

Operation and Service Manual Documents

TUG Model MA Tow Tractor - Rev 19:

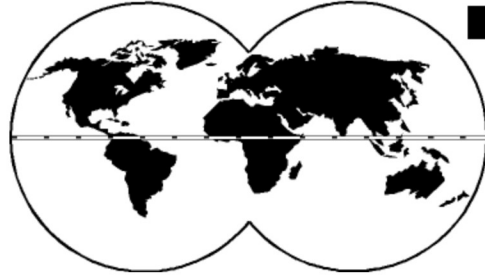
Chapter One: General Information and Operating Instructions.

Chapter Two: Maintenance

Chapter Three: Overhaul

Chapter Four: Illustrated Parts List

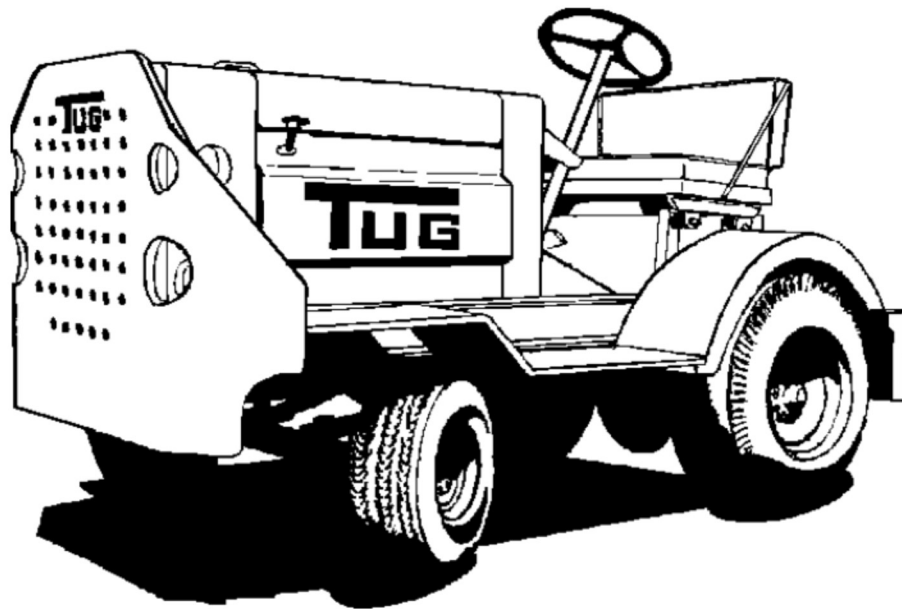
Chapter Five: Appendices



TUG
MANUFACTURING
CORPORATION

MODEL MA TOW TRACTOR

OPERATION AND SERVICE MANUAL



ORIGINALLY ISSUED MARCH 22, 1974



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Note: The information contained in this document is intended to be accurate and up to date at the time of original issue. Tug Manufacturing Corporation reserves the right to update the information in this document, without warning, as deemed prudent or necessary by Tug Manufacturing Corporation.



INTRODUCTION TO THE OPERATION AND SERVICE MANUAL

This manual establishes the operation and maintenance procedures that are to be used by operators of the Tug Manufacturing Corporation Models MA-30, MA-40, MA-50, MA-60, MA-70 & MA-80 Tow Tractors.

During recent years, the importance of Materials Handling (the physical movement of materials) has received serious and concentrated study. Due to the need for increased economy in today's industry, new and more efficient methods have become necessary for the handling and storage of materials.

Forklift and reach trucks are the well established implements utilized for stocking loads, often stacking them extremely high. They have enabled more effective utilization of valuable storage space. While these vehicles are frequently operated for transferring loads over short distances, their use is not economical when lengthy traveling is involved.

For lengthy traveling, the tow tractor is a valuable tool, especially when used in conjunction with a trailer train. This system provides an economical mode of transferring a large amount of material or goods over a long distance. The more specialized forklifts are then left to concentrate on the high stacking operations for which they were designed.

