

SAFETY INSTRUCTIONS

A Word to the Owner, Operator and Maintenance Personnel

DANGER! Failure to read this manual is misuse of this equipment. Anyone who will operate, service or work around this equipment shall first read this manual. Death or serious injury will result from improper use or maintenance of this equipment.

Occupational safety is of prime concern to DUX in the design and production of this equipment. This manual was written with the safety of the operator and others who work around this equipment as our primary objective.

It is your responsibility to know the specific requirements, governmental regulations, precautions and work hazards which exist. You shall make these known to all personnel working with the equipment or in the area, so that all of you may take the necessary and required safety precautions.

FAILURE TO READ THESE INSTRUCTIONS CAN RESULT IN DEATH OR SERIOUS INJURY.

It is your responsibility to operate and maintain your equipment with caution, skill and good judgement. Following recognized safety procedures will help you avoid accidents. Modification to any part of this equipment can create a safety hazard and therefore shall not be made without the manufacturer's written approval. Use only factory-approved accessories, options and parts on this equipment. If this equipment is rebuilt or modified, procedures must be approved in accordance to factory instructions. Safety devices must remain installed and maintained in proper working condition. Safety decals must also be maintained so as to be completely legible and located properly. If safety devices or decals are missing, they must be replaced with the proper designated DUX part.

Disconnecting, removing or otherwise disabling any safety device is a misuse of the equipment.

As owner or employer, it is your responsibility to instruct the operator in the safe operation of your equipment and to provide the operator with properly maintained equipment.

Keep children, visitors and untrained personnel away from this equipment.

BE CAREFUL, CONCERNED AND MAKE SAFETY YOUR EVERYDAY BUSINESS!

SAFETY INSTRUCTIONS

General Safety Guidelines

GENERAL

1. Do not operate equipment with smoky exhaust.
2. Always make sure that ventilation system of underground area is working properly before starting the equipment.
3. Do not idle engine unnecessarily, but never shut engine down from full load. Allow engine to idle for two minutes before turning off.
4. Keep the equipment clean and in proper working order.
5. Do not operate the equipment if defective.
6. Make sure that standard safety equipment (fire extinguisher, decals, first aid kit, etc.) is properly installed.
7. Refuel only with proper diesel fuel. Clean up any spilled fuel.

STARTING & RUNNING

1. Before starting the equipment, make sure that the daily shift maintenance check is carried out, and that the area is clear of personnel and other equipment.
2. Check brakes, lights and warning signals. Before starting make sure that the passage way is free from personnel and other equipment.
3. **WHEN UNDERGROUND, NEVER EXCEED MINE REGULATION SPEEDS.**
(WE RECOMMEND NOT MORE THAN 5 TO 10 M.P.H.)
4. Stop and shift into appropriate gear before travelling up or down a ramp.
5. Always stop with service brakes. Use emergency and parking brake only in the case of an emergency and for parking.
6. If you have a mechanical failure, apply service brakes and emergency/ parking brake immediately and call for mechanical assistance.
7. Before turning blind corners and/or reversing unit, give signal and reduce speed.
8. Make sure the automatically applied backup alarm is functioning properly and is audible. If in doubt, park the equipment with transmission in neutral and parking brake applied, climb out of the equipment, walk to the rear and make sure the way is clear of personnel and any obstacles.
9. Do not transport personnel on vehicle while travelling.
10. Make sure travel ways are clear of rocks, steel or other obstacles.
11. Park vehicle on the level, clear of all traffic. When parking on ramp, follow mine rules and always chock wheels.
12. When parking the equipment, always turn master-switch off.
13. The equipment must be operated only by a responsible, qualified and trained operator at all times.
14. Any misuse is not the responsibility of the manufacturer.

**WE URGE TO READ THIS PARTS AND INSTRUCTION MANUAL CAREFULLY
FOR YOUR SAFETY AND THE SAFETY OF OTHERS**

SAFETY INSTRUCTIONS

Haulage Truck Safety Guidelines

This safety information was taken from the Government of Western Australia's Department of Mines and Petroleum Resources Safety Haul Truck Driving Mine Safety Matters Pamphlet.

The advice provided is basic safety and health information. Ensure you are familiar with your site procedures, and if uncertain, discuss this information with your supervisor and safety and health representative.

THE HAZARDS

Haulage trucks pose a significant hazard to employees, other vehicles and equipment because of their size, weight and power and the driver's limited visibility from the cabin.

WHAT CAN HAPPEN

Injury or death can result from:

- collision caused by:
 - light vehicles or employees in blind spot
 - poor visibility or unseen obstacles
 - steering or brake failure
 - excessive speed for road conditions
 - other vehicles and machines intruding in the truck's operating area
 - lack of concentration or drowsiness
- reversing over the edge of a stockpile
- truck rollover due to speed or road conditions
- personnel falls when accessing cabin and service locations
- truck fire due to burst oil hoses
- tyre fire or explosion following contact of raised box with overhead power lines
- tyre explosions due to damage or truck fire
- jolting and jarring caused by poor road maintenance or loading practices.

SPECIAL PRECAUTIONS UNDERGROUND

- Always test the brakes before entering the portal. Do not drive down declines on the service brakes. Select the correct gear and use the retarder if fitted
- Ensure the box has been lowered before entering the portal
- Only enter excavations designed to suit the size of your truck
- Only operate in areas that have sufficient ventilation
- If a vehicle is emitting a lot of black smoke, report it to your supervisor and remove it from service
- Do not leave a vehicle unattended unless the power has been switched off, the brakes applied and the battery cut-off is off switch is off and in the locked position
- Turn the wheels towards the wall when the vehicle is parked on a slope

SAFE WORK PRACTICES

- Always carry out the prestart checks and follow start-up procedures
- Walk around the truck to ensure the area around and under it is clear of obstacles,



SAFETY INSTRUCTIONS

Haulage Truck Safety Guidelines

- including other vehicles and people, and sound the horn before moving off
- Use designated pick up areas for driver change out. Ensure positive communication practices for getting on and off trucks
- Access and exit the truck correctly, maintain a three-point contact at all times and do not jump, even from the lowest rung
- Do not attempt to carry heavy or awkward material onto truck platforms
- Wear seatbelts and harnesses that are fitted in the vehicle
- Obey all road rules, speed limits, signs and traffic control systems
- Observe tyre inflation and condition of tyres – damaged or under-inflated tyres can lead to a tyre explosion or fire
- Check the brakes every time you move the truck
- Drive to the road conditions. Know the stopping distance for various road conditions and adjust your speed accordingly. Exercise particular care in wet weather
- Never coast downhill out of gear. Keep the transmission engaged, and use the retarder system
- Keep the cabin clean — loose items can jam under the brake or accelerator pedals
- Use two-way radios to communicate when overtaking or entering a congested area, or with people involved in activities around you
- Use the radio system correctly and maintain radio procedure and protocol
- Do not use the service brakes on downhauls except in an emergency, as they may overheat and fail. Use the correct gears and retarder system
- If a load hangs up during tipping, contact your supervisor for assistance
- Use “Danger” and “Out of Service” tags when required, and take notice of any tags that may be in place
- Maintain a safe distance of five truck lengths (about 50 m) between trucks travelling in the same direction
- Slow down near buildings and built up areas, and pay attention to the position of overhead powerlines and other overhead structures
- Never drive off with the box raised as it may hit overhead powerlines with potentially fatal consequences for personnel and major damage to the hoist rams
- Give plenty of room to other mobile equipment, such as graders, dozers and water trucks
- Slow down when negotiating bends and corners as sudden shifts in direction can cause the truck to roll over or rocks to fall onto the road
- Rock spillage can cause tyre damage. Avoid areas of spillage and contact your supervisor or the grader driver to remove them
- Ensure truck is regularly washed and kept clean so it is visible via marking and lights for both day and night time operations
- Approach dumping areas so the edge is on the driver’s side and is clearly visible. If in doubt, dump away from the edge and notify your supervisor
- Never dump over the edge of a stockpile above an area where material has been or is being removed until you have been reliably informed that it is safe to do so
- Do not use the retarder as a parking brake
- Tag out and report all truck defects, and submit reports of all incidents, including near misses



OPERATING INSTRUCTIONS

General

All members of the crew must become thoroughly familiar with all control functions, correct operating procedures, maximum capacities, standard hand signals, and safety precautions applicable to this machine before operation. Training and being prepared in case of an emergency are essential to everyone's safety.

The following pages contain numerous safety precautions, information and detailed operating instructions that must be observed while performing work operations. These pages, along with this entire manual, must be read carefully before operating this machine.

The health, safety and well-being of all crew members are of primary importance. Consequently, each member has an obligation to themselves and fellow workers to make sure safe operating procedures are followed.

All operating regulations recommended by the manufacturer, the employer and by municipal, provincial/state and federal agencies must be observed. The operating procedures included in this manual are DUX recommendations and do not necessarily cover employer and governmental regulations. Each crew member must know and observe those regulations as well.

Crew members must be familiar with all equipment checks and be able to spot an abnormality. Equipment inspections must be performed before beginning an assigned task, while working and after completing the task. There is a high degree of reliability built into this machine but there is always a possibility of mechanical failure or power failure due to incomplete service or abnormal wear. An operator should never take another's word and should always thoroughly check the machine themselves for proper function before each use.

Each crew member must receive thorough instruction on the care and maintenance of this machine in order to identify and anticipate any problems that may occur. Knowing how the equipment operates will help determine when the machine is malfunctioning and when repairs or adjustments may be required.

OPERATING INSTRUCTIONS

Instrument Panel & Cab Controls



OPERATING INSTRUCTIONS

Instrument Panel & Cab Controls

<u>Item</u>	<u>Pictogram</u>	<u>Function</u>	<u>Function Translation</u>
1		Ignition key switch; ON Turn key to ON position before pushing horn (pre-start warning) and start switches.	<i>français</i> Interrupteur de clé de contact; OUVERT Tourner la clé sur ON avant de pousser le klaxon (d'avertissement pré-départ) et l'interrupteur de démarrage. <i>español</i> Interruptor de encendido; ON Gire la llave hasta la posición ON antes de presionar el interruptor de la bocina (advertencia antes del arranque) y el de arranque. <i>português</i> Chave liga-desliga; LIGADA Coloque na posição LIGADA antes de pressionar a buzina (advertência de pré-partida) e chaves de partida.
(SAE-09.01K)			
2		Ignition key switch; OFF Turn key to OFF position to shut down engine. Always let the engine idle for a few minutes before shutting down from full load or high RPM to permit engine temperature to even out. IMPORTANT: If key is turned on more than one notch, the key must be pushed in to return to the OFF position.	<i>français</i> Interrupteur de clé de contact; FERMÉ Éteindre lorsqu'on stationne le véhicule. Toujours laisser le moteur tourner au ralenti pendant quelques minutes avant d'arrêter à pleine charge ou vitesse de rotation élevée pour permettre à la température du moteur de s'égaliser. IMPORTANT : Si la clé tourne sur plus d'une encoche, la clé doit être enfoncée pour la renvoyer à la position d'arrêt. <i>español</i> Interruptor de encendido; OFF Gire la llave hasta la posición OFF para apagar el motor. Cuando el motor esté operando a altas revoluciones o carga, siempre dejar el motor en marcha

OPERATING INSTRUCTIONS

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a bajas revoluciones por unos minutos antes de apagarlo, para que la temperatura del motor se equilibre.

IMPORTANTE: Si la llave ha sido girada más allá de la primera posición, es necesario empujarla hacia adentro para que vuelva a la posición OFF.

português

**Chave liga-desliga;
DESLIGADA**

Coloque a chave na posição DESLIGADA para desligar o motor.

Deixe sempre o motor em marcha lenta por alguns minutos antes de desligar de uma carga plena ou RPM elevada para permitir que a temperatura do motor fique equilibrada.

IMPORTANTE: Se a chave for girada para mais de uma posição, empurre-a para dentro para retornar à posição DESLIGADA.

(SAE-09.02K)

3



Engine oil temperature gauge

español

Indicador de temperatura del motor

(SAE-10.05G)

4

VOLTS

Voltmeter

Do not start engine if voltage is below 24 volts.

español

Voltímetro

No encienda el motor si el voltaje es inferior a 24 voltios.

(DUX-09.12.1)

5



Engine oil pressure gauge

español

Manómetro del aceite del motor

(SAE-10.04G)

OPERATING INSTRUCTIONS

Instrument Panel & Cab Controls

6



Hourmeter

français
Compteur d'heures

español
Contador de horas

português
Horímetro

(SAE-09.15)

7



Rear light switch

français
Interrupteur des feux arrière
Active les feux arrière.

español
Interruptor de las luces traseras

Las luces traseras se encienden cuando el botón se presiona del lado opuesto al del pictograma, y se apagan cuando el botón se presiona del mismo lado del pictograma.

português
Interruptor dos faróis traseiros
Acenda os faróis se for necessária mais iluminação além dos faróis de ré.

(DUX-15.01-REAR)

OPERATING INSTRUCTIONS

Instrument Panel & Cab Controls

8



Front light switch

français

Interrupteur des feux arrière

Active les feux arrière.

español

Interruptor de las luces traseras

Las luces traseras se encienden cuando el botón se presiona del lado opuesto al del pictograma, y se apagan cuando el botón se presiona del mismo lado del pictograma.

português

Interruptor dos faróis traseiros

Acenda os faróis se for necessária mais iluminação além dos faróis de ré.

(DUX-15.01-FRONT)

9



Engine preheat switch

Light will illuminate if pre-heating is required and will go out when engine is ready to start; do not start the engine until the light goes out.

français

Interrupteur de préchauffage

Le témoin s'allume si le pré-chauffage est requis et s'éteindra lorsque le moteur est prêt à démarrer; ne pas démarrer avec le témoin allumé.

español

Luz de "precalentamiento del motor" (amarilla)

La luz se encenderá si es necesario un precalentamiento, y se apagará cuando el motor esté listo para arrancar, no encienda el motor hasta que la luz se apague

português

Esperar antes de dar a partida

(DUX-10.41A)

OPERATING INSTRUCTIONS

Instrument Panel & Cab Controls

10



Override switch

Press while starting to by pas low engine oil pressure shut down.
Press and hold while starting engine to bypass low engine oil pressure shutdown switch. For low engine oil pressure.

español

Interruptor de paso de mando

Para ignorar señal de baja presión de aceite y poder arrancar el motor

(DUX-10.1.2)

11



Start switch

Starts the engine; do not hold for more than 15 seconds at a time.

français

Interrupteur de démarrage

Enfoncer l'interrupteur pour démarrer le moteur; ne pas tenir pendant plus de 15 secondes consécutives.

español

Interruptor de arranque

Presione el botón para hacer arrancar el motor; no lo mantenga presionado por más de 15 segundos consecutivos.

português

Botão de partida

Dá partida no motor; não mantenha o botão pressionado por mais de 15 segundos de cada vez.

(SAE-10.22)

12



Horn

français

Klaxon

español

Bocina

português

Buzina

(SAE-09.10)

OPERATING INSTRUCTIONS

Instrument Panel & Cab Controls

13



Emergency park brake switch

Push to apply; pull to second stage and hold to release.

(door may need to be closed for brakes to release)

français

Frein de stationnement d'urgence

Poussez le bouton pour appliquer; tirer à la seconde position et maintenir pour libérer.

(la porte doit être fermée pour désengager les freins)

español

Interruptor del freno de estacionamiento

Presione el interruptor para aplicar los frenos, tire del interruptor hasta la segunda posición y manténgalo ahí para soltarlos.

(es posible que las puertas deben estar cerradas para que los frenos se suelten)

português

Alça do freio de emergência / estacionamento

Pressione para aplicá-lo, puxe e mantenha na segunda posição para liberá-lo.

(SAE-13.06S)

OPERATING INSTRUCTIONS

Instrument Panel & Cab Controls

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Heater plug indicator

Light will illuminate if pre-heating is required and will go out when engine is ready to start; do not start the engine until the light goes out.

français

Interrupteur de préchauffage

Le témoin s'allume si le pré-chauffage est requis et s'éteindra lorsque le moteur est prêt à démarrer; ne pas démarrer avec le témoin allumé.

español

Luz de "precalentamiento del motor" (amarilla)

La luz se encenderá si es necesario un precalentamiento, y se apagará cuando el motor esté listo para arrancar, no encienda el motor hasta que la luz se apague

português

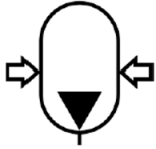
Esperar antes de dar a partida

(DUX-10.41B)

OPERATING INSTRUCTIONS

Instrument Panel & Cab Controls

15



Low brake pressure warning light (red)
Stop machine immediately as brakes will apply automatically if the brake system pressure drops below 93 bar (1350 PSI).

Illuminates if brake system pressure drops below 1450 PSI.

français

Témoin de faible pression de freinage (rouge)

Arrêtez la machine immédiatement puisque les freins s'appliquent dès que la pression atteint 1 350 lb/po2.

Le témoin s'allume si la pression du circuit de freinage descend sous 1 450 lb/po2.

español

Luz de advertencia de baja presión de los frenos (roja)

Pare la máquina inmediatamente, pues los frenos se accionarán automáticamente cuando la presión se encuentre por debajo de los 93 bar (1350 PSI).

La luz de advertencia se ilumina si la presión del sistema de frenos cae por debajo de los 1450 PSI.

português

Luz de advertência de baixa pressão do freio (Vermelha)

Desligue a máquina imediatamente, pois os freios serão acionados automaticamente se a pressão do sistema cair abaixo de 1350 PSI (93 Bar).

Acende quando a pressão do sistema do freio cair abaixo de 1450 PSI (100 Bar).

(SAE-09.63L)

16



Low engine oil pressure light
To indicate that the engine oil pressure is below the specified range of parameters.

(SAE-10.04L)

español

Luz de baja presión del aceite del motor (amarilla)

Para indicar que el valor de presión de aceite está por debajo de los parámetros establecidos.

OPERATING INSTRUCTIONS

Instrument Panel & Cab Controls

17



Park brake ON light (red)

Illuminates when the emergency/park brake is applied.

français

Lumière de frein de stationnement (rouge)

S'allume lorsque le frein d'urgence / de stationnement est appliqué.

español

Luz de freno de estacionamiento accionado (roja)

La luz se enciende al aplicarse el freno de emergencia / estacionamiento.

português

Luz do freio de estacionamento acesa (Vermelha)

Acende quando o freio de emergência/estacionamento é acionado.

(SAE-13.06L)

18



Check engine light (amber)

Illuminates when Ignition Switch is turned ON; will go out in approximately 5 seconds if all systems are functioning normally. Consult a qualified technician if light stays on, or if light does not illuminate momentarily after starting engine.

Should the light come on while operating the unit, the engine will continue to function, but must be immediately stopped and checked by a qualified technician to avoid major damage.

français

Témoin d'anomalie (ambre)

S'allume lorsque le bouton d'allumage est en position « ON »; s'éteindra après environ 5 secondes si tout fonctionne normalement. Consulter un technicien si le voyant lumineux reste allumé ou s'il s'allume momentanément après démarrage du moteur.

Si le témoin s'allume pendant l'utilisation de l'appareil, le moteur continue de fonctionner, mais il faut le faire vérifier par un technicien qualifié aussi rapidement que possible pour éviter les dommages majeurs.

español

Luz de "verificar el motor"

Si la luz de "verificar el motor" se enciende durante el funcionamiento de la unidad, el motor seguirá funcionando, pero se lo deberá hacer verificar por un técnico calificado lo antes posible, para evitar daños graves.

Quando o comutador de ligue

OPERATING INSTRUCTIONS

Instrument Panel & Cab Controls

se pone en la posición "ON", las luces de "verificar el motor" se encienden. Si todos los sistemas están funcionando normalmente, ambas luces se apagarán en aproximadamente 5 segundos.

Si las luces de advertencia permanecen encendidas, o si no se encienden un momento después de haber arrancado el motor, consulte un técnico.

português

Luz de verificação do motor (âmbar)

Essa luz acende quando a Chave de Ignição for LIGADA; apagará automaticamente em 5 segundos se todos os sistemas estiverem funcionando normalmente.

Consulte um técnico qualificado se a luz permanecer acesa ou se não acender momentaneamente após a partida do motor.

Se a luz acender durante a operação da unidade, o motor continuará funcionando, mas deve ser parado imediatamente e inspecionado por um técnico qualificado para evitar danos de maiores proporções.

(SAE-10.25)

OPERATING INSTRUCTIONS

Instrument Panel & Cab Controls

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Engine preheat light (yellow)

Light will illuminate if pre-heating is required and will go out when engine is ready to start; do not start the engine until the light goes out.

français

Témoin de préchauffage

Le témoin s'allume si le pré-chauffage est requis et s'éteindra lorsque le moteur est prêt à démarrer; ne pas démarrer avec le témoin allumé.

español

Luz de "precalentamiento del motor" (amarilla)

La luz se encenderá si es necesario un precalentamiento, y se apagará cuando el motor esté listo para arrancar, no encienda el motor hasta que la luz se apague

português

Esperar antes de dar a partida

(SAE-10.41)

20



Brake test switch

Used to perform the DAILY STATIC BRAKE TEST; must be held when testing the emergency/park brakes.

français

Interrupteur de test statique du frein de stationnement

Pour effectuer le TEST DE FREIN STATIQUE JOURNALIER ; doit être tenu lors de l'essai des freins d'urgence/stationnement.

español

Interruptor de prueba del freno

Presionar el botón para efectuar la PRUEBA ESTÁTICO DIARIA DE FRENOS; se debe realizar para probar el freno de emergencia/ estacionamiento.

português

Interruptor de teste de freio

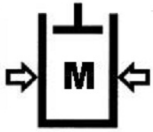
Usado para executar o TESTE ESTÁTICO DIÁRIO DOS FREIOS; deve ser realizada ao testar os freios de emergência/ estacionamento.

(DUX-09.44S)

OPERATING INSTRUCTIONS

Instrument Panel & Cab Controls

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Main hydraulic system pressure
To indicate the main hydraulic pressure.

français

Principale pression du système hydraulique

Pour indiquer la pression hydraulique principal.

español

Manómetro del sistema hidráulico

Indica la presión del sistema hidráulico

português

Manômetro do sistema hidráulico

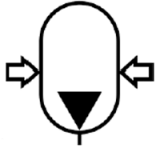
Para indicar a pressão do sistema hidráulico principal.

(DUX-12.3.3)

OPERATING INSTRUCTIONS

Instrument Panel & Cab Controls

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Accumulator brake pressure gauge

Readings should be between 1850 +/-50 PSI (128 +/-3.5 BAR) & 2300 +/-50 PSI (159 +/-3.5 BAR). If pressure drops to 1450 PSI (100 BAR), warning light (1) will turn on. If pressure drops to 1350 PSI (93 BAR) stop machine immediately as brakes will appl

français

Jauge de l'accumulateur le système de freinage

La pression doit indiquer entre 1850 +/-50 PSI (128 +/-3.5 BAR) et 300 +/-50 PSI (159 +/-3.5 BAR). Ne pas conduire la machine si la pression des freins est sous 1450 PSI (100 BAR). Si la pression chute à 1350 PSI, les freins seront actionnés.

español

Manómetro de los acumuladores del sistema de frenos

La lectura debe de estar entre 1850 +/-50 PSI (128 +/-3.5 BAR) y 2300 +/-50 PSI (159 +/-3.5 BAR). Si la presión baja a 1450 PSI (100 BAR), la luz de advertencia (1) se encenderá. Si la presión baja aún a 1350 PSI (93 BAR), pare la máquina inmediatamente, pues los frenos se accionarán automáticamente

português

Manômetro do freio do acumulador

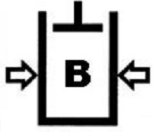
A pressão indicada deve estar entre 1850 +/-50 PSI (128 +/-3.5 BAR) e 2 300 +/-50 PSI (159 +/-3.5 BAR). Não opere a máquina se a pressão do freio estiver abaixo de 1450 PSI (100 BAR). Se a pressão cair para 1350 PSI (93 Bar), os freios serão acionados

(SAE-09.63G)

OPERATING INSTRUCTIONS

Instrument Panel & Cab Controls

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Brake system pressure
To indicate the brake system pressure.

español

Manómetro del sistema hidráulico de freno

Indica la presión del sistema hidráulico de freno

português

Manômetro do mecanismo de liberação dos freios

A pressão indicada deve ser no mínimo 1500 PSI (103 Bar) ao se dirigir o veículo, e 0 PSI/Bar quando os freios de estacionamento/serviço estiverem totalmente aplicados

(DUX-12.3.1)

24



Hydrostatic transmission charge pressure gauge
Reading should be at 400 PSI at idle.

français

Pression d'huile de transmission jauge

La lecture devrait être de 19 à 21 Bar (240 à 300 PSI). Ne pas opérer le véhicule si la lecture n'est pas dans cette plage, faire inspecter le véhicule par un technicien de maintenance qualifié.

español

Indicador de presión del transmisión

La lectura debe estar entre 240 a 300 PSI. No opere el vehículo si la lectura no está en ese rango, haga inspeccionar el vehículo por un técnico calificado.

português

Manômetro da embreagem da transmissão

A pressão indicada deve estar entre 240 PSI (19 Bar) e 300 PSI (21 Bar). Não dirija o veículo se a indicação não estiver nessa faixa. Faça inspecionar o veículo por um técnico de manutenção qualificado.

(SAE-11.03-HSTATIC)

OPERATING INSTRUCTIONS

Instrument Panel & Cab Controls

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Main fuse; reset type

français

**Fusible de panneau de contrôle
de type réinitialisable**

español

**Fusible principal; de reinicio
manual**

português

**Fusível principal;
reconfigurável**

(DUX-80AMP)

26



Master switch; off

Disconnect the batteries from the unit electrical system.

français

Interrupteur principal ; fermé
Pour identifier la commande qui arrête une fonction ou une opération.

español

Interruptor principal OFF
Desconecta las baterías del sistema eléctrico de la unidad

português

Chave mestre; DESLIGADA
Para identificar o controle que suspende uma função ou operação.

(SAE-09.02M)

27



Master switch; on

Connect the batteries with the unit electrical system.

français

Interrupteur principal ; ouvert
Pour identifier la commande qui démarre une fonction ou une opération.

español

Interruptor principal ON
Conecta las baterías con el sistema eléctrico de la unidad

português

Chave mestre; LIGADA
Para identificar o controle que inicia uma função ou operação.

OPERATING INSTRUCTIONS

Instrument Panel & Cab Controls

(SAE-09.01M)

28



Brake pedal

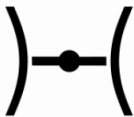
français
Pédale de frein

español
Pedal de freno

português
Pedal de freio

(SAE-13.01A)

29



Hand throttle

To identify the hand-operated control that sets or adjusts the power generated by or available to the equipment.

(SAE-10.44)

30



Hydrostatic transmission shifter

Push right to go forward.
Push left to go in reverse.

The truck will go faster the further the joystick is pushed.

français
Contrôle de direction
Pousser à gauche pour tourner à gauche, pousser à droite pour tourner à droite

español
Palanca de control de la dirección
Empujar hacia la izquierda para girar a la izquierda Empujar hacia la derecha para girar a la derecha

(DUX-
JOYSTICKHCT)

31



Steering control joystick

Push forward to turn left.
Pull back to turn right.

français
Contrôle de direction
Pousser à gauche pour tourner à gauche, pousser à droite pour tourner à droite

español
Palanca de control de la dirección
Empujar hacia la izquierda para girar a la izquierda Empujar hacia la derecha para girar a la derecha

(DUX-JOYSTICK-
DT5N)

OPERATING INSTRUCTIONS

Instrument Panel & Cab Controls

32



Dump body, raise (dump)

français

Boîte, soulever

Pour identifier la commande qui soulève l'avant de la carrosserie du camion à partir de l'horizontale pour déverser son contenu. Hydraulique ou électrique
Joystick / Poignée de Valve

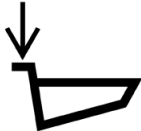
español

Elevar tolva (Descargar)

Para identificar el control que eleva la tolva para descargar. El control es un joystick que pilotea una válvula: hidráulicamente o eléctricamente. También puede ser una palanca que opera directamente a la válvula. Hydraulic or Electric Joystick/ Valve Handle

(SAE-47.02)

33



Dump body, lower

français

Boîte, abaisser

Pour identifier la commande qui abaisse l'avant de la caisse du camion vers l'horizontale. Hydraulique ou électrique
Joystick / Poignée de Valve

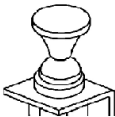
español

Bajar tolva

Para identificar el control que baja la tolva. El control es un joystick que pilotea una válvula: hidráulicamente o eléctricamente. También puede ser una palanca que opera directamente a la válvula. Hydraulic or Electric Joystick/ Valve Handle

(SAE-47.03)

34



Fire system actuator; manual

français

Actionneur du système de prévention des incendies; manuel

español

Actuador del sistema anti-incendios; manual

português

Atuador do sistema anti-incêndio; manual

(DUX-ANSUL)

MAINTENANCE INSTRUCTIONS

General

Please refer to the appropriate sections in this manual for more complete and detailed maintenance instructions.

MAINTENANCE SUGGESTIONS

Before opening any system, for refilling or for maintenance, clean the concerned area. During repairs, cap all open lines and use a clean cloth to wipe the internal parts. Wipe up dirt around the filler plugs before refilling.

Inspect all filters when removed for dirt or cracks. If these are observed, shorten the maintenance interval. Never operate the truck without all filters in place, even if only testing equipment during or after maintenance. Always empty the air filter pre-cleaner when half full, or as often as required. Clean air filter or change it if required.

The maintenance schedule shown below and on the following maintenance checklist should be strictly adhered to. Under no circumstances should the time intervals be extended, however if necessary intervals may be shortened.

BRAKE SYSTEM MAINTENANCE

DAILY

1. Check the system for leakage. With the parking brakes applied, idle the engine and allow the system pressure to build-up to its regulated value.
2. To ensure adequate braking on inclines, make certain that when the service brake is applied the truck does not move or creep (**Static Brake Test**).
3. Check that all hose connections and fittings are properly tightened and in good condition.

NOTE: Maintenance procedures for hydraulic and brake assemblies can be reviewed elsewhere in this manual (please refer to Section M and Section Mc).

SECONDARY HYDRAULIC SYSTEM MAINTENANCE

It is important that strict cleanliness be observed when working with the hydraulic system. Never use cotton, linen or other material that could fray while cleaning or fitting hose connections.

DAILY

1. Prior to moving the vehicle, check that the steering control is properly functioning. With the engine running and the transmission shifter in neutral position, steering should turn freely. Any malfunction of steering response should be corrected immediately.
2. Check couplings, fittings and hoses for leaks.
3. Make certain oil reservoir is filled to the appropriate level.

NOTE: It is important that the maintenance instructions given above and in other sections of this manual are followed and that the vehicle's moving parts are kept clean from dirt and impurities. By doing so, satisfactory operation will be assured and excessive wear will be avoided.

GREASING AND LUBRICATION

GREASING

When greasing a component it is essential that all the old grit laden grease be removed from the

MAINTENANCE INSTRUCTIONS

General

bearing surfaces. This can be achieved by applying new grease until the existing grease flows completely out of the bearing. Wipe away any excess grease as this will only accumulate dirt and grit.

LUBRICATION

DUX trucks are designed to work under the difficult conditions of a mining operation. To maintain safety on rough ground and on slopes, to resist the corrosion and wear due to dust and contaminants and to give long trouble free service; well-planned lubrication, as well as an inspection and maintenance program is required. It is extremely important that all moving parts be lubricated regularly and with care (see above information on greasing). This ensures the removal of old, contaminated grease that could lead to expensive repairs if not properly removed.

Filtration of the various lubricants used on the machine is very important for maintaining full mechanical efficiency. It is for this reason the vehicle is equipped with high quality filters that must be checked and changed when necessary.

If your equipment comes with an automatic lubrication system, the grease reservoir must be checked daily and filled as required (please see Section T). All grease hoses must also be checked during regular preventative maintenance.



MAINTENANCE INSTRUCTIONS

Maintenance & Inspection Checklist

DATE	UNIT NO.
DUX SERIAL NO.	HOUR METER
INSPECTED BY	

1. DAILY

- **A) Before each shift**
 - Walk around machine and make a visual inspection for any apparent damage or discrepancies
- **B) Prior to engine start-up**
 - Check engine oil level
 - Check all instruments and warning lights for proper functioning including horn and lights
 - Check coolant level (if applicable)
 - Check hydraulic oil level
 - Check fuel level
 - Check tire pressure
 - Check wheel nuts and rims
 - Check all drive belts
 - Clean machine and drive train components of excess dust, mud or stones
 - Check radiator for cleanliness
 - Check air filter condition indicator and connections
 - Check exhaust purifier and silencer connections
 - Check fuel filter/water separator and drain as required
- **C) After starting engine**
 - With parking brake released, check steering in both directions while sitting in operator's seat
 - With engine running, transmission in neutral and parking brake applied; check for leaks or deteriorated hoses
- **D) Before driving vehicle**
 - Proceed with "DAILY STATIC BRAKE TEST"

2. EVERY 50 WORKING HOURS

- **A) Daily Maintenance and Inspection (1)**
- **B) Steam clean complete unit**
- **C) Perform the following:**
 - Check oil level in differentials
 - Check oil level in planetary
 - Lubricate entire driveline universal joints
 - Lubricate slip joints
 - Lubricate brake pedal using light oil
 - Lubricate acceleration pedal using light oil (if applicable)
 - Check battery for proper level
 - Check and clean primary air intake filter
 - Check secondary air intake filter, change when dirty, do not clean



MAINTENANCE INSTRUCTIONS

Maintenance & Inspection Checklist

- Check wheel studs for tightness
- Check rims (flanges, lock rings)
- Check tires for cuts
- Steam clean radiator (when applicable)
- Follow checks in engine operator's guide
- Drain water from fuel filter

3. EVERY 250 WORKING HOURS

- **A) Daily Maintenance and Inspection (1)**
- **B) Maintenance and Inspection Every 50 Hours (2)**
- **C) Perform the following:**
 - Change engine oil (see engine operator's manual for proper oil selection)
 - Change engine oil filter
 - Check visual indicator on hydraulic system in-line pressure filter
 - Visually check axle bolts for tightness
 - Check planetary cover bolts (if applicable)
 - Check all driveline bolts for tightness (including pillow block)
 - Check hose fittings for tightness
 - Lubricate all linkages
 - Check charge air connections
 - Check radiator hoses
 - Check fan and belts

4. EVERY 500 WORKING HOURS

- **A) Daily Maintenance and Inspection (1)**
- **B) Maintenance and Inspection Every 50 Hours (2)**
- **C) Maintenance and Inspection Every 250 Hours (3)**
- **D) Perform the following:**
 - Change hydraulic oil suction strainers
 - Check axle breathers for plugging
 - Check hydrostatic transmission system components
 - Check and reset all hydraulic pressures if required
 - Check and reset all hydraulic brake pressures if required
 - Check brake lining wear indicator
 - Check secondary fuel filter (if applicable)
 - Check anti-freeze (if applicable)
 - Check crankcase breather tube

5. EVERY 1000 WORKING HOURS

- **A) Daily Maintenance and Inspection (1)**
- **B) Maintenance and Inspection Every 50 Hours (2)**
- **C) Maintenance and Inspection Every 250 Hours (3)**
- **D) Maintenance and Inspection Every 500 Hours (4)**
- **E) Perform the following:**
 - Check all electrical wiring and connections for damage
 - Change hydraulic oil
 - Change hydraulic system in-line pressure filter
 - Change hydraulic brake system in-line pressure filter
 - Change transmission oil



MAINTENANCE INSTRUCTIONS

Maintenance & Inspection Checklist

- Change primary fuel filter
- Clean transmission strainer
- Check axle oil condition, check magnet plugs for metal particles (fine particles are normal)
- Change water conditioner
- Change return filter element
- Change brake cooling oil
- Check belt tensioner

5. EVERY 2500 WORKING HOURS

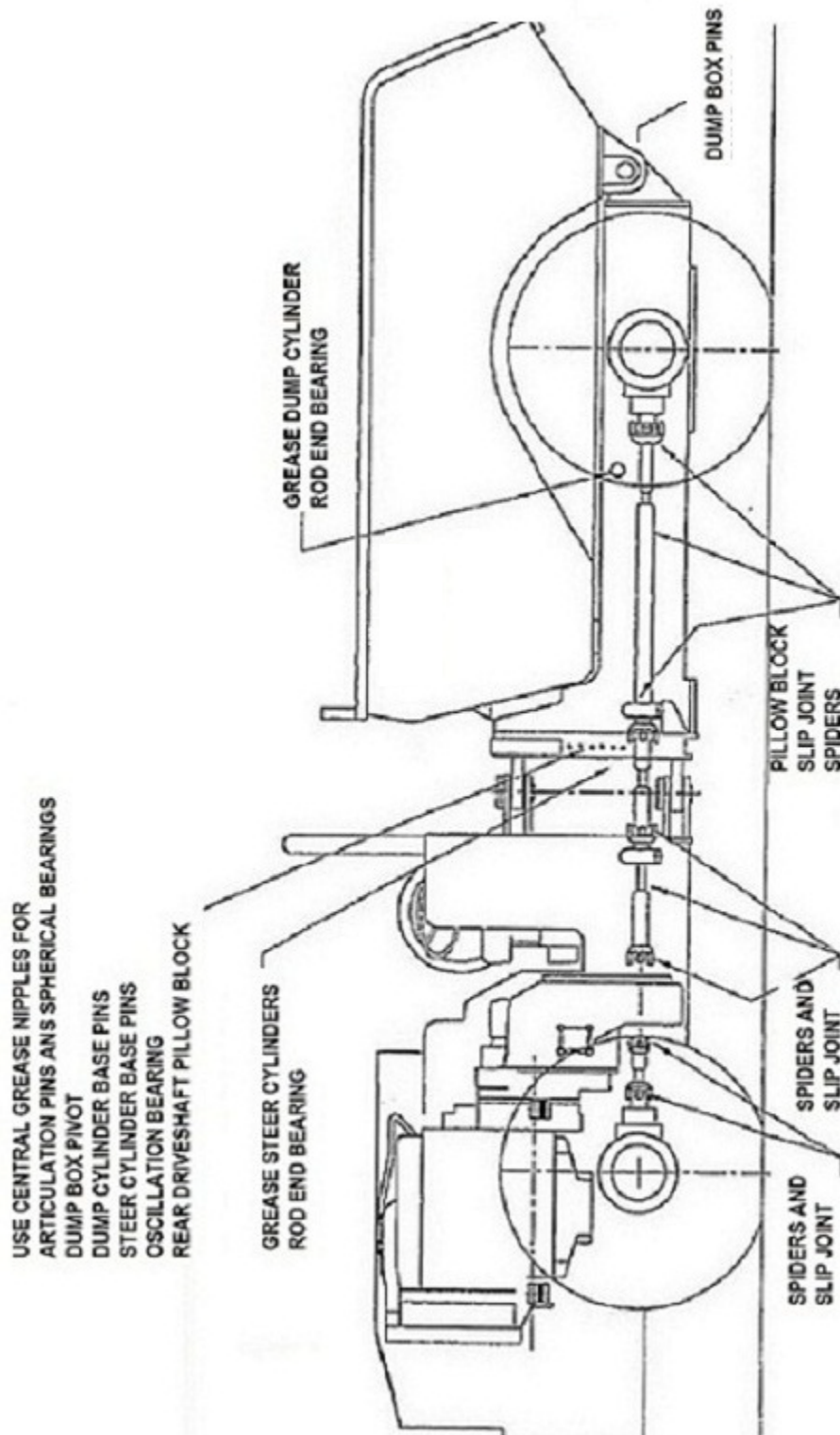
- **A) Daily Maintenance and Inspection (1)**
- **B) Maintenance and Inspection Every 50 Hours (2)**
- **C) Maintenance and Inspection Every 250 Hours (3)**
- **D) Maintenance and Inspection Every 500 Hours (4)**
- **E) Maintenance and Inspection Every 1000 Hours (5)**
- **F) Perform the following:**
 - Change axle oils
 - Change secondary fuel filter element
 - Change fuel pro element

REMARKS



MAINTENANCE INSTRUCTIONS

General Lubrication Points



MAINTENANCE INSTRUCTIONS

Lubricant Requirements

<u>Part No.</u>	<u>Quantity</u>	<u>Description</u>
		----- ENGINE -----
DUR15	16L	DURON 15W-40 HEAVY DUTY ENGINE OIL
		----- AXLES -----
PD430	15.5LEA	PRODURO TO-4 30 TRANSMISION/DRIVE TRAIN OIL
		----- AXLE DIFFERENTIAL -----
PD430	7.6LEA	PRODURO TO-4 30 TRANSMISION/DRIVE TRAIN OIL
		----- AXLE PLANETARY -----
PD430	3.9LEA	PRODURO TO-4 30 TRANSMISION/DRIVE TRAIN OIL
		----- FUEL TANK -----
W104	75L	DIESEL FUEL
		----- HYDRAULIC TANK -----
PD410	75L	PRODURO TO-4 10W
		----- DRIVELINE -----
PFG1	*AR	PURITY FG1 GREASE
*AR (As Required)		



MAINTENANCE INSTRUCTIONS

Recommended Filters

<u>Part No.</u>	<u>Quantity</u>	<u>Description</u>
----- ENGINE -----		
2859-16	2	ENGINE OIL FILTER
7011-7-1	1	PRIMARY FUEL PREFILTER CARTRIDGE
5164	1	SECONDARY SPIN ON FUEL FILTER
----- TRANSMISSION -----		
6973-177A	1	RETURN FILTER /SUCTION STRAINER
6974-2C	1	MAGNETIC SUCTION SEPARATORS
----- HYDRAULIC SYSTEM -----		
102-6689	1	FILTER ELEMENT-HIGH PRESSURE FILTER
6973-177A	1	RETURN FILTER /SUCTION STRAINER
3434-7B	1	FILTER CARTRIDGE-PRESSURE FILTER
----- ENGINE AIR INTAKE -----		
2570-1	1	PRIMARY ELEMENT
2570-2	1	SAFETY ELEMENT



MAINTENANCE INSTRUCTIONS

Decal Inspection

Use the pictures on the next page to verify that all decals are legible and in place.

To order decals, use part numbers or send copy of desired decal to the attention of the spare parts department along with truck model, truck serial number and the quantity required. Please include your complete address and specify how decals must be shipped.

DUX MACHINERY CORPORATION
615 LAVOISIER, REPENTIGNY, QUEBEC, CANADA J6A 7N2
Phone: (450) 581-8341
Fax (450) 581-5138
Web site: www.duxmachinery.com



MAINTENANCE INSTRUCTIONS

DT-5N Decal Kit No. 6999 (EN)

<u>Item</u>	<u>Part No.</u>	<u>Quantity</u>	<u>Description</u>
1	102-6710B	1	DAILY STATIC BRAKE TEST INSTRUCTIONS

DAILY STATIC BRAKE TEST

WITH MACHINE ON LEVEL GROUND

1. TEST EMERGENCY/PARKING BRAKE

- Run engine at full RPM for a few seconds
- Engage hydrostatic drive lever in forward or in reverse
- Push park brake override button
- The machine should not move or creep

2. TEST SERVICE BRAKE

- Run engine at full RPM for a few seconds
- Engage hydrostatic drive lever in forward or in reverse
- Fully apply service brake pedal
- Release park brake
- The machine should not move or creep

⚠ WARNING

**DO NOT DRIVE MACHINE IF THE
DAILY STATIC BRAKE TEST
IS NOT SATISFACTORY**

102-6710

2	102-6710A	1	DRIVING SAFETY INSTRUCTIONS
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MAINTENANCE INSTRUCTIONS

DT-5N Decal Kit No. 6999 (EN)

Item Part No. Quantity Description

DRIVING SAFETY INSTRUCTIONS

**AT THE BEGINNING OF EACH SHIFT,
CHECK MACHINE AS PER DAILY CHECK LIST**

1. Before climbing into machine, check and make sure the way is clear of obstacles and personnel, front and rear
2. Turn master switch "ON"
3. Turn key switch "ON"
4. Make sure hydrostatic drive lever is in neutral and that emergency/parking brake is "ON" (push to apply; pull and hold to release)
5. Fasten seat belt (including co-driver)
6. Check all warning lights and gauges for proper function
7. Let engine warm up for a few minutes before driving
8. Never let the machine freewheel downhill
9. When parking, chock wheels (follow mine rules)
10. Do not let engine run with machine unattended
11. Always turn master switch "OFF" when parking machine
12. Make sure all warning decals are readable, and do not operate faulty or defective machine

3	102-6509	1	FALLING (USE 3-POINT CONTACT)
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MAINTENANCE INSTRUCTIONS

DT-5N Decal Kit No. 6999 (EN)

Item	Part No.	Quantity	Description
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4	102-6507	1	WEAR SEAT BELT
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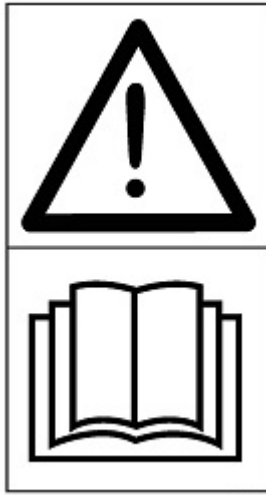


5	102-6511	1	READ OPERATOR'S MANUAL
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MAINTENANCE INSTRUCTIONS

DT-5N Decal Kit No. 6999 (EN)

Item	Part No.	Quantity	Description
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6	102-6206-EN	1	WARNING/TRAINED PERSONNEL DECAL
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WARNING
ONLY TRAINED
AND AUTHORIZED
PERSONNEL TO
OPERATE UNIT

7	102-6211	1	CRUSHING OF WHOLE BODY (KEEP SAFE DISTANCE FROM ARTICULATION AREA)
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8	102-6510	2	KEEP CLEAR OF TIPPING AREA
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MAINTENANCE INSTRUCTIONS

DT-5N Decal Kit No. 6999 (EN)

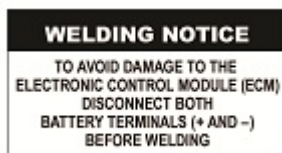
Item	Part No.	Quantity	Description
------	----------	----------	-------------



9	102-6506	1	CRUSHING OF WHOLE BODY (ATTACH SUPPORT BEFORE ENTERING HAZARDOUS AREA)
---	----------	---	--



10	102-6240-EN	1	WARNING WELDING
----	-------------	---	-----------------

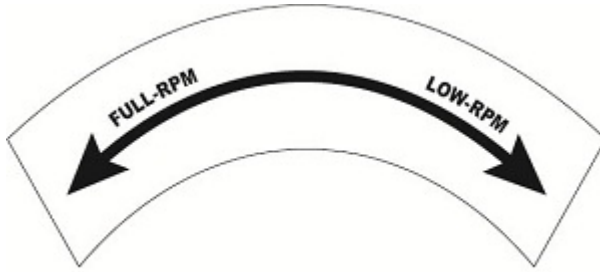


11	102-6708	1	RPM DECAL (HI-LOW)
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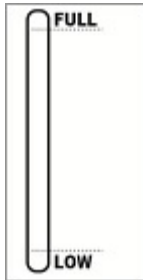
MAINTENANCE INSTRUCTIONS

DT-5N Decal Kit No. 6999 (EN)

Item	Part No.	Quantity	Description
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12	102-6709	1	TANK LEVE (HI-LOW)
----	----------	---	--------------------



13	102-6210	1	HYDRAULIC OIL TANK
----	----------	---	--------------------



14	102-6209	1	FUEL TANK
----	----------	---	-----------



15	102-6238	3	DUX DECAL
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16	102-6213	2	TIE DOWN POINT
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MAINTENANCE INSTRUCTIONS

DT-5N Decal Kit No. 6999 (EN)

<u>Item</u>	<u>Part No.</u>	<u>Quantity</u>	<u>Description</u>
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17	102-6707	1	DUX MODEL DT-5N
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18	102-6342	1	DRAPEAU DU QUEBEC
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19	102-6422	1	FLAG OF CANADA
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HAND PUMP BRAKE RELEASE

WARNING: PRIOR TO RELEASING THE BRAKES INSERT FRONT AND REAR WHEEL CHOCKS TO ENSURE THAT THE TRUCK WILL NOT FREE WHEEL DOWN AN INCLINE. THE BRAKES WILL BEGIN TO RELEASE AT 350 PSI +/- . BRAKES ARE FULLY RELEASED AT 420 PSI. HAND PUMP RELIEF IS SET AT 450 PSI TO PROTECT THE BRAKE SEALS.

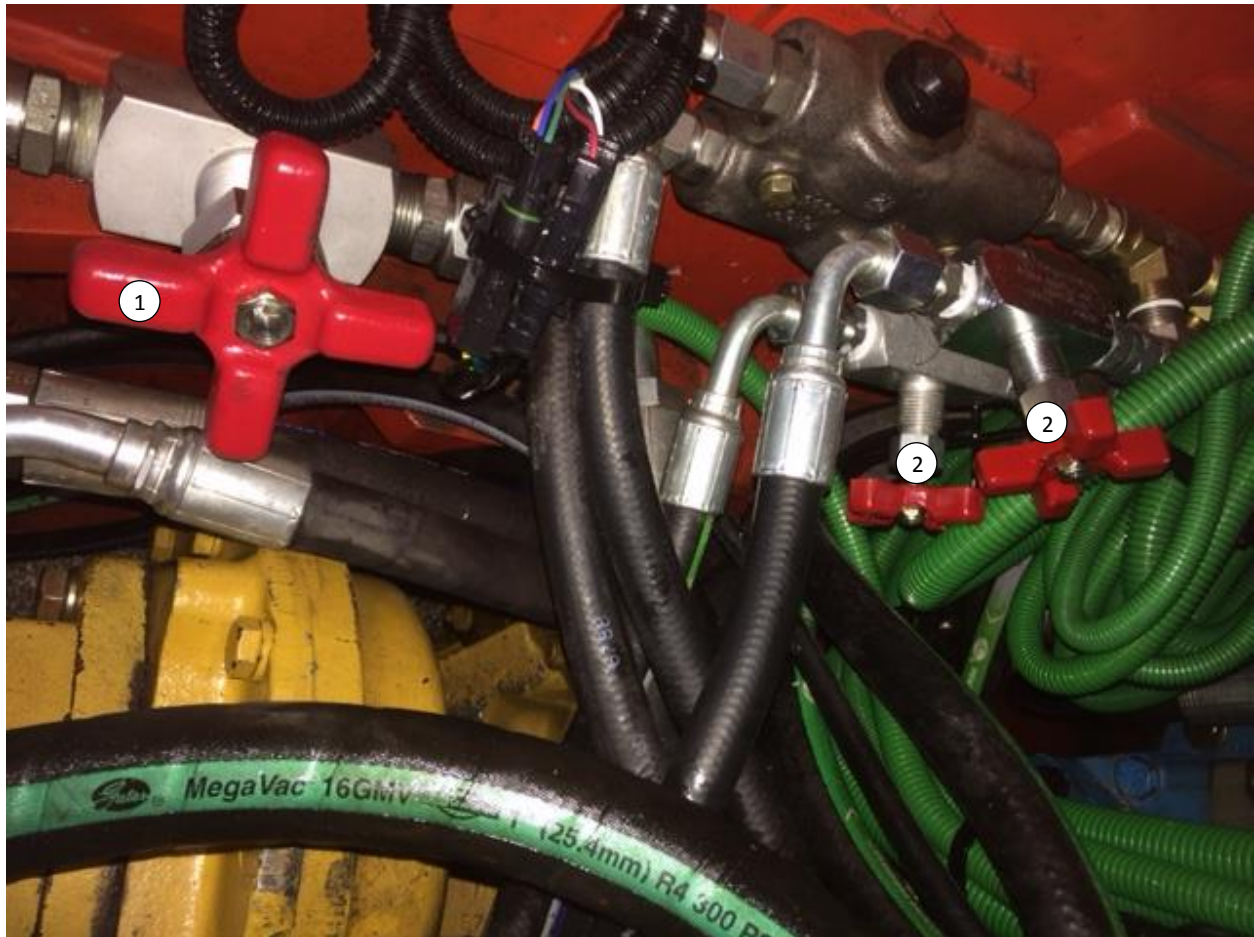
ONLY WITH THE ENGINE OFF AND THE MASTER SWITCH CLOSED, MANUALLY RELEASE THE BRAKES.

- 1- CLOSE BRAKE NEEDLE VALVE (1). Turn clock wise to close. Located behind the front grill. Ensure the hand pump relief valve (2) is turned clock wise so it is closed.



- 2- PUMP, BRAKE RELEASE HAND PUMP (3) TILL THE PRESSURE GAUGE ON THE HAND PUMP SHOWS 420 PSI. BRAKES ARE NOW RELEASED.
- 3- TO RE APPLY THE BRAKES OPEN THE HAND PUMP RELIEF VALVE. (2)
- 4- TO RETURN TO NORMAL BRAKE CIRCUIT FUNCTION OPEN THE BRAKE NEEDLE VALVE (1) AND CLOSE THE HAND PUMP RELIEF VALVE. (2)

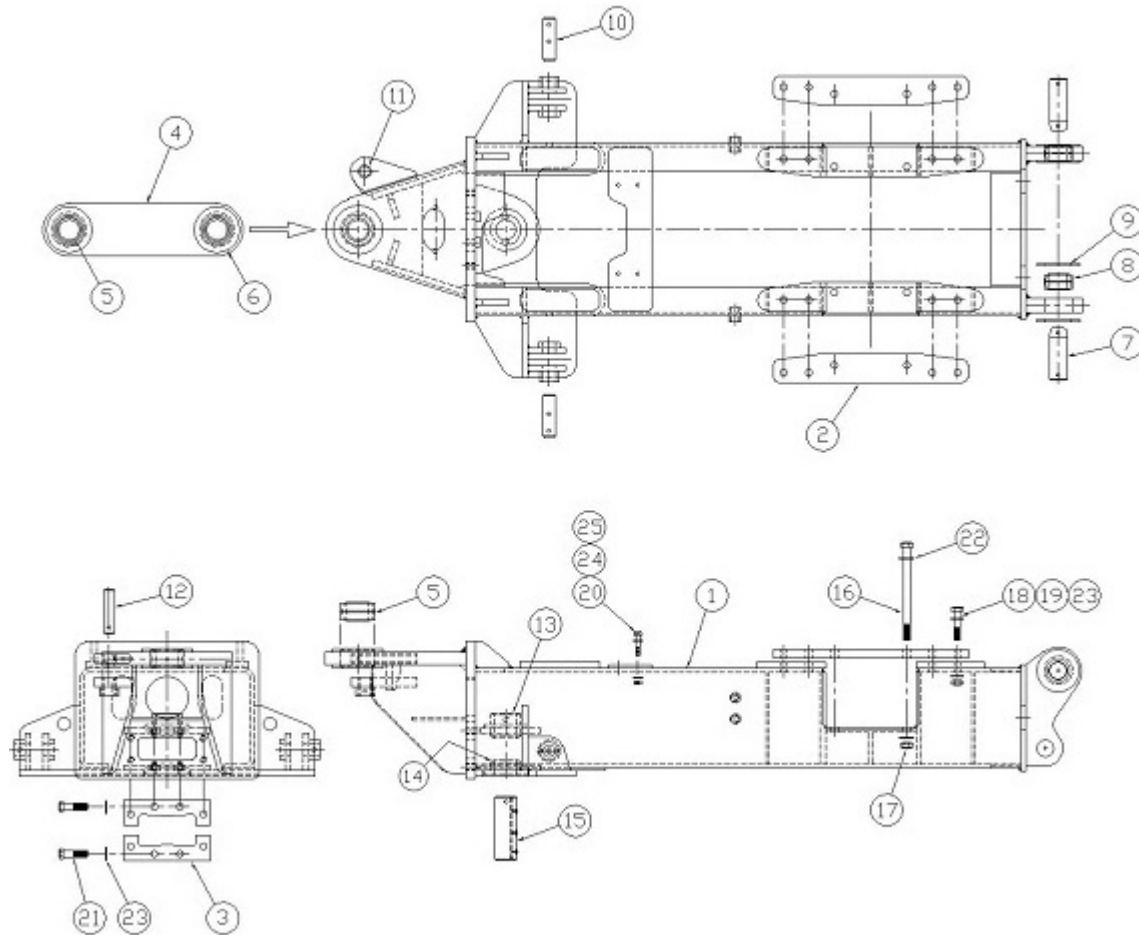
TOWING PROCEDURE WITH HYDROSTATIC TRANSMISSION



BEFORE TOWING VEHICLE:

- A- OPEN NEEDLE VALVE (1) TO ALLOW THE CIRCULATION OF OIL IN A CLOSED LOOP AT THE HYDROSTATIC MOTOR.
- B- OPEN BOTH NEEDLE VALVES (2) BY TURNING COUNTER CLOCK WISE TO ALLOW FREE CIRCULATION OF OIL AT THE STEERING CYLINDERS ALLOWING THE VEHICLE TO TRACK WITH THE TOWING VEHICLE.
- C- MAKE SURE THE DT5 VEHICLE IS WELL SECURED TO THE TOWING VEHICLE AND REMOVE THE PARKING BRAKE VIA THE HAND PUMP BRAKE RELEASE.
- D- TO RESUME TO NORMAL OPERATION PROCEED IN REVERSE ORDER.

6971 REAR FRAME ASSEMBLY



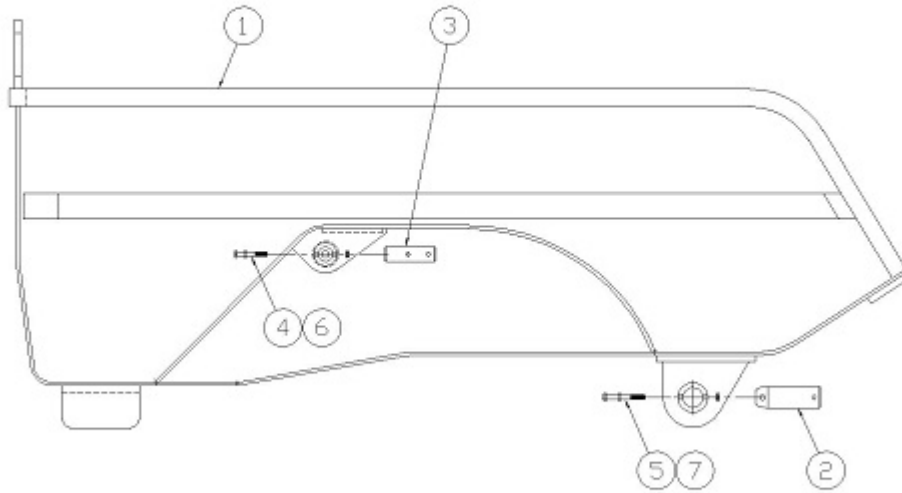
6971 REAR FRAME ASSEMBLY

<u>Item</u>	<u>Part No.</u>	<u>Quantity</u>	<u>Description</u>
1	6971-1	1	REAR FRAME WELDMENT
2	6971-2	2	TOP AXLE CLAMP PLATE
3	6971-3	2	TWIST ARM SPLIT GUIDE
4	6851-1-27	1	TWIST ARM ASSEMBLY
5	1879-10-15	3	SPHERICAL PLAIN BEARING
6	6965-2	4	RETAINING RING
7	6972-2	2	DUMP PIVOT PIN
8	1980-7-13	2	SPHERICAL PLAIN BEARING
9	6971-1-24	4	BEARING SHIM RING
10	6971-5	2	DUMP CYLINDER PIN
11	1707-16-7	3	BUSHING
12	6971-6	1	STEERING CYLINDER PIN
13	6961-2	1	LOWER PIN BUSHING
14	6961-4	1	LOWER PIN BUSHING (BOTTOM)
15	6964-2	1	LOWER ARTICULATION PIN
16	113C8	4	BOLT
17	2797-2-37	4	HEX NUT
18	784C8	8	BOLT
19	78NC8	8	HEX NUT
20	583C8	4	BOLT
21	78312C8	8	BOLT
22	34F436	8	FLAT WASHER
23	78F436	24	FLAT WASHER
24	58F436	8	FLAT WASHER
25	58NC8	4	HEX NUT



6972

COMPLETE DUMP BOX ASSEMBLY



<u>Item</u>	<u>Part No.</u>	<u>Quantity</u>	<u>Description</u>
1	6972-1	1	DUMP BOX WELDMENT
2	6972-2	2	DUMP PIVOT PIN
3	6971-5	2	DUMP CYLINDER PIN
4	716312C8	2	COLLAR HEX BOLT
5	12412C8	2	BOLT
6	716NC8	2	HEX NUT
7	12NC8	2	HEX NUT



DUX MACHINERY CORPORATION
 615 Lavoisier, Repentigny Quebec, Canada J6A 7N2
 Phone +1 (450) 581-8341 • Fax +1 (450) 581-5138
 Web www.duxmachinery.com

Model DUX DT, TD, ET, P1, S1 SERIES

Subject BOLT CLAMP LOADS:

102-6445 TECHNICAL BULLETIN (PAGE 1 OF 1)

SUGGESTED ASSEMBLY TORQUE VALUES

BOLT CLAMP LOADS - SUGGESTED ASSEMBLY TORQUE VALUES																					
DIA. & THDS. PER IN.	STRESS AREA SQ. IN.	SAE GRADE 2 THRU 6" LONG					SAE GRADE 5					SAE GRADE 8					L9* FASTENING SYSTEM				
		TENSILE Strength MIN. KSI.	PROOF LOAD LBS.	CLAMP LOAD LBS.	TORQUE		TENSILE Strength MIN. KSI.	PROOF LOAD LBS.	CLAMP LOAD LBS.	TORQUE		TENSILE Strength MIN. KSI.	PROOF LOAD LBS.	CLAMP LOAD LBS.	TORQUE		TENSILE Strength MIN. KSI.	PROOF LOAD LBS.	CLAMP LOAD LBS.	TORQUE BY	
					DRY FT. LB.	LUB. FT. LB.				DRY FT. LB.	LUB. FT. LB.				DRY FT. LB.	LUB. FT. LB.				HEAD FT. LB.	NUT FT. LB.
1/4-20	.0318	74	1750	1310	5.5	4.2	120	2700	2020	8	6.3	150	3800	2850	12	9	180	4610	3450	10	11
28	.0364	74	2000	1500	6.3	4.7	120	3100	2320	10	7.2	150	4350	3250	14	10	180	5270	3950	12	13
5/16-18	.0524	74	2900	2160	11	8	120	4450	3340	17	13	150	6300	4700	24	18	180	7590	5700	19	21
24	.0580	74	3200	2400	12	9	120	4900	3700	19	14	150	6950	5200	27	20	180	8410	6300	20	23
3/8-16	.0775	74	4250	3200	20	15	120	6600	4950	30	23	150	9300	6980	45	35	180	11230	8450	30	33
24	.0878	74	4800	3620	23	17	120	7450	5600	35	25	150	10500	7900	50	35	180	12730	9550	35	38
7/16-14	.1063	74	5850	4380	32	24	120		6780	50	35	150	12800	9550	70	50	180	15410	11550	55	60
20	.1187	74	6550	4900	36	27	120		7570	55	40	150	14200	10650	80	60	180	17210	12900	60	65
1/2-13	.1419	74	7800	5850	50	35	120	12100	9050	75	55	150	17000	12750	110	80	180	20570	15450	85	95
20	.1599	74	8800	6600	55	40	120	13600	10200	85	65	150	19200	14400	120	90	180	23180	17400	95	105
9/16-12	.1820	74	10000	7500	70	55	120	15500	11600	110	80	150	21800	16350	150	110	180	26390	19800	120	140
18	.2030	74	11200	8400	80	60	120	17300	12950	120	90	150	24400	18250	170	130	180	29430	22100	135	150
5/8-11	.226	74	12400	9320	100	75	120	19200	14400	150	110	150	27100	20350	210	160	180	32770	24550	170	185
18	.256	74	14100	10560	110	85	120	21800	16350	170	130	150	30700	23000	240	180	180	37120	27800	190	205
3/4-10	.334	74	18400	13800	175	130	120	28400	21300	260	200	150	40100	30100	380	280	180	48430	36350	265	290
16	.373	74	20500	15390	200	140	120	31700	23780	300	220	150	44800	33500	420	310	180	54080	40600	330	355
7/8-9	.462	60	15200	11430	170	125	120	39300	29450	430	320	150	55400	41600	600	450	180	66990	50300	475	505
14	.509	60	16800	12600	180	140	120	43300	32450	470	350	150	61100	45800	670	500	180	73800	55400	520	585
1-8	.606	60	20000	15000	250	190	120	51500	38600	640	480	150	72700	54500	910	680	180	87870	65900	550	775
14	.679	60	22400	16800	280	210	120	57700	43300	720	540	150	81500	61100	1020	760	180	98450	73800	700	900
1-1/8-7	.763	60	25200	18900	350	270	105	56500	42300	790	590	150	91600	68700	1290	970	180	110630	83000	1025	1150
12	.856	60	28200	21200	400	300	105	63300	47500	890	670	150	102700	77000	1440	1080	180	124120	93100	1150	1325
1-1/4-7	.969	60	32000	24000	500	380	105	71700	53800	1120	840	150	116300	87200	1820	1360	180	140500	105400	1400	1600
12	1.073	60	35400	26550	550	420	105	79400	59600	1240	930	150	128800	96600	2010	1510	180	155580	116700	1600	1750
1-1/2-6	1.405	60	46400	34800	870	650	105	104000	78000	1950	1460	150	168600	126500	3160	2370	180	203720	152800	2900	3250
12	1.581	60	52200	39150	980	730	105	117000	87700	2200	1640	150	189700	142200	3560	2670	180	229240	171900	3300	3650

NOTES:

The above recommended assembly torques are offered as a guide only. Torque specifications, especially for critical joints, should be determined under actual assembly conditions due to the many variables involved which are difficult to predict and do affect the torque-tension relationship.

The above recommended clamp loads are based on 75% of the minimum specified proof loads for each grade size.

Torques for Grades 2, 5 and 8 were calculated based on the following relationship:

$$T = RDP$$

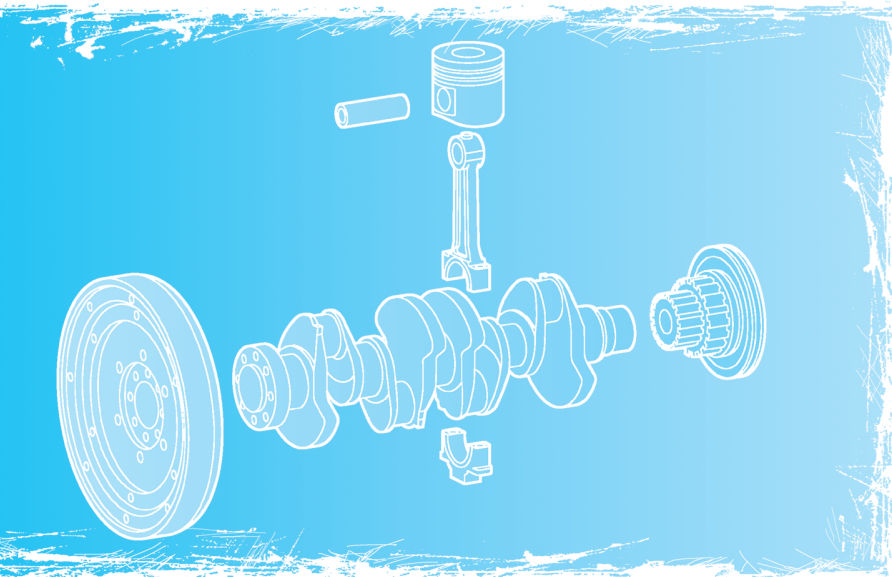
Where: T = Torque (in. - lbs.)
 D = Nominal Diameter (in.)
 P = Clamp Load (lbs.)
 R = Tightening Coefficient

**Torques Wrenches
Available - Special
to Order**

Strength Grade	Applicable Sizes	Proof Load Stress (psi)	Yield Strength Min. Stress (psi)	Tensile Strength Min. Stress (psi)
SAE Gr. 2	1/4" thru 3/4" dia.	55,000	57,000	74,000
	over 3/4" thru 1-1/2" dia.	33,000	36,000	60,000
	over 6" long	33,000	36,000	60,000
SAE Gr. 5	1/4" thru 1" dia.	85,000	92,000	120,000
	over 1" thru 1-1/2" dia.	74,000	81,000	105,000
SAE Gr. 8	1/4" thru 1-1/2" dia.	120,000	130,000	150,000
L9	1/4" thru 1-1/2" dia.	145,000	155,000	180,000

The value of R is assumed to be equal to .20 for dry unplated conditions, and equal to .15 for lubricated, including plated, conditions. Actual values of R can vary between .05 and .35 for commonly encountered conditions.

L9* Fastening System torque values are for a nut, bolt, and two-washer assembly, not for screws used in tapped holes; and were developed through laboratory testing of representative sample. As such, they are average values, which when used under actual assembly conditions, can be expected to produce clamp loads within $\pm 15\%$ of the recommended values. When L9* hex screw with L9* tension control washers are used in tapped holes, assembly torque values should be determined experimentally under actual conditions.



Ersatzteilliste

Spare Parts Catalogue

Catalogue de Pièces de Rechange

Lista de Piezas de Repuesto

F3-6L 912/W + E-Pac



Die in dieser Ersatzteilliste aufgeführten Bauteile sind nur für Reparatur von Deutz Motoren der bezeichneten Baureihe zu verwenden (bestimmungsgemäßer Gebrauch). Über den fachgerechten Einbau von Ersatzteilen informieren die Betriebsanleitung (Wartungsarbeiten) und das Werkstatt-handbuch (Reparaturarbeiten) ausführlich. Für Schäden oder Verletzungen von Personen, die aus der Nichtbeachtung der entsprechenden Anleitung führen, übernimmt der Hersteller keine Haftung.

The parts contained in this Catalogue are type-specific and shall be used only for repairing engines belonging to the DEUTZ engine family given on the cover (approved purpose). Full information for the proper installation of spare parts are to be found in the relevant Operating Manual (maintenance work) and Workshop Manual (repair work). The manufacturer shall not be liable for any damage or injury of persons resulting from non-compliance with guidelines given in the manuals.

La présente nomenclature de pièce détachées énumère les composants à utiliser uniquement à des fins de réparation des moteurs Deutz de la série indiquée (utilisation conforme). Le manuel d'utilisation (travaux d'entretien) et le manuel d'atelier (réparations) apportent de plus amples informations sur le montage approprié des pièces détachées. Le fabricant décline toute responsabilité concernant les dommages ou blessures de personnes résultant du non-respect des présentes instructions.

Los componentes indicados en esta lista de piezas de repuesto se emplearán exclusivamente para la reparación de motores Deutz de la serie indicada (uso conforme a la finalidad). Respecto al correcto montaje de las piezas de repuesto, véanse los manuales de instrucciones (trabajos de mantenimiento) y el manual de servicio (trabajos de reparación). El fabricante no responderá por daños o lesiones de personas resultantes de la inobservancia de la instrucción correspondiente.

As peças e partes componentes relacionadas nesta lista de peças sobressalentes serão utilizadas (uso a que se destinam) somente para a reparação de motores Deutz da série designada. O manual de instruções de serviço (trabalhos de manutenção) e o manual de oficina (trabalhos de reparação) proporcionam informações pormenorizadas quanto à montagem tecnicamente correta de peças sobressalentes. O fabricante não assume qualquer responsabilidade por danos ou lesões pessoais resultantes da inobservância das instruções correspondentes.

I componenti elencati in questa lista di pezzi di ricambio devono essere utilizzati soltanto per la riparazione di motori Deutz della serie specifica indicata (uso conforme alla destinazione). Il libretto di istruzioni (interventi di manutenzione) ed il manuale d'officina (interventi di riparazione) forniranno delucidazioni dettagliate sul montaggio corretto dei pezzi di ricambio. Il fabbricante non si assume nessuna responsabilità per danni o lesioni a persone dovuti all'inosservanza delle relative istruzioni.

De onderdelen in deze onderdelenlijst mogen uitsluitend worden gebruikt voor reparatie van Deutz-motoren uit de vermelde bouwserie (gebruik volgens de voorschriften). Uitvoering informatie over de correcte montage van onderdelen is te vinden in de gebruiksaanwijzing (onderhoudswerkzaamheden) en de werkplaatshandleiding (reparaties). De fabrikant is niet aansprakelijk voor beschadigingen of lichamelijke letsels die voortvloeien uit de niet-naleving van de desbetreffende voorschriften.

De i denna reservdelslista upptagna komponenterna ska endast användas för reparation av Deutz-motorer av angivna byggserie (ändamålsenlig användning). Utöfriga informationer angående korrekt montering av reservdelar framgår av instruktionsboken (skötselarbeten) och verkstadsdataboken (reparationer). För person- och materialskador, som uppstår på grund av ignorering av respektive anvisning, övertar tillverkaren inget ansvar.

De i denne reservdeliste angivne komponenter må kun anvendes til reparation af Deutz-motorer i den anførte serie (Anvendelse i overensstemmelse med formålet). Detaljer vedrørende den korrekte montering af reservdelene fremgår af instruktionsbogen (service) samt værkstedshåndbogen (reparation). Producenten påtager sig intet ansvar for skader på personer eller ting som følge af, at bestemmelserne i den relevante vejledning ikke er overholdt.

Tässä varaosalettelossa luetelluja komponentteja tulee käyttää vain ilmoitetun tyyppisten Deutz-moottoreiden korjaustöissä (käyttötarkoituksen mukainen käyttö). Käyttöohjeesta (kohdasta Huoltotyöt) ja korjaamokäsikirjasta (kohdasta Korjaustyöt) käy yksityiskohtaisesti ilmi, kuinka varaosat asennetaan asianmukaisesti. Valmistaja ei vastaa vahingoista tai henkilöiden loukkaantumisista, jotka johtuvat siitä, että vastaavaa ohjetta ei ole noudatettu.

Komponenter som er oppført på denne reservdelslisten, er bare beregnet til reparasjon av DEUTZ motorer som tilhører de serier som er angitt (forskriftsmessig bruk). Fagmessig innmontering av reservedeler er utførlig beskrevet i instruksjonsboken (vedlikeholdsarbeid) og verkstedshåndbo-

ken (reparasjonsarbeid). Produsenten påtar seg ikke ansvar for materielle skader eller personskader som skyldes at de relevante anvisningene ikke har blitt fulgt.

القطع المدرجة في لائحة قطع الغيار هذه، معدة فقط للإستعمال في تصليح محركات دويتس من الفئة المناسبة (استعمالها مقصّر على الغاية الأساسية).

تتضمن إرشادات التشغيل وكتيّب الورشة (التصليحات) تعليمات مستوفضة لتزكيب قطع الغيار كما يجب. لا يتحمّل المنتج أي مسؤولية في ما يختص بالأضرار وإصابات الأشخاص الناتجة عن عدم التقيد بالإرشادات المناسبة.

Τα εξαρτήματα που περιλαμβάνονται σ' αυτόν τον κατάλογο ανταλλακτικών μερών πρέπει να χρησιμοποιούνται μόνο για την επισκευή κινητήρων Deutz της αναφερόμενης κατασκευαστικής σειράς (προοριζόμενη χρήση). Για τη σωστή τοποθέτηση των ανταλλακτικών μερών ενημερώνουν αναλυτικά οι οδηγίες λειτουργίας (εργασίες συντήρησης) και το εγχειρίδιο συνεργείου (εργασίες επισκευής). Ο κατασκευαστής δεν αναλαμβάνει καμία ευθύνη για υλικές ζημιές και τραυματισμούς που θα προκληθούν από τη μη τήρηση των αντίστοιχων οδηγιών.

Bu yedek parça listesinde belirtilen yapı parçaları yalnızca, adı geçen yapı serisine mensup DEUTZ motorlarının tamirinde kullanılır (amacı uygun kullanımı). Yedek parçaların kuralınca uygun olarak takılması için detaylı bilgiyi, işletim talimatından (bakım işleri) ve atölye el kitabından (tamir işleri) edinebilirsiniz. İlgili talimatlara riayet edilmediği takdirde, kişilerde oluşacak hasar veya yaralanmalar durumunda Üretici, sorumluluk üstlenmez.

Приведенные в данном перечне запасных частей детали предназначены только для ремонта двигателя Deutz указанных серий (использование по назначению). Правильный монтаж запасных частей подробно описывается в руководствах по эксплуатации (работы по техническому обслуживанию) и ремонту (ремонтные работы). Изготовитель не несет никакой ответственности за ущерб или травмирование персонала вследствие несоблюдения соответствующего руководства.

Części zamienne znajdujące się na niniejszej liście przeznaczone są wyłącznie do napraw silników Deutz oznaczonej serii (zastosowanie zgodne z przeznaczeniem). Fachowy montaż części zamiennych opisany jest obszernie w instrukcji obsługi (prace konserwacyjne) i książce warsztatowej (naprawy). Producent nie ponosi odpowiedzialności za uszkodzenia sprzętu lub obrażenia ludzi, które wynikają z nieprzestrzegania odpowiedniej instrukcji.

Ersatzteilliste
Spare Parts Catalogue
Catalogue de pièces de rechange
Lista de piezas de repuesto
Lista de peças sobressalentes
Listino parti di ricambio
Onderdelenlijst
Reservdelslista
Reservedelsliste
Varaosaluettelo
Reservedelsliste
Κατάλογος ανταλλακτικών
Yedek parça Listesi
Список запасных частей
لائحة قطع الغيار
Lista części zamiennych

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Sehr geehrter Kunde

Die Motoren der Marke DEUTZ sind für ein breites Anwendungsspektrum entwickelt. Dabei wird durch ein umfangreiches Angebot von Varianten sichergestellt, dass die jeweiligen speziellen Anforderungen erfüllt werden.

Ihr Motor ist dem Einbaufall entsprechend ausgerüstet, das heißt nicht alle in dieser Ersatzteilliste dargestellten Bauteile und Komponenten sind an Ihrem Motor angebaut.

Obwohl die Grafiken weitgehend nicht mit allen Details dargestellt sind, können die einzelnen Varianten deutlich unterschieden werden, so dass das für Ihren Motor relevante Ersatzteil leicht herauszufinden ist. Über Positions-, Baugruppen- und Motornummer wird in jedem Fall das richtige Ersatzteil ermittelt.

Bitte beachten Sie bei dieser Ersatzteilbestellung unsere Bestellhinweise (siehe nachfolgende Beispielgrafiken), damit wir Ihnen schnell und zuverlässig die benötigten Ersatzteile in der jeweils dem letzten Änderungsstand entsprechenden Ausführung liefern können.

Für Ihre Rückfragen stehen wir Ihnen gerne beratend zur Verfügung.

Ihre

DEUTZ AG

Bestellangaben

Bei der Bestellung von Original DEUTZ Teilen sind folgende Angaben erforderlich:

- Motor-Nr.
- Ident-Nr.
- Stückzahl

Dokumentationsaufbau

Die Bildtafeln dieser Ersatzteilliste sind nach Motor-Baugruppen sortiert.

Die Ident-Nr. 06/59 besteht aus Baugruppe (z.B. 06) und Position (z.B. 59).

Symbolerklärung

-  Baugruppennummer (z.B. 06)
-  Änderungsziffer (z.B. 000)
-  Anschlussymbol
Tritt immer mindestens paarweise auf (z.B. A-A, B-B, C-C etc.)

Service

Wenden Sie sich bei Betriebsstörungen und Ersatzteilfragen an eine unserer zuständigen Service-Vertretungen. Unser geschultes Fachpersonal sorgt im Schadensfall für eine schnelle und fachgerechte Instandsetzung unter Verwendung von Original DEUTZ Teilen.

Einen Überblick über die DEUTZ Partner in ihrer Nähe, über deren Produkt-Zuständigkeiten und Service-Leistungen können Sie der DEUTZ-Internetseite entnehmen.

<http://www.deutz.com>

Gegenüber Darstellungen und Angaben dieser Ersatzteilliste sind technische Änderungen, die zur Verbesserung der Motoren notwendig werden, vorbehalten. Nachdruck und Vervielfältigung jeglicher Art, auch auszugsweise, bedarf unserer schriftlichen Genehmigung.

Dear Customer

DEUTZ engines are developed to meet the requirements of a wide range of applications. An extensive program of variant options gives them their high flexibility.

Your engine is custom-made, i.e. specifically equipped for your requirement, which means that not all of the components and assemblies contained in this catalogue are fitted to your engine.

The greater part of the illustrations does not depict all details, and yet you will find it easy to differentiate between versions and thus to identify the parts pertaining to your engine model. Fig. Item No., Assembly Group No., Engine Serial No. are the codes that infallibly lead to the right spare part.

When placing your order, please observe our ordering hints (see graphic examples below). This allow speedy and reliable delivery of the required parts that are based on latest engineering standards.

If there are any questions, please do not hesitate to contact us.

Sincerely,

DEUTZ AG

Order information

Please specify the following information when ordering original DEUTZ parts:

- Engine no.
- Ident no.
- Quantity

Document structure

The picture diagrams in this spare list are sorted according to engine assembly groups.

The ident no. 06/59 is made up of the assembly group (e.g. 06) and item number (e.g. 59).

Explanation of symbols

-  Assembly No. (e.g. 06)
-  Revision level (e.g. 000)
-  A connection symbol
Always occurs at least in pairs
(e.g. A-A, B-B, C-C etc.)

Service

In case of operational trouble with your equipment or queries about spare parts please contact your nearest service dealership. Our skilled staff of service experts will trace and remedy any defect quickly, using genuine DEUTZ parts.

An overview of the DEUTZ partners in your area, their product responsibilities and range of services provided can be found on the DEUTZ home page.

<http://www.deutz.com>

This Spare Parts Catalogue is subject to engineering changes necessary for engine advancement. All rights reserved. No part of this publication may be reprinted or reproduced in any form, without our prior permission in writing.

Cher client

Les moteurs de la marque DEUTZ ont été développés pour une gamme étendue d'applications. Il existe un grand choix de variantes répondant aux exigences spéciales demandées dans chaque cas.

Votre moteur est équipé pour le cas d'application envisagé, ce qui signifie que toutes les pièces et composants représentés dans ce catalogue de pièces de rechange ne sont pas montés sur votre moteur.

Bien que les graphiques ne représentent pas tous les détails, les variantes se distinguent nettement les unes des autres, si bien que vous trouverez sans problème la pièce de rechange correspondant à votre moteur. Les numéros de référence, de l'organe et du moteur permettent en tous les cas de retrouver la pièce de rechange que vous cherchez.

Lors de votre commande de pièces de rechange veuillez respecter nos indications de commande, (cf. les tableaux graphiques suivants) afin que nous puissions vous fournir rapidement et sûrement les pièces de rechange demandées dans la version correspondante réactualisée.

Nous restons à votre entière disposition pour toute question complémentaire.

DEUTZ AG

Indications de commande

Lors d'une commande de pièces de rechange d'origine DEUTZ, il est nécessaire de fournir les indications suivantes :

- n° de moteur
- n° d'identification
- nombre

Structure de la documentation

Les tableaux illustrés de cette liste de pièces de rechange sont classés par groupe de moteur.

Le n° d'identification 06/59 est constitué du n° de groupe (p.ex. 06) et du n° de position (p.ex. 59).

Explication des symboles

-  Numéro de groupe constitutif
(p. ex. 06)
-  Indice de modification (p. ex. 000)
-  Symbole d'assemblage
Se présente toujours par paire
(p. ex. A-A, B-B, C-C etc.)

Service

En cas de panne de fonctionnement et pour toute question relative à des pièces de rechange, veuillez vous adresser à notre point de service responsable pour votre secteur. Notre personnel qualifié assure une remise en état rapide et appropriée de votre moteur en n'utilisant que des pièces d'origine DEUTZ.

Vous trouverez un aperçu des partenaires DEUTZ les plus proches avec leurs compétences techniques et les services qu'ils vous offrent, sur le site internet de DEUTZ.

<http://www.deutz.com>

Nous nous réservons le droit de procéder dans cette liste de pièces de rechange à toutes modifications techniques utiles visant à améliorer la qualité des moteurs. Toute réimpression ou reproduction du présent document, même partielle, exige notre autorisation écrite.

Estimado cliente

Los motores de la marca DEUTZ se han desarrollado para una amplia gama de aplicaciones. Una extensa oferta de variantes garantiza que se cumplan las exigencias especiales de cada caso.

Su motor se ha equipado de acuerdo con el caso de montaje. Esto significa que en su motor están montados los componentes mostrados.

Pese a que la mayoría de los gráficos no contiene todos los detalles, se pueden distinguir bien las diferentes variantes de modo que resulta fácil identificar el repuesto correspondiente a su motor. El repuesto correcto para cada caso se determina a través de los números de posición, de grupo constructivo y de motor.

Le rogamos que tenga en cuenta nuestras indicaciones al confeccionar su pedido de repuestos para que le podamos suministrar rápida y eficazmente los repuestos requeridos en el modelo correspondiente al último estado de modificación.

En caso de dudas, estamos a su disposición para asesorarle.

DEUTZ AG

Datos del pedido

Para realizar un pedido de repuestos originales de DEUTZ tendrá que incluir los siguientes datos:

- N.º del motor
- N.º de identificación
- Número

Estructura de la documentación

Las láminas de esta lista de piezas de repuestos están clasificadas según el grupo de motor.

El n.º de identificación 06/59 está compuesto por un n.º de grupo (p. ej. 06) y un n.º de posición (p. ej. 59).

Explicación sobre los símbolos

-  Número del grupo constructivo (p. ej. 06)
-  Cifra de modificación (p. ej. 000)
-  Símbolo de conexión
Aparece siempre en grupos de dos (p. ej. A-A, B-B, C-C).

Servicio

En caso de anomalías en el funcionamiento y cuestiones sobre repuestos, dirijase a uno de nuestros centros responsables del servicio técnico. Nuestro personal especializado y cualificado se ocupará de arreglar eficientemente y con rapidez cualquier desperfecto, utilizando repuestos originales DEUTZ.

En la página de internet de DEUTZ encontrará un resumen de los centros de DEUTZ más cercanos, los productos de los que se ocupa cada centro y la gama de servicios disponibles.

<http://www.deutz.com>

Nos reservamos el derecho a efectuar, frente a las representaciones e indicaciones de esta lista de repuestos, las modificaciones técnicas necesarias para perfeccionar los motores. Para la reimpresión y reproducción en cualquier forma, también en la de extractos, se requiere nuestra autorización por escrito.

Prezado cliente

Os motores da marca DEUTZ foram desenvolvidos para um grande número de aplicações vasto. Assegura-se ao mesmo tempo o cumprimento das exigências específicas correspondentes através da ampla oferta de variantes.

O seu motor encontra-se equipado de acordo com o tipo de montagem, isto é, nele não estão embutidas todas as peças e partes componentes representadas na lista de peças sobressalentes.

Embora os gráficos não se encontrem amplamente representados com todos os pormenores, é possível distinguir claramente cada uma das variantes, de forma a se encontrar facilmente a peça sobressalente de importância para o seu motor. É possível, em todo o caso, verificar a devida peça sobressalente correta.

Quanto ao pedido de peças sobressalentes queira, por favor, observar as nossas instruções para encomendas (veja os gráficos de exemplo que seguem), a fim de podermos fornecer-lhes rápida e seguramente as peças sobressalentes necessárias de acordo com a correspondente versão à da última alteração atualizada.

Estamos à sua inteira disposição para um aconselhamento no caso de quaisquer pedidos de informação que nos dirigir.

A sua

DEUTZ AG

Dados necessários para a encomenda

Para encomendar as peças originais DEUTZ é necessário indicar os seguintes dados:

- Número de série do motor
- Números de identificação
- Quantidade

Esquema da documentação

As figuras representativas das peças sobressalentes estão agrupadas por módulos do motor.

O Número de identificação 06/59 consiste do número do módulo (por ex. 06) e da posição (por ex. 59)

Explicação dos símbolos

 Número dos módulos (p.ex. 06)

 Algarismo variável (p.ex. 000)

 Símbolo de conexão
Introduzir sempre, no mínimo, em pares (p. ex. A-A, B-B, C-C etc.)

Serviço

No caso de avarias operacionais e de possíveis consultas relacionadas com peças e partes sobressalentes, queiram dirigir-se a uma das nossas representações autorizadas de serviço. O nosso pessoal técnico especializado procurará, em caso de uma avaria, proceder a uma reparação rápida e tecnicamente competente, com a aplicação de peças originais DEUTZ.

Consulte a informação na página da Internet DEUTZ (ver em baixo) sobre os parceiros DEUTZ da sua área, as suas competências de produtos e prestações de serviços.

E, mesmo na ausência de um registro de competência de produtos direto, qualquer parceiro DEUTZ estará disponível para dar o seu conselho competente.

<http://www.deutz.com>

Reservamo-nos o direito de proceder a alterações de ordem técnica na representação e nos dados desta lista de peças sobressalentes que se tornem necessárias para o aperfeiçoamento dos motores. Toda e qualquer reimpressão e reprodução, mesmo só em parte, requer a nossa autorização por escrito.

Egregio cliente

I motori DEUTZ sono stati sviluppati per un ampio spettro d'uso. Grazie ad una vasta offerta di varianti viene garantito che verrà fatto fronte alle rispettive esigenze particolari.

Il Suo motore è allestito secondo lo specifico caso di montaggio, vale a dire che non tutti gli elementi ed i componenti illustrati nel Suo listino dei pezzi di ricambio sono integrati nel Suo motore.

Nonostante le immagini non siano illustrate con tutti i dettagli, si possono distinguere chiaramente le singole varianti, così da poter trovare con facilità il pezzo di ricambio adatto al Suo motore. In ogni caso sarà possibile identificare il pezzo di ricambio giusto tramite numero di posizione, di gruppo di assemblaggio e di motore.

Per l'ordinazione di pezzi di ricambio voglia osservare le nostre indicazioni al fine di permetterci di fornirle in modo celere e sicuro i pezzi di ricambio necessari nella relativa versione, conforme all'ultima modifica.

Siamo a Vs. completa disposizione per eventuali chiarimenti.

Sua

DEUTZ AG

Dati di ordinazione

Per l'ordinazione di pezzi di ricambio originali DEUTZ, indicare sempre i seguenti dati:

- N. del motore
- Codice d'identificazione
- Quantità pezzi

Struttura della documentazione

Le tavole di questa lista dei pezzi di ricambio sono suddivise secondo i gruppi costruttivi dei motori in base alle unità dei motori

Il codice d'identificazione 06/59 è costituito dall'unità costruttivo (per es. 06) e dalla posizione (per es. 59)

Legenda

-  Numero dell'unità dell'elemento costruttivo (ad esempio 06)
-  Numero variabile (ad esempio 000)
-  Simbolo di collegamento
compare sempre almeno a coppie
(ad esempio A-A, B-B, C-C, ecc.)

Servizi

In caso di avarie o richieste di ricambi, rivolgersi immediatamente ai nostri Centri di Assistenza autorizzati. Il nostro personale appositamente addestrato è a disposizione in caso di guasto per un intervento rapido, garantendo l'uso di ricambi originali DEUTZ.

Una panoramica dei partner DEUTZ di zona, delle relative competenze e dei servizi di assistenza offerti è illustrata alla pagina Internet.

<http://www.deutz.com>

L'azienda si riserva il diritto di apportare le modifiche necessarie alle illustrazioni e alle indicazioni di questa lista dei pezzi di ricambio con lo scopo di migliorare i propri motori. Per la ristampa e la riproduzione di qualsiasi tipo è necessaria la nostra autorizzazione scritta.

Geachte klant

De motoren van het merk DEUTZ werden ontwikkeld voor een breed toepassings-spectrum. Door middel van een uitgebreid aanbod van varianten wordt er steeds weer voor gezorgd dat er aan de betreffende specifieke eisen wordt voldaan.

Uw motor werd uitgerust in overeenstemming met de specifieke inbouwsituatie. Dat wil zeggen dat uw motor niet al de onderdelen bevat die in deze lijst werden opgenomen.

Hoewel de tekeningen in de meeste gevallen niet alle details bevatten, kunnen de verschillende uitvoeringen duidelijk onderscheiden worden, zodat u het voor uw motor relevante onderdeel gemakkelijk kunt vinden. Met behulp van het positie-, het module- en het motornummer kunt u het juiste onderdeel in ieder geval bepalen.

Houdt u bij het bestellen van onderdelen a.u.b. rekening met onze bestelaanwijzingen (zie onderstaande voorbeeldtekeningen), zodat wij u de benodigde onderdelen snel en in hun juiste uitvoering kunnen leveren.

Voor nadere inlichtingen staan wij geheel tot uw beschikking.

DEUTZ AG

Bestelgegevens

Bij bestelling van originele DEUTZ-onderdelen dienen de volgende gegevens verstrekt te worden:

- Motornummer
- Identificatienummer
- Aantal

Gebruiksaanwijzing voor documentatie

De afbeeldingen in deze onderdelenlijst werden gesorteerd naar motormodule.

Het identificatienummer (bijv. 06/59) bestaat uit het modulenummer (bijv. 06), gevolgd door het positienummer (bijv. 59).

Verklaring van de symbolen

-  Nummer van de module (b.v. 06)
-  Modificatie cijfer (b.v. 000)
-  Het aansluitsymbool verschijnt altijd minstens paarsgewijs (bijv. A-A, B-B, C-C, enz.)

Service

In geval van storingen en met vragen omtrent reserveonderdelen kunt u terecht bij een van onze service-vertegenwoordigers. Ons geschoolde vakpersoneel zorgt in geval van schade of storingen voor een snelle en vakkundige reparatie met originele DEUTZ-onderdelen.

Een overzicht van de DEUTZ-dealers in uw omgeving, van hun productverantwoordelijkheid en hun onderhoudsdiensten vindt u op de internetsite van DEUTZ

<http://www.deutz.com>

Technische wijzigingen ten opzichte van de tekeningen en gegevens in deze onderdelenlijst, die noodzakelijk zijn ter verbetering van de motoren, blijven voorbehouden. Het nadrukken of kopiëren van deze gebruiksaanwijzing of gedeelten ervan, in welke vorm dan ook, is niet toegestaan zonder onze voorafgaande schriftelijke toestemming.

Bäste kund

Deutz motorer har utvecklats för att täcka ett brett användningsområde. Tack vare ett omfattande utbud av varianter säkerställs att alla speciella krav uppfylls.

Din motor är alltid rätt utrustad inför monteringen, vilket innebär att inte alla delar och komponenter som finns i den här reservdelslistan behöver finnas på din motor.

Trots att inte alla detaljer visas på ritningarna, är det enkelt att skilja på de olika varianterna. Därmed är det lätt att hitta den reservdel som passar till just din motor. Den korrekta reservdelen fastställs via positionsnummer, modulnummer och motornummer.

Beakta våra beställningsanvisningar vid beställning av reservdelar (se nedanstående exempel), så att vi snabbt och tillförlitligt kan leverera de nödvändiga reservdelarna i det utförande som motsvarar den senaste ändringsstatusen.

Vi hjälper gärna till om du har några frågor.

Ditt

DEUTZ AG

Beställningsuppgifter

För beställning av DEUTZ original reservdelar krävs följande uppgifter:

- Motornr.
- ID-nr.
- Antal

Dokumentationens uppbyggnad

Illustrationerna i denna reservdelslista är sorterade enligt motorns moduler.

ID-numret 06/59 består av modul (t.ex. 06) och position (t.ex.59).

Symbolförklaring

- Modulnummer (t.ex. 06)
- Förändringsnummer (t.ex. 000)
- Anslutningssymbol visas alltid minst parvis (t.ex. A-A, B-B, C-C, osv)

Service

Vänd dig till någon av våra servicerepresentanter vid driftstörningar och frågor som rör reservdelar. Våra utbildade fackmän reparerar motorn snabbt och korrekt med hjälp av DEUTZ originaldelar.

Här får du en överblick över DEUTZ partner i din närhet och om deras produktansvar och service. Även om det inte finns något direkt produktansvar, så hjälper DEUTZ partner ändå till med kompetent rådgivning.

<http://www.deutz.com>

Vi förbehåller oss att göra tekniska ändringar, nödvändiga för att förbättra motorerna ytterligare, gentemot de bilder och uppgifter som finns i den här reservdelslistan. Varje typ av kopiering och mångfaldigande, även delar av den, kräver vårt skriftliga tillstånd.

Kære kunde

De væskekølede motorer fra firmaet DEUTZ er udviklet til et bredt anvendelsesspektrum. Derved sikres det på grund af det omfattende udbud af varianter, at de individuelle specielle krav kan opfyldes.

Deres motor er udstyret, så den svarer til brugstilfældet; det vil sige, at ikke alle i denne reservedelsliste viste dele og komponenter er monteret på motoren.

Selv om de grafiske afbildninger ikke kan vises med alle detaljer, kan man tydeligt se forskel på de enkelte varianter, så De let kan finde de reservedele, som er relevante til Deres motor. Ved hjælp af positions-, type- og motor-nummeret kan man altid finde frem til den rigtige reservedel.

Første gang De bestiller reservedele, bedes De bemærke vore bestillingshenvisninger, så vi hurtigt og korrekt kan finde frem til de nødvendige reservedele i den udførelse, som svarer til den nyeste ændringstilstand.

Vi står gerne til rådighed, hvis De har spørgsmål.

Deres

DEUTZ AG

Bestillingsangivelser

Ved bestillingen af originale DEUTZ-dele er det nødvendigt med følgende angivelser:

- Motor-nr.
- Ident.-nr.
- Antal

Dokumentationens opbygning

Billederne i denne reservedelsliste er sorteret efter motorkomponenter.

Ident-nr. 06/59 er opbygget af komponent (f.eks. 06) og position (f.eks. 59).

Symbolforklaring

- Delmontagenummer (f.eks. 06)
- Ændringsciffrer (f.eks. 000)
- Tilslutningssymbol
optræder altid mindst parvis
(f.eks. A-A, B-B, C-C osv.)

Service

I tilfælde af driftsforstyrrelser og ved reservedelsspørgsmål kan De henvende Dem til en af vores ansvarlige servicerepræsentanter.

Vores skolede fag-personale sørger i tilfælde af skader for en hurtig og faglig korrekt istandsættelse under anvendelse af originale dele.

De kan få et overblik over de DEUTZ-partnere, der er beliggende i nærheden af Dem, over deres produktkompetencer og serviceydelser på DEUTZ's internetside.

<http://www.deutz.com>

Ret til tekniske ændringer, som bliver nødvendige til forbedring af motorerne, forbeholdes. Eftertryk og mangfoldiggørelse af enhver art, også i uddrag, kun tilladt med vores skriftlige samtykke.

Hyvä asiakas

DEUTZ-moottorit on kehitetty laajaa käyttäjäkuntaa silmälläpitäen. Niinpä tarjolla on laaja valikoima moottorivaihtoehtoja, jotka täyttävät asiakkaiden vaihtelevat moottoritarpeet.

Moottorinne on toimitettu tietyin varustein, eivätkä kaikki tässä varaosaluettelossa esiintyvät osat välttämättä kuulu moottorin varusteisiin.

Vaikka kaaviokuvat eivät sisällä kaikkia yksityiskohtia, eri vaihtoehdot on kuitenkin helppo erottaa toisistaan moottorillenne tärkeiden varaosien tunnistamiseksi. Position, rakenneryhmä ja moottorinumeron avulla pystytään joka tapauksessa toimittamaan oikea varaosa.

Varaasia tilatessa on noudatettava annettuja tilausohjeita, jotta pystymme nopeasti ja varmasti toimittamaan tarvittavat, kyseisen mallin viimeisintä teknistä kehitystä vastaavat varaosat. Annamme mielellään lisätietoja ja vastaamme kysymyksiinne.

DEUTZ AG

Tilaustiedot

Alkuperäisten DEUTZ-varaosien tilauksen yhteydessä on ilmoitettava seuraavat tiedot:

- Moottori numero
- Tunnusnumero
- Kappalemäärä

Dokumentaation rakenne

Tämän varaosaluettelon kuvat on ryhmitelty moottorin rakenneryhmien mukaan.

Tunnusnumero 06/59 koostuu rakenneryhmästä (esim. 06) ja osanumerosta (esim. 59).

Symbolien selitykset

- Rakenneryhmänumero (esim. 06)
- Muutosnumero (esim. 000)
- Liitännäsymbooli
Ilmenee aina vähintään parittain (esim. A-A, B-B, C-C, jne.)

SERVICE

Käyntihäiriöissä ja varaosakysymyksissä voit kääntyä DEUTZ-edustajanne puoleen. Vauriotapauksessa koulutettu henkilökunta huolehtii nopeasta ja asianmukaisesta korjauksesta käyttämällä alkuperäisiä DEUTZ-osia.

DEUTZin internetsivuilta löydät yleiskatsauksen kaikista lähelläsi olevista DEUTZ-edustajista ja heidän tuotteistaan ja palveluistaan (ks. alla). Ja vaikka yksilöllistä tuoteedustusta ei olisikaan mainittu, DEUTZ-edustaja auttaa sinua eteenpäin asiantuntevalla neuvonnalla.

<http://www.deutz.com>

Tämän varaosaluettelon kuvauksien ja tietojen suhteen pidämme oikeuden muutoksiin, jotka ovat tarpeellisia moottorin teknisen kehityksen kannalta. Kaikenlaisen jälkipainosten ja kopioiden tekoon, myös osittaiseen, tarvitaan kirjallinen lupamme.

Kjære kunde

Væskekjølte motorer av merket DEUTZ er utviklet med tanke på mange forskjellige bruksområder. Et bredt spekter av varianter sikrer at mange forskjellige spesielle krav kan oppfylles.

Din motor er utstyrt for det aktuelle bruksområdet. Derfor vil ikke alle deler og komponenter som er oppført på denne reservedelslisten, være montert på din motor.

Selv om bildene ikke alltid viser alle detaljer, kan de enkelte variantene tydelig skilles fra hverandre slik at det er lett å finne frem til de relevante reservedelene til din motor. Ved hjelp av posisjonsnummer, komponentgruppenummer og motornummer kan du i hvert enkelt tilfelle finne frem til riktig reservedel.

Vi ber deg vennligst følge våre anvisninger ved bestilling av reservedeler (se bildeeksempel nedenfor) slik at vi kan levere de reservedelene du har bruk for, raskt og sikkert og ifølge de seneste endringer.

Vi står gjerne til din disposisjon hvis du har ytterligere spørsmål.

Vennlig hilsen

DEUTZ AG

Bestillingsangivelser

Ved bestilling av originale DEUTZ deler er følgende opplysninger nødvendige:

- Motor-nr.
- Ident-nr.
- Antall

Dokumentasjonsoversikt

Illustrasjonene i denne reservedelslisten er sortert etter komponentgruppe.

Ident-nr. 06/59 består av konstruksjonsgruppe (f.eks 06) og posisjon (f.eks 59).

Symbolforklaring

- Delenummer (f.eks. 06)
- Endringsnummer (f.eks. 000)
- Koblingssymbol
Føres alltid opp parvis
(f.eks. A-A, B-B, C-C osv.)

Service

For kontakt med en av våre ansvarlige service-representanter ved driftsforstyrrelser og spørsmål angående reservedeler. Vårt utdannede fagpersonale sørger for rask og fagmessig reparasjon med DEUTZ originaldeler.

En liste over DEUTZ-partnerne i nærheten av deg, samt hvilken produktkompetanse og hvilke serviceytelser de tilbyr, finner du på DEUTZ' nettsider.

<http://www.deutz.com>

Vi forbeholder oss tekniske forandringer i våre beskrivelser og opplysninger i denne instruksjonsboken som er nødvendig for forbedring.

Αξιότιμε πελάτη

Οι κινητήρες DEUTZ έχουν σχεδιαστεί για ένα ευρύ φάσμα εφαρμογών. Κατά την προσπάθειά μας αυτή εξασφαλίστηκε μέσω μίας πολυπληθούς προσφοράς κατασκευαστικών παραλλαγών, ώστε να εκπληρώνονται όλες οι ειδικές απαιτήσεις των πελατών μας.

Ο κινητήρας σας εξοπλίζεται ανάλογα με την κάθε περίπτωση τοποθέτησης, και αυτό σημαίνει ότι τα κατασκευαστικά εξαρτήματα και στοιχεία, τα οποία περιλαμβάνονται σε αυτό τον κατάλογο ανταλλακτικών, δεν είναι εξ ολοκλήρου εφαρμοσμένα στον κινητήρα σας.

Αν και οι γραφικές παραστάσεις δεν είναι διαμορφωμένες με όλες τις λεπτομέρειες, μπορεί εντούτοις να προκύψει διαχωρισμός μεταξύ των μεμονωμένων κατασκευαστικών παραλλαγών κατά σαφή τρόπο, ούτως ώστε να μπορείτε να βρείτε με ευκολία τα ανταλλακτικά εκείνα, τα οποία αφορούν τον κινητήρα σας. Μέσω του αριθμού θέσης, ομάδας εξαρτημάτων και κινητήρα μπορεί να διαπιστωθεί σε κάθε ξεχωριστή περίπτωση το σωστό ανταλλακτικό.

Παρακαλούμε προσέξτε για την παραγγελία ανταλλακτικών τις οδηγίες μας, που έχουν σχέση με τις παραγγελίες αυτές, (βλέπε τα ακόλουθα υποδείγματα), με σκοπό να σας προσφέρουμε μία σύντομη και εμπιστευτική παράδοση των ανταλλακτικών που

χρειάζεστε, στον κατασκευαστικό τύπο, ο οποίος ανταποκρίνεται στην εκάστοτε έκδοση αναθεώρησης.

Βρισκόμαστε πάντοτε στη διάθεση σας, αν έχετε ερωτήματα, προσφέροντάς σας και τις αναγκαίες συμβουλευτικές υπηρεσίες.

Η εταιρεία σας

DEUTZ AG

Στοιχεία παραγγελίας

Κατά την παραγγελία των γνήσιων ανταλλακτικών DEUTZ χρειάζονται τα ακόλουθα στοιχεία:

- Αρ. κινητήρα
- Αρ. αναγνώρισης
- Αρ. τεμαχίων

Διάρθρωση περιγραφής

Οι πίνακες με εικόνες αυτού του καταλόγου ανταλλακτικών είναι ταξινομημένοι σύμφωνα με τα συγκροτήματα κινητήρων.

Ο αρ. αναγνώρισης 06/59 αποτελείται από συγκρότημα (π.χ 06) και θέση (π.χ 59).

Επεξηγήσεις συμβόλων

-06- Αριθμός κατασκευαστικής ομάδας (π.χ 06)

000 Ψηφίο μετατροπής (π.χ 000)

A Σύμβολο συνδέσεων – εμφανίζεται πάντοτε τουλάχιστο σε ζεύγη (π.χ A-A, B-B, C-C κ.λ.π)

ΣΕΡΒΙΣ

Για βλάβες λειτουργίας και ερωτήσεις σχετικά με ανταλλακτικά μέρη απευθυνθείτε σε έναν αρμόδιο αντιπρόσωπό μας για το σέρβις. Το εκπαιδευμένο μας τεχνικό προσωπικό θα μεριμνήσει σε περίπτωση βλάβης για τη γρήγορη και σωστή επιδιόρθωση, χρησιμοποιώντας γνήσια ανταλλακτικά μέρη. Μία συνοπτική αναφορά για τους συνεργάτες της DEUTZ στην περιοχή σας, για τα προϊόντα που είναι αρμόδιοι και τις υπηρεσίες σέρβις αναφέρεται στην ιστοσελίδα της DEUTZ <http://www.deutz.com>

Διατηρούμε το δικαίωμα, να προβαίνουμε σε τεχνικές αλλαγές επί των απεικονίσεων, και ενδείξεων αυτού του καταλόγου ανταλλακτικών, εφόσον οι αλλαγές αυτές αποβλέπουν σε βελτίωση των κινητήρων. Η ανατύπωση και η αντιγραφή κάθε είδους, έστω και κατά μέρος, του καταλόγου ανταλλακτικών επιτρέπονται μόνο μετά από έγγραφη έγκρισή μας.

Sayın müşterimiz

DEUTZ motorları, geniş bir kullanım alanı için geliştirilmiştir. Bunun yanın sıra geniş varyasyon teklifleri ile çeşitli özel gereksinimlerin yerine getirilmesi sağlanmaktadır.

Sahip olduğunuz motor, bağlı olduğu kullanım amacı ile donatılmış olup, yedek parça listesinde gösterilmiş olan tüm eleman ve parçalar motorunuzda mevcut değildir.

Gösterilmiş olan grafikler tüm ayrıntıları içermemesine rağmen, motorunuz için önemli olan yedek parça kolayca tespit edilebilir. Pozisyon, yapı grubu ve motor numarası üzerinden her halukârda, motorunuz ile ilgili doğru yedek parça tespit edilebilir.

Bu yedek parça siparişinde, ihtiyacınız olan yedek parçayı en kısa zamanda, güvenilir ve son değişiklik tipinde teslim edebilmemiz için sipariş bilgilerini (bakınız sonraki örnek grafiklere) dikkate alınız.

Sormak istediğiniz sorular olduğunda bize her zaman başvurabilirsiniz.

DEUTZ AG

Sipariş bilgileri

Orijinal DEUTZ yedek parça siparişlerinde aşağıdaki bilgilerin belirtilmesi gereklidir:

- Motor-No.

- Kod No.

- Adet

Dokümantasyon yapısı

Yedek parça listesindeki şekiller ve çizimler motor gruplarına göre ayrılmıştır.

Kod No. 06/59, yapı grubundan (örn. 06) ve pozisyonundan (örn. 59) oluşmaktadır.

Sembol açıklamaları

-06- Yapı grubu numarası (örneğin 06)

000 Değişim rakamı (örneğin 000)



Bağlantı sembolü
Daima en az çiftli olarak yer alır
(Örneğin A-A, B-B, C-C, vs.)

SERVİS

Arıza durumlarında ve yedek parça konularında bilgi edinmek için yetkili servislerimize başvurunuz. Eğitimli kalifiye personelimiz, orijinal DEUTZ parçaları kullanarak tamir çalışmalarını yerine getireceklerdir.

DEUTZ'un en yakınınızdaki temsilcileri, onların ürün yetkileri ve servis hizmetleri hakkında genel bilgileri DEUTZ'un Internet sayfasından öğrenebilirsiniz

<http://www.deutz.com>

Yedek parça listesinde gösterilen şekillerde ve teknik bilgilerinde, motorların geliştirilmesi için gerekli olan değişiklik yapma hakkı saklıdır. Firmamızın yazılı izni olmaksızın, kısmen de olsa her türlü çoğaltmakve kopyalamak yasaktır.

Уважаемый заказчик!

Двигатели марки DEUTZ предназначены для широкого круга применения. При этом богатый выбор предлагаемых вариантов обеспечивает выполнение самых разнообразных требований заказчика.

Ваш двигатель оборудован в соответствии с его конкретным назначением, поэтому на нем установлены не все узлы и детали, описанные в настоящем перечне запасных частей.

Несмотря на то, что на большинстве схем показаны не все подробности, на них четко указаны различия отдельных вариантов, чтобы можно было легко найти запасные части, необходимые для конкретного двигателя. Нужную деталь всегда можно определить по номеру позиции, узла и двигателя.

При заказе запасных частей соблюдайте наши указания (см. приведенные далее примеры заказов), чтобы мы могли быстро и надежно доставить вам необходимые детали выполненные с учетом всех внесенных в конструкцию изменений.

Мы всегда готовы ответить на все ваши вопросы.

С уважением, компания

DEUTZ AG

Данные для заказа

Для заказа фирменных запасных частей DEUTZ необходимы следующие данные:

- номер двигателя
- идентификационный номер
- количество

Структура документации

Таблицы со схемами в этом перечне запасных частей упорядочены по узлам двигателя.

Идентификационный номер 06/59 состоит из номера узла (например 06) и позиции (например 59).

Условные обозначения

-  Номер узла (например 06)
-  Код изменения (например 000)
-  Обозначение соединения всегда используется как минимум попарно (например, A-A, B-B, C-C и т. д.)

СЕРВИС

По вопросам устранения неисправностей и приобретения запасных частей обращайтесь в наши сервисные представительства. В случае выхода двигателя из строя наш обученный персонал позаботится о быстром и квалифицированном ремонте с использованием фирменных запасных частей DEUTZ.

Общие сведения о партнерах фирмы DEUTZ в вашем регионе, предлагаемых ими изделиях и сервисном обслуживании вы можете найти на веб-сайте фирмы DEUTZ.

<http://www.deutz.com>

Приведенные в этом перечне запасных частей иллюстрации и данные могут отличаться от реального оборудования из-за технических усовершенствований двигателей. Полная или частичная перепечатка и размножение в любой форме возможны только с письменного разрешения изготовителя.

الخدمة

في حالات الأعطال أو للاستفسار عن قطع الغيار الرجاء الاتصال بوكلائنا المسؤولين عن الخدمة. إن موظفينا المتخصصين والمدربين يؤمنون في حالات الأعطال حلولاً خبيرة وسريعة ويستعملون قطع دويتس الأصلية. إذا أردتم معرفة عنوان وكيل دويتس القريب منكم وما هو مسؤول عنه من منتجات وما يمكنه تقديمه من خدمات، الرجاء مراجعة العنوان الإلكتروني التالي : <http://www.deutz.com>

التعليمات الخاصة بالطلبات

عند طلب قطع دويتس الأصلية يجب إعطاء المعلومات التالية
- رقم المحرك
- رقم القطعة
- عدد القطع

ترتيب الوثيقة
صور القطع في لائحة قطع الغيار هذه مرتبة حسب فئة المحرك.

يشير رقم القطعة 06/59 مثلاً إلى الفئة (06) وإلى الموضوع (59)

شرح الرموز

رقم مجموعة قطع الغيار (06 مثلاً)
رقم التغيير (000 مثلاً)
رمز التوصيل يكون دائماً مزدوجاً
(مثلاً أ - أ ، ب - ب ، ج - ج ، إلخ...)

أيها الزبون الكريم

جرى تطوير محركات دويتس لتلبي الحاجة في الكثير من وجهات الاستعمال. وروعي عن طريق تشكيلة متنوعة واسعة النطاق، ضمان تلبية المتطلبات الخاصة لكل قطاع.

محرك مجهز بشكل مناسب للتركيب، ولكن لا يعني ذلك أن القطع والمكونات المدرجة في لائحة قطع الغيار هذه مركبة كلها في المحرك.

وعلى الرغم من أن الرسوم البيانية لا تتطابق كلياً مع جميع التفاصيل، يسهل التفريق بين جميع فئات المحركات، بحيث يمكنك بلا صعوبة إيجاد القطعة اللازمة لمحرك. ويوجد في كل حالة تعليمات دقيقة عن كل قطعة غيار وأرقام موضعها والمجموعة التي تنتمي إليها والمحرك الخاص بها.

عند إعداد طلبية قطع الغيار، الرجاء التقيد بالتعليمات الخاصة بالطلبات (أنظر إلى المثال في البيان التالي) وذلك لتمكيننا من تسليم سريع وموثوق به للقطع المطلوبة والمنتجة بحسب أحدث المعايير التقنية.

نحن تحت تصرفك عن طيب خاطر إذا أردت أي استشارة أو استفسار. مع تحيات شركة دويتس ش.م.

تحتفظ شركة دويتس بحق اللجوء إلى تغييرات تقنية تختلف عما ورد في لائحة قطع الغيار هذه، ولكنها ضرورية لتحسين المحركات. يحظر، ولو لمقاطع، الطبع والتصوير والنسخ مهما كان نوعه بدون موافقة خطية مسبقة من الشركة.

Szanowny kliencie

Chłodzone cieczą silniki marki DEUTZ zostały opracowane dla szerokiego zakresu zastosowania. Bogata oferta różnych wariantów zapewnia możliwość spełnienia wymagań specjalnych w poszczególnych przypadkach.

Państwa silnik wyposażony jest odpowiednio do danego zastosowania, oznacza to, że nie wszystkie części i komponenty z niniejszej listy części zamiennych zostały zamontowane w Państwa silniku.

Mimo, że załączone rysunki nie zawierają wielu szczegółów, poszczególne warianty pozwalają się wyraźnie rozróżnić i znalezienie istotnych części zamiennych dla Państwa silnika nie sprawi trudności. Poszukiwana część zamienna może być w każdym przypadku bezbłędnie znaleziona na podstawie numeru pozycji, numeru podzespołu i numeru silnika.

Przy zamawianiu części zamiennych prosimy przestrzegać naszych wskazówek do zamówienia (patrz objaśnienia symboli). Zapewni nam to możliwość szybkiego i niezawodnego dostarczenia potrzebnych części zamiennych z każdorazowym uwzględnieniem ostatnio wprowadzonych zmian.

Na zapytania Państwa zawsze z przyjemnością udzielimy odpowiedzi.

Z poważaniem

DEUTZ AG

Dane zamówieniowe

Przy zamawianiu oryginalnych części zamiennych marki DEUTZ należy podać następujące dane:

- Numer silnika
- Numer identyfikacyjny
- Ilość

Układ dokumentacji

Tabele zawierające rysunki części zamiennych są uszeregowane według podzespołów silnika.

Numer identyfikacyjny 06/59 składa się z podzespołu (np. 06) i z pozycji (np. 59).

Objaśnienia symboli

-  Numer podzespołu (np. 06)
-  Cyfra zmiany (np. 000)
-  Symbol połączenia
Występuje zwykle co najmniej parami (np. A-A, B-B, C-C itd.)

Serwis

W przypadkach zakłóceń eksploatacyjnych oraz w sprawach części zamiennych prosimy zwrócić się do jednego z naszych przedstawicielstw serwisowych. W przypadku usterek nasi przeszkoleni specjaliści zapewnią Państwu szybką i fachową naprawę z użyciem oryginalnych części zamiennych marki DEUTZ.

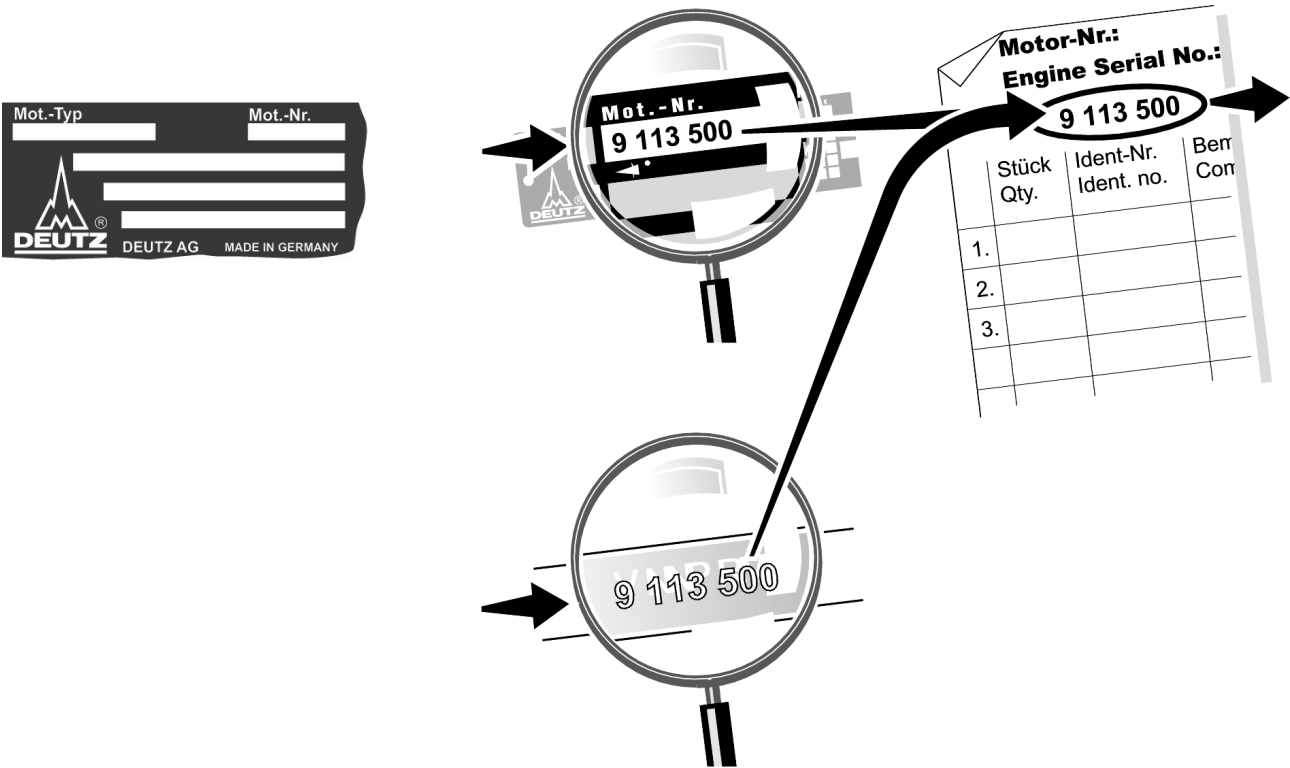
Zestawienie obejmujące partnerów handlowych Deutz w Państwa pobliżu, ich zakres odpowiedzialności za produkt i wykonywane czynności serwisowe znajdują się na stronie internetowej DEUTZ.

<http://www.deutz.com>

Zastrzega się prawo do modyfikacji technicznej rysunków i danych zawartych w liście części zamiennych, mających na celu usprawnienie silników. Przedruk i powielanie dokumentacji w jakikolwiek sposób, także w postaci wyciągów, wymaga naszej pisemnej zgody.

