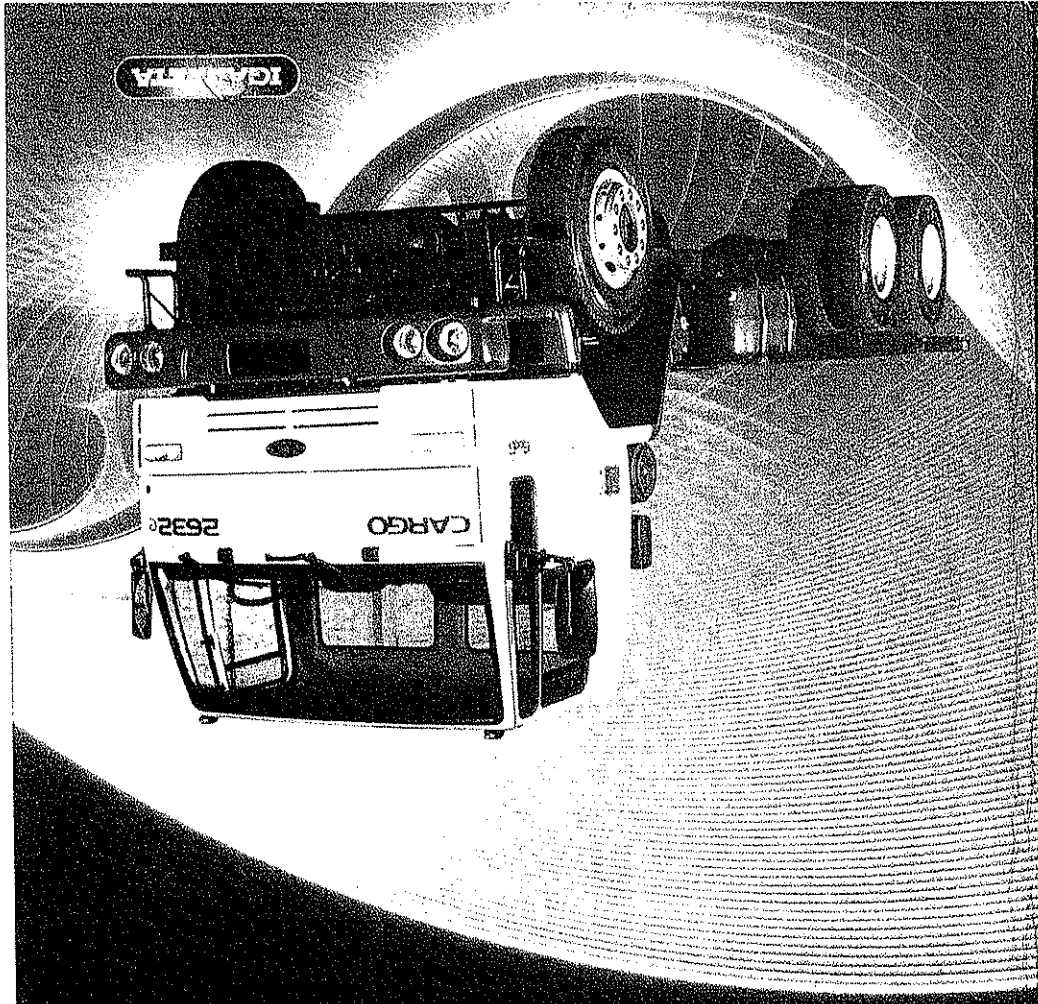


Manual de Operación y Mantenimiento

Conversión a 6x6



IGARRETA

"El mayor desafío es, sin lugar a dudas, el próximo"

Igarreta S.A.C.I.
División Vehículos Especiales
Departamento de Ingeniería
Industria Argentina

Lo que debe saber antes de conducir el vehículo

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En este manual se describen los opcionales y niveles de equipamiento disponibles para toda la gama de modelos de este vehículo con conversión a 6x6. Para su vehículo, se aplican las descripciones del equipamiento instalado según la versión adquirida.

Importante: Las piezas y accesorios originales de Igarreta S.A.C.I., han sido especialmente diseñados para los vehículos con conversión a 6x6, y son, en cualquier caso, los más adecuados para su vehículo.

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Impreso en Argentina.

Editado por Igarreta S.A.C.I.
Departamento de Ingeniería
Publicaciones Técnicas.

FELICITACIONES

Felicitaciones por la adquisición de su Conversión a 6x6. Dedique tiempo a leer este Manual para familiarizarse con su contenido, ya que, cuanto más sepa y compranda de su vehículo, mayor será el grado de seguridad, economía y satisfacción que conseguirá al conducirlo.

Este manual lo familiarizará con el manejo de su vehículo. Contiene instrucciones para la conducción normal de cada día, el uso de los comandos del 6x6, el mantenimiento periódico del vehículo y su garantía.

Atención!

En este manual se describen todas las opciones y variantes del modelo disponibles y, por lo tanto, puede que algunos de los accesorios descritos no sean aplicables a su propio vehículo. Además, debido a los periodos de impresión de los manuales, puede suceder que algunos elementos opcionales se describan antes de su comercialización.

Si vende su vehículo, no olvide entregar el presente manual al futuro comprador. Es parte integrante del vehículo.

PARA SU SEGURIDAD Y LA PROTECCIÓN DE SU VEHÍCULO



Simbolos de aviso en este Manual

?Cómo puede usted reducir los riesgos de sufrir lesiones personales y evitar posibles daños a otras personas, a su vehículo y a su equipo? En este Manual, las respuestas a tales preguntas vienen dadas mediante comentarios resaltados con el símbolo de un triángulo de aviso. Estos comentarios deben leerse y observarse.



Simbolos de aviso en su vehículo

Quando vea este símbolo, es absolutamente necesario que consulte el apartado correspondiente de este Manual antes de tocar o intentar llevar a cabo ajustes de cualquier clase.



ATENCIÓN!

Toda la información contenida en este manual estaba vigente en el momento de su impresión. Igarreta S.A.C.I. se reserva el derecho de cambiar modelos, especificaciones o diseños sin necesidad de previo aviso, sin que ello implique obligación de su parte o de sus Concesionarios.

CONOCIENDO EL VEHÍCULO

Usted dispone de un vehículo capaz de transitar por caminos no convencionales, y de esta manera permitirle llegar a lugares inaccesibles para otros vehículos. Basta con recibir algunos consejos y observar varias precauciones para poder obtener con seguridad y confiabilidad el máximo rendimiento de su vehículo.

Las diferencias originadas en la transformación de 6x4 a 6x6, hacen que la forma de conducir sea algo diferente a la de un vehículo convencional. Tómese su tiempo para familiarizarse con las nuevas características de manejo: conduzca primero en zonas poco transitadas, practique virajes a distintas velocidades y en diferentes direcciones. Aprenda a identificar las características que favorecen la marcha fuera de carretera, disminuyen el desempeño de su 6x6 en carretera.

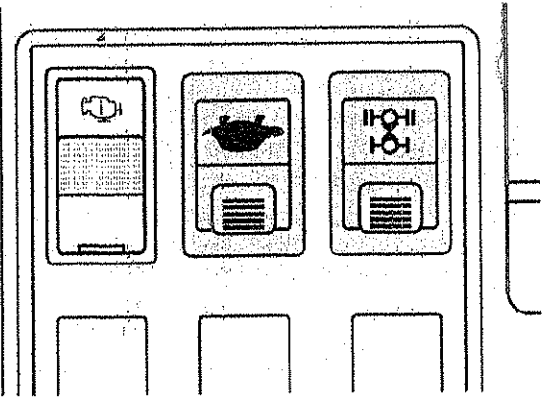
La unidad cuenta con neumáticos de dibujo apto para tracción en terrenos difíciles, lo que ocasiona un aumento en la rumorosidad de marcha sobre pavimentos firmes.

SISTEMA 6x6

El sistema 6x6 aplica tracción en los 3 ejes (10 ruedas) para impulsar el vehículo, pudiendo hacerse en 6x6 en combinación con las 10 marchas de avance o las 2 de retroceso que ofrece el camión. Esta tracción 6x6 es permanente ya que la conversión incorpora una caja divisora de potencia denominada "caja de transferencia" (montada a la salida de la caja de velocidades) que distribuye la potencia del motor entre ambos ejes en forma simultánea, siendo un 30% para el eje delantero y un 70% para el eje trasero. El reparto de potencia de la *caja de transferencia* se logra a través de un *interferencial*, que en caso de condiciones de patinamiento extremo, es posible bloquear, aumentando así la capacidad de tracción a partir de un reparto simétrico de potencia a todos los ejes. Este bloqueo debe ser utilizado en manera transitoria hasta salir del trance.

Además de la caja de transferencia, la conversión incorpora un eje delantero motoriz direccional de relación similar al trasero. De esta forma se reparte y aumenta la adherencia al suelo debido a la tracción adicional de las ruedas delanteras, las cuales direccionan la fuerza de tracción en el sentido de la dirección. Esto le permite a la unidad avanzar en caminos que normalmente son inaccesibles para un vehículo 6x4 común.

COMANDOS DE LA CONVERSIÓN 6x6:



Los comandos de bloqueo y baja de la unidad, se realizan con las teclas ubicadas en el extremo derecho inferior del tablero de instrumentos, próximo a la guantera. El comando de *bloqueo* es la tecla señalizada en naranja, mientras que la tecla de baja es la tecla con traba señalizada con una tortuga. **IMPORTANTE:** Recordamos que estas teclas deben ser accionadas únicamente con el vehículo detenido o en baja velocidad (máximo 10km/h) para evitar accidentes y daños severos.

El uso de estas teclas es independiente entre sí.

MODOS DE MARCHA.

Según cuales sean sus necesidades, usted cuenta con diferentes configuraciones de los comandos que lo ayudarán a sortear todo tipo de superficies. Dichas configuraciones, son las siguientes:

Posición normal: Caja de velocidades en marchas altas (6^{ta} a 10^{ma})

Es la condición habitual de marcha y muy aconsejada para uso en terrenos resbaladizos ya sea por agua, arena, ripio, nieve o hielo. El vehículo se movilliza por tracción en las ruedas de ambos ejes, la potencia del motor se reparte entre los mismos y no hay reducción adicional de velocidad.

Posición eventual: Caja de velocidades en marchas bajas (1^{ra} a 5^{ta})

Es aconsejada para uso fuera de ruta en terrenos abruptos como médanos, terreno barroso o con fuerte pendiente de subida. El vehículo se movilliza por tracción en las ruedas de ambos ejes.

CONDUCCIÓN

Tal como mencionamos al comienzo de este manual, las diferencias originadas en la transformación de 6x4 a 6x6 hacen que la forma de conducir sea algo diferente a la de un vehículo convencional. Es por ello que consideramos importante que se familiarice con las recomendaciones indicadas a continuación para poder obtener con seguridad y confiabilidad el máximo rendimiento de su vehículo:

En carretera:

- Evite las maniobras bruscas y los virajes cerrados. Este vehículo no está diseñado para tomar una curva a la misma velocidad que un camión normal 6x4 ya que posee un centro de gravedad más alto.
- Evite las velocidades excesivas.
- Fuertes vientos laterales pueden hacer que el vehículo se vuelva inestable. Ante esta situación conduzca lentamente.
- Conduzca con extremo cuidado sobre pavimento resbaloso, sea arena, ripio suelto, agua, nieve, hielo o lluvia torrencial.

• Si se sale del pavimento:

- ✓ Disminuya la velocidad.
- ✓ Evite frenar o doblar bruscamente.
- ✓ Vuelva al pavimento sólo cuando haya reducido la velocidad y sin girar demasiado el volante. Bajo ninguna circunstancia circule sobre pavimentos o caminos firmes con el *comando de bloqueo* conectado.
- ✓ A menudo puede ser menos riesgoso pasar por encima de pequeños objetos como piedras o arbustos, que intentar volver al pavimento en forma repentina, ya que esto puede provocar que el vehículo resbale hacia los costados, perdiendo el control.

• Cuidado del vehículo:

- ✓ Evite accidentes y/o averías: Bajo ninguna circunstancia circule sobre pavimentos o caminos firmes con el *comando de bloqueo* conectado. Esto puede producir severos daños en la caja de transferencia, los ejes u otros componentes de la transmisión. También causa desgaste innecesario de los neumáticos.
- ✓ Opere los *comandos de bloqueo* y 6x6 Baja únicamente con el vehículo detenido. La tecla selectora de 6x6 Baja tiene un seguro que evita la colocación en forma accidental.

Fuera de ruta (Off-Road):

- Recuerde usar siempre el cinturón de seguridad.
- Al conducir especialmente en terrenos desparejos tome el volante manteniendo los pulgares fuera del aro del mismo. Así podrá evitar lesiones si el volante retorna violentamente ante un fuerte golpe en las ruedas delanteras.

Bloqueo de diferencial trasero e interdiferencial de caja de

transferencia:

Este comando es muy aconsejado en caso de tener un excesivo patinamiento de los 3 ejes, y podrá utilizarse para cualquier posición de marcha de velocidad o de baja en caja de transferencia.

Para activar el *comando de bloqueo* se deberá detener la unidad, colocar en punto muerto la caja de velocidades y accionar la tecla que posee una etiqueta color naranja con el dibujo de dos ejes. Se encenderá una luz en el conjunto de los instrumentos del panel indicando esta condición.

