

OWNER'S MANUAL

Scott System Driving Control

CHEVROLET UPLANDER MINI-VAN

CONTENTS

I. Introductory Information.....	
DSI's Commitment to You	
About the Warranties.....	
View of system.....	
Safety Precautions	
II. Using and Understanding the System.....	
About the System	
System Design Features	
System Controls	
III. Driving the Van with the System	
Accelerator and Brake	
Accelerator	
Steering	
IV. Operating the Van with the System	
Entering the Van.....	
The Driving Position	
System Controls	
Starting the Engine	
Motion Control	
Shut Down and Exit	
V. Care and Maintenance of the System	
Meter Readings.....	
Operational Check List.....	
Maintenance and warning devices	
Warning lights and indicators.....	
Lift warning buzzer	
Low Vacuum warning buzzer	
Tiedown Warning Buzzer	
Warning lights	
ABS warning lights	

VI. Repairs and Troubleshooting
 Brake system
 Steering function
 Secondary controls
 Dsi tie-down description
 Dsi tie-down trouble shooting

I. INTRODUCTORY INFORMATION

DSI'S COMMITMENT TO YOU

Driving Systems Incorporated (DSI) is the foremost developer of adapted vehicles. Since 1967, DSI has produced safe and reliable vehicle for their clients and has provided service and maintenance to allow continued satisfaction.

The Driving System (Scott System) van control equipment has been designed and installed in your van to provide a specific means of operating a van for a particular individual.

To contact Driving Systems Incorporated call or write:

Driving Systems Incorporated
16139 Runnymede Street
Van Nuys, CA 91406-2913
TEL: 818-782-6793
FAX: 818-782-6485

This manual is supplemental to the vehicle owner guide. This manual and the vehicle owner guide should be read and understood before operating the vehicle.

If a situation arises that is not covered in this manual, please contact DSI for assistance.

This manual is not intended to replace a thorough program of evaluation and driver training. The Scott Driving System is for those with severe disabilities. We feel strongly that potential drivers with disabilities should be tested to decide that the Scott System is a suitable solution to help an individual to become an independent driver. Driving Systems Inc. has been a long time member and supporter of the Association of Driver Rehabilitation Specialists (A.D.E.D.). This organization and its members have a large amount of experience regarding disabled drivers and can provide insight into the challenge of selecting equipment that meets the needs of the individual driver. We strongly recommend contacting an A.D.E.D. member before the selection of any type of mobility equipment.

A second issue which should be touched on at the very beginning of this manual is that of the individualization of the controls and positioning for each driver. The “fitting” as we call it, is almost as important as the mechanical condition of the vehicle and driving controls themselves. Due to the physical limitations of our drivers, the positioning of the controls and the driver in relation to the controls is critical to the safe operation of a Scott System equipped van. The fitting consists of adjustment and location of the driver and controls. The effectiveness of which is confirmed by test driving. Very small changes can make a large difference in the driver’s ability to control the vehicle and the secondary functions.

A third consideration to be addressed is the use of the vehicle by an able bodied driver. Over the years we have noted that with proper training it is possible for an able bodied individual to drive the Scott System successfully. The key is the proper training. A seat, firmly attached to the tie-down with two arm rests is best for a driving platform. While the lap and shoulder belt which came with the van should always be used, the driver without a disability may also wish to have a chest harness attached to the quick release seat. Excessive movement of the arms and upper body make driving difficult. Driving Systems Inc. can provide a bracket that locks out the forward / rearward throttle – brake movement, allowing the driver to use the original equipment pedals for brake and gas. Remember anyone lacking both the training and experience will not be as skillful as the person who the vehicle was built for and who has the proper training and some miles experience. Many of our clients have spouses, attendants and mechanics who are able to drive their Scott System vans successfully.

WARRANTIES

The DSI equipment is used in conjunction with the products of other companies, most notably the van and the wheelchair lift. The warranties for all items other than DSI equipment should be referred to in respective owner's manuals.

