



# Maintenance Manual

## MAINTENANCE MANUAL

This booklet has been designed and written to supply information regarding maintenance requirements for all makes and models built by Starcraft Bus.

As the owner of a new Starcraft Bus product, it is important to recognize the importance of performing routine maintenance during the warranty period. Just like oil changes, if proper maintenance is not performed, the warranty coverage can be denied.

Familiarizing yourself with this manual will help you make sure that proper maintenance is performed. Please remember, routine maintenance is not covered by warranty.

With proper and scheduled maintenance on your Starcraft Bus, we believe you will enjoy your Starcraft Bus for many years to come.

## FLASH DRIVE

In an effort to provide our dealers and end user customers with the most current and up-to-date information on your bus, Starcraft Bus has provided you with a flash drive. This flash drive contains a large amount of important information regarding your specific vehicle. Please take time to review the material housed on the drive.

You will find this flash drive in a small manila folder within your new bus packet.

### **IMPORTANT:**

CONTACT YOUR SELLING DEALER **PRIOR** TO HAVING ANY WARRANTY WORK PERFORMED ON YOUR BUS.

**The information provided in this maintenance manual is neither intended to nor should it be used to replace the chassis and other component manufacturers' service, warranty and care information.**

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## CHAPTER 1 – CHASSIS AND FRAME

Your Starcraft Bus vehicle is designed to be as maintenance free as possible. However, all vehicles require some care to reduce the possibility of unwanted breakdowns during travel. Maintenance to your bus may not seem necessary at the time of purchase, yet it is very important to keep your bus in its best condition for your enjoyment and use. Normal maintenance is required to maintain warranty coverage, reduce wear, and prolong the life of your bus.

### Engine

- Start the engine every 15 days.
- Run it at fast idle until it reaches normal operating temperature.
- Shift the transmission into all gears while engine is running.

### Fuel System

- Regularly move vehicles short distances to mix fuel anti-oxidation agents.
- For vehicles being stored for prolonged periods, a commercial gasoline or diesel fuel stabilizer should be used.
- \*For more information please refer to your Ford, GM, or International Owner's and Maintenance Manuals that came with your bus.

### Tires & Wheels

- Tires installed on your bus are matched to the weight of your vehicle according to the rating of the tires. The most important item in tires is to inspect and check air pressure no less than once per week, perhaps daily during travel. Correct PSI air pressure is listed on each tire as per rating (shown on data sticker on the driver side door jamb). When air pressure is not maintained as specified, tires will run hot, especially in summer months and blow outs can occur. Pressure must always be checked when tires are cold, preferably in the morning. DO NOT adjust or lower tire pressure when warm, as it will be too low when cool. All tire pressures rise when tires are moving on roadway. A tire is considered "cold" after 3 hours of not moving. Again, please refer to your Ford, GM, or International Owner's and Maintenance Manual for torque specifications, cleaning procedures, etc.
- Alignments are NOT performed by Starcraft Bus. Please confirm with your selling dealer to determine if an alignment has been completed on your Starcraft Bus (alignments are not a warrantable expense with Starcraft Bus).

## CHAPTER 1 – CHASSIS AND FRAME

### Axles, Bearings, Brakes and Hubs

- Verify that all linkages, cables, levers, and clevis points under the vehicle are covered with grease to prevent rust.
- Move trucks at least 25 feet every 15 days to lubricate working parts and prevent corrosion.
- \*For more information please refer to your Ford, GM, or International Owner's and maintenance manuals that came with your bus.

## CHAPTER 2 – EXTERIOR

### Metal

- Aluminum skin is painted and prepared by Starcraft Bus with an automotive paint finish. To clean, use a mild detergent soap and water.
- Use an automotive type wax or polish; same as you may use on your personal vehicle. By waxing your bus once a year, it retains its nice, new appearance.

### Fiberglass – Gel Coat

- Fiberglass skin is painted and prepared by Starcraft Bus with an automotive paint finish. To clean, use a mild detergent and warm water using a soft brush or rag.
- Use an automotive type wax or polish; same as you may use on your personal vehicle. By waxing your bus once a year, it retains its nice, new appearance.

