MANITOU NORTH AMERICA, INC.
6401 IMPERIAL DRIVE
WACO, TX 76712-6803

⚠ WARNING

The specially designed TMT Forks must be replaced with Factory Approved Forks only! Contact your Dealer or Manitou North America, Inc.

CALIFORNIA PROPOSITION 65 WARNING

Diesel Engine Exhaust and some of its constituents are known to the State of California to cause cancer, birth defects or other reproductive harm.

IMPORTANT

When changing or replacing the tires and wheels; use only the manufacturer's approved components as installed at the factory. Any substitutes or modifications must first be approved by the manufacturer.

For Parts Orders contact your Manitou Dealer or call:
Manitou North Amerida, Inc. Parts Dept. (800) 425-3727 or (254) 799-0232.
Parts Dept. Fax (254) 867-6504 Website: www.manitou-na.com

TMT 320/HT
TMT 320 FL/HT/
TURBO

OPERATOR/SERVICE MANUAL

THIS OPERATOR'S MANUAL MUST BE KEPT IN THE LIFT TRUCK AND MUST BE READ AND UNDERSTOOD BY THE LIFT TRUCK OPERATOR.

CATALOG 547043AS
R11-10

CONTENTS

- INTRODUCTION TO SAFETY -

CONTENTS

ROUGH TERRAIN FORKLIFT TRUCK GENERAL SAFETY STANDARDS

ROUGH TERRAIN FORKLIFT TRUCK GENERAL SAFETY STANDARDS

STUDY THE OPERATOR/SERVICE MANUALS

The information in this manual provides general instructions for the safe operation and maintenance of your forklift truck. This information is vital and must be clearly understood by the operator and serviceman. Study this manual and the Rough Terrain Forklift Safety Manual (part no. 422494) thoroughly and carefully before operating or servicing your forklift. Contact your dealer or Manitou North America, Inc. if you have any questions concerning your forklift, its operation, service or parts. Keep both manuals in the literature box on the forklift available for reference. If either manual becomes illegible or is missing, contact your dealer for replacements immediately. This manual cannot cover every situation that might result in an accident. It is the responsibility of the operator to always remain alert for potential hazards and be prepared to avoid them!

ADDITIONAL RECOMMENDED LITERATURE:

ANSI / ITSDF B56.6 is the national consensus standard for rough terrain forklift trucks. It contains rules about forklift safety, maintenance, safe operation, training, and supervision. Forklift owners should learn this standard and make it available for their operators, service personnel, and supervisors. These standards can be obtained, free of charge, from the Industrial Truck Standards Development Foundation (ITSDF) on their website at www.itsdf.org. The following references are examples from the standard, addressing forklift operators:

A.) OPERATOR TRAINING QUALIFICATIONS

1.) The user shall ensure that operators understand that safe operation is the operator's responsibility. The user shall ensure that operators are knowledgeable of, and observe, all safety rules and practices.
2.) Create an effective operator training program centered around user company's policies, operating conditions, and rough terrain forklift trucks. The program should be presented completely to all new operators and not be condensed for those claiming previous experience.
3.) Information on operator training is available from several sources, including rough terrain forklift truck manufacturers, users, government agencies, etc.
4.) An operator training program should consist of the following:

a.) careful selection of the operator, considering physical qualifications, job attitude, and aptitude;
b.) emphasis on safety of stock, equipment, operator, and other personnel;
c.) citing of rules and why they were formulated;
d.) basic fundamentals of rough terrain forklift truck and component design as related to safety, e.g., in.-lb (N-m) loading, mechanical limitations, center of gravity, stability, etc.;
e.) introduction to equipment, control locations, and functions. Explain how they work when used properly and problems when used improperly.
f.) supervise practice on operating course remote from normal activity and designed to simulate actual operations, e.g., lumber stacking, elevating shingles to the roof, etc.;
g.) oral, written, and operational performance tests and evaluations during and at completion of the course;
h.) refresher courses, which may be condensed versions of the primary course, and periodic "on job" operator evaluation;
i.) understanding of nameplate data and operator instructions and warning information appearing on the rough terrain forklift truck.

B.) GENERAL SAFETY PRACTICES

1.) Rough terrain forklift trucks can cause injury if improperly used or maintained.
2.) Only authorized operators trained to adhere strictly to all operating instructions shall be permitted to operate rough terrain forklift trucks. Unusual operating conditions may require additional safety precautions, training, and special operating instructions.
3.) Modifications and additions which affect capacity or safe operation shall not be preformed without the manufacturer's prior written approval. Where such authorization is granted, capacity, operation, and maintenance instruction plates, tags, or decals shall be changed accordingly.
4.) If the rough terrain forklift truck is equipped with front end attachment(s) or optional forks, the user shall see that the truck is marked to identify the forks or attachment(s), show the approximate weight of the truck and fork or attachment combination, and show the capacity of the truck with forks or attachment(s) at maximum elevation with load laterally centered.
5.) The user shall see that all nameplates and caution and instruction markings are in place and legible.
6.) The user shall consider that changes in load dimension may affect rough terrain forklift truck capacity.

ROUGH TERRAIN FORKLIFT TRUCK GENERAL SAFETY STANDARDS (cont.)

B.) GENERAL SAFETY PRACTICES (cont.)

7.) Where steering can be accomplished with either hand and the steering mechanism is of a type that prevents road reactions from causing the handwheel to spin (power steering or equivalent), steering knobs may be used. When used, steering knobs shall be of a type that can be engaged by the operator's hand from the top and shall be within the periphery of the steering handwheel.
8.) Experience has shown that rough terrain forklift trucks which comply with stability requirements are stable when properly operated. However, improper operation, faulty maintenance, or poor housekeeping may contribute to a condition of instability and defeat the purpose of the requirements.
9.) Users shall give consideration to special operating conditions. The amount of forward and rearward tilt to be used is governed by the application. Although the use of maximum rearward tilt is allowable under certain conditions, such as traveling with the load lowered, the stability of a rough terrain forklift truck as determined by standardized tests does not encompass consideration for excessive tilt at high elevations or the operation of trucks with excessive off-center loads.
10.) Some of the conditions which may affect stability are ground and floor conditions, grade, speed, loading (rough terrain forklift trucks equipped with attachments behave as partially loaded trucks even when operated without a load on the attachment), dynamic and static forces, improper tire inflation, and the judgement exercised by the operator.

C.) OPERATING SAFETY RULES AND PRACTICES

1.) Safe operation is the responsibility of the operator.
2.) This equipment can be dangerous if not used properly. The operator shall develop safe working habits and also be aware of hazardous conditions in order to protect himself, other personnel, the rough terrain forklift truck, and other material.
3.) The operator shall be familiar with the operation and function of all controls and instruments before undertaking to operate the rough terrain forklift truck.
4.) Before operating any rough terrain forklift truck, truck operators shall have read and be familiar with the operator's manual for the particular truck being operated.
5.) Before starting to operate the rough terrain forklift truck:
    a.) be in operating position and fasten seat belt;
    b.) place directional controls in neutral;
    c.) apply brakes;
    d.) start engine.
6.) Do not start or operate the rough terrain forklift truck, any of its functions, or attachments from any place other than the designated operator's position.
7.) Keep hands and feet inside the operator's designated area or compartment. Do not put any part of the body outside the operator compartment of the rough terrain forklift truck.
8.) Never put any part of the body into the mast structure or between the mast and the rough terrain forklift truck.
9.) Never put any part of the body within the reach mechanism of the rough terrain forklift truck or other attachments.
10.) Understand rough terrain forklift limitations and operate the truck in a safe manner so as not to cause injury to personnel.
11.) Do not allow anyone to stand or pass under the elevated portion of any rough terrain forklift truck, whether empty or loaded.
12.) Do not permit passengers to ride on rough terrain forklift trucks.
13.) Check clearance carefully before driving under electrical lines, bridges, etc.
14.) A rough terrain forklift truck is attended when the operator is less than 25 ft (7.6m) from the truck, which remains in his view.
15.) A rough terrain forklift truck is unattended when the operator is 25ft (7.6m) or more from the truck, which remains in his view, or whenever the operator leaves the truck and it is not in his view.
16.) Before leaving the operator's position:
    a.) bring rough terrain forklift truck to a complete stop;
    b.) place directional controls in neutral;
    c.) apply the parking brake;
    d.) lower load-engaging means fully, unless supporting an occupied elevated platform;
    e.) stop the engine;
    f.) if the rough terrain forklift truck must be left on an incline, block the wheels;
    g.) fully lower the load-engaging means.
17.) Maintain a safe distance from the edge of ramps, platforms, and other similar working surfaces.
18.) Do no move railroad cars or trailer with a rough terrain forklift truck.

ROUGH TERRAIN FORKLIFT TRUCK GENERAL SAFETY STANDARDS (cont.)

C.) OPERATING SAFETY RULES AND PRACTICES (cont.)

19.) Do not use a rough terrain forklift truck for opening or closing railroad car doors.
20.) In areas classified as hazardous, use only rough terrain forklift trucks approved for use in those areas.
21.) Report all accidents involving personnel, building structures, and equipment to the supervisor or as directed.
22.) Do not add to, or modify, the rough terrain forklift truck.
23.) Do not block access to fire aisles, stairways, and fire equipment.
24.) For rough terrain forklift trucks equipped with a differential lock, the lock should not be engaged when driving on the road or at high speeds or when turning. If the lock is engaged when turning, there could be loss of steering control.
25.) Observe all traffic regulations including authorized speed limits. Under normal traffic conditions, keep to the right, maintain a safe distance, based on speed of travel, from the truck ahead; and keep the truck under control at all times.
26.) Yield the right-of-way to pedestrians and emergency vehicles such as ambulances and fire trucks.
27.) Do not pass another truck traveling in the same direction at intersections, blind spots, or at other dangerous locations.
28.) Slow down and sound the audible warning device(s) at cross-aisles and other locations where vision is obstructed.
29.) Cross railroad tracks at an angle wherever possible. Do not park closer than 6 ft (1.8m) to the nearest rail of a railroad track.
30.) Keep a clear view of the path of travel and observe other traffic, personnel, and safe clearances.
31.) If the load being carried obstructs forward view, travel with the load trailing.
32.) Ascend or descend grades slowly and with caution.
    a.) When ascending or descending grades in excess of 5%, loaded rough terrain forklift trucks should be driven with the load upgrade.
    b.) Unloaded rough terrain forklift trucks should be operated on all grades with the load-engaging means downgrade.
    c.) On all grades, the load and load-engaging means shall be tilted back, if applicable, and raised only as far as necessary to clear the road surface.
    d.) Avoid turning, if possible, and use extreme caution on grades, ramps, or inclines; normally travel straight up or down.
33.) Under all travel conditions, operate the rough terrain forklift truck at a speed that will permit it to be brought to a stop in a safe manner.
34.) Travel with load-engaging means or load low and, where possible, tilted back. Do not elevate the load except during stacking.
35.) Make starts, stops, turns, or direction reversals in a smooth manner so as not to shift load and/or overturn the rough terrain forklift truck.
36.) Do not indulge in stunt driving or horseplay.
37.) Slow down for wet and slippery surfaces.
38.) Before driving over a dockboard or bridge plate, be sure that it is properly secured. Drive carefully and slowly across the dockboard or bridge plate, and never exceed its rated capacity.
39.) Do not drive rough terrain forklift trucks onto any elevator unless specifically authorized to do so. Approach elevators slowly, and then enter squarely after the elevator car is properly leveled. Once on the elevator, neutralize the controls, shut off engine, and set brakes. It is advisable that all other personnel leave the elevator before truck is allowed to enter or leave.
40.) Avoid running over loose objects on the roadway surface.
41.) When negotiating turns, reduce speed to a safe level, and turn steering handwheel in a smooth sweeping motion. Except when maneuvering at a very low speed, turn the steering handwheel at a moderate, even rate.
42.) Use special care when traveling without load, as the risk of lateral overturning is greater.
43.) Improper use of stabilizer controls (if so equipped) could cause rough terrain forklift truck upset. Always lower the carriage before operating stabilizer controls.
44.) For rough terrain forklift trucks equipped with lateral leveling:
    a.) Always level the frame before raising the boom or mast, with or without a load.
    b.) Lateral leveling should not be used to position an elevated load; instead, lower the load and reposition the rough terrain forklift truck.
45.) Handle only stable or safely arranged loads.
    a.) When handling off-center loads which cannot be centered, operate with extra caution.
    b.) Handle only loads within the capacity of the rough terrain forklift truck.
    c.) Handle loads exceeding the dimensions used to establish rough terrain forklift truck capacity with extra caution. Stability and maneuverability may be adversely affected.

ROUGH TERRAIN FORKLIFT TRUCK GENERAL SAFETY STANDARDS (cont.)

C.) OPERATING SAFETY RULES AND PRACTICES (cont.)

46.) When attachments are used, extra care shall be taken in securing, manipulating, positioning, and transporting the load. Operate rough terrain forklift trucks equipped with attachments as partially loaded trucks when not handling a load.

47.) Completely engage the load with the load-engaging means. Fork length should be at least two-thirds of load length. Where tilt is provided, carefully tilt the load backward to stabilize the load. Caution should be used in tilting backward with high or segmented loads.

48.) Use extreme care when tilting load forward or backward, particularly when high tiering. Do not tilt forward with load-engaging means elevated except to pick up or deposit a load over a rack or stack. When stacking or tiering, use only enough backward tilt to stabilize the load.

49.) The handling of suspended loads by means of a crane arm (boom) or other device can introduce dynamic forces affecting the stability of a rough terrain forklift truck. Grades and sudden starts, stops, and turns can cause the load to swing and create a hazard if not externally stabilized. When handling suspended loads:

a.) do not exceed the truck manufacturer's capacity of the rough terrain forklift truck as equipped for handling suspended loads.

b.) only lift the load vertically and never drag it horizontally;

c.) transport the load with the bottom of the load and the mast as low as possible;

d.) with load elevated, maneuver the rough terrain forklift truck slowly and cautiously, and only to the extent necessary to permit lowering to the transport position;

e.) use tag lines to restrain load swing whenever possible.

50.) At the beginning of each shift and before operating the rough terrain forklift truck, check its condition, giving special attention to:

a.) tires and their inflation pressure

b.) warning devices

c.) lights

d.) lift and tilt systems, load-engaging means, chains, cables, and limit switches

e.) brakes

f.) steering mechanism

g.) fuel system(s)

51.) If the rough terrain forklift truck is found to be in need of repair or in any way unsafe, or if it contributes to an unsafe condition, the matter shall be reported immediately to the user's designated authority, and the truck shall not be operated until it has been restored to safe operating condition.

52.) If during operation the rough terrain forklift truck becomes unsafe in any way, the matter shall be reported immediately to the user's designated authority, and the truck shall not be operated until it has been restored to safe operating condition.

53.) Do not make repairs or adjustments unless specifically authorized to do so.

54.) When refueling, smoking in the area shall not be permitted, the engine shall be stopped, and the operator shall not be on the rough terrain forklift
truck.

55.) Spillage of oil or fuel shall be carefully and completely absorbed or evaporated and fuel tank cap replaced before restarting engine.

56.) Do not use open flames when checking electrolyte level in storage batteries, liquid level in fuel tanks, or the condition of LPG fuel lines and connectors.

57.) Do not lift personnel with the forklift. If the forklift must be used to lift people, precautions for the protection of the personnel must be taken (see ITSDF B56.6, chapter 5.15 Elevating Personnel).

D.) SUSPENDED LOADS

A jib or truss boom should ONLY be used to lift and place loads when the machine is stationary and the frame is level. Transporting suspended loads must ALWAYS be done slowly and cautiously, with the boom and load as low as possible. Use taglines to restrict loads from swinging, to avoid overturn.

The handling of suspended loads by means of a truss boom or other similar device can introduce dynamic forces affecting the stability of the machine that are not considered in the stability criteria of industry test standards. Grades and sudden starts, stops and turns can cause the load to swing and create a hazard.

Guidelines for "Free Rigging / Suspended Loads"

1. DO NOT exceed the rated capacity of the telescopic handler as equipped for handling suspended loads. The weight of the rigging must be included as part of the load.

2. During transport, DO NOT raise the load more than 12 inches (305 mm) above the ground, or raise the boom more than 45 degrees.

3. Only lift the load vertically – NEVER drag it horizontally.

4. Use multiple pickup points on the load when possible. Use taglines to restrain the load from swinging and rotating.

5. Start, travel, turn and stop SLOWLY to prevent the load from swinging. DO NOT exceed walking speed.

6. Inspect rigging before use. Rigging must be in good condition and in the U.S. comply with OSHA regulation §1910.184, "Slings," or §1926.251, "Rigging equipment for material handling."

7. Rigging equipment attached to the forks must be secured such that it cannot move either sideways or fore and aft. The load center must not exceed 24 inches (610 mm).

8. DO NOT lift the load with anyone on the load, rigging or lift equipment, and NEVER lift the load over personnel.

9. Beware of the wind, which can cause suspended loads to swing, even with taglines.

10. DO NOT attempt to use frame-leveling to compensate for load swing.

WARNING

U.S. OSHA regulations effective November 8, 2010 (29 CFR Part 1926, Subpart CC - Cranes and Derricks in Construction) include requirements for employers that use powered industrial trucks ("forklifts") configured to hoist (by means of a winch or hook) and move suspended loads horizontally. In particular, this regulation applies to any rough-terrain forklift (e.g., "telescopic handler") equipped with a jib or truss boom with a hook (with or without a winch), or a hook assembly attached to the forks. [Note: This regulation is in addition to the OSHA regulation that requires specific forklift operator training: §1910.178(l).]

When a forklift / telescopic handler is configured and used for hoisting, the employer must ensure that:

1. **Forklift, lift equipment and rigging have been inspected (each shift, month and year) and are in good, safe condition and properly installed.**

2. **An operator's manual and applicable load charts are on the forklift.**

3. **Work zone ground conditions can support the equipment and load. Any hazardous conditions in the work area have been identified, and the operator notified.**

4. **Equipment is being used within its rated capacity and in accordance with the manufacturer's instructions.**

5. **Operator and crew members have been trained in the safe use and operation of the equipment, including how to avoid electrocution.**

6. **During use, no part of the equipment, load line or load will be within the minimum clearance distance specified by OSHA [10 feet (3.0 m), and more for lines rated over 50 kV] of any energized power line, and any taglines used are non-conductive.**

7. **In addition, for lift equipment with a rated capacity greater than 2000 lbs. (907 kg), the employer must ensure that:**

   a.) An accessible fire extinguisher is on the forklift;

   b.) Monthly and annual inspections are performed and documented, and records retained (three months for monthly, one year for annual);

   c.) Before November 10, 2014, operators must have had the additional training and qualification / certification required by OSHA regulations §1926.1427 and §1926.1430.

Note: Refer to the full text of the OSHA crane regulation (29 CFR Part 1926, Subpart CC) for a detailed description

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CONCLUSION:

1.) ATTEND OPERATOR TRAINING CLASSES

The forklift operator must clearly understand all instructions concerning the safe operation of the forklift and all safety rules and regulations of the work site. They must have successfully completed a training coarse in accordance with the Powered Industrial Truck Standard (29 CFR 1910.178) as described by the Occupational Safety and Health Administration (OSHA). They must be qualified as to their visual, hearing, physical, and mental ability to operate the equipment safely. NEVER use drugs or alcohol while operating a forklift! NEVER operate or allow anyone to operate a forklift when mental alertness or coordination is impaired! An operator on prescription or over-the-counter drugs must consult a medical professional regarding any side effects of the medication that may impair their ability to safely operate the forklift.

2.) CREATE A MAINTENANCE PROGRAM

OSHA recommends a maintenance log, listing repairs requested and completed, for each forklift. Also, “lock out tag procedures” should be utilized. If the forklift malfunctions; park it safely, remove the key, tag “Do Not Use”, and report the problem to the proper authority or authorized service personnel immediately.

ROUGH TERRAIN FORKLIFT TRUCK GENERAL SAFETY STANDARDS (cont.)

2.) CREATE A MAINTENANCE PROGRAM (cont.)

For the best forklift performance and operation, a maintenance program is required. Use the hour meter on the instrument panel to keep maintenance properly scheduled (see SECTION TWO - “Servicing Schedule”). For repairs on major components (engine, transmission, etc.), contact your nearest dealer for a Repair Manual. Do not operate a forklift that is damaged or does not function properly. Only authorized personnel may make repairs or adjustments to the lift truck. After repairs, the lift truck must be tested for safe operation before returning to service.

3.) FORKLIFT KNOWLEDGE

Forklift trucks can cause serious injury if improperly used or maintained. Study all of the manuals provided for your forklift model. Learn the locations and meanings of all safety decals. If any decals are illegible or missing, have them replaced immediately. Make sure all safety features provided by the original manufacturer are in place and function properly. Do not operate a forklift with damaged, missing or unsafe components. Have it repaired by authorized service personnel. Learn the functions of all controls, gauges, indicator lights, etc. on the forklift. Know the speed/gear ranges, braking and steering capabilities, load ratings and clearances. When referring to the location of forklift components, the terms “left”, “right”, “front”, and “rear” are related to the operator seated normally, facing forward in the operator’s seat. If you have any questions about the forklift, consult your supervisor. Failure to fully understand or obey safety warnings can result in serious injury or death!

4.) WORK SITE KNOWLEDGE

Before operating on a work site, learn the rules for movement of people, forklifts and all other traffic. Check the size, weight, and condition of the loads you will be expected to handle. Verify that they are properly secured and safe to transport. Learn where the loads are to be placed, planning your route for a safe approach, watching for hazardous conditions. Will a signal man be required to help place the load? Remove any debris which may cause tire damage or rupture. Plan your route around problem areas or have them corrected. Inform the supervisor of any unsafe conditions observed at the site. Examples of hazards: power lines, cables, low clearance structures, garage doors, telephone pole guide lines, fencing, loose lumber, building materials, drop-offs, trenches, rough/soft spots, oil spills, deep mud, steep inclines, railroad tracks, curbs, etc.. NEVER approach power lines, gas lines or other utilities with the forklift! Always verify that local, state/provincial and federal regulations have been met. Report any accidents involving personnel, building structures, and equipment to the supervisor immediately. Always remain alert - conditions are constantly changing at the work site!

TECHNICAL SUPPORT

All data provided in this manual is subject to production changes, addition of new models, and improved product designs. If a question arises regarding your forklift, please consult your dealer or K-D Manitou, Inc. for the latest information. When ordering service parts or requesting technical information, be prepared to quote the applicable Model/Serial Numbers.

SAFETY MESSAGES

NOTE THE SAFETY ALERT SYMBOL (SHOWN BELOW). IT IDENTIFIES POTENTIAL HAZARDS WHICH, IF NOT AVOIDED MAY RESULT IN INJURY OR DEATH! Also, observe the safety messages places throughout this manual; providing special instructions, telling you when to take precautions and to identify potential hazards. The safety messages are highlighted and outlined in a box similar to those shown in the examples below.

SAFETY ALERT SYMBOL

NOTE or NOTICE
Provides information, special instructions or references about the lift truck.

IMPORTANT
Precautions which must be taken to avoid damage to the lift truck.

CAUTION
Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. May also alert unsafe practices.

WARNING
Indicates a potentially hazardous situation which, if not avoided, *may result in death or serious injury!*

DANGER
Indicates an imminently hazardous situation which, if not avoided, *will result in death or serious injury.*

CALIFORNIA PROPOSITION 65 WARNING

Diesel Engine Exhaust and some of its constituents are known to the State of California to cause cancer, birth defects or other reproductive harm.

WARNING: Battery posts, terminals and related accesories and related accessories contain lead and lead compounds. **Wash hands after handling.**

SAFETY DECALS

The purpose of this chapter is to introduce you to the safety messages, decals, and nameplates found on your forklift truck. The decals are identified by name, part number, location, and a brief description. (The forklift model logos, and other misc. decals not shown, can be found in your forklift parts manual.) The decals illustrated may not be exactly the same as those installed on your forklift; installation of the decals varies depending on the forklift model, series, decal updates, etc.. The size and location of some decals limit the amount of information that can be placed upon it. For this reason, additional detailed information not found on the decals is provided through-out this manual.

Every decal placed on the lift truck is important; they are constant reminders of safety and instructions that should never be taken for granted. Even experienced operators can be seriously injured or killed by ignoring, refusing to enforce, or forgetting to follow safe operating procedures! Do not assume you know all safety issues concerning the decals. Before operating the lift truck; learn the meaning(s) of the decals as described in this manual. If any decal becomes illegible or missing, have it replaced immediately! Always replace decals using the same decal part no., unless otherwise specified by the manufacturer. For replacement decals not found in your parts manual, contact your nearest dealer. If you have any questions, contact your supervisor or nearest dealer for advice before operating your forklift!