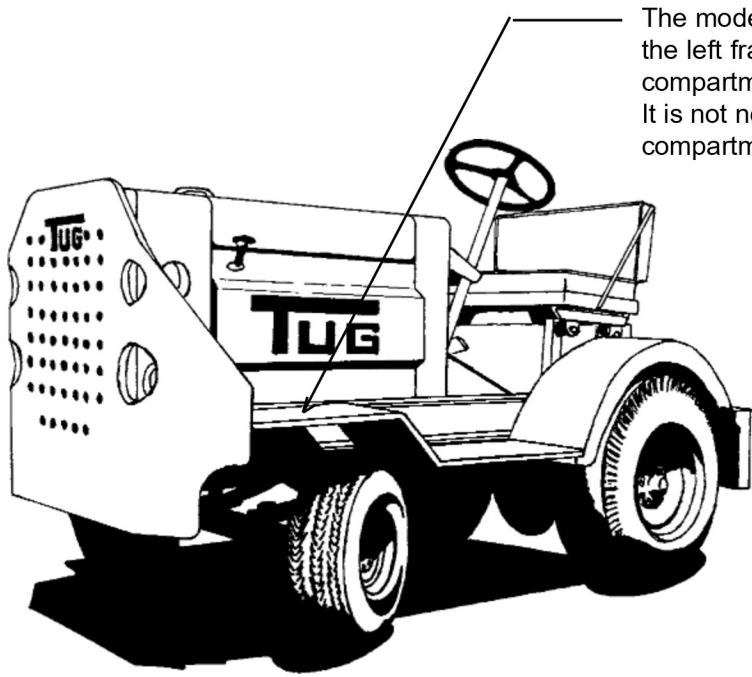
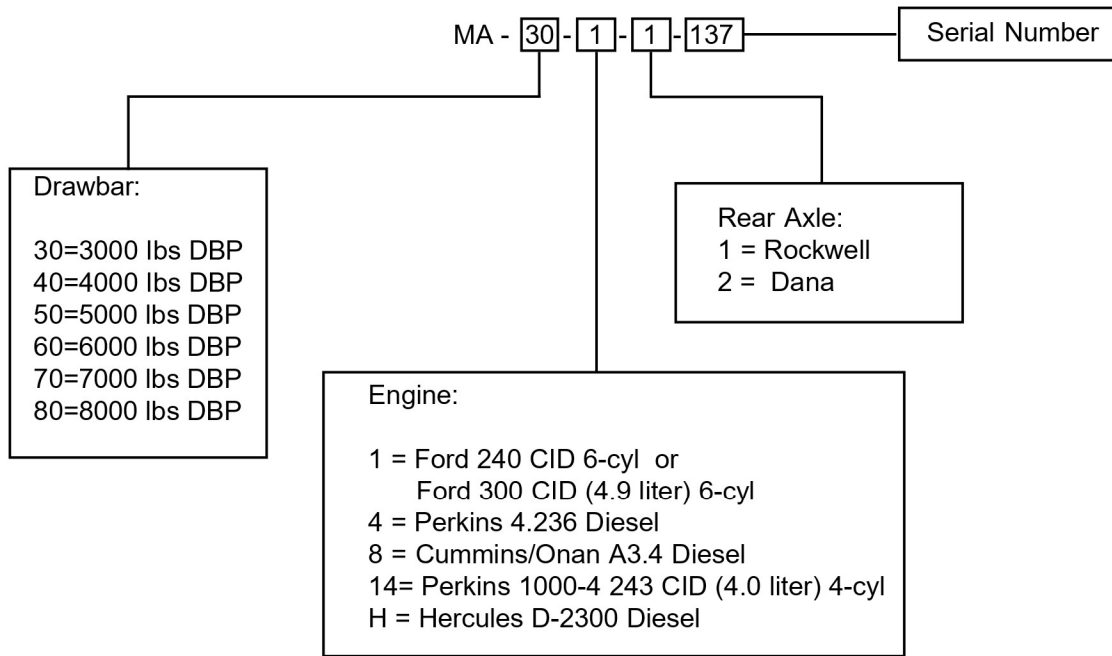
To accomplish productive movement of materials, one more important factor must be considered. **The operator must be a skilled and responsible person.** This expertise should not be solely based on his ability to drive, but on his ability to identify and understand the various pieces of equipment related to his job.