### TPO / ABS

- TPO / ABS can come in a wide range of textures and colors. It is a strong plastic compound (ABS) or rubber compound (TPO) commonly used for molded articles within the manufacturing industry and is used for a wide range of production components inside and outside of your Starcraft Bus. The most common exterior components are fender flares on your Starcraft commercial shuttle bus.
- TPO / ABS components are lightweight and strong, however the surface is not as hard as fiberglass and can scratch easily.
- The proper care, cleaning and maintenance of your TPO and ABS components is quite simple because of the basic properties and longevity of the material itself.
- Periodic cleaning is the primary maintenance. Starcraft Bus suggests using Murphy's Oil Soap with a soft nylon brush or sponge. DO NOT USE solid or granulated cleaners, as they will mar the natural finish.

## CHAPTER 2 – EXTERIOR

- Do not use Armor All or other oil solvent base cleaners on your TPO or ABS components as they will leave a slick surface.
- A good thorough cleaning should keep your TPO and ABS components looking good and remove most stains. For more stubborn stains, you should contact your Starcraft Bus authorized dealer.
- DO NOT use citrus based cleaners on ABS materials. The ABS will break down and become brittle.

### Exterior Roof

- To clean, use a mild detergent and warm water using a soft brush or rag.
- Use an automotive type wax or polish; same as you may use on your personal vehicle. By waxing your bus once a year, it retains its nice, new appearance.

### Underbody

- Most individuals are aware of the effects that prolonged exposure to salt and ice melting chemicals have and the adverse effects on any coated metal surfaces, our chassis are no exception. The effects of these corrosives are magnified with time and therefore should be removed from the chassis as soon as possible after a unit has been on the road.
- Washing the frame is especially important during the winter driving season. The danger of exposure to road chemicals is not limited to only the northern snow states. Many southern states use salt and ice melt solutions as well, and any vehicle which originates from a northern state has potential exposure.

### Extrusions and Vents

- All components installed on the exterior of your bus have some type or form of “putty/foam tape” placed between the mounting flange or surface to guard against water entry and leakage.
- Additional sealant, referred to as “cap seal” is used to protect along the edges of extrusions or be a secondary surface sealant. All of these sealants are subject to weather elements such as UV rays from the sun, rain, snow, cold, heat, air pollution, frost and other exposures causing dry-out, shrinkage and possible cracking.
- Cap seal must be examined each year, preferably each spring and fall, for looseness, cracking, and separation from any attached surface. If upon inspection you find the above conditions, repairs must be made. These conditions will permit water to enter slowly and eventually cause water damage.

## CHAPTER 2 – EXTERIOR

- Corner and roof extrusions have “putty tape” sealant between the components. This material can and will also dry and/or crack from weather elements, permitting leakage and eventually major deterioration. Starcraft Bus advises the owner to have these extrusions removed, and have the old putty tape replaced with new sealant material every five years.
- Windows, entrance doors, and cargo doors (but not limited to) may also use a closed cell foam seal. The seal may also deteriorate over time, lose its memory, shrink with weather conditions, etc., over a period of five years.
- All sealants must be maintained to prevent failure plus leakage damage. For best results, sealant requirements are:
  - Resistant to checking
  - Resistant to shrinking
  - Dries rapidly
  - Adheres to metal, TPO, and fiberglass
  - Expands and contracts with temperature changes
  - Color should match
  - For suggested sealants, please contact your Starcraft Bus servicing dealer.
- AT LEAST THREE TIMES PER YEAR, INSPECT ALL ROOF SEAMS; FRONT, REAR AND ALL AROUND VENTS AND ATTACHMENTS. Remove any loose sealant and reseal these areas. For a list of recommended sealants, please contact our authorized Starcraft Bus dealer. FAILURE TO INSPECT AND CORRECT CAN VOID THE WARRANTY COVERAGE, CLASSIFIED AS NEGLIGENCE.