Para desactivar este comando, también se deberá detener la unidad y colocar en punto muerto la caja de velocidades.



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6x6 Baja (Si está equipado)

Este comando es aconsejado para superar pendientes extremadamente pronunciadas. El vehículo se movilizará por tracción en las ruedas de ambos ejes. La potencia del motor se reparte entre los mismos, con una reducción adicional de velocidad y consecuente aumento del par en la relación en un 30% aproximadamente.

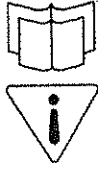
Para activar el *comando 6x6 baja* se deberá detener la unidad, colocar en punto muerto la caja de velocidades y accionar la tecla que está señalizada con una tortuga, deslizando el seguro que posee hacia abajo al mismo tiempo que se presiona la tecla. Esta tecla posee una luz roja interior que se encenderá indicando esta condición.

Para desactivar este comando, también se deberá detener la unidad y colocar en punto muerto la caja de velocidades.



RECUERDE:

- Tracción 6x6 PERMANENTE.
- Para evitar accidentes y roturas:
- NO cambiar selectores con vehículo en movimiento.
- NO circular en caminos firmes con bloqueo activado.



- Antes de emprender una travesía fuera de carretera, aun siendo breve, es recomendable mantener el nivel de combustible por encima de la mitad del tanque, para asegurar el suministro al motor en caso de inclinaciones elevadas. Por otra parte, las incursiones fuera de ruta conllevan a un mayor consumo de combustible.
- No es recomendable incursionar en terreno desconocido sin otro vehículo que le pueda brindar apoyo en caso de emergencia.

En terrenos diversos:

• Agua

- ✓ Determine antes la profundidad a vadear.
- ✓ Conduzca lentamente a velocidad constante.
- ✓ No circule por profundidad mayor que el borde inferior de maza de rueda.
- ✓ Antes de ingresar, ponga una marcha lenta con la caja de velocidades (Por ej. 6x6 2^{da} ó 3^{ra}).
- ✓ Al salir del agua los frenos estarán mojados, siendo así, menos efectivos. Séquelos durante la marcha aplicando una leve presión sobre el pedal de freno.

• Arena.

- ✓ Trate de mantener las 10 ruedas en la superficie más sólida posible.
- ✓ Conduzca lentamente a velocidad constante.
- ✓ Acelere lentamente para evitar que las ruedas patinen.
- ✓ Si tiene que reducir la presión de neumáticos, asegúrese de inflarlos lo antes posible.
- ✓ En playa marítima, circule por arena húmeda alejado del agua. Esta puede dañar todo el vehículo.
- ✓ En caso de quedarse enterrado no intente salir acelerando. Detenga la marcha, baje y retire la mayor cantidad de arena de adelante de las ruedas delanteras (o de las traseras si cree mejor salir hacia atrás). Coloque la caja de velocidades en marchas bajas (1^{ra} a 5^{ta}) e intente salir lentamente.

• Barro

- ✓ Mantenga el acelerador ligeramente apretado y no gire bruscamente.
- ✓ Revise el nivel del líquido limpiaparabrisas; puede necesitarlo.
- ✓ Si el vehículo empieza a patinar, mueva el volante en la dirección de patinaje hasta recuperar el control. No pise repentinamente el freno.
- ✓ Si las ruedas patinan, no las haga girar a más de 40km/h. Los neumáticos pueden desbandarse y lastimar a un tercero.
- ✓ Después de salir del barro, limpie todo el vehículo. Especialmente, quite el barro atascado en las partes rotativas, zona del radiador y aire acondicionado.

- ✓ Si se produce una condición de estancamiento con patinamiento de ambos ejes, se deberá parar la unidad y colocar el *comando de bloqueo*. Una vez salido del trance se procederá al desbloqueo.

• Nieve y hielo

- ✓ Utilice el mando la caja de velocidades en marchas bajas (1^{ra} a 5^{ta}) si hace falta.
- ✓ Mantenga una velocidad constante para evitar que las ruedas patinen.
- ✓ Se recomienda el uso de cadenas para nieve. No se deben poner cadenas en las ruedas delanteras.
- ✓ Si el vehículo empieza a patinar, mueva el volante en la dirección de patinaje hasta recuperar el control. No pise repentinamente el freno.
- ✓ Para partir después de una detención completa, pise el acelerador en forma lenta y uniforme.
- ✓ Si tiene que detenerse asegúrese de contar con suficiente espacio ante otro vehículo u obstáculo. Maneje más lento de lo normal y considere el uso de velocidades inferiores.
- ✓ Si habría un patinamiento excesivo de ambos ejes, se deberá parar la unidad y colocar el *comando de bloqueo*. Una vez salido del trance se procederá al desbloqueo

• Ripio, grava y rutas poco transitadas

- ✓ Especialmente en la Patagonia y otras regiones de América es común recorrer grandes distancias sin encontrar áreas de servicio o descanso. Considere esto y en caso necesario, una detención y breve caminata lo ayudarán
- ✓ Mantenga una velocidad constante y evite los movimientos repentinos de dirección.
- ✓ Inicie el viaje con el tanque lleno, ya que no se encuentran abastecimientos cercanos. Familiarícese con el consumo de combustible, tenga en cuenta que en zonas abruptas y con viento en contra el consumo es mucho mayor.
- ✓ Conduzca en lo posible por el centro del camino evitando los costados con ripio suelto, donde el vehículo se comportará en forma inestable.

• Pendientes.

- ✓ Evite manejar transversalmente o vitar en pendientes o terrenos montañosos.
- ✓ Conduzca en forma perpendicular a la pendiente. Determine de antemano la ruta a seguir, vea cuáles son las condiciones del otro lado de una cima antes de intentar bajarla. Para manejar marcha atrás en una colina ayúdese con alguien que lo guíe.
- ✓ Al subir una colina, empiece con una velocidad baja en lugar de efectuar luego un cambio descendente desde una velocidad alta. Esto reduce el esfuerzo del motor y la posibilidad de que se detenga.

MANTENIMIENTO Y GARANTÍA:

Toda la información detallada en esta sección incorpora las condiciones esenciales del Mantenimiento y Garantía necesarias para una operación adecuada y segura de su vehículo 6x6. Es de suma importancia someter el vehículo a las revisiones periódicas, en los kilómetros indicados, de acuerdo con los puntos ya establecidos en el Programa de Lubricación y Mantenimiento. Recuerde que el no cumplimiento del programa regular de revisión, lubricación y mantenimiento, implica la pérdida de validez de la garantía. En este manual usted encontrará también la dirección y teléfono de nuestras oficinas en caso de necesitar asistencia técnica.

PROGRAMA DE LUBRICACIÓN Y MANTENIMIENTO

El mantenimiento periódico es un requisito esencial para que su vehículo siga funcionando de forma segura, económica y que sea lo menos contaminante posible. Ayuda a conservarlo en buen estado, prolonga su vida útil y mantiene su valor en una posible venta futura. Para ello, se deben realizarse las revisiones periódicas detalladas a continuación. Las mismas son de vital importancia, ya que el desgaste de las piezas son procesos graduales, por lo que si se detecta una anomalía a tiempo los costos de reparación son pequeños y el beneficio en cuanto a economía y seguridad puede ser considerable.

- ✓ Si el vehículo tiene una repentina inclinación lateral, no intentar la dirección hacia la cima porque podría volcar. Lévelo con la dirección hacia abajo, lentamente, hasta que se enderece y pueda maniobrar con seguridad.
- ✓ Descienda una cuesta en la misma velocidad que usó para subir. No descienda en neutral y evite el frenado brusco en descenso por que podría volcar.
- ✓ En pendientes pronunciadas, tanto en ascenso como descenso utilice la caja de velocidades en marchas bajas (1^{ra} a 5^{ta}) para aprovechar el torque multiplicador de la caja de transferencia.

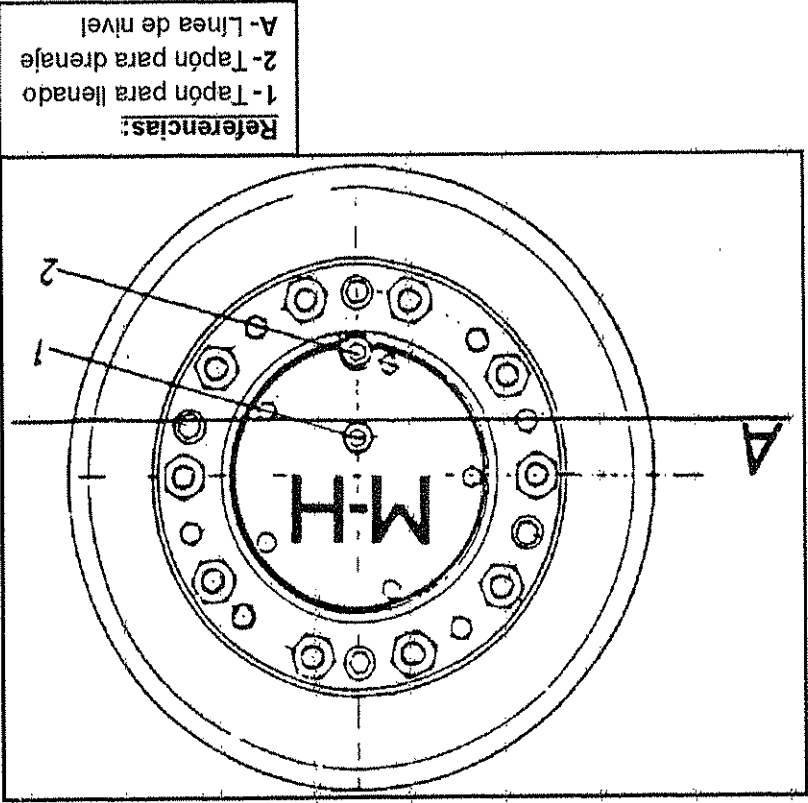
Si su vehículo queda atascado...

- Si su vehículo queda atascado sobre nieve, barro, o arena, use la caja de velocidades en marchas bajas (1^{ra} a 5^{ta}), si es que no estaba ya en esa posición.
- Efectúe sucesivos cambios de marcha en 1^{ra} y marcha atrás para conseguir que el vehículo se balancee y de este modo libere. Haga esto sin modular con el pedal de embrague y pisando levemente el acelerador. No prolongue demasiado esta maniobra. Si no logra resolver el atascado en unos pocos intentos, pida ayuda. No acelere el motor ya que solo logrará escarbar debajo de las ruedas y empeorar la situación de forma que deberá ser remolcado.

Uso de eslingas, malacates y otros accesorios off-road.