Certain operation and maintenance procedures have been covered in greater depth in a series of video tapes which are available from Tug Manufacturing Corporation. These video tapes include the following:

- MA-1 Proper Operation
- C148 Ford 300 L.P. System
- C149 Basic 12 Volt Electrics
- C144 Rockwell Steer Axle Repairs (With Brakes)
- C145 Rockwell Drive Axle Repairs
- C147 Ford 300 Carburetor Overhaul



MODEL NUMBER CODING OF MA TOW TRACTORS



The model number is stamped on the top of the left frame rail, just outside the engine compartment, as is the date of manufacture. It is not necessary to open the engine compartment to locate the serial number.



TUG Manufacturing Corporation

LIMITED WARRANTY

TUG Manufacturing Corporation ("TUG") warrants to the original purchaser all TUG equipment against defective materials or workmanship (but not against failures or defects resulting, directly or indirectly, from accident, abuse, modification, alteration, lack of recommended maintenance, use of non-recommended fuels, normal wear and tear, misuse, use of parts and components not manufactured or supplied by TUG, or use for purposes not reasonably intended) for a period of one (1) year from date of shipment to the original purchaser or the first 1,000 hours of operation, whichever occurs first. The warranty of purchased functional components is limited to that specified by the component manufacturer.

THIS LIMITED WARRANTY IS NOT ASSIGNABLE BY THE ORIGINAL PURCHASER OF TUG EQUIPMENT. ANY PURPORTED ASSIGNMENT OF THIS LIMITED WARRANTY SHALL BE VOID AND TUG SHALL HAVE NO OBLIGATION TO HONOR OR PERFORM UNDER THIS LIMITED WARRANTY IN FAVOR OF ANY PERSON OR ENTITY OTHER THAN THE ORIGINAL PURCHASER.

TUG will, at its sole option, repair or replace any component, part or parts, if found on examination by TUG to be defective and if the necessary return charges are prepaid by the original purchaser. Installation labor will be the original purchaser's responsibility. The above only applies to TUG manufactured components. Purchased components will be handled based on their individual warranties.

THE ABOVE WARRANTY AND THE ABOVE OBLIGATION TO REPAIR OR REPLACE ARE COMPLETE AND INCLUSIVE. THIS LIMITED WARRANTY IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. ANY IMPLIED WARRANTIES WHICH MAY BE FOUND IN CONNECTION WITH THE PRODUCT ARE HEREBY LIMITED IN DURATION TO NINETY (90) DAYS FROM THE DATE OF SHIPMENT TO THE ORIGINAL PURCHASER.

THE SOLE AND EXCLUSIVE REMEDY OF ANY PERSON, AND THE SOLE AND EXCLUSIVE OBLIGATION AND LIABILITY OF TUG WITH RESPECT TO TUG EQUIPMENT IS THE LIMITED WARRANTY SET FORTH HEREIN. TUG SHALL NOT BE RESPONSIBLE OR LIABLE FOR ANY DAMAGES, WHETHER ARISING IN CONTRACT OR IN TORT, OR FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING LOSS OF USE AND LOST PROFITS, IN CONNECTION WITH THE PURCHASE, SALES, SHIPMENT, SERVICE, REPAIR OR OPERATION OF ANY TUG EQUIPMENT. IN NO EVENT SHALL TUG'S LIABILITY TO ANY PERSON EXCEED THE PURCHASE PRICE OF THE TUG EQUIPMENT.