Basic DSI Warranty

WARRANTY AND LIABILITY: dSi will repair or replace any product or parts there are that wears out or proves defective under normal use for a period of one year from date shipped. All equipment and modifications must be inspected by DSI or an approved DSI dealer every six (6) months for the warranty to remain effective. Use of the equipment by people other than those specifically authorized and instructed by an employee of dSi, or a driver trainer voids warranty. Use of equipment manufactured, modified, serviced, installed or sold by dSi is at the user's risk. dSi will not be held liable for any injury or property damage due to use or failure of equipment sold, serviced, modified, manufactured or installed by dSi. dSi will not assume financial responsibility or any liability for alterations or repairs of equipment done elsewhere.

DSI Warranty on Maintenance and Repair

The D.S.I. warranty covers the driving controls, parts and labor for a period of one year or 12,000 miles which ever comes first.

WHAT YOU MUST DO:

Return your DSI van to your selling agency. Please give him as much advance notice as possible. You must allow a reasonable time for repairs.

IF YOU ARE TRAVELING:

Call DSI for further instructions to honor this warranty.

WHAT IS NOT COVERED:

- Lubrication. Adjustments for rattles and squeaks due to normal use.
- Malfunction or damage caused by misuse, neglect, improper adjustments, modification, alteration, tampering, disconnection, improper or inadequate maintenance, accidents, the mechanical condition of your vehicle, road hazards, weather, overloading, or other events beyond our control (such as fire, lightning, flood, etc.).
- Paint and trim damage due to after delivery use.
- Shipping or transportation charges, loss of time, inconvenience, loss of use of the vehicle, commercial loss, or other consequential damages.

PRODUCT CHANGES:

We reserve the right to make changes in DSI products at any time without incurring any obligation to make the same or similar changes on products previously built and sold by us.

STATE LAW RIGHTS:

This warranty gives you specific legal rights; you may also have other rights, which vary from state to state.

OWNERS MANUALS:

This owner's manual is one of three which you must read and understand before operating your vehicle. The other two are the Owners Manual for the General Motors, vehicle which has been modified for your use and the Braun Corp Mini Van Owner's manual. Braun Corp did the access modifications on your van (floor lowering , ramp, etc.) and those instructions are important for your safe use.

SAFETY PRECAUTIONS

**** PLEASE BE CAREFUL ****

Caution

Read and understand all instructions before attempting to operate your vehicle.

Any product is only as safe as the individual using it. For that reason, the following basic safety precautions must be complied with at all times.

- Respect the marked speed limit.
- Unusual noises or movements should be immediately inspected by a dSi dealer.
- Inspect the dSi van prior to each use. If an unsafe condition exists, do not use it. Return it to dSi for repair.
- Keep others clear of the DSI equipment when it is being operated. This includes service animals.
- Do not place any part of your body (except your hands) or clothing in or near any part of the DSI equipment.
- Always use careful common sense when operating the DSI van. This product is designed and manufactured to give years of safe, reliable service but it is not capable of thinking for the user...that is your responsibility as the user.

- The van must be safely parked and the motor turned off before leaving the van.
- Never allow children or others to play with DSI equipment.
- Be sure you have read and understand each of these safety precautions. If you have any questions contact DSI.
- Keep these instructions in the van and review them periodically. If you permit other users to operate this product be certain they also review these instructions and have been trained and have an opportunity to practice before driving on the road.

II. USING AND UNDERSTANDING THE SYSTEM

About the system

The DSI van control equipment enhances the original van manufacturer's mechanisms, allowing for balanced, sensitive control of the steering, accelerator and brake.

A customized control post with steering wheel (or Tri-post) is fitted to the individual client. An array of vehicle function switches is arranged within the client's reach. Auxiliary and/or optional switches are located in the center of the steering wheel or where convenient.

System design features

The DSI van control equipment has been designed in such a way that a small amount of force and motion can safely and conveniently manage the driving controls of a van.