Service

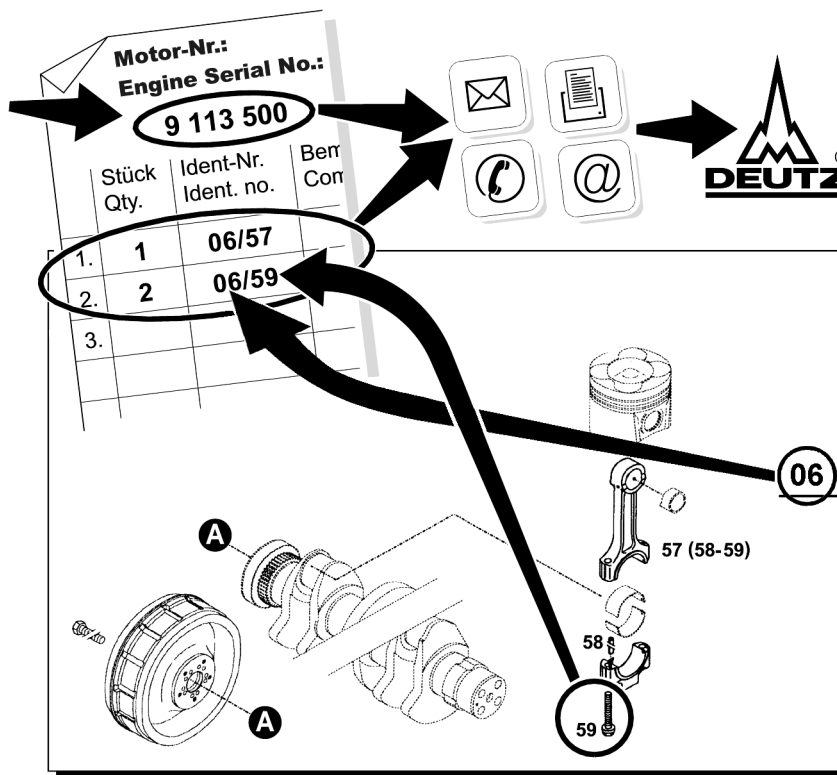
Beispiel/Example

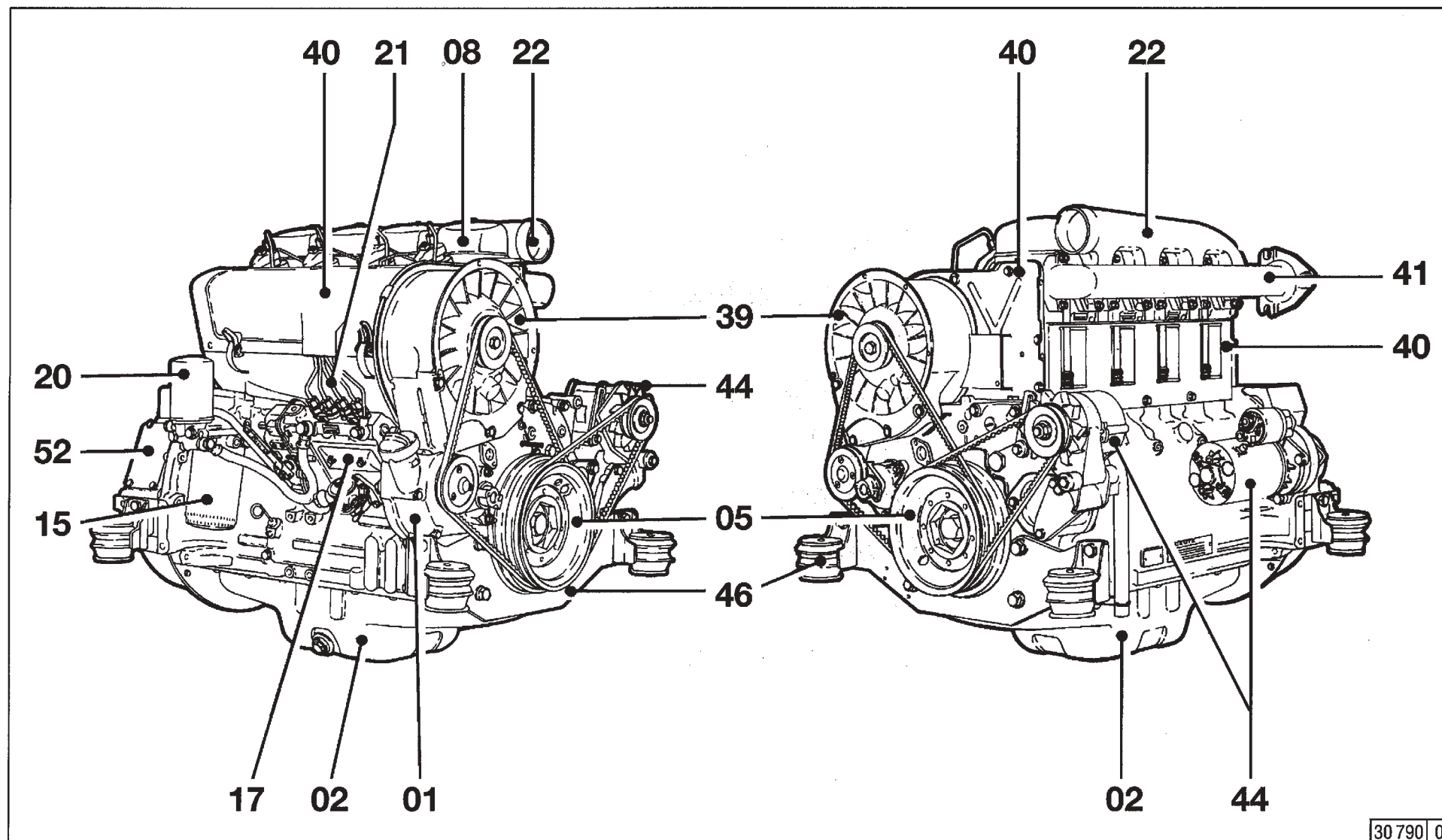


Beispiel/Example

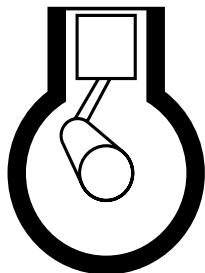
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Motor-Nr.:	de
Engine Serial No.:	en
Numéro du moteur:	fr
N.º de motor:	es
Número do motor:	pt
Numero del motore:	it
Motornummer:	nl
Motornummer:	sv
Motornummer:	da
Moottorinnumero:	fi
Motornummer:	no
Αριθμός κινητήρα:	el
Motor numarası:	tr
Номер двигателя:	ru
رقم المحرك	ar
Numer silnika:	pl

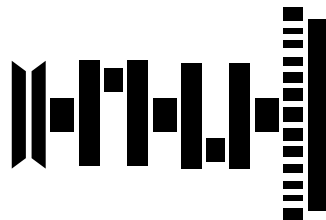




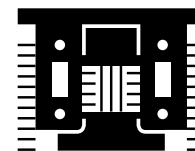
01



05



08



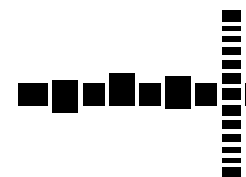
02



06



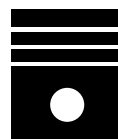
10

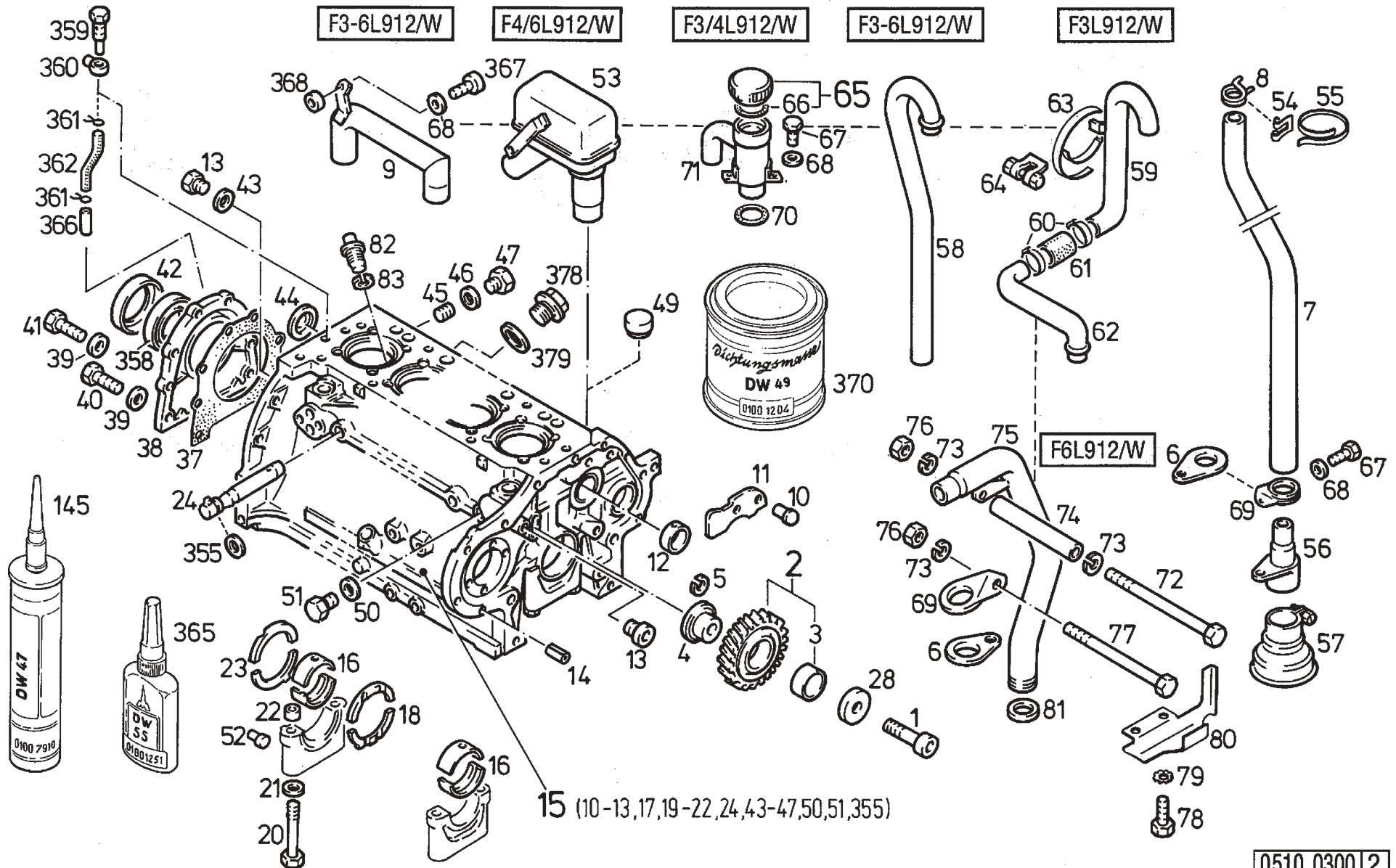


04



07





Nr. 16

Normal
Номинальный размер 70,00 mm Φ (2.7559 in.)
عادي

Nr. 16/1

Untermaßstufen 69,75 mm Φ (2.7459 in.)

Nr. 16/2

Undersizes 69,50 mm Φ (2.7362 in.)

Nr. 16/3

Cote réparation 69,25 mm Φ (2.7263 in.)

Nr. 16/4

Misura minorata 69,00 mm Φ (2.7165 in.)

Nr. 16/5

Medida de desgaste 68,75 mm Φ (2.7066 in.)

Nr. 16/6

Underdimensioner 68,50 mm Φ (2.6968 in.)

Ondermaten 68,50 mm Φ (2.6968 in.)

Ремонтные размеры

أقل من المقاييس العادية

für Lagerzapfen
for bearing journal
pour tourillon
perno del cuscinetto di banco
para muñón de cigüeñal
para munhão do virabrequim
för ramlagertappar
voor Lagertap
для шеек коленчатого вала
لتيللة المحاور

Nr. 18, 23

Normal
Номинальный размер 3,00 mm (0.1181 in.)
عادي

Nr. 18/1, 23/1

Übermaßstufen

Nr. 18/2, 23/2

Oversizes 3,25 mm (0.1279 in.)

Nr. 18/3, 23/3

Cote réparation 3,50 mm (0.1378 in.)

Nr. 18/4, 23/4

Misura maggiorata 3,75 mm (0.1476 in.)

Medida de desgaste 4,00 mm (0.1575 in.)

Medida de desgaste 4,00 mm (0.1575 in.)

Överdimensioner 4,00 mm (0.1575 in.)

Overmaten 4,00 mm (0.1575 in.)

Ремонтные размеры

أكبر من المقاييس العادية

dick
thick
épais
spessore
espesor
grossura
tjock
dik
толщина
سميك

Genaue Schleifmaße in mm und inch siehe Werkstatthandbuch.

The exact grinding dimensions in mm and inch can be taken from the Workshop Manual.

Pour les cotes de rectification exactes en mm et en pouce, voir Manuel d'Atelier.

Per le misure esatte di rettifica in mm vedasi manuale per il meccanico di officina.

Las medidas de rectificación, exactas, en mm y en inch, pueden verse en el Manual de Taller.

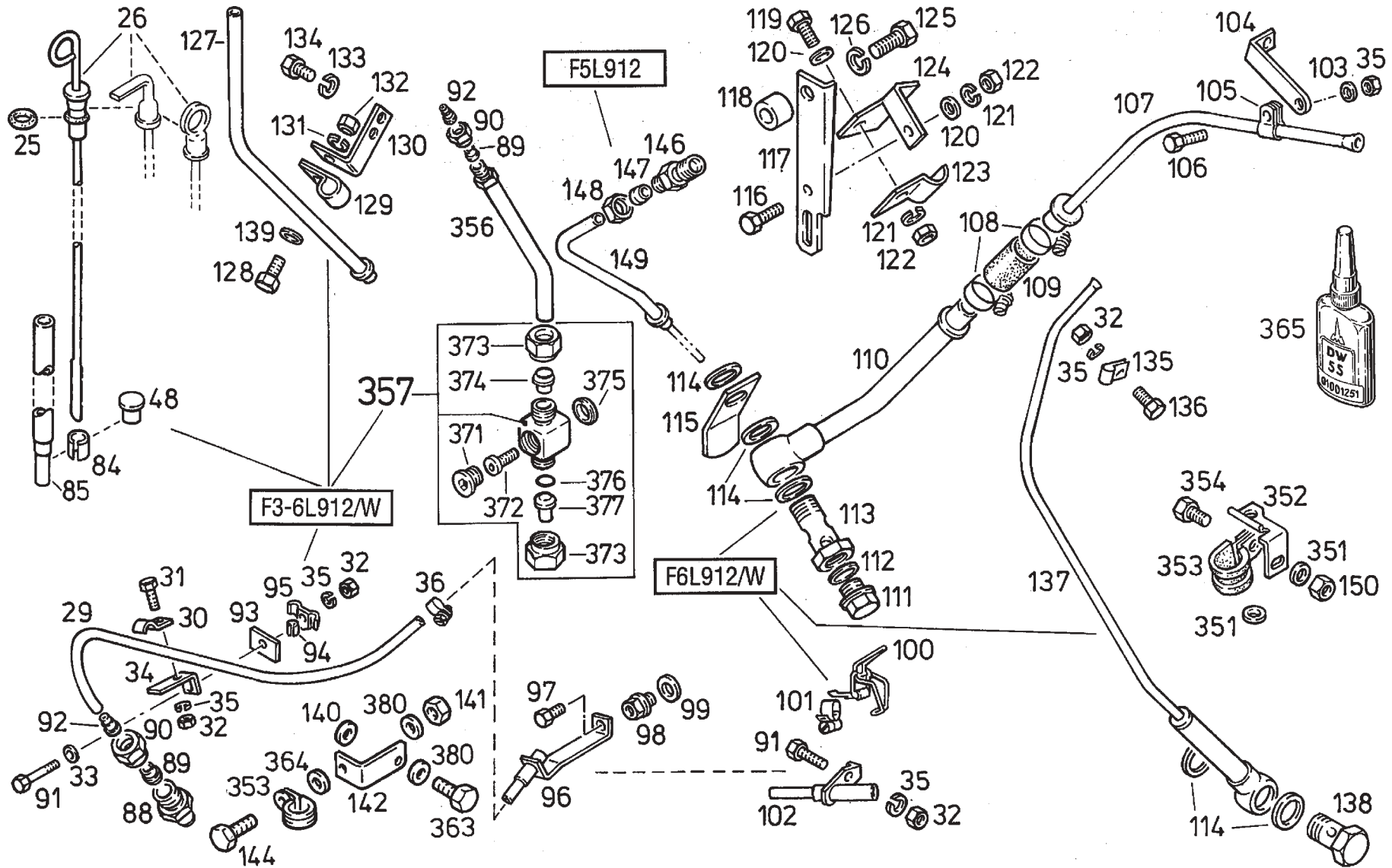
A medidas de retificação, exatas, em mm e em inch podem verse no Manual de Oficina.

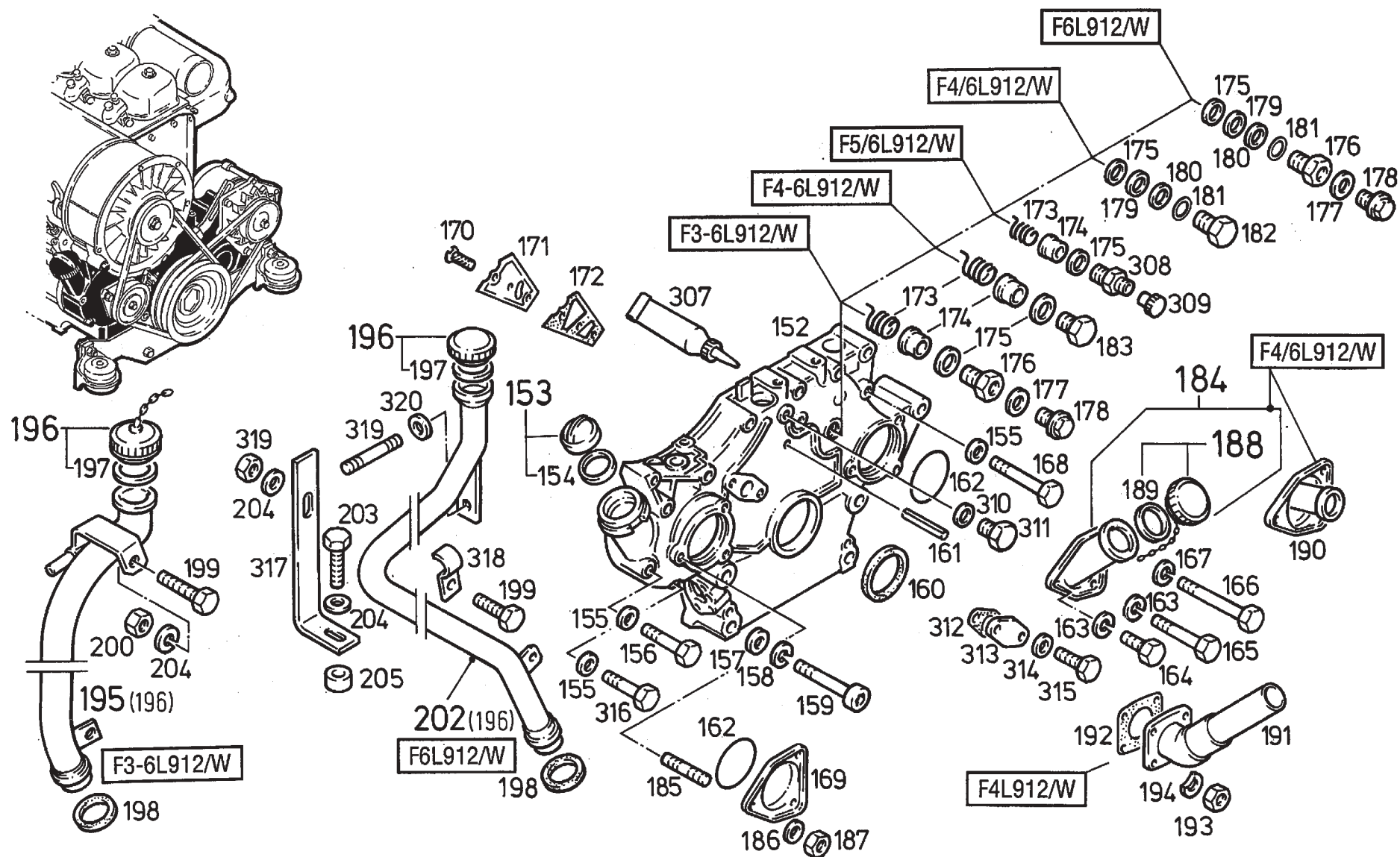
Exakta slipmått i mm och tum-återfinns i verkstadshandboken.

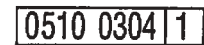
Voor Zuivere slijpmaten in mm en inches zie werkplaats handboek.

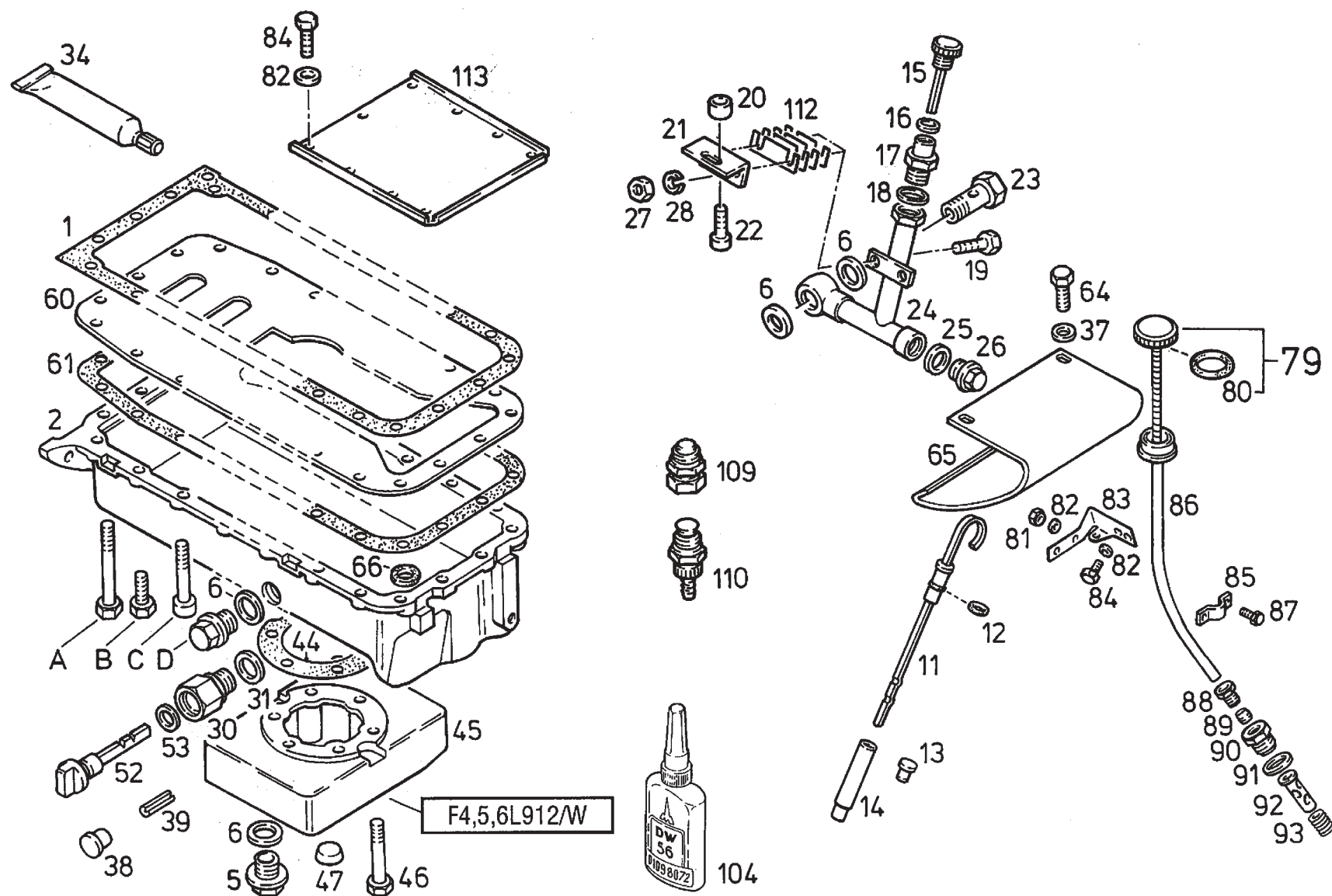
Точные размеры для шлифования в мм и дюймах см. в руководстве по ремонту.

المقياس النهائي للتجليخ بالمم أو بالبوصة ، أنظر كتاب الورشة .

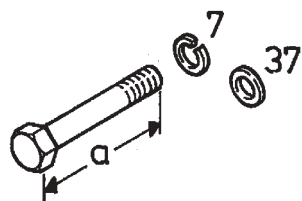




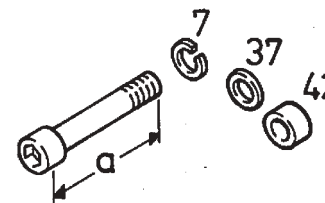




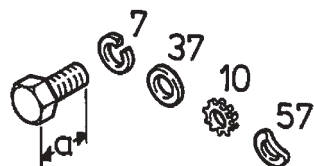
	$\phi \times a$
A	36 = M8 × 40
	29 = M8 × 45
	78 = M8 × 50
	74 = M8 × 70
	43 = M8 × 90
	58 = M8 × 100
	3 = M8 × 110
	35 = M8 × 130
	77 = M8 × 140
	72 = M8 × 180
	67 = M8 × 200
	111 = M8 × 80



C	40 = M8 × 16
	62 = M8 × 20
	41 = M8 × 25
	63 = M8 × 30
	59 = M8 × 35
	75 = M8 × 50

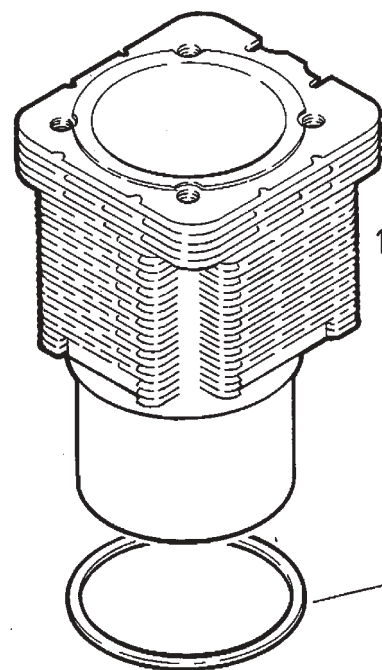
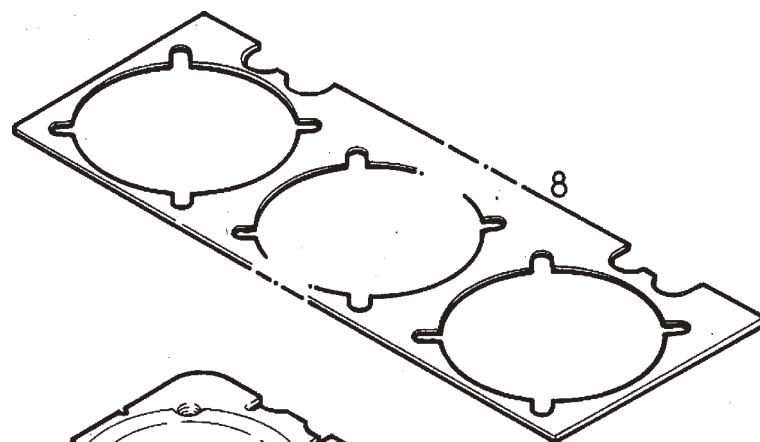


B	4 = M8 × 25
	73 = M8 × 28
	22 = M8 × 30
	51 = M8 × 35
	48 = M8 × 45

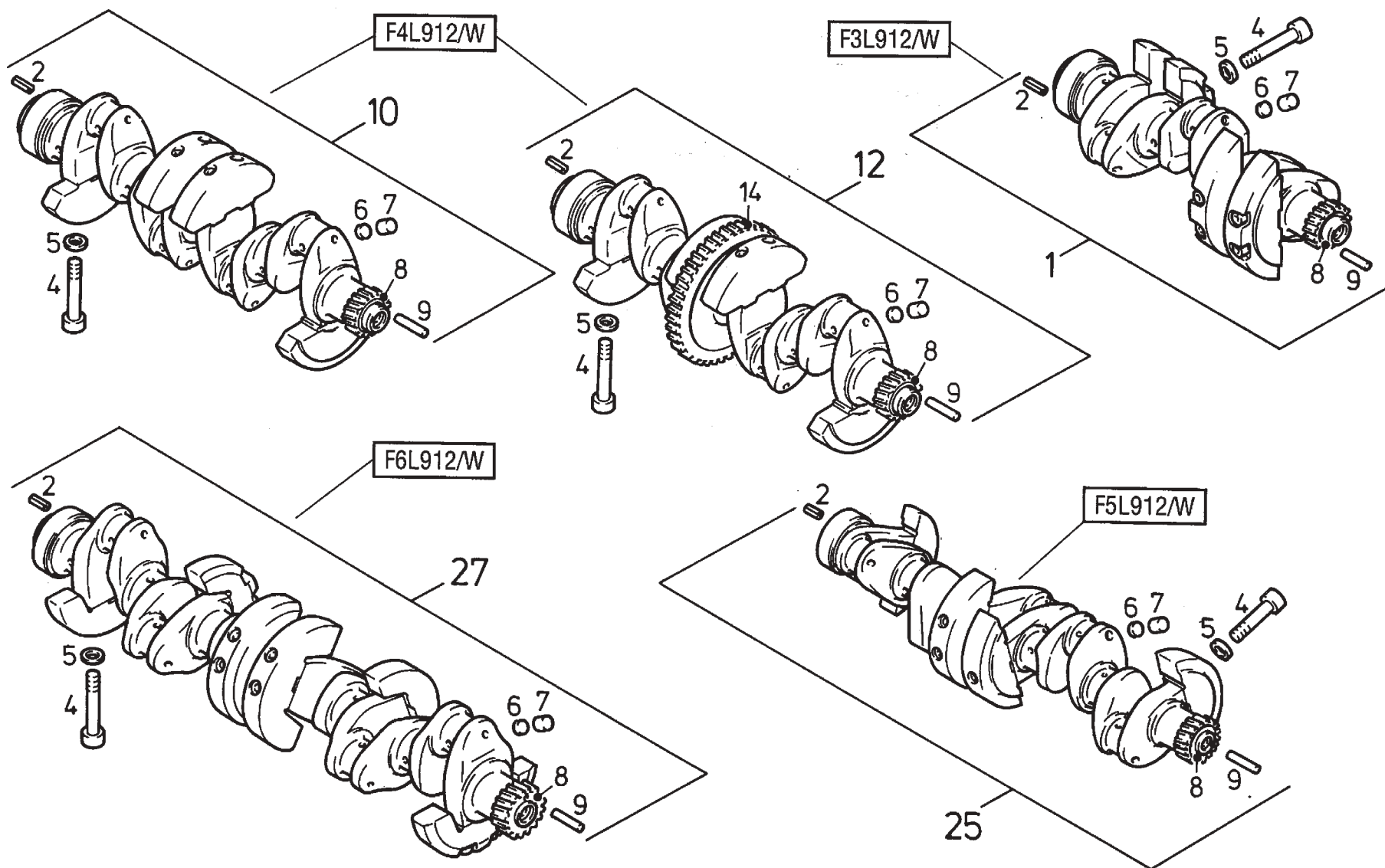


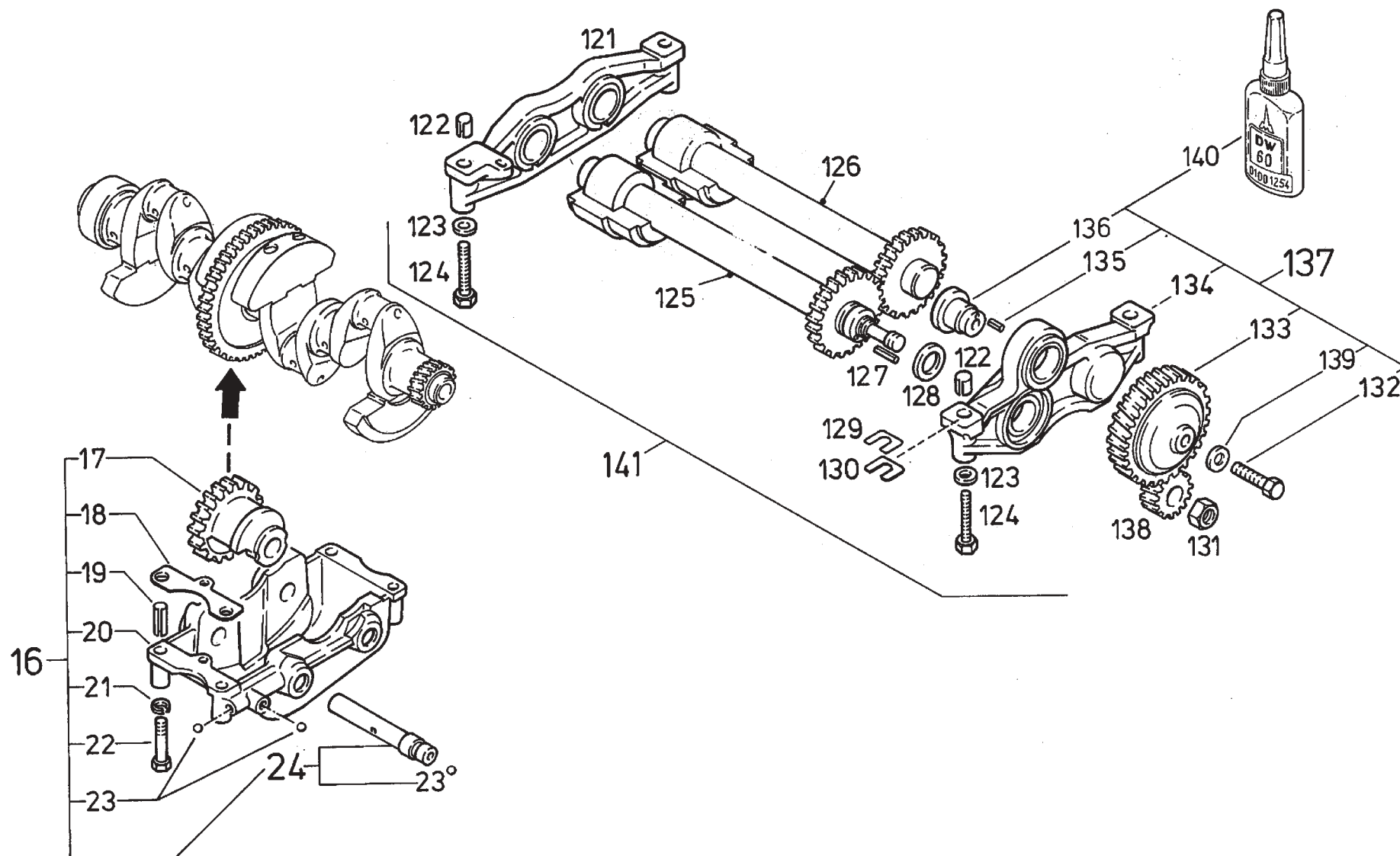
D	54 = M16 × 1,5
	49 = M18 × 1,5
	8 = M22 × 1,5
	5 = M30 × 1,5
	76 = M22 × 1,5
	105 = M42 × 2
	107 = M48 × 2
	55 = A16 × 20
	50 = A18 × 22
	9 = A22 × 27
	6 = A30 × 36
	106 = A42 × 49
	108 = A48 × 55

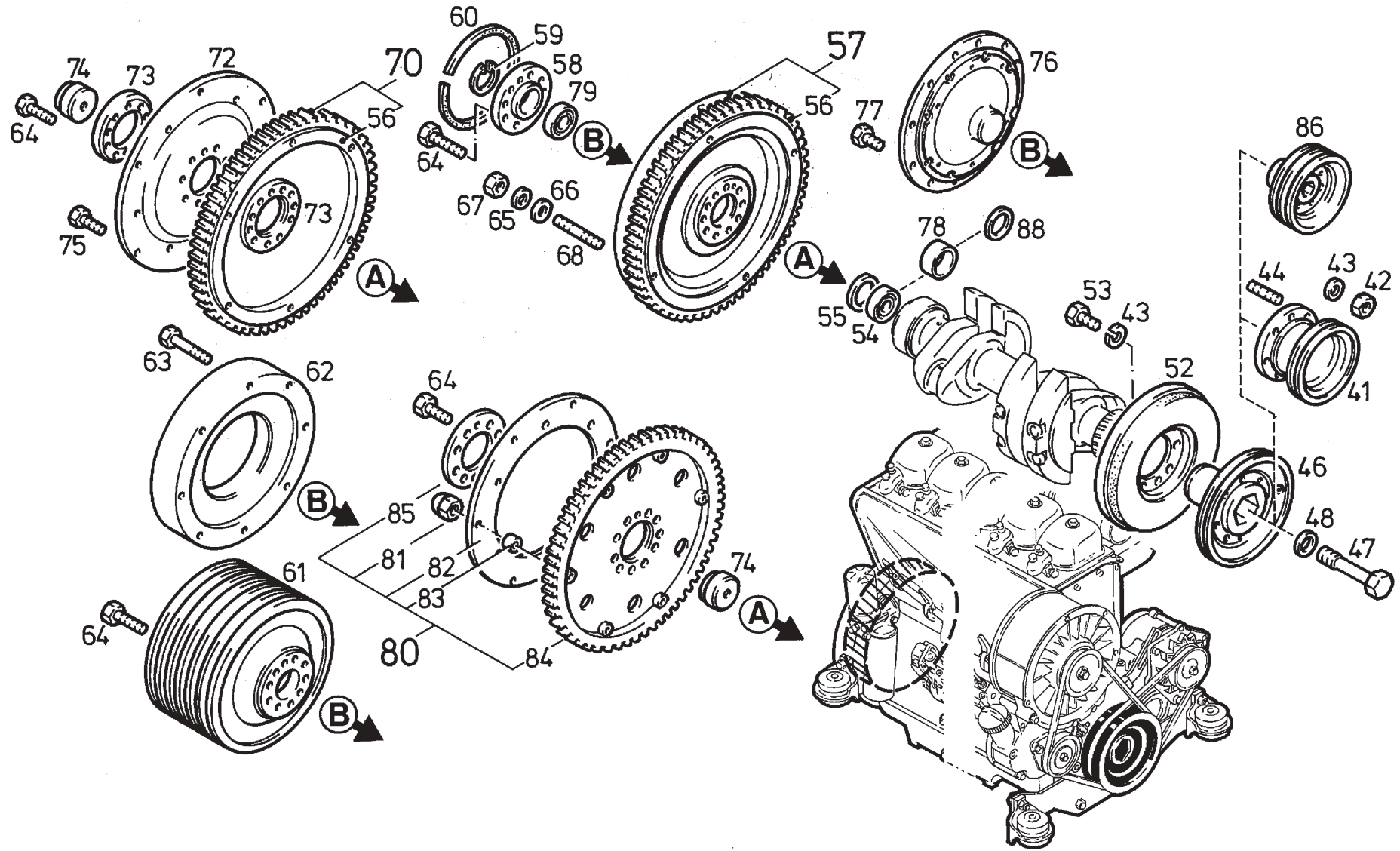


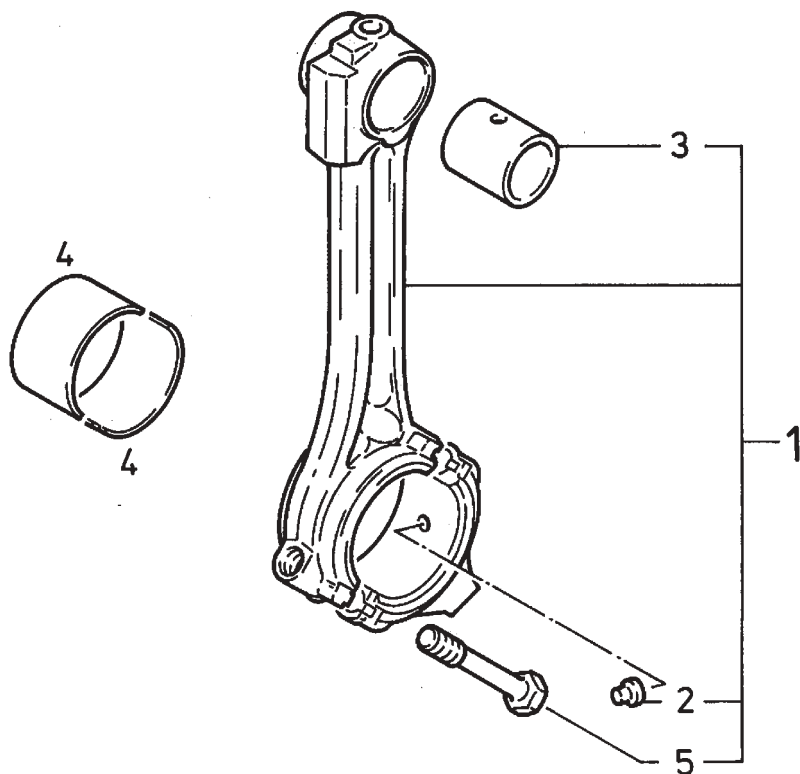


5 (0,2mm)
3 (0,5mm)
6 (0,8mm)
7 (1,0mm)
9 (0,3mm)









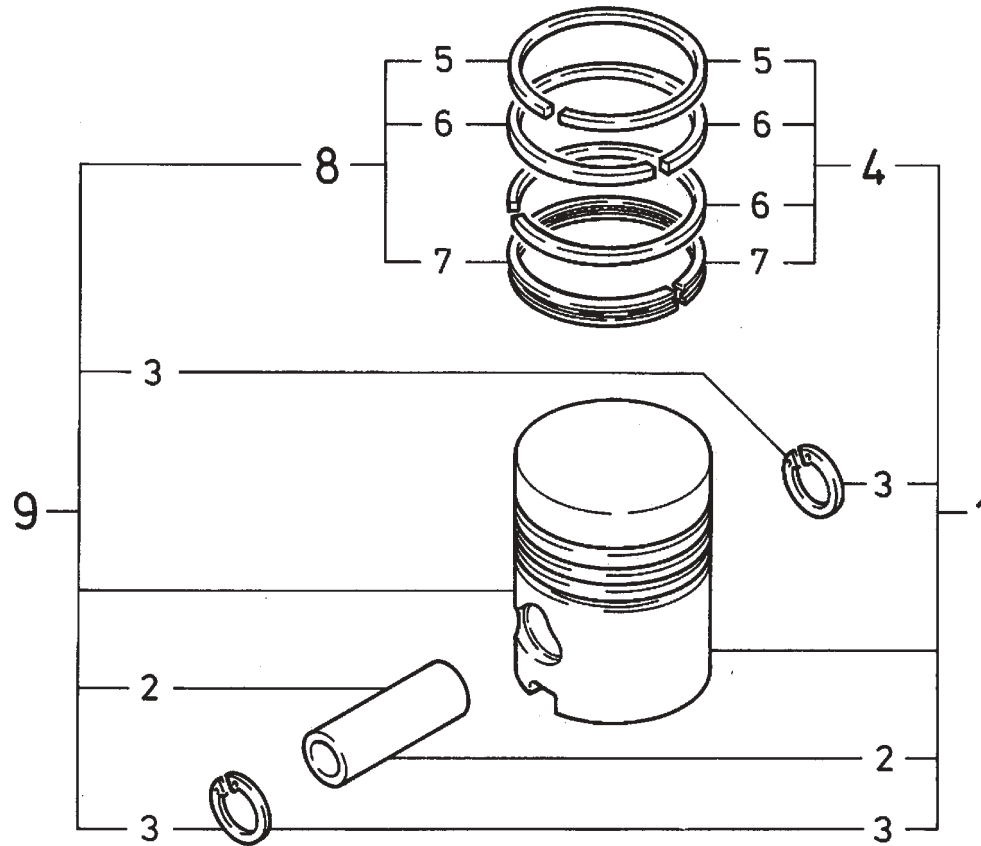
Normal
Номинальный размер
عادي

Nr. 4 ϕ 60,00 (2.3622 in.)

Untermaßstufen
Undersizes
Cote réparation
Misura minorata
Medida de desgaste
Medida de desgaste
Underdimensioner
Ondermaten
Ремонтные размеры

Nr. 4 / 1 ϕ 59,75 (2.3523 in.)
Nr. 4 / 2 ϕ 59,50 (2.3425 in.)
Nr. 4 / 3 ϕ 59,25 (2.3327 in.)
Nr. 4 / 4 ϕ 59,00 (2.3228 in.)
Nr. 4 / 5 ϕ 58,75 (2.3130 in.)
Nr. 4 / 6 ϕ 58,50 (2.3031 in.)

أقل من المقاس
ييس العاديّة



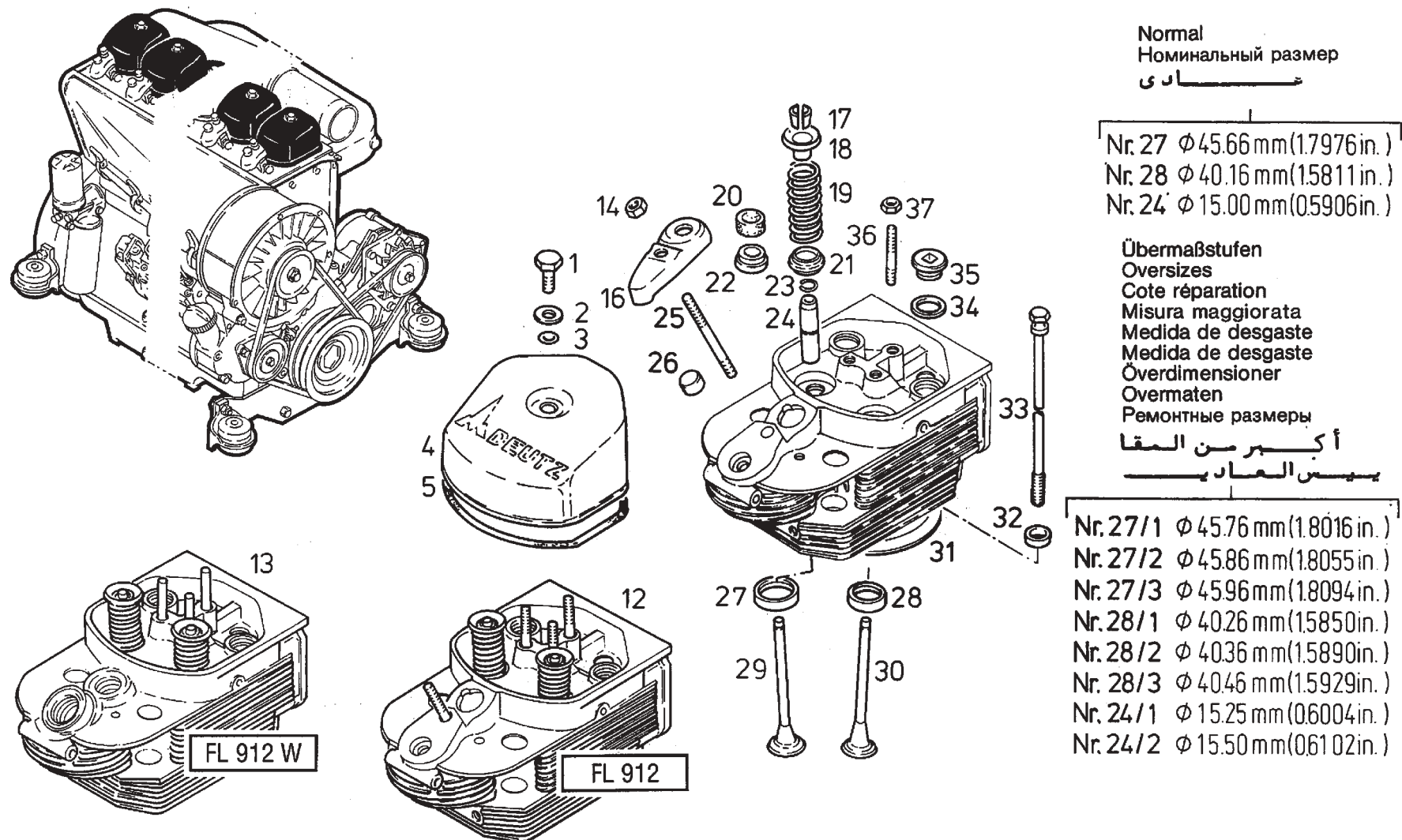
Normal
Номинальный размер
عادي

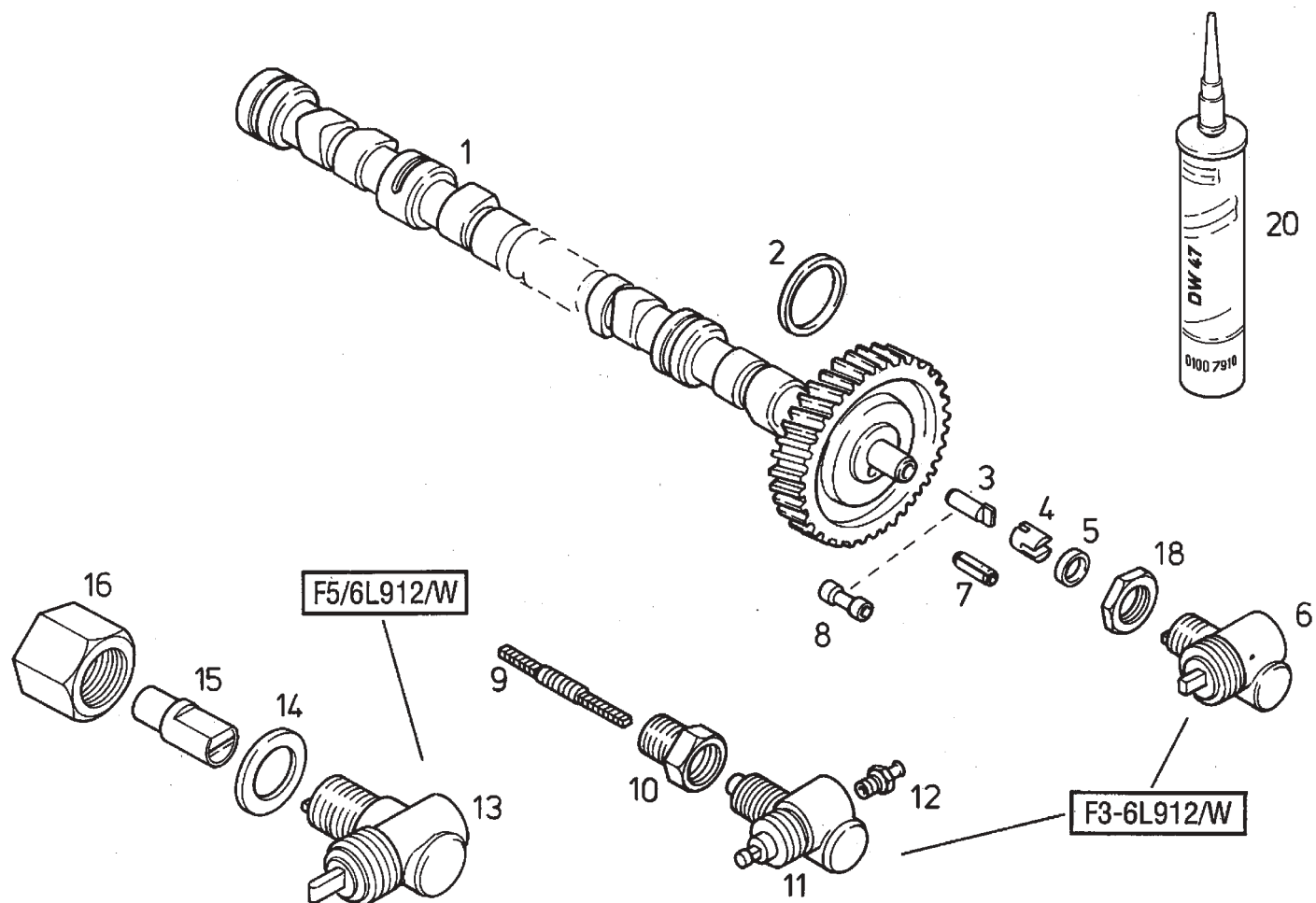
Nr. 1	Ø 100mm (3.9730in.)
Nr. 9	Ø 100mm (3.9730in.)
Nr. 5	Ø 100×91,4mm (3.9730×3.5984in.)
Nr. 6	Ø 100×91,4mm (3.9730×3.5984in.)
Nr. 7	Ø 100×90,9mm (3.9730×3.5784in.)

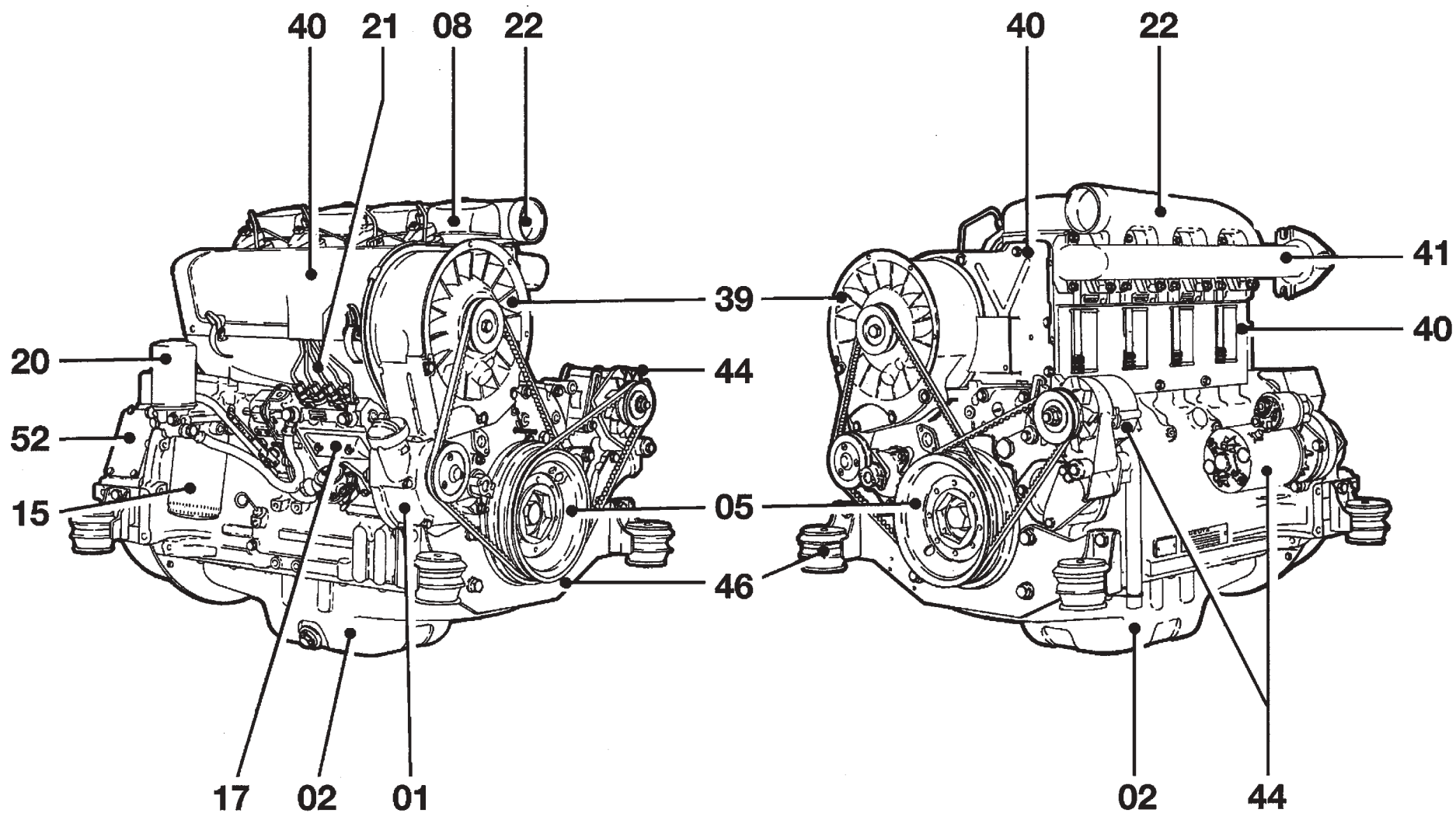
Nr. 1/1	Ø 100,5mm (3.9567in.)
Nr. 9/1	Ø 100,5mm (3.9567in.)
Nr. 5/1	Ø 100,5×91,9mm (3.9567×3.6181in.)
Nr. 6/1	Ø 100,5×91,9mm (3.9567×3.6181in.)
Nr. 7/1	Ø 100,5×91,4mm (3.9567×3.5984in.)

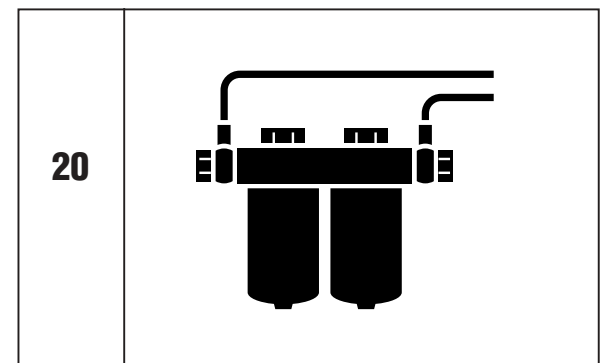
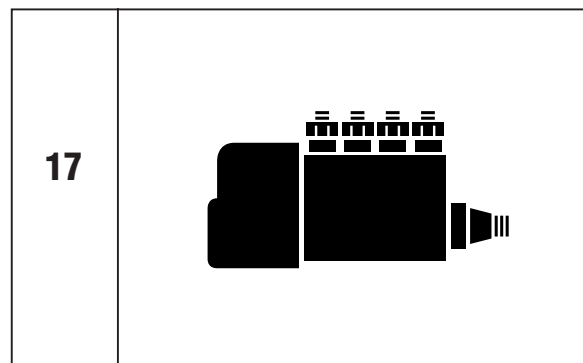
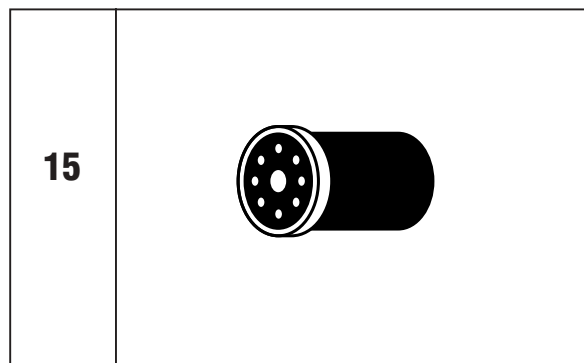
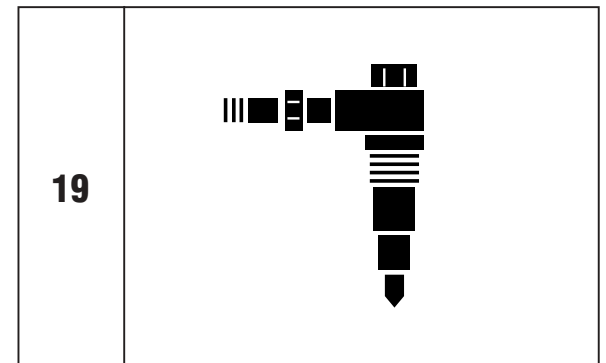
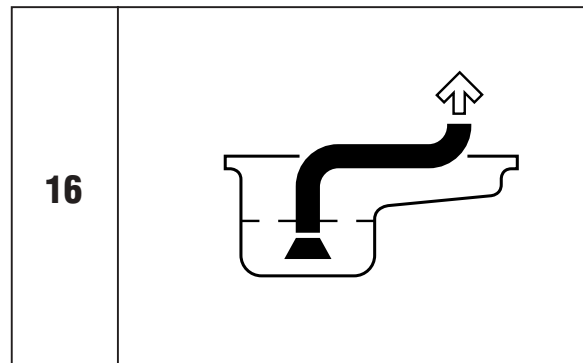
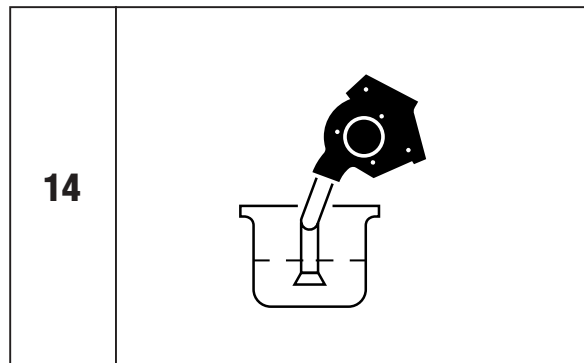
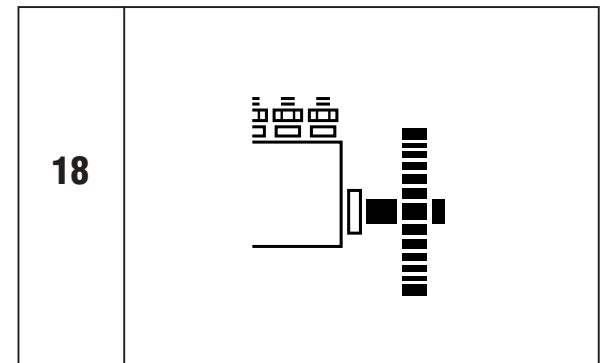
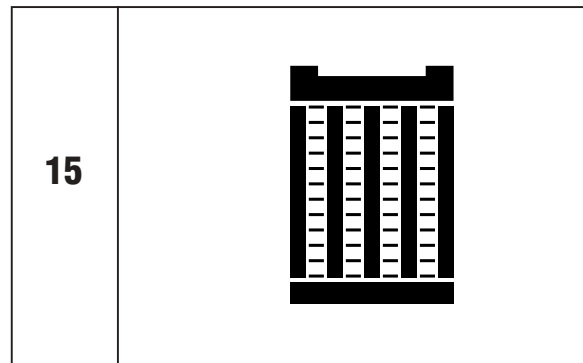
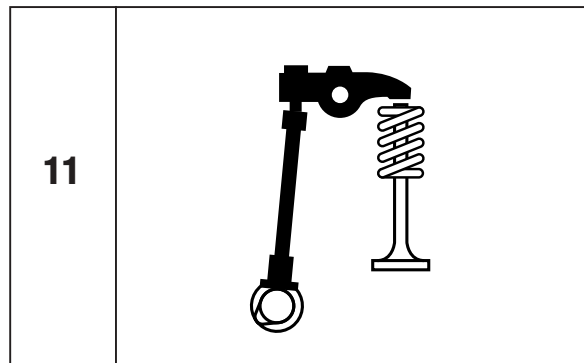
Übermaßstufen
Oversizes
Cote réparation
Misura maggiorata
Medida de desgaste
Medida de desgaste
Överdimensioner
Overmaten
Ремонтные размеры

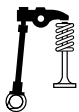
أكبر من المقاييس العادية



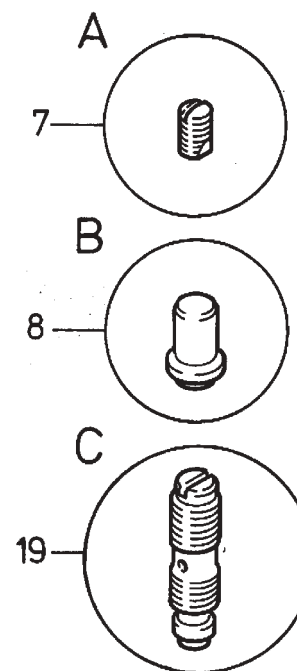
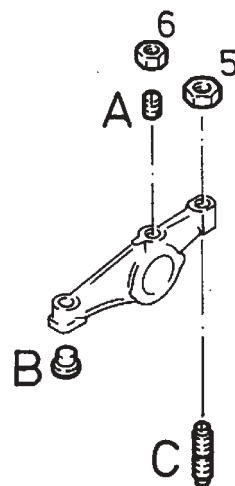
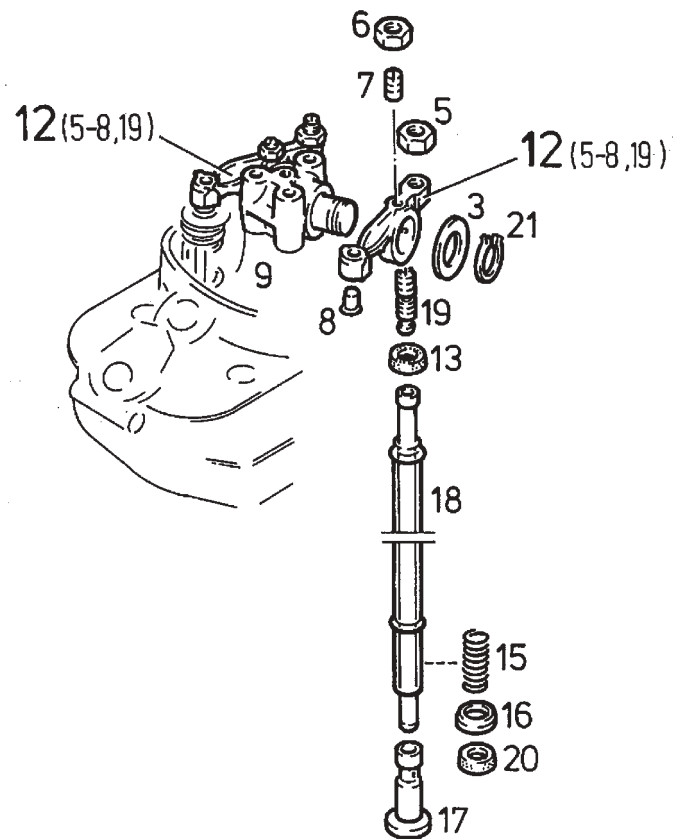


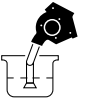






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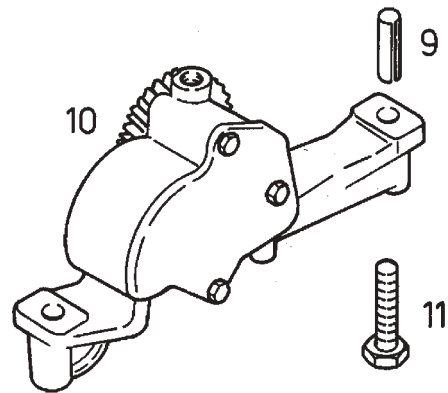




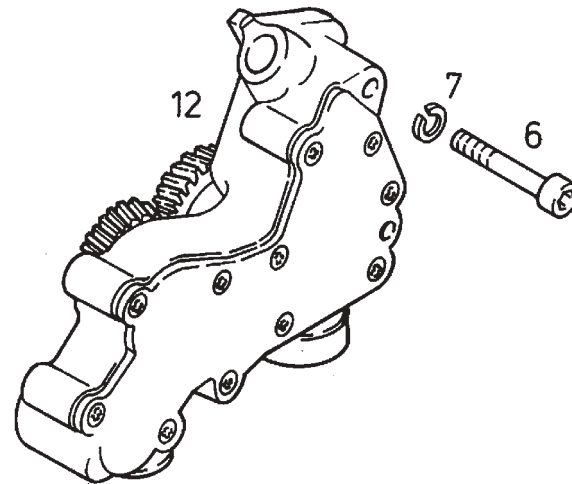
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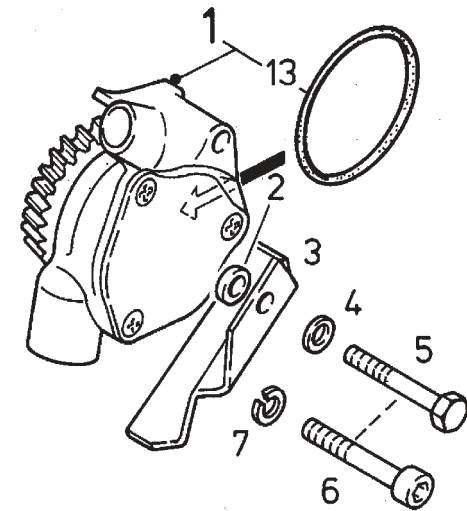
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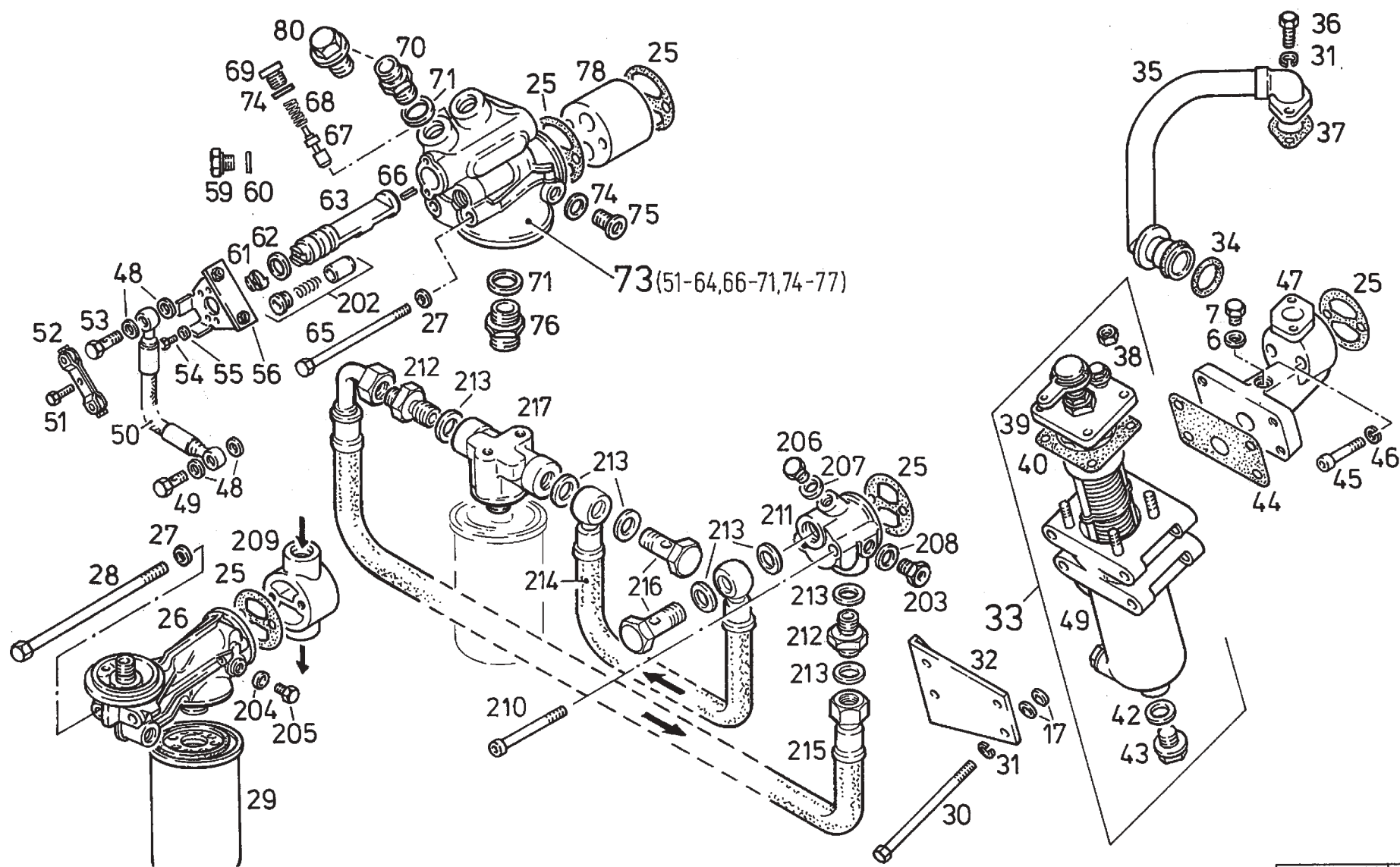
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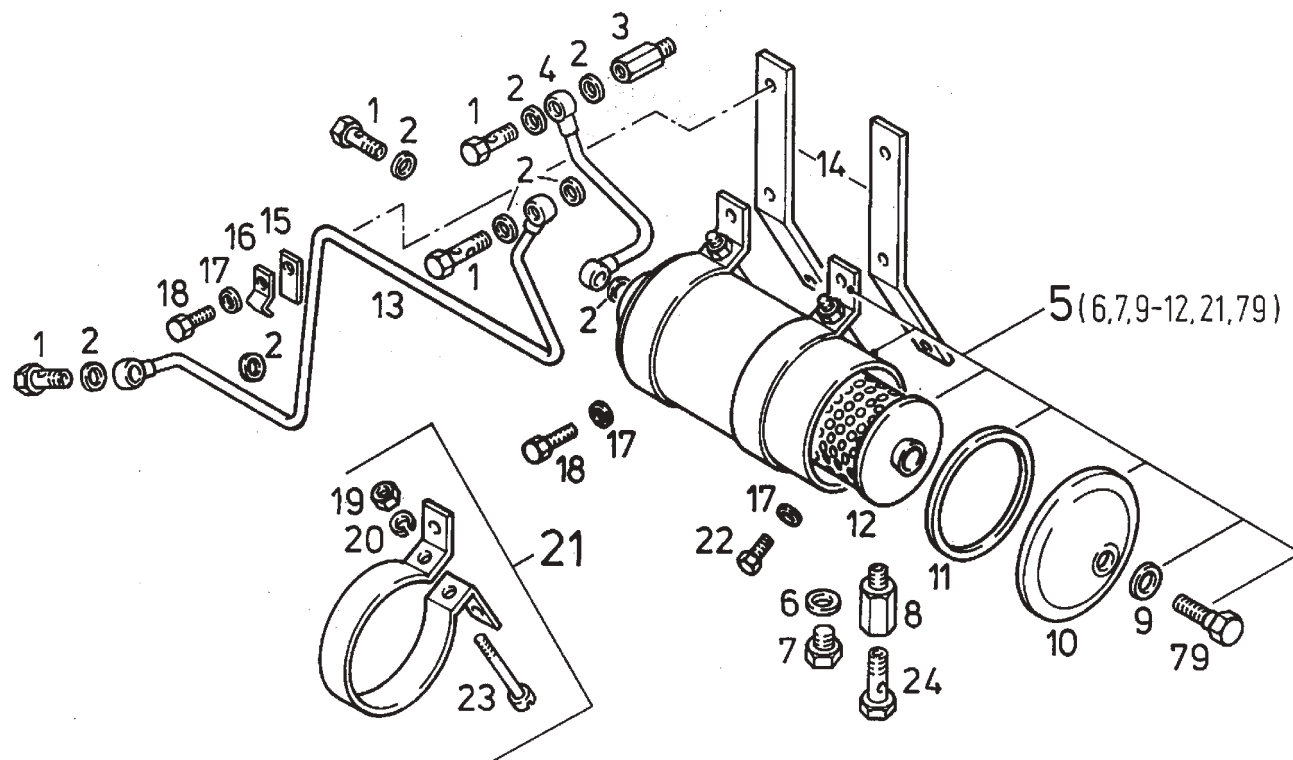
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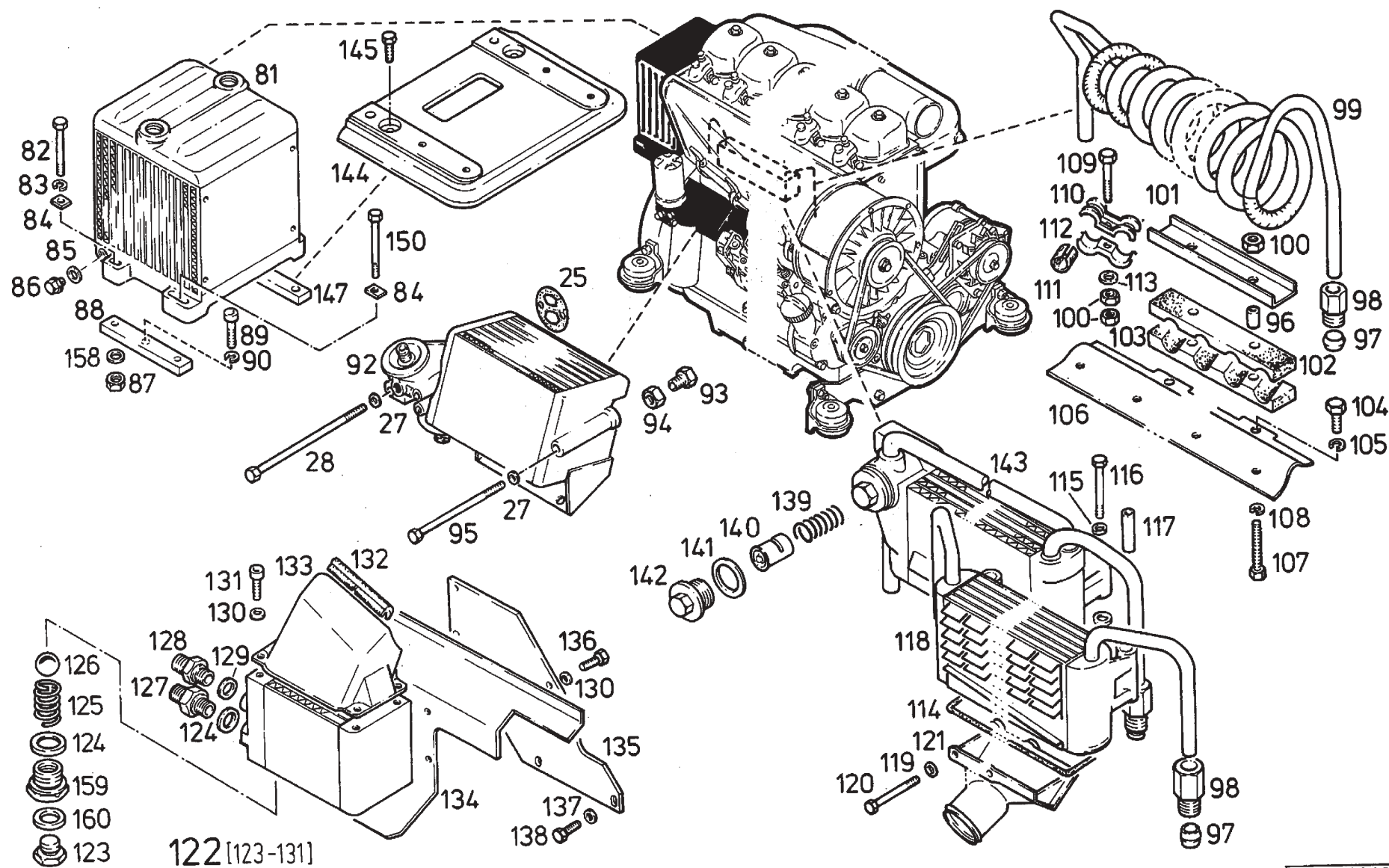


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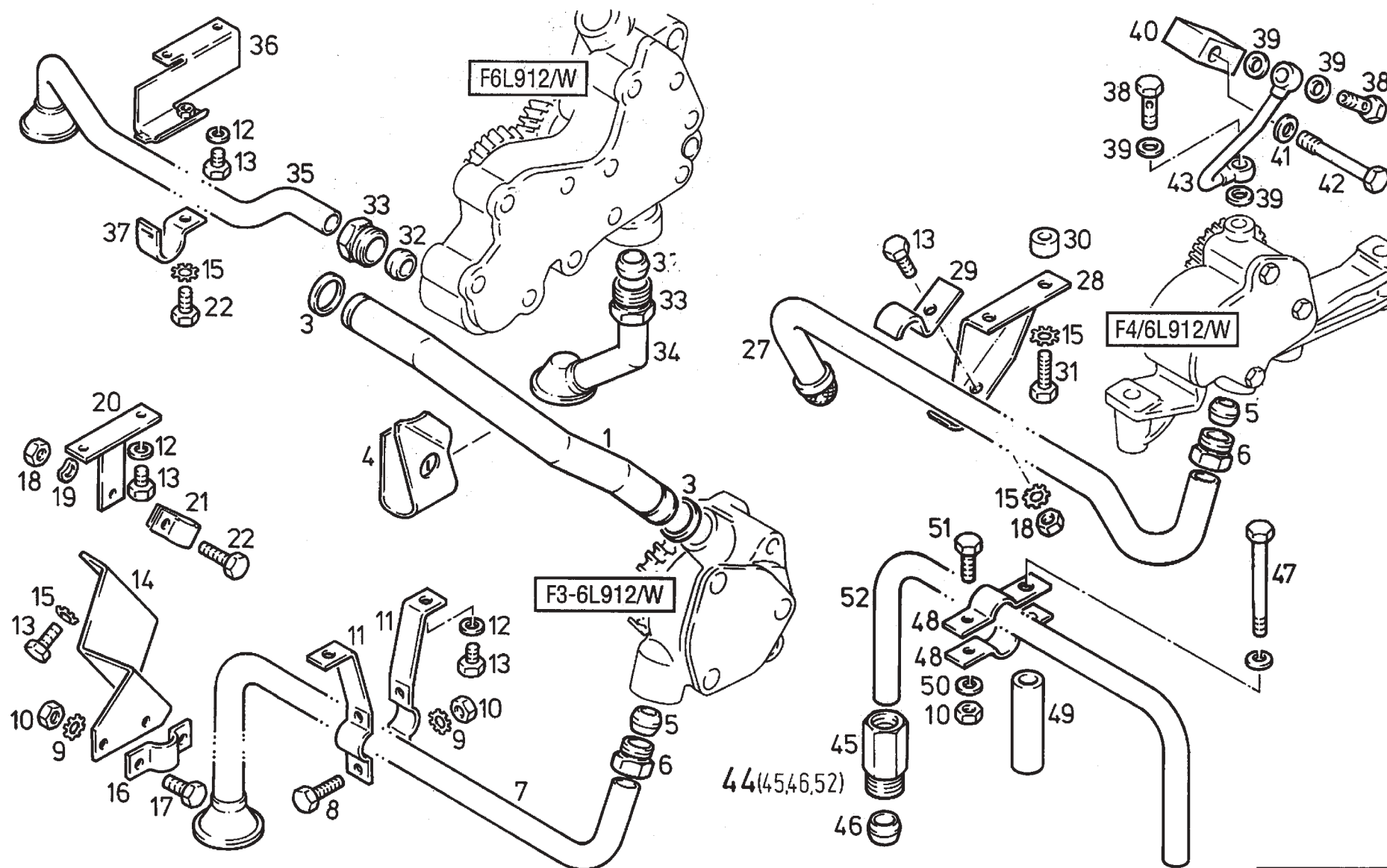
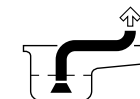




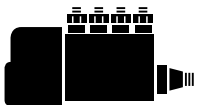
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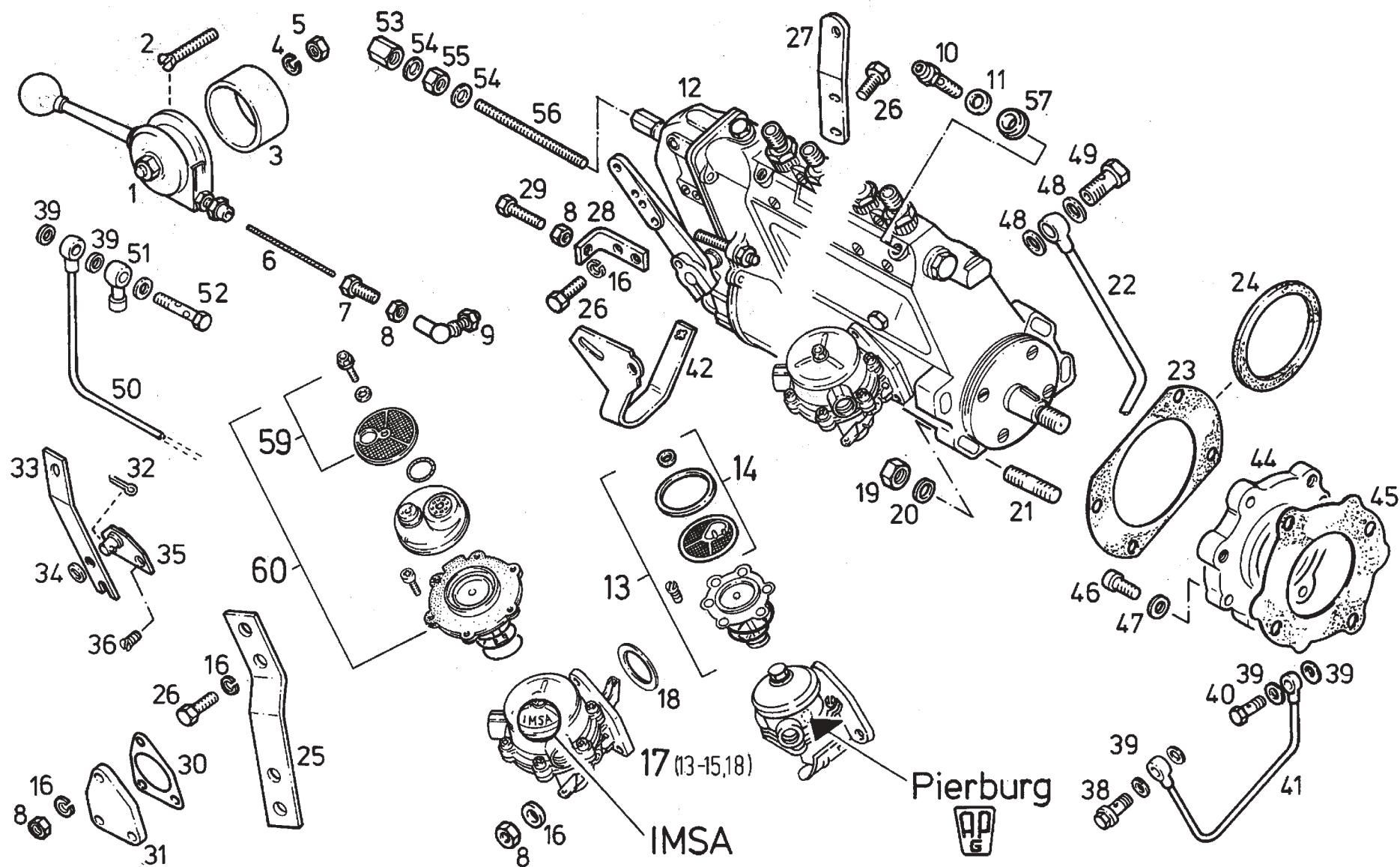
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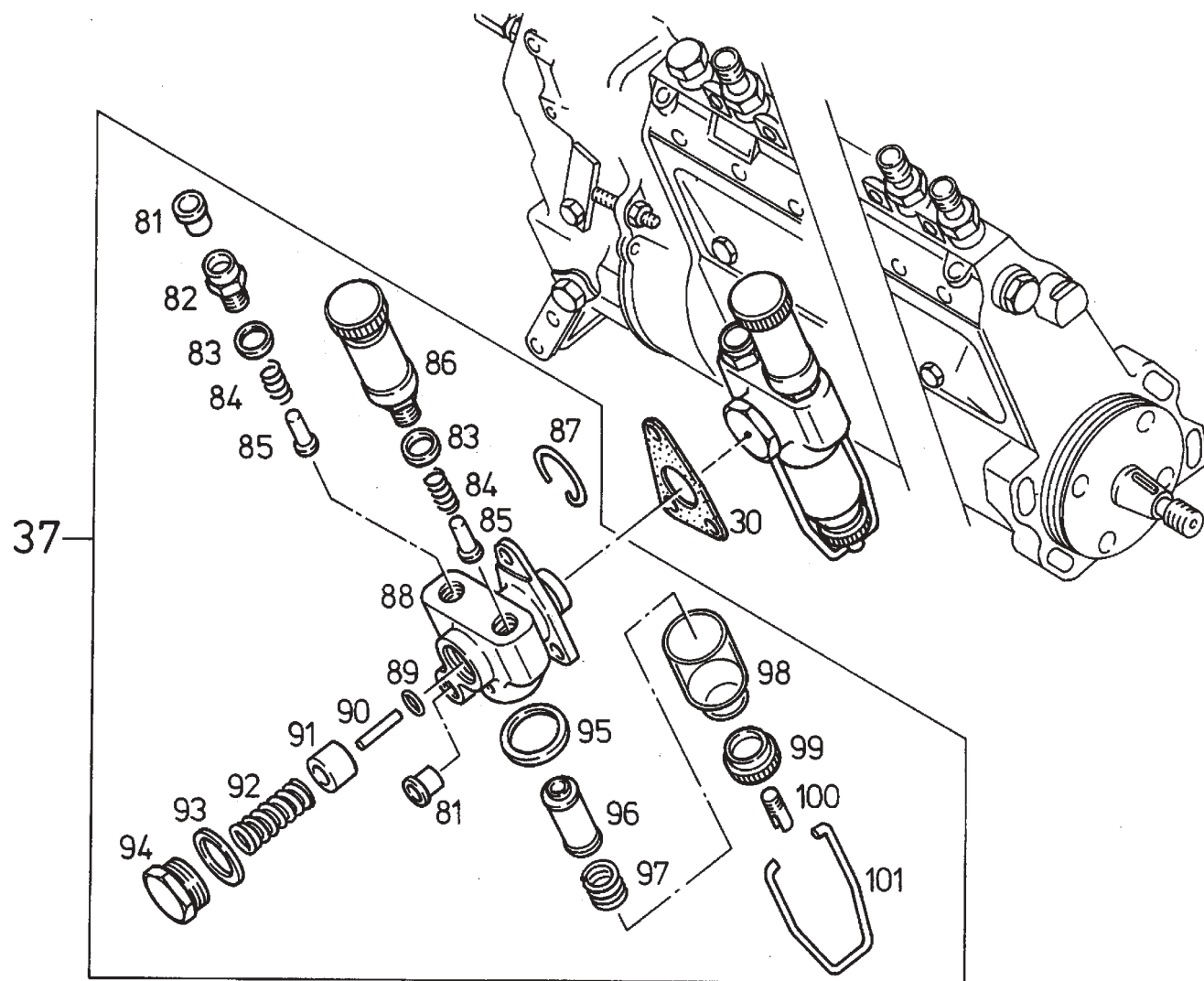
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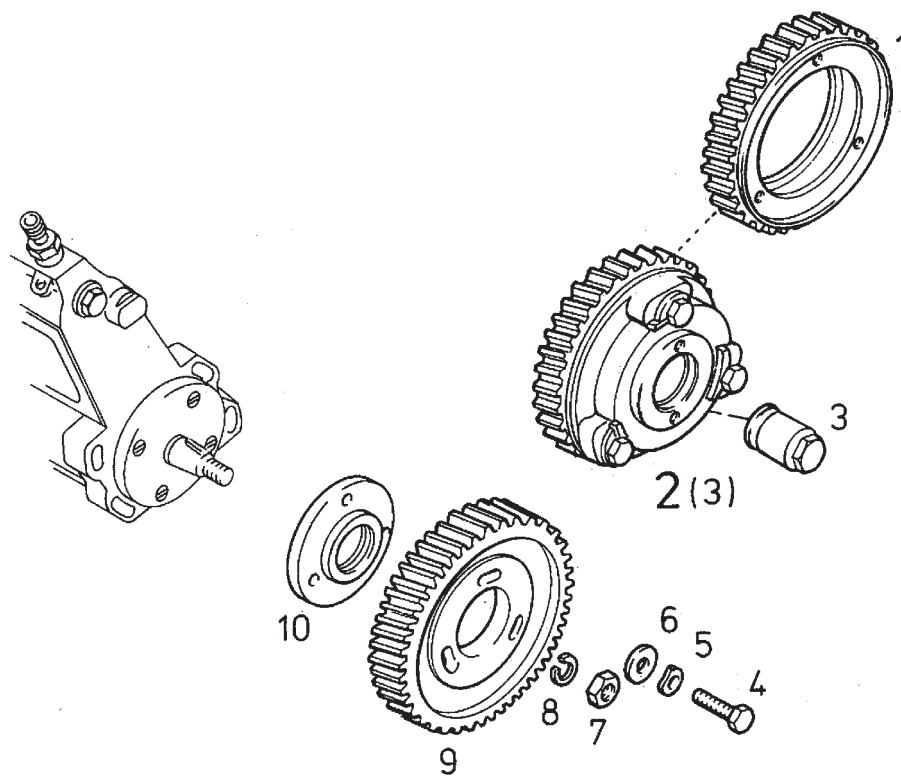


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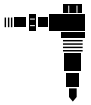




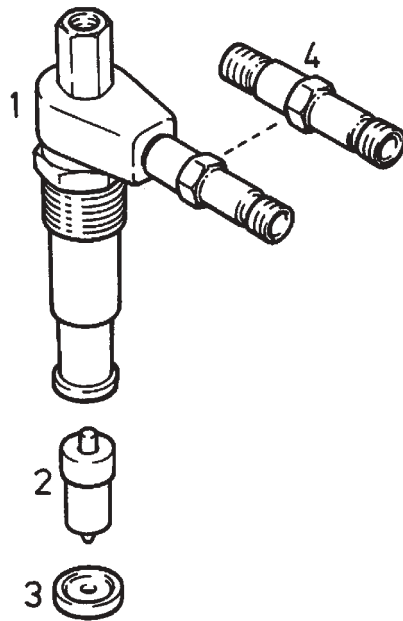
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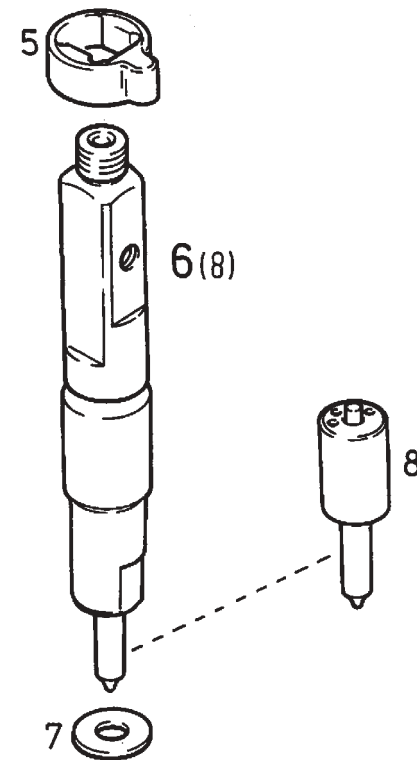
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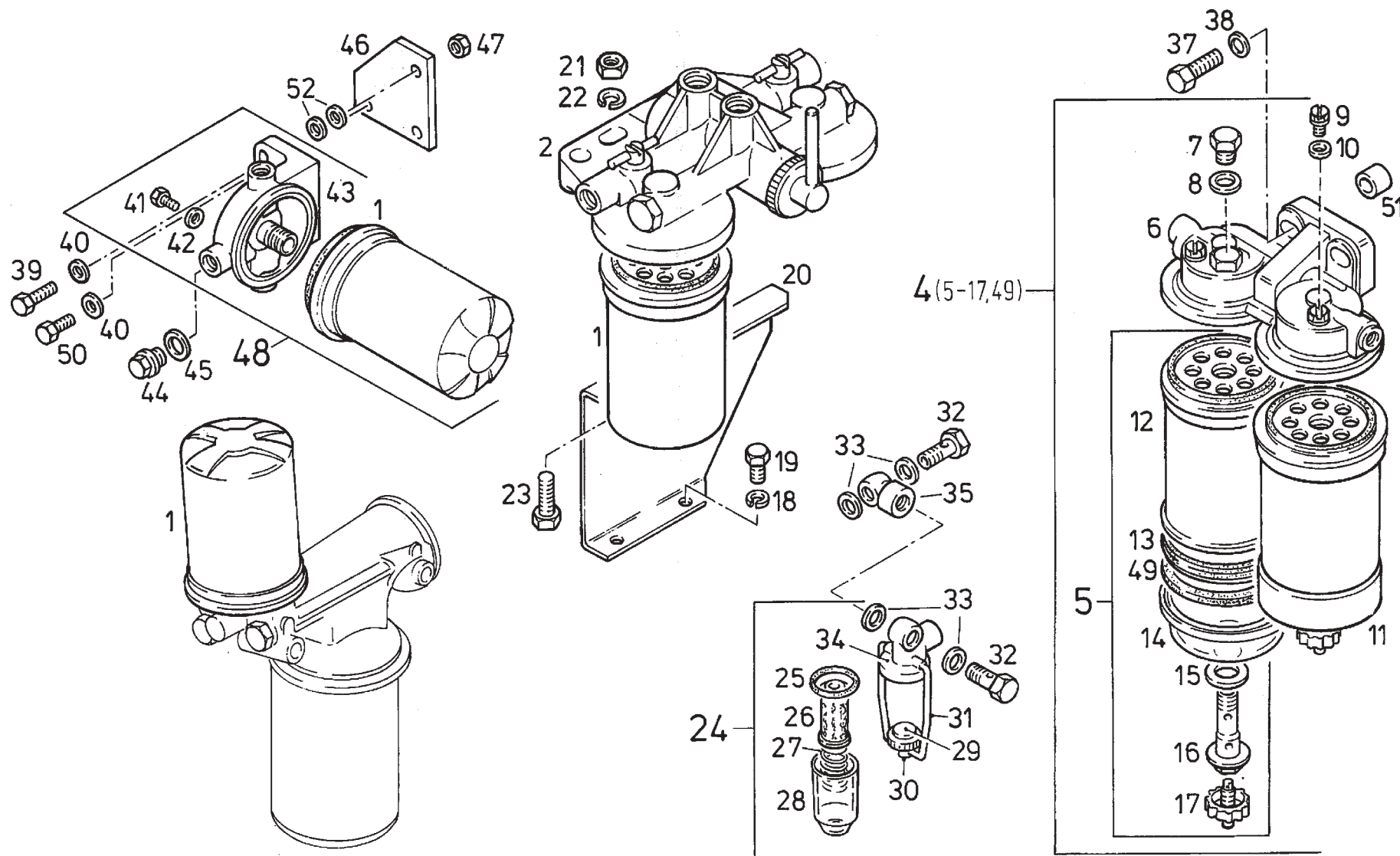


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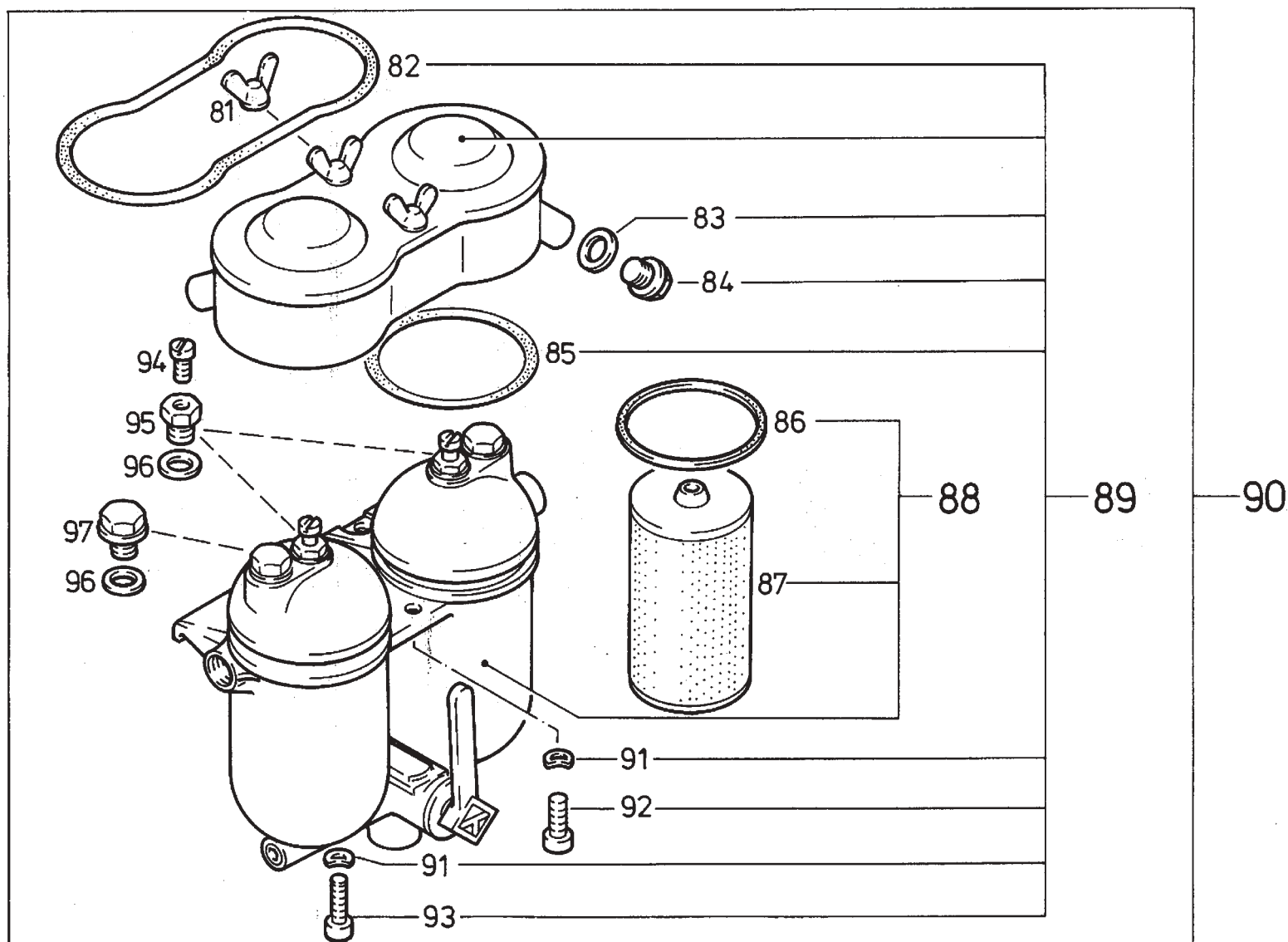


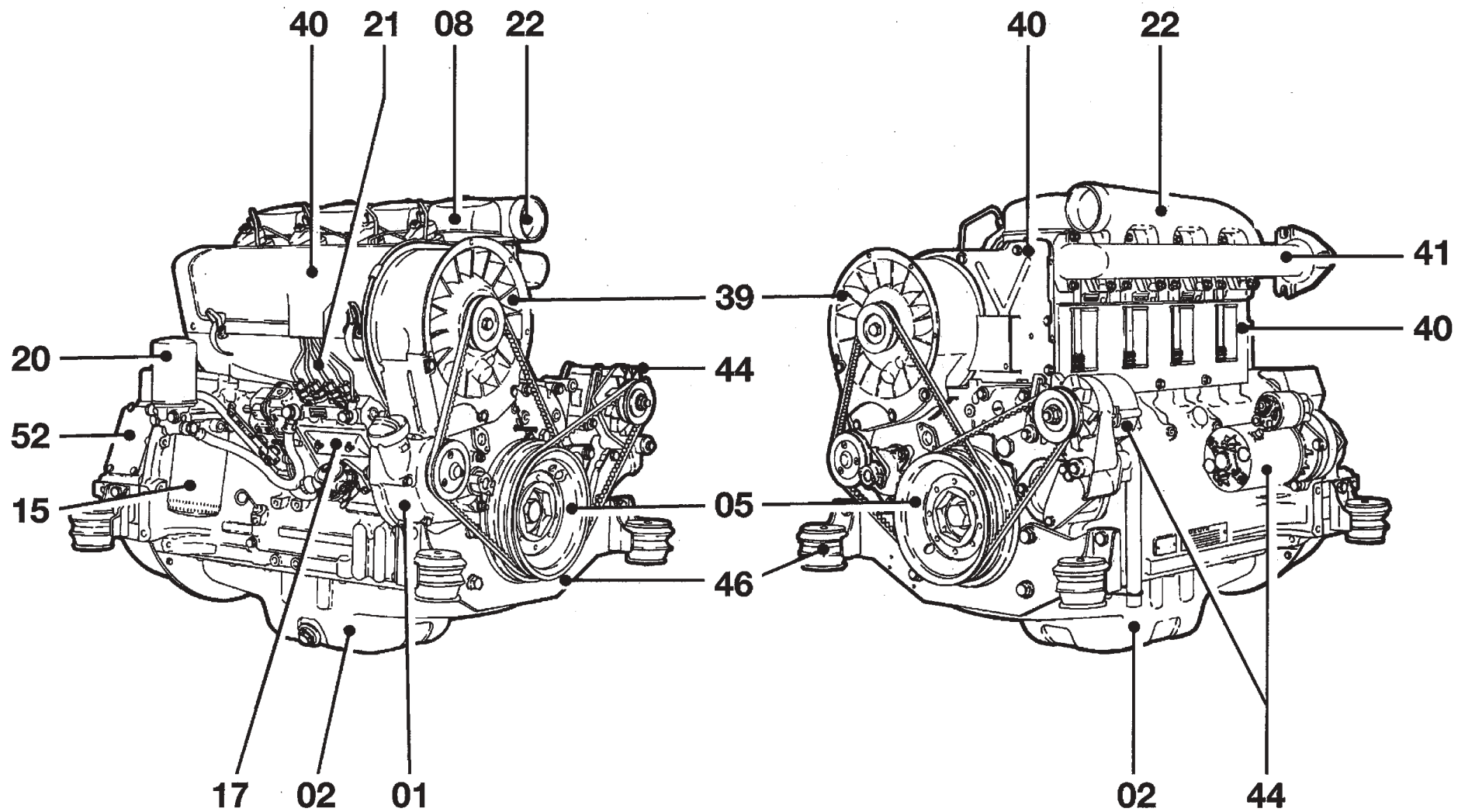


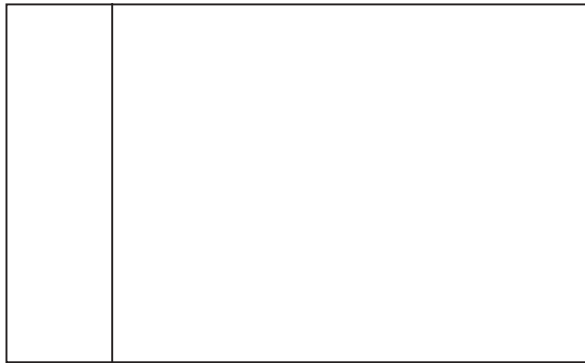
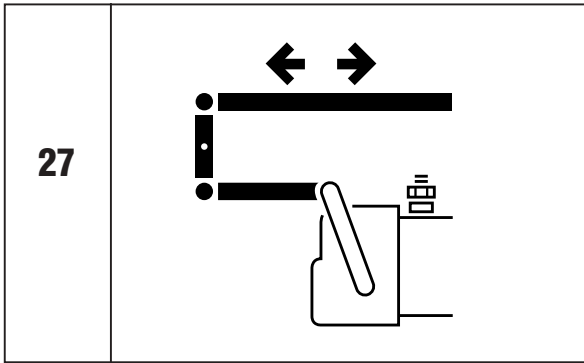
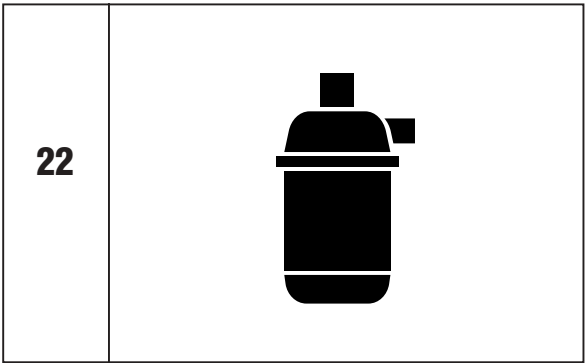
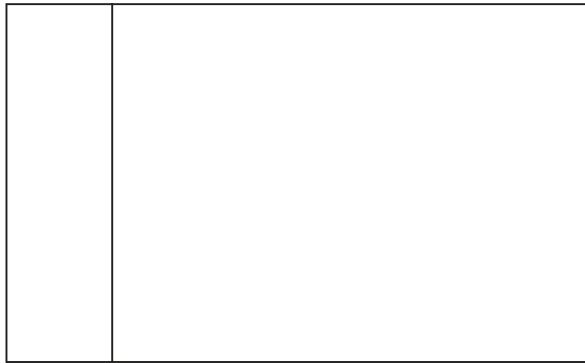
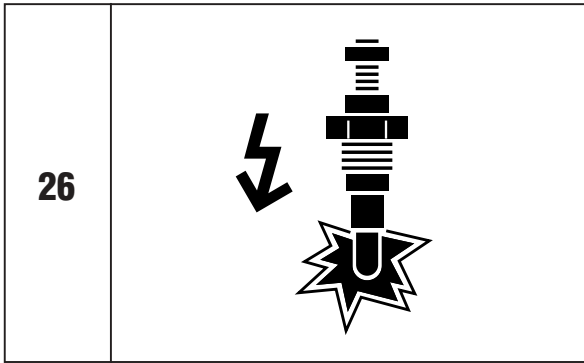
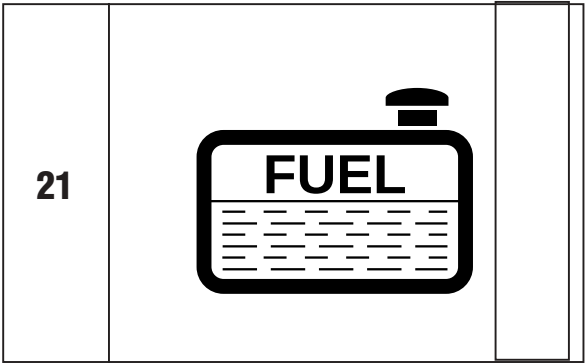
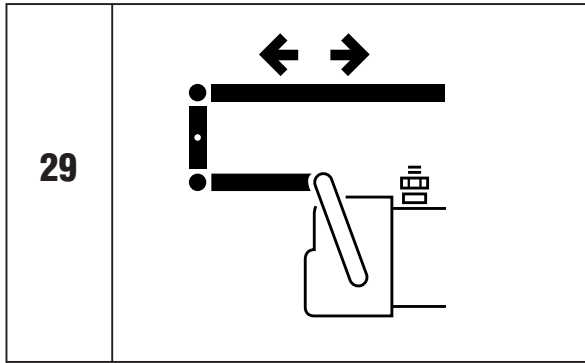
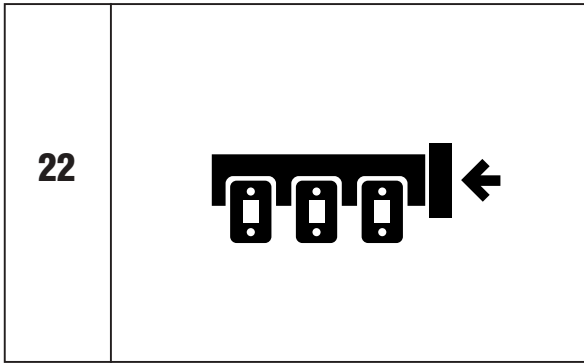
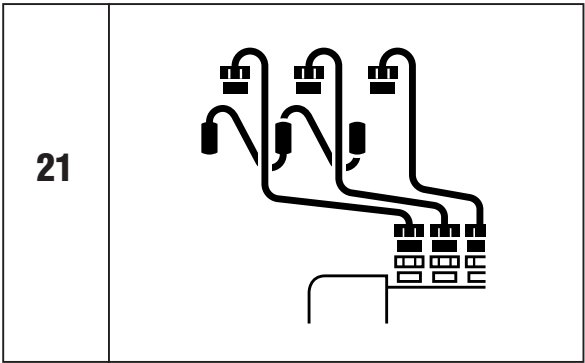
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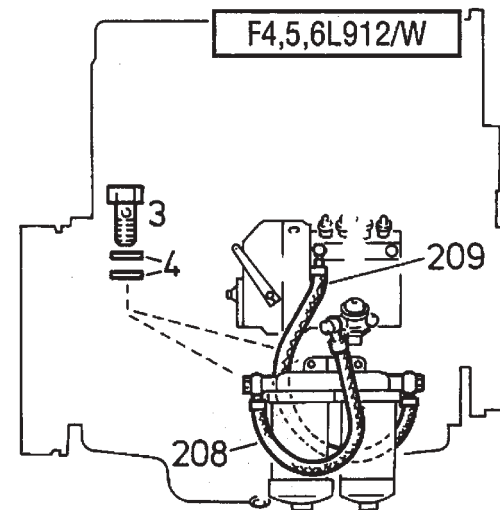


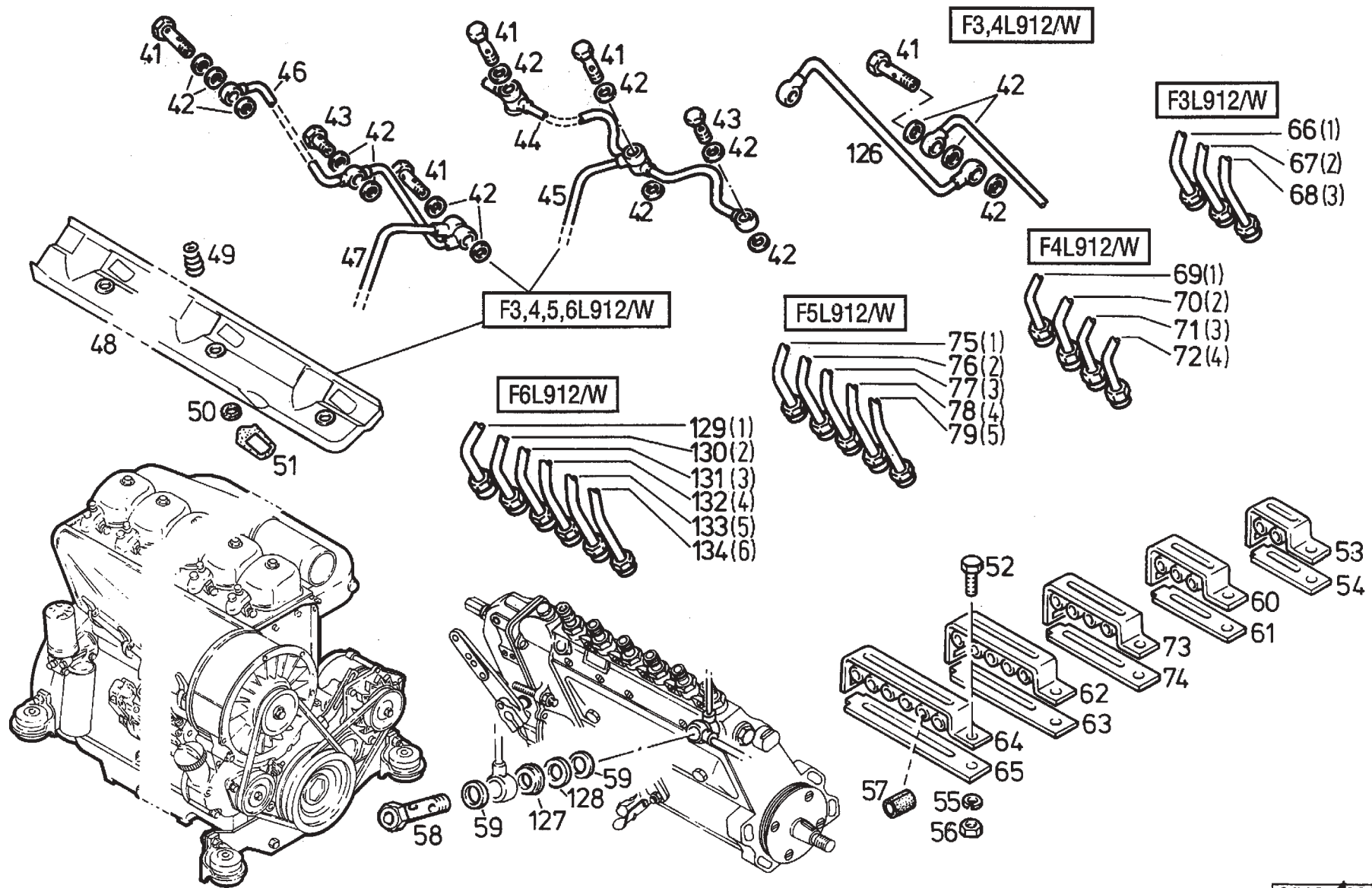
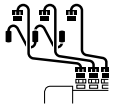
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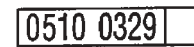


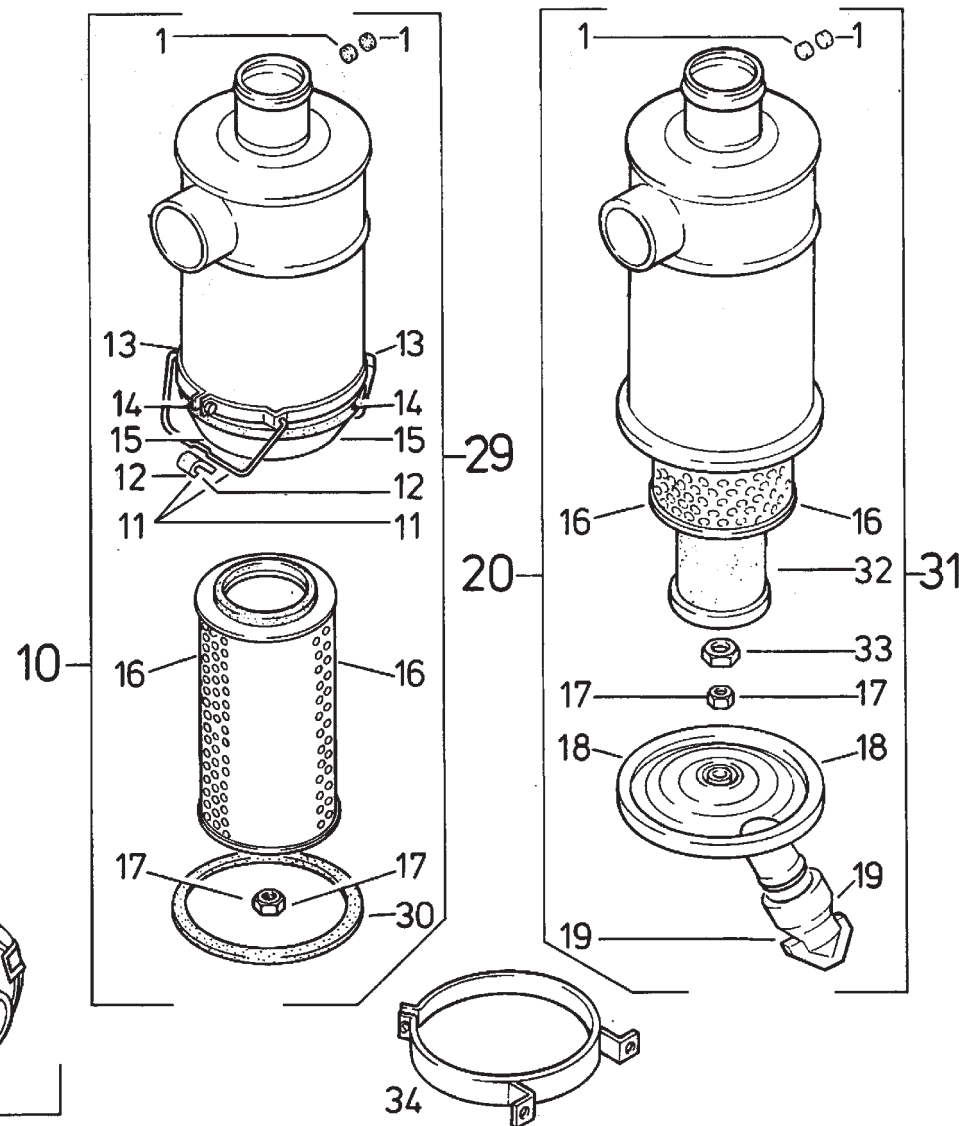
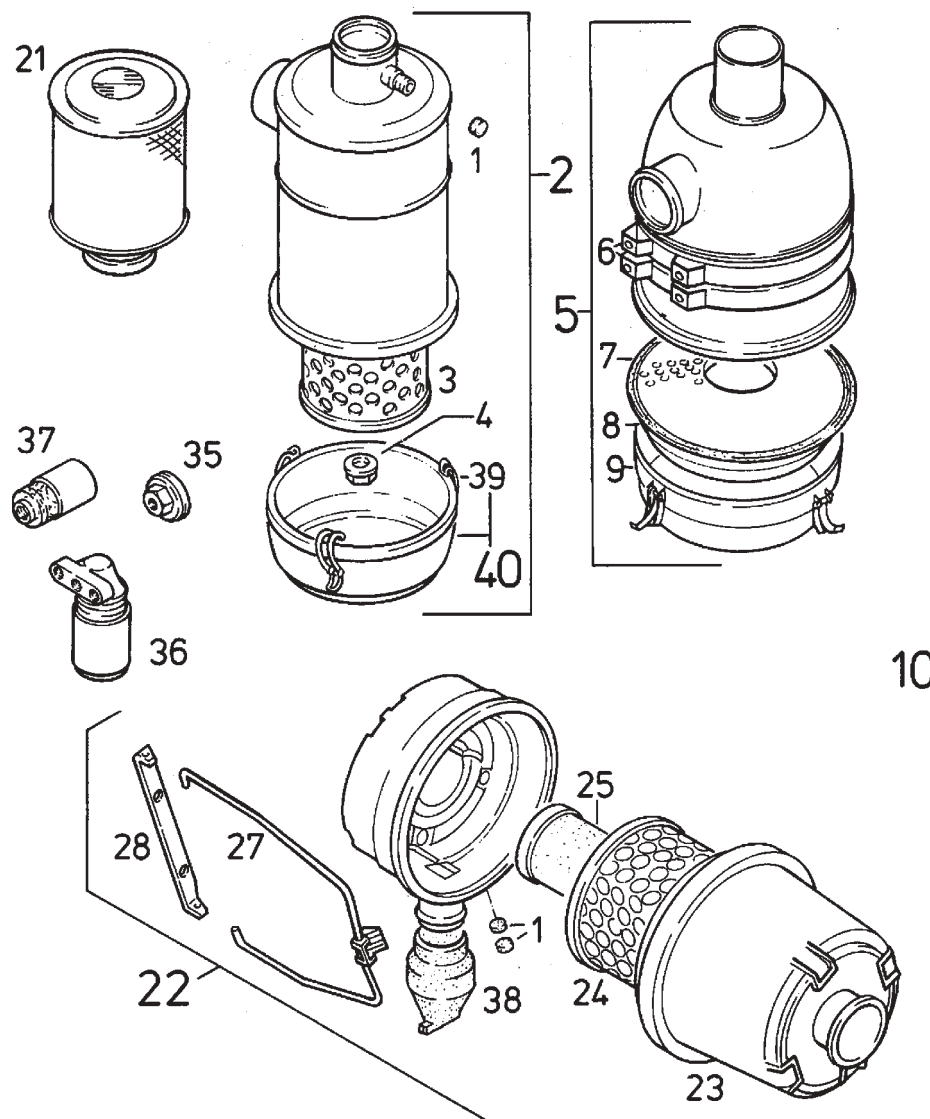