Any expense incurred without TUG's prior consent for repairs or replacement will not be allowed. All modifications by the end-user must be approved by TUG in writing, in order that the expressed warranty remain in effect.

TUG reserves the right to make changes in design and changes or improvements upon its products without any obligation upon itself to install the same upon its products theretofore manufactured.

Tractors with known failed or defective parts must be immediately removed from service.

This Warranty requires proper and timely maintenance and periodic inspections of the TUG tow tractor as indicated in the operator's manual furnished with each TUG unit. The cost of routine or required maintenance and service is the responsibility of the customer. The customer is required to keep documented evidence of when and by whom maintenance and service are performed.

Inquiries concerning this policy should be addressed to:

TUG Manufacturing Corporation
2652 South Main Street
P.O. Box 1447
Kennesaw, GA 30144-3520 USA

Operations Phone Number: (770) 422-7233
Sales Phone Number: (770) 422-7230
TUG Shop Phone: (800) 989-8499 or (770) 422-8021
TUG Shop Fax Number: (770) 422-8730

<http://www.tugmanufacturing.com>



Dear Customer,

On behalf of the entire Tug Team, I want to both thank you and congratulate you for purchasing your Tug MA Tow Tractor. You have made an excellent choice.

At Tug, our first priority is to build the toughest, most capable and safest vehicle available in the marketplace. We believe we do that. The Safety chapter in this manual discusses several safety items that are built into your new product as standard equipment.

Additionally, Tug makes available numerous special safety items which may be especially suited to your particular application. You may have already chosen to have your new unit equipped with some or all of these features. These additional safety options are also listed in the Safety chapter for your convenience, so that you have a complete list of all available safety features.

Safety is important to you as the owner of this equipment, and to Tug as the manufacturer. That is why we urge you to closely adhere to our recommended preventive maintenance program, and to thoroughly train all of your operating and maintenance personnel in the proper use and maintenance procedures for your vehicles. Tug is always anxious to help in this capacity wherever we are needed.

We go to a great deal of expense to prepare the most current and comprehensive Operation and Service Manuals in the industry. We urge you to ensure that no one operates or services your vehicles without first reading and understanding this manual. This will keep us in a safety partnership which will benefit both your company and ours.

Sincerely,

A handwritten signature in black ink that reads "Don L. Chapman". The signature is written in a cursive style with a large initial 'D'.

Don L. Chapman
President



Editor's Note:

The number one priority at Tug Manufacturing is always to provide the very best, safest and most reliable equipment available anywhere in the world. An important part of meeting this goal is providing you, the customer, with the most accurate and complete technical documentation in the industry. Whether you are an engineer, a maintenance technician, an operator or a spare parts purchasing agent, this Operation and Service Manual has been designed to make your part of maintaining and operating your Tug equipment as safe, simple and cost efficient as possible.

At Tug, we are the best at what we do. However, we maintain that where serving the customer's needs is concerned, we always leave room for improvement. That is why we have included the Customer Manual Revision Forms located at the back of this manual. If you have any comments, corrections or omissions that you feel should be addressed, we ask that you please fill out one of these simple, self-addressed forms, add postage and mail it back to us. We will promptly and seriously consider the problem and take appropriate action.

Please accept our personal thanks for giving all of us at Tug Manufacturing the pleasure of meeting your ground support equipment needs.



