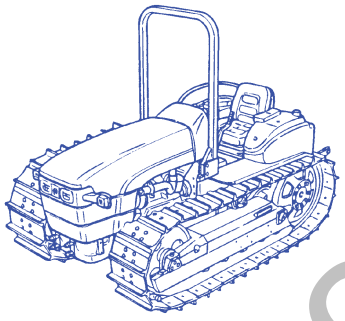


# NEW HOLLAND

# REPAIR MANUAL

## TK76
## TK85
## TK85M

Section 00 – General
Section 10 – Engine
Section 18 – Clutch
Section 21 – Transmissions

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# TK76, TK85, TK85M REPAIR MANUAL CONTENTS



**SECTION 00 – GENERAL**
**SECTION 10 – ENGINE**
**SECTION 18 – CLUTCH**
**SECTION 21 – TRANSMISSIONS**
**SECTION 27 – REAR MECHANICAL WHEEL DRIVE**
**SECTION 31 – MECHANICAL POWER TAKE-OFF**
**SECTION 33 – BRAKING SYSTEM**
**SECTION 35 – HYDRAULIC LIFT**
**SECTION 46 – STEERING CLUTCHES**
**SECTION 48 – SUSPENSION AND TRACKS**
**SECTION 55 – ELECTRICAL SYSTEM**

**The sections used through out all New Holland product Repair manuals may not be used for each product. Each Repair manual will be made up of one or several books. Each book will be labeled as to which sections are in the overall Repair manual and which sections are in each book.**

**The sections listed above are the sections utilized for the TK Tractors.**

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## DESCRIPTION AND OPERATION

The type of starting system installed depends on the type of gearbox fitted on the tractor. All systems consist of an ignition key-switch, heavy-duty wiring, a starter motor with an electromagnet, a starter relay and gear, range gear and PTO control lever switches. These are the basic circuit components used on models with a mechanical gearbox. More sophisticated systems incorporate other components, which ensure that the engine can only be started in the correct conditions.

A 2.5 kW starter motor is series installed. This motor has four poles, four brushes with integrated electromagnet and positive mesh engagement control.

The electromagnet consists of two parallel-connected coils. The low resistance intake coil is grounded via the engine, whilst the high resistance hold coil is grounded via the electromagnet body.

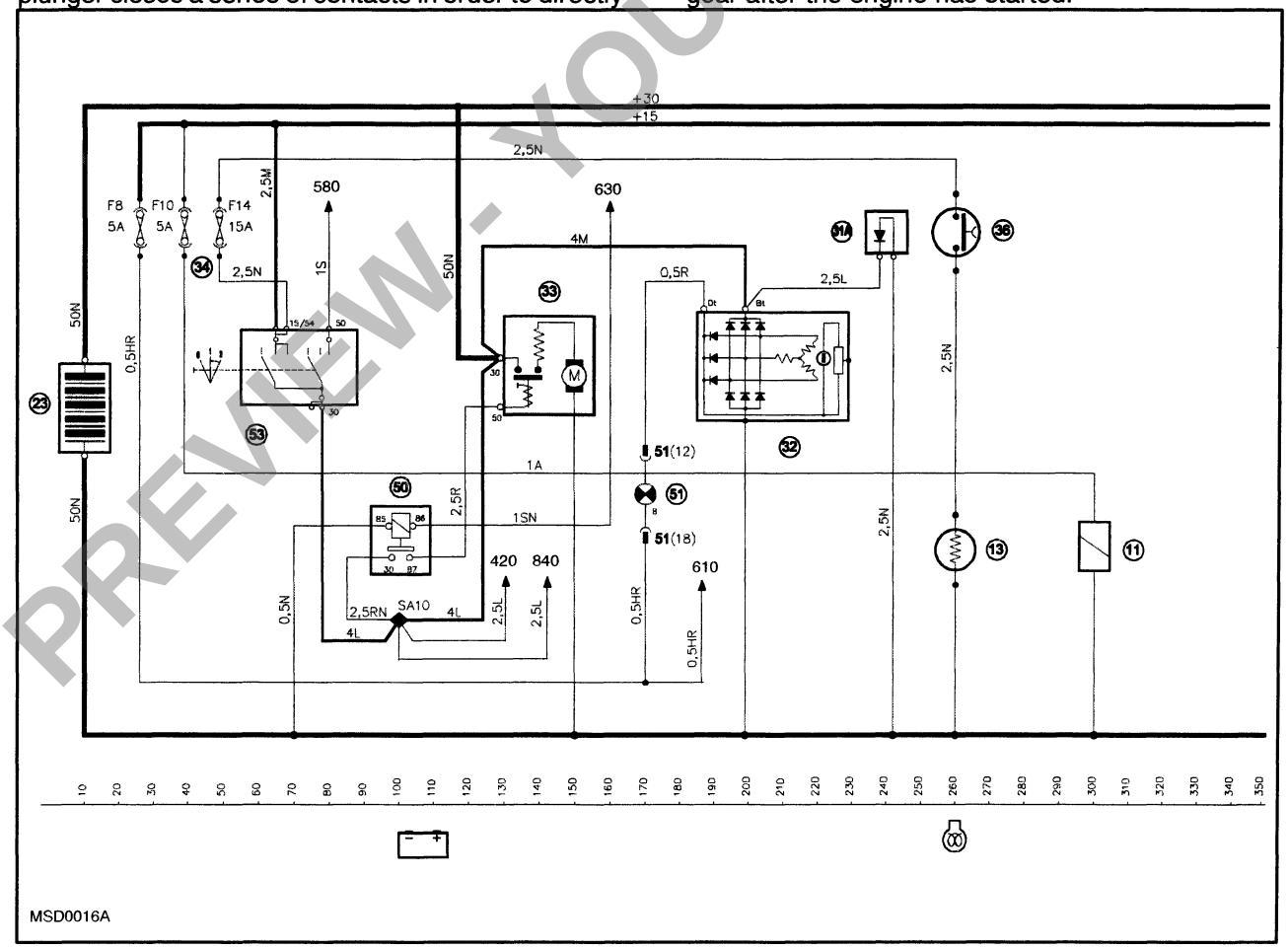
When the key-switch contact is closed (with the gear and range gear in neutral and the PTO disengaged) the coils are energised and the plunger is magnetically drawn into the electromagnet. This movement, transmitted by an adjustable joint mechanism, makes the driving pinion engage the flywheel rim gear. When the pinion makes contact with the rim gear, the plunger closes a series of contacts in order to directly power-up all four field coils, thereby supplying full power to the starter motor.

At this stage, one end of the intake coil is connected to the positive battery pole through the starter switch, whilst the other end is connected to the positive battery pole through the solenoid valve contacts. In this manner the intake coil is by-passed, without absorbing power, and the hold coil exclusively maintains the electromagnet plunger in position.

The starter motor includes a series of contacts and a two-part electromagnet plunger that totally closes the contacts, even if the pinion teeth are not perfectly in line with the rim gear. When this happens, a clutch spring compresses the pinion, forcing it to engage completely as soon as the starter motor begins to turn over.

When the key-switch is released, power to the electromagnet and motor is cut off. The electromagnet return spring, acting on the adjustable joint mechanism, frees the driving pinion from the gear and re-opens the solenoid valve contacts.

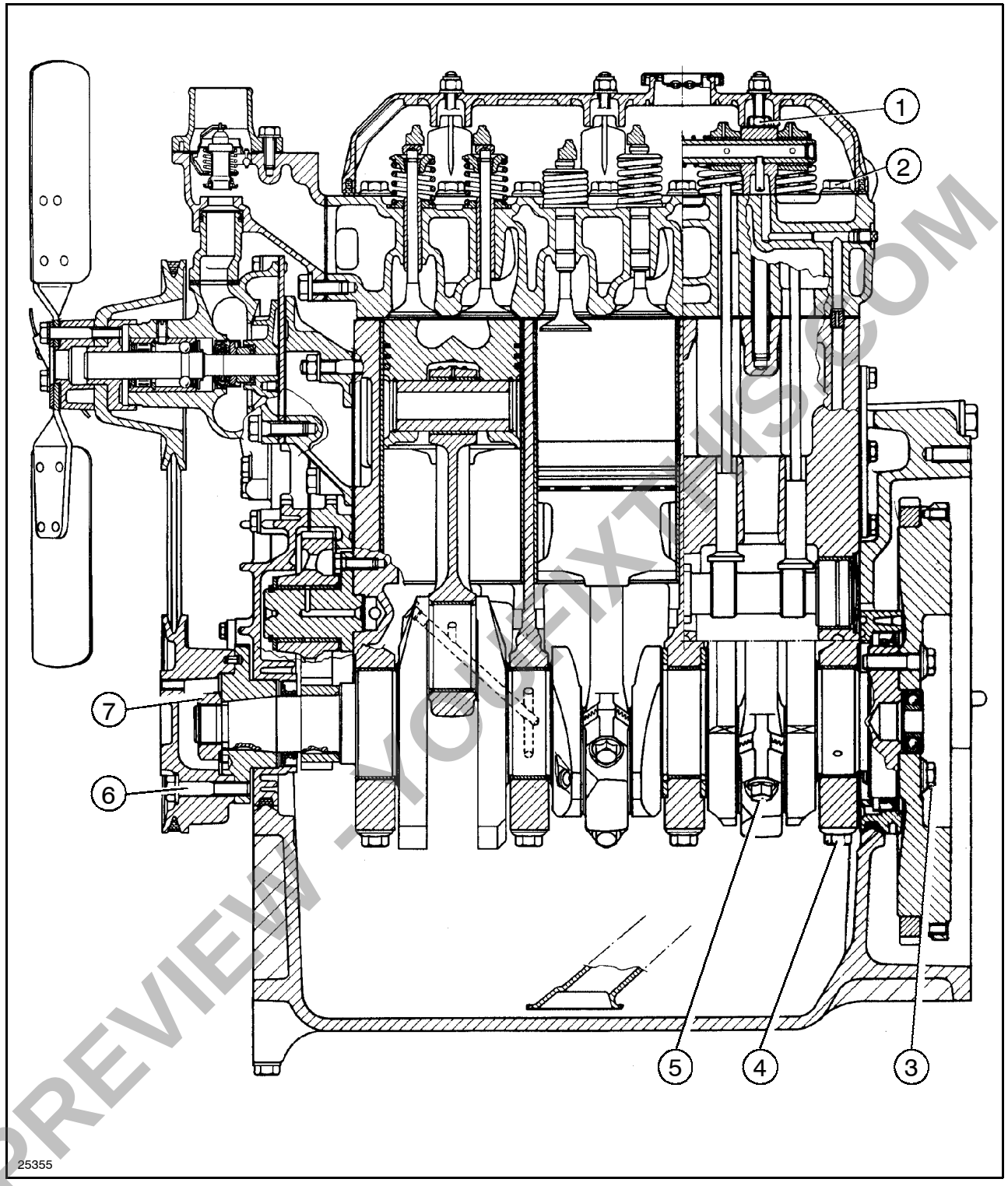
A roller-type clutch mechanism is incorporated in the driving pinion unit. This prevents the pinion from overspeeding if it remains engaged in the flywheel rim gear after the engine has started.






