemble as shown here



U-BOLT SELECTION ~ OBTAINABLE FROM HARDWARE SHOPS

1. Determine type of axle	2. Measure the axle	3. BSP SIZE TO BUY * Indicates the internal bore of the pipe the u-bolt fits over												
STANDARD axle use single or short U-bolts.	OVERLAY needs longer U-bolt to fit over two sections of axle as shown here.													
ASK FOR DOUBLE U-BOLT FOR OVERLAY AXLES		<table border="1"> <thead> <tr> <th>AXLE SIZE</th> <th>BSP U-bolt</th> </tr> </thead> <tbody> <tr> <td>35 mm</td> <td>25 mm BSP U-bolt</td> </tr> <tr> <td>40 mm</td> <td>32 mm BSP U-bolt</td> </tr> <tr> <td>45 mm</td> <td>38 mm BSP U-bolt</td> </tr> <tr> <td>50 mm</td> <td>38 mm BSP U-bolt</td> </tr> <tr> <td>60 mm</td> <td>50 mm BSP U-bolt</td> </tr> </tbody> </table>	AXLE SIZE	BSP U-bolt	35 mm	25 mm BSP U-bolt	40 mm	32 mm BSP U-bolt	45 mm	38 mm BSP U-bolt	50 mm	38 mm BSP U-bolt	60 mm	50 mm BSP U-bolt
AXLE SIZE	BSP U-bolt													
35 mm	25 mm BSP U-bolt													
40 mm	32 mm BSP U-bolt													
45 mm	38 mm BSP U-bolt													
50 mm	38 mm BSP U-bolt													
60 mm	50 mm BSP U-bolt													

SEE PAGE 9 FOR 80mm ROUND AXLES ON IMPORTED 5th WHEELERS



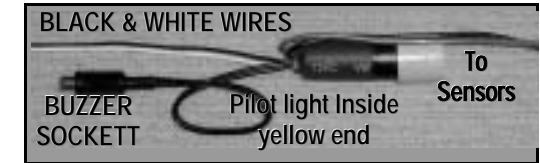
SOLVING PROBLEMS

PAGE 7

PROBLEM (A)

THE BUZZER WON'T SOUND WITH TEST BUTTON

Check that the pilot light is on.



Possible reasons for no power being available:

- Plug from trailer to vehicle loose, removed or worn contacts. Apply Lanotec.
- Blown fuse in towing vehicle
- Bad connections for wires from the Discriminator to terminals in the trailer plug.

BUZZER WON'T SOUND WHEN HOLDING SENSORS BACK (5 SECONDS)

A1. Check the contacts in the height sensors. They may need cleaning with "CLR" or emery paper **SEE REGULAR MAINTENANCE PAGE 1**



After cleaning, if buzzer sounds with some sensors but not others the offending sensor is faulty and will need replacing. If buzzer won't sound with any sensors go to step A2

A2. ONLY IF BUZZER WILL ALSO NOT SOUND WITH RED TEST BUTTON
 Connect the buzzer plug to a separate 12 volt power supply, (centre pin Positive ~ outside Negative) . If the buzzer does not sound it is faulty.

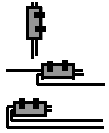
If the buzzer tests OK reconnect it to the socket and proceed to next step

A3. Disconnect the cable joiners between the Discriminator and Signal Circuit. Join the two wires from the Discriminator. The buzzer should sound. If not the Discriminator is faulty.

If the buzzer does sound proceed to next step

A4. Reconnect the cables between the Discriminator and Signal Circuit. Check the entire signal circuit and joiners for broken connections.

We recommend the method shown here.