801011

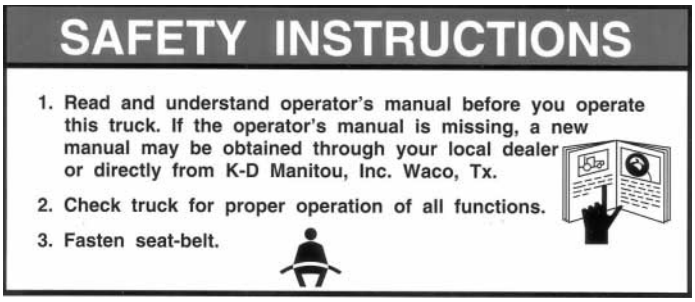
Before Starting - 801011

(Boom equipped models). Location: on the brake fluid cover panel (to the left and below the dash panel).

Safety Instructions - 420792

(Mast equipped models). Location: on or near the operator manual storage case, and/or on the dash panel.

Instructions for the forklift operator; before operating the forklift.



Use of Seat Belt - 801012

(Boom equipped models). Location: to the right of the operator, near the hydraulic control lever.

Instructs the operator to always wear the seat belt during operations, and never jump from an over-turning forklift.

SAFETY DECALS

Emergency and Parking Brake - 801010

Location: near the park brake lever.

Identifies the Emergency/Parking Brake Lever.

Alarm Must Sound - 496162

Location: on the dash, in direct view of the operator.

The backup alarm must sound when the forklift is placed in reverse gear.

No Riders - 420732

Location: on the cab entrance(s), and on or near wheel fenders and engine cover.

Informs: riders are not allowed on the forklift.

Clear of Raised Boom - 801006

(Boom equipped models). Location: on both sides of the boom nose.

Keep away from unsupported boom.

Clear of Power Lines - 801007

(Boom equipped models). Location: on both sides of the boom nose.

Keep away from power lines.

SAFETY DECALS

Use of Frame Leveling - 801013

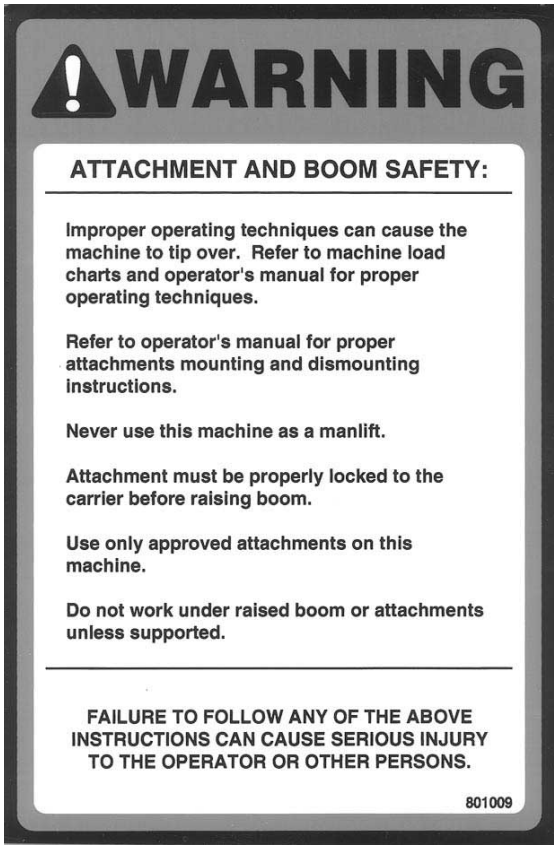
(Boom equipped models). Location: to the right of the operator near the hydraulic control lever.

Frame leveling notice; load must be lowered.

Attachment and Boom Safety - 801009

(Boom equipped models). Location: on both sides of the boom nose.

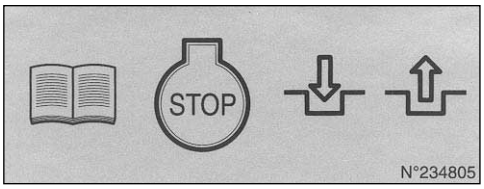
Important reminders of attachment and boom safety.



Hydraulic Coupling - 234805

Location: near the quick-disconnect adapters.

Stop the engine and release hydraulic pressure before changing attachments.



Rotating Fan and Belt(s) - 801008

Location: on the radiator near the fan, and on any fan belt/pulley cover(s).

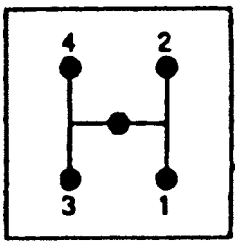
Keep hands and clothing away from rotating fan and belts.

SAFETY DECALS

Gear Shift Pattern - 33460

(4-speed transmission models). Location: near the gear shift lever.

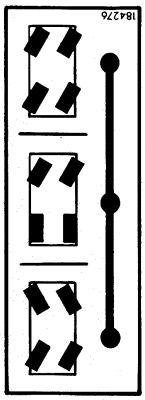
Identifies the gear shift pattern of the forklift transmission.



Steering Mode - 184276

(4 wheel steer equipped models). Location: near the steering mode selection lever.

Identifies the steering mode selection.



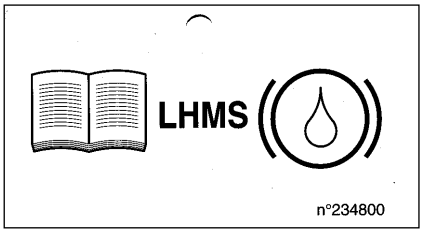
Mineral Oil (Brake Reservoir) - 221322 or 234800

Location: attached to the brake fluid reservoir.

Refer to the Operator/Service Manual for the correct brake fluid (mineral oil) to be used in the brake system.

221322

234800

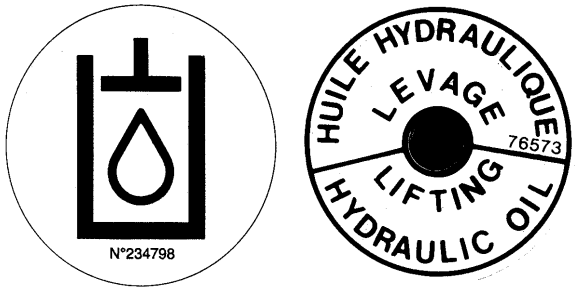


SAFETY DECALS

Hydraulic Oil - 234798 or 76573

Location: on the hydraulic tank or filler cap.

Identifies the hydraulic reservoir (tank) or filler cap.



Hydraulic Oil - 61024

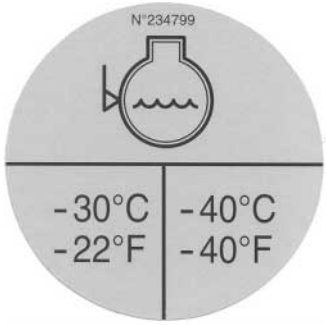
Location: on the hydraulic tank.

Identifies the hydraulic reservoir (tank).

Anti-Freeze - 234799

Location: on the radiator, near the radiator filler cap.

Indicates required minimum to maximum anti-freeze protection (-22^{0}F to -40^{0}F).



Diesel Fuel - 161101

Location: on the fuel tank, near the filler cap.

Identifies the fuel tank, and use of diesel fuel.

No Step - 496735

Location: varies, depending on the forklift model.

Instructs personnel not to use the designated area as a step.

Do Not Tow - 494918

(Hydrostatic equipped models). Location: on the dash, in view of the operator.

Towing the forklift will damage the transmission; refer to the operator's manual.

SAFETY DECALS

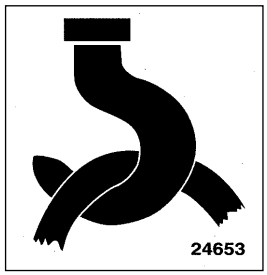
Attachment Warning - 421016

(Boom equipped models). Location: on the boom coupler, near where the retaining shaft is installed.

Reminder to operator; install attachment retaining shaft and safety pin before operations.

Hook Here - 24653

Location: at points provided on the forklift, where straps or chains may be attached to secure the forklift to a trailer during transport.



Fork Safety - 426641

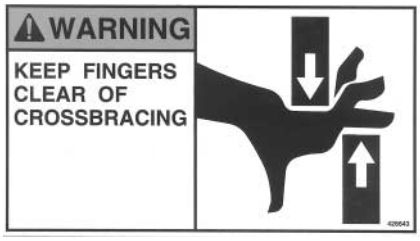
(Mast equipped models). Location: on the front and back side of the mast's outer rails, at eye level (4 required).

Instructs personnel not to travel beneath or upon the lift truck forks.

Pinch Point, Large, 2.5 x 4.5 in. - 426643
Pinch Point, Small, 1.5 x 2.75 in. - 426642

(Mast equipped models). Location: on the front and rear sides of the mast cross bracing.

Keep fingers away from the mast crossbracing.



HAND THROTTLE DANGER - 804784

(Boom equipped models, option). Location: Near the hand throttle mechanism.

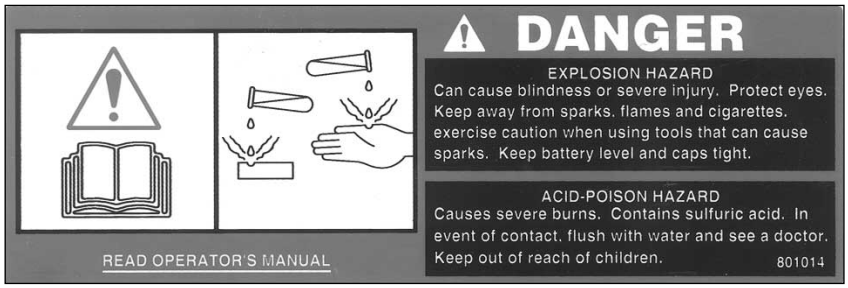
Reminder to operator; set parking brake before operating hand throttle. Disengage hand throttle before leaving the forklift.

SAFETY DECALS

Acid in Battery - 801014

Location: in or near the battery storage compartment.

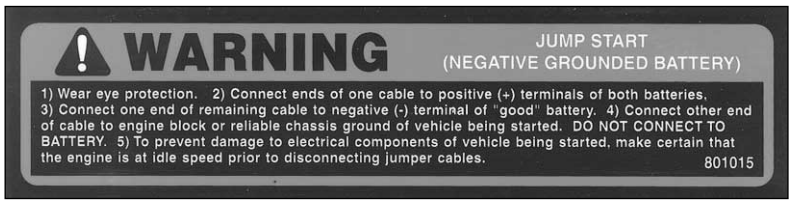
Addresses battery hazards.



Jump Start Battery - 801015

Location: in or near the battery storage compartment.

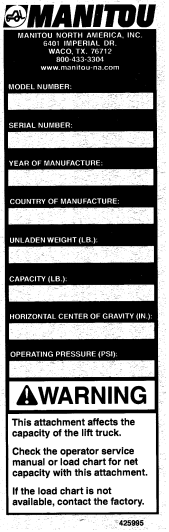
Jump start instructions.



Attachment Plate - 425995

Location: on the optional removeable forklift attachment.

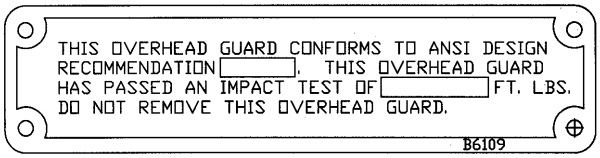
Important manufacturer information about the attachment. Record this information for use when contacting the maufacturer for parts and service.



Overhead Guard Data Plate - B6109

Location: attached to the overhead guard.

Overhead guard conformity.



Forklift Data Plate - 496550

(Boom equipped models)

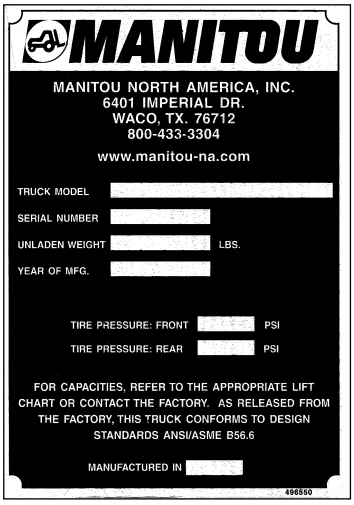
Forklift Data Plate - 496538

(Mast equipped models)

Location: within the operator's compartment.

Important forklift truck identification. Record this information for use when contacting the manufacturer for parts and service.

496550



496538

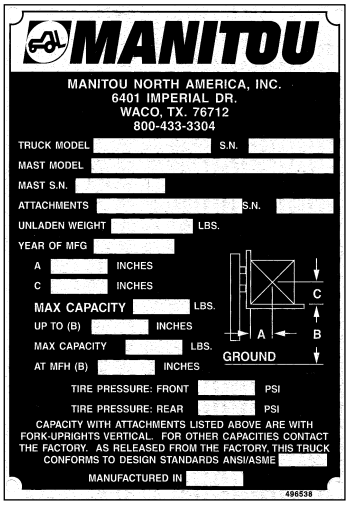


TABLE OF CONTENTS

CONTENTS

1 - OPERATING AND SAFETY INSTRUCTIONS

ORIGINAL REPLACEMENT PARTS AND ATTACHMENTS

ALL MAINTENANCE ON OUR LIFT TRUCKS MUST BE CARRIED OUT USING ORIGINAL PARTS.

BY ALLOWING NON-ORIGINAL PARTS TO BE USED,

YOU RUN THE RISK - Legally, of being liable in the event of an accident.

IMPORTANT	*Technically, of causing breakdowns to occur or of reducing your lift truck's service life.*

BY USING ORIGINAL PARTS DURING MAINTENANCE OPERATIONS,

YOU ARE LEGALLY COVERING YOURSELF

- Any user who procures parts from another vendor does so at his own risk.
- Any user who modifies his lift truck or has it modified by a service company, must consider that a new item of equipment has been brought onto the market and therefore takes liability for it.
- Any user who copies original parts or has them copied is taking a risk from the legal viewpoint.
- The certificate of compliance only binds the maker for parts chosen or produced under the maker's control.
- The practicalities of maintenance terms are set out by the maker. The maker is in no way liable in the event of the user not complying with such terms.

YOU GET THE BENEFIT OF THE MANUFACTURER'S KNOW-HOW

THE MANUFACTURER BRINGS TO THE USER,

- His know-how and skill.
- Guaranteed quality work.
- Original replacement parts.
- Help with preventive maintenance.
- Effective help with diagnosing faults.
- Enhancements gained from feedback.
- Training for operating staff.
- Only the manufacturer knows the details of the lift truck design and therefore has the best technological capability to carry out maintenance.

DRIVER'S OPERATING INSTRUCTIONS

WHENEVER YOU SEE THIS SYMBOL IT MEANS:

WARNING ! BE CAREFUL ! YOUR SAFETY
OR THE SAFETY OF THE LIFT TRUCK IS AT RISK.

WARNING

- Most accidents connected with the use, maintenance and repair of the lift truck are due to neglect of the basic forklift safety instructions. By being aware of the risks to which you are exposed and by taking the necessary preventive measures, you can avoid accidents.
- Any operation or maneuver not described in the instructions is prohibited, however, any person who does use another method must first ensure that he is not putting himself, another person or the lift truck in danger.
- The manufacturer is not able to anticipate all possible risk situations. Therefore the safety instructions and notices given in the user manual and on the lift truck are not conclusive.

Bending the rules in safety notices, maintenance or repair instructions for your lift truck, may result in serious or even fatal accidents.

We would remind users of the risks in driving at excessive speed with regard to traffic conditions, particularly:

- *Risk of loss of control on loose, rough terrain.*
- *Increased stopping distance.*

The user must remain in full control of his lift truck and should:

- *Adapt his speed to each situation in order to maintain his own safety, that of others and of his equipment.*
- *Always be aware of his stopping distance.*

On the basis of experience, there are a number of possible situations in which operating the lift truck is prohibited. Such foreseeable abnormal uses, the main ones being listed below, are strictly forbidden.

- *The foreseeable abnormal behavior resulting from ordinary neglect, but does not result from any wish to put the machinery to any improper use.*
- *The reflex reactions of a person in the event of a malfunction, incident, fault, etc. during operation of the lift truck.*
- *Behavior resulting from application of the "principle of least action" when performing a task.*
- *For certain machines, the foreseeable behavior of such persons as unauthorized: apprentices, teenagers, handicapped persons and trainees tempted to drive a lift truck. Truck drivers tempted to operate a truck to win a bet, in competition or for their own personal experience.*

The person in charge of the equipment must take these criteria into account when assessing whether or not a person will make a suitable driver.

GENERAL INSTRUCTIONS

A - DRIVER'S OPERATING INSTRUCTIONS

- Read the operator's manual carefully, making sure you understand it.
- The operator's manual must always be kept in the lift truck, in the place provided and in the language understood by the operator.
- Every operation or maneuvre not described in the manual must be assumed to be prohibited.
- Respect the safety notices and instructions given on the lift truck.
- It is mandatory to replace all plates or stickers which are no longer legible or which have become worn or damaged.

B - AUTHORIZATION TO OPERATE
(Refer to current legislation)

- Only qualified personnel may use the lift truck. Its use is subject to authorization to operate being given by the appropriate manager in the user establishment.
- The user should always carry this authorization to operate with him while he is using the lift truck.
- The driver is not authorized to permit others to drive the lift truck.
- In addition, the vehicle should be used in accordance with good practice for the profession.

C - MAINTENANCE

- The user must immediately advise his superior if his lift truck is not in good working order or does not comply with safety standards.
- The operator is prohibited from performing repairs or adjustments himself, unless he has been trained for this purpose. He must keep the lift truck properly cleaned if this is among his responsibilities.
- Carry out daily maintenance (See: A - DAILY OR EVERY 10 HOURS SERVICE in SECTION: 3 - MAINTENANCE).
- Ensure tires are adapted to the nature of the ground:
  - . SAND tires.
  - . LAND tires.
  - . Snow chains.

  There are optional solutions, consult your agent or dealer.

WARNING	*A worn or damaged tire can result in the lift truck being temporarily out of service.*

IMPORTANT	*Unless previously approved, foam inflated tires are prohibited and are not guaranteed by the manufacturer.*

- For your own and other people's safety, it is forbidden to modify the structure and settings of the various components of your lift truck yourself (Hydraulic pressure, relief valve calibration, engine running speed, addition of extra equipment etc.). The same holds with regard to any suppression or modification of the safety systems, in which case the maker would no longer be liable.

WARNING	*Regular inspection of your lift truck is mandatory if it is to be kept in conforming condition. The frequency of such checks are defined by the current legislation of the country in which the lift truck is being operated.*

D - ENVIRONMENT

- A lift truck operating in an area without fire extinguishing equipment must be equipped with an individual extinguisher. There are optional solutions, consult your agent or dealer.
- Take into account climatic and atmospheric conditions of the site of utilization.
  - . Protection against frost (See: LUBRICANTS AND FUEL in SECTION: 3 - MAINTENANCE).
  - . Adaptation of lubricants (Ask your dealer for information).
  - . Engine filtration.
  - . Lighting (Working headlight).

  Optional solutions exist, consult your dealer.

WARNING	*Use of a lift truck is prohibited in protected areas (e.g. refinery, explosive atmosphere). For use in these areas, specific equipment is available as an option. Consult your dealer.*

D - CLIMBING ONTO THE TRUCK

- Optional solutions exist, consult your dealer.

WARNING	*To climb onto the truck, it is strictly prohibited to use the lift truck hydraulic system if it is not equipped with a suitable hydraulic safety device kit.*

IF NECESSARY, CONSULT YOUR DEALER.

OPERATING INSTRUCTIONS

A - DRIVER'S OPERATING INSTRUCTIONS

- Wear clothes suited for driving the lift truck, avoid loose clothes.
- Never operate the vehicle when hands or feet are wet or soiled with greasy substances.
- For increased comfort, adjust the driver's seat to your requirements and adopt the correct position in the driver's seat.
- The operator must always operate the forklift seated in the normal position in the cab. It is prohibited to have arms, legs, or any part of the body, protruding from the cab of the lift truck.
- Remember to always fasten your seat belt and adjust it to your requirements.
- The controls must never be used for any other than their intended purposes (do not climb onto or down from the lift truck by grabbing the controls).
- If the controls are fitted with a forced operation (lever lock) device, it is forbidden to leave the cab without first placing these controls in neutral.
- Never allow a passenger to travel on the lift truck or in the driver's cab.

B - BEFORE STARTING THE LIFT TRUCK

- If the lift truck is new, refer to: BEFORE STARTING UP A NEW LIFT TRUCK in SECTION: 1 - OPERATING AND SAFETY INSTRUCTIONS.
- Check the condition of the tires and tire pressures (See: CHARACTERISTICS in SECTION: 2 - DESCRIPTION).
- Before starting the lift truck, check the different levels:
  - . Engine oil.
  - . Hydraulic reservoir oil.
  - . Cooling liquid.
  - . Braking oil.
- Also check for possible leakage of oil, fuel or liquid from the lift truck.
- Check the closing and locking levers of the hood.
- Whatever his experience as a truck driver, the operator is advised to familiarize himself with the position and operation of all controls and instruments before operating the lift truck.

C - STARTING THE LIFT TRUCK

SAFETY NOTICE

WARNING	*The operator must be correctly seated in the driver's seat, seat belt adjusted and fastened, before operating the lift truck.*

- Never try to start the lift truck by pushing or towing it.

IMPORTANT	*Such operation may cause severe damage to the transmission. If necessary, to tow the lift truck in an emergency, the transmission must be placed in the neutral position (See: H - OCCASIONAL MAINTENANCE in SECTION: 3 - MAINTENANCE).*

INSTRUCTIONS

- Make sure that the forward/reverse lever is in neutral.
- Turn the ignition key to the position I to activate the electrical system.
- Check the level on the fuel level gauge.
- Turn the ignition key to position II to preheat for 15 seconds.

IMPORTANT	*Do not engage the starter motor for more than 15 seconds at a time. Engage preheating for 10 seconds between unsuccessful starting attempts.*

- Press the accelerator pedal and turn the ignition key fully: the engine should then start. Release the ignition key and let the engine run at idle.
- Check all control instruments immediately after starting up, when the engine is warm and at regular intervals during use, so as to quickly detect any faults and to be able to correct them without any delay.
- If an instrument does not show the correct display, stop the engine and immediately carry out the necessary operations.

D - DRIVING THE LIFT TRUCK

SAFETY NOTICE

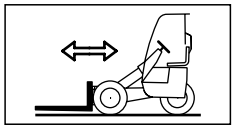
- Always drive the lift truck with the forks or attachment at approximately 12 in. from the ground, i.e. In the travel position.
- Familiarize yourself with the lift truck on the terrain where it will be used.
- Ensure that the service brakes and the backup alarm are working properly.
- Drive according to, and at an appropriate speed for, the conditions and state of the terrain.
- Slow down before executing a turn.
- In all circumstances make sure you are in control of your speed.
- On damp, slippery or uneven terrain, drive slowly.
- Brake gently, never abruptly.
- Only use the lift truck's forward/reverse lever from a stationary position and never do so abruptly.
- Do not drive with your foot on the brake pedal or with the parking brake on.
- Always remember that hydrostatic type steering is extremely sensitive to movement of the steering wheel, so turn it gently and not abruptly.
- Do not allow the engine to idle needlessly for a long period.
- Never leave the engine running when the lift truck is unattended.
- Look in the direction of travel and always ensure you have good visibility of the route ahead.
- When working at night, ensure that your lift truck is fitted with full beam lights. There are optional solutions, consult your agent or dealer.
- Drive around obstacles.
- Never move onto a loading platform without having first checked:
  - . That it is suitably positioned and made fast.
  - . That the unit to which it is connected (Trailer, truck, etc.) will not shift.
  - . That this platform is prescribed for the total weight of the lift truck to be loaded.
  - . That this platform is prescribed for the width of the lift truck.
- Never move onto a foot bridge, floor or freight lift, without being certain that they are approved for the weight and size of the lift truck to be loaded and without having checked that they are in sound working order.

WARNING	*Take extreme care with loading platforms, trenches, scaffolding, recently dug and/or backfilled ground.*

- The loaded lift truck must not travel at speeds in excess of 12 km/h (7.5 mph).

INSTRUCTIONS

- Check the transmission oil level.
- Raise the forks or attachment to the travel position approximately 300 mm (12 in.) from the ground.
- Shift the forward/reverse lever to the selected direction of travel.
- Release the parking brake and accelerate gradually until the lift truck moves off.



E - STOPPING (PARKING) THE LIFT TRUCK

SAFETY NOTICE

- Before stopping the lift truck after a long working period, let the engine idle for a few moments, allowing the coolant and oil to lower the temperature of the engine and transmission.