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**Engine longitudinal cross section - 3-cylinder model TK 65.**

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## MODELTK 95 - CALIBRATION DATA FOR BOSCH INJECTION PUMP TYPE VE 4/11 F 1250 L 850 - 500358111

### ASSEMBLY DATA

Pump timing on engine: delivery start $5^{o} \pm 0.5^{o}$ before TDC of cylinder 1 compression stroke.
Plunger pre-lift for timing on engine: 1 mm (0.0394 in.) from BDC (with tools **291754** - **291755**).
Cylinder No.1 delivery line union on pump: marked with letter A.

### ASSEMBLY DIMENSIONS

| SYMBOL | K | r | ya | yb |
|---|---|---|---|---|
| mm (in.) | - | 30.1 (1.185) | 36.5 to 38.5 (1.437 to 1.5157) | 40 to 46 |

### CALIBRATION TEST CONDITIONS

Test bench conforming to ISO 4008/1 .../2
Injectors conforming to ISO 7440-A61 - (1.688.901.027 with calibrated pad ∅ 0.5 mm - 0.0197 in.).

Injector pressure setting 250 to 253 bar (3626 to 3669 psi).

Fuel supply pressure:
. . . . . 0.35 + 0.05 bar (5.1 + 0.7 psi).
Delivery pipes (conforming to ISO 4093.2):
. . . . . 6 x 2 x 450 mm (0.2362 x 0.0787 x 17.716 in.).

Graduate drain time . . . . . : 30".

Test liquid: ISO 4113 at a temperature of $45^{o} \pm 1^{o}C$ ($113^{o} \pm 33.8^{o}F$) at outlet.

### 1. START OF DELIVERY

| | | |
|---|---|---|
| Plunger pre-lift from TDC: mm - | Pump rotation (viewed from drive side): counter-clockwise | Injection order:1-3-4-2 |

### 2. ADVANCE REGULATOR STROKE

| | |
|---|---|
| rpm: 900 | Advance stroke: 0.8 to 1.2 mm (0.0315 to 0.0472 in.) |

### 3. FUEL SUPPLY PUMP PRESSURE

| | |
|---|---|
| rpm: 900 | Internal pressure: 6.2 to 6.8 bar (89.9 to 98.6 psi) |

### 4. FULL-LOAD DELIVERY WITH BOOSTER PRESSURE

| | | | |
|---|---|---|---|
| rpm: 750 | LDA pressure: kPa 100 | Delivery per 1000 shots: 76 to 77 $cm^3$ (0.0167 to 0.0169 gal.) | Spread: ≤ 3.5 $cm^3$ (0.0008 gal.) |

### 5. FULL-LOAD DELIVERY WITHOUT BOOSTER PRESSURE

| | |
|---|---|
| rpm: 600 | Delivery per 1000 shots: 54.2 to 55.2 $cm^3$ (0.0119 to 0.0121 gal.) |

### 6. SPREAD GOVERNOR AT IDLE SPEED

| | | |
|---|---|---|
| rpm: 325 | Delivery per 1000 shots: 11.5 to 12.5 $cm^3$ (0.0025 to 0.0027 gal.) | Spread: ≤ 4.0 $cm^3$ (0.0009 gal.) |

### 7. SPREAD GOVERNOR AT MAXIMUM SPEED

| | | |
|---|---|---|
| rpm: 1300 | LDA pressure: kPa 100 | Delivery per 1000 shots: 42.7 to 43.7 $cm^3$ (0.0094 to 0.0096 gal.) |

### 8. DELIVERY AT STARTING SPEED

| | |
|---|---|
| rpm: 100 | Delivery per 1000 shots: 85 to 125 $cm^3$ (0.0187 to 0.0275 gal.) |

### 9. TRANSFER PRESSURE PROGRESSION

| | | | |
|---|---|---|---|
| LDA pressure: | kPa | 100 | |
| rpm | | 400 | 900 |
| Internal pressure supply: | bar (psi) | 2.9 to 3.9 (42.1 to 56.6) | 6.2 to 6.8 (89.9 to 98.6) |

### 10. INJECTION ADVANCE PROGRESSION

| | | | |
|---|---|---|---|
| LDA pressure | kPa | 100 | |
| rpm | | 900 | 1050 |
| Advance stroke | mm (in.) | 0.8 to 1.2 (0.0315 to 0.0472) | 1.4 to 2.0 (0.0551 to 0.0787) |

### 11. BACKFLOW

| | | | |
|---|---|---|---|
| rpm | | 600 | 1250 |
| LDA pressure | kPa | 0 | 100 |
| Backflow | $cm^3$ (gal.) | 18 to 30 (0.0039 to 0.0066) | 22 to 38 (0.0048 to 0.0083) |

*(continued)*

Note: the values shown above in brackets must be used for checking purposes only.

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**Op.10 001 10**
**ENGINE**
**Removal-Installation**

**DANGER**

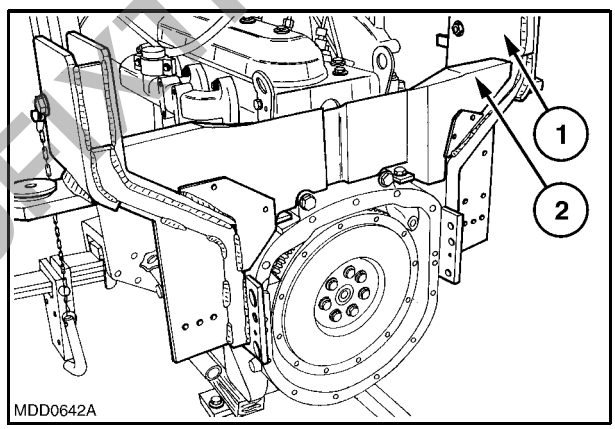
Lift and handle all heavy parts using suitable lifting equipment.
Make sure that assemblies or parts are supported by means of suitable slings and hooks. Make sure that no one is standing in the vicinity of the load to be lifted.

**CAUTION**

Always use appropriate tools to align fixing holes. NEVER USE YOUR FINGERS OR HANDS.

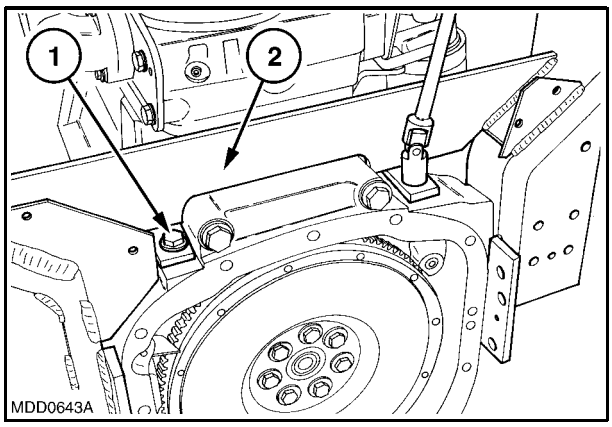
Carry out operations 1 to 32 relative to clutch removal (Op. **18 110 10** page 11, Section 18) proceeding as follows:

1. For 4-cylinder engines, remove the rubber heat guard (2) from the roll bar support (1).




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2. For 4-cylinder engines, remove the retaining bolts (1) and the roll bar support (2).




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| ROCKER ARM - VALVE DATA | mm (in.) | |
|---|---|---|
| | Bore 100 | Bore 104 |
| Diameter of shaft bores in rocker arms | 18.016 to 18.034 (0.7093 to 0.71) | |
| Diameter of rocker arm shaft | 17.982 to 18.000 (0.7079 to 0.7087) | |
| Rocker shaft to rocker arm bore clearance | 0.016 to 0.052 (0.0006 to 0.002) | |
| Maximum permitted wear endfloat | 0.15 (0.0059) | |
| Rocker arm spacing springs: | | |
| - free length | 59.5 (2.3425) | |
| - length under load of 46 to 52 N (4.7 to 5.3 kg, 10.36 to 11.68 lbs.) | 44 (1.7323) | |
| Valve clearance for timing check | 0.45 (0.0177) | |
| Valve clearance for normal running (engine cold): | | |
| - inlet valve | 0.30 ± 0.05 (0.0118 ± 0.002) | |
| - exhaust valve | 0.30 ± 0.05 (0.0118 ± 0.002) | |
| Cam lift: | | |
| - inlet valve | 5.67 (0.2232) | |
| - exhaust valve | 5.95 (0.2342) | |

| MAIN DATA FOR EQUALIZER WITH COUNTER ROTATION MASSES (fig. 65) (*) | (*) Only fitted on 4-cylinder models |
|---|---|
| | mm (in.) |
| Bushing (28) interference fit in seat on gear unit (26) | 0.063 to 0.140 (0.0025 to 0.0055) |
| Clearance between intermediate gear journal (27) and bushing (28) | 0.050 to 0.100 (0.002 to 0.0039) |
| Interference between bushings and support seats (20) | 0.063 to 0.140 (0.0025 to 0.0055) |
| Clearance between gear unit shaft (22) and relative bushings | 0.050 to 0.100 (0.002 to 0.0039) |
| Clearance between sides of sleeve grooves (17), drive gear unit connection (22) and rotating masses gear unit (13) | 0.038 to 0.106 (0.0015 to 0.0042) |
| Interference between front bush (16) and seat on casing (12) | 0.063 to 0.140 (0.0025 to 0.0055) |
| Clearance between rotating masses shaft (13) and front bush (16) | 0.050 to 0.100 (0.002 to 0.0039) |
| Interference between rotating masses rear bush (13) and seat on support (7) | 0.037 to 0.101 (0.0014 to 0.0040) |
| Clearance between shaft (13) and rear bush | 0.013 to 0.061 (0.0005 to 0.0024) |
| Interference between bushings and relative seats on masses (6) | 0.040 to 0.100 (0.0016 to 0.0039) |
| Clearance between rotating masses axis (5) and relative bushings | 0.020 to 0.073 (0.0008 to 0.0029) |
| Interference between intermediate gear bush (10) and relative seat on rotating masses casing (12) | 0.037 to 0.101 (0.0014 to 0.00409) |
| Clearance between intermediate gear shaft (10) and relative bush | 0.013 to 0.061 (0.0005 to 0.0024) |
| Clearance between the teeth and the coupled wheels | 0.080 (0.0031) |

