



OPERATOR'S HANDBOOK

R Series



TS57500



OPERATOR'S HANDBOOK

R Series

TS57500

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Printed in U.S.A.



R SERIES OPERATOR'S HANDBOOK TS57500

*THE INFORMATION CONTAINED IN THIS HANDBOOK IS
CURRENT AT TIME OF PUBLICATION.*

Mack Trucks, Inc. reserves the right to make changes without
prior notification.

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NOTES



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TO THE OWNER

In Appreciation

Thank you for buying a MACK® vehicle. With proper care and maintenance, your new R model will help you gain a competitive edge with its fuel-efficient drivetrain combinations, low maintenance, extended service intervals and, eventually, good resale value.

The R model is available for a wide range of applications. Because of this versatility, drivetrains and components vary and operating instructions may differ from one model to another. While every effort has been made to cover all current arrangements, do not hesitate to consult your MACK distributor if a question arises. Honest, personal service is standard with every MACK sale.

NOTE

Mack Trucks, Inc. would like to point out the important role that the driver will play in the life of the vehicle. Only trained and informed drivers should operate this vehicle.

We, at Mack Trucks, Inc., hope that you will be happy with your new R model, and that you see many years of trouble-free driving.

This vehicle was built to conform to all federal standards and regulations applicable at the time of manufacture.



About This Handbook

This handbook is referred to as the R Series Operator's Handbook. It covers all R models. Its identification number is TS57500. Keep this handbook with the vehicle at all times to ensure that each owner and/or operator will have access to all pertinent information relating to the operation and handling of this vehicle.

This handbook was prepared to provide the driver with all relevant information concerning the daily operation of this vehicle. Please read it thoroughly, paying particular attention to advisory labels that have been included to draw attention to important issues of operator safety and overall performance.

Information and illustrations in this handbook are based on the latest production usage at the time of printing and are subject to change without prior notice.

NOTE

Basic maintenance and lubrication procedures are found in this manual beginning on page 181. For further information, refer to the MAINTENANCE AND LUBRICATION manual, TS494. Other important information can be found in the EMISSION CONTROL SYSTEMS booklet, TS505.



THE VEHICLE

Basic Configuration

The R model features a conventionally styled, aerodynamic cab.

Model Identification

R models include the following features:

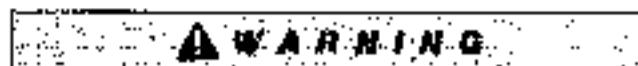
- RB — set-back front axle
- RD600 — heavy-duty frame, construction-type bumper and fiberglass hood
- RD800 — heavy-duty frame, construction-type bumper and sheet metal hood

Vehicle Management and Control System (V-MAC®)

The Vehicle Management and Control System (V-MAC), is an electronic control system that manages engine and vehicle functions. In addition, the DataMax portion of V-MAC monitors and stores a variety of information (i.e., maintenance schedules, overspeed logs, fault tables, trip summaries).

For a complete description of the V-MAC III system, refer to the V-MAC III Operator's Guide (TS799), which is supplied with the vehicle.

Additional information concerning service, diagnostics, programming and vendor equipment interface application is available from the Mack Trucks, Inc. Service Publications Department. Contact your local MACK dealer for details.



Never cut into the V-MAC system wire harness to power additional equipment. If such equipment is to be installed, contact your MACK dealer for assistance.



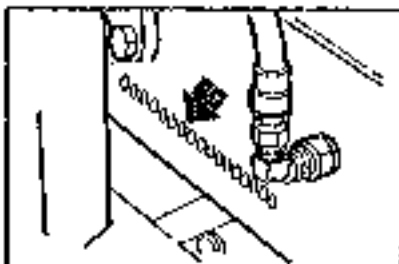
COMPONENT IDENTIFICATION

Locate the following serial numbers and write them in the boxes provided next to each illustration.

VIN Locations

The Vehicle Identification Number (VIN) is displayed in two locations (a frame rail stamping and a plate). The 17-digit VIN must be identical in both locations.

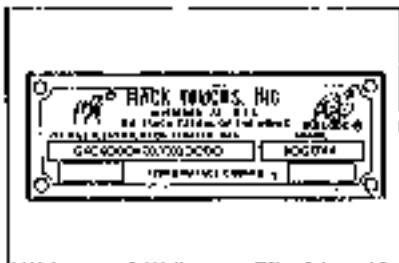
The VIN frame stamping is located on the right front frame rail.



Vehicle
Identification
Number

00000000

The VIN plate is located on the locking edge of the driver-side door.



Vehicle
Identification
Number

00000000



INTRODUCTION

Engine Identification

All MAC's E-Tech™ engine stampings are located on the right side center of the engine block, below the turbocharger oil drain tube.



Mac's
E-Tech™ Engine
Serial Number

20S177a



INTRODUCTION

Engine Information Plate

In compliance with the emissions standards requirements, an engine exhaust emissions control plate is affixed to one of the engine valve covers for all MACK engines. This plate provides basic engine identification information, as well as specifications for injection pump-to-engine timing and valve clearances.

The engine information plate is found on the forward valve cover on MACK E-Tech engines.

IMPORTANT ENGINE INFORMATION		DÉTAILS IMPORTANTS SUR LE MOTEUR	
TO OBTAIN EMISSIONS INFORMATION, SEE THE EMISSIONS CONTROL PLATE FOR EMISSIONS INFORMATION. SEE THE EMISSIONS CONTROL PLATE FOR EMISSIONS INFORMATION.		POUR OBTENIR LES INFORMATIONS ÉMISSIONS, VOUS DEVEZ CONSULTER LA PLaque D'ÉMISSIONS. VOUS DEVEZ CONSULTER LA PLaque D'ÉMISSIONS.	
☒ U.S. EPA EMISSIONS	☒ APPROVED BY EMISSIONS	1990	MODEL YEAR
☐ EMISSIONS CONTROL	☐ APPROVED BY EMISSIONS	WMAKXH1.9E51	WMAKXH1.9E51
GRAND PRIX	GRAND PRIX	E7-350	GRAND PRIX
GRAND PRIX	GRAND PRIX	9F1381	GRAND PRIX
GRAND PRIX	GRAND PRIX	728	GRAND PRIX
GRAND PRIX	GRAND PRIX	184	GRAND PRIX
GRAND PRIX	GRAND PRIX	SPI	GRAND PRIX
GRAND PRIX	GRAND PRIX	024	GRAND PRIX
GRAND PRIX	GRAND PRIX	016	GRAND PRIX
GRAND PRIX	GRAND PRIX	015	GRAND PRIX

205270a

NOTE

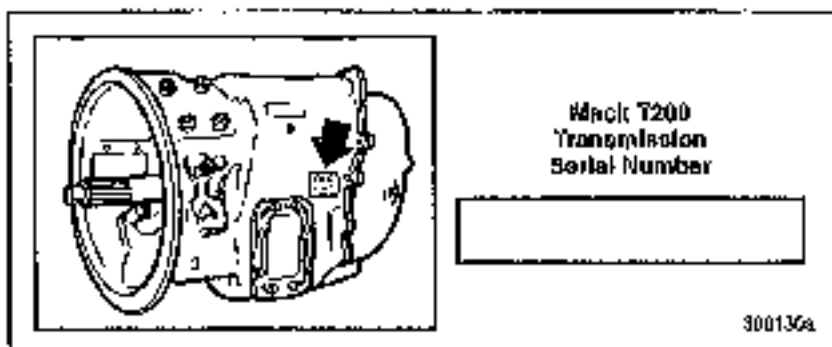
On the E-Tech engine, the plate is separated along the perforation, and the two pieces are mounted side-by-side.



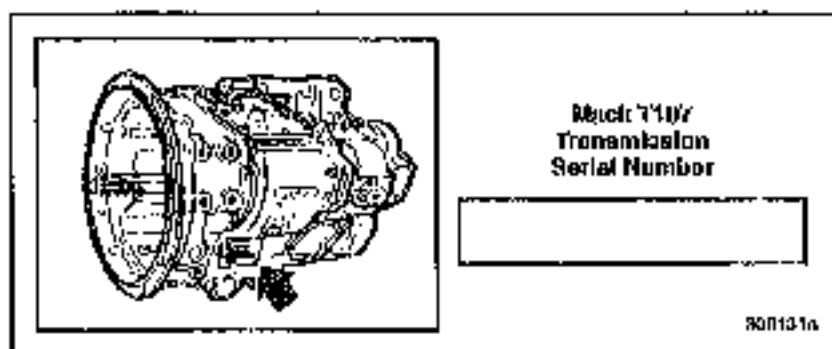
INTRODUCTION

Transmission Identification

The **MACK T200 Series transmission** identification plate is located on the rear left side of the main case.



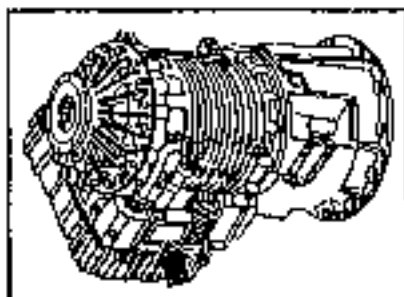
The **MACK T107 Series transmission** identification plate is located on the front left side of the main case.





INTRODUCTION

The Allison HD transmission identification plate is located on the rear right side of the main case, near the lower end.

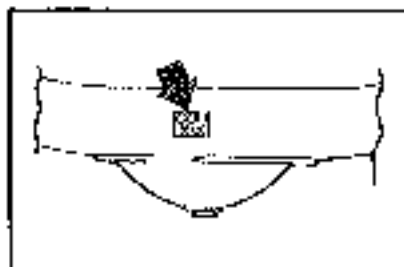


Allison HD & MD
Transmission
Serial Number

J01358a

Axle Identification

The MACK rear axle arrangement number is located on the center rear of the axle housing.



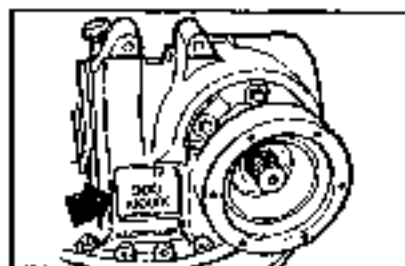
REAR AXLE
ARRANGEMENT NUMBER

400025h



INTRODUCTION

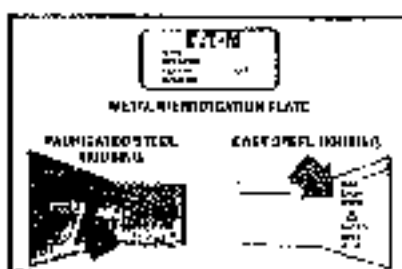
The **MACK** carrier assembly serial number is located on the right front side of the housing.



Carrier
Serial Number

400024a

The **EATON** rear axle serial number is located on the rear of the axle housing toward the carrier.



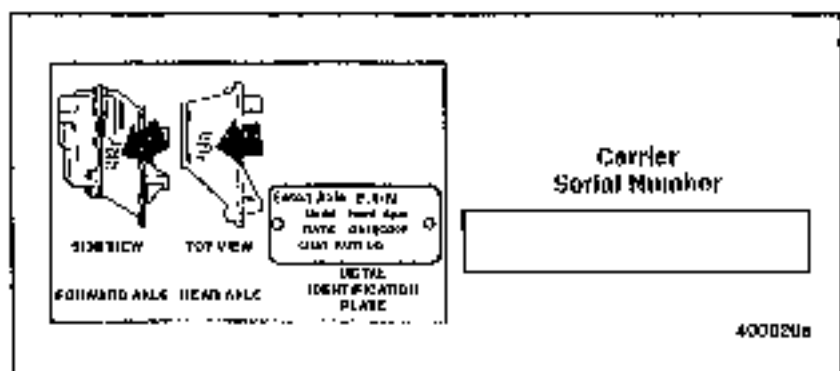
Rear Axle
Serial Number

400010a

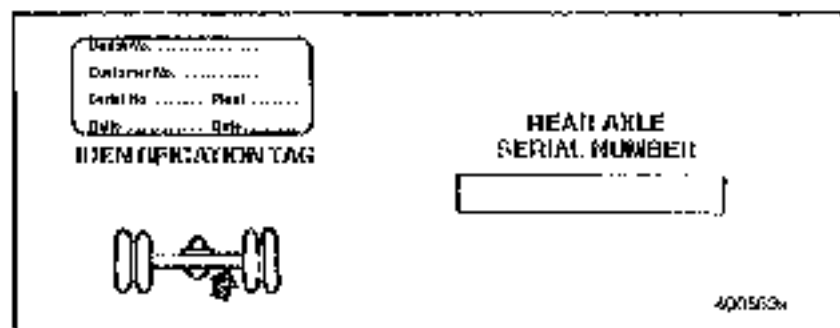


INTRODUCTION

The **EATON** carrier assembly serial number is located on the left side of the forward carrier, and the top of the rear carrier.



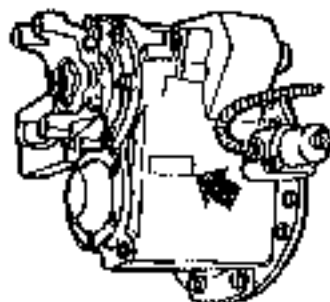
The **MERITOR** rear axle identification tag is located on the left or right rear of the rear axle housing, next to the carrier.



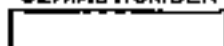


INTRODUCTION

The **MERITOR** carrier assembly serial number is located on the left side of the forward carrier, and the top of the rear carrier,



CARRIER
SERIAL NUMBER



4005643



WARRANTY INFORMATION

Injection Pump and Governor Settings

⚠ CAUTION

Any unauthorized adjustments of the injection pump and governor settings, other than as specified, can cause serious damage to the engine.

Please be aware of the hazards involved with attempting to increase the power of the engine by adjusting injection pump and governor settings. Standard specifications for injection pump and governor settings permit the maximum allowable engine output. Adjustments of the injection pump and governor settings, other than as specified, can cause serious damage to the engine. In some engines, improper adjustments produce visual evidence of overfueling, excessive fuel consumption and smoke. Turbocharged diesel engines usually do not produce visual evidence. The possibility of damage from improper adjustments is greater in turbocharged diesel engines because the usual warning signs may not be present.

In the event that damage results from such unauthorized adjustments, as evidenced by improper settings in the injection pump and governor assembly or broken fastener seals of the same, the cost of repairing such damage will NOT be covered under the MACK Standard Vehicle Warranty.



Air Brake System

The MACK Standard Vehicle Warranty applies to the air brake system, as set forth in the Warranty, but only if the air brake system has not been subjected to unauthorized additions, deletions or modifications. If any such unauthorized additions, deletions or modifications are performed, Mack Trucks, Inc. disclaims any and all liability for any loss or damage arising out of a malfunction of the air brake system.

The air brake system was designed and built to conform to all applicable federal motor vehicle safety standards in effect at the time of manufacture.

Tractor air systems are designed for operation as a tractor only, and truck air systems are designed to be operated as a truck only. If a tractor is going to be converted for operation as a truck, the air brake system must be reconfigured to that of a truck. Conversely, if a truck is going to be converted for operation as a tractor, the air system must be reconfigured to that of a tractor. Consult your MACK trucks distributor for additional information.

If any unauthorized additions, deletions or modifications are made to any portion of the air brake system which is required by Federal Motor Vehicle Safety Standards, Mack Trucks, Inc. makes no representation as to conformity with the Standards.

For complete warranty information, refer to the Podigreed Protection Plan (US-1S400, CANADA-1S500) or Standard Vehicle Warranty (Form F031) provided with each vehicle.



SERVICE LITERATURE

The MACK Service Publications department offers a variety of service literature that can be ordered through any MACK dealer.

NOTE

Mack Trucks, Inc. would like to emphasize the importance of proper service and maintenance procedures. Service, repair and replacements must be performed by certified, licensed mechanics in accordance with MACK standards.

Individual Service Manuals

Each individual service manual provides service information for the specified component (i.e., E-Tech Engine Service Manual, T200 Transmission Service Manual).

TS578 -- MACK Components Service Manual

This multi-binder set contains service information covering all MACK components (i.e., engines, transmissions, front and rear axles, cabs, fuel systems, electrical systems, etc.).

NOTE

If your vehicle contains a number of non-MACK (vendor) components, the TS473 might be more appropriate.

TS473 -- Custom Service Manual

This tailor-made set provides complete service information for all components in the specified vehicle (including both MACK and vendor service manuals). When ordering a TS473, be sure to include the complete model, chassis serial number and General Sales Order (GSO).



CUSTOMER SERVICE

Questions and Complaints

Your satisfaction is our most important concern.

If questions or complaints arise, first discuss the matter with the service manager at the MACK facility involved. If you are not satisfied with the service manager's response, contact the branch manager, principal or general manager of the distributorship. If assistance is required at a service dealer, contact the owner of the establishment.

If, for any reason, you need further assistance after dealing with the personnel at a MACK subsidiary or distributor, contact the regional service manager at the nearest MACK regional service office. The regional service manager has the responsibility and the authority to recommend action in most cases and (with the aid of relevant district service personnel) will make every effort to conduct a fair review of the situation.

Addresses

The addresses and telephone and fax numbers of the Mack Trucks, Inc. regional offices are:

United States

Northeast Region — 2100 Mack Blvd., Mail: P.O. Box M, Allentown, PA 18105-5000, TEL: (610) 966-8093, FAX: (610) 966-8005

Southeast Region — 6768 Southlake Parkway, Morrow, GA 30260, TEL: (770) 960-0511, FAX: (770) 960-0593

Central Region — 900 S. Frontage Rd., Suite 100, Woodridge, IL 60517, TEL: (630) 910-3330, FAX: (630) 910-3331

Southwest Region — 5605 N. MacArthur Blvd., #550, Mail: P.O. Box 165408, Irving, TX 75016-5408, TEL: (972) 518-1614, FAX: (972) 550-0389

Western Region — 2525 E. Camelback Rd., Suite 760, Phoenix, AZ 85016, TEL: (602) 553-7090, FAX: (602) 553-7091



INTRODUCTION

Canada

Executive Office — Mack Canada, Inc., 6860 Century Ave., East Tower, Suite 3000, Mississauga, ON L5N 2W5, TEL: (905) 814-5358, FAX: Marketing/Sales (905) 814-4528
FAX: Warranty/Service (905) 814-4554

Laurentian District — Mack Canada, Inc., 1000-20 Boul. St. Jean, Suite 512, Point Claire, PQ H9R 5R1, TEL: (514) 620-6049, FAX: (514) 620-5103

Ontario/Atlantic District — Mack Canada, Inc., 10553 Guilph Line, Campbellville, ON L0P 1B0, TEL: (905) 854-3610, FAX: (905) 854-3611

Metro/Prairie District — Mack Canada, Inc., 2025 Guilph Line, Suite 183, Burlington, ON L7P 4X4, TEL: (905) 333-0065, FAX: (905) 333-4021

Western District — Mack Canada, Inc., #327-11940, 207th St., Maple Ridge, BC, V2X 1X7, TEL: (604) 463-1439, FAX: (604) 463-9329

Australia

P.O. Box 984, Darra 4076, Queensland, Australia, TEL: 61-7-375-3333, FAX: 62-7-375-3469

International

P.O. Box 1782, Allentown, PA 18105-1782, TEL: (610) 709-2470, FAX: (610) 709-3800



Additional Assistance

If additional assistance is required, Mack Trucks, Inc. maintains a Customer Service Department (staffed by experienced personnel), to aid customers who need information or assistance not provided at the local or regional level.

The Customer Service Department phone number is (610) 709-3961.

When contacting the regional service offices or Customer Service Department, provide the following information:

- ☐ Vehicle Identification Number (VIN) — This 17-digit number is typically located on a plate on the driver-side door latch post and behind the front axle on the right, front frame rail.
- ☐ Model and year of the vehicle
- ☐ Date that the vehicle was purchased and put into service
- ☐ Date(s) and mileage of repair(s)
- ☐ Dealer that sold and/or serviced the vehicle
- ☐ Description of unresolved service complaint or inquiry
- ☐ Summary of action taken to date (by the dealer and the regional service office)
- ☐ Names of individuals (if known) contacted at the dealer and the Mack Trucks, Inc. regional service office



REPORTING SAFETY DEFECTS

United States

If you believe that your vehicle has a defect which could cause a crash, injury or death, you should immediately inform the National Highway Traffic Safety Administration (NHTSA), in addition to notifying Mack Trucks, Inc.

If NHTSA receives similar complaints it may open an investigation, and if it finds that a safety defect exists in a group of vehicles, it may order a recall and remedy campaign. However, NHTSA cannot become involved in individual problems between you, your distributor, or Mack Trucks, Inc.

To contact NHTSA, either call the Auto Safety Hotline toll-free at 1-800-424-9393 (or 366-0123 in Washington, D.C. area) or write to: NHTSA, U.S. Department of Transportation, Washington, D.C. 20590. You can also obtain other information about motor vehicle safety from the Auto Safety Hotline.

Canada

For Canadian consumer complaints, contact Transport Canada - Department of Public Complaints, Recalls and Investigations. Call (613) 993-9851.





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SAFETY INFORMATION

SAFETY STATEMENT

Mack Trucks, Inc. cannot anticipate every possible occurrence which may involve a potential hazard. An accident can be avoided by recognizing potentially hazardous situations before a dangerous situation occurs. Correctly performed service procedures are critical for technician safety and safe, reliable operation of the vehicle.

WARNING

Do not operate the engine while in an enclosed area. All internal combustion engines give off various fumes and gases while running. Inhalation of exhaust fumes can cause death.

WARNING

Do not sit in a parked vehicle for any extended amount of time with the engine running. Exhaust fumes could leak into the cab area and death can result.

DANGER

Driver attitude is the most important part of any effective vehicle safety system. Mack Trucks, Inc. strongly encourages all drivers and passengers to use their seat belts, drive defensively, remain alert and respect the speed limits. Many accidents can also be avoided through regular vehicle maintenance.



SAFETY INFORMATION

Certain everyday procedures such as washing the vehicle and cleaning the windshield can also be hazardous because of the vehicle's height. Mack Trucks, Inc. does NOT recommend climbing up on the vehicle to perform these operations. Instead, stand on the ground and use brushes and squeegees mounted on extension poles. When better access is necessary (for instance, when washing the cab roof), use sturdy ladders held in place by someone on the ground.

DANGER

Engine driven components such as Power Take-Off (PTO) units, fans and fan belts, driveshafts and other related rotating assemblies, can be very dangerous. Do not service engine driven components unless the engine is shut down. Always keep body parts and loose clothing out of range of these powerful components to prevent serious personal injury. Be aware of PTO engagement or nonengagement status. Always disengage the PTO when not in use.



SAFETY INFORMATION

Completed Vehicles

In addition to the label supplied by Mack Trucks, Inc. as the chassis-cab manufacturer, a Completed Vehicle certification label, supplied by the body manufacturer, is affixed in the same general location. This label provides information pertaining to Gross Vehicle Weight Rating (GVWR), Gross Axle Weight Rating (GAWR), tire and rim information, etc.

On MACK-completed vehicles, this label contains the date of manufacture, VIN, GVWR, GAWR, and tire and rim data. It is found in one of the NHTSA locations listed above.



INFORMATION ON THIS LABEL IS IN ACCORDANCE WITH THE U.S. FEDERAL MOTOR VEHICLE SAFETY (FMVSS) REGULATIONS, PART 571, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.

U.S. VEHICLES



THIS VEHICLE CONFORMS TO ALL APPLICABLE FEDERAL MOTOR VEHICLE SAFETY (FMVSS) REGULATIONS, PART 571, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.

CANADIAN VEHICLES

0002206



ADVISORY LABELS

Throughout this book you will find paragraphs labeled *Service Hint*, *Note*, *Caution*, *Warning* and *Danger*. *Caution* and *Warning* labels are also found in various locations on the vehicle to alert drivers, operators and service technicians to situations which can cause personal injury or equipment damage. The labels shown are applicable to the R model chassis at the time of publication and are representative of what can be typically found on an R. (Your vehicle may not contain all of the labels illustrated in this handbook.) These labels are for your benefit. Please look through this section and note the labels, their locations and what they explain. Be sure to replace any label that is damaged.



SAFETY INFORMATION

Advisory Label Definitions (in Handbook)

Cautionary signal words (Danger-Warning-Caution) may appear in various locations throughout this manual. Information accented by one of these signal words must be observed to minimize the risk of personal injury to service personnel, or the possibility of improper service methods which may damage the vehicle or render it unsafe. Additional Notes and Service Hints are utilized to emphasize areas of procedural importance and provide suggestions for ease of repair. The following definitions indicate the use of these advisory labels as they appear throughout the manual:

CAUTION

Directs attention to unsafe practices which could result in damage to equipment and possible subsequent personal injury or death if proper precautions are not taken.

Directs attention to unsafe practices which could result in personal injury or death if proper precautions are not taken.

DANGER

Directs attention to unsafe practices and/or existing hazards which will result in personal injury or death if proper precautions are not taken.

NOTE

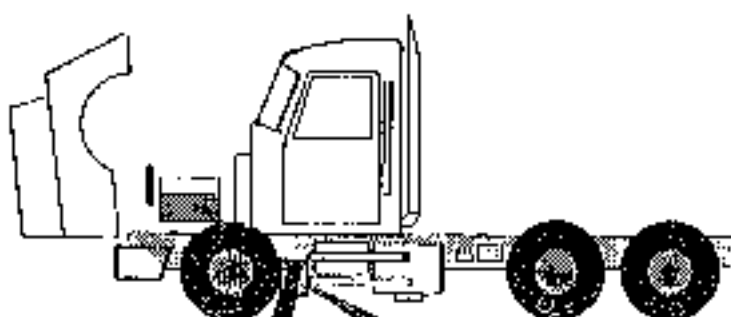
An operating procedure, practice, condition, etc., which is essential to emphasize.

SERVICE HINT

A helpful suggestion which will make it quicker and/or easier to perform a certain procedure, while possibly reducing overhaul cost.



SAFETY INFORMATION



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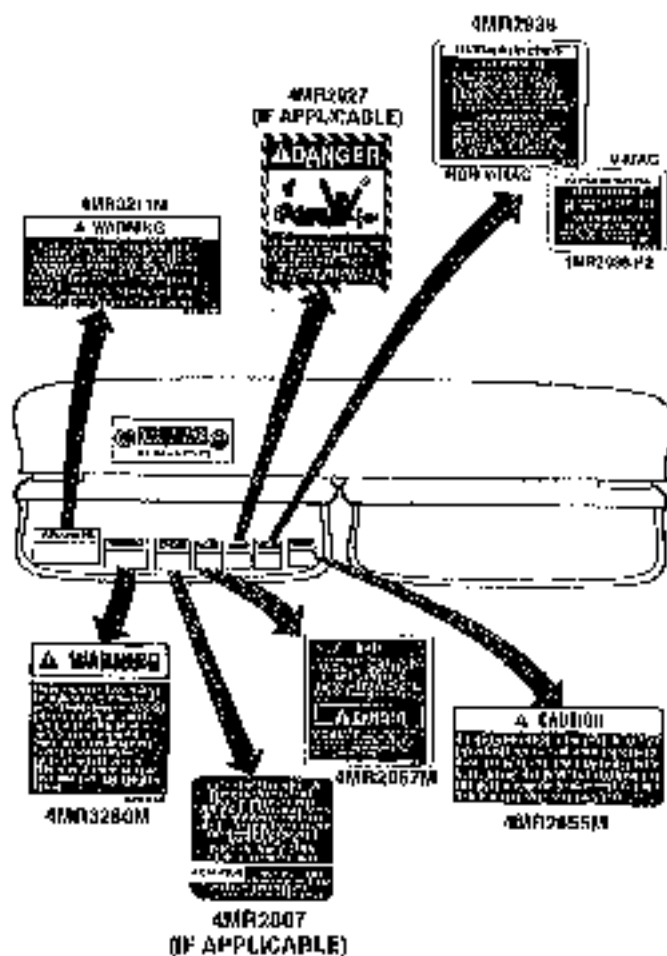
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SAFETY INFORMATION

Labels Found on Driver-Side Sun Visor



CUH51b



SAFETY INFORMATION

Labels Found on Windshield and Dashboard

CAUTION

This tractor has an air brake system designed for TRACTOR OPERATION ONLY. If this tractor is converted for operation as a TRUCK, the air brake system MUST be changed to provide SAFE OPERATION as a TRUCK. Contact your MACK Dealer for instructions.

DO NOT remove until delivered to the ultimate consumer.

1242001

CAUTION

This truck has an air brake system designed for TRUCK OPERATION ONLY. If this truck is converted for operation as a TRACTOR the air brake system MUST be changed to provide SAFE OPERATION as a TRACTOR. Contact your MACK Dealer for instructions.

DO NOT remove until delivered to the ultimate consumer.

1242002

000217a

NOTE

Label to be removed upon delivery to the end user.
Refer to page 14 for additional information.



SAFETY INFORMATION

R-134a Refrigerant Label

The servicing caution label 4MR3283M is located under the hood attached to the receiver dryer bracket.