The DSI System features a combination of mechanical, vacuum and electrical devices to achieve the level of sensitivity needed to operate the van. The accelerator and brake leverage device is mechanically balanced to provide the client a feel for the van and the road and counter the effects of acceleration and deceleration on the control post. This allows for a true driving sensation and safe operation over rough surfaces. The steering system is controlled by a wheel, (or Tri-Post), which conveys the client's movements to the tires, with the DSI system assisting the motion.

SYSTEM CONTROLS

Primary Controls-The driving controls are attached to the center post. Turning the steering wheel (or pivoting the tri-post) causes the front van wheels to turn. Moving the center post forward engages the accelerator and pulling back on the center post engages the brakes.

Secondary Controls-An array of push button switches are placed in a convenient location for the client. The switch box connects to the relay box. The switches and relays control various van functions. Some buttons are momentary (such as the horn) and other buttons are latching which turn on and off with one push of the button and off with a second push of the button (such as the lights). The relays are 30 amp Bosch relays which are easily replaced. The switch boxes are arranged by D.S.I to safely fit each client's needs.

III. DRIVING THE VAN WITH THE SYSTEM

Accelerator and brake

Vacuum Brake Assist

The brake system employed in the Scott Driving Controls is essentially a vacuum boost assist applied to the stock van power brake controls. The stock brake mechanism is unmodified from the brake pedal to the brake drum and calipers. In late model vans the A.B.S. brake controls are unaffected.

The Scott System is fairly simple and consists of two major components. The driver in pulling back the steering column operates a brake servo valve which in turn supplies vacuum to a brake booster diaphragm. This diaphragm pulls on the stock brake pedal through a bell crank, thereby applying the brakes.

The brake servo valve is a balanced poppet vacuum valve. When it is operated, vacuum flows to the brake booster diaphragm and the brakes are actuated. The valve will allow vacuum to flow in a measured and predictable way, making it possible to make smooth, predictable brake applications. The brake servo valve has just two moving parts and requires very little maintenance. Since the brake servo valve is built into the brake linkage, it responds very quickly to changes to the control column position. The brake booster is a large rubber diaphragm; enclosed in a metal container responsive to the vacuum supplied by the valve. The rubber diaphragm inside the brake booster requires periodic replacement.

All brake linkage is made of 4130 chrom-moly steel. All rod ends are impregnated with long lasting lubricant. The length of the brake linkage is fixed at the time of construction, insuring that the brake is activated as soon as the control column is pulled back from its 90° position. Any increase in brake travel is usually the result of rear brake shoe wear. DSI recommends the rear brakes be manually adjusted or adjusted by deliberate use of the self-adjusting feature of the General Motors brake system (see your vehicle's owner's manual). Gradual deterioration of the stock brake master cylinder will be characterized by intermittent loss of hydraulic pressure at the wheels. The driver will experience dramatically increased control column travel most often starting intermittently. If these conditions occur, the vehicle must be returned to the General Motors dealer as soon as possible to avoid brake failure. Brake problems, which are mechanical in origin, will be consistent, happening every time the brake is applied.

All braking mechanisms added in the Scott Driving Systems are vacuum in nature. There are no changes or modifications to the original manufacturers hydraulic brake controls. Vacuum is created by the engine sucking air into the intake system. Vacuum for the Scott System controls is drawn from the 3/8 vacuum line that supplies vacuum boost to the stock power brake vacuum booster. Vacuum is stored in a 720 cubic inch steel vacuum tank under the van. A soft seated check valve insures the retention of stored vacuum for emergency use. If the engine stalls or runs out of gas, the stored vacuum provides enough brake assist to pull off the road.

In normal use, the driver in the Scott System will not really feel the quality of the brake valve. If however the driver pulls back for brakes the brake valve opens, the brake pedal is pulled down and the driver's 'feel' notchiness or stickiness, this is characteristic of a brake valve that needs service. Since the valve is vented with atmospheric air from both sides, dirt, sand and water can enter the valve under extreme conditions. These contaminants shorten the life of the

they quad rings inside the valve. Since the two moving parts inside the valve are stainless steel, are seldom damaged.