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## TORQUE SETTINGS WITH ANGLE

| PARTS TO TIGHTEN | Thread | Tightening torque | | Angle |
|---|---|---|---|---|
| | | Nm | kgm | |
| Cylinder head bolts (2, fig. 3 , or fig. 5 ) | M 12 x 1.25 | 70 | 7.1 | $90^o + 90^o$ |
| Main bearing cap bolts (4) | M 14 x 1.5 | 80 | 8.2 | $90^o$ |
| Big-end cap bolts (5) | M 11 x 1.5 | 40 | 4.1 | $60^o$ |
| Flywheel mounting bolts (3) | M 12 x 1.25 | 40 | 4.1 | $60^o$ |

## TORQUE SETTINGS

| PARTS TO TIGHTEN | Thread | Tightening torque | |
|---|---|---|---|
| | | Nm | kgm |
| Rocker shaft pedestal bolts (1, fig. 3 , or fig. 5 ) | M 8 | 25 | 2.5 |
| Crankshaft hub retaining nut (7) | M 30 x 1.5 | 294 | 30 |
| Fan and alternator pulley bolts (6) | M 10 x 1.25 | 55 | 5.6 |
| Additional rotating masses retaining bolts (1, fig. 6) for models TK 76, TK 85 and TK 95 | M 12 x 1.25 | 110 | 11.2 |
| Intake manifold retaining bolts (1, fig. 28) | M 8 | 25 | 2.6 |
| Alternator and belt tension adjustment nut (2, fig. 27) | M 10 x 1.25 | 55 | 5.6 |
| Coolant pump retaining bolts (1, fig. 32) | M 10 x 1.25 | 55 | 5.6 |
| Nuts for injector mounting studs (1. fig. 95) | M 8 | 25 **(*)** | 2.6 **(*)** |
| Tappet cover nuts (1, fig. 37) | M 8 | 15 | 1.5 |
| Rocker shaft pedestal bolts (2, fig. 38) | M 8 | 25 | 2.5 |
| Oil pump and cover retaining bolts (1, fig. 46) | M 8 | 25 | 2.6 |
| Timing gear case and cover bolts (1, fig. 50) | M 8 | 25 | 2.6 |
| Intermediate flanged journal bolts (1, fig. 53) | M 10 x 1.25 | 55 | 5.6 |
| Camshaft thrust plate retaining bolts (2, fig. 54) | M 8 | 35 | 3.6 |
| Rear crankcase cover bolts (2, fig. 74) | M 8 | 25 | 2.6 |
| Tappet adjuster locknuts (1, fig. 94) | M 8 | 22 | 2.2 |
| Exhaust manifold retaining bolts (2, fig. 26) | M 8 | 25 | 2.6 |
| Injection pump retaining bolts (1, fig. 191) | M 8 | 25 | 2.6 |
| Engine sump retaining bolts (4, fig. 43) | M 12 x 1.25 | 69 | 7 |

**(*)** Tighten the nuts in two stages – see operations described in fig. 95.

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| GENERAL SPECIFICATIONS | 3 cylinders | 4 cylinders |
|---|---|---|
| Engine, technical type: | | |
| - model TK 65 - type 8035.05.421 (BOSCH pump) ..... | See data on page 6-7 | - |
| - model TK 75 - type 8035.25.421 (BOSCH pump) ..... | See data on page 8-9 | - |
| - model TK 76 - type 8045.06.421/521 (BOSCH pump) . | - | See data on page 10-11 |
| - model TK 85 - type 8045.05.421/521 (BOSCH pump) . | - | See data on page 12-13 |
| - model TK 95 - type 8045.25L.421 (BOSCH pump) .... | - | See data on page 14-15 |
| Cycle ..... | diesel, 4-stroke | |
| Injection ..... | direct | |
| Number of on-line cylinders ..... | 3 | 4 |
| Cylinder liners ..... | dry force-fitted in cylinder block | |
| Piston diameter | | |
| - models TK 65, TK 75 ..... | 104 mm (4.0945 in.) | - |
| - model TK 76 ..... | - | 100 mm (3.937 in.) |
| - models TK 85, TK 95 ..... | - | 104 mm (4.0945 in.) |
| Piston stroke ..... | 115 mm (4.37 in.) | |
| Total displacement: | | |
| - model TK 65 ..... | 2931 $cm^3$ (0.6447 gal.) | - |
| - model TK 75 ..... | 2931 $cm^3$ (0.6447 gal.) | - |
| - model TK 76 ..... | - | 3613 $cm^3$ (0.7947 gal.) |
| - model TK 85 ..... | - | 3908 $cm^3$ (0.8596 gal.) |
| - model TK 95 ..... | - | 3908 $cm^3$ (0.8596 gal.) |
| Compression ratio for models TK 65, TK 76 and TK 85 .... | 17 to 1 normally aspirated | |
| Compression ratio for models TK 75 and TK 95 ..... | 16.5 to 1 turbocharged | |
| Maximum power: | | |
| - model TK 65 ..... | 44.5 kW (60 Hp) | - |
| - model TK 75 ..... | 54 kW (72 Hp) | - |
| - model TK 76 ..... | - | 53 kW (71 Hp) |
| - model TK 85 ..... | - | 58.8 kW (80 Hp) |
| - model TK 95 ..... | - | 66.5 kW (90 Hp) |
| Maximum power speed - models TK 65, TK 75 ..... | 2300 rpm | |
| Maximum power speed - TK 76, TK 85, TK 95 ..... | 2500 rpm | |
| Maximum torque speed - model TK 65 ..... | 1400 rpm | - |
| Maximum torque speed - model TK 75 ..... | 1400 rpm | - |
| Maximum torque speed - model TK 76 ..... | - | 1500 rpm |
| Maximum torque speed - model TK 85 ..... | - | 1500 rpm |
| Maximum torque speed - model TK 95 ..... | - | 1500 rpm |
| Number of main bearings ..... | 4 | 5 |
| Sump pan ..... | structural, cast iron | |

*(continued)*

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## MODEL TK 65 - CALIBRATION DATA FOR BOSCH INJECTION PUMP TYPE VE 3/11 F 1150 L 766 - 99441586

### ASSEMBLY DATA

Pump timing on engine: delivery start 9° ± 0.5° before TDC of cylinder 1 compression stroke.
Plunger pre-lift for timing on engine: 1 mm (0.0394 in.) from BDC (with tools **291754** - **291755**).
Cylinder No.1 delivery line union on pump: marked with letter A.

### ASSEMBLY DIMENSIONS

| SYMBOL | VHA | MS | ya | yb |
|---|---|---|---|---|
| mm (in.) | 30.1 (1.185) | - | 36.5 to 38.5 (1.437 to 1.5157) | 40.4 to 45.6 (1.5905 to 1.7953) |

### CALIBRATION TEST CONDITIONS

Test bench conforming to ISO 4008/1 .../2
Injectors conforming to ISO 7440-A61 - (1.688.901.020 with calibrated pad ∅ 0.6 mm - 0.0236 in.).

Injector pressure setting 172 to 175 bar (2495 to 2538 psi).

Fuel supply pressure:
. . . . . 0.35 + 0.05 bar (5.1 + 0.7 psi).

Pipes (conforming to ISO 4093.2):
. . . . . 6 x 2 x 840 mm (0.2362 x 0.0787 x 33.071 in.).

Graduate drain time . . . . . : 30".

Test liquid: ISO 4113 at a temperature of 45° ± 1°C (113° ± 33.8°F) at outlet.

### 1. START OF DELIVERY

| | | |
|---|---|---|
| Plunger pre-lift from TDC: mm - | Pump rotation (viewed from drive side): counter-clockwise | Injection order:1-2-3 |

### 2. ADVANCE REGULATOR STROKE

| | |
|---|---|
| rpm: 1220 | Advance stroke: 0.7 to 1.1 mm (0.0276 to 0.0433 in.) |

### 3. FUEL SUPPLY PUMP PRESSURE

| | |
|---|---|
| rpm: 1220 | Internal pressure: 7.9 to 8.5 bar (114.5 to 123.3 psi) |

### 4. FULL LOAD DELIVERY

| | | |
|---|---|---|
| rpm: 700 | Delivery per 1000 shots: 66.7 to 67.7 $cm^3$ (0.0147 to 0.0149 gal.) | Spread: ≤ 3.5 $cm^3$ (0.0008 gal.) |

### 5. SPREAD GOVERNOR AT IDLE SPEED

| | | |
|---|---|---|
| rpm: 325 | Delivery per 1000 shots: 16.3 to 17.3 $cm^3$ (0.0036 to 0.0038 gal.) | Spread: ≤ 5.5 $cm^3$ (0.0012 gal.) |

### 6. SPREAD GOVERNOR AT MAXIMUM SPEED

| | | |
|---|---|---|
| rpm: 1200 | Delivery per 1000 shots: 48.5 to 49.5 $cm^3$ (0.0107 to 0.0109 gal.) | Spread: $cm^3$ - |

### 7. DELIVERY AT STARTING SPEED

| | |
|---|---|
| rpm: 100 | Delivery per 1000 shots: 60 to 100 $cm^3$ (0.0132 to 0.022 gal.) |

### 8. TRANSFER PRESSURE PROGRESSION

| rpm | | 1220 | 400 |
|---|---|---|---|
| Internal pressure | bar (psi) | 7.9 to 8.5 (114.6 to 123.3) | 3.4 to 4.4 (49.3 to 63.8) |

### 9. INJECTION ADVANCE PROGRESSION

| rpm | | 1220 | 1260 |
|---|---|---|---|
| Advance stroke | mm (in.) | 0.7 to 1.1 (0.276 to 0.0433) | 1.3 to 1.9 (0.0512 to 0.0748) |

### 10. BACKFLOW

| rpm | | 400 | 1150 |
|---|---|---|---|
| Backflow | $cm^3$ (gal.)/10 sec | 16 to 28 (0.0035 to 0.0062) | 20 to 36 (0.0044 to 0.0079) |

*(continued)*

Note: the values shown above in brackets must be used for checking purposes only.