IMPORTANT	*Frequently stopping a hot engine will raise the temperature of some components, with the risk of badly damaging them.*

Never leave the ignition key in the lift truck while the lift truck is unattended.

- When the lift truck is stationary, place the forks or attachment on the ground, place the gear lever in neutral, apply the parking brake and place the forward/reverse lever in neutral.
- If the driver has to leave the cab, even for a moment, it is essential to place the gear lever in neutral, apply the parking brake and put the forward/reverse lever in neutral.
- Make sure that the lift truck is not stopped in any position that will interfere with the traffic and at less than one meter from the track of a railway.
- In the event of prolonged parking on a site, protect the lift truck from bad weather, particularly from frost (Check the level of antifreeze), and ensure that the hood is properly secured.

INSTRUCTIONS

- Park the lift truck on flat ground or on an incline less than 15 %.
- Release the accelerator pedal and stop the lift truck.
- Place the forward/reverse lever in neutral.
- Apply the parking brake.
- Retract the boom completely.
- Lower the forks or attachment to rest on the ground.
- Stop the engine.
- Remove the pressure in the hydraulic circuits by using the hydraulic controls.
- Remove the ignition key.
- Check that the hood is closed.

WARNING	*Before leaving your cab, ensure that you have carried out all operations for stopping and parking the lift truck, for your safety and the safety of others.*

F - DRIVING THE LIFT TRUCK ON THE PUBLIC HIGHWAY

SAFETY INSTRUCTIONS

- When driving a lift truck on roads open to public traffic, observe the provisions of the local Highway Code.
- Lift truck drivers, driving on the public highway, must abide by the general provisions relative to highway traffic.
- The lift truck must conform to the provisions of the Highway Code. If necessary, optional solutions exist, consult your dealer.

CAUTION	*Transport of loads on the public highway is forbidden and attachments mounted on the lift truck must be fitted with equipment in accordance with regulations or removed.*

INSTRUCTIONS
- Ensure that the flashing light is in position and that it is working.
- Check the good working order and cleanness of lights, indicators and windscreen wiper (where applicable).
- Control the alignment of the wheels and select the steering mode HIGHWAY TRAFFIC.
- Check the adjustment of the rear view mirrors.
- Ensure that the fuel level is sufficient.
- Place the boom in the retracted position and the attachment at 300 mm (12 in) from the ground.

WARNING	*While on the road do not use the transmission cut-off to maintain engine braking on the lift truck.*

G - OPERATING THE LIFT TRUCK WITH A TRAILER ON A PUBLIC HIGHWAY

- When using a trailer, consult the regulations in your country (Maximum travel speed, braking, maximum weight of trailer, etc.).
- Do not forget to connect the lift truck's electrical equipment to that of the trailer.
- Do not use a non-braked trailer if the unit weight of a load exceeds that imposed by the highway code.
- Do not use a non-braked trailer without braking equipment for the trailer on the lift truck.
- Do not forget to connect the lift truck's braking equipment to that of the trailer.
- The maximum vertical pull on the trailer hook must not exceed 1500 daN (3372 lbs).
- The authorized total towed weight (A.T.T.W.) must not exceed the maximum weight as authorized by the manufacturer (Consult the manufacturer's plate on your lift truck).

H - OPERATING THE LIFT TRUCK WITH A FRONT-END ATTACHMENT ON A PUBLIC HIGHWAY

- For driving with an attachment, check the regulations currently applicable in your country.
- The attachment must not exceed the overall width of the lift truck.
- The length of the entire unit must not exceed the overall length of 6 metres (19.7 ft).
- Do not mask the lighting range of the front headlamps.
- Set safety shields in place on any attachments or remove the attachment.

IF NECESSARY, CONSULT YOUR DEALER.

HANDLING INSTRUCTIONS

A - GENERAL

- Ensure the lift truck's attachments function correctly.
- Do not attempt to perform operations which exceed the capacities of your lift truck or attachments.
- It is prohibited to increase the counterweight value in any way.
- It is prohibited to transport or carry persons in or on the lift truck.
- Avoid traveling for long distances in reverse.

B - ATTACHMENTS

- Ensure that the attachment is correctly fitted and locked in place.
- Conform to the limits on the load chart for the lift truck and/or attachment.
- Ensure that palettes, cases, etc, are in good order and suitable for the load to be lifted.
- Position the forks perpendicular to the load to be lifted, taking account of the load's center of gravity.
- Never lift a load with a single fork.
- Never lift a sling load with a single fork or with the carriage. Optional solutions exist, consult your dealer.
- Ensure that quick-fit hydraulic connections on the attachment system are clean and protected.

IMPORTANT	*Before each change of an attachment with hydraulic function, in order to avoid damaging the quick-fit hydraulic connections:* *- Place the attachment in the closed position, flat on the ground (For unstable attachments, ensure they are secured using wedges).* *- Switch off the engine.* *- Remove pressure from the attachment hydraulic system using the hydraulic controls.*

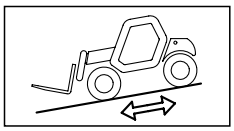
C - ENVIRONMENT

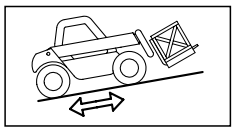
- Signaling and lighting on the lift truck must suit the conditions of use. In addition to the factory equipment mounted on your lift truck, a certain number of options are available, such as: road lighting, stop lights, flashing light, reverse lights, reverse buzzer alarm, front light, rear light, light at the boom head, etc. Consult your agent or dealer.
- Take care when raising the load that no object or person is in the way of movement, and avoid incorrect maneuvers.
- In the case of work near power lines, ensure that the safety distance is sufficient between the working area of the lift truck and the power line.

⚠ WARNING	*You must consult your local electrical agency. You could be electrocuted or seriously injured if you operate or park the lift truck too close to power cables. You are strongly advised to ensure that the safety rules on the site conform to local regulations regarding all types of work performed near power cables.*

- Do not allow personnel to approach the working area of the lift truck or pass beneath an elevated load.
- When operating on a slope, before raising the boom, ensure that the terrain is as level as possible. Lift trucks fitted with level correction may work on a steeper incline provided that the greatest part of the slope is corrected.

- Travelling on a longitudinal slope:
  - Drive and brake gently.
  - Moving without load: Forks or attachment facing downhill.
  - Moving with load: Forks or attachment facing uphill.





- Ensure that scaffolding, loading platform or pile is capable of bearing the weight.
- Ensure the stability and solidity of the ground before depositing a load.

D - HANDLING

- Always consider safety; transport only balanced and correctly secured loads to avoid risk of tipping.
- Fully engage forks under the load and transport it in the low position (Approximately 300 mm (12 in) from the ground), with the boom fully retracted and the forks sloping back.
- For obvious reasons regarding the lift truck's stability and clear visibility of the surrounding area, operate the lift truck only when the boom is in the travel position (Forks approximately 300 mm (12 in) from the ground).
- Do not maneuver the lift truck with the boom in the raised position unless under exceptional circumstances and then with extreme caution, at very low speed, and using gentle braking. Ensure that visibility is adequate and get another person to guide you along if necessary.
- Never shift the position of the load while the lift truck is in motion.
- The simultaneous use of two lift trucks to handle heavy or bulky loads is a dangerous maneuver, requiring specific precautions. This should only be done in exceptional circumstances and in the presence of a handling manager.
- Never drive too fast or brake abruptly when carrying a load.
- Check the load, particularly when turning corners and especially if it is bulky.
- Always secure unstable loads.
- Handle loads with caution, at slow speed, and without abrupt movements when positioning them at significant heights and boom extention.

WARNING	*In the event of high winds or storms, do not lift loads that jeopardize the stability of the lift truck, particularly if the load catches the wind badly.*

- Do not change direction sharply or at high speed.

DANGER	*In the event of the lift truck overturning, do not try to leave the cab during the incident. YOUR BEST PROTECTION IS TO STAY FASTENED IN THE CAB.*

- Apply the parking brake when lifting or depositing a difficult load or when on an incline.
- Do not leave the lift truck with the load in an elevated position.
- Do not leave a laden lift truck with the parking brake applied on an incline which exceeds 15 %.

E - VISIBILITY

- If the visibility in forward motion is not sufficient because of a bulky load, drive in reverse motion. This maneuver must remain exceptional and for short distances only.
- Ensure you have good visibility (adequate lighting, correctly adjusted rear view mirror, etc.).

IF NECESSARY, CONSULT YOUR DEALER.

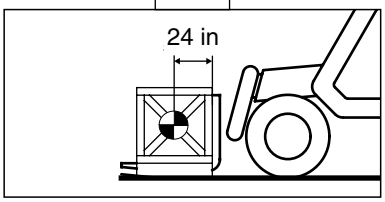
LOAD HANDLING

WEIGHT OF LOAD AND CENTER OF GRAVITY

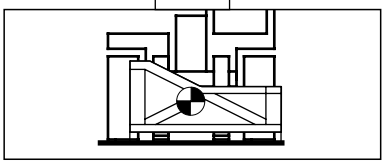
- Before taking up a load, you must know its weight and its center of gravity.
- The load chart relating to your lift truck is valid for a weight with its center of gravity 24 in. from the heel of the forks (Fig. A). For a higher center of gravity, consult your agent or dealer.

- For irregular loads, determine the center of gravity in the transverse (right to left) direction before handling (Fig. B).

A



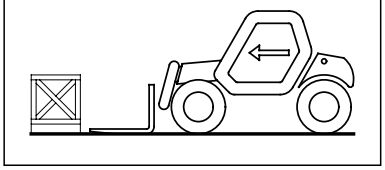
B



TAKING UP A LOAD ON THE GROUND

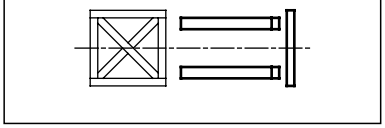
- Direct the lift truck perpendicular to the load, with the boom retracted and the forks in a horizontal position (Fig. C).

C



- Adjust the fork spread and centering in relation to the load (Fig. D) (Optional solutions exist, consult your dealer).

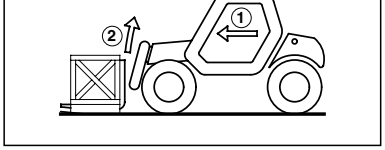
D



- Move the lift truck forward slowly (1) maneuvering the forks under the load (Fig. E). If necessary, slightly lift the boom (2) while taking up the load.

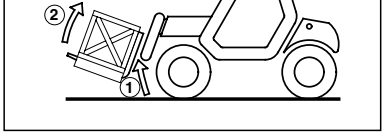
- Apply the parking brake and place the forward/reverse lever in neutral.

E



- Lift the load further (1), incline the carriage slightly back (2) into the transport position (Fig. F).

F

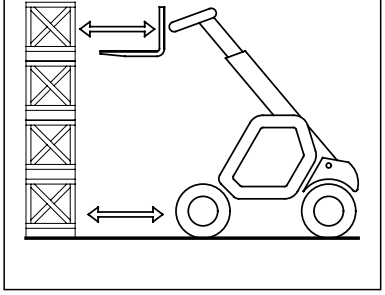


TAKING UP A HIGH LOAD ON TIRES

- Ensure that the forks will pass easily under the load.

- Position the lift truck perpendicular to the load, with the forks in a horizontal position (Fig. G), maneuvering gently and carefully.

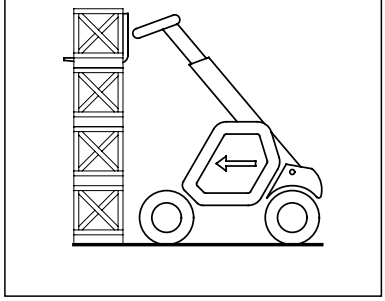
G



⚠WARNING	*Keep constant watch while placing the forks under the load (Fig. G), use the shortest possible length of boom. NEVER EXCEED RATED CAPACITY.*

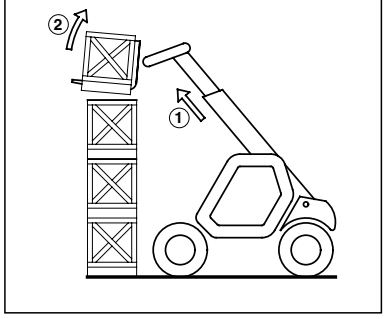
- Position the forks completely under the load (Fig. H). Apply the parking brake and place the forward/reverse lever in neutral.

H



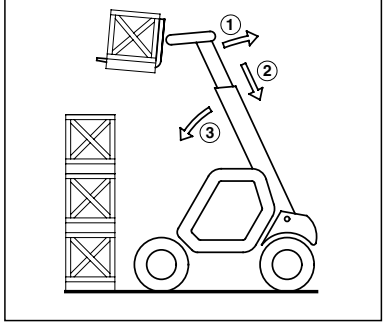
- Slightly lift the load (1) and incline the carriage back (2) to stabilize the load (Fig. I).

I



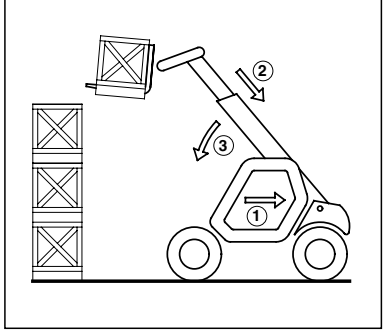
- If possible lower the load without shifting the lift truck. Lift the boom (1) to release the load, retract (2) and lower the boom (3) to bring the load into the transport position (Fig. J).

J



- If this is not possible, carefully back the lift truck. Maneuvering gently, back the lift truck to remove the load (1), retract and lower the boom (2, 3) and bring the load into the transport position (Fig. K).

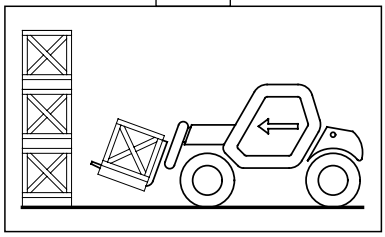
K



LAYING A HIGH LOAD ON TIRES

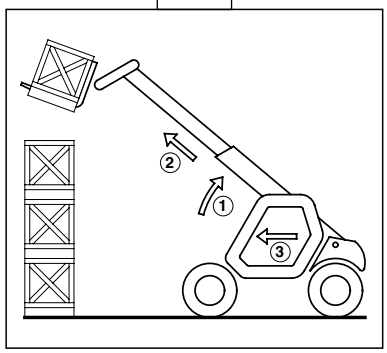
- Approach with the load in the transport position in front of the pile (Fig. L).

L



- Lift and extend the boom (1) (2) until the load is above the pile, if necessary move the lift truck forward (3) (Fig. M) maneuvering very gently and carefully. Apply the parking brake and place the forward/reverse lever in neutral.

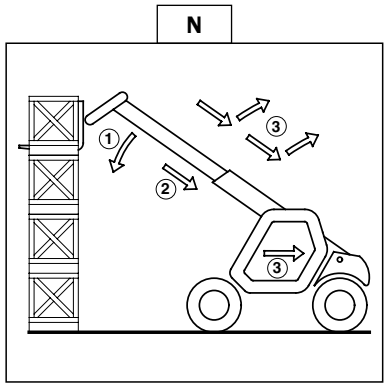
M



- Place the load in a horizontal position and lay it down on the pile by lowering and retracting the boom (1) (2) in order to position the load correctly (Fig. N).

- Free the forks by alternately retracting and lifting the boom (3) (Fig. N) or, if possible, by reversing the lift truck (3). Then bring the boom into the transport position.

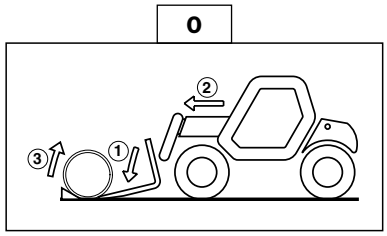
N



TAKING UP A NON PALLETIZED LOAD

- Tilt the carriage (1) forwards and extend the boom (2) while simultaneously crowding the carriage backward to slip the forks under the load (Fig. O). If necessary, wedge the load.

O

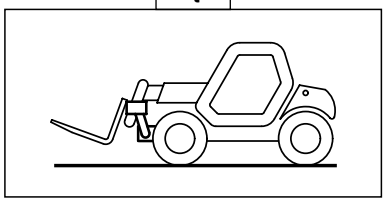


HANDLING THE LOAD USING STABILIZERS
(TMT 320 / TMT 320 FL / TMT 320 FL HT / TMT 320 FL TURBO HT)

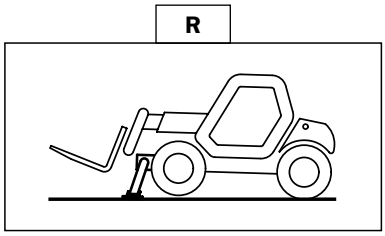
- Place the lift truck in the transport position (Fig. Q).
- Engage parking brake.
- Put forward/reverse lever in neutral.
- Bring the two stabilizers in contact with the ground (Fig. R)..

NOTE: On unstable terrain, secure the stabilizers adequately with blocks.

Q



R



MAINTENANCE INSTRUCTIONS OF THE LIFT TRUCK

MAINTENANCE INSTRUCTIONS

A - GENERAL

- Read the operator's manual carefully and ensure you understand it.
- Stop the engine, when an intervention is necessary.
- Wear clothes suitable for the maintenance of the lift truck, avoid wearing jewelry and loose clothes. Tie and protect your hair, if necessary.
- Ensure the area is sufficiently ventilated before starting the lift truck.

IMPORTANT	*Make sure that the disposal of process materials and spare parts is carried out in a safe and ecological manner.*

- Carry out all repairs immediately, even if the repairs are minor.
- Repair all leaks immediately, even if the leak is minor.
- Do not attempt to loosen unions, hoses or any hydraulic component with the circuit under pressure.

WARNING	*The handling and removal of the balancing valves which may be fitted to the cylinders of your lift truck can be dangerous. A balancing valve must only be removed when the cylinder concerned is at rest and the hydraulic circuit is depressurized.* ***This operation can only be carried out by authorized staff.***

- Do not smoke or approach the lift truck with a flame, while the fuel tank is open or is being filled.
- Take care not to burn yourself (exhaust, radiator, engine, etc.).
- Disconnect the negative cable terminal (-) from the top of the battery before working on the electrical circuit or on the lift truck (e.g.: welding).
- Do not drop metallic items on the battery.
- When carrying out electric welding work on the lift truck, connect the negative cable from the welding equipment directly to the part being welded, so as to avoid high tension current passing through the alternator.

B - MAINTENANCE

- The maintenance and compliance of the lift truck are mandatory.
- Carry out daily maintenance (See: A - DAILY OR EVERY 10 HOURS SERVICE in SECTION: 3 - MAINTENANCE).
- Do not run the engine without the air filter, or with oil, water or fuel leaks.

WARNING	*Wait for the engine to cool before removing the radiator cap.*

- Change the filter cartridges (See servicing schedules in: FILTERS CARTRIDGES AND BELTS in SECTION: 3 - MAINTENANCE).

C - LEVELS

- Use the recommended lubricants, never use contaminated lubricants.
- Do not fill the fuel tank while the engine is running.
- Fill the fuel tank only in areas specified for this purpose.
- Do not fill the fuel tank to over-flowing.

D - WASHING

- Clean the lift truck or at least the area concerned before making repairs.
- During washing, avoid the articulations, electrical components and connections.

IMPORTANT	*Protect against penetration of water, steam or cleaning agents: all components susceptible of being damaged, particularly electrical components, electrical connections and the injection pump.*

- Clean and remove all excess fuel, oil and grease from the lift truck.

FOR ANY INTERVENTION OTHER THAN REGULAR MAINTENANCE, CONSULT YOUR DEALER.

BEFORE STARTING UP A NEW LIFT TRUCK

INTRODUCTION

- Our lift trucks are designed with the operator and mechanic in mind, providing comfortable handling and simplified maintenance.
- However, before operating the lift truck, the user should carefully read and understand the various chapters of this manual which has been provided to solve driving and maintenance problems. By following these instructions the user will be able to take full advantage of the versatility of this lift truck.
- The operator must familiarize himself with the positions and functions of all controls and instruments before operating the lift truck.

IMPORTANT	*Do not attempt to start a new lift truck before the following checks have been performed:*

LUBRICATION

- Check that all the correct grades of oils and greases that are required are installed, see: SERVICING SCHEDULE in SECTION: 3 - MAINTENANCE and top up if necessary.

IMPORTANT	*For operation under average climatic conditions, i.e.: between -15 °C and + 35 °C (5° to 95°F), correct levels of lubricants in all the circuits are filled in production. For operation under more severe climatic conditions, before starting up, it is necessary to drain all the circuits, then ensure correct levels of lubricants properly suited to the relevant ambient temperatures are installed. It is the same for the engine cooling liquid (Contact your dealer for information, if necessary).*

DRY AIR FILTER

- Ensure that the air filter is undamaged and not blocked.
- Tighten the fastening devices if necessary.

IMPORTANT	*Never run the engine with the air filter removed or damaged.*

COOLING SYSTEM

- Do not start the lift truck without checking the radiator coolant level or if the fan belt is damaged or broken.

HYDRAULIC SYSTEM

- Check for leaks; oil seeping from the hoses, connections or unions. If necessary, tighten or repair the defective connections.
- Also check that the hydraulic tank oil level is correct.

BRAKING SYSTEM

- Check leaks, oil seeping from the hoses, connections and unions. If necessary, tighten or repair the defective connections.
- Also check the brake oil level in the tank.

WARNING	*Ensure that the recommended oil is used, in order to avoid serious damage to the braking system.*

TIRES

- Make sure that the wheel nuts are correctly tightened (See: A - DAILY OR EVERY 10 HOURS SERVICE in SECTION: 3 - MAINTENANCE) and that the tire pressures are correct (See: CHARACTERISTICS in SECTION: 2 - DESCRIPTION).

FUEL SYSTEM

- Check that all fuel lines are secured.
- If necessary drain the fuel filter and bleed the fuel system of air.

ELECTRICAL CIRCUIT

- Check the level and the density of the electrolyte in the battery (See: B - EVERY 50 HOURS SERVICE in SECTION: 3 - MAINTENANCE).
- Check the components of the electrical system, the connections and fastening devices.

IF NECESSARY, CONSULT YOUR DEALER.

2 - DESCRIPTION

TMT 320 / TMT 320 FL

TMT 320 FL / HT / TMT 320 FL HT TURBO

IDENTIFICATION OF THE LIFT TRUCK

Our policy is to promote a constant improvement to our products, for this reason our range of telescopic lift trucks may undergo certain modifications without prior notice.
When you order parts, or when you require any technical information, always specify:

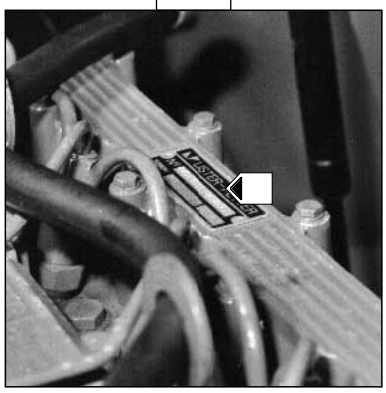
NOTE: For the owner's convenience, it is recommended that a note of these numbers be made in the spaces provided, at the time of the lift truck's delivery.