RECORD OF REVISIONS

MAR 22, 1974	-	ORIGINAL ISSUE	
NOV 14, 1974	-	REVISION #1	
APR 15, 1975	-	REVISION #2	
NOV 15, 1975	-	REVISION #3	
AUG 15, 1977	-	REVISION #4	
SEP 01, 1978	-	REVISION #5	
JAN 01, 1979	-	REVISION #6	
APR 01, 1980	-	REVISION #7	
DEC 31, 1983	-	REVISION #8	
JUL 16, 1984	-	REVISION #9	
OCT 26, 1984	-	REVISION #10	
DEC 01, 1985	-	REVISION #11	
JUL 08, 1987	-	REVISION #12	
JUL 08, 1987	-	REVISION #13	
AUG 25, 1987	-	REVISION #14	
APR 02, 1989	-	REVISION #15	
MAY 1992	-	REVISION #16	
OCT 1992	-	REVISION #17	
DEC 1995	-	REVISION #18	(RE-ISSUED)
<u>1997</u>	-	<u>REVISION #19</u>	
JAN 1997	-	REVISION #19A	
JUNE 1997	-	REVISION #19B	
NOV. 1998	-	REVISION #20	(REISSUED) REFER TO CHAPTER 4-2 SECTIONS.



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SAFETY

Operator and Mechanic safety is an extremely high priority Tug Manufacturing; so much so, in fact, that every component is specifically designed and carefully built to produce the safest equipment available today. However, safety is more than quality design and construction. It also requires proper operation and maintenance practices. That is why we have devoted this chapter of the Operation and Service Manual entirely to Safety. **THIS CHAPTER MUST BE READ AND UNDERSTOOD BY EVERY OPERATOR AND MECHANIC THAT MAY BE INVOLVED WITH THIS EQUIPMENT.** When the design features and precautions with which this vehicle is equipped are combined with proper safety practices and good common sense, the Tug Model MA tow tractor is one of the safest tractors available today.

The following is a list of the topics covered in this chapter.

- A. Standard Safety Features List
- B. Available Safety Items as Extra Cost Options
- C. Operator Responsibilities
- D. Mechanic Responsibilities
- E. Dry Chemical (Purple K) Fire Extinguisher Use and Maintenance

Tug Manufacturing strongly recommends that this chapter be reproduced and bound in the **Operator's Safety Instruction Book** along with safety rules for the stations where this equipment will be operated and/or maintained.



A. STANDARD SAFETY FEATURES

The following features are standard equipment on every Tug MA Tow Tractor.

1. Recessed Headlights
2. Combination tail and stop lights
3. Hood lock and double hood latches
4. Dual independent, power boosted disc brake systems
5. Independent park brake on drive shaft
6. Adjustable over center park brake hand lever
7. Lighted transmission shift control
8. Neutral only start switch in transmission shift control
9. Engine speed governor
10. Automatic transmission
11. Rear hitch visibility from the seat
12. Low center of gravity
13. Ease of maneuverability
14. Easily operated horn
15. Labelled controls
16. Reflectors
17. High central operator seating for easy mounting/dismounting and optimum visibility.
18. Seat belts
19. Nonslip covering on running boards and floor boards.
20. Nonslip "Morton Cast" surface on brake pedal.

B. AVAILABLE SAFETY ITEMS AS EXTRA COST OPTIONS

The following features are available as extra cost items on the Tug MA Tow Tractor.

1. Retracting seat belts.
2. Backup alarm.
3. Overhead guard.
4. Cab with tempered glass, defroster and wiper.
5. Backup lights
6. Turn signals with hazard warning
7. Amber flashing light.
8. Amber strobe light.
9. Mud and snow tires.
10. Reflective striping
11. Work lights
12. Ryder Safe Seat and Control Module
13. Additional ballast weight



C. OPERATOR RESPONSIBILITIES

This chapter must be read and thoroughly understood prior to operating or performing any maintenance on this equipment.



WARNING: FAILURE TO COMPLY WITH THE FOLLOWING SAFETY PRECAUTIONS CAN RESULT IN SERIOUS INJURY OR DEATH AS WELL AS EQUIPMENT DAMAGE.