*(continued)*

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| FUEL SUPPLY PUMP DATA | mm (in.) |
|---|---|
| Eccentricity of drive shaft | 3 (0.1181) |
| Diameter of drive shaft at bushings | 31.975 to 32.000 (1.2588 to 1.2598) |
| Internal diameter of installed and reamed bushings | 32.050 to 32.075 (1.2618 to 1.2628) |
| Interference between bushings and seats | 0.063 to 0.140 (0.0025 to 0.0055) |
| Clearance between axle shafts and bushes | 0.050 to 0.100 (0.0020 to 0.0039) |
| Thickness of internal washer | 1.45 to 1.50 (0.0571 to 0.0591) |
| Thickness of external washer | 2.93 to 3.00 (0.1154 to 0.1181) |

| CRANKCASE/CYLINDER BLOCK DATA | mm (in.) | |
|---|---|---|
| | Bore 100 | Bore 104 |
| Cylinder block | cast-iron monobloc with replaceable dry-fitted cylinder liners, incorporating seatings for crankshaft bearings, camshaft and tappet assemblies | |
| Internal diameter of cylinder liners | 100 to 100.024 ([1]) (3.937 to 3.9379) | 104 to 104.024 ([1]) (4.0945 to 4.0954) |
| External diameter of cylinder liners | 103.02 to 103.05 (4.0559 to 4.0571) | 107.02 to 107.05 (4.2134 to 4.2146) |
| Diameter of cylinder liner bores on block | 102.85 to 102.9 (4.0492 to 4.0512) | 106.85 to 106.9 (4.2067 to 4.2087) |
| Interference fit between cylinder liners and bores on the cylinder block | 0.120 to 0.200 (0.0047 to 0.0079) | |
| Cylinder liners internal diameter oversizes | 0.4 to 0.8 (0.0157 to 0.0315) | |
| Liner external diameter oversizes | 0.2 (0.0079) | |
| Maximum permissible liner ovality or taper due to wear ([2]) | 0.12 (0.0047) | |
| Main journal half bearing seat diameter | 84.200 to 84.230 (3.3150 to 3.3161) | |
| Camshaft bushing seat diameter: | | |
| - front | 54.780 to 54.805 (2.1567 to 2.1577) | |
| - intermediate | 54.280 to 54.305 (2.1370 to 2.1380) | |
| - rear | 53.780 to 53.805 (2.1173 to 2.1183) | |
| Diameter of standard tappet bores in crankcase | 15.000 to 15.018 (0.5905 to 0.5912) | |
| Tappet oversizes | 0.1 - 0.2 - 0.3 (0.0039 - 0.0079 - 0.0118) | |

([1]) Measured after press-fitting and reaming.
([2]) Measure in the area swept by piston rings, both parallel and perpendicular to the crankshaft axis.

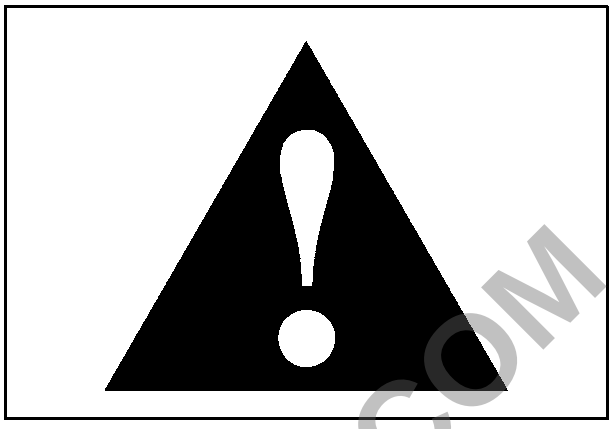
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### *WARNING AND DANGER SYMBOL*

*This warning symbol points out important messages concerning your safety.*
*Carefully read the following safety regulations and observe advised precautions in order to avoid potential hazards and safeguard your health and safety.*
*In this manual the symbol is accompanied by the following key-words:*

***CAUTION** - Warnings concerning unsuitable repair operations that may jeopardise the safety of Service personnel.*
***DANGER** Specific warnings concerning potential hazards for operator safety or for other persons directly or indirectly involved.*



5

## ACCIDENT PREVENTION

Most accidents or injuries that occur in workshops are the result of non-observance of simple and fundamental safety regulations. For this reason, IN MOST CASES THESE ACCIDENTS CAN BE AVOIDED by foreseeing possible causes and consequently acting with the necessary caution and care.

Accidents may occur with all types of vehicles, regardless of how well it was designed and built.

A careful and judicious service technician is the best guarantee against accidents.

Precise observance of the most basic safety rule is normally sufficient to avoid many serious accidents.

**DANGER.** Never carry out any cleaning, lubrication or maintenance operations when the engine is running.

## SAFETY REGULATIONS

## GENERAL GUIDELINES

- Carefully follow specified repair and maintenance procedures.
- Do not wear rings, wristwatches, jewellery, unbuttoned or loose articles of clothing such as: ties, torn clothing, scarves, open jackets or shirts with open zips that may remain entangled in moving parts. It is advised to wear approved safety clothing, e.g.: non-slip footwear, gloves, safety goggles, helmets, etc.
- Do not carry out repair operations with someone sitting in the driver's seat, unless the person is a trained technician who is assisting with the operation in question.
- Do not operate the vehicle or use any of the implements from different positions, other than the driver's seat.
- Do not carry out operations on the vehicle with the engine running, unless specifically indicated.
- Stop the engine and check that the hydraulic circuits are pressure-free before removing caps, covers, valves, etc.
- All repair and maintenance operations must be carried out using extreme care and attention.
- Service steps and platforms used in the workshop or elsewhere should be built according to standard accident prevention regulations.
- Disconnect the batteries and label all controls to indicate that the vehicle is being serviced. Any parts that are to be raised must be locked in position.
- Do not check or fill fuel tanks, accumulator batteries, nor use starting liquid when smoking or near naked flames, as these fluids are inflammable.
- Brakes are inoperative when manually released for repair or maintenance purposes. Use blocks or similar devices to control the machine in these conditions.
- The fuel nozzle should always be in contact with the filling aperture. Maintain this position until filling operations are completed in order to avoid possible sparks caused by the accumulation of static electricity.

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## FRONT SEALS

Carefully check the metal rings, making sure that the sealing surfaces show no signs of scoring, dents or wear caused by ring pair misalignment or surface flatness errors.

Even if only one of the rings is faulty, change the entire seal.

Never pair a used ring with a new one or use different pairs of rings.

To fit the seals, proceed as follows.

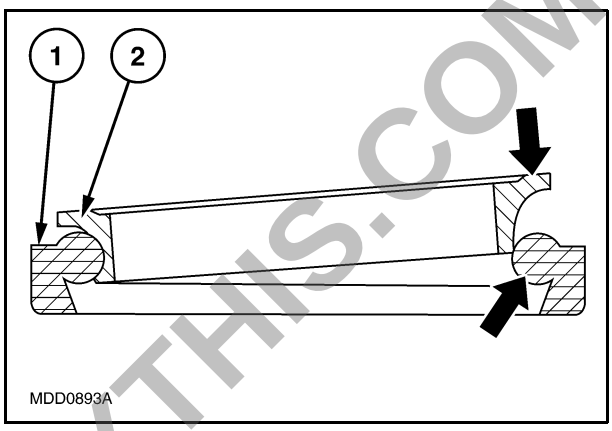
1. Eliminate any sharp edges or burr and carefully clean the seats for the rubber rings.

2. Thoroughly clean the rings on the seals.

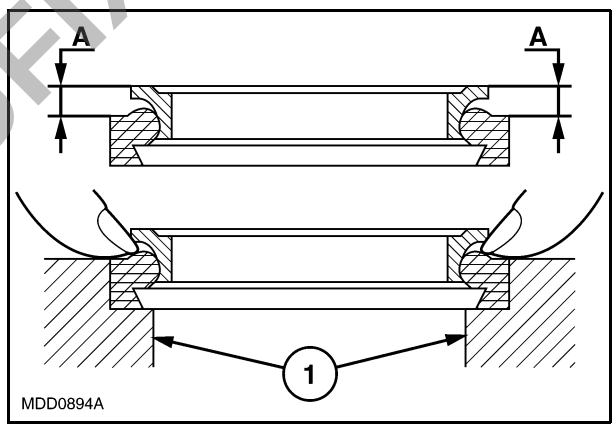
3. Insert each metal ring (2) on the respective rubber ring (1), as shown in the drawing, acting on the points indicated by the arrows.

4. Make sure that the metal ring is fitted correctly, checking that measurement (A) is constant on all of the circumference.

5. Assemble each pair of rings in their respective seats (1), manually positioning the rubber ring (as shown in figure

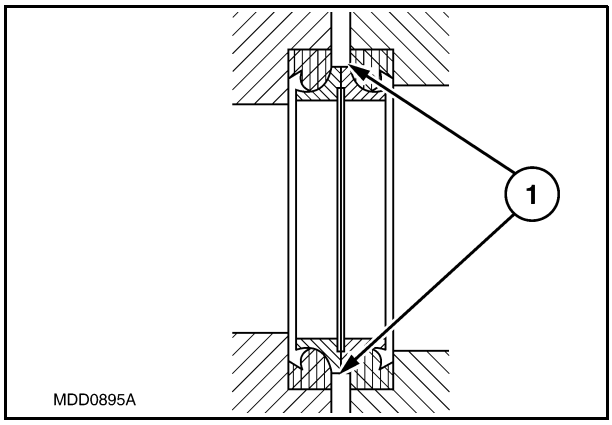



1




2

6. Before terminating assembly operations, clean the sealing surfaces (1) with a clean (not frayed) cloth and pour a thin covering of fluid oil over the surfaces.

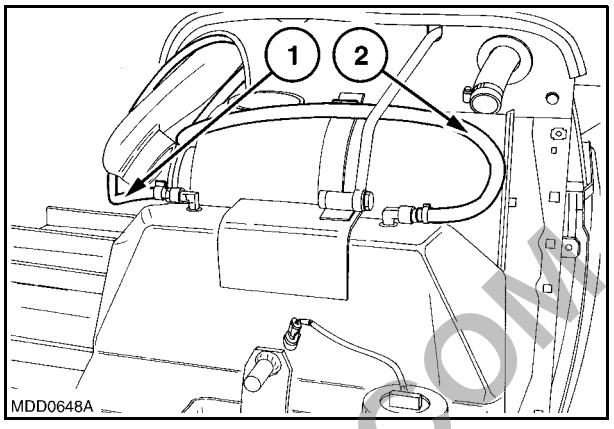



3

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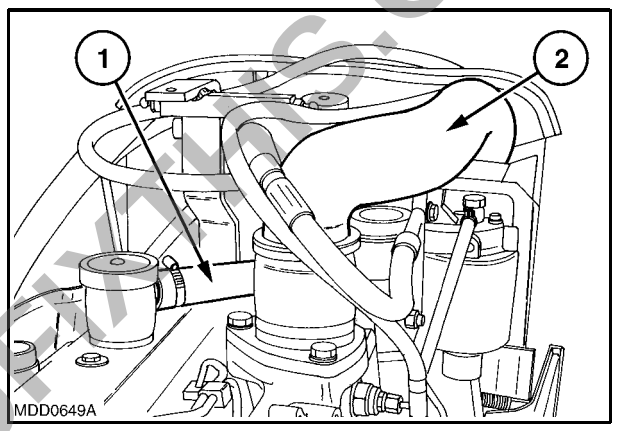
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10. Remove the piping (1) and (2) located on the upper part of the tank.