A

PLATE MANUFACTURER OF THE LIFT TRUCK (FIG. A)

- Model _____
- Series _____
- Serial No. _____
- Chassis No. _____
- Year of manufacture _____

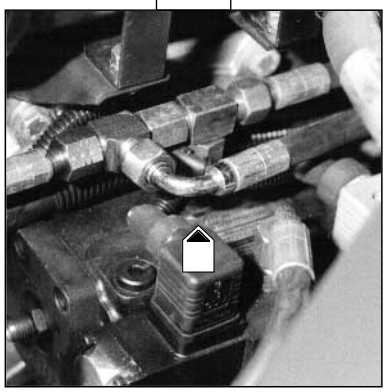
B



I.C. ENGINE (FIG. B)

- Engine No. _____

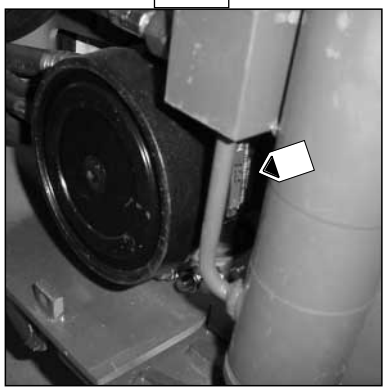
C



TRANSMISSION (FIG. C)

- Transmission type _____
- MANITOU parts No. _____
- Serial No. _____

D



FRONT WHEEL REDUCER (FIG. D)

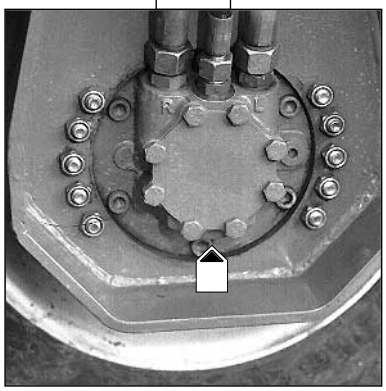
(Remove cover plate to expose ID Plate)

- Type _____
- Code _____
- Serial No _____

REAR WHEEL REDUCER (FIG. D)

- Type
- Code
- Serial No

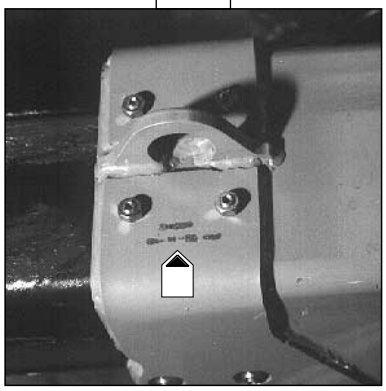
E



BOOM (FIG. F)

- Boom No _____
- Date of manufacture _____

F



CHARACTERISTICS

TMT 320 /TMT 320 FL / TMT 320 FL HT

ENGINE

- Type	**LISTER - PETTER LPWS 4**
- Number of cylinders	4
- Number of strokes	4
- Injection system	Indirect
- Firing order	1.3.4.2.
- Capacity	114 in^3 (1860 cm^3)
- Bore	3.39 in (86 mm)
- Stroke	3.15 in (80 mm)
- Compression ratio	22:1
- Nominal running speed	2800 rpm
- Idle speed	950 rpm
- Full speed	3000 rpm
- Power DIN 70.020	39,7 cv 29,2 kw
- Power DIN 6270 B	38,8 cv 28,6 kw
- Power SAE	41,3 cv 30,4 kw
- Power BS.AU 141 a 1971	39,7 cv 29,2 kw
- Maximum torque	71.3 ft lb (96,6 Nm) to 2000 rpm
- Air cleaner	dry 3 microns

COOLING CIRCUIT

- Type	By water
- Fan	Puller
. Number of blades	5
. Diameter	12.4 in (315 mm)
- Thermostat	
. Start opening	160 °F (71 °C)
. Full opening	185 °F (85 °C)

ELECTRIC CIRCUIT

- Ground	Negative
- Battery	12 V - 105 Ah
- Alternator	14 V - 45 A
- Tension regulator	Incorporated into the alternator
- Starter	12 V

HYDROSTATIC TRANSMISSION

HYDROSTATIC PUMP	
- Type	**A4VG 40 DA** variable displacement pump with automatic power governor
- Gear reverser	Electromagnetic 12V
- Inching starter	Hydraulic through outside valve TH 7
MAIN PUMP	
- Displacement MAX.	2.44 in^3/rev (40 cm^3/tr)
MIN	0 in^3/rev (0 cm^3/tr)
- Flow rate at 3,000 rpm MAX.	31.7 gpm (120 l/min)
MIN.	0 gpm (0 l/min)
- Working pressure	6090 psi (420 bar)
BOOST PUMP	
- Cubic capacity	.513 in^3/tr (8,4 cm^3/tr)
- Flow rate at 3,000 rpm MAX.	6.66 gpm (25,2 l/min)
MIN.	0 gpm (0 l/min)
- Boost pressure Max. rpm	406/435 psi (28/30 bar)

FRONT WHEEL REDUCER

- Type	MSE02 POCLAIN Motor wheel with brakes fixed displacement
- Cubic capacity	24.3 in^3/tr (398 cm^3/tr)
- Working pressure	6090 psi (420 bar)

REAR WHEEL REDUCER

- Type	MSE02 POCLAIN Motor wheel fixed displacement
- Cubic capacity	24.3 in^3/tr (398 cm^3/tr)
- Working pressure	6090 psi (420 bar)

REAR WHEEL REDUCER

(TMT 320 FL HT)

- Type	MSE05 POCLAIN Motor wheel fixed displacement
- Cubic capacity	45.8 in^3 (750 cm^3/tr)
- Working pressure	6090 psi (420 bar)

BRAKE

- Type	Multidisc brake immersed in oil
- Service brakes	Hydrostatic
- Parking brakes	Electrically controlled on dashboard on the front wheels through hydraulic pressure break

TMT 320

HYDRAULIC CIRCUIT

- Lifting, tilting, telescoping, travel circuit, stabilizer			
. Type of pump	Gear		
. Flow rate at full speed		9.51gpm	(36 L/min)
. Pressure		3625 psi	(250 Bar)
. Capacity		1.86 in^2	(12 cm^3/tr)
- Steering direction			
. Provided by flow distributor (Loadsensing)			
. Pressure		1740 psi	(120 Bar)
- Filtration			
. Suction		100 Microns	
. Return		10 Microns	
. Air contained in the tank		5 Microns	

SPECIFICATIONS

- Level of sound pressure in the driver's cabin (According to norm prEN 12053 : 1995)		dB	
- Travel speed of the lift truck			
. Front unloaded		7.77 mph	(12,5 km/h)
. Rear unloaded		7.77 mph	(12,5 km/h)
- Standard lift height		113 in	(2870 mm)
- Rated capacity with standard attachment		5500 lb	(2495 kg)
- Load center		24 in	(610 mm)
- Weight of forks (Each)		119 lb	(54 kg)
- Lifting motions (Telescopes retracted)			
. Unloaded lifting	9,4 s	40.0 ft/min	(12,2 m/min)
. Rated load lifting	10,1 s	37.1 ft/min	(11,3 m/min)
. Unloaded lowering	7,1 s	52.8 ft/min	(16,1 m/min)
. Rated load lowering	7,1 s	52.8 ft/min	(16,1 m/min)
- Telescoping motions (Lifting boom)			
. Extending of telescopes unloaded	4,3 s	42.0 ft/min	(12,8 m/min)
. Extending of telescopes loaded	4,7 s	38.4 ft/min	(11,7 m/min)
. Retracting of telescopes unloaded	3,8 s	47.6 ft/min	(14,5 m/min)
. Retracting of telescopes loaded	4,2 s	43.0 ft/min	(13,1 m/min)
- Reverse tilt time unloaded		5,3 s	20,2 °/s
- Forward tilt time unloaded		10 s	10,7 °/s
- Lift truck weight with standard attachment			
. Unloaded		4938 lb	(2240 kg)
. Rated load		9348 lb	(4240 kg)
- Axle weight with standard attachment (Transport position)			
. Front unloaded		1554 lb	(705 kg)
rated load		5964 lb	(2705 kg)
. Rear unloaded		3384 lb	(1535 kg)
rated load		3384 lb	(1535 kg)
- Drawbar pull			
. Rated load		4275 lb	(1900 daN)

TIRES

- OTR Industrial 31 x 10-16.5 - 10 PR	61psi (4.2 bar)
Front tire load	unladen - 882 lb (400 kg) laden - 2976 lb (1350 kg)
Rear tire load	unladen - 3417 lb (1550 kg) laden - 3417 lb (1550 kg)

TMT 320 FL

HYDRAULIC CIRCUIT

Lifting, tilting, telescoping, travel circuit, stabilizer			
. Type of pump	Gear		
. Flow rate at full speed		9.51 gpm	(36 L/min)
. Pressure		3625 psi	(250 Bar)
. Capacity		.732 in^3	(12 cm^3/tr)
- Steering direction			
. Provided by flow distributor (Load sensing)			
. Pressure		1740 psi	(120 Bar)
- Filtration			
. Suction		100 Microns	
. Return		10 Microns	
. Air contained in the tank		5 Microns	

SPECIFICATIONS

- Level of sound pressure in the driver's cabin (According to norm prEN 12053 : 1995)		dB	
- Travel speed of the lift truck			
. Front unloaded		7.77 mph	(12,5 km/h)
. Rear unloaded		7.77 mph	(12,5 km/h)
- Standard lift height		135 in	(3429 mm)
- Rated capacity with standard attachment		5500 lb	(2495 kg)
- Load center		24 in	(610 mm)
- Weight of forks (Each)		119 lb	(54 kg)
- Lifting motions (Telescopes retracted)			
. Unloaded lifting	9,4 s	40.0 ft/min	(12,2 m/min)
. Rated load lifting	10,1 s	37.1 ft/min	(11,3 m/min)
. Unloaded lowering	7,1 s	52.8 ft/min	(16,1 m/min)
. Rated load lowering	7,1 s	52.8 ft/min	(16,1 m/min)
- Telescoping motions (Lifting boom)			
. Extending of telescopes unloaded	5,9 s	40.7 ft/min	(12,4 m/min)
. Extending of telescopes loaded	6,4 s	37.4 ft/min	(11,4 m/min)
. Retracting of telescopes unloaded	5,1 s	46.9 ft/min	(14,3 m/min)
. Retracting of telescopes loaded	5,7 s	42.0 ft/min	(12,8 m/min)
- Reverse tilt time unloaded		5,3 s	20,2 °/s
- Forward tilt time unloaded		10 s	10,7 °/s
- Lift truck weight with standard attachment			
. Unloaded		5225 lb	(2370 kg)
. Rated load		9634 lb	(4370 kg)
- Axle weight with standard attachment (Transport position)			
. Front unloaded		1576 lb	(715 kg)
rated load		5986 lb	(2715 kg)
. Rear unloaded		1576 lb	(1655 kg)
rated load		1576 lb	(1655 kg)
- Drawbar pull			
. Rated load		4275 lb	(1900 daN)

TIRES

- OTR Industrial 31 x 10-16.5 - 10 PR	61psi (4.2 bar)	
Front tire load	unladen - 882 lb (400 kg)	laden - 2976 lb (1350 kg)
Rear tire load	unladen - 3417 lb (1550 kg)	laden - 3417 lb (1550 kg)

TMT 320 FL HT

HYDRAULIC CIRCUIT

- Lifting, tilting, telescoping, travel circuit, stabilizer		
. Type of pump	Gear	
. Flow rate at full speed	9.51 gpm	(36 L/min)
. Pressure	3625 psi	(250 Bar)
. Capacity	1.86 cm^3	(12 cm^3/tr)
- Steering direction		
. Provided by flow distributor (Loadsensing)		
. Pressure	1740 psi	(120 Bar)
- Filtration		
. Suction	100 Microns	
. Return	10 Microns	
. Air contained in the tank	5 Microns	

SPECIFICATIONS

- Level of sound pressure in the driver's cabin (According to norm prEN 12053 : 1995)	dB	
- Travel speed of the lift truck		
. Front unladen	7.76 mph	(12,5 km/h)
. Rear unladen	7.76 mph	(12,5 km/h)
- Standard lift height	135 in	(3429 mm)
- Rated capacity with standard attachment	5500 lb	(2495 kg)
- Load center	24 in	(610 mm)
- Weight of forks (Each)	119 lb	(54 kg)
- Lifting motions (Telescopes retracted)		
. Unladen lifting	9,4 s	40 ft/min (12,2 m/min)
. Rated load lifting	10,1 s	37.1 ft/min (11,3 m/min)
. Unladen lowering	7,1 s	52.8 ft/min (16,1 m/min)
. Rated load lowering	7,1 s	52.8 ft/min (16,1 m/min)
- Telescoping motions (Lifting boom)		
. Extending of telescopes unladen	5,9 s	40.7 ft/min (12,4 m/min)
. Extending of telescopes laden	6,4 s	37.4 ft/min (11,4 m/min)
. Retracting of telescopes unladen	5,1 s	46.9 ft/min (14,3 m/min)
. Retracting of telescopes laden	5,7 s	42 ft/min (12,8 m/min)
- Reverse tilt time unladen	5,3 s	20,2 °/s
- Forward tilt time unladen	10 s	10,7 °/s
- Lift truck weight with standard attachment		
. Unladen	5225 lb	(2370 kg)
. Rated load	9634 lb	(4370 kg)
- Axle weight with standard attachment (Transport position)		
. Front unladen	1576 lb	(715 kg)
rated load	5986 lb	(2715 kg)
. Rear unladen	3649 lb	(1655 kg)
rated load	3649 lb	(1655 kg)
- Drawbar pull		
. Rated load	4275 lb	(1900 daN)

TIRES

- OTR Mud Shark 31 x 15.50-15 NHS	46psi (3.2 bar)
Front tire load	unladen - 992 lb (450 kg) laden - 3197 lb (1450 kg)
Rear tire load	unladen - 3527 lb (1600 kg) laden - 3527 lb (1600 kg)

CHARACTERISTICS

TMT 320 FL TURBO HT

ENGINE

- Type	**LISTER - PETTER LPWT 4**
- Number of cylinders	4
- Number of strokes	4
- Injection system	Indirect
- Ignition sequence	1.3.4.2.
- Capacity	114 in^3 (1860 cm^3)
- Bore	3.39 in (86 mm)
- Stroke	3.15 in (80 mm)
- Volumetric ratio	22:1
- Nominal running speed	2800 rpm
- Idle speed	1100 rpm
- Full speed	3000 rpm
- Power DIN 70.020	53,1 cv 39,6 kw
- Power BS.5514 / ISO 3046 / DIN 6271 B	55,4 cv 41,3 kw
- Maximum torque	110 ft lb (149 Nm) to 2000 rpm
- Air cleaner	dry 3 microns

COOLING CIRCUIT

- Type	By water
- Fan	Puller
. Number of blades	5
. Diameter	12.4 in (315 mm)
- Thermostat	
. Start opening	160°F (71 °C)
. Full opening	185°F (85 °C)

ELECTRIC CIRCUIT

- Earth	Negative
- Battery	12 V - 105 Ah
- Alternator	12 V - 45 A
- Tension regulator	Incorporated into the alternator
- Starter	12 V

HYDROSTATIC TRANSMISSION

HYDROSTATIC PUMP	
- Type	**A4VG 56 DA** variable displacement pump with automatic power governor
- Gear reverser	Electromagnetic 12V
- Inching starter	Hydraulic through outside valve TH 7
MAIN PUMP	
- Displacement MAX.	3.42 in^3/tr (56 cm^3/tr)
MIN.	0 in^3/tr (0 cm^3/tr)
- Flow rate at 3,000 rpm MAX.	44.4 gpm (168 l/min)
MIN.	0 gpm (0 l/min)
- Working pressure	6090 psi (420 bar)
BOOST PUMP	
- Cubic capacity	.513 in^3/tr (8,4 cm^3/tr)
- Flow rate at 3,000 rpm MAX.	6.66 gpm (25,2 l/min)
MIN.	0 gpm (0 l/min)
- Boost pressure Max. rpm	406/435 psi (28/30 bar)

FRONT WHEEL REDUCER

- Type	MSE05 POCLAIN Motor wheel with brakes fixed displacement
- Cubic capacity	38.1 in^3/tr (625 cm^3/tr)
- Working pressure	6090 psi (420 bar)

REAR WHEEL REDUCER

- Type	MSE05 POCLAIN Motor wheel fixed displacement
- Cubic capacity	45.8 in^3/tr (750 cm^3/tr)
- Working pressure	6090 psi (420 bar)

BRAKE

- Type	Multidisc brake immersed in oil
- Service brakes	Hydrostatic
- Parking brakes	Electrically controlled on dashboard on the front wheels through hydraulic pressure break

TMT 320 FL TURBO HT

HYDRAULIC CIRCUIT

- Lifting, tilting, telescoping, travel circuit, stabilizer			
. Type of pump	Gear		
. Flow rate at full speed		9.51 gpm	(36 L/min)
. Pressure		3625 psi	(250 Bar)
. Capacity		.732 in³/tr	(12 cm³/tr)
- Steering direction			
. Provided by flow distributor (Loadsensing)			
. Pressure		1740 psi	(120 Bar)
- Filtration			
. Suction		100 Microns	
. Return		10 Microns	
. Air contained in the tank		5 Microns	

SPECIFICATIONS

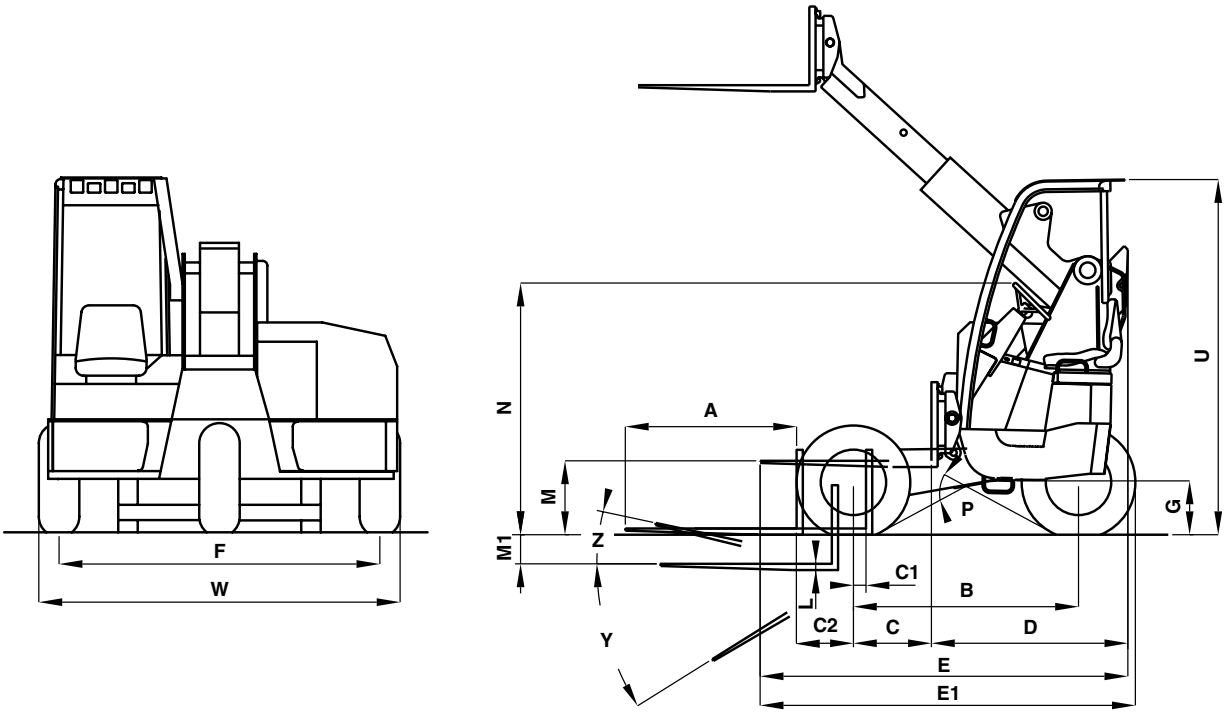
- Level of sound pressure in the driver's cabin (According to norm prEN 12053 : 1995)		dB	
- Travel speed of the lift truck			
. Front unladen		6.8 mph	(11 km/h)
. Rear unladen		6.8 mph	(11 km/h)
- Standard lift height		135 in	(3429 mm)
- Rated capacity with standard attachment		5500 lb	(2495 kg)
- Load center		24 in	(610 mm)
- Weight of forks (Each)		119 lb	(54 kg)
- Lifting motions (Telescopes retracted)			
. Unladen lifting	9,4 s	40 ft/min	(12,2 m/min)
. Rated load lifting	10,1 s	37.1 ft/min	(11,3 m/min)
. Unladen lowering	7,1 s	52.8 ft/min	(16,1 m/min)
. Rated load lowering	7,1 s	52.8 ft/min	(16,1 m/min)
- Telescoping motions (Lifting boom)			
. Extending of telescopes unladen	5,9 s	40.7 ft/min	(12,4 m/min)
. Extending of telescopes laden	6,4 s	37.4 ft/min	(11,4 m/min)
. Retracting of telescopes unladen	5,1 s	46.9 ft/min	(14,3 m/min)
. Retracting of telescopes laden	5,7 s	42.0 ft/min	(12,8 m/min)
- Reverse tilt time unladen		5,3 s	20,2 °/s
- Forward tilt time unladen		10 s	10,7 °/s
- Lift truck weight with standard attachment			
. Unladen		5478 lb	(2485 kg)
. Rated load		9888 lb	(4485 kg)
- Axle weight with standard attachment (Transport position)			
. Front unladen		1907 lb	(865 kg)
rated load		6316 lb	(2865 kg)
. Rear unladen		3571 lb	(1620 kg)
rated load		3571 lb	(1620 kg)
- Drawbar pull			
. Rated load		5490 lb	(2440 daN)

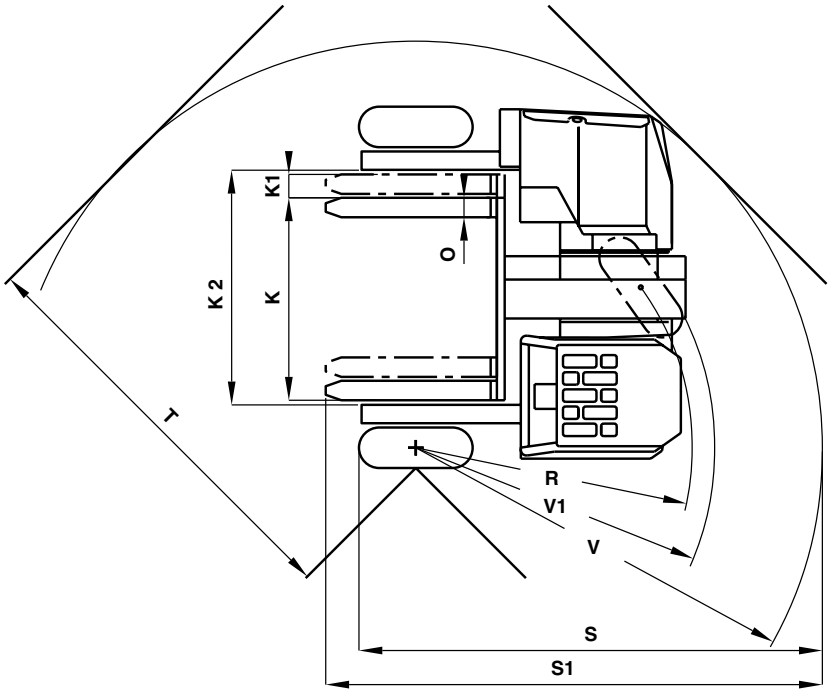
TIRES

- OTR Mud Shark 31 x 15.50-15 NHS	46psi (3.2 bar)
Front tire load	unladen - 992 lb (450 kg) laden - 3197 lb (1450 kg)
Rear tire load	unladen - 3527 lb (1600 kg) laden - 3527 lb (1600 kg)