**CAUTION**

REFRIGERANT UNDER HIGH PRESSURE. SYSTEM TO BE SERVICED BY QUALIFIED PERSONNEL ONLY. IMPROPER SERVICE METHODS MAY CAUSE PERSONAL INJURY. CONSULT SERVICE MANUAL.

**USE R-134a
REFRIGERANT ONLY**

Charging Refrigerant Charge:
1.381kg (3.10 lbs) without accumulator and/or drier
1.801kg (3.98 lbs) with accumulator and/or drier
Fill Amount: 2.28kg (5.02 lbs)
Fill Type: USE ONLY PURCHASER 3283-0020 PAG

4MR3283M

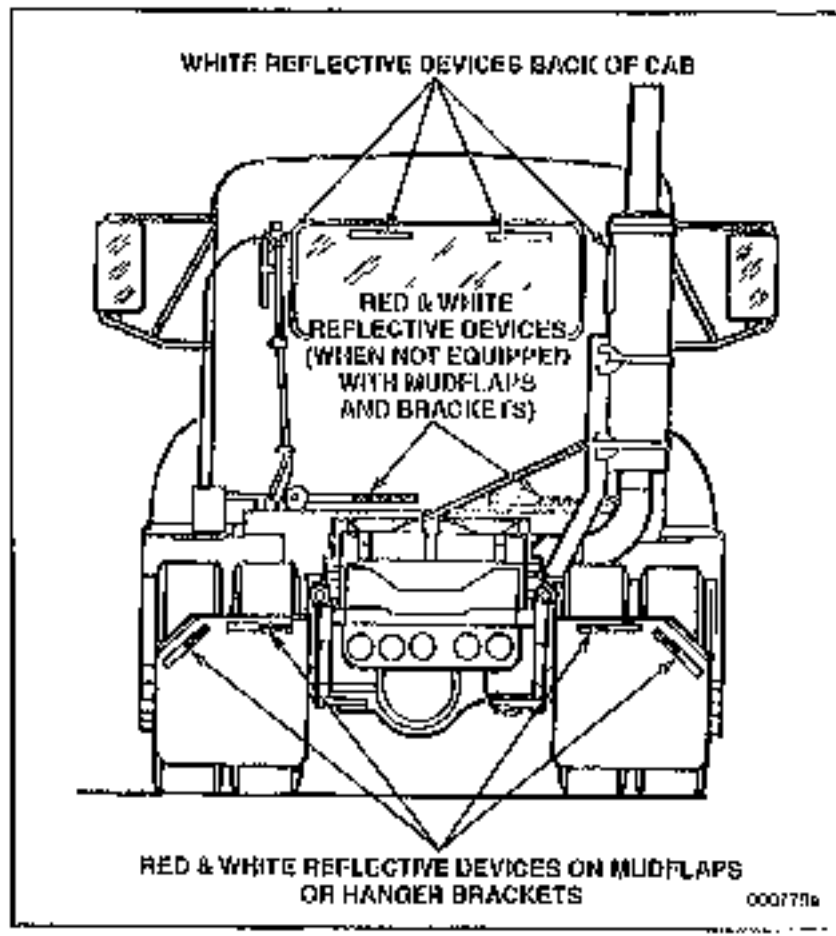
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SAFETY INFORMATION

TRUCK-TRACTOR CONSPICUITY

To make the vehicle more conspicuous when approached from the rear (in times when visibility is reduced), all truck/tractors built on or after July 1, 1997 have reflective devices applied on the rear of the cab and on the mudflaps or mudlap hanger brackets if mudflaps or mudlap hanger brackets are supplied from the factory. If mudflaps or mudlap hanger brackets are not supplied from the factory, reflective devices will be applied on the rear, lower portion of the cab. Refer to the illustration.





CAB ENTRY/EXIT

Three-Limb Contact

When entering or exiting a cab, the driver and/or passenger must have at least three limbs in contact with the vehicle or ground at all times. This means that a minimum of two hands and one foot, or one hand and two feet must be in FIRM contact with the vehicle or ground.



When entering or exiting the cab, be aware of the condition of steps and handrails, especially in cold weather. During cold weather operations, ice and snow may accumulate and should be cleaned off to prevent slipping.

During cold, wet conditions when ice, slush, or snow may accumulate on the cab doorstep and other external surfaces, extra caution must be observed when entering or exiting the cab.



SAFETY INFORMATION

WARNING

To avoid injury, use the following guidelines when entering and exiting the cab:

- Face the cab when entering and exiting.
 - Keep hands free to grip handholds. Place papers, coats, etc., in the cab before entering, and remove after exiting.
 - Keep hands and shoes clean. Check hands and shoes for grease, mud, etc., before entering and exiting to avoid slipping.
 - Do NOT jump from the vehicle.
 - Do NOT step on the fuel tank, battery box, frame, etc., unless adequate slip-resistant surfaces and handholds are provided.
 - Be aware of the condition of steps and handholds, especially in rainy or snowy weather. Clean grease, oil, mud, snow, ice, etc., from steps and handholds before entering and exiting to avoid slipping.
-



SAFETY INFORMATION

NOTE

The illustrations on the following pages are typical for purposes of emphasizing a safe method for hand/foot placement and movement during cab entry/exit. Your vehicle may not look exactly like the one pictured.

NOTE

The arrows in the illustrations are intended to show movement. Notice that three-limb contact is maintained even when one foot, or one hand, is moving.



SAFETY INFORMATION

Left Side

The following cab entry and exit procedures, along with the safety guidelines outlined in Three-Limb Contact earlier in this section, should be used with this MACK vehicle.

Entry

These entry procedures are illustrated on the following page:

1. With both feet firmly on the ground, grab the outside handhold with both hands or grab the outside handhold with one hand and grab the steering wheel or inside handhold (if equipped) with the other hand. Then raise one foot to the bottom step. (See figure 1.)
2. Maintain a firm grip on the handholds and/or steering wheel and raise your other foot to the top step. (See figure 2.)
3. While still gripping the handholds and/or steering wheel, raise one foot to the cab floor. (See figure 3.)
4. Move one hand at a time to the steering wheel, inside handhold (if equipped) or cab interior. Bring the other foot inside the cab and sit down. (See figure 4.)

Exit

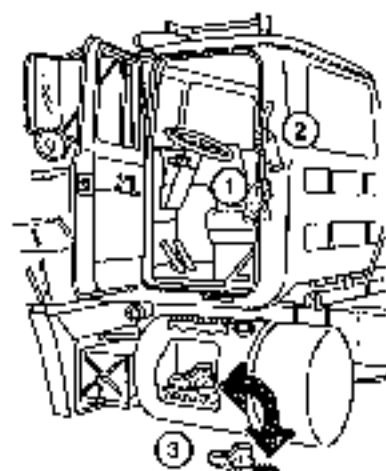
To exit, follow the illustrations in reverse order:

1. With both hands gripping the steering wheel, inside handhold (if equipped) or cab interior, stand up and face the inside of the cab. Move one foot to the top step. (See figure 4.)
2. Move one hand to the outside handhold and grip the steering wheel, inside handhold (if equipped), or cab interior with the other hand. With one foot firmly on the top step, lower the other foot to the bottom step. (See figure 3.)
3. Maintain a firm grip on the handholds and/or steering wheel, and keep one foot firmly on the bottom step. Then lower the other foot to the ground. (See figure 2.)
4. With both hands firmly gripping the handholds and/or steering wheel, lower the other foot to the ground. (See figure 1.)

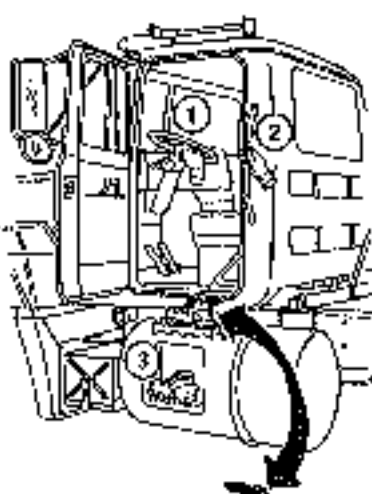


SAFETY INFORMATION

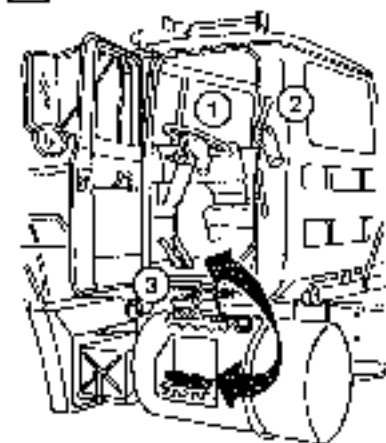
1



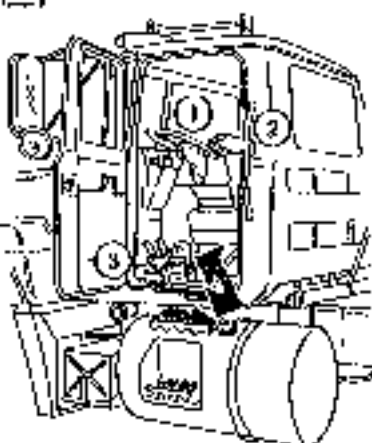
2



3



4



550532a



Right Side

The following cab entry and exit procedures, along with the safety guidelines outlined in the Three-Limb Contact section, can be used with this MACK vehicle.

Entry

These entry procedures are illustrated on the following page:

1. With both feet firmly on the ground, grab the outside handhold with your left hand and the inside door handle with your right hand. Then raise one foot to the bottom step. (See figure 1.)
2. Maintain a firm grip on the outside handhold with your left hand and the door handle with your right hand. Then raise your other foot to the top step. Once your foot is firmly planted on the top step, raise the other foot to the top step. (See figure 2.)
3. While still gripping the outside handhold with your left hand, transfer your right hand to the cab interior. Then raise one foot to the cab floor. (See figure 3.)
4. Move your left hand to the cab interior for support. Bring the other foot inside the cab and sit down. (See figure 4.)

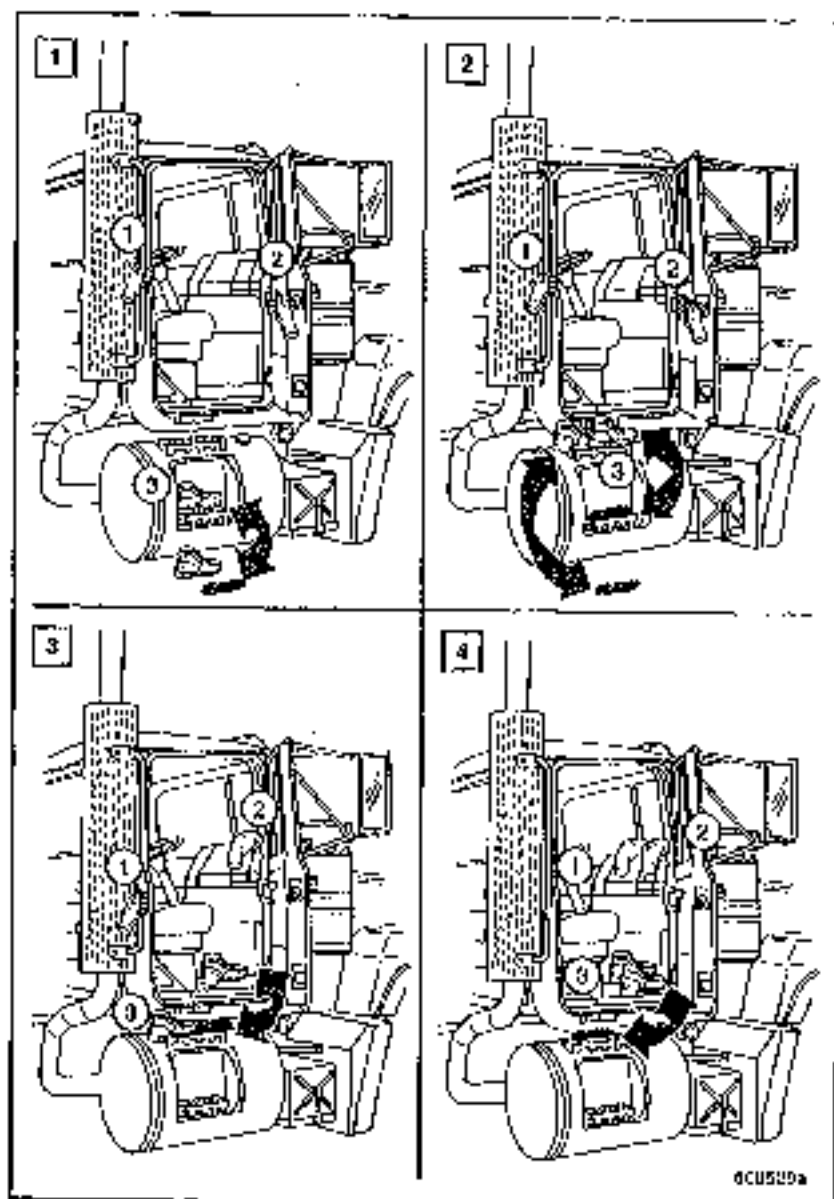
Exit

To exit, follow the illustrations in reverse order:

1. With both hands gripping the cab interior for support, stand up and face the inside of the cab. Move one foot to the top step. (See figure 4.)
2. While maintaining a firm grip on the cab interior with your right hand, move your left hand to the outside handhold. Then lower the other foot to the top step. (See figure 3.)
3. With your left hand firmly gripping the outside handhold, move your right hand to the inside door handle. Lower one foot to the bottom step. Once your foot is firmly planted on the bottom step, lower the other foot to the ground. (See figure 2.)
4. Maintaining a firm grip on the outside handhold and door handle, lower the other foot to the ground. (See figure 1.)



SAFETY INFORMATION





SEAT BELTS

WARNING

The use of seat belts is required in some states and is strongly recommended at all times, especially during adverse road conditions associated with winter weather. Failure to use seat belts can result in SEVERE bodily injury. Unbelted riders could be thrown into the windshield or other parts of the cab, or thrown out of the cab entirely.

General Information

Seat Belt Operation

MACK vehicles manufactured on or after September 1, 1990 must have locking retractable seat belts.

For all seating positions on your MACK vehicle, this type of seat belt is a combination lap and shoulder belt.

NOTE

Vehicles equipped with a two-man rider's seat have only a lap belt at each rider position.

This type of belt is designed to lock (prevent belt travel out of the retractor) only during sudden stops or impacts. This feature allows the operator to move freely under normal conditions. Seat belts cannot be locked by jerking on the belt, except during sudden stops or harsh bumps.



SAFETY INFORMATION

Fastening

- f. Pull clip so the belt crosses your shoulder and lap and insert it into the buckle until an audible snap is heard.

⚠ WARNING

Use the shoulder belt only on the shoulder that is closest to the vehicle door. Never wear the shoulder portion of the belt under your arm or behind your back. Improper use will increase your chances of injury during a collision.

⚠ WARNING

To prevent possible injury, pregnant women should be careful to make sure that the seat belt is worn properly. The belt should be positioned low over the pelvis and below the abdomen.

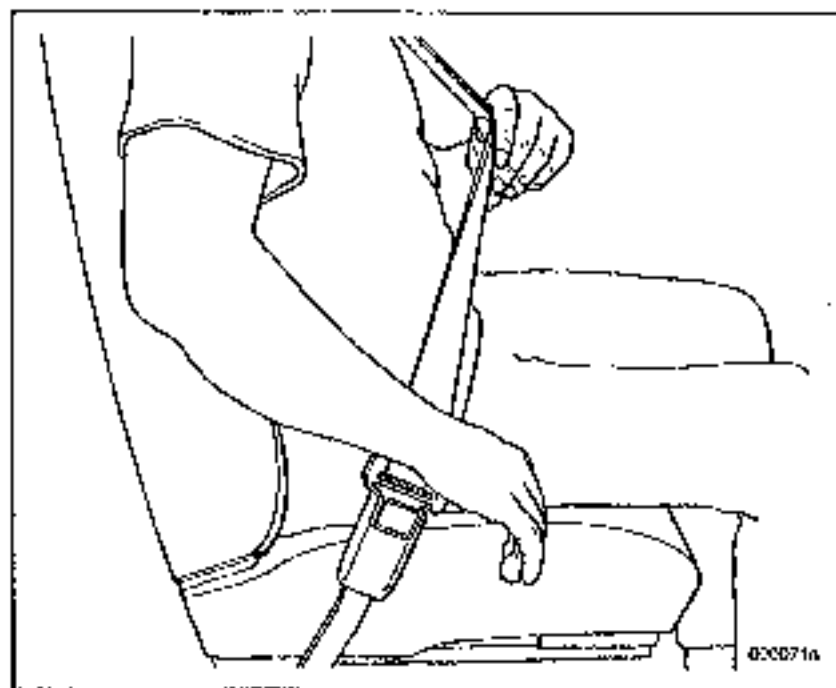
⚠ WARNING

Do NOT wear seat belt loosely. Do NOT use one belt for more than one person.

2. Make sure the clip is securely fastened into the buckle.



SAFETY INFORMATION



3. To tighten the lap portion of the combination belt, pull upward on the shoulder portion until the lap portion fits snugly. The belt should rest as low on your hips as possible.



SAFETY INFORMATION

Unfastening

Push down on the button to release the belt.

Seat Belt Maintenance

- Keep belt clean and dry.
- Clean with mild soap solution and lukewarm water.

WARNING

Do NOT bleach or dye belt, as this may cause severe loss of strength. Do NOT install belt in a truck with weakened floor until the floor has been replaced or reinforced.

- Periodically inspect belt, retractor and mounting points for damage or corrosion that could materially lessen effectiveness of belt installation. Replace all inadequate parts.

NOTE

Seat belt assemblies must be replaced after an accident if they have been subjected to loading by occupants (even if no damage is obvious), or if they have been damaged by an accident (bent retractor, torn webbing, etc.). If there is any question regarding belt or retractor condition, replace the appropriate part.



SAFETY INFORMATION

Komfort[®] Latch System

Seat Belt Assembly

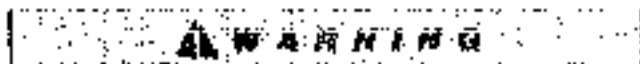
The Track III three-point seat belts installed in this chassis are designed to provide the highest degree of operator safety, comfort and convenience. Additional comfort is provided by the Komfort Latch mechanism which is incorporated into the seat belt assembly, and may be used to relieve any discomfort caused by the constant pressure of engaged seat belts.

Seat Belt Operation

To buckle the seat belt, grasp the latch portion of the buckle, bring it across your lap (from outboard to inboard) and insert it into the fixed buckle which is mounted to the floor or seat (depending on seat type). With the belt properly latched, the pelvic and upper torso restraints will be in place and automatically adjusted to provide a snug fit.

Komfort Latch Feature

If the constant tension of the buckled seat belt causes any discomfort, engage the Komfort Latch as follows:



Do NOT attempt to engage the Komfort Latch feature while the truck is in motion.

Engagement — Pull the webbing of the shoulder belt away from the upper torso, pulling only as much slack as needed while still allowing the belt to exert slight pressure against your chest and shoulder. (Maximum amount of slack should not exceed one inch when measured from the chest to the belt.) While holding the slack, lift the lever located on top of the Komfort Latch mechanism upward to clamp the webbing in place.



SAFETY INFORMATION

Normal Release — To unfasten the seat belt, simply release the buckle and give the shoulder belt a quick tug to release the Komfort Latch mechanism. Allow the belt to retract into the retractor.

Emergency Release — In the event of an emergency, release the seat belt buckle. It is not necessary to release the Komfort Latch in an emergency situation.

NOTE

If forward movement is required while the Komfort Latch mechanism is latched, the latch automatically releases when you lean against the shoulder portion of the belt. Repeat the above steps to reset the Komfort Latch, if desired, after forward movement is no longer required.

⚠ DANGER

Excessive slack will reduce effectiveness of the seat belt, which could result in personal injury and death. CAREFULLY follow the instructions for adjusting the tension-relieving device.



SAFETY TIPS FOR COLD WEATHER OPERATION

Driver Visibility

Poor driver visibility is not only annoying, but extremely unsafe under any circumstances. Without proper maintenance of visibility-related components, adverse weather conditions such as rain, snow and frost can seriously reduce visibility. Take time before winter arrives to check the following:

- **Windshield Wipers**
 - Check windshield wiper operation and speeds.
 - Inspect condition and travel of blades. Install new refills for any blades that are cracked, brittle, torn, or coated with road oil along the wiping edge.
- **Windshield Washers**
 - Check operation of windshield washer.
 - Inspect system hoses and replace if brittle or worn.
 - Inspect washer reservoir. Drain and flush if dirt particles are evident in washer solution.
 - Fill reservoir with commercially available non-freezing type washer fluid.

⚠ CAUTION

Do NOT fill reservoir with water only. Even though non-freezing type washer fluid is recommended, do not attempt to clear the windshield of ice by activating the windshield washer and wipers. Ice accumulations should be removed manually by using a scraper.

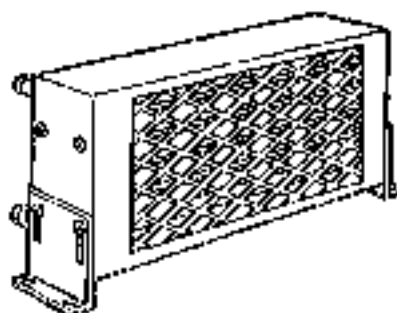


SAFETY INFORMATION

- **Heater/Defroster**
 - Check operation and blowers for speed control, noise and temperature.
 - Inspect heater core for signs of corrosion and/or leakage.
 - Check that the defroster blend door is operating correctly and that all ducting is connected properly.
 - Be sure that vents are not obstructed by debris or other objects.

Auxiliary Cab Heater

To ensure maximum in-cab comfort (even under severe cold weather conditions) contact a MACK subsidiary or distributor for details concerning auxiliary in-cab heaters (see figure below).



0002651



SAFETY INFORMATION

Cab Door Seals and Key Locks

Hollow-core rubber weather seals around some cab doors may lose their resilience in extremely cold temperatures (i.e., -40°F – -40°C and below). Under these conditions, it may be necessary to drill holes to penetrate the hollow core. This allows entrapped air to escape, thereby easing the opening/closing of cab door(s).

Be sure to keep the key locks clean and dry to prevent occasional winter freeze-up. Use of antifreeze lubricants is neither required nor recommended.

Outside Mirror Heater

In areas of frequent snowfall and ice, it may be beneficial to install heated mirrors which will defrost and de-ice cab mirrors. Heated mirrors eliminate the need to pull off the highway and stand on the roadside to scrape ice and snow from the mirrors during winter driving conditions.



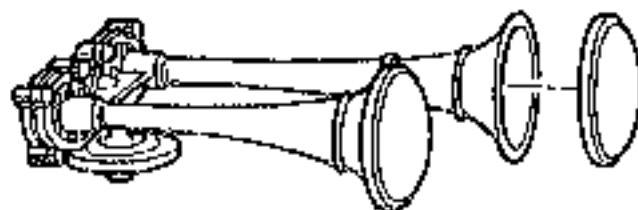
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SAFETY INFORMATION

Air Horn Snow Shield

Installation of an air horn snow shield is recommended to prevent snow from clogging the air horn bell (maintaining maximum sound output).



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INSTRUMENTS AND CONTROLS

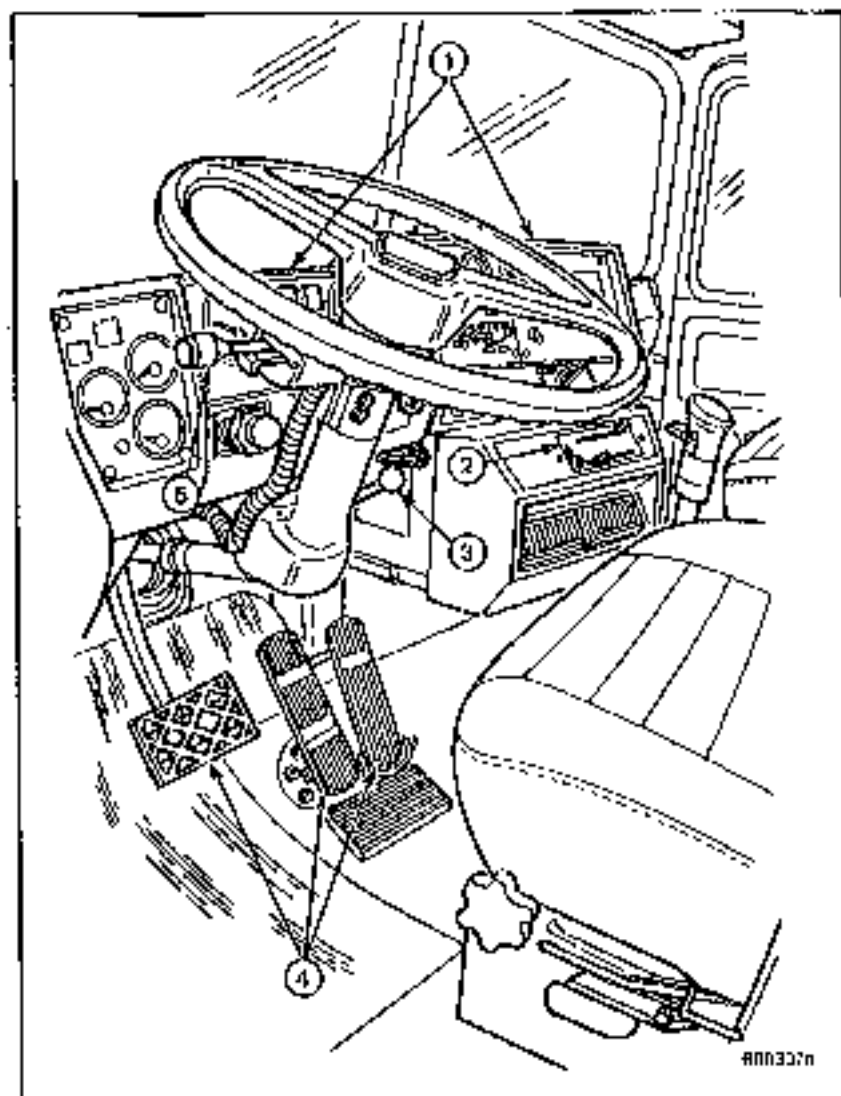
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INSTRUMENTS AND CONTROLS

CAB INTERIOR



1. Instrument Panels
2. Cab Climate Control Panel
3. Tilt Control Lever

4. Foot Pedals
5. Turn Signal, Hazard Switch and HI/LO Beam



INSTRUMENT PANEL

Tell-Tales

A tell-tale is a display that indicates the actuation of a device, a correct or defective condition, or a failure to function.

The operator should become familiar with these symbols in order to recognize and react (if necessary) to the indicated condition. Tell-tale symbols are shown in the instrument panel illustrations on the following pages.

Colors

To promote visual recognition internationally, specific colors for tell-tales have been established. Unless governmental regulations (in the area where the vehicle is to be used) or engineering directives specify otherwise, the standard colors are:

- **Blue** — high-beam headlights
- **Flashing Green** — turn signals
- **Flashing Red** — hazard condition involving the safety of personnel
- **Steady Green** — system in operation
- **Steady Red** — warning, immediate action required
- **Amber** — early warning, such as low fuel or Anti-Lock Brake System (ABS) malfunction



INSTRUMENTS AND CONTROLS

Panel Arrangement

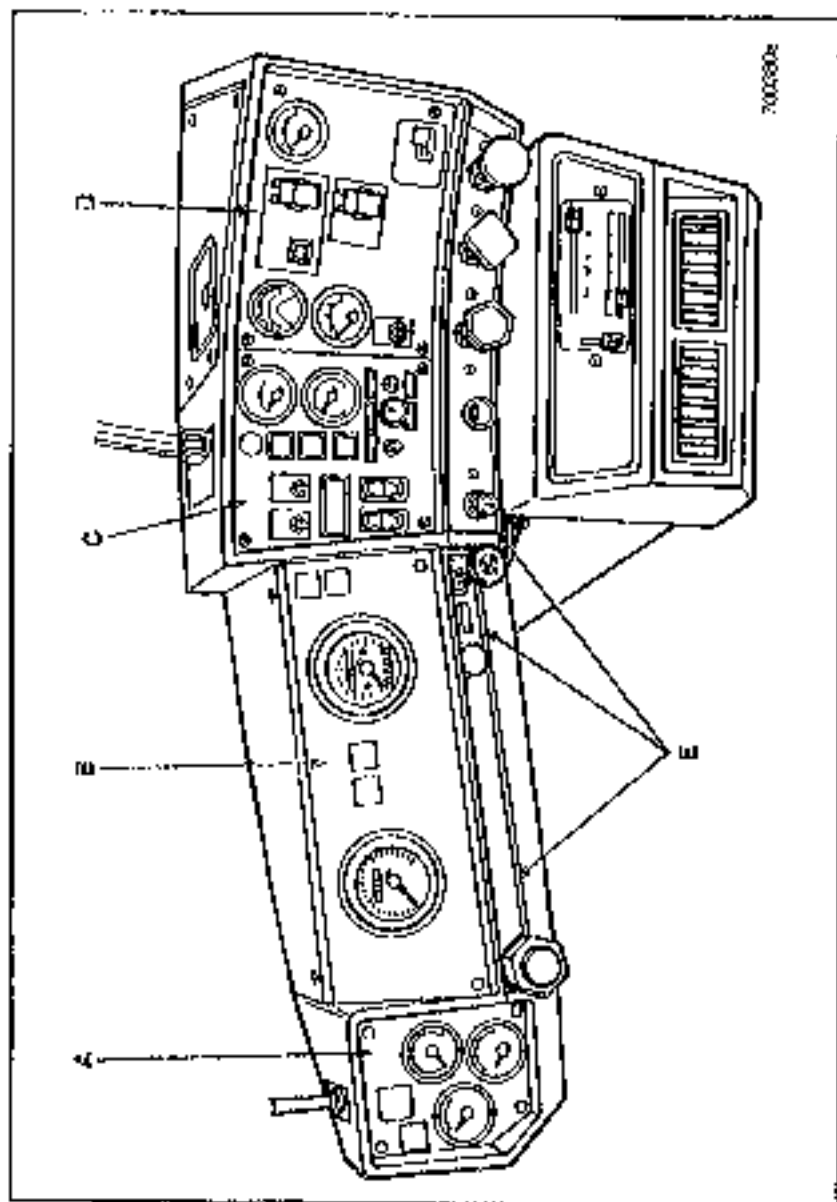
Your view from the driver seat should look something like the illustrations shown. The layout is designed to provide the operator with a good view of the gauges and controls (which are placed so they are within easy reach). The instrument panel, as shown in the following drawing, is broken down into several main sections. For easy identification we refer to them, from left to right, as Panels A, B, C, D, E and F (where necessary).