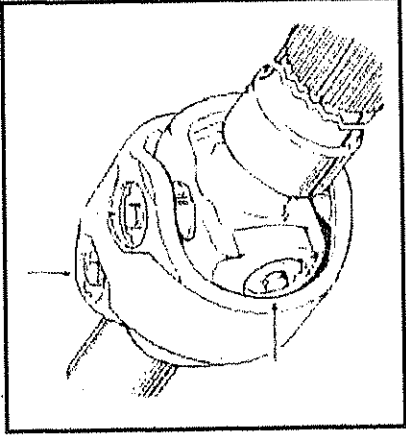
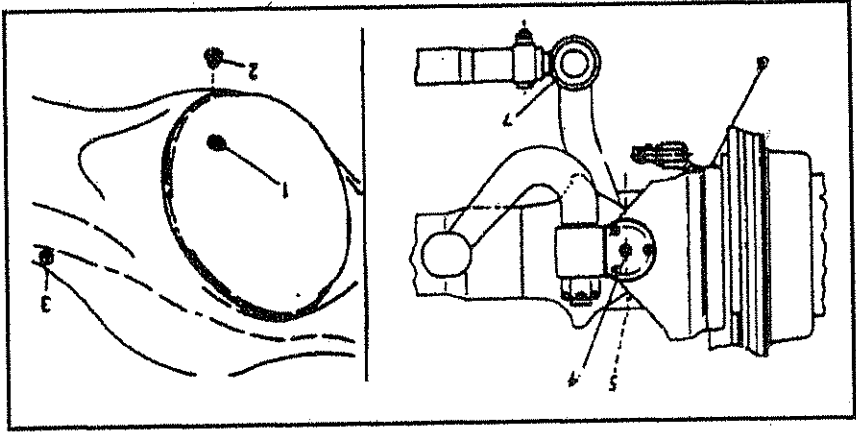
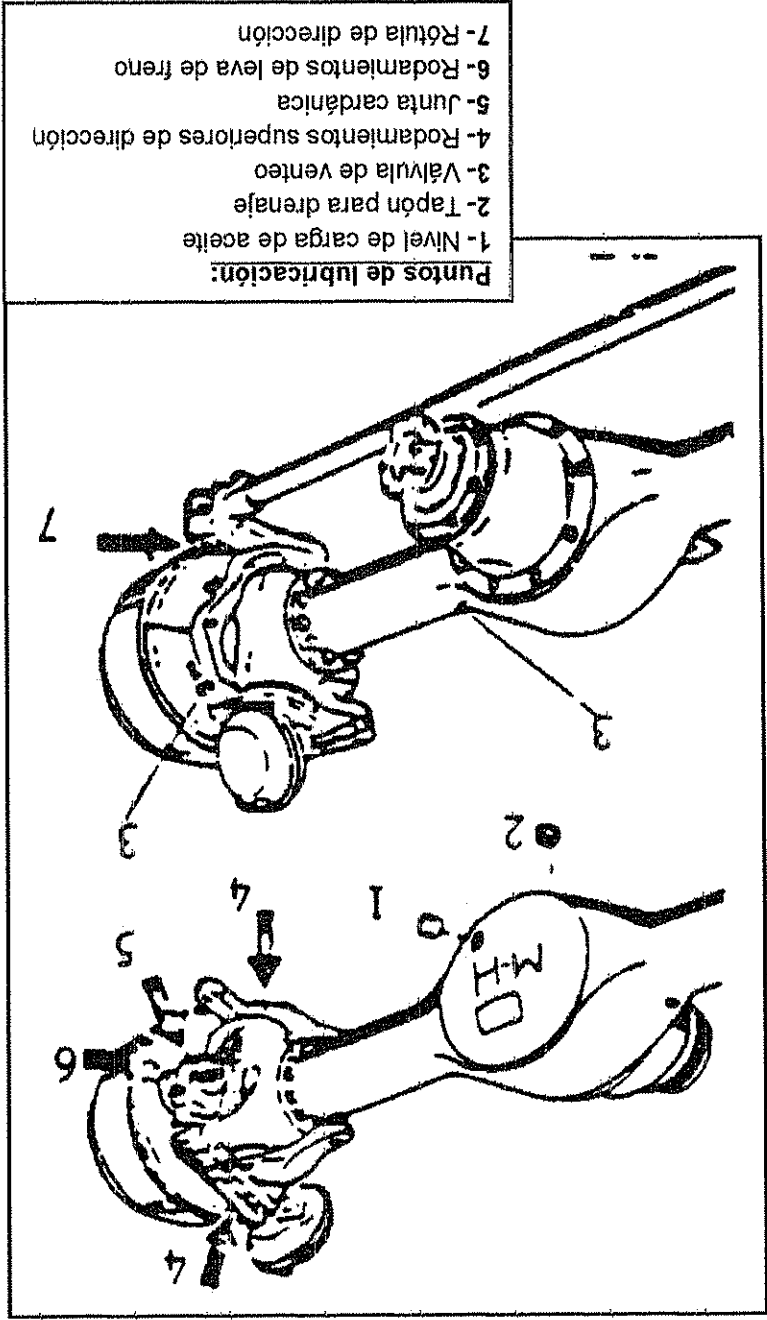
En caso de recurrir a estos elementos de rescate o presenciar el uso de los mismos, ponga especial atención al tema seguridad. Las fuerzas involucradas en estas maniobras alcanzan valores muy importantes, y en caso de sobrevenir la rotura de un cable o elementos vinculados a ello pueden surgir lesiones para el operador u espectador. Deje que los expertos hagan esta maniobra y es prudente colocarse a una distancia mayor que el largo de cable.

CUBOS DE RUEDA EN EJE MT-17:



COMPONENTE	TIPO	CANT. (Lts)	FRECUCENCIA
Diferencial delantero	SAE 85-140EP	8	Primer cambio a los 1600 Km, (no exceder los 4800 Km). Luego cada 16.000 Km ó anualmente. Drenar con el aceite caliente. Reposición según necesidad.
Reducción de cubos	SAE 85-140EP	1	Verificación nivel cada 1.600 Km. Cambio cada 16.000 Km ó anualmente.
Juntas homocinéticas	NL-GI-2EP Litio	-	Reponer cada 16.000 Km ó anualmente.
Caja de transferencia	SAE 85-140EP	8.2	Reponer fluido según tapa de nivel. Cambio anual.
Cruceatas de palieres	Grasa de litio	-	inyectar según necesidad. Seguir el mismo mantenimiento que las cruceatas de cardanes.

GUÍA DE LUBRICACIÓN POR COMPONENTE



NOTA: Junto con el presente manual, se entrega el manual de servicio del eje delantero por parte del fabricante. Para más detalles sobre el mantenimiento del eje, por favor, consultar dicho manual.

CERTIFICADO DE GARANTIA

Igarreta S.A.C.I. garantiza al comprador, que cada elemento de conversión a 6x6 fabricado por Igarreta S.A.C.I., vendido por la firma comprador, bajo uso y servicios normales, está libre de desperfectos material o en mano de obra por un periodo de un (1) año desde la fecha entrega de tal producto al comprador original o hasta que tal producto ha sido manejado, usado y operado por una distancia de sesenta mil (60.0 kilómetros, lo que ocurra primero.

ALCANCES DE LA GARANTIA

Esta garantía no cubrirá ningún producto de Igarreta S.A.C.I. que ha sido sometido a maltrato, negligencia o accidente, que hubiese sido usado eventos deportivos formales o informales, que no hubiese recibido oportunamente los servicios de mantenimiento preventivo recomendado; en los cuales se hayan usado piezas que no son hechas ni suministradas por Igarreta S.A.C.I., si en la determinación de la firma tal uso ha afectado funcionamiento, estabilidad o confiabilidad, o que haya sido alterado reparado fuera del lugar de negocios de la firma, de manera que el deterioro de la firma este haya afectado su funcionamiento, estabilidad o confiabilidad. Tampoco cubrirá el reemplazo de aquellos componentes o cambio se encuentre previsto en los planes de mantenimiento preventivo normal. Esta garantía explícitamente sustituye toda otra garantía, expresa implícita y toda otra obligación por parte de Igarreta S.A.C.I.

* Se define como evento deportivo formal o informal las pruebas tiempo, competición con otro vehículo o cualquier aplicación anormal esfuerzo.

PLAZOS DE LA GARANTIA

El plazo de la garantía de su vehículo 6x6 es de un (1) año o 60.000 km que ocurra primero, contados a partir de la fecha de entrega del mismo.

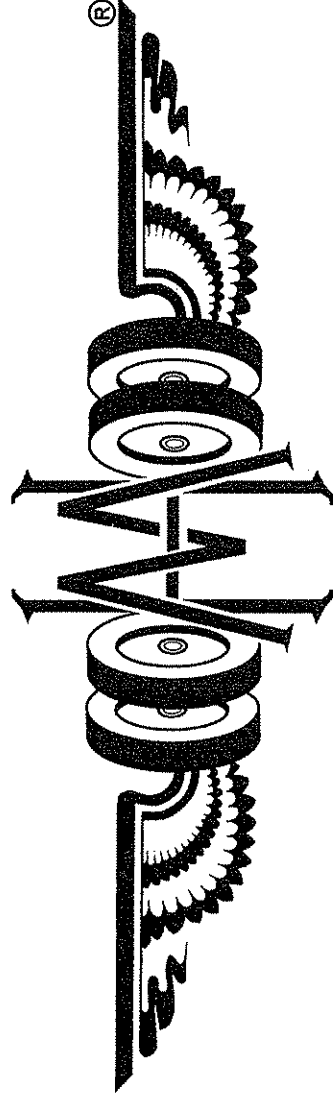
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MOD. Y SERIE: R-1100/1204-CO66-1395



DPTO. DE INGENIERIA



Marmon-Herrington

OPERATORS MANUAL

MARMON-HERRINGTON ALL-WHEEL DRIVE

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E-mail: info@marmon-herrington.com

AM 04/11

OPERATION INSTRUCTIONS



Marmon-Herrington

FOREWORD

This manual has been prepared for owners and operators of vehicles equipped with Marmon-Herrington All-Wheel-Drive systems and components. For additional technical assistance, contact Marmon-Herrington Customer Service.

Please observe and follow all procedural and maintenance guidelines to ensure reliable operation and optimum service life. The Marmon-Herrington basic service schedule will integrate seamlessly with most preventative maintenance programs.

Marmon-Herrington shall not be liable for component failures or damages caused by operational abuse or neglect. Please review the Warranty Statement for a detailed explanation of coverage and claim reporting procedures.

We thank you for your investment in Marmon-Herrington equipment, and look forward to serving your needs in the tradition of engineering excellence.

GENERAL OPERATION STATEMENT

As close as engineers try to match gear ratios and tires for a given application, the reality is that there will always be some degree of ratio mismatch between front and rear axles. When a vehicle is operated on a hard, dry surface with the front axle engaged (AWD, 4X4, 6X6 modes), the tires are not able to slip and relieve the torsional forces being generated.

As such, Marmon-Herrington equipped vehicles are designed for **"as needed" AWD operation only**, in "off-road" or poor traction conditions. They are **not** intended to be driven in AWD mode on hard, dry surfaces.

Note: Seek expert advice when considering tire size or gear ratios changes.

SHIFTING OF AXLE OR TRANSFER CASE

Marmon-Herrington Axles and Transfer Cases use no clutching or synchronization devices, and therefore should only be shifted when the vehicle is at a complete stop. This applies to front axle engagement, high and low ranges, and locking differentials. The only exceptions are those vehicles equipped with Marmon-Herrington's **Safety-Shift** system, which are calibrated to shift up to 5 mph.

"Shifting on the fly" generally results in two types of damage. The first is degradation of the engagement teeth due to relative rotation of the drive gears and shift collars. This type of damage can prevent the case from shifting normally, as the teeth become burred and cannot mesh.

The second condition occurs when a shift is actually completed at excessive speed. This results in extreme torque loading that is transmitted through the transfer case, drive shafts, and axles. The extent of possible damage increases proportionately with the vehicle speed.

SAFETY-SHIFT

In late 2003 Marmon-Herrington introduced Safe-T-Shift, an electronic management system developed to help prevent shift-on-the fly events. It consists of a microprocessor that receives speed information from a remote sensor in the transfer case. The system is calibrated to activate the shift solenoids at the first detection of motion, and then cancel control functions at 5 mph.

The actual completion of a shift still relies on the tooth alignment of the gear sets, and the vehicle may need to roll a few feet before the transfer case can shift. Because the system becomes active at first motion, and maintains air pressure thereafter, it is possible to accelerate rapidly to a speed greater than 5 mph before the tooth alignment occurs, thus allowing the teeth to grind against each other. In this case, the shift may occur while decelerating at a speed great enough to cause shock damage. For this reason, it is essential that the operator allow the vehicle to "walk" or idle forward until the shift is complete (indicated by the appropriate dash signal) before accelerating normally.



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Note: Vehicles built after December 2007 are equipped with a 2nd generation Safe-T-Shift system which does not require motion to become active. It will activate the solenoids at a complete stop, and then cancel at 5 mph. This updated system simplifies the shift operation and allows for easier troubleshooting. Call Marmon-Herrington Customer Service to verify your vehicles system.

SHIFT PROCEDURE

1. With the vehicle at a complete stop, select the desired range or axle position.
2. Place the main transmission in gear.
3. Allow the vehicle to idle forward (or backwards) at walking speed until the shift is complete (as per the appropriate dash indicator).
4. Accelerate normally.

In case of a manual transmission, ease the clutch out in low gear, allowing the vehicle to "walk" until shift is complete (as per the appropriate dash indicator).

Some possible exclusions to the Safe-T-Shift program are those vehicles fitted with a transfer case mounted PTO, Freightliner factory installations, and any with Rockwell transfer cases.

SUMMARY

Before retreating from the subject of shifting, it must be reemphasized that **no transfer case, PTO, axle differential, or power divider should ever be shifted while the vehicle is in motion. The engagement of these components is intended for off-road use only, in poor traction conditions.**

TORQUE

"Torque Shock" or "Torque Loading" is a damaging mode of failure that is easily avoidable. It generally occurs in situations when a vehicle is operating in an area of low traction at high RPM with the wheels spinning. When the tires make abrupt contact with a tractable surface, a violent shock-load is transmitted through the drive train. This can result in damage to axles, drive shafts, transfer cases and transmissions.

Simply engaging the front axle and operating in low range at lower speeds will allow the vehicle to proceed without imparting undue stress on the drive train.



TRANSFER CASES

OPTIONAL POWER-TAKE-OFF (PTO)

On transfer cases with this option, the PTO is mounted on the rear of the case and driven by the input shaft. The PTO is a signal speed device that will operate at the same RPM as the main transmission in forward or reverse.

When mounting equipment to be driven by the PTO, it must be connected by way of a double universal joint type shaft to minimize thrust forces and shock loads to the PTO and transfer case, as well as the equipment being driven.

PTO ENGAGEMENT

The PTO should only be shifted when vehicle is at a complete stop. The PTO is engaged by way of an intergrated shift cylinder using 95 - 115 PSI. Before engagement, the transfer case should be shifted to its neutral position. Automatic transmissions should be shifted to neutral and parking brakes set before engagement. In the case of a manual transmission, depress the clutch and allow for RPM drop. With the transfer case in neutral and PTO engaged, the main transmission may now be shifted to a drive gear for operation. Before disengaging the PTO, allow RPM to drop to idle, and shift main transmission to neutral.

If a task requirement calls for using the PTO while the vehicle is moving, the transfer case may be shifted to high or low range after PTO is engaged. **Before using equipment while in motion, check with manufacturer to ensure that this is an approved operation.**

"PD" T-CASES - MVG750PD, MVG1200PD, MVG2000PD

This series of transfer cases feature a proportioning differential between the front and rear outputs. This allows for the front drive axle to be constantly driven in a 30% front - 70% rear configuration.

In severe conditions where wheel slip is encountered, the differential may be manually locked, creating a solid link between front and rear output shafts. The differential lock should be disengaged as soon as traction is restored.