DIMENSIONS AND LOAD CHART

TMT 320 / TMT 320 FL

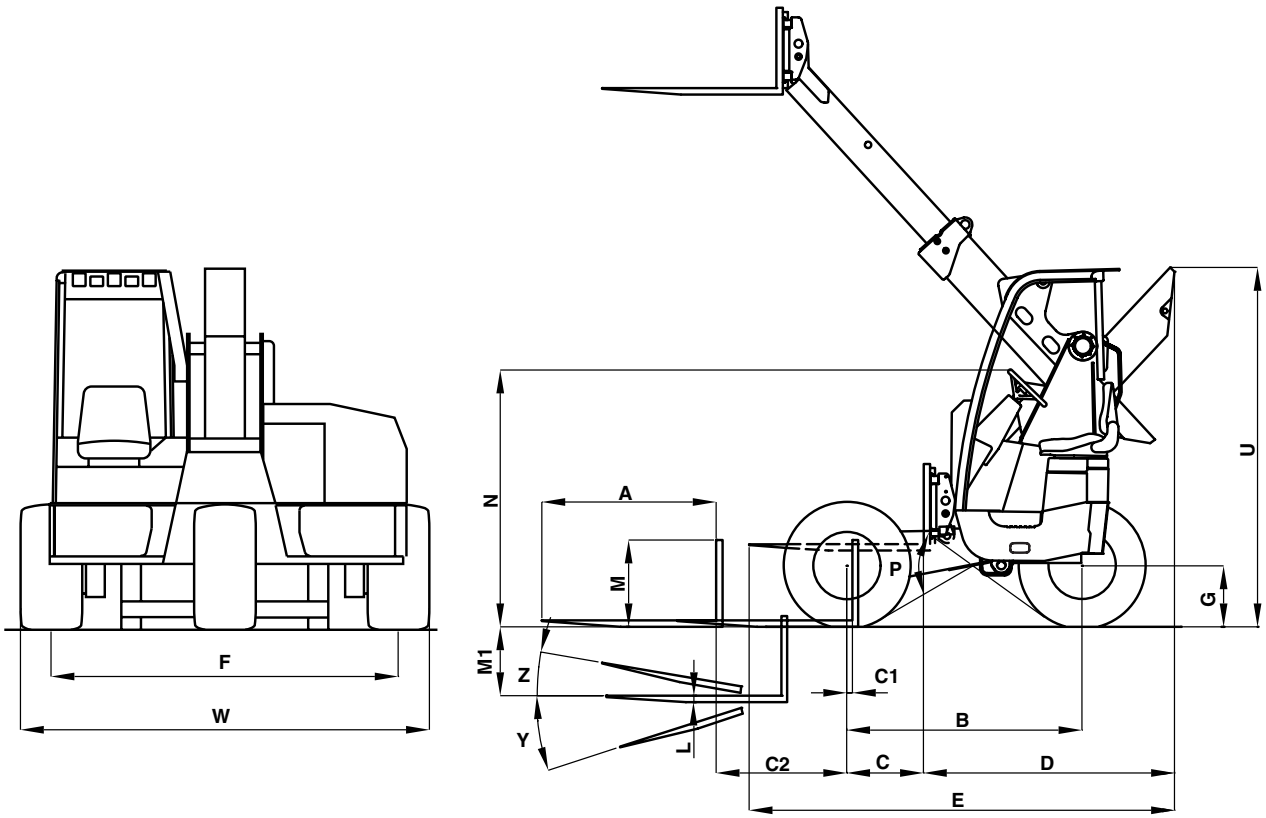


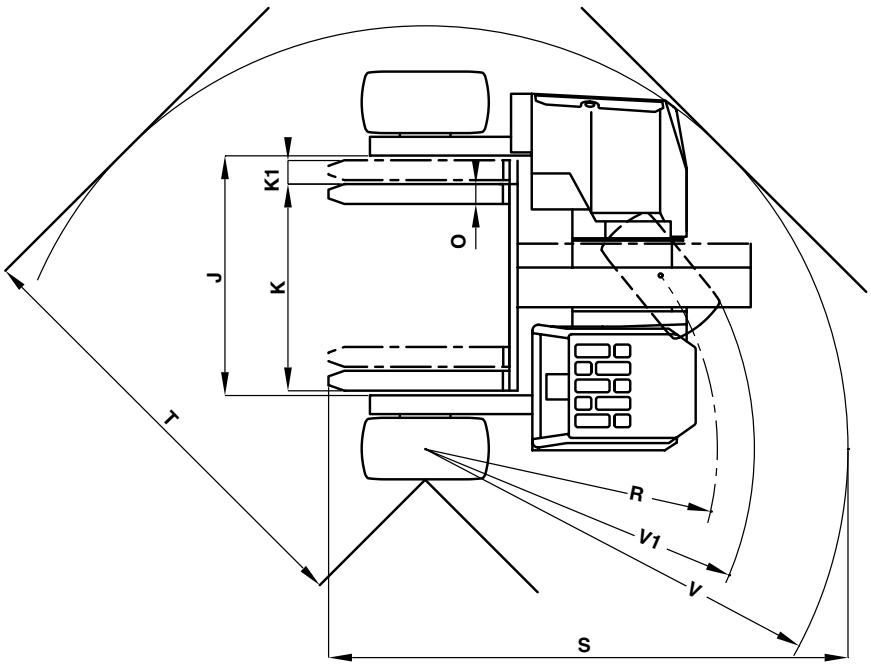


	TMT 320		TMT 320 FL	
A	43.3 in	(1100 mm)	43.3 in	(1100 mm)
B	56.9 in	(1445 mm)	58.3 in	(1481 mm)
C	19.3 in	(491 mm)	19.7 in	(500 mm)
C1	3.31 in	(84 mm)	2.17 in	(55 mm)
C2	14.6 in	(370 mm)	28.2 in	(716 mm)
D	50.4 in	(1279 mm)	62.9 in	(1598 mm)
E	93.7 in	(2379 mm)	106 in	(2698 mm)
E1	95.2 in	(2419 mm)		
F	81.1 in	(2060 mm)	81.5 in	(2070 mm)
G	13.2 in	(336 mm)	13.2 in	(336 mm)
K	51.2 in	(1300 mm)	51.2 in	(1300 mm)
K1	5.91 in	(150 mm)	5.91 in	(150 mm)
K2	59.4 in	(1509 mm)	58.2 in	(1479 mm)
L	1.57 in	(40 mm)	1.57 in	(40 mm)
M	18.1 in	(461 mm)	19.3 in	(491 mm)
M1	7.87 in	(200 mm)	15.2 in	(386 mm)
N	61.9 in	(1571 mm)	62.4 in	(1586 mm)
O	4.92 in	(125 mm)	4.92 in	(125 mm)
P	55°		59°	
R	69.9 in	(1775 mm)	71.1 in	(1807 mm)
S	117 in	(2976 mm)	127 in	(3225 mm)
S1	126 in	(3210 mm)		
T	106 in	(2701 mm)	107 in	(2708 mm)
U	86.6 in	(2200 mm)	87.3 in	(2218 mm)
V	103 in	(2611 mm)	03 in	(2616 mm)
V1	75.6 in	(1919 mm)	76.9 in	(1952 mm)
W	91.3 in	(2320 mm)	91.7 in	(2330 mm)
Y	97°		97°	
Z	10°		10°	

DIMENSIONS AND LOAD CHART

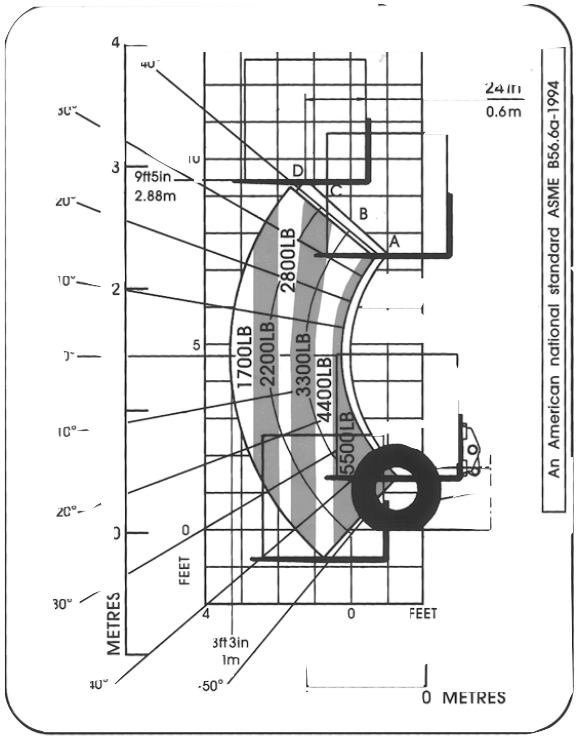
TMT 320 FL HT / TMT 320 FL Turbo HT



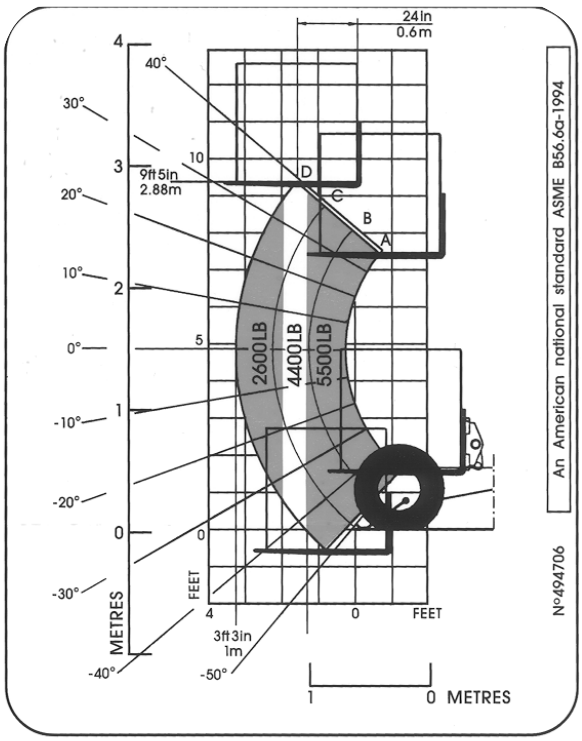


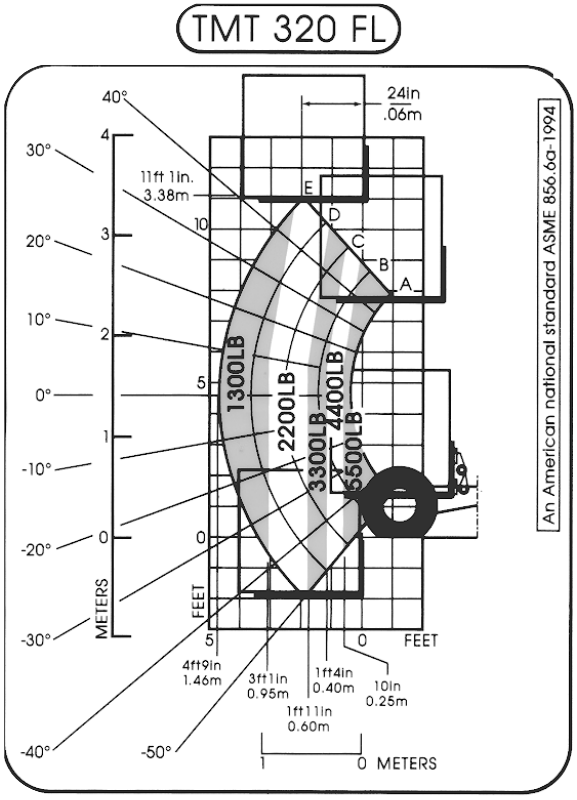
	TMT 320 FL HT / TMT 320 FL Turbo HT
A	3.3 in (1100 mm)
B	58.3 in (1481 mm)
C	19.7 in (500 mm)
C1	1.57 in (40 mm)
C2	27.7 in (703 mm)
D	62.9 in (1598 mm)
E	106 in (2698 mm)
F	84.6 in (2149 mm)
G	13.9 in (353 mm)
K	51.2 in (1300 mm)
K1	5.91 in (150 mm)
L	1.57 in (40 mm)
M	20 in (508 mm)
M1	14.5 in (369 mm)
N	63.1 in (1603 mm)
O	4.92 in (125 mm)
P	65°
R	75.6 in (1920 mm)
S	133 in (3379 mm)
T	110 in (2806 mm)
U	88.0 in (2235 mm)
V	109 in (2770 mm)
V1	84.3 in (2140 mm)
W	100 in (2543 mm)
Y	97°
Z	10°

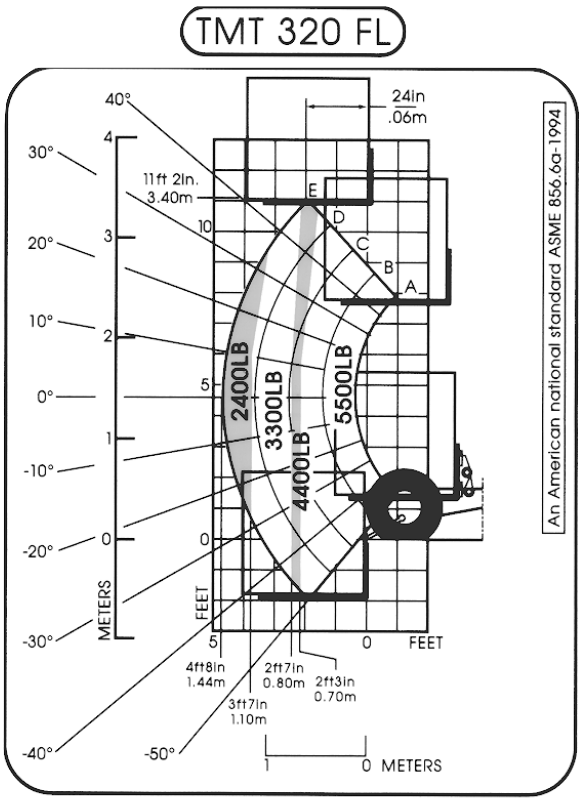
TMT 320



TMT 320

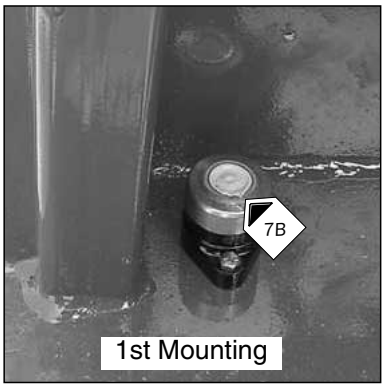


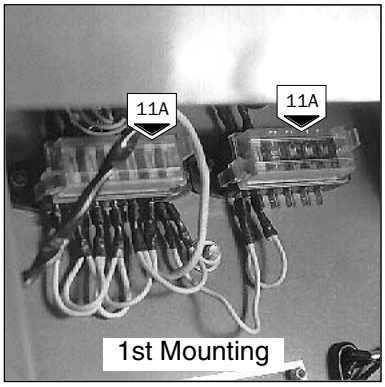

TMT 320 FL
24in
.06m
11ft 1in.
3.38m
1300LB
2200LB
3300LB
4400LB
5500LB
An American national standard ASME 856.6a-1994
METERS
FEET
4ft9in
1.46m
3ft1in
0.95m
1ft4in
0.40m
10in
0.25m
1ft11in
0.60m
1 0 METERS
5 0 FEET

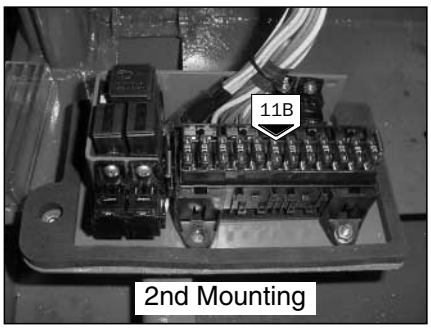

TMT 320 FL
24in
.06m
11ft 2in.
3.40m
2400LB
3300LB
4400LB
5500LB
An American national standard ASME 856.6a-1994
METERS
FEET
4ft8in
1.44m
2ft7in
0.80m
2ft3in
0.70m
3ft7in
1.10m
1 0 METERS
5 0 FEET

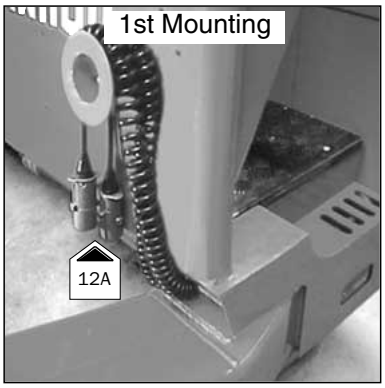
495922

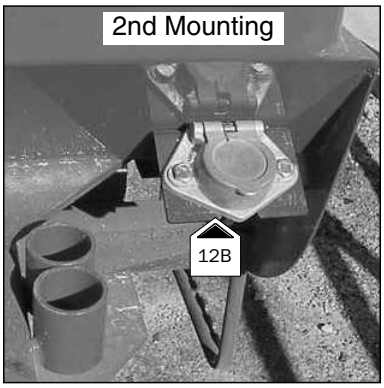
INSTRUMENTS AND CONTROLS

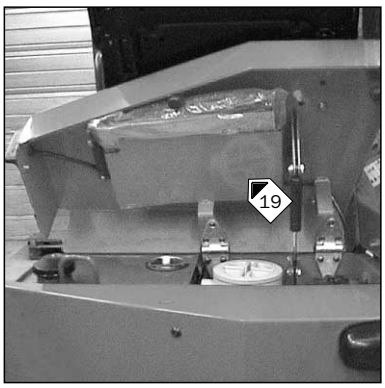












DESCRIPTION

1 - DRIVER'S SEAT

2 - SAFETY BELT

3 - SIGNAL LAMP PANEL

4 - FUEL LEVEL GAUGE AND HOURMETER

5 - N/A

6 - SWITCH PANEL

7A - FLOW DIVIDER SWITCH (S/N: 750269 & ABOVE)

7B - FLOW DIVIDER SWITCH (S/N: 750268 & BELOW)

8 - N/A

9 - IGNITION SWITCH

10 - SOUND ALARM SWITCH (HORN)

11A - FUSES (S/N: 750268 & BELOW)

11B - FUSES (S/N: 750269 & ABOVE)

12A - SOCKETS FOR TRUCK TRAILER (1ST MOUNTING)

12B - SOCKET FOR TRUCK TRAILER (2ND MOUNTING)

13 - OPENING LEVER : ACCESS TO TANKS

14 - ACCELERATOR PEDAL

15 - INCHING PEDAL

16 - FORWARD/REVERSE LEVER

17 - HYDRAULIC CONTROL DISTRIBUTOR LEVERS

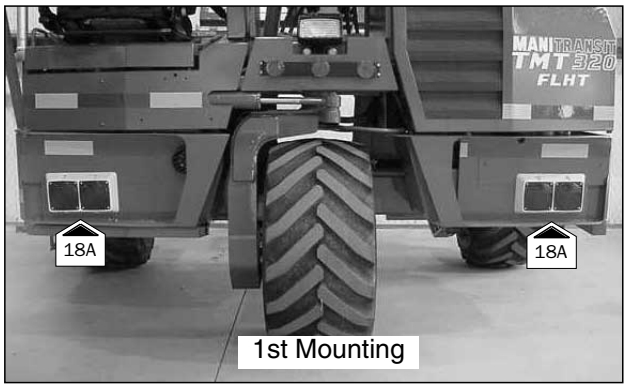
18A - REAR LIGHTS AND INDICATORS (S/N: 750268 & BELOW)

18B - REAR LIGHTS AND INDICATORS (S/N: 750269 & ABOVE)

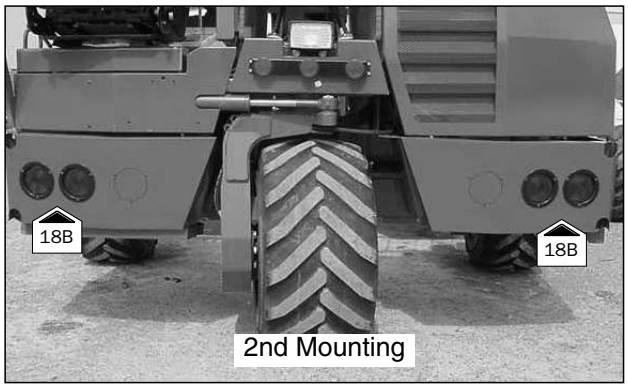
19 - DOCUMENT HOLDER

20 - LOAD CHART FILE

NOTE: Terms such as RIGHT, LEFT, FRONT, REAR are reference points as observed by the driver seated normally, facing forward.

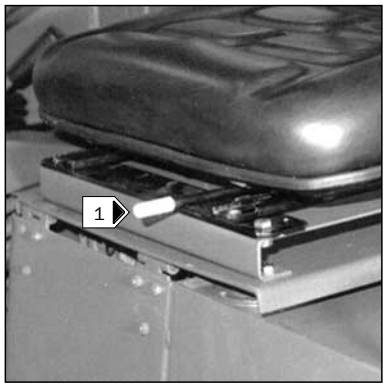


1st Mounting



2nd Mounting

1 - DRIVER'S SEAT



DESIGNED FOR MAXIMUM COMFORT, THIS SEAT CAN BE ADJUSTED AS FOLLOWS:

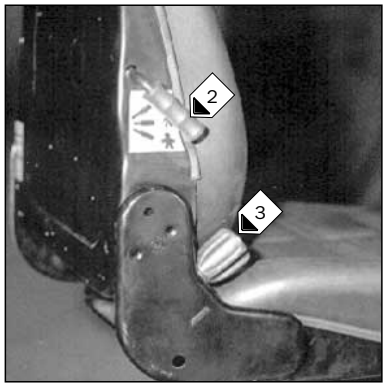
LONGITUDINAL ADJUSTMENT

- Pull locking lever 1 towards the right.

- Slide the seat to the required position.

- Release the lever and insure it returns to the locked position.

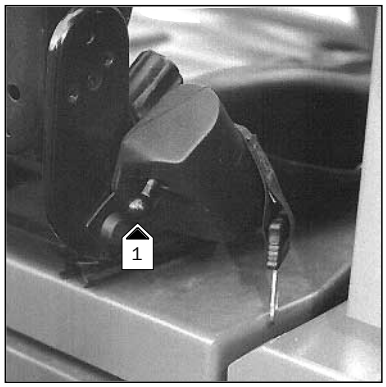
SEAT SUSPENSION ADJUSTMENT



- Position lever 2 according to the driver's weight
Position A: light weight driver.
Position B: middle weight driver.
Position C: heavy weight driver.

ADJUSTMENT OF THE BACK-REST ANGLE
- Rotate lever 3 to incline the back-rest into the required position between 5° and -20°.

2 - SAFETY BELT

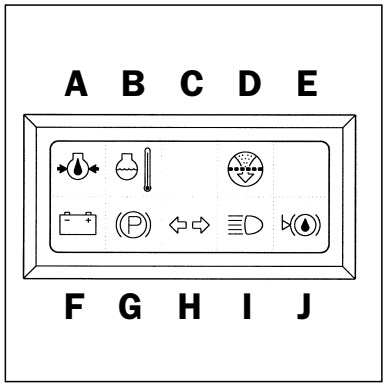


- Operate lever 1 to wind or unwind the safety belt.

3 - SIGNAL LAMP PANEL

- When activating the ignition on the lift truck, all the panel lamps must light to indicate their good working order. If one of the panel lamps is not working, carry out the necessary repairs.

A - Red engine oil pressure lamp.
B - Red water temperature lamp.
C - Red hydrostatic transmission oil filter clog lamp.
D - Red air filter clog lamp.
E - not used.
F - Red alternator charge lamp.
G - not used
H - not used
I - not used
J - Red preheating lamp.



A - RED ENGINE OIL PRESSURE LAMP
If the lamp or the buzzer come on while the lift truck is running, stop the engine immediately and determine the cause (See oil level in engine crankcase).

B - RED WATER TEMPERATURE LAMP
If the warning lamp lights while operating the lift truck, stop the engine immediately and allow it to cool. Check the cooling system for leaks.

C - RED HYDROSTATIC TRANSMISSION OIL FILTER CLOG LAMP
The warning lamp lights when the oil filter cartridge is clogged or damaged. Stop the lift truck and carry out the necessary repairs (See cleaning and changing schedules in: Filters, cartridges and belts).

Note: This lamp may light in cold weather when starting the truck; it will go out when the hydraulic oil reaches its working temperature.

D - RED AIR FILTER CLOG LAMP
The warning lamp lights when the air filter cartridge is clogged. Stop the lift truck and carry out the necessary repairs (See cleaning and changing schedules in: Filters, cartridges and belts)

F - RED ALTERNATOR CHARGE LAMP
If the warning lamp lights while operating the lift truck, immediately stop the engine and check the electrical circuit as well as the alternator belt.

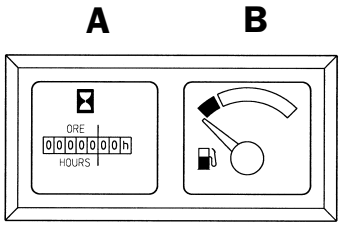
J - RED PREHEATING LAMP
The warning lamp lights when the operator turns the ignition key in preheating position and goes out when the operator turns the key in engine starting position.

4 - FUEL LEVEL GAUGE AND HOURMETER

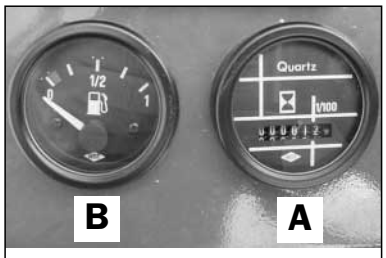
1st Mounting S/N: 750268 & below.
2nd Mounting S/N: 750269 & above.

A - HOURMETER
It shows the number of hours the lift truck has run. Use the hourmeter to schedule routine maintenance.

B - FUEL LEVEL GAUGE
Shows approximate level of fuel in the fuel tank. To reduce condensation in the fuel tank, keep the fuel level near full.



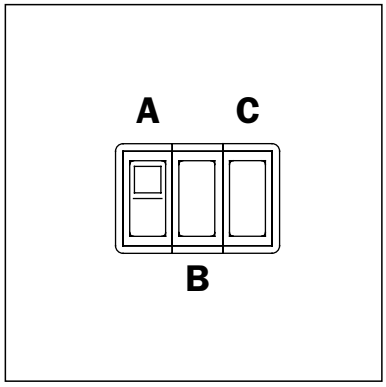
1st Mounting



2nd Mounting

5 - N/A

6 - SWITCH PANEL



A - Parking brake switch.
B - Front white work lights.
C - OPTION.

A - PARKING BRAKE SWITCH
This switch engages the parking brake. The lighted switch indicates the park brake is on.

B - FRONT WHITE WORK LIGHTS
Operates with the ignition switch turned on. The lighted switch indicates the work lights are on.