## CHAPTER 3 – SYSTEMS

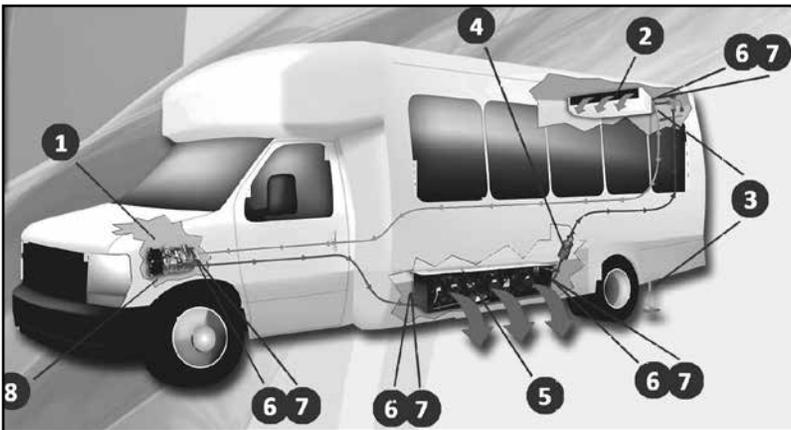
### Batteries

- As a manufacturer, we suggest you have your bus inspected each spring to check for any loose wires and/or loose connections in the load center and have tightened if loose. Also, have the fuses inspected for continuity and operation.
- Maintaining the state-of-charge while vehicles are in storage or not being used is the bus owner’s responsibility.

## CHAPTER 3 – SYSTEMS

- Check the battery state-of-charge every 15 days. If the battery eye is “red,” recharge the battery until the eye turns green. Check battery condition for possible storage damage using either a Bear or Midtronics battery tester. Batteries without an eye – recharge if the voltage is less than 12.40 volts.
- Batteries, whether supplied from manufacturer or dealer, require constant inspection and maintenance. To preserve long life in any battery, three important functions are required: Charge battery every 30-60 days to keep fully charged during non-use, especially during winter months. Certain types require water to be checked and added as necessary. Keep water above cell mass to avoid permanent damage. Store battery in a cool place when not in use, around 40 degrees Fahrenheit.
- A fully charged battery will measure at 1.265 specific gravity. A discharged battery will measure at 1.120 specific gravity or 11.7 volts DC. A hydrometer is required to measure “specific gravity.”
- Most batteries with deep cycle rating require water to be added as needed. This depends on the amount of draw time that is on that specific battery.
- Use distilled water if possible as it is nearly mineral free. Not keeping batteries charged will result in shorter life expectancy.
- Be sure to keep all battery terminals clean at all times to ensure good contact.

### Air Conditioning



## CHAPTER 3 – SYSTEMS

- USE EXTREME CAUTION AROUND ENGINE COMPARTMENT AND ANY OTHER MOVING PARTS. HAVE SYSTEM MAINTENANCE AND SERVICE PERFORMED BY A QUALIFIED TECHNICIAN.
- For the below information, refer to the illustration on Page 6.
  - 1 = Charge Level / Pressure
  - Recharging MUST be done by a QUALIFIED TECHNICIAN.
  - 2 = Evaporator Filters
  - A properly maintained, clean filter maximizes air flow and system performance.
  - Filters should be inspected visually every month and cleaned/replaced as needed.
  - 2 = Evaporator Coil(s)
  - A properly maintained, clean evaporator coil will ensure maximum heat transfer and system performance.
  - 2 = Evaporator Blower(s)
  - Proper air flow across evaporator coil allows for efficient heat transfer. Be sure to check to make sure all blowers are actually operating.
  - 3 = Evaporator Drain Line(s)
  - Prevents water from collecting in the evaporator drain pan. On a hot humid day the evaporator should drip water under the vehicle.
  - 4 = Sight Glass / Moisture Indicator(s)
  - Deep Green OR Purple = Absence of Moisture.
  - Yellow OR Pink = Moisture is present – IMMEDIATE SYSTEM SERVICE IS REQUIRED TO PREVENT SYSTEM DAMAGE.
  - 5 = Condenser Coil(s)
  - A properly maintained, clean condenser coil will ensure maximum heat transfer and system performance. Clean with non-caustic cleaner.
  - 5 = Condenser Fan(s)
  - Proper air flow across condenser coil allows for efficient heat transfer. Check to make sure all fans are actually operating when compressor is engaged.
  - 6 = Hoses / Piping
  - Properly supported hoses prevent the possibility of refrigerant leaks. Check for residue around connections (sign of refrigerant leak) / hose wear from rubbing other objects / loose or missing clamping.
  - 7 = Wiring Harness(es)
  - Properly supported and protected harnesses prevent the possibility of electrical issues.

## CHAPTER 3 – SYSTEMS

8 = Compressor Belt(s)

- Properly tensioned belts ensure maximum compressor performance and belt life.