TOWING

In most cases the optimal procedure for towing is to remove the driveshaft from the axle that is being towed (example: front wheels lifted; rear wheels being towed). **Towing a vehicle without removing the driveshaft from the towed axle will result in bearing and gear damage.**

The only exceptions are transfer cases that are fitted with PTOs, as these units are plumbed for a switchable neutral position. In the case of a PTO style transfer case that can not be shifted into neutral due to air system failure, the driveshaft at the axle being towed must be removed.

TESTING

When performing diagnostics on a dynamometer or rolling test rack without the front axle engaged (front wheels stationary), limit test intervals to 2 minutes. While the front output pilot shaft employs a needle roller bearing to protect it from relative rotational heat damage, it should be allowed to cool for a few minutes between intervals.



FRONT AND REAR DRIVE AXLES

The Marmon-Herrington line of drive axles are rated from 8,000 - 23,000 pounds based on application and suspension components. The line includes front, rear and tandem drive axles in both single and double reduction configurations. A lighter series of front drive axle offers **single reduction with optional free-wheel hubs**.

Models with double reduction gear ratios utilize "wet" planetary hubs that require attention during scheduled preventative maintenance.

All Marmon-Herrington front drive axles have standard "double-cardan" steering joints which provide smoother steering and resist steering wheel "fight back" in full deflection turns. Latest joint designs are permanently lubed, and require no maintenance. Earlier units have plugs at each cap that can be removed to add non-pressurized grease.

Axles fitted with locking differentials should never be shifted while in motion as stated in the **SHIFTING PROCEDURES** section.

FREE WHEEL HUBS

On axles with free wheel hubs, the hubs must be completely engaged when the transfer case is in AWD mode and the front axle is being driven. In either mode (AWD or 2WD) both hubs must be either fully engaged or fully disengaged. Failure to observe these practices will result in component failure.

The hub is engaged by rotating the handle clockwise in accordance with its markings. On some axle models, a rubber cover will need to be removed to manipulate the hubs. Reinstall these protective covers after setting hub positions. If the hub selector is difficult to turn, rock the top of the tire back and forth by hand while twisting the selector handle.

Never operate the vehicle on hard, dry surfaces with the hubs engaged. This will result in gear train damage and tire wear.



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INTRODUCTION

The efficiency and life of mechanical equipment is as dependent on proper lubrication as it is on proper engineering design. The importance of proper lubrication is increased because of greater gear tooth and bearing pressures and higher speeds in present day vehicles. For this reason we are vitally interested in promoting widespread usage of the best possible lubricants for our products.

It is advisable to consider the reputation of the refiner or vendor when selecting a lubricant. He is responsible for the quality and correct application of his product. A high quality lubricant incorrectly applied may greatly reduce the maximum service built into our product. Past experience has proven that a large portion of service problems can be traced to an improper lubricant or to an incorrect lubricant application.

Our purpose in compiling these specifications is to provide a guide to aid in the selection of a lubricant which will render the most satisfactory service.

We recommend a good quality gear lube for use in our axles and transfer cases. Suitable grades include 75w/90 thru 85w/140 and SAE90. Synthetics or mineral products are both appropriate.

LUBRICATION

A. LUBRICATION OF THE FRONT AXLE DIFFERENTIAL CARRIER

With new axles, the original lubricant should be drained at 1,000 miles (1,600 km) but no later than 3,000 miles (4,800 km). Change every 10,000 miles (16,000 km) or annually. Drain the lubricant initially used in the assembly while the assembly is still warm. Axles **SHOULD NOT** be flushed with any solvent such as kerosene. All new axles should be checked for correct oil level before being placed into service.

Fill axle housings to bottom of level hole (in carrier and/or housing) with specified lubricant with the vehicle on level ground.

The most satisfactory results will be obtained only when the lubricant is of the correct viscosity API GL-5 or MILL2105B. For general use, use **SAE 85-140 EP Multi-Viscosity gear lube**. Higher or lower viscosity may be required for extremely hot or cold weather.

VENTS

When filling wheel ends, take care not to over-fill the hubs. This results in lube being pumped up the vent tube, and out the vent. When this occurs, enough lube can be purged to cause heat damage to the planetary system.

If lube is observed leaking from the vent, the vent and it's tube must be removed and flushed with solvent. This cleans the inner walls of residual lube which can cause a capillary effect, resulting in continued siphoning. Ensure correct lube level after reinstalling tube and vent.

B. FRONT DRIVE STEERING AXLE WHEEL ENDS, UNIVERSAL JOINTS, BEARINGS, BUSHINGS AND KNUCKLE PINS

The frequency of lubricant changes depends upon individual operating conditions, speed and loads. Change whenever seals are replaced or when brakes are relined or at 10,000 miles (16,000 km) or annually.

Use a high grade Lithium chassis lubricant that conforms to NLGI-2EP requirements.

1. Check for looseness
2. Apply grease
3. Observe lube purging - except in the case of cardon joints
4. If the above is not successful, remove cup or joint and check old grease. If rusty, gritty or burned, replace.

NOTE: Axle shaft cardan joints are not serviceable with pressurized grease.

IMPORTANT: At rebuild time, before installing wheel bearings onto spindle, coat bearing journals with a film of grease to deter fretting corrosion. Apply 1/16" on spindle hub and knead into the bearings. Apply by hand, repack every 10,000 miles (16,000 km) or annually.

C. BRAKE LUBRICATION

A high temperature waterproof grease in a Number 1 NLGI Grade is recommended for lubricating the brake actuating system. It should be a smooth textured corrosion resistant grease free of filters and abrasives. It should maintain a satisfactory softness under normal parking and storage temperatures so the brakes can be



applied and released. Vehicles operating in extremely cold weather (below -40°) require a grease conforming to MIL-G-25013C.

WEDGE BRAKES AND CHAMBERS (ON-HIGHWAY AND OFF-HIGHWAY)

On-Highway – Change whenever seals are replaced or when brakes are relined.

Off-Highway – Change grease every 12 months (maximum), whenever seals are replaced and when brakes are relined. However, the change interval may be shorter than 12 months depending on the severity of service operations. This can be determined by initially scheduling an inspection of the internal parts and lubricant every 2 months until the first 12 month period has passed. At each inspection look for contaminated or hardened grease, or for the lack of grease.

CAM BRAKES (ON-HIGHWAY AND OFF-HIGHWAY)

On-Highway – Every 10,000 miles (16,000 km) or every 6 months for all components depending on severity of service.

Off-Highway – For all components, change grease every 4 months (maximum), whenever seals are replaced and brakes are relined. However, the change interval may be shorter than 4 months depending on the severity of service operation. This can be determined by initially scheduling an inspection of internal parts. At each inspection look for contaminated or hardened grease or for the lack of grease.

D. LUBRICATION OF TIE-ROD AND DRAG LINK

Use the same type of grease as for the wheel bearings.

E. LUBRICATION OF DRIVELINES

Off-Highway – The change interval will differ greatly and be determined largely on the type of vehicle or machinery being used, type of operation and severity of service. The lubricant change interval could be, for example, one (1) day maximum or three (3) months maximum. This can be determined by initially scheduling daily or weekly inspections of universal joint, shaft, and slip yoke parts. Check seals, bearings, splines, etc., and check condition of grease in the assemblies by purging with new grease. Look for contaminated or hardened grease or for the lack of grease. Also, check to make sure grease purges from all four (4) bearing and seal positions of the cross.

LUBRICATION PROCEDURES FOR UNIVERSAL JOINTS (DRIVE SHAFTS ONLY)

1. Check for looseness.
2. Apply grease.
3. Observe lube purging from all seals until new grease comes out.
4. If grease does not purge, manipulate the "U" joint until purging occurs.
5. If the above is not successful, remove cup or joint and check old grease. If rusty, gritty or burnt, replace the complete universal joint.

LUBRICATION PROCEDURES FOR SLIP YOKES AND SPLINES

1. Check for looseness or sideplay.
2. Apply grease until purging takes place at air hie in end of slip yoke.

NOTE: Axle shaft cardan joints are not serviceable with pressurized grease.

F. LUBRICATION OF TRANSFER CASE

Use same type and viscosity of gear lube as used in the differential carrier. Fill to the bottom of the fill hole. **DO NOT OVERFILL** as this may cause the case to run hot, or cause lubricant to be pumped out of the vent.

Transfer Case may be mounted at various approved angles by the vehicle manufacturer and normally should be filled to the bottom of the tapped hole. Capacities will vary depending upon the angle of mounting.

Lubricant should be drained at 1,000 miles (1,600 km) but no later than 3,000 miles (4,800 km). Change every 10,000 miles (16,000 km) or annually. Drain the lubricant initially used in the assembly while the assembly is still warm. Transfer Case **SHOULD NOT** be flushed with any solvent such as kerosene.

G. MAGNETIC DRAIN PLUGS

Any drive axle or transfer case while it is working, generates wear particles at a fairly steady rate. These wear particles are very fine but hard. If these hard wear particles are allowed to circulate in the lubricant, the anti-friction bearings will wear at a faster rate than they would if the hard wear particles were removed as they are generated.



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MAINTENANCE SCHEDULE – AXLES

1,000 Miles

1. Change lube in differential and hubs no later than 3,000 miles.

5,000 Miles

1. Re-torque wheel nuts after 100 and 500 miles, then every 5,000 miles thereafter.
2. Clean vent and vent tubes.
3. Check operation of differential lock control pressure switch.

10,000 Miles

1. Change lube in differential and hubs.
2. Lube brake cam bushings and brake levers.

15,000 Miles

1. Check shoe clearance and brake lining wear.

30,000 Miles

1. Check brake shoes, drums and parts for wear.
2. Check and re-torque mounting bolts.
3. Lube brake shoe rollers.

60,000 Miles

Check and adjust wheel bearings.

Note: Change lube annually if vehicle operates less than prescribed mileage periods.



non-Herrington

MAINTENANCE SCHEDULE – TRANSFER CASES

1,000 Miles

Change Lube.

10,000 Miles

Change lube and check vent every 10,000 miles.

Note: Change lube annually if vehicle operates less than prescribed mileage periods.

Viscosity is dependant on ambient regional temperature:

Tropic Zone: SAE 85W/140

Normal Zone: SAE 85W/90 - SAE 85W/140 – SAE 90

Frigid Zone: SAE 80W – SAE 75W/140 – SAE 75W – 90

LUBRICATION GUIDE

Acceptable Grades (-26C to 38C / -14.8F to 100F)

BP hypergear EP

Castrol EXP, Dynadriver 80W/90

ELF Tranself TYPE B

ESSO Gear Oil GX 80W/90

GX-D85W/90

MOBIL Mobilube HD

Shell Spirax HD

Total Transmission TM 85W/90

Lithium Based Lube (Grease)

Specification: NLGI-2EP

Acceptable Grades:

MOL LZS-2 EP

AGIP GR MU/EP2

SHELL Alvania EP2

Use AGIP AUTOL TOP 2000 for brake rollers.

Lubrication and Inspection Points - Axles

1. Oil level plug (hubs)
2. Oil fill and drain plugs (hubs)
3. Vent and vent tube (wheel ends)
4. Oil level and drain plugs (housing)
5. Differential vent (housing)
6. Lube fittings at brake arms
7. Slack adjuster



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SERVICE AND MAINTENANCE

HIGH PRESSURE CLEANING

When using high pressure cleaning equipment, it should be applied in such a way that:

- the water jet does not penetrate the shaft oil seals
- the cleaning water does not enter through the breather orifices

PRESERVATION FOR STORAGE

The transfer case should be stored inside a room with low air circulation with maximum relative humidity of 60% and a temperature between 15 and 20 C.

We recommend to issue storage cards to keep record of the preservation details and dates.

Our transfer cases were filled for the test run in our factory. The remaining quantity of oil protects the unit temporarily against corrosion.

If intending to store the unit for more than 4 months, carry out the following preservation procedure.

1. **Remove breather and seal bore by means of suitable plug.**
2. **Fill gear oil according to instruction chapter ("oil change and maintenance").**
3. **Rotate transfer cases in such a way that all interior surfaces are coated with oil.**
4. **Turn shafts and at the same time shift twice every position of all shifting cylinders (see chapter "handling").**

When storage conditions are favorable (less than 60% humidity) repeat procedure points 3 - 5 every 6 months.

When conditions are extreme (arctic or tropical, high humidity, high variation of temperature, storage location is near to sea) repeat procedure points 3 - 5 every four months.

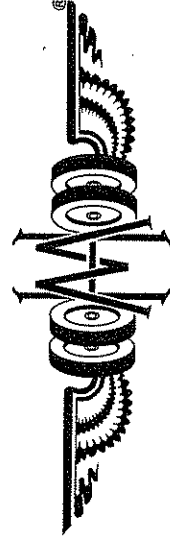
CAUTION: Before putting the transfer case into use the breather must be installed!