Maintenance of the valve normally requires only cleaning, polishing, re-lubrication and replacement of the quad rings. This should be done only by a DSI authorized dealer. If it must be done by a local mechanic, the recommended lubricant is moly-disulphide grease, which is resistant to heat/cold, water and oxidation. The use of other greases, lithium, wheel bearing grease etc. is not recommended due to the precise operation of the brake valve.

Your van has a vacuum gauge to monitor the amount of reserve brake vacuum in the storage tank. This gauge allows a test procedure to be performed to check the integrity of the brake booster diaphragm.

Accelerator

The operation of the throttle is accomplished by a leverage system actuating a specially lightened electrically operated throttle pedal.

Steering

The steering components in the Scott Driving System are modified stock mechanical/hydraulic items utilizing closed loop follow-up linkage and a redundant back-up pump. A steering ratio change reduces the turning radius of the small steering wheel or 3 post device to 180 degrees from 3 turns on the stock steering wheel or 3 post device to 180 degrees from 3 turns on the stock steering wheel.

From the input devices, (either the mini wheel or the 3 post), a series of sprockets and chains carry the motion through rectangular housing. The entire counter balanced housing pivots in a floor mounted framework, forward movement for throttle, backwards for brake. The lowest sprocket rotates a shaft which has u-joints at both ends. This shaft goes through the firewall and connects with a G.M. rack valve mounted on the stock steering rack. A follow-up link assembly connects with the rack end on the passenger side to complete the full feed-back

The Scott Driving System incorporates a full closed loop steering. This means that the control device is mechanically attached to the road wheels. The driver receives feedback relating to both road conditions and control movement limits due the continuous mechanical attachment or the controls in the O.E.M. steering, brake and throttle devices. "Road Feel" is transmitted to the driver through the linkage. The position of the input devices is always directly related to the position of the road wheels.

The Scott System has a back-up steering system, which is intended to provide power assist in case of power steering pump, belt or engine failure. A 12-volt pump is triggered either automatically by means of a pressure sensitive switch or manually via a console-mounted push button. To insure durability of hydraulic and components the power steering fluid is cooled, filtered and stored in a large capacity aluminum tank.

IV. OPERATING THE VAN WITH THE DSI SYSTEM

Entering the Van

- 1) Fully open power door
- 2) Deploy folded ramp or slide out ramp to floor level.
- 3) Enter van per the owners manual for the mini van modifier.

The driving position

- 1) Move wheelchair into driving position.
- 2) Latch wheelchair tiedown. Try backing out to make sure it has latched.
- 3) Fasten or make sure the safety restraint systems are properly in place.

System controls

Check all switches and confirm proper location of all control components.

Starting the engine

- 1) Press the ignition switch ON.
- 2) Press the START switch to operate the engine starter motor, release when engine starts.
- 3) Stow ramp and close doors
For more information on starting instructions, read the GM vehicle owner's guide.

Motion controls

Use the center post to control the accelerator and brake. Pull back on the center post (using the wheel or the 3 post device) to apply the brakes. Press the SHIFT RIGHT switches to move the transmission gear to the desired location (i.e.) DRIVE or REVERSE). Check the shift indicator on the dash to confirm the selection of the proper gear. Release the parking brake by pushing the parking brake button marked "EMERG BRAKE". Moving the center post forward to the "middle" position will release the brake and the van will move. Pushing the center post forward will engage the accelerator and the van speed will increase. REMEMBER, while the gas and brake controls are sensitive, the steering is very sensitive.

Shut down and exit

When the driving trip is complete, use the SHIFT LEFT switch to move the transmission to the park position. Engage the parking brake by pushing the parking brake button. Push the IGNITION switch to shut off the engine. Use the button switches to turn off any van function no longer needed (such as lights). Use the SEAT UNLOCK button to release the wheelchair tiedown. Use the DOOR OPEN to open the door and deploy the ramp. Turn on the power to the wheelchair and exit the van.

Refer to the Vehicle Modifiers Manual for detailed information on care and operation of the wheelchair ramp.