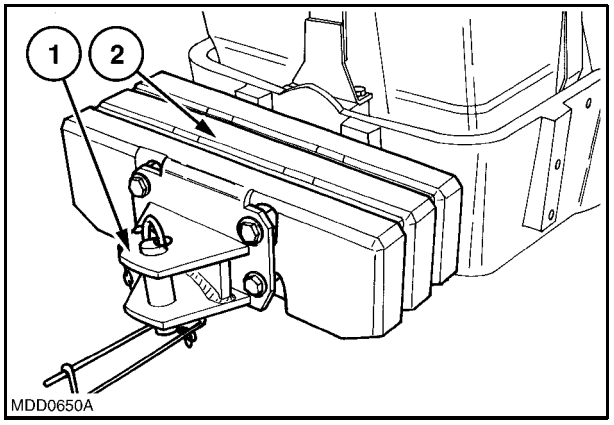

16

11. Detach the oil vapor breather pipes (1) and the turbocharger feed piping (2).



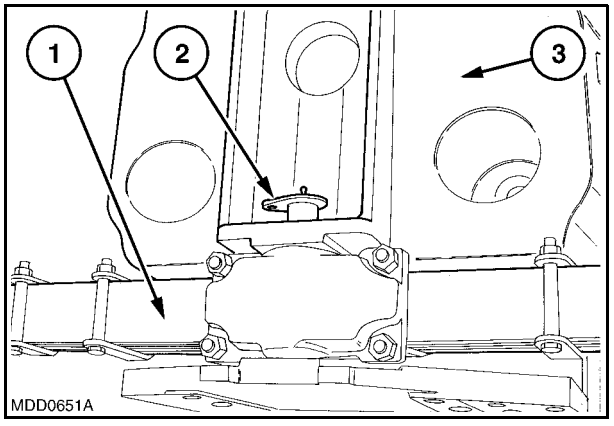

17

12. Remove the tow bar hook (1) and the front ballast (2).




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13. Hitch the front suspension (1) to a hoist, remove the suspension retaining pin (2) on the support (3) and remove the front suspension.
14. Hitch the front suspension support (3) to a hoist, remove the sump retaining bolts and remove the support.




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## CHECKS, DIMENSIONS AND REPAIRS - LUBRICATION SYSTEM

**CAUTION**

Handle all parts carefully.
Do not put your hands or fingers between parts.
Wear suitable safety clothing - safety goggles, gloves and shoes.

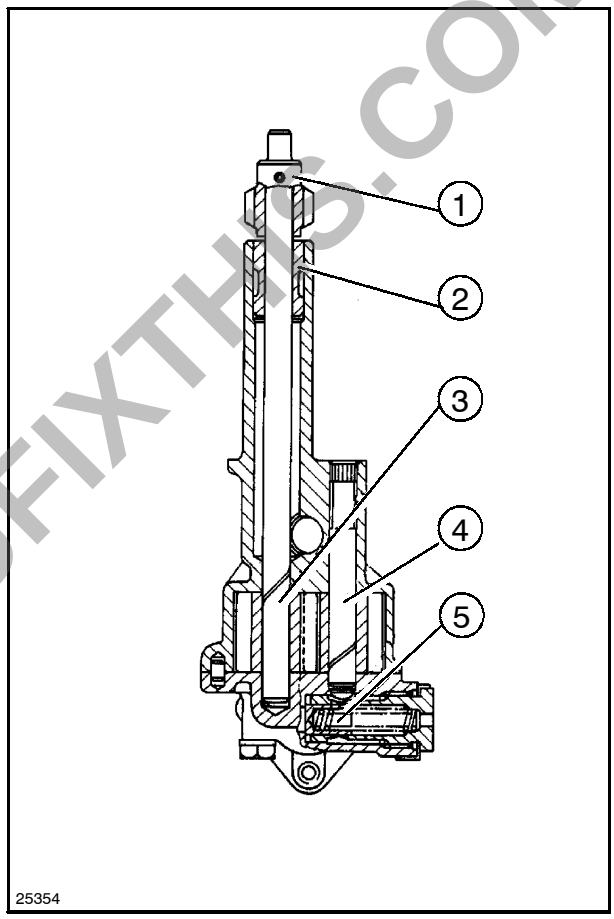
Clean all parts carefully before proceeding with the operations described below.

### OIL PUMP - Overhaul

To access the oil pump, remove the sump pan.

When servicing the pump, check component wear against the dimensions specified in the table on page 23.

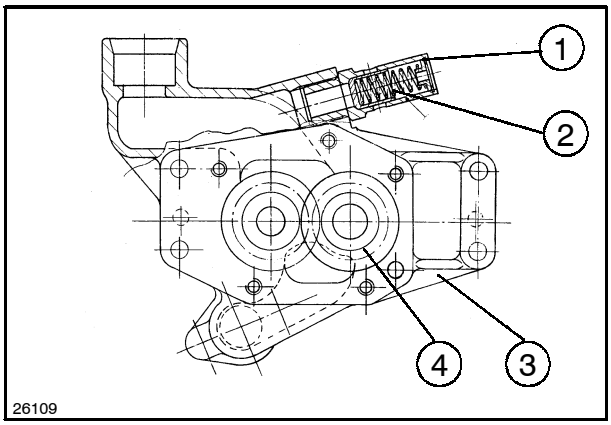
In case of replacement, note that the drive shaft (3) and drive gear are supplied ready assembled, with the gear hot force-filled on the shaft.




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**Cross-sectional view of engine lubricating oil pump - Models TK 65, TK 76 and TK 85.**

1. External drive gear.
2. Bush.
3. Drive shaft and gear.
4. Driven shaft and gear.
5. Pressure relief valve.




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**Cross-sectional view of engine lubricating oil pump - Models TK 75 and TK 95.**

1. Pressure relief valve.
2. Spring.
3. Pump body.
4. Internal gears.

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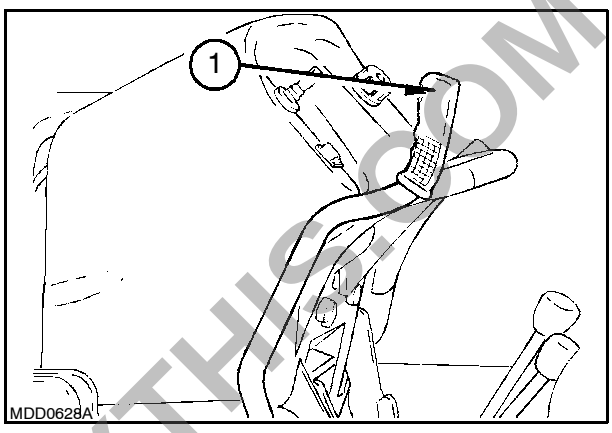
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**MAIN CLUTCH**
**Lever adjustment.**
**(Op. 18 100 40)**

**CAUTION**

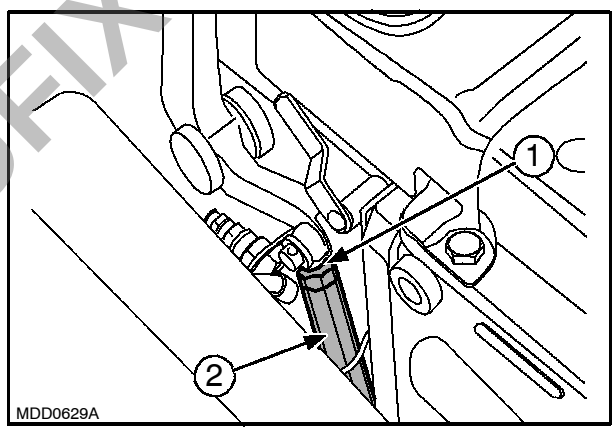
Always use appropriate tools to align fixing holes. NEVER USE YOUR FINGERS OR HANDS.

1. When the lever (1), interferes with the bonnet, or when adjusting the main clutch engagement, the play on lever (1) must be adjusted as follows:
2. Remove the LH lateral footboard, extract the lower part of the central rubber covering, to facilitate tie rod adjustment operations on the lever.




9

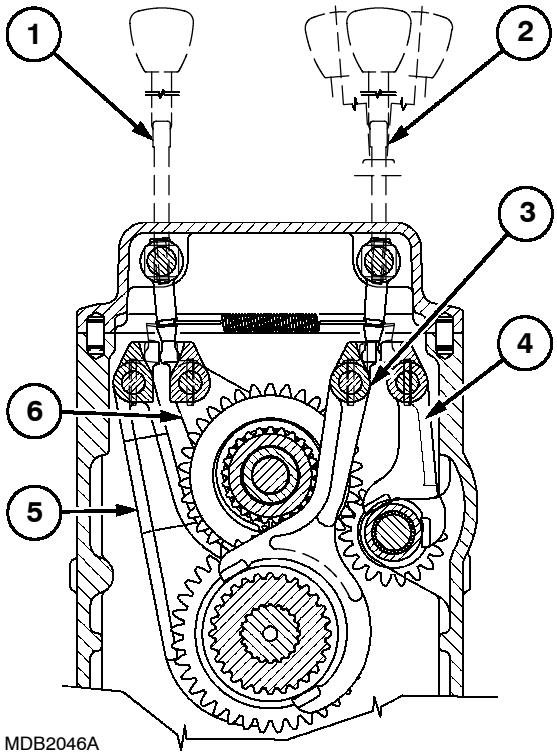
3. Loosen the locknut (1), tighten or loosen the tie rod (2) to position the lever nearer to, or farther away from, the driving position.
4. Check that the lever does not interfere with the bonnet when the clutch is engaged.
5. Tighten the locknut (1).
6. Refit the central rubber covering and the two lateral footboards.