1. **Always** follow Station Safety Rules. Obtain a written list before operating this tractor if one is not already posted.
2. Before using this tractor, **Always** check it for proper operation and condition of lights, brakes, park brake, steering, horn and tires.
3. **Do not** operate a tractor with defective brakes, steering, tires, horn, parking brake or lights. Refer to the maintenance section of the operation and service manual.
4. **Always** keep hands and feet away from rotating parts and tires. Wear secured clothing.
5. **Always** wear suitable footwear when operating this equipment, and avoid loose-fitting clothing that might get caught in moving parts.
6. **Always** bring unit to a complete stop before dismounting or shifting from forward to reverse or reverse to forward.
7. **Do not** shift transmission into gear with engine above idle speed. Keep foot off accelerator when shifting.
8. **Always** check path clear prior to backing:
 - a. Check local station rules and sound horn if permitted prior to backing.
 - b. If sounding the horn is not permitted, follow applicable safety rules for other personnel prior to moving.
9. **Always** be sure load is secured before moving.
10. **Always** use safety chains between wagons to control uncoupled wagons from accidental hitch releases.
11. **Always** use particular caution when in congested areas and around blind corners and rows of carts. Be alert for other equipment and personnel.
12. **Never** operate at speeds inconsistent with operating conditions. Always limit speed to ensure adequate time for braking in an emergency.
13. **Do not** use tractor to push other equipment. Use proper towing equipment.



C. OPERATOR RESPONSIBILITIES (CONT)

14. **Do not** allow tractor to be pushed by other equipment. Use proper towing equipment.
15. **Do not** tamper with the engine speed governor.
16. **Do not** tow objects from any point on the tractor other than the hitch provided. **Towing from a point above the rear axle center line could cause the tractor to roll over backwards.**
17. **Do not** disconnect or otherwise disable Ryder Safe Seat system if so equipped.
18. **Do not** remove radiator cap when the engine is hot, as serious burns may result. Allow radiator to cool before removing cap.
19. **Always** be sure the load is contained within the bulkheads of the wagons. Without bulkheads, a sudden stop could cause the load to shift onto the tractor.
20. **Never** refuel unit when the engine is running.
21. **Do not** fill the fuel cell above the bottom of filler screen. **Do not overfill.** Clean off any spilled oil or fuel.
22. **Do not** smoke while refueling.
23. **Do not** store, spill or use fuel near an open flame.
24. **Do not** check engine oil while engine is running.
25. **Do not** use the battery in this unit to start other vehicles.
26. **Do not** drive up or down hills with slopes greater than 15 degrees, or drive across any slope.
27. **Always** leave room when stopping or starting on hills to allow for slight roll downhill.
28. **Never** engage in "horseplay" with the tractor
29. **Always** exercise common sense, stay alert and keep aware of what is happening around the tractor at all times.



D. MECHANIC RESPONSIBILITIES

This chapter must be read and thoroughly understood prior to performing any maintenance on this equipment.



WARNING: FAILURE TO COMPLY WITH THE FOLLOWING SAFETY PRECAUTIONS CAN RESULT IN SERIOUS INJURY OR DEATH AS WELL AS EQUIPMENT DAMAGE.

1. **Always** follow Station Safety Rules. If a written list of the safety rules is not posted at the station, obtain one prior to operating this tractor.
2. **Always** review the "Operator Responsibilities" section of this chapter prior to operating this equipment.
3. **Always** keep hands and feet away from rotating parts and tires. Wear secured clothing.
4. **Always** wear suitable footwear when operating or servicing this equipment and avoid loose fitting clothing that might get caught in moving parts.
5. **Do not** use the tractor to push other equipment. Use the proper towing equipment.
6. **Do not** allow the tractor to be pushed by other equipment. Use the proper towing equipment.
7. **Always** stop the engine when adjusting fan and alternator belts.
8. **Always** keep hands clear of the cooling fan
9. **Do not** remove radiator cap when the engine is hot, as serious burns may result. Allow radiator to cool before removing cap.
10. **Do not** check engine oil while the engine is running.
11. **Always** disconnect the battery negative cable when working on the engine or under the hood.
12. If electrolyte is spilled, always wash hands or clothing immediately.
13. **Do not** touch hot engine, exhaust or hydraulic components as serious burns may result.
14. **Do not** smoke near the battery. Fumes from charging electrolyte are explosive. Always keep the battery away from sparks, flame and smoking materials.
15. **Always** remove metal bracelets, watch bands, etc. prior to installing, removing or servicing the battery.
16. **Do not** short the battery terminals.