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TRANSFER CASES

Transfer Cases



Marmon-Herrington

DESCRIPTION

TECHNICAL DATA

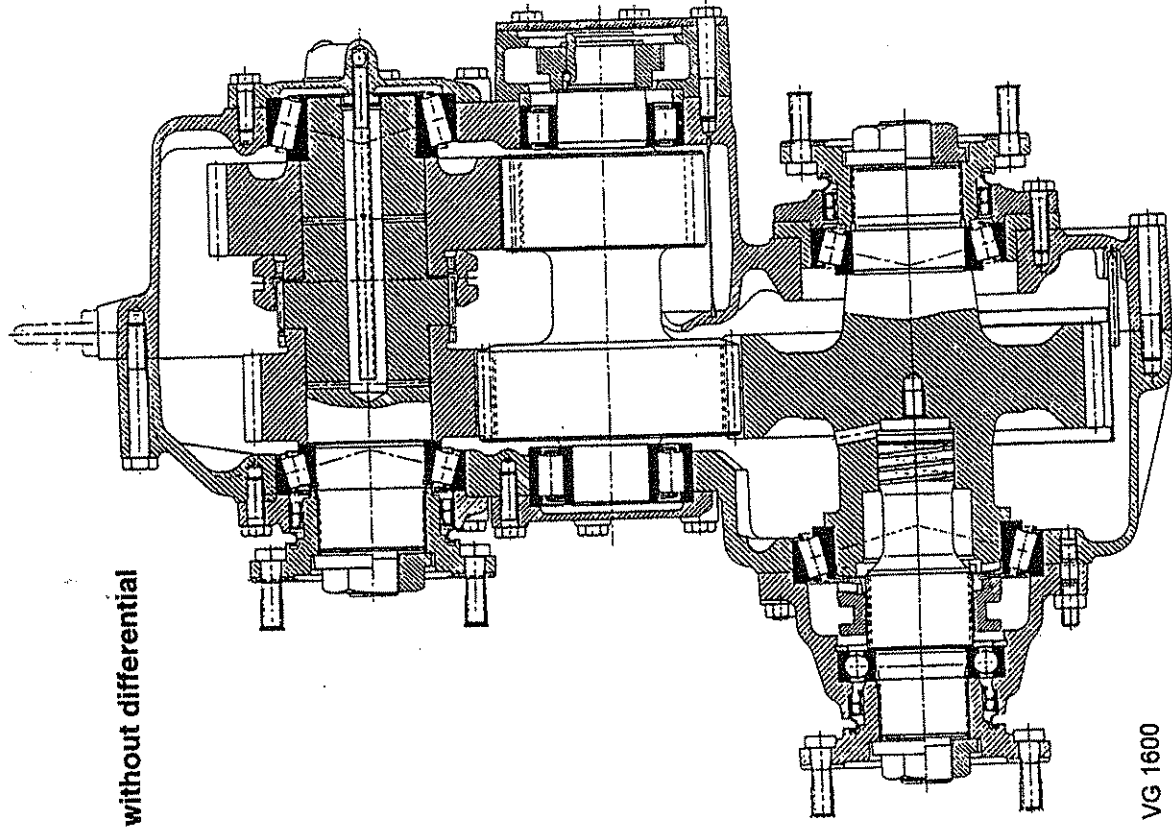
TRANSFER CASE TYPE	INPUT TORQUE (lbf ft)	INPUT SPEED MAX. (r.p.m.)	WEIGHT APPROX. (w/o oil, PTO) kg	RATIO	
/G 750 w/o diff.	7400	3,500	115	on-road	off-road
/G 750 w. diff.	7400	3,500	125	1.00	2.1
/G 1200 w/o diff.	11,000	3,000	220	1.00	2.1
/G 1200 w. diff.	10,000	3,000	230	1.00	1.75
/G 1600/300 w/o diff.	15,000	2,800	305	0.89	1.75
/G 1600/396 w/o diff.	15,000	2,800	290	0.89	1.536
/G 1600/300 w. diff.	15,000	2,800	315	0.89	1.536
/G 1600/396 w. diff.	15,000	2,800	300	0.89	1.536
/G 2000/300 w/o diff.	18,500	2,800	335	0.89	1.536
/G 2000/396 w/o diff.	18,500	2,800	330	0.89	1.536
/G 2000/300 w. diff.	18,500	2,800	355	0.89	1.536
/G 2000/396 w. diff.	18,500	2,800	350	0.89	1.536
TC 100	15,000	3,100	235	1:0.98	1:2.48
TC 60-420	11,500	3,500	218	1:1.09	1:2.47

DESIGN

MVG 1600

without differential

MVG 2000



Cross section VG 1600

The MVG 1600 / MVG 2000 without differential is a 3-shaft design, 2-speed transfer case with clockwise input drive direction (view to input flange).

Housing:	two-parts
Bearing application:	Input shaft Intermediate shaft Output shaft Front output shaft
Lubrication:	- taper roller bearings - cylinder roller bearings - tapered roller bearings - roller bearing, slide bearing splash lubrication or splash / force feed lubrication with pump at input shaft for the executions with PTO and for external cooling system, rear engine drive version and version with mechanical shifting
Shifting:	mechanical - 3 positions pneumatic - 2 or 3 positions
Options:	pneumatic operation PTO; without front drive; rear engine drive version; pump fitting at front and rear side; external oil cooler connection; electronic speedometer connection; input drive direction counter-clockwise; synchronisation; ADM



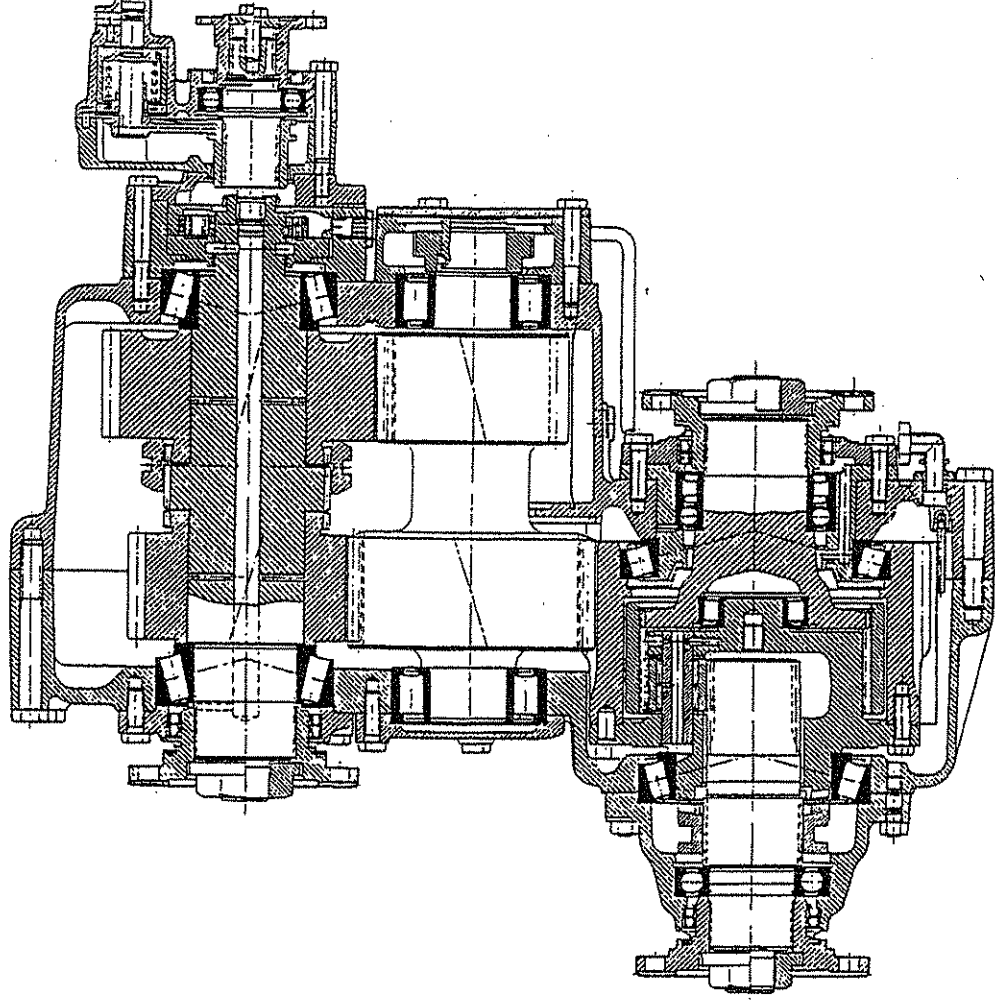
Marmot-Herrington

DESIGN

MVG 1600

with differential

MVG 2000



Cross section VG 2000

The MVG 1600 / MVG 2000 with differential 3-shaft design, 2-speed transfer case with clockwise input drive direction (view to input flange).

Housing:	two-parts
Bearing application:	- Input shaft - Intermediate shaft - Output shaft and differential - Front output shaft - Rear drive
Lubrication:	- taper roller bearings - cylinder roller bearings - tapered roller bearings and needle bearing - roller bearing, slide bearing - cylinder roller bearing, 4-point bearing splash lubrication or splash / force feed lubrication with pump on input shaft for the executions with PTO and for external oil cooling system
Shifting:	mechanical - 3 positions pneumatic - 2 or 3 positions
Front drive:	pneumatic, differential pneumatically lockable
Options:	pneumatic operation PTO; rear engine drive version; pump fitting at front and rear side; external oil cooler connection; electronic speedometer connection; input drive direction counter-clockwise; synchronisation; ADM



on-Herrington

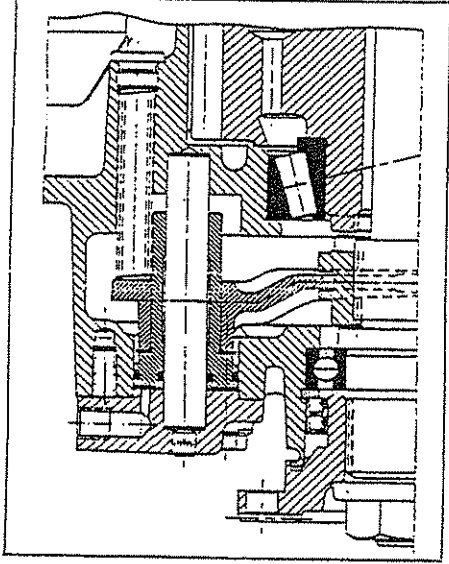
DESCRIPTION - Shift mechanism

Engagement of the front axle drive as well as the PTO is performed pneumatically (6.5 to 8 bar air pressure). Disengaging is done by the return spring which is installed in the shifting cylinder.

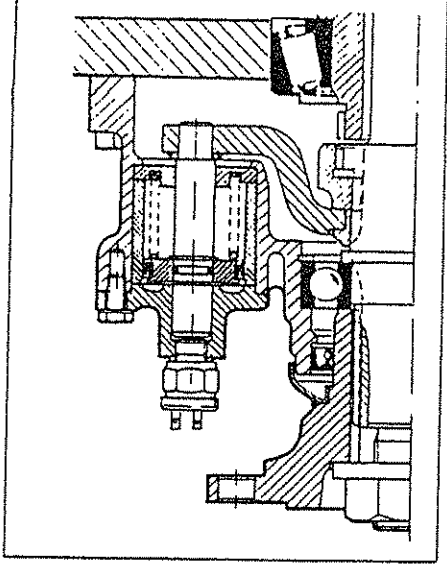
Pneumatic Shifting:

High and Low
2/3 positions without return spring

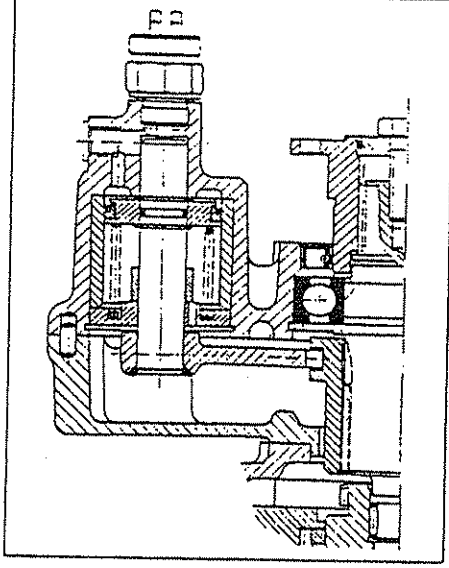
MVG 750



MVG 1200



N 200 Pneumatic Shifting: Power Take Off (PTO)



Magnetic drain plugs perform the vital function of trapping small metallic particles that circulate in the lubricant, through the gears and bearings, causing rapid wear and premature failure.

REFERENCE ONLY:

- A. Never add lubricant to axle or transfer case unless it is the same make and grade as that which is already in the axle or transfer case. If the same lubricant is not available, drain and refill.

B. CHECKING LEVEL

Remove filler plug. Lubricant should be level with bottom of tapped filler hole.

C. AIR VENTS

Check every 2,000 miles (3,200 km) – Clean in solvent.