## CHAPTER 4 – INTERIOR

### TPO / ABS

- TPO / ABS can come in a wide range of textures and colors. It is a strong plastic compound (ABS) or rubber compound (TPO) used commonly for molded articles within the manufacturing industry and is used for a wide range of production components inside and outside of your Starcraft Bus. The most common interior components are front bulkhead window trims on your Starcraft School bus / MFSAB vehicles.
- TPO / ABS components are lightweight and strong, however the surface is not as hard as fiberglass and can scratch easily.
- The proper care, cleaning and maintenance of your TPO and ABS components is quite simple because of the basic properties and longevity of the material itself.
- Periodic cleaning is the primary maintenance. Starcraft Bus suggests using Murphy's Oil Soap with a soft nylon brush or sponge. DO NOT USE solid or granulated cleaners, as they will mar the natural finish.
- Do not use Armor All or other oil solvent based cleaners on your TPO or ABS components as they will leave a slick surface.
- A good thorough cleaning should keep your TPO and ABS components looking good and remove most stains. For most stubborn stains, you should contact your Starcraft Bus authorized dealer.
- DO NOT USE citrus based cleaners on ABS materials. The ABS will break down and become brittle.

### Wall / Ceiling Covering – Vinyl

- To clean, use a mild solution of soap and water with a sponge or soft cloth. DO NOT use any abrasive cleaner as scratching of vinyl could occur, causing dull colors and/or scratches. Avoid cleaners with bleach. For stubborn stains, you may need a strong all-purpose spray cleaner which will need to be sprayed on and QUICKLY wiped off.

### Wall / Ceiling Covering – Fabric

- To clean fabric wall covering of dust, use a soft attachment of a vacuum cleaner. To remove solid spots on fabric use clear Ivory dish washing liquid and water.

## CHAPTER 4 – INTERIOR

### Flooring

- To care for and clean your floor covering, use a mild soap in water and a damp cloth. DO NOT pour water on floors as it may seep under / in attachment points in the buses floor.

### Seating – Vinyl

- To clean, use a mild solution of soap and water with a sponge or soft cloth. DO NOT use any abrasive cleaner as scratching of vinyl could occur, causing dull colors and/or scratches. Avoid cleaners with bleach. For stubborn stains you may need a strong all purpose spray cleaner which will need to be sprayed on and QUICKLY wiped off.

### Seating – Fabric

- To clean fabric seat covering of dust, use a soft attachment of a vacuum cleaner. To remove solid spots on fabric use clear Ivory dish washing liquid and water.  
\*For more stubborn stains you may need to contact your authorized Starcraft Bus dealer.

### Windows

- On window(s) which have opening sliders, there are “weep or drain” holes at lower sections of frame extrusions, generally at the end of each moveable panel. Dirt, debris, insects, etc. can and will accumulate, potentially plugging up these weep holes. Should water accumulate (stand in threshold of window), your weep holes and / or channels in window have become plugged. Be sure to keep these draining areas open at all times.

## CHAPTER 5 – WHEELCHAIR LIFT

- Regular maintenance of the wheelchair lift will help optimize its performance and reduce the need for repairs. This chapter contains cleaning and lubrication instructions.
- Lubrication  
Lubrication should be performed at least every six months, or sooner depending on usage. Lubricate lift at torsion springs (both sides with penetrating oil); knuckle links (both sides with penetrating oil), and; the hinge (with penetrating oil). Lubricate the outer barrier (both sides with a dry graphite lubricant).

## CHAPTER 5 – WHEELCHAIR LIFT

- Cleaning  
Regular cleaning with mild soap (i.e. dish soap, car wash liquid) and drying thoroughly will protect the lifts' painted surfaces. Cleaning is especially important in areas where roads are salted in winter. Make sure that lift pivot points remain clear and clean prior to lubrication.

### Maintenance Schedule

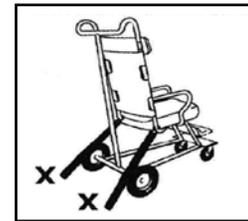
- Under normal operation conditions, maintenance inspections are required at least every six months (1750 cycles).
- Service should be increased under conditions of heavier use (more than 10 cycles per day).
- 10 Cycles
  - Listen for abnormal noises as lift operates (i.e. grinding or binding noises).
  - Verify that control pendant is undamaged and cable connector is tight.
  - Verify that system properly detects objects in threshold area and actuates the audible alarm.
  - Verify that sensor inhibits downward movement of platform when a weight is present on lowered bridgeplate.
- 150 Cycles
  - Inspect electrical wiring for frayed wires, loose connectors, etc.
  - Place vehicle in non-interlock mode and verify that lift does not operate.
  - Verify that lift decals are properly affixed, clearly visible, and legible. Replace, if necessary.
  - Verify that armrest fasteners are properly tightened.
  - Verify that mounting and support points are undamaged.
  - Verify that mounting bolts are sufficiently tight and free of corrosion.
  - Verify that link pins on arms are properly installed, free from damage, and locked in position.
  - Verify that bridgeplate operates without binding during lift functions.
  - Verify that bridgeplate deploys fully when platform stops at floor level.
  - Verify that bridgeplate rests flat against baseplate.
  - Verify that rollstop is opened completely when platform is at ground level.
  - Verify that rollstop closes and locks when platform leaves ground.