D. MECHANIC RESPONSIBILITIES (CONT)

17. When connecting battery, the positive terminal must **always** be connected first to prevent sparks from accidental grounding.
 18. Check governor operation and set at 2400 RPM max.
 19. **Do not** substitute throttle return springs with lighter or other springs.
 20. Check brakes and fill master cylinder with DOT 3 brake fluid.
 21. Check steering for excessive backlash and adjust as required.
 22. Check all lights.
 23. Check horn operation.
 24. Check neutral start only switch for proper adjustment and operation.
 25. **Do not** disconnect or otherwise disable the Ryder Safe Seat system if so equipped.
 26. Check tire and wheel condition along with proper inflation pressures. **Unless beads are seated when mounting tires, over-inflation can result in explosion.**
 27. Torque all lug nuts to 100 ft. lbs.
 28. **Always** use proper lifting equipment safely when removing or replacing heavy components.
 29. When working underneath the tractor, be sure it is supported properly on secure jack stands. **Do not** rely on hydraulic jacks to support the tractor.
 30. If the tractor is on a hydraulic or air operated lift, **always** be sure the safety support or lock is in position prior to working under the tractor.
 31. **Always** use a proper transmission jack and secure the transmission when removing or replacing it.
 32. **Always** jack the drive wheels off the floor when troubleshooting the drive system.
 33. **Never** refuel the unit while the engine is running.
 34. **Do not** fill the fuel cell above the bottom of filler screen. Do not overfill. Clean off any spilled oil or fuel.
 35. **Do not** smoke while refueling.
 36. **Do not** store, spill or use fuel near an open flame.
 37. **Do not** use the battery in this unit to start other vehicles.
-



38. **Do not** attempt to install or adjust control cables with the engine running.
39. **Always** replace a control cable which exhibits any gradual or sudden increase in no-load friction or resistance or decrease in usable stroke, or which have moisture inside or have been frozen.
40. **Do not** use heat to attempt to dry or thaw a control cable.
41. **Do not** remove the seats from a control cable or attempt to lubricate it. Any control cable which exhibits possible lubrication problems should be replaced.
42. **Do not** attempt to repair or modify a control cable. Any damaged control cable should be replaced immediately.
43. **Always** avoid exposing control cables to fuels, oils, chemicals, paint, water or dirt as damage may result.
44. **Always** adjust each control cable so that the utilized stroke of the cable is centered within the cable's available stroke.
45. **Always** deflate a tire and wheel assembly prior to removing it for servicing or dismounting.
46. **Do not** use wheels or wheel components that are cracked, bent, pitted or corroded. Insure all wheel components are of the same type and size and that wheel size and tire size match. Inspect all components carefully prior to use.
47. **Do not** attempt to seat a tire bead or side or lock ring by using inflation pressure or any flammable or explosive substance such as starting fluid or ether. Never inflate a tire beyond 40 psi to seat tire beads.
48. **Do not** hammer, pry or weld on or near an inflated or partially inflated wheel and tire assembly.
49. **Do not** rework, weld, heat or braze any wheel parts for any reason.
50. **Always** use a safety cage or other restraining device and a clip-on air chuck with a remote valve and pressure gauge when inflating a tire. Insure the tire and wheel assembly is properly assembled prior to inflating it. Visually inspect it for proper seating of beads and side or lock rings prior to removing it from the cage.
51. **Do not** add air to a tire that has been in service with less than 80% recommended pressure without first fully deflating, removing, disassembling and inspecting the tire assembly for damage.

Recommended Tire Pressure	80% Recommended Pressure
40 psi	32 psi
45 psi	36 psi
60 psi	48 psi

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