NOTE

This section is intended to show all the possible instruments and controls available for this vehicle. However, depending on options, your vehicle may not have all of the instruments and controls shown here, and they may not be in exactly the same position.



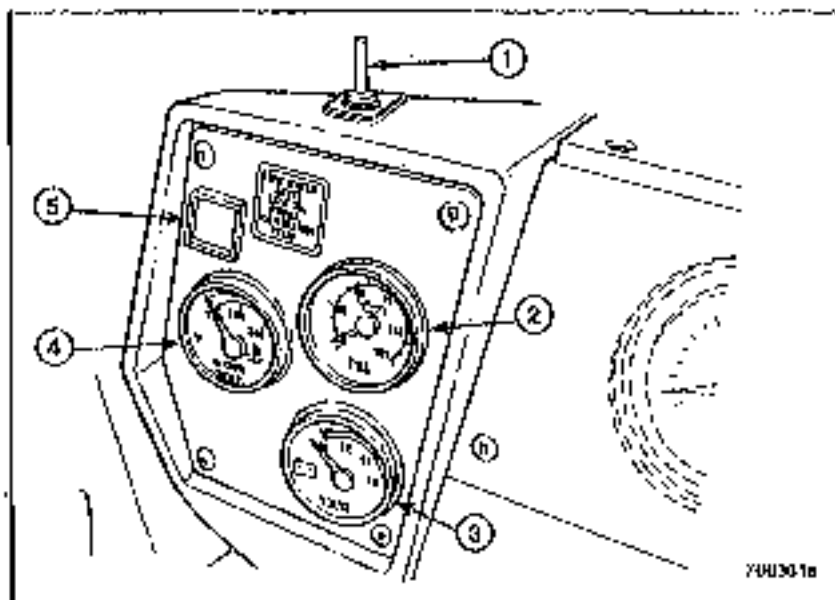
INSTRUMENTS AND CONTROLS





INSTRUMENTS AND CONTROLS

Panel A

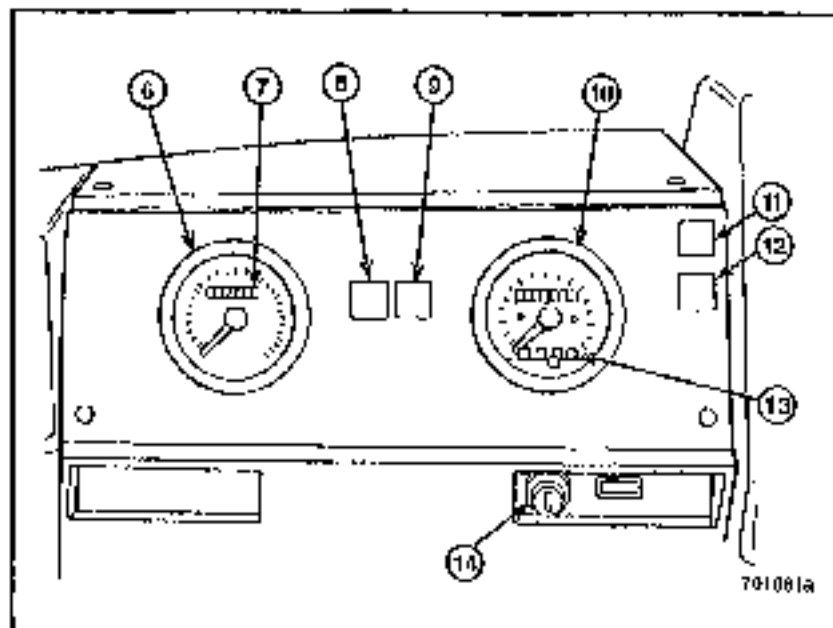


- | | |
|-----------------------|------------------------------------|
| 1. Signal Switch | 4. Coolant Temperature Gauge |
| 2. Oil Pressure Gauge | 5. Engine Shutdown Indicator (Red) |
| 3. Voltmeter | |



INSTRUMENTS AND CONTROLS

Panel B



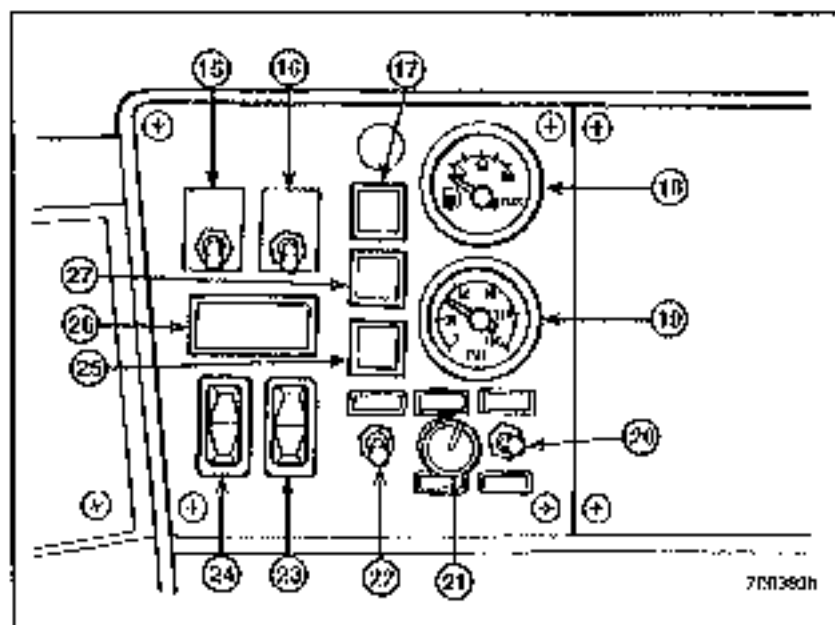
- 6. Tachometer
- 7. Hour Meter
- 8. Parking Brake Indicator (Red)
- 9. High Beam Indicator (Blue)
- 10. Speedometer/Odometer

- 11. Electronic Malfunction Indicator (Amber)
- 12. Anti-Lock Brake System (ABS) Indicator (Amber)
- 13. Trip Odometer
- 14. Combination Starter and Electrical Switch



INSTRUMENTS AND CONTROLS

Panel C



77M380h

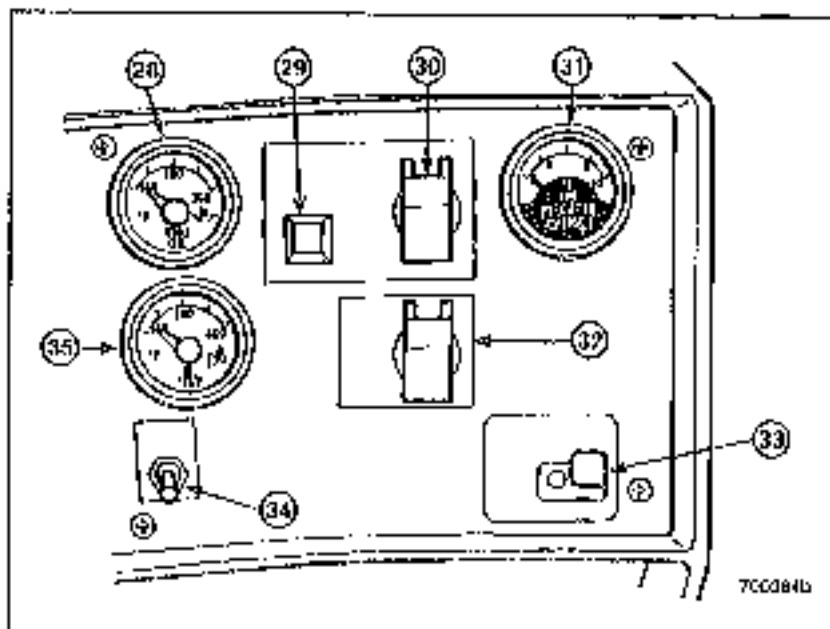
- | | |
|--|--|
| 15. Hook-Up Light Switch | 23. Resume/Set Switch |
| 16. Heated Mirror Switch (If Equipped) | 24. Speed Control Switch |
| 17. Hook-Up Indicator (Amber) | 25. Heated Mirror Indicator |
| 18. Fuel Gauge | 26. Turn Signal Indicators (Green) |
| 19. Air Pressure Gauge | 27. Low Air Pressure Warning Indicator (Red) |
| 20. Light Switch | |
| 21. Panel Lights Rheostat | |
| 22. Clearance Light Switch | |

If equipped with Moto-Mirrors, the switch is located on Panel C



INSTRUMENTS AND CONTROLS

Panel D

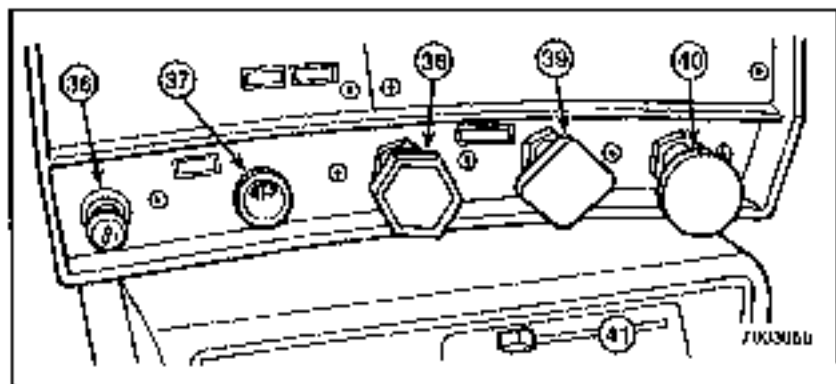


- | | |
|-----------------------------------|--|
| 28. Engine Oil Temperature Gauge | 32. Air Suspension Control Switch |
| 29. Neutral Indicator (Amber) | 33. Fifth Wheel Slide Switch |
| 30. Power Take-Off Neutral Switch | 34. Engine Brake Switch |
| 31. Exhaust Pyrometer | 35. Transmission Oil Temperature Gauge |



INSTRUMENTS AND CONTROLS

Panel E



- 36. Cigar Lighter
- 37. Windshield Wiper/Washer Controls
- 38. Trailer Air Supply Valve

- 39. Parking Brake Valve
- 40. Tractor Brake Valve (Optional)
- 41. Cab Climate Control Panel



INSTRUMENTS AND CONTROLS

- ① **Signal Switch** — Flashes the front and rear lights, eliminating the necessity of reaching for separate switches when signaling for passing or being passed by other vehicles. This switch is spring-loaded so it automatically returns to the neutral position when released.

With the headlights on, moving the Signal switch to the rear turns the marker lights OFF. With the marker lights on, moving the Signal switch to the rear turns the lights on. Regardless of whether the headlights are on, moving the Signal switch forward turns on the high beams.

- ② **Oil Pressure Gauge** — Indicates engine oil pressure. The normal operating oil pressure for a MACK E7 engine (at governed speed) is between 30 and 84 psi (207 and 579 kPa), depending on engine type speed and oil viscosity. At idling speed, the oil pressure should be between 10 and 35 psi (69 and 241 kPa).

Should the oil pressure drop suddenly from normal readings, stop the engine immediately and determine the cause.

- ③ **Voltmeter** — Indicates the surface charge of the battery with the engine NOT running (and the Ignition ON). Indicates the condition of charging system with the engine running.

The voltmeter can be useful as a diagnostic tool. During cranking, the reading should not drop below 10 volts. Lower readings may be an indication of corroded connections at the cranking motor or battery terminals, or discharged or defective batteries.



INSTRUMENTS AND CONTROLS

- ④ **Coolant Temperature Gauge** — Indicates the temperature of the engine coolant. The normal operating temperature for MACK engines is between 170°F and 225°F (77°C and 107°C). Certain operating conditions, such as pulling heavy loads up steep grades and high ambient temperatures, will affect operating temperature. The engine must not be operated if the coolant temperature exceeds 225°F (107°C).

Consult the appropriate vendor engine manual if your vehicle is not equipped with a MACK engine.

CAUTION

Coolant temperature must NOT exceed 225°F (107°C).

- ⑤ **Engine Shutdown Indicator (Red)** — Indicates the occurrence of a condition which requires that the engine be shut down (i.e., low water level, low oil pressure or high water temperature). If the engine shutdown feature is enabled, the operator has about 15 seconds after the light goes on to pull to the side of the road before the engine shuts off. If the engine shutdown feature is disabled, the indicator will function as a warning light but the engine will not shut down.
- ⑥ **Tachometer** — Indicates engine speed in revolutions per minute (RPM). Tachometer readings should be used as a guide for shifting, as well as to prevent engine damage due to overspeed. The blue band indicates the optimum range for engine brake operation.
- ⑦ **Hour Meter** — Indicates hours of engine operation. Hours of operation should be used as a guide for certain engine or PTO maintenance operations.
- ⑧ **Parking Brake Indicator (Red)** — Indicates that the parking brake is engaged.
- ⑨ **High Beam Indicator (Blue)** — Indicates that high beams are on.



INSTRUMENTS AND CONTROLS

- ⑩ **Speedometer/Odometer** — Indicates road speed in miles and/or kilometers per hour and total distance vehicle has traveled.
- ⑪ **Electronic Malfunction Indicator (Amber)** — Illuminates when V-MAC detects an electronic malfunction. Refer to the appropriate V-MAC Operator's Manual for details.
- ⑫ **Anti-Lock Brake System (ABS) Indicator (Amber)** — Indicates an ABS malfunction. Also illuminates momentarily as a bulb check when the ignition is turned on. If the light turns on and stays on, a malfunction is indicated. If the light does not turn on when the ignition is turned on, the bulb and the power source may be defective. For additional information on operating an ABS-equipped vehicle, refer to page 105, *Anti-Lock Brakes*.

NOTE

When an ABS malfunction is detected, anti-lock braking in the affected wheel will be disabled and normal braking will return; the other wheels will retain anti-lock braking.

- ⑬ **Trip Odometer** — Indicates mileage that the vehicle has traveled since the trip counter was last reset. To reset the trip odometer, press the button at bottom of gauge.
- ⑭ **Combination Starter and Electrical Switch** — Starts the engine and activates the accessory relay. To start the engine, turn key clockwise. To activate the accessories, turn the key counterclockwise. When the switch is turned ON (in other direction), a warning buzzer will sound if air pressure is below 65 ± 5 psi (448 ± 34 kPa); the buzzer will turn off as soon as sufficient air pressure is restored. When the key is straight up and down, the switch is OFF.

NOTE

When starting the engine, turn the key clockwise until the engine fires; then release the key (which will automatically return to the RUN position).



INSTRUMENTS AND CONTROLS

- (15) **Hook-Up Light Switch** — Push the top to activate the hook-up lights. Push the bottom to turn them off.
- (16) **Heated Mirror Switch (If Equipped)** — Activates the outside heated mirrors (for use in icy conditions).
- (17) **Hook-Up Indicator (Amber)**
- (18) **Fuel Gauge** — Registers the fuel level in the supply tank(s).
- (19) **Air Pressure Gauge** — Indicates the air pressure in the air brake system(s). The normal operating air pressure is between 105 psi (724 kPa) and 135 psi (931 kPa) in both air brake systems. If pressure drops below 75 psi (± 5 psi) in either system, the warning buzzer and warning light will go on. Determine the cause of failure before proceeding. Primary air pressure is supplied to the rear brakes and is indicated by the green pointer on the gauge. Secondary air pressure is supplied to the steering axle brakes and indicated by the orange pointer.
- (20) **Light Switch** — Allows the operator to choose between parking lights (middle position), headlights (push top in) or OFF (push bottom in).
- (21) **Panel Lights Rheostat** — Clockwise rotation decreases dash light intensity.

NOTE

Panel lights will not go on unless the Light Switch is ON.

- (22) **Clearance Light Switch** — Push the top to activate the clearance lights on the tractor and the trailer. Push the bottom to turn the switch OFF.
- (23) **Resume/Set Switch** — This is a V-MAC switch; refer to the appropriate V-MAC Operator's Manual for more information.
- (24) **Speed Control Switch** — This is a V-MAC switch; refer to the appropriate V-MAC Operator's Manual for more information.



INSTRUMENTS AND CONTROLS

- (26) **Heated Mirror Indicator** — Indicates that the outside mirror heater is in operation.
- (26) **Turn Signal Indicators** — Flash green when the turn signals are activated.
- (27) **Low Air Pressure Warning Indicator (Red)** — Indicates low air pressure in the air brake system(s).
- (28) **Engine Oil Temperature Gauge** — Indicates the temperature of the engine oil.

 CAUTION

The maximum safe oil temperature for MACK engines is 250°F (121°C). Continued operation with oil above this temperature will cause rapid deterioration of the oil's lubricating properties and is NOT recommended.

- (28) **Neutral Indicator (Amber)** — Indicates that the transmission is in Neutral.
- (28) **Power Take-Off Neutral Switch** — Neutralizes the rear compound on T2070 Long Compound, T2100, and T2180 transmissions for rear case power take-off operation.



INSTRUMENTS AND CONTROLS

- ① **Exhaust Pyrometer** — Indicates the temperature of exhaust gases (about 12 to 16 inches from the turbocharger exhaust connections). This helps the operator select the proper gear for load and grade conditions, thereby avoiding excessive exhaust temperatures. The maximum operation temperature is shown on the nameplate of the pyrometer glass.

CAUTION

Do NOT exceed the maximum exhaust temperature indicated by the red line on the gauge. To reduce exhaust temperature, downshift or reduce engine power. If operating in cold climates with a winterfront, open the winterfront.

- ③ **Air Suspension Control Switch** — Exhausts air from the air bags of the air suspension when coupling or uncoupling trailers.

NOTE

Always exhaust the air from the bags before raising the dump body, to protect the air bags and improve chassis stability while dumping. If the dump body is raised while the air suspension is pressurized, damage to the air bags may result.

- ④ **Fifth Wheel Slide Switch** — Locks and releases a sliding fifth wheel using air pressure; this allows the fifth wheel to be properly positioned.

NOTE

The air pressure for the fifth wheel slide is supplied through the trailer brake hand-control valve. The trailer brake hand control must be applied before the fifth wheel can be positioned.



INSTRUMENTS AND CONTROLS

- 38 Engine Brake Switch** — Activates the engine brake. On chassis equipped with the Jacobs compression release engine brake, or the Jacobs Stealth Retarding System™, the best braking performance is achieved in the 1600 to 2100 rpm range. For optimum retarding power, keep engine RPM as close to 2100 rpm as possible. For additional information, refer to the Jacobs driver's manual supplied with the vehicle.

CAUTION

Do NOT activate the engine brake until the engine has reached normal operating temperature

- 39 Transmission Oil Temperature Gauge** — Indicates transmission oil temperature.

CAUTION

The maximum safe oil temperature for MACK transmissions is 250°F (121°C) for mineral-based oil, or 300°F (149°C) for synthetic oil. Continued operation with oil above this temperature will cause rapid deterioration of the oil's lubricating properties and is NOT recommended. Consult the vendor manual for non-MACK components

- 40 Cigar Lighter** — Press in the lighter; it will pop out when element is hot.
- 41 Windshield Wiper/Washer Controls** — Push the knob in to activate the washers. The 12 o'clock position is OFF. The 4 o'clock position is LOW speed. The 6 o'clock position is HIGH speed. The area between OFF and LOW is the Intermittent wiper control.



INSTRUMENTS AND CONTROLS

- ④⑨ **Trailer Air Supply Valve** — Red octagonally-shaped knob. Pull to apply trailer emergency brakes. Push to pressurize the trailer air reservoir, releasing the trailer emergency brakes.

NOTE

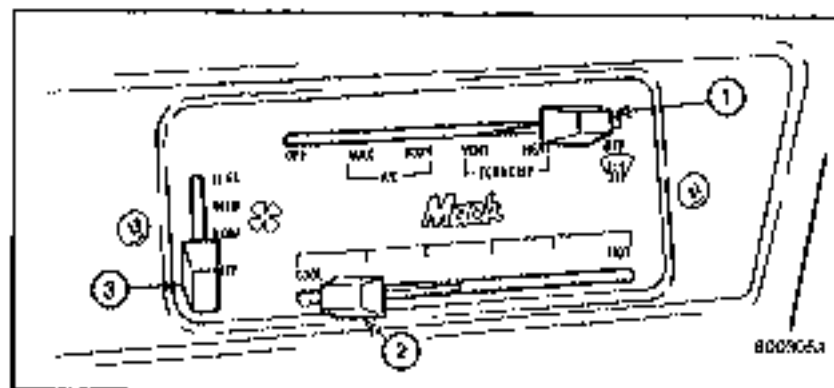
The trailer air supply valve should NOT be used for parking.

- ④⑩ **Parking Brake Valve** — Yellow diamond-shaped knob. Pull to apply. Push to release. Applies tractor parking brakes and trailer brakes, if equipped.
- ④⑪ **Tractor Brake Valve (Optional)** — Blue round-shaped knob. Exhausts the air in the brake chambers when the parking brakes are applied; serves as a tractor parking brake.
- ④⑫ **Cab Climate Control Panel** — See the CAB CLIMATE CONTROL section for more information.



INSTRUMENTS AND CONTROLS

CAB CLIMATE CONTROL



1. Mode Selection Lever

2. Temperature Control Lever

3. Fan Control Switch

- ① **Mode Selection Lever** — Allows the operator to choose the type of climate and air direction in the cab.
- Trucks without air conditioner -- This lever provides for OFF, VENT (untreated outside air), HEAT and DEF (useful for removing condensation from the windows and eliminates inside wiping).
 - Trucks with air conditioner -- This lever provides for OFF, MAX A/C (recirculates and treats cab air for the fastest cool down), NORM A/C (brings in and treats fresh air from the outside), VENT (untreated outside air), HEAT and DEF (useful for removing condensation from the windows and eliminates inside wiping).

NOTE

If your vehicle is equipped with air conditioning, the air conditioner unit should be run for FIVE MINUTES at least ONCE A WEEK throughout the year to keep the moving parts well lubricated.

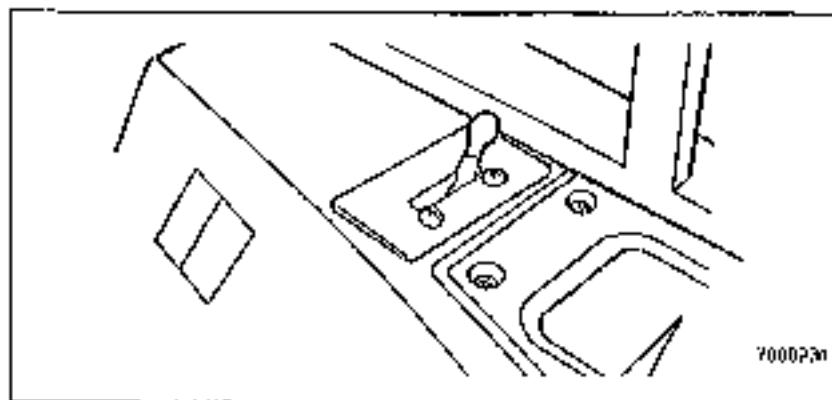


INSTRUMENTS AND CONTROLS

CLIMATE CONTROL (continued)

- ② **Temperature Control Lever** — Controls the temperature of air from *COOL* (far left) to *WARM* (far right).
- ③ **Fan Control Switch** — Controls the amount of air delivered through the vents. Down is *OFF* and up is *HIGH* speed. The middle positions are *LOW* and *MEDIUM* speeds.

Inside/Outside Air Switch



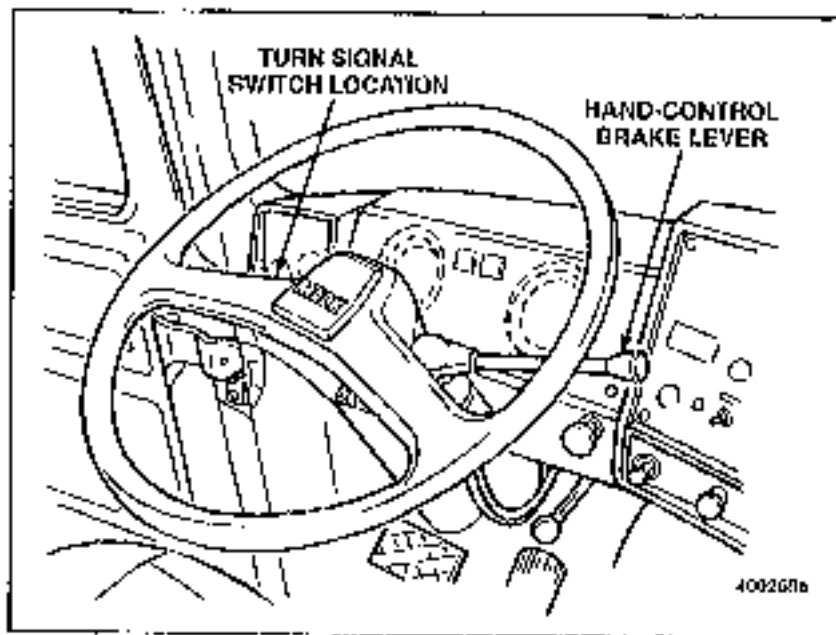
This switch, located above **Panel C** of the instrument panel, activates a solenoid which allows you to choose between outside air or "under the hood" air to be fed to the air cleaner.



INSTRUMENTS AND CONTROLS

STEERING COLUMN

Combination Starter and Electrical Switch





INSTRUMENTS AND CONTROLS

Turn Signal Lever

NOTE

The turn signals are not self-cancelling and must be returned to the middle position manually.

The turn signal lever is located on the steering column. It performs a number of functions, including activating the high and low beams and the hazard switch.

Hand-Control Brake Lever — Pull down to activate the trailer brakes, or the rear axle brakes in the case of a platform truck.

WARNING

The hand-control brake system must NOT be used for parking.



INSTRUMENTS AND CONTROLS

HANDLE IN RIGHT
TURN POSITION AND
CANCEL POSITION OF
HAZARD WARNING

PUSH BUTTON
FOR HI/O BEAM

HANDLE IN LEFT
TURN POSITION AND
CANCEL POSITION OF
HAZARD WARNING

PULL FOR WARNING
HAZARD POSITION

700366



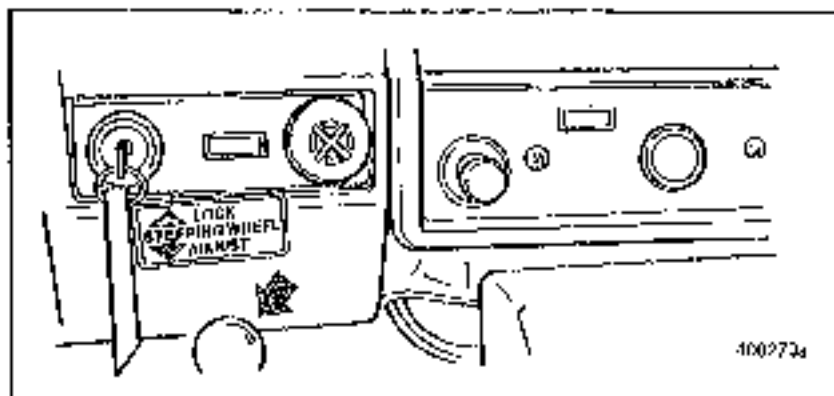
INSTRUMENTS AND CONTROLS

Steering Wheel Adjustment

WARNING

Adjust the steering wheel position **BEFORE** attempting to move the vehicle to avoid losing control of the vehicle.

The steering column adjusts by telescoping. There is a lever which controls this function.