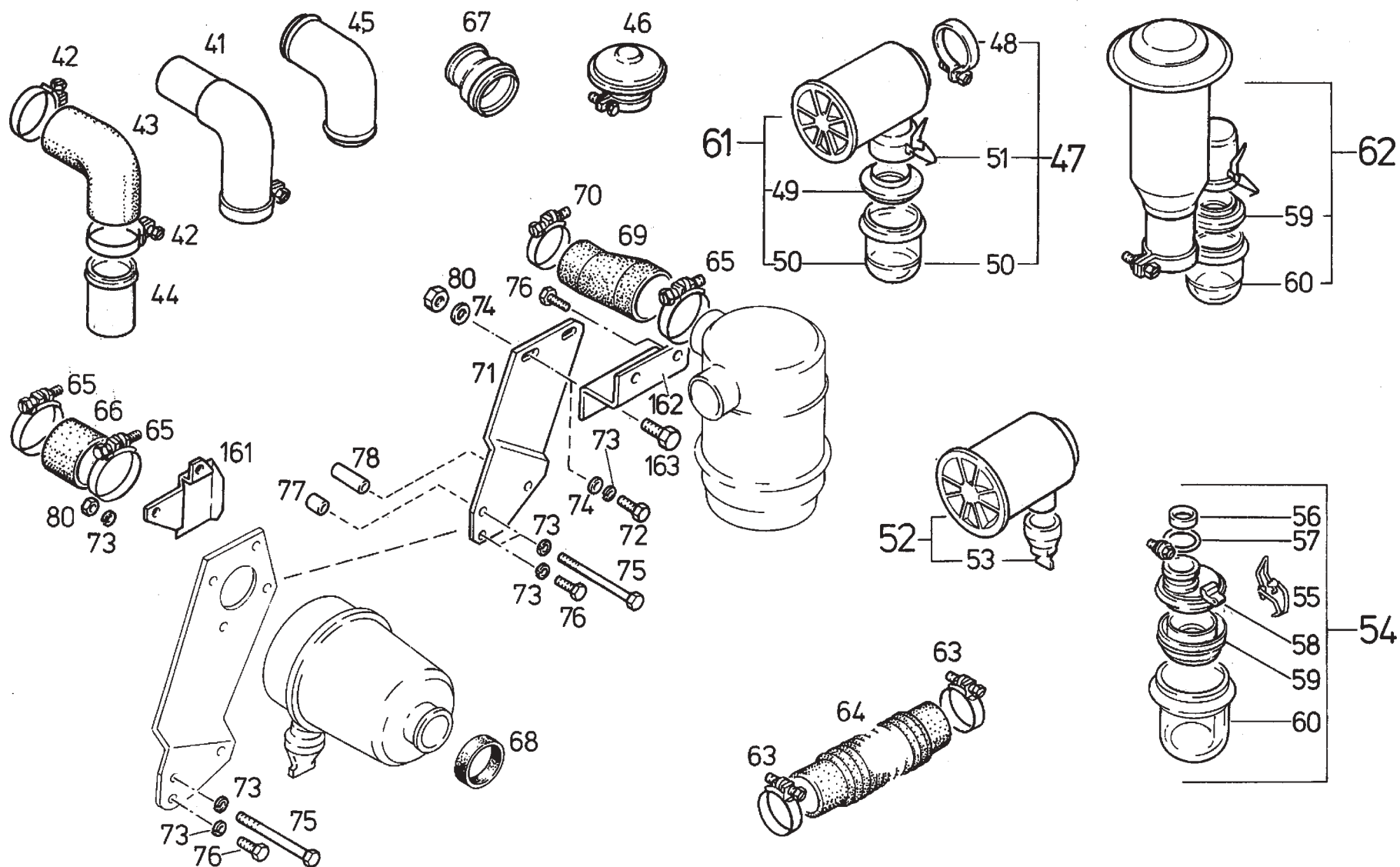




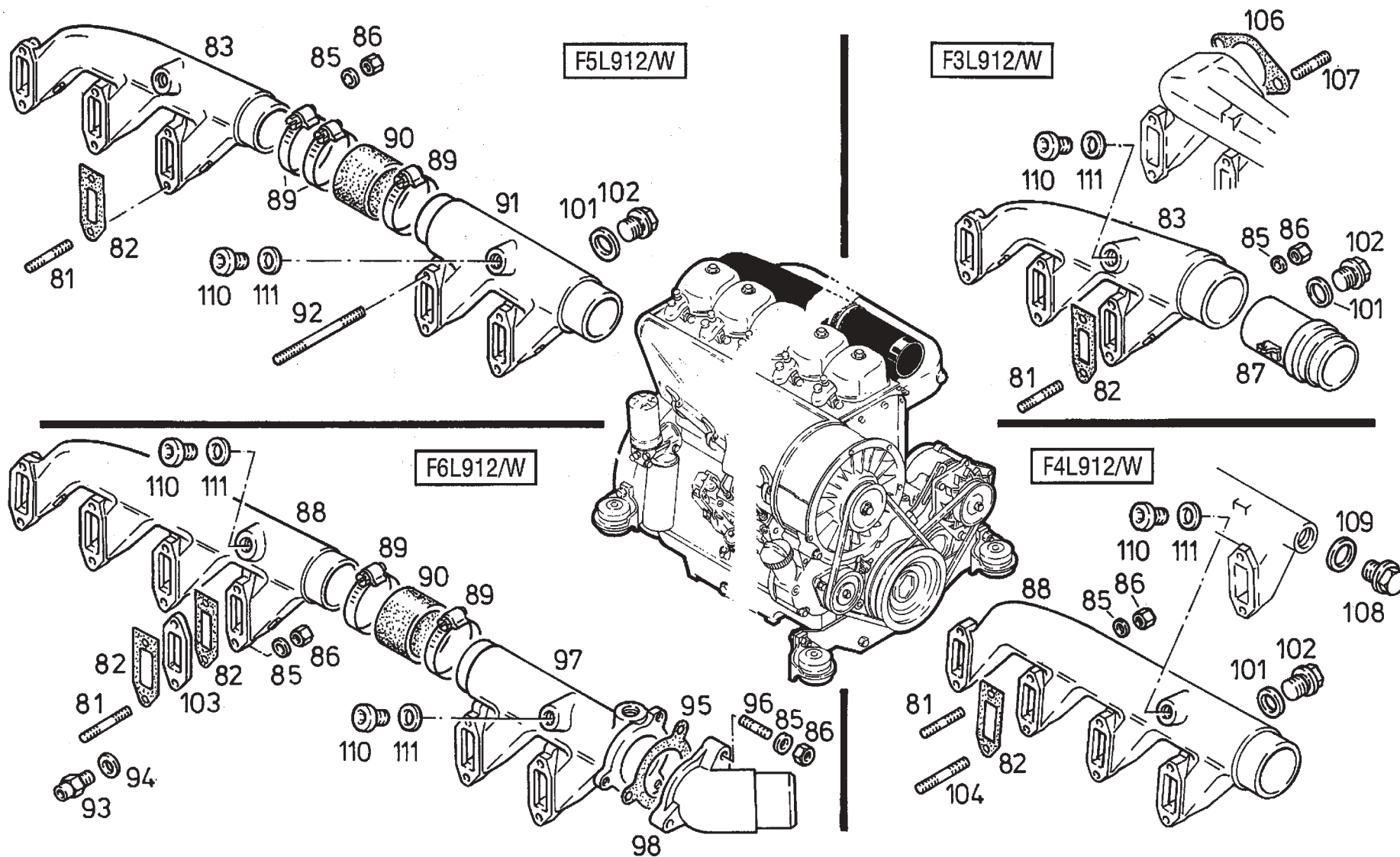




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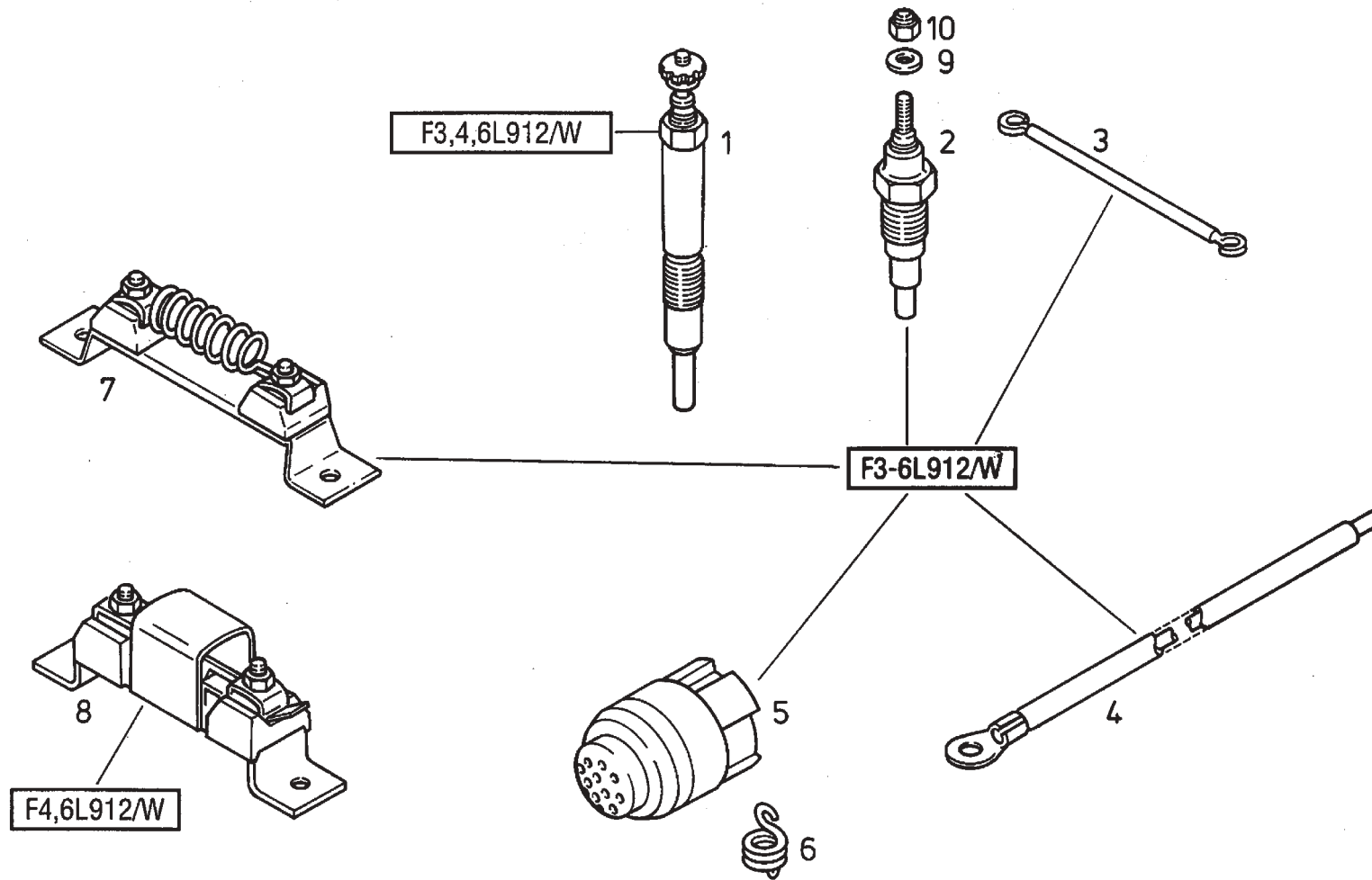


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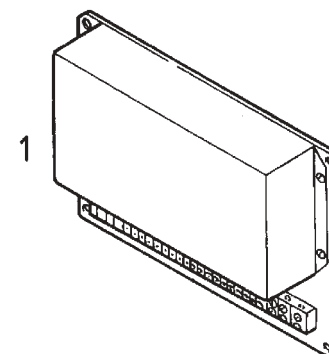
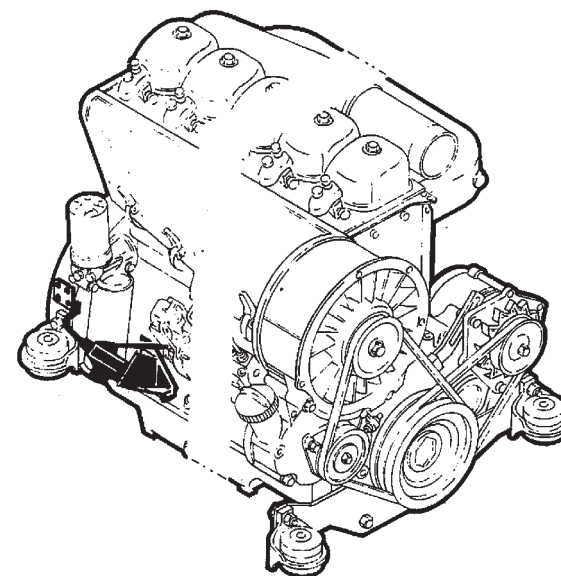
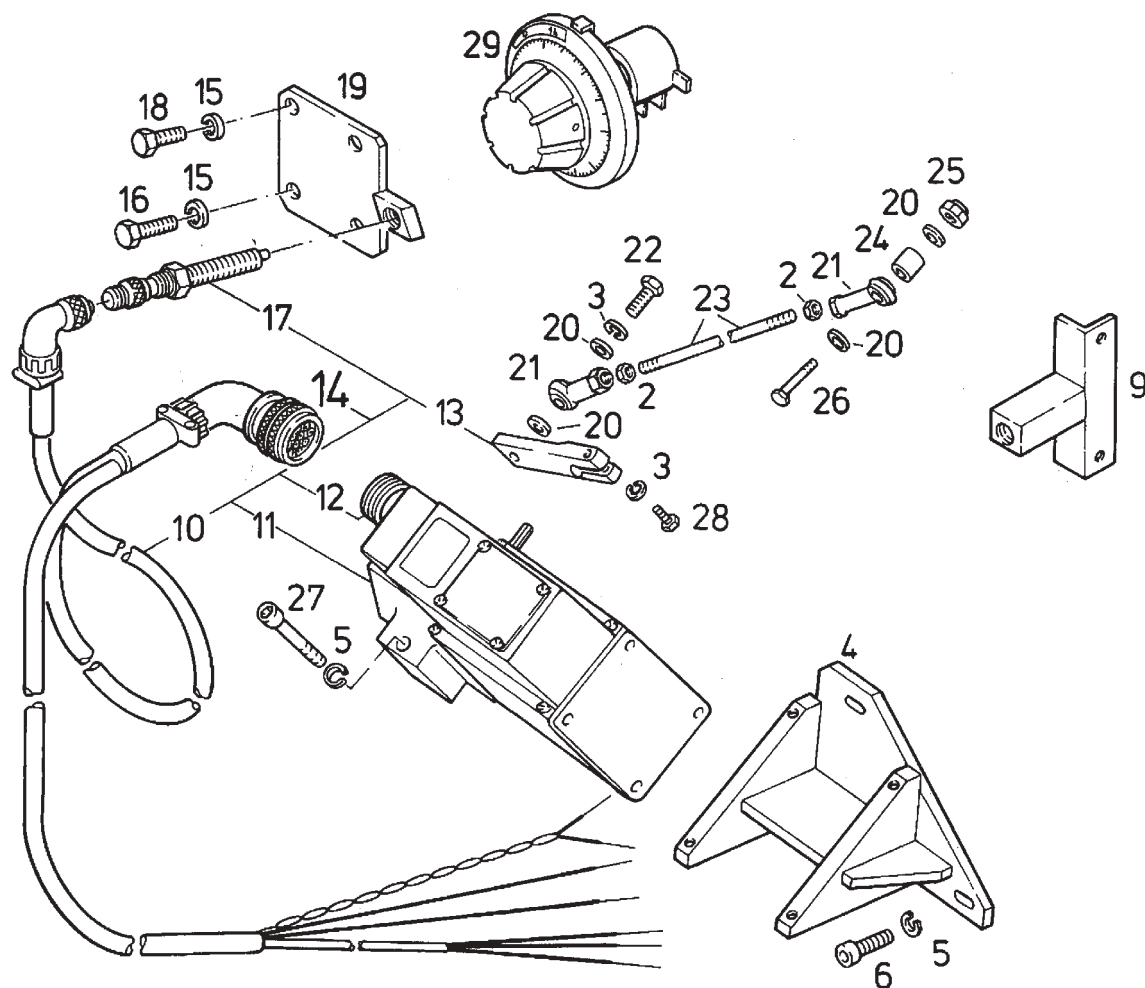
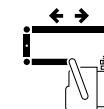


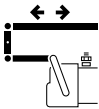


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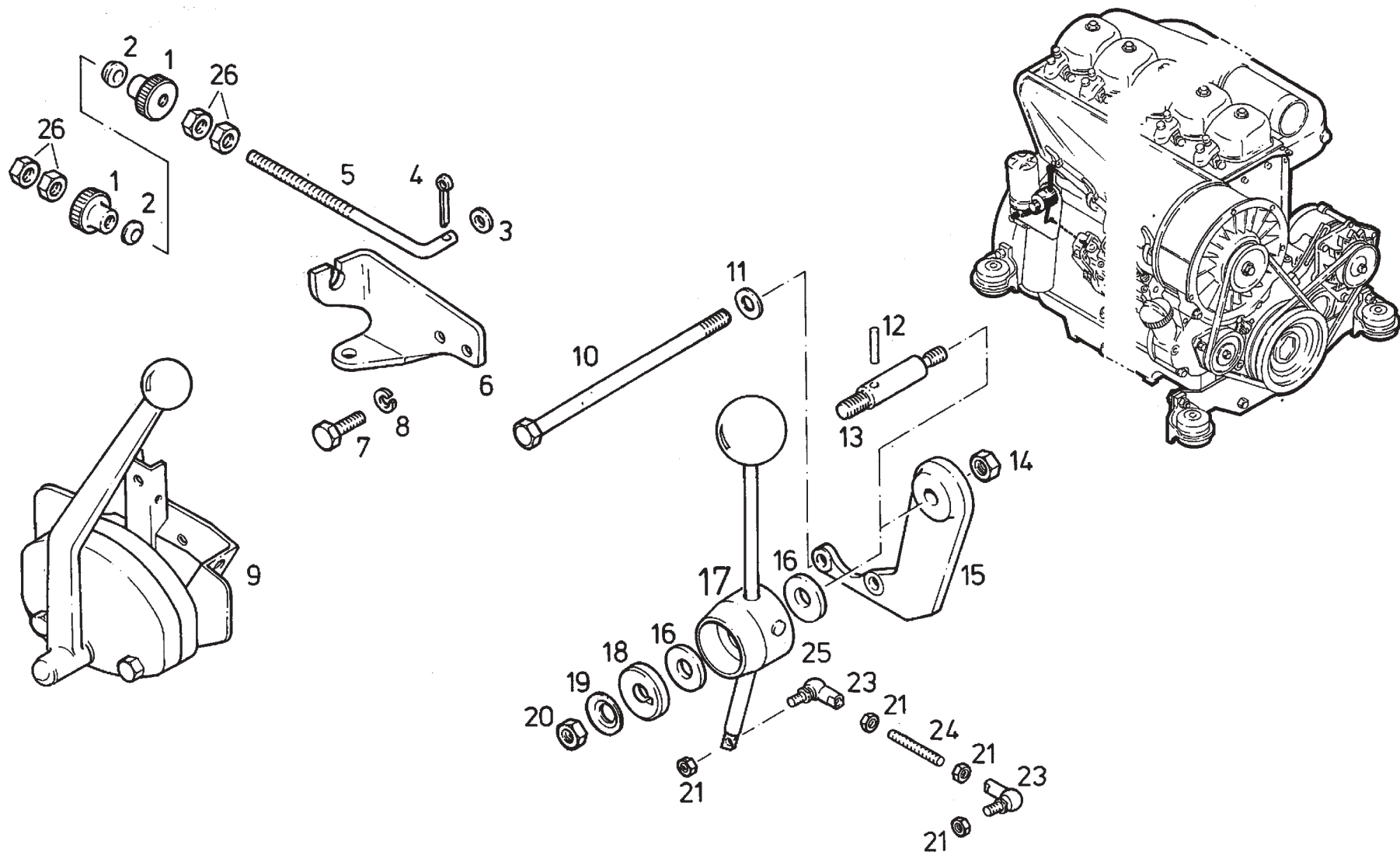


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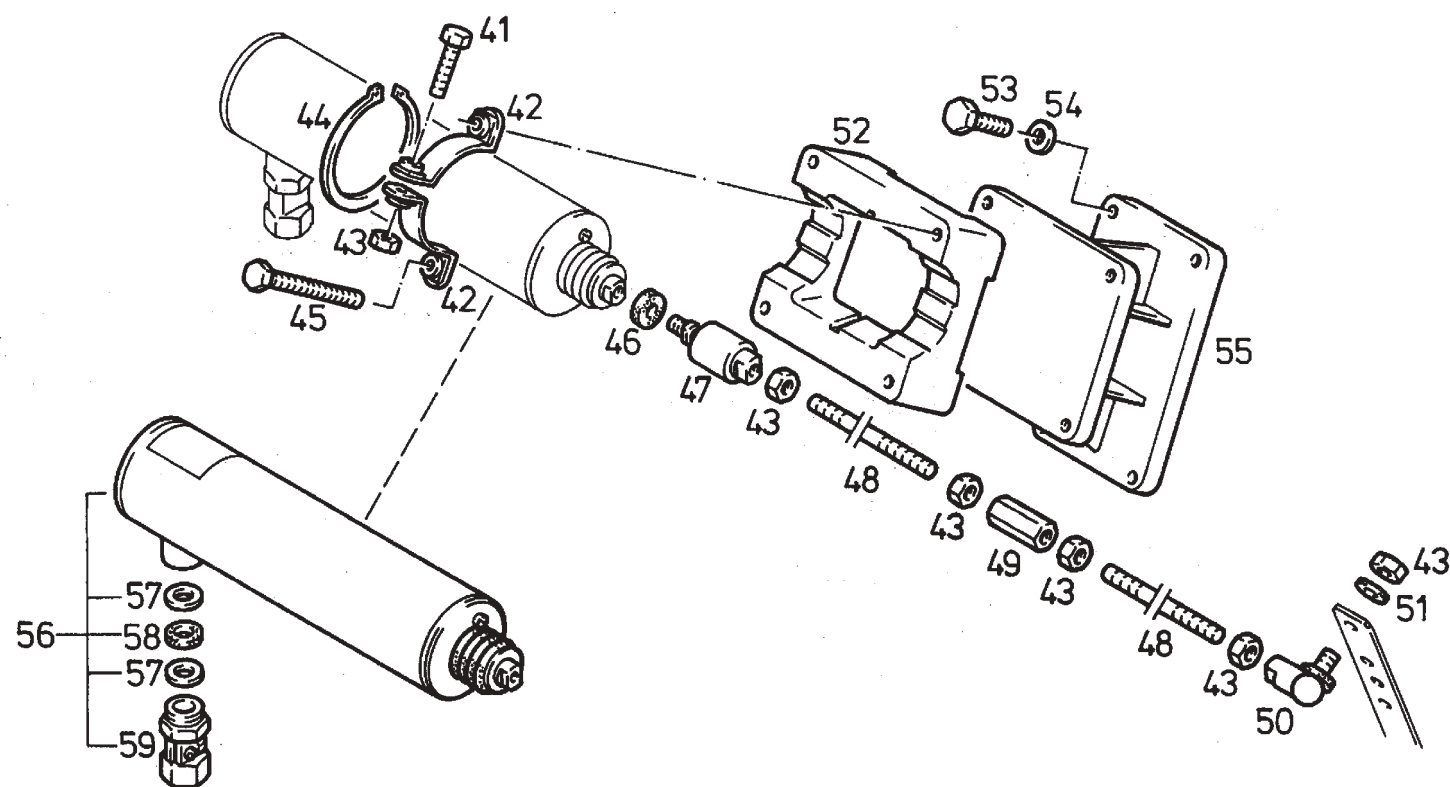
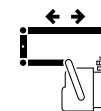


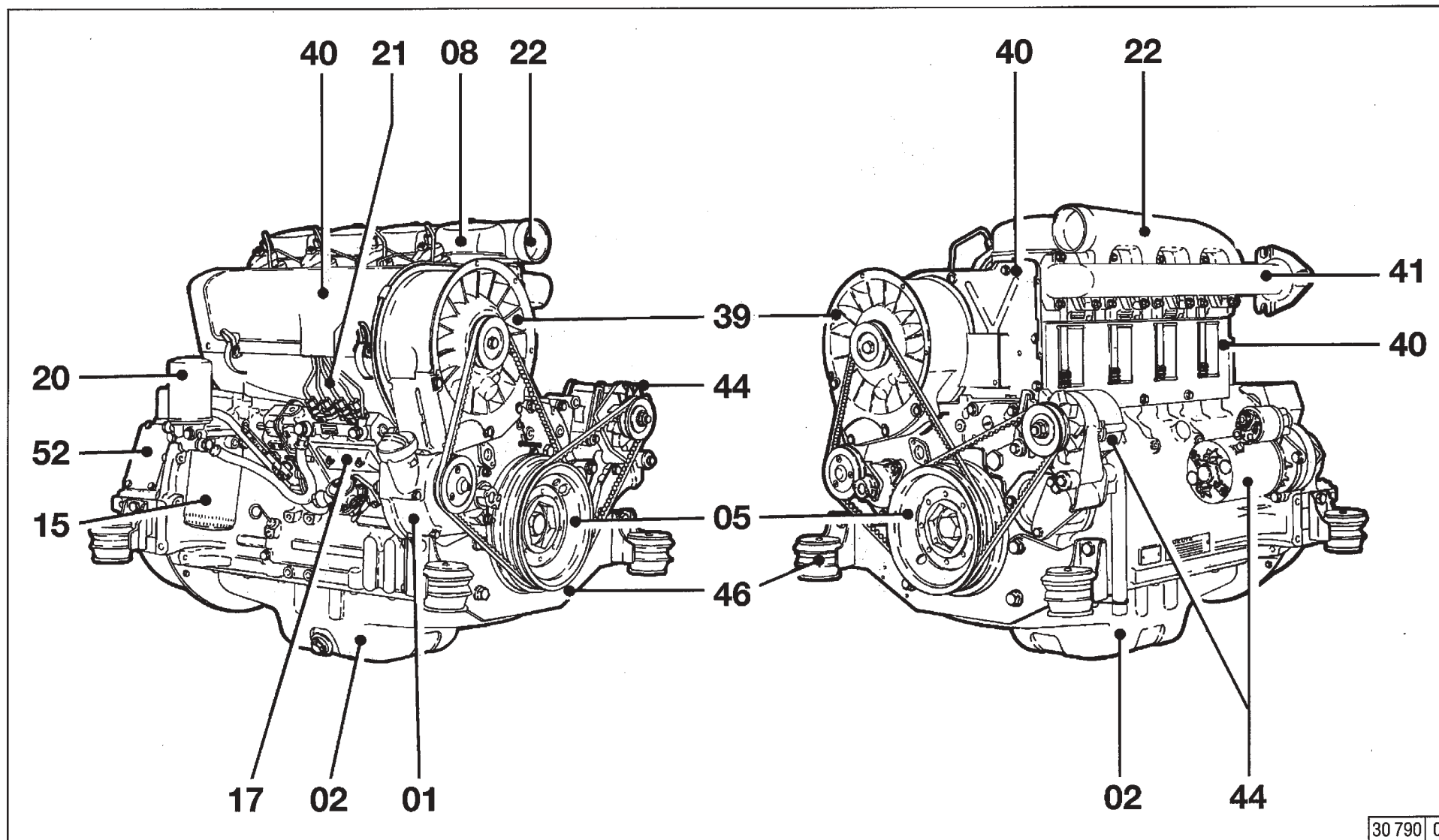


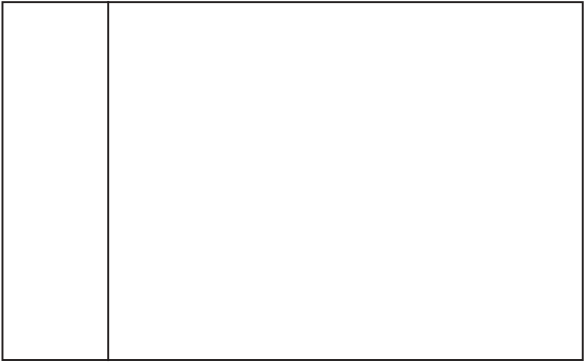
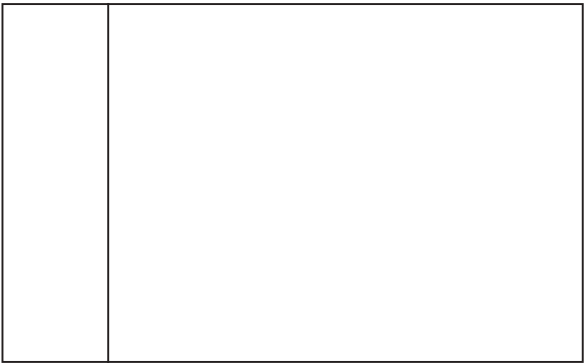
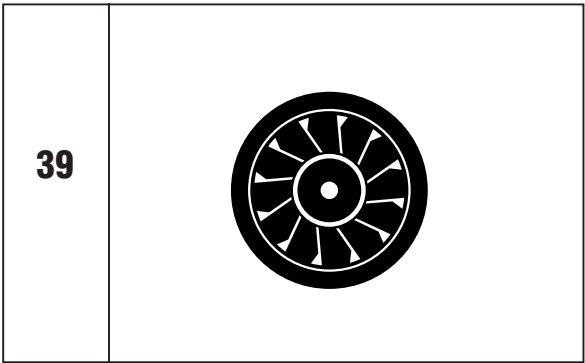
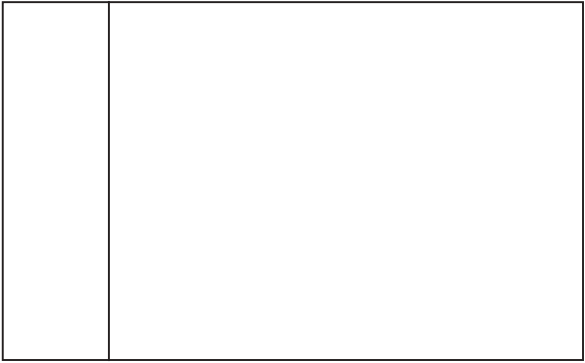
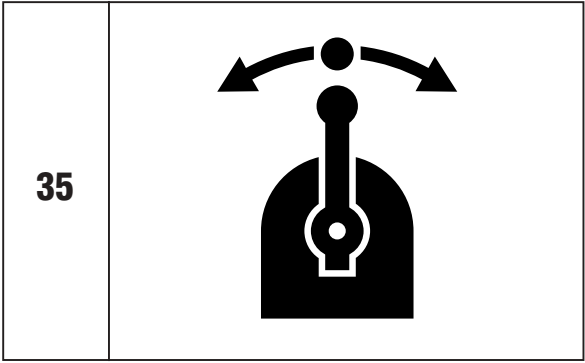
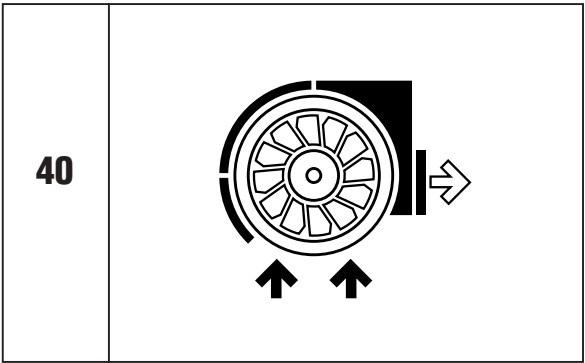
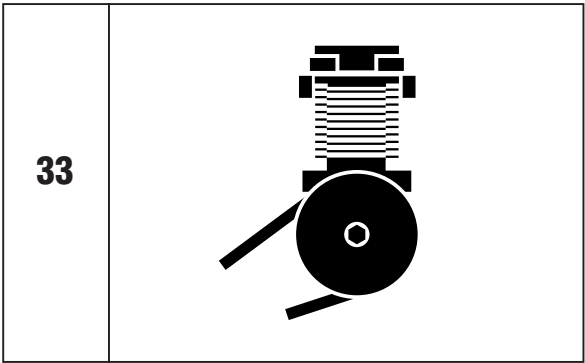
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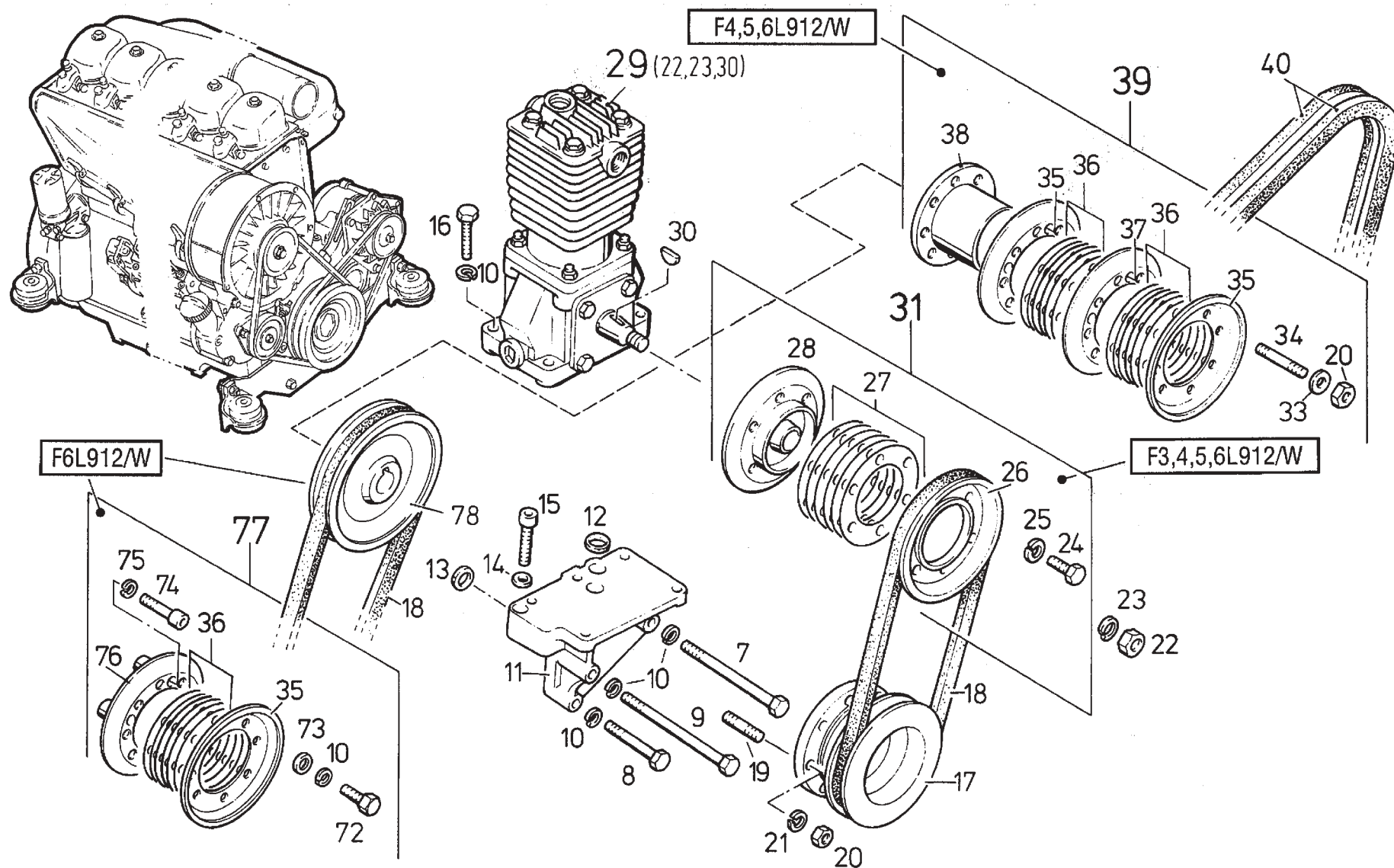




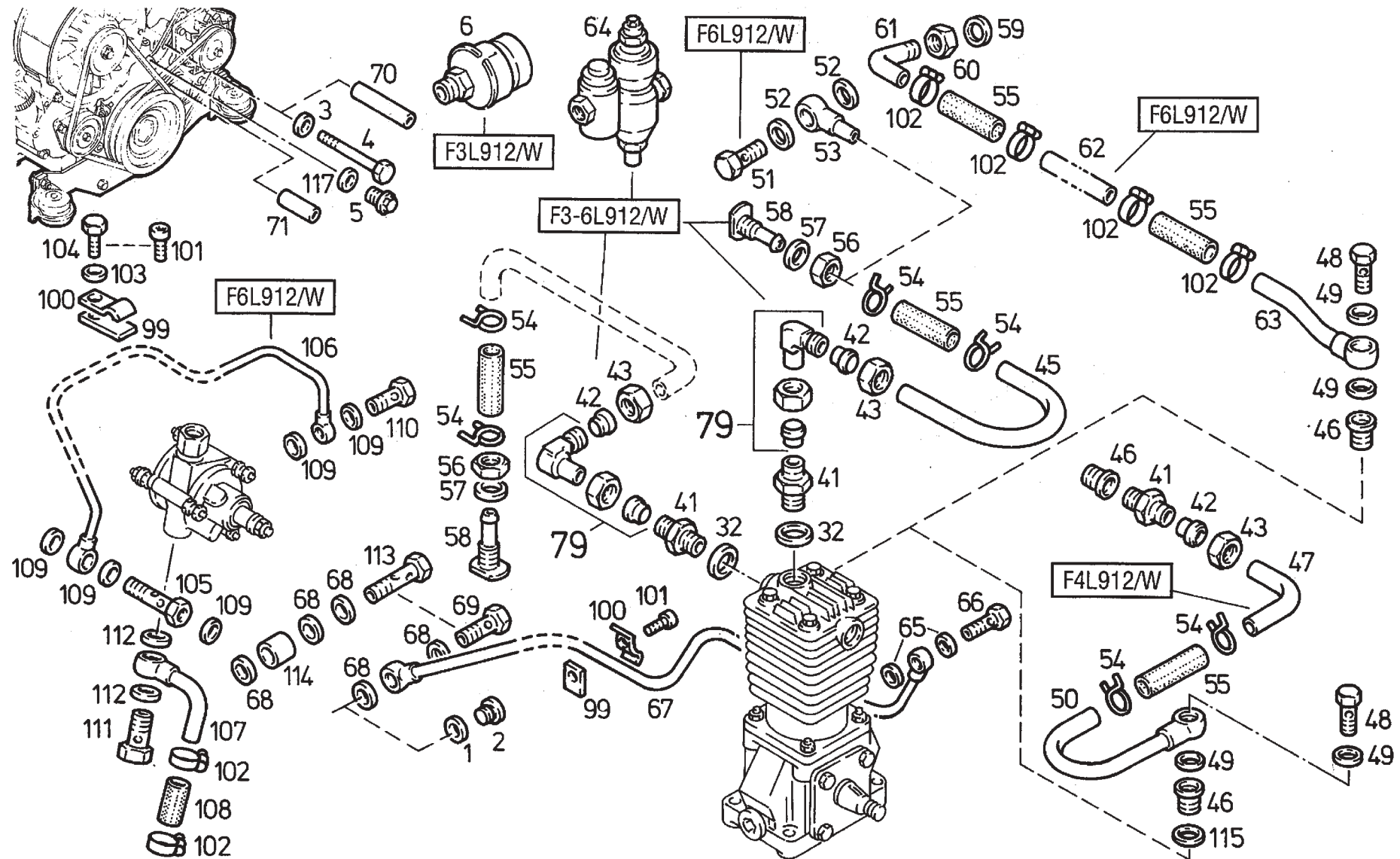




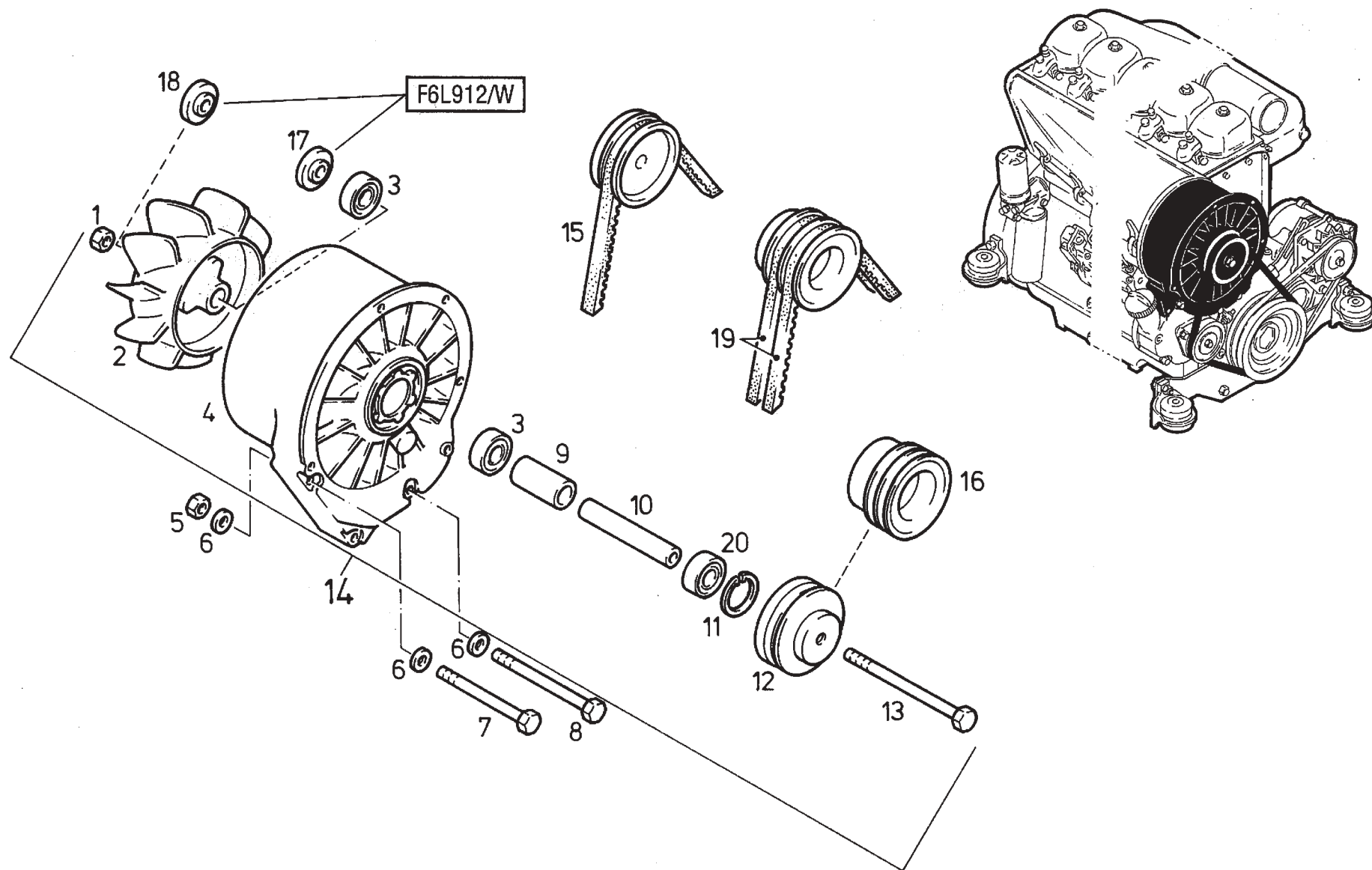
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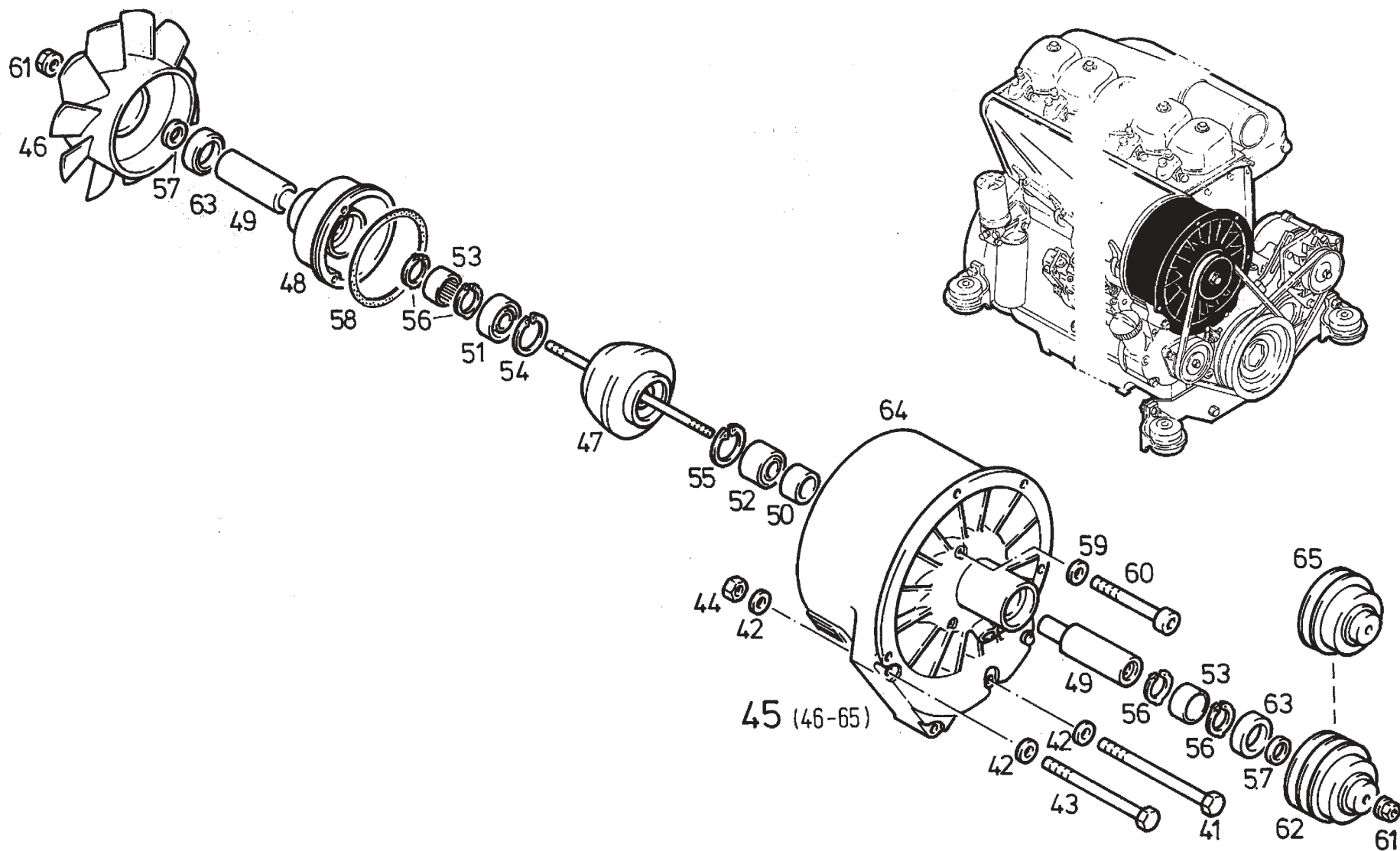




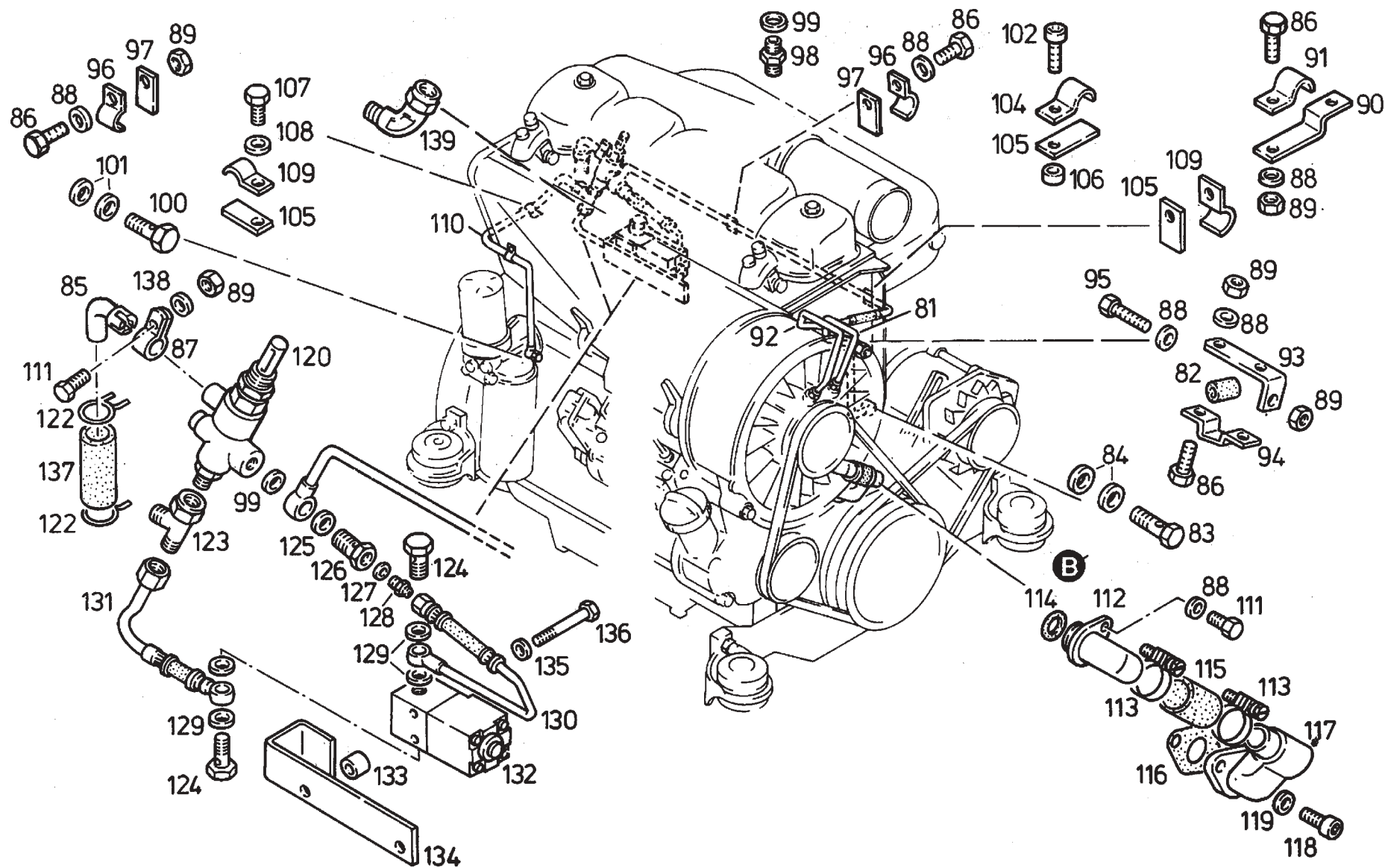


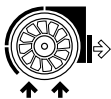


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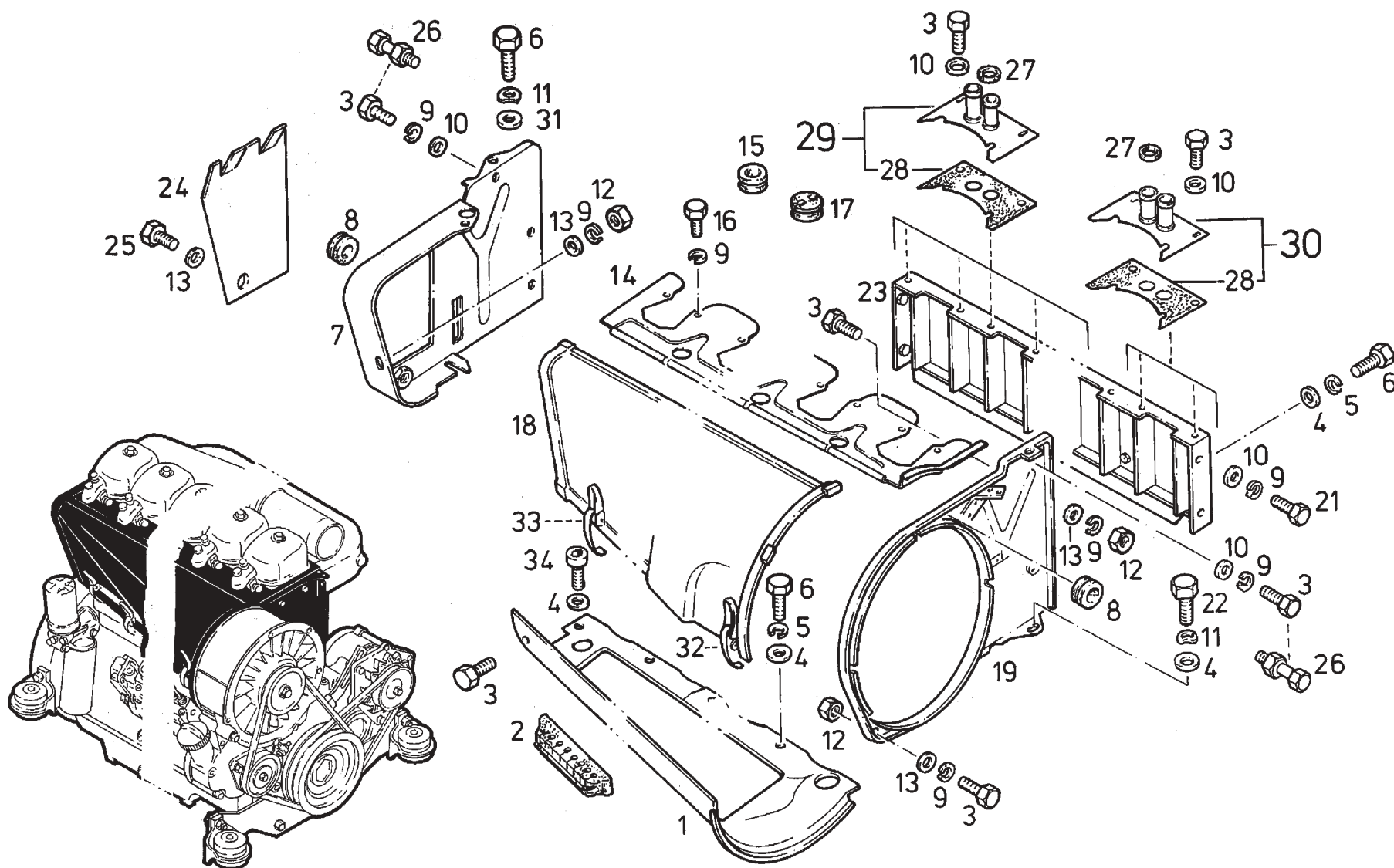


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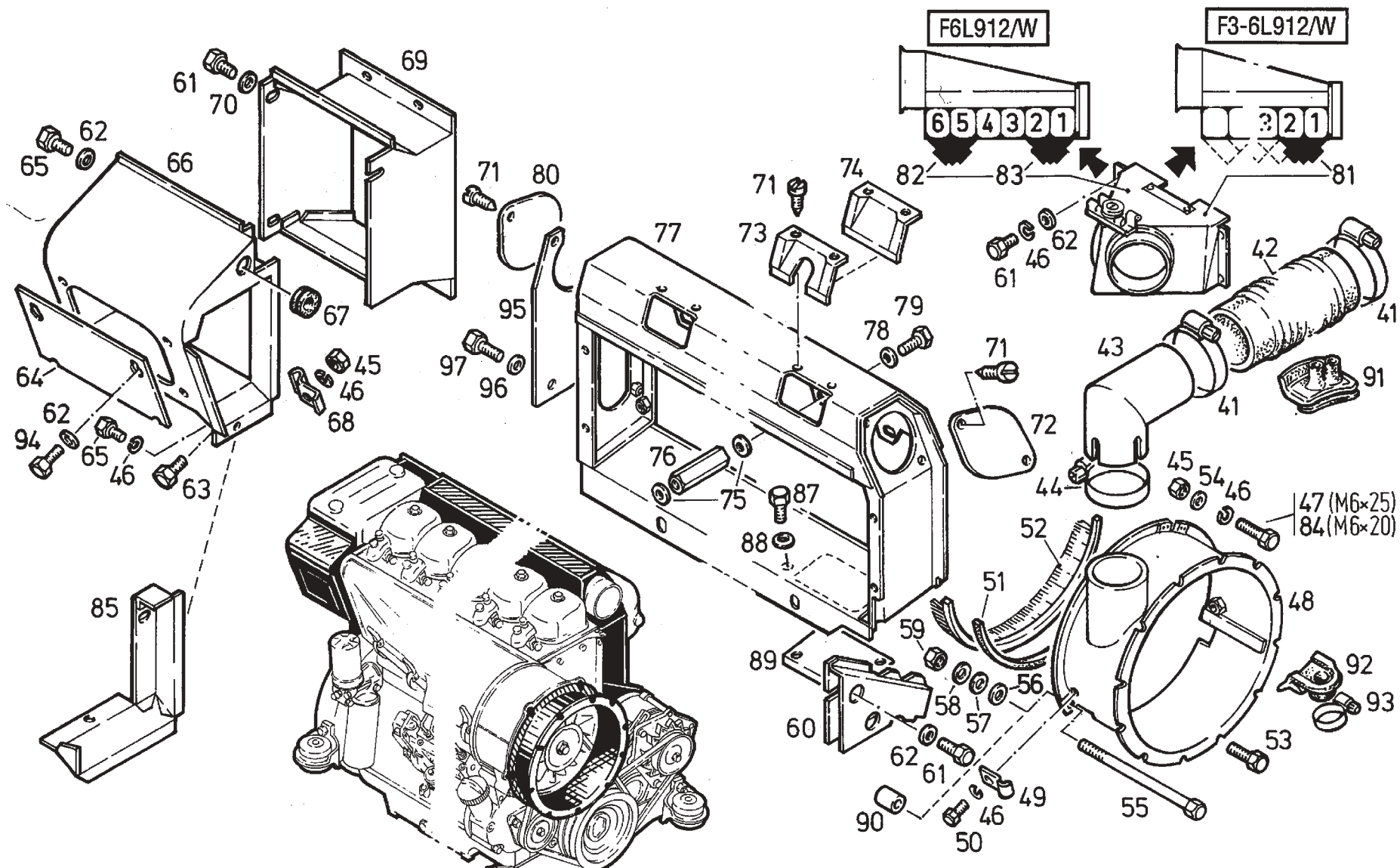
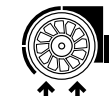


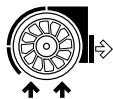


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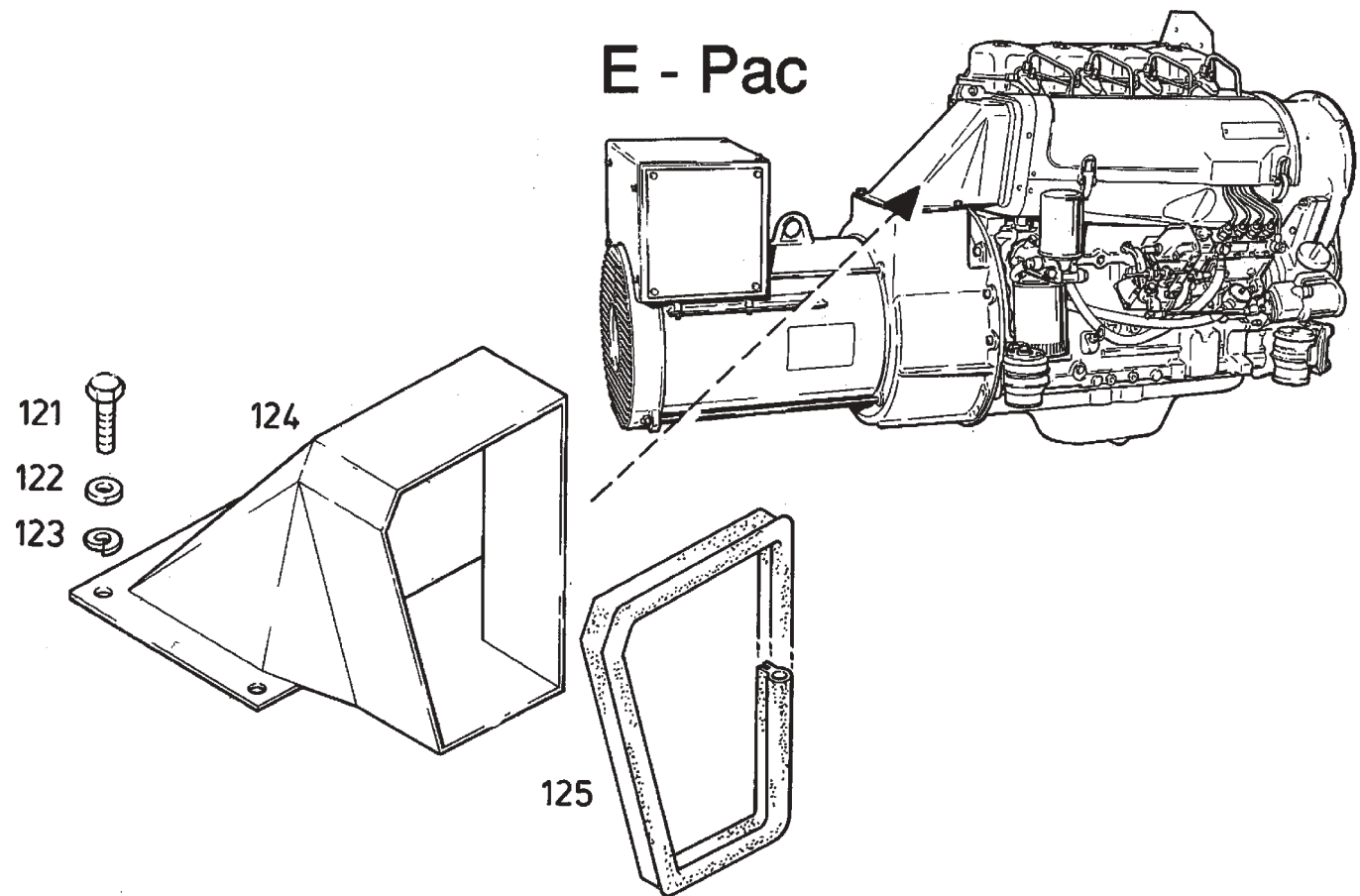


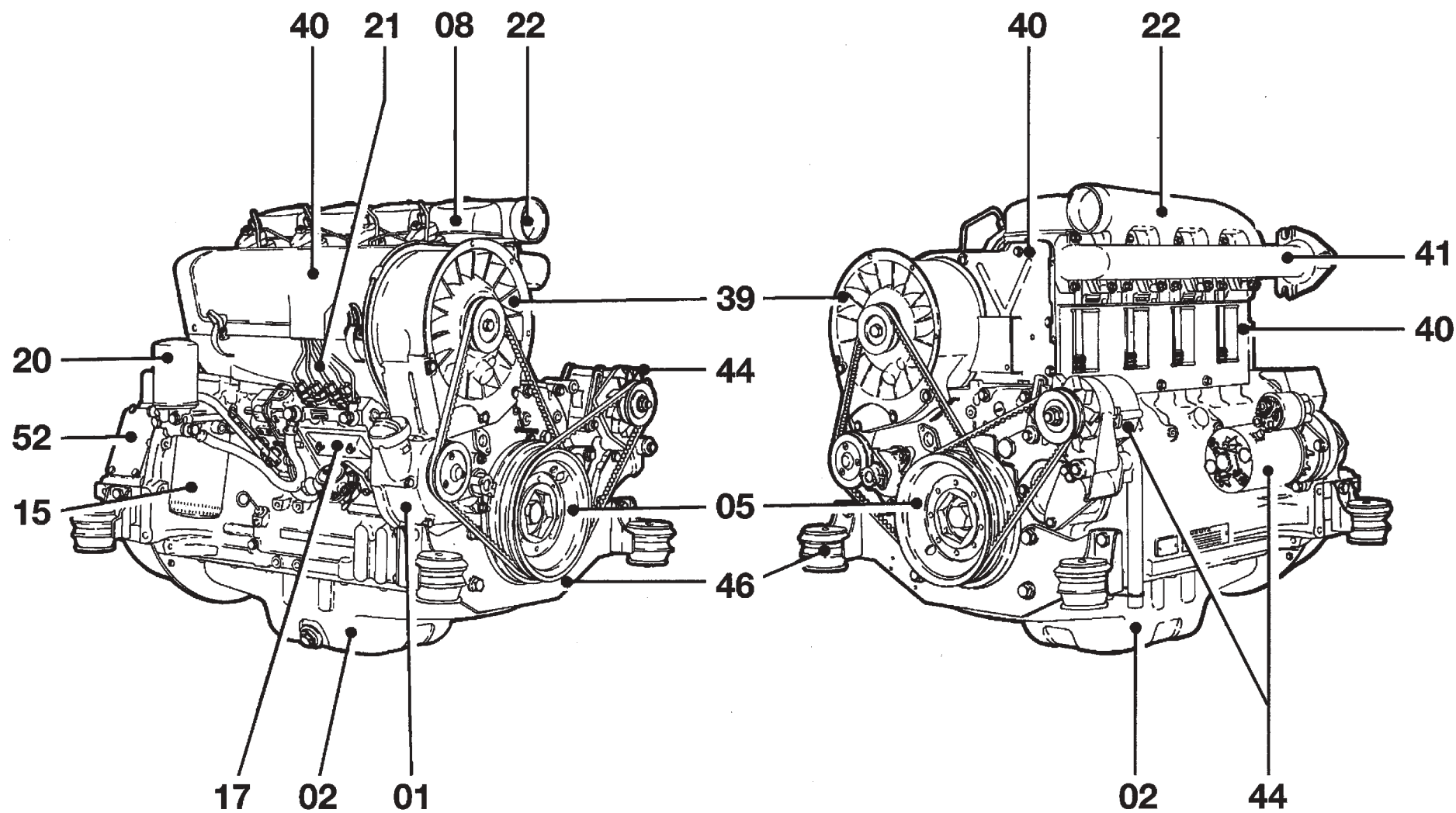
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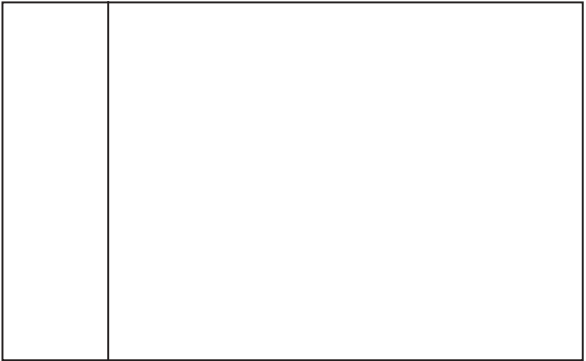
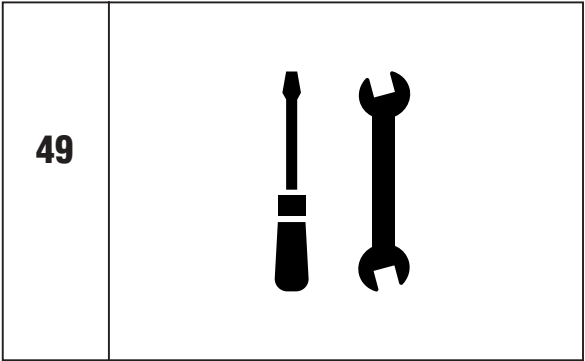
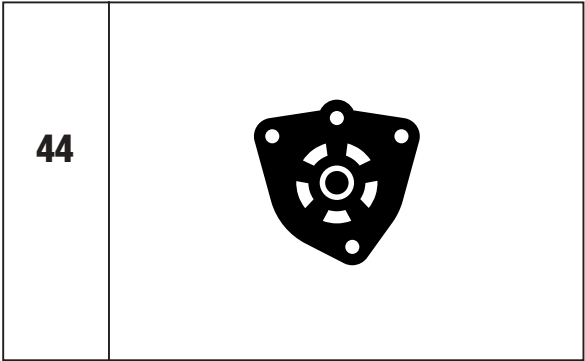
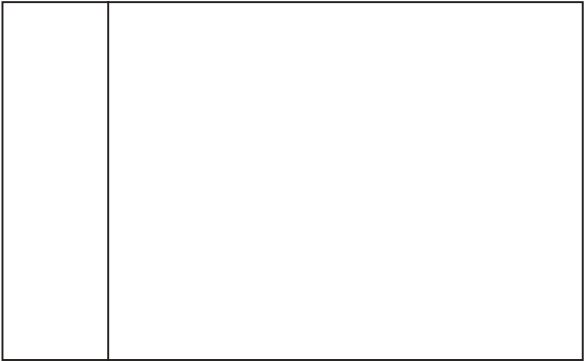
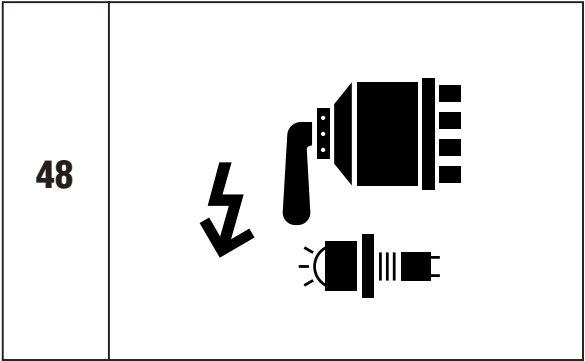
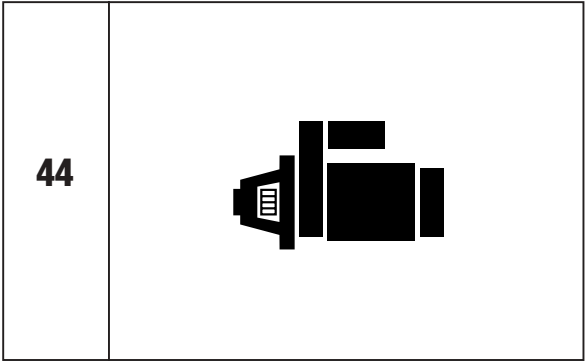
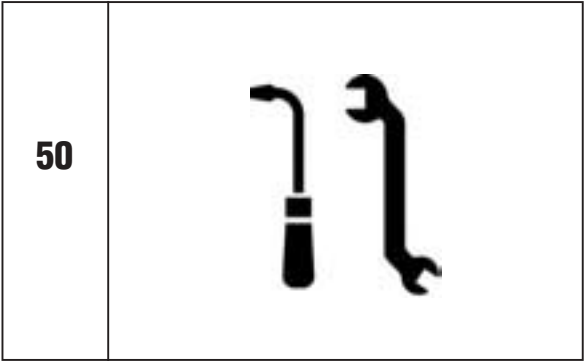
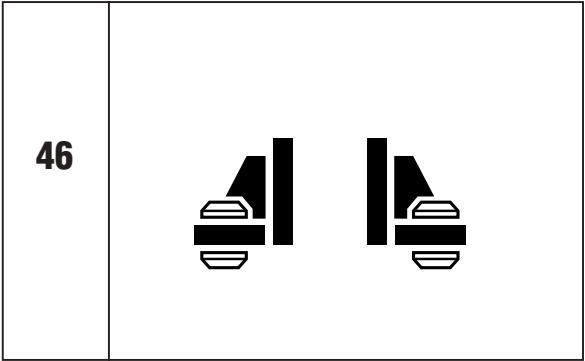
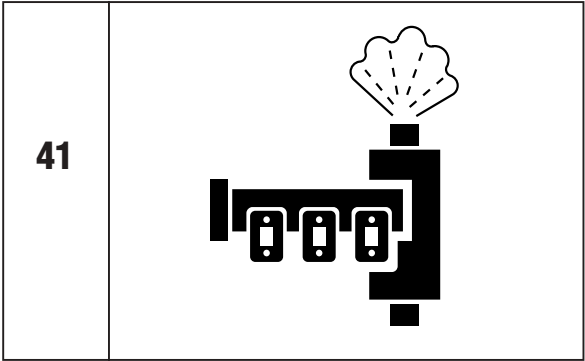




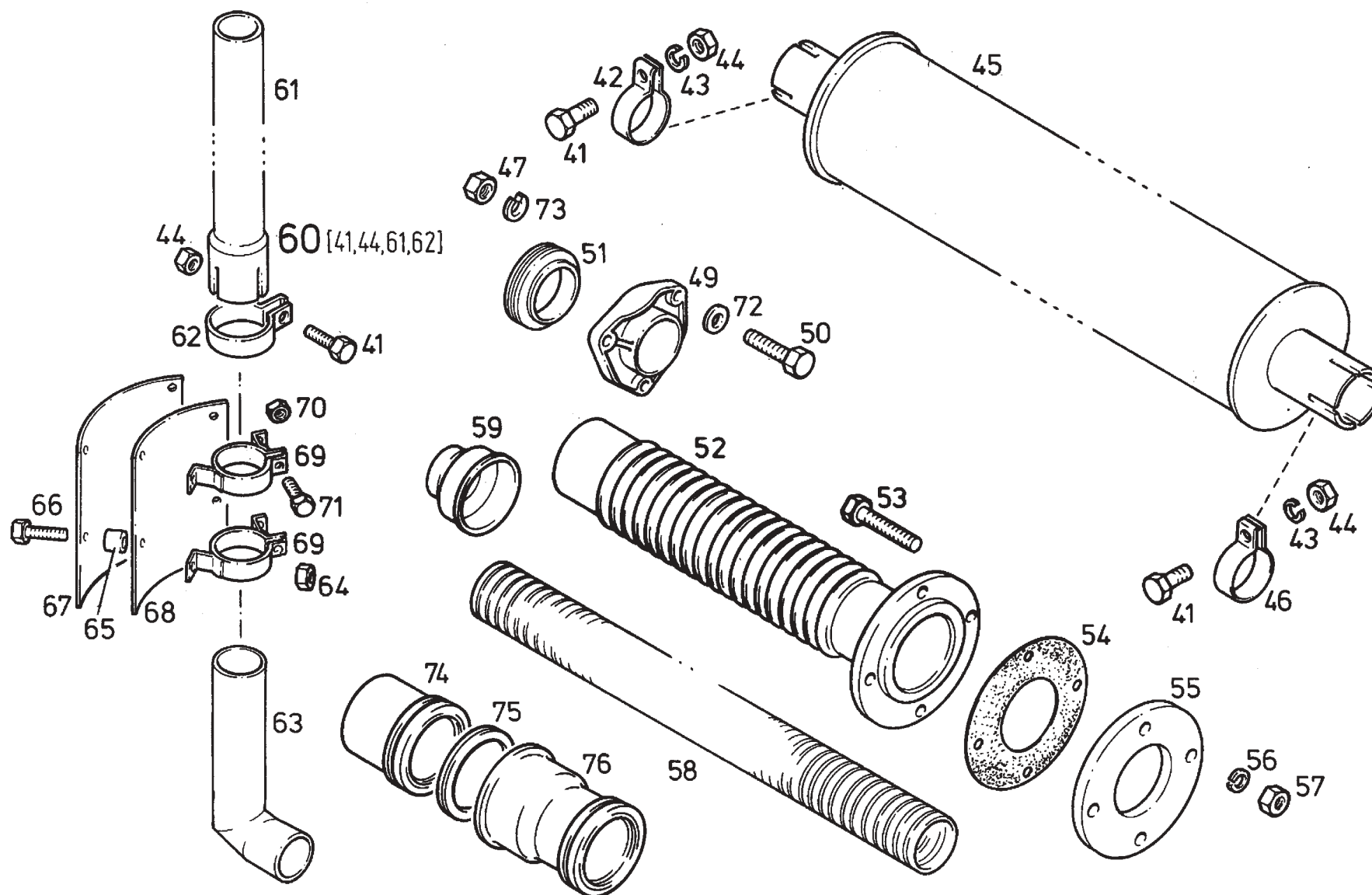
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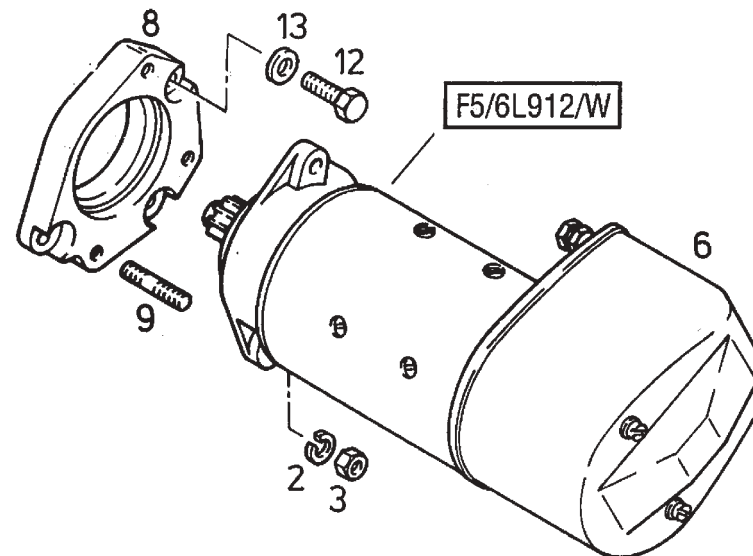
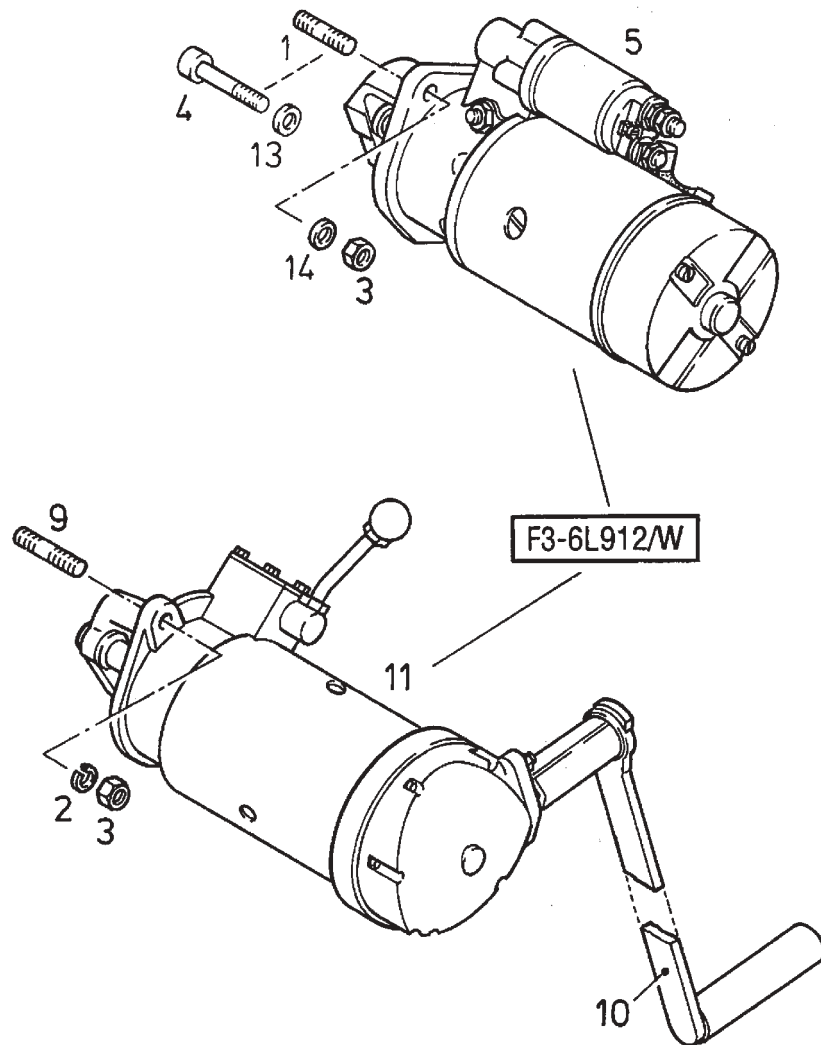


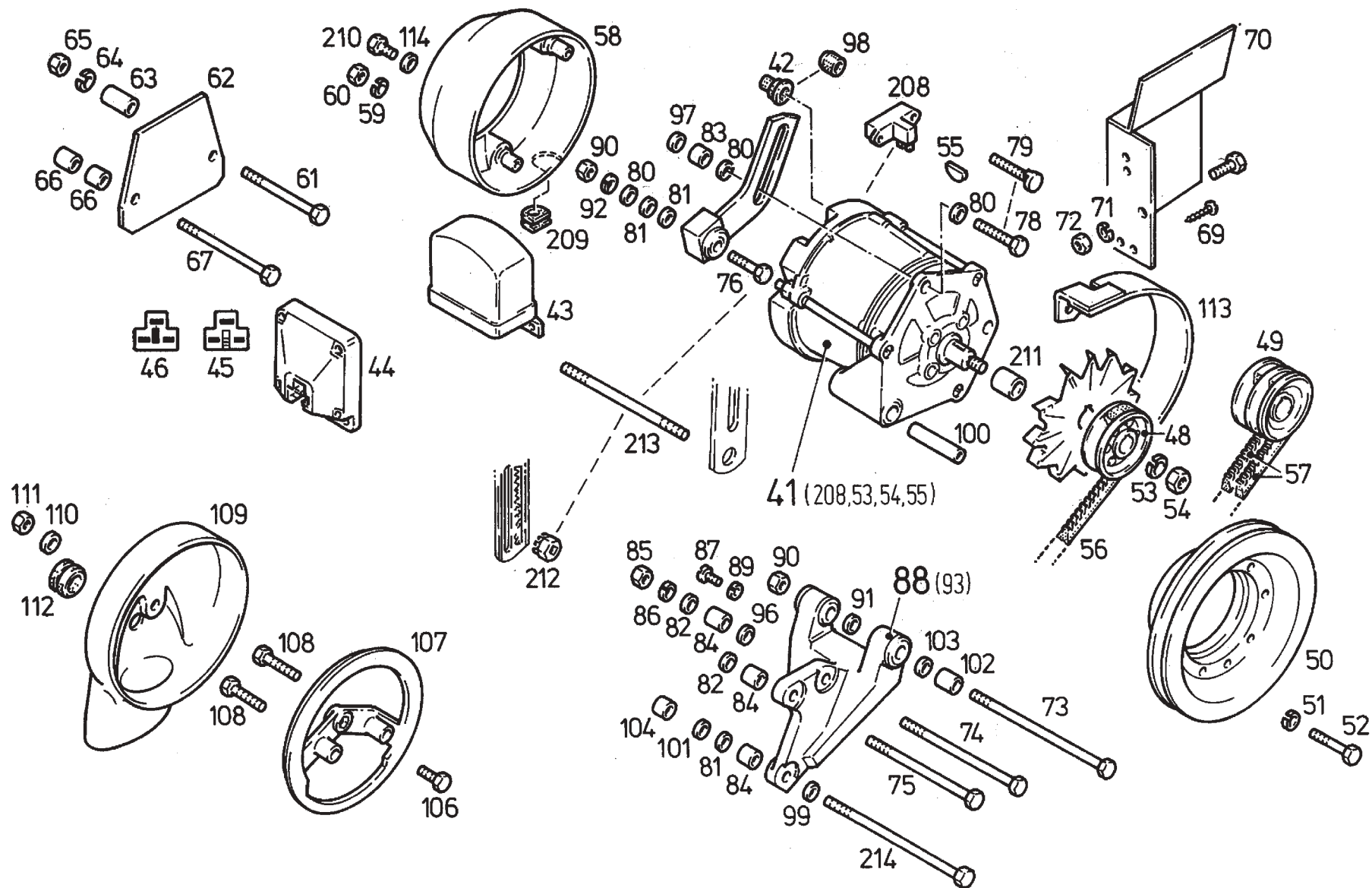


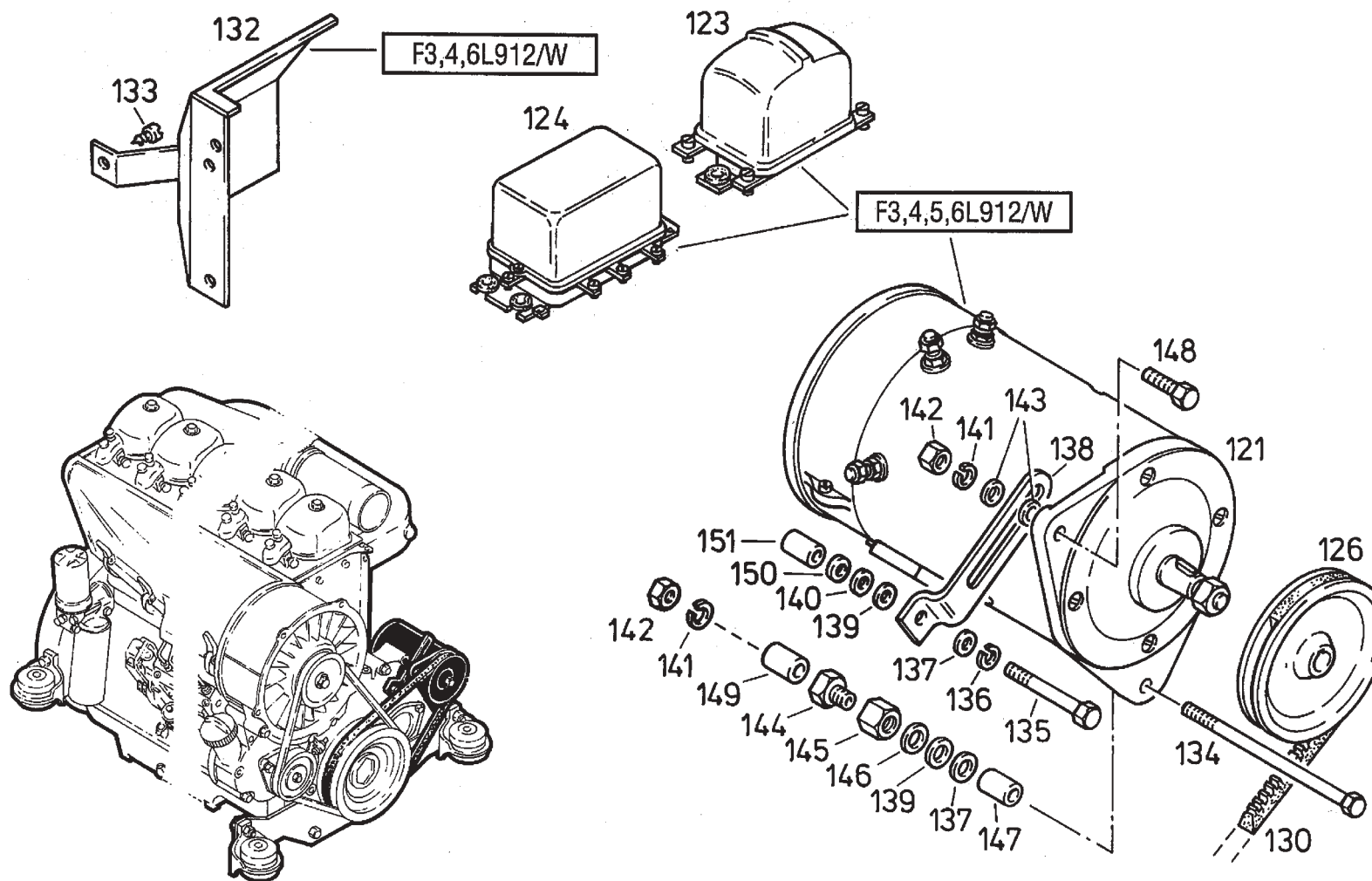






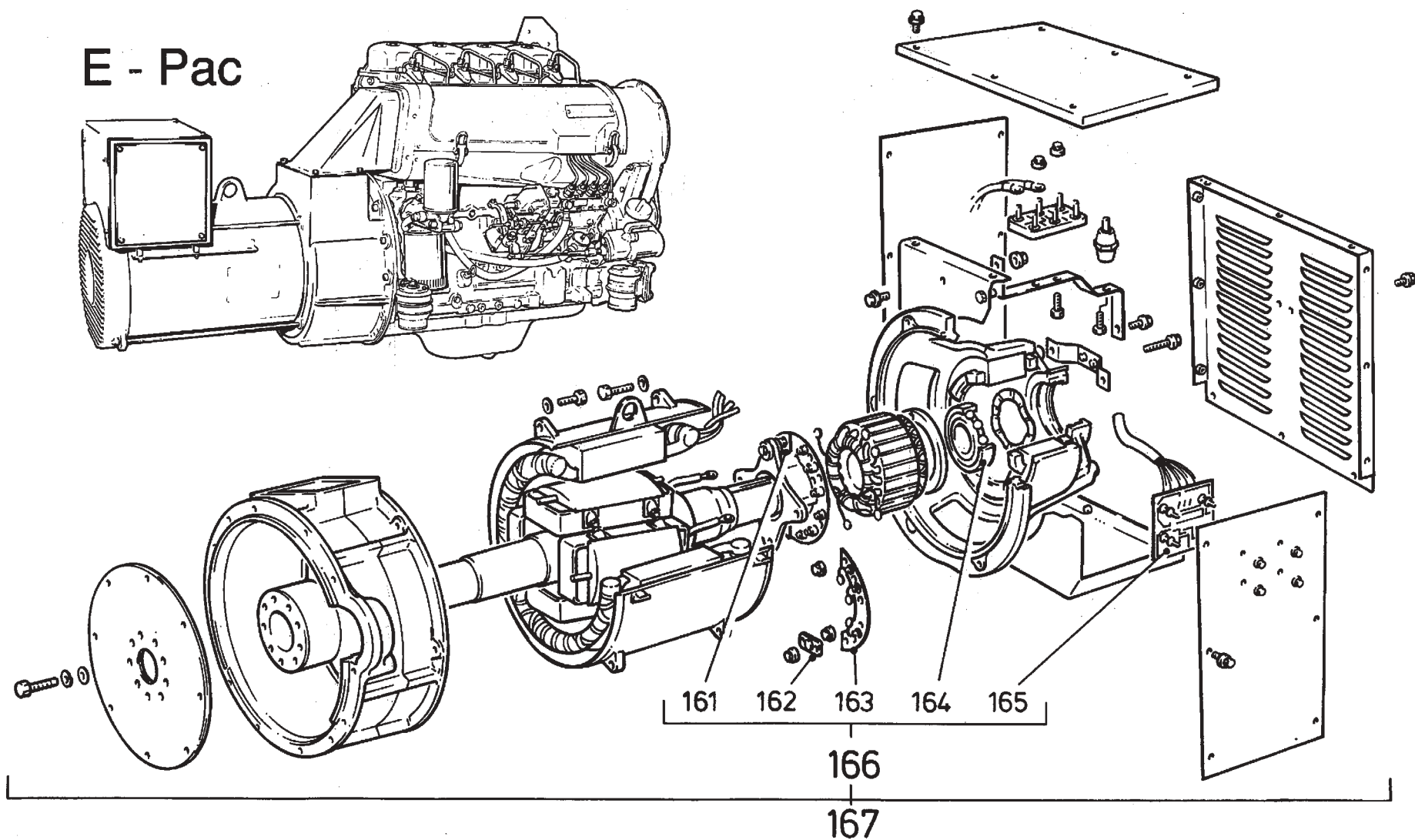








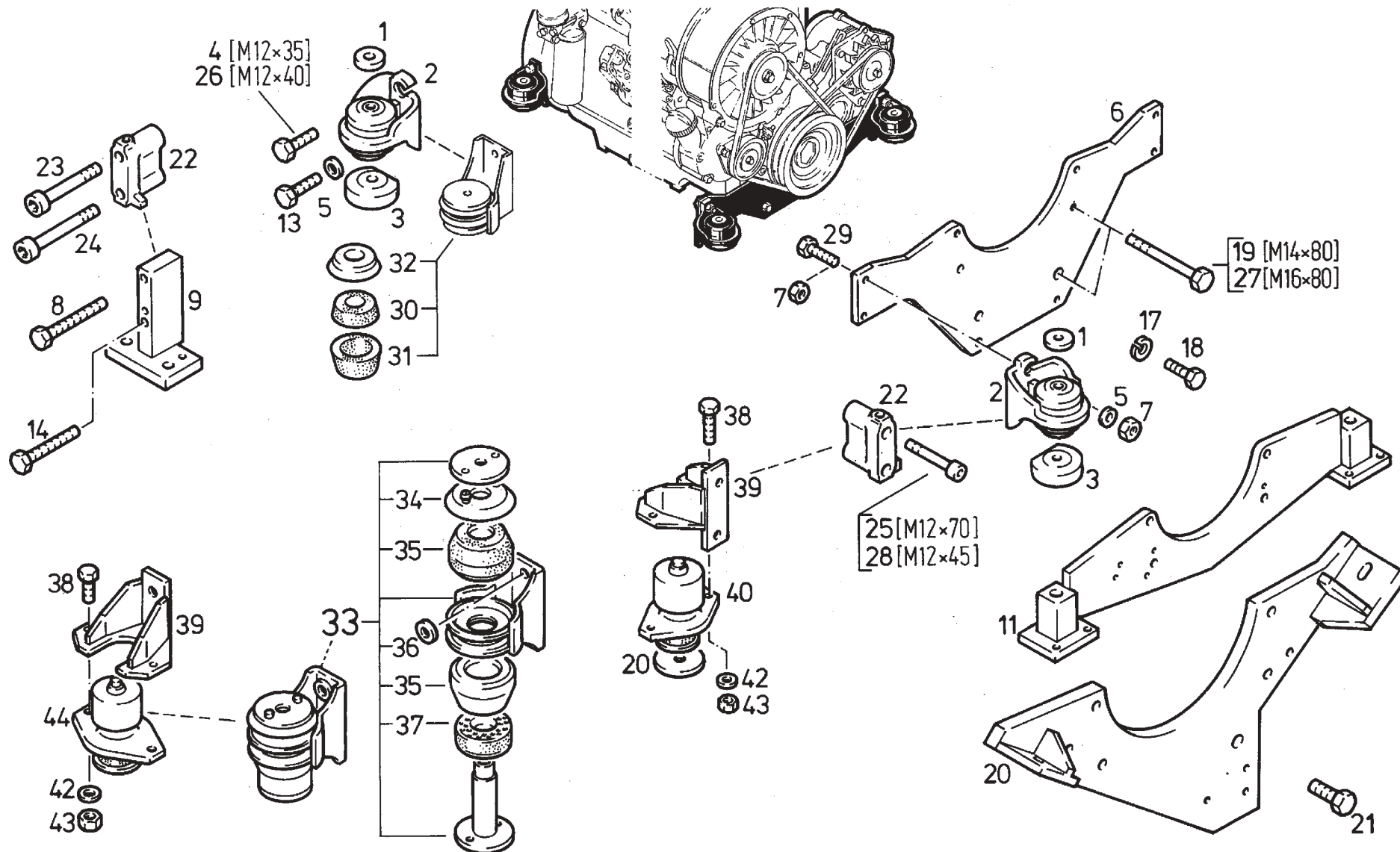
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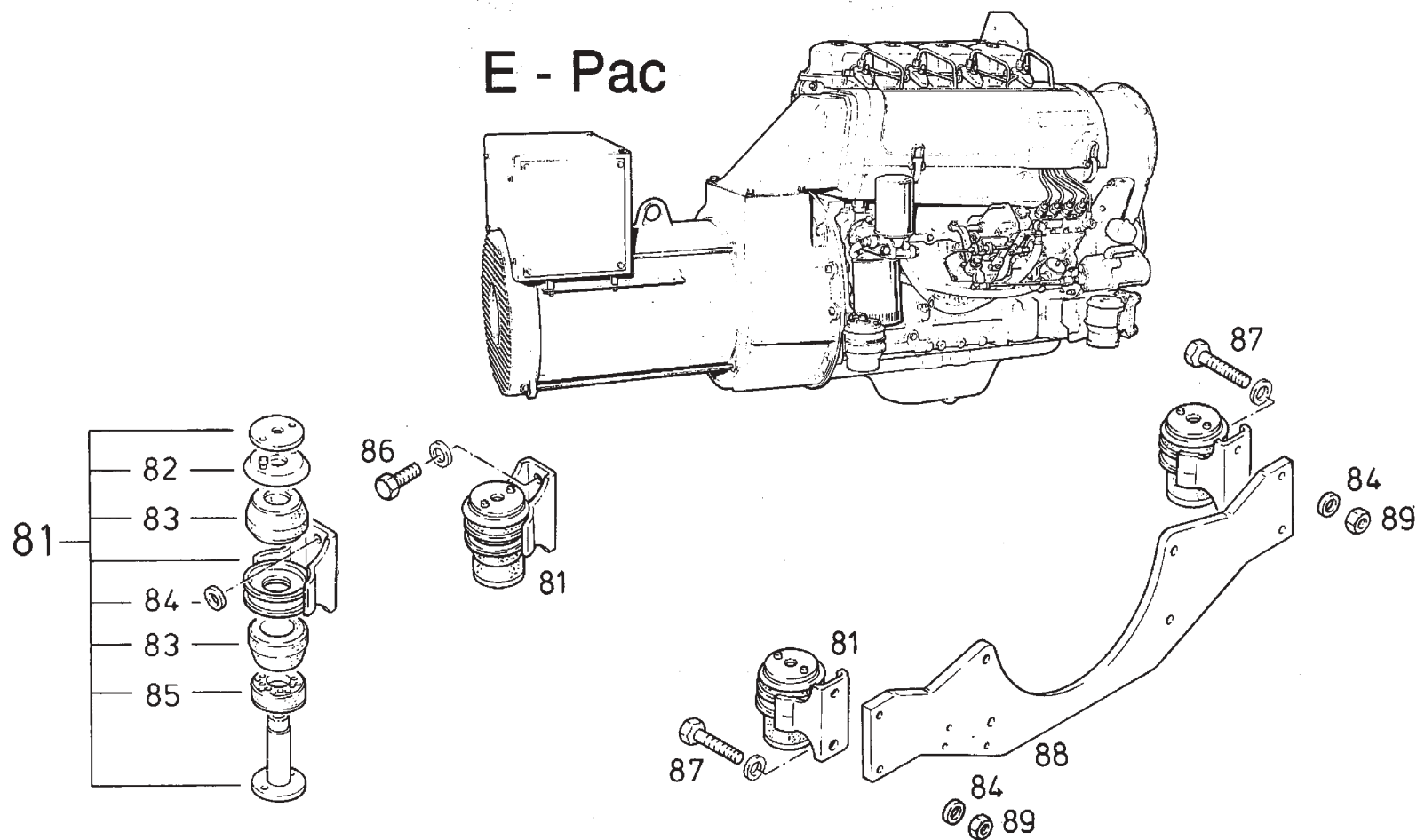
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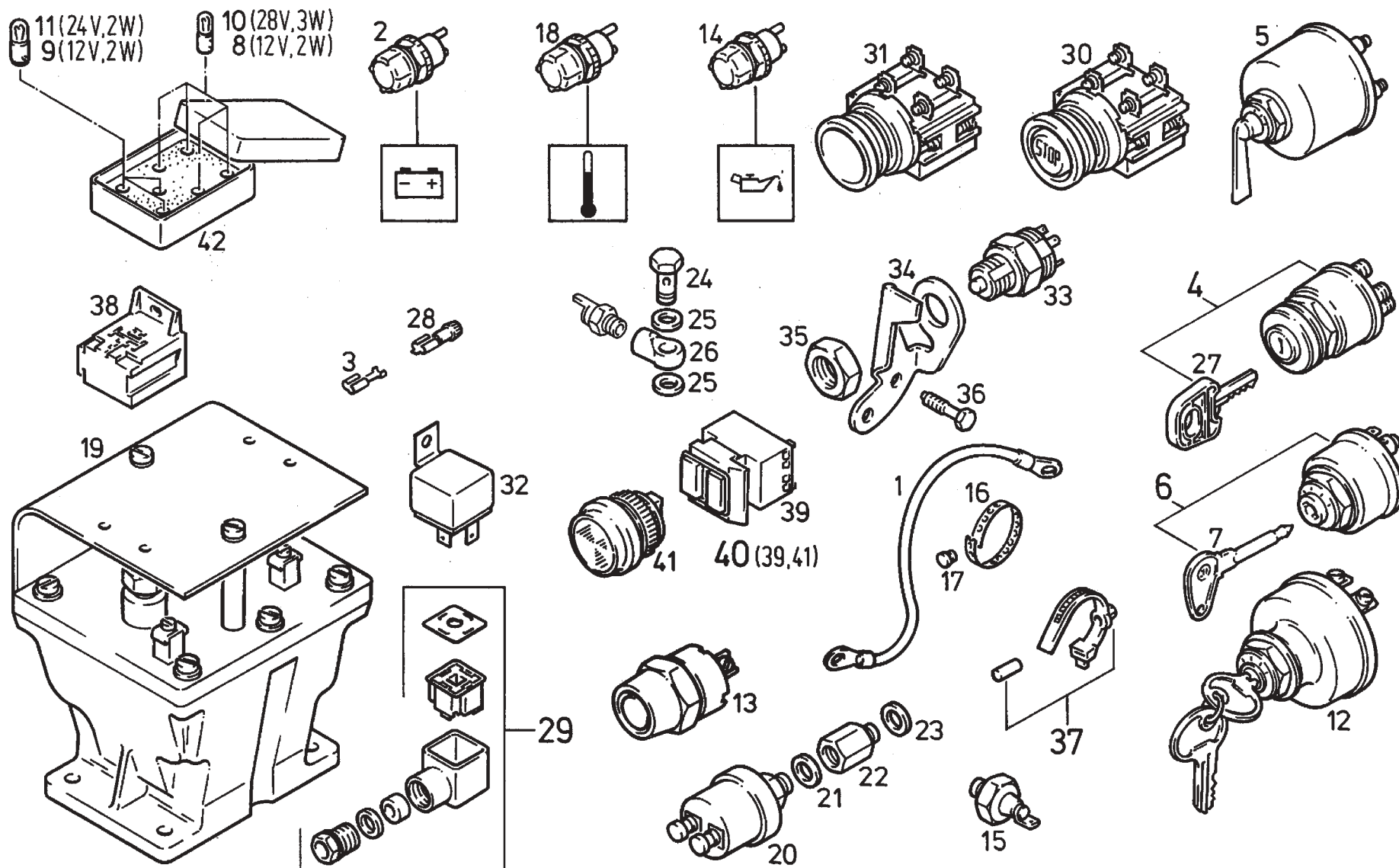
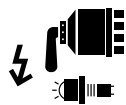


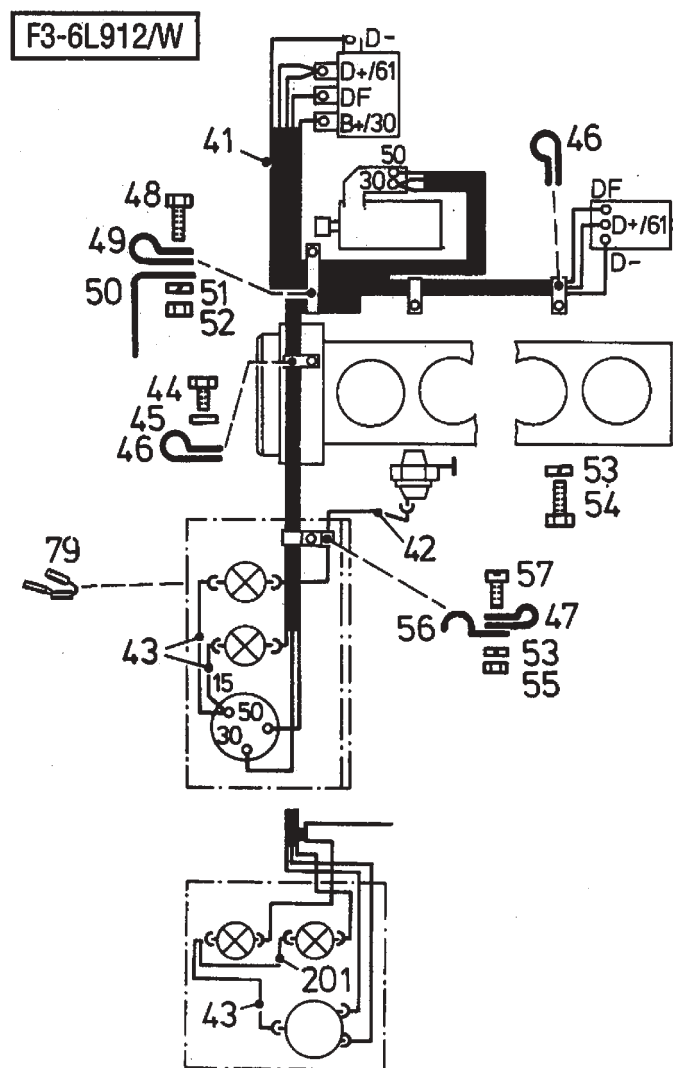
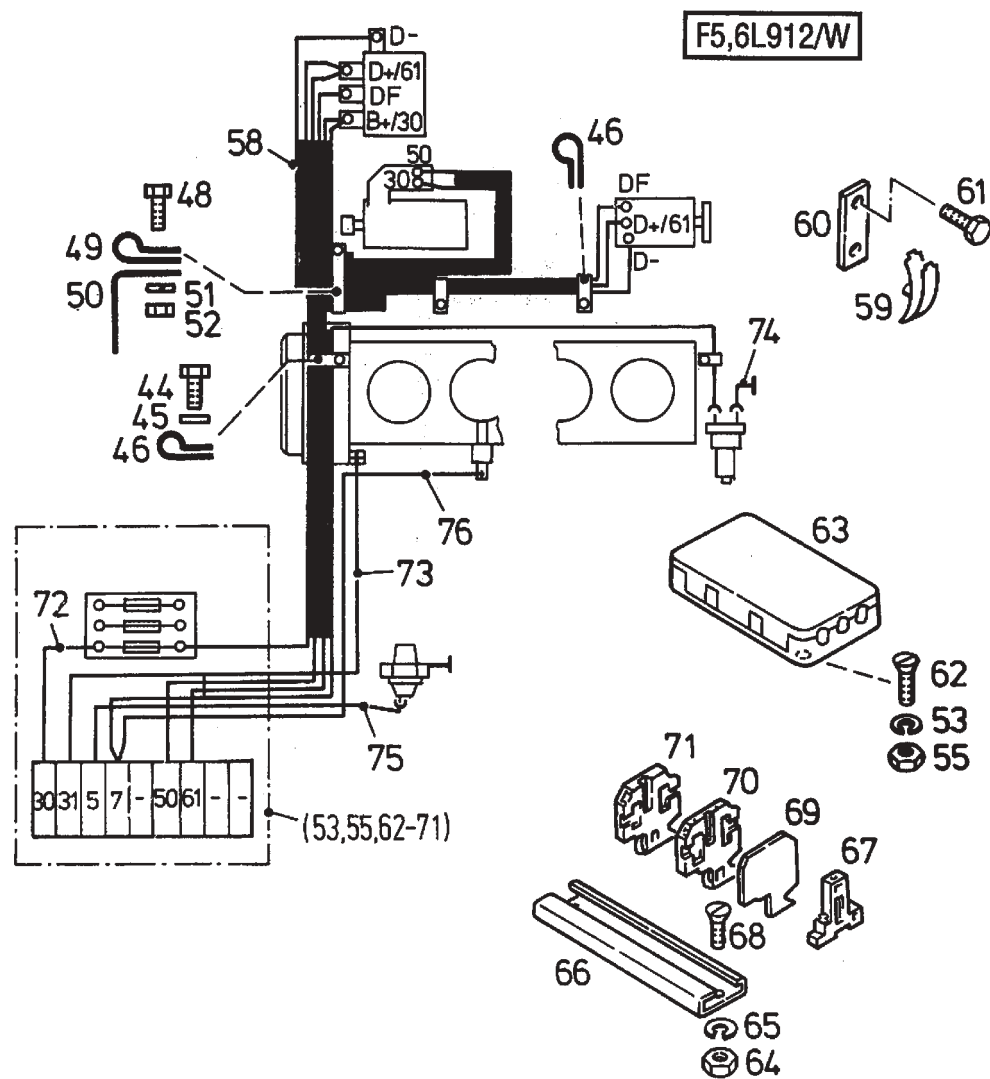
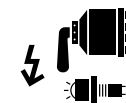
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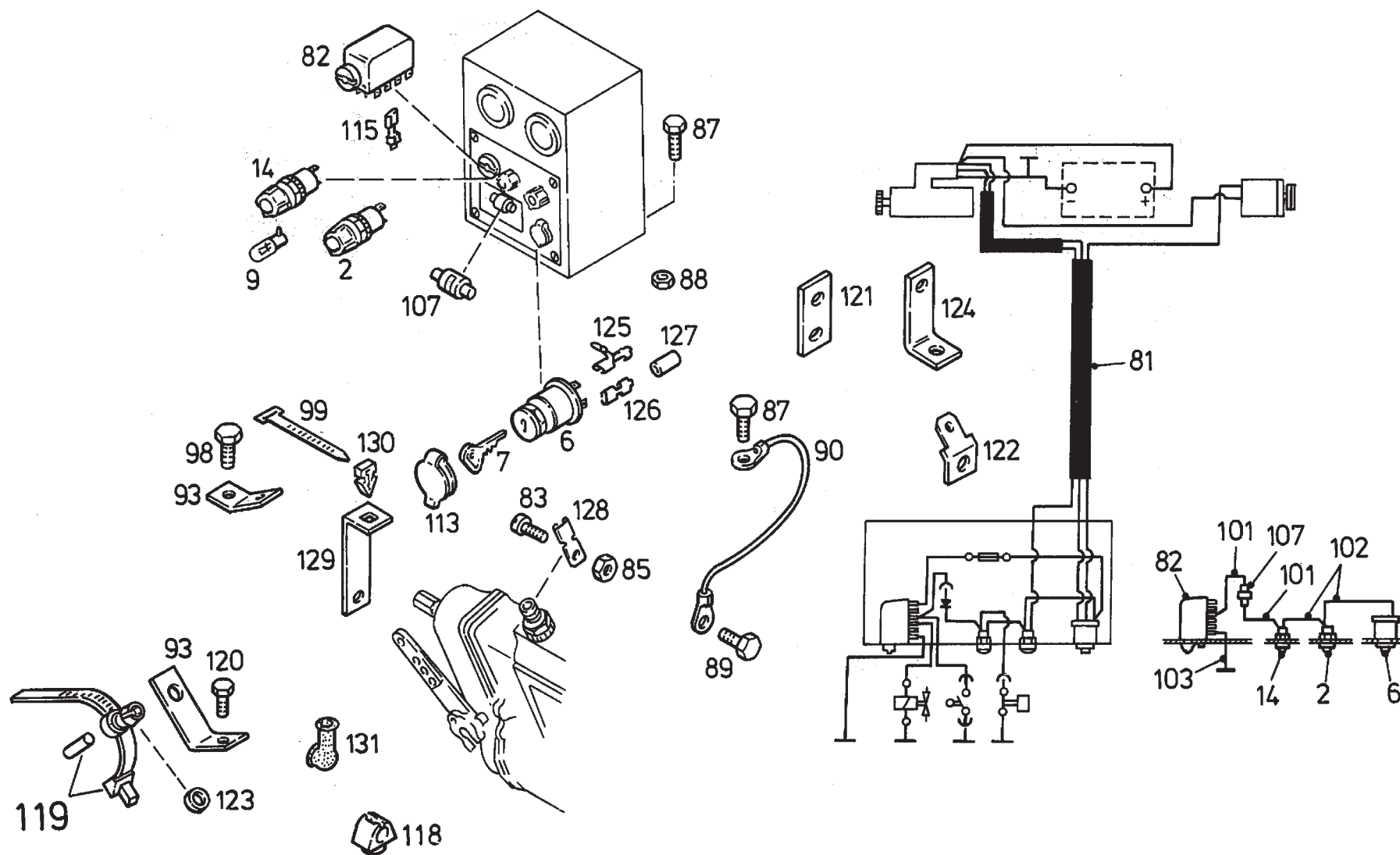
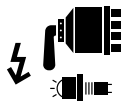
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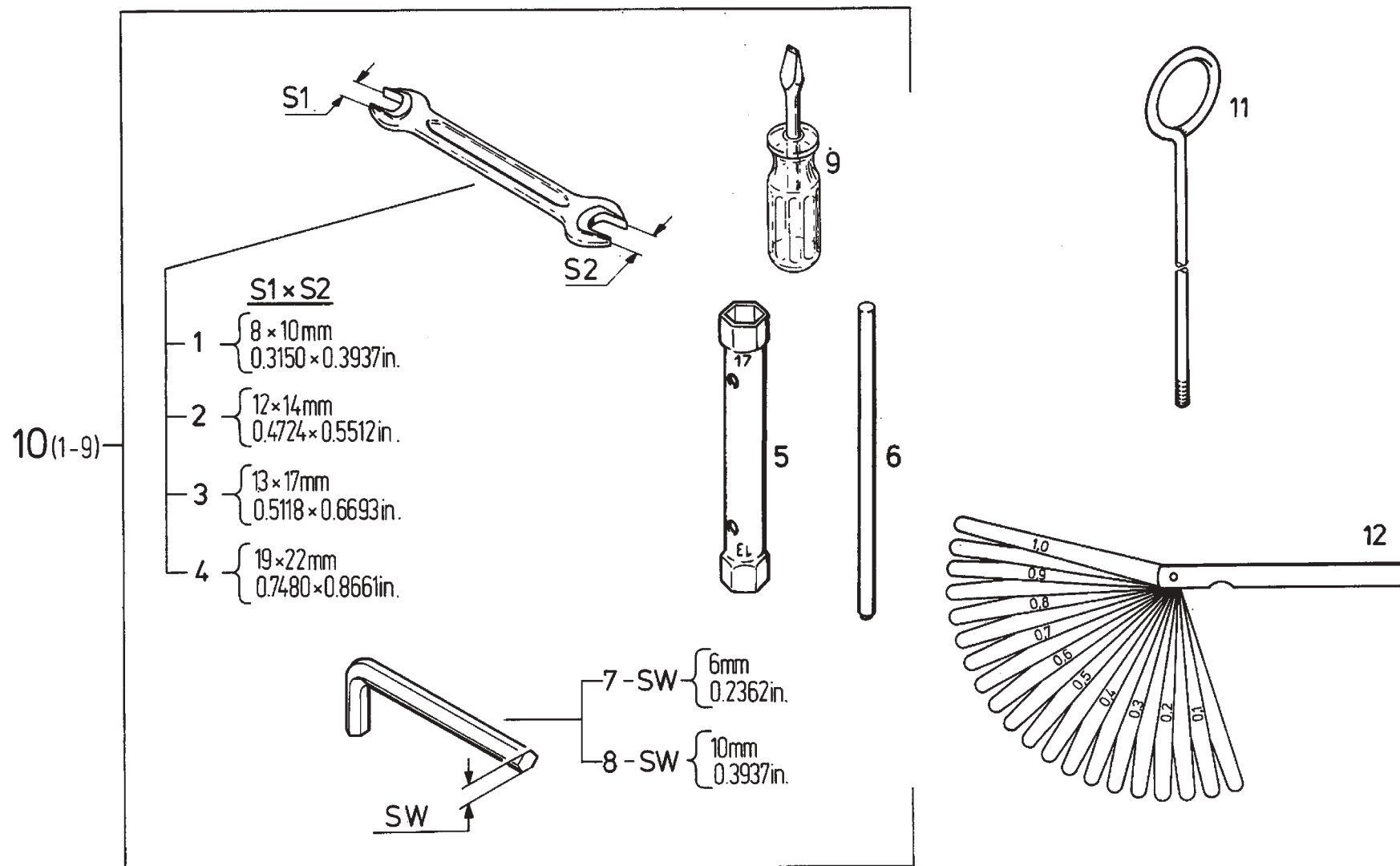




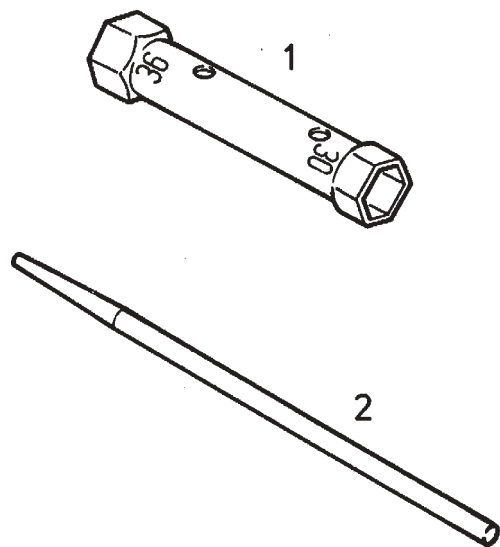


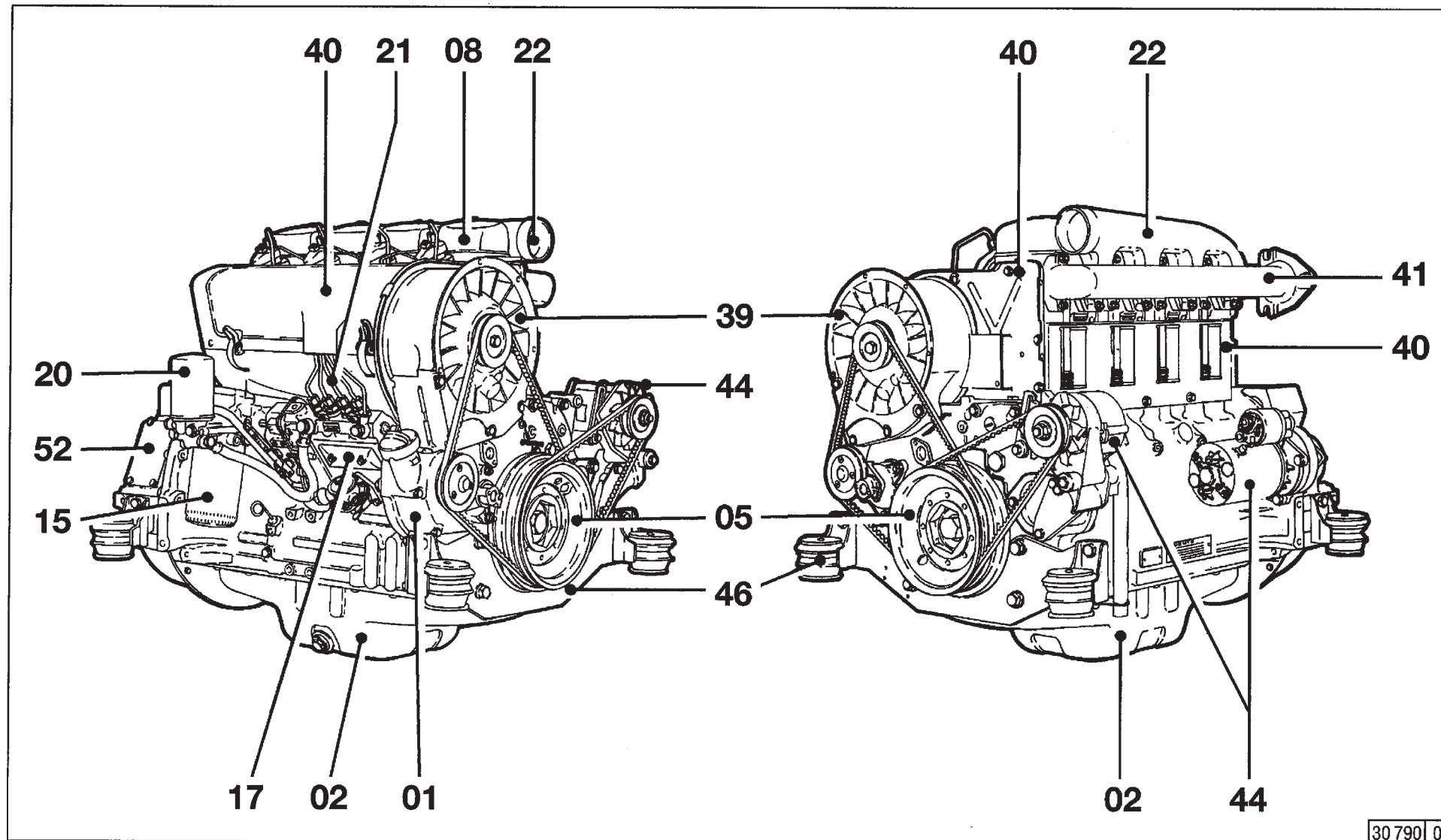
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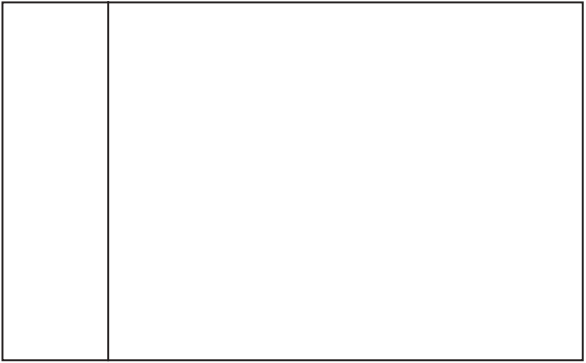
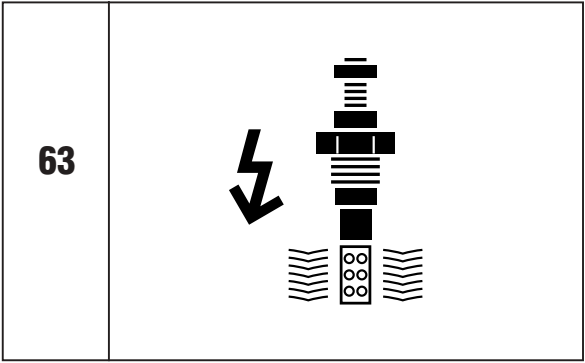
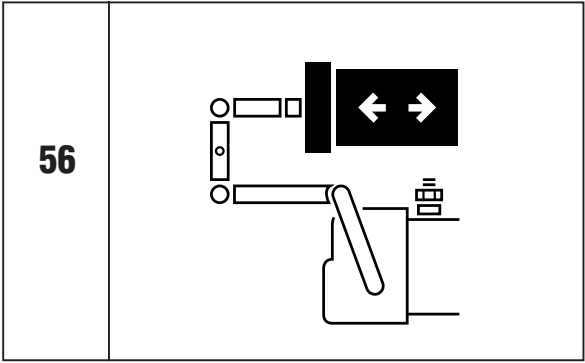
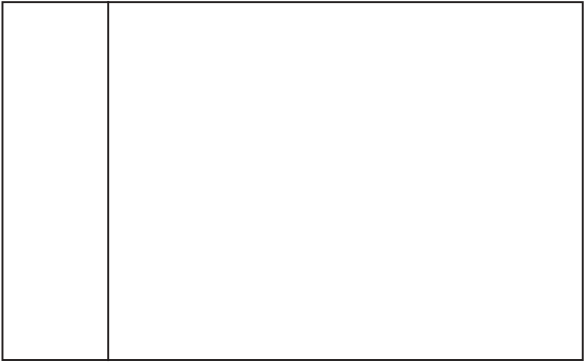
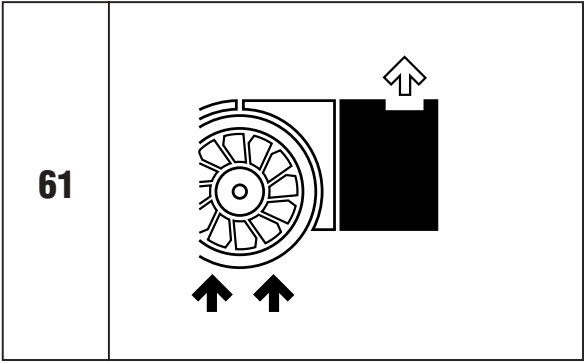
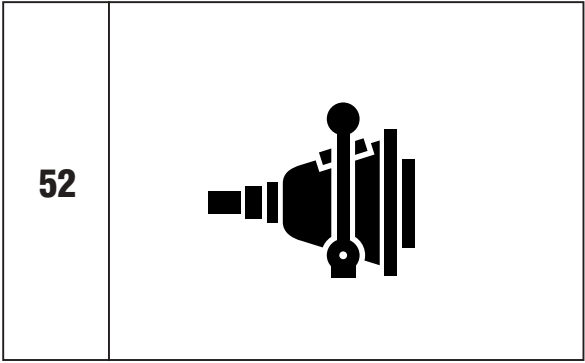
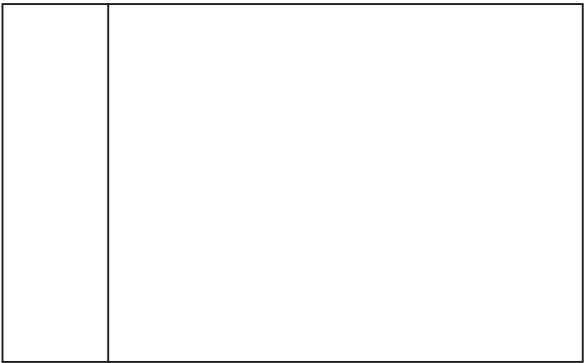
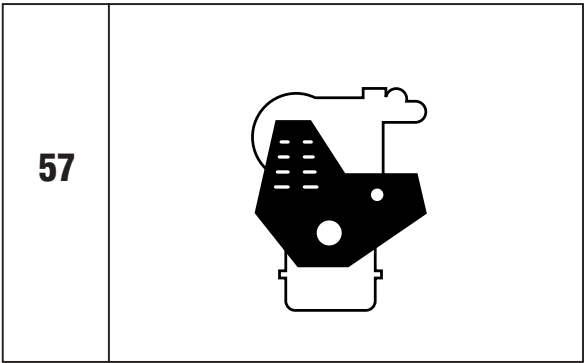
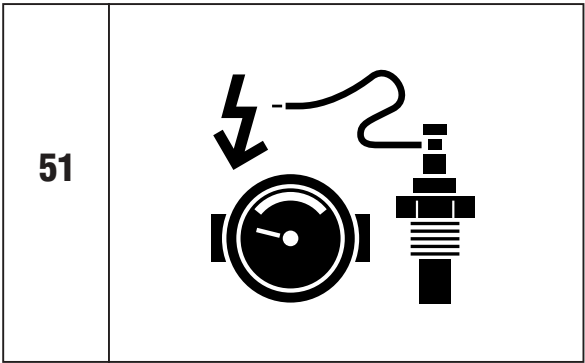