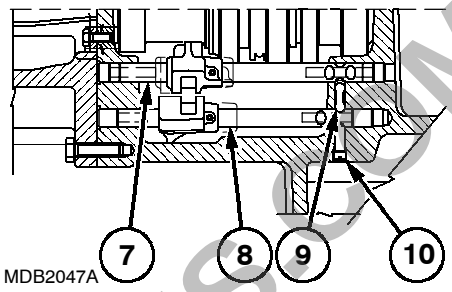

10

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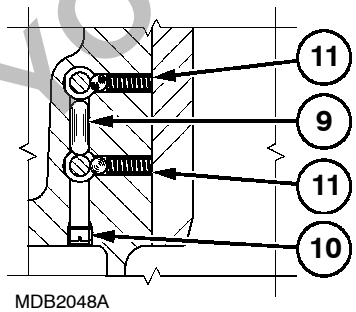
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MDB2046A




MDB2047A




MDB2048A

7

**Cross-sectional view of gearbox and creeper**

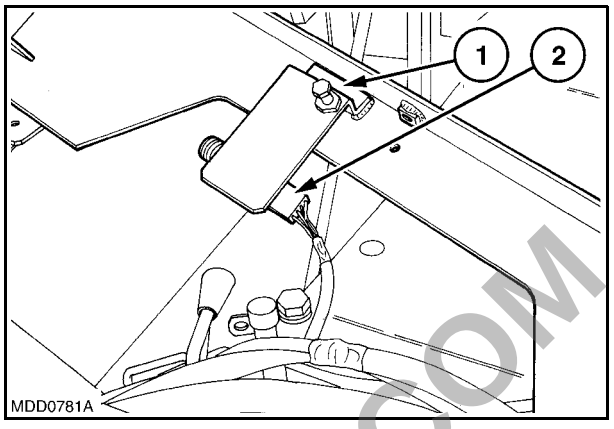
1. Main gear lever.
2. Creeper and reverse gear lever.
3. Fast and slow range fork.
4. Reverse gear fork.
5. 1st and 2nd engagement fork.
6. 3rd and 4th engagement fork.
7. Fast and slow range engagement rod.
8. Reverse gear engagement rod.
9. Safety pawl.
10. Plug.
11. Springs and relative poppet balls.

***NOTE:*** *For missing data see Chapter 1, page 7.*

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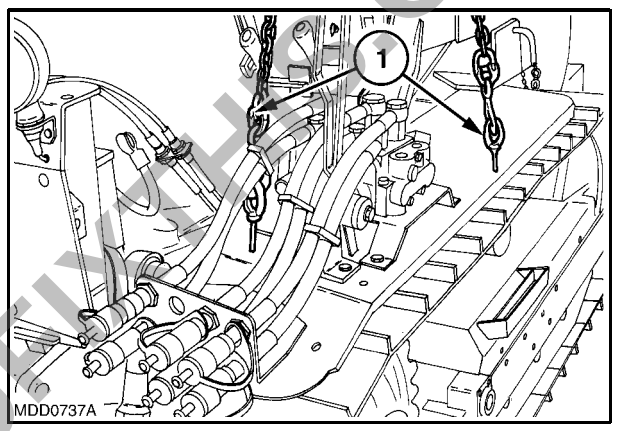
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28. Remove the crosspiece (1) and detach the PTO switch connection (2).



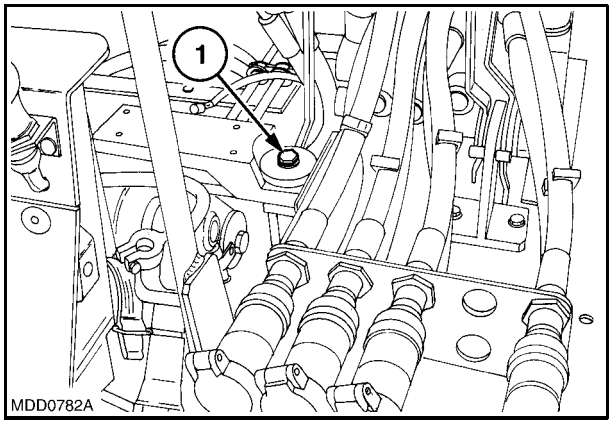

84

29. Attach the right-hand mudguard, using a chain (1), to the hoist.



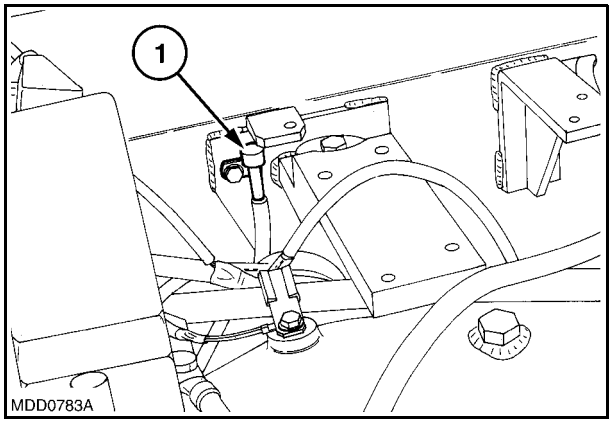

85

30. Unscrew the rear (1) and front retaining bolts, then detach the right-hand mudguard.




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31. Detach the breather pipe (1) on the left-hand final drive.

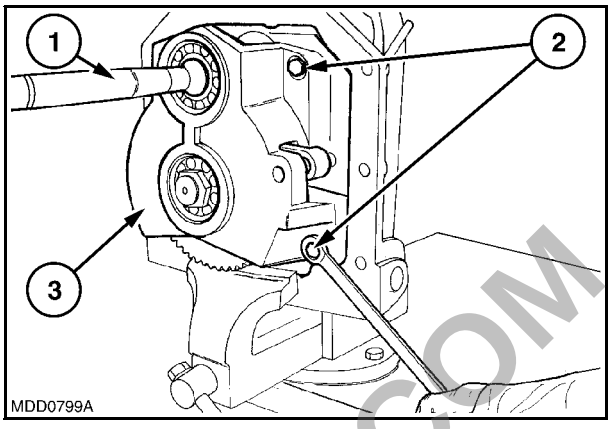



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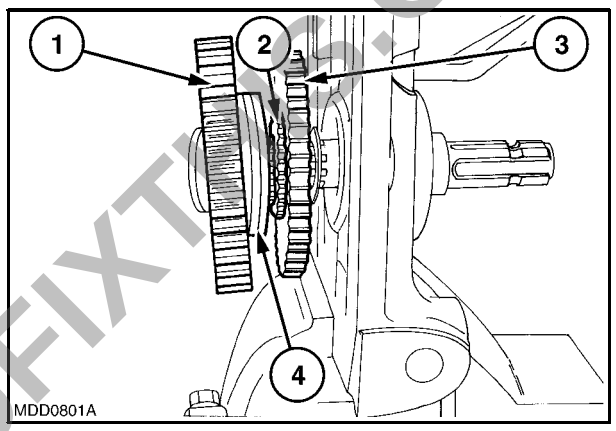
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4. Remove the bolts (2), and disassemble the front bearings support (3) together with the driving shaft (1).



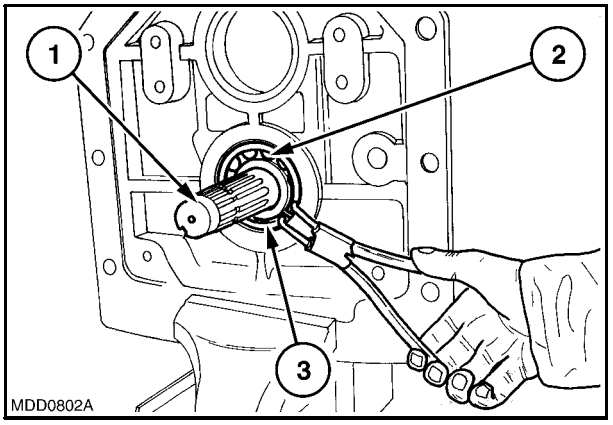

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5. Extract the 540 rpm driven gear (1), the sliding engagement sleeve (4), the fixed gear (2) and 540E or 1000 rpm speed gear (3).




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6. Extract the driven shaft (1), remove the circlip (3) and disassemble the bearing (2). Check for wear and replace if necessary.



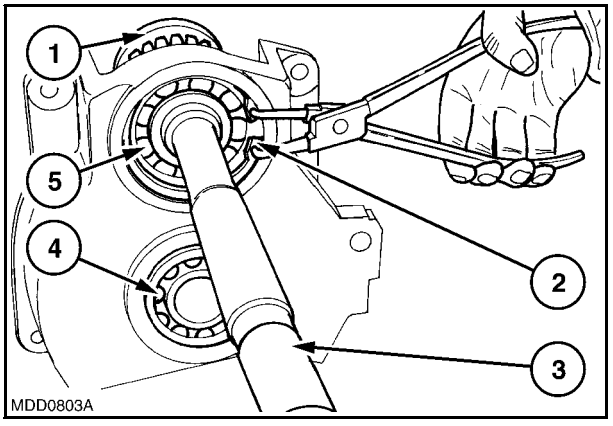

21

7. Remove the circlip (2), extract the driven shaft (3) together with the bearings (1 and 5).

8. Extract the bearing (4).

9. Check the bearings (1, 4 and 5) for wear and replace if necessary.

***NOTE:*** *Use an extractor to remove the bearings (1 and 5)*.



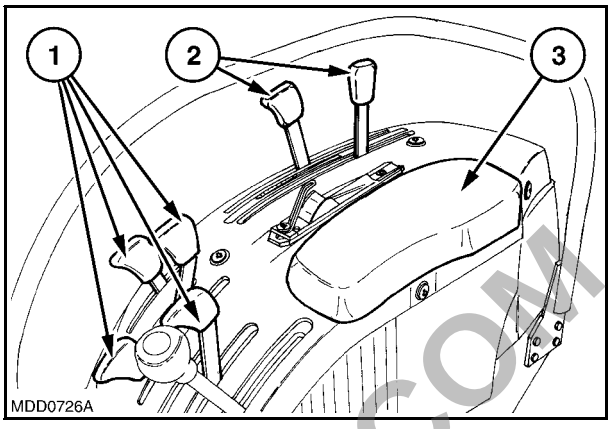

22

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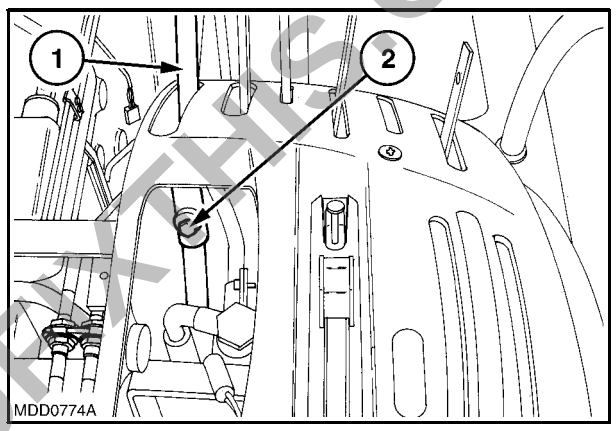
10. Unscrew the retaining bolt and remove the armrest (3).