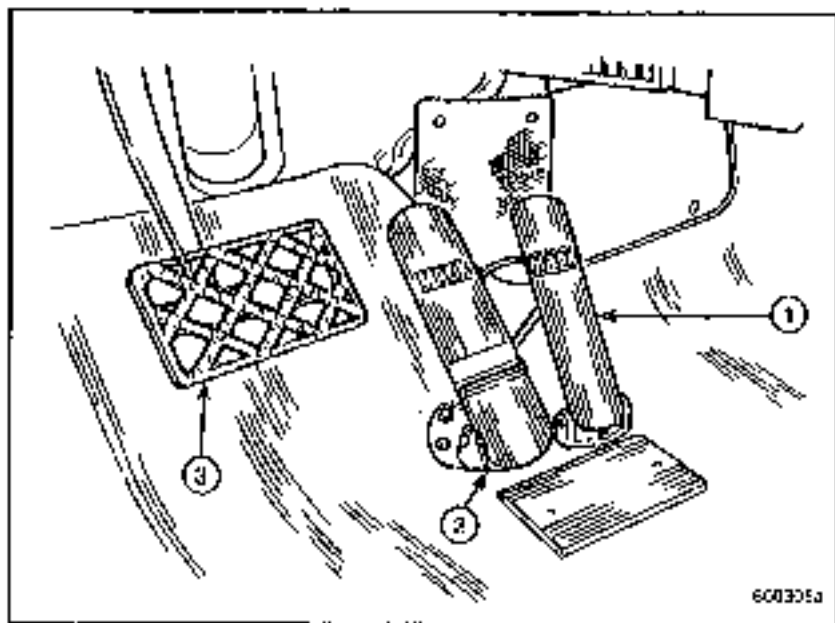


Telescoping

Push down on the lever and the steering wheel can be pulled toward the driver or pushed in toward the dash. Pull up on the lever to lock the steering wheel in place.



FLOOR PEDALS



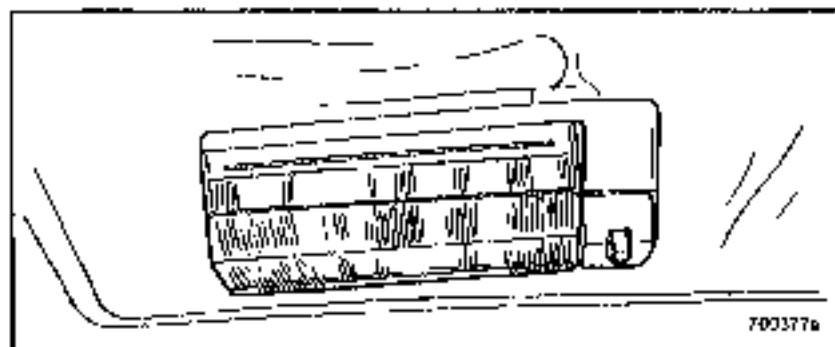
- ① **Accelerator Pedal** — Depress to increase engine/vehicle speed; release to decrease engine/vehicle speed.
- ② **Brake Treadle Valve** — Depress to activate the service brakes.
- ③ **Clutch Pedal** — Depress to disengage the clutch. For trucks equipped with standard transmissions.



INSTRUMENTS AND CONTROLS

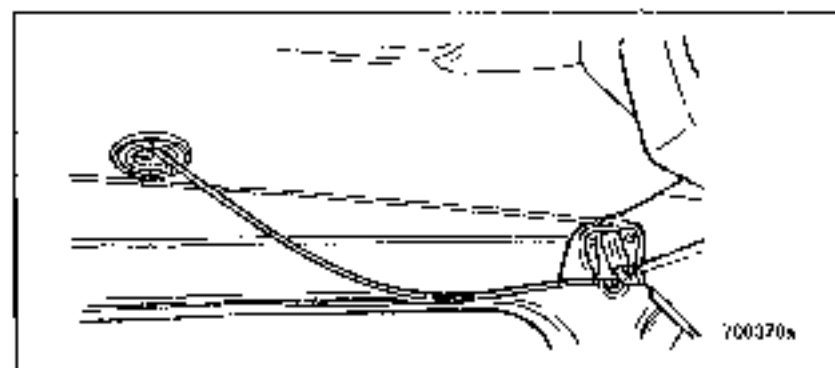
MISCELLANEOUS CONTROLS

Dome Light



The dome light is located in the cab headliner. To turn the dome light on, push the toggle switch to the left. To turn the light off, push the switch right.

Air Horn

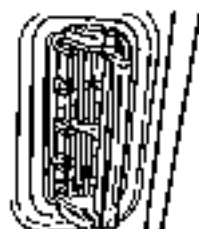


The air horns, if equipped, are activated by pulling down on the cord that is located above the left-side window.



INSTRUMENTS AND CONTROLS

Fresh Air Vent



600270a

An air vent is provided to circulate outside air to the cab interior. Move the vent lever forward or rearward to open the vent. Move the lever to the center to close the vent.



INSTRUMENTS AND CONTROLS

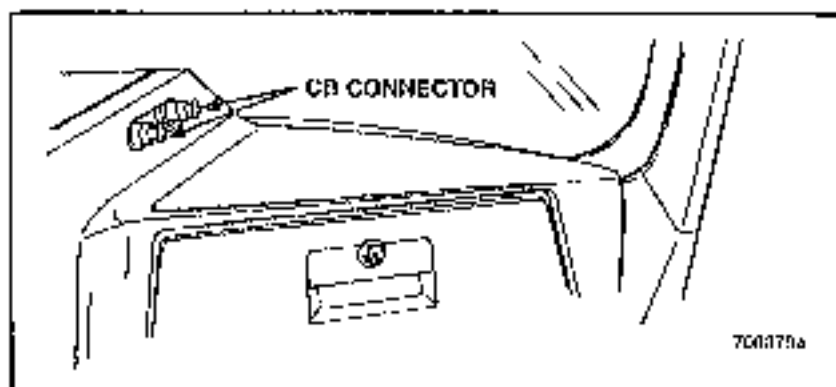
CB Connector

CB Radio Power Jack (+) Located on the Dashboard

This is a 12-volt, switched battery connection. It is to be used to power the vehicle's CB radio. It is protected by a 15-amp circuit breaker and supplies power only when the key is turned ON.

CB Radio Power Jack (-) Located on the Dashboard

This is a ground connection. It is to be used as a power return (-) connection for the vehicle's CB radio.



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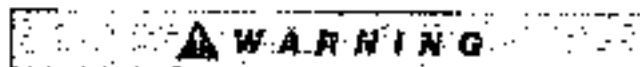


BEFORE OPERATING THE VEHICLE

Driver's Daily Walk-Around Inspection

With the proper care, your R will give you years of efficient performance.

Before each shift, the driver should perform the following inspections:



To avoid serious injury, do NOT step on fuel tank, battery box, frame, etc., unless adequate slip-resistant surfaces and handholds are provided.

Fluids

- ☐ Engine oil
- ☐ Engine coolant
- ☐ Fuel
- ☐ Power steering fluid

Leaks

- ☐ Air, coolant, oil, fuel, power steering fluid

Wheels and Tires

- ☐ Tire air pressure
- ☐ Tire/wheel condition
- ☐ Wheel stud nuts
- ☐ Front wheel bearings (oil)

Fasteners

- ☐ Steering linkage
- ☐ Seat bolts
- ☐ Doors and windows



- ☐ Battery box covers
- ☐ Fuel tank straps
- ☐ Hood or engine compartment covers

Air Reservoir

- ☐ Drain to remove moisture

Lights/Reflectors

- ☐ Replace defective and burned-out bulbs
- ☐ Replace broken lenses and reflectors

Gauges and Instruments

- ☐ Air pressure gauge
- ☐ Oil pressure gauge
- ☐ Temperature gauge
- ☐ Voltmeter

Component Operation

- ☐ Brakes (service and parking)
- ☐ Horn
- ☐ Heater and defroster
- ☐ Signaling devices
- ☐ Windshield wipers/washers
- ☐ Foot pedals
- ☐ Back-up alarms (if equipped)

Component Adjustment

- ☐ Rearview mirrors
- ☐ Seats



New Vehicle Break-In

To ensure many years of reliable, trouble-free operation, the following "break-in" procedures are recommended:

NOTE

Oil change, filter change and chassis lubrication are no longer required at the 3,000-mile vehicle break-in interval.

Refer to the preventive maintenance schedules outlined in the **MAINTENANCE AND LUBRICATION** manual, TS494, for recommended lubrication change intervals for the following items:

- Gear oils (transmission, rear axle carrier(s), front drive axle carrier, transfer case, flywheel PTO)
- Engine oil
- Oil filters
- Fuel filters
- Coolant conditioner

NOTE

It is important that components be filled with lubricants meeting the specifications as given in the **MAINTENANCE AND LUBRICATION** manual, TS494.

NOTE

When checking oil levels, the vehicle must be parked on level ground, and the units at normal operating temperature. Components must be filled to the correct level. **DO NOT OVERFILL.**



NOTE

Oil and filter change intervals in this manual pertain to components built by Mack Trucks, Inc. For information concerning oil and oil filter change intervals for vendor components, refer to the specific vendor component service literature.

During the First 3000 Miles (5000 Kilometers)

- After the first 125 miles (200 km), retorque the wheel nuts using an accurately calibrated torque wrench. Recheck this torque again after 500 miles (800 km).
- Check oil and coolant levels frequently.
- Check brake and clutch adjustments per recommended maintenance schedule, and adjust as needed.
- Observe the instruments often, and shut down the engine at the first sign of any abnormal readings.
- Report all leaks, loose fasteners, unusual noises, etc., to the service representative at the nearest branch or distributor, so they can be checked and corrected.
- Check the spring clip torque (U-bolts). (On Heyco suspensions, also check equalizer nut torque.)
- Check the U-bolt torque on the MACK air suspension at the end of the first 1000 miles (1600 km).



After the First 3000 Miles (5000 Kilometers) or Before 4000 Miles (6400 Kilometers) or Before 3 to 4 Months

- ◆ Retorque the spring clip (U-bolts). (On Rayon suspensions, also retorque the equalizer nut.)

At the First A Inspection Interval

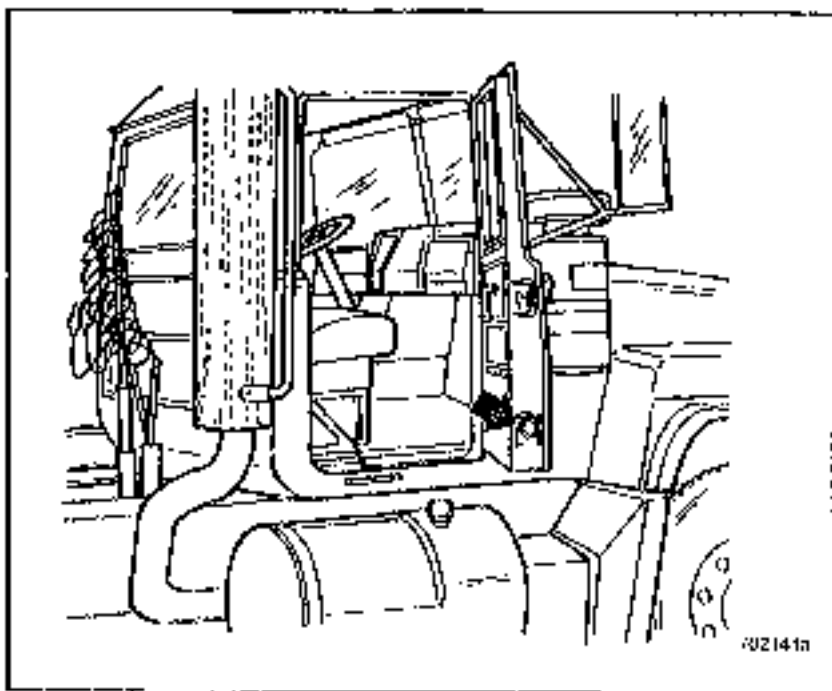
- ◆ Check front and rear axle alignment and adjust if the alignment is out of specifications.
- ◆ Check steering knuckle to axle beam clearance.

Although this quality-built vehicle has been inspected, lubricated and adjusted at the MACK Trucks Assembly Plant, an occasional air, oil or coolant leak may develop. Quick action to correct these minor items will prevent a major repair later. Take the vehicle to the nearest MACK service center as soon as any abnormal condition becomes evident.



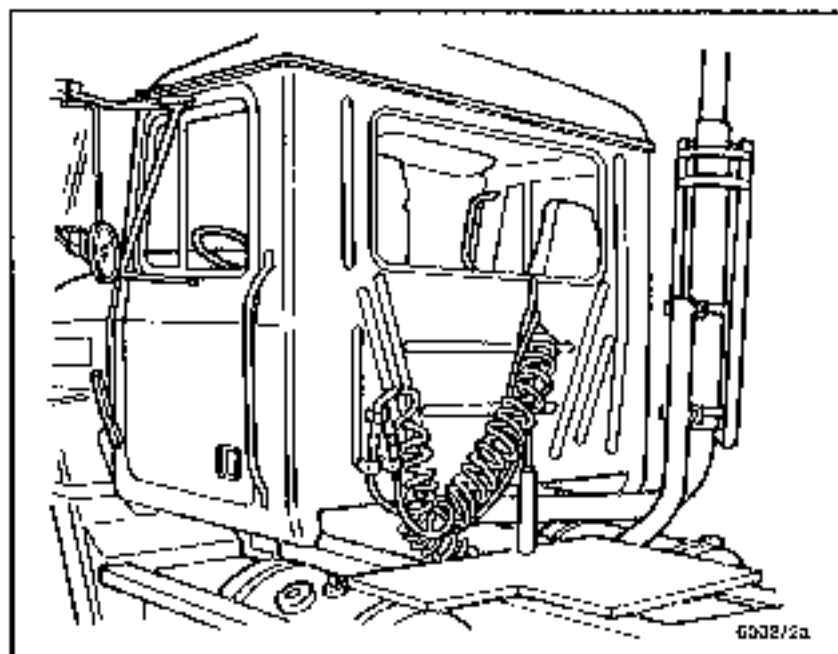
WINDSHIELD WASHER RESERVOIR

As shown in the drawing below, the windshield washer reservoir opening is located at the bottom of the rider-side door.





HOSE TENDERS



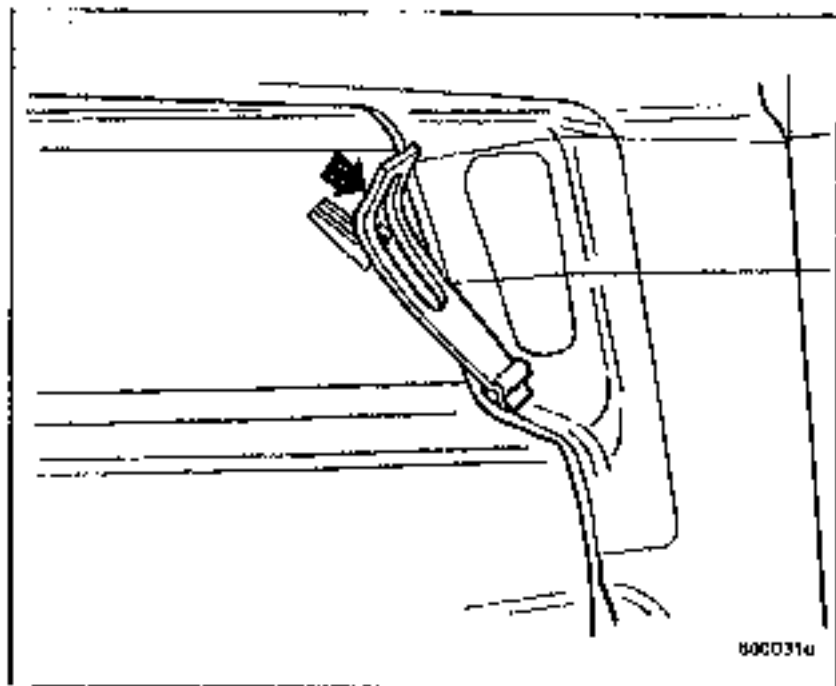
⚠ CAUTION

Avoid loose hoses. Air lines and tractor-to-trailer electrical connections must be secured to the tractor hose tenders (hose hanger, towel bar, pogo stick, etc.) to prevent them from tangling in the driveline.



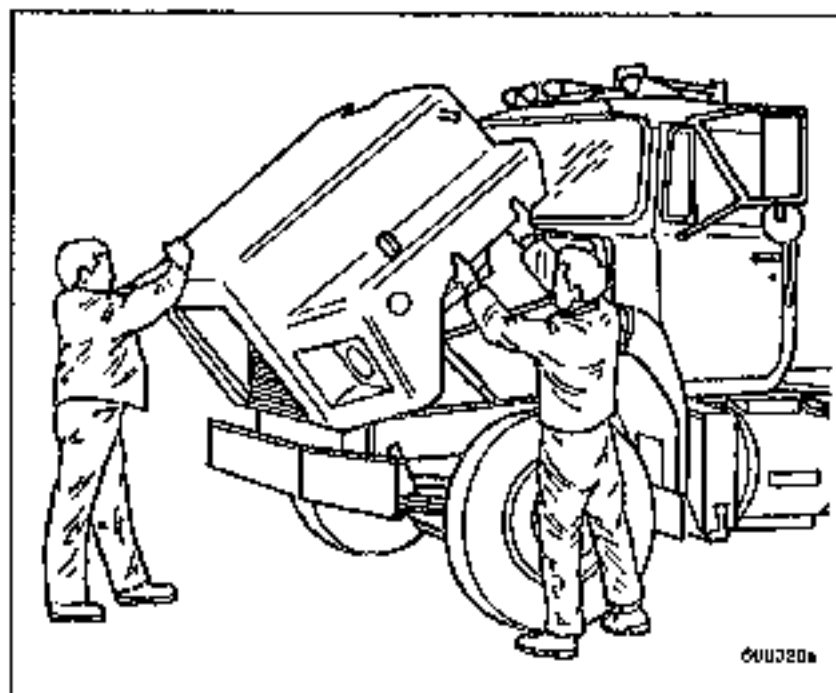
HOOD OPERATION

Opening the Hood



To open the hood, first release the hold-down straps on each side of the hood.

1. With the hood in the locked position, pull outward on the hold-down strap.
2. Swing the strap down and out of the way.
3. Repeat this procedure on the other side of the hood.



4. Using the Bulldog as a handle, pull on the hood to raise it over the engine. You may put one foot on the bumper, if necessary.
5. Pull steadily on the hood until it comes over the center and stops fully open.

⚠ WARNING ⚠

NEVER take both feet off the ground to lift the hood. Keep at least one foot on the ground to avoid a slip or fall. If it is difficult for you to raise the hood, get the help of someone who can lift from the rear of the hood.



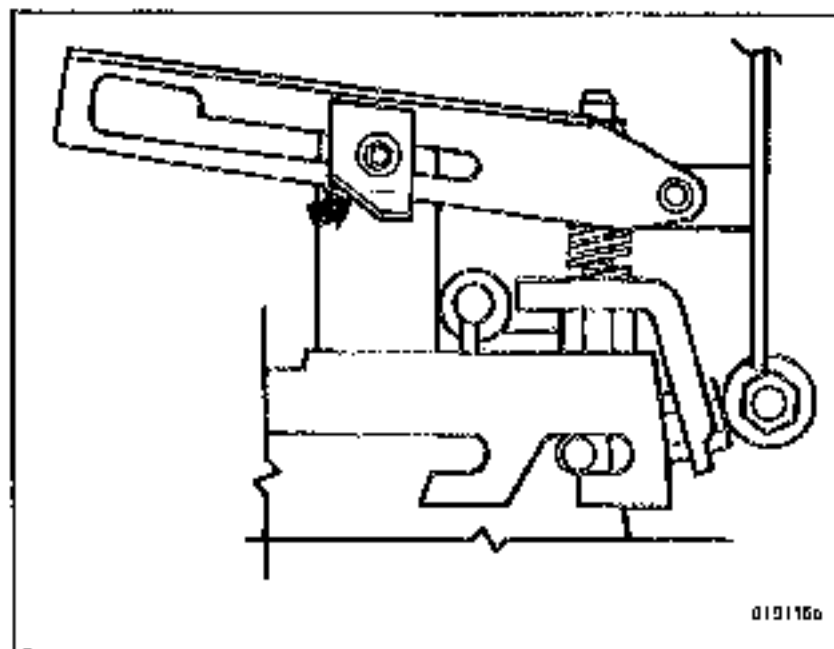
Closing the Hood

NOTE

Remember to remove all tools, rags and test equipment from the engine compartment before closing.

NOTE

The safety latch must be released (reset) before the hood will close.

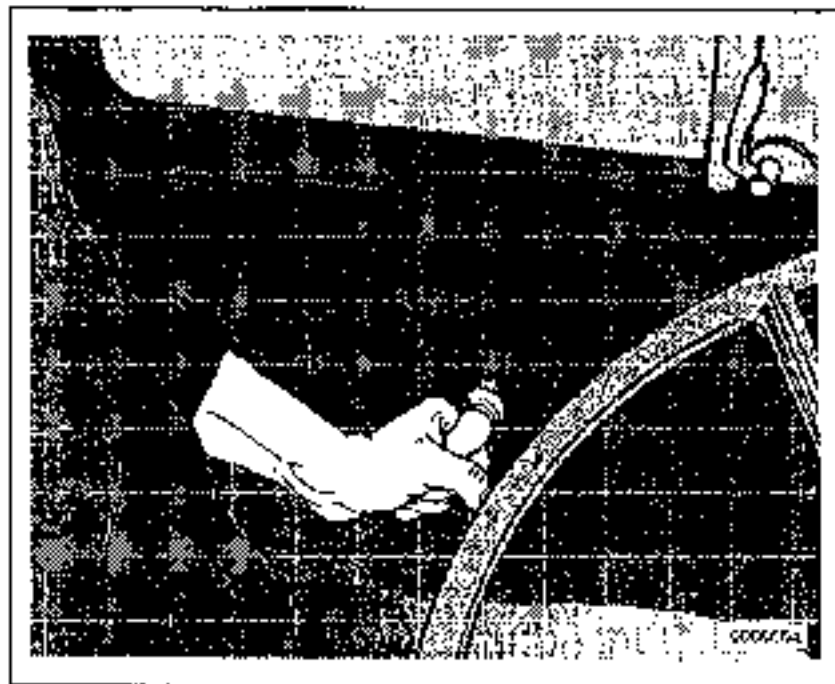


To lock the hood, secure the hold-down straps on each side of the hood by setting the groove in the strap over the hood latch. Then force the strap over the hood latch.



DOORS

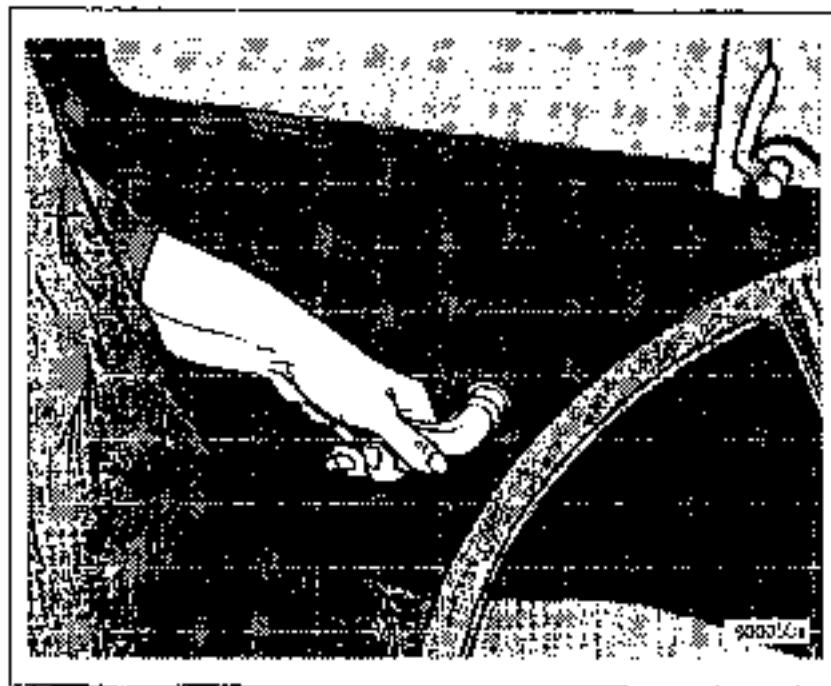
Opening the Cab Door



To open the door, grasp the handle and push away while exerting some force on the door.



Locking the Cab Door



To lock with door closed (from the inside), grasp the door handle and pull upward until an audible "click" is heard.



POWER TAKE-OFF (PTO) OPERATION

If the vehicle is equipped with a Power Take-Off (PTO) unit, be sure to read the following section.

PTO Precautions

⚠ DANGER

Power Take-Off (PTO) units and related equipment can be very dangerous. Any PTO installation, repair or replacement should include a warning indicator light which indicates PTO engagement. The light must be located close to the PTO control and clearly visible to the operator.

⚠ DANGER

PTO units are driven by engine or drivetrain components (flywheel, crankshaft, transmission). Do not attempt to service the PTO and related units unless the engine is shut down.

⚠ DANGER

Always keep body parts and loose-fitting clothing out of the range of drivetrain components, or personal injury may result.

⚠ DANGER

Always be aware of the current PTO status (engaged or disengaged) and the position of the vehicle body (dump body controlled by PTO, etc.). Be sure to disengage the PTO when not in use.



PTO Classification

Rear-mounted PTO units, for MACK transmissions, are categorized according to operation.

Intermittent Service -- The PTO unit is operated, under load, for less than seven minutes and then allowed to cool before it is operated again.

NOTE

If a PTO unit is operated for less than seven minutes but is "not" allowed to cool down before operating again, it is considered in Continuous Service.

Continuous Service — The PTO unit is operated, under load, for seven minutes or more.

NOTE

Rear-mounted PTO units operating under the Continuous Service guideline must not be run at more than 70% of the PTO output-rated torque/horsepower.



PTO Operating Procedures

The following procedures only apply to transmissions with a neutral switch and a transmission rear-mounted PTO.

When engaging the PTO unit:

1. Select LO-split using the splitter switch and select LO range using the range selector. The transmission **MUST** be in LO range and LO-split at all times during PTO operation.

NOTE

The transmission **MUST** be in LO range and LO-split at all times during PTO operation.

2. Depress the clutch pedal to disengage the clutch.
3. Set the parking brake(s).
4. Move the main box gearshift lever to the NEUTRAL position.
5. For transmissions with a neutral switch and a rear-mounted PTO, move the dash-mounted compound neutral control valve to the ON position (which moves the synchro clutch to a neutral position).
6. Engage the PTO.
7. Move the main box gearshift lever to the desired ratio.
8. Release the clutch pedal to engage the clutch.
9. Operate the PTO-driven load.



When disengaging the PTO unit:

1. Depress the clutch pedal to disengage the clutch.
2. Move the main box gearshift lever to NEUTRAL.
3. Disengage the PTO.
4. For transmissions with a neutral switch and a rear-mounted PTO, move the dash-mounted compound neutral control valve to the OFF position (which moves the synchro clutch back to LO range).
5. Move the gearshift lever to the desired main gear box ratio.
6. Release the parking brake(s).
7. Release the clutch pedal to engage the clutch.



ENGINE INFORMATION

For engine starting procedures, refer to the "Starting the Vehicle" section.

Precautions and Warnings

CAUTION

If a winterfront is required, use only a MACIK-approved winterfront that was designed for this specific chassis.

CAUTION

Be sure to avoid high intake/exhaust temperatures when using winterfronts or shutters under normal operating conditions (above freezing). The restriction of airflow can cause higher exhaust temperatures, power loss, excessive fan usage and reduced fuel economy.

CAUTION

When using a winterfront, a MACIK-approved exhaust pyrometer must be installed and closely monitored while the engine is in operation. Do NOT exceed the maximum temperature indicated by the red line on the gauge. To reduce exhaust temperature, downshift or reduce engine power and open the winterfront.

CAUTION

Do not permit a heavy load to drive the engine above the governed speed. Operate in a gear low enough to allow the engine to accelerate to (or maintain) governed speed when applying the throttle.



WARNING

Misuse or modification of a turbocharger can result in serious injury and property damage. In addition, extreme care must be taken to avoid foreign material induction, excessive exhaust temperatures and lack of lubrication.

Engine Model Designations

The MACK engine model designation system uses letters and numbers to provide a complete unit description.

Prefix Letters and Numbers:

- E = MACK turbocharged diesel engine
- M = Maxidyne engine (high torque rise)
- 7 = 720 cubic inch displacement
- Digits = rated gross horsepower (WHP)
- E-Tech = Electronic unit pump injection



Engine Brake Operation (If Equipped)

WARNING

Operation of any vehicle on wet or slippery roads requires extreme caution. Since the engine brake converts the engine to a retarding device, it should **NOT** be used on wet or slippery roads if the vehicle has a single driving axle or if it has tandem driving axles that are lightly loaded. Use of an engine brake under these conditions can cause the vehicle to skid or jackknife.

The purpose of an engine brake is to assist in slowing down the vehicle and reduce brake wear.