## CHAPTER 5 – WHEELCHAIR LIFT

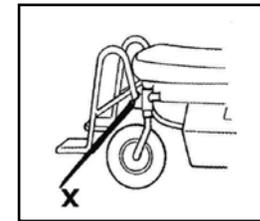
- 1800 Cycles
  - Clean lift with mild soap and water and wipe dry. Prevent rust by coating all surfaces with a light weight oil. REMOVE EXCESS OIL.
  - Spray penetrating oil where specified in the Lubrication section in this chapter. Remove excess from surrounding areas.
- 3600 Cycles
  - A certified technician must perform the following safety check(s).
  - Check hydraulic cylinder for evidence of leaks.
  - Inspect hydraulic hoses for damage.
  - Verify that all fittings are tight.

## CHAPTER 6 – WHEELCHAIR TIE DOWNS

The “Q’Straint, M-series or QRT MAX” systems are very flexible in accommodating most wheelchair styles as shown below.



Child Stroller Wheelchair –  
Rear Attachments



Standard Power Wheelchair –  
Front Attachments

It is recommended that Tri-Wheeler users transfer to an ambulatory seat. However, if this procedure is not possible, securement of the Tri-Wheeler and its occupant can be accomplished by using the optional Q’Straint rear middle belt G5-5010 and fastening it to a solid frame member on the base of the Tri-Wheeler chair and then by following all regular Q’Straint securement instructions.

- Auxiliary wheelchair equipment should be effectively secured to the wheelchair or removed from the wheelchair and secured in the vehicle during transport so as to not break free and cause injury in an impact.
- Whenever possible, items attached to the wheelchair in front of the passenger should be removed and secured separately during transportation to prevent potential injury to the passenger.

## CHAPTER 6 – WHEELCHAIR TIE DOWNS

### Maintenance

- Inspect your Q'Strain, M-Series and/or QRT Max series regularly, before and after every use.
- The Q'Strain, M-Series and/or QRT Max series must be replaced if suspected to have been in use during impact or show ANY sign(s) of damage or excessive wear and tear. Belts should be replaced if they have been worn during impact, even if the damage is not obvious.
- Prevent contamination of belt webbing from oil, gases, polishes and chemicals, in particular – battery acid.
- Be sure to visually inspect the wheelchair tie down tracking for dirt and debris after every use. This should be cleaned out with a shop vac as needed.

## CHAPTER 7 – ENTRY DOORS

### Six-month Actuator Maintenance Schedule

- Lubricate the main gears with white lithium aerosol grease.
- Lubricate all other moving parts with white lithium grease.
- Inspect the open limit switch actuating tab for proper adjustment. Ensure that it is limiting the operator from driving the doors past 90 degrees while opening. Adjust as required (this can be performed by an authorized Starcraft Bus dealer).
- Inspect the operation of the current sensing system built into the motor control board. The red LED must illuminate when the door reaches the fully closed position.
- Inspect for bent push-pull rods; replace as necessary (replacement and parts for replacement should be handled through an authorized Starcraft Bus dealer).
- Inspect the entire system for loose fasteners or components. Repair as required (this can be handled by an authorized Starcraft Bus dealer).
- Inspect for tightness of the set screws binding the actuator arms to the door leaf drive hex. Tighten or replace as needed.
- Inspect emergency release lever for proper operation. Lubricate the shaft running through the center of the body with WD-40 or equivalent.

### Six-Month Door Leaf Maintenance Schedule

- Inspect all door frame mechanical joints for looseness. Tighten as needed.

## CHAPTER 7 – ENTRY DOORS

- Inspect torque arm attaching rivets for looseness. Replace as needed (this can be handled through an authorized Starcraft Bus dealer).
- Inspect lower door hinge pivot for any defects and repair or replace as required (this can be handled through an authorized Starcraft Bus dealer).
- Inspect door leaf center overlap seal for damage. Clean only with a mild detergent.