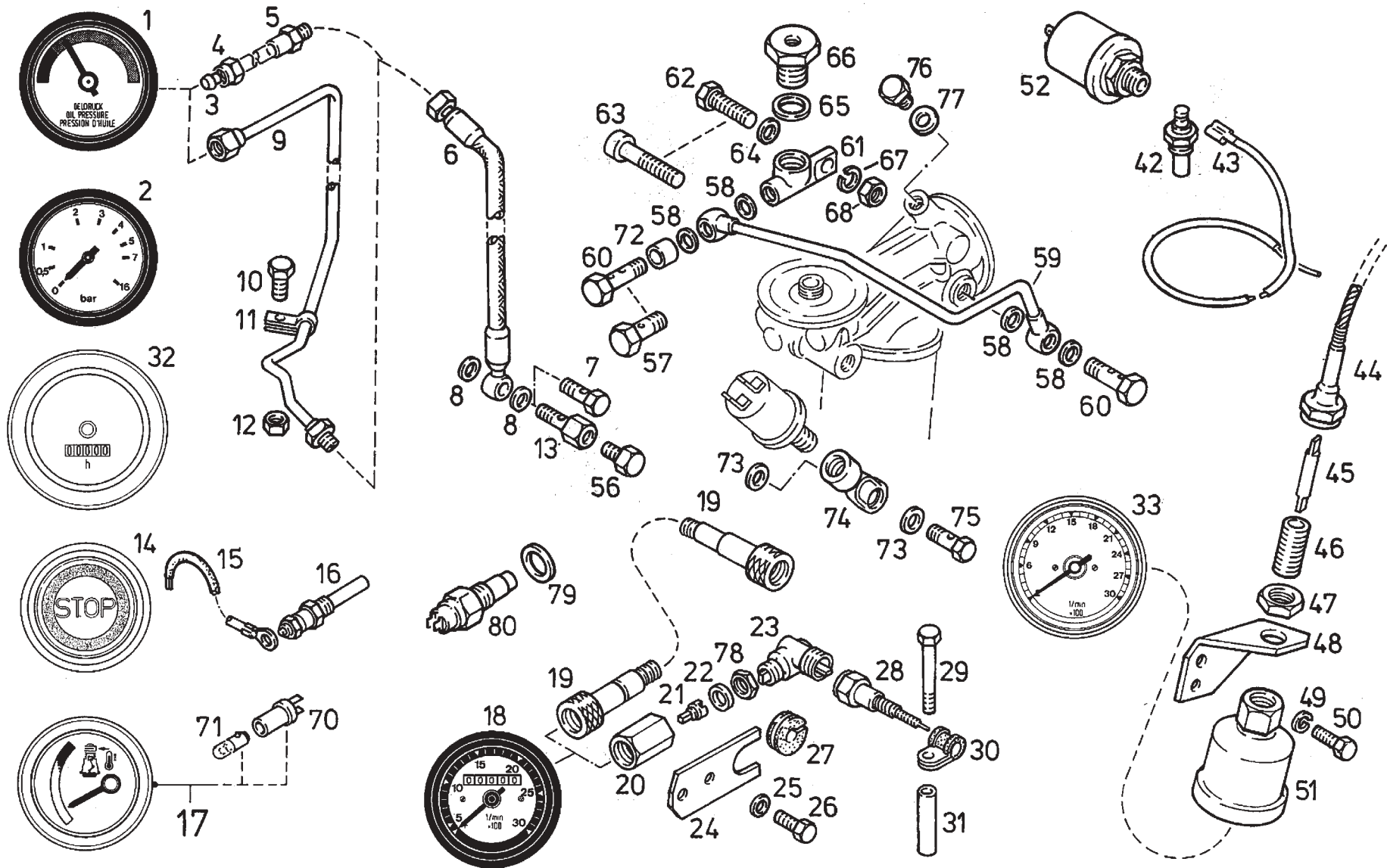
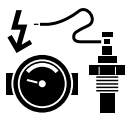


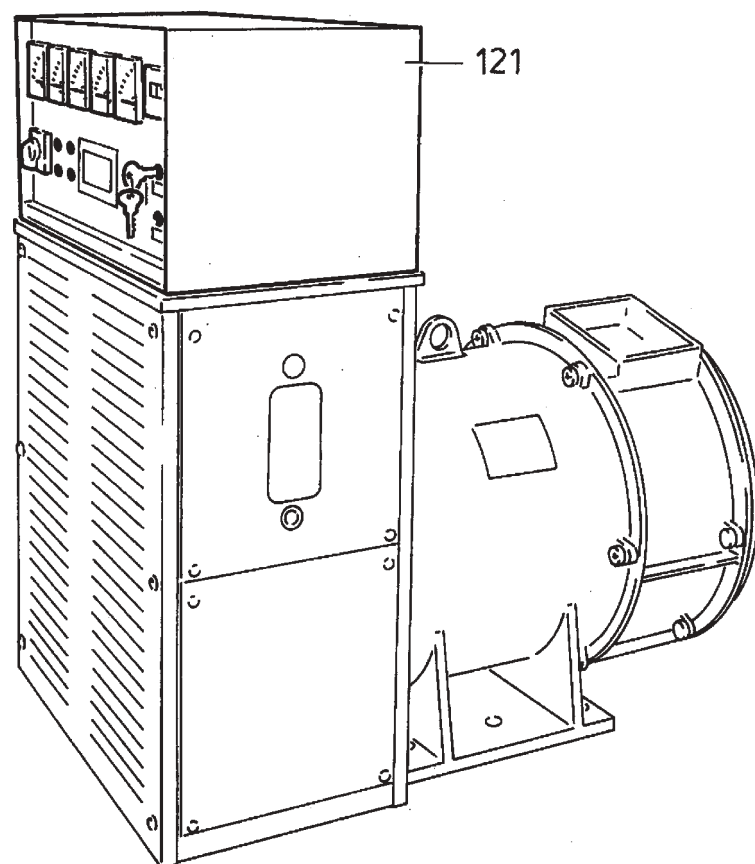
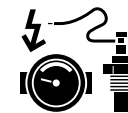
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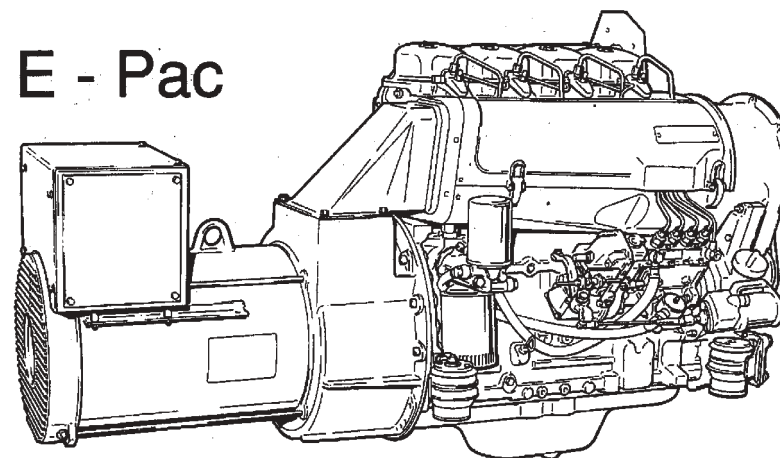


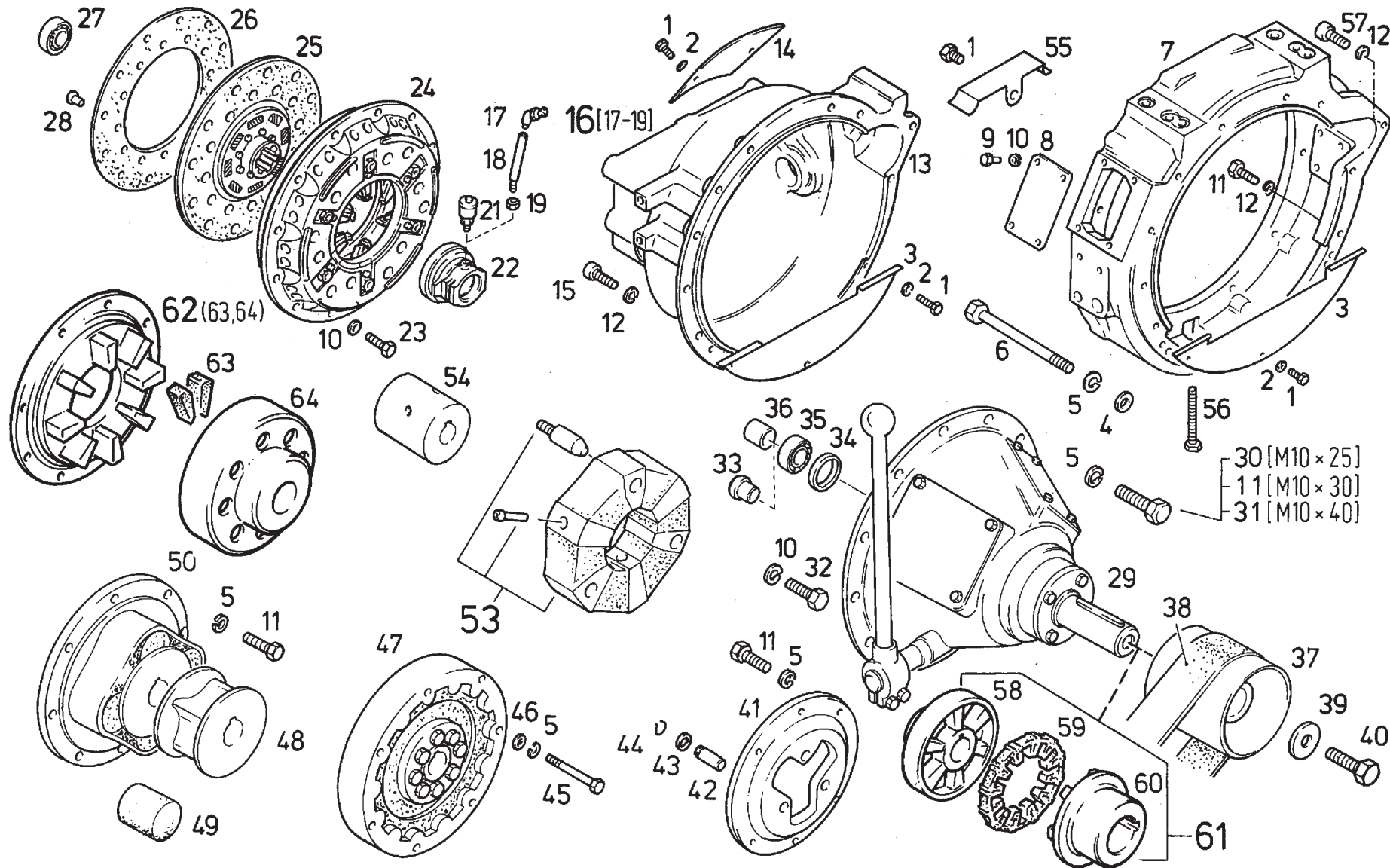


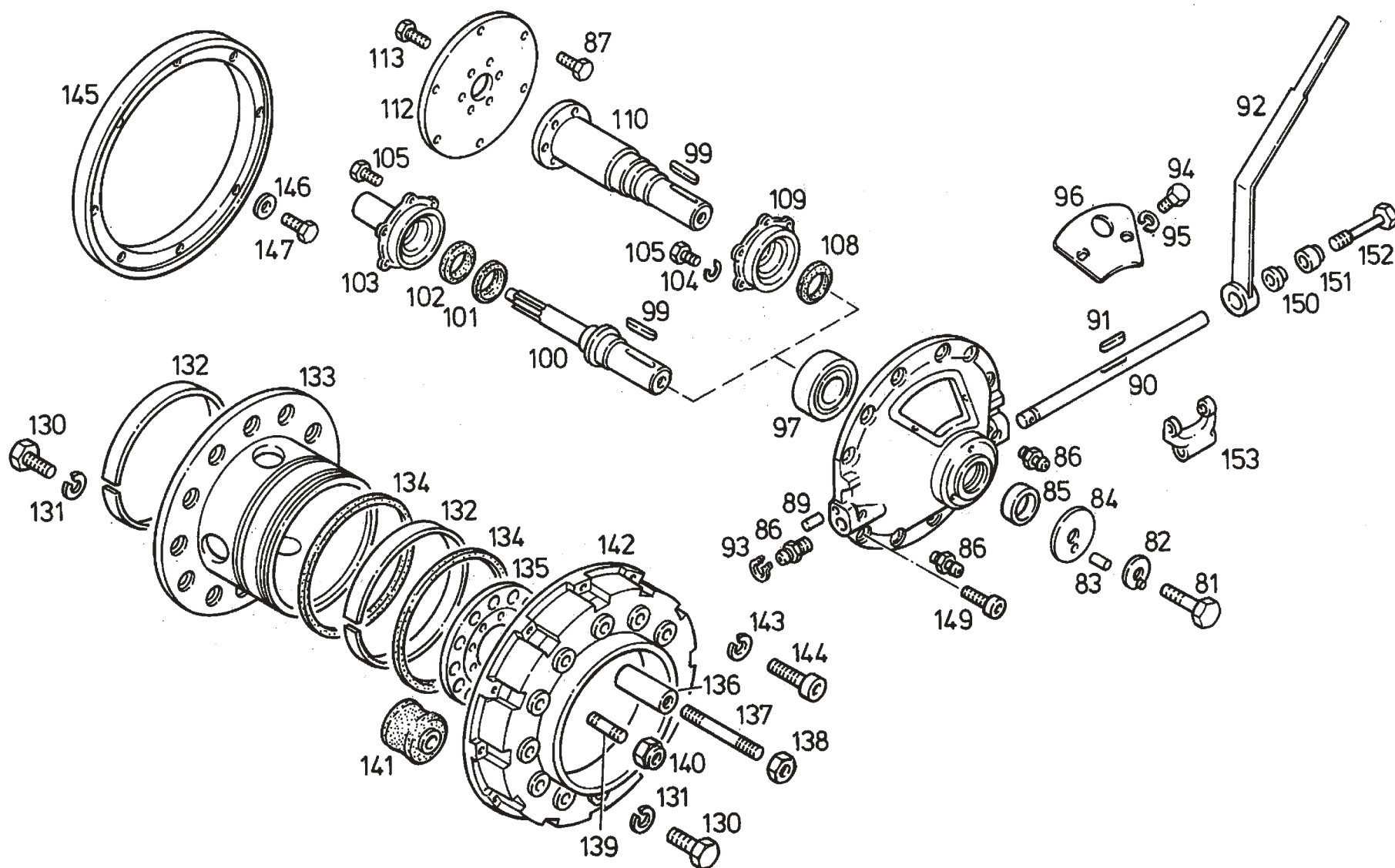


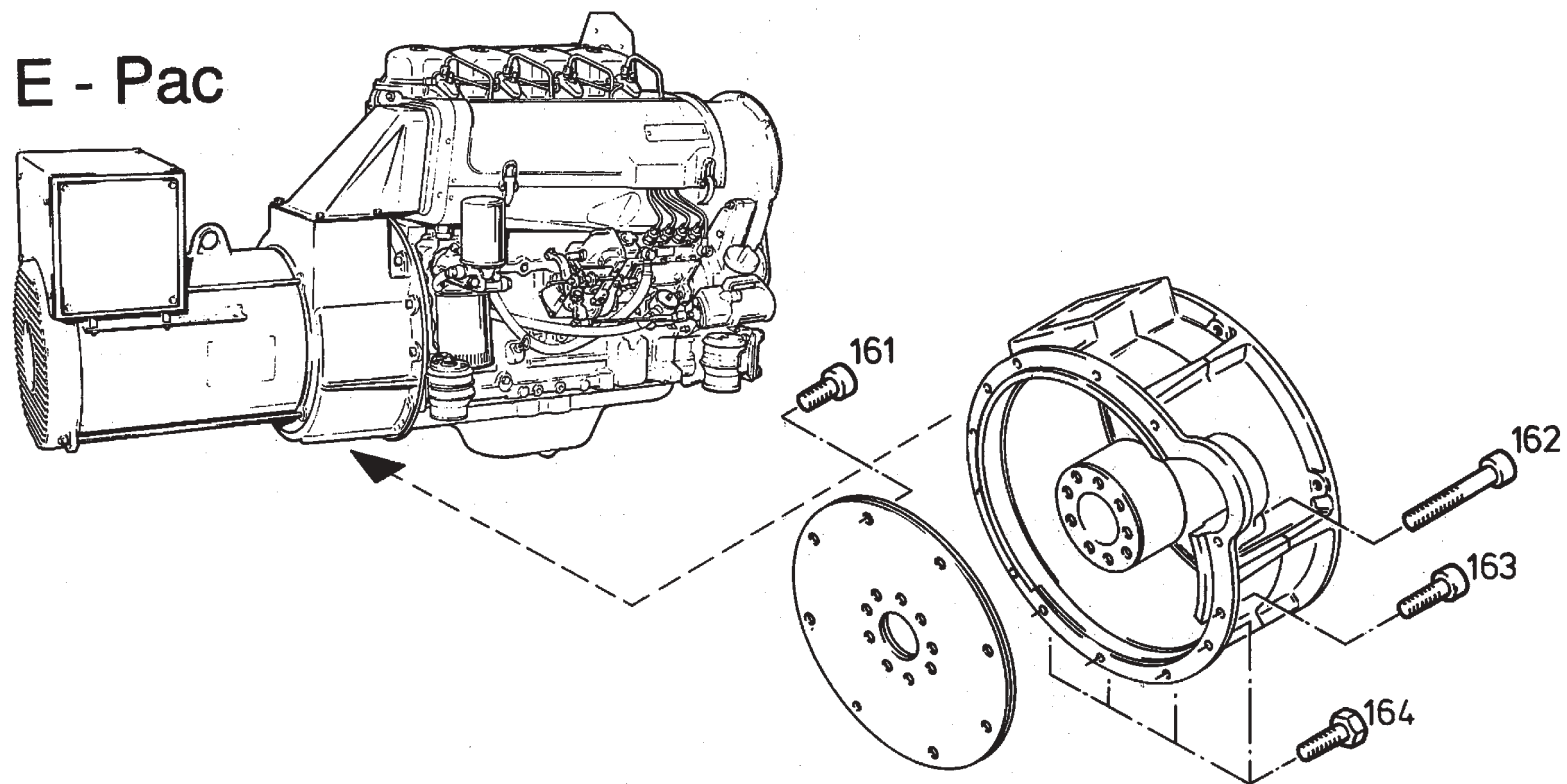


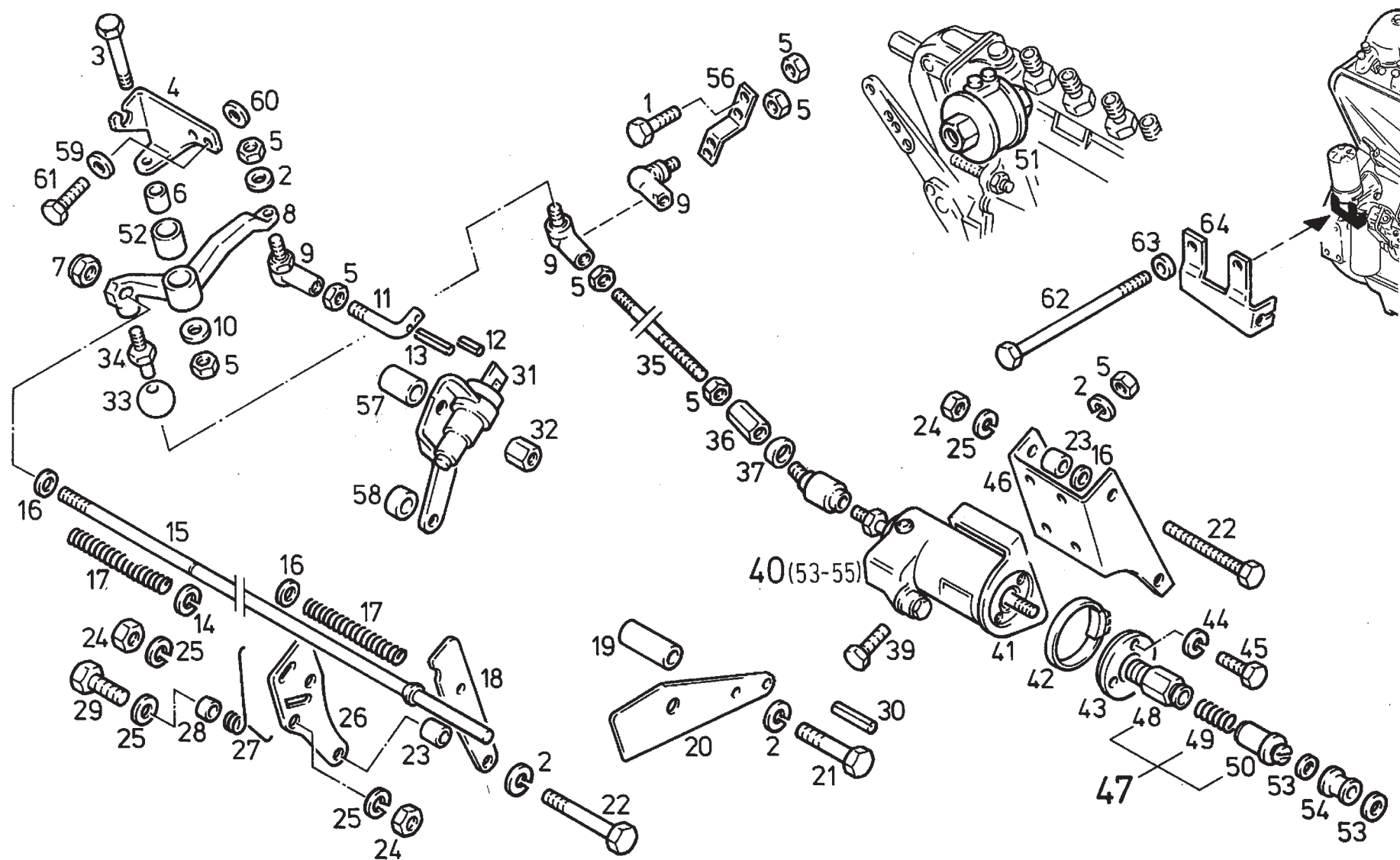
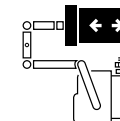
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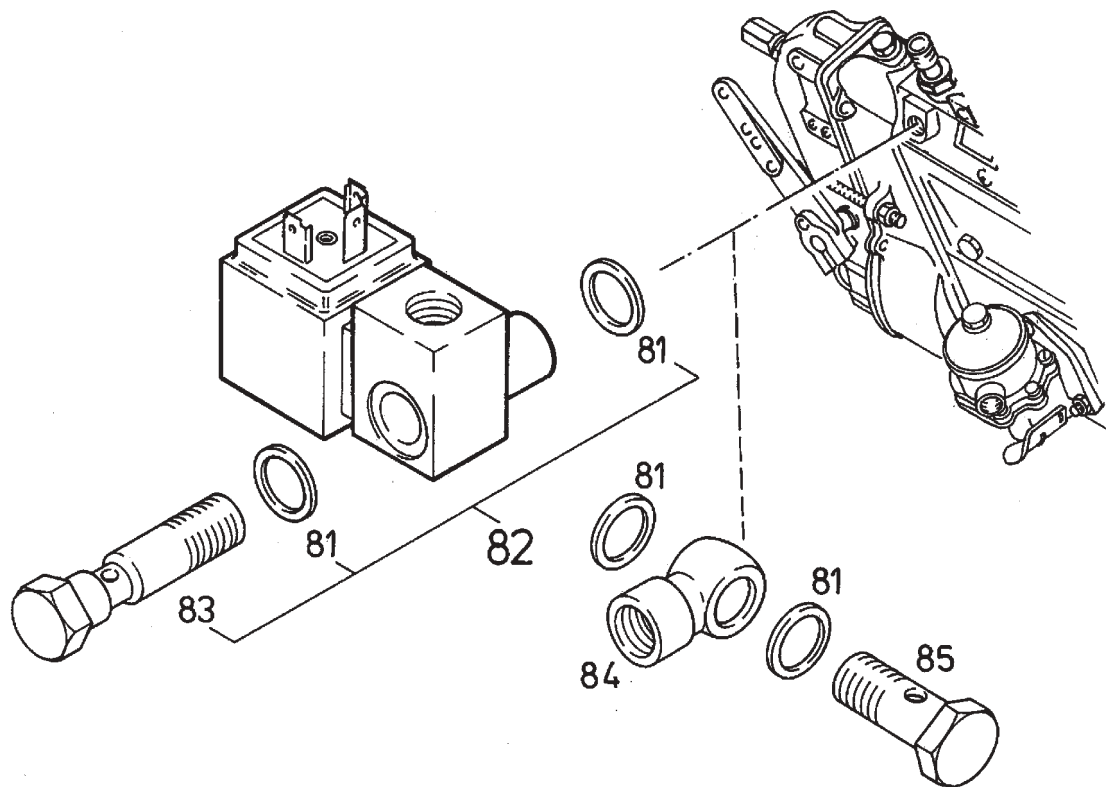
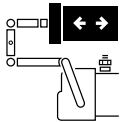


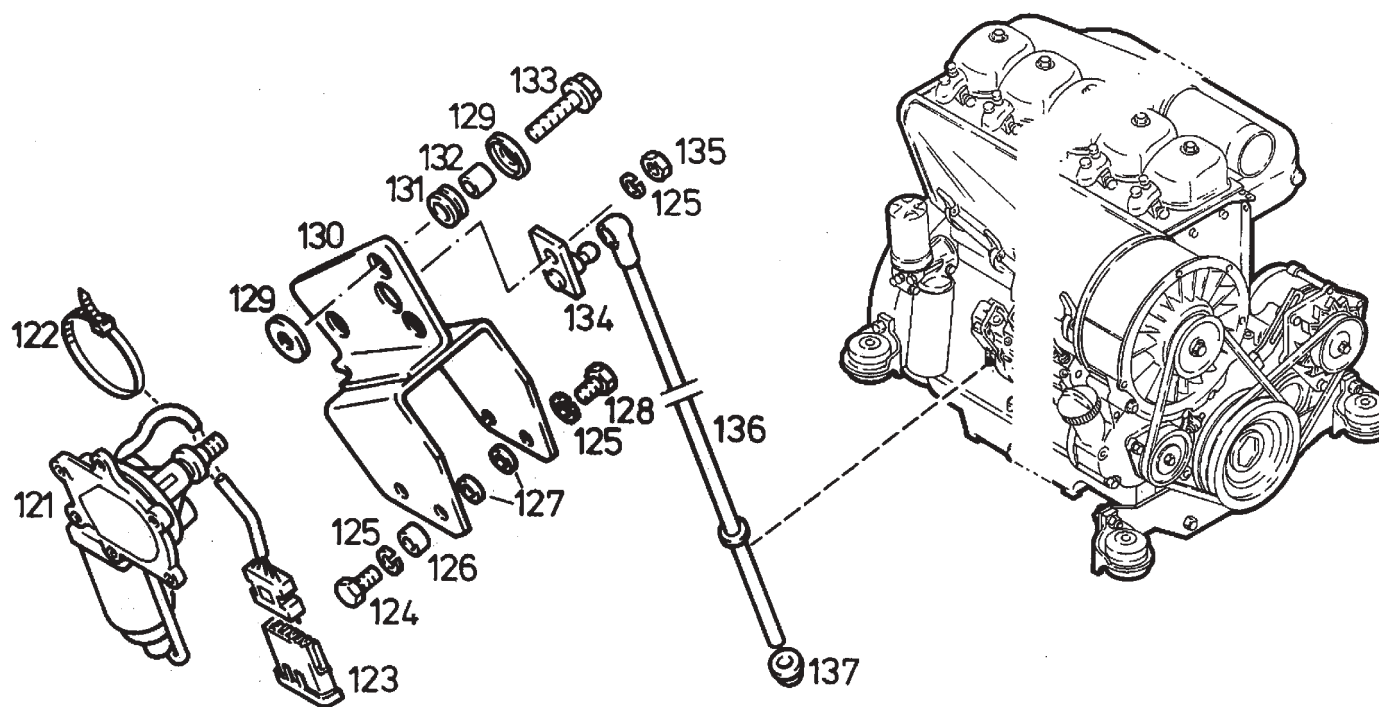
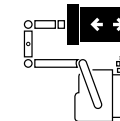


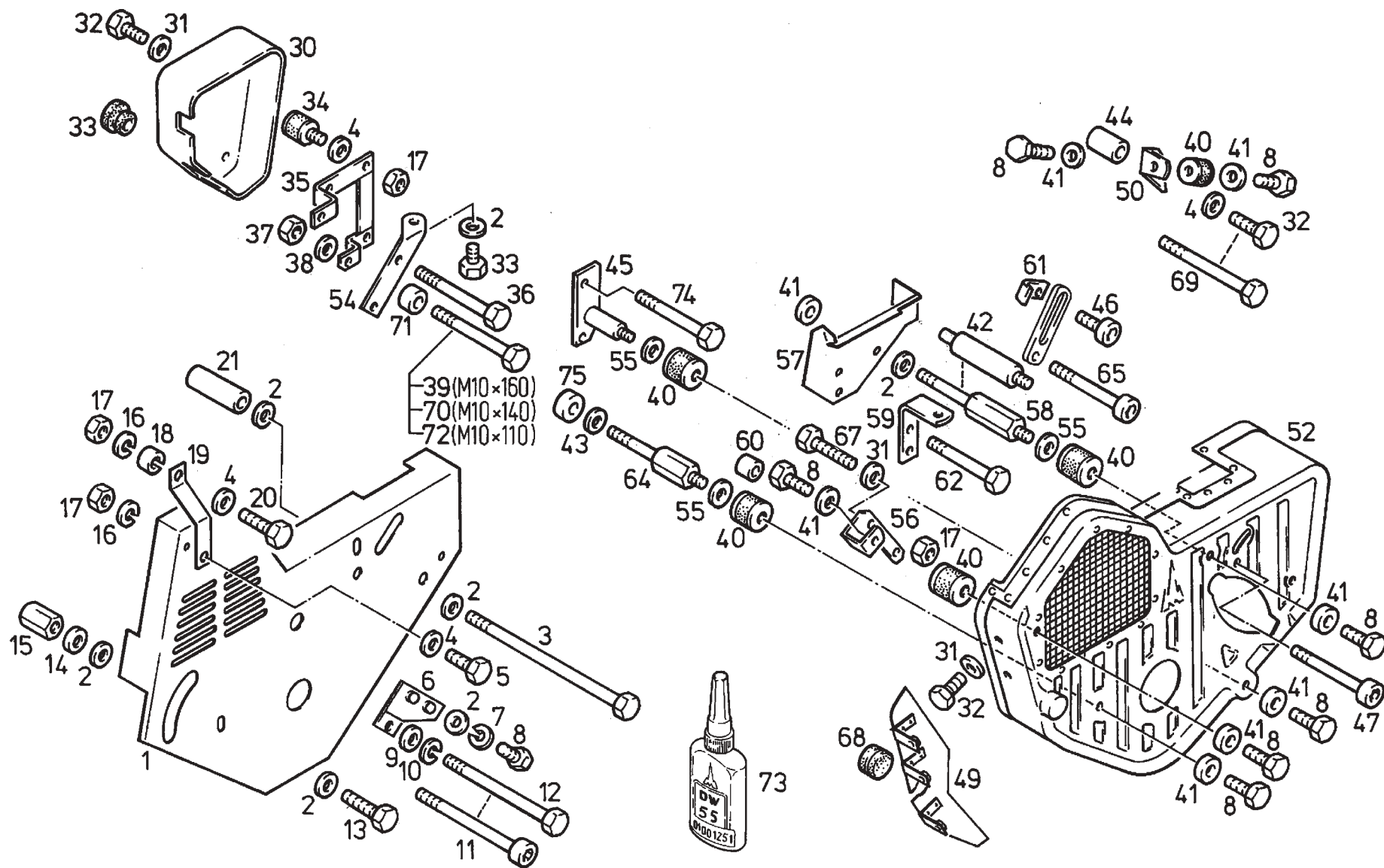
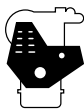


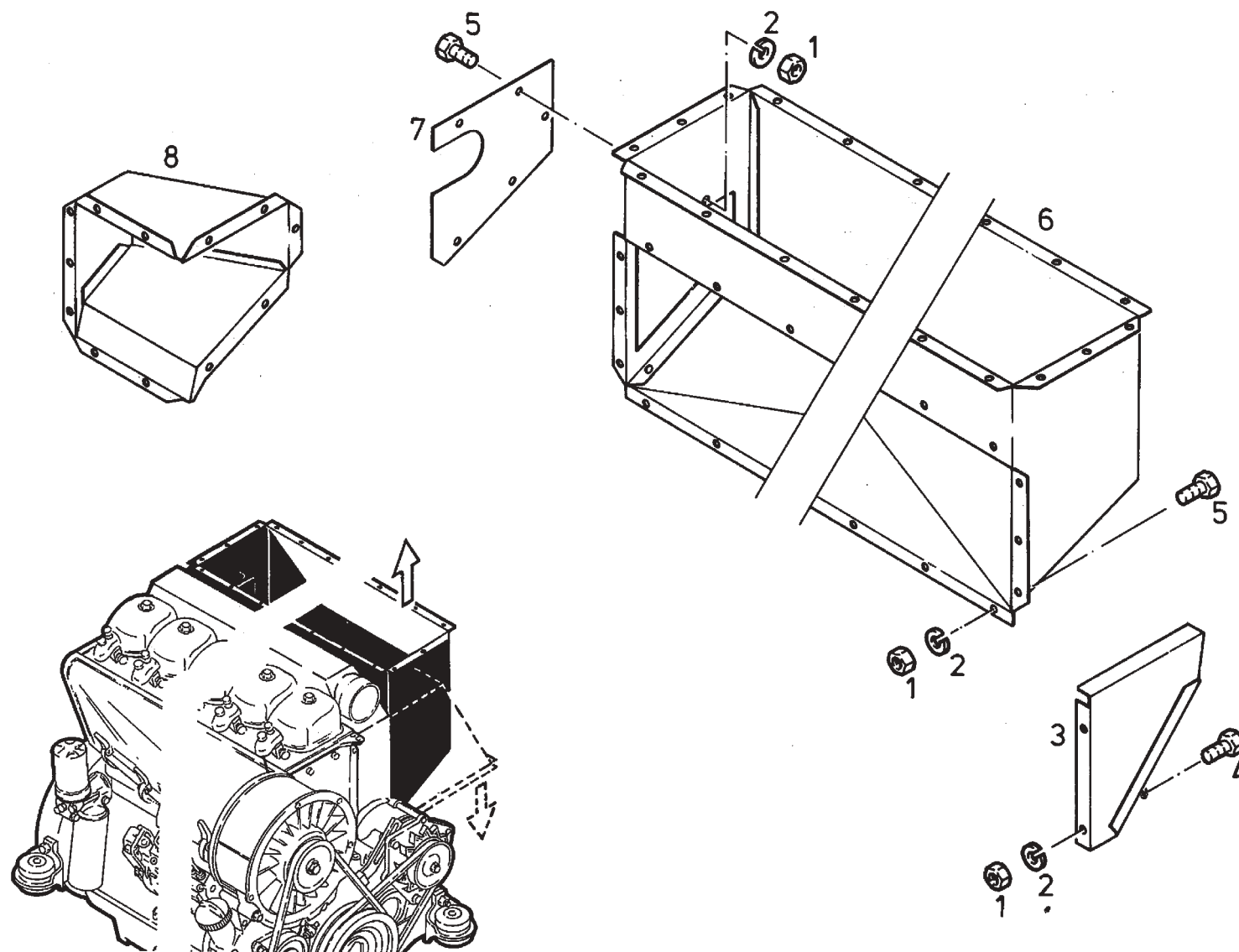
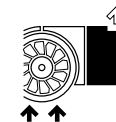




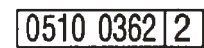


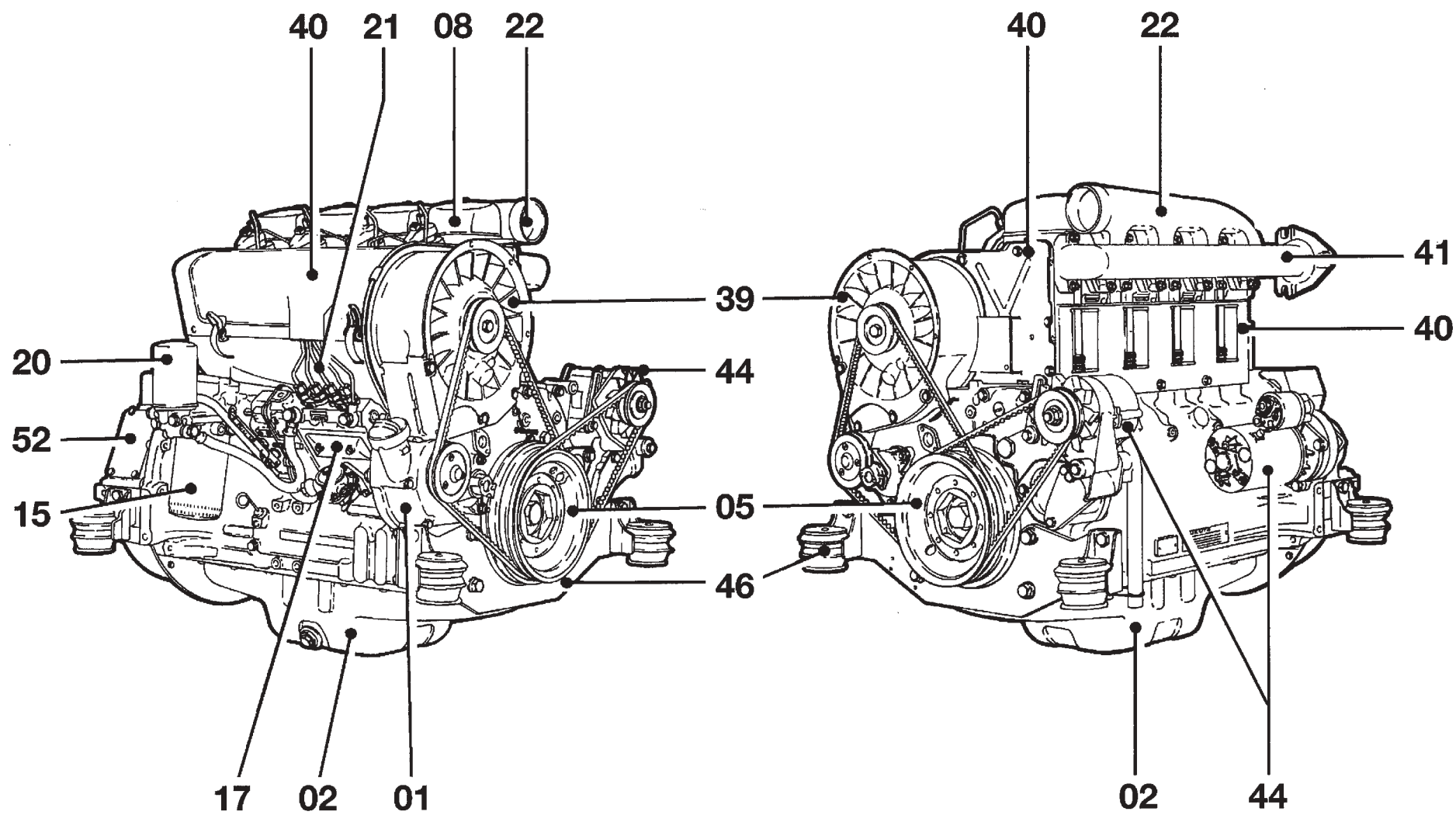


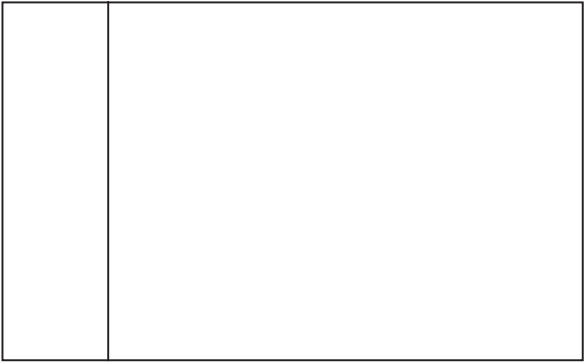
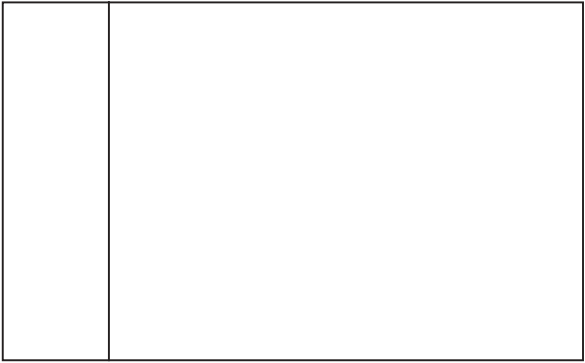
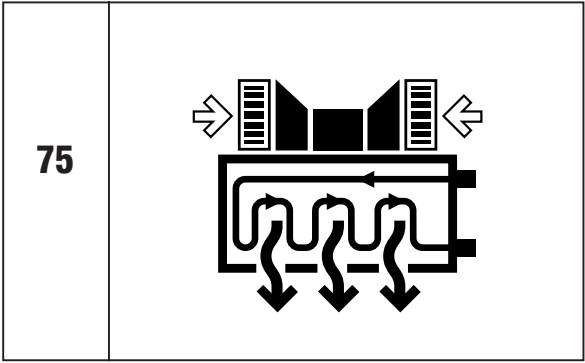
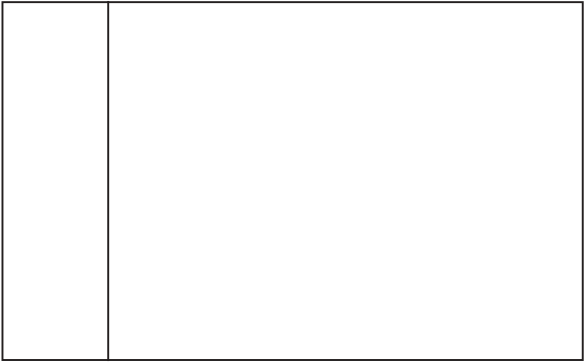
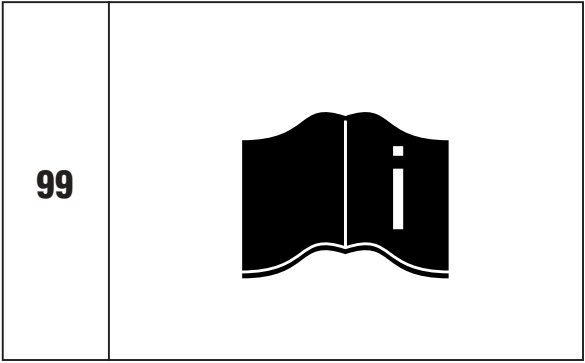
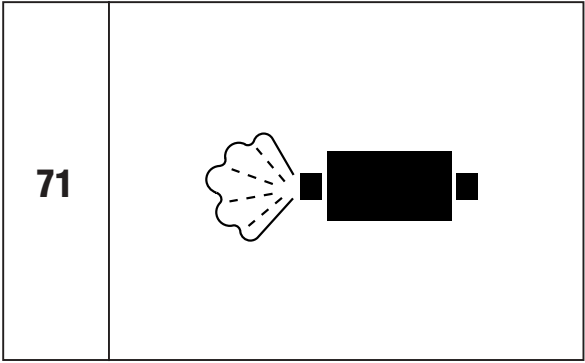
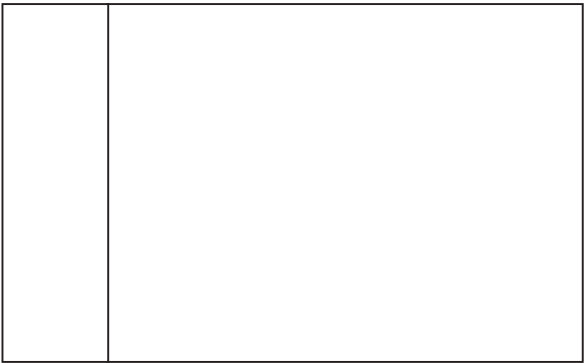
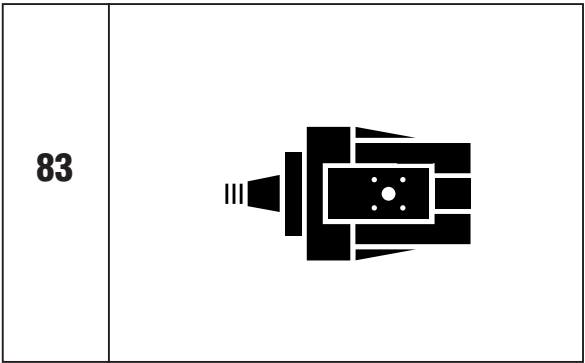
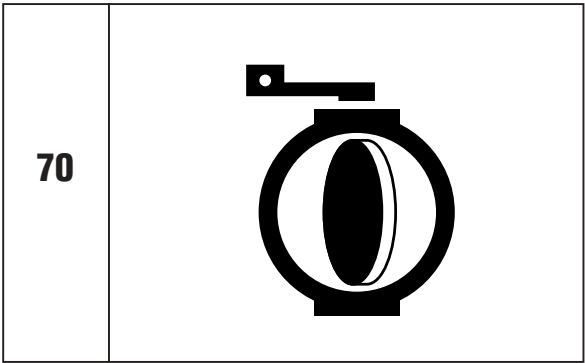


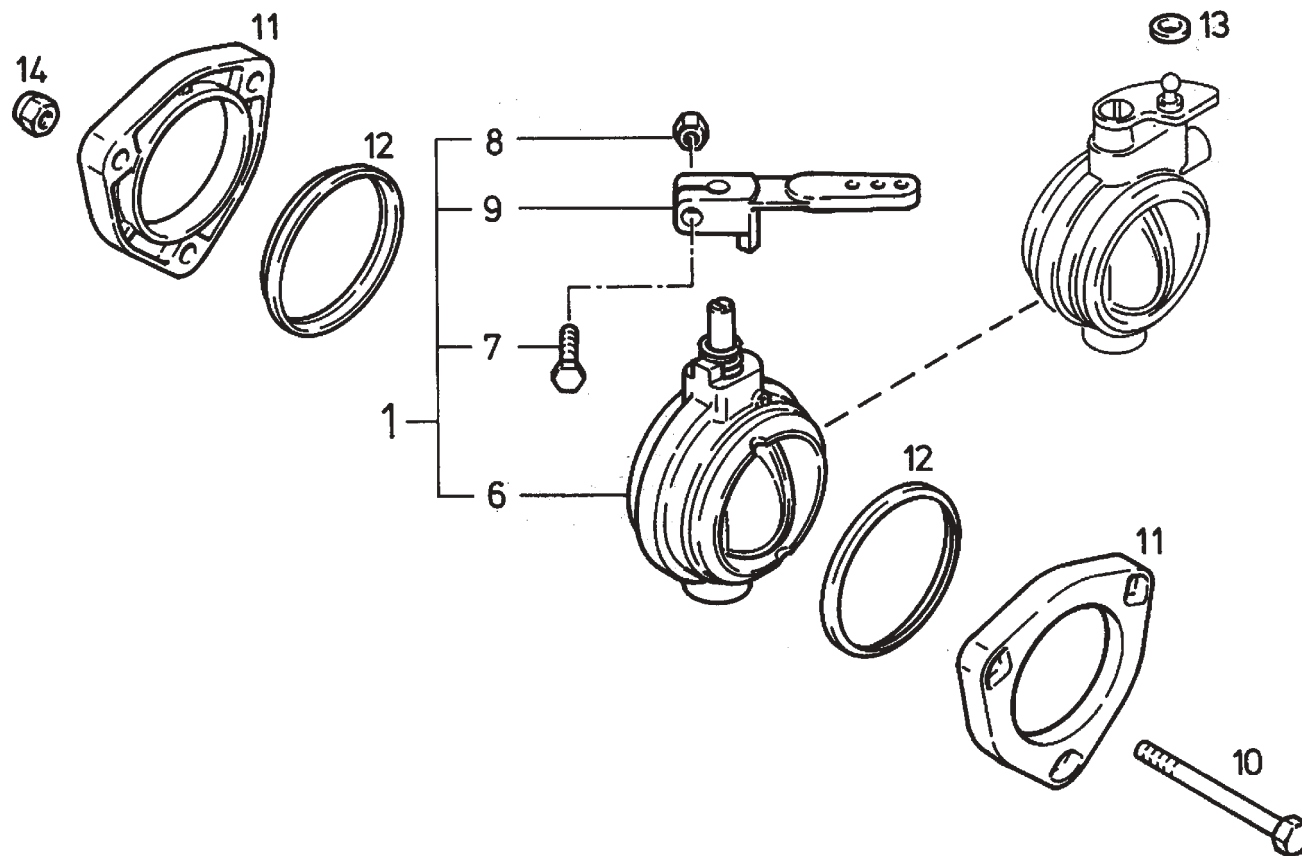


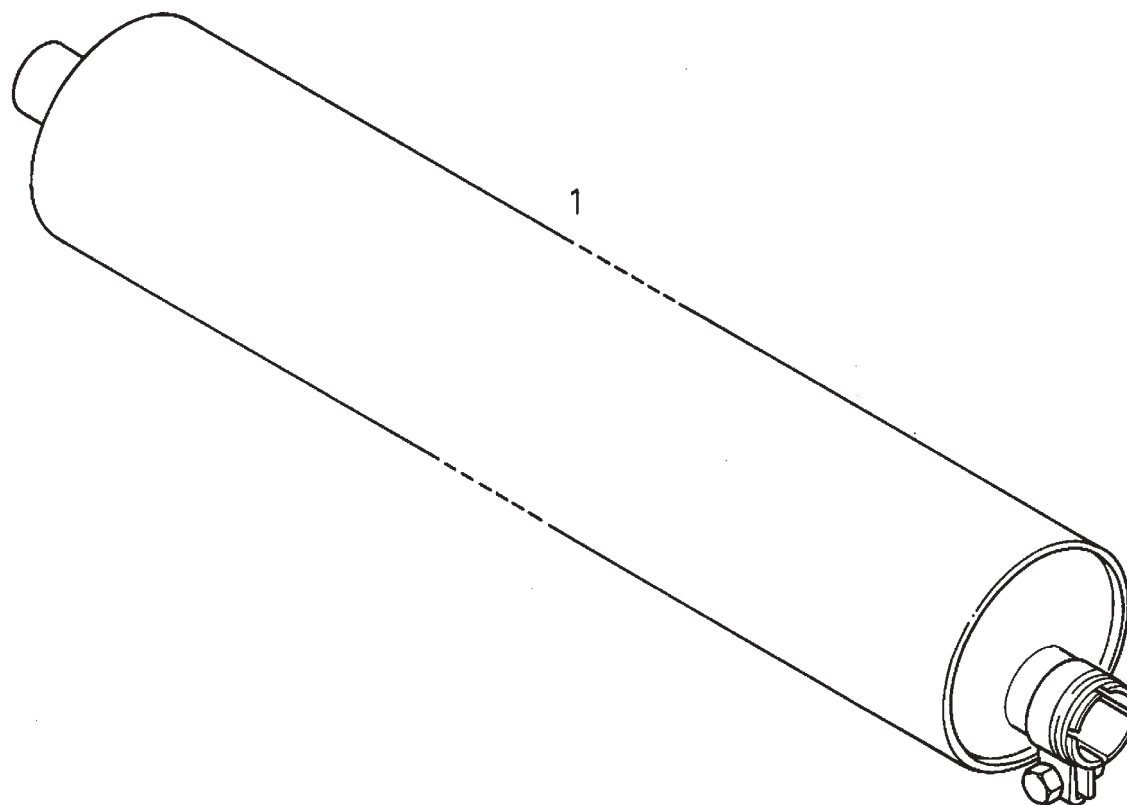
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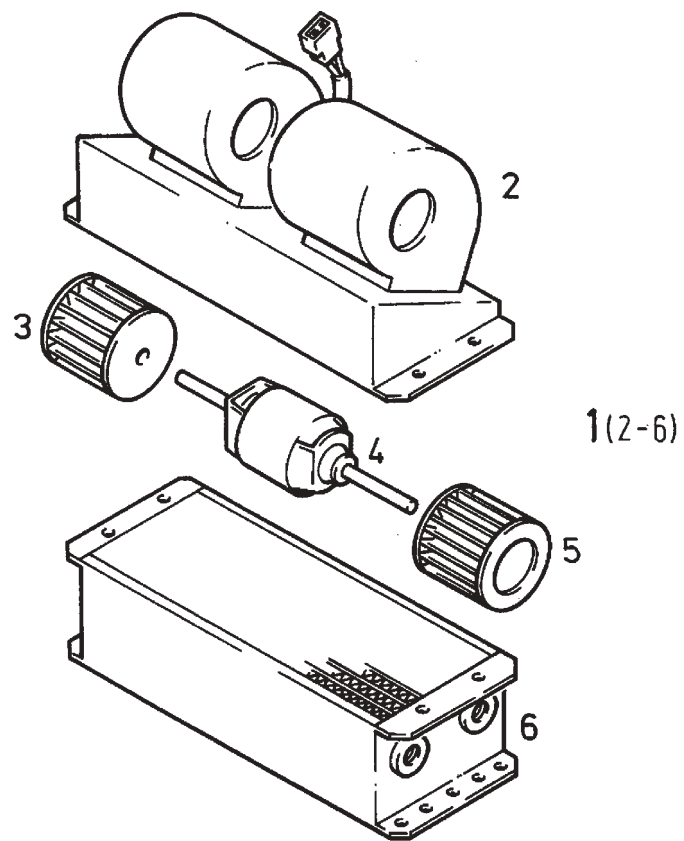
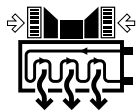


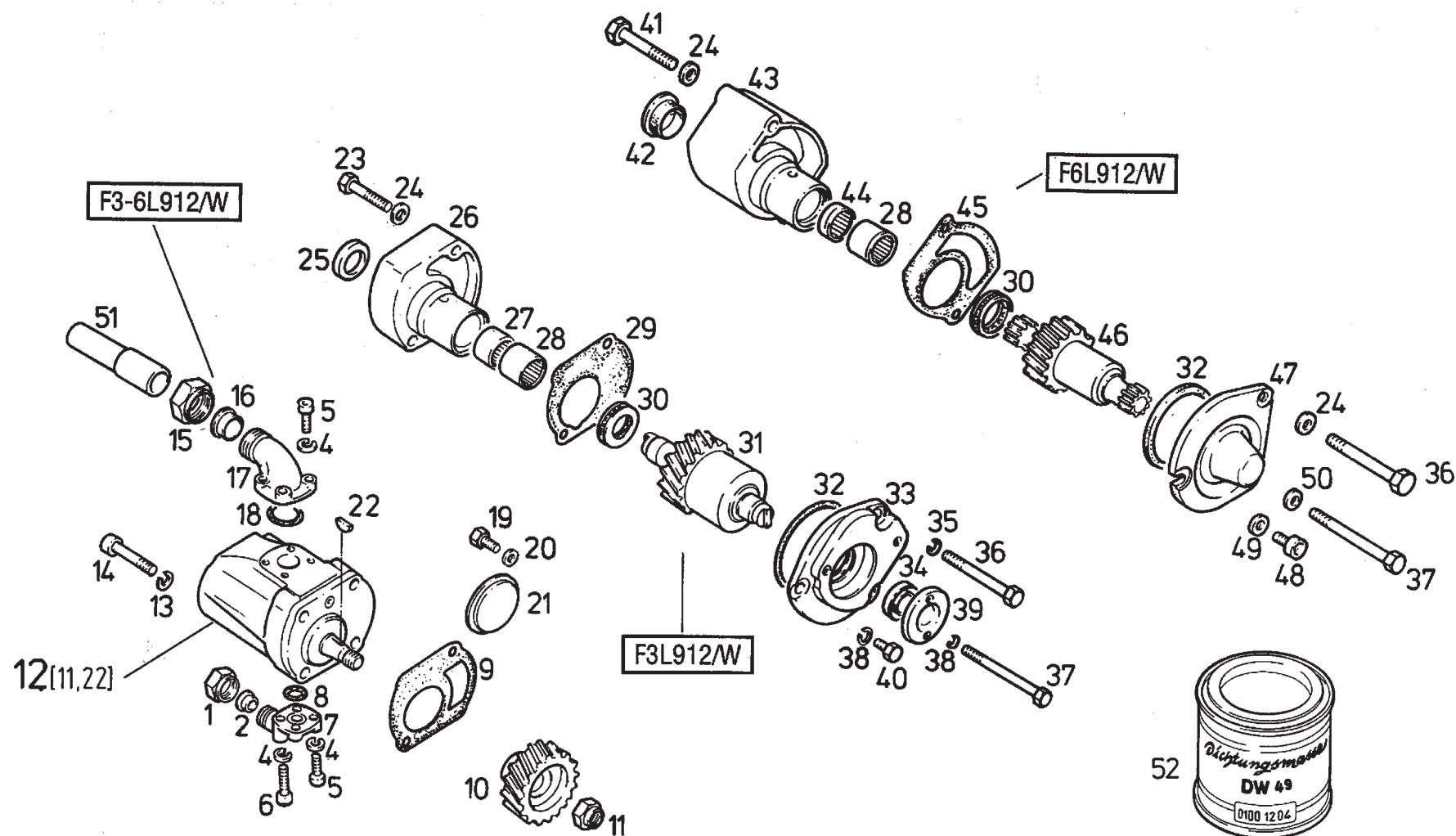
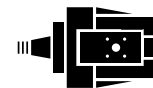






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DEUTZ Oil



DEUTZ Oil DQC II-05

ACEA E5-02 / E3-96 / B3-04
API CG-4

TLS-15W40D (DQC II-05)	
5 L	0101 6331
20 L	0101 6332
209 L	0101 6333



DEUTZ Oil DQC III-05

ACEA E7-04 / E5-02 / E3-96 / B4-04 / A3-04
API CI-4 / SL GLOBAL DHD-1

TLX-10W40FE (DQC III-05)	
5 L	0101 6335
20 L	0101 6336
209 L	0101 6337



DEUTZ Oil DQC IV-05 (Synthetic)

ACEA E7-04 / E5-02 / E4-99

DEUTZ Oel DQC IV-5W30 (DQC IV-05)	
5 L	-
20 L	0101 7849
209 L	0101 7850



The engine company.

DEUTZ AG

Service Information Systems

Ottostraße 1

D-51149 Köln

Telefon: +49 (0) 221-822-0

Fax: +49 (0) 221-822-5850

Internet: www.deutz.com

eMail: info@deutz.com

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Order No.: 0312 3532

Instrucciones de Operación

F3-6L 912/W



0297 5343 es

**Número
de motor:**

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Rogamos se introduzca aquí el número del motor. Con ello se facilitarán las gestiones relacionadas con servicio técnico, trabajos de reparación y consultas sobre repuestos (véase apartado 2.1).

Nos reservamos el derecho de introducir modificaciones técnicas necesarias para el mejoramiento de los motores, aunque difieran de las ilustraciones y datos contenidos en estas Instrucciones de Operación. La reimpresión del presente libro o cualquier forma de reproducción, aunque sea parcial, requiere nuestro permiso por escrito.



Prologo

Estimado cliente:

Los motores DEUTZ refrigerados por aire han sido desarrollados para una amplia gama de aplicaciones, por lo que una extensa oferta de variantes garantiza que se den cumplimiento a las exigencias de cada caso.

Su motor ha sido equipado de acuerdo con los requerimientos de su incorporación, lo que significa que no necesariamente todos los elementos y componentes descritos en estas Instrucciones de Operación, están incluidos en el mismo.

Nos hemos preocupado de destacar claramente las diferencias, para permitirle encontrar con facilidad las advertencias sobre operación y mantenimiento preventivo que se refieren concretamente a su motor.

Le rogamos lea estas Instrucciones de Operación antes de poner en marcha su motor, tomando en cuenta las advertencias correspondientes a su operación y mantenimiento preventivo.

Para atender a sus consultas, se encuentra gustosamente a su disposición el DEUTZ SERVICE.

Atentamente

DEUTZ SERVICE

1. Generalidades

2. Descripción del motor

- 2.1 Modelo
 - 2.1.1 Rótulo de fábrica
 - 2.1.2 Posición del rótulo de fábrica
 - 2.1.3 Número del motor
 - 2.1.4 Numeración de los cilindros
 - 2.1.5 Inyección directa
 - 2.1.6 Combustión de dos etapas
- 2.2 Ilustraciones del motor
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 - 2.2.2 Lado de descarga de aire
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 - 2.3.1 Circuito de aceite lubricante (sin calefacción de aceite)
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 - 8.1.1 Conservación del motor
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- 9.1 Datos del motor y valores de ajuste
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10. DEUTZ SERVICE

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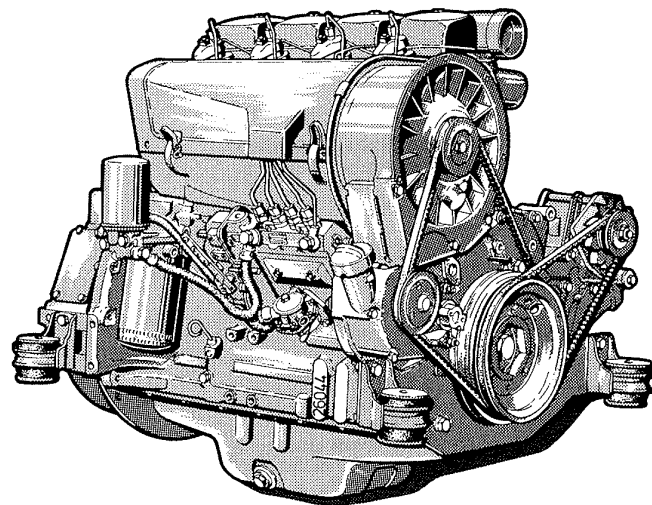
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Los motores diesel DEUTZ

son el producto de muchos años de investigación y desarrollo técnico. El know-how conseguido de tal manera, unido a las elevadas exigencias de calidad, constituye la garantía para una producción de motor de larga vida, alta fiabilidad y bajo consumo de combustible. Es evidente que también se da cumplimiento a las altas exigencias referentes a la protección del medio ambiente.

El mantenimiento preventivo y el cuidado

son premisas fundamentales para que el motor cumpla satisfactoriamente las exigencias que se le impongan. Por tal motivo, es fundamental que se mantengan los plazos prescritos para trabajos de mantenimiento preventivo y tanto éstos como el cuidado general del motor se realicen con el máximo esmero. Se deben tomar en consideración especialmente condiciones difíciles de funcionamiento, que difieran de las condiciones normales.

DEUTZ SERVICE

En caso de producirse perturbaciones o tener consultas referentes al servicio de repuestos, diríjase al representante del DEUTZ SERVICE que le corresponda. Nuestro bien instruido personal de expertos se ocupará de subsanar eficientemente y con rapidez, cualquier desperfecto, utilizando repuestos originales. Los repuestos originales del DEUTZ SERVICE han sido elaborados siempre de acuerdo con la técnica más avanzada.

Al final del presente libro de Instrucciones de Operación, encontrará más referencias respecto al DEUTZ SERVICE.

Cuidado cuando el motor está en marcha

Cuando se efectúan trabajos con el motor en marcha, la vestimenta de trabajo debe estar bien ceñida al cuerpo. Nunca ponga en marcha el motor en recintos cerrados, debido al peligro de envenenamiento.

Los trabajos de mantenimiento preventivo o reparaciones sólo deben realizarse con el motor detenido. Después de terminar los trabajos, se deben volver a montar los dispositivos de seguridad que hayan sido desmontados. La carga de combustible se debe efectuar sólo con el motor parado.

Seguridad



Este símbolo se encuentra junto a todas las advertencias sobre seguridad, las cuales deben observarse cuidadosamente.

Las indicaciones sobre medidas de seguridad, se deben poner también a disposición del personal que maneja el equipo. Además, se deben tomar en cuenta los reglamentos oficiales de seguridad de prevención de accidentes vigentes en el país.

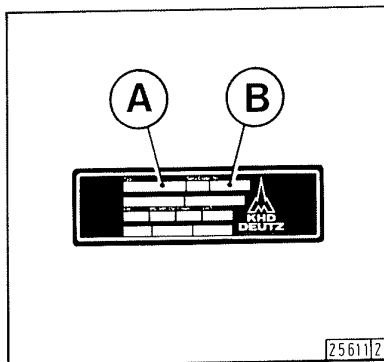
Amianto



Algunas juntas utilizadas en este motor pueden contener amianto. Por tal motivo, en trabajos de reparaciones, póngase atención a los repuestos marcados con „a“.

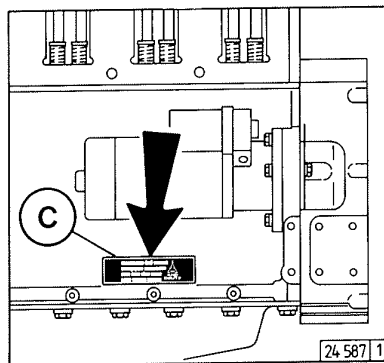
- 2.1 Modelo**
- 2.2 Ilustraciones del motor**
- 2.3 Circuito de aceite lubricante**
- 2.4 Esquema de combustible**
- 2.5 Refrigeración del motor**

2.1.1 Rótulo de fábrica



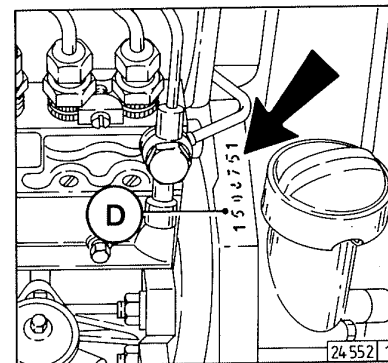
El modelo **A**, el número del motor **B** y los datos de potencia etc., se encuentran grabados en el rótulo de fábrica.
Para pedidos de repuestos, se deben indicar tanto el modelo como el número del motor.

2.1.2 Posición del rótulo de fábrica



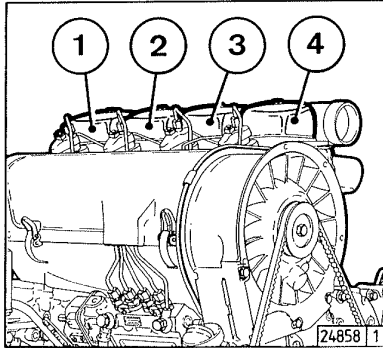
El rótulo de fábrica **C** está adherido al cárter del cigüeñal; según ejecución, puede haber un segundo rótulo de fábrica fijado sobre la cubierta de guía de aire.

2.1.3 Número del motor



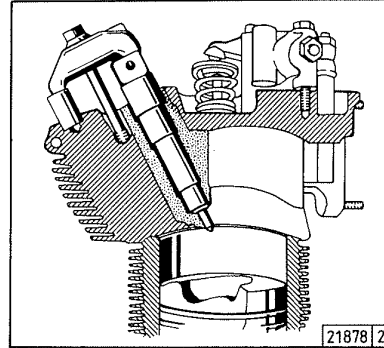
El número del motor **D** está grabado en el cárter del cigüeñal y el rótulo de fábrica.

2.1.4 Numeración de los cilindros



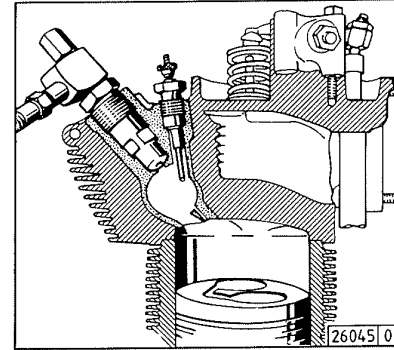
Comenzando en el lado del volante, los cilindros están numerados consecutivamente.

2.1.5 Inyección directa



Los motores con inyección directa se utilizan en donde se requieren grandes prestaciones.

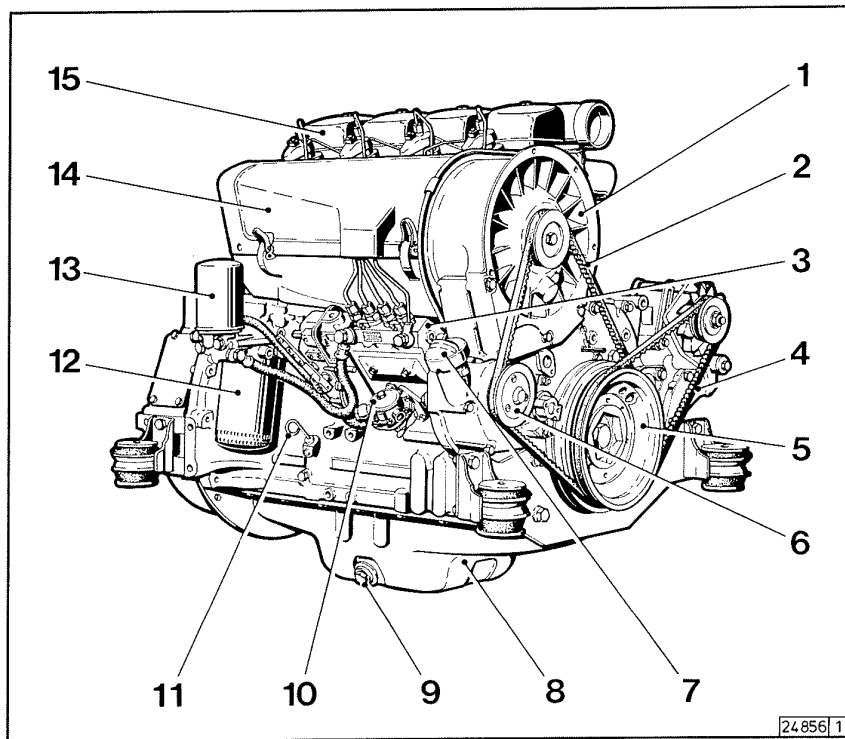
2.1.6 Combustión de dos etapas



Los motores con combustión de dos etapas se montan cuando se debe conceder un valor especial a mantener lo más reducido posible el nivel de molestias causadas por los gases de escape.

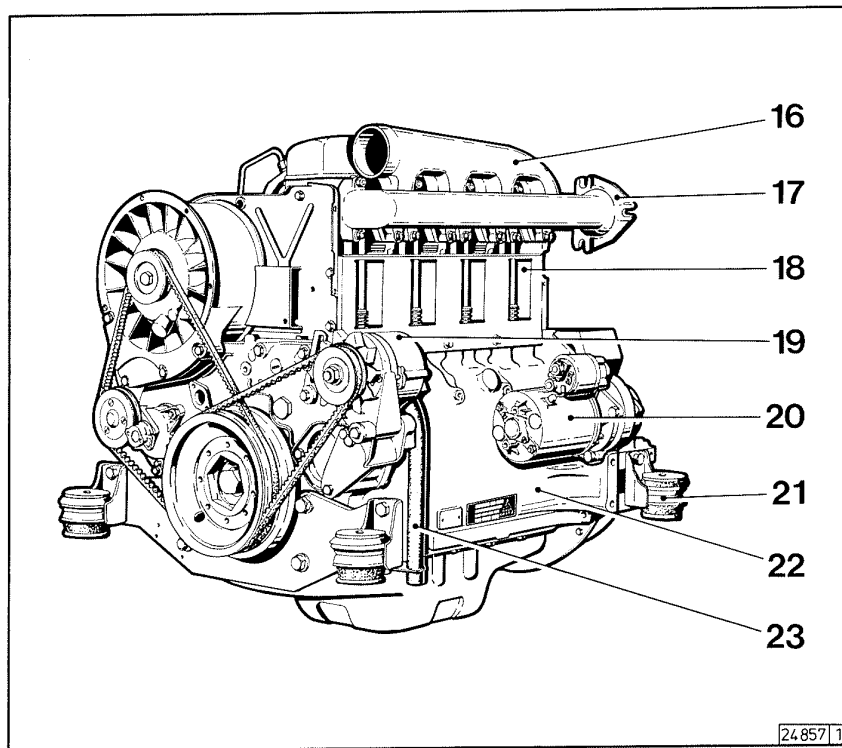
2.2.1 Lado de mando

2



- 1 Turbina de refrigeración
- 2 Correa trapezoidal (turbina)
- 3 Bomba de inyección
- 4 Correa trapezoidal (generador)
- 5 Polea de correa trapezoidal
- 6 Polea tensora de correa trapezoidal
- 7 Boca de carga de aceite
- 8 Cáster de aceite
- 9 Tapón roscado de descarga de aceite
- 10 Bomba de alimentación de combustible
- 11 Varilla de medición del nivel de aceite
- 12 Cartucho del filtro de aceite lubricante
- 13 Cartucho del filtro de combustible
- 14 Cubierta de guía de aire
- 15 Tapa de culata

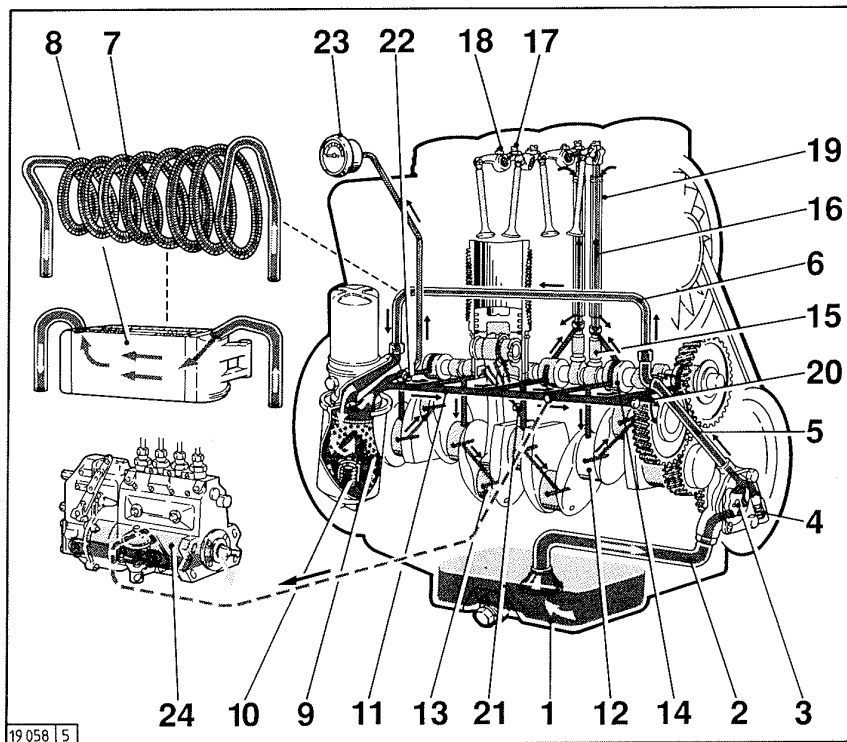
2.2.2 Lado de descarga de aire



- 16 Colector de admisión
- 17 Colector de escape
- 18 Caja de descarga de aire
- 19 Generador
- 20 Motor de arranque
- 21 Fijación del motor
- 22 Cáster del cigüeñal
- 23 Tubo de ventilación del cáster del cigüeñal

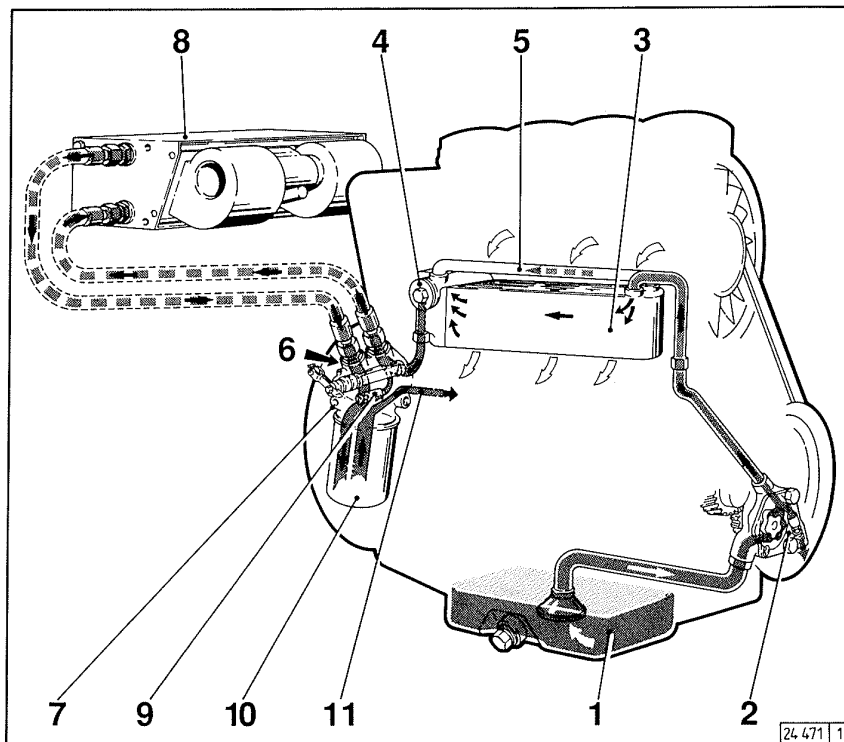
2.3.1 Circuito de aceite lubricante - sin calefacción de aceite

2

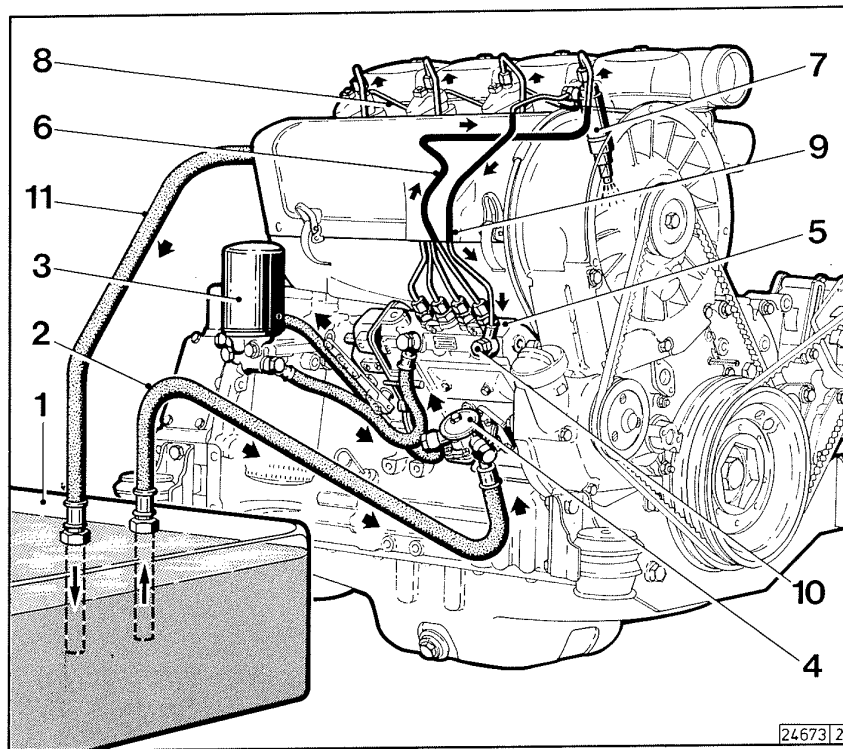


- 1 Cáster de aceite
- 2 Codo de aspiración
- 3 Bomba de aceite lubricante
- 4 Válvula de regulación de presión de aceite
- 5 Tubería de impulsión
- 6 Tubería de cortocircuito o, a elección
- 7 Serpentín de aletas o, a elección
- 8 Refrigerador de aceite de bloque
- 9 Filtro de aceite lubricante
- 10 Válvula de seguridad
- 11 Canal principal de aceite
- 12 Cojinete de cigüeñal
- 13 Cojinete de biela
- 14 Cojinete del árbol de levas
- 15 Empujador
- 16 Varilla de empuje
- 17 Cojinete de balancín
- 18 Tornillo dosificador (para lubricación de las válvulas)
- 19 Tubo de protección de la varilla empujadora
- 20 Taladro estrangulador (para lubricación de los engranajes)
- 21 Tobera de aceite para refrigeración de pistón
- 22 Conexión para el manómetro de presión de aceite
- 23 Manómetro de presión de aceite
- 24 Bomba inyectora conectada al circuito de aceite

2.3.2 Circuito de aceite lubricante - con calefacción de aceite

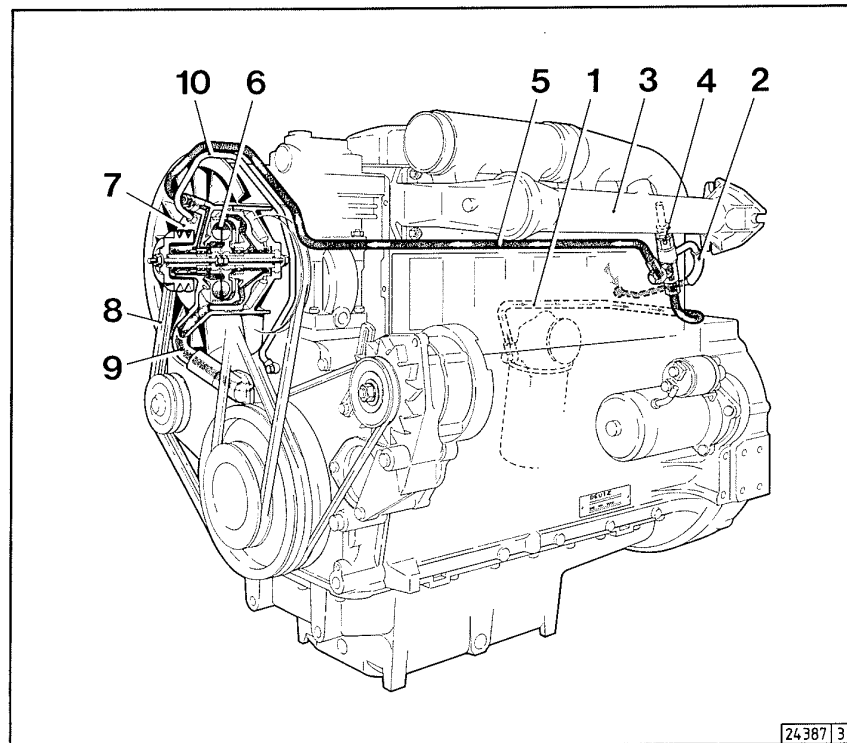


- 1 Cárter de aceite
- 2 Bomba de aceite
- 3 Refrigerador de aceite
- 4 Válvula termostática
- 5 Tubería de desvío
- 6 Posibilidad de conexión para indicador de temperatura del aceite
- 7 Válvula de regulación de la calefacción
- 8 Intercambiador de calor con soplante
- 9 Válvula de paso
- 10 Filtro de aceite lubricante
- 11 Conducción al circuito de aceite lubricante del motor



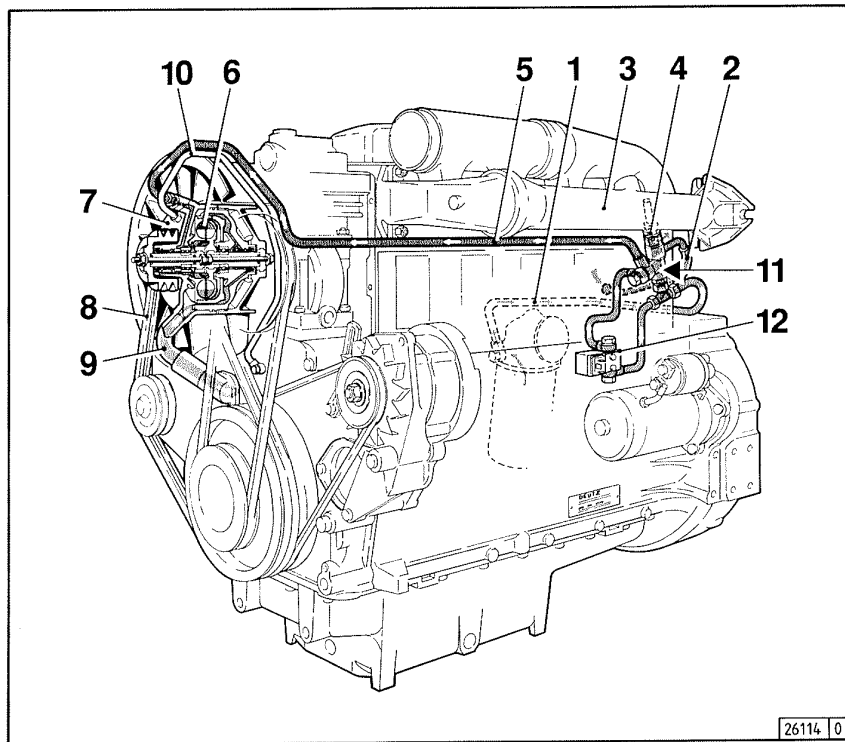
- 1 Depósito de combustible
- 2 Tubería de combustible del depósito a la bomba de alimentación de combustible
- 3 Filtro del combustible
- 4 Bomba de alimentación de combustible
- 5 Bomba de inyección
- 6 Tuberías de inyección
- 7 Inyector
- 8 Tubería de combustible sobrante
- 9 Tubería de combustible de rebose
- 10 Válvula de combustible de rebose
- 11 Tubería de retorno de combustible al depósito

2.5.1 Regulación del volumen de aire de refrigeración por termostato de gases de escape



2.5.2 Regulación del volumen de aire de refrigeración mediante termostato de gases de escape y válvula electromagnética

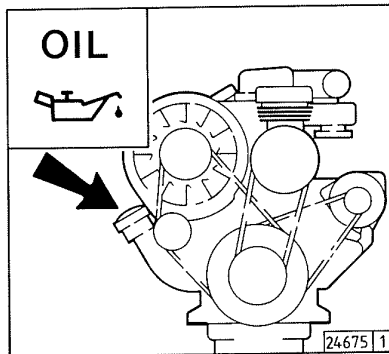
2



- 1 Tubería de aceite a presión del motor al termostato de gases de escape
- 2 Tubo de aire al termostato de gases de escape
- 3 Colector de escape
- 4 Termostato de gases de escape
- 5 Tubería de aceite de mando al embrague hidráulico
- 6 Embrague hidráulico
- 7 Turbina de refrigeración
- 8 Accionamiento de la turbina de refrigeración
- 9 Tubería de retorno de aceite al cárter del cigüeñal
- 10 Tubería de purga de aire
- 11 Tornillo regulador con anillo hermetizante especial
- 12 Válvula electromagnética

- 3.1 Primera puesta en funcionamiento**
- 3.2 Arranque**
- 3.3 Vigilancia de operación**
- 3.4 Parada**
- 3.5 Condiciones de operación**

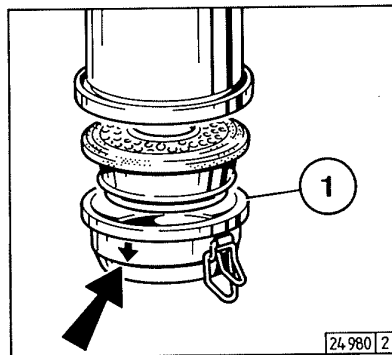
3.1.1 Carga de aceite del motor



Normalmente, los motores son suministrados sin aceite.

Liénesse el motor de aceite lubricante por la boca de carga (flecha). Véase volumen de llenado de aceite en 9.1. Véanse calidad y viscosidad del aceite en 4.1.

3.1.2 Llenado del filtro de aire en baño de aceite con aceite de motor



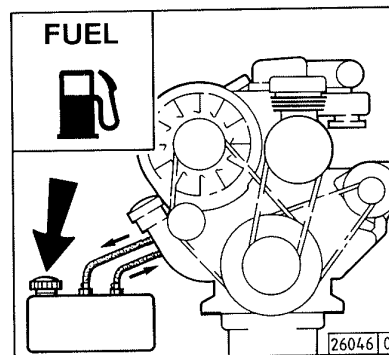
Liénesse la cubeta 1 del filtro de aire en baño de aceite hasta la marca de la flecha con aceite de motores.

Véanse calidad y viscosidad del aceite en 4.1.



No debe llenarse aceite en el bote colector de polvo, si existe, del separador previo.

3.1.3 Carga de combustible



Utilícense solamente combustibles diesel de marcas corrientes en el comercio. Véase en 4.2 la calidad del combustible.

De acuerdo con la temperatura ambiente, utilícense combustible diesel de verano o de invierno. Para purgado del sistema de combustible, ver 3.1.4

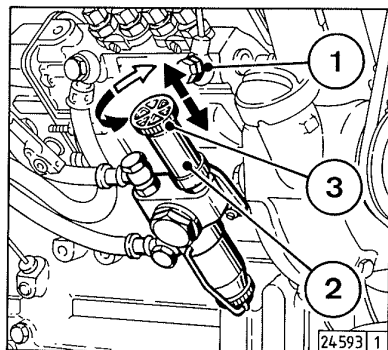


Cárguese combustible solamente con el motor detenido. Manténgase una buena limpieza. No se vierta combustible fuera de la boca de carga.

3.1.4 Purgado

Ejecución:

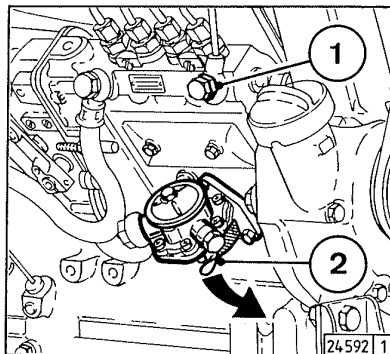
Bomba de alimentación „Bosch“



- Aflojar la válvula de combustible de rebose 1 del hexágono inferior (grande).
- Soltar la bomba manual 2 de la posición roscada de fijación mediante algunos giros hacia la izquierda de la ruedecita 3.
- Accionar la bomba manual hasta que por la válvula de combustible de rebose 1 soltada salga el combustible libre de burbujas.
- Volver a apretar la válvula de combustible de rebose, continuando el bombeo.
- Atornillar firmemente la ruedecita 3.

Ejecución:

Bomba de alimentación „IMSA“



- Aflojar la válvula de combustible de rebose 1 del hexágono inferior (grande).
- Accionar la palanca de cebado 2 contra el resorte hasta que por la válvula de combustible de rebose 1 soltada salga el combustible libre de burbujas.
- Volver a apretar la válvula de combustible de rebose, continuando el bombeo.

3.1.5 Otras maniobras preparatorias

- Verificación de la batería y las conexiones de cables, ver 6.7.1
- Quítense las argollas de transporte, si están montadas, véase 6.7.3

- Marcha de prueba
Después de los preparativos, hágase rodar el motor unos 10 minutos para probarlo. No se aplique carga al motor.

Durante y después de la marcha de prueba:

- Exáminese el motor si se advierten fugas por falta de estanqueidad.

Con el motor parado:

- Verifíquese el nivel de aceite, véase 6.1.2, complétese si es necesario.
- Corrijase la tensión de las correas trapezoidales, véase 6.5

- Rodaje
Durante el período de rodaje, de unas 200 horas de servicio, se recomienda controlar el nivel de aceite dos veces al día. Una vez terminado el período de rodaje, basta controlar dicho nivel una vez al día.

3.1.6 Trabajos adicionales de mantenimiento preventivo

Después de 50 horas de servicio, se deben realizar los siguientes trabajos de mantenimiento preventivo:

- Cambio de aceite lubricante del motor, véase 6.1.2
- Cambio del filtro de aceite, véase 6.1.3
- Reapretar los atornillamientos del cárter de aceite.
- Cambiar el filtro de combustible, véase 6.2.1
- Verificación de la tensión de las correas trapezoidales, corrija la tensión si es necesario, véase 6.5
- Verificación del juego de válvulas, ajústese si es necesario, véase 6.6.1
- Revisión del motor por si se advierten fugas por falta de estanqueidad (pérdidas por goteo).
- Verificación de la suspensión del motor, corrija el apriete si es necesario, véase 9.2
- Purificación previa de combustible, limpiar el filtro tamiz de combustible/tamiz de combustible, véase 6.2.3
- Reapretar la fijación de los colectores de admisión y escape en las culatas, véase 6.8.1

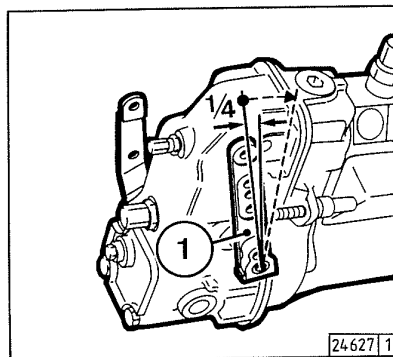
3.2.1 Arranque eléctrico



Antes de arrancar el motor, asegúrese de que nadie se encuentra en la zona de peligro alrededor del motor o de la máquina propulsada.

Después de reparaciones: contrólese si todos los dispositivos de protección han sido montados otra vez y si se han retirado del motor todas las herramientas.

Al arrancar con bujía de incandescencia-llama/ tubo de calefacción, no emplear al mismo tiempo otros medios auxiliares de arranque.

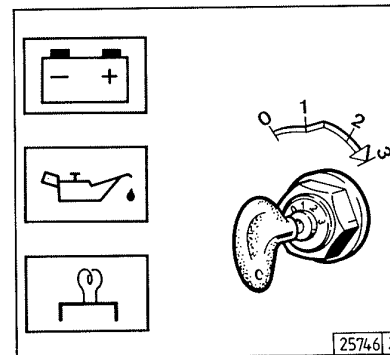


- Si es posible, desembráguese el motor para separarlo de máquinas propulsadas.
- Sitúese la palanca de ajuste de revoluciones 1 en la posición de marcha en vacío.
- Colóquese la palanca de parada 2 en la posición de funcionamiento.

El arranque no se debe accionar ininterrumpidamente por más de 20 segundos. Si el motor no arranca, repítase la maniobra después de un descanso de un minuto.

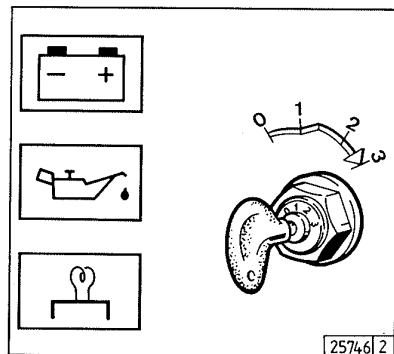
Si el motor no ha arrancado tras dos intentos de arranque, búsquese la causa según la tabla de perturbaciones (véase página 7.1).

sin auxiliar de arranque en frío



- Introdúzcase la llave
 - Posición 0 = no hay tensión de trabajo.
- Gírese la llave hacia la derecha
 - Posición 1 = tensión de trabajo
 - Los pilotos de control se encienden.
- Empújese la llave hacia adentro y continúese girando hacia la derecha, en contra de la resistencia del resorte.
 - Posición 2 = sin función
 - Posición 3 = arranque
- Tan pronto haya arrancado el motor, suéltese la llave.
 - Los pilotos de control se apagan.

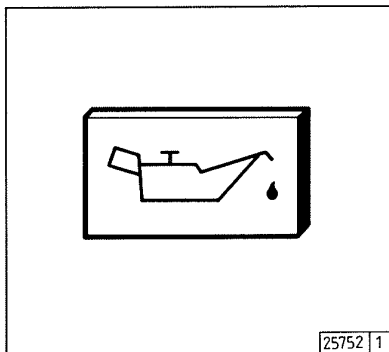
**con auxiliar de arranque en frío,
bujía de incandescencia-llama/tubo
de calefacción**



- Introdúzcase la llave
 - Posición 0 = no hay tensión de trabajo.
- Gírese la llave hacia la derecha
 - Posición 1 = tensión de trabajo
 - Los pilotos de control se encienden.
- Empújese la llave hacia adentro y continúese girando hacia la derecha, en contra de la resistencia del resorte.
 - Posición 2 = precalentamiento, manténgase en esta posición aproximadamente un minuto
 - El piloto de control de precalentamiento se enciende.
 - Posición 3 = arranque
- Tan pronto haya arrancado el motor, suéltese la llave.
 - Los pilotos de control se apagan.

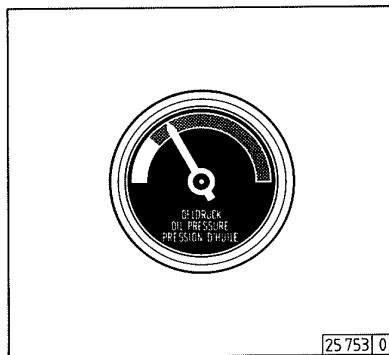
3.3.1 Presión de aceite del motor

Piloto de control de presión de aceite



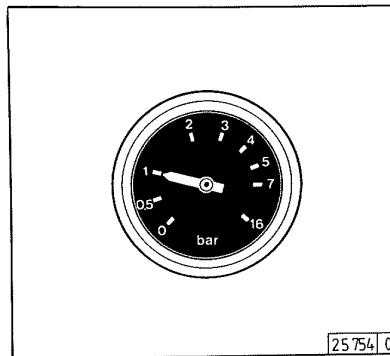
- El piloto de control de presión de aceite se enciende al estar conectada la tensión de trabajo y el motor parado.
- El piloto de control de presión de aceite debe estar apagado durante la marcha del motor.

Indicador de presión de aceite



- La aguja se debe encontrar, durante la gama completa de servicio, dentro del campo verde.

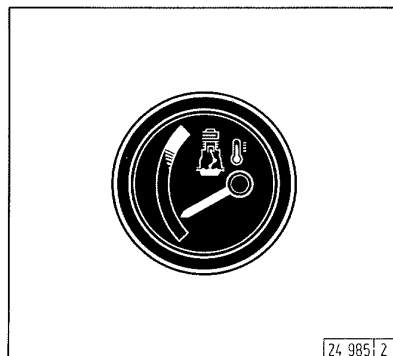
Manómetro para presión de aceite



- La aguja del manómetro de presión de aceite debe indicar la presión mínima (ver 9.1)

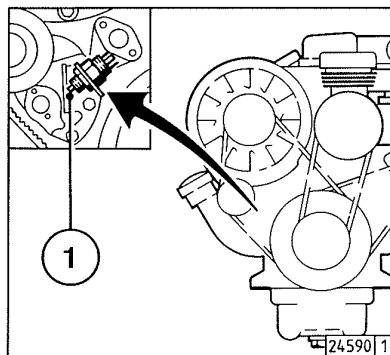
3.3.2 Temperatura del motor

Indicador de temperatura

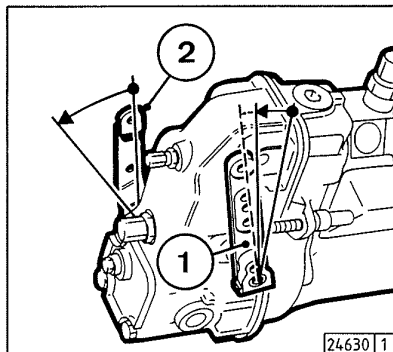


- La aguja del indicador de la temperatura del motor debe encontrarse siempre en el sector verde y sólo en casos excepcionales en el sector verde amarillo. Si pasa al sector anaranjado, es señal de que el motor se sobrecalienta. Entonces habrá que parar el motor y descubrir la causa de ello, de acuerdo con la tabla de perturbaciones (véase 7.1).

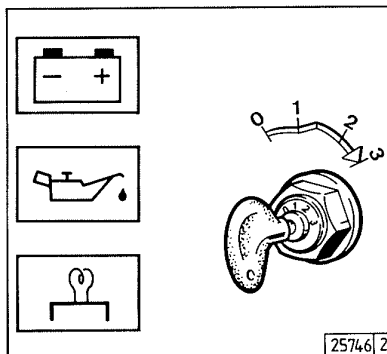
3.3.3 Accionamiento de la turbina de refrigeración



- En caso de rotura de la correa trapezoidal, el vástago de presión 1 del interruptor eléctrico es accionado por la polea tensora y se dispara una alarma acústica o luminosa. **Parar inmediatamente el motor, para evitar un sobrecalentamiento.**

3.4.1 Motores con parada mecánica


- Sitúese la palanca de ajuste de velocidad de giro 1 a bajas revoluciones.
- Acciónese la palanca de parada 2 el tiempo necesario hasta que el motor sea detenido. Los pilotos de control de corriente de carga y de presión de aceite se encienden después de pararse el motor.
- Gírese la llave hacia la izquierda (a la posición 0) y sacarla. Los pilotos de control se apagan.

3.4.2 Motores con parada eléctrica (llave de encendido)


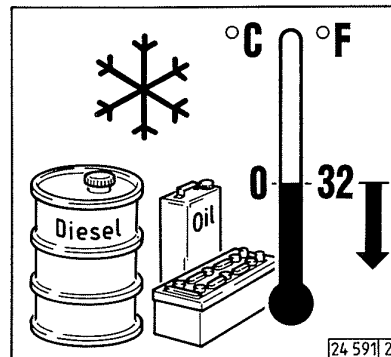
- Gírese la llave hacia la izquierda (a la posición 0) y quítese. Los pilotos de control se apagan.

No se pare el motor repentinamente, habiendo estado funcionando a plena carga.

3.5.1 Funcionamiento en invierno

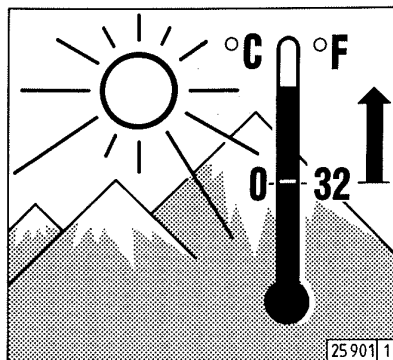
- Viscosidad del aceite lubricante
 - Escójase la viscosidad (clase SAE) adecuada a la temperatura ambiente al arrancar el motor, según 4.1.2
 - Considérense los lapsos cortos entre cambios de aceite al funcionar bajo -10°C , véase 6.1.1.
- Combustible diesel
 - Bajo 0°C , utilícese combustible para invierno, véase 4.2.2.
- Trabajos adicionales de mantenimiento preventivo
 - Vacíese el sedimento barroso del depósito de combustible una vez a la semana (aflojando el tapón roscado de drenaje)
 - Si es necesario, adaptese tanto la carga de aceite del filtro de aire en baño de aceite como la del motor a la temperatura ambiente.
 - A temperaturas inferiores a -20°C , si es necesario después de haber desmontado el arrancador, engrásese de vez en cuando con grasa resistente al frío (p.ej., grasa Bosch FT 1 V 31) la corona dentada en el volante, a través del orificio del piñón.
- Auxiliares para arranque en frío
 - Si es necesario, a temperaturas bajo cero, arránquese con ayuda de la bujía de incandescencia-llama, véase 3.2.1. Esta sirve no sólo para reducir las temperaturas mínimas de arranque, sino también para facilitar el arranque a temperaturas en las cuales normalmente no se requiere auxiliar de arranque.

- Batería
 - Un buen estado de carga de la batería es premisa para una maniobra satisfactoria de arranque en frío, véase 6.7.1.
 - Manteniendo la batería a unos 20°C (desmontándola y depositándola en una habitación templada), se consigue disminuir el límite de temperatura de arranque del motor en 4 a 5°C .



3.5.2 Temperatura ambiente elevada, gran altura

- Tanto al aumentar la altura como al subir la temperatura ambiente disminuye la densidad del aire, lo que influye sobre la potencia máxima del motor, la calidad de los gases de escape, el nivel de temperaturas y, en casos extremos, el comportamiento durante el arranque. En servicios no estacionarios, se admite un funcionamiento a una altura de hasta 1000 m y una temperatura de hasta 30° C.
Para funcionamiento en condiciones desfavorables (mayor altura y temperaturas superiores), se requiere una reducción del caudal de combustible inyectado y, con ello, de la potencia del motor.
- En caso de duda, al prestar servicios con el motor en tales condiciones, consulte al suministrador de su motor o su equipo si ha sido efectuado el bloqueo de reducción necesario, en beneficio de la seguridad de accionamiento, la vida del motor y la calidad del escape (humos!). En casos dados, diríjase al DEUTZ SERVICE.



4.1 Aceite lubricante

4.2 Combustible

4.1.1 Calidad

Los aceites lubricantes se diferencian por parte de **Deutz** según su eficacia y clase de calidad. Se pueden utilizar aceites de diferentes y comparables especificaciones.

Aceites API homologados:			
Deutz	DQCI	DQCII	DQCIII
ACEA	E2-96	E3/96/E5-02	E4-99
API	CF/CF-4	CH-4/CG-4	-
DHD	-	DHD-1	-

La exacta asignación a los motores de las calidades de aceite admisibles figura en capítulo 6.1.1.

En caso de duda consulte a su representante de servicio.

4.1.2 Viscosidad

Se deberán emplear generalmente aceites multigrados. En locales cerrados, calentados, a temperaturas $>5^{\circ}\text{C}$ podrán hallar aplicación también aceites monogrados.

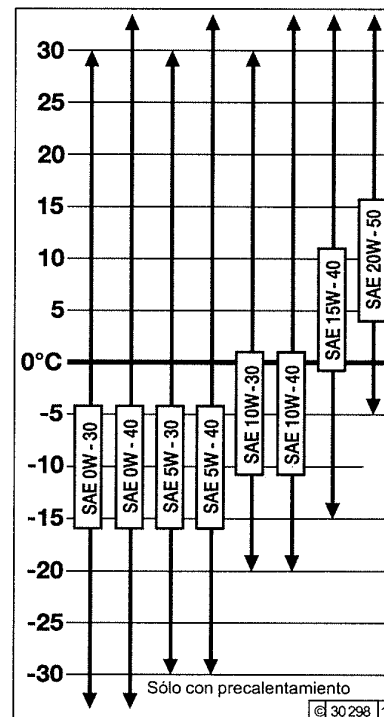
Debido a que el aceite lubricante varía su viscosidad con la temperatura, la elección del tipo de viscosidad (categoría SAE) depende de la temperatura ambiente en el lugar de trabajo del motor.

Se alcanzan condiciones óptimas de funcionamiento, si se utilizan aceites de las viscosidades indicadas en el diagrama al margen, que sirve de orientación.

Si, ocasionalmente, se queda por debajo de los límites de temperatura, pueden surgir dificultades para el arranque en frío, pero no se producirán daños en el motor.

El sobrepaso de dichos límites no se debe prolongar por mucho tiempo a fin de reducir al mínimo el desgaste.

Debido a su mejor estabilidad térmica y de oxidación los aceites lubricantes sintéticos ofrecen más ventajas.



4.2.1 Calidad

Utilídense combustibles diesel corrientes en el comercio, con un contenido de azufre inferior al 0,5 %. De ser mayor el contenido de azufre, deben reducirse los intervalos entre cambios de aceite, véase 6.1.1.

Han sido homologadas las siguientes especificaciones de combustible:

- DIN 51 601
- BS 2869: A 1 y A 2
(para A 2, tómese en cuenta el contenido de azufre)
- ASTM D 975-81: 1-D y 2-D
- VV-F-800C: DF-A, DF-1 y DF-2

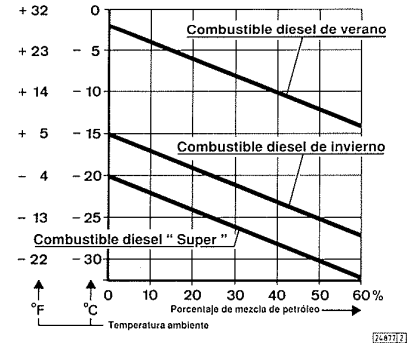
4.2.2 Combustible para invierno

A bajas temperaturas se pueden producir precipitaciones parafínicas que originen obturaciones en el sistema de combustible, perturbando el funcionamiento. Por tal motivo, utilícese combustible diesel de invierno (hasta -15°C) para temperaturas ambientales inferiores a 0°C (se ofrece en los surtidores de combustible oportunamente antes de comenzar la estación fría). Frecuentemente, se ofrece combustible diesel con aditivos, utilizable hasta temperaturas de aproximadamente -20°C („Superdiesel“).

- A temperaturas ambientales inferiores a -15°C bien -20°C , se debe mezclar con petróleo. La relación de mezcla necesaria debe tomarse del diagrama adjunto.

Si es necesario utilizar combustible diesel de verano bajo 0°C , se puede mezclar también con petróleo hasta 60 %, según el diagrama de la derecha.

En la mayoría de los casos, se puede también conseguir una resistencia aceptable al frío, agregando un agente para mejorar la fluidez (aditivos de combustible). Para ello, consulte a su DEUTZ SERVICE correspondiente.



El mezclado debe efectuarse solamente dentro del depósito. Echese primero la cantidad de petróleo requerida y, a continuación, agréguese el combustible diesel.

- 5.1 Plan de mantenimiento preventivo**
- 5.2 Cuadro de mantenimiento preventivo**
- 5.3 Trabajos de mantenimiento preventivo realizados**

Cada 10 horas o diaria-mente	Una sola vez tras 50 ²⁾	En horas de servicio (hs) ¹⁾							Verificación			Véase apartado	
		Cada									Limpieza		
		125	250	500	750	1000	2000	3000					Cambio
●									●		Nivel de aceite en el motor/depósito separado	6.1.2	
	●								●		Estanqueidad del motor (fugas)		
●									●		Filtros de aire en baño de aceite y seco ³⁾⁴⁾	6.4	
		●							●		Batería y conexiones por cables	6.7.1	
		●	●	●		●	●		●		Sistema de refrigeración (según tipo de aplicación del motor) ³⁾	6.3.1/2	
	●	●	●	●						●	Aceite del motor (según tipo de aplicación del motor) ⁵⁾	6.1.2	
	●			●						●	Cartucho de filtro de aceite	6.1.3	
	●					●				●	Cartucho de filtro de combustible	6.2.1	
	●			● ⁶⁾		●			●		Huelgo de válvulas (ajustar si es necesario)	6.6.1	
	●								●		Suspensión del motor (corregir apriete si es necesario)	9.2	
	●		●						●		Correas trapezoidales (corregir tensión si es necesario)	6.5	
			●						●		Sistema de aviso	6.5.3	
	●					●				●	Purificación previa de combustible	6.2.2	
	●					●			●		Fijaciones	6.8.1	
									●		Bujías de incandescencia-llama ⁴⁾	6.8.3	
				●						●	Filtro de aceite en derivación	6.1.4	
								●	●		Inyectores	6.1.4	

¹⁾ Tiempos orientativos máximos admisibles

⁴⁾ Cámbiese si es necesario

²⁾ Puesta en servicio de motores nuevos y repasados totalmente

⁵⁾ Para intervalos entre cambios de aceite, véase 6.1.1

³⁾ Límpiense si es necesario

⁶⁾ Sólo FL 912W

¹⁾ Tiempos orientativos máximos admisibles

⁴⁾ Cámbiese si es necesario

²⁾ Puesta en servicio de motores nuevos y repasados totalmente

⁵⁾ Para intervalos entre cambios de aceite, véase 6.1.1

³⁾ Limpiese si es necesario

⁶⁾ Sólo FL 912W

La ilustración de mantenimiento preventivo representada en esta página se suministra con cada motor con pegamento para adherir y debe pegarse en una parte bien visible en el motor o en el equipo.

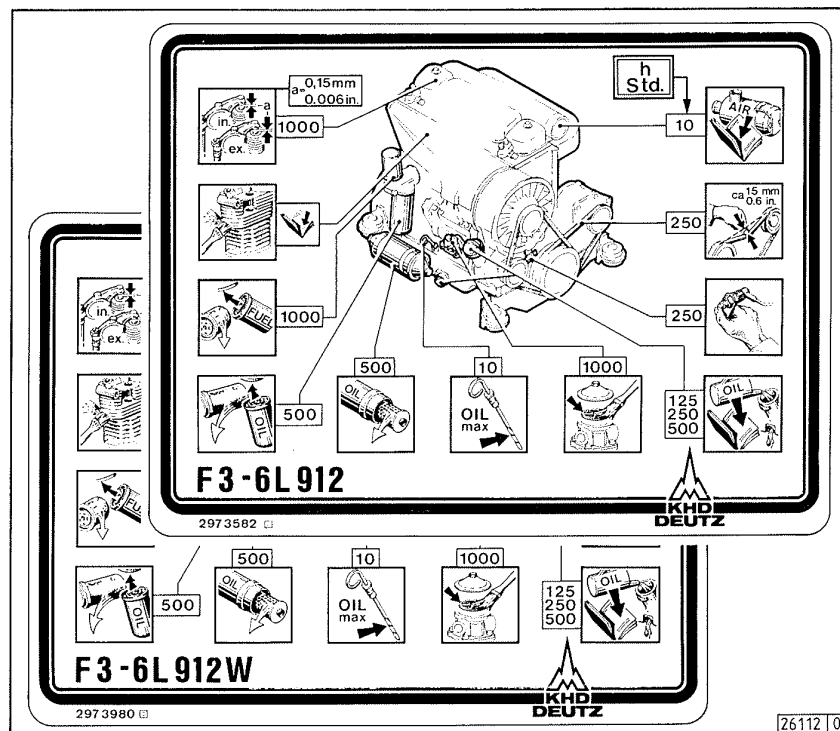
Compruebe que haya sido pegada.

En caso contrario, solicite le sea repuesta por su suministrador del motor o del equipo.

Para el mantenimiento preventivo regular es de absoluta importancia el plan de mantenimiento, véase 5.1.



Todos los trabajos de mantenimiento preventivo solamente se pueden realizar con el motor detenido.



Mantenimiento preventivo

5.3 Trabajos de mantenimiento preventivo realizados

5

Horas de servicio	Fecha	Firma/sello	Horas de servicio	Fecha	Firma/sello
*50			--		
125			250		
375			500		
625			750		
875			1000		
1125			1250		
1375			1500		
1625			1750		
1875			2000		
2125			2250		
2375			2500		
2625			2750		
En la tabla de mantenimiento preventivo se pueden registrar y confirmar los trabajos de mantenimiento correctamente realizados. * Puesta en servicio de motores nuevos y repasados totalmente.					

Horas de servicio	Fecha	Firma/sello	Horas de servicio	Fecha	Firma/sello
2875			3000		
3125			3250		
3375			3500		
3625			3750		
3875			4000		
4125			4250		
4375			4500		
4625			4750		
4875			5000		
5125			5250		
5375			5500		
5625			5750		
En la tabla de mantenimiento preventivo se pueden registrar y confirmar los trabajos de mantenimiento correctamente realizados.					

Horas de servicio	Fecha	Firma/sello	Horas de servicio	Fecha	Firma/sello
5875			6000		
6125			6250		
6375			6500		
6625			6750		
6875			7000		
7125			7250		
7375			7500		
7625			7750		
7875			8000		
8125			8250		
8375			8500		
8625			8750		
En la tabla de mantenimiento preventivo se pueden registrar y confirmar los trabajos de mantenimiento correctamente realizados.					

Horas de servicio	Fecha	Firma/sello	Horas de servicio	Fecha	Firma/sello
8875			9000		
9125			9250		
9375			9500		
3625			9750		
9875			10000		
10125			10250		
10375			10500		
10625			10750		
10875			11000		
11125			11250		
11375			11500		
11625			11750		

En la tabla de mantenimiento preventivo se pueden registrar y confirmar los trabajos de mantenimiento correctamente realizados.

Horas de servicio	Fecha	Firma/sello	Horas de servicio	Fecha	Firma/sello
11875			12000		
12125			12250		
12375			12500		
12625			12750		
12875			13000		
13125			13250		
13375			13500		
13625			13750		
13875			14000		
14125			14250		
14375			14500		
14625			14750		
En la tabla de mantenimiento preventivo se pueden registrar y confirmar los trabajos de mantenimiento correctamente realizados.					

- 6.1 Sistema de lubricación**
- 6.2 Sistema de combustible**
- 6.3 Sistema de refrigeración**
- 6.4 Filtro de aire de combustión**
- 6.5 Accionamientos por correas**
- 6.6 Operaciones de ajuste**
- 6.7 Accesorios adosados**
- 6.8 Trabajos adicionales de mantenimiento preventivo**

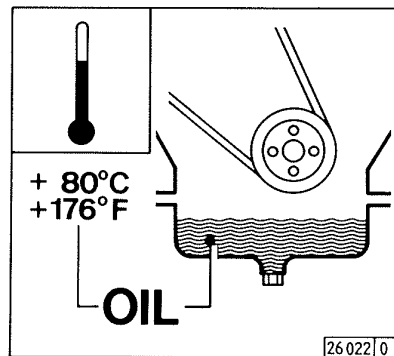
6.1.1 Intervalos entre cambios de aceite

- Los plazos para cambios de aceite dependen del servicio que presta el motor y de la calidad del aceite lubricante.
- Si los plazos para el cambio de aceite no se llegan a alcanzar en el lapso de **un año**, por lo menos se debe efectuar un cambio de aceite **una vez al año**.
- La tabla está basada en las siguientes condiciones:
 - Contenido máximo de azufre en el combustible diesel 0,5% de peso.
 - Temperatura ambiente constante hasta -10°C ($+14^{\circ}\text{F}$).
- Si el contenido de azufre es superior al 0,5 %, hasta el 1 % o la temperatura ambiente constante es inferior a -10°C ($+14^{\circ}\text{F}$), los lapsos entre cambios de aceite se deben reducir a la mitad.
- Para combustibles con contenido de azufre superior al 1 %, rogamos consulte a su DEUTZ SERVICE.

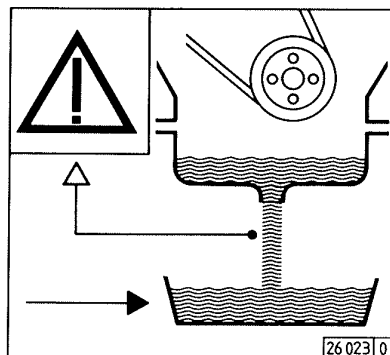
	Motores de aspiración natural	
Calidad del aceite	CC/SF CC/SF	CD/SE CD/SF CE/SF CE/SG
Motores de incorporación	Cambios de aceite en hs	
Servicio de baja solitación, p.ej.: Vehículos de rodaje por carreteras, tractores, transportadores y carretillas industriales, grúas, maquinaria de obras públicas, vehículos sobre rieles, barcos, grupos electrógenos, bombas	250	500
Servicio de alta solitación, p.ej.: Cosechadoras, máquinas de minería, barredoras, equipos para servicio en invierno, grupos electrógenos de emergencia, bombas de emergencia	125	250
Motores de combustión en dos etapas		

Los cambios de aceite deben hacerse con el motor detenido y calentado por el funcionamiento. (Temperatura del aceite lubricante aproximadamente 80°C .)