An example of when to use the engine brake is when descending a hill with a load.

NOTE

The best engine braking performance is achieved in the 1800 to 2100 rpm range. For optimum retarding power, keep engine speed as close to 2100 rpm as possible. For additional information, refer to the Jacobs driver's manual supplied with the vehicle.

NOTE

With the Stealth Retarding System™ in operation, no boost pressure readings will be observed. This is normal since this system does not require boost pressure to operate.



CRUISE CONTROL OPERATION

Speed Control Switches

Resume/Set Switch — Allows the driver to set and resume cruise control.

NOTE

In most cases, the Speed Control switch must be in the ON position in order to use the Resume/Set switch. However, when the Initial Set Using Resume Switch feature is enabled, cruise control can be activated using the Resume/Set switch.

The Resume/Set switch also functions as the Accel/Decel switch. Usually the Resume position (press the top) corresponds to an increase in engine speed (Accel) and the Set position (press the bottom) corresponds to a decrease in engine speed (Decel). However, V-MAC can be programmed so that the reverse is true.

NOTE

Under specific circumstances this switch can also be used to activate cruise control. For details concerning the Initial Set Using Resume Switch feature, refer to the V-MAC III User Guide.

Speed Control Switch — Activates the cruise control system.



Setting Cruise Control

1. Engage the clutch.
2. Move the Speed Control switch to the ON position.
3. Increase engine speed using the accelerator pedal.
4. At the desired speed, press and release the Resume/Set switch. This speed is now programmed and will be automatically maintained.

NOTE

To increase the engine speed, press and hold the Accel switch until the desired speed is attained, or press the accelerator pedal until the desired speed is attained and then press and release the Set switch.

Disengaging Cruise Control

To turn off the cruise control system, move the Speed Control switch to the OFF position.

NOTE

If the Speed Control switch is moved to the OFF position, the process of setting cruise control must be repeated in order to re-activate cruise control (unless the Initial Set Using Resume Switch feature is enabled).

To temporarily disengage cruise control, disengage the clutch or apply the service brakes.

NOTE

If cruise control is temporarily disengaged using the clutch or service brakes, press the Resume switch to resume the previously programmed speed.



BRAKE OPERATION

Air Brake System

This chassis features a dual braking system which has two complete air circuits: a primary circuit for rear brakes and a secondary circuit for front brakes. Each circuit receives air from separate reservoirs. Although there are two air circuits, they operate as one brake system through the dual-circuit treadle valve. This provides the driver with easy, graduated control when applying and releasing the brakes.

The air pressure in the two circuits is monitored by gauges on the instrument panel. (See the INSTRUMENT PANEL section for more information.) When air pressure drops below 75 ± 5 psi (517 ± 34 kPa) in either system at any time other than vehicle startup, pull to the side of the road and determine the problem. If air pressure continues to drop below 40 ± 5 psi in BOTH systems, spring brakes will automatically apply. The Low Air Pressure Warning indicator will be activated if low air pressure occurs in either circuit.

The air brake system consists of three main elements:

- The compressor, governor and reservoirs supply and store the air pressure.
- The brake application valve controls the brake application pressures.
- The brake chambers control the brake mechanism.

Air Brake Operation

CAUTION

Avoid sudden stops. Constant, sudden stops may negatively affect the performance of braking and driving parts.

When slowing for a stop, leave clutch engaged as long as possible to use the braking effect of the engine. When forward speed has dropped to a little above idling speed, push clutch pedal in and brake to a complete stop.



Parking Brake System

Spring-type parking brakes are standard on all single and tandem rear axles.

The spring brake system consists of an air cylinder with heavy springs, which is integrated with the spring brake air chamber. When there is no pressure in the air chamber, the springs expand (causing a brake application). When air pressure is applied to the air chamber, the springs are compressed (releasing the brakes).

Parking Brake Operation

The parking brakes can be applied and released from the cab, using the hand-operated control valve.

In the event of a significant air pressure loss in both the air brake systems, the spring brake air chambers will be automatically exhausted (applying the brakes). The parking brakes will remain applied until enough pressure is available to recompress the springs.

CAUTION

NEVER use the trailer parking brake system alone.
When parking a combination vehicle always use the tractor-trailer parking brake system.

CAUTION

Never leave the driver's seat if parking a tractor-trailer combination using the "tractor only" parking brake.
The "tractor only" parking brake should never be used alone to permanently park a combination vehicle.

CAUTION

Be sure to only use the parking brake for parking. Do NOT use the rear service brakes for parking.



Do **NOT** use the parking brake to slow or stop the vehicle when in motion, except in an emergency. When parking on a grade, use wheel chocks under the rear wheels or turn front wheels to the curb. Do **NOT** leave diesel engine vehicles in gear; if the vehicle should move, the engine may start by heat of compression.

NOTE

Check brake adjustment frequently to be sure that the brakes will lock and hold the vehicle when parked.

Anti-Lock Brake System (ABS)

ABS Operation

When operating an ABS-equipped vehicle, the following guidelines should be used.

- Apply the brakes as normal. If the anti-lock brake system begins to function, maintain brake pressure. Do **NOT** release the brakes.
- Avoid rapidly pumping the brakes. The anti-lock brake system automatically applies and releases the brakes up to five times per second.
- When towing a trailer (especially if only the tractor is equipped with anti-lock brakes), watch the trailer through the mirrors. Adjust brake application as necessary to keep the combination in a straight line. Make sure the trailer follows the tractor properly.

Precautions When Installing Electrical Equipment

Connecting electrically powered or electrically controlled equipment to the vehicle may cause interference with other vehicle components (e.g., the ABS system). The amount of interference will depend on the operating frequency of any new signals and the degree to which transient signals are coupled into the vehicle system.



NOTE

Whenever new electrical equipment is installed, it is the obligation of the installer to ensure that the new equipment does not interfere with the proper operation of all other electrical systems on the vehicle.

If new electrical equipment is installed, a vehicle checkout procedure should be performed.

1. Perform the checkout procedure under the following conditions:
 - Engine running
 - Brake system air pressure in operating range
 - Vehicle stationary
 - Brake pedal fully depressed
2. Operate the new equipment under all starting, running and shutdown conditions.
3. Listen for signs of air exhausting from anti-wheel-lock controllers (which is an indication of an interference condition).
4. Correct all interference conditions before operating the vehicle.

NOTE

The center pin on the standard seven-pin electrical connector will always be 'hot' when the tractor ignition is on. This may interfere with trailer systems on some tractor-trailers.



Automatic Traction Control (ATC) (If Equipped)

Automatic Traction Control (ATC) provides improved traction on slippery surfaces by reducing wheel spin. The system operates automatically as follows:

- If a drive wheel starts to spin, ATC applies air pressure to the brake of the spinning wheel. Doing this transfers engine torque to the wheels having better traction.
- If all drive wheels are spinning, ATC limits engine torque which, in turn, reduces wheel spin to provide improved traction.

When ATC automatically becomes active, the ATC indicator lamp turns on to alert the operator. The lamp turns off when the wheel(s) stops spinning.

Deep Mud and Snow Function

ATC may also include a deep mud and snow function which allows the operator to activate ATC when additional traction is needed. This function is activated with the ATC mode switch which is located on the dashboard (refer to INSTRUMENTS AND CONTROLS section). The deep mud and snow function increases available traction by increasing permissible wheel spin.

When the operator selects the deep mud and snow function, the ATC indicator lamp blinks continuously. The ATC lamp stops blinking when the ATC mode switch is turned off.

CAUTION

Be sure to deactivate the deep mud and snow function when no longer needed. Continued operation with the deep mud and snow function active will result in vehicle damage. If after a reasonable amount of time (no more than 5 minutes) the vehicle is still not moving, deactivate the ATC and put on chains.



GOOD DRIVING HABITS

Weight Ratings

Do not overload the vehicle. The gross vehicle weight and gross axle weight ratings for a given model vary with operating conditions, tire size, wheel base, type of wheels, axles, suspension, frame length and overhang. For economy and safety, it is important to observe the Gross Vehicle Weight (GVW) and Gross Axle Weight (GAW) ratings for your particular truck, which can be found on the Safety Certification Label.

Instruments

Glance at the instruments frequently. When problems develop, take prompt steps to correct them.

Engine Shutdown

After a hard run, allow the engine to idle three minutes before shutdown in order to stabilize the temperature of all engine parts. Quick shutdowns can cause engine damage and prevent the turbocharger from being properly lubricated.

Parking

CAUTION

NEVER use the trailer parking brake system alone. When parking a combination vehicle always use the tractor-trailer parking brake system.

CAUTION

Never leave the driver's seat if parking a tractor-trailer combination using the "tractor only" parking brake. The "tractor only" parking brake should never be used alone to permanently park a combination vehicle.



CAUTION

Be sure to only use the parking brake for parking. Do NOT use the rear service brakes for parking.

Do NOT use the parking brake to slow or stop the vehicle when in motion, except in an emergency. When parking on a grade, use wheel chocks under the rear wheels or turn front wheels to the curb. Do NOT leave diesel engine vehicles in gear; if the vehicle should move, the engine may start by heat of compression.

NOTE

Check brake adjustment frequently to be sure that the brakes will lock and hold the vehicle when parked.

General Observation

Make it a habit at stops to walk around your truck looking for fuel, oil and coolant leaks. Also check condition of tires, wheel nuts, springs and lights. Stop trouble before it stops you!

**STARTING THE VEHICLE****General Information**

Before putting the key in the ignition switch, set the parking (spring) brake, disengage the clutch (if equipped) and put the transmission in NEUTRAL.

⚠ CAUTION

Do not engage the starting motor too soon after an incomplete start of the engine, or the starter may be damaged. Wait at least five seconds before attempting to restart the engine.

⚠ CAUTION

Do not rev the engine at start-up. Turbocharger damage may result since lubricants need time to establish a film between moving parts.

⚠ CAUTION

If the engine does not start immediately, limit cranking periods to 30 seconds to avoid overheating and damaging the starter.

NOTE

Build up air pressure to a maximum (120 lbs/827 kPa) before shutting down and parking for the night.



Push Button Starters

Put the key in the ignition switch. Turn the key clockwise to the first "click" (about two o'clock position) to activate the instruments. Depress the starter button and release as soon as engine starts. Keep the clutch (if equipped) disengaged until the engine runs smoothly.

Air Starters

On chassis equipped with an air starter, make sure that the air pressure gauge reads a maximum of 120 psi before shutting down and parking for the night. This will ensure sufficient air pressure for restarting the engine.

Starting E-Tech™ Engines

If the vehicle is equipped with an electronically governed MACK E-Tech (V-MAC III) engine, use the following procedure:

1. Crank the engine until it starts.

NOTE

Throttle pedal position is not important during cranking.

2. After the engine has started, warm the engine until the coolant temperature reaches normal operating range (170°F to 225°F; 77°C to 107°C). Once the engine reaches this temperature it can be operated in a normal fashion.

NOTE

Warm-up time can be reduced by increasing engine idle speed to 1000–1200 rpm by either applying the throttle pedal or by using the Electronic Hand Throttle feature.



NOTE

For bolted or unloaded applications, the engine may be warmed up by moving the vehicle with "light" throttle application after only one (1) minute of idle.

Priming the MACK E-tech Fuel System

Using a hand-priming pump is usually only necessary when the fuel system has run dry. If the hand-priming pump is needed, use the following procedure:

1. Remove, fill and reinstall the primary and secondary fuel filters.
2. Disconnect the inlet hose at the secondary fuel filter.
3. Hand-prime until fuel is seen at the inlet hose fitting. This should take approximately 50 hand pumps.

SERVICE HINT

Excessive hand priming after fuel is seen at the fitting may make the engine difficult to start.

4. Reconnect the inlet hose to the secondary fuel filter and crank the engine.

SERVICE HINT

If the engine does not start, refill both filters and repeat priming procedure outlined in Steps 2, 3 and 4.



NOTE

Do not crank the engine continuously for more than 30 seconds without allowing the starter to cool for two minutes between cranks.

CAUTION

The only acceptable method of priming the fuel system is the hand primer pump. The application of air pressure to the fuel tank or the use of an auxiliary pump to prime the fuel system is PROHIBITED. These priming techniques may result in severe engine damage caused by leakage of fuel past the supply pump seal and into the crankcase.

Engine Warm-Up

CAUTION

Idling the engine unnecessarily for long periods of time wastes fuel and fouls injection nozzles. Unburned fuel causes carbon formation and oil dilution. NEVER race an engine during warm-up.

Engine damage can occur if the engine is not warmed up to a minimum operating temperature of 170°F (77°C) before putting the vehicle into full operation.



Heavy-duty diesel engines are designed to operate at optimum efficiency when they are running loaded at (or very near) normal operating temperature, where efficient combustion takes place. When the engine is operated unloaded, lightly loaded (i.e., stop-and-go operations, PTO operations, or periods of extended engine idling) or in cold weather conditions, normal operating temperature may not be achieved or maintained. As a result, carbon and/or varnish build-up will occur and lubricating oil will become contaminated with combustion by-products.

Cold weather operations place added demands on a diesel engine. When operating in cold climates (particularly in stop-and-go operations, PTO operations or periods of extended engine idling), minimum operating temperature must be maintained to prevent engine damage resulting from valve varnishing and carbon build-up.

NOTE

Many accessories are available for cold weather operations. Refer to the **MAINTENANCE AND LUBRICATION** manual, TS494, for additional information concerning cold weather accessories.

Engine Idling

Idling the engine unnecessarily for long periods of time wastes fuel, fouls injector nozzles and can lead to valve carbon and varnish deposits. Unburned fuel causes carbon formation and oil dilution. Shut the engine down when prolonged loading or unloading of cargo is required.

When starting a cold engine, or if the vehicle has been parked and the engine coolant has fallen well below normal operating temperature, a fast idle speed of approximately 1200 rpm should be maintained to help the engine warm up more quickly.



Engine Shutdown

After a hard run, allow the engine to idle approximately three minutes before shutdown. This provides time to stabilize the temperature of all engine parts and allows the turbocharger to slow gradually. Quick shutdowns can result in mechanical problems for the engine and/or turbocharger.

CAUTION

Operating the engine below normal operating temperature for extended periods of time will allow varnish/carbon deposits to build up on the valve stems and guides. This will cause the valves to stick in the guides after the engine has been shut down, and could result in push rod damage when the engine is restarted. If the engine has been operated below normal operating temperature for an extended period of time (and the odor of raw diesel fuel is detected or unburned fuel can be seen at the exhaust stack), the engine should be operated under "load" until normal operating temperature is achieved BEFORE shutting down the engine.

On chassis equipped with an air starter, make sure that the air pressure gauge reads a maximum of 120 psi before shutting down and parking for the night. This will ensure sufficient air pressure for restarting the engine.



Engine Shutdown System (If Enabled)

The engine may be protected by a shutdown system that prevents engine failure by shutting down the engine whenever a dangerous condition (such as loss of oil pressure, loss of coolant or engine overheating) is detected. If the system detects a condition that will initiate engine shutdown, a warning indicator light will illuminate to alert the driver before the engine actually shuts down. Should shutdown occur, the system can be overridden so the vehicle can be moved to a location where it will not pose a hazard.

Engine Shutdown Indicator — During normal operating conditions, this indicator should illuminate as soon as the key switch is turned on. After the engine is started, it will remain illuminated until engine oil pressure reaches normal idling range. During shutdown, if the system detects a condition that could lead to engine failure, the Engine Shutdown indicator will illuminate prior to engine shutdown.



COLD WEATHER OPERATION

Cold Weather Starting Tips

- Save the batteries. Do not overtax the batteries and starting motor by cranking for more than 30 seconds without interruption. Allow about two minutes between attempts at starting the vehicle; this allows the starter to cool and the batteries to re-energize.

NOTE

Always make sure that the battery is fully charged in cold weather.

- Use the correct grade of oil for the prevailing winter temperature.
- Drain the fuel tanks and filters regularly to prevent water accumulation in the fuel system. This accumulation can freeze in fuel tanks, fuel lines and filters.

WARNING

Do NOT (under any circumstances) add gasoline, alcohol, used oil or additives with metallic particles to the fuel.

- If the fuel gets and starts clogging filters and small passages, mix a small percentage of No. 1D fuel (kerosene) with No. 2D (diesel) fuel.

NOTE

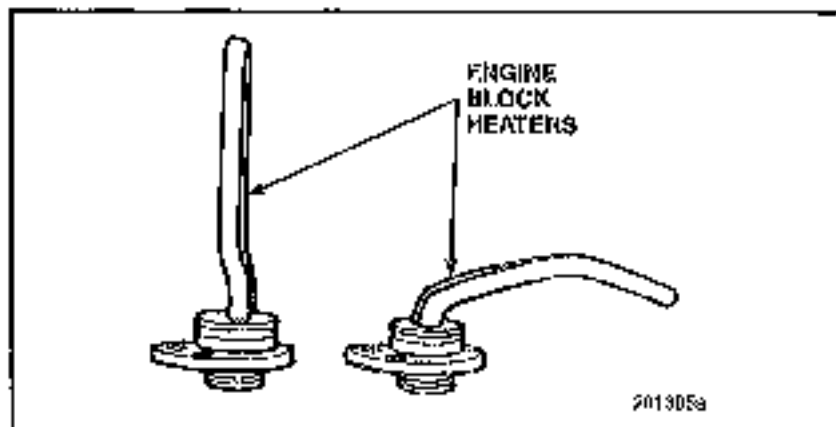
Adding kerosene is NOT recommended for general use, since both performance and fuel economy will be reduced.

- Refer to the MAINTENANCE AND LUBRICATION manual, TS494, for additional cold weather operating information.



Engine Block Heaters

An engine block heater works by heating the coolant surrounding the combustion chambers. Engine heaters are recommended to help combat the extreme demands of cold weather operating conditions. When the temperature drops, the engine heater can be plugged in overnight. The location of the engine heater power receptacle varies according to vehicle design.



Engine Heater Benefits

- Eliminates cold weather starting problems.
- Increases engine life significantly by keeping the engine warm and avoiding costly, excessive idling.
- Prevents external water leaks caused by excessive cold.
- Allows the cab to heat more quickly.
- Reduces the temperature at which ether is required.
- Engine heaters may be activated as soon as the engine is stopped.



MOVING THE VEHICLE

General Information

Braking

Avoid sudden stops. Constant sudden stops may negatively affect braking performance and driving parts. When slowing, leave the clutch (if equipped) engaged as long as possible to use the braking effect of the engine.

⚠ CAUTION

When using the braking effect of the engine, final gear selection is critical. If gear selection is too high the vehicle will buck, which could cause loss of control.

E7 engines use a Jacobs engine brake. The best engine braking performance is achieved in the 1800 to 2100 rpm range. For optimum retarding power, keep engine speed as close to 2100 rpm as possible. For additional information, refer to the Jacobs driver's manual supplied with the vehicle.

Shifting

Operate in a gear low enough to allow the engine to accelerate to (or maintain) governed engine speed when applying full throttle. Allowing the engine to lug causes excessive strain on the engine, which could damage pistons, rings, cylinder walls, or bearings. However, be sure not to overspeed the engine.

⚠ CAUTION

Do not permit a load to drive the engine above governed speed. When descending steep grades, use lower gears and watch the tachometer. Overspeeding will cause severe drivetrain damage and eventually destroy the engine.



DANGER

*Always select the proper gear ratio **BEFORE** descending a grade (to avoid a runaway vehicle and to stay within safe and legal speed limits). Do **NOT** coast down hills. Gear ratios should be selected to allow the engine to operate between peak torque and rated speed.*

CAUTION

Running the engine at a speed that is too low for the load (or grade of the road) can cause damage to the drivetrain.

Shifting at the proper time will result in increased fuel efficiency, as well as a decrease in costly repairs. Remember that once the engine falls below peak torque, both torque and horsepower will drop off very rapidly; before this happens, downshift to the next lower gear.

For vehicles with transmissions that have extreme reduction gearing coupled with high rear-axle loads, a torque-limiting device should be used. This device limits the amount of fuel that can be delivered to the engine by the injection pump, and prevents overloading of drivetrain components while in extreme reduction gears.

Always use the same gear going downhill as uphill. This will reduce brake wear and prevent damage to the engine from overspeeding.

Engine Temperature

Before entering high-speed traffic conditions, allow the engine to reach normal operating temperature. Normal operating range is between 170°F and 225°F (77°C and 107°C) depending on weather and road conditions.



Clutch (If Equipped)

To avoid shock damage, release the clutch pedal smoothly, without shock-loading the driveline (especially on grades while carrying heavy loads). Do not ride the clutch pedal. Premature wear of the clutch facing and release bearing may result.

CAUTION

Always use the lowest drive gear combination to start the vehicle moving to avoid premature clutch failure.

General Instructions

1. To move the vehicle, start the engine and wait until it reaches operating temperature.
2. Disengage the clutch by pushing the pedal to the floor.
3. Shift the transmission into first or L.O gear (see "Transmission Shifting Instructions" for specific procedures).
4. Release the parking brake.

CAUTION

If the Parking Brake Indicator is on, do NOT attempt to move the vehicle, driveline damage may result.

5. Engage the clutch smoothly by releasing the clutch pedal. At the same time, apply the accelerator enough for the engine to move the load.

CAUTION

Never allow your foot to ride the clutch pedal when clutch is engaged. This will cause premature failure and increased clutch wear.



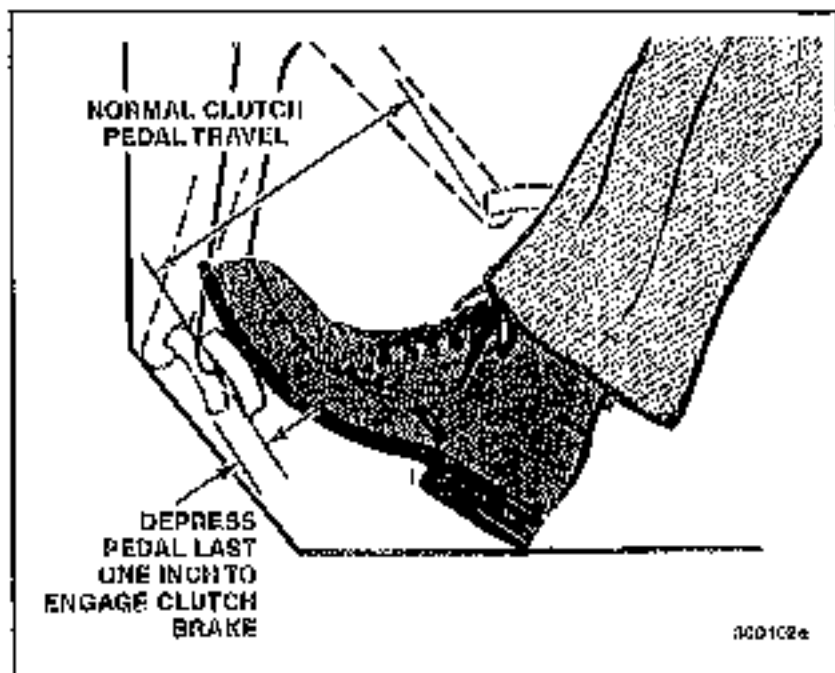
6. As the vehicle gains speed, continue shifting until the transmission is in the highest gear possible (with engine in operating range).

NOTE

When the vehicle is equipped with a torque-limiting device, the engine must be warmed up to operating temperature before attempting to move in either REVERSE or I.O.-I.O. range.

Clutch Brake Operation

The clutch brake is designed to stop the rotation of the transmission input shaft while the truck is standing still, to make shifting into first or reverse gears easier.





1. With the vehicle standing still, apply the clutch brake by pushing the clutch pedal all the way to the floor; the clutch brake is applied when the clutch pedal is fully depressed (the last one inch of travel past normal pedal travel).

NOTE

When the clutch is disengaged, a slight but definite resistance to clutch pedal downward travel will be felt in the last one inch.

2. Shift the transmission into first or reverse gear, engage the clutch and accelerate. The clutch brake is only to be used when the vehicle is stopped and being shifted into first or reverse gears. It is not designed to be used as an upshifting aid.

CAUTION

Clutch brake damage may result if used while the vehicle is in motion. The clutch brake must NOT be used when making a downshift or an upshift.

Double-Clutching

Double-clutching is a way to bring the speed of the transmission gears into synchronization so that the shift can be made without a clash. The engine is used to speed up the countershaft for a downshift and to slow it down for an upshift.

NOTE

For all nonsynchronized transmissions, double-clutching is necessary on downshifts as well as upshifts. It is advisable to use the torque-limiting clutch brake to engage first and REVERSE gears and to double-clutch for gear ratio changes.



1. Depress the clutch pedal and shift to NEUTRAL.
2. Release the clutch pedal and increase (downshift) or decrease (upshift) engine speed until it roughly corresponds to the road speed of the desired gear.
3. Depress the clutch pedal and complete the shift. Then release the clutch pedal.

Transmission Shifting Instructions

CAUTION

The maximum safe oil temperature for manual transmissions is 250°F (121°C) for mineral based oil, or 300°F (148°C) for synthetic oil. Continued operation with oil above this temperature will result in rapid deterioration of the oil's lubricating properties and is NOT recommended.

CAUTION

To avoid transmission damage, the vehicle must be completely stopped before attempting to shift from REVERSE to any forward speed (and vice versa).

MACK T2050 Shifting Instructions

Upshift — The T2050 is a five-speed overgear transmission designed for general highway use. This is a nonsynchronized model that shifts through the use of a single shift lever in the traditional "1" pattern. Start out in first gear and shift up to second, third, fourth and fifth, double-clutching from one gear to the next.

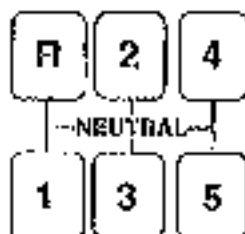
Downshift — Downshift in reverse order, double-clutching through each gear.



CAUTION

*Do NOT overspeed the engine during downshifting.
Damage to the drivetrain components may result.*

T2050



3001264

T2050 TRANSMISSION RATIOS

Gear	Ratio
1	5.24
2	3.05
3	1.73
4	1.00
5	0.60
Reverse	5.38

3005104



MACK T2060 Shifting Instructions

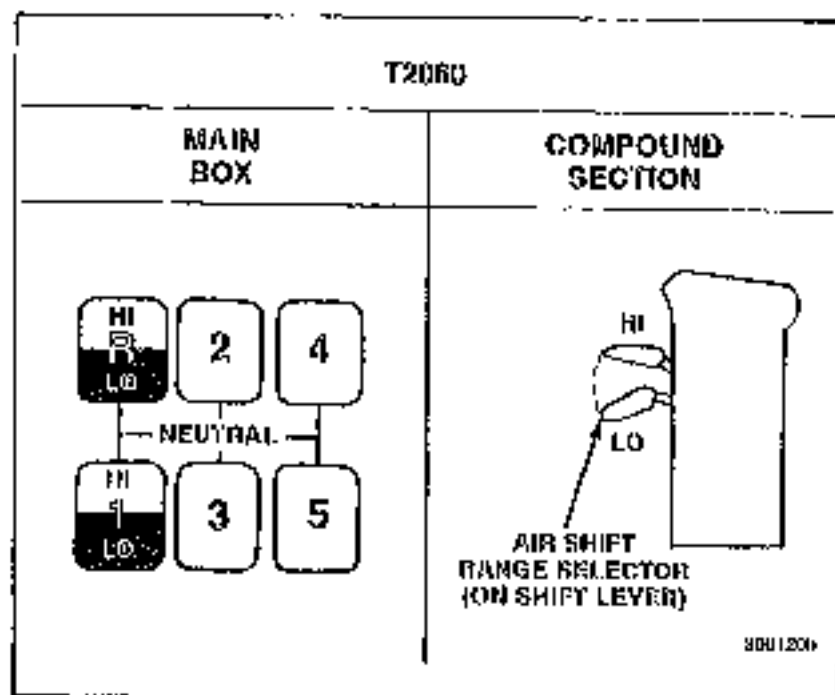
The T2060 is a nonsynchronized transmission. There is a LO and HI auxiliary compound section controlled by an air-shift range selector located on the shift lever. The LO range has one low ratio. In HI range there are five forward gears which can be shifted in the standard manner, but remember to double-clutch whether moving up or down through the gears. For normal highway use, start in HI range, first gear and shift through second, third, fourth and fifth. The LO range is designed for off-highway use and in slow-moving operations (curb pouring, material spreading, heavy load, steep grade). REVERSE can be used in LO or HI range.

Upshift — Begin in first gear (LO range), depress the clutch pedal and release accelerator pedal. Flip air-shift range selector to HI range (while still in first gear). Release the clutch pedal and apply the accelerator to reach the top of the operating range. Shift through second, third, fourth and fifth, double-clutching through each gear.

Downshift — Downshift as normal through fifth, fourth, third, second and first (HI range), double-clutching through all gears. When you get to the low end of the first gear HI range, make final downshift to first gear, LO range by depressing the clutch pedal, releasing the accelerator, and flipping air-shift range selector to LO. Release the clutch pedal.

CAUTION

Do NOT overspeed the engine during downshifting. Damage to the drivetrain components may result. Do NOT preselect the air-shift range selector. Shift the auxiliary compound section only with the clutch pedal depressed and/or the shift lever in NEUTRAL.