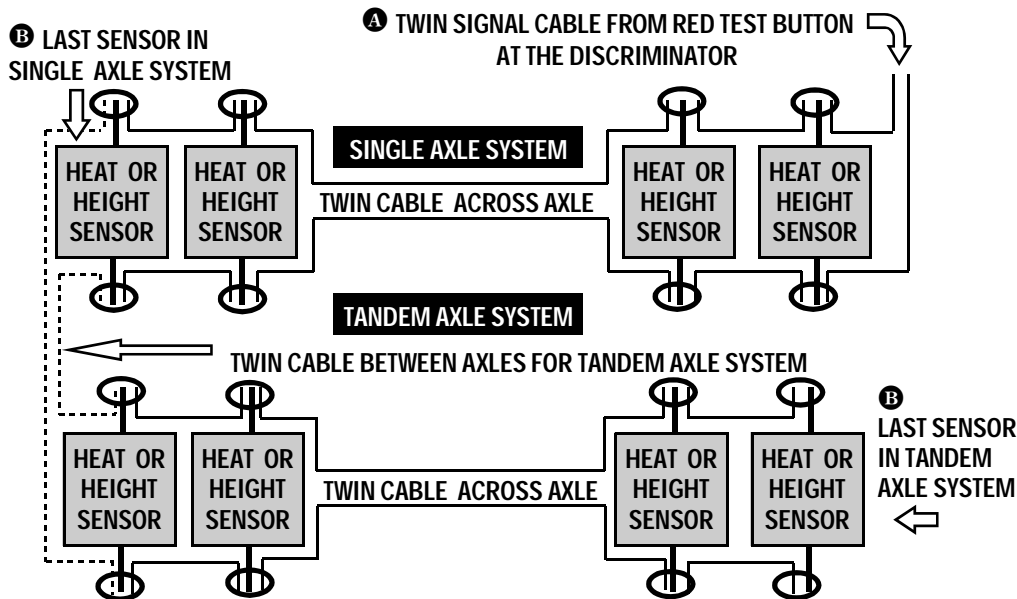
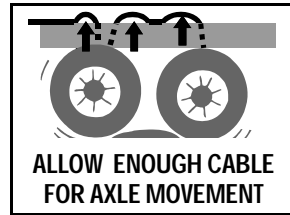
- Strip then twist the wires together and attach the joiners supplied. Tighten both screws.
- Bend the wires back on themselves to take the strain off the joint before applying insulation tape.

Soldering can make it difficult to isolate components for testing!

WARNING UNLIKE SOME PREVIOUS MODELS THIS SYSTEM HAS A NORMALLY OPEN CIRCUIT AND MUST BE CONNECTED IN PARALLEL

This includes any heat sensors installed. There is no particular order necessary but the entire circuit must be in parallel. The diagram below shows both a heat sensor and height sensor at each wheel. If only one type is to be installed, disregard the second sensor at each wheel in the diagram.

Starting from the signal circuit **A** cable coming from the Discriminator, each sensor will require **2 joiners with 3 wires in each joiner** except for the very last sensor **B** which requires only **2 wires in each joiner**.

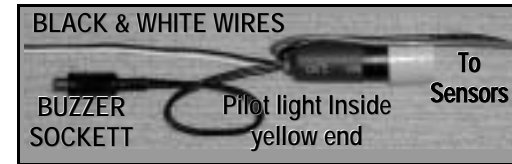


WARNING

TEST THE SYSTEM BEFORE APPLYING INSULATION TAPE TO JOINTS OR SILICONE TO HEAT SENSORS

ELECTRICAL CONNECTIONS

Discriminator is normally mounted close to existing 7 pin plug on caravan or trailer.



After removing any excess wire to suit your application, insert the Black & White wires through the rubber boot of the 7 pin plug and connect to the trailer plug terminals.

Black to terminal 2 (aux. power) Normally Black **SEE ALTERNATIVE BELOW**
White to terminal 3 (earth) Normally White

ALTERNATIVE *If no aux. power line available use the tail light circuit. Tail lights need to be on when driving*

Black to terminal 7 (tail lights) Normally Brown .

RUN THE SIGNAL CIRCUIT

After removing any excess wire to position the red test button in a suitable location, join the signal circuit with the red test button onto the 2 wires from the Discriminator with the smaller joiners supplied to maintain compactness at this location.

Run the twin cable back towards the axle and fix with cable ties to original trailer cable if accessible. If the heavy trailer cable is located inside the A-Frame box section, temporarily secure the twin cable to the A-Frame with adhesive tape and apply silicone in several locations. Cut and join the twin cable as shown on page 4. Tape the controller or Discriminator to the trailer plug cable.

FITTING DASH WARNING LIGHTS (ONLY IF APPLICABLE)

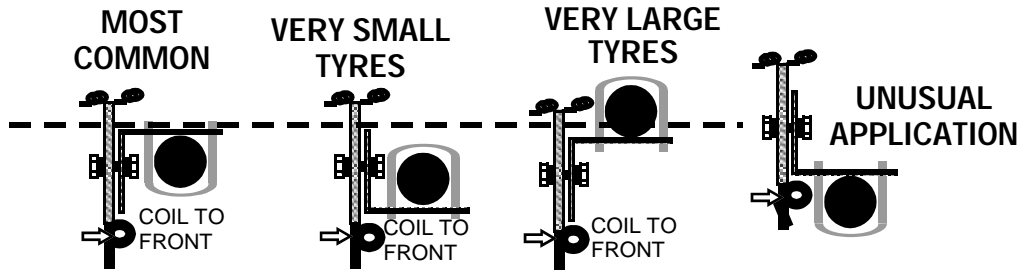
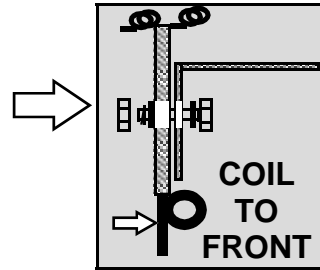
- Decide on a suitable location for the lights e.g. blanking plugs found in the dash of most vehicles.
- Drill a 7/32" (5.5 mm) hole for each light and Insert the mounting bezel into the hole from the front then while holding it in position Insert the lights from behind.
- Push until the light locks into position. For thicker materials, it may be necessary to drill a larger hole. Go up only one drill size at a time.
- Connect white wire to suitable earth.
- Route the buzzer cable up to dash and connect both the light and buzzer plugs
- Mount buzzer in suitable location (**SEE SUGGESTIONS PAGE 8 F.A.Q.**)