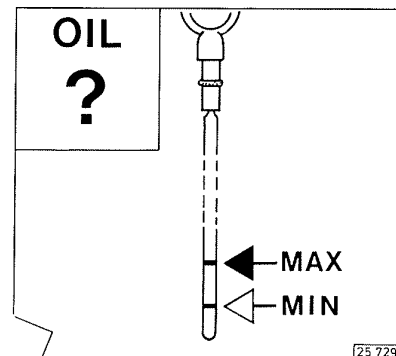
6.1.2 Cambio de aceite del motor Verificación del nivel de aceite



- Sitúese el motor o el vehículo en posición horizontal.
- Colóquese la palanca de mando de la calefacción de la cabina del conductor en su posición máxima (sólo en vehículos con calefacción de aceite de motor).
- Hágase funcionar el motor hasta que se caliente.
 - Temperatura del aceite lubricante aproximadamente 80° C
- Párese el motor.



- Colóquese un recipiente para recoger el aceite, debajo del motor.
- Desenrózquese el tapón de descarga de aceite.
- Déjese salir el aceite.
- Enrózquese el tapón de descarga de aceite con un anillo de junta nuevo y apriétese.
- Llénese de aceite lubricante nuevo.
 - Para informaciones sobre calidad/viscosidad, véase. 4.1.
 - Para cantidades de llenado, véase 9.1.
- Póngase el motor en marcha y hágasele funcionar en vacío, a bajas revoluciones (con calefacción de aceite aprox. 2 min.)



- Párese el motor.
- Contrólese el nivel de aceite.
 - en varillas de sondeo con marca doble (● y –) vale la marca de trazo.
 - Si es necesario, complétese el nivel de aceite hasta la marca de trazo.

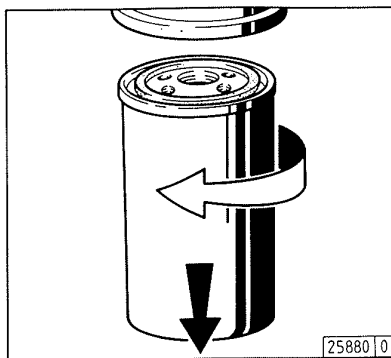


en forma reglamentaria.

Póngase cuidado al vaciar aceite caliente, por el peligro de quemaduras. Recójase el aceite usado y no se vierta en el suelo. Elimínese

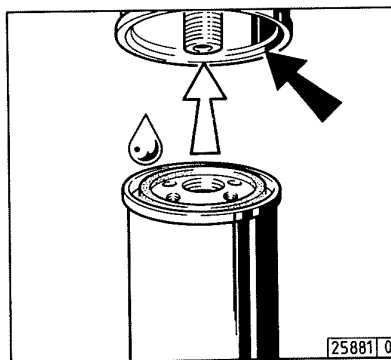
6.1.3 Cambio de filtro de aceite

6



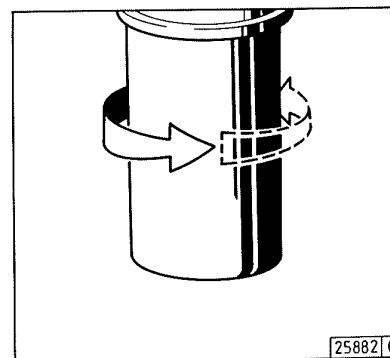
25880 0

- Aflojese el cartucho de filtro de aceite lubricante con una herramienta corriente en el comercio y desenróquese.
- Recójase el aceite que pueda salir.



25881 0

- Límpiase la superficie obturante del porta-filtro de posible ensuciamiento.
- Untese con un poco de aceite la junta de goma del cartucho de filtro nuevo.
- Enróquese el cartucho de filtro con la mano, hasta que la junta se haya asentado bien.



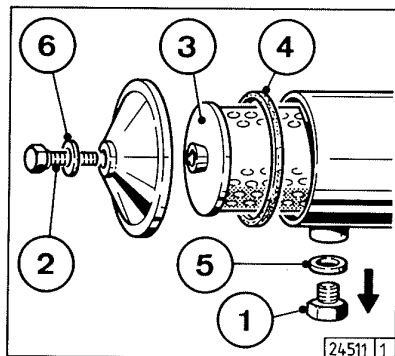
25882 0

- Apriétese el cartucho de filtro de aceite lubricante, dándole otra media vuelta.
- Verifíquese el nivel de aceite, véase 6.1.2
- Verifíquese la presión de aceite, véase 3.3.1
- Verifíquese la hermeticidad de la junta del cartucho de filtro de aceite lubricante.



Téngase cuidado con el aceite caliente, por el peligro de quemaduras.

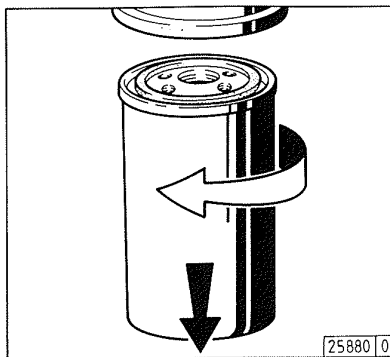
6.1.4 Cambio del elemento del filtro de aceite en derivación



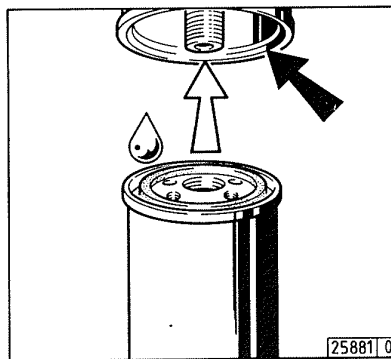
- Desenroscar el tapón de vaciado de aceite 1 y dejar salir el aceite.
- Desenroscar el tornillo de fijación 2. Quitar la tapa.
- Quitar el elemento de filtro sucio 3. Limpiar la carcasa de filtro.
- Verificar, y en caso dado, cambiar la junta 4 de la tapa.
- Enroscar el tapón de vaciado de aceite con una junta hermetizante 5 nueva.
- Colocar un elemento de filtro nuevo.
- Enroscar la tapa con un anillo de junta 6 nuevo.
- En la marcha de prueba, observar la hermeticidad del circuito y la presión de aceite.

6.2.1 Cambio de filtro de combustible

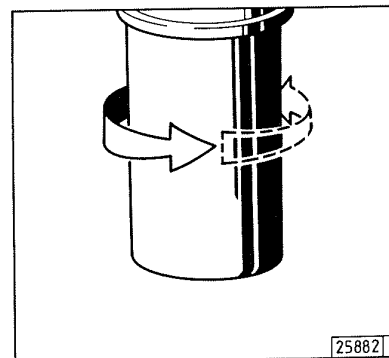
6



- Círrrese el grifo de bloqueo de combustible.
- Aflójese el cartucho del filtro de combustible con una herramienta corriente en el comercio, y des-enrósqese.
- Recójase el combustible que sale.



- Límpiese la superficie obturante del porta-filtro de posible ensuciamiento.
- Untese con un poco de aceite o humidézcase con combustible diesel la junta de goma del nuevo cartucho de filtro de combustible.
- Enrósqese el cartucho de filtro con la mano, hasta que la junta se haya asentado bien.



- Apriétese el cartucho de filtro de combustible, dándole otra media vuelta.
- Abrase el grifo de cierre del combustible.
- Púrguese de aire el sistema de combustible, véase 3.1.4.
- Verifíquese la hermeticidad.

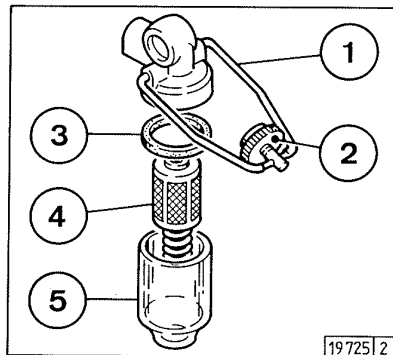


Nunca se acerque una llama de fuego ni se fume al trabajar en el sistema de combustible.

6.2.2 Purificación previa de combustible

Limpieza del filtro tamiz de combustible

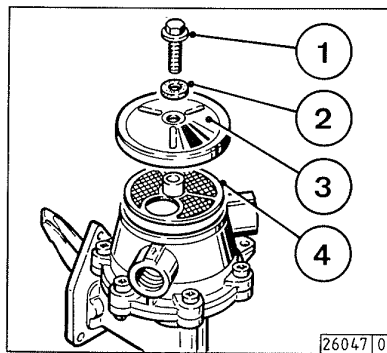
Ejecución „Bosch“



- Cerrar el grifo de combustible.
- Aflojar la tuerca de fijación 1.
- Desplazar lateralmente el estribo de alambre 1.
- Quitar la campana de filtro 5 con filtro de tamiz 4 y limpiarlas con combustible.
- Utilizar una junta 3 nueva para la campana de filtro 5.
- Purgar de aire el sistema de combustible, véase 3.1.4.
- Verificar la hermeticidad.

Limpieza del tamiz de combustible

Ejecución „IMSA“



- Cerrar el grifo de combustible.
- Desenroscar el tornillo hexagonal 1 con junta 2.
- Quitar la tapa 3.
- Sacar el tamiz de combustible 4.
- Limpiar el tamiz con combustible, en caso necesario según su estado, sustituirlo.
- Efectuar el montaje en el orden inverso.
- Purgar de aire el sistema de combustible, véase 3.1.4.
- Verificar la hermeticidad.

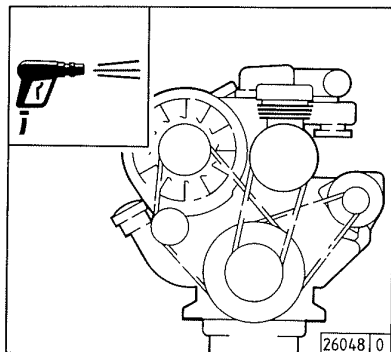
6.3.1 Intervalos entre trabajos de limpieza

- El ensuciamiento del sistema de refrigeración depende del tipo de servicio del motor.
- El peligro de ensuciamiento se aumenta por los residuos de aceite y combustible en el motor. Por ello, se debe prestar especial atención a la estanqueidad del motor, al trabajar en ambientes de alta saturación de polvo.
- Se registra ensuciamiento intenso, p.ej.:
 - cuando se trabaja en obras de construcción, debido al gran contenido de polvo en el aire,
 - al trabajar en cosechas, por la alta concentración de paja en la zona de trabajo de la máquina.
- En atención a las condiciones diferentes de servicio, los intervalos entre trabajos de limpieza se deben fijar individualmente en cada caso. Los intervalos de limpieza indicados en la tabla adjunta, se pueden considerar, por ello, como datos orientativos.

Intervalos entre verificaciones y trabajos de limpieza	Tipo de aplicación del motor
Valores orientativos hs	
2000	Barcos, grupos electrógenos en recintos cerrados, bombas
1000	Vehículos para circulación por carreteras firmes
500	Tractores, carretillas elevadoras, grupos electrógenos sobre ruedas
250	Vehículos que prestan servicio en obras de construcción y caminos de tierra, maquinaria de obras de construcción, compresores, equipos para minería subterránea
125	Maquinaria agrícola, tractores en servicio de cosechas

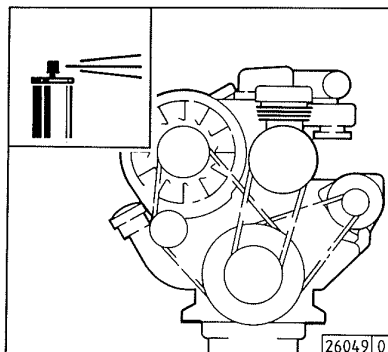
6.3.2 Limpieza del sistema de refrigeración

- con aire comprimido



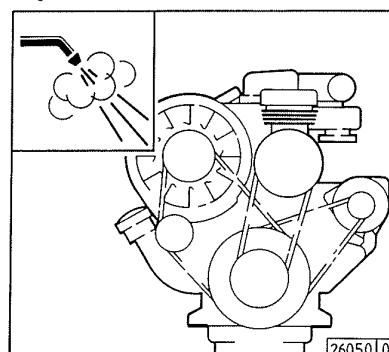
- Desmóntese la cubierta para el aire refrigerante 1.
- Comenzando por el lado de descarga de aire, soplese el motor con aire comprimido, poniendo atención especialmente en las aletas de refrigeración y en el refrigerador de aceite. Elimínese la suciedad que el aire comprimido haya podido introducir en el espacio de conducción de aire.
- Móntese la cubierta para aire refrigerante.

- con detergente para limpieza en frío



- Desmóntese la cubierta para el aire refrigerante.
- Rocíese el motor con detergente para limpieza en frío, de venta corriente en el comercio, dejándolo actuar unos 10 minutos.
- Lávese el motor con un fuerte chorro de agua, hasta que quede limpio (no se dirija el chorro de agua directamente a piezas delicadas del motor, p.ej. el generador).
- Repítase el proceso si es necesario.
- Móntese la cubierta para el aire refrigerante.
- Hágase funcionar el motor hasta que se caliente, para que se evapore el agua restante.

- con aparato de vapor a alta presión



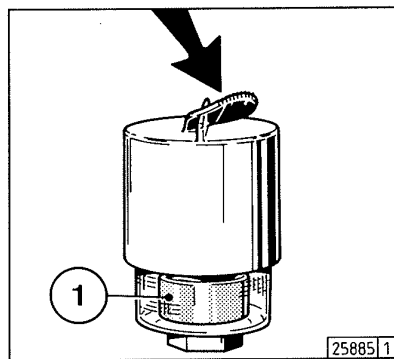
- Desmóntese la cubierta para el aire refrigerante.
- Límpiase el motor con chorro de vapor (no se dirija el chorro de vapor directamente a piezas delicadas del motor, p.ej. el generador).
- Móntese la cubierta para aire refrigerante.
- Hágase funcionar el motor hasta que se caliente, para la evaporación del agua restante.



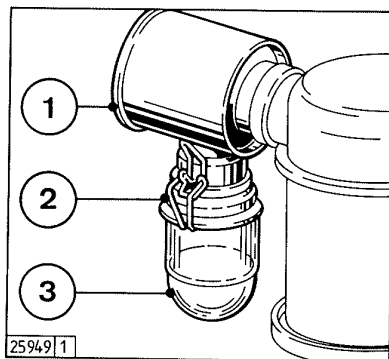
Los trabajos de limpieza se pueden realizar sólo con el motor parado y suficientemente enfriado.

6.4.1 Intervalos de limpieza

- El ensuciamiento del filtro de aire para la combustión depende de la concentración de polvo en el aire y del tamaño de filtro elegido. Al contar con una alta concentración de polvo, se puede anteponer al filtro de aire de combustión un separador previo de ciclón.
- Por ello, los intervalos entre trabajos de limpieza no se pueden fijar en forma general, sino independientemente, de caso en caso.
- Al utilizarse filtros secos de aire, la limpieza se debe realizar sólo en función del indicador o contacto de mantenimiento.
- En los casos siguientes es necesario efectuar trabajos de mantenimiento preventivo del filtro:
 - **Con indicador de mantenimiento**, si, con el motor parado el campo rojo de mantenimiento 1 es totalmente visible.
 - **Con contacto de mantenimiento**, si, con el motor en marcha se enciende el piloto amarillo de control.
- Terminado el trabajo de mantenimiento, se debe pulsar el botón de reposición del indicador de mantenimiento, con lo que éste se encuentra de nuevo en orden de servicio.



6.4.2 Limpieza del separador previo

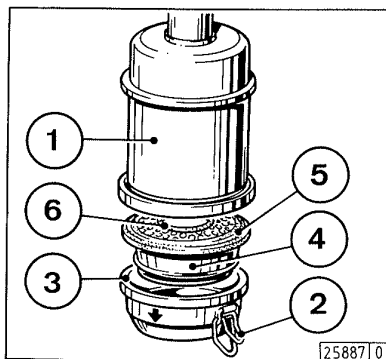


- Limpiar el separador previo 1.
- Soltar los cierres de enganche rápido 2, vaciar el depósito de recogida de polvo 3 y limpiar.



Nunca se llene de aceite el recipiente de recogida de polvo 3 del separador previo 1.

6.4.3 Limpieza del filtro de aire en baño de aceite



- Párese el motor y espérense unos 10 minutos hasta que haya salido el aceite de la caja de filtro 1.
- Aflojense los cierres de enganche rápido 2 y retírese la cazoleta de aceite 3 con el elemento de filtro 4 y, si es necesario, aflojese éste en la junta de separación con un destornillador, cuidando de no dañar la junta de goma 5.
- Vacíese el aceite sucio y el barro y límpiese la cazoleta.
- Lávese el elemento de filtro 4 en combustible diesel y déjese escurrir bien el líquido.

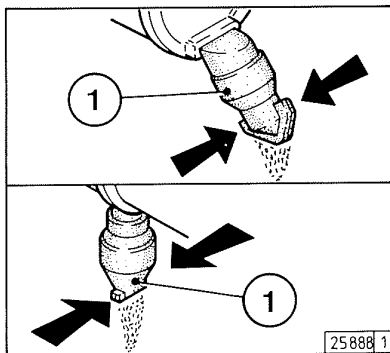
- Límpiese la carcasa 1 del filtro en caso de estar sucia.
- Revisense visualmente las juntas de goma 5 y 6 y cámbiense si es necesario.
- Llénese la cazoleta con aceite de motor hasta la marca de nivel (flecha), (viscosidad, véase en 4.1.2).
- Júntense la cazoleta de aceite y el elemento de filtro con la caja de filtro y engánchense los cierres.



Nunca se lave el filtro en gasolina. Con respecto al aceite sucio, considérense los reglamentos vigentes para eliminación de sustancias contaminadoras.

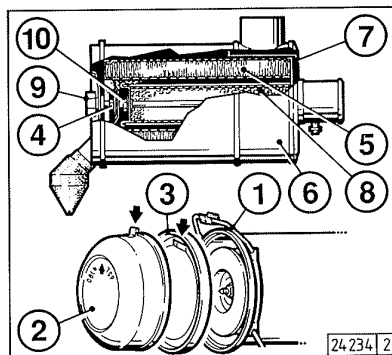
6.4.4 Filtro seco de aire

Válvula de evacuación de polvo



- Vacíese la válvula evacuadora de polvo 1, oprimiendo en la dirección de la flecha la ranura de evacuación.
- Límpiase cada cierto tiempo la válvula evacuadora de polvo.
- Elimínense las posibles formaciones de polvo endurecido, oprimiendo la zona superior de la válvula.

Cartuchos de filtro



- En la ejecución con recipiente de recogida de polvo, desenganchar el estribo de fijación 1 y sacar el recipiente de recogida de polvo 2 junto con la tapa 3.
- Quitar la tapa 3 del recipiente de recogida de polvo y limpiar el recipiente.
- En la ejecución con válvula evacuadora de polvo 1 situada directamente en la caja de filtro 6 desenroscar la tuerca 9. Quitar la tapa.
- Desenroscar la tuerca hexagonal 4, sacar el cartucho de filtro 5 sucio.
- Limpiar el cartucho de filtro, sustituir como máximo después de 1 año.

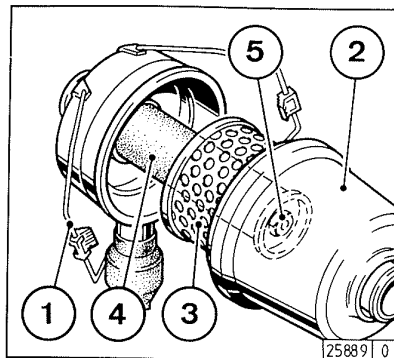
- Limpieza del cartucho de filtro 5:
 - Soplese desde adentro hacia afuera con aire comprimido seco (máximo 5 bar), o bien,
 - golpéese (sólo como emergencia) cuidando de no dañar el cartucho, o bien
 - lávese completamente según prescripción del fabricante.
- Al montar y desmontar con demasiada frecuencia, se puede dañar la junta en el cartucho de filtro. Verifíquese el cartucho por si el papel de filtrado está dañado (mirándolo a contraluz), e igualmente la junta. Cámbiase en caso necesario.
- Después de cinco operaciones de mantenimiento preventivo del filtro, a más tardar después de dos años, cámbiase el cartucho de seguridad 8 (nunca se debe limpiar).

Para ello:

- Aflojese la tuerca hexagonal 10 y extraíga-se el cartucho 8.
- Introdúzcase el nuevo cartucho y apriétese otra vez con la tuerca hexagonal.
- Introdúzcase el cartucho de filtro 5 con el labio de hermetizado 7, tal y como se muestra, en la caja de filtro 6.
- Colocar la tapa y apretar con tuerca 9, respectivamente colocar el depósito de recogida de polvo 2 junto con la tapa 3 y fijar con el estribo de fijación.



Nunca se lave el cartucho de filtro con gasolina o con líquidos calientes.



- Abrase el estribo de apriete 1.
- Quítese la caperuza del filtro 2 y extrágase el cartucho de filtro 3.
- Limpíese el cartucho de filtro o cámbiase, a más tardar después de un año.
- Limpieza del cartucho de filtro 3:
 - Soplese desde adentro hacia afuera con aire comprimido seco (máximo 5 bar), o bien,
 - golpéese (sólo como emergencia), cuidando de no dañar el cartucho, o bien,
 - lávese completamente según prescripción del fabricante.

- Al montar y desmontar con demasiada frecuencia, se puede dañar la junta en el cartucho de filtro. Verifíquese el cartucho por si el papel de filtrado está dañado (mirándolo a contraluz), e igualmente la junta. Cámbiase en caso necesario.
- Después de 5 operaciones de mantenimiento preventivo del filtro, a más tardar después de dos años, cámbiase el cartucho de seguridad 4 (nunca se debe limpiar).

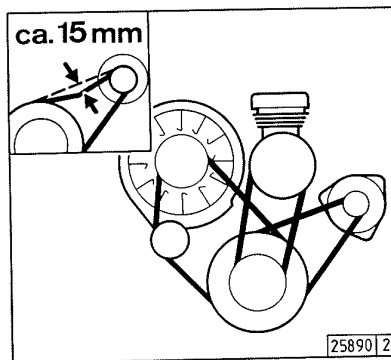
Para ello:

- Aflojese la tuerca hexagonal 5 y extrágase el cartucho 4.
- Introdúzcase el nuevo cartucho y apriétese otra vez con la tuerca hexagonal.
- Introdúzcase el cartucho de filtro 3, colóquese la caperuza 2 y engánchese el estribo de fijación 1.



Nunca se lave el cartucho de filtro con gasolina o con líquidos calientes.

6.5.1 Verificación de correas trapezoidales

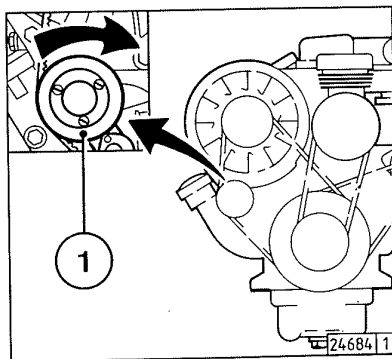


- Inspecciónese visualmente la correa trapezoidal en toda su longitud, para detectar daños o fisuras. Cámbiense en caso de que presente tales defectos.
- Apretando con el pulgar entre las poleas, compruébese que no sea posible desviar la correa trapezoidal por más de unos 10 a 15 mm.
- Corrijase la tensión de la correa trapezoidal si es necesario, véase 6.5.4 a 6.5.7.



La verificación/tensado/cambio de correas trapezoidales se puede realizar solamente si el motor está detenido. Móntese otra vez el protector de correas, si es necesario.

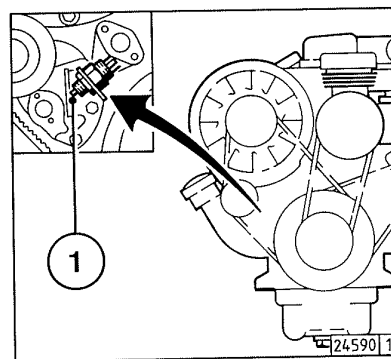
6.5.2 Sustitución de la correa trapezoidal de la turbina de refrigeración



- Para la sustitución, apretar hacia adentro la polea tensora 1 con herramienta usual en el comercio y retirar la correa trapezoidal.
- Colocar una correa trapezoidal nueva.

Si las correas trapezoidales son nuevas, verifíquese nuevamente la tensión después de 15 minutos de rodaje.

6.5.3 Verificación del sistema de aviso

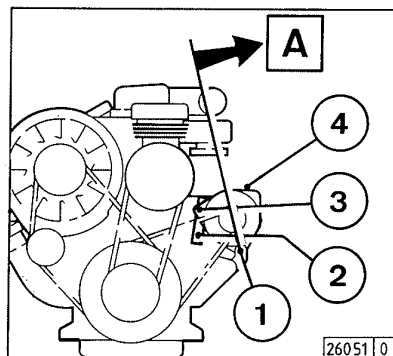


- En caso de rotura de la correa trapezoidal, el vástago de presión 1 del interruptor eléctrico es accionado por la polea tensora y se dispara una señal de advertencia acústica o luminosa.
- Verificación de funcionamiento mediante la presión del vástago 1.



Llevar a cabo la comprobación de funcionamiento sólo con el motor parado.

6.5.4 Corrección del tensado de la correa trapezoidal del generador

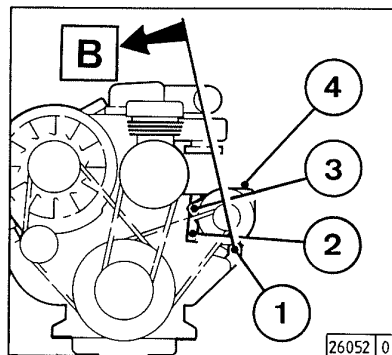


- Aflojar un poco los tornillos 1, 2 y 3.
- Desplazar el generador 4 hacia afuera, en dirección a **A**, hasta alcanzar la tensión de correa trapezoidal correcta.
- Volver a apretar los tornillos 1, 2 y 3.



La comprobación/tensado/sustitución de las correas trapezoidales se puede realizar solamente si el motor está detenido. Móntese otra vez el protector de correas si es necesario.

6.5.5 Sustitución de la correa trapezoidal del generador

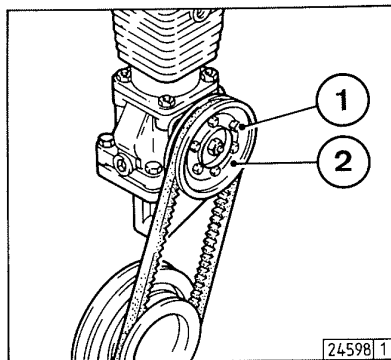


- Desmontar la correa trapezoidal de la turbina de refrigeración tal y como se ha descrito bajo el punto 6.5.2.
- Aflojar los tornillos 1, 2 y 3.
- Desplazar el generador 4 hacia adentro, en dirección hacia **B**.
- Quitar la correa trapezoidal y colocar la nueva.
- Desplazar el generador 4 hacia afuera, en dirección a **A**, hasta obtener la tensión de correa trapezoidal correcta.
- Volver a apretar los tornillos 1, 2 y 3.

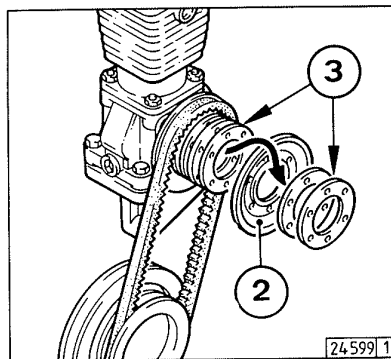
- Volver a montar la correa trapezoidal de la turbina del refrigerador tal y como se ha descrito bajo el punto 6.5.2.

Si las correas trapezoidales son nuevas, verifíquese nuevamente la tensión después de 15 minutos de rodaje.

6.5.6 Corrección del tensado de la correa trapezoidal del compresor de aire, resp. cambio de la misma



- Desenrózquense los tornillos hexagonales 1.
- Extrágase la mitad exterior de la polea 2.
- Cámbiase la correa trapezoidal si es necesario.



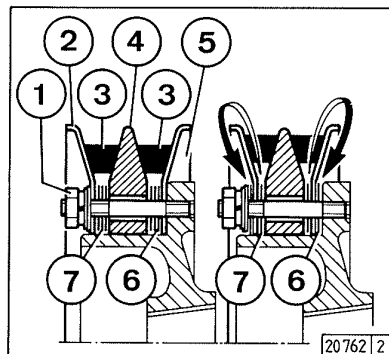
- Para ajustar la tensión, retírese una o si es necesario, varias arandelas distanciadoras 3 del interior, colocando exteriormente las arandelas quitadas, sobre la mitad de polea para correa 2 que se había desmontado.
- Apriétense nuevamente los tornillos 1, mientras se gira el motor manualmente, para evitar el aplastado de la correa trapezoidal.



La verificación/tensado/sustitución de las correas trapezoidales se puede realizar solamente si el motor es detenido. Móntese otra vez el protector de correas, si es necesario.

Si las correas trapezoidales son nuevas, verifíquese nuevamente la tensión después de 15 minutos de rodaje.

6.5.7 Ejecución de compresor de aire con correa trapezoidal doble



- Desenroscar las tuercas hexagonales 1, quitar la mitad de polea para correa trapezoidal 2, correa trapezoidal 3 y el paquete de arandelas intermedias 7.
- Quitar la arandela intermedia 4, correa trapezoidal posterior 3, paquete de arandelas intermedias 6 y mitad de polea para correa trapezoidal 5.
- Para ajustar la tensión, quitar una o más arandelas intermedias de los paquetes 6 y 7. Colocar las arandelas quitadas delante, respectivamente detrás de la mitad de polea para correa trapezoidal, para garantizar el alineamiento de la correa trapezoidal. Quitar siempre de cada paquete el mismo número de arandelas intermedias.

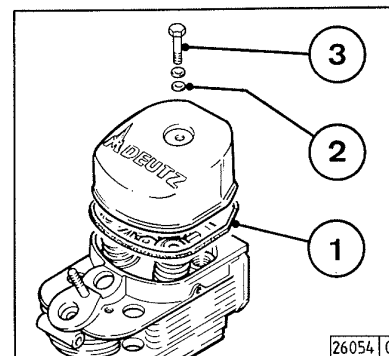
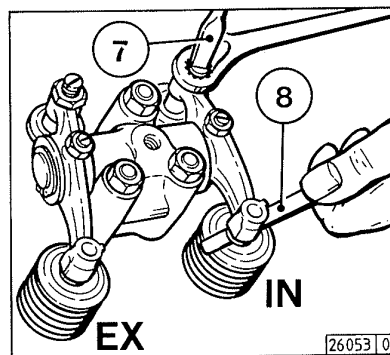
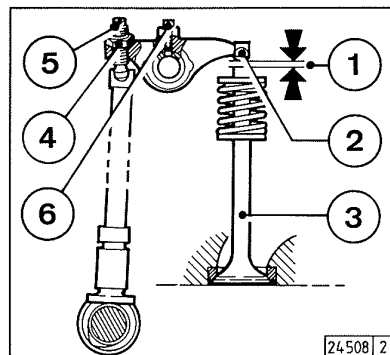
- Proceder al montaje en el orden inverso al descrito. Girar el motor al mismo tiempo que se aprieta la tuerca 1 para evitar un aplastamiento de la correa trapezoidal.

En caso de desgaste o daños en una correa trapezoidal, cambiar siempre ambas correas. La diferencia longitudinal de las nuevas correas trapezoidales entre sí no puede sobrepasar un 0,15 %.



La verificación/tensado/sustitución de las correas trapezoidales se puede realizar solamente si el motor está detenido. Móntese otra vez el protector de correas, si es necesario.

6.6.1 Verificación del juego de válvulas y ajuste, si es necesario



- Desmóntense las tapas de culata.
- La posición del cigüeñal debe corresponder al esquema de ajuste en 6.6.1.1.
- Antes de proceder al ajuste del juego de válvulas, déjese enfriar el motor por lo menos unos 30 minutos. La temperatura del aceite debe ser inferior a 80° C.
- Contrólense el juego 1 de la válvula con la galga 8, entre el dedo del balancín 2 y la válvula 3 (la galga debe poderse introducir con poca resistencia). Véase el juego admisible de la válvula en 9.1.

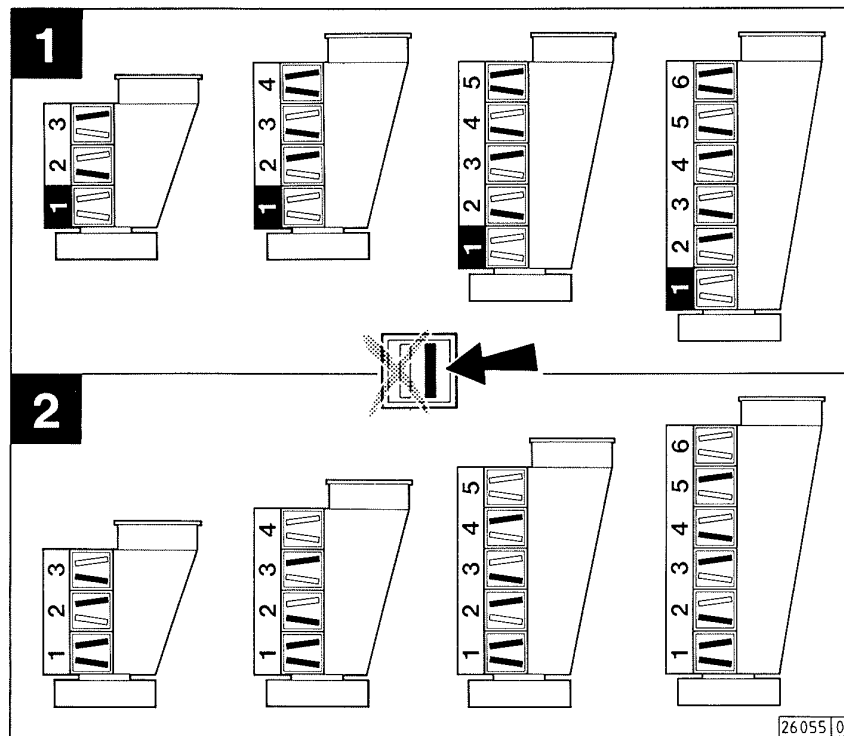


No modificar el ajuste de la tobera de aceite 6, hacer realizar este trabajo en un taller calificado.

- Si es necesario, ajústese el juego de válvula como sigue:
 - Aflojese la contratuercas 4.
 - Con el destornillador 7, regúlese el tornillo de ajuste 5, de tal manera que se obtenga un juego correcto de válvulas tras apretar la contratuercas 4.
- Revisense las operaciones de verificación, respectivamente de ajuste, en cada cilindro.

- Pegar una junta 1 nueva con producto hermético a la tapa de la culata. La superficie grafiada debe señalar hacia la culata.
- Montar la tapa de culata con una junta 2 nueva bajo la arandela del tornillo de fijación 3.
- Pares de apriete de tornillos, ver 9.2.

6.6.1.1 Esquema de ajuste para el juego de válvulas



● Posición 1 del cigüeñal:

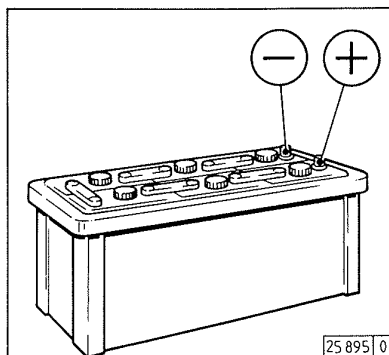
Gírese el cigüeñal hasta que se cruce el movimiento de ambas válvulas del cilindro 1 (la válvula de escape aún no está cerrada y la de admisión comienza a abrirse). En tal punto, se pueden ajustar las válvulas **marcadas en negro**, según el esquema al margen. Para fines de control, márquese con tiza el balancín en que se haya efectuado el ajuste.

● Posición 2 del cigüeñal:

Dése otra vuelta al cigüeñal (360°). En tal punto, se pueden ajustar las válvulas **marcadas en negro**, según el esquema al margen.

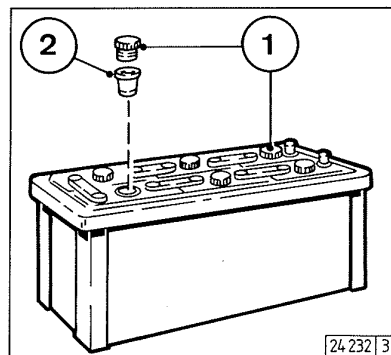
6.7.1 Batería

6.7.1.1 Verificación de la batería y de las conexiones de cables



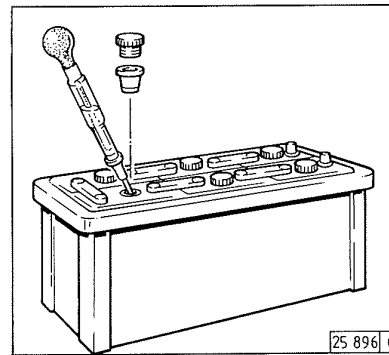
- Manténgase la batería limpia y seca.
- Aflojense los bornes de conexión sucios.
- Límpiense los polos de la batería (+ y -) y los bornes, y engrásense con una grasa exenta de ácido y resistente a ácidos.
- Al montar, cuídese de que las conexiones por bornes hagan un buen contacto. Apriétense los tornillos de los bornes fuertemente con la mano.

6.7.1.2 Verificación del nivel de electrolito



- Retírense las tapas 1.
- Si hay embudos de control 2:
El nivel del líquido debe llegar hasta el fondo.
- Sin embudos de control:
El nivel del líquido debe quedar 10–15 mm por encima del borde superior de las placas.
- Agréguese agua destilada si es necesario.
- Enrósquense nuevamente las tapas.

6.7.1.3 Verificación de la densidad del electrolito



- Mídase la densidad del electrolito de cada una de las celdas con un aparato de prueba de ácidos de venta corriente en el comercio.

De los valores medidos (véase la tabla en la página siguiente) se desprende el estado de carga de la batería.

Al realizar la medición, la temperatura del electrolito debe ser, en lo posible, de 20° C.

Densidad del electrolito				
en kg/l		en °Bé (grados Baumé)*		Estado de carga
Normal	Trópicos	Normal	Trópicos	
1,28	1,23	32°	27°	bien cargado
1,20	1,12	24°	16°	semicargado, recargar
1,12	1,08	16°	11°	descargado, cargar inmediatamente

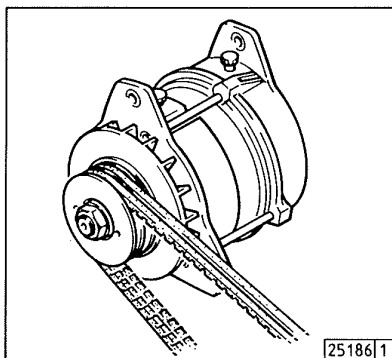
* La indicación de densidad de electrolito en °Bé (grados Baumé) es anticuada y casi no se utiliza.



Los gases que desprende la batería son explosivos, por lo que hay que evitar chispas y llamas de fuego en su cercanía.

Cuidese de que el electrolito no entre en contacto con la piel o vestimenta. Se debe trabajar con gafas. No se depositen herramientas sobre la batería.

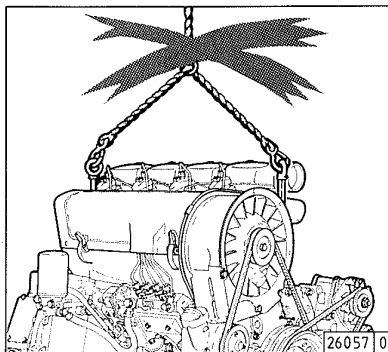
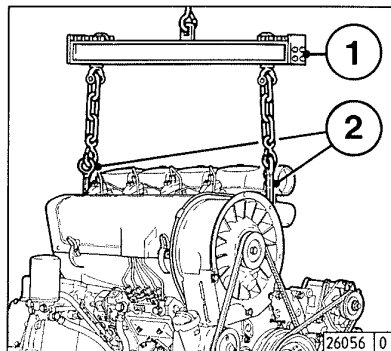
6.7.2 Generador trifásico



6

- Con el motor **en marcha**, no se debe interrumpir la conexión entre batería, generador y regulador.
- Sin embargo, si se tiene que arrancar y operar un motor sin batería, se desconectará la unión regulador/generador antes del arranque.
- No confundir la conexión de bornes en la batería.
- Una lámpara de control de carga defectuosa se sustituirá inmediatamente.
- Para la limpieza del motor se cubrirán el generador y el regulador.
- En sistemas de corriente trifásica, para comprobar si hay tensión en un conductor, no está permitido de manera alguna rozar éste ligeramente con masa.
- Para trabajos de soldadura eléctrica, el borne a masa del aparato de soldar se conectará directamente a la parte a soldar.

6.7.3 Suspensión para transporte

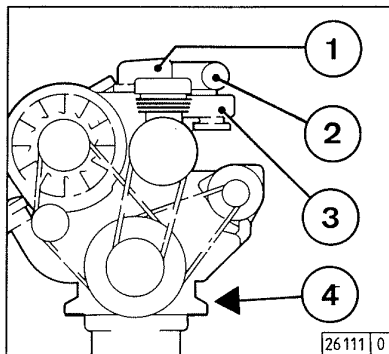


- Para el transporte del motor, utilícese solamente el dispositivo correcto de suspensión 1.
- Una vez terminado el transporte y antes de la puesta en servicio del motor:
Retírense las argollas de transporte 2.



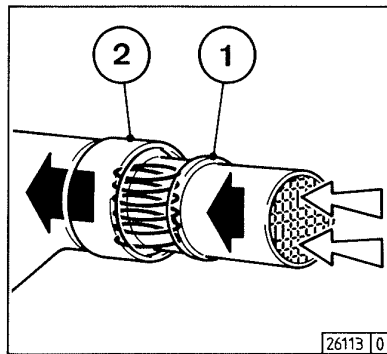
Utilícese solamente el dispositivo correcto de suspensión.

6.8.1 Verificación de las fijaciones



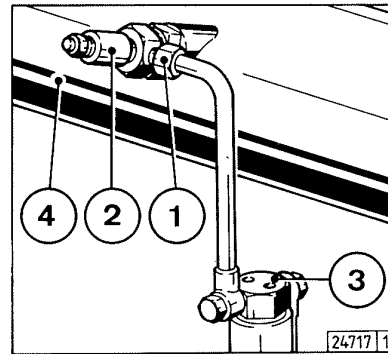
- Tapa de culata 1
- Colector de admisión 2
- Manguitos de unión
- Colector de escape 3
- Suspensión del motor 4

6.8.2 Verificación del funcionamiento del tubo de calefacción

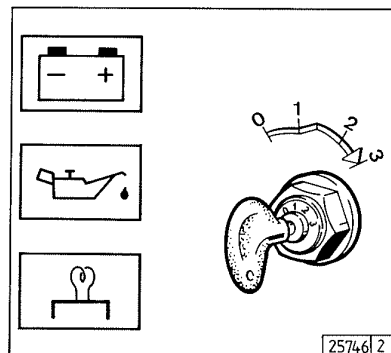


- Con un funcionamiento correcto, se calienta el tubo de calefacción mediante la espiral de calefacción al arrancar con precalentamiento.
 - 1 Tubo de calefacción
 - 2 Colector de admisión

6.8.3 Verificación del funcionamiento del sistema de incandescencia-llama

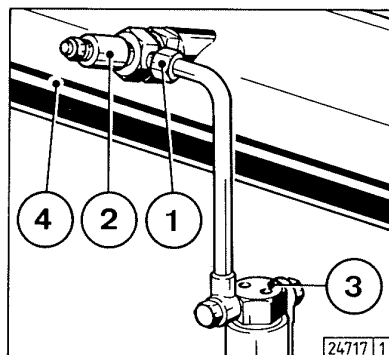


- Con un funcionamiento correcto, se calienta el tubo de aspiración 4 en la cercanía de la bujía de incandescencia-llama 2 al arrancar con calentamiento previo.



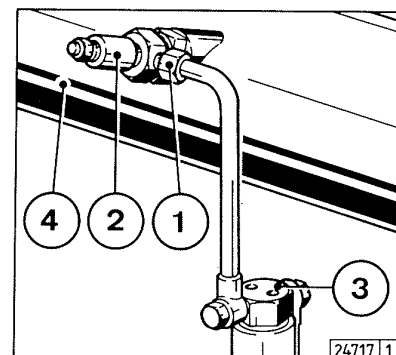
Paso de prueba 1:

- Colocar la palanca de ajuste de velocidad de giro, respectivamente la palanca de parada en posición „Stop“.
- Introducir la llave
 - Posición 0 = sin tensión de funcionamiento.
- Girar la llave hacia la derecha
 - Posición 1 = tensión de funcionamiento
 - Las lámparas de control se encienden.
- Empujar la llave hacia adentro y continuar girando hacia la derecha, en contra de la resistencia del resorte:
 - Posición 2 = precalentamiento, mantener en la posición 2 aproximadamente durante 1 minuto.
 - Se enciende el piloto de control de precalentamiento.
- De no ser así, la bujía de incandescencia-llama está defectuosa o existe una interrupción en el circuito.



Paso de prueba 2:

- Aflojar la unión roscada del tubo 1.
- Hacer girar el motor con el motor de arranque, estando la llave en la posición 3.
- Debe salir combustible por la unión aflojada del tubo. En otro caso, hacer verificar por un técnico el sistema, válvula magnética 3.



Paso de prueba 3:

- Desmontar la bujía de incandescencia-llama 2.
- Volver a montar la bujía en la tubería de combustible.
- Hacer girar el motor con el motor de arranque, estando la llave en la posición 3.
- Debe salir combustible de la bujía, dado el caso sustituirla.
- Para montar la bujía, utilizar el sellante DEUTZ DW 47.



Manténgase alejado de partes en rotación. Recójase el combustible que sale.

7.1 Tabla de perturbaciones

- Las perturbaciones se deben con frecuencia a que el manejo del motor o las medidas de mantenimiento preventivo aplicadas no son adecuados.
- Al surgir cualquier perturbación, compruébese si se han tomado debidamente en cuenta todas las prescripciones de operación y de mantenimiento preventivo.
- En la página siguiente, se encuentra una tabla de las perturbaciones correspondientes.
- Si no es posible identificar el origen de una perturbación o el operador no está en condiciones de subsanar dicha perturbación, póngase en contacto con el DEUTZ SERVICE.

Perturbación										Medidas a tomar	
El motor no arranca o lo hace con dificultad										Verificar	V
El motor arranca, pero gira irregularmente o se para										Ajustar	A
El motor se calienta mucho, la alarma de temperatura actúa										Cambiar	C
El motor acusa falta de potencia										Limpiar	Li
El motor no trabaja con todos los cilindros										Llenar	L
El motor no tiene presión de aceite o sólo es muy baja										Reducir	R
El motor tiene un consumo de aceite excesivo											
El motor echa humo											
- azulado											
- blanco											
- negro											
Causa										Capítulo	
●									No está desembragado (si es posible desembragar)	Mando	V
●							●		Temperatura límite para el arranque no alcanzada		V
●			●						Palanca de parada del motor todavía en posición „Stop“		V
		●			●				Nivel de aceite demasiado bajo		L
		●	●			●	●		Nivel de aceite demasiado elevado		R
					●	●	●		Inclinación excesiva del motor		V
●					●	●			Clase SAE o calidad incorrectas del aceite lubricante	Comb., lubri. etc.	C
●	●			●				●	Calidad de combustible no corresponde a instrucciones de operación		C
		●	●					●	Filtro de aire sucio	Aire de comb.	C
		●	●					●	Indicador o contacto de mantenimiento del filtro de aire, defectuoso		C
		●							Aletas de refrigeración sucias	Sistema refr.	Li
		●							Turbina de refrigeración defectuosa, correa trapezoidal rota o floja		V / C
		●							Calentamiento del aire de refrigeración/corto-circuito térmico		V
		●							Refrigerador de aceite sucio		V/Li
●									Batería defectuosa o sin carga	Electricidad	V
●									Empalmes de cables sueltos u oxidados en el circuito del arrancador		V
●									Arrancador defectuoso o piñón no engrana		V
●	●		●				●	●	Juego de válvulas incorrecto	Motor	A
	●		●	●					Fugas en tubería de inyección		V
●	●	●	●	●			●	●	Injector defectuoso		V / C
●							●		Sistema de incandescencia-llama/tubo calef. defectuosos		V
●	●		●						Aire en el sistema de combustible		V
●	●		●	●					Filtro/purificación previa de combustible sucio		V/Li/C

8.1 Conservación

8.1 Conservación

Si el motor debe permanecer fuera de servicio durante algún tiempo prolongado, será necesario tomar precauciones para preservarlo contra oxidación. Las medidas descritas aquí son válidas para un tiempo máximo de aproximadamente 6 meses fuera de servicio. Antes de poner el motor otra vez en servicio, se deben eliminar los agentes de preservación utilizados.

- Aceites anticorrosivos según especificación:
 - MIL – L – 21260B
 - TL 9150 – 037/2
 - Código Otan C 640/642
- Agentes anticorrosivos según especificación:
 - Código Otan C 632
- Detergente recomendado para limpieza de los agentes de preservación:
 - Bencina de petróleo (Categoría de peligro A3)

8.1.1 Conservación del motor

Conservación del motor

- Límpiase el motor con aparato de vapor a alta presión (si es necesario con detergente de limpieza en frío), ver 6.3.1.
- Hágase funcionar el motor hasta que se caliente y pararlo después.
- Vacíese el aceite del motor de acuerdo con el capítulo 6.1.2, y échese aceite anticorrosivo.
- Si es necesario, límpiase el filtro de aire en baño de aceite, según 6.4.3 y échese aceite anticorrosivo.
- Vacíese el combustible del depósito.
- Prepárese una mezcla del 90% de combustible diesel y 10% de aceite anticorrosivo y llénese con ella el depósito.
- Hágase funcionar el motor unos 10 minutos.
- Párese el motor.
- Gírese el motor completamente, varias veces a mano, para la conservación de cilindros y cámara de combustión.
- Desmóntese la correa trapezoidal y almacénese debidamente empaquetada.
- Rocíense las ranuras de las poleas para correas trapezoidales con agente anticorrosivo, que deberá ser eliminado antes de poner nuevamente en servicio el motor.
- Obtúrense las bocas de aspiración y de escape.

8.1.2 Eliminación de la conservación del motor

Eliminación de la conservación del motor:

- Límpiase el agente anticorrosivo de las ranuras de las poleas para correas trapezoidales.
- Móntese la correa trapezoidal y corrija su tensión, si es necesario, después de un breve tiempo de marcha, véase 6.5.
- Elimínense los tapones de las bocas de aspiración y de escape.
- Póngase el motor en servicio, como descrito en el cap. 5.1, nota 2.

9.1 Datos del motor y valores de ajuste

9.2 Pares de apriete de tornillos

Datos técnicos

9.1 Datos del motor y valores de ajuste

Tipo

		F3L 912	F4L 912	F5L 912	F6L 912
Número de cilindros		3	4	5	6
Disposición de los cilindros		Verticales en línea			
Diámetro	mm	100	100	100	100
Carrera	mm	120	120	120	120
Cilindrada total	cm ³	2827	3770	4715	5655
Relación de compresión		17,0	17,0	17,0	17,0
Ciclo		Motor diesel de 4 tiempos			
Sistema de combustión		Motor de aspiración natural con inyección directa			
Sentido de rotación		Hacia la izquierda mirando el volante			
Peso incluyendo sistema de refrigeración integrado (sin arrancador, con generador)	aprox. kg	270	300 ⁴⁾	380	410 ⁴⁾
Potencia del motor	kW (CV)	¹⁾	¹⁾	¹⁾	¹⁾
Número de revoluciones	r/min	¹⁾	¹⁾	¹⁾	¹⁾
Engrase		Lubricación por circulación a presión			
Presión de aceite mínima a motor caliente; temperatura de aceite aprox. 100 °C, a 700/min (revoluciones bajas de marcha en vacío)	bar	0,9 ²⁾	0,9 ²⁾	0,9 ²⁾	0,9 ²⁾
Primera carga de aceite	aprox. l	9,5 ³⁾	12,5 ³⁾	14,5 ³⁾	15,5 ³⁾
Carga de aceite con cambio de filtro	aprox. l	9,0 ³⁾	12,0 ³⁾	13,5 ³⁾	14,5 ³⁾
Juego de válvulas a motor frío	mm	Válvula de admisión 0,15			
	mm	Válvula de escape 0,15			
Presión de descarga del inyector	bar	175 ⁺⁸	175 ⁺⁸	175 ⁺⁸	175 ⁺⁸
Comienzo de alimentación	Grados de cigüeñal a PMS	¹⁾	¹⁾	¹⁾	¹⁾
Orden de encendido del motor		1-2-3	1-3-4-2	1-2-4-5-3	1-5-3-6-2-4

¹⁾ Los datos de potencia, número de revoluciones y comienzo de alimentación están grabados, entre otros, en el rótulo de fábrica del motor, véase también 2.1.

²⁾ Datos correspondientes a motores sin calefacción de aceite.

³⁾ Valores aproximados que pueden variar según la versión. Válida es siempre la marca superior de la varilla de nivel.

⁴⁾ Cáster de chapa

Tipo

		F3L 912 W	F4L 912 W	F5L 912 W	F6L 912 W
Número de cilindros		3	4	5	6
Disposición de los cilindros		Verticales en línea			
Diámetro	mm	100	100	100	100
Carrera	mm	120	120	120	120
Cilindrada total	cm ³	2827	3770	4712	5655
Relación de compresión		17,0	17,0	17,0	17,0
Ciclo		Motor diesel de 4 tiempos			
Sistema de combustión		Motor de aspiración natural con combustión en dos etapas			
Sentido de rotación		Hacia la izquierda mirando el volante			
Peso incluyendo sistema de refrigeración integrado (sin arrancador, con generador)	aprox. kg	270	300 ⁴⁾	380	410 ⁴⁾
Potencia del motor	kW (CV)	¹⁾	¹⁾	¹⁾	¹⁾
Número de revoluciones	r/min	¹⁾	¹⁾	¹⁾	¹⁾
Engrase		Lubricación por circulación a presión			
Presión de aceite mínima a motor caliente; temperatura de aceite aprox. 100 °C, a 700/min (revoluciones bajas de marcha en vacío)	bar	0,9 ²⁾	0,9 ²⁾	0,9 ²⁾	0,9 ²⁾
Primera carga de aceite	aprox. l	9,5 ³⁾	12,5 ³⁾	14,5 ³⁾	15,5 ³⁾
Carga de aceite con cambio de filtro	aprox. l	9,0 ³⁾	12,0 ³⁾	13,5 ³⁾	14,5 ³⁾
Juego de válvulas a motor frío	mm	Válvula de admisión 0,15			
	mm	Válvula de escape 0,15			
Presión de descarga del inyector	bar	115* ⁸	115* ⁸	115* ⁸	115* ⁸
Comienzo de alimentación	Grados de cigüeñal a PMS	¹⁾	¹⁾	¹⁾	¹⁾
Orden de encendido del motor		1-2-3	1-3-4-2	1-2-4-5-3	1-5-3-6-2-4

¹⁾ Los datos de potencia, número de revoluciones y comienzo de alimentación están grabados, entre otros, en el rótulo de fábrica del motor, véase también 2.1

²⁾ Datos correspondientes a motores sin calefacción de aceite.

³⁾ Valores aproximados que pueden variar según la versión. Válida es siempre la marca superior de la varilla de nivel.

⁴⁾ Cáter de chapa

Alojamiento del tornillo		Apriete inicial Nm	1ª etapa	Reapriete 2ª etapa	3ª etapa	4ª etapa	Total	Observaciones
Fijación del generador	M 10 x 180	30	180°	-	-	-	180°	
	M 14 x 230	30	180°	-	-	-	180°	
Tapa de culata		-	-	-	-	-	10 ⁺⁵ -3 Nm	
Tornillo de ajuste de balancín		-	-	-	-	-	22 ± 2 Nm	
Pata de colocación	M 14 x 100	30	15°	60°	-	-	75°	
	M 14 x 110	30	45°	60°	-	-	105°	
	M 14 x 125	30	45°	60°	-	-	105°	
Colector de admisión		-	-	-	-	-	22 ± 2 Nm	
Colector de escape		-	-	-	-	-	40 ± 4 Nm	
Tapón roscado de descarga de aceite		-	-	-	-	-	150 Nm	
Fijación del inyector	FL 912	-	-	-	-	-	25-30 Nm	
	FL 912 W	-	-	-	-	-	90-110 Nm	

Werkstatthandbuch
Workshop Manual
Manuel d'Atelier
Manual de Taller

0291 1842

Service-Drucksachenverzeichnis
List of Service Documentation
List of the documentation S.A.V.
Relación de documentación de servicio

0292 5198

Service Verzeichnis Welt
Service Register
Réseau de Service
Red de Servicio
Mundo

0297 4709

Service Verzeichnis
Bundesrepublik Deutschland

0297 4747

0297 3980

Instruktionsbok
F3-6L 912/W

0297 5272

Handledning
F3-6L 912/W

0297 5271

Manuale di Istruzioni
F3-6L 912/W

0297 5270

Manual de instruções de serviço
F3-6L 912/W

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Instrucciones de Operación
F3-6L 912/W

0297 5343

Manuel d'instructions
F3-6L 912/W

0297 5342

Operation Manual
F3-6L 912/W

0297 5640

Betriebsanleitung
F3-6L 912/W

0297 5639

0297 4146

Ersatzteilliste

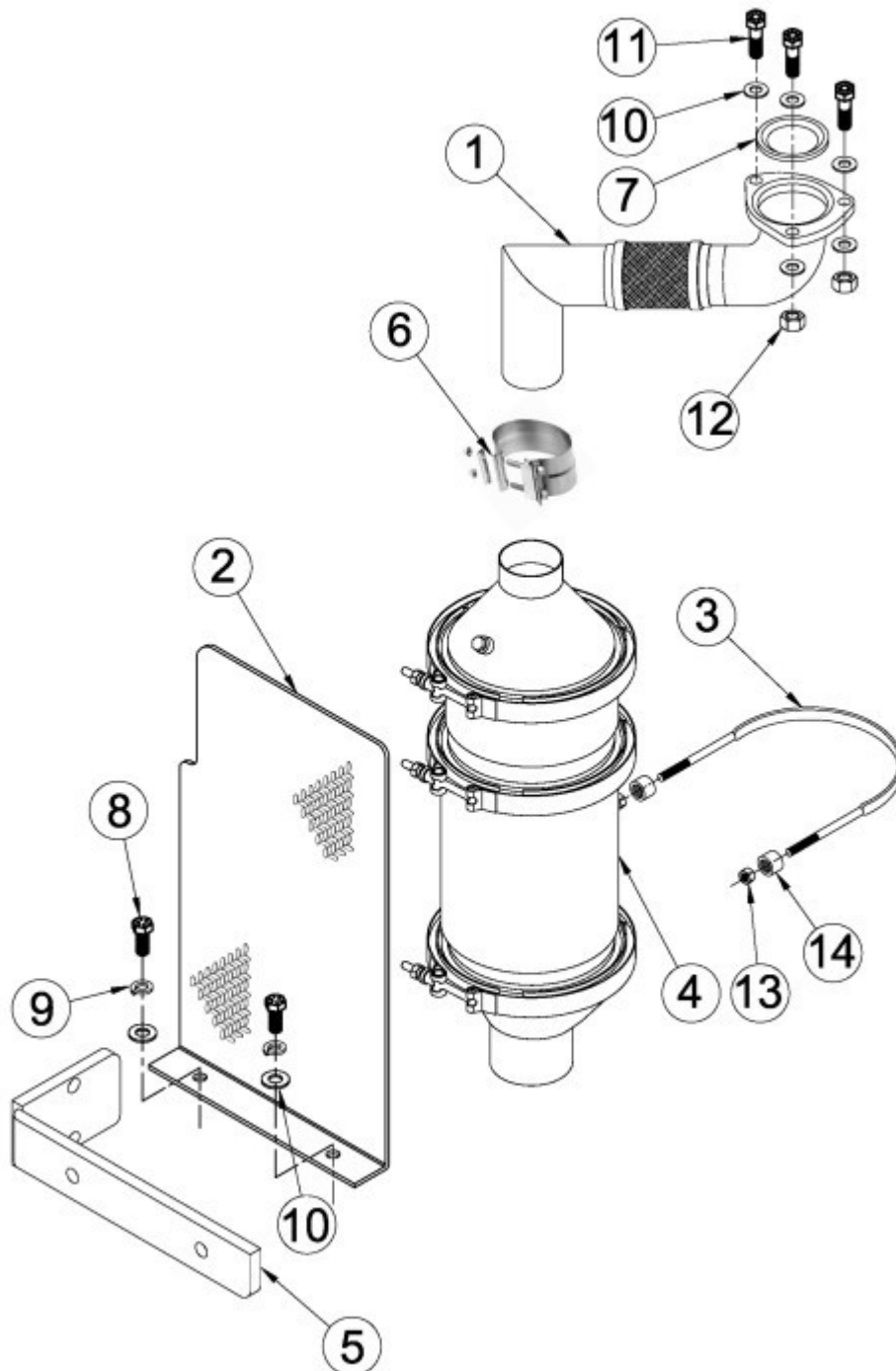
Spare Parts Catalogue
Catalogue de pièces de rechange
Liste de repuestos
Catalogo de repuestos
Lijst van onderdelen
Kataloog za rezervne dijelove

F3-6L 912/W

0297 3582

0510 1131 0

7012 EXHAUST SYSTEM ASSEMBLY



7012 EXHAUST SYSTEM ASSEMBLY

<u>Item</u>	<u>Part No.</u>	<u>Quantity</u>	<u>Description</u>
1	7012-1	1	EXHAUST PIPE ASSEMBLY
2	7012-2	1	EXHAUST HEAT PROTECTOR SHIELD
3	7012-3	1	PURIFIER AND SILANCER MOUNTING CLAMP
4	7012-4	1	PURIFIER AND SILANCER ASSEMBLY
5	7012-5	1	MOUNTING BRACKET
6	4019-2	1	WIDE BAND LAP CLAMP
7	216-1907	1	EXHAUST GASKET
8	1234C8	2	BOLT
9	12LWL9	2	LOCK WASHER
10	12F436	8	FLAT WASHER
11	12214C8	3	BOLT
12	12NCSC	3	STOVER NUT
13	38NC8	2	3/8 NUT NC GR 8
14	14FSHFCPLG	2	1/4 HALF COUPLING 3000
15	FDUX05-034	1	HEAT BLANKET
15		-	(NOT ILLUSTRATED)
16	6989-5	1	PYROTAPE 30 FEET
16		-	(NOT ILLUSTRATED)
17	6553-11	1	END SEAL WRAP 1"W X 36' LONG
17		-	(NOT ILLUSTRATED)



EXHAUST SYSTEM

Maintenance and Trouble-shooting

Maintenance

It is recommended that the purifier be cleaned during regular preventative maintenance program.

The condition of the exhaust, amount of wet or heavy particulate, determines the cleaning cycle.

Cleaning Steps:

1. Remove the purifier from the exhaust system. If quick-release clamp design is installed, remove the centerbody only.
2. Immerse the purifier in diesel fuel. Allow to soak for 1 hour.
3. Using steam or high pressure water (not greater than 100 psi), wash the purifier through both the inlet and outlet ends keeping the tip of the nozzle at least 2 inches away from the purifier face. Do not use detergents.
4. Dry the purifier thoroughly with compressed air (not greater than 100 psi) keeping the tip of the nozzle at least 2 inches away from the purifier face.
5. Place the converter back into the exhaust system being sure to tighten clamps and fittings and replacing gaskets where necessary.

Trouble-shooting

If the following situations should occur, the outlined maintenance steps should be followed:

1. **Increased Backpressure** If, during the periodic backpressure check, the backpressure of the ECS purifier is measured and determined to be more than 3" water gauge higher than the initial clean reading, it would indicate that the purifier is becoming blocked with diesel soot. When the purifier is blocked with soot the harmful fumes in the exhaust cannot contact the catalytic coating on the purifier. This prevents the purifier from reacting and removing these harmful fumes.
2. **Excessive Smoke**
If the machine is observed emitting excessive quantities of blue or black smoke, this indicates that an engine problem exists which can adversely affect the performance of the ECS purifier. Maintenance steps should be followed after the engine problem has been solved.
3. **High Levels of Odour or Irritation**
If it is reported that high levels of odour or irritation from the exhaust fumes are present, this indicates that there is a condition that is leading to reduced purifier performance. The odour and irritation represent components that the purifier would normally remove.

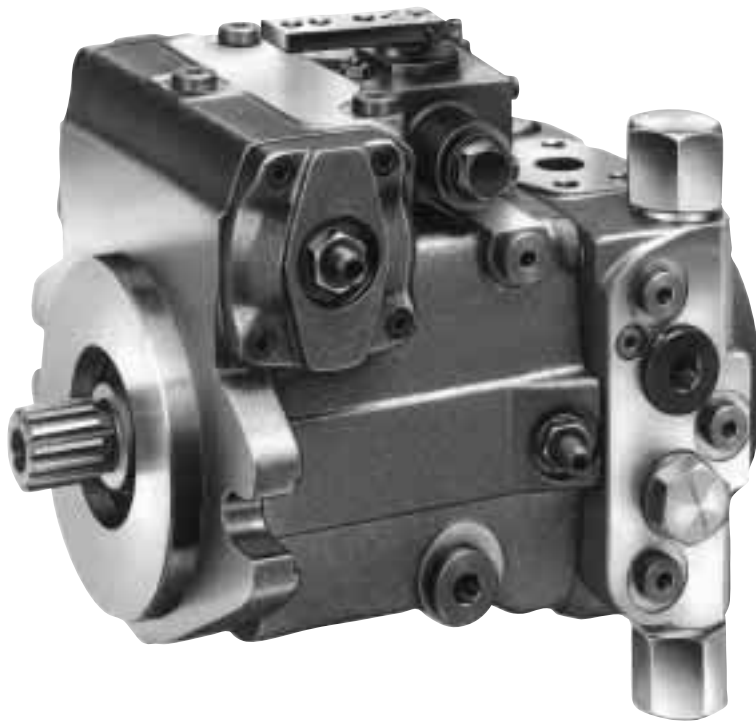
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HYDROSTATIC TRANSMISSION SYSTEM

<u>Item</u>	<u>Part No.</u>	<u>Quantity</u>	<u>Description</u>
002	6974-2	1	HYDROSTATIC PUMP
003	6974-3	1	HYDROSTATIC MOTOR
005	2203-33-7	1	SOLENOID VALVE ASSEMBLY -24V
006	5391-5	1	STARTER PROTECTION SWITCH 215 PSI
007	5391-14	1	TRANSMISSION PRESSURE SWITCH 100 PSI
008C	3463-12	1	PRESSURE GAUGE 0-500 PSI
017	6974-17	1	JOYSTICK VALVE
017A	6974-17A	1	GRIP HANDLE
053	6974-54	1	CHECK VALVE - SAE 12, 25 PSI
070	2118-11	1	PRESSURE SWITCH
113	6974-113	1	NEEDLE VALVE 1"



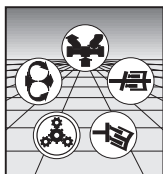
Application & Service Manual



AA4VG

Series 3.2
Size 28...250

RA 92003-S
11.97

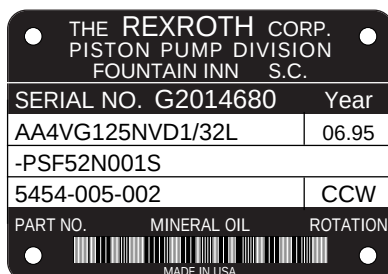


Ordering of Parts

For Rexroth to supply the correct parts for your unit, please include all of the following information along with your parts order.

Model Code
Serial Number
Unit Number
Part Name
Part Number

Due to modifications and improvements to our products, minor changes can occur to the parts, even though the type code may not necessarily reflect these changes. The type number and serial number will guarantee that the correct parts for your unit are supplied.



Ordering Example

To order a replacement rotary group for an AA4VG variable displacement pump having the above nameplate, the following information would be required.

+ Model Code	AA4VG125NVD1/32LPSFN001S
+ Serial Number	G2014680
+ Unit Number	5454-005-002
* Part Name	Charge Pressure Relief Valve
* Part Number	HU00434856

+ This information is taken from the nameplate on the pump.

* This information is taken from the Application and Service Manual.

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Variable Displacement Pump AA4VG, Series 3

Ordering Code

Hydraulic Fluid

Petroleum Oil (For operation with other fluids, consult a Rexroth Application Engineer)

Axial Piston Unit

Variable swashplate design. Nominal pressure 5800 psi; peak pressure 6500 psi

AA4V

Mode of Operation

Pump in closed circuit

G

Size

≈ Displacement $V_{g\max}$ (cm³)

28 40 56 71 90 125 180 250

Size 28, see RA 92002

Size 250, see RA 92000

Control Options

		40	56	71	90	125	180	
None	NV	●	●	●	●	●	●	NV
Hydraulic Control–Direct Operated	DG	●	●	●	●	●	●	DG
Electrical Control–Proportional	EP	●	●	●	●	●	●	EP
Electrical Control–Non Proportional	EZ	●	●	●	●	●	●	EZ
Rotary Manual Servo Control	HW	●	●	●	●	●	●	HW
Hydraulic Control–Pilot Operated	HD	●	●	●	●	●	●	HD
Hydraulic Control–Speed Dependent	DA	●	●	●	●	●	●	DA

Solenoid Voltage (EP, EZ, or DA only)

12 Volt DC	●	●	●	●	●	●	1
24 Volt DC	●	●	●	●	●	●	2

Pressure Cut-Off

With Pressure Cut-Off	●	●	●	●	●	●	D
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Neutral Position Switch (HW control only)

Without Neutral Position Switch (no code)	●	●	●	●	●	●	Omit
With Neutral Position Switch	●	●	●	●	●	●	L

Mechanical Stroke Limiter

Without Stroke Limiter	●	●	●	●	●	●	Omit
With Stroke Limiter	●	●	●	●	●	●	M

Ports X₃, X₄ for Stroking Pressure

Without Ports X ₃ , X ₄ (no code)	●	●	●	●	●	●	Omit
With Ports X ₃ , X ₄	●	●	●	●	●	●	T

Regulating (DA) Cartridge

	NV	EZ	DG	EP	HW	HD	DA	40	56	71	90	125	180	
Without DA Cartridge	●	●	●	●	●	●	–	●	●	●	●	●	●	1
With DA Cartridge, fixed adjustment	–	●	●	●	●	●	●	●	●	●	●	●	●	2
With DA Cartridge, mech. adjustable w/lever	–	●	●	●	●	●	●	●	●	●	●	●	●	3
With DA Cartridge, fixed adjustment and Hydraulic Inching Valve built on	–	–	–	–	–	●	●	●	●	●	●	●	●	4
With DA Cartridge, mech. adjust. w/lever and Hydraulic Inching Valve built on	–	–	–	–	–	●	●	●	●	●	●	●	●	5
With DA Cartridge, fixed adjustment and connection for TH7 master controller	–	●	●	●	●	●	●	●	●	●	●	●	●	7

Series

	3
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Index

	2
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Direction of Rotation

(As viewed from drive shaft)	clockwise	R
	counter-clockwise	L

- ① Shaft Option "S" is standard for the front pump of tandem units.
 ② See Page 6.
 ③ With "Cold Start" bypass valve. See page 7.

- Available
 ○ On Request;
 Consult Factory
 – Not Available

Variable Displacement Pump AA4VG, Series 3

AA4V	G				/	3	2		-				52						
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Axial Piston Unit

Operation

Displacement

Control & Options

Regulating Cartridge

Design Series

Index

Direction of Rotation

Seals

NBR	P
NBR, FPM shaft seal	N

Shaft Type (For maximum permissible shaft torque refer to page 33)

	40	56	71	90	125	180	
Spline–SAE (Standard for single pump)	●	●	●	●	●	●	S
Spline–SAE (Standard for tandem pump, 1 st pump)	①	●	●	①	●	●	T
Spline–SAE (Only for tandem pump, 2 nd pump)	●	–	–	–	–	–	U
Spline–DIN 5480 (For tandem pump, 2 nd pump)	–	–	–	●	–	–	Z

Mounting Flange

	40	56	71	90	125	180	
SAE 2-bolt	●	●	–	–	–	–	C
4-bolt	–	–	–	–	–	●	D
2 + 4 bolt	–	–	●	●	●	–	F

Port Connections

	40	56	71	90	125	180	
Ports A & B (SAE 4-bolt flange), on top and bottom	●	●	●	●	●	●	52

Charge Pump

	40	56	71	90	125	180	
With Charge Pump & without Through-Drive	●	●	●	●	●	●	F00
Without Charge Pump & without Through-Drive	●	●	●	●	●	●	N00
With Charge Pump & with Through-Drive	●	●	●	●	●	●	F...
Without Charge Pump & with Through-Drive	○	○	○	○	○	○	K...

Through-Drive

	40	56	71	90	125	180	
Shaft							
SAE A (¾" 9T 16/32P)	●	●	●	●	●	●	...01
SAE B (¾" 13T-16/32P)	●	●	●	●	●	●	...02
SAE B–B (1" 15T-16/32P)	●	●	●	●	●	●	...04
SAE B–B (1" 15T-16/32P)	●	–	–	–	–	–	...09
SAE C (1¼" 14T-12/24P)	–	●	●	●	●	●	...07
DIN (N35x2x30x16x9H DIN 5480)	–	–	–	●	–	–	...73
SAE D (1¾" 13T-8/16P)	–	–	–	–	●	●	...69
SAE D (1¾" 13T-8/16P)	–	–	–	–	–	○	...72

Relief Valves ②

Adjustment Range

	40	56	71	90	125	180	
W/high press. relief valves, pilot oper.	1450...6100 psi	with bypass	–	–	●	●	1
With high pressure relief valves	4000...6100 psi	without bypass	●	●	–	–	3
Direct operated, fixed setting		with bypass	●	●	–	–	5
	1450...3600 psi	without bypass	●	●	–	–	4
		with bypass	●	●	–	–	6

Filtration

	40	56	71	90	125	180	
Filtration in Charge Pump suction line	●	●	●	●	●	●	S
Charge Pressure Filtration (Ports Fe and Fa)	●	●	●	●	●	●	D
Cold start valve and ports for external charge circuit filter (Ports Fe and Fa)	○	○	○	○	○	○	K
Mounted Filter (Without contamination indicator) ③	●	●	●	●	●	●	F
Filter with visual contamination indicator ③	●	●	●	●	●	●	P
Filter with electrical contamination indicator ③	●	●	●	●	●	●	L
Filter with visual and electrical contamination indicator ③	●	●	●	●	●	●	M
External Charge Supply (Units without charge pump–N00 or K..)	●	●	●	●	●	●	E

Variable Displacement Pump AA4VG, Series 3

Technical Data

Description

The AA4VG is a swashplate design, variable displacement, over center, axial piston pump. It has been designed exclusively for closed circuit hydrostatic transmissions where a self-contained pump package is required. The pump design incorporates a charge pump, a charge pressure relief valve, two combination high pressure relief and make-up check valves, and an integrated pressure cut-off valve.

Installation

The AA4VG pump may be mounted in any position around the horizontal (drive shaft) axis. Other mounting orientations (e.g. drive shaft vertical) are possible, but should be reviewed with a Rexroth Application Engineer prior to finalizing the design. The case drain line should be connected to the highest case drain port (T_1 or T_2) so that the pump case always remains full of oil. The case drain piping, or hose, should be sized to accept the full flow of the charge pump at the maximum anticipated drive speed, with minimal pressure drop.

Fluid Recommendations

The AA4VG pumps are supplied as standard for use with good quality, petroleum oil based, anti-wear hydraulic fluids. More detailed information regarding the selection of hydraulic fluids and their application limits can be found in our Data Sheets RA 90220 (Petroleum Oil), RE 90221 (Biodegradable Fluids) and RA 90223 (Type HF—Fire Resistant/Synthetic Fluids).

For applications with biodegradable or Type HF fluids, possible reduction of the operating specifications may be required. Please consult Rexroth and your oil supplier.

Operating Viscosity Range

In order to obtain optimum efficiency and service life, we recommend that the operating viscosity (at normal loop operating temperature) be selected from within the range:

Optimum Viscosity (V_{opt}) 80...170 SUS (16...36 mm²/S)

Viscosity Limits

Max. Viscosity at startup (V_{max}) 7273 SUS (1600 mm²/S)

Min. Viscosity for short duration (V_{min}) 42 SUS (5 mm²/S)

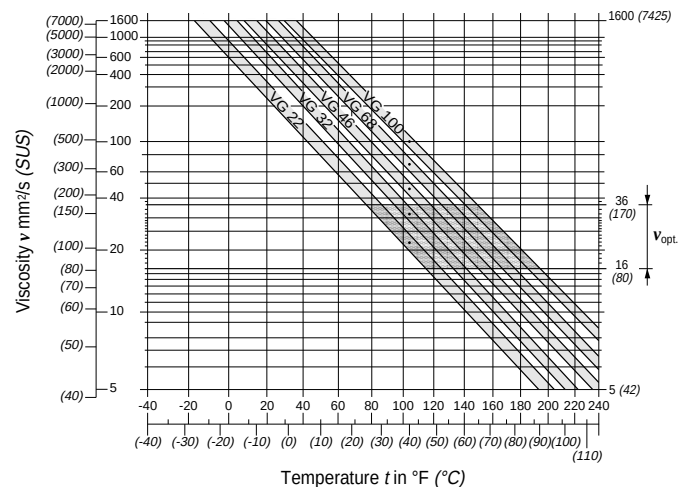
Operating Temperature Limits

Min. operating temperature -13°F (-25°C)

Absolute min. temperature -40°F (-40°C)

Max. operating temperature for short duration 239°F (115°C)

Selection Diagram



Notes on hydraulic fluid selection

In order to select the correct fluid, it is necessary to know the normal operating temperature in the circuit (closed loop), when the system is operated at the design ambient temperature.

The hydraulic fluid should be selected so that, within the operating temperature range, the fluid viscosity is within the optimum range V_{opt} (see shaded area of the selection diagram). We recommend that the higher viscosity grade is selected in each case.

Example: At an ambient temperature of X°F the closed circuit fluid temperature is 140°F (60°C). Within the optimum operating viscosity range V_{opt} (shaded area), this corresponds to ISO viscosity grades VG 46 or VG 68. VG 68 should be selected.

Important: The leakage oil (case drain oil) temperature is influenced by pressure and pump speed and is typically higher than the circuit temperature. However, maximum temperature at any point in the system must be limited to 239°F (115°C).

If it is not possible to comply with the above conditions because of extreme operating parameters or high ambient temperatures please consult Rexroth.

Fluid Cleanliness Levels

In order to ensure proper and reliable operation, the hydraulic fluid must be maintained at a minimum cleanliness level of 18/15 (ISO/DIS 4406; SAE J1165). Axial piston pump component life is directly affected by the cleanliness of the fluid in the system.

Temperature Range	-40...195°F (-40...90°C)	195...240°F (90...115°C)
Cleanliness Recommendations:	Class	Class
ISO/DIS 4406 (SAE J1165)	18/15	17/14
NAS 1638	9	8
SAE, ASTM, AIA	6	5

Operating Pressures Ranges

Main pump:

Nominal charge pressure; p_{sp} 20 bar (290 psi)

Nominal pressure (port A or B); p_N 400 bar (5800 psi)

Peak pressure (port A or B); p_{max} 450 bar (6525 psi)

Maximum case drain pressure (T_1, T_2, T_3 , and T_4)

p_L 2 bar abs. (30 psia)

short term (cold start) 3 bar abs. (43.5 psia)

Charge pump:

Nominal pressure p_{sp} 20 bar (290 psi)

Peak pressure p_{Hmax} 40 bar (580 psi)

Min. pressure at charge pump inlet port (S):

at $V = 141$ SUS (30 cSt) $p \geq 0.8$ bar abs. (6.3 in-Hg.)

at cold start $p \geq 0.5$ bar abs. (15.2 in-Hg.)

Variable Displacement Pump AA4VG, Series 3

Technical Data

AA4VG Specifications (Theoretical values; rounded)

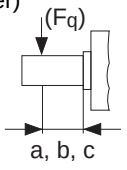
Size				40	56	71	90	125	180
Displacement	Variable pump	$V_{g \max}$	cm ³ /rev	40	56	71	90	125	180
			in ³ /rev	2.44	3.42	4.33	5.49	7.63	10.98
	Charge pump	V_{gH}	cm ³ /rev	8.4	11.1	18.7	18.7	25.7	36.9
			in ³ /rev	0.51	0.68	1.14	1.14	1.56	2.25
Speed	max. rpm at $V_{g \max}$	$n_{\max \text{ cont}}$	rpm	4000	3600	3300	3050	2750	2400
	limited max. rpm ①	$n_{\max \text{ limit}}$	rpm	4200	3900	3600	3300	3100	2900
	intermittent max. rpm ②	$n_{\max \text{ Interm}}$	rpm	5000	4500	4100	3800	3450	3000
	minimum rpm	$n_{\min}$	rpm	500	500	500	500	500	500
Flow	at $n_{\max \text{ cont}}$ and $V_{g \max}$	$Q_{\max}$	L/min	160	202	234	275	344	432
			gpm	42.3	53.4	61.8	72.7	90.9	114.1
Power	at $n_{\max \text{ cont}}$	$\Delta p = 400 \text{ bar}$	$P_{\max}$	kW	107	134	156	183	229
		$\Delta p = 5800 \text{ psi}$		hp	144	180	209	245	307
Torque (without charge pump)	at $V_{g \max}$	$\Delta p = 400 \text{ bar}$	$M_{\max}$	Nm	254	356	451	572	795
		$\Delta p = 5800 \text{ psi}$		lb-ft	187	263	333	423	586
		$\Delta p = 100 \text{ bar}$	M	Nm	63.5	89	112.8	143	198.8
		$\Delta p = 1450 \text{ psi}$		lb-ft	46.8	65.6	83.2	105.5	146.6
Moment of inertia (about drive axis)		J	kgm ²	0.003	0.0051	0.0072	0.0106	0.0164	0.0323
			lb-ft ²	0.0712	0.1210	0.1709	0.2515	0.3892	0.7665
Weight (standard model without through drive)		m	kg	31	38	50	66	80	104
			lbs.	68	84	110	145	176	229

① Limited maximum rpm: – at half corner power (e.g. at $V_{g \max}$ and $p_N/2$)

② Intermittent maximum rpm: – at high idle speed

– during engine overspeed: $\Delta p = 70\text{--}150 \text{ bar}$ (1015–2176 psi) and $V_{g \max}$
– with reversing loads: $\Delta p < 300 \text{ bar}$ (4350 psi) and $t < 5 \text{ seconds}$ V_g = Displacement (cm³ or in³) per revolution Δp = Differential pressure n = Speed (rpm)

Input Drive (Permissible axial and radial loading on drive shaft)

Size				40	56	71	90	125	180
Distance of F_q (from shaft shoulder)		a	mm	17.5	17.5	20.0	20.0	22.5	25.0
		a	in	0.69	0.69	0.79	0.79	0.89	0.98
		b	mm	30	30	35	35	40	45
		b	in	1.18	1.18	1.38	1.38	1.57	1.77
		c	mm	42.5	42.5	50	50	57.5	60
		c	in	1.67	1.67	1.97	1.97	2.26	2.36
Max. permissible radial load at distance	a	$F_{q \max}$	N	3600	5000	6300	8000	11000	16000
	a		lbs.	809	1124	1416	1798	2473	3597
	b	$F_{q \max}$	N	2891	4046	4950	6334	8594	12375
	b		lbs.	650	910	1113	1424	1932	2782
	c	$F_{q \max}$	N	2416	3398	4077	5242	7051	10150
	c		lbs.	543	764	917	1178	1585	2282
Max. permissible axial load		$\pm F_{q \max}$	N	1500	2200	3500	3500	4800	6000
			lbs.	337	495	787	787	1079	1349

Filtration Options

Many factors influence the selection of a filter to achieve the desired cleanliness level, including: dirt ingress rate, required cleanliness level, and system complexity. We have found the following filter Beta (β) ratios (ISO 4572) to be satisfactory:

Suction Filtration..... $\beta_{10} \geq 2.0$ & $\beta_{30} \geq 100$
 Charge Pressure Filtration..... $\beta_{10} \geq 10.0$ & $\beta_{20} \geq 100$

Machine testing is necessary to confirm the ability of the selected filter to maintain the desired fluid cleanliness levels.

Charge Flow Suction Filtration (standard model)...S

Filter type: Filter **without** bypass

Filter element pressure drop:

at $V = 141 \text{ SUS}$ (30 cSt); $n = n_{\max}$ $\Delta p \leq 0.1 \text{ bar}$ (1.5 psi)
 at $V = 4635 \text{ SUS}$ (1000 cSt); $n = 1000 \text{ rpm}$.. $\Delta p \leq 0.3 \text{ bar}$ (4.5 psi)

Min. pressure at charge pump inlet port (S):

at $V = 141 \text{ SUS}$ (30 cSt)..... $p \geq 0.8 \text{ bar abs.}$ (6.3 in-Hg.)
 at cold start $p \geq 0.5 \text{ bar abs.}$ (15.2 in-Hg.)

The filter should be fitted with a ΔP indicator and/or switch.

Variable Displacement Pump AA4VG, Series 3

Filtration Options

Charge Pressure Filtration...D (Ports Fe & Fa)

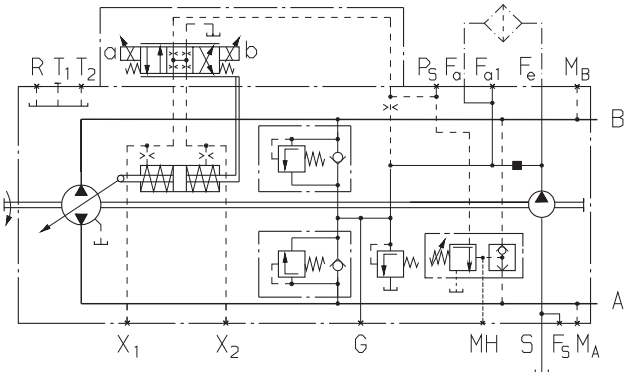
Filter type: Filter **without** bypass

Filter element pressure drop (line mounted filter):
 at $V=141 \text{ SUS (30 cSt)}$; $n=n_{\text{max}}$ $\Delta p \leq 1 \text{ bar (14.5 psi)}$
 at cold start $\Delta p_{\text{max}} = 3 \text{ bar (43.5 psi)}$
 (valid for entire speed range $n_{\text{min}}-n_{\text{max}}$)

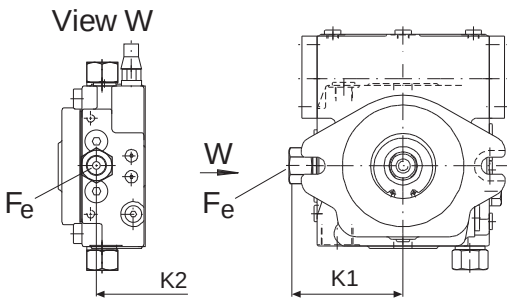
Please note:

- With Direct Operated Hydraulic Control–Type DG, control pressure should be supplied from the P_s port.
- The filter should be fitted with a ΔP indicator and/or switch set at $\leq 3 \text{ bar (43.5 psid)}$.

Circuit Diagram...D (Ports Fe & Fa)



Dimensions...D (Ports Fe & Fa)



Size	K1	K2	Fe
40	112	198.7	3/4"-16 UNF-2B; 15 deep
56	115	215.4	3/4"-16 UNF-2B; 15 deep
71	134	239.0	1 1/16"-12 UN; 20 deep
90	128	248.5	1 1/16"-12 UN; 20 deep
125	147	267.9	1 5/16"-12 UN-2B; 20 deep
180	148	311.9	1 5/16"-12 UN-2B; 20 deep

External Charge Supply...E (without charge pump)

On units supplied without an integrated charge pump (N00 or K...) the suction port (S) is plugged, and the external charge supply is connected at port F_a . Please note that the externally supplied charge flow must be maintained at the cleanliness levels indicated on page 4.

Charge Pressure Filtration...K (with cold start valve)

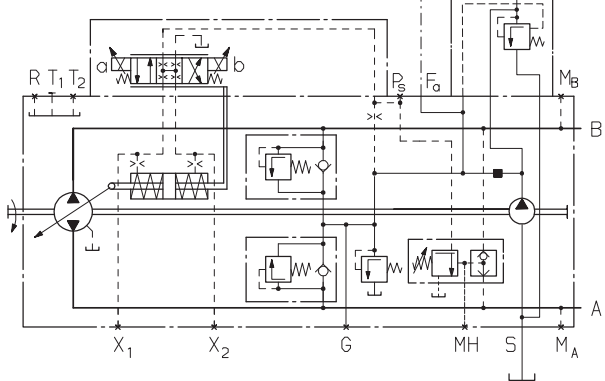
Similar to option D, except with cold start valve, providing filter bypass function and charge pump protection.

Bypass valve:
 Bypass setting $\Delta p \geq 3.5 \text{ bar (50 psi)}$
 Bypass flow To charge pump inlet

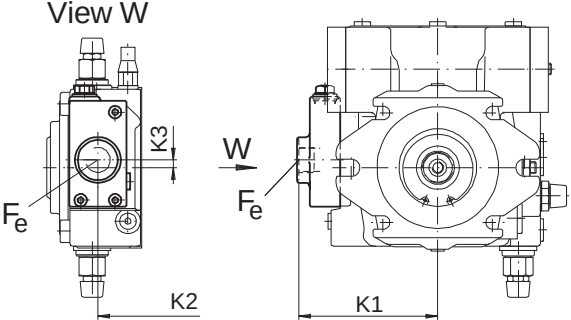
Port F_e To line mounted filter
 Port F_a From line mounted filter

The filter should be fitted with a ΔP indicator and/or switch set at $\leq 3 \text{ bar (43.5 psid)}$.

Circuit Diagram...K (with cold start valve)

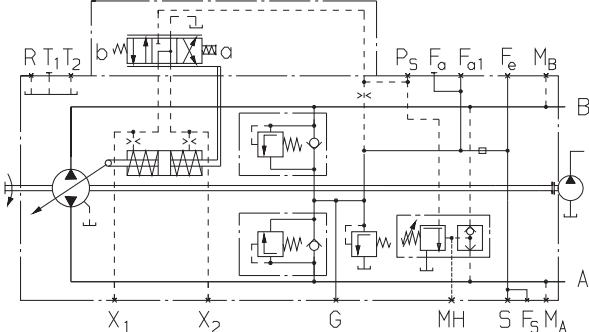


Dimensions...K (with cold start valve)



Size	K1	K2	K3	Fe
40	122.5	198.7	0	3/4"-16 UNF-2B; 15 deep
56	125.5	215.4	0	3/4"-16 UNF-2B; 15 deep
71	145.5	239.0	8	1 1/16"-12 UN; 20 deep
90	139.5	248.5	24	1 1/16"-12 UN; 20 deep
125	172.0	267.9	20	1 5/16"-12 UN-2B; 20 deep
180	173.0	311.9	3	1 5/16"-12 UN-2B; 20 deep

Circuit Diagram...E (without charge pump)



Variable Displacement Pump AA4VG, Series 3

Filtration Options

Charge Pressure Filtration...F (mounted filter)
(Without contamination indicator)Filter type: Filter **without** bypass

Integral bypass valve:

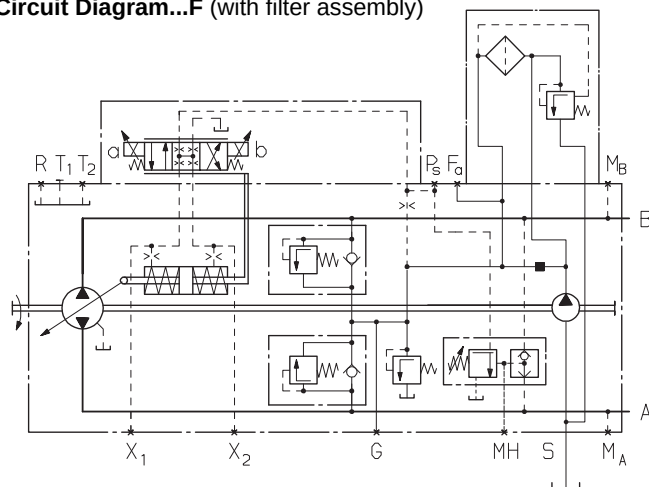
Bypass setting $\Delta P \geq 3.5$ bar (50 psi)

Bypass flow To charge pump inlet

Filter element pressure drop (mounted filter):

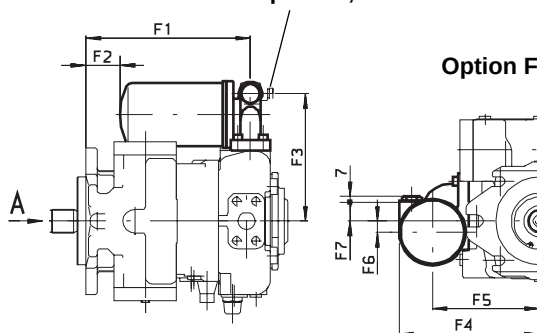
at $V = 141$ SUS (30 cSt); $n = n_{\max}$ $\Delta p \leq 1$ bar (14.5 psi)at cold start $\Delta p_{\max} = 3$ bar (43.5 psi)
(valid for entire speed range $n_{\min} - n_{\max}$)*Please note:*

- Max. perm. charge pressure for sizes 40 and 56:
 $p_{Sp \max} = 510$ psi (35 bar)
- With Direct Operated Hydraulic Control–Type DG, control pressure should be supplied from the P_S port.
- The filter should be fitted with a ΔP indicator and/or switch set at ≤ 3 bar (43.5 psid).

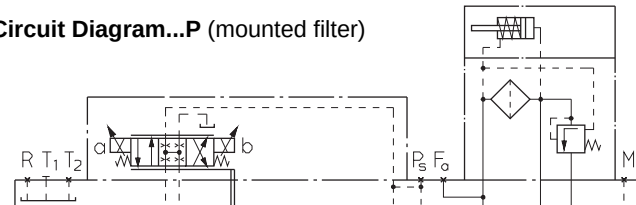
Circuit Diagram...F (with filter assembly)**Dimensions...F, P, L, M** (with filter assembly)

Size	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
40	198.7	46.7	160	175	135	0	42	78.5	122	125
56	215.4	63.4	163	178	138	0	42	78.5	122	125
71	239	50	185	203.5	155	16	29	65.5	109	112
90	248.5	59.4	179	197.5	149	0	53	89.5	133	136
125	267.9	62.8	201	219.5	171	0	53	89.5	133	136
180	311.9	37.9	202	220.4	171.9	17	36	72.5	116	119

Option L, M

**Charge Pressure Filtration...P** (mounted filter)
(With visual contamination indicator)

Similar to option F, except model P includes visual contamination indicator. Indication: Green/Red window.

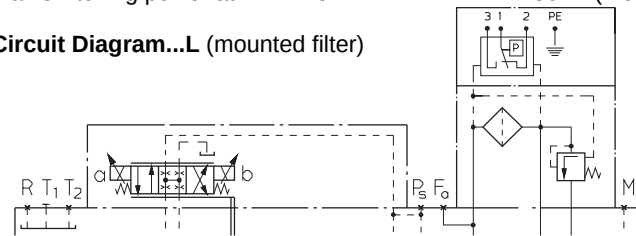
Indicator switching pressure. $\Delta p = 3$ bar (43.5 psi)**Circuit Diagram...P** (mounted filter)**Charge Pressure Filtration...L** (mounted filter)
(With electrical contamination indicator)

Similar to option F, except model L includes electrical contamination indicator. Indication: Electrical.

Indicator switching pressure. $\Delta p = 3$ bar (43.5 psi)

Max switching power at 24 V DC 60 W (2.5 A)

Max switching power at 12 V DC 30 W (2.5 A)

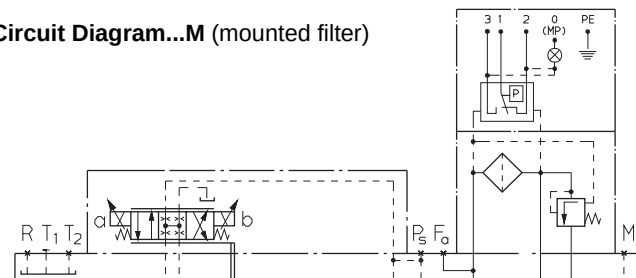
Circuit Diagram...L (mounted filter)**Charge Pressure Filtration...M** (mounted filter)
(With visual and electrical contamination indicator)

Similar to option F, except model M includes visual and electrical contamination indicator. Indication: ep. and visual by lamp.

Indicator switching pressure. $\Delta p = 3$ bar (43.5 psi)

Max switching power at 24 V DC 60 W (2.5 A)

Max switching power at 12 V DC 30 W (2.5 A)

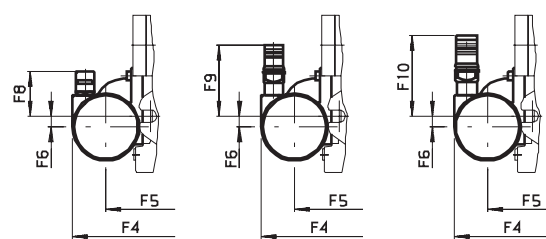
Circuit Diagram...M (mounted filter)

View A, rotated 90°

Option P

Option L

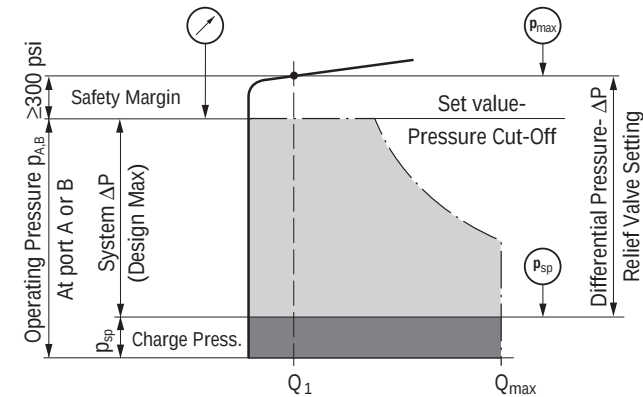
Option M



Variable Displacement Pump AA4VG, Series 3

High Pressure Relief Valve

Adjustment diagram with Pressure Cut-Off



Note: Relief valves are adjusted at a flow rate of:
Q₁ = 6–10 l/min (1.6–2.6 gpm), depending on size

Example: Charge pressure 30 bar (435 psi)
Operating pressure 410 bar (5945 psi)
(Pressure cut-off setting)
Safety margin 20 bar (290 psi)

Operating press. $p_{A,B}$ – Charge press. p_{sp} + Safety Margin = Differential press. Δp
410 bar – 30 bar + 20 bar = 400 bar
(5945 psi) – (435 psi) + (290 psi) = (5800 psi)

High pressure relief valve Pilot Operated (size 71...180)	Differential pressure settings (Δp_{HD})
Setting range valve 1	420 bar (6090 psi)
Δp 100–420 bar	400 bar (5800 psi) *
Δp 1450–6090 psi (see model code)	350 bar (5075 psi)
	320 bar (4640 psi)
	300 bar (4350 psi)
	270 bar (3915 psi)
	250 bar (3625 psi)
	230 bar (3335 psi)
	200 bar (2900 psi)
	150 bar (2175 psi)
	100 bar (1450 psi)

High pressure relief valve Direct Operated (size 40, 56)	Differential pressure settings (Δp_{HD})
Setting range valve 3, 5	420 bar (6090 psi)
Δp 270–420 bar	400 bar (5800 psi) *
Δp 3915–6090 psi (see model code)	350 bar (5075 psi)
	320 bar (4640 psi)
	300 bar (4350 psi)
	270 bar (3915 psi)
Setting range valve 4, 6	250 bar (3625 psi)
Δp 60–250 bar	230 bar (3335 psi)*
Δp 870–3625 psi (see model code)	200 bar (2900 psi)
	150 bar (2175 psi)
	100 bar (1450 psi)

* Standard setting if not specified otherwise

Bypass Function

Size 40, 56: HD-valves direct operated (3), (4): without bypass
Size 40, 56: HD-valves direct operated (5), (6): with bypass
Size 71...180: HD-valves pilot operated (1): with bypass

Simplification: The bypass function is not shown in the circuit diagrams.
The pilot operated HD-valves (sizes 71...180) are not shown in the circuit diagrams.

Please state in clear text when ordering:

High pressure relief valve A
Differential pressure setting: Δp_{HD} = ...psi
Pressure value of the HD-valve (at Q_1) p_{max} = ...psi
($p_{max} = \Delta p_{HD} + p_{sp}$)

High pressure relief valve B
Differential pressure setting: Δp_{HD} = ...psi
Pressure value of the HD-valve (at Q_1) p_{max} = ...psi

Pressure Cut-Off

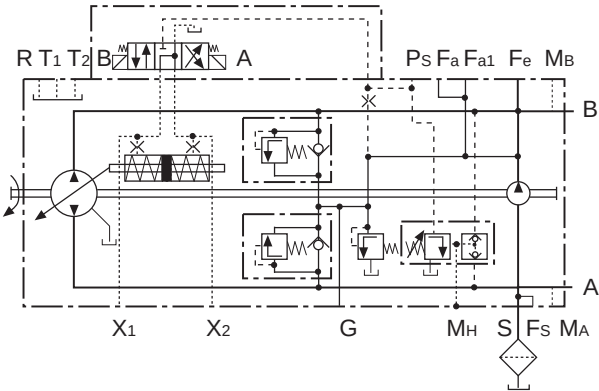
The pressure cut-off valve varies the swashplate angle, as required, to limit the maximum pressure at port A or B.

The pressure cut-off valve prevents continuous dumping of excessive flow, at load pressure, through the cross port relief valves in the pump. This eliminates unnecessary heating of the oil and protects the pump and motor during rapid acceleration or deceleration, or when the drive stalls, causing the pump to dead-head.

The pressure peaks that occur with rapid swivel angle changes, and also the maximum system pressure, are further protected by the high pressure relief valves.

The pressure cut-off valve should be set 20–30 bar (290–435 psi) less than the high pressure relief valve settings.

Standard Adjustment Range: 2175–6500 psi (150–450 bar)



Electrical Control–Non Proportional, EZ1D/EZ2D with Pressure Cut-Off

Variable Displacement Pump AA4VG, Series 3

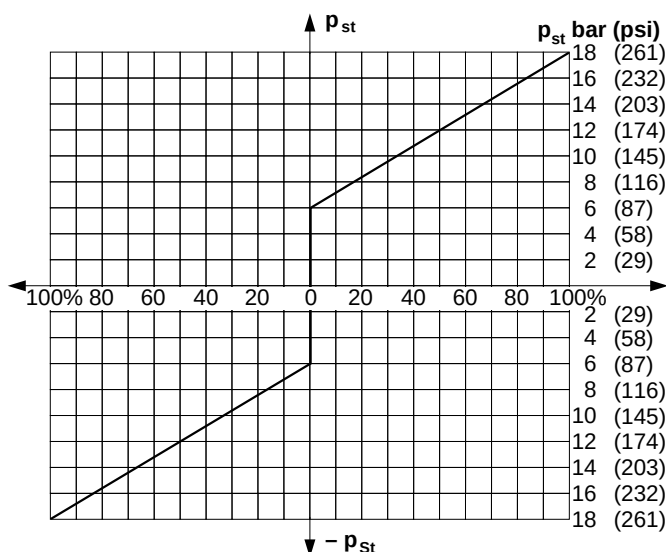
HD Hydraulic Pilot Control

The flow output of the pump is infinitely varied between 0 and 100%, proportional to the difference in pilot pressure applied to the two control ports (Y_1 and Y_2), in the range of 6 to 18 bar (87 to 261 psi).

The pilot signal, which originates from an external, remote source, is pressure only. Flow is negligible as the pilot signal is only acting on the spool of the control valve.

This spool then directs control oil into and out of the stroking cylinder to adjust pump displacement as required.

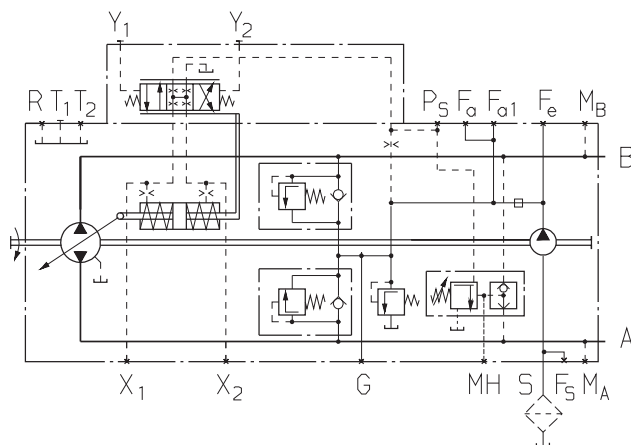
A feedback lever, connected to the stroking piston, maintains the pump flow for any given pilot signal.



Pilot pressure p_{st} : 6–18 bar (87–261 psi) at ports Y_1 , Y_2
 Begin of regulation: 6 bar (87 psi)
 End of regulation: 18 bar (261 psi)

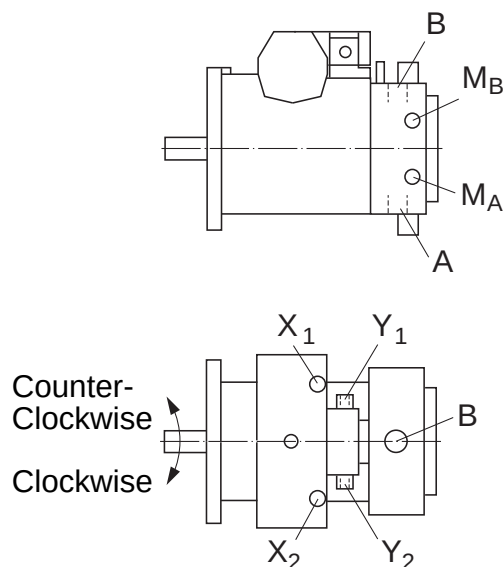
If the pump is also fitted with a DA control valve, automotive control of the vehicle transmission is possible.
 For DA control valve see page 12, 13, 28, & 29.

Standard model

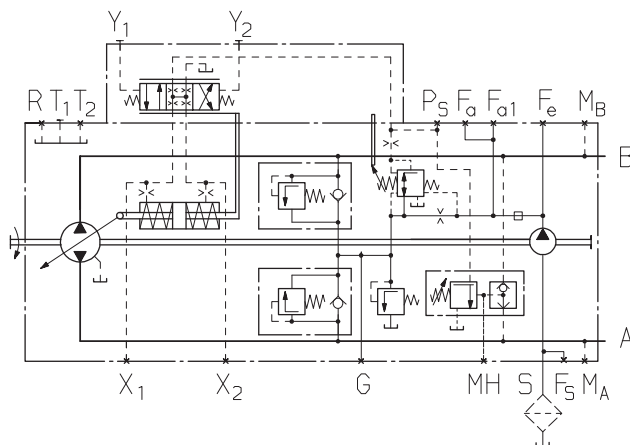


Data Table – AA4VG...HD
Direction of rotation – Control – Output flow direction

	Size	Pilot Pressure	Control Pressure	Direction of Flow	Operating Pressure
Direction of Rotation	Clockwise	Y_1	X_1	A to B	M_B
		Y_2	X_2	B to A	M_A
	71, 90, 125, 180	Y_1	X_1	B to A	M_A
		Y_2	X_2	A to B	M_B
Counter-Clockwise	40, 56	Y_1	X_1	B to A	M_A
		Y_2	X_2	A to B	M_B
	71, 90, 125, 180	Y_1	X_1	A to B	M_B
		Y_2	X_2	B to A	M_A



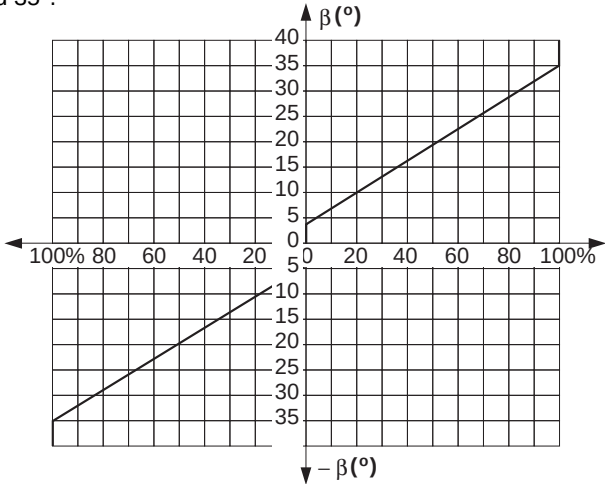
Model with DA control valve



HW Rotary Manual Servo Control

The flow output of the pump is infinitely varied in the range of 0 to 100%, proportional to the rotation of the control lever between 0° and ±35° from the spring centered zero flow position.

A feedback lever, connected to the stroking piston, maintains the pump flow for any given position of the control lever between 0° and 35°.



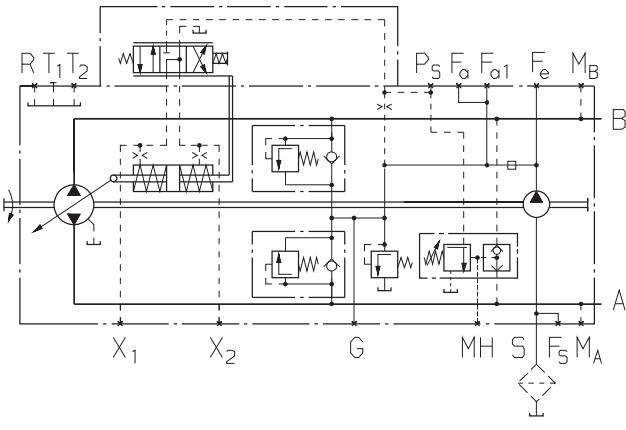
Swivel angle of the control lever:
from 0 to ± V_{g max} or β = 0° to ± 35°
mechanical stop: size 40–71 ± 40°
size 90–180 ± 35°

Required lever torque: 85–210 Ncm (7.5–19 lb-in)
Maximum lever torque: 250 Ncm (22 lb-in)

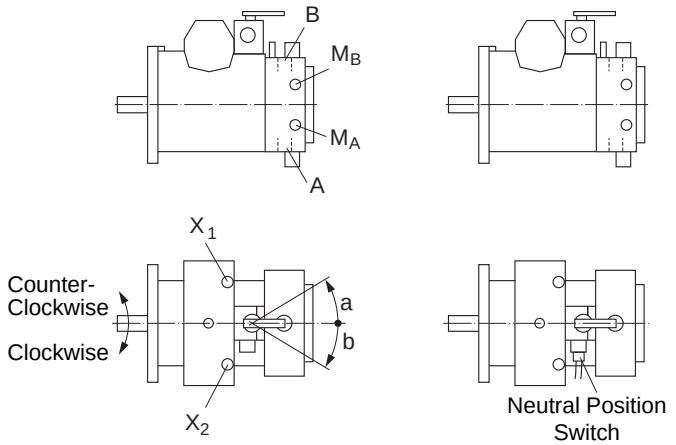
If the pump is also fitted with a DA valve, automotive control of the vehicle transmission is also possible.
For DA control valve see page 12, 13, 28, & 29.
For pressure cut-off see page 8.

Option: Neutral position switch...HWDL
When the HW control lever is in the neutral position, the neutral position switch is closed. The switch opens if the control lever is moved out of neutral in either direction.
The neutral position switch provides a safety function for systems that require zero flow under certain operating conditions. (e.g.–engine start).

Standard model

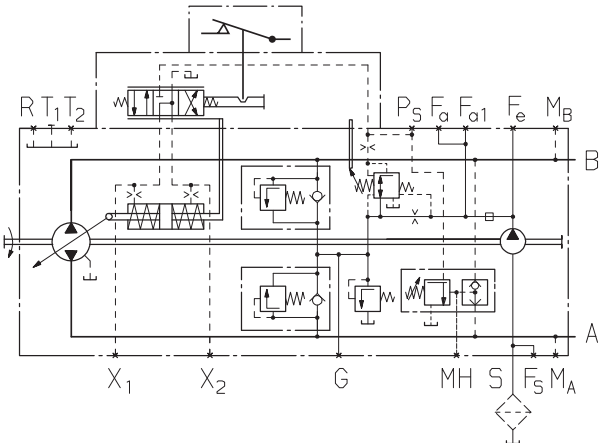


Data Table – AA4VG...HW					
Direction of rotation – Control – Output flow direction					
Direction of Rotation	Size	Lever Direction	Control Pressure	Direction of Flow	Operating Pressure
	40, 56	a	X ₂	B to A	M _A
		b	X ₁	A to B	M _B
	71, 90, 125, 180	a	X ₂	A to B	M _B
		b	X ₁	B to A	M _A
	40, 56	a	X ₂	A to B	M _B



Technical data for neutral position switch	
Load performance	20A (continuous)
Switch performance	15A / 32V (DC)
	4A / 32V (AC - inductive)

Model with DA control valve and neutral position switch

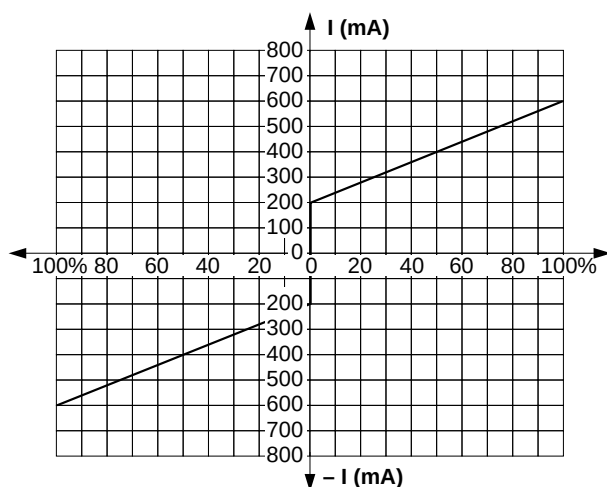


EP Proportional Electrical Control

The flow output of the pump is infinitely varied in the range of 0 to 100%, proportional to an electrical current, in the range of 200–600 mA at 24 volts DC, supplied to solenoid a or b. (A current of 400 to 1200 mA is required for the 12 volt solenoids.)

The electrical energy is converted to a force acting on the control spool. The spool then directs control oil in and out of the stroking piston to stroke the pump as required. A feedback lever, connected to the stroking piston, maintains the pump flow for any given current within the control range.

Proportional amplifiers MDSD, PVR-PVRS and special function amplifier EDA are available to control the proportional solenoids. As well, electronic control of the solenoids can be achieved by using a microcontroller with software that is programmed to perform special functions for custom applications.

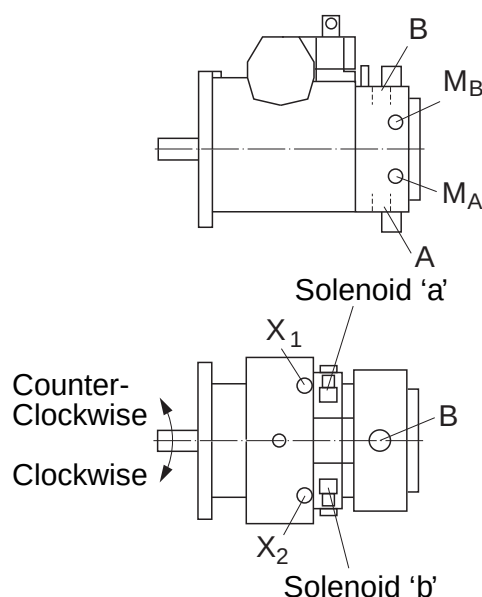


Control current (24 vdc;EP2): $I=200\text{--}600\text{ mA}$
 Begin of control: $I=200\text{ mA (V}_{g0})$
 End of control: $I=600\text{ mA (V}_{g\text{ max}})$
 Control current (12 vdc;EP1): $I=400\text{--}1200\text{ mA}$
 Begin of control: $I=400\text{ mA (V}_{g0})$
 End of control: $I=1200\text{ mA (V}_{g\text{ max}})$

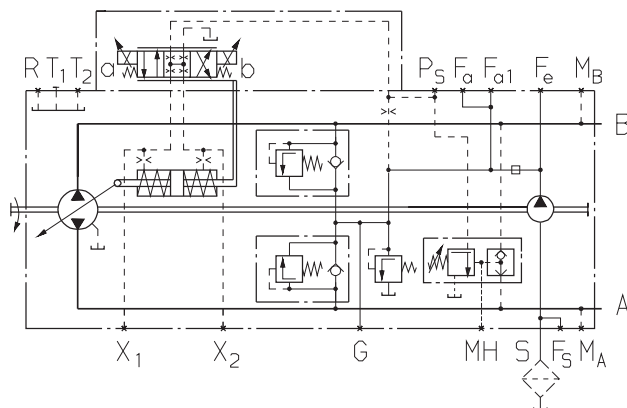
If the pump is also fitted with a DA control valve, automotive control of the vehicle transmission is possible.
 For DA control valve see page 12,13, 28, & 29.

Data Table – AA4VG...EP
Direction of rotation – Control – Output flow direction

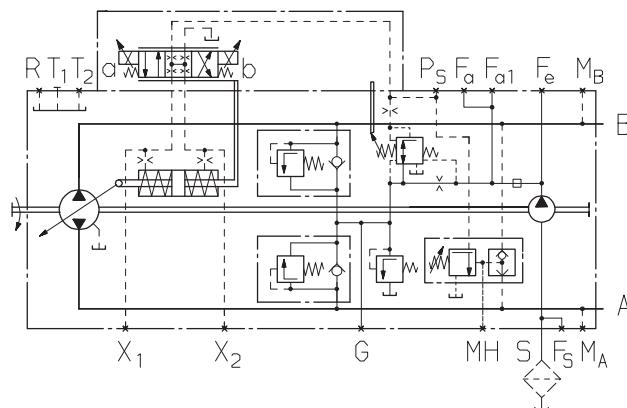
	Size	Solenoid	Control Pressure	Direction of Flow	Operating Pressure
Direction of Rotation	Clockwise	a	X ₁	A to B	M _B
		b	X ₂	B to A	M _A
	71, 90, 125, 180	a	X ₁	B to A	M _A
		b	X ₂	A to B	M _B
Counter-Clockwise	40, 56	a	X ₁	B to A	M _A
		b	X ₂	A to B	M _B
	71, 90, 125, 180	a	X ₁	A to B	M _B
		b	X ₂	B to A	M _A



Standard model



Model with DA control valve



DA Hydraulic Control Speed Dependent

Pilot pressure from the DA regulating cartridge is directed to the stroking piston of the pump by a 4/3 way directional valve. Pump displacement is infinitely variable in each direction of flow, proportional to both pump drive speed and discharge pressure. Flow direction (i.e.-Machine forward or reverse) is controlled by energizing solenoid a or b (refer to flow direction data table at right).

Increasing pump drive speed generates a higher pilot pressure from the DA cartridge, with a subsequent increase in pump flow and/or pressure.

Dependent on the pump operating curve, increasing system pressure causes the pump to swivel back towards a smaller displacement.

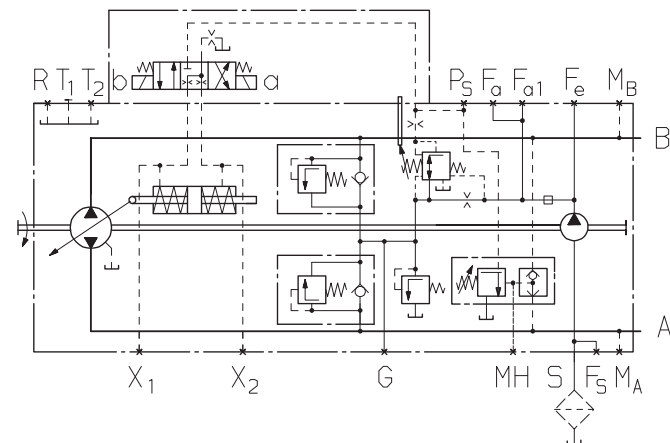
A relatively constant torque input to the pump is achieved by this combination of de-stroking the pump as the operating pressure increases and the response to the "pull-down" of the prime mover (reduced pilot pressure).

Any additional power requirements, such as implement hydraulics, may result in engine pull down. This leads to a reduction in pilot pressure and therefore pump displacement (i.e.-power). The power thus released is then available to supply that demanded by the implement hydraulics. Automatic power division and full utilization of available power is thus achieved for both the vehicle transmission and the implement hydraulics.

Minimizing the engine pull down provides optimum usage of the available drive power. This can be achieved by "partial inching", using the adjustable regulating cartridge with lever (catalog code options 3 and 5). With partial inching, the DA cartridge is mechanically coupled to the accelerator pedal. This means that when a certain engine speed is reached, (movement of the accelerator pedal), the control curve is offset parallel to the engine speed curve.