11. Extract the plastic grips on the lift (2) and auxiliary control valve (1) levers.



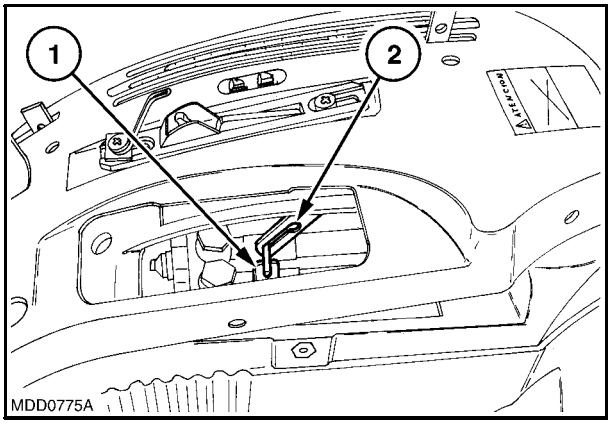

38

12. Unscrew the retaining bolt (2) and remove the shuttle lever (1).



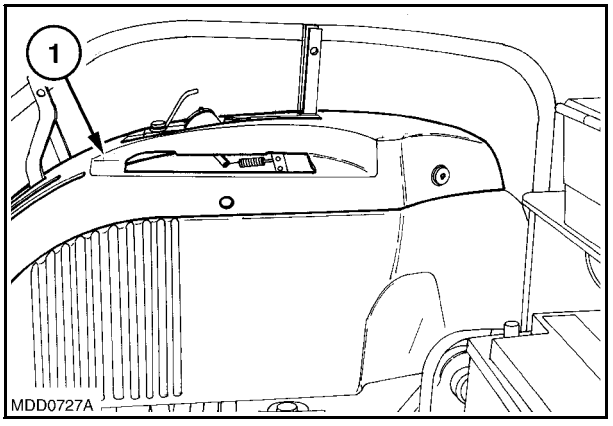

39

13. Release the (2) Lift - O - Matic device from the relative lever (1).




40

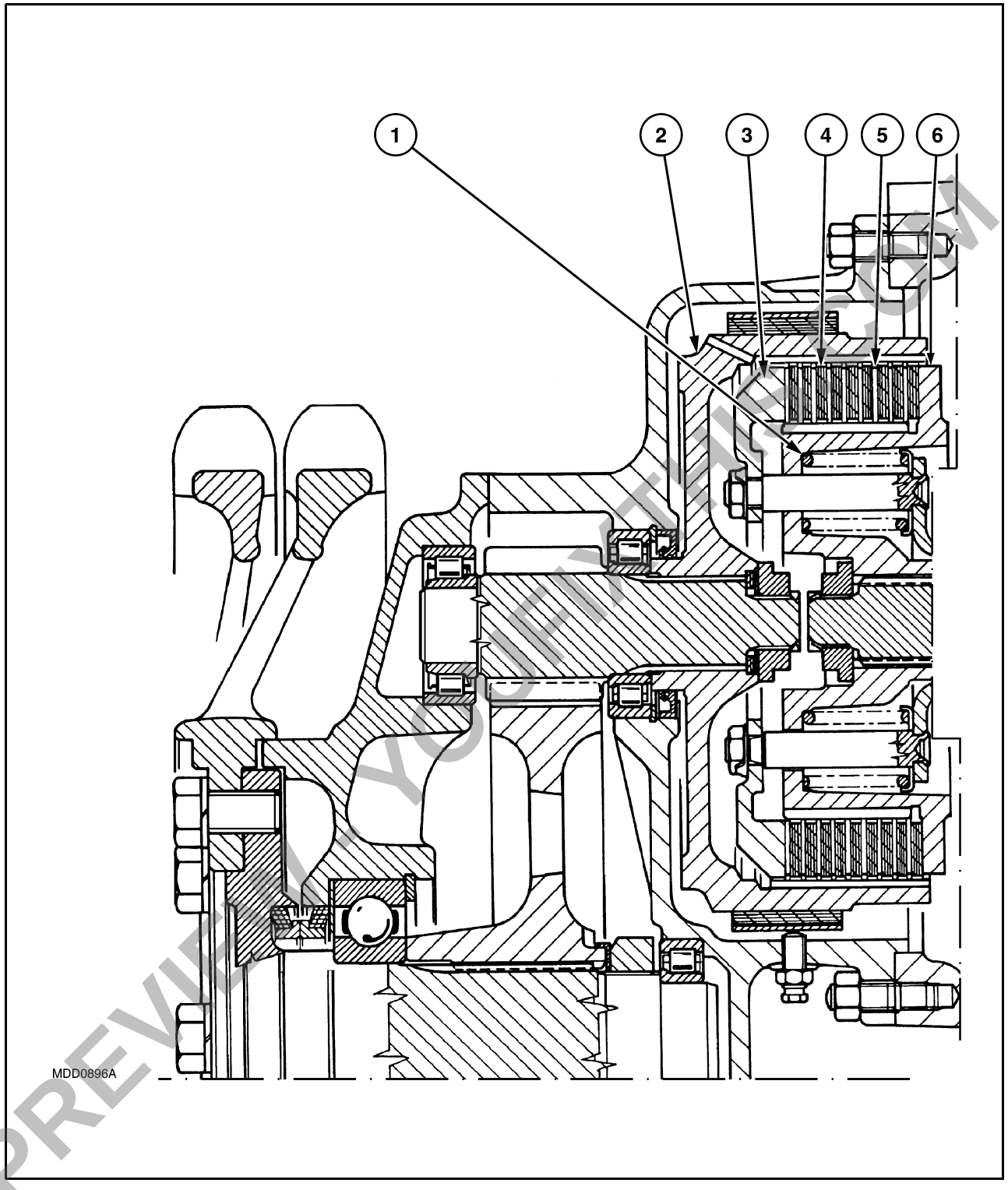
14. Unscrew the retaining bolts and remove the plastic cover (1).




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5

**Cross-sectional view of left-hand steering clutch (models TK 65 and TK 75V/F)**

1. Clutch engagement springs.
2. Clutch external drum and brake.
3. Disk pusher ring.
4. Driven disks.
5. Driving disks.
6. Clutch internal drum.

***NOTE:*** *On assembly apply a bead of sealing compound to the surfaces **X** as indicated on page 17.*

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## SHOES ON A CHAIN
## Removal-Refitting (Op. 48 100 30)

**DANGER**

Lift and handle all heavy parts using suitable lifting equipment.
Make sure that assemblies or parts are supported by means of suitable slings and hooks. Make sure that no one is standing in the vicinity of the load to be lifted.

Proceed as follows:

1. Remove the chains as described in operation **48 100 20**.

2. Remove the fixing bolts and the shoes.

3. To refit the shoes on the chains, proceed as follows:

**CAUTION**

Always use appropriate tools to align fixing holes. NEVER USE YOUR FINGERS OR HANDS.

4. **To correctly fit the shoes** it is extremely important to:

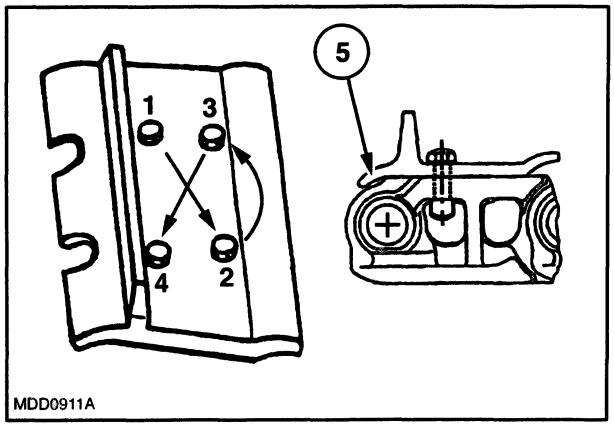
- Carefully clean the contact surfaces between shoes and links, removing all foreign matter (rust, dust, etc.).
- Position the shoes with the front part (5) as shown in fig. 22.
- Use new bolts, oil the threads, insert the bolts in the link holes and slightly tighten the nuts, checking that the rounded face of the nuts make contact with the seats on the links.
- Tighten the bolts with a torque wrench, following the procedure shown in fig. 22, using a uniform rotation force to avoid tightening peaks and deformities.
  Remember that:
  excessive bolt tightening could cause the threads to yield and the threaded parts to break
  for M10x1 bolts the tightening torque ($C_1$, fig. 4) is 83 ± 4 Nm (8.5 ± 0.4 kgm).
  for M12x1 bolts the tightening torque ($C_1$, fig. 4) is 145.7 ± 7 Nm (14.8 ± 0.7 kgm).

5. **To correctly fit the shoes on the Split joint links it** is extremely important to:

- Carefully clean the contact surfaces between shoes and links, removing all foreign matter (rust, dust, etc.).
- Carefully clean the contact surfaces on the two semi-links, removing all foreign matter (rust, dust, etc.).
- Carefully clean the threaded holes on the SPLIT links, removing all foreign matter (dust, etc.).
- Check that the bolts can be manually tightened on the threaded seats of the semi-SPLIT links.
- Position the shoes with the front part (5) as shown in fig. 22.
- Use new bolts, oil the threads (do not use grease which may accumulate in the blank holes, preventing correct tightening) insert the bolts in the holes on the semi-links.
- Tighten the bolts following the procedure shown in fig. 22, remembering that:
  for M12x1 bolts fitted on **Split joint links**, the tightening torque ($C_3$, fig. 4) is 133 ± 15 Nm (13.5 ± 1.5 kgm) kgm.
- To refit the chains, proceed as described in operation **48 100 20**.

6. **Checking the shoe tightening bolts with Split joint links**

- Remember to check the tightening torque of the bolts **after 50 hours of work**. If they are loose, tighten to the aforementioned torque values.