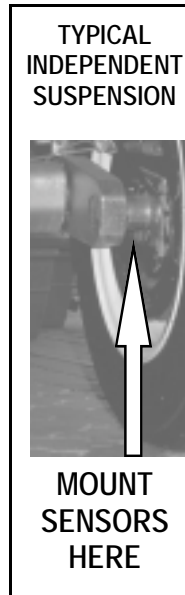
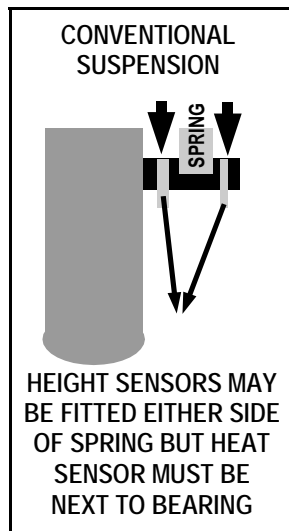
It's best to mount the lights first then locate the buzzer because the buzzer cable is a set length.

INSTALLING HEIGHT SENSORS (IF APPLICABLE)

1. Attach sensor to R-angle bracket with pivot bolt, washers and nut as shown with the coil to the front.
2. Determine most suitable option below to configure the right angle bracket on the sensor in relation to the axle height above the ground.



3. Determine the most suitable location for the sensor.
4. Place the bracket on the axle and fit the U-bolt for round axle ~ or bolts and spreader plate for square axle.
5. Swing the sensor sideways at the pivot bolt to achieve the desired positioning next to tyre.



POSITIONING HEIGHT SENSORS

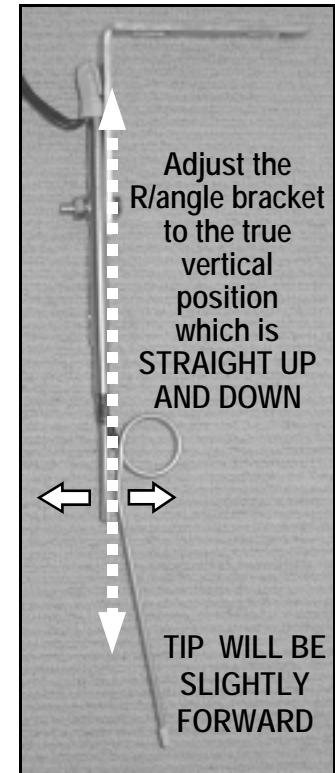
With the tyres correctly inflated, set the height about 30 ~ 50 mm from the ground and preferably about 30 ~ 50 mm from the inside wall of the tyre.

Tighten the U-bolt securely with R/angle bracket in the **true vertical position**.

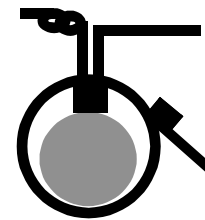
The trigger must move back when it contacts the ground. It will simply drag and not move back if at the wrong angle. This is particularly important with trailing arm suspensions which should be adjusted when the caravan is loaded as the angle varies with weight.

With square axles it may be necessary to bend the R/angle bracket forwards or backwards to achieve the true vertical position.

Slide the pivot bolt as low as possible in the sensor slot for maximum support and tighten securely to ensure that the sensor does not move sideways.



INSTALLING HEAT SENSORS



Mount sensors as close as possible to bearings.

- Clean the intended location of the heat sensor.
- Place the heat sensor on the axle near the bearings, (or on top of R-angle bracket if applicable) if near the bearings.
- Place a cable tie between the two terminals and around the axle. Draw the cable tie tight.
- Apply a large "blob" of silicone over the heat sensors, with cable tie intact, to water proof and protect from stone damage ~ but only after testing the system.

In the case of overlay axles the sensors must be mounted on the axle which carries the bearings.

(SEE PAGE 9 ~ FAQ. FOR ADHERING ALTERNATIVE)