*Application of the DA Control is only appropriate on certain types of vehicle drive systems, and requires a careful review of the engine and vehicle parameters to ensure that the pump is set up correctly. All DA applications **must** therefore be reviewed by a Rexroth Application Engineer.*

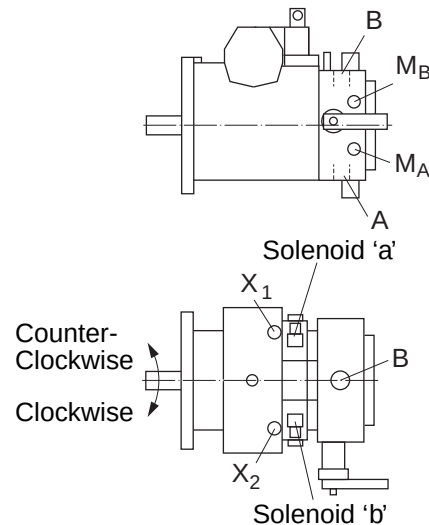
Hydraulic Control, Speed Dependent (DA) control valve, mech. adjustable with control lever DA1D3/DA2D3



Data Table – AA4VG...DA

Direction of rotation – Control – Output flow direction

Direction of Rotation	Size	Solenoid	Control Pressure	Direction of Flow	Operating Pressure
Clockwise	40, 56	a	X ₂	B to A	M _A
		b	X ₁	A to B	M _B
	71, 90, 125, 180	a	X ₂	A to B	M _B
		b	X ₁	B to A	M _A
Counter-Clockwise	40, 56	a	X ₂	A to B	M _B
		b	X ₁	B to A	M _A
	71, 90, 125, 180	a	X ₂	B to A	M _A
		b	X ₁	A to B	M _B



Rotary Inching Valve

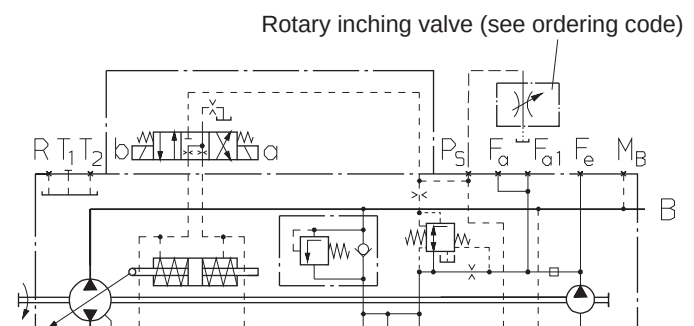
This valve is used to provide vehicle inching function, and is used in conjunction with the DA Regulating Cartridge with fixed adjustment.

It permits the pilot pressure (speed dependent) to be reduced as necessary, independently of the pump drive speed, controlled by rotation of the inching lever.

Maximum angle of lever operation is 90°. The position of the lever is optional (inching operation clockwise or counter-clockwise).

The valve is mounted separately from the pump and connected to the P_S port. Maximum line length should be limited to approximately 2 meters (79").

Hydraulic Control, Speed Dependent (DA) with separate rotary inching valve



DA Hydraulic Control Speed Dependent

Function and control of DA valves.

Rotary Inching Valve

The rotary inch valve is to be ordered separately.

Size	Ordering Code
40, 56, 71, 90	438 553/470.05.31.01
125	438 554/470.05.31.02
180	438 555/470.05.31.03

Please state your requirements in clear text: Inching, clockwise or counter-clockwise operation of the lever (this is determined on assembly).

Attention: The rotary inch valve can be used independently from the control device.

DA regulating cartridge, fixed adjustment (2)

Pilot pressure is generated in relation to drive speed. There are no provisions for inching with this cartridge. The pump is factory preset as determined by engine/vehicle requirements.

DA regulating cartridge, mechanically adjustable w/lever (3)

Pilot pressure is generated in relation to drive speed. The pump is factory preset as determined by engine/vehicle requirements. Pilot pressure may be reduced (independently of drive speed) as required, by operation of the control lever (inching function).

Maximum angle of lever operation is 70°. The position of the lever is optional (inching operation clockwise or counter-clockwise).

Hydraulic inching valve (4, 5)

This valve is used to provide vehicle inching function, and is used in conjunction with the DA Regulating Cartridge, either with fixed adjustment or mechanically adjustable with lever.

Model with throttle valve used on Size 40, 56, & 71.

Model with pressure reducing valve used on size 90, 125, & 180.

It permits the pilot pressure (speed dependent) to be reduced as necessary, independently of the pump drive speed, by applying a hydraulic pressure at Port Z. This is normally supplied from the vehicle braking system using the brake fluid of the power brakes.

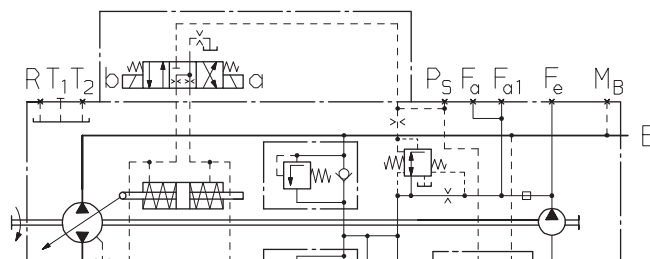
Master controller TH7 as inching valve (7)

This valve is used to provide vehicle inching function, and is used in conjunction with the DA control valve, fixed setting.

Any reduction of control pressure, independent from the input speed through the mechanical operation of the master controller TH7.

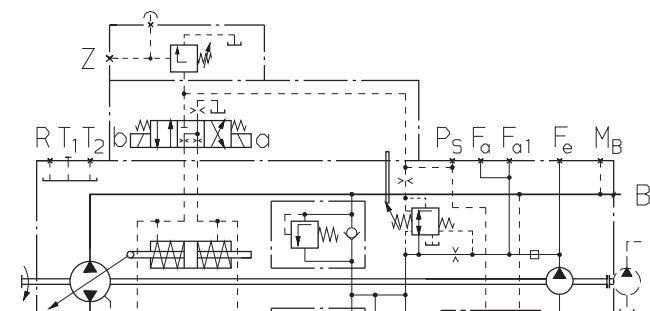
The master controller is installed separately from the pump connected with the pump by 2 hydraulic control lines at ports P_s and Y. The master controller is to be ordered separately (see data sheet RE 64558)

Hydraulic Control, Speed Dependent (DA) fixed setting, DA1D2/DA2D2

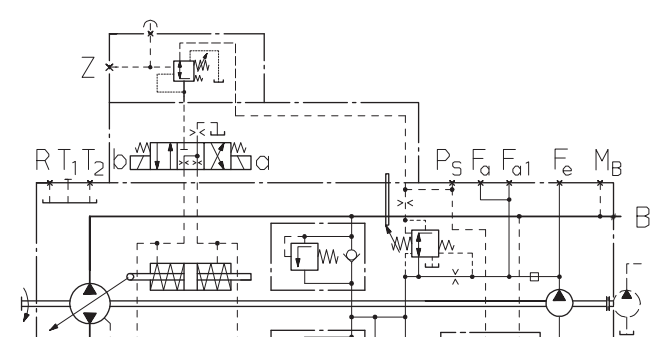


Hydraulic Control, Speed Dependent (DA) mechanically adjustable with control lever, with hydraulic inching valve, DA1D5/DA2D5

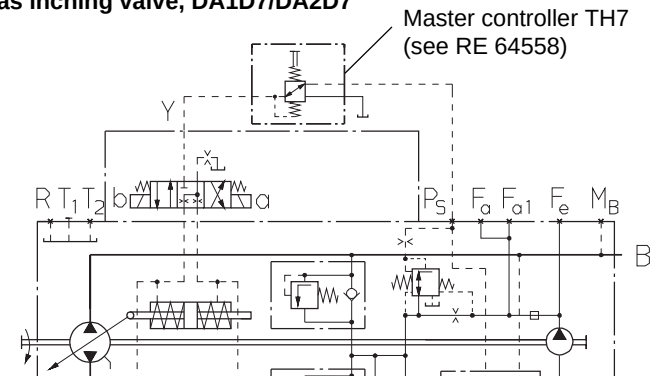
with throttle valve
Sizes 40...71



with pressure reducing valve
Sizes 90...180



Hydraulic Control, Speed Dependent (DA) fixed setting, with separately installed master controller TH7 as inching valve, DA1D7/DA2D7



Master controller TH7
(see RE 64558)

**EZ Electrical Control
Non-Proportional**

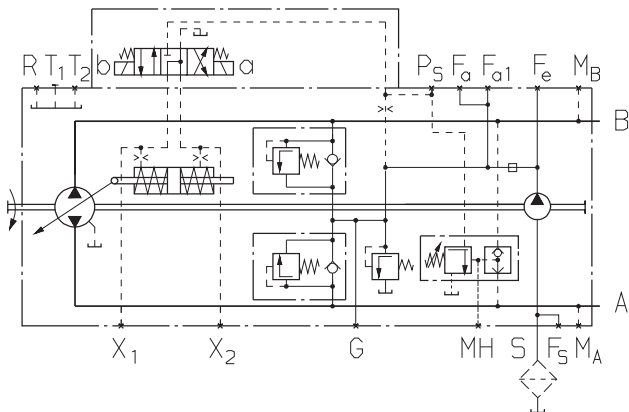
By energizing either solenoid a or b, internal control pressure is connected directly to the stroking piston, and the pump swivels to maximum displacement.

With the EZ control pump flow is switchable from zero flow (neither solenoid energized) to maximum flow. Flow direction is determined by which solenoid is energized (please refer to the data table at the top of page 12).

- EZ1 12 vdc solenoids
- EZ2 24 vdc solenoids

Pressure Cut-Off: Refer to page 8.

Standard model



**DG Hydraulic Control
Direct Operated**

Pumps supplied with the DG control have no control module. The module is replaced by a cover plate.

Pump output is controlled by hydraulic control pressure (P_{st}), typically supplied by a remote pilot controller, applied directly to the stroking piston through either the X_1 or X_2 port. The DG control is not a positive displacement control, as there is no control feedback device.

While pump displacement is infinitely variable between 0 and 100%, a given swashplate position can be affected by system pressure and/or pump drive speed, as well as the stroking piston centering springs.

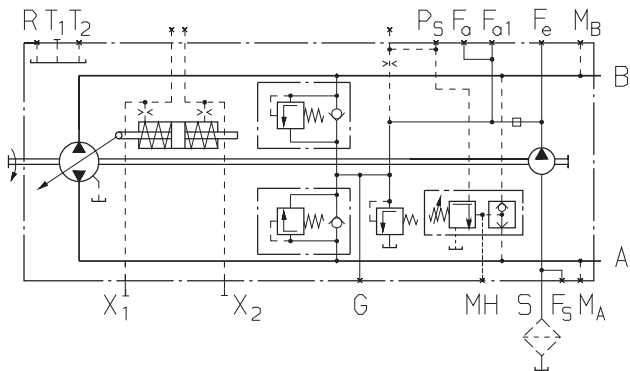
Flow direction is determined by which pilot port is pressurized (please refer to the data table at the top of page 9; Control Pressure column- X_1 ; X_2).

Nominal characteristics:

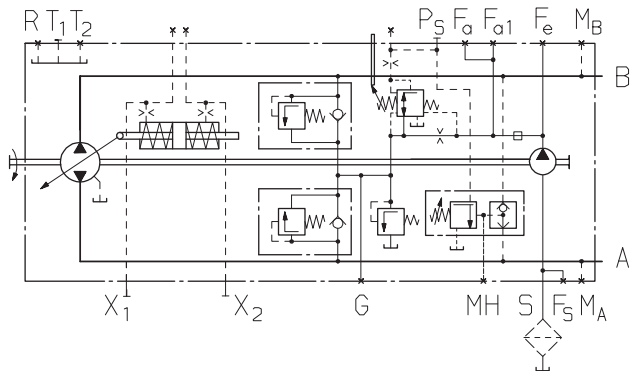
- Begin of regulation- $P_{st \min}$ 5–8 bar (73–116 psi)
- End of regulation (full stroke)- $P_{st \max}$ 22–25 bar (320–363 psi)

Application of the DG Control is only appropriate on certain types of vehicle drive systems, and requires a careful review of the engine and vehicle parameters to ensure that the pump is set up correctly. All DG applications should be reviewed by a Rexroth Application Engineer.

Standard model



Standard model with DA control valve

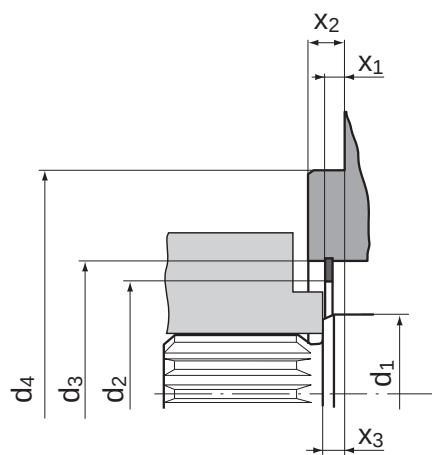


Installation Situation for Coupling Assembly

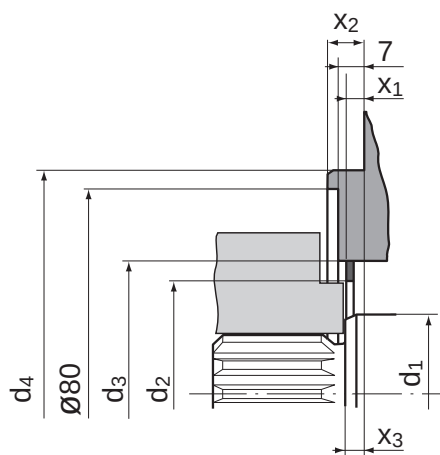
In order to assure that rotating parts (coupling hub) and fixed parts (housing circlip) do not contact each other the installation situations are described in this data sheet have to be observed. The installation situation depend upon the sizes and the spline.

For SAE spline shaft (shaft S or T) the outer diameter of the coupling hub must be smaller than the inner diameter of the circlip d_3 at the zone of the drive shaft shoulder (measure $X_2 - X_3$).

SAE Spline



Sizes 56–180



Size 40 only

Size	$\varnothing d_1$	$\varnothing d_2 \text{ min}$	$\varnothing d_3$	$\varnothing d_4$	X_1	X_2	X_3
40	40	51.4	63 ± 0.1	127	$4.3^{+0.2}$	$12.7_{-0.5}$	$8^{+0.9}_{-0.6}$
56	40	54.4	68 ± 0.1	127	$7.0^{+0.2}$	$12.7_{-0.5}$	
71	45	66.5	81 ± 0.1	127	$7.0^{+0.2}$	$12.7_{-0.5}$	
90	50	66.5	81 ± 0.1	152.4	$6.8^{+0.2}$	$12.7_{-0.5}$	
125	55	76.3	91 ± 0.1	152.4	$7.0^{+0.2}$	$12.7_{-0.5}$	
180	60	88	107 ± 0.1	165.1	$7.4^{+0.2}$	$15.9_{-0.5}$	

Variable Displacement Pump AA4VG, Series 3

Combination Pump

Combination pumps provide two independent closed circuits without the need for splitter gear boxes. When ordering combination pumps the individual model codes should be connected by a '+' sign:

Code: Pump #1 (front pump) + Code: Pump #2 (rear pump)

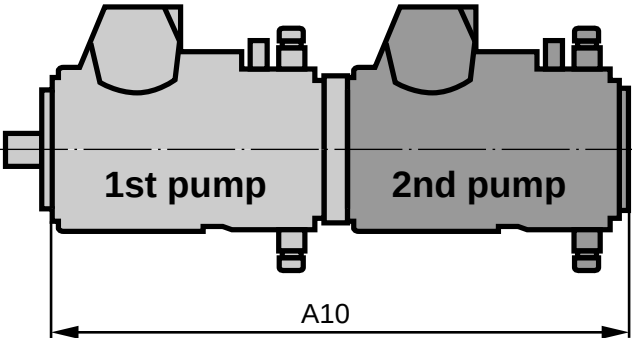
Code example: AA4VG 56 EP1D1/32 R – PTC 52 F073S + AA4VG 56 EP1D1/32 R – PSC 52 F003S

External support for combination pumps of the same frame size is not required, if the dynamic acceleration does not exceed 10g (=98.1 m/s²).

The 4-bolt mounting flange is recommended for size 71 and larger pumps.

Combination pump of the same size
(2nd pump without through drive and with auxiliary pump, F00)

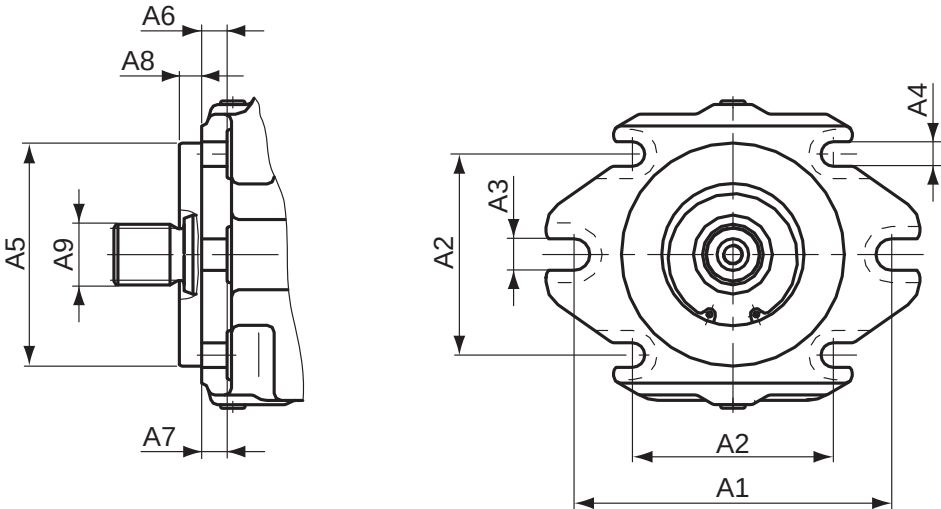
Size	40	56	71	90	125	180
A10	475.5	521.2	596.4	608.8	669.1	764



Mounting flanges & shaft options (of single and combination pumps)

										Combination pump of same size		
Size	Mtg. flange	A1	A2	A3	A4	A5	A6	A7	A8	Single pump	1st Pump	2nd Pump
										A9	Through drive	A9
40	SAE C (2-Bolt)	181	–	18	–	ø127	–	15	12.7	S (SAE 1¼")	S (SAE 1¼") F09/K09	U (SAE 1")
56	SAE C (2-Bolt)	181	–	18	–	ø127	–	18	12.7	S (SAE 1¼")	T (SAE 1¾") F07/K07	S (SAE 1¼")
71	SAE C (2+4-Bolt)	181	114.6	18	14	ø127	15	15	12.7	S (SAE 1¼")	T (SAE 1¾") F07/K07	S (SAE 1¼")
90	SAE D (2+4-Bolt)	228.6	161.4	22	21	ø152.4	17	20	12.7	S (SAE 1¾")	S (SAE 1¾") F73/K73	Z (W35)
125	SAE D (2+4-Bolt)	228.6	161.4	22	21	ø152.4	20	20	12.7	S (SAE 1¾")	T (SAE 2") F69/K69	S (SAE 1¾")
180	SAE E (4-Bolt)	–	224.5	–	21	ø165.1	22	–	15.9	S (SAE 1¾")	T (SAE 2¼") F72/K72	S (SAE 1¾")

Mounting Flange



Variable Displacement Pump AA4VG, Series 3

Start-Up Procedure

The following procedure has been developed based on experience with most types of applications, however certain applications may require a departure from or variation to this procedure.

For the start-up of new or overhauled installations.

1. If the prime mover is:

Internal combustion engine: (Diesel, gasoline or LP)- Remove the coil wire, close the injector rack or leave the gas turned off and turn the engine over until the charge pressure reaches 50 psi or more.

Electric Motor: Jog the starting circuit until the charge pressure reaches 50 psi or more.
2. Start the prime mover, and if possible, maintain a pump speed of approximately 750 rpm for 5 minutes. This will allow the system to be filled.
3. Listen for any abnormal noises.
4. Check for oil leaks.
5. Run prime mover to 1800 rpm. (Adjust to the design speed if less than 1800 rpm.)
6. Set charge and pilot pressure as required for the application. (Refer to circuit schematic)
7. For the HD control, bleed the pilot lines by loosening the connections at Y1 and Y2 and then actuate the remote control unit in both directions until oil seeps from the connections.
8. Retighten all connections.
9. Operate the control to work the hydrostatic transmission at approximately 20% of maximum speed.
10. Deaerate system by venting a bleed valve or by cracking the highest connection until fluid seeps out without bubbles.
11. Check fluid level and add fluid if necessary.
12. Continue operating transmission and gradually increase to full speed, still with no load.
13. With controls neutralized, check for creep in neutral. If evident, center the control in accordance with the instructions in the pump service manual.
14. Check that the controls are connected so that the transmission operates in the correct direction related to the control input.
15. Continue to monitor all pressure gauges and correct any irregularities.
16. Apply brakes and set high pressure relief valves (and pressure override if installed) to levels required for the application by stroking the pump to approximately 20% of maximum displacement.
17. Check security of high pressure connections.
18. Check oil level and temperature.
19. Remove and inspect high pressure filter elements, if so equipped. Replace with new elements.
20. Operate transmission under no load conditions for about 15 minutes to stabilize the temperature and remove any residual air from the fluid.
21. Again remove and inspect high pressure filter elements, if so equipped. If clean, the high pressure, bi-direction filters may be removed from the circuit. If contamination is still evident, fit new elements and continue flushing until the system is clean.
22. Replace the elements in the charge pump suction or pressure filter, whichever is installed.
23. Operate the transmission under full and normal load conditions.
24. Erratic operation may indicate there is still air trapped in the system. By working the pump control to one or both sides the remaining air can be eliminated. The system is free of air when all functions can be operated smoothly and when the oil in the reservoir is no longer aerated. (Usually less than 1 hour of operation).

Note:

If, after following the Pre-Start and Start-up procedures, the transmission does not perform correctly, refer to the relevant sections of the trouble-shooting procedures on pages 20–23.

Variable Displacement Pump AA4VG, Series 3

Troubleshooting Procedure

To aid in troubleshooting, refer also to the diagnostic port connections for test gauge installation information. Procedure assumes gauges are installed.

This procedure was written to aid the troubleshooter in following a logical approach to a system fault.

1...Transmission does not Drive with the Prime Mover Running

- | | | | |
|-----|---|-----|--|
| 1.1 | Is there oil in the reservoir? | No | Fill reservoir. |
| | | Yes | Proceed to step 1.2. |
| 1.2 | Is engine clutch engaged? | No | Engage clutch. |
| | | Yes | Proceed to step 1.3. |
| 1.3 | Is the hydraulic piping in accordance with the hydraulic circuit? | No | Correct the piping. |
| | | Yes | Proceed to step 1.4. |
| 1.4 | Is the pump direction of rotation correct? | No | Fit pump having the correct direction of rotation. |
| | | Yes | Proceed to step 1.5. |
| 1.5 | Is there a broken pipe, loose fitting or burst hose? | No | Proceed to step 1.6. |
| | | Yes | Repair the fault. |
| 1.6 | Are the brakes released? | No | Check brake release circuit or mechanism. |
| | | Yes | Proceed to step 1.7. |

Charge Pump & Relief Valve

- | | | | |
|-----|--|-----|---|
| 1.7 | Is there any charge pressure at port G? | No | Proceed to step 1.10. |
| | | Yes | Proceed to step 1.8. |
| 1.8 | Is the charge pressure at least 300 psi while the pump is running at normal operating speed? | No | Proceed to step 1.9. |
| | | Yes | Proceed to step 1.19. |
| 1.9 | Can charge pressure be adjusted by adding or removing relief valve spring shims or by adjusting charge pressure relief valve setting screw if so equipped. | No | Proceed to step 1.10. |
| | | Yes | Adjust charge pressure to 300 psi and proceed to step 1.19. |

Note: If flushing valve is used in circuit, it should set at 25 psi less than charge pump relief. Refer to data sheet on flushing valve for information and setting procedure.

- | | | | |
|------|--|-----|-------------------------------|
| 1.10 | Is the suction line shut-off? | No | Open valve |
| | | Yes | Proceed to step 1.11. |
| 1.11 | Is the charge pump suction pressure within the recommended limits? (0.8 bar abs or 6.3 in-Hg.) | No | Proceed to step 1.12. |
| | | Yes | Proceed to step 1.16. |
| 1.12 | Is the suction filter element plugged. | No | Proceed to step 1.13. |
| | | Yes | Replace filter element |
| 1.13 | Does the reservoir design ensure that suction pipe is always covered with oil. | No | Correct the reservoir design. |
| | | Yes | Proceed to step 1.14. |

- | | | | |
|------|---|-----|---|
| 1.14 | Is the suction pipe size adequate for the flow? | No | Run at lower speed and return to point 1.7, or rework suction piping. |
| | | Yes | Proceed to step 1.15. |
| 1.15 | Is the reservoir air breather blocked or undersized? | No | Proceed to step 1.16. |
| | | Yes | Clean or Replace air breather. |
| 1.16 | Remove charge pressure relief valve cartridge and inspect. Is it damaged? | No | Refit cartridge and proceed to step 1.17. |
| | | Yes | Fit a new cartridge and return to step 1.7. |
| 1.17 | Remove and inspect charge pump assembly. Is it damaged? | No | Proceed to step 1.18. |
| | | Yes | Repair or replace damaged components and return to step 1.7. |
| 1.18 | Is the charge pump installed for correct direction of rotation? | No | Refit charge pump. Return to step 1.7. |
| | | Yes | With proper charge pressure, and transmission still does not operate, proceed to step 1.19. |

Pump Control

- | | | | |
|------|---|-----|---|
| 1.19 | Is control medium connected to pump control? HD...pilot pressure HW...mechanical cable or linkage. EP...12 or 24 volts dc, electrical current. | No | Connect appropriate medium and check that control signal is actually being applied to the pump control valve. |
| | | Yes | Proceed to step 1.20. |
| 1.20 | If variable displacement motors are installed, is maximum displacement selected? (If not done automatically). | No | Select maximum displacement. |
| | | Yes | Proceed to step 1.21. |
| 1.21 | Actuate the control in both directions. Does pump stroke? Does it go to full stroke? | No | Refer to the pump service manual and then proceed to step 1.22. |
| | | Yes | Operate the transmission. |
| 1.22 | Remove stroking orifices in X1 and X2. Stroke the pump in both directions. Do the pressures at X1 and X2 Alternate between 30 and 250 psi during cycle? | No | Remove control module and replace it with a new unit. Repeat step 1.21. |
| | | Yes | Proceed to step 1.23 |

Variable Displacement Pump AA4VG, Series 3

Troubleshooting Procedure**1...Transmission does not Drive with the Prime Mover Running** (Continued from page 20)

1.23	Is the pressure at port R less than 2 bar abs. or 30 psia?	No	Repipe pump case drain line so that case pressure at port R is less than 8 bar abs. or 30 psia. Return to step 1.21.	1.25	Is it possible to adjust high pressure relief valves using the 0...10,000 psi gages at MA and MB to monitor pressure? (Refer to relief valve adjustment).	No	Replace high pressure relief valve cartridges and return to step 1.21.
		Yes	Proceed to step 1.24.			Yes	Adjust high pressure relief valves to required or design pressure. Proceed to step 1.26.
1.24	Stroke pump in both directions. Does any pressure greater than 350 psi alternate between parts M _A and M _B ?	No	Verify that loading of the pump will cause system pressure to increase above charge pressure. Proceed to step 1.19.	1.26	Actuate Control in both directions. Does transmission run?	No	Check if motor sizing is adequate for application. Check for mechanical faults in the drive beyond the motor shaft.
		Yes	Proceed to step 1.25.			Yes	operate the transmission.

2...Transmission Drive is Sluggish or Erratic

2.1	Is the control medium in good condition? For example: control medium is not in good condition if: HD...control-air in pilot lines. HW...Control-sticking cable or linkage. EP...Control-fluctuating control current.	No	Rectify the control fault. HD...Bleed pilot lines. HW...Lubricate or free the cable or linkage. EP...Check control current.	2.5	Does the charge pressure fluctuate more than 30 psi when stroking the pump?	No	Proceed to step 2.9.
		Yes	Proceed to step 2.2.			Yes	Proceed to step 2.6.
2.2	Are the brakes fully released?	No	Check brake release circuit or mechanism.	2.6	If the charge pump output is used to operate auxiliary functions, do these other functions cause fluctuations in charge pressure?	No	Proceed to step 2.8.
		Yes	Proceed to step 2.3.			Yes	Proceed to step 2.7.
2.3	Are the stroking time orifices correctly sized for the application?	No	Remove the plugs in ports X ₁ and X ₂ and remove control orifices with 3mm allen wrench, for size 71 and a 5mm allen wrench for size 250. Try various sizes until desired pump stroking rate is attained.	2.7	Isolate the auxiliary function and run the transmission. Are the charge pressure fluctuations reduced or eliminated?	No	Proceed to step 2.8.
		Yes	Proceed to step 2.4.			Yes	Operate transmission and return to step 2.1.
2.4	With HD control, is the control curve of the remote pilot valve correctly matched to the pump?	No	Change spring to suit.	2.8	Are there system pressure fluctuations which are synchronous with the charge pressure fluctuations?	No	Proceed to step 2.9.
		Yes	Proceed to step 2.5.			Yes	Determine the cause of system pressure fluctuations.
				2.9	If variable displacement motor is used, is the motor stroking time correct for the application?	No	Add motor stroking time adjustment valve or orifice to the variable motor, or modify the control circuit to provide desired stroking time.

Variable Displacement Pump AA4VG, Series 3

Troubleshooting Procedure**3...Transmission Drives in One Direction Only**

3.1 With control lines lines switched does pump drive in opposite direction only?	No Yes	Proceed to step 3.2. Control signal from one side does not work properly. Repair as necessary.	3.4 Check flushing valve (If Installed). Is shuttle spool stuck in one position?	No Yes	(Not installed) Proceed to step 3.5. Remove flushing valve and clean or replace.
3.2 With control lines still switched does pump drive in initial direction only?	No Yes	proceed to step 3.3. Problem is one side of control module or the pump. Proceed to step 3.3.	3.5 Switch relief valves. does transmission drive in other direction only?	No Yes	Proceed to step 3.6. Repair or replace relief valve on nondriving side.
3.3 Is there control pressure or current from both control lines?	No Yes	Correct control signal problem. Proceed to step 3.4.	3.6 Replace control module and reconnect control lines. Does pump operate properly?	No Yes	Replace or repair pump. Operate transmission.

4...Transmission Drives in the Wrong Direction

4.1 Pump with HD control.	Switch control lines on ports Y ₁ and Y ₂ .	4.3 Pump with HW Control.	Rework linkage or cable to give correct drive direction.
4.2 Pump with EP Control.	Switch electrical connectors on solenoids A & B.		

5...Pump Does Not Find or Hold Neutral (Also refer to pages 24 & 25)

5.1 Does pump return to neutral with control lines removed?	No Yes	Proceed to step 5.2. Check control for electrical signal problem (EP control) or back pressure in the pilot lines (HD Control).	5.2 Check mechanical centering of pump and control per pages 24 & 25. Does pump return to neutral with control lines removed?	No Yes	Repair or replace pump. Replace control module if needed. Operate transmission.
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6...Transmission Drives at a High Noise Level

6.1 Are the drive gearboxes filled with correct grade of oil?	No Yes	Fill gearbox with correct grade of oil to the prescribed level. Proceed to step 6.2.	6.4 Is the suction pressure at the charge pump inlet within recommended limits?	No Yes	Return to step 1.7. Proceed to step. 6.5.
6.2 Is the drive coupling correctly installed and aligned?	No Yes	Install coupling per manufacturer's instructions and tolerances. Proceed to step 6.3.	6.5 Is there air in the hydraulic oil? This may be indicated by foaming or milky colored oil.	No Yes	Proceed to step 6.6. Deaerate the oil and inspect system for cause of air induction.
6.3 Is rigid piping connected to the pump and motor?	No Yes	Proceed to step 6.4 Install short length of hose between pressure ports and the system piping.	6.6 Is the hydraulic motor operating at excessive speed?	Yes	Check motor sizing in relation to available oil flow from the pump. Check motor minimum displacement. See page 20.

Variable Displacement Pump AA4VG, Series 3

Troubleshooting Procedure**7...Transmission Operates at a Higher Than Normal Temperature**

7.1	Is the operating temperature above 195°F?	No	195°F is the upper limit. If temperature is close to 195°F, the oil cooler may need to be cleaned.	7.4	Check differential pressure across oil cooler as compared to the manufacturer's specs at charge pump flow. Is ΔP higher than it should be?	No	Proceed to step 7.5
		Yes	Proceed to step 7.3.			Yes	Check piping from oil cooler to reservoir. Check for plugged or damaged oil cooler.
7.2	Is the hydraulic motor stalling intermittently?	No	Proceed to 7.3.	Note: See page 7 for case pressure rating.			
		Yes	Hydraulic oil is being heated through system relief valves. Shut down system and rectify cause of the motor stall.				
7.3	Does temperature remain above 195°F after cleaning oil cooler?	No	Operate transmission. Check oil cooler more often.	7.5	Disconnect pump case drain from oil cooler and check flow from charge pump. Is flow normal?	No	Refer to charge pump removed and inspection procedure.
		Yes	Proceed to step 7.4.			Yes	Check oil cooler location.

8...Pump Does Not Develop Maximum Horsepower (Flow & Pressure)

8.1	Does charge pressure meet specification	No	Return to step 1.9.	8.3	Are high pressure relief valves adjusted to the required pressure so that they do not bypass?	No	Adjust or replace relief valve cartridge.
		Yes	Proceed to 8.2.			Yes	Replace the pump.
8.2	Is the case pressure less than 2 bar abs or 30 psia?	No	Check sizing of return line from T port of pump and cooler sizing related to flow.	Note: If pressure override valve is fitted to pump, check that pressure setting is sufficient for the application.			
		Yes	Proceed to 8.3.				

Charge Pressure Relief Valve Adjustment

For AA4VG28...AA4VG56

With pressure gauge installed at G port run pump at normal operating speed and temperature. If pressure is low, remove relief valve and add shim(s). If pressure is high, remove relief valve and take shim(s) out.

Note: 1mm = 56.5 psi (3.9 bar)

For AA4VG71...AA4VG250

With pressure gage installed at G port run pump at normal operating speed and temperature. If pressure is low loosen jam nut and turn set screw clockwise. If pressure is high loosen jam nut and turn set screw counterclockwise.

Note: 1 turn = 55 psi (3.8 bar) for sizes 71 thru 125.

Note: 1 turn = 43.5 psi (3.0 bar) for sizes 180 thru 250.

Pump Size	Allen Wrench	Box Wrench	Wrench To Remove
28 - 56	N/A	N/A	27 mm
71 - 125	5 mm	17 mm	27 mm
180 - 250	5 mm	17 mm	32 mm

Mechanical Centering of Pump

Preparation for Adjustment

The control piston has strong centering springs to ensure that once the pump is adjusted for the neutral position it will always return to neutral. If an adjustment is necessary follow the steps listed below.

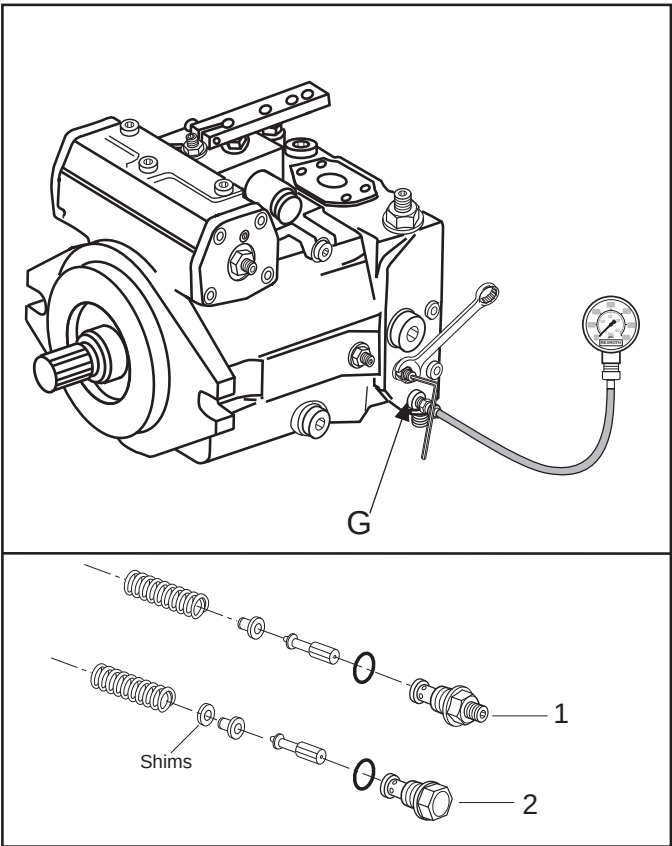
To ensure there is equal pressure on both sides of the control module during the centering operation, it is necessary to connect the X₁ and X₂ ports together by means of hose or tubing (No less than a 1/4 inch ID). The port sizes are as follows:

Size 28...90	7/16"-20 UNF
Size 125 & 250	9/16"-18 UNF

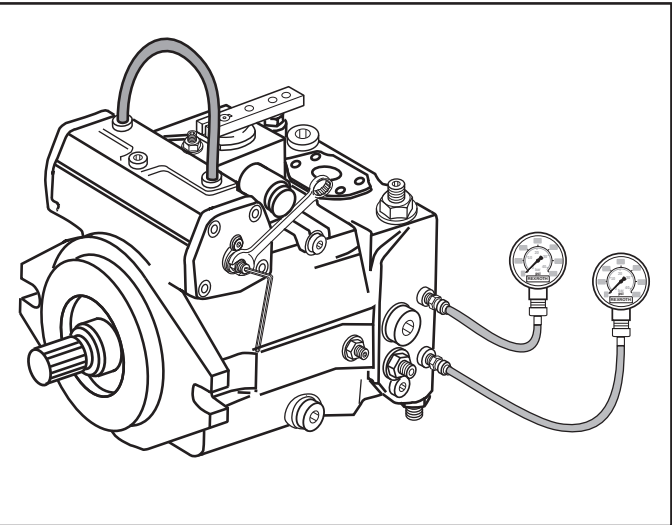
Pump Size	Allen Wrench	Wrench
28...56	6 mm	19 mm
71...90	6 mm	24 mm
125...250	8 mm	24 mm

With pressure gages installed at M_A and M_B, and with A and B ports blocked (or motor stalled), and with the pump running, loosen the jam nut. Turn the mechanical centering adjusting screw until 1000 psi is read on M_A or M_B then turn screw opposite direction until 1000 psi is read on other pressure port. Turn the screw back, splitting the distance between the previous two positions. This should be the neutral position. Pressure on M_A and M_B should be equal.

Tighten jam nut, stop the pump drive, remove the hose connecting ports X₁ and X₂.



- 1. Adjustable charge pressure relief valve for sizes 71...180.
- 2. Shim charge relief for sizes 28 and 56.



Hydraulic Centering of Control Modules

Preparation for Adjustment

When control modules are exchanged or replaced, it is generally necessary to center the new module. This is done by running the pump with gauges installed at ports X_1 , X_2 , M_A and M_B . Release the jam nut and turn the adjustment screw on top of the control module valve body.

The adjustment screw is an eccentric, therefore, turning more than 90° in either direction will have no further centering effect, and could cause damage to the eccentric pin.

Pump Size	Allen Wrench	Wrench
28...71	Screw Driver	10 mm
90...250	4mm	13 mm

Centering the HD Control Module

With Y_1 and Y_2 ports vented to atmosphere, neutral position of the HD control is correctly adjusted when any or all of the following conditions exist:

1. Approximately, when equal control pressures are obtained at control pressure ports X_1 and X_2 .
2. The hydraulic motor does not turn when the brake is released.
3. Charge pressure is registered equally at ports M_A and M_B , when flow output of the pump is deadheaded against a locked motor, or a valve.

Centering the HW Control Module

With the control lever allowed to freely spring to its center position, the HW control module is correctly adjusted when any or all of the following conditions exist:

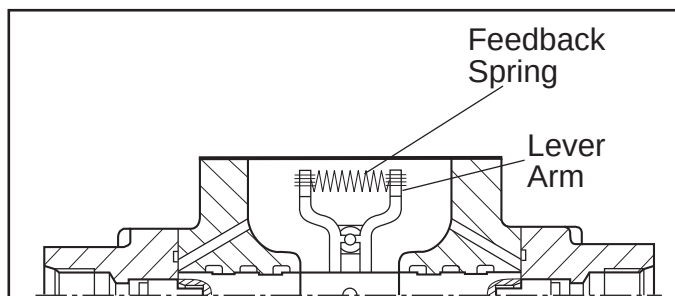
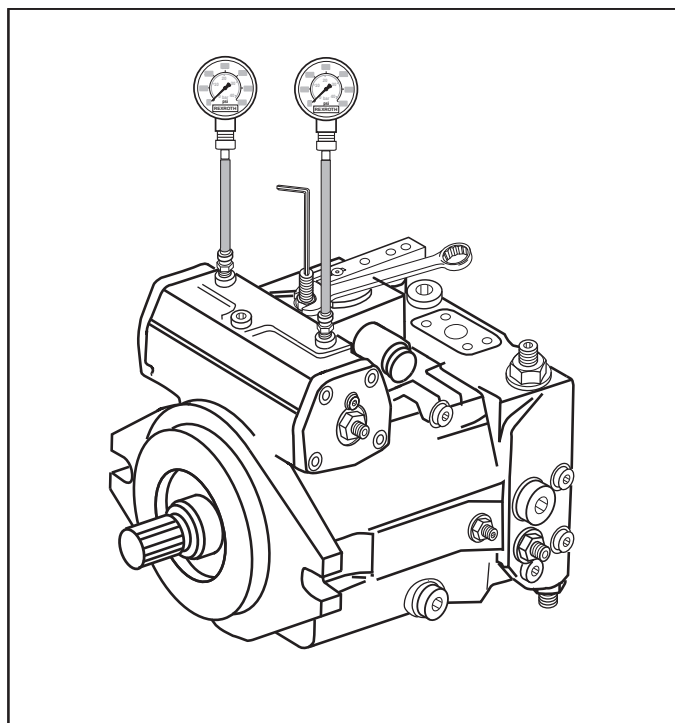
1. Approximately, when equal control pressures are obtained at control pressure ports X_1 and X_2 .
2. The hydraulic motor does not turn when the brake is released.
3. Charge pressure is registers equally at ports M_A and M_B , when the flow output of the pump is deadheaded against a locked motor, or a valve.

Centering the EP Control Module

With no electrical signal to solenoids A and B, (remove both plug-in connectors), the EP control module is correctly adjusted when any or all of the following conditions exist:

1. Approximately, when equal control pressures are obtained at control pressure ports X_1 and X_2 .
2. The hydraulic motor does not turn when the brake is released.
3. Charge pressure is registered equally at ports M_A and M_B , when the flow output of the pump is deadheaded against a locked motor or a valve.

If difficulties are encountered in obtaining neutral position of the HD or EP control modules, check that the ends of the control spring are correctly located in the grooves near the end of the feedback lever arms.



Variable Displacement Pump AA4VG, Series 3

Pressure Override Valve Adjustment

Function of Pressure Override

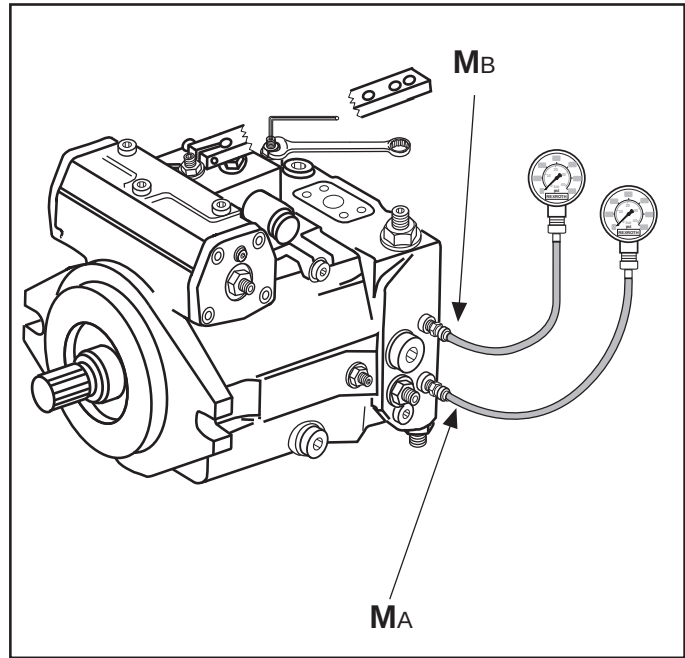
The pressure override valve varies the swashplate angle, as required, to limit the maximum pressure at port A or B. The override valve prevents continuous dumping of excessive flow, at load pressure, through the cross port relief valves contained in the pump. This eliminates unnecessary heating of the oil and protects the pump and motor from heavy-handed operators, or, if the drive stalls causing the pump to deadhead. The pressure override valve should be adjusted to a pressure at least 500 psi less than the setting of the main relief valves.

Adjustment Procedure

1. Neutralize the pump control and turn P.O.R. adjusting screw counterclockwise, all the way out.
2. Stroke the pump fully in either direction, then turn the P.O.R. adjusting screw in (clockwise) until the desired pressure setting is achieved.
3. Stroke the pump for opposite flow direction to that used in step 2 and check the operation of the P.O.R. Equal maximum pressures should be seen both sides of center.

Note: One turn of screw equals 1200 psi.

Note: All adjustments require a 4 mm allen wrench and a 13 mm box wrench.



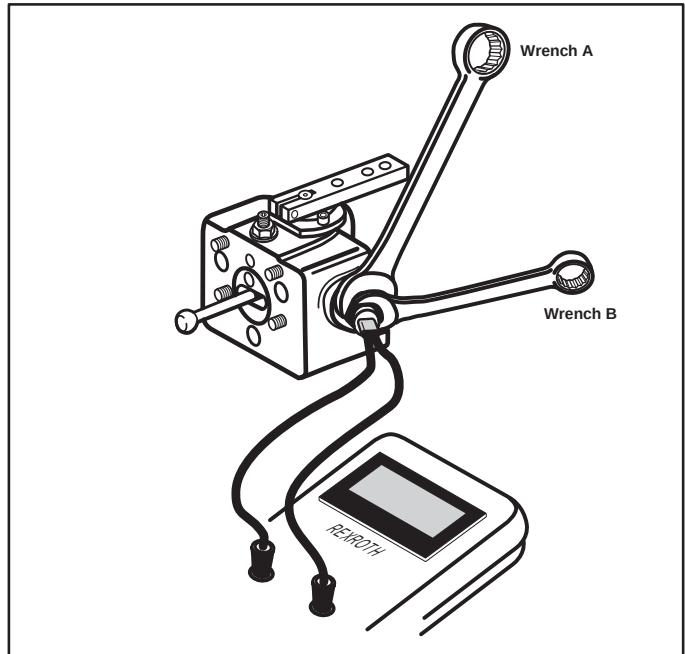
Adjustment of P.O.R. valve on pumps with remote hydraulic pilot control (type HD), manual rotary servo (type HW), and proportional electric control (type EP).

Neutral Start Switch Adjustment Procedure

Note: Before adjusting neutral start switch pump should be centered.

1. To adjust neutral safety switch, disconnect linkage from control handle and connect an ohm meter across the leads from the neutral safety switch adjust the ohm meter to read continuity.
2. Then loosen the jam nut with wrench A and turn the switch (wrench B) in until you lose Continuity.
3. Then back the switch out until you complete the circuit and tighten jam nut.
4. Block vehicle to prevent movement. Return HW control to neutral. Install gages in M_A and M_B and start engine. Slowly bring pump on stroke, switch must open before pressure is developed in M_A or M_B port.

Note: All adjustments require a 23 mm box wrench and a 30 mm box wrench.



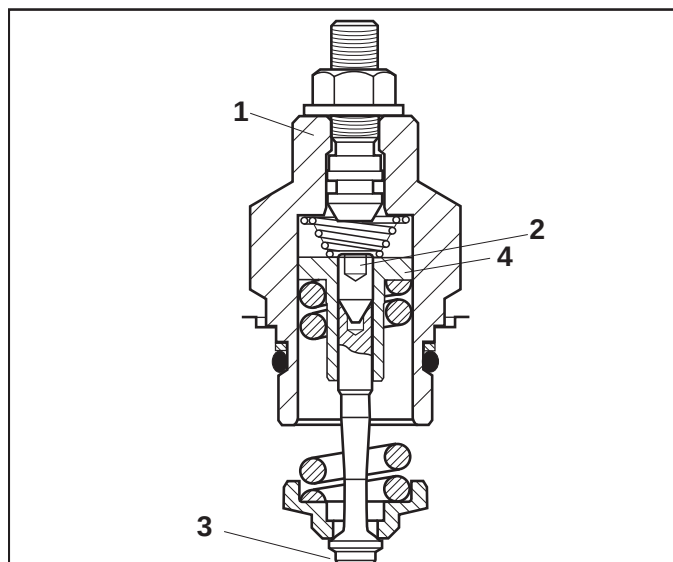
Variable Displacement Pump AA4VG, Series 3

High Pressure Relief Valve Adjustments

High Pressure Relief Valve Adjustment Procedure
AA4VG40 & AA4VG56

1. Remove relief valve cover from pump (ref. item 1).
2. Loosen jam screw (ref. item 2).
3. Holding spring loading nut (ref. item 4) adjust valve spindle (ref. item 3). One turn equals approx. 630 psi (44 bar).
4. After adjustment is completed tighten jam screw (ref. item 2) to 5 ft-lbs. (7 Nm).
5. Install relief valve assembly into pump, tighten cover (ref. item 1) to 66 ft-lbs. (90 Nm).

Note: All high pressure relief valve adjustments on size 40 and 56 to be done with a 3 mm allen wrench and a 5 mm box wrench.



High pressure relief valve with tow option used in AA4VG40 and AA4VG56

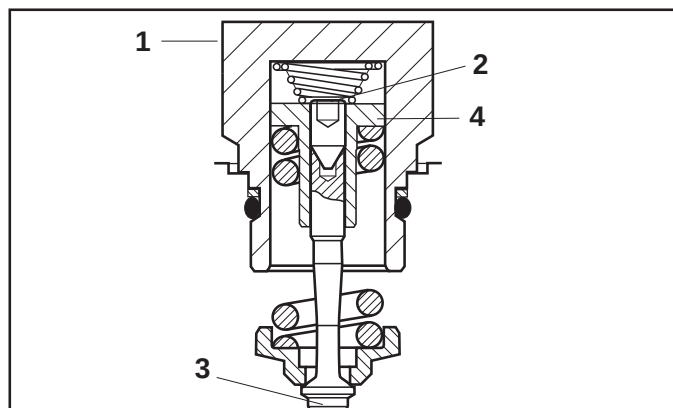
High Pressure Relief Valve Adjustment Procedure
AA4VG71...AA4VG250

Following is a suggested procedure for adjusting the relief valves. It is assumed that high pressure gauges are connected to ports M_A and M_B . Some applications may require a slight departure from the procedure.

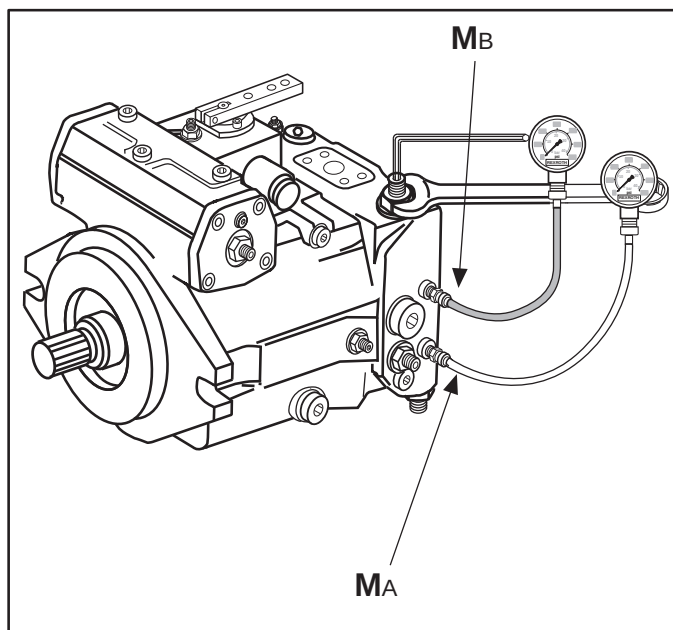
1. Block the output flow from the high pressure ports A & B, or lock the hydraulic motor by applying the brake.
2. Turn both high pressure relief valve adjusting screws counterclockwise until the spring tension is completely relieved, then turn both adjusting screws one full turn clockwise.
3. Turn the P.O.R. adjusting screw in (clockwise) until firm resistance is encountered. Do not force the adjustment beyond this point.
4. Stroke the pump to approximately 20 percent of full flow in one direction and adjust the high pressure relief for that flow direction to a pressure which is 500 psi higher than the required P.O.R. pressure setting. For the AA4VG71 and AA4VG90 one turn equals 2200 psi (150 bar).
5. Repeat step 4 for the opposite direction of flow.

Note: Perform steps 4 & 5 as quickly as possible to prevent overheating of the pump. Flow should not be permitted to spill over the high pressure relief valves for longer than 10 seconds, especially at higher pressures.

Note: High pressure relief valve adjustments on size 71 and 90 to be done with a 11 mm box wrench and a 19 mm box wrench, 125 and 180 to be done with a 5 mm allen wrench and a 17 mm box wrench.



High pressure relief valve with out tow option used in AA4VG40 and AA4VG56



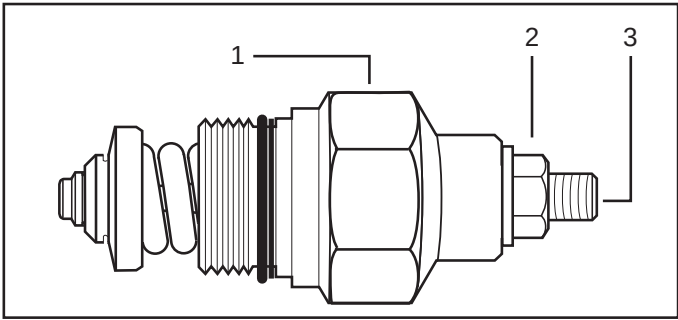
Engagement of Relief Valve Tow Option

Tow Option Engagement for AA4VG40 and AA4VG56

To actuate tow option loosen lock nut (ref. item 2). Turn tow option engagement screw (ref item 3) in six turns and tighten lock nut.

To disengage tow option loosen lock nut and turn tow option screw all the way out until it stops.

Note: Use a 4 mm allen wrench and a 13 mm box wrench to adjust.



Relief valve for AA4VG40 and AA4VG56.

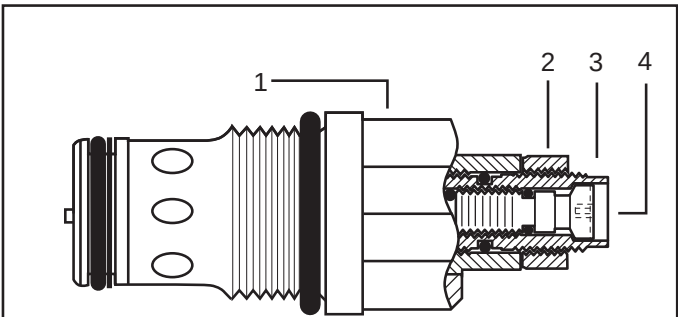
- 1...Nut used to torque relief valve into port block.
- 2...Lock nut for tow option engagement.
- 3...Tow option engagement screw.

Tow Option Engagement for AA4VG71 and AA4VG90

To actuate tow option turn tow option engagement screw (ref. item 4) out three turns.

To disengage tow option turn tow option engagement screw in until it stops.

Note: Use a 4 mm allen wrench to adjust.



Relief valve for AA4VG71 and AA4VG90.

- 1...Nut used to torque relief valve into port block.
- 2...Lock nut for high pressure relief adjustment.
- 3...Adjustment screw for high pressure adjustment.
- 4...Tow option engagement screw.

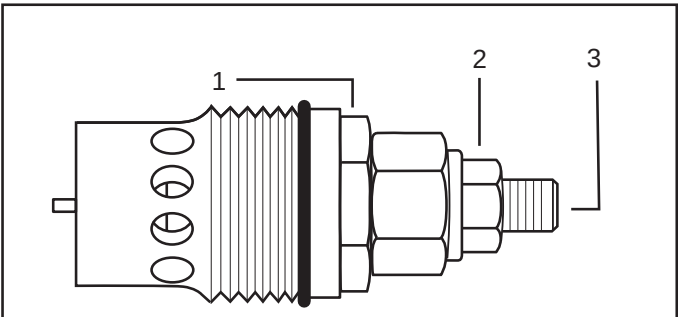
Tow option Engagement for AA4VG125 and AA4VG180

To actuate tow option turn relief valve (ref. item 1) out two turns.

To disengage tow option tighten relief valve.

Note: Use a 36 mm box wrench to adjust.

Note: Tow options are meant to be used for a short time period only. Tow options are not to be used for extended tows.



Relief valve for AA4VG125 and AA4VG180.

- 1...Nut used to torque relief valve into port block and engage tow option.
- 2...Lock nut for high pressure relief adjustment.
- 3...Adjustment Screw for high pressure relief adjustment.

Torque Specs for Relief Valves into Port Block

Pump Size	Wrench Size	Torque
28...56	32 mm	66 ft.lb. (90 Nm)
71...90	32 mm	110 ft.lb. (150 Nm)
125...180	36 mm	147 ft.lb. (200 Nm)

Warning: Tow option bypasses high pressure relief valves. Catastrophic motor damage can occur if hydraulic circuit empties or overheats.

Removal and Inspection of Charge Pump

Before removing cap screws, mark the position of the charge pump housing and separator plate in relation to the port block.

Loosen screws with metric allen wrench.

Pump Size	Allen Wrench
28...125	6 mm
180...250	10 mm

Remove charge pump housing and inspect for wear or damage to gear set and O-ring seals. Grease O-rings prior to reassembly. Make sure O-rings are completely seated in their grooves.

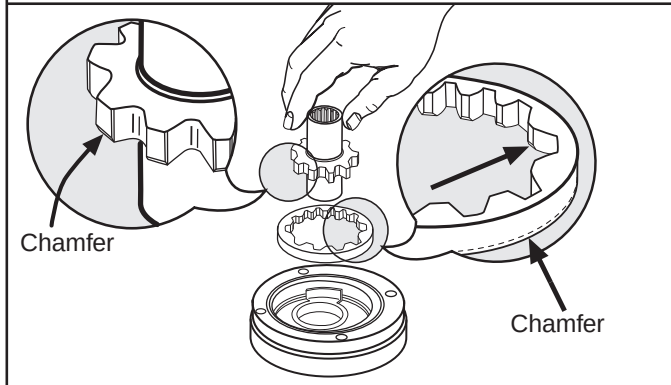
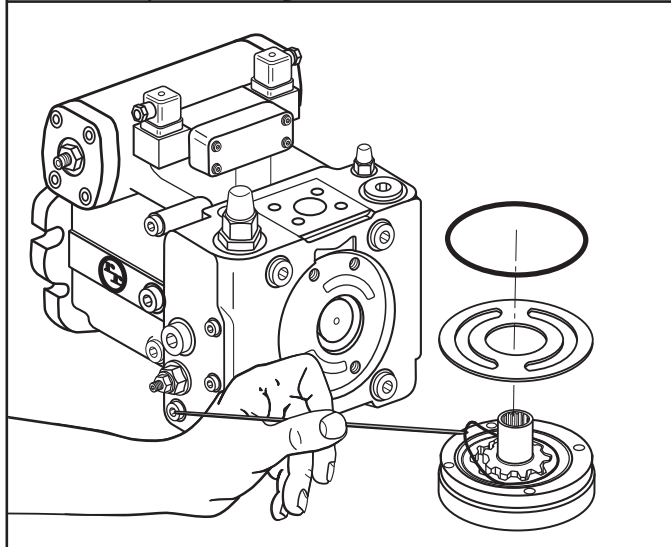
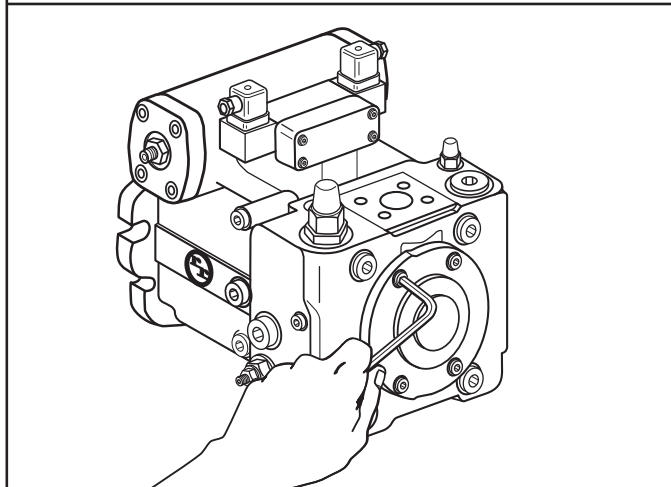
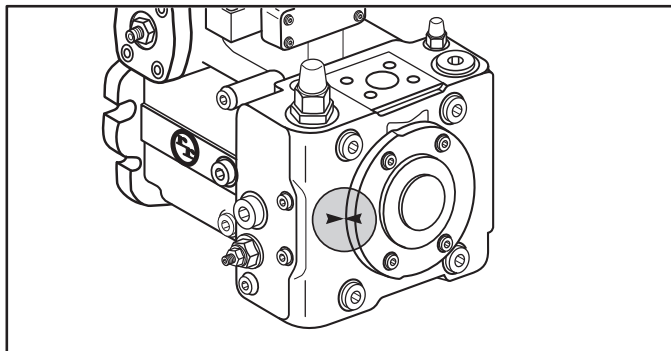
Withdraw pinion shaft and inspect gear teeth and bearing surfaces for abnormal wear.

When reassembling, make sure chamfer (on outer edge of driven gear and drive gear) is installed into housing per illustration.

Torque value for bolts when replacing charge pump.

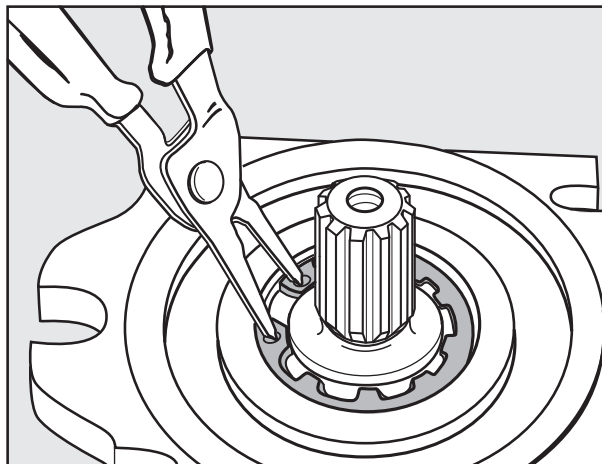
Pump Size	Torque
28...125	18 ft-lbs (24 Nm)
180...250	62 ft-lbs (24 Nm)

Note: If serious wear or damage has occurred to one component, the complete charge pump assembly must be replaced because they are matched components.



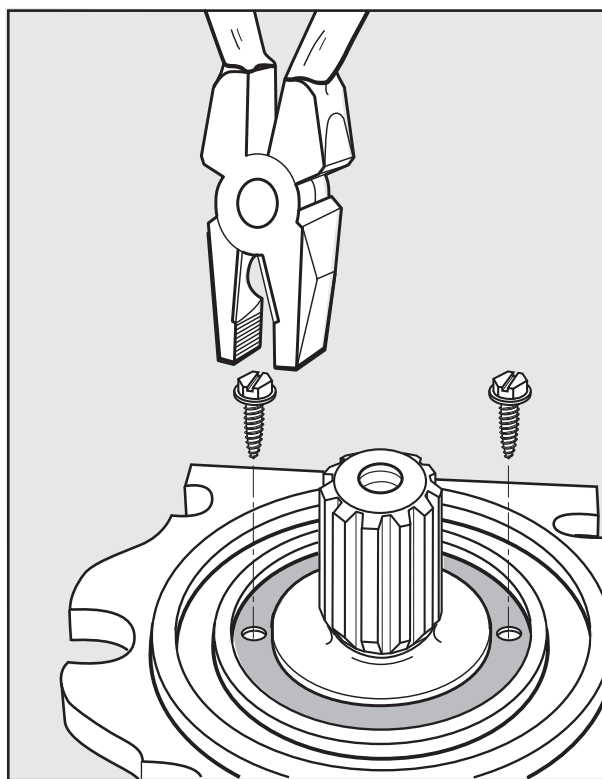
Removal and Installation of Shaft Seal

Remove the retaining ring with snap ring pliers.

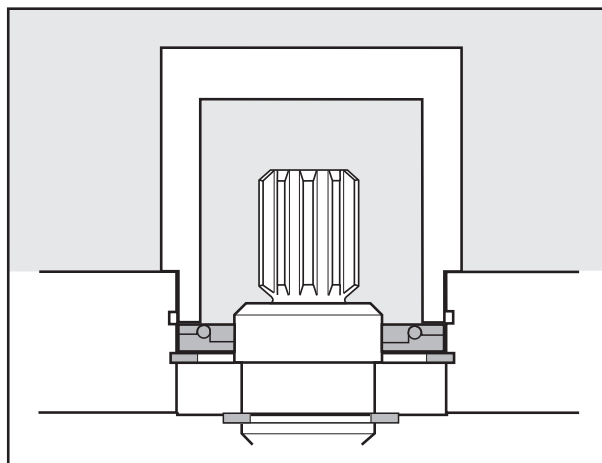


Screw in sheet metal screw into the holes fitted with rubber.

Pull out shaft seal with pliers.

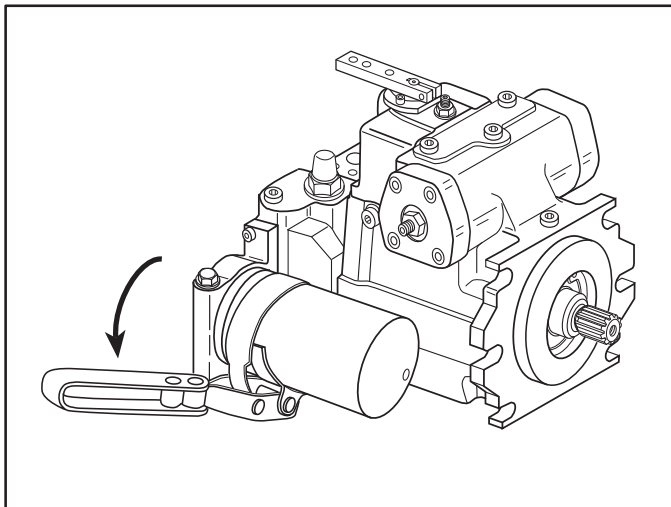


Press-in shaft seal with bushing to the stop.
Then replace snap ring.

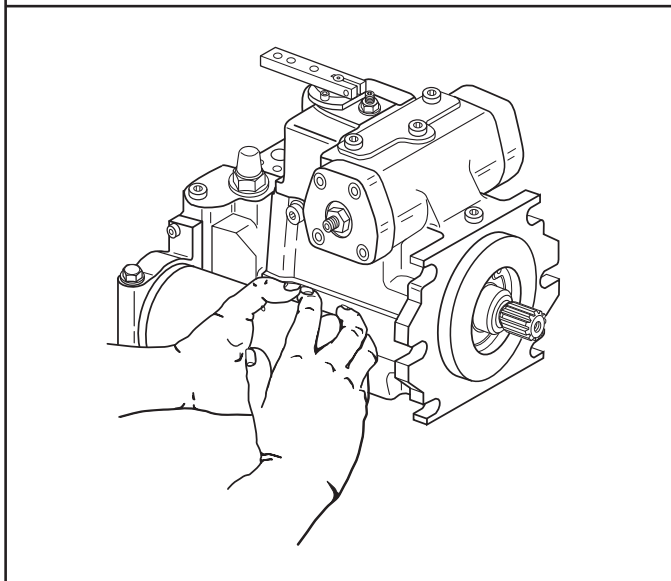


Changing Charge Filter

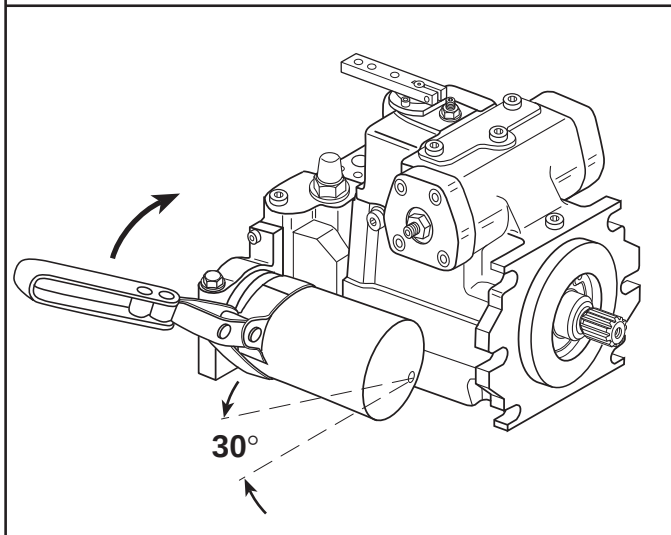
Remove charge filter (turn counter clockwise) with filter wrench.



Apply a small amount of oil to seal.
Screw on new filter (Clockwise) until seal touches housing.



Turn charge filter 30 degrees (clockwise) to tighten.



Variable Displacement Pump AA4VG, Series 3

Routine Maintenance

The AA4VG variable pumps are relatively maintenance free. Maintenance work is confined to the system, by way of oil changes and renewal of filter elements. Both of these measures promote system cleanliness. Monitoring and periodic maintenance of the system can prevent premature breakdowns and repairs. Under normal application conditions, the following maintenance intervals are suggested:

1. Renewal of Filter Elements

- After commissioning.
- At every 500 operating hours, or when filter indicator shows a dirty element.
- With suction filtration, the filter element should be renewed as soon as a charge pump inlet pressure of less than -3.2 psi (0.8 bar absolute) becomes evident with the transmission in warm running condition (indicates contamination).
- With charge flow filtration, watch for high pressure differential across the filter element (Refer to filter manufacturer's specifications).

Caution: Only filter elements capable of meeting or exceeding the fluid cleanliness level requirements (reference page 9) should be used.

Note: Paper inserts cannot be cleaned; use throwaway cartridges (maintain a stock).

2. Hydraulic Oil Change

- After 2000 operating hours (1st oil change).
- Thereafter every 2000 operating hours or annually irrespective of operating hours achieved.

The oil change should be carried out with the system in warm running condition. Before re-filling, the reservoir should be cleaned to remove any sludge.

Caution: Rags or other threading material must not be used.

Note: The recommended interval between oil changes is based on various factors and should be carried out according to the type of fluid, the degree of aging and contamination of the fluid. The water content is also a contributory factor.

Under application conditions with a heavy occurrence of dust or severe temperature fluctuations the intervals between oil changes should be shortened accordingly.

Caution: Practical experience shows that most maintenance errors occur during an oil change due to:

- Use of an unsuitable hydraulic oil.
- Use of oil contaminated due to faulty storage.
- Failure to clean reservoir.
- Inadequate cleanliness when filling (dirty drums or containers).

3. Leakage Inspection

- After commissioning.
- The complete transmission (pump, motor and all pipelines, filters, valves, etc.) should be checked for leakage at regular intervals.

Caution: Leaking joints and connections must only be tightened in pressure less conditions

4. Cleanliness Inspection

The oil tank breather should be regularly cleaned of dirt and dust to prevent clogging. The cooling surfaces should be cleaned at the same time.

Caution: If hose couplings are used in the high pressure lines, it is imperative that the utmost care be taken that no foreign bodies infiltrate the oil circuit when coupling and uncoupling (danger of damage to rotary group, and even possibility of total breakdown).

5. Oil level Inspection

Inspect oil level in reservoir after commissioning, thereafter daily.

Caution: Top up only with specified oil type. Do not mix fluids.

Hydraulic Fluid

Most good quality, mineral oil based, hydraulic fluids exhibiting the following characteristics are suitable for use in a Rexroth hydrostatic transmission.

Good antiwear performance
Resistant to oxidation deprecation
Protection against rust and corrosion
Resistance to foaming
Ability to separate water rapidly
Suitable for widely varying temperature conditions
good low temperature flow properties
Retains viscosity-temperature characteristics in service
Universally available

The prime consideration in the selection of hydraulic fluid is the expected oil temperature extremes that will be experienced in service. The extremes should be considered when selecting a fluid, so that the most suitable temperature-viscosity characteristics are obtained.

The fluid chosen should permit the system to operate within the following viscosity ranges.

Maximum viscosity at start-up 4600 SUS (1000 cSt)
Normal operating viscosity range . . . 66–464 SUS (12–100 cSt)
Optimum viscosity range 81–141 SUS (16–30 cSt)
Absolute minimum viscosity 60 SUS (10 cSt)

When the fluid viscosity is greater than 1000 SUS (216 cSt) the transmission should be operated at reduced speed until the oil has been warmed to a temperature of 40°F (4.5°C).

For applications that will operate near the extremes of viscosity and/or temperature, the fluid manufacturer should be consulted for assistance in selection of the most suitable type and grade of fluid for your application.

Rexroth strongly recommends the selection and use of fluids from reputable and established suppliers.

Variable Displacement Pump AA4VG, Series 3

Replacement Subassemblies and Parts

Control Modules

Control Module	Size		
	28	40	56
HW	HU00606886	HU00606886	HU00606888
HWD	HU00607224	HU00607224	HU00607226
HD	HU00601717	HU00601717	HU00433487
EP1	HU00601622	HU00601622	HU00429169
EP2	HU00601621	HU00601621	HU00429168
EZ1	HU00600074	HU00600074	HU00600074
EZ2	HU00600076	HU00600076	HU00600076

Control Module	Size		
	71	90	125
HW	HU00606891	HU00608523	HU00608522
HWD	HU00607228	HU00608526	HU00608525
HD	HU00429114	HU00602225	HU00602238
EP1	HU00428139	HU00602227	HU00602236
EP2	HU00428138	HU00602226	HU00602237
EZ1	HU00600074	HU00437191	HU00437191
EZ2	HU00600076	HU00437190	HU00437190

Control Module	Size	
	180	250
HW	HU00608521	HU02008008
HWD	HU00608524	▲
HD	HU00602245	▲
EP1	HU00602248	HU02007246
EP2	HU00602247	HU02007245
EZ1	HU00437191	HU00437191
EZ2	HU00437190	HU00437190

Note: To add neutral start switch to an existing HW control add kit 5400-635-009

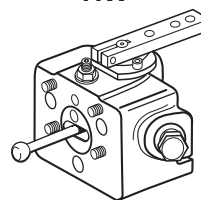
▲ Part numbers not released at time of printing

Control Module Size

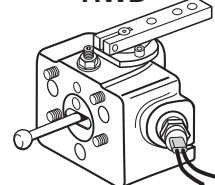
Control module housing for sizes AA4VG28...AA4VG71 and AA4VG90...AA4VG250 are the same. To determine size of control module feedback lever length (dimension "A") can be measured. To convert control modules within a housing size feed back levers can be changed (Reference page 33).

Pump Size	"A" Dimension
28...40	See page 33
56	1.45 in. (36.8 mm)
71	See page 33
90	1.36 in. (34.5 mm)
125	1.55 in. (39.4 mm)
180	2.15 in. (54.6 mm)
250	2.88 in. (73.2 mm)

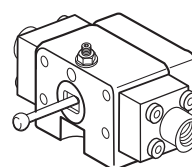
HW



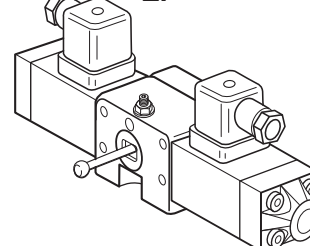
HWD



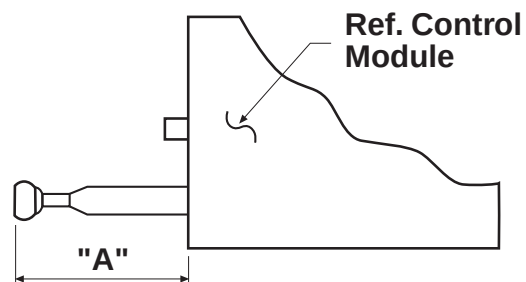
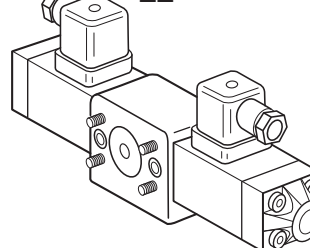
HD



EP



EZ



Variable Displacement Pump AA4VG, Series 3

Replacement Subassemblies and Parts

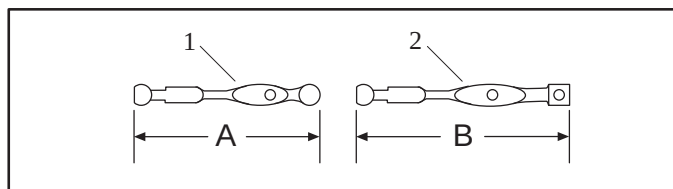
Control Module Size

Control module housing for sizes AA4VG28, AA4VG40, AA4VG56 and AA4VG71 are the same. To determine size of control module feedback lever length (dimension "A" or "B") can be measured. To convert control modules within a housing size feedback levers can be changed (Reference page 33).

Pump Size	"A" Dimension	"B" Dimension
28...40	2.27 in. (57.7 mm)	2.62 in. (66.5 mm)
71	2.31 in. (58.7 mm)	2.66 in. (67.5 mm)

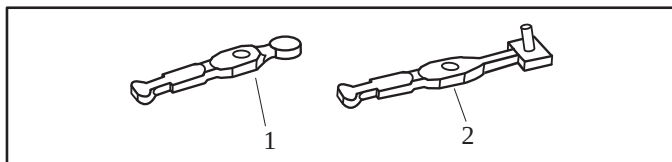
Feedback Levers

Pump Size	Feedback lever HW Control	Feedback lever HD & EP Control
28...40	HU00432448	HU00432509
56	HU00432489	HU00430310
71	HU00432256	HU00430319
90	HU02008032	HU00436442
125	HU02008033	HU00445730
180	HU02008034	HU02008036
250	HU02008006	HU02006296



Feedback Control Levers.

- 1...Feedback lever for HW control.
- 2...Feedback lever for HD and EP controls.



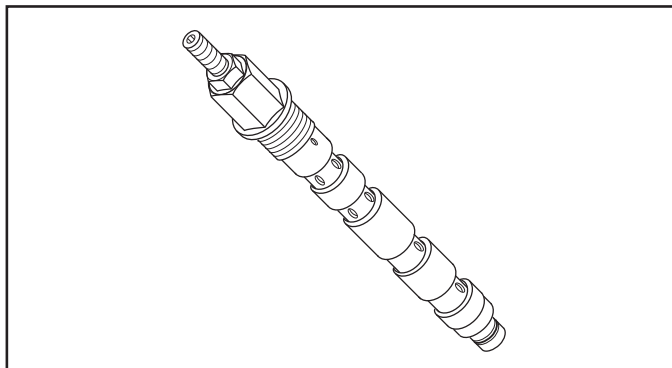
Feedback Control Levers.

- 1...Feedback lever for HW control.
- 2...Feedback lever for HD and EP controls.

Pressure Override Valve Part Numbers

Pump Size	Pressure Override Valve
28	HU00447281
40	HU00447281
56	HU00446763
71	HU00437084
90	HU00437363
125	HU00433834
180	HU00433834
250	▲

▲ Part numbers not released at time of printing

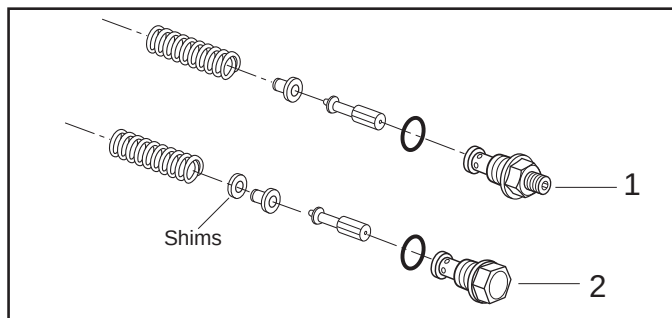


Pressure Override Valve

Charge Pressure Relief Valves

Pump Size	Pressure Range	Part Number
28	215...435 psi (15...30 bar)	5400-635-007 ^①
40	215...435 psi (15...30 bar)	5400-635-007 ^①
56	215...435 psi (15...30 bar)	5400-635-007 ^①
71	215...435 psi (15...30 bar)	HU00434856
90	215...435 psi (15...30 bar)	HU00434856
125	215...435 psi (15...30 bar)	HU00434856
180	215...435 psi (15...30 bar)	HU00437151
250	215...435 psi (15...30 bar)	HU00437151

^① Adjustment kit 5400-635-007 consists of charge pressure relief valve HU00434636 and shims.



Charge Pressure Relief Valves

- 1...Adjustable Charge relief for sizes 71 thru 180.
- 2...Shim charge relief for sizes 40 and 56 only, 1 mm equals 56 psi (3.9 bar).

Variable Displacement Pump AA4VG, Series 3

Replacement Subassemblies and Parts

High Pressure Relief Valve Part Numbers

Pump Size	Part Number	Pressure Range	Type of Relief Valve
40	HU00447133	3600-6000 psi	Direct acting without tow option
	HU00447134	3600-6000 psi	Direct acting with tow option
56	HU00429458	3600-6000 psi	Direct acting without tow option
	HU00434301	3600-6000 psi	Direct acting with tow option
71...90	HU02600466	1450-6000 psi	Pilot operated with tow option
125...180	HU00832121	1450-6000 psi	Pilot operated with tow option
250	▲	▲	▲

▲ Part number not released at time of printing

EP Solenoids (Proportional)

Pump Size	24 Volts DC	12 Volts DC
All	HU00441692	HU00441691

EZ Solenoids (Non-Proportional)

Pump Size	24 Volts DC	12 Volts DC
All	HU00428266	HU00428265

Plug-in Connectors

Pump Size	Gray	Black
All	HU00152503	HU0085290

Ammeter with Sandwich Plug

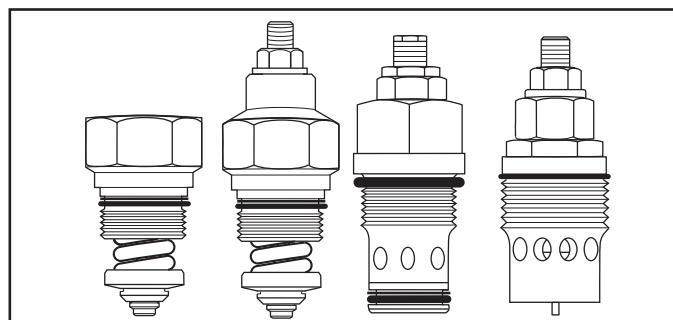
Pump Size	Part Number
All EP Controls	5956-001-018

Stroking Time Orifices for Sizes 28...71

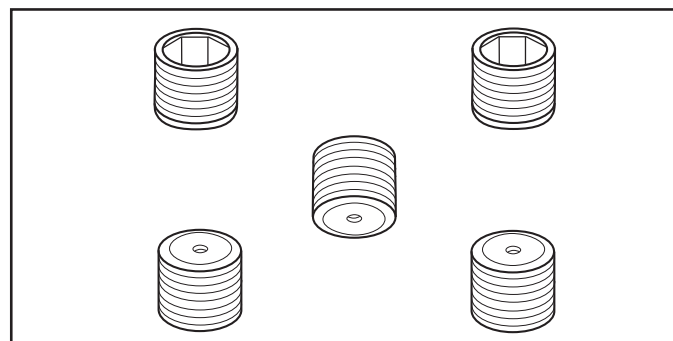
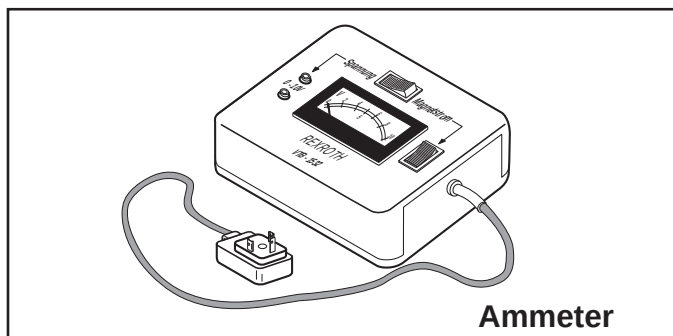
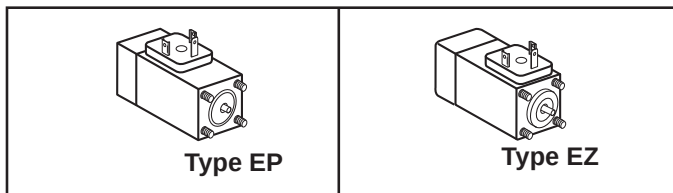
Part Number	Orifice Size	Thread Size
HU00156492	0.8 mm DIA.	M 6
HU00156493	1.0 mm DIA.	M 6
HU00156494	1.2 mm DIA.	M 6
HU00156495	1.4 mm DIA.	M 6
HU00156496	1.6 mm DIA.	M 6
HU00156497	1.8 mm DIA.	M 6

Stroking Time Orifices for Sizes 90...250

Part Number	Orifice Size	Thread Size
HU00426701	0.8 mm DIA.	M 10
HU00426702	0.9 mm DIA.	M 10
HU00426700	1.0 mm DIA.	M 10
HU00426703	1.2 mm DIA.	M 10
HU00426704	1.4 mm DIA.	M 10
HU00426705	1.6 mm DIA.	M 10
HU00426706	1.8 mm DIA.	M 10
HU00426707	2.0 mm DIA.	M 10
HU00426708	2.2 mm DIA.	M 10
HU00439372	2.4 mm DIA.	M 10
HU00426709	2.5 mm DIA.	M 10



High Pressure relief valves for AA4VG28...AA4VG180



Stroking Time Orifices

Variable Displacement Pump AA4VG, Series 3

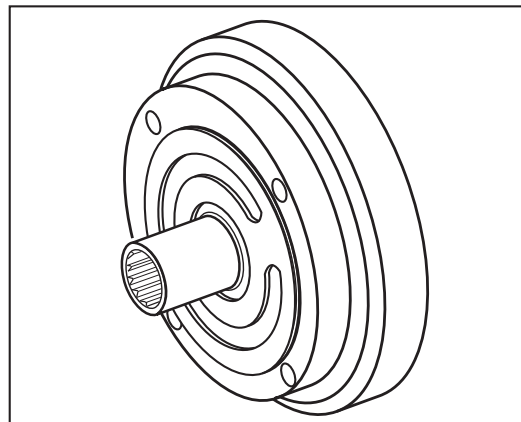
Replacement Subassemblies and Parts

Charge Pumps and Through Drives

Type Code	AA4VG28	AA4VG40	AA4VG56	AA4VG71
F00	▲	HU00606688	HU00606382	HU00606657
F01	▲	HU00606691	HU00606386	HU00606655
F02	▲	HU00606694	HU00606390	HU00606661
F04	▲	HU00606700	HU00606393	HU00606658
F09	▲	HU00606687	○	○
F07	▲	○	HU00606379	HU00606660
F69	▲	○	○	○
F73	▲	○	○	○
Type Code	AA4VG90	AA4VG125	AA4VG180	AA4VG250
F00	HU00606811	HU00606320	HU00606233	▲
F01	HU00606803	HU00606309	HU00606225	▲
F02	HU00606809	HU00606312	HU00606228	▲
F04	HU00606807	HU00606314	HU00606226	▲
F09	○	○	○	▲
F07	HU00606801	HU00606317	HU00606214	▲
F69	○	HU00606330	HU00606245	▲
F73	HU00606805	○	○	▲

○ Not Available

▲ Part numbers not released at time of printing.



Charge Pump

Seal Kits and Shaft Seals for AA4VG/32 – Size 28...250

Pump Size	Seal Kits			Shaft Seal	
	AA4VG/32...P Buna	AA4VG/32...V FPM	AA4VG/32...N FPM Shaft Seal with Buna Seals	Buna	FPM
28	5470-635-023	5470-635-024	5470-635-025	HU00830425	HU00830742
40	5410-635-033	5410-635-035	5410-635-034	HU00831285	HU00831284
56	5420-635-028	5420-635-031	5420-635-029	HU00830970	HU00830976
71	5430-635-025	5430-635-027	5430-635-026	HU00830971	HU00830977
90	5440-635-033	5440-635-040	5440-635-038	HU00830972	HU00830978
125	5450-635-031	5450-635-033	5450-635-032	HU00830974	HU00830980
180	5480-635-007	5480-635-009	5480-635-008	HU00830973	HU00830979
250	○	5460-635-022	5460-635-023	○	HU02600118

○ Not Available

Charge Pressure Filtration Kits and Filter Elements

Pump Size	“F” Standard	“P” Visual Indicator	“L” Electrical Indicator	“M” Visual & Electrical Indicator	Filter Element Only	Cold Starting Valve
28	▲	▲	▲	▲	▲	▲
40...56	HU00434508	HU00441717	HU00606914	HU00606305	HU00830024	HU02007002
71...90	HU00434509	HU00446438	HU00434984	N/A	HU00157926	HU02006412
125	HU00434510	HU00447605	HU00601330	HU00602557	HU00157926	HU02006413
180	HU00434511	HU00600111	HU00447472	HU00606008	HU00157956	HU02006413
250	▲	▲	▲	▲	▲	▲

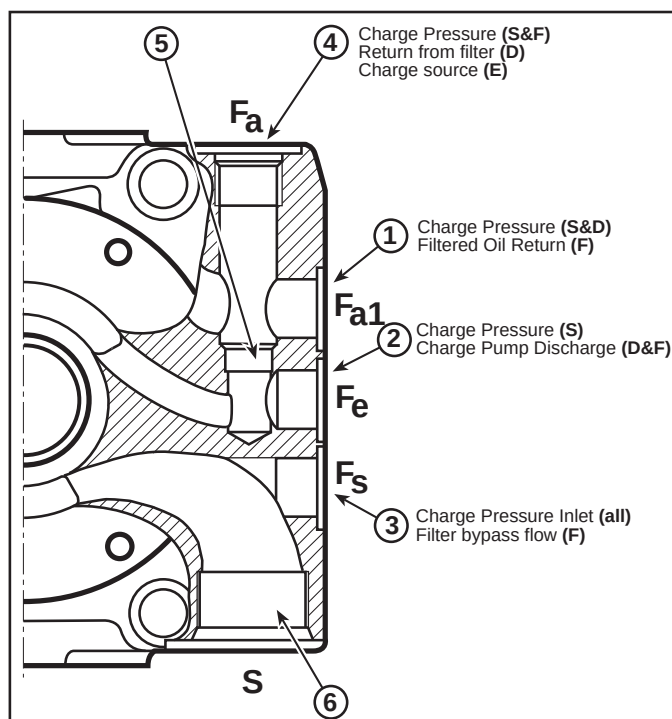
▲ Part numbers not released at time of printing

Variable Displacement Pump AA4VG, Series 3

Filtration Configurations for AA4VG, Series 32

Filtration Configuration	Port Configuration	AA4VG40 AA4VG56		AA4VG71 AA4VG90		AA4VG125 AA4VG180	
		Port Size	Part Number	Port Size	Part Number	Port Size	Part Number
Suction Filtration "S"	1 Plugged	M18 x 1.5	76116-010	M22 x 1.5	76116-009	M33 x 2	76116-008
	2 Plugged	M18 x 1.5	76116-010	M22 x 1.5	76116-009	M33 x 2	76116-008
	3 Plugged	M18 x 1.5	76116-010	M22 x 1.5	76116-009	M33 x 2	76116-008
	4 Plugged	3/4" - 16 UN	76107-008	1 1/16" - 12 UN	76107-012	1 5/16" - 12 UN	76107-016
	5 Open	M14 x 1.5		M18 x 1.5		M20 x 1.5	
	6 Open	1 5/16" - 12 UN		1 5/8" - 12 UN		1 7/8" - 12 UN	
Charge Pressure Filtration "D"	1 Plugged	M18 x 1.5	76116-010	M22 x 1.5	76116-009	M33 x 2	76116-008
	2 Open	3/4" - 16 UN	HU00607033 ^①	1 1/16" - 12 UN	HU00448824 ^①	1 5/16" - 12 UN	HU00442847 ^①
	3 Plugged	M18 x 1.5	76116-010	M22 x 1.5	76116-009	M33 x 2	76116-008
	4 Open	3/4" - 16 UN		1 1/16" - 12 UN		1 5/16" - 12 UN	
	5 Plugged	M14 x 1.5	76117-001	M18 x 1.5	76117-007	M20 x 1.5	76117-008
	6 Open	1 5/16" - 12 UN		1 5/8" - 12 UN		1 7/8" - 12 UN	
Mounted Filter "F" or Cold Start Valve "K"	1 Open	M18 x 1.5	Filter Port	M22 x 1.5	Filter Port	M33 x 2	Filter Port
	2 Open	M18 x 1.5	Filter Port	M22 x 1.5	Filter Port	M33 x 2	Filter Port
	3 Open	M18 x 1.5	Filter Port	M22 x 1.5	Filter Port	M33 x 2	Filter Port
	4 Plugged	3/4" - 16 UN	76107-008	1 1/16" - 12 UN	76107-012	1 5/16" - 12 UN	76107-016
	5 Plugged	M14 x 1.5	76117-001	M18 x 1.5	76117-007	M20 x 1.5	76117-008
	6 Open	1 5/16" - 12 UN		1 5/8" - 12 UN		1 7/8" - 12 UN	
External Charge Supply "E"	1 Plugged	M18 x 1.5	76116-010	M22 x 1.5	76116-009	M33 x 2	76116-008
	2 Plugged	M18 x 1.5	76116-010	M22 x 1.5	76116-009	M33 x 2	76116-008
	3 Plugged	M18 x 1.5	76116-010	M22 x 1.5	76116-009	M33 x 2	76116-008
	4 Open	3/4" - 16 UN		1 1/16" - 12 UN		1 5/16" - 12 UN	
	5 Open	M14 x 1.5		M18 x 1.5		M20 x 1.5	
	6 Plugged	1 5/16" - 12 UN	76107-016	1 5/8" - 12 UN	76107-020	1 7/8" - 12 UN	76107-024

① Adapts metric "Fe" port to SAE size indicated.



Variable Displacement Pump AA4VG, Series 3

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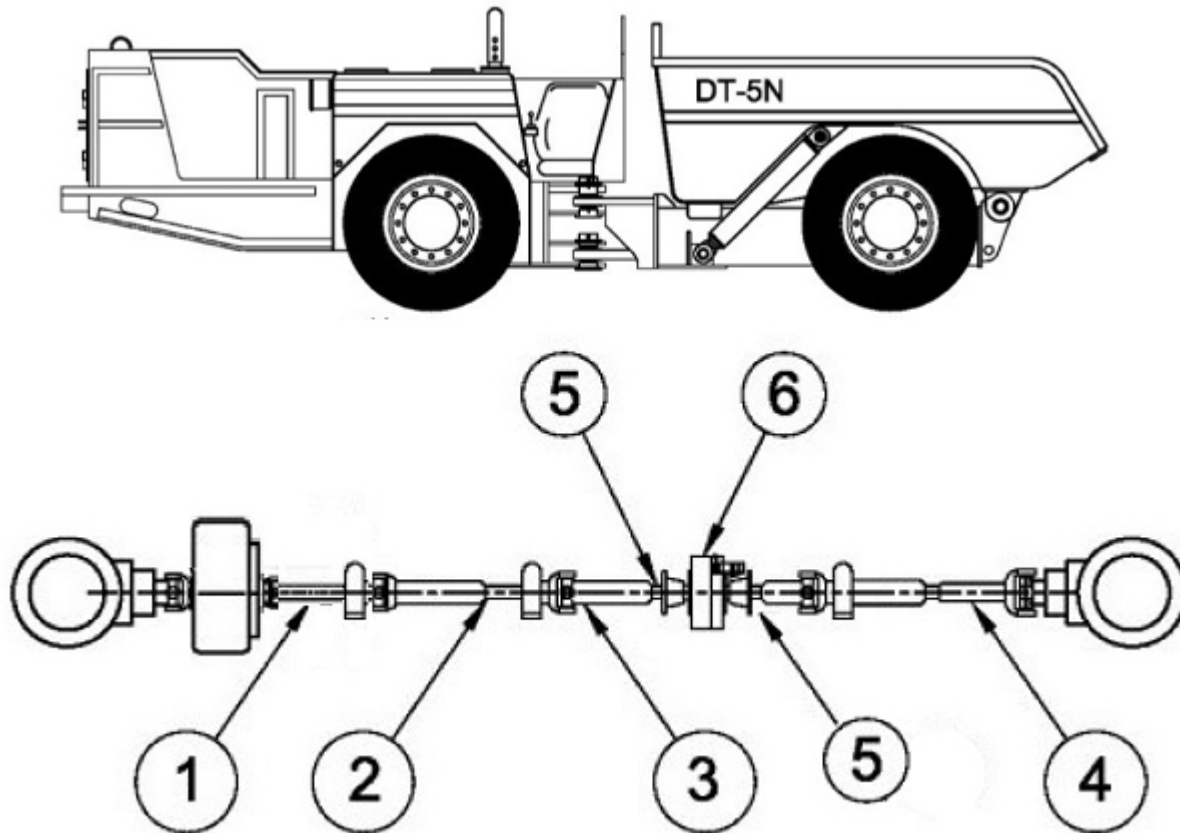
Optional equipment and accessories may add cost to the basic unit, and some options are available only in combination with certain models or other options.

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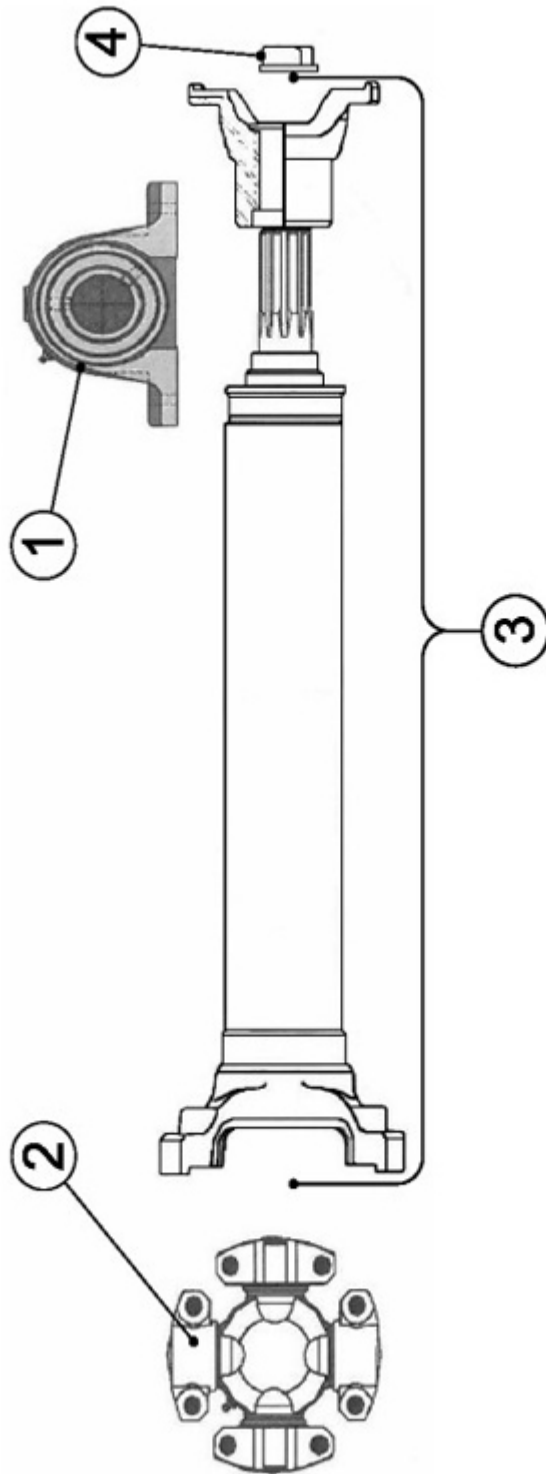
The Rexroth Corporation
Mobile Hydraulics Division, 1700 Old Mansfield Road, Wooster, OH 44691-0394 Tel. (330) 263-3400 Fax. (330) 263-3329
Industrial Hydraulics Division, 2315 City Line Road, Bethlehem, PA 18017-2131 Tel. (610) 694-8300 Fax. (610) 694-8467

7004 DRIVELINE ARRANGEMENT



<u>Item</u>	<u>Part No.</u>	<u>Quantity</u>	<u>Description</u>
1	7000	1	DRIVELINE -TRANSFER CASE TO ARTICULATION
2	7001	1	DRIVELINE - ARTICULATION
3	7002	1	DRIVELINE - ARTICULATION TO WETBRAKE
4	7003	1	DRIVELINE -REAR AXLE
5	7005	2	YOKE - DRIVELINE
6	6955-53	1	DRIVELINE WET DISC BRAKE

7000 DRIVELINE -TRANSFER CASE TO ARTICULATION



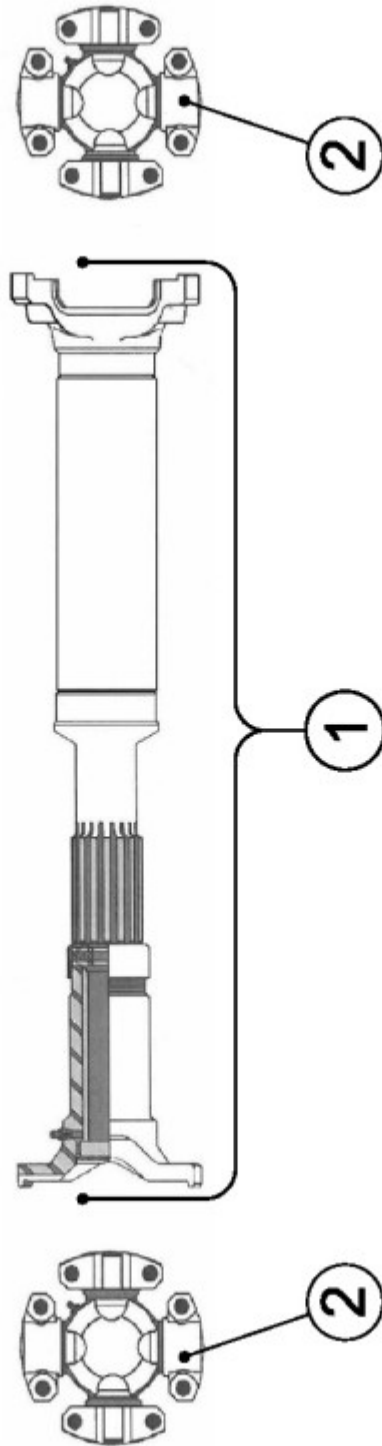
7000

DRIVELINE -TRANSFER CASE TO ARTICULATION

<u>Item</u>	<u>Part No.</u>	<u>Quantity</u>	<u>Description</u>
1	7000-1	1	PILLOW BLOCK
2	7000-2	1	UJOINT
3	7000-3	1	DRIVELINE WITHOUT UJOINTS
4	2096-2-7	1	JAM NUT



7001 DRIVELINE - ARTICULATION



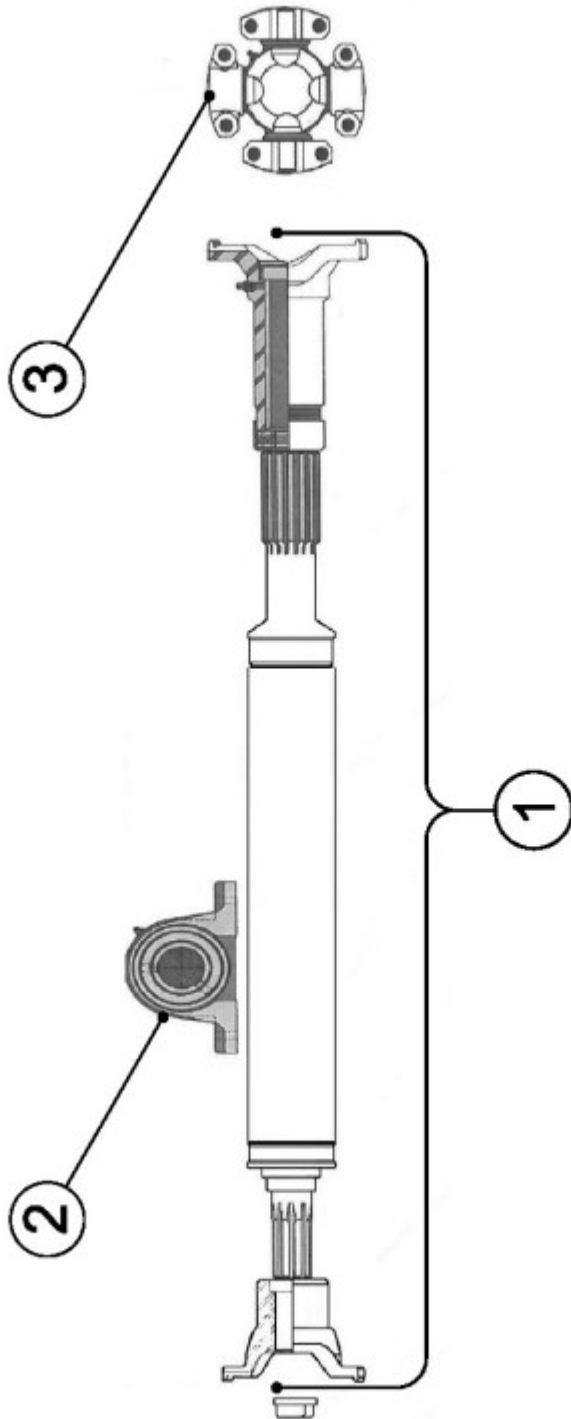
7001 DRIVELINE - ARTICULATION

<u>Item</u>	<u>Part No.</u>	<u>Quantity</u>	<u>Description</u>
1	7001-1	1	DRIVELINE WITHOUT UJOINTS
2	7000-2	2	UJOINT



7002

DRIVELINE - ARTICULATION TO WETBRAKE



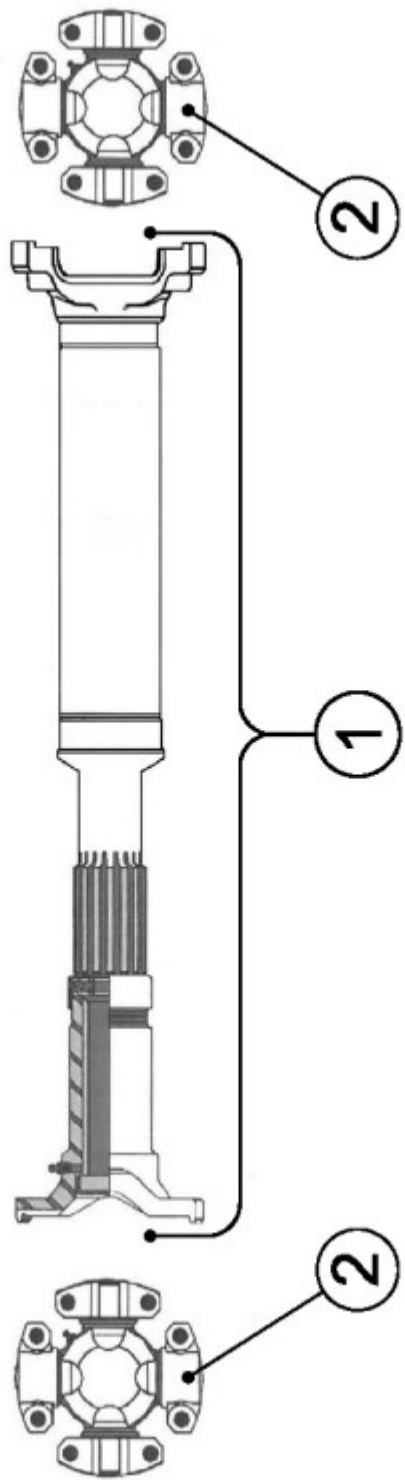
7002

DRIVELINE - ARTICULATION TO WETBRAKE

<u>Item</u>	<u>Part No.</u>	<u>Quantity</u>	<u>Description</u>
1	7002-1	1	DRIVELINE WITHOUT UJOINTS
2	DELETED2016-07-19	1	PILLOW BLOCK
3	7000-2	1	UJOINT



7003
DRIVELINE -REAR AXLE



7003 DRIVELINE -REAR AXLE

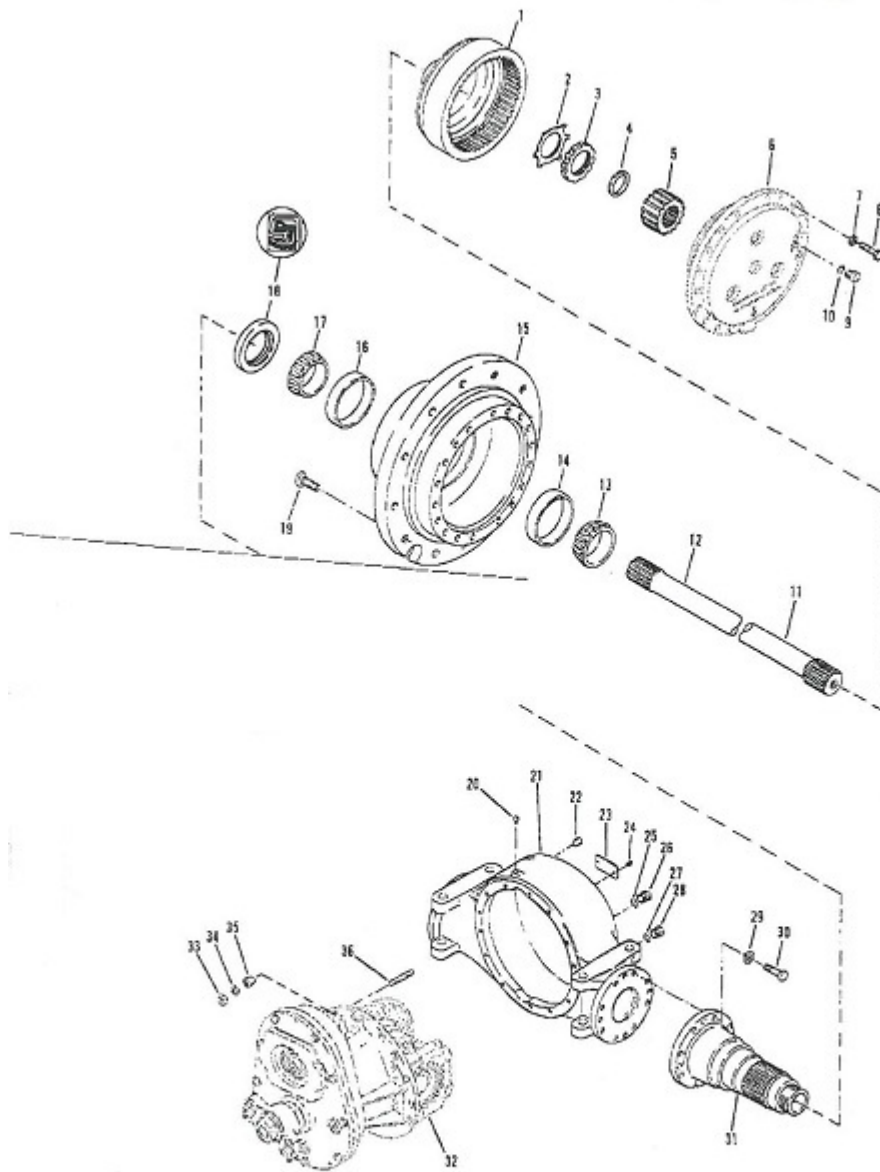
<u>Item</u>	<u>Part No.</u>	<u>Quantity</u>	<u>Description</u>
1	7003-1	1	DRIVELINE WITHOUT UJOINTS
2	7000-2	2	UJOINT



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6979 **AXLE ASSEMBLY-FRONT**



ITEM#15 INCLUDES ITEMS
14,16,19

<u>Item</u>	<u>Part No.</u>	<u>Quantity</u>	<u>Description</u>
1	6977-1	2	INTERNAL GEAR HUB
2	6977-2	2	SPINDLE NUT LOCK ASSEMBLY

6979 AXLE ASSEMBLY-FRONT

<u>Item</u>	<u>Part No.</u>	<u>Quantity</u>	<u>Description</u>
3	6977-3	2	SPINDLE LOCK NUT
4	6976-8	2	THRUST WASHER
5	6976-5	2	SUN GEAR
6	6977-6	2	PLANET CARRIER ASSEMBLY
6		-	(SEE SEPARATE PARTS LIST)
7	2959-36-14	36	WASHER
8	4437-14-8	36	CAP SCREW
9	2958-29-2	2	PLUG (INCLUDES 2958-29-3)
10	2958-29-3	2	O-RING
11	6977-11	1	AXLE SHAFT - 21.00 LENGTH
12	6977-12	1	AXLE SHAFT - 22.59 LENGTH
13	6977-13	2	HUB OUTER CONE
14	6977-14	2	HUB OUTER CUP
15	6977-15	2	HUB & CUP & STUD ASSEMBLY
16	6977-16	2	HUB INNER CUP
17	6977-17	2	HUB INNER CONE
18	6977-18	2	HUB OIL SEAL
19	6976-41	24	WHEEL ATTACHING STUD
20	2166-39	1	VENT BREATHER
21	6976-59	1	AXLE HOUSING
22	2862-2-13	1	PLUG
23	2958-24	1	NAME PLATE
24	2166-41	2	SCREW
25	2958-29-3	1	O-RING
26	2958-29-2	1	PLUG (INCLUDES 2958-29-3)
27	2958-29-3	1	O-RING
28	2958-29-2	1	PLUG (INCLUDES 2958-29-3)
29	2958-32	24	WASHER
30	6976-50	24	CAPSCREW



6979

AXLE ASSEMBLY-FRONT

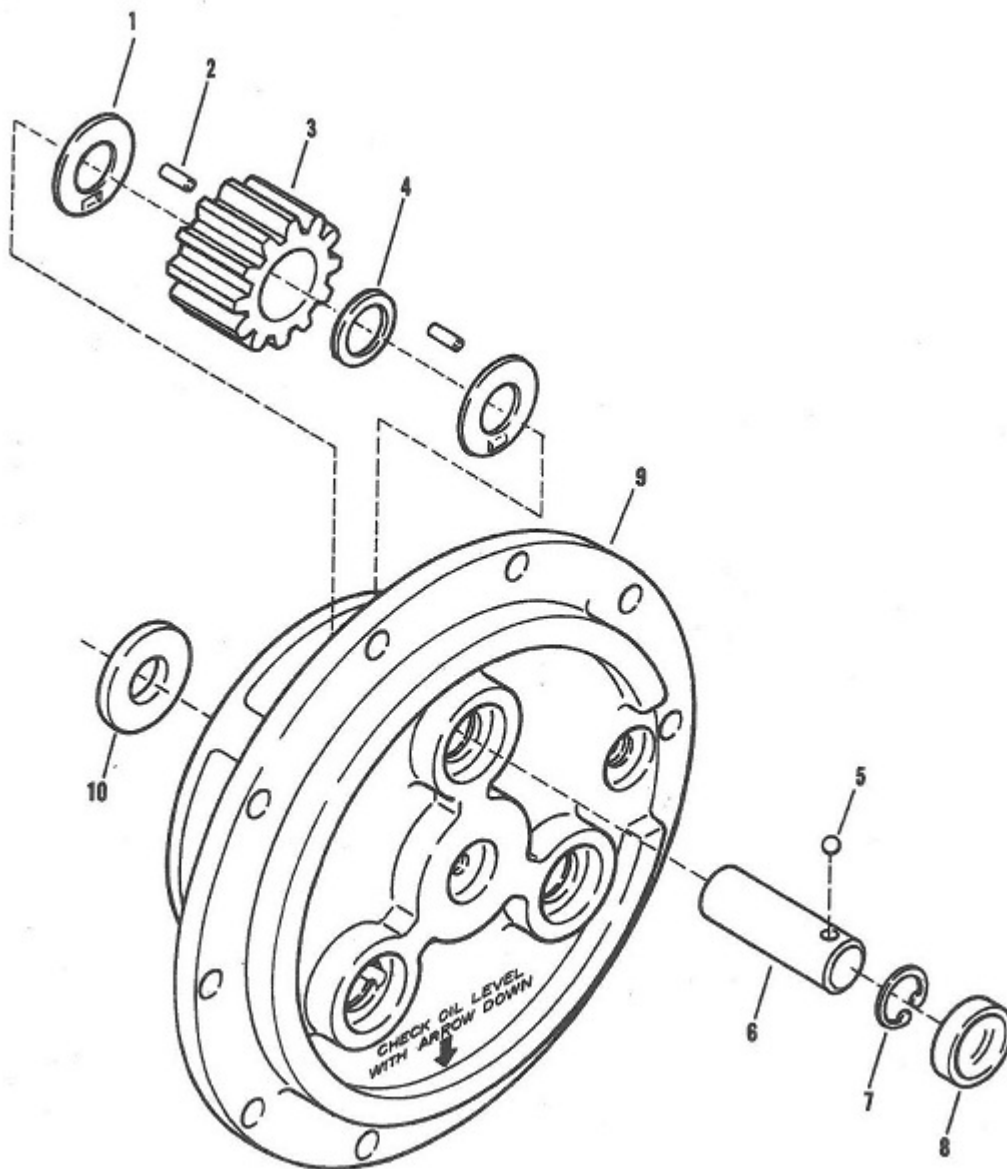
<u>Item</u>	<u>Part No.</u>	<u>Quantity</u>	<u>Description</u>
31	6977-30	2	SPINDLE
32	6976-64	1	DIFFERENTIAL & CARRIER AND DROP BOX
32		-	(SEE SEPARATE PARTS LIST)
33	6976-63	12	DIFFERENTIAL AND CARRIER STUD NUT
34	6976-62	12	DIFFERENTIAL AND CARRIER STUD WASHER
35	6976-61	3	DIFFERENTIAL AND CARRIER STUD DOWEL
36	6976-60	12	DIFFERENTIAL & CARRIER STUD



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6977-6 PLANET CARRIER ASSEMBLY



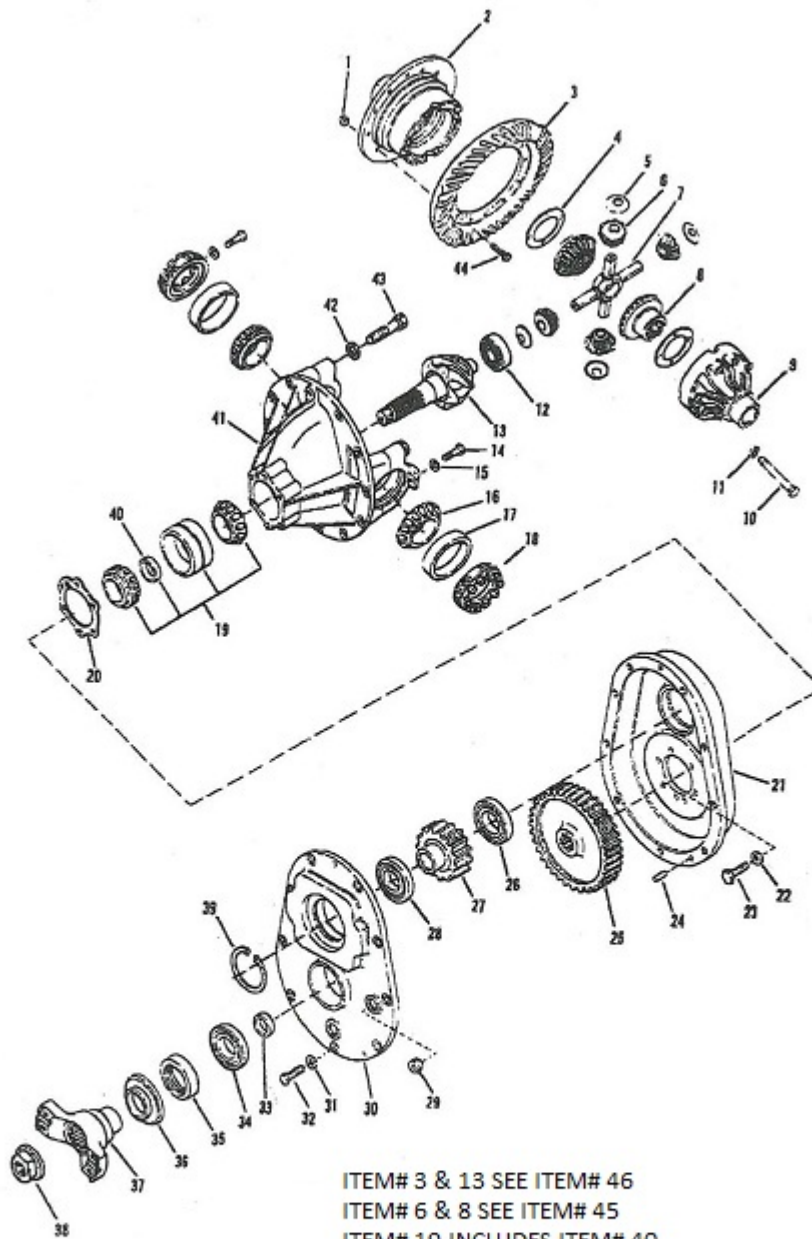
6977-6 PLANET CARRIER ASSEMBLY

<u>Item</u>	<u>Part No.</u>	<u>Quantity</u>	<u>Description</u>
1	6976-4-1	6	THRUST WABSER
2	6976-4-2	144	ROLLER NEEDLE
3	6976-4-3	3	PLANET GEAR
4	6976-4-4	3	PINION NEEDLE ROLLER SPACER
5	2956-27	3	DETENT BALL
6	6977-6-6	3	PLANET SHAFT
7	4097-10-44	3	RETAINER RING
8	6976-4-8	3	PLANET SHAFT HOLE PLUG
9	6977-6-9	1	PLANET CARRIER
10	6976-4-10	1	THRUST WASHER



6976-64

DIFFERENTIAL & CARRIER AND DROP BOX



ITEM# 3 & 13 SEE ITEM# 46
 ITEM# 6 & 8 SEE ITEM# 45
 ITEM# 19 INCLUDES ITEM# 40
 ITEM#21 INCLUDES ITEMS 24,30,31,32
 ITEM#30 SEE ITEM# 21
 ITEM#41 INCLUDES ITEM# 42 & 43