SCHEDULED MAINTENANCE SERVICES

COMPONENT	(CODE)
Front Axle Differential Carrier	(1) (2) (4) (6)
Steering Axle Wheel Ends	(2) (5) (6)
Brake Lubrication	(2) (6)
Tie Rod Lubrication	(3) (6)
Drag Link Lubrication	(3) (6)
Drivelines Lubrication	(2) (3) (6)
Transfer Case Lubrication	(1) (2) (4) (6)
Wheel Bearing Lubrication	(5) (6)

(CODE)

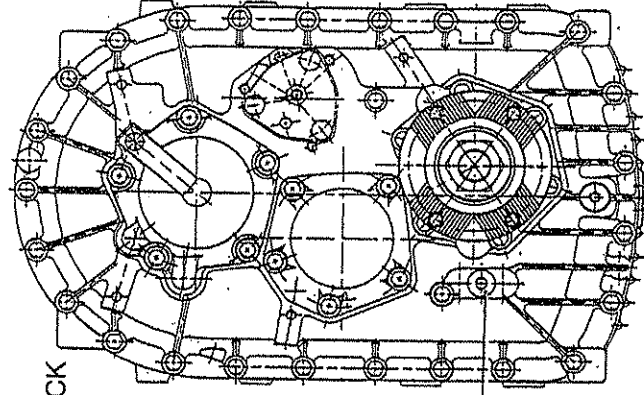
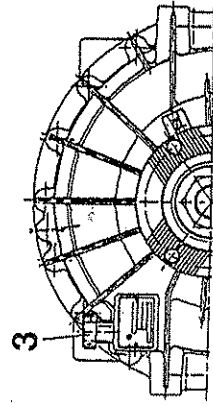
1. Change after first 1,000 miles (1,600 km)
2. Check each 1,000 miles (1,600 km)
3. Lubricant every 2,000 miles (3,200 km)
4. Drain and refill every 10,000 miles (16,000 km)
5. Repack every 10,000 miles (16,000 km)
6. More frequent intervals may be required under adverse operating conditions.

LUBRICATION GUIDE:

TRANSFER CASE MODELS: MVG750, MVG1200, MVG2000

SERVICE AND MAINTENANCE

OIL CHANGE AND OIL LEVEL CHECK



- 1 oil drain plug
- 2 level plug
- 3 breather

MVG750

OIL CHANGE (recommended in warm condition)

- drain gear oil at drain plug (1)
- clean magnet of drain plug
- mount drain plug with new seal
- fill new gear oil at filling bore/level bore (2) until it flows over
- mount level plug (2) with new seal
- unscrew breather (3), clean it and mount it again

OIL LEVEL CHECK

- open oil filling/level plug (2)
- oil level must reach edge of level bore, if necessary top up
- mount level plug with new seal

without longitudinal differential

approx. 6,4 l

13.5 pts.

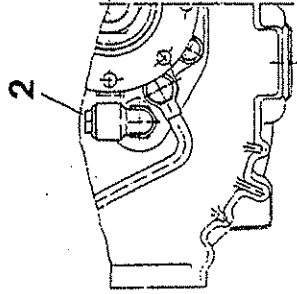
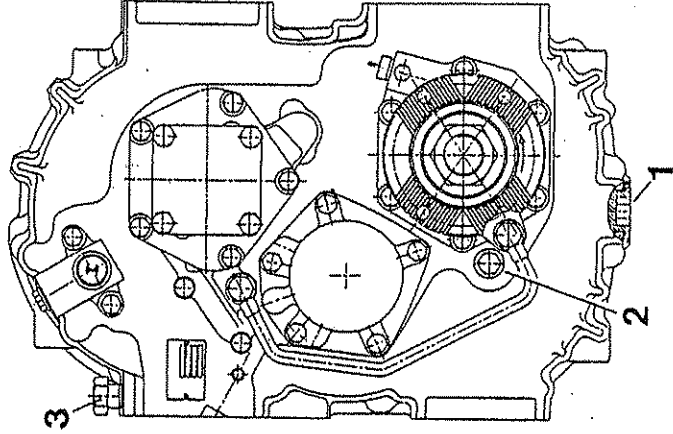
With longitudinal differential

approx. 5,5 l

11.6 pts.

ATTENTION: Assure correct oil level. Low level causes lack of lubrication and reduces durability. Too high level causes excessive splashing and leads to overheating of transfer case.

MVG1200



- 1 oil drain plug
- 2 level plug
- 3 breather

OIL CHANGE (recommended in warm condition)

- drain gear oil at drain plug (1)
- clean magnet of drain plug
- mount drain plug with new seal
- fill new gear oil at filling bore/level bore (2) until it flows over
- mount level plug (2) with new seal
- unscrew breather (3), clean it and mount it again

OIL LEVEL CHECK

- open oil filling/level plug (2)
- oil level must reach edge of level bore, if necessary top up
- mount level plug with new seal

without longitudinal differential

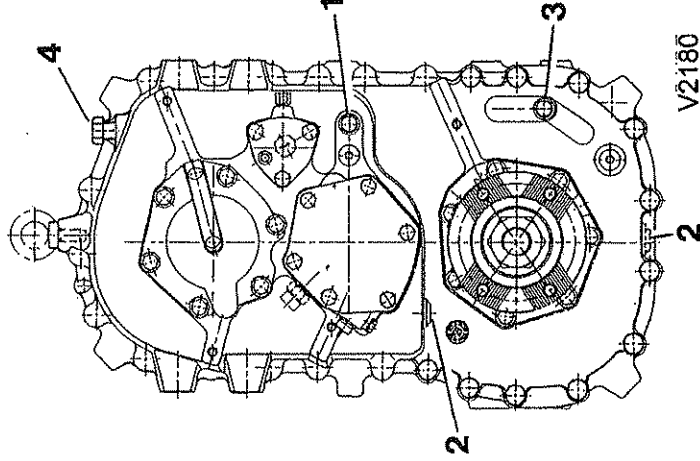
approx. 4,6 l
9.7 pts.

with longitudinal differential

approx. 3,5 l
7.8 pts.

ATTENTION: Assure correct oil level. Low level causes lack of lubrication and reduces durability.
Too high level causes excessive splashing and leads to overheating of transfer case.

MVG1600



- 1 Oil filling plug
- 2 Oil drain plug
- 3 Oil level plug
- 4 Breather

Drain oil by unscrewing both oil drain plugs (2)

Install oil drain plugs (2) with new seals

Fill oil through oil filling bore (1) until it starts to overflow at oil level bore (3)

After setting of correct oil quantity Install oil level plug (3) with new seal

Clean and install breather (4)



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SERVICE AND MAINTENANCE

MVG2000 (Long Drop)

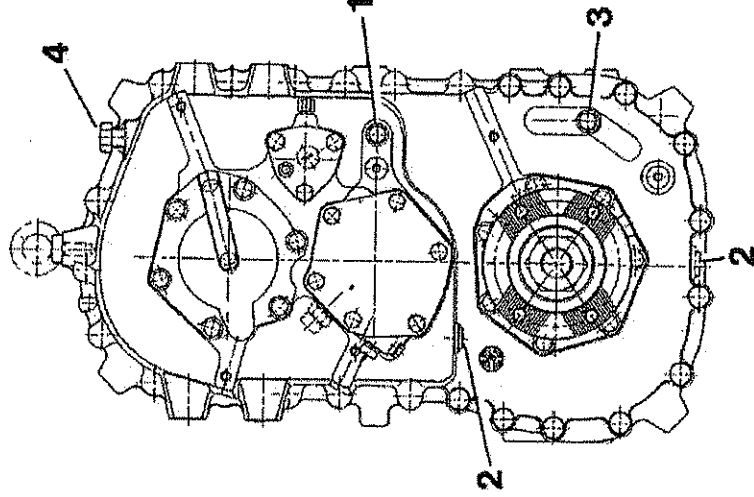
- OIL CHANGE** (recommended in warm condition)
- drain gear oil at drain plug (2)
 - clean magnet of drain plug
 - mount drain plug with new seal
 - fill new gear oil at filling bore/level bore (1) until it flows over (3)
 - mount level plug (3) with new seal
 - unscrew breather (4), clean it and mount it again

OIL LEVEL CHECK

- open oil filling/level plug (3)
- oil level must reach edge of level bore, if necessary top up
- mount level plug with new seal

without longitudinal differential
approx. 7,1 l
15 pts.

with longitudinal differential
approx. 6,5 l
13.74 pts.



- 1 oil filling plug
- 2 oil drain plug
- 3 level plug
- 4 breather

ATTENTION: Assure correct oil level. Low level causes lack of lubrication and reduces durability.
Too high level causes excessive splashing and leads to overheating of transfer case.

MVG2000 (Short Drop)

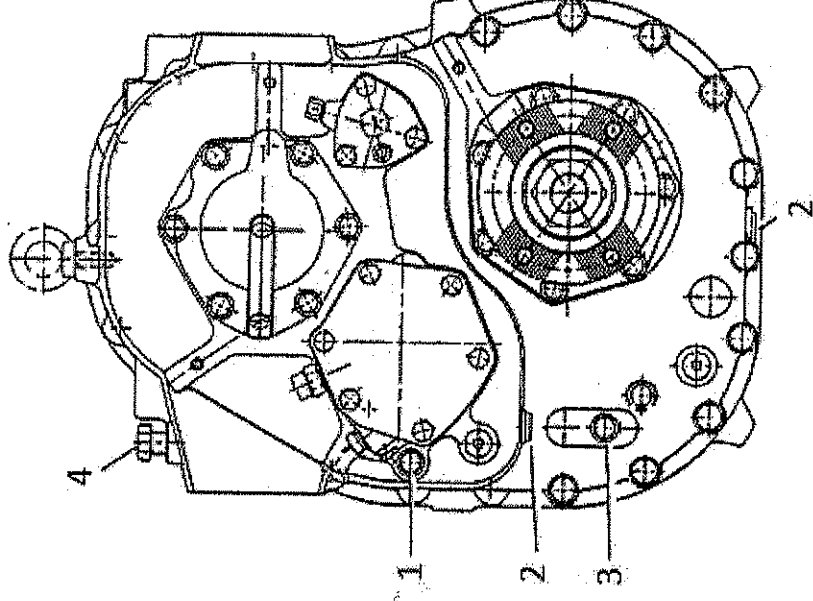
- OIL CHANGE** (recommended in warm condition)
- drain gear oil at drain plug (1)
 - clean magnet of drain plug
 - mount drain plug with new seal
 - fill new gear oil at filling bore/level bore (2) until it flows over
 - mount level plug (2) with new seal
 - unscrew breather (3), clean it and mount it again

OIL LEVEL CHECK

- open oil filling/level plug (2)
- oil level must reach edge of level bore, if necessary top up
- mount level plug with new seal

without longitudinal differential
approx. 9,0 l
19 pts.

with longitudinal differential
approx. 8,4 l
17.75 pts.



- 1 oil filling plug
- 2 oil drain plug
- 3 level plug
- 4 breather

ATTENTION: Assure correct oil level. Low level causes lack of lubrication and reduces durability.
Too high level causes excessive splashing and leads to overheating of transfer case.

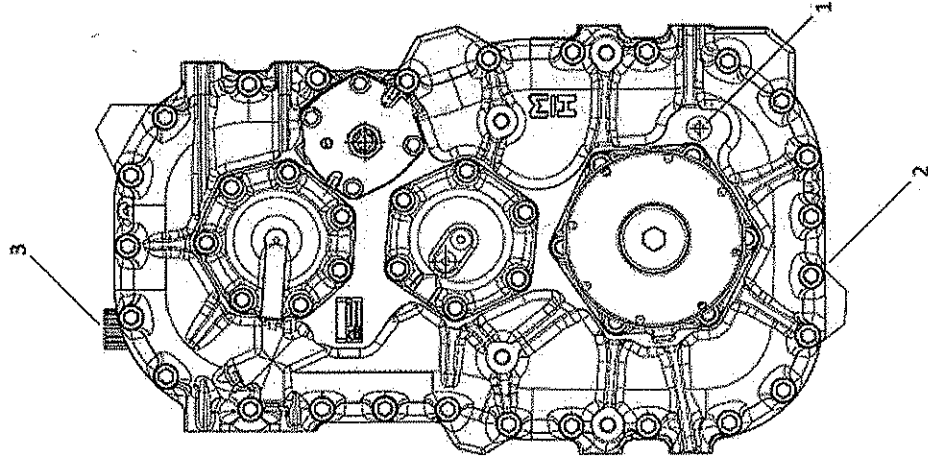
RTC 60-420

DRAIN OIL IN WARM CONDITIONS.
DRAIN LUBE THROUGH BOTTOM PLUG (2).
CLEAN MAGNETIC PLUG AND REPLACE.
ADD LUBE THROUGH FILL PLUG (1) UNTIL
LUBE JUST STARTS TO FLOW FROM PORT.
REPLACE PLUG.

LUBE QTY: APPROX. 5.5 PINTS

- 1 - FILL AND LEVEL PLUG
- 2 - DRAIN PLUG
- 3 - VENT

RTC/MTC 60: DO NOT operate with
unit in neutral, except for towing.
The lube pump drive is on idler shaft,
thus top shaft does not receive lube
in neutral position. The same applies
to 25 Series.