Operate the exterior switch (or remote) to stow the ramp and close the door. Refer to the Braun Mini Van Modifiers Manual for detailed information on care and operation of the wheelchair ramp.

Important: Please read and fully understand all instructions before attempting to operate.

Caution

- Do not exceed rated load.
- Prior to use, inspect DSI System for proper function, required maintenance, and damage. If a problem exists, do not use. Return to an authorized DSI Agency for repair.
- Keep others including service animals clear of DSI System when operating.
- Be certain vehicle is safely parked before exiting.

Warning

Improper use of this DSI van can result in personal injury. User must read and follow operating instructions in Owner Manual. Additional copies of Owner Manual are available from DRIVING SYSTEMS INCORPORATED.

V. CARE AND MAINTENANCE OF THE SYSTEM

Reading the Gauges Meter-readings

The gauges on the added instrument panel of the system help the driver monitor the operational status of the system. The meters should stay within the following defined values: .

Meter	HI	LOW	DEFECTS
Volts	13	7	READING below LOW Battery low, replace Charging system defect, replace Reading above High Charging system defect, replace
Vacuum	25+	6	Reading below 6 Broken hose, repair/replace Storage tank/brake valve leak, repair/replace Reading above 25 Reading above 25 Gauge broken

Operational check list

Before driving the van check the following:

- A) Test lock down by moving chair rearward
- B) Check location and tightness of shoulder belt
- C) Check tightness of lap and chest belts on wheelchair
- D) Check battery voltmeter
- E) Check vacuum gauge

Maintenance and warning devices

The Scott System has been designed in such a way that it interfaces with the basic van controls in only a few places. Most regular maintenance procedures are not affected by the addition of the Scott Driving Controls. The stock brakes are retained from brake pedal to wheels as the Scott System works by pulling on the brake pedal. The throttle assist is strictly a mechanical function with a lever arm acting on a specially lightened stock throttle pedal. The stock ignition system (other than the push button operation) is unaltered. The DSI electrical control system is simply a way of accessing dash and steering column electrical controls and relocating them so the driver can comfortably operate them. An Electric ball drive actuator operates the transmission shifting. The emergency brake is operated by a rotary motor that is mounted directly on the parking brake assembly.

The driving controls themselves are very low maintenance. All linkage rod ends are permanently lubricated. All bearings used are sealed and require no lubrication. All hydraulic components and hoses are long lasting and require only periodic visual inspection. The reservoir for the backup steering pump should be checked every time the oil is changed and should be “topped up” to within about one inch of the top of the reservoir with General Motors power steering fluid..

The vacuum assisted brake mechanism do require periodic servicing. Brake booster diaphragm should be replaced every five years. The brake servo valve has 2 moving parts and need to be cleaned and 2 quad rings replaced and re-lubricated every 3 to 4 years. Braking performance lacks smoothness when the valve needs servicing.

Since most of our drivers are not able to perform trouble shooting in a physical way, we would like to break down the various functions performed by the Scott System so that symptoms can be separated from the causes of malfunctions. In this way causes can be inferred from symptoms noted by the driver. For simplicity we will separate the aspects of the Scott System by function.

Warning lights and indicators

Your van is equipped with a number of warning devices that are meant to alert you to a problem or a condition that you should be aware of. These devices can be further broken down into audible and visual warnings.

Audible warning devices

Low Vacuum warning buzzer

The Scott System uses a stored vacuum system for reserve braking. Vacuum is stored in a check valve protected tank under the vehicle. The contents of this tank are monitored by a low vacuum switch, which will activate a loud buzzer that makes a metallic sounding noise. Sometimes this device will sound if vacuum has leaked from the tank during the night and will shut off when the engine is started, providing vacuum to fill the tank. Remember, brake assist vacuum is created by the engine running, and the storage tank is intended to keep enough vacuum to allow the driver to drive to the side of the road, should the engine stall, not to provide vacuum to allow braking of a van that has not been running for sometime. Both the low vacuum switch and the low vacuum warning buzzer are mounted on the driver side under the dash. Together with the vacuum gauge, the low vacuum warning allows the driver to monitor the creation and storage of brake assist vacuum.