T2060 TRANSMISSION RATIOS

Gear (Main Box)	Ratios	
	LO	HI
1	9.02	5.24
2	(5.25)	3.05
3	(2.98)	1.73
4	(1.72)	1.00
5 (T2060)	(1.03)	0.60
Reverse	9.25	5.30

() The ratios in parentheses are not practical to use.

3001216



MACK T2060A Shifting Instructions

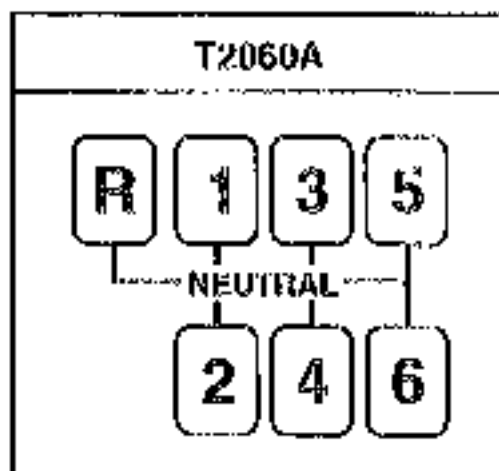
The T2060A is a six speed overgear, nonsynchronized transmission design for general highway use. Shifting is accomplished through a single shift lever using the traditional "H" pattern.

Uphift — Start out in first gear and shift up to second, third, fourth, fifth and sixth gears, double-clutching from one gear to the next.

Downshift — Downshift in reverse order (sixth through first), double-clutching through each gear.

CAUTION

*Do NOT overspeed the engine when downshifting.
Damage to driveline components may result.*



T2060A TRANSMISSION RATIOS	
GEAR	RATIO
1	7.50
2	4.00
3	2.41
4	1.50
5	1.00
6	.71
Reverse	6.43

301466n



MACK T2070-T2070F Shifting Instructions

The T2070-T2070F are nonsynchronized transmissions. Those transmissions feature a LO and HI auxillary compound section controlled by an air-shift range selector located on the shift lever. The LO range provides two low ratios. In HI range there are five forward gears that can be shifted in the standard manner, but remember to double-clutch whether moving up or down through the gears. For normal highway usage, start in HI range, first gear and shift through second, third, fourth, and fifth. The two gears in LO range are designed for off-highway use and in slow-moving applications (curb pouring, material spreading, heavy load/steep grade operation). REVERSE can be used in LO or HI range.

Upshift -- Begin in first gear, LO range (commonly called LO-LO as shown on the shift pattern diagram). Double-clutch and upshift to second gear, LO range (called LO) in the normal manner. When ready to upshift again, depress the clutch pedal and release the accelerator pedal. Move the shift lever to NEUTRAL, then flip the air-shift range selector to HI range, double-clutch and move the shift lever back to first gear. This is first gear HI range, which provides the next higher ratio. Release the clutch pedal and apply the accelerator to reach the top of the operating range. Shift through second, third, fourth, and fifth (HI range), being sure to double-clutch from one gear to the next.



Downshift — Downshift in reverse order from fifth through first gear (HI range), double-clutching through each gear. The next downshift will be to second gear, LO range (called LO). Proceed to depress the clutch pedal and release the accelerator pedal. Move the shift lever to **NEUTRAL**, then flip the air-shift range selector to LO range, double-clutch and move the shift lever to second gear. This is second gear, LO range, which provides the next lower ratio. When ready for the lowest ratio available (called LO-LO), double-clutch and downshift to first gear, LO range.

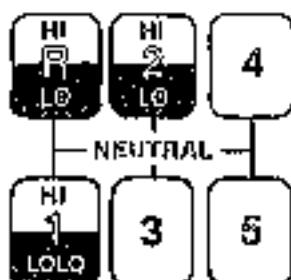
CAUTION

*Do not overspeed the engine when downshifting the transmission. Damage to the drivetrain components can result. Do NOT preselect the air-shift range selector. Shift the auxiliary compound section only with the clutch pedal depressed and/or the shift lever in **NEUTRAL**.*

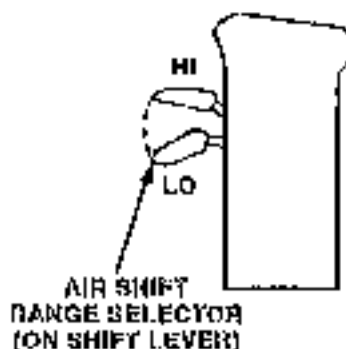


T2070-T2070F

MAIN BOX



COMPOUND SECTION



300102b

T2070-T2070F TRANSMISSION RATIOS

Gear (Main Box)	Ratios	
	LO	HI
1	14.16	5.24
2	8.25	3.05
3	(4.67)	1.73
4	(2.70)	1.00
5	(1.62)	0.60
Reverse	14.53	5.38

() The ratios in parentheses are not practical to use.

300161b



MACK T2070A (Long Compound) Shifting Instructions

The T2070A is a nonsynchronized transmission. There is a LO and HI auxiliary compound section controlled by an air-shift range selector located on the shift lever. There is also a compound neutral switch located on the dash to allow variable speed stationary (vehicle) operation of a rear case side-mounted PTO. The LO range has two low ratios. In HI range there are five forward gears which can be shifted in the standard manner, but remember to double-clutch whether moving up or down through the gears. For normal highway use, start in HI range, first gear and shift through second, third, fourth and fifth. The two gears in LO range are designed for off-highway use and in slow-moving operations (curb pouring, material spreading, heavy load, steep grade). REVERSE can be used in LO or HI range.

CAUTION

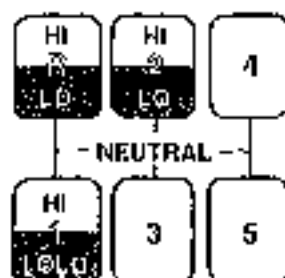
Do NOT preselect the air-shift range selector on the T2070A. Shift the rear compound only with the clutch pedal depressed and the gearshift lever in NEUTRAL. To avoid transmission damage, do NOT change range while moving in reverse gear.

Upshift — Begin in first gear, LO range (commonly called LO-LO, as shown in the shift pattern illustration). Upshift to second gear, LO range (commonly called LO) in the normal manner (double-clutch). When you are ready to upshift again, depress the clutch pedal and release the accelerator pedal. Move the shift lever to NEUTRAL, then flip the air shift range selector to HI, double clutch and move the shift lever back to first gear. You are now in first gear, HI range (which is the next highest ratio). Release the clutch pedal and apply the accelerator to reach the top of the operation range. Shift through second, third, fourth and fifth (HI range), double-clutching through all gears.

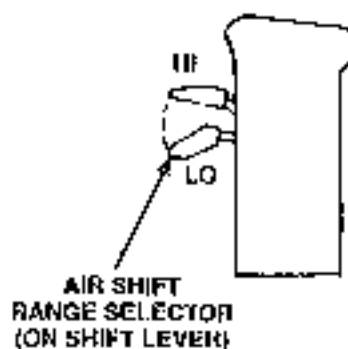


T2070A

MAIN BOX



COMPOUND SECTION



200113a

T2070A TRANSMISSION RATIOS

Gear (Main Box)	Ratios	
	LO	HI
1	14.16	5.24
2	6.25	3.05
3	(4.67)	1.73
4	(2.70)	1.00
5	(1.62)	0.60
Reverse	14.53	5.38

() The ratios in parentheses are not practical to use.

200113a



Downshift — Downshift as normal from fifth to fourth, third, second to first (HI range), double-clutching through all gears. The next downshift will be to second gear, LO range (commonly called LO). When you are ready for this gear, depress the clutch pedal and release the accelerator pedal. Move the shift lever to NEUTRAL, then move the air-shift range selector to LO. Double-clutch and move the shift lever to second gear. You are now in second gear, LO range. Your next lower gear (and lowest ratio in the T2070A) is first LO (commonly called LO-LO). Double-clutch down to first gear (LO range) at the proper time.

CAUTION

Do NOT overspeed the engine during downshifting. Damage to the drivetrain components may result. Do NOT preselect the air-shift range selector. Shift the auxiliary compound section only with the clutch pedal depressed and/or the shift lever in NEUTRAL.

Obtaining Neutral in Rear (Compound) Case

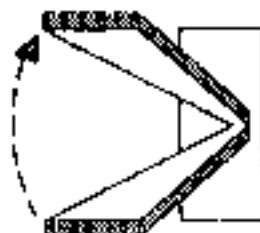
The T2070A has a two-position switch mounted on the dashboard which controls airflow to the rear case (compound). This allows the operator to obtain NEUTRAL in the rear case (compound) when needed for PTO operation when the vehicle is stationary. To get NEUTRAL in the rear case (compound), follow the procedure listed below.

Stationary PTO Operation (T2070A Only)

1. Depress the clutch pedal.
2. Apply parking brake.
3. Move the main box shift lever to NEUTRAL.
4. Flip the dash-mounted compound neutral switch to ON.



"ON"



DASH-MOUNTED
SWITCH

300127a

5. Select and engage the required main box ratio for PTO operation.

CAUTION

*Very high PTO speed will cause equipment damage.
Select the lowest gear that provides satisfactory
operation.*

6. Follow the applicable instructions for engaging the PTO.
7. Engage the clutch.

Road Operation (12070A Only)

1. Depress the clutch pedal and move the main box shift lever to NEUTRAL.
2. Flip the dash-mounted compound neutral switch down to the OFF position.

"OFF"



DASH-MOUNTED
SWITCH

300172a



MACK T2070B-T2070D Shifting Instructions

The T2070B-T2070D are nonsynchronized transmissions. These transmissions feature a **LO** and **DIRECT** auxiliary compound section controlled by an air-shift selector located on the main shift lever.

The T2070B-T2070D units also provide a multi-speed reverse feature by means of reverse gearing in the compound case which works in conjunction with the first-second-third speed gears in the main case. The air shift selector must be moved to the **R** (REVERSE) position to use the multi-speed reverse feature.

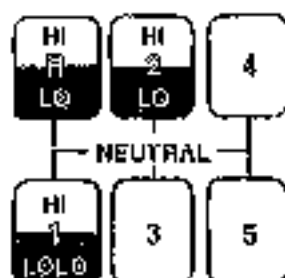
The **LO** range provides two low ratios. In **DIRECT**, there are five forward gears that can be shifted in the standard manner, but remember to double-clutch, whether moving up or down through the gears. For normal highway use, start in **DIRECT**, first gear and shift through second, third, fourth, and fifth. The two gears in **LO** range are designed for off-highway use and in slow-moving applications (curb pouring, material spreading, heavy load/steep grade operation).



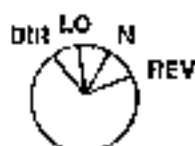
OPERATION

T2070B - T2070D

MAIN BOX



COMPOUND SECTION



AIR SHIFT SELECTOR
(ON SHIFT LEVER)

500120b

T2070B-T2070D TRANSMISSION RATIOS

Gear (Main Box)	Ratios		
	LO	D	Reverse
T2070B			
1	14.16	5.24	12.42
2	8.23	3.06	7.29
3	(4.70)	1.73	4.12
4	(2.70)	1.00	(2.37)
5	(1.61)	0.60	(1.42)
T2070D			
1	14.16	5.24	12.42
2	8.23	3.06	7.29
3	(4.70)	1.73	4.12
4	(2.70)	1.00	(2.37)
5	(1.82)	0.67	(1.59)

() The ratios in parentheses are not practical to use.

500120b



Upshift — Begin in first gear with the air-shift range selector at L (LO range), commonly called LO-LO as shown on the shift pattern diagram. Double-clutch and upshift to second gear, LO range (called LO) in the normal manner. When ready to upshift again, depress the clutch pedal and release the accelerator pedal. Push the shift lever to NEUTRAL, then move the air-shift selector to U (DIRECT), double-clutch and move the shift lever back to first gear. This is first gear (DIRECT), which provides the next higher ratio. Release the clutch pedal and apply the accelerator to reach the top of the operating range. Shift through second, third, fourth and fifth (DIRECT), being sure to double-clutch from one gear to the next.

Downshift — Downshift in reverse order from fifth through first gear (DIRECT), double-clutching through each gear. The next downshift will be to second gear, LO range (called LO). Proceed to depress the clutch pedal and release the accelerator pedal. Push the shift lever to NEUTRAL, then move the air-shift selector to L (LO range), double-clutch, and move the shift lever to second gear. This is second gear LO range, which provides the next lower ratio. When ready for the lowest ratio available (called LO-LO), double-clutch and downshift to first gear (LO range).

To utilize reverse gear(s), proceed as follows:

- Bring the vehicle to a complete stop. Check that shift lever is in NEUTRAL position.
- Move the air-shift selector to R (REVERSE). Depress the clutch pedal and move the shift lever to first gear. Release clutch pedal and apply the accelerator to reach the top of the operating range. Shift through second and third gears as needed for desired reverse speed, being sure to double-clutch from one gear to the next.

 CAUTION

Do not overspeed the engine when downshifting the transmission, or damage to drivetrain components can result.



Obtaining NEUTRAL in the Compound (Rear Case)

The T2070B and T2070D transmissions feature a neutral switch (N in illustration) located on the air-shift selector (on the shift lever). This allows variable speed stationary (vehicle) operation of a rear case, side-mounted power take-off (PTO).

Stationary PTO Operation (T2070B and T2070D)

1. Depress the clutch pedal.
2. Apply the parking brake.
3. Move the main box shift lever to NEUTRAL.
4. Move the air-shift selector to the N (NEUTRAL) position.
5. Move the shift lever to the correct gear position for the required main box ratio for PTO operation.

CAUTION
--

*Very high PTO speed will cause equipment damage.
Select the lowest gear that provides satisfactory
operation.*

6. Follow the applicable instructions for engaging the PTO.
7. Engage the clutch.

Road Operation

1. Depress the clutch pedal and move the main box shift lever to NEUTRAL.
2. Move the air-shift selector from the N (NEUTRAL) position, and place in D (DIRECT), L (LO range), or R (REVERSE) as needed.



MACK T2000 Shifting Instructions

The T2000 is a range-shifted transmission with eight forward speeds. LO and HI ranges are controlled by an air-shift range selector located on the shift lever.

Never attempt to move the vehicle from a stopped position in any gear higher than third LO. Depending on load, grade or road conditions, you will very likely have to start in first LO-LO or second LO. All three speeds in LO range are torque limited.

CAUTION

Do not move the air-shift range selector while moving in REVERSE. Also, when the truck is stationary, do not shift into HI range and then start moving the truck. Damage to the synchronizer may result.

Upshift — If all eight forward speeds are necessary to get up to fifth HI, the following procedures should be used. With shift lever in NEUTRAL, flip the air-shift range selector down to LO range, then shift the transmission into first LO-LO. Shift up through second LO and third LO, double-clutching between the gears. When maximum RPM has been reached in third LO, flip the air-shift range selector to HI range (preselect) and then move the shift lever through NEUTRAL to first HI. When passing through NEUTRAL, your shift lever will put you in HI range. Now follow the normal sequence (second HI, third HI, fourth HI and fifth HI), double-clutching through all gears.

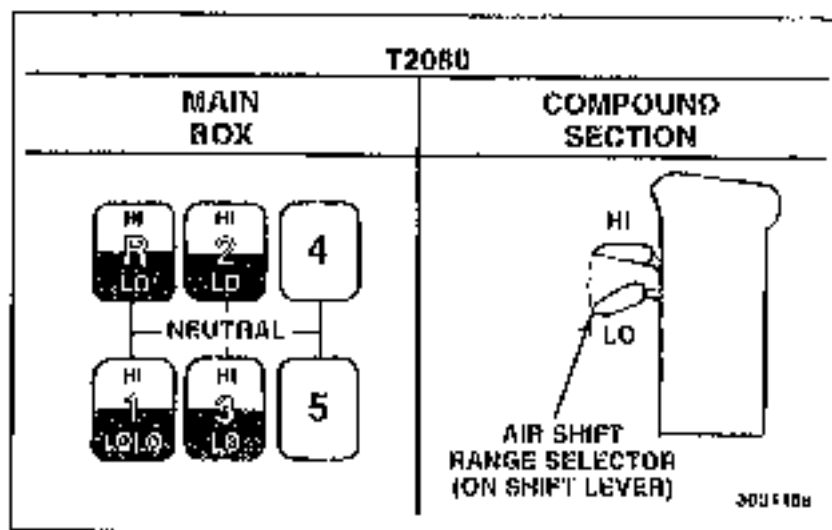
CAUTION

Do NOT overspeed the engine during downshifting. Damage to the drivetrain may result.

Downshift — Shift from fifth HI down through HI range (fourth HI, third HI, second HI and first HI), double-clutching through all gears. While still in first HI, flip the air-shift range selector to LO range (preselect) and move the shift lever through NEUTRAL to third LO. The move through NEUTRAL again activates the air-shift mechanism, this time to LO range. Then shift down to second LO and first LO-LO, double-clutching between all gears.



OPERATION



T2000 TRANSMISSION RATIOS

Gear (Main Box)	Ratio	
	LO	HI
T2000		
1	20.04	5.24
2	11.49	3.05
3	6.69	1.73
4	(3.93)	1.00
5	(2.29)	0.60
Reverse	20.51	5.38

() The ratios in parentheses are not practical to use.

305851a



MACK T2000B-T2000D Shifting Instructions

The T2000B-T2000D transmissions feature a LO and DIRECT auxillary compound section controlled by an air-shift selector located on the main shift lever. This compound section is equipped with a synchronizer to facilitate LO-DIRECT range shifting.

The T2000B-T2000D units also provide a multi-speed reverse feature by means of reversing gearing in the compound case which works in conjunction with the first-second-third speed gears in the main case. The air-shift selector must be moved to the R (REVERSE) position to use the multi-speed reverse feature.

The LO range provides three low ratios. Never attempt to move the vehicle from a stopped position in any gear higher than third LO. Depending on the load, grade or road conditions, it may be necessary to start in first LO-LO or second LO. All three speeds in LO range are torque limited.

In DIRECT, there are five forward gears that can be shifted in the standard manner, but always remember to double-clutch whether moving up or down through these gears.

Upshift — To upshift the transmission through all eight forward speeds, the following procedures should be used: With the shift lever in NEUTRAL, move the air-shift selector to L (LO range) and shift the transmission into first LO-LO. Shift up to second LO and third LO, double-clutching between the gears. When maximum engine RPM has been reached in third LO, preselect by moving the air-shift selector to D (DIRECT) and then move the shift lever through NEUTRAL to first DIRECT. As the shift lever passes through NEUTRAL, it will put the transmission in DIRECT range. Now follow the normal shift sequence (two-three-four-five DIRECT), being sure to double-clutch from one gear to the next.

Downshift — Downshift in reverse order from fifth through first gear DIRECT, double-clutching through each gear. While still in first DIRECT, preselect by moving the air-shift selector to L (LO range) and then move the shift lever through NEUTRAL to third LO. The move through NEUTRAL activates the air-shift mechanism, this time to LO range. Then shift down to second LO and first LO-LO, double-clutching between all gears.



OPERATION

To use reverse gear(s), proceed as follows:

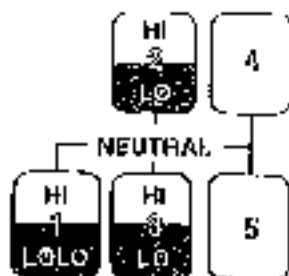
- Bring the vehicle to a complete stop. Check that shift lever is in NEUTRAL position.
- Move the air-shift selector to R (REVERSE). Depress the clutch pedal and move the shift lever to first gear. Release the clutch pedal and apply the accelerator to reach the top of the operating range. Shift through second and third gears as needed for desired reverse speed, being sure to double-clutch from one gear to the next.

CAUTION

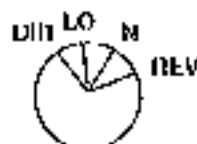
Do NOT overspeed the engine when downshifting. Damage to the drivetrain may result. Also, when the truck is stationary, do NOT shift to DIRECT (D) and then start to move the truck. Damage to the synchronizer may result.

T2080B - T2080D

MAIN BOX



COMPOUND SECTION



AIR SHIFT SELECTOR
(ON SHIFT LEVER)

300124b

**T2080B-T2000D TRANSMISSION RATIOS**

Gear (Main Box)	Ratios		
	Lo	n	Reverse
T2080B			
1	20.08	5.24	17.62
2	11.88	3.05	10.25
3	6.63	1.73	5.82
4	(3.83)	1.00	(3.37)
5	(2.29)	0.60	(2.04)
T2000D			
1	20.08	5.24	17.62
2	11.88	3.06	10.25
3	6.63	1.73	5.82
4	(3.83)	1.00	(3.37)
5	(2.58)	0.67	(2.26)

() The ratios in parentheses are not practical to use.

300123a

Obtaining Neutral in Rear (Compound) Case

The T2080B and T2000D transmissions feature a neutral switch (N in shift pattern illustration) located on the air-shift selector (on shift lever). This allows variable speed stationary (vehicle) operation of a rear case, side-mounted power take-off (PTO).



Stationary Operation for PTO on Transmission Compound, Rear Case (T2000B and T2000D)

1. Depress the clutch pedal.
2. Apply the parking brake.
3. Move the main box shift lever to NEUTRAL.
4. Move the air-shift selector to the N (NEUTRAL) position.
5. Move the shift lever to the correct gear position for the required main box ratio for PTO operation.

CAUTION

Very high PTO speed will cause equipment damage. Select the lowest gear that provides satisfactory operation.

6. Follow the applicable instructions for engaging the PTO.
7. Engage the clutch.

Road Operation

1. Depress the clutch pedal and move the main box shift lever to NEUTRAL.
2. Move the air-shift selector from the N (NEUTRAL) position, and place in L (LOW range) or R (REVERSE), as needed.



MACK T2090 Shifting Instructions

CAUTION

Air pressure should be at least 100 psi and the units should be warm before making range shifts. Always start in LO range, third or lower, including dynamometer testing.

NOTE

The following shifting instructions are based on the RECOMMENDED T2090 shift pattern. If optional shift pattern is used, refer to T2090 OPTIONAL SHIFT PATTERN instructions.

The T2090 unit is a range-shifted transmission which has eight forward highway speeds plus an extra LO speed gear in the LO range. This transmission features a LO and HI auxiliary compound section controlled by an air-shift range selector located on the shift lever. The compound section is equipped with a synchronizer to facilitate LO-HI range shifting.

The LO range provides four low ratios. Never attempt to move the vehicle from a stopped position in any gear higher than third gear. Depending on the load, grade or road conditions, it may be necessary to start in LO speed gear or first-second gears. Note that LO speed gear was designed for off highway use such as paving, material spreading or heavy load/steep grade conditions.

In HI range, there are five forward gears that can be shifted in the standard manner, but always remember to double-clutch whether moving up or down through these gears.

REVERSE gear is used in LO range only. (With the shift lever in NEUTRAL, flip the air-shift range selector down to LO range, then shift the transmission into REVERSE gear.)



Upshift — Under normal highway conditions, with shift lever in NEUTRAL, flip air-shift range selector to LO range, then shift the transmission into first gear (see shift pattern). Shift through second and third, double-clutching between gears. When maximum RPM is reached in third gear, flip air-shift range selector to HI range (preselect) and then move shift lever through NEUTRAL to fourth gear. As the shift lever passes through NEUTRAL, it will put the transmission in HI range. Now continue double-clutching through fifth, sixth, seventh and eighth.

CAUTION

Do NOT move the air-shift range selector while moving in REVERSE. Also, when the truck is stationary, do NOT shift into HI range and then start moving the truck. Damage to the synchronizer may result.

Downshift — To downshift the T2000, shift from eighth to seventh, sixth, fifth, and fourth (HI range), double-clutching between gears. While still in fourth gear, flip the air-shift range selector to LO range (preselect), then shift through NEUTRAL to third gear. As you shift through NEUTRAL, the range shift to LO will be completed. Move the shift lever to second and first, double-clutching between gears.

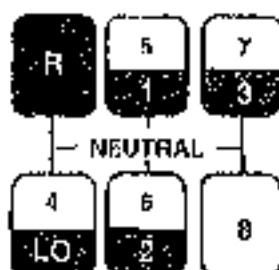
CAUTION

Do NOT overspeed the engine during downshifting. Damage to the drivetrain may result.

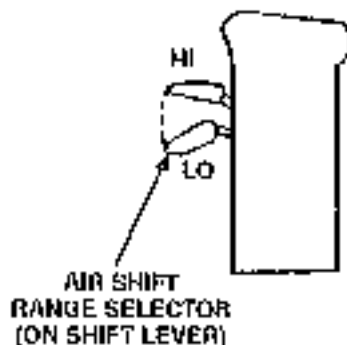


T2090 RECOMMENDED SHIFT PATTERN — CURRENT T2090 UNITS

MAIN BOX



COMPOUND SECTION



303112b

T2090 TRANSMISSION RATIOS — CURRENT T2090 UNITS

Gear (Main Box)	LO Range	Gear (Main Box)	HI Range
LO	10.89	4	2.70
1	7.45	5	1.94
2	5.33	6	1.59
3	3.84	7	1.00
(4)	(2.73)	8	0.71
Reverse	10.92	(Reverse)	(2.84)

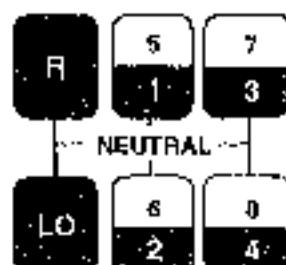
() The ratios in parentheses are not practical to use.

300113a

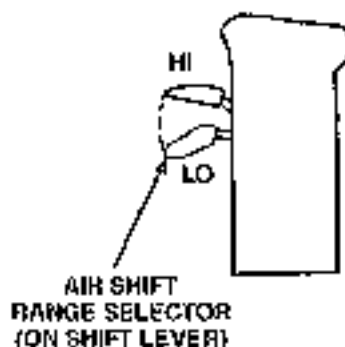


T2000 OPTIONAL SHIFT PATTERN

MAIN BOX



COMPOUND SECTION



300460b

T2000 OPTIONAL TRANSMISSION RATIOS

Gear (Main Box)	LO Range Ratio	Gear (Main Box)	HI Range Ratio
LO	10.00	(LO)	(2.78)
1	7.45	5	1.94
2	5.83	6	1.39
3	3.84	7	1.00
4	2.73	8	0.71
Reverse	10.92	(Reverse)	(2.84)

() The ratios in parentheses are not practical to use.

300455a



Preferred Methods for Engaging T2090 "Eighth" Gear for Output Shaft Driven Power Take-Off Operation

- **Method #1**

After positioning the vehicle for power take-off operation, and with vehicle wheels off the ground:

1. Shift the transmission to neutral.
2. Engage power take-off drive.
3. Move the range selector to H1 range.
4. Disengage the engine clutch and select reverse.
5. Feather the clutch until the transmission range clutch engagement is heard.
6. Disengage the engine clutch.
7. Select 8th speed gear for T2090.
8. Engage the clutch when power take-off operation is desired.

- **Method #2**

After positioning the vehicle for power take-off operation, and with vehicle wheels on the ground:

1. Shift the transmission to neutral.
2. Move the range selector to high range.
3. Disengage the engine clutch and select reverse.
4. Feather the clutch until the transmission range clutch engagement is heard.
5. Disengage the engine clutch.
6. Engage power take-off drive.
7. Select 8th speed gear for T2090.
8. Engage the clutch when power take-off operation is desired.



MACK T2100 Shifting Instructions

CAUTION

Make sure air pressure is at least 100 psi and unit is warmed before making range shifts. Always start in LO range, fifth (or lower), including dynamometer testing.

Uphill — The T2100 is a range-shifted transmission with 10 forward highway speeds. LO and HI ranges are controlled by an air-shift range selector located on the shift lever. With shift lever in NEUTRAL, flip the air-shift range selector to LO range, then shift the transmission into first gear (see shift pattern). Shift through second, third, fourth and fifth, double-clutching through all gears. When maximum RPM has been reached in fifth, flip the air-shift range selector to HI range (preselect), and then move shift lever through NEUTRAL to sixth gear. As the shift lever passes through NEUTRAL, it will put the transmission in HI range. Now continue double-clutching through seventh, eighth, ninth and tenth.

CAUTION

Do NOT move the air-shift range selector while moving in REVERSE. Also, when the truck is stationary, do NOT shift into HI range and then start moving the truck. Damage to the synchronizer may result.



Downhill — Shift from tenth down through HI range (ninth, eighth, seventh and sixth), double-clutching through all gears. While still in sixth gear, flip the air-shift range selector to LO range (preselect). As you shift through NEUTRAL to fifth, the range shift to LO will be completed. Move the shift lever to fourth, third, second and first.

REVERSE gear is used in LO range only. (With the shift lever in NEUTRAL, flip the air-shift range selector down to LO range, then shift the transmission into REVERSE gear.)