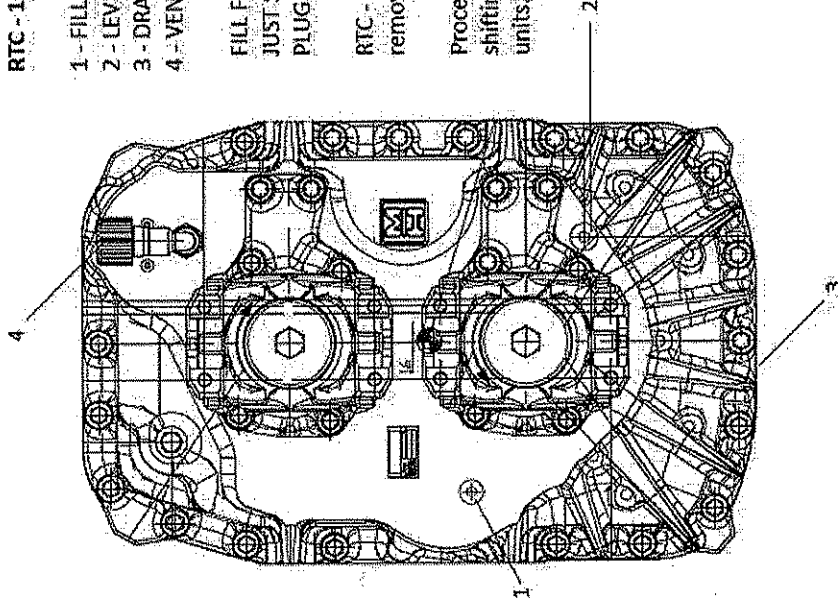
RTC - 100

- 1 - FILL PLUG
- 2 - LEVEL PLUG
- 3 - DRAIN PLUG
- 4 - VENT

FILL FROM PLUG #1 UNTIL LUBE
JUST STARTS TO FLOW FROM LEVEL
PLUG (2).

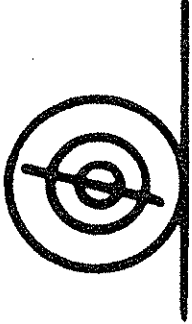
RTC - 100 Drive shaft must be
removed for towing.

Procedures for FAE and HI/LO
shifting the same as MVG series
units.



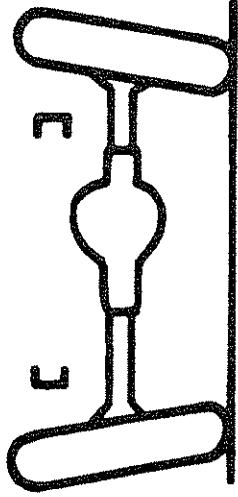
FRONT AXLE

CASTER



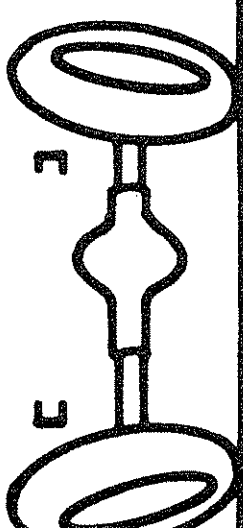
CASTER: Backward tilt of king pin at top. To cause front wheels to run straight normally, straighten up after turn, and give trailing action to wheels.

CAMBER



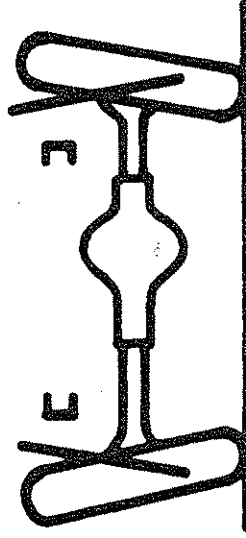
CAMBER: Outward tilt of front wheels at top. To bring road contact point of wheel more nearly under center of load. Important tire saving adjustment.

TOE IN



TOE-IN: Drawing together of front wheels at front at hub height. To prevent excessive tire wear.

KING PIN INCLINATION



KING PIN INCLINATION: Inward tilt of king pin at top to compensate for shearing action on king pin which would result if wheels were left vertical and had no camber and no king pin inclination.

DRAG LINK & TIE ROD NOMENCLATURE:

The term **DRAG LINK** is the component that connects the Front Axle steering arm to the steering gear box.

The term **TIE ROD** is the component that connects the left and right front axle wheels.

ADJUSTMENTS

A. CASTER

A change in axle caster could indicate front axle housing distortion, which might be caused by a minor accident or a permanent set in the front springs.

This is read by a protractor mounted on the pinion U-joint. Consult the respective axle specifications to determine the actual caster reading.

TO CORRECT:

If front springs are badly distorted, it is advisable to install new leaves or complete new springs.

It may only be necessary to install tapered shims between the front axle spring pads and springs. The position of the thick part of the shim will be determined by the direction in which the axle must be tilted in order to bring the caster angle to the correct specification.

B. CAMBER

Front wheel camber is controlled by the axle housings, and cannot be changed.

TO CORRECT:

Call the Factory. The application of heat will destroy the heat treatment and make the housing susceptible to distortion.

C. TOE-IN

Front wheel toe-in is controlled by the length of the tie rod.

For smooth operation and ease of steering at highway speeds, the axle has been adjusted such that the wheel mounting surfaces at the front are slightly closer together than on the rear side. This difference should measure $1/8" \pm 1/6"$.

TO CORRECT:

The length of the tie rod is adjusted by rotating the threaded end (ends) through a complete turn.

Turning the tie-rod one way will slightly increase the toe-in, while rotating it the other way will slightly decrease it with each turn.

In the event the tie rod becomes bent, it should be replaced, as it will again bend easily even though straightened to its original form.

D. TIE ROD ENDS

Tie rod yoke pins should be adjusted to eliminate lost motion. Tie rod pins and bushings, or ball sockets, should be replaced if worn.

E. STEERING GEAR

The steering gear should be adjusted to eliminate excessive looseness. The standard original steering gear is used, therefore, the original service operation applies.

F. U-BOLT AND STUD NUTS

Front spring U-bolt nuts should be securely tightened. If the front axle continues to shift on the springs, it is an indication that the spring center bolts are sheared and they should be replaced.

G. WHEELS AND TIRES

Check wheels and tires for runout and balance.

See that tires are inflated to recommended pressure, in order to provide the **SAME TIRE ROLLING RADIUS FRONT AND REAR.**



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H. WHEEL BEARINGS

In order to ensure top performance long bearing life, the tapered-roller bearings must be properly preloaded upon assembly anytime the outer and assembly is disassembled. Proper adjustment is obtained by tightening the inner bearing nut, with the bearings in position, until the hub will no longer turn. Then back off the nut approximately 1/8 revolution, install retainer and outer nut, and lock in position. The hub should now turn freely with no perceivable end-play. Consult the specific axle maintenance manual for a more detailed procedure.

I. GENERAL INFORMATION

(1) Lubrication — Lubricate the front axle assembly in accordance with the Lubrication Chart of this manual. **DO NOT OVER LUBRICATE.** If the differential, universal joints, or hub bearings are over-lubricated, the lubricant will be pressurized past the oil seals and vents and may do damage by destroying the seal as well as entering the brakes.

(2) **LOOSE ADJUSTMENTS** — As soon as a looseness is noted in the hub bearings pivot pins, or other adjustable points, attention should be given to these items. Normal wear is slight but develops more rapidly as looseness occurs. If a unit is operated for a long length of time with a prevailing perceptible looseness, it will impose a pounding action on the parts involved. This may result in severe damage or destruction of parts and cause the necessity of replacement. This service repair can be avoided by preventive maintenance in eliminating the looseness as it develops, by performing the necessary adjustments.

TROUBLE SHOOTING

PROBLEM

Transfer case or axle running "Hot"

Excessive driveline or gear noise

Steering instability (shimmy)

Excessive or uneven tire wear

POSSIBLE CAUSE

Improper lubrication

Driveline imbalance
Improper lubrication
Loose or worn parts

Wheels and/or tires out of balance
Over or under inflated tires
Worn or loose parts
Improper lubrication
Overload

Wheels and/or tires out of balance
Improper alignment
Over or under inflated tires.



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LUBRICATION GUIDE:

FRONT DRIVING STEER AXLES: MODELS: MT10/11, MT14/17, MT22/23

MODEL	MT10/11 AXLE	MT14/17 AXLE	MT22/23 AXLE
WHEEL ENDS		2.0 pints	2.0 pints
DIFFERENTIAL	17.0 pints	17.0 pints	17.0 pints

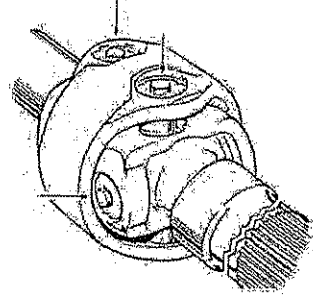
NOTE: All capacities approximate

LUBRICATION POINTS: (Fig. 1 and 2)

- 1 — oil level check & filter bore screw plug
- 2 — oil drain bore screw plug
- 3 — vent valve
- 4 — steering swivel bearings (bottom-top)
- 5 — slack adjuster
- 6 — brake camshaft bearings
- 7 — tie-rod ball joints

CARDAN-JOINT SERVICE

The Cardan-Joint caps are fitted with plugged threaded ports that are used for disassembly/assembly. While these ports will accept a standard zerk fitting, we recommend that only a needle attachments be used to flow lube into these joints. Adding lube under pressure may result in the failure of the cup seal.