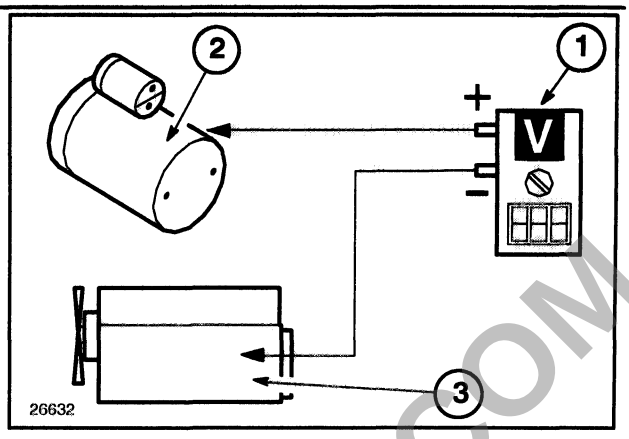

22

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**Starter motor ground connections**

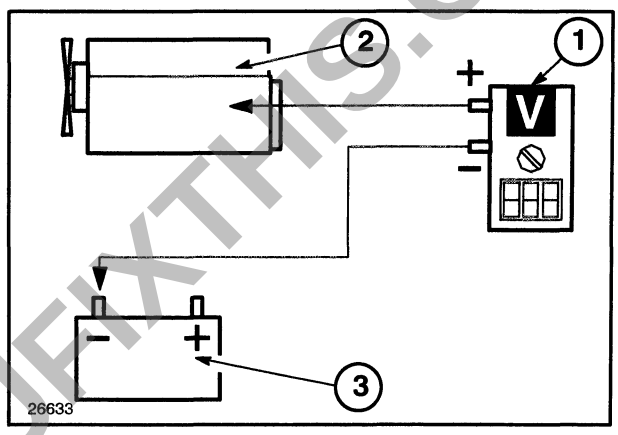
1. Connect the positive lead on the voltmeter (1) to the starter motor casing (2).
2. Connect the negative lead on the voltmeter to the engine block (3).
3. Run the engine and check the voltmeter readings. If the value exceeds 0.2 V, check the ground connections between the starter motor flange and the engine rear cover.




6

**Battery ground lead**

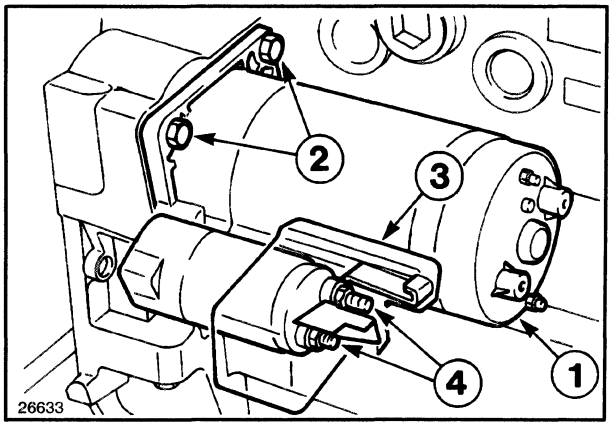
1. Connect the positive lead on the voltmeter (1) to the engine block (2).
2. Connect the negative lead on the voltmeter to the negative terminal on the battery (3).
3. Run the engine and check the voltmeter readings. If voltage exceeds 0.2 V, check and tighten the ground cable connections. Re-check the voltage and, if the value is still too high, replace the ground cable.




7

**Op. 55 201 50**
**STARTER MOTOR**
**Removal - Refitting**

1. Disconnect the battery negative lead.
2. Remove the plastic guard (3) on the terminals.
3. Unscrew the nut and remove the power and emergency switch terminal (4).
4. Extract the three retaining bolts (2) on the starter motor (1).
5. To reassemble the starter motor, carry out the removal operations in reverse.

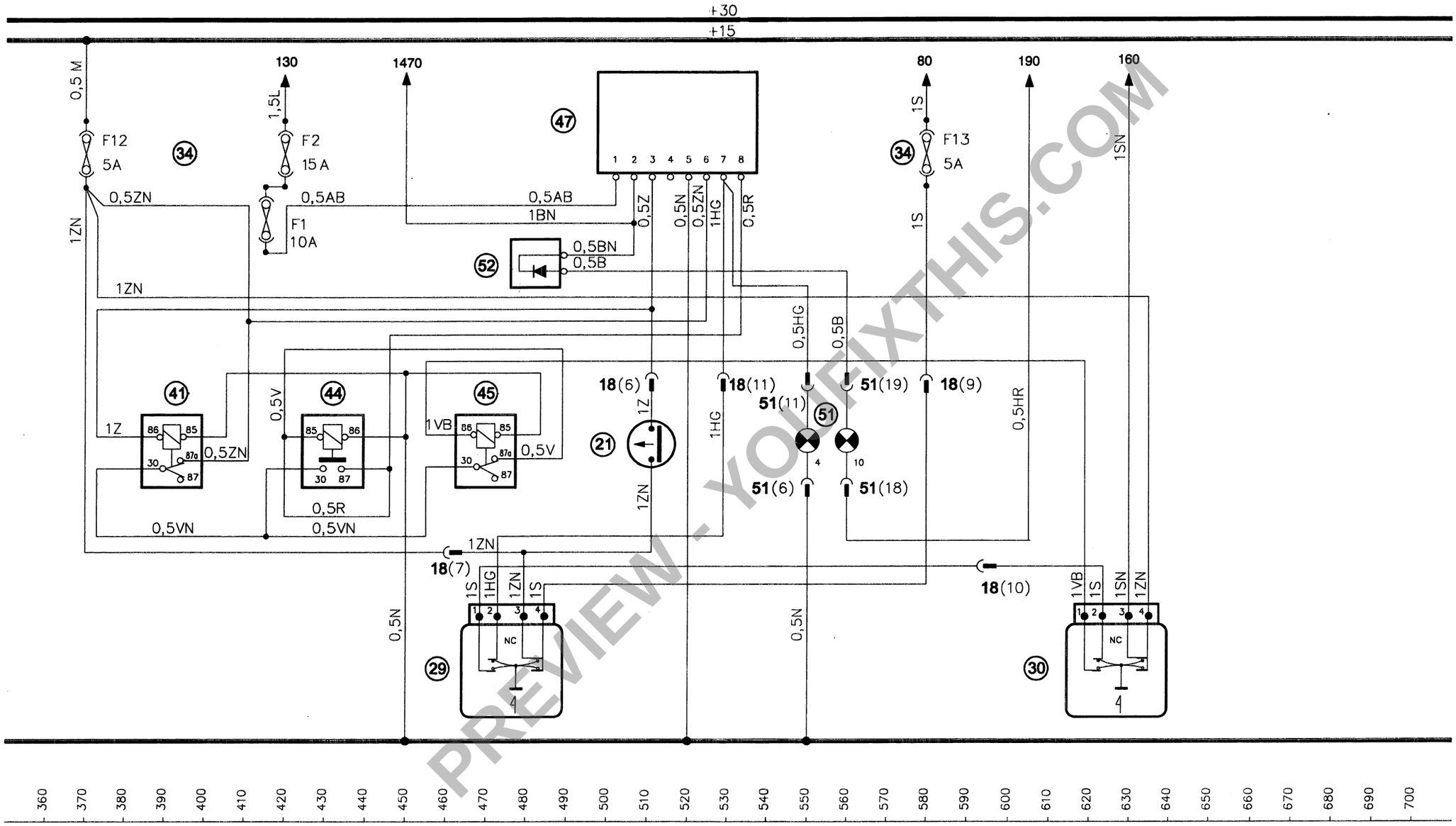



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**OPERATOR SAFETY CIRCUIT (Diagram B)**



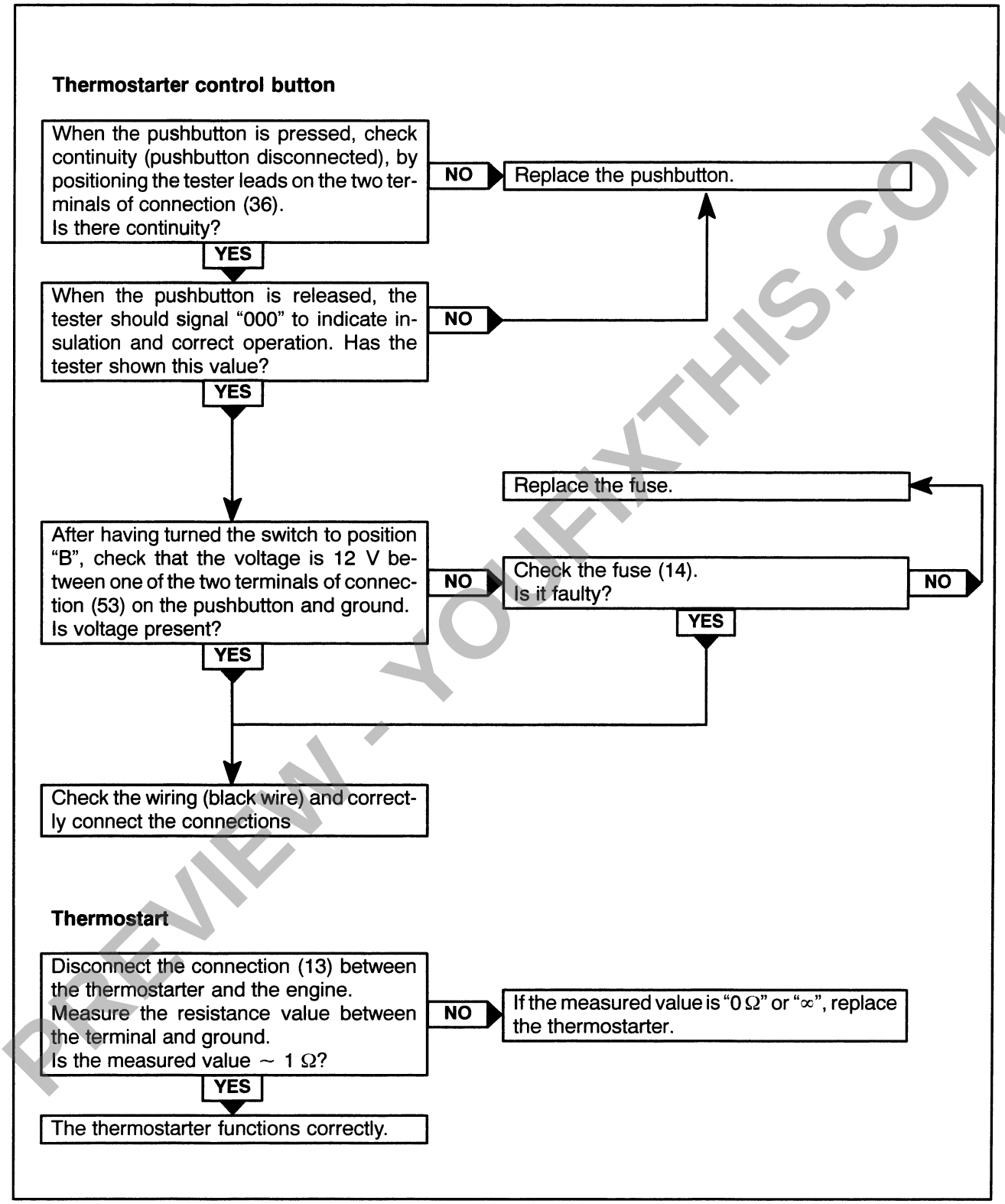

MSD0032A

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**THERMOSTARTER PUSHBUTTON (See: ELECTRICAL CIRCUITS - Diagram A)**

When the starter key (2) is turned to position "A" and the thermostarter pushbutton (1) is pressed, the engine does not start.




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