Wheelchair Tiedown Warning Buzzer -

On vans equipped with the Scott System a micro switch is mounted on the tiedown hook, behind the protective cover. This switch is meant to be in contact with the wheelchair-mounted bar which latches the chair to the tiedown. If the ignition is on and the hook-mounted switch is not in contact with the wheelchair bar a buzzer will sound. This buzzer is mounted under the dash on the driver's side.

DSI always recommends the driver test his/her chair lock by briefly attempting to back the wheelchair out of the tiedown to test the successful locking of the wheelchair into the tiedown. It is possible for the warning buzzer to sound if the wheelchair tiedown is not properly adjusted. As the tires wear the wheelchair gets lower and may not be in contact with the micro switch, and the alarm will sound even though the wheelchair is really locked securely to the floor. Should this be the case the tiedown can be lowered (or the wheelchair tires can be replaced) to reestablish the original relationship between the tiedown and the wheelchair. Someone looking from the driver's door at floor level can confirm what must be done to stop the buzzer.

If the van in question has an E-Z Lock tiedown, it too has a warning buzzer that sounds if the ignition is on and the wheelchair is not locked in place. There is also a visible warning light that is mounted on the ECU-2 control panel. The ECU-2 is a small box containing two switches and a buzzer that allows the buzzer to be deactivated when the vehicle is being serviced. Please read all material relating to your E-Z Lock and check with your local dealer should you have any question regarding its operation or repair.

Warning lights

A few words should be said regarding the two most common dashboard-warning lights and what they mean to you and your vehicle.

“Check Engine” warning light.

Your vehicle has a comprehensive electronic system for monitoring various functions in the van. The final result of this monitoring is a flashing message on your dashboard saying “Check Engine”. Using a diagnostic tool a technician can discover which vehicle system generated the illumination of the warning light. More than 80 different conditions can turn this light on. In our experience, the most common reasons include faulty emissions system sensor, a low coolant level, low oil level, poorly attached engine air cleaner, loose or missing gas cap. Even if the light should go out there is a memory that can be retrieved with the diagnostic tool.

ABS warning light

Another prominent warning light is the ABS warning light. The system has a combination of electronic and hydraulic equipment that monitors several parts of the brake system and ultimately controls the brake response to prevent one or more of the wheels to lock up. Diagnosis requires a different type of tool. Fewer causes will turn the light on than with the check engine light. There is one feature that the driver should be aware of, if the ABS does not work; the system reverts to standard braking.

Symptom	Probable Cause	Action
Steering not smooth Steering assist “skips”	-Stretched or dirty power steering pump belt.	Return vehicle to OEM Dealer For new steering belt, Return vehicle to DSI Dealer
.		
Steering control is not centered	-Change in wheel alignment	Return vehicle to OEM Dealer or local alignment shop
Vehicle drifts to one side, correction must be made to keep vehicle steering straight.	-Bad wheel alignment	Return vehicle to OEM or local Alignment shop.
Steering has a dead spot in the center that makes it difficult to drive straight without almost constant correction	-Steering play in upper steering column	Return vehicle to DSI Dealer
Back-up steering pump does not turn on.	Power steering pressure switch isn't working or emergency pump solenoid does not work	Return vehicle to DSI Dealer

Secondary Controls

The Scott System is a relay based switching system that allows a driver to access the electrical controls originally found on the dash and steering column. There are 5 4 major elements in the electrical control system. The most obvious element is the push button box. The push button box, usually mounted on the drivers door has 30 individual buttons, each representing a different function. The push button box contains only switches. The push button box has 2 metal connectors (the second element) which interface with the third element, the relay box. The relay box contains Bosch 30 amp relays, each of which represents a given function. The box is mounted behind the knee panel and under the speedometer. A diagram showing the location of each relay and its function is attached to the bottom of the relay box.