Item	Part No.	Quantity	Description
1	6976-64-1	12	RING GEAR BOLT NUT

6976-64

DIFFERENTIAL & CARRIER AND DROP BOX

<u>Item</u>	<u>Part No.</u>	<u>Quantity</u>	<u>Description</u>
2		1	(NOT SOLD SEPARATELY)
3		1	(NOT SOLD SEPARATELY)
4	6977-32-3	2	SIDE GEAR THRUST WASHER
5	6977-32-4	4	PINION THRUST WASHER
6		1	(NOT SOLD SEPARATELY)
7	6977-32-6	1	DIFFERENTIAL SPIDER
8		1	(NOT SOLD SEPARATELY)
9		1	(NOT SOLD SEPARATELY)
10	6976-64-10	8	CASE CAPSCREW
11	2166-18	8	WASHER
12	6976-64-12	1	PINION BEARING
13		1	(NOT SOLD SEPARATELY)
14	3244-15	2	CAPSCREW
15	6976-62	2	DIFFERENTIAL AND CARRIER STUD WASHER
16	6976-64-16	2	BEARING CONE
17	6976-64-17	2	BEARING CUP
18	6976-64-18	2	ADJUSTING NUT
19	6976-64-19	1	BEARING ASSEMBLY
20	6976-64-20	-	SHIM
20		1	(QUANTITY AS REQUIRED)
20A	6976-64-20A	-	SHIM
20A		-	(QUANTITY AS REQUIRED)
21	6976-64-21	1	DROP GEAR CASE ASSEMBLY
22	2166-18	6	WASHER
23	6976-64-23	6	DROP GEAR CASE CAPSCREW
24	6976-64-24	2	DOWEL
25	6976-64-25	1	DROP GEAR
26	6976-64-26	1	CASE BEARING
27	6976-64-27	1	PINION DROP GEAR



6976-64

DIFFERENTIAL & CARRIER AND DROP BOX

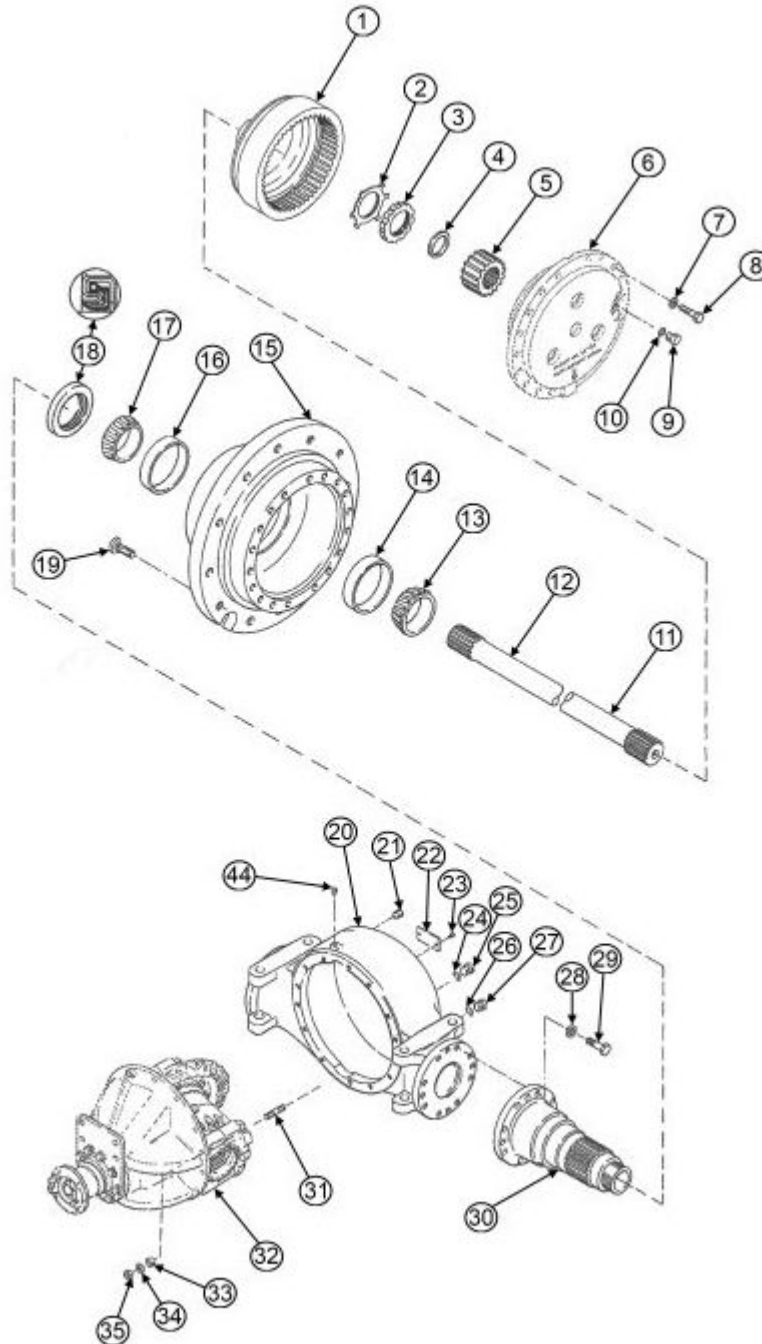
<u>Item</u>	<u>Part No.</u>	<u>Quantity</u>	<u>Description</u>
28	6976-64-26	1	CASE BEARING
29	6976-64-29	2	PLUG
30		1	(NOT SOLD SEPARATELY)
31	2166-18	9	WASHER
32	6976-64-32	9	CAPSCREW
33	6976-64-33	1	PINION BEARING SLEEVE
34	6976-64-26	1	CASE BEARING
35	6976-64-35	1	PINION OIL SEAL
36	6976-64-36	1	PINION DUST SHIELD
37	6976-64-37	1	UNIVERSAL JOINT FLANGE
38	6976-64-38	1	PISTON SHAFT NUT
39	6976-64-39	1	BEARING SNAP RING
40	6976-64-40	1	SPACER
41	6977-32-28	1	DIFFERENTIAL CARRIER & CAP ASSEMBLY
42	2166-56	4	WASHER
43	3641-159-20	4	CAPSCREW
44	6976-64-44	12	RING GEAR BOLT
45	6976-64-45	1	GEAR KIT
46	6976-64-46	1	RING & PINION SET
47		1	(NOT SOLD SEPARATELY)
48		1	(NOT SOLD SEPARATELY)
49	6976-64-49	1	THURST SCREW
49		1	(NOT ILLUSTRATED)
50	6976-64-50	1	NUT
50		1	(NOT ILLUSTRATED)



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6978 AXLE ASSEMBLY- REAR



6978 AXLE ASSEMBLY- REAR

<u>Item</u>	<u>Part No.</u>	<u>Quantity</u>	<u>Description</u>
1	6977-1	2	INTERNAL GEAR HUB
2	6977-2	2	SPINDLE NUT LOCK ASSEMBLY
3	6977-3	2	SPINDLE LOCK NUT
4	6976-8	2	THRUST WASHER
5	6976-5	2	SUN GEAR
6	6977-6	2	PLANET CARRIER ASSEMBLY
6	-	-	(SEE ASSEMBLY IN THIS SECTION)
7	2959-36-14	36	WASHER
8	4437-14-8	36	CAP SCREW
9	2958-29-2	2	PLUG (INCLUDES 2958-29-3)
10	2958-29-3	2	O-RING
11	6977-11	1	AXLE SHAFT - 21.00 LENGTH
12	6977-12	1	AXLE SHAFT - 22.59 LENGTH
13	6977-13	2	HUB OUTER CONE
14	6977-14	2	HUB OUTER CUP
15	6977-15	2	HUB & CUP & STUD ASSEMBLY
16	6977-16	2	HUB INNER CUP
17	6977-17	2	HUB INNER CONE
18	6977-18	2	HUB OIL SEAL
19	6976-41	24	WHEEL ATTACHING STUD
20	6976-59	1	AXLE HOUSING
21	2862-2-13	1	PLUG
22	2958-24	1	NAME PLATE
23	2166-41	2	SCREW
24	2958-29-3	1	O-RING
25	2958-29-2	1	PLUG (INCLUDES 2958-29-3)
26	2958-29-3	1	O-RING
27	2958-29-2	1	PLUG (INCLUDES 2958-29-3)
28	2958-32	24	WASHER



6978 AXLE ASSEMBLY- REAR

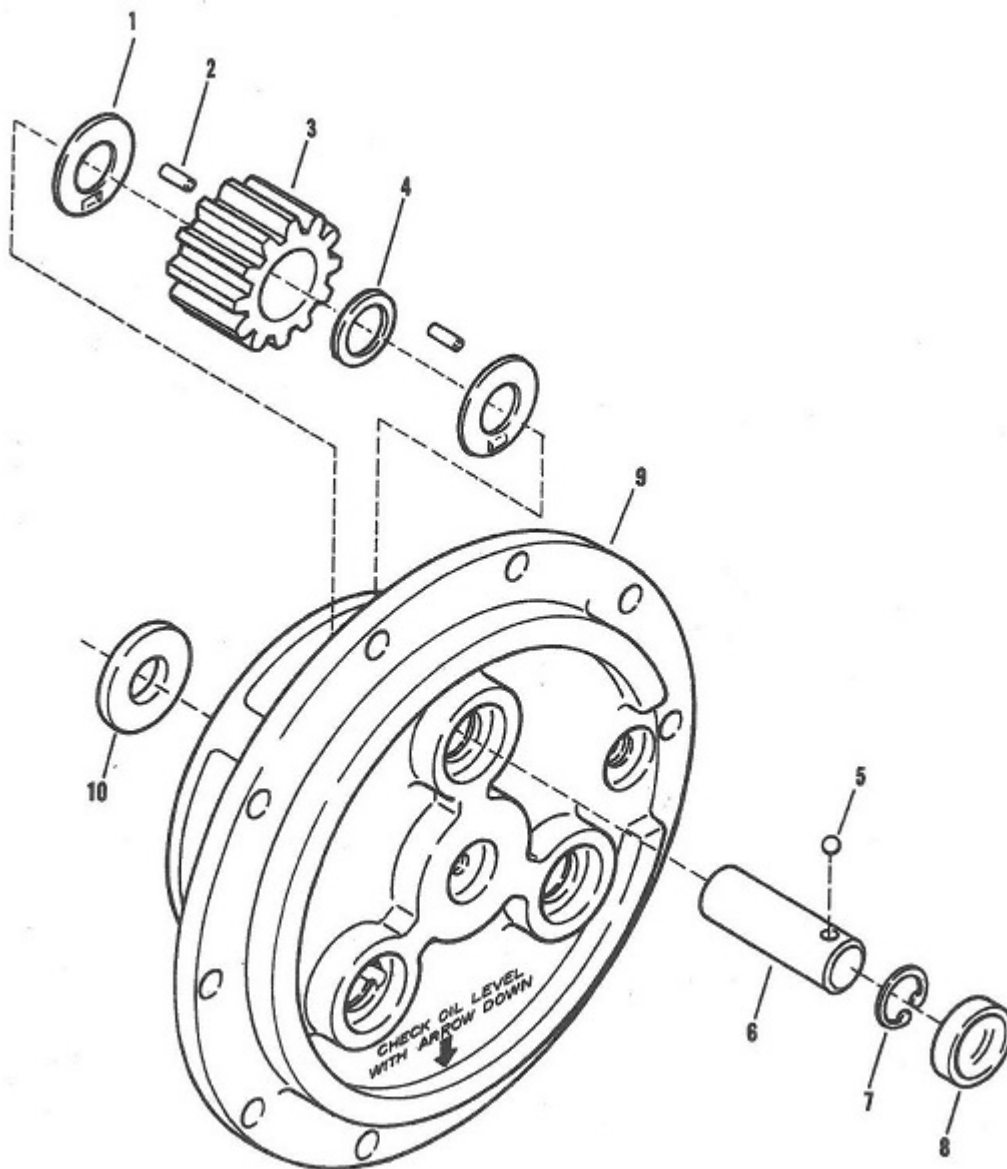
<u>Item</u>	<u>Part No.</u>	<u>Quantity</u>	<u>Description</u>
29	6976-50	24	CAPSCREW
30	6977-30	2	SPINDLE
31	6976-60	12	DIFFERENTIAL & CARRIER STUD
32	6977-32	1	DIFFERENTIAL & CARRIER ASSEMBLY
32		-	(SEE ASSEMBLY IN THIS SECTION)
33	6976-61	3	DIFFERENTIAL AND CARRIER STUD DOWEL
34	6976-62	12	DIFFERENTIAL AND CARRIER STUD WASHER
35	6976-63	12	DIFFERENTIAL AND CARRIER STUD NUT
44	2166-39	1	VENT BREATHER



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6977-6 PLANET CARRIER ASSEMBLY



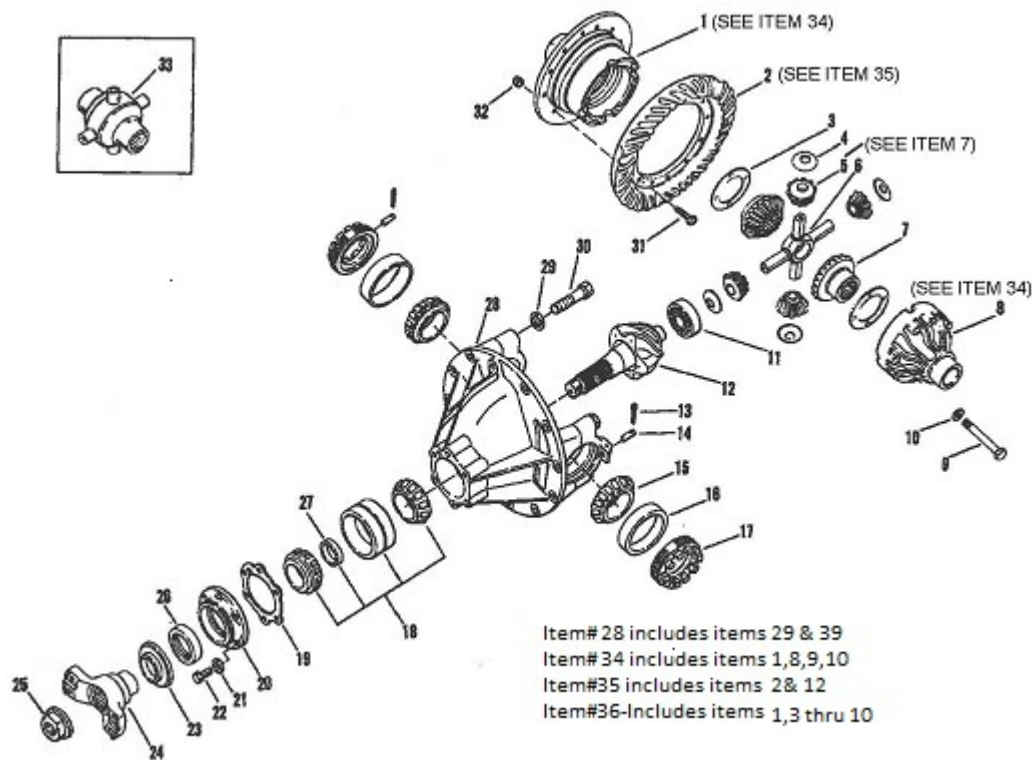
6977-6 PLANET CARRIER ASSEMBLY

<u>Item</u>	<u>Part No.</u>	<u>Quantity</u>	<u>Description</u>
1	6976-4-1	6	THRUST WABSER
2	6976-4-2	144	ROLLER NEEDLE
3	6976-4-3	3	PLANET GEAR
4	6976-4-4	3	PINION NEEDLE ROLLER SPACER
5	2956-27	3	DETENT BALL
6	6977-6-6	3	PLANET SHAFT
7	4097-10-44	3	RETAINER RING
8	6976-4-8	3	PLANET SHAFT HOLE PLUG
9	6977-6-9	1	PLANET CARRIER
10	6976-4-10	1	THRUST WASHER



6977-32

DIFFERENTIAL & CARRIER ASSEMBLY



Item	Part No.	Quantity	Description
1		1	(NOT SOLD SEPARATELY)
2		1	(NOT SOLD SEPARATELY)
3	6977-32-3	2	SIDE GEAR THRUST WASHER
4	6977-32-4	4	PINION THRUST WASHER
5		4	(NOT SOLD SEPARATELY)
6	6977-32-6	1	DIFFERENTIAL SPIDER
7	6977-32-7	1	DIFFERENTIAL SIDE GEAR & PINION GEAR KIT
8		1	(NOT SOLD SEPARATELY)
9	6976-64-10	8	CASE CAPSCREW
10	2166-18	8	WASHER
11	6976-64-12	1	PINION BEARING
12		1	(NOT SOLD SEPARATELY)
13	3244-15	2	SCREW

6977-32

DIFFERENTIAL & CARRIER ASSEMBLY

<u>Item</u>	<u>Part No.</u>	<u>Quantity</u>	<u>Description</u>
14	6976-62	2	DIFFERENTIAL AND CARRIER STUD WASHER
15	6976-64-16	2	BEARING CONE
16	6976-64-17	2	BEARING CUP
17	6976-64-18	2	ADJUSTING NUT
18	6976-64-19	1	BEARING ASSEMBLY
19	6976-64-20	-	SHIM
19		-	(QUANTITY AS REQUIRED)
19A	6976-64-20A	-	SHIM
19A		-	(QUANTITY AS REQUIRED)
20	6977-32-20	1	PINION OIL SEAL RETAINER
21	2166-18	6	WASHER
22	6977-32-22	6	RETAINER & BRAKE ATTACHING CAPSCREW
22A	6977-32-22A	1	BRAKE BRACKET
23	6977-32-23	1	PISTON DUST SHIELD
24	6977-32-24	1	UNIVERSAL JOINT FLANGE
25	6976-64-38	1	PISTON SHAFT NUT
26	6977-32-26	1	OIL SEAL
27	6976-64-40	1	SPACER
28	6977-32-28	1	DIFFERENTIAL CARRIER & CAP ASSEMBLY
29	2166-56	4	WASHER
30	3641-159-20	4	CAPSCREW
31	6976-64-44	12	RING GEAR BOLT
32	6976-64-1	12	RING GEAR BOLT NUT
33		1	NOT USED ON THIS MODEL
34	6979-32-48	1	HALF CASE ASSEMBLY
35	6977-32-35	1	RING & PINION SET
36	6977-32-36	1	DIFFERENTIAL BODY ASSEMBLY
37	6976-64-49	1	THURST SCREW
37		1	(NOT ILLUSTRATED)



6977-32

DIFFERENTIAL & CARRIER ASSEMBLY

<u>Item</u>	<u>Part No.</u>	<u>Quantity</u>	<u>Description</u>
38	6976-64-50	1	NUT
38		1	(NOT ILLUSTRATED)





SPICER®

Off-Highway Products

Service Manual

Planetary Drive Axle
12D0840
(formerly DRD-13550)

ASM-0133
May 1986

FOREWARD

This manual has been prepared to provide the customer and the maintenance personnel with information and instructions on maintenance and repair of the DRD13550 Series Drive Axle Assembly.

Extreme care has been exercised in the design, selection of materials and manufacturing of these units. The slight outlay in personal attention and cost required to provide regular and proper lubrication, inspections at stated intervals, and such adjustments as may be indicated will be reimbursed many times in low cost operation and trouble-free service.

In order to become familiar with the various parts of the axle, its overhaul and adjustments, it is urged that the mechanic study the instructions in this manual carefully and use it as a reference when performing maintenance and repair operations.

To assure the best results and to maintain the original quality built into the axle, it is important that only Clark-approved parts be used when new parts are required. **IMPORTANT:** Always furnish the Distributor with the axle differential serial number when ordering parts.

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NOTE: Metric Dimensions Shown in Brackets [].

CLARK

DESCRIPTION

The axle assembly has a spiral bevel type ring gear and pinion with further reduction provided by planetary gear set within the wheel hub.

PRIMARY REDUCTION

The spiral bevel pinion and ring gear transmit power through the center differential pinions, side gears and to the axle shaft. The spiral bevel differential assembly is mounted on tapered roller bearings which are adjusted by positioning of the two threaded adjusting nuts mounted in the differential carrier and cap assembly. The tapered roller pinion bearing pre-load is adjusted and maintained by a hardened and precision ground spacer positioned between inner and outer bearings. Spacer is selected at assembly.

SECONDARY REDUCTION

In the wheel hub, a self-centering sun gear is spline fitted to the axle shaft and drives three planetary pinion gears. These gears in turn mesh with and react against a rigidly mounted internal ring gear. The planet gears rotate on needle roller bearings mounted on hardened

and ground pins located in the planet carrier which in turn drives the wheel hub. Positive lubrication keeps all moving parts bathed in lubricant to reduce friction, heat and wear.

DESIGN

With full knowledge of the stresses encountered in off-highway usage, planetary-drive axles are designed structurally to give long life. Clark planetary axles offer a selection of more than fifty standard models for on-off highway equipment, with track and ratio availability to match most vehicle configurations. Planetary gearing provides high numerical gear ratios for maximum performance.

With final reduction made at the wheel ends, the three planetary gears take over and distribute torque smoothly and evenly. This secondary reduction at the wheel, as compared with conventional axles, reduces torque loading on the axle shafts as much as 80%. As a result, there is little axle shaft wind-up, less chance for chattering and digging in. In short, less maintenance — more equipment availability.

Recommended Lubricants for Clark Drive Axles

Initial Fill

Grade 85W140 qualified MIL-L-2105C gear lubricant as specified in Clark MS-8 engineering standard is preferred for initial fill for most ambient temperatures. (See chart on page 4) For other ambient temperature ranges use proper viscosities of MIL-L-2105C.

Other lubricants approved to MIL-L-2105C specifications are acceptable for initial fill or top off.

Service Fill

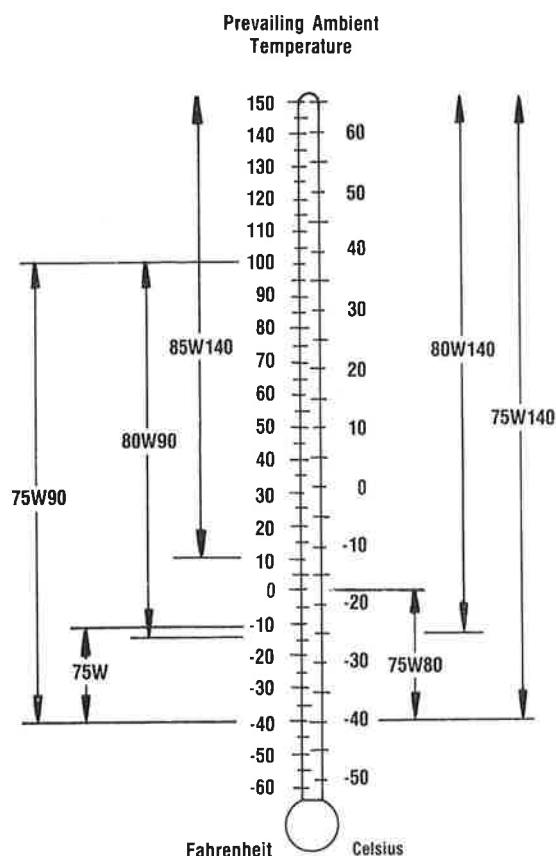
Multipurpose gear lubricants approved to the MIL-L-2105C specifications are recommended. MIL-L-2105C classifies multigrade gear lubricants on the basis of their viscosities at various temperatures.

Listed on page 4 are the recommended multigrade viscosities for use at the prevailing operating temperatures in Clark Drive Axles.

MS-8 Extreme Pressure Gear Lubricant

MS-8 specifications covers a gear lubricant for use in heavy-duty axles. It is a highly refined base stock properly compounded with selected extreme pressure additives. MS-8 meets MIL-L-2105C but is fortified with an additive package that provides added protection during the break-in period and reduced wear and improved efficiency during subsequent operation.

**ALWAYS FILL WHEEL ENDS AND AXLE CENTERS TO
THE BOTTOM OF THE OIL LEVEL PLUG HOLE.**



For proper viscosity lube, refer to fahrenheit or celsius chart below.

Gear Lubricant Chart

Ambient Temperature Ranges			Multigrade Viscosities MIL-L-2105C
-40°F	to	-10°F (-40°C to -23°C)	See (a) note below.
-40°F	to	0°F (-40°C to -18°C)	75W See (b) note below.
-40°F	to	+100°F (-40°C to -38°C)	75W80
-40°F	+	Above (-40°C + Above)	75W90
-15°F	to	100°F (-26°C to 38°C)	75W140
-15°F	+	Above (-26°C + Above)	80W90
+10°F	+	Above (-12°C + Above)	80W140
			85W140

Notes:

- (a) The MIL-L-2105C Specification replaced the MIL-L-2105B Specification.
- (b) The MIL-L-2105C 75W Classification replaced the MIL-L-10324A Subartic Specification.

Note: Specifications are subject to change.

Checking Oil Level in Drive Axles

For off-highway operation, check lubricant level after each 250 hours of operation. Always maintain lubricant level to bottom of filler plug hole. Drain oil every 2500 hours, or one year whichever comes first.

For highway operation, lubricant should be checked each 5000 miles [8000 km]. Maintain lubricant level to bottom of filler plug hole. Drain oil every 25,000 miles [40,000 km] or one year whichever comes first.

To check oil level in axles with differential drive and planetary wheel ends, the axle should be run first, then allowed to stand for a minimum of five minutes on level ground. This procedure will allow oil to drain back to its normal level. After the five minute interval, remove oil filler plug in axle center and in the planetary wheel ends for oil level inspection. If oil level is not to the bottom of the filler hole, add necessary lubricant.

Checking and Filling Planetary Wheel Ends

Always check lubricant level in planetary wheel ends with wheel hub oil level plug and/or arrow in a down position. Remove oil level plug. If lubricant is below oil level hole, remove filler plug and fill to oil level hole. Reinstall plugs.

Filling Drive Axles

Axles with single or double reduction at center: Fill axle housing through filler hole until lubricant is at bottom of filler hole.

Axles with planetary wheel ends. Follow procedure in "checking and filling planetary wheel ends."

Draining

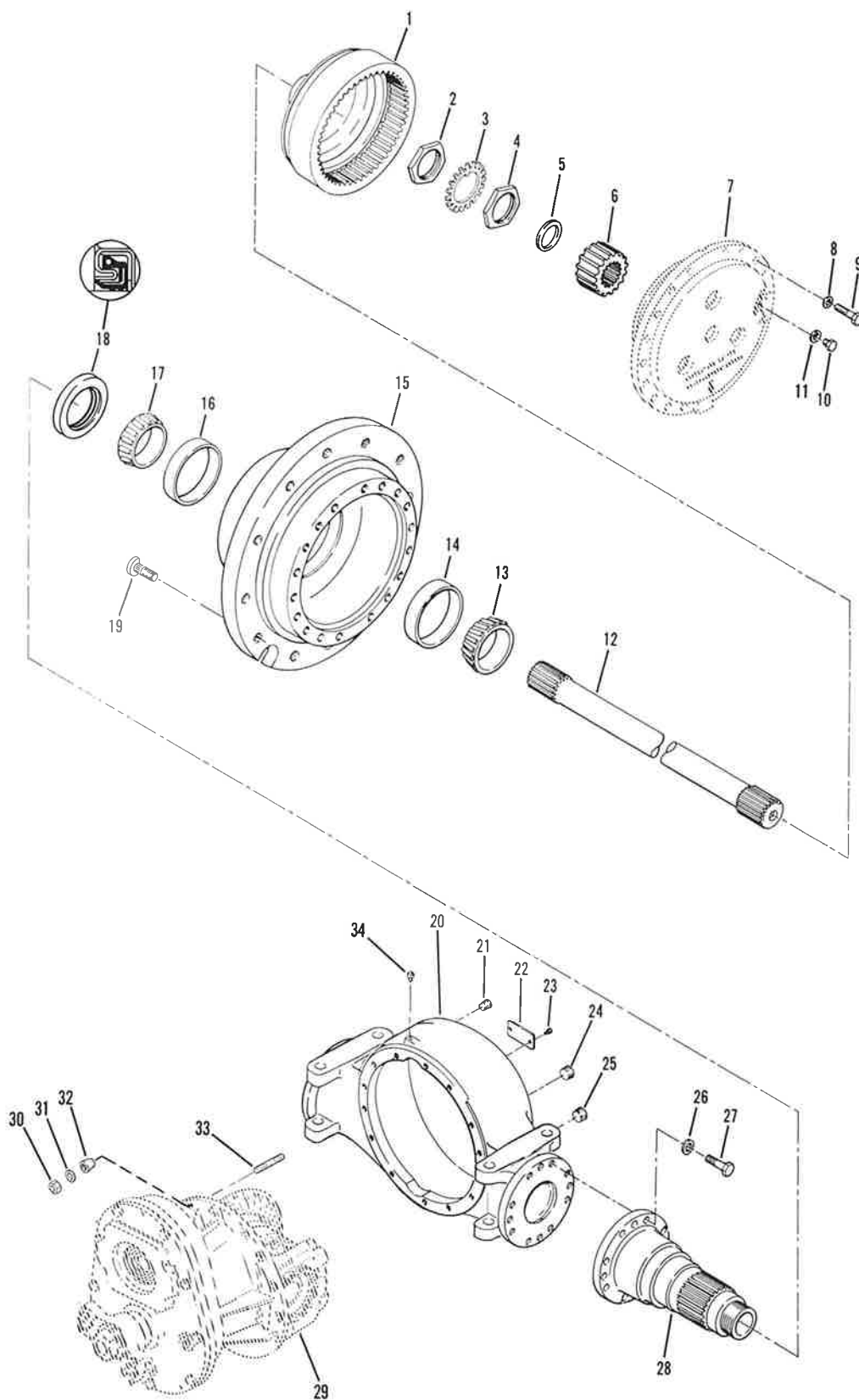
Draining is best accomplished immediately after vehicle has operated a short time or completed a trip. The lubricant is then warm and will flow freely, allowing full drainage in minimum time. This is particularly desirable in cold weather.

Remove plug at bottom of axle housing and allow sufficient time for lubricant to drain. With planetary wheel ends, rotate wheel until filler hole is down. Remove plug and allow sufficient time for draining. Be sure planet cover oil level hole is in proper position when refilling wheel ends.

Flushing

After draining, axles should be flushed. Replace drain plugs and fill axles to proper level with a light flushing oil. Operate the axles for a short period of time, then drain. Be sure to drain all of the flushing oil before refilling with new oil. Inspect the magnetic drain plug for metal particles or other foreign matter indicative of wear or possible failure. When refilling, cleanliness is extremely important.

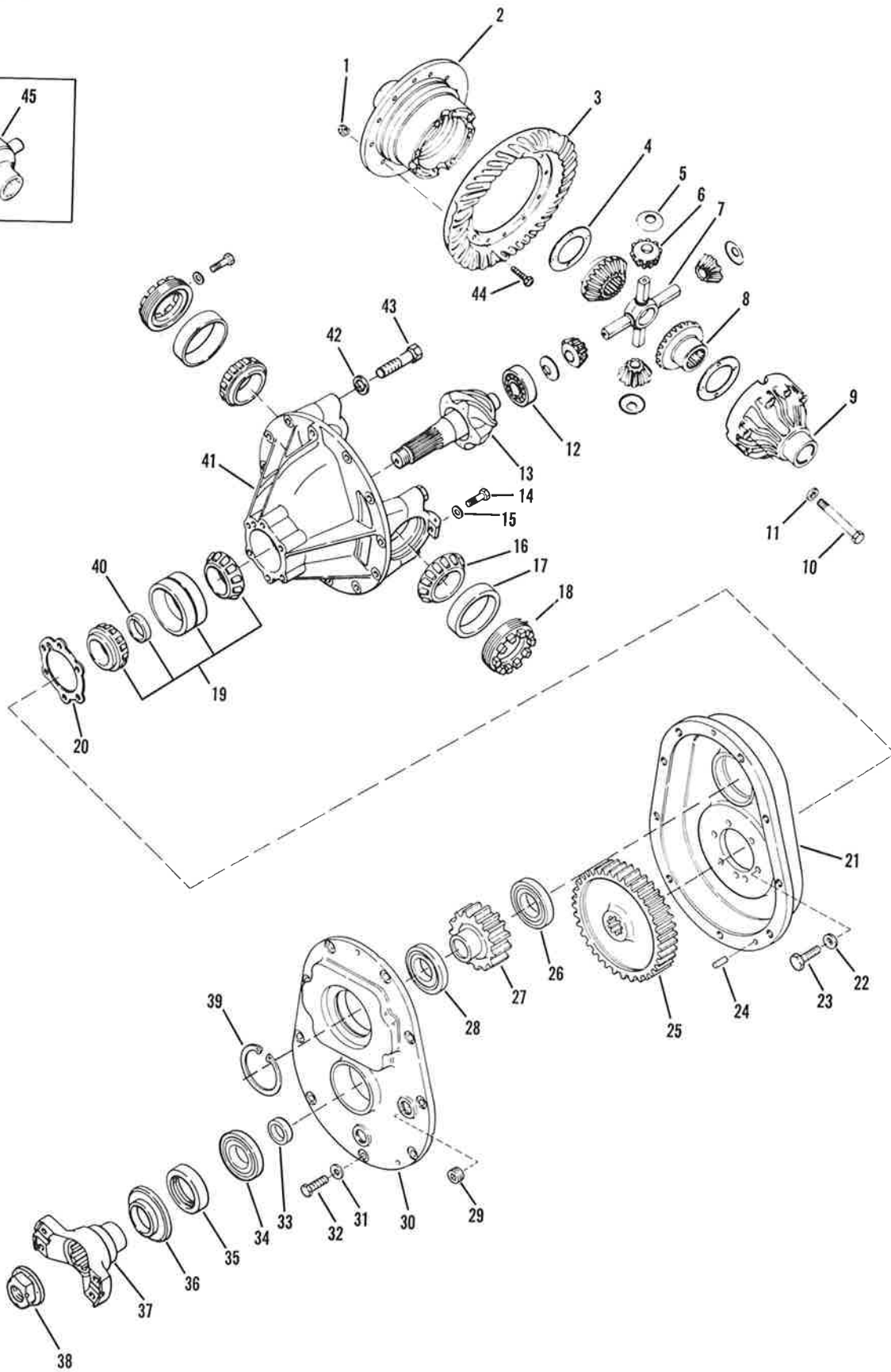
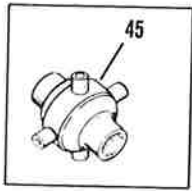
CLARK



AXLE ASSEMBLY

ITEM	DESCRIPTION	QTY.	ITEM	DESCRIPTION	QTY.
1	Internal Gear Hub.....	2	18	Hub Oil Seal.....	2
2	Spindle Nut.....	2	19	Wheel Bolt.....	24
3	Spindle Nut Lock.....	2	20	Axle Housing.....	1
4	Spindle Nut.....	2	21	Housing Plug.....	1
5	Sun Gear Thrust Washer.....	2	22	Name Plate.....	1
6	Sun Gear.....	2	23	Name Plate Screw.....	2
7	Planet Carrier Assembly.....	2	24	Housing Filler Plug.....	1
8	Washer.....	36	25	Housing Drain Plug.....	1
9	Planet Carrier Capscrew.....	36	26	Spindle Attaching Capscrew Washer...	24
10	Planet Filler & Drain Plug.....	2	27	Spindle Attaching Capscrew.....	24
11	Plug "O" Ring-Part of Item 10.....	2	28	Spindle.....	2
12	Axle Shaft.....	1	29	Differential & Carrier Assembly.....	1
13	Hub Outer Cone.....	2	30	Differential & Carrier Stud Nut.....	12
14	Hub Outer Cup.....	2	31	Differential & Carrier Stud Washer....	12
15	Wheel Hub.....	2	32	Differential & Carrier Stud Dowel.....	3
16	Hub Inner Cup.....	2	33	Differential & Carrier Stud.....	12
17	Hub Inner Cone.....	2	34	Breather.....	1

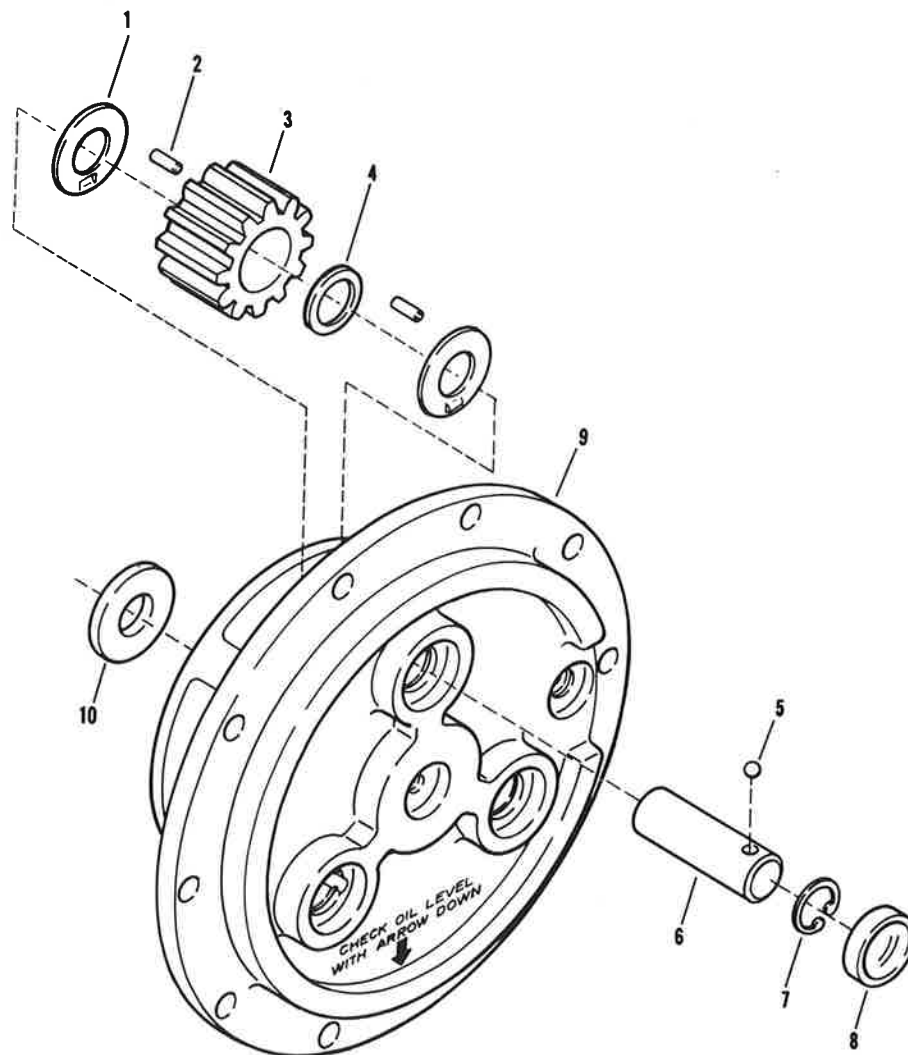
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DIFFERENTIAL AND CARRIER ASSEMBLY

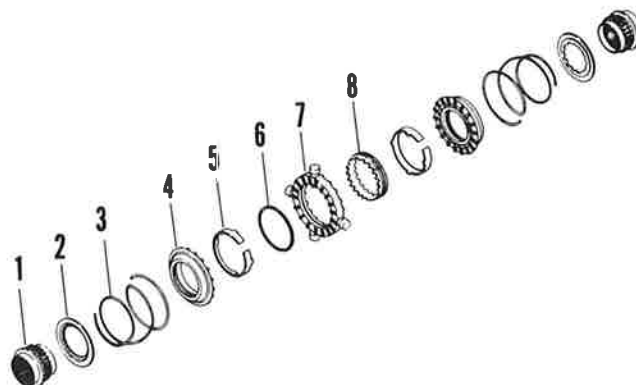
ITEM	DESCRIPTION	QTY.	ITEM	DESCRIPTION	QTY.
1	Ring Gear Bolt	12	23	Drop Gear Housing Capscrew	6
2	Flanged Half Case	1	24	Dowel	2
3	Ring Gear	1	25	Drop Gear	1
4	Side Gear Thrust Washer	2	26	Drop Gear Inner Bearing	1
5	Pinion Gear Thrust Washer.....	4	27	Pinion Drop Gear	1
6	Pinion Gear.....	4	28	Drop Gear Outer Bearing.....	1
7	Differential Spider	1	29	Drain Plug.....	2
8	Side Gear	2	30	Housing.....	1
9	Plain Half Case.....	1	31	Housing Cover Capscrew Washer.....	9
10	Case Capscrew.....	8	32	Housing Cover Capscrew.....	9
11	Case Capscrew Washer.....	8	33	Pinion Bearing Sleeve	1
12	Inner Pinion Bearing	1	34	Pinion Shaft Outer Bearing	1
13	Spiral Bevel Drive Pinion.....	1	35	Pinion Oil Seal	1
14	Adjusting Nut Lock Capscrew.....	2	36	Flange Dust Shield.....	1
15	Adjusting Nut Lock Capscrew Washer...	2	37	Universal Joint Flange.....	1
16	Differential Bearing Cone.....	2	38	Pinion Shaft Nut.....	1
17	Differential Bearing Cup.....	2	39	Bearing Snap Ring.....	1
18	Differential Adjusting Nut	2	40	Pinion Bearing Cone Spacer.....	1
19	Bearing Assembly.....	1	41	Differential Carrier & Cap Assy.	1
20	Pinion Bearing Retainer Shim.....	AR	42	Carrier Cap Lockwasher.....	4
21	Drop Gear Housing	1	43	Carrier Cap Capscrew.....	4
22	Drop Gear Housing Capscrew Washer	6	44	Ring Gear Bolt	12
AR - As Required			45	Optional No Spin Assembly	1

CLARK



PLANET CARRIER ASSEMBLY

ITEM	DESCRIPTION	QTY.	ITEM	DESCRIPTION	QTY.
1	Planet Thrust Washer	6	6	Planet Shaft	3
2	Planet Needle Roller	144	7	Planet Shaft Retaining Snap Ring	3
3	Planet Gear	3	8	Planet Shaft Hole Plug	3
4	Needle Roller Spacer	3	9	Planet Carrier	1
5	Planet Shaft Ball	3	10	Axle Shaft Thrust Washer	1



NO-SPIN ASSEMBLY

ITEM	DESCRIPTION	QTY.	ITEM	DESCRIPTION	QTY.
1	Side Gear	2	5	Holdout Ring	2
2	Spring Retainer	2	6	Snap Ring	1
3	Spring	2	7	Spider Assembly	1
4	Holdout Ring and Clutch Assembly	2	8	Center Cam	1

noSPIN®

automatic positive locking
traction differential

NoSPIN differentials are ideal for vehicles that operate off-road, in bad weather, or under other adverse traction conditions.

PRIME FUNCTIONS

- Assures "maximum traction" at all times.
- Automatically permits wheel speed differentiation when vehicle turns or operates on uneven surfaces.

OPERATION

When a vehicle equipped with a NoSPIN differential is operated in forward or reverse over a smooth surface, the NoSPIN remains locked. Both wheels thus turn at the same speed. If one wheel loses traction or leaves the ground, the opposite wheel, which still has traction, continues to drive the vehicle until traction is regained by both wheels. There can be no one-wheel spinout when using NoSPIN differentials. (Fig. 1)

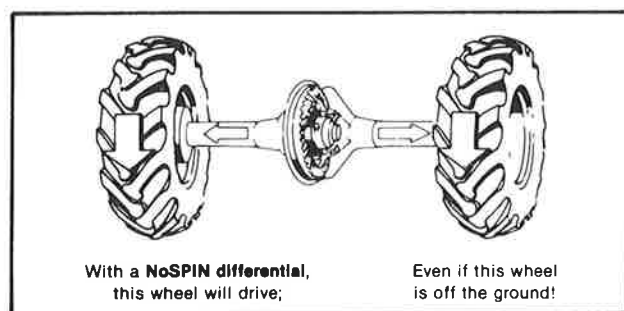


Fig. 1

When the vehicle turns a corner, or when one wheel passes over an obstruction, the outside wheel, or the wheel passing over the obstruction, must travel a greater distance and therefore faster than the other wheel. When this occurs, the NoSPIN differential automatically allows for the necessary difference in wheel speed. (Fig. 2)

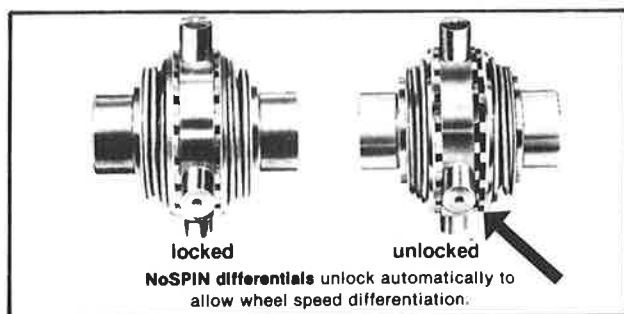


Fig. 2

A comprehensive NoSPIN differential operation and maintenance manual is available at a nominal charge. Contact service publications for information as to how to order.

MAINTENANCE

Lubrication

The NoSPIN differential is designed to operate in those lubricants recommended by the vehicle/axle manufacturer. No special lubricant is needed. For certain cold weather applications, use the lightest oil the axle manufacturer will allow.

Routine Inspection

Follow the recommended lubrication, preventative maintenance and inspection procedures of the vehicle/axle manufacturer as part of NoSPIN differential preventative maintenance. Maintenance, inspection and lubrication requirements of NoSPIN differential equipped vehicles are the same as for vehicles with conventional differentials.

Adjustments

No adjustments or alterations should be made to the NoSPIN differential.

VEHICLE PERFORMANCE

The performance of a vehicle equipped with a NoSPIN differential will differ from that of a vehicle equipped with a conventional differential. For example:

When turning a corner, the sound of gear disengagement and reengagement may be audible, and the transfer of driving torque from both wheels to one wheel may be noticeable.

When going from drive (acceleration) to coast (deceleration) in a turn, a "metallic" sound may be heard as torque flow is reversed (inside wheel engaged during acceleration; outside wheel engaged during deceleration).

These characteristics are normal because of backlash designed into the NoSPIN differential.

When negotiating a turn under conditions of poor traction, the inside wheel may receive excessive torque which will cause it to break traction. This will cause the inside wheel to slip until the turn is completed or until the inside wheel catches up with the outside wheel.

CAUTION

Operator

Turn the engine off and raise all driving wheels of a NoSPIN differential equipped axle when changing tires to prevent the vehicle from moving. Axles equipped with NoSPIN differentials deliver power to both wheels—even when only one wheel is on the ground.

Do not operate the vehicle if both wheels of a NoSPIN differential equipped axle are not driving. Power to only one wheel can cause serious steering problems.

Distribute the load evenly side-to-side; do not exceed the vehicle's rated payload capacity; keep the diameter of the tires equal. Failure to observe these measures can create a difference in individual wheel speeds which can cause the NoSPIN differential to deliver power to only one side of the vehicle and thus cause steering problems.

Operate in low gear when coasting downhill into a turn. Braking capacity is reduced when a NoSPIN differential equipped vehicle makes a turn while coasting downhill.

Mechanic

NoSPIN differentials have compressed springs. Use a retaining bolt or some other restraining means when separating the differential case halves.

DRD-13550 ASSEMBLY INSTRUCTIONS

△1 These surfaces must be dry and free from sealing compounds, rust, nicks and burrs.

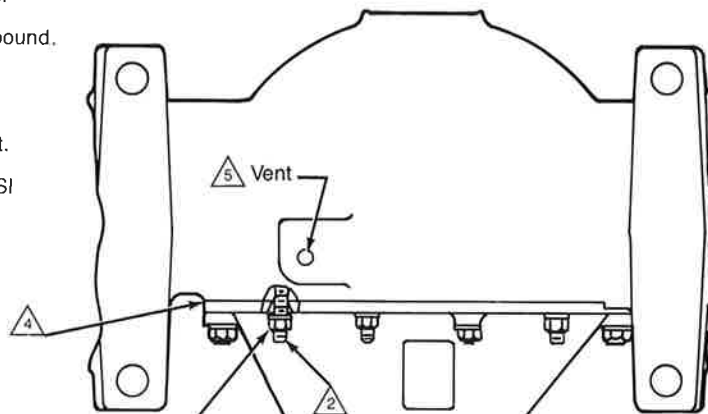
△2 Apply Loctite #262 Thread Locking Compound.

△3 Apply Loctite pipe sealant with Teflon, item No. 59241.

△4 Apply Dow Corning RTV-Q3-7069 Sealant.

△5 Axle assembly to be air checked at 12 PSI [83 KPA] for 15 seconds with no drop in air pressure.

△6 Apply coating of E.P. Multi-Purpose Grease Grade #2 to inside dia. of oil seals and to spindle seal journal dia. prior to assembly.

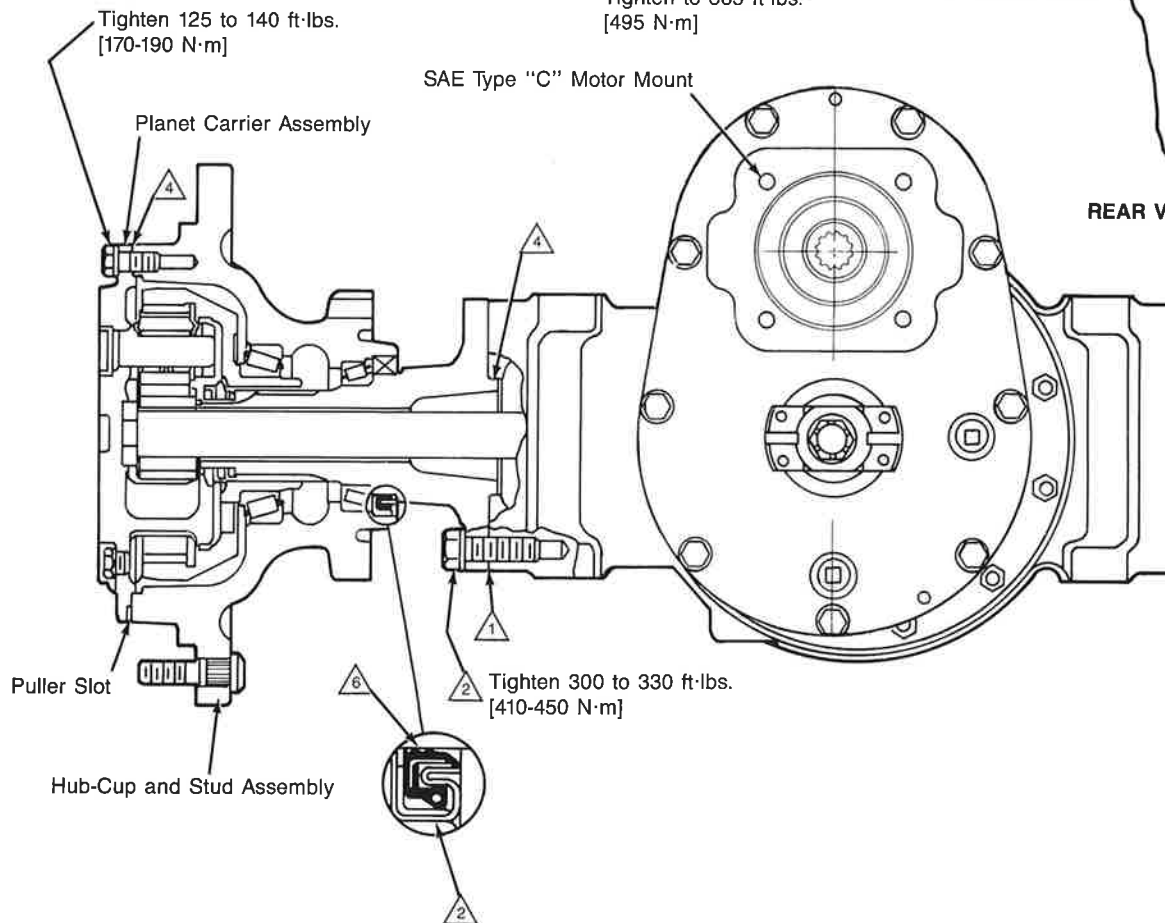


△2 Tighten 60 to 65 ft-lbs.
[82-88 N·m]

Tighten to 365 ft-lbs.
[495 N·m]

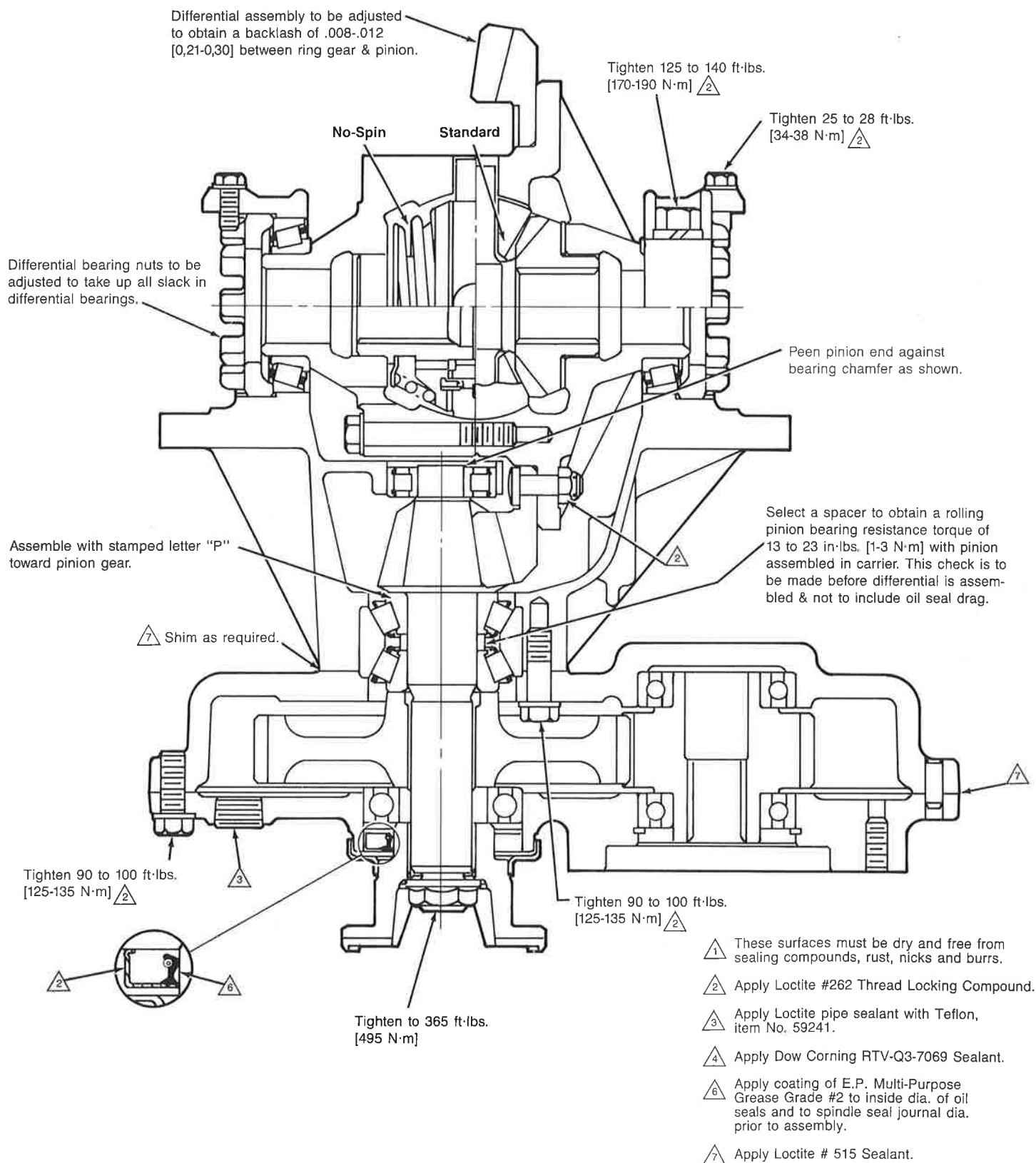
Serial Number Here

REAR VIEW OF HOUSING BOWL



△2 Tighten 300 to 330 ft-lbs.
[410-450 N·m]

1231 SERIES DIFFERENTIAL & CARRIER ASSEMBLY



[illegible]

OVERHAUL OF AXLE ASSEMBLY

The instructions contained herein cover the disassembly and reassembly of the axle assembly in a sequence that would normally be followed after the unit has been removed from the machine and is to be completely overhauled. Mount axle on steel horses or on V-blocks. Allow axle housing mounting pads to rest on crossbars of horses to provide necessary rigidity.

NOTE: Drain axle wheel ends and center section thoroughly before disassembly.

The photos shown in this text were taken of two different model axles. Although some of the photos may not be exactly like the axle you are repairing, the procedures are identical. If a procedure is not identical, a clear photo and explanation will be shown.

CAUTION: Cleanliness is of extreme importance in the repair and overhaul of this unit. Before attempting any repairs, the exterior of the unit must be thoroughly cleaned to prevent the possibility of dirt and foreign matter entering the mechanism.

CAUTION: Before removing wheel hub assembly, install a "C" clamp on each end of axle housing as shown to prevent axle assembly from flipping off repair stand.

DISASSEMBLY OF AXLE

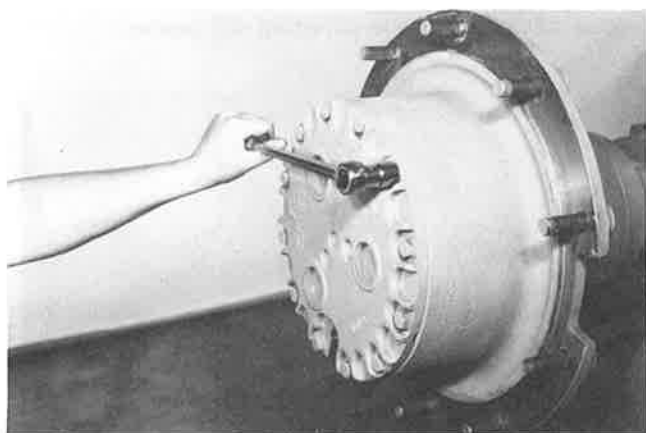


Figure 1

Remove planet carrier attaching capscrews and washers.

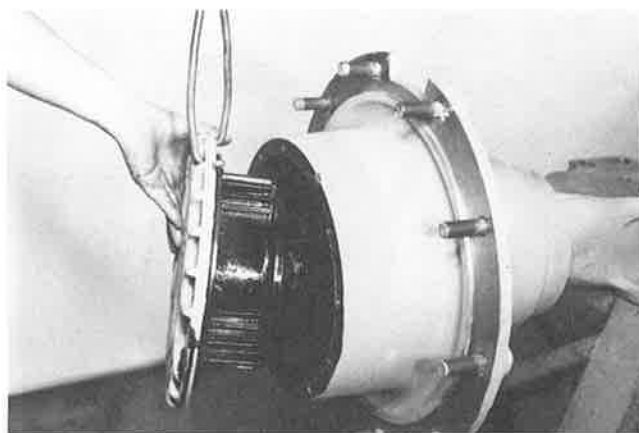


Figure 3

Remove planet carrier assembly. If only the differential is to be removed pull axle shaft out of the differential side gear and repeat procedures 1 thru 3 on the opposite wheel end.

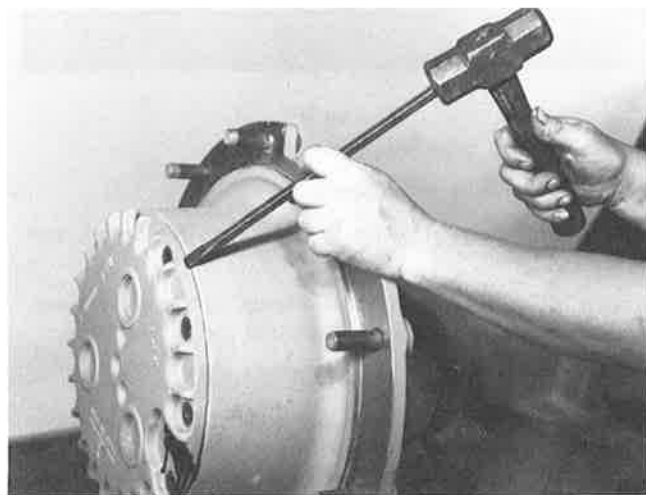


Figure 2

Using pry slots provided, tap planet carrier assembly from wheel hub.

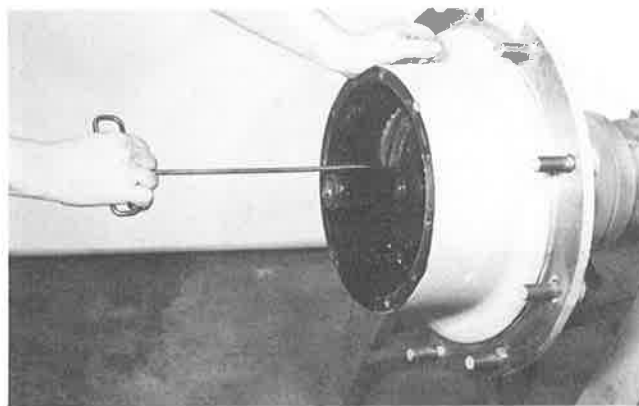


Figure 4

Remove axle shaft and sun gear. **NOTE:** If only the differential assembly is to be removed, repeat procedures 1 thru 4 on the opposite wheel end.



Figure 5

Straighten tangs on wheel nut lock.

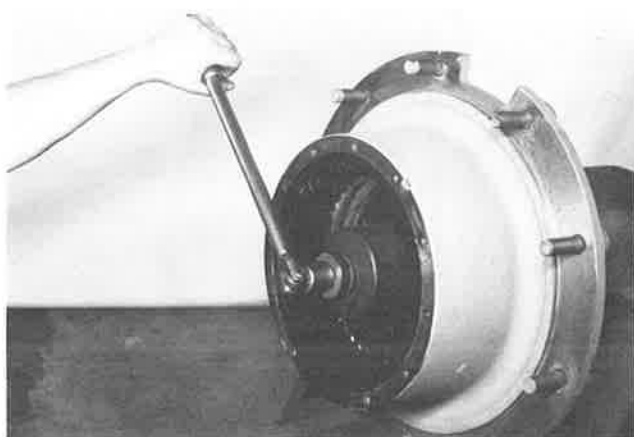


Figure 6

Remove outer jam nut and nut lock.

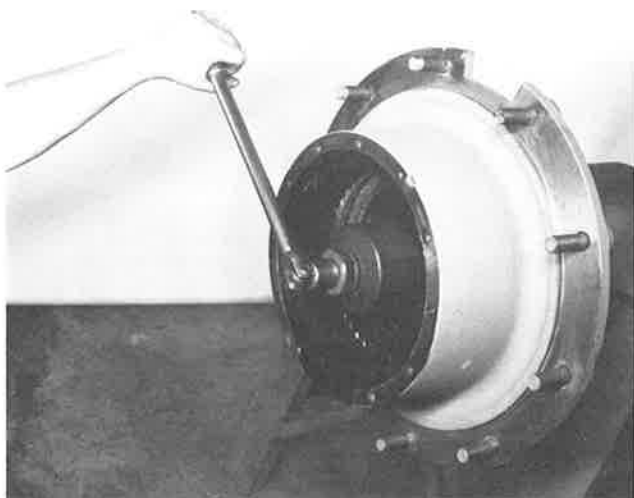


Figure 7

Loosen inner wheel bearing adjusting nut.

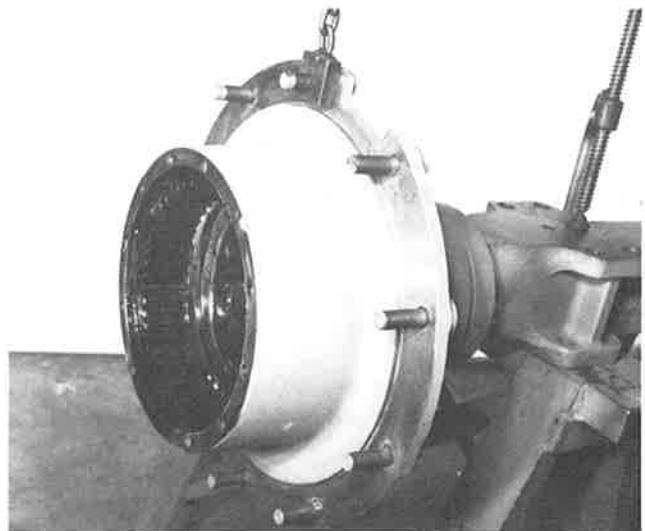


Figure 8

Support wheel hub and drum assembly with a chain hoist. Remove adjusting nut and adjusting nut washer.

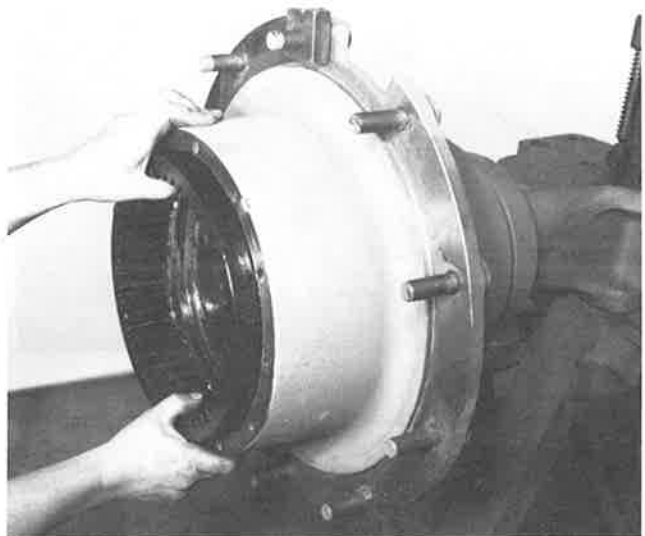


Figure 9

Remove internal gear and hub assembly.

Remove wheel hub and bearing assembly.

Repeat procedures 1 thru 9 for opposite wheel end disassembly.

Remove "C" clamps holding axle housing to steel horses. Turn axle housing to point differential input flange up.

DIFFERENTIAL REMOVAL

Remove differential stud nuts and washers. Remove taper dowels by tapping a small screwdriver in taper dowel slots. Remove differential assembly by lifting straight off studs.

Before disassembly of differential, check ring gear backlash like shown in Figure 59. Record backlash. If ring and pinion gears are not replaced this value will be used at reassembly.

DISSASSEMBLY OF DIFFERENTIAL

Mount differential assembly on repair stand.



Figure 10

Overall view of speed reducer differential. **NOTE:** Some models will have a drive flange thru the drop gear cover. The following photos do not have this flange but a thorough procedure is explained in this text.

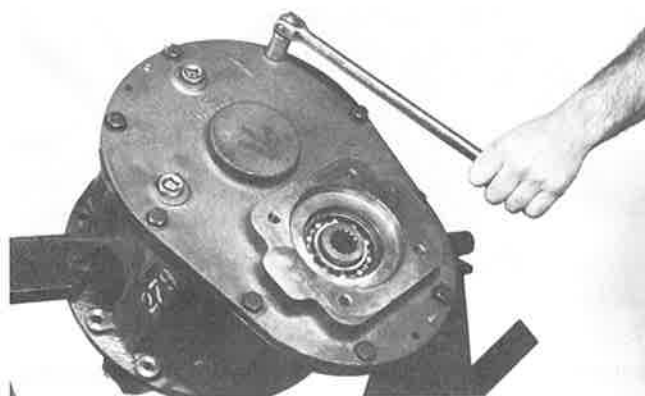


Figure 11

If unit has a drive flange, install a flange retainer tool and loosen flange nut, remove retainer tool. Remove flange nut and flange. Remove drop gear housing bolts and washers.



Figure 12

From under side of drop gear housing drive aligning dowels from drop gear cover.



Figure 13

Remove drop gear cover. If a drive flange is used tap bearing and oil seal from cover.



Figure 14

Drop gear cover removed.

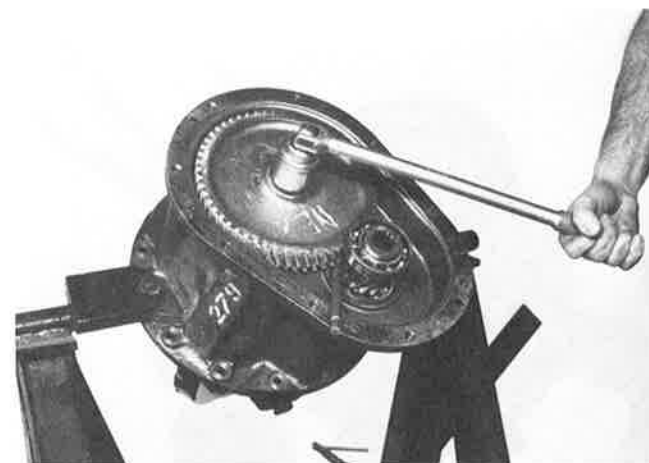


Figure 15

Units with drive flange proceed to figure 17. Block drop gears with a soft bar and remove pinion shaft nut.

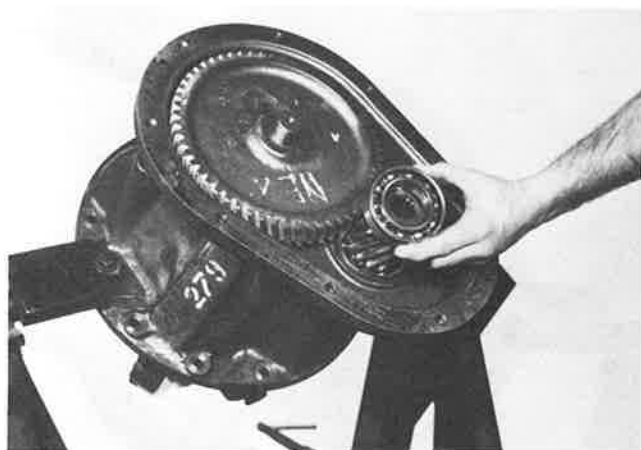


Figure 16

Gear ratio will determine if large pinion drop gear teeth are under small drop gear bearing. If gear teeth are under bearing, remove small drop gear outer bearing.



Figure 19

Remove drop gear housing bolts and washers.



Figure 17

Remove large drop gear.



Figure 20

Remove drop gear housing and shims. Turn differential assembly over with ring gear up. If unit has a ring gear thrust screw, remove jam nut and thrust screw.

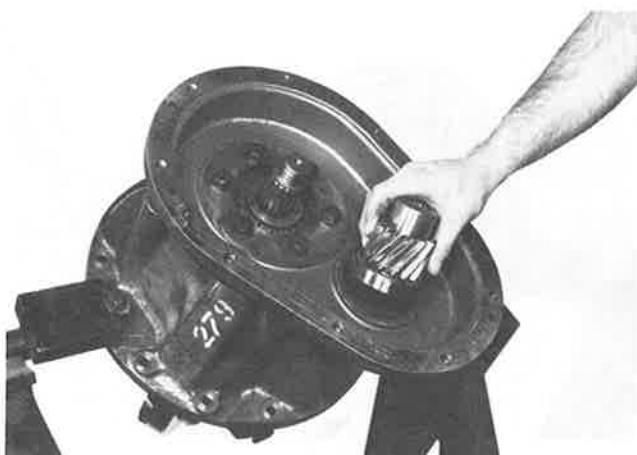


Figure 18

Remove small drop gear and inner bearing.

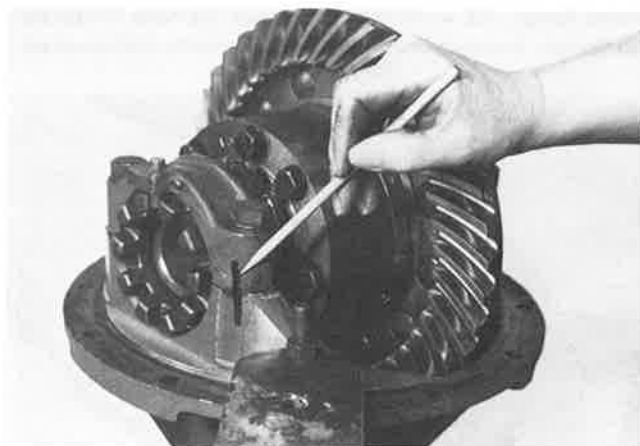


Figure 21

Mark carrier cap and carrier housing to insure correct match in reassembly.



Figure 22

Remove adjusting nut lock pin cotter and pin, or adjusting nut capscrew and washer.

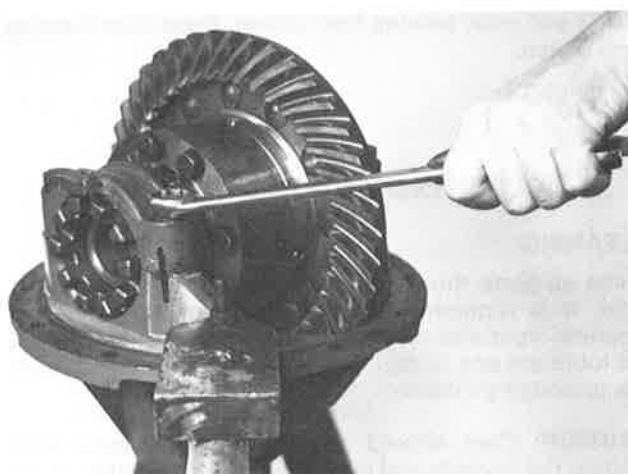


Figure 23

Remove carrier cap bolts.

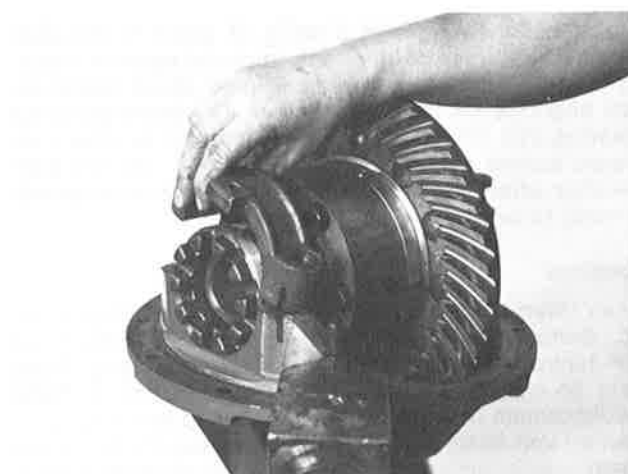


Figure 24

Remove carrier caps.



Figure 25

Remove differential adjusting nut and taper bearing cup.

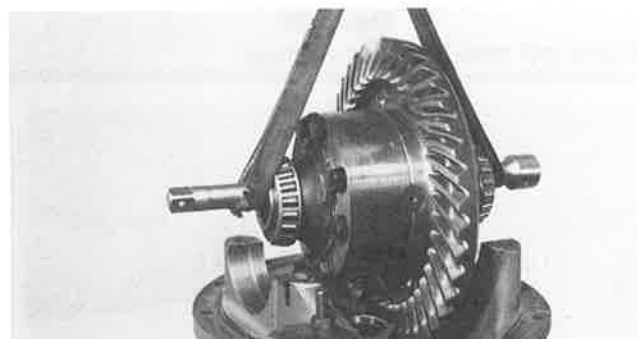
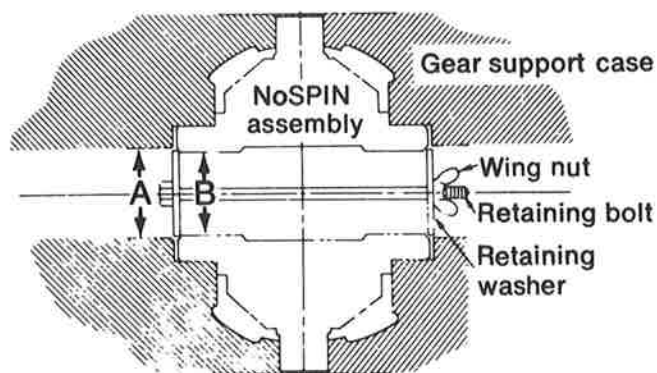


Figure 26

Remove differential from carrier housing as shown.

Mark plain and flange half case to insure correct re-assembly.

NOTE: If No-Spin differential is **NOT** used, proceed with Figure 27. If No-Spin is used, use the following for removing and proceed to Figure 30.



1. Mark the mating halves of the differential case with a center punch so they can be reassembled in the original position when repairs or inspection is completed.
2. Insert a retaining bolt and washer assembly, (as shown,) threading the nut finger-tight against the washer.
3. Separate the case halves and lift out the No-Spin assembly.

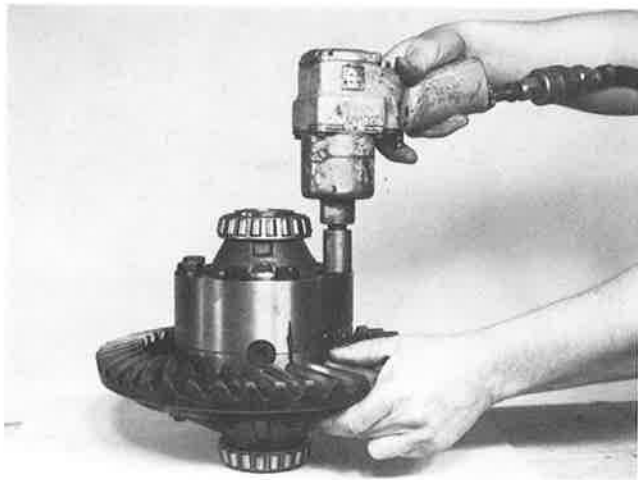


Figure 27

Remove half case bolts and washers.

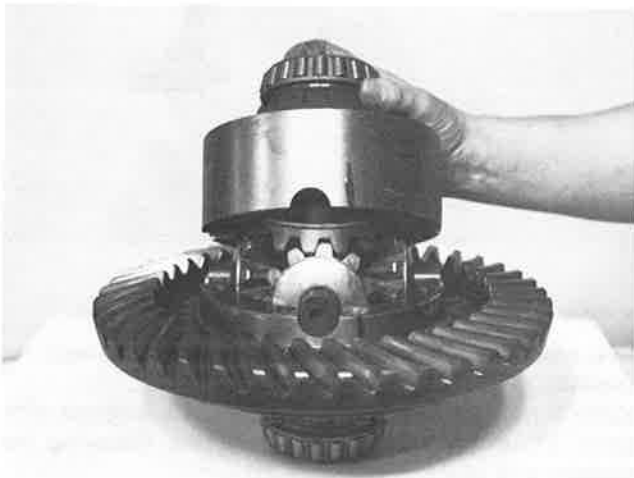


Figure 28

Remove plain half case.

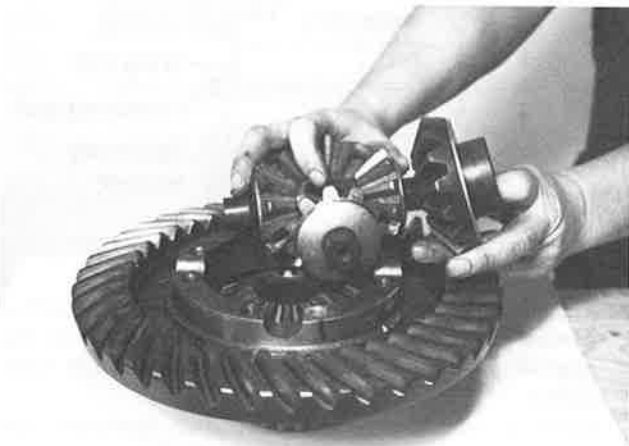


Figure 29

Remove differential side gear, spider and pinion gears.

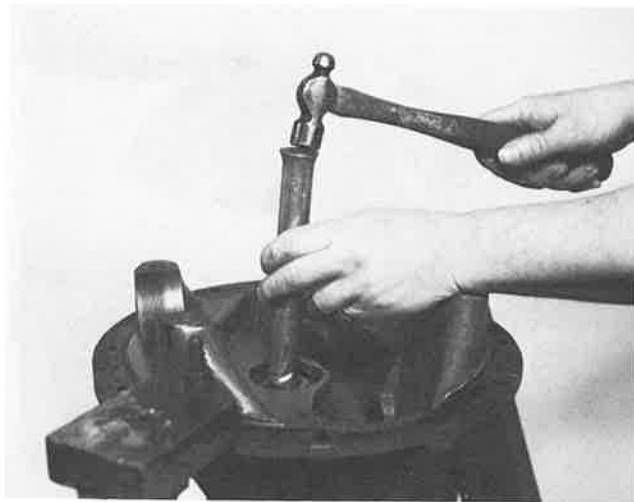


Figure 30

Tap or press pinion assembly from carrier bearing spacer housing. Press center bearing, double bearing cup, bearing spacer and outer bearing from pinion. Press inner bearing from pinion.

CLEANING AND INSPECTION

CLEANING

Clean all parts thoroughly using solvent type cleaning fluid. It is recommended that parts be immersed in cleaning fluid and moved up and down slowly until all old lubricant and foreign material is dissolved and parts are thoroughly cleaned.

CAUTION: Care should be exercised to avoid skin rashes, fire hazards and inhalation of vapors when using solvent type cleaners.

Bearings

Remove bearings from cleaning fluid and strike larger side of cone flat against a block of wood to dislodge solidified particles of lubricant. Immerse again in cleaning fluid to flush out particles. Repeat above operation until bearings are thoroughly clean. Dry bearings using moisture-free compressed air. Be careful to direct air stream across bearing to avoid spinning. Do not spin bearings when drying. Bearings may be rotated slowly by hand to facilitate drying process.

Housings

Clean interior and exterior of housings, bearing caps, etc., thoroughly. Cast parts may be cleaned in hot solution tanks with mild alkali solutions providing these parts do not have ground or polished surfaces. Parts should remain in solution long enough to be thoroughly cleaned and heated. This will aid the evaporation of the cleaning solution and rinse water. Parts cleaned in solution tanks must be thoroughly rinsed with clean water to remove all traces of alkali. Cast parts may also be cleaned with steam cleaner.

CAUTION: Care should be exercised to avoid skin rashes and inhalation of vapors when using alkali cleaners.

Thoroughly dry all parts cleaned immediately by using moisture-free compressed air or soft, lintless absorbent wiping rags free of abrasive materials such as metal filings, contaminated oil or lapping compound.

INSPECTION

The importance of careful and thorough inspection of all parts cannot be overstressed. Replacement of all parts showing indication of wear or stress will eliminate costly and avoidable failures at a later date.

Bearings

Carefully inspect all rollers, cages and cups for wear, chipping or nicks to determine fitness of bearings for further use. Do not replace a bearing cone or cup individually without replacing the mating cup or cone at the same time. After inspection, dip bearings in clean light oil and wrap in clean lintless cloth or paper to protect them until installed.

Oil Seals, Gaskets and Retaining Rings

Replacement of spring loaded oil seals, gaskets and snap rings is more economical when unit is disassembled than to risk premature overhaul to replace these parts at a future time. Loss of lubricant through a worn seal may result in failure of other more expensive parts of the assembly. Sealing members should be handled carefully, particularly when being installed. Cutting, scratching, or curling under lip of seal seriously impairs its efficiency. At reassembly, lubricate lips of oil seals with Lubriplate.

Gears and Shafts

If magna-flux process is available, use process to check parts. Examine teeth and ground and polished surfaces on all gears and shafts carefully for wear, pitting, chipping, nicks, cracks or scores. If gear teeth are cracked or show spots where case hardening is worn through, replace with new gear. Small nicks may be removed with suitable hone. Inspect shafts to make certain they are not sprung, bent, or splines twisted, and that shafts are true. Differential pinions and side gears must be replaced as sets. Differential ring gear and bevel pinion must also be replaced as a set if either is damaged.

Housing and Covers

Inspect housing, covers, planet spider, and differential case to be certain they are thoroughly cleaned and that mating surfaces, bearing bores, etc., are free from nicks or burrs. Check all parts carefully for evidence of cracks or conditions which would cause subsequent oil leaks or failures.

At reassembly apply thread locking compound where noted.

Guidelines for application where to apply.

- A.** On bolts, cap screws and studs (anchor end) apply compound on female threaded component part.
- B.** On nuts, apply compound to the male thread of the mating fastener.
- C.** Apply compound to coat the full length and circumference of thread engagement.
- D.** Remove excess compound from mating parts after fastener installation.

REASSEMBLY OF DIFFERENTIAL AND CARRIER

NOTE: Lubricate all differential bearings, gears, and thrust washers thoroughly at assembly.

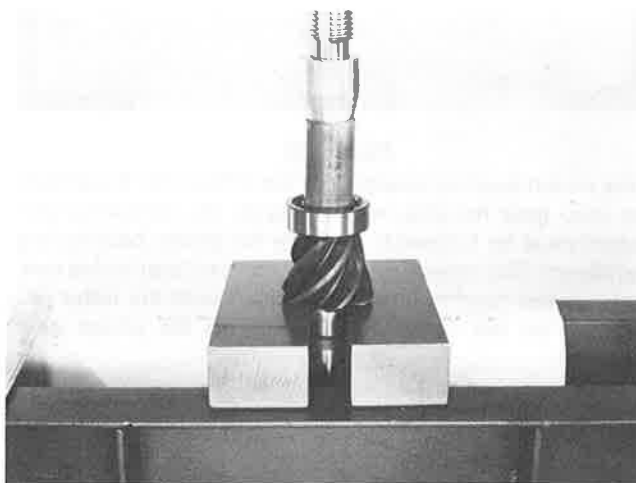


Figure 31

Press inner bearing on pinion shaft.



Figure 32

Stake bearing in four places equally spaced around diameter. Use square end staking tool as shown. See page 38.

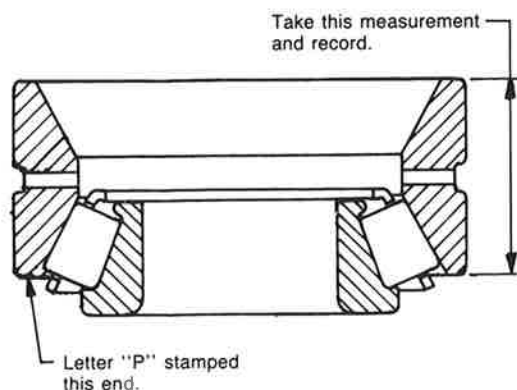


Figure 33

If the pinion bearing assembly or the differential housing or the drop gear housing was changed, the following procedure must be followed. Measure the pinion bearing cup and record. This measurement will be used later in this text. Press center bearing onto pinion shaft with the letter "P" stamped on the center bearing toward the pinion gear teeth.



Figure 34

Locate double taper bearing cup on center pinion bearing. If the pinion bearing assembly or the pinion gear was not changed, use the same bearing spacer that was removed at pinion disassembly.

A pinion bearing spacer and shim kit is provided for service repair of differential and carrier assemblies. This kit, consisting of a spacer and quantity of shims, is used to obtain proper pinion bearing preload as described in Figure 39. Position bearing spacer and one .010 [0,25mm] shim on pinion shaft.



Figure 35

Press outer pinion bearing on pinion shaft.

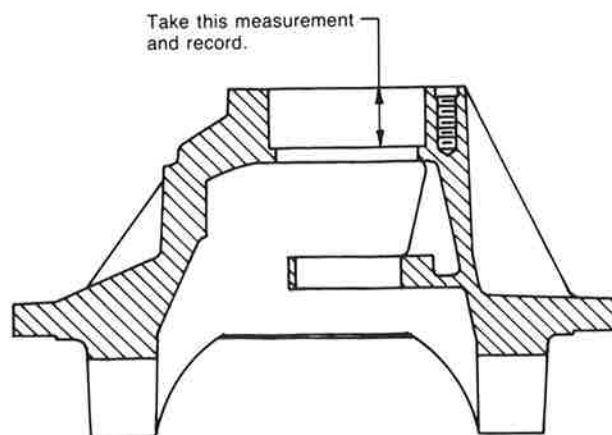


Figure 36

Measure bore depth of carrier housing as shown and record measurement.

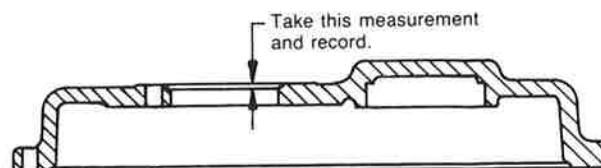


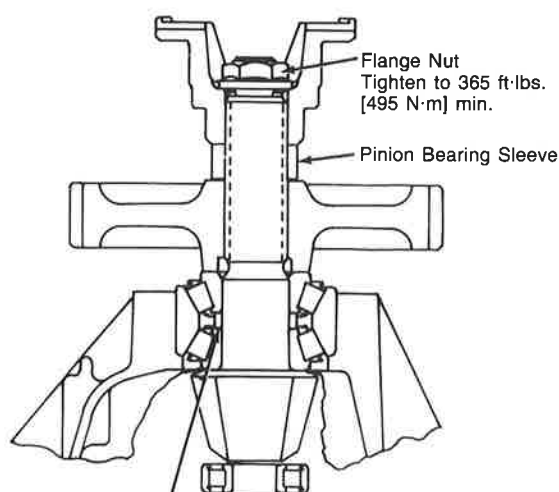
Figure 37

Measure bore depth of drop gear housing as shown and record measurement.



Figure 38

Install pinion and bearing assembly into carrier housing.



Select a spacer to obtain a rolling Pinion Bearing resistance torque of 13 to 23 in-lbs [1-3 N·m] with pinion assembled in carrier. This check to be made before Diff. is assembled and not to include pinion oil seal drag.



Figure 39

If a drive flange is used, temporarily install the large pinion gear on the pinion shaft and the outer pinion bearing sleeve. Install the drive flange and nut, tighten nut 365 ft. lbs. torque [495,0 N.m].

If a drive flange is not used install the large pinion gear on the pinion shaft. Install pinion gear nut and tighten 365 ft. lbs. torque [495,0 N.m].

Use "inch-pound" torque wrench to check bearing preload. If bearing pre-load is not between 13 and 23 in. lbs. [1-3 N.m], disassemble parts and add shims to decrease pre-load or remove shims to increase pre-load. If pre-load is satisfactory, remove nut, companion flange and large pinion gear.



Figure 40

If the differential carrier housing, the drop gear housing or the pinion bearing assembly was changed use the following procedure to shim between carrier housing and drop gear housing.

Using the measurements taken and recorded previously, use the following example.

Example If the bore depth of the carrier housing taken in Fig. 36 was 1.404

If the bore depth of the drop gear housing taken in Fig. 37 was .143

If the width of the pinion bearing cup taken in Fig. 33 was 1.562

1.404 Carrier housing bore depth [35,66 mm]
 .143 Drop gear housing bore depth [3,63 mm]
 1.547 Total [39,29 mm]

1.562 Pinion bearing cup width [39,67 mm]

Minus 1.547 Total housing bore dimension [39,29 mm]
 .015 Gap between carrier and drop gear housing [0,38 mm]

Plus .005 [0,12 mm]
 .020 [0,50 mm] Use two .010 shims [0,25 mm]

The above is an example only, use this procedure and your measurements to determine the correct shim pack.

Apply Loctite #262 to drop gear housing threaded holes in carrier housing. Apply Loctite #515 to drop gear housing shims and joining surfaces. Position shims and drop gear housing on carrier housing.

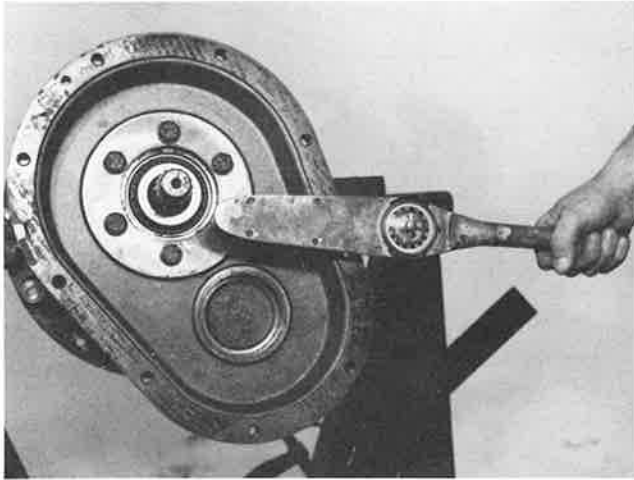


Figure 41

Install drop gear housing bolts and tighten 90 to 100 ft. lbs. torque [125-135 N.m].

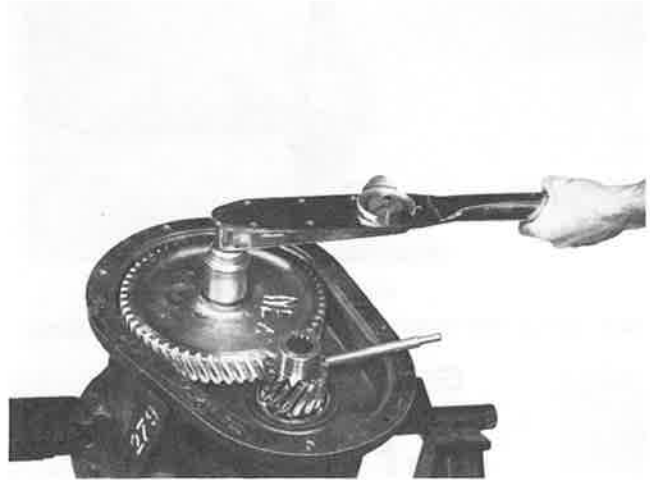


Figure 44

If a drive flange is used proceed to Fig. 45. Install pinion shaft nut. Block gears to prevent turning and tighten nut to 365 ft. lbs. torque [495 N.m].

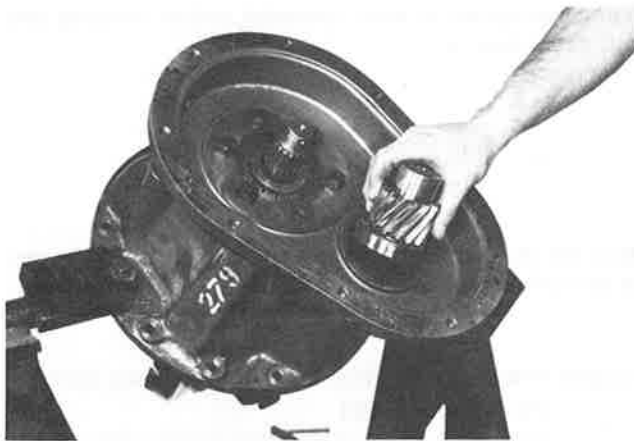


Figure 42

Press bearing on small gear, position gear and bearing in drop gear housing.



Figure 45

Install small drop gear outer bearing.



Figure 43

Position large drop gear on pinion shaft with long hub of gear toward pinion bearing.



Figure 46

Apply Loctite #515 to drop gear housing machine surface. Apply Loctite #262 thread locking compound to threaded holes.



Figure 47

Position the drop gear cover on the drop gear housing.

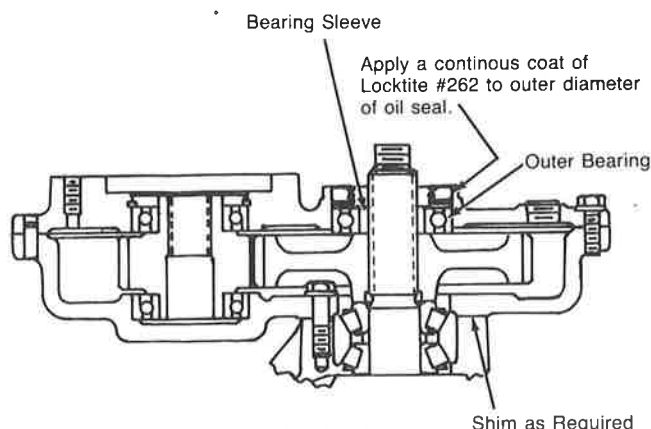


Figure 48

If a drive flange is used install the large drop gear outer bearing in bore of drop gear cover. Tap bearing in bore until bearing bottoms on the large drop gear. Install bearing sleeve over pinion shaft until it bottoms on the large drop gear. Apply a continuous coat of Loctite #262 to the outer diameter of the drive flange oil seal. Install oil seal in drop gear cover with lip of seal down.

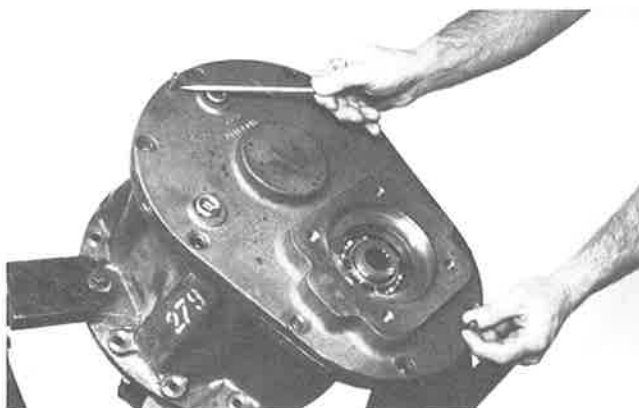


Figure 49

Locate drop gear housing cover dowels in dowel holes, do not drive in at this time.

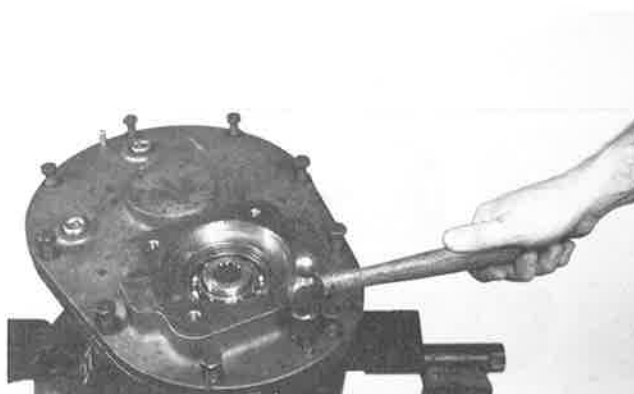


Figure 50

Start all of the drop gear cover to housing bolts and washers. Tap dowel pins into position.



Figure 51

Tighten drop gear cover bolts 90 to 100 ft. lbs. torque [125-135 N.m]. Install drive flange and nut. Using a flange retainer to prevent flange from turning, tighten flange nut to 365 ft. lbs. torque [495 N.m].

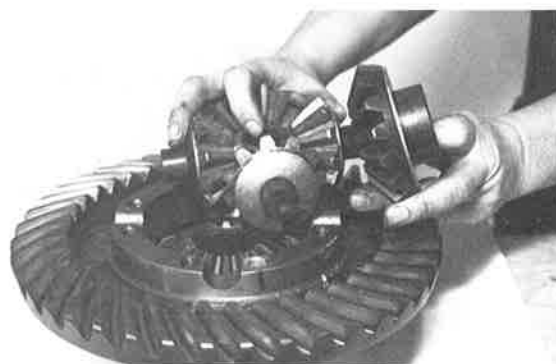


Figure 52

Position ring gear on flanged half case. Install bolts and nuts. Tighten nuts 60 to 65 ft. lbs. torque [82,0-88,0 N.m]. If a no-spin is used, install in case half as an assembly and proceed to Figure 53. Install thrust washer and side gear in half case. Position pinion gears and washers on differential spider. Install spider and gears in half case, position other side gear and thrust washer on pinion gears.

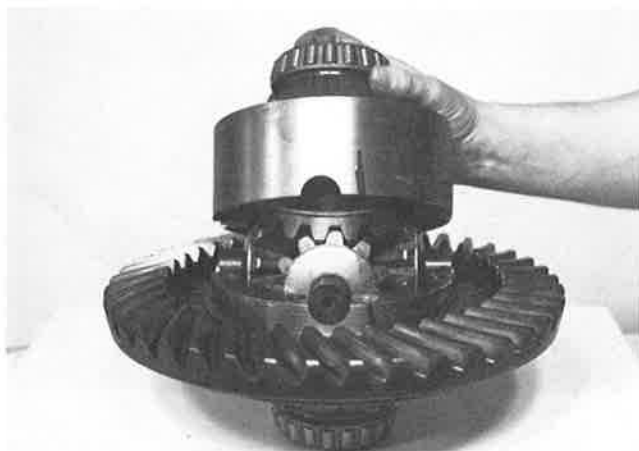


Figure 53

Align matchmarks and install plain half case on flanged half assembly, making sure of full gear engagement. Apply Loctite #262 to internal and external threads.



Figure 54

Tighten half case bolts to 90 to 100 ft. lbs. torque [125,0-135,0 N.m].



Figure 55

Insert bar through differential to facilitate hoisting. Position differential into carrier, tilting it so that ring gear will clear inner bearing boss in carrier.

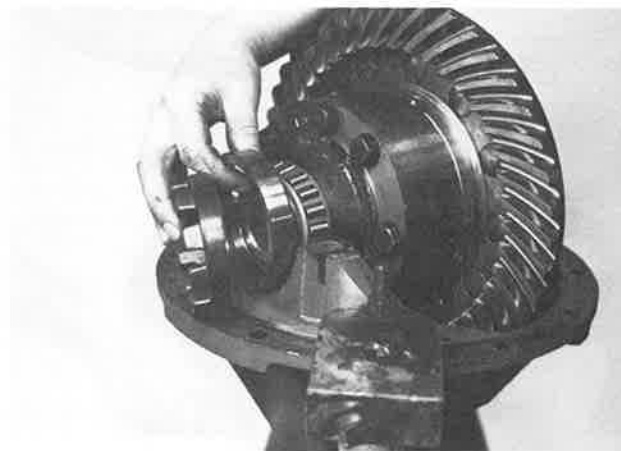


Figure 56

Position bearing cup and adjusting nut on carrier. Repeat procedure and install opposite bearing cup and adjusting nut. Turn adjusting nuts by hand to be sure of proper thread alignment.

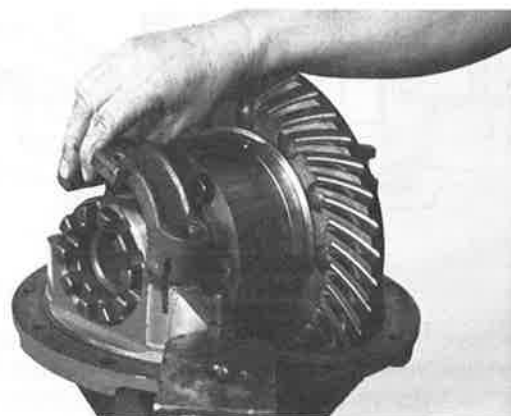


Figure 57

Coat internal threads with Loctite #262. Position bearing caps on bearings and adjusting nuts, making sure matchmarks made during disassembly are properly aligned.

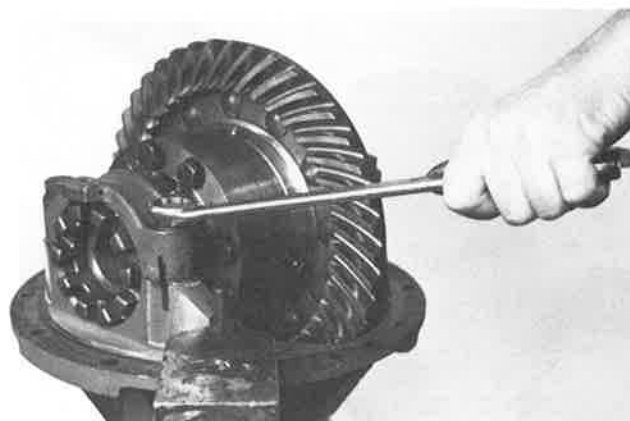


Figure 58

Install cap bolts, and tighten lightly. Do not torque at this time.

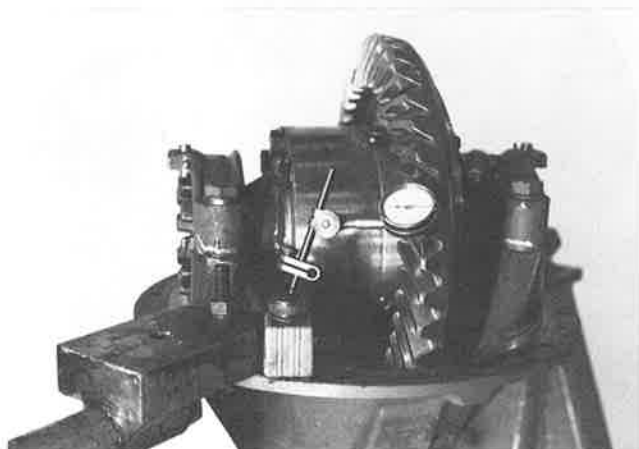


Figure 59

Use a dial indicator as shown. Move ring gear by loosening one adjusting nut and tighten opposite adjusting nut. Adjust position until gear backlash is .008-.012 [0,21-0,30 mm] if new gear set is used, or adjust to backlash noted at disassembly for used gears. When proper backlash is achieved, tighten opposite adjusting nut to set pre-load on taper bearings. Using only thumb and forefinger move ring gear. When ring gear becomes difficult to move, pre-load on bearings is set.



Figure 60

Check ring and pinion gear for proper tooth contact.

Paint ring gear with a mixture of red lead and linseed oil. When ring and pinion gears are rotated, the red lead is squeezed away by the contact of the teeth, leaving bare areas the exact size, shape and location of the contacts. As a rule, painting about 10 or 12 teeth is sufficient for checking purposes.

Sharper impressions may be obtained by applying a small amount of resistance to the ring gear with a flat steel bar and using a wrench to rotate the pinion. Gears should be rotated, under slight load, until ring gear has turned at least one revolution in both directions.

Check tooth contact pattern on drive side (convex side) of ring gear teeth. Coast side will automatically correct when drive side pattern is correct. Refer to gear tooth contact chart.



Figure 61

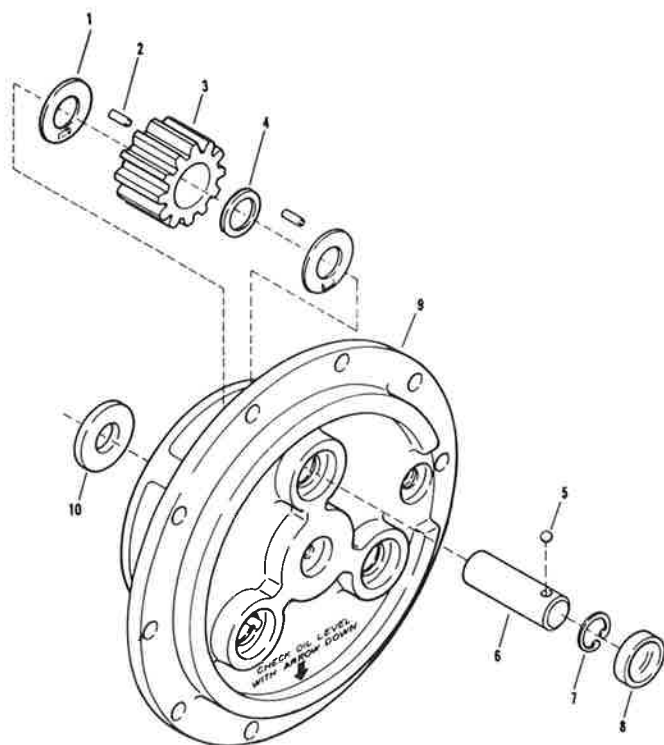
Tighten cap bolts 125-140 ft. lbs. torque [170,0-190,0 N.m].

With dial indicator, recheck ring gear and pinion backlash. Recheck differential bearings for preload as described in Figure 59.



Figure 62

Install adjusting nut lock and cotter pin, or if a capscrew is used, apply Loctite #262 to threaded holes and install capscrews and washers. Tighten 25 to 28 ft. lbs. torque [34-38 N.m].



ITEM	DESCRIPTION
1.	Pinion Gear Thrust Washer
2.	Needle Roller Bearing
3.	Planet Pinion Gear
4.	Roller Bearing Spacer
5.	Pinion Shaft Lock Ball
6.	Pinion Shaft
7.	Pinion Shaft Snap Ring
8.	Planet Housing Bore Plug
9.	Planet Housing
10.	Thrust Washer

PLANET CARRIER DISASSEMBLY

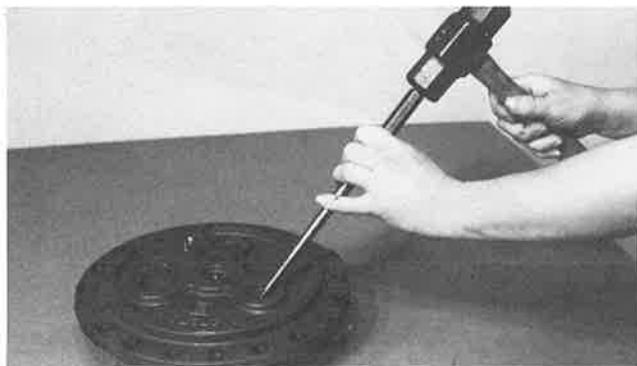


Figure 63

Remove housing bore plugs by driving a sharp punch through the plug at an angle and prying plug from carrier housing.

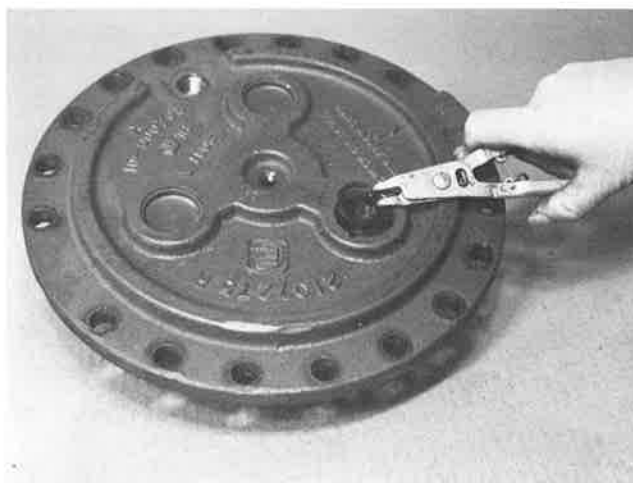


Figure 64

Remove pinion shaft snap ring.

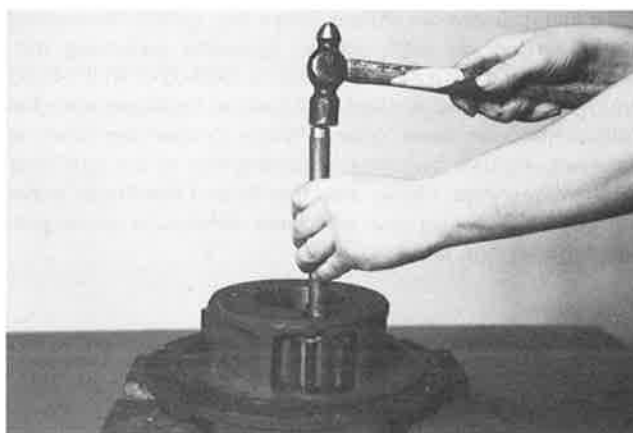


Figure 65

Tap pinion shaft from housing. Use caution as not to lose shaft lock balls.



Figure 66

Remove pinion gear, pinion rollers, roller spacer and thrust washers from carrier housing.

REASSEMBLY OF PLANET CARRIER



Figure 67

Apply grease to the inside of the pinion gear to hold needle rollers in place. Install a row of rollers in the pinion gear (see parts list for proper quantity). Position roller bearing spacer on top of rollers. Apply grease above spacer and install top row of bearings.

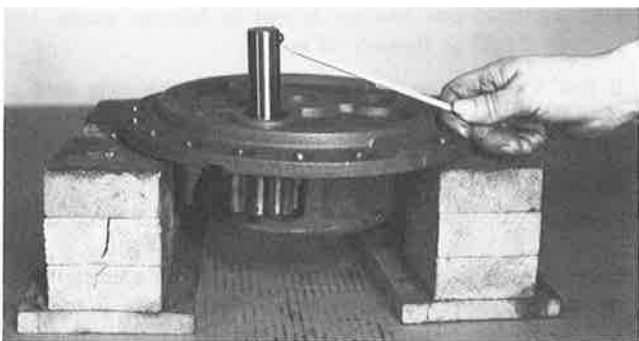


Figure 68

Position pinion and roller assembly and two pinion thrust washers in planet housing.

NOTE: Tangs on thrust washers must engage grooves in housing.

Align pinion shaft lock ball recess with groove in planet housing. Using caution as not to disrupt needle rollers, and with lock ball in place, press pinion shaft into position.

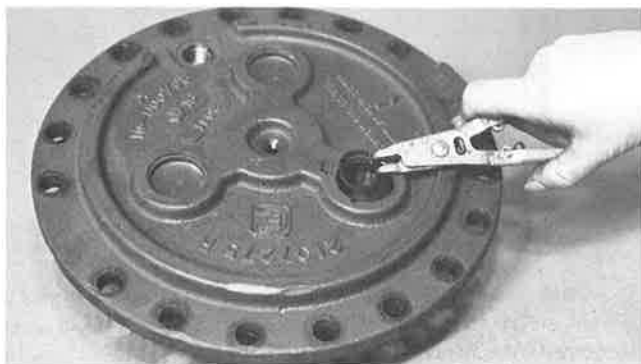


Figure 69

Install snap ring in housing.

NOTE: Be sure snap ring is in full position in snap ring groove.



Figure 70

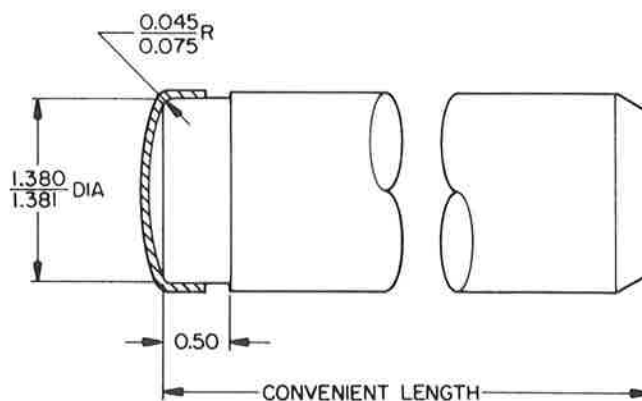
Apply a band of sealant in the planet housing bore plug hole (see Figure 72). Use Loctite #515 as the bore plug sealant.



Figure 71

Using a plug driver as shown, seat bore plug in housing.

NOTE: Be sure plug is installed straight in bore and bottoms out on shoulder in carrier housing.



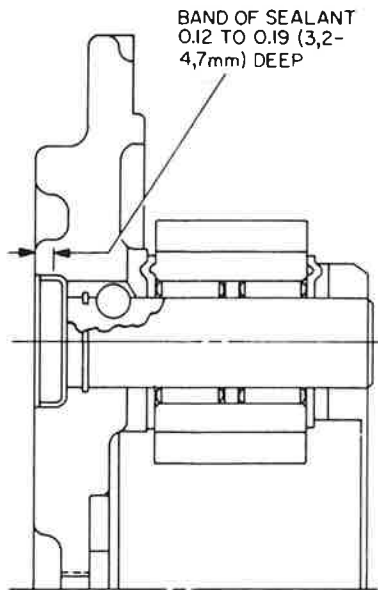


Figure 72

REASSEMBLY OF AXLE

The following instructions describe the procedure to be followed when reassembling and installing components of axle. Instructions cover reassembly of only one side of axle. Reassembly of opposite side is identical unless otherwise noted.

IMPORTANT: Both Grade 5 and Grade 8 fastening hardware have been used in the production of the axle assemblies covered by this manual. A table of proper torque values for both Grade 5 and Grade 8 hardware is provided at the rear of this manual. Grade of hardware may be determined by the "hash" marks contained on the head of each bolt; Grade 5 having three hash marks and Grade 8 having six hash marks as indicated below.

GRADE 5



GRADE 8



Torque values specified in text of this manual are for Grade 8 hardware where presently used in production. Grade 5 torque values are also specified when that grade hardware is presently used. On all axles being overhauled, bolts should be identified as described above and torque value chart consulted for correct torque.

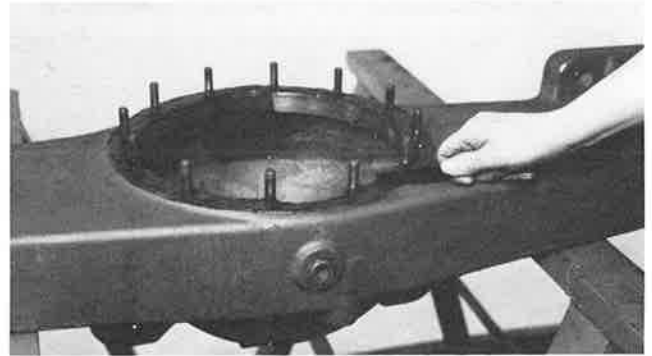


Figure 73

Check differential mounting flange of axle housing to be sure it is free of dirt and burrs. Coat differential to axle housing surface with Dow Corning RTV-Q3-7069.

Align differential assembly with axle housing studs. Lower into position. Use caution as not to damage studs. Apply Loctite #262 to threads of studs.

If the spindle was removed, be sure the axle end and spindle flange is free and dry from sealing compounds, rust, nicks and burrs. Apply Loctite #262 thread locking compound to threads in axle end.

Apply a continuous bead .09 diameter [2,3 mm] of Dow Corning RTV-Q3-7069 sealant to spindle pilot diameter only. Position spindle on axle end. Install spindle to axle housing capscrews and washers. Tighten capscrews 300 to 330 ft. lbs. torque [410-450 N.m].

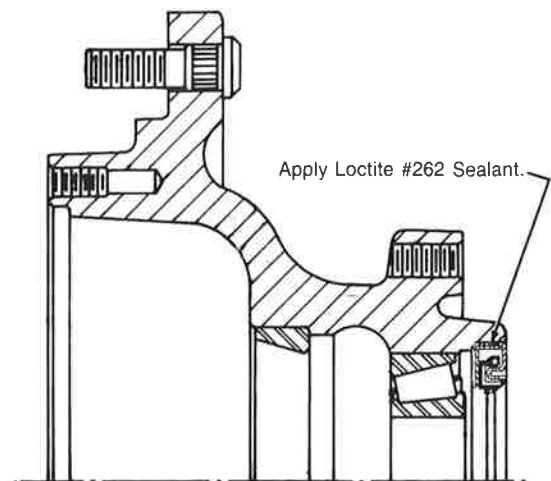


Figure 74

If wheel hub was disassembled check bearing bores in wheel hubs to be sure all nicks and burrs have been removed from both bores and bearing seats. Install bearing cups in wheel hub with large diameter of taper toward outside of hub. Bearing cups must be fully seated.

Coat wheel hub oil seal bore with Loctite Sealant #262. With inner wheel bearings in place, install hub oil seal in wheel hub with lip of seal toward bearing.

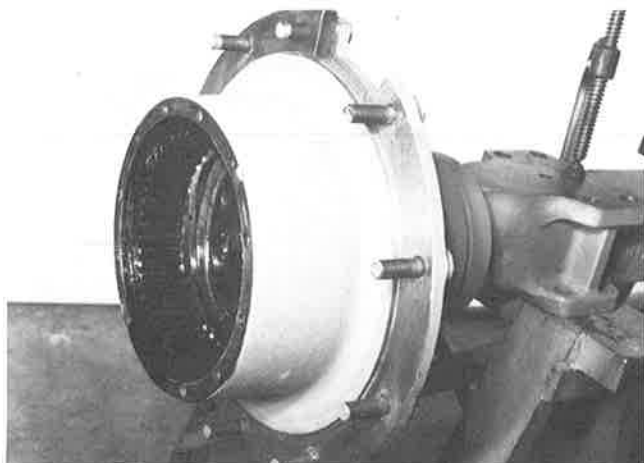


Figure 75

Lubricate lip of wheel hub oil seal. Align wheel hub with spindle end. Use caution as not to damage wheel hub oil seal. Support wheel hub and bearing assembly.



Figure 76

Install internal gear into wheel hub and in spindle end splines.

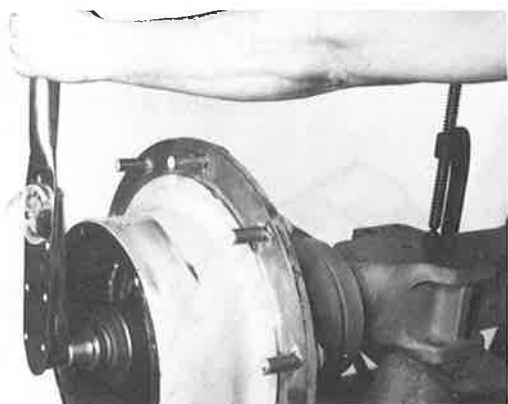


Figure 77

Install inner wheel bearing adjusting nut.

Tighten the adjusting nut to approximately 500 ft. lbs. torque [677,9 N.m] while rolling the wheel. Strike the rim and surrounding parts with a mallet to shock the wheel end and better seat the parts (bearing cups and cones). Reverse the adjusting nut and again strike the rim with a mallet. Loosen adjusting nut until a slight bearing end play is detected.

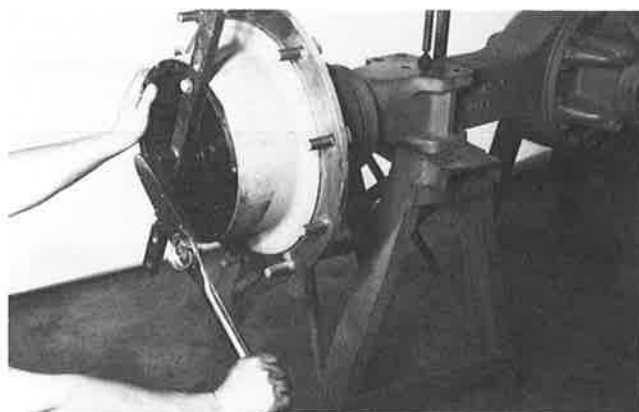


Figure 78

Using a torque wrench adaptor like one shown in Figure 78A, determine the rolling torque of the wheel end with the bearings in a no-load end play position. Due to unbalance of parts, etc., there will be a variation of rolling torque as the wheel hub is rotated. Record the maximum value of rolling torque throughout a revolution. This figure is a "No-load rolling torque" value. Tighten the adjusting nut to achieve a bearing pre-load in ft. lbs. above the "No-load rolling torque" value recorded. New bearings 7 to 12 ft. lbs. [0,97-1,65 m.kg]. Used bearings 3 to 5 ft. lbs. [0,42-0,69 m.kg]. greater than no-load value. It is best to use the lowest pre-load value as the pre-load may increase when the jam nut is installed and tightened.