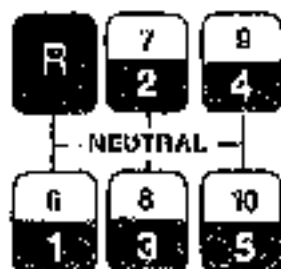
CAUTION
--

*Do NOT overspeed the engine when downshifting.
Damage to the drivetrain may result.*

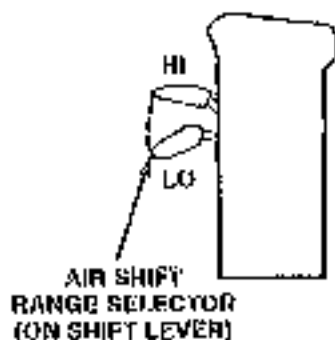


T2100

MAIN BOX



COMPOUND SECTION



300110a

T2100 TRANSMISSION RATIOS

Gear (Main Box)	LO Range	Gear (Main Box)	HI Range
1	8.52	6	2.22
2	5.50	7	1.70
3	4.09	8	1.30
4	3.04	9	1.00
5	2.04	10	0.77
Reverse	11.76	(Reverse)	(3.08)

() The ratios in parentheses are not practical to use.

300111a



MACK T2110B Shifting Instructions

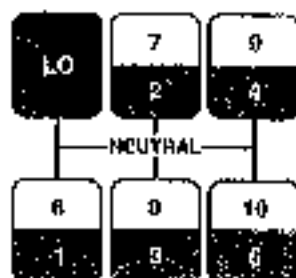
The T2110B is a range-shifted transmission which has eleven forward speeds. There is a LO and HI auxiliary compound section controlled by an airshift selector on the shifter. This compound section is equipped with a synchronizer to facilitate LO-HI range shifting. The T2110B transmission also provides a multi-speed reverse feature by means of reverse gearing in the compound case which works in conjunction with LO, first, second and third speed gears in the main box. The airshift selector must be moved to the "R" (Reverse) position in order to utilize the multi-speed reverse feature.

LO range provides six low ratios for six forward gears in the T2110B. In HI range there are five additional forward gears which can be shifted in the standard manner. Remember, however, to double-clutch whether moving up or down through the gears. For normal highway use, start in LO range first gear and shift through second, third, fourth and fifth. The LO position in LO range for this transmission is designed for use in off-highway and slow-moving (curb pouring, material spreading, heavy load/sleep grade) operations. Reverse is used in LO range for four reverse speeds.

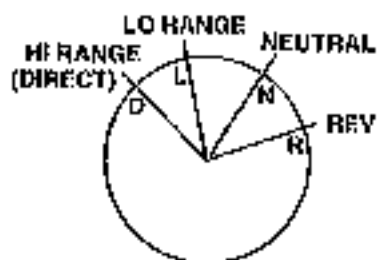
Upshift - Begin in first gear with airshift selector in LO range (shown as 1/6 on shift pattern diagram). Upshift to second gear LO range (shown as 2/7 on shift pattern diagram) in the normal manner (double-clutching). When ready to upshift again, depress the clutch pedal and release the accelerator pedal in the normal manner. Repeat this shifting pattern through the remaining gears up to fifth speed (shown as 5/10 on the shift pattern diagram). When maximum engine RPM has been reached in fifth gear, flip the air control selector to HI range (preselect), then double-clutch and shift to sixth gear. As the shift lever passes through NEUTRAL, it will put the transmission in HI range. Continue to upshift through normal seventh, eighth, ninth and tenth gears, while double-clutching.



MAIN BOX T2110B



REAR COMPOUND T2110B



AIR SHIFT SELECTOR
(ON SHIFT LEVER)

303520b

Gear (Main Box)	Ratios		
	T2110B		
	LO Range	HI Range	Reverse
LO	15.00		13.16
1/6	8.52	2.22	7.47
2/7	6.50	1.70	6.70
3/8	4.99	1.30	4.37
4/9	3.64	1.00	(3.37)
5/10	2.94	0.77	

Ratios shown in parentheses are not practical to use.



Downshift — Downshift as normal from tenth to ninth, eighth, seventh and sixth in HI range (double-clutch between all gear ranges). The next lower shift will be to fifth gear LO range. While still in sixth gear, flip the air control selector to LO range (preselect), then double-clutch and move the shift lever through **NEUTRAL** to fifth gear. The move through **NEUTRAL** activates the airshift mechanism, this time to LO range. The next lower gear is fourth gear LO range. Double-clutch down through the remaining gears to first gear LO range as needed.

CAUTION

Be careful not to overspeed the engine during downshifting. Damage to powertrain components may result.

CAUTION

When the vehicle is stationary, do NOT shift to HI range and then start moving the vehicle. Damage to the synchronizer may result.



MACK T2130-T2130B Shifting Instructions

CAUTION

Make sure air pressure is at least 100 psi and unit is warmed before making range shifts. Always start in LO range. This also applies to dynamometer testing. When the truck is stationary; do NOT shift into HI range and then start moving the truck; damage to the synchronizer may result. To avoid transmission damage, do NOT change range while in REVERSE.

The T2130 is a range-shifted transmission with 12 forward highway speeds and an extra LO gear in the LO range. LO and HI ranges are controlled by an air-shift range selector.

NOTE

When making a SPLIT SHIFT (from gear to gear), the splitter switch must not be actuated, either up or down, until the main box is in NEUTRAL. When making a SPLIT SHIFT (in the same gear), to preselect a gear, especially under heavy load, the splitter will not shift until the driveline torque is relieved. This can be done by depressing the clutch pedal and releasing it, or by backing off the throttle and reapplying it. When making a RANGE SHIFT, it is important to preselect the range shift. This means that the range selector must be moved to its next position (up or down) BEFORE the gearshift lever is moved. Then move the gearshift lever through NEUTRAL to the next desired gear position. As the lever passes through NEUTRAL, the range shift will be completed.



OPERATION

Upshift — For purposes of explaining the shift procedure through ALL gears, assume that the vehicle has a full load and will be climbing a slight grade.

To prepare for moving the vehicle, position the shift lever in NEUTRAL and move the range selector up to HI range. (This must be done before the splitter switch can be moved to LO, due to a mechanical interlock.) Next, select LO-split using the splitter switch, then select LO range using the range selector.

Refer to the shift pattern and move the shift lever to LO speed gear (LO range, LO-split). Apply accelerator, engage the clutch, and accelerate to governed speed. Shift up through first-second-third-fourth speed gears, double-clutching between the gears.

To continue while in fourth gear (LO-split), flip the range selector up to HI range (preselect), then move the shift lever through NEUTRAL to fifth gear. As the lever moves through NEUTRAL, the range shift to HI will be completed. You are now in fifth gear LO-split (HI range). Use a combination of the splitter and shift lever to continue shifting to fifth HI-split, sixth LO-split, sixth HI-split and so on, until you reach eighth HI-split. Remember to double-clutch between gears.

To upshift from LO-split to HI-split (in the same gear), accelerate the engine to governed speed, move the splitter switch to HI (preselect), depress the clutch and back off the accelerator pedal. Reapply the accelerator and engage the clutch when the audible shift is heard, or when the engine speed falls by approximately 200 rpm. Depressing the clutch may not be necessary to break the driveline torque, but this will vary with road and load conditions.

To upshift from a HI-split gear to the next higher gear's LO-split (in HI range), accelerate the engine to governed speed, then move the splitter switch to LO as you move the shift lever through NEUTRAL to the next higher gear. Note that the splitter switch must not be actuated down to the LO position until the main box is in NEUTRAL.



Downshift — Shift from eighth HI-split to eighth LO-split, then seventh HI-split, seventh LO-split and so on (double-clutching between the gears), until you reach fifth LO-split.

While in fifth gear LO-split, flip the range selector down to LO range (preselect), then move the shift lever through NEUTRAL to fourth gear (double-clutch and use the throttle in the normal manner between gears). As the shift lever moves through NEUTRAL, the range shift to LO will be completed. You are now in fourth gear LO-split (LO range). Continue downshifting, using the shift lever in the normal manner until you reach LO speed gear (LO range, LO-split).

To downshift from HI-split to LO-split (in the same gear) as engine speed falls, move the splitter to LO (preselect), then release and reapply the accelerator pedal. An audible shift completion should be heard.

To downshift from a LO-split gear to the next lower gear's HI-split (in HI range) as engine speed falls, move the splitter switch to HI as you move the shift lever through NEUTRAL to the next lower gear. Note that the splitter switch must not be actuated up to the HI position until the main box is in NEUTRAL. Remember to double-clutch between gears.

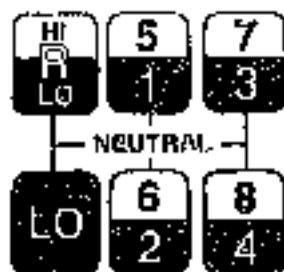
 CAUTION

Do NOT overspeed the engine during downshifting. Damage to the driveline components may be the result.

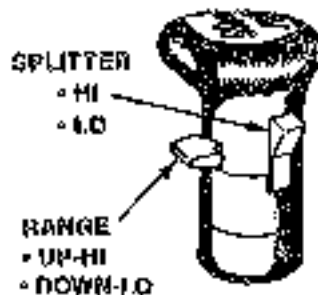


T2130 AND T2130B

MAIN BOX



COMPOUND SECTION



300109a



T2130 AND T2130B TRANSMISSION RATIOS

Gear (Main Box)	Splitter	Range	Ratio	
			T2130	T2130B
LO	LO	LO	13.91	13.91
1	LO	LO	8.78	8.78
2	LO	LO	6.28	6.28
3	LO	LO	4.52	4.52
4	LO	LO	3.22	3.22
Range Shift Lever				
6	LO	HI	2.29	2.29
5	HI	HI	1.94	1.84
6	LO	HI	1.64	1.64
6	HI	HI	1.39	1.39
7	LO	HI	1.18	1.18
7	HI	HI	1.00	1.00
8	LO	HI	0.84	0.84
U	HI	HI	0.71	0.71
R	LO	LO	28.90	12.00
R	LO	HI	7.58	3.36
R	HI	HI	6.41	2.85

300109a



Rear Compound-Mounted PTO Operating Procedures (T2130 and T2130B)

When engaging the PTO —

1. Select LO-split using the splitter switch and select LO range using the range selector. The transmission **MUST** be in LO range and LO-split at all times during PTO operation.
2. Depress the clutch pedal to disengage the clutch.
3. Set the parking brakes.
4. Move the main box shift lever to the NEUTRAL position.
5. Move the dash-mounted compound neutral control valve to the ON position, which moves the synchro clutch to a neutral position.
6. Engage the PTO.
7. Move the main box shift lever to the desired ratio.
8. Release the clutch pedal to engage the clutch.
9. Operate the PTO-driven load.

When disengaging the PTO —

1. Depress the clutch pedal to disengage the clutch.
2. Move the main box shift lever to NEUTRAL.
3. Disengage the PTO.
4. Move the dash-mounted compound neutral control valve to the OFF position, which moves the synchro clutch back to LO range.
5. Move the shift lever to the desired main gear box ratio.
6. Release the parking brakes.
7. Release the clutch pedal to engage the clutch.



MACK T2180-T2180B Shifting Instructions

CAUTION

Make sure air pressure is at least 100 psi and unit is warmed before making range shifts. Always start in LO range. This also applies to dynamometer testing. When truck is stationary, do NOT shift to HI range and then start moving the truck. Damage to synchronizer may result. To avoid transmission damage, do NOT change range while in REVERSE.

NOTE

When making a SPLIT SHIFT (from gear to gear), the splitter switch must not be actuated, either up or down, until the main box is in NEUTRAL. When making a SPLIT SHIFT (in the same gear), to preselect a gear, especially under heavy load, the splitter will not shift until the driveline torque is relieved. This can be done by depressing the clutch pedal and releasing it, or by backing off the throttle and reapplying it. When making a RANGE SHIFT, it is important to preselect the range shift. This means that the range selector must be moved to its next position (up or down) BEFORE the gearshift lever is moved. Then move the gearshift lever through NEUTRAL to the next desired gear position. As the lever passes through NEUTRAL, the range shift will be completed.



Upshift — For purposes of explaining the shift procedure through ALL the gears, assume that the vehicle has a full load and will be climbing a slight grade.

To prepare for moving the vehicle, position the shift lever in **NEUTRAL**, select **LO-split** using the splitter switch, and select **LO** range using the range selector.

Refer to the shift pattern and move the shift lever to **LO** speed gear (**LO** range, **LO-split**). Apply accelerator and engage the clutch, then accelerate to governed speed. Select **HI** on the splitter switch (preselect) and release the accelerator pedal long enough for the split shift to complete. Reapply the accelerator. Shift through first **LO-split**, first **HI-split**, second **LO-split**, second **HI-split** and so on, until you reach fourth **HI-split**.

To continue while in fourth gear **HI-split**, flip the range selector up to **HI** range (preselect), and as you move the shift lever through **NEUTRAL** to fifth gear, move the splitter switch from **HI** to **LO**. As the shift lever moves through **NEUTRAL**, the range shift to **HI** will be completed. You are now in fifth **LO-split** (**HI** range). Continue shifting to fifth **HI-split**, sixth **LO-split**, sixth **HI-split** and so on, until you reach eighth **HI-split**.

To upshift from **LO-split** to **HI-split** (in the same gear), accelerate the engine to governed speed, move the splitter switch to **HI** (preselect), depress the clutch and back off the accelerator pedal. Reapply the accelerator and engage the clutch when the audible shift is heard, or when the engine speed falls by approximately 200 rpm. Depressing the clutch may not be necessary to break the driveline torque, but this will vary with road and load conditions.

To upshift from a **HI-split** gear to the next higher gear's **LO-split** (in the same range), accelerate the engine to governed speed, then move the splitter switch to **LO** as you move the shift lever through **NEUTRAL** to the next higher gear. Note that the splitter switch must not be actuated down to the **LO** position until the main box is in **NEUTRAL**.



Downshift -- Shift from eighth HI-split to eighth LO-split, seventh HI-split, seventh LO-split and so on (double-clutching between the gears), until you reach fifth LO-split.

To continue while in fifth gear LO-split, flip the range selector down to LO range (preselect), and as you move the gearshift lever through NEUTRAL to fourth gear, move the splitter switch from LO to HI. As the shift lever moves through NEUTRAL, the range shift to LO will be completed. You are now in fourth gear HI-split (LO range). Continue downshifting, using the shift lever and splitter in the normal manner, until you reach LO speed gear (LO range, LO-split).

To downshift from HI-split to LO-split (in the same gear) as engine speed falls, move the splitter to LO (preselect), then release and reapply the accelerator pedal. An audible shift completion should be heard.

To downshift from a LO-split gear to the next lower gear's HI-split (in the same range) as engine speed falls, move the splitter switch to HI as you move the shift lever through NEUTRAL to the next lower gear. Note that the splitter switch must not be actuated up to the HI position until the main box is in NEUTRAL. Remember to double-clutch between gears using the accelerator pedal to synchronize the transmission components.

CAUTION

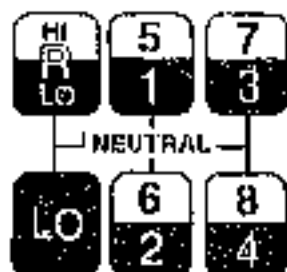
*Do NOT overspeed the engine during downshifting.
Damage to the drivetrain may result.*



OPERATION

T2150 AND T2100B

MAIN BOX



COMPOUND SECTION

SPLITTER

- HI
- LO

RANGE

- UP-HI
- DOWN-LO



3001090



T2100 AND T2100B TRANSMISSION RATIOS

Gear (Main Box)	Splitter	Range	Ratios	
			T2100	T2100B
LO	LO	LO	13.91	13.91
LO	HI	LO	11.80	11.80
1	LO	LO	8.78	8.78
1	HI	LO	7.45	7.45
2	LO	LO	6.28	6.28
2	HI	LO	5.33	5.33
3	LO	LO	4.52	4.52
3	HI	LO	3.83	3.83
4	LO	LO	3.22	3.22
4	HI	LO	2.73	2.73
Range Shift Here				
5	LO	HI	2.29	2.29
5	III	III	1.94	1.94
6	LO	HI	1.64	1.64
6	HI	HI	1.39	1.39
7	LO	HI	1.16	1.16
7	HI	HI	1.00	1.00
8	LO	HI	0.84	0.84
8	HI	HI	0.71	0.71
R	LO	LO	28.88	12.88
R	HI	LO	24.50	10.92
R	LO	HI	7.68	3.36
R	HI	HI	6.41	2.85

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Rear Compound-Mounted PTO Operating Procedures (T2180 and T2180B)

When engaging PTO —

1. Select LO-split using the splitter switch and select LO range using the range selector. The transmission **MUST** be in LO range and LO-split at all times during PTO operation.
2. Depress the clutch pedal to disengage the clutch.
3. Set the parking brakes.
4. Move the main box shift lever to the NEUTRAL position.
5. Move the dash-mounted compound neutral control valve to the ON position, which moves the synchro clutch to a neutral position.
6. Engage the PTO.
7. Move the main box shift lever to the desired ratio.
8. Release the clutch pedal to engage the clutch.
9. Operate the PTO-driven load.

When disengaging PTO —

1. Depress the clutch pedal to disengage the clutch.
2. Move the main box shift lever to NEUTRAL.
3. Disengage the PTO.
4. Move the dash-mounted compound neutral control valve to the OFF position, which moves the synchro clutch back to LO range.
5. Move the shift lever to the desired main gear box ratio.
6. Release the parking brakes.
7. Release the clutch pedal to engage the clutch.



Preferred Methods for Engaging T2180 "Eighteenth" Gear (or any high-range gear) for Output Shaft Driven Power Take-Off Operation

a Method #1

After positioning the vehicle for power take-off operation, and with vehicle wheels off the ground:

1. Shift the transmission to neutral.
2. Engage power take-off drive.
3. Move the range selector to high range.
4. Disengage the engine clutch and select reverse.
5. Feather the clutch until the transmission range clutch engagement is heard.
6. Disengage the engine clutch.
7. Select 18th speed gear for T2180.
8. Engage the clutch when power take-off operation is desired.

a Method #2

After positioning the vehicle for power take-off operation, and with vehicle wheels on the ground:

1. Shift the transmission to neutral.
2. Move the range selector to high range.
3. Disengage the engine clutch and select reverse.
4. Feather the clutch until the transmission range clutch engagement is heard.
5. Disengage the engine clutch.
6. Engage power take-off drive.
7. Select 18th speed gear for T2180.
8. Engage the clutch when power take-off operation is desired.



Allison HD* Series Shifting Instructions

* With Allison Transmission Electronic Control.

R	Use this to back the vehicle. Completely stop before shifting from forward to reverse or from reverse to forward. The reverse warning signal sounds when this gear is selected. The SELECT Indicator and the MONITOR will both display R when reverse is attained.
N	Use neutral when starting the engine, when checking vehicle accessories, and for extended periods of engine idling. The transmission will automatically select neutral when the master switch is turned on. If the engine starts in any other selected gear, the neutral start circuit is malfunctioning and should be repaired immediately. Use neutral when the vehicle will be left unattended with the engine running - always apply the parking brake. Neutral is also used during stationary operation of the power takeoff (if equipped). The SELECT Indicator and the MONITOR will both display N when neutral is attained.
D	When the drive position is selected, the transmission will initially attain first gear. Then, as the vehicle speed increases, the transmission will upshift through all the gears automatically. As vehicle speed decreases, the transmission will automatically downshift to the correct range. When drive is selected, the SELECT Indicator will display the highest range available and the MONITOR will display the current operating range.
5 4 3 2	Occasionally, road, load, or traffic conditions will make it desirable to restrict automatic shifting to a lower range. (When conditions improve, the gear selector should be returned to the normal drive position.) These positions also provide progressively greater engine braking for going down medium grades (the lower the gear range, the greater the braking effect). Note that even if a lower range is selected, the transmission may not downshift until vehicle speed is reduced. The SELECT Indicator will display the selected range, and the MONITOR will display the current operating range.
1	Use this gear when pulling through mud or deep snow, when manouvering in tight spaces, or while driving up or down steep grades. Low gear provides the vehicle with maximum driving power, as well as maximum braking power.

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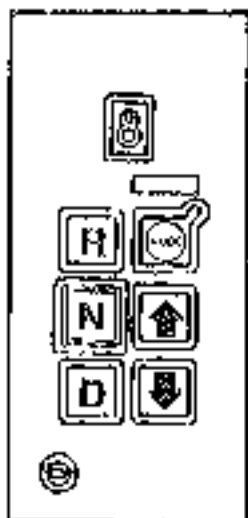
OPERATION

The HD Series shift selector is an electronic control unit with membrane-type push-button switches.

In addition to the R, N, D, Up arrow and Down arrow push buttons, the HD Series shift selector incorporates a MODE button, which allows the driver to enable a secondary shift schedule of other special function.

When you select and depress the desired operating range, a slight click will be felt and a tone will sound.

In D (drive), selection of a specific range can be accomplished by pressing the Up or Down arrow buttons to reach the desired operating range.



324282a



Status Lights

CHECK TRANS LIGHT — Illumination of this indicator notifies the driver that the transmission is not performing as designed. Service advice should be sought as soon as possible and the problem rectified.

For HD Series transmissions, this indicator is also used as the DO NOT SHIFT LIGHT which indicates that your shifts are being restricted. For push button operations, the control unit will not respond to operator requests. Seek service advice as soon as possible.

CAUTION

Applying parking brakes or work brake (if equipped) from the right side of the truck while in DRIVE, will force the transmission into NEUTRAL.

NOTE

Shifting is restricted to second gear when the vehicle is being operated from the right-hand driving position.

NOTE

For forty builders, applicable connections have been reduced to one plug which is located behind panel D.



Axles

Rear Axle

Mack Trucks, Inc. provides axle housings in three capacity classifications:

- Medium Duty
- Heavy Duty
- Extra-Heavy Duty

To deliver the appropriate amount of torque to the driving wheels, MACK offers dual reduction carriers in a variety of ratios.

Mack Trucks, Inc. offers a large variety of four-wheel-drive tandem axles with top-mounted, dual-reduction carriers (for straight line through drive). Carriers are also available in a large number of ratios.

All four-wheel-drive tandem carriers are available with the MACK Inter-axle power divider third differential (with or without a power divider lockout).

MACK rear axles are designed so the entire load is carried by the axle housing (through the wheel bearings mounted on the housing spindle). The rear axle shafts are either free-splined (both ends) or integral flange type. Both types of axle shafts can be removed without removing or disturbing the rear wheels.

To avoid excessive tire wear, proper maintenance must be practiced and rear axle tires must be matched.

▲ CAUTION

The maximum safe oil temperature for a MACK rear axle is 250°F (121°C). Continued operation with oil above this temperature will result in rapid deterioration of the oil's lubricating properties and is NOT recommended.



Two-Speed Rear Axle

The dual-reduction (two-speed) rear axle carrier provides two axle speeds. The axle shift button (on the transmission shifter lever) allows the driver to select the axle gear (HI or LO).

Split Shifting --- To shift to a higher transmission gear and the LO axle speed at the same time:

1. Shift the transmission to the higher gear.
2. Push the axle shift button down just before re-engaging the clutch.
3. Re-engage the clutch and depress the accelerator pedal (to maintain road speed).

To shift to a lower transmission gear and the HI axle speed at the same time:

1. Depress the accelerator pedal and pull the axle shift button up.
2. Shift the transmission to a lower gear, then depress the accelerator pedal (to maintain road speed).

CAUTION

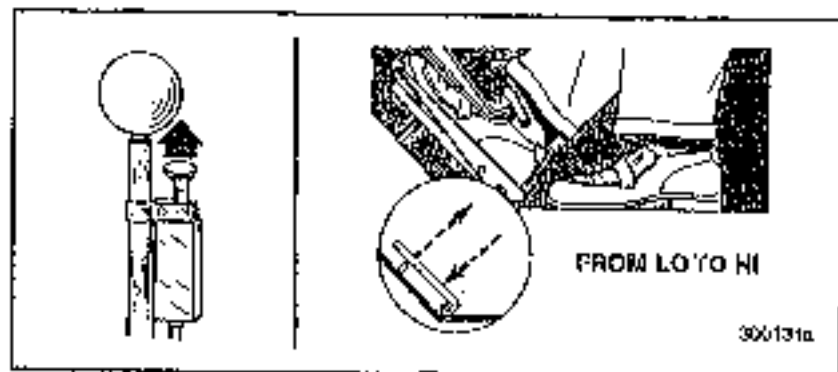
Always keep accelerator pedal down when the axle shift button is moved, except when split shifting to LO axle speed. The vehicle must be brought to a full stop before shifting from forward to REVERSE, and vice versa.



OPERATION

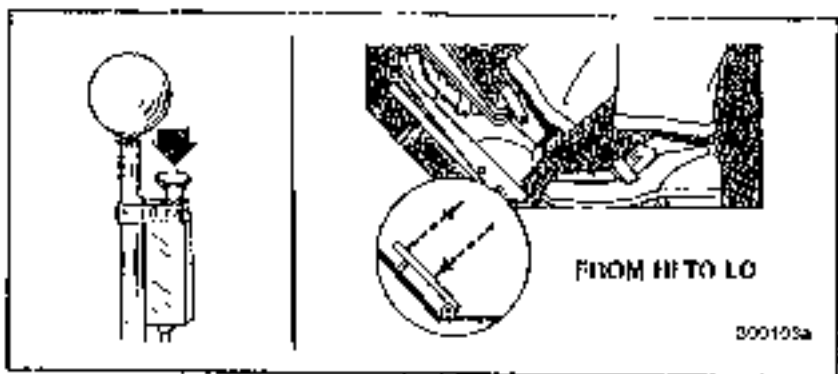
To shift from LO to HI speed:

1. Depress the accelerator pedal and pull the axle shift button up.
2. Release the accelerator pedal and pause until the shift is completed.
3. Depress the accelerator pedal to maintain road speed.



To shift from HI to LO speed:

1. Push the axle shift button down and depress the accelerator pedal.
2. Disengage and re-engage the clutch as quickly as possible while holding the accelerator pedal down (or release and depress the accelerator as quickly as possible without declutching).





Inter-Axle Power Divider Lockout (If Equipped)

The MACK power divider can be rendered inoperative, during short periods of poor traction, using a power divider lockout. When the power divider lockout is engaged, both axles are locked together (in positive through-drive) for maximum traction with no differential action between axles. It is not necessary to stop the vehicle to engage the power divider lockout. The lockout may be engaged while the vehicle is moving, as long as the wheels are not spinning.

⚠ CAUTION

Do not engage the power divider lockout if the wheels are spinning.

NOTE

Even when no traction is available at the spinning wheel, the driver can "feather" the brakes (apply the brakes slightly), creating enough resistance at that wheel to allow power to the axle with traction.



Engaging the Power Divider Lockout

Normally, the Power Divider switch is in the OUT (disengaged) position. In poor traction conditions, it may be necessary to provide positive through-drive to both axles by flipping the switch to the locked (engaged) position.

1. Push switch to engage.
2. Momentarily release the accelerator pedal to allow the shift to take place, then drive through the slippery area.

NOTE

A lockout indicator lamp will remain lit as long as the lockout is engaged. This is to remind the driver to release the lockout as soon as normal traction is regained.

3. When driving conditions permit, unlock the power divider by moving the Power Divider switch back to the OUT (disengaged) position. Then release the accelerator pedal momentarily (to shift out of the locked position) and drive as usual.

CAUTION

Do NOT (under any circumstances) engage or disengage the lockout while the drive wheels are actually slipping or spinning; clashing between the lockout sliding clutch and the outer cam may result.



All-Wheel Drive

Transfer Case - The TC15 Series and TC25 Series are two-speed transfer cases designed for all-wheel-drive vehicles. All gears are in constant mesh and are of the helical type (for quiet running). All shafts and the differential are mounted in heavy-duty tapered roller bearings. HI-LO engagement is effected by means of a sliding clutch. A conventional fork spans the sliding clutch and moves in response to movement of the gearshift hand-control lever or air-control valve.

A planetary gear-type center differential is incorporated to provide front-wheel drive availability at all times (without requiring driver attention). However, for extremely slippery conditions, a power divider lockout is provided.

WARNING

Do NOT attempt to shift between HI and LO range (or engage the) while the vehicle is in motion; drivetrain component damage could occur.

NOTE

A transfer case NEUTRAL position is required when a transfer case power take-off (PTO) unit is incorporated.



OPERATION

TC(S) 15 Series		Model	HI Range	LO Range	Front Drive
H HI ↓ N NEUTRAL ↓ L LO		TC(S)15	0.999	2.593	0.966
		TC(S)160	0.768	1.992	0.965
		TC(S)151	0.999	2.593	0.838
		TC(S)1510	0.768	1.992	0.838
		TC(S)152	0.999	2.593	1.000
SHIFT PATTERN		TC(S)1520	0.768	1.992	1.000

TC(S) 25 Series		Model	HI Range	LO Range	Front Drive
H HI ↓ N NEUTRAL ↓ L LO		TC(S)25	1.38	2.593	0.965
		TC(S)250	1.045	1.992	0.965
		TC(S)251	1.38	2.593	0.838
		TC(S)2510	1.045	1.992	0.838
		TC(S)252	1.38	2.593	1.000
SHIFT PATTERN		TC(S)2520	1.045	1.992	1.000

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MAINTENANCE AND LUBRICATION

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MAINTENANCE AND LUBRICATION

MAINTENANCE INTRODUCTION

Preventive maintenance is vital to the life of your new vehicle. This section of the Operator's Handbook covers items of importance concerning the proper care of MACK vehicles. A well-run maintenance and lubrication program is the best way to ensure a long life of productive operation.