The Bosch relays are plug-in and easily replaceable. The fifth element is the loom that connects the electrical loom and the relay box. This loom is plugged directly into the General Motors loom not spliced or t- tapped.

The reliability and serviceability of this system has been proven over the last 25 years. Should there be a problem with any function, the problem is limited to that function. If there is a problem with the Secondary controls, other than a burned out bulb, the vehicle should be returned to the DSI Dealer.

Each button can, however be removed for cleaning and/or replacement of light bulbs. We do not recommend spraying anything into the box for cleaning or lubrication other than tuner cleaner or compressed air.

D.S.I. Tie-down Description

A general description of the DSI tie-down system is important to understanding how it works. The basic tie-down mechanism is partial electrical, partly vacuum and partly mechanical in nature. Each wheelchair has a tie-down bar that incorporates a 1" x 2" bar, which becomes the attaching point for the floor mounted tie-down.

As the wheelchair approaches the drivers area, care should be taken to make the chair parallel with the side of the vehicle. A channel or track is provided for the right front tire so that

Guided consistently to the same spot in relation to the tie-down and controls. The wheelchair bar will push the latching hook up allowing the bar to enter the area under the hook where it will be trapped. Spring tension will cause the hook to drop back down latching the wheelchair.

To release the chair from the lockdown, push the button marked "Seat Release". An electrical signal opens a vacuum controlled valve, which sends vacuum to the diaphragm that lift's the hook. The vacuum which comes from the brake storage tank, is controlled after the electric valve closes so it takes 7 to 10 seconds for the hook to return to it's original position. This delay allows the driver to turn on the wheelchair and to leave the drivers station. A castor plate (or a second track) prevents both front tires from castering at the same time and trapping the wheelchair in the driver's area.

Over time as the front tires of the wheelchair wear, it will become necessary to readjust the tie-down for the best fit. The space under the hook allows for about 1/8" of drop in the height of the bar attached to the chair. This allows some mis-adjustment while still holding the chair in place. We would prefer that a slight amount of down pressure be placed on the chair bar to keep small movements of the chair to a minimum while driving. It is possible to adjust the tie-down lower, or the same effect can be accomplished by replacing the front wheelchair tires. The fit of the tie-down can be verified by opening the driver's door and manually lifting the hook to check the amount of adjustment needed.

The wheelchair can always be released by raising the hook by hand allowing the wheelchair to back up. If the chair backs up only 1/4", the hook will not be trapped in the lockdown unless it moves forward again. Watch those fingers.

The tie-down hook is equipped with a tie-down warning switch. The switch is attached to the hook and sounds a buzzer if the ignition is on and the tie-down is not in the locked position in direct contact with the wheelchair cross bar. The micro switch is small with a long lever arm that has a roller mounted on the tip. When the hook is down the roller should be in contact with the chair bar. As the tires wear, primarily the front tires, the chair bar becomes lower and is not in contact with the hook switch. The fact that the buzzer sounds in those circumstances though does not mean that the wheelchair is not locked down. The wheelchair may still be locked down even if the tie-down adjustment is not correct. Correct tie-down adjustment limits movement and improves driver control.

Tie-down adjustment can be made by your local DSI dealer. .

Tie-down

Symptom

Probable Cause

Action

Wheelchair will not lock into	-Lock down bar on wheelchair	-This is usually caused by tire
-------------------------------	------------------------------	---------------------------------

tie-down	is to low to enter the lock down	wear or flat tires. Check front tires
Wheelchair is not being retained by lock down mechanism	-Vacuum motor on tie-down up right is bent and doesn't let the hook drop down into the locked position.	Return vehicle to DSI Dealer
Wheelchair is not being released by lock down	-Release mechanism not operating properly.	Return vehicle to DSI Dealer
The tie-down hook will raise but drops too quickly to allow release of wheelchair.	-Dirty or slow release valve	Return vehicle to DSI Dealer
Tie-down warning buzzer won't shut off or comes on during braking	-Misaligned tie-down or bent or damaged micro switch	Return vehicle to DSI Dealer