7 - Flow divider switch

This switch locks all 3 wheels into drive, causing all 3 wheels to rotate at the same time and speed (for temporary use in loose or muddy terrain).
NOTE: This operation limits steering the forklift, and is best utilized with the steer tire directed straight ahead before engaging the switch and during use.
- Press and hold the switch as required.
- Release the switch to resume normal operation.

8 - N/A

9 - Ignition switch

The key switch has five positions :

P - Ignition off, parking position.
O - Ignition switched off and engine stopped.
I - Ignition on.
II - Heating.
III - The engine starts, return to position I as soon as the key is released.

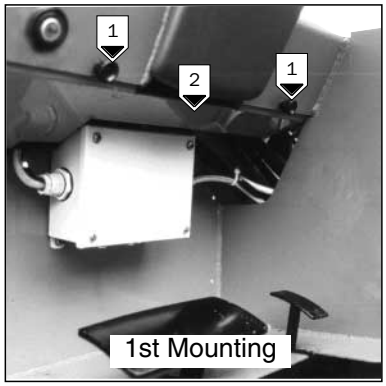
10 - Sound alarm switch (horn)

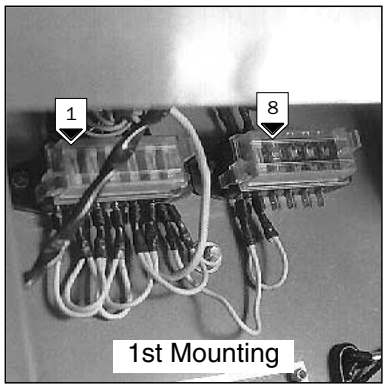
11A - FUSES (1ST MOUNTING)

Loosen both knobs 1 and remove the fuse box access cover 2.
Remove the plastic covers to gain access to the fuses, the functions of the fuses are as follows.

1 - Fuel level gauge + hourmeter.
2 - Load status indicator device.
3 - Sound alarm.
4 - Signal light panel.
5 - Brake solenoid valve block assembly.
6 - Gear reverser + reverse gear horn + reverse light.
7 - Flow divider.
8 - Working headlight (OPTION).

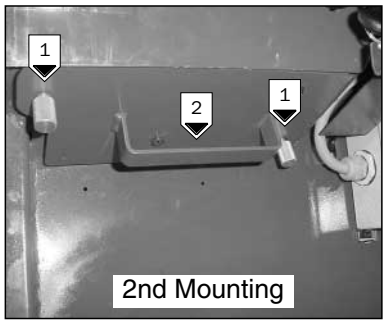
NOTE: Replace fuses with those of the same quality and capacity. Never reuse a repaired fuse.

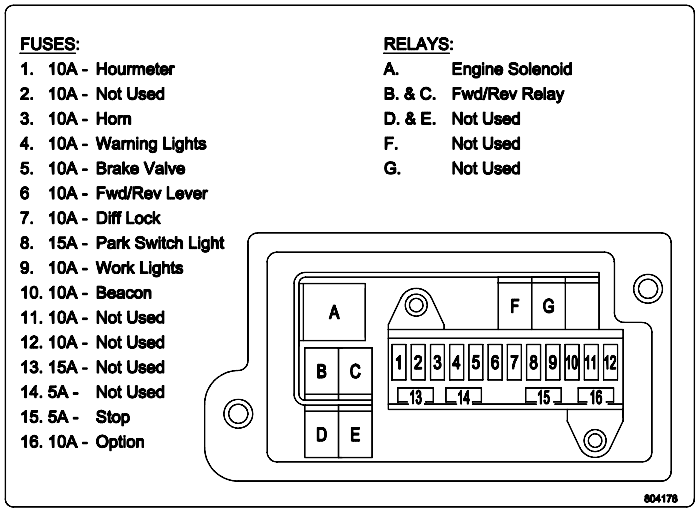


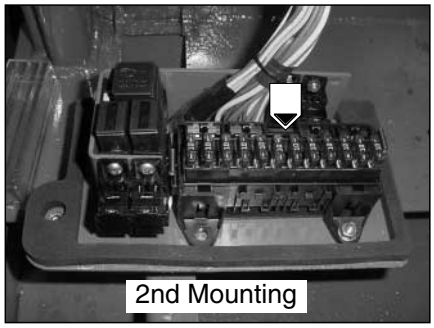


11B - FUSES (2ND MOUNTING)

Loosen both knobs 1, and lower the fuse box 2.
Remove the plastic cover to access the fuses, the functions of the fuses are as follows.







12A - SOCKETS FOR TRUCK TRAILER (1ST MOUNTING)

These sockets connect to the tractor trailer during transport, supplying rear lighting.

12B - SOCKETS FOR TRUCK TRAILER (2ND MOUNTING)

This single socket connects the trailer lights to the forklift for proper rear lighting during transport.

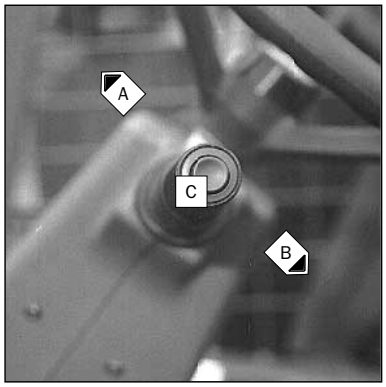
13 - OPENING LEVER: ACCESS TO TANKS

14 - ACCELERATOR PEDAL

15 - INCHING PEDAL

- Progressively cuts the hydrostatic transmission, enabling a slow approach with full engine power.

16 - FORWARD/REVERSE LEVER

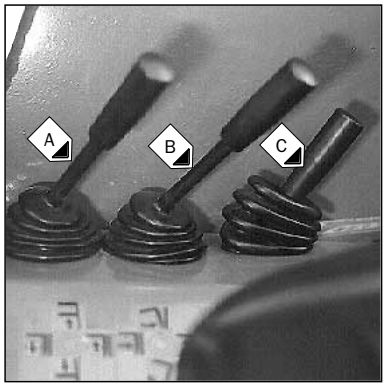


When operating this control, the truck should be travelling at very low speed and not accelerating.

FORWARD: Lift then push the lever forward (Position A).
REVERSE: Lift then pull the lever backward (Position B).
NEUTRAL: To start the truck, the lever must be in neutral (Position C).

NOTE: When in reverse gear the backup alarm must sound, indicating the lift truck is in reverse. Also, the backup light is illuminated.

17 - HYDRAULIC CONTROL DISTRIBUTOR LEVERS



LEVER A: Controls lifting the load and telescoping the boom.
- The lever backwards when lifting.
- The lever forwards when lowering.
- The lever to the left for retracting.
- The lever to the right for extending.

LEVER B: Controls the tilt of the carriage and side shifting the boom.
- The lever backwards when reverse tilt.
- The lever forwards when forward tilt.
- The lever to the left for side shifting to the left.
- The lever to the right for side shifting to the right.

LEVER C: controls the stabilizers
- The lever backwards when rising.
- The lever forwards when lowering.

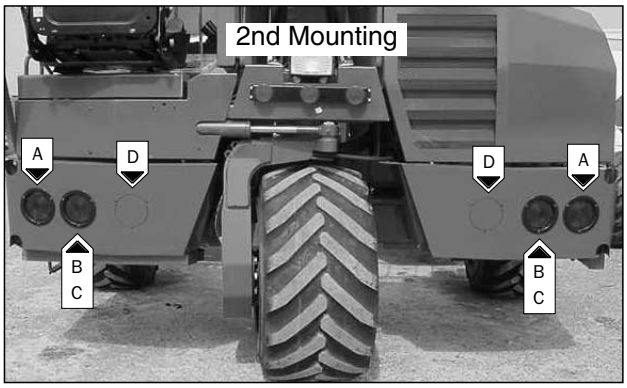
CAUTION	*Do not attempt to alter the hydraulic system pressure by interfering with the pressure regulating valve. In the event of suspected malfunction, contact your dealer.*

ANY ALTERATION MAY VOID THE WARRANTY.

18 - REAR LIGHTS AND INDICATORS

These lights function only while in the transport position, attached to the tractor trailer lights.

A - Turn indicators.
B - Brakelights.
C - Tail or running lights.
D - Rear fog lamps (optional).



19 - DOCUMENT HOLDER

Store the Operator's Manual in the document holder under the driver's seat.

20 - LOAD CHART FILE

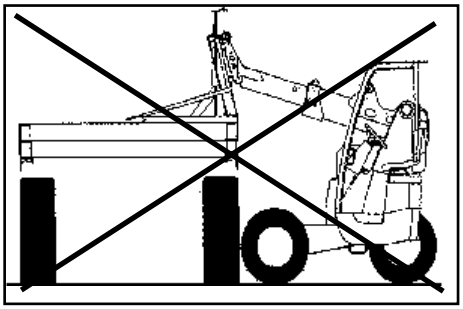
TURBO MODELS:
This file includes the load chart for the Turbo Model Lift Truck and its attachments.

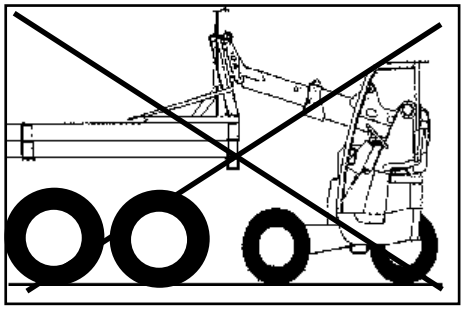
ALL MODELS EXCEPT TURBO:
The load chart decal(s) for all models except the Turbo Model Lift Truck are found immediately to the right of the driver at eye level.

MOUNTING THE LIFT TRUCK ON THE TRACTOR TRAILER

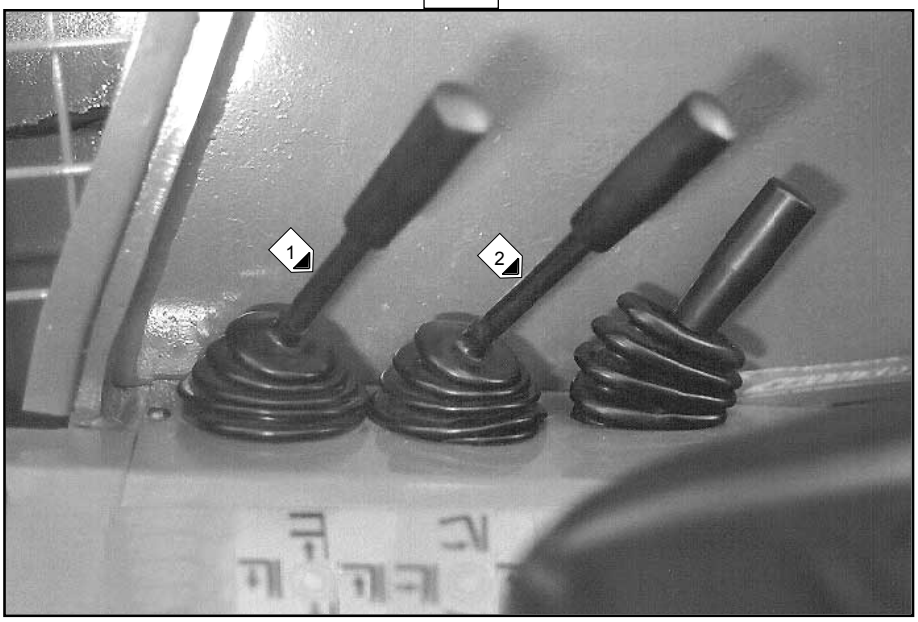
DANGER

Never mount the TMT Lift Truck to the trailer as shown below! Use only the Mounting Kit as approved by Manitou North America, Inc.. The approved kit mounts the lift truck below the trailer bed at the rear of the trailer. Mounting the forklift higher than recommeded *may result in damage to the lift truck, serious injury or death!*





A1/1



- Location of the control levers:

- Lever N° 1 - Controls lifting the load and telescoping the boom.

- Lever N° 2 - Controls tilting the carriage and side shifting the boom.

1 - LOADING THE LIFT TRUCK ONTO THE TRAILER

WARNING

The mounting kit for the TMT must be supplied or approved in writting by Manitou North America, Inc.

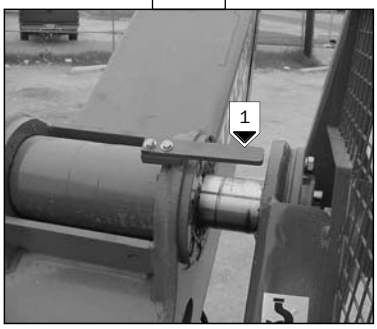
WARNING

Ensure the tractor/trailer is properly parked and secured, utilizing wheel chocks as required.

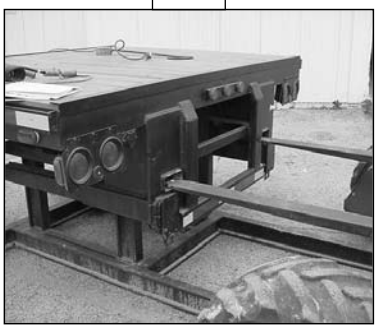
TO LOAD THE MANITOU TMT ONTO THE TRAILER:

1) Learn the controls. Execute all movements slowly. All forklift movements are to be made by the operator positioned in the operator's seat, with the seat belt fastened. Take extra precaution when entering and exiting the cab while it is in the raised position.
2) Fully retract the boom, Lever 1 left.
3) Side shift the boom until centered, move Lever 2 to the right or left to align the centering bar (1) as shown (fig. 1A).
4) Align the forks to the trailer sleeves (fig. 1B), insure the forks are equally spaced from the center of the carriage.
5) Maneuver the forks into the sleeves, make adjustments as required, insure both forks are fully inserted and flush with the trailer bed (fig. 1C).
6) Tilt the carriage back slightly, until the forks are tight in the sleeves, Lever 2 back.
7) Raise the forklift off the ground, Lever 1 forward, the full distance of travel.
8) Tilt the lift truck fully forward, Lever 2 back.
9) Extend the boom - 5" max., Lever 1 to the right. Carefully exit the cab.
10) With the support hook, fully extend both support arms (fig. 1D).
11) Retract the boom, Lever 1 to the left. Insure the lift truck is properly positioned above the support arms.
12) To set the forklift on the support arms, tilt the lift truck back, Lever 2 forward.
13) Make sure the support arms are locked in place (fig. 1E).
14) Connect the electrical cable and straps (fig. 1F & 1G).

1A



1B



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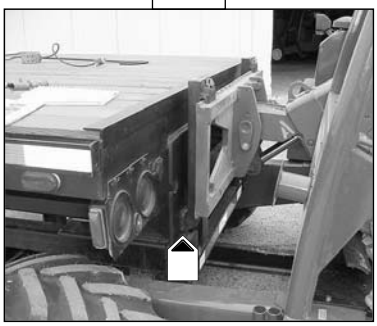
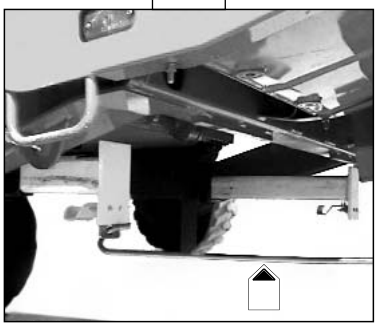
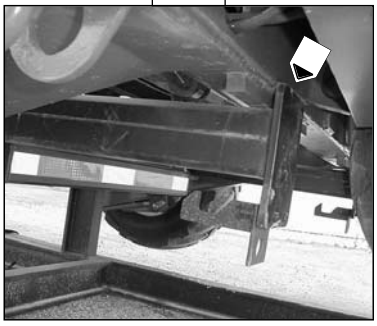


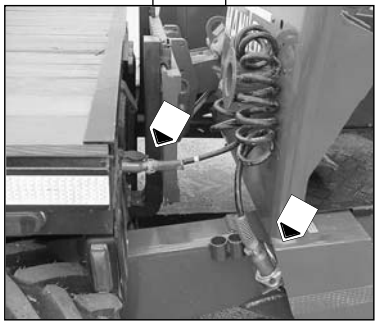
1D



1E



1F



1G

2 - UNLOADING THE LIFT TRUCK FROM THE TRAILER

WARNING

Ensure the tractor/trailer is properly parked and secured, utilizing wheel chocks as required.

TO UNLOAD THE MANITOU TMT:

1) Learn the controls. Execute all movements slowly. All forklift movements are to be made by the operator positioned in the operator's seat, with the seat belt fastened. Take extra precaution when entering and exiting the cab while it is in the raised position.

2) Disconnect trailer/lift truck electrical cable and tie-down straps.

3) Raise the lift truck, Lever 2 back, the full distance of travel.

4) Extend the boom 5" max., push Lever 1 to the right.

5) Carefully exit the cab. With the support hook, push the support bars back, insure they are locked in place.

6) Retract the boom, push Lever 1 to the left.

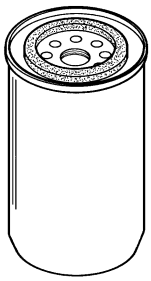
6) Slightly lower the forklift, Lever 1 back, until the front wheels touch the ground.

7) Tilt the forklift back, Lever 2 forward, until the rear wheel is on the ground.

8) Slowly back the forklift away from the trailer, adjust fork angle as needed.

3 - MAINTENANCE

FILTERS CARTRIDGES AND BELTS



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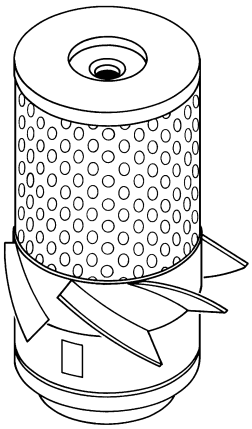

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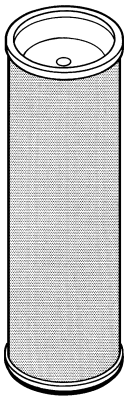

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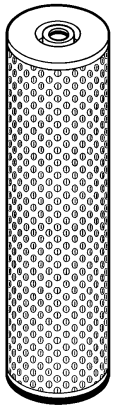

5

1er MONTAGE
1ste MONTAGE
1ro MONTAJE
1st MOUNTING

6

2ème MONTAGE
2te MONTAGE
2do MONTAJE
2nd MOUNTING

7

1er MONTAGE
1ste MONTAGE
1ro MONTAJE
1st MOUNTING

2ème MONTAGE
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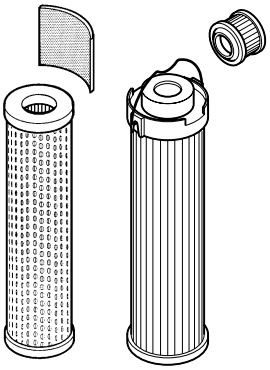
2nd MOUNTING



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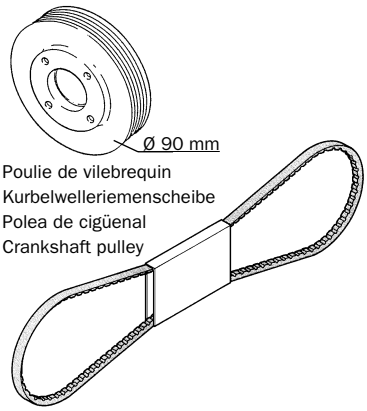

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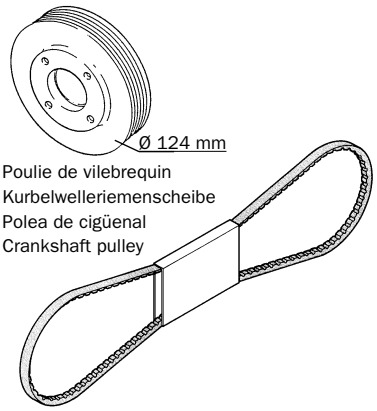
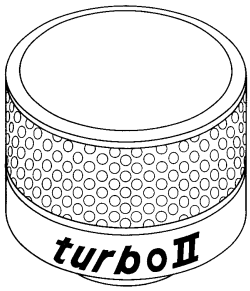


11

OPTION



12

DESIGNATION		PART NUMBER	CLEAN	CHANGE
1 - Engine oil filter	- (Standard)	549798		400 H
	- (TMT 320 FL Turbo HT)	600 759		200 H
2 - Dry air filter cartridge		551 017	50 H	400 H
3 - Safety dry air filter cartridge		551 018		800 H
4 - Suction strainer for hydraulic oil tank		19 911	800 H	
5 - Hydrostatic transmission oil filter cartridge		46 028		800 H
6 - Fuel filter cartridge		549 797		400 H
7 - Fuel filter cartridge		561 370		400 H
8 - Hydraulic return oil filter cartridge + oil container breather		203 787		400 H
9 - Hydraulic return oil filter cartridge + oil container breather		217 031		400 H
10 - Alternator belt / Fan / Crankshaft		549 800		1600 H
11 - Alternator belt / Fan / Crankshaft		552 500		1600 H
12 - Automatic vacuum-cleaning pre-filter		160 945		

LUBRICANTS

COMPONENT	CAPACITY	RECOMMENDATION	PACKAGING	REFERENCE
ENGINE, except Turbo ENGINE, Turbo	5,6 Litres (1.5 gal) 6,5 Litres (1.7 gal)	Shell: Rotella 15w40 Texaco: URSA Super +15w40		
HYDRAULIC OIL TANK	35 Litres (9.2 gal)	Shell: Tellus T46 Texaco: Rando HDZ46 Shell: Tellus T32 (-2°F to +124°F)	25 gal	803373
GENERAL GREASING		Shell: Rentinax Am Texaco: Havoline WBCG		
BOOM PADS		Shell: Rentinax Am Texaco: Havoline WBCG		
GREASING OF THE BOOM		Shell: Rentinax Am Texaco: Havoline WBCG		
GREASING OF THE STABILIZERS		Shell: Rentinax Am Texaco: Havoline WBCG		
COOLING CIRCUIT	8 Litres (2.1 gal)	Texaco Texguard Anti-Freeze 45/55 Pre-mix (-22°F)		
FUEL TANK	40 Litres	(10.5 gal) Diesel fuel - Grade 1-D		

DIAGNOSTIC ANALYSIS OF OIL

In the event of a maintenance or service contract with the dealer, you may be requested a diagnostic analysis of engine, transmission and axle oils, according to the utilization rate.

SERVICING SCHEDULE

AFTER THE FIRST 50 WORKING HOURS SERVICE

A - EVERY DAY OR EVERY 10 WORKING HOURS SERVICE

GREASING OF THE BOOM

B - EVERY 50 WORKING HOURS SERVICE

GENERAL GREASING

LUBRIFICATION OF THE STABILIZERS
(TMT 320 - TMT 320 FL - TMT 320 FL HT - TMT 320 FL Turbo HT)

C - EVERY 200 WORKING HOURS SERVICE

D - EVERY 400 WORKING HOURS SERVICE

To be carried out once a year if the lift truck has not reached the 400 hours service in the year.

E - EVERY 800 WORKING HOURS SERVICE

To be carried out once a year if the lift truck has not reached the 800 hours service in the year.

F - EVERY 1600 WORKING HOURS SERVICE

G - EVERY 2400 WORKING HOURS SERVICE

H - EVERY 4800 WORKING HOURS SERVICE

I - OCCASIONAL MAINTENANCE

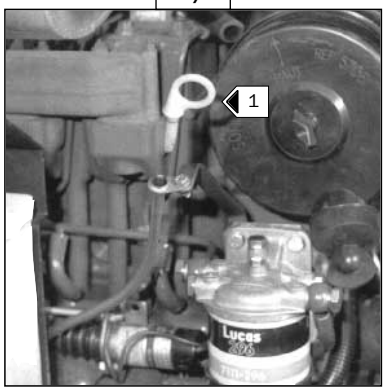
A - EVERY DAY OR EVERY 10 WORKING HOURS SERVICE

A1 - CHECK THE ENGINE OIL LEVEL

Park the truck on level ground with the engine stopped, allowing the oil to settle.

- Open the engine compartment.
- Remove the dipstick 1 (Fig. A1/1).
- Clean the dipstick and check that the oil level is between the notches.
- If necessary, add oil (See: LUBRICANTS) by the filler port 2 (Fig. A1/2).

A1/1

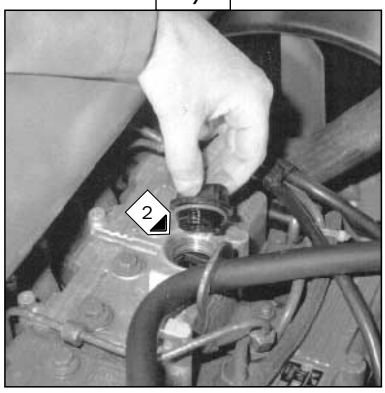


A2 - CHECK THE COOLING LIQUID LEVEL

Park the truck on level ground with the engine stopped, allow the engine to cool.