The operator plays an important role in the proper care of this equipment. By performing daily checks and observing the equipment while in operation, minor defects can be caught and corrected before they become major problems. Make sure any problems are corrected before putting the equipment into operation.

If you have any questions concerning the proper care, maintenance and lubrication of your vehicle, or if you need help in developing a preventive maintenance program, contact the service manager at the local MACK Sales, Parts and Service Center.

NOTE

This handbook contains basic maintenance information. For complete maintenance and lubrication procedures, refer to the MAINTENANCE AND LUBRICATION manual, TS494.



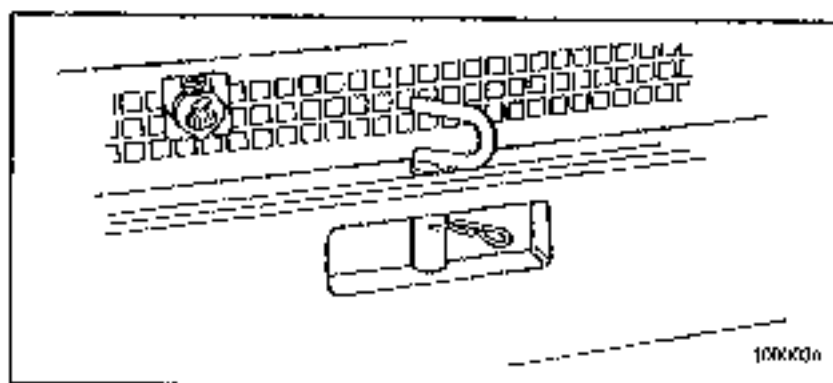
MAINTENANCE AND LUBRICATION

TOWING

Tow pins, hooks, eyes, etc., are located in or behind the front bumper. These devices meet the requirements for towing set forth by The Maintenance Council (TMC) of the American Trucking Association and can be used for towing a disabled vehicle from the immediate location.

CAUTION

Do NOT lift and tow any vehicle by tow pins, hooks, eyes, etc. If the vehicle is mired in heavy mud, snow, etc., use a suitable sling-type towing arrangement.



NOTE

Tow pins, hooks, eyes, etc., are NOT intended for use as long-term towing devices.

CAUTION

Failure to disconnect the driveline before towing or pushing the vehicle can cause serious transmission damage.

Before towing or pushing the vehicle, the driveline should be disconnected or the drive wheels should be lifted off the ground.



MAINTENANCE AND LUBRICATION

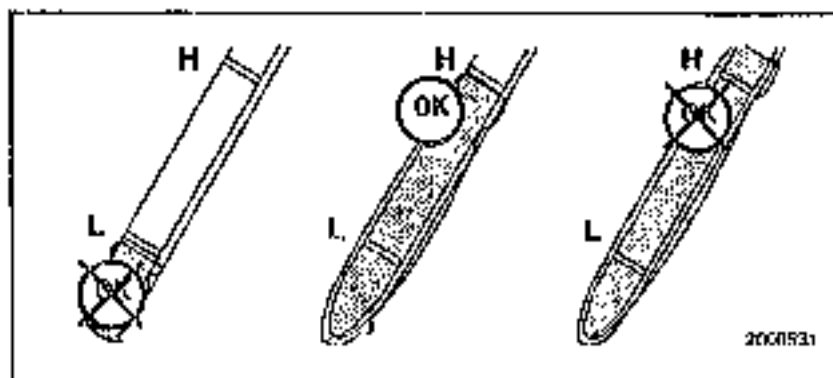
ENGINE

Oil Level Check

As the operator of this vehicle, it is important for you to perform the daily inspections necessary to keep your truck in good shape. Maintaining the proper oil level in your engine crankcase cannot be overemphasized.

Before checking the oil, remember these important points:

- Measurement of the oil level must be taken on level ground.
- If the engine has been running, allow about 15 minutes after shutdown for oil to drain down to the oil pan.
- The level must be close to the FULL line (at least between the ADD and FULL lines) on the dipstick, but must NOT exceed the FULL line (refer to illustration below).





MAINTENANCE AND LUBRICATION

COOLING SYSTEM

The cooling system is a pressurized system. The coolant is circulated by a centrifugal pump. It is a typical system in most respects, but there are a few things to keep in mind when checking or working on the cooling system.



Avoid injury when checking coolant in a hot engine. Wait for the engine to cool prior to checking the level, whenever possible.

Coolant Level Check



Turn the radiator cap counterclockwise to the first stop but do NOT depress. After the pressure has completely dissipated, press the cap downward and continue turning to remove.

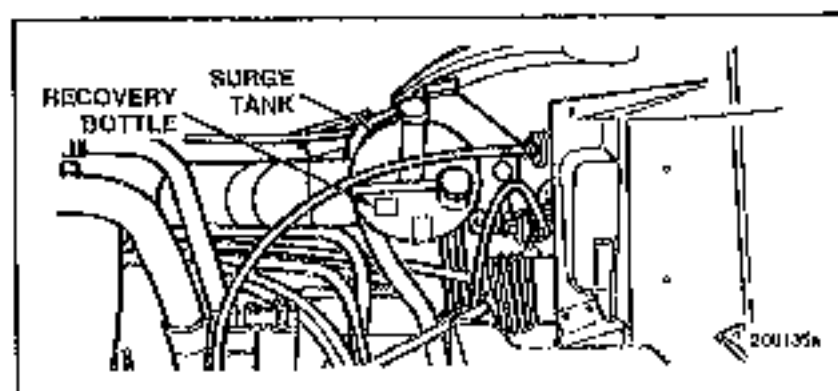


MAINTENANCE AND LUBRICATION

RD6 Series

The RD6 model chassis has both a pressurized surge tank and a non-pressurized plastic coolant recovery bottle where quick checks of coolant level can be made and additional coolant can be added to the system. The recovery bottle is located in the engine compartment, mounted on the left-hand cab firewall bracket. Coolant should be visible between the indicator lines on the bottle.

Periodically, the coolant level should be checked by observing the coolant in the pressurized coolant surge tank. The coolant surge tank is located directly above the coolant recovery bottle. The surge tank should always be full of coolant.

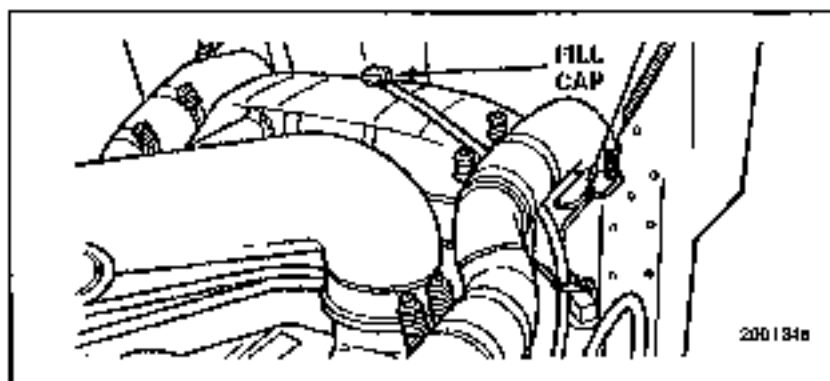




MAINTENANCE AND LUBRICATION

RD6 and RB Series

The RD6 and RB model chassis do not have a coolant recovery bottle. Coolant is checked by removing the radiator fill cap and observing if coolant is visible one inch below the base of the radiator filler neck.



Draining the Cooling System

Whenever repairs are to be made which would require disconnection of coolant hoses, etc., the cooling system should be drained. Carefully remove the filler cap and open all coolant drain cocks.

Refilling the Cooling System

Close all drain cocks and fill with the proper coolant mixture. Run engine with the radiator cap off until operating temperature is reached and the thermostat opens. Recheck level and add coolant, if required. Run the engine long enough to be sure the system is free of air and has the correct amount of coolant.



MAINTENANCE AND LUBRICATION

CAUTION

If using a coolant other than as specified by Mack Trucks, Inc., it is the responsibility of the customer to determine and perform the proper coolant maintenance procedures. Refer to the MAINTENANCE AND LUBRICATION manual, TS494, for antifreeze specifications.

Protecting the Cooling System

CAUTION

The concentration of ethylene glycol or propylene glycol in the cooling system must be checked with a refractometer prior to travelling or operating in areas where subfreezing temperatures may be encountered. When adding antifreeze to the system, run the engine for 20 minutes before checking with a hydrometer.

NOTE

Your chassis is currently supplied from the factory with engine coolant protection to -10°F (-23°C). Optional coolant protection to -40°F (-40°C) is also available.

Ethylene glycol or propylene glycol-based antifreezes are both approved for all MACK engines. All ethylene glycol and propylene glycol coolants must be low-alkaline antifreezes which meet ASTM4985 test (GM6038M SPEC) criteria. These antifreezes are sometimes referred to as heavy-duty diesel coolants. Passenger car coolants do NOT meet this specification.



MAINTENANCE AND LUBRICATION

Be sure to maintain the required level of antifreeze protection for anticipated winter temperatures in your area of operation. A 40% to 60% concentration of antifreeze is required for E7 engines, regardless of application, geographic location or ambient air temperature.

⚠ CAUTION

Do NOT exceed a 60% concentration of antifreeze to water. A higher percentage of antifreeze will not increase protection. Concentrations over 60% adversely affect freeze protection and heat transfer rates.

NOTE

Propylene glycol should be checked with a refractometer.

NOTE

ALWAYS mix the water/antifreeze solution before pouring it into the cooling system.

NOTE

The piping arrangement may cause capacity variation depending on the type of cooling system and optional external cooling devices which may be attached. Therefore, it is difficult to tell exactly how much coolant it will take to fill any one particular system.



MAINTENANCE AND LUBRICATION

⚠ CAUTION

Do NOT use coolant solutions which contain anti-leak additives in trucks equipped with coolant filters or conditioners.

⚠ CAUTION

Do NOT use soluble oil-type coolants in any MACK cooling system.

Cooling System Maintenance

The cooling system must be maintained by performing regularly scheduled maintenance as outlined in the MAINTENANCE AND LUBRICATION manual, TS494. Cold weather operations, however, place added demands on the cooling system. Prevent potential cold weather problems by performing a quick check of the cooling system as outlined below:

- Make a general check for cooling system leaks.
- Inspect hoses and clamps for leaks and condition. Tighten hose clamps to specifications (as required).
- Check coolant level. Add fresh coolant (in specified concentration) as necessary.
- Check and record degree of antifreeze concentration. Add antifreeze as necessary to obtain required protection level.



MAINTENANCE AND LUBRICATION

Winterfronts

A MACK-approved winterfront, although not recommended for normal operation, may be used during cold weather to aid the engine in reaching and maintaining engine coolant temperatures within the normal operating range.

⚠ CAUTION

Use only a MACK-approved winterfront designed for the specific chassis. Restricted air flow through the charge air cooler can cause higher exhaust temperatures, power loss, excessive fan usage, reduced fuel economy and possible engine or charge air cooler damage. The use of any other type of device, such as a radiator cover, cardboard or similar material, is not approved by Mack Trucks, Inc.

NOTE

The minimum operating temperature is 170°F (77°C).

If a winterfront is used, a MACK-approved exhaust pyrometer must also be installed and closely monitored while the engine is in operation.

⚠ CAUTION

DO NOT exceed the maximum exhaust temperature listed on the pyrometer decal. To reduce exhaust temperature, open the winterfront, downshift or reduce engine power.



MACK MAINTENANCE AND LUBRICATION

Refer to the following chart for suggested temperature ranges concerning the use of various cold-weather accessories.

Expected Coldest Temperature	MACK Approved Winterfront or Shutters	Belly Tarp	On/Off Fan	Inside/Outside Air		
40°F (4°C)	Prohibited	Prohibited	Available	Available		
32°F (0°C)						
20°F (-7°C)	Suggested (Center Panel Fully Opened)	Available	Suggested	Suggested		
10°F (-12°C)						
0°F (-18°C)						
-10°F (-23°C)	Recommended (Center Panel Fully Closed)*	Suggested	Recommended	Recommended		
-20°F (-29°C)		Recommended				
-30°F (-35°C)						
-40°F (-40°C)						

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*Never close winterfront if equipped with viscous fan drive.

CAUTION

Winter treatments are NOT RECOMMENDED for vehicles which only operate intermittently in cold climates.

CAUTION

Never fully close the winterfront if equipped with viscous fan drive.



ON/OFF Fan Clutch

An ON/OFF fan clutch can help prevent excessive cooling during extremely cold weather operations. Whereas viscous fans often rotate continuously during cold weather, an ON/OFF fan clutch keeps the fan in the OFF position. This reduces unnecessary air movement and helps to maintain adequate engine operating temperatures.



MAINTENANCE AND LUBRICATION

WHEELS

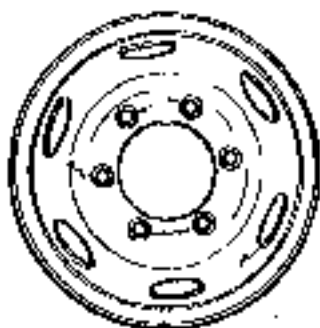
Wheel inspection

Look at wheels and cap nuts. Inspect them for evidence of cap nut looseness. Rust streaks from the cap nut ball seat are an indication of looseness. Refer to the MAINTENANCE AND LUBRICATION manual, TS494, for complete procedures concerning wheel inspection and wheel nut tightening.



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Look for cracks around the hand hole, stud hole and wheel. Look for broken studs, wheel damage or improperly seated lock rings.



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Tires



DANGER

Tires used on multipiece rims must be assembled and inflated only by experienced, qualified personnel. Tires must be inflated in a safety cage whenever possible. If, however, a safety cage is not available, use a portable lock-ring guard. The tire must be deflated prior to removal of the tire-and-rim assembly from the vehicle. Remove the valve core to ensure complete deflation.



DANGER

NEVER position your body in front of the rim during inflation.



CAUTION

NEVER use water-based sealants, puncture proofing, or liquid balance materials containing water in All-Steel Radial Ply truck tires.



MAINTENANCE AND LUBRICATION

Inflation Pressure

In order to ensure maximum mileage and overall performance from your tires, it is essential that they operate at the correct inflation pressure for the load carried. Inflation pressure should be checked daily while the tires are cold. Always use an accurate tire pressure gauge. NEVER bleed air from a hot tire, as it will then be underinflated. Refer to the specific tire manufacturer's data books, or to the vehicle certification label for a complete listing of tire inflation pressures. For additional information concerning tire care, refer to the MAINTENANCE AND LUBRICATION manual, TS494.

WARNING

UNDER NO CIRCUMSTANCES should you drive on underinflated or overloaded tires. A tire in this condition builds up excessive heat which can result in sudden tire destruction, property damage and personal injury.

CAUTION

Never bleed air from your tires in an attempt to gain traction for a vehicle stuck in snow, ice or mud. This practice provides no additional traction and typically results in underinflated tires. Never bleed air from a hot tire since that tire will then be underinflated.

To adjust for pressure fluctuations induced by temperature changes associated with winter weather, it is recommended that tire inflation pressure be checked daily when the tires are cold (i.e., before the vehicle is driven). Always use an accurate tire pressure gauge.



MAINTENANCE AND LUBRICATION

Inspection

Inspect your tires daily. Look for bulges, cracks, cuts, penetrations and/or oil contamination. If any such damage is found, the tire must be thoroughly inspected by a qualified tire inspector and repaired or discarded immediately, at his discretion. Also, check for uneven wear. If found, a thorough inspection of front end parts and alignment should be made by a qualified mechanic. Refer to the MAINTENANCE AND LUBRICATION manual, TS494, for more information.

Tire Manufacturer's Data Book

Specific and more detailed information can be obtained by referring to the technical data books provided by each tire manufacturer.

Subjects of interest are:

- ♦ High-speed or low-speed operation
- ♦ Repair, retreading and regrooving
- ♦ Use of tire chains
- ♦ Mixing radial and bias tires on the same vehicle
- ♦ Use of dynamometers
- ♦ Tire mounting/dismounting

CAUTION

For important tire information (i.e., high speed limits, inflation pressures, etc.), consult the product information available through the specific tire manufacturer.



MAINTENANCE AND LUBRICATION

Oil Contamination of Tires

Lubricating oils, fuel oil, gasoline and other petroleum derivatives, if allowed to contact tires, will soften the rubber and destroy the tire. Preventive maintenance is necessary to ensure that oil leakage does not occur. The following areas should be inspected on a regular basis:

- Axle end seals
- Engine seals
- Transmission seals
- Drive axle seals
- Oil filters
- Oil and hydraulic lines (if equipped)

Refer to the MAINTENANCE AND LUBRICATION manual, TS494, specific tire manufacturer's books, or to the vehicle certification label, for additional information concerning tires and their care.



BATTERY

⚠ CAUTION

To avoid damage to sensitive electronic equipment, disconnect ALL battery cables and harnesses to electronic control units before welding. Do NOT disconnect batteries while engine is running.

Jump-Starting Engine

If you encounter a situation in which it is necessary to jump-start an engine, use the following procedures.

⚠ WARNING

Batteries which are to be linked together must be of the same voltage (12 to 12, 24 to 24). Take care to observe proper polarity when connecting batteries. Batteries produce explosive gases. Keep sparks, flames, cigarettes, etc., away from batteries at all times. Protect your eyes by wearing safety goggles. Be sure vehicles are NOT touching each other.

⚠ CAUTION

To avoid damaging any electronic controllers when jump-starting a V-MAC vehicle, always turn the ignition switch OFF before connecting the batteries.



MAINTENANCE AND LUBRICATION

1. Connect positive (+) cable to positive (+) post of discharged battery.
2. Connect the other end of the same cable to the positive (+) post of the booster battery.
3. Connect the second cable, negative (-) side, to the other post of the booster battery.
4. Make the final connection to the negative (-) battery terminal of the stalled vehicle, and stand back.
5. Start the vehicle with the booster batteries and then start the stalled vehicle. Shut down the vehicle with the booster batteries and remove the cables in the reverse order of connection.



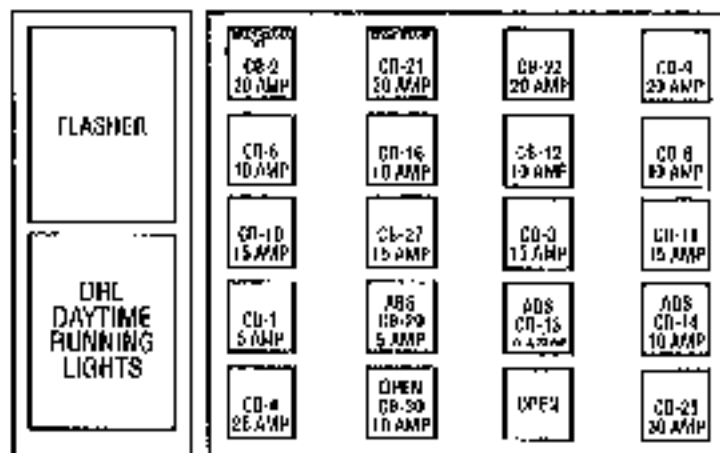
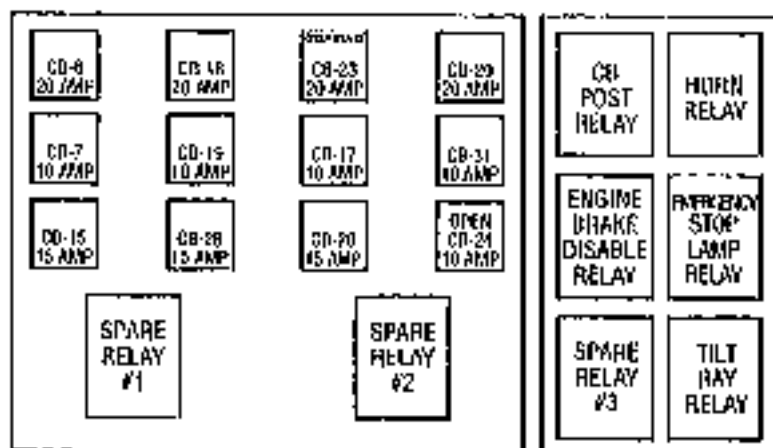
Do NOT connect the final negative (-) connection to the frame of the stalled vehicle. This would cause all current to flow through the master ground circuit breaker resulting in overload.



MAINTENANCE AND LUBRICATION

ELECTRICAL

Circuit Breaker and Relay Panels



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MAINTENANCE AND LUBRICATION

NOTE

For circuit breaker designations refer to the Circuit Protections charts.

Fuses are standard equipment for all circuits except the headlamps and windshield wipers. Circuit breakers are available as optional equipment.

CAUTION

For proper installation of electrical accessories, all wiring should meet SAE requirements and be routed through the circuit protection panel with proper amperage fuses or Type I circuit breakers. (Headlights and wipers will be on Type I, cycling-type circuit breakers.)

Some vehicles may be equipped with daytime running lights. For the daytime running lights to be operational, a DRL module must be installed in the relay socket marked either "DRL MOD" or "Running Lamps" on the electrical equipment panel. Do NOT install a standard relay into the daytime running light relay socket (marked either "DRL MOD" or "Running Lamps") or a short circuit in the headlight high beam circuit will result.



MAINTENANCE AND LUBRICATION

The headlight circuits are protected by SAE Type I (automatic reset-cycling) circuit breakers that automatically interrupt then restore the flow of current through the circuit in the event of an overload. This cycling will continue until the cause of the overload is repaired.

SAE Type II (automatic reset, non-cycling) circuit breakers (if equipped) provide a complete circuit disconnect until the overload is corrected. The power to the affected circuit breaker must be shut off before the circuit breaker will reset itself.

The circuit protection panel also provides access to battery, ignition and ground terminals for non-factory installed electronic equipment. (On V-MAC chassis, there are two serial link terminals for easy local connection of a trip recording device.)



MAINTENANCE AND LUBRICATION

Circuit Protection Charts

Cub Circuit Protection (V-MAC® III)			
#1 5A	#2 20A	#3 15A	#4 25A
VCU (Clock)	Headlamps DRL Module	Marker Lps., Park & Tail Lps., Cnb ID Lps., Panel Lps	Direct. Lps. Flasher
#5 10A	#6 10A	#7 10A	#8 20A
Tractor Stop Lps.	Dome Lps., Clock or Spare	Ign. Switch	Cigar Lighter Horn
#9 20A	#10 15A	#11 15A	#12 10A
Radio CD Posts	Communication Connector (DDL)	Battery Stud	Spare
#13 10A	#14 10A	#15 15A	#16 10A
AHS	ABS	Spare	Vehicle Control Unit (VCU)
#17 10A		#18 20A	#19 10A
Clutch Switch, Parking Brake, Cruise On/Off & Set/Resume, Overrun Switch, Park Brake, PTO w/in T2000, Spare (VCU) Relay Coils		Spare (VCU) Relay Power	Gauges, PDLO Switch, Digital Display, Ind. Lamps, Hourmeter
#20 20A	#21 20A	#22 20A	#23 20A
Htg. Mirrors, Cold Start	Windshield Wiper & Washer	Auxiliary Cab Heater, Spare	RH Window Lift Motor, Instr./Outside Air Spare
#24 10A	#25 30A	#26 10A	#27 15A
Spare	Heater/Air Conditioner	Hook-Up Lps., Spot Lps., Spare	Ignition Stud, Moto Mirrors
#28 15A	#29 5A	#30 10A	#31 10A
Spare	ADS	Spare	ABS

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MAINTENANCE AND LUBRICATION

Engine Circuit Protection (V-MAC® III)					
#32	20A	#33	30A	#34	30A
Spare		Trailer Stop Lps.		Reverse/Neutral Power	
					Cab & Trailer Clearance Lps., Mirror Illum.
#36	20A	#37	30A	#38	20A
Fog Lps.		Spare/Trailer Tail Lps.		Cab & Trailer Clearance Lps., Mirror Illum.	
					Trailer ABS Power
#40	25A	#41	15A	#42	20A
Engine Control Unit (Ign.)		Fan Clutch, Torque Limiter, PTO w/12000, Engine Brake Solenoids, (ECU) Switches			Back-Up Lps.
#43	20A	#44	25A	#45	30A
Spare		Air Dryer, Hld, Drain Valve		Spare/Fuel Separator, Fuel Heater	
					Spare
#47	20A	#48	50A		
Spare		Spare			

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MAINTENANCE AND LUBRICATION

Electrical Accessory Connection Points

This MACK chassis is ready for convenient installation of electrical accessories. Use only the designated CB jacks on the dashboard, or Battery post (12 volts), Ignition, ground post, buffered tachometer (RPM) output, and buffered speedometer (MPH) output connections available on the electrical equipment panel. Each connection point is described below.

Battery Post (BATT)

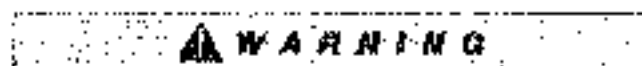
This is a 12-volt, unswitched battery power connection. It can be used to power external devices that require power at all times, even when the key is turned off. This source is protected by a 20-amp circuit breaker.

Ignition Post (IGN)

This is a 12-volt, switched battery power connection. It can be used to power external devices that require power only when the key is turned on. This source is protected by a 15-amp circuit breaker.

Ground Post (GND)

This is a ground connection. It can be used as a power return connection for external devices.



The tachometer output, speedometer output, and serial links A and B are for specific hookups. These terminals should be used only for their specified purposes and connection to these terminals should be done only by a qualified service technician.



MAINTENANCE AND LUBRICATION

NOTE

The tachometer output and speedometer output are 50% duty cycle, Transistor-Transistor Logic (TTL) compatible, square wave signals that are calibrated to provide a standard pulse rate of 12 pulses per engine revolution. TTL compatibility of these outputs may be affected by other devices connected to these outputs.

Tachometer (RPM) Output

This terminal is to be used for devices requiring information for engine speed signals. (See the Warning and Note above.)

Speedometer (MPH) Output

This terminal is to be used for devices requiring information for vehicle speed signals. (See the Warning and Note above.)

SAE/ATA J1708 Posts (Serial Links A and B)

This is a serial communication interface. It conforms to the SAE/ATA J1708 Recommended Practice for Serial Data Communications Between Microcomputer Systems in Heavy-Duty Vehicle Applications. (See the Warning above.)

CB Radio Power Jack (+) Located on the Dashboard

This is a 12-volt, switched battery connection. It is to be used to power the vehicle's CB radio. It is protected by a 15-amp circuit breaker and will supply power only when the key is turned ON.

CB Radio Power Jack (-) Located on the Dashboard

This is a ground connection. It is to be used as a power return (-) connection for the vehicle's CB radio.



MAINTENANCE AND LUBRICATION

Electrical Grease

To prevent corrosion of the lamp socket terminals, particularly with the clearance and marker lamps, apply a coating of electrical sealing grease, such as Lubriplate DS-EX, to the socket and terminal assemblies.

 CAUTION

Do not use electrical grease on any V-MAC connectors.



METRIC CONVERSIONS

NOTE

Use all tools on the fasteners they were made to be used on. Use metric tools on SI metric units only. Never try to use metric tools on U.S. pound-inch units or U.S. pound-inch tools on SI metric units.

⚠ CAUTION

Potential external/internal thread mismatch condition(s) may occur with certain metric thread-inch thread fastener combinations, and with fastener combinations involving incompatible metric fastener systems. A given thread mismatch condition can result in thread stripping and/or assembly weakness leading to potential service failure, thereby rendering a vehicle non-operational and/or unsafe for operation. The specific external/internal thread combinations from which such problems can result are identified and set forth in TS494.



METRIC CONVERSIONS

U.S. to SI Conversions	
1 inch	= 25.4 millimeters
1 mile	= 1.61 kilometers
1 pint (U.S. liquid)	= .473 liter
1 quart (U.S. liquid)	= .946 liter
1 cubic inch	= .01639 liter
1 pound-foot	= 1.3558 Newton meters
1 horsepower	= .746 kilowatt
1 pound/square inch	= 6.895 kilopascals
degrees Fahrenheit	= (1.8 x degrees Celsius) + 32
1 gallon (U.S. liquid)	= .83267 Imperial gallon
SI to U.S. Conversions	
1 millimeter	= .03937 inch
1 kilometer	= .6214 mile
1 liter	= 2.1134 pints (U.S. liquid)
1 liter	= 1.0567 quarts (U.S. liquid)
1 liter	= 81.024 cubic inches (U.S. liquid)
1 Newton meter	= .7376 pound-foot
1 kilowatt	= 1.34 horsepower
1 kilopascal	= .145 pound/square inch
degrees Celsius	= .556 x (degrees Fahrenheit - 32)
1 Imperial gallon	= 1.2009 gallons (U.S. liquid)

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