MT14, MT17, MT22, MT23

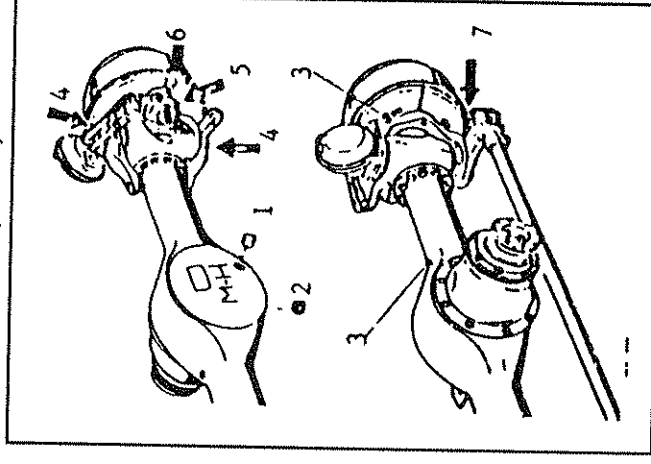


fig. 1

MT10, MT11

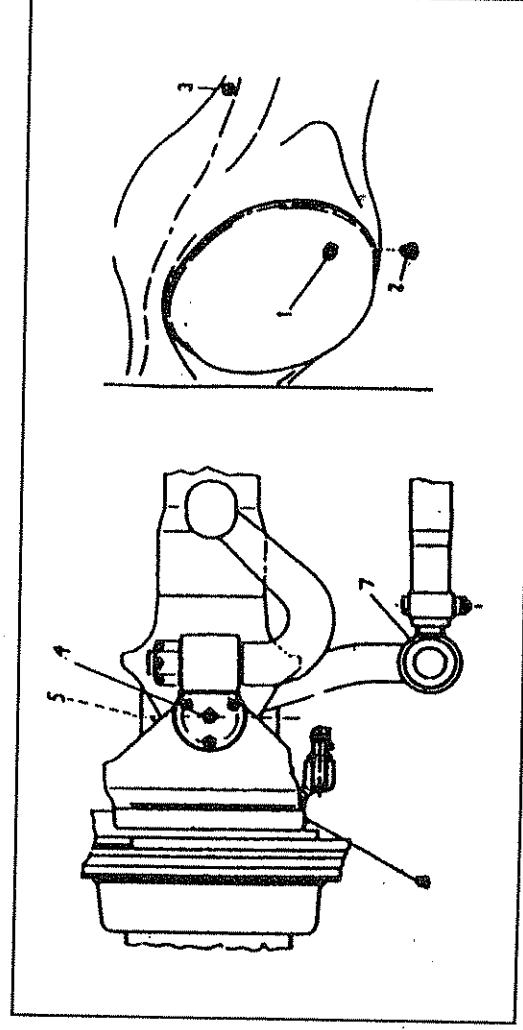


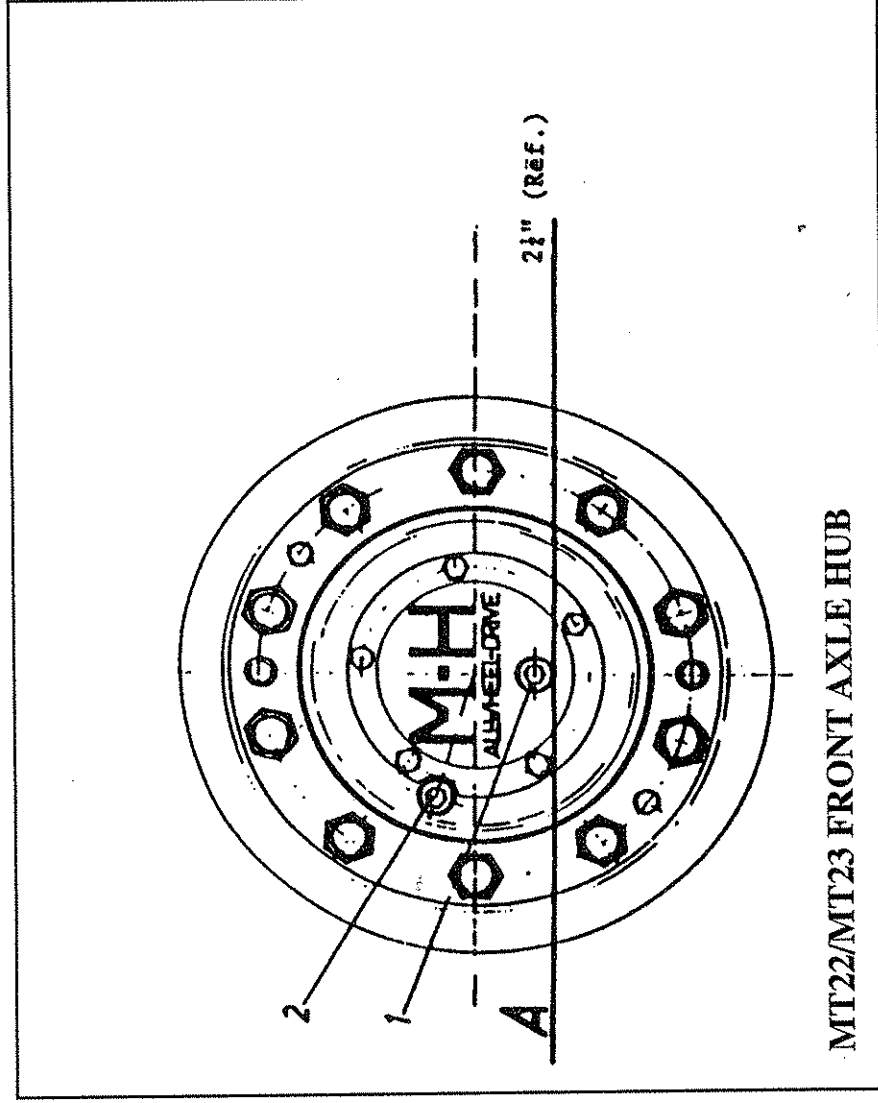
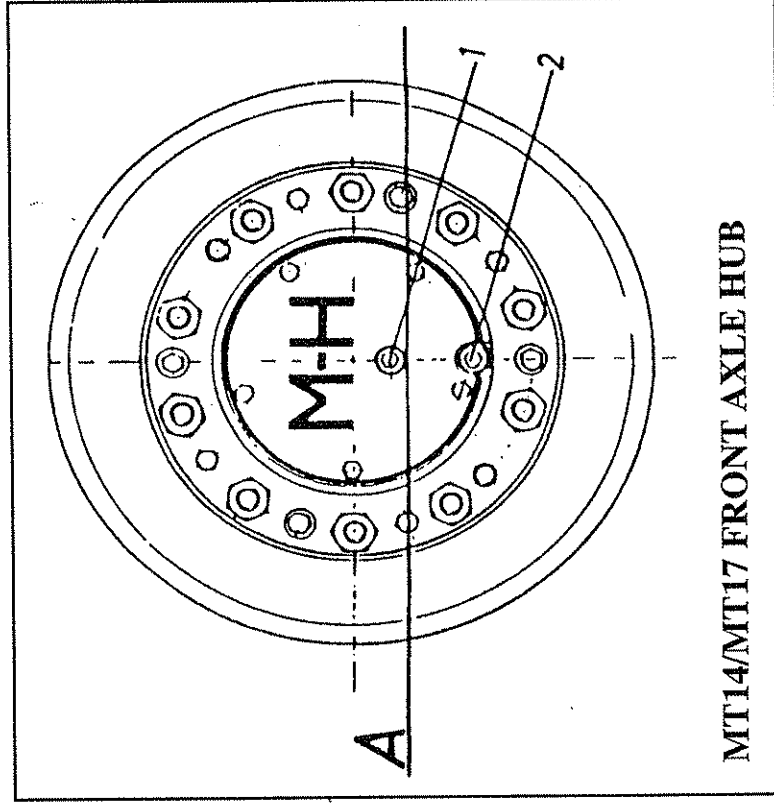
fig. 2

OIL LEVEL OF WHEEL HUBS: MT14, MT17, MT22, MT23

1 — Plug for OIL FILLING and inspection hole

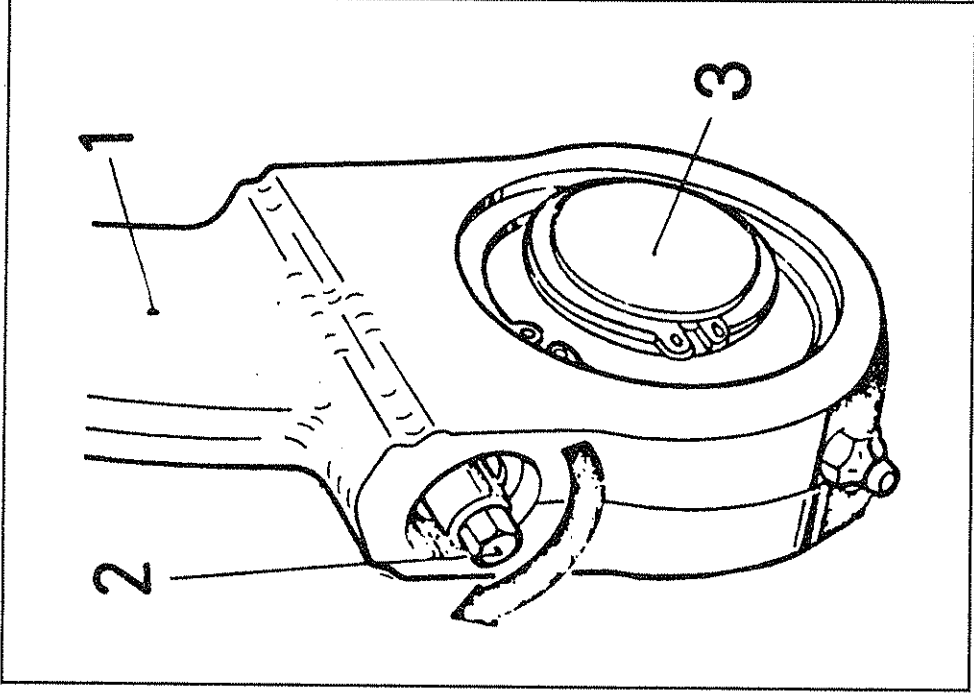
2 — Plug for DRAIN hole

A — Line of OIL LEVEL



BRAKE LEVER ADJUSTING: MT11, MT14, MT17, MT22, MT23 MODEL AXLES

- 1 — brake lever
- 2 — worm shaft
- 3 — cam shaft



MANUAL SLACK ADJUSTERS:

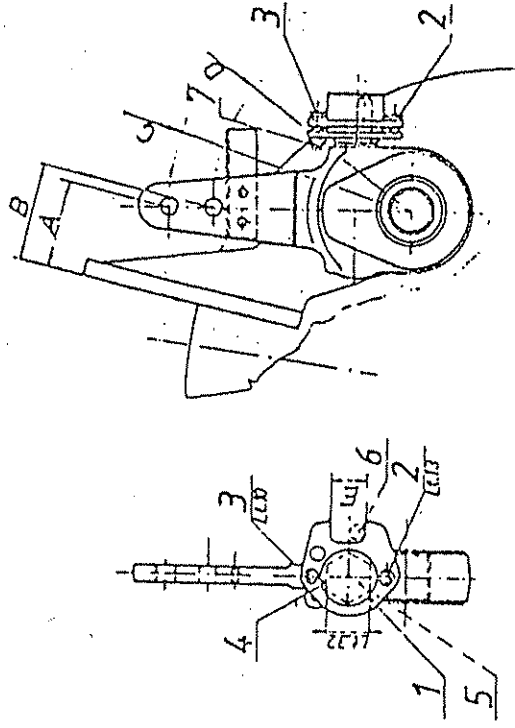
Adjustment of the front brake is performed by turning off the worm gears of the adjustable brake lever.

Using a wrench, turn the worm shaft until the brakes stop wheel rotation. Now back off the worm shaft until only a slight drag is felt turning the wheel by hand. The shoe clearance can be checked with a feeler gauge through an opening in the brake cover plate.

AUTOMATIC SLACK ADJUSTER

ITEMS:

- 1 — Adjusting plate
- 2 — Setscrew (hex. dist. 13)
- 3 — Setscrew (hex. dist. 10)
- 4 — Plastic protection cap
- 5 — Hex. adjusting ring (hex. dist. 32)
- 6 — Stop pin
- 7 — Plastic thread protector



The slack adjuster requires no maintenance, since it is automatically readjusted according to brake lining wear.

When replacing the brake linings, or after repairing the axle, perform adjustment of the shoe clearance and automatic slack adjuster as follows:

ADJUSTMENT DATA:

A = Distance between the chamber holder plane and the brake lever bore.

B = Distance between the chamber holder plane and the brake lever bore.

C = Brake lever installation radius.

D = Brake lever installation radius.

a. Adjusting position of the brake lever and the shoe clearance:

- Remove setscrews (2,3).
- Take care of the plastic thread protector (7).
- Remove the adjusting plate (1) and the plastic protection cap (4).

By turning the hex adjusting ring (5) to proper direction, adjust for the specified distance between the seating surface and the brake lever bore. (Start adjustment from a distance greater than specified. If required, also adjust the push rod clevis.)

- After the above operation adjust the shoe clearance to 0.3 — 0.6 mm.



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REPLACEMENT PARTS

When ordering replacement parts for **MARMON-HERRINGTON ALL-WHEEL DRIVE** conversions, the following information should be given:

1. **FACTORY ORDER NUMBER** (found on I.D. Plate on driver's door panel or small plate affixed to axle housing). This will be a six (6) digit number. (See illustrations this page.)
2. Component for which parts are required, i.e. front drive axle or transfer case.
3. Model of axle and/or transfer, i.e. MR-90, MR-226.

WARRANTY CLAIM PROCEDURE

When ordering parts which you feel might be covered under warranty, advise the following information:

1. **FACTORY ORDER NUMBER** (found on I.D. Plate on driver's door panel or small plate affixed to axle housing). This will be a six (6) digit number. (See illustrations this page.)
2. Date unit was put into operation.
3. Mileage of unit at time of failure.
4. Nature of failure.

Upon receipt of the above, you will be advised as to how to proceed with the claim.

The information necessary for replacement parts and/or warranty claim procedures will be found on either plate design.

MARMON-HERRINGTON

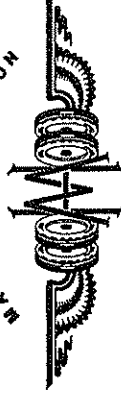
SALES ORDER 0000-00

TYPE

S/N

RATIO

MARMON-HERRINGTON



ALL-WHEEL DRIVE

LOUISVILLE, KENTUCKY U.S.A.

FACTORY

ORDER NO.

0000-00

INSTALLED

BY

FRONT DRIVING AXLE

MODEL

CAPACITY

SERIAL NO.

RATIO

TRANSFER CASE

MODEL

SERIAL NO.



Marmon-Herrington

Marmon-Herrington Literature Order Form

Literature available on line at www.Marmon-Herrington.com

Sales Literature - No Charge	Part	Quantity	Parts Manuals:	Part	Price	Quantity	Extended Cost:
MVG 750 Transfer Case	TCSL001		MVG 750 Transfer Case	TCPM001	*		
MVG 1200 Transfer Case	TCSL002		MVG 1200 Transfer Case	TCPM002	*		
MVG 2000 Transfer Case	TCSL003		MVG 1600SD Transfer Case	TCPM004	*		
MT 8 Axle	AXSL001		MVG 1600LD Transfer Case	TCPM005	*		
MT 10 Axle	AXSL002		MVG 1600PLD Transfer Case	TCPM006	*		
MT 11 Axle	AXSL003		MVG 2000LD Transfer Case	TCPM003	*		
MT 14 Axle	AXSL004		MT 8 Axle	AXPM001	*		
MT 17 Axle	AXSL005		MT 10 Axle	AXPM002	*		
MT 22 Axle	AXSL006		MT 11 Axle	AXPM003	*		
MT 23 Axle	AXSL007		MT 14 Axle	AXPM004	*		
Driver Controlled Locking Differential	AXSL008		MT 17 Axle	AXPM005	*		
4 Page Brochure	PRBR001		MT 22 Axle	AXPM006	*		
Total Sales Literature			MT 23 Axle	AXPM007	*		
			R/RF 22 Axle	AXPM008	*		
			CT-8 Axle	AXPM009	*		
			MTL Carrier	MTLM009	*		
			Repair Manuals:				
			MVG 750 Transfer Case	TCRM001	*		
			MVG 754 Transfer Case	TCRM005	*		
			MVG 1200 Transfer Case	TCRM002	*		
			MVG 1600 Transfer Case	TCRM004	*		
			MDB 1610 Drop Box	DBM002	*		
			MDB 500 Drop Box	DBM003	*		
			MVG 2000 Transfer Case	TCRM003	*		
			MT10/MT11 Axles	ARM001	*		
			MT14/MT17 Axles	ARM002	*		
			MT22/MT23 Axles	ARM003	*		
			R/RF 22 Axle	ARM004	*		
			CT-8 Axle	ARM005	*		
			Operators Manuals:				
			General	OMG-2	*		

Sub Total:

Total Quantity Sales Literature:

Ship Order to the following address

Company:

KY Sales Tax:

Name:

Standard Shipping:

Address:

TOTAL Due:

City/State:

Zip Code:

Country:

Postal Code:

Telephone Number:

Fax Number:

* Call for current pricing

Method of Payment

☐ Check Enclosed

☐ Purchase Order/P.O. #
(only w/current M-H Account)

☐ Mastercard/VISA -
Card # _____

Exp. Date _____

Authorized Card User's Signature: _____

Credit Card Orders Or Current
Customers' Purchase Orders
May Be Faxed - 502/253-0317



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