- Open the engine compartment.
- Slowly turn the radiator cap 1 (Fig. A2) counterclockwise up to the safety stop.
- Allow any pressure or steam to escape.
- Press down and turn the cap to remove it.
- If necessary, add cooling liquid up to 1/2 in. below the filler port 2 (Fig. A2).
- Slightly lubricate the filler neck to ease the removal of the radiator cap.

A1/2



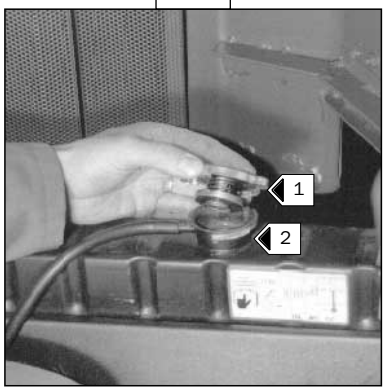
IMPORTANT	*If the cooling liquid is hot, add only hot cooling liquid.*

A3 - CHECK THE FUEL LEVEL

Keep the fuel tank near full to reduce condensation in the tank due to atmospheric conditions.

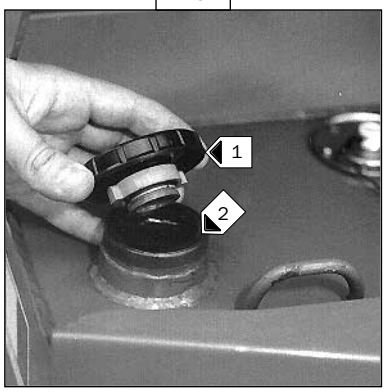
- Open the access compartment/seat support.
- Remove cap 1 (Fig. A3).
- Fill the fuel tank with clean fuel, filtered through a strainer or a clean, lint free cloth, through filler port 2 (Fig. A3).
- Re-install the cap.

A2



WARNING	*Never smoke or approach with a flame during filling operations or when the tank is open. Never refill while engine is running.*

A3



A4 - CHECK THE TIRE PRESSURE AND THE WHEEL NUT TORQUE

- Check and adjust the tire pressure if necessary (See: CHARACTERISTICS SECTION: SPECIFICATIONS).
- Check the condition of the tires: cuts, protrusions, wear, etc.
- Check the torque load on the wheel nuts (Fig. A4).

NOTE: Neglect of proper torque can cause damage and rupture to the wheel bolts, and distortion of the wheels.

A4

WHEEL TORQUE NUTS LOADING	
FRONT WHEEL	12 kg/m (87 ft/lb) to 15 kg/m (108 ft/lb)
REAR WHEEL	12 kg/m (87 ft/lb) to 15 kg/m (108 ft/lb)

GREASING THE BOOM

Clean and lubricate at the following points with grease (See: LUBRICANTS) remove any surplus.

A5 - LUBRICATORS OF BOOM AXLE 1 (FIG. A5) (2 lubricators).

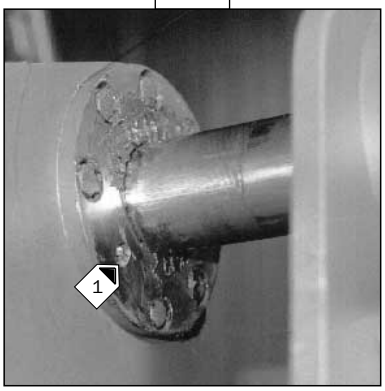
A6 - LUBRICATOR OF CARRIAGE AXLE 2 (FIG. A6) (1 lubricator).

A7 - LUBRICATORS OF LIFTING CYLINDER FOOT AXLE 3 (FIG. A7/1) (1 lubricator) **AND HEAD AXLES 4 (FIG. A7/2)** (1 lubricator).

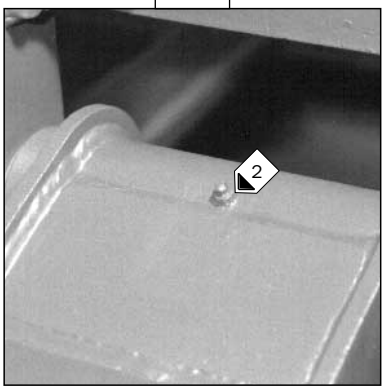
A8 - LUBRICATORS OF COMPENSATION CYLINDER FOOT AXLE 5 (FIG. A8/1) (1 lubricator) **AND HEAD AXLE 6 (FIG. A8/2)** (1 lubricator).

A9 - LUBRICATORS OF TILTING CYLINDER FOOT AXLE 7 (FIG. A9/1) (1 lubricator) **AND HEAD AXLE 8 (FIG. A9/2)** (1 lubricator).

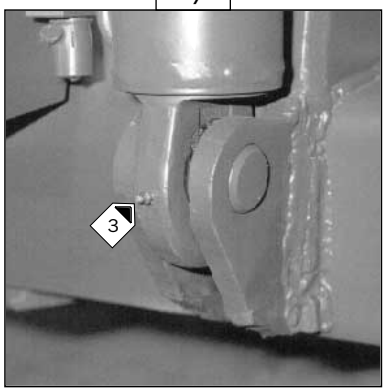
A5



A6



A7/1



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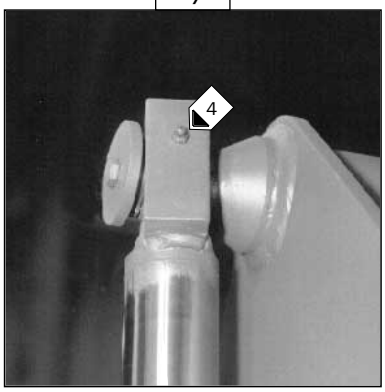
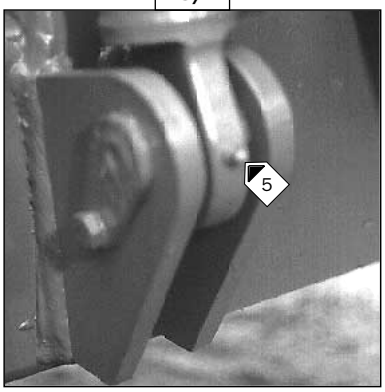


A8/1



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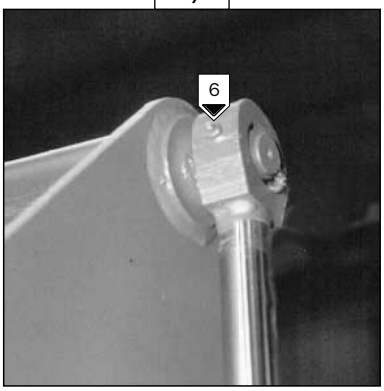
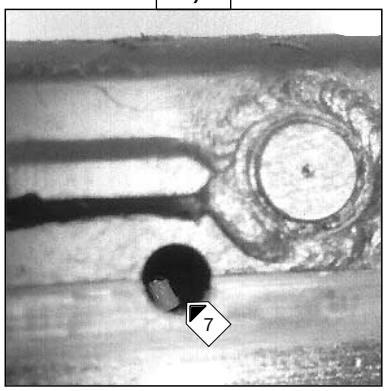
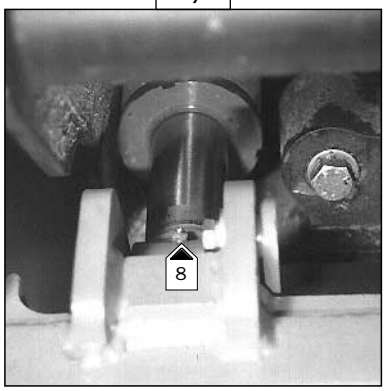


A9/1

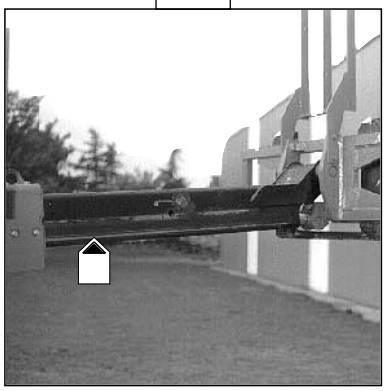


A9/2



A10 - CLEAN AND GREASE THE BOOM PADS

A10



To be carried out every 10 hours during the first 50 hours service, then once every 200 hours.

- Fully extend the telescopic boom.

- With a brush, apply a coat of grease (See: LUBRICANTS) on all 4 sides of the boom (Fig. A10).

- Telescope the boom several times in order to spread the coat of grease evenly.

- Remove any surplus grease.

IMPORTANT	***If the truck is used in an abrasive environment (Dust, sand, coal...) use lubricating varnish (Dry lubrication). Consult your agent or dealer.***

B - EVERY 50 WORKING HOURS SERVICE

B1 - CLEAN THE DRY AIR FILTER CARTRIDGE

Use in a heavy dust atmosphere requires more frequent cleaning, see: FILTERS CARTRIDGES AND BELTS.

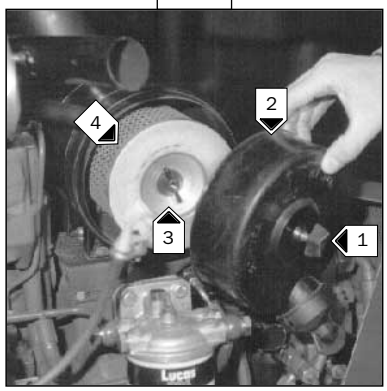
- Open the engine compartment.
- Unscrew nut 1 (Fig. B1), and remove cover 2 (Fig. B1).
- Unscrew nut 3 (Fig. B1), and lift out filter cartridge 4 (Fig. B1).
- Leave the safety cartridge in place.
- Clean the filter cartridge using a low pressure air jet directed from the inside to the outside surface of the cartridge only.

IMPORTANT	***Keep a safe distance between the nozzle and the cartridge to avoid tearing or piercing it.***

- Clean the inside of the casing with a clean, damp lint-free cloth.
- Check the condition of the filter cartridge, replace the cartridge if necessary.
- Refit the cartridge and cover.

IMPORTANT	***Do not clean the dry air filter cartridge by washing it in liquid. Do not clean the safety cartridge located inside the filter cartridge, exchange it for a new one if it is dirty or damaged.***

B1



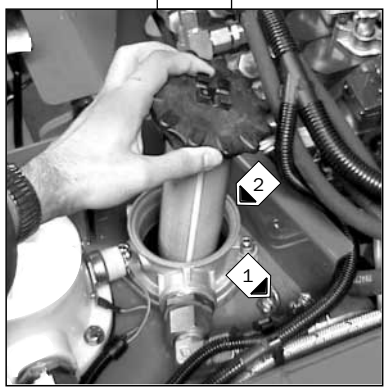
B2 - CHECK THE HYDRAULIC OIL LEVEL

Park the lift truck on level ground with the engine stopped, the boom retracted and lowered as far as possible.

- Open the access compartment, seat support.
- Refer to gauge 1 (Fig. B2).
- The level is correct when it is midway between the upper and lower marks.
- If necessary, add oil (See: LUBRICANTS).
- Add oil by filler port 2 (Fig. B2).

Always maintain the correct oil level, cooling depends on adequate oil flowing through the tank.

B2



B3 - CHECK THE BATTERY ELECTROLYTE LEVEL

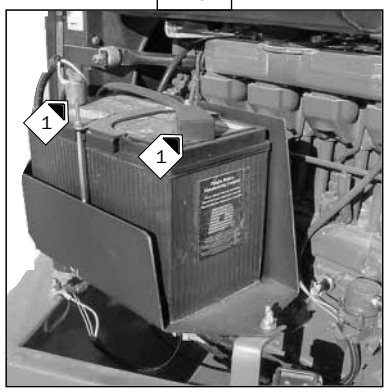
The factory installed battery is maintenance free, requiring no service to the electrolyte.

- Open the engine compartment.
- Check the connections to the battery 1 (Fig. B3), remove any corrosion on the terminals.
- Apply petroleum jelly to prevent corrosion.
- Check the battery mounts and over-all condition of the battery for leaks, cracks, etc..

- If the original battery is replaced with a serviceable battery, follow the manufacturer's instructions for maintenance.

- See CAUTION on the following page -

B3



CAUTION

Handling and servicing a battery can be dangerous, take the following precautions:

- Wear protective goggles.
- Keep the battery horizontal.
- Never smoke or work near an open flame.
- Work in a well-ventilated area.
- In the event of electrolyte being spilled onto the skin or splashed in the eyes, rinse thoroughly with cold water for 15 minutes and call a doctor.

B4

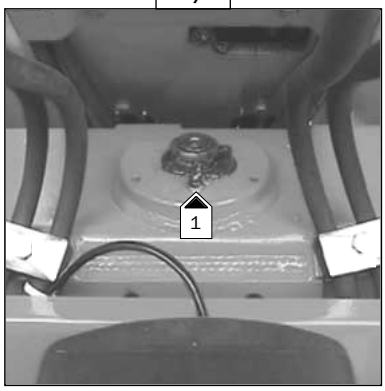
B4 - CLEAN THE RADIATOR CORE

- Open the engine compartment.

Clean the radiator core with compressed air directed from the back to the front of the radiator. Avoid high pressure washing which may damage the radiator.

IMPORTANT	***When handling straw, grains or cereals, clean the radiator core every day.***

B5/1



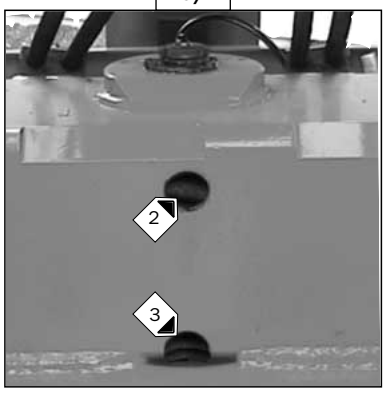
GENERAL GREASING

Clean and lubricate the following points with grease (See: LUBRICANTS), remove any surplus.

B5 - LUBRICATORS OF THE REAR WHEEL PIVOT (3 lubricators).

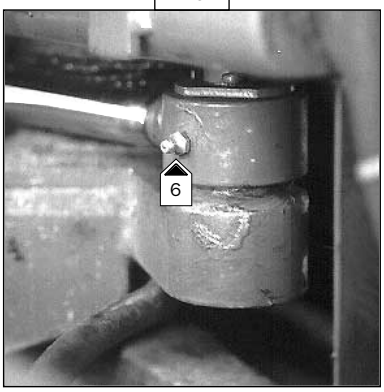
- **TMT 320**
  - **LUBRICATOR 1** (Fig. B5/1)
  - **LUBRICATORS 2 ET 3** (Fig. B5/2)
- **TMT 320 FL / TMT 320 FL HT**
  TMT 320 FL Turbo HT
  - **LUBRICATOR 1** (Fig. B5/1)
  - **LUBRICATOR 4** (Fig. B5/3)
  - **LUBRICATOR 5** (Fig. B5/4)

B5/2

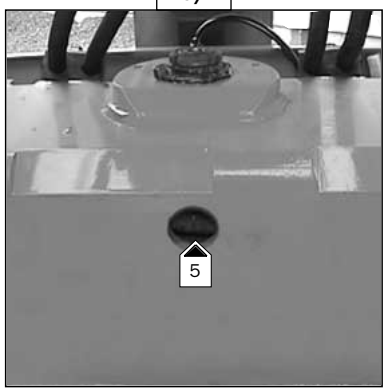


B6 - LUBRICATOR 6 OF THE HEAD AXLE OF THE STEERING CYLINDER (FIG. B6) (1 lubricator)

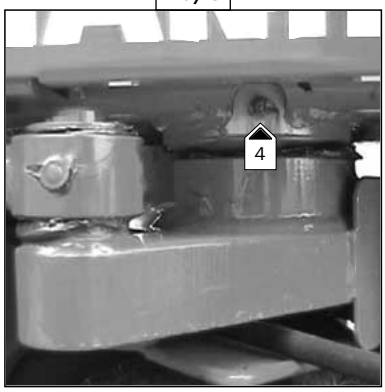
B6



B5/4



B5/3

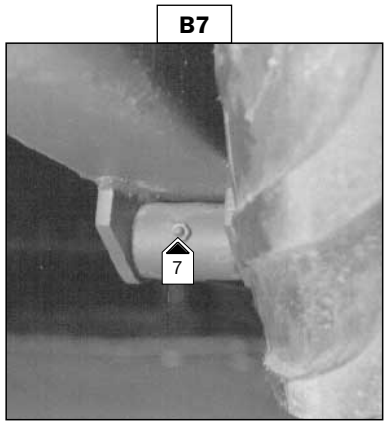


GREASING OF THE STABILIZERS

(TMT 320 - TMT 320 FL
TMT 320 FL HT - TMT 320 FL TURBO HT)

Clean and lubricate the following points with grease (See: LUBRICANTS), remove any surplus.

B7 - LUBRICATORS OF STABILIZER AXLES 7 (FIG. B7)
(2 lubricators).



C - EVERY 200 WORKING HOURS SERVICE

C1 - DRAIN AND CHANGE THE ENGINE OIL

C2 - CHANGE THE ENGINE OIL FILTER

Park the truck on level ground, run the engine at idle for a few minutes to warm the oil, then stop the engine.

DRAINING THE OIL

- Open the engine compartment.
- Place a container under drain plug 1 (Fig. C1/1) and unscrew the plug.
- Remove drain hose 2 (Fig. C1/2).
- Insure the drain end of the hose is in the drain pan; oil will drain the moment the drain hose is attached to the coupling on the draining port 3 (Fig. C1/3).
- Remove filler cap 4 (Fig. C1/4) to ensure that the oil is drained properly.

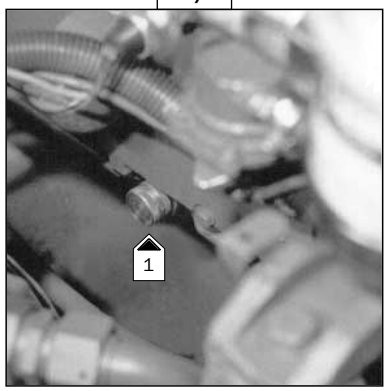
IMPORTANT	*Dispose of the drain oil in an ecological manner.*

REPLACEMENT OF THE FILTER

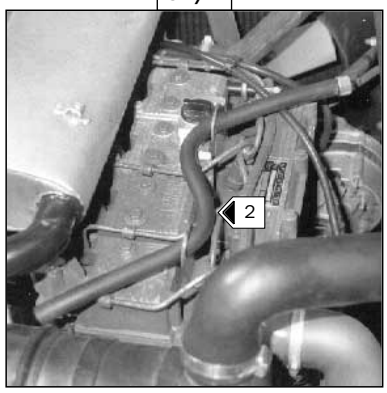
- Loosen 1 (Fig. C2/1) and rotate the battery housing for clearance.
- Clean the filter bracket with a clean, lint-free cloth.
- Remove engine oil filter 2 (Fig. C2/2); discard the filter and filter seal.
- Lightly lubricate the new seal.
- Install the new oil filter and seal.
- Return the battery housing to its initial position.

IMPORTANT	*Tighten the oil filter by hand pressure only and lock the filter in place by a quarter turn.*

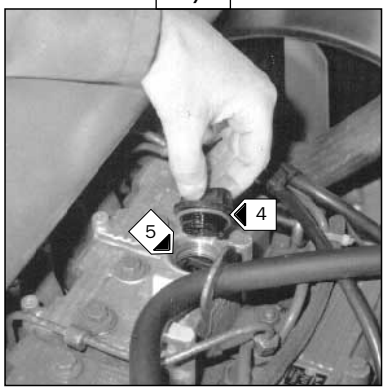
C1/1



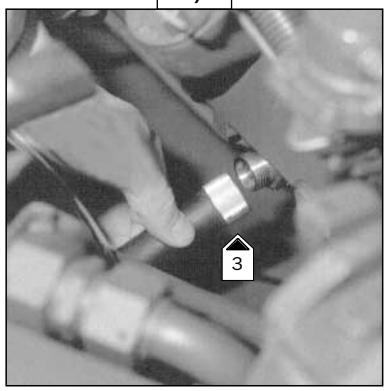
C1/2



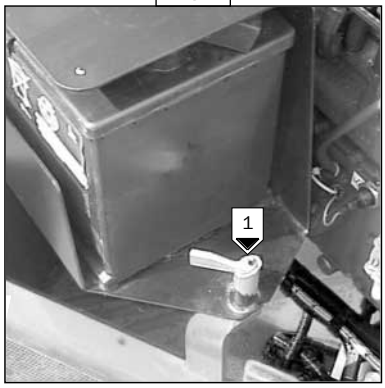
C1/4



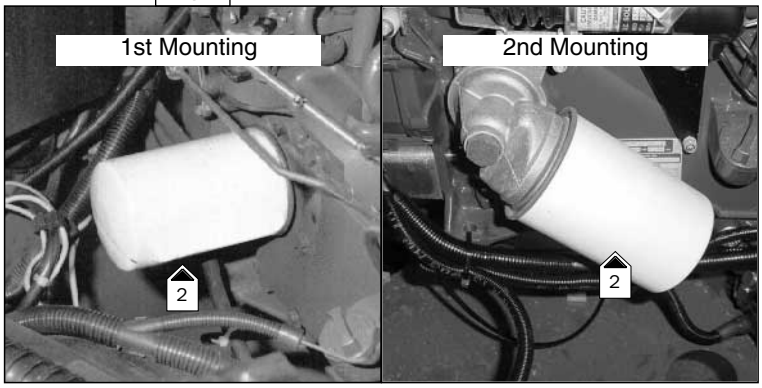
C1/3



C2/1



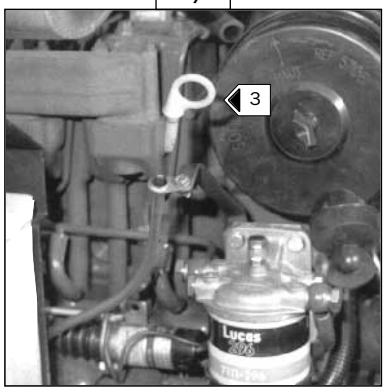
C2/2



FILLING UP THE OIL

- Loosen, clean and return the drain hose 2 (Fig. C1/2).
- Reinstall and tighten drain plug 1 (Fig. C1/1).
- Fill up with oil (See: LUBRICANTS) by filler port 5 (Fig. C1/4)
- Allow the oil to settle.
- Start the engine and let it run for a few minutes.
- Check for leaks at the drain plug and oil filter.
- Stop the engine, allow the oil to settle, then check the oil level. It should be between the notches on the dipstick 3 (Fig. C2/3).
- Adjust the oil level if necessary.

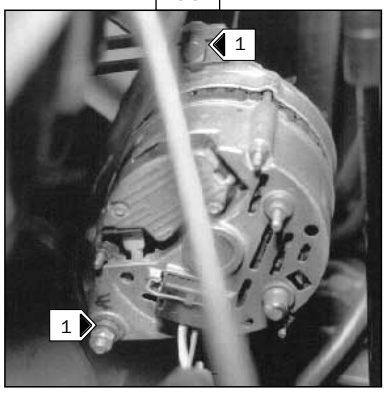
C2/3



C3 - CHECK AND ADJUST THE TENSION OF THE BELT ALTERNATOR / FAN / CRANKSHAFT

- Open the engine compartment.
- Check the belt for wear and cracks, change it if necessary.
- Check the belt tension between the pulleys of the crankshaft and alternator.
- Under a normal pressure exerted with the thumb, the tension should be approximately 10 mm (3/8”).
- Make adjustments if necessary.
- Loosen screws 1 (Fig. C3) by two to three turns.
- Swivel the alternator assembly to obtain the belt tension required.
- Retighten screws 1 (Fig. C3).

C3



D - EVERY 400 WORKING HOURS SERVICE

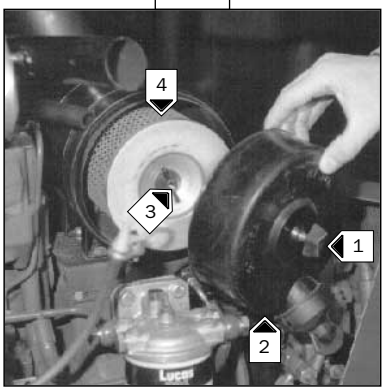
D1 - CHANGE THE DRY AIR FILTER CARTRIDGE

The air used to burn the fuel is purified by dry air filters. It is very important that the lift truck engine not be operated with the cartridges removed or damaged.

- Open the engine compartment.
- Loosen nut 1 (Fig. D1) and remove cover 2 (Fig. D1).
- Remove nut 3 (Fig. D1), lift out and discard the filter cartridge 4 (Fig. D1).
- Leave the safety cartridge in place.
- Clean the inside of the casing with a clean, damp, lint free cloth.
- Install the new cartridge and filter cover.