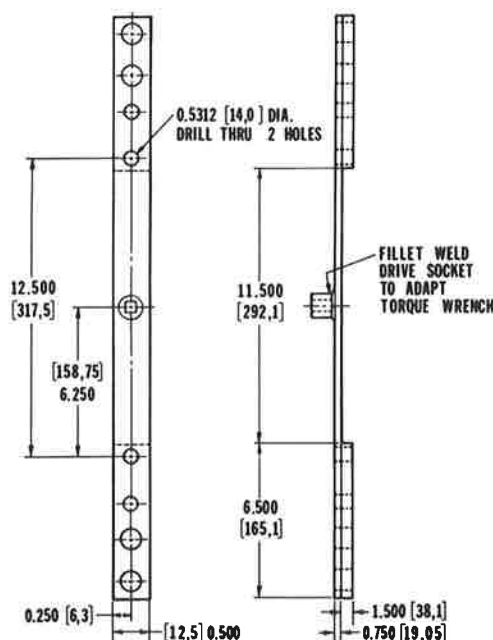


Figure 78A

The adaptor bar can be fabricated locally to specifications outlined in Figure 78A. Bar illustrated will accommodate a wheel hub with a planetary bolt circle diameter of 12-1/2" [317.5 mm]. Other wheel hubs can be accommodated by measuring across the planetary bolt circle and drilling adaptors to size.

CLARK

When proper wheel bearing pre-load is achieved install wheel bearing adjusting nut lock.

NOTE: Coat inner face of jam nut with E.P. multipurpose grease. Install jam nut.

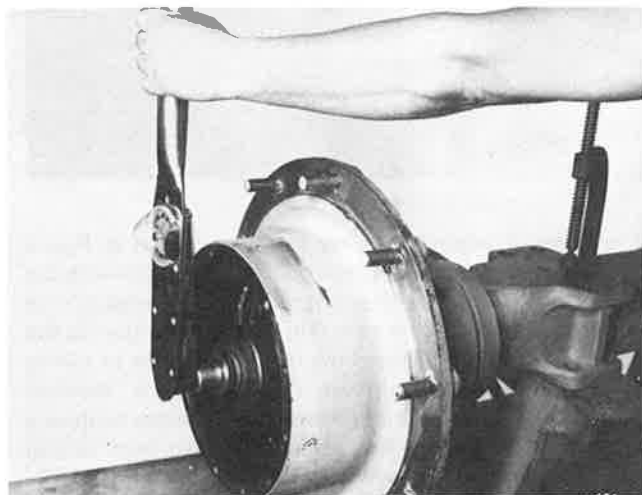


Figure 79

NOTE: The nut socket used to torque the jam nut should be depth controlled (see Figure A following) to prevent contact between the socket face and outer tangs of the nut lock. This controlled depth will prevent torque from being transmitted from the socket face to the nut lock outer tangs and the possibility of shearing the nut lock inner tang. Tighten jam nut 500 ft. lbs. torque [677,9 N.m]. Recheck final rolling torque, which should not be greater than the sum of the "No-load" rolling torque plus the highest value of rolling torque specified in Figure 78.

DEPTH CONTROLLED
TO PREVENT FACE
OF SOCKET FROM
CONTACTING NUT LOCK

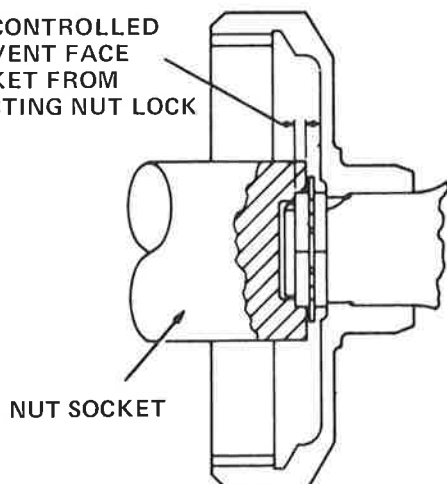


FIGURE A



Figure 80

When proper pre-load is achieved bend two tangs of nut lock on flats of inner nut (adjusting) and two tangs on flat of jam nut (see Figures B and C).

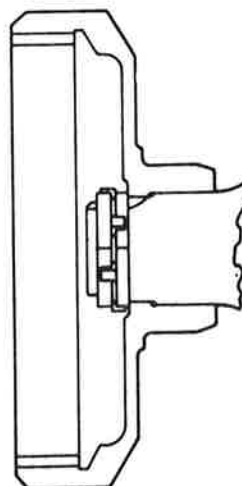


FIGURE B

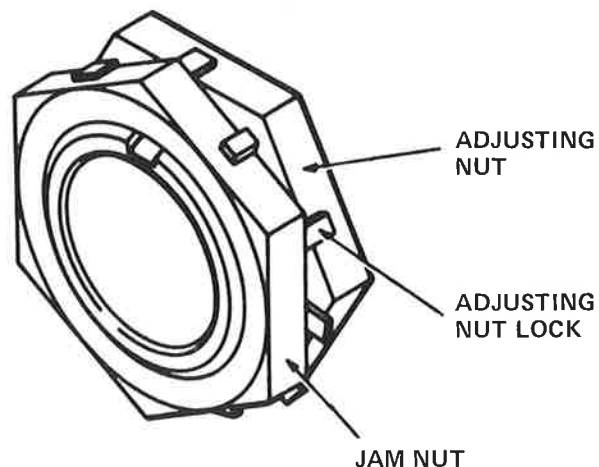


FIGURE C

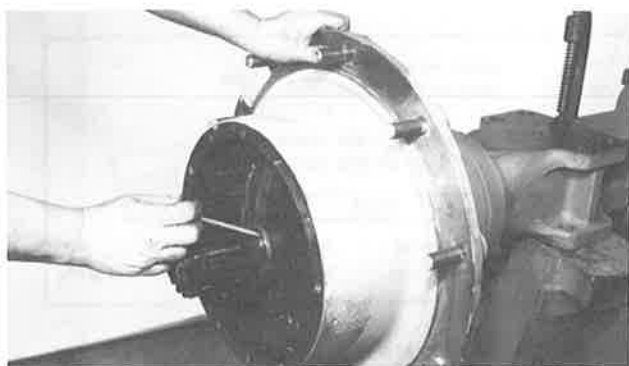


Figure 81

Install sun gear thrust washer and sun gear.

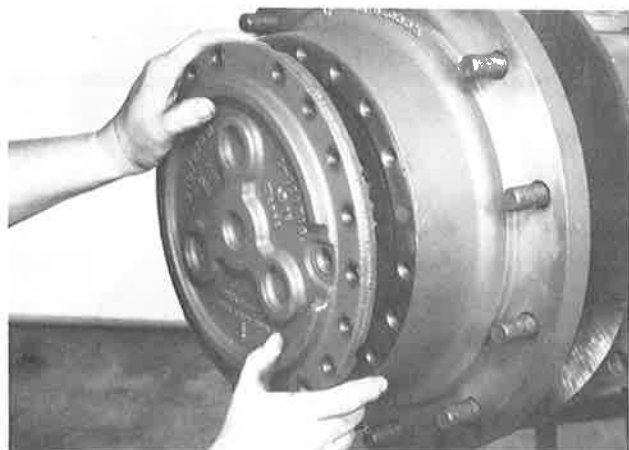


Figure 82

Apply Dow Corning RTV-Q3-7069 sealant with a continuous bead on inside of bolt circle of wheel hub. Install planet carrier assembly on wheel hub.



Figure 83

Install planet carrier to wheel hub cap screws and washers. Tighten cap screws 125 to 140 ft. lbs. torque [170,0-190,0 N.m].

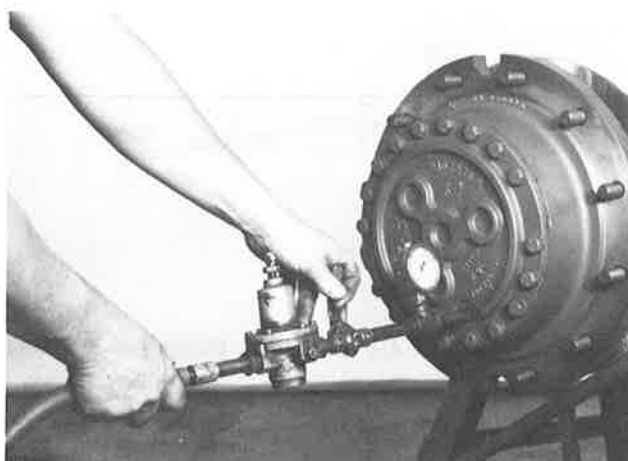


Figure 84

It is recommended an air check be made on each wheel end after reassembly. This checking device is comprised of a minimum 30 P.S.I. air gauge, an air shut off valve, an air regulator valve, pipe tee, pipe nipple, reducing bushing and air line connector. The relief valve is removed from the planet cover and a pipe nipple is installed in its place. The regulator is opened to 12 P.S.I. on the gauge. The air shut-off (installed between the regulator and gauge) is then closed. A 12 P.S.I. pressure must be retained for 15 seconds. If there is a pressure drop in less than 15 seconds there is an air leak at the wheel hub oil seal. If an air leak is detected it will require a wheel end disassembly to correct the leak. Make both wheel end air checks and the following center section air check before disassembly any of the axle to correct an airleak.

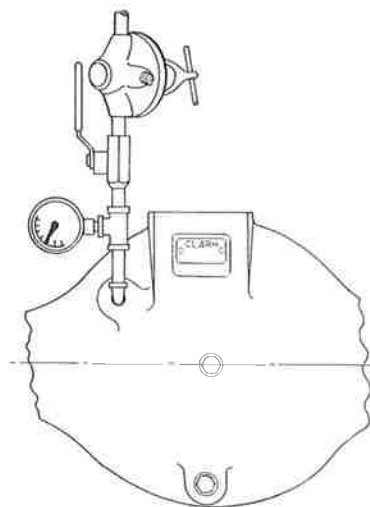
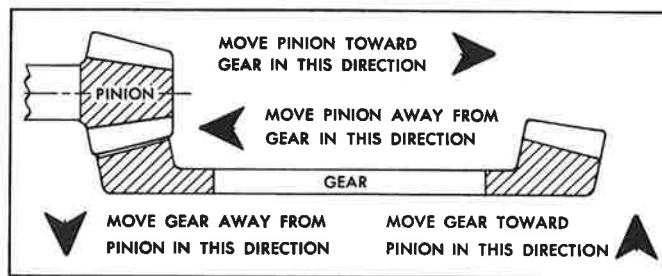
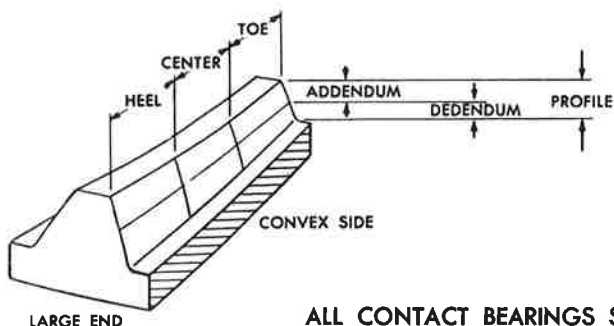


Figure 85

Air check the axle center section the same way as the wheel ends except the checking device is installed in the air breather hole in the axle center. If any air leak is detected, the probable cause will be one or both wheel hub oil seals leaking.

SPIRAL BEVEL AND HYPOID TOOTH BEARING CONTACT CHART



ALL CONTACT BEARINGS SHOWN BELOW ARE ON **RIGHT HAND** SPIRAL RING GEAR — THE DRIVE IS ON THE CONVEX SIDE OF THE TOOTH.



FIG. 1

TYPICAL PREFERRED BEARING ON BOTH SIDES OF TOOTH WHILE UNDER A LIGHT LOAD



FIG. 2

TOE BEARING ON BOTH SIDES OF TOOTH — GEAR SET NOISY. TO MOVE BEARING TOWARD HEEL INCREASE BACKLASH WITHIN LIMITS BY MOVING GEAR AWAY FROM PINION.



FIG. 3

HEEL BEARING ON BOTH SIDES OF TOOTH — GEARSET NOISY AND COULD RESULT IN EARLY GEAR FAILURE. TO MOVE BEARING TOWARD TOE DECREASE BACKLASH WITHIN LIMITS BY MOVING GEAR TOWARD PINION.



FIG. 4

LOW BEARING ON GEAR AND HIGH BEARING ON PINION. CORRECT BY PULLING PINION AWAY FROM GEAR (INCREASE MOUNTING DISTANCE).



FIG. 5

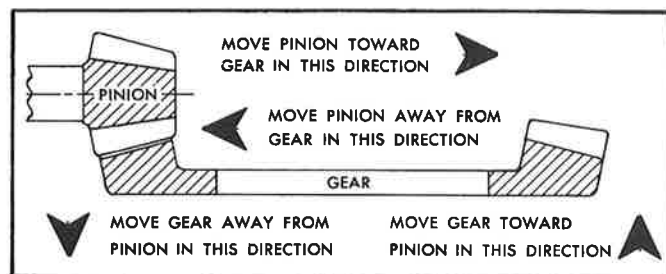
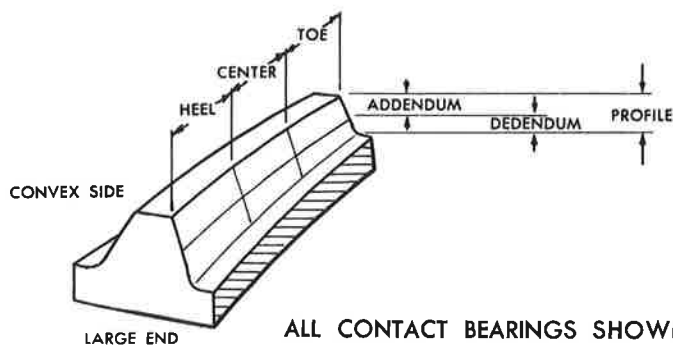
HIGH BEARING ON GEAR AND LOW BEARING ON PINION. CORRECT BY MOVING PINION IN TOWARD GEAR (DECREASE MOUNTING DISTANCE).



BACKLASH

BACKLASH SHOULD BE MEASURED WITH A DIAL INDICATOR RIGIDLY MOUNTED WITH THE STEM PERPENDICULAR TO THE TOOTH SURFACE AT THE EXTREME HEEL.

SPIRAL BEVEL AND HYPOID TOOTH BEARING CONTACT CHART



ALL CONTACT BEARINGS SHOWN BELOW ARE ON LEFT HAND SPIRAL RING GEAR — THE DRIVE IS ON THE CONVEX SIDE OF THE TOOTH.



FIG. 1

TYPICAL PREFERRED BEARING ON BOTH SIDES OF TOOTH WHILE UNDER A LIGHT LOAD



FIG. 2

TOE BEARING ON BOTH SIDES OF TOOTH — GEAR SET NOISY. TO MOVE BEARING TOWARD HEEL INCREASE BACKLASH WITHIN LIMITS BY MOVING GEAR AWAY FROM PINION.



FIG. 3

HEEL BEARING ON BOTH SIDES OF TOOTH — GEARSET NOISY AND COULD RESULT IN EARLY GEAR FAILURE. TO MOVE BEARING TOWARD TOE DECREASE BACKLASH WITHIN LIMITS BY MOVING GEAR TOWARD PINION.



FIG. 4

LOW BEARING ON GEAR AND HIGH BEARING ON PINION. CORRECT BY PULLING PINION AWAY FROM GEAR (INCREASE MOUNTING DISTANCE).



FIG. 5

HIGH BEARING ON GEAR AND LOW BEARING ON PINION. CORRECT BY MOVING PINION IN TOWARD GEAR (DECREASE MOUNTING DISTANCE).

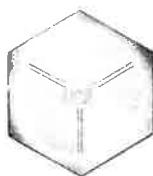


BACKLASH

BACKLASH SHOULD BE MEASURED WITH A DIAL INDICATOR RIGIDLY MOUNTED WITH THE STEM PERPENDICULAR TO THE TOOTH SURFACE AT THE EXTREME HEEL.

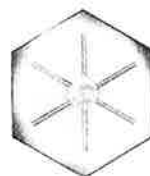
TORQUE FOR BOLTS, CAPSCREWS, STUDS AND NUTS AS SUPPLIED BY CLARK EQUIPMENT

Grade 5 Identification, 3 Radial
Dashes 120° Apart on Head of Bolt



Grade 5

Grade 8 Identification, 6 Radial
Dashes 60° Apart on Head of Bolt



Grade 8

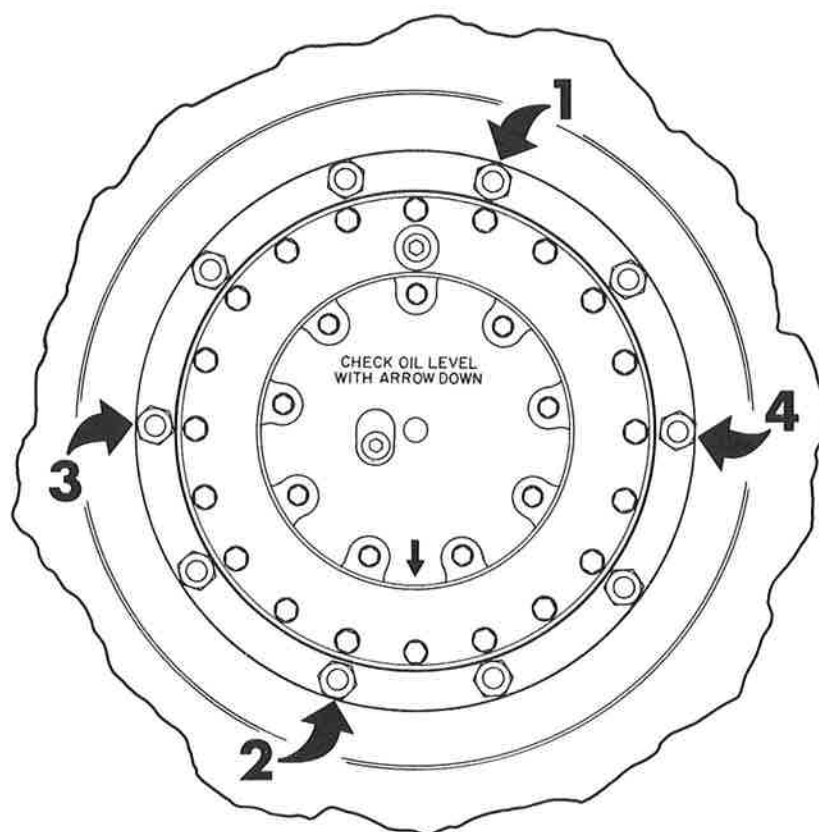
**Fastener
Size**

Lubricated and Plated

Lubricated and Plated

1/4 - 20 1/4 - 28	80 - 90 Lbs. In. [9 - 10 N.m]	110 - 120 Lbs. In. [13 - 14 N.m]
5/16 - 18 5/16 - 24	180 - 200 Lbs. In. [21 - 23 N.m]	215 - 240 Lbs. In. [24 - 27 N.m]
3/8 - 16 3/8 - 24	25 - 28 Lbs. Ft. [34 - 38 N.m]	35 - 40 Lbs. Ft. [48 - 54 N.m]
7/16 - 14 7/16 - 20	40 - 45 Lbs. Ft. [54 - 61 N.m]	60 - 65 Lbs. Ft. [82 - 88 N.m]
1/2 - 13 1/2 - 20	65 - 70 Lbs. Ft. [88 - 95 N.m]	90 - 100 Lbs. Ft. [125 - 135 N.m]
9/16 - 12 9/16 - 18	90 - 100 Lbs. Ft. [125 - 135 N.m]	125 - 140 Lbs. Ft. [170 - 190 N.m]
5/8 - 11 5/8 - 18	125 - 140 Lbs. Ft. [170 - 190 N.m]	175 - 190 Lbs. Ft. [240 - 260 N.m]
3/4 - 10 3/4 - 16	220 - 245 Lbs. Ft. [300 - 330 N.m]	300 - 330 Lbs. Ft. [410 - 450 N.m]
7/8 - 9 7/8 - 14	330 - 360 Lbs. Ft. [450 - 490 N.m]	475 - 525 Lbs. Ft. [645 - 710 N.m]
1 - 8 1 - 12	475 - 525 Lbs. Ft. [645 - 710 N.m]	725 - 800 Lbs. Ft. [985 - 1085 N.m]
1-1/8 - 7 1-1/8 - 12	650 - 720 Lbs. Ft. [880 - 975 N.m]	1050 - 1175 Lbs. Ft. [1425 - 1600 N.m]
1-1/4 - 7 1-1/4 - 12	900 - 1000 Lbs. Ft. [1220 - 1360 N.m]	1475 - 1625 Lbs. Ft. [2000 - 2200 N.m]

CLARK RECOMMENDED WHEEL MOUNTING TORQUE



PROPER TIGHTENING PROCEDURE

(Use Tightening Sequence Shown)

Thread Size	Flat Nuts and Hardened Washer	Flat Nuts with Rim Clamps	Spherical Nuts
5/8 (.625)	175 - 190 Lbs. Ft. [240 - 260 N.m]	—	240 - 275 Lbs. Ft. [325 - 375 N.m]
3/4 (.750)	300 - 330 Lbs. Ft. [410 - 450 N.m]	250 Max. Lbs. Ft. [340 N.m]	450 - 500 Lbs. Ft. [610 - 680 N.m]
7/8 (.875)	475 - 525 Lbs. Ft. [645 - 710 N.m]	350 Max. Lbs. Ft. [475 N.m]	600 - 700 Lbs. Ft. [815 - 950 N.m]
1 (1.000)	725 - 800 Lbs. Ft. [985 - 1085 N.m]	—	750 - 900 Lbs. Ft. [1015 - 1220 N.m]

When the inner pinion bearing or the pinion shaft and ring gear are being replaced staking of the pinion end to the inner pinion bearing is required.

If a staking groove is in the pinion shaft use procedure shown in Figure "A" and a square end staking tool.

If pinion has no staking groove use procedure in Figure "B" and a standard prick punch to up-set the metal over the bearing inner race.

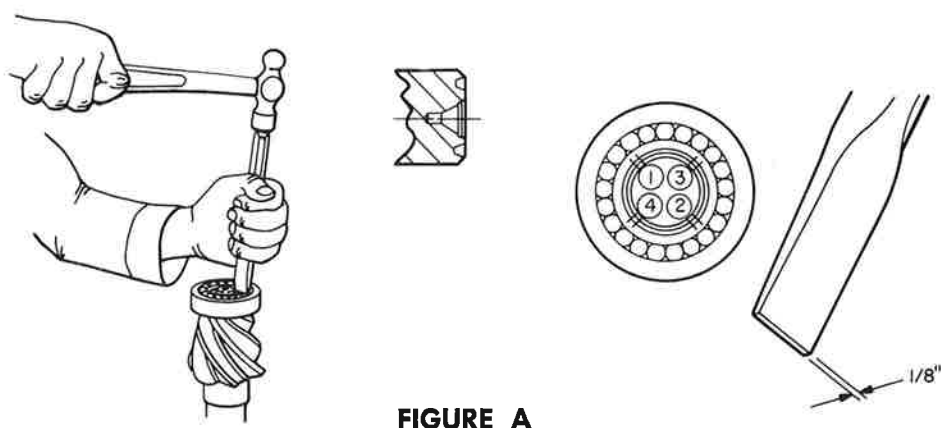


FIGURE A

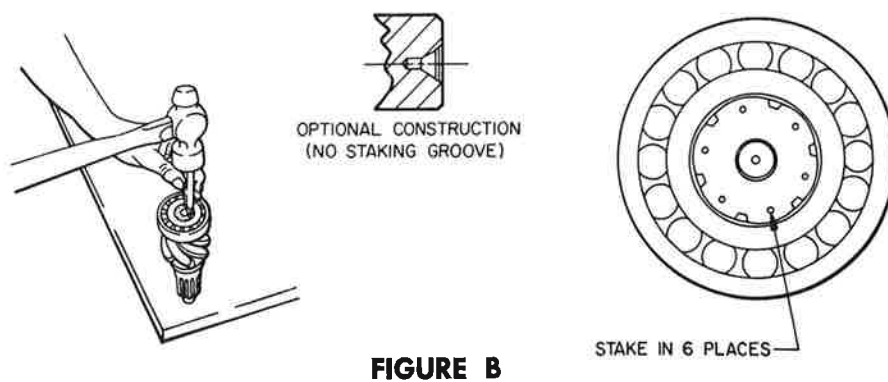


FIGURE B

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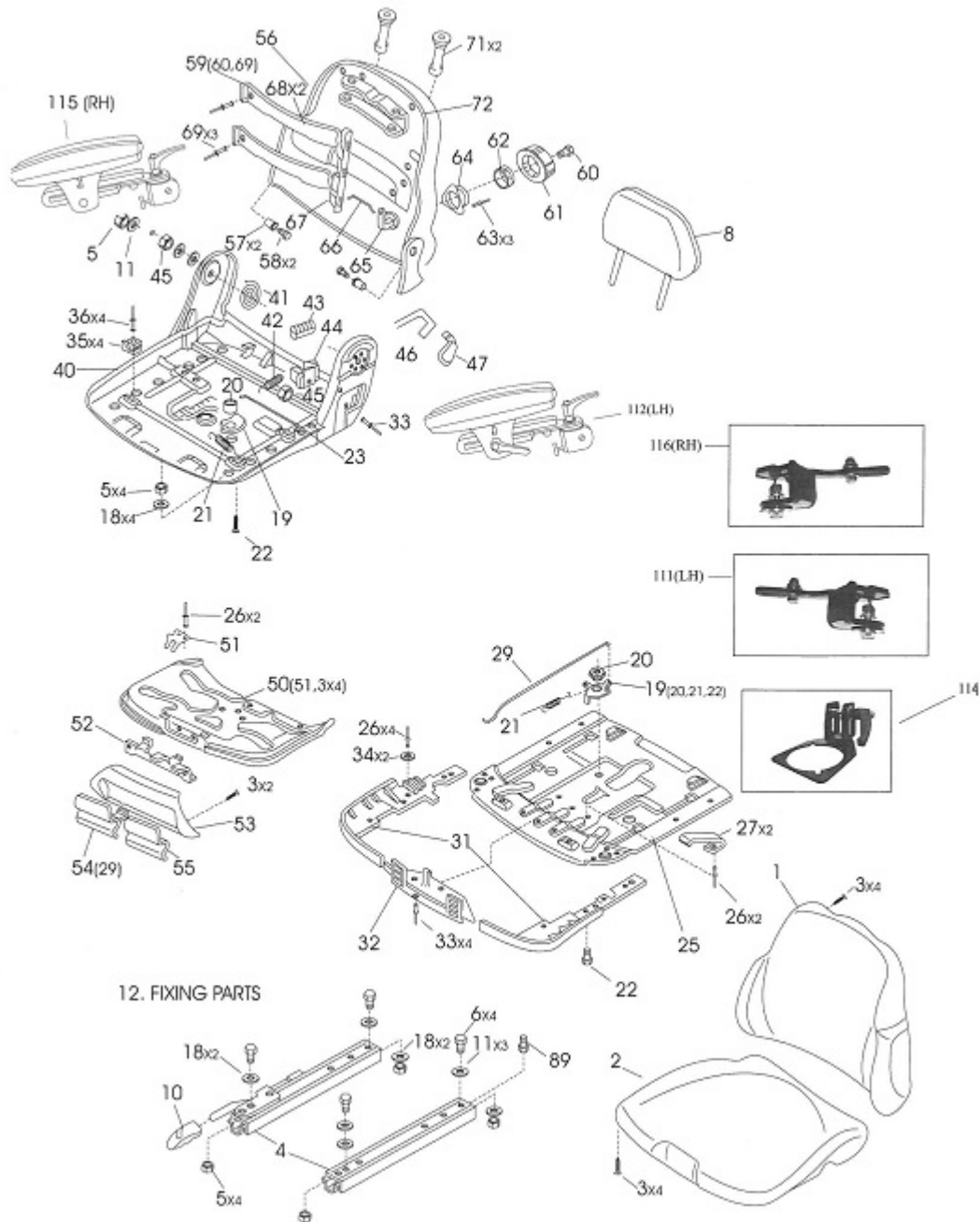
SPICER[®]

Off-Highway Products

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6996 SEAT ASSEMBLY W/SUSPENSION



Item	Part No.	Quantity	Description
1	5028-1-1	1	BACK REST CUSHION
2	5028-1-2	1	SEAT CUSHION
3	3513-3	10	SCREW

6996

SEAT ASSEMBLY W/SUSPENSION

<u>Item</u>	<u>Part No.</u>	<u>Quantity</u>	<u>Description</u>
4	3513-9	1	SET OF ADJUSTMENT RAILS
5	3653-1-5	6	NUT
6	3513-6	4	SCREW
8	2644-1-1	1	HEADREST EXTENSION (BLACK VINYL)
10	3513-10	1	HANDLE
11	3513-11	11	WASHER
12	3513-12	1	MOUNTING KIT FOR SLIDE RAILS
18	3513-18	6	WASHER
19	3513-75	1	LEVER
20	6700-20	1	BUSHING
21	3513-72	1	TENSION SPRING
22	3513-74	1	SCREW
25	3513-25	1	PLATE
26	3513-26	8	RIVET
27	3513-27	2	FLEXIBLE SHEATH
29	3513-71	1	RODS
31	3513-31	1	COVER
32	3513-32	1	BRACKET KIT
33	3513-33	5	BLIND RIVET
34	3513-34	2	WASHER
35	3513-29	4	GLIDE
36	3513-69	4	RIVET
40	5028-1-40	1	SEAT PAN
41	4008-37	1	LEG SPRING
42	5028-1-42	1	SPIRAL SPRING
43	5028-1-43	1	LOCK SEGMENT
44	5028-1-44	1	BEARING KIT
45	3513-43	2	NUT
46	5028-1-46	1	LEVER & HANDLE KIT



6996

SEAT ASSEMBLY W/SUSPENSION

<u>Item</u>	<u>Part No.</u>	<u>Quantity</u>	<u>Description</u>
47	5028-1-47	1	HANDLE COVER
50	3513-50	1	SEAT ANGLE ADJUSTMENT
51	3513-51	1	FLEXIBLE SHEATH
52	3513-52	1	LATCH
53	3513-53	1	COVER
54	3513-54	1	HANDLE
55	3513-55	1	GRIP HANDLE
56	5028-1-56	1	BACKREST PAN
57	4008-66	2	TUBE
58	3513-41	2	SCREW
59	3653-1-59	1	LUMBAR SUPPORT
60	3653-1-60	1	SCREW
61	4008-61	1	HANDLE
62	3653-1-62	1	TOOTHED WHEEL
63	3653-1-63	3	RIVET
64	3653-1-64	1	SLING SPRING BRAKE
65	4008-65	1	CARRIER
66	3653-1-14	1	ROD
67	3653-1-17	1	PLATE
68	3653-1-16	2	PLATE
69	3513-15	7	RIVET
71	3513-57	2	BUSHING
72	3513-58	1	RETAINER
87	5814-87	1	COVER PVS PLASTIC
89	3513-5	4	NUT
90	2644-1-25	4	SCREW
91	3653-1-88	1	SEAT TILT & DEPTH KIT
111	6700-111	1	LEFT HAND MOUNTING BRACKET
112	4008-83	1	L/H ARMREST CONCAVE WITHOUT BRACKET



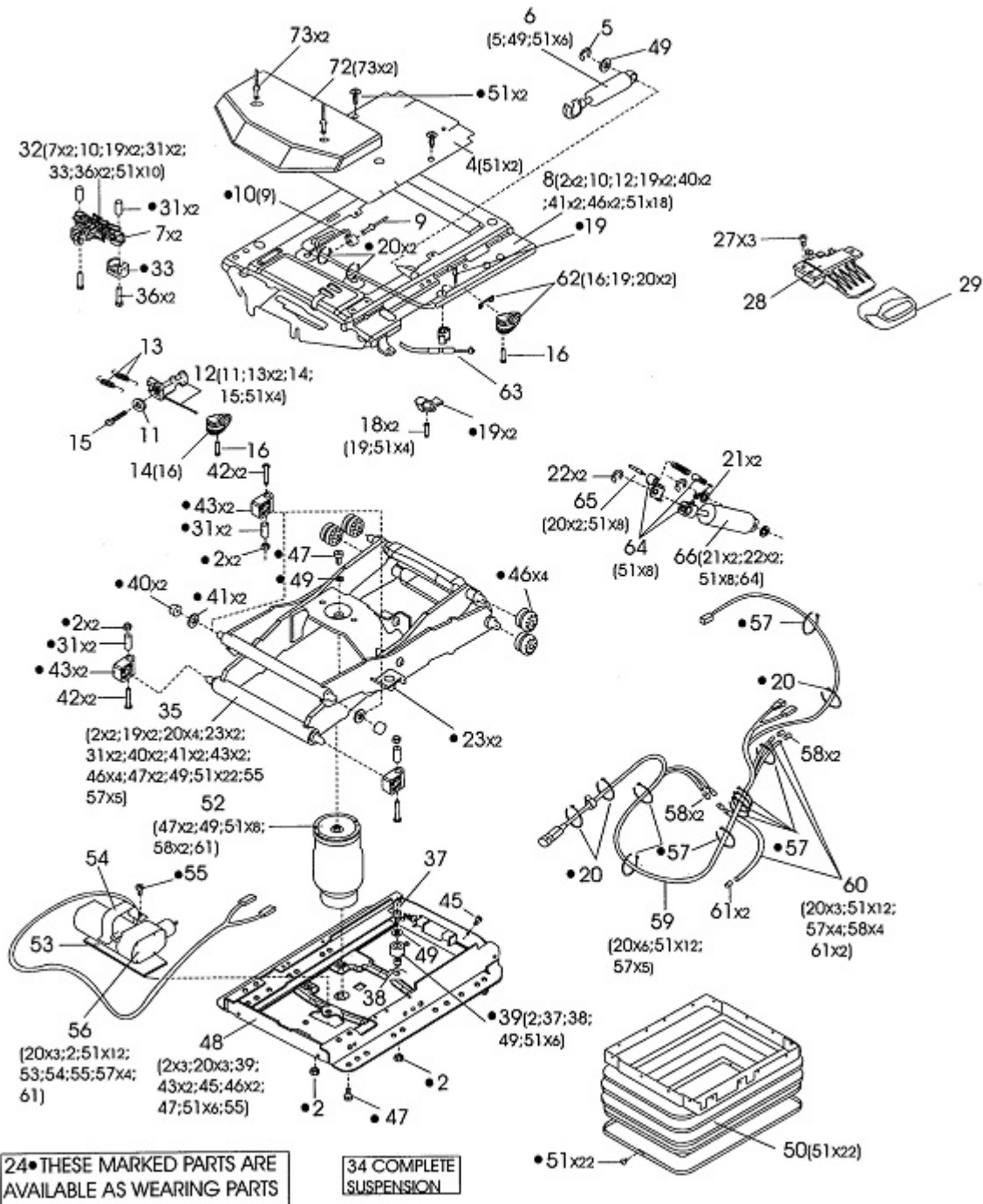
6996

SEAT ASSEMBLY W/SUSPENSION

<u>Item</u>	<u>Part No.</u>	<u>Quantity</u>	<u>Description</u>
112A	5152-40-2-1	2	BRACKET SUPPORT FOR JOYSTICK
112A		1	(NOT ILLUSTRATED)
112A		1	(SOLD SEPARATELY)
114	4008-81	2	CONTROL HOLDER 102MM
115	6700-115	1	RIGHT HAND ARMREST WITHOUT BRACKET
115B	6996-117	1	R/H BRACKET SUPPORT FOR JOYSTICK
115B		1	(NOT ILLUSTRATED)
115B		1	(SOLD SEPARATELY)
116	6996-116	1	BRACKET FOR ARMREST



4008-2 SEAT SUSPENSION



Item	Part No.	Quantity	Description
2	3513-43	6	NUT
4	3653-2-4	1	COVER

4008-2 SEAT SUSPENSION

<u>Item</u>	<u>Part No.</u>	<u>Quantity</u>	<u>Description</u>
5	3653-2-5	1	E-CLIP
6	3653-2-6	1	SHOCK ABSORBER
7	3653-2-7	2	BUSHING
8	4008-2-8	1	SUSPENSION UPPER PART
9	4008-2-9	1	NSS SEE PART 5814-1-78 KIT
10	3653-2-10	1	BUMPER
11	3513-34	1	WASHER
12	3653-2-12	1	LOCKING LEVER
13	3653-2-13	2	TENSION SPRING
14	3653-2-14	1	HANDLE
16	3653-2-16	2	SCREW
18	3653-2-18	2	STOP
19	3653-2-19	3	RIVET
20	3513-8	6	CABLE FASTENER
21	3653-2-21	2	WASHER
22	3653-2-22	2	E-CLIP
23	3513-22	2	BUMPER
24	4008-2-24	1	SET OF WEAR PARTS (SEAT SUSP)
28	4008-2-27	3	SCREW
29	4008-2-28	1	CONTROL VALVE
30	3653-2-30	1	HANDLE
31	3653-2-31	4	TUBE / SPACER
32	3653-2-32	1	HORIZONTAL ISOLATOR
33	3653-2-33	1	BUMPER
34	4008-2-34	1	SEAT SUSPENSION
35	3653-2-35	1	SWING ARM
36	3653-2-36	2	SCREW
37	3653-2-37	1	SCREW
38	3653-2-38	1	TUBE



4008-2 SEAT SUSPENSION

<u>Item</u>	<u>Part No.</u>	<u>Quantity</u>	<u>Description</u>
39	3653-2-39	1	BUMPER
40	4008-2-40	2	NEEDLE BUSHING
41	4008-2-41	2	FELT RING
42	3653-2-42	2	SCREW
43	3653-2-43	2	BEARING
45	3653-2-45	1	SCREW
46	3653-2-46	4	ROLLER
47	3653-2-47	2	SCREW
48	3653-2-48	1	SUSPENSION LOWER PART
49	3513-18	3	WASHER
50	4008-2-50	1	BELLOWS
51	3653-2-51	24	RETAINER PLUG
52	3653-2-52	1	AIR SPRING
53	3653-2-53	1	PLATE
54	3653-2-54	1	BRACKET
55	3653-2-55	1	SCREW
56	3653-2-56	1	COMPRESSOR 24V
57	3653-2-57	5	CABLE FASTENER
58	3653-2-58	4	HOSE NIPPLE
59	3654-59	1	CONNECTING CABLE
60	3653-2-60	1	AIR HOSE KIT
61	3653-2-61	2	HOSE CLAMP
62	4008-2-62	1	HANDLE
63	4008-2-63	1	GUIDE
64	4008-2-64	1	BEARING
65	4008-2-65	1	BOWDEN CABLE
66	4008-2-66	1	SHOCK ABSORBER
72	3653-2-72	1	COVER
73	3653-2-73	2	RIVET



[PLT-1](#)
(SEE HYD. BRAKE)

[PLT-2](#)
(SEE HYD. BRAKE)

[PRH-1](#)
(SEE HYD. BRAKE)

[PRH-2](#)
(SEE HYD. BRAKE)

[TRH-1](#)
(SEE HYD. BRAKE)

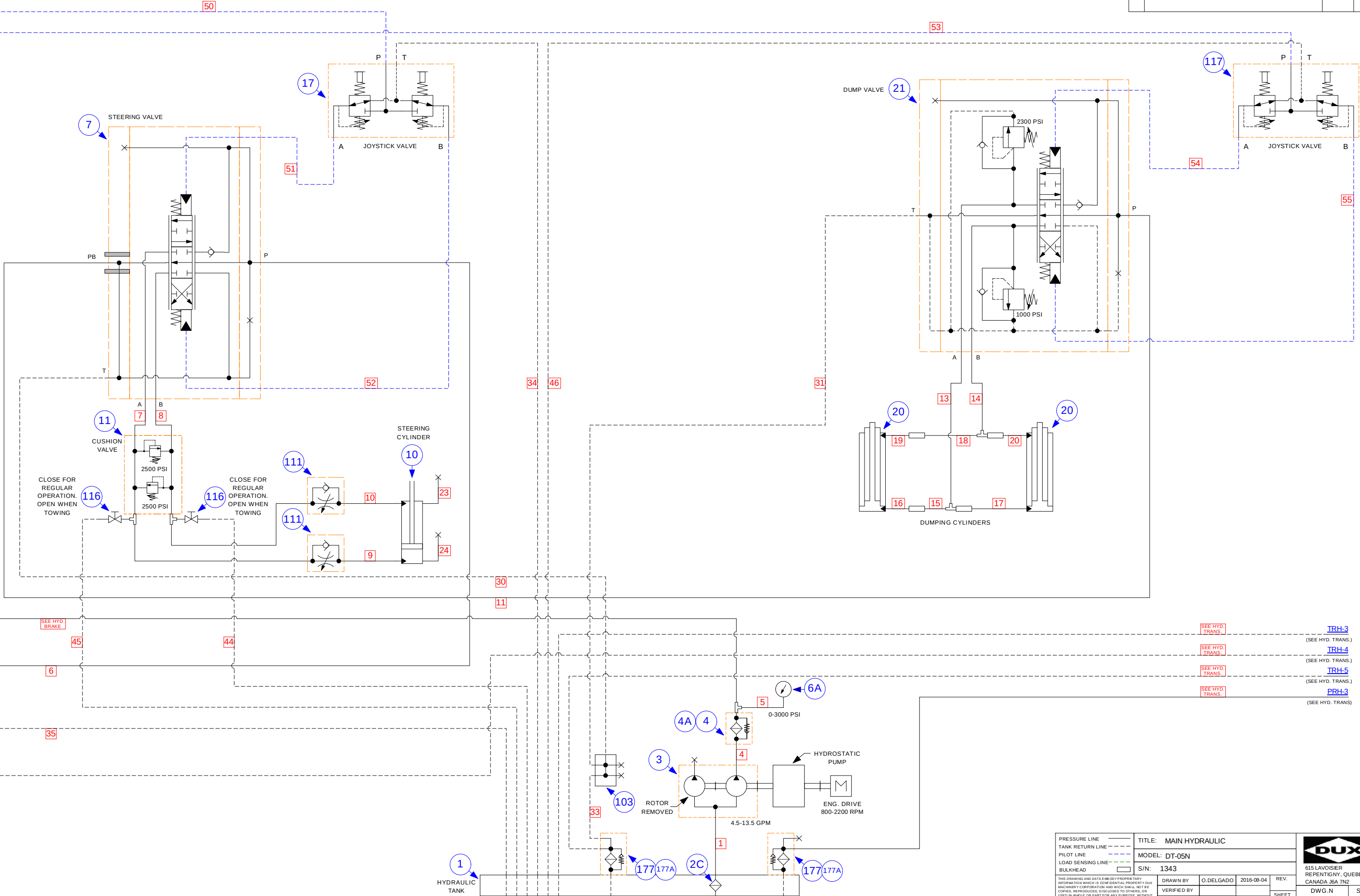
[TRH-2](#)
(SEE HYD. BRAKE)

[TRH-3](#)
(SEE HYD. TRANS.)

[TRH-4](#)
(SEE HYD. TRANS.)

[TRH-5](#)
(SEE HYD. TRANS.)

[PRH-3](#)
(SEE HYD. TRANS.)



7013 MAIN HYDRAULIC SYSTEM

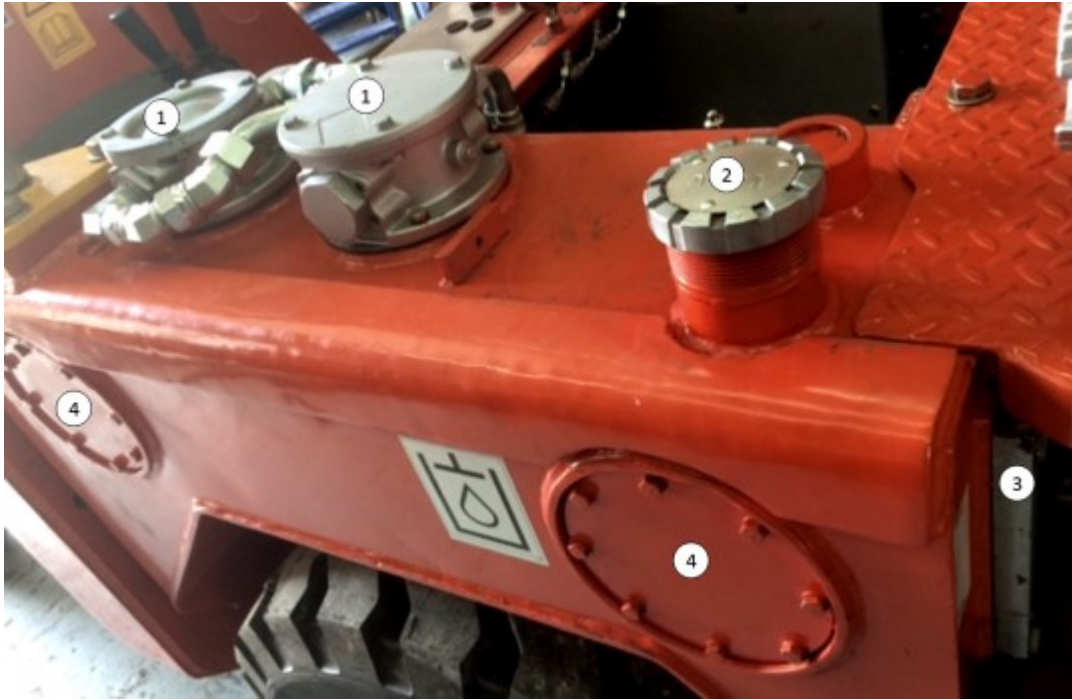
<u>Item</u>	<u>Part No.</u>	<u>Quantity</u>	<u>Description</u>
001		1	(SEE ASSEMBLY IN THIS SECTION)
002C	6974-2C	1	MAGNETIC SUCTION SEPARATORS
003	6973-3	1	PUMP
004	5257-4	1	HIGH PRESSURE FILTER ASSEMBLY
004A	102-6689	1	FILTER ELEMENT-HIGH PRESSURE FILTER
006A	2094-3	1	PRESSURE GAUGE 3000 psi
007	4658-14	1	STEERING VALVE
010	6973-10	1	STEERING CYLINDER
011	4260-13	1	CUSHION VALVE
017	4976-17	1	JOYSTICK 29-160 PSI W/O SWITCH
020	6962	2	DUMP BOX CYLINDER
021	4117-17	1	EJECTOR VALVE
103	6264	1	MANIFOLD BLOCK
111	6973-111	2	NEEDLE VALVE 1/2" NPT F-F 13GPM 5800PSI
116	102-6656	2	NEEDLE VALVE
117	6973-117	1	JOYSTICK VALVE ASSEMBLY
177	6973-177	2	TANK MOUNTED RETURN FILTER
177A	6973-177A	2	RETURN FILTER /SUCTION STRAINER



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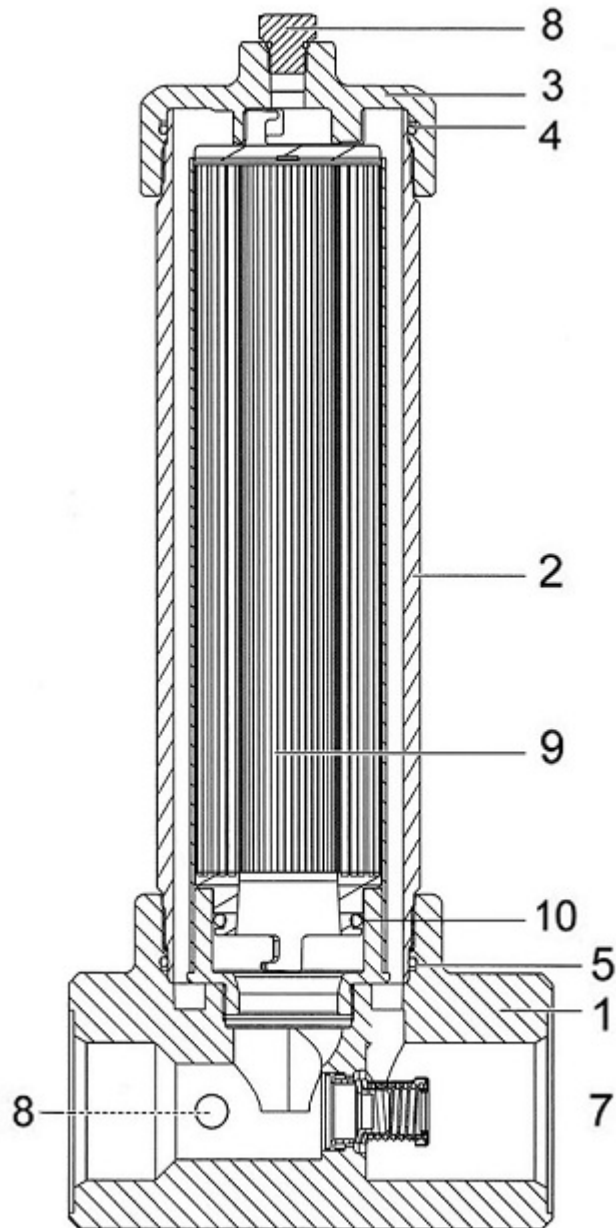


7006 HYDRAULIC TANK ASSEMBLY



<u>Item</u>	<u>Part No.</u>	<u>Quantity</u>	<u>Description</u>
1	6973-177	2	TANK MOUNTED RETURN FILTER
1A	6973-177A	2	RETURN FILTER /SUCTION STRAINER
1A		1	(NOT ILLUSTRATED)
2	1333-8	1	VENT CAP
3	7006-4	1	SIGHT GAUGE 9"
4	7006-2	2	TANK COVER
4A	7006-3	2	COVER ORING SEAL
4A		1	(NOT ILLUSTRATED)
5	6974-2C	1	MAGNETIC SUCTION SEPARATORS
5A		1	(NOT ILLUSTRATED)

5257-4 HIGH PRESSURE FILTER ASSEMBLY



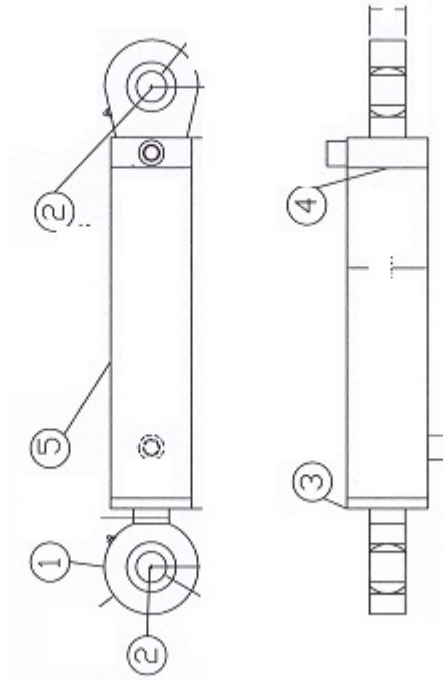
5257-4

HIGH PRESSURE FILTER ASSEMBLY

<u>Item</u>	<u>Part No.</u>	<u>Quantity</u>	<u>Description</u>
1		-	(NOT SOLD SEPARATELY)
2		-	(NOT SOLD SEPARATELY)
3	5257-4-3	1	FILTER COVER
3		-	(NOT SOLD SEPARATELY)
4		-	(NOT SOLD SEPARATELY)
5		-	(NOT SOLD SEPARATELY)
6	5257-4-6	1	SEAL KIT-FILTER ASSEMBLY
7	5257-4-7	1	INDICATOR
8	5257-4-8	1	PLUG
9	102-6689	1	FILTER ELEMENT-HIGH PRESSURE FILTER
10	5257-4-10	1	O-RING-FILTER ASSEMBLY

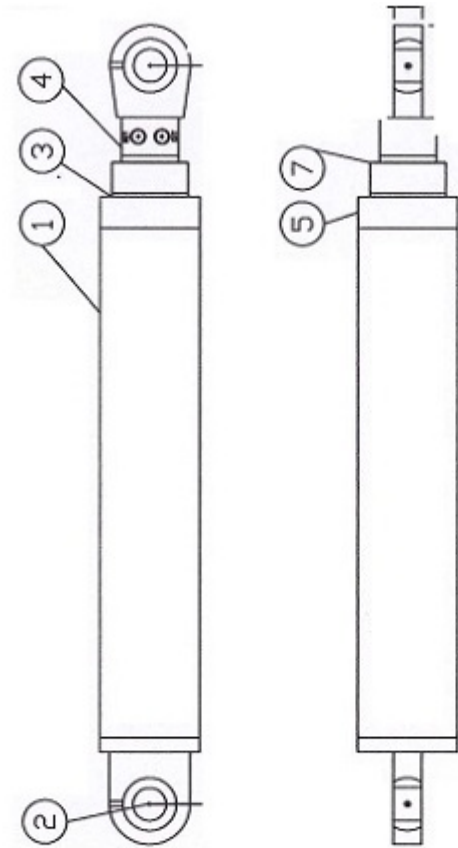


6973-10 STEERING CYLINDER

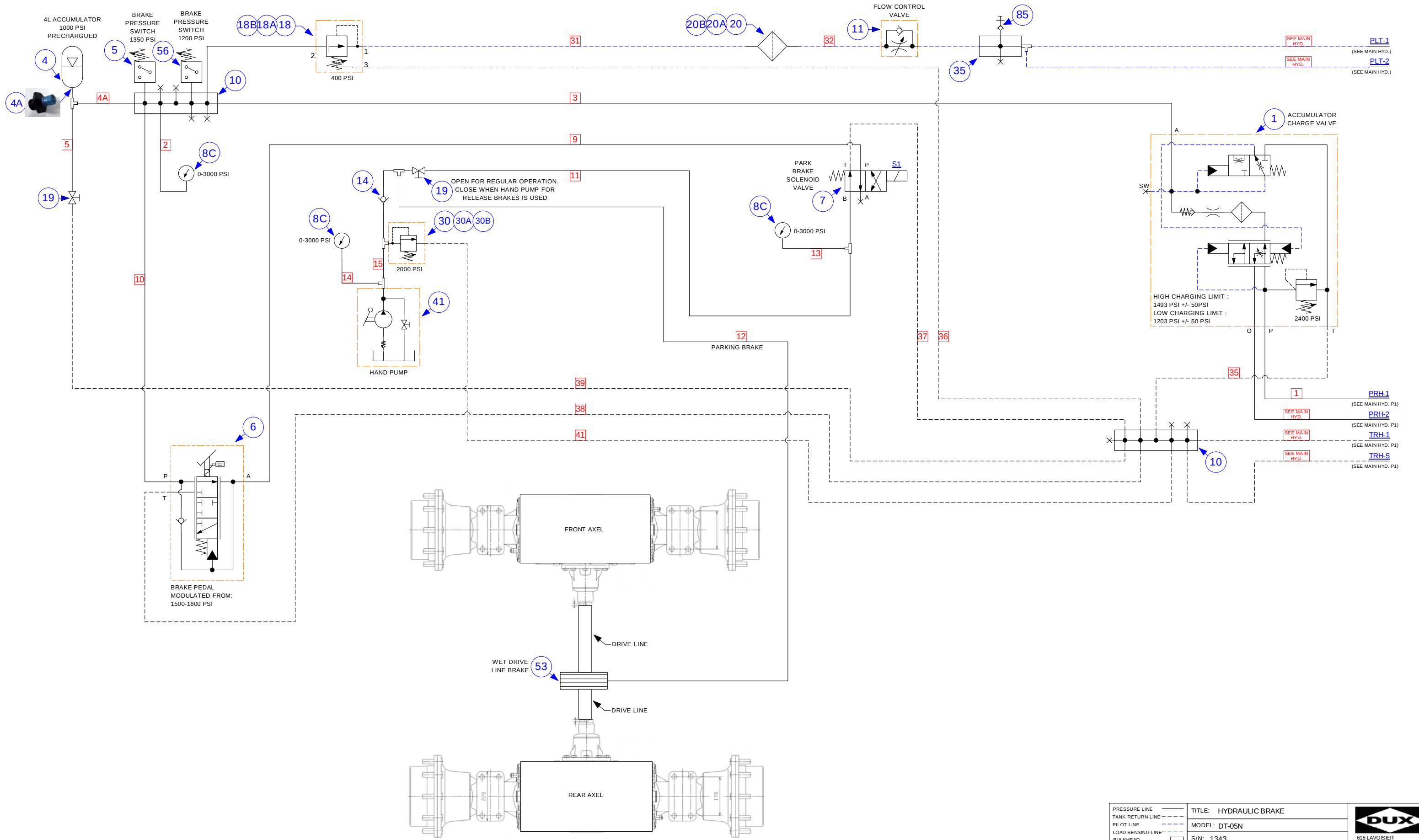


<u>Item</u>	<u>Part No.</u>	<u>Quantity</u>	<u>Description</u>
1	6973-10-1	1	TUBE COMPLETE WITH YOKE
2	1973-10-5	2	SPHERICAL PLAIN BEARING
3	6973-10-3	1	MAIN HEAD
4	6973-10-4	1	CYLINDER PISTON
5	6973-10-5	1	CYLINDER ROD 1 3/4 WITH YOKE
6	6973-10-8SK	1	SEAL KIT-STEERING CYLINDER

6962 DUMP BOX CYLINDER



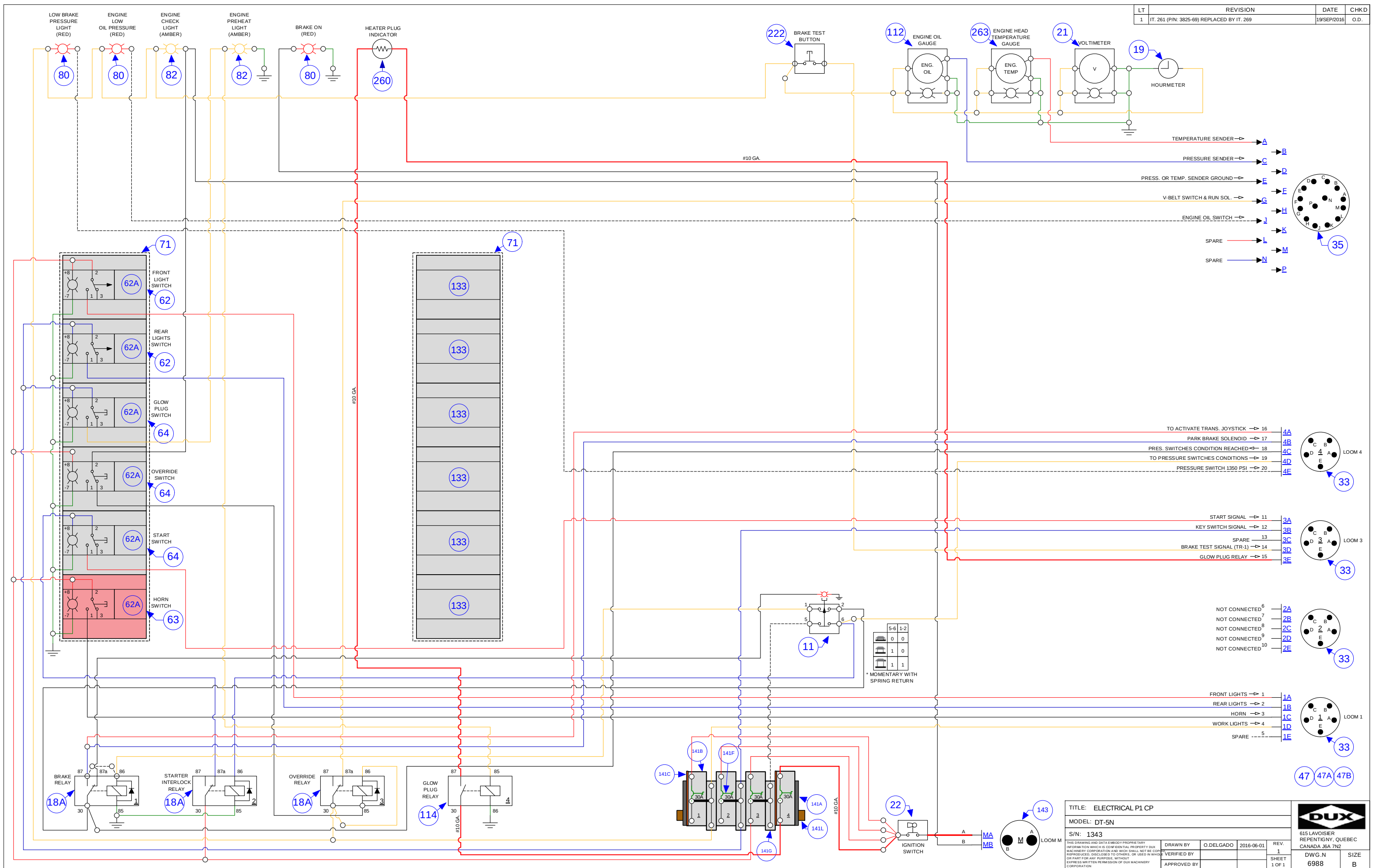
<u>Item</u>	<u>Part No.</u>	<u>Quantity</u>	<u>Description</u>
1	6962-1	1	TUBE COMPLETE WITH YOKE
2	1973-10-5	2	SPHERICAL PLAIN BEARING
3	6962-3	1	4 INCH CHROME SECTION
4	6962-4	1	3 INCH CHROME SECTION WITH YOKE
5	6962-5	1	MAIN TUBE HEAD
6	6962-6SK	1	SEAL KIT - DUMP CYLINDER
6		1	(NOT ILLUSTRATED)
7	6962-7	1	3 INCH HEAD



6987 HYDRAULIC BRAKE SYSTEM

<u>Item</u>	<u>Part No.</u>	<u>Quantity</u>	<u>Description</u>
001	6987-1	1	ACCUMULATOR CHARGE VALVE
004	4784	1	ACCUMULATOR 4L
004A	4784-1	1	SHREDDER TYPE CHARGE VALVE
005	5818-5	1	BRAKE ACCUMULATOR PRESSURE SWITCH 1350 PSI
006	2446-7	1	BRAKE PEDAL ASSEMBLY
007	2203-33-7	1	SOLENOID VALVE ASSEMBLY -24V
008C	2094-3	3	PRESSURE GAUGE 3000 psi
010	4982	2	MANIFOLD BLOCK
011	3701-31	1	FLOW CONTROL VALVE 3/8
014	3656-27	1	CHECK VALVE
018	3057-14	1	PRESSURE REDUCING VALVE ASSEMBLY
018A	3057-14A	1	VALVE BODY
018B	3057-14B	1	PRESSURE REDUCING CARTRIDGE
019	4469-8	2	NEEDLE VALVE 3/8 NPT
020	3434-7	1	MEDIUM PRESSURE FILTER ASSEMBLY
020A	3434-7A	1	FILTER HEAD
020B	3434-7B	1	FILTER CARTRIDGE-PRESSURE FILTER
030	6955-30	1	PRESSURE RELIEF VALVE
030A	6955-30A	1	RELIEF VALVE BODY
030B	4692-30B	1	RELIEF VALVE ASSEMBLY
035	6088	1	MANIFOLD BLOCK
041	5873-41	1	HAND PUMP STRONGARM
053	6955-53	1	DRIVELINE WET DISC BRAKE
056	6987-56	1	PRESSURE SWITCH -1200 PSI
085	6987-85	1	TEST POINT SIMPLE 9/16 UNF (-6 SAE)





6988-P1 ELECTRICAL SYSTEM: CONTROL PANEL

<u>Item</u>	<u>Part No.</u>	<u>Quantity</u>	<u>Description</u>
011	5763	1	EMERGENCY PARK BRAKE SWITCH
018A	6070-18A	3	RELAY 24V
019	2118-13	1	HOURLMETER
021	2191-6	1	VOLTMETER
022	2118-18	1	KEY SWITCH
033	2752-28	4	RECEPTACLE MALE
035	4656-48	1	RECEPTACLE
047	5877-1	1	STAINLESS STEEL ENCLOSURE
047A	5877-1B	1	STAINLESS STEEL BOX
047B	5938-47B	1	STAINLESS STEEL COVER
062	5045-62	2	SWITCH ROCKER ON/OFF BLACK
062A	5045-62A	6	BASE FOR ROCKER SWITCH AMP
063	5045-63	1	SWITCH ROCKER RED ON/ON
064	5045-64	3	SWITCH ROCKER BLACK ON/ON
071	5082-71	2	6 POSITION BEZEL
080	4656-19	3	WARNING LIGHT (RED)
082	4656-30	2	WARNING LIGHT (AMBER)
112	2118-29	1	PRESSURE GAUGE
114	2419-35	1	SOLENOID RELAY
133	5257-133	6	BLANK PLUG
141A	5274-141A	2	WAGO END STOP
141B	5274-141B	3	FUSE HOLDER
141C	5274-141C	2	FUSE HOLDER END PLATE ORANGE
141F	5274-141F	4	CIRCUIT BREAKER 30AMP
141G	5274-141G	3	2-CONDUCTOR TERMINAL
141L	5274-141L	1	SLOTTED MOUNTING RAIL
143	5378-143	1	RECEPTABLE MALE
222	6765-222	1	BRAKE TEST PUSH BUTTON

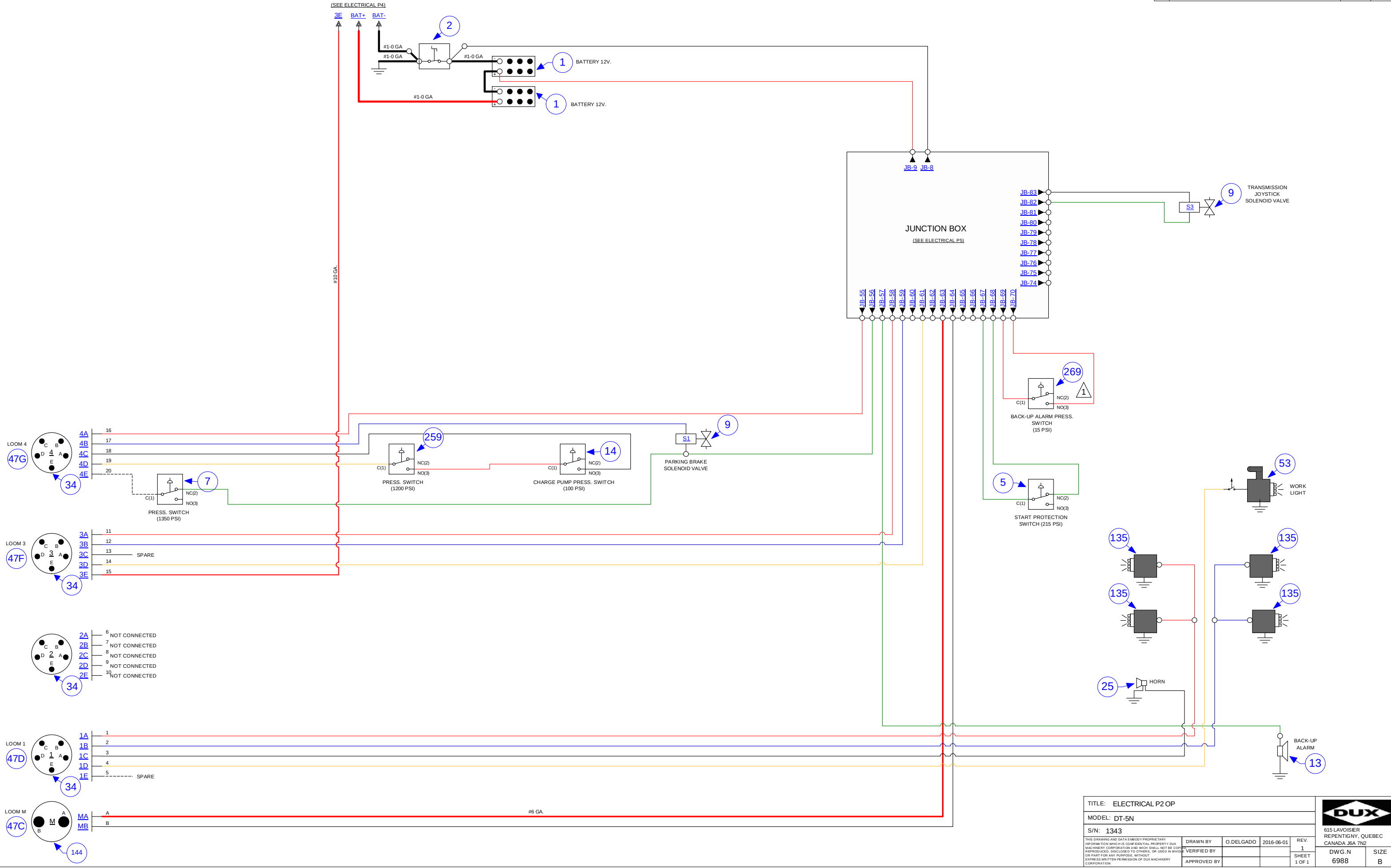


6988-P1

ELECTRICAL SYSTEM: CONTROL PANEL

<u>Item</u>	<u>Part No.</u>	<u>Quantity</u>	<u>Description</u>
260	2289-2	1	HEATER PLUG INDICATOR
263	2118-27	1	TEMPERATURE GAUGE



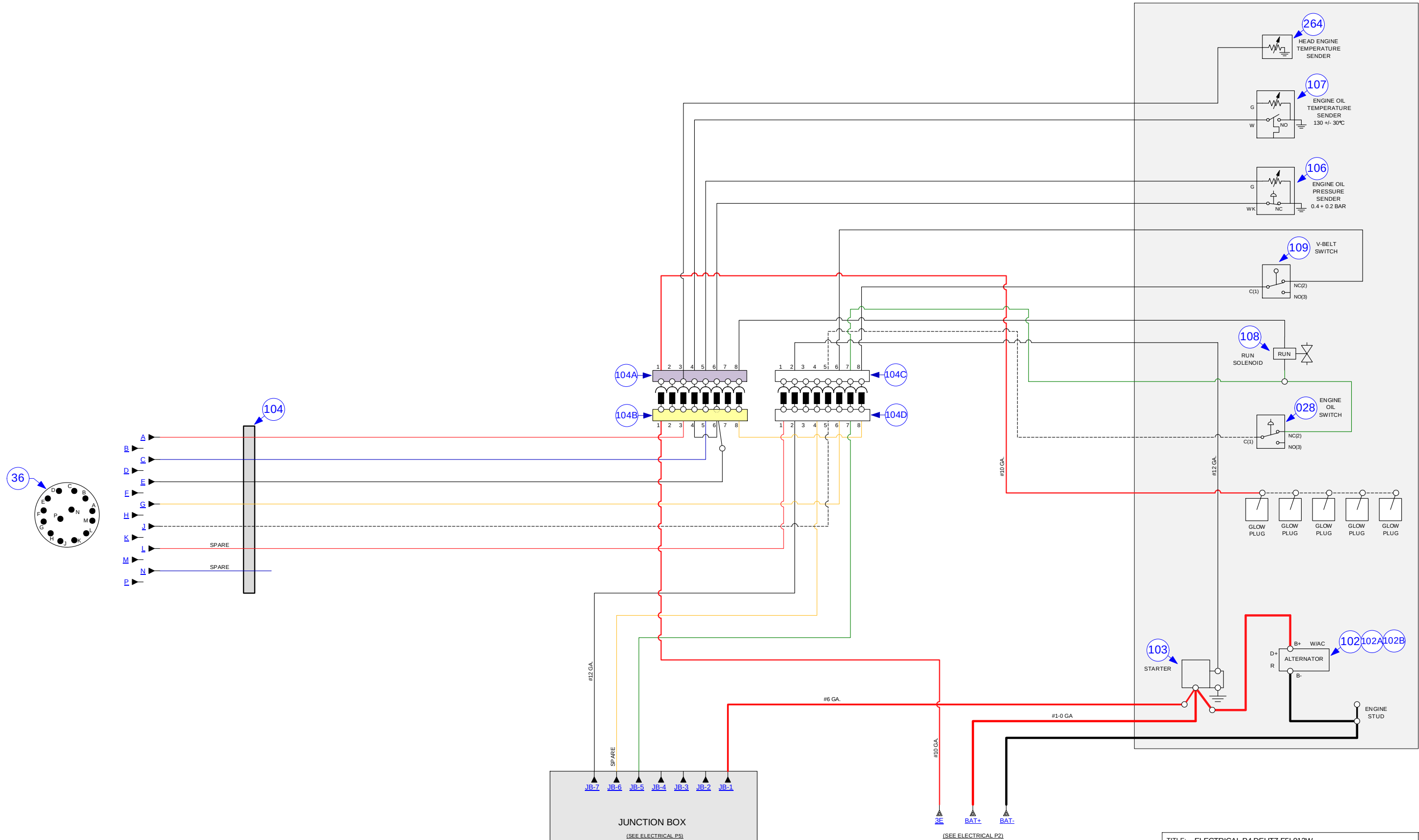


6988-P2

ELECTRICAL SYSTEM: OPERATING

<u>Item</u>	<u>Part No.</u>	<u>Quantity</u>	<u>Description</u>
001	2118-26	2	BATTERY 1000 AMPS
002	1462-35	1	MASTER CUT-OFF SWITCH
005	5391-5	1	STARTER PROTECTION SWITCH 215 PSI
007	5818-5	1	BRAKE ACCUMULATOR PRESSURE SWITCH 1350 PSI
009	2203-33-7	2	SOLENOID VALVE ASSEMBLY -24V
013	3305-12	1	BACK-UP ALARM H/D
014	5391-14	1	TRANSMISSION PRESSURE SWITCH 100 PSI
025	2118-15	1	ELECTRIC HORN 24V
034	2752-75	4	PLUG ASSEMBLY
047C	6988-47C	1	LOOM M
047D	6988-47D	1	LOOM 1
047F	6988-47F	1	LOOM 3
047G	6988-47G	1	LOOM 4
053	6885-53	1	DIRECTIONAL WORK LED LIGHT ASSEMBLY
135	6497-135	4	LED LIGHT ASSEMBLY WITH SQUARE SWIVEL BRACKET
144	5378-144	1	CONNECTOR FEMALE
259	6987-56	1	PRESSURE SWITCH -1200 PSI
269	2118-11	1	PRESSURE SWITCH





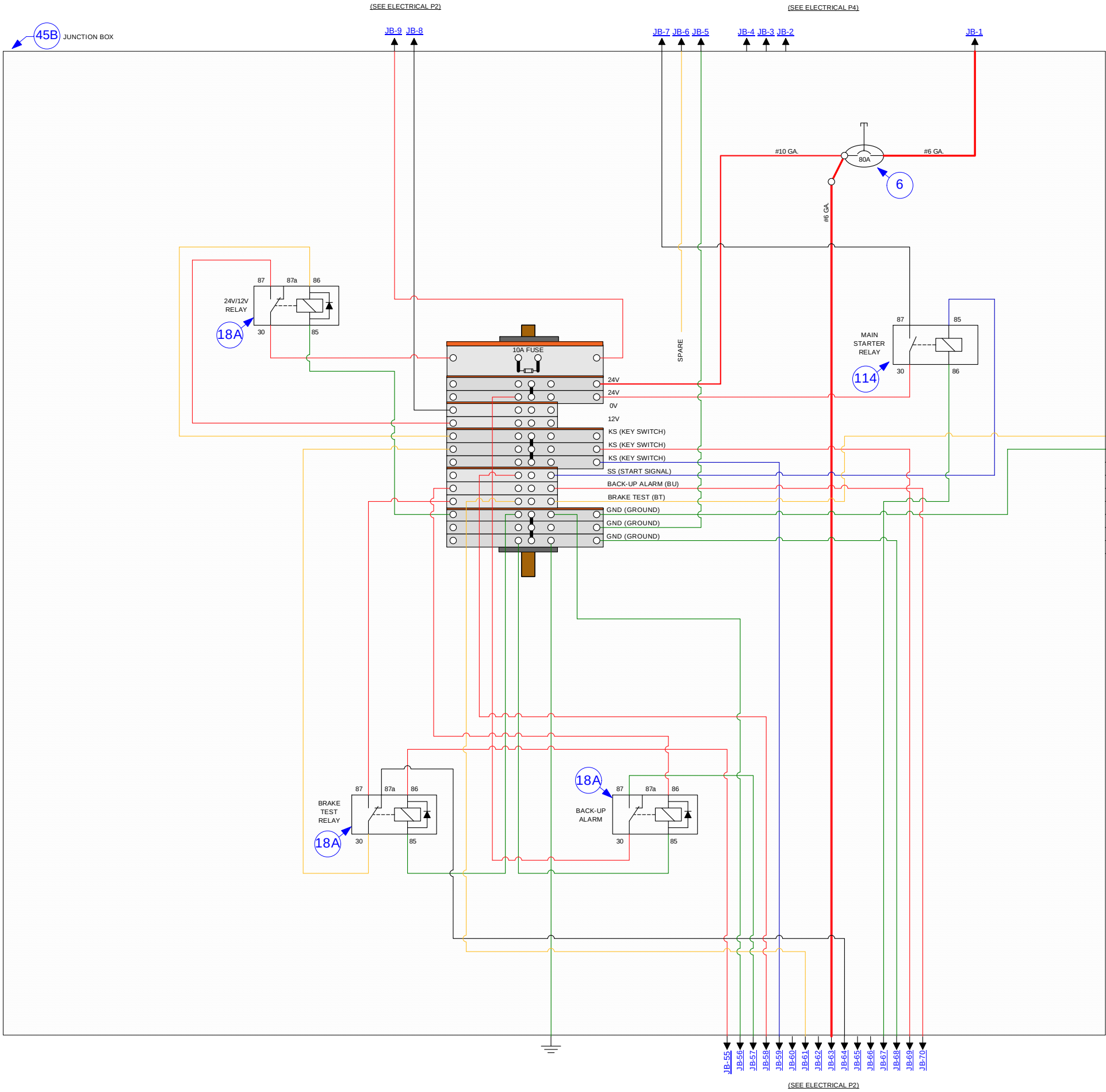
6988-P4

ELECTRICAL SYSTEM: ENGINE

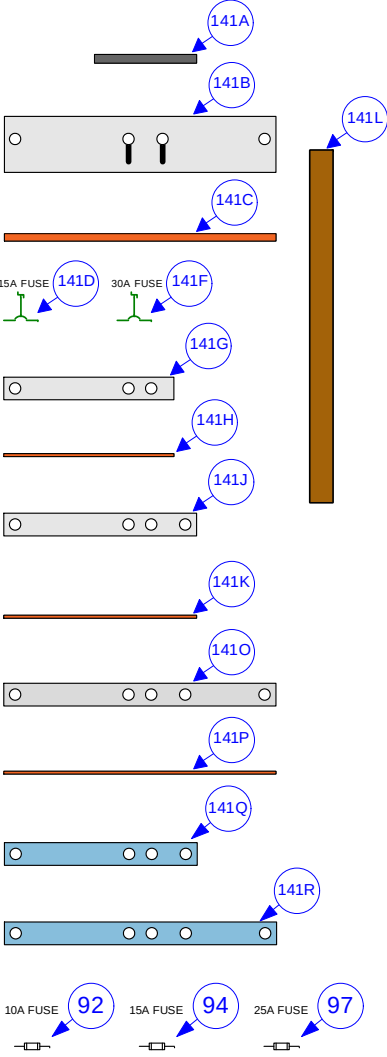
<u>Item</u>	<u>Part No.</u>	<u>Quantity</u>	<u>Description</u>
028	2118-11	1	PRESSURE SWITCH
036	4656-14	1	PLUG
102	2856-7	1	ALTERNATOR 55 AMP 24V
102A	6988-102A	1	ALTERNATOR BELT
102B	6988-102B	1	PULLEY V GROOVE
103	6988-103	1	STARTER
104	6988-104	1	ENGINE HARNESS
104A	6988-104A	1	ATTACHMENT PLUG
104B	6988-104B	1	PLUGIN CONNECTOR
104C	6988-104C	1	HARNESS COUNTER PLUG
104D	6988-104D	1	PLUG-IN CONNECTOR
106	2118-30	1	ENGINE OIL PRESS SENDER
107	5147-107	1	TEMPERATURE SENDER
108	2368-34	1	ENG.RUN SOLENOID 24V
109	6988-109	1	V BELT SWITCH
264	2118-28	1	ENGINE TEMP SENDER (SHORT)



LT	REVISION	DATE	CHKD
1	IT. 261 (P/N: 3825-69) REPLACED BY IT. 269	19/SEP/2016	O.D.



LEGEND :



TITLE: ELECTRICAL P5 JB					
MODEL: DT-5N					
S/N: 1343				615 LAVOISIER REPENTIGNY, QUEBEC CANADA J6A 7N2	
THIS DRAWING AND DATA IS MIDDY PROPRIETARY INFORMATION WHICH IS CONFIDENTIAL PROPERTY OF DUX MACHINERY CORPORATION AND WHICH SHALL NOT BE COPIED, REPRODUCED, DISCLOSED TO OTHERS, OR USED IN WHOLE OR PART FOR ANY PURPOSE, WITHOUT EXPRESS WRITTEN PERMISSION OF DUX MACHINERY CORPORATION.		DRAWN BY	O.DELGADO	2016-06-01	REV. 1
		VERIFIED BY			SHEET 1 OF 1
		APPROVED BY			
DWG. N 6988				SIZE B	

6988-P5

ELECTRICAL SYSTEM: JUNCTION BOX

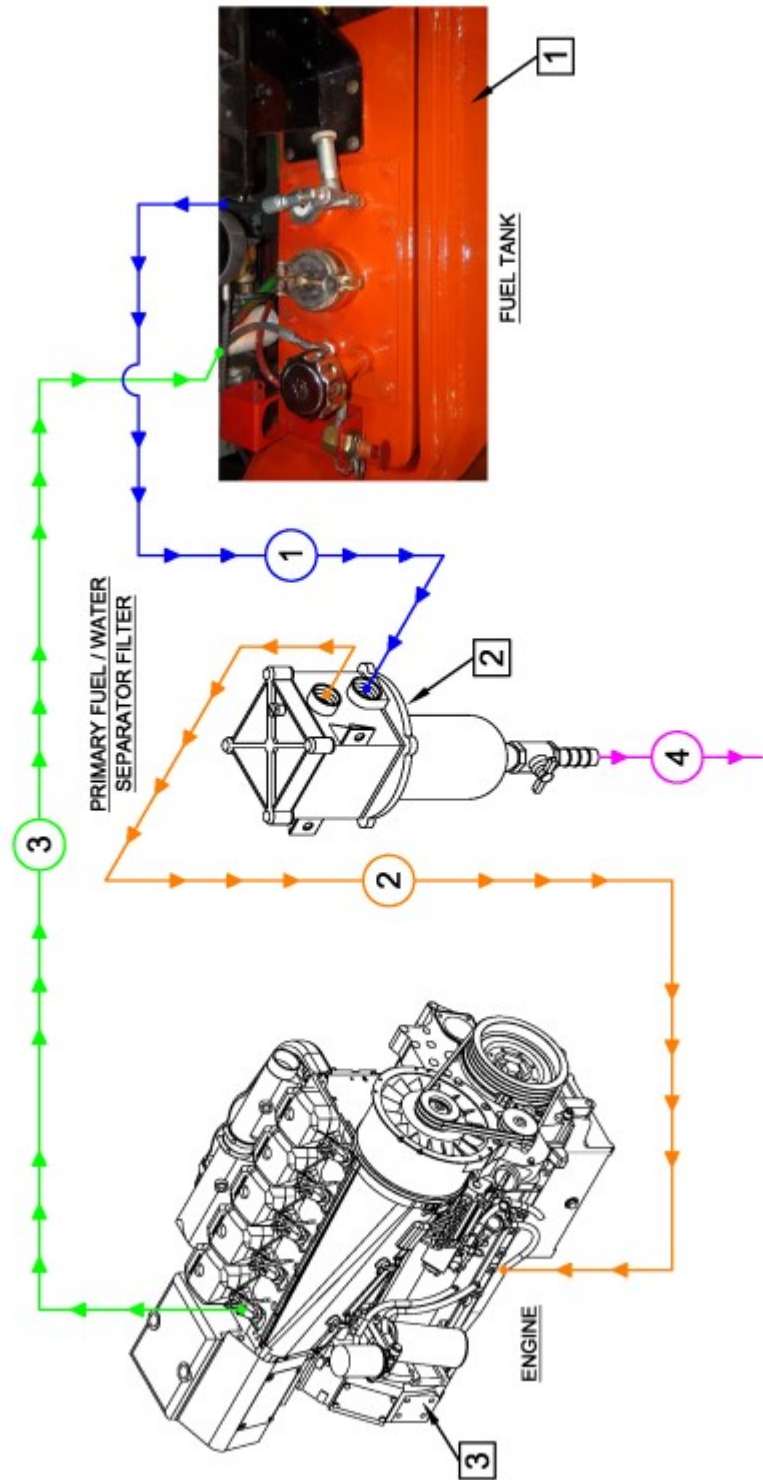
<u>Item</u>	<u>Part No.</u>	<u>Quantity</u>	<u>Description</u>
006	2856-39	1	BREAKER 80 AMP
018A	6070-18A	3	RELAY 24V
045B	5681-45	1	ELECTRICAL BOX WITH COVER
092	4656-77	1	FUSE 10 AMP
114	2419-35	1	SOLENOID RELAY
141A	5274-141A	2	WAGO END STOP
141B	5274-141B	1	FUSE HOLDER
141C	5274-141C	1	FUSE HOLDER END PLATE ORANGE
141J	5274-141J	5	3 CONDUCTOR TERMINAL
141K	5274-141K	2	3 CONDUCTOR TERMINAL END PLATE
141L	5274-141L	1	SLOTTED MOUNTING RAIL
141O	6221-141O	8	4 CONDUCTOR TERMINAL
141P	6221-141P	3	4 CONDUCTOR END PLATE



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7016
FUEL SYSTEM SCHEMATIC



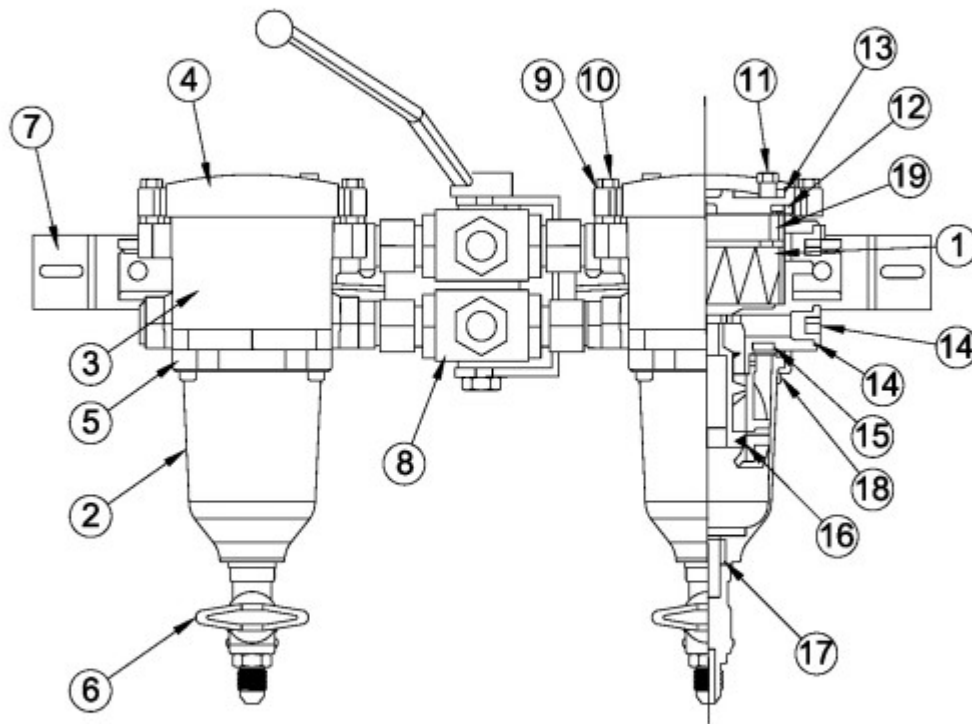
7016

FUEL SYSTEM SCHEMATIC

<u>Item</u>	<u>Part No.</u>	<u>Quantity</u>	<u>Description</u>
1	7016-1	1	FUEL TANK ASSEMBLY
2	7011-7	1	FUEL FILTER / SEPARATOR
3	F5L912W	1	REMAN DEUTZ ENGINE XE VERSION W/O ELECTRICAL & APPLICATION



7011-7 FUEL FILTER / SEPARATOR



7011-7 FUEL FILTER / SEPARATOR

<u>Item</u>	<u>Part No.</u>	<u>Quantity</u>	<u>Description</u>
1	7011-7-1	1	PRIMARY FUEL PREFILTER CARTRIDGE
2	7011-7-2	1	CLEAR BOWL
3	7011-7-3	1	HOUSING
4	7011-7-4	1	LID
5	7011-7-5	1	RETAINER RING
6	7011-7-6	1	DRAIN VALVE
7	7011-7-7	1	MOUNTING BRACKET
8	7011-7-8	1	REVERSING VALVE ASSEMBLY
9	7011-7-9	4	WASHER
10	7011-7-10	4	LID SCREW
11	7011-7-11	1	BLEED SCREW
12	7011-7-12	1	LID GASKET
13	7011-7-13	1	BLEED SCREW GASKET
14	7011-7-14	2	PLUG / O-RING
15	7011-7-15	1	BOWL GASKET
16	7011-7-16	1	CENTRIFUGE
17	7011-7-17	1	DRAIN VALVE O-RING
18	7011-7-18	1	BOW SCREW
19	7011-7-19	1	SPRING FRAME

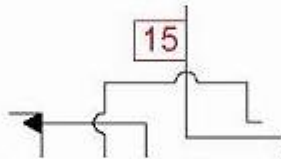


7016-H HOSE CUTTING LIST

HOSE CUTTING LIST

Item:
HOSE ASSEMBLY-HOSE COMPONENT

HOSE ASSEMBLY



(red boxes on system schematic)

HOSE COMPONENT



(hose length "B" shown in inches)

7016-H HOSE CUTTING LIST

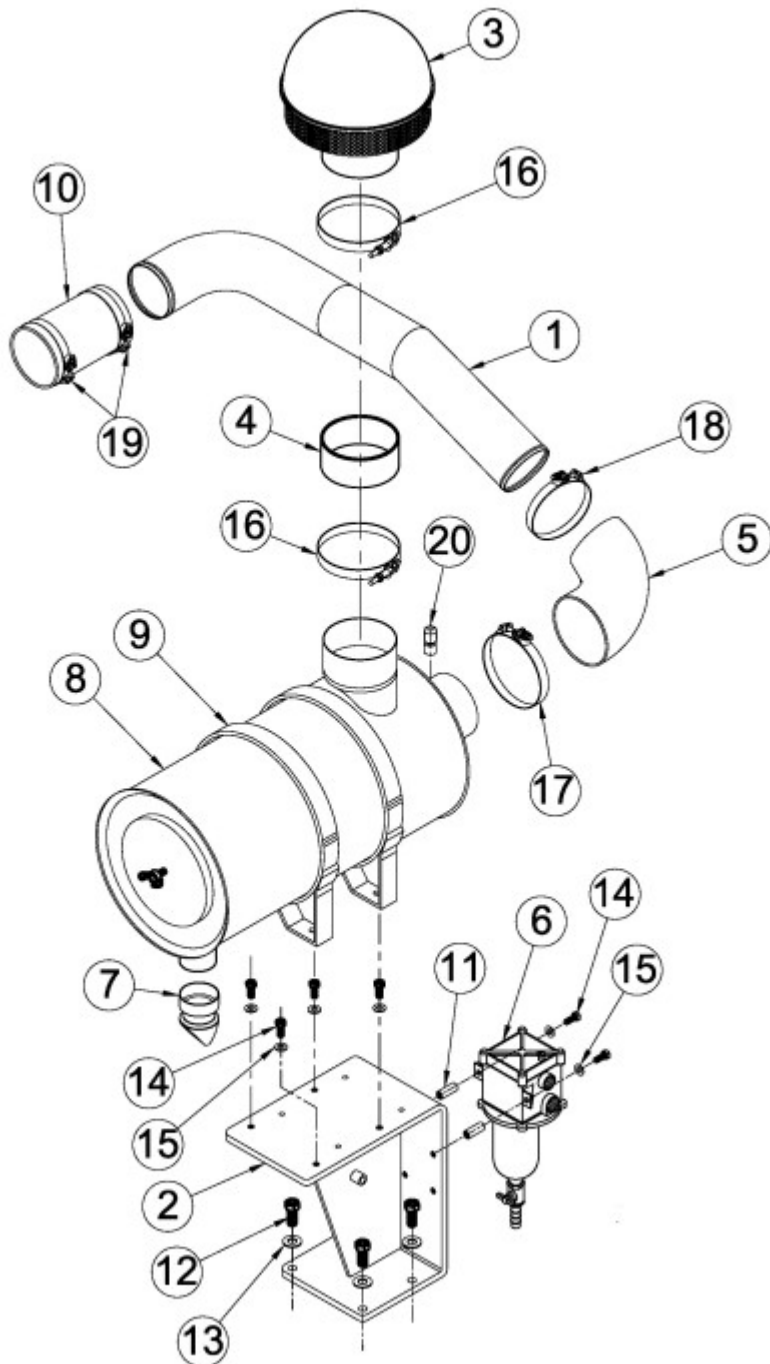
<u>Item</u>	<u>Part No.</u>	<u>Quantity</u>	<u>Description</u>
		-	-----
1-A	G25170-0606	1	FEMALE JIC 37° FLARE SWIVEL
1-B	70391	15	6M2TXREEL - MEGAFLEX® 2-WIRE BRAID HOSE
1-C	G25170-0606	1	FEMALE JIC 37° FLARE SWIVEL
		-	-----
2-A	G25170-0606	1	FEMALE JIC 37° FLARE SWIVEL
2-B	70391	39	6M2TXREEL - MEGAFLEX® 2-WIRE BRAID HOSE
2-C	G25179-0606	1	FEMALE JIC 37° FLARE SWIVEL - 90° BENT TUBE
		-	-----
3-A	G25170-0606	1	FEMALE JIC 37° FLARE SWIVEL
3-B	70391	24	6M2TXREEL - MEGAFLEX® 2-WIRE BRAID HOSE
3-C	G25175-0606	1	FEMALE JIC 37° FLARE SWIVEL - 45° BENT TUBE
		-	-----
4	H177	12	FUEL HOSE // BOYAU A ESSENCE



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7011 AIR INTAKE SYSTEM ASSEMBLY



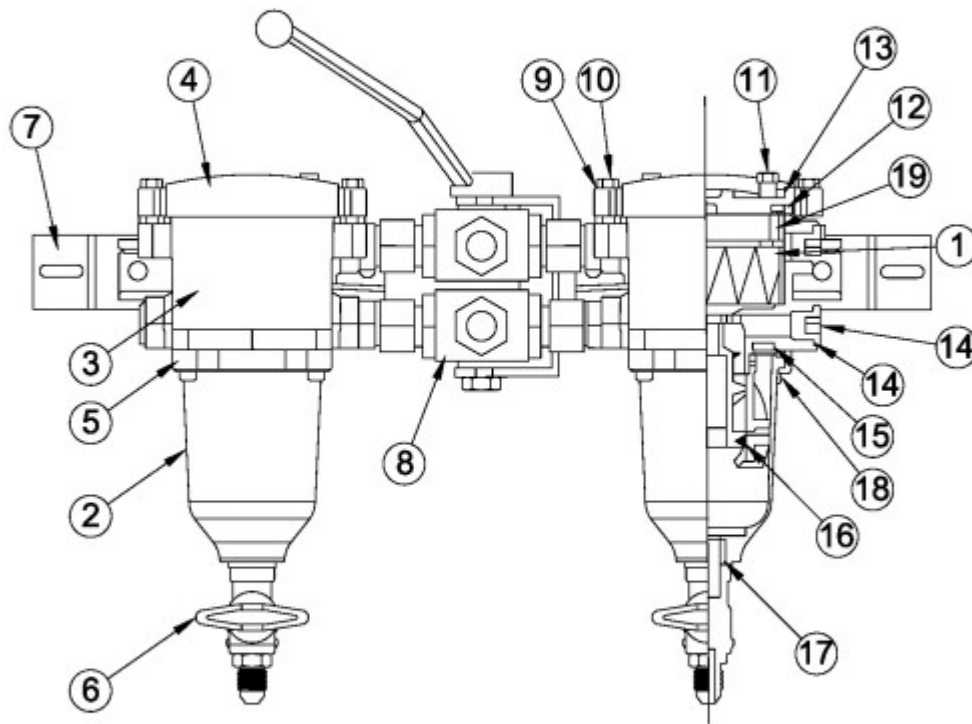
7011

AIR INTAKE SYSTEM ASSEMBLY

<u>Item</u>	<u>Part No.</u>	<u>Quantity</u>	<u>Description</u>
1	7011-1	1	AIR INTAKE PIPING
2	7011-2	1	AIR INTAKE MOUNTING BRACKET
3	7011-4	1	INLET HOOD-STEEL
4	7011-5	1	HUMP RUBBER REDUCER
5	7011-6	1	RUBBER ELBOW REDUCER 90°
6	7011-7	1	FUEL FILTER / SEPARATOR
7	7011-8	1	VACUATOR VALVE
8	2570	1	AIR INTAKE CLEANER ASSEMBLY
9	2570-10	2	MOUNTING BAND
10	6703-4	1	BLUE SILICONE COOLANT HOSE
11	14FSCPLG	2	1/4' FULL COUPLING 3000
12	3834C8	4	BOLT
13	38F436	4	FLAT WASHER
14	51634C8	6	BOLT
15	516F436	6	FLAT WASHER
16	6613-6	2	T-BOLT SPRING LOADED CLAMP
17	6104-110-44	1	T-BOLT SPRING LOADED CLAMP
18	4109-13	1	T-BOLT SPRING LOADED CLAMP
19	3290-8	2	T-BOLT SPRING LOADED CLAMP
20	2235-15	1	GAUGE SERVICE INDICATOR KIT



7011-7 FUEL FILTER / SEPARATOR

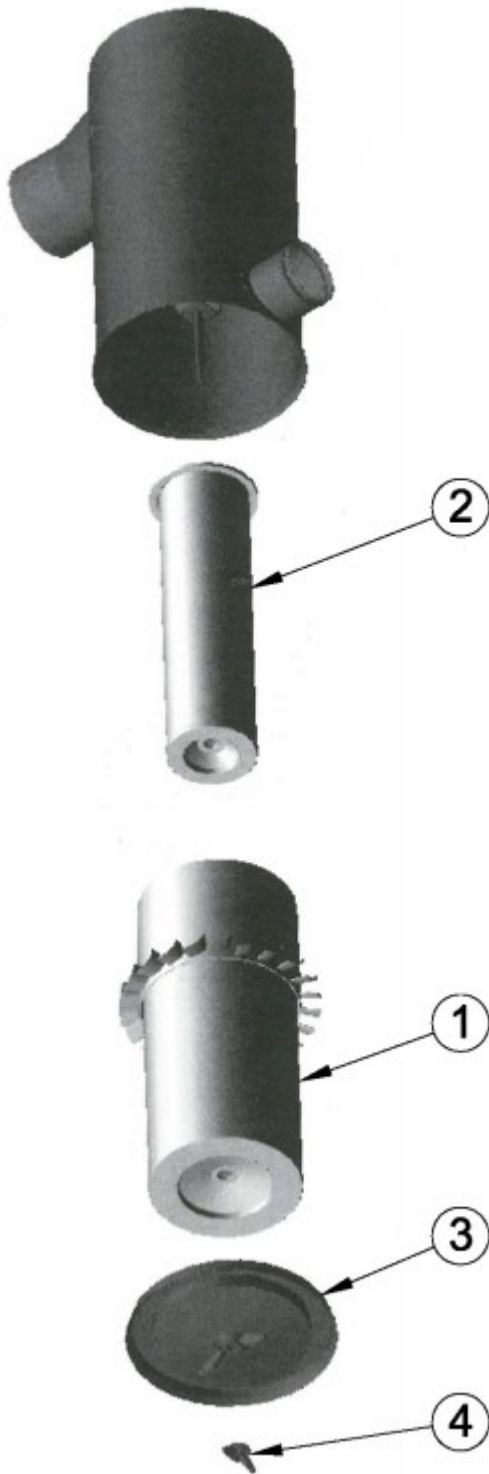


7011-7 FUEL FILTER / SEPARATOR

<u>Item</u>	<u>Part No.</u>	<u>Quantity</u>	<u>Description</u>
1	7011-7-1	1	PRIMARY FUEL PREFILTER CARTRIDGE
2	7011-7-2	1	CLEAR BOWL
3	7011-7-3	1	HOUSING
4	7011-7-4	1	LID
5	7011-7-5	1	RETAINER RING
6	7011-7-6	1	DRAIN VALVE
7	7011-7-7	1	MOUNTING BRACKET
8	7011-7-8	1	REVERSING VALVE ASSEMBLY
9	7011-7-9	4	WASHER
10	7011-7-10	4	LID SCREW
11	7011-7-11	1	BLEED SCREW
12	7011-7-12	1	LID GASKET
13	7011-7-13	1	BLEED SCREW GASKET
14	7011-7-14	2	PLUG / O-RING
15	7011-7-15	1	BOWL GASKET
16	7011-7-16	1	CENTRIFUGE
17	7011-7-17	1	DRAIN VALVE O-RING
18	7011-7-18	1	BOW SCREW
19	7011-7-19	1	SPRING FRAME



2570 AIR INTAKE CLEANER ASSEMBLY



2570 AIR INTAKE CLEANER ASSEMBLY

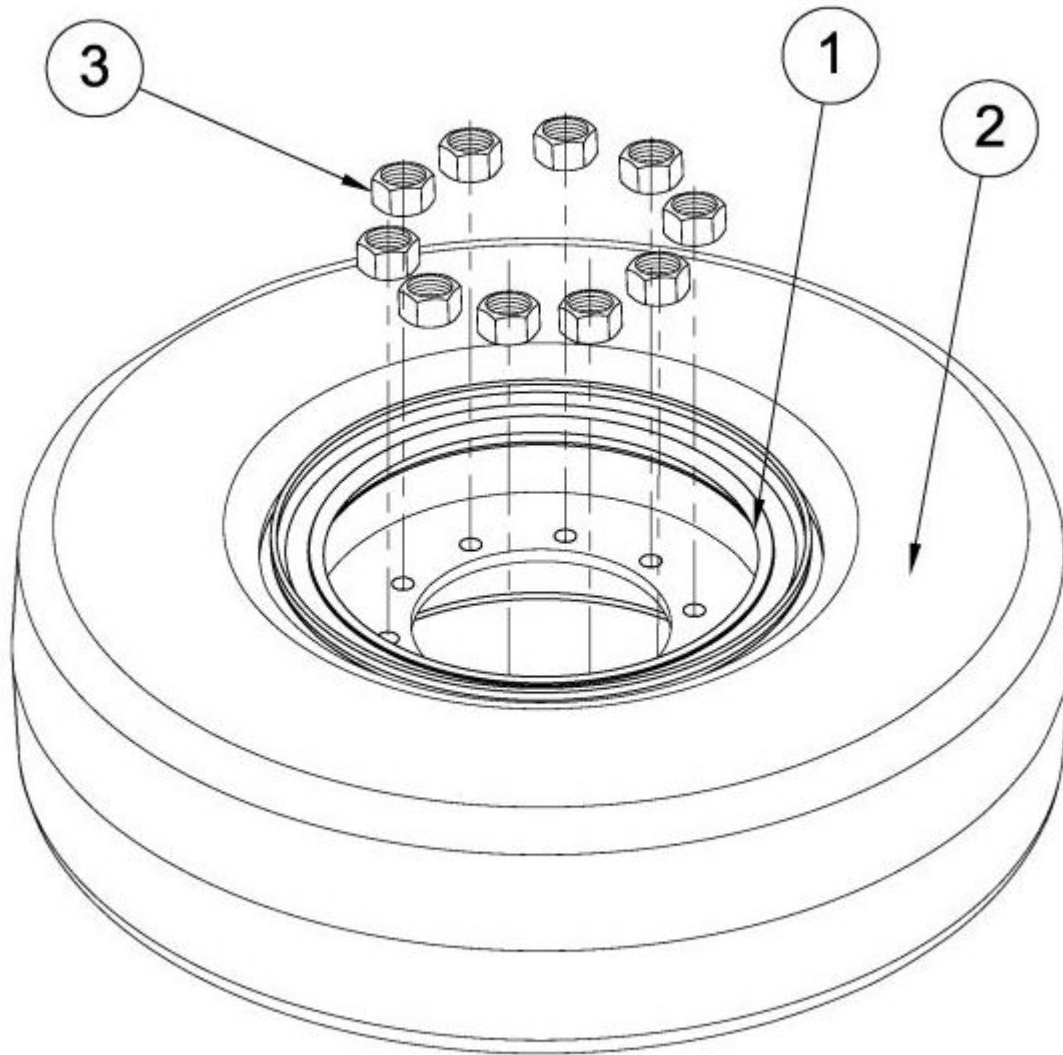
<u>Item</u>	<u>Part No.</u>	<u>Quantity</u>	<u>Description</u>
1	2570-1	1	PRIMARY ELEMENT
2	2570-2	1	SAFETY ELEMENT
3	2570-4	1	BAFFLE
4	2570-7	1	WING NUT



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6998 WHEEL ASSEMBLY

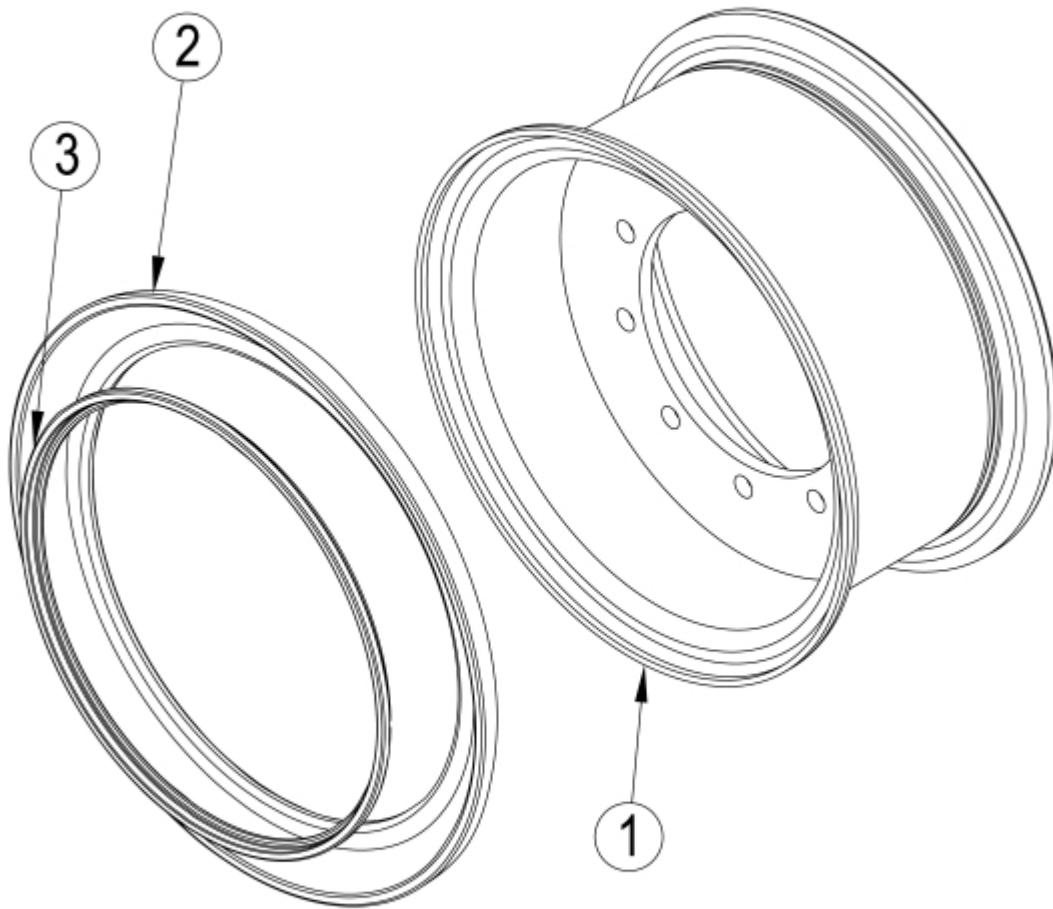


6998 WHEEL ASSEMBLY

<u>Item</u>	<u>Part No.</u>	<u>Quantity</u>	<u>Description</u>
1	6958	1	RIM ASSEMBLY
2	5167-2	1	TIRE
3	2958-14A	12	WHEEL NUT



6958 RIM ASSEMBLY



6958 RIM ASSEMBLY

<u>Item</u>	<u>Part No.</u>	<u>Quantity</u>	<u>Description</u>
1	6958-1	1	RIM BASE
2	6958-2	1	FLANGE - RIM
3	6958-3	1	LOCK RING - RIM



TIRE, RIM AND WHEEL ASSEMBLY

Safety Instructions

GENERAL

- Do not mount or demount tires without proper training. Follow all procedures and safety instructions.
- "MULTIPIECE RIM/WHEEL MATCHING CHARTS" are available through Motor Wheel Corporation and the United States Department of Transportation, Washington, D.C.

DEMOUNTING

- Always exhaust all air from a single tire and from both tires of a dual assembly prior to removing any rim components or any wheel components such as nuts and rim clamps.
- Make sure to remove valve core to exhaust all air from the tire. Remove both cores from a dual assembly.
- Check the valve stem by running a piece of wire through the stem to make sure it is not plugged.

INSPECTION

- Clean rims and repaint to stop detrimental effects of corrosion and facilitate checking and tire mounting. Be very careful to clean all dirt and rust from the lock ring and gutter. This is important to secure the lock ring in its proper position. A filter on the air inflation equipment to remove the moisture from the air line helps prevent corrosion. The filter should be checked periodically to see that it is working properly.
- Check rim components periodically for cracks. Replace all cracked, badly worn, damaged and severely rusted components with new parts of same size and type.
- Make sure correct parts are being assembled. Check DOT chart, your distributor or the manufacturer if you have any doubts.
- Don't be careless or take chances. If you are not sure about the proper mating of rim and wheel parts, consult a rim and wheel expert. This may be the tire man who is servicing your fleet, the rim and wheel distributor in your area, or the Motor Wheel sales engineer.
- Mixing parts of one type rim with those of another is potentially dangerous. Always check DOT chart or manufacturer for approval.
- Don't reinflate a tire that has been run flat without first inspecting the tire, rim and wheel assembly. Double check the flange, bead seat, lock ring and "O" ring for damage and make sure that they are secure in the gutter before inflation.

MOUNTING & INFLATION

- Don't try to seat rings or other components by hammering while tire is inflated or partially inflated.
- Double check to make sure all components are properly seated prior to inflation.
- Inflate in a safety cage or use safety chains during inflation.
- Don't inflate tire before all components are properly in place. Check components for proper assembly after inflating to fully seat tire beads. Then completely deflate tire to prevent localized over-stretching of tube. Re-inflate to recommend operating pressure.
- Never sit on or stand in front of a tire and rim assembly that is being inflated. Use a clip-on chuck and make sure inflation hose is long enough to permit the person inflating the tire to stand to the side of the tire, not in front or in back of the tire assembly.
- Follow tire manufacturers recommended mounting, demounting, inflating and deflating procedures for tires.
- Don't hammer on rims or components with steel hammers. Use rubber, lead, plastic or brass faced mallets if it is necessary to tap components together.

SERVICING TIRE & RIM IN VEHICLE

- Don't try to drive an assembled or partially assembled tire and rim over a cast spoke wheel by hammering. Stop – deflate and examine to determine the reason for the



TIRE, RIM AND WHEEL ASSEMBLY

Safety Instructions

- improper fit. Look for distortion or for components that are not properly locked or seated.
- Block the tire and wheel on the opposite side of the vehicle before you place the jack in position.
- Regardless of how hard or firm the ground appears, put hardwood blocks under the jack. Always crib up vehicle with blocks just in case the jack should slip.

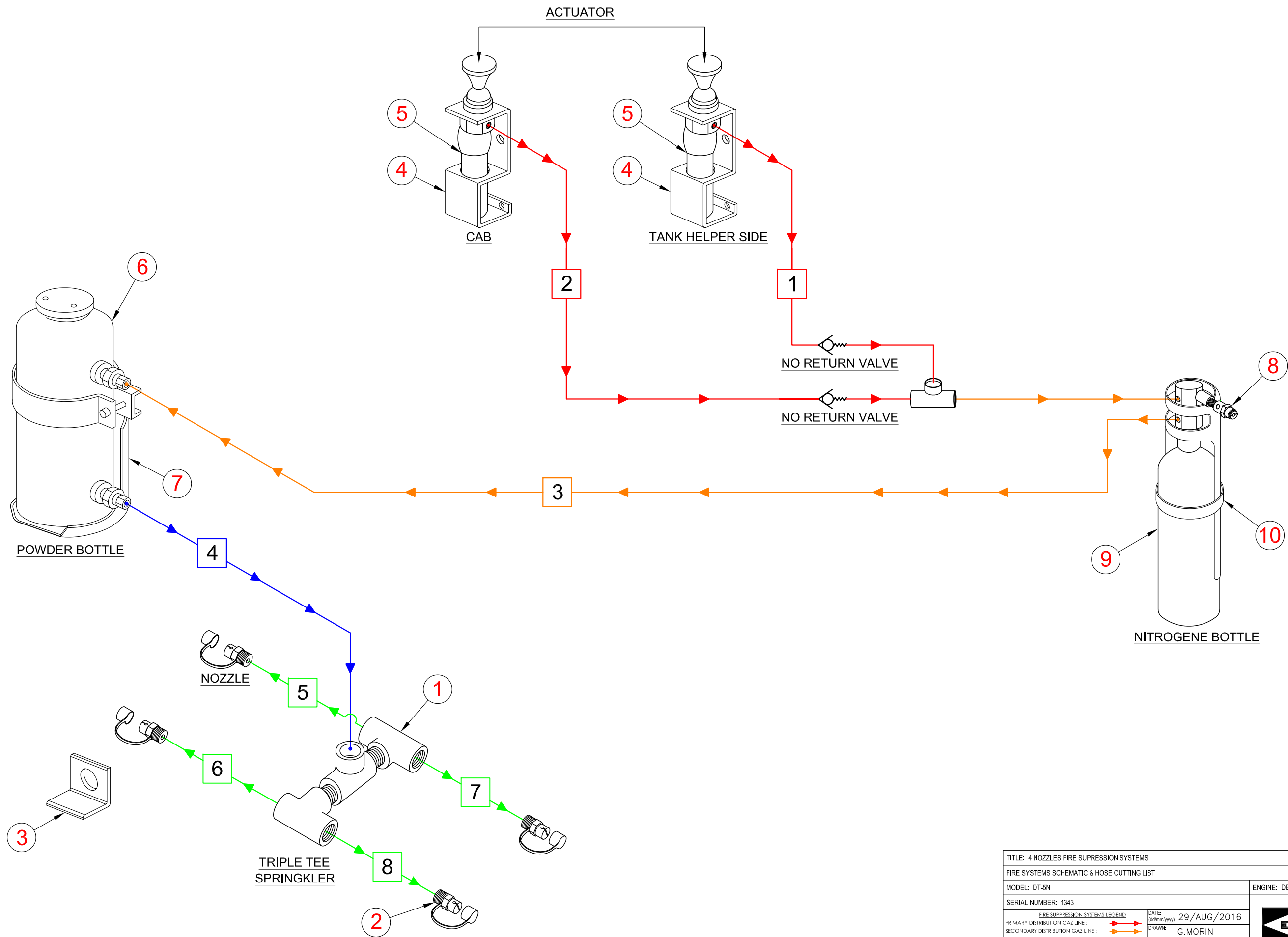
OPERATION

- Don't use undersized rims. Use recommended rim for tire. Check tire manufacturer catalogs for proper tire/rim matching.
- Don't overload or over-inflate tire/rim assemblies. Check your rim manufacturer if special operating conditions are required.

ADDITIONAL NOTES

- Use caution when removing side ring, flange, or lock ring. Support them on your thigh and roll them slowly to the ground. This will help protect you from injury.
- Demounting tools apply pressure to rim flanges to unseat tire beads. Keep your fingers clear. Always stand to one side when you apply hydraulic pressure (if the tool slips off, it can fly with enough force to kill).
- When using a cable or chain sling, stand clear; it might snap and lash out.
- Never attempt to weld on an inflated tire/rim assembly.





TITLE: 4 NOZZLES FIRE SUPPRESSION SYSTEMS									
FIRE SYSTEMS SCHEMATIC & HOSE CUTTING LIST									
MODEL: DT-5N					ENGINE: DEUTZ F5L912W 72HP @ 2300 RPM				
SERIAL NUMBER: 1343									
FIRE SUPPRESSION SYSTEMS LEGEND					DATE: 29/AUG/2016				
PRIMARY DISTRIBUTION GAZ LINE :					DRAWN: G.MORIN				
SECONDARY DISTRIBUTION GAZ LINE :					CHECKED: -				
PRIMARY DISTRIBUTION POWDER LINE :					WEIGHT: N/A				
SECONDARY DISTRIBUTION POWDER LINE :					SHUTDOWN DEVICE SWITCH LINE :				
HOSE # : 1					PART # : 0				
3rd ANGLE PROJECTION					SCALE: NTS				
IMPERIAL					SHEET: 1 OF 1				
DIMSENSIONS IN INCHES					DRAWING NUMBER: 7017				
					REV: 0				
					SIZE: B				

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7017

FIRE SYSTEM SCHEMATIC

<u>Item</u>	<u>Part No.</u>	<u>Quantity</u>	<u>Description</u>
1	1221-54	1	TRIPLE TEE
2	1303-6	4	V-1/2 NOZZLE
3	1303-2-9	4	L-SHAPED NOZZLE BRACKETS
34	1303-3-7-4	3	S-SHAPED BRACKET
5	423420	2	DISCHARGING BOTTLE LT-5-R
6	1303-1-1	1	DRY CHEMICAL TANK/FORAY POWDER
7	1303-2-1	1	TANK MOUNTING BRACKET
8	1303-3-4	1	SAFETY RELIEF VALVE
9	1303-3-4-1	1	NITRO CARTRIDGE 30 LB.
10	1303-1-3	1	BRACKET FOR NITRO CARTRIDGE

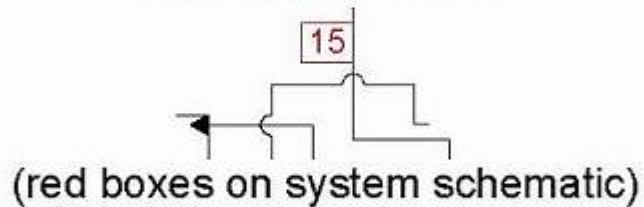


7017-H HOSE CUTTING LIST

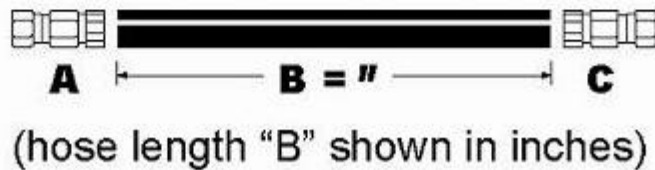
HOSE CUTTING LIST

Item:
HOSE ASSEMBLY-HOSE COMPONENT

HOSE ASSEMBLY



HOSE COMPONENT



Item	Part No.	Quantity	Description
1	G25170-0404	1	FEMALE JIC 37° FLARE SWIVEL
	H24100-04F	140	RFS RED FIRE SUPPRESSANT HOSE
	G25170-0404	1	FEMALE JIC 37° FLARE SWIVEL
	-	-	-----
2	G25170-0404	1	FEMALE JIC 37° FLARE SWIVEL
	H24100-04F	120	RFS RED FIRE SUPPRESSANT HOSE
	G25170-0404	1	FEMALE JIC 37° FLARE SWIVEL
	-	-	-----
3	G25170-0606	1	FEMALE JIC 37° FLARE SWIVEL
	H24100-06F	140	RFS RED FIRE SUPPRESSANT HOSE
	G25179-0606	1	FEMALE JIC 37° FLARE SWIVEL - 90° BENT TUBE
	-	-	-----

7017-H HOSE CUTTING LIST

<u>Item</u>	<u>Part No.</u>	<u>Quantity</u>	<u>Description</u>
4	G25170-1212	1	FEMALE JIC 37° FLARE SWIVEL
	H24100-12F	140	RFS RED FIRE SUPPRESSANT HOSE
	G25179-1212	1	FEMALE JIC 37° FLARE SWIVEL - 90° BENT TUBE
	-	-	-----
5	G25170-0808	1	FEMALE JIC 37° FLARE SWIVEL
	H24100-08F	90	RFS RED FIRE SUPPRESSANT HOSE
	G25170-0808	1	FEMALE JIC 37° FLARE SWIVEL
	-	-	-----
6	G25170-0808	1	FEMALE JIC 37° FLARE SWIVEL
	H24100-08F	90	RFS RED FIRE SUPPRESSANT HOSE
	G25170-0808	1	FEMALE JIC 37° FLARE SWIVEL
	-	-	-----
7	G25170-0808	1	FEMALE JIC 37° FLARE SWIVEL
	H24100-08F	90	RFS RED FIRE SUPPRESSANT HOSE
	G25170-0808	1	FEMALE JIC 37° FLARE SWIVEL
	-	-	-----
8	G25170-0808	1	FEMALE JIC 37° FLARE SWIVEL
	H24100-08F	90	RFS RED FIRE SUPPRESSANT HOSE
	G25170-0808	1	FEMALE JIC 37° FLARE SWIVEL



4567 HAND HELD FIRE EXTINGUISHER



<u>Item</u>	<u>Part No.</u>	<u>Quantity</u>	<u>Description</u>
1	4567-1	1	ANSUL 20LB CARTRIDGE
2	3702-2	1	BRACKET, ANSUL, CLAMP TYPE 20LB