## CHAPTER 8 – EMERGENCY EXIT / ESCAPE HATCH

### Emergency Exit / Escape Hatch

All Starcraft Bus products are equipped with an EMERGENCY EXIT hatch. Please review and understand fully the information in this chapter.

### Opening an Emergency Hatch



1. Rotate the red knob 90 degrees in either direction.



2. Push the red knob into the lid.

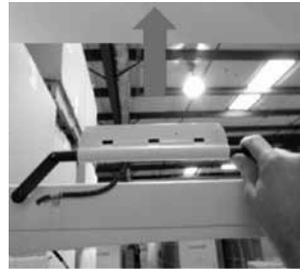


3. Continue to push the lid to the fully open position.

**Closing an Emergency Hatch**



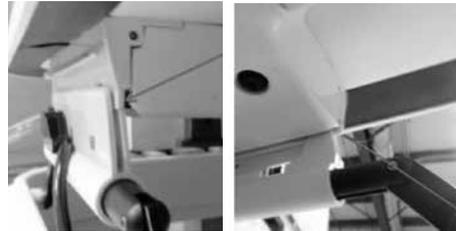
1. If the hatch was opened with the lid in the fully closed position, the release hinge will still be in the down position.



2. Push the release hinge upward to the position shown above.



3. Lower the lid into position.



4. Guide the release hinge into the handle base on the lid as shown above.



5. Pull down on the top of the lid to force the release hinge and the lid together until you hear “clicks.” This will be the spring loaded handle setting in place.



6. Grasp both sides of the lid and pull down to fully close the hatch.



7. Rotate the red knob back into position.



8. The red knob should be in this position during normal operation of the vehicle.

**EP1 Operation Check List**

- Upon starting the bus, the EP1 Alarm Unit will emit an audible noise indicating that the system is now operational.
- Close the front door and turn on the master switch. Open the front door and the red overhead lights will flash.
  - Expect an audible sound from the EP1 Alarm Unit as the red lights are activated.
- Close the front door and the overhead lights will stop flashing.
- Turn the ignition to the “OFF” position. The system’s alarm, a high-pitched beep, will begin to sound. After approximately eight seconds, the bus horn will begin to sound on and off.
- Turn the ignition back to the “ON” position. The EP1 Alarm Unit will sound a high pitched tone three times at 30 second intervals (90 seconds) reminding the driver to perform their child check.
- Proceed to the rear of the bus and depress the RVT Reset Button for at least three seconds. You will hear the deactivation signal, a rapid chirping sound from the EP1.
  - Note: The Child Checkmate EP1 system’s deactivation process is designed so that the ignition key must remain in the “OFF” position for at least one second before switching to the “IGNITION” or “ACCESSORY” position.
- The system has now been deactivated and the key can be removed safely from the ignition.

**DOME LIGHT OPTION – IF EQUIPPED**

- Turn the ignition to the “ON” position to illuminate dome lights for 20 seconds.
- Once the system has been activated, turn the ignition to the “OFF” position and the dome lights will illuminate.
- Turn ignition to the “ON” position. The dome lights will remain illuminated. Proceed to the rear of the bus to deactivate the system.
- The dome lights will remain on for two minutes.
- Stepping on the brake pedal will trigger an audible sound. This will also turn the dome lights off.

## CUSTOMER BUS INFORMATION

VIN # \_\_\_\_\_

Body # \_\_\_\_\_

### HELPFUL CONTACTS

Ford Chassis	800.392.3673
GM Chassis	800.353.3867
International Chassis	888.633.8380
Braun	800.946.6158 or <a href="http://www.braunlift.com">www.braunlift.com</a>
Ricon	800.322.2884 or <a href="http://www.riconcorp.com">www.riconcorp.com</a>
Trans Air	800.673.2448 or <a href="http://transairmfg.com">transairmfg.com</a>
Carrier	717.767.3341 or <a href="http://www.mcc-hvac.com">www.mcc-hvac.com</a>
A & M	574.225.5000 or <a href="http://www.anmsystems.com">www.anmsystems.com</a>
Q'Straint	USA or Canada Phone 800.987.9987 or fax: 954.986.0021 Email: <a href="mailto:Qstraint@qstraint.com">Qstraint@qstraint.com</a>
Child Checkmate	877.494.8222 or <a href="http://www.childcheckmate.com">www.childcheckmate.com</a>

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