When operating the truck in a heavy dust environment see: FILTERS CARTRIDGES AND BELTS for additional precleaner protection.

D1



D2 - CHANGE THE FUEL FILTER CARTRIDGE

- Open the engine compartment.
- Carefully clean the exterior of the filter and bracket to prevent dirt from entering the system.
- Remove and discard cartridge 1 (Fig. D2) and seals.
- Clean inside the filter bracket using a brush immersed in clean diesel oil.
- Reinstall a new cartridge and seals.

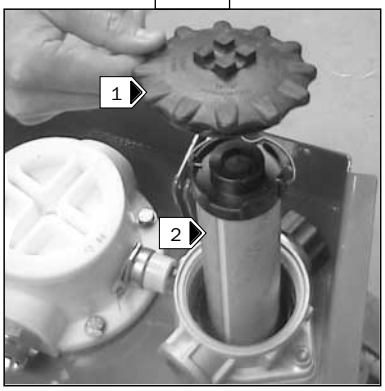
If necessary, bleed the fuel circuit (See SECTION: I1).

D2

D3 - CHANGE THE HYDRAULIC RETURN OIL FILTER CARTRIDGE

- Open the seat support access compartment.
- Remove the cover 1 (Fig. D3).
- Remove the hydraulic return oil filter cartridge 2 (Fig. D3), replace it with a new one.
- Make sure that the cartridge is correctly positioned, reinstall the cover.

D3



D4 - CHANGE THE OIL CONTAINER BREATHER.

- Remove the cover 3 (Fig. D4).
- Remove the oil container breather 4 (Fig. D4) and replace it with a new one.
- Make sure that the oil container breather is correctly positioned, reinstall the cover.

D4

D5 - CHECK THE DENSITY OF THE BATTERY ELECTROLYTE

The factory installed battery is maintenance free, requiring no service to the electrolyte.

- If the original battery is replaced with a serviceable battery, follow the manufacturer's instructions for maintenance.

D6 - CHECK THE WEAR ON THE FORKS (CONSULT YOUR DEALER)

E - EVERY 800 WORKING HOURS SERVICE

E1 - DRAIN AND CHANGE THE HYDRAULIC OIL

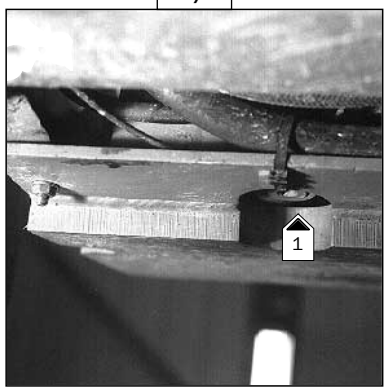
Park the lift truck on level ground with the engine stopped, the boom retracted and lowered as far as possible.

DRAINING THE OIL

- Place a container under drain plug 1 (Fig. E1/1) and remove the plug.
- Open the seat support access compartment.
- Remove the filler cap 2 (Fig. E1/2). Remove the return filter cartridge 3 to ensure a correct draining.

IMPORTANT	***Dispose of the drain oil in an ecological manner. Use only clean equipment and funnel to fill the system.***

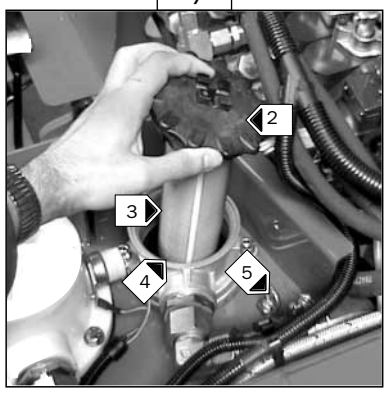
E1/1



FILLING THE OIL

- Install and tighten drain plug 1 (Fig. E1/1) (Tightening torque 22 ft/lb).
- Fill up with oil (See: LUBRICANTS) through filler port 4 (Fig. E1/2).
- Observe the oil level on dipstick 5 (Fig. E1/2), the oil should be between the lower and upper marks.
- Check for leaks at the drain plug.
- Reinstall the cartridge 3 and the filler plug 2 (Fig. E1/2) into initial position.

E1/2



FLUSHING THE HYDRAULIC CIRCUIT

- Park the lift truck on level ground.
- Allow the engine to run at half throttle for 5 minutes without operating hydraulic movements, then again for 5 minutes utilizing all hydraulic movements (except the steering system and brakes).
- Accelerate the engine to full speed for 1 minute, then activate the steering system and brakes.

This operation directs debris in the hydraulic circuit into the hydraulic return oil filter.

IMPORTANT	***It may be necessary to bleed the system at the inlet of the pumps if air bubbles have formed during the draining; if so, consult your dealer.***

E2 - REMOVE AND CLEAN THE SUCTION STRAINER LOCATED INSIDE THE HYDRAULIC OIL TANK

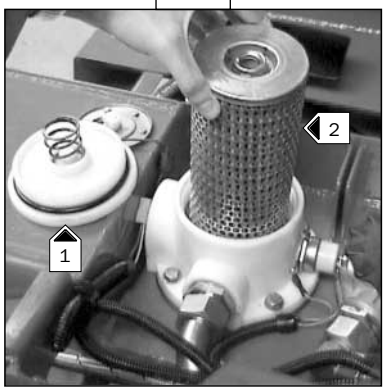
Access to the strainer requires removal of the hydrostatic transmission oil filter housing.

E3 - CHANGE THE HYDROSTATIC TRANSMISSION OIL FILTER CARTRIDGE.

- Remove cap 1 (Fig. E3).
- Remove the hydrostatic transmission oil filter cartridge 2 (Fig. E3) and replace it with a new one.
- Make sure the cartridge is correctly positioned, reinstall the cap.

IMPORTANT	Do not operate the lift truck without the oil filter cartridge. Serious damage may result in the transmission hydraulic circuit, the hydrostatic wheel motors and pump.

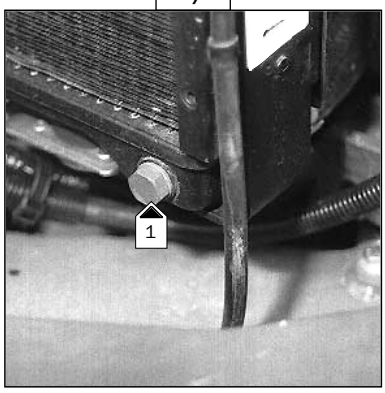
E3



E4 - DRAIN AND CHANGE THE COOLING LIQUID

These operations are to be carried out as necessary or at least once a year with the coming of winter.
Park the truck on level ground with the engine stopped and cold.

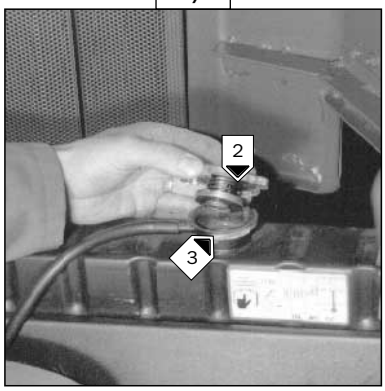
E4/1



DRAINING THE LIQUID

- Open the engine compartment.
- Place a container under drain plug 1 (Fig. E4/1) of the radiator.
- Remove filler cap 2 (Fig. E4/2) from the radiator.
- Allow the cooling circuit to drain completely.
- Check the condition of the hoses and fastening devices. Replace the hoses if necessary.
- Rinse the circuit with clean water, use a cleaning agent if necessary.

E4/2



FILLING THE LIQUID

- Reinstall the drain plug 1 (Fig. E4/1).
- Fill the cooling circuit slowly, up to 1/2 in. below the filler port 3 (Fig. E4/2).
- Reinstall the filler cap 2 (Fig. E4/2).

- Let the engine run at idle a few minutes.
- Check for leaks.
- Check the level and refill if necessary.

E5 - DRAIN AND CLEAN THE FUEL TANK

WARNING ***While performing these operations, do not smoke or work near a flame.***

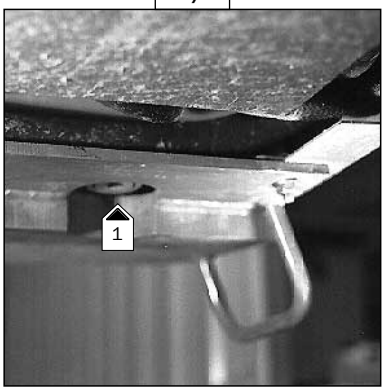
Park the truck on level ground with the engine stopped.

- Check for leaks in the fuel circuit and tank.
- **In the event of a leak, contact your dealer.**

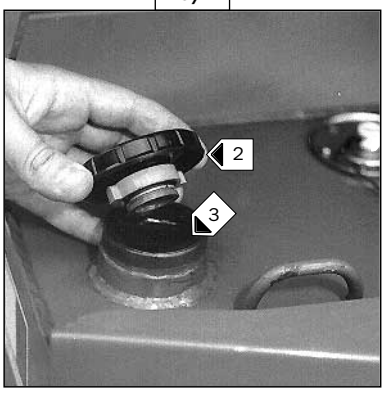
WARNING ***Never weld onto or near the fuel tank, this could provoke an explosion or a fire.***

- Place a container under drain plug 1 (Fig. E5/1) and remove the plug.
- Open the access panel under the seat for fuel filling.
- Remove cap 2 (Fig. E5/2).
- Flush the tank with 2 gal. of clean fuel through filler port 3 (Fig. E5/2).
- Reinstall and tighten drain plug 1 (Fig. E5/1).
- Fill the fuel tank with clean fuel filtered through a strainer or a clean, lint-free cloth. Reinstall the filler plug 2 (Fig. E5/2).
- Re-prime the system by activating fuel feed pump 4 (Fig. E5/3)
- If necessary, bleed the system (See SECTION: I1).

E5/1



E5/2



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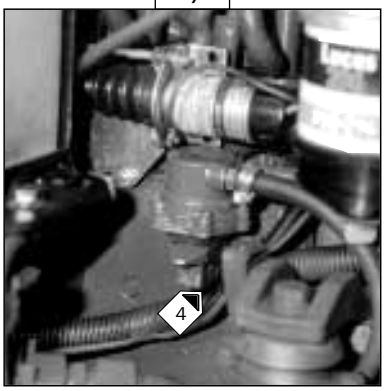
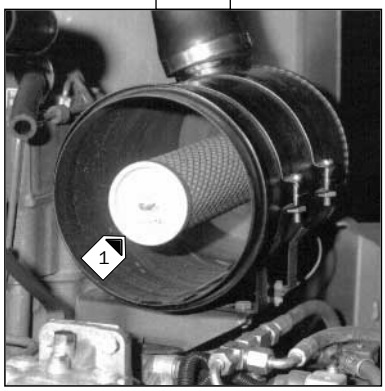


E6 - N/A

E7 - CHANGE THE SAFETY AIR FILTER CARTRIDGE

- Disassemble the air filter cartridge (See: D1).
- Remove and replace the air filter safety cartridge 1 (Fig. E7).
- Reassemble the unit (See: D1).

E7



E8 - CHECK THE WEAR OF THE BOOM PADS (CONSULT YOUR DEALER)

E9 - CHECK THE BRAKE ADJUSTMENT (CONSULT YOUR DEALER)

E10 - N/A

E11 - CHECK THE ENGINE SILENTBLOCS (ENGINE MOUNTS) (CONSULT YOUR DEALER)

E12 - CHECK THE ENGINE SPEEDS (CONSULT YOUR DEALER)

E13 - CHECK THE CARRIAGE (CONSULT YOUR DEALER)

E14 - CHECK THE CONDITION OF THE WHEELS AND TIRES (CONSULT YOUR DEALER)

E15 - CHECK THE SPEEDS OF THE HYDRAULIC MOVEMENTS (CONSULT YOUR DEALER)

E16 - CHECK THE CONDITION OF THE ATTACHMENTS (CONSULT YOUR DEALER)

E17 - CLEAN THE SCREEN FILTER INSIDE THE HYDRAULIC TANK (CONSULT YOUR DEALER)

F - EVERY 1600 WORKING HOURS SERVICE

F1 - CHANGE THE CRANKSHAFT / FAN / ALTERNATOR BELT (CONSULT YOUR DEALER)

G - EVERY 2400 WORKING HOURS SERVICE

G1 - CHECK THE HYDRAULIC CIRCUIT PRESSURES AND DISCHARGE RATES (CONSULT YOUR DEALER).

G2 - CHECK THE HYDROSTATIC TRANSMISSION CIRCUIT PRESSURES (CONSULT YOUR DEALER).

G3 - CHECK AND ADJUST THE GOVERNING START R.P.M. OF THE HYDROSTATIC TRANSMISSION (CONSULT YOUR DEALER).

G4 - MAKE SURE THE TRANSMISSION CUT-OFF HYDRAULIC VALVES ARE IN GOOD WORKING ORDER (CONSULT YOUR DEALER).

G5 - CHECK THE STEERING SYSTEM (CONSULT YOUR DEALER).

G6 - CLEAN THE HYDRAULIC OIL TANK (CONSULT YOUR DEALER).

G7 - CHECK THE INJECTORS (CONSULT YOUR DEALER).

G8 - CHECK AND SCALE THE RADIATOR (CONSULT YOUR DEALER).

G9 - CHECK THE WATER PUMP AND THE THERMOSTAT (CONSULT YOUR DEALER).

G10 - CHECK THE CONDITION OF THE BOOM ASSEMBLY (CONSULT YOUR DEALER).

H - EVERY 4800 WORKING HOURS SERVICE

H1 - CHECK THE WEAR OF THE BRAKE DISKS ON THE FRONT WHEEL MOTORS (CONSULT YOUR DEALER).

H2 - CHECK THE REAR WHEEL MOTOR PIVOT (CONSULT YOUR DEALER).

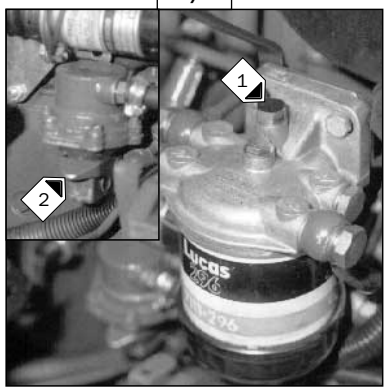
H3 - CHECK THE STEERING BALL JOINTS (CONSULT YOUR DEALER)

H4 - CHECK THE ALTERNATOR AND THE STARTER MOTOR (CONSULT YOUR DEALER)

I - OCCASIONAL MAINTENANCE

I1 - BLEED THE FUEL SYSTEM

I1/1



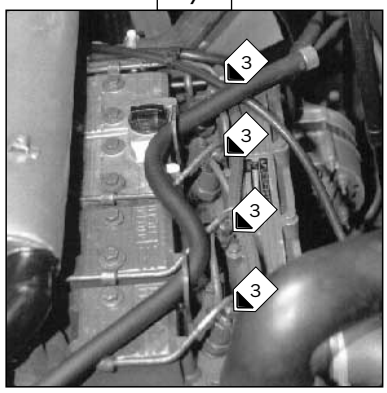
These operations may be required in the following cases:
- A changed or drained component in the fuel system.
- A drained tank.
- Running out of fuel.

Insure the fuel level is sufficient, turn the ignition key to notch I, turning on the ignition.

- Open the engine compartment.
- Loosen the bleed screw 1 (Fig. I1/1).
- Operate the fuel lift pump 2 until airless fuel drains from the bleed screw.
- Tighten the bleed screw 1 (Fig. I1/1) while the fuel is flowing.

NOTE: If the fuel lift pump lever will not operate, rotate the crankshaft one turn.

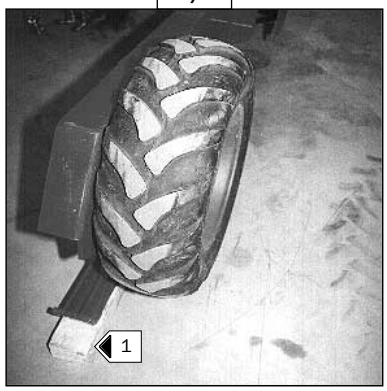
I1/2



BLEEDING THE INJECTION NOZZLES
- Loosen the tube connections 3 (Fig. I1/2) of the injection nozzles.
- Operate the starter motor until airless fuel drains from the tube connections 3 (Fig. I1/2).
- Tighten these connections while the fuel is flowing out.
- Clean all spilt fuel residue.
- The engine is now ready to start.

I2 - CHANGE A WHEEL

I2/1



- Park the lift truck on level, solid ground.
- Stop the lift truck (See: Driving the lift truck SECTON: stopping the lift truck).

CHANGING THE FRONT WHEEL
(TMT 320 - TMT320 FL - TMT 320 FL HT
TMT 320 FL Turbo HT)

- Block the lift truck in both directions on the wheel opposite to the wheel to be changed.
- Loosen the wheel nuts on the tire to be changed.

- Place a block under the stabilizer 1 (Fig. I2/1) of the wheel to be changed.
- Lower the stabilizers.
- Remove the wheel nuts.
- Remove the wheel and roll it aside.

- Slide the new wheel onto the wheel hub.
- Install the nuts by hand, if necessary, lubricate them.
- Lift the stabilizers.
- Remove the block.
- Torque the wheel nuts with a torque wrench. (See: A - DAILY OR EVERY 10 HOURS SERVICE for tightening torque).

CHANGING THE REAR WHEEL

- Block the lift truck in both directions on the front wheels.
- Loosen the rear wheel nuts.

- Place the hydraulic jack under the rear pivot.
- Lift the wheel until it is raised from the ground.
- Remove the wheel nuts.
- Remove the wheel and roll it aside.

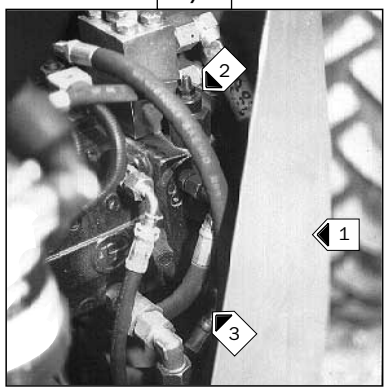
- Slide the new wheel onto the wheel hub.
- Tighten the nuts by hand, if necessary, lubricate them.
- Lower the wheel to the ground.
- Torque the wheel nuts with a torque wrench (See: A - DAILY OR EVERY 10 HOURS SERVICE for tightening torque).

I3 - TOWING THE LIFT TRUCK

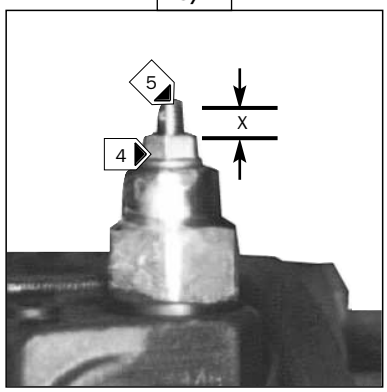
IMPORTANT	*Towing the lift truck must be carried out at a very low speed (not exceeding 3 mph) and at a distance, as short as possible (not exceeding 325 ft).*

Remove the front cover 1 (Fig. I3/1).
- Loosen the high pressure relief valves 2 and 3 (Fig. I3/1).
- Measure and record distance X (Fig. I3/2) on both high pressure relief valves 2 and 3.
- Loosen the jam nuts 4 (Fig.B).
- Tighten screw 5 (Fig.B) until flush the jam nuts 4 (Fig.B).
- After towing proceed in reverse order to reposition the HP valves to the X position.

I3/1



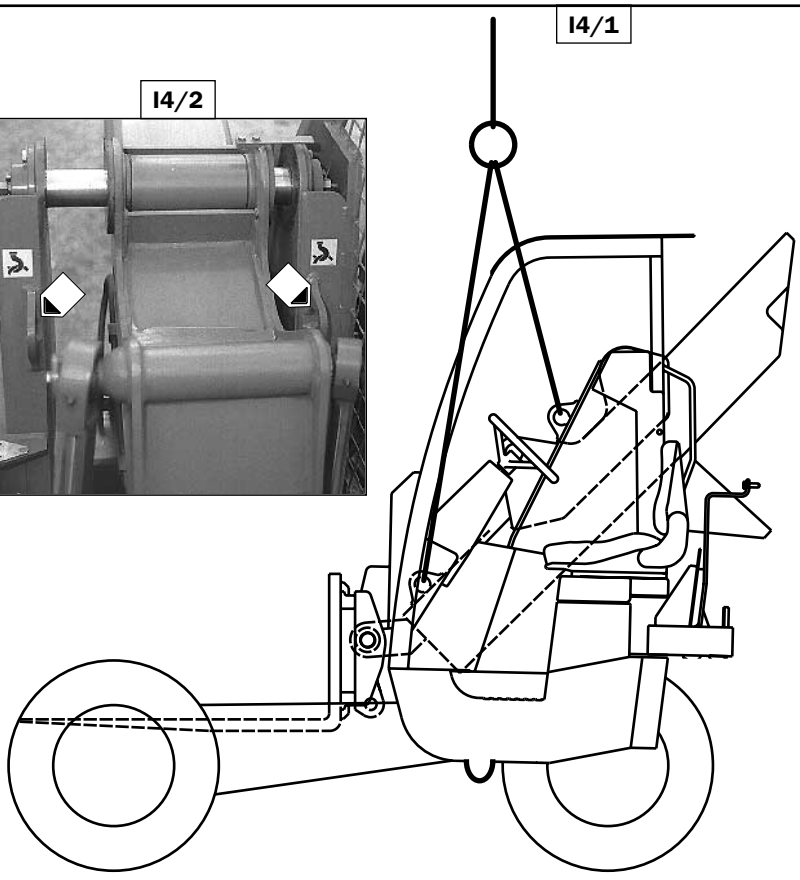
I3/2



I4 - SLING THE LIFT TRUCK

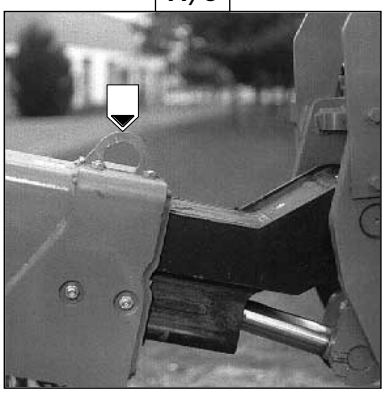
- Take into account the center of gravity of the lift truck before lifting (Fig.I4/1).
- Place the hooks into the fastening points provided (Fig. I4/2 and I4/3).

I4/1



I4/2

I4/3



I5 - TRANSPORT THE LIFT TRUCK ON A FLATBED TRAILER

WARNING	***It is mandatory that the lift truck be backed onto the trailer in reverse, and unloaded in forward motion.***

WARNING	***Ensure safety procedures involving the flatbed trailer are observed before loading the lift truck and that the driver has been informed about the dimensions and weight of the lift truck (See chaper: CHARACTERISTICS).***

WARNING	***Ensure the flatbed trailer is the proper size and load capacity for transporting the lift truck. Verify pressure point load capacity on the flatbed surface.***

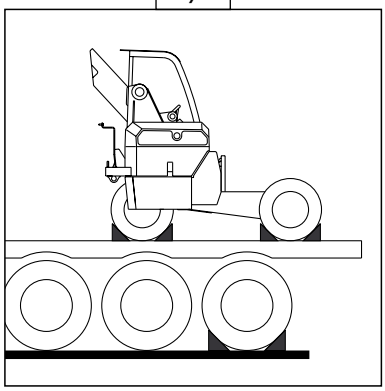
LOAD THE LIFT TRUCK

- Block/chock the wheels of the semitrailer.
- Use only approved capacity loading ramps, avoid steep inclines.
- Load the lift truck parallel to the semitrailer.
- Stop and park the lift truck (See: DRIVING THE LIFT TRUCK in SECTION: STOPPING THE LIFT TRUCK).

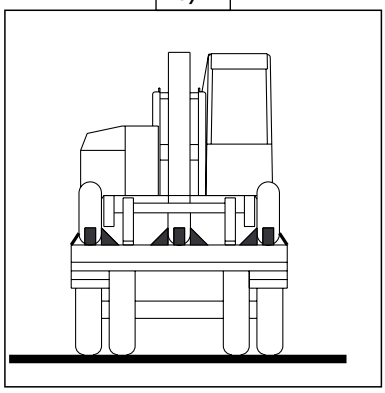
STOW THE LIFT TRUCK

- Fix the blocks to the semitrailer at the front and back of each tire (Fig. I5/1).
- Also fix the blocks to the semitrailer on the inside of the front wheels and on each side of the rear wheel (Fig. I5/2).
- Secure the lift truck to the semitrailer with approved straps or chains. Utilize the tie downs provided on either side of the forklift, also secure the front end as shown (Fig. I5/3).
- Properly tighten the straps or chains.

I5/1



I